

# CITY OF VAUGHAN INTEGRATED URBAN WATER PLAN

FUNCTIONAL SERVICING STRATEGY REPORT Vaughan Metropolitan Centre (VMC)

Consolidated Final Report June 2024





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# STATEMENT OF QUALIFICATIONS AND LIMITATIONS

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VAU19-0018

Page ii

City of Vaughan 2141 Major Mackenzie Dr W Maple, ON L6A 1T1

#### Attention: Michael Frieri

# RE: City of Vaughan Integrated Urban Water Plan- Vaughan Metropolitan Centre(VMC) Consolidated FSSR Report

Civica Infrastructure Inc. is pleased to submit the following report. The Integrated Urban Water Plan is comprised of the main Environmental Assessment Report and a series of Functional Servicing Strategy Reports of which this is one. These reports focus on specific development areas and provide information to facilitate more comprehensive servicing planning direction for redevelopment projects in these designated community growth areas.

This report contains the following four volumes being Background Information (Vol. 1), Water Servicing (Vol. 2), Wastewater Servicing (Vol. 3), and Stormwater Servicing (Vol. 4).

Sincerely,

## CIVICA INFRASTRUCTURE INC.

Ilmar Simanovskis, P.Eng, MBA Project Manager



# CITY OF VAUGHAN INTEGRATED URBAN WATER PLAN

FUNCTIONAL SERVICING STRATEGY REPORT

# Vaughan Metropolitan Centre (VMC)

Volume 1 – Background Final Report June 2024





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# RE: City of Vaughan Integrated Urban Water Plan- Vaughan Metropolitan Centre FSSR Vol 1 Background Report

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This report provides servicing area background information and is part of a four-volume series that provides information on Background (Vol.1), Water Servicing (Vol. 2), Wastewater Servicing (Vol. 3), and Stormwater Servicing (Vol. 4).

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#### CIVICA INFRASTRUCTURE INC.

Ilmar Simanovskis, P.Eng, MBA Project Manager



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## **1.0** Introduction

### 1.1 Background

Volume I Background Report for the Vaughan Metropolitan Centre (VMC) Functional Servicing Strategy Report (FSSR) provides the background information of the study area. It characterizes the existing and proposed land uses and developments identified in the documentation review that included relevant information such as technical documents, studies, guidelines and Master Plans prepared by the municipality, conservation authority and private agencies.

## 1.2 Study Area

The Vaughan Metropolitan Centre (VMC) study area is comprised of mixed-use development and vacant lands centred on the Hwy 7 corridor and designated with the goal of becoming a mid-rise, mixed use, vibrant community that is transit oriented, and pedestrian friendly. The study area has the following characteristics:

#### 1.2.1 Secondary Planning Area

The VMC Plan is the secondary plan for the Vaughan Metropolitan Centre with the most recent version being the May 2021 consolidation that has been partially approved by the Ontario Municipal Board. The core area is approximately 190 ha. This document establishes the context, planning framework and policies that will guide development in this are for the next 25 years. The secondary plan identifies policies for green initiatives including naturalization of stormwater facilities, local hydrological system will be designed to minimize waste and run-off and maximize positive impacts on the natural environment, and Low Impact Development measures will be encouraged for all future developments.

#### 1.2.2 Expanded VMC Boundary Areas

Two additional areas have been identified that increase the area of the VMC secondary plan. The first is the North Expanded Area bounded by Portage Way and extending from the Western boundary limit to just East of Jane Street and consists of 31.34 ha. The second is the Southeast Expanded Area and it completes the southeast corner up to Creditstone Road and includes 56.12 ha.

#### 1.2.3 Major Transit Station Areas

The VMC study area include three priority transit areas which are:

- PMTSA 54-This is Commerce BRT Station which has a gross area of 71.40 ha and a density target of 350 people and jobs per ha.
- PMTAS 67- Vaughan Metropolitan Centre Subway Station which has a gross area of 110.76 ha and a density target of 400 people and jobs per ha.
- PMTSA 56- Creditstone BRT Station which has a gross area of 52.08 ha and a density target of 300 people and jobs per ha.

The areas designated for intensification will be analyzed for the capacity needs for water, wastewater, and stormwater infrastructure and is presented in **Error! Reference source not found..** 



## 1.3 Objective of Volume 1- Background Report

The objective of this Volume 1 background report is to provide the background planning and area information, and the assumptions used to develop the water, wastewater, and stormwater models. In this report the basic assumptions and parameters used under the existing conditions used in the Visual Otthymo (VO), InfoWater and InfoWorks models will be outlined. Also, population growth for the existing, 2028, 2036, 2041, and 2051 time horizon will be assessed in comparison to land use changes in the study area. Overall, this report will provide the background understanding of this area and how it will be applied to propose the future servicing conditions.





Figure 1-1: Study Area





## 2.0 Background Review

## 2.1 General Documents

The background review completed as part of this FSSR includes the review of the following documents:

- 2014 Provincial Policy Statement, Under the *Planning Act* (MMAH)
- A Place to Grow Growth Plan for the Greater Golden Horseshoe (Province of Ontario, 2019)
- Black Creek Stormwater Optimization Study Municipal Class Environmental Assessment Master Plan Report (Phases 1 & 2), (AECOM, 2012)
- City of Vaughan Design Criteria Water, Sanitary, Stormwater (City of Vaughan, 2018)
- City of Vaughan Official Plan (City of Vaughan, 2010)
- Green Directions Vaughan | 2019 Community Sustainability Plan (City of Vaughan, 2019)
- MOE Stormwater Management Practices Planning and Design Manual (Ministry of Environment, 2003)
- Stormwater Management Criteria (Toronto and Region Conservation Authority, 2012)
- Stormwater Management Report 2748355 Canada Inc. Buetel Goodman Real Estate Inc. The Interchange – Phase 1 (WHY 400/407), (GM Sernas and Associates, 1997)
- Stormwater Management Report -Edgeley Pond and Park (City of Vaughan, 2019)
- York Region Long Term Water Conservation Strategy (York Region, 2016)
- York Region One Water Action Plan (York Region, 2017)
- York Region Water and Wastewater Master Plan (York Region, 2016)
- Vaughan Metropolitan Centre Black Creek Renewal Class EA -Environmental Study Report (Municipal Infrastructure Group, 2018)
- Vaughan Metropolitan Centre Municipal Servicing Class Environmental Assessment Master Plan (City of Vaughan, 2012)

## 2.2 Site Specific Documents

The following background data for the VMC study area was also collected and reviewed as a part of this study:

- Existing and approved development applications since the 2012 VMC Municipal Servicing
- First Vaughan Development Limited VMC West, Functional Servicing Report (SCS Consulting Group, 2018)
- Functional Servicing Reports (FSRs), Architectural Plans, Plan and Profile Drawings, etc. for the development applications since 2012 (where available and required)
- Sanitary Storage Capacity Report (Schaeffers Consulting Engineering, 2019)
- Stormwater Management Report Edgeley Pond and Park Vaughan Metropolitan Centre (WSP, 2019)
- Stormwater Retention Guideline-Vaughan Metropolitan Centre Southeast Quadrant (City of Vaughan, 2020)
- Topographic Surveys
- VMC Utility Servicing Report Version 5 (City of Vaughan, 2017)
- VMC Secondary Plan (City of Vaughan, 2020 Office Consolidation)
- VMC SW Quadrant-SWM Strategy (Stantec, 2020)



## 2.3 VMC Infrastructure

The information on the existing VMC study area infrastructure was provided by the City in GIS format which was used to model the existing water, wastewater, and stormwater service system. The City has provided Civica with the City-Wide water and wastewater models in InfoWater and InfoWorks ICM. The model has undergone a rigorous quality assurance and quality control (QA/QC) process to ensure accuracy and to reflect the current conditions of all newly serviced developments since June 2018. The level of service of the existing infrastructure is documented in further detail in each of the corresponding water, wastewater, and stormwater FSSR reports.



# **3.0** Description of the Project Area

## 3.1 Planning Goals

The VMC study area planning, and development is governed by the Provincial Policy Statement (PPS), the Growth Plan for the Greater Golden Horseshoe (Places to Grow), the York Region Official Plan and the City of Vaughan Official Plan (2010). The growth plan anticipates an increase of 25,000 residents and 11,500 jobs. The VMC Secondary Plan is currently undergoing a review and update. At the request of the City, an area of 80 m<sup>2</sup> was assumed for the typical unit size, 2.5 persons per unit was assumed, and a trend ratio of 1.61 was used for calculating the future VMC study area population to accommodate the potential changes to the VMC Secondary Plan. Height and density assumptions were taken from the VMC Secondary Plan and servicing reports for existing development applications in the study area.

#### 3.2 Existing and Approved Development Applications Since 2012

The City tracks its active and archived planning documents online through their Vaughan Planit portal at <u>https://maps.vaughan.ca/planit/</u>. As planning information is constantly changing, viewing this data portal is recommended to gain understanding of the status of any planning documents related to this report.

Relevant information and status of various planning documents have been referenced and incorporating in the analysis and alternatives solution evaluations and where relevant have been identified in the various FSSR Reports.

### 3.3 Existing Land Use

Existing land use in the VMC study area combines mix-use classifications ranging from residential, commercial, and office land use. This existing land use mapping was used to determine population and runoff coefficient assumptions for each parcel within the study area. Land use mapping in the VMC study area is shown in Figure 3-1.





Figure 3-1 : Existing Land Use Mapping





## 3.4 Natural Environment

### 3.4.1 Fluvial Geomorphological Assessment

This fluvial geomorphological assessment was undertaken by GeoMorphix for this study and the full report is available as Appendix B of the Main Environmental Assessment Report. The following is a summary of the significant features and considerations for the Black Creek area of the Humber River Watershed of which this study area is located.

The VMC study area is located in the Black Creek sub-watershed which contributes to the Humber River watershed. The Black Creek sub-watershed has a tributary area of approximately 65km<sup>2</sup>. Overall, the Black Creek sub-watershed is considered degraded, with local flooding, poor water quality, and excessive instream erosion (AECOM, 2012). The Municipal Infrastructure Group (TMIG) prepared the Vaughan Metropolitan Centre Black Creek Renewal Class EA in 2018 to identify a range of alternative solutions to reduce flooding and flood damage, improve water quality, and limit stream bank erosion in Black Creek within the VMC NE quadrant. The VMC Black Creek renewal study area and the preferred Black Creek Realignment are presented in Figure 3-2, Figure 3-3, and Figure 3-4 respectively.

## 3.4.2 Groundwater Resource Characterization

The groundwater assessment was undertaken by Banks Groundwater Engineering Limited, and the technical memo is available as Appendix B of the Main Environmental Assessment Report. This following is a summary of significant features and considerations for this study area.

The groundwater characteristics considered for the report are based on regulatory requirements for drinking water source protection and impact mitigation to groundwater resources. These stem from the studies and assessment reports prepared through the Credit Valley, Toronto Region, Central Lake Ontario (CTC) Source Protection Committee. These assessments identify locations and the nature of potential threats to sources of municipal drinking water supplies.

Most of the City of Vaughan is within the CTC region which completed this areas Source Protection Plan in December 2015. This was after to last City of Vaughan (2010) Official Plan; however, requirements as defined thought local and regional planning approvals are required to consider the guidance of the Source Protection Plan.

Stormwater management and the discharge of stormwater are considered a significant threat to groundwater resources where they are within well head protection areas A, B, or E based on specific criteria outlined in the CTC reports. Further, Significant Groundwater Recharge Area and Well Head Protection Quantity Areas are also relevant to stormwater management where is it important to maintain pre-development recharge rates while minimizing the risk of threats to groundwater quality. These requirements are to be considered during development design and Infiltration Management Plans. Significant Groundwater Recharge areas encompass over half of the City wide area.

Highly vulnerable Aquifers are also identified within the CTC reports and are areas where the relative amount of protection provided by the overlaying geological materials decreases. These areas are scored on a number of factors including the type, thickness, composition and characteristics of the overlaying material. Higher risk is associated with areas where surface water has a higher potential to infiltrate to the aquifer and thereby impact water quality.



This study area is not within a Significant Groundwater Recharge Area and therefore not subject to the Source Protection Plan policies. The study area is not within an area that has Highly Vulnerable Aquifers. The study area is not within the Wellhead Protection area Q1/Q2.

An LID study was conducted for the VMC study by EOR to develop a stormwater retention guideline. In this report LID options were considered and assessed to determine whether or not it is feasible to be implemented. In some parts within the VMC area there are shallow ground water levels which would make it not suitable for LID options.

## 3.4.3 Natural Heritage Characterization

Natural Heritage Characterization was completed by Natural Resource Solutions Inc. and the report is available as Appendix B of the Main Environmental Assessment Report. This characterization includes features of aquatic, Terrestrial and wildlife conditions and environments.

The Vegetation Communities mapping from the main report does not identify any significant vegetation communities in this study area.

The Aquatic Resources mapping from the main report does identify the Black Creek watercourse near Hwy 7 as a cool water fish community with the location near the southern boundary of the study area as a cool/warm thermal regime.

Secondary Plan Areas constraints were identified mainly as wooded areas along the Black Creek watercourse.





Figure 3-2: Black Creek Sub-Watershed









Figure 3-3: VMC Black Creek Renewal EA Study Area







## Figure 3-4: Proposed Black Creek Realignment



# **4.0 Future Conditions**

The VMC study area has been identified as a Major Transit Area and seeks to meet an overall density target of 300 to 400 people and jobs per hectare by the year 2041 as previously noted in the MTSA areas. The anticipated redevelopment of land and population growth will increase the capacity required for existing infrastructure in the study area. The following section discusses the population growth, proposed land use changes and developmental constraints.

## 4.1 Proposed Land Use and Population

Population forecasting for the study period was based on existing population data for the base year 2019 and forecast growth projections for the years 2028, 2036, 2041 and 2051. Populations were derived from various sources and planned growth area designation and are detailed in Appendix D of the main report. The following assumptions were used to assess population impacts for infrastructure planning purposes.

- Existing development applications are assumed to be occupied by 2028.
- All areas with no development application assumed linear population growth Error! Reference source not found.

#### Table 4-1 Population Growth Where Not Otherwise Defined

Year	2019	2028	2036	2041	2051
Percentage Growth Towards Ultimate Populations	0%	41%	77%	100%	100%

For the VMC FSSR area, the population forecast aggregated from all sources is summarized in **Error! Reference source not found.** The proposed land uses are presented in Figure 4-1and the various population distributions are presented in Figure 4-2**Error! Reference source not found.**, Figure 4-3, Figure 4-4, and Figure 4-5.

#### Table 4-2 VMC FSSR Population Forecast

Year	2019	2028	2036	2041	2051
VMC FSSR Planning Area Population Forecast	12,620	111,043	172,798	194,886	194,886





Figure 4-1: VMC Proposed Land Use







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Figure 4-2: Existing Population (2019)



Figure 4-3: Population 2028







Figure 4-4: Population 2036







Figure 4-5: Population 2041





# CITY OF VAUGHAN INTEGRATED URBAN WATER PLAN

FUNCTIONAL SERVICING STRATEGY REPORT

# Vaughan Metropolitan Centre

Volume 2 – Water Servicing Final Report June 2024







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Ilmar Simanovskis, P.Eng, MBA Project Manager

FP&P HydraTek Inc.

Fabian Papa, M.A.Sc., M.B.A., P.Eng. Water Lead



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# **1.0 Water Servicing**

## 1.1 Investigation Methodology

The methodology undertaken in this section includes the following:

- Application of the City's calibrated InfoWater operational model (2019) to reflect projected water demands and assess performance.
- Investigate the potential deficiencies in the existing water servicing infrastructure (e.g., low pressure, low available fire flow, etc.), as well as impacts on system-wide performance.
- Propose solutions to resolve deficiencies.

It is also noted that due to the large projected population identified for this study area, the infrastructure upgrades required to service growth therefore are expected to be significant. Accordingly, a sensitivity analysis is also considered herein which adopts more moderate water design criteria.

## 1.2 Water Servicing Design Criteria

The City's 2020 water design criteria are applied for this work are summarized below in **Table 1**.

Operating Condition	Unit	Value	Pressure Requirement
Average Day Demand (ADD)	Lpcd	300	-
Maximum Day Demand + Fire Flow (MDD + Fire)	Peak Factor	1.8	Minimum 140 kPa
Peak Hour Demand (PHD)	Peak Factor	3.0	Minimum 275 kPa

#### Table 1: Water System Design Criteria

**Table 2** provides required fire flow rates by the City of Vaughan for various land use types. The study area consists of land uses that include low- to high-rise residential, mixed use, and commercial/office use. Therefore, required fire flow rates of **317 L/s** and **417 L/s** are used as assessment criteria for this FSSR.

#### Table 2: Required Fire Flow Rates

Land Use	Fire Flow Requirement	
Single Family & Semi-Detached	7,000 L/min or 117 L/s	
Townhouses	9,000 L/min or 150 L/s	
Institutional	15,000 L/min or 250 L/s	
Industrial/Commercial	25,000 L/min or 417 L/s	
Multi-Unit Apartment Buildings	19,000 L/min or 317 L/s	



## 1.3 Existing Water Servicing

The Vaughan Metropolitan Centre & Steeles West study areas are situated in Pressure District 6 (PD6), and the principal supply thereto is provided by a reservoir and pumping station at Keele Street and Steeles Avenue West which transmits water to the South Maple Reservoir at Keele Street and Teston Road. Water supply to the study area is generally described as follows:

- Via 900 mm and 750 mm diameter Region of York transmission mains along Keele Street and Highway 7, respectively, providing supply from the east.
- Via a 400 mm diameter City of Vaughan watermain along Highway 7 from Keele Street to Creditstone Road, providing supply from the east.
- Via 400 mm and 300 mm diameter City of Vaughan watermains along Steeles Avenue West from Keele Street to Jane Street and Jane Street therefrom to Doughton Road, respectively, providing supply from the south.
- Connectivity to watermains north of the study area via a 600 mm City-owned watermain on Jane Street, a 500 mm City-owned watermain on Millway Avenue and 300 mm City-owned watermains on Buttermill Avenue, Edgeley Boulevard and Applewood Crescent.

Figure 1-1 shows a map of existing water servicing infrastructure relevant to the Study Area.

An assessment of the performance of the existing watermain infrastructure was undertaken under existing as well as potential future demand conditions, hereinafter referred to as Scenarios A1 to D1 (see **Table 3**). These results are presented graphically as cumulative distribution plots in **Figure 1-2** (MDD + Fire) and **Figure 1-3** (PHD).

Scenario ID	Population	Water Demand <sup>1</sup>	Water Servicing Infrastructure
A1	Existing Population	Calibration	Existing Infrastructure
B1	Future (2028) Population	Calibration + City's Criteria	Existing Infrastructure
C1	Future (2036) Population	Calibration + City's Criteria	Existing Infrastructure
D1	Future (2041) Population	Calibration + City's Criteria	Existing Infrastructure

Table 3: Modelling Scenarios with Existing Infrastructure

<sup>&</sup>lt;sup>1</sup> Demands for existing population are based on the City's (2019) calibrated hydraulic model and is denoted as "calibration", whereas the "City's Criteria" (as per Table 1) are applied to future populations.





Figure 1-1: Existing Water Servicing Infrastructure Map





Figure 1-2: Available Fire Flow Distributions, Maximum Day Demand, Existing Infrastructure



Figure 1-3: Pressure Distributions, PHD Conditions, Existing Infrastructure



The cumulative distribution plots suggest the following:

- Fire Flow Capacity: Approximately 10% of the model nodes do not meet the minimum available fire flow criterion for multi-unit apartment buildings of 317 L/s under existing demand conditions. This amount increases to 13% under 2041 demand conditions. While the increases in system demand are shown to exacerbate the fire supply, the effect is relatively minor at model nodes with already low available fire flows. The fire flow capacity exhibits greater decreases mostly at locations where there is already a considerable amount of available fire flow and where some lesser capacity can be tolerated whilst maintaining compliance with City criteria.
- **Operating Pressures:** Existing PHD operating pressures in the study area are relatively high, exceeding 550 kPa (80 psi) at all locations. This is expected to drop considerably under future demand conditions, resulting in approximately 29% of the model nodes not meeting the minimum 275 kPa (40 psi) pressure criterion under 2041 demand conditions (with current infrastructure). Further, the results indicate a wide range of service pressures throughout the study area under 2036 demand projections and beyond, suggesting the presence of a bottleneck in the distribution network. The expected range in diurnal operating pressures is expected to be rather wide.

It is worth noting that at this point in the analysis, the objective is not to address the acceptability of the modelling results (existing or future) relative to design criteria. Rather, it is to evaluate the impact of the projected water demands on the system's performance, as well as to identify possible capacity constraints such that future upgrades can be properly informed. As such, justifying and/or making recommendations with respect to the failure of 10% of the model nodes to meet the minimum available fire flow criterion of 317 L/s under existing conditions is not relevant to this analysis.

**Figure 1-4** and **Figure 1-5** show maps of available fire flow during maximum day demand under existing and future (2041) demand conditions (respectively) based on the existing water servicing infrastructure. Areas with low available fire flows are primarily located around small diameter watermains in the southeast quadrant. For instance, the existing watermains in the vicinity of Maplecrete Road and Freshway Drive are 150 mm in diameter. As previously noted, the distribution and magnitude of available fire flows does not change significantly between existing and 2041 demand conditions, suggesting that the observed capacity deficiencies are primarily the result of undersized watermains and lack of interconnectivity as opposed to regular system demands.

**Figure 1-6** and **Figure 1-7** show maps of water pressure during peak hour demand under existing and future (2041) demand conditions (respectively) based on the existing water servicing infrastructure. Under existing demand conditions, model nodes in the southern quadrants exhibit higher pressures due to having lower ground elevations. Conversely, under future demand conditions, the service pressures in the southern quadrants are substantially lower. This is due to a lack of conveyance capacity from the south via the 400 mm and 300 mm watermains on Steeles Avenue West and Jane Street (respectively), coupled with limited interconnectivity between the northern and southern quadrants. This capacity limitation is not manifested under the existing conditions, wherein the smaller system demands do not invoke enough head losses for it to become apparent. This is evidenced in the fact that the existing condition HGLs range from approximately 268 m to 272 m, whereas the 2041 condition HGLs range approximately from 221 m to 258 m.




Figure 1-4: Available Fire Flows, Existing MDD + FF Conditions, Existing Water Servicing



Figure 1-5: Available Fire Flows, Future (2041) MDD + FF Conditions, Existing Water Servicing





Figure 1-6: Pressures, Existing PHD Conditions, Existing Water Servicing



Figure 1-7: Pressures, Future (2041) PHD Conditions, Existing Water Servicing



# 1.4 Proposed Water Servicing

This section summarizes the proposed system upgrades, including latest recommended upgrade phasing timelines from 2028 through 2041. It is noted that the proposed upgrades do not have to be phased exactly in accordance with the timelines presented herein, but generally not any later. For instance, proposed watermain upgrades will most likely be implemented in conjunction with active developments whose frontages they belong to. The recommendations also include provisional watermain replacements that are not strictly necessary from a hydraulic perspective, although would be beneficial for purposes of completing an envisioned skeletal supply system consisting of 400 mm diameter watermains. Accordingly, these provisional watermain replacements may be implemented in conjunction with other major road or other infrastructure improvements occurring in the same area. A summary of the proposed upgrades is provided in **Table 4**, with detailed cost estimations provided in the recommendations section of this report.

It is noted that the previous Municipal Servicing Class Environmental Assessment (EA) for VMC, completed in 2012, provides a proposed water servicing infrastructure solution up to a 2051 build-out. This proposed solution has been considered in the development of the recommendations presented in this FSSR, but has ultimately been expanded upon due to the previous EA study using a 2051 population projection that is less than four times smaller than the 2041 population projection utilized in this FSSR.

A map showing the ultimate (2041) proposed servicing infrastructure, including both existing and proposed watermains, is provided in **Figure 1-8**. It is noted that project ID #1 is characteristic of "region-scale" infrastructure given that its principal function is to transmit water to the VMC area to supplement the anticipated supply deficit. Although such a function is generally in keeping with the role of York Region in the supply of water, whether this infrastructure falls within the domain of York Region or the City is not known as at the time of writing and is expected to be subject to consideration by both parties.

ID	Description	Diameter (mm)	Length (m)	Cost	Phase	EA Schedule
1	Steeles Avenue West and Jane Street	600	4,200	\$58,700,000	2036	Exempt/B (TBD)
2	Commerce Street, Highway 7 crossing	400	80	\$1,300,000	2028	Exempt
3	Peelar Road	400	310	\$1,700,000	2028	Exempt
4	Creditstone Road	300	710	\$3,200,000	2028	Exempt
5	Peelar Road	300	270	\$1,200,000	2028	В
6	Various streets	400	2,250	\$12,700,000	2041	Exempt/B
7	Various streets	300	4,670	\$21,200,000	2041	Exempt
8	Provisional watermain replacements	400	1,820	\$11,300,000	n/a	Exempt/B
Tota	al			\$111.300,000		

#### Table 4: Proposed Infrastructure Upgrades

City of Vaughan Integrated Urban Water Plan Vaughan Metropolitan Centre FSSR Volume 2 – Water Servicing June 2024





Figure 1-8: Ultimate (2041) Water Servicing Strategy



An assessment of the performance of the proposed watermain infrastructure was undertaken for all potential future demand conditions, hereinafter referred to as Scenarios B2 to D2 (see **Table 5**). These results are presented graphically as cumulative distribution plots in **Figure 1-9** (MDD + Fire) and **Figure 1-10** (PHD) in comparison with the previously discussed existing infrastructure results.

Scenario ID	Population	Water Demand <sup>2</sup>	Water Servicing Infrastructure
A1	Existing Population	Calibration	Existing Infrastructure
B1	Future (2028) Population	Calibration + City's Criteria	Existing Infrastructure
C1	Future (2036) Population	Calibration + City's Criteria	Existing Infrastructure
D1	Future (2041) Population	Calibration + City's Criteria	Existing Infrastructure
B2	Future (2028) Population	Calibration + City's Criteria	Proposed (2028) Infrastructure
C2	Future (2036) Population	Calibration + City's Criteria	Proposed (2036) Infrastructure
D2	Future (2041) Population	Calibration + City's Criteria	Proposed (2041) Infrastructure

#### Table 5: Existing and Future Condition Modelling Scenarios



Figure 1-9: Available Fire Flow Distributions, MDD Conditions, Existing & Proposed Water Servicing

<sup>&</sup>lt;sup>2</sup> Demands for existing population are based on the City's (2019) calibrated hydraulic model and is denoted as "calibration", whereas the "City's Criteria" (as per Table 1) are applied to future populations.





Figure 1-10: Pressure Distributions, PHD Conditions, Existing & Proposed Water Servicing

The cumulative distribution results suggest the following:

- Fire Flow Capacity: There is a modest improvement in model nodes previously noted to experience low available fire flows under the 2028 and 2036 upgrade phases, with larger improvement being exhibited after the 2041 upgrades. This is because, as previously noted, their low fire flow capacity is the result of locally undersized watermains which do not greatly impact the overall system performance and have thus not been identified as necessary for earlier phases. It is assumed that any developments occurring in these areas prior to 2041 will be accompanied by watermain upgrades along their frontages, thereby increasing their fire flow capacity, effectively improving these results.
- **Operating Pressures:** Although the PHD pressures are appreciably lower than the existing condition (approximately 110 kPa or 16 psi lower), they are comfortably above the minimum 275 kPa criterion. Further, the expected range in system pressures is considerably tighter than the modelled future demand scenarios based on existing infrastructure (Scenarios B1 to D1), and somewhat tighter than the existing condition (Scenario A1). This suggests that the overall pressures in the study area are caused by overall supply capacity limitations as opposed to the watermains internal to VMC. Improvements to increase the study area pressures to levels similar to the existing condition must factor in system-wide performance and are thus better considered in the City's the master planning process.

**Figure 1-11** shows a map of available fire flow during maximum day demand under future (2041) demand conditions based on the proposed water servicing infrastructure. All model nodes appear to have sufficient fire flow capacity, with the exception of the dead-end of the existing 300 mm watermain on



Killaloe Road, where the existing land uses are commercial and/or industrial and the available fire flow is less than 417 L/s. The modelled available fire flow at this location under future conditions is 397 L/s which is expected to be sufficient for future developments, noting that their designs are expected to be reasonably flexible to address this condition in terms of construction materials and fire suppression systems. Further, the available fire flow at this location is not materially different compared to the present-day condition, where it is equal to 392 L/s.

**Figure 1-12** shows a map of water pressure during peak hour demand under future (2041) demand conditions based on the proposed water servicing infrastructure. The increase in supply from the south via the Steeles Avenue West and Jane Street upgrades (A1 to A3) in combination to the added conveyance capacity between the northern and southern quadrants appears to resolve the previously noted disparity in service pressures throughout the study area. The HGL delivered throughout the area ranges from approximately 256 m to 261 m, or a 5 m wide band. This is a significant improvement from the 37 m wide band that was observed under 2041 demand conditions based on the existing infrastructure, further reinforcing the notion that there is adequate capacity internal to the study area, and that any limitations on service pressures are the result of overall supply.



Figure 1-11: Available Fire Flows, Future (2041) MDD + FF Conditions, Proposed Water Servicing





Figure 1-12: Pressures, Future (2041) PHD Conditions, Proposed Water Servicing

# 1.5 Sensitivity Analysis

For this sensitivity analysis, a unit consumption rate of 200 Lpcd was used based on a review of historical consumption data for the City of Vaughan. Peaking factors from the MECP's Design Guidelines for Drinking Water Systems of 1.50 and 2.25 for MDD and PHD were used, respectively (based on a population greater than 150,000). The same minimum pressure assessment criteria as outlined in Section 1.2 are used. The parameters applied in the sensitivity analysis are summarized in **Table 6**.

Operating Condition	Unit	Value	Pressure Requirement
Average Day Demand (ADD)	Lpcd	200	-
Maximum Day Demand + Fire Flow (MDD + Fire)	Peak Factor	1.50	Minimum 140 kPa
Peak Hour Demand (PHD)	Peak Factor	2.25	Minimum 275 kPa

#### Table 6: Water System Design Criteria for Sensitivity Analysis

In addition to testing the performance of the system under these alternative scenarios with the proposed infrastructure identified above, an alternative solution with less intensive upgrade requirements was developed (**Figure 1-13**). The only differences in the alternative solution are with respect to the "region-scale" upgrade projects (ID #1), wherein only an extension of the existing 300 mm watermain on Jane Street between Highway 7 and Doughton Road is carried. All other recommended upgrades and phasing requirements are unchanged in the alternative solution.





Figure 1-13: Ultimate (2041) Alternative Proposed Water Servicing Infrastructure Map



Sensitivity analysis results are presented herein with respect to 2041 build-out scenarios. Interim (2028 and 2036) build-out conditions have been considered in the analysis but are not shown for the sake of brevity, noting that no additional insights are afforded as a result of showing those interim condition results. **Figure 1-14** and **Figure 1-15** provide cumulative distribution plots of available fire flow during MDD conditions and operating pressure during PHD conditions (respectively) for the following scenarios:

Scenario ID	Population	Water Demand	Water Servicing Infrastructure
A1	Existing Population	Calibration	Existing
D1	Future (2041) Population	Calibration + City's Criteria	Existing
D2	Future (2041) Population	Calibration + City's Criteria	Proposed
E2	Future (2041) Population	Calibration + Reduced Criteria	Proposed
<b>E3</b>	Future (2041) Population	Calibration + Reduced Criteria	Alternative Proposed

## Table 7: Modelling Scenarios for Sensitivity Analysis



Figure 1-14: Available Fire Flows, MDD Conditions, All Scenarios





Figure 1-15: Pressures, PHD Conditions, All Scenarios

Based on these results, the following observations are made:

- Both the original and alternative proposed infrastructure upgrades appear sufficient in supplying fire flow, with no material change in capacity for model nodes with low available fire flows. Where there is surplus in the fire flow capacity relative to the City's requirements, the larger variations in capacity can be tolerated, whilst satisfying City criteria.
- The distribution of PHD pressures throughout the study area (i.e., the slope of the CDF curve) does not appear to change significantly between modelling scenarios, but are translated horizontally. This again indicates that conveyance capacity internal to the study area is not the primary servicing constraint, but rather overall supply to the area causing the HGL to drop uniformly.
- The alternative proposed infrastructure upgrades can sufficiently support the proposed developments whilst maintaining operating pressures above 275 kPa (40 psi). The performance degradation is more modest under the originally proposed upgrades for the same conditions.
- With the reduced demand criteria and the proposed infrastructure upgrades, operating pressures under PHD conditions more closely resemble current conditions. There is a modest degradation in performance with the alternative proposed upgrades (i.e., avoidance of major project to supply water along Steeles Avenue West from Keele Street and north on Jane Street to Doughton Road).



# 1.6 System-Wide Impacts

This section discusses the expected impact on operating pressures in the broader PD6 zone caused by the projected 2041 demands. This has been illustrated graphically by plotting the difference between the PHD pressures at all PD6 model nodes between existing conditions and various future (2041) conditions, summarized in **Table 8** below.

Figure	Population	Water Demand	Water Servicing Infrastructure
Figure 16	Future (2041) Population	Calibration + City's Criteria	Existing
Figure 17	Future (2041) Population	Calibration + Reduced Criteria	Existing
Figure 18	Future (2041) Population	Calibration + City's Criteria	Proposed
Figure 19	Future (2041) Population	Calibration + Reduced Criteria	Alt. Proposed

### Table 8: Graphical Plots of System-Wide Pressure Impacts

Based on these results, the following observations are made:

- The projected (2041) study area demands without the expanded boundary and calculated with the City's design criteria (**Figure 1-16**) are expected to have the greatest impact on operating pressures to areas south of the existing 400 mm watermain on Langstaff Road (under existing infrastructure), wherein the decrease in PHD pressures is predicted to be on the order of 125 kPa (18 psi) or greater. Operating pressures northerly therefrom up to Rutherford Road are predicted to decrease by at least approximately 35 kPa (5 psi). The impact is notable but less significant for areas southwest of the intersection of Rutherford Road and Highway 400, and relatively modest for all other areas in PD6.
- In calculating the projected (2041) VMC demands using the reduced design criteria (Figure 1-17), the predicted impact on PD6 pressures is significantly diminished. The reduced design criteria are intended to represent a more realistic depiction of future demands and are likely more appropriate when considering performance on a system-wide scale. It is worth noting that the application of the reduced design criteria also affects the modelled demands outside of the VMC study area via reduction in the PHD peaking factor.
- The proposed infrastructure upgrades are expected to mitigate the impact of the projected (2041) demands (**Figure 1-18**) by providing increased supply from the south and connectivity to areas north of the study area.
- The alternative proposed infrastructure upgrades are expected to result in modest impacts when considered with the reduced design criteria (**Figure 1-19**). The decrease in PHD pressures is predicted to be no greater than 70 kPa (10 psi) at any location in PD6.





Figure 1-16: Impact of 2041 Demands on PD6 Pressures; based on City Design Criteria and with Existing Infrastructure





Figure 1-17: Impact of 2041 Demands on PD6 Pressures; based on Reduced Design Criteria and with Existing Infrastructure





Figure 1-18: Impact of 2041 Demands on PD6 Pressures; based on City Design Criteria and with Proposed Infrastructure





Figure 1-19: Impact of 2041 Demands on PHD Pressures; based on Reduced Design Criteria and with Alternative Proposed Infrastructure



## 1.7 Recommendations

Based on the assessment conducted and reported herein, the following recommendations are made:

- That the City plan for the full extent of the proposed infrastructure identified herein, for which the total estimated cost is equal to \$111.30 million (including various contingencies). A detailed breakdown of the project cost estimates is provided below in **Figure 1-20**.
- That the City, perhaps in conjunction with York Region, more closely examine the design criteria to be applied for the projects categorized as "region-scale" (ID #1).
- That the City monitor system behaviour in the VMC area over time to quantify any performance degradation associated with increase demands as the area develops.
- That the City apply the results of the design criteria examination and system monitoring exercises noted above in a form of Real Options Analysis to determine whether the "region-scale" projects can be deferred or avoided.
- That the City assess matters related to the "region-scale" projects on a regular basis (e.g., annually) using the then best available information.

It is important to note that the projects identified and anticipated timing requirements are based on the assumptions of the temporal and spatial distribution of populations applied for this work. Any material deviation from these assumptions, or development proposals that may alter the upgrades required and/or the timing therefore, may require re-assessment, as appropriate.



# **CITY OF VAUGHAN INTEGRATED URBAN WATER MASTER PLAN (2023)**

#### **Project Cost Estimate**

FSSR Area 06 - Vaughan Metropolitan Centre



ltem	PID	Description	Qty	Unit	Rate	Amount	NOTES 8	& ASSUMPTIONS
A		Construction					1.	Watermain installation condition legend:
1	1	600Ø watermain (U)	2100	m	\$4,400	\$9,240,000		(R) - Rural/Greenfield Open Cut
2	1	600Ø watermain (T)	2100	m	\$11,000	\$23,100,000		(U) - Urban/Redevelopment Open Cut (T) - Trenchless
3	2	400Ø watermain (T)	80	m	\$8,700	\$696,000		
4	3	400Ø watermain (U)	310	m	\$3,100	\$961,000	2.	Assumed that 50% of Jane Street and S
5	4	300Ø watermain (U)	710	m	\$2,500	\$1,775,000		watermains to be installed using trenchle
6	5	300Ø watermain (U)	270	m	\$2,500	\$675,000	3.	Project Item ID (PID) column represents
7	6	400Ø watermain (U)	2250	m	\$3,100	\$6,975,000		seen in the project image.
8	7	300Ø watermain (U)	4670	m	\$2,500	\$11,675,000		
9	8	400Ø watermain (U)	1820	m	\$3,100	\$5,642,000		
10 11		Connect to existing	6	ea	\$100,000	\$600,000		
		Sub-Total Construction:				\$61,339,000		
12		Contingency			10.00%	\$6,133,900		
		Total Construction:				\$67,472,900		
в		Design & Administration						
1		Engineering (Design, Supervisio	on, Administration	)	24.00%	\$16,193,496		
2		Treasury Administration			3.00%	\$2,024,187		
3		Dense Urban Area Factor			5.00%	\$3,373,645		
		Total Design & Administration	1:			\$21,591,328		
с		Land Acquisition	0.000	ha	\$0	\$0		
		Sub-Total Project:				\$89,064,228		
D		Class D Estimate Contingenc	у		25.00%	\$22,266,057		
		PROJECT TOTAL:				\$111,340,000		

#### n/Redevelopment Open Cut hless hat 50% of Jane Street and Steeles Avenue West ns to be installed using trenchless methods. m ID (PID) column represents the corresponding PID as project im age.

Figure 1-20: Vaughan Metropolitan Centre Project 1 Cost Estimates



# CITY OF VAUGHAN INTEGRATED URBAN WATER PLAN

FUNCTIONAL SERVICING STRATEGY REPORT

# Vaughan Metropolitan Center (VMC)

Volume 3 – Sanitary Sewer Report Final Report June 2024





# STATEMENT OF QUALIFICATIONS AND LIMITATIONS

The attached Report (the "Report") has been prepared by Civica Infrastructure Inc. (the "Consultant") at the request of, and for the exclusive use of the City of Vaughan (the "Client") in accordance with the terms of agreement between the Consultant and the Client, including the scope of work detailed therein (the "Agreement").

Please note that the information, data, analysis, recommendations, and conclusions contained in the Report was prepared for the specific purposes described in the Report and the Agreement and may be based upon information which has not been independently verified by the Consultant. The Consultant shall be entitled to rely upon the accuracy and completeness of information that was provided to the Consultant, and has no obligation to update such information. The material in this report reflects the Consultant's best professional judgement in the light of the information available to it at the time of preparation and publication.

The Consultant agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement. The Consultant makes no other representations, any guarantees or warranties whatsoever, whether expressed or implied, with respect to the Report or any part thereof.

The Report is to be treated as confidential and may not be used or relied upon by third parties, except as agreed in writing by the Consultant and the Client. Neither possession of the Report, nor a copy of it, carries the right of publication. The Report shall not be disclosed, produced or reproduced, in whole or in part, neither published in any manner, without the written consent of the Consultant and the Client.

The Consultant expressly excludes liability to any party except the Client for either any use of or reliance upon the Report.

This Statement of Qualifications and Limitations is attached to and forms part of the Report and any usage of the Report is subject to the terms therein.

#### Disclaimer

The data used for this analysis has been obtained from City of Vaughan sources with the understanding that these are provided without warranties. This data is included in the hydraulic model. The information has been reviewed to ensure consistency with general sanitary system modeling principles used in the City of Vaughan. Unless noted in this memo, specific water system geometric characteristics and operating conditions have not been verified in the field or by cross-referencing with As-Built drawings or other sources that may be available from the City of Vaughan.

June 2024

VAU19-0018

City of Vaughan 2141 Major Mackenzie Dr W Maple, ON L6A 1T1

**Attention: Michael Frieri** 

# RE: City of Vaughan Integrated Urban Water Plan- Vaughan Metropolitan Centre (VMC) FSSR Vol 3 Sanitary Report

Civica Infrastructure Inc. is pleased to submit the following report. The Integrated Urban Water Plan is comprised of the main Environmental Assessment Report and a series of Functional Servicing Strategy Reports of which this is one. These reports focus on specific development areas and provide information to facilitate more comprehensive servicing planning direction for redevelopment projects in these designated community growth areas.

This report provides servicing area background information and is part of a four-volume series that provides information on Background Information (Vol. 1), Water Servicing (Vol. 2), Wastewater Servicing (Vol. 3), and Stormwater Servicing (Vol. 4).

Sincerely,

CIVICA INFRASTRUCTURE INC.

Ilmar Simanovskis, P.Eng, MBA Project Manager

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Appendix A Cost Estimate Details Appendix B Hydraulic Model Output



# **1.0 Introduction**

#### 1.1 Background

This Report evaluates and identifies the wastewater infrastructure required to support the growth in the planning area for the ultimate population time horizon (2041 and beyond).

#### 1.1.1 VMC Sanitary Drainage Area

The sanitary capacity analysis was completed for the existing condition, the interim conditions (2028 and 2036) and the ultimate condition (2041 and beyond). Sanitary system deficiencies at each horizon year are identified and solutions are proposed based on the ultimate build-out condition. The phasing and cost of the proposed solutions are discussed, and a sensitivity analysis was conducted to evaluate the effect of climate change and boundary expansion. The study area is presented in Figure 1-1. This study area includes the VMC Secondary Plan, expanded area and the Major Transit Station Area (MTSA).





Figure 1-1: VMC Sanitary Drainage Area



# 2.0 Sanitary Servicing Design Criteria

#### 2.1 Sanitary Flows

The sanitary sewer system conveys flow from the following sources:

- Domestic Sewage (Residential and ICI);
- Base flow (Ground Water Infiltration, GWI); and,
- Rainfall-Derived Inflow and Infiltration (RDII).

The first two sources of flow generation are considered as dry-weather flow (DWF). The third source is the extraneous flow known as RDII or I/I. Extraneous flows are undesirable as they increase the load on the sanitary sewer and reduce the capacity on treatment facilities. Figure 2-1 illustrate a typical sanitary flow hydrograph under WWF conditions.



Figure 2-1: Sanitary Flow Components

Table 2-1 summarizes the design criteria for existing and future conditions. The existing condition model was provided by the City and is representative of conditions based on the status of the area for 2020 flow conditions.

Modelling parameters are established based on the following conditions:

- Per capita Dry Weather Flow (DWF) and Inflow and Infiltration (I/I) design rates are used to characterize the flow from future development subcatchments, as per the City's design criteria.
- The I/I rate is calculated based on the area design flow of each subcatchment and assigned as baseflow.



- The wastewater generation rates for future subcatchments are based on a peak flow using the Harmon Peaking Factor which is then assigned based on the total future population in the sewershed.
- Existing developments subcatchments that are not anticipated to be redeveloped are assigned DWF generation rates and peaking factors based on measured flows and I/I rates calculated by the model using available flow monitoring data.

Development Condition	Per Capita DWF Generation Rates	Peaking Factor	Peak I/I Rate
Existing (At the time of flow monitoring, i.e., 2020)	Measured Flow Monitoring Results	Measured	Predicted by model (estimated using flow monitoring data)
Approved and Future Developments	370 L/c/d	Harmon Peaking Factor*	0.26 L/s/ha

#### Table 2-1 : Existing and Future Sanitary Flow Criteria

\* Minimum K = 2; Maximum K = 4.

# 2.2 Rainfall-Derived Inflow and Infiltration (I/I)

Rainfall-Derived Inflow and Infiltration (I/I) represents any extraneous source of water entering the sanitary system as a result of a storm event. I/I is calculated separately in the model. Since I/I varies between subcatchments primarily due to cross-connections, sewer infrastructure condition, soil conditions, and topography, this value was calibrated using the RTK unit hydrograph method. The RTK method generates a hydrograph based on precipitation data and catchment area. The total I/I into the sanitary sewer system is determined by combining triangular unit hydrographs from three components of flow:

- Rapid inflow (short-term response);
- Moderate infiltration (medium-term response); and,
- Slow infiltration (long-term response).

The following three (3) parameters describe the shape and volume of runoff that enters the sanitary sewer (See Figure 2-2):

- "R" is the fraction of precipitation that becomes direct inflow;
- "T" is the time to peak of the hydrograph; and,
- "K" is the ratio of the recession time to time to peak.

"R" can be equated to the area under the unit hydrograph curve and represents I/I volume per unit area as a fraction of precipitation.





Figure 2-2: RTK hydrograph components

# 2.3 Design Storm

The calibrated model simulates the operating condition of the sewer under the City's 5-year and 25-year design storms. The design storms are three-hour storms with a time-to-peak ratio of 0.33 (Chicago-type storm) over 7-min intervals. The peak intensities for the 25-year and 5-year storms are 200 and 137 mm-/hr, respectively. Figure 2-3 and Figure 2-4 below are the hyetographs of the 5-year and 25-year storms used in this analysis, respectively.

In the model, the peak intensity of the design storms is aligned at 12:00 p.m. to match the (approximate) peak-measured DWF for existing conditions and the theoretical-peak DWF for future scenarios. This approach predicts the worst-case scenario in which the peak DWF and peak I/I occur at the same time.

I/I for the 5-year and 25-year design storms is predicted by the model based on the RTK method explained in the previous section.





Figure 2-3: 1 in 5-year Storm Hyetograph (Intensity)



Figure 2-4: 1 in 25-year Storm Hyetograph (Intensity)



# **3.0** Sanitary Sewer Capacity Analysis Methodology

## 3.1 Population

The existing population is obtained from the Operational model. The various scenario population forecasts are discussed in Volume I of this FSSR and detailed in Technical Memorandum 18 - Planning: Population and Sewer Infrastructure.

Existing condition (2019) and four planning horizons were considered in the study: interim growth scenarios 2028, 2036, and ultimate growth 2041 and beyond. To phase the servicing plans, an interim condition population was assumed as follows:

• Existing considered development applications are assumed to be occupied by 2028.

All areas with no development application assumed linear population growth.

## 3.2 Level of Service

Acceptable level of service in this study is defined as the following:

• Free flow under the 25-Year Design Storm (no surcharge); i.e., the maximum flow depth is below the obvert of the pipe, no surcharge of the pipe; and

80% full pipe capacity under the 5-Year Design Storm (no surcharge); i.e. the ratio of water depth to pipe diameter (h/H) is less than 80%.

## 3.3 City of Vaughan Engineering Design Criteria Versus IUWMP EA Criteria

The City of Vaughan's Engineering Design Criteria and Standard Drawings (EDCSD) provide the criteria for model conditions. Although the intent of the design standards is to ensure design flow are not surcharging within the network, there is no specific criteria as stated above. The above level of service criteria have been provided and reviewed by the City as an acceptable approach to assessing network impacts for future conditions and are applied in this EA study and are recommended to be included in the future City's EDCSD updates. Detailed design and hydraulic modelling for engineering and approval purposes are to continue to follow that most current city design criteria as updates are issued.

#### 3.4 Boundary Conditions

The boundary condition for the sanitary system is the discharge point into the York Durham Sanitary Sewer The peak flow elevation at the inlet point to the YDSS during a 25- year design storm is the boundary condition used in the model.

## 3.5 Capacity Analysis Scenarios

The calibrated model is used to analyze available residual capacities within outlet sewers to accommodate future developments. Five development scenarios are analyzed under the City's design storms to assess the performance of the sanitary sewer system in the study area. These scenarios are detailed below.



#### 3.5.1 Scenario 1: Existing

This scenario represents the existing condition based on 2019 population data and as adjusted based on calibration to 2021 flow monitoring data. The sanitary generation rates, I/I rates, and DWF patterns for the existing developments are calculated based on flow monitoring data.

#### 3.5.2 Scenario 2 (2028) and Scenario 3 (2036) Interim Conditions

To analyze the effect of phased development within the study area, population is estimated for two interim year conditions: being 2028 and year 2036. For 2028, all current active and approved development applications to 2021 are included in the population forecast. Sanitary connection points of the developments application used in this analysis are shown in Figure 3-1. Where no development applications are occurring, the population in those areas was increased to match the overall community growth forecast.

Population is assigned to the new subcatchment areas where greenfield development area planned, and population in existing areas was increased based on growth projections and target population information.

## 3.5.3 Scenario 4 (2041) Ultimate Future Condition

This scenario represents the condition where the study area ultimate population is reached (year 2041). The additional population growth was then distributed across the study area as appropriately as possible based on known growth plans and future building of lands in the study area.

#### 3.5.4 Scenario 5: Population Sensitivity Analysis

This scenario represents the condition where the future population in the VMC expanded boundary and Major Transit Station Area (MTSA) will increase to approximately 74,000 persons and jobs, while the ultimate population in the secondary plan boundary stays the same as the 2041 scenario. The population of areas inside secondary plan boundary is calculated as described before in this report and in Volume I of the FSSR. The population of the blocks inside the expanded boundary and MTSA area is calculated assuming floor space index (FSI) of 3, the average area of 80m<sup>2</sup> for each unit, and density of 2.5 persons per unit. The calculated population was then adjusted based on City's instruction to consider current planning goals. Figure 3-2 presents the developments which are used in the population sensitivity analysis.

#### 3.5.5 Scenario 6: Climate change Sensitivity Analysis

This scenario represents the impact of climate change on the network related to storm intensification and increased I/I that could result from the effects of more intense storms.

The methodology considers two conditions, where there is existing development with flow monitoring results and where RDII can be calculated, the RTK unit hydrograph method is used based on a climate change modified 25-year design storm. To consider climate change, the 25-year design storm is increased by 15 percent.

Where there is the requirement for new sewers and areas of undeveloped land as an example, the infiltration allowance of 0.26 l/ha/d has been increased by 15 percent to 0.30 l/ha/d to allow for the



impact of higher intensity storms that would increase the amount of surface water and potential infiltration.

These two methodologies were then applied to the 25-year storm event for the ultimate population scenario to assess the impact of climate change on the proposed solutions.





Figure 3-1: Sanitary Connections of Existing Development Applications

	Sanitary Sewers
	Sanitary Conection Point
	Application/Committed/ Recently Occupied Development
	Existing (population from the model)
	Future
·	Expanded Boundary
	Major Park / Open Space
(22)	Vaughan Metropolitan Centre Study Area Boundary
VAL	JGHAN CIVICA
- Integrat	JGHAN CIVICA VAU19-0018 ed Urban Water Master Plan
- Integrat Sar Existing	VAU19-0018 ed Urban Water Master Plan Figure 3-1: hitary Connections of Development Applications
- Integrat Sar Existing	VAU19-0018 ed Urban Water Master Plan Figure 3-1: hitary Connections of Development Applications





Figure 3-2: Expanded VMC Boundary (Population Sensitivity Analysis)



# 4.0 Sanitary Capacity Analysis Results

This section presents the results and recommended infrastructure needs for the scenarios identified above. The level of service criteria were applied to assess capacity constraints. The first model condition was to assess dry weather flows and flows during a 5-year storm event. It would be expected that no surcharging would be occurring for the dry weather flow scenario, however, any capacity constraints identified would be identified in red and considered a high priority. If the results of the 5-year storm event exceeded the design criteria, those pipe segments would be identified in red in the corresponding figure.

The second model condition was to assess the 25-year design storm event. If the results exceeded the design criteria, those pipe segments would be identified in red in the corresponding figure.

### 4.1 VMC Study Area

#### 4.1.1 Sanitary Service Under Existing Condition

Figure 4-1 and Figure 4-5 show the sanitary system conditions under existing population and the 5-year storm and 25-year storm respectively. There are no capacity constraints within the VMC study area for these two WW conditions, however there are some areas of constraint in the upper areas of the servicing catchment.

#### 4.1.2 Sanitary System Condition under 2028 Population

Figure 4-2 and Figure 4-6 show the sanitary system conditions under the 2028 population scenario and the 5-year and 25-year storm respectively. There are capacity constraints within the VMC study area for these two WWF conditions. The sanitary system conditions under 2028 population are assigned to the existing sanitary system network. Sanitary connection points of the existing developments used in this analysis are shown in Figure 3-1.

#### 4.1.3 Sanitary System Condition under 2036 Population

Figure 4-3 and Figure 4-7 show the sanitary system conditions under the 2036 population scenario and the 5-year and 25-year storm respectively. There are capacity constraints within the VMC study area for these two WWF conditions.

#### 4.1.4 Sanitary System Condition Under 2041 Population

Figure-4-4 and Figure 4-8 show the sanitary system conditions under the 2041 population scenario and the 5-year and 25-year storm respectively. There are capacity constraints within the VMC study area for these two WWF conditions.





Figure 4-1: Sanitary Capacity Under Existing Population 5-Year Storm




Figure 4-2: Sanitary Capacity Under 2028 Population & 5-Year Storm





Figure 4-3: Sanitary Capacity Under 2036 Population & 5-Year Storm





Figure-4-4: Sanitary Capacity Under Ultimate Population & 5-Year Storm





Figure 4-5: Sanitary Capacity Under Existing Population and 25-Year Storm





Figure 4-6: Sanitary Capacity Under 2028 Population & 25-Year Storm





Figure 4-7: Sanitary Capacity Under 2036 Population & 25-Year Storm





Figure 4-8: Sanitary Capacity Under Ultimate Population & 25-Year Storm



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# 5.0 Sanitary Servicing Proposed Solutions

The proposed solutions for the ultimate conditions were investigated and are discussed in this section. Alternatives were analyzed and a preferred solution recommended with figures and tables illustrating the proposed sanitary upgrades.

The primary servicing needs resulting from the scenario analysis is to either provide for increased capacity to existing infrastructure or to add new infrastructure where service needs are outside of the current network. The approach to identifying solutions is predominantly guided by using the existing or proposed future road allowances. This is because use of existing rights of way has the least environmental impact and is generally the most appropriate from serving provision and operating and maintenance cost.

The priority solutions are therefore generally within the existing rights of way or within future rights of way that may be identified in a secondary plan or other planning approval process. As identification of alternatives is an important aspect of the environmental assessment process, were feasible and comparable, alternative solutions are identified. Although in some instances there are no practical alternatives to addressing the constraints, the most direct approach to meeting the servicing needs will be applied. Where either alternate, routes or access to other subcatchment areas is possible, these alternatives have been modelled and are included in the evaluation.

There is also a higher consideration of the impact to an identified alternative where there are conditions what would either result in access to a regional right of way or where there may be more significant environmental impacts such as water course crossings or other environmentally sensitive lands that are outside the existing right of way.

## 5.1 Alternative 1

Alternative 1 considers both the need for infrastructure upgrades within the VMC study area as well as upsizing requirements to address capacity constraints to the network components north of the study area. This solution is presented in Figure 5-1 and includes the network upgrade requirements for the study area and catchment just north of this area.

## 5.2 Alternative 2

Alternative 2 considers the implementation of a Wet-Weather Flow Reduction program upstream of the study area to reduce I/I flow. This recommendation is proposed as it was determined during model calibration that the 25-year storm estimated relatively high I&I in is area of 3.34 I/s/ha. Although a significant reduction in I&I through the WWFR Program is not expected, a reduction of 25 percent can be achieved which will reduce or eliminate the constraints identified in the model results. The 25 percent reduction in I&I was modelled and is part of the solution presented in Figure 5-2.





*Figure 5-1: Proposed Solutions – Alternative 1* 





Figure 5-2: Proposed Solutions- Alternative 2 – Preferred Solution



# 5.3 Alternative Evaluation Matrix

Table 5-1 provides the evaluation matrix for alternative 1 and 2. For economic, constructability and social & economic benefits, Alternative 2 is preferred and is the recommended solution that addresses constraints both within the VMC study area and the high I/I area north of the study area.



#### Table 5-1: Evaluation Matrix

		Alternative 1	Alternative 2		
Criteria	Criteria Description	Description	Evaluation*	Description	Evaluation*
Flexibility, Redundancy and Integration	How flexible the option is to design changes or additional/future flows. How easy it is to integrate the planned system with the existing system while maximizing the utilization of the current assets.	This alternative recommends increasing sewer capacity along Jane St, taking into account the heavy traffic regional route, which poses a limiting factor	Low (1)	Enhanced sewer design along the future Millway Ave extension facilitates seamless integration of future flows, given the planned construction of the road	High (3)
Constructability	Ease of construction, clash/conflict with other infrastructure and sensitive locations, interfacing with existing projects, construction schedule. Schedule and cost risk associated with construction method	Construction along Jane St corridor may require additional permitting and less flexible schedule	Medium (2)	The proximity to the subway tunnel is a crucial factor under consideration. However, the advantage of designing the proposed new sewer along the forthcoming street enhances the planning perspective, simplifying the process	Medium (2)
Operation & Maintenance requirement	How easy or complex it is to operate and maintain the system. Gravity vs. Pumping	Easy Operation as gravity solution Maintenace can be challenging on Jane St	Medium (2)	Relatively Easy O&M. Gravity solution.	High (3)
Social & Environmental Considerations	Traffic disruption and impact due to construction. Environmental impact during project execution on sensitive receivers (noise, odour, air, waste impact, etc.) and long-term environmental impact on land, flora fauna, bio-diversity, public health, water resources	Low disruption on Jane St (trenchless construction method) Traffic disruption in local roads will not be very impactful.	Medium (2)	No traffic disruption is anticipated on the future Millway Avenue Extension. Traffic disruption in local roads will not be very impactful.	High (3)
Economic Considerations	Optimal capital and O&M cost of the alternative Amount of initial investment	Elevated costs are expected in comparison to Alternative 2, primarily due to the construction method involved in the sewer upsize along Jane	Medium (2)	Minimized costs related to the installation of a new sanitary sewer	High (3)
Summary Scoring			9/15		14/15

\* The evaluation should be understood as the rating of one alternative in comparison to the other proposed alternatives. 'High' and "Low' are qualifications relative to the other proposed solutions only.



# 5.4 The VMC North West Quadrant Solution (NWQ)

#### 5.4.1 NWQ - West of Edgeley Boulevard

The existing infrastructure in this area includes a 450mm sanitary section designed to collect flows from future developments, including Royal Centre and Smart Centre E2, and drain to the sewer at Edgeley Boulevard. The sanitary flow then proceeds eastward on Apple Mill Road and ultimately discharges to the Jane Street trunk Sewer.

The existing 450mm sewer on Apple Mill Road, west of Edgeley Blvd meets the criteria for the acceptable level of service under existing conditions but will not accommodate additional flow.

*Proposed Solution:* A new 450mm sewer is recommended to convey the flow from the developments south of Portage Parkway to the proposed Edgeley Blvd trunk (see next section). Flow monitoring is also proposed on Apple Mill Road just west of Edgeley Boulevard to monitor the flow rate in the upstream drainage area.

#### 5.4.2 NWQ - Edgeley Boulevard

The 450mm sanitary sewer on Apple Mill Road east of Edgeley Blvd surcharges under ultimate future conditions.

*Proposed Solution:* the planned extension of the 900mm trunk on Interchange Way is recommended to be constructed before 2028 and according to the capacity limitation on Apple Mill Rd. The invert levels of the new trunk should be lower than the sanitary section on Apple Mill Road to allow the upstream sanitary flow to move southward; this will free up capacity in the sanitary sewers on Apple Mill Road and Jane Street trunk. As this project affects the capacity of the Jane Street Trunk and the sewers draining to it, it is recommended as a priority project.

#### 5.4.3 The VMC North East Quadrant (NEQ)

The bottleneck in the sewers north of Highway 7, east of Jane Street, is the 250mm sanitary sewer along Barnes Court. 450mm sewers are proposed west of Creditstone Road before upstream future developments are occupied.

## 5.5 The VMC South East Quadrant Solution (SEQ)

Surcharging is predicted under 25-year design storm along Doughton Road, Maplecrete Road, Creditstone Rd, and Peelar Road. The proposed solutions for this section include upsizing the pipes on Maplecrete Road, Doughton Road, and Peelar Road. New sanitary pipes are also proposed to service Melrose and other future developments on the anticipated road at the north of Doughton Road, south of Highway 7.

The 300mm sanitary sections on Doughton Road are proposed to upsize to 450mm before the development at 216-220 Doughton Rd is occupied.

Upgrades are also recommended for the pipes on Maplecrete Road north of Peelar Road, as well as the sanitary sections on Peelar Road to the Jane Street trunk.



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# 5.6 The VMC Southwest Quadrant Solution (SWQ)

Future developments in southwest quadrant will be serviced through the new 900mm trunk on Interchange Way. Phase 1 of this trunk, constructed in December 2020, starts on the south of Highway 7 and proceeds southward and eastward until it drains to the trunk on Highway 407. The extension of this trunk, proposed in section 5.4.2, will connect the drainage area north of Highway 7 to this constructed sewer.

All future developments are proposed to drain to the Interchange Way trunk. New sanitary sections are proposed to discharge the flow from the future populations on the side streets on the east and west side of Interchange Way. The work in SWQ will also include abandoning some of the existing sewers on Interchange Way and Commerce Street.

Future developments in the eastside of the southwest quadrant, along Jane Street, are proposed to be serviced through the Jane Street trunk.

Although the newly constructed trunk on Interchange Way operates under free flow (no surcharge) under the 25-year design storm, h/H more than 80% is predicted under the 5-year design storm. As this trunk is constructed recently, upsizing the trunk is not proposed in this report. However, flow monitoring is proposed to monitor the future flows and plan accordingly. Also, annual CCTV inspections are recommended to make sure the pipe is operating under full capacity.

#### 5.6.1 Millway avenue extension and Highway 407 Trunk

The existing trunk along Millway Avenue and Jane Street is surcharging under the future conditions. Constructing phase 2 of the Interchange Way trunk will free capacity from the Jane Street trunk and remove surcharging under 25-year storm. However, the updated forecasted population of Smart Centers A5 Development is causing a surcharge in the Jane St under the 25-year storm, even after the Interchange Way trunk is fully in place. A new pipe along Millway avenue extension is proposed which will divert flow from Millway Avenue and then flow east through the future street and will connect to the existing trunk sewer at the Doughton Road intersection, from here will flow south along Jane Street, as open-cut construction is very challenging on Jane Street, alternative construction methods (e.g., micro-tunneling) should be considered.

The 900mm pipe crossing Highway 407 is surcharging in ultimate conditions as well as under interim conditions. For the section south of Highway 407 to the outlet (Regional trunk), twinning is proposed before 2028. As open-cut construction is not a viable option for crossing the 407 Highway, alternative construction methods (e.g., micro-tunneling) should be considered.

Note that surcharging in the 900mm pipes crossing Highway 407 is partly due to the backflow from the Regional trunk at MH95B. Therefore, coordination with the Region may be required to further investigate and upgrade the 900mm YDSS (asset ID YR-BLSS-01\_46-05A) which connects to the 1050mm YDSS draining to the Black Creek SPS. More investigation will be required by the City and the Region to ascertain the causes of the backflow impacting the 900mm Highway 407 sewer.



# 5.7 Population Sensitivity Analysis

The additional population that has been provided by the City in the expansion areas of the VMC study area were modelled to assess the impact on the sanitary system and the results identify a number of additional upgrades required. Table 5-2 and Figure 5-3 presents the network pipe sizing impacts and the map of the network upgrade locations.

Solution		Preferred Solution	Population Sensitivity Analysis	Commont
3010	ation	Diameter (mm)	Diameter (mm)	comment
	C 1	1050	1200	Pipe size increased required
	M1	750 - 900 - 1050 825 - 1050 - 1200		Pipe size increased required
	NC 1	750	750	No change
	NE 1	450 600		Pipe size increased required
	NW 1	450 - 900	450 - 900	No change
c	NW 2	450	450	No change
ıtio	NW 3	450	450	No change
solu	SW 1	375-450	375-450	No change
p	SW 2	450-600	450-600	No change
erre	SW 3	450	450	No change
refe	SW 4	450-525	450-525	No change
٩	SW 5	375	375	No change
	SW 6	375-450	375-450	No change
	SE 1	600	600	No change
	SE 2	450	450	No change
	SE 3	450	600	Pipe size increased required
	SE 4	375-450	375-450	No change
_	E 1	N/A	450	New Project required
tion	E 2	N/A	750	New Project required
ulat	E 3	N/A	825	New Project required
e	E 4	N/A	600-750	New Project required
eas eas	E 5	N/A	450-525	New Project required
are	E 6	N/A	300	New Project required
i	E 7	N/A	300	New Project required
end	E 8	N/A	600	New Project required
Ext	E 9	N/A	375	New Project required
	E 10	N/A	450	New Project required
YDSS Upsi scope of	zing (out of this study)	1500	1500	No change

#### Table 5-2: Population Sensitivity Analysis project summary

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Figure 5-3 VMC Expanded Boundary Population Sensitivity Impact on Network





Figure 5-4: Climate Change Sensitivity Analysis



### 5.8 Recommendations

#### 5.8.1 Preferred Solution

Alternative 2 is the preferred solution as it provides the most net benefit and the least negative impacts. This alternative meets all the requirements for servicing present and future populations within the study area.

#### 5.8.2 Costing and Timing

Table 5-3 summarizes the recommended capital projects to accommodate future growth including timing, cost and the applicable environmental assessment project schedule. Details of each project cost can be found in Appendix A.

Project	Description	Total Cost (2024)	Completed By	EA Schedule
NC 1	284m of 750mm	\$2,700,000	Prior 2028	Exempted
NW 1	85m of 450mm 388m of 900mm Dia part directional Bore	\$8,200,000	Prior 2028	Exempted
NW 2	309m of 450mm	\$1,600,000	Prior 2028	Schedule B
NW 3	185m of 450mm	\$1,000,000	Prior 2028	Schedule B
SW 1	142m of 375mm	\$700,000	2036-2041	Exempted
SW 2	319m of 450mm and 161m of 600mm	\$2,100,000	Prior 2028	Exempted
SW 3	181m of 450mm	\$900,000	Prior 2028	Exempted
SW 4	152m of 450mm and 136m of 525mm	\$1,700,000	Prior 2028	Schedule B
SW 5	394m of 375mm	\$2,200,000	Prior 2028	Exempted
SW 6	138m of 375mm and 135m of 450mm	\$1,300,000	Prior 2028	Exempted
SE 1	324m of 600mm	\$2,300,000	Prior 2028	Exempted
SE 2	218m of 450mm	\$1,100,000	Prior 2028	Exempted
SE 3	302m of 450mm	\$1,700,000	Prior 2028	Exempted
SE 4	236m of 375mm and 214m of 450mm	\$2,400,000	Prior 2028	Schedule B
C 1	876m of 1050mm tunnelling	\$21,500,000	Prior 2028	Schedule B
M 1	448m of 750mm, 506m of 900 mm and 8m of 1050 mm.	\$11,500,000	Prior 2028	Schedule B
NE 1	219m of 450mm	\$1,400,000	Prior 2028	Exempted
Total		\$64,300,000		

#### Table 5-3: Cost Table and Timing

## 5.9 Climate Change Sensitivity Analysis

In Figure 5-4, the model output incorporates climate change sensitivity factors to account for increased wet weather effects. The figure indicates that the proposed solutions are effective in managing the increased flow resulting from climate change. However, constraints are evident in the northern part of the drainage area, suggesting the need for further consideration and potential adjustments in that region

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# Appendix A Cost Estimates

NC 1					
Reference	Description	Unit	Quantity	Est. Cost	Amount
Construction	ı				
	Supply and install 750 mm pipe, over 9.0 m to 10.0 m in depth	m	75	\$4,923.73	\$369,280
	Supply and install 750 mm, over 10.0 m to 11.0 m in depth	m	209	\$5,215.70	\$1,090,082
Subtotal					\$1,459,361
Construction	n Allowances and Contingency				
	Construction Contingency	10%			\$145,936
Base cost Su	m				\$1,605,298
Engineering	and Management				
	Engineering Planning	4%			\$64,212
	Engineering Design	10%			\$160,530
	Engineering Construction Services	10%			\$160,530
	City Program Management	3%			\$48,159
	Dense Urban Factor	5%			\$80,265
Support Cos	t Sum				\$513,695
<b></b>					
Land for PS	f Required				
	Station Design Capacity	L/s			\$0
Contingency	,				
r	Class D Estimate Contingency	25%			\$529,748
Total Projec	t Estimate (2024 dollars)				\$2,648,741



NI\A/	1
INVV	T

Reference	Description	Unit	Quantity	Est. Cost	Amount
Construction	1				
	Supply and install 450 mm, over 6.0 m to 7.0 m in depth	m	85	\$3,030.68	\$257,608
	Supply and install 900 mm, over 8.0 m to 9.0 m in depth Gravity sewer tunneling for 900 mm reinforced concrete pipe	m	198 190	\$5,161.63 \$8,820.50	\$1,022,003
	Shaft for 900 mm pipe- over 7.0 m to 8.0 m in depth	each	2	\$758,617.78	\$1,517,236
Subtotal					\$4,472,742
Construction	Allowances and Contingency				
	Construction Contingency	10%			\$447,274
Base cost Su	m				\$4,920,016
Engineering	and Management				
	Engineering Planning	4%			\$196,801
	Engineering Design	10%			\$492,002
	Engineering Construction Services	10%			\$492,002
	City Program Management	3%			\$147,600
	Dense Urban Factor	5%			\$246,001
Support Cost	Sum				\$1,574,405
Land for PS i	f Required				
	Station Design Capacity	L/s			\$0
Contingency					
	Class D Estimate Contingency	25%			\$1,623,605
Total Project	Estimate (2024 dollars)				\$8,118,026



NW 2					
Reference	Description	Unit	Quantity	Est. Cost	Amount
Construction	1				
	Supply and install 450 mm pipe, over 4.0 m to		102	62 614 46	¢260.250
	5.0 m in depth	m	103	\$2,614.16	\$269,259
	Supply and install 450 mm pipe, over 5.0 m to		200	¢2,022,42	6504 440
	6.0 m in depth	m	206	\$2,822.42	\$581,419
Subtotal					\$850,678
Construction	Allowances and Contingency				
	Construction Contingency	10%			\$85,068
Base cost Su	m				\$935,745
Engineering	and Management				
	Engineering Planning	4%			\$37,430
	Engineering Design	10%			\$93,575
	Engineering Construction Services	10%			\$93,575
	City Program Management	3%			\$28,072
	Dense Urban Factor	5%			\$46,787
Support Cos	t Sum				\$299,439
Land for PS i	f Required				
<b></b>	Station Design Capacity	L/s			\$0
Contingency					
	Class D Estimate Contingency	25%			\$308,796
Total Proiec	Estimate (2024 dollars)				\$1.543.980

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NW 3					
Reference	Description	Unit	Quantity	Est. Cost	Amount
Construction	1				
	Supply and install 450 mm pipe,				
	over 4.0 m to 5.0 m in depth	m	185	\$2,822.42	\$522,148
Subtotal					\$522,148
Construction	Allowances and Contingency				
	Construction Contingency	10%			\$52,215
Base cost Su	m				\$574,363
Engineering	and Management				
	Engineering Planning	4%			\$22,975
	Engineering Design	10%			\$57,436
	Engineering Construction Services	10%			\$57 <i>,</i> 436
	City Program Management	3%			\$17,231
	Dense Urban Factor	5%			\$28,718
Support Cost	t Sum				\$183,796
Land for PS i	f Required				
	Station Design Capacity	L/s			\$0
Contingency					
	Class D Estimate Contingency	25%			\$189,540
Total Project	Estimate (2024 dollars)				\$947,699



500 1				[	[
Reference	Description	Unit	Quantity	Est. Cost	Amount
Construction	1				
	Supply and install 375 mm pipe, over 4.0 m to 5.0 m in depth	m	104	\$2,603.81	\$270,796
	Supply and install 375 mm pipe, over 5.0 m to 6.0 m in depth	m	38	\$2,788.48	\$105,962
Subtotal					\$376,758
Construction	n Allowances and Contingency				
	Construction Contingency	10%			\$37,676
Base cost Su	m				\$414,434
Engineering	and Management				
	Engineering Planning	4%			\$16,577
	Engineering Design	10%			\$41,443
	Engineering Construction Services	10%			\$41,443
	City Program Management	3%			\$12,433
	Dense Urban Factor	5%			\$20,722
Support Cos	t Sum				\$132,619
Land for PS i	f Required				
	Station Design Capacity	L/s			\$0
Contingency	,				
	Class D Estimate Contingency	25%			\$136,763
Total Projec	t Estimate (2024 dollars)				\$683,816

**Total Project Estimate (2024 dollars)** 



\$2,072,060

#### **Project ID**

SW 2

<u> </u>							
Reference	Description	Unit	Quantity	Est. Cost	Amount		
Construction							
	Supply and install 450 mm pipe, over 3.0 m in depth	m	68	\$1,157.50	\$78,710		
	Supply and install 450 mm pipe, over 3.0 m to 4.0 m in depth	m	70	\$1,778.83	\$124,518		
	Supply and install 450 mm pipe, over 4.0 m to 5.0 m in depth	m	181	\$2,614.16	\$473,164		
	Supply and install 600 mm pipe, over 5.0 m to 6.0 m in depth	m	109	\$2,822.42	\$307,644		
	Supply and install 600 mm pipe, over 6.0 m to 7.0 m in depth	m	52	\$3,030.68	\$157,595		
Subtotal					\$1,141,631		
Construction	n Allowances and Contingency						
	Construction Contingency	10%			\$114,163		
Base cost Su	m				\$1,255,794		
r							
Engineering	and Management						
	Engineering Planning	4%			\$50,232		
	Engineering Design	10%			\$125,579		
	Engineering Construction Services	10%			\$125,579		
	City Program Management	3%			\$37,674		
	Dense Urban Factor	5%			\$62,790		
Support Cos	t Sum				\$401,854		
Land for PS i	if Required						
	Station Design Capacity	L/s			\$0		
Contingency							
	Class D Estimate Contingency	25%			\$414.412		



SW 3					
Reference	Description	Unit	Quantity	Est. Cost	Amount
Construction	n				
	Supply and install 450 mm pipe, over 4.0 m to 5.0 m in depth	m	100	\$2,614.16	\$261,416
	Supply and install 450 mm pipe,over 5.0 m to 6.0 m in depth	m	81	\$2,822.42	\$228,616
Subtotal					\$490,032
Construction	n Allowances and Contingency				
	Construction Contingency	10%			\$49,003
Base cost Su	ım				\$539,036
Engineering	and Management				
	Engineering Planning	4%			\$21,561
	Engineering Design	10%			\$53 <i>,</i> 904
	Engineering Construction Services	10%			\$53 <i>,</i> 904
	City Program Management	3%			\$16,171
	Dense Urban Factor	5%			\$26,952
Support Cos	t Sum				\$172,491
Land for PS	if Required				
	Station Design Capacity	L/s			\$0
Contingency					
	Class D Estimate Contingency	25%			\$177,882
Total Projec	t Estimate (2024 dollars)				\$889,409



500 4				Γ	
Reference	Description	Unit	Quantity	Est. Cost	Amount
Construction	n				
	Supply and install 450 mm pipe, over 6.0 m to 7.0 m in depth	m	152	\$3,030.68	\$460,663
	Supply and install 525 mm pipe, over 6.0 m to 7.0 m in depth	m	136	\$3,157.25	\$429,386
Subtotal					\$890,049
Construction	n Allowances and Contingency				
	Construction Contingency	10%			\$89,005
Base cost Su	ım				\$979,054
Engineering	and Management				
	Engineering Planning	4%			\$39,162
	Engineering Design	10%			\$97,905
	Engineering Construction Services	10%			\$97,905
	City Program Management	3%			\$29,372
	Dense Urban Factor	5%			\$48,953
Support Cos	t Sum				\$313,297
Land for PS	if Required				
	Station Design Capacity	L/s			\$0
Contingency	1				
	Class D Estimate Contingency	25%			\$323,088
Total Projec	t Estimate (2024 dollars)				\$1,615,439



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Reference	Description	Unit	Quantity	Est. Cost	Amount
Construction	n				
	Supply and install 375 mm pipe,				
	over 5.0 m to 6.0 m in depth	m	220	\$2,788.48	\$613 <i>,</i> 465
	Supply and install 375 mm pipe,				
	over 6.0 m to 7.0 m in depth	m	100	\$2,973.15	\$297,315
	Supply and install 375 mm pipe,				
	over 8.0 m to 9.0 m in depth	m	74	\$3,428.22	\$253,689
Subtotal					\$1,164,469
Construction	n Allowances and Contingency				
	Construction Contingency	10%			\$116,447
Base cost Su	Im				\$1,280,916
Engineering	and Management				
	Engineering Planning	4%			\$51,237
	Engineering Design	10%			\$128,092
	Engineering Construction Services	10%			\$128,092
	City Program Management	3%			\$38,427
	Dense Urban Factor	5%			\$64,046
Support Cos	t Sum				\$409,893
Land for PS	if Required				
	Station Design Capacity	L/s			\$0
Contingency	/				
	Class D Estimate Contingency	25%			\$422,702
Total Projec	t Estimate (2024 dollars)				\$2,113,511



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					1
Reference	Description	Unit	Quantity	Est. Cost	Amount
Construction	n				
	Supply and install 375 mm pipe,				
	over 3.0 m to 4.0 m in depth	m	75	\$1,771.92	\$132,894
	Supply and install 375 mm pipe,				
	over 4.0 m to 5.0 m in depth	m	63	\$2,603.81	\$164,040
	Supply and install 450 mm pipe,				
-	over 5.0 m to 6.0 m in depth	m	135	\$2,822.42	\$381,027
Subtotal					\$677,961
Construction	n Allowances and Contingency				
	Construction Contingency	10%			\$67,796
Base cost Su	Im				\$745,757
Engineering	and Management				
	Engineering Planning	4%			\$29,830
	Engineering Design	10%			\$74,576
	Engineering Construction Services	10%			\$74,576
	City Program Management	3%			\$22,373
	Dense Urban Factor	5%			\$37,288
Support Cos	t Sum				\$238,642
Land for PS	if Required				
	Station Design Capacity	L/s			\$0
Contingency	/				
	Class D Estimate Contingency	25%			\$246,100
Total Projec	t Estimate (2024 dollars)				\$1,230,499

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Total Project Estimate (2024 dollars)



#### **Project ID**

SE 1					
Reference	Description	Unit	Quantity	Est. Cost	Amount
Constructio	n				
	Supply and install 600 mm pipe, over 6.0 m to 7.0 m in depth	m	92	\$3,334.44	\$306,768
	Supply and install 600 mm pipe, over 7.0 m to 8.0 m in depth	m	83	\$3,626.69	\$301,015
	Supply and install 600 mm pipe, over 9.0 m to 10.0 m in depth	m	149	\$4,100.74	\$611,010
Subtotal					\$1,218,794
Constructio	n Allowances and Contingency				
	Construction Contingency	10%			\$121,879
Base cost Su	ım				\$1,340,673
Engineering	and Management				
	Engineering Planning	4%			\$53,627
	Engineering Design	10%			\$134,067
	Engineering Construction Services	10%			\$134,067
	City Program Management	3%			\$40,220
	Dense Urban Factor	5%			\$67,034
Support Cos	t Sum				\$429,015
Land for PS	if Required				
	Station Design Capacity	L/s			\$0
Contingency	/				
	Class D Estimate Contingency	25%			\$442,422

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\$2,212,111



SE 2	1	•	1	r	1
Reference	Description	Unit	Quantity	Est. Cost	Amount
Construction	n				
	Supply and install 450 mm pipe, over 4.0 m to 6.0 m in depth	m	110	\$2,614.16	\$287,558
	Supply and install 450 mm pipe, over 5.0 m to 6.0 m in depth	m	108	\$2,822.42	\$304,822
Subtotal					\$592,380
Construction	n Allowances and Contingency				
	Construction Contingency	10%			\$59,238
Base cost Su	Im				\$651,617
Engineering	and Management				
	Engineering Planning	4%			\$26,065
	Engineering Design	10%			\$65,162
	Engineering Construction Services	10%			\$65,162
	City Program Management	3%			\$19,549
	Dense Urban Factor	5%			\$32,581
Support Cos	t Sum				\$208,518
Land for PS i	if Required				
	Station Design Capacity	L/s			\$0
Contingency	,				
	Class D Estimate Contingency	25%			\$215,034
Total Project	t Estimate (2024 dollars)				\$1,075,169



SF	3	

	1				
Reference	Description	Unit	Quantity	Est. Cost	Amount
Construction	1				
	Supply and install 450mm pipe, over 4.0 m to 5.0 m in depth	m	149	\$2,614.16	\$389,510
	Supply and install 450 mm pipe, over 6.0 m to 7.0 m in depth	m	102	\$3,030.68	\$309,129
	Supply and install 450 mm pipe, over 11.0 m to 12.0 m in depth	m	51	\$4,198.73	\$214,135
Subtotal					\$912,775
Construction	n Allowances and Contingency				
	Construction Contingency	10%			\$91,277
Base cost Su	m				\$1,004,052
Engineering	and Management				
	Engineering Planning	4%			\$40,162
	Engineering Design	10%			\$100,405
	Engineering Construction Services	10%			\$100,405
	City Program Management	3%			\$30,122
	Dense Urban Factor	5%			\$50,203
Support Cos	t Sum				\$321,297
Land for PS	f Required				
	Station Design Capacity	L/s			\$0
Contingency					
	Class D Estimate Contingency	25%			\$331,337
Total Projec	t Estimate (2024 dollars)				\$1,656,686



SE 4	
------	--

Reference	Description	Unit	Quantity	Est. Cost	Amount
Construction	1				
	Supply and install 375 mm pipe, over 5.0 m to 6.0 m in depth	m	236	\$2,788.48	\$658,081
	Supply and install 450 mm pipe, over 5.0 m to 6.0 m in depth	m	91	\$2,822.42	\$256,840
	Supply and install 450 mm pipe, over 6.0 m to 7.0 m in depth	m	123	\$3,030.68	\$372,774
Subtotal					\$1,287,695
Construction	n Allowances and Contingency				
	Construction Contingency	10%			\$128,770
Base cost Su	m				\$1,416,465
Engineering	and Management				
	Engineering Planning	4%			\$56,659
	Engineering Design	10%			\$141,646
	Engineering Construction Services	10%			\$141,646
	City Program Management	3%			\$42,494
	Dense Urban Factor	5%			\$70,823
Support Cos	t Sum				\$453,269
Land for PS i	f Required				
	Station Design Capacity	L/s			\$0
Contingency	,				
<u>.</u>	Class D Estimate Contingency	25%			\$467,433
Total Project	t Estimate (2024 dollars)				\$2,337,167

Total Project Estimate (2024 dollars)

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C	1
L	T.

Reference	Description	Unit	Quantity	Est. Cost	Amount
Construction					
	Gravity sewer tunneling for 1050 mm reinforced concrete pipe	m	876	\$9,274.99	\$8,124,888
	Shaft for 1050 mm pipe- over 10.0 m to 11.0 m in depth	each	1	\$1,043,099.44	\$1,043,099
	Shaft for 1050 mm pipe- over 12.0 m to 13.0 m in depth	each	1	\$1,232,753.89	\$1,232,754
	Shaft for 1050 mm pipe- over 14.0 m to 15.0 m in depth	each	1	\$1,422,408.33	\$1,422,408
Subtotal					\$11,823,150
Construction	Allowances and Contingency				
	Construction Contingency	10%			\$1,182,315
Base cost Sum				\$13,005,465	
Engineering	and Management				
	Engineering Planning	4%			\$520,219
	Engineering Design	10%			\$1,300,546
	Engineering Construction Services	10%			\$1,300,546
	City Program Management	3%			\$390,164
	Dense Urban Factor	5%			\$650,273
Support Cost	Sum				\$4,161,749
Land for PS in	f Required				
	Station Design Capacity	L/s			\$0
Contingency					
	Class D Estimate Contingency	25%			\$4,291,803
Total Project	Estimate (2024 dollars)				\$21,459,017

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M 1	1	-					
Reference	Description	Unit	Qu	uantity	Est. Cost		Amount
Construction	1						
	Supply and install 750 mm pipe, over	er					
	10.0 m to 11.0 m in depth	m		448	\$6	,695.68	\$2,999,663
	Supply and install 900 mm pipe, over	er					
	12.0 m to 13.0 m in depth	m		506	\$6 \$6	,443.86	\$3,260,594
	Supply and install 1050 mm pipe	2,					
r	over 12.0 m to 13.0 m in depth	m		8	\$6	,734.63	\$53,877
Subtotal							\$6,314,134
Construction	Allowances and Contingency						
	Construction Contingency		10%				\$631,413
Base cost Su	m						\$6,945,548
Engineering	and Management						
	Engineering Planning		4%				\$277,822
	Engineering Design		10%				\$694,555
	Engineering Construction Services		10%				\$694,555
	City Program Management		3%				\$208,366
	Dense Urban Factor		5%				\$347,277
Support Cost	: Sum						\$2,222,575
l and for PS it	fRequired						
	Station Design Capacity	1/6					<u></u>
Contingonou	Station Design Capacity	L/ 3					ŲÇ
Contingency			250/				¢2 202 024
	Class D Estimate Contingency		25%				\$2,292,031
Total Project	: Estimate (2023 dollars)						\$11,460,15 <b>3</b>



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NE 1	1				1
Reference	Description	Unit	Quantity	Est. Cost	Amount
Constructio	n				
	Supply and install 450 mm pipe, over	er			
	8.0 m to 9.0 m in depth	m	219	9 \$3,513.89	9 \$769,542
Subtotal					\$769,542
Constructio	n Allowances and Contingency				
	Construction Contingency	1	0%		\$76,954
Base cost Su	ım				\$846,496
r					
Engineering	and Management				
	Engineering Planning		4%		\$33,860
	Engineering Design	1	0%		\$84,650
	Engineering Construction Services	1	0%		\$84 <i>,</i> 650
	City Program Management		3%		\$25,395
	Dense Urban Factor		5%		\$42,325
Support Cos	st Sum				\$270,879
Land for PS	if Required				
	Station Design Capacity	L/s			\$(
Contingency	/				
	Class D Estimate Contingency	2	5%		\$279,344
Total Projec	t Estimate (2023 dollars)				\$1,396,719



Appendix B Hydraulic Model Outputs












Figure: NW1











Maplecret	e Road		- 1					
205.0 204.0 203.0 202.0 201.0 200.0 199.0								
198.0 — 197.0 —						e		
m	0		90			213		
Link length (m) width (mm) height (mm) us inv (m AD) ds inv (m AD) grad (m/m) pfc (l/s) surc		SANMH12167.1 90.1 450 200.900 200.425 0.00527 207 0.28		VM 1. 190 190 0.0 2 0.0	C52.1 22.7 450 450 8.925 8.250 00550 212 0.60			
DS flow (I/s)	SANMH12167	33.29	VMC52	139.37 VMC52				
expr:HGL	4.975861		5.853779			5.765671		
203.0 – 202.0 – 201.0 – 200.0 – 199.0 –	/MC54							
198.0 — m	0			120		235		
Link length (m) width (mm) height (mm) us inv (m AD) ds inv (m AD) grad (m/m) pfc (l/s) surc DS flow (l/s) Node	VMC54	VM( 11 3 201 200 0.0 1 0.2 27	254.1 9.7 75 .500 0.000 1253 96 .27 7.59	VMC53	VMC53.1 115.7 375 375 199.920 199.500 0.00363 106 0.48 48.95	VMC52		
expr:HGL	3.837873	1	5	.361155		5.853779		
CI		City Of Vaugh Plan VMC Functior	an Integrated Urban Water Master nal Servicing Strategy Report	L	Project: SE4 ocation: Maplecrete	Road		





197.0 - 196.0 - E 195.0 - E 195.0 - 194.0 - 193.0 - 192.0 -								
191.0 -	- NM		407		2027			
ink ength (m) ridth (mm) eight (mm) s inv (m AD)	VMC1 67.5 450 450 193.2	9.1 SANN 5 ) 35 1	1H17556.1 70.0 450 450 33.025	SANMH17555.1 90.0 450 450 192.810	SANMI 1 ( 19	H17553.1 08.9 600 600 2.360	SANMH 5 6 6	117552.1 1.5 00 00
Is inv (m AD) grad (m/m) ofc (l/s) ourc DS flow (l/s)	193.0 0.003 159 0.67 91.3	25 11 11 0 7 0 1	92.810 00307 158 0.66 21.46	192.540 0.00300 156 0.66 121.22	19 0.0 2 0 19	2.040 0294 133 .55 4.20	191 0.00 3 0. 214	.850 0311 42 .56 4.03
Node	VMC19	SANMH17556	SANMH17555	SAT	NMH17553		SANMH17552	C 1FOFF
96.0 - 195.5 - 195.5 - 195.0 - 194.5 - 194.0 - 193.5 - 193.0 - 192.5 - 192.0 - m								
ale.				VMC-2.1				
nk ngth (m) eight (mm) s inv (m AD) s inv (m AD) rad (m/m) fc (l/s) urc				90.2 450 450 193.000 192.500 0.00554 212 0.42				
ength (m) vidth (mm) neight (mm) ns inv (m AD) Is inv (m AD) Is inv (m AD) prad (m/m) nfc (l/s) urc DS flow (l/s) lode ync HGI	VMC-2 3.866223			90.2 450 450 193.000 192.500 0.00554 212 0.42 72.86			SAN	IMH17553













# CITY OF VAUGHAN INTEGRATED URBAN WATER PLAN

FUNCTIONAL SERVICING STRATEGY REPORT

### Vaughan Metropolitan Centre

Volume 4 – Stormwater Report Final Report September 2024





# STATEMENT OF QUALIFICATIONS AND LIMITATIONS

The attached Report (the "Report") has been prepared by Civica Infrastructure Inc. (the "Consultant") at the request of, and for the exclusive use of the City of Vaughan (the "Client") in accordance with the terms of agreement between the Consultant and the Client, including the scope of work detailed therein (the "Agreement").

Please note that the information, data, analysis, recommendations, and conclusions contained in the Report was prepared for the specific purposes described in the Report and the Agreement and may be based upon information which has not been independently verified by the Consultant. The Consultant shall be entitled to rely upon the accuracy and completeness of information that was provided to the Consultant and has no obligation to update such information. The material in this report reflects the Consultant's best professional judgement in the light of the information available to it at the time of preparation and publication.

The Consultant agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement. The Consultant makes no other representations, any guarantees or warranties whatsoever, whether expressed or implied, with respect to the Report or any part thereof.

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The Consultant expressly excludes liability to any party except the Client for either any use of or reliance upon the Report.

This Statement of Qualifications and Limitations is attached to, and forms part of the Report and any usage of the Report is subject to the terms therein.

#### Disclaimer

The data used for this analysis has been obtained from City of Vaughan sources with the understanding that these are provided without warranties. This data is included in the hydraulic model. The information has been reviewed to ensure consistency with general sanitary system modeling principles used in the City of Vaughan. Unless noted in this memo, specific water system geometric characteristics and operating conditions have not been verified in the field or by cross-referencing with As-Built drawings or other sources that may be available from the City of Vaughan.

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September, 2024

VAU19-0018

Page ii

City of Vaughan 2141 Major Mackenzie Dr W Maple, ON L6A 1T1

Attention: Michael Frieri

# RE: City of Vaughan Integrated Urban Water Plan- Vaughan Metropolitan Centre FSSR Vol 4 Stormwater Report

Civica Infrastructure Inc. is pleased to submit the following report. The Integrated Urban Water Plan is comprised of the main Environmental Assessment Report and a series of Functional Servicing Strategy Reports of which this is one. These reports focus on specific development areas and provide information to facilitate more comprehensive servicing planning direction for redevelopment projects in these designated community growth areas.

This report provides servicing area background information and is part of a four-volume series that provides information on Background Information (Vol. 1), Water Servicing (Vol. 2), Wastewater Servicing (Vol. 3), and Stormwater Servicing (Vol. 4).

Sincerely,

CIVICA INFRASTRUCTURE INC.

Ilmar Simanovskis, P.Eng, MBA Project Manager



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# **1.0 Introduction**

The Vaughan Metropolitan Centre (VMC) is an emerging downtown area that is currently undergoing redevelopment. Stormwater management is provided through a local conveyance network with outlets either to adjacent receiver locations or through end-of-pipe treatment for quantity and quality control. The study area will be governed by watershed policies and design requirements provided by the conservation authority through TRCA design and watershed characterization studies as well as stormwater design requirements provided by the City. The VMC study area is rapidly redeveloping with high density residential, commercial and businesses, therefore there is a need to improve the stormwater infrastructure. This report will include a review of the existing conditions of the stormwater infrastructure and stormwater management ponds and assess the existing and future conditions to determine solutions to meet the future demands. The VMC Functional Servicing Strategy Report (FSSR) is an update to the VMC Municipal Servicing Class Environmental Assessment Master Plan (MSMP), prepared in 2012 by The Municipal Infrastructure Group (TMIG) and will re-evaluate the stormwater management solutions proposed.

The first objective for stormwater management is to manage the impact of development on the change in land surface permeability due to buildings and hard surfaces such as pavement. The consideration is that pre and post-development conditions will generally reduce surface permeability and increase the amount of water that will run off a property thereby increasing the amount of surface runoff that must be collected and directed to a watercourse and back to the natural system. The impact of this is generally a higher volume of runoff generated due to development as well as a higher and earlier peak flow that will be experienced at a discharge point to the natural receiver. Various controls such as stormwater ponds or other retention and flow control structures are used to create final discharge flow conditions that best recreate pre-development runoff characteristics that are intended to protect downstream watercourse and natural environment conditions.

The design objective for this study is to provide minor system capacity to convey a 5 year design storm without surcharge of the stormwater network and to provide major system capacity that will contain the 100 year design storm runoff within rights of way and not impact private lands as flow is directed to outlet locations through overland routes. The analysis of these conditions is modelled with InfoWorks based on the dual drainage methodology. Recommendations for future servicing needs is based on the balance of achieving minor system capacity criteria for a 5 year storm event while further achieving effective major system surface water flow management without surcharging the sewer network during a 100 year storm event. These results and the recommended solutions are provided through the dual drainage assessments.

The main criteria considered to mitigate the effects of urbanization and development are as follows:

**Stormwater Quality Control**- These are features and structures that are intended to clean the stormwater that is collected from the community to reduce sediment and other materials collected through the sewers. This is commonly achieved through features such as ponds that allow for storage capacity where sediments can settle out and thereby meet quality discharge limits established by the authority.

**Stormwater Quantity Control**- Quantity control is required to retain the higher peak flows caused by urbanization and lower ground infiltration so that the final discharge rate to the receiver better matches



the flow pattern experienced before development. This also is generally controlled through stormwater management ponds.

**Watercourse Erosion Control**- Water course erosion control is intended to mitigate rapid and high rate surface flows that could impact watercourse conditions through sediment washout or bank erosion. The criteria for mitigating erosion are also related to stormwater storage and controlled release based on specific criteria set by the authority.

**Water Balance**- Water balance is a concept based on the hydrologic cycle and is intended to recognize the unique characteristics of a watershed that include the amount of rain, the portion that infiltrates as groundwater, the portion that evaporates to the atmosphere, and the portion that runs of the surface. As infiltration is often the factor most effected by urbanization, requirements for on site storage and other infiltration enhancing measures are used to demonstrate a mitigative approach to restoring infiltration function.

These objectives are applied in the evaluation of the future growth scenarios and how intensification and further urbanization may change stormwater system performance, and the recommended strategies to mitigate these effects.

#### 1.1 Study Area

Based on the City of Vaughan's historical aerial photos, in the late 1960s to early 1970s, the existing farm fields in the Vaughan Metropolitan Centre (VMC) area began to develop into industrial land uses. Industrial developments expanded to the northeast and southeast quadrants by the mid to late 1970s. By the mid to late 1990's the on-line, Edgeley Pond and Interchange Pond were constructed along with more industrial land uses throughout the northeast, southeast and southwest quadrants. Commercial developments were added to the northwest and southwest quadrant by the early to mid 2000s along with more industrial land-uses and the construction of the pond southeast of Portage Parkway and Hwy. 400. By the mid 2010s, the VMC began its transformation to the new City of Vaughan's Downtown with new and redevelopments changing the industrial-heavy area to mixed land-uses including residential, commercial and institutional land-uses. Under existing conditions, as of 2021, the VMC study area consisted mainly of commercial, industrial, and residential land uses. VMC is serviced with existing storm sewers and stormwater management ponds. The existing local and regional stormwater infrastructure features are presented in Figure 1-2.

The VMC study area is within the Black Creek subwatershed and generally drains southeast toward the main tributary of Black Creek or drains southwest toward the west branch of Black Creek. The VMC is divided into four quadrants, which follow the four distinct drainage areas. Highway 7 delineates the study area into north and south while Edgeley Boulevard separates the northern area into the VMC northwest and northeast quadrants. Jane St. delineates the VMC south of Highway 7 into the VMC southwest and southeast quadrants. Figure 1-2 illustrates the four VMC quadrants – northwest, northeast, southwest and southeast.

The drainage system for each VCM quadrant is designed as a dual drainage system in accordance with the City design standards. The MSMP2012 TMIG VMC Master Plan EA – November 29, 2012, Final Appendix D – Stormwater Drainage and Management was used to set the on-site controls in the study area. Individual lots provide on-site control to restrict peak flows to the 2 year post development runoff rate.



On-site storage is provided to control runoff generated from the 100 year event to the 2 year post development flow rate. In addition, to assist in providing storage volume for the development site, rooftop controls to meet the release rate of 42 L/s/ha is acceptable.

The VMC is within the Black Creek subwatershed and drainage channels through the VMC require strategic improvements based on the Black Creek Stormwater Optimization (BCSO) Study prepared by AECOM in May 2011. Many of the BCSO recommended improvements are in the detailed design process or have approved detailed designs and will be constructed to the benefit of the Black Creek flow capacity and overall subwatershed performance through and downstream of the VMC study area.

#### 1.1.1 Northwest Quadrant

The northwest quadrant consists of two separate catchment areas. The northern catchment drains to Stormwater Management (SWM) Pond 2 with a drainage area of 25.82 ha. This pond was constructed in approximately 1999. The interim SWM pond provides SWM controls for the minor drainage system received from a portion of Portage Parkway and Applewood Crescent. In this area, the major system flows from a portion of Portage Parkway before outletting to the existing large pond. Both Ponds provide quantity control for the upstream area. In this area, the major system flows from a portion of Portage portion grave port. Both Ponds provide quantity control for the upstream area. In this area, the major system flows from a portion of Portage port. Both Ponds provide quantity control for the upstream area. In this area, the major system flows from a portion of Portage Parkway before outletting to the existing large pond. Both Ponds provide quantity control for the upstream area. In this area, the major system flows from a portion of Portage Parkway before outletting to the existing large pond. Both Ponds provide quantity control for the upstream area. In this area, the major system flows from a portion of Portage Parkway before outletting to the existing large pond. Both Ponds provide quantity control for the upstream area. The flows from this existing pond discharges to the west tributary of the Black Creek.

The second catchment area drains to an existing pond that was recently constructed with a drainage area of approximately 14.45 ha. This pond provides SWM controls for a portion of the constructed spine roads (constructed in 2019 and 2020 on Applewood Crescent, Apple Mill Road and Commerce Street) and the undeveloped development sites within the northeast quadrant. The controlled flow from the existing pond discharges to the west tributary of Black Creek. The Commerce Superpipe and downstream OGS provide SWM controls for runoff received from Commerce St., Highway 7 to roughly New Park Place and undeveloped development sites located east and west of Commerce St. The controlled flow received from the Superpipe discharges to the existing Highway 7 storm sewer.

The three ponds in the Northwest Quadrant (NWQ) will be replaced with SWM facilities under the ultimate condition to meet the current SWM criteria.

This quadrant was also affected by the Black Creek Spill as is detailed in section 1.3.2.

#### 1.1.1.1 First Vaughan Development FSR

As per the First Vaughan Development VMC West FSR (SCS, July 2018) and First Vaughan Lands – Phase Spine Roads Interim SWM Report (SCS, May 2019), the on-site controls for development blocks within the VMC draining to the temporary and ultimate north and south SWM facilities is to control post development flows to the 2 yr post flow rate with a maximum imperviousness of 80%. Runoff from approximately 20% of development blocks draining to these ponds would be left uncontrolled. According to the First Vaughan Lands Interim SWM report, this uncontrolled drainage is to be compensated for by over control of the controlled drainage area such that the overall site release rate does not exceed the allowable release rate. If it is determined that over controlling to achieve the allowable release rate is not feasible, the City of Vaughan will assess the allowance of uncontrolled flows in excess of the allowable release rate on a case-by-case basis. In this scenario, an assessment of downstream municipal infrastructure must be completed to demonstrate there is no negative impact.



Also, as per the First Vaughan Lands – Phase 1 Spine Roads Interim SWM Report (SCS, May 2019), the onsite controls for development blocks draining to the Commerce St. superpipe is to control post development flows to Humber River Unit Flow Rate, and Commerce St. superpipe was sized to accommodate the controlled and uncontrolled (15%) runoff from the contributing development blocks.

The southeast quadrant is presently not serviced by an end-of-pipe facility. The functionality of the quadrant is initially analyzed without a SWM facility for controlling the flow being conveyed to Humber River. Therefore, this quadrant will require an Alternative SWM strategy to provide the required level of stormwater management. The Alternative SWM strategy will include on-site control for each development and redevelopment block where the peak release rate is controlled to the 2-year post-development flow rate, based on an 80% level of imperviousness, with the 100-year less the 2-year excess runoff stored on-site. The SE quadrant will require on-site retention of 15 mm over entire development blocks, instead of only the building footprint and landscaped areas. The capture and retention of runoff from rainfall events are to be achieved through the implementation of LID measures. The Implementation of the alternative SWM method will assist in achieving the required level of stormwater management for the development sites in the SE quadrant. The addition of a SWM pond will ensure the overall SWM criteria are achieved prior to discharging to the Black Creek.

#### 1.1.2 Northeast Quadrant

This quadrant drains to the existing on-line Edgeley Pond and includes a catchment area of 793.59 ha. This pond was designed in the late 1980s by Ander Engineering, constructed in the early 1990s and provides quantity control for an upstream drainage area of 767.31 ha. (Also referred to as Pond 18 in the City's 2007 Stormwater Management Retrofit Study). The City will be retrofitting the Edgeley Pond to meet local flood control and water quality goals and to accommodate development within these lands while integrating the Edgeley Pond Park into the City's Iconic Park. The 1986 Ander engineering report identified a release rate of 2 year post development for this quadrant related to on site quantity control with overall pond discharge control to meet Humber River unit rates. The detailed design of the pond retrofit was reviewed and approved by the majority of agencies. The retrofit design provides quantity, quality and erosion controls. The quantity control is designed for post flow to meet the existing flow conditions and is provided in the WSP Stormwater Management Report, February 2021.

The TRCA has recently updated their hydraulic model and floodplain mapping for Black Creek. Thus, the original spill of Black Creek at the 90 degree bend, located east of Hwy. 400 and by Pennsylvania Ave. was included in TRCA floodplain mapping update. This Black Creek spill now affects the western limit of the VMC. Please refer to Section 1.3.2 of this report for more details regarding the Black Creek spill.

#### 1.1.3 Southeast Quadrant

The Southeast quadrant has a total drainage area of 93 ha that discharges directly to Black Creek as there is no existing pond for this area. As part of the recommendations for the future redevelopment of this quadrant including Expansion Area A, the addition of a storm pond is proposed, similar to what was proposed in the 2012 Municipal Servicing Environmental Assessment Master Plan (TMIG). The proposed pond remains within the open space as identified in the VMC Secondary Plan (2017 Review of the performance and function of this SWM pond is provided in the proposed scenarios discussion in section 4.8.5.



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The Black Creek Renewal project will involve the realignment and recanalization of the Black Creek to mitigate the existing flood concerns that will allow to convey and contain flows up to the 100 year storm and Regional Hurricane Hazel flows.

#### 1.1.4 Southwest Quadrant

The Southwest quadrant has two SWM ponds, the main existing pond, known as the Interchange Pond, has a catchment area of approximately 54 ha. This pond provides quality, quantity, and erosion control for the majority of the southwest quadrant. The design was completed by G.M. Sernas in June 1997, excludes the Toromont pond, did not consider onsite controls for the development sites and met SWM criteria relevant at the time of the design. The existing Interchange pond currently does not meet current SWM criteria and will require a retrofit design to meet current SWM criteria. As part of the 2012 MSMP, a 2 year post development release rate was applied for developmental sites and the Humber River unit flow rate was used for the SWM Ponds.

The smaller, second pond is a private pond within the Toromont property and is located southwest of Hwy. 7 and Jane St. The catchment area to the private pond is 10.63 ha and discharges to an existing Jane Street culvert that connects to the Black Creek watercourse, east of Jane St. This private pond was constructed when the Toromont lands were developed, and the Toromont pond stage storage was taken from the Humber River Hydrology Report (2015) prepared by Civica. The drainage area to the private pond was to be included as part of G.M. Sernas' design for the current Interchange Pond to address MTO comments from June 1997. However, drainage from the Toromont lands was not directed to the Interchange pond and continues to flow to the private pond and ultimately to Black Creek.

Under the ultimate condition, with the redevelopment of the southwest quadrant, the entire southwest quadrant drainage area, including the Toromont lands will be directed to the existing Interchange pond. Thus, the Interchange pond will require a retrofit design and consider the overall drainage area and onsite control for the development sites which is to control flows from up to and including the 100 year storm event to the 2yr post-development flow rate (maximum 80% imperviousness).

As noted in Section 1.1.2 Northwest Quadrant, the Black Creek spill also affects the west portion of the southwest quadrant. Refer to Section 1.3.2 for details regarding the Black Creek Spill.

#### 1.1.5 Major Transit Station Area

The VMC has three distinct Major Transit Station Areas (MTSA) as shown in Figure 1-1 below. The western portion of the VMC is serviced by MTSA 54- Commerce BRT Station and has a gross area of 71.40 ha. The second and central areas of the VMC consist of MTSA 67- Vaughan Metropolitan Centre Subway Station which has a gross area of 110.76 ha. The third and eastern service area of the VMC is MTSA 56- Credit Stone BRT Station which has a gross area of 52.08 ha.



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Figure 1-1: York Region Major Transit Station Areas (MTSA's)

#### 1.1.6 Expansion Areas

The City of Vaughan has recently approved the inclusion of two expansion areas to the original VMC boundary area and are illustrated on Figure 1-2. Expansion Area A is located in the southeast quadrant and extends south from the current VCM boundary to Highway 407 west bound off ramp and east from Maplecrete Road to Creditstone Road. Expansion Area B is within the northwest and northeast quadrants and extends north one to two parcels, approximately 100m north of Portage Parkway from Highway 400 to Black Creek. The City is currently updating the VMC Secondary Plan, which will identify the land-use and road network for these expansion areas.





Figure 1-2: VMC Four Quadrants, Expansion Areas and Existing Stormwater Infrastructure







Figure 1-3: Existing Storm Drainage Area



#### 1.2 Existing Stormwater Management Facilities

Four existing stormwater management ponds service the majority of the VMC study area. Table 1-1 provides the target release rate and storage volumes for the existing SWM facilities within the VMC study area. The target release rate from each existing SWM facility varies since the quantity control criteria varied at the time each SWM facility was designed and implemented. Table 1-1 identifies the quantity control criteria identify that return period peak flows be based on Humber River target flows for the 6 and 12 hour AES storm. The bolded values in Table 1-1 identify the governing storm based on the larger required storage volume while achieving the target release rate.

					6 (Bl		6-hour AES (Bloor, TRCA)		12-hour AES (Bloor, TRCA)	
Quadrant	Existing Pond and Location	Quantity Control Criterion	Storm Return Period	Target Release Rate (m3/s)	Storage Provided (ha.m)	Outflow (m³/s)	Max. Storage Used (ha.m)	Outflow (m³/s)	Max. Storage Used (ha.m)	
			2 Yr	0.028	0.2129	0.016	0.0235	0.016	0.0234	
	Interim North SWM Facility -		5 Yr	0.041	0.2129	0.023	0.0323	0.022	0.0310	
	SW of Portage Parkway and	Humber Bivor Unit	10 Yr	0.050	0.2129	0.030	0.0448	0.025	0.0363	
	Applewood Crescent	Flow	25 yr	0.063	0.2129	0.040	0.0636	0.030	0.0430	
	(Servicing Area 4.18 ha)		50 Yr	0.072	0.2129	0.046	0.0784	0.032	0.0483	
			100 Yr	0.083	0.2129	0.051	0.0933	0.035	0.0536	
	Interim SWM Pond - NW of HWY 7 and Applewood Crescent (Servicing Area 10.74 ha)	Humber River Unit Flow	2 Yr	0.064	0.6374	0.027	0.1942	0.029	0.2223	
			5 Yr	0.095	0.6374	0.033	0.2823	0.034	0.3134	
NW			10 Yr	0.115	0.6374	0.041	0.3427	0.049	0.3702	
			25 yr	0.144	0.6374	0.093	0.3963	0.120	0.4083	
			50 Yr	0.166	0.6374	0.154	0.4238	0.171	0.4314	
			100 Yr	0.189	0.6374	0.193	0.4528	0.198	0.4589	
	Supernine		2 Yr	0.015	0.0383	0.012	0.0114	0.013	0.0123	
	Facility -	Llumbor	5 Yr	0.022	0.0383	0.016	0.0164	0.016	0.0178	
	Street,	River Unit	10 Yr	0.026	0.0383	0.017	0.0211	0.019	0.0227	
	N of HWY 7 (Servicing	Flow	25 yr	0.033	0.0383	0.023	0.0257	0.025	0.0267	
	Area 2.03 ha)		50 Yr	0.038	0.0383	0.028	0.0284	0.029	0.0289	

#### Table 1-1: Existing SWM Facility Information



						6-hou (Bloor,	r AES TRCA)	12-hou (Bloor,	ur AES TRCA)
Quadrant	Existing Pond and Location	Quantity Control Criterion	Storm Return Period	Target Release Rate (m3/s)	Storage Provided (ha.m)	Outflow (m³/s)	Max. Storage Used (ha.m)	Outflow (m <sup>3</sup> /s)	Max. Storage Used (ha.m)
			100 Yr	0.043	0.0383	0.033	0.0309	0.033	0.0312
		Control	2 Yr	1.135	2.0250	0.688	0.2646	0.630	0.2382
	Existing NWQ Pond - SE of	Structures (Constricted	5 Yr	NA	2.0250	0.842	0.3740	0.804	0.3189
	Portage	outfall	10 Yr	NA	2.0250	0.905	0.4649	0.854	0.3911
	HWY 400	broad-	25 yr	NA	2.0250	0.988	0.5870	0.920	0.4866
	(Servicing Area 25.2 ha)	overspill	50 Yr	NA	2.0250	1.051	0.6825	0.972	0.5633
		weir)	100 Yr	3.183	2.0250	1.104	0.7805	1.025	0.6430
		Pre- development	2 Yr	1.120	3.4107	0.374	1.2796	0.381	1.3311
	Interchange Pond - NE of HWY 407 and Hwy 7 (Servicing Area 53.5 ha)		5 Yr	1.450	3.4107	0.666	1.7307	0.673	1.7337
			10 Yr	NA	3.4107	1.086	1.9172	1.039	1.8961
			25 yr	NA	3.4107	1.601	2.1451	1.479	2.0912
			50 Yr	NA	3.4107	1.984	2.3157	1.802	2.2342
510/			100 Yr	3.330	3.4107	2.365	2.4845	2.134	2.3817
300	Existing		2 Yr	NA	0.616	0.095	0.2708	0.097	0.2773
		Unknown	5 Yr	NA	0.616	0.175	0.3572	0.171	0.3561
	Pond - SW of		10 Yr	NA	0.616	0.301	0.3918	0.269	0.3829
	Jane St.		25 yr	NA	0.616	0.455	0.4355	0.423	0.4264
	Area 10.6 ha)		50 Yr	NA	0.616	0.570	0.4668	0.534	0.4573
			100 Yr	NA	0.616	0.700	0.5007	0.639	0.4876
			2 Yr	16.5	16.9514	7.904	7.6039	8.403	7.7975
	Edgeley Pond		5 Yr	23.9	16.9514	13.155	9.6418	13.020	9.5933
NE	<ul> <li>NE of Hwy 7 and Jane St.</li> </ul>	Original	10 Yr	29.8	16.9514	17.612	10.9583	16.441	10.7667
INE	(Servicing Area 793.5	Flow	25 yr	37.2	16.9514	24.601	12.1205	22.296	11.7387
	ha)		50 Yr	44.2	16.9514	29.205	12.8897	26.560	12.4465
			100 Yr	50.6	16.9514	34.582	13.7887	30.879	13.1667



						6-hou	ır AES	12-hour AES		
						(Bloor,	TRCA)	(Bloor, TRCA)		
Quadrant	Existing Pond and Location	Quantity Control Criterion	Storm Return Period	Target Release Rate (m3/s)	Storage Provided (ha.m)	Outflow (m³/s)	Max. Storage Used (ha.m)	Outflow (m³/s)	Max. Storage Used (ha.m)	

Note: 1. Bold values indicate the more conservative (higher) discharge and storage volumes.2. The analysis of the VO model shows that the existing facilities function according to design except for the South Interim SWM Pond in the NWQ, as this is an interim pond once the ultimate solution is designed that the discharge rates are to be met.

3. The quantity control criteria for the Toromont Pond was not available under the existing conditions. That is why it is marked "NA" in the table

#### **1.3** Special Considerations

#### 1.3.1 Retention Volume and Low Impact Development for VMC Southeast Quadrant

As part of previous studies noted for the SE quadrant area, the consideration of LID applications as a feasible alternative was considered and various evaluations were undertaken. To confirm the feasibility of LID features, this assignment included a detailed analysis of LID features and applicability in this area. The study is included in Appendix E of this report and titled Stormwater Retention Guideline- Vaughan Metropolitan Centre Southeast Quadrant ("Stormwater Retention Guideline") prepared in February 2023 by Emmons and Olivier Resources Canada Inc in consultation with the TRCA and is provided in Appendix 4 of the Main Report.

As part of the southeast quadrant future condition, the Black Creek Renewal Class Environmental Assessment (BCR EA) (TMIG, 2018) developed a stormwater management strategy unique for this quadrant, including infiltration trench and stormwater tree trench concepts to retain rainfall in parks and road right-of-way (ROW). The BCR EA also defined criteria for stormwater management within development blocks, including retention, attenuation and water quality.

Plans for the VMC have since evolved, including an expansion of the Southeast Quadrant's eastern boundary from Maplecrete Road to Creditstone Road, which is referenced as Expansion Area A. The expanded southeast quadrant, Expansion Area A is approximately 56% larger than the area considered in the BCR EA. In addition, development proposals have thus far been only able to engage rainwater harvesting practices to address retention criteria within development blocks as ground-level practices, including in adjacent parks, have been challenging due to constraints and conflicting demands.

The purpose of the report was to assess feasibility and provide guidance on stormwater retention in the ROW, parks and open spaces in the original VCM southeast quadrant and Expansion Area A. The Stormwater Retention Guideline – Vaughan Metropolitan Centre Southeast Quadrant document also provides insight for the City and development community to consider various LIDs within public and private lands across the other three VMC quadrants. The 2012 MSMP report was used as a reference and followed the on-site retention requirement. In this study, the on-site controls applied are within developmental sites and not on ROWs. All ROWs are uncontrolled areas.


Although a key feature of the Stormwater Retention Guideline was to assess the retention capacity and feasibility based on the BCR EA recommendations for the original southeast quadrant and Expansion Area A, it was discovered that there was high groundwater throughout this quadrant. Given that the City currently only accepts infiltration type LIDs within the boulevard, the 15mm on-site retention within City right of ways could not be fully achieved. It is noted that although the BCR EA was based on meeting quantity and quality control without the benefit of a storm water pond, the overall assessment of feasibility and ability to fully implement LID targeted solutions was discounted due to high groundwater levels which would not allow achieving the 15 mm retention in the ROW. Therefore, it was recommended to proceed with a new stormwater pond in the southeast quadrant. The SWM pond will be re-assessed to determine if it will meet the City's criteria. The recommended retention target for the public and private development sites within the southeast quadrant remains 15 mm over impermeable and permeable areas.

# 1.3.2 Black Creek Flood Event Evaluation

TRCA updated the hydraulic analysis and floodplain mapping for Black Creek (2020) north of Hwy. 407 which included the spill analysis between Hwy. 400 and Applewood Cres. by Pennsylvania Ave. TRCA's MikeFlood/2D model showed the flow from the Regional storm event will result in a spill and will be conveyed south within the exiting ditch along the east side Highway 400. The new floodplain within the VMC northwest and southwest quadrants result mainly from the Black Creek spill which will occur under the 350 year and Regional storm events. The spill and resulting floodplain do not occur under the 2 year through to 100 year storm events. Figures 1-4 and 1-5 illustrate the flow path of the spill under the 350 year and Regional storm events, from the Black Creek channel east of Highway 400 by Pennsylvania Ave.



Figure 1-4 Extent of Floodplain through the VMC Northwest and Southwest Quadrants under the Regional Event



Figure 1-5 Flow path of Black Creek Spill under the 350 year and Regional storm events



Given the newly identified floodplain in the Northwest and Southwest quadrants is due to the result of the Black Creek spill (under the 350 year and Regional storm events) that occurred at the 90 degree bend east of Highway 400 and North of Pennsylvania Avenue. TRCA has recognized that this area requires special consideration for development/redevelopment. TRCA has noted the following:

Properties in this area may be within the floodplain, or within a floodplain spill, and the corresponding sections of the Living City Policies may apply, which may require mitigation or site-specific flood proofing. TRCA recommends a comprehensive mitigation option at the spill point. For clarity on mitigation options, and to obtain model information, or minimum floodproofing elevation requirements, please contact TRCA for further information.

Additional flow data from the VMC northwest and southwest quadrants should be considered for future hydraulic assessments and/or a spill mitigation study conducted by TRCA and/or City of Vaughan for the Black Creek spill.



# 2.0 Stormwater Servicing Design Criteria

## 2.1 Quality and Quantity Control Criteria

The design criteria for this study area are in accordance with the City of Vaughan's Design Criteria, Toronto and Region Conservation Authority (TRCA) standards, and the Ontario Ministry of Environment Stormwater Management Planning and Design Manual (March 2003). The stormwater control criteria were also established in several previously approved studies including the VMC Municipal Servicing Municipal Class Environmental Assessment Master Plan (MSMP) prepared by TMIG, 2012, the Black Creek Renewal Municipal Class Environmental Assessment (BCR EA), prepared by TMIG, 2018, Black Creek Stormwater Optimization Municipal Class Environmental Assessment Master Plan (BCSOMP) prepared by AECOM. 2012), Hydrologic Analysis of the Black Creek Sub watershed (HABC) prepared by Ander 1986. Table 2-1 compares the SWM criteria for On-site/development sites, public right of ways and end of pipe facility as identified in the 2012 Municipal Servicing Master Plan, 2018 Black Creek Renewal EA and the current VMC Functional Servicing Strategy Report.

SWM	2012 MSMP Applicable to the 4 VMC quadrants	2018 BCR EA – Alternative SWM Strategy applicable to SEQ Only	2024 VMC FSSR
On-site/Development Sites:			
Water Quality	None – to be provided via end of pipe facility	For SEQ: Enhanced (80% TSS removal)	For NWQ, NEQ, & SWQ: None – to be provided via end of pipe facility. For SEQ: Interim scenario: Until the SWM facility is implemented, Enhanced treatment (80% TSS removal) required Ultimate scenario: None – to be provided via end of pipe facility
Water Quantity/Peak Flow	Controlled to 2 year post development. (100 yr less 2 yr runoff stored on-site)	Controlled to 2 year post development. (100 yr less 2 yr runoff stored on-site)	For NWQ, NEQ, & SWQ Controlled to 2 year post development. (100 yr less 2 yr runoff stored on-site) For SEQ: Controlled to 2 year post development. (100 yr less 2 yr runoff stored on-site)
Retention Volume (i.e. Water Balance)	15mm for roof/building footprint and landscape areas only	For SEQ: 15mm for the entire site	For NWQ, NEQ, & SWQ: 15mm for roof/building footprint and landscape areas only For SEQ: 15mm for the entire site

#### Table 2-1: Comparison of SWM Strategy Criteria:



SWM	2012 MSMP Applicable to the 4 VMC quadrants	2018 BCR EA – Alternative SWM Strategy applicable to SEQ Only	2024 VMC FSSR
Water Quality	None - to be provided via end of pipe facility	For SEQ: Via Retention Volume, see below.	For NWQ, NEQ, & SWQ: None – to be provided via end of pipe facility. For SEQ: Interim scenario*: Basic -Enhanced (60%-80% TSS removal) Ultimate scenario**: None – to be provided via end of pipe facility
Water Quantity/Peak Flow	None - to be provided via end of pipe facility	For SEQ: Via Retention Volume, see below.	For NWQ, NEQ, & SWQ: None. For SEQ: None.
Retention Volume (i.e. Water Balance)	None.	For SEQ: 15mm	For NWQ, NEQ, & SWQ: None. For SEQ: None.
End of Pipe Facility		·	
Water Quality	Enhanced (80% TSS removal)	n/a since the pond	For NWQ, NEQ, & SWQ: Enhanced (80% TSS removal) For SEQ: Enhanced (80% TSS removal)
Water Quantity/Peak Flow	Humber River Unit Flow Rates	Was deleted for the BCR EA. The 15mm on-site retention on RoWs is in lieu of the SEQ SWM facility.	For NWQ, NEQ, & SWQ: Humber River Unit Flow Rates For SEQ: Humber River Unit Flow Rates
Retention Volume	None.		Based on subwatershed area and unit release rates
Erosion Control	25mm storm – 48 hours		25mm storm – 48 hours

Notes:

\*Interim Scenario - Water quality for public ROWs: until the proposed SWM facility for the southeast quadrant is constructed or a more feasible SWM strategy for the VMC SEQ is approved, water quality control is required. 60-80% TSS removal is required pending the proposed treatment train approach.

\*\**Ultimate Scenario – Water quality for public ROWs*: The design of the proposed SEQ SWM pond will include quality control for the tributary area. Therefore, once the proposed SEQ SWM pond is constructed, water quality control within the public right of way will no longer be required.

Table 2-2 describes the stormwater management design criteria used in the VMC study area. The table provides details on the quality, erosion and quantity controls used.

Control Measure	Criteria
Quality Control	Enhanced/Level 1 Protection (80% TSS removal) for end of pipe solutions

### Table 2-2: VMC Stormwater Management Design Criteria

Civica Infrastructure Inc. • 330 Rodinea Road, Unit 3, Vaughan, Ontario, Canada, L6A 4P5 • 905-417-9792 | www.civi.ca | info@civi.ca



Control Measure		Criteria			
Erosion Control	Erosion and sediment control measures will be implemented in accordance with the standards of the City of Vaughan. The TRCA has identified that 25mm should be captured for 48 hours for erosion control where SWM ponds are provided.				
Water Balance	The on-site runoff building footprint over the entire sit road allowances.	retention is 15mm and applies to NW, SW, NE quadrants and is determined for and landscape of site developments. For the SE quadrant, the 15mm applies e development. This criterion does not apply to major parks, open spaces, or This criterion came into effect in 2012.			
	Right-of-Way (ROW), Open Parks	Will be uncontrolled unless a previous SWM Report on the study area indicates otherwise			
	Low density residential	Will be controlled downstream by a SWM pond.			
		For <b>existing conditions</b> , will be controlled to 180 L/s/ha unless a previous SWM Report on the study area indicates otherwise			
Quantity Control Quantial, Control Control Quantity Control	<ul> <li>Proposed conditions will be controlled to 180L/s/ha for areas that do not have surcharging downstream from the proposed developments. (180 L/s/ha control meets the criteria for ICI areas with no basement, residential area 5 yr Stormwater no surcharging, 100 yr Stormwater freeboard &gt; 1.8 m, 100 yr Overland depth &lt; 0.15 m for Arterial and &lt;0.3 m for local and collector road)</li> <li>If there are surcharging pipes downstream from the proposed developments the 2 year post development control was applied. (2 yr post plus 15 mm retention control meet the criteria for ICI areas with no basement, residential area 5 yr Stormwater no surcharging, 100 yr Stormwater freeboard &gt;1.8 m, 100 yr Overland depth &lt; 0.15 m for Arterial and collector no surcharging, 100 yr stormwater freeboard &gt;1.8 m, 100 yr Overland depth &lt; 0.15 m for Arterial area 5 yr Stormwater no surcharging, 100 yr Stormwater freeboard &gt;1.8 m, 100 yr Overland depth &lt; 0.15 m for Arterial area 5 yr Stormwater no surcharging, 100 yr Stormwater freeboard &gt;1.8 m, 100 yr Overland depth &lt; 0.15 m for Arterial area 5 yr Stormwater no surcharging, 100 yr Stormwater freeboard &gt;1.8 m, 100 yr Overland depth &lt; 0.15 m for Arterial area 5 yr for here area (0.2 m for Arterial area)</li> </ul>				
		<ul> <li>If surcharging is still present downstream from pipes than resizing will be proposed. Solutions within the Secondary Plan Area will be proposed downstream from the development except for sewers that are not affected by future developments. (2 yr post plus 15 mm retention control has not met the criteria for ICI areas with no basement, residential areas, 5 yr minor no surcharging 100 yr minor freeboard &gt; 1.8 m, 100 yr major &lt; 0.15 m for Arterial and &lt; 0.3 m for local and collector road).</li> </ul>			
	Development Application	Will be controlled according to the quantity control specified in the corresponding SWM Report. (To existing release rate of 180 l/s/ha or 2 year post with 80% impervious as current quantity control criteria)			
	Onsite Storage	The development sites should apply the on-site quantity control criterion of controlling 2-100 year post development flow to the 2 year post flow rate with a maximum of 80% imperviousness as per the MSMP (2012) and BCR Ex (2018)			



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# 2.1.1 Development Blocks

Quantity control is required for all development blocks within the four quadrants of the VMC. Development blocks include privately owned site block developments and public lands excluding right of ways, open space and major parks. The quantity control requirement for development blocks is to control runoff from the redevelopment of a site to the 2-year post development flow rate (with a maximum of 80% imperviousness) for storm events up to and including the 100-year storm event.

All development blocks are assumed to self-contain stormwater runoff where no overland flow leaves the block. The specific storage requirement and flow control measures for each development block will be determined at the site plan development stage. Development blocks within each quadrant have been grouped based on land use and storage volumes determined to achieve the required on-site quantity control flow rates.

# 2.1.2 Stormwater Management Facilities

In addition to on-site controls within the development blocks, end of pipe facilities will also be required to meet quantity control targets. The existing ponds within the northwest, northeast and southwest quadrants will be retrofitted to meet the Table 2-2 criteria. Quantity control within the pond retrofits will provide flood control on a watershed scale. For the southeast quadrant, the VMC Municipal Servicing Master Plan (TMIG, 2012) recommended a new pond be implemented. Subsequently the Black Creek Renewal Environmental Assessment (TMIG, 2018) study provided an alternative SWM strategy that proposed the deletion of the proposed SWM pond. Based on the finding of the LID feasibility investigation for the VMC southeast quadrant for this FSSR, it was determined that LID solutions would not function adequately to meet the intended design recommendation of the BCR SWM strategy. It is also noted that there are site constraints for the pond block resulting in challenges to meeting the TRCA Humber River unit flow rate targets. Further analysis of the MSMP (TMIG 2012) recommendation of a new SWM facility for the VMC southeast quadrant was conducted as part of this study and detailed in Section 4.6. These findings of allowable release rates from a potential SWM facility for the southeast quadrant were shared with the TRCA and will require TRCA approval to establish as acceptable level of quantity control for the SE quadrant including Expansion Area A.

The quantity control criterion for the pond retrofit design within the northwest and southwest quadrants is the control of flow for the 2 year through to and including the 100-year storm events to the TRCA's Humber River unit flow rates for the Black Creek subwatershed. Although the quantity control criterion of meeting the Humber River Unit flow rate, the Stormwater Management Report – Edgeley Pond and Park (WSP, 2021) identifies that the quantity control through the northeast quadrant retrofit SWM facility is post to pre-development flow rates for the 2 year through to the 100 year storm events, which was approved by TRCA. For the southeast quadrant, the allowable release rate is to control post-development flow from the 2 year through to 100 year storms to the pre-development greenfield conditions, pending approval from TRCA. Details regarding the allowable release rate for the proposed southeast quadrant pond are provided in Section 4.6

### 2.1.3 Further Notes on Quantity Control- ROW

It is noted that quantity control for ROWs within the VMC will be left uncontrolled. This is consistent with the 2012 MSMP . However, it should be noted that the BCR (2018) recommended 15mm on-site retention via (infiltration) LIDs for ROWs within the SE quadrant, which is in lieu of the proposed SE quadrant SWM



pond recommended in the MSMP (2012). With the geotechnical investigation for the FSSR, high groundwater within the SE quadrant was determined. Thus, the (infiltration) LID would not be feasible and the 15mm on-site retention could not be achieved. Until a new SWM strategy is established for the SE quadrant, quality control for ROWs within the SE quadrant should be provided as a minimum and can be identified as an interim approach. Although a proposed SWM facility is assessed in this study for the southeast quadrant, the City will conduct a separate study to assess various options for stormwater management in the southeast quadrant to ensure a feasible SWM strategy for the SE quadrant is identified and includes SWM solutions for on-site, ROWs, and end-of-pipe treatment.

# 2.2 Design Storm

### 2.2.1 Dual Drainage Model Design Storm

The model simulates the performance of the storm sewer under the City's 5- and 100-year design storms. The design storms are three-hour storms with a time-to-peak ratio of 0.33 (Chicago-type storm) over 7- minute intervals. Table 2-3 outlines the rainfall intensities for both the 5- and 100-year design storms.

Time	Rain Intensity (mm/hr)		
(hh:mm)	5-Year Storm	100-Year Storm	
7:00	0.0	0.0	
7:07	3.9	6.0	
7:14	4.4	6.9	
7:21	5.3	8.2	
7:28	6.5	10.2	
7:35	8.6	13.8	
7:42	13.2	21.6	
7:49	32.3	55.0	
7:56	137.2	247.8	
8:03	42.5	73.2	
8:10	22.1	36.9	
8:17	15.0	24.7	
8:24	11.5	18.6	
8:31	9.3	15.0	
8:38	7.9	12.6	
8:45	6.9	10.9	
8:52	6.1	9.6	
8:59	5.5	8.6	
9:06	5.0	7.8	
9:13	4.6	7.2	
9:20	4.3	6.6	
9:27	4.0	6.2	

### Table 2-3: Rainfall Intensity for the 5- and 100-Year Design Storms



Time	Rain Intensity (mm/hr)		
(hh:mm)	5-Year Storm	100-Year Storm	
9:34	3.7	5.8	
9:41	3.5	5.4	
9:48	3.3	5.1	
9:55	3.4	5.3	
10:02	0.0	0.0	



# **3.0 Modelling Methodology**

## 3.1 Stormwater Pond Modelling Methodology

The methodology for modelling the stormwater pond requirements is based on the use of Visual Otthymo (VO) for SWM. The procedure for setting up the model consists of the following:

- Analyze the Digital Elevation Model (DEM) data of the area.
- Create a VO model based on existing and proposed drainage patterns and assumptions made.
- Existing Stormwater controls and pond volumes are added to the model based on available conditions information.
- Existing and Proposed Land uses are modelled to assess the impact.
- The appropriate design storm is applied based on watershed requirements

Output from the model provides stormwater storage and discharge rate information that is then used to compare the operating assumptions to the required discharge rates. Storage volume and discharge rate curves are modified to match the target release rate(s).

### 3.2 Dual Drainage Modelling Methodology

Dual drainage modelling requires both surface and piping network information to allow for the evaluation of storm sewer performance and the condition that occur when the major system (road surface areas) are conveying surface runoff. The modelling software used for this task is InfoWorks and the following describes the procedure for setup:

- Delineate drainage area into subcatchments
- Define minor and major systems in the model.
- Confirm model completeness and close/correct data gaps
- Input parameters, controls, and boundary conditions
- Model based on 5 year and 100 year design storm events

The output of the model provides results for the two design storm conditions, the first being the 5 year storm event and confirmation that the minor systems meets the design criteria. The second design storm condition is the 100 year storm event were the performance of the major system meets the design criteria.

Identify the minor and major system design criteria for the 5 year and 100 year storm events in a new paragraph.

#### 3.2.1 Subcatchment Delineation

Delineation includes defining flow paths and boundaries of subcatchments. For existing condition, the topographic-based approach was adopted in which topographic information (DEM) was used to define subcatchment boundaries for the existing land-uses. The proposed development areas were discretized based on property boundaries using the parcel-based approach to facilitate controlled release rates from development areas.



# 4.0 Stormwater Management Pond Modelling

# 4.1 Objective

This section outlines the approach and parameters used to assess watershed conditions for stormwater management using the Visual Otthymo (VO) model. The results of the model are then used to assess outlet control conditions and how outlet flow rates compare to required criteria.

The objective of this section is to assess the difference between existing watershed runoff generation and proposed watershed runoff generation with future land uses and control rate applied to study area. This analysis is used to determine if ponds need to be sized to accommodate additional flow under the post development conditions.

Based on the existing and proposed outlet flow rates, storage requirements were analyzed to determine if the pond has sufficient capacity to meet future post development conditions. If so, then no recommendations are provided. If the pond does exhibit to have capacity constraints, then recommendations are provided to meet requirements. Ponds where post-development outlet flow rates exceed TRCA requirements, these differences are noted and post development conditions are targeted to be at or below the predevelopment condition to demonstrate a net benefit to the watershed.

### 4.2 Stormwater Outlet Scenarios

The following defines the scenarios evaluated for stormwater outlet controls:

- Outlet control target- Based on TRCA criteria and design parameters to meet service level objectives and identify the maximum condition for the analysis
- Existing condition- Based on current (2021) land use conditions and used to model outlet and pond storage quantities which are then compared to the results of the future condition
- Future Condition- Based on future land use conditions at ultimate buildout and used to model outlet and pond storage quantities to assess any mitigation strategies

# 4.3 Catchment Scenarios

The VMC study area is divided into four quadrants based on the existing catchment area delineations. A review of potential catchment scenarios and alternatives was considered and reviewed in reference to the analysis completed for the MSMP (TMIG 2012). There is confirmed to be no changes to the catchment areas as identified in the existing and future condition scenarios and that the proposed areas presented in this report are preferred. Proposed drainage areas and outlets are presented in Figure 4-1.

# 4.4 Current and Future Land Use Modelling Designation

The defined catchment areas and respective NHYD areas are presented in Figure 4-2 and Figure 4-3 for the existing and proposed conditions, respectively. These defined catchment areas were used to determine the impact of future land use changes and mitigating measures that may be needed to meet the defined design criteria and performance constraints.





Figure 4-1: Proposed Drainage Areas to Outlets





Figure 4-2: Existing VO HYDS





Figure 4-3: Proposed VO HYDS



# 4.5 Assumptions

The following parameter assumptions were made for the model development:

- A curve number of 79 is utilized based on Hydrologic Soil Group C/D, which corresponds to clay soils with low permeability coefficients.
- For SE Quadrant curve number of 80 was used from TRCA hydrology model.
- The peak flow generated by storms up to and including the 100-year return period event is to be attenuated to the following:
  - o allowable release rate of 180L/s/ha for existing ICI development blocks;
  - 2-year and 100-year post-development flow rate control, using the 6 and 12 hour AES storm, for proposed development blocks;
- On-site retention requirements of 15mm over building footprint and 10mm over landscape areas was accounted for in the model by calculating a weighted impervious value based on 80 percent level of imperviousness with the 100 year storm less the 2 year excess runoff stored on site.
  - The proposed areas had on-site control with 61% imperviousness for the 5-Yr and 100-Yr design storms
- the impervious depression storage (DPSI) of 1 mm for developed areas (it is assumed that this value is typically 1.0 mm for roads, driveway, and roofs, and an additional 5 mm for initial abstraction for pervious area)

#### 4.5.1 Existing Development Blocks and 180 L/s/ha Release Rate

This section provided further clarification on the release rates for existing development blocks related to the peak flow release rate of 180 l/s/ha.

- It is noted that on-Site Detention of the Hydrological Analysis of the Black Creek Watershed and the Resolution of the Post Development Stormwater Runoff Controls and Facilities for the Vaughan/400 Industrial Park report, prepared by Ander Engineering, revised January 1986 (Ander, 1986) indicated that flows up to the 100 year storm event should be controlled to the 2 year flow with storage kept on-site. The study area for the 1986 Ander report included the northern quadrants of the VMC. The 1986 Ander report was provided to Civica as part of the background info.
- Also, Section 4.3 Storm Drainage Infrastructure and Black Creek (for Existing Infrastructure) of the Municipal Servicing Class Environmental Assessment Master Plan (MSMP) prepared by TMIG in 2012 also indicated that existing individual lots provide on-site control to restrict the peak flow to the 2 year post development runoff rate with on-site storage.

Based on the above, the release rate from existing development sites within the VMC, for at least the sites north of Hwy. 7 should be controlled to the 2 year post. However, for the purpose of this VMC FSSR, the 180L/s/ha. on-site quantity control criterion is acceptable for existing site developments outside and within the VMC and expansion boundaries since the same target rate was applied to the other Integrated Urban Water Mater Plan study areas. The majority of existing development sites within the VMC are/were of industrial land-use.



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Note, as the VMC and expansion areas undergo redevelopment, the 180L/s/ha. target rate can continue to be applied to the external existing industrial sites. Thus, the 180L/s/ha. control rate for the existing industrial lots outside the VMC area remains applicable.

# 4.5.2 TRCA Quantity Control Release Rate Targets

The proposed stormwater management controls from the TRCA Stormwater Management Criteria(2012) are based on the Black Creek, which is a sub-watershed to the Humber River watershed. According to TRCA's Humber River Hydrology Update, the Stormwater Management Quantity Control Release Rate for the Black Creek is the Humber River River Unit Flow Rate, specifically based on, Equation G,Subbasin 46, consistent with TRCA's Stormwater Management Criteria (August 2012).

To bring the southeast quadrant outlet release rates to meet the TRCA's Black Creek subwatershed quantity control criterion (i.e. Humber River unit flow equations), a number of scenarios were assessed based on the changing conditions related to increased service area and the limited applicability of right of way LID measures and on-site treatment and storage options within development sites.

Although the original VMC southeast quadrant was 31.9 ha., the actual drainage area to the proposed SWM pond excludes Jane St. and Hwy. 7, resulting in a 29.1 ha. The actual drainage area of 29.1 ha. was modelled and the results of that configuration are in Table 4-13. Subsequently, the City requested an evaluation of the addition of Expansion Area A (16.4 ha) and a portion of the MTSA area (4.34 ha), outside the VMC boundary limits. This section provides the results of these areas and how they impact servicing capacity of the proposed SWM pond identified in the 2012 Municipal Servicing Master Plan (MSMP) prepared by TMIG.

### 4.5.3 Proposed Storm Pond Configuration

The 2012 MSMP report provided recommendations to proceed with a stormwater management pond based on the then approved VMC servicing area of 31.9 ha. The required and provided pond storage of the proposed southeast quadrant SWM pond as identified in the 2012 MSMP are presented in Table 4-1.

Proposed SWM Pond Storage	Required Storage Volume per 2012 MSMP Proposed Design	Provided/Available Storage Volume per 2012 MSMP Proposed Design
Permanent Pool	5,675	7,769
Active Storage	16,325	20,000
Total Storage Volume	22,000	27,769

#### Table 4-1 SE Quadrant Proposed Pond Volumes

#### 4.5.4 Stormwater Servicing Area

The service area of the VMC southeast quadrant has increased with the addition of Expansion Area A and inclusion of a portion of the MTSA east of Creditstone Road, several scenarios were developed to consider the SWM capacity requirements and the potential impact to the Black Creek sub-watershed quantity control criterion. Table 4-2, below provides the target release rates based on two service areas to the potential future southeast quadrant SWM pond. The first service area considered is comprised of the original VMC southeast quadrant plus Expansion Area A, which equates to 45.43 ha. The second service area considered is the same as the first service area plus the portion of the MTSA 56 south of Hwy 7 for a total drainage area of 49.77 ha Although tributary to the Black Creek, for this Study, the drainage area



east of Creditstone is excluded from the assessment of the proposed southeast quadrant SWM pond and is defined as external drainage area only.

	TRCA' Black Creek Sub- Watershed Quantity Control Criterion	Target Outflow (m <sup>3</sup> /s)	
Return Period	(Humber River Unit Flow – Equation G/Sub-basin 46 )	Service Area 1:	Service 2:
		VMC southeast quadrant as per the	Scenario 1 plus MTSA 56 south of Highway
		(4E 42 ba)	/. (40.77 hz.)
		(45.43 fid.)	(49.77 fid.)
2-year	Q = 7.745 - 0.762ln(A)	0.22	0.24
5-year	Q = 11.468 - 1.123ln(A)	0.33	0.35
10-year	Q = 13.877 - 1.342ln(A)	0.4	0.43
25-year	Q = 17.381 - 1.690ln(A)	0.5	0.54
50-year	Q = 20.164 - 1.973ln(A)	0.57	0.62
100-year	Q = 22.973 - 2.256ln(A)	0.65	0.7

# Table 4-2 TRCA Release Rates for SE Quadrant

#### 4.5.5 Scenarios Considered

Four scenarios were developed to consider the impacts of the added Expansion Area A and a portion of MTSA 56 to the servicing area to the 2012 proposed VMC southeast quadrant SWM pond design. Table 4-3 identifies the various service areas to the 2012 proposed SWM pond, on-site controls/uncontrolled for development sites and type of quantity control criterion for the proposed SWM pond. The greenfield control is based on the assumptions presented in Table 4-4 and were suggested by TRCA for an alternate target flow rate to the Humber River Unit Flow Rate. The review of the greenfield control assessment is yet to be formally approved by TRCA.

#### Table 4-3 Discharge Control Scenarios

Scenarios	Service Area to Proposed SEQ SWM Pond	Area (ha)	On-Site Control for Development Sites	SWM Pond Quantity Control Criterion
1	VMC SE quad plus Expansion Area A	45.43	2 yr – 100 yr flow controlled to 2 year post development	Humber Unit Flow
2	VMC SE quad Expansion Area A	45.43	2 yr – 100 yr flow controlled to 2 year post development	Humber Unit Flow
	MTSA Area	4.34	Uncontrolled	
3	VMC SE quad + Expansion Area A	45.43	Controlled to 2 year post development	Pre-greenfield flow 100 yr event
4	VMC SE quad Expansion Area A	45.43	Controlled to 2 year post development	Pre-greenfield flow 100 yr event
	MTSA Area	4.34	Uncontrolled	



		Pond Target Ou	utflow, Q (m <sup>3/</sup> s)
Return Period	Pre-development/ Greenfield	VMC SE quad Expansion Area A	VMC SE quad Expansion Area A + MTSA
2-year	CN = 80 Tp = 1.41 hr / 1.56 hr	0.39	0.40
5-year		0.66	0.67
10-year		0.87	0.88
25-year		1.14	1.16
50-year		1.36	1.38
100-year		1.58	1.61

#### Table 4-4 Pre-Development/Greenfield Release Rate

#### 4.5.6 Scenario 1

Scenario 1 includes the current VMC boundary area plus Expansion Area A, on-site controls for development sites and the quantity control criteria for the proposed SWM pond is the Humber River Unit Flow Rate. The results of this alternative are presented in Table 4-5. Based on the results the required storage exceeds the available volume of 20,000 m<sup>3</sup> by 589 m<sup>3</sup> (3% of available storage of 2012 pond design).

Detuum Devied	Outflow (m <sup>3</sup> /s)		Poquirad Storage (m3)
Keturn Period	Target	Actual	Kequired Storage (m <sup>2</sup> )
2-year	0.22	0.22	8,723
5-year	0.33	0.32	11,794
10-year	0.40	0.39	13,893
25-year	0.50	0.49	16,558
50-year	0.57	0.57	18,575
100-vear	0.65	0.64	20.589*

#### Table 4-5 Scenario 1 Outflow and Storage Results

Note: \* Required storage exceeded by 589m<sup>3</sup>/3% of available storage volume.

#### 4.5.7 Scenario 2

Scenario 2 includes the current VMC boundary area plus Expansion Area A with on-site controls for development sites and portion of MTSA 56 south of Hwy. 7 (uncontrolled). The quantity control criteria for the proposed SWM pond is Humber River Unit Flow Rate. The results of this scenario are presented in Table 4-6. Based on the results the required storage exceeds the available volume of 20,000m<sup>3</sup> by 2,786m<sup>3</sup> (14% of available storage of 2012 pond design).

#### Table 4-6 Scenario 2 Outflow and Storage Results

Detum Devied	Outflov	Derwined Stenage (m3)		
Return Period	Target Actual		Required Storage (m <sup>3</sup> )	
2-year	0.24	0.25	9,664	
5-year	0.35	0.36	13,074	



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Poturn Deried	Outflov	Paguirad Storage (m3)		
Return Periou	Target	Actual	Required Storage (III-)	
10-year	0.43	0.45	15,390	
25-year	0.54	0.56	18,332	
50-year	0.62	0.64	20,560	
100-year	0.70	0.73	22,786*	

Note: \* Required storage exceeded by 2,786m<sup>3</sup>/14% of available storage volume.

#### 4.5.8 Scenario 3

Scenario 3 includes the current VMC boundary area plus Expansion Area A, on-site controls for development sites and the quantity control criteria for the proposed SWM pond flows based on Greenfield condition. The results of this scenario are presented in Table 4-7. Based on the results the required storage is less than what will be provided for the 2012 SWM pond design and meets the predevelopment greenfield condition.

#### Outflow (m<sup>3</sup>/s) **Return Period** Required Storage (m<sup>3</sup>) Target Actual 0.39 0.39 7,520 2-year 5-year 0.66 0.64 9,392 10-year 0.87 0.81 10,702 1.14 12,370 1.03 25-year 50-year 1.36 1.20 13,627 1.58 1.37 14,870 100-year

#### Table 4-7 Scenario 3 Outflow and Storage Results

#### 4.5.9 Scenario 4

Scenario 4 includes the current VMC boundary area plus Expansion Area A with on-site controls for development sites and portion of MTSA 56 south of Hwy. 7 (uncontrolled). The quantity control criteria for the proposed SWM pond is flows based on Greenfield condition. The results of this scenario are presented in Table 4-8. Based on the results the required storage is less than what will be provided for the 2012 SWM pond design and meets the predevelopment greenfield condition.

#### Table 4-8 Scenario 4 Outflow and Storage Results

Detune Devied	Outflov	Dominal Changes (m3)		
Return Period	Target	Actual	Required Storage (m <sup>2</sup> )	
2-year	0.40	0.40	8,563	
5-year	0.67	0.67	10,830	
10-year	0.88	0.88	12,285	
25-year	1.16	1.16	14,007	
50-year	1.38	1.38	15,284	
100-year	1.61	1.61	16,507	

#### 4.5.10 Scenario 5 – Sensitivity Analysis: Between Scenarios 2 and 4

Scenarios 2 and 4 were evaluated as part of a sensitivity analysis to assess what the actual release rate would be with the full storage capacity of the 2012 proposed SWM pond design under the 100 yr storm



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event (Scenario 5). Table 4-9 summarizes the target release rate based on the Humber River Unit Flow Rate, Greenfield Condition flow rate and the expected release rates achievable by utilizing the available capacity of the 2012 proposed SWM pond design. This data provides a sense of how the fully utilized SWM pond capacity would perform, what the actual flow rates are and how they compare to the two quantity control criteria for the proposed SWM pond.

# Table 4-9 Sensitivity Analysis of Scenario 2 and 4 and Actual Flow Rate Utilizing Storage Capacity of2012 Proposed SWM Pond Design

Return Period	Scenario 2: Humber River Unit Flow Return Rate Period		Scena Greenfield	rio 4: Condition	Scenario 5: Full Utilization of 2012 SWM Pond Design Storage. (20,000m <sup>3)</sup>		
	Target Outflow (m³/s)	Required Storage (m³)	Target Outflow (m³/s)	Required Storage (m <sup>3</sup> )	Target Outflow (m³/s)	Required Storage (m³)	
2-year	0.24	9,664	0.40	8,563	0.31	9,146	
5-year	0.35	13,074	0.67	10,830	0.50	11,996	
10-year	0.43	15,390	0.88	12,285	0.63	13,919	
25-year	0.54	18,332	1.16	14,007	0.81	16,332	
50-year	0.62	20,560	1.38	15,284	0.94	18,146	
100-year	0.70	22,786	1.61	16,507	1.07	19,959	

# 4.5.11 Evaluation and Recommendation

Table 4-10 provides a summary of the results for Scenarios (or Alternative) 1 to 5 under the 100 yr storm event. The location and footprint for the2012 proposed SWM pond design is limited and will require the purchase of existing properties. At the detailed design stage for the proposed southeast quadrant SWM pond, it is recommended that site optimization be undertaken to balance storage capacity and adjustments to the various design parameters used in the above analysis to avoid the need for additional lands. Also, quantity control criterion for the proposed SWM pond may need to be reassessed to balance storage and available lands for the pond.

Therefore, it is recommended that Scenario 5 be considered for the quantity control criterion of the proposed SWM pond. The quantity control criterion for Scenario 5 includes target flow rates for the 2 year through to 100 year storm events between the Humber River Unit Flow Rate (Scenario 2) and the Greenfield Condition (Scenario 4) while maintaining required storage equivalent to the maximum capacity of the 2012 proposed SWM pond design. The servicing area for Scenario 5 includes the current VMC boundary area, Expansion Area A and MTSA 56 south of Hwy. 7. Development sites will also be required to control development site flows to the 2 year post-development flow rate within the current VMC boundary area and Expansion Area A.



Scenario	Service Area VMC Expansion MTSA			On-site Control of Development Sites: 2 yr = 2 year Post Development Or UC = Uncontrolled		Target Q (m³/s)	Actual Q (m³/s)	Required Storage (m³)	
	VIVIC	Area A	WITSA	VIVIC	Area A	IVITSA			
1	Y	Y	N	Y	Y	n/a	0.65	0.64	20,589
2	Y	Y	Y	Y	Y	UC	0.70	0.73	22,786
3	Y	Y	N	Y	Y	n/a	1.58	1.37	14,870
4	Y	Y	Y	Y	Y	UC	1.61	1.61	16,507
5	Y	Y	Y	Y	Y	UC	0.70 to 1.61	1.07	19,959

#### Table 4-10 Summary Storage Required for 100 yr Event Outlet Control

### 4.6 Scenario Results

The results of the modelling outputs are summarized and compared to target criteria in Table 4-11. The information in the table provides the existing available SWM pond storage capacity, the target release rates based on TRCA Humber Watershed equations, and the outflow rate and storage requirements for each of the 6 hr and 12 hr AES design storm. The bolded values in each of the two scenarios represent the more conservate requirement.



Table 4-11:	Proposed	SWM	Facility	Results
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						6-hou (Bloor,	r AES TRCA)	12-hour AES (Bloor, TRCA)	
Quadrant	Proposed Pond and Location	Quantity Control Criterion	Storm Return Period	Allowable Release Rate (m3/s)	Storage Provided (ha.m)	Outflow (m³/s)	Max. Storage Used (ha.m)	Outflow (m³/s)	Max. Storage Used (ha.m)
	North SWM Facility - SW		2 Yr	0.157	1.2536	0.182	0.6139	0.201	0.6647
	of Portage Parkway	Humber	5 Yr	0.232	1.2536	0.264	0.8377	0.281	0.8798
	Applewood	River Unit Flow	10 Yr	0.283	1.2536	0.325	0.9892	0.339	1.0246
	(Servicing		25 yr	0.353	1.2536	0.405	1.1785	0.415	1.2035
	Area 30.4 ha)		50 Yr	0.409	1.2536	0.466	1.3204	0.473	1.3369
			100 Yr	0.465	1.2536	0.526	1.4610	0.531	1.4721
	South SWM	Humber River Unit Flow	2 Yr	0.076	0.2682	0.115	0.1718	0.124	0.1800
t (NW)	Facility - NW of HWY		5 Yr	0.112	0.2682	0.176	0.2384	0.178	0.2413
thwes	Applewood		10 Yr	0.136	0.2682	0.226	0.2841	0.224	0.2827
Nor	(Servicing		25 yr	0.171	0.2682	0.289	0.3409	0.282	0.3340
	ha)		50 Yr	0.198	0.2682	0.338	0.3840	0.325	0.3724
			100 Yr	0.225	0.2682	0.386	0.4270	0.369	0.4119
			2 Yr	0.015	0.0377	0.012	0.0126	0.013	0.0141
	Commerce Superpipe -	Humbor	5 Yr	0.022	0.0377	0.017	0.0178	0.019	0.0192
	north of	River Unit	10 Yr	0.027	0.0377	0.021	0.0209	0.023	0.0222
	(Servicing	FIOW	25 yr	0.034	0.0377	0.026	0.0252	0.027	0.0265
	Area 2.1 ha)		50 Yr	0.039	0.0377	0.030	0.0284	0.032	0.0295
			100 Yr	0.045	0.0377	0.034	0.0314	0.036	0.0323
South	Interchange Pond - NE		2 Yr	0.298	3.3500	0.315	1.3107	0.348	1.4477



						6-hour AES (Bloor, TRCA)		12-hour AES (Bloor, TRCA)	
Quadrant	Proposed Pond and Location	Quantity Control Criterion	Storm Return Period	Allowable Release Rate (m3/s)	Storage Provided (ha.m)	Outflow (m³/s)	Max. Storage Used (ha.m)	Outflow (m³/s)	Max. Storage Used (ha.m)
	of HWY 407 and Hwy 7		5 Yr	0.442	3.3500	0.43	1.7872	0.466	1.9249
	(Servicing Area 65.3	Humber	10 Yr	0.540	3.3500	0.52	2.1195	0.559	2.2525
	ha)	River Unit	25 yr	0.674	3.3500	0.645	2.54	0.682	2.6633
		11000	50 Yr	0.778	3.3500	0.741	2.8598	0.775	2.9729
			100 Yr	0.884	3.3500	0.837	3.1762	0.869	3.2831
		Existing Conditions Flow Rates	2 Yr	7.904	19.3351	6.448	5.7475	6.421	5.6569
JE)	Edgeley Pond - NE		5 Yr	13.155	19.3351	8.507	9.0979	8.169	8.9246
east (N	of Hwy 7 and Jane St.		10 Yr	17.612	19.3351	12.514	10.5994	10.899	10.3191
Vorthe	(Servicing Area 795.9		25 yr	24.601	19.3351	20.491	11.3600	17.622	11.0862
-	ha)		50 Yr	29.205	19.3351	26.566	11.8504	21.875	11.4961
			100 Yr	34.582	19.3351	34.345	12.1745	28.018	11.9135
			2 Yr	0.40	2.0	0.31	0.9146	0.362	0.9929
(SE)	New SWM Facility - NE	Dro	5 Yr	0.67	2.0	0.50	1.1996	0.54	1.2631
heast	ts of HWY 407 and Jane St.	development	10 Yr	0.88	2.0	0.63	1.3919	0.667	1.4453
Sout	(Servicing Area 49.8	/Greenfield	25 yr	1.16	2.0	0.81	1.6332	0.834	1.6723
	ha)		50 Yr	1.38	2.0	0.94	1.8146	0.959	1.8417
			100 Yr	1.61	2.0	1.07	1.9959	1.085	2.0127

Note: 1. Bold values indicate the more conservative (higher) discharge and storage volumes.

2. The SSD/rating curves for the ponds in this table are from development applications, City Study or part of this VMC FSSR study.

3. The discharge-storage curves for North SWM Facility, South SWM Facility, and Commerce Superpipe in the NWQ are taken from FSR, First Vaughan Development Limited - VMC West, July 2018. Prepared by SCS Consulting Ltd. The generated flow for both the North and South SWM facilities are greater than the allowable release rate. It is suggested to complete a pond detailed design to re-assess to determine if pond re-sizing would be suitable.



#### 4.6.1 Black Creek Flow Comparison

The flows at the Black Creek Flow points presented in Table 4-12 for the existing and proposed scenarios are shown in Figure 4-2 and Figure 4-3.

Flow Mode Loostics	Chause Datum Daviad	Flow Rat	:e (m3/s)
Flow Node Location	Storm Return Period	Existing	Proposed
	2 Yr	2.03	1.20
	5 Yr	2.68	1.71
West Branch of Black Creek	10 Yr	3.08	2.05
(NHYD - 60)	25 yr	3.60	2.45
	50 Yr	4.02	2.77
	100 Yr	4.41	3.07
	2 Yr	8.34	8.10
	5 Yr	14.07	10.46
Main Branch of Black Creek	10 Yr	18.64	12.79
(NHYD - 128)	25 yr	26.08	20.33
	50 Yr	31.21	25.58
	100 Yr	36.96	32.70

#### Table 4-12: Existing and Proposed Release to Black Creek

### 4.7 Conclusions and Recommendations

The following sections describe the current condition and future requirements for each of the VMC quadrants and specific ponds therein. Only the major pond locations where long-term solutions are required are described in detail. Where current temporary or interim solutions exist, they will continue as such and will continue in service until replaced by the ultimate stormwater solutions. The VMC study area is the most complex in terms of function and timing as the rapid growth and changes in land use will be occurring concurrently with the completion of the stormwater system and there may continue to be the need for temporary solutions either within city property or as part of private site controls as infrastructure is completed. This report recognizes these challenges and takes the approach to identify the ultimate solution and then comment on the transition challenges and opportunities that may be encountered from the current condition.

Storm drainage alternatives were explored and reviewed based on current and future planning considerations and compared to previous reports and studies that have been completed and that have informed current stormwater studies and projects. Based on the commitments in place at the time of preparing this report, further evaluation of drainage areas was considered where current drainage



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patterns are defined. Any recommendations within the four VMC quadrants are provided as an advancement to and in support of previous recommendations.

Stormwater management strategies were evaluated and modelled based on previous studies and current approaches and approvals that have been feasible for implementation. Although the goal is to meet TRCA discharge and release rate criteria, there is recognition from the TRCA that existing conditions may prove difficult to remediate to meet current criteria. As current strategies are in line with the TMIG 2012 Municipal Servicing Class EA, this report is continuing with those recommendations and augmenting where current conditions provide flexibility or verification of improved conditions within the land uses and as development progresses.

The preferred stormwater management strategy is presented in the criteria Section 2.0 of this report and are to be referenced.

Recognizing the difference between the TRCA outlet rates for this watershed and the high on site performance targets set for future development, the analysis and conclusions of this report have assessed the impact of various conditions and the sensitivity of achieving these goals compared to end of pipe discharge targets.

There are currently five stormwater ponds servicing the majority of the VMC area in addition to one private pond as described herein. The conclusions for stormwater management based on the above criteria require that the facilities in the NE, NW, SW quadrants be retrofitted to meet the recommended criteria, and that a new pond in the SE quadrant be carried forward as previously recommended.

For each landowner proposed development, supporting calculations and details for each private on site quality control measure will be required by the site plan development stage where these controls are required. The existing SWM facilities within each quadrant will likely not be retrofitted prior to construction commencing within each respective quadrant. Landowners will be required to verify that the existing facilities have the capacity to provide quality control for the redevelopment of a site. Otherwise, on-site quality controls may be required within the various quadrants until the respective SWM ponds are retrofitted/ constructed. The required on-site volume and provided volume for the water balance/retention volume requirement as well, details of the mitigation measures including possible limited application of LIDs to achieve the water balance/retention volume criterion must be provided by the site plan development stage. The City further requires that concept calculations are required for early stages of re/development with details required at site plan/detailed design.

For collection and reuse options, it is recommended that the dual drainage method continue to be used to meet the criteria for the 5 year minor system target and the 100 year major system target of control and conveyance. Where existing constraints are identified in the modelling results, these constraints will not be addressed unless further impact is identified and as a result of redevelopment impacts.

#### 4.7.1 Existing and Proposed Release Rate Improvement to Black Creek.

The overall goal is to reduce future release rates to the Black Creek watershed at the two downstream discharge points with the ideal condition being that the TRCA release rates are met. As previously stated, this study area is constrained and there are limited opportunities to improve conditions based on existing land use and stormwater controls. Overall, and as noted in Table 4-12 the release rates have improved



and continue to exceed TRCA targets. As redevelopment occurs and the more stringent on site controls applied to future land uses, there is the expectation that future flow rates to the watershed will decrease during peak flow conditions. The following sections describe the changes anticipated from the existing conditions to ultimate future conditions as upgrades and additions are completed.

### 4.7.2 Northwest Quadrant

The northwest quadrant drainage areas and outflows under the 100 year storm event are summarized in Table 4-13. The overall outflow for this quadrant is reduced from 2.53 m<sup>3</sup>/s to 1.42 m<sup>3</sup>/s while the overall required storage is also reduced from 2.757 ha\*m to 1.587 ha\*m. Refer to Figure 4-3 for the drainage area plan, location of the SWM ponds within the northwest quadrant and flow node.

Catchment area	Existing Area (ha)	Proposed Area (ha)	Existing Outflow <sup>(1)</sup> (m³/s)	Proposed Outflow <sup>(1)</sup> (m <sup>3</sup> /s)	Existing Available Storage (ha*m)	Proposed Available Storage (ha*m)	TRCA Target <sup>(1,</sup> <sup>2)</sup> (m³/s)
SWM Pond 2 & Interim/Ultimate North Facility	25.23	30.45	1.104	0.526	2.025	1.254	0.465
Interim & Ultimate South SWM Facility	10.60	13.09	0.193	0.208	0.637	0.268	0.225
Commerce Superpipe	2.02	2.09	0.213	0.046	0.042	0.065	0.045
Uncontrolled	8.39	5.46	1.302	1.081	0	0	0.105
On site control	2.24	0	0.317	0	0.053	0	0
Total	48.48	51.09	3.129	1.861	2.757	1.587	0.840
Cumulative Outflow			2.53	1.42			

# Table 4-13 Northwest Quadrant Catchment Area Summary

Note 1- 100 year return period

Note 2- TRCA Target based on proposed areas

The northwest quadrant is serviced by two SWM facilities in the northwest corner of the quadrant, a SWM facility in the southwest corner of the quadrant and a super pipe structure servicing a small area along the south boundary of the quadrant as follows:

# 4.7.2.1 North SWM Facility - Southwest of Portage Parkway and Applewood Crescent and Northwest quadrant Pond Southeast of Portage Parkway and HWY 400

The two existing ponds are located at the northwest corner of the VMC area, between Hwy 400 and Applewood Crescent. There is limited information for the larger and older pond except that the pond provides quantity control. For the smaller pond, immediately southwest of Portage Parkway and Applewood Crescent, the pond provides quantity, quality and erosion controls.

The SCS 2018 report for First Vaughan Development Limited provided a servicing plan as part of the future redevelopment of this area. The proposed north SWM facility was assumed to be an underground storage facility, to accommodate the total required volume, which includes active and permanent pool volume. Although the concept of the underground storage facility was approved by the City for quantity control, the permanent pool was not supported by the City. Thus, a final design of the proposed underground



storage facility and quality control measures are to be provided for the City to review for feasibility and approval.

# 4.7.2.2 South SWM Facility - NW of HWY 7 and Applewood Crescent

The SCS First Vaughan Investment Limited Phase 1 Spine Roads interim Stormwater Management Report (2018) identified a pond for the area in the northwest Quadrant just north of Hwy 7. This interim south SWM pond was constructed and is currently in service providing quantity control, quality control and erosion control for the contributing drainage area. An ultimate SWM facility is proposed for the full build out of the service area. An underground SWM facility is also proposed to replace the interim south SWM pond and was designed to provide active storage and permanent pool to achieve the SWM criteria. Similar to the north ultimate SWM facility, the the concept of the underground storage facility was approved by the City for quantity control, but the permanent pool was not supported by the City. Thus, a final design of the proposed underground storage facility and quality control measure(s) are to be provided for the City to review for feasibility and approval.

# 4.7.2.3 Commerce Superpipe - Commerce north of HWY 7

The SCS 2018 report for First Vaughan Development Limited provided a servicing plan as part of the future redevelopment of this area. The constructed superpipe was designed to provide storage volume required to achieve the quantity control criterion of meeting the Humber River Unit Flow Rates. For quality control, an oil-grit separator with catch basin inserts were implemented to achieve quality control. It should be noted that runoff from the future development sites tributary to the Commerce superpipe are to be controlled to the Humber River Unit Flow rates. As the Commerce superpipe service area undergoes further redevelopment and approvals, confirmation of the function and capacity of the as built superpipe is recommended and verification of performance related to the serviced catchment should be undertaken during site plan approval.

### 4.7.3 Northeast Quadrant

The VMC northeast quadrant is serviced by the existing Edgeley pond, an on-line pond. The Edgeley pond was originally designed in the late 1980's (Ander Engineering, July 1986) and provides quantity control for a tributary area of 767.31 ha., including approximately 49.0 ha. from the VMC area. The Edgeley pond is proposed to be retrofitted to accommodate future redevelopment within the VMC boundary as recognized in the Vaughan Stormwater Management Retrofit Study (2007). A detailed design of the Edgeley Pond retrofit (WSP, 2021) was approved by the Toronto and Region Conservation Authority (TRCA), Ministry of Environment and Conservation (MECP), Department of Fisheries and Ocean (DFO), and York Region. Approval from Ministry of Natural Resources and Forestry is imminent with construction of the retrofit design to commence in 2025 and take a few years to complete. The northeast Quadrant drainage areas and outflow conditions are summarized in Table 4-14. While the outflow remains the same, the overall storage requirement increased from 16.651 ha\*m to 19.335 ha\*m.

Catchment area	Existing Area (ha)	Proposed Area (ha)	Existing Outflow <sup>(1)</sup> (m <sup>3</sup> /s)	Proposed Outflow <sup>(1)</sup> (m <sup>3</sup> /s)	Existing Available Storage (ha*m)	Proposed Available Storage (ha*m)
Edgeley Pond	793.5	795.9	34.582	34.345	16.651	19.335

#### Table 4-14 Northeast Quadrant Catchment Area Summary

Note 1- 100 year return period

Note 2- TRCA Target based on proposed areas



The design parameters modeled within this report are from the 2021 WSP report. Table 4-15 provides a summary of the pond performance from various relevant reports and studies and corroborates the various findings in the recent reports including this FSSR.

Parameters	Municipal Servicing Master Plan (TMIG, 2012)	TRCA Humber River Hydrology Update (Civica, 2018)	WSP SWM Report 2021	Civica FSSR
Drainage Area to EPP (ha.)	767	783	767	795.90
Inflow to EPP (m3/s)	39.6	50.5	56.1	55.74
Outflow from EPP (m3/s)	17.4	32.3	36.9	34.34

#### Table 4-15 Comparison of SWM Pond Performance for the 100 Year Storm Event

Based on these results, it is concluded that the proposed retrofit design to the Edgeley Pond are consistent with the results of this VMC FSSR and no further improvements to the Edgeley Pond retrofit design are required.

### 4.7.4 Southeast Quadrant

The southeast quadrant drainage areas and outflow conditions are summarized in Table 4-16. In considering the recommended Scenario 5 as detailed in Section 4.6.8, Sensitivity Analysis: Between Scenarios 2 and 4, which includes Expansion Area A and the MTSA area south of Hwy. 7. Under the 100 year storm event, the overall flow for the southeast quadrant was reduced from 8.519 m<sup>3</sup>/s, which does not include a SWM facility to 1.070 m<sup>3</sup>/s, the controlled flow from the proposed future SWM facility. The proposed SWM pond for the southeast quadrant is proposed to be located south of Peelar Road and east of the existing and future Black Creek, as noted in the 2012 MSMP (TMIG), also so illustrated in Figure 4-3.

#### Existing Proposed Existing Proposed TRCA Existing Proposed Available Available Target<sup>(1, 2)</sup> Catchment area Outflow<sup>(1)</sup> Outflow<sup>(1)</sup> Area (ha) Area (ha) Storage Storage (m<sup>3</sup>/s) $(m^3/s)$ $(m^3/s)$ (ha\*m) (ha\*m) **Existing Drainage** 1.61 + Expanded Area 62.79 49.77 8.519 1.07 N/A 2.000 +MTSA Area External to 39.77 39.77 7.053 7.053 N/A 0 0.583 **Study Boundary** 15.572 1.010 2.193 Total 102.56 89.54 8.123 2.000

### Table 4-16 Southeast Quadrant Catchment Area Summary

Note 1- 100 year return period

Note 2- TRCA Target based on proposed areas

Note 3 – The Greenfield target rate is used for the existing drainage + Expanded Aera + MTSA

The proposal is to provide a new pond as previously identified in the 2012 MSMP report. As detailed in Section 4.6, the VO modelling was based on four scenarios to assess the performance of the proposed future pond based on 2012 MSMP recommended parameters. The site for this pond is constrained as previously identified in the 2012 MSMP) report and covers 3 parcels that are currently privately owned and operating with ICI activities. There was no ability to consider including additional land for a larger



pond that would be ideal considering the increased catchment area with the addition of the Additional Area A and the MTSA lands.

The assessment confirmed that the Humber River Unit Flow rates could not be achieved with the 2012 MSMP proposed pond design. However, through discussions with TRCA, it was suggested that the quantity control criterion could be a hybrid between the Humber River Unit Flow rate and the pre-development greenfield condition. Although tributary to the Black Creek, for this Study, the area east of Creditstone and south of Hwy. 7 as shown in Figure 4-3, is considered as external and not tributary to the SWM facility.

Although the proposed SWM facility identified in the 2012 MSMP could be implemented to provide water quantity, quality and erosion controls to achieve the SWM criteria, implementing a single SWM facility may not be feasible due to the complexity of the southeast quadrant. Therefore, the City has commenced a separate SWM study to assess various stormwater management measure options to establish a feasible SWM strategy for the VMC southeast quadrant.

#### 4.7.5 Southwest Quadrant

The southwest quadrant drainage areas and outflow conditions are summarized in Table 4-17.

Catchment area	Existing Area (ha)	Proposed Area (ha)	Existing Outflow <sup>(1)</sup> (m³/s)	Proposed Outflow <sup>(1)</sup> (m³/s)	Existing Available Storage (ha*m)	Proposed Available Storage (ha*m)	TRCA Target <sup>(1, 2)</sup> (m <sup>3</sup> /s)
Interchange Pond	53.5	65.3	2.572	0.837	7.868	7.868	0.869
Toromont Pond	10.6	N/A	0.700	N/A	0.616	N/A	N/A
Uncontrolled	0	0	0	0	0	0	0
Total	64.1	65.3	3.272	0.837	8.484	7.868	0.869

#### Table 4-17 Southwest Quadrant Catchment Area Summary

Note 1- 100 year return period

Note 2- TRCA Target based on proposed areas

The condition of the southwest quadrant is that the drainage area will increase for the Interchange pond as the Toromont Pond is removed from service and this catchment redirected to the Interchange watershed area.

### 4.7.5.1 Interchange Pond - NE of HWY 407 and Hwy 7

The current Interchange Pond provides quality, erosion and quantity control for a 62.3 ha area and is located in the southwest corner of the VMC area. The design was completed by G.M. Sernas in 1997 and did not include consideration for onsite controls or the existence of the Toromont SWM pond.

The results of our modelling confirm that there is sufficient storage proposed on the development application submissions and that the final configuration and location is to be determined through the site plan submission and approval process.



# 5.0 Dual Drainage Modelling

# 5.1 Objective

The objective of the dual drainage modeling is to assess the impact of pre and post development land use conditions and how these changes impact the minor system for network capacity and how the overland flows routes are affected for the major system.

As this study is focused on the impact of growth on stormwater management, no recommended upgrades to the minor or major systems are identified unless the service level criteria are violated within the VMC and Expansion Areas A and B. Further, network deficiencies noted on York Region assets including ROW's and infrastructure are excluded from this study.

Therefore, infrastructure improvement recommendations are only recommended for areas within the secondary plan area and downstream from it.

### 5.2 Dual Drainage Scenarios

InfoWorks ICM model was used for the VMC dual drainage model to represent the major and minor drainage systems. Two model scenarios were prepared and analyzed for the four VMC quadrants along with Expansion Area A and B and MTSA 56 east of Creditstone including:

- 1. *Existing Condition*: In this scenario, the purpose is to evaluate the capacity of the existing infrastructure, including storm sewers and overland flow routes (i.e. rights-of-way) and the current land uses, as of 2021.
- 2. **Ultimate Future Condition**: In this scenario, the future land uses are applied to assess the impact of development on runoff and infrastructure performance with full build-out of the VMC area as per the 2010 VMC Secondary Plan (revised 2021).

### 5.3 Impervious Area Calculation

Impervious surfaces are land surfaces such as roads, parking lots, and building roofs that prevent rainwater from infiltrating into the ground. The percentage of impervious area under the existing and future conditions were assigned a value based on the land use type. Table 5-1 lists the land use designations identified and the imperviousness percentage assigned for each land use type in the model.

Land Use Designation	Existing and Future Condition Imperviousness (%)
Commercial	95%
Industrial	95%
Institutional	80%
Residential Commercial	80%

Table 5-1: Land Use Type Imperviousness Percentage				
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	1 UDIE 5-1. L	unu ose ivbe	IIIIDerviousriess	Percentuue



Land Use Designation	Existing and Future Condition Imperviousness (%)
High Density Residential	80%
Medium Residential	60%
Estate Residential	40%
Recreational/ Open Space	10%
ROW	90%

#### 5.4 Future Stormwater Peak Flows

The future stormwater peak flows for each future re/development are estimated based on the City of Vaughan's standard runoff coefficients for specific land uses as shown in Table 5-2.

The target rate for ICI was implemented in the model having these sites controlled by the 2-year post development with 15 mm on-site retention with 90% imperviousness. Parks and open spaces are also controlled by the 2-year post development and 15 mm retention with 40% imperviousness.

Landuse	Runoff Coefficient for 5-Year Return Period Storm (R5)
Residential Single family, semi-detached, duplex, triplex, quad	Designer to calculate actual composite runoff coefficient. Minimum = 0.50
Block Residential Development Block town housing, stack town housing, apartments	Designer to calculate actual composite runoff coefficient. Minimum = 0.65
Neighborhood Commercial, Commercial Centre, Institutional	Designer to calculate actual composite runoff coefficient. Minimum = 0.75
Infill Development	Site-specific Designer to calculate actual composite runoff coefficient
Unimproved Open Space <7% Slop	0.25
Unimproved Open Space ≥7% Slope	0.30
Neighborhood Park, Cemetery	0.45
District/Regional Park	0.75
Sodded Area	0.25
Paved and Gravel Areas	0.90
Roof Area	0.90

#### Table 5-2: Runoff Coefficients



# 5.5 Boundary Conditions

Boundary conditions for the downstream receiving location at the storm sewer outlets are modeled based on available information where one of the following conditions prevail:

- i. Where the outfall is directly to the watercourse, the appropriate Hec-Ras model results provided from the TRCA were used to define the receiver elevation for the various return periods.
- ii. Where the outlet condition is unknown or undefined, then a free flow condition is used

Table 5-3 provides the outlet conditions in the model for a 5 year and 100 year design storm.



#### Table 5-3: Outfalls Boundary Water Level and Submerged Under the 5 yr and 100 yr Design Storm

ltem	Outfall Manhole	System Type	Invert Elevation (m)	Obvert Elevation (m)	Existing 5-year Water Level (m)	Existing 100-year Water Level (m)	Proposed 5-year Water Level (m)	Proposed 100-year Water Level (m)	Submerged during the Existing 5- year design storm	Submerged during the Existing 100- year design storm	Submerged during the Proposed 5- year design storm	Submerged during the Proposed 100- year design storm
1 – NEQ	IO12 – Edgeley Pond - west – north outfall	Storm	196.500	198.000	200.180	200.180	200.180	200.180	Yes	Yes	Yes	Yes
2 – NEQ	IO3017_0001 – Edgeley Pond – west – south outfall	Storm	197.300	198.650	200.180	200.180	200.180	200.180	Yes	Yes	Yes	Yes
3 – NEQ	IO303 – Edgeley Pond – east outfall	Storm	197.500	199.300	200.180	200.180	200.180	200.180	Yes	Yes	Yes	Yes
4 – NEQ	OF616 – Black Creek Channel, south Edgeley Pond, east	Storm	196.690	197.290	200.410	200.410	200.410	200.410	Yes	Yes	Yes	Yes
5 – NEQ	OF617 - Black Creek Channel, south Edgeley Pond, west	Storm	196.640	197.315	200.410	200.410	200.410	200.410	Yes	Yes	Yes	Yes
6 - SEQ	OF622 – Black Creek channel, south Hwy. 7 (Hwy. 7 culvert???)	Storm	198.860	199.535	198.700	198.700	198.700	198.700	No	No	No	No
7 - SEQ	OF940 – Black Creek Channel, south Hwy. 7 (from Jane)	Storm	195.980	196.705	196.920	196.920	196.920	196.920	Yes	Yes	Yes	Yes
8 - SEQ	OF1214 – Black Creek Channel, north of Doughton (from Jane)	Storm	196.500	197.025	196.540	196.540	196.540	196.540	No	No	No	No
9 - SEQ	IO283 – Black Creek Channel, south of Doughton (from Doughton)	Storm	195.400	196.750	196.140	196.140	196.140	196.140	No	No	No	No
10 - SEQ	OF1213 – Black Creek Channel – by 7601 Jane (from Jane)	Storm	197.500	198.100	195.510	195.510	195.510	195.510	No	No	No	No
11 - SEQ	OF1215 – Black Creek Channel – by 7581 Jane (from Jane)	Storm	198.000	198.600	195.340	195.340	195.340	195.340	No	No	No	No
12- SEQ	IO285 – Black Creek Channel, south Peelar	Storm	191.000	192.350	193.180	193.180	193.180	193.180	Yes	Yes	Yes	Yes
13 – NWQ	NW_Pond_Out1 – Applewood North Pond	Storm	197.720	199.220	N/A	196.880	196.880	196.880	N/A	No	No	No
14 – NWQ	NW_Pond_Out2 – Applewood North Pond???? – see image below	Storm	197.720	198.920	N/A	196.880	196.880	196.880	N/A	No	No	No
15 – NWQ	NW_Pond_Out3 – Applewood South Pond	Storm	197.470	198.820	N/A	196.790	196.790	196.790	N/A	No	No	No
16 – SWQ	IO472 – Interchange Pond	Storm	189.980	192.380	N/A	190.300	190.300	190.300	N/A	No	No	No
17 - SWQ	STMMH17491 – this is not an outfall, flow continues to the Interchange pond – see image below	Storm	191.650	193.000	N/A	190.300	190.300	190.300	N/A	No	No	No
18- NEQ	ST_AD_5 – Edgeley Pond – north (from Portage Parkway)	Storm	201.500	202.250	N/A	202.110	N/A	N/A	N/A	No	N/A	N/A



#### 5.5.1 Proposed Discharge Control Condition

The land use and discharge criteria conditions were modelled to assess how these criteria met the requirements from Table 2-2. The majority of the existing sites within the VMC study area are industrial and are controlled to 180/s/ha. Under the proposed conditions the ICI secondary plan areas are controlled to the 2 year post development discharge rate with 15 mm of onsite retention with 90% imperviousness. Parks and open spaces are controlled to the 2-year post development and 15 mm on-site retention with 40% imperviousness. The discharge rate control targets for the various land uses are presented in Figure 5-1.





Figure 5-1: Proposed Controls

1	Legend
7	VMC Study Area
1	2-yr Post Control & 15mm retention
	180 L/s/ha Control
21	SWM Pond
	Watercourse
1	
18	
10	
10	
14	
A	
E.	
-	
が形	Vaughan Metropolitan Centre
1	
1	Proposed Controls
	Fioposed controls
and the	Drawn By: T.N. Date: 2024-06-07
1	0 62.5 125 250 Meters



# 5.6 Storm Sewer System Model Approach (Minor System)

For the existing condition scenario, the assumption for Institutional-Commercial-Industrial (ICI) and high-density residential buildings is that they are directly connected to the storm system with on-site conveyance controls. For existing conditions, directly connected sub-catchments were discretized based on lots and blocks, and it was assumed that the 100-year design storm runoff was controlled to 180 L/s/ha, as per the City's design criteria. For redeveloped sites the target flow is based on 2-year post with a maximum 90% imperviousness.

The future condition scenario future land uses were assessed to determine runoff coefficients and to estimate future runoff volumes. The proposed future condition assumes that the parcels within the VMC Secondary Plan area and Expansion Area A and B will be controlled to the 2 year post development discharge rate up to and including the 100-year design storm. Currently, there are no plans to redevelop the lands within MTSA 56 east of Creditstone and lands upstream and external to the VMC boundary. Thus, the 180 L/s/ha. was applied to these lands.

The InfoWorks model uses the Stormwater Management Model (SWMM) routine procedure to calculate runoff over different types of surfaces, and the Horton method to calculate infiltration in pervious areas to determine the flows of the minor storm sewer system. The subsurface conditions in the study area are typically clay soils with low permeability, which corresponds to a soil type C/D based on the SCS hydrologic soil group classification.

# 5.7 Overland Drainage System Model Approach (Major System)

The major system is designed to convey the surface runoff to the minor system inlets (catch basins) and carry flows beyond what the minor system can handle. The model simulates the overland flow paths along with road networks and open natural channels (i.e. roadside ditches and culverts, etc.). For municipal rights-of-way, the existing subcatchments were delineated on a MH-to-MH basis using Civica's VO SWMM flow path tool which utilizes the Digital Elevation Model (DEM) data provided by the City. This approach accounts for the actual topography of the terrain.

Once the existing storm subcatchments were delineated, the pervious and impervious areas were calculated for each subcatchment. The approach taken was to calculate the impervious areas and then assign the pervious areas as the difference between total area minus impervious area.

### 5.8 Level of Service Conditions

### 5.8.1 Storm Sewer System (Minor System)

The storm sewers shall convey the 5-year design storm at a maximum full flow capacity. Therefore, when the pipe is not surcharged, the water level (h) upstream or downstream from the subject storm sewer pipe is above the obvert elevation (H); the flow is less than the pipe's full capacity (backflow) or greater than the pipe's full capacity (bottleneck).

The following criteria determines if the storm sewers are surcharged under a 5-yr design storm event and are presented in the figures as noted and where h is the water depth and H is the pipe height:

- h/H <1: No surcharge is green
- h/H≥1: Surcharge is red



For the 100 year storm event, the target design criteria conditions are as follows:

- i. The maximum HGL in the storm sewer shall be maintained below basement elevation (1.8 m below the ground elevation);
- ii. Shallow sewer systems do not require infrastructure upgrades where the existing sewer HGL is below the obvert of the existing pipe; and
- iii. Where the HGL is above the obvert elevation and the HGL is less than 1.8m below grade, it is recommended to:
  - a. Confirm that the area properties r do not have basements (typical IC and some institutional types)
  - b. Confirm that the area properties connected to the storm sewer have a basement elevation at least 300mm above the HGL
  - c. Deepen the sewer to achieve the 1.8 m freeboard requirement from the surface or mitigate the surcharging condition such that resultant HGL is low enough to mitigate risk of basement flooding.

Based on these criteria, the results of the 100 year storm event are presented in Section 5 figures as follows:

- h < H, pipe segment is illustrated as green in Section 5 figures
- h > H and the freeboard >1.8m, pipe segment is yellow in Section 5 figures
- h > H and the freeboard <1.8m, pipe segment is red in Section 5 figures
  - where;
  - h is the hydraulic grade line elevation, and,
  - H is the pipe height/obvert.

### 5.8.2 Overland System (Major System)

The capacity of the major storm drainage system shall be adequate to carry the remaining discharge from 100year return period storm when the capacity of the minor storm drainage system is exceeded. The overland flow system shall be maintained within the road allowance and no deeper than the recommended standard which varies depending on the type of road. Table 5-4 lists the relevant ponding depths for major storm system as per City of Vaughan Engineering Criteria.

Location	Criteria
Open Spaces	As required for overland flow outlets
Local Roads	Maximum depth of ponding is 0.20 m above the crown of the road (i.e., 0.30 m above the gutter level of the road) and the water level up to the right-of-way
Collector Roads	Maximum depth of ponding is 0.10 m above the crown of the road (i.e., 0.30 m above the gutter level of the road) and the water level up to the right-of-way
Arterial Roads	Maximum depth of ponding/flow is to the crown of the road (i.e., 0.15 m above the gutter level of the road) and the water level up to the right-of-way

#### Table 5-4: Permissible Overland Flow Depth

For the purposes of this analysis, model results are presented based on the following overland flood depth conditions at the critical control points and illustrated in Section 5 figures:


- Flood Depth <0.15m, the overland flow route (i.e. right of way) is illustrated as green,
- 0.15m < Flood Depth < 0.3m, the overland flow route (i.e. right of way) is illustrated as yellow, and,
- Flood Depth >0.3m, the overland flow route (i.e. right of way) is illustrated as red.

#### 5.9 Dual Drainage Results- Existing Condition

The results of the stormwater service model for existing conditions are summarized in this section. The model was used to evaluate the conveyance capacities of each storm sewer pipe and the ponding depths of the major overland flow routes during the 5 and the 100-year design storms, respectively.

#### 5.9.1 Storm Sewer System (Existing Minor System)

The capacity of the existing storm sewer performance under the 5 year design storm is presented in Figure 5-2 where areas not meeting the service level criteria for surcharging are depicted in red. Similarly, the capacity of the existing storm sewer under the 100 year design storm is presented in Figure 5-3 where areas not meeting the service level criteria for surcharging are depicted in red.

#### 5.9.2 Overland Flow System (Existing Major System)

The overland flow system is required when the minor sewer system is surcharged to the point that flow from the sewer is backed up to the surface. The major system model identifies the overland flow paths and the depths of flow under the 100-yr design storm scenario. The depths of the overland flow of the 100-year design storm are shown in Figure 5-4.





*Figure 5-2: Existing Storm Sewer Minor System 5-Year Design Storm Model Results* 





Figure 5-3: Existing Storm Sewer Minor System 100-Year Design Storm Model Results





*Figure 5-4: Existing Major System 100-Year Design Storm Model Results* 



### 5.10 Dual Drainage Modelling Results- Future Condition

The results of the stormwater service model for future conditions are summarized in this section. The model was used to evaluate the conveyance capacities of each storm sewer pipe and the ponding depths of the major overland flow routes during the 5 and 100-year design storms, respectively.

Recommendations for infrastructure improvement are made when:

- The new constraint is due to adding the flow conditions for land use areas that are controlled by the 2 year post development outlet flow limit and 15 mm onsite retention and
- The future flows have increased to the point where the existing conditions are further constrained or now are exceeding the service level targets

#### 5.10.1 Storm Sewer System (Future Minor System)

It is observed that there are a number of sewer pipes experiencing surcharging under the existing conditions. For the proposed minor and major system solutions, surcharging within the Secondary Plan areas and downstream are considered. Downstream pipes that are not affected by the future development will be maintained. Sewer pipes that are within the VMC and Expansion Area A and B and experiencing sewer capacity issues were assessed based on the following criteria:

- For redevelopment within the VMC and Expansion Area A and B as well as downstream areas that already meet the 180 L/s/ha criteria, then no solutions will be proposed.
- If proposed areas for redevelopment and downstream do not meet the 180 L/s/ha criterion then a 2 year post development outlet flow limit and 15 mm onsite retention was applied.
  - The 2-yr post flow rate and 15mm criteria approach was followed from the MSMP2012 TMIG VMC Master Plan EA – November 29, 2012, Final Appendix D – Stormwater Drainage and Management. Appendix D in this report provides the release rate calculations used for VMC
  - On-site control quantity control criterion of controlling 2-100 year post development flow to the 2-year post flow rate with an 80% imperviousness was applied for the proposed redevelopment sites
  - The criteria for 15mm on-site retention for on-site building footprint and landscape areas was applied. The proposed areas had on-site control with 61% imperviousness for the 5-Yr and 100-Yr design storms
- If proposed areas for development and downstream meet the 2 year post development and 15 mm retention criteria, then no solutions will be proposed.
  - It is assumed that ICI areas do not have basements, no surcharging in residential areas for the 5 – year storm, 100 year storm freeboard > 1.8m, 100- year overland depth is <0.15m for arterial and <0.3 m for local and collector roads, therefore</li>
  - If surcharging exists within the Secondary Plan areas and downstream from it, then solutions are proposed

There will not be any proposed solutions for pipes that are surcharging due to backwater from SWM ponds.



Figure 5-5 and Figure 5-6 outlines the study area and the sewer pipes that experience surcharging under the minor system 5 yr and 100 yr design storm events. It is recommended that with the proposed SWM pond located in the SEQ along the south end of the quadrant, the stormwater network will need to be revised to ensure that it can convey flow to the proposed SWM pond. Further investigation is suggested to analyze the stormwater network.





Figure 5-5: Proposed Minor Storm System under Future Conditions (5-Year Design Storm)





Figure 5-6: Proposed Minor Storm System under Future Conditions (100-year Design Storm)



#### 5.10.2 Overland Flow System (Proposed Major System Solutions Under Future Conditions)

The results of the model analysis outline the overland flow depths and flooding locations under the future conditions for the proposed street network and end-of-pipe stormwater management solutions. The results of the major overland flows under the proposed ultimate VMC buildout are shown in Figure 5-7.

City ROWs are designed to convey major system runoff and direct the resulting runoff to SWM facilities before being released back into natural watercourses. The proposed street network and road classification in the VMC study area have been adapted from "Schedule C, Street Network" of the VMC Secondary Plan. The street cross-sections used to convey the future major storm event runoff are defined for each road classification from "Appendix B – Street Cross Sections" of the VMC Secondary Plan.





Figure 5-7: Proposed Major Storm System Under Future Conditions (100- Year Design Storm)



# 5.11 Proposed Solutions

Figure 5-8 shows the proposed stormwater servicing solutions for the VMC study area. The proposed solutions from the dual drainage analysis identify sewer capacity increase for pipes in the northwest, northeast and southeast quadrants. Two ponds in the northwest quadrant are recommended for retrofitting and a new SWM pond is proposed in the southeast quadrant. The new pipes identified in the Figure 5-8 are a part of the City's Secondary Plan. These pipes will be built when the roads are constructed. The new pipes were modelled under the proposed conditions and no deficiencies were observed and performed to meet the City's criteria.

Figure 5-9 and Figure 5-10 show the performance of the proposed solutions for the 5 – year and 100 - year design storm event. As shown in the figure the system can convey stormwater under future conditions. Pipes that indicate to be surcharging in the figure are due to backwater received from the ponds. The pipes are not surcharging due to inadequate storage capacity.





Figure 5-8: Proposed Stormwater Servicing Solutions





Figure 5-9: Storm Sewer System Performance with Proposed Solutions Under 5-Year Design Storm





Figure 5-10: Storm Sewer System Performance with Proposed Solutions Under 100-Year Design Storm



# 5.12 Climate Change Sensitivity Analysis

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A climate change sensitivity analysis was conducted using the City's design criteria based on the August 19, 2005, storm event. The results of this analysis of the proposed solution are presented in Figure 5-11 *and* Figure 5-12.





Figure 5-11: Climate Change(August 19, 2005) Sensitivity Proposed Condition Minor System -





Figure 5-12: Climate Change (August 19, 2005) Sensitivity Proposed Condition Overland System



# 6.0 Cost and Timing

Table 6-1 summarizes the recommended capital projects to accommodate future growth including timing, cost and the applicable environmental assessment project schedule. Details of each project cost can be found in Appendix A.

Project	Description	Total Cost (2024)	Completed By	EA Schedule
SNE-1	101m of 525mm	\$600,000	2028-2036	Exempt
SNW-1	283m of 1,800mm	\$2,500,000	2028-2036	Exempt
SNW-2	234m of 975, 283m of 1,200mm	\$2,500,000	2028-2036	Exempt
SNW-3	508m ranging from 675mm to 2,400mm	\$5,000,000	2028-2036	Exempt
SNW-4	580m ranging from 1,500mm to 2,400mm	\$6,600,000	2028-2036	Exempt
SSE-1	70m of 600mm	\$200,000	2028-2036	Exempt
SSE-2	77m of 450mm, 50m of 600mm, 237m of 1,350mm	\$1,500,000	2028-2036	Exempt
SSE-3	77m of 600mm, 92m of 1,200mm, 194m of 1,350mm	\$1,500,000	2028-2036	Exempt
SSE-4	153m of 675mm, 270m of 1,500mm	\$2,600,000	2028-2036	Exempt
Northwest Quadrant	91 m of 300mm, 115m of 325mm, 93 of 375mm, 219m of 450 mm, 254 of 600 mm, 105m of 750mm, 199m of 825mm, 199m of 975mm and 173m of 1050mm	\$10,400,000	2028-2036	Schedule B
Northeast Quadrant	55 m of 300mm, 104m of 525mm, 199 m of 975mm, 139m of 1050mm, 98m of 1350mm	\$11,100,000	2028-2036	Schedule B
Southeast Quadrant	216 m of 300mm, 61.5m of 450mm, 687.4 m of 525mm, 118.4 m of 600mm, 72.4m of 900mm, 93m of 1200mm and 54m of 1350 mm	\$8,700,000	2028-2036	Schedule B
Southwest Quadrant	184.6m of 300mm, 232 m of 375mm, 614.3m of 450mm, 463m of 525mm, 787.5 m of 600mm, 597m of 675mm, 414m of 752mm, 98.3m of 825mm, 185m of 900mm, 16.7m of 975mm, 197m of 1200mm and 185m of 2250mm	\$15,300,000	2028-2036	Schedule B
Total		\$68,500,000		

#### Table 6-1: Cost Estimate for the Proposed Stormwater Solutions



# Appendix A Cost Estimates

Project ID					
SNE-1					
Reference	Description	Unit	Quantity	Est. Cost	Amount
Construction	ı				
	Supply and install 525 mm pipe,				
	over 4.0 m to 5.0 m in depth	m	101.1	\$2,728.07	\$275 <i>,</i> 808
Subtotal					\$275,808
Construction	n Allowances and Contingency				
	Construction Contingency	10%			\$27,581
Base cost Su	m				\$303,389
Engineering	and Management				
	Engineering Planning	4%			\$12,136
	Engineering Design	10%			\$30,339
	Engineering Construction Services	10%			\$30,339
	City Program Management	3%			\$9,102
	Dense Urban Factor	5%			\$15,169
Support Cos	t Sum				\$97,084
Land for PS	if Required				
	Station Design Capacity	L/s			\$0
Contingency	,				
	Class D Estimate Contingency	25%			\$100,118
Total Projec	t Estimate (2024 dollars)				\$500,592



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S2					
Reference	Description	Unit	Quantity	Est. Cost	Amount
Constructio	n				
	Supply and install 1800 mm pipe,				
	over 4.0 m to 5.0 m in depth	m	283	\$4,831.37	\$1,367,278
Subtotal					\$1,367,278
Constructio	n Allowances and Contingency				
	Construction Contingency		10%		\$136,728
Base cost Su	ım				\$1,504,005
Engineering	and Management				
	Engineering Planning		4%		\$60,160
	Engineering Design		10%		\$150,401
	Engineering Construction Services		10%		\$150,401
	City Program Management		3%		\$45,120
	Dense Urban Factor		5%		\$75,200
Support Cos	st Sum				\$481,282
Land for PS	if Required				
	Station Design Capacity	L/s			\$0
Contingency	¥				
	Class D Estimate Contingency		25%		\$496,322
Total Projec	t Estimate (2024 dollars)				\$2,481,609



SNW-2					
Reference	Description	Unit	Quantity	Est. Cost	Amount
Construction	n				
	Supply and install 975 mm pipe, over 3.0 m to 4.0 m in depth	m	79	\$3,058.29	\$241,605
	Supply and install 975 mm pipe, over 4.0 m to 5.0 m in depth	m	154.7	\$4,061.62	\$628,332
	Supply and install 1200 mm pipe, over 4.0 m to 5.0 m in depth	m	283	\$4,831.37	\$1,367,278
Subtotal					\$1,367,278
Construction	n Allowances and Contingency				
	Construction Contingency	10%			\$136,728
Base cost Su	Im				\$1,504,005
Engineering	and Management				
	Engineering Planning	4%			\$60,160
	Engineering Design	10%			\$150,401
	Engineering Construction Services	10%			\$150,401
	City Program Management	3%			\$45,120
	Dense Urban Factor	5%			\$75,200
Support Cos	t Sum				\$481,282
Land for PS	if Required				
	Station Design Capacity	L/s			\$0
Contingency	/				
	Class D Estimate Contingency	25%			\$496,322
Total Project Estimate (2024 dollars)					



SNW-3					
Reference	Description	Unit	Quantity	Est. Cost	Amount
Constructio	n				
	Supply and install 975 mm pipe, over	er			
	4.0 m to 5.0 m in depth	m	165.3	\$3,058.29	\$505,536
	Supply and install 2100 mm pipe, ove	er			
	4.0 m to 5.0 m in depth	m	32.1	L \$6,039.21	\$193,859
	Supply and install 675 mm pipe, over	er			
	5.0 m to 6.0 m in depth	m	13.6	\$3,539.25	\$48,134
	Supply and install 1050 mm pipe, over	er			
	5.0 m to 6.0 m in depth	m	10.3	\$4,602.40	\$47,405
	Supply and install 2100 mm pipe, over	er			
	5.0 m to 6.0 m in depth	m	141.3	\$6,508.08	\$919,592
	Supply and install 2400 mm pipe, over	er			
	6.0 m to 7.0 m in depth	m	145.4	\$6,976.95	\$1,014,449
Subtotal					- \$2,728,974
Constructio	n Allowances and Contingency				
	Construction Contingency	10	0%		\$272,897
Base cost Su	ım				\$3,001,871
Engineering	and Management				
	Engineering Planning	4	4%		\$120,075
	Engineering Design	10	0%		\$300,187
	Engineering Construction Services	10	0%		\$300,187
	City Program Management	3	3%		\$90,056
	Dense Urban Factor	ļ	5%		\$150,094
Support Cos	st Sum				\$960,599

Land for PS if Required				
Station Design Capacity	L/s	\$0		
Contingency				
Class D Estimate Contingency	25%	\$990,617		
Total Project Estimate (2024 dollars)		\$4,953,087		



Reference Description Unit Quantity Est. Cost   Construction Supply and install 1500 mm pipe,	s <b>t</b> \$5,727.11	Amount
Construction Supply and install 1500 mm pipe,	\$5,727.11	
Supply and install 1500 mm pipe,	\$5,727.11	
aver 50 m to 60 m in death	\$5,727.11	
over 5.0 m to 6.0 m in depth m 290.4		\$1,663,153
Supply and install 2100 mm pipe,		
over 5.0 m to 6.0 m in depth m 182.6	\$6,508.08	\$1,188,376
Supply and install 2400 mm pipe,		
over 6.0 m to 7.0 m in depth m 106.8	\$6,976.95	\$745,138
Subtotal		\$3,596,667
Construction Allowances and Contingency		
Construction Contingency 10%		\$359,667
Base cost Sum		\$3,956,334
Engineering and Management		
Engineering Planning 4%		\$158,253
Engineering Design 10%		\$395,633
Engineering Construction Services 10%		\$395,633
City Program Management 3%		\$118,690
Dense Urban Factor 5%		\$197,817
Support Cost Sum		\$1,266,027
Land for PS if Required		
Station Design Capacity L/s		\$0
Contingency		
Class D Estimate Contingency 25%		\$1,305,590
Total Project Estimate (2024 dollars)		\$6,527,951



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SSE-1					
Reference	Description	Unit	Quantity	Est. Cost	Amount
Construction					
	Supply and install 600 mm pipe,				
	over 2.0 m to 3.0 m in depth	m	67.5	\$1,357.71	\$91,645
Subtotal					\$91,645
Construction	Allowances and Contingency				
	Construction Contingency	10%			\$9,165
Base cost Su	m				\$100,810
Engineering	and Management				
	Engineering Planning	4%			\$4,032
	Engineering Design	10%			\$10,081
	Engineering Construction Services	10%			\$10,081
	City Program Management	3%			\$3,024
	Dense Urban Factor	5%			\$5 <i>,</i> 040
Support Cost	Sum				\$32,259
Land for PS i	f Required				
	Station Design Capacity	L/s			\$0
Contingency					
	Class D Estimate Contingency	25%			\$33,267
Total Project	Estimate (2024 dollars)				\$166,336



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SSE-2					
Reference	Description	Unit	Quantity	Est. Cost	Amount
Construction	1				
	Supply and install 450 mm pipe, over 2.0 m to 3.0 m in depth	m	76.8	\$1,157.50	\$88,896
	Supply and install 600 mm pipe, over 3.0 m to 4.0 m in depth	m	52	\$1,993.99	\$103,687
Γ	Supply and install 1350 mm pipe, over 3.0 m to 4.0 m in depth	m	236.2	\$3,326.15	\$785,638
Subtotal					\$785,638
Construction	n Allowances and Contingency				
	Construction Contingency	10%			\$78,564
Base cost Su	m				\$864,201
Engineering	and Management				
	Engineering Planning	4%			\$34,568
	Engineering Design	10%			\$86,420
	Engineering Construction Services	10%			\$86,420
	City Program Management	3%			\$25,926
	Dense Urban Factor	5%			\$43,210
Support Cos	t Sum				\$276,544
Land for PS	if Required				
	Station Design Capacity	L/s			\$0
Contingency	,				
	Class D Estimate Contingency	25%			\$285,186
Total Projec	t Estimate (2024 dollars)				\$1,425,932



SSE-3						
Reference	Description	Unit	Quantity	Est. Cost	Amount	
Construction	Construction					
	Supply and install 600 mm pipe,					
	over 2.0 m to 3.0 m in depth	m	77	\$1,357.71	\$104,544	
	Supply and install 1200 mm pipe,					
	over 3.0 m to 4.0 m in depth	m	91.6	\$3,768.22	\$345,168	
	Supply and install 1350 mm pipe,					
	over 3.0 m to 4.0 m in depth	m	193.9	\$4,145.04	\$803,723	
Subtotal					\$803,723	
Construction	Allowances and Contingency					
	Construction Contingency	10%			\$80,372	
Base cost Su	m				\$884,095	
Engineering	and Management					
	Engineering Planning	4%			\$35,364	
	Engineering Design	10%			\$88,409	
	Engineering Construction Services	10%			\$88,409	
	City Program Management	3%			\$26,523	
	Dense Urban Factor	5%			\$44,205	
Support Cos	t Sum				\$282,910	
Land for PS i	f Required					
	Station Design Capacity	L/s			\$0	
Contingency	,					
	Class D Estimate Contingency	25%			\$291,751	
Total Project	t Estimate (2024 dollars)				\$1,458,756	



SSE-4						
Reference	Description	Unit	Quantity	Est. Cost	Amount	
Construction						
	Supply and install 675 mm pipe,					
	over 2.0 m to 3.0 m in depth	m	153.4	\$1,706.34	\$261,753	
	Supply and install 1500 mm pipe,					
	over 3.0 m to 4.0 m in depth	m	270.9	\$4,145.04	\$1,122,890	
Subtotal					\$1,384,643	
Construction	Allowances and Contingency					
	Construction Contingency	10%			\$138,464	
Base cost Su	m				\$1,523,107	
Engineering	and Management					
	Engineering Planning	4%			\$60,924	
	Engineering Design	10%			\$152,311	
	Engineering Construction Services	10%			\$152,311	
	City Program Management	3%			\$45,693	
	Dense Urban Factor	5%			\$76,155	
Support Cos	t Sum				\$487,394	
Г						
Land for PS i	f Required					
	Station Design Capacity	L/s			\$0	
Contingency						
	Class D Estimate Contingency	25%			\$502,625	
Total Project	t Estimate (2024 dollars)				\$2,513,127	



Northwest

Quadrant	1				
Reference	Description	Unit	Quantity	Est. Cost	Amount
Construction					
	Supply and install 300 mm pipe, over 3.0 m to 4.0 m in depth	m	91	\$1,640.76	\$149,309
	Supply and install 450 mm pipe, over 2.0 m to 3.0 m in depth	m	46	\$1,157.50	\$53,245
	Supply and install 600 mm pipe, over 3.0 m to 4.0 m in depth	m	254	\$1,993.99	\$506,473
	Supply and install 750 mm pipe, over 3.0 m to 4.0 m in depth	m	105	\$2,527.87	\$265,426
	Supply and install 825 mm pipe, over 3.0 m to 4.0 m in depth	m	199	\$2,679.75	\$533,270
	Supply and install 975 mm pipe, over 3.0 m to 4.0 m in depth	m	173	\$3,058.29	\$529 <i>,</i> 085
	Supply and install 1050 mm pipe, over 4.0 m to 5.0 m in depth	m	109	\$4,256.07	\$463,912
	Storm Pond Construction	m3	33580	\$100.00	\$3,358,000
Subtotal					\$5,709,411
<b>Construction Allow</b>	ances and Contingency				
	Construction Contingency	10%			\$570,941
Base cost Sum					\$6,280,352
Engineering and Ma	anagement				
0 0	Engineering Planning	4%			\$251,214
	Engineering Design	10%			\$628 <i>,</i> 035
	Engineering Construction Services	10%			\$628 <i>,</i> 035
	City Program Management	3%			\$188,411
	Dense Urban Factor	5%			\$314,018
Support Cost Sum					\$2,009,713
Land for Pond if Re	quired				
Contingency					
	Class D Estimate Contingency	25%			\$2,072,516
Total Project Estimation	Total Project Estimate (2024 dollars)				



Northeast Quadrant

Reference	Description	Unit	Quantity	Est. Cost	Amount
Construction					
	Supply and install 300 mm pipe, over				
	2.0 m to 3.0 m in depth	m	55	\$1,033.24	\$56,828
	Supply and install 375 mm pipe, over				
		m	93	\$ \$1,156.35	\$107,541
	3.0 m to 4.0 m in depth	m	115	\$1,640.76	\$188,687
	Supply and install 450 mm pipe, over				
	2.0 m to 3.0 m in depth	m	58	\$2,614.16	\$151,621
	Supply and install 450 mm pipe, over				
	4.0 m to 5.0 m in depth	m	115	\$2,614.16	\$300,629
	Supply and install 525 mm pipe, over				
		m	104	\$1,227.69	\$127,680
	Supply and install 600 mm pipe, over		4.02		6420 400
	2.0 m to 3.0 m m depth	m	102	\$1,357.71	\$138,486
	4 0 m to 5 0 m in denth	m	113	¢4.061.62	¢454.001
	Supply and install 975 mm nine, over	111	112	\$4,001.02	\$454,901
	2.0 m to 3.0 m in depth	m	87	\$2 371 30	\$206 311
	Supply and install 1050 mm pipe.		0,	<i>42,07</i> 1.00	<i>\$200,311</i>
	over 2.0 m to 3.0 m in depth	m	139	\$2,527.87	y \$351,374
	Supply and install 1350 mm pipe,			. ,	. ,
	over 2.0 m to 3.0 m in depth	m	98	\$6,624.97	\$649,247
Subtotal					\$6,100,000
<b>Construction Allow</b>	ances and Contingency				
	Construction Contingency	10%	6		\$610,000
Base cost Sum					\$6,710,000
Engineering and M	anagement				
0 0 0	Engineering Planning	49	6		\$268,400
	Engineering Design	10%	6		\$671,000
	Engineering Construction Services	10%	6		\$671,000
	City Program Management	3%	6		\$201,300
	Dense Urban Factor	5%	6		\$335,500
Support Cost Sum					\$2,147,200

Land for Pond if Required



	Pond Design Capacity	L/s	\$0
Contingency			
	Class D Estimate Contingency	25%	\$2,214,300
Total Project Es	timate (2024 dollars)		\$11,071,500



Southeast Quadrant

Construction	Supply and install 300 mm pipe, over 3.0 m to 4.0 m in depth Supply and install 300 mm pipe, over 4.0 m to 5.0 m in depth Supply and install 450 mm pipe, over 2.0 m to 3.0 m in depth Supply and install 525 mm pipe, over 2.0 m to 3.0 m in depth	m m m	110 106 61.5	\$1,640.76 \$2,464.59	\$180,483 \$261,246
	Supply and install 300 mm pipe, over 3.0 m to 4.0 m in depth Supply and install 300 mm pipe, over 4.0 m to 5.0 m in depth Supply and install 450 mm pipe, over 2.0 m to 3.0 m in depth Supply and install 525 mm pipe, over 2.0 m to 3.0 m in depth	m	110 106 61.5	\$1,640.76 \$2,464.59	\$180,483 \$261,246
	3.0 m to 4.0 m in depth Supply and install 300 mm pipe, over 4.0 m to 5.0 m in depth Supply and install 450 mm pipe, over 2.0 m to 3.0 m in depth Supply and install 525 mm pipe, over 2.0 m to 3.0 m in depth	m	110 106 61.5	\$1,640.76 \$2,464.59	\$180,483 \$261,246
	Supply and install 300 mm pipe, over 4.0 m to 5.0 m in depth Supply and install 450 mm pipe, over 2.0 m to 3.0 m in depth Supply and install 525 mm pipe, over 2.0 m to 3.0 m in depth	m	106 61.5	\$2,464.59	\$261,246
	4.0 m to 5.0 m in depth Supply and install 450 mm pipe, over 2.0 m to 3.0 m in depth Supply and install 525 mm pipe, over 2.0 m to 3.0 m in depth	m	106 61.5	\$2,464.59	\$261,246
	Supply and install 450 mm pipe, over 2.0 m to 3.0 m in depth Supply and install 525 mm pipe, over 2.0 m to 3.0 m in depth	m	61.5	¢1 157 50	
	2.0 m to 3.0 m in depth Supply and install 525 mm pipe, over 2.0 m to 3.0 m in depth	m	61.5	¢1 157 50	
	Supply and install 525 mm pipe, over 2.0 m to 3.0 m in denth	•		\$1,137.50	\$71,186
	2  Lm to $3  Lm$ in denth				4-
		m	574	\$1,227.69	\$704,694
	Supply and install 525 mm pipe, over			<b>4</b>	
	S.o m to 4.o m m deptn	m	86	\$1,855.92	\$159,609
	Suppiy and install 525 mm pipe, over		27.4	ća 700 07	674 740
-	4.0 m to 3.0 m m depth	m	27.4	\$2,728.07	\$74,749
	2.0 m to 3.0 m in denth	m	<b>E7</b>	¢1 2F7 71	677 200
•	Supply and install 600 mm nine, over		57	\$1,55/./I	. 377,389
	3.0 m to 4.0 m in depth	m	61 /	\$1 993 99	\$177 /21
	Supply and install 900 mm pipe over		01.4	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,431 ,431
	4.0 m to 5.0 m in depth	m	72.4	\$3.884.43	\$281,232
:	Supply and install 1200 mm pipe. over		, 2. 1	ço,co 1. 13	<i><i><i>ų</i><sub>2</sub>02,202</i></i>
	4.0 m to 5.0 m in depth	m	53	\$4,831.37	\$256,063
:	Supply and install 1200 mm pipe, over			. ,	. ,
!	5.0 m to 6.0 m in depth	m	40	\$4,831.37	\$193,255
:	Supply and install 1350 mm pipe, over				
4	4.0 m to 5.0 m in depth	m	54	\$6,805.73	\$367,509
:	Storm Pond Construction m3	20000	\$100.00	\$2,000,000	)
Subtotal					\$4,749,847
<b>Construction Allowa</b>	nces and Contingency				
	Construction Contingency	10%	)		\$474,985
Base cost Sum					\$5,224,832

Engineering and Management		
Engineering Planning	4%	\$208,993
Engineering Design	10%	\$522,483
Engineering Construction Services	10%	\$522,483
City Program Management	3%	\$156,745
Dense Urban Factor	5%	\$261,242



#### Support Cost Sum

## \$1,671,946

#### Land for Pond if Required

Contingency		
Class D Estimate Contingency	25%	\$1,724,195
Total Project Estimate (2024 dollars)		\$8,620,973



Southwest Quadrant

Reference	Description	Unit	Quantity E	st. Cost	Amount
Construction					
	Supply and install 300 mm pipe, o	ver			
	2.0 m to 3.0 m in depth	m	156	\$1,033.24	\$161,185
	Supply and install 300 mm pipe, o	ver			
	3.0 m to 4.0 m in depth	m	28.6	\$1,640.76	\$46,926
	Supply and install 375mm pipe, o	ver	60 Q	<u>.</u>	
	2.0 m to 3.0 m m depth	m	60.3	\$1,156.35	\$69,728
	3.0 m to 4.0 m in denth	ver	107 1	¢1 771 02	¢100 772
	Supply and install 375 mm nine	III Ver	107.1	\$1,771.92	\$109,775
	5.0 m to 6.0 m in depth	m	64 7	\$2 788 48	\$180 415
	Supply and install 450 mm pipe, o	ver	01.7	<i>42,700.10</i>	Ŷ100,113
	2.0 m to 3.0 m in depth	m	305.3	\$1.157.50	\$353.386
	Supply and install 450 mm pipe, o	ver		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	, ,
	3.0 m to 4.0 m in depth	m	149	\$1,778.83	\$265,045
	Supply and install 450 mm pipe, o	ver			
	4.0 m to 5.0 m in depth	m	160	\$2,614.16	\$418,266
	Supply and install 525 mm pipe, o	ver			
	2.0 m to 3.0 m in depth	m	359	\$1,227.69	\$440,741
	Supply and install 525 mm pipe, o	ver			
	5.0 m to 6.0 m in depth	m	104	\$2,942.66	\$306,037
	Supply and install 600 mm pipe, o	ver		<b>.</b>	
	2.0 m to 3.0 m in depth	m	458	\$1,357.71	Ş621,830
	Supply and Install 600 mm pipe, o	ver		ć1 000 00	¢202.000
	Supply and install 600 mm pipe of	m	151.5	\$1,993.99	\$302,089
	4.0 m to 5.0 m in depth	m	178	\$2 870 05	\$512 631
	Supply and install 675 mm pipe of	ver	178	JZ,075.55	Ş512,051
	2.0 m to 3.0 m in depth	m	259	\$1.706.34	\$441.942
	Supply and install 675 mm pipe, o	ver		<i>+_,</i>	<i>•</i> • • <b>- / •</b> • -
	3.0 m to 4.0 m in depth	m	229	\$2,358.73	\$540,149
	Supply and install 675 mm pipe, o	ver			
	4.0 m to 5.0 m in depth	m	109	\$3,278.06	\$357,308
	Supply and install 750 mm pipe, o	ver			
	2.0 m to 3.0 m in depth	m	414	\$1,867.42	\$773,113
	Supply and install 825 mm pipe, o	ver			
	5.0 m to 6.0 m in depth	m	98.3	\$3 <i>,</i> 969.57	\$390,209



	Supply and install 900 mm pipe, ov	er				
	2.0 m to 3.0 m in depth	m		78	\$2,219.51	\$173,122
	Supply and install 900 mm pipe, ov	er				
	5.0 m to 6.0 m in depth	m	1	07	\$4,197.39	\$449,121
	Supply and install 975 mm pipe, ov	er				
	6.0 m to 7.0 m in depth	m	16	5.7	\$4,724.36	\$78,897
	Supply and install 1200 mm pipe, ov	er				
	2.0 m to 3.0 m in depth	m	1	97	\$3,023.78	\$595 <i>,</i> 684
	Supply and install 2250 mm pipe, ov	er				
	3.0 m to 4.0 m in depth	m	1	60	\$3 <i>,</i> 965.83	\$634,533
	Supply and install 2250 mm pipe, ov	er				
	4.0 m to 5.0 m in depth	m		25	\$4,976.06	\$124,401
Subtotal						\$8,426,532
<b>Construction Allow</b>	ances and Contingency					
	Construction Contingency	10	0%			\$842 <i>,</i> 653
Base cost Sum						\$9,269,185
Engineering and M	anagement					
	Engineering Planning	4	4%			\$370,767
	Engineering Design	10	0%			\$926,918
	Engineering Construction Services	10	0%			\$926,918
	City Program Management		3%			\$278,076
	Dense Urban Factor	!	5%			\$463,459
Support Cost Sum						\$2,966,139
Land for Pond if Re	quired					
	Pond Design Capacity	m3				\$0
Contingency						

containing circly		
Class D Estimate Contingency	25%	\$3,058,831
Total Project Estimate (2024 dollars)		\$15,294,155



Appendix B VO Model Outputs

# Appendix

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Figure 1. 5 yr- 6 hr AES Storm.	2
Figure 3. 100 yr- 6 hr AES Storm.	2
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Figure 2. 100 yr- 6 hr AES Storm.



# VMC - 5yr- 6hr Storm- Existing Condition

Figure 3. VMC - 5yr- 6hr Storm- Existing Condition.

SSSSS U SS U А А А ААААА v v UU (v 6.2.2013) IIII L v ٧ SS Ũ Ū Ē v v SS Ū Ū AA AA vv SSSSS ບັບບບບັ 000 ππ ΠΠ H H H YYY M M MM MM 000 TM 0 0 0 т т ő Y Y M M M M 0 0 т н н т 0 000 т т н н 000 Developed and Distributed by Smart City Water Inc Copyright 2007 - 2022 Smart City Water Inc All rights reserved. \*\*\*\*\* DETAILED OUTPUT \*\*\*\*\* Input filename: D:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat
Output filename: C:\Users\rhe\AppData\Local\Civica\VH5\562b9aa2-0cdc-4391-a1f5-d8b11ec718d4\42c587f1-e443-4
Summary filename: C:\Users\rhe\AppData\Local\Civica\VH5\562b9aa2-0cdc-4391-a1f5-d8b11ec718d4\42c587f1-e443-4 DATE: 06/18/2024 TIME: 11:03:23 USER: COMMENTS: \_\_\_\_\_ \* \*\* SIMULATION : 5yr Filename: C:\Users\rhe\AppData\ Local\Temp\ 5ba76906-13ea-4b66-90ff-302ac1cad32c\10b1293c READ STORM Ptotal= 47.81 mm Comments: 5 Year 6 Hour AES (Bloor, TRCA) RAIN mm/hr RAIN mm/hr TIME RAIN mm/hr TIME TIME TIME RAIN hrs hrs mm/hr hrs 0.00 0.00 1.75 16.25 3.50 6.69 5.25 0.96 0.25 0.96 2.00 16.25 43.98 3.75 3.82 5.50 0.96 0.75 0.96 2.50 43.98 4.25 1.91 6.00 0.96 2.75 1.00 0.96 5.74 12.43 12.43 4.50 4.75 1.91 0.96 5.74 1.50 3.25 6.69 5.00 0.96 \_\_\_\_\_ CAL TR (ha)= (mm)= 5.48 NASHYD ( 0002) ID= 1 DT= 5.0 min 0002) Area (ha)= Ia (mm)= U.H. Tp(hrs)= Curve Number (CN)= 79.0 # of Linear Res.(N)= 3.00 0.58 NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP. --- TRANSFORMED HYETOGRAPH ----RAIN | mm/hr | 12.43 | TIME RAIN TIME RAIN TIME TIME RAIN hrs 0.083 mm/hr 0.00 hrs 1.667 mm/hr 5.74 hrs hrs mm/hr 0.96 4.83 3.250 0.00 0.00 0.96 0.167 0.250 0.333 1.750 1.833 1.917 5.74 3.333 3.417 6.69 4.92 0.96 16.25 5.00 6.69 0.96 16.25 3.500 6.69 0.96 0.417 0.96 2.000 16.25 3.583 3.667 5.17 6.69 0.96 0.96 6.69 0.583 0.96 2.167 16.25 3.750 5.33 6.69 0.96 0.667 0.96 2.250 2.333 16.25 43.98 3.833 3.917 3.82 3.82 5.42 0.96 0.833 0.96 2.417 2.500 43.98 43.98 4.000 4.083 3.82 5.58 0.96 1.000 0.96 2.583 43.98 4.167 3.82 5.75 0.96 1.083 0.96 2.667 43.98 43.98 4.250 4.333 3.82 5.83 0.96 0.96 1.167 1.91

1.25 1.33 1.41 1.50 1.58	0 0.96 3 5.74 7 5.74 0 5.74 3 5.74 3 5.74	2.833 2.917 3.000 3.083 3.167	12.43 12.43 12.43 12.43 12.43 12.43	4.417 4.500 4.583 4.667 4.750	1.91 1.91 1.91 1.91 1.91	6.00 6.08 6.17 6.25	0.96 0.96 0.96 0.96
Unit Hyd Qpeak	(cms)= (	0.361					
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI	(cms)= ( (hrs)= 3 (mm)= 10 (mm)= 42 ENT = (	0.137 (i) 3.333 5.611 7.810 0.347					
(i) PEAK FLOW D	DES NOT INC	CLUDE BAS	SEFLOW IN	F ANY.			
CALIB	Area	(ha)=	5.48				
1D= 1 DT= 5.0 mnn	lotal In	np(%)= 9	90.00 L	Dir. Conn	.(%)= 9	0.00	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVIOL 4.93 1.00 1.00 191.14 0.013	JS PEF	RVIOUS (i 0.55 1.50 2.00 40.00 0.250	)		
NOTE: RAIN	FALL WAS TH	RANSFORME	D TO	5.0 MIN.	TIME STE	Р.	
	DATN	TR/	NSFORME	HYETOGR	APH	TTME	DATM
hr	s mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.08	3 0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.16	0.00	1.833	16.25	3.417	6.69	4.92	0.96
0.33	3 0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.41	0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.50	0.96	2.083	16.25	3.66/	6.69	5.25	0.96
0.58	7 0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.75	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.83	3 0.96	2.417	43.98	4.000	3.82	5.58	0.96

0.583 0.667 0.750 0.833	0.96 0.96 0.96 0.96	2.167 2.250 2.333 2.417	16.25 16.25 43.98 43.98	3.750 3.833 3.917 4.000	6.69 3.82 3.82 3.82	5.33 5.42 5.50 5.58	0.96 0.96 0.96 0.96
0.917 1.000 1.083 1.167	0.96	2.500 2.583 2.667 2.750	43.98 43.98 43.98 43.98	4.083 4.167 4.250 4.333	3.82 3.82 3.82 1.91	5.67 5.75 5.83 5.92	0.96 0.96 0.96
1.250 1.333 1.417 1.500 1.583	0.96 5.74 5.74 5.74 5.74 5.74	2.833 2.917 3.000 3.083 3.167	12.43 12.43 12.43 12.43 12.43	4.41/ 4.500 4.583 4.667 4.750	1.91 1.91 1.91 1.91 1.91	6.00 6.08 6.17 6.25	0.96 0.96 0.96 0.96
Max.Eff.Inten.(n over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	m/hr)= (min) (min)= (min)= (cms)=	43.98 5.00 5.23 5.00 0.21	(ii)	27.63 10.00 9.30 (ii) 10.00 0.12	1000		
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	(cms)= (hrs)= (mm)= (mm)= ENT =	0.60 2.75 46.81 47.81 0.98		0.04 2.75 23.53 47.81 0.49	*101 0. 2 44 47	IALS* .638 (iii) 2.75 4.48 7.81 ).93	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR( 0058)	OVERFLOW IS OFF						
DT= 5.0 min	OUTFLOW (cms) 0.0000	OUTFLOW STORAGE (cms) (ha.m.) 0.0000 0.0000		00000000000000000000000000000000000000			
	ARI (ha	EA OP	EAK ms)	TPEAK (hrs)	R.V. (mm)		

INFLOW : ID= 2 OUTFLOW: ID= 1	( 0001) ( 0058)	5.480 5.480	0.638	2.75	44.48 44.48
	PEAK FLOW	REDUCTION	[Qout/Qin]	(%)= 87.20	
	MAXIMUM STO	RAGE USED	(ha.	m.)= 0.04	65
CALIB   STANDHYD ( 0003  ID= 1 DT= 5.0 min	     Area   Total Im	(ha)= 11.0 p(%)= 90.0	9 0 Dir.Co	onn.(%)= 9	0.00
Surface Area Dep. Storage Average Slope Length Mannings n	I (ha)= (mm)= : (%)= (m)= =	MPERVIOUS 9.98 1.00 1.00 271.91 0.013	PERVIOUS 1.11 1.50 2.00 40.00 0.250	(i)	
NOTE: RA	INFALL WAS TR	ANSFORMED T	0 5.0 MIN	. TIME STE	Ρ.
T 0. 0. 0. 0. 0. 0. 0. 0. 0. 1. 1. 1. 1. 1. 1. 1. 1.	IME         RAIN           hrs         mm/hr           083         0.00           167         0.00           250         0.00           333         0.96           417         0.96           500         0.96           583         0.96           667         0.966           917         0.966           000         0.966           000         0.966           250         0.966           333         0.966           167         0.966           250         0.966           333         0.966           167         0.966           250         0.966           250         0.966           250         0.966           250         0.966           333         5.74           417         5.74           500         5.74           583         5.74	TIME R hrs mm 1.667 5 1.750 5 1.833 16 1.917 16 2.000 16 2.083 16 2.167 16 2.250 16 2.333 43 2.417 43 2.500 43 2.500 43 2.667 43 2.667 43 2.667 43 2.833 12 3.083 12 3.083 12 3.167 12	ORMED HYETO AIN   TIM /hr   hr .74   3.250 .74   3.333 .25   3.583 .25   3.583 .25   3.583 .25   3.667 .25   3.750 .25   3.750 .25   3.833 .98   4.083 .98   4.084 .98   4.084 .98   4.250 .98   4.250 .98   4.250 .98   4.250 .43   4.583 .43   4.677 .43   4.580 .43   4.750	GRAPH E RAIN 5 mm/hr 12.43 6.69 6.69 6.69 6.69 6.69 3.82 3.82 3.82 3.82 3.82 3.82 3.82 3.82 1.91 1.91 1.91 1.91	TIME         RAIN           hrs         mm/hr           4.83         0.96           5.00         0.96           5.08         0.96           5.17         0.96           5.25         0.96           5.33         0.96           5.50         0.96           5.58         0.96           5.75         0.96           5.83         0.96           5.92         0.96           6.00         0.96           6.17         0.96           6.25         0.96
Max.Eff.Inten ov Storage Coeff Unit Hyd. Tpe Unit Hyd. pea	n.(mm/hr)= er (min) 5. (min)= aak (min)= ak (cms)=	43.98 5.00 6.47 (ii 5.00 0.18	27.63 15.00 ) 10.54 ( 15.00 0.09	ii) *TOT	AI C*
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFAL RUNOFF COEFFI	(cms)= (hrs)= (mm)= L (mm)= CIENT =	1.21 2.75 46.81 47.81 0.98	0.07 2.83 23.53 47.81 0.49	101 1. 2 44 47 0	ALS 279 (iii) .75 .48 .81 .93
(i) CN PROC CN* = (ii) TIME ST THAN TH (iii) PEAK FL	EDURE SELECTE 85.0 Ia EP (DT) SHOULI E STORAGE COE OW DOES NOT I	D FOR PERVI = Dep. Stor D BE SMALLE FFICIENT. NCLUDE BASE	OUS LOSSES: age (Above R OR EQUAL FLOW IF ANY	.) ·.	
RESERVOIR( 0057   IN= 2> QUT= 1   DT= 5.0 min		DW IS OFF W STORAG (ha.m. 0 0.000	E   OUTF )   (cm 0   1.9	ELOW STO Is) (ha 1960 0	RAGE m.) 0.1535
INFLOW : ID= 2 OUTFLOW: ID= 1	( 0003) ( 0057)	AREA Q (ha) ( 11.090 11.090	PEAK TP cms) (h 1.279 1.114	PEAK (rs) 2.75 2.75	R.V. (mm) 44.48 44.48
	PEAK FLOW TIME SHIFT O MAXIMUM STO	REDUCTION F PEAK FLOW RAGE USED	[Qout/Qin] (m (ha.	(%)= 87.09 nin)= 0.00 m.)= 0.08	82

CALIB STANDHYD ( 0004) ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	1.43 90.00	Dir. Conn.(%)=	90.00
Surface Area Dep. Storage Average Slope Length	(ha)= (mm)= (%)= (m)=	IMPERVIO 1.29 1.00 1.00 97.64	US	PERVIOUS (i) 0.14 1.50 2.00 40.00	

		TR4	NSFORME	D HYETOGRA	PH	-	
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	0.96	1.91/	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16 25	2.565	6.69	5.1/	0.96
0.500	0.96	2.065	16 25	3 750	6.69	5 33	0.96
0.565	0.96	2.107	16 25	3 833	3 82	5 42	0.96
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833	0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.917	0.96	2.500	43.98	4.083	3.82	5.67	0.96
1.000	0.96	2.583	43.98	4.167	3.82	5.75	0.96
1.083	0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.167	0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.250	0.96	2.833	12.43	4.417	1.91	6.00	0.96
1.333	5.74	2.91/	12.43	4.500	1.91	6.08	0.96
1.41/	5.74	3.000	12.43	4.583	1.91	6.1/	0.96
1.500	5.74	3.065	12.43	4.007	1 01	0.25	0.90
1.303	5.74	5.10/	12.45	4.750	1.91		
Max.Eff.Inten.(mm/	'hr)=	43.98		27.63			
over (m	nin)	5.00		10.00			
Storage Coeff. (m	nin)=	3.50	(11)	7.57 (ii)			
Unit Hyd. Tpeak (m	nn)=	5.00		10.00			
Unit Hyd. peak (c	ms)=	0.26		0.13	*TOT	AL C+	
		0.16		0.01	~101	ALS"	
TTME TO DEAK /L	ms =	2 75		2 75	0.	207 (111)	
RUNDEE VOLUME (	mm)=	46 81		23 53	44	1 48	
TOTAL RATNEALL (	mm)=	47.81		47.81	47	7.81	
RUNOFF COEFFICIENT	=	0.98		0.49	Ċ	0.93	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

#### \_\_\_\_\_ -----

CALIB STANDHYD ( 0201) ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	0.74 99.00	Dir. Conn.(%)=	99.00
Surface Area	(ha)-	IMPERVI	ous	PERVIOUS (i)	
Dep. Storage	(mm) =	2.0	0	5.00	
Average Slope	(%)=	1.0	0	2.00	

Length Mannings n (m)= = 70.24 0.013 40.00 0.250 NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

### TRANSFORMED HYFTOCRADH

		164	ANSFURMEL	TETUGK	APR		
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
nrs	mm/nr	nrs	mm/nr	nrs	mm/nr	nrs	mm/nr
0.083	0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500	0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.583	0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.667	0.96	2.250	16.25	3.833	3.82	5.42	0.96

0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583	0.96 0.96 0.96 0.96 0.96 5.74 5.74 5.74 5.74	2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	43.98 43.98 43.98 43.98 43.98 43.98 12.43 12.43 12.43 12.43 12.43 12.43	3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750	3.82 3.82 3.82 3.82 1.91 1.91 1.91 1.91 1.91 1.91 1.91	5.50 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten.(mm over ( Storage Coeff. ( Unit Hyd. Tpeak ( Unit Hyd. peak ( PEAK FLOW (	n/hr)= (min)= (min)= (cms)= (cms)=	43.98 5.00 2.87 5.00 0.28 0.09	(ii)	17.87 5.00 4.43 (ii) 5.00 0.23 0.00	*T01 0.	「ALS* .090 (iii)	
TIME TO PEAK ( RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIEN ***** WARNING: STORAGE	(hrs)= (mm)= (mm)= IT = E COEFF. I	2.75 45.81 47.81 0.96	r than	2.75 14.38 47.81 0.30 TIME STEP!	45 47 0	2.75 5.49 7.81 0.95	
(i) CN PROCEDUR CN* = 75 (ii) TIME STEP ( THAN THE ST (iii) PEAK FLOW D	E SELECTE 0 Ia DT) SHOUL ORAGE COE DOES NOT I	D FOR PE = Dep. S D BE SMA FFICIENT NCLUDE B	RVIOUS torage LLER OR ASEFLOW	LOSSES: (Above) EQUAL IF ANY.			
CALIB STANDHYD ( 0202) ID= 1 DT= 5.0 min	Area Total Im	(ha)= ıp(%)= 5	0.49 0.00	Dir. Conn.	(%)= 5	50.00	
Surface Area Dep. Storage Average Slope Length Mannings n	I (ha)= (mm)= (%)= (m)= =	MPERVIOU 0.25 2.00 1.00 57.15 0.013	S PE	RVIOUS (i) 0.25 5.00 2.00 40.00 0.250			
NOTE: RAINFA	ALL WAS TR	ANSFORME	D TO	5.0 MIN. T	IME STE	Ρ.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583 Max.Eff.Inten.(mm	RAIN mm/hr 0.00 0.00 0.96 0.96 0.96 0.96 0.96 0.96	TRA TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.583 2.667 2.750 2.583 2.917 3.000 3.083 3.167 43.98	NSFORME RAIN mm/hr 5.74 16.25 16.25 16.25 16.25 16.25 16.25 16.25 16.25 43.98 43.98 43.98 43.98 43.98 43.98 43.98 12.43 12.43 12.43 12.43	D HYETOGRA TIME hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.583 4.667 4.750 16.94	PH RAIN mm/hr 12.43 6.69 6.69 6.69 6.69 6.69 6.69 6.69 3.82 3.82 3.82 3.82 3.82 3.82 3.82 1.91 1.91 1.91 1.91	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.58 5.57 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.ETT.Inten.(mn over ( Storage Coeff. ( Unit Hyd. Tpeak ( Unit Hyd. peak (	min) min)= min)= cms)=	43.98 5.00 2.54 5.00 0.29	(ii)	16.94 20.00 16.90 (ii) 20.00 0.06	*707	TAL C#	
PEAK FLOW ( TIME TO PEAK ( RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIEN	(cms)= (hrs)= (mm)= (mm)= IT =	0.03 2.75 45.81 47.81 0.96		0.01 2.92 14.38 47.81 0.30	0. 2 30 47	.036 (iii) 2.75 0.07 7.81 0.63	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 75.0 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 ( 0203)  Area  ID= 1 DT= 5.0 min   Total Im	(ha)= 2.95 p(%)= 99.00	Dir. Conn.(%)	= 99.00
I	MPERVIOUS P	ERVIOUS (i)	
Surface Area (ha)=	2.92	0.03	
Dep. Storage (mm)=	2.00	5.00	
Length (m)=	140 24	40.00	
Mannings n =	0.013	0.250	
	ANGEORNER TO		
NOTE: RAINFALL WAS IN	ANSFORMED TO	5.0 MIN. IIME	SIEP.
	TRANSFORM	ED HYETOGRAPH	
TIME RAIN	TIME RAIN	TIME R	AIN TIME RAIN
hrs mm/hr	hrs mm/hr	hrs mm	/hr   hrs mm/hr
0.083 0.00	1.66/ 5./4	3.250 12.	43 4.83 0.96
0.167 0.00	1 833 16 25	3 417 6	69 5.00 0.96
0.333 0.96	1.917 16.25	3.500 6.	69 5.08 0.96
0.417 0.96	2.000 16.25	3.583 6.	69 5.17 0.96
0.500 0.96	2.083 16.25	3.667 6.	69 5.25 0.96
0.583 0.96	2.167 16.25	3.750 6.	69 5.33 0.96
0.667 0.96	2.250 16.25	3.833 3.	82 5.42 0.96
0.750 0.96	2.333 43.98	3.917 3.	82 5.50 0.96
0.833 0.96	2.41/ 43.98	4.000 3.	82 5.58 0.96
1 000 0 96	2 583 43 98	4.065 5.	82 5 75 0 96
1.083 0.96	2.667 43.98	4.250 3.	82 5.83 0.96
1.167 0.96	2.750 43.98	4.333 1.	91 5.92 0.96
1.250 0.96	2.833 12.43	4.417 1.	91 6.00 0.96
1.333 5.74	2.917 12.43	4.500 1.	91 6.08 0.96
1.417 5.74	3.000 12.43	4.583 1.	91 6.17 0.96
1.500 5.74	3.083 12.43	4.667 1.	91 6.25 0.96
1.565 5.74   Max.Eff.Inten.(mm/hr)=	43.98	17.87	91
over (min)	5.00	10.00	
Storage Coeff. (min)=	4.35 (ii)	5.91 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.23	0.15	*TOTAL C*
	0.26	0.00	O 258 (iii)
TIME TO PEAK (brs)=	2 75	2 75	2 75
RUNOFE VOLUME (mm)=	45.81	14.38	45.49
TOTAL RAINFALL (mm)=	47.81	47.81	47.81
RUNOFF COEFFICIENT =	0.96	0.30	0.95
***** WARNING: STORAGE COEFF. I	S SMALLER THAN	TIME STEP!	
(i) CN PROCEDURE SELECTE	D FOR PERVIOUS	LOSSES.	
$CN^* = 75.0$ Ia	= Dep. Storage	(Above)	
(ii) TIME STEP (DT) SHOUL	D BE SMALLER O	R EQUAL	
THAN THE STORAGE COE	FFICIENT.	2 TALL LAS DE LA	
(111) PEAK FLOW DOES NOT I	NCLUDE BASEFLO	W IF ANY.	
DUHYD ( 0204)			
Inlet Cap.= 0.358			
#of Inlets= 1	010000000000000000000000000000000000000	10000000 0000000	
lotal(cms)= 0.4  AREA	OPEAK	(hpc) (mp)	
TOTAL HYD.(ID= 1): 2.95	0.36	2.75 45.49	
MAJOR SYS.(ID= 2): 0.00 MINOR SYS.(ID= 3): 2.95	0.00 0.36	0.00 0.00 2.75 45.49	
NOTE: PEAK FLOWS DO NOT T	NCLUDE BASEFLO	WS IF ANY.	

| ADD HYD ( 0205)|

$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	AREA (ha) 0.74 0.49	QPEAK (cms) 0.090 0.036	TPEAK (hrs) 2.75 2.75	R.V. (mm) 45.49 30.07	_
ID = 3 ( 0205):	1.23	0.126	2.75	39.35	
NOTE: PEAK FLOWS DO	NOT INCL	UDE BASEFL	OWS IF AM	NΥ.	
ADD HYD ( 0205) 3 + 2 = 1 *** W A R N I N G : HYDRO *** W A R N I N G : HYDRO ID1= 3 ( 0205): + ID2= 2 ( 0204): ID = 1 ( 0205): NOTE: PEAK FLOWS DO	AREA (ha) GRAPH 1.23 0.00 1.23 NOT INCL	QPEAK (cms) 0204 <id= 0001 = HYU 0.126 0.000 </id= 	TPEAK (hrs) 2> IS DR 0ROGRAPH ( 2.75 0.00 2.75 0.00 2.75 0.00S IF AM	R.V. (mm) 2003 39.35 0.00 39.35 39.35	
RESERVOIR( 0206)   IN= 2> OUT= 1     DT= 5.0 min   0	VERFLOW (TFLOW (cms) 0.0000 0.0280 0.0410	IS OFF STORAGE (ha.m.) 0.0000 0.0401 0.0647	OUTI (cr 0.0 0.0	FLOW ns) 0500 0830 0000	STORAGE (ha.m.) 0.0898 0.2129 0.0000
INFLOW : ID= 2 ( 0205) OUTFLOW: ID= 1 ( 0206)	AR (h 1. 1.	EA QPE a) (cm 230 0 230 0	AK TI 1s) (1 0.126 0.023	PEAK hrs) 2.75 3.50	R.V. (mm) 39.35 39.06
PEAK TIME SH MAXIMUM	FLOW R IFT OF P STORAG	EDUCTION [ EAK FLOW E USED	Qout/Qin (r (ha	](%)= 17 nin)= 45 .m.)= 0	2.85 5.00 5.0323
ADD HYD ( 0005) 1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.	
ID1= 1 ( 0002): + ID2= 2 ( 0206):	(ha) 5.48 1.23	(cms) 0.137 0.023	(hrs) 3.33 3.50	(mm) 16.61 39.06	
ID = 3 ( 0005):	6.71	0.160	3.33	20.73	
NOTE: PEAK FLOWS DO	NOT INCL	UDE BASEFL	OWS IF AM	WY.	
ADD HYD ( 0005) 3 + 2 = 1 ID1= 3 ( 0005): + ID2= 2 ( 0004):	AREA (ha) 6.71 1.43	OPEAK (cms) 0.160 0.167	TPEAK (hrs) 3.33 2.75	R.V. (mm) 20.73 44.48	
ID = 1 ( 0005):	8.14	0.256	2.75	24.90	
NOTE: PEAK FLOWS DO	NOT INCL	UDE BASEFL	OWS IF AN	NY.	
$\begin{vmatrix} ADD & HYD & ( 0005) \\ 1 + 2 = 3 \end{vmatrix}$	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	
$+ \frac{101-1}{102=2} ( 0057):$	11.09	1.114	2.75	44.48	
ID = 3 ( 0005):	19.23	1.370	2.75	36.19	
ID = 3 ( 0005): NOTE: PEAK FLOWS DO	19.23 NOT INCL	1.370 UDE BASEFL	2.75 OWS IF AM	36.19 WY.	
ID = 3 ( 0005): NOTE: PEAK FLOWS DO	19.23 NOT INCL	1.370 UDE BASEFL	2.75 OWS IF AN	36.19 WY.	
ID = 3 ( 0005): NOTE: PEAK FLOWS DO	19.23 NOT INCL	1.370 UDE BASEFL	2.75 OWS IF AN TPEAK	36.19 WY. R.V.	

+ ID2= 2 ( 0058):	5.48	0.556	2.75 4	4.48		
ID = 1 ( 0005):	24.71	1.927	2.75 3	8.03		
NOTE: PEAK FLOWS D	O NOT INCLU	DE BASEFLO	WS IF ANY.			
RESERVOIR( 0006)    IN= 2> OUT= 1   DT= 5.0 min	OVERFLOW I OUTFLOW (cms) 0.0000 0.7950 0.9350 1.0700 1.1700	S OFF STORAGE (ha.m.) 0.0000 0.3050 0.5080 0.7100 0.9180	OUTFLC (cms) 1.370 2.100 3.000 4.550 6.650	W STOR (ha. 0 1. 0 1. 0 1. 0 1. 0 1. 0 1. 0 2.	AGE m.) 1250 3480 5700 7980 0250	
INFLOW : ID= 2 ( 000 OUTFLOW: ID= 1 ( 000 PEAK	ARE (ha 5) 24.7 6) 24.7 FLOW RE	A QPEA ) (cms) 10 1. 10 0.4 DUCTION [O	<pre>K TPEA ) (hrs )27 2 842 3 put/0inl(%)</pre>	K F 5) ( 2.75 3.33	R.V. (mm) 38.03 38.03	
TIME MAXIM	SHIFT OF PE UM STORAGE	AK FLOW	(min (ha.m.	)= 35.00 )= 0.374	10	
CALIB     NASHYD ( 0011)   A  ID= 1 DT= 5.0 min   I U NOTE: RAINFALL	rea (ha) a (mm) .H. Tp(hrs) WAS TRANSF	= 2.93 = 5.00 = 0.43	Curve Num # of Line 5.0 MIN.	nber (CM ar Res.(M TIME STEF	i)= 79.0 i)= 3.00	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583	RAIN         TI           mm/hr         h           0.00         1.6           0.00         1.7           0.00         1.7           0.00         1.7           0.96         1.9           0.96         2.0           0.96         2.1           0.96         2.1           0.96         2.3           0.96         2.3           0.96         2.3           0.96         2.3           0.96         2.5           0.96         2.5           0.96         2.5           0.96         2.6           0.96         2.7           0.96         2.8           5.74         3.0           5.74         3.0           5.74         3.0           5.74         3.1	TRANSFORM           ME         RAIN           Irs         mm/hr           167         5.74           131         16.25           147         16.25           160         16.25           160         16.25           163         16.25           163         16.25           163         16.25           164         16.25           163         16.25           163         16.25           164         16.25           17         43.98           167         43.98           167         43.98           167         43.98           167         43.98           167         43.98           167         43.98           167         12.43           160         12.43           167         12.43           167         12.43	ED HYETOGR TIME hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750	RAIN           RAIN           mm/hr           12.43           6.69           6.69           6.69           6.69           6.69           3.82           3.82           3.82           3.82           3.82           3.82           1.91           1.91           1.91           1.91           1.91           1.91           1.91           1.91	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.58 5.67 5.58 5.67 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Unit Hyd Qpeak (cm	s)= 0.260					
PEAK FLOW (cm TIME TO PEAK (hr RUNOFF VOLUME (m TOTAL RAINFALL (m RUNOFF COEFFICIENT	s)= 0.087 s)= 3.083 m)= 16.609 m)= 47.810 = 0.347	(i)				
(i) PEAK FLOW DOES	NOT INCLUDE	BASEFLOW	IF ANY.			
CALIB         NASHYD         0401)         A           ID= 1 DT= 5.0 min         I         U	rea (ha) a (mm) .H. Tp(hrs)	= 3.66 = 4.60 = 0.13	Curve Num # of Line	uber (CM ar Res.(M	()= 80.0 ()= 3.00	
NOTE: RAINFALL	WAS TRANSF	ORMED TO	5.0 MIN.	TIME STEP	·.	
TIME hrs 0.083 0.167	RAIN   TI mm/hr   h 0.00   1.6 0.00   1.7	TRANSFORM ME RAIN rs mm/hr 67 5.74 50 5.74	ED HYETOGR  ' TIME  ' hrs   3.250   3.333	APH RAIN   mm/hr   12.43   6.69	TIME hrs 4.83 4.92	RAIN mm/hr 0.96 0.96

0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500	$\begin{array}{c} 0.00 \\ 0.96 \\ 0.96 \\ 0.96 \\ 0.96 \\ 0.96 \\ 0.96 \\ 0.96 \\ 0.96 \\ 0.96 \\ 0.96 \\ 0.96 \\ 0.96 \\ 5.74 \\ 5.74 \\ 5.74 \\ 5.74 \\ \end{array}$	1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	$\begin{array}{c} 16.25\\ 16.25\\ 16.25\\ 16.25\\ 16.25\\ 16.25\\ 16.25\\ 43.98\\ 43.98\\ 43.98\\ 43.98\\ 43.98\\ 12.43\\ 12.43\\ 12.43\\ 12.43\\ 12.43\\ 12.43\\ 12.43\\ \end{array}$	3.417           3.500           3.583           3.667           3.750           3.833           3.917           4.000           4.083           4.167           4.250           4.333           4.417           4.583           4.667           4.750	6.69 6.69 6.69 3.82 3.82 3.82 3.82 3.82 3.82 1.91 1.91 1.91 1.91 1.91	5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.75 5.83 5.92 6.00 6.08 6.17 6.25	0.96 0.96
Unit Hyd Qpeak (	(cms)= 1	.075					
PEAK FLOW ( TIME TO PEAK ( RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIEN	(cms)= 0 (hrs)= 2 (mm)= 17 (mm)= 47 IT = 0	0.198 (i) 2.750 7.324 7.810 0.362					
(i) PEAK FLOW DOE	S NOT INC	LUDE BAS	EFLOW 1	EF ANY.			
CALIB STANDHYD ( 0408) ID= 1 DT= 5.0 min Surface Area Dep. Storage Average Slope	Area Total In (ha)= (mm)= (%)=	(ha)= np(%)= 7 MPERVIOU 0.89 2.00 1.00	1.13 9.00 IS PE	Dir. Conn. ERVIOUS (i) 0.24 5.00 2.00	(%)= 7	9.00	
Length Mannings n	(m)= =	86.79 0.013		40.00			
NOTE: RAINFA	LL WAS TR	ANSFORME	р то	5.0 MIN. T	IME STE	P.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583 Max.Eff.Inten.(mm	RAIN   mm/hr 0.00 0.00 0.96 0.96 0.96 0.96 0.96 0.96	TRA TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167 43.98	NSFORME RAIN mm/hr 5.74 5.74 16.25 16.25 16.25 16.25 16.25 16.25 16.25 16.25 16.25 143.98 43.98 43.98 43.98 43.98 43.98 43.98 12.43 12.43 12.43 12.43	ED HYETOGRAA TIME TIME 1 hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.583 4.417 4.583 4.467 4.583 4.667 4.750 16.94	PH RAIN mm/hr 12.43   6.69   6.69   6.69   6.69   6.69   3.82   1.91   1.91   1.91   1.91	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.50 5.58 5.50 5.58 5.58 5.58 5.75 5.83 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
over ( Storage Coeff. ( Unit Hyd. Tpeak ( Unit Hyd. peak ( PEAK FLOW ( TIME TO PEAK ( RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIEN	min) min)= (ms)= (cms)= (hrs)= (mm)= (mm)= (mm)= (T =	5.00 3.26 5.00 0.27 0.11 2.75 45.81 47.81 0.96	(ii)	20.00 17.62 (ii) 20.00 0.06 0.01 2.92 14.38 47.81 0.30	*TOT 0. 29 47 0	ALS* 115 (iii) .75 .20 .81 .82	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  $CN^* = 75.0$  Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

THAN THE STORAG (iii) PEAK FLOW DOES	GE COEFFICIENT. NOT INCLUDE BASEFLOW	IF ANY.	
RESERVOIR( 4081)   0   IN= 2> OUT= 1     DT= 5.0 min   0	OVERFLOW IS OFF DUTFLOW STORAGE (cms) (ha.m.) 0.0000 0.0000	OUTFLOW STO   (cms) (ha   0.0856 0	0RAGE 1.m.) 0.0385
INFLOW : ID= 2 ( 0408) OUTFLOW: ID= 1 ( 4081) PEAK	AREA QPEAK (ha) (cms) ) 1.130 0.1 ) 1.130 0.0 FLOW REDUCTION FOC	TPEAK (hrs) 15 2.75 147 2.92 nut/Oinl(%)= 40.49	R.V. (mm) 39.20 39.11
TIME SH MAXIMUN	IFT OF PEAK FLOW 1 STORAGE USED	(min)= 10.00 (ha.m.)= 0.02	2 11
CALIB STANDHYD (0412) Are ID= 1 DT= 5.0 min Tot	a (ha)= 0.58 tal Imp(%)= 79.00	Dir. Conn.(%)= 7	9.00
Surface Area (ha) Dep. Storage (mm) Average Slope (%) Length (m) Mannings n	IMPERVIOUS PE )= 0.46 )= 2.00 )= 1.00 )= 62.18 = 0.013	RVIOUS (i) 0.12 5.00 2.00 40.00 0.250	
NOTE: RAINFALL W	NAS TRANSFORMED TO	5.0 MIN. TIME STE	Р.
TIME F hrs mm 0.083 (0 0.167 (0 0.250 (0 0.333 (0 0.417 (0 0.500 (0 0.583 (0 0.667 (0 0.750 (0 0.833 (0 0.917 (0 1.000 (0 1.083 (0 1.167 (0 1.250 (0 1.333 (5) 1.417 (5) 1.500 (5) 1.583 (5)	TRANSFORME RAIN   TIME RAIN n/hr   hrs mm/hr ).00   1.667 5.74 ).00   1.750 5.74 ).00   1.750 5.74 ).00   1.833 16.25 ).96   2.000 16.25 ).96   2.000 16.25 ).96   2.167 16.25 ).96   2.250 16.25 ).96   2.333 43.98 ).96   2.583 43.98 ).96   2.583 43.98 ).96   2.583 43.98 ).96   2.667 43.98 ).96   2.674 43.98 ).96   2.833 12.43 5.74   3.000 12.43 5.74   3.167 12.43 ).74   3.167 12.43 ).74   3.167 12.43 ).74   3.98	D HYETOGRAPH ' TIME RAIN ' hrs mm/hr 3.250 12.43 3.333 6.69 3.417 6.69 3.500 6.69 3.583 6.69 3.583 6.69 3.667 6.69 3.750 6.69 3.833 3.82 3.917 3.82 4.000 3.82 4.083 3.82 4.083 3.82 4.167 3.82 4.250 3.82 4.331 1.91 4.450 1.91 4.583 1.91 4.583 1.91 4.750 1.91 4.750 1.91 16.94	TIME         RAIN           hrs         mm/hr           4.83         0.96           5.00         0.96           5.08         0.96           5.17         0.96           5.25         0.96           5.33         0.96           5.50         0.96           5.50         0.96           5.50         0.96           5.50         0.96           5.50         0.96           5.50         0.96           5.50         0.96           5.51         0.96           5.52         0.96           5.67         0.96           5.75         0.96           5.83         0.96           6.00         0.96           6.00         0.96           6.17         0.96           6.25         0.96
Max.Eff.Inten.(mm/hr) over (min) Storage Coeff. (min) Unit Hyd. Tpeak (min) Unit Hyd. peak (cms) PEAK FLOW (cms) TIME TO PEAK (hrs) RUNOFF VOLUME (mm) TOTAL RAINFALL (mm) RUNOFF COEFFICIENT ****** WARNING: STORAGE COE (i) CN PROCEDURE SE	)= 43.98 ) 5.00 )= 2.67 (ii) )= 5.00 )= 0.29 )= 0.06 )= 2.75 )= 45.81 )= 47.81 = 0.96 EFF. IS SMALLER THAN ELECTED FOR PERVIOUS Ta = Dap Storage	16.94 20.00 17.03 (ii) 20.00 0.06 *TOT 0.00 0.2.92 14.38 47.81 47.81 47.81 0.30 C TIME STEP! LOSSES: (Above)	ALS* 059 (iii) .75 .19 .81 0.82
(ii) TIME STEP (DT) THAN THE STORAC (iii) PEAK FLOW DOES	SHOULD BE SMALLER OR GE COEFFICIENT. NOT INCLUDE BASEFLOW	IF ANY.	

| RESERVOIR( 4121) | OVERFLOW IS OFF | IN= 2---> OUT= 1 | DT= 5.0 min | OUTFLOW STORAGE | OUTFLOW STORAGE

	(cms)	(ha	.m.)	(cms)	(ha	.m.)	
	0.000	AREA	OPEAK	TDEAL	, 0 ,	.0198	
	0412)	(ha)	(cms)	(hrs)	75	(mm) 39 19	
OUTFLOW: ID= 1 (	4121)	0.580	0.0	24 2.	.83	39.00	
PE	AK FLOW		ION [Qo	ut/Qin](%)	= 40.57		
MA	XIMUM STO	RAGE U	SED	(ha.m.)	= 0.01	08	
CALIB	Area	(ha)=	0.51				
ID= 1 DT= 5.0 min	Total Im	ıp(%)= 9	9.00	Dir. Conn.	(%)= 9	9.00	
Surface Area	(ha)=	MPERVIOU 0.50	S PE	RVIOUS (i) 0.01			
Dep. Storage	(mm)=	2.00		5.00			
Length Mannings n	(m)=	58.31		40.00			
	-	ANSFORME	р то	5.0 MTN T	TME STE	Ρ.	
AULT MAIN			2 10		and of E		
TTM	PATN I	TRA	NSFORME	D HYETOGRA	АРН ВАТМ		PATN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.167	0.00	1.750	5.74	3.333	6.69	4.85	0.96
0.250	0.00	1.833 1.917	16.25	3.417 3.500	6.69	5.00	0.96
0.417	0.96	2.000 2.083	16.25	3.583 3.667	6.69	5.17	0.96
0.583	0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.917	0.96	2.500	43.98	4.083	3.82	5.67	0.96
1.000	0.96	2.565	43.98	4.167	3.82	5.83	0.96
1.167	0.96	2.750 2.833	43.98 12.43	4.333	1.91	5.92	0.96
1.333	5.74	2.917 3.000	12.43	4.500 4.583	1.91	6.08	0.96
1.500	5.74	3.083 3.167	12.43 12.43	4.667	1.91	6.25	0.96
Max.Eff.Inten.(m	m/hr)=	43.98		17.87			
over Storage Coeff.	(min) (min)=	5.00	(ii)	5.00 4.13 (ii)	)		
Unit Hyd. Tpeak Unit Hyd. peak	(min)= (cms)=	5.00	-	5.00			
PEAK FLOW	(cms)=	0.06		0.00	*TOT	ALS* 062 (iii)	
TIME TO PEAK	(hrs)=	2.75	2	2.75	2	.75	
TOTAL RAINFALL	(mm)=	47.81		47.81	47	.81	
***** WADNING. CTORA		C SMALLE	D THAN	TTME STER	0		
(i) CN DROCED	DE CUEFF. I	D COP PC		ITHE SIEP!			
(1) CN PROCEDU $CN^* = 7$	5.0 Ia	= Dep. S	torage	(Above)			
THAN THE STEP	TORAGE COE	FFICIENT	ACTELON	EQUAL			
(111) PEAK FLOW	DOES NOT I	NCLUDE B	ASEFLOW	IF ANY.			
CALIB STANDHYD ( 0409)	Area	(ha)=	0.53				
ID= 1 DT= 5.0 min	Total Im	1p(%)= 7	9.00	Dir. Conn.	(%)= 7	9.00	
Surface Area	(ha)=	MPERVIOU 0.42	S PE	RVIOUS (i)	)		
Dep. Storage	(mm)=	2.00		5.00			
Length	(m)=	59.44		40.00			
Mannings n	=	0.013	2	0.250			

	TR	ANSFORMED HYET	TOGRAPH	-	
11ME hrs n 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.583	RAIN         IIME mn/hr         hrs           0.00         1.667           0.00         1.750           0.00         1.833           0.96         1.917           0.96         2.083           0.96         2.167           0.96         2.250           0.96         2.333           0.96         2.583           0.96         2.583           0.96         2.563           0.96         2.563           0.96         2.750           0.96         2.833           5.74         2.917           5.74         3.003           5.74         3.083           5.74         3.167	RAIN         1           mm/hr         1           5.74         3.23           5.74         3.23           16.25         3.43           16.25         3.54           16.25         3.62           16.25         3.61           16.25         3.61           16.25         3.61           16.25         3.71           16.25         3.83           43.98         4.00           43.98         4.00           43.98         4.01           43.98         4.02           43.98         4.02           43.98         4.02           43.98         4.22           43.98         4.22           43.98         4.22           43.98         4.22           43.98         4.22           43.98         4.22           43.98         4.23           4.243         4.63           12.43         4.64           12.43         4.67           12.43         4.67	IME         RAIN           hrs         mm/hr           50         12.43           33         6.69           17         6.69           50         6.69           53         6.69           53         3.82           50         3.82           50         3.82           50         3.82           53         1.91           50         1.91           57         1.91           50         1.91           57         1.91	1 IME 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.67 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten.(mm/hr over (mi Storage Coeff. (mir Unit Hyd. Tpeak (mir Unit Hyd. peak (cms	•)=       43.98         •)       5.00         •)=       2.60         •)=       5.00         •)=       0.29	16.94 20.00 (ii) 16.96 20.00 0.06	(ii)	FAL C+	
PEAK FLOW (cms TIME TO PEAK (hrs RUNOFF VOLUME (mm TOTAL RAINFALL (mm RUNOFF COEFFICIENT	()=       0.05         ()=       2.75         ()=       45.81         ()=       47.81         =       0.96	0.00 2.92 14.38 47.81 0.30	39 47	IALS" .054 (iii) 2.75 9.19 7.81 0.82	
(i) CN PROCEDURE S CN* = 75.0 (ii) TIME STEP (DT) THAN THE STORA (iii) PEAK FLOW DOES RESERVOIR( 4091) IN= 2> OUT= 1 DT= 5.0 min	SELECTED FOR P IA = Dep. SHOULD BE SM GE COEFFICIEN NOT INCLUDE OVERFLOW IS O OUTFLOW ST (cms) (h 0.0000 0	ER THAN TIME S ERVIOUS LOSSES Storage (Abox ALLER OR EQUAL T. BASEFLOW IF AN 	SIEP! S: Ve) VY. TFLOW ST( cms) (ha .0402 (	DRAGE a.m.) 0.0179	
INFLOW : ID= 2 ( 0409 OUTFLOW: ID= 1 ( 4091 PEAK	AREA (ha) ) 0.530 .) 0.530 FLOW REDUC	QPEAK 1 (cms) 0 0.054 0.022 TION [Qout/Qin	TPEAK (hrs) 2.75 2.83 n](%)= 40.85	R.V. (mm) 39.19 38.98	
MAXIMU	MIFT OF PEAK	USED (ha	(min)= 5.00 a.m.)= 0.00	) )99	
$\begin{vmatrix} ADD & HYD & ( & 0420) \\ 1 + 2 = 3 \end{vmatrix}$ ID1= 1 ( & 0404):	AREA Q (ha) ( 0.51 0.	PEAK TPEAK cms) (hrs) 062 2.75	R.V. (mm) 45.49		
+ $ID2= 2 (4081):$ ID = 3 (0420):	1.13 0.	047 2.92 106 2.75	39.11 41.09		
NOTE: PEAK FLOWS DO	NOT INCLUDE	BASEFLOWS IF A	ANY.		
ADD HYD ( 0420)					
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	AKEA Q (ha) ( 1.64 0. 0.53 0.	reak TPEAK cms) (hrs) 106 2.75 022 2.83	к.v. (mm) 41.09 38.98		

NOTE: PEAK FLOWS DO N	NOT INCLUDE BASE	FLOWS IF ANY.		
ADD HYD ( 0420) 1 + 2 = 3 ID1= 1 ( 0420): + ID2= 2 ( 4121):	AREA QPEAK (ha) (cms) 2.17 0.127 0.58 0.024	TPEAK (hrs) 2.75 4 2.83 3	R.V. (mm) 0.58 9.00	
ID = 3 ( 0420):	2.75 0.150	2.75 4	0.25	
NOTE: PEAK FLOWS DO	NOT INCLUDE BASE	FLOWS IF ANY.		
CALIB   STANDHYD ( 0410)  Area  ID= 1 DT= 5.0 min   Tota	a (ha)= 1.1 al Imp(%)= 36.0	1 0 Dir. Conn	.(%)= 27.00	
Surface Area (ha)= Dep. Storage (mm)= Average Slope (%)= Length (m)= Mannings n	IMPERVIOUS = 0.40 = 2.00 = 1.00 = 86.02 = 0.013	PERVIOUS (i 0.71 5.00 2.00 40.00 0.250	)	
NOTE: RAINFALL WA	AS TRANSFORMED T	0 5.0 MIN.	TIME STEP.	
TIME R/ hrs mm, 0.083 0, 0.167 0, 0.250 0, 0.333 0, 0.417 0, 0.500 0, 0.583 0, 0.667 0, 0.750 0, 0.833 0, 0.667 0, 0.750 0, 0.833 0, 0.667 0, 0.750 0, 0.833 0, 0.917 0, 1.000 0, 1.083 0, 0.917 0, 1.167 0, 1.250 0, 1.333 5, 1.417 5, 1.583 5, Max.Eff.Inten.(mm/hr)= over (min) Storage Coeff	TRANSF AIN   TIME R /hr hrs mm 00 1.667 5 00 1.750 5 00 1.833 16 96 1.917 16 96 2.083 16 96 2.167 16 96 2.333 43 96 2.417 43 96 2.583 43 96 2.583 43 96 2.583 43 96 2.667 43 96 2.833 12 74 2.917 12 74 3.000 12 74 3.083 12 74 3.167 12 43.98 5.00 3.24 (jj)	ORMED HYETOGR AIN  ' TIME /hr  ' hrs .74 3.250 .74 3.333 .25 3.417 .25 3.500 .25 3.583 .25 3.667 .25 3.750 .25 3.750 .25 3.750 .25 3.750 .25 3.98 4.000 .98 4.083 .98 4.067 .98 4.250 .98 4.333 .43 4.417 .43 4.500 .98 4.583 .43 4.667 .43 4.750 21.47 20.00 .16 30 (jj)	APH RAIN   TIME mm/hr   hrs 12.43   4.83 6.69   4.92 6.69   5.00 6.69   5.08 6.69   5.17 6.69   5.25 6.69   5.25 6.69   5.33 3.82   5.42 3.82   5.58 3.82   5.58 3.82   5.67 3.82   5.75 3.82   5.83 1.91   5.92 1.91   6.00 1.91   6.17 1.91   6.25 1.91	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)= PEAK FLOW (cms)=	= 3.24 (11) = 5.00 = 0.27 = 0.04	) 16.30 (11 20.00 0.06 0.03	) *TOTALS* 0.061 (iii	i)
RUNOFF VOLUME (mm)= TOTAL RAINFALL (mm)= RUNOFF COEFFICIENT =	45.81 47.81 0.96	16.03 47.81 0.34	24.06 47.81 0.50	
(i) CN PROCEDURE SEL (i) CN PROCEDURE SEL CN* = 75.0 (ii) TIME STEP (DT) S THAN THE STORAGE (iii) PEAK FLOW DOES N	F. IS SMALLER T LECTED FOR PERVII Ia = Dep. Stor HOULD BE SMALLE COEFFICIENT. NOT INCLUDE BASE	HAN TIME STEP OUS LOSSES: age (Above) R OR EQUAL FLOW IF ANY.	1	

RESERVOIR( 4101)	OVERFLOW	IS OFF	5 C		
DT= 5.0 min	OUTFLOW	STOR	AGE	OUTFLOW	STORAGE
	(cms)	(ha.	m.)	(cms)	(ha.m.)
	0.0000	0.0	000	0.0841	0.0375
	AR	EA	QPEAK	TPEAK	R.V.
	(h	a)	(cms)	(hrs)	(mm)

INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0410) 4101)	1.110 1.110	0.061	2.	75 33	24.06 23.96	
PE	AK FLOW	REDUCTIO	N [Qout	/Qin](%)	= 41.27		
I L MA	ME SHIFT O XIMUM STO	RAGE USE	ED.	(min): (ha.m.):	= 35.00 = 0.011	.3	
CALIB   STANDHYD ( 0411)  ID= 1 DT= 5.0 min	Area Total Im	(ha)= 0. p(%)= 79.	.75 .00 Di	r. Conn.	(%)= 79	.00	
Surface Area	(ha)=	MPERVIOUS	PERV:	IOUS (i)			
Dep. Storage Average Slope	(mm)= (%)=	2.00	5	.00			
Length Mannings n	(m)= =	70.71	40	.00			
NOTE: RAINF	ALL WAS TR	ANSFORMED	TO 5.0	O MIN. T	IME STEP	·.	
TIME	RAIN	TRANS	FORMED   RAIN  '	HYETOGRA TIME	PH RAIN	TIME	RAIN
hrs 0.083	mm/hr 0.00	hrs n 1.667	m/hr ' 5.74	hrs 3.250	mm/hr   12.43	hrs 4.83	mm/hr 0.96
0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.333	0.96	1.917 1	6.25	3.500	6.69	5.08	0.96
0.500	0.96	2.083 1	6.25	3.667	6.69	5.25	0.96
0.667	0.96	2.250 1	6.25	3.833	3.82	5.42	0.96
0.833	0.96	2.417 4	13.98	4.000	3.82	5.58	0.96
1.000	0.96	2.583 4	13.98	4.167	3.82	5.75	0.96
1.167	0.96	2.750 4	13.98	4.333	1.91	5.92	0.96
1.333	5.74	2.917 1	2.43	4.500	1.91	6.08	0.96
1.500	5.74	3.083 1	2.43	4.667	1.91	6.25	0.96
Max Eff. Inten. (m	m/hr)=	43.98	16	.94	1.51		
Storage Coeff	(min)	5.00	20 17	.00 24 (ii)			
Unit Hyd. Tpeak	(min)=	5.00	20	.00			
	(cms)=	0.07	0	.00	*TOTA	LS*	
TIME TO PEAK	(hrs)=	2.75	2	.92	2.	75	
TOTAL RAINFALL	(mm)=	47.81	47	.81	47.	81	
***** WARNING . STORAG	E COEEE T		THAN TT	ME STEDI	0.	02	
(i) CN PROCEDU	RE SELECTE	D FOR DEDI		SSES.			
(ii) TIME STEP	5.0 Ia	= Dep. Sto	rage (	Above)			
THAN THE S (iii) PEAK FLOW	TORAGE COE	FFICIENT.					
		NCEODE DA.					
RESERVOTR( 4111)	OVEREI	OW TS OFF					
IN= 2> OUT= 1		W STOR	GE I		STOP	AGE	
	(cms)	(ha.n	1.)	(cms)	(ha.	m.)	
	0.000		OPEAK	TDEAV		V	
	0411)	(ha)	(cms)	(hrs)	75	(mm)	
OUTFLOW: ID= 1 (	4111)	0.750	0.031	2.	83	39.05	
PE	AK FLOW		ON [Qout,	/Qin](%)	= 40.24		
MA	XIMUM STO	RAGE USE	D	(ha.m.)	= 0.014	10	

CALIB   STANDHYD ( 0406)  ID= 1 DT= 5.0 min	Area Total Im	(ha)= ( p(%)= 9	0.14 9.00	Dir. Conn	. (%)= 9	9.00	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	MPERVIOU 0.14 2.00 1.00 30.55 0.013	S PE	RVIOUS (i) 0.00 5.00 2.00 40.00 0.250	)		
NOTE: RAINF	ALL WAS TR	ANSFORME	о то	5.0 MIN. 1	TIME STE	Ρ.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.583	RAIN mm/hr 0.00 0.00 0.96 0.96 0.96 0.96 0.96 0.96	TRAI TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	NSFORME RAIN mm/hr 5.74 16.25 16.25 16.25 16.25 16.25 16.25 16.25 43.98 43.98 43.98 43.98 43.98 43.98 43.98 12.43 12.43 12.43	D HYETOGR/	APH            RAIN         mm/hr           12.43         6.69           6.69         6.69           6.69         6.69           6.69         6.69           3.82         3.82           3.82         3.82           3.82         3.82           1.91         1.91           1.91         1.91           1.91         1.91	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE ***** WARNING: STORAG (i) CN PROCEDU CN* = 7 (ii) TIME STEP THAN THE S (iii) PEAK FLOW	m/hr)= (min)= (min)= (cms)= (hrs)= (hrs)= (mm)= NT = E COEFF. I RE SELECTE 5.0 IA (DT) SHOUL TORAGE COE DOES NOT I	43.98 5.00 1.74 5.00 0.32 0.02 2.75 45.81 0.96 S SMALLED D FOR PEI = Dep. S D BE SMAL FFICIENT NCLUDE B	(ii) R THAN RVIOUS LOFAGE ULER OR ASEFLOW	17.87 5.00 3.30 (ii) 5.00 0.27 0.00 2.75 14.38 47.81 0.30 TIME STEP LOSSES: (Above) EQUAL IF ANY.	*TOT 0. 2 45 47 0	ALS* 017 (iii) .75 .49 .81 .95	
CALIB   STANDHYD ( 0403)  ID= 1 DT= 5.0 min	Area Total Im	(ha)= : ıp(%)= 9	1.84 9.00	Dir. Conn	. (%)= 9	9.00	
Surface Area Dep. Storage Average Slope Length Mannings n	I (ha)= (mm)= (%)= (m)= =	MPERVIOU 1.82 2.00 1.00 110.75 0.013	S PE	RVIOUS (1) 0.02 5.00 2.00 40.00 0.250	)		
NOTE: RAINF	ALL WAS TR	ANSFORME	о то	5.0 MIN. 1	TIME STE	Ρ.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583	RAIN mm/hr 0.00 0.00 0.96 0.96 0.96 0.96	TRAI TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167	NSFORME RAIN mm/hr 5.74 16.25 16.25 16.25 16.25 16.25 16.25	D HYETOGRA TIME hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750	APH RAIN mm/hr 12.43   6.69   6.69   6.69   6.69   6.69	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96

0.66 0.75 0.83 0.91 1.00 1.08 1.16 1.25 1.33 1.41 1.50 1.58	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	16.25 43.98 43.98 43.98 43.98 43.98 43.98 12.43 12.43 12.43 12.43 12.43	3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750	3.82 3.82 3.82 3.82 3.82 1.91 1.91 1.91 1.91 1.91 1.91 1.91	5.42 5.50 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	$0.96 \\ $
Max.Eff.Inten.(ı over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	nm/hr)= (min) (min)= (min)= (cms)=	43.98 5.00 3.77 5.00 0.25	(ii)	17.87 10.00 5.33 (ii) 10.00 0.16			
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI	(cms)= (hrs)= (mm)= (mm)= ENT =	0.22 2.75 45.81 47.81 0.96		0.00 2.75 14.38 47.81 0.30	45 47	ALS" 223 (iii) .75 .49 .81 .95	
***** WARNING: STORA	GE COEFF. I	S SMALLE	R THAN	TIME STEP!			
(i) CN PROCED CN* = (ii) TIME STEP THAN THE (iii) PEAK FLOW	JRE SELECTE 75.0 Ia (DT) SHOUL STORAGE COE DOES NOT I	D FOR PE = Dep. S D BE SMA FFICIENT NCLUDE B	RVIOUS torage LLER OR	LOSSES: (Above) EQUAL IF ANY.			
CALIB STANDHYD ( 0405) ID= 1 DT= 5.0 min	Area Total Im	(ha)= 1p(%)= 9	0.35	Dir. Conn.	(%)= 9	9.00	
Surface Area Dep. Storage Average Slope Length Mannings n	I (ha)= (mm)= (%)= (m)= =	MPERVIOU 0.35 2.00 1.00 48.30 0.013	IS PE	RVIOUS (1) 0.00 5.00 2.00 40.00 0.250			
NOTE: RAIN	FALL WAS TR	ANSFORME	D TO	5.0 MIN. T	IME STE	Ρ.	
TIM hr: 0.08 0.16 0.25 0.33 0.41 0.50 0.58 0.66 0.75 0.83 0.91 1.00 1.08 1.16 1.25 1.33 1.41 1.50 1.50	RAIN         RAIN           s         mm/hr         1           3         0.00         0           7         0.00         0           3         0.96         0           7         0.96         0           0         0.96         0           3         0.96         0           7         0.96         0           0         0.96         0           3         0.96         0           7         0.96         0           9         0.96         0           9         0.96         0           9         0.96         0           9         0.96         0           9         0.96         0           9         0.96         0           9         0.96         0           9         0.96         0           9         0.74         0           9         5.74         0	TRA TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.417 2.500 2.583 2.417 2.750 2.833 2.667 2.750 2.833 2.917 3.000 3.083 3.167	NSFORME RAIN mm/hr 5.74 16.25 16.25 16.25 16.25 16.25 16.25 16.25 43.98 43.98 43.98 43.98 43.98 43.98 12.43 12.43 12.43 12.43	D HYETOGRA TIME hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.583 4.417 4.500 4.583 4.667 4.750	PH RAIN mm/hr 12.43   6.69   6.69   6.69   6.69   6.69   3.82   3.82   3.82   3.82   3.82   3.82   1.91   1.91   1.91	TIME 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.58 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAII mm/h 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten.(r over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	nm/hr)= (min) (min)= (min)= (cms)=	43.98 5.00 2.29 5.00 0.30	(ii)	17.87 5.00 3.85 (ii) 5.00 0.25			
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL	(cms)= (hrs)= (mm)= (mm)=	0.04 2.75 45.81 47.81		0.00 2.75 14.38 47.81	*TOT/ 0.( 2 45 47	ALS* 043 (iii) .75 .49 .81	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 75.0 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 ( 0407)  ID= 1 DT= 5.0 min	Area Total In	(ha)= ( mp(%)= 99	0.14 9.00	Dir. Conn.	(%)= 9	99.00	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVIOUS 0.14 2.00 1.00 30.55 0.013	S PE	RVIOUS (i) 0.00 5.00 2.00 40.00 0.250			
NOTE: RAIN	NFALL WAS T	RANSFORMED	о то	5.0 MIN. T	IME STE	EP.	
TI h 0.00 0.11 0.2 0.3 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	ME         RAIN           33         0.00           57         0.00           50         0.96           17         0.96           183         0.96           193         0.96           193         0.96           100         0.96           100         0.96           100         0.96           100         0.96           100         0.96           100         0.96           100         0.96           100         0.96           100         0.96           100         0.96           101         0.96           102         0.96           103         0.96           100         0.96           100         5.74           100         5.74           101         5.74	TRAN TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.333 2.417 2.500 2.833 2.667 2.750 2.833 2.917 3.000 3.083 3.167	VSFORME RAIN mm/hr 5.74 16.25 17.25 17.55	D HYETOGRA ' TIME ' hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.583 4.667 4.583	PH RAIN mm/hr 12.43 6.69 6.69 6.69 6.69 6.69 3.82 3.82 3.82 3.82 3.82 3.82 1.91 1.91 1.91 1.91	TIME 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.67 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten. over Storage Coeff. Unit Hyd. Tpeal Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFIC: ***** WARNING: STOR/ (i) CN PROCEE CN* = (ii) TIME STEI THAN THE (iii) PEAK FLOW	(mm/hr)= (min)= (min)= (cms)= (cms)= (hrs)= (hrs)= (mm)= EENT = AGE COEFF. DURE SELECTI 75.0 IA P (DT) SHOU STORAGE COM V DOES NOT	43.98 5.00 1.74 5.00 0.32 0.02 2.75 45.81 47.81 0.96 IS SMALLEF ED FOR PEF = Dep. St LD BE SMAL EFFICIENT INCLUDE B/	(ii) R THAN RVIOUS torage LLER OR ASEFLOW	17.87 5.00 3.30 (ii) 5.00 0.27 0.00 2.75 14.38 47.81 0.30 TIME STEP! LOSSES: (Above) EQUAL	*TOT 0, 2 45 47 0	FALS* .017 (iii) 2.75 5.49 7.81 0.95	í.
DUHYD ( 4071)	-		_				

Inlet Cap.= 0.060   #of Inlets= 10   Total(cms)= 0.6 	AREA (ha) 0.14	QPEAK (cms) 0.02	TPEAK (hrs) 2.75	R.V. (mm) 45.49
MAJOR SYS.(ID= 2): MINOR SYS.(ID= 3):	0.00 0.14	0.00 0.02	0.00 2.75	0.00 45.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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ID1= 1 ( 0403): + ID2= 2 ( 0405):	AREA (ha) 1.84 0.35	QPEAK (cms) 0.223 0.043	TPEAK (hrs) 2.75 2.75	R.V. (mm) 45.49 45.49	
ID = 3 ( 0421):	2.19	0.266	2.75	45.49	
NOTE: PEAK FLOWS DO	NOT INCL	UDE BASEFL	OWS IF AM	WY.	
$\begin{array}{cccc} \text{ADD HYD} & ( & 0421) \\ 3 + 2 = 1 &   \end{array}$	AREA	QPEAK	TPEAK	R.V.	
ID1= 3 ( 0421):	2.19	0.266	2.75	45.49	
+ 102 = 2 (0406): TD = 1 (0421):	2 33	0.017	2.75	45.49	
NOTE: PEAK FLOWS DO N	NOT INCL	UDE BASEFL	LOWS IF AN	WY.	
ADD HYD ( 0421) 1 + 2 = 3 ** W A R N I N G : HYDROC ** W A R N I N G : HYDROC	AREA (ha) GRAPH GRAPH	QPEAK (cms) 4071 <id= 0003 = HYI</id= 	TPEAK (hrs) 2> IS DR) DROGRAPH (	R.V. (mm) Y.	
ID1= 1 ( 0421): + ID2= 2 ( 4071):	2.33	0.283	2.75	45.49	
ID = 3 ( 0421):	2.33	0.283	2.75	45.49	
NOTE: PEAK FLOWS DO N	NOT INCL	UDE BASEFL	LOWS IF AM	NY.	
$\begin{array}{ccc} \text{ADD HYD} & ( & 0421) \\ 3 + 2 = 1 \end{array}$	AREA	QPEAK	TPEAK	R.V.	
ID1= 3 ( 0421):	(ha) 2,33	(cms) 0,283	(hrs) 2.75	(mm) 45,49	
+ ID2= 2 ( 4101):	1.11	0.025	3.33	23.96	
TD = 1 ( 0421).					
10 = 1 (0421):	3.44	0.301	2.75	38.55	
NOTE: PEAK FLOWS DO N	3.44 NOT INCL	0.301 UDE BASEFL	2.75 LOWS IF AN	38.55 NY.	
NOTE: PEAK FLOWS DO N	3.44 NOT INCL	0.301 UDE BASEFL	2.75 LOWS IF AM	38.55 NY.	
ADD HYD ( 0421) 1 + 2 = 3	3.44 NOT INCL	0.301 UDE BASEFL	2.75 LOWS IF AN TPEAK	38.55 YY. R.V.	
ADD HYD ( 0421): 1 + 2 = 3   ID1= 1 ( 0421): 1 + 2 = 4 ( 0421): ID1= 1 ( 0421):	AREA (ha) 3.44	0.301 UDE BASEFL QPEAK (cms) 0.301	2.75 LOWS IF AN TPEAK (hrs) 2.75	38.55 NY. R.V. (mm) 38.55	
ADD HYD ( 0421): ID = 1 ( 0421): ADD HYD ( 0421)  1 + 2 = 3   ID1= 1 ( 0421): + ID2= 2 ( 4111): ID = 3 ( 0421):	3.44 NOT INCLI AREA (ha) 3.44 0.75	0.301 UDE BASEFL QPEAK (cms) 0.301 0.031	2.75 OWS IF AM TPEAK (hrs) 2.75 2.83	38.55 NY. R.V. (mm) 38.55 39.05 38.64	
ADD HYD ( 0421): NOTE: PEAK FLOWS DO N ADD HYD ( 0421) 1 + 2 = 3 ID1= 1 ( 0421): + ID2= 2 ( 4111): ID = 3 ( 0421): NOTE: PEAK FLOWS DO N	3.44 NOT INCL AREA (ha) 3.44 0.75 4.19	0.301 UDE BASEFI QPEAK (cms) 0.301 0.031 0.331	2.75 LOWS IF AN TPEAK (hrs) 2.75 2.83 2.75	38.55 YY. R.V. (mm) 38.55 39.05 38.64	
ADD HYD ( 0421): ID = 1 ( 0421): ADD HYD ( 0421)  1 + 2 = 3   ID1= 1 ( 0421): + ID2= 2 ( 4111): ID = 3 ( 0421): NOTE: PEAK FLOWS DO N	3.44 NOT INCL (ha) 3.44 0.75 4.19 NOT INCL	0.301 UDE BASEFI QPEAK (cms) 0.301 0.031 0.331 UDE BASEFI	2.75 LOWS IF AN TPEAK (hrs) 2.75 2.83 2.75 LOWS IF AN	38.55 YY. R.V. (mm) 38.55 39.05 38.64 YY.	
ADD HYD ( 0421): NOTE: PEAK FLOWS DO N ADD HYD ( 0421)  1 + 2 = 3   IDI= 1 ( 0421): + ID2= 2 ( 4111): ID = 3 ( 0421): NOTE: PEAK FLOWS DO N ADD HYD ( 0421)	3.44 NOT INCL (ha) 3.44 0.75 4.19 NOT INCL	0.301 UDE BASEFI (cms) 0.301 0.031 0.331 UDE BASEFI	2.75 LOWS IF AN TPEAK (hrs) 2.75 2.83 2.75 LOWS IF AN	38.55 YY. R.V. (mm) 38.55 39.05 38.64 YY.	
ADD HYD ( 0421): NOTE: PEAK FLOWS DO N I + 2 = 3   IDI= 1 ( 0421); + ID2= 2 ( 4111): ID = 3 ( 0421); NOTE: PEAK FLOWS DO N ADD HYD ( 0421)  3 + 2 = 1	3.44 NOT INCLI AREA (ha) 3.44 0.75 4.19 NOT INCLI AREA (ha)	0.301 UDE BASEFI OPEAK (cms) 0.301 0.031 0.331 UDE BASEFI	2.75 LOWS IF AN TPEAK (hrs) 2.75 2.83 2.75 LOWS IF AN TPEAK (hrs)	38.55 YY. R.V. (mm) 38.55 39.05 38.64 YY. R.V.	
ADD HYD ( 0421): NOTE: PEAK FLOWS DO N I + 2 = 3   ID1= 1 ( 0421); + ID2= 2 ( 4111): ID = 3 ( 0421): NOTE: PEAK FLOWS DO N ADD HYD ( 0421) 3 + 2 = 1   ID1= 3 ( 0421):	3.44 NOT INCLI AREA (ha) 3.44 0.75 4.19 NOT INCLI AREA (ha) 4.19	0.301 UDE BASEFI OPEAK (cms) 0.301 0.031 0.331 UDE BASEFI OPEAK (cms) 0.331	2.75 LOWS IF AN TPEAK (hrs) 2.75 2.83 2.75 LOWS IF AN TPEAK (hrs) 2.75	38.55 NY. R.V. (mm) 38.55 39.05 38.64 NY. R.V. (mm) 38.64	
ADD HYD ( 0421): ID = 1 ( 0421): ADD HYD ( 0421)  1 + 2 = 3   ID1= 1 ( 0421): + ID2= 2 ( 4111): ID = 3 ( 0421): NOTE: PEAK FLOWS DO N ADD HYD ( 0421)  3 + 2 = 1   ID1= 3 ( 0421): + ID2= 2 ( 0420): + ID2= 2 ( 0420):	3.44 NOT INCLI AREA (ha) 3.44 0.75 4.19 NOT INCLI AREA (ha) 4.19 2.75	0.301 UDE BASEFI (cms) 0.301 0.331 UDE BASEFI OPEAK (cms) 0.331 0.150	2.75 LOWS IF AM TPEAK (hrs) 2.75 2.83 2.75 LOWS IF AM TPEAK (hrs) 2.75 2.75	38.55 NY. R.V. (mm) 38.55 39.05 38.64 NY. R.V. (mm) 38.64 40.25	
ADD HYD (0421); $ADD HYD (0421) $ $1 + 2 = 3  $ $IDI = 1 (0421);$ $+ ID2 = 2 (4111);$ $ID = 3 (0421);$ $NOTE: PEAK FLOWS DO N$ $ADD HYD (0421) $ $3 + 2 = 1  $ $IDI = 3 (0421);$ $IDI = 3 (0421);$ $IDI = 1 (0421);$	3.44 NOT INCLI AREA (ha) 3.44 0.75 4.19 NOT INCLI AREA (ha) 4.19 2.75 6.94	0.301 UDE BASEFI (cms) 0.301 0.031 0.331 UDE BASEFI OPEAK (cms) 0.331 0.150 0.480	2.75 LOWS IF AN TPEAK (hrs) 2.75 2.83 2.75 LOWS IF AN TPEAK (hrs) 2.75 2.75 2.75 2.75	38.55 YY. R.V. (mm) 38.55 39.05 38.64 YY. R.V. (mm) 38.64 40.25 39.27	
ADD HYD ( 0421): NOTE: PEAK FLOWS DO N ID = 1 ( 0421) 1 + 2 = 3   ID = 1 ( 0421); + ID2= 2 ( 4111): ID = 3 ( 0421); NOTE: PEAK FLOWS DO N ADD HYD ( 0421) 3 + 2 = 1   ID = 3 ( 0421); HD = 3 ( 0421); ID = 1 ( 0421); ID = 1 ( 0421); NOTE: PEAK FLOWS DO N	3.44 NOT INCLI AREA (ha) 3.44 0.75 4.19 NOT INCLI AREA (ha) 4.19 2.75 6.94	0.301 UDE BASEFI (cms) 0.301 0.031 0.331 UDE BASEFI 0.331 0.150 0.480 UDE BASEFI	2.75 .0WS IF AN TPEAK (hrs) 2.75 2.83 2.75 .0WS IF AN TPEAK (hrs) 2.75 2.75 2.75 2.75 2.75 2.75 .0WS IF AN	38.55 NY. R.V. (mm) 38.55 39.05 38.64 NY. R.V. (mm) 38.64 40.25 39.27 NY.	
ADD HYD ( 0421): NOTE: PEAK FLOWS DO N ADD HYD ( 0421) 1 + 2 = 3   ID1= 1 ( 0421): + ID2= 2 ( 4111): ID = 3 ( 0421): NOTE: PEAK FLOWS DO N ADD HYD ( 0421) 3 + 2 = 1   ID1= 3 ( 0421): + ID2= 2 ( 0420): ID = 1 ( 0421): NOTE: PEAK FLOWS DO N ADD HYD ( 0421): NOTE: PEAK FLOWS DO N	3.44 NOT INCLI AREA (ha) 3.44 0.75 4.19 NOT INCLI AREA (ha) 4.19 2.75 6.94 NOT INCLI	0.301 UDE BASEFI 0.301 0.331 UDE BASEFI 0.150 0.480 UDE BASEFI	2.75 LOWS IF AN TPEAK (hrs) 2.75 2.83 2.75 2.83 2.75 LOWS IF AN TPEAK (hrs) 2.75 2.75 2.75 2.75 2.75 2.75	38.55 YY. R.V. (mm) 38.55 39.05 38.64 YY. R.V. (mm) 38.64 40.25 39.27 YY.	
ADD HYD ( 0421): NOTE: PEAK FLOWS DO N ID = 1 ( 0421) 1 + 2 = 3   ID = 1 ( 0421): + ID2 = 2 ( 4111): ID = 3 ( 0421): NOTE: PEAK FLOWS DO N ADD HYD ( 0421) ID = 1 ( 0421): NOTE: PEAK FLOWS DO N ID = 1 ( 0421): NOTE: PEAK FLOWS DO N ADD HYD ( 0422) I + 2 = 3	3.44 NOT INCLI AREA (ha) 3.44 0.75 4.19 NOT INCLI AREA (ha) 4.19 2.75 6.94 NOT INCLI	0.301 UDE BASEFI (cms) 0.301 0.031 0.331 UDE BASEFI 0.480 UDE BASEFI 0.480 UDE BASEFI	2.75 LOWS IF AM TPEAK (hrs) 2.75 2.83 2.75 2.83 2.75 LOWS IF AM TPEAK (hrs) 2.75 2.75 2.75 2.75 2.75 2.75	38.55 YY. R.V. (mm) 38.55 39.05 38.64 YY. R.V. (mm) 38.64 40.25 39.27 YY. R.V.	
ADD HYD ( 0421): NOTE: PEAK FLOWS DO N ADD HYD ( 0421) 1 + 2 = 3   ID1= 1 ( 0421): + ID2= 2 ( 4111): ID = 3 ( 0421): NOTE: PEAK FLOWS DO N ADD HYD ( 0421) 3 + 2 = 1   ID1= 3 ( 0421): HD2= 2 ( 0420): ID = 1 ( 0421): NOTE: PEAK FLOWS DO N ADD HYD ( 0422) 1 + 2 = 3   ID1= 1 ( 0401):	3.44 NOT INCLI AREA (ha) 3.44 0.75 4.19 NOT INCLI AREA (ha) 4.19 2.75 6.94 NOT INCLI AREA (ha) 3.66	0.301 UDE BASEFI 0.301 0.031 0.031 0.331 UDE BASEFI 0.480 UDE BASEFI 0.480 UDE BASEFI 0.480 UDE BASEFI	2.75 LOWS IF AN TPEAK (hrs) 2.75 2.83 2.75 LOWS IF AN TPEAK (hrs) 2.75 2.75 2.75 2.75 2.75 2.75 2.75 2.75	38.55 YY. R.V. (mm) 38.55 39.05 38.64 YY. R.V. (mm) 38.64 40.25 39.27 YY. R.V. (mm) 17.32	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	3.44 NOT INCLI AREA (ha) 3.44 0.75 4.19 NOT INCLI AREA (ha) 4.19 2.75 6.94 NOT INCLI AREA (ha) 3.66 6.94	0.301 UDE BASEFI 0.301 0.031 0.331 UDE BASEFI 0.480 UDE BASEFI 0.480 UDE BASEFI	2.75 .0WS IF AN TPEAK (hrs) 2.75 2.83 2.75 .0WS IF AN TPEAK (hrs) 2.75 2.75 2.75 .0WS IF AN TPEAK (hrs) 2.75 2.75 2.75 2.75 .0WS IF AN TPEAK	38.55 NY. R.V. (mm) 38.55 39.05 38.64 NY. R.V. (mm) 38.64 40.25 39.27 NY. R.V. (mm) 17.32 39.27	

INE 2> 0UT= 1 DT= 5.0 min	OVERFLOW OUTFLOW Ccms) 0.0000 0.0074 0.0211 0.0289 0.0350 0.0509	STORAGE (ha.m.) 0.0000 0.0401 0.1264 0.2209 0.3233 0.3774	OUTFLOW (cms) 0.1751 0.2276 0.2601 0.4822 2.0944 0.0000	STORAGE (ha.m.) 0.4332 0.4910 0.5266 0.5507 0.6374 0.0000	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	AR (h 0422) 10. 0423) 10. PEAK FLOW R	EA QPEAK a) (cms) 500 0.6 500 0.0 EDUCTION [Qo	TPEAK (hrs) 78 2.75 33 6.33 ut/Qin](%)=	R.V. (mm) 31.69 31.56 4.80	
M	MAXIMUM STORAG	EAK FLOW E USED	(min)=2 (ha.m.)=	0.2823	
CALIB   STANDHYD ( 0067)  ID= 1 DT= 5.0 min	Area (ha Total Imp(%	)= 5.46 )= 90.00	Dir. Conn.(%	6)= 90.00	
Surface Area Dep. Storage Average Slope Length Mannings n	IMPE (ha)= (mm)= (%)= (m)= 19 = 0	RVIOUS PEI 4.91 1.00 1.00 0.79 .013	RVIOUS (i) 0.55 1.50 2.00 40.00 0.250		
NOTE: RAIN	FALL WAS TRANS	FORMED TO	5.0 MIN. TIM	NE STEP.	
TIM hi 0.00 0.11 0.22 0.33 0.44 0.55 0.56 0.56 0.56 0.57 0.68 0.99 1.00 1.10 1.10 1.22 1.33 1.44 1.51	RAIN $$ rs         mm/hr         T           33         0.00         1.           57         0.00         1.           50         0.00         1.           33         0.96         1.           133         0.96         2.           33         0.96         2.           33         0.96         2.           33         0.96         2.           50         0.96         2.           50         0.96         2.           33         0.96         2.           50         0.96         2.           50         0.96         2.           50         0.96         2.           50         0.96         2.           50         0.96         2.           50         0.96         2.           50         0.96         2.           50         0.96         2.           50         5.74         3.           50         5.74         3.           50         5.74         3.	- TRANSFORMEI IME RAIN hrs mm/hr 667 5.74 750 5.74 750 5.74 750 16.25 917 16.25 917 16.25 913 16.25 167 16.25 250 16.25 167 16.25 250 16.25 333 43.98 417 43.98 500 43.98 583 43.98 833 12.43 917 12.43 900 12.43 9167 12.43	D HYETOGRAPH ' TIME ' hrs n 3.250 12 3.333 6 3.417 6 3.500 6 3.583 6 3.667 6 3.750 6 3.750 6 3.833 3 4.000 3 4.083 3 4.167 3 4.250 3 4.333 1 4.417 1 4.583 1	Implant       TIME         RAIN       TIME         mm/hr       hrss         2.43       4.83         5.69       5.00         5.69       5.08         5.69       5.17         5.69       5.25         5.69       5.25         5.69       5.23         3.82       5.50         3.82       5.58         3.82       5.67         3.82       5.83         1.91       5.92         1.91       6.00         1.91       6.25         1.91       6.25	RA1 mm/F 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten.( over Storage Coeff. Unit Hyd. Tpeal Unit Hyd. peak	(mm/hr)= 4 r (min) (min)= c (min)= (cms)=	3.98 5.00 5.23 (ii) 5.00 0.21	27.63 10.00 9.30 (ii) 10.00 0.12	*TOTAL C*	
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFIC	(cms)= (hrs)= (mm)= 4 (mm)= 4 (ENT =	0.60 2.75 5.81 7.81 0.98	0.04 2.75 23.53 47.81 0.49	0.636 (iii 2.75 44.48 47.81 0.93	)
(i) CN PROCEL CN* = (ii) TIME STEF THAN THE (iii) PEAK FLOW	DURE SELECTED F 85.0 Ia = D 9 (DT) SHOULD B STORAGE COEFFI W DOES NOT INCL	DR PERVIOUS ep. Storage E SMALLER OR CIENT. UDE BASEFLOW	LOSSES: (Above) EQUAL IF ANY.		
(ii) TIME STEF THAN THE (iii) PEAK FLOW	P (DT) SHOULD B STORAGE COEFFI DOES NOT INCL	E SMALLER OR CIENT. JDE BASEFLOW	EQUAL IF ANY.		

Surface Area (h Dep. Storage (m Average Slope (i Length (n Mannings n	IMPERVIOUS a)= 0.79 m)= 1.00 b)= 1.00 m)= 76.59 = 0.013	PERVIOUS (i) 0.09 1.50 2.00 40.00 0.250		
NOTE: RAINFALL	WAS TRANSFORMED TO	5.0 MIN. TIME	STEP.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583	TRANSFOR           RAIN         TIME         RAI           nm/hr         hrs         mm/h           0.00         1.667         5.7           0.00         1.750         5.7           0.00         1.833         16.2           0.96         2.000         16.2           0.96         2.083         16.2           0.96         2.250         16.2           0.96         2.250         16.2           0.96         2.417         43.9           0.96         2.503         43.9           0.96         2.667         43.9           0.96         2.750         43.9           0.96         2.750         43.9           0.96         2.833         12.4           5.74         3.083         12.4           5.74         3.083         12.4	MED         HYETOGRAPH           N         TIME         R/           r         'hrs         mm/           4         3.250         12.4           4         3.333         6.6           5         3.417         6.6           5         3.500         6.6           5         3.507         6.6           5         3.667         6.6           5         3.833         3.8           8         4.000         3.8           8         4.003         3.8           8         4.083         3.8           8         4.250         3.8           3         4.500         1.9           3         4.500         1.9           3         4.667         1.9           3         4.667         1.9           3         4.750         1.9	IIN         TIME           /hr         hrs           i3         4.83           i3         4.83           i3         5.00           i3         5.00           i3         5.00           i3         5.00           i3         5.25           i3         5.25           i3         5.42           i4         5.58           i5         5.67           i5         5.83           i5         5.82           i5         5.83           i5         5.92           i1         6.00           i1         6.25           i1         6.25	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten.(mm/h over (mi Storage Coeff. (mi Unit Hyd. Tpeak (mi Unit Hyd. peak (cm PEAK FLOW (cm TIME TO PEAK (hr RUNOFF VOLUME (m TOTAL RAINFALL (m RUNOFF COEFFICIENT ***** WARNING: STORAGE CO (i) CN PROCEDURE : CN* = 85.0 (ii) TIME STEP (DT) THAN THE STOR (iii) PEAK FLOW DOE:	r)= 43.98 n) 5.00 n)= 3.02 (ii) n)= 5.00 s)= 0.27 s)= 0.27 s)= 0.27 s)= 46.81 m)= 47.81 = 0.98 DEFF. IS SMALLER THA SELECTED FOR PERVIOU Ia = Dep. SEVORU SHOULD BE SMALLER AGE COEFFICIENT. S NOT INCLUDE BASEFL	27.63 10.00 7.09 (ii) 10.00 0.14 0.01 2.75 23.53 47.81 0.49 N TIME STEP! S LOSSES: e (Above) OR EQUAL OW IF ANY.	TOTALS* 0.103 (iii) 2.75 44.48 47.81 0.93	
RESERVOIR( 0070) IN= 2> OUT= 1 DT= 5.0 min	OVERFLOW IS OFF OUTFLOW STORAGE (cms) (ha.m.) 0.0000 0.0000 AREA QPE (ha) (cm	OUTFLOW   (cms)   0.0770 AK TPEAK s) (hrs) 77	STORAGE (ha.m.) 0.0323 R.V. (nm)	
OUTFLOW: ID= 2 ( 006 OUTFLOW: ID= 1 ( 007 PEAK TIME : MAXIM	9) 0.880 0 D) 0.880 0 FLOW REDUCTION [ SHIFT OF PEAK FLOW UM STORAGE USED	.103 2.75 .045 2.83 Qout/Qin](%)= 43 (min)= 5 (ha.m.)= 0	44.48 44.36 3.30 5.00 0.0187	
CALIB STANDHYD ( 0071) A ID= 1 DT= 5.0 min   Te	rea (ha)= 1.36 otal Imp(%)= 90.00 IMPEPVIOUS	Dir. Conn.(%)=	= 90.00	
Surface Area (h Dep. Storage (m Average Slope ( Length (n Mannings n	$ \begin{array}{r} \begin{array}{r} 1.22\\ n) = & 1.22\\ n) = & 1.00\\ b) = & 1.00\\ b) = & 95.22\\ = & 0.013 \end{array} $	0.14 1.50 2.00 40.00 0.250		

	TRANSFOR	MED HYETOGRA	APH		
$\begin{array}{c} 1\text{Im} \\ \text{hrs} \\ \text{mm}/\text{hr} \\ 0.083 \\ 0.00 \\ 0.167 \\ 0.00 \\ 0.250 \\ 0.00 \\ 0.333 \\ 0.96 \\ 0.417 \\ 0.96 \\ 0.500 \\ 0.96 \\ 0.583 \\ 0.96 \\ 0.667 \\ 0.96 \\ 0.667 \\ 0.96 \\ 0.683 \\ 0.917 \\ 0.96 \\ 1.000 \\ 0.991 \\ 0.96 \\ 1.000 \\ 0.917 \\ 0.96 \\ 1.000 \\ 0.917 \\ 0.96 \\ 1.000 \\ 0.917 \\ 0.96 \\ 1.000 \\ 0.917 \\ 0.96 \\ 1.000 \\ 0.917 \\ 0.96 \\ 1.000 \\ 0.917 \\ 0.96 \\ 1.000 \\ 0.917 \\ 0.96 \\ 1.000 \\ 0.917 \\ 0.96 \\ 1.000 \\ 0.917 \\ 0.96 \\ 1.000 \\ 0.917 \\ 0.96 \\ 1.000 \\ 0.917 \\ 0.96 \\ 1.000 \\ 0.917 \\ 0.96 \\ 1.000 \\ 0.917 \\ 0.96 \\ 1.000 \\ 0.917 \\ 0.96 \\ 1.000 \\ 0.917 \\ 0.96 \\ 1.000 \\ 0.917 \\ 0.96 \\ 1.000 \\ 0.95 \\ 0.917 \\ 0.96 \\ 1.000 \\ 0.95 $	IME         KAI           hrs         mm/h           1.667         5.7           1.750         5.7           1.833         16.2           1.917         16.2           2.000         16.2           2.083         16.2           2.167         16.2           2.333         43.9           2.417         43.9           2.500         43.9           2.583         43.9           2.667         43.9           2.833         12.4           3.000         12.4           3.000         12.4           3.167         12.4	N   11ME 4 3.250 4 3.250 5 3.417 5 3.500 5 3.583 5 3.667 5 3.750 5 3.833 8 3.917 8 4.000 8 4.083 8 4.083 8 4.167 8 4.250 8 4.433 3 4.500 3 4.583 3 4.567 3 4.750	RAIN mm/hr 12.43   6.69   6.69   6.69   6.69   6.69   6.69   3.82   3.82   3.82   3.82   3.82   3.82   3.82   1.91   1.91	1 IME 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.75 5.83 5.75 5.83 5.75 5.83 5.92 6.00 6.08 6.17 6.25	mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten.(mm/hr)= over (min) Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)=	43.98 5.00 3.45 (ii) 5.00 0.26	27.63 10.00 7.52 (ii) 10.00 0.13	+707	41.5*	
PEAK FLOW (cms)= TIME TO PEAK (hrs)= RUNOFF VOLUME (mm)= TOTAL RAINFALL (mm)= RUNOFF COEFFICIENT =	0.15 2.75 46.81 47.81 0.98	0.01 2.75 23.53 47.81 0.49	*101 0. 2 44 47 0	ALS* 159 (iii) .75 .48 .81 .93	
***** WARNING: STORAGE COEFF. 3	IS SMALLER THA	N TIME STEP			
(i) CN PROCEDURE SELECT CN* = 85.0 IA (ii) TIME STEP (DT) SHOU THAN THE STORAGE CO (iii) PEAK FLOW DOES NOT	ED FOR PERVICU = Dep. Storag LD BE SMALLER EFFICIENT. INCLUDE BASEFL	OR EQUAL			
RESERVOIR( 0072)  OVERFI   IN= 2> OUT= 1   DT= 5.0 min   OUTFL( (cms) 0.000	LOW IS OFF OW STORAGE ) (ha.m.) 00 0.0000	OUTFLOW   (cms)   0.2450	( STO (ha ) 0	RAGE .m.) .0209	
INFLOW : ID= 2 ( 0071) OUTFLOW: ID= 1 ( 0072)	AREA QPE (ha) (cm 1.360 0 1.360 0	AK TPEAK (hrs) (hrs) 0.159 2. 0.140 2.	75	R.V. (mm) 44.48 44.47	
TIME SHIFT ( MAXIMUM ST	OF PEAK FLOW ORAGE USED	(ha.m.)	= 0.00 = 0.01	22	
CALIB   STANDHYD ( 0502)   Area  ID= 1 DT= 5.0 min   Total I	(ha)= 0.73 mp(%)= 79.00	Dir. Conn.	(%)= 7	9.00	
Surface Area (ha)= Dep. Storage (mm)= Average Slope (%)= Length (m)= Mannings n =	IMPERVIOUS 0.58 2.00 1.00 69.76 0.013	PERVIOUS (i) 0.15 5.00 2.00 40.00 0.250			
NOTE: RAINFALL WAS T	RANSFORMED TO	5.0 MIN. 1	IME STE	Ρ.	
TIME RAIN hrs mm/hr	TRANSFOR   TIME RAI   hrs mm/h	MED HYETOGRANN  ' TIME	RAIN mm/hr	TIME   hrs	RAIN mm/hr

 hrs
 mm/hr
 hrs
 m/hr
 hrs
 m/hr
 hrs
 m/hr
 hrs
 m/hr
 hrs
 m/hr
 hrs<

0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500	0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.583	0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.667	0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833	0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.917	0.96	2.500	43.98	4.083	3.82	5.67	0.96
1.000	0.96	2.583	43.98	4.167	3.82	5.75	0.96
1.083	0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.167	0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.250	0.96	2.833	12.43	4.417	1.91	6.00	0.96
1.333	5.74	2.917	12.43	4.500	1.91	6.08	0.96
1.417	5.74	3.000	12.43	4.583	1.91	6.17	0.96
1.500	5.74	3.083	12.43	4.667	1.91	6.25	0.96
1.583	5.74	3.167	12.43	4.750	1.91		
Max.Eff.Inten.(m	m/hr)=	43.98		16.94			
over	(min)	5.00		20.00			
Storage Coeff.	(min)=	2.86	(ii)	17.22 (ii)			
Unit Hvd. Tpeak	(min)=	5.00		20.00			
Unit Hvd. peak	(cms)=	0.28		0.06			
	( <i>)</i>				*T0	TALS*	
PEAK FLOW	(cms)=	0.07		0.00	0	.074 (iii)	Ŕ.
TIME TO PEAK	(hrs)=	2.75		2.92		2.75	
RUNOFF VOLUME	(mm)=	45.81		14.38	39	9.19	
TOTAL RAINFALL	(mm)=	47.81		47.81	4	7.81	
RUNOFF COEFFICIE	NT =	0.96		0.30	(	0.82	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 75.0 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( 5021)| IN= 2---> OUT= 1 DT= 5.0 min OVERFLOW IS OFF OUTFLOW STORAGE OUTFLOW STORAGE 1 (cms) 0.0000 0.0050 (cms) 0.0110 0.0130 (ha.m.) 0.0323 0.0364 (ha.m.) 0.0000 0.0070 0.0232 0.0277 0.0150 0.0000 0.0393 TPEAK (hrs) 2.75 4.25 AREA (ha) 0.730 OPEAK (cms) 0.074 R.V. (mm) 39.19 INFLOW : ID= 2 ( 0502) OUTFLOW: ID= 1 ( 5021) 0.730 0.007 37.97 PEAK FLOW REDUCTION [Qout/Qin](%)= 9.14 TIME SHIFT OF PEAK FLOW (min)= 90.00 MAXIMUM STORAGE USED (ha.m.)= 0.0227 \_\_\_\_\_

CALIB STANDHYD ( 0501) ID= 1 DT= 5.0 min Area (ha)= 0.38 Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00 IMPERVIOUS 0.38 2.00 PERVIOUS (i) 0.00 5.00 Surface Area (ha)= Dep

Dep. Storage	(mm) =	2.00	5.00
Average Slope	`(%)=	1.00	2.00
Length	(m)=	50.33	40.00
Mannings n	=	0.013	0.250

		TR/	ANSFORME	D HYETOGR	APH		
TIME	RAIN mm/hr	TIME   hrs	RAIN mm/hr	' TIME	RAIN mm/hr	TIME   hrs	RAIN mm/hr
0.083	0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500	0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.583	0.96	2.167	16.25	3.750	6.69	5.33	0.96

0.66 0.75 0.83 0.91 1.00 1.08 1.16 1.25 1.33 1.41 1.58	$ \begin{array}{c cccc} 7 & 0.96 \\ 0 & 0.96 \\ 3 & 0.96 \\ 0 & 0.96 \\ 0 & 0.96 \\ 7 & 0.96 \\ 0 & 0.96 \\ 0 & 0.96 \\ 0 & 0.96 \\ 0 & 0.96 \\ 3 & 5.74 \\ 0 & 5.74 \\ 0 & 5.74 \\ 3 & 5.74 \\ \end{array} $	2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	16.25 43.98 43.98 43.98 43.98 43.98 43.98 43.98 12.43 12.43 12.43 12.43 12.43	3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.583 4.667 4.750	3.82       5.42         3.82       5.50         3.82       5.67         3.82       5.75         3.82       5.75         3.82       5.92         1.91       6.00         1.91       6.17         1.91       6.25         1.91       6.25	0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten.(r over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	nm/hr)= (min) (min)= (min)= (cms)=	43.98 5.00 2.35 (* 5.00 0.30	ii)	17.87 5.00 3.91 (ii) 5.00 0.25		
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI	(cms)= (hrs)= (mm)= (mm)= ENT =	0.05 2.75 45.81 47.81 0.96		0.00 2.75 14.38 47.81 0.30	*TOTALS* 0.046 (iii) 2.75 45.49 47.81 0.95	
***** WARNING: STORA	GE COEFF. IS	SMALLER	THAN	TIME STEP!		
(i) CN PROCEDU CN* = (ii) TIME STEP THAN THE (iii) PEAK FLOW	JRE SELECTED 75.0 Ia = (DT) SHOULD STORAGE COEF DOES NOT IN	) FOR PER Dep. Sto BE SMALI FICIENT. ICLUDE BAS	VIOUS orage LER OR SEFLOW	LOSSES: (Above) EQUAL IF ANY.		
CALIB STANDHYD ( 0503) ID= 1 DT= 5.0 min   Surface Area	Area ( Total Imp IM (ha)=	(ha)= 0 (%)= 79 IPERVIOUS 0.72	.91 .00 PE	Dir. Conn.( RVIOUS (i) 0.19	(%)= 79.00	
Dep. Storage Average Slope Length Mannings n	(mm)= (%)= (m)= =	2.00 1.00 77.89 0.013		5.00 2.00 40.00 0.250		
NOTE: RAIN	FALL WAS TRA	NSFORMED	то	5.0 MIN. T	IME STEP.	
TIM hr: 0.08: 0.16: 0.25: 0.33: 0.41: 0.50: 0.50: 0.50: 0.50: 0.58: 0.66: 0.75: 0.83: 0.91: 1.00: 1.00: 1.00: 1.16: 1.33: 1.41: 1.50:	RAIN         RAIN           s         mm/hr           s         0.00           0         0.00           0         0.00           0         0.00           0         0.96           0         5.74           0         5.74	TIME hrs 1.667 1.750 1.833 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.417 2.500 2.417 2.500 2.417 2.500 2.417 2.500 2.417 2.500 2.417 2.500 2.417 2.500 2.417 2.500 2.667 2.917 3.000 3.083 3.167	SFORME RAIN mm/hr 5.74 5.74 16.25 16.25 16.25 16.25 16.25 16.25 43.98 43.98 43.98 43.98 43.98 43.98 43.98 12.43 12.43 12.43 12.43	D HYETOGRAH ' TIME ' hrs 3.250 1 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten.(r over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	nm/hr)= (min) (min)= (min)= (cms)=	43.98 5.00 3.05 (* 5.00 0.27	ii)	16.94 20.00 17.41 (ii) 20.00 0.06		
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL	(cms)= (hrs)= (mm)=	0.09 2.75 45.81 47.81		0.01 2.92 14.38 47.81	*TOTALS* 0.093 (iii) 2.75 39.20 47.81	

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: (i) CN\* = 75.0 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( 5031) OVERFLOW IS OFF IN= 2---> OUT= 1 DT= 5.0 min OUTFLOW STORAGE OUTFLOW STORAGE (cms) 0.0000 (ha.m.) 0.0000 (cms) 0.0140 (ha.m.) 0.0404 0.0060 0.0221 0.0160 0.0456 0.0290 0.0347 0.0090 0.0180 0.0492 0.0110 0.0000 0.0000 AREA (ha) 0.910 0.910 QPEAK TPEAK R.V. (mm) (cms) 0.093 (hrs) 2.75 4.25 INFLOW : ID= 2 ( 0503) OUTFLOW: ID= 1 ( 5031) 39.20 0.009 38.17 PEAKFLOWREDUCTION[Qout/Qin](%)=9.34TIMESHIFT OFPEAKFLOW(min)=90.00MAXIMUMSTORAGEUSED(ha.m.)=0.0283 ADD HYD ( 0504) | 1 + 2 = 3 | QPEAK AREA TPEAK R.V. ID1= 1 ( 0501): + ID2= 2 ( 5021): (cms) 0.046 (mm) 45.49 (ha) 0.38 (hrs) 2.75 4.25 0.73 0.007 37.97 ID = 3 ( 0504): 2.75 40.55 1.11 0.051 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. ADD HYD ( 0504) 3 + 2 = 1 AREA (ha) 1.11 0.91 TPEAK (hrs) 2.75 4.25 R.V. (mm) 40.55 38.17 OPEAK (cms) ID1= 3 ( 0504): + ID2= 2 ( 5031): 0.051 0.009 ID = 1 ( 0504): 2.02 0.056 2.75 39.48 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. \_\_\_\_\_ RESERVOIR( 0505)| IN= 2---> OUT= 1 DT= 5.0 min OVERFLOW IS OFF OUTFLOW STORAGE OUTFLOW STORAGE (cms) 0.0000 (ha.m.) 0.0000 (cms) 0.0330 (ha.m.) 0.0308 0.0150 0.0145 0.0370 0.0345 0.0180 0.0224 0.0420 0.0383 0.0250 0.0268 0.0000 0.0000 AREA (ha) 2.020 QPEAK (cms) 0.056 TPEAK (hrs) 2.75 R.V. (mm) 39.48 INFLOW : ID= 2 ( 0504) OUTFLOW: ID= 1 ( 0505) 2.020 0.016 5.00 39.36 PEAKFLOWREDUCTION[Qout/Qin](%)=27.82TIMESHIFT OFPEAKFLOW(min)=135.00MAXIMUMSTORAGEUSED(ha.m.)=0.0164 ADD HYD ( 0009) | 1 + 2 = 3 | AREA TPEAK QPEAK R.V. (ha) 2.93 (cms) 0.087 (hrs) 3.08 (mm) 16.61 ID1= 1 ( 0011): + ID2= 2 ( 0423): 10.60 0.033 6.33 31.56 ID = 3 ( 0009): 13.53 0.112 3.08 28.33 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD ( 0009)	)					
3 + 2 = 1	AREA	QPEAK (cms)	(hrs)	R.V. (mm)		
ID1= 3 ( 0	0009): 13.53	0.112	3.08	28.33		
+ 1D2= 2 ( 0	2.02	0.016	5.00	39.36		
ID = 1 (0)	0009): 15.55	0.125	3.08	29.76		
NOTE: PEAK FL	LOWS DO NOT INC	LUDE BASEF	LOWS IF AN	NY.		
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.		
TD1= 1 ( (	(ha) 0009): 15.55	(cms)	(hrs) 3.08	(mm) 29.76		
+ ID2= 2 ( 0	0006): 24.71	0.842	3.33	38.03		
ID = 3 ( 0	0009): 40.26	0.963	3.25	34.83		
NOTE: PEAK FL	LOWS DO NOT INC	LUDE BASEF	LOWS IF AN	NY.		
$\begin{vmatrix} ADD & HYD & (0009) \\ 3 + 2 = 1 \end{vmatrix}$	AREA	QPEAK	TPEAK	R.V.		
	(ha)	(cms)	(hrs)	(mm)		
+ ID1= 3 ( 0)	0067): 40.26 0067): 5.46	0.963	2.75	34.83 44.48		
ID = 1 (0)	0009): 45.72	1.389	2.75	35.99		
NOTE: PEAK EL	OWS DO NOT THE	UDE BASEE	LOWS TE AN	WY.		
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.		
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	AREA (ha) 0009): 45.72 0070): 0.88	QPEAK (cms) 1.389 0.045	TPEAK (hrs) 2.75 2.83	R.V. (mm) 35.99 44.36		
$\begin{array}{c} \text{ID} \text{ID}$	AREA (ha) (0009): 45.72 (0070): 0.88 (0009): 46.60	QPEAK (cms) 1.389 0.045	TPEAK (hrs) 2.75 2.83 2.75	R.V. (mm) 35.99 44.36 36.14		
IDI= 1 ( 0 IDI= 1 ( 0 IDI= 3 ( 0 NOTE: PEAK FL	AREA (ha) 0009): 45.72 0070): 0.88 0009): 46.60 0009): 46.60	QPEAK (cms) 1.389 0.045 1.431 CLUDE BASEF	TPEAK (hrs) 2.75 2.83 2.75 2.75 LOWS IF AM	R.V. (mm) 35.99 44.36 36.14 WY.		2018
ID1= 1 ( 0 + ID2= 2 ( 0 ID = 3 ( 0 NOTE: PEAK FL	AREA (ha) 0009): 45.72 0070): 0.88 0009): 46.60 0009): 46.60	QPEAK (cms) 1.389 0.045 0 1.431 CLUDE BASEF	TPEAK (hrs) 2.75 2.83 2.75 LOWS IF A	R.V. (mm) 35.99 44.36 36.14 WY.		
ID1= 1 ( 0 + ID2= 2 ( 0 ID = 3 ( 0 NOTE: PEAK FL	AREA (ha) 2009): 45.72 20070): 0.88 20009): 46.60 LOWS DO NOT INC	QPEAK (cms) 1.389 0.045 0 1.431 CLUDE BASEF	TPEAK (hrs) 2.75 2.83 2.75 LOWS IF A	R.V. (mm) 35.99 44.36 36.14 WY.		
ID       ID <td< td=""><td>  AREA  (ha) 0009): 45.72 0070): 0.88 0009): 46.60 LOWS DO NOT INC  (ha)</td><td>QPEAK (cms) 1.389 0.045 0 1.431 CLUDE BASEF</td><td>TPEAK (hrs) 2.75 2.83 2.75 LOWS IF Al</td><td>R.V. (mm) 35.99 44.36 36.14 YY. R.V. (mm)</td><td></td><td></td></td<>	AREA (ha) 0009): 45.72 0070): 0.88 0009): 46.60 LOWS DO NOT INC (ha)	QPEAK (cms) 1.389 0.045 0 1.431 CLUDE BASEF	TPEAK (hrs) 2.75 2.83 2.75 LOWS IF Al	R.V. (mm) 35.99 44.36 36.14 YY. R.V. (mm)		
1 + 2 = 3   1 + 2 = 2   1 + 2 = 2   1 + 2 = 3   1 + 2 = 2   1 + 2 = 2   1 + 2 = 3   1 + 2 =	AREA (ha) 0009): 45.72 0009): 0.88 0009): 46.60 LOWS DO NOT INC (ha) 0009): 46.60	QPEAK (cms) 1.389 0.045 0 1.431 CLUDE BASEF QPEAK (cms) 1.431	TPEAK (hrs) 2.75 2.83 2.75 LOWS IF AP TPEAK (hrs) 2.75	R.V. (mm) 35.99 44.36 36.14 WY. R.V. (mm) 36.14		
$\begin{array}{c} \text{ID} \text{ ID} \text{ ID} \text{ ID} \text{ ID} \text{ I} \text{ ID} \text{ I} \text{ ID} \text{ I} \text{ I} \text{ ID} \text{ I} \text{ I} \text{ ( } \text{ ( } \text{ ID} \text{ ID} \text{ I} \text{ I} \text{ I} \text{ O} \text{ ID} \text{ I} \text{ I} \text{ I} \text{ O} \text{ I} \text{ I}$	AREA (ha) 0009): 45.72 0070): 0.88 0009): 46.60 LOWS DO NOT INC (ha) 0009): 46.60 0072): 1.36	QPEAK (cms) 1.389 0.045 0 1.431 CLUDE BASEF CLUDE BASEF (cms) 0 1.431 0.140	TPEAK (hrs) 2.75 2.83 2.75 LOWS IF AM TPEAK (hrs) 2.75 2.75 2.75	R.V. (mm) 35.99 44.36 36.14 WY. R.V. (mm) 36.14 44.47		
$\begin{array}{c} \text{ADD HID} & (1 + 2 = 3) \\ 1 + 2 = 3 \\ 1 + 102 = 2 & (1 + 102 = 2) \\ 1 + 102 = 2 & (1 + 102 = 3) \\ 1 + 102 = 1 \\ 1 + 102 = 2 & (1 + 102 = 3) \\ 1 + 102 & (1 + 102 = 3) \\ 1 + 102 & (1 + 102 = 3) \\ 1 + 102 & (1 +$	AREA            (ha)           0009):         45.72           0009):         46.60	QPEAK (cms) 1.389 0.045 0 1.431 LUDE BASEF QPEAK (cms) 1.431 0 1.431 0 0.140 5 1.571	TPEAK (hrs) 2.75 2.83 2.75 LOWS IF AN TPEAK (hrs) 2.75 2.75 2.75	R.V. (mm) 35.99 44.36 36.14 WY. R.V. (mm) 36.14 44.47 36.38		
$\begin{array}{c} 1 + 2 = 3 \\ \hline 1 + 2 = 3 \\ \hline 1 + 102 = 2 \\ + 102 = 2 \\ \hline 1D = 3 \\ \hline 1D = 3 \\ \hline 0 \\ \hline 0 \\ \hline 0 \\ \hline 1D = 3 \\ \hline 0 \\ \hline 0 \\ \hline 0 \\ \hline 1D = 1 \\ \hline 0 \\ \hline 0$	AREA (ha) 0009): 45.72 0070): 0.88 0009): 46.60 0009): 46.60 0009): 46.60 0072): 1.36 0009): 47.96 0009): 47.96	QPEAK (cms) 1.389 0.045 1.431 CLUDE BASEF QPEAK (cms) 1.431 0.140 1.571 CLUDE BASEF	TPEAK (hrs) 2.75 2.83 2.75 LOWS IF Al TPEAK (hrs) 2.75 2.75 2.75 2.75 LOWS IF Al	R.V. (mm) 35.99 44.36 36.14 WY. R.V. (mm) 36.14 44.47 36.38 WY.		
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Image: ADD HID (1000)         Image:	AREA (ha) 0009): 45.72 0070): 0.88 0009): 46.60 .0WS DO NOT INC (ha) 0009): 46.60 0009): 46.60 0009): 46.60 0009): 47.96 .0009): 47.96 .00090; 47.96 .00090; 47.96 .00090; 47.96 .00090; 47.96 .00090; 47.96 .00090; 47.96 .0009; 47.96 .0000; 47.96.0000; 47.96 .0000; 47.96.00	QPEAK (cms) 1.389 0.045 1.431 LUDE BASEF (cms) 1.431 0.140 1.431 0.140 1.571 LUDE BASEF time step SECTION ( ation 1.50 0.70	TPEAK (hrs) 2.75 2.83 2.75 LOWS IF AN TPEAK (hrs) 2.75 2.75 2.75 LOWS IF AN (min)'= 1 1.1) Manning 0.0500 0.0500	R.V. (mm) 35.99 44.36 36.14 WY. R.V. (mm) 36.14 44.47 36.38 WY. 5.00		
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I + 2 = 3         ID1= 1 ( ()         + ID2= 2 ( ()         ID = 3 ( ()         ID = 3 ( ()         NOTE: PEAK FL         ADD HYD ( 0009)         3 + 2 = 1         ID1= 3 ( ()         ID1= 1 ( )         NOTE: PEAK FL         ID1= 1 ( )         NOTE: PEAK FL         ROUTE CHN( 0013)         IN= 2> OUT= 1         <	AREA (ha) 0009): 45.72 0070): 0.88 0009): 46.60 0009): 46.60 0009): 46.60 0009): 46.60 0009): 46.60 0009): 46.60 0009): 47.96 0009): 47.96 000000000000000000000000000000000000	QPEAK (cms) 1.389 0.045 0 1.431 LUDE BASEF (cms) 1.431 0.140 0 1.431 0.140 0 1.571 LUDE BASEF time step SECTION ( ation 0.70 0.75 0.70 0.55 0.99.60	TPEAK (hrs) 2.75 2.83 2.75 LOWS IF AN TPEAK (hrs) 2.75 2.75 2.75 LOWS IF AN (min)'= \$ 1.1) Manning 0.0500 0.0300 0.0300	R.V. (mm) 35.99 44.36 36.14 WY. R.V. (mm) 36.14 44.47 36.38 WY. 5.00 > 800 Main Main Main	n Channel n Channel n Channel	
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1 + 2 = 3         ID1= 1 ( ()         + ID2= 2 ( ()         ID = 3 ( ()         ID = 3 ( ()         NOTE: PEAK FL         ADD HYD ( 0009)         3 + 2 = 1         ID1= 3 ( 0)         + ID2= 2 ( 0)         ID = 1 ( 0)         NOTE: PEAK FL         ID = 1 ( 0)         NOTE: PEAK FL         ROUTE CHN( 0013)         IN= 2> OUT= 1         Comparison         Comparison         Comparison         Comparison         Comparison         IN= 2> OUT= 1	AREA (ha) 0009): 45.72 0070): 0.88 0009): 46.60 0009): 46.60 0009): 46.60 0072): 1.30 0009): 47.90 0009): 47.90 00090 100 1000 100 1.000 100 1.500 100 1.500 100 1.500 100 1.500 100 0.000 100 1.500 100 0.000 100 1.500 100 0.000 1000 1	QPEAK (cms) 1.389 0.045 1.431 CLUDE BASEF CCTION ( 4 Cms) 1.431 0.140 0.140 0.140 0.140 0.140 0.140 0.140 0.140 0.140 0.70 0.75 0.70 0.75 0.75 0.75 0.75 0.7	TPEAK (hrs) 2.75 2.83 2.75 LOWS IF AN TPEAK (hrs) 2.75 2.75 2.75 2.75 2.75 1.1) Manning 0.0500 0.0500 0.0300 0.0300 0.0300 0.0300 0.0500 BLE TE VELC	R.V. (mm) 35.99 44.36 36.14 WY. R.V. (mm) 36.14 44.47 36.38 WY. 5.00 5.00 5.00 Main Main 500 Main	n Channel n Channel n Channel n Channel n Channel	
ADD HID       1 + 2 = 3         ID1= 1 ( ()         + ID2= 2 ( ()         ID = 3 ( ()         ID = 3 ( ()         NOTE:       PEAK FL         ADD HYD ( 0009)         3 + 2 = 1         ID1= 3 ( ()         + ID2= 2 ( ()         ID = 1 ( ()         NOTE:       PEAK FL         ID = 1 ( ()         NOTE:       PEAK FL         ROUTE CHN( 0013)         IN= 2> OUT= 1         Comparison         Comparison         Comparison         OLD 99.6	AREA (ha) 0009): 45.72 0070): 0.88 0009): 45.60 0009): 45.60 0009): 46.60 0009): 46.60 0072): 1.30 0009): 47.90 0009): 47.90 00000000000000000000000000000000000	QPEAK (cms) 1.389 0.045 1.431 CLUDE BASEF CCTION ( 4 0PEAK (cms) 1.431 0.140 0.140 0.140 0.140 0.140 0.140 0.140 0.140 0.1571 CLUDE BASEF CECTION ( 4 ation 0.55 0.0 9.60 0.65 0.0 0.65 0.0 0.0	TPEAK (hrs) 2.75 2.83 2.75 LOWS IF AN TPEAK (hrs) 2.75 2.75 2.75 2.75 LOWS IF AN (min)'= 5 1.1) Manning 0.0500 0.0500 0.0300 0.0300 0.0300 0.0300 0.0300 0.0300 0.0300 0.0300 0.0500 BLE	R.V. (mm) 35.99 44.36 36.14 WY. R.V. (mm) 36.14 44.47 36.38 WY. 5.00 6.00 Main Main Main 500 Main Main Main 500 Main	n Channel n Channel n Channel n Channel n Channel rRAV.TIME (min) 43.69	
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	0.67	100.17	. 59	4E+03	0.9		0.80	10.43	
	0.76	100.26	.71	0E+03	1.2		0.86	9.74	
	0.86	100.36	.83	2E+03	1.5		0.91	9.18	
	0.95	100.45	.96	1E+03	1.8		0.96	8.72	
	1.05	100.55	.11	0E+04	2.2		1.00	8.32	
	1.16	100.66	.12	7E+04	2.7		1.07	7.80	
	1.28	100.78	.14	8E+04	3.4		1.14	7.31	
	1.39	100.89	.17	0E+04	4.1		1.20	6.94	
	1.50	101.00	.19	5E+04	4.9		1.25	6.65	
	1.61	101.11	.22	1E+04	5.8		1.30	6.41	
	1.72	101.22	.25	0E+04	6.7		1.34	6.22	
	1.84	101.34	.28	0F+04	7.7		1.38	6.04	
	1.95	101.45	.31	3E+04	8.8		1.41	5.90	
					< hyd	Irograph	>	<-pipe / c	hannel->
				AREA	OPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
				(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
IN	FLOW :	ID= 2 (	0009)	47.96	1.57	2.75	36.38	0.88	0.92
OU	TELOW:	TD= 1 (	0013)	47.96	1.41	2.83	36.38	0.83	0.89
		(	,						

CALIB NASHYD ( 0018) ID= 1 DT= 5.0 min	Area (ha)= Ia (mm)= U.H. Tp(hrs)=	1.85 5.00 0.24	Curve Number (CN)= 79.0 # of Linear Res.(N)= 3.00

		TR/	ANSFORME	D HYETOGR	APH	2	
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500	0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.583	0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.667	0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833	0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.917	0.96	2.500	43.98	4.083	3.82	5.67	0.96
1.000	0.96	2.583	43.98	4.167	3.82	5.75	0.96
1.083	0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.167	0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.250	0.96	2.833	12.43	4.417	1.91	6.00	0.96
1.333	5.74	2.917	12.43	4.500	1.91	6.08	0.96
1.417	5.74	3.000	12.43	4.583	1.91	6.17	0.96
1.500	5.74	3.083	12.43	4.667	1.91	6.25	0.96
1.583	5.74	3.167	12.43	4.750	1.91	en anna an sta th	

Unit Hyd Qpeak (cms)= 0.294

PEAK FLOW	(cms)=	0.076	(i)
RUNOFF VOLUME	(mm)=	16.595	
RUNOFF COEFFICI	(mm)= ENT =	47.810 0.347	

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

CALIB     STANDHYD ( 0019)  ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	3.97 90.00	Dir.	Conn.(%)=	90.00	
		IMPERVIC	US	PERVIOU	JS (i)		
Surface Area	(ha)=	3.57		0.40	)		
Dep. Storage	(mm)=	1.00	) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (	1.50	)		
Average Slope	(%)=	1.00	)	2.00	)		
Length	(m)=	162.69	)	40.00	)		
Mannings n	=	0.013		0.250	)		
and the second second second second							

		TRA	ANSFORME	DH	YETOGR/	APH		
TIME	RAIN	TIME	RAIN	1:	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr		hrs	mm/hr	hrs	mm/hr

0.083	0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500	0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.583	0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.667	0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833	0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.917	0.96	2.500	43.98	4.083	3.82	5.67	0.96
1.000	0.96	2.583	43.98	4.167	3.82	5.75	0.96
1.083	0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.167	0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.250	0.96	2.833	12.43	4.417	1.91	6.00	0.96
1.333	5.74	2.917	12.43	4.500	1.91	6.08	0.96
1.417	5.74	3.000	12.43	4.583	1.91	6.17	0.96
1.500	5.74	3.083	12.43	4.667	1.91	6.25	0.96
1.583	5.74	3.167	12.43	4.750	1.91		
Max.Eff.Inten.(mm/k	nr)=	43.98		27.63			
over (mi	in)	5.00		10.00			
Storage Coeff. (mi	n =	4.75	(ii)	8.82 (ii)	)		
Unit Hvd. Tpeak (mi	n)=	5.00	()	10.00			
Unit Hvd. peak (cm	ns)=	0.22		0.12			
					*T0	TALS*	
PEAK FLOW (cn	ns)=	0.44		0.03	0	.463 (iii	)
TIME TO PEAK (hr	's)=	2.75		2.75		2.75	-
RUNOFF VOLUME (n	nm)=	46.81		23.53	44	4.48	
TOTAL RAINFALL (n	nm)=	47.81		47.81	4	7.81	
RUNOFF COEFFICIENT	=	0.98		0.49	(	0.93	
역사의 사람이 많은 것을 것을 만들었다. 이 것은 것은 것은 것을 수 있다.		122122		2014/01/19/19			

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB   STANDHYD ( 0043)   ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	11.15 90.00	Dir.	Conn.(%)=	90.00	
Surface Area	(ha)=	IMPERVI 10.0	OUS 3	PERVIOU 1.12	JS (i)		

-----

Dep. Storage	(mm)=	1.00	1.50	
Average Slope	(%)=	1.00	2.00	
Length	(m)=	272.64	40.00	
Mannings n	=	0.013	0.250	

		TR/	ANSFORME	D HYETOGRA	APH	-	
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500	0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.583	0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.667	0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833	0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.917	0.96	2.500	43.98	4.083	3.82	5.67	0.96
1.000	0.96	2.583	43.98	4.167	3.82	5.75	0.96
1.083	0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.167	0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.250	0.96	2.833	12.43	4.417	1.91	6.00	0.96
1.333	5.74	2.917	12.43	4.500	1.91	6.08	0.96
1.417	5.74	3.000	12.43	4.583	1.91	6.17	0.96
1.500	5.74	3.083	12.43	4.667	1.91	6.25	0.96
1.583	5.74	3.167	12.43	4.750	1.91		
Max.Eff.Inten.(mm	/hr)=	43.98		27.63			
over (n	nin)	5.00		15.00			
Storage Coeff. (n	nin)=	6.48	(ii)	10.55 (ii)	6		
Unit Hyd. Tpeak (n	nin)=	5.00		15.00			
Unit Hyd. peak (d	cms)=	0.18		0.09			

PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFIC	(cms)= (hrs)= (mm)= (mm)= ENT =	1.22 2.75 46.81 47.81 0.98		0.07 2.83 23.53 47.81 0.49	*TOT/ 1.2 2. 44. 47. 0.	ALS* 286 (iii) .75 .48 .81 .93	
(i) CN PROCEU CN* = (ii) TIME STEU THAN THE (iii) PEAK FLOU	OURE SELECT 85.0 Ia 9 (DT) SHOUI STORAGE COL 1 DOES NOT 3	ED FOR PER = Dep. St LD BE SMAL EFFICIENT. INCLUDE BA	VIOUS orage LER OR	LOSSES: (Above) EQUAL IF ANY.			
RESERVOIR( 0045)   IN= 2> OUT= 1   DT= 5.0 min	OVERFI OUTFL( (cms) 0.000	LOW IS OFF DW STOR ) (ha. DO 0.0	AGE m.) 0000	OUTFLOW   (cms)   1.1000	STOF (ha. 0.	RAGE .m.) .3830	
INFLOW : ID= 2 { OUTFLOW: ID= 1 {	0043) 0045) PEAK FLOW IME SHIFT ( MAXIMUM STI	AREA (ha) 11.150 11.150 REDUCTI DF PEAK FL DRAGE US	QPEAK (cms) 1.2 0.6 0.6	TPEAK (hrs) 86 2. 15 2. ut/Qin](%) (min) (ha.m.)	75 92 = 47.78 = 10.00 = 0.214	R.V. (mm) 44.48 44.47	
			20	(1121111)	0122		
CALIB STANDHYD ( 0044) ID= 1 DT= 5.0 min	Area Total In	(ha)= 36 np(%)= 90	.51	Dir. Conn.	(%)= 90	0.00	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVIOUS 32.86 1.00 1.00 493.36 0.013	PE	RVIOUS (i) 3.65 1.50 2.00 40.00 0.250			
NOTE: RAIN	FALL WAS TH	RANSFORMED	то	5.0 MIN. T	IME STEP	Ρ.	
Th h 0.00 0.11 0.22 0.31 0.42 0.50 0.50 0.51 0.51 0.51 0.51 0.51 0.51	RAIN           mm/hr           33         0.00           57         0.00           50         0.00           57         0.96           56         0.96           57         0.96           56         0.96           57         0.96           56         0.96           57         0.96           50         0.96           57         0.96           53         0.96           57         0.96           53         0.96           53         5.74           5.74         5.74           53         5.74	TRAN TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.417 2.503 2.417 3.000 2.503 2.417 2.503 2.417 3.000 2.503 2.417 3.000 2.503 2.417 3.000 2.503 2.417 3.000 2.503 2.417 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.0000 3.00000 3.00000 3.00000000	ISFORMEI RAIN mm/hr 5.74 16.25 12.24 12.43 12.43 12.43 12.43 12.43	D HYETOGRA ' TIME ' hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.583 4.667	PH RAIN mm/hr 12.43   6.69   6.69   6.69   6.69   6.69   6.69   3.82   3.82   3.82   3.82   3.82   3.82   3.82   1.91   1.91	TIME hrs 4.83 4.92 5.00 5.17 5.25 5.33 5.42 5.50 5.58 5.67 5.75 5.92 6.00 6.17 6.25	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten. over Storage Coeff. Unit Hvd. Toeal	(mm/hr)= r (min) (min)= r (min)=	43.98 10.00 9.25 ( 10.00	ii)	27.63 15.00 13.32 (ii) 15.00			
Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFIC	(cms)= (cms)= (hrs)= (mm)= (mm)= (ENT =	0.12 3.87 2.75 46.81 47.81 0.98		0.08 0.21 2.83 23.53 47.81 0.49	*TOT/ 4.0 2. 44. 47. 0.	ALS* 079 (iii) .75 .48 .81 .93	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN* = 85.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.	_
Image: Note of the state of the st	
AREA         QPEAK         TPEAK         R.V.           (ha)         (cms)         (hrs)         (mm)           INFLOW:         ID= 2 (0044)         36.510         4.079         2.75         44.48           OUTFLOW:         ID= 1 (0046)         36.510         3.665         2.83         44.48	
PEAK FLOW REDUCTION [Qout/Qin](%)= 89.84 TIME SHIFT OF PEAK FLOW (min)= 5.00 MAXIMUM STORAGE USED (ha.m.)= 0.2244	
ADD HYD ( 0016)    1 + 2 = 3   AREA QPEAK TPEAK R.V. 	
ID = 3 ( 0016): 5.82 0.534 2.75 35.62	
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.	_
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.	-
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
ID = 3 ( 0016): 53.48 4.635 2.75 43.52	
NOTE:         PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANT.	-
AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) INFLOW: ID= 2 (0016) 53.480 4.635 2.75 43.52 OUTFLOW: ID= 1 (0015) 53.480 0.666 4.50 43.51 PEAK FLOW REDUCTION [Qout/Qin](%)= 14.36 TIME SHIFT OF PEAK FLOW (min)=105.00 MAXIMUM STORAGE USED (ha.m.)= 1.7307	
	-
ADD HYD ( 0064)    1 + 2 = 3   AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm)	

ID1= + ID2=	$\frac{1}{2}$	0013) 0015)	: 47 : 53	.96 1 .48 0	.409 .666	2.83 4.50	36. 43.	38 51		
ID =	3 (	0064)	: 101	.44 1	.733	2.83	40.	14		
NOTE:	PEAK	FLOWS	DO NOT	INCLUDE	BASEFL	OWS IF	ANY.			
ROUTE CHN(	225 OUT=	9) 1	Routin	ng time	step (	(min)'=	5.00			
	Di	stance 28.50 47.35 51.00 60.44 65.44 72.65 95.97 103.18 108.18 116.25 122.09 131.52 149.56 155.39 177.88 190.96 195.96 226.50 238.71 251.40		R SECTI levatio 210.02 209.86 209.54 209.54 209.50 209.54 208.58 208.38 208.38 208.38 208.38 208.38 207.92 207.65 208.22 208.49 208.58 208.73 208.58 208.72 209.32 209.32 209.40	ON ( n 0.0	1.1) Mannin 0.0600 0.0450 0.05	g 0600	Main ( Main (	Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel	
DEPTH (m) 0.11 0.22 0.43 0.53 0.64 0.75 0.85 0.96 1.07 1.17 1.28 1.39 1.49 1.60 1.71 1.81 1.93 2.05	207 207 208 208 208 208 208 208 208 208 208 208	LEV (m) .75 .86 .97 .07 .18 .29 .39 .61 .71 .82 .93 .03 .03 .14 .25 .35 .35 .35 .35 .35 .35 .35 .35 .35 .3	The second secon	RAVEL T ME F .) )3 )3 )4 )4 )4 )4 )5 )5 )5 )5 )5 )5 )5 )5 )5 )5 )5 )5 )5	IME TAE LOW RAT (cms) 0.0 0.3 1.8 3.3 5.5 8.0 11.2 20.3 27.7 37.5 48.7 61.5 76.0 91.6 107.8 130.3 156.6	BLE E VE	LOCITY (m/s) 0.12 0.25 0.30 0.40 0.43 0.46 0.44 0.48 0.57 0.66 0.70 0.66 0.70 0.73 0.66 0.80 0.80	7 TR/ 22 14 10	AV. TIME (min) 22.56 40.20 07.47 89.07 76.07 66.47 66.47 66.92 58.04 60.79 55.45 51.74 47.20 43.64 40.75 38.35 38.35 38.50 35.28 33.51 31.84	
INFLOW : OUTFLOW:	ID= 2 ID= 1	{ 00 22	064) 10: 59) 10:	<pre> </pre> AREA (ha) 1.44 1.44	hy QPEAK (cms) 1.73 1.22	drograp TPEAK (hrs) 2.83 4.75	h R.V (mm 40.1 40.1	> < . M .) .4 .3	-pipe / c AX DEPTH (m) 0.42 0.36	hannel-> MAX VEL (m/s) 0.30 0.27
CALIB   NASHYD (  ID= 1 DT= 5	002 .0 mi	5) n	Area Ia U.H. Tp	(ha)= (mm)= (hrs)=	8.34 5.00 0.84	Curve # of	Numbe Linear	r (( Res.	CN)= 79.0 (N)= 3.00	
NOT	E: R	AINFAL	L WAS TH	RANSFOR	MED TO	5.0 M	IN. TI	ME STI	EP.	
	000000000000000000000000000000000000000	TIME hrs .083 .167 .250 .333 .417	RAIN mm/hr 0.00 0.00 0.00 0.96 0.96	T TIME hrs 1.667 1.750 1.833 1.833 1.917	RANSFOR RAI mm/h 5.7 5.7 16.2 16.2	MED HYE N  ' T 74   3.2 74   3.3 75   3.4 25   3.5	TOGRAP IME hrs 50 1 33 17 00 83	RAIN mm/hr 2.43 6.69 6.69 6.69 6.69	- TIME   hrs   4.83   4.92   5.00   5.08   5.17	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96

0.583	0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.667	0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833	0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.917	0.96	2.500	43.98	4.083	3.82	5.67	0.96
1.000	0.96	2.583	43.98	4.167	3.82	5.75	0.96
1.083	0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.167	0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.250	0.96	2.833	12.43	4.417	1.91	6.00	0.96
1.333	5.74	2.91/	12.43	4.500	1.91	6.08	0.96
1.417	5.74	3.000	12.43	4.583	1.91	6.17	0.96
1.500	5.74	3.083	12.43	4.667	1.91	6.25	0.96
1.583	5.74	3.167	12.43	4.750	1.91		

Unit Hyd Qpeak (cms)= 0.379 PEAK FLOW (cms)= 0.166 (i) TIME TO PEAK (hrs)= 3.667

RUNOFF VOLUME	(mm)=	16.611
TOTAL RAINFALL	(mm)=	47.810
RUNOFF COEFFICIE	ENT =	0.347

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

Dep. Storage	(mm)=	1.00	1.50	
Average Slope	(%)=	1.00	2.00	
Length	(m)=	252.32	40.00	
Mannings n	=	0.013	0.250	

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

TRANSFORMED HYETOGRAPH							
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	s mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500	0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.583	0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.667	0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833	0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.91/	0.96	2.500	43.98	4.083	3.82	5.67	0.96
1.000	0.96	2.583	43.98	4.16/	3.82	5.75	0.96
1.083	0.96	2.66/	43.98	4.250	3.82	5.83	0.96
1.16/	0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.250	0.96	2.833	12.43	4.41/	1.91	6.00	0.96
1.333	5.74	2.91/	12.45	4.500	1.91	6.00	0.96
1.41/	5.74	2.000	12.43	4.303	1.91	6.25	0.90
1.500	5 74	3 167	12.43	4.00/	1.91	0.25	0.96
1.585	5.74	1 3.10/	12.45	1 4.750	1.91		
Max Eff Inten (n	m/hr =	43 98		27 63			
over	(min)	5.00		15.00			
Storage Coeff.	(min)=	6.18	(ii)	10.25 (ii)	)		
Unit Hvd. Tpeak	(min)=	5.00		15.00			
Unit Hyd. peak	(cms)=	0.19		0.09			
and the second second	0 0 U				*T0T	TALS*	
PEAK FLOW	(cms)=	1.04		0.06	1.	.103 (iii	)
TIME TO PEAK	(hrs)=	2.75		2.83	2	2.75	
RUNOFF VOLUME	(mm)=	46.81		23.53	44	4.48	
TOTAL RAINFALL	(mm)=	47.81		47.81	47	7.81	
RUNOFF COEFFICIE	ENT =	0.98		0.49	0	0.93	
			DVTOUC	100000			
CN* - S	IS 0 Ta	- Den 9	Storage	(Above)			

CN\* = 85.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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CALIB STANDHYD ( 0047) ID= 1 DT= 5.0 min	Area Total	(ha)= 2 Imp(%)= 9	3.02	Dir. Conn.(%)=	90.00
Sunface Area	(ha)-	IMPERVIOU	JS	PERVIOUS (i)	
Den Storage	(mm)=	1 00		1 50	
Average Slope	(%)=	1.00		2.00	
Length	(m)=	391.75		40.00	
Mannings n	=	0.013		0.250	

		TRA	NSFORME	D HYETOGRA	PH	-	
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	0.96	1.91/	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16.25	3.585	6.69	5.1/	0.96
0.500	0.96	2.065	16 25	3 750	6.69	5.23	0.96
0.565	0.96	2.107	16 25	3 833	3 82	5 42	0.96
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833	0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.917	0.96	2,500	43.98	4.083	3.82	5.67	0.96
1.000	0.96	2.583	43.98	4.167	3.82	5.75	0.96
1.083	0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.167	0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.250	0.96	2.833	12.43	4.417	1.91	6.00	0.96
1.333	5.74	2.917	12.43	4.500	1.91	6.08	0.96
1.41/	5.74	3.000	12.43	4.583	1.91	6.1/	0.96
1.500	5.74	3.085	12.43	4.007	1.91	0.25	0.96
1.303	5.74	5.10/	12.45	4.750	1.91		
Max.Eff.Inten.(mm	/hr)=	43.98		27.63			
over (	min)	10.00	3	15.00			
Storage Coeff. (	min)=	8.05	(ii)	12.12 (ii)			
Unit Hyd. Tpeak (	min)=	10.00		15.00			
Unit Hyd. peak (	cms)=	0.13		0.09	*TOT	AL C+	
DEAK FLOW	>	2 47		0.14	^10I	ALS"	
TTME TO DEAK	cms)=	2.4/		0.14	4	007 (111)	
RUNDEE VOLUME	(mm)=	46 81		23 53	44	1 48	
TOTAL RATNEALL	(mm)=	47.81		47.81	47	7.81	
RUNOFF COEFFICIEN	Ť =	0.98		0.49	Ċ	0.93	

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2.75 46.81 47.81 0.98 2.83 23.53 47.81 0.49

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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RESERVOIR( 0049)	OVERFLOW 1	S OFF			
DT= 5.0 min	OUTFLOW (cms) 0.0000	STORAGE (ha.m.) 0.0000	OUTFLOW (cms) 3.4700	STORAGE (ha.m.) 0.0040	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 ( TI MA	ARE (ha 0047) 23.0 0049) 23.0 EAK FLOW RE IME SHIFT OF PE XXIMUM STORAGE	A QPEAK (cms) 20 2.600 20 2.600 20 2.600 CDUCTION [Qout AK FLOW USED	TPEAK (hrs) 7 2.75 0 2.75 t/Qin](%)= 9 (min)= (ha.m.)=	R.V. (mm) 44.48 44.48 9.73 0.00 0.0031	
CALIB   STANDHYD ( 0048)  ID= 1 DT= 5.0 min	Area (ha) Total Imp(%)	= 31.36 = 90.00 D <sup>-</sup>	ir. Conn.(%)	= 90.00	
Surface Area Dep. Storage Average Slope Length	[ha]= 28 (mm)= 1 (%)= 1 (m)= 457	VIOUS PERV .22 .00 .00 .24 40	VIOUS (i) 3.14 1.50 2.00 0.00		

Mannings n	=	0.013	0.250			
NOTE: R	AINFALL WAS T	RANSFORMED TO	5.0 MIN. TI	ME STEP.		
	TIME         RAIN           hrs         mm/hr           0.083         0.00           1.167         0.00           2.500         0.00           2.333         0.96           .417         0.96           .583         0.96           .667         0.96           .750         0.96           .917         0.96           .000         0.96           .167         0.96           .250         0.96           .333         5.74           .417         5.74	TRANSFORM TIME RAIT hrs mm/hh 1.667 5.74 1.750 5.74 1.833 16.22 2.000 16.22 2.003 16.22 2.167 16.22 2.250 16.22 2.333 43.99 2.417 43.98 2.500 43.99 2.583 43.99 2.667 43.99 2.667 43.99 2.833 12.44 3.000 12.43	MED HYETOGRAP   ' TIME   3.250 1   3.333   3.500   3.503   3.533   3.5417   3.503   3.5417   3.553   3.5417   3.555   3.5555   3.5555   3.5555   3.55	H          RAIN       TIME         mm/hr       hrs         2.43       4.83         6.69       5.00         6.69       5.08         6.69       5.17         6.69       5.25         6.69       5.33         3.82       5.42         3.82       5.58         3.82       5.75         3.82       5.75         3.82       5.75         3.82       5.75         3.82       5.83         1.91       6.08         1.91       6.08         1.91       6.25	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96	
1 Max.Eff.Inte G Storage Coef Unit Hyd. Tp Unit Hyd. pe	583 5.74 n.(mm/hr)= over (min) f. (min)= weak (min)= wak (cms)=	3.167 12.4 43.98 10.00 8.83 (ii) 10.00 0.12	27.63 15.00 12.90 (ii) 15.00 0.08	1.91		
PEAK FLOW TIME TO PEAK RUNOFF VOLUM TOTAL RAINFA RUNOFF COEFF	(cms)= (hrs)= E (mm)= LL (mm)= ICIENT =	3.34 2.75 46.81 47.81 0.98	0.19 2.83 23.53 47.81 0.49	*TOTALS* 3.521 (iii) 2.75 44.48 47.81 0.93		
(i) CN PRC CN* (ii) TIME S THAN T (iii) PEAK F	CEDURE SELECT = 85.0 Ia TEP (DT) SHOU HE STORAGE CO LOW DOES NOT	ED FOR PERVIOUS = Dep. Storage LD BE SMALLER ( EFFICIENT. INCLUDE BASEFL(	S LOSSES: (Above) OR EQUAL DW IF ANY.			
RESERVOIR( 005   IN= 2> OUT=   DT= 5.0 min	0) OVERF 1 000000000000000000000000000000000000	LOW IS OFF DW STORAGE ) (ha.m.) 00 0.0000	OUTFLOW (cms) 5.6500	STORAGE (ha.m.) 0.3682		
INFLOW : ID= 2 OUTFLOW: ID= 1	( 0048) ( 0050)	(ha) (cms 31.360 3. 31.360 3.	s) (hrs) .521 2.7 .135 2.8	(mm) 5 44.48 3 44.48		
PEAK FLOW REDUCTION [Qout/Qin](%)= 89.03 TIME SHIFT OF PEAK FLOW (min)= 5.00 MAXIMUM STORAGE USED (ha.m.)= 0.2043						
CALIB STANDHYD ( 009 ID= 1 DT= 5.0 mi	3) Area n Total In	(ha)= 88.14 mp(%)= 28.90	Dir. Conn.(	%)= 28.20		
Surface Area Dep. Storage Average Slop Length Mannings n	ha)= (mm)= we (%)= (m)= =	IMPERVIOUS 25.47 2.00 2.28 766.55 0.013	PERVIOUS (i) 62.67 5.00 2.28 40.00 0.250			
NOTE: R	AINFALL WAS T	RANSFORMED TO	5.0 MIN. TI	ME STEP.		
	TIME RAIN	TRANSFORM	MED HYETOGRAP	H RAIN   TIME	RAIN	
	hrs mm/hr	hrs mm/h	' hrs	mm/hr hrs	mm/hr	

RAIN mm/hr 0.96 mm/hr | hrs mm/hr | hrs mm/hr | hrs 0.00 | 1.667 5.74 | 3.250 12.43 | 4.83 0.083

0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500	0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.583	0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.667	0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833	0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.917	0.96	2.500	43.98	4.083	3.82	5.67	0.96
1.000	0.96	2.583	43.98	4.167	3.82	5.75	0.96
1.083	0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.167	0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.250	0.96	2.833	12.43	4.417	1.91	6.00	0.96
1.333	5.74	2.917	12.43	4.500	1.91	6.08	0.96
1.417	5.74	3.000	12.43	4.583	1.91	6.17	0.96
1.500	5.74	3.083	12.43	4.667	1.91	6.25	0.96
1.583	5.74	3.167	12.43	4.750	1.91		
Max.Eff.Inten.(mm/	(hr)=	43.98		21.60			
over (n	nin	10.00		25.00			
Storage Coeff. (n	nin)=	9.41	(ii)	21.93 (ii)			
Unit Hvd. Tpeak (n	nin)=	10.00		25.00			
Unit Hvd. peak (c	cms)=	0.12		0.05			
					*T0	TALS*	
PEAK FLOW (c	cms)=	2.92		2.25	4.	.584 (iii)	)
TIME TO PEAK (1	nrs)=	2.75		3.00	2	2.75	
RUNOFF VOLUME	(mm) =	45.81		18.03	25	5.87	
TOTAL RAINFALL	(mm)=	47.81		47.81	47	7.81	
RUNOFF COEFFICIENT	Г =	0.96		0.38	(	0.54	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 81.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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Surface Area	(ha)=	IMPERVIOUS	PERVIOUS (i)		
CALIB STANDHYD ( 0088) ID= 1 DT= 5.0 min	Area Total	(ha)= 181.61 Imp(%)= 58.40	Dir. Conn.(%)=	54.10	

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Sui lace Alea	(na)-	100.00	13.35
Dep. Storage	(mm)=	2.00	5.00
Average Slope	`(%)=	2.50	2.50
Length	(m)=	1100.33	40.00
Mannings n	=	0.013	0.250

		TR/	ANSFORME	ED HYETOGRA	PH		
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	s mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500	0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.583	0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.667	0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833	0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.917	0.96	2.500	43.98	4.083	3.82	5.67	0.96
1.000	0.96	2.583	43.98	4.167	3.82	5.75	0.96
1.083	0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.167	0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.250	0.96	2.833	12.43	4.417	1.91	6.00	0.96
1.333	5.74	2.917	12.43	4.500	1.91	6.08	0.96
1.417	5.74	3.000	12.43	4.583	1.91	6.17	0.96
1.500	5.74	3.083	12.43	4.667	1.91	6.25	0.96
1.583	5.74	3.167	12.43	4.750	1.91		
Max.Eff.Inten.(m	m/hr)=	43.98		26.05			
over	(min)	10.00		25.00			
Storage Coeff.	(min)=	11.37	(ii)	22.67 (ii)			
Unit Hyd. Tpeak	(min)=	10.00		25.00			
Unit Hyd. peak	(cms)=	0.10		0.05			
					*T0T	ALS*	
PEAK FLOW	(cms)=	11.27		3.26	13.	714 (iii)	
TIME TO PEAK (hr	-(2	2 75	3 00	2 75			
--------------------	-----	-------	-------	-------			
PUNOFF VOLUME		45 01	10.07	22.05			
RUNDEF VOLUME (M	m2=	45.01	19.97	55.95			
TOTAL RAINFALL (m	m)=	47.81	47.81	47.81			
RUNOFF COEFFICIENT	=	0.96	0.42	0.71			

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 82.0 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( 0089)    IN= 2> OUT= 1	OVERFLOW I	5 OFF			
DT= 5.0 min	OUTFLOW (cms) 0.0000 0.6870 1.0220	STORAGE (ha.m.) 0.0000 3.6492 5.2831	OUTFLOW (cms) 1.5600 2.0400 40.8000	STORAGE (ha.m.) 7.7340 9.8037 10.8930	
INFLOW : ID= 2 { OUTFLOW: ID= 1 { TI MA	ARE, (ha; 0088) 181.6; 0089) 181.6; AK FLOW REI ME SHIFT OF PE, XIMUM STORAGE	A OPEAK ) (cms) 10 13.714 10 0.991 DUCTION [Qout AK FLOW USED	TPEAK (hrs) 2.75 4.83 (din](%)= (min)=12 (ha.m.)=	R.V. (mm) 33.95 33.94 7.23 5.00 5.1343	

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CALIB STANDHYD ( 0091) ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	19.40 65.30	Dir.	Conn.(%)=	59.80
		IMPERVI	OUS	PERVIO	JS (i)	
Surface Area	(ha)=	12.6	7	6.73	3	
Dep. Storage	(mm)=	2.0	0	5.00	0	
Average Slope	(%)=	2.4	0	2.00	0	
Length	(m)=	359.6	3	40.00	0	
Mannings n	=	0.01	3	0.250	0	

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

	TR	ANSFORME	D HYETOGRA	PH	-	
TIME RA	IN   TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs mm/	hr hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083 0.	00 1.667	5.74	3.250	12.43	4.83	0.96
0.167 0.	00   1.750	5.74	3.333	6.69	4.92	0.96
0.250 0.	00   1.833	16.25	3.417	6.69	5.00	0.96
0.333 0.	96   1.917	16.25	3.500	6.69	5.08	0.96
0.417 0.	96 2.000	16.25	3.583	6.69	5.17	0.96
0.500 0.	96 2.083	16.25	3.667	6.69	5.25	0.96
0.583 0.	96   2.167	16.25	3.750	6.69	5.33	0.96
0.667 0.	96 2.250	16.25	3.833	3.82	5.42	0.96
0.750 0.	96 2.333	43.98	3.91/	3.82	5.50	0.96
0.833 0.	96   2.41/	43.98	4.000	3.82	5.58	0.96
0.91/ 0.	96 2.500	43.98	4.083	3.82	5.6/	0.96
1.000 0.	96 2.583	43.98	4.16/	3.82	5./5	0.96
1.065 0.	90 2.00/	43.90	4.230	3.02	5.65	0.96
1.10/ 0.	96 2.750	43.90	4.333	1.91	5.92	0.96
1 333 5	74 2 017	12.43	4.417	1 01	6.08	0.96
1 417 5	74 3 000	12.43	4 583	1 01	6.17	0.96
1.500 5.	74 3.083	12.43	4.667	1.91	6.25	0.96
1.583 5.	74 3.167	12.43	4.750	1.91	0120	0.00
May Eff Inten (mm/hr)=	43 98	8	31 48			
over (min)	5.00		20.00			
Storage Coeff. (min)=	5.88	(ii)	17.09 (ii)	6		
Unit Hvd. Tpeak (min)=	5.00		20.00			
Unit Hvd. peak (cms)=	0.19		0.06			
	122491234		294320622	*TOT	ALS*	
PEAK FLOW (cms)=	1.41		0.41	1.	770 (iii)	
TIME TO PEAK (hrs)=	2.75		2.92	2	.75	
RUNOFF VOLUME (mm)=	45.81		23.02	36	5.65	
TOTAL RAINFALL (mm)=	47.81		47.81	47	.81	
RUNOFF COEFFICIENT =	0.96		0.48	C	).77	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

ADD HYD ( 1 + 2 =	0092) 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)		
+ ID1=	1 008	9): 1 )1): 1	81.61 19.40	0.991 1.770	4.83	33.94 36.65		
ID =	3 ( 009	92): 20	01.01	2.201	2.75	34.20		
NOTE:	PEAK FLOW	S DO NO	T INCLU	DE BASEFL	OWS IF A	NY.		
ROUTE CHN( IN= 2>	2252) OUT= 1	Rou	ting ti	me step (	min)'=	5.00		
	<pre></pre>	DATA 1000 150 150 150 150 150 150 15	FOR SEC Elevat 210. 209. 209. 209. 209. 209. 209. 208. 208.	TION ( ion 02 86 76 54 60 41 53 38	1.1) Manning 0.0600 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450	> Main Main Main Main Main Main	Channel Channel Channel Channel Channel Channel	
	108 116 122 131 149 155 177 190 195	18 125 109 52 56 39 88 96 96 50	208. 207. 207. 207. 208. 208. 208. 208. 208. 208. 208. 208	53 08 92 65 22 49 58 73 72 32	0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450	Main Main Main Main Main Main Main Main	Channel Channel Channel Channel Channel Channel Channel Channel Channel	
<	238 251	71 40	209. 209. TRAVEL	46 0.0 70 TIME TAE	450 /0.0 0.0600	600 Main	Channel	
0.11 0.21 0.32 0.43 0.53 0.64 0.75 0.85 0.96 1.07	(m) 207.75 207.86 207.97 208.07 208.18 208.29 208.39 208.39 208.50 208.61 208.71	(cu .531) .213 .479 .856 .134 .193 .261 .344 .458 .598	.m.) =+03 =+04 =+04 =+04 =+05 =+05 =+05 =+05 =+05 =+05 =+05	(cms) 0.1 0.5 1.4 3.0 5.5 9.0 13.1 18.4 23.5 33.6		0.20 0.22 0.41 0.50 0.58 0.67 0.71 0.76 0.73 0.73 0.80	(min) 119.24 75.12 57.58 47.72 40.76 35.61 33.18 31.10 32.57 29.71	
1.17 1.28 1.39 1.60 1.71 1.81 1.93 2.05	208.82 208.93 209.03 209.14 209.25 209.35 209.46 209.58 209.70	.761 .938 .113 .133 .154 .177 .202 .232 .264	E+05 E+05 E+06 E+06 E+06 E+06 E+06 E+06 E+06 E+06	45.8 61.8 80.4 101.5 125.3 151.0 177.9 214.9 258.3		0.85 0.94 1.01 1.09 1.15 1.21 1.25 1.32 1.39	27.72 25.29 23.38 21.84 20.55 19.56 18.90 17.96 17.06	
INFLOW : OUTFLOW:	ID= 2 ( ID= 1 (	0092) 2252)	AREA (ha) 201.01 201.01	< hy QPEAK (cms) 2.20 1.18	drograph TPEAK (hrs) 2.75 3.83	R.V. (mm) 34.20 34.20	<-pipe / c MAX DEPTH (m) 0.37 0.30	hannel MAX V (m/s 0.4 0.3

Dep. Storage	(mm)=	2.00	5.00
Average Slope	`(%)=	2.04	2.04
Length	(m)=	530.22	40.00
Mannings n	=	0.013	0.250

	TRANS	FORMED HYET	OGRAPH		
hrs mm/br	IIME   hrs n	m/hr l'h	ne RA∐ rs mm/hi	n IIME	mm/hr
0.083 0.00	1.667	5.74 3.25	0 12.43	4.83	0.96
0.167 0.00	1.750	5.74   3.33	3 6.69	4.92	0.96
0.333 0.96	1.917	6.25 3.50	6.69	5.08	0.96
0.417 0.96	2.000 1	6.25 3.58	3 6.69	5.17	0.96
0.583 0.96	2.167 1	6.25 3.75	0 6.69	5.33	0.96
0.667 0.96	2.250 1	6.25 3.83	3 3.82	5.42	0.96
0.750 0.96	2.333 4	3.98 3.91	7 3.82 0 3.82	5.50	0.96
0.917 0.96	2.500 4	3.98 4.08	3 3.82	5.67	0.96
1.000 0.96	2.583 4	3.98 4.16	7 3.82	5.75	0.96
1.167 0.96	2.750 4	3.98 4.33	3 1.91	5.92	0.96
1.250 0.96	2.833 1		7 1.91	6.00	0.96
1.417 5.74	3.000 1	2.43 4.58	3 1.91	6.17	0.96
1.500 5.74	3.083 1	2.43 4.66	7 1.91	6.25	0.96
1.385 5.74	1 2.10/	2.43   4.75	0 1.91	I	
Max.Eff.Inten.(mm/hr)=	43.98	22.08			
over (min) Storage Coeff. (min)=	7.80 (i	i) 20.63	(ii)		
Unit Hyd. Tpeak (min)=	10.00	25.00	()		
Unit Hyd. peak (cms)=	0.13	0.05	*T(	TALS*	
PEAK FLOW (cms)=	3.63	0.44		3.964 (iii)	
TIME TO PEAK (hrs)=	2.75	3.00		2.75	
TOTAL RAINFALL (mm)=	47.81	47.81	4	47.81	
RUNOFF COEFFICIENT =	0.96	0.39		0.80	
(i) CN PROCEDURE SELECT	ED FOR PER	IOUS LOSSES	:		
(ii) TIME STEP (DT) SHOU	LD BE SMALL	ER OR EQUAL	e)		
THAN THE STORAGE CO	EFFICIENT.		~		
(TTT) PEAK FLOW DOES NOT	INCLUDE BAS	EFLOW IF AN			
ADD HYD ( 0095)			PV		
(	NEA GEL	A TEAK	N. V.		
	na) (cms	i) (nrs)	(mm)		
ID1=1(2252):201	.01 1.184	(hrs) 3.83	(mm) 34.20		
ID1= 1 ( 2252): 201 + ID2= 2 ( 0093): 88	na) (cms .01 1.184 .14 4.584	3.83 2.75	(mm) 34.20 25.87		
$     \begin{array}{r}       ID1 = 1 ( 2252): 201 \\       + ID2 = 2 ( 0093): 88 \\       \hline       ID = 3 ( 0095): 289     \end{array} $	.01 1.184 .14 4.584 .15 5.502	2.83	(mm) 34.20 25.87 31.66		
ID1= 1 ( 2252): 201 + ID2= 2 ( 0093): 88 ID = 3 ( 0095): 289 NOTE: PEAK FLOWS DO NOT	na) (cms .01 1.184 .14 4.584 .15 5.502 INCLUDE BAS	2.83 2.83 2.83 2.83 2.83	(mm) 34.20 25.87 31.66		
ID1= 1 ( 2252): 201 + ID2= 2 ( 0093): 88 ID = 3 ( 0095): 289 NOTE: PEAK FLOWS DO NOT	na) (cms .01 1.184 .14 4.584 .15 5.502 INCLUDE BAS	2.75 2.83 2.75 2.83 SEFLOWS IF A	(mm) 34.20 25.87 31.66 NY.		
ID1= 1 ( 2252): 201 + ID2= 2 ( 0093): 88 ID = 3 ( 0095): 289 NOTE: PEAK FLOWS DO NOT	na) (cms .01 1.184 .14 4.584 .15 5.502 INCLUDE BAS	2.75 2.83 2.75 2.83 2.83	(mm) 34.20 25.87 31.66 NY.		
ID1= 1 ( 2252): 201 + ID2= 2 ( 0093): 88 ID = 3 ( 0095): 289 NOTE: PEAK FLOWS DO NOT	na) (cms .01 1.184 .14 4.584 .15 5.502 INCLUDE BAS	() (nrs) 3.83 2.75 2.83 SEFLOWS IF A	(mm) 34.20 25.87 31.66 NY.		
$\begin{array}{c} \text{ID1= 1 ( 2252): 201} \\ + \text{ ID2= 2 ( 0093): 88} \\ \hline \text{ID = 3 ( 0095): 289} \\ \hline \text{NOTE: PEAK FLOWS DO NOT} \\ \hline \\ \hline \\ \text{ADD HYD ( 0095) } \\ \hline \\ 3 + 2 = 1 \\ \hline \\ \end{array}$	REA OPE4 ha) (cms	() (nrs) 3.83 2.75 2.83 SEFLOWS IF A SEFLOWS IF A Chrs)	(mm) 34.20 25.87 31.66 NY. R.V. (mm)		
$\begin{array}{c} \text{ID1=1} (2252): 201 \\ + \text{ID2=2} (0093): 88 \\ \hline \text{ID=3} (0095): 289 \\ \hline \text{NOTE: PEAK FLOWS DO NOT} \\ \hline \text{ADD HYD} (0095) \\ \hline 3 + 2 = 1 \\ \hline \text{ID1=3} (0095): 289 \\ \hline \text{ID1=3} (2095): 289 \\ \hline \text{ID1=3} (0095): 289 \\ \hline \\text{ID1=3} (0095): 289 \\ \hline \\ \hline \\ \ \ \\ \\ \\ \\ \\ \ \ \ \ $	REA OPE4 ha) (cms .11 1.184 .15 5.502 INCLUDE BAS	() (nrs) 3.83 2.75 2.83 SEFLOWS IF A SEFLOWS IF A (hrs) 2.83 2.83	(nm) 34.20 25.87 31.66 NY. R.V. (mm) 31.66		
$\begin{array}{c} \text{ID1=1} (2252): 201 \\ + \text{ID2=2} (0093): 88 \\ \hline \text{ID=3} (0095): 289 \\ \hline \text{NOTE: PEAK FLOWS DO NOT} \\ \hline \text{ADD HYD} (0095) \\ 3 + 2 = 1 \\ \hline \text{ID1=3} (0095): 289 \\ + \text{ID2=2} (0096): 42 \\ \hline \end{array}$	REA OPE/ ha) (cms .11 1.18/ .15 5.502 INCLUDE BAS .15 5.502 .17 3.96/	() (nrs) 3.83 2.75 2.83 SEFLOWS IF A SEFLOWS IF A (hrs) 2.83 2.83 2.75	(nm) 34.20 25.87 31.66 NY. R.V. (mm) 31.66 38.19		
$\begin{array}{c} \text{ID1=1 ( 2252): 201} \\ + \text{ ID2= 2 ( 0093): 88} \\ \hline \text{ID = 3 ( 0095): 289} \\ \hline \text{NOTE: PEAK FLOWS DO NOT} \\ \hline \\ \hline \\ \text{ADD HYD ( 0095)  } \\ \hline \\ 3 + 2 = 1 \\ \hline \\ \hline \\ \hline \\ \hline \\ \text{ID1= 3 ( 0095): 289} \\ + \text{ ID2= 2 ( 0096): 42} \\ \hline \\ \hline \\ \hline \\ \hline \\ \text{ID = 1 ( 0095): 331} \end{array}$	REA OPE/ ha) (cms .11 1.18/ .15 5.502 INCLUDE BAS .15 5.502 .17 3.964 .32 9.387	() (nrs) 3.83 2.75 2 2.83 SEFLOWS IF A SEFLOWS IF A (hrs) 2.83 2.75 7 2.75	(mm) 34.20 25.87 31.66 WY. R.V. (mm) 31.66 38.19 32.49		
$\begin{array}{c} \text{ID1=1 ( 2252): 201} \\ + \text{ ID2= 2 ( 0093): 88} \\ \hline \text{ID=3 ( 0095): 289} \\ \hline \text{ID=3 ( 0095): 289} \\ \hline \text{NOTE: PEAK FLOWS DO NOT} \\ \hline \\ $	REA QPE/ ha) (cms .11 4.584 .15 5.502 INCLUDE BAS .15 5.502 .17 3.964 .32 9.387 INCLUDE BAS	() (nrs) 3.83 2.75 2.83 SEFLOWS IF A (hrs) 2.83 2.75 2.75 SEFLOWS IF A	(nmn) 34.20 25.87 31.66 NY. R.V. (nmn) 31.66 38.19 32.49 NY.		
$\begin{array}{c} \text{ID1=1 ( 2252): 201} \\ + \text{ ID2= 2 ( 0093): 88} \\ \hline \text{ID=3 ( 0095): 289} \\ \hline \text{ID=3 ( 0095): 289} \\ \hline \text{NOTE: PEAK FLOWS DO NOT} \\ \hline \\ $	REA QPE/ ha) (cms .11 4.584 .15 5.502 INCLUDE BAS .15 5.502 .17 3.964 .32 9.387 INCLUDE BAS	(nrs)           3.83           2.75           2.83           SEFLOWS IF A           (hrs)           2.83           2.75           2.75           3.83           2.75           3.83           2.75           3.83	(nmn) 34.20 25.87 31.66 NY. R.V. (nmn) 31.66 38.19 32.49 NY.		
ID1= 1 ( 2252): 201 + ID2= 2 ( 0093): 88 ID = 3 ( 0095): 289 NOTE: PEAK FLOWS DO NOT   ADD HYD ( 0095)    3 + 2 = 1   A ID1= 3 ( 0095): 289 + ID2= 2 ( 0096): 42 ID = 1 ( 0095): 331 NOTE: PEAK FLOWS DO NOT 	REA OPE/ ha) (cms .11 1.82 .14 4.584 .15 5.502 INCLUDE BAS .15 5.502 .17 3.964 .32 9.387 INCLUDE BAS	(nrs)           3.83           2.75           2.83           SEFLOWS IF A           (hrs)           2.83           2.75           2.75           3.82           3.83           2.75           3.83           3.83           3.83           3.83           3.83           3.83           3.83           3.83           3.83           3.85	(nmn) 34.20 25.87 31.66 NY. R.V. (nmn) 31.66 38.19 32.49 NY.		
ID1= 1 ( 2252): 201 + ID2= 2 ( 0093): 88 ID = 3 ( 0095): 289 NOTE: PEAK FLOWS DO NOT   ADD HYD ( 0095)    3 + 2 = 1   A ID1= 3 ( 0095): 289 + ID2= 2 ( 0096): 42 ID = 1 ( 0095): 331 NOTE: PEAK FLOWS DO NOT 	REA OPE/ ha) (cms .11 4.584 .15 5.502 INCLUDE BAS .15 5.502 .17 3.964 .32 9.387 INCLUDE BAS	() (nrs) 3.83 2.75 2.83 SEFLOWS IF A (hrs) 2.83 2.75 2.75 2.75 SEFLOWS IF A 2.75 SEFLOWS IF A	(mm) 34.20 25.87 31.66 NY. R.V. (mm) 31.66 38.19 32.49 NY. 5.00		
ID1= 1 ( 2252): 201 + ID2= 2 ( 0093): 88 ID = 3 ( 0095): 289 NOTE: PEAK FLOWS DO NOT   ADD HYD ( 0095)    3 + 2 = 1   A ID1= 3 ( 0095): 289 + ID2= 2 ( 0096): 42 ID = 1 ( 0095): 331 NOTE: PEAK FLOWS DO NOT 	REA QPE/ ha) (cms .11 4.584 .15 5.502 INCLUDE BAS .15 5.502 .17 3.964 .32 9.387 INCLUDE BAS .32 9.387 INCLUDE BAS	() (nrs) 3.83 2.75 2.83 SEFLOWS IF A (hrs) 2.83 2.75 2.75 SEFLOWS IF A 2.75 SEFLOWS IF A (hrs) 2.175 2.11 2.11	(mm) 34.20 25.87 31.66 NY. R.V. (mm) 31.66 38.19 32.49 NY. 5.00		
ID1= 1 ( 2252): 201 + ID2= 2 ( 0093): 88 ID = 3 ( 0095): 289 NOTE: PEAK FLOWS DO NOT   ADD HYD ( 0095)    3 + 2 = 1   A ID1= 3 ( 0095): 289 + ID2= 2 ( 0096): 42 ID = 1 ( 0095): 331 NOTE: PEAK FLOWS DO NOT 	REA QPE/ ha) (cms .11 1.82 .14 4.584 .15 5.502 INCLUDE BAS .15 5.502 .17 3.964 .15 5.502 .17 3.964 .13 9.387 INCLUDE BAS ng time stee R SECTION ( levation	<pre>() (nrs) 3.83 2.75 2.83 SEFLOWS IF A (hrs) 2.83 (hrs) 2.83 2.75 2.75 SEFLOWS IF A (hrs) 2.75 SEFLOWS IF A (hrs) 2.75</pre>	(mm) 34.20 25.87 31.66 NY. R.V. (mm) 31.66 38.19 32.49 NY. 5.00 >		
ID1= 1 ( 2252): 201 + ID2= 2 ( 0093): 88 ID = 3 ( 0095): 289 NOTE: PEAK FLOWS DO NOT   ADD HYD ( 0095)    3 + 2 = 1   A ID1= 3 ( 0095): 289 + ID2= 2 ( 0096): 42 ID = 1 ( 0095): 331 NOTE: PEAK FLOWS DO NOT 	REA QPE/ A) 1 1.184 .14 4.584 .15 5.502 INCLUDE BAS .15 5.502 .17 3.964 .15 5.502 .17 3.964 .17 3.964 .17 3.964 .12 9.387 .10 0.02 .209.86	<pre>c) (nrs) 3.83 2.75 2.83 3.2.75 3.2.83 3.2.75 3.2.83 4.2.75 3</pre>	(mm) 34.20 25.87 31.66 NY. R.V. (mm) 31.66 38.19 32.49 NY. 5.00 > Main	Channel	

60 65 72 95 103 108 116 122 131 149 155 177 190 195 226 238 251	.44         209.5.           .44         209.6.           .65         209.4.           .97         208.5.           .18         208.3.           .125         208.0.           .09         207.9.           .52         207.6.           .56         208.4.           .88         208.5.           .96         208.7.           .50         209.3.           .96         208.7.           .50         209.3.           .71         209.44           .40         209.70	4 0.04 0 0.04 1 0.04 8 0.04 8 0.04 8 0.04 8 0.04 2 0.04 9 0.04 9 0.04 9 0.04 9 0.04 9 0.04 5 0.04 9 0.04 5 0.04 9 0.04	50         Maii           50	Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel	
DEPTH         ELEV           (m)         (m)           0.11         207.75           0.21         207.86           0.32         207.97           0.43         208.07           0.53         208.18           0.64         208.29           0.75         208.39           0.85         208.61           1.07         208.71           1.17         208.82           1.28         209.03           1.49         209.14           1.60         209.55           1.71         209.35           1.81         209.46           1.93         209.70	TRAVEL 1 VOLUME (cu.m.) .143E+03 .574E+03 .574E+03 .129E+04 .231E+04 .362E+04 .520E+04 .206E+04 .206E+05 .162E+05 .206E+05 .305E+05 .359E+05 .417E+05 .479E+05 .545E+05 .625E+05 .714E+05	TIME TABLE FLOW RATE (cms) 0.1 0.4 1.0 2.2 4.1 6.7 9.8 13.8 17.5 25.1 34.2 46.2 60.1 75.9 93.7 112.9 133.0 160.7 193.1	VELOCITY (m/s) 0.15 0.24 0.31 0.37 0.43 0.50 0.53 0.57 0.54 0.60 0.64 0.70 0.76 0.81 0.86 0.91 0.94 0.99 1.04	<pre>&gt;&gt; RAV.TIME (min) 43.07 27.13 20.80 17.24 14.72 12.86 11.98 11.23 11.76 10.73 10.01 9.13 8.45 7.89 7.42 7.06 6.83 6.49 6.16</pre>	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	AREA (ha) 0095) 331.32 2257) 331.32	< hydrogr QPEAK TPE (cms) (hr 9.39 2. 8.14 2.	aph> AK R.V. s) (mm) 75 32.49 83 32.49	<-pipe / c MAX DEPTH (m) 0.73 0.69	hannel-> MAX VEL (m/s) 0.53 0.51
CALIB   STANDHYD ( 0100)  ID= 1 DT= 5.0 min	Area (ha)= Total Imp(%)= IMPERVI	36.92 58.10 Dir IOUS PERVI	. Conn.(%)= OUS (i)	58.10	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	21.45	15.47
Dep. Storage	(mm)=	2.00	5.00
Average Slope	`(%)=	3.42	3.42
Length	(m)=	496.12	40.00
Mannings n	=	0.013	0.250

		TR/	ANSFORME	DHYETOGR	APH		
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500	0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.583	0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.667	0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833	0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.917	0.96	2.500	43.98	4.083	3.82	5.67	0.96
1.000	0.96	2.583	43.98	4.167	3.82	5.75	0.96
1.083	0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.167	0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.250	0.96	2.833	12.43	4.417	1.91	6.00	0.96
1.333	5.74	2.917	12.43	4.500	1.91	6.08	0.96

1 1 1	.417 .500 .583	5.74 5.74 5.74	3.000 3.083 3.167	12.43 12.43 12.43	4.583 4.667 4.750	1.91   1.91   1.91	6.17 6.25	0.96 0.96
Max.Eff.Inte C Storage Coef Unit Hyd. Tr Unit Hyd. pe	en.(mm/hr over (min ff. (min beak (min eak (cms	)= }= )= )=	43.98 5.00 6.41 5.00 0.18	(ii)	21.23 20.00 17.58 (ii) 20.00 0.06			
PEAK FLOW TIME TO PEAK RUNOFF VOLUM TOTAL RAINFA RUNOFF COEFF	(cms (hrs ME (mm ALL (mm FICIENT	)= }= }= )= =	2.61 2.75 45.81 47.81 0.96		0.61 2.92 17.90 47.81 0.37	*101/ 3.: 2 34 47 0	ALS* 122 (iii) .75 .12 .81 .71	
(i) CN PRC CN* (ii) TIME 3 THAN 1 (iii) PEAK F	CEDURE S = 81.0 STEP (DT) THE STORA LOW DOES	ELECTED Ia = SHOULD GE COEF NOT IN	) FOR PE = Dep. S ) BE SM/ FICIENT WCLUDE E	ERVIOUS Storage ALLER OF F. BASEFLOW	LOSSES: (Above) EQUAL IF ANY.			
CALIB   STANDHYD ( 010  ID= 1 DT= 5.0 mi	)2) Ar in To	ea ( tal Imp	(ha)= 7 b(%)= 8	71.88 33.70	Dir. Conn.	(%)= 8	3.70	
Surface Area Dep. Storage Average Slop Length Mannings n	a (ha e (mm be (% (m	AI = = = = = = =	IPERVIOU 60.16 2.00 2.22 692.24 0.013	JS PE	RVIOUS (i) 11.72 5.00 2.22 40.00 0.250			
NOTE: F	AINFALL	WAS TRA	NSFORME	D TO	5.0 MIN. T	IME STE	Ρ.	
	TIME hrs m ).083 ).167 ).250 ).333 ).417 ).500 ).583 ).667 ).750 ).833 ).917 .000 1.083 1.167 250 333 1.417 500 1.583	RAIN   m/hr   0.00   0.00   0.96   0.	TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.317 2.667 2.750 2.807 2.667 2.750 2.817 3.000 3.083 3.167	NSFORM RAIN mm/hr 5.74 16.25 16.25 16.25 16.25 16.25 16.25 16.25 16.25 16.25 16.25 143.98 43.98 43.98 43.98 43.98 43.98 43.98 12.43 12.43 12.43	D HYETOGRA TIME hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.583 4.417 4.500 4.583 4.667 4.750	PH RAIN mm/hr 12.43   6.69   6.69   6.69   6.69   6.69   6.69   3.82   3.82   3.82   3.82   3.82   3.82   1.91   1.91   1.91	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.67 5.75 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inte Storage Coef Unit Hyd. Tp Unit Hyd. pp	en.(mm/hr over (min ff. (min beak (min eak (cms	)= }= }= )=	43.98 10.00 8.92 10.00 0.12	(ii)	22.26 15.00 13.86 (ii) 15.00 0.08	*T0T/	ALS*	
PEAK FLOW TIME TO PEAK RUNOFF VOLUN TOTAL RAINFA RUNOFF COEFF	(cms (hrs ME (mm ALL (mm FICIENT	)= )= )= =	7.12 2.75 45.81 47.81 0.96		0.52 2.83 17.90 47.81 0.37	7.0 2 41 47 0	504 (iii) .75 .26 .81 .86	
(i) CN PRC CN* (ii) TIME S THAN T (iii) PEAK F	CEDURE S = 81.0 TEP (DT) THE STORA LOW DOES	ELECTEL Ia = SHOULE GE COEF NOT IN	) FOR PE = Dep. S ) BE SMA FFICIENT WCLUDE E	ERVIOUS Storage ALLER OF F. BASEFLOW	LOSSES: (Above) R EQUAL W IF ANY.			
RESERVOIR( 010	)3)	OVERFLO	W IS OF					

DT= 5.0 mTn   	OUTFLOW ST (cms) (ha 0.0000 0 1.3100 1 2.6500 1 AREA (ha) 2) 71.880	ORAGE   OUTFL a.m.)   (cms .0000 4.69 .3639   6.29 .7635   62.90 OPEAK TPE (cms) (hr 7.604	OW STORAGE ) (ha.m.) 00 2.1905 00 2.4799 00 2.7554 AK R.V. s) (mm) 2.75 41.20	
OUTFLOW: ID= 1 ( 010	(3) 71.880	2.466 TION [Oout/Oin](	3.33 41.20	
TIME MAXIN	SHIFT OF PEAK I UM STORAGE U	FLOW (mi USED (ha.m	n)= 35.00 .)= 1.7109	
$\begin{vmatrix} ADD HYD ( 0099) \\ 1 + 2 = 3 \end{vmatrix}$	AREA QI (ha) (d	PEAK TPEAK cms) (hrs)	R.V. (mm)	
ID1= 1 ( 0100): + ID2= 2 ( 0103):	36.92 3.1 71.88 2.4	122 2.75 466 3.33	34.12 41.26	
ID = 3 ( 0099):	108.80 4.3	352 2.75	38.83	
		CASE CONS IF ANT	<u>.</u>	
ADD HYD ( 0099)    3 + 2 = 1   ID1= 3 ( 0099) + ID2= 2 ( 2257):	AREA QI (ha) (d 108.80 4.3 331.32 8.3	PEAK TPEAK cms) (hrs) 352 2.75 144 2.83	R.V. (mm) 38.83 32.49	
ID = 1 ( 0099):	440.12 11.9	935 2.83	34.06	
NOTE: PEAK FLOWS D	O NOT INCLUDE	BASEFLOWS IF ANY	·	
ROUTE CHN( 2255)    IN= 2> OUT= 1	Routing time s	step (min)'= 5.	00	
<pre></pre>	ATA FOR SECTION Elevation	N ( 1.1) Manning	->	
47.35 51.00 60.44 65.44 72.65 95.97 103.18 108.18 116.25 122.09 131.52 149.56 155.39 177.88 190.96 195.96 226.50 238.71 251.40	210.02 209.86 209.76 209.54 209.60 208.53 208.38 208.38 208.08 207.92 207.65 208.22 208.49 208.58 208.73 208.72 209.32 209.46 209.70	0.0600 0.0450	Main Channe Main Channe	

1.49 1.60 1.71 1.81 1.93 2.05	209.14 209.25 209.35 209.46 209.58 209.70	.150E+06 .175E+06 .201E+06 .228E+06 .262E+06 .299E+06	61.5 76.0 91.6 107.8 130.3 156.6	0.66 0.70 0.73 0.76 0.80 0.84	40.75 38.35 36.50 35.28 33.51 31.84	
INFLOW : OUTFLOW:	ID= 2 ( ID= 1 (	AREA (ha) 0099) 440.12 2255) 440.12	< hy OPEAK (cms) 11.94 7.05	drograph TPEAK R. (hrs) (n 2.83 34. 3.58 34.	> <-pipe / V. MAX DEPTH m) (m) 06 0.88 06 0.71	channel-> MAX VEL (m/s) 0.46 0.42
ROUTE CHN(   IN= 2>	( 2296)  OUT= 1	Routing ti	ime step (	(min)'= 5.00	·····	
	<pre></pre>	- DATA FOR SEC ce Elevat 00 204. 24 204. 30 203. 31 203. 49 204. 51 203. 49 204. 51 203. 49 204. 51 203. 18 202. 40 202. 82 202. 76 202. 43 2000. 61 199. 61 203. 97 203. 87 204. 05 205. 60 205.	TION ( tion 60 58 90 83 24 34 04 05 84 89 66 66 26 25 94 77 80 71 01 02 0.0 56	1.1)> Manning 0.0600 0.0450	Main Channel Main Channel	
C DEPTT (m) 0.23 0.47 0.70 0.93 1.17 1.40 1.63 1.87 2.10 2.33 2.57 2.80 3.03 3.27 3.50 3.73 3.57 3.50 3.73 3.97 4.20	ELEV (m) 200.17 200.40 200.64 200.87 201.10 201.34 201.57 201.80 202.04 202.07 202.05 202.74 202.97 203.20 203.44 203.67 203.90 204.14 204.49	TRAVEL VOLUME (cu.m.) .403E+03 .149E+04 .284E+04 .624E+04 .624E+04 .624E+04 .828E+04 .106E+05 .131E+05 .138E+05 .221E+05 .261E+05 .317E+05 .389E+05 .467E+05 .548E+05 .650E+05 .788E+05 .103E+06	TIME TAB FLOW RAT (cms) 0.2 1.3 3.3 6.2 10.2 15.1 21.2 28.4 36.8 46.4 54.8 65.8 87.1 113.5 143.4 141.2 182.1 256.5	LE E VELOCIT (m/s) 0.17 0.30 0.41 0.50 0.55 0.55 0.77 0.83 0.88 0.88 0.88 0.88 0.86 0.74 0.87 0.93 0.77 0.83 0.93 0.77 0.82 0	Y TRAV.TIME (min) 35.38 19.71 14.37 11.80 10.22 9.13 8.31 7.67 6.75 6.75 6.75 6.75 6.75 6.75 6.87 8.03 7.45 6.85 6.85 6.37 7.67 7.67 7.67 7.67 7.67 7.67	
INFLOW : OUTFLOW:	ID= 2 ( ID= 1 (	AREA (ha) 2255) 440.12 2296) 440.12	< hy QPEAK (cms) 7.05 6.86	drograph TPEAK R. (hrs) (n 3.58 34. 3.75 34.	> <-pipe / V. MAX DEPTH m) (m) 06 0.98 06 0.97	channel-> MAX VEL (m/s) 0.52 0.51
CALIB   STANDHYD (  ID= 1 DT= 5 Surface Dep. St Average	0106) 0 min Area corage Slope	Area (ha) Total Imp(%) IMPER (ha)= 223 (mm)= 2 (%)= 1	281.15 = 79.50 RVIOUS 3.51 2.00 L.63	Dir. Conn. PERVIOUS (i) 57.64 5.00 1.63	(%)= 79.40	

Length Mannings n	(m)= =	1369.06 0.013		40.00 0.250			
NOTE: RAIN	FALL WAS T	RANSFORME	d to	5.0 MIN.	TIME STE	Р.	
TIM hr: 0.08 0.16 0.25 0.33 0.41 0.50 0.58 0.66 0.75 0.83 0.91 1.00 1.08 1.16 1.25 1.33 1.41 1.58	E RAIN s mm/hr 3 0.00 7 0.00 0 0.96 3 0.97 4 0.96 3 0.74 3 5.74 3 5.74 3 5.74	TRA   TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	NSFORME RAIN mm/hr 5.74 5.74 16.25 16.25 16.25 16.25 16.25 16.25 16.25 16.25 43.98 43.98 43.98 43.98 43.98 43.98 12.43 12.43 12.43	D HYETOGI TIME hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.583 4.467 4.583 4.667 4.750	RAPH RAIN mm/hr 12.43 6.69 6.69 6.69 6.69 6.69 6.69 6.69 3.82 3.82 3.82 3.82 3.82 3.82 3.82 3.82	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.58 5.75 5.83 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten.( over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK	nm/hr)= (min)= (min)= (cms)= (cms)= (hrs)=	43.98 15.00 14.73 15.00 0.08 23.64 2.75	(ii)	21.41 30.00 28.63 (i 30.00 0.04 1.79 3.08	i) *TOT 24. 2	ALS* 748 (iii)	)
RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI	(mm)= (mm)= ENT =	45.81 47.81 0.96		17.97 47.81 0.38	40 47 0	0.07 7.81 0.84	
(i) CN PROCED CN* = (ii) TIME STEP THAN THE (iii) PEAK FLOW	URE SELECT 81.0 Ia (DT) SHOU STORAGE CO DOES NOT	ED FOR PE = Dep. S LD BE SMA EFFICIENT INCLUDE B	RVIOUS torage LLER OF ASEFLOW	LOSSES: (Above) EQUAL IF ANY.			
$ \begin{vmatrix} ADD & HYD & ( & 0107) \\ 1 & 1 + 2 & 3 \\ \end{bmatrix} $ $ \begin{array}{c} ID1 = 1 & ( & 010 \\ + & ID2 = 2 & ( & 220 \\ ID & = 3 & ( & 010 \\ \end{array} $	A (06): 281 96): 440 07): 721	REA OP ha) (c .15 24.7 .12 6.8	EAK ms) 48 56 05	TPEAK (hrs) 2.75 3.75 2.83	R.V. (mm) 40.07 34.06 36.40		
NOTE: PEAK FLO	WS DO NOT	INCLUDE B	ASEFLOW	S IF ANY			
ROUTE CHN( 2300)    IN= 2> OUT= 1	Routi	ng time s	tep (mi	in)'= 5.0	00		
<pre></pre>	DATA FO nce E .00 .24 .30 .31 .49 .15 .86 .51 .18 .40 .82 .76 .40 .82 .76 .61 .61 .97 .87	R SECTION levation 204.60 204.58 203.90 203.83 204.24 204.34 204.04 203.05 202.84 202.89 202.66 200.25 199.94 203.72 203.80 204.71		1) lanning 0.0600 .0450	-> Main C Main C	Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel	

	229.05 240.71 284.60	205. 205. 205.	.01 .02 0.04 .56	0.0450 50 /0.06 0.0600	Mai 600 Mai	n Channel n Channel	
<pre>&lt; DEPTH (m) 0.23 0.47 0.70 0.93 1.17 1.40 1.63 1.87 2.10 2.33 2.57 2.80 3.03 3.27 3.50 3.73 3.97 4.20 4.55</pre>	ELEV (m) 200.17 200.40 200.64 200.87 201.10 201.34 201.57 201.80 202.04 202.04 202.27 202.50 202.74 202.97 203.20 203.44 203.67 203.90 204.14 204.49	TRAVEL VOLUME (cu.m.) 888E+03 217E+04 115E+04 910E+04 121E+05 154E+05 191E+05 231E+05 232E+05 381E+05 381E+05 382E+05 381E+05 381E+05 381E+05 381E+05 381E+05 381E+05 381E+05 115E+06 150E+06	TIME TABL FLOW RATE (cms) 0.2 1.3 3.3 6.3 10.2 15.2 21.3 28.5 37.0 46.6 55.0 63.6 66.1 87.4 114.0 143.9 141.7 182.8 257.5		OCITY n/s) ).17 ).30 ).41 ).50 ).58 ).65 ).72 ).78 ).83 ).88 ).88 ).87 ).87 ).80 ).74 ).80 ).74 ).80 ).78 ).78 ).78 ).82 ).89	<pre>&gt;&gt; TRAV.TIME (min) 51.42 28.64 20.89 17.15 14.86 13.27 12.08 11.15 10.39 9.80 9.79 9.98 11.66 10.83 9.96 11.14 10.49 9.74</pre>	
INFLOW : I OUTFLOW: I	D= 2 { 0107 D= 1 { 2300	AREA (ha) 721.27 721.27	< hyd QPEAK (cms) 27.71 24.63	rograph TPEAK (hrs) 2.83 2.92	> R.V. (mm) 36.40 36.40	<-pipe / c MAX DEPTH (m) 1.84 1.75	channel-> MAX VEL (m/s) 0.77 0.74
ADD HYD ( 1 + 2 = ID1= + ID2= ID = NOTE: P	0023) 3 1 { 2300): 2 { 0024): 3 ( 0023): EAK FLOWS DO	AREA (ha) 721.27 9.55 730.82 NOT INCLU	QPEAK (cms) 24.626 1.103 25.125 JDE BASEFLO	TPEAK (hrs) 2.92 2.75 2.92 WS IF AM	R.V. (mm) 36.40 44.48 36.51		
ADD HYD (   3 + 2 =   ID1= + ID2=   ID =   ID =	0023)  1   3 ( 0023): 2 ( 0025): 1 ( 0023): EAK FLOWS DO	AREA (ha) 730.82 8.34 739.16 NOT INCLU	QPEAK (cms) 25.125 0.166 25.214 JDE BASEFLO	TPEAK (hrs) 2.92 3.67 2.92 WS IF AM	R.V. (mm) 36.51 16.61 36.28		
ADD HYD (   1 + 2 = ID1= + ID2= ID = NOTE: P	0023)  3   1 ( 0023): 2 ( 0049): 3 ( 0023): EAK FLOWS DO	AREA (ha) 739.16 23.02 762.18 NOT INCLU	OPEAK (cms) 25.214 2.600 27.349 JDE BASEFLO	TPEAK (hrs) 2.92 2.75 2.83 WS IF AN	R.V. (mm) 36.28 44.48 36.53		
ADD HYD ( 3 + 2 = ID1= + ID2= ID = NOTE: P	0023) 1 3 { 0023): 2 { 0050): 1 ( 0023): EAK FLOWS DO	AREA (ha) 762.18 31.36 793.54 NOT INCLU	QPEAK (cms) 27.349 3.135 30.484 JDE BASEFLO	TPEAK (hrs) 2.83 2.83 2.83 WS IF AN	R.V. (mm) 36.53 44.48 36.85		

RESERVOIR( 0042)	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         45.9000         15.6510           3.5700         5.9180         *******         16.6510           15.7400         10.6460         0.0000         0.0000	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) 0023) 793.540 30.484 2.83 36.85 0042) 793.540 13.155 4.08 36.84 EAK FLOW REDUCTION [Operat/Ope	
	AXE FLOW (min) = 75.00 AXIMUM STORAGE USED (ha.m.) = 9.6418	
ROUTE CHN( 2297)   IN= 2> OUT= 1	Routing time step (min)'= 5.00	
< Dista 10 33 44 65 8 8 99 100 111 120 133 144 144 177 199 211 229 244 284		
<pre></pre>	TRAVEL         TIME         TABLE        >           VOLUME         FLOW RATE         VELOCITY         TRAV.TIME           (cu.m.)         (cms)         (m/s)         (min)           .921E+03         0.2         0.20         68.84           .341E+04         1.5         0.35         38.35           .650E+04         3.9         0.48         27.97           .101E+05         7.3         0.59         22.96           .143E+05         11.9         0.68         19.89           .189E+05         17.8         0.76         17.77           .241E+05         24.9         0.84         16.18           .299E+05         33.3         0.91         14.93           .361E+05         54.5         1.03         13.12           .506E+05         64.4         1.03         13.10           .597E+05         74.4         1.01         13.37           .724E+05         102.3         0.93         14.50           .107E+06         133.4         1.02         13.33           .125E+06         168.4         1.09         12.40           .148E+06         165.8         0.91         14.92	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	<pre>&lt; hydrograph&gt; &lt;-pipe / channe AREA QPEAK TPEAK R.V. MAX DEPTH MAX (ha) (cms) (hrs) (mm) (m) (m) 0042) 793.54 13.15 4.08 36.84 1.22 0, 2297) 793.54 12.65 4.42 36.84 1.19 0.</pre>	≥1-> VEL ⁄s) .70 .69
CALIB STANDHYD ( 0021) ID= 1 DT= 5.0 min	Area (ha)= 10.63 Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00	

IMPERVIOUS PERVIOUS (i)

Surface Area	(ha)=	9.57	1.06
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	266.21	40.00
Mannings n	=	0.013	0.250

	TRA	NSFORME	D HYETOGR	APH		
TIME RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
0.083 0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.167 0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.250 0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333 0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500 0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.583 0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.750 0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833 0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.91/ 0.96	2.500	43.98	4.083	3.82	5.6/	0.96
1.083 0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.167 0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.333 5.74	2.917	12.43	4.500	1.91	6.08	0.96
1.417 5.74	3.000	12.43	4.583	1.91	6.17	0.96
1.500 5.74	3.167	12.43	4.667	1.91	6.25	0.96
	1 51157					
Max.Eff.Inten.(mm/hr)=	43.98		27.63			
Storage Coeff. (min)=	6.39	(ii)	10.46 (ii	)		
Unit Hyd. Tpeak (min)=	5.00	· · ·	15.00			
Unit Hyd. peak (Cms)=	0.18		0.09	*T0T	TALS*	
PEAK FLOW (cms)=	1.16		0.07	1.	227 (iii)	)
IIME IO PEAK (hrs)= RUNOEE VOLUME (mm)=	2.75	3	2.83	44	1 48	
TOTAL RAINFALL (mm)=	47.81	2	47.81	47	7.81	
RUNOFF COEFFICIENT =	0.98		0.49	C	0.93	
<ul> <li>(1) CN PROCEDURE SELECT CN* = 85.0 Ia</li> <li>(ii) TIME STEP (DT) SHOU THAN THE STORAGE CO (iii) PEAK FLOW DOES NOT</li> </ul>	ED FOR PE = Dep. S LD BE SMA EFFICIENT INCLUDE E	ASEFLOW	LOSSES: (Above) EQUAL IF ANY.			
RESERVOIR( 0039)  OVERF	LOW IS OF	F				
DT= 5.0 min   OUTFL	OW STO	RAGE		W STO	RAGE	
(cms	) (ha	.m.)	(cms)	(ha	a.m.)	
0.00	00 0.	0000 3419	0.640	0 0	0.4866	
0.30	00 0.	3912	9.300	ŏč	0.6160	
	AREA	ΟΡΕΔΚ	ΤΡΕΔ	ĸ	RV	
	(ha)	(cms)	(hrs	)	(mm)	
INFLOW : ID= 2 ( 0021)	10.630	1.2	27 2	.75	44.48	
001FL0W: 1D = 1 (0039)	10.030	0.1	13 3	./5	44.41	
PEAK FLOW	REDUCT	ION [Qoi	ut/Qin](%	)= 14.23	3	
MAXIMUM ST	ORAGE U	ISED	(ha.m.	)= 0.00	572	
1 + 2 = 3 A	REA OF	PEAK 1	TPEAK	R.V.		
	ha) (c	ms)	(hrs)	(mm)		
1D1=1 (2297): 793 + $ID2=2 (0039): 10$	.54 12.6	75	4.42 3 3.75 4	6.84 4.41		
	17 13		4.42	C 04		
10 = 5 (0022): 804	.1/ 12./	04 4	+.42 3	0.94		
NOTE: PEAK FLOWS DO NOT	INCLUDE E	ASEFLOW	S IF ANY.			

CALIB NASHYD ( 0030) ID= 1 DT= 5.0 min	Area (ha)= Ia (mm)= U.H. Tp(hrs)=	5.65 5.00 0.99	Curve Number (CN)= 79.0 # of Linear Res.(N)= 3.00
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		TR/	ANSFORME	D HYETOGR	APH	25 	
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500	0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.583	0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.667	0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833	0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.917	0.96	2.500	43.98	4.083	3.82	5.67	0.96
1.000	0.96	2.583	43.98	4.167	3.82	5.75	0.96
1.083	0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.167	0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.250	0.96	2.833	12.43	4.417	1.91	6.00	0.96
1.333	5.74	2.917	12.43	4.500	1.91	6.08	0.96
1.417	5.74	3.000	12.43	4.583	1.91	6.17	0.96
1.500	5.74	3.083	12.43	4.667	1.91	6.25	0.96
1.583	5.74	3.167	12.43	4.750	1.91		

Unit Hyd Qpeak (cms)= 0.218

 PEAK FLOW
 (cms)=
 0.101 (i)

 TIME TO PEAK
 (hrs)=
 3.833

 RUNOFF VOLUME
 (mm)=
 16.611

 TOTAL RAINFALL
 (mm)=
 47.810

 RUNOFF COEFFICIENT
 =
 0.347

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

\_\_\_\_\_ CALIB STANDHYD ( 0029) ID= 1 DT= 5.0 min Area (ha)= 9.43 Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00 \_\_\_\_\_ IMPERVIOUS PERVIOUS (i) 8.49 1.00 1.00 0.94 1.50 2.00 Surface Area (ha)= (mm)= (%)= (m)= = Dep. Storage Average Slope Length 250.73 40.00 Mannings n 0.013 0.250

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		TR/	NSFORM	ED HYETOGRA	PH		
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500	0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.583	0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.667	0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833	0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.917	0.96	2.500	43.98	4.083	3.82	5.67	0.96
1.000	0.96	2.583	43.98	4.167	3.82	5.75	0.96
1.083	0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.167	0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.250	0.96	2.833	12.43	4.417	1.91	6.00	0.96
1.333	5.74	2.917	12.43	4.500	1.91	6.08	0.96
1.417	5.74	3.000	12.43	4.583	1.91	6.17	0.96
1.500	5.74	3.083	12.43	4.667	1.91	6.25	0.96
1.583	5.74	3.167	12.43	4.750	1.91	1	
Max.Eff.Inten.(mm/	hr)=	43.98		27.63			
over (m	in)	5.00		15.00			
Storage Coeff. (m	nin)=	6.16	(ii)	10.23 (ii)			
Unit Hyd. Tpeak (m	in)=	5.00	3 Č	15.00			

Unit Hyd. peak (cms)= PEAK FLOW (cms)= TIME TO PEAK (hrs)= RUNOFF VOLUME (mm)= TOTAL RAINFALL (mm)= RUNOFF COEFFICIENT = (i) CN PROCEDURE SELECT CN* = 85.0 Ia (ii) TIME STEP (DT) SHOU THAN THE STORAGE CO (iii) PEAK FLOW DOES NOT	0.19 1.03 2.75 46.81 47.81 0.98 TED FOR PERVIOUS a = Dep. Storagy LD BE SMALLER ( DEFFICIENT. INCLUDE BASEFLO	0.09 0.06 2.83 23.53 47.81 0.49 5 LOSSES: e (Above) DR EQUAL DW IF ANY.	*TOTALS* 1.090 (iii) 2.75 44.48 47.81 0.93
CALIB     STANDHYD ( 0031)  Area  ID= 1 DT= 5.0 min   Total I	(ha)= 39.77 mp(%)= 90.00 TMPERVTOUS	Dir. Conn. PERVIOUS (i)	(%)= 90.00
Surface Area (ha)= Dep. Storage (mm)= Average Slope (%)= Length (m)= Mannings n =	35.79 1.00 1.00 514.91 0.013	3.98 1.50 2.00 40.00 0.250	
NOTE: RAINFALL WAS T	RANSFORMED TO	5.0 MIN. T	IME STEP.
TIME         RAIN           hrs         mm/hr           0.083         0.00           0.167         0.00           0.250         0.00           0.333         0.96           0.417         0.96           0.583         0.96           0.583         0.96           0.667         0.96           0.833         0.96           0.917         0.96           1.083         0.96           1.167         0.96           1.333         5.74           1.583         5.74           1.583         5.74	TRANSFOR hrs mm/hi 1.667 5.7 1.750 5.7 1.833 16.2 1.917 16.2 2.000 16.2 2.083 16.2 2.167 16.2 2.250 16.2 2.250 16.2 2.250 16.2 2.250 16.2 2.250 43.9 2.583 43.9 2.583 43.9 2.583 43.9 2.667 43.9 2.750 43.90	MED HYETOGRA N   TIME A 3.250 4 3.333 5 3.417 5 3.583 5 3.667 5 3.750 5 3.683 3 .917 8 4.000 8 4.083 8 4.000 8 4.083 8 4.167 8 4.250 8	$\begin{array}{c c c c c c c c c c c c c c c c c c c $
Max.Eff.Inten.(mm/hr)= over (min) Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)= PEAK FLOW (cms)= TIME TO PEAK (hrs)= RUNOFF VOLUME (mm)= TOTAL RAINFALL (mm)= RUNOFF COEFFICIENT = (i) CN PROCEDURE SELECT	43.98 10.00 9.49 (ii) 10.00 0.12 4.21 2.75 46.81 47.81 0.98 ED FOR PERVIOUS	27.63 15.00 13.56 (ii) 15.00 0.08 0.23 2.83 23.53 47.81 0.49	*TOTALS* 4.430 (iii) 2.75 44.48 47.81 0.93
CN* = 85.0 Ia (ii) TIME STEP (DT) SHOU THAN THE STORAGE CO (iii) PEAK FLOW DOES NOT	L = Dep. Storage LD BE SMALLER ( DEFFICIENT. INCLUDE BASEFL(	e (Above) DR EQUAL DW IF ANY.	
IN= 2> OUT= 1     DT= 5.0 min   OUTFL (cms 0.00	OW STORAGE ) (ha.m.) 00 0.0000	OUTFLOW (cms) 7.1600	STORAGE (ha.m.) 0.3940
INFLOW : ID= 2 ( 0031)	AREA QPE/ (ha) (cm: 39.770 4	4K TPEAK 5) (hrs) .430 2.	к.V. (mm) 75 44.48

OUTFLOW: ID= 1 (	0061)	39.770	4.038	2.83	44.48	
-	PEAK FLOW TIME SHIFT ( MAXIMUM ST(	REDUCTION OF PEAK FLOW ORAGE USED	[Qout/Qin]( (mi (ha.m	%)= 91.14 n)= 5.00 .)= 0.22	32	
CALIB STANDHYD ( 0051) ID= 1 DT= 5.0 min	Area Total In	(ha)= 11.4 np(%)= 90.0	1 0 Dir.Con	n.(%)= 9	0.00	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVIOUS 10.27 1.00 1.00 275.80 0.013	PERVIOUS ( 1.14 5.00 2.00 40.00 0.250	i)		
NOTE: RAIN	FALL WAS TH	RANSFORMED T	0 5.0 MIN.	TIME STE	Ρ.	
TIN h 0.00 0.10 0.22 0.33 0.44 0.55 0.55 0.55 0.55 0.55 0.55 0.57 0.83 0.97 1.00 1.00 1.00 1.01 1.11 1.22 1.33 1.44 1.55 1.55	RAIN           rs         mm/hr           33         0.00           57         0.00           53         0.96           17         0.96           183         0.96           193         0.96           100         0.96           100         0.96           101         0.96           102         0.96           103         0.96           100         0.96           100         0.96           100         0.96           100         0.96           100         0.96           100         0.96           100         0.96           100         0.96           100         0.96           100         0.96           100         5.74           100         5.74           100         5.74	TRANSF TIME R hrs mm 1.667 5 1.750 5 1.833 16 1.917 16 2.000 16 2.083 16 2.167 16 2.250 16 2.333 43 2.500 43 2.583 43 2.5667 43 2.583 43 2.667 43 2.750 43 2.833 12 2.917 12 3.000 12 3.083 12 3.167 12	ORMED         HYETOG           AIN         TIME           /hr         'hrs.           .74         3.250           .74         3.333           .25         3.417           .25         3.583           .25         3.583           .25         3.667           .25         3.750           .25         3.483           .98         4.000           .98         4.083           .98         4.167           .98         4.250           .98         4.254           .98         4.254           .98         4.254           .98         4.254           .98         4.254           .98         4.254           .98         4.254           .43         4.417           .43         4.583           .43         4.583           .43         4.667           .43         4.750	RAPH RAIN mm/hr 12.43 6.69 6.69 6.69 6.69 6.69 6.69 6.69 3.82 3.82 3.82 3.82 3.82 3.82 3.82 1.91 1.91 1.91 1.91 1.91	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.67 5.75 5.83 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten. over Storage Coeff. Unit Hyd. Tpeal Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICT	(mm/hr)= (min)= (cms)= (cms)= (cms)= (hrs)= (mm)= (mm)= EENT =	43.98 5.00 6.52 (ii 5.00 0.18 1.25 2.75 46.81 47.81 0.98	24.02 15.00 10.59 (i 15.00 0.09 0.06 2.83 19.33 47.81 0.40	i) *TOT 1. 2 44 47 0	ALS* 304 (iii) .75 .06 .81 .92	
(i) CN PROCED CN* = (ii) TIME STED THAN THE (iii) PEAK FLOM	OURE SELECTE 83.0 Ia (DT) SHOU STORAGE CO DOES NOT I	ED FOR PERVI = Dep. Stor D BE SMALLE EFFICIENT. INCLUDE BASE	OUS LOSSES: age (Above) R OR EQUAL FLOW IF ANY.			
	-					
IN= 2> OUT= 1 DT= 5.0 min	00000000000000000000000000000000000000	DW IS OFF DW STORAG ) (ha.m. DO 0.000	E   OUTFL )   (cms 0   1.41	0W STO ) (ha .00 0	RAGE .m.) .4103	
INFLOW : ID= 2 { OUTFLOW: ID= 1 {	0051) 0053)	AREA Q (ha) ( 11.410 11.410	PEAK TPE cms) (hr 1.304 0.688	AK s) 2.75 2.92	R.V. (mm) 44.06 44.06	
1	PEAK FLOW FIME SHIFT ( MAXIMUM STO	REDUCTION DF PEAK FLOW DRAGE USED	[Qout/Qin]( (mi (ha.m	%)= 52.78 n)= 10.00 .)= 0.20	15	
CALIB						

	-	IMPERVIOUS	PERVIOUS (i	)		
Surface Area Dep. Storage	(ha)= (mm)=	23.10	2.57			
Average Slope	(%)=	1.00	2.00			
Mannings n	(m)= =	413.68 0.013	40.00			
NOTE: RAI	NFALL WAS T	RANSFORMED	TO 5.0 MIN.	TIME STE	Ρ.	
		TRANS	ORMED HYETOGR	APH		DATN
ŕ	irs mm/hr	hrs m	/hr   hrs	mm/hr	hrs	mm/hr
0.0	0.00 0.00	1.667	5.74 3.250	12.43	4.83	0.96
0.2	50 0.00	1.833 10	5.25 3.417	6.69	5.00	0.96
0.4	17 0.96	2.000 10	5.25 3.583	6.69	5.08	0.96
0.5	00 0.96	2.083 10	5.25   3.667	6.69	5.25	0.96
0.6	67 0.96	2.250 1	5.25 3.833	3.82	5.42	0.96
0.7	50 0.96 33 0.96	2.333 4	3.98 3.917 3.98 4.000	3.82	5.50	0.96
0.9	0.96	2.500 4	3.98 4.083	3.82	5.67	0.96
1.0	0.96	2.565 4	3.98 4.16/	3.82	5.83	0.96
1.1	67 0.96	2.750 43	3.98   4.333 43   4.417	1.91	5.92	0.96
1.3	33 5.74	2.917 1	.43 4.500	1.91	6.08	0.96
1.4	5.74	3.000 12	2.43 4.583	1.91	6.25	0.96
1.5	5.74	3.167 12	2.43 4.750	1.91		
Max.Eff.Inten.	(mm/hr)=	43.98	27.63			
Storage Coeff.	(min)=	8.32 (i	i) 12.39 (ii	)		
Unit Hyd. Ipea Unit Hyd. peak	uk (min)= (cms)=	0.13	0.08			
PEAK FLOW	(cms)=	2.75	0.15	*T0T.	ALS* 899 (iii	)
TIME TO PEAK	(hrs)=	2.75	2.83	2	.75	
TOTAL RAINFALL	(mm)=	46.81 47.81	47.81	44 47	.48	
RUNOFF COEFFIC	IENT =	0.98	0.49	0	.93	
(i) CN PROCE		ED FOR PERV	OUS LOSSES:			
(ii) TIME STE	85.0 1a P (DT) SHOU	LD BE SMALL	R OR EQUAL			
THAN THE	STORAGE CO	EFFICIENT.	FLOW TE ANY			
ESERVOIR( 0054)	OVERF	LOW IS OFF				
T= 5.0 min	OUTFL	OW STORA	E OUTFLO	W STO	RAGE	
	(cms 0.00	) (ha.m. 00 0.000	.) (cms) )0 4.621	(ha .0 0	.m.) .3130	
		AREA	PEAK TPEA	ĸ	R.V.	
	0053)	(ha)	(cms) (hrs	)	(mm)	
OUTFLOW: ID= 2 (	0054)	25.670	2.568 2	.83	44.48	
	PEAK FLOW TIME SHIFT	REDUCTION	N [Qout/Qin](%	6)= 88.57 1)= 5.00		
	MAXIMUM ST	ORAGE USE	) (ha.m.	)= 0.17	40	
DD HYD ( 0032)	1					
1 + 2 = 3	- A	ikeA QPEAN ha) (cms)	(hrs)	(mm)		
ID1= 1 ( 0	022): 804	.17 12.784	4.42 3	6.94		
	0/91: 9	.43 1.090	2.75 4	4.48		

ADD HYD ( 0032) 3 + 2 = 1 ID1= 3 ( 0032): + ID2= 2 ( 0030):	AREA (ha) 813.60 5.65	QPEAK (cms) 12.845 0.101	TPEAK (hrs) 4.42 3.83	R.V. (mm) 37.03 16.61		
ID = 1 ( 0032):	819.25	12.933	4.42	36.89		
NOTE: PEAK FLOWS DO	NOT INCL	UDE BASEFLO	WS IF AN	Υ.		
ADD HYD ( 0032) 1 + 2 = 3 TD1= 1 ( 0032):	AREA (ha) 819 25	OPEAK (cms)	TPEAK (hrs) 4 42	R.V. (mm)		
+ ID2= 2 ( 0053):	11.41	0.688	2.92	44.06		
ID = 3 ( 0032):	830.66	13.206	4.33	36.99		
NOTE: PEAK FLOWS DO	NOT INCL	UDE BASEFLO	WS IF AN	Υ.		
	87.0.2. AC 97.0 AC	~ 것 같은 이상가 잘 안 하는 것 같		15.00300300.000		
$\begin{vmatrix} ADD \ HYD \ ( \ 0032) \\ 3 + 2 = 1 \end{vmatrix}$	AREA	OPEAK	TPEAK	R.V.		
TD1= 3 ( 0032):	(ha) 830.66	(cms) 13,206	(hrs) 4.33	(mm) 36,99		
+ ID2= 2 ( 0054):	25.67	2.568	2.83	44.48		
ID = 1 ( 0032):	856.33	13.511	4.33	37.21		
NOTE: PEAK FLOWS DO	NOT INCL	UDE BASEFLO	WS IF AN	Y.		
ADD HYD ( 0032) 1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.		
ID1= 1 ( 0032):	(ha) 856.33	(cms) 13.511	(hrs) 4.33	(mm) 37.21		
+ ID2= 2 ( 0061):	39.77	4.038	2.83	44.48		
ID = 3 ( 0032):	896.10	14.005	4.25	37.54		
NOTE: PEAK FLOWS DO	D NOT INCL	UDE BASEFLO	WS IF AN	Υ.		
CALIB   STANDHYD ( 0068)  A  ID= 1 DT= 5.0 min   To	rea (ha otal Imp(%	)= 6.00 )= 90.00	Dir. Co	nn.(%)= 9	90.00	
Sunface Anon (b)	IMPE	RVIOUS PI	ERVIOUS	(i)		
Dep. Storage (m	n) =	1.00	1.50			
Length (i	n)= 20	0.00	40.00			
	- U	EOPMED TO	5 0 MTN	TTME ST	ED	
		FORMED TO	5.0 111	. TIME ST	Lr •	
TTME	RATN   T	- TRANSFORM	ED HYETO	GRAPH		RATN
hrs 1	mm/hr 0.00 1.	hrs mm/hr 667 5.74	' hr:	s mm/hr 12.43	hrs	mm/hr
0.167	0.00 1.	750 5.74 833 16.25	3.333	6.69	4.92	0.96
0.333 0.417	0.96   1.	917 16.25 000 16.25	3.500	6.69	5.08	0.96
0.500 0.583	0.96 2.	083 16.25 167 16.25	3.667	6.69	5.25	0.96
0.667	0.96 2.	250 16.25 333 43.98	3.833 3.917	3.82 3.82	5.42 5.50	0.96
0.833 0.917	0.96   2.	417 43.98 500 43.98	4.000	3.82	5.58	0.96
1.000	0.96 2.	583 43.98 667 43.98	4.167	3.82	5.75	0.96
1.167 1.250	0.96 2.	/50 43.98 833 12.43	4.333	1.91	5.92	0.96
1.333 1.417	5.74 2.	917 12.43 000 12.43	4.500	1.91	6.08 6.17	0.96

1.500 5.74 3.083 12.43 4.667 1.91 6.25 5.74 3.167 12.43 4.750 1.91 0.96 Max.Eff.Inten.(mm/hr)= 43.98 27.63 over (min) Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)= 5.00 5.38 (ii) 5.00 10.00 9.45 (ii) 10.00 0.21 0.12 \*TOTAL S\* 0.04 0.698 (iii) (cms)= 0.66 PEAK FLOW TIME TO PEAK (h RUNOFF VOLUME ( TOTAL RAINFALL ( RUNOFF COEFFICIENT (hrs)= (mm)= 2.75 23.53 47.81 2.75 2.75 (mm)= (mm)= 46.81 47.81 44.48 47.81 0.98 0.49 0.93 = (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. \_\_\_\_\_ ADD HYD ( 0066) 1 + 2 = 3 QPEAK (cms) 14.005 AREA TPEAK R.V. (mm) 37.54 (ha) 896.10 (hrs) 4.25 2.75 ID1= 1 ( 0032): + ID2= 2 ( 0068): 6.00 0.698 44.48 ID = 3 ( 0066): 902.10 14.068 4.25 37.58 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. ------ROUTE CHN( 2875)| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00 <----- DATA FOR SECTION ( 1.1) -----> Distance Elevation Manning 0.00 204.68 204.67 0.0600 Main Channel 51.26 203.93 0.0450 Main Channel 66.07 87.42 203.18 203.39 0.0450 0.0450 Main Channel Main Channel 132.09 202.47 201.66 0.0450 0.0450 Main Channel Main Channel 213.87 200.24 0.0450 Main Channel 259.32 266.86 199.43 197.71 0.0450 0.0450 Main Channel Main Channel 276.16 196.93 0.0450 Main Channel 304.50 307.31 197.16 197.98 0.0450 0.0450 Main Channel Main Channel Main Channel Main Channel Main Channel 0.0450 311.09 198.45 198.06 329.41 371.71 200.22 0.0450 200.32 199.51 0.0450 0.0450 Main Channel Main Channel 378.80 411.13 0.0450 /0.0600 Main Channel 421.51 202.47 0.0600 202.80 461.76 ----- TRAVEL TIME TABLE -----VOLUME (cu.m.) .601E+04 DEPTH ELEV FLOW RATE VELOCITY TRAV.TIME (m) 0.31 (m) 197.24 (cms) 3.8 (m/s) 0.64 (min) 26.05 1.14 1.54 1.72 1.72 2.01 197.55 .166E+05 19.1 14.50 0.62 44.3 72.2 105.3 171.0 197.85 0.92 .286E+05 10.76 9.67 9.67 8.27 198.16 .419E+05 1.54 198.47 198.78 .611E+05 .849E+05 1.85 252.0 2.26 2.15 199.08 .111E+06 7.34 199.39 .139E+06 6.65 2.77 199.70 416.9 2.41 .172E+06 6.89 200.01 200.32 .217E+06 .272E+06 514.0 649.5 2.36 3.08 7.02 6.98 3.39 200.62 .336E+06 888.1 6.31 3.69 2.63 4.00 4.31 .403E+06 .474E+06 1163.0 1473.8 2.87 5.78 200.93 201.24 201.55 201.85 1820.8 2198.2 3.30 5.03 4.62 .549E+06 4.92 .627E+06 5.23 202.16 .710E+06 2610.1 3.66 4.53 5.54 202.47 202.80 .796E+06 3061.7 3585.6 3.83 4.34 .901E+06 3.96

			< hyd	drograph	>	<-pipe / c	hannel->
INFLOW : ID= 2 (	0066)	AREA (ha) 902.10	OPEAK (cms) 14.07	TPEAK (hrs) 4.25	R.V. (mm) 37.58	MAX DEPTH (m) 0.51	MAX VEL (m/s) 0.91
OUTFLOW: ID= 1 (	2875)	902.10	13.88	4.42	37.58	0.51	0.90



## VMC - 5yr- 6hr Storm- Proposed Condition

Figure 4. VMC - 5yr- 6hr Storm- Proposed Condition.

А А А ААААА v v SSSSS UU UU (v 6.2.2013) IIII L SS v ٧ SS Ũ Ū Ē v v SS Ū Ū AA AA vv SSSSS ບັບບບບັ 000 ππ ΠΠ H H H YYY M M MM MM 000 TM o 0 0 т т ő Y Y M M M M 0 0 т н н т 0 000 т т н н 000 Developed and Distributed by Smart City Water Inc Copyright 2007 - 2022 Smart City Water Inc All rights reserved. \*\*\*\*\* DETAILED OUTPUT \*\*\*\*\* Input filename: D:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat
Output filename: C:\Users\rhe\AppData\Local\Civica\VH5\562b9aa2-0cdc-4391-a1f5-d8b11ec718d4\b93b33f7-7f16-4
Summary filename: C:\Users\rhe\AppData\Local\Civica\VH5\562b9aa2-0cdc-4391-a1f5-d8b11ec718d4\b93b33f7-7f16-4 DATE: 06/18/2024 TIME: 08:23:31 USER: COMMENTS: \* \*\* SIMULATION : 5yr Filename: C:\Users\rhe\AppData\ Local\Temp\ 51a56c8c-3579-4d4b-b5ff-1a77600eda50\10b1293c READ STORM Ptotal= 47.81 mm Comments: 5 Year 6 Hour AES (Bloor, TRCA) RAIN mm/hr RAIN mm/hr RAIN mm/hr TIME TIME TIME TIME RAIN hrs hrs hrs mm/hr hrs 0.00 0.00 1.75 16.25 3.50 6.69 5.25 0.96 0.25 0.96 2.00 16.25 43.98 3.75 3.82 5.50 0.96 0.75 0.96 2.50 43.98 4.25 1.91 6.00 0.96 2.75 1.00 0.96 5.74 12.43 12.43 4.50 4.75 1.91 0.96 1.50 5.74 3.25 6.69 5.00 0.96 \_\_\_\_\_ CAL TR (ha)= 11.16 (mm)= 5.00 (hrs)= 0.70 NASHYD ( 0025) ID= 1 DT= 5.0 min 0025) Area (ha)= Ia (mm)= U.H. Tp(hrs)= Curve Number (CN)= 79.0 # of Linear Res.(N)= 3.00 NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP. --- TRANSFORMED HYETOGRAPH ----RAIN | mm/hr | 12.43 | TIME RAIN TIME RAIN TIME TIME RAIN hrs 0.083 mm/hr 0.00 hrs 1.667 mm/hr 5.74 hrs hrs mm/hr 0.96 4.83 3.250 0.00 0.00 0.96 0.167 0.250 0.333 1.750 1.833 1.917 5.74 3.333 3.417 6.69 4.92 0.96 16.25 5.00 6.69 0.96 16.25 3.500 6.69 0.96 0.417 0.96 2.000 16.25 3.583 3.667 5.17 6.69 0.96 0.96 6.69 0.583 0.96 2.167 16.25 3.750 5.33 6.69 0.96 0.667 0.96 2.250 2.333 16.25 43.98 3.833 3.917 3.82 3.82 5.42 0.96 0.833 0.96 2.417 2.500 43.98 43.98 4.000 4.083 3.82 5.58 0.96 1.000 0.96 2.583 43.98 4.167 3.82 5.75 0.96 1.083 0.96 2.667 43.98 43.98 4.250 4.333 3.82 5.83 0.96 0.96 1.167 1.91

1.250 1.33 1.417 1.500 1.58	0 0.96 3 5.74 7 5.74 0 5.74 3 5.74	2.833 2.917 3.000 3.083 3.167	12.43 12.43 12.43 12.43 12.43 12.43	4.417 4.500 4.583 4.667 4.750	1.91 1.91 1.91 1.91 1.91	6.00 6.08 6.17 6.25	0.96 0.96 0.96 0.96
Unit Hyd Qpeak	(cms)=	0.609					
PEAK FLOW	(cms)=	0.249 (i)					

FEAK FLOW	(Clis)-	0.245	(1)
TIME TO PEAK	(hrs)=	3.417	
RUNOFF VOLUME	(mm)=	16.611	
TOTAL RAINFALL	(mm)=	47.810	
RUNOFF COEFFICIE	NT =	0.347	

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

CALIB NASHYD (0164) ID= 1 DT= 5.0 min	Area (ha)= Ia (mm)= U.H. Tp(hrs)=	1.00 5.00 0.85	Curve Number (CN)= 79.0 # of Linear Res.(N)= 3.00

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

TRANSFORMED HYETOGRAPH								
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN	
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr	
0.083	0.00	1.667	5.74	3.250	12.43	4.83	0.96	
0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96	
0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96	
0.333	0.96	1.917	16.25	3.500	6.69	5.08	0.96	
0.417	0.96	2.000	16.25	3.583	6.69	5.17	0.96	
0.500	0.96	2.083	16.25	3.667	6.69	5.25	0.96	
0.583	0.96	2.167	16.25	3.750	6.69	5.33	0.96	
0.667	0.96	2.250	16.25	3.833	3.82	5.42	0.96	
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96	
0.833	0.96	2.417	43.98	4.000	3.82	5.58	0.96	
0.917	0.96	2.500	43.98	4.083	3.82	5.67	0.96	
1.000	0.96	2.583	43.98	4.167	3.82	5.75	0.96	
1.083	0.96	2.667	43.98	4.250	3.82	5.83	0.96	
1.167	0.96	2.750	43.98	4.333	1.91	5.92	0.96	
1.250	0.96	2.833	12.43	4.417	1.91	6.00	0.96	
1.333	5.74	2.917	12.43	4.500	1.91	6.08	0.96	
1.417	5.74	3.000	12.43	4.583	1.91	6.17	0.96	
1.500	5.74	3.083	12.43	4.667	1.91	6.25	0.96	
1.583	5.74	3.167	12.43	4.750	1.91			

Unit Hyd Qpeak (cms)= 0.045

PEAK FLOW	(cms)=	0.020	(i)
TIME TO PEAK	(hrs)=	3.667	
RUNOFF VOLUME	(mm)=	16,609	
TOTAL RAINFALL	(mm)=	47.810	
RUNOFF COEFFICI	ENT =	0.347	

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

CALIB   STANDHYD ( 0163)   ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	8.73 61.00	Dir.	Conn.(%)=	61.00
		IMPERVI	OUS	PERVIO	US (i)	
Surface Area	(ha)=	5.3	3	3.4	0	
Dep. Storage	(mm)=	1.0	0	5.0	D	
Average Slope	(%)=	1.0	0	1.0	0	

\_\_\_\_\_

Dep. Storage	(100)-	1.00	5.00	
Average Slope	(%)=	1.00	1.00	
Length	(m)=	241.25	40.00	
Mannings n	=	0.013	0.250	
a mene waar une ang <del>a</del> pat sa pagt				

		TR/	ANSFORME	D HYETOGR	APH		
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500	0.96	2.083	16.25	3.667	6.69	5.25	0.96

0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583	0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96	2.167 2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	16.25 16.25 43.98 43.98 43.98 43.98 43.98 43.98 12.43 12.43 12.43 12.43 12.43	3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750	6.69 3.82 3.82 3.82 3.82 3.82 1.91 1.91 1.91 1.91 1.91 1.91 1.91	5.33 5.42 5.50 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten.(mn over ( Storage Coeff. ( Unit Hyd. Tpeak ( Unit Hyd. peak (	n/hr)= (min) (min)= (min)= (cms)=	43.98 5.00 6.02 5.00 0.19	(ii)	21.81 25.00 22.00 (ii) 25.00 0.05	*TOT	AI 5*	
PEAK FLOW ( TIME TO PEAK ( RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIEN	(cms)= (hrs)= (mm)= (mm)= IT =	0.65 2.75 46.81 47.81 0.98	ž	0.13 3.00 19.33 47.81 0.40	0. 2 36 47 0	745 (iii) 2.75 5.09 7.81 0.75	)
(i) CN PROCEDUR CN* = 83 (ii) TIME STEP ( THAN THE ST (iii) PEAK FLOW D	E SELECTER 0 Ia DT) SHOULI ORAGE COE DOES NOT I	D FOR PE = Dep. S D BE SMA FFICIENT NCLUDE E	RVIOUS I Storage LLER OR ASEFLOW	LOSSES: (Above) EQUAL IF ANY.			
RESERVOIR( 0168)   IN= 2> OUT= 1   DT= 5.0 min	OVERFLO OUTFLO (cms) 0.000	OW IS OF W STC (ha O O.	F DRAGE L.m.) 0000	OUTFLOW (cms) 1.5700	I STC (ha	DRAGE 1.m.) 0.1040	
INFLOW : ID= 2 ( 0 OUTFLOW: ID= 1 ( 0 PEA TIN MAX	0163) 0168) NK FLOW 1E SHIFT O 11MUM STO	AREA (ha) 8.730 8.730 REDUCT F PEAK F RAGE L	OPEAK (cms) 0.74 0.64 TON [Qou LOW ISED	TPEAK (hrs) 45 2. 48 2. ut/Qin](%) (min) (ha.m.)	75 75 = 87.06 = 0.00 = 0.04	R.V. (mm) 36.09 36.09	
CALIB STANDHYD ( 0165) ID= 1 DT= 5.0 min	Area Total Im I	(ha)= p(%)= 9 MPERVIOL	1.11 00.00 [ JS PEF	Dir. Conn. RVIOUS (i)	(%)= 9	0.00	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	1.00 1.00 86.02 0.013	ć	0.11 5.00 2.00 40.00 0.250			
NOTE: RAINFA	LL WAS TR	ANSFORME	D TO	5.0 MIN. T	IME STE	Р.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250	RAIN   mm/hr 0.00 0.96 0.96 0.96 0.96 0.96 0.96 0.96	TRA TIME hrs 1.667 1.750 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.650 2.583 2.650 2.750 2.750 2.833	NSFORMEI RAIN mm/hr 5.74 16.25 16.25 16.25 16.25 16.25 16.25 16.25 16.25 16.25 43.98 43.98 43.98 43.98 43.98 43.98 12.43	HYETOGRA ' TIME ' hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417	RAIN mm/hr 12.43   6.69   6.69   6.69   6.69   6.69   3.82   3.82   3.82   3.82   3.82   3.82   3.82   3.82   3.82   1.91	TIME hrs 4.83 4.92 5.00 5.17 5.25 5.33 5.42 5.50 5.58 5.58 5.67 5.75 5.83 5.92 6.00	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96

1.333 5.7 1.417 5.7 1.500 5.7 1.583 5.7	24         2.917         12.43           24         3.000         12.43           24         3.083         12.43           24         3.083         12.43           24         3.167         12.43	4.500         1.9           4.583         1.9           4.667         1.9           4.750         1.9	01 6.08 0.96 01 6.17 0.96 01 6.25 0.96 01
Max.Eff.Inten.(mm/hr)= over (min) Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)=	43.98 5.00 3.24 (ii) 5.00 0.27	24.02 10.00 7.31 (ii) 10.00 0.13	*TOTAI S*
PEAK FLOW (cms)= TIME TO PEAK (hrs)= RUNOFF VOLUME (mm)= TOTAL RAINFALL (mm)= RUNOFF COEFFICIENT =	0.12 2.75 46.81 47.81 0.98	0.01 2.75 19.33 47.81 0.40	0.129 (iii) 2.75 44.06 47.81 0.92
<pre>***** WARNING: STORAGE COEFF (i) CN PROCEDURE SELE CN* = 83.0 (ii) TIME STEP (DT) SH THAN THE STORAGE (iii) PEAK FLOW DOES NO</pre>	. IS SMALLER THAN CCTED FOR PERVIOUS Ia = Dep. Storage WOLD BE SMALLER O COEFFICIENT. DT INCLUDE BASEFLO	TIME STEP! (Above) R EQUAL W IF ANY.	
ADD HYD ( 0162) 1 + 2 = 3 ID1= 1 ( 0164): + ID2= 2 ( 0165):	AREA QPEAK (ha) (cms) 1.00 0.020 1.11 0.129	TPEAK R.V. (hrs) (mm) 3.67 16.61 2.75 44.06	
ID = 3 ( 0162):	2.11 0.135	2.75 31.05	
NOTE: PEAK FLOWS DO NO	T INCLUDE BASEFLO	WS IF ANY.	
ADD HYD ( 0162) 3 + 2 = 1 ID1= 3 ( 0162): + ID2= 2 ( 0168):	AREA QPEAK (ha) (cms) 2.11 0.135 8.73 0.648	TPEAK R.V. (hrs) (mm) 2.75 31.05 2.75 36.09	
ID = 1 (0162);	10.84 0.783	2.75 35.11	-
		WS TE ANY	
CALIB   STANDHYD ( 0024)   Area  ID= 1 DT= 5.0 min   Tota]	(ha)= 7.52 Imp(%)= 90.00	Dir. Conn.(%)=	= 90.00
Surface Area (ha)= Dep. Storage (mm)= Average Slope (%)= Length (m)= Mannings n =	IMPERVIOUS P 6.77 1.00 1.00 223.90 0.013	ERVIOUS (i) 0.75 5.00 2.00 40.00 0.250	
NOTE: RAINFALL WAS	TRANSFORMED TO	5.0 MIN. TIME	STEP.
TIME RAJ hrs mm/h 0.083 0.0 0.167 0.0 0.250 0.0 0.333 0.9 0.417 0.5	TRANSFORM IN TIME RAIN IF hrs mm/hr 00 1.667 5.74 00 1.750 5.74 00 1.833 16.25 16 1.917 16.25 66 2.000 16.25	ED HYETOGRAPH TIME R/ 3.250 12.4 3.333 6.6 3.417 6.6 3.500 6.6	IIN   TIME RAIN /hr   hrs mm/hr 13   4.83 0.96 19   4.92 0.96 19   5.00 0.96 19   5.08 0.96 19   5.17 0.96

0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500	0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.583	0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.667	0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833	0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.917	0.96	2.500	43.98	4.083	3.82	5.67	0.96
1.000	0.96	2.583	43.98	4.167	3.82	5.75	0.96
1.083	0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.167	0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.250	0.96	2.833	12.43	4.417	1.91	6.00	0.96
1.333	5.74	2.917	12.43	4.500	1.91	6.08	0.96

1.41 1.50 1.58	7 5.74 0 5.74 3 5.74	3.000 3.083 3.167	12.43 12.43 12.43	4.583 4.667 4.750	1.91 1.91 1.91	6.17 6.25	0.96
Max.Eff.Inten.( over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	mm/hr)= (min) (min)= (min)= (cms)=	43.98 5.00 5.76 5.00 0.20	(ii)	24.02 10.00 9.83 (ii) 10.00 0.11	*101	A1 C*	
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI	(cms)= (hrs)= (mm)= (mm)= ENT =	0.82 2.75 46.81 47.81 0.98		0.04 2.75 19.33 47.81 0.40	0.1 2 44 47 0	866 (iii) .75 .06 .81 .92	
(i) CN PROCED CN* = (ii) TIME STEP THAN THE (iii) PEAK FLOW	URE SELECT 83.0 Ia (DT) SHOU STORAGE CO DOES NOT	ED FOR PE = Dep. S LD BE SMA EFFICIENT INCLUDE B	RVIOUS torage LLER OR ASEFLOW	LOSSES: (Above) EQUAL IF ANY.			
STANDHYD ( 0047)   ID= 1 DT= 5.0 min	Area Total I	(ha)= 2 mp(%)= 9	3.15 0.00	Dir. Conn.	(%)= 90	0.00	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVIOU 20.83 1.00 1.00 392.85 0.013	S PE	RVIOUS (i) 2.32 5.00 2.00 40.00 0.250			
NOTE: RAIN	FALL WAS T	RANSFORME	р то	5.0 MIN. T	IME STE	Ρ.	
TIM hr 0.08 0.16 0.25 0.33 0.41 0.50 0.58 0.66 0.75	E RAIN s mm/hr 3 0.00 7 0.00 3 0.96 7 0.96 0 0.96 3 0.96 7 0.96 0 0.96	TRA TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333	NSFORME RAIN mm/hr 5.74 16.25 16.25 16.25 16.25 16.25 16.25 16.25 43.98	D HYETOGRAI TIME hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917	PH RAIN mm/hr 12.43   6.69   6.69   6.69   6.69   6.69   3.82   3.82	TIME 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
0.83 0.91 1.00 1.08 1.16 1.25 1.33 1.41 1.50 1.58	3         0.96           7         0.96           0         0.96           3         0.96           7         0.96           0         0.96           3         5.74           7         5.74           3         5.74           3         5.74	2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	43.98 43.98 43.98 43.98 12.43 12.43 12.43 12.43 12.43 12.43	4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750	3.82 3.82 3.82 3.82 1.91 1.91 1.91 1.91 1.91 1.91 1.91	5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten.( over Storage Coeff	mm/hr)= (min) (min)-	43.98 10.00 8.06	(iii)	24.02 15.00			

8.06 (ii) 10.00 0.13 12.14 (ii) 15.00 0.09 Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)= \*TOTALS\* 2.597 (iii) 2.75 44.06 47.81 0.92 0.12 2.83 19.33 47.81 0.40 PEAK FLOW (cms)= TIME TO PEAK (hrs)= RUNOFF VOLUME (mm)= TOTAL RAINFALL (mm)= RUNOFF COEFFICIENT = 2.49 2.75 46.81 47.81 0.98

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 83.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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| RESERVOIR( 0049)| OVERFLOW IS OFF

IN= 2> OUT= 1     DT= 5.0 min	OUTFLOW S (cms) ( 0.0000	TORAGE   ha.m.)   0.0000	OUTFLOW (cms) 3.4880	STORAGE (ha.m.) 0.0000	
INFLOW : ID= 2 ( 00 OUTFLOW: ID= 1 ( 00	AREA (ha) 47) 23.150 49) 23.150	QPEAK (cms) 2.592 2.592	TPEAK (hrs) 7 2.75 7 2.75	R.V. (mm) 5 44.06 5 44.06	
PEAK TIME MAXI MAXI **** WARNING : HYD	FLOW REDU SHIFT OF PEAK MUM STORAGE MUM STORAGE ROGRAPH PEAK W	CTION [Qout FLOW USED USED AS NOT REDI	t/Qin](%)=1 (min)= (ha.m.)= (cu.m.)= JCED.	L00.00 0.00 0.0000 0.000146	
CALIB STANDHYD ( 0048) ID= 1 DT= 5.0 min	Area (ha)= Total Imp(%)=	10.29 61.00 D	ir. Conn.(9	6)= 61.00	
Surface Area ( Dep. Storage ( Average Slope Length Mannings n	IMPERVI ha)= 6.2 mm)= 1.0 (%)= 1.0 (m)= 261.9 = 0.01	DUS PER 8 4 0 5 2 4( 3 0	/IOUS (i) 4.01 5.00 1.00 0.00 .250		
NOTE: RAINFAL	L WAS TRANSFOR	MED TO 5	O MIN. TIM	ME STEP.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.503 1.583 Max.Eff.Inten.(mm/	RAIN         TIME           mm/hr         hrs           0.00         1.667           0.00         1.750           0.00         1.750           0.00         1.833           0.96         2.000           0.96         2.083           0.96         2.167           0.96         2.167           0.96         2.417           0.96         2.583           0.96         2.583           0.96         2.583           0.96         2.750           0.96         2.750           0.96         2.753           0.96         2.750           0.96         2.750           0.96         2.750           0.96         2.750           0.96         2.750           0.96         2.750           0.96         2.750           0.96         2.750           0.96         2.750           0.96         2.750           0.574         3.083           5.74         3.167           hr)=         43.9	RANSFORMED RAIN   mm/hr 5.74   16.25 16.25   16.25   12.43   12.43	HYETOGRAPH TIME hrs m 3.250 12 3.333 ( 3.417 ( 3.500 ( 3.583 ( 3.667 ( 3.833 3 3.917 3 4.000 3 4.083 3 4.083 3 4.083 3 4.167 3 4.250 4 4.250 4 4.333 3 4.417 4 4.583 4 4.583 4 4.667 3 4.667 4 4.667 4 4.667 4 4.667 4 4.667 4 4.667 4 4.667 4 4.667 4 4.66	RAIN       TIME         mm/hr       hrs         2.43       4.83         5.69       5.00         5.69       5.08         5.69       5.17         5.69       5.25         5.69       5.25         5.69       5.25         3.82       5.58         3.82       5.67         3.82       5.67         3.82       5.67         3.82       5.67         3.82       5.67         3.82       5.67         3.82       5.67         3.82       5.67         3.82       5.67         3.82       5.67         3.82       5.67         3.82       5.67         3.82       5.67         3.82       5.83         1.91       6.00         1.91       6.025         1.91       6.25         1.91       6.25         1.91       6.25	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
over (m Storage Coeff. (m Unit Hyd. Tpeak (m Unit Hyd. peak (c PEAK FLOW (c TIME TO PEAK (h RUNOFF VOLUME ( TOTAL RAINFALL ( RUNOFF COEFFICIENT (i) CN PROCEDURE	1n)       5.0         in)=       6.3         in)=       5.0         ms)=       0.1         ms)=       0.7         rs)=       2.7         mm)=       46.8         mm)=       47.8         =       0.9         SELECTED FOR	0 22 2 (ii) 22 9 (ii) 22 9 (ii) 22 9 (ii) 22 9 (ii) 22 9 (ii) 22 8 (ii) 22 1 12 8 (ii) 22 9 (ii) 22	5.00 5.00 5.00 5.05 5.15 5.00 9.15 5.00 9.33 7.81 0.40 DSSES:	*TOTALS* 0.876 (iii) 2.75 36.09 47.81 0.75	
CN* = 83. (ii) TIME STEP (D THAN THE STO (iii) PEAK FLOW DO	0 Ia = Dep. T) SHOULD BE S RAGE COEFFICIE ES NOT INCLUDE	Storage MALLER OR I NT. BASEFLOW 1	(Above) EQUAL IF ANY.		
RESERVOIR( 0050)   IN= 2> OUT= 1   DT= 5.0 min	OVERFLOW IS OUTFLOW S (cms) ( 0.0000	DFF TORAGE   ha.m.)   0.0000	OUTFLOW (cms) 0.6200	STORAGE (ha.m.) 0.3247	
	AREA	QPEAK	IPEAK	R.V.	

INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0048) 0050)	(ha) 10.290 10.290	(cms) 0.876 0.329	(hrs) 2.75 3.25	(mm) 36.09 36.08	
P T M	EAK FLOW IME SHIFT ( AXIMUM ST(	REDUCTIO DF PEAK FLO DRAGE USE	DN [Qout/Q DW ED (	in](%)= 37. (min)= 30. ha.m.)= 0.	51 00 1724	
CALIB   STANDHYD ( 0088)  ID= 1 DT= 5.0 min	Area Total In	(ha)= 181. np(%)= 58.	.61 .40 Dir.	Conn.(%)=	54.10	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVIOUS 106.06 2.00 2.50 1100.33 0.013	PERVIO 75.5 5.0 2.5 40.0 0.25	US (i) 5 0 0 0 0		
NOTE: RAIN	FALL WAS T	RANSFORMED	TO 5.0	MIN. TIME S	STEP.	
TIM hr 0.08 0.16 0.25 0.33 0.41 0.58 0.66 0.75 0.83 0.91 1.00 1.00 1.08 1.16 1.25 1.33 1.41 1.50 1.58	E RAIN s mm/hr 3 0.00 7 0.00 0 0.00 3 0.96 7 0.96 0 0.96 3 0.96 0 0.96 3 0.96 0 0.96 3 0.96 0 0.9	TIME hrs n 1.667 1.750 1.917 2.000 2.167 2.250 2.333 2.167 2.250 2.417 2.500 2.417 2.667 2.417 2.667 2.667 2.667 2.917 3.000 3.083 3.167 2.30	SFORMED         HY           RAIN          *           mm/hr          *           5.74         3.           16.25         3.           16.25         3.           16.25         3.           16.25         3.           16.25         3.           13.98         4.           13.98         4.           13.98         4.           13.98         4.           12.43         4.           12.43         4.           12.43         4.           12.43         4.           12.43         4.           12.43         4.           12.43         4.           12.43         4.           12.43         4.	ETOGRAPH TIME RAJ hrs mm/k 250 12.43 333 6.69 500 6.69 583 6.69 833 3.82 917 3.82 000 3.82 083 3.82 167 3.82 250 3.82 333 1.91 417 1.91 500 1.91 583 1.91 667 1.91	TIME           hrs           4.83           4.92           5.00           5.08           5.17           5.533           5.42           5.58           5.58           5.75           5.83           5.92           5.83           6.00           6.08           6.17           6.25	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten.( over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	mm/hr)= (min) (min)= (min)= (cms)=	43.98 10.00 11.37 (1 10.00 0.10	26.0 25.0 25.0 25.0 25.0 0.0	5 0 7 (ii) 5 *1		
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI	(cms)= (hrs)= (mm)= (mm)= ENT =	11.27 2.75 45.81 47.81 0.96	3.2 3.0 19.9 47.8 0.4	6 1 0 7 1 2	13.714 (iii) 2.75 33.95 47.81 0.71	
(i) CN PROCED CN* = (ii) TIME STEP THAN THE (iii) PEAK FLOW	URE SELECTI 82.0 Ia (DT) SHOUI STORAGE CO DOES NOT	ED FOR PERV = Dep. Sto LD BE SMALI EFFICIENT. INCLUDE BAS	VIOUS LOSS prage (Ab LER OR EQU SEFLOW IF	ES: ove) AL ANY.		
RESERVOIR( 0089) IN= 2> OUT= 1 DT= 5.0 min	OVERFI OUTFL( (cms) 0.000 0.683 1.022	LOW IS OFF DW STOR/ ) (ha.r 00 0.00 70 3.64 20 5.28	AGE   O n.)   2000   492   831   *	UTFLOW 5 (cms) ( 1.5600 2.0400 ******	TORAGE (ha.m.) 7.7340 9.8037 10.8930	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 ( T M	0088) 0089) EAK FLOW IME SHIFT ( AXIMUM STO	AREA (ha) 181.610 181.610 REDUCTIC DF PEAK FLC DRAGE USE	QPEAK (cms) 13.714 0.991 DN [Qout/Q DW ED (	TPEAK (hrs) 2.75 4.83 in](%)= 7. (min)=125. ha.m.)= 5.	R.V. (mm) 33.95 33.94 23 00 1343	

ALIB   TANDHYD ( 0091)  = 1 DT= 5.0 min	Area (ha)= 19.40 Total Imp(%)= 72.50	) Dir. Conn.	(%)= 66.50	
Surface Area () Dep. Storage () Average Slope Length Mannings n	IMPERVIOUS           (ha) =         14.07           (mm) =         2.00           (%) =         2.42           (m) =         359.63           =         0.013	PERVIOUS (i) 5.33 5.00 2.42 40.00 0.250		
NOTE: RAINFAL	L WAS TRANSFORMED TO	5.0 MIN. T	IME STEP.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500	TRANSF(           RAIN         TIME         R/           mm/hr         hrs         mm,           0.00         1.667         5           0.00         1.833         16           0.96         2.000         16           0.96         2.000         16           0.96         2.083         16           0.96         2.167         16           0.96         2.250         16           0.96         2.500         43           0.96         2.583         43           0.96         2.583         43           0.96         2.750         43           0.96         2.750         43           0.96         2.750         43           0.96         2.750         43           0.96         2.750         43           0.96         2.833         12           5.74         3.003         12           5.74         3.083         12	ORMED         HYETOGRA           AIN         '         TIME           /hr         '         hrs           .74         3.250         .3417           .25         3.417         .25           .25         3.667         .25           .25         3.667         .25           .25         3.667         .25           .25         3.683         .98           .98         4.000         .98           .98         4.167         .98           .98         4.250         .98           .43         4.417         .43           .43         4.583         .43           .43         4.583         .43           .43         4.583         .43           .43         4.583         .43           .43         4.667         .43           .43         4.750         .4750	PH       RAIN       TIME         mm/hr       hrs       hrs         12.43       4.83       6.69       5.00         6.69       5.00       6.69       5.08         6.69       5.08       6.69       5.17         6.69       5.25       6.69       5.33         3.82       5.42       3.82       5.50         3.82       5.58       3.82       5.67         3.82       5.75       3.82       5.83         1.91       5.92       1.91       6.00         1.91       6.08       1.91       6.17         1.91       6.25       1.91       1.91	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten.(mm, over (r Storage Coeff. (r Unit Hyd. Tpeak (r Unit Hyd. peak (c	(hr)= 43.98 nin) 5.00 nin)= 5.87 (ii) nin)= 5.00 ms)= 0.19	34.01 20.00 16.13 (ii) 20.00 0.06	*TOTALS*	,
TIME TO PEAK (FLOW TIME TO PEAK (F RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIENT	ms)= 1.37 irs)= 2.75 (mm)= 45.81 (mm)= 47.81 = 0.96	2.92 23.73 47.81 0.50	2.75 38.41 47.81 0.80	
(i) CN PROCEDURE CN* = 85. (ii) TIME STEP (I THAN THE STC (iii) PEAK FLOW DC	E SELECTED FOR PERVIC O Ia = Dep. Story DT) SHOULD BE SMALLER DRAGE COEFFICIENT. DES NOT INCLUDE BASER	DUS LOSSES: age (Above) R OR EQUAL FLOW IF ANY.		
DD HYD ( 0092) 1 + 2 = 3   ID1= 1 ( 0089) + ID2= 2 ( 0091)	AREA QPEAK (ha) (cms) 181.61 0.991 19.40 1.888	TPEAK (hrs) 4.83 33 2.75 38	R.V. (mm) .94 .41	
ID = 3 ( 0092)	: 201.01 2.319	2.75 34	.37	
NOTE: PEAK FLOWS	DO NOT INCLUDE BASE	LOWS IF ANY.		
OUTE CHN( 2252)  N= 2> OUT= 1	Routing time step	(min)'= 5.00		
< Distance 28.50 47.31 51.00	DATA FOR SECTION ( Elevation 210.02 209.86 209.76	1.1)> Manning 0.0600 0.0450 0.0450	Main Channel Main Channel	

	95.97 103.18 108.18 116.25 122.00 131.55 149.56 155.33 177.88 190.96 226.56 228.71 251.40	7 2 8 2 9 2 9 2 9 2 9 2 9 2 9 2 9 2 9	08.53 08.38 08.33 08.08 07.92 07.65 08.22 08.49 08.58 08.73 08.72 09.32 09.32 09.46 09.70	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	.0450 .0450 .0450 .0450 .0450 .0450 .0450 .0450 .0450 .0450 .0450 .0450 0 /0.060	Mai Mai Mai Mai Mai Mai Mai Mai Mai Mai	n Channel n Channel	
DEPTH (m) 0.11 0.21 0.43 0.53 0.64 0.75 0.85 0.96 1.07 1.17 1.28 1.39 1.49 1.60 1.71 1.81 1.93 2.05	ELEV (m) 207.75 207.86 207.97 208.07 208.18 208.29 208.50 208.61 208.71 208.82 208.93 209.03 209.14 209.25 209.35 209.58 209.70	TRA VOLUME (cu.m.) .531E+03 .213E+04 .479E+04 .856E+04 .134E+05 .261E+05 .344E+05 .344E+05 .344E+05 .598E+05 .598E+05 .598E+05 .113E+06 .133E+06 .202E+06 .202E+06 .264E+06	VEL TIM FLO ( 1 1 1 1 1 1 1 1 1 1 1 5 1 5 1 7 5 25	E TABLE W RATE cms) 0.1 0.5 1.4 3.0 5.5 9.0 3.1 8.4 3.5 3.6 5.8 1.8 5.8 1.8 0.4 1.5 5.3 1.0 7.9 7.9 8.3	VELOC (m/ 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 1. 1. 1. 1. 1.	ITY (s) 20 32 41 50 58 67 71 76 67 71 73 80 85 94 001 09 15 21 225 32 39	TRAV. TIME (min) 119.24 75.12 57.58 47.72 40.76 35.61 33.18 31.10 32.57 29.71 27.72 25.29 23.38 21.84 20.55 19.56 18.90 17.96 17.06	
INFLOW : I OUTFLOW: I	D= 2 ( 00 D= 1 ( 22	AR (h 092) 201. 252) 201.	<pre>&lt; (EA Q) (a) ( 01 01 01</pre>	hydr PEAK cms) 2.32 1.21	ograph - TPEAK (hrs) 2.75 3 3.75 3	R.V. (mm) 34.37 34.37	<-pipe / c MAX DEPTH (m) 0.38 0.30	hannel-> MAX VEL (m/s) 0.46 0.39
CALIB   STANDHYD (  ID= 1 DT= 5.	0093) 0 min	Area ( Total Imp	[ha)= 8 (%)= 7	8.14 6.00	Dir. Cor	nn.(%)=	76.00	
Surface Dep. Sto Average Length Mannings	Area ( prage ( Slope n	IM (ha)= (mm)= (%)= (m)= =	PERVIOU 66.99 2.28 2.00 766.55 0.013	S PE	RVIOUS ( 21.15 5.00 2.28 40.00 0.250	(i)	STED	
NUTE	TIME hrs 0.083 0.167 0.250 0.333 0.417	RAIN   mm/hr 0.00   0.00   0.00   0.96   0.96	TRA TIME hrs 1.667 1.750 1.833 1.917 2.000	NSFORME RAIN mm/hr 5.74 5.74 16.25 16.25 16.25	D HYETOG  ' TIME   hrs   3.250   3.333   3.417   3.500   3.583	GRAPH - RA 5 mm/ 12.4 6.6 6.6 6.6	IN   TIME hr   hrs 3   4.83 9   4.92 9   5.00 9   5.08 9   5.17	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96

hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500	0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.583	0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.667	0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833	0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.917	0.96	2.500	43.98	4.083	3.82	5.67	0.96
1.000	0.96	2.583	43.98	4.167	3.82	5.75	0.96
1.083	0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.167	0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.250	0.96	2.833	12.43	4.417	1.91	6.00	0.96
1.333	5.74	2.91/	12.43	4.500	1.91	6.08	0.96
1.417	5.74	3.000	12.43	4.583	1.91	6.17	0.96
1.500	5.74	3.083	12.43	4.667	1.91	6.25	0.96
1.583	5.74	3.16/	12.43	4.750	1.91		

Max.Eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE (i) CN PROCEDU CN* = 8 (ii) TIME STEP	m/hr)= (min)= (min)= (cms)= (cms)= (hrs)= (hrs)= (mm)= NT = RE SELECTE 1.0 Ia (DT) SHOUL TOPAGE COE	43.98 10.00 9.78 (1 10.00 0.11 7.84 2.75 45.53 47.81 0.95 D FOR PERN = Dep. Stop D BE SMALL EFETCHENT	21.23 25.00 22.39 (ii 25.00 0.05 0.74 3.00 17.90 47.81 0.37 VIOUS LOSSES: prage (Above) .ER OR EQUAL	*TOTALS* 8.387 (iii) 2.75 38.90 47.81 0.81	
(iii) PEAK FLOW	DOES NOT I	NCLUDE BAS	SEFLOW IF ANY.		
RESERVOIR( 0097) IN= 2> OUT= 1 DT= 5.0 min	OVERFL OUTFLO (cms) 0.000 0.382 0.567 0.693	OW IS OFF W STOR/ (ha.n 0 0.00 0 1.83 0 2.56 0 3.07	AGE   OUTFLC 1.)   (cms) 000   0.865 840   0.998 550   1.134 550   0.000	W STORAGE (ha.m.) 50 3.7180 30 4.2030 40 4.6850 30 0.0000	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0093) 0097)	AREA (ha) 88.140 88.140	QPEAK TPEA (cms) (hrs 8.387 2 0.631 4	AK R.V. 5) (mm) 2.75 38.90 4.50 38.88	
PE TI MA	AK FLOW ME SHIFT O XIMUM STO	REDUCTIO F PEAK FLO RAGE USE	DN [Qout/Qin](% DW (min DD (ha.m.	6)= 7.52 1)=105.00 .)= 2.8226	
CALIB     STANDHYD ( 0096)  ID= 1 DT= 5.0 min	Area Total Im	(ha)= 42. p(%)= 72.	.17 .00 Dir. Conr	n.(%)= 72.00	
Surface Area Dep. Storage Average Slope Length Mannings n	[ha]= (mm)= (%)= (m)= =	MPERVIOUS 30.36 2.00 2.04 530.22 0.013	PERVIOUS (i 11.81 5.00 2.04 40.00 0.250	)	
NOTE: RAINF	ALL WAS TR	ANSFORMED	TO 5.0 MIN.	TIME STEP.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500	RAIN mm/hr 0.00 0.96 0.96 0.96 0.96 0.96 0.96 0.96	TIME hrs n 1.667 1.750 1.833 2.000 2.083 2.167 2.250 2.333 2.417 2.500 4 2.500 4 2.500 4 2.667 4 2.667 4 2.667 4 2.750 4 3.000 3.083 3.167 2 2.000 2.917 2.0000 2.0000 2.0000 2.0000 2.0000 2.00000000	FORMED         HYETOGR           RAIN         '         TIME           mm/hr         '         hrs           5.74         3.250           5.74         3.333           16.25         3.417           16.25         3.500           16.25         3.583           16.25         3.667           16.25         3.750           16.25         3.833           13.98         4.000           13.98         4.003           13.98         4.003           13.98         4.250           13.98         4.250           13.98         4.253           12.43         4.417           12.43         4.503           12.43         4.503           12.43         4.503           12.43         4.750	RAIN         TIME           mm/hr         hrs           12.43         4.83           6.69         4.92           6.69         5.00           6.69         5.08           6.69         5.17           6.69         5.25           6.69         5.33           3.82         5.42           3.82         5.58           3.82         5.58           1.91         5.92           1.91         6.00           1.91         6.08           1.91         6.02           1.91         6.02           1.91         6.02           1.91         6.02           1.91         6.02           1.91         6.17           1.91         6.17           1.91         6.17           1.91         6.17           1.91         6.25           1.91         1.91	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	m/hr)= (min) (min)= (min)= (cms)=	43.98 10.00 7.80 (i 10.00 0.13	22.08 25.00 20.63 (ii 25.00 0.05	)	

PEAK FLC TIME TO RUNOFF V TOTAL RA RUNOFF C	W (c PEAK (h 'OLUME ( INFALL ( COEFFICIENT	ns)= 2 rs)= 2 nm)= 49 nm)= 47 = 0	8.63 2.75 5.81 7.81 0.96	0.44 3.00 18.59 47.81 0.39	*T	OTALS* 3.964 (iii) 2.75 38.19 47.81 0.80	
(i) CM (ii) TI TH (iii) PE	N* = 82. ME STEP (D IAN THE STO AK FLOW DO	SELECTED FO D Ia = De T) SHOULD BE RAGE COEFFIC ES NOT INCLU	OR PERVIOU p. Storag SMALLER CIENT. JDE BASEFL	JS LOSSES: je (Above) OR EQUAL .OW IF ANY.			
ADD HYD (   1 + 2 = ID1= + ID2= ID =	0095) 3 1 ( 2252) 2 ( 0096) 3 ( 0095)	AREA (ha) : 201.01 : 42.17 : 243.18	QPEAK (cms) 1.207 3.964 4.879	TPEAK (hrs) 3.75 2.75 2.75	R.V. (mm) 34.37 38.19 35.03		
NOTE: F	PEAK FLOWS	DO NOT INCLU	JDE BASEFL	OWS IF ANY	•		
ADD HYD (   3 + 2 = ID1= + ID2=	0095)  1   3 ( 0095) 2 ( 0097)	AREA (ha) : 243.18 : 88.14	QPEAK (cms) 4.879 0.631	TPEAK (hrs) 2.75 4.50	R.V. (mm) 35.03 38.88		
===== ID =	1 ( 0095)	: 331.32	5.193	2.75	36.06		
NOTE: F	PEAK FLOWS	DO NOT INCLU	JDE BASEFL	OWS IF ANY	•		
ROUTE CHN(   IN= 2> C	2257)  DUT= 1	Routing ti	ime step (	(min)'= 5.	00		
	<pre>     Ze Distance     Z8.50     47.35     51.00     60.44     65.44     72.65     95.97     103.18     108.18     116.25     122.09     131.52     149.56     155.39     177.88     190.96     195.96     226.50     238.71     251.40 </pre>	DATA FOR SEC Elevat 2100, 209, 209, 209, 209, 208, 208, 208, 208, 208, 208, 207, 207, 207, 207, 208, 208, 208, 208, 208, 209, 209, 209, 209, 209, 209, 209, 209	TION ( tion 02 86 54 60 41 53 38 33 08 92 65 22 49 58 73 72 32 46 0.0 70	1.1) Manning 0.0600 0.0450	-> Main Main Main Main Main Main Main Main	Channel Channel	
CEPTH (m) 0.11 0.21 0.43 0.53 0.64 0.75 0.85 0.96 1.07 1.17 1.28 1.39 1.49 1.60	ELEV (m) 207.75 207.86 207.97 208.07 208.18 208.29 208.39 208.50 208.61 208.71 208.71 208.82 208.93 209.03 209.14 209.25	TRAVEI VOLUME (cu.m.) .143E+03 .574E+03 .129E+04 .231E+04 .362E+04 .362E+04 .520E+04 .929E+04 .124E+05 .266E+05 .253E+05 .305E+05 .359E+05 .417E+05	- TIME TAE FLOW RAT (cms) 0.1 0.4 1.0 2.2 4.1 6.7 9.8 13.8 17.5 25.1 34.2 46.2 46.2 60.1 75.9 93.7	BLEBLE (m/ E VELOC 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	TTY T s) 15 24 31 37 43 50 55 53 57 54 60 64 64 70 64 81 88 6	RAV.TIME (min) 43.07 27.13 20.80 17.24 14.72 12.86 11.98 11.23 11.76 10.73 10.01 9.13 8.45 7.89 7.42	

1.71 1.81 1.93 2.05	209.35 209.46 209.58 209.70	.47 .54 .62 .71	9E+05 5E+05 5E+05 4E+05	112.9 133.0 160.7 193.1		0.91 0.94 0.99 1.04	7.06 6.83 6.49 6.16	
INFLOW : OUTFLOW:	ID= 2 { ID= 1 {	0095) 2257)	AREA (ha) 331.32 331.32	< hyd QPEAK (cms) 5.19 4.42	Irograph TPEAK (hrs) 2.75 2.83	R.V. (mm) 36.06 36.06	<-pipe / c MAX DEPTH (m) 0.58 0.55	hannel-> MAX VEL (m/s) 0.46 0.44

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CALIB   STANDHYD ( 0100)  ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	36.92 64.90	Dir.	Conn.(%)=	64.90
		IMPERVIO	US	PERVIO	JS (i)	
Surface Area	(ha)=	23.96		12.96	3	
Dep. Storage	(mm)=	2.00		5.00	)	
Average Slope	(%)=	2.42		2.42	2	
Length	(m)=	496.12		40.00	)	
Mannings n	=	0.013		0.250	)	

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

		TRA	NSFORME	D HYETOGR/	APH	-	
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500	0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.583	0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.667	0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833	0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.917	0.96	2.500	43.98	4.083	3.82	5.67	0.96
1.000	0.96	2.583	43.98	4.167	3.82	5.75	0.96
1.083	0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.167	0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.250	0.96	2.833	12.43	4.417	1.91	6.00	0.96
1.333	5.74	2.917	12.43	4.500	1.91	6.08	0.96
1.417	5.74	3.000	12.43	4.583	1.91	6.17	0.96
1.500	5.74	3.083	12.43	4.667	1.91	6.25	0.96
1.583	5.74	3.167	12.43	4.750	1.91	-	
Max.Eff.Inten.(mr	n/hr)=	43.98		21.23			
over (	(min)	5.00		20.00			
Storage Coeff.	(min)=	7.12	(ii)	19.50 (ii)	)		
Unit Hvd. Tpeak	(min)=	5.00		20.00			
Unit Hyd. peak	(cms)=	0.17		0.06			
and the second se	· · ·				*T01	TALS*	
PEAK FLOW	(cms)=	2.90		0.49	3.	.311 (iii)	
TIME TO PEAK	(hrs)=	2.75		2.92	2	2.75	
RUNOFF VOLUME	(mm)=	45.81		17.90	36	5.01	
TOTAL RAINFALL	(mm)=	47.81		47.81	47	7.81	
RUNOFF COEFFICIEN	- TI	0.96		0.37	(	0.75	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 81.0 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( 0101)    TN= 2> OUT= 1	OVERFLOW	IS OFF			
DT= 5.0 min	OUTFLOW (cms) 0.0000 0.1840 0.2740 0.3340	STORAGE (ha.m.) 0.0000 0.9170 1.2500 1.4720	OUTFLOW (cms) 0.4170 0.4820 0.5480 0.0000	STORAGE (ha.m.) 1.7520 1.9610 2.1660 0.0000	

QPEAK (cms)

TPEAK (hrs)

R.V. (mm)

AREA (ha)

INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0100) 0101)	36.920 36.920	3.311 0.234	2.75 4.50	36.01 35.98	
Р	EAK FLOW	REDUCTIO	N [Qout/Qin	](%)= 7.0	6	
M	AXIMUM ST	DRAGE USE	D (ha	(mn) = 103.0 (.m.) = 1.10	007	
CALIB   STANDHYD ( 0102)   ID= 1 DT= 5.0 min	Area Total I	(ha)= 71. mp(%)= 93.	88 00 Dir.C	Conn.(%)=	93.00	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVIOUS 66.85 2.00 2.22 692.24 0.013	PERVIOUS 5.03 5.00 2.20 40.00 0.250	i (i)		
NOTE: RAIN	FALL WAS T	RANSFORMED	то 5.0 МІ	N. TIME ST	EP.	
TIM hr 0.08 0.16 0.25 0.33 0.41	E RAIN s mm/hr 3 0.00 7 0.00 0 0.00 3 0.96 7 0 96	TRANS TIME hrs m 1.667 1.750 1.833 1 1.917 1 2 000 1	FORMED HYET RAIN  ' TI m/hr  ' h 5.74   3.25 5.74   3.33 6.25   3.41 6.25   3.50 6.25   3.50	OGRAPH ME RAIN Irs mm/hr 0 12.43 3 6.69 17 6.69 0 6.69 0 6.69	-   TIME   hrs   4.83   4.92   5.00   5.08   5.17	RAIN mm/hr 0.96 0.96 0.96 0.96
0.50 0.58 0.66 0.75 0.83 0.91 1.00 1.08 1.16	0 0.96 3 0.96 7 0.96 0 0.96 3 0.96 7 0.96 0 0.96 0 0.96 3 0.96 7 0.96	2.083 1 2.167 1 2.250 1 2.333 4 2.417 4 2.500 4 2.583 4 2.667 4 2.750 4	6.25 3.66 6.25 3.75 6.25 3.83 3.98 3.91 3.98 4.00 3.98 4.08 3.98 4.08 3.98 4.25 3.98 4.33	6.69         6.69           3         3.82           7         3.82           10         3.82           13         3.82           14         3.82           15         3.82           16         3.82           17         3.82           18         3.82           17         3.82           16         3.82           17         3.82           10         3.82           13         1.91	5.25 5.33 5.42 5.50 5.58 5.67 5.75 5.75 5.83 5.92	0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
1.25 1.33 1.41 1.50 1.58	0 0.96 3 5.74 7 5.74 0 5.74 3 5.74	2.833 1 2.917 1 3.000 1 3.083 1 3.167 1	2.43   4.41 2.43   4.50 2.43   4.58 2.43   4.66 2.43   4.66 2.43   4.75	7         1.91           90         1.91           33         1.91           37         1.91           30         1.91	6.00 6.08 6.17 6.25	0.96 0.96 0.96 0.96
Max.Eff.Inten.( over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	mm/hr)= (min) (min)= (min)= (cms)=	43.98 10.00 8.92 (i 10.00 0.12	22.26 15.00 i) 12.30 15.00 0.09	(ii) *T0	TALS*	
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI	(cms)= (hrs)= (mm)= (mm)= ENT =	7.91 2.75 45.81 47.81 0.96	0.23 2.83 17.90 47.81 0.37	8 4 4	.125 (iii) 2.75 3.86 7.81 0.92	
(i) CN PROCED CN* = (ii) TIME STEP THAN THE (iii) PEAK FLOW	URE SELECT 81.0 Ia (DT) SHOU STORAGE CO DOES NOT	ED FOR PERV = Dep. Sto LD BE SMALL EFFICIENT. INCLUDE BAS	IOUS LOSSES rage (Abov ER OR EQUAL EFLOW IF AN	;: /e) - IY.		
RESERVOIR( 0103)	OVERF	LOW IS OFF				
IN= 2> OUT= 1     DT= 5.0 min	OUTFL( (cms) 0.00 1.31 2.65	0W STORA ) (ha.m 00 0.00 00 1.36 00 1.76	GE   OUT .)   (c 00   4. 39   6. 35   84.	FLOW ST ms) (h 6900 2900 9300	ORAGE a.m.) 2.1905 2.4799 2.7554	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0102) 0103)	AREA (ha) 71.880 71.880	QPEAK T (cms) ( 8.125 2.804	PEAK (hrs) 2.75 3.25	R.V. (mm) 43.86 43.85	

PEAKFLOWREDUCTION[Qout/Qin](%)= 34.51TIME SHIFT OF PEAKFLOW(min)= 30.00MAXIMUMSTORAGEUSED(ha.m.)= 1.7972

ADD HYD ( 0099) 1 + 2 = 3 ID1= 1 ( 0101) + ID2= 2 ( 0103)	AREA (ha) 36.92 71.88	QPEAK (cms) 0.234 2.804	TPEAK (hrs) 4.50 3.25	R.V. (mm) 35.98 43.85		
ID = 3 (0099):	108.80	2.995	3.25	41.18		
NOTE: PEAK FLOWS D	O NOT TNCLU	DE BASEEL	OWS TE AN	Υ.		
ADD HYD ( 0099) 3 + 2 = 1 ID1= 3 ( 0099) + ID2= 2 ( 2257):	AREA (ha) 108.80 331.32	QPEAK (cms) 2.995 4.418	TPEAK (hrs) 3.25 2.83	R.V. (mm) 41.18 36.06		
ID = 1 (0099):	440.12	6.905	2.92	37.32		
NOTE: PEAK FLOWS D	O NOT TNCLU	DE BASEEL	OWS TE AN	Υ.		
ROUTE CHN( 0173)    IN= 2> OUT= 1	Routing ti	me step (	min)'= 5	.00		
<pre>&lt; D Distance 28.50 47.35 51.00 60.44 65.44 72.65 95.97 103.18 108.18 116.25 122.09 131.52 149.56 155.39 177.88 190.96 195.96 226.50 238.71 251.40</pre>	DATA FOR SEC Elevat 210. 209. 209. 209. 209. 208. 208. 208. 208. 208. 208. 208. 208	TION ( Tion 02 86 54 60 41 53 38 33 08 92 65 22 49 58 72 72 32 46 0.0 70	1.1) Manning 0.0600 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450	> Main Main Main Main Main Main Main Main	Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel	
Composition         Composition           DEPTH         ELEV           (m)         (m)           0.11         207.75           0.21         207.86           0.32         207.97           0.43         208.07           0.53         208.18           0.64         208.29           0.75         208.39           0.85         208.61           1.07         208.71           1.17         208.82           1.28         208.93           1.39         209.03           1.49         209.14           1.60         209.25           1.71         209.35           1.81         209.58           2.05         209.70	TRAVEL VOLUME (cu.m.) .601E+03 .241E+04 .542E+04 .542E+04 .152E+05 .218E+05 .218E+05 .296E+05 .389E+05 .389E+05 .677E+05 .861E+05 .106E+06 .128E+06 .201E+06 .228E+06 .228E+06 .299E+06	TIME TAB FLOW RAT (cms) 0.0 0.3 0.8 1.8 3.3 5.5 8.0 11.2 14.2 20.3 27.7 37.5 48.7 61.5 76.0 91.6 107.8 130.3 156.6	LE E VELO (m 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	CITY T /s) .12 .19 .25 .30 .40 .43 .46 .44 .44 .44 .52 .57 .61 .70 .73 .76 .80 .84	RAV.TIME (min) 222.56 140.20 107.47 89.07 76.07 66.47 61.92 58.04 60.79 55.45 51.74 47.20 43.64 40.75 38.35 36.50 35.28 33.51 31.84	
INFLOW : ID= 2 ( 009 OUTFLOW: ID= 1 ( 017	AREA (ha) 99) 440.12 73) 440.12	< hy QPEAK (cms) 6.90 4.32	drograph TPEAK (hrs) 2.92 4.00	R.V. (mm) 37.32 37.32	<-pipe / cha MAX DEPTH 1 (m) 0.70 0.58	annel-> MAX VEL (m/s) 0.42 0.37

\_\_\_\_\_

ROUTE CHN(   IN= 2> (	2296)  DUT= 1	Routing ti	me step (n	nin)'= 5.00		
	<pre>&lt; Distance 0.00 2.22 10.30 36.33 47.4% 59.11 65.88 81.55 93.11 104.44 117.82 126.77 138.4% 149.66 172.66 172.66 172.67 194.97 217.88 229.00 240.77 284.66</pre>	DATA FOR SEC E Elevat 204. 203. 203. 203. 203. 204. 5 204. 5 204. 5 204. 5 204. 5 202. 2 202. 2 202. 5 203. 7 203. 7 203. 7 204. 5 205. 5	TION ( 1 tion 60 58 90 83 24 34 05 84 89 66 25 94 72 80 71 01 02 0.04 56	<pre>L.1)&gt; Manning 0.0600 0.0450 150 /0.0600</pre>	Main Channel Main Channel	
DEPTH (m) 0.23 0.47 0.70 0.93 1.17 1.40 1.63 1.87 2.10 2.33 2.57 2.80 3.03 3.27 3.50 3.27 3.50 3.77 4.20 4.55	ELEV (m) 200.17 200.40 200.64 201.10 201.34 201.57 201.80 202.04 202.27 202.50 202.74 202.75 202.97 203.44 203.67 203.90 204.14 204.49	TRAVEL VOLUME (cu.m.) .403E+03 .149E+04 .284E+04 .443E+04 .624E+04 .624E+04 .106E+05 .131E+05 .138E+05 .188E+05 .221E+05 .261E+05 .389E+05 .467E+05 .650E+05 .788E+05 .103E+06	TIME TABI FLOW RATE (cms) 0.2 1.3 3.3 6.2 10.2 15.1 21.2 28.4 36.8 46.4 54.8 63.4 65.8 87.1 113.5 143.4 141.2 182.1 256.5	E VELOCIT (m/s) 0.17 0.30 0.41 0.50 0.58 0.65 0.71 0.77 0.83 0.88	Y TRAV.TIME (min) 35.38 19.71 14.37 11.80 10.22 9.13 8.31 7.67 7.15 6.75 6.75 6.73 6.87 8.03 7.45 6.85 6.37 7.67 7.67 7.22 6.70	
INFLOW : 1 OUTFLOW: 1	ID= 2 ( 01 ID= 1 ( 22	AREA (ha) 173) 440.12 296) 440.12	< hyc QPEAK (cms) 4.32 4.24	Irograph TPEAK R. (hrs) (m 4.00 37. 4.25 37.	-> <-pipe / c V. MAX DEPTH m) (m) 32 0.78 32 0.77	hannel-> MAX VEL (m/s) 0.44 0.44
CALIB STANDHYD ( ID= 1 DT= 5	0106) .0 min	Area (ha) Total Imp(%)	= 281.15 = 87.70	Dir. Conn.	(%)= 87.50	
Surface Dep. Sto Average Length Mannings	Area ( prage ( Slope s n	IMPER           (ha)=         246           (mm)=         2           (%)=         1           (m)=         1369           =         0.	VIOUS 5.57 2.00 1.63 0.06 013	PERVIOUS (i) 34.58 5.00 1.63 40.00 0.250		
NOTE	E: RAINFAL	L WAS TRANSF	ORMED TO	5.0 MIN. T	IME STEP.	
	TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583	RAIN   TI mm/hr   h 0.00   1.6 0.00   1.7 0.00   1.8 0.96   1.9 0.96   2.0 0.96   2.0 0.96   2.1	TRANSFORM           ME         RAIM           105         mm/hi           167         5.74           133         16.25           167         16.25           100         16.25           183         16.25           167         16.25	HED HYETOGRA	PH         TIME           mm/hr         hrs           12.43         4.83           6.69         5.00           6.69         5.00           6.69         5.08           6.69         5.12           6.69         5.25           6.69         5.33	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96

	0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583	0.96   2. 0.96   2. 0.96   2. 0.96   2. 0.96   2. 0.96   2. 0.96   2. 0.96   2. 5.74   3. 5.74   3.	250         16.25           333         43.98           417         43.98           500         43.98           583         43.98           667         43.98           833         12.43           917         12.43           000         12.43           083         12.43           167         12.43	3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750	3.82 5. 3.82 5. 3.82 5. 3.82 5. 3.82 5. 3.82 5. 1.91 6. 1.91 6. 1.91 6. 1.91 6. 1.91 6.	42       0.96         50       0.96         57       0.96         75       0.96         92       0.96         90       0.96         98       0.96         90       0.96         91       0.96         92       0.96         93       0.96         94       0.96         95       0.96
Max.Eff Storage Unit Hy Unit Hy PEAK FL TIME TO RUNOFF TOTAL R RUNOFF	.Inten.(mm/ over (m Coeff. (m d. Tpeak (m d. peak (c OW (c PEAK (h VOLUME ( AINFALL ( COEFFICIENT	hr)= 4 in)= 1 in)= 1 ms)= ms)= 2 rs)= 2 mm)= 4 mm)= 4	3.98 5.00 4.73 (ii) 5.00 0.08 6.05 2.75 5.81 7.81 0.96	22.87 20.00 19.49 20.00 0.06 1.35 2.92 18.12 47.81 0.38	*TOTALS* 27.186 2.75 42.35 47.81 0.89	(iii)
(i) C (ii) T (iii) P 	N PROCEDURE CN* = 81. IME STEP (D HAN THE STO EAK FLOW DO 0107) 3	SELECTED F O Ia = D T) SHOULD B RAGE COEFFI ES NOT INCL	OR PERVIOUS ep. Storage E SMALLER O CIENT. UDE BASEFLO 	LOSSES: (Above) R EQUAL W IF ANY.	Ŗ.V.	
+ ID1= + ID2= ID = NOTE: 	1 ( 0106) 2 ( 2296) 3 ( 0107) PEAK FLOWS 2300) DUT= 1	: 281.15 : 440.12 : 721.27 DO NOT INCL	27.186 4.235 27.779 UDE BASEFLO	2.75 42 4.25 37 2.75 39 WS IF ANY.		
	<pre></pre>	DATA FOR SE Eleva 204 203 203 204 204 204 204 202 202 202 202 202 202	CTION ( 1 tion .60 .58 .90 .83 .24 .34 .04 .05 .84 .89 .66 .26 .25 .94 .72 .80 .71 .01 .02 .02 .02 .04 .56	.1)> Manning 0.0600 0.0450 0	Main Chann Main Chann	2] 2] 2] 2] 2] 2] 2] 2] 2] 2] 2] 2] 2] 2
DEPTH (m) 0.23 0.47 0.70 0.93 1.17 1.40 1.63	ELEV (m) 200.17 200.40 200.64 200.87 201.10 201.34 201.57 201.90	VOLUME (cu.m.) .588E+03 .217E+04 .415E+04 .646E+04 .910E+04 .121E+05 .154E+05	FLOW RATE (cms) 0.2 1.3 3.3 6.3 10.2 15.2 21.3	VELOCIT (m/s) 0.17 0.30 0.41 0.50 0.58 0.65 0.72	Y TRAV.TI (min) 51.42 28.64 20.89 17.15 14.86 13.27 12.08	ME

2.33	202.27	.27	4E+05	46.6		0.88	9.80	
2.57	202.50	. 32	3E+05	55.0		0.88	9.79	
2.80	202.74	.38	1E+05	63.6		0.87	9.98	
3.03	202.97	.46	2E+05	66.1		0.74	11.66	
3.27	203.20	. 56	8E+05	87.4		0.80	10.83	
3.50	203.44	. 68	1E+05	114.0		0.87	9.96	
3.73	203.67	.80	0E+05	143.9		0.93	9.26	
3.97	203.90	.94	8E+05	141.7		0.78	11.14	
4.20	204.14	.11	5E+06	182.8		0.82	10.49	
4.55	204.49	.15	0E+06	257.5		0.89	9.74	
				12 12 12				h
				< nyc	rograph	>	<-pipe / c	nanne I->
			AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
			(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW :	ID= 2 (	0107)	/21.2/	27.78	2.75	39.28	1.84	0.77
OUTFLOW:	ID= 1 (	2300)	721.27	24.79	2.83	39.28	1.75	0.74

CALIB   STANDHYD ( 0166)  ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	9.33 61.00	Dir.	Conn.(%)=	61.00	
		IMPERVI	OUS	PERVIO	JS (i)		
Surface Area	(ha)=	5.6	9	3.64	1		
Dep. Storage	(mm)=	1.0	0	5.00	0		
Average Slope	(%)-	1 0	0	1 00	2		

bep: beorage	(mm)		5.00	
Average Slope	(%)=	1.00	1.00	
Length	(m)=	249.40	40.00	
Mannings n	=	0.013	0.250	

		TRA	NSFORME	D HYETOGRA	APH	ora montalo	
TIM	E RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hr	s mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.08	3 0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.16	7 0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.25	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.33	3 0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.41	7 0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.50	0 0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.58	3 0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.66	7 0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.75	0 0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.83	3 0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.91	7 0.96	2.500	43.98	4.083	3.82	5.67	0.96
1.00	0 0.96	2.583	43.98	4.167	3.82	5.75	0.96
1.08	3 0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.16	7 0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.25	0 0.96	2.833	12.43	4.417	1.91	6.00	0.96
1.33	3 5.74	2.917	12.43	4.500	1.91	6.08	0.96
1.41	/ 5./4	3.000	12.43	4.583	1.91	6.1/	0.96
1.50	0 5.74	3.083	12.43	4.667	1.91	6.25	0.96
1.58	3 5.74	3.167	12.43	4.750	1.91		
Max.Eff.Inten.(	mm/hr)=	43.98		21.81			
over	(min)	5.00		25.00			
Storage Coeff.	(min)=	6.14	(ii)	22.12 (ii)	)		
Unit Hyd. Tpeak	(min)=	5.00		25.00			
Unit Hyd. peak	(cms)=	0.19		0.05			
					*T01	TALS*	
PEAK FLOW	(cms)=	0.69		0.14	0.	.795 (iii)	)
TIME TO PEAK	(hrs)=	2.75		3.00	2	2.75	
RUNOFF VOLUME	(mm)=	46.81		19.33	36	5.09	
TOTAL RAINFALL	(mm)=	47.81		47.81	47	7.81	
RUNOFF COEFFICI	ENT =	0.98		0.40	(	0.75	
(-) CN DROCED			DVTOUC	LOCCEC.			
CN* =	83.0 Ta	= Dep. S	torage	(Above)			
(ii) TIME STEP	(DT) SHOU	LD BE SMA	LLER OF	EOUAL			
THAN THE	STORAGE CO	EFFICIENT					

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

RESERVOIR( 0167) IN= 2> OUT= 1	OVERFLOW	IS OFF					
DT= 5.0 min	OUTFLOW	STORAGE	0UTFLOW	STORAGE			
	(cms)	(ha.m.)	(cms)	(ha.m.)			
	0.0000	0.0000	0.7030	0.3085			
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0166) 0167)	(ha) 9.330 9.330	(cms) 0.795 0.329	(hrs 2 3	) .75 .17	(mm) 36.09 36.08	
---	---	--	---	---	--	---	---
F T N	YEAK FLON TIME SHIFT NAXIMUM S	W REDUCT OF PEAK F TORAGE U	ION [Qout LOW SED	/Qin](% (min (ha.m.	6)= 41.3 )= 25.0 )= 0.1	5 0 443	
CALIB STANDHYD ( 0169) ID= 1 DT= 5.0 min	Area Total I	(ha)= Imp(%)= 9	2.34 0.00 Di	r. Conn	. (%)=	90.00	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVIOU 2.11 1.00 1.00 124.90 0.013	S PERV 0 5 2 40	IOUS (i .23 .00 .00 .00 250	)		
NOTE: RAIN	FALL WAS	TRANSFORME	D TO 5.	O MIN.	TIME ST	EP.	
		TRA	NSFORMED	HYETOGR	APH	2	
TIM hr 0.08 0.16 0.25 0.33 0.41 0.55 0.58 0.58 0.58 0.91 1.00 1.08 1.16 1.25 1.33 1.41 1.56	IE         RAIN mm/hr           's         mm/hr           '3         0.00           '7         0.00           '0         0.00           '3         0.96           '7         0.96           '8         0.966           '7         0.96           '3         0.966           '7         0.96           '3         0.966           '3         0.966           '3         0.966           '3         0.966           '3         0.966           '3         0.966           '3         0.966           '3         0.966           '3         0.966           '3         5.744           '0         5.74           '3         5.74	TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	RAIN ' mm/hr ' 5.74   5.74   16.25   16.25   16.25   16.25   16.25   43.98   43.98   43.98   43.98   43.98   43.98   12.43   12.43   12.43	TIME hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.003 4.083 4.083 4.083 4.167 4.250 4.333 4.417 4.583 4.667 4.750	RAIN mm/hr 12.43 6.69 6.69 6.69 6.69 6.69 3.82 3.82 3.82 3.82 3.82 3.82 3.82 1.91 1.91 1.91 1.91	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAI mm/h 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten.( over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	mm/hr)= (min)= (min)= (min)= (cms)=	43.98 5.00 4.05 5.00 0.24	24 10 (ii) 8 10 0	.02 .00 .13 (ii .00 .13	)		
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI	(cms)= (hrs)= (mm)= (mm)= ENT =	0.26 2.75 46.81 47.81 0.98	0 2 19 47 0	.01 .75 .33 .81 .40	*10 0 4 4	1ALS* .271 (iii) 2.75 4.06 7.81 0.92	r.
***** WARNING: STORA	GE COEFF.	IS SMALLE	R THAN TI	ME STEP	1		
(i) CN PROCED CN* = (ii) TIME STEF THAN THE (iii) PEAK FLOW	URE SELECT 83.0 I (DT) SHO STORAGE CO DOES NOT	TED FOR PE a = Dep. S JLD BE SMA DEFFICIENT INCLUDE B	RVIOUS LO torage ( LLER OR E ASEFLOW I	SSES: Above) QUAL F ANY.			
ADD HYD ( 0023) 1 + 2 = 3 ID1= 1 ( 01	.62): 10	AREA QP (ha) (c 0.84 0.7	EAK TP ms) (h 83 2.	EAK rs) 75 3	R.V. (mm) 5.11		
+ ID2= 2 ( 01	.67):	9.33 0.3	29 3.	17 3	6.08		
TD = 2 ( 00	23). 20	J.1/ 1.0	2.	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	5.50		

 $\begin{array}{r} \text{ADD HYD ( 0023)} \\ 3 + 2 = 1 \end{array}$ AREA QPEAK TPEAK R.V. ID1= 3 ( 0023): + ID2= 2 ( 0169): (hrs) 2.75 2.75 (ha) 20.17 (cms) 1.066 (mm) 35.56 0.271 44.06 2.34 ID = 1 ( 0023): 22.51 1.337 2.75 36.44 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. \_\_\_\_\_ ADD HYD ( 0023) 1 + 2 = 3 AREA (ha) QPEAK (cms) TPEAK (hrs) 2.75 R.V. (mm) ID1= 1 ( 0023): + ID2= 2 ( 2300): 22.51 1.337 36.44 721.27 24.792 2.83 39.28 ID = 3 ( 0023): 743.78 25.947 2.83 39.20 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. \_\_\_\_\_  $\begin{array}{c|c} \text{ADD HYD} & ( & 0023) \\ 3 + 2 = 1 \end{array}$ AREA QPEAK TPEAK R.V. (ha) 743.78 (cms) 25.947 (hrs) 2.83 (mm) ID1= 3 ( 0023): + ID2= 2 ( 0024): 39.20 7.52 0.866 2.75 44.06 ID = 1 ( 0023): 751.30 26.468 2.83 39.24 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. ADD HYD ( 0023) 1 + 2 = 3 QPEAK (cms) 26.468 TPEAK AREA R.V. ID1= 1 ( 0023): + ID2= 2 ( 0025): (hrs) 2.83 3.42 (ha) 751.30 (mm) 39,24 0.249 16.61 11.16 ID = 3 ( 0023): 762.46 26.602 38.91 2.83 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. ADD HYD ( 0023) 3 + 2 = 1 AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm) ID1= 3 ( 0023): + ID2= 2 ( 0049): 762.46 26.602 2.83 38.91 23.15 2.597 2.75 44.06 ID = 1 (0023):785.61 28.889 2.83 39.06 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. -----ADD HYD ( 0023) 1 + 2 = 3 AREA QPEAK TPEAK R.V. (ha) 785.61 (cms) 28.889 (hrs) 2.83 (mm) ID1= 1 ( 0023): + ID2= 2 ( 0050): 39.06 10.29 0.329 3.25 36.08 ID = 3 ( 0023): 795.90 29.187 2.83 39.03 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. -----RESERVOIR( 0042) IN= 2---> OUT= 1 DT= 5.0 min OVERFLOW IS OFF OUTFLOW STORAGE OUTFLOW STORAGE (ha.m.) 0.0000 (cms) 0.0000 (cms) 24.8000 (ha.m.) 11.7715 3.0000 0.7487 58.0000 13.1395 1.0973 1.7943 14.5671 15.1408 3.6000 \*\*\*\*\*\* 4.5000 \*\*\*\*\*\* 5.3000 2.1670 4.3060 \*\*\*\*\*\* 16.0822 \*\*\*\*\*\* 16.8383 6.4000 5.5883 \*\*\*\*\*\* 17.6711 \*\*\*\*\*\* 7.0000 7.5770 8.6849 18.4932 19.3351

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AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) INFLOW: ID= 2 (0023) 795.900 29.187 2.83 39.03 OUTFLOW: ID= 1 (0042) 795.900 8.507 4.50 39.03 PEAK FLOW REDUCTION [Qout/Qin](%)= 29.15 TIME SHIFT OF PEAK FLOW (min)=100.00 MAXIMUM STORAGE USED (ha.m.)= 9.0979	
PEAK FLOW REDUCTION [Qout/Qin](%)= 29.15 TIME SHIFT OF PEAK FLOW (min)=100.00 MAXIMUM STORAGE USED (ha.m.)= 9.0979	
ROUTE CHN(2297)           IN= 2> OUT= 1           Routing time step (min)'= 5.00	
<pre>&lt;&gt; DATA FOR SECTION ( 1.1)&gt; Distance Elevation Manning</pre>	
0.00 204.60 0.0600 2.24 204.58 0.0450 Main Channe]	
10.30 203.90 0.0450 Main Channel 36.31 203.83 0.0450 Main Channel	
47.49 204.24 0.0450 Main Channel 59.15 204.34 0.0450 Main Channel	
65.86 204.04 0.0450 Main Channel 81.51 203.05 0.0450 Main Channel	
93.18 202.84 0.0450 Main Channel 104.40 202.89 0.0450 Main Channel	
117.82 202.66 0.0450 Main Channel 126.76 202.26 0.0450 Main Channel	
138.43 200.25 0.0450 Main Channel 149.61 199.94 0.0450 Main Channel	
172.61 203.72 0.0450 Main Channel 194.97 203.80 0.0450 Main Channel	
229.05 205.01 0.0450 Main Channel 229.05 205.01 0.0450 Main Channel	
284.60 205.56 0.0600 Main chamer	
<> DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME	
(m) (m) (cu.m.) (cms) (m/s) (min) 0.23 200.17 .921E+03 0.2 0.20 68.84	
0.47 200.40 .341E+04 1.5 0.35 38.35 0.70 200.64 .650E+04 3.9 0.48 27.97	
0.93 200.87 .101E+05 7.3 0.59 22.96 1.17 201.10 .143E+05 11.9 0.68 19.89	
1.40 201.34 .189E+05 17.8 0.76 17.77 1.63 201.57 .241E+05 24.9 0.84 16.18	
1.87 201.80 .299E+05 33.3 0.91 14.93 2.10 202.04 .361E+05 43.3 0.97 13.92	
2.33 202.27 .429E+05 54.5 1.03 13.12 2.57 202.50 .506E+05 64.4 1.03 13.10	
2.80 202.74 .597E+05 74.4 1.01 13.37 3.03 202.97 .724E+05 77.3 0.87 15.62	
3.27 203.20 .890E+05 102.3 0.93 14.50 3.50 203.44 .107E+06 133.4 1.02 13.33	
3.73 203.67 .125E+06 168.4 1.09 12.40 3.97 203.90 .148E+06 165.8 0.91 14.92	
4.20 204.14 .180E+06 213.9 0.97 14.04 4.55 204.49 .236E+06 301.3 1.04 13.04	
< hydrograph> <-pipe / channe	-1->
AREA OPEAK TPEAK R.V. MAX DEPTH MAX (ha) (cms) (hrs) (mm) (m) (m/	VEL (s)
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	61
CALIB     NASHYD ( 0030)  Area (ha)= 6.79 Curve Number (CN)= 79.0	
CALIB     NASHYD ( 0030)   Area (ha)= 6.79 Curve Number (CN)= 79.0  ID= 1 DT= 5.0 min   Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 U.H. Tp(hrs)= 0.76	
CALIB     NASHYD ( 0030)   Area (ha)= 6.79 Curve Number (CN)= 79.0  ID= 1 DT= 5.0 min   Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 U.H. Tp(hrs)= 0.76 NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.	

		TRA	ANSFORME	D HYETOGR	APH		
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	5.74	3.250	12.43	4.83	0.96
	100220233			2.1.0.0.000 contraction	1000000000-00		

0.167 ( 0.250 ( 0.333 ( 0.417 ( 0.500 ( 0.583 ( 0.667 ( 0.750 ( 0.833 ( 0.917 ( 1.000 ( 1.083 ( 1.167 ( 1.250 ( 1.333 ( 1.167 ( 1.333 ( 1.167 ( 1.583	0.00       1.750         0.00       1.833         0.96       1.917         0.96       2.000         0.96       2.003         0.96       2.167         0.96       2.250         0.96       2.417         0.96       2.500         0.96       2.583         0.96       2.667         0.96       2.667         0.96       2.833         5.74       2.917         5.74       3.083         5.74       3.083         5.74       3.083         5.74       3.083	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	6.69 6.69 6.69 6.69 6.69 3.82 3.82 3.82 3.82 3.82 3.82 1.91 1.91 1.91 1.91 1.91 1.91	4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.58 5.75 5.83 5.75 5.83 5.92 6.00 6.08 6.17 6.25	0.96 0.96
PEAK FLOW (cms) TIME TO PEAK (hrs) RUNOFF VOLUME (mm) TOTAL RAINFALL (mm) RUNOFF COEFFICIENT (i) PEAK FLOW DOES NO	)= 0.144 (i) )= 3.500 )= 16.611 )= 47.810 = 0.347 DT INCLUDE BAS	EFLOW IF ANY.			
CALIB STANDHYD ( 0029) Are ID= 1 DT= 5.0 min Tot Surface Area (ha) Dep. Storage (mm Average Slope (%) Length (m)	Ba (ha)= tal Imp(%)= 9 IMPERVIOU )= 7.21 )= 1.00 )= 1.00 )= 231.08	8.01 10.00 Dir. Conr 15 PERVIOUS († 0.80 5.00 2.00 40.00	i.(%)= 94	0.00	
NOTE: RAINFALL V	VAS TRANSFORME	D TO 5.0 MIN.	TIME STE	Ρ.	
TIME 6 hrs mm 0.083 ( 0.167 ( 0.250 ( 0.333 ( 0.417 ( 0.500 ( 0.583 ( 0.667 ( 0.750 ( 0.833 ( 0.917 ( 1.000 ( 1.083 ( 1.167 ( 1.250 ( 1.333 ( 1.167 ( 1.250 ( 1.333 ( 1.1417 ( 1.500 ( 1.583 (	TRA           XAIN         TIME           \/hr         hrs           >.00         1.667           >.00         1.750           >.00         1.833           >.96         2.000           >.96         2.083           >.96         2.167           >.96         2.250           >.96         2.417           >.96         2.667           >.96         2.670           >.96         2.750           >.96         2.750           >.96         2.833           >.74         3.000           \$.74         3.083	NSFORMED HYETOGF RAIN   TIME mm/hr   hrs 5.74   3.250 5.74   3.250 16.25   3.417 16.25   3.500 16.25   3.667 16.25   3.667 16.25   3.750 16.25   3.917 43.98   4.000 43.98   4.063 43.98   4.250 43.98   4.250 43.98   4.250 43.98   4.250 43.98   4.250 12.43   4.503 12.43   4.503 12.43   4.563 12.43   4.563 12.43   4.560 12.43   4.563 12.43   4.560 12.43   4.563 12.43   4.560 12.43   4.563 12.43   4.560 12.43   4.560 12.45   4	KAPH RAIN mm/hr 12.43   6.69 6.69 6.69 6.69 6.69 3.82 3.82 3.82 3.82 3.82 3.82 3.82 1.91 1.91 1.91 1.91 1.91 1.91	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96

1.30	5 5.74	3.10/	12.45	4.750	1.91
Max.Eff.Inten.(r over	nm/hr)= (min)	43.98 5.00		24.02 10.00	
Storage Coeff.	(min)=	5.87	(ii)	9.94 (ii)	
Unit Hyd. Tpeak	(min)=	5.00		10.00	
Unit Hyd. peak	(cms)=	0.19		0.11	
	0.050.05				*TOTALS*
PEAK FLOW	(cms)=	0.88		0.04	0.922 (iii)
TIME TO PEAK	(hrs)=	2.75		2.75	2.75
RUNOFF VOLUME	(mm)=	46.81		19.33	44.06
TOTAL RAINFALL	(mm)=	47.81		47.81	47.81
RUNOFF COEFFICIE	ENT =	0.98		0.40	0.92

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:  $CN^* = 83.0$  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 ( 0051) Area (ha)= 7.81 ID= 1 DT= 5.0 min   Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00
$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$
NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.
$\begin{array}{c c c c c c c c c c c c c c c c c c c $
Max.Eff.Inten.(mm/hr)=       43.98       24.02         over (min)       5.00       10.00         Storage Coeff. (min)=       5.82 (ii)       9.89 (ii)         Unit Hyd. Tpeak (min)=       5.00       10.00         Unit Hyd. Tpeak (cms)=       0.20       0.11         *TOTALS*       *         PEAK FLOW (cms)=       0.86       0.04       0.899 (iii)         TIME TO PEAK (hrs)=       2.75       2.75       2.75         RUNOFF VOLUME (mm)=       46.81       19.33       44.06         TOTAL RAINFALL (mm)=       47.81       47.81       47.81         RUNOFF COEFFICIENT =       0.98       0.40       0.92
<ul> <li>(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 83.0 Ia = Dep. Storage (Above)</li> <li>(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.</li> <li>(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.</li> </ul>
RESERVOIR(         0053)         OVERFLOW IS OFF           IN= 2> OUT= 1         OUTFLOW         STORAGE         OUTFLOW         STORAGE           DT= 5.0 min         OUTFLOW         STORAGE         OUTFLOW         STORAGE
AREA         QPEAK         TPEAK         R.V.           (ha)         (cms)         (hrs)         (mm)           INFLOW : ID= 2 (0051)         7.810         0.899         2.75         44.06           OUTFLOW: ID= 1 (0053)         7.810         0.259         3.25         44.04
PEAK FLOW REDUCTION [Qout/Qin](%)= 28.78 TIME SHIFT OF PEAK FLOW (min)= 30.00 MAXIMUM STORAGE USED (ha.m.)= 0.1953
CALIB   STANDHYD ( 0052)  Area (ha)= 6.47  ID= 1 DT= 5.0 min   Total Imp(%)= 61.00 Dir. Conn.(%)= 61.00

Surface Area Dep. Storage Average Slope Length Mannings n	IMPER (ha)= 3 (mm)= 1 (%)= 1 (m)= 207 = 0.0	VIOUS PER .95 .00 .00 .69 4 013 0	VIOUS (i) 2.52 5.00 1.00 0.00 0.250		
NOTE: RAINFA	LL WAS TRANSFO	ORMED TO 5	.0 MIN. TIME	STEP.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500	RAIN         TI           mm/hr         hi           0.00         1.6i           0.00         1.7i           0.00         1.8i           0.96         2.0i           0.96         2.0i           0.96         2.2i           0.96         2.2i           0.96         2.2i           0.96         2.2i           0.96         2.3i           0.96         2.5i           0.96         2.5i           0.96         2.5i           0.96         2.5i           0.96         2.6i           0.74         3.00           5.74         3.00           5.74         3.00           5.74         3.10	TRANSFORMED           ME         RAIN           rs         mm/hr           67         5.74           50         5.74           31         16.25           107         16.25           103         16.25           103         16.25           50         16.25           50         16.25           51         16.25           53         43.98           107         43.98           50         43.98           50         43.98           50         43.98           51         12.43           107         12.43           567         12.43	HYETOGRAPH - TIME RA hrs mm/ 3.250 12.4 3.333 6.6 3.417 6.6 3.500 6.6 3.583 6.6 3.667 6.6 3.667 6.6 3.6833 3.8 3.917 3.8 4.000 3.8 4.003 3.8 4.000 3.8 4.167 3.8 4.250 3.8 4.167 3.8 4.250 3.8 4.167 3.8 4.250 3.8 4.167 3.8 4.250 3.8 4.167 3.8 4.250 3.8	IN         TIME hrs           3         4.83           9         5.00           9         5.07           9         5.17           9         5.25           9         5.33           2         5.42           2         5.50           2         5.57           2         5.67           2         5.75           2         5.83           1         5.92           1         6.00           1         6.17           1         6.25           1         6.25	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten.(mm over ( Storage Coeff. ( Unit Hyd. Tpeak ( Unit Hyd. peak ( PEAK FLOW ( TIME TO PEAK ( RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIEN (i) CN PROCEDUR CN* = 83 (ii) TIME STEP ( THAN THE ST (iii) PEAK FLOW D	/hr)= 43 min)= 5 min)= 5 cms)= 0 hrs)= 2 (mm)= 46 (mm)= 47 T = 0 T = 0 E SELECTED FOI .0 Ia = Dep DT) SHOULD BE ORAGE COEFFIC DES NOT INCLU	.98 2 .00 2 .50 (ii) 2 .00 2 .20 .48 .75 .81 1 .81 4 .98 R PERVIOUS LI p. Storage SMALLER OR IENT. DE BASEFLOW	1.81 5.00 1.48 (ii) 5.00 0.05 * 0.10 3.00 9.33 7.81 0.40 0.40 0SSES: (Above) EQUAL IF ANY.	TOTALS* 0.554 (iii) 2.75 36.09 47.81 0.75	
RESERVOIR( 0054)    IN= 2> OUT= 1   DT= 5.0 min	OVERFLOW IS OUTFLOW (cms) 0.0000	S OFF STORAGE   (ha.m.) 0.0000	OUTFLOW (cms) 0.4900	STORAGE (ha.m.) 0.2144	
INFLOW : ID= 2 ( 0 OUTFLOW: ID= 1 ( 0 PEA TTM	ARE/ (ha) 052) 6.47 054) 6.47 K FLOW REI K FLOW REI F SHIFT OF PE/	A OPEAK ) (cms) 70 0.55 70 0.22 DUCTION [Qou	TPEAK (hrs) 4 2.75 9 3.17 t/Qin](%)= 41 (min)= 25	R.V. (mm) 36.09 36.07	
ADD HYD ( 0032)   1 + 2 = 3     1 + 2 = 3     1 = 1 ( 0029 + 1D2= 2 ( 0030   1D = 3 ( 0032   NOTE: PEAK FLOWS	AREA (ha) ): 8.01 ): 6.79 ): 14.80 DO NOT INCLU	QPEAK T (cms) ( 0.922 2 0.144 3 0.975 2 DE BASEFLOWS	PEAK R.V. hrs) (mm) .75 44.06 .50 16.61 .75 31.47 IF ANY.	.1001	

$\begin{array}{c c} ADD & HD & ( & 0052) \\ 3 + 2 = 1 \\ \hline \\ ID1 = 3 & ( & 0 \\ + & ID2 = 2 & ( & 0 \end{array}$	A - ( 032): 14 053): 7	REA QI ha) (c .80 0.9	PEAK TP cms) (h 975 2. 259 3.	PEAK Irs) 75 31 25 44	R.V. (mm) .47 .04	
ID = 1 (0)	032): 22	.61 1.1	199 2.	75 35	.81	
NOTE: PEAK FL	OWS DO NOT	INCLUDE E	BASEFLOWS	IF ANY.		
$ \begin{vmatrix} ADD & HYD & ( & 0032) \\ 1 & 1 + 2 & 3 \end{vmatrix} $ $ + \frac{ID1 = 1 ( & 0) \\ ID2 = 2 ( & 0) \\ \hline ID = 3 ( & 0) \end{vmatrix} $	-   A - ( 032): 22 054): 6 032): 29	REA OF ha) (c .61 1.1 .47 0.2	PEAK TP cms) (h 199 2. 229 3. 398 2.	PEAK Irs) 75 35 17 36 75 35	R.V. (mm) .81 .07	
NOTE: PEAK FL	OWS DO NOT	INCLUDE E	BASEFLOWS	IF ANY.		
RESERVOIR( 0078)   IN= 2> OUT= 1   DT= 5.0 min	- OVERF - OUTFL - (cms 0.00 0.05 0.16 0.24	LOW IS OF OW ST( ) (ha 00 0. 20 0. 30 0. 20 0.	FF DRAGE   a.m.)   .0000   .5230   .7202   .9521	OUTFLOW (cms) 0.2940 0.3680 0.4250 0.4830	STORAG (ha.m. 1.11 1.32 1.47 1.63	SE -) L58 234 787 325
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0032) 0078) PEAK FLOW TIME SHIFT	AREA (ha) 29.080 29.080 REDUCT	QPEAK (cms) 1.398 0.183 TION [Qout	TPEAK (hrs) 2. 6. :/Qin](%)	R.V (mm 75 35 25 35 = 13.05	/. n) 5.87 5.78
				(11111)	=210 00	
	MAXIMUM ST	ORAGE U	USED	(min) (ha.m.)	=210.00 = 0.7775	
CALIB STANDHYD ( 0130) ID= 1 DT= 5.0 min Surface Area Dep. Storage Average Slope Length Mannings n	MAXIMUM ST 	(ha)= mp(%)= 9 IMPERVIOI 1.69 1.00 1.00 111.95 0.013	1.88 90.00 Di US PERV 0 5 2 40 0 0.	(min) (ha.m.) r. Conn. (IOUS (i) ).19 .00 2.00 250	= 0.7775 (%)= 90.0	00
CALIB   STANDHYD ( 0130)  ID= 1 DT= 5.0 min   Surface Area Dep. Storage Average Slope Length Mannings n   NOTE: RAI	MAXIMUM ST 	(ha)= mp(%)= 9 IMPERVIOU 1.69 1.00 1.00 111.95 0.013 RANSFORME	1.88 90.00 Di US PERV 0 5 2 40 0. ED TO 5.	(min) (ha.m.) r. Conn. (IOUS (i) ).19 2.00 2.00 2.00 2.00 2.00 2.00 2.00 2.0	= 0.7775  (%)= 90.0 IME STEP.	00
CALIB STANDHYD ( 0130) ID= 1 DT= 5.0 min Surface Area Dep. Storage Average Slope Length Mannings n NOTE: RAI TI h 0.0 0.1 0.2 0.3 0.4 0.5 0.5 0.5 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5	MAXIMUM ST 	(ha) = mp(%) = 9 IMPERVIOU 1.69 1.00 111.95 0.013 RANSFORME TR/   TIME   1.667 1.750 1.833   1.9100 2.083   2.167 2.2500 2.333   2.417 2.500 2.583 2.417 2.500 2.583 2.667 2.750 2.583 2.917 3.000 3.083	1.88 90.00 Di US PERV 0 5 2 40 0. ED TO 5. ANSFORMED RAIN  ' 5.74 16.25 12.43 1	(min) (ha.m.)	=210.00 = 0.7775  (%)= 90.0 IME STEP. PH RAIN   mm/hr   12.43   4 6.69   5 6.69   5 6.69   5 6.69   5 6.69   5 6.69   5 6.69   5 8.82   5 3.82   5 3.82	TIME RAI hrs mm/h 4.83 0.96 4.92 0.96 5.00 0.96 5.08 0.96 5.17 0.96 5.25 0.96 5.42 0.96 5.50 0.96 5.50 0.96 5.50 0.96 5.67 0.96 5.67 0.96 5.67 0.96 5.67 0.96 5.92 0.96 5.92 0.96 5.17 0.96 5.17 0.96 5.17 0.96

Unit Hyd. peak	(cms)=	0.25		0.13			
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	(cms)= (hrs)= (mm)= (mm)= ENT =	0.21 2.75 46.81 47.81 0.98	1 4	0.01 2.75 19.33 17.81 0.40	*1017 0.2 24 44 47	ALS* 218 (iii) .75 .06 .81 .92	
***** WARNING: STORAG	E COEFF. IS	5 SMALLE	R THAN T	IME STEP!			
(i) CN PROCEDU CN* = 8 (ii) TIME STEP THAN THE S (iii) PEAK FLOW	RE SELECTED 3.0 Ia = (DT) SHOULD TORAGE COEP DOES NOT IM	D FOR PE = Dep. S D BE SMA FFICIENT NCLUDE B	RVIOUS L torage LLER OR	OSSES: (Above) EQUAL IF ANY.			
STANDHYD ( 0133) ID= 1 DT= 5.0 min	Area ( Total Imp	(ha)= p(%)= 9	2.46 0.00 D	Dir. Conn.	(%)= 90	0.00	
Surface Area Dep. Storage Average Slope Length Mannings n	IM (ha)= (mm)= (%)= (m)= =	PERVIOU 2.21 1.00 1.00 128.06 0.013	IS PER	RVIOUS (i) 0.25 5.00 2.00 0.00 0.250			
NOTE: RAINF	ALL WAS TRA	ANSFORME	D TO 5	.0 MIN. T	IME STER	Ρ.	
TIME hrs 0.08 0.16	RAIN   mm/hr   0.00   0.00	TRA TIME hrs 1.667 1.750	NSFORMED RAIN mm/hr 5.74 5.74	HYETOGRA TIME hrs 3.250 3.333	PH RAIN mm/hr 12.43 6.69	TIME hrs 4.83 4.92	RAIN mm/hr 0.96 0.96
0.250 0.333 0.417 0.500 0.583	0.00	1.833 1.917 2.000 2.083 2.167	16.25 16.25 16.25 16.25 16.25	3.417 3.500 3.583 3.667 3.750	6.69 6.69 6.69 6.69 6.69	5.00 5.08 5.17 5.25 5.33	0.96 0.96 0.96 0.96 0.96
0.755 0.833 0.917 1.000 1.083	0.96 0.96 0.96 0.96 0.96 0.96	2.333 2.417 2.500 2.583 2.667 2.750	43.98 43.98 43.98 43.98 43.98 43.98	3.917 4.000 4.083 4.167 4.250 4.333	3.82 3.82 3.82 3.82 3.82 3.82 3.82	5.50 5.58 5.67 5.75 5.83 5.92	0.96 0.96 0.96 0.96 0.96 0.96
1.250 1.333 1.417 1.500 1.58	0.96 5.74 5.74 5.74 5.74 5.74	2.833 2.917 3.000 3.083 3.167	12.43 12.43 12.43 12.43 12.43 12.43	4.417 4.500 4.583 4.667 4.750	1.91 1.91 1.91 1.91 1.91 1.91	6.00 6.08 6.17 6.25	0.96 0.96 0.96 0.96
Max.Eff.Inten.(n over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	m/hr)= (min) (min)= (min)= (cms)=	43.98 5.00 4.12 5.00 0.24	(ii) 1	24.02 10.00 8.19 (ii) 10.00 0.13	*TOT	AI S*	
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	(cms)= (hrs)= (mm)= NT =	0.27 2.75 46.81 47.81 0.98	1	0.01 2.75 19.33 17.81 0.40	0.2 2 44 47 0	285 (iii) .75 .06 .81 .92	
***** WARNING: STORAG	E COEFF. IS	5 SMALLE	R THAN T	IME STEP!			
(i) CN PROCEDL CN* = 8 (ii) TIME STEP THAN THE S (iii) PEAK FLOW	RE SELECTED 3.0 Ia = (DT) SHOULD TORAGE COEP DOES NOT IN	D FOR PE = Dep. S D BE SMA FFICIENT WCLUDE B	RVIOUS L torage LLER OR ASEFLOW	OSSES: (Above) EQUAL IF ANY.			
RESERVOIR( 0170)   IN= 2> OUT= 1   DT= 5.0 min	OVERFLO OUTFLOW (cms)	W IS OF	F RAGE	OUTFLOW (cms)	STOP (ha	RAGE .m.)	
	0.000	AREA	QPEAK	TPEAK	U.	R.V.	

INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0133) 0170)	(ha) 2.460 2.460	(cms) 0.285 0.250	(hrs) 2.75 2.75	(mm) 44.06 44.05	
PE. TII MA	AK FLOW ME SHIFT ( XIMUM STO	REDUCTIO DF PEAK FLO DRAGE USE	ON [Qout/Q W ED (	nn](%)= 87.9 (min)= 0.0 ha.m.)= 0.0	98 00 0211	
ADD HYD ( 0171) 1 + 2 = 3	AF	REA QPE/	K TPEA	K R.V.		
ID1= 1 ( 013) + ID2= 2 ( 017)	0): 1. 0): 2.	.88 0.218 .46 0.250	s) (hrs 3 2.75 ) 2.75	44.06 44.05		
ID = 3 ( 017	1): 4.	.34 0.468	3 2.75	44.06		
NOTE: PEAK FLOW	S DO NOT 1	INCLUDE BAS	SEFLOWS IF	ANY.		
CALIB STANDHYD ( 0135) ID= 1 DT= 5.0 min	Area Total In	(ha)= 0. np(%)= 90.	.95 .00 Dir.	Conn.(%)=	90.00	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	MPERVIOUS 0.86 1.00 1.00 79.58 0.013	PERVIO 0.1 5.0 2.0 40.0 0.25	US (i) 0 0 0 0 0 0		
NOTE: RAINF	ALL WAS TH	RANSFORMED	TO 5.0	MIN. TIME S	TEP.	
		TRANS	FORMED HY	ETOGRAPH		
TIME	RAIN mm/hr	TIME hrs r	RAIN  '	TIME RAI	N   TIME r   hrs	RAIN mm/hr
0.083	0.00	1.66/	5.74 3.	250 12.43 333 6.69	4.83	0.96
0.230	0.96	1.917	6.25 3.	500 6.69 583 6.69	5.08	0.96
0.500 0.583	0.96	2.083	L6.25 3. L6.25 3.	667 6.69 750 6.69	5.25 5.33	0.96
0.667	0.96	2.250 2.333 4	L6.25   3. 13.98   3.	833 3.82 917 3.82	5.42	0.96
0.833	0.96	2.417 4	13.98   4. 13.98   4.	000 3.82 083 3.82	5.58	0.96
1.000	0.96	2.667	13.98 4.	250 3.82 222 1.01	5.83	0.96
1.107	0.96	2.833	2.43 4.	417 1.91	6.00	0.96
1.417	5.74	3.000	2.43 4.	583 1.91 667 1.91	6.17	0.96
1.583	5.74	3.167	12.43   4.	750 1.91	1	
Max.Eff.Inten.(m over	m/hr)= (min)	43.98 5.00	24.0 10.0	0		
Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	(min)= (min)= (cms)=	3.09 († 5.00 0.27	ii) 7.1 10.0 0.1	.6 (ii) 10 .4		
PEAK FLOW	(cms)=	0.10	0.0	1	0.110 (iii)	
RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	(mm)= (mm)= NT =	46.81 47.81 0.98	19.3 47.8 0.4	3 1 0	44.06 47.81 0.92	
***** WARNING: STORAG	E COEFF. 1	S SMALLER	THAN TIME	STEP!		
(i) CN PROCEDU	RE SELECTE	D FOR PERV	IOUS LOSS	ES:		
CN* = 8 (ii) TIME STEP	3.0 Ia (DT) SHOUL	= Dep. Sto D BE SMALL	ER OR EQU	iove) IAL		
(iii) PEAK FLOW	DOES NOT 1	INCLUDE BAS	SEFLOW IF	ANY.		

| CALIB | STANDHYD ( 0136) | Area (ha)= 15.11 |ID= 1 DT= 5.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

		THEFENITOR		N TOUR C			
Surface Area Dep. Storage Average Slope	(ha)= (mm)= (%)=	13.60 1.00 1.00	s PEI	RVIOUS (* 1.51 5.00 2.00	1)		
Length Mannings n	(m)=	317.39	-	40.00			
NOTE: RAIN	FALL WAS	TRANSFORMED	ото з	5.0 MIN.	TIME STE	EP.	
		TRAM	SFORMED	d hyetogi	RAPH		
TIM	E RAIN s mm/hr	TIME   hrs	RAIN mm/hr	' TIME ' hrs	RAIN mm/hr	TIME   hrs	RAI mm/h
0.08	3 0.00 7 0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.25	0 0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.41	7 0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.50	0 0.96 3 0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.66	7 0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.83	3 0.96	2.417	43.98	4.000	3.82	5.58	0.96
1.00	0.96	2.583	43.98	4.085	3.82	5.75	0.96
1.08	3 0.96 7 0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.25	0 0.96	2.833	12.43	4.417	1.91	6.00	0.96
1.41	7 5.74	3.000	12.43	4.583	1.91	6.17	0.96
1.58	3 5.74	3.167	12.43	4.750	1.91	0.25	0.90
Max.Eff.Inten.(	mm/hr)=	43.98	2	24.02			
Storage Coeff.	(min)=	7.10	(ii)	15.00 11.17 (i	i)		
Unit Hyd. Tpeak Unit Hyd. peak	(min)= (cms)=	5.00	-	0.09			
PEAK FLOW	(cms)=	1.65		0.08	*TOT 1.	TALS* .720 (iii	)
TIME TO PEAK RUNOFF VOLUME	(hrs)= (mm)=	2.75 46.81		2.83	44	2.75	
TOTAL RAINFALL	(mm)=	47.81	4	47.81	47	7.81	
KONOFF COEFFICI	-	0.50		0.40			
(i) CN PROCED	URE SELECT	TED FOR PER	RVIOUS I	LOSSES:			
(ii) TIME STEP	(DT) SHOU	ULD BE SMAL	LER OR	EQUAL			
(iii) PEAK FLOW	DOES NOT	INCLUDE BA	SEFLOW	IF ANY.			
RESERVOIR( 0137)	OVER	FLOW IS OFF	F.				
DT= 5.0 min	OUTFL	LOW STOR	RAGE	OUTFL	DW STO	DRAGE	
	0.00	0.0	0000	2.72	00 0	2000	
		AREA	QPEAK	TPE/	AK	R.V.	
INFLOW : ID= 2 (	0136)	(ha) 15.110	(cms) 1.72	20 (nr	2.75	(mm) 44.06	
OUTFLOW: ID= 1 (	0137)	15.110	1.50	04	2.75	44.06	
D	E 417 EL OI	A DEDUCTION	ΓΟΝ ΓΟΟΙ	+ /0 = 1/9	6) = 87.47	2	
Ť.	EAK FLOW	OF PEAK FL	OW	(mii	1)= 0.00	0	
Ť. M	EAK FLOW IME SHIFT AXIMUM ST	OF PEAK FL	LOW	(mii (ha.m	n)= 0.00 .)= 0.11	) L38	
	EAK FLOW IME SHIFT AXIMUM ST	OF PEAK FL	SED	(mii (ha.m	n)= 0.00 .)= 0.11	) L38 	
T. M   CALIB     STANDHYD ( 0138)  ID= 1 DT= 5.0 min	Area Total 1	(ha)= ( Imp(%)= 90	0.29 0.00	(ha.m (ha.m	n)= 0.00 .)= 0.11	0 L38 	
T M   CALIB   STANDHYD ( 0138)  ID= 1 DT= 5.0 min   	Area Total	(ha)= ( Imp(%)= 90 ImpERVIOUS	0.29 0.00 [ 5 PEF	Dir. Con	n)= 0.00 .)= 0.11 n.(%)= 9 i)	0 138 	
CALIB   CALIB   STANDHYD ( 0138)  ID= 1 DT= 5.0 min   Surface Area Dep. Storage	Area Total : (ha)= (mm)=	(ha)= ( Imp(%)= 90 IMPERVIOUS 0.26 1.00	0.29 0.00 [ 5 PEF	Dir. Con (Na.m Dir. Con RVIOUS ( 0.03 5.00	n)= 0.00 .)= 0.11 n.(%)= 9 i)	0 L38 90.00	
CALIB   CALIB   STANDHYD ( 0138)  ID= 1 DT= 5.0 min   Surface Area Dep. Storage Average Slope Length	HAK FLOW IME SHIFT AXIMUM ST Area Total 1 (ha)= (mm)= (%)= (m)=	(ha)= ( (ha)= ( Imp(%)= 90 IMPERVIOUS 0.26 1.00 1.00 43.97	0.29 0.00 [ 5 PEF	Dir. Con RVIOUS (* 0.03 5.00 2.00	n)= 0.00 .)= 0.11 n.(%)= 9	) 138 	10001002
CALIB   STANDHYD ( 0138) ID= 1 DT= 5.0 min   Surface Area Dep. Storage Average Slope Length Mannings n	Area Total 1 (ha)= (mm)= (%)= (m)= (%)=	(ha)= ( Imp(%)= 90 IMPERVIOUS 0.26 1.00 43.97 0.013	0.29 0.00 ( 5 PEF	Dir. Con RVIOUS ( 0.03 5.00 2.00 40.00 0.250	i)= 0.00 .)= 0.11 	) 138 90.00	

	TRANSF	ORMED HYETOGR	APH	
TIME RAIN brs mm/br	TIME R	AIN  ' TIME	RAIN   TIME	RAIN mm/hr
0.083 0.00	1.667 5	.74 3.250	12.43   4.83	0.96
0.167 0.00	1.750 5	.74   3.333	6.69 4.92	0.96
0.230 0.00	1.917 16	.25 3.500	6.69 5.08	0.96
0.417 0.96	2.000 16	.25 3.583	6.69 5.17	0.96
0.500 0.96	2.083 16	.25 3.66/	6.69 5.25	0.96
0.667 0.96	2.250 16	.25 3.833	3.82 5.42	0.96
0.750 0.96	2.333 43	.98 3.917	3.82 5.50	0.96
0.917 0.96	2.500 43	.98 4.083	3.82 5.67	0.96
1.000 0.96	2.583 43	.98 4.167	3.82 5.75	0.96
1.167 0.96	2.750 43	.98 4.333	1.91 5.92	0.96
1.250 0.96	2.833 12	.43 4.417	1.91 6.00	0.96
1.333 5.74	3.000 12	.43 4.583	1.91 6.17	0.96
1.500 5.74	3.083 12	.43 4.667	1.91 6.25	0.96
1.583 5.74	3.167 12	.43   4.750	1.91	
Max.Eff.Inten.(mm/hr)=	43.98	24.02		
over (min) Storage Coeff. (min)=	5.00 2.17 (ii	10.00 ) 6.24 (ii	)	
Unit Hyd. Tpeak (min)=	5.00	10.00	,	
Unit Hyd. peak (cms)=	0.31	0.15	*TOTAL 5*	
PEAK FLOW (cms)=	0.03	0.00	0.034 (iii)	
TIME TO PEAK (hrs)=	2.75	2.75	2.75	
TOTAL RAINFALL (mm)=	47.81	47.81	47.81	
RUNOFF COEFFICIENT =	0.98	0.40	0.92	
***** WARNING: STORAGE COEFF.	IS SMALLER T	HAN TIME STEP	1	
(i) CN PROCEDURE SELECT				
$CN^* = 83.0$ Ia	= Dep. Stor	age (Above)		
(ii) TIME STEP (DT) SHOUL	D BE SMALLE	R OR EQUAL		
(iii) PEAK FLOW DOES NOT	ENCLUDE BASE	FLOW IF ANY.		
	N.C. 700000 100000			
RESERVOIR( 0139)  OVERFI	LOW IS OFF			
DT= 5.0 min   OUTFL	W STORAG	E   OUTFLO	W STORAGE	
(cms)	) (ha.m.	)   (cms)	(ha.m.)	
0.000	0.000	0   0.455	0.0005	
	AREA Q	PEAK TPEA	K R.V.	
	(na) (			
INFLOW : ID= 2 ( 0138)	(na) ( 0.290	0.034 2	.75 44.06	
INFLOW : ID= 2 ( 0138) OUTFLOW: ID= 1 ( 0139)	(na) ( 0.290 0.290	0.034 2 0.034 2	.75 44.06 .75 44.06	
INFLOW : ID= 2 ( 0138) OUTFLOW: ID= 1 ( 0139) PEAK FLOW	(na) 0.290 0.290 REDUCTION	0.034 2 0.034 2 [Qout/Qin](%	.75 44.06 .75 44.06 .)=101.69	
INFLOW : ID= 2 ( 0138) OUTFLOW: ID= 1 ( 0139) PEAK FLOW TIME SHIFT ( MAXIMIM ST	(na) 0.290 0.290 REDUCTION DF PEAK FLOW	0.034 2 0.034 2 [Qout/Qin] (% (min (ba.m.	75 44.06 .75 44.06 .75 44.06 	
INFLOW : ID= 2 ( 0138) OUTFLOW: ID= 1 ( 0139) PEAK FLOW TIME SHIFT ( MAXIMUM ST( MAXIMUM ST(	(na) 0.290 0.290 REDUCTION OF PEAK FLOW DRAGE USED DRAGE USED	0.034 2 0.034 2 [Qout/Qin](% (min (ha.m. (cu.m.	)=101.69 )= 0.00 )= 0.100 )= 0.1000 )= 0.148338	
INFLOW : ID= 2 ( 0138) OUTFLOW: ID= 1 ( 0139) PEAK FLOW TIME SHIFT ( MAXIMUM STO MAXIMUM STO **** WARNING : HYDROGRAPH	(na) 0.290 REDUCTION DF PEAK FLOW DRAGE USED DRAGE USED	0.034 2 0.034 2 [Qout/Qin](% (min (ha.m. (cu.m. T REDUCED.	)=101.69 )= 0.00 )= 0.000 )= 0.148338	
INFLOW : ID= 2 { 0138} OUTFLOW: ID= 1 { 0139} TIME SHIFT ( MAXIMUM STO MAXIMUM STO **** WARNING : HYDROGRAPH CHECK OUTF	(na) 0.290 0.290 DF PEAK FLOW DRAGE USED DRAGE USED PEAK WAS NO FLOW/STORAGE	COUST COUST COUST COUT/Qin](% (min (ha.m. (cu.m. T REDUCED. TABLE OR RE	75     44.06       .75     44.06       )=101.69       )=     0.00       )=     0.0000       )=     0.148338       DUCE DT.	
INFLOW : ID= 2 { 0138} OUTFLOW: ID= 1 { 0139} PEAK FLOW TIME SHIFT ( MAXIMUM STO **** WARNING : HYDROGRAPH CHECK OUTF	(na) 0.290 0.290 DF PEAK FLOW DRAGE USED DRAGE USED PEAK WAS NO FLOW/STORAGE	CM 30 0.034 2 0.034 2 [Qout/Qin](% (min (ha.m. (cu.m. T REDUCED. TABLE OR RE	75     44.06       .75     44.06       )=101.69       )=     0.00       )=     0.0000       )=     0.148338	
INFLOW : ID= 2 { 0138} OUTFLOW: ID= 1 { 0139} PEAK FLOW TIME SHIFT ( MAXIMUM STO ***** WARNING : HYDROGRAPH CHECK OUTP	(na) 0.290 0.290 DF PEAK FLOW DRAGE USED DRAGE USED PEAK WAS NO FLOW/STORAGE	C	.75       44.06         .75       44.06         .9=101.69       .00         .9=       0.000         .9=       0.148338         DUCE DT.	
INFLOW : ID= 2 { 0138} OUTFLOW: ID= 1 { 0139} PEAK FLOW TIME SHIFT ( MAXIMUM STC **** WARNING : HYDROGRAPH CHECK OUTI 	(na) 0.290 0.290 REDUCTION OF PEAK FLOW DRAGE USED DRAGE USED PEAK WAS NO FLOW/STORAGE 	COUST COULT OF COULT	R.V.	
INFLOW : ID= 2 { 0138} OUTFLOW: ID= 1 { 0139} TIME SHIFT ( MAXIMUM STC MAXIMUM STC **** WARNING : HYDROGRAPH CHECK OUTF 	(na) 0.290 0.290 REDUCTION OF PEAK FLOW DRAGE USED PEAK WAS NO FLOW/STORAGE REA QPEAK na) (cms)	COUCED TPEAK (hrs) COUCED TPEAK (hrs) COUCED TPEAK (hrs) TPEAK	R.V. (mm)	

$\begin{vmatrix} ADD & HD & ( & 01/2) \end{vmatrix}$ $\begin{vmatrix} 3 + 2 = 1 \end{vmatrix}$	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
101=3(01/2):	16.06	1.614	2.75	44.06

+ 10	)2= 2	(	0139):	0.29	0.034	2.75	44.06
I	) = 1	(	0172):	16.35	1.648	2.75	44.06

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB   STANDHYD ( 0076)  ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	6.00 90.00	Dir.	Conn.(%)=	90.00	
		IMPERVI	OUS	PERVIO	US (i)		
Surface Area	(ha)=	5.4	0	0.6	0		
Dep. Storage	(mm)=	1.0	0	5.0	D		
Average Slope	(%)=	1.0	0	2.0	0		
Length	(m)=	200.0	0	40.0	0		
Mannings n	=	0.01	.3	0.25	D		

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

		TR/	ANSFORM	ED HYETOGR/	APH	-	
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500	0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.583	0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.667	0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833	0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.917	0.96	2.500	43.98	4.083	3.82	5.67	0.96
1.000	0.96	2.583	43.98	4.167	3.82	5.75	0.96
1.083	0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.167	0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.250	0.96	2.833	12.43	4.417	1.91	6.00	0.96
1.333	5.74	2.917	12.43	4.500	1.91	6.08	0.96
1.417	5.74	3.000	12.43	4.583	1.91	6.17	0.96
1.500	5.74	3.083	12.43	4.667	1.91	6.25	0.96
1.583	5.74	3.167	12.43	4.750	1.91	e en	
Max.Eff.Inten.(m	m/hr)=	43.98		24.02			
over	(min)	5.00		10.00			
Storage Coeff.	(min)=	5.38	(ii)	9.45 (ii)	)		
Unit Hyd. Tpeak	(min)=	5.00		10.00			
Unit Hyd. peak	(cms)=	0.21		0.12			
					*T0	TALS*	
PEAK FLOW	(cms)=	0.66		0.03	0.	.692 (iii)	)
TIME TO PEAK	(hrs)=	2.75		2.75	2	2.75	
RUNOFF VOLUME	(mm)=	46.81		19.33	44	4.06	
TOTAL RAINFALL	(mm)=	47.81		47.81	47	7.81	
RUNOFF COEFFICIE	NT =	0.98		0.40	0	0.92	
(i) CN PROCEDU CN* = 8	RE SELECT	ED FOR PE = Dep. S	RVIOUS	LOSSES: (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 ( 0031) ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	39.77 90.00	Dir.	Conn . (%)=	90.00
		IMPERVI	ous	PERVIO	JS (i)	
Surface Area	(ha)=	35.7	9	3.98	3	
Dep. Storage	(mm)=	1.0	0	5.00	)	
Average Slope	(%)=	1.0	ō	2.00	5	
Length	(m)=	514.9	1	40.00	)	
Mannings n	=	0.01	3	0.250	)	
NOTE: RAINF	ALL WAS	TRANSFOR	MED TO	5.0 1	IN. TIME S	STEP.

\_\_\_\_\_

		TR/	NSFORMED	) HYETOGR	APH		
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
				1000000000000	10000000		

0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	3 0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500	0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.583	3 0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.667	0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833	3 0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.917	0.96	2.500	43.98	4.083	3.82	5.67	0.96
1.000	0.96	2.583	43.98	4.167	3.82	5.75	0.96
1.083	0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.167	0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.250	0.96	2.833	12.43	4.417	1.91	6.00	0.96
1.333	5.74	2.917	12.43	4.500	1.91	6.08	0.96
1.417	5.74	3.000	12.43	4.583	1.91	6.17	0.96
1.500	5.74	3.083	12.43	4.667	1.91	6.25	0.96
1.583	3 5.74	3.167	12.43	4.750	1.91		
Max.Eff.Inten.(n	nm/hr)=	43.98		24.02			
over	(min)	10.00		15.00			
Storage Coeff.	(min)=	9.49	(ii)	13.56 (ii)			
Unit Hyd. Tpeak	(min)=	10.00		15.00			
Unit Hyd. peak	(cms)=	0.12		0.08			
					*T0	TALS*	
PEAK FLOW	(cms)=	4.21		0.19	4	.388 (iii)	ki -
TIME TO PEAK	(hrs)=	2.75		2.83		2.75	
RUNOFF VOLUME	(mm)=	46.81		19.33	44	4.06	
TOTAL RAINFALL	(mm)=	47.81		47.81	4	7.81	
RUNOFF COEFFICIE	ENT =	0.98		0.40	(	0.92	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 83.0 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( 0061)    IN= 2> OUT= 1     DT= 5.0 min	OVERFLOW 1 OUTFLOW (cms)	S OFF STORAGE (ha.m.)	0UTF (cm	LOW S	STORAGE (ha.m.) 0.3940
INFLOW : ID= 2 ( 0 OUTFLOW: ID= 1 ( 0 PEA TIM MAX	ARE (ha 031) 39.7 061) 39.7 K FLOW RE E SHIFT OF PE IMUM STORAGE	A QPE () (cm 770 2 770 3 EDUCTION ( EAK FLOW USED	AK TP IS) (h I.388 I.998 [Qout/Qin] (m (ha.	PEAK PEAK 2.75 2.83 (%)= 91 min)= 5 m.)= 0	R.V. (mm) 44.06 44.06 .11 .00 .2211
$ \begin{vmatrix} ADD & HYD & ( & 0128) \\ 1 & + & 2 & 3 \end{vmatrix} $ $ + \frac{ID1=1}{ID2=2} \begin{pmatrix} 0171 \\ 0172 \\ 0172 \\ ID & = 3 \end{pmatrix} ( & 0128 \\ NOTE: PEAK FLOWS $	AREA (ha) 1: 4.34 16.35 ): 20.69 DO NOT INCLU	QPEAK (cms) 0.468 1.648 2.116 IDE BASEFI	TPEAK (hrs) 2.75 2.75 2.75 2.75	R.V. (mm) 44.06 44.06 44.06	
ADD HYD ( 0128) 3 + 2 = 1 ID1= 3 ( 0128 + ID2= 2 ( 2297 ID = 1 ( 0128 NOTE: PEAK FLOWS	AREA (ha) ): 20.69 ): 795.90 ): 816.59 DO NOT INCLL	QPEAK (cms) 2.116 8.304 8.431 JDE BASEFI	TPEAK (hrs) 2.75 4.75 4.75 0WS IF AN	R.V. (mm) 44.06 39.03 39.15	
ADD HYD ( 0128)    1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	

ID1= 1 ( 0128 + ID2= 2 ( 0061	): 816.59 ): 39.77	8.431 3.998	4.75	39.15 44.06	
ID = 3 ( 0128	): 856.36	10.026	2.83	39.38	
NOTE: PEAK FLOWS	DO NOT INCLU	JDE BASEF	LOWS IF AN	IY.	
ADD HYD ( 0128) 3 + 2 = 1	AREA	QPEAK	TPEAK	R.V.	
ID1=3(0128) + $ID2=2(0076)$	(ha) (ha) (ha) (ha) (ha) (ha) (ha) (ha)	(cms) 10.026 0.692	(hrs) 2.83 2.75	(mm) 39.38 44.06	
ID = 1 (0128)	): 862.36	10.430	2.83	39.41	
NOTE: PEAK FLOWS	DO NOT INCLU	JDE BASEF	LOWS IF AN	IY.	
ADD HYD ( 0128) 1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.	
ID1= 1 ( 0128	(ha) (ha): 862.36	(cms) 10.430	(hrs) 2.83	(mm) 39.41	
+ ID2= 2 ( 0078	5): 29.08	0.183	6.25	35.78	
ID = 3 ( 0128	6): 891.44	10.461	2.83	39.30	
NOTE: PEAK FLOWS	DO NOT INCLU	JDE BASEF	LOWS IF AN	IY.	
ROUTE CHN( 2875)    IN= 2> OUT= 1	Routing ti	ime step	(min)'= 5	.00	
< Dictor	DATA FOR SEC	TION (	1.1)	>	
0.0	0 204.	.68	0.0600		channel 1
51.2	4 204. 6 203.	. 93	0.0450	Main	Channel
66.0 87.4	7 203. 2 203.	.18	0.0450	Main Main	Channel Channel
132.0	9 202.	47	0.0450	Main	Channel Channel
213.8	7 200.	.24	0.0450	Main	Channel
259.3	2 199. 6 197	.43	0.0450	Main	Channel
276.1	.6 196.	.93	0.0450	Main	Channel
304.5	0 197.	.16	0.0450	Main	Channel Channel
311.0	9 198.	45	0.0450	Main	Channe1
329.4	1 198. 1 200.	.06	0.0450	Main Main	Channel Channel
378.8	200.	32	0.0450	Main	Channe1
411.1	.3 199. 1 202.	.51 .47 0.	0.0450	Main 600 Main	Channel Channel
461.7	6 202.	.80	0.0600		
<	TRAVEL	TIME TA	BLE		>
(m) (m)	(cu.m.)	(cms)	TE VELC (n	1/s)	(min)
0.31 197.24	.601E+04	3.8	0	1.64	26.05
0.92 197.85	.286E+05	44.3	1		10.76
1.23 198.16	.419E+05	72.2	1	72	9.67
1.85 198.78	.849E+05	171.0	2	.01	8.27
2.15 199.08 2.46 199.39	.111E+06 .139E+06	252.0	2	.26	7.34
2.77 199.70	.172E+06	416.9	2	.41	6.89
3.39 200.32	.217E+06	649.5	2	.36	6.98
3.69 200.62	.336E+06	888.1	2	.63	6.31
4.31 201.24	.474E+06	1473.8	3	.09	5.37
4.62 201.55	.549E+06	1820.8	3	.30	5.03
5.23 202.16	.710E+06	2610.1	3	.66	4.53
5.54 202.47 5.87 202.80	.796E+06 .901E+06	3061.7 3585.6	3	.83	4.34 4.19
		< h	vdrograph		-nine / channel-s
	AREA (ha)	OPEAK (cms)	TPEAK (hrs)	R.V. M (mm)	MAX DEPTH MAX VEL (m) (m/s)

CALIB   NASHYD ( 0002)  ID= 1 DT= 5.0 min	Area (ha)= Ia (mm)= U.H. Tp(hrs)=	2.27 5.00 0.35	Curve Numb # of Linea	er (C r Res.(	N)= 83.0 N)= 3.00	
NOTE: RAINFAL	L WAS TRANSFORM	IED TO	5.0 MIN. T	IME STE	Ρ.	
		ANGEODAE		BU		
TIME	RAIN   TIME	RAIN	' TIME	RAIN	TIME	RAIN
0.083	0.00   1.667	mm/hr 5.74	3.250	mm/hr 12.43	4.83	mm/hr 0.96
0.167 0.250	0.00   1.750 0.00   1.833	5.74	3.333	6.69	4.92 5.00	0.96
0.333	0.96 1.917	16.25	3.500	6.69	5.08	0.96
0.500	0.96 2.083	16.25	3.667	6.69	5.25	0.96
0.667	0.96 2.250	16.25	3.833	3.82	5.42	0.96
0.833	0.96 2.333	43.98	4.000	3.82	5.50	0.96
0.917 1.000	0.96   2.500	43.98	4.083	3.82	5.67	0.96
1.083	0.96 2.667	43.98	4.250	3.82	5.83	0.96
1.250	0.96 2.833	12.43	4.417	1.91	6.00	0.96
1.417	5.74 3.000	12.43	4.583	1.91	6.17	0.96
1.583	5.74 3.167	12.43	4.750	1.91	0.25	0.90
Unit Hyd Qpeak (c	ms)= 0.248					
PEAK FLOW (C TIME TO PEAK (H RUNOFF VOLUME ( TOTAL RAINFALL ( RUNOFF COEFFICIENT	mms)= 0.089 (i nrs)= 2.917 mm)= 19.321 mm)= 47.810 = 0.404	)				
(i) PEAK FLOW DOES	NOT THE UDE BA	SEELOW T	F ANY.			
CALIB   STANDHYD ( 0001)   ID= 1 DT= 5.0 min	Area (ha)= Total Imp(%)=	6.71 61.00	Dir. Conn.	(%)= 6	1.00	
	IMPERVIO	US PE	RVIOUS (i)			
Surface Area ( Dep. Storage (	ha)= 4.09		2.62			
Average Slope	(%)= 1.00 (m)= 211.50		1.00			
Mannings n	= 0.013		0.250			
NOTE: RAINFAL	L WAS TRANSFORM	IED TO	5.0 MIN. T	IME STE	Ρ.	
	т			DU		
TIME	RAIN   TIME	RAIN	I' TIME	RAIN	TIME	RAIN
0.083	mm/hr   hrs 0.00   1.667	mm/hr 5.74	3.250	mm/hr 12.43	hrs 4.83	mm/hr 0.96
0.167	0.00 1.750 0.00 1.833	5.74	3.333 3.417	6.69	4.92 5.00	0.96
0.333	0.96   1.917	16.25	3.500	6.69	5.08	0.96
0.500	0.96 2.083	16.25	3.667	6.69	5.25	0.96
0.667	0.96 2.250	16.25	3.833	3.82	5.42	0.96
0.833	0.96 2.417	43.98	4.000	3.82	5.58	0.96
1.000	0.96 2.500	43.98	4.083	3.82	5.6/	0.96
1.083	0.96 2.667	43.98	4.250	3.82	5.83	0.96
1.16/	0.00 1 2.7.00	10.00	4.333	T'9T	3.92	0.00
1.167 1.250 1.333	0.96 2.833 5.74 2.917	12.43	4.417	1.91	6.00	0.96

 
 1.500
 5.74
 3.083
 12.43
 4.667
 1.91
 6.25
 0.96

 1.583
 5.74
 3.167
 12.43
 4.750
 1.91
 6.25
 0.96
 Max.Eff.Inten.(mm/hr)= 43.98 21.81 over (min) Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)= 5.00 5.56 (ii) 5.00 25.00 21.54 (ii) 25.00 0.20 0.05 
 PEAK
 FLOW
 (cms)=
 0.50
 0.10

 TIME
 TO
 PEAK
 (hrs)=
 2.75
 3.00

 RUNOFF
 VOLUME
 (mm)=
 46.81
 19.33

 TOTAL
 RAINFALL
 (mm)=
 47.81
 47.81

 RUNOFF
 COEFFICIENT
 0.98
 0.40
 \*TOTALS\* 0.574 (iii) 2.75 36.09 47.81 0.75 (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 83.0 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( 0070) IN= 2---> OUT= 1 DT= 5.0 min | OVERFLOW IS OFF 
 OUTFLOW
 STORAGE
 OUTFLOW
 STORAGE

 (cms)
 (ha.m.)
 (cms)
 (ha.m.)

 0.0000
 0.0000
 0.5080
 0.2222
 (ha.m.) 0.2222 -----AREA (ha) 6.710 QPEAK TPEAK (cms) (hrs) 0.574 2.75 0.237 3.17 R.V. (mm) 36.09 INFLOW : ID= 2 ( 0001) OUTFLOW: ID= 1 ( 0070) 6.710 36.07 PEAKFLOWREDUCTION[Qout/Qin](%)=41.30TIMESHIFT OFPEAKFLOW(min)=25.00MAXIMUMSTORAGEUSED(ha.m.)=0.1037 \_\_\_\_\_ CAL TR CALIB STANDHYD ( 0004) ID= 1 DT= 5.0 min Area (ha)= 2.00 Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00 IMPERVIOUS PERVIOUS (i)  $\begin{array}{rrrr} \text{IMPERVIOUS} \\ (ha) = & 1.80 \\ (mm) = & 1.00 \\ (\%) = & 1.00 \\ (m) = & 115.47 \\ = & 0.013 \end{array}$ Surface Area Dep. Storage 0.20 Average Slope 2.00 Length Mannings n 40.00 0.250 NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP. 
 TRANSFORMED
 HYETOGRAPH

 ME
 RAIN
 '
 TIME
 R

 rs
 mm/hr
 '
 hrs
 mm

 67
 5.74
 3.250
 12.

 50
 5.74
 3.333
 6.

 33
 16.25
 3.417
 6.

 17
 16.25
 3.500
 6.
 TIME RAIN | TIME RAIN TIME RAIN mm/hr 0.00 hrs 1.667 mm/hr | hrs 12.43 | 4.83 mm/hr 0.96 hrs hrs 0.083 0.167 0.250 0.333 0.00 0.00 0.96 1.750 1.833 1.917 6.69 4.92 0.96 6.69 5.00 0.96 0.417 0.500 0.583 5.17 5.25 5.33 5.42 0.96 2.000 16.25 3.583 6.69 0.96 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.667 16.25 3.667 3.750 3.833 6.69 0.96 6.69 0.96 16.25 43.98 0.96 0.667 3.82 3.917 4.000 0.750 3.82 5.50 0.96 43.98 43.98 43.98 5.58 5.67 5.75 0.833 0.917 3.82 0.96 4.083 4.167 4.250 3.82 0.96 1.000 3.82 0.96 43.98 1.083 3.82 5.83 0.96 43.98 | 4.230 43.98 | 4.333 12.43 | 4.417 12.43 | 4.500 12.43 | 4.583 12.43 | 4.667 12.43 | 4.750 0.96 0.96 5.74 2.750 2.833 1.91 1.91 1.91 1.167 5.92 0.96 6.00 0.96 1.250 1.333 2.917 1.417 5.74 3.000 3.083 6.17 1.91 0.96 1.91 0.96 5.74 | 3.083 1.583 1.91 Max.Eff.Inten.(mm/hr)= 43.98 24.02 over (min) Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)= 5.00 10.00 3.87 (ii) 7.94 (ii) 5.00 10.00 0.25 0.13

\*TOTALS\*

PEAK FLOW	(cms)=	0.22	0.01	0.231 (iii)
RUNOFF VOLUME	(mm)=	46.81	19.33	44.06
TOTAL RAINFALL	(mm)=	47.81	47.81	47.81
RUNOFF COEFFICI	ENI =	0.98	0.40	0.92

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 83.0 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 ( 0079) ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	0.60	Dir.	Conn.(%)=	90.00	
		IMPERVI	OUS	PERVIO	JS (i)		
Surface Area	(ha)=	0.5	4	0.0	6		
Dep. Storage	(mm)=	1.0	0	5.0	D		
Average Slope	(%)=	1.0	0	2.0	D		
Length	(m)=	63.2	5	40.0	D		
Mannings n	=	0.01	.3	0.25	D		

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

	TR/	NSFORME	D HYETOGRA	PH		
TIME RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083 0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.167 0.00	1 922	16 25	3.333	6.69	4.92	0.96
0.333 0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.417 0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500 0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.583 0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.667 0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.750 0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833 0.96	2.41/	43.98	4.000	3.82	5.58	0.96
1 000 0 96	2.500	43.98	4.065	3 82	5 75	0.96
1.083 0.96	2.667	43.98	4.250	3.82	5.83	0.96
1.167 0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.250 0.96	2.833	12.43	4.417	1.91	6.00	0.96
1.333 5.74	2.917	12.43	4.500	1.91	6.08	0.96
1.41/ 5./4	3.000	12.43	4.583	1.91	6.1/	0.96
1.500 5.74	3 167	12.45	4.00/	1 91	0.25	0.96
1.365 5.74	5.10/	12.45	4.750	1.91		
Max.Eff.Inten.(mm/hr)=	43.98		24.02			
over (min)	5.00	(::)	10.00 6 77 (iii)			
Unit Hyd Tneak (min)=	5.00	(II)	10.00			
Unit Hyd. peak (cms)=	0.29		0.14			
				*TOT	ALS*	
PEAK FLOW (cms)=	0.07		0.00	0.	070 (iii)	K.
TIME TO PEAK (hrs)=	2.75		2.75	2	.75	
RUNOFF VOLUME (mm)=	46.81		19.33	44	.06	
DUNOEL COLLECTENT -	47.81	~	47.81	4/	.81	
KONOFF COEFFICIENT =	0.96		0.40		1.92	
***** WARNING: STORAGE COEFF. I	S SMALLE	R THAN	TIME STEP!			
(i) CN PROCEDURE SELECTED	D FOR PE	RVIOUS	LOSSES:			
CN* = 83.0 Ia	= Dep. S	storage	(Above)			
<li>(ii) TIME STEP (DT) SHOULD</li>	D BE SMA	LLER OR	EQUAL			
THAN THE STORAGE COE	FFICIEN					
(111) PEAK FLOW DOES NOT I	NCLUDE E	SASEFLOW	IF ANY.			
I CALTR I						

CALIB   STANDHYD ( 0003)   ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	11.10 90.00	Dir. Conn.(%)=	90.00
Surface Area Dep. Storage Average Slope	(ha)= (mm)= (%)=	IMPERVI 9.9 1.0 1.0	OUS 9 0 0	PERVIOUS (i) 1.11 5.00 2.00	

Mannings n		0.013	0.250		
NOTE: RAI	NFALL WAS TH	RANSFORMED 1	TO 5.0 MIN.	TIME STEP.	
T 0.0 0.1 0.2 0.3 0.4 0.5 0.5 0.6 0.7 0.6 0.7 0.6 0.7 0.6 1.0 1.0 1.0 1.0 1.1 1.2 1.3 1.4 1.5	ME         RAIN           Irs         mm/hr           83         0.00           67         0.00           50         0.00           33         0.96           83         0.96           83         0.96           83         0.96           83         0.96           83         0.96           83         0.96           83         0.96           83         0.96           83         0.96           83         0.96           83         0.96           83         0.96           83         0.96           83         0.96           83         0.96           83         0.96           83         5.74	TIME F hrs mm 1.667 5 1.750 5 1.833 16 2.000 16 2.083 16 2.250 16 2.250 16 2.333 43 2.417 4 2.500 43 2.583 43 2.591 12 3.000 12 3.083 12 3.167 12	CORMED         HYETOGR           AIN         '         TIME           n/hr         '         hrs           .74         3.250         .74           .74         3.333         .250           .74         3.333         .252           3.525         3.417           .25         3.583           .25         3.583           .25         3.667           .25         3.750           .25         3.833           .98         4.000           .98         4.083           .98         4.083           .98         4.167           .98         4.250           .98         4.250           .98         4.417           .43         4.500           .43         4.567           .43         4.667           .43         4.750	APH            RAIN         TIME           mm/hr         hrs           12.43         4.83           6.69         4.92           6.69         5.00           6.69         5.00           6.69         5.17           6.69         5.25           6.69         5.33           3.82         5.42           3.82         5.58           3.82         5.83           1.91         5.92           1.91         6.00           1.91         6.08           1.91         6.17           1.91         6.25           1.91         6.25           1.91         6.25	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten. ove Storage Coeff. Unit Hyd. Tpea Unit Hyd. peak	(mm/hr)= (min) (min)= (k (min)= (cms)=	43.98 5.00 6.47 (ii 5.00 0.18	24.02 15.00 i) 10.54 (ii 15.00 0.09	) *TOTAI \$*	
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFIC	(cms)= (hrs)= (mm)= . (mm)= . IENT =	1.21 2.75 46.81 47.81 0.98	0.06 2.83 19.33 47.81 0.40	1.269 (iii 2.75 44.06 47.81 0.92	)
(i) CN PROCE CN* = (ii) TIME STE THAN THE (iii) PEAK FLC	DURE SELECT 83.0 Ia P (DT) SHOUI STORAGE CO W DOES NOT I	ED FOR PERVJ = Dep. Stor LD BE SMALLE EFFICIENT. INCLUDE BASE	COUS LOSSES: "age (Above) ER OR EQUAL EFLOW IF ANY.		
RESERVOIR( 0083)   IN= 2> OUT= 1   DT= 5.0 min		LOW IS OFF DW STORAG ) (ha.m. DO 0.000	GE   OUTFLO .)   (cms) 00   1.998	W STORAGE (ha.m.) 0 0.1569	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0003) 0083)	AREA ( (ha) ( 11.100 11.100	PEAK         TPEA           (cms)         (hrs)           1.269         2           1.099         2	K R.V. ) (mm) .75 44.06 .75 44.06	
	TIME SHIFT ( MAXIMUM ST(	DF PEAK FLOW DRAGE USED	V [Qout/Qin](% V (min ) (ha.m.	)= 86.66 )= 0.00 )= 0.0889	
CALIB   STANDHYD ( 0151)  ID= 1 DT= 5.0 min	Area Total Ir	(ha)= 7.7 np(%)= 61.0	77 DO Dir. Conn	.(%)= 61.00	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVIOUS 4.74 1.00 1.00 227.60 0.013	PERVIOUS (i 3.03 5.00 1.00 40.00 0.250	)	
NOTE: RAI	NFALL WAS TH	RANSFORMED 1	TO 5.0 MIN.	TIME STEP.	
נד ד ס.ס	ME RAIN rs mm/hr 83 0.00	TRANSF   TIME F   hrs mn   1.667 5	CORMED HYETOGR WAIN  ' TIME n/hr  ' hrs 5.74   3.250	APH RAIN   TIME mm/hr   hrs 12.43   4.83	RAIN mm/hr 0.96

$\begin{array}{ccccccc} 0.167 & 0.00 \\ 0.250 & 0.00 \\ 0.333 & 0.96 \\ 0.417 & 0.96 \\ 0.500 & 0.96 \\ 0.583 & 0.96 \\ 0.667 & 0.96 \\ 0.667 & 0.96 \\ 0.750 & 0.96 \\ 0.917 & 0.96 \\ 1.000 & 0.96 \\ 1.083 & 0.96 \\ 1.083 & 0.96 \\ 1.67 & 0.96 \\ 1.250 & 0.96 \\ 1.333 & 5.74 \\ 1.417 & 5.74 \\ 1.583 & 5.74 \end{array}$		3.333         3.417         3.500         3.583         3.667         3.750         3.833         3.917         4.000         4.083         4.167         4.250         4.333         4.417         4.583         4.667         4.750	6.69         4.92         0           6.69         5.00         0           6.69         5.08         0           6.69         5.17         0           6.69         5.17         0           6.69         5.25         0           3.82         5.42         0           3.82         5.58         0           3.82         5.67         0           3.82         5.75         0           3.82         5.83         0           1.91         6.00         0           1.91         6.08         0           1.91         6.07         0           1.91         6.25         0	.96 .96 .96 .96 .96 .96 .96 .96 .96 .96
Max.Eff.Inten.(mm/hr)= over (min) Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)=	43.98 5.00 5.81 (ii) 5.00 0.20	21.81 25.00 21.79 (ii) 25.00 0.05	*70741.5*	
PEAK FLOW (cms)= TIME TO PEAK (hrs)= RUNOFF VOLUME (mm)= TOTAL RAINFALL (mm)= RUNOFF COEFFICIENT =	0.58 2.75 46.81 47.81 0.98	0.12 3.00 19.33 47.81 0.40	0.664 (iii) 2.75 36.09 47.81 0.75	
(i) CN PROCEDURE SELECT CN* = 83.0 Ia (ii) TIME STEP (DT) SHOU THAN THE STORAGE CO (iii) PEAK FLOW DOES NOT	ED FOR PERVIOUS = Dep. Storage LD BE SMALLER OF EFFICIENT. INCLUDE BASEFLOW	LOSSES: (Above) R EQUAL W IF ANY.		
RESERVOIR(         0152)         OVERFI           IN=         2>         OUT=         1           DT=         5.0 min         OUTFLI         OUTFLI	LOW IS OFF DW STORAGE ) (ha.m.) DO 0.0000	OUTFLOW   (cms)   0.5870	STORAGE (ha.m.) 0.2573	
INFLOW : ID= 2 ( 0151) OUTFLOW: ID= 1 ( 0152)	AREA OPEAN (ha) (cms) 7.770 0.0 7.770 0.2	( TPEAK ) (hrs) 564 2.7 274 3.1	R.V. (mm) 5 36.09 7 36.08	
PEAK FLOW TIME SHIFT ( MAXIMUM ST)	DF PEAK FLOW DRAGE USED	out/Qinj(%)= (min)= (ha.m.)=	41.31 25.00 0.1202	
$\begin{vmatrix} ADD & HYD & ( & 0081) \\ 1 & + & 2 & = & 3 \\ \hline \\ 1D1 = & 1 & ( & 0152) \\ + & 1D2 = & 2 & ( & 0079) \\ \hline \\ 1D & = & 3 & ( & 0081) \\$	REA QPEAK ha) (cms) .77 0.274 .60 0.070	TPEAK R (hrs) ( 3.17 36. 2.75 44.	2.V. mm) 08 06	
NOTE: PEAK FLOWS DO NOT	INCLUDE BASEFLO	WS IF ANY.		
$\begin{vmatrix} ADD & HYD & ( & 0081) \\ 3 + 2 = 1 & Al \\ \hline ID1 = 3 & ( & 0081) \\ + & ID2 = 2 & ( & 0083) \\ \hline ID = 1 & ( & 0081) \\ \hline ID = 1 & ( & 0081) \\ \hline 19 \\ \end{vmatrix}$	REA OPEAK ha) (cms) .37 0.307 .10 1.099 .47 1.407	TPEAK R (hrs) ( 2.75 36. 2.75 44. 2.75 40.	2.V. mm) 65 06 87	
NOTE: PEAK FLOWS DO NOT	INCLUDE BASEFLO	WS IF ANY.		10.000
ADD HYD ( 0005) 1 + 2 = 3 AI	REA QPEAK	TPEAK R	e.v.	

ID1= 1 ( 0002): + ID2= 2 ( 0004):	(ha) 2.27 2.00	(cms) 0.089 0.231	(hrs) 2.92 2.75	(mm) 19.32 44.06		
ID = 3 (0005):	4.27	0.304	2.75	30.91		
NOTE: PEAK FLOWS DO	NOT INCLU	JDE BASEFLO	S TE AN	Υ.		
ADD HYD ( 0005) 3 + 2 = 1 ID1= 3 ( 0005): + ID2= 2 ( 0070):	AREA (ha) 4.27 6.71	QPEAK (cms) 0.304 0.237	TPEAK (hrs) 2.75 3.17	R.V. (mm) 30.91 36.07		
ID = 1 ( 0005):	10.98	0.511	2.75	34.07		
NOTE: PEAK FLOWS DO	NOT INCLU	JDE BASEFLOW	S IF AN	Υ.		
ADD HYD ( 0005) 1 + 2 = 3 ID1= 1 ( 0005): + ID2= 2 ( 0081):	AREA (ha) 10.98 19.47	QPEAK (cms) 0.511 1.407	TPEAK (hrs) 2.75 2.75	R.V. (mm) 34.07 40.87		
ID = 3 (0005):	30.45	1.917	2.75	38.42		
NOTE: PEAK FLOWS DO	NOT INCLU	JDE BASEFLO	WS IF AN	Υ.		
IN= 2> OUT= 1   DT= 5.0 min	OUTFLOW (cms) 0.0000 0.1470 0.2180 0.2660	STORAGE (ha.m.) 0.0000 0.5184 0.7112 0.8419	OUTF (cm 0.3 0.3 0.4 0.4	LOW ST s) (H 320 840 370 000	TORAGE ha.m.) 1.0067 1.1307 1.2536 0.0000	
INFLOW : ID= 2 ( 0005 OUTFLOW: ID= 1 ( 0006	ARE (ha 5) 30.4	EA QPEAN a) (cms) 450 1.9 450 0.2	( TPI ) (h 917 264	EAK rs) 2.75 5.17	R.V. (mm) 38.42 38.39	
PEAK TIME S MAXIMU	FLOW RE SHIFT OF PE JM STORAGE	EDUCTION [QC EAK FLOW E USED	out/Qin] (m (ha.u	(%)= 13.7 in)=145.0 m.)= 0.8	79 00 3377	
CALIB     NASHYD ( 0011)  Ar  ID= 1 DT= 5.0 min   Ia U.	rea (ha) a (mm) .H. Tp(hrs)	)= 4.52 )= 5.00 )= 0.43	Curve N # of Li	umber ( near Res.	(CN)= 83.0 (N)= 3.00	
NOTE: RAINFALL	WAS TRANSP	ORMED TO	5.0 MIN	. TIME ST	EP.	
TIME hrs n 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500	RAIN   T] mm/hr   1 0.00   1.6 0.90   1.8 0.96   2.0 0.96   2.0 0.96   2.2 0.96   2.4 0.96   2.5 0.96   2.5   3.5	TRANSFORM TRANSFORM Trs mm/hr 567 5.74 750 5.74 750 16.25 917 16.25 900 16.25 900 16.25 933 16.25 933 16.25 943 16.25 950 16.25 950 16.25 950 16.25 950 43.98 853 43.98 853 43.98 853 43.98 853 12.43 917 12.43 900 12.43 957 43.98 917 12.43 917 12.43 91	ED HYETO TIM hr: 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.457 4.500 4.583 4.667 4.750	GRAPH E RAIN s mm/hr 12.43 6.69 6.69 6.69 6.69 6.69 3.82 3.82 3.82 3.82 3.82 3.82 3.82 1.91 1.91 1.91 1.91 1.91	I         TIME           4.83         4.92           5.00         5.08           5.17         5.25           5.33         5.42           5.50         5.58           5.67         5.75           5.83         5.92           6.00         6.017           6.25         5.25	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96

Unit Hyd Qpeak (cms)= 0.401 
 PEAK FLOW
 (cms)=
 0.158 (i)

 TIME TO PEAK
 (hrs)=
 3.083

 RUNOFF VOLUME
 (mm)=
 19.323

 TOTAL RAINFALL
 (mm)=
 47.810

 RUNOFF COEFFICIENT
 0.404

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

CALIB   STANDHYD ( 0010)  ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	0.88 90.00	Dir.	Conn.(%)=	90.00	
Surface Area Dep. Storage	(ha)= (mm)=	IMPERVI 0.7 1.0	OUS 9 0	PERVIOU 0.09 5.00	JS (i) 9		

\_\_\_\_\_

(mm)=	1.00	5.00	
(%)=	1.00	2.00	
(m)=	76.59	40.00	
=	0.013	0.250	
	(mm)= (%)= (m)= =	(mm)= 1.00 (%)= 1.00 (m)= 76.59 = 0.013	(mm)= 1.00 5.00 (%)= 1.00 2.00 (m)= 76.59 40.00 = 0.013 0.250

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

		TRA	NSFORME	D HYETOGRA	APH	Contraction -	
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	5.74	3.250	12.43	4.83	0.96
0.167	0.00	1.750	5.74	3.333	6.69	4.92	0.96
0.250	0.00	1.833	16.25	3.417	6.69	5.00	0.96
0.333	0.96	1.917	16.25	3.500	6.69	5.08	0.96
0.417	0.96	2.000	16.25	3.583	6.69	5.17	0.96
0.500	0.96	2.083	16.25	3.667	6.69	5.25	0.96
0.583	0.96	2.167	16.25	3.750	6.69	5.33	0.96
0.667	0.96	2.250	16.25	3.833	3.82	5.42	0.96
0.750	0.96	2.333	43.98	3.917	3.82	5.50	0.96
0.833	0.96	2.417	43.98	4.000	3.82	5.58	0.96
0.91/	0.96	2.500	43.98	4.083	3.82	5.6/	0.96
1.000	0.96	2.583	43.98	4.16/	3.82	5.75	0.96
1.083	0.96	2.66/	43.98	4.250	3.82	5.83	0.96
1.16/	0.96	2.750	43.98	4.333	1.91	5.92	0.96
1.250	0.96	2.833	12.43	4.41/	1.91	6.00	0.96
1.333	5.74	2.91/	12.43	4.500	1.91	6.08	0.96
1.41/	5.74	2.000	12.43	4.303	1.91	6.25	0.96
1 583	5 74	3 167	12.43	4.007	1 91	0.25	0.90
1.505	5.74	1 3.107	12.45	1 4.750	1.51		
Max Eff Inten (mm)	(hr)=	43 98		24 02			
over (n	in	5.00		10.00			
Storage Coeff. (n	nin)=	3.02	(ii)	7.09 (ii)			
Unit Hvd. Tpeak (n	nin)=	5.00	()	10.00			
Unit Hvd. peak (c	ms)=	0.27		0.14			
, , ,					*TOT	ALS*	
PEAK FLOW (c	cms)=	0.10		0.01	0.	102 (iii)	)
TIME TO PEAK (H	nrs)=	2.75		2.75	2	2.75	
RUNOFF VOLUME (	(mm)=	46.81		19.33	44	.06	
TOTAL RAINFALL (	(mm)=	47.81		47.81	47	.81	
RUNOFF COEFFICIENT		0.98		0.40	C	0.92	
* WARNING: STORAGE	COEFF.	IS SMALLE	R THAN	TIME STEP!			
(i) CN PROCEDURE	SELECT	ED FOR PE	RVIOUS	LOSSES:			
CN* = 83.	0 Ia	= Dep. S	torage	(Above)			

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(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.



	MAXIMUM STORA MAXIMUM STORA	GE USED GE USED	(ha.m.) (cu.m.)	= 0.0000 = 0.021707	
**** WARNING	: HYDROGRAPH PE CHECK OUTFLO	AK WAS NOT R W/STORAGE TA	EDUCED. BLE OR RED	UCE DT.	
CALIB   STANDHYD ( 0012)  ID= 1 DT= 5.0 min	   Area (h   Total Imp(	a)= 2.19 %)= 90.00	Dir. Conn.	(%)= 90.00	
Surface Area Dep. Storage Average Slope Length Mannings n	 (ha)= (mm)= (%)= (m)= 1 =	ERVIOUS P 1.97 1.00 1.00 20.83 0.013	ERVIOUS (i) 0.22 5.00 2.00 40.00 0.250		
NOTE: RA	INFALL WAS TRAM	SFORMED TO	5.0 MIN. T	IME STEP.	
T 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 1. 1. 1. 1. 1. 1.	IME         RAIN           hrs         mm/hr           083         0.00           167         0.00           250         0.00           333         0.96           417         0.96           2500         0.96           2500         0.96           2500         0.96           2500         0.96           2500         0.96           2500         0.96           2500         0.96           2000         0.96           250         0.96           250         0.96           250         0.96           250         0.96           250         0.96           250         0.96           250         5.74           583         5.74	TRANSFORM TIME RAIN hrs mm/hr .667 5.74 .833 16.25 .917 16.25 .000 16.25 .000 16.25 .003 16.25 .167 16.25 .333 43.98 .417 43.98 .583 43.98 .583 43.98 .667 43.98 .833 12.43 .917 12.43 .000 12.43 .083 12.43 .167 12.43	ED HYETOGRA TIME hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750	PH            RAIN         TI           mm/hr         h           12.43         4.8           6.69         5.0           6.69         5.0           6.69         5.2           6.69         5.2           6.69         5.2           6.69         5.3           3.82         5.5           3.82         5.5           3.82         5.6           3.82         5.8           1.91         6.0           1.91         6.0           1.91         6.2           1.91         6.2           1.91         6.2           1.91         6.1           1.91         6.2           1.91         6.2           1.91         6.2           1.91         6.2	IME         RAIN           13         0.96           14         0.96           15         0.96           16         0.96           17         0.96           18         0.96           17         0.96           18         0.96           12         0.96           12         0.96           12         0.96           12         0.96           12         0.96           12         0.96           12         0.96           13         0.96           14         0.96           15         0.96           16         0.96           17         0.96           10         0.96           12         0.96           13         0.96           14         0.96           15         0.96
Max.Eff.Inten ovv Storage Coeff Unit Hyd. Tpe Unit Hyd. peal PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALI RUNOFF COEFFI	.(mm/hr)= er (min)= ak (min)= k (cms)= (cms)= (hrs)= (mm)= L (mm)= CIENT =	43.98 5.00 5.00 0.24 0.24 2.75 46.81 47.81 0.98	24.02 10.00 8.05 (ii) 10.00 0.13 0.01 2.75 19.33 47.81 0.40	*TOTALS* 0.253 ( 2.75 44.06 47.81 0.92	(iii)
***** WARNING: STO (i) CN PROC CN* = (i) TIME ST THAN THI (iii) PEAK FL	RAGE COEFF. IS EDURE SELECTED 83.0 Ia = EP (DT) SHOULD E STORAGE COEFF DW DOES NOT INC	SMALLER THAN FOR PERVIOUS Dep. Storage BE SMALLER O ICIENT. LUDE BASEFLO	TIME STEP! LOSSES: (Above) R EQUAL W IF ANY.	2	
CALIB   STANDHYD ( 0056)  ID= 1 DT= 5.0 min	)   Area (h   Total Imp(	a)= 5.50 %)= 61.00	Dir. Conn.	(%)= 61.00	
Surface Area Dep. Storage Average Slope Length Mannings n	IMF (ha)= (mm)= (%)= (m)= 1 =	ERVIOUS P 3.36 1.00 1.00 91.49 0.013	ERVIOUS (i) 2.14 5.00 1.00 40.00 0.250		
NOTE: RA	INFALL WAS TRAN	SFORMED TO	5.0 MIN. T	IME STEP.	
		TRANSFORM	ED HYETOGRA	PH RAIN   TI	ME RAIN

$\begin{array}{ccccccc} 0.167 & 0.00 \\ 0.250 & 0.00 \\ 0.333 & 0.96 \\ 0.417 & 0.96 \\ 0.500 & 0.96 \\ 0.583 & 0.96 \\ 0.667 & 0.96 \\ 0.667 & 0.96 \\ 0.750 & 0.96 \\ 0.917 & 0.96 \\ 1.000 & 0.96 \\ 1.083 & 0.96 \\ 1.083 & 0.96 \\ 1.67 & 0.96 \\ 1.250 & 0.96 \\ 1.333 & 5.74 \\ 1.417 & 5.74 \\ 1.583 & 5.74 \end{array}$		74       3.333         25       3.417         25       3.500         25       3.583         25       3.667         25       3.750         25       3.750         25       3.917         98       4.000         98       4.083         98       4.167         98       4.250         98       4.417         43       4.583         43       4.667         43       4.583         43       4.750	$\begin{array}{c cccc} 6.69 & 4.92 \\ 6.69 & 5.00 \\ 6.69 & 5.08 \\ 6.69 & 5.17 \\ 6.69 & 5.25 \\ 6.69 & 5.33 \\ 3.82 & 5.42 \\ 3.82 & 5.50 \\ 3.82 & 5.58 \\ 3.82 & 5.58 \\ 3.82 & 5.67 \\ 3.82 & 5.75 \\ 3.82 & 5.75 \\ 3.82 & 5.92 \\ 1.91 & 6.00 \\ 1.91 & 6.08 \\ 1.91 & 6.17 \\ 1.91 & 6.25 \\ 1.91 & 0 \\ $	0.96 0.96
Max.Eff.Inten.(mm/hr)= over (min) Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)=	43.98 5.00 5.24 (ii) 5.00 0.21	21.81 25.00 21.22 (ii) 25.00 0.05	*10141 5*	
PEAK FLOW (cms)= TIME TO PEAK (hrs)= RUNOFF VOLUME (mm)= TOTAL RAINFALL (mm)= RUNOFF COEFFICIENT =	0.41 2.75 46.81 47.81 0.98	0.08 3.00 19.33 47.81 0.40	0.471 (iii) 2.75 36.09 47.81 0.75	)
(i) CN PROCEDURE SELECT CN* = 83.0 Ia (ii) TIME STEP (DT) SHOU THAN THE STORAGE CO (iii) PEAK FLOW DOES NOT	ED FOR PERVIO = Dep. Stora LD BE SMALLER EFFICIENT. INCLUDE BASEF	US LOSSES: ge (Above) OR EQUAL LOW IF ANY.		
RESERVOIR( 0057)   OVERF   IN= 2> OUT= 1   DT= 5.0 min   OUTFL (cms 0.000	LOW IS OFF OW STORAGE ) (ha.m.) OO 0.0000	OUTFLOW   (cms)   0.4170	STORAGE (ha.m.) 0.1822	
INFLOW : ID= 2 ( 0056) OUTFLOW: ID= 1 ( 0057)	AREA QP (ha) (c 5.500 5.500	EAK TPEAK ms) (hrs) 0.471 2. 0.195 3.	R.V. (mm) 75 36.09 17 36.07	
PEAK FLOW TIME SHIFT MAXIMUM ST	DF PEAK FLOW DRAGE USED	[Qout/Qin](%) (min) (ha.m.)	= 41.26 = 25.00 = 0.0850	
$\begin{vmatrix} ADD HYD & (0009) \\ 1 + 2 = 3 \end{vmatrix} All ID1= 1 (0011): 4 + ID2= 2 (0012): 2 ID = 3 (0009): 6 ID = 3 (0009): 7 ID = 3$	REA QPEAK ha) (cms) .52 0.158 .19 0.253	TPEAK (hrs) 3.08 19 2.75 44 2.75 27	R.V. (mm) .32 .06	
NOTE: PEAK FLOWS DO NOT	INCLUDE BASEF	LOWS IF ANY.		
$\begin{vmatrix} ADD & HYD & ( & 0009) \\   & 3 + 2 = 1 &   & A  \\ \hline & ID1 = 3 & ( & 0009) : & 6 \\ + & ID2 = 2 & ( & 0055) : & 0 \\ \hline & ID = 1 & ( & 0009) : & 7 \end{vmatrix}$	REA OPEAK ha) (cms) .71 0.365 .88 0.102 .59 0.467	TPEAK (hrs) 2.75 27 2.75 44 2.75 29	R.V. (mm) .40 .06	
NOTE: PEAK FLOWS DO NOT	INCLUDE BASEF	LOWS IF ANY.		
ADD HYD ( 0009) 1 + 2 = 3 A	REA QPEAK	ТРЕАК	R.V.	

ID1= 1 ( 0009): + ID2= 2 ( 0057):	(ha) (c 7.59 0.4 5.50 0.1	ms) (hrs) 67 2.75 95 3.17	(mm) 29.33 36.07		
ID = 3 ( 0009):	13.09 0.6	37 2.75	32.16		
NOTE: PEAK FLOWS DO N	OT INCLUDE B	ASEFLOWS IF A	NY.		
RESERVOIR( 0063)  0V/   IN= 2> OUT= 1     DT= 5.0 min   0U 00 0 0 0 0 0 0 0	ERFLOW IS OF TFLOW STC cms) (ha .0000 0. .0700 0. .1000 0. .1300 0.	F RAGE   OUT L.m.)   (c 0000   0. 1180   0. 1585   0. 1851   0.	FLOW STO ms) (ha 1600 0 1800 0 2080 0 0000 0	RAGE ) 	
INFLOW : ID= 2 ( 0009) OUTFLOW: ID= 1 ( 0063) PEAK FI TIME SHI MAXIMUM	AREA (ha) 13.090 13.090 LOW REDUCT FT OF PEAK F STORAGE U	QPEAK T (cms) ( 0.637 0.176 ION [Qout/Qin LOW ( SED (ha	PEAK hrs) 2.75 4.50 ](%)= 27.62 min)=105.00 .m.)= 0.23	R.V. (mm) 32.16 32.13 84	
CALIB   STANDHYD ( 0058)   Area  ID= 1 DT= 5.0 min   Tota	(ha)=   Imp(%)= 9	1.63 0.00 Dir. C	onn.(%)= 9	0.00	
Surface Area (ha)= Dep. Storage (mm)= Average Slope (%)= Length (m)= Mannings n = NOTE: RAINFALL WAY	IMPERVIOU 1.47 1.00 1.00 104.24 0.013 5 TRANSFORME	IS PERVIOUS 0.16 5.00 40.00 0.250 ED TO 5.0 MI	(i) N. TIME STE	Р.	
TIME RA hrs mm/ 0.083 0. 0.167 0. 0.250 0. 0.333 0. 0.417 0. 0.500 0. 0.583 0. 0.667 0. 0.750 0. 0.833 0. 0.917 0. 1.000 0. 1.083 0. 1.167 0. 1.250 0. 1.333 5. 1.417 5. 1.580 5.	TRA IN TIME TIME 100 1.667 1.750 1.833 1.917 1.833 1.917 1.96 2.000 1.833 1.917 1.96 2.000 1.917 1.96 2.083 1.917 1.96 2.250 1.96 2.250 1.96 2.583 1.96 2.583 1.97 4.3.088 1.97 4.3.088 1.97 4.3.088 1.97 4.3.088 1.96 2.588 1.97 4.3.088 1.97 4.	NSFORMED HYET RAIN   TI mm/hr   h 5.74 3.25 5.74 3.25 16.25 3.41 16.25 3.50 16.25 3.60 16.25 3	OGRAPH ME RAIN rs mm/hr 0 12.43 3 6.69 7 6.69 0 6.69 3 6.69 3 6.69 0 6.69 3 3.82 0 3.82 0 3.82 3 3.82 0 3.82 0 3.82 3 3.82 0 3.82 3 3.82 0 3.82 3 1.91 7 1.91 0 1.91 0 1.91	TIME         RAIN           hrs         mm/hr           4.83         0.96           5.00         0.96           5.08         0.96           5.17         0.96           5.25         0.96           5.33         0.96           5.50         0.96           5.50         0.96           5.58         0.96           5.75         0.96           5.75         0.96           6.00         0.96           6.00         0.96           6.17         0.96           6.25         0.96	
Max.Eff.Inten.(mm/hr)= over (min) Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)= PEAK FLOW (cms)= TIME TO PEAK (hrs)= RUNOFF VOLUME (mm)= TOTAL RAINFALL (mm)= RUNOFF COEFFICIENT =	43.98 5.00 3.64 5.00 0.25 0.18 2.75 46.81 47.81 0.98	21.81 20.00 (ii) 19.62 20.00 0.06 0.01 2.92 19.33 47.81 0.40	(ii) *TOT 0. 2 44 47 0 0	ALS* 185 (iii) .75 .05 .81 .92	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 83.0 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( 0073)	OVERFLOW	IS OFF			
IN= 2> OUT= 1   DT= 5.0 min 	OUTFLOW (cms) 0.0000 0.0120 0.0178 0.0216	STORAGE (ha.m.) 0.0000 0.0426 0.0560 0.0670	OUTFLOW (cms) 0.0270 0.0313 0.0356 0.0000	STORAGE (ha.m.) 0.0780 0.0880 0.0949 0.0000	
INFLOW : ID= 2 ( 0 OUTFLOW: ID= 1 ( 0	AR (h 0058) 1. 0073) 1.	EA QPEAK a) (cms) 630 0.1 630 0.0	TPEAK (hrs) 85 2.7 18 4.0	R.V. (mm) 5 44.05 0 43.50	
PE4 TIN MA)	NK FLOW R NE SHIFT OF P XIMUM STORAG	EDUCTION [Qo EAK FLOW E USED	out/Qin](%)= (min)= (ha.m.)=	9.73 75.00 0.0565	
CALIB   STANDHYD ( 0071)   ID= 1 DT= 5.0 min	Area (ha Total Imp(%	)= 0.25 )= 90.00	Dir. Conn.(	%)= 90.00	
Surface Area Dep. Storage Average Slope Length Mannings n	IMPE (ha)= (mm)= (%)= (m)= 4 = 0	RVIOUS PE 0.22 1.00 1.00 0.82 .013	RVIOUS (i) 0.03 5.00 2.00 40.00 0.250		
NOTE: RAINFA	LL WAS TRANS	FORMED TO	5.0 MIN. TI	ME STEP.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583	RAIN         T           mm/hr         0.00         1.           0.00         1.         0.00           0.96         2.         0.96           0.96         2.         0.96           0.96         2.         0.96           0.96         2.         0.96           0.96         2.         0.96           0.96         2.         0.96           0.96         2.         0.96           0.96         2.         0.96           0.96         2.         0.96           0.96         2.         0.96           0.96         2.         0.96           0.96         2.         0.96           0.96         2.         0.74           0.96         2.         5.74           0.74         3.         5.74	- TRANSFORME IME RAIN hrs mm/hr 667 5.74 750 5.74 833 16.25 917 16.25 000 16.25 083 16.25 167 16.25 250 16.25 333 43.98 417 43.98 500 43.98 500 43.98 833 12.43 917 12.43 000 12.43 083 12.43	D HYETOGRAP TIME hrs 3.250 1 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750 24.02	H RAIN   TIME mm/hr   hrs 2.43   4.83 6.69   4.92 6.69   5.00 6.69   5.08 6.69   5.25 6.69   5.25 6.69   5.33 3.82   5.42 3.82   5.58 3.82   5.58 3.82   5.67 3.82   5.83 1.91   5.92 1.91   6.08 1.91   6.01 1.91   6.25 1.91   72   72   72   72   72   72   72   7	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten.(mm over ( Storage Coeff. () Unit Hyd. Tpeak () Unit Hyd. peak () PEAK FLOW () TIME TO PEAK () RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIEN ****** WARNING: STORAGE	//hr)= 4 (min)= (min)= (cms)= (cms)= (hrs)= (mm)= 4 (mm)= 4 TT = E COEFF. IS S	3.98 5.00 2.07 (ii) 5.00 0.31 0.03 2.75 6.81 7.81 0.98 MALLER THAN	24.02 10.00 6.14 (ii) 10.00 0.15 0.00 2.75 19.33 47.81 0.40 TIME STEP!	*TOTALS* 0.029 (iii) 2.75 44.05 47.81 0.92	
(i) CN PROCEDUR CN* = 8 (ii) TIME STEP ( THAN THE ST (iii) PEAK FLOW D	RE SELECTED F 3.0 Ia = D (DT) SHOULD B ORAGE COEFFI DOES NOT INCL	OR PERVIOUS ep. Storage E SMALLER OR CIENT. UDE BASEFLOW	LOSSES: (Above) E EQUAL IF ANY.		
CALIB					

Set 1. Solution and a set of the second second		IMPERVIOUS	PERVIOUS (i)	)		
Surface Area	(ha)=	0.19	0.02			
Average Slope	(%)=	1.00	2.00			
Length	(m)=	37.42	40.00			
Mannings n	=	0.013	0.250			
NOTE: RA	INFALL WAS T	RANSFORMED TO	5.0 MIN. 7	TIME STEP.		
-		TRANSFOR	MED HYETOGR	APH		
1.	LME RAIN	IIME RAJ   brs mm/k	IN   IIME	RAIN	hrs	mm/hr
0.0	0.00	1.667 5.7	4 3.250	12.43   4	1.83	0.96
0.:	L67 0.00	1.750 5.7	4 3.333	6.69	.92	0.96
0.	33 0.96	1.833 16.2	25   3.417	6.69	.00	0.96
0.4	17 0.96	2.000 16.2	3.583	6.69	.17	0.96
0.	0.96	2.083 16.2	25 3.667	6.69	.25	0.96
0.0	367 0.96	2.250 16.2	3.833	3.82	.42	0.96
0.1	/50 0.96	2.333 43.9	8 3.917	3.82	.50	0.96
0.0	0.96 017 0.96	2.41/ 43.9	98   4.000 98   4.083	3.82	.58	0.96
1.0	0.96	2.583 43.9	8 4.167	3.82	.75	0.96
1.0	0.96	2.667 43.9	8 4.250	3.82	.83	0.96
1.1	250 0.96	2.833 12.4	4.417	1.91	5.00	0.96
1.	333 5.74	2.917 12.4	4.500	1.91	.08	0.96
1.4	500 5.74	3.083 12.4	4.583	1.91	5.25	0.96
1.	5.74	3.167 12.4	4.750	1.91		
Max.Eff.Inten	(mm/hr)=	43.98	24.02			
Storage Coeff	(min)=	1.97 (ii)	6.04 (ii)	)		
Unit Hyd. Tper	ak (min)=	5.00	10.00			
Unit nya. pea	(Cms)=	0.51	0.15	*TOTAL	*	
PEAK FLOW	(cms)=	0.02	0.00	0.024	(iii)	
RUNOFE VOLUME	(hrs)=	2.75	2.75	44.0		
TOTAL RAINFAL	_ (mm)=	47.81	47.81	47.8	i.	
RUNOFF COEFFIC	CIENT =	0.98	0.40	0.9		
** WARNING: STO	AGE COEFF.	IS SMALLER THA	N TIME STEP	!		
(i) CN PROC	DURE SELECT	ED FOR PERVIOU	IS LOSSES:			
(ii) TIME ST	83.0 Ia	= Dep. Storag	ge (Above)			
THAN TH	STORAGE CO	EFFICIENT.	OK EQUAL			
(iii) PEAK FL	W DOES NOT	INCLUDE BASEFL	OW IF ANY.			
		LOW IS OFF				
ESERVOIR( 0075) N= 2> OUT= 1	) OVERF					
ESERVOIR( 0075) N= 2> OUT= 1 T= 5.0 min	OVERF	W STORAGE	OUTFLO	N STORA	Ę	
ESERVOIR( 0075) N= 2> OUT= 1 T= 5.0 min	) OVERF	OW STORAGE ) (ha.m.) 00 0.0000	0UTFL0 (cms)	W STORAG (ha.m 2 0.0	SE )	
ESERVOIR( 0075) N= 2> OUT= 1 T= 5.0 min	) OVERF 0UTFL (cms 0.00 0.00	OW STORAGE ) (ha.m.) 00 0.0000 19 0.0055	0UTFL0 (cms) 0.0042	W STORAG (ha.m 2 0.02 9 0.02	E ) 100	
ESERVOIR( 0075) N= 2> OUT= 1 T= 5.0 min	)  OVERF     OUTFL (cms 0.00 0.00 0.00	DW STORAGE ) (ha.m.) 00 0.0000 19 0.0055 28 0.0072 34 0.0086	OUTFLO (cms) 0.0042 0.0045	W STORAG (ha.m. 2 0.00 9 0.00 6 0.00	SE ) 100 113 122 000	
ESERVOIR( 0075) N= 2> OUT= 1 T= 5.0 min	) OVERF   OUTFL: (cms (cms 0.00 0.00 0.00 0.00	0W STORAGE ) (ha.m.) 00 0.0000 19 0.0055 28 0.0072 34 0.0086	OUTFLO (cms) 0.0042 0.0042 0.0042 0.0042 0.0042	W STORAG (ha.m 2 0.0 9 0.0 6 0.0 0 0.0 0 0.0	SE ) 100 113 122 000	
SERVOIR( 0075) = 2> OUT= 1 = 5.0 min	)  OVERF     OUTFL (cms 0.00 0.00 0.00 0.00	DW STORAGE ) (ha.m.) 00 0.0000 19 0.0055 28 0.0072 34 0.0086 AREA QPE (ha) (cn	OUTFLO (cms) 0.004 0.004 0.005 0.000 AK TPEA ns) (hrs)	W STORA (ha.m 2 0.0 9 0.0 6 0.0 0 0.0 0 0.0 K R. <sup>1</sup>	SE ) 100 113 122 000 /.	
SERVOIR( 0075) = 2> OUT= 1 = 5.0 min NFLOW : ID= 2	) OVERF OUTFL Crms 0.00 0.00 0.00 0.00 0.00 0.00	DW STORAGE ) (ha.m.) 00 0.0000 19 0.0055 28 0.0072 34 0.0086 AREA QPE (ha) (cn 0.210	OUTFLOI (cms) 0.0042 0.0044 0.0056 0.0000 EAK TPEAI ns) (hrs) 0.024 2	W STORA (ha.m 2 0.0 6 0.0 6 0.0 0 0.0 K R. ) (m .75 4	E ) 100 13 122 000 /. ) +.05	
SERVOIR( 0075) = 2> OUT= 1 = 5.0 min NFLOW : ID= 2 OUTFLOW: ID= 1	) OVERF 0UTFL 0.00 0.00 0.00 0.00 0.00 0.00	DW         STORAGE           )         (ha.m.)           00         0.0000           19         0.0055           28         0.0072           34         0.0086           AREA         QPE           (ha)         (cm           0.210         (cm)	OUTFL01 (cms) 0.0042 0.0044 0.0051 0.00051 0.0000 EAK TPEAI ns) (hrs) 0.024 2 0.003 3	W STORA( (ha.m. 2 0.0: 9 0.0: 6 0.0: 0 0.00 0 0.00 K R.1 ) (m. .75 44 .83 44	E ) 100 113 122 000 /. 1) 1.05 0.58	
ESERVOIR( 0075) N= 2> OUT= 1 T= 5.0 min INFLOW : ID= 2 DUTFLOW: ID= 1	) OVERF OUTFL Cms 0.00 0.0	OW         STORAGE           )         (ha.m.)           00         0.0000           19         0.0055           28         0.0072           34         0.0086           AREA         QPE           (ha)         (cm           0.210         (Cm)           0E         PEAK           EDUCTION         (Cm)	OUTFLOI (cms) 0.004; 0.004; 0.005; 0.005; 0.000; AK TPEAI ns) (hrs; 0.024 2; 0.003 3; [Qout/Qin] (%	W STORA( (ha.m 2 0.0) 5 0.0) 5 0.00 0 0.00 K R.1 0 (m 75 4 4 .83 44 )= 11.25 = 65.00	6E 100 113 122 100 1.13 1.22 100 1.13 1.22 1.00 1.13 1.22 1.00 1.13 1.22 1.00 1.13 1.22 1.00 1.13 1.22 1.00 1.13 1.22 1.00 1.13 1.22 1.00 1.13 1.22 1.00 1.13 1.22 1.00 1.13 1.22 1.00 1.13 1.22 1.00 1.13 1.22 1.00 1.13 1.22 1.00 1.13 1.22 1.00 1.13 1.22 1.00 1.13 1.22 1.05 1.55 1	
ESERVOIR( 0075) N= 2> OUT= 1 T= 5.0 min INFLOW : ID= 2 OUTFLOW: ID= 1	)  OVERF     OUTFL (cms 0.00 0.00 0.00 0.00 0.00 ( 0074) ( 0075) PEAK FLOW TIME SHIFT TIME SHIFT ( MAXIMUM ST	DW         STORAGE           )         (ha.m.)           00         0.0000           19         0.0055           28         0.0072           34         0.0086           AREA         QPE           (ha)         (cm           0.210         (C           0.210         (C           0.5210         (C           0F         PEAK           DFAGE         USED	OUTFLOI (cms) 0.004; 0.004; 0.005; 0.005; 0.0000 EAK TPEAI ns) (hrs; 0.024 2 0.003 3 [Qout/Qin](%; (min] (ha.m.)	W STORA( (ha.m 2 0.0) 6 0.0) 0 0.00 0 0.00 K R.1 ) (m .75 4, .83 44 )= 11.25 )= 65.00 )= 0.0071	E) 100 113 122 100 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	
ESERVOIR( 0075) N= 2> OUT= 1 T= 5.0 min INFLOW : ID= 2 OUTFLOW: ID= 1	)  OVERF   OUTFL (cms 0.00 0.00 0.00 0.00 ( 0074) ( 0075) PEAK FLOW TIME SHIFT MAXIMUM ST	DW STORAGE ) (ha.m.) 00 0.0000 19 0.0055 28 0.0072 34 0.0086 AREA QPE (ha) (cm 0.210 (C 0.210 (C REDUCTION ( DF PEAK FLOW DRAGE USED	OUTFLOI (cms) 0.004 0.005i 0.0000 EAK TPEAI ns) (hrs 0.024 2 0.003 3 [Qout/Qin](% (min (ha.m.)	W STOR4( (ha.m 2 0.0) 6 0.0) 6 0.0) 0 0.00 K R.1 ) (m 75 44 83 4( )= 11.25 )= 65.00 )= 0.0071	5E ) 100 113 122 000 /. ) 1.05 ).58	
ESERVOIR( 0075) N= 2> OUT= 1 T= 5.0 min INFLOW : ID= 2 OUTFLOW: ID= 1	0  OVERF   OUTFL (cms 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	DW STORAGE ) (ha.m.) 00 0.0000 19 0.0055 28 0.0072 34 0.0086 AREA QPE (ha) (cn 0.210 ( 0.210 ( REDUCTION   DF PEAK FLOW DRAGE USED	OUTFLOI (cms) 0.004; 0.004; 0.005; 0.000 EAK TPEAI ns) (hrs; 0.024 2 0.003 3 [Qout/Qin](% (min; (ha.m.)	W STORA( (ha.m 2 0.0) 9 0.0) 6 0.0) 0 0.00 K R. ), (m 75 4 4.83 44 )= 11.25 )= 65.00 )= 0.0071	5E ) 100 113 122 000 /. ) 1.05 0.58	
ESERVOIR( 0075) N= 2> OUT= 1 T= 5.0 min INFLOW : ID= 2 DUTFLOW: ID= 1 DUTFLOW: ID= 1 DUTFLOW: ID= 1 DUTFLOW: ID= 1 DUTFLOW: ID= 1 DUTFLOW: ID= 1 DUTFLOW: ID= 2 DUTFLOW: ID= 3 DUTFLOW:	0  OVERF 0 OUTFL (cms 0.00 0.	DW         STORAGE           )         (ha.m.)           00         0.0000           19         0.0055           28         0.0072           34         0.0086           AREA         QPE           (ha)         (cm           0.210         (C           0.210         (C	OUTFLOI (cms) 0.004; 0.004; 0.005; 0.005; 0.000; AK TPEAI (min (ha.m.) TPEAK	W STORA( (ha.m 2 0.0) 9 0.0) 6 0.00 0 0.00 K R.1 ) (m 75 4, 83 44 )= 11.25 )= 65.00 )= 0.0071 	5E ) 100 113 122 2000 /. 1) 1.05 0.58	
SERVOIR( 0075) = 2> OUT= 1 = 5.0 min NFLOW : ID= 2 UTFLOW: ID= 1 D HYD ( 0072) 1 + 2 = 3	0  OVERF 0UTFL (cms 0.00	OW         STORAGE           )         (ha.m.)           00         0.0000           19         0.0055           28         0.0072           34         0.0086           AREA         QPE           (ha)         (cm           0.210         (C           0.210         (C           0.210         (C           0.210         (C           0RAGE         USED	OUTFLOI (cms) 0.004; 0.004; 0.005; 0.005; 0.0000 EAK TPEAI (min (ha.m.) TPEAK (hrs)	W STORA( (ha.m 2 0.0) 9 0.0) 6 0.00 0 0.00 K R.1 )= 11.25 )= 65.00 )= 0.0071 R.V. (mm)	5E ) 100 113 122 2000 /. 1) 1.05 0.58	
SERVOIR( 0075) = 2> OUT= 1 = 5.0 min NFLOW : ID= 2 UTFLOW: ID= 1 D HYD ( 0072) 1 + 2 = 3 ID1= 1 { ( )	0  OVERF 0 OUTFL (cms 0.00 0.	OW         STORAGE           )         (ha.m.)           00         0.0000           19         0.0055           28         0.0072           34         0.0086           AREA         QPE           (ha)         (cm           0.210         (C           0.210         (C           0.210         (C           0.210         (C           0.7210         (C           0.746E         USED           0.746E         USED           0.746E         USED           0.75         0.029           .63         0.018	OUTFLOI (cms) 0.004; 0.004; 0.005; 0.005; 0.0000 EAK TPEAI ns) (hrs; 0.024 2 0.003 3 [Qout/Qin](%; (min; (ha.m.) TPEAK (hrs) 2.75 44 4.00 4;	<pre>N STORA( (ha.m 2 0.0) 6 0.0) 0 0.00 0 0.00 K R.1 ) (mm .75 4 .83 44 )= 11.25 )= 65.00 )= 0.0071 R.V. (mm) 4.05 3.50</pre>	5E ) 100 113 122 2000 /. 1) 1.05 0.58	

ID = 3 ( 0072): 1.88 0.041 2.75 43.57 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. ADD HYD ( 0072) | 3 + 2 = 1 | AREA (ha) 1.88 TPEAK (hrs) 2.75 R.V. (mm) 43.57 QPEAK (cms) ID1= 3 ( 0072): + ID2= 2 ( 0075): 0.041 0.21 0.003 3.83 40.58 ID = 1 ( 0072): 2.09 0.043 2.75 43.27 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. -------RESERVOIR( 0065) OVERFLOW IS OFF IN= 2---> OUT= 1 DT= 5.0 min OUTFLOW STORAGE | OUTFLOW STORAGE (cms) 0.0000 (ha.m.) 0.0000 (cms) 0.0330 (ha.m.) 0.0305 \_\_\_\_\_ 0.0150 0.0159 0.0380 0.0340 0.0430 0.0377 0.0220 0.0216 0.0260 0.0256 0.0000 0.0000 QPEAK TPEAK (cms) (hrs) 0.043 2.75 0.017 6.25 AREA R.V. (ha) 2.090 2.090 (mm) 43.27 INFLOW : ID= 2 ( 0072) OUTFLOW: ID= 1 ( 0065) 43.15 
 PEAK
 FLOW
 REDUCTION
 [Qout/Qin] (%)= 40.41

 TIME
 SHIFT OF
 PEAK
 FLOW
 (min)=210.00

 MAXIMUM
 STORAGE
 USED
 (ha.m.)= 0.017
 (min)=210.00 (ha.m.)= 0.0178 \_\_\_\_\_ CALIB | CALIB | STANDHYD ( 0077) |ID= 1 DT= 5.0 min | Area (ha)= 5.46 Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00 Area IMPERVIOUS PERVIOUS (i) Surface Area (ha)= 4.91 0.55 (mm)= (%)= (m)= = Dep. Storage Average Slope 1.00 5.00 190.79 0.013 Length 40.00 0.250 Mannings n NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP. TRANSFORMED HYETOGRAPH TIME RAIN | TIME RAIN |' TIME RAIN TIME RAIN mm/hr 0.00 0.00 hrs 1.667 mm/hr 0.96 hrs mm/hr hrs mm/hr | hrs 4.83 0.083 3.250 5.74 12.43 0.167 1.750 3.333 6.69 4.92 0.96 0.00 1.833 1.917 16.25 16.25 5.00 0.96 0.250 3.417 6.69 0.333 3.500 6.69 0.417 0.500 0.583 0.96 0.96 0.96 2.000 2.083 2.167 16.25 16.25 16.25 5.17 5.25 5.33 3.583 6.69 0.96 3.667 3.750 6.69 0.96 0.96 3.833 5.42 0.96 2.250 0.667 16.25 3.82 0.96 0.96 0.750 2.333 43.98 43.98 3.917 3.82 0.96 2.417 2.500 2.583 4.000 0.833 0.96 0.96 4.083 0.917 0.96 43.98 3.82 5.67 1.000 0.96 43.98 4.167 3.82 5.75 0.96 43.98 43.98 12.43 12.43 12.43 12.43 12.43 12.43 12.43 0.96 0.96 0.96 5.74 1.083 2.667 4.250 3.82 5.83 0.96 2.750 2.833 2.917 4.333 4.417 4.500 1.91 1.91 1.91 5.92 6.00 6.08 1.167 0.96 1.250 0.96 0.96 5.74 3.000 5.74 3.083 5.74 3.167 1.417 1.500 1.583 4.583 4.667 1.91 6.17 0.96 6.25 0.96 4.750 1.91 Max.Eff.Inten.(mm/hr)= 43.98 24.02 over (min)= Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)= 5.00 5.23 (ii) 5.00 10.00 9.30 (ii) 10.00 0.21 0.12 \*TOTALS\* PEAK FLOW (cms)= 0.60 0.03 0.630 (iii) 2.75 TIME TO PEAK (hrs)= RUNOFF VOLUME (mm)= 2.75 2.75

TOTAL RA RUNOFF (	INFALL (mm) OEFFICIENT	= 47 = 0	7.81 ).98	47.81 0.40		47.81 0.92
(i) () (ii) 11 T (iii) PE (iii) PE	I PROCEDURE SE N* = 83.0 ME STEP (DT) IAN THE STORAG AK FLOW DOES	ELECTED FC Ia = De SHOULD BE GE COEFFIC NOT INCLU	DR PERVIOU p. Storag SMALLER IENT. JDE BASEFL	JS LOSSES: je (Above OR EQUAL .OW IF ANY	e) *.	
ADD HYD ( 1 + 2 = ID1= + ID2= ID = NOTE: F	0064) 1 ( 0006): 2 ( 0063): 3 ( 0064): PEAK FLOWS DO	AREA (ha) 30.45 13.09 43.54 NOT INCLU	QPEAK (cms) 0.264 0.176 0.437 JDE BASEFL	TPEAK (hrs) 5.17 4.50 4.83 .OWS IF AN	R.V. (mm) 38.39 32.13 36.51 Y.	
ADD HYD (   3 + 2 = ID1= + ID2= ID = NOTE: F	0064)  1   3 ( 0064): 2 ( 0065): 1 ( 0064): PEAK FLOWS DO	AREA (ha) 43.54 2.09 45.63 NOT INCLU	QPEAK (cms) 0.437 0.017 0.453 JDE BASEFL	TPEAK (hrs) 4.83 6.25 4.83 0WS IF AN	R.V. (mm) 36.51 43.15 36.81 IY.	
ADD HYD (   1 + 2 = ID1= + ID2= ID = NOTE: F	0064)  3   1 ( 0064): 2 ( 0077): 3 ( 0064): 2EAK FLOWS DO	AREA (ha) 45.63 5.46 51.09 NOT INCLU	QPEAK (cms) 0.453 0.630 0.797 JDE BASEFL	TPEAK (hrs) 4.83 2.75 2.75 2.75 OWS IF AN	R.V. (mm) 36.81 44.06 37.59 IY.	
<pre>     ROUTE CHN(     IN= 2&gt; C     DEPTH     (m)     0.10     0.19     0.29     0.38     0.48     0.457     0.67     0.76     0.86     0.95     1.06     1.28     1.39     1.50     1.61     1.72     1.84     1.95 </pre>	CONTRACT NOT STATE	Routing ti A FOR SEC Elevat 101. 100. 100. 99. 99. 100. 101. TRAVEL VOLUME (cu.m.) 53E+02 12E+03 85E+03 84E+03 10E+03 10E+04 13E+04 10E+04 27E+04 27E+04 27E+04 27E+04 27E+04 27E+04 280E+04 13E+04	ime step ( TION ( 50 55 0.0 55 0.0 65 0.0 65 0.0 65 0.0 0.1 0.2 0.3 0.5 0.7 0.9 1.2 1.8 2.2 2.7 3.4 4.1 4.9 5.8 6.7 7.7 8.8	(min)'= 5 1.1) Manning 0.0500 0.0500 0.0300 0.0300 0.0300 0.0300 0.0500 BLE E VELO (m 0 0 0 0 0 0 0 0 0 0 0 0 0		n Channel n Channel n Channel n Channel rrRAV.TIME (min) 43.69 22.76 17.03 14.23 12.51 11.32 10.43 9.74 9.74 9.18 8.72 8.32 7.80 7.31 6.94 6.65 6.41 6.22 6.04 5.90

INFLOW : ID= 2 ( 0064) OUTFLOW: ID= 1 ( 0013)	< hyd AREA QPEAK (ha) (cms) 51.09 0.80 51.09 0.72	rograph> TPEAK R.V. ( (hrs) (mm) 2.75 37.59 2.75 37.58	<-pipe / channel-> MAX DEPTH MAX VEL (m) (m/s) 0.61 0.76 0.57 0.74
CALIB NASHYD (0018) ID= 1 DT= 5.0 min U.H.	(ha)= 10.38 (mm)= 5.00 Tp(hrs)= 0.89	Curve Number # of Linear Res	(CN)= 83.0 .(N)= 3.00
NUIE: RAINFALL WAS	TRANSFORMED TO	5.0 MIN. TIME S	IEP.
TIME         RAII           hrs         mm/h           0.083         0.00           0.167         0.00           0.250         0.00           0.333         0.99           0.417         0.99           0.583         0.99           0.667         0.99           0.750         0.99           0.833         0.99           1.083         0.99           1.083         0.99           1.167         0.99           1.333         5.7           1.417         5.7           1.583         5.7	TRANSFORM N TIME RAIN hrs mm/hr 0 1.667 5.74 0 1.750 5.74 0 1.750 5.74 0 1.750 5.74 0 1.833 16.25 6 2.003 16.25 6 2.083 16.25 6 2.167 16.25 6 2.250 16.25 6 2.417 43.98 6 2.500 43.98 6 2.583 43.98 6 2.667 43.98 6 2.617 12.43 4 3.000 12.43 4 3.003 12.43 4 3.167 12.43	ED HYETOGRAPH ' TIME RAII ' hrs mm/h 3.250 12.43 3.333 6.69 3.417 6.69 3.500 6.69 3.583 6.69 3.667 6.69 3.750 6.69 3.750 6.69 3.833 3.82 4.000 3.82 4.000 3.82 4.000 3.82 4.083 3.82 4.167 3.82 4.250 3.82 4.333 1.91 4.417 1.91 4.500 1.91 4.667 1.91 4.750 1.91	TIME         RAIN           hrs         mm/hr           4.83         0.96           4.92         0.96           5.00         0.96           5.17         0.96           5.25         0.96           5.33         0.96           5.42         0.96           5.58         0.96           5.50         0.96           5.52         0.96           5.53         0.96           5.54         0.96           5.55         0.96           5.58         0.96           5.75         0.96           5.83         0.96           5.92         0.96           6.00         0.96           6.00         0.96           6.17         0.96           6.25         0.96
Unit Hyd Qpeak (cms)= PEAK FLOW (cms)= TIME TO PEAK (hrs)= RUNOFF VOLUME (mm)= TOTAL RAINFALL (mm)= RUNOFF COEFFICIENT = (i) PEAK FLOW DOES NOT	0.445 0.234 (i) 3.667 19.325 47.810 0.404 INCLUDE BASEFLOW	IF ANY.	
CALIB     Area     Area	(ha)= 12.41 Imp(%)= 90.00 IMPERVIOUS P 11.17 1.00	Dir. Conn.(%)= ERVIOUS (i) 1.24 5.00	90.00
Average Slope (%)= Length (m)=	1.00 287.63	2.00 40.00	
Mannings n =	0.013	0.250	TEP
HUTET INTERALE WAS		STO FILME TIPE 3	
TIME RAI hrs mm/h 0.083 0.00 0.167 0.00 0.250 0.00 0.333 0.99 0.417 0.90 0.500 0.99 0.583 0.99 0.667 0.99 0.750 0.99 0.750 0.91 0.833 0.99 1.000 0.94 1.083 0.99	TRANSFORM N   TIME RAIN r hrs mm/hr 0   1.667 5.74 0   1.750 5.74 0   1.833 16.25 6   1.917 16.25 6   2.000 16.25 6   2.083 16.25 6   2.250 16.25 6   2.333 43.98 6   2.583 43.98 6   2.583 43.98 6   2.750 43.98	ED HYETOGRAPH ' TIME RATI hrs mm/h 3.250 12.43 3.333 6.69 3.417 6.69 3.500 6.69 3.583 6.67 3.667 6.69 3.750 6.69 3.750 6.69 3.833 3.82 4.000 3.82 4.000 3.82 4.083 3.82 4.167 3.82 4.250 3.82 4.333 1.91	TIME         RAIN           hrs         mm/hr           4.83         0.96           4.92         0.96           5.00         0.96           5.17         0.96           5.25         0.96           5.33         0.96           5.50         0.96           5.517         0.96           5.525         0.96           5.53         0.96           5.542         0.96           5.58         0.96           5.67         0.96           5.75         0.96           5.75         0.96           5.92         0.96

1.250 1.333 1.417 1.500 1.585	0.96 5.74 5.74 5.74 5.74 5.74 5.74	2.833 2.917 3.000 3.083 3.167	12.43 12.43 12.43 12.43 12.43 12.43	4.417 4.500 4.583 4.667 4.750	1.91 1.91 1.91 1.91 1.91	6.00 6.08 6.17 6.25	0.96 0.96 0.96 0.96
Max.Eff.Inten.(n over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	m/hr)= (min) (min)= (min)= (cms)=	43.98 5.00 6.69 5.00 0.18	(ii)	24.02 15.00 10.76 (ii) 15.00 0.09	*101	A1 C*	
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	(cms)= (hrs)= (mm)= (mm)= NT =	1.35 2.75 46.81 47.81 0.98		0.06 2.83 19.33 47.81 0.40	1. 2 44 47 0	ALS 416 (iii) .75 .06 .81 .92	
(i) CN PROCEDU CN* = 8 (ii) TIME STEP THAN THE S (iii) PEAK FLOW	IRE SELECTE 3.0 Ia (DT) SHOUL STORAGE COE DOES NOT I	ED FOR PE = Dep. S D BE SMA EFFICIENT INCLUDE B	RVIOUS torage LLER OF ASEFLOW	LOSSES: (Above) EQUAL IF ANY.			
CALIB STANDHYD ( 0043) ID= 1 DT= 5.0 min	Area Total In	(ha)= 1 np(%)= 9	1.15 0.00	Dir. Conn.	(%)= 9	0.00	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVIOU 10.03 1.00 1.00 272.64 0.013	S PE	ERVIOUS (i) 1.12 5.00 2.00 40.00 0.250			
NOTE: RAINF	ALL WAS TR	RANSFORME	d to	5.0 MIN. T	IME STE	Ρ.	
TIME hrs 0.08 0.16 0.25 0.33 0.41 0.50 0.58 0.66 0.75 0.83 0.91 1.00 1.08 1.16 1.25 1.35 1.41 1.50 1.58 1.50	RAIN mm/hr 0.00 0.000 0.000 0.96 0.96 0.96 0.96 0.	TRA TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	NSFORME RAIN mm/hr 5.74 16.25 16.25 16.25 16.25 16.25 16.25 16.25 16.25 16.25 16.25 16.25 16.25 16.25 16.25 16.25 16.25 16.25 12.43 12.43 12.43 12.43	D HYETOGRA TIME hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750 24.02	PH RAIN mm/hr 12.43 6.69 6.69 6.69 6.69 3.82 3.82 3.82 3.82 3.82 1.91 1.91 1.91 1.91 1.91	TIME hrs 4.83 4.92 5.00 5.17 5.25 5.33 5.42 5.50 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten.(n over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	<pre>m/hr)= (min)= (min)= (cms)= (cms)= (hrs)= (hrs)= (mm)= (mm)= NT =</pre>	43.98 5.00 6.48 5.00 0.18 1.22 2.75 46.81 47.81 0.98	(ii)	24.02 15.00 10.55 (ii) 15.00 0.09 0.06 2.83 19.33 47.81 0.40	*TOT. 1. 2 44 47 0	ALS* 274 (iii) .75 .06 .81 .92	
(i) CN PROCEDU CN* = 8 (ii) TIME STEP THAN THE S	IRE SELECTE 3.0 Ia (DT) SHOUL STORAGE COE	ED FOR PE = Dep. S _D BE SMA EFFICIENT	RVIOUS torage LLER OF	LOSSES: (Above) E EQUAL			

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

\_\_\_\_\_

RESERVOIR( 0045)	OVERFLOW I	S OFF				
IN= 2> OUI= 1 DT= 5.0 min	OUTFLOW (cms) 0.0000	STORAGE (ha.m.) 0.0000	OUTFLOW   (cms)   1.0400	STORA (ha.m ) 0.3	GE .) 830	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	ARE (ha 0043) 11.1 0045) 11.1	A QPEA ) (cms 50 1. 50 0.	K TPEAK ) (hrs) 274 2. 589 2.	R. (m 75 4 92 4	V. m) 4.06 4.05	
PE TI MA	AK FLOW RE ME SHIFT OF PE KIMUM STORAGE	DUCTION [Q AK FLOW USED	out/Qin](%) (min) (ha.m.)	= 46.20 = 10.00 = 0.2168		
CALIB   STANDHYD ( 0044) D= 1 DT= 5.0 min	Area (ha) Total Imp(%)	= 31.33 = 61.00	Dir. Conn.	(%)= 61.	00	
Surface Area Dep. Storage Average Slope Length Mannings n	IMPER (ha)= 19 (mm)= 1 (%)= 1 (%)= 457 = 0.	VIOUS P .11 .00 .00 .02 013	ERVIOUS (i) 12.22 5.00 1.00 40.00 0.250	(		
NOTE: RAINF	ALL WAS TRANSF	ORMED TO	5.0 MIN. T	IME STEP.		
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583 Max.Eff.Inten.(m	RAIN         TI           mm/hr         h           0.00         1.6           0.00         1.7           0.00         1.8           0.96         2.0           0.96         2.0           0.96         2.1           0.96         2.3           0.96         2.4           0.96         2.5           0.96         2.6           0.96         2.7           0.96         2.8           0.96         2.7           0.96         2.8           5.74         3.0           5.74         3.0           5.74         3.1           m/hr)=         43	TRANSFORM ME RAIN rs mm/hr 67 5.74 33 16.25 17 16.25 50 16.25 50 16.25 50 16.25 50 16.25 50 16.25 33 43.98 17 43.98 83 43.98 50 43.98 50 43.98 50 43.98 33 12.43 17 12.43 00 12.43 67 12.43	ED HYETOGRA TIME hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750 21.81	PH            RAIN         mm/hr           12.43         6.69           6.69         6.69           6.69         6.69           6.69         3.82           3.82         3.82           3.82         3.82           3.82         3.82           1.91         1.91           1.91         1.91           1.91         1.91           1.91         1.91           1.91         1.91	TIME hrs 4.82 5.00 5.17 5.25 5.33 5.42 5.50 5.58 5.58 5.58 5.75 5.83 5.75 5.83 5.92 6.00 6.00 6.00 6.017 6.25	RAIN mm/hr 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96
Max.Eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	n/hr)= 43 (min) 10 (min)= 8 (min)= 10 (cms)= 0	.98 .00 .83 (ii) .00 .12	21.81 25.00 24.81 (ii) 25.00 0.05	*TOTAL	S*	
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	(cms)= 2 (hrs)= 2 (mm)= 46 (mm)= 47 NT = 0	.26 .75 .81 .81 .98	0.44 3.00 19.33 47.81 0.40	2.58 2.7 36.0 47.8 0.7	7 (iii) 5 9 1 5	
(i) CN PROCEDU CN* = 8 (ii) TIME STEP THAN THE S (iii) PEAK FLOW	RE SELECTED FO 3.0 Ia = De (DT) SHOULD BE TORAGE COEFFIC DOES NOT INCLU	R PERVIOUS p. Storage SMALLER O IENT. DE BASEFLO	LOSSES: (Above) R EQUAL W IF ANY.			
RESERVOIR( 0046)  IN= 2> OUT= 1	OVERFLOW I	S OFF				

IN= 2> OUT= 1 DT= 5.0 min	OUTFLOW (cms) 0.0000	STORAGE   (ha.m.) 0.0000		OUTFLOW (cms) 2.2770	STORAGE (ha.m.) 1.0445
	AR	EA	QPEAK	TPEAK	R.V.
	(h	a)	(cms)	(hrs)	(mm)

INFLOW : ID= OUTFLOW: ID=	2 { 0044 1 { 0046	$31.3 \\ $	330 330	2.587 1.079	2.75	36.09 36.09
	PEAK	FLOW R	DUCTION	[Qout/Qin]	(%)= 41	.71
	MAXIMU	JM STORAGE	EAK FLOW	(ha.	m.)= 30	).00 ).4956
ADD HYD ( 0	016)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	
ID1= 1 + ID2= 2	( 0018): 0019):	10.38	0.234	3.67	19.33 44.06	
TD = 3	( 0016):	22.79	1,488	2.75	32.79	-
NOTE: PEA	K FLOWS DO	NOT INCLU	JDE BASEF	LOWS IF AN	IY.	
ADD HYD ( 0	016)		OPEAK	TDEAK	ΡV	
J, 2 - 1	( 0016)	(ha)	(cms)	(hrs)	(mm)	
+ ID2= 2	( 0045):	11.15	0.589	2.92	44.05	
ID = 1	( 0016):	33.94	2.028	2.75	36.49	-
NOTE: PEA	K FLOWS DO	NOT INCLU	JDE BASEF	LOWS IF AN	Ν.	
						(2010), Sole Personething, Spin (2010), Sole Personethin
ADD HYD ( 00	016)	ARFA	OPFAK	TPFAK	R.V.	
	·····	(ha)	(cms)	(hrs)	(mm)	
+ ID1 = 1	( 0016):	33.94	1.079	3.25	36.49	
ID = 3	( 0016):	65.27	2.837	2.75	36.30	-
NOTE: PEA	K FLOWS DO	NOT INCLU	JDE BASEF	LOWS IF AN	Y.	
RESERVOIR( 00 IN= 2> OUT:	015)  = 1	OVERFLOW 1	LS OFF			
DT= 5.0 min		OUTFLOW	STORAGE		LOW	STORAGE
		0.0000	0.0000	0.5	5430	2.2000
		0.0690	0.8600	0.6	5780	2.6500
		0.3000	1.8500	0.8	830	3.3500
		AR	EA QP	EAK TH	PEAK	R.V.
INFLOW : ID=	2 ( 0016	(ha 5) 65.2	a) (c 270	ms) (ł 2.837	2.75	(mm) 36.30
OUTFLOW: ID=	1 ( 0015	5) 65.2	270	0.430	6.17	36.12
	PEAK		DUCTION	[Qout/Qin]	(%) = 15 (in) = 205	.15
	MAXIM	JM STORAGE	USED	(ha.	m.)= 1	.7872
ADD HYD ( 0	060)	AREA	OPEAK	TPEAK	ΡV	
		(ha)	(cms)	(hrs)	(mm)	
1 + 2 - 5	( 00133	51.09	0./18	2.75	36 12	
I + 2 = 3 ID1= 1 + ID2= 2	( 0013): ( 0015):	65.27	0.430	0.1/	30.12	_
IT + 2 = 3 ID1= 1 + ID2= 2 ID = 3	( 0013): ( 0015): ( 0060):	65.27 116.36	0.430	5.33	36.76	
I + Z = 3 IDI= 1 + ID2= 2 ID = 3 NOTE: PEA	( 0013): ( 0015): ( 0060): K FLOWS DO	65.27 116.36 D NOT INCLU	0.430 0.885 JDE BASEF	5.33 LOWS IF AM	36.76 IY.	
I + 2 = 3 IDI = 1 + ID2 = 2 ID = 3 NOTE: PEA ROUTE CHN( 2 IN= 2> OUT	( 0013): ( 0015): ( 0060): K FLOWS DO  255)  = 1	65.27 116.36 D NOT INCLU Routing t	0.430 0.885 JDE BASEF	5.33 (min)'= 5	36.76 IY.	
I + 2 = 3 IDI = 1 + ID2 = 2 ID = 3 NOTE: PEA ROUTE CHN( 2: IN= 2> OUT:	( 0013): ( 0015): ( 0060): K FLOWS DO 255) = 1 < DA	65.27 116.36 D NOT INCLU Routing t	0.430 0.885 JDE BASEF ime step	5.33 LOWS IF AN (min)'= 5 1.1)	36.76 IY.	
I + 2 = 3 IDI = 1 + ID2 = 2 ID = 3 NOTE: PEA ROUTE CHN( 2: IN= 2> OUT	( 0013): ( 0015): ( 0060): K FLOWS DC  255) = 1  	65.27 116.36 D NOT INCLU Routing t ATA FOR SEC Elevat 210	0.430 0.885 JDE BASEF ime step CTION ( tion .02	5.33 LOWS IF AN (min)'= 5 1.1) Manning 0.0600	36.76 IY. 5.00	

	51. 60. 65. 103. 108. 116. 122. 131. 149. 155. 177. 190. 195. 226. 238. 251.	00 44 45 97 18 25 09 52 56 39 88 96 50 71 40	209. 209. 209. 208. 208. 208. 208. 207. 207. 207. 208. 208. 208. 208. 208. 208. 208. 208	76 54 60 41 53 38 33 08 92 65 22 49 58 73 72 32 46 0.04 70	0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450	Mai Mai Mai Mai Mai Mai Mai Mai Mai Mai	h Channel h Channel	
<	EL EV		- TRAVEL	TIME TABL	E		>	
(m)	(m)	G		(cms)	. VEL	n/s)	(min)	
0.11	207.75	. 60	1F+03	0.0		0.12	222.56	
0.21	207.86	.24	1E+04	0.3		0.19	140.20	
0.32	207.97	.54	2E+04	0.8	(	0.25	107.47	
0.43	208.07	.96	9E+04	1.8		0.30	89.07	
0.53	208.18	.15	2E+05	3.3		0.35	76.07	
0.64	208.29	.21	8E+05	5.5		0.40	66.47	
0.75	208.39	.25	0E+05	8.0		0.43	61.92	
0.85	208.50	. 50	96+05	14.2		0.46	60 79	
1.07	208.71	.67	7E+05	20.3		0.48	55.45	
1.17	208.82	.86	1E+05	27.7		0.52	51.74	
1.28	208.93	.10	6E+06	37.5	(	0.57	47.20	
1.39	209.03	.12	8E+06	48.7	(	0.61	43.64	
1.49	209.14	.15	0E+06	61.5		0.66	40.75	
1.60	209.25	.1/	5E+06	76.0		0.70	38.35	
1.71	209.55	.20	8E+06	107.8		0.75	35.28	
1.93	209.58	.26	2E+06	130.3		0.80	33.51	
2.05	209.70	.29	9E+06	156.6		0.84	31.84	
INFLOW : I OUTFLOW: I	D= 2 ( D= 1 (	0060) 2255)	AREA (ha) 116.36 116.36	< hyd QPEAK (cms) 0.89 0.78	lrograph TPEAK (hrs) 5.33 6.92	R.V. (mm) 36.76 36.75	<-pipe / c MAX DEPTH (m) 0.32 0.31	hannel-> MAX VEL (m/s) 0.25 0.24



## VMC - 100yr- 6hr Storm- Existing Condition

Figure 5. VMC - 100yr- 6hr Storm- Existing Condition.

SSSSS U SS U А А А ААААА v v UU (v 6.2.2013) IIII L v ٧ SS Ū Ū Ē v v SS Ū Ū AA AA vv SSSSS ບັບບບບັ 000 ππ ππ H H H H YYY M M MM MM 000 TM 0 0 0 ŏ т т ő Y Y M M M M 0 T н н т 0 000 т н н 000 Developed and Distributed by Smart City Water Inc Copyright 2007 - 2022 Smart City Water Inc All rights reserved. \*\*\*\*\* DETAILED OUTPUT \*\*\*\*\* Input filename: D:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat
Output filename: C:\Users\rhe\AppData\Local\Civica\VH5\562b9aa2-0cdc-4391-a1f5-d8b11ec718d4\32e850c8-7888-4
Summary filename: C:\Users\rhe\AppData\Local\Civica\VH5\562b9aa2-0cdc-4391-a1f5-d8b11ec718d4\32e850c8-7888-4 DATE: 06/18/2024 TIME: 11:03:20 USER: COMMENTS: \_\_\_\_\_ \* \*\* SIMULATION : 100yr Filename: C:\Users\rhe\AppData\ Local\Temp\ 5ba76906-13ea-4b66-90ff-302ac1cad32c\6808d89b READ STORM Ptotal= 80.31 mm Comments: 100 Year 6 Hour AES (Bloor, TRCA) RAIN |' TIME mm/hr |' hrs RAIN mm/hr TIME TIME RAIN TIME RAIN hrs mm/hr | 11.24 | hrs mm/hr hrs 0.00 0.00 1.75 27.30 3.50 5.25 1.61 0.25 1.61 2.00 27.30 73.88 3.75 6.42 5.50 1.61 0.75 1.61 2.50 73.88 4.25 3.21 6.00 1.61 2.75 1.00 1.61 9.64 20.88 4.50 4.75 3.21 1.61 20.88 1.50 9.64 3.25 11.24 5.00 1.61 \_\_\_\_\_ CAL TR (ha)= (mm)= 5.48 NASHYD ( 0002) ID= 1 DT= 5.0 min 0002) Area (ha)= Ia (mm)= U.H. Tp(hrs)= Curve Number (CN)= 79.0 # of Linear Res.(N)= 3.00 0.58 NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP. --- TRANSFORMED HYETOGRAPH ----RAIN mm/hr TIME RAIN TIME RAIN TIME TIME RAIN hrs 0.083 mm/hr 0.00 hrs 1.667 mm/hr 9.64 hrs hrs mm/hr 4.83 3.250 20.88 1.61 0.00 0.00 1.61 0.167 0.250 0.333 1.750 1.833 1.917 3.333 3.417 11.24 9.64 4.92 1.61 27.30 27.30 5.00 1.61 3.500 11.24 1.61 0.417 1.61 2.000 27.30 27.30 27.30 3.583 3.667 11.24 5.17 1.61 1.61 0.583 1.61 2.167 3.750 11.24 5.33 1.61 0.667 1.61 2.250 2.333 27.30 73.88 3.833 3.917 6.42 5.42 1.61 0.833 1.61 2.417 2.500 73.88 6.42 5.58 4.000 1.61 4.083 1.61 1.000 1.61 2.583 73.88 4.167 6.42 5.75 1.61 1.083 1.61 2.667 73.88 4.250 4.333 6.42 3.21 5.83 1.61 1.167 1.61

1.250 1.333 1.417 1.500 1.583	1.61 9.64 9.64 9.64 9.64	2.833 20.8 2.917 20.8 3.000 20.8 3.083 20.8 3.167 20.8	88   4.417 88   4.500 88   4.583 88   4.667 88   4.750	3.21   6.00 3.21   6.08 3.21   6.17 3.21   6.25 3.21	1.61 1.61 1.61 1.61	
Unit Hyd Qpeak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	(cms)= 0. (hrs)= 0. (hrs)= 3. (mm)= 39. (mm)= 80. NT = 0.	361 336 (i) 250 708 310 494				
(i) PEAK FLOW DO	ES NOT INCL	UDE BASEFLO	W IF ANY.			
CALIB STANDHYD ( 0001) ID= 1 DT= 5.0 min	Area ( Total Imp	(ha)= 5.48 5(%)= 90.00	Dir. Conn.	(%)= 90.00		
Surface Area Dep. Storage Average Slope Length Mannings n	IM (ha)= (mm)= (%)= (m)= =	1PERVIOUS 4.93 1.00 1.00 191.14 0.013	PERVIOUS (i) 0.55 1.50 2.00 40.00 0.250			
NOTE: RAINF	ALL WAS TRA	ANSFORMED TO	5.0 MIN. 1	TIME STEP.		
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583 Max.Eff.Inten.(n over	RAIN mm/hr 0.00 0.00 1.61 1.61 1.61 1.61 1.61 1.61	TIME RAY hrs mm/ 1.667 9. 1.750 9. 1.750 9. 1.750 9. 1.833 27. 2.000 27. 2.000 27. 2.003 27. 2.250 27. 2.250 27. 2.333 73. 2.417 73. 2.500 73. 2.500 73. 2.500 73. 2.750 73. 2.750 73. 2.750 73. 2.750 73. 2.750 73. 2.833 20. 2.750 73. 2.750 73. 2.750 73. 2.833 20. 2.750 73. 2.750 73. 2.7	RMED         HYETOGR/ TIME           IN         '         TIME           IN         '         hrs           S4         3.250         54           54         3.250         54           54         3.250         54           50         3.583         30           30         3.583         30           30         3.583           30         3.750           30         3.833           38         4.000           38         4.083           38         4.167           38         4.503           38         4.503           38         4.583           38         4.583           38         4.750           57.08         10.00           7.70         7.02	RAIN mm/hr         TIME hrs           20.88         4.83           11.24         5.00           11.24         5.00           11.24         5.07           11.24         5.17           11.24         5.33           6.42         5.50           6.42         5.58           6.42         5.58           6.42         5.67           6.42         5.83           3.21         5.92           3.21         6.08           3.21         6.17           3.21         6.17           3.21         6.25           3.21         6.25           3.21         6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6	
Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	(min)= (cms)= (cms)= (hrs)= (mm)= (mm)= (mm)=	4.23 5.00 0.23 1.01 2.75 79.31 80.31 0.99	10.00 0.13 0.08 2.75 50.24 80.31 0.63	*TOTALS* 1.092 (iii) 2.75 76.40 80.31 0.95	)	
**** WARNING: STORAG	E COEFF. IS	SMALLER THA	AN TIME STEP!			
(i) CN PROCEDU CN* = 8 (ii) TIME STEP THAN THE S (iii) PEAK FLOW	RE SELECTED 5.0 Ia = (DT) SHOULD TORAGE COEF DOES NOT IN	) FOR PERVIOU = Dep. Storag ) BE SMALLER FFICIENT. WCLUDE BASEFU	US LOSSES: ge (Above) OR EQUAL LOW IF ANY.			
RESERVOIR( 0058) IN= 2> OUT= 1 DT= 5.0 min	OVERFLO OUTFLOW (cms) 0.0000	W IS OFF STORAGE (ha.m.) 0 0.0000	OUTFLOW   (cms)   0.9860	STORAGE (ha.m.) 0 0.0802		
		AREA QPE	EAK TPEAK	K R.V.		

AREA	QPEAK	TPEAK	R.V				
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0001) 0058)	(ha) 5.480 5.480	(cms) 1.09 0.96	(hrs) 2 2 2 2	) .75 .75	(mm) 76.40 76.40	
--	---	---	--	---	--	--	--
PE TI MA	AK FLOW ME SHIFT O XIMUM STO	REDUCTI F PEAK FL RAGE US	ION [Qou LOW SED	t/Qin](% (min (ha.m.)	)= 88.10 )= 0.00 )= 0.08	02	
CALIB STANDHYD ( 0003) ID= 1 DT= 5.0 min	Area Total Im	(ha)= 11 p(%)= 90	L.09 ).00 D	ir. Conn	.(%)= 9	0.00	
Surface Area Dep. Storage Average Slope Length Mannings n	I (ha)= (mm)= (%)= (m)= =	MPERVIOUS 9.98 1.00 1.00 271.91 0.013	5 PER 4 0	VIOUS (i) 1.11 1.50 2.00 0.00 .250	)		
NOTE: RAINF	ALL WAS TR	ANSFORMED	ото 5	.0 MIN.	TIME STE	Р.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583	RAIN mm/hr 0.00 0.00 1.61 1.61 1.61 1.61 1.61 1.61	TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	ISFORMED RAIN   9.64 9.64 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.38 73.88 73.88 73.88 73.88 73.88 73.88 20.88 20.88 20.88 20.88 20.88	HYETOGR, TIME 5.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.167 4.250 4.333 4.667 4.583 4.667 4.750	APH RAIN mm/hr 20.88 11.24 11.24 11.24 11.24 11.24 11.24 11.24 6.42 6.42 6.42 6.42 6.42 6.42 3.21 3.21 3.21 3.21	TIME 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.58 5.67 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN nm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.Eff.inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	m/nr)= (min) (min)= (min)= (cms)=	73.88 5.00 5.26 ( 5.00 0.21	(ii) 1	7.08 0.00 8.56 (ii) 0.00 0.12	)		
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	(cms)= (hrs)= (mm)= (mm)= NT =	2.04 2.75 79.31 80.31 0.99	5 8	0.16 2.75 0.24 0.31 0.63	*101 2. 76 80	ALS* 204 (iii) 2.75 5.40 0.31 0.95	
(i) CN PROCEDU CN* = 8 (ii) TIME STEP THAN THE S (iii) PEAK FLOW	RE SELECTE 5.0 Ia (DT) SHOUL TORAGE COE DOES NOT I	D FOR PER = Dep. St D BE SMAL FFICIENT. NCLUDE BA	RVIOUS L torage LER OR	OSSES: (Above) EQUAL IF ANY.			
RESERVOIR( 0057) IN= 2> OUT= 1 DT= 5.0 min	OVERFL OUTFLO (cms) 0.000	OW IS OFF W STOR (ha. 0 0.0	AGE   .m.)   .0000	OUTFLO (cms) 1.996	w STC (ha 0 C	0RAGE 1.m.) 0.1535	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0003) 0057)	AREA (ha) 11.090 11.090	OPEAK (cms) 2.20 1.94	TPEA (hrs) 4 2 6 2	K ) .75 .75	R.V. (mm) 76.40 76.40	
PE TI MA	AK FLOW ME SHIFT O XIMUM STO	REDUCTI F PEAK FL RAGE US	ION [Qou IOW SED	t/Qin](% (min (ha.m.)	)= 88.29 )= 0.00 )= 0.15	35	

CALI STAN	IB NDHYD ( C L DT= 5.0	0004) min	Area Total	(ha)= Imp(%)=	1.43 90.00	Dir. Conr	n.(%)= 9	90.00	
S C A L N	Surface Ar Dep. Stora Average SI Length Mannings r	rea age lope	(ha)= (mm)= (%)= (m)= =	IMPERVIO 1.29 1.00 1.00 97.64 0.013	US PE	RVIOUS (i 0.14 1.50 2.00 40.00 0.250	)		
	NOTE:	RAINF	ALL WAS	TRANSFORM	ED TO	5.0 MIN.	TIME STE	P.	
		TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.687 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.583	RAIN mm/hr 0.00 0.00 1.61 1.61 1.61 1.61 1.61 1.61	TR hrs 1.667 1.750 1.833 1.917 2.000 2.2.083 2.167 2.250 2.2.333 2.2.417 2.500 2.2.583 2.2.417 2.5667 2.750 2.2.833 2.2.667 2.750 2.2.833 2.2.917 3.000 3.3.083 3.167	ANSFORME RAIN mm/hr 9.64 27.30 27.30 27.30 27.30 27.30 27.30 27.30 73.88 73.88 73.88 73.88 73.88 73.88 20.88 20.88 20.88 20.88 20.88	D HYETOGR TIME hrss 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750	RAIN mm/hr 20.88 11.24 11.24 11.24 11.24 11.24 11.24 11.24 11.24 6.42 6.42 6.42 6.42 6.42 6.42 6.42 6	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.57 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
N S U F F F F F F (	Max.Eff.Ir Storage Co Jnit Hyd. Jnit Hyd. Jnit Hyd. PEAK FLOW RUNOFF VOL TOTAL RAIN RUNOFF COE WARNING: (i) CN F CN <sup>a</sup> (ii) TIME (iii) PEAM	T. Sas over seff. Tpeak peak EAK UME IFALL EFFICIEI STORAGE PROCEDUI = 8 E STEP STEP S THE S C FLOW I	<pre>// (min)= (min)= (min)= (cms)= (cms)= (hrs)= (mm)= (mm)= (mm)= E COEFF. RE SELEC 5.0 I (DT) SHO (DT) SHO DOES NOT</pre>	73.88 5.00 2.84 5.00 0.28 0.26 2.75 79.31 80.31 0.99 IS SMALL TED FOR P a = Dep. WLD BE SM OEFFICIEN INCLUDE	(ii) ER THAN ERVIOUS Storage ALLER OR T. BASEFLOW	57.08 10.00 6.15 (ii 10.00 0.15 0.02 2.75 50.24 80.31 0.63 TIME STEF LOSSES: (Above) EQUAL IF ANY.	3.21 ( *T01 0, 22 76 80 0	ALS* 286 (iii) .75 .40 .31 .95	
CALI   STAN  ID= 1	IB NDHYD ( C L DT= 5.0	)201) min	Area Total	(ha)= Imp(%)=	0.74 99.00	Dir. Conr	n.(%)= 9	9.00	
S D A L N	Surface Ar Dep. Stora Average Sl Length Mannings r NOTE:	rea age lope n RAINF/	(ha)= (mm)= (%)= (m)= = ALL WAS	IMPERVIO 0.73 2.00 1.00 70.24 0.013 TRANSFORM	US PE ED TO	RV10US (1 0.01 5.00 2.00 40.00 0.250 5.0 MIN.	TIME STE	P.	
		TTHE		TR	ANSFORME	DHYETOGR	APH		DATH
		11ME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583	RAIN 0.00 0.00 1.61 1.61 1.61	hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167	RAIN 9.64 9.64 27.30 27.30 27.30 27.30 27.30	11ME hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750	KAIN mm/hr 20.88 11.24 11.24 11.24 11.24 11.24 11.24	4.83 4.92 5.00 5.08 5.17 5.25 5.33	mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61

0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583	$\begin{array}{c} 1.61 \\ 1.61 \\ 1.61 \\ 1.61 \\ 1.61 \\ 1.61 \\ 1.61 \\ 1.61 \\ 1.61 \\ 9.64 \\ 9.64 \\ 9.64 \\ 9.64 \\ \end{array}$	2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	27.30 73.88 73.88 73.88 73.88 73.88 73.88 20.88 20.88 20.88 20.88 20.88 20.88	3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750	6.42 6.42 6.42 6.42 6.42 3.21 3.21 3.21 3.21 3.21 3.21 3.21 3.2	5.42 5.50 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61
Max.Eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	m/hr)= (min) (min)= (min)= (cms)=	73.88 5.00 2.33 5.00 0.30	(ii)	42.73 5.00 3.60 (ii 5.00 0.26	)	AL 5+	
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIEI	(cms)= (hrs)= (mm)= (mm)= NT =	0.15 2.75 78.31 80.31 0.98		0.00 2.75 35.45 80.31 0.44	0. 2 77 80 0	151 (iii) .75 .88 .31 .97	)
***** WARNING: STORAG	E COEFF. I	S SMALLE	R THAN	TIME STEP	1		
(i) CN PROCEDU CN* = 7 (ii) TIME STEP THAN THE S (iii) PEAK FLOW I	RE SELECTE 5.0 Ia (DT) SHOUL TORAGE COE DOES NOT I	D FOR PE = Dep. S D BE SMA FFICIENT NCLUDE B	RVIOUS torage LLER OF ASEFLOW	LOSSES: (Above) E EQUAL I IF ANY.			
CALIB STANDHYD ( 0202) ID= 1 DT= 5.0 min	Area Total Im	(ha)= 1p(%)= 5	0.49 0.00	Dir. Conn	.(%)= 5	0.00	
Surface Area Dep. Storage Average Slope Length Mannings n	1 (ha)= (mm)= (%)= (m)= =	MPERVIOU 0.25 2.00 1.00 57.15 0.013	S PE	RVIOUS (1 0.25 5.00 2.00 40.00 0.250	)		
NOTE: RAINF	ALL WAS TR	RANSFORME	D TO	5.0 MIN.	TIME STE	Ρ.	
		TRA	NSFORME	D HYETOGR	APH		
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500	RAIN mm/hr 0.00 0.00 1.61 1.61 1.61 1.61 1.61 1.61	TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	RAIN mm/hr 9.64 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.38 73.88 73.88 73.88 73.88 73.88 20.88 20.88 20.88 20.88	<pre>' TIME ' hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750</pre>	RAIN mm/hr 20.88 11.24 11.24 11.24 11.24 11.24 11.24 11.24 6.42 6.42 6.42 6.42 6.42 6.42 6.42 6	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.58 5.75 5.83 5.75 5.83 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAI mm/h 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.Eff.Inten.(m over Storage Coeff. Unit Hvd. Toeak	m/hr)= (min) (min)= (min)=	73.88 5.00 2.06 5.00	(ii)	42.73 15.00 11.98 (ii 15.00	)		
Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL	(cms)= (cms)= (hrs)= (mm)= (mm)=	0.31 0.05 2.75 78.31 80.31		0.09 0.02 2.83 35.45 80.31	*TOT 0. 2 56 80	ALS* 072 (iiii) .75 .87 .31	)

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 75.0 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 ( 020  ID= 1 DT= 5.0 mi	3) Area n Total In	(ha)= 2.95 mp(%)= 99.00	Dir. Conn	n.(%)= 99	9.00	
Surface Area Dep. Storage Average Slop Length Mannings n	(ha)= (mm)= e (%)= (m)= =	IMPERVIOUS 2.92 2.00 1.00 140.24 0.013	PERVIOUS (i 0.03 5.00 2.00 40.00 0.250	)		
NOTE: R	AINFALL WAS T	RANSFORMED TO	5.0 MIN.	TIME STE	Ρ.	
0 0 0 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1	TIME RAIN hrs mm/hr .083 0.00 .167 0.00 .250 0.00 .333 1.61 .417 1.61 .500 1.61 .583 1.61 .667 1.61 .833 1.61 .833 1.61 .917 1.61 .083 1.61 .083 1.61 .167 1.61 .250 1.61 .333 9.64	TRANSEC TIME R hrs mm/ 1.667 9 1.750 9 1.833 27 1.917 27 2.000 27 2.083 27 2.167 27 2.333 73 2.417 73 2.500 73 2.500 73 2.500 73 2.667 73 2.667 73 2.750 73 2.833 20 2.917 20 3.008 20 3.167 20	RMED         HYETOGR           IN         '         TIME           hr         '         hrs           64         3.250         64           64         3.33         30         3.417           30         3.500         3.583         30           30         3.503         3.667         30           30         3.683         4.003         88           88         4.003         88         4.167           88         4.250         88         4.250           88         4.417         88         4.583           88         4.667         88         4.750	APH RAIN mm/hr 20.88 11.24 11.24 11.24 11.24 11.24 11.24 11.24 11.24 6.42 6.42 6.42 6.42 6.42 6.42 6.42 3.21 3.21 3.21 3.21 3.21	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.58 5.67 5.58 5.67 5.58 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.Eff.Inte o Storage Coef Unit Hyd. Tp Unit Hyd. pe PEAK FLOW TIME TO PEAK RUNOFF VOLUM TOTAL RAINFA RUNOFF COEFF ***** WARNING: ST (i) CN PRO CN* 5 (ii) TIME ST THAN T (iii) PEAK F	n.(mm/hr)= ver (min) f. (min)= eak (min)= ak (cms)= (hrs)= E (mm)= LL (mm)= ICIENT = ORAGE COEFF. CEDURE SELECT = 75.0 Ia TEP (DT) SHOU HE STORAGE CO LOW DOES NOT	73.88 5.00 3.53 (ii) 5.00 0.26 0.60 2.75 78.31 80.31 0.98 IS SMALLER TH ED FOR PERVIC = DEP. Stora LD BE SMALLEF EFFICIENT. INCLUDE BASEF	42.73 5.00 4.80 (ii 5.00 0.22 0.00 2.75 35.45 80.31 0.44 MAN TIME STEP US LOSSES: 0.00 2.00 2.00 2.75 35.45 80.31 0.44 US LOSSES: 0.00 2.00 2.00 2.00 2.00 2.00 2.75 35.45 80.31 0.44 US LOSSES: 0.00 2.00 2.00 2.00 2.75 35.45 80.31 0.44 US LOSSES: 0.00 2.00 2.00 2.00 2.75 35.45 80.31 0.44 US LOSSES: 0.00 2.00 2.00 2.00 2.75 35.45 80.31 0.44 US LOSSES: 2.00 2.00 2.00 2.00 2.00 2.00 2.00 2.75 35.45 80.31 0.44 2.00 2.00 2.00 2.00 2.00 2.00 2.00	) *TOT/ 0.( 2 77 80 0	ALS* 603 (iii) .75 .88 .31 .97	
DUHYD ( 020   Inlet Cap.= 0.3	4)  58					

TOTAL HYD.(ID= 1):	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
	2.95	0.60	2.75	77.88
MAJOR SYS.(ID= 2):	0.52	0.24	2.75	77.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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+ ID2= 2 ( 0202):	AREA (ha) 0.74 0.49	QPEAK (cms) 0.151 0.072	TPEAK (hrs) 2.75 2.75	R.V. (mm) 77.88 56.87	
ID = 3 ( 0205):	1.23	0.223	2.75	69.51	
NOTE: PEAK FLOWS D	O NOT INCL	UDE BASEFI	LOWS IF A	NY.	
ADD HYD ( 0205) 3 + 2 = 1 ID1= 3 ( 0205): + ID2= 2 ( 0204):	AREA (ha) 1.23 0.52	QPEAK (cms) 0.223 0.245	TPEAK (hrs) 2.75 2.75	R.V. (mm) 69.51 77.88	
ID = 1 ( 0205):	1.75	0.468	2.75	71.99	
NOTE: PEAK FLOWS D	O NOT INCL	UDE BASEFI	LOWS IF A	WY.	
RESERVOIR( 0206)   IN= 2> OUT= 1  DT= 5.0 min	OVERFLOW (cms) 0.0000 0.0280 0.0410	IS OFF STORAGE (ha.m.) 0.0000 0.0401 0.0647	OUTI   (cr   0.0   0.0	FLOW ns) 0500 0830 0000	STORAGE (ha.m.) 0.0898 0.2129 0.0000
INFLOW : ID= 2 ( 020 OUTFLOW: ID= 1 ( 020 PEAK	AR (h 5) 1. 6) 1. FLOW R	EA QPE a) (cr 747 ( 747 ( EDUCTION	EAK TI ms) (I 0.468 0.051 [Qout/Qin]	PEAK hrs) 2.75 3.33	R.V. (mm) 71.99 71.78
MAXIM	UM STORAG	E USED	(hà	.m.)= 0	.0933
ADD HYD ( 0005)    1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	
ADD HYD ( 0005) 1 + 2 = 3 ID1= 1 ( 0002): + ID2= 2 ( 0206):	AREA (ha) 5.48 1.75	QPEAK (cms) 0.336 0.051	TPEAK (hrs) 3.25 3.33	R.V. (mm) 39.71 71.78	
$\begin{vmatrix} ADD & HYD & ( & 0005) \\ 1 & 1 & 2 & 3 \end{vmatrix}$ $+ \frac{ID1=1}{ID2=2} \begin{pmatrix} 0002): \\ 0206): \\ IDD=3 & ( & 0005): \end{vmatrix}$	AREA (ha) 5.48 1.75 7.23	OPEAK (cms) 0.336 0.051 0.386	TPEAK (hrs) 3.25 3.33 3.25	R.V. (mm) 39.71 71.78 47.46	
ADD HYD ( 0005) 1 + 2 = 3 ID1= 1 ( 0002): + ID2= 2 ( 0206): ID = 3 ( 0005): NOTE: PEAK FLOWS D	AREA (ha) 5.48 1.75 7.23 0 NOT INCL	QPEAK (cms) 0.336 0.051 0.386 UDE BASEFI	TPEAK (hrs) 3.25 3.33 3.25 LOWS IF Al	R.V. (mm) 39.71 71.78 47.46 WY.	
$\begin{vmatrix} ADD & HYD & ( & 0005) \\ 1 & + & 2 & 3 \\ & & 1D1 = 1 & ( & 0002) \\ + & ID2 = 2 & ( & 0206) \\ \hline & & ID = 3 & ( & 0005) \\ \hline & & ID = 3 & ( & 0005) \\ \hline & & & ADD & HYD & ( & 0005) \\ \hline & & & & ID1 = 3 & ( & 0005) \\ + & & ID2 = 2 & ( & 0004) \\ \end{vmatrix}$	AREA (ha) 5.48 1.75 7.23 0 NOT INCL AREA (ha) 7.23 1.43	0PEAK (cms) 0.336 0.051 0.386 UDE BASEFI 0PEAK (cms) 0.386 0.286	TPEAK (hrs) 3.25 3.25 LOWS IF AI TPEAK (hrs) 3.25 2.75	R.V. (mm) 39.71 71.78 47.46 WY. R.V. (mm) 47.46 76.40	
ADD HYD ( 0005) 1 + 2 = 3 ID1= 1 ( 0002): + ID2= 2 ( 0206): ID = 3 ( 0005): NOTE: PEAK FLOWS D ADD HYD ( 0005) 3 + 2 = 1 ID1= 3 ( 0005): + ID2= 2 ( 0004): ID = 1 ( 0005):	AREA (ha) 5.48 1.75 7.23 0 NOT INCL AREA (ha) 7.23 1.43 8.66	OPEAK (cms) 0.336 0.051 0.386 UDE BASEFI OPEAK (cms) 0.386 0.286 0.528	TPEAK (hrs) 3.25 3.33 3.25 LOWS IF Al TPEAK (hrs) 3.25 2.75	R.V. (mm) 39.71 71.78 47.46 YY. R.V. (mm) 47.46 76.40 52.24	
$\begin{vmatrix} ADD & HYD & ( & 0005) \\ 1 & + & 2 & 3 \\ \\ + & ID2 & 2 & ( & 0206) \\ \hline ID & = & 3 & ( & 0005) \\ \hline ID & = & 3 & ( & 0005) \\ \hline NOTE & PEAK & FLOWS & D \\ \hline \\ ADD & HYD & ( & 0005) \\ 3 & + & 2 & = & 1 \\ \hline \\ ID1 & = & 3 & ( & 0005) \\ + & ID2 & 2 & ( & 0004) \\ \hline \\ ID & = & 1 & ( & 0005) \\ \hline \\ ID & = & 1 & ( & 0005) \\ \hline \\ NOTE & PEAK & FLOWS & D \\ \hline \end{aligned}$	AREA (ha) 5.48 1.75 7.23 0 NOT INCL AREA (ha) 7.23 1.43 8.66 0 NOT INCL	OPEAK (cms) 0.336 0.051 0.386 UDE BASEFI OPEAK (cms) 0.386 0.286 0.528 UDE BASEFI	TPEAK (hrs) 3.25 3.33 3.25 LOWS IF AI TPEAK (hrs) 3.25 2.75 2.75 LOWS IF AI	R.V. (mm) 39.71 71.78 47.46 WY. R.V. (mm) 47.46 76.40 52.24 WY.	
$\begin{vmatrix} ADD & HYD & ( & 0005) \\ 1 & + & 2 & 3 \\ \\ + & ID2 & 2 & ( & 0206) \\ \hline ID & = & 3 & ( & 0005) \\ \hline ID & = & 3 & ( & 0005) \\ \hline ID & = & 3 & ( & 0005) \\ \hline ADD & HYD & ( & 0005) \\ \hline 3 & + & 2 & = & 1 \\ \hline ID1 & = & 3 & ( & 0005) \\ \hline + & ID2 & 2 & ( & 0004) \\ \hline ID & = & 1 & ( & 0005) \\ \hline ID & = & 1 & ( & 0005) \\ \hline ID & = & 1 & ( & 0005) \\ \hline NOTE & PEAK & FLOWS D \\ \hline ADD & HYD & ( & 0005) \\ \hline ADD & HYD & ( & 0005) \\ \hline 1 & + & 2 & = & 3 \\ \hline \end{vmatrix}$	AREA (ha) 5.48 1.75 7.23 0 NOT INCL AREA (ha) 7.23 1.43 8.66 0 NOT INCL	0РЕАК (cms) 0.386 0.051 0.386 UDE BASEFI 0.286 0.286 UDE BASEFI	ТРЕАК (hrs) 3.25 3.33 3.25 LOWS IF AI ТРЕАК (hrs) 3.25 2.75 2.75 LOWS IF AI	R.V. (mm) 39.71 71.78 47.46 WY. R.V. (mm) 47.46 76.40 52.24 WY.	
$\begin{vmatrix} ADD & HYD & ( & 0005) \\ 1 & + & 2 & 3 \\ \\ & ID1 = 1 & ( & 0002) \\ + & ID2 = 2 & ( & 0206) \\ \hline & ID = 3 & ( & 0005) \\ \hline & ID = 3 & ( & 0005) \\ \hline & ID = 3 & ( & 0005) \\ \end{vmatrix}$ $\begin{vmatrix} ADD & HYD & ( & 0005) \\ 3 & + & 2 & = 1 \\ \hline & ID1 = 3 & ( & 0005) \\ + & ID2 = 2 & ( & 0004) \\ \hline & ID = 1 & ( & 0005) \\ \hline & ID = 1 & ( & 0005) \\ \end{vmatrix}$ $\begin{vmatrix} ADD & HYD & ( & 0005) \\ ID = 1 & ( & 0005) \\ 1 & + & 2 & = 3 \\ \hline & ID1 = 1 & ( & 0005) \\ + & ID2 = 2 & ( & 00057) \\ \end{vmatrix}$	AREA (ha) 5.48 1.75 7.23 0 NOT INCL AREA (ha) 7.23 1.43 8.66 0 NOT INCL AREA (ha) 8.66 11.09	QPEAK (cms) 0.386 UDE BASEFI QPEAK (cms) 0.528 UDE BASEFI 0.528 UDE BASEFI QPEAK (cms) 0.528 1.946	TPEAK (hrs) 3.25 3.33 3.25 LOWS IF AI TPEAK (hrs) 3.25 2.75 2.75 LOWS IF AI TPEAK (hrs) 2.75 2.75	R.V. (mm) 39.71 71.78 47.46 WY. R.V. (mm) 47.46 76.40 52.24 WY. R.V. (mm) 52.24 YY.	
ADD HYD ( 0005) 1 + 2 = 3 ID1= 1 ( 0002): + ID2= 2 ( 0206): ID = 3 ( 0005): NOTE: PEAK FLOWS D ADD HYD ( 0005) 3 + 2 = 1 ID1= 3 ( 0005): + ID2= 2 ( 0004): ID = 1 ( 0005): NOTE: PEAK FLOWS D ADD HYD ( 0005) 1 + 2 = 3 ID1= 1 ( 0005): + ID2= 2 ( 0057): ID1= 3 ( 0005): ID = 3 ( 0005):	AREA (ha) 5.48 1.75 7.23 0 NOT INCL AREA (ha) 7.23 1.43 8.66 0 NOT INCL AREA (ha) 8.66 11.09 19.75	QPEAK (cms) 0.386 0.051 0.386 UDE BASEFI QPEAK (cms) 0.528 UDE BASEFI QPEAK (cms) 0.528 UDE BASEFI 0.528	TPEAK (hrs) 3.25 3.33 3.25 LOWS IF AI TPEAK (hrs) 3.25 2.75 2.75 LOWS IF AI TPEAK (hrs) 2.75 2.75 2.75	R.V. (mm) 39.71 71.78 47.46 76.40 52.24 YY. R.V. (mm) 52.24 YY. 52.24 76.40 65.81	-
ADD HYD ( 0005) 1 + 2 = 3 ID1= 1 ( 0002): + ID2= 2 ( 0206): ID = 3 ( 0005): NOTE: PEAK FLOWS D ADD HYD ( 0005) 3 + 2 = 1 ID1= 3 ( 0005): + ID2= 2 ( 0004): ID = 1 ( 0005): NOTE: PEAK FLOWS D ADD HYD ( 0005) 1 + 2 = 3 ID1= 1 ( 0005): + ID2= 2 ( 0057): ID1= 3 ( 0005): NOTE: PEAK FLOWS D ADD HYD ( 0005) 1 + 2 = 3	AREA (ha) 5.48 1.75 7.23 0 NOT INCL AREA (ha) 7.23 1.43 8.66 0 NOT INCL AREA (ha) 8.66 11.09 19.75 0 NOT INCL	QPEAK (cms) 0.386 0.051 0.386 UDE BASEFI QPEAK (cms) 0.528 UDE BASEFI QPEAK (cms) 0.528 UDE BASEFI 0.528	TPEAK (hrs) 3.25 3.33 3.25 LOWS IF Al TPEAK (hrs) 2.75 2.75 2.75 2.75 2.75 2.75 2.75 2.75	R.V. (mm) 39.71 71.78 47.46 76.40 52.24 YY. R.V. (mm) 52.24 YY. 65.81 YY.	-

ID = 1 (0)	0005): 25.23 3.436 2.75 68.11
NOTE: PEAK FL	LOWS DO NOT INCLUDE BASEFLOWS IF ANY.
RESERVOIR( 0006)   IN= 2> OUT= 1   DT= 5.0 min	) OVERFLOW IS OFF
	(cms) (ha.m.) (cms) (ha.m.) 0.0000 0.0000 1.3700 1.1250 0.7950 0.3050 2.1000 1.3480 0.9350 0.5080 3.0000 1.5700 1.0700 0.7100 4.5500 1.7980 1.1700 0.9180 6.6500 2.0250
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) ( 0005) 25.227 3.436 2.75 68.11 ( 0006) 25.227 1.104 3.58 68.11
	PEAK FLOW REDUCTION [Qout/Qin](%)= 32.12 TIME SHIFT OF PEAK FLOW (min)= 50.00 MAXIMUM STORAGE USED (ha.m.)= 0.7805
CALIB   NASHYD ( 0011)  ID= 1 DT= 5.0 min	
NOTE: RAI	INFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.
T]	$\begin{array}{c c c c c c c c c c c c c c c c c c c $
1.5	500         9.64         5.083         20.88         4.667         5.21         6.25         1.61           583         9.64         3.167         20.88         4.750         3.21         6.25         1.61
Unit Hyd Qpeak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFIC	k (cms)= 0.260 (cms)= 0.214 (i) (hrs)= 3.000 (mm)= 39.705 L (mm)= 80.310 CIENT = 0.494
(i) PEAK FLOW	DOES NOT INCLUDE BASEFLOW IF ANY.
CALIB   NASHYD ( 0401)  ID= 1 DT= 5.0 min	   Area (ha)= 3.66 Curve Number (CN)= 80.0   Ia (mm)= 4.60 # of Linear Res.(N)= 3.00 U.H. Tp(hrs)= 0.13
NOTE: RAI	INFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.
TT h 0.0 0.1 0.2	TRANSFORMED HYETOGRAPH IME RAIN   TIME RAIN   TIME RAIN   TIME RAIN hrs mm/hr   hrs mm/hr   hrs mm/hr   hrs mm/hr 083 0.00   1.667 9.64   3.250 20.88   4.83 1.61 167 0.00   1.750 9.64   3.333 11.24   4.92 1.61 250 0.00   1.833 27.30   3.417 11.24   5.00 1.61

0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333	$\begin{array}{c ccccc} 1.61 & 1.9 \\ 1.61 & 2.0 \\ 1.61 & 2.0 \\ 1.61 & 2.1 \\ 1.61 & 2.2 \\ 1.61 & 2.3 \\ 1.61 & 2.4 \\ 1.61 & 2.5 \\ 1.61 & 2.6 \\ 1.61 & 2.6 \\ 1.61 & 2.7 \\ 1.61 & 2.8 \\ 9.64 & 2.9 \\ \end{array}$	17         27.30           00         27.30           83         27.30           667         27.30           50         27.30           50         27.30           33         73.88           17         73.88           60         73.88           67         73.88           67         73.88           50         73.88           50         73.88           33         20.88           17         20.88	3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500	$11.24 \\ 11.24 \\ 11.24 \\ 11.24 \\ 6.42 \\ 6.42 \\ 6.42 \\ 6.42 \\ 6.42 \\ 6.42 \\ 6.42 \\ 3.21 \\ 3.2$	5.08 5.17 5.25 5.33 5.42 5.58 5.58 5.67 5.75 5.83 5.92 6.00 6.08	1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61
1.417 1.500 1.583	9.64 3.0	00 20.88 83 20.88 67 20.88	4.583 4.667 4.750	3.21 3.21 3.21	6.17 6.25	1.61
Unit Hyd Qpeak (c PEAK FLOW (c TIME TO PEAK (h RUNOFF VOLUME () TOTAL RAINFALL ( RUNOFF COEFFICIENT	ns)= 1.075 ns)= 0.461 rs)= 2.750 nm)= 40.767 nm)= 80.310 = 0.508	(i)				
(1) PEAK FLOW DOES	NOT INCLUDE	BASEFLOW	1F ANY.			
CALIB   STANDHYD ( 0408)   ID= 1 DT= 5.0 min	Area (ha) Total Imp(%)	= 1.13 = 79.00	Dir. Conr	n.(%)= 7	79.00	
		the second se				

Surface Area	(ha)=	IMPERVIOUS 0.89	PERVIOUS (i) 0.24
Dep. Storage	(mm)=	2.00	5.00
Length	(%)= (m)=	86.79	40.00
Mannings n	=	0.013	0.250

		TR/	ANSFORME	D HYETOGR	APH		
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	9.64	3.250	20.88	4.83	1.61
0.167	0.00	1.750	9.64	3.333	11.24	4.92	1.61
0.250	0.00	1.833	27.30	3.417	11.24	5.00	1.61
0.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61
0.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61
0.500	1.61	2.083	27.30	3.667	11.24	5.25	1.61
0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61
0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61
0.750	1.61	2.333	73.88	3.917	6.42	5.50	1.61
0.833	1.61	2.417	73.88	4.000	6.42	5.58	1.61
0.917	1.61	2.500	73.88	4.083	6.42	5.67	1.61
1.000	1.61	2.583	73.88	4.167	6.42	5.75	1.61
1.083	1.61	2.66/	/3.88	4.250	6.42	5.83	1.61
1.16/	1.61	2.750	/3.88	4.333	3.21	5.92	1.61
1.250	1.61	2.833	20.88	4.41/	3.21	6.00	1.61
1.333	9.64	2.91/	20.88	4.500	3.21	6.08	1.61
1.41/	9.64	3.000	20.88	4.583	3.21	6.1/	1.61
1.500	9.64	3.083	20.88	4.66/	3.21	6.25	1.61
1.202	9.64	3.10/	20.00	4.750	3.21		
Max.Eff.Inten.(mm	hr) =	73.88		42.73			
over (	(min)	5.00		10.00			
Storage Coeff. (	(min)=	2.65	(ii)	7.34 (ii	)		
Unit Hyd. Tpeak (	(min)=	5.00		10.00			
Unit Hyd. peak (	(cms)=	0.29		0.13			
					*T0	TALS*	
PEAK FLOW (	(cms)=	0.18		0.03	0.	.209 (iii)	)
TIME TO PEAK (	(hrs)=	2.75		2.75	2	2.75	
RUNOFF VOLUME	(mm)=	78.31		35.45	69	9.31	
TOTAL RAINFALL	(mm)=	80.31		80.31	80	0.31	
RUNOFF COEFFICIEN	IT =	0.98		0.44	(	0.86	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 75.0 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( 4081)    IN= 2> OUT= 1	OVERFLOW IS	5 OFF			
DT= 5.0 min	OUTFLOW (cms) 0.0000	STORAGE (ha.m.) 0.0000	OUTFLOW (cms) 0.0856	STORAGE (ha.m.) 0.0385	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	ARE4 (ha) 0408) 1.13 4081) 1.13	QPEAK (cms) 30 0.20 30 0.08	TPEAK (hrs) 09 2.75 34 2.83	R.V. (mm) 69.31 69.21	
F T N	PEAK FLOW RED IME SHIFT OF PEA MAXIMUM STORAGE	UCTION [Qou AK FLOW USED	ut/Qin](%)= 4 (min)= (ha.m.)=	40.31 5.00 0.0380	
CALIB STANDHYD (0412) ID= 1 DT= 5.0 min	Area (ha)= Total Imp(%)=	= 0.58 = 79.00 [	Dir. Conn.(%)	)= 79.00	
Surface Area Dep. Storage Average Slope Length Mannings n	IMPERV         (ha)=       0.         (mm)=       2.         (%)=       1.         (m)=       62.         =       0.0	/IOUS PEF .46 .00 .00 .18 4 013 0	RVIOUS (i) 0.12 5.00 2.00 40.00 0.250		
NOTE: RAIN	IFALL WAS TRANSFO	ORMED TO 5	5.0 MIN. TIME	E STEP.	
TIM hr 0.08 0.16 0.25 0.33 0.41 0.50 0.66 0.66 0.75 0.83 0.91 1.00 1.08 1.16 1.25 1.33 1.41 1.56	RAIN         TIN           rs         mmm/hr         hu $33$ 0.00         1.66 $57$ 0.00         1.83 $33$ 1.61         1.99 $77$ 1.61         2.06 $33$ 1.61         2.06 $33$ 1.61         2.06 $33$ 1.61         2.02 $33$ 1.61         2.02 $33$ 1.61         2.03 $33$ 1.61         2.03 $33$ 1.61         2.04 $33$ 1.61         2.05 $33$ 1.61         2.58 $33$ 1.61         2.58 $33$ 1.61         2.69 $74$ 1.61         2.69 $74$ 9.64         3.09 $33$ 9.64         3.06 $33$ 9.64         3.06 $33$ 9.64         3.06	TRANSFORMEL           ME         RAIN           *s         mm/hr           57         9.64           53         27.30           17         27.30           53         27.30           53         27.30           53         27.30           56         27.30           50         27.30           53         73.88           53         73.88           53         73.88           53         20.88           53         20.88           53         20.88           53         20.88           53         20.88           53         20.88           53         20.88           54         20.88	HYETOGRAPH           TIME           ' hrs mm           3.250         20.           3.33         11.           3.500         11.           3.583         11.           3.667         11.           3.750         11.           3.667         11.           3.750         11.           3.833         6.           3.917         6.           4.000         6.           4.003         6.           4.250         6.           4.333         3.           4.4167         6.           4.500         3.           4.500         3.           4.583         3.           4.583         3.           4.667         3.           4.750         3.	RAIN         TIME           m/hr         hrs           88         4.83           24         5.00           24         5.08           24         5.17           24         5.25           24         5.33           42         5.42           42         5.50           42         5.58           42         5.67           42         5.67           42         5.83           21         5.92           21         6.00           21         6.25           21         6.25           21         6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.Eff.Inten.( over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINEAL	(mm/hr)= 73. (min)= 5. (min)= 2. (min)= 5. (cms)= 0. (cms)= 0. (hrs)= 2. (mm)= 78. (mm)= 78.	88 4 00 1 17 (ii) 1 31 0 99 75 31 5 31 5	42.73 L0.00 6.86 (ii) L0.00 0.14 0.01 2.75 35.45 80.31	*TOTALS* 0.107 (iii) 2.75 69.30 80 31	(
RUNOFF COEFFICI	ENT = 0.	98	0.44	0.86	
***** WARNING: STORA	GE COEFF. IS SMA	ALLER THAN 1	TIME STEP!		
(i) CN PROCED CN* = (ii) TIME STEF THAN THE (iii) PEAK FLOW	DURE SELECTED FOR 75.0 Ia = Dep (DT) SHOULD BE STORAGE COEFFICI / DOES NOT INCLUE	R PERVIOUS L 5. Storage SMALLER OR EENT. DE BASEFLOW	LOSSES: (Above) EQUAL IF ANY.		
RESERVOIR( 4121)   IN= 2> OUT= 1     DT= 5.0 min	OVERFLOW IS OUTFLOW (cms)	S OFF STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)	

	0.0000	0.0000	0.0440	0.0198
INFLOW : ID= 2 ( 04) OUTFLOW: ID= 1 ( 41)	AREA (ha) 12) 0.58 21) 0.58	QPEAK (cms) 0 0.10 0 0.04	TPEAK (hrs) 07 2.75 43 2.83	R.V. (mm) 69.30 69.11
PEAK TIME MAXII	FLOW RED SHIFT OF PEA MUM STORAGE	UCTION [Qou K FLOW USED	ut/Qin](%)= 4 (min)= (ha.m.)=	0.42 5.00 0.0195
CALIB STANDHYD ( 0404) ID= 1 DT= 5.0 min	Area (ha)= Total Imp(%)=	0.51 99.00 [	Dir. Conn.(%):	= 99.00
Surface Area () Dep. Storage (i Average Slope Length Mannings n	IMPERV ha)= 0. nm)= 2. (%)= 1. (m)= 58. = 0.0	IOUS PEF 50 00 00 31 4 13 0	RVIOUS (i) 0.01 5.00 2.00 40.00 0.250	
NOTE: RAINFAL	L WAS TRANSFO	RMED TO	5.0 MIN. TIME	STEP.
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583 Max Eff Inten (mm/	RAIN   TIM mm/hr   hr 0.00   1.66 0.00   1.75 0.00   1.83 1.61   2.91 1.61   2.08 1.61   2.16 1.61   2.33 1.61   2.41 1.61   2.58 1.61   2.66 1.61   2.75 1.61   2.83 9.64   2.91 9.64   3.08 9.64   3.16	TRANSFORMET E RAIN s mm/hr 7 9.64 0 9.64 3 27.30 7 27.30 0 27.30 0 27.30 7 27.30 0 27.30 0 27.30 0 27.30 0 27.30 0 27.30 3 73.88 7 73.88 3 73.88 3 73.88 3 73.88 3 73.88 3 20.88 3 20.88 3 20.88 3 20.88 3 20.88	HYETOGRAPH           ' TIME         R           ' hrs         mm           3.250         20.:           3.333         11.:           3.417         11.:           3.500         11.:           3.563         11.:           3.667         11.:           3.750         11.:           3.917         6.:           4.000         6.:           4.000         6.:           4.333         3.:           4.4167         6.:           4.333         3.:           4.583         3.:           4.583         3.:           4.583         3.:           4.583         3.:           4.5667         3.:           4.750         3.:	$\begin{array}{c c c c c c c c c c c c c c c c c c c $
Max.LTT.Inten.(mm/) over (m Storage Coeff. (m Unit Hyd. Tpeak (m Unit Hyd. peak (c PEAK FLOW (c TIME TO PEAK (h RUNOFF VOLUME ( TOTAL RAINFALL ( RUNOFF COEFFICIENT	nr)= /3. in)= 5. in)= 2. ns)= 0. ns)= 0. ns)= 2. nm)= 78. nm)= 78. = 0.	88 2 00 09 (ii) 00 31 10 75 31 3 31 8	42.73 5.00 3.35 (ii) 5.00 0.26 0.00 2.75 35.45 80.31 0.44	*TOTALS* 0.104 (iii) 2.75 77.88 80.31 0.97
***** WARNING: STORAGE (	COEFF. IS SMA	LLER THAN T	TIME STEP!	0.57
(i) TIME STEP (D THAN THE STOI (ii) PEAK FLOW DO	D Ia = Dep T) SHOULD BE RAGE COEFFICI ES NOT INCLUD	Storage SMALLER OR ENT. E BASEFLOW	(Above) EQUAL IF ANY.	
CALIB     STANDHYD ( 0409) /  ID= 1 DT= 5.0 min	Area (ha)= Total Imp(%)=	0.53 79.00 [	Dir. Conn.(%):	= 79.00
Surface Area (1 Dep. Storage (1 Average Slope Length Mannings n	IMPERV ha)= 0. nm)= 2. (%)= 1. (m)= 59. = 0.0	IOUS PEF 42 00 00 44 4 13 (	RVIOUS (i) 0.11 5.00 2.00 40.00 0.250	

$\begin{array}{c ccccc} TIME & RAIN & hrs & mm/hr \\ 0.083 & 0.00 \\ 0.167 & 0.00 \\ 0.250 & 0.00 \\ 0.333 & 1.61 \\ 0.417 & 1.61 \\ 0.500 & 1.61 \\ 0.583 & 1.61 \\ 0.667 & 1.61 \\ 0.750 & 1.61 \\ 0.917 & 1.61 \\ 1.000 & 1.61 \\ 1.083 & 1.61 \\ 1.167 & 1.61 \\ 1.250 & 1.61 \\ 1.250 & 1.61 \\ 1.333 & 9.64 \\ 1.417 & 9.64 \\ 1.583 & 9.64 \\ \end{array}$	TRANSFORM TIME RAIN hrs mm/hr 1.667 9.64 1.750 9.64 1.833 27.30 1.917 27.30 2.000 27.30 2.003 27.30 2.167 27.30 2.250 27.30 2.250 27.30 2.250 37.388 2.417 73.88 2.500 73.88 2.500 73.88 2.5667 73.88 2.5667 73.88 2.667 73.88 2.667 73.88 2.917 20.88 3.000 20.88 3.003 20.88 3.003 20.88 3.167 20.88	ED HYETOGRAPH ' TIME RAIN ' hrs mm/hi 3.250 20.88 3.333 11.24 3.417 11.24 3.500 11.24 3.500 11.24 3.567 11.24 3.667 11.24 3.667 11.24 3.917 6.42 4.000 6.42 4.000 6.42 4.000 6.42 4.167 6.42 4.250 6.42 4.250 6.42 4.417 3.21 4.417 3.21 4.450 3.21 4.667 3.21 4.750 3.21	TIME         RAIN           hrs         mm/hr           4.83         1.61           4.92         1.61           5.00         1.61           5.08         1.61           5.17         1.61           5.25         1.61           5.33         1.61           5.42         1.61           5.50         1.61           5.58         1.61           5.67         1.61           5.75         1.61           5.92         1.61           6.00         1.61           6.03         1.61           6.25         1.61
Max.Eff.Inten.(mm/hr)= over (min) Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)=	73.88 5.00 2.11 (ii) 5.00 0.31	42.73 10.00 6.80 (ii) 10.00 0.14	
PEAK FLOW (cms)= TIME TO PEAK (hrs)= RUNOFF VOLUME (mm)= TOTAL RAINFALL (mm)= RUNOFF COEFFICIENT =	0.09 2.75 78.31 80.31 0.98	*TC 0.01 C 2.75 35.45 6 80.31 8 0.44	DTALS* J.098 (iii) 2.75 39.30 30.31 0.86
***** WARNING: STORAGE COEFF. ( (i) CN PROCEDURE SELECTI CN* = 75.0 Ia (ii) TIME STEP (DT) SHOU THAN THE STORAGE CO (iii) PEAK FLOW DOES NOT	IS SMALLER THAN ED FOR PERVIOUS = Dep. Storage LD BE SMALLER OF EFFICIENT. INCLUDE BASEFLOF	TIME STEP! LOSSES: (Above) R EQUAL W IF ANY.	
RESERVOIR( 4091)         OVERF           IN= 2> OUT= 1         OUTFL           DT= 5.0 min         OUTFL           (cms)         0.000	LOW IS OFF OW STORAGE ) (ha.m.) OO 0.0000	OUTFLOW ST   (cms) (†   0.0402	TORAGE na.m.) 0.0179
INFLOW : ID= 2 ( 0409) OUTFLOW: ID= 1 ( 4091)	AREA QPEAI (ha) (cms) 0.530 0.0 0.530 0.0	K TPEAK ) (hrs) 098 2.75 040 2.83	R.V. (mm) 69.30 69.10
PEAK FLOW TIME SHIFT ( MAXIMUM ST	REDUCTION LQ OF PEAK FLOW ORAGE USED	out/Qin](%)= 40.7 (min)= 5.0 (ha.m.)= 0.0	'3 )0 )178
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	REA QPEAK ha) (cms) .51 0.104 .13 0.084	TPEAK R.V. (hrs) (mm) 2.75 77.88 2.83 69.21	
ID = 3 ( 0420): 1 NOTE: PEAK FLOWS DO NOT	.64 0.184 INCLUDE BASEFLO	2.75 71.91 WS IF ANY.	

$\begin{array}{c c} \text{ADD HYD } ( 0420) \\ 3+2=1 \\ \hline \\ \text{ID1= 3 } ( 0420): \\ + \text{ID2= 2 } ( 4091): \\ \end{array}$	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
	1.64	0.184	2.75	71.91
	0.53	0.040	2.83	69.10
ID = 1 (0420):	2.17	0.221	2.75	71.22

NOTE: PEAK FLOW	S DO NOT I	NCLUDE B	ASEFLOWS	IF ANY.			
$\begin{vmatrix} ADD & HYD & ( & 0420) \\ 1 & + & 2 & 3 \end{vmatrix}$ $ID1= 1 ( & 042 \\ + & ID2= 2 & ( & 412 \\ - & 412 & - & 412 \\ + & 102= 2 & ( & 412 \\ - & 412 & - & 412 \\ + & 102= 2 & ( & 412 \\ - & 412 & - & 412 \\ + & 102= 2 & ( & 412 & - & 412 \\ - & 102= 2 & ( & 412 & - & -& -& -& -& -& -& -& -& -& -& -& $	AR (h 20): 2.	EA QPI a) (cr 17 0.2)	EAK T ms) ( 21 2 43 2	PEAK hrs) .75 7	R.V. (mm) 1.22		
TD = 3 ( 042	(1). 0.	75 0.2	43 2 63 3	75 7	0 78		
	US DO NOT T			TE ANY	0.78		
CALIB STANDHYD ( 0410) ID= 1 DT= 5.0 min	Area Total Im	(ha)= : ip(%)= 3	1.11 6.00 D	ir. Conn	.(%)= 2	27.00	
Surface Area Dep. Storage Average Slope Length Mannings n	I (ha)= (mm)= (%)= (m)= =	MPERVIOU 0.40 2.00 1.00 86.02 0.013	S PER 4 0	VIOUS (i 0.71 5.00 2.00 0.00 .250	)		
NOTE: RAINF	ALL WAS TR	ANSFORME	D TO 5	.0 MIN.	TIME STE	EP.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.667 1.000 1.083 1.167 1.250 1.333 1.417 1.500	RAIN mm/hr 0.00 0.00 1.61 1.61 1.61 1.61 1.61 1.61	TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	NSFORMED RAIN   9.64 27.30 27.88 20.	HYETOGR TIME 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750	RAIN mm/hr 20.88 11.24 11.24 11.24 11.24 11.24 11.24 11.24 11.24 6.42 6.42 6.42 6.42 6.42 6.42 6.42 6	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.Eff.Inten.(n over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	m/hr)= (min)= (min)= (cms)= (cms)= (hrs)= (mm)= (mm)= (mm)=	73.88 5.00 2.63 5.00 0.29 0.06 2.75 78.31 80.31 0.98	5 1 (ii) 1 1 3 8	2.32 5.00 1.78 (ii 5.00 0.09 0.08 2.83 8.39 0.31 0.48	) *T01 0. 2 49 80 0	FALS* 140 (iii) 2.75 9.16 0.31 0.61	(
***** WARNING: STORAG	E COEFF. I	S SMALLE	R THAN T	IME STEP	1		
(i) CN PROCEDU CN* = 7 (ii) TIME STEP THAN THE S (iii) PEAK FLOW	VRE SELECTE '5.0 Ia (DT) SHOUL STORAGE COE DOES NOT I	D FOR PE = Dep. S D BE SMA FFICIENT NCLUDE B	RVIOUS L torage LLER OR ASEFLOW	OSSES: (Above) EQUAL IF ANY.			
RESERVOIR( 4101)    IN= 2> OUT= 1   DT= 5.0 min	OVERFL OUTFLO (cms) 0.000	OW IS OF W STO (ha O O.(	F RAGE   .m.)   0000	OUTFL0 (cms) 0.084	W ST( (ha 1 (	DRAGE a.m.) ).0375	
INFLOW : ID= 2 (	0410)	AREA (ha) 1.110	QPEAK (cms) 0.14	TPEA (hrs 0 2	K ) .75	R.V. (mm) 49.16	

OUTFLOW: ID= 1 ( 4101	) 1.110	0.054 3	.25 49.0	7
PEAK TIME S MAXIMU	FLOW REDUCTION HIFT OF PEAK FLOW M STORAGE USED	[Qout/Qin](% (min (ha.m.)	)= 38.81 )= 30.00 )= 0.0242	
CALIB   STANDHYD ( 0411)   Ar   ID= 1 DT= 5.0 min   To	ea (ha)= 0.7 tal Imp(%)= 79.0	75 00 Dir. Conn	.(%)= 79.00	
Surface Area (ha Dep.Storage (mm Average Slope (% Length (m Mannings n	IMPERVIOUS )= 0.59 )= 2.00 )= 1.00 )= 70.71 = 0.013	PERVIOUS (1) 0.16 5.00 2.00 40.00 0.250	)	
NOTE: RAINFALL	WAS TRANSFORMED T	O 5.0 MIN.	TIME STEP.	
TIME hrs m 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583	TRANSF           RAIN         TIME         FR           m/hr         hrs         mn           0.00         1.667         9           0.00         1.750         9           0.00         1.833         27           1.61         2.000         27           1.61         2.000         27           1.61         2.053         27           1.61         2.167         27           1.61         2.333         73           1.61         2.417         73           1.61         2.583         73           1.61         2.667         73           1.61         2.833         20           9.64         2.081         20           9.64         3.000         20           9.64         3.083         20           9.64         3.083         20           9.64         3.083         20	ORMED         HYETOGR,           AIN         TIME           //hr         'hrs           0.64         3.250           0.64         3.333           30         3.500           .30         3.500           .30         3.500           .30         3.500           .30         3.667           .30         3.750           .30         3.883           .88         4.000           .88         4.083           .88         4.067           .88         4.583           .88         4.667           .88         4.6750	APH            RAIN         TII           mm/hr         h           20.88         4.83           11.24         5.00           11.24         5.01           11.24         5.01           11.24         5.01           11.24         5.21           11.24         5.21           6.42         5.53           6.42         5.55           6.42         5.56           6.42         5.53           6.42         5.53           6.42         5.53           6.42         5.53           6.42         5.53           6.42         5.54           6.42         5.55           6.42         5.56           6.42         5.63           3.21         6.00           3.21         6.01           3.21         6.02           3.21         6.22           3.21         6.22           3.21         6.22	ME         RAIN           rs         nm/hr           3         1.61           2         1.61           3         1.61           5         1.61           5         1.61           3         1.61           2         1.61           3         1.61           2         1.61           3         1.61           5         1.61           5         1.61           3         1.61           2         1.61           3         1.61           2         1.61           3         1.61           2         1.61           3         1.61           2         1.61           3         1.61           5         1.61           5         1.61           5         1.61           5         1.61
Max.Eff.Inten.(mm/hr over (min Storage Coeff. (min Unit Hyd. Tpeak (min Unit Hyd. peak (cms PEAK FLOW (cms TIME TO PEAK (hrs RUNOFF VOLUME (mm	$\begin{array}{cccc} ) = & 73.88 \\ 5.00 \\ = & 2.34 \\ (ii) \\ = & 5.00 \\ ) = & 0.30 \\ ) = & 0.30 \\ ) = & 0.12 \\ ) = & 2.75 \\ ) = & 78.31 \\ = & 78.31 \\ \end{array}$	42.73 10.00 10.00 0.14 0.02 2.75 35.45	) *TOTALS* 0.139 (* 2.75 69.31 80.31	iii)
RUNOFF COEFFICIENT	= 80.31 = 0.98	0.44	0.86	
***** WARNING: STORAGE CO	EFF. IS SMALLER T	HAN TIME STEP	1	
(i) CN PROCEDURE S CN* = 75.0 (ii) TIME STEP (DT) THAN THE STORA (iii) PEAK FLOW DOES	ELECTED FOR PERVI Ia = Dep. Stor SHOULD BE SMALLE GE COEFFICIENT. NOT INCLUDE BASE	COUS LOSSES: rage (Above) R OR EQUAL FLOW IF ANY.		
RESERVOIR( 4111)   IN= 2> OUT= 1   DT= 5.0 min	OVERFLOW IS OFF OUTFLOW STORAG (cms) (ha.m. 0.0000 0.000	5E   OUTFLO )   (cms) )0   0.056	W STORAGE (ha.m.) 8 0.0258	
INFLOW : ID= 2 ( 0411 OUTFLOW: ID= 1 ( 4111	AREA ( (ha) ( ) 0.750 ) 0.750	PEAK TPEAK cms) (hrs 0.139 2 0.056 2	K R.V. ) (mm) .75 69.3 .83 69.10	1 6
PEAK TIME S MAXIMU	FLOW REDUCTION HIFT OF PEAK FLOW M STORAGE USED	l [Qout/Qin](% / (min ) (ha.m.)	)= 40.11 )= 5.00 )= 0.0253	

CALIB STANDHYD ( 0406) ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	0.14 99.00	Dir. Conn.(%)=	99.00
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVIO 0.14 2.00 1.00 30.55 0.013	)US 4 ) ) 3	PERVIOUS (i) 0.00 5.00 2.00 40.00 0.250	

		TR/	ANSFORME	D HYETOGR	APH	-	
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	9.64	3.250	20.88	4.83	1.61
0.167	0.00	1.750	9.64	3.333	11.24	4.92	1.61
0.250	0.00	1.833	27.30	3.417	11.24	5.00	1.61
0.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61
0.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61
0.500	1.61	2.083	27.30	3.667	11.24	5.25	1.61
0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61
0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61
0.750	1.61	2.333	73.88	3.917	6.42	5.50	1.61
0.833	1.61	2.417	73.88	4.000	6.42	5.58	1.61
0.917	1.61	2.500	73.88	4.083	6.42	5.67	1.61
1.000	1.61	2.583	73.88	4.167	6.42	5.75	1.61
1.083	1.61	2.667	73.88	4.250	6.42	5.83	1.61
1.167	1.61	2.750	73.88	4.333	3.21	5.92	1.61
1.250	1.61	2.833	20.88	4.417	3.21	6.00	1.61
1.333	9.64	2.917	20.88	4.500	3.21	6.08	1.61
1.417	9.64	3.000	20.88	4.583	3.21	6.17	1.61
1.500	9.64	3.083	20.88	4.667	3.21	6.25	1.61
1.583	9.64	3.167	20.88	4.750	3.21		
Max Eff Inten (mm)	/hr)=	73 88		42 73			
over (n	nin	5.00		5.00			
Storage Coeff. (n	nin)=	1.42	(iii)	2.68 (ii	)		
Unit Had Tread (		5.00	()	5 00	/		

over	(min)	5.00	5.00	
Storage Coeff.	(min)=	1.42 (ii)	2.68 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	5.00	
Unit Hyd. peak	(cms)=	0.33	0.29	
	0.000			*TOTALS*
PEAK FLOW	(cms)=	0.03	0.00	0.029 (iii)
TIME TO PEAK	(hrs)=	2.67	2.75	2.75
RUNOFF VOLUME	(mm)=	78.31	35.45	77.88
TOTAL RAINFALL	(mm)=	80.31	80.31	80.31
RUNOFF COEFFICIE	ENT =	0.98	0.44	0.97

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 75.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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CALIB   STANDHYD ( 0403)  ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	1.84 99.00	Dir.	Conn . (%)=	99.00	
		IMPERVI	OUS	PERVIO	JS (i)		
Surface Area	(ha)=	1.8	2	0.02	2		
Dep. Storage	(mm)=	2.0	0	5.00	0		
Average Slope	(%)=	1.0	0	2.00	0		

Average Slope	(%)=	1.00	2.00
Length	(m)=	110.75	40.00
Mannings n	=	0.013	0.250

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

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## ---- TRANSFORMED HYETOGRAPH ----

		114	STOL OT A LES				
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	9.64	3.250	20.88	4.83	1.61
0.167	0.00	1.750	9.64	3.333	11.24	4.92	1.61
0.250	0.00	1.833	27.30	3.417	11.24	5.00	1.61
0.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61
0.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61
0.500	1.61	2.083	27.30	3.667	11.24	5.25	1.61
0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61
0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61

0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583	$\begin{array}{c ccccc} 1.61 & 2.33 \\ 1.61 & 2.43 \\ 1.61 & 2.53 \\ 1.61 & 2.56 \\ 1.61 & 2.57 \\ 1.61 & 2.73 \\ 9.64 & 2.93 \\ 9.64 & 3.00 \\ 9.64 & 3.00 \\ 9.64 & 3.10 \end{array}$	33         73.88           17         73.88           00         73.88           30         73.88           37         73.88           57         73.88           50         73.88           50         73.88           50         73.88           50         73.88           50         73.88           50         73.88           51         20.88           52         20.88           53         20.88           56         20.88           57         20.88	3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750	6.42 6.42 6.42 6.42 3.21 3.21 3.21 3.21 3.21 3.21 3.21 3.2	5.50 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61
Max.Eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RATNFALL	m/hr)= 73. (min) 5. (min)= 3. (min)= 5. (cms)= 0. (cms)= 0. (hrs)= 2. (mm)= 78. (mm)= 80.	88 00 07 (ii) 00 27 37 75 31 31	42.73 5.00 4.33 (ii) 5.00 0.23 0.00 2.75 35.45 80.31	*TOTAI 0.3 2. 77.1 80.	_S* 76 (iii) 75 88	
RUNOFF COEFFICIE ***** WARNING: STORAG (i) CN PROCEDU CN = 7 (ii) TIME STEP THAN THE S (iii) PEAK FLOW	(MT = 0. NT = 0. RE SELECTED FOM S.0 Ia = Dep (DT) SHOULD BE TORAGE COEFFICI DOES NOT INCLUE	98 ALLER THAN R PERVIOUS D. Storage SMALLER OR CENT. DE BASEFLOW	0.44 TIME STEP! LOSSES: (Above) EQUAL IF ANY.	0.9	97 97	
CALIB STANDHYD ( 0405) ID= 1 DT= 5.0 min	Area (ha)= Total Imp(%)=	= 0.35 = 99.00	Dir. Conn.(	(%)= 99	.00	
Surface Area Dep. Storage Average Slope Length Mannings n	IMPERV       (ha)=     0.0       (mm)=     2.0       (%)=     1.0       (m)=     48.0       =     0.0	/IOUS PE .35 .00 .00 .30 .13	RVIOUS (i) 0.00 5.00 2.00 40.00 0.250			
NOTE: RAINF	ALL WAS TRANSFO	ORMED TO	5.0 MIN. TI	ME STEP	<b>.</b> 10	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500	RAIN         TIN           mm/hr         hn           0.00         1.66           0.00         1.67           0.00         1.61           1.61         2.00           1.61         2.01           1.61         2.02           1.61         2.03           1.61         2.03           1.61         2.04           1.61         2.05           1.61         2.05           1.61         2.53           1.61         2.55           1.61         2.64           1.61         2.63           9.64         3.00           9.64         3.04           9.64         3.04           9.64         3.04           9.64         3.05           9.64         3.06           9.64         3.06	TRANSFORME ME RAIN 's mm/hr 67 9.64 60 9.64 63 27.30 7.30 60 27.30 60 27.30 60 27.30 60 27.30 7.30 60 27.30 7.30 83 73.88 83 73.88 83 73.88 83 73.88 83 20.88 83 20.88 83 20.88 83 20.88 83 20.88 84 20.88 85 20.88	D HYETOGRAF	PH          RAIN       mm/hr         20.88       1.24         11.24       1.24         11.24       1.24         11.24       6.42         6.42       6.42         6.42       6.42         3.21       3.21         3.21       3.21         3.21       3.21	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.42 5.50 5.542 5.50 5.58 5.67 5.75 5.82 6.00 6.08 6.17 6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.Eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	m/hr)= 73. (min) 5. (min)= 1. (min)= 5. (cms)= 0.	.88 .00 .86 (ii) .00 .32	42.73 5.00 3.13 (ii) 5.00 0.27			
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	(cms)= 0. (hrs)= 2. (mm)= 78. (mm)= 80. NT = 0.	07 75 31 31 98	0.00 2.75 35.45 80.31 0.44	0.0 2. 77. 80.	-5" 72 (iii) 75 88 31 97	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 75.0 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 ( 0407)   Ar  ID= 1 DT= 5.0 min   To	ea (ha)= tal Imp(%)=	0.14 99.00 Di	r. Conn.(	%)= 99.00	
Surface Area (ha Dep.Storage (mm Average Slope (% Length (m Mannings n	IMPERVIO )= 0.14 )= 2.00 )= 1.00 )= 30.55 = 0.013	US PERV 0 5 2 40 0.	IOUS (i) .00 .00 .00 .00 250		
NOTE: RAINFALL	WAS TRANSFORM	ED TO 5.	O MIN. TI	ME STEP.	
TIME hrs m 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500	TR           RAIN         TIME           m/hr         hrs           0.00         1.667           0.00         1.750           0.00         1.833           1.61         2.003           1.61         2.083           1.61         2.167           1.61         2.333           1.61         2.417           1.61         2.583           1.61         2.583           1.61         2.583           1.61         2.750           1.61         2.733           9.64         2.917           9.64         3.003           9.64         3.083	ANSFORMED RAIN   9.64 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.38 73.88 73.88 73.88 73.88 73.88 73.88 73.88 20.88 20.88 20.88 20.88	HYETOGRAP TIME hrs 3.250 2 3.333 1 3.417 1 3.500 1 3.583 1 3.667 1 3.750 1 3.833 3 3.917 4.003 4.083 4.083 4.167 4.250 4.333 4.417 4.583 4.583 4.667	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	ME RAIN rs mm/hr 3 1.61 2 1.61 0 1.61 8 1.61 5 1.61 3 1.61 2 1.61 0 1.61 3 1.61 5 1.61 5 1.61 3 1.61 5 1.61 0 1.61 5 1.61 5 1.61 5 1.61 5 1.61
Max.Eff.Inten.(mm/hr over (min Storage Coeff. (min Unit Hyd. Tpeak (min Unit Hyd. peak (cms	)= 73.88 ) 5.00 )= 1.42 )= 5.00 )= 0.33	42 5 (ii) 2 5 0	.73 .00 .68 (ii) .00 .29	*TOTALS*	
PEAK FLOW (cms TIME TO PEAK (hrs RUNOFF VOLUME (mm TOTAL RAINFALL (mm RUNOFF COEFFICIENT	)= 0.03 )= 2.67 )= 78.31 )= 80.31 = 0.98	0 2 35 80 0	.00 .75 .45 .31 .44	0.029 ( 2.75 77.88 80.31 0.97	111)
***** WARNING: STORAGE CO (i) CN PROCEDURE S CN* = 75.0 (ii) TIME STEP (DT) THAN THE STORA (iii) PEAK FLOW DOES	EFF. IS SMALL ELECTED FOR P Ia = Dep. SHOULD BE SM GE COEFFICIEN NOT INCLUDE	ER THAN TI ERVIOUS LO Storage ( ALLER OR E T. BASEFLOW I	ME STEP! SSES: Above) QUAL F ANY.		
DUHYD ( 4071) Inlet Cap.= 0.060 #of Inlets= 10 Total(cms)= 0.6 TOTAL HYD.(ID= 1):	AREA QPE (ha) (cm 0.14 0.	AK TPE s) (hr 03 2.	AK R.V s) (mm 75 77.8	) 8	
MAJOR SYS.(ID= 2): MINOR SYS.(ID= 3):	0.00 0. 0.14 0.	00 0. 03 2.	00 0.0 75 77.8	= 0 8	
NOTE: PEAK FLOWS DO	NOT INCLUDE	BASEFLOWS	IF ANY.		

| ADD HYD ( 0421)|

1 + 2 = 3	AREA	<b>QPEAK</b>	TPEAK	R.V.	
ID1= 1 ( 0403):	1.84	0.376	2.75	77.88	
+ 1D2= 2 ( 0405):	0.35	0.072	2.75	77.88	
ID = 3 (0421):	2.19	0.448	2.75	//.00	
NOTE: PEAK FLOWS DO	NOT INCLU	JDE BASEFL	LOWS IF AN	IY.	
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	AREA	QPEAK	TPEAK	R.V.	
ID1= 3 ( 0421):	(ha) 2.19	(cms) 0.448	(hrs) 2.75	(mm) 77.88	
+ ID2= 2 ( 0406):	0.14	0.029	2.75	77.88	
ID = 1 ( 0421):	2.33	0.476	2.75	77.88	
NOTE: PEAK FLOWS DO	NOT INCLU	JDE BASEFL	OWS IF AN	IY.	
e Ster Sofiel (BLIME) e o mer Sofiel (BLIME) e o mer Sofiel (BLIME) e o mer S					
ADD HYD ( 0421)		OPEAK	TDEAK	D V	
	(ha)	(cms)	(hrs)	(mm)	
*** WARNING: HYDRO	GRAPH 4 GRAPH (	10/1 < 10= 1003 = HYE	Z> IS DRY DROGRAPH C	0001	
ID1= 1 ( 0421): + ID2= 2 ( 4071):	2.33	0.476	2.75	77.88	
ID = 3 ( 0421):	2.33	0.476	2.75	77.88	
NOTE: PEAK FLOWS DO	NOT INCLU	JDE BASEFL	OWS IF AN	Y.	
ADD HYD ( 0421)					
3 + 2 = 1	AREA	OPEAK	TPEAK	R.V.	
ID1= 3 ( 0421):	2.33	0.476	2.75	77.88	
+ ID2= 2 ( 4101):	1.11	0.054	3.25	49.07	
ID = 1 ( 0421):	3.44	0.517	2.75	68.58	
NOTE: PEAK FLOWS DO	NOT INCLU	JDE BASEFL	OWS IF AN	IY.	
ADD HYD ( 0421)		ODEAK	TDEAK	D V	
1 1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)	
ID1= 1 ( 0421): + ID2= 2 ( 4111):	3.44 0.75	0.517 0.056	2.75 2.83	68.58 69.16	
ID = 3 ( 0421):	4.19	0.570	2.75	68.69	
NOTE: PEAK FLOWS DO	NOT INCLU	JDE BASEFL	OWS IF AN	IY.	
ADD HYD ( 0421)					
3 + 2 = 1	AREA	QPEAK	TPEAK	R.V.	
ID1= 3 ( 0421):	(ha) 4.19	(cms) 0.570	(hrs) 2.75	(mm) 68.69	
+ ID2= 2 ( 0420):	2.75	0.262	2.75	70.78	
ID = 1 ( 0421):	6.94	0.832	2.75	69.52	
NOTE: PEAK FLOWS DO	NOT INCLU	JDE BASEFL	OWS IF AN	IY.	
ADD HYD ( 0422)		ODEAK	TOPAK	<b>D</b> 1/	
1 1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)	
ID1= 1 ( 0401): + ID2= 2 ( 0421):	3.66	0.461 0.832	2.75	40.77 69.52	
ID = 3 (0422):	10.60	1.294	2.75	59.59	
NOTE: PEAK FLOWS DO	NOT TNCL	JDE BASEFI	OWS TE AN	Y.	
HOTEL TEAK TEOWS DO	Inclu				

RESERVOIR( 0423)	OVERFLO	W IS OFF				
DT= 5.0 min	OUTFLOW	STORAG	SE   C	OUTFLOW	STORAGE	
	0.0000	0.000	00	0.1751	0.4332	
	0.0211	0.126	54	0.2276	0.5266	
	0.0285	0.323	33	2.0944	0.6374	
	0.0505	0.377	/4	0.0000	0.0000	
		AREA ( (ha) (	OPEAK (cms)	TPEAK (hrs)	R.V. (mm)	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0422) 1 0423) 1	L0.600 L0.600	1.294 0.193	2.75 4.58	59.59 59.46	
PE	AK FLOW	REDUCTION	N [Qout/0	Qin](%)= 1	4.91	
TI MA	ME SHIFT OF	PEAK FLOW	N C	(min)=11 (ha.m.)=	0.00	
STANDHYD ( 0067) ID= 1 DT= 5.0 min	Area ( Total Imp	(ha)= 5.4 (%)= 90.0	46 DO Dir.	. Conn.(%)	= 90.00	
Sunface Anon	(ha)-	PERVIOUS	PERVIO	DUS (i)		
Dep. Storage	(mm)=	1.00	1.5	50		
Length	(m)=	190.79	40.0	00		
Mannings n	=	0.015	0.2		0750	
NOIE: RAINF	ALL WAS IRA	INSFORMED I	10 5.0	MIN. IIME	STEP.	
		TRANSF	FORMED HY	TOGRAPH		
TIME	RAIN   mm/hr	TIME F hrs mn	n/hr  '	TIME R. hrs mm	AIN   TIME /hr   hrs	RAIN mm/hr
0.083 0.167	0.00	1.667 9 1.750 9	9.64   3. 9.64   3.	.250 20. .333 11.	88   4.83 24   4.92	1.61
0.250	0.00	1.833 27 1.917 27	7.30 3.	.417 11. .500 11.	24 5.00 24 5.08	1.61 1.61
0.417	1.61	2.000 27	7.30   3. 7.30   3.	.583 11. .667 11.	24 5.17	1.61
0.583	1.61	2.167 27	7.30 3.	.750 11. .833 6.	24 5.33	1.61
0.750	1.61	2.333 73	3.88 3. 3.88 4.	.917 6. .000 6.	42 5.50	1.61
0.917	1.61	2.500 73	3.88 4.	.083 6.	42 5.67	1.61
1.083	1.61	2.667 73	3.88 4.	.250 6.	42 5.83	1.61
1.250	1.61	2.833 20	0.88 4.	.417 3.	21 6.00	1.61
1.555	9.64	3.000 20	0.88 4.	.583 3.		1.61
1.500	9.64	3.167 20	0.88   4.	.667 3.	21   6.25	1.61
Max.Eff.Inten.(m	m/hr)=	73.88	57.0	08		
Storage Coeff.	(min)=	5.00 4.25 (ii	i) 7.5	56 (ii)		
Unit Hyd. Tpeak Unit Hyd. peak	(min)= (cms)=	5.00	10.0	00 L3		
PEAK FLOW	(cms)=	1.01	0.0	08	*TOTALS* 1.088 (iii)	
TIME TO PEAK RUNOFF VOLUME	(hrs)= (mm)=	2.75 79.31	2.7	75 24	2.75 76.40	
TOTAL RAINFALL RUNOFF COEFFICTE	(mm)= NT =	80.31 0.99	80.3	31 53	80.31 0.95	
***** WARNING: STORAG	E COEFF. IS	S SMALLER 1	THAN TIME	E STEP!		
(i) CN PROCEDU	RE SELECTED	FOR PERVI	LOUS LOSS	SES:		
CN* = 8 (ii) TIME STEP	5.0 Ia = (DT) SHOULD	Dep. Stor BE SMALLE	rage (Ab ER OR EQU	oove) JAL		
THAN THE S (iii) PEAK FLOW	TORAGE COEF	FICIENT.	EFLOW IF	ANY.		
CALIB						
STANDHYD ( 0069) ID= 1 DT= 5.0 min	Area ( Total Imp	(ha)= 0.8 (%)= 90.0	88 00 Dir.	. Conn.(%)	= 90.00	

Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVIOUS 0.79 1.00 1.00 76.59 0.013	PEF	VIOUS (i 0.09 1.50 2.00 0.00 0.250	)		
NOTE: RAINF	ALL WAS TI	RANSFORMED	то 5	5.0 MIN.	TIME ST	EP.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583	RAIN mm/hr 0.00 0.00 1.61 1.61 1.61 1.61 1.61 1.61	TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	SFORMEI RAIN 9.64 9.64 27.30 27.30 27.30 27.30 27.30 73.88 73.88 73.88 73.88 73.88 73.88 73.88 20.88 20.88 20.88 20.88	HYETOGR. TIME hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.333 4.417 4.500 4.333 4.417 4.500 4.750 4.750	APH RAIN mm/hr 20.88 11.24 11.24 11.24 11.24 11.24 11.24 11.24 11.24 6.42 6.42 6.42 6.42 6.42 6.42 6.42 3.21 3.21 3.21 3.21	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.67 5.75 5.83 5.92 6.00 6.17 6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.Eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE ***** WARNING: STORAG (i) CN PROCEDU CN* = 8 (ii) TIME STEP THAN THE S (iii) PEAK FLOW	m/hr)= (min)= (min)= (cms)= (cms)= (cms)= (hrs)=(hrs)=(hrs)(hrs)=(hrs)(hrs)(hrs)(hrs)(hrs)(hrs)(hrs)(hrs)	73.88 5.00 2.46 ( 5.00 0.30 0.16 2.75 79.31 80.31 0.99 IS SMALLER ED FOR PER = Dep. St LD BE SMAL EFFICIENT. INCLUDE BA	ii) THAN 1 VIOUS L LER OR SEFLOW	7.08 0.00 5.77 (ii 5.77 (ii 0.01 2.75 0.24 0.31 0.63 TIME STEP 0SSES: (Above) EQUAL IF ANY.	) *T0' 0 77 81	TALS* .176 (iii) 2.75 6.40 0.31 0.95	
RESERVOIR( 0070)  IN= 2> OUT= 1 DT= 5.0 min	OVERFI OUTFL( (cms) 0.000	LOW IS OFF DW STOR ) (ha.) DO 0.0	AGE   m.) 000	OUTFLO (cms) 0.077	W STO (hi O O	DRAGE a.m.) 0.0323	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 ( PE TI	0069) 0070) AK FLOW ME SHIFT (	AREA (ha) 0.880 0.880 REDUCTI	QPEAK (cms) 0.17 0.07 0.07 ON [Qou	TPEA (hrs 76 2 77 2 it/Qin](% (min	K ) .75 .83 )= 43.6 }= 5.0	R.V. (mm) 76.40 76.29	
MA	SI(	US		(na.m.	)= 0.0		
CALIB STANDHYD ( 0071) ID= 1 DT= 5.0 min	Area Total In	(ha)= 1 np(%)= 90	.36 .00 [	)ir. Conn	. (%)=	90.00	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVIOUS 1.22 1.00 1.00 95.22 0.013	PEF	VIOUS (i 0.14 1.50 2.00 0.00 0.250	)		

TTHE	D 4 711	IR/	ANSFORME	D HYETOGR	APH		DATH
LIME	RAIN	IIME	RAIN mm/hr	I' IIME	RAIN mm/hr	IIME	RAIN mm/hr
0.083	0.00	1.667	9.64	3.250	20.88	4.83	1.61
0.167	0.00	1.750	9.64	3.333	11.24	4.92	1.61
0.250	0.00	1.833	27.30	3.417	11.24	5.00	1.61
0.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61
0.417	1.61	2.000	27.30	3.585	11 24	5.1/	1.61
0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61
0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61
0.750	1.61	2.333	73.88	3.917	6.42	5.50	1.61
0.833	1.61	2.417	73.88	4.000	6.42	5.58	1.61
0.917	1.61	2.500	73.88	4.083	6.42	5.67	1.61
1.000	1 61	2.565	73 88	4.167	6 42	5 83	1.61
1.167	1.61	2.750	73.88	4.333	3.21	5.92	1.61
1.250	1.61	2.833	20.88	4.417	3.21	6.00	1.61
1.333	9.64	2.917	20.88	4.500	3.21	6.08	1.61
1.41/	9.64	3.000	20.88	4.583	3.21	6.1/	1.61
1.583	9.64	3.167	20.88	4.750	3.21	0.25	1.01
1.000			20100	1			
Max.Eff.Inten.(mm	1/hr)=	73.88		57.08			
over	(min)	5.00		10.00			
Storage Coeff.	min)=	2.80	(11)	6.11 (11	)		
Unit Hyd neak		0.28		0.15			
onre nyu: peak	clis)=	0.20		0.15	*T0T	ALS*	
PEAK FLOW	(cms)=	0.25		0.02	0.	272 (iii)	)
TIME TO PEAK	(hrs)=	2.75		2.75	2	.75	
RUNOFF VOLUME	(mm)=	79.31		50.24	76	.40	
RUNDEE COEFETCTEN	(mm)=	80.31	1	0.63	80	95	
KONOTT COETTICIES		0.55		0.05			
***** WARNING: STORAGE	COEFF. 1	ES SMALLE	ER THAN	TIME STEP	1		
(i) CN PROCEDUR	E SELECT	ED FOR P	RVIOUS	LOSSES:			
CN* = 85	.0 Ia	= Dep. S	Storage	(Above)			
THAN THE STEP	ORAGE COL	FFTCTEN	LLER OR	EQUAL			
(iii) PEAK FLOW [	OES NOT	ENCLUDE I	BASEFLOW	IF ANY.			
RESERVOIR( 0072)							
	OVEREI	OW TS OF					
IN= 2> OUT= 1	OVERFL	LOW IS O	-F				
IN= 2> OUT= 1 DT= 5.0 min	OVERFL	LOW IS ON DW STO	ORAGE	OUTFLO	w sto	RAGE	
IN= 2> OUT= 1     DT= 5.0 min	OVERFI OUTFL( (cms)	LOW IS ON DW ST( ) (ha	DRAGE	OUTFLO	W STC	RAGE	
IN= 2> OUT= 1   DT= 5.0 min	OVERFI OUTFL( (cms) 0.000	LOW IS OF DW ST( ) (ha DO 0	DRAGE a.m.) .0000	0UTFL0 (cms) 0.245	W STC (ha 0 C	RAGE m.) .0209	
IN= 2> OUT= 1   DT= 5.0 min	OVERFI OUTFL( (cms) 0.000	LOW IS OF DW ST( ) (ha DO 0. AREA	DRAGE a.m.) .0000 OPEAK	OUTFLO   (cms)   0.245 TPEA	W STO (ha O C	RAGE m.) 0.0209 R.V.	
IN= 2> OUT= 1   DT= 5.0 min	OVERFI OUTFL( (cms) 0.000	LOW IS OF DW ST( ) (ha DO 0 AREA (ha)	PRAGE a.m.) .0000 QPEAK (cms)	OUTFLO   (cms)   0.245 TPEA (hrs	W STC (ha 0 C K	0RAGE (.m.) ).0209 R.V. (mm)	
IN= 2> OUT= 1	OVERFI OUTFL( (cms) 0.000	DW IS OF DW ST( ) (ha DO 0 AREA (ha) 1.360	PRAGE a.m.) .0000 QPEAK (cms) 0.2	OUTFLO   (cms)   0.245 TPEA (hrs 72 2	W STC (ha 0 C K ) .75	0RAGE (.m.) 0.0209 R.V. (mm) 76.40	
IN= 2> OUT= 1   DT= 5.0 min INFLOW : ID= 2 ( 0 OUTFLOW: ID= 1 ( 0	OVERFI OUTFL( (cms) 0.000 0071) 0072)	LOW IS OF DW ST( ) (ha DO 0 AREA (ha) 1.360 1.360	PRAGE a.m.) .0000 QPEAK (cms) 0.2 0.2	OUTFLO   (cms)   0.245 TPEA (hrs 72 2 40 2	W STC (ha 0 C K ) .75 .75	0RAGE (.m.) 0.0209 R.V. (mm) 76.40 76.39	
IN= 2> OUT= 1   DT= 5.0 min  INFLOW : ID= 2 ( ( OUTFLOW: ID= 1 ( (	0071) 0072)	LOW IS OF DW ST( ) (ha DO 0 AREA (ha) 1.360 1.360 REDUC	CRAGE a.m.) .0000 QPEAK (cms) 0.2 0.2 0.2	OUTFLO   (cms)   0.245 TPEA (hrs 72 2 40 2 ut/0inl(%	W STC (ha 0 C K ) .75 .75 .75	0RAGE 1.m.) 0.0209 R.V. (mm) 76.40 76.39	
IN= 2> OUT= 1   DT= 5.0 min INFLOW : ID= 2 ( 0 OUTFLOW: ID= 1 ( 0 TIN	0VERFI 0UTFL( (cms) 0.000 0071) 0071) 0072) WK FLOW NE SHIFT (	LOW IS OF DW ST( ) (ha DO 0 AREA (ha) 1.360 1.360 REDUCT DF PEAK I	CRAGE a.m.) .0000 QPEAK (cms) 0.2 0.2 0.2 TION [Qoint FLOW]	OUTFLO   (cms)   0.245 TPEA (hrs 72 2 40 2 ut/Qin](% (min	W STC (ha 0 C K )- .75 .75 )= 88.34 )= 0.00	0RAGE m.) .0209 R.V. (mm) 76.40 76.39	
IN= 2> OUT= 1   DT= 5.0 min INFLOW : ID= 2 ( 0 OUTFLOW: ID= 1 ( 0 PE/ TIN MA)	OVERFI OUTFL( (cms) 0.000 0071) 0072) WK FLOW IE SHIFT ( CIMUM STO	LOW IS OF DW ST( ) (ha DO 0 AREA (ha) 1.360 1.360 1.360 REDUCT DF PEAK I DRAGE U	CRAGE a.m.) .0000 QPEAK (cms) 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	OUTFLO   (cms)   0.245 TPEA (hrs 72 2 40 2 ut/Qin](% (min (ha.m.	W STC (ha 0 C K ).75 .75 .75 )= 88.34 )= 0.00 )= 0.02	RAGE m.) 0.0209 R.V. (mm) 76.40 76.39	
IN= 2> OUT= 1   DT= 5.0 min INFLOW : ID= 2 ( ( OUTFLOW: ID= 1 ( ( PE/ TIN MA)	00071) 0071) 0072) 0072) 0072 0072) 0072 0072) 0072 0072	LOW IS ON DW ST( ) (ha DO 0 AREA (ha) 1.360 1.360 1.360 REDUCC DF PEAK I DRAGE I	CRAGE a.m.) .0000 QPEAK (cms) 0.2 0.2 0.2 TION [Qoint FLOW JSED	OUTFLO   (cms)   0.245 TPEA (hrs 72 2 40 2 ut/Qin](% (min (ha.m.	W STC (ha 0 C K ) .75 .75 .75 .75 .75 .75 .75 .75 	RAGE 1.m.) 0.0209 R.V. (mm) 76.40 76.39	
IN= 2> OUT= 1   DT= 5.0 min INFLOW : ID= 2 ( ( OUTFLOW: ID= 1 ( ( PE/ TIM MA)	OVERFI OUTFL( (cms) 0.000 0071) 0072) WK FLOW TE SHIFT ( CIMUM STO	LOW IS ON DW ST( ) (ha DO 0 AREA (ha) 1.360 1.360 1.360 REDUCT DF PEAK I	CRAGE a.m.) .0000 QPEAK (cms) 0.2 0.2 0.2 TION [Qoint FLOW JSED	OUTFLO   (cms)   0.245 TPEA (hrs 72 2 40 2 40 2 ut/Qin](% (min (ha.m.	W STC (ha 0 C K ).75 .75 .75 )= 88.34 )= 0.02 )= 0.02	RAGE 1.m.) .0209 R.V. (mm) 76.40 76.39	
IN= 2> OUT= 1   DT= 5.0 min INFLOW : ID= 2 ( ( OUTFLOW: ID= 1 ( ( PE/ TIN MA)	0071) 0071) 0072) 0072) 0072) 0072) 0072) 0072) 0072) 0071 0071) 0071 0071) 0071 0071) 0071 0071	LOW IS OF DW ST( ) (ha DO 0 AREA (ha) 1.360 1.360 REDUCT DF PEAK I DRAGE U	CRAGE a.m.) .0000 QPEAK (cms) 0.2 0.2 TION [Qoin FLOW JSED	OUTFLO   (cms)   0.245 TPEA (hrs 72 2 40 2 ut/Qin](% (min (ha.m.	W STC (ha 0 C K ) .75 .75 )= 88.34 )= 0.00 )= 0.02	RAGE 1.m.) .0209 R.V. (mm) 76.40 76.39 1 009	
IN= 2> OUT= 1   DT= 5.0 min INFLOW : ID= 2 ( ( OUTFLOW: ID= 1 ( ) PEA TIN MAX 	OVERFI OUTFL( (cms) 0.000 0071) 0072) KK FLOW HE SHIFT ( IMUM STO Area	LOW IS ON DW ST( ) (ha) 00 0 AREA (ha) 1.360 1.360 REDUCT DF PEAK I DRAGE I (ha)=	CRAGE a.m.) .0000 QPEAK (cms) 0.2 0.2 TION [Qoo FLOW JSED 0.73	OUTFLO   (cms)   0.245 TPEA (hrs 72 2 40 2 40 2 ut/Qin](% (min (ha.m.	W STC (ha 0 (k ). .75 .75 .75 )= 88.34 )= 0.00 )= 0.02	ORAGE 1.m.) 0.0209 R.V. (mm) 76.40 76.39 0 09	
IN= 2> OUT= 1   DT= 5.0 min INFLOW : ID= 2 ( 0 OUTFLOW: ID= 1 ( 0 PE/ TID MA) 	OVERFI OUTFL( (cms) 0.000 0071) 0072) WK FLOW HE SHIFT ( IMUM STO Area Total Ir	LOW IS OF DW ST( ) (ha) 00 0 AREA (ha) 1.360 1.360 REDUCT DF PEAK I DRAGE I (ha)= mp(%)= 2	CRAGE a.m.) .0000 QPEAK (cms) 0.2 0.2 TION [Qoo FLOW JSED 0.73 79.00	OUTFLO   (cms)   0.245 TPEA (hrs 72 2 40 2 ut/Qin](% (min (ha.m. Dir. Conn	W STC (ha ).75 .75 )= 88.34 )= 0.02 .(%)= 7	ORAGE 1.m.) 0.0209 R.V. (mm) 76.40 76.39 0 0 0 0 79.00	
IN= 2> OUT= 1 DT= 5.0 min INFLOW : ID= 2 ( ( OUTFLOW: ID= 1 ( ( PEA TIN MA) CALIB STANDHYD ( 0502) ID= 1 DT= 5.0 min	OVERFI OUTFL( (cms) 0.000 0071) 0072) WK FLOW HE SHIFT ( IMUM STO Area Total Ir	LOW IS OF DW ST( ) (ha) 00 0 AREA (ha) 1.360 1.360 REDUCT DF PEAK 1 DRAGE 1 (ha)= mp(%)= 3 TMPEPVT0	CAGE a.m.) .0000 QPEAK (cms) 0.2 0.2 0.2 TION [Qol FLOW JSED 0.73 79.00	OUTFLO   (cms)   0.245 TPEA (hrs 72 2 40 2 ut/Qin](% (min (ha.m.) Dir. Conn	W STC 0 (ha 0 (k ) .75 .75 .75 .75 .75 .75 .75 	RAGE (.m.) (.0209 R.V. (mm) 76.40 76.39 () (09	
IN= 2> OUT= 1   DT= 5.0 min INFLOW : ID= 2 ( ( OUTFLOW: ID= 1 ( C PE/ TIM MAX 	OVERFI OUTFL( (cms) 0.000 0071) 0072) WK FLOW E SHIFT ( CIMUM STO Area Total Ir	LOW IS OF DW ST( ) (ha) 00 0 AREA (ha) 1.360 1.360 REDUCT DF PEAK I DRAGE U (ha)= mp(%)= 1 IMPERVIOU 0.58	CRAGE a.m.) .0000 QPEAK (cms) 0.2 0.2 0.2 TION [Qol FLOW JSED 0.73 79.00 II JS PEI	OUTFLO   (cms)   0.245 TPEA (hrs 72 2 40 2 ut/Qin](% (min (ha.m. Dir. Conn RVIOUS (i 0.15	W STC 0 (ha 0 ( ) .75 .75 )= 88.34 )= 0.02 .(%)= 7 )	0RAGE (.m.) (.0209 R.V. (mm) 76.40 76.39 (09 (09	
IN= 2> OUT= 1   DT= 5.0 min INFLOW : ID= 2 ( ( OUTFLOW: ID= 1 ( C PEA TIM MAX CALIB   STANDHYD ( 0502)  ID= 1 DT= 5.0 min   Surface Area Dep. Storage	OVERFI OUTFL( (cms) 0.000 0071) 0072) WK FLOW IE SHIFT ( CIMUM STO CIMUM STO Area Total Ir (ha)=	LOW IS OF DW ST( ) (ha) 00 0 AREA (ha) 1.360 1.360 REDUCT DF PEAK I DRAGE U (ha)= mp(%)= 1.360 IMPERVIOU 0.58 2.00		OUTFLO   (cms)   0.245 TPEA (hrs 72 2 40 2 ut/Qin](% (min (ha.m. Dir. Conn RVIOUS (i 0.15 5.00	W STC 0 (ha 0 (k ) .75 .75 )= 88.34 )= 0.02 .(%)= 7 )	0RAGE 1.m.) .0209 R.V. (mm) 76.40 76.39 .09	
IN= 2> OUT= 1   DT= 5.0 min INFLOW : ID= 2 ( ( OUTFLOW: ID= 1 ( ( PEA TIN MAX CALIB STANDHYD ( 0502)  ID= 1 DT= 5.0 min Surface Area Dep. Storage Average Slope	OVERFI OUTFLC (cms) 0.000 0071) 0072) KK FLOW IE SHIFT ( CIMUM STO STORE Area Total Ir (ha)= (mm)= (%)=	LOW IS OF DW ST( ) (ha) 00 0 AREA (ha) 1.360 1.360 REDUCC DF PEAK I DRAGE U (ha)= mp(%)= 1.360 REDUCC DF PEAK I DRAGE U 0.58 2.00 1.00		OUTFLO   (cms)   0.245 TPEA (hrs 72 2 40 2 40 2 (min (ha.m. Cha.m. Dir. Conn RVIOUS (i 0.15 5.00 2.00	W STC 0 (ha 0 C K .75 .75 )= 88.34 )= 0.02 .02 .(%)= 7 )	0RAGE 1.m.) 0.0209 R.V. (mm) 76.40 76.39 009	
IN= 2> OUT= 1   DT= 5.0 min INFLOW : ID= 2 ( 0 OUTFLOW: ID= 1 ( 0 PEA TID MAD CALIB STANDHYD ( 0502)  ID= 1 DT= 5.0 min Surface Area Dep. Storage Average Slope Length	OVERFI OUTFL( (cms) 0.000 0071) 0072) KK FLOW IE SHIFT ( IMUM STO STO Area Total Ir (ha)= (ma)= (ma)= (ma)=	LOW IS OF DW ST( ) (ha) 00 0 AREA (ha) 1.360 1.360 REDUCT DF PEAK I DRAGE I (ha)= mp(%)= IMPERVIOU 0.58 2.00 1.00 69.76		OUTFLO   (cms)   0.245 TPEA (hrs 72 2 40 2 ut/Qin](% (min (ha.m. Dir. Conn RVIOUS (i 0.15 5.00 2.00 40.00	W STC (ha ) .75 )= 88.34 )= 0.02 .(%)= 7 )	ORAGE 1.m.) 0.0209 R.V. (mm) 76.40 76.39 0 0 0 0 79.00	
IN= 2> OUT= 1   DT= 5.0 min INFLOW : ID= 2 ( 0 OUTFLOW: ID= 1 ( 0 PE/ TID MA) 	OVERFI OUTFL( (cms; 0.000 0071) 0072) WK FLOW HE SHIFT ( IMUM STO Total In Total In (ha)= (m)= (%)= (%)=	LOW IS OF DW ST( ) (ha) 00 0 AREA (ha) 1.360 1.360 REDUC DF PEAK 1 DRAGE (ha)= mp(%)= 1.00 0.58 2.00 1.00 69.76 0.013		OUTFLO   (cms)   0.245 TPEA (hrs 72 2 40 2 ut/Qin](% (min (ha.m. Dir. Conn RVIOUS (i 0.15 5.00 2.00 40.00 0.250	W STC 0 (ha 0 (7 ).75 )= 88.34 )= 0.02 .(%)= 7 )	0RAGE 1.m.) 0.0209 R.V. (mm) 76.40 76.39 0 0 0 0 79.00	
IN= 2> OUT= 1   DT= 5.0 min INFLOW : ID= 2 ( ( OUTFLOW: ID= 1 ( ( PEA TIN MA) CALIB STANDHYD ( 0502) ID= 1 DT= 5.0 min Surface Area Dep. Storage Average Slope Length Mannings n NOTE: RAINFA	OVERFI OUTFL( (cms) 0.000 0071) 0072) WK FLOW E SHIFT ( IMUM STO Area Total In Total In (ha)= (mm)= (%)= (%)= =	LOW IS OF DW ST( ) (ha) 00 0 AREA (ha) 1.360 1.360 REDUCT DF PEAK I DRAGE U (ha)= mp(%)= IMPERVIOU 0.58 2.000 1.00 69.76 0.013 RANSFORMI		OUTFLO   (cms)   0.245 TPEA (hrs 72 2 40 2 ut/Qin](% (min (ha.m.) Dir. Conn RVIOUS (i 0.15 5.00 2.00 4.000 0.250 5.0 MIN.	W STC 0 (ha 0 C K ) -75 )= 88.34 )= 0.02  .(%)= 7 ) TIME STE	PRAGE (.m.) (.0209 R.V. (mm) 76.40 76.39 (	
IN= 2> OUT= 1   DT= 5.0 min INFLOW : ID= 2 ( 0 OUTFLOW: ID= 1 ( 0 PE/ TID MAD CALIB STANDHYD ( 0502)  ID= 1 DT= 5.0 min Surface Area Dep. Storage Average Slope Length Mannings n NOTE: RAINFA	OVERFI OUTFL( (cms; 0.000 0071) 0072) WK FLOW E SHIFT ( IMUM STO Total Ir (ma)= (ma)= (%)= (%)= (%)= (ma)=	LOW IS OF DW ST( ) (ha) 00 0 AREA (ha) 1.360 1.360 REDUCTOR PEAK 1 DRAGE (ha)= mp(%)= 1.00 0.58 2.00 0.013 RANSFORMI	ORAGE a.m.) OOOO QPEAK (cms) 0.2 0.2 0.2 TION [Qoo FLOW JSED 0.73 79.00 I JS PEI COO DIS PEI	OUTFLO   (cms)   0.245 TPEA (hrs 72 2 40 2 ut/Qin](% (min (ha.m. Dir. Conn RVIOUS (i 0.15 5.00 2.00 40.00 0.250 5.0 MIN.	W STC 0 (ha .75 .75 )= 88.34 )= 0.02 .(%)= 7 ) TIME STE	PRAGE 	
IN= 2> OUT= 1 DT= 5.0 min INFLOW : ID= 2 ( ( OUTFLOW: ID= 1 ( ( PEA TIN MA) CALIB STANDHYD ( 0502) ID= 1 DT= 5.0 min Surface Area Dep. Storage Average Slope Length Mannings n NOTE: RAINFA	OVERFI OUTFLC (cms) 0.000 0071) 0072) KK FLOW IE SHIFT ( IMUM STO STATE Area Total Ir (ha)= (mm)= (%)= (m)= = SLL WAS TH	LOW IS OF LOW IS OF DW ST( ) (ha) 00 0 AREA (ha) 1.360 1.360 REDUCC DF PEAK I DRAGE U (ha) = mp(%) = IMPERVIOU 0.58 2.00 69.76 0.013 RANSFORMI TR	ANSFORMEL	OUTFLO   (cms)   0.245 TPEA (hrs 72 2 40 2 ut/Qin](% (min (ha.m. Dir. Conn RVIOUS (i 0.15 5.00 2.00 40.00 0.250 5.0 MIN.	W STC 0 (ha .75 .75 )= 88.34 = 0.02 .(%)= 7 ) TIME STE APH	PRAGE 	

		110	AN SPURIE		AFII		
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	9.64	3.250	20.88	4.83	1.61
0.167	0.00	1.750	9.64	3.333	11.24	4.92	1.61

$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	0.250	0.00	1.833	27.30	3.417	11.24	5.00	1.61
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	0.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	0.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	0.500	1.61	2.083	27.30	3.667	11.24	5.25	1.61
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	0.750	1.61	2.333	73.88	3.917	6.42	5.50	1.61
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	0.833	1.61	2.417	73.88	4.000	6.42	5.58	1.61
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	0.917	1.61	2.500	73.88	4.083	6.42	5.67	1.61
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1.000	1.61	2.583	73.88	4.167	6.42	5.75	1.61
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1.083	1.61	2.667	73.88	4.250	6.42	5.83	1.61
1.250 1.61 2.833 20.88 4.417 3.21 6.00 1.63 1.333 9.64 2.917 20.88 4.500 3.21 6.08 1.63 1.417 9.64 3.000 20.88 4.583 3.21 6.17 1.63 1.500 9.64 3.083 20.88 4.667 3.21 6.25 1.63 1.583 9.64 3.167 20.88 4.750 3.21 6.25 1.63 1.583 9.64 3.167 20.88 4.750 3.21 Max.Eff.Inten.(mm/hr)= 73.88 42.73 over (min) 5.00 10.00 Storage Coeff. (min)= 2.32 (ii) 7.01 (ii) Unit Hyd. Tpeak (min)= 5.00 10.00 Unit Hyd. peak (cms)= 0.30 0.14 *TOTALS* PEAK FLOW (cms)= 0.12 0.02 0.135 (iii) TIME TO PEAK (hrs)= 2.75 2.75 2.75 RUNOFF VOLUME (mm)= 78.31 35.45 69.30 TOTAL RAINFALL (mm)= 80.31 80.31 RUNOFF COEFFICIENT = 0.98 0.44 0.86	1.167	1.61	2.750	73.88	4.333	3.21	5.92	1.61
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1.250	1.61	2.833	20.88	4.417	3.21	6.00	1.61
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1.333	9.64	2.917	20.88	4.500	3.21	6.08	1.61
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1.417	9.64	3.000	20.88	4.583	3.21	6.17	1.61
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1.500	9.64	3.083	20.88	4.667	3.21	6.25	1.61
$\begin{array}{llllllllllllllllllllllllllllllllllll$	1.583	9.64	3.167	20.88	4.750	3.21	I	
over         (min)         5.00         10.00           Storage Coeff.         (min)=         2.32 (ii)         7.01 (ii)           Unit Hyd. Tpeak (min)=         5.00         10.00           Unit Hyd. peak (cms)=         0.30         0.14           PEAK FLOW         (cms)=         0.12         0.02         0.135 (iii)           TIME TO PEAK         (hrs)=         2.75         2.75         2.75           RUNOFF VOLUME         (mm)=         78.31         35.45         69.30           TOTAL RAINFALL         (mm)=         80.31         80.31         80.31           RUNOFF COEFFICIENT         =         0.98         0.44         0.86	Max.Eff.Inten.(m	m/hr)=	73.88		42.73			
Storage Coeff. (min)=       2.32 (ii)       7.01 (ii)         Unit Hyd. Tpeak (min)=       5.00       10.00         Unit Hyd. peak (cms)=       0.30       0.14         PEAK FLOW (cms)=       0.12       0.02       0.135 (iii)         TIME TO PEAK (hrs)=       2.75       2.75       2.75         RUNOFF VOLUME (mm)=       78.31       35.45       69.30         TOTAL RAINFALL (mm)=       80.31       80.31       80.31	over	(min)	5.00		10.00			
Unit Hyd. Tpeak (min)= 5.00 10.00 Unit Hyd. peak (cms)= 0.30 0.14 PEAK FLOW (cms)= 0.12 0.02 0.135 (iii) TIME TO PEAK (hrs)= 2.75 2.75 2.75 RUNOFF VOLUME (mm)= 78.31 35.45 69.30 TOTAL RAINFALL (mm)= 80.31 80.31 80.31 RUNOFF COEFFICIENT = 0.98 0.44 0.86	Storage Coeff.	(min)=	2.32	(ii)	7.01 (ii)			
Unit Hýd. peak (cms)= 0.30 0.14 PEAK FLOW (cms)= 0.12 0.02 0.135 (iii) TIME TO PEAK (hrs)= 2.75 2.75 2.75 RUNOFF VOLUME (mm)= 78.31 35.45 69.30 TOTAL RAINFALL (mm)= 80.31 80.31 80.31 RUNOFF COEFFICIENT = 0.98 0.44 0.86	Unit Hvd. Tpeak	(min)=	5.00		10.00			
*TOTALS*           PEAK FLOW         (cms)=         0.12         0.02         0.135         (iii)           TIME TO PEAK         (hrs)=         2.75         2.75         2.75           RUNOFF VOLUME         (mm)=         78.31         35.45         69.30           TOTAL RAINFALL         (mm)=         80.31         80.31         80.31           RUNOFF COEFFICIENT         =         0.98         0.44         0.86	Unit Hvd. peak	(cms)=	0.30		0.14			
PEAK         FLOW         (cms)=         0.12         0.02         0.135         (iii)           TIME         TO         PEAK         (hrs)=         2.75         2.75         2.75           RUNOFF         VOLUME         (mm)=         78.31         35.45         69.30           TOTAL         RAINFALL         (mm)=         80.31         80.31         80.31           RUNOFF         COEFFICIENT         =         0.98         0.44         0.86		( <i>)</i>				*T0	TALS*	
TIME TO PEAK         (hrs)=         2.75         2.75         2.75           RUNOFF VOLUME         (mm)=         78.31         35.45         69.30           TOTAL RAINFALL         (mm)=         80.31         80.31         80.31           RUNOFF COEFFICIENT         =         0.98         0.44         0.86	PEAK FLOW	(cms)=	0.12		0.02	0	.135 (iii)	Ŕ.
RUNOFF VOLUME (mm)= 78.31 35.45 69.30 TOTAL RAINFALL (mm)= 80.31 80.31 80.31 RUNOFF COEFFICIENT = 0.98 0.44 0.86	TIME TO PEAK	(hrs)=	2.75		2.75		2.75	
TOTAL RAINFALL (mm)= 80.31 80.31 80.31 RUNOFF COEFFICIENT = 0.98 0.44 0.86	RUNOFF VOLUME	(mm)=	78.31		35.45	69	9.30	
RUNOFF COEFFICIENT = $0.98$ $0.44$ $0.86$	TOTAL RAINFALL	(mm)=	80.31		80.31	80	0.31	
	RUNOFF COEFFICIE	NT =	0.98		0.44	(	0.86	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
 CN\* = 75.0 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( 5021)| IN= 2---> OUT= 1 DT= 5.0 min OVERFLOW IS OFF OUTFLOW STORAGE OUTFLOW STORAGE I (cms) 0.0000 0.0050 (cms) 0.0110 0.0130 (ha.m.) 0.0323 0.0364 (ha.m.) 0.0000 0.0070 0.0232 0.0277 0.0150 0.0000 0.0393 TPEAK (hrs) 2.75 3.83 AREA (ha) 0.730 OPEAK (cms) 0.135 R.V. (mm) 69.30 INFLOW : ID= 2 ( 0502) OUTFLOW: ID= 1 ( 5021) 0.730 0.015 68.08 PEAKFLOWREDUCTION[Qout/Qin](%)=11.00TIME SHIFT OF PEAKFLOW(min)=65.00MAXIMUMSTORAGEUSED(ha.m.)=0.0391 \_\_\_\_\_ CALIB STANDHYD ( 0501) ID= 1 DT= 5.0 min

Area (ha)= 0.38 Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00 IMPERVIOUS PERVIOUS (i) Surface Area Dep. Storage Average Slope Length Mannings n (ha)= (mm)= (%)= (m)= = 0.00 5.00 2.00 40.00 0.250 0.38 2.00 1.00 50.33 0.013

		TRA	ANSFORME	D HYETOGR	APH		
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	9.64	3.250	20.88	4.83	1.61
0.167	0.00	1.750	9.64	3.333	11.24	4.92	1.61
0.250	0.00	1.833	27.30	3.417	11.24	5.00	1.61
0.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61
0.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61
0.500	1.61	2.083	27.30	3.667	11.24	5.25	1.61
0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61

0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583	$\begin{array}{c ccccc} 1.61 & 2.250 \\ 1.61 & 2.33 \\ 1.61 & 2.41 \\ 1.61 & 2.500 \\ 1.61 & 2.58 \\ 1.61 & 2.58 \\ 1.61 & 2.58 \\ 1.61 & 2.750 \\ 1.61 & 2.83 \\ 9.64 & 2.91 \\ 9.64 & 3.000 \\ 9.64 & 3.08 \\ 9.64 & 3.16 \end{array}$	0       27.30         3       73.88         7       73.88         7       73.88         7       73.88         7       73.88         7       73.88         7       73.88         7       73.88         7       73.88         20.88       20.88         20.88       20.88         7       20.88         7       20.88	3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750	6.42       5.42         6.42       5.50         6.42       5.67         6.42       5.67         6.42       5.83         3.21       5.92         3.21       6.00         3.21       6.03         3.21       6.05         3.21       6.02         3.21       6.25         3.21       6.25         3.21       6.25	1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61
Max.Eff.Inten.(mn over ( Storage Coeff. ( Unit Hyd. Tpeak ( Unit Hyd. peak (	/hr)= 73. min) 5. min)= 1. min)= 5. cms)= 0.	88 4 00 91 (ii) 00 32	42.73 5.00 3.18 (ii) 5.00 0.27		
PEAK FLOW ( TIME TO PEAK ( RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIEN	cms)= 0. hrs)= 2. (mm)= 78. (mm)= 80. T = 0.	08 75 31 3 31 8 98	0.00 2.75 35.45 30.31 0.44	*TOTALS* 0.078 (iii) 2.75 77.88 80.31 0.97	
***** WARNING: STORAGE	COEFF. IS SMA	LLER THAN T	IME STEP!		
(i) CN PROCEDUR CN* = 75 (ii) TIME STEP ( THAN THE ST (iii) PEAK FLOW D	E SELECTED FOR 0 Ia = Dep DT) SHOULD BE ORAGE COEFFICI OES NOT INCLUD	PERVIOUS L Storage MALLER OR ENT. BASEFLOW	OSSES: (Above) EQUAL IF ANY.		
CALIB STANDHYD ( 0503) ID= 1 DT= 5.0 min	Area (ha)= Total Imp(%)=	0.91 79.00 D	Dir. Conn.(	(%)= 79.00	
Surface Area Dep. Storage Average Slope Length Mannings n	$\begin{array}{rcrc} \text{IMPERV.} \\ (ha) = & 0.1 \\ (mm) = & 2.0 \\ (\%) = & 1.0 \\ (m) = & 77.0 \\ = & 0.00 \end{array}$	100S PER 72 00 00 89 4 13 0	0.19 5.00 2.00 40.00 0.250		
NOTE: RAINFA	LL WAS TRANSFO	RMED TO 5	5.0 MIN. TI	ME STEP.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500	RAIN         TIM           mm/hr         hr:           0.00         1.66:           0.00         1.83:           1.61         2.00           1.61         2.00           1.61         2.00           1.61         2.03:           1.61         2.03:           1.61         2.16:           1.61         2.53:           1.61         2.54:           1.61         2.53:           1.61         2.54:           1.61         2.54:           1.61         2.56:           1.61         2.66:           1.61         2.65:           1.61         2.50:           1.61         2.56:           1.61         2.66:           1.61         2.65:           1.61         2.65:           1.61         2.65:           1.61         2.64:           9.64         3.06:           9.64         3.08:           9.64         3.08:	TRANSFORMED           E         RAIN           S         mm/hr           7         9.64           0         9.64           1         27.30           7         27.30           0         27.30           1         27.30           1         27.30           2         27.30           1         27.30           2         7.388           7         73.88           7         73.88           0         73.88           0         73.88           0         73.88           0         73.88           0         73.88           0         73.88           0         20.88           0         20.88           0         20.88           0         20.88           0         20.88           0         20.88           0         20.88           0         20.88           0         20.88	D HYETOGRAF TIME ' hrs 3.250 2 3.333 1 3.417 1 3.500 1 3.583 1 3.667 1 3.750 1 3.667 1 3.750 1 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.583 4.667 4.583 4.667	PH         RAIN   TIME         mm/hr   hrs         20.88   4.83         1.24   4.92         1.24   5.00         1.24   5.08         1.24   5.25         1.24   5.33         6.42   5.50         6.42   5.58         6.42   5.67         6.42   5.83         3.21   5.92         3.21   6.08         3.21   6.17         3.21   6.25	RAIN mm/hu 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.Eff.Inten.(mm over ( Storage Coeff. ( Unit Hyd. Tpeak ( Unit Hyd. peak (	n/hr)= 73.0 min)= 73.0 min)= 2.0 min)= 5.0 cms)= 0.0	88 4 00 1 48 (ii) 29 1	42.73 10.00 7.17 (ii) 10.00 0.14	*****	
PEAK FLOW () TIME TO PEAK () RUNOFF VOLUME TOTAL RAINFALL DUNCEF COFFICIEN	cms)= 0. hrs)= 2. (mm)= 78. (mm)= 80.	15 75 31 3 31 8	0.02 2.75 35.45 30.31	*10[ALS* 0.168 (iii) 2.75 69.31 80.31	

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: (i) CN\* = 75.0 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( 5031) OVERFLOW IS OFF IN= 2---> OUT= 1 DT= 5.0 min OUTFLOW STORAGE OUTFLOW STORAGE (cms) 0.0000 (ha.m.) 0.0000 (cms) 0.0140 (ha.m.) 0.0404 0.0060 0.0221 0.0160 0.0456 0.0290 0.0347 0.0090 0.0180 0.0492 0.0110 0.0000 0.0000 R.V. (mm) AREA (ha) 0.910 0.910 QPEAK TPEAK (cms) 0.168 0.018 (hrs) 2.75 3.83 INFLOW : ID= 2 ( 0503) OUTFLOW: ID= 1 ( 5031) 69.31 68.28 PEAKFLOWREDUCTION[Qout/Qin](%)=10.60TIMESHIFT OFPEAKFLOW(min)=65.00MAXIMUMSTORAGEUSED(ha.m.)=0.0489 ADD HYD ( 0504) | 1 + 2 = 3 | QPEAK AREA TPEAK R.V. ID1= 1 ( 0501): + ID2= 2 ( 5021): (cms) 0.078 (ha) 0.38 (hrs) 2.75 (mm) 77.88 0.73 0.015 3.83 68.08 ID = 3 ( 0504): 1.11 2.75 0.088 71.44 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. ADD HYD ( 0504) 3 + 2 = 1 AREA (ha) 1.11 0.91 OPEAK (cms) TPEAK R.V. (mm) (hrs) 2.75 3.83 ID1= 3 ( 0504): + ID2= 2 ( 5031): 71.44 68.28 0.088 0.018 ID = 1 ( 0504): 2.02 0.100 2.75 70.01 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. \_\_\_\_\_ RESERVOIR( 0505)| IN= 2---> OUT= 1 DT= 5.0 min OVERFLOW IS OFF OUTFLOW STORAGE OUTFLOW STORAGE (cms) 0.0000 (ha.m.) 0.0000 (cms) 0.0330 (ha.m.) 0.0308 0.0150 0.0145 0.0370 0.0345 0.0180 0.0224 0.0420 0.0383 0.0250 0.0268 0.0000 0.0000 AREA (ha) 2.020 QPEAK (cms) 0.100 TPEAK (hrs) 2.75 R.V. (mm) 70.01 INFLOW : ID= 2 ( 0504) OUTFLOW: ID= 1 ( 0505) 2.020 0.033 4.75 69.90 PEAKFLOWREDUCTION[Qout/Qin](%)= 33.09TIMESHIFT OFPEAKFLOW(min)=120.00MAXIMUMSTORAGEUSED(ha.m.)=0.0309 ADD HYD ( 0009) | 1 + 2 = 3 | AREA TPEAK QPEAK R.V. (ha) 2.93 (cms) 0.214 (hrs) 3.00 (mm) 39.71 ID1= 1 ( 0011): + ID2= 2 ( 0423): 10.60 0.193 4.58 59.46 ID = 3 ( 0009): 13.53 0.279 3.83 55.18 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD ( $000$ 3 + 2 = 1	9)	AREA	OPEAK	TPEAK	R.V.		
TD1-3 (	0009)	(ha)	(cms)	(hrs)	(mm)		
+ ID2 = 2 (	0505):	2.02	0.033	4.75	69.90		
ID = 1 (	0009):	15.55	0.309	3.83	57.09		
NOTE: PEAK	FLOWS DO NO	T INCLU	DE BASEFLO	WS IF AN	r.		
ADD HYD ( 000	9)			1000000	10000		
1 + 2 = 3		AREA (ha)	(cms)	(hrs)	R.V. (mm)		
ID1= 1 ( + ID2= 2 (	0009): 0006):	15.55	0.309 1.104	3.83 3.58	57.09 68.11		
ID = 3 (	0009):	40.78	1.409	3.83	63.91		
NOTE: PEAK	FLOWS DO NO	OT INCLU	DE BASEFLO	WS IF AN	r.		
	9)						
3 + 2 = 1		AREA	QPEAK	TPEAK	R.V.		
ID1= 3 (	0009):	40.78	1.409	3.83	63.91		
+ 1D2= 2 (	0067):	5.46	1.088	2.75	76.40		
ID = 1 (	0009):	46.24	2.201	2.75	65.38		
NOTE: PEAK	FLOWS DO NO	DT INCLU	DE BASEFLO	WS IF AN	r.		
ADD HYD ( 000 1 + 2 = 3	9)	AREA	OPEAK	ΤΡΕΔΚ	RV		
TD1_1 (		(ha)	(cms)	(hrs)	(mm)		
+ ID1 = 1 (	0009):	0.88	0.077	2.75	76.29		
ID = 3 (	0009):	47.12	2.274	2.75	65.59		
NOTE: PEAK	FLOWS DO NO	T INCLU	DE BASEFLO	WS IF AN	r.		
ADD HYD ( 000	9)						
3 + 2 = 1		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V.		
ID1= 3 (	0009):	47.12	2.274	2.75	65.59		
+ ID2= 2 (	0072):	1.30	0.240	2.75	70.39		
ID = 1 (	0009):	48.48	2.514	2.75	65.89		
NOTE: PEAK	FLOWS DO NO	DT INCLU	DE BASEFLO	WS IF AN	r. 		
ROUTE CHN( 001	3)						
IN= 2> OUT= :	1   Rou	uting ti	me step (m	in)'= 5	.00		
<	DATA	FOR SEC	TION ( 1	.1)	>		
DI	0.00	101.	50	0.0500			
	1.50	100.	55 0.05	0.0500	00 Main	Channel	
	2.00 3.50	99. 99.	50 60	0.0300	Main Main	Channe I Channe I	
	4.50	100.	65 0.03 45	00 /0.050	00 Main	Channe1	
<i></i>		- TRAVEL	TTME TAR	F		>	
DEPTH E	LEV VC	DLUME	FLOW RATE	VELO		RAV.TIME	
0.10 99	.60 .353	3E+02	0.0	Cm, O	.19	43.69	
0.19 99 0.29 99	.69 .112 .79 .195	2E+03 5E+03	0.1	0	. 37	17.03	
0.38 99 0.48 99	.88 .285 .98 .381	5E+03 LE+03	0.3	0	.59	14.23 12.51	
0.57 100	.07 .484	4E+03	0.7	ŏ	.74	11.32	

0.67	100.17	. 59	4E+03	0.9		0.80	10.43	
0.76	100.26	.71	0E+03	1.2		0.86	9.74	
0.86	100.36	.83	2E+03	1.5		0.91	9.18	
0.95	100.45	.96	1E+03	1.8		0.96	8.72	
1.05	100.55	.11	0E+04	2.2		1.00	8.32	
1.16	100.66	.12	7E+04	2.7		1.07	7.80	
1.28	100.78	.14	8E+04	3.4		1.14	7.31	
1.39	100.89	.17	0E+04	4.1		1.20	6.94	
1.50	101.00	.19	5E+04	4.9		1.25	6.65	
1.61	101.11	.22	1E+04	5.8		1.30	6.41	
1.72	101.22	.25	0F+04	6.7		1.34	6.22	
1.84	101.34	.28	0E+04	7.7	1.38		6.04	
1.95	101.45	.31	3E+04	8.8	1.41		5.90	
				< hvo	drograph	>	<-pipe / c	hannel->
			AREA	OPFAK	TPFAK	R.V.	MAX DEPTH	MAX VEI
			(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW :	TD= 2 (	0009)	48.48	2.51	2.75	65.89	1.12	1.04
OUTEL OW:	TD = 1	0013)	48.48	2.32	2.75	65.89	1.08	1.02
CON LOW!	(	0010)	.0.40	21.52	2.75	00100	2.00	2.02

CALIB NASHYD ( 0018) ID= 1 DT= 5.0 min	Area (ha)= Ia (mm)= U.H. Tp(hrs)=	1.85 5.00 0.24	Curve Number (CN)= 79.0 # of Linear Res.(N)= 3.00

TRANSFORMED HYETOGRAPH										
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN			
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr			
0.083	0.00	1.667	9.64	3.250	20.88	4.83	1.61			
0.167	0.00	1.750	9.64	3.333	11.24	4.92	1.61			
0.250	0.00	1.833	27.30	3.417	11.24	5.00	1.61			
0.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61			
0.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61			
0.500	1.61	2.083	27.30	3.667	11.24	5.25	1.61			
0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61			
0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61			
0.750	1.61	2.333	73.88	3.917	6.42	5.50	1.61			
0.833	1.61	2.417	73.88	4.000	6.42	5.58	1.61			
0.917	1.61	2.500	73.88	4.083	6.42	5.67	1.61			
1.000	1.61	2.583	73.88	4.167	6.42	5.75	1.61			
1.083	1.61	2.667	73.88	4.250	6.42	5.83	1.61			
1.167	1.61	2.750	73.88	4.333	3.21	5.92	1.61			
1.250	1.61	2.833	20.88	4.417	3.21	6.00	1.61			
1.333	9.64	2.917	20.88	4.500	3.21	6.08	1.61			
1.417	9.64	3.000	20.88	4.583	3.21	6.17	1.61			
1.500	9.64	3.083	20.88	4.667	3.21	6.25	1.61			
1.583	9.64	3.167	20.88	4.750	3.21	And and a state of the state of				

Unit Hyd Qpeak (cms)= 0.294

PEAK FLOW TIME TO PEAK	(cms)= (hrs)=	0.184	(i)
RUNOFF VOLUME	(mm)=	39.672	
RUNOFF COEFFICI	(mm)= ENT =	80.310 0.494	

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

CALIB STANDHYD ( 0019) ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	3.97 90.00	Dir.	Conn.(%)=	90.00	
		IMPERVI	OUS	PERVIO	US (i)		
Surface Area	(ha)=	3.5	7	0.4	0		
Dep. Storage	(mm)=	1.0	0	1.5	0		
Average Slope	(%)=	1.0	0	2.0	0		
Length	(m)=	162.6	9	40.0	0		
Mannings n	=	0.01	.3	0.25	0		

		TRA	ANSFORME	DH	YETOGR/	APH		
TIME	RAIN	TIME	RAIN	1:	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr		hrs	mm/hr	hrs	mm/hr

0.083	0.00	1.667	9.64	3.250	20.88	4.83	1.61
0.167	0.00	1.750	9.64	3.333	11.24	4.92	1.61
0.250	0.00	1.833	27.30	3.417	11.24	5.00	1.61
0.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61
0.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61
0.500	1.61	2.083	27.30	3.667	11.24	5.25	1.61
0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61
0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61
0.750	1.61	2.333	73.88	3.917	6.42	5.50	1.61
0.833	1.61	2.417	73.88	4.000	6.42	5.58	1.61
0.917	1.61	2.500	73.88	4.083	6.42	5.67	1.61
1.000	1.61	2.583	73.88	4.167	6.42	5.75	1.61
1.083	1.61	2.667	73.88	4.250	6.42	5.83	1.61
1.167	1.61	2.750	73.88	4.333	3.21	5.92	1.61
1.250	1.61	2.833	20.88	4.417	3.21	6.00	1.61
1.333	9.64	2.917	20.88	4.500	3.21	6.08	1.61
1.417	9.64	3.000	20.88	4.583	3.21	6.17	1.61
1.500	9.64	3.083	20.88	4.667	3.21	6.25	1.61
1.583	9.64	3.167	20.88	4.750	3.21		
Max.Eff.Inten.(mm/	hr)=	73.88		57.08			
over (m	in)	5.00		10.00			
Storage Coeff. (m	in)=	3.86	(ii)	7.17 (ii	)		
Unit Hyd. Tpeak (m	in)=	5.00		10.00			
Unit Hvd. peak (c	ms)=	0.25		0.14			
					*T0	TALS*	
PEAK FLOW (c	ms)=	0.73		0.06	0.	792 (iii	)
TIME TO PEAK (h	rs)=	2.75		2.75	2	2.75	5.00
RUNOFF VOLUME (	mm)=	79.31		50.24	76	5.40	
TOTAL RAINFALL (	mm)=	80.31		80.31	80	0.31	
RUNOFF COEFFICIENT	=	0.99		0.63	(	0.95	

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 85.0 Ia = Dep. Storage (Above)
   (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
   (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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CALIB   STANDHYD ( 0043)  ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	11.15 90.00	Dir.	Conn.(%)=	90.00	
		THEFT	-	DEDI (TO)			

		IMPERVIOUS	PERVIOUS (1)
Surface Area	(ha)=	10.03	1.12
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	272.64	40.00
Mannings n	=	0.013	0.250

TRANSFORMED HYETOGRAPH									
TIME R/	AIN   TIME	RAIN	' TIME	RAIN	TIME	RAIN			
hrs mm/	/hr hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr			
0.083 0.	.00   1.667	9.64	3.250	20.88	4.83	1.61			
0.167 0.	.00   1.750	9.64	3.333	11.24	4.92	1.61			
0.250 0.	.00   1.833	27.30	3.417	11.24	5.00	1.61			
0.333 1.	.61   1.917	27.30	3.500	11.24	5.08	1.61			
0.417 1.	.61   2.000	27.30	3.583	11.24	5.17	1.61			
0.500 1.	.61 2.083	27.30	3.667	11.24	5.25	1.61			
0.583 1.	.61   2.167	27.30	3.750	11.24	5.33	1.61			
0.667 1.	.61   2.250	27.30	3.833	6.42	5.42	1.61			
0.750 1.	.61   2.333	73.88	3.917	6.42	5.50	1.61			
0.833 1.	.61 2.417	73.88	4.000	6.42	5.58	1.61			
0.917 1.	.61   2.500	73.88	4.083	6.42	5.67	1.61			
1.000 1.	.61   2.583	73.88	4.167	6.42	5.75	1.61			
1.083 1.	.61 2.667	73.88	4.250	6.42	5.83	1.61			
1.167 1.	.61 2.750	73.88	4.333	3.21	5.92	1.61			
1.250 1.	.61   2.833	20.88	4.417	3.21	6.00	1.61			
1.333 9.	.64 2.917	20.88	4.500	3.21	6.08	1.61			
1.41/ 9.	.64 3.000	20.88	4.583	3.21	6.1/	1.61			
1.500 9.	.64 3.083	20.88	4.667	3.21	6.25	1.61			
1.583 9.	.64   3.167	20.88	4.750	3.21					
Max.Eff.Inten.(mm/hr)=	73.88	1	57.08						
over (min)	5.00	)	10.00						
Storage Coeff. (min)=	= 5.26	(ii)	8.57 (ii)	É.					
Unit Hvd. Tpeak (min)=	= 5.00	)	10.00						
Unit Hyd. peak (cms)-	= 0.21		0.12						

PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI	(cms)= (hrs)= (mm)= (mm)= ENT =	2.06 2.75 79.31 80.31 0.99		0.16 2.75 50.24 80.31 0.63	*T01 2. 76 80	FALS* .216 (iii) 2.75 5.40 ).31 ).95	
(i) CN PROCED CN* = (ii) TIME STEP THAN THE (iii) PEAK FLOW	URE SELECTE 85.0 Ia (DT) SHOUL STORAGE COE DOES NOT I	D FOR PE = Dep. S <sup>+</sup> D BE SMAI FFICIENT NCLUDE B/	RVIOUS torage LLER OR ASEFLOW	LOSSES: (Above) EQUAL IF ANY.			
RESERVOIR( 0045)   IN= 2> OUT= 1   DT= 5.0 min	OVERFL OUTFLO (cms) 0.000	OW IS OF W STO (ha. 0 0.0	F RAGE .m.) 0000	OUTFLO   (cms)   1.1000	V STC (ha D C	DRAGE a.m.) D.3830	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 ( PI T.	0043) 0045) EAK FLOW IME SHIFT O	AREA (ha) 11.150 11.150 REDUCT F PEAK FI	QPEAK (cms) 2.2 1.0 LON [Qo	TPEA (hrs) 16 2 65 2 ut/Qin](%) (min	( ) .75 .92 )= 48.04 )= 10.00	R.V. (mm) 76.40 76.39	
M/	AXIMUM STO	RAGE US	SED	(ha.m.)	)= 0.37	731	
CALIB STANDHYD ( 0044) ID= 1 DT= 5.0 min	Area Total Im	(ha)= 30 p(%)= 90	5.51 0.00	Dir. Conn	. (%)= 9	90.00	
Surface Area Dep. Storage Average Slope Length Mannings n	I (ha)= (mm)= (%)= (m)= =	MPERVIOUS 32.86 1.00 1.00 493.36 0.013	S PE	RVIOUS (1) 3.65 1.50 2.00 40.00 0.250	)		
NOTE: RAIN	FALL WAS TR	ANSFORME	о то	5.0 MIN.	TIME STE	EP.	
TIM hr: 0.08 0.16 0.25 0.33 0.41 0.50 0.58 0.66 0.75 0.83 0.91 1.00 1.08 1.16 1.25 1.33 1.41 1.50	E RAIN   s mm/hr 3 0.00 7 0.00   0 0.00   3 1.61   7 1.61   0 1.61   3 1.61   7 1.61   3 1.61   7 3 4.61   7 3 4.61   7 4.61   7 4.61   7 5.64   7	TRAI TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.417 2.500 2.583 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	NSFORME RAIN 9.64 9.64 27.30 27.30 27.30 27.30 27.30 27.30 73.88 73.88 73.88 73.88 73.88 73.88 73.88 20.88 20.88 20.88 20.88	D HYETOGR/	APH RAIN mm/hr 20.88 11.24 11.24 11.24 11.24 11.24 11.24 11.24 11.24 6.42 6.42 6.42 6.42 6.42 6.42 6.42 6	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.67 5.75 5.75 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.Eff.Inten.(r over Storage Coeff. Unit Hvd. Tpeak	nm/hr)= (min) (min)= (min)=	73.88 10.00 7.51 10.00	(ii)	57.08 15.00 10.82 (ii) 15.00	)		
Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI	(cms)= (cms)= (hrs)= (mm)= (mm)= ENT =	0.13 6.62 2.75 79.31 80.31 0.99		0.09 0.48 2.83 50.24 80.31 0.63	*TOT 7. 76 80	TALS* .097 (iii) 2.75 5.40 0.31 0.95	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

CN* = 85.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.	_
Image: Normal State         OVERFLOW IS OFF           IN= 2> OUT= 1         OVERFLOW IS OFF           DT= 5.0 min         OUTFLOW         STORAGE            (cms)         (ha.m.)           0.0000         0.0000         6.5700	
AREA         QPEAK         TPEAK         R.V.           (ha)         (cms)         (hrs)         (mm)           INFLOW : ID= 2         0044)         36.510         7.097         2.75         76.40           OUTFLOW: ID= 1         0046)         36.510         6.401         2.83         76.40	
PEAK FLOW REDUCTION [Qout/Qin](%)= 90.19 TIME SHIFT OF PEAK FLOW (min)= 5.00 MAXIMUM STORAGE USED (ha.m.)= 0.3944	
ADD HYD ( 0016)    1 + 2 = 3   AREA QPEAK TPEAK R.V. 	
ID = 3 ( 0016): 5.82 0.969 2.75 64.73	
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.	_
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
ID = 3 ( 0016): 53.48 8.204 2.75 75.13	
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.	-
DI=         5.0 min         OUTFLOW         STORAGE         OUTFLOW         STORAGE            (cms)         (ha.m.)         (cms)         (ha.m.)           0.0000         0.0000         0.4100         1.6169           0.2000         0.2102         2.5600         2.5701           0.3200         0.8386         3.1500         3.1183           0.3900         1.4070         3.4200         3.4107	
AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) INFLOW: ID= 2 (0016) 53.480 8.204 2.75 75.13 OUTFLOW: ID= 1 (0015) 53.480 2.365 3.75 75.13 PEAK FLOW REDUCTION [Qout/Qin](%)= 28.82 TME SHIET OF REAK FLOW [Qout/Qin](%)= 28.82	
MAXIMUM STORAGE USED (ha.m.)= 2.4845	
	-
ADD HYD ( 0064)           1 + 2 = 3           (ha)         (cms)           (hrs)         (mm)	

ID1= + ID2=	12	0013): 0015):	48 53	.48 2 .48 2	.316	2.75 3.75	65. 75.	89 13		
==== ID =	3 (	0064):	101	.96 4	.063	3.67	70.	73		
NOTE:	PEAK	FLOWS D	O NOT	INCLUDE	BASEFLO	WS IF /	ANY.			
ROUTE CHN(   IN= 2>	225 OUT=	9) 1	Routi	ng time	step (m	1in)'=	5.00			
1 1 1 2>	our=  Di		ATA FOI	R SECTI levatio 210.02 209.86 209.76 209.54 209.60 209.41 208.53 208.38 208.38 208.38 208.22 207.65 208.22 208.48 208.73 208.73 208.73 208.73 208.73	0.04	111)            Manning         0.0600           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450	> 9	Main Main Main Main Main Main Main Main	Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel	
DEPTH (m) 0.11 0.21 0.43 0.53 0.64 0.75 0.85 0.96 1.07 1.17 1.28 1.39 1.49 1.60 1.71 1.81 1.93 2.05	207 207 207 208 208 208 208 208 208 208 208 208 208	251.40 LEV (m) .75 .86 .97 .07 .18 .29 .50 .61 .71 .82 .93 .03 .14 .25 .35 .46 .58 .70	Ti VOLU (cu.m .601E++ .241E++ .969E++ .152E++ .218E++ .2389E++ .389E++ .519E++ .677E++ .150E++ .150E++ .150E++ .228E++ .229E++	209.70 RAVEL T ME F .) 03 04 04 04 05 05 05 05 05 05 05 05 05 05 05 05 05	IME TABL LOW RATE (cms) 0.0 0.3 0.8 3.3 5.5 8.0 11.2 20.3 27.7 37.5 76.0 91.6 107.8 130.3 156.6	0.0600	LOCITY (m/s) 0.12 0.35 0.40 0.43 0.46 0.44 0.48 0.52 0.57 0.61 0.66 0.70 0.73 0.76 0.80 0.84	7 TR. 2 1. 1.	AV. TIME (min) 22.56 40.20 07.47 89.07 76.07 66.47 61.92 58.04 60.79 55.45 51.74 47.20 43.64 40.75 38.35 36.50 35.28 33.51 31.84	
INFLOW : OUTFLOW:	ID= 2 ID= 1	{ 006 225	(4) 10: (9) 10:	<pre> </pre> AREA  (ha)  1.96  1.96	hyd QPEAK (cms) 4.06 3.06	Irograpi TPEAK (hrs) 3.67 4.67	n R.V (mn 70.7 70.7	> < (. M 1) 73 73	-pipe / cł AX DEPTH (m) 0.57 0.51	MAX VEL (m/s) 0.37 0.34
CALIB   NASHYD (  ID= 1 DT= 5 NOT	002 .0 mi	5) A n I U	rea a .H. Tp	(ha)= (mm)= (hrs)= RANSFOR	8.34 5.00 0.84 MED TO	Curve # of I 5.0 M	Numbe Linear	er ( Res.	CN)= 79.0 (N)= 3.00 EP.	
	000000000000000000000000000000000000000	TIME hrs .083 .167 .250 .333 .417 .500	RAIN mm/hr 0.00 0.00 1.61 1.61 1.61	T TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083	RANSFORM RAIN 9.64 27.30 27.30 27.30 27.30	IED HYE   1   1   3.2   3.3   3.4   3.5   3.5   3.5   3.6	TOGRAF IME hrs 50 2 33 1 17 1 00 1 83 1 57 1	H RAIN mm/hr 0.88 1.24 1.24 1.24 1.24 1.24 1.24	- TIME   hrs   4.83   4.92   5.00   5.08   5.17   5.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61

0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61
0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61
0.750	1.61	2.333	73.88	3.917	6.42	5.50	1.61
0.833	1.61	2.417	73.88	4.000	6.42	5.58	1.61
0.917	1.61	2.500	73.88	4.083	6.42	5.67	1.61
1.000	1.61	2.583	73.88	4.167	6.42	5.75	1.61
1.083	1.61	2.667	73.88	4.250	6.42	5.83	1.61
1.167	1.61	2.750	73.88	4.333	3.21	5.92	1.61
1.250	1.61	2.833	20.88	4.417	3.21	6.00	1.61
1.333	9.64	2.917	20.88	4.500	3.21	6.08	1.61
1.417	9.64	3.000	20.88	4.583	3.21	6.17	1.61
1.500	9.64	3.083	20.88	4.667	3.21	6.25	1.61
1.583	9.64	3.167	20.88	4.750	3.21		

Unit Hyd Qpeak (cms)= 0.379 PEAK FLOW (cms)= 0.405 (i)

TTHE TO TEAK	(111 3)-	5.505	
RUNOFF VOLUME	(mm)=	39.709	
TOTAL RAINFALL	(mm)=	80.310	
RUNOFF COEFFICIE	ENT =	0.494	

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

CALIB   STANDHYD ( 0024)  ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	9.55 90.00	Dir.	Conn . (%)=	90.00	
Surface Area	(ha)= (mm)=	IMPERVI 8.5	0US 9	PERVIO 0.9	US (i) 5		

	(			
Dep. Storage	(mm)=	1.00	1.50	
Average Slope	(%)=	1.00	2.00	
Length	(m)=	252.32	40.00	
Mannings n	=	0.013	0.250	

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

		TRA	ANSFORME	D HYETOGR	APH	-	
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	9.64	3.250	20.88	4.83	1.61
0.167	0.00	1.750	9.64	3.333	11.24	4.92	1.61
0.250	0.00	1.833	27.30	3.417	11.24	5.00	1.61
0.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61
0.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61
0.500	1.61	2.083	27.30	3.667	11.24	5.25	1.61
0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61
0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61
0.750	1.61	2.333	73.88	3.917	6.42	5.50	1.61
0.833	1.61	2.417	73.88	4.000	6.42	5.58	1.61
0.91/	1.61	2.500	/3.88	4.083	6.42	5.6/	1.61
1.000	1.61	2.583	/3.88	4.16/	6.42	5./5	1.61
1.083	1.61	2.00/	73.88	4.250	0.42	5.83	1.61
1.10/	1.61	2.750	73.00	4.333	3.21	5.92	1.61
1 333	9.64	2.033	20.00	4.41/	3 21	6.00	1 61
1.333	9.64	3 000	20.88	4.500	3 21	6 17	1 61
1.41/	9.64	3 083	20.88	4.565	3 21	6.25	1 61
1.583	9.64	3.167	20.88	4.750	3.21	0.25	1.01
1.505	5.04	1 5.107	20.00	1 4.750	3.21		
Max.Eff.Inten.(m	m/hr)=	73.88		57.08			
over	(min)	5.00		10.00			
Storage Coeff.	(min)=	5.02	(ii)	8.33 (ii	)		
Unit Hvd. Tpeak	(min)=	5.00		10.00			
Unit Hyd. peak	(cms)=	0.21		0.13			
and the second second second	0 0				*T0T	TALS*	
PEAK FLOW	(cms)=	1.76		0.14	1.	.900 (iii	)
TIME TO PEAK	(hrs)=	2.75		2.75	2	2.75	
RUNOFF VOLUME	(mm)=	79.31		50.24	70	5.40	
TOTAL RAINFALL	(mm)=	80.31		80.31	80	0.31	
RUNOFF COEFFICIE	NT =	0.99		0.63	(	0.95	
(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:							

(1) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
 THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB STANDHYD ( 0047) ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	23.02 90.00	Dir. Conn.(%)=	90.00
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVI 20.7 1.0 1.0 391.7 0.01	DUS 2 0 5 3	PERVIOUS (i) 2.30 1.50 2.00 40.00 0.250	

		TRA	NSFORM	D HYETOGR	APH	-2	
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	s mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	9.64	3.250	20.88	4.83	1.61
0.167	0.00	1.750	9.64	3.333	11.24	4.92	1.61
0.250	0.00	1.833	27.30	3.417	11.24	5.00	1.61
0.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61
0.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61
0.500	1.61	2.083	27.30	3.667	11.24	5.25	1.61
0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61
0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61
0.750	) 1.61	2.333	73.88	3.917	6.42	5.50	1.61
0.833	3 1.61	2.417	73.88	4.000	6.42	5.58	1.61
0.917	1.61	2.500	73.88	4.083	6.42	5.67	1.61
1.000	) 1.61	2.583	/3.88	4.16/	6.42	5.75	1.61
1.08	1.61	2.66/	/3.88	4.250	6.42	5.83	1.61
1.16	1.61	2.750	/3.88	4.333	3.21	5.92	1.61
1.250	1.61	2.833	20.88	4.41/	3.21	6.00	1.61
1.33	9.64	2.91/	20.88	4.500	3.21	6.08	1.61
1.41	9.64	3.000	20.88	4.583	3.21	6.1/	1.61
1.500	9.64	3.085	20.88	4.00/	3.21	0.25	1.01
1.58:	9.64	3.16/	20.88	4.750	3.21		
Max.Eff.Inten.(n	mm/hr)=	73.88		57.08			
over	(min)	5.00		10.00			
Storage Coeff.	(min)=	6.54	(ii)	9.85 (ii	)		
Unit Hyd. Tpeak	(min)=	5.00		10.00			
Unit Hyd. peak	(cms)=	0.18		0.11			
	0.1019/04/25 10				*T01	TALS*	
PEAK FLOW	(cms)=	4.22		0.32	4.	.549 (iii)	)
TIME TO PEAK	(hrs)=	2.75		2.75	2	2.75	
RUNOFF VOLUME	(mm)=	79.31		50.24	76	5.40	

80.31 0.95

TOTAL RAINFALL (mm)=	80.31	80.31	
RUNOFF COEFFICIENT =	0.99	0.63	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

\_\_\_\_\_ \_\_\_\_\_ RESERVOIR( 0049)| IN= 2---> OUT= 1 | DT= 5.0 min | OVERFLOW IS OFF STORAGE (ha.m.) 0.0000 OUTFLOW OUTFLOW (cms) 3.4700 STORAGE (ha.m.) 0.0040 (cms) 0.0000 TPEAK (hrs) 2.75 2.75 AREA (ha) 23.020 23.020 QPEAK (cms) 4.549 4.583 R.V. (mm) 76.40 76.40 INFLOW : ID= 2 ( 0047) OUTFLOW: ID= 1 ( 0049) PEAKFLOWREDUCTION[Qout/Qin](%)=100.75TIMESHIFT OFPEAKFLOW(min)=0.00MAXIMUMSTORAGEUSED(ha.m.)=0.0048

\*\*\*\* WARNING : HYDROGRAPH PEAK WAS NOT REDUCED. CHECK OUTFLOW/STORAGE TABLE OR REDUCE DT. ----

CAL TR	1		

STANDHYD ( 0048) ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	31.36 90.00	Dir.	Conn . (%)=	90.00
Surface Area Dep. Storage	(ha)= (mm)=	IMPERVI 28.2 1.0	0US 2 0	PERVIO 3.14 1.50	US (i) 4 0	

Average Slope	(%)=	1.00	2.00
Length	(m)=	457.24	40.00
Mannings n	=	0.013	0.250

	TRAM	NSFORMED	D HYETOGR	APH	5	
TIME RAIN	TIME	RAIN	; TIME	RAIN	TIME	RAIN
0.083 0.00	1 667	0 64	3 250	20.88	1 nrs	1 61
0.167 0.00	1.750	9.64	3.333	11.24	4.92	1.61
0.250 0.00	1.833	27.30	3.417	11.24	5.00	1.61
0.333 1.61	1.917	27.30	3.500	11.24	5.08	1.61
0.417 1.61	2.000	27.30	3.583	11.24	5.17	1.61
0.500 1.61	2.083	27.30	3.667	11.24	5.25	1.61
0.583 1.61	2.16/	27.30	3.750	6 42	5.33	1.61
0.750 1.61	2.333	73.88	3.917	6.42	5.50	1.61
0.833 1.61	2.417	73.88	4.000	6.42	5.58	1.61
0.917 1.61	2.500	73.88	4.083	6.42	5.67	1.61
1.000 1.61	2.583	73.88	4.167	6.42	5.75	1.61
1.083 1.61	2.66/	73.88	4.250	5.42	5.83	1.61
1.250 1.61	2.833	20.88	4.417	3.21	6.00	1.61
1.333 9.64	2.917	20.88	4.500	3.21	6.08	1.61
1.417 9.64	3.000	20.88	4.583	3.21	6.17	1.61
1.500 9.64	3.083	20.88	4.667	3.21	6.25	1.61
1.583 9.64	3.16/	20.88	4.750	3.21		
Max.Eff.Inten.(mm/hr)=	73.88	03	57.08			
over (min)	5.00		15.00			
Storage Coeff. (min)=	7.18	(ii) :	10.49 (ii	)		
Unit Hyd. Tpeak (min)=	5.00	1	15.00			
Unit Hyd. peak (cms)=	0.17		0.09	*T01	TALS*	
PEAK FLOW (cms)=	5.74		0.41	6.	149 (iiii	)
TIME TO PEAK (hrs)=	2.75		2.75	2	2.75	
RUNOFF VOLUME (mm)=	79.31		50.24	76	5.40	
IOIAL RAINFALL (mm)=	80.31	5	50.31	80	0.31	
KONOFF COEFFICIENT =	0.99		0.05		1.95	
<ul><li>(i) CN PROCEDURE SELECT</li></ul>	ED FOR PER	RVIOUS I	LOSSES:			
$CN^* = 85.0$ Ia	= Dep. St	torage	(Above)			
TITLE STEP THE SPEED			FOLIAL			
THAN THE STOPAGE CO	LD BE SMAL	LLER OR	EQUAL			
THAN THE STORAGE CO (iii) PEAK FLOW DOES NOT	EFFICIENT	ASEFLOW	EQUAL IF ANY.			
THAN THE STORAGE CO (iii) PEAK FLOW DOES NOT	EFFICIENT	ASEFLOW	EQUAL IF ANY.			
THAN THE STORAGE CO (iii) PEAK FLOW DOES NOT	LD BE SMAL EFFICIENT INCLUDE BA	ASEFLOW	EQUAL IF ANY.			
(iii) PEAK FLOW DOES NOT	EFFICIENT	ASEFLOW	EQUAL IF ANY.			
THAN THE STORAGE CO (iii) PEAK FLOW DOES NOT RESERVOIR( 0050) OVERF	EFFICIENT INCLUDE BA	ASEFLOW	EQUAL IF ANY.			
Iman The STORAGE CO       THAN THE STORAGE CO       (iii) PEAK FLOW DOES NOT	LD BE SMAI EFFICIENT INCLUDE BA 	ASEFLOW	EQUAL IF ANY.	w sto	DRAGE	
(TI) THAN THE STORAGE CO       THAN THE STORAGE CO       (iii) PEAK FLOW DOES NOT	LD BE SMAI EFFICIENT INCLUDE BA LOW IS OFF OW STOP ) (ha	ASEFLOW F RAGE	EQUAL IF ANY. OUTFLO	W STC	DRAGE	
(11) THAN THE STORAGE CO         THAN THE STORAGE CO         (iii) PEAK FLOW DOES NOT	LD BE SMAI EFFICIENT INCLUDE BA LOW IS OFF OW STOF ) (ha. 00 0.0	ASEFLOW F RAGE .m.)	EQUAL IF ANY. OUTFLO (cms) 5.650	W STC (ha 0 C	DRAGE a.m.) ).3682	
(11)         THAN         THE STORAGE CO           (11i)         PEAK         FLOW DOES NOT	LD BE SMAI EFFICIENT, INCLUDE B/ LOW IS OFF OW STOF ) (ha. 00 0.0	ASEFLOW F RAGE .m.) DOOO OPFAK	EQUAL IF ANY. OUTFLO (cms) 5.650	W STC (ha O C	DRAGE a.m.) D.3682 R.V.	
ITHAN THE STORAGE CO         (iii) PEAK FLOW DOES NOT            RESERVOIR( 0050)         OVERF         IN= 2> OUT= 1         DT= 5.0 min         OUTFL            (cms         0.000	LD BE SMAIL EFFICIENT INCLUDE B/ 	ASEFLOW F RAGE .m.) DOOO QPEAK (cms)	EQUAL IF ANY. OUTFLO (cms) 5.650 TPEA (hrs	W STC (ha 0 (	DRAGE a.m.) J.3682 R.V. (mm)	
(11) THAN THE STORAGE CO (iii) PEAK FLOW DOES NOT	LD BE SMAIL EFFICIENT INCLUDE B/ 	ASEFLOW F RAGE .m.) DOOO OPEAK (cms) 6.14	EQUAL IF ANY. 0UTFLO (cms) 5.650 TPEA (hrs 49 2	W STC (ha 0 C .K )	DRAGE a.m.) ).3682 R.V. (mm) 76.40	
(11)         THAN         THE STORAGE CO           (iii)         PEAK         FLOW DOES NOT	LD BE SMAIL EFFICIENT. INCLUDE B/ LOW IS OFF OW STOF ) (ha. 00 0.0 AREA (ha) 31.360 31.360	ASEFLOW F RAGE .m.) D0000 QPEAK (cms) 6.14 5.50	EQUAL IF ANY. OUTFLO (cms) 5.650 TPEA (hrs 49 2 201 2	W STC (ha 0 C .K .75 .75	DRAGE a.m.) J.3682 R.V. (mm) 76.40 76.40	
(11) THAN THE STORAGE CO (iii) PEAK FLOW DOES NOT	LD BE SMAIL EFFICIENT INCLUDE B/ LOW IS OFF OW STOF ) (ha, 00 0.0 AREA (ha) 31.360 31.360	LLER OR ASEFLOW F RAGE .m.) D0000 OPEAK (cms) 6.14 5.50 TON [OOI	EQUAL IF ANY. OUTFLO (cms) 5.650 TPEA (hrs 49 2 01 2 ut/Oinl(%	W STC 0 (ha 0 ( .75 .75 .75 .75	DRAGE A.m.) ).3682 R.V. (mm) 76.40 76.40	
INFLOW : ID= 2 ( 0048) OUTFLOW: ID= 1 ( 0050) PEAK FLOW DOES NOT INFLOW : ID= 2 ( 0048) OUTFLOW: ID= 1 ( 0050) PEAK FLOW	LD BE SMAL EFFICIENT INCLUDE B/ LOW IS OFF OW STOF ) (ha. 00 0.( AREA (ha) 31.360 31.360 1 REDUCTI OF PEAK FI	ASEFLOW ASEFLOW F RAGE .m.) DOOO OPEAK (cms) 6.14 5.50 LON [QOIL LOW	EQUAL IF ANY. OUTFLO (cms) 5.650 TPEA (hrs 49 2 01 2 01 2 01 2 ut/Qin](%	W STC (ha 0 (k ).75 .75 .75 .)= 89.47	DRAGE 1.m.) ).3682 R.V. (mm) 76.40 76.40	
ITHAN THE STORAGE CO (iii) PEAK FLOW DOES NOT RESERVOIR( 0050) OVERF IN= 2> OUT= 1 DT= 5.0 min OUTFL (cms 0.00 INFLOW : ID= 2 ( 0048) OUTFLOW: ID= 1 ( 0050) PEAK FLOW TIME SHIFT MAXIMUM ST	LD BE SMAIL EFFICIENT INCLUDE B/ LOW IS OFF OW STOF ) (ha. 00 0.( AREA (ha) 31.360 31.360 REDUCT] OF PEAK FI ORAGE US	ASEFLOW ASEFLOW F RAGE .m.) DOOO OPEAK (cms) 6.14 5.50 ION [Qou LOW SED	EQUAL IF ANY. (OUTFLO (cms) 5.650 TPEA (hrs 49 2 01 2 01 2 01 2 (min (ha.m.	W STO (ha 0 (k ).75 .75 )= 89.47 )= 0.00 )= 0.36	DRAGE 1.m.) ).3682 R.V. (mm) 76.40 76.40 7 ) 582	
INFLOW : ID= 2 ( 0048) OUTFLOW : ID= 1 ( 0050) PEAK FLOW INFLOW : SIDE 2 ( 0048) OUTFLOW : ID= 1 ( 0050) PEAK FLOW TIME SHIFT MAXIMUM ST	LD BE SMAIL EFFICIENT. INCLUDE B/ LOW IS OFF OW STOF OW STOF ) (ha. 00 0.0 AREA (ha) 31.360 31.360 REDUCTI OF PEAK FI ORAGE US	ASEFLOW ASEFLOW F RAGE (m.) 0000 0PEAK (cms) 6.14 5.50 ION [Qou LOW SED	EQUAL IF ANY. OUTFLO (cms) 5.650 TPEA (hrs 49 2 01 2 ut/Qin](% (min (ha.m.	W STC 0 (ha 0 ( ) .75 .75 .75 .75 .75 .75 .25 .00 )= 0.36	DRAGE 1.m.) ).3682 R.V. (mm) 76.40 76.40 76.40 7 382	
INFLOW : ID= 2 ( 0048) OUTFLOW: ID= 1 ( 0050) PEAK FLOW DOES NOT INFLOW : ID= 2 ( 0048) OUTFLOW: STD= 1 ( 0050) PEAK FLOW TIME SHIFT MAXIMUM ST	LD BE SMAIL EFFICIENT. INCLUDE B/ LOW IS OFF OW STOF ) (ha. 00 0.0 AREA (ha) 31.360 31.360 31.360 V REDUCTI OF PEAK FI ORAGE US	ASEFLOW ASEFLOW F RAGE (m.) 0000 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	EQUAL IF ANY.   OUTFLO   (cms)   5.650 TPEA (hrs 49 2 201 2 ut/Qin](% (min (ha.m.	W STC (ha 0 C K ) .75 .75 .75 )= 89.47 )= 0.00 )= 0.36	DRAGE a.m.) 0.3682 R.V. (mm) 76.40 76.40 76.40 76.82	
INFLOW : ID= 2 ( 0048) OUTFLOW: ID= 1 ( 0050) INFLOW : ID= 1 ( 0050) INFLOW : ID= 1 ( 0050) PEAK FLOW TIME SHIFT MAXIMUM ST	LD BE SMAIL EFFICIENT INCLUDE BA LOW IS OFF OW STOF ) (ha. 00 0.0 AREA (ha) 31.360 31.360 REDUCTI OF PEAK FI ORAGE US	ASEFLOW ASEFLOW F RAGE (m.) 00000 QPEAK (cms) 6.14 5.50 ION [Qou LOW SED	EQUAL IF ANY. OUTFLO (cms) 5.650 TPEA (hrs; 49 2 201 2 ut/Qin](% (min (ha.m.	W STC (ha 0 C 	DRAGE a.m.) J.3682 R.V. (mm) 76.40 76.40 76.40 7582	
(11)       THAN THE STORAGE CO (iii)         THAN THE STORAGE CO (iii)       OVERF         INE 2> OUT= 1 DT= 5.0 min       OVERF         INFLOW : ID= 2 ( 0048) OUTFLOW: ID= 1 ( 0050)       OVERF         INFLOW : ID= 1 ( 0050)       PEAK FLOW TIME SHIFT MAXIMUM ST         CALIB STANDHYD ( 0093)       Area	LD BE SMAIL EFFICIENT. INCLUDE B/ LOW IS OFF OW STOF ) (ha) 00 0.0 AREA (ha) 31.360 31.360 REDUCTI OF PEAK FI ORAGE US 	LLER OR ASEFLOW F RAGE .m.) DOOO QPEAK (cms) 6.1.4 S.50 ION [Qou SED 8.14	EQUAL IF ANY.   OUTFLO   (cms)   5.650 TPEA (hrs 49 2 01 2 ut/Qin](% (min (ha.m.	W STC 0 (ha 0 ( .75 .75 .75 .75 .)= 89.47 )= 0.00 )= 0.36	DRAGE A.m.) 0.3682 R.V. (mm) 76.40 76.40 7 582	
Image: The storage condition of the storage conditing conditex of the storage conditing condition of the storage co	LD BE SMAIL EFFICIENT. INCLUDE B/ LOW IS OFF OW STOF ) (ha) 00 0.0 AREA (ha) 31.360 31.360 AREA (ha) 31.360 CREDUCTI OF PEAK FI ORAGE US (ha)= 88 mp(%)= 28	LLER OR ASEFLOW F RAGE .m.) DOOO OPEAK (cms) 6.12 (cms) 6.12 (CMS) 6.12 (CMS) 6.14 SED SED SED SED	EQUAL IF ANY. OUTFLO (cms) 5.650 TPEA (hrs 49 2 01 2 ut/Qin](% (min (ha.m. Dir. Conn	W STC 0 (ha 0 ( .75 .75 .75 .)= 89.47 )= 0.00 )= 0.36	DRAGE A.m.) ).3682 R.V. (mm) 76.40 76.40 7 582	
(II) THAN THE STORAGE CO       (iii) PEAK FLOW DOES NOT         RESERVOIR( 0050)       IN= 2> OUT= 1       DT= 5.0 min       OUTFLOW: ID= 2 ( 0048)       OUTFLOW: ID= 1 ( 0050)       PEAK FLOW       TIME SHIFT       MAXIMUM ST       CALIB       STANDHYD ( 0093)       ID= 1 DT= 5.0 min	LD BE SMAIL EFFICIENT. INCLUDE B/ COW IS OFF OW STOF OW STOF O	ASEFLOW ASEFLOW F RAGE (m.) 0000 (PEAK (cms) 6.14 5.50 (CMS) 6.14 5.50 (ION [Qould DW SED 	EQUAL IF ANY. OUTFLO (cms) 5.650 TPEA (hrs 49 2 01 2 01 2 ut/Qin](% (min (ha.m.) Dir. Conn 2017. Conn	W STC (ha 0 (k ).75 .75 )= 89.47 )= 0.00 )= 0.36 (%)= 2	DRAGE 1.m.) ).3682 R.V. (mm) 76.40 76.40 7 582 28.20	
INFLOW : ID= 2 ( 0048) OUTFLOW : ID= 2 ( 0048) OUTFLOW : ID= 1 ( 0050) INFLOW : ID= 1 ( 0050) PEAK FLOW TIME SHIFT MAXIMUM ST CALIB STANDHYD ( 0093) ID= 1 DT= 5.0 min   Total I Surface Area ( ha)=	LD BE SMAL EFFICIENT. INCLUDE B/ 	LLER OR ASEFLOW F RAGE (m.) 00000 QPEAK (cms) 6.14 5.50 ION [Qou LOW SED 8.14 8.90 [] S. PER	EQUAL IF ANY. OUTFLO (cms) 5.650 TPEA (hrs 49 2 01 2 ut/Qin](% (min (ha.m. Dir. Conn RVIOUS (i	W STC (ha 0 C K) .75 .75 .75 .75 .75 .75 .75 	DRAGE a.m.) 0.3682 R.V. (mm) 76.40 76.40 76.40 76.40 782 28.20	
INFLOW : ID= 2 ( 0048) OUTFLOW : ID= 2 ( 0048) OUTFLOW : ID= 1 ( 0050) INFLOW : ID= 1 ( 0050) PEAK FLOW TIME SHIFT MAXIMUM ST CALIB STANDHYD ( 0093) ID= 1 DT= 5.0 min   Total I Surface Area (ha)= Dep. Storage (mm)=	LD BE SMAIL EFFICIENT. INCLUDE B/ 	ASEFLOW ASEFLOW F RAGE (m.) 00000 0PEAK (cms) 6.14 5.50 ION [Qou LOW SED 8.14 8.90 [ S PE] (	EQUAL IF ANY. OUTFLO (cms) 5.650 TPEA (hrs 49 2 201 2 ut/Qin](% (min (ha.m. Dir. Conn RVIOUS (i 52.67 5.00	W STC (ha 0 C .K .75 .75 .75 .75 )= 0.00 )= 0.36 (%)= 2 )	DRAGE a.m.) .3682 R.V. (mm) 76.40 76.40 76.40 7 582 28.20	
(11)       THAN THE STORAGE CO (iii) PEAK FLOW DOES NOT	LD BE SMAL EFFICIENT. INCLUDE B/ LOW IS OFF OW STOF ) (ha. 00 0.0 AREA (ha) 31.360 31.360 REDUCTI OF PEAK FI ORAGE US 	LLER OR ASEFLOW F RAGE (m.) 0000 000 000 000 000 000 000 000 000	EQUAL IF ANY. IF ANY. OUTFLO Crms) 5.650 TPEA (hrss) 49 2 201 2 ut/Qin](% (min (ha.m. Dir. Conn RVIOUS (i 52.67 5.00 2.28	W STC (ha 0 C .75 .75 .75 .75 .75 .75 .75 75 75	DRAGE A.m.) 0.3682 R.V. (mm) 76.40 76.40 76.40 76.40 28.20	
Iman The STORAGE CO         (iii) PEAK FLOW DOES NOT         INFLOW: PEAK FLOW DOES NOT         INFLOW: ID= 1         OUTFLOW: ID= 1         Strandhyd (0093)         Area         ID= 1         Surface Area       (ha)=         Dep. Storage       (m)=         Average Slope       (%)=         Length       (m)=	LD BE SMAL EFFICIENT. INCLUDE B/ INCLUDE B/ ILOW IS OFF OW STOF ) (ha.) 00 0.0 AREA (ha) 31.360 31.360 / REDUCTI OF PEAK FI ORAGE US  (ha)= 88 mp(%)= 28 IMPERVIOUS 25.47 2.00 2.28 766.55 	LLER OR ASEFLOW F RAGE .m.) DOOO OPEAK (cms) 6.1.4 5.50 ION [Qou LOW SED 8.14 8.90 [] SED	EQUAL IF ANY.   OUTFLO   (cms)   5.650 TPEA (hrs 49 2 01 2 ut/Qin](% (min (ha.m. Dir. Conn RVIOUS (i 52.67 5.00 2.28 40.00	W STC (ha ) .75 .75 .75 )= 89.47 )= 0.00 )= 0.36 .(%)= 2 )	DRAGE A.m.) 0.3682 R.V. (mm) 76.40 76.40 7 582 28.20	
(II) THAN THE STORAGE CO (iii) PEAK FLOW DOES NOT         III) PEAK FLOW DOES NOT         INFLOW: ID=2       OVERF         DT= 5.0 min       OUTFL         OUTFLOW: ID=2       0048)         OUTFLOW: ID=1       0050)         PEAK FLOW TIME SHIFT MAXIMUM ST         CALIB STANDHYD       0093)         STANDHYD       0093)         Area Dep. Storage       Total I         Surface Area Average Slope       (%)= Length         Mannings n       =	LD BE SMAIL EFFICIENT. INCLUDE B/ 	ASEFLOW ASEFLOW F RAGE (m.) D0000 QPEAK (cms) 6.14 5.50 ION [Qou LOW SED 8.14 8.90 [I S.90 [I] S.90 [I S.90 [I] S.90 [I S.90 [	EQUAL IF ANY. I OUTFLO (cms) 5.650 TPEA (hrs 49 2 01 2 0	W ST( (ha 0 () .75 .75 )= 89.47 )= 0.00 )= 0.36 .(%)= 2 )	DRAGE A.m.) ).3682 R.V. (mm) 76.40 76.40 7 582	
(II) THAN THE STORAGE CO (iii) PEAK FLOW DOES NOT         INFLOW: PEAK FLOW DOES NOT         INFLOW: ID= 2 ( 0048) OUTFLOW: ID= 1 ( 0050)         INFLOW: ID= 2 ( 0048) OUTFLOW: ID= 1 ( 0050)         PEAK FLOW TIME SHIFT MAXIMUM ST         CALIB STANDHYD ( 0093)         STANDHYD ( 0093)         ID= 1 DT= 5.0 min   Total I         Surface Area (ha)= Dep. Storage (mm)= Average Slope (%)= Length (m)= Mannings n =         NOTE:         NOTE:	LD BE SMAL EFFICIENT. INCLUDE B/ 	LLER OR ASEFLOW F RAGE (m.) 00000 QPEAK (cms) 6.14 5.50 ION [Qou LOW SED 8.14 8.90 [] SED 8.14 8.90 [] SED () () () () () () () () () () () () ()	EQUAL IF ANY. I OUTFLO (cms) 5.650 TPEA (hrs 49 2 01 2 ut/Qin](% (min (ha.m. Oir. Conn RVIOUS (i 5.06 2.28 40.00 0.250 5.0 MIN.	W STC (ha 0 C K) .75 .75 .75 )= 89.47 )= 0.00 )= 0.36 .(%)= 2 ) TIME STE	DRAGE a.m.) 0.3682 R.V. (mm) 76.40 76.40 76.40 76.40 782 28.20	
(II) THAN THE STORAGE CO (iii) PEAK FLOW DOES NOT         INELOW: IDEAK FLOW DOES NOT         INELOW: ID= 1         OUTFLOW: ID= 1         OUTFLOW: ID= 1         OUTFLOW: ID= 1         PEAK FLOW TIME SHIFT MAXIMUM ST         CALIB STANDHYD (0093)         Area ID= 1 DT= 5.0 min         Surface Area Length         Surface Area Length         Mannings n         NOTE: RAINFALL WAS T	LD BE SMAL EFFICIENT. INCLUDE B/ 	ASEFLOW ASEFLOW F RAGE (m.) D0000 QPEAK (cms) 6.14 5.50 ION [Qoi LOW SED 8.14 8.90 [I S PEF ( 2 0 TO 5	EQUAL IF ANY. I OUTFLO (cms) 5.650 TPEA (hrs 49 2 201 2 ut/Qin](% (min (ha.m. Dir. Conn RVIOUS (i 5.00 2.28 40.00 0.250 5.0 MIN.	W STC (ha 0 C .K .75 .75 .75 )= 0.00 )= 0.36 .(%)= 2 ) TIME STE	DRAGE a.m.) .3682 R.V. (mm) 76.40 76.40 76.40 78 28.20	
(II) THAN THE STORAGE CO (iii) PEAK FLOW DOES NOT         INFLOW: ID=2K FLOW DOES NOT         INFLOW: ID=2 (O048) OUTFLOW: ID=1 (O050)         INFLOW: ID=2 (O048) OUTFLOW: ID=1 (O050)         PEAK FLOW TIME SHIFT MAXIMUM ST         CALIB STANDHYD (O093)         Area ID=1 DT= 5.0 min         Surface Area Average Slope Length Mannings n         NOTE: RAINFALL WAS T	LD BE SMAIL EFFICIENT. INCLUDE B/ LOW IS OFF OW STOF ) (ha.) 00 0.0 AREA (ha) 31.360 31.360 REDUCTI OF PEAK FI ORAGE US IMPERVIOUS 25.47 2.00 2.28 766.55 0.013 RANSFORMEI	ASEFLOW ASEFLOW F RAGE ) 00000 00000 0000 0000 0000 0000 0000	EQUAL IF ANY. IF ANY. OUTFLO (cms) 5.650 TPEA (hrs; 49 2 201 2 at/Qin](% (min (ha.m. Dir. Conn RVIOUS (i 5.00 2.28 40.00 0.250 5.0 MIN.	W STC (ha 0 C 	DRAGE a.m.) 0.3682 R.V. (mm) 76.40 76.40 76.40 78 28.20	
CALIB       SUFF COUST         CALIB       STANDHYD (0093)         ID= 1 DT= 5.0 min       OUTFLOW: ID= 1 (0050)         PEAK FLOW       PEAK FLOW         TIME SHIFT       MAXIMUM ST         CALIB       STANDHYD (0093)         Surface Area (ha)=       Dep. Storage (mm)=         Average Slope       (%)=         Length       (m)=         Mannings n       =         NOTE:       RAINFALL WAS T	LD BE SMAIL EFFICIENT. INCLUDE B/ LOW IS OFF OW STOF ) (ha. 00 0.0 AREA (ha) 31.360 31.360 REDUCTI OF PEAK FI ORAGE US 	ASEFLOW ASEFLOW F RAGE ) 00000 0PEAK (cms) 6.14 5.50 ION [Qou LOW SED 8.14 8.90 [ S PEF ( 0 D TO ! NSFORMELI DATA	EQUAL IF ANY. IF ANY. OUTFLO Crms) 5.650 TPEA (hrss) 49 2 201 2 ut/Qin](% (min (ha.m. Oir. Conn RVIOUS (i 52.67 5.00 2.28 40.00 0.250 5.0 MIN. D HYETOGR	W STC (ha 0 (k ).75 .75 .75 .75 .75 .75 .75 75 	DRAGE A.m.) 0.3682 R.V. (mm) 76.40 76.40 76.40 78.20 28.20	

hr	s mm/hr	l hrs	mm/hr	l' hrs	mm/hr	hrs	mm/hr
0.08	33 0.00	1.667	9.64	3.250	20.88	4.83	1.61
0.16	0.00	1.750	9.64	3.333	11.24	4.92	1.61
0.25	0.00	1.833	27.30	3.417	11.24	5.00	1.61
0.33	33 1.61	1.917	27.30	3.500	11.24	5.08	1.61
0.41	1.61	2.000	27.30	3.583	11.24	5.17	1.61
0.50	0 1.61	2.083	27.30	3.667	11.24	5.25	1.61
0.58	33 1.61	2.167	27.30	3.750	11.24	5.33	1.61
0.66	57 1.61	2.250	27.30	3.833	6.42	5.42	1.61
0.75	50 1.61	2.333	73.88	3.917	6.42	5.50	1.61
0.83	33 1.61	2.417	73.88	4.000	6.42	5.58	1.61
0.91	1.61	2.500	73.88	4.083	6.42	5.67	1.61
1.00	0 1.61	2.583	73.88	4.167	6.42	5.75	1.61
1.08	33 1.61	2.667	73.88	4.250	6.42	5.83	1.61
1.16	57 1.61	2.750	73.88	4.333	3.21	5.92	1.61
1.25	50 1.61	2.833	20.88	4.417	3.21	6.00	1.61
1.33	9.64	2.917	20.88	4.500	3.21	6.08	1.61
1.41	L/ 9.64	3.000	20.88	4.583	3.21	6.1/	1.61
1.50	9.64	3.083	20.88	4.66/	3.21	6.25	1.61
1.58	9.64	3.167	20.88	4.750	3.21		
Max.Eff.Inten.(	(mm/hr)=	73.88		50.93			
over	(min)	10.00		20.00			
Storage Coeff.	(min)=	7.64	(ii)	16.53 (ii)	)		
Unit Hvd. Tpeak	(min)=	10.00		20.00			
Unit Hyd. peak	(cms)=	0.13		0.06			
and the second					*TOT	ALS*	
PEAK FLOW	(cms)=	5.00		6.10	10.	507 (iii)	)
TIME TO PEAK	(hrs)=	2.75		2.92	2	.75	
RUNOFF VOLUME	(mm)=	78.31		42.27	52	.43	
TOTAL RAINFALL	(mm)=	80.31		80.31	80	.31	
RUNOFF COEFFICI	ENT =	0.98		0.53	0	.65	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 81.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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CALIB

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STANDHYD ( 0088)   ID= 1 DT= 5.0 min	Area Total	(ha)= 181.61 Imp(%)= 58.40	Dir. Conn.(%)=	54.10
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVIOUS 106.06 2.00 2.50 1100.33 0.013	PERVIOUS (i) 75.55 5.00 2.50 40.00 0.250	

TRANSFORMED HYETOGRAPH									
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN		
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr		
0.083	0.00	1.667	9.64	3.250	20.88	4.83	1.61		
0.167	0.00	1.750	9.64	3.333	11.24	4.92	1.61		
0.250	0.00	1.833	27.30	3.417	11.24	5.00	1.61		
0.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61		
0.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61		
0.500	1.61	2.083	27.30	3.667	11.24	5.25	1.61		
0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61		
0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61		
0.750	1.61	2.333	/3.88	3.91/	6.42	5.50	1.61		
0.833	1.61	2.41/	/3.88	4.000	6.42	5.58	1.61		
0.917	1.61	2.500	73.88	4.083	6.42	5.6/	1.61		
1.000	1.61	2.585	/3.88	4.16/	6.42	5.75	1.61		
1.085	1.61	2.00/	73.88	4.250	0.42	5.83	1.61		
1.107	1.61	2.750	75.00	4.333	2 21	5.92	1.61		
1 222	0.64	2.033	20.00	4.41/	2 21	6.00	1.61		
1.333	9.64	3 000	20.88	4.500	3 21	6.17	1 61		
1 500	9 64	3 083	20.88	4.567	3 21	6.25	1 61		
1 583	9.64	3 167	20.88	4.750	3 21	0.25	1.01		
1.365	5.04	5.10/	20.00	1 4.750	3.21	8			
Max.Eff.Inten.(mm	/hr)=	73.88		59.24					
over (i	nin)	10.00		20.00					
Storage Coeff. (r	nin)=	9.24	(ii)	17.37 (ii	)				
Unit Hyd. Tpeak (r	nin)=	10.00		20.00					
Unit Hyd. peak (	cms)=	0.12		0.06					

PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI	(cms)= (hrs)= (mm)= (mm)= ENT =	19.45 2.75 78.31 80.31 0.98	8.54 2.92 45.46 80.31 0.57	*TOTAL 27.19 2.7 63.2 80.3 0.7	S* 90 (iii) 75 23 21 29	
(i) CN PROCED CN* = (ii) TIME STEP THAN THE (iii) PEAK FLOW	URE SELECTED 82.0 Ia = (DT) SHOULD STORAGE COEF DOES NOT IN	) FOR PERVIOL = Dep. Storag ) BE SMALLER FFICIENT. NCLUDE BASEFL	JS LOSSES: je (Above) OR EQUAL .OW IF ANY.			
RESERVOIR( 0089) IN= 2> OUT= 1 DT= 5.0 min	OVERFLO OUTFLOW (cms) 0.0000 0.6870 1.0220	W IS OFF (ha.m.) 0 0.0000 3.6492 0 5.2831	OUTFLO   (cms)   1.560   2.040   40.800	W STORA (ha.m 0 7.7 0 9.8 0 10.8	AGE 1.) 7340 8037 8930	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0088) 18 0089) 18 EAK FLOW IME SHIFT OF	AREA         OPE           (ha)         (cm           31.610         27           31.610         1           REDUCTION         [           PEAK         FLOW	AK TPEA is) (hrs 7.190 2 1.977 4 [Qout/Qin](%	K R. ) (m .75 6 .67 6 )= 7.27 )=115.00	V. m) 3.23 3.23	
CALIB STANDHYD ( 0091) ID= 1 DT= 5.0 min Surface Area Dep. Storage Average Slope Length Mannings n	Area ( Total Imp (ha)= (mm)= (%)= (m)= =	(ha)= 19.40 (%)= 65.30 MPERVIOUS 12.67 2.00 2.40 359.63 0.013 NUCCOMPENTE	Dir. Conn PERVIOUS (i 6.73 5.00 2.00 40.00 0.250	.(%)= 59. )	80	
NOTE: RAIN TIM hr 0.08 0.16 0.25 0.33 0.41 0.50 0.58 0.66 0.75 0.83 0.91 1.00 1.08 1.16 1.25 1.33 1.41 1.56	E         RAIN         F           3         0.00         0           7         0.00         0           7         0.00         1           7         1.61         1           7         1.61         1           7         1.61         1           7         1.61         1           7         1.61         1           7         1.61         1           7         1.61         1           7         1.61         1           7         1.61         1           3         1.61         1           7         1.61         1           3         1.61         1           7         1.61         1           7         1.61         1           7         1.61         1           7         9.64         1           3         9.64         1           3         9.64         1	ANSFORMED 10 TIME RAI hrs mm/f 1.667 9.6 1.750 9.6 1.833 27.3 1.917 27.3 2.083 27.3 2.083 27.3 2.167 27.3 2.333 73.8 2.417 73.8 2.583 73.8 2.593 73.8	S.O. MIN.           RMED HYETOGR           In   TIME           Irr   hrs           34         3.250           54         3.333           50         3.417           50         3.503           50         3.503           50         3.583           50         3.667           50         3.833           88         4.083           88         4.083           88         4.167           88         4.450           88         4.450           88         4.467           88         4.4667           88         4.750	APH RAIN   mm/hr   20.88   11.24   12.21   3.21   3.21   3.21   3.21   3.21	TIME hrs 4.83 4.92 5.00 5.25 5.25 5.25 5.58 5.57 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.Eff.Inten.( over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	mm/hr)= (min) (min)= (min)= (cms)=	73.88 5.00 4.78 (ii) 5.00 0.22	67.86 15.00 13.02 (ii 15.00 0.08	)		
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI	(cms)= (hrs)= (mm)= (mm)= ENT =	2.38 2.75 78.31 80.31 0.98	1.00 2.83 50.36 80.31 0.63	*TOTAL 3.36 2.7 67.0 80.3 0.8	.S* 66 (iii) 75 81 84	

<pre>***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!   (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:         CN* = 85.0 Ia = Dep. Storage (Above)   (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL         THAN THE STORAGE COEFFICIENT.   (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.</pre>
ADD HYD ( 0092)       1 + 2 = 3       AREA QPEAK TPEAK R.V.         ID1= 1 ( 0089):       181.61       1.977       4.67       63.23         + ID2= 2 ( 0091):       19.40       3.366       2.75       67.07
ID = 3 ( 0092): 201.01 4.250 2.75 63.60
ROUTE CHN(2252)           IN= 2> OUT= 1           Routing time step (min)'= 5.00
<pre>&lt; DATA FOR SECTION ( 1.1)&gt; Distance Elevation Manning 28.50 210.02 0.06600 47.35 209.86 0.0450 Main Channel 51.00 209.76 0.0450 Main Channel 60.44 209.54 0.0450 Main Channel 65.44 209.60 0.0450 Main Channel 72.65 209.41 0.0450 Main Channel 103.18 208.33 0.0450 Main Channel 108.18 208.33 0.0450 Main Channel 116.25 208.08 0.0450 Main Channel 122.09 207.92 0.0450 Main Channel 131.52 207.65 0.0450 Main Channel 149.56 208.22 0.0450 Main Channel 149.56 208.22 0.0450 Main Channel 155.39 208.49 0.0450 Main Channel 157.88 208.58 0.0450 Main Channel 157.88 208.58 0.0450 Main Channel 155.39 208.49 0.0450 Main Channel 190.96 208.73 0.0450 Main Channel 226.50 209.32 0.0450 Main Channel 238.71 209.46 0.0450 /0.0600</pre>
RAVEL TIME TABLE         DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME         (m)       (m)       (cu.m.)       (cms)       (m/s)       (min)         0.11       207.75       .531E+03       0.1       0.20       119.24         0.21       207.86       .213E+04       0.5       0.32       75.12         0.32       207.97       .479E+04       1.4       0.41       57.58         0.43       208.07       .856E+04       3.0       0.50       47.72         0.53       208.18       .134E+05       5.5       0.58       40.76         0.64       208.29       .193E+05       9.0       0.67       35.61         0.75       208.39       .261E+05       13.1       0.71       33.18         0.85       208.50       .344E+05       18.4       0.76       11.10         0.96       208.61       .458E+05       23.5       0.73       32.57         1.07       208.71       .598E+05       33.6       0.80       29.71         1.17       208.82       .761E+05       45.8       0.85       27.72         1.28       208.93       .938E+05       61.8       0.94       25.29
<pre>&lt; hydrograph&gt; &lt;-pipe / channel-&gt; AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL (ha) (cms) (hrs) (mm) (m) (m/s) INFLOW : ID= 2 ( 0092) 201.01 4.25 2.75 63.60 0.48 0.54 OUTFLOW: ID= 1 ( 2252) 201.01 2.38 3.75 63.60 0.38 0.46</pre>

NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP. TRANSFORMED HYETOGRAPH TIME RAIN   TIME RAIN   TIME RAIN   TIME RAIN hrs mm/hr hrs mm/hr   hrs mm/hr   hrs mm/hr 0.083 0.00 1.667 9.64 3.250 20.88 4.83 1.61 0.167 0.00 1.750 9.64 3.333 11.24 4.92 1.61 0.250 0.00 1.833 27.30 3.417 11.24 5.00 1.61 0.333 1.61 1.977 27.30 3.500 11.24 5.08 1.61 0.417 1.61 2.000 27.30 3.583 11.24 5.17 1.61 0.500 1.61 2.083 27.30 3.667 11.24 5.25 1.61 0.583 1.61 2.167 27.30 3.750 11.24 5.35 1.61 0.583 1.61 2.167 27.30 3.750 11.24 5.35 1.61 0.667 1.61 2.250 27.30 3.833 6.42 5.42 1.61 0.750 1.61 2.333 73.88 3.917 6.42 5.58 1.61 0.833 1.61 2.417 73.88 4.000 6.42 5.58 1.61 0.917 1.61 2.500 73.88 4.083 6.42 5.67 1.61 1.000 1.61 2.583 73.88 4.167 6.42 5.75 1.61 1.003 1.61 2.677 73.88 4.250 6.42 5.83 1.61 1.003 1.61 2.587 73.88 4.250 6.42 5.75 1.61 1.003 1.61 2.587 73.88 4.250 6.42 5.75 1.61 1.003 1.61 2.677 73.88 4.250 6.42 5.83 1.61 1.003 1.61 2.677 73.88 4.250 73.88 4.167 6.42 5.75 1.61 1.003 1.61 2.580 73.88 4.167 6.42 5.75 1.61 1.003 1.61 2.750 73.88 4.167 6.42 5.75 1.61	N
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	N r
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
Max.Eff.Inten.(mm/hr)=       73.88       51.56         over (min)       5.00       20.00         Storage Coeff. (min)=       6.33 (ii)       15.48 (ii)         Unit Hyd. Tpeak (min)=       5.00       20.00         Unit Hyd. Tpeak (min)=       5.00       20.00         Unit Hyd. peak (cms)=       0.19       0.07         *TOTALS*         PEAK FLOW (cms)=       6.20       1.19       7.283 (iii)         TIME TO PEAK (hrs)=       2.75       2.92       2.75         RUNOFF VOLUME (mm)=       80.31       43.27       68.50         TOTAL RAINFALL (mm)=       80.31       80.31       80.31         RUNOFF COEFFICIENT =       0.98       0.54       0.85         (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:       CN* = 82.0       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.       If Any.	
ADD HYD ( 0095) 1 + 2 = 3   AREA QPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) ID1= 1 ( 2252): 201.01 2.382 3.75 63.60 + ID2= 2 ( 0093): 88.14 10.507 2.75 52.43 ID = 3 ( 0095): 289.15 12.436 2.83 60.19 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	
ROUTE CHN( 2257) IN= 2> OUT= 1   Routing time step (min)'= 5.00	
<pre>&lt;&gt; DATA FOR SECTION ( 1.1)&gt; Distance Clavation</pre>	

2 4 5 6 6 7 9 10 10 11 11 12 13 14 14 15 17 19 19 22 23 25	8.50       21         7.35       20         1.00       20         0.44       20         2.45       20         5.97       20         8.18       20         8.18       20         8.18       20         5.97       20         1.52       20         5.39       20         5.39       20         5.39       20         5.39       20         5.39       20         5.39       20         5.39       20         5.39       20         5.39       20         5.39       20         5.39       20         5.39       20         5.39       20         5.39       20         5.30       20         5.96       20         5.96       20         5.96       20         5.96       20         5.96       20         5.50       20         5.50       20         5.50       20         5.50       20         5.50	0.02 19.86 19.76 19.76 19.74 19.60 19.41 18.53 18.38 18.38 18.38 18.33 18.55 18.52 19.35 19.35 19.	0.0600 0.0450 M 0.0450 M	ain Channel ain Channel	
<pre></pre>	TRAV           V         VOLUME           0         (cu.m.)           5         .143E+03           6         .574E+03           7         .129E+04           7         .231E+04           8         .362E+04           9         .520E+04           9         .520E+04           9         .520E+04           9         .206E+05           1         .124E+05           1         .162E+05           2         .206E+05           3         .305E+05           4         .359E+05           5         .417E+05           5         .417E+05           6         .545E+05           8         .625E+05           9         .714E+05	<pre>/EL TIME TABL FLOW RATE (cms) 0.1 0.4 1.0 2.2 4.1 6.7 9.8 13.8 17.5 25.1 34.2 46.2 60.1 75.9 93.7 112.9 133.0 160.7 193.1</pre>	E VELOCITY (m/s) 0.15 0.24 0.31 0.37 0.43 0.50 0.53 0.57 0.54 0.64 0.64 0.64 0.70 0.76 0.76 0.86 0.91 0.99 1.04	TRAV.TIME (min) 43.07 27.13 20.80 17.24 14.72 12.86 11.98 11.23 11.76 10.73 10.01 9.13 8.45 7.89 7.42 7.06 6.83 6.49 6.16	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	ARE (ha 0095) 331.3 2257) 331.3	<pre>&lt; hyd A QPEAK () (cms) 2 19.68 32 16.42</pre>	Irograph> TPEAK R.V. (hrs) (mm) 2.75 61.25 2.83 61.25	<-pipe / c MAX DEPTH (m) 0.99 0.93	hannel-> MAX VEL (m/s) 0.56 0.55
CALIB   STANDHYD ( 0100)  ID= 1 DT= 5.0 min	- Area (h Total Imp(	a)= 36.92 %)= 58.10	Dir. Conn.(%	)= 58.10	
Surface Area Dep. Storage Average Slope Length Mannings n	- (ha)= (mm)= (%)= (m)= - -	PERVIOUS P 21.45 2.00 3.42 96.12 0.013	PERVIOUS (i) 15.47 5.00 3.42 40.00 0.250		
NUTE: RAI TI h 0.0 0.1 0.2 0.3 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	ME RAIN   rs mm/hr   83 0.00 1 67 0.00 1 50 0.00 1 50 0.00 1 133 1.61 1 17 1.61 2 50 1.61 2 50 1.61 2 50 1.61 2 53 1.61 2 233 1.61 2 233 1.61 2 233 1.61 2 247 1.61 2 250 1.61 2	TRANSFORM TIME RAIN hrs mm/hr .667 9.64 .750 9.64 .833 27.30 .917 27.33 .000 27.30 .003 27.30 .167 27.33 .250 27.30 .333 73.88 .417 73.88 .500 73.88 .583 73.88 .667 73.88	HYETOGRAPH           I ' TIME           ' hrs           ME           3.250           20           3.333           11           3.500           13.417           3.500           13.583           11           3.5067           11           3.750           11           3.833           63           3.917           63           4.0000           63           4.083           63           4.167           63           4.250	RAIN   TIME m/hr   hrs .88   4.83 .24   4.92 .24   5.00 .24   5.08 .24   5.25 .24   5.25 .24   5.25 .24   5.33 .42   5.42 .42   5.58 .42   5.58 .42   5.75 .42   5.83	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6

TRANSFORMED HYETOGRAPH								
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME		
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs		
0.083	0.00	1.667	9.64	3.250	20.88	4.83		
0.167	0.00	1.750	9.64	3.333	11.24	4.92		
0.250	0.00	1.833	27.30	3.417	11.24	5.00		
0.333	1.61	1.917	27.30	3.500	11.24	5.08		
0.417	1.61	2.000	27.30	3.583	11.24	5.17		
0.500	1.61	2.083	27.30	3.667	11.24	5.25		
0.583	1.61	2.167	27.30	3.750	11.24	5.33		
0.667	1.61	2.250	27.30	3.833	6.42	5.42		
0.750	1.61	2.333	73.88	3.917	6.42	5.50		
0.833	1.61	2.417	73.88	4.000	6.42	5.58		
0.917	1.61	2.500	73.88	4.083	6.42	5.67		
1.000	1.61	2.583	73.88	4.167	6.42	5.75		
1.083	1.61	2.667	73.88	4.250	6.42	5.83		
1.250 1.61 1.333 9.64 1.417 9.64 1.500 9.64 1.583 9.64	2.750 73.88 2.833 20.88 2.917 20.88 3.000 20.88 3.083 20.88 3.167 20.88	4.333 4.417 4.500 4.583 4.667 4.750	3.21       5.92         3.21       6.00         3.21       6.08         3.21       6.17         3.21       6.25         3.21       1	1.61 1.61 1.61 1.61 1.61				
---	--	--	--	--				
Max.Eff.Inten.(mm/hr)= over (min) Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)=	73.88 5.00 5.21 (ii) 5.00 0.21	50.21 15.00 13.13 (ii) 15.00 0.08	*T0TAI S*					
PEAK FLOW (cms)= TIME TO PEAK (hrs)= RUNOFF VOLUME (mm)= TOTAL RAINFALL (mm)= RUNOFF COEFFICIENT =	4.39 2.75 78.31 80.31 0.98	1.66 2.83 42.05 80.31 0.52	5.996 (iii) 2.75 63.12 80.31 0.79					
<ul> <li>(i) CN PROCEDURE SELECTE</li> <li>CN* = 81.0 Ia</li> <li>(ii) TIME STEP (DT) SHOUL</li> <li>THAN THE STORAGE COD</li> <li>(iii) PEAK FLOW DOES NOT 1</li> </ul>	ED FOR PERVIOUS = Dep. Storage D BE SMALLER C EFFICIENT. INCLUDE BASEFLO	& LOSSES: (Above) R EQUAL W IF ANY.						
CALIB     STANDHYD ( 0102)  Area  ID= 1 DT= 5.0 min   Total Im	(ha)= 71.88 np(%)= 83.70	Dir. Conn.	(%)= 83.70					
] Surface Area (ha)=	MPERVIOUS F 60.16	ERVIOUS (i) 11.72						
Dep.Storage (mm)= Average Slope (%)=	2.00	5.00 2.22						
Length (m)= Mannings n =	692.24 0.013	40.00 0.250						
NOTE: RAINFALL WAS TH	ANSFORMED TO	5.0 MIN. T	IME STEP.					
	TRANSFORM		DU					
TIME RAIN	TIME RAIN	I  ' TIME	RAIN   TIME	RAIN				
0.083 0.00	1.667 9.64	3.250	20.88 4.83	1.61				
0.16/ 0.00				1.61				
0.167 0.00 0.250 0.00 0.333 1.61	1.833 27.30 1.917 27.30	3.417	11.24 5.00 11.24 5.08	1.61 1.61 1.61				
0.250 0.00 0.333 1.61 0.417 1.61 0.500 1.61	1.833 27.30 1.917 27.30 2.000 27.30 2.083 27.30	3.417 3.500 3.583 3.667	11.24 5.00 11.24 5.08 11.24 5.17 11.24 5.25	1.61 1.61 1.61 1.61 1.61				
$\begin{array}{ccccc} 0.167 & 0.00 \\ 0.250 & 0.00 \\ 0.333 & 1.61 \\ 0.417 & 1.61 \\ 0.500 & 1.61 \\ 0.583 & 1.61 \\ 0.667 & 1.61 \end{array}$	1.833 27.30 1.917 27.30 2.000 27.30 2.083 27.30 2.167 27.30 2.250 27.30	3.5417 3.500 3.583 3.667 3.750 3.833	11.24 5.00 11.24 5.08 11.24 5.17 11.24 5.25 11.24 5.33 6.42 5.42	1.61 1.61 1.61 1.61 1.61 1.61 1.61				
$\begin{array}{cccccc} 0.167 & 0.00 \\ 0.250 & 0.00 \\ 0.333 & 1.61 \\ 0.417 & 1.61 \\ 0.500 & 1.61 \\ 0.583 & 1.61 \\ 0.667 & 1.61 \\ 0.750 & 1.61 \\ 0.833 & 1.61 \end{array}$	1.833 27.30 1.917 27.30 2.000 27.30 2.083 27.30 2.167 27.30 2.250 27.30 2.333 73.88 2.417 73.88	) 3.417 ) 3.500 ) 3.583 ) 3.667 ) 3.750 ) 3.833 3.917 3 4.000	11.24         5.00           11.24         5.08           11.24         5.17           11.24         5.25           11.24         5.33           6.42         5.42           6.42         5.50           6.42         5.58	1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61				
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1.833         27.30           1.917         27.30           2.000         27.30           2.083         27.30           2.167         27.30           2.333         73.88           2.417         73.88           2.583         73.88           2.583         73.88	3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 6.4.083 4.167	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61				
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1.833         27.30           1.917         27.30           2.000         27.30           2.083         27.30           2.167         27.30           2.333         73.88           2.417         73.88           2.500         73.88           2.501         73.88           2.502         73.88           2.503         73.88           2.667         73.88           2.750         73.88	3,417 3,500 3,583 3,567 3,750 3,833 3,917 4,000 4,083 4,083 4,167 4,250 4,333	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61				
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1.833         27.30           1.917         27.30           2.000         27.30           2.083         27.30           2.167         27.30           2.250         27.30           2.333         73.88           2.417         73.88           2.560         73.88           2.563         73.88           2.667         73.88           2.667         73.88           2.833         20.88           2.917         20.88           2.917         20.88	3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.003 4.167 4.250 4.333 4.417 4.500	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1.61 1.61				
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1.833 27.30 1.917 27.30 2.000 27.30 2.083 27.30 2.167 27.30 2.250 27.30 2.333 73.88 2.417 73.88 2.500 73.88 2.583 73.88 2.667 73.88 2.667 73.88 2.667 73.88 2.667 73.88 2.667 73.88 2.667 73.88 2.683 20.88 2.917 20.88 3.000 20.88 3.000 20.88 3.003 20.88 3.003 20.88 3.003 20.88 3.004 20.88 3.005 20.85 3.005	3.417         3.500         3.583         3.667         3.750         3.833         4.000         4.083         4.167         4.250         4.333         4.417         4.583         4.583         4.583         4.667         4.667	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61				
0.187 0.00 0.250 0.00 0.333 1.61 0.417 1.61 0.500 1.61 0.583 1.61 0.667 1.61 0.750 1.61 0.917 1.61 1.000 1.61 1.000 1.61 1.250 1.61 1.250 1.61 1.333 9.64 1.583 9.64 Max.Eff.Inten.(mm/hr)=	1.833 27.30 1.917 27.30 2.000 27.30 2.083 27.30 2.167 27.30 2.250 27.30 2.333 73.88 2.417 73.88 2.500 73.88 2.583 73.88 2.667 73.88 2.667 73.88 2.667 73.88 2.833 20.88 2.917 20.88 3.000 20.88 3.167 20.88 73.88	3.417           3.500           3.583           3.667           3.750           3.833           3.917           4.000           4.083           4.167           4.250           3.4.167           4.333           4.4.167           4.583           4.4.583           4.4.750           5.4.667           4.750	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61				
0.187 0.00 0.250 0.00 0.333 1.61 0.417 1.61 0.500 1.61 0.583 1.61 0.667 1.61 0.750 1.61 0.917 1.61 1.000 1.61 1.083 1.61 1.167 1.61 1.250 1.61 1.333 9.64 1.417 9.64 1.583 9.64 Max.Eff.Inten.(mm/hr)= over (min) Storage Coeff. (min)=	1.833 27.30 1.917 27.30 2.000 27.30 2.083 27.30 2.167 27.30 2.250 27.30 2.333 73.88 2.417 73.88 2.500 73.88 2.583 73.88 2.667 73.88 2.667 73.88 2.833 20.88 3.000 20.88 3.000 20.88 3.167 20.88 3.167 20.88 5.00 7.25 (ii) 5.00 (ii)	) 3.417 ) 3.500 ) 3.583 ) 3.667 ) 3.750 ) 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.4.167 4.250 4.333 4.4.500 4.583 4.4.67 4.500 50.21 15.00 11.26 (ii)	11.24       5.00         11.24       5.08         11.24       5.17         11.24       5.25         11.24       5.25         11.24       5.33         6.42       5.42         6.42       5.50         6.42       5.67         6.42       5.83         3.21       5.92         3.21       6.08         3.21       6.17         3.21       6.25         3.21       6.25         3.21       6.25	1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61				
0.187 0.00 0.250 0.00 0.333 1.61 0.417 1.61 0.500 1.61 0.583 1.61 0.667 1.61 0.750 1.61 0.833 1.61 0.917 1.61 1.000 1.61 1.000 1.61 1.001 1.61 1.250 1.61 1.250 1.61 1.333 9.64 1.583 9.64 Max.Eff.Inten.(mm/hr)= over (min) Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)=	1.833         27.30           1.917         27.30           2.000         27.30           2.167         27.30           2.250         27.30           2.333         73.88           2.417         73.88           2.583         73.88           2.750         73.88           2.750         73.88           2.917         20.88           3.000         20.88           3.083         20.88           3.167         20.88           5.00         7.25           73.88         5.00           7.25         (ii)           5.00         0.17	50.21 50.21 50.21 50.21 50.21 50.21 50.21 50.21 50.21 50.21 50.21 50.21 50.21 50.21 50.21 50.21 50.21 50.21 50.21 50.00 50.21 50.00 50.21 50.00 50.21 50.00 50.21 50.00 50.21 50.00 50.21 50.00 50.21 50.00 50.21 50.00 50.21 50.00 50	11.24 5.00 11.24 5.08 11.24 5.17 11.24 5.25 11.24 5.25 11.24 5.33 6.42 5.42 6.42 5.50 6.42 5.58 6.42 5.67 6.42 5.75 6.42 5.75 6.42 5.75 6.42 5.75 6.42 5.83 3.21 6.00 3.21 6.00 3.21 6.08 3.21 6.17 3.21 6.25 3.21 7 6.25 3.21 7 6.25 5.25 6.25 5.25	1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61				
0.187 0.00 0.250 0.00 0.333 1.61 0.417 1.61 0.500 1.61 0.583 1.61 0.667 1.61 0.750 1.61 0.750 1.61 1.000 1.61 1.000 1.61 1.083 1.61 1.167 1.61 1.250 1.61 1.250 1.61 1.333 9.64 1.417 9.64 1.583 9.64 Max.Eff.Inten.(mm/hr)= over (min) Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)= PEAK FLOW (cms)= TIME TO PEAK (hrs)=	1.833 27.30 1.917 27.33 2.000 27.30 2.083 27.30 2.250 27.30 2.333 73.88 2.417 73.88 2.500 73.88 2.583 73.88 2.667 73.88 2.667 73.88 2.667 73.88 2.833 20.88 3.000 20.88 3.063 20.88 3.167	) 3.417 ) 3.500 ) 3.583 ) 3.667 ) 3.750 ) 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.4.167 4.250 4.4.33 4.4.50 4.4.583 4.4.667 4.750 50.21 15.00 11.26 (ii) 15.00 0.09 1.30 2.83	11.24 5.00 11.24 5.08 11.24 5.17 11.24 5.25 11.24 5.25 11.24 5.33 6.42 5.42 6.42 5.50 6.42 5.58 6.42 5.75 6.42 5.75 6.42 5.75 6.42 5.75 6.42 5.75 6.42 5.83 3.21 6.00 3.21 6.08 3.21 6.17 3.21 6.25 3.21 8.25 3.21 8.25 3.21 1.25 3.21 1.25 3.25	1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61				
0.187 0.00 0.250 0.00 0.333 1.61 0.417 1.61 0.500 1.61 0.583 1.61 0.667 1.61 0.750 1.61 0.917 1.61 1.000 1.61 1.000 1.61 1.083 1.61 1.167 1.61 1.250 1.61 1.250 1.61 1.333 9.64 1.417 9.64 1.583 9.64 Max.Eff.Inten.(mm/hr)= over (min)= Unit Hyd. Tpeak (min)= Unit Hyd. Tpeak (min)= Unit Hyd. Tpeak (min)= Unit Hyd. Tpeak (hrs)= PEAK FLOW (cms)= TIME TO PEAK (hrs)= RUNOFF VOLUME (mm)= TOTAL RAINFALL (mm)=	1.833 27.30 1.917 27.30 2.000 27.30 2.083 27.30 2.167 27.30 2.333 73.88 2.417 73.88 2.500 73.88 2.583 73.88 2.583 73.88 2.667 73.88 2.750 73.88 2.750 73.88 2.917 20.88 3.000 20.88 3.083 20.88 3.167 20.88 3.167 20.88 3.167 20.88 3.167 20.88 3.167 20.88 3.167 20.88 3.000 7.25 (ii) 5.00 0.17 12.22 2.75 78.31 80.31	50,231 50,3417 51,500 51,750 51,750 51,750 51,750 51,750 51,4000 50,211 50,000 50,211 50,000 50,211 50,000 50,211 50,000 50,211 50,000 50,211 50,000 50,211 50,000 50,211 50,000 50,211 50,000 50,212 50,000 50,212 50,000 50,212 50,000 50,212 50,000 50,212 50,000 50,212 50,000 50,212 50,000 50,212 50,000 50,212 50,000 50,212 50,0000 50,0000 50,0000 50,0000 50,0000 50,0000 50,0000 50,	11.24 5.00 11.24 5.08 11.24 5.17 11.24 5.25 11.24 5.25 11.24 5.33 6.42 5.42 6.42 5.50 6.42 5.58 6.42 5.58 6.42 5.75 6.42 5.83 3.21 6.00 3.21 6.00 3.21 6.00 3.21 6.17 3.21 6.25 3.21 6.17 3.21 6.25 3.21 8.17 13.496 (iii) 2.75 72.40 80.31	1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61				

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 81.0 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.

RESER   IN= 2   DT=	VOIR( > 0 5.0 mi	0103)  UT= 1   n	OVERFLOW 3 OUTFLOW (cms) 0.0000 1.3100 2.6500	IS OFF STORAGE (ha.m.) 0.0000 1.3639	0UTFL0 (cms) 4.690 6.290	W ST (I	TORAGE 1a.m.) 2.1905 2.4799	
INFL OUTF	OW : I LOW: I	D= 2 ( 01 D= 1 ( 01 PEAK TIME MAXT	ARI (ha 02) 71.8 03) 71.8 FLOW RI SHIFT OF PI WIM STORAG	EA QPE a) (cm 380 13 380 8 EDUCTION [ EAK FLOW E USED	AK TPEA s) (hrs .496 2 .676 2 Qout/Qin](% (min (ham	K 75 83 83 83 83 83 	R.V. (mm) 72.40 72.40 29 00	
					(114.111.	,	1505	
ADD H	IVD ( 2 = ID1=	0099) 3	AREA (ha) : 36.92	QPEAK (cms) 5.996 8.676	TPEAK (hrs) 2.75 6	R.V. (mm) 3.12		
	ID2-	3 ( 0000)	. 108 80	12 783	2.05 /	0 25		
	ID =		: 108.80	12.765		9.25		
	DIE: P	EAK FLOWS	DO NOT INCLU	JDE BASEFL	OWS IF ANY.			
ADD H   3 +	· 2 = ID1=	0099)  1   3 ( 0099)	AREA (ha) : 108.80	OPEAK (cms) 12.783	TPEAK (hrs) 2.83 6	R.V. (mm) 9.25		
+	· ID2=	2 ( 2257)	: 331.32	16.421	2.83 6	1.25		
	ID =	1 ( 0099)	: 440.12	29.204	2.83 6	3.23		
NO	TE: P	EAK FLOWS	DO NOT INCLU	JDE BASEFL	OWS IF ANY.			
ROUTE   IN= 2	CHN(	2255)  UT= 1	Routing t	ime step (	min)'= 5.0	0		
		<	DATA FOR SEC	CTION (	1.1)	>		
		Distance 28.50	Eleva 210	.02	Manning 0.0600	1000		
		47.35 51.00	209 209	.86	0.0450	Main Main	Channel Channel	
		60.44	209	.54	0.0450	Main	Channel Channel	
		72.65	209	.41	0.0450	Main	Channe]	
		95.97 103.18	208 208	.53	0.0450	Main Main	Channe I Channe I	
		108.18	208	.33	0.0450	Main	Channel Channel	
		122.09	207	.92	0.0450	Main	Channel	
		131.52	207	.65	0.0450	Main Main	Channe I Channe I	
		155.39	208	.49	0.0450	Main	Channel Channel	
		190.96	208	.73	0.0450	Main	Channel	
		195.96 226.50	208	.72 .32	0.0450 0.0450	Main Main	Channe I Channe I	
		238.71 251.40	209 209	.46 0.0 .70	450 /0.0600 0.0600	Main	Channe1	
<			TRAVE	L TIME TAB	LE		>	
	DEPTH (m)	ELEV (m)	VOLUME	FLOW RAT	E VELOCI	TY TI	(min)	
	0.11	207.75	.601E+03	0.0	0.1	2 2	222.56	
	0.32	207.97	.542E+04	0.8	0.2	5 1	L07.47	
	0.43	208.07 208.18	.969E+04 .152E+05	1.8	0.3	5	89.07	
	0.64	208.29	.218E+05 .296E+05	5.5	0.4	0	66.47 61.92	
	0.85	208.50	.389E+05	11.2	0.4	6	58.04	
	1.07	208.71	.677E+05	20.3	0.4	8	55.45	

1.17 1.28 1.39 1.49 1.60 1.71 1.81 1.93 2.05	208.82 208.93 209.03 209.14 209.25 209.35 209.46 209.58 209.70	.861E+05 .106E+06 .128E+06 .150E+06 .175E+06 .201E+06 .202E+06 .262E+06 .299E+06	27.7 37.5 48.7 61.5 76.0 91.6 107.8 130.3 156.6	0.52 0.57 0.61 0.66 0.70 0.73 0.76 0.80 0.84	51.74 47.20 43.64 40.75 38.35 36.50 35.28 33.51 31.84	
INFLOW : I OUTFLOW: I	D= 2 ( 00 D= 1 ( 22	AREA (ha) 999) 440.12 55) 440.12	< hyo OPEAK (cms) 29.20 15.10	drograph TPEAK R.V (hrs) (mm 2.83 63.2 3.33 63.2	> <-pipe / 0 /. MAX DEPTH ) (m) 3 1.19 3 0.98	channel-> MAX VEL (m/s) 0.53 0.45
ROUTE CHN(   IN= 2> 0	2296)  UT= 1	Routing ti	me step (r	min)'= 5.00		
	<pre>&lt; Distance 0.00</pre>	DATA FOR SEC Elevat 204. 204. 203. 204. 204. 204. 204. 204. 204. 204. 202. 202	TION ( : ion 60 58 90 83 24 34 04 05 84 89 66 26 25 94 72 25 94 72 80 71 01 02 0.04 56	I.1)        >           Manning         0.0600           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450           0.0450         0.0450	Main Channel Main Channel	
<pre></pre>	ELEV (m) 200.17 200.40 200.64 200.87 201.10 201.34 201.57 201.80 202.04 202.27 202.50 202.74 202.97 203.20 203.44 203.67 203.90 204.14 204.49	TRAVEL VOLUME (cu.m.) .403E+03 .149E+04 .284E+04 .43E+04 .624E+04 .828E+04 .106E+05 .131E+05 .158E+05 .158E+05 .261E+05 .317E+05 .348E+05 .548E+05 .548E+05 .788E+05 .103E+06	TIME TABL FLOW RATI (cms) 0.2 1.3 3.3 6.2 15.1 21.2 28.4 36.8 46.4 54.8 63.4 65.8 87.1 113.5 143.4 141.2 182.1 256.5	LE E VELOCITY (m/s) 0.17 0.30 0.41 0.50 0.58 0.71 0.77 0.83 0.88 0.88 0.88 0.88 0.86 0.74 0.80 0.87 0.93 0.87 0.93 0.77	<pre>TRAV.TIME (min) 35.38 19.71 14.37 11.80 10.22 9.13 8.31 7.67 7.15 6.75 6.73 6.87 8.03 7.45 6.85 6.37 7.67 7.22 6.70</pre>	
INFLOW : I OUTFLOW: I	D= 2 ( 22 D= 1 ( 22	AREA (ha) 255) 440.12 296) 440.12	< hyd QPEAK (cms) 15.10 14.56	drograph TPEAK R.V (hrs) (mm 3.33 63.2 3.50 63.2	> <-pipe / 6 7. MAX DEPTH b) (m) 3 1.40 2 1.38	channel-> MAX VEL (m/s) 0.65 0.64
CALIB   STANDHYD (  ID= 1 DT= 5.	0106) 0 min	Area (ha) Total Imp(%) IMPER	= 281.15 = 79.50 VIOUS	Dir. Conn.( PERVIOUS (i)	%)= 79.40	

Surface Area	(ha)=	223.51	57.64
Dep. Storage	(mm)=	2.00	5.00
Average Slope	(%)=	1.63	1.63
Length	(m)=	1369.06	40.00
Mannings n	=	0.013	0.250

	TRANSF	ORMED HYETOGR	APH	
TIME RAIN	TIME R	AIN  ' TIME	RAIN	TIME RAIN
0.083 0.00	1.667 9	.64 3.250	20.88	4.83 1.61
0.167 0.00	1.750 9	.64 3.333	11.24	4.92 1.61
0.250 0.00	1.833 27	.30   3.417	11.24	5.00 1.61
0.417 1.61	2.000 27	.30 3.583	11.24	5.17 1.61
0.500 1.61	2.083 27	.30 3.667	11.24	5.25 1.61
0.583 1.61	2.167 27	.30   3.750	11.24	5.33 1.61
0.750 1.61	2.333 73	.88 3.917	6.42	5.50 1.61
0.833 1.61	2.417 73	.88 4.000	6.42	5.58 1.61
0.91/ 1.61	2.500 /3	.88 4.083	6.42	5.6/ 1.61
1.083 1.61	2.667 73	.88 4.250	6.42	5.83 1.61
1.167 1.61	2.750 73	.88 4.333	3.21	5.92 1.61
1.333 9.64	2.917 20	.88 4.500	3.21	6.08 1.61
1.417 9.64	3.000 20	.88 4.583	3.21	6.17 1.61
1.500 9.64	3.083 20	.88 4.667	3.21	6.25 1.61
1.385 9.04	1 3.167 20	.00   4.750	3.21	
Max.Eff.Inten.(mm/hr)=	73.88	50.57		
Storage Coeff. (min)=	10.00 11.97 (ii	) 16.90 (ii	)	
Unit Hyd. Tpeak (min)=	10.00	20.00		
Unit Hyd. peak (cms)=	0.10	0.06	*TOTAL	C*
PEAK FLOW (cms)=	42.66	5.53	47.63	1 (iii)
TIME TO PEAK (hrs)=	2.75	2.92	2.7	5
RUNOFF VOLUME (mm)=	78.31	42.16	70.8	6
RUNOFF COEFFICIENT =	0.98	0.52	0.8	8
(i) CN PROCEDURE SELECT	ED FOR PERVI	OUS LOSSES:		
CN* = 81.0 Ia	= Dep. Stor	age (Above)		
(11) IIME SIEP (DI) SHOU THAN THE STORAGE CO	LD BE SMALLE	R OR EQUAL		
(iii) PEAK FLOW DOES NOT	INCLUDE BASE	FLOW IF ANY.		
174 - 184				
1 + 2 = 3	REA OPEAK	TPEAK	R.V.	
(	ha) (cms)	(hrs)	(mm)	
ID1=1 (0106): 281 + $ID2=2 (2296): 440$	.15 47.631	2.75 7	0.86	
ID = 3 ( 0107): 721	.27 54.622	2.75 6	6.20	
NOTE: PEAK FLOWS DO NOT	INCLUDE BASE	FLOWS IF ANY.		
ROUTE CHN( 2300)				
IN= 2> OUT= 1   Routi	ng time step	(min)'= 5.0	0	
DATA FO	D SECTION (	1 1)		
Distance E	levation	Manning	-	
0.00	204.60	0.0600		
2.24		0.0450	Main Cha	nnel
10.00	204.58	0.0450	Main Cha	nnei
36.31	204.58 203.90 203.83	0.0450 0.0450	Main Cha Main Cha	nnel
36.31 47.49	204.58 203.90 203.83 204.24	0.0450 0.0450 0.0450	Main Cha Main Cha Main Cha	nnel nnel nnel
36.31 47.49 59.15 65.86	204.58 203.90 203.83 204.24 204.34 204.04	0.0450 0.0450 0.0450 0.0450 0.0450	Main Cha Main Cha Main Cha Main Cha Main Cha	nnei nnel nnel nnel
36.31 47.49 59.15 65.86 81.51	204.58 203.90 203.83 204.24 204.34 204.04 203.05	0.0450 0.0450 0.0450 0.0450 0.0450 0.0450	Main Cha Main Cha Main Cha Main Cha Main Cha Main Cha	nnel nnel nnel nnel nnel nnel
36.31 47.49 59.15 65.86 81.51 93.18	204.58 203.90 203.83 204.24 204.34 204.04 203.05 202.84 202.89	0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450	Main Cha Main Cha Main Cha Main Cha Main Cha Main Cha Main Cha	nnel nnel nnel nnel nnel nnel nnel
36.31 47.49 59.15 65.86 81.51 93.18 104.40 117.82	204.58 203.90 203.83 204.24 204.34 204.04 203.05 202.84 202.89 202.66	0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450	Main Cha Main Cha Main Cha Main Cha Main Cha Main Cha Main Cha Main Cha	nnel nnel nnel nnel nnel nnel nnel nnel
36.31 47.49 59.15 65.86 81.51 93.18 104.40 117.82 126.76	204.58 203.90 203.83 204.24 204.34 204.04 203.05 202.84 202.89 202.66 202.26	0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450	Main Cha Main Cha Main Cha Main Cha Main Cha Main Cha Main Cha Main Cha Main Cha	nnel nnel nnel nnel nnel nnel nnel nnel
36.31 47.49 59.15 65.86 81.51 93.18 104.40 117.82 126.76 138.43 149.61	204.58 203.90 203.83 204.24 204.34 204.04 203.05 202.84 202.89 202.66 202.26 200.25 199.94	0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450	Main Cha Main Cha	nne1 nne1 nne1 nne1 nne1 nne1 nne1 nne1

172.61 194.97 217.87 229.05 240.71 284.60	203 203 204 205 205 205	.72 .80 .71 .01 .02 0.04 .56	0.0450 0.0450 0.0450 0.0450 50 /0.06 0.0600	Main Main Main Main 500 Main	n Channel n Channel n Channel n Channel n Channel n Channel	
<pre></pre>	TRAVE VOLUME (cu.m.) .588±+03 .217E+04 .415E+04 .646E+04 .910E+04 .121E+05 .134E+05 .134E+05 .231E+05 .232E+05 .381E+05 .462E+05 .688±+05 .800E+05 .948E+05 .115E+06 .150E+06	L TIME TABL FLOW RATE (cms) 0.2 1.3 6.3 10.2 15.2 21.3 28.5 37.0 46.6 55.0 63.6 66.1 87.4 114.0 143.9 141.7 182.8 257.5		DCITY n/s) 0.17 0.30 0.41 0.50 0.58 0.65 0.72 0.78 0.88 0.88 0.88 0.88 0.88 0.88 0.87 0.74 0.87 0.74 0.80 0.87 0.78 0.88 0.88 0.88 0.87	<pre>&gt; TRAV.TIME (min) 51.42 28.64 20.89 17.15 14.86 13.27 12.08 11.15 10.39 9.80 9.79 9.98 11.66 10.83 9.96 9.26 11.14 10.49 9.74</pre>	
INFLOW : ID= 2 ( 010 OUTFLOW: ID= 1 ( 230	AREA (ha) 7) 721.27 0) 721.27	< hyd QPEAK (cms) 54.62 49.35	rograph TPEAK (hrs) 2.75 2.83	> R.V. (mm) 66.20 66.20	<-pipe / c MAX DEPTH (m) 2.56 2.40	hannel-> MAX VEL (m/s) 0.88 0.88
$\begin{array}{c c} \text{ADD} & \text{HYD} & ( & 0023) \\ 1 & + & 2 & 3 \\ \end{array} \\ & & & \\ & & \\ & + & 102 = 2 \\ \end{array} \begin{pmatrix} & 2300 \\ & 0024 \\ \end{pmatrix} \vdots$	AREA (ha) 721.27 9.55	QPEAK (cms) 49.352 1.900	TPEAK (hrs) 2.83 2.75	R.V. (mm) 66.20 76.40		
ID = 3 ( 0023): NOTE: PEAK FLOWS D	730.82 D NOT INCL	50.442 UDE BASEFLO	2.83 WS IF AM	66.33 W.		
ADD HYD ( 0023) 3 + 2 = 1 1D1= 3 ( 0023): + ID2= 2 ( 0025): ID = 1 ( 0023):	AREA (ha) 730.82 8.34 739.16	QPEAK (cms) 50.442 0.405	TPEAK (hrs) 2.83 3.58 2.83	R.V. (mm) 66.33 39.71 66.03		
NOTE: PEAK FLOWS D	O NOT INCL	UDE BASEFLO	WS IF AM	۱Y.		
ADD HYD ( 0023) 1 + 2 = 3 ID1= 1 ( 0023): + ID2= 2 ( 0049):	AREA (ha) 739.16 23.02	OPEAK (cms) 50.641 4.583	TPEAK (hrs) 2.83 2.75	R.V. (mm) 66.03 76.40		
ID = 3 ( 0023):	762.18	54.041	2.75 WS TE AN	66.35		
			"3 IF AF			
$\begin{array}{c c} \text{ADD HYD } ( 0023) \\ \hline 3 + 2 = 1 \\ \hline 1D1 = 3 ( 0023) \\ + D2 = 2 ( 0050) \\ \hline \end{array}$	AREA (ha) 762.18 31.36	QPEAK (cms) 54.041 5.501	TPEAK (hrs) 2.75 2.75	R.V. (mm) 66.35 76.40		
ID = 1 (0023):	793.54	59.542	2.75	66.75		

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
RESERVOIR(         0042)         OVERFLOW IS OFF           IN= 2> OUT= 1         OUTFLOW         STORAGE         OUTFLOW           DT= 5.0 min         OUTFLOW         STORAGE         OUTFLOW         STORAGE           (cms)         (ha.m.)         (cms)         (ha.m.)         (cms)         (ha.m.)
Ò.0000         O.0000         45.9000         15.6510           3.5700         5.9180         ********         16.6510           15.7400         10.6460         0.0000         0.0000
AREA         QPEAK         TPEAK         R.V.           (ha)         (cms)         (hrs)         (mm)           INFLOW : ID= 2 (0023)         793.540         59.542         2.75         66.75           OUTFLOW: ID= 1 (0042)         793.540         34.582         3.42         66.74
PEAK FLOW REDUCTION [Qout/Qin](%)= 58.08 TIME SHIFT OF PEAK FLOW (min)= 40.00 MAXIMUM STORAGE USED (ha.m.)= 13.7887
ROUTE CHN( 2297)    IN= 2> OUT= 1   Routing time step (min)'= 5.00
<pre>&lt; DATA FOR SECTION ( 1.1)&gt; Distance Elevation Manning     0.00 204.60 0.0600</pre>
2.24 204.58 0.0450 Main Channel 10.30 203.90 0.0450 Main Channel 36.31 203.83 0.0450 Main Channel 47.49 204.24 0.0450 Main Channel
59.15         204.34         0.0450         Main         Channel           65.86         204.04         0.0450         Main         Channel           81.51         203.05         0.0450         Main         Channel           03.14         203.05         0.0450         Main         Channel
104.40 202.89 0.0450 Main Channel 117.82 202.66 0.0450 Main Channel 126.76 202.26 0.0450 Main Channel
138.43 200.25 0.0450 Main Channel 149.61 199.94 0.0450 Main Channel 172.61 203.72 0.0450 Main Channel 194.97 203.80 0.0450 Main Channel
217.87         204.71         0.0450         Main Channel           229.05         205.01         0.0450         Main Channel           240.71         205.02         0.0450 /0.0600         Main Channel           284.60         205.56         0.0600         Main Channel
<pre>&lt; TRAVEL TIME TABLE&gt; DEPTH ELEV VOLUME FLOW RATE VELOCITY TRAV.TIME (m) (m) (cu.m.) (cms) (m/s) (min) 0.23 200.17 921E-03 0.2 0.20 68.84</pre>
0.47 200.40 .341E+04 1.5 0.35 38.35 0.70 200.64 .650E+04 3.9 0.48 27.97 0.93 200.87 .101E+05 7.3 0.59 22.96
1.17 201.10 .143E+05 11.9 0.68 19.89 1.40 201.34 .189E+05 17.8 0.76 17.77 1.63 201.57 .241E+05 24.9 0.84 16.18 1.87 201.80 .299E+05 33.3 0.91 14.93
2.10         202.04         .361E+05         43.3         0.97         13.92           2.33         202.27         .429E+05         54.5         1.03         13.12           2.57         202.50         .506E+05         64.4         1.03         13.10           2.80         202.74         597E+05         74.4         1.01         13.37
3.03         202.97         .724E+05         77.3         0.87         15.62           3.27         203.20         .890E+05         102.3         0.93         14.50           3.50         203.44         .107E+06         133.4         1.02         13.33           72         203.67         .125E         .62         13.40         1.00         13.40
3.75       203.90       .1425440       108.4       1.09       12.40         3.97       203.90       .1486406       165.8       0.91       14.92         4.20       204.14       .180E+06       213.9       0.97       14.04         4.55       204.49       .236E+06       301.3       1.04       13.04
<pre>&lt; hydrograph&gt; &lt;-pipe / channel-&gt; AREA QPEAK TPEAK R.V. MAX DEPTH MAX VEL (ha) (cms) (hrs) (mm) (m) (m/s) INFLOW : ID= 2 ( 0042) 793.54 34.58 3.42 66.74 1.90 0.92 OUTFLOW: ID= 1 ( 2297) 793.54 32.21 3.75 66.74 1.83 0.90</pre>
CALIB STANDHYD ( 0021) Area (ha)= 10.63

Average Slo Length Mannings n	ea ge ope	(ha)= (mm)= (%)= (m)= =	9.57 1.00 1.00 266.21 0.013	JS PE	1.06 1.50 2.00 40.00 0.250	)		
NOTE:	RAINFA	LL WAS TH	RANSFORME	D TO	5.0 MIN.	TIME ST	EP.	
	TTME	DATN	TRA		D HYETOGR	APH	-	DATN
	hrs 0.083	mm/hr 0.00	hrs 1.667	mm/hr 9.64	' hrs	mm/hr 20.88	4.83	mm/hr 1.61
	0.167 0.250	0.00	1.750 1.833	9.64 27.30	3.333 3.417	11.24 11.24	4.92 5.00	1.61 1.61
	0.333 0.417	1.61	1.917 2.000	27.30 27.30	3.500	11.24 11.24	5.08	1.61
	0.500	1.61	2.083 2.167	27.30 27.30	3.667	11.24 11.24	5.25	1.61
	0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61
	0.833	1.61	2.41/	73.88	4.000	6.42	5.58	1.61
	1.083	1.61	2.667	73.88	4.250	6.42 3.21	5.83	1.61
	1.250	1.61	2.833	20.88	4.417	3.21	6.00	1.61
	1.417	9.64	3.000	20.88	4.583	3.21	6.17	1.61
	1.583	9.64	3.167	20.88	4.750	3.21		1000
Max.Eff.In	over (	/hr)= min)	73.88	(	57.08 10.00			
Unit Hyd. Unit Hyd.	err. ( Tpeak ( peak (	min)= min)= cms)=	5.19 5.00 0.21	(11)	8.50 (11 10.00 0.12	,		
PEAK FLOW	(	cms)=	1.96		0.15	*T0 2	TALS* .113 (iii)	)
TIME TO PER	AK ( UME	hrs)= (mm)=	2.75 79.31		2.75 50.24	70	2.75	204 
TOTAL RAIN RUNOFF COE	FALL FFICIEN	(mm)=  T =	80.31 0.99		80.31 0.63	80	0.31 0.95	
(i) CN P	ROCEDUR	E SELECT	D FOR PE	RVTOUS	LOSSES:			
CN* (ii) TIME	= 85 STEP (	.0 Ia DT) SHOUL	= Dep. S	Storage	(Above) EQUAL			
THAN	THE ST FLOW D	ORAGE CON	FFICIENT	ASEFLOW	IF ANY.			
(111) PEAK								
(111) PEAK								
(111) PEAK	039)	OVERFL	OW IS OF	F				
(111) PEAK SERVOIR( 00 = 2> OUT = 5.0 min	039)  = 1	OVERFI OUTFL( (cms)	LOW IS OF	F DRAGE	OUTFLO	W STO	DRAGE	
(111) PEAK SERVOIR( 00 = 2> OUT: = 5.0 min	039)  = 1	OVERFI OUTFL( (cms) 0.000 0.120	OW IS OF DW STC DW STC DW Cha DO 0. DO 0.	F DRAGE A.m.) .0000 .3419	0UTFL0 (cms) 0.640 0.930	W ST( ) (ha )0 ()	DRAGE a.m.) 0.4866 0.5544	
(111) PEAK SERVOIR( 0 ≡ 2> OUT = 5.0 min	039)  = 1	OVERFI OUTFL( (cms) 0.000 0.120 0.300	.OW IS OF DW STC ) (ha 00 0. 00 0. 00 0.	F DRAGE a.m.) .0000 .3419 .3912	OUTFL0   (cms)   0.640   0.930   9.300	W ST( ) (ha )0 () )0 ()	DRAGE a.m.) 0.4866 0.5544 0.6160	
(111) PEAK SERVOIR( 0 = 2> QUT = 5.0 min	039)  = 1	OVERFI OUTFL( (cms) 0.000 0.120 0.300	OW IS OF OW STC O (ha OO 0. OO 0. OO 0. AREA (ha)	F PRAGE A.m.) .0000 .3419 .3912 QPEAk (cms)	OUTFLO   (cms)   0.640   0.930   9.300 ( TPEA ) (hrs	W ST( ) (ha )0 ( )0 ( )0 ( )0 ( ).K	DRAGE a.m.) 0.4866 0.5544 0.6160 R.V. (mm)	
(111) PEAK 	039)  = 1    2 { 0 1 { 0	OVERFI OUTFL( (cms) 0.000 0.120 0.300 0.300	LOW IS OF DW STC DO 0. DO 0. DO 0. DO 0. DO 0. AREA (ha) 10.630 10.630	CRAGE A.m.) 00000 .3419 .3912 QPEAk (cms) 2.1 0.7	OUTFLO   (cms)   0.640   9.300   9.300 ( TPEA ) (hrs L13 2 700 3	WW ST( )0 (ha )0 ( )0 ( )0 ( )0 ( ). ) ). ) ). ) ) ) ) ) ) ) ) ) ) ) ) )	DRAGE a.m.) 0.4866 0.5544 0.6160 R.V. (mm) 76.40 76.34	
(111) PEAK 	039)  = 1    1 ( 0 PEA	OVERFI OUTFL( (cms) 0.000 0.120 0.300 021) 039) K FLOW	OW IS OF OW STC O (ha OO 0. OO 0. OO 0. AREA (ha) 10.630 10.630 REDUCT	F DRAGE a.m.) .0000 .3419 .3912 QPEAk (cms) 2.1 0.7 TION [Qc ELOW	OUTFLC   (cms)   0.640   0.930   9.300 ( TPEA ) (hrs 113 2 700 3 pout/Qin](%	W ST( (ha )0 ( )0 ( )0 ( )1.75 :.00 ()= 33.11	DRAGE a.m.) 0.4866 0.5544 0.6160 R.V. (mm) 76.40 76.34	
(111) PEAK 	039)  = 1    2 { 0 1 { 0 PEA TIM MAX	OVERFI OUTFLC (cms) 0.000 0.120 0.300 021) 039) K FLOW E SHIFT ( IMUM STO	OW IS OF OW STC O (ha DO 0. DO 0. OO 0. AREA (ha) 10.630 10.630 REDUCT DF PEAK F DRAGE U	F PRAGE 1.m.) 0000 3419 3912 QPEAk (cms) 2.1 0.7 TION [Qc LOW JSED	OUTFLC   (cms)   0.640   0.930   9.300 ( TPEA ) (hrs 113 22 700 3 put/Qin](% (min (ha.m.	WW ST( )0 (0 )0 (0 )0 (0 )2,75 00 6)= 33.11 )= 15.00 )= 0.50	DRAGE 1.m.) 0.4866 0.5544 0.6160 R.V. (mm) 76.34 L 0007	
(111) PEAK 	039)  = 1    1 { 0 PEA TIM MAX	0VERFI 0UTFL( (cms) 0.000 0.120 0.300 039) K FLOW E SHIFT ( IMUM STO	OW IS OF OW STC (ha) (ha) (ha) 10.630 10.630 REDUCT OF PEAK F ORAGE U	RAGE 1.m.) 00000 3419 3912 QPEAK (cms) 2.1 0.7 TION [Qc LOW JSED	OUTFLC   (cms)   0.640   0.930   9.300 ( TPEA ) (hrs 113 2 700 3 pout/Qin](% (min (ha.m.	W ST( )0 (ha )0 ( )0 ( )0 ( )0 ( )0 ( )0 ( )0 ( )0 (	DRAGE a.m.) 0.4866 0.5544 0.6160 R.V. (mm) 76.40 76.34 L 0 007	
(111) PEAK ESERVOIR( 0 N= 2> OUT T= 5.0 min ENFLOW : ID= DUTFLOW: ID= DUTFLOW: ID= DUTFLOW: 0	2 { 0 1 { 0 PEA TIM MAX	OVERFI OUTFLC (cms) 0.000 0.120 0.300 021) 039) K FLOW E SHIFT ( IMUM STO	OW IS OF OW STC O (ha DO 0. DO 0. OO 0. AREA (ha) 10.630 10.630 REDUCT DF PEAK F DRAGE U	F RAGE A.m.) 0000 3419 3912 QPEAK (cms) 2.1 0.7 TION [Qc FLOW JSED	OUTFLC   (cms)   0.640 0.930   9.300 ( TPEA ) (hrs 113 2 700 3 put/Qin](% (min (ha.m.	WW ST( )0 (h )0 ( )0 ( )0 ( ).75 ).00 6)= 33.11 )= 15.00 )= 0.50	DRAGE a.m.) ).4866 ).5544 ).6160 R.V. (mm) 76.40 76.34 L ) 007	
(111) PEAK SERVOIR( 0 V= 2> OUT T= 5.0 min (NFLOW : ID= DUTFLOW: ID= DUTFLOW: ID= DUTFLOW: ID= 00 HYD ( 0) 1 + 2 = 3	2 { 0 1 { 0 PEA TIM MAX	OVERFI OUTFLC (cms) 0.000 0.120 0.300 039) K FLOW E SHIFT ( IMUM STO 	OW IS OF OW STC (ha) (ha) 00 0. 00 0. 00 0. AREA (ha) 10.630 10.630 REDUCT OF PEAK F ORAGE U CARGE U CARG	FF PRAGE (0000 (0000 (000) (00) (000)	OUTFLC   (cms)   0.640   0.930   9.300 ( TPEA ) (hrs 113 2 700 3 pout/Qin](% (min (ha.m. TPEAK (hrs)	W ST( ) (ha )0 ( )0 ()) ()) ()) ()) ()) ()) ()) ()) ()) (	DRAGE a.m.) 0.4866 0.5544 0.6160 R.V. (mm) 76.40 76.34 L 0007	

CALIB NASHYD ( 0030)  D= 1 DT= 5.0 min	Area Ia U.H. Tp	(ha)= (mm)= (hrs)=	5.65 5.00 0.99	Curve Nur # of Line	mber (C ear Res.(	N)= 79.0 N)= 3.00	
NOTE: RAINF	ALL WAS T	RANSFORME	D TO	5.0 MIN.	TIME STE	Р.	
TIM	DATN	TRA	NSFORME	D HYETOG	RAPH	TTME	DATN
hrs	mm/hr	hrs	mm/hr 9 64	hrs	mm/hr 20 88 1	hrs 4 83	mm/hr
0.167	0.00	1.750	9.64	3.333	11.24	4.92	1.61
0.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61
0.500	1.61	2.083 2.167	27.30 27.30	3.667 3.750	11.24 11.24	5.25	1.61
0.667	1.61	2.250	27.30 73.88	3.833	6.42	5.42	1.61
0.833	1.61	2.417	73.88	4.000	6.42	5.58	1.61
1.000	1.61	2.583	73.88	4.167	6.42 6.42	5.75	1.61
1.16/	1.61	2.833	20.88	4.333	3.21	6.00	1.61
1.55	9.64	3.000	20.88	4.583	3.21	6.17	1.61
1.583	9.64	3.167	20.88	4.750	3.21	0.25	1.01
Unit Hyd Qpeak	(cms)=	0.218					
RUNOFF COEFFICIE	(mm)= 8 NT =	0.310 0.494					
RUNOFF COEFFICIE (i) PEAK FLOW DC ALIB STANDHYD ( 0029) = 1 DT= 5.0 min	(MM)= S NT = DES NOT IN Area Total I	0.310 0.494 CLUDE BAS  (ha)= mp(%)= 9	9.43	F ANY.			
RUNOFF COEFFICIE (i) PEAK FLOW DC CALIB STANDHYD ( 0029) D= 1 DT= 5.0 min	(mm)= o NT = DES NOT IN Area Total I	0.310 0.494 CLUDE BAS  (ha)= mp(%)= 9 IMPERVIO	9.43 00.00 JS PE	F ANY. Dir. Con RVIOUS (1	n.(%)= 9 i)	0.00	
RUNOFF COEFFICIE (i) PEAK FLOW DC CALIB STANDHYD ( 0029) D= 1 DT= 5.0 min   Surface Area Dep. Storage Average Slope	(nm)= o NT = PES NOT IN Area Total II (ha)= (mm)= (%)=	0.310 0.494 CLUDE BAS (ha)= mp(%)= 9 IMPERVIOU 8.49 1.00	9.43 90.00 IS PE	F ANY. Dir. Com RVIOUS (* 0.94 1.50 2.00	n.(%)= 9 i)	0.00	
RUNOFF COEFFICIE (i) PEAK FLOW DC CALIB STANDHYD ( 0029) D= 1 DT= 5.0 min   Surface Area Dep. Storage Average Slope Length Mannings n	(nm)= % NT = DES NOT IN Area Total I (ha)= (%)= (%)= (%)=	0.310 0.494 CLUDE BAS 	9.43 90.00 95 PE	EF ANY. Dir. Coni RVIOUS (* 0.94 1.50 2.00 40.00 0.250	n.(%)= 9 i)	0.00	
RUNOFF COEFFICIE (i) PEAK FLOW DC CALIB STANDHYD ( 0029) = 1 DT= 5.0 min   Surface Area Dep. Storage Average Slope Length Mannings n NOTE: RAINF	(hm)= o NT = o DES NOT IN Area Total I (ha)= (m)= (%)= (%)= (%)= (m)= =	0.310 0.494 CLUDE BAS 	9.43 9.00 IS PE	F ANY. Dir. Coni RVIOUS (* 0.94 1.50 2.00 40.00 0.250 5.0 MIN.	n.(%)= 9 i) TIME STE	0.00 P.	
RUNOFF COEFFICIE (i) PEAK FLOW DO CALIB STANDHYD ( 0029) D= 1 DT= 5.0 min   Surface Area Dep. Storage Average Slope Length Mannings n NOTE: RAINE	(hm)= o NT = o PES NOT IN Area Total I (ha)= (m)= (%)= (%)= (%)= (%)= (%)= (%)= (%)=	0.310 0.494 CLUDE BAS 	9.43 9.00 US PE D TO	Dir. Coni RVIOUS (* 0.94 1.50 2.00 40.00 0.250 5.0 MIN.	n.(%)= 9 i) TIME STE RAPH	0.00 P.	раты
RUNOFF COEFFICIE (i) PEAK FLOW DO CALIB STANDHYD ( 0029) D= 1 DT= 5.0 min   Surface Area Dep. Storage Average Slope Length Mannings n NOTE: RAINF TIME hrs 0 083	(mm)= 0 NT = 0 NT = 0 Area Total II (ha)= (mm)= (%)= (m)= = ALL WAS TI RAIN mm/hr ALL WAS TI	0.310 0.494 CLUDE BAS (ha)= mp(%)= 9 IMPERVIOU 8.49 1.00 1.00 250.73 0.013 RANSFORME TRA   TIME   hrs 1 667	9.43 9.43 0.00 IS PE D TO NSFORME RAIN mm/hr 9 64	Dir. Con ERVIOUS ( 0.94 1.50 2.00 40.00 0.250 5.0 MIN. D HYETOGI   TIME   hrs 3.250	n.(%)= 9 i) TIME STE RAPH RAIN mm/br 20 88	0.00 P.   TIME   hrs 4 83	RAIN mm/hr 1 61
RUNOFF COEFFICIE (i) PEAK FLOW DC CALIB STANDHYD ( 0029) D= 1 DT= 5.0 min   Surface Area Dep. Storage Average Slope Length Mannings n NOTE: RAINF TIME hrs 0.08 0.165 0.250	(nm) = 0 NT =	0.310 0.494 CLUDE BAS 	9.43 9.000 IS PE ED TO INSFORME RAIN mm/hr 9.64 9.64 27.30	Dir. Con RVIOUS ( 0.94 1.50 2.00 40.00 0.250 5.0 MIN. D HYETOG   TIME   hrs 3.250 3.333 3.417	n.(%)= 9 i) TIME STE RAPH MM/hr 20.88 11.24 11.24	0.00 P.   TIME   hrs 4.83 4.92 5.00	RAIN mm/hr 1.61 1.61
RUNOFF COEFFICIE (i) PEAK FLOW DO CALIB STANDHYD ( 0029) D= 1 DT= 5.0 min   Surface Area Dep. Storage Average Slope Length Mannings n NOTE: RAINF 0.083 0.167 0.255 0.331 0.417	(nm)= 0 NT = 0 PES NOT IN Area Total I (ha)= (%)= (%)= (m)= = ALL WAS T ALL WAS T RAIN mm/hr 0.00 0.00 1.61	0.310 0.494 CLUDE BAS 	9.43 90.00 IS PE D TO NSFORME RAIN mm/hr 9.64 27.30 27.30 27.30	Dir. Com RVIOUS (* 0.94 1.50 2.00 40.00 0.250 5.0 MIN. D HYETOGI 1 TIME 1 hrs 3.250 3.333 3.417 3.500 3.583	n.(%)= 9 i) TIME STE RAPH RAIN mm/br 11.24 11.24 11.24 11.24 11.24	P. TIME hrs 4.83 4.92 5.00 5.08 5.17	RAIN mm/hr 1.61 1.61 1.61
RUNOFF COEFFICIE (i) PEAK FLOW DO CALIB STANDHYD ( 0029) D= 1 DT= 5.0 min   Surface Area Dep. Storage Average Slope Length Mannings n NOTE: RAINF 0.088 0.165 0.250 0.333 0.417 0.500 0.585	(nm) = 0 NT = 0	0.310 0.494 CLUDE BAS 	9.43 9.000 IS PE 20 TO INSFORME RAIN mm/hr 9.64 9.64 27.30 27.30 27.30 27.30	Dir. Conn RVIOUS ( 0.94 1.50 2.00 40.00 0.250 5.0 MIN. D HYETOG 3.333 3.417 3.500 3.583 3.667 3.750	n.(%)= 9 i) TIME STE RAPH RAIN mm/hr 20.88 11.24 11.24 11.24 11.24 11.24 11.24 11.24	0.00 P. Inrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61
RUNOFF COEFFICIE (i) PEAK FLOW DC CALIB STANDHYD ( 0029) D= 1 DT= 5.0 min Surface Area Dep. Storage Average Slope Length Mannings n NOTE: RAINF 0.083 0.167 0.255 0.333 0.417 0.500 0.585 0.667 0.755	(mm)= o NT = 0 NT = 0 NES NOT IN Area Total I (ha)= (%)= (m)= (%)= (m)= (%)= (m)= (%)= (m)- (m)- (%)= (m)- (m)- (%)= (m)- (	0.310 0.494 CLUDE BAS 	9.43 90.00 IS PE 20 TO NNSFORME RAIN mm/hr 9.64 9.64 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30	Dir. Com RVIOUS (* 0.94 1.50 2.00 40.00 0.250 5.0 MIN. D HYETOGI 1 hrs 3.333 3.417 3.500 3.333 3.417 3.500 3.583 3.667 3.750 3.750 3.750 3.833 3.917	n.(%)= 9 i) TIME STE RAPH RAIN mm/hr 20.88 11.24 11.24 11.24 11.24 11.24 11.24 11.24 11.24 11.24 11.24 11.24	P. TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61
RUNOFF COEFFICIE (i) PEAK FLOW DO CALIB STANDHYD ( 0029) D= 1 DT= 5.0 min   Surface Area Dep. Storage Average Slope Length Mannings n NOTE: RAINE 0.083 0.166 0.250 0.333 0.411 0.588 0.668 0.750 0.750 0.833 0.611 0.750	(mm) = 0 (NT = 0 (N	0.310 0.494 CLUDE BAS 	9.43 9.000 9.43 00.00 9.5 PE 20 TO 10 10 10 10 10 10 10 10 10 10 10 10 10	EF ANY. Dir. Conn RVIOUS ( 0.94 1.50 2.00 40.00 0.250 5.0 MIN. D HYETOGI 1 TIME 1 TIME 1 TIME 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.127	n.(%)= 9 i) TIME STE RAPH RAIN mm/hr 20.88 11.24 11.24 11.24 11.24 11.24 11.24 11.24 11.24 11.24 11.24 6.42 6.42 6.42 6.42 6.42	P. TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.58 5.58 5.58 5.67 5.72	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
RUNOFF COEFFICIE (i) PEAK FLOW DO CALIB STANDHYD ( 0029) D= 1 DT= 5.0 min Surface Area Dep. Storage Average Slope Length Mannings n NOTE: RAINF NOTE: RAINF D.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167	(mm)= 0 NT = 0 NT = 0 NT = 0 NT = 0 NES NOT IN (ha)= (mm)= (%)= (%)= (%)=	0.310 0.494 CLUDE BAS 	9.43 9.43 90.00 IS PE 20 TO NNSFORME RAIN mm/hr 9.64 9.64 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.38 873.88 73.88 73.88 73.88	Dir. Com RVIOUS ( 0.94 1.50 2.00 40.00 0.250 5.0 MIN. D HYETOGG 3.333 3.417 3.500 3.583 3.417 3.500 3.583 3.417 3.500 3.583 3.417 3.500 3.583 3.417 4.000 3.833 3.917 4.000 4.083 4.167 4.250	n.(%)= 9 i) TIME STE RAPH RAIN mm/hr 20.88 11.24 12.23	P. TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.58 5.58 5.58 5.75 5.83 5.92	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
RUNOFF COEFFICIE (i) PEAK FLOW DO CALIB STANDHYD ( 0029) D= 1 DT= 5.0 min   Surface Area Dep. Storage Average Slope Length Mannings n NOTE: RAINF Mannings n NOTE: RAINF 0.083 0.167 0.255 0.333 0.417 0.500 0.583 0.667 0.755 0.683 0.667 0.755 0.683 0.667 0.755 0.683 0.617 0.583 0.667 0.755	(mm) = 0 NT = 0 NT = 0 NT = 0 NES NOT IN Area Total II (ha)= (mm)= (%)= (%)= (%	0.310 0.494 CLUDE BAS 	9.43 9.43 0.00 IS PE D TO WSFORME RAIN mm/hc4 9.64 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.38 73.88 73.88 73.88 73.88 73.88 73.88 73.88 73.88 73.88 73.88 73.88 73.88 73.88 73.88 73.88 73.88	EF ANY. Dir. Coni RVIOUS ( 0.94 1.50 2.00 40.00 0.250 5.0 MIN. D HYETOGI 3.333 3.417 3.500 3.583 3.417 3.500 3.583 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500	n.(%)= 9 i) TIME STE RAPH RAIN mm./br 11.24 12.21 2.21	P. TIME hrs 4.83 4.92 5.08 5.17 5.25 5.33 5.42 5.58 5.67 5.75 5.83 5.92 6.00 6.08	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
RUNOFF COEFFICIE (i) PEAK FLOW DO CALIB STANDHYD ( 0029) D= 1 DT= 5.0 min Surface Area Dep. Storage Average Slope Length Mannings n NOTE: RAINF NOTE: RAINF D.250 0.333 0.417 0.500 0.588 0.667 0.755 0.333 0.417 0.500 0.588 0.667 0.755 0.833 0.917 1.000 1.088 1.167 1.255	(mm)= o NT = NT = NT = NES NOT IN Area Total II (ha)= (mm)= (%)= (%)= (	0.310 0.494 CLUDE BAS 	9.43 9.43 10.00 IS PE 20 TO NNSFORME RAIN mm/hr 9.64 9.64 27.30 20.88 20.89 20.88 20.88 20.88 20	Dir. Com RVIOUS ( 0.94 1.50 2.00 40.00 0.250 5.0 MIN. D HYETOGI ' TIME ' hrs 3.250 5.0 MIN. D HYETOGI 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.417 4.500 4.583 4.467 4.550 4.550 4.550 4.550 4.550 4.550 4.550 4.550 4.550 4.550 4.550 4.550 4.550 4.550 5.50	n.(%)= 9 i) TIME STE RAPH RAIN mm/hr 20.88 11.24	P. TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.58 5.58 5.58 5.58 5.58 5.58 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
RUNOFF COEFFICIE (i) PEAK FLOW DO ANDHYD ( 0029) 1 DT= 5.0 min DT= 5.0 min DT= 5.0 min Surface Area Dep. Storage Average Slope Length Mannings n NOTE: RAINF 0.083 0.165 0.250 0.333 0.417 0.500 0.588 0.665 0.750 0.833 0.417 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.585 Max.Eff.Inten.(n	(mm) = 0 (NT = 0 PES NOT IN Area Total I (ha) = (mm) = (%)	0.310 0.494 CLUDE BAS 	9.43 9.000 IS PE ED TO INSFORME RAIN mm/hr 9.64 9.64 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.38 87 3.88 73.88	F ANY. Dir. Cont RVIOUS ( 0.94 1.50 2.00 40.00 0.250 5.0 MIN. D HYETOGG 3.333 3.417 3.500 3.583 3.417 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 1.4.583 4.417 4.583 4.667 4.750 57.08	n.(%)= 9 i) TIME STE RAPH RAIN mm/hr 20.88 11.24 11.21 13.21 13.21 13.21	0.00 P. 1 TIME 1 hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.57 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6

over Storage Coeff. Unit Hyd. Tpeak	(min) (min)= (min)=	5.00 5.01 (ii) 5.00	10.00 8.31 (ii) 10.00	
Unit Hyd. peak	(cms)=	0.21	0.13	
and the second	10 I.			*TOTALS*
PEAK FLOW	(cms)=	1.74	0.14	1.876 (iii)
TIME TO PEAK	(hrs)=	2.75	2.75	2.75
RUNOFF VOLUME	(mm)=	79.31	50.24	76.40
TOTAL RAINFALL	(mm)=	80.31	80.31	80.31
RUNOFF COEFFICIE	ENT =	0.99	0.63	0.95

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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CALIB   STANDHYD ( 0031)   ID= 1 DT= 5.0 min	Area Total	(ha)= 3 Imp(%)= 9	9.77 0.00	Dir. Conn.(%)=	90.00
Surface Area Dep. Storage Average Slope Length Mappings p	(ha)= (mm)= (%)= (m)=	IMPERVIOU 35.79 1.00 1.00 514.91 0.013	s	PERVIOUS (i) 3.98 1.50 2.00 40.00 0.250	

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

		TR/	NSFORME	D HYETOGR	APH	-0	
TIM	E RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hr	s mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.08	3 0.00	1.667	9.64	3.250	20.88	4.83	1.61
0.16	7 0.00	1.750	9.64	3.333	11.24	4.92	1.61
0.25	0 0.00	1.833	27.30	3.417	11.24	5.00	1.61
0.33	3 1.61	1.917	27.30	3.500	11.24	5.08	1.61
0.41	7 1.61	2.000	27.30	3.583	11.24	5.17	1.61
0.50	0 1.61	2.083	27.30	3.667	11.24	5.25	1.61
0.58	3 1.61	2.167	27.30	3.750	11.24	5.33	1.61
0.66	7 1.61	2.250	27.30	3.833	6.42	5.42	1.61
0.75	0 1.61	2.333	73.88	3.917	6.42	5.50	1.61
0.83	3 1.61	2.417	73.88	4.000	6.42	5.58	1.61
0.91	/ 1.61	2.500	/3.88	4.083	6.42	5.6/	1.61
1.00	0 1.61	2.583	73.88	4.167	6.42	5.75	1.61
1.08	3 1.61	2.667	73.88	4.250	6.42	5.83	1.61
1.16	/ 1.61	2.750	/3.88	4.333	3.21	5.92	1.61
1.25	0 1.61	2.833	20.88	4.41/	3.21	6.00	1.61
1.33	3 9.64	2.91/	20.88	4.500	3.21	6.08	1.61
1.41	/ 9.64	3.000	20.88	4.565	3.21	0.1/	1.01
1.50	0 9.64	3.083	20.88	4.66/	3.21	6.25	1.61
1.58	3 9.64	3.16/	20.88	4.750	3.21		
Max Eff Inten (	mm/hr)=	73 88		57 08			
over	(min)	10.00		15.00			
Storage Coeff.	(min)=	7.71	(ii)	11.02 (ii)	)		
Unit Hvd. Tneak	(min)=	10.00	()	15.00			
Unit Hvd. peak	(cms)=	0.13		0.09			
					*TOT	ALS*	
PEAK FLOW	(cms)=	7.20		0.52	7.	716 (iii)	)
TIME TO PEAK	(hrs)=	2.75		2.83	2	.75	
RUNOFF VOLUME	(mm)=	79.31		50.24	76	5.40	
TOTAL RAINFALL	(mm)=	80.31		80.31	80	0.31	
RUNOFF COEFFICI	ENT =	0.99		0.63	C	.95	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 85.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR( 0061)	OVERFLOW	IS OFF			
IN= 2> OUT= 1   DT= 5.0 min   	OUTFLOW (cms) 0.0000	STORAGE (ha.m.) 0.0000	OUTFLOW (cms) 7.1600	STORAGE (ha.m.) 0.3940	

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INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0031) 0061)	AREA (ha) 39.770 39.770	OPEAK (cms) 7.7 7.0	TPEA (hrs) 16 2 53 2	K ) .75 .83	R.V. (mm) 76.40 76.40	
РЕ ТІ МА	AK FLOW MESHIFTO XIMUMSTO	REDUCTJ F PEAK FL RAGE US	EON [Qoi LOW SED	ut/Qin](% (min (ha.m.)	)= 91.4 )= 5.0 )= 0.3	0 0 923	
CALIB STANDHYD ( 0051) ID= 1 DT= 5.0 min	Area Total Im	(ha)= 11 p(%)= 90	L.41 ).00 I	Dir. Conn	. (%)=	90.00	
Surface Area Dep. Storage Average Slope Length Mannings n	I (ha)= (mm)= (%)= (m)= =	MPERVIOUS 10.27 1.00 1.00 275.80 0.013	5 PEI	RVIOUS (i) 1.14 5.00 2.00 40.00 0.250	)		
NOTE: RAINF	ALL WAS TR	ANSFORMED	ото	5.0 MIN.	TIME ST	EP.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.667 0.750 0.833 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583 Max.Eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak PEAK FLOW TIME TO PEAK	RAIN   mm/hr 0.00 0.00 1.61 1.6	TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167 73.88 5.00 5.300 5.300 0.21 2.10 2.75 2.75	NSFORMEL RAIN mm/hr 9.64 9.64 27.30 27.30 27.30 27.30 27.30 73.88 73.88 73.88 73.88 73.88 73.88 20.88 20.88 20.88 20.88 20.88	D HYETOGR. - TIME - hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.917 4.000 4.083 4.167 4.250 4.250 4.250 4.333 4.417 4.583 4.667 4.750 52.93 10.00 0.12 0.15 2.75	APH RAIN mm/hr 20.88 11.24 1.21 3.21 3.21 3.21	-   TIME   hrs   4.83   4.92   5.00   5.08   5.17   5.25   5.33   5.42   5.50   5.58   5.58   5.58   5.58   5.75   5.83   5.92   6.00   6.08   6.17   6.25   TALS* .253 (iii) 2.75	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	(mm)= (mm)= NT =	79.31 80.31 0.99	4	44.54 80.31 0.55	7	5.83 0.31 0.94	
<ul> <li>(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 83.0 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.</li> </ul>							
RESERVOIR( 0053)    IN= 2> OUT= 1     DT= 5.0 min	OVERFL OUTFLO (cms) 0.000	OW IS OFF W STOF (ha. 0 0.0	RAGE .m.) 0000	0UTFL00 (cms) 1.4100	W ST (h	ORAGE a.m.) 0.4103	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0051) 0053)	AREA (ha) 11.410 11.410	QPEAK (cms) 2.2 1.1	TPEA (hrs) 53 2 99 2	K ) .75 .83	R.V. (mm) 75.83 75.83	
TI	ME SHIFT O	F PEAK FL	LOW	(min)	= 5.0	0	

MAXIMUM STORAGE USED (ha.m.)= 0.3508

STAI	IB NDHYD ( 00 L DT= 5.0 m	)52) nin	Area Total 1	(ha)= [mp(%)=	25.67 90.00	Dir. Conr	n.(%)= 9	90.00	
63			(1-)	IMPERVIO	US PI	ERVIOUS (	i)		
i i	Surface Are	ea	(ha)= (mm)=	23.10		2.5/			
7	Average Slo	ope	(%)=	1.00		2.00			
	Length		(m)=	413.68		40.00			
	Mannings n		=	0.013		0.250			
	NOTE:	RAINF	ALL WAS 1	RANSFORM	ED TO	5.0 MIN.	TIME STE	EP.	
		TIME	RAIN	TR	ANSFORM RAIN	ED HYETOGE	RAPH RAIN	-   TIME	RAIN
		hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
		0.083	0.00	1.66/	9.64	3.333	20.88	4.83	1.61
		0.250	0.00	1.833	27.30	3.417	11.24	5.00	1.61
		0.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61
		0.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61
		0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61
		0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61
		0.750	1.61	2.333	73.88	3.917	6.42	5.50	1.61
		0.035	1.61	2.41/	73 88	4.000	6 42	5.67	1.61
		1.000	1.61	2.583	73.88	4.167	6.42	5.75	1.61
		1.083	1.61	2.667	73.88	4.250	6.42	5.83	1.61
		1.167	1.61	2.750	73.88	4.333	3.21	5.92	1.61
		1.333	9.64	2.033	20.88	4.500	3.21	6.08	1.61
		1.417	9.64	3.000	20.88	4.583	3.21	6.17	1.61
		1.500	9.64	3.083	20.88	4.667	3.21	6.25	1.61
		1.583	9.64	3.16/	20.88	4./50	3.21		
1	Max.Eff.Int	ten.(mr	n/hr)=	73.88		57.08			
	Storage Cos	over	(min)-	5.00	(iii)	15.00	i)		
i	Jnit Hvd. 1	Tpeak	(min)=	5.00	(11)	15.00	.,		
1	Unit Hyd. p	beak	(cms)=	0.18		0.10			
			(cms)-	4 71		0.34	*T01	ALS*	`
	TTME TO PEA	AK	(hrs)=	2.75		2.75	5.	2.75	,
E.	RUNOFF VOLU	JME	(mm)=	79.31		50.24	76	5.40	
	TOTAL RAIN	FALL	(mm)=	80.31		80.31	80	0.31	
1	KUNUFF COEF	FICIE		0.99		0.63		1.95	
	(i) CN PE				FRVTOUS	LOSSES			
	CN*	= 8	5.0 Ia	a = Dep.	Storage	(Above)			
	(ii) TIME	STEP	(DT) SHOU	JLD BE SM	ALLER O	REQUAL			
	THAN	THE ST	TORAGE CO	DEFFICIEN	T.	TE ANY			
	(III) PEAK	FLOW L	JUES NUT	INCLUDE	DASEFLO	WIF ANY.			
RESI	ERVOIR( 00	54)	OVER	LOW IS 0	FF				
DT=	5.0 min		OUTEI	OW ST	ORAGE	OUTFLO	DW STO	ORAGE	
			(cms	s) (h	a.m.)	(cms)	) (ha	a.m.)	
			0.00	000 0	.0000	4.62	10 0	0.3130	
				AREA	OPEA		AK	R.V.	
				(ha)	(cms)	) (hrs	5)	(mm)	
IN	FLOW : ID=	2 ( (	0052)	25.670	5.0	047 2	2.75	76.40	
00	TFLOW: ID=	1 ( (	0054)	25.670	4.4	499 2	2.75	76.40	
		PE	AK FLOW	REDUC	TION TO	out/0in1(9	6)= 89.14	1	
		TI	E SHIFT	OF PEAK	FLOW	(mir	n)= 0.00	b .	
		MAX	KIMUM ST	TORAGE	USED	(ha.m.	.)= 0.31	L30	
ADD 1	HYD ( 00	032)					D V		
ADD 1	HYD ( 00 + 2 = 3	)32)	ł	AREA Q	PEAK cms)	TPEAK (hrs)	R.V. (mm)		
ADD 1	HYD ( 00 + 2 = 3 ID1= 1 (	032)    ( 0022	2): 804	AREA Q (ha) ( 4.17 32.	PEAK cms) 747	TPEAK (hrs) 3.75 6	R.V. (mm) 56.87		
D 1	HYD ( 00 + 2 = 3 ID1= 1 ( + ID2= 2 (	032)     ( 0022 ( 0029	2): 804 9): 9	AREA Q (ha) ( 4.17 32. 9.43 1.	PEAK cms) 747 876	TPEAK (hrs) 3.75 ( 2.75 7	R.V. (mm) 56.87 76.40		

NOTE: PEAK FLOWS DO	NOT INCL	UDE BASEFL	OWS IF AM	NY.	
ADD HYD ( 0032) 3 + 2 = 1 ID1= 3 ( 0032): + ID2= 2 ( 0030):	AREA (ha) 813.60 5.65	QPEAK (cms) 33.038 0.246	TPEAK (hrs) 3.75 3.75	R.V. (nm) 66.98 39.71	
ID = 1 ( 0032):	819.25	33.284	3.75	66.79	
NOTE: PEAK FLOWS DO	NOT INCL	UDE BASEFL	OWS IF AM	WY.	
ADD HYD ( 0032) 1 + 2 = 3 ID1= 1 ( 0032): + ID2= 2 ( 0053):	AREA (ha) 819.25 11.41	OPEAK (cms) 33.284 1.199	TPEAK (hrs) 3.75 2.83	R.V. (mm) 66.79 75.83	
ID = 3 (0032):	830.66	34.065	3.67	66.92	
NOTE: PEAK FLOWS DO	NOT INCL	UDE BASEFL	OWS IF AM	WY.	
$\begin{vmatrix} ADD HYD ( 0032) \\ 3 + 2 = 1 \end{vmatrix}$	AREA	QPEAK	TPEAK	R.V.	
ID1= 3 ( 0032):	(na) 830.66	34.065	(nrs) 3.67	(mm) 66.92	
+ ID2= 2 ( 0054):	25.67	4.499	2.75	76.40	
ID = 1 (0032):	856.33	35.101	3.67	67.20	
NOTE: PEAK FLOWS DO	NOT INCL	UDE BASEFL	OWS IF AN	NΥ.	
ADD HYD ( 0032) 1 + 2 = 3 ID1= 1 ( 0032): + ID2= 2 ( 0061):	AREA (ha) 856.33 39.77	QPEAK (cms) 35.101 7.053	TPEAK (hrs) 3.67 2.83	R.V. (mm) 67.20 76.40	
ID = 3 ( 0032):	896.10	36.772	3.58	67.61	
NOTE: PEAK FLOWS DO	NOT INCL	UDE BASEFL	OWS IF AM	WY.	
CALIB   STANDHYD ( 0068)  Are  ID= 1 DT= 5.0 min   Tot	a (ha al Imp(%	)= 6.00 )= 90.00	Dir. Co	onn.(%)=	90.00
Surface Area (ha) Dep. Storage (mm) Average Slope (%) Length (m) Mannings n	IMPE = = = 20 = 0	RVIOUS 5.40 1.00 1.00 0.00 0.013	PERVIOUS 0.60 1.50 2.00 40.00 0.250	(i)	
NOTE: RAINFALL W	AS TRANS	FORMED TO	5.0 MIN	N. TIME ST	EP.

TRANSFORMED HYETOGRAPH									
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN		
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr		
0.083	0.00	1.667	9.64	3.250	20.88	4.83	1.61		
0.167	0.00	1.750	9.64	3.333	11.24	4.92	1.61		
0.250	0.00	1.833	27.30	3.417	11.24	5.00	1.61		
0.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61		
0.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61		
0.500	1.61	2.083	27.30	3.667	11.24	5.25	1.61		
0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61		
0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61		
0.750	1.61	2.333	73.88	3.917	6.42	5.50	1.61		
0.833	1.61	2.417	73.88	4.000	6.42	5.58	1.61		
0.917	1.61	2.500	73.88	4.083	6.42	5.67	1.61		
1.000	1.61	2.583	73.88	4.167	6.42	5.75	1.61		
1.083	1.61	2.667	73.88	4.250	6.42	5.83	1.61		
1.167	1.61	2.750	73.88	4.333	3.21	5.92	1.61		

1.250 1.333 1.417 1.500 1.583	1.61   2.83 9.64   2.91 9.64   3.000 9.64   3.08 9.64   3.16	3         20.88           7         20.88           0         20.88           3         20.88           4         20.88           5         20.88           6         20.88           7         20.88	4.417 4.500 4.583 4.667 4.750	3.21       6.00         3.21       6.08         3.21       6.17         3.21       6.25         3.21       6.25	1.61 1.61 1.61 1.61
Max.Eff.Inten.(mm/ over (m Storage Coeff. (m Unit Hyd. Tpeak (m Unit Hyd. peak (c	hr)= 73.8 in) 5.0 in)= 4.1 in)= 5.0 ms)= 0.2	88 5 00 1 37 (ii) 1 00 1 23	57.08 10.00 7.68 (ii) 10.00 0.13	*T0TAI S*	
PEAK FLOW (c TIME TO PEAK (h RUNOFF VOLUME TOTAL RAINFALL ( RUNOFF COEFFICIENT	ms)= 1.: rs)= 2.: mm)= 79. mm)= 80.: = 0.9	11 75 31 5 31 8 99	0.09 2.75 50.24 80.31 0.63	1.196 (iii 2.75 76.40 80.31 0.95	)
***** WARNING: STORAGE (i) CN PROCEDURE CN* = 85. (ii) TIME STEP (D THAN THE STO (iii) PEAK FLOW DO	COEFF. IS SMAN SELECTED FOR 0 Ia = Dep T) SHOULD BE 3 RAGE COEFFICIN ES NOT INCLUDE	LLER THAN T PERVIOUS L Storage SMALLER OR ENT. E BASEFLOW	IME STEP! OSSES: (Above) EQUAL IF ANY.		
ADD HYD ( 0066) 1 + 2 = 3 ID1= 1 ( 0032) + ID2= 2 ( 0068) ID = 3 ( 0066)	AREA (ha) : 896.10 30 : 6.00 2	QPEAK T (cms) ( 6.772 3 1.196 2	PEAK F (hrs) 6 2.58 67 2.75 76 3.58 67	R.V. (mm) .61 .40	
NOTE: PEAK FLOWS   ROUTE CHN( 2875)    IN= 2> OUT= 1	DO NOT INCLUD	E BASEFLOWS e step (min	5 IF ANY.		
< Distance 0.00 3.24 51.26 66.07 87.42 132.09 165.30 213.87 259.32 266.86 276.16 304.50 307.31 311.09 329.41 371.71 378.80 411.13 461.76	DATA FOR SECT Elevati 204.6 204.6 203.9 203.1 203.3 202.4 200.2 199.4 197.7 196.9 197.1 198.4 198.0 200.2 200.3 199.5 202.4	ION (       1.1         pn       Ma         S       0.         Max       0.         S       0.         S	1)> anning 0600 0450	Main Channel Main Channel	
C	IRAVEL VOLUME (cu.m.) .601E+04 .166E+05 .286E+05 .419E+05 .611E+05 .849E+05 .111E+06 .132E+06 .272E+06 .272E+06 .336E+06 .403E+06 .549E+06	I IME FABLE FLOW RATE (cms) 3.8 19.1 44.3 72.2 105.3 171.0 252.0 348.9 416.9 514.0 649.5 888.1 1163.0 1473.8 1820.8	VELOCIT (m/s) 0.64 1.14 1.54 1.72 1.72 2.01 2.26 2.50 0.2.41 2.36 2.38 2.63 2.87 3.09 3.30	<pre>Y TRAV.TIME (min) 26.05 14.50 10.76 9.67 9.67 8.27 7.34 6.65 6.89 7.02 6.98 6.31 5.78 5.37 5.03</pre>	

4.92	201.85	.627E+06	2198.2	3.49	4.76	
5.23	202.16	.710E+06	2610.1	3.66	4.53	
5.54	202.47	.796E+06	3061.7	3.83	4.34	
5.87	202.80	.901E+06	3585.6	3.96	4.19	
INFLOW : OUTFLOW:	ID= 2 { ID= 1 {	AREA (ha) 0066) 902.10 2875) 902.10	< hy QPEAK (cms) 36.96 36.53	drograph> TPEAK R.V. (hrs) (mm) 3.58 67.67 3.75 67.67	<-pipe / 0 MAX DEPTH (m) 0.83 0.83	channel-> MAX VEL (m/s) 1.40 1.39



## VMC - 100yr- 6hr Storm- Proposed Condition

Figure 6. VMC - 100yr- 6hr Storm- Proposed Condition.

SSSSS U SS U А А А ААААА v v UU (v 6.2.2013) IIIII L v ٧ SS Ũ Ū Ē v v SS Ū Ū A AA vv SSSSS ບັບບບບັ 000 ππ ππ H H H YYY M M MM MM 000 TM 0 0 0 ŏ т т ő Y Y M M M M 0 T н н т 0 000 т н н 000 Developed and Distributed by Smart City Water Inc Copyright 2007 - 2022 Smart City Water Inc All rights reserved. \*\*\*\*\* DETAILED OUTPUT \*\*\*\*\* Input filename: D:\Program Files (x86)\Visual OTTHYMO 6.2\V02\voin.dat
Output filename: C:\Users\rhe\AppData\Local\Civica\VH5\562b9aa2-0cdc-4391-a1f5-d8b11ec718d4\c67ebbb9-9662-4
Summary filename: C:\Users\rhe\AppData\Local\Civica\VH5\562b9aa2-0cdc-4391-a1f5-d8b11ec718d4\c67ebbb9-9662-4 DATE: 06/18/2024 TIME: 08:23:33 USER: COMMENTS: \_\_\_\_\_ \*\* SIMULATION : 100yr READ STORM Filename: C:\Users\rhe\AppData\ Local\Temp\ 51a56c8c-3579-4d4b-b5ff-1a77600eda50\6808d89b Ptotal= 80.31 mm Comments: 100 Year 6 Hour AES (Bloor, TRCA) RAIN mm/hr RAIN mm/hr TIME TIME TIME RAIN TIME RAIN hrs hrs mm/hr | 11.24 | hrs mm/hr hrs 0.00 0.00 1.75 27.30 3.50 5.25 1.61 0.25 1.61 2.00 27.30 73.88 3.75 6.42 5.50 1.61 0.75 1.61 2.50 73.88 4.25 3.21 6.00 1.61 2.75 1.00 1.61 9.64 20.88 4.50 4.75 3.21 1.61 20.88 1.50 9.64 3.25 11.24 5.00 1.61 \_\_\_\_\_ CAL TR (ha)= 11.16 (mm)= 5.00 (hrs)= 0.70 NASHYD ( 0025) ID= 1 DT= 5.0 min 0025) Area (ha)= Ia (mm)= U.H. Tp(hrs)= Curve Number (CN)= 79.0 # of Linear Res.(N)= 3.00 NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP. --- TRANSFORMED HYETOGRAPH ----RAIN mm/hr TIME RAIN TIME RAIN TIME TIME RAIN hrs 0.083 mm/hr 0.00 hrs 1.667 mm/hr 9.64 hrs hrs mm/hr 4.83 3.250 20.88 1.61 0.00 0.00 1.61 0.167 0.250 0.333 1.750 1.833 1.917 3.333 3.417 11.24 9.64 4.92 1.61 27.30 27.30 5.00 1.61 3.500 11.24 1.61 0.417 1.61 2.000 27.30 27.30 27.30 3.583 3.667 11.24 5.17 1.61 1.61 0.583 1.61 2.167 3.750 11.24 5.33 1.61 0.667 1.61 2.250 2.333 27.30 73.88 3.833 3.917 6.42 5.42 1.61 0.833 1.61 2.417 2.500 73.88 6.42 5.58 4.000 1.61 4.083 1.61 1.000 1.61 2.583 73.88 4.167 6.42 5.75 1.61 1.083 1.61 2.667 73.88 4.250 4.333 6.42 3.21 5.83 1.61 1.167 1.61

1.250 1.33 1.41 1.500 1.58	0 1.61 3 9.64 7 9.64 0 9.64 3 9.64	2.833 2.917 3.000 3.083 3.167	20.88 20.88 20.88 20.88 20.88 20.88	4.417 4.500 4.583 4.667 4.750	3.21 3.21 3.21 3.21 3.21 3.21	6.00 6.08 6.17 6.25	1.61 1.61 1.61 1.61
Hyd Qpeak	(cms)=	0.609					

PEAK FLOW	(cms)=	0.610	(i)
TIME TO PEAK	(hrs)=	3.417	
RUNOFF VOLUME	(mm)=	39.708	
TOTAL RAINFALL	(mm)=	80.310	
RUNOFF COEFFICI	ENT =	0.494	

Unit

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

CALIB   NASHYD ( 0164)   ID= 1 DT= 5.0 min	Area (ha)= Ia (mm)= U.H. Tp(hrs)=	1.00 5.00 0.85	Curve Number (CN)= 79.0 # of Linear Res.(N)= 3.00
	0.n. ip(nrs)=	0.05	

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

	TRANSFORMED HYETOGRAPH								
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN		
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr		
0.083	0.00	1.667	9.64	3.250	20.88	4.83	1.61		
0.167	0.00	1.750	9.64	3.333	11.24	4.92	1.61		
0.250	0.00	1.833	27.30	3.417	11.24	5.00	1.61		
0.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61		
0.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61		
0.500	1.61	2.083	27.30	3.667	11.24	5.25	1.61		
0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61		
0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61		
0.750	1.61	2.333	73.88	3.917	6.42	5.50	1.61		
0.833	1.61	2.417	73.88	4.000	6.42	5.58	1.61		
0.917	1.61	2.500	73.88	4.083	6.42	5.67	1.61		
1.000	1.61	2.583	73.88	4.167	6.42	5.75	1.61		
1.083	1.61	2.667	73.88	4.250	6.42	5.83	1.61		
1.167	1.61	2.750	73.88	4.333	3.21	5.92	1.61		
1.250	1.61	2.833	20.88	4.417	3.21	6.00	1.61		
1.333	9.64	2.917	20.88	4.500	3.21	6.08	1.61		
1.417	9.64	3.000	20.88	4.583	3.21	6.17	1.61		
1.500	9.64	3.083	20.88	4.667	3.21	6.25	1.61		
1.583	9.64	3.167	20.88	4.750	3.21				

Unit Hyd Qpeak (cms)= 0.045

PEAK FLOW	(cms)=	0.048	(i)
TIME TO PEAK	(hrs)=	3.583	
RUNOFF VOLUME	(mm)=	39.707	
TOTAL RAINFALL	(mm)=	80.310	
RUNOFF COEFFICI	ENT =	0.494	

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

CALIB   STANDHYD ( 0163)   ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	8.73 61.00	Dir.	Conn . (%)=	61.00
		IMPERVI	OUS	PERVIO	US (i)	
Surface Area	(ha)=	5.3	3	3.4	0	
Dep. Storage	(mm)=	1.0	0	5.0	0	
Avenage Clone	10/1-	1 0	0	1 0	0	

\_\_\_\_\_

bep: beorage	(mm)	2.00	5.00	
Average Slope	(%)=	1.00	1.00	
Length	(m)=	241.25	40.00	
Mannings n	=	0.013	0.250	

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

## TRANSFORMED HYETOGRAPH TIME RAIN ' TIME RAIN hrs mm/hr ' hrs mm/hr 1.667 9.64 3.250 20.88 1.750 9.64 3.333 11.24 1.833 27.30 3.417 11.24 1.917 27.30 3.583 11.24 2.000 27.30 3.583 11.24 2.083 27.30 3.667 11.24 APH ----RAIN | mm/hr | 20.88 | 11.24 | 11.24 | 11.24 | 11.24 | 11.24 | 11.24 | TIME RAIN TIME RAIN RAIN mm/hr 0.00 0.00 1.61 1.61 1.61 hrs 0.083 hrs 1.667 hrs 4.83 mm/hr 1.61 1.750 1.833 1.917 2.000 2.083 4.85 4.92 5.00 5.08 5.17 5.25 1.61 1.61 1.61 1.61 1.61 1.61 0.167 0.333 0.417 0.500

2.167 2.250 2.333 0.583 1.61 27.30 27.30 3.750 11.24 6.42 5.33 1.61 73.88 3.917 4.000 6.42 0.750 1.61 5.50 1.61 1.61 5.58 0.833 2.417 1.61 0.917 1.61 2.500 73.88 4.083 6.42 5.67 1.61 1.61 2.583 2.667 73.88 4.167 4.250 6.42 5.75 1.000 1.61 1.083 1.61 1.167 1.61 2.750 73.88 4.333 3.21 5.92 1.61 4.417 4.500 4.583 1.250 1.333 1.61 9.64 2.833 2.917 20.88 20.88 3.21 3.21 6.00 1.61 1.417 9.64 3.000 20.88 3.21 6.17 1.61 1.500 1.583 9.64 3.083 9.64 3.167 20.88 4.667 20.88 4.750 3.21 3.21 6.25 1.61 Max.Eff.Inten.(mm/hr)= 73.88 51.42 over (min) Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)= 5.00 4.89 (ii) 5.00 20.00 16.23 (ii) 20.00 0.22 0.06 \*TOTALS\* PEAK FLOW (cms)= TIME TO PEAK (hrs)= RUNOFF VOLUME (mm)= TOTAL RAINFALL (mm)= RUNOFF COEFFICIENT = 1.09 0.35 1.409 (iii) 2.75 79.31 2.92 44.54 2.75 80.31 80.31 80.31 0.99 0.55 0.82 \*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 83.0 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( 0168)| IN= 2---> OUT= 1 | DT= 5.0 min | OVERFLOW IS OFF STORAGE | OUTFLOW (ha.m.) | (cms) 0.0000 | 1.5700 OUTFLOW STORAGE (cms) 0.0000 (ha.m.) 0.1040 QPEAK TPEAK AREA R.V. (ha) 8.730 8.730 (cms) (hrs) 1.409 2.75 1.217 2.75 (mm) INFLOW : ID= 2 ( 0163) OUTFLOW: ID= 1 ( 0168) 65.75 PEAKFLOWREDUCTION[Qout/Qin](%)=86.36TIMESHIFT OFPEAKFLOW(min)=0.00MAXIMUMSTORAGEUSED(ha.m.)=0.0835 \_\_\_\_\_ \_\_\_\_\_ CALIB CAL15 STANDHYD ( 0165) ID= 1 DT= 5.0 min | Area (ha)= 1.11 Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00 IMPERVIOUS PERVIOUS (i) 1.00 1.00 1.00 86.02 (na)= (mm)= (%)= (m)= Surface Area (ha)= 0.11 Dep. Storage Average Slope 5.00 Length 40.00 Mannings n = 0.013 0.250 NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP. ---- TRANSFORMED HYETOGRAPH ----TIME RAIN ' TIME RAIN hrs mm/hr ' hrs mm/hr 1.667 9.64 3.250 20.88 1.750 9.64 3.333 11.24 1.833 27.30 3.417 11.24 1.917 27.30 3.500 11.24 RAIN mm/hr 20.88 | 11.24 | 11.24 | | TIME TIME RAIN TIME RAIN hrs mm/hr 0.00 hrs mm/hr 4.83 0.083 1.61 0.00 0.00 1.61 0.167 4.92 1.61 0.250 0.333 1.61 5.00 27.30 27.30 27.30 27.30 27.30 73.88 0.417 2.000 3.583 3.667 11.24 5.17 1.61 1.61 1.61 1.61 2.167 2.250 2.333 0.583 1.61 3.750 11.24 5.33 1.61 0.667 1.61 3.833 3.917 6.42 5.42 1.61 1.61 2.417 2.500 2.583 0.833 0.917 1.61 73.88 4.000 4.083 6.42 5.58

1.000

1.083

1.61

1.61 2.667 1.61 2.750

73.88

4.167

73.88 4.250 73.88 4.333

6.42

6.42 3.21

5.75

5.83

1.61 1.61

1.61

1.61

1.250 1.333 1.417 1.500 1.583	L.61   2.833 0.64   2.917 0.64   3.000 0.64   3.083 0.64   3.167	20.88 20.88 20.88 20.88 20.88 20.88	4.417 4.500 4.583 4.667 4.750	3.21 3.21 3.21 3.21 3.21 3.21	6.00 6.08 6.17 6.25	1.61 1.61 1.61 1.61
Max.Eff.Inten.(mm/hr; over (min Storage Coeff. (min Unit Hyd. Tpeak (min Unit Hyd. peak (cms)	)= 73.88 5.00 )= 2.63 )= 5.00 )= 0.29	(ii)	52.93 10.00 5.94 (ii) 10.00 0.15	*1014	15*	
PEAK FLOW (cms) TIME TO PEAK (hrs) RUNOFF VOLUME (mm) TOTAL RAINFALL (mm) RUNOFF COEFFICIENT	)= 0.21 )= 2.75 )= 79.31 )= 80.31 = 0.99	L 4	0.02 2.75 44.54 80.31 0.55	0.2 2. 75. 80. 0.	20 (iii) 75 83 31 94	
***** WARNING: STORAGE COU (i) CN PROCEDURE SI CN* = 83.0 (ii) TIME STEP (DT) THAN THE STORA (iii) PEAK FLOW DOES	EFF. IS SMALL ELECTED FOR F Ia = Dep. SHOULD BE SM GE COEFFICIEN NOT INCLUDE	ER THAN 1 PERVIOUS L Storage MALLER OR MT. BASEFLOW	TIME STEP! LOSSES: (Above) EQUAL IF ANY.			
ADD HYD ( 0162) 1 + 2 = 3 ID1= 1 ( 0164): + ID2= 2 ( 0165):	AREA ( (ha) ( 1.00 0. 1.11 0.	PEAK 1 (cms) ( 048 3 220 2	TPEAK (hrs) 3.58 39 2.75 75	R.V. (mm) .71 .83		
ID = 3 ( 0162):	2.11 0.	239 2	2.75 58	.71		
NOTE: PEAK FLOWS DO	NOT INCLUDE	BASEFLOWS	S IF ANY.			
$\begin{vmatrix} ADD \ HYD \ ( 0162) \\ 3 \ + \ 2 \ = \ 1 \end{vmatrix}$	AREA Q	PEAK 1	TPEAK	R.V.		
ID1=3 (0162): + $ID2=2 (0168):$	(ha) ( 2.11 0. 8.73 1	239 2 217 2	(nrs) 2.75 58 2.75 65	(mm) .71 .75		
ID = 1 (0163):	10.84 1.	456 2	2.75 64	.38		
NOTE: PEAK FLOWS DO	NOT INCLUDE	BASEFLOWS	S IF ANY.			
CALIB         STANDHYD (0024)         Are           ID= 1 DT= 5.0 min         Tot	ea (ha)= tal Imp(%)=	7.52 90.00 [	Dir. Conn.	(%)= 90	.00	
Surface Area (ha)	IMPERVIC	US PER	RVIOUS (i) 0.75			
Dep. Storage (mm) Average Slope (%	)= 1.00 )= 1.00	)	5.00 2.00			
Length (mj Mannings n	= 223.90 = 0.013		40.00 0.250			
NOTE: RAINFALL V	AS TRANSFORM	IED TO S	5.0 MIN. T	IME STEP		
	TR	ANSFORMED	HYETOGRA	PH	:	
TIME I hrs mr	AIN   TIME	RAIN mm/hr	' TIME	RAIN   mm/hr	hrs	RAIN mm/hr
0.167 0	0.00   1.750	9.64 27.30	3.333	11.24	4.92	1.61
0.333 0.417	L.61   1.917 L.61   2.000	27.30 27.30	3.500 3.583	11.24	5.08	1.61 1.61
0.500	1.61 2.083 1.61 2.167	27.30 27.30	3.667 3.750	11.24 11.24	5.25	1.61
0.667	L.61   2.250 L.61   2.333	27.30 73.88	3.833	6.42	5.42	1.61
0.855	.61 2.500	73.88	4.083	6.42 6.42	5.67	1.61
1.083	L.61   2.667	73.88	4.250	6.42	5.83	1.61
1.250	.61 2.833	20.88	4.417	3.21	6.00	1.61

1.3 1.4 1.5 1.5	33         9.64           17         9.64           00         9.64           33         9.64	2.917 3.000 3.083 3.167	20.88 20.88 20.88 20.88	4.500 4.583 4.667 4.750	3.21 3.21 3.21 3.21 3.21	6.08 6.17 6.25	1.61 1.61 1.61
Max.Eff.Inten. over Storage Coeff. Unit Hyd. Tpeal Unit Hyd. peak	(mm/hr)= r (min) (min)= c (min)= (cms)=	73.88 5.00 4.68 5.00 0.22	(ii)	52.93 10.00 7.98 (ii) 10.00 0.13	*707/	N 6*	
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFIC	(cms)= (hrs)= (mm)= (mm)= LENT =	1.39 2.75 79.31 80.31 0.99		0.10 2.75 44.54 80.31 0.55	1.4 2. 75. 80. 0.	488 (iii) .75 .83 .31 .94	
***** WARNING: STOR	GE COEFF. 1	IS SMALLE	r than	TIME STEP!			
(i) CN PROCEU CN* = (ii) TIME STEU THAN THE (iii) PEAK FLOU	DURE SELECT 83.0 Ia 9 (DT) SHOUI STORAGE COI V DOES NOT 3	ED FOR PE = Dep. S LD BE SMA EFFICIENT INCLUDE B	RVIOUS torage LLER OR ASEFLOW	LOSSES: (Above) R EQUAL IF ANY.			
CALIB STANDHYD ( 0047) ID= 1 DT= 5.0 min	Area Total Ir	(ha)= 2 mp(%)= 9	3.15 0.00	Dir. Conn.	(%)= 90	0.00	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVIOU 20.83 1.00 1.00 392.85 0.013	S PE	RVIOUS (i) 2.32 5.00 2.00 40.00 0.250			
NOTE: RAIN	FALL WAS TH	RANSFORME	D TO	5.0 MIN. T	IME STEP	·.	
TT		TRA	NSFORME	D HYETOGRA		TTME	DATN
hi 0.00 0.11 0.22 0.33 0.44 0.55 0.55 0.55 0.55 0.55 0.55 0.55	$\begin{array}{rrrr} & RAIN\\ rs & mm/hr\\ 33 & 0.00\\ 57 & 0.00\\ 50 & 0.00\\ 33 & 1.61\\ 17 & 1.61\\ 33 & 1.61\\ 57 & 1.61\\ 53 & 1.61\\ 50 & 1.61\\ 33 & 1.61\\ 17 & 1.61\\ 33 & 1.61\\ 57 & 1.61\\ 33 & 1.61\\ 57 & 1.61\\ 33 & 1.61\\ 57 & 1.61\\ 33 & 9.64\\ 17 & 9.64\\ 17 & 9.64\\ 33 & 9.64\\ 17 & 9.64\\ 33 & 9.64\\ 17 & 9.64\\ 33 & 9.64\\ 17 & 9.64\\ 33 & 9.64\\ 17 & 9.64\\ 33 & 9.64\\ 17 & 9.64\\ 18 $	1.1ME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.417 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167 73.88	RAIN mm/hr 9.64 9.64 27.30 20.388 20.889 20.89	11ME hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750 52.93	KAIN           mm/hr           20.88           11.24           11.24           11.24           11.24           11.24           11.24           11.24           11.24           11.24           11.24           11.24           11.24           11.24           13.21           6.42           6.42           6.42           6.42           6.42           6.42           3.21           3.21           3.21           3.21	hrs 4.83 4.92 5.00 5.08 5.17 5.33 5.42 5.58 5.58 5.58 5.58 5.67 5.75 5.83 5.92 6.08 6.17 6.25	KAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.ETT.Inten. over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	(mm/nr)= r (min) (min)= k (min)= (cms)=	73.88 5.00 6.55 5.00 0.18	(ii)	52.93 10.00 9.86 (ii) 10.00 0.11	*T0T/	ALS*	
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFIC	(cms)= (hrs)= (mm)= (mm)= LENT =	4.25 2.75 79.31 80.31 0.99		0.30 2.75 44.54 80.31 0.55	4.5 2. 75. 80. 0.	944 (111) .75 .83 .31 .94	
(i) CN PROCED CN* = (ii) TIME STED THAN THE (iii) PEAK FLOM	OURE SELECT 83.0 Ia (DT) SHOU STORAGE CO V DOES NOT 3	ED FOR PE = Dep. S LD BE SMA EFFICIENT INCLUDE B	RVIOUS torage LLER OR ASEFLOW	LOSSES: (Above) E EQUAL			

RESERVOIR( 0049) IN= 2> OUT= 1 DT= 5.0 min	OVERFLOW OUTFLOW (cms) 0.0000	W IS OFF STORAGE (ha.m.) 0.0000	OUTFLO   (cms)   3.488	W STORAGE (ha.m.) 0 0.0000	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0047) 2: 0049) 2:	AREA QPEA (ha) (cms 3.150 4. 3.150 4.	K TPEA 5) (hrs 544 2 544 2	K R.V. ) (mm) .75 75.83 .75 75.83	
	PEAK FLOW FIME SHIFT OF MAXIMUM STOR/ MAXIMUM STOR/	REDUCTION [C PEAK FLOW AGE USED AGE USED	out/Qin](% (min (ha.m. (cu.m.)	)=100.00 )= 0.00 )= 0.0000 )= 0.000130	
**** WARNING :	HYDROGRAPH PI CHECK OUTFL	EAK WAS NOT R DW/STORAGE TA	REDUCED.	DUCE DT.	
CALIB STANDHYD ( 0048) ID= 1 DT= 5.0 min	Area (l Total Imp	ha)= 10.29 (%)= 61.00	Dir. Conn	.(%)= 61.00	
Surface Area Dep. Storage Average Slope Length Mannings n	IM (ha)= (mm)= (%)= (m)=	PERVIOUS F 6.28 1.00 1.00 261.92 0.013	PERVIOUS (1) 4.01 5.00 1.00 40.00 0.250	)	
NOTE: RAIN	NFALL WAS TRAI	NSFORMED TO	5.0 MIN.	TIME STEP.	
TI h 0.00 0.10 0.22 0.33 0.42 0.55 0.55 0.55 0.55 0.55 0.55 0.57 0.55 0.57 0.57	ME         RAIN           rs         mm/hr           33         0.00           57         0.00           50         0.00           53         1.61           53         1.61           54         1.61           57         1.61           57         1.61           57         1.61           53         1.61           57         1.61           57         1.61           57         1.61           53         1.61           57         1.61           53         1.61           53         1.61           53         1.61           53         9.64           53         9.64           53         9.64           53         9.64           53         9.64           53         9.64	TIME RAIN hrs mm/hr 1.667 9.64 1.750 9.64 1.833 27.30 2.000 27.30 2.083 27.30 2.167 27.33 2.250 27.30 2.417 73.88 2.583 73.88 2.667 73.88 2.917 20.88 3.083 20.88 3.167 20.88 5.100 5.14 (ii)	I       TIME         I       hrs         3.250       3.250         3.333       3.417         0       3.583         0       3.667         0       3.750         0       3.750         0       3.667         0       3.750         0       3.750         0       3.750         0       3.750         0       3.750         0       3.750         0       3.750         0       3.750         0       3.750         0       3.667         0       3.750         3.833       4.167         8       4.250         8       4.667         8       4.583         8       4.667         9       4.750         51.42       20.00         16.48       (ii)         20.00       16.48	RAIN         TIME           mm/hr         hrs           20.88         4.83           11.24         4.92           11.24         5.00           11.24         5.00           11.24         5.01           11.24         5.17           11.24         5.17           11.24         5.17           11.24         5.13           6.42         5.58           6.42         5.58           6.42         5.58           6.42         5.75           6.42         5.75           6.42         5.75           6.42         5.83           3.21         5.92           3.21         6.00           3.21         6.08           3.21         6.25           3.21         6.25           3.21         6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Unit Hyd. Tpeak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFIC	(cms)= (cms)= (hrs)= (mm)= (mm)= (ENT =	0.21 1.29 2.75 79.31 80.31 0.99	0.06 0.41 2.92 44.54 80.31 0.55	*TOTALS* 1.658 (iii) 2.75 65.75 80.31 0.82	)
(i) CN PROCED CN* = (ii) TIME STEI THAN THE (iii) PEAK FLOU	DURE SELECTED 83.0 Ia = 2 (DT) SHOULD STORAGE COEFI 0 DOES NOT INC	FOR PERVIOUS Dep. Storage BE SMALLER ( FICIENT. CLUDE BASEFLO	& LOSSES: (Above) R EQUAL W IF ANY.		
RESERVOIR( 0050) IN= 2> OUT= 1 DT= 5.0 min	OVERFLOW OUTFLOW (cms) 0.0000	W IS OFF STORAGE (ha.m.) 0.0000	OUTFLO   (cms)   0.620	W STORAGE (ha.m.) 0 0.3247	

INFLOW : ID= 2 (	0048)	AREA (ha) 10.290	QPEAK (cms) 1.658 0.613	TPEAK (hrs) 2.7	R. (m 75 6	V. m) 5.75 5.74	
0011200.12-1	PEAK FLOW TIME SHIFT MAXIMUM ST	OF PEAK F	ION [Qout LOW SED	/Qin](%)= (min)= (ha.m.)=	= 36.94 = 30.00 = 0.3211		
CALIB   STANDHYD ( 0088)  ID= 1 DT= 5.0 min	Area Total I	(ha)= 18 mp(%)= 5	1.61 8.40 Di	r. Conn.(	(%)= 54.	10	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVIOU 106.06 2.00 2.50 1100.33 0.013	S PERV 75 5 2 40 0.	IOUS (i) .55 .00 .50 .00 250			
NOTE: RAI	NFALL WAS T	RANSFORME	D TO 5.	0 MIN. TI	IME STEP.		
TI h 0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.5 0.6 0.5 0.6 0.7 0.7 0.8 0.9 1.0 1.0 1.1 1.2 1.3 1.4 1.5	ME         RAIN           rs         mm/hr           83         0.00           67         0.00           50         0.00           33         1.61           17         1.61           100         1.61           83         1.61           50         1.61           133         1.61           167         1.61           163         1.61           163         1.61           163         1.61           163         9.64           17         9.64           17         9.64	TTME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	NSFORMED RAIN 9.64 27.30 27.30 27.30 27.30 27.30 27.30 27.30 73.88 73.88 73.88 73.88 73.88 73.88 73.88 20.88 20.88 20.88 20.88 20.88	HYETOGRAF TIME hrs 3.250 3.333 1 3.417 1 3.583 1 3.667 1 3.750 1 3.750 1 3.750 1 3.833 3.917 4.000 4.083 4.083 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750	RAIN         mm/hr         20.88         11.24         11.24         11.24         11.24         11.24         11.24         12.24         6.42         6.42         6.42         6.42         6.42         3.21         3.21         3.21         3.21         3.21         3.21	TIME hrs 4.83 5.00 5.08 5.17 5.25 5.32 5.53 5.54 5.56 5.58 5.67 5.58 5.67 5.75 5.83 5.92 6.008 6.17 6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.Eff.Inten. ove Storage Coeff. Unit Hyd. Tpea Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFIC	(mm/hr)= r (min)= (min)= k (min)= (cms)= (hrs)= (hrs)= (mm)= IENT =	73.88 10.00 9.24 10.00 0.12 19.45 2.75 78.31 80.31 0.98	59 20 (ii) 17 20 0 8 8 2 45 80 0 0	.24 .00 .37 (ii) .00 .06 .54 .92 .46 .31 .57	*TOTAL 27.19 2.7 63.2 80.3 0.7	S* 0 (iii) 5 3 1 9	
(i) CN* = (ii) TIME STE THAN THE (iii) PEAK FLO	82.0 Ia P (DT) SHOU STORAGE CO W DOES NOT	E Dep. S JLD BE SMA DEFFICIENT INCLUDE B	torage ( LLER OR E ASEFLOW I	Above) QUAL F ANY.			
RESERVOIR( 0089)   IN= 2> QUT= 1   DT= 5.0 min	-   OVERF   OUTFL - (cms 0.00 0.68 1.02	LOW IS OF OW STO (ha 00 0. 70 3. 20 5.	F RAGE   .m.)   0000   6492   2831	OUTFLOW (cms) 1.5600 2.0400	STORA (ha.m 7.7 9.8 10.8	GE .) 340 037 930	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0088) 0089) PEAK FLOW	AREA (ha) 181.610 181.610 REDUCT	QPEAK (cms) 27.190 1.977 ION [Qout	TPEAK (hrs) 2.7 4.6 /Qin](%)=	R. (m 75 6 67 6 = 7.27	V. m) 3.23 3.23	

	TIME SHIFT O MAXIMUM STO	F PEAK FLOW RAGE USED	(min) (ha.m.)	=115.00 = 9.5344	
CALIB   STANDHYD ( 0091)  ID= 1 DT= 5.0 min	-   Area   Total Im - T	(ha)= 19.40 p(%)= 72.50	Dir. Conn.	(%)= 66.50	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	14.07 2.00 2.42 359.63 0.013	5.33 5.00 2.42 40.00 0.250		
NOTE: RAI	NFALL WAS TR	ANSFORMED TO	5.0 MIN. T	IME STEP.	
TI h 0.0 0.1 0.2 0.3 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.7 0.8 0.9 1.0 1.0 1.0 1.1 1.2 1.3 1.4 1.5 1.5	ME         RAIN         rs           mm         hr         83         0.00           67         0.00         50         0.00           50         0.00         161         17         1.61           00         1.61         161         161         161           67         1.61         161         161         161           17         1.61         100         1.61         161           167         1.61         161         161         161           67         1.61         33         9.64         17         9.64           17         9.64         83         9.64         1         164	TIME RAINSFORM TIME RAIN hrs mm/hr 1.667 9.64 1.750 9.64 1.833 27.30 1.917 27.30 2.000 27.30 2.083 27.30 2.167 27.30 2.250 27.30 2.333 73.88 2.417 73.88 2.500 73.88 2.500 73.88 2.500 73.88 2.500 73.88 2.500 73.88 2.500 73.88 3.000 20.88 3.083 20.88 3.167 20	ED HYETOGRA TIME TIME TIME TIME TIME TIME TIME TIME TRE TRE TRE TRE TRE TRE TRE TR	PH         PH           RAIN         TIME           mm/hr         hrs           20.88         4.83           11.24         5.00           11.24         5.08           11.24         5.08           11.24         5.08           11.24         5.17           11.24         5.33           6.42         5.42           6.42         5.56           6.42         5.67           6.42         5.75           6.42         5.75           6.42         5.67           6.42         5.67           6.42         5.68           3.21         5.92           3.21         6.08           3.21         6.08           3.21         6.17           3.21         6.25           3.21         6.25           3.21         6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.Eff.Inten. ove Storage Coeff. Unit Hyd. Tpea Unit Hyd. peak	(mm/hr)= r (min) (min)= k (min)= (cms)=	73.88 5.00 4.77 (ii) 5.00 0.22	72.45 15.00 12.35 (ii) 15.00 0.08	*T0TAI S*	
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFIC	(cms)= (hrs)= (mm)= (mm)= IENT =	2.64 2.75 78.31 80.31 0.98	0.86 2.83 51.39 80.31 0.64	3.499 (iii) 2.75 69.29 80.31 0.86	
***** WARNING: STOR (i) CN PROCE CN* = (ii) TIME STA THAN THE (iii) PEAK FLO	AGE COEFF. I DURE SELECTE 85.0 Ia P (DT) SHOUL STORAGE COE W DOES NOT I	S SMALLER THAN D FOR PERVIOUS = Dep. Storage D BE SMALLER O FFICIENT. NCLUDE BASEFLO	I TIME STEP! LOSSES: (Above) R EQUAL W IF ANY.		
$ \begin{array}{c c} ADD HYD & ( & 0092) \\ 1 & 1 + 2 & 3 \\ \hline \\ & + & ID1 = 1 \\ 0 & - & ID2 = 2 \\ \end{array} $	-   AR - (h 089): 181. 091): 19.	EA QPEAK a) (cms) 61 1.977 40 3.499	TPEAK (hrs) 4.67 63 2.75 69	R.V. (mm) .23 .29	
	092): 201.	VI 4.383	2.75 63	.81	
ROUTE CHN( 2252)   IN= 2> OUT= 1 <	- Routin - Routin	g time step (m	in)'= 5.00		
Dist 2 4 5	ance El 8.50 7.35 1.00	evation 210.02 209.86 209.76	Manning 0.0600 0.0450 0.0450	Main Channel Main Channel	

	60.4 65.4 72.6 95.9 103.1 116.2 122.0 131.5 149.5 149.5 155.3 177.8 190.9 195.9 226.5 238.7 251.4	14         209.           14         209.           15         209.           16         208.           17         208.           18         208.           19         207.           12         207.           16         208.           18         208.           19         207.           16         208.           16         208.           16         208.           16         208.           16         208.           10         209.           11         209.           10         209.	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	.0450 .04500 .0450 .0450 .04500 .0450 .04500 .04500 .04500	Main Channel Main Channel	
< DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)	
0.11	207.75	.531E+03	0.1	0.20	119.24	
0.32	207.97	.213E+04	1.4	0.32	57.58	
0.43	208.07	.856E+04	3.0	0.50	47.72	
0.53	208.18	.134E+05	5.5	0.58	40.76	
0.64	208.29	.193E+05	9.0	0.6/	35.61	
0.85	208.59	.344E+05	18.4	0.76	31.10	
0.96	208.61	.458E+05	23.5	0.73	32.57	
1.07	208.71	.598E+05	33.6	0.80	29.71	
1.17	208.82	.761E+05	45.8	0.85	27.72	
1.28	208.93	.938E+05	61.8	0.94	25.29	
1.39	209.03	.133E+06	101.5	1.01	23.30	
1.60	209.25	.154E+06	125.3	1.15	20.55	
1.71	209.35	.177E+06	151.0	1.21	19.56	
1.81	209.46	.202E+06	177.9	1.25	18.90	
1.93	209.58	.232E+06	214.9	1.32	17.96	
2.05	209.70	.204E+00	230.3	1.59	17.06	
			< hydr	ograph	<-pipe / o	channel->
		AREA	QPEAK	IPEAK R.V	. MAX DEPTH	MAX VEL
TNELOW • T	D= 2 ( 0	(na) (092) 201 01	4 38	2 75 63 8	1 0 49	0.54
OUTFLOW: I	D = 1 (2)	252) 201.01	2.40	3.75 63.8	1 0.39	0.46
		Č.				
CALIB						

STANDHYD ( 0093) ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	88.14 76.00	Dir. Conn.(%)=	76.00
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVI 66.9 2.2 2.0 766.5 0.01	OUS 9 8 0 5 3	PERVIOUS (i) 21.15 5.00 2.28 40.00 0.250	

TRANSFORMED HYETOGRAPH										
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN			
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr			
0.083	0.00	1.667	9.64	3.250	20.88	4.83	1.61			
0.167	0.00	1.750	9.64	3.333	11.24	4.92	1.61			
0.250	0.00	1.833	27.30	3.417	11.24	5.00	1.61			
0.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61			
0.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61			
0.500	1.61	2.083	27.30	3.667	11.24	5.25	1.61			
0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61			
0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61			
0.750	1.61	2.333	73.88	3.917	6.42	5.50	1.61			
0.833	1.61	2.417	73.88	4.000	6.42	5.58	1.61			
0.917	1.61	2.500	73.88	4.083	6.42	5.67	1.61			
1.000	1.61	2.583	73.88	4.167	6.42	5.75	1.61			
1.083	1.61	2.667	73.88	4.250	6.42	5.83	1.61			
1.167	1.61	2.750	73.88	4.333	3.21	5.92	1.61			
1.250	1.61	2.833	20.88	4.417	3.21	6.00	1.61			
1.333	9.64	2.917	20.88	4.500	3.21	6.08	1.61			

1.417 1.500 1.583	9.64   3 9.64   3 9.64   3	.000 20.88 .083 20.88 .167 20.88	4.583 4.667 4.750	3.21 3.21 3.21	6.17 6.25	1.61 1.61
Max.Eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	n/hr)= (min)= (min)= (min)= (cms)=	73.88 10.00 7.95 (ii) 10.00 0.13	50.21 15.00 12.78 (ii) 15.00 0.08	*1014	C*	
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	(cms)= (hrs)= (mm)= (mm)= NT =	13.44 2.75 78.03 80.31 0.97	2.28 2.83 42.05 80.31 0.52	15.6 2. 69. 80.	53 (iii) 75 39 31 86	
(i) CN PROCEDU CN* = 8 (ii) TIME STEP THAN THE S (iii) PEAK FLOW I	RE SELECTED L.O Ia = 1 (DT) SHOULD TORAGE COEFF DOES NOT INC	FOR PERVIOUS Dep. Storage BE SMALLER OF ICIENT. LUDE BASEFLOW	LOSSES: (Above) E EQUAL IF ANY.			
RESERVOIR( 0097)  IN= 2> OUT= 1   DT= 5.0 min	OVERFLOW (cms) 0.0000 0.3820 0.5670 0.6930	IS OFF STORAGE (ha.m.) 0.0000 1.8340 2.5650 3.0750	OUTFLOW (cms) 0.8650 0.9980 1.1340 0.0000	STOR (ha.r 3.: 4.: 4.: 0.0	AGE n.) 7180 2030 5850 2000	
INFLOW : ID= 2 ( ) OUTFLOW: ID= 1 ( )	A (1 0093) 88 0097) 88	REA QPEAK ha) (cms) .140 15.6 .140 1.2	TPEAK (hrs) 553 2. 24 4.4	75 (1 42 (1	.V. mm) 59.39 59.38	
PE/ TIM MAJ	AK FLOW I ME SHIFT OF KIMUM STORA	REDUCTION [Qo PEAK FLOW GE USED	out/Qin](%): (min): (ha.m.):	= 7.82 =100.00 = 5.0043	3	
CALIB STANDHYD ( 0096) ID= 1 DT= 5.0 min	Area (h Total Imp(	a)= 42.17 6)= 72.00	Dir. Conn.	(%)= 72	.00	
Surface Area Dep. Storage Average Slope Length Mannings n	IMP (ha)= (mm)= (%)= (m)= 5 = 0	ERVIOUS PE 30.36 2.00 2.04 30.22 0.013	RVIOUS (i) 11.81 5.00 2.04 40.00 0.250			
NOTE: RAINF/	ALL WAS TRAN	SFORMED TO	5.0 MIN. T	IME STEP		
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.250 0.1.583 Max Eff Inten (mm	RAIN mm/hr 0.00   1 0.00   1 1.61   1 1.61   2 1.61   3 9.64   3 9.64   3 9.64   3 9.64   3 9.64   3	TIME         RAIN           hrs         mm/hr           .667         9.64           .833         27.30           .917         27.30           .000         27.30           .033         27.30           .053         27.30           .250         27.30           .333         73.88           .500         73.88           .500         73.88           .667         73.88           .670         73.88           .670         73.88           .683         20.88           .917         20.88           .083         20.88           .167         20.88	TIME           hrs           3.250           3.333           3.417           3.500           3.583           3.667           3.750           3.833           3.917           4.000           4.083           4.167           4.250           4.333           4.417           4.5803           4.667           4.750           51<56	RAIN mm/hr           20.88           11.24           11.24           11.24           11.24           11.24           11.24           6.42           6.42           6.42           6.42           6.42           6.42           3.21           3.21           3.21           3.21           3.21           3.21           3.21           3.21           3.21	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.58 5.75 5.83 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Character Contracting (III)		2.00	20.00			

Storage Coeff. (min)= Unit Hyd. Tpeak (min)= Unit Hyd. peak (cms)= 6.33 (ii) 5.00 15.48 (ii) 20.00 0.19 0.07 \*TOTALS\* 7.283 (iii) 2.75 68.50 PEAK FLOW 6.20 1.19 (cms)= (hrs)= (mm)= (mm)= TIME TO PEAK RUNOFF VOLUME 2.75 2.92 43.27 TOTAL RAINFALL 80.31 80.31 80.31 RUNOFF COEFFICIENT \_ 0.98 0.85 0.54 (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 82.0 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 ( 0095) 1 + 2 = 3 QPEAK (cms) 2.400 AREA TPEAK R.V. (ha) 201.01 (hrs) 3.75 (mm) 63.81 ----ID1= 1 ( 2252): + ID2= 2 ( 0096): 7.283 2.75 42.17 68.50 2.75 ID = 3 ( 0095): 243.18 9.288 64.62 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. \_\_\_\_\_ ADD HYD ( 0095) 3 + 2 = 1 TPEAK (hrs) 2.75 4.42 AREA (ha) 243.18 QPEAK (cms) 9.288 R.V. (mm) ID1= 3 ( 0095): + ID2= 2 ( 0097): 64.62 88.14 1.224 69.38 ID = 1 ( 0095): 331.32 9.940 2.75 65.89 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. ROUTE CHN( 2257) Routing time step (min)'= 5.00 IN= 2---> OUT= 1 | ---<----- DATA FOR SECTION ( 1.1) -----> Distance Elevation Manning Distance Elevation 28.50 210.02 0.0600 47.35 51.00 209.86 209.76 0.0450 0.0450 Main Channel Main Channel 60.44 209.54 0.0450 Main Channel 0.0450 0.0450 65.44 72.65 209.60 209.41 Main Channel Main Channel Main Channel Main Channel Main Channel 0.0450 95.97 208.53 103.18 208.38 108.18 208.33 0.0450 208.08 207.92 0.0450 0.0450 Main Channel Main Channel 116.25 122.09 0.0450 0.0450 0.0450 Main Channel Main Channel Main Channel 131.52 207.65 208.22 149.56 155.39 208.49 Main Channel 0.0450 177.88 208.58 208.73 208.72 190.96 0.0450 Main Channel 195.96 0.0450 Main Channel 209.32 226.50 0.0450 Main Channel 0.0450 /0.0600 Main Channel 0.0600 238.71 209.46 251.40 209.70 ----- TRAVEL TIME TABLE --V VOLUME FLOW RATE DEPTH VELOCITY TRAV.TIME ELEV (m) 0.11 0.21 (m) 207.75 207.86 (cms) 0.1 0.4 (m/s) 0.15 0.24 (min) 43.07 27.13 (cu.m.) .143E+03 .574E+03 207.97 208.07 1.0 0.31 20.80 17.24 0.32 .129E+04 0.43 .231F+04 4.1 6.7 9.8 0.53 .362E+04 0.43 14.72 208.18 0.64 208.29 208.39 .520E+04 .706E+04 0.50 12.86 208.50 208.61 13.8 17.5 0.57 11.23 0.85 .929E+04 0.96 .124E+05 1.07 208.71 .162E+05 25.1 0.60 10.73 1.17 208.82 .206E+05 34.2 0.64 10.01 208.93 1.28 .253E+05 9.13

1.39	209.03	. 30	5E+05	60.1		0.76	8.45	
1.49	209.14	.35	9E+05	75.9		0.81	7.89	
1.60	209.25	.41	7E+05	93.7		0.86	7.42	
1.71	209.35	.47	9E+05	112.9		0.91	7.06	
1.81	209.46	. 54	5E+05	133.0		0.94	6.83	
1.93	209.58	.62	5E+05	160.7		0.99	6.49	
2.05	209.70	.71	4E+05	193.1		1.04	6.16	
				< hvo	drograph	>	<-pipe / c	hannel->
			AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
			(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW :	ID= 2 (	0095)	331.32	9.94	2.75	65.89	0.75	0.54
OUTFLOW:	ID= 1 (	2257)	331.32	8.37	2.83	65.89	0.70	0.52

CALIB     STANDHYD ( 0100)   ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	36.92 64.90	Dir.	Conn.(%)=	64.90	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVI 23.9 2.0 2.4 496.1 0.01	OUS 6 0 2 2 3	PERVIO 12.90 5.00 2.42 40.00 0.250	US (i) 5 2 2 0 0		

		TR/	NSFORME	D HYETOGR	APH	-	
TIME	RAIN	TIME	RAIN	I' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	9.64	3.250	20.88	4.83	1.61
0.167	0.00	1.750	9.64	3.333	11.24	4.92	1.61
0.250	0.00	1.833	27.30	3.417	11.24	5.00	1.61
0.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61
0.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61
0.500	1.61	2.083	27.30	3.667	11.24	5.25	1.61
0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61
0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61
0.750	1.61	2.333	/3.88	3.91/	6.42	5.50	1.61
0.833	1.61	2.41/	/3.88	4.000	6.42	5.58	1.61
0.917	1.61	2.500	73.00	4.085	6.42	5.6/	1.01
1.000	1.61	2.303	73.88	4.107	6.42	5.83	1.61
1 167	1 61	2.007	73.88	4.230	3 21	5 02	1 61
1 250	1 61	2 833	20.88	4 417	3 21	6.00	1 61
1.333	9.64	2.917	20.88	4.500	3.21	6.08	1.61
1,417	9.64	3,000	20.88	4.583	3.21	6.17	1.61
1,500	9.64	3.083	20.88	4.667	3.21	6.25	1.61
1.583	9.64	3.167	20.88	4.750	3.21	100000	
Max.Eff.Inten.(mr	n/hr)=	73.88		50.21			
over	(min)	5.00		15.00			
Storage Coeff.	(min)=	5.78	(ii)	14.56 (ii)	)		
Unit Hyd. Tpeak	(min)=	5.00		15.00			
Unit Hyd. peak	(cms)=	0.20		0.08			
					*T0T	TALS*	
PEAK FLOW	(cms)=	4.90		1.35	6.	.193 (iii)	)
TIME TO PEAK	(hrs)=	2.75		2.83	2	2.75	
RUNOFF VOLUME	(mm)=	78.31		42.05	65	5.58	
IOTAL RAINFALL	(mm)=	80.31		80.31	80	0.31	
KUNDEF COFFFICIEN	= 10	0.98		0.52	C	0.82	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 81.0 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( 0101)	OVERFLOW	IS OFF		
DT= 5.0 min	OUTFLOW	STORAGE	OUTFLOW	STORAGE
	(cms)	(ha.m.)	(cms)	(ha.m.)
	0.0000	0.0000	0.4170	1.7520
	0.1840	0.9170	0.4820	1.9610
	0.2740	1.2500	0.5480	2.1660
	0.3340	1.4720	0.0000	0.0000

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INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0100) 0101)	AREA (ha) 36.920 36.920	QPEAK (cms) 6.193 0.487	TPEAK (hrs) 2.75 4.33	R.V. (mm) 65.58 65.55	
F T N	PEAK FLOW TIME SHIFT NAXIMUM ST	V REDUCT OF PEAK F FORAGE U	ION [Qout/Q LOW SED (	tin](%)= 7. (min)= 95. ha.m.)= 1.	.87 .00 .9775	
CALIB STANDHYD ( 0102) ID= 1 DT= 5.0 min	Area Total 1	(ha)= 7 [mp(%)= 9	1.88 3.00 Dir.	Conn . (%)=	93.00	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVIOU 66.85 2.00 2.22 692.24 0.013	S PERVIO 5.0 5.0 2.2 40.0 0.25	US (i) 3 0 0 0 0		
NOTE: RAIN	IFALL WAS	TRANSFORME	D TO 5.0	MIN. TIME S	STEP.	
TIM hr 0.08 0.16 0.25 0.33 0.41 0.56 0.56 0.56 0.55 0.83 0.93 1.00 1.06 1.16 1.25 1.33 1.41 1.56	E         RAIN           13         0.00           161         0.00           161         1.61           17         1.61           161         1.61           17         1.61           161         1.61           17         1.61           161         1.61           17         1.61           161         1.61           17         1.61           161         1.61           17         1.61           161         1.61           17         1.61           163         1.61           164         9.64           163         9.64           163         9.64	TRA TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	NSFORMED HY RAIN   9.64   3. 9.64   3. 27.30   3. 27.30   3. 27.30   3. 27.30   3. 27.30   3. 27.30   3. 73.88   4. 73.88   4. 73.88   4. 73.88   4. 20.88   4. 20.88   4. 20.88   4. 20.88   4. 20.88   4.	ETOGRAPH            TIME         RAJ           hrs         mm/l           250         20.83           333         11.22           417         11.22           500         11.22           667         11.22           667         11.22           667         11.22           917         6.42           917         6.42           917         6.42           167         6.42           250         6.42           533         3.21           417         3.22           500         3.21           500         3.21           583         3.21           667         3.22           750         3.21	TIME           nr         hrs           4         4.83           4         4.92           4         5.00           4         5.08           4         5.25           4         5.23           2         5.42           2         5.58           2         5.58           2         5.75           2         5.83           2         5.42           2         5.75           2         5.83           2         5.42           2         5.75           2         5.83           1         5.92           1         6.00           1         6.25           1         6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.Eff.Inten.( over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI	<pre>(mm/hr)= (min)= (min)= (cms)= (cms)= (hrs)= (hrs)= (mm)= (mm)= ENT =</pre>	73.88 5.00 7.25 5.00 0.17 13.58 2.75 78.31 80.31 0.98	50.2 10.0 (ii) 10.0 0.1 0.1 0.1 2.7 42.0 80.3 0.5	1 0 (ii) 1 ×1 0 1 5 5 1 5 1 5	TOTALS* 14.184 (iii) 2.75 75.77 80.31 0.94	
(i) CN PROCED CN* = (ii) TIME STEF THAN THE (iii) PEAK FLOW	URE SELECT 81.0 Ia (DT) SHOU STORAGE CO DOES NOT	TED FOR PE a = Dep. S JLD BE SMA DEFFICIENT INCLUDE B	RVIOUS LOSS torage (Ab LLER OR EQU ASEFLOW IF	ES: ove) AL ANY.		
RESERVOIR( 0103)   IN= 2> OUT= 1   DT= 5.0 min	OVERI OUTFI (cms 0.00 1.3 2.6	FLOW IS OF LOW STO s) (ha 500 0. LOO 1. 500 1.	F RAGE   0 .m.)   0000   3639   7635   8	UTFLOW 5 (cms) ( 4.6900 6.2900 4.9300	5TORAGE (ha.m.) 2.1905 2.4799 2.7554	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0102) 0103)	AREA (ha) 71.880 71.880	QPEAK (cms) 14.184 13.779	TPEAK (hrs) 2.75 2.83	R.V. (mm) 75.77 75.77	

	TIME SHIFT OF MAXIMUM STORA	PEAK FLOW GE USED	(mi (ha.m	n)= 5.0 .)= 2.5	0 732	
ADD HYD ( 009   1 + 2 = 3 ID1= 1 ( + ID2= 2 (	9)    AREA (ha) 0101): 36.92 0103): 71.88	QPEAK (cms) 0.487 13.779	TPEAK (hrs) 4.33 2.83	R.V. (mm) 65.55 75.77		
ID = 3 (	0099): 108.80	14.089	2.83	72.30		
NOTE: PEAK	FLOWS DO NOT INC	LUDE BASEFLO	WS IF ANY	•		
$\begin{vmatrix} Abb & HTD \\ 3 + 2 = 1 \end{vmatrix}$ ID1= 3 ( + ID2= 2 (	9) AREA (ha) 0099): 108.80 2257): 331.32	QPEAK (cms) 14.089 8 374	TPEAK (hrs) 2.83	R.V. (mm) 72.30 65.89		
$ID_{2} = 2$ ( ID = 1 (	0099): 440.12	22.463	2.83	67.47		
NOTE: PEAK	FLOWS DO NOT INC	LUDE BASEFLO	WS IF ANY			
ROUTE CHN( 017	 3)					
IN= 2> OUT=	1 Routing	time step (m	in)'= 5.	00		
Di	DATA         FOR         S           stance         Elev         Elev         23.50         21           47.35         20         51.00         20         51.00         20           51.00         20         66.44         20         65.44         20           72.65         20         95.97         20         103.18         20           103.18         20         116.25         20         1149.56         20           131.52         20         155.39         20         155.39         20           190.96         20         238.71         20         238.71         20           238.71         20         20         238.71         20         20	LCIION ( 1 ation ) 9.02 9 9.86 9 9.76 9 9.54 9 9.60 9 8.53 0 8.33 0 8.33 0 8.33 0 8.33 0 8.33 0 8.33 0 8.33 0 8.33 0 8.34 0 8.22 0 8.49 0 8.22 0 8.49 0 8.72 9 9.32 0 9.32 0 9.32 0 9.32 0 9.46 0.04	.1) Manning 0.0600 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450	-> Main Main Main Main Main Main Main Main	Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel	
DEPTH E (m) 0.11 207 0.21 207 0.32 207 0.43 208 0.53 208 0.64 208 0.75 208 0.85 208 0.96 208 1.07 208 1.17 208 1.28 208 1.39 209 1.49 209 1.60 209 1.71 209 1.81 209 1.81 209 2.05 209	LEV VOLUME (m) (cu.m.) .75 .601E+03 .86 .241E+04 .97 .542E+04 .07 .969E+04 .18 .152E+05 .29 .218E+05 .39 .296E+05 .50 .389E+05 .61 .519E+05 .71 .677E+05 .82 .861E+05 .93 .106E+06 .14 .150E+06 .14 .150E+06 .35 .201E+06 .58 .262E+06 .58 .262E+06 .70 .299E+06	FLOW RATE (cms) 0.0 0.3 0.8 1.8 3.3 5.5 8.0 11.2 14.2 20.3 27.7 37.5 48.7 61.5 76.0 91.6 107.8 130.3 156.6	VELOC (m/ 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	ITY TR s) 12 2 19 1 25 1 30 40 43 46 44 46 44 48 52 57 61 66 70 73 76 80 84	AV.TIME (min) 22.56 40.20 07.47 89.07 76.07 66.47 61.92 58.04 60.79 55.45 51.74 47.20 43.64 40.75 38.35 36.50 35.28 33.51 31.84	
INFLOW : ID= 2 OUTFLOW: ID= 1	ARE (ha ( 0099) 440.1 ( 0173) 440.1	< hyd A QPEAK ) (cms) 2 22.46 2 9.25	rograph - TPEAK (hrs) 2.83 6 3.58 6	> < R.V. M (mm) 7.47 7.47	-pipe / cł AX DEPTH (m) 1.10 0.79	MAX VEL (m/s) 0.49 0.44

ROUTE CHN(   IN= 2> OU	2296)  JT= 1	Routing ti	me step (r	nin)'= 5.00		
	<pre></pre>	DATA FOR SEC e Elevat 0 204. 4 204. 0 203. 1 203. 9 204. 5 204. 6 204. 6 204. 1 203. 8 202. 0 202. 6 202. 3 200. 1 199. 1 203. 7 203. 7 203. 7 203. 7 205. 0 205.	TION ( : ion 60 58 90 83 24 34 04 05 84 89 05 84 89 66 26 25 94 72 80 71 01 02 0.04 56 90 90 90 90 90 90 90 90 90 90	1.1)> Manning 0.0600 0.0450	Main Channel Main Channel	
Cm DEPTH (m) 0.23 0.47 0.70 0.93 1.17 1.40 1.63 1.87 2.10 2.33 2.57 2.80 3.03 3.27 3.50 3.73 3.97 4.20 4.55	ELEV (m) 200.17 200.64 200.64 200.87 201.10 201.34 201.57 201.80 202.04 202.27 202.50 202.74 202.97 203.20 203.44 203.67 203.90 204.14 204.49	TRAVEL VOLUME (cu.m.) .403E+03 .149E+04 .284E+04 .443E+04 .428E+04 .428E+04 .106E+05 .131E+05 .138E+05 .158E+05 .317E+05 .317E+05 .548E+05 .650E+05 .788E+05 .103E+06	TIME TABLE FLOW RATI (cms) 0.2 1.3 3.3 6.2 15.1 21.2 28.4 36.8 46.4 54.8 63.4 65.8 85.1 113.5 143.4 141.2 182.1 256.5	LE E VELOCIT (m/s) 0.17 0.30 0.41 0.50 0.58 0.65 0.71 0.77 0.83 0.88 0.88 0.88 0.86 0.74 0.83 0.88 0.84 0.77 0.93 0.77 0.82 0.82	Y TRAV.TIME (min) 35.38 19.71 14.37 11.80 10.22 9.13 8.31 7.67 7.15 6.75 6.73 6.87 8.03 7.45 6.85 6.37 7.67 7.22 6.70	
INFLOW : ID OUTFLOW: ID	0=2(0) 0=1(2)	AREA (ha) 173) 440.12 296) 440.12	< hyo QPEAK (cms) 9.25 9.04	drograph TPEAK R. (hrs) (m 3.58 67. 3.75 67.	-> <-pipe / 0 V. MAX DEPTH m) (m) 47 1.11 47 1.10	channe1-> MAX VEL (m/s) 0.56 0.56
CALIB   STANDHYD (  ID= 1 DT= 5.0	0106) ) min	Area (ha) Total Imp(%)	= 281.15 = 87.70	Dir. Conn.	(%)= 87.50	
Surface A Dep. Stor Average S Length Mannings	Area Tage Slope n	$\begin{array}{rcl} \text{IMPER} \\ \text{(ha)} = & 246 \\ \text{(mm)} = & 2 \\ \text{(\%)} = & 1 \\ \text{(m)} = & 1369 \\ = & 0 \end{array}$	.57 .00 .63 .06 013	34.58 5.00 1.63 40.00 0.250		
NOTE:	RAINFA	LL WAS TRANSF	ORMED TO	5.0 MIN. T	IME STEP.	
	TIME hrs 0.083 0.167 0.250 0.333	RAIN   TI mm/hr   h 0.00   1.6 0.00   1.7 0.00   1.8 1.61   1.9	TRANSFORM ME RAIN 67 9.64 50 9.64 33 27.30 17 27.30	MED HYETOGRA N  ' TIME r  ' hrs 4   3.250 4   3.333 0   3.417 0   3.500	PH RAIN   TIME mm/hr   hrs 20.88   4.83 11.24   4.92 11.24   5.00 11.24   5.08	RAIN mm/hr 1.61 1.61 1.61 1.61

$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	0         27.30           3         27.30           7         27.30           0         27.30           0         27.30           0         27.30           3         73.88           73.88         73.88           73.88         73.88           73.88         73.88           73.88         20.88           72.88         20.88           20.88         20.88           72.88         20.88	3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.583 4.667 4.750	$11.24 \\ 11.24 \\ 11.24 \\ 6.42 \\ 6.42 \\ 6.42 \\ 6.42 \\ 6.42 \\ 6.42 \\ 3.21$	5.17 5.25 5.33 5.42 5.50 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61
<pre>(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 81.0 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. DD HYD ( 0107) 1+ 2 = 3 AREA OPEAK TPEAK R.V. </pre>	Max.Eff.Inten.(mm/h over (mi Storage Coeff. (mi Unit Hyd. Tpeak (mi Unit Hyd. peak (cm PEAK FLOW (cm TIME TO PEAK (nr RUNOFF VOLUME (r TOTAL RAINFALL (r RUNOFF COEFFICIENT	$\begin{array}{llllllllllllllllllllllllllllllllllll$	88 00 07 (ii) 10 01 75 31 31 98	51.40 20.00 15.84 (ii) 20.00 0.07 3.44 2.92 42.41 80.31 0.53	*T01 50. 73 80 (	TALS* 134 (iii) 2.75 3.82 3.31 3.92	i.
DD HYD ( 0107) 1 + 2 = 3 (ha) (cms) (hrs) (mm) ID1 = 1 ( 0106): 281.15 50.134 2.75 73.82 + ID2 = 2 ( 2296): 440.12 9.035 3.75 67.47 ID = 3 ( 0107): 721.27 52.737 2.75 69.95 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. DUTE CHN( 2300) N= 2> OUT= 1 Routing time step (min)'= 5.00 DATA FOR SECTION ( 1.1)> Distance Elevation Manning 0.00 204.60 0.06500 2.24 204.58 0.0450 Main Channel 10.30 203.90 0.0450 Main Channel 36.31 203.83 0.0450 Main Channel 47.49 204.24 0.0450 Main Channel 59.15 204.34 0.0450 Main Channel 65.86 204.04 0.0450 Main Channel 10.40 202.89 0.0450 Main Channel 10.40 202.89 0.0450 Main Channel 117.82 202.66 0.0450 Main Channel 117.82 202.66 0.0450 Main Channel 117.82 202.66 0.0450 Main Channel 117.82 202.66 0.0450 Main Channel 126.76 202.26 0.0450 Main Channel 138.43 200.25 0.0450 Main Channel 149.61 199.94 0.0450 Main Channel 127.61 203.72 0.0450 Main Channel 149.61 199.94 0.0450 Main Channel 149.61 203.72 0.0450 Main Channel 149.61 203.72 0.0450 Main Channel 149.61 205.02 0.0450 Main Channel 140.61 205.05 0.0600 Main Channel 140.61 205.05 0.00600 Main Channel 240.71 205.02 0.0450	<ul> <li>(i) CN PROCEDURE CN* = 81.0</li> <li>(ii) TIME STEP (DI THAN THE STOF</li> <li>(iii) PEAK FLOW DOF</li> </ul>	SELECTED FOR ) Ia = Dep () SHOULD BE S AGE COEFFICI S NOT INCLUD	PERVIOUS Storage MALLER OR ENT. BASEFLOW	LOSSES: (Above) EQUAL IF ANY.			
DUTE CHN( 2300)       Routing time step (min)'= 5.00         N=2> OUT= 1       Routing time step (min)'= 5.00         Distance       Elevation       Main ing         0.00       204.60       0.0600         2.24       204.58       0.0450       Main Channel         10.30       203.90       0.0450       Main Channel         36.31       203.83       0.0450       Main Channel         59.15       204.24       0.0450       Main Channel         65.86       204.04       0.0450       Main Channel         93.18       202.84       0.0450       Main Channel         104.40       202.89       0.0450       Main Channel         117.82       202.66       0.0450       Main Channel         126.76       202.26       0.0450       Main Channel         127.81       203.80       0.0450       Main Channel         149.61       199.94       0.0450       Main Channel         149.97       203.80       0.0450       Main Channel         126.76       202.26       0.0450       Main Channel         127.87       204.71       0.0450       Main Channel         128.43       200.25       0.0450       Main Cha	$\begin{array}{c c} D & HYD & ( & 0107) \\ 1 + 2 & = & 3 \\ \\ & & ID1 = & 1 & ( & 0106) \\ + & ID2 = & 2 & ( & 2296) \\ \hline & ID & = & 3 & ( & 0107) \\ \hline & ID & = & 3 & ( & 0107) \\ \hline & NOTE: & PEAK & FLOWS & I \\ \hline & & & & & & \\ \hline & & & & & & & \\ \hline & & & &$	AREA (ha) 281.15 55 440.12 721.27 5 00 NOT INCLUD	QPEAK (cms) 0.134 9.035 2.737 E BASEFLOW	TPEAK (hrs) 2.75 73 3.75 67 2.75 69 5 IF ANY.	R.V. (mm) 3.82 7.47		
	DIE CHN( 2300) = 2> OUT= 1 Distance 0.00 2.24 10.30 36.31 47.49 59.15 65.86 81.51 93.18 104.40 117.82 126.76 138.43 149.61 172.61 194.97 229.05 240.71 284.60	Routing time DATA FOR SECT: Elevati 204.66 204.51 203.99 203.8 204.2 204.3 204.0 203.0 204.3 204.0 203.0 204.3 202.6 202.6 202.2 199.9 203.7 203.8 204.7 203.8 204.7 205.0 205.0	e step (min LON ( 1.: on Min 0 0 3 0 4 0 4 0 4 0 4 0 5 0 4 0 5 0 6 0 5 0 6 0 6 0 6 0 6 0 6 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0	n)'= 5.00 1)> anning .0600 .0450	Main ( Main (	Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel Channel	

1	L.63	201.57	.15	4E+05	21.3		0.72	12.08	
1	L.87	201.80	.19	1E+05	28.5		0.78	11.15	
2	2.10	202.04	.23	1E+05	37.0		0.83	10.39	
2	2.33	202.27	.27	4E+05	46.6		0.88	9.80	
2	2.57	202.50	. 32	3E+05	55.0		0.88	9.79	
2	2.80	202.74	.38	1E+05	63.6		0.87	9.98	
3	3.03	202.97	.46	2E+05	66.1		0.74	11.66	
3	3.27	203.20	.56	8E+05	87.4		0.80	10.83	
3	3.50	203.44	.68	1E+05	114.0		0.87	9.96	
3	3.73	203.67	.80	0E+05	143.9		0.93	9.26	
3	3.97	203.90	.94	8E+05	141.7		0.78	11.14	
4	1.20	204.14	.11	5E+06	182.8		0.82	10.49	
4	1.55	204.49	.15	0E+06	257.5		0.89	9.74	
					< nyo	irograph	>	<-pipe / c	nanne I->
				AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
				(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLO	. wc	1D = 2 (	0107)	/21.2/	52.74	2.75	69.95	2.50	0.88
OUTFL	.OW:	ID = 1 (	2300)	/21.27	4/.16	2.83	69.95	2.36	0.88

CALIB STANDHYD ( 0166) ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	9.33 61.00	Dir.	Conn . (%)=	61.00
		IMPERVI	OUS	PERVIO	JS (1)	
Surface Area	(ha)=	5.6	9	3.64	4	
Dep. Storage	(mm)=	1.0	0	5.00	D	
Average Slope	(%)=	1.0	ō	1.0	5	
Length	(m)=	249 4	0	40 00	ñ	
Mannings n	=	0.01	.3	0.250	Ď	

		TRA	NSFORME	D HYETOGR	APH		
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	9.64	3.250	20.88	4.83	1.61
0.167	0.00	1.750	9.64	3.333	11.24	4.92	1.61
0.250	0.00	1.833	27.30	3.417	11.24	5.00	1.61
0.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61
0.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61
0.500	1.61	2.083	27.30	3.667	11.24	5.25	1.61
0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61
0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61
0.750	1.61	2.333	73.88	3.917	6.42	5.50	1.61
0.833	1.61	2.417	73.88	4.000	6.42	5.58	1.61
0.917	1.61	2.500	73.88	4.083	6.42	5.67	1.61
1.000	1.61	2.583	73.88	4.167	6.42	5.75	1.61
1.083	1.61	2.667	73.88	4.250	6.42	5.83	1.61
1.167	1.61	2.750	73.88	4.333	3.21	5.92	1.61
1.250	1.61	2.833	20.88	4.417	3.21	6.00	1.61
1.333	9.64	2.917	20.88	4.500	3.21	6.08	1.61
1.417	9.64	3.000	20.88	4.583	3.21	6.17	1.61
1.500	9.64	3.083	20.88	4.667	3.21	6.25	1.61
1.583	9.64	3.167	20.88	4.750	3.21		
Max Eff Inten (mm/	ur)=	73 88		51 42			
over (m	in	5.00		20.00			
Storage Coeff (m	in)-	4 99	(iii)	16 33 (iii	1		
Unit Hyd. Tpeak (m	in)=	5.00	(11)	20.00	,		
Unit Hyd neak (cr	ns)=	0.22		0.06			
onite nyu: peak (ei	13)-	0.22		0.00	*TOT	*214	
PEAK FLOW (cr	ns)=	1.17		0.37	1	505 (iiii	
TIME TO PEAK (b)	(5)=	2 75		2 92		75	·
RUNOFE VOLUME (	nm)=	79.31		44.54	65	.75	
TOTAL RATNEALL (	mm)=	80 31		80 31	80	31	
RUNDEE COFFETCIENT	=	0.99		0.55	0	82	
KONOT COEFFICIENT		5.55		0.00		10L	
***** WARNING: STORAGE	COEFF.	IS SMALLE	R THAN	TIME STEP	1		
(i) CN PROCEDURE	SELECT	ED FOR PE	RVIOUS	LOSSES:			

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 83.0 Ia = Dep. Storage (Above)

   (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.

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

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| RESERVOIR( 0167)| OVERFLOW IS OFF

IN= 2> OUT= 1     DT= 5.0 min	0UTFL0 (cms) 0.000	W STOF (ha. 0 0.0	RAGE .m.)	00000000000000000000000000000000000000	0W STO ) (ha 30 0	RAGE m.) .3085	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0166) 0167)	AREA (ha) 9.330 9.330	QPEAK (cms) 1.50 0.6	TPE (hr 05 14	AK s) 2.75 3.17	R.V. (mm) 65.75 65.74	
Р Т М	EAK FLOW IME SHIFT OF AXIMUM STOP	F PEAK FL RAGE US	LON [QOI LOW SED	ut/Qinj( (mi (ha.m	n)= 25.00 n)= 0.26	97	
CALIB STANDHYD ( 0169) ID= 1 DT= 5.0 min	Area Total Imp	(ha)= 2 p(%)= 90	2.34 0.00 I	Dir. Con	n.(%)= 9	0.00	
Surface Area Dep. Storage Average Slope Length Mannings n	II (ha)= (mm)= (%)= (m)= =	MPERVIOUS 2.11 1.00 1.00 124.90 0.013	s pei	RVIOUS ( 0.23 5.00 2.00 40.00 0.250	i)		
NOTE: RAIN	FALL WAS TR	ANSFORMED	ото !	5.0 MIN.	TIME STE	Ρ.	
TIM hr 0.08 0.16 0.25 0.33 0.41 0.50 0.66 0.75 0.83 0.66 0.75 0.83 0.91 1.00 1.08 1.16 1.25 1.33 1.41 1.50 1.58 Max.Eff.Inten.( over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME	E RAIN   s mm/hr   3 0.00 7 0.00 0 0.00   3 1.61   0 1.61   3 9.64   mm/hr)= (mn)= (mn)= (mn)= (mn)= (mn)= (mn)=	TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167 73.88 5.00 3.083 3.167 73.88 5.00 0.27 0.27 0.27 0.27 0.43 2.75 79.31	NSFORMEI RAIN mm/hr 9.64 9.64 9.64 27.30 20.38 20.80 20.80 2	D HYETOG TIME TIME TIME Thrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.333 4.417 4.500 52.93 10.00 6.60 (i 10.00 0.14 0.03 2.75 44.54	RAPH RAIN mm/hr 20.88 11.24 11.24 11.24 11.24 11.24 11.24 11.24 11.24 11.24 11.24 11.24 6.42 6.42 6.42 6.42 6.42 6.42 6.42 6.42 13.21 3.21	ALS* 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.58 5.75 5.83 5.92 6.00 6.08 6.17 6.25 6.25 6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
TOTAL RAINFALL RUNOFF COEFFICI	(mm)= ENT =	80.31 0.99	1	80.31 0.55	80 0	.31 .94	
***** WARNING: STORA (i) CN PROCED CN* = (ii) TIME STEP THAN THE (iii) PEAK FLOW	GE COEFF. I URE SELECTEI 83.0 Ia (DT) SHOULI STORAGE COEI DOES NOT I	S SMALLEF D FOR PEF D DEP. S1 D BE SMAL FFICIENT NCLUDE B/	R THAN T RVIOUS I torage LLER OR ASEFLOW	TIME STE LOSSES: (Above) EQUAL IF ANY.	P!		
$\begin{vmatrix} ADD HYD & ( 0023) \\ 1 + 2 = 3 \end{vmatrix}$ $+ ID1 = 1 \begin{cases} 01 \\ 1D2 = 2 \end{cases} \begin{pmatrix} 01 \\ 01 \end{bmatrix}$	AR (h: 62): 10.; 67): 9.	EA OPF a) (cr 84 1.49 33 0.61	EAK ns) 56 2 14	TPEAK (hrs) 2.75 3.17	R.V. (mm) 64.38 65.74		
ID = 3 ( 00	23): 20.3	17 1.98	83 2	2.75	65.01		

ADD HYD ( 0023) 3 + 2 = 1 ID1= 3 ( 0023): + ID2= 2 ( 0169):	AREA (ha) 20.17 2.34	QPEAK (cms) 1.983 0.464	TPEAK (hrs) 2.75 2.75	R.V. (mm) 65.01 75.83	
ID = 1 ( 0023):	22.51	2.447	2.75	66.13	
NOTE: PEAK FLOWS D	O NOT INCL	UDE BASEFL	OWS IF AN	IY.	
ADD HYD ( 0023) 1 + 2 = 3 ID1= 1 ( 0023):	AREA (ha) 22.51	QPEAK (cms) 2.447	TPEAK (hrs) 2.75	R.V. (mm) 66.13	
+ ID2= 2 ( 2300):	721.27	47.162	2.83	69.95	
ID = 3 (0023):	743.78	49.273	2.83	69.83	
NOTE: PEAK FLOWS D	O NOT INCL	UDE BASEFL	OWS IF AN	IY.	
ADD HYD ( 0023) 3 + 2 = 1 ID1= 3 ( 0023): + ID2= 2 ( 0024):	AREA (ha) 743.78 7.52	QPEAK (cms) 49.273 1.488	TPEAK (hrs) 2.83 2.75	R.V. (mm) 69.83 75.83	
ID = 1 ( 0023):	751.30	50.403	2.75	69.89	
NOTE: PEAK FLOWS D	O NOT INCL	UDE BASEFL	OWS IF AN	IY.	
ADD HYD ( 0023) 1 + 2 = 3	AREA (ha)	OPEAK (cms)	TPEAK (hrs)	R.V. (mm)	
+ ID2 = 2 (0023):	11.16	0.610	3.42	69.89 39.71	
ID = 3 ( 0023):	762.46	50.693	2.75	69.45	
NOTE: PEAK FLOWS D	O NOT INCL	UDE BASEFL	OWS IF AN	IY.	
$\begin{vmatrix} ADD HYD & (0023) \\ 3 + 2 = 1 \end{vmatrix}$	AREA	QPEAK	ТРЕАК	R.V.	
ID1= 3 ( 0023):	762.46	50.693	(nrs) 2.75	(mm) 69.45	
+ 1D2= 2 ( 0049):	23.15	4.544	2.75	/5.83	
ID = 1 ( 0023):	785.61	55.237	2.75	69.64	
NOTE: PEAK FLOWS D	O NOT INCL	UDE BASEFL	OWS IF AN	IY.	
ADD HYD ( 0023) 1 + 2 = 3 ID1= 1 ( 0023): + ID2= 2 ( 0050):	AREA (ha) 785.61	QPEAK (cms) 55.237 0.613	TPEAK (hrs) 2.75	R.V. (mm) 69.64	
TD = 2 ( 0030):	705 00	EE 745	3.75	60 50	
	795.90	33.743	2.75	09.39	
RESERVOIR( 0042)    IN= 2> OUT= 1     DT= 5.0 min	OVERFLOW (cms) 0.0000 3.0000 3.6000 4.5000 5.3000	IS OFF STORAGE (ha.m.) 0.0000 0.7487 1.0973 1.7943 2.1670	OUTF (cm 24.8 58.0 ****	ELOW IS) 0000 ****	STORAGE (ha.m.) 11.7715 13.1395 14.5671 15.1408 16.0822

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

INFLOW : ID= 2 ( 0 OUTFLOW: ID= 1 ( 0	5.9000 6.4000 7.0000 7.7000 11.2000 AREA (ha) 023) 795.90 042) 795.90	4.3060 5.5883 7.5770 8.6849 10.4726 QPEAK (cms) 0 55.7 0 34.3	******* ******* 0.0000 TPEAK (hrs) 45 2.75 3.25	16.8383 17.6711 18.4932 19.3351 0.0000 R.V. (mm) 69.59 69.59	
PEA TIM MAX	K FLOW RED E SHIFT OF PEA IMUM STORAGE	UCTION [Qou K FLOW USED	ut/Qin](%)= 61 (min)= 30 (ha.m.)= 12	L.61 D.00 2.1745	
ROUTE CHN( 2297)    IN= 2> OUT= 1	Routing tim	e step (min	n)'= 5.00		
< Distanc 0.0 2.2 10.3 36.3 47.4 59.1 65.8 81.5 93.1 104.4 117.8 126.7 138.4 149.6 172.6 194.9 217.8 229.0 240.7 284.6	DATA         FOR         SECT           re         Elevati         204.6           0         203.9         203.9           1         203.8         9           9         204.2         5           5         204.3         6           6         202.8         202.8           0         202.8         202.2           3         200.2         1           1         203.7         7           203.8         202.8         202.8           2         202.6         202.2           3         200.2         1           1         203.7         7           203.8         7         204.2           3         200.2         1           1         203.7         7           203.8         7         204.7           5         205.0         1         205.0           0         205.5         5	ION ( 1.: on Ma 0 0 8 0 0 0 3 0 4 0 4 0 4 0 4 0 5 0 4 0 5 0 6 0 5 0 6 0 5 0 4 0 2 0 0 0 1 0 2 0.0456 6 0	1)> anning .0600 .0450 Mai .0450 Mai	in Channel in Channel	
Cmpt ELEV (m) (m) 0.23 200.17 0.47 200.40 0.70 200.64 0.93 200.87 1.17 201.10 1.40 201.34 1.63 201.57 1.87 201.80 2.10 202.04 2.33 202.27 2.57 202.50 2.80 202.74 3.03 202.97 3.50 203.44 3.73 203.67 3.97 203.90 4.20 204.14 4.55 204.49	TRAVEL VOLUME (cu.m.) .921E+03 .341E+04 .650E+04 .101E+05 .143E+05 .143E+05 .241E+05 .241E+05 .361E+05 .506E+05 .506E+05 .597E+05 .890E+05 .107E+06 .125E+06 .180E+06 .236E+06	TIME TABLE FLOW RATE (cms) 0.2 1.5 3.9 7.3 11.9 17.8 24.9 33.3 43.3 54.5 64.4 74.4 77.3 102.3 133.4 165.8 213.9 301.3	VELOCITY (m/s) 0.20 0.35 0.48 0.59 0.68 0.76 0.84 0.91 0.97 1.03 1.03 1.03 1.03 1.03 1.03 1.03 1.02 1.09 0.93 1.02 1.09 0.91 0.97 1.04	TRAV.TIME (min) 68.84 38.35 27.97 22.96 19.89 17.77 16.18 14.93 13.92 13.12 13.10 13.37 15.62 14.50 13.33 12.40 14.92 14.04 13.04	
INFLOW : ID= 2 ( 0 OUTFLOW: ID= 1 ( 2	AREA (ha) 042) 795.90 297) 795.90	< hydro QPEAK (cms) 34.34 28.84	ograph> TPEAK R.V. (hrs) (mm) 3.25 69.59 3.50 69.59	<-pipe / cl MAX DEPTH (m) 1.89 1.74	hannel-> MAX VEL (m/s) 0.91 0.87
CALIB NASHYD (0030) ID= 1 DT= 5.0 min	Area (ha)= Ia (mm)= U.H. Tp(hrs)=	6.79 ( 5.00 ; 0.76	Curve Number # of Linear Re	(CN)= 79.0 es.(N)= 3.00	

TIME hrs 0.083 0.167 0.255 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583 Unit Hyd Qpeak	RAIN   mm/hr 0.00 0.000 1.61 1.61 1.61 1.61 1.61 1.6	TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.417 2.500 2.583 2.667 2.750 2.833 2.667 2.750 3.000 3.083 3.167 0.341	NSFORME RAIN mm/hr 9.64 9.64 27.30 27.30 27.30 27.30 27.30 27.30 27.30 73.88 73.88 73.88 73.88 73.88 73.88 20.88 20.88 20.88 20.88	D HYETOGR/ TIME hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750	APH RAIN mm/hr 20.88 11.24 11.24 11.24 11.24 11.24 11.24 11.24 6.42 6.42 6.42 6.42 6.42 6.42 6.42 6	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.58 5.67 5.75 5.83 5.92 6.00 6.17 6.25	RAIN nmm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6			
PEAK FLOW       (cms)=       0.352 (i)         TIME TO PEAK       (hrs)=       3.500         RUNOFF VOLUME       (mm)=       39.708         TOTAL RAINFALL       (mm)=       80.310         RUNOFF COEFFICIENT       =       0.494										
(i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.										
CALIB STANDHYD ( 0029) ID= 1 DT= 5.0 min Surface Area Dep. Storage Average Slope Length Mannings n NOTE: RAINF	Area Total Im (ha)= (mm)= (%)= (m)= =	(ha)= np(%)= 9 IMPERVIOU 7.21 1.00 231.08 0.013 RANSFORME	8.01 0.00 S PE	Dir. Conn RVIOUS (i) 0.80 5.00 2.00 40.00 0.250 5.0 MIN.	.(%)= 9 ) TIME STE	0.00 P.				
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.667 1.000 1.083 1.167 1.250 1.333 1.417 1.500	RAIN   mm/hr   0.00 0.000   1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6	TRA TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	NSFORME RAIN mm/hr 9.64 27.30 27.30 27.30 27.30 27.30 27.30 73.88 73.88 73.88 73.88 73.88 73.88 73.88 20.88 20.88 20.88 20.88	D HYETOGR/ TIME hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750	APH RAIN mm/hr 20.88 11.24 11.24 11.24 11.24 11.24 11.24 11.24 11.24 6.42 6.42 6.42 6.42 6.42 6.42 6.42 3.21 3.21 3.21 3.21 3.21	TIME   hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.50 5.58 5.58 5.75 5.83 5.75 5.83 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6			
Max.Eff.Inten.(n over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	m/hr)= (min)= (min)= (cms)= (cms)= (hrs)= (mm)= (mm)= SNT =	73.88 5.00 4.77 5.00 0.22 1.48 2.75 79.31 80.31 0.99	(ii)	52.93 10.00 8.07 (ii) 10.00 0.13 0.11 2.75 44.54 80.31 0.55	) *TOT 1. 2 75 80 0	ALS* 584 (iii) .75 .83 .31 .94	)			
(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 83.0 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 ( 00 ID= 1 DT= 5.0	051) Area min Total	(ha)= 7. Imp(%)= 90.	81 00 Dir. Conr	n.(%)= 90	0.00	
Surface Ard Dep. Stora Average Slu Length Mannings n	ea (ha)= ge (mm)= ope (%)= (m)= =	IMPERVIOUS 7.03 1.00 1.00 228.18 0.013	PERVIOUS (1 0.78 5.00 2.00 40.00 0.250	i) TIME STEE		
NOTE.	TIME         RAIN           hrs         mm/hr           0.083         0.00           0.167         0.00           0.250         0.00           0.333         1.61           0.500         1.61           0.500         1.61           0.501         1.61           0.667         1.61           0.750         1.61           0.917         1.61           1.000         1.61           1.083         1.61           1.250         1.61           1.333         9.64           1.417         9.64           1.500         9.64	TRANS TIME hrs m 1.667 1.750 1.833 2 1.917 2 2.000 2 2.083 2 2.167 2 2.250 2 2.333 7 2.417 7 2.583 2 2.591 7 2.583 2 2.591 7 2.583 7 2.591 7 2.583 7 2.583 7 2.591 7 2.583 2 2.591 7 2.583 7 3.000 2 3.083 2 3.083 2 3.085 2 3.067 7 3.085 2 3.085 2 3.085 2 3.067 7 3.085 2 3.085 2 3.085 2 3.085 2 3.067 7 3.085 2 3.085 2 3.085 2 3.067 7 3.085 2 3.067 7 3.085 2 3.067 7 3.067 7 3.077 7 3.077 7 3.077 7 3.077 7 3.077 7 3.077 7	FORMED HYETOGF RAIN   ' TIME m/hr   ' hrs 9.64   3.250 9.64   3.250 9.64   3.333 7.30   3.417 7.30   3.583 7.30   3.550 7.30   3.550 7.	APH RAIN   mm/hr   20.88   11.24   12.21   3.21   3.21	TIME hrs 4.83 4.92 5.00 5.25 5.33 5.42 5.50 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.Eff.In Storage Co Unit Hyd. Unit Hyd. PEAK FLOW TIME TO PE RUNOFF VOLI TOTAL RAIN RUNOFF COE ****** WARNING: (i) CN PI CN* (ii) TIME THAN (iii) PEAK	ten.(mm/hr)= over (min) eff. (min)= Tpeak (min)= peak (cms)= (cms)= AK (hrs)= AK (hrs)= FALL (mm)= FALL (mm)= FFICIENT = STORAGE COEFF. ROCEDURE SELECC = 83.0 II STEP (DT) SHOU THE STORAGE CO FLOW DOES NOT	73.88 5.00 4.73 (i 5.00 0.22 1.44 2.75 79.31 80.31 0.99 IS SMALLER TED FOR PERV. a = Dep. Sto ULD BE SMALL DEFFICIENT. INCLUDE BAS	52.93 10.00 i) 8.04 (ii 10.00 0.13 0.10 2.75 44.54 80.31 0.55 THAN TIME STEP IOUS LOSSES: rage (Above) ER OR EQUAL EFLOW IF ANY.	*TOTA 1.5 2. 75. 80. 0.	ALS* 645 (iii) 75 83 31 94	

RESERVOIR( 0053	) OVERFLO	OVERFLOW IS OFF					
DT= 5.0 min	OUTFLO	W STOR (ha.) 0 0.0	AGE   m.)   000	OUTFLOW (cms) 0.3770	STORAGE (ha.m.) 0.2845		
INFLOW : ID= 2 OUTFLOW: ID= 1	( 0051) ( 0053)	AREA (ha) 7.810 7.810	QPEAK (cms) 1.545 0.445	TPEAK (hrs) 2.75 3.25	R.V. (mm) 75.83 75.81		
	PEAK FLOW TIME SHIFT O MAXIMUM STO	REDUCTI F PEAK FL RAGE US	ON [Qout/ DW ED	(Qin](%)= 23 (min)= 30 (ha.m.)= 0	8.79 0.00 0.3357		

IMPERVIOUS         PERVIOUS         (i)           Surface Area         A.95         2.52           Dep. Storage         (m)=         1.00         5.00           Average Slope         (m)=         207.69         40.00           Mannings n         =         0.013         0.250           NOTE:         RAINFALL WAS TRANSFORMED TO         S.0 MIN. TIME STEP.           TIME         RAIN         TIME RAIN         TIME RAIN         TIME RAIN           hrs <mm hr<="" td="">         hrs<mm hr<="" td="">         hrs<mm hr<="" td="">         hrs<mm hr<="" td="">         hrs<mm hr<="" td="">           0.033         0.00         1.667         9.64         3.333         11.24         4.92         1.61           0.167         0.00         1.750         9.64         3.333         11.24         5.00         1.61           0.333         1.61         1.917         27.30         3.500         11.24         5.08         1.61           0.417         1.61         2.000         27.30         3.833         1.42         5.17         1.61           0.500         1.61         2.033         7.388         4.000         6.42         5.58         1.61           0.667         1.61         2.250         27.</mm></mm></mm></mm></mm>	IMPERVIOUS Area (ha)= 3.95 orage (mm)= 1.00 Slope (%)= 1.00 (m)= 207.69 IS n = 0.013 TIME RAIN   TIME hrs mm/hr   hrs m 0.083 0.001 1.657	PERVIOUS (i) 2.52 5.00 1.00 40.00 0.250 TO 5.0 MIN. TIME STEP	
Dep. Storage (m) = 1.00 5.00 Average Slope (%) = 1.00 1.00 Length (m) = 207.69 40.00 Mannings n = 0.013 0.250 NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP. TIME RAIN   TIME	Area       (ha)=       5.95         sorage       (m)=       1.00         Slope       (%)=       1.00         (m)=       207.69         [s n       =       0.013         TE:       RAINFALL WAS TRANSFORMED         TRANS         TIME       RAIN   TIME         hrs       mm/hr   hrs       m         0.083       0.001       4.57	2.52 5.00 1.00 40.00 0.250 TO 5.0 MIN. TIME STEP	
Average STBpe       (0)       1.00       1.00         Length       (m) =       207.69       40.00         Mannings n       =       0.013       0.250         NOTE:       RAINFALL WAS TRANSFORMED TO       5.0 MIN. TIME STEP.         TTME RAIN       TIME RAIN         hrs       mm/hr       hrs       mm/hr         hrs       mm/hr       hrs       mm/hr         0.083       0.00       1.667       9.64       3.250         0.083       0.00       1.750       9.64       3.333       1.24       4.92         0.167       0.00       1.670       9.64       3.333       1.24       4.92       1.61         0.250       0.00       1.833       27.30       3.667       1.24       5.00       1.61         0.417       1.61       2.000       27.30       3.750       11.24       5.01       1.61         0.533       1.61       2.167       27.30       3.750       1.24       5.20       1.61         0.750       1.61       2.333       73.88       4.000       6.42       5.58       1.61         1.083       1.61       2.667       73.88       4.250 <td< td=""><td>: Slope (%)= 1.00 (m)= 207.69 js n = 0.013 TE: RAINFALL WAS TRANSFORMED  TRANS TIME RAIN   TIME hrs mm/hr   hrs m</td><td>1.00 40.00 0.250 TO 5.0 MIN. TIME STEP</td><td></td></td<>	: Slope (%)= 1.00 (m)= 207.69 js n = 0.013 TE: RAINFALL WAS TRANSFORMED TRANS TIME RAIN   TIME hrs mm/hr   hrs m	1.00 40.00 0.250 TO 5.0 MIN. TIME STEP	
Length (m)= 207.69 40.00 Mannings n = 0.013 0.250 NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP. TIME RAIN   TIME RAIN   TIME RAIN   TIME RAIN hrs mm/hr   hrs mm/hr   hrs mm/hr   hrs mm/hr   hrs mm/hr 0.083 0.00 1.667 9.64 3.333 11.24 4.83 1.61 0.167 0.00 1.750 9.64 3.333 11.24 4.92 1.61 0.250 0.00 1.750 9.64 3.333 11.24 5.08 1.61 0.333 1.61 1.917 27.30 3.500 11.24 5.08 1.61 0.417 1.61 2.000 27.30 3.583 11.24 5.17 1.61 0.500 1.61 2.083 27.30 3.667 11.24 5.25 1.61 0.531 1.61 2.250 27.30 3.687 11.24 5.25 1.61 0.750 1.61 2.250 27.30 3.883 6.42 5.42 1.61 0.750 1.61 2.250 73.88 4.000 6.42 5.58 1.61 0.933 1.61 2.417 73.88 4.000 6.42 5.58 1.61 0.933 1.61 2.500 73.88 4.056 6.42 5.58 1.61 1.000 1.61 2.580 73.88 4.050 6.42 5.58 1.61 1.033 1.61 2.67 73.88 4.050 6.42 5.58 1.61 1.033 1.61 2.667 73.88 4.050 6.42 5.58 1.61 1.033 1.61 2.680 73.88 4.050 6.42 5.58 1.61 1.033 1.61 2.630 73.88 4.667 3.21 6.25 1.61 1.033 9.64 2.917 20.88 4.450 6.42 5.75 1.61 1.1417 9.64 3.000 20.88 4.583 3.21 6.00 1.61 1.417 9.64 3.082 20.88 4.467 3.21 6.25 1.61 1.530 9.64 3.083 20.88 4.667 3.21 6.25 1.61 1.531 9.64 3.082 20.88 4.450 3.21 6.08 1.61 1.533 9.64 3.087 20.88 4.750 3.21 [ 0.07 1.61] 1.550 9.64 3.083 20.88 4.667 3.21 6.25 1.61 1.551 1.61 2.633 70.88 4.750 3.21 [ 0.07 1.61] 1.553 9.64 3.083 20.88 4.750 3.21 [ 0.07 1.61] 1.553 9.64 3.083 20.88 4.750 3.21 [ 0.07 1.61] 1.561 1.553 9.64 3.083 20.88 4.667 3.21 [ 0.25 1.61] 1.561	(m)= 207.69 sn = 0.013 TE: RAINFALL WAS TRANSFORMED TRANS TIME RAIN   TIME hrs mm/hr   hrs m 0.083 0.001   567	40.00 0.250 TO 5.0 MIN. TIME STEP	
Maintings n         =         0.013         0.230           NOTE:         RAINFALL WAS TRANSFORMED TO         5.0 MIN. TIME STEP.           TIME RAIN	IS N = 0.013 TE: RAINFALL WAS TRANSFORMED TRANS TIME RAIN   TIME hrs mm/hr   hrs m 0.083 0.001 1.657	TO 5.0 MIN. TIME STEP	
NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP. TIME RAIN   TIME RAIN  ' TIME RAIN   TIME RAIN hrs mm/hr   hrs mm/hr   hrs mm/hr   hrs mm/hr   hrs mm/hr 0.083 0.00 1.667 9.64 3.250 20.088   4.83 1.61 0.167 0.00 1.750 9.64 3.233 11.24 4.22 1.61 0.333 1.61 1.917 27.30 3.600 11.24 5.08 1.61 0.333 1.61 2.083 27.30 3.647 11.24 5.08 1.61 0.500 1.61 2.083 27.30 3.500 11.24 5.25 1.61 0.501 1.61 2.208 27.30 3.566 11.24 5.25 1.61 0.583 1.61 2.167 72.30 3.750 11.24 5.25 1.61 0.667 1.61 2.250 27.30 3.667 11.24 5.25 1.61 0.667 1.61 2.250 73.88 4.000 6.42 5.58 1.61 0.750 1.61 2.583 73.88 3.917 6.42 5.50 1.61 1.000 1.61 2.583 73.88 4.000 6.42 5.58 1.61 1.001 1.61 2.583 73.88 4.003 6.42 5.56 1.61 1.003 1.61 2.667 73.88 4.250 6.42 5.58 1.61 1.033 1.61 2.667 73.88 4.453 3.21 6.12 1.500 9.64 3.002 20.88 4.457 3.21 6.00 1.61 1.47 9.64 3.000 20.88 4.457 3.21 6.00 1.61 1.583 9.64 2.917 20.88 4.500 3.21 6.07 1.61 1.583 9.64 3.083 20.88 4.667 3.21 6.07 1.61 1.583 9.64 3.083 20.88 4.667 3.21 6.07 1.61 1.583 9.64 3.083 20.88 4.667 3.21 6.25 1.61 1.583 9.64 3.083 20.80 4.583 3.21 6.17 1.61 1.583 9.64 3.161 2.083 1.61 1.47 9.50 20.00 Storage Coeff. (min) 5.00 20.00 Unit Hyd. Tpeak (min) 5.00 2.65 0.82 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! () CN PROCEDURE SELECTED FOR PERVIOUS LOSES: (N* = 83.0 I a Dep. Storage (Above) (i) TIME STEP (0T) SHOULD BE SMALLER N TANY. ****** WARNING: STOR	TE: RAINFALL WAS TRANSFORMED TRANS TIME RAIN   TIME hrs mm/hr   hrs m 0.083 0.001 1.657	TO 5.0 MIN. TIME STEP	
TANS FORMED, HYETOGRAPH           TIME         RAIN         TIME <td> TRANS TIME RAIN   TIME hrs mm/hr   hrs m 0.023 0 00 1 557</td> <td></td> <td><u>.</u></td>	TRANS TIME RAIN   TIME hrs mm/hr   hrs m 0.023 0 00 1 557		<u>.</u>
hrs         mm/hr         hrs         hrs         hrs         hrs         hrs         hrs         hrs         hrs          hotho         hoto	hrs mm/hr   hrs m	FORMED HYETOGRAPH RAIN  ' TIME RAIN	TIME RAIN
0.083 0.00 1.750 9.64 3.233 11.24 4.92 1.61 0.250 0.00 1.833 27.30 3.417 11.24 5.00 1.61 0.333 1.61 1.917 27.30 3.500 11.24 5.08 1.61 0.417 1.61 2.000 27.30 3.583 11.24 5.17 1.61 0.500 1.61 2.083 27.30 3.667 11.24 5.25 1.61 0.583 1.61 2.167 27.30 3.750 11.24 5.33 1.61 0.667 1.61 2.250 27.30 3.750 11.24 5.33 1.61 0.750 1.61 2.250 27.30 3.750 11.24 5.33 1.61 0.833 1.61 2.417 73.88 4.000 6.42 5.42 1.61 0.833 1.61 2.417 73.88 4.000 6.42 5.83 1.61 0.833 1.61 2.417 73.88 4.006 6.42 5.83 1.61 1.000 1.61 2.583 73.88 4.167 6.42 5.75 1.61 1.003 1.61 2.637 73.88 4.083 6.42 5.67 1.61 1.003 1.61 2.637 73.88 4.403 6.42 5.75 1.61 1.167 1.61 2.750 73.88 4.403 6.42 5.75 1.61 1.167 1.61 2.833 70.88 4.403 6.42 5.75 1.61 1.167 1.61 2.833 70.88 4.4167 6.42 5.75 1.61 1.169 1.61 2.833 70.88 4.4167 6.42 5.75 1.61 1.1750 1.61 2.833 20.88 4.417 3.21 6.00 1.61 1.333 9.64 2.917 20.88 4.500 3.21 6.08 1.61 1.133 9.64 3.000 20.88 4.563 3.21 6.07 1.61 1.500 9.64 3.002 20.88 4.667 3.21 6.05 1.61 1.533 9.64 3.167 20.80 (20.00 Unit Hyd. peak (cms)= 0.23 0.07 *TOTALS* PEAK FLOW (cms)= 0.81 0.26 1.048 ((iii) UNIT Hyd. peak (cms)= 0.23 0.07 *TOTALS* PEAK FLOW (cms)= 0.81 0.26 1.048 ((iii) TIME TO PEAK (hrs)= 2.75 2.92 2.75 RUNOFF VOLIME (mm)= 79.31 44.54 65.75 TOTAL RAINFALL (mm)= 80.31 80.31 80.31 RUNOFF COEFFLCIENT = 0.99 0.55 0.82 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 83.0 Ia = Dep. Storage (Above) (ii) TIME STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 83.0 Ia = Dep. Storage (Above) (ii) TIME STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 83.0 Ia = Dep. Storage (Above) (ii) TIME STORAGE COEFF.ICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.		m/hr 'hrs_mm/hr	hrs mm/hr
0.250 0.00 1.833 27.30 3.417 11.24 5.00 1.61 0.333 1.61 1.917 27.30 3.500 11.24 5.08 1.61 0.417 1.61 2.000 27.30 3.500 11.24 5.25 1.61 0.500 1.61 2.083 27.30 3.667 11.24 5.25 1.61 0.583 1.61 2.167 27.30 3.750 11.24 5.33 1.61 0.667 1.61 2.250 27.30 3.833 6.42 5.42 1.61 0.750 1.61 2.337 73.88 3.917 6.42 5.50 1.61 0.917 1.61 2.500 73.88 4.000 6.42 5.58 1.61 1.003 1.61 2.583 73.88 4.000 6.42 5.58 1.61 1.003 1.61 2.583 73.88 4.167 6.42 5.75 1.61 1.083 1.61 2.667 73.88 4.405 6.42 5.75 1.61 1.167 1.61 2.750 73.88 4.4157 6.42 5.75 1.61 1.250 1.61 2.833 20.88 4.417 3.21 6.00 1.61 1.333 9.64 2.917 20.88 4.503 3.21 6.08 1.61 1.417 9.64 3.000 20.88 4.583 3.21 6.08 1.61 1.583 9.64 3.167 20.88 4.503 3.21 6.02 1.61 1.583 9.64 3.167 20.88 4.503 3.21 6.02 1.61 1.583 9.64 3.167 20.88 4.503 3.21 6.25 1.61 1.583 9.64 3.167 20.88 4.533 3.21 6.25 1.61 1.583 9.64 3.167 20.88 4.533 3.21 6.25 1.61 1.583 9.64 3.167 20.88 4.553 3.21 6.25 1.61 1.583 9.64 3.107 20.88 4.553 3.21 6.25 1.61 1.583 9.64 3.107 20.00 20.00 Unit Hyd. peak (mm)= 79.31 44.54 65.75 TOTALS* PEAK FLOW (cms)= 0.81 0.26 1.048 (iiii) TIME TO PEAK (hrrs)= 2.75 2.92 2.75 RUNOFF VOLUME SALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CM* = 83.0 I a = Dep. Storage (Above) (ii) TIME STORAGE COEFF.IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CM* = 83.0 I a = Dep. Storage (Move) (ii) TIME STEP (DT) SHOLD BE SMALLER OR EQUAL THAN THE STORAGE COEFF.IS OFF IM=2 OU	0.167 0.00 1.750	9.64 3.333 11.24	4.83 1.61
0.333 1.61 1.917 27.30 3.500 11.24 5.08 1.61 0.417 1.61 2.000 27.30 3.567 11.24 5.17 1.61 0.500 1.61 2.063 27.30 3.667 11.24 5.25 1.61 0.583 1.61 2.167 27.30 3.750 11.24 5.33 1.61 0.667 1.61 2.250 27.30 3.750 11.24 5.33 1.61 0.633 1.61 2.417 73.88 4.000 6.42 5.50 1.61 1.000 1.61 2.583 73.88 4.008 6.42 5.58 1.61 0.917 1.61 2.500 73.88 4.083 6.42 5.75 1.61 1.000 1.61 2.583 73.88 4.106 6.42 5.75 1.61 1.003 1.61 2.667 73.88 4.250 6.42 5.75 1.61 1.167 1.61 2.750 73.88 4.333 3.21 5.92 1.61 1.250 1.61 2.833 20.88 4.417 3.21 6.00 1.61 1.333 9.64 2.917 20.88 4.500 3.21 6.08 1.61 1.417 9.64 3.000 20.88 4.500 3.21 6.08 1.61 1.500 9.64 3.083 20.88 4.4667 3.21 6.07 1.61 1.583 9.64 3.167 20.88 4.750 3.21 6.17 1.61 1.583 9.64 3.167 20.88 4.750 3.21 6.25 1.61 1.583 9.64 3.083 20.88 4.667 3.21 6.25 1.61 1.583 9.64 3.083 20.80 4.657 3.21 6.25 1.61 1.583 9.64 3.083 20.80 4.4500 3.21 Max.Eff.Inten.(mm/hr)= 73.88 51.42 over (min) 5.00 20.00 Unit Hyd. Tpeak (min)= 4.47 (ij) 15.81 (ij) Unit Hyd. Tpeak (min)= 5.00 20.00 Storage Coeff. (min)= 4.47 (ij) 15.81 (ij) Unit Hyd. Tpeak (cms)= 0.23 0.07 *TOTALS* PEAK FLOW (cms)= 0.81 0.26 1.048 (iji) TIME TO PEAK (hrs)= 2.75 2.92 2.75 RUNOFF VOLUME (mm)= 79.31 44.54 65.75 TOTAL RAINFALL (mm)= 80.31 80.31 80.31 RUNOFF COEFFICIENT = 0.99 0.55 0.82 ****** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CM* = 83.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFF. IS SMALLER NEEP! (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. ****** WARNING: STORAGE COEFFLOENT. RESERVOIR( 0054) OVERFLOW IS OFF IM= 2> OUT= 1 DT= 5.0 min 0 OVERFLOW IS OFF IM= 2> OUT= 1 DT= 5.0 min 0 OVERFLOW IS OFF IM= 2> OUT= 1 DT= 5.0 min 0 OVERFLOW STORAGE 0 OUTFLOW STORAGE 0 CM A.M.) 0.0000 0.0000 0.0000 0.4900 0.2144	0.250 0.00 1.833 2	27.30 3.417 11.24	5.00 1.61
0.41/         1.61         2.083         27.30         3.667         11.24         5.25           0.583         1.61         2.167         27.30         3.750         11.24         5.33         1.61           0.667         1.61         2.250         27.30         3.833         6.42         5.50         1.61           0.750         1.61         2.250         27.30         3.833         6.42         5.58         1.61           0.833         1.61         2.417         73.88         4.000         6.42         5.58         1.61           0.917         1.61         2.500         73.88         4.083         6.42         5.75         1.61           1.000         1.61         2.507         73.88         4.403         6.42         5.83         1.61           1.607         1.61         2.750         73.88         4.433         3.21         5.92         1.61           1.417         9.64         3.083         20.88         4.433         3.21         6.08         1.61           1.417         9.64         3.083         20.88         4.567         3.21         6.17         1.61           1.583         9.64         3.167 <td>0.333 1.61 1.917 2</td> <td>7.30 3.500 11.24</td> <td>5.08 1.61</td>	0.333 1.61 1.917 2	7.30 3.500 11.24	5.08 1.61
0.583         1.61         2.167         27.30         3.750         11.24         5.33         1.61           0.667         1.61         2.250         27.30         3.833         6.42         5.42         1.61           0.750         1.61         2.333         73.88         4.000         6.42         5.58         1.61           0.833         1.61         2.417         73.88         4.000         6.42         5.58         1.61           0.917         1.61         2.500         73.88         4.083         6.42         5.67         1.61           1.000         1.61         2.583         73.88         4.083         6.42         5.75         1.61           1.083         1.61         2.667         73.88         4.4250         6.42         5.83         1.61           1.67         1.61         2.750         73.88         4.417         3.21         6.00         1.61           1.550         1.61         2.833         20.88         4.503         3.21         6.17         1.61           1.500         9.64         3.063         20.88         4.667         3.21         6.25         1.61           1.500         9.64	0.500 1.61 2.083 2	7.30 3.667 11.24	5.25 1.61
0.667 1.61 2.250 27.30 3.833 6.42 5.42 1.61 0.750 1.61 2.333 73.88 3.917 6.42 5.50 1.61 0.833 1.61 2.417 73.88 4.000 6.42 5.58 1.61 1.000 1.61 2.583 73.88 4.083 6.42 5.67 1.61 1.083 1.61 2.667 73.88 4.250 6.42 5.75 1.61 1.083 1.61 2.667 73.88 4.250 6.42 5.75 1.61 1.250 1.61 2.750 73.88 4.433 3.21 5.92 1.61 1.250 1.61 2.833 20.88 4.417 3.21 6.00 1.61 1.333 9.64 2.917 20.88 4.500 3.21 6.08 1.61 1.417 9.64 3.000 20.88 4.583 3.21 6.17 1.61 1.500 9.64 3.083 20.88 4.667 3.21 6.25 1.61 1.500 9.64 3.083 20.88 4.667 3.21 6.25 1.61 1.583 9.64 3.167 20.88 4.750 3.21 Max.Eff.Inten.(mm/hr)= 73.88 51.42 over (min) 5.00 20.00 Storage Coeff. (min)= 4.47 (ii) 15.81 (ii) Unit Hyd. Tpeak (min)= 5.00 20.00 Unit Hyd. peak (cms)= 0.23 0.07 *TOTALS* PEAK FLOW (cms)= 0.81 0.26 1.048 (iii) TIME TO PEAK (hrs)= 2.75 2.92 2.75 RUNOFF VOLUME (mm)= 79.31 44.54 65.75 TOTAL RAINFALL (mm)= 80.31 80.31 80.31 RUNOFF COEFFICIENT = 0.99 0.55 0.82 ****** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 83.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFF. IS SMALLER OR EQUAL THAN THE STORAGE COEFF. IS OFF [IN= 2> OUT= 1] DT= 5.0 min OVERFLOW IS OFF [IN= 2> OUT= 1 DT= 5.0 min OVERFLOW IS OFF	0.583 1.61 2.167 2	7.30 3.750 11.24	5.33 1.61
0.750 1.61 2.333 73.88 3.917 6.42 5.50 1.61 0.833 1.61 2.417 73.88 4.000 6.42 5.58 1.61 1.000 1.61 2.583 73.88 4.083 6.42 5.67 1.61 1.003 1.61 2.583 73.88 4.167 6.42 5.75 1.61 1.003 1.61 2.583 73.88 4.250 6.42 5.83 1.61 1.167 1.61 2.750 73.88 4.250 6.42 5.83 1.61 1.250 1.61 2.833 20.88 4.417 3.21 6.00 1.61 1.333 9.64 2.917 20.88 4.500 3.21 6.08 1.61 1.417 9.64 3.000 20.88 4.560 3.21 6.25 1.61 1.500 9.64 3.083 20.88 4.667 3.21 6.25 1.61 1.583 9.64 3.167 20.88 4.750 3.21 Max.Eff.Inten.(mm/hr)= 73.88 51.42 over (min) 5.00 20.00 Unit Hyd. Tpeak (min)= 4.47 (ii) 15.81 (ii) Unit Hyd. Tpeak (min)= 5.00 20.00 Unit Hyd. peak (cms)= 0.23 0.07 *TOTALS* PEAK FLOW (cms)= 0.81 0.26 1.048 (iii) TIME TO PEAK (hrs)= 2.75 2.92 2.75 RUNOFF VOLUME (mm)= 79.31 44.54 65.75 TOTAL RAINFALL (mm)= 80.31 80.31 80.31 RUNOFF COEFFLCIENT = 0.99 0.55 0.82 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 83.0 Ia = Dep. Storage (Above) (ii) TIME STEP (D) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFF. IS OFF IN= 2> OUT= 1 DT= 5.0 min 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 0.4900 0.2144	0.667 1.61 2.250 2	7.30 3.833 6.42	5.42 1.61
0.053 1.01 2.417 73.00 4.000 0.42 5.87 1.61 0.917 1.61 2.500 73.88 4.083 6.42 5.67 1.61 1.000 1.61 2.583 73.88 4.167 6.42 5.75 1.61 1.083 1.61 2.667 73.88 4.250 6.42 5.83 1.61 1.167 1.61 2.833 20.88 4.333 3.21 5.92 1.61 1.250 1.61 2.833 20.88 4.417 3.21 6.00 1.61 1.333 9.64 2.917 20.88 4.500 3.21 6.08 1.61 1.417 9.64 3.000 20.88 4.583 3.21 6.17 1.61 1.583 9.64 3.167 20.88 4.567 3.21 6.25 1.61 1.583 9.64 3.167 20.88 4.750 3.21 7.61 1.583 9.64 3.167 20.88 4.750 3.21 7.61 1.048 (iii) Unit Hyd. Tpeak (min)= 5.00 20.00 Vinit Hyd. Tpeak (min)= 5.00 20.00 Unit Hyd. Tpeak (min)= 5.00 20.00 Unit Hyd. Tpeak (min)= 5.00 20.00 Unit Hyd. Tpeak (min)= 79.31 44.54 65.75 TOTALS* RUNOFF VOLUME (mm)= 79.31 44.54 65.75 0.82 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 83.0 Ia = Dep. Storage (Above) (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFF.ICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.		3.88 3.917 6.42	5.50 1.61
1.000       1.61       2.583       73.88       4.167       6.42       5.75       1.61         1.083       1.61       2.667       73.88       4.250       6.42       5.83       1.61         1.167       1.61       2.750       73.88       4.333       3.21       5.92       1.61         1.250       1.61       2.833       20.88       4.417       3.21       6.00       1.61         1.333       9.64       2.917       20.88       4.503       3.21       6.08       1.61         1.417       9.64       3.003       20.88       4.583       3.21       6.17       1.61         1.500       9.64       3.083       20.88       4.667       3.21       6.25       1.61         1.583       9.64       3.167       20.88       4.750       3.21       6.25       1.61         1.583       9.64       3.167       20.88       4.750       3.21       6.25       1.61         1.583       9.64       3.167       20.88       4.750       3.21       6.25       1.61         1.583       9.64       3.167       20.88       1.42       5.75       3.21       75       75       2.92 </td <td>0.035 1.01 2.41/ /</td> <td>3.88 4.083 6.42</td> <td>5.67 1.61</td>	0.035 1.01 2.41/ /	3.88 4.083 6.42	5.67 1.61
1.083       1.61       2.667       73.88       4.250       6.42       5.83       1.61         1.167       1.61       2.750       73.88       4.333       3.21       5.92       1.61         1.250       1.61       2.730       73.88       4.417       3.21       5.00       5.92       1.61         1.333       9.64       2.917       20.88       4.417       3.21       6.00       1.61         1.417       9.64       3.000       20.88       4.583       3.21       6.17       1.61         1.500       9.64       3.083       20.88       4.667       3.21       6.25       1.61         1.583       9.64       3.167       20.88       4.750       3.21       6.17       1.61         1.583       9.64       3.167       20.88       4.750       3.21       6.25       1.61         1.583       9.64       3.167       20.88       4.750       3.21       6.25       1.61         1.583       9.64       3.167       20.88       5.142       0.200       0.200       0.00         Unit Hyd. peak (min)=       5.00       20.00       75       0.75       75       2.92       2.75	1.000 1.61 2.583 7	3.88 4.167 6.42	5.75 1.61
1.16/       1.61       2.750       73.88       4.437       3.21       5.92       1.61         1.250       1.61       2.833       20.88       4.417       3.21       6.00       1.61         1.333       9.64       2.917       20.88       4.500       3.21       6.08       1.61         1.417       9.64       3.000       20.88       4.567       3.21       6.17       1.61         1.500       9.64       3.083       20.88       4.667       3.21       6.25       1.61         1.583       9.64       3.167       20.88       4.667       3.21       6.25       1.61         1.583       9.64       3.167       20.88       4.750       3.21       6.25       1.61         1.583       9.64       3.167       20.88       4.750       3.21       6.25       1.61         1.583       9.64       3.167       20.88       4.750       3.21       6.25       1.61         1.583       9.64       3.167       20.00       20.00       3.21       6.25       1.61         1.041       1.683       9.64       3.167       20.00       75       77       77       77       77	1.083 1.61 2.667 7	3.88 4.250 6.42	5.83 1.61
1.333       9.64       2.917       20.88       4.500       3.21       6.00       1.61         1.417       9.64       3.000       20.88       4.583       3.21       6.17       1.61         1.500       9.64       3.083       20.88       4.667       3.21       6.25       1.61         1.583       9.64       3.167       20.88       4.750       3.21       6.25       1.61         1.583       9.64       3.167       20.88       4.750       3.21       6.25       1.61         1.583       9.64       3.167       20.88       4.750       3.21       6.25       1.61         1.583       9.64       3.167       20.88       4.750       3.21       6.25       1.61         1.583       9.64       3.063       20.00       3.21       6.25       1.61         Unit Hyd. peak       (cms)=       0.23       0.00       7       *TOTALS*         PEAK       FLOW       (cms)=       0.81       0.26       1.048       (iii)         TIME TO PEAK       (hrs)=       2.75       2.92       2.75       1.048       63.31         RUNOFF VOLUME       (mm)=       79.31       44.54	1.16/ 1.61   2.750 7	3.88 4.333 3.21	5.92 1.61
1.417       9.64       3.000       20.88       4.583       3.21       6.17       1.61         1.500       9.64       3.083       20.88       4.667       3.21       6.25       1.61         1.583       9.64       3.167       20.88       4.667       3.21       6.25       1.61         1.583       9.64       3.167       20.88       4.667       3.21       6.25       1.61         Max.Eff.Inten.(mm/hr)=       73.88       \$1.42       0.00       3.21       6.25       1.61         Max.Eff.Inten.(mm/hr)=       73.88       \$1.42       0.00       0.00       3.21       6.25       1.61         Max.Eff.Inten.(mm/hr)=       5.00       20.00       70       ************************************	1.333 9.64 2.917 2	0.88 4.500 3.21	6.08 1.61
1.500 9.64   3.083 20.88   4.667 3.21   6.25 1.61 1.583 9.64   3.167 20.88   4.750 3.21   Max.Eff.Inten.(mm/hr)= 73.88 51.42 over (min) 5.00 20.00 Storage Coeff. (min)= 4.47 (ii) 15.81 (ii) Unit Hyd. Tpeak (min)= 5.00 20.00 Unit Hyd. peak (cms)= 0.23 0.07 *TOTALS* PEAK FLOW (cms)= 0.81 0.26 1.048 (iii) TIME TO PEAK (hrs)= 2.75 2.92 2.75 RUNOFF VOLUME (mm)= 79.31 44.54 65.75 TOTAL RAINFALL (mm)= 80.31 80.31 80.31 RUNOFF COEFFICIENT = 0.99 0.55 0.82 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 83.0 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.	1.417 9.64 3.000 2	0.88 4.583 3.21	6.17 1.61
I.363       9.04   9.107       20.88   4.730       3.21           Max.Eff.Inten.(mm/hr)=       73.88       51.42         over (min)       5.00       20.00         Storage Coeff. (min)=       4.47 (ii)       15.81 (ii)         Unit Hyd. Tpeak (min)=       5.00       20.00         Unit Hyd. peak (cms)=       0.23       0.07         *TOTALS*       9.81       0.26       1.048 (iii)         TIME TO PEAK (hrs)=       2.75       2.92       2.75         RUNOFF VOLUME (mm)=       90.31       44.54       65.75         TOTAL RAINFALL (mm)=       80.31       80.31       80.31         RUNOFF COEFFICIENT =       0.99       0.55       0.82         ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:       CN* = 83.0       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.         COVERFLOW IS OFF         IN= 2> OUT= 1       OVERFLOW IS OFF         DT= 5.0 min       OUTFLOW STORAGE       OUTFLOW STORAGE         0.0000       0.0000       0.4900       0.2144	1.500 9.64 3.083 2		6.25 1.61
Max.Eff.Inten.(mm/hr)=       73.88       \$1.42 over (min)         over (min)=       4.47 (ii)       15.81 (ii)         Unit Hyd.Tpeak (min)=       5.00       20.00         Unit Hyd.Tpeak (min)=       5.00       20.00         Unit Hyd.Tpeak (min)=       5.00       20.00         Unit Hyd.Tpeak (min)=       0.23       0.07         *TOTALS*       *TOTALS*         PEAK FLOW (cms)=       0.81       0.26       1.048 (iii)         TIME TO PEAK (hrs)=       2.75       2.92       2.75         RUNOFF VOLUME (mm)=       79.31       44.54       65.75         TOTAL RAINFALL (mm)=       80.31       80.31       80.31         RUNOFF COEFFICIENT =       0.99       0.55       0.82         ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 83.0       Ia = Dep. Storage (Above)         (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.       (iii) THAN THE STORAGE COEFFICIENT.         (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.       STORAGE         COMTELOW       STORAGE   OUTFLOW       STORAGE         IN= 2> OUT= 1       OUTFLOW       Cms) (ha.m.)       (cms) (ha.m.)         0.0000       0.00000       0.4900       0	1.303 9.04   3.16/ 2	0.00   4.750 5.21	
over         (min)         3.00         20.00           Storage Coeff.         (min)=         4.47         (ii)         15.81         (ii)           Unit Hyd. Tpeak         (min)=         5.00         20.00         0.07         *TOTALS*           PEAK FLOW         (cms)=         0.81         0.26         1.048         (iii)           TIME TO PEAK         (hrs)=         2.75         2.92         2.75           RUNOFF VOLUME         (mm)=         79.31         44.54         65.75           TOTAL RAINFALL         (mm)=         80.31         80.31         80.31           RUNOFF COEFFICIENT         0.99         0.55         0.82           ******         WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!         (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:           CN*         =         83.0         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.	.Inten.(mm/hr)= 73.88	51.42	
Unit Hyd. costn. (min)=       5.00       20.00         Unit Hyd. peak (cms)=       0.23       0.07         *TOTALS*       *TOTALS*         PEAK FLOW (cms)=       0.81       0.26       1.048 (iii)         TIME TO PEAK (hrs)=       2.75       2.92       2.75         RUNOFF VOLUME (mm)=       79.31       44.54       65.75         TOTAL RAINFALL (mm)=       80.31       80.31       80.31         RUNOFF COEFFICIENT =       0.99       0.55       0.82         ****** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:       CN* = 83.0       Ia = Dep. Storage (Above)         (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.       (iii) TIME STORAGE COEFFICIENT.       (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.         TOTALS*         VERFLOW IS OFF         IN= 2> OUT= 1       OUTFLOW STORAGE       OUTFLOW STORAGE         DT= 5.0 min       OUTFLOW STORAGE       OUTFLOW STORAGE       (cms) (ha.m.)         0.00000       0.00000       0.4900       0.2144	over (min) 5.00	20.00	
Unit Hyd. peak (cms)= 0.23 0.07 PEAK FLOW (cms)= 0.81 0.26 1.048 (iii) TIME TO PEAK (hrs)= 2.75 2.92 2.75 RUNOFF VOLUME (mm)= 79.31 44.54 65.75 TOTAL RAINFALL (mm)= 80.31 80.31 80.31 RUNOFF COEFFICIENT = 0.99 0.55 0.82 ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 83.0 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.	/d. Tpeak (min)= 5.00	20.00	
**TOTALS*         PEAK FLOW (cms)=       0.81       0.26       1.048 (iii)         TIME TO PEAK (hrs)=       2.75       2.92       2.75         RUNOFF VOLUME (mm)=       79.31       44.54       65.75         TOTAL RAINFALL (mm)=       80.31       80.31       80.31         RUNOFF COEFFICIENT =       0.99       0.55       0.82         ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:       CN* = 83.0       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( 0054)         DT= 5.0 min       OVERFLOW IS OFF         Cms)       (ha.m.)       (cms)       (ha.m.)         0.0000       0.0000       0.4900       0.2144	d. peak (cms)= 0.23	0.07	
TIME TO PEAK (hrs)=       0.01       0.02       1.048 (111)         TIME TO PEAK (hrs)=       2.75       2.92       2.75         RUNOFF VOLUME (mm)=       79.31       44.54       65.75         TOTAL RAINFALL (mm)=       80.31       80.31       80.31         RUNOFF COEFFICIENT =       0.99       0.55       0.82         ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:       CN* = 83.0       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( 0054)         OVERFLOW IS OFF       IN= 2> OUT= 1         DT= 5.0 min       OUTFLOW STORAGE   OUTFLOW STORAGE   OUTFLOW STORAGE   0.0000   0.4900   0.2144		*TOTA	LS*
RUNOFF VOLUME (mm)=       79.31       44.54       65.75         TOTAL RAINFALL (mm)=       80.31       80.31       80.31         RUNOFF COEFFICIENT =       0.99       0.55       0.82         ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!         (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:         (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL         THAN THE STORAGE COEFFICIENT.         (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.         ******         RESERVOIR( 0054)         OVERFLOW IS OFF         IN= 2> OUT= 1         DT= 5.0 min       OUTFLOW STORAGE         OUTFLOW       STORAGE         (cms)       (ha.m.)         0.0000       0.4900	(cms) = 0.81 ) PFAK (hrs) = 2.75	2.92 2	75
TOTAL RAINFALL (mm)=       80.31       80.31       80.31         RUNOFF COEFFICIENT =       0.99       0.55       0.82         ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!         (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:         CN* =       83.0       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.         COVERFLOW IS OFF         IN= 2> OUT= 1         DT= 5.0 min       OUTFLOW STORAGE         OUTFLOW       STORAGE         (cms)       (ha.m.)         0.0000       0.4900       0.2144	VOLUME (mm)= 79.31	44.54 65.	75
RUNOFF COEFFICIENT =       0.99       0.55       0.82         ***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!         (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:         CN* =       83.0       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.         COVERFLOW IS OFF         IN= 2> OUT= 1         DT= 5.0 min       OUTFLOW STORAGE       OUTFLOW STORAGE         0.0000       0.0000       0.4900       0.2144	AINFALL (mm)= 80.31	80.31 80.	31
<pre>***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP! (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:     CN* = 83.0 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( 0054) OVERFLOW IS OFF IN= 2&gt; OUT= 1 DT= 5.0 min OUTFLOW STORAGE OUTFLOW STORAGE     (cms) (ha.m.) (cms) (ha.m.)     0.0000 0.0000 0.4900 0.2144 </pre>	COEFFICIENT = 0.99	0.55 0.	82
<pre>(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 83.0 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.</pre>	IG: STORAGE COEFF. IS SMALLER	THAN TIME STEP!	
CN* = 83.0 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( 0054) OVERFLOW IS OFF IN= 2> OUT= 1 OUTFLOW STORAGE OUTFLOW STORAGE DT= 5.0 min OUTFLOW STORAGE (cms) (ha.m.) 0.0000 0.0000 0.4900 0.2144	N PROCEDURE SELECTED FOR PERV	IOUS LOSSES:	
(11) IIME STEP (DI) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.         (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.	CN* = 83.0 Ia = Dep. Sto	rage (Above)	
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. RESERVOIR( 0054) OVERFLOW IS OFF IN= 2> OUT= 1 OUTFLOW STORAGE OUTFLOW STORAGE DT= 5.0 min OUTFLOW STORAGE (cms) (ha.m.) 0.0000 0.0000 0.4900 0.2144	THE STEP (DI) SHOULD BE SMALL	EK UK EQUAL	
RESERVOIR( 0054)        OVERFLOW IS OFF         IN= 2> OUT= 1         OUTFLOW STORAGE         OUTFLOW STORAGE           DT= 5.0 min         OUTFLOW STORAGE         Crms) (ha.m.)         .00000 0.00000         0.4900 0.2144	EAK FLOW DOES NOT INCLUDE BAS	SEFLOW IF ANY.	
RESERVOIR(         0054)          OVERFLOW IS OFF           IN=         2> 0UT=         1           DT=         5.0 min         0UTFLOW         STORAGE           (cms)         (ha.m.)         (cms)         (ha.m.)           0.0000         0.0000         0.4900         0.2144		n men met men state for all and the state of	
RESERVOIK(         0054)         OVERFLOW IS OFF           IN= 2> OUT= 1         OUTFLOW         STORAGE         OUTFLOW         STORAGE           DT= 5.0 min         OUTFLOW         STORAGE         OUTFLOW         STORAGE            (cms)         (ha.m.)         (cms)         (ha.m.)           0.0000         0.0000         0.4900         0.2144			
IN-         2>         001=1         0UTFLOW         STORAGE         0UTFLOW         STORAGE           DT=         5.0 min                   0UTFLOW         STORAGE         (cms)         (ha.m.)	0054) OVERFLOW IS OFF		
(cms) (ha.m.) (cms) (ha.m.) 0.0000 0.0000 0.4900 0.2144			AGE
0.0000 0.0000 0.4900 0.2144	(cms) (ha.m	1.) (cms) (ha.	m.)
	0.0000 0.00	00   0.4900 0.	2144
	ADEA		V V
(ha) (cms) (hrs) (mm)	(ha)	(cms) (hrs) (	(mm)
INFLOW : ID= 2 ( 0052) 6.470 1.048 2.75 65.75	ID= 2 ( 0052) 6.470	1.048 2.75	65.75
OUTFLOW: ID= 1 ( 0054) 6.470 0.427 3.17 65.73	ID= 1 ( 0054) 6.470	0.427 3.17	65.73
DEAK ELOW DEDITCTION FOOTH /0101 (4)- 40 76		W [Oout/Oin](%)- 40 76	
TIME SHIFT OF PEAK FLOW $(min) = 40.70$	FEAD FILM REDUCTION	(min) = 25.00	
MAXIMUM STORAGE USED (ha.m.)= 0.1870	TIME SHIFT OF PEAK FLO		0
	TIME SHIFT OF PEAK FLO MAXIMUM STORAGE USE	D (na.m.)= 0.18/	
	TIME SHIFT OF PEAK FLO MAXIMUM STORAGE USE	D (na.m.)= 0.18/	
ADD HYD ( 0032)	TIME SHIFT OF PEAK FLO MAXIMUM STORAGE USE	D (ha.m.)= 0.187	
1 + 2 = 3 AREA QPEAK TPEAK R.V.	TIME SHIFT OF PEAK FLO MAXIMUM STORAGE USE	D (na.m.)= 0.18/	
(ha) (cms) (hrs) (mm)	TIME SHIFT OF PEAK FLO MAXIMUM STORAGE USE	U (na.m.)= 0.187	
101=1 ( $0029$ ); 8.01 1.584 2.75 75.83 + $TD2=2$ ( $0030$ ); 6.79 0.352 3.50 39.71	O032) 3 AREA OPEA (ha) (cms	U (na.m.)= 0.18/	

ID = 3 ( 0032): 14.80 1.736 2.75 59.26 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. ADD HYD ( 0032) 3 + 2 = 1 1D1= 3 ( 0032): + 1D2= 2 ( 0053):QPEAK (cms) 1.736 TPEAK (hrs) 2.75 AREA (ha) R.V. (mm) 14.80 59.26 7.81 0.445 3.25 75.81 ID = 1 ( 0032): 22.61 2.131 2.75 64.98 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. \_\_\_\_\_  $\begin{array}{c|c} \text{ADD HYD} & ( & 0032 ) \\ 1 + 2 = & 3 \end{array}$ AREA QPEAK TPEAK R.V. (hrs) 2.75 3.17 ------(ha) 22.61 (cms) 2.131 (mm) ID1= 1 ( 0032): + ID2= 2 ( 0054): 64.98 6.47 0.427 65.73 \_\_\_\_\_ ID = 3 ( 0032): 29.08 2.501 2.75 65.14 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. \_\_\_\_\_ OVERFLOW IS OFF RESERVOIR( 0078) IN= 2---> OUT= 1 DT= 5.0 min (ha.m.) 1.1158 1.322 OUTFLOW OUTFLOW STORAGE (cms) 0.0000 (ha.m.) 0.0000 (cms) 0.2940 0.3680 0.4250 0.4830 (cms) 0.2940 0.5230 0.3680 0.4250 0.0520 0.1630 1 4787 Ì 0.9521 0.2420 1.6325 QPEAK TPEAK AREA R.V. (cms) 2.501 0.374 (hrs) 2.75 5.92 (ha) (mm) INFLOW : ID= 2 ( 0032) OUTFLOW: ID= 1 ( 0078) 29.080 29.080 65.14 PEAK FLOW REDUCTION [Qout/Qin](%)= 14.94 TIME SHIFT OF PEAK FLOW (min)=190.00 MAXIMUM STORAGE USED (ha.m.)= 1.3389 CALIB | CALIB | STANDHYD ( 0130)| |ID= 1 DT= 5.0 min | Area (ha)= 1.88 Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00 PERVIOUS (i) IMPERVIOUS Surface Area 0.19 Dep. Storage 5.00 Average Slope Length 2.00 40.00 Mannings n = 0.013 0.250 NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP. ---- TRANSFORMED HYETOGRAPH ----TIME RAIN |' TIME RAIN brs mm/br |' hrs mm/br | TIME TIME RAIN RAIN TIME RAIN mm/hr 9.64 9.64 27.30 27.30 RAIN mm/hr 20.88 | 11.24 11.24 11.24 | 11.24 | hrs 1.667 1.750 1.833 1.917 mm/hr hrs hrs hrs mm/hr 0.00 0.00 0.00 4.83 0.083 3.250 1.61 3.333 3.417 3.500 4.92 5.00 5.08 0.167 0.250 0.333 1.61 1.61 1.61 0.417 0.500 0.583 1.61 1.61 1.61 2.000 2.083 2.167 27.30 27.30 27.30 3.583 3.667 3.750 11.24 11.24 11.24 5.17 5.25 5.33 1.61 1.61 1.61 2.250 2.333 2.417 27.30 73.88 3.833 3.917 6.42 5.42 0.667 1.61 0.750 1.61 0.833 1.61 73.88 4.000 6.42 5.58 1.61 0.917 1.000 1.61 2.500 2.583 73.88 4.083 4.167 6.42 5.67 1.61 1.61 1.61 2.667 2.750 73.88 4.250 4.333 6.42 3.21 5.83 1.083 1.61 1.61 1.167 1.250 1.61 2.833 20.88 4.417 3.21 6.00 1.61 1.333 1.417 9.64 2.917 9.64 3.000 20.88 4.500 20.88 4.583 3.21 3.21 6.08 1.61

1.500 1.583	9.64   3.083 9.64   3.167	20.88 20.88	4.667	3.21 3.21	6.25	1.61
Max.Eff.Inten.(mm	/hr)= 73.8	8	52.93			
over ( Storage Coeff. ( Unit Hyd. Tpeak ( Unit Hyd. peak (	min) 5.0 min)= 3.0 min)= 5.0 cms)= 0.2	0 9 (ii) 0 7	10.00 6.39 (ii) 10.00 0.15	****		
PEAK FLOW ( TIME TO PEAK ( RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIEN	cms)= 0.3 hrs)= 2.7 (mm)= 79.3 (mm)= 80.3 T = 0.9	5 5 1 9	0.03 2.75 44.54 80.31 0.55	0.3 2 75 80	ALS" 373 (iii) .75 .83 .31 .94	
***** WARNING: STORAGE	COEFF. IS SMAL	LER THAN	TIME STEP!			
(i) CN PROCEDUR CN* = 83 (ii) TIME STEP ( THAN THE ST (iii) PEAK FLOW D	E SELECTED FOR .0 Ia = Dep. DT) SHOULD BE S ORAGE COEFFICIE OES NOT INCLUDE	PERVIOUS Storage MALLER OR NT. BASEFLOW	LOSSES: (Above) E EQUAL IF ANY.			
CALIB     STANDHYD ( 0133)   ID= 1 DT= 5.0 min	Area (ha)= Total Imp(%)=	2.46 90.00	Dir. Conn.	(%)= 9	0.00	
C	IMPERVI	OUS PE	RVIOUS (i)			
Dep. Storage	(ma) = 2.2 (mm) = 1.0	0	5.00			
Length Mannings n	(m) = 128.0	6	40.00			
NOTE · RATNEA	- 0.01	MED TO	5.0 MTN T	TME STE	Þ	
		HED TO	5.0 MIN. 1			
TIME	RAIN   TIME	RANSFORME RAIN	D HYETOGRA	RAIN	TIME	RAIN
hrs 0.083	mm/hr hrs 0.00 1.667	mm/hr 9.64	' hrs 3.250	mm/hr 20.88	hrs 4.83	mm/hr 1.61
0.167 0.250	0.00   1.750	9.64 27.30	3.333	11.24	4.92	1.61
0.333 0.417	1.61 1.917	27.30	3.500	11.24	5.08	1.61
0.500	1.61 2.083	27.30	3.667	11.24	5.25	1.61
0.667	1.61 2.250	27.30	3.833	6.42	5.42	1.61
0.833	1.61   2.417	73.88	4.000	6.42	5.58	1.61
0.917 1.000	1.61 2.500	73.88	4.083	6.42	5.67	1.61
1.083	1.61   2.667	73.88	4.250	6.42	5.83	1.61
1.250	1.61 2.833	20.88	4.417	3.21	6.00	1.61
1.333	9.64 3.000	20.88	4.583	3.21	6.17	1.61
1.500	9.64   3.083	20.88	4.66/	3.21	6.25	1.61
Max.Eff.Inten.(mm	/hr)= 73.8	8	52.93			
Storage Coeff. (	min)= 3.3	4 (ii)	6.65 (ii)			
Unit Hyd. Ipeak ( Unit Hyd. peak (	min)= 5.0 cms)= 0.2	6	0.14	*TOT	AI C*	
PEAK FLOW	cms)= 0.4	5	0.03	0.4	488 (iii)	
RUNOFF VOLUME	(mm)= 2.7	1	44.54	75	.83	
TOTAL RAINFALL RUNOFF COEFFICIEN	(mm)= 80.3 T = 0.9	1 9	80.31 0.55	80 0	.31 .94	
***** WARNING: STORAGE	COEFF. IS SMAL	LER THAN	TIME STEP!			
(i) CN PROCEDUR	E SELECTED FOR	PERVIOUS	LOSSES:			
CN* = 83 (ii) TIME STEP (	.0 Ia = Dep. DT) SHOULD BE S	Storage MALLER OR	(Above) EQUAL			
THAN THE ST (iii) PEAK FLOW D	ORAGE COEFFICIE OES NOT INCLUDE	NT. BASEFLOW	IF ANY.			

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RESERVOIR( 0170)	OVERFL	OW IS OFF			
IN= 2> 001= 1     DT= 5.0 min	OUTFLO (cms) 0.000	W STORAG (ha.m. 0 0.000	E   OUTFLO )   (cms) 0   0.442	W STORAGE (ha.m.) 8 0.0364	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0133) 0170)	AREA Q (ha) ( 2.460 2.460	PEAK TPEA cms) (hrs 0.488 2 0.432 2	K R.V. ) (mm) .75 75.83 .75 75.83	
P T M	EAK FLOW IME SHIFT O AXIMUM STO	REDUCTION F PEAK FLOW RAGE USED	[Qout/Qin](% (min (ha.m.	)= 88.58 )= 0.00 )= 0.0364	
ADD HYD ( 0171) 1 + 2 = 3 ID1= 1 ( 01 + ID2= 2 ( 01	AR (h 30): 1. 70): 2.	EA QPEAK a) (cms) 88 0.373 46 0.432	TPEAK (hrs) 2.75 7 2.75 7	R.V. (mm) 5.83 5.83	
ID = 3 ( 01	71): 4.	34 0.805	2.75 7	5.83	
NOTE: PEAK FLO	WS DO NOT I	NCLUDE BASE	FLOWS IF ANY.		
CALIB   STANDHYD ( 0135)  ID= 1 DT= 5.0 min	Area Total Im	(ha)= 0.9 p(%)= 90.0	5 0 Dir. Conn	.(%)= 90.00	
Surface Area Dep. Storage Average Slope Length Mannings n	I (ha)= (mm)= (%)= (m)= =	MPERVIOUS 0.86 1.00 1.00 79.58 0.013	PERVIOUS (i 0.10 5.00 2.00 40.00 0.250	)	
NOTE: RAIN	FALL WAS TR	ANSFORMED T	0 5.0 MIN.	TIME STEP.	
TIM hr 0.08 0.16 0.25 0.33 0.41 0.50 0.58 0.66 0.75 0.83 0.91 1.00 1.08 1.16 1.25 1.33 1.41 1.50 1.58	E RAIN s mm/hr 3 0.00 7 0.00 0 0.00 3 1.61 7 1.61 3 9.64 3 9.6	TIME RANSE TIME R hrs mm 1.667 9 1.750 9 1.750 9 1.833 27 1.917 27 2.000 27 2.083 27 2.167 27 2.333 73 2.417 73 2.500 73 2.500 73 2.583 73 2.667 73 2.583 73 2.833 20 2.917 20 3.000 20 3.063 20 3.167 20	ORMED HYETOGR AIN TIME /hr hrs .64 3.250 .64 3.333 .30 3.417 .30 3.500 .30 3.583 .30 3.667 .30 3.750 .30 3.750 .30 3.750 .30 3.833 .88 4.083 .88 4.083 .88 4.167 .88 4.250 .88 4.583 .88 4.500 .88 4.583 .88 4.667 .88 4.667 .88 4.750	APH         TIME           RAIN         TIME           mm/hr         hrs           20.88         4.83           11.24         4.92           11.24         5.00           11.24         5.00           11.24         5.01           11.24         5.17           11.24         5.25           11.24         5.25           11.24         5.33           6.42         5.42           6.42         5.50           6.42         5.56           6.42         5.67           6.42         5.75           6.42         5.75           6.42         5.75           6.42         5.75           6.42         5.67           6.42         5.75           6.42         5.75           6.42         5.67           6.42         5.75           6.42         5.75           6.42         5.67           3.21         6.00           3.21         6.08           3.21         6.25           3.21         6.25           3.21         6.25 <td< td=""><td>RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6</td></td<>	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.Eff.Inten.( over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICI	mm/hr)= (min)= (min)= (cms)= (cms)= (hrs)= (hrs)= (mm)= ENT =	73.88 5.00 2.51 (ii 5.00 0.29 0.18 2.75 79.31 80.31 0.99	52.93 10.00 5.82 (ii 10.00 0.15 0.01 2.75 44.54 80.31 0.55	*TOTALS* 0.189 (iii) 2.75 75.83 80.31 0.94	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 83.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.

CALIB   STANDHYD ( 0136)  ID= 1 DT= 5.0 min	Area Total In	(ha)= 1 np(%)= 9	5.11 0.00 I	Dir. Conn	.(%)= 9	0.00	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	MPERVIOU 13.60 1.00 1.00 317.39 0.013	S PEI	RVIOUS (i 1.51 5.00 2.00 40.00 0.250	)		
NOTE: RAINF	ALL WAS TR	RANSFORME	D TO	5.0 MIN.	TIME STE	Р.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500	RAIN mm/hr 0.00 1.61 1.61 1.61 1.61 1.61 1.61 1.61	TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	NSFORMEI RAIN mm/hr 9.64 9.64 27.30 27.30 27.30 27.30 27.30 73.88 73.88 73.88 73.88 73.88 73.88 73.88 20.88 20.88 20.88 20.88	D HYETOGR TIME hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750	APH RAIN mm/hr 20.88 11.24 11.24 11.24 11.24 11.24 11.24 11.24 11.24 6.42 6.42 6.42 6.42 6.42 6.42 6.42 6	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.Eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	m/hr)= (min) (min)= (min)= (cms)=	73.88 5.00 5.77 5.00 0.20	(ii)	52.93 10.00 9.07 (ii 10.00 0.12	) *TOT	ALS*	
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	(cms)= (hrs)= (mm)= (mm)= NT =	2.78 2.75 79.31 80.31 0.99	1	0.20 2.75 44.54 80.31 0.55	2. 2 75 80 0	978 (iii) .75 .83 .31 .94	λ.
(i) CN PROCEDU CN* = 8 (ii) TIME STEP THAN THE S (iii) PEAK FLOW	RE SELECTE 3.0 Ia (DT) SHOUL TORAGE COE DOES NOT J	D FOR PE = Dep. S D BE SMA FFICIENT NCLUDE B	RVIOUS I torage LLER OR ASEFLOW	LOSSES: (Above) EQUAL IF ANY.			
RESERVOIR( 0137)    IN= 2> OUT= 1   DT= 5.0 min	OVERFL OUTFLC (cms) 0.000	.OW IS OF W STO (ha 00 0.	F RAGE .m.) 0000	0UTFL0 (cms) 2.720	W STO (ha 0 0	0RAGE ) 0.2000	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0136) 0137)	AREA (ha) 15.110 15.110	QPEAK (cms) 2.97 2.63	TPEA (hrs 78 2 38 2	K ) .75 .75	R.V. (mm) 75.83 75.83	
РЕ ТІ МА	AK FLOW ME SHIFT C XIMUM STC	REDUCT DF PEAK F DRAGE U	ION [Qoi LOW SED	ut/Qin](% (min (ha.m.	6)= 88.61 )= 0.00 )= 0.19	) )91	
CALIB STANDHYD ( 0138) ID= 1 DT= 5.0 min	Area Total In J	(ha)= ıp(%)= 9 IMPERVIOU	0.29 0.00 I S PEI	Dir. Conn RVIOUS (i	.(%)= 9 )	0.00	

Surface Area	(ha)=	0.26	0.03
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	43.97	40.00
Mannings n	=	0.013	0.250

	TRA	NSFORME	D HYETOGR	APH		
TIME RAIN hrs mm/hr	TIME	RAIN mm/hr	' TIME	RAIN mm/hr	TIME   hrs	RAIN mm/hr
0.167 0.00	1.750	9.64	3.333	11.24	4.92	1.61
0.250 0.00	1.833	27.30	3.417	11.24	5.00	1.61
0.333 1.61	2.000	27.30	3.583	11.24	5.08	1.61
0.500 1.61	2.083	27.30	3.667	11.24	5.25	1.61
0.583 1.61	2.16/	27.30	3.833	6.42	5.33	1.61
0.750 1.61	2.333	73.88	3.917	6.42	5.50	1.61
0.833 1.61	2.417	73.88	4.000	6.42	5.58	1.61
1.000 1.61	2.583	73.88	4.167	6.42	5.75	1.61
1.083 1.61	2.667	73.88	4.250	6.42	5.83	1.61
1.250 1.61	2.833	20.88	4.417	3.21	6.00	1.61
1.333 9.64	2.917	20.88	4.500	3.21	6.08	1.61
1.500 9.64	3.083	20.88	4.667	3.21	6.25	1.61
1.583 9.64	3.167	20.88	4.750	3.21		
Max.Eff.Inten.(mm/hr)=	73.88	1	52.93			
over (min) Storage Coeff. (min)=	5.00	(ii)	10.00 5.07 (ii	)		
Unit Hyd. Tpeak (min)=	5.00		10.00	·		
Unit Hyd. peak (Cms)=	0.32		0.16	*T0T	ALS*	
PEAK FLOW (cms)=	0.05		0.00	0.	058 (iii)	)
RUNOFF VOLUME (mm)=	79.31	22	44.54	75	.83	
TOTAL RAINFALL (mm)=	80.31		80.31	80	.31	
***** WARNING, STORAGE COFFE	0.99		0.33	. ``		
(2) CN PROCEDURE SELECT	TO FOR DE			1		
(1) CN PROCEDURE SELECT CN* = 83.0 Ia	= Dep. S	Storage	(Above)			
(ii) TIME STEP (DT) SHOU	LD BE SMA	LLER OR	EQUAL			
(iii) DEAK ELOW DOES NOT	TNCLUDE R		TE			
(III) FEAK FLOW DOES NOT	INCLUDE E	SASEFLOW	IF ANY.			
(111) FEAK FLOW DOES NOT		SASEFLOW	IF ANY.			
L RESERVOTR( 0139)			IF ANY.			
RESERVOIR( 0139)  OVERF   IN= 2> OUT= 1   OUTE	LOW IS OF	F	1F ANY.			
RESERVOIR( 0139)  OVERF   IN= 2> OUT= 1   DT= 5.0 min   OUTFL (cms	LOW IS OF OW STO	ASEFLOW FF ORAGE	OUTFLO	W STC	RAGE	
IRESERVOIR(0139)         OVERF           IN= 2> OUT= 1         OUTFL           DT= 5.0 min         OUTFL	LOW IS OF OW STC OW STC OO 0.	ASEFLOW FF DRAGE 1.m.) .0000	IF ANY.   OUTFLO   (cms)   0.439	W STC (ha O C	0RAGE 1.m.) 0.0003	
RESERVOIR( 0139)  OVERF   IN= 2> OUT= 1   DT= 5.0 min   OUTFL 	LOW IS OF OW STC ) (ha 00 0. AREA (ha)	ASEFLOW FF DRAGE (A.m.) 0000 OPEAK (Cms)	IF ANY.   OUTFLO   (cms)   0.439 TPEA (brs	W STC (ha O C	0RAGE (.m.) 0.0003 R.V.	
RESERVOIR( 0139)  OVERF   IN= 2> OUT= 1   OUTFL   DT= 5.0 min   OUTFL (cms 0.00	LOW IS OF OW STC ) (ha 00 0. AREA (ha) 0.290	ASEFLOW FF (A.m.) (0000 (PEAK (Cms) 0.0	OUTFLO   (cms)   0.439 TPEA (hrs 58 2	W STC (ha 0 C K ) .75	0RAGE (.m.) 0.0003 R.V. (mm) 75.83	
RESERVOIR( 0139)  OVERF   IN= 2> OUT= 1   OUTFL   DT= 5.0 min   OUTFL (cms 0.00 INFLOW : ID= 2 ( 0138) OUTFLOW: ID= 1 ( 0139)	LOW IS OF OW ST( ) (ha 00 0. AREA (ha) 0.290 0.290	ASEFLOW PRAGE A.m.) 00000 QPEAK (cms) 0.0 0.0	IF ANY. OUTFLO (cms) 0.439 TPEA (hrs 58 2 59 2	W STC (ha 0 C K ) .75 .75	RAGE m.) 0003 R.V. (mm) 75.83 75.83	
RESERVOIR( 0139)  OVERF   IN= 2> OUT= 1   OUTFL   DT= 5.0 min   OUTFL (cms 0.00 INFLOW : ID= 2 ( 0138) OUTFLOW: ID= 1 ( 0139) PEAK FLOW	LOW IS OF OW ST( ) (ha OO 0. AREA (ha) 0.290 0.290	ASEFLOW FF 0RAGE (cms) 0.00 0.00 0.00 0.00 0.00 0.00	OUTFLO   (cms)   0.439 TPEA (hrs 58 2 59 2 ut/Qin](%	W STC (ha 0 C K ).75 .75 )=101.81	RAGE m.) .0003 R.V. (mm) 75.83 75.83	
(TTT) FEAK FLOW DOES NOT   RESERVOIR( 0139)  OVERF IN= 2> OUT= 1   OUTFL DT= 5.0 min   OUTFL (cms 0.00 INFLOW : ID= 2 ( 0138) OUTFLOW: ID= 1 ( 0139) PEAK FLOW TIME SHIFT MAXIMUM ST	LOW IS OF OW STC ) (ha 00 0. AREA (ha) 0.290 0.290 REDUCT OF PEAK F ORAGE U	RAGE RAGE A.m.) 0000 QPEAK (cms) 0.0 0.0 0.0 0.0 0.0 10N [Qou	OUTFLO   (cms)   0.439 TPEA (hrs 58 2 59 2 ut/Qin](% (min (ha.m.	W STC (ha 0 C × )-75 )=101.81 )= 0.00	RAGE m.) .0003 R.V. (mm) 75.83 75.83	
INFLOW : ID= 2 (0138)         OUTFLOW: ID= 1 (0139)         PEAK FLOW DOES NOT         INFLOW : ID= 2 (0138)         OUTFLOW: ID= 1 (0139)         PEAK FLOW         TIME SHIFT         MAXIMUM ST         MAXIMUM ST	LOW IS OF OW STC ) (ha 00 0. AREA (ha) 0.290 0.290 REDUCT OF PEAK F ORAGE L	ASEFLOW PRAGE A.m.) 0000 QPEAK (cms) 0.0 0.0 0.0 0.0 CON [Qout SED JSED	OUTFLO   (cms)   0.439 TPEA (hrs 58 2 59 2 ut/Qin](% (min (ha.m. (cu.m.	W STC (ha 0 (k ).75 .75 )=101.81 )= 0.00 )= 0.00 )= 0.24	0RAGE 1.m.) 0.0003 R.V. (mm) 75.83 75.83 75.83 000 000 14628	
INFLOW : ID= 2 ( 0138) OUTFLOW: ID= 1 ( 0139) OUTFLOW: ID= 1 ( 0139) PEAK FLOW TIME SHIFT MAXIMUM ST MAXIMUM ST **** WARNING : HYDROGRAPH CHECK OUT	LOW IS OF OW STC OW STC O (ha OO 0. AREA (ha) 0.290 0.290 0.290 REDUCI OF PEAK F ORAGE U ORAGE U PEAK WAS	ASEFLOW AGE A.m.) OPEAK (Cms) 0.00 0.00 0.00 COW JSED JSED S NOT REI AGE TAR	OUTFLO   (cms)   0.439   0.4	W STC (ha 0 C ) .75 .75 )=101.81 )= 0.00 )= 0.24 DUCE DT	RAGE (.m.) ).0003 R.V. (mm) 75.83 75.83 75.83 000 000 04628	
INFLOW : ID= 2 ( 0138) OUTFLOW : ID= 2 ( 0138) OUTFLOW : ID= 1 ( 0139) PEAK FLOW TIME SHIFT MAXIMUM ST **** WARNING : HYDROGRAPH CHECK OUT	LOW IS OF OW STC ) (ha 00 0. AREA (ha) 0.290 0.290 REDUCT OF PEAK F ORAGE U ORAGE U PEAK WAS FLOW/STOF	RAGE RAGE A.m.) 0000 OPEAK (cms) 0.0 0.0 0.0 COW JSED JSED S NOT REI AGE TAB	OUTFLO   (cms)   0.439 TPEA (hrs 58 2 59 2 ut/Qin](% (min (ha.m. (cu.m. DUCED. LE OR RE	W STC (ha 0 C ) .75 .75 )=101.81 )= 0.00 )= 0.02 )= 0.24 DUCE DT.	RAGE m.) .0003 R.V. (mm) 75.83 75.83 75.83 000 4628	
INFLOW : ID= 2 ( 0138) OUTFLOW : ID= 2 ( 0138) OUTFLOW : ID= 1 ( 0139) PEAK FLOW TIME SHIFT MAXIMUM ST **** WARNING : HYDROGRAPH CHECK OUT	LOW IS OF OW STC ) (ha 00 0. AREA (ha) 0.290 0.290 0.290 REDUCT 0F PEAK FLOW/STOF	RAGE RAGE A.m.) 0000 QPEAK (cms) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	OUTFLO   (cms)   0.439 TPEA (hrs 58 2 59 2 ut/Qin](% (min (ha.m. (cu.m. DUCED. LE OR RE	W STC (ha 0 C ) .75 .75 )=101.81 )= 0.00 )= 0.02 )= 0.24 DUCE DT.	ORAGE ) 0003 R.V. (mm) 75.83 75.83 75.83 000 44628	
INFLOW : ID= 2 (0138)         OUTFLOW: ID= 2 (0138)         OUTFLOW: ID= 1 (0139)         PEAK FLOW         TIME SHIFT         MAXIMUM ST         **** WARNING : HYDROGRAPH         CHECK OUT	LOW IS OF OW STC ) (ha 00 0. AREA (ha) 0.290 0.2	ASEFLOW PRAGE A.m.) 0000 OPEAK (cms) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	IF ANY. OUTFLO (cms) 0.439 TPEA (hrs 58 2 259 2 ut/Qin](% (min (ha.m. (cu.m. DUCED. LE OR RE	W STC (ha 0 C ) .75 .75 )=101.81 )= 0.00 )= 0.02 DUCE DT. 	0RAGE ) 0003 R.V. (mm) 75.83 75.83 75.83 000 44628	
Image: Second state sta	LOW IS OF OW STC ) (ha 00 0. AREA (ha) 0.290 0.2	ASEFLOW PRAGE A.m.) 0000 OPEAK (cms) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	IF ANY. OUTFLO (cms) 0.439 TPEA (hrs 58 2 59 2 ut/Qin](% (min (ha.m. (cu.m. DUCED. LE OR RE TPEAK (hrs)	W STC (ha 0 C ) .75 .75 )=101.81 )= 0.00 )= 0.024 DUCE DT. 	0RAGE ) 0.0003 R.V. (mm) 75.83 75.83 75.83 000 44628	
INFLOW : ID= 2 (0138)         OUTFLOW: ID= 2 (0138)         OUTFLOW: ID= 1 (0139)         PEAK FLOW         TIME SHIFT         MAXIMUM ST         ***** WARNING : HYDROGRAPH         CHECK OUT         ID= 1 (0172)         1 + 2 = 3         ID= 1 (0135): 0         + TD2= 2 (0135): 0	LOW IS OF OW STC ) (ha 00 0. AREA (ha) 0.290 0.290 REDUCT OF PEAK FLOW/STOF PEAK WAS FLOW/STOF PEAK WAS FLOW/STOF PEAK WAS FLOW/STOF 0.35 0.1	ASEFLOW PRAGE A.m.) 0000 QPEAK (cms) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	IF ANY. OUTFLO (cms) (cms) 0.439 TPEA (hrs 58 2 59 2 ut/Qin](% (min (ha.m. (cu.m. DUCED. LE OR RE TPEAK (hrs) 2.75 7 2.75 7 2.75 7	W STC (ha 0 C ).75 .75 )=101.81 )= 0.00 )= 0.24 DUCE DT. 	0RAGE 1.m.) 0.0003 R.V. (mm) 75.83 75.83 75.83 000 14628	
INFLOW : ID= 2 (0138)         OUTFLOW: ID= 2 (0138)         OUTFLOW: ID= 1 (0139)         PEAK FLOW         TIME SHIFT         MAXIMUM ST         **** WARNING : HYDROGRAPH         CHECK OUT         ID1 + 2 = 3         ID1 + 2 = 3         ID1 + 1 (0135): 0         + ID2 = 2 (0137): 15	LOW IS OF OW STC ) (ha 00 0. AREA (ha) 0.290 0.290 REDUCT ORAGE U ORAGE U PEAK WAS FLOW/STOP PEAK WAS FLOW/STOP REA QF ha) (c .95 0.1 11 2.6	ASEFLOW PRAGE A.m.) 0000 QPEAK (cms) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	IF ANY. OUTFLO (cms) (cms) (cms) (hrs) 58 2 59 2 ut/Qin](% (min (ha.m. (cu.m. DUCED. LE OR RE TPEAK (hrs) 2.75 7 2.75 7	W STC (ha 0 C K ).75 .75 )=101.81 )= 0.00 )= 0.02 )= 0.24 DUCE DT. R.V. (mm) 5.83 	0RAGE 1.m.) 0.0003 R.V. (mm) 75.83 75.83 75.83 000 44628	
INFLOW : ID= 2 ( 0138)         OUTFLOW: ID= 1 ( 0139)         OUTFLOW: ID= 1 ( 0138)         OUTFLOW: ID= 1 ( 0139)         PEAK FLOW         TIME SHIFT         MAXIMUM ST         ***** WARNING : HYDROGRAPH         CHECK OUT         ID1= 1 ( 0135):         0         ID1= 1 ( 0135):         ID1= 1 ( 0137):         ID1= 3 ( 0172):         ID1= 3 ( 0172):	LOW IS OF OW STC ) (ha 00 0. AREA (ha) 0.290 0.290 REDUCT OF PEAK F ORAGE L ORAGE L ORAGE L PEAK WAS FLOW/STOF PEAK WAS FLOW/STOF 	ASEFLOW PRAGE A.m.) 0000 QPEAK (cms) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	IF ANY.   OUTFLO   (cms)   0.439 TPEA (hrs 58 2 259 2 ut/Qin](% (min (ha.m. (cu.m. DUCED. LE OR RE TPEAK (hrs) 2.75 7 2.75 7	W STC (ha 0 (k )	0RAGE 1.m.) 0.0003 R.V. (mm) 75.83 75.83 000 14628	

$\begin{vmatrix} ADD & HYD & ( & 0172) \\ 3 & + & 2 & = & 1 \\ \hline ID1 = & 3 & ( & 017 \\ + & ID2 = & 2 & ( & 013 \\ \end{vmatrix}$	AR (h 2): 16. 9): 0.	EA QPEA a) (cms 06 2.827 29 0.059	K TPEAK ) (hrs) 2.75 2.75	R.V. (mm) 75.83 75.83		
ID = 1 ( 017	2): 16.	35 2.886	2.75	75.83		
NOTE: PEAK FLOW	S DO NOT I	NCLUDE BAS	EFLOWS IF ANY	<i>r</i> .		
CALIB   STANDHYD ( 0076)  ID= 1 DT= 5.0 min	Area Total Im	(ha)= 6. p(%)= 90.	00 00 Dir.Com	nn.(%)= 9	90.00	
Surface Area Dep. Storage Average Slope Length Mannings n	I (ha)= (mm)= (%)= (m)= =	MPERVIOUS 5.40 1.00 1.00 200.00 0.013	PERVIOUS 0.60 5.00 2.00 40.00 0.250	(i)		
NOTE: RAINE	ALL WAS TR	ANSFORMED	TO 5.0 MIN	. TIME ST	EP.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583	RAIN   mm/hr 0.00 0.00 1.61 1.61 1.61 1.61 1.61 1.61	TIME hrs m 1.667 1.750 2.000 2 2.1917 2 2.003 2 2.167 2 2.250 2 2.333 7 2.417 7 2.583 7 2.417 7 2.580 7 2.667 7 2.580 7 2.667 7 2.580 7 2.667 7 2.580 7 2.607 2 2.917 2 3.000 2 3.083 2 3.167 2 2.88	FORMED HYETO RAIN  ' TIM 9.64   3.250 9.64   3.333 7.30   3.417 7.30   3.500 7.30   3.500 7.30   3.683 7.30   3.667 7.30   3.750 7.30   3.838 3.88   4.083 3.88   4.083 3.88   4.083 3.88   4.250 3.88   4.250 0.88   4.580 0.88   4.580 0.80   4.580 0.80   4.580 0.80   4.580 0.80   4.580 0.80   4.580 0.80   4.580 0.80	GRAPH RAIN mm/hr 20.88 11.24 11.24 11.24 11.24 11.24 11.24 11.24 6.42 6.42 6.42 6.42 6.42 6.42 6.42 3.21 3.21 3.21 3.21	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.67 5.58 5.67 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.Eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL PATNEALL	m/hr)= (min)= (min)= (cms)= (cms)= (hrs)= (mm)= (mm)=	73.88 5.00 4.37 (i 5.00 0.23 1.11 2.75 79.31 80 31	52.93 10.00 7.68 (* 10.00 0.13 0.08 2.75 44.54 80.31	ii) *TO 1 7	TALS* .188 (iii) 2.75 5.83	
RUNOFF COEFFICIE	NT =	0.99	0.55	0	0.94	
***** WARNING: STORAG	E COEFF. I	S SMALLER	THAN TIME ST	EP!		
(i) CN PROCEDU CN* = 8 (ii) TIME STEP THAN THE S (iii) PEAK FLOW	RE SELECTE 3.0 Ia (DT) SHOUL TORAGE COE DOES NOT I	D FOR PERV = Dep. Sto D BE SMALL FFICIENT. NCLUDE BAS	IOUS LOSSES: rage (Above) ER OR EQUAL EFLOW IF ANY			
CALIB   STANDHYD ( 0031)  ID= 1 DT= 5.0 min	Area Total Im	(ha)= 39. p(%)= 90.	77 00 Dir.Com	nn.(%)= 9	90.00	
Surface Area Dep. Storage	I (ha)= (mm)=	MPERVIOUS 35.79 1.00	PERVIOUS 3.98 5.00	(i)		

 Surface Area
 (ma)=
 55.79
 5.90

 Dep. Storage
 (mm)=
 1.00
 5.00

 Average Slope
 (%)=
 1.00
 2.00

 Length
 (m)=
 514.91
 40.00

 Mannings n
 =
 0.013
 0.250

	TR/	NSFORMED	HYETOG	RAPH		
TIME RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
0.083 0.00	1.667	9.64	3.250	20.88	4.83	1.61
0.167 0.00	1.750	9.64	3.333	11.24	4.92	1.61
0.250 0.00	1.833	27.30	3.41/	11.24	5.00	1.61
0.417 1.61	2.000	27.30	3.583	11.24	5.17	1.61
0.500 1.61	2.083	27.30	3.667	11.24	5.25	1.61
0.667 1.61	2.250	27.30	3.833	6.42	5.42	1.61
0.750 1.61	2.333	73.88	3.917	6.42	5.50	1.61
0.917 1.61	2.500	73.88	4.083	6.42	5.67	1.61
1.000 1.61	2.583	73.88	4.167	6.42	5.75	1.61
1.167 1.61	2.750	73.88	4.333	3.21	5.92	1.61
1.250 1.61	2.833	20.88	4.417	3.21	6.00	1.61
1.555 9.64	3.000	20.88	4.500	3.21	6.17	1.61
1.500 9.64	3.083	20.88	4.667	3.21	6.25	1.61
1.583 9.64	3.16/	20.88	4.750	3.21		
Max.Eff.Inten.(mm/hr)=	73.88		52.93			
Storage Coeff. (min)=	7.71	(ii) 1	L1.02 (i	i)		
Unit Hyd. Tpeak (min)=	10.00	1	15.00			
Unit Hyd. peak (cms)=	0.13		0.09	*тот	ALS*	
PEAK FLOW (cms)=	7.20		0.47	7.	663 (iii)	
RUNOFF VOLUME (mm)=	79.31	4	2.83	75	. 83	
TOTAL RAINFALL (mm)=	80.31	8	30.31	80	.31	
RUNOFF COEFFICIENI =	0.99		0.55	C	.94	
		DUCTOR I	00050			
(1) CN PROCEDURE SELECT $CN^* = 83.0$ Ta	= Dep. 9	RVIOUS L	(Above)			
(ii) TIME STEP (DT) SHOU	LD BE SMA	LLER OR	EQUAL			
(iii) PEAK FLOW DOES NOT	TNCLUDE F	ASEEL OW	TE ANY.			
(,						
RESERVOIR( 0061) OVERF	LOW IS O	F				
DT= 5.0 min   OUTFL	OW STO	RAGE	OUTFL	DW STO	RAGE	
(cms	) (ha	.m.)	(cms)	) (ha		
0.00	00 0.	0000	7.15	50 U	. 5940	
	AREA	QPEAK	TPE	AK	R.V.	
INFLOW : ID= 2 ( 0031)	39.770	(Cms) 7.66	53	2.75	75.83	
OUTFLOW: ID= 1 ( 0061)	39.770	7.00	01 2	2.83	75.83	
PEAK FLOW	REDUCT	ION [Qou	ut/Qin](	6)= 91.36	5	
TIME SHIFT	OF PEAK	LOW	(mii	n) = 5.00	06	
PRATION ST	UKAGE (	JSED	(114.111	.)- 0.56	50	
ADD HYD (0128)     1 + 2 = 3   A	REA OF	PEAK 1	PEAK	R.V.		
(	ha) (o	ms) (	(hrs)	(mm)		
ID1=1 (0171): 4 + $ID2=2 (0172): 16$	.34 0.8	805 2 886 2	2.75	75.83 75.83		
ID = 3 ( 0128): 20	.69 3.6	5 <b>91</b> 2	2.75	75.83		
NOTE: PEAK FLOWS DO NOT	INCLUDE E	ASEFLOWS	S IF ANY	9. 		
ADD HYD ( 0128)						
$\begin{vmatrix} 3 + 2 = 1 \end{vmatrix}$ A	REA Q	PEAK 1	PEAK	R.V.		
TD1= 3 ( 0128) · 20	ha) (0	(ms) (	(hrs)	(mm) 75 83		
+ ID2= 2 ( 2297): 795	.90 28.8	344 3	3.50	69.59		
ID = 1 ( 0128): 816	.59 29.8	31 3	3.50	59.75		

NOTE: PEAK FL	OWS DO NOT INCL	LUDE BASEFLO	WS IF ANY		
ADD HYD ( 0128)	ā.				
1 + 2 = 3	AREA (ba)	QPEAK (cms)	TPEAK (hrs)	R.V.	
ID1= 1 ( 0	128): 816.59	29.831	3.50	69.75	
+ ID2= 2 ( 0	061): 39.77	7.001	2.83	75.83	
ID = 3 ( 0	128): 856.36	32.284	3.42	70.03	
NOTE: PEAK FL	OWS DO NOT INC	LUDE BASEFLO	WS IF ANY	•	
	. <u> </u>				
3 + 2 = 1	AREA	QPEAK	TPEAK	R.V.	
TD1= 3 ( 0	- (ha)	(cms) 32,284	(hrs) 3.42	(mm) 70.03	
+ ID2= 2 ( 0	076): 6.00	1.188	2.75	75.83	
ID = 1 (0)	)128): 862.36	32.488	3.42	70.07	
NOTE: PEAK FL	OWS DO NOT INC	LUDE BASEFLO	WS IF ANY		
ADD HYD ( 0128)	ARFA	OPEAK	TPFAK	R.V.	
	- (ha)	(cms)	(hrs)	(mm)	
ID1=1(0) + $ID2=2(0)$	(128): 862.36 (078): 29.08	32.488	3.42	/0.0/ 65.05	
TD = 3 ( 0	128) · 891 44	32 704	3 42	69 90	
NOTE: PEAK EL	OWS DO NOT THE		WS TE ANY	00100	
ROUTE CHN( 2875)	ā.				
IN= 2> OUT= 1	Routing	time step (m	nin)'= 5.	00	
<	DATA FOR SE	ECTION ( 1	.1)	->	
Dist	ance Eleva 0.00 204	ation 4.68	Manning 0.0600		
2	3.24 204	4.67	0.0450	Main	Channel
5	1.26 20	3.93	0.0450	Main Main	Channel Channel
8	37.42 203	3.39	0.0450	Main	Channel
13	2.09 202	2.47	0.0450	Main	Channel
21	3.87 20	0.24	0.0450	Main	Channel
25	9.32 199	9.43	0.0450	Main	Channel
26	6.86 197	7.71	0.0450	Main	Channel Channel
30	4.50 197	7.16	0.0450	Main	Channel
30	7.31 197	7.98	0.0450	Main	Channel
32	9.41 198	8.06	0.0450	Main	Channel
37	1.71 200	0.22	0.0450	Main	Channel
37	1.13 199	9.51	0.0450	Main	Channel
42	1.51 202	2.47 0.04	50 /0.060	0 Main	Channe1
46	20/	2.80	0.0600		
<	VOLUME	EL TIME TABL	E	тту т	
(m) (m	i) (cu.m.)	(cms)	(m/	s)	(min)
0.31 197.2	4 .601E+04	3.8	0.	64	26.05
0.92 197.8	286E+05	44.3	1.	54	10.76
1.23 198.1	.6 .419E+05	72.2	1.	72	9.67
1.54 198.4	8 .849E+05	171.0	1.	01	8.27
2.15 199.0	.111E+06	252.0	2.	26	7.34
2.46 199.3	9 .139E+06	348.9	2.	50	6.65
3.08 200.0	0 .172E+06	514.0	2.	36	7.02
3.39 200.3	2 .272E+06	649.5	2.	38	6.98
5.69 200.6 4.00 200.9	3 .403E+06	1163.0	2.	63 87	5.78
4.31 201.2	4 .474E+06	1473.8	3.	09	5.37
4.62 201.5	.549E+06	1820.8	3.	50	5.05

4.92 201.85 .6276 5.23 202.16 .7100 5.54 202.47 .7966 5.87 202.80 .9016	+06 2198.2 +06 2610.1 +06 3061.7 +06 3585.6	3.49 3.66 3.83 3.96	4.76 4.53 4.34 4.19			
INFLOW : ID= 2 ( 0128) 8 OUTFLOW: ID= 1 ( 2875) 8	<pre>&lt; hydr AREA QPEAK (ha) (cms) 391.44 32.70 391.44 31.07</pre>	ograph> < TPEAK R.V. M (hrs) (mm) 3.42 69.90 3.58 69.90	-pipe / cł AX DEPTH (m) 0.78 0.76	MAX VEL (m/s) 1.33 1.30		
CALIB	(ha)= 2.27 (mm)= 5.00 [p(hrs)= 0.35	Curve Number ( # of Linear Res.	CN)= 83.0 (N)= 3.00			
NOTE: RAINFALL WAS	TRANSFORMED TO	5.0 MIN. TIME ST	EP.			
$\begin{array}{c c c c c c c c c c c c c c c c c c c $						
PEAK FLOW (cms)=	0.212 (i)					
RUNOFF VOLUME (mm)= TOTAL RAINFALL (mm)= RUNOFF COEFFICIENT =	2.917 44.531 80.310 0.554					
(i) PEAK FLOW DOES NOT 1	NCLUDE BASEFLOW 1	F ANY.				
CALIB   STANDHYD ( 0001)   Area  ID= 1 DT= 5.0 min   Tota]	(ha)= 6.71 Imp(%)= 61.00	Dir. Conn.(%)=	61.00			
Surface Area (ha)= Dep. Storage (mm)= Average Slope (%)= Length (m)= Mannings n =	IMPERVIOUS PE 4.09 1.00 1.00 211.50 0.013	RVIOUS (i) 2.62 5.00 1.00 40.00 0.250				
NOTE: RAINFALL WAS	TRANSFORMED TO	5.0 MIN. TIME ST	EP.			
TIME RAIN hrs mm/h 0.083 0.00 0.167 0.00 0.250 0.00 0.333 1.63 0.417 1.65 0.500 1.65 0.583 1.63 0.667 1.65 0.750 1.63	TRANSFORME h TIME RAIN hrs mm/hr 1.667 9.64 1.750 9.64 1.833 27.30 1.917 27.30 2.000 27.30 2.000 27.30 2.167 27.30 2.2.250 27.30 2.2.33 73.88	D HYETOGRAPH ' TIME RAIN ' hrs mm/hr 3.250 20.88 3.333 11.24 3.417 11.24 3.500 11.24 3.583 11.24 3.667 11.24 3.667 11.24 3.750 11.24 3.833 6.42 3.917 6.42	-   TIME   hrs   4.83   4.92   5.00   5.08   5.17   5.25   5.33   5.42   5.50	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6		

$\begin{array}{ccccc} 0.833 & 1.61 \\ 0.917 & 1.61 \\ 1.000 & 1.61 \\ 1.083 & 1.61 \\ 1.167 & 1.61 \\ 1.250 & 1.61 \end{array}$	2.417 73.88 2.500 73.88 2.583 73.88 2.667 73.88 2.750 73.88 2.833 20.88	4.000 4.083 4.167 4.250 4.333 4.417	6.42 5.5 6.42 5.6 6.42 5.7 6.42 5.8 3.21 5.9 3.21 6.0	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
1.333 9.64	2.917 20.88	4.500	3.21 6.0	8 1.61
1.417 9.64	3.000 20.88	4.583	3.21 6.1	7 1.61
1.500 9.64	3.083 20.88	4.667	3.21 6.2	5 1.61
1.583 9.64	3.16/ 20.88	4.750	3.21	
Max.Eff.Inten.(mm/hr)=	73.88	51.42		
Storage Coeff. (min)=	4.52 (ii)	15.86 (ii)		
Unit Hvd. Tpeak (min)=	5.00	20.00		
Unit Hyd. peak (cms)=	0.23	0.07		
			*TOTALS*	
PEAK FLOW (cms)=	0.84	0.27	1.086 (	iii)
TIME TO PEAK (hrs)=	2.75	2.92	2.75	
RUNOFF VOLUME (mm)=	79.31	44.54	65.75	
TOTAL RAINFALL (mm)=	80.31	80.31	80.31	
RUNOFF COEFFICIENT =	0.99	0.55	0.82	
***** WARNING: STORAGE COEFF.	IS SMALLER THAN	TIME STEP!		
(i) CN PROCEDURE SELECT	TED FOR PERVIOUS	LOSSES:		

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 83.0 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( 0070) IN= 2---> OUT= 1 DT= 5.0 min OVERFLOW IS OFF 
 OUTFLOW
 STORAGE
 OUTFLOW

 (cms)
 (ha.m.)
 (cms)

 0.0000
 0.0000
 0.5080
 STORAGE (ha.m.) 0.2222 QPEAK TPEAK (cms) (hrs) 1.086 2.75 0.443 3.17 AREA R.V. (ha) 6.710 6.710 (mm) 65.75 65.73 INFLOW : ID= 2 ( 0001) OUTFLOW: ID= 1 ( 0070) PEAKFLOWREDUCTION[Qout/Qin](%)=40.77TIMESHIFT OFPEAKFLOW(min)=25.00MAXIMUMSTORAGEUSED(ha.m.)=0.1939 -----CALIB | CALIB | STANDHYD ( 0004)| |ID= 1 DT= 5.0 min | Area (ha)= 2.00 Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00 PERVIOUS (i) 0.20 5.00 2.00 40.00 IMPERVIOUS Surface Area Dep. Storage Average Slope Length (ha)= (mm)= (%)= (m)= 1.80

1.00 0.013 Mannings n = 0.250

TRANSFORMED HYETOGRAPH											
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN				
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr				
0.083	0.00	1.667	9.64	3.250	20.88	4.83	1.61				
0.167	0.00	1.750	9.64	3.333	11.24	4.92	1.61				
0.250	0.00	1.833	27.30	3.417	11.24	5.00	1.61				
0.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61				
0.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61				
0.500	1.61	2.083	27.30	3.667	11.24	5.25	1.61				
0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61				
0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61				
0.750	1.61	2.333	73.88	3.917	6.42	5.50	1.61				
0.833	1.61	2.417	73.88	4.000	6.42	5.58	1.61				
0.917	1.61	2.500	73.88	4.083	6.42	5.67	1.61				
1.000	1.61	2.583	73.88	4.167	6.42	5.75	1.61				
1.083	1.61	2.667	73.88	4.250	6.42	5.83	1.61				
1.167	1.61	2.750	73.88	4.333	3.21	5.92	1.61				
1.250	1.61	2.833	20.88	4.417	3.21	6.00	1.61				
1.333	9.64	2.917	20.88	4.500	3.21	6.08	1.61				
1.417	9.64	3.000	20.88	4.583	3.21	6.17	1.61				

1.500 1.583	9.64   3.083 2 9.64   3.167 2	20.88 4.667 20.88 4.750	3.21 6.25 3.21	1.61
Max.Eff.Inten.(mm/H over (m Storage Coeff. (m Unit Hyd. Tpeak (m Unit Hyd. peak (cr	nr)= 73.88 in) 5.00 in)= 3.14 (i in)= 5.00 ns)= 0.27	$\begin{array}{c} 52.93\\ 10.00\\ 6.45\\ 10.00\\ 0.14\end{array}$	*TOTAI \$*	
PEAK FLOW (CM TIME TO PEAK (hn RUNOFF VOLUME (n TOTAL RAINFALL (n RUNOFF COEFFICIENT	ns)= 0.37 rs)= 2.75 nm)= 79.31 nm)= 80.31 = 0.99	0.03 2.75 44.54 80.31 0.55	0.397 (iii) 2.75 75.83 80.31 0.94	
**** WARNING: STORAGE ( (i) CN PROCEDURE CN* = 83.(	SELECTED FOR PERV Ia = Dep. Sto	THAN TIME STEP! /IOUS LOSSES: prage (Above)		
(iii) PEAK FLOW DOE	AGE COEFFICIENT.	SEFLOW IF ANY.		
CALIB   STANDHYD ( 0079)   ID= 1 DT= 5.0 min	Area (ha)= 0. Fotal Imp(%)= 90.	.60 .00 Dir. Conn.(	(%)= 90.00	
Surface Area (H Dep. Storage (m Average Slope ( Length Mannings n	$\begin{array}{rrrr} \text{IMPERVIOUS} \\ \text{nm} = & 0.54 \\ \text{nm} = & 1.00 \\ (\%) = & 1.00 \\ (m) = & 63.25 \\ = & 0.013 \end{array}$	PERVIOUS (i) 0.06 5.00 2.00 40.00 0.250		
NOTE: RAINFALI	WAS TRANSFORMED	TO 5.0 MIN. T	IME STEP.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.383 Max.Eff.Inten.(mm/1	TRANS           RAIN         TIME           mm/hr         hrs         n           0.00         1.667         0.00           0.00         1.833         2           1.61         1.917         2           1.61         2.000         2           1.61         2.083         2           1.61         2.083         2           1.61         2.333         7           1.61         2.583         7           1.61         2.583         7           1.61         2.583         7           1.61         2.583         7           1.61         2.583         2           9.64         2.917         2           9.64         2.917         2           9.64         3.083         2           9.64         3.083         2           9.64         3.167         2           9.64         3.167         2	FORMED         HYETOGRAF           RAIN         '         TIME           m/hr         '         hrs           9.64         3.250         2           9.64         3.333         2           27.30         3.417         2           27.30         3.417         2           27.30         3.583         2           27.30         3.667         2           27.30         3.667         2           27.30         3.667         2           27.30         3.750         2           27.30         3.883         4.000           3.88         4.083         3           3.88         4.083         3           20.88         4.250         3           20.88         4.583         2           20.88         4.583         2           20.88         4.667         2           20.88         4.750         5	PH       RAIN       TIME         mm/hr       hrs         20.88       4.83         11.24       5.00         11.24       5.00         11.24       5.08         11.24       5.08         11.24       5.25         11.24       5.25         11.24       5.25         11.24       5.25         6.42       5.42         6.42       5.58         6.42       5.58         6.42       5.75         6.42       5.75         6.42       5.75         6.42       5.67         6.42       5.75         6.42       5.67         6.42       5.75         3.21       6.00         3.21       6.08         3.21       6.25         3.21       6.25         3.21       6.25         3.21       6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
over (m Storage Coeff. (m Unit Hyd. Tpeak (m Unit Hyd. ppeak (cr PEAK FLOW (cr TIME TO PEAK (h RUNOFF VOLUME (r TOTAL RAINFALL (r RUNOFF COEFFICIENT	$\begin{array}{llllllllllllllllllllllllllllllllllll$	$\begin{array}{c} 10.00\\ 5.50 (ii)\\ 10.00\\ 0.16\\ 0.01\\ 2.75\\ 44.54\\ 80.31\\ 0.55\\ \end{array}$	*TOTALS* 0.119 (iii) 2.75 75.83 80.31 0.94	
**** WARNING: STORAGE ( (i) CN PROCEDURE CN* = 83.( (ii) TIME STEP (DI THAN THE STOD (iii) PEAK FLOW DOI	COEFF. IS SMALLER SELECTED FOR PERV ) Ia = Dep. Sto F) SHOULD BE SMALL AGE COEFFICIENT. ES NOT INCLUDE BAS	THAN TIME STEP! /IOUS LOSSES: prage (Above) .ER OR EQUAL SEFLOW IF ANY.		

CALIB STANDHYD ( 0003) ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	11.10 90.00	Dir. Conn.(%)=	90.00
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVI 9.9 1.0 1.0 272.0 0.01	OUS 9 0 3 3	PERVIOUS (i) 1.11 5.00 2.00 40.00 0.250	

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

		TR/	NSFORME	D HYETOGRA	PH	-1	
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	9.64	3.250	20.88	4.83	1.61
0.167	0.00	1.750	9.64	3.333	11.24	4.92	1.61
0.250	0.00	1.833	27.30	3.417	11.24	5.00	1.61
0.333	1.61	1.917	27.30	3.500	11.24	5.08	1.61
0.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61
0.500	1.61	2.083	27.30	3.667	11.24	5.25	1.61
0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61
0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61
0.750	1.61	2.333	73.88	3.917	6.42	5.50	1.61
0.833	1.61	2.417	73.88	4.000	6.42	5.58	1.61
0.917	1.61	2.500	73.88	4.083	6.42	5.67	1.61
1.000	1.61	2.583	73.88	4.167	6.42	5.75	1.61
1.083	1.61	2.667	73.88	4.250	6.42	5.83	1.61
1.167	1.61	2.750	73.88	4.333	3.21	5.92	1.61
1.250	1.61	2.833	20.88	4.41/	3.21	6.00	1.61
1.333	9.64	2.917	20.88	4.500	3.21	6.08	1.61
1.417	9.64	3.000	20.88	4.583	3.21	6.17	1.61
1.500	9.64	3.083	20.88	4.66/	3.21	6.25	1.61
1.583	9.64	3.167	20.88	4.750	3.21		
Max.Eff.Inten.(mm.	/hr)=	73.88		52.93			
over (i	min)	5.00		10.00			
Storage Coeff. (n	min)=	5.26	(ii)	8.56 (ii)	6		
Unit Hyd. Tpeak (r	min)=	5.00		10.00			
Unit Hyd. peak (	cms)=	0.21		0.12			

	*TOTALS*
0.15	2.192 (iii)
2.75	2.75
44.54	75.83
80.31	80.31
0.55	0.94

\_\_\_\_\_

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 83.0 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.

2.05 2.75 79.31 80.31 0.99

PEAK FLOW (cms)= TIME TO PEAK (hrs)= RUNOFF VOLUME (mm)= TOTAL RAINFALL (mm)= RUNOFF COEFFICIENT =

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RESERVOIR( 0083)    IN= 2> OUT= 1     DT= 5.0 min	OVERFLOW : OUTFLOW (cms) 0.0000	IS OFF STORAGE   (ha.m.)   0.0000	OUTFLOW (cms) 1.9980	STORAGE (ha.m.) 0.1569	
INFLOW : ID= 2 { OUTFLOW: ID= 1 { FE TI MA	ARI (h: 0003) 11.: 0083) 11.: AK FLOW RI ME SHIFT OF PI XIMUM STORAGI	EA QPEAK a) (cms) 100 2.19 100 1.92 EDUCTION [Qou EAK FLOW E USED	TPEAK (hrs) 2 2.75 4 2.75 t/Qin](%)= 8 (min)= (ha.m.)=	R.V. (mm) 75.83 75.83 7.79 0.00 0.1551	
CALIB   STANDHYD ( 0151)  ID= 1 DT= 5.0 min	Area (ha Total Imp(%	)= 7.77 )= 61.00 D	hir. Conn.(%)	= 61.00	
Surface Area Dep. Storage Average Slope Length	(ha)= (mm)= (%)= (m)= 22	RVIOUS PER 4.74 1.00 1.00 7.60 4	VIOUS (i) 3.03 5.00 1.00 0.00		

Mannings n	=	0.013	0.250	)		
NOTE: RAINE	FALL WAS TR	ANSFORMED	TO 5.0 M	IN. TIME ST	EP.	
TIME hrs 0.08 0.167 0.250 0.33 0.417 0.500 0.58 0.665 0.750 0.83 0.911 1.000 1.08 1.165 1.250 1.33 1.411 1.500	RAIN         s       mm/hr         s       0.00         0       0.00         0       0.00         0       1.61         7       1.61         0       1.61         7       1.61         0       1.61         7       1.61         0       1.61         7       1.61         0       1.61         7       1.61         0       1.61         0       1.61         0       1.61         0       1.61         0       1.61         0       1.61         0       1.61         0       1.61         0       1.61         0       1.61         0       1.61         0       1.61         0       1.61         0       1.61         0       1.61         0       1.61         0       1.61         0       0.64         0       9.64	TIME hrs 1.667 1.750 1.833 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.667 2.500 2.583 2.667 2.750 2.750 2.750 2.750 2.833 2.917 3.000 3.083	SFORMED       HYE         RAIN       1         mm/hr       1         9.64       3.2         9.64       3.2         9.64       3.3         27.30       3.4         27.30       3.5         27.30       3.6         27.30       3.6         27.30       3.8         73.88       4.0         73.88       4.0         73.88       4.1         73.88       4.2         20.88       4.3         20.88       4.5         20.88       4.6	TOGRAPH            IME         RAIN           hrs         mm/hr           50         20.88           i33         11.24           i17         11.24           i83         11.24           i83         11.24           i67         11.24           i50         11.24           i50         11.24           i67         6.42           000         6.42           000         6.42           i67         6.42           i33         2.21           i00         3.21           i17         3.21           i67         3.21	TIME         RAI           hrs         mm/h           4.83         1.61           5.00         1.61           5.17         1.61           5.25         1.61           5.25         1.61           5.33         1.61           5.50         1.61           5.50         1.61           5.50         1.61           5.50         1.61           5.50         1.61           5.50         1.61           5.75         1.61           5.75         1.61           5.75         1.61           5.75         1.61           5.75         1.61           5.75         1.61           5.75         1.61           5.75         1.61           5.75         1.61           5.75         1.61           5.75         1.61           5.75         1.61           6.00         1.61           6.00         1.61           6.01         6.16           6.25         1.61	N
1.583	9.64	3.167	20.88   4.7	50 3.21	l.	
Max.Eff.Inten.(n over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	nm/hr)= (min) (min)= (min)= (cms)=	73.88 5.00 4.72 (* 5.00 0.22	51.42 20.00 16.06 20.00 0.06	(ii) *TO	TALS*	
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	(cms)= (hrs)= (mm)= (mm)= ENT =	0.97 2.75 79.31 80.31 0.99	0.31 2.92 44.54 80.31 0.55	1 6 8	.256 (111) 2.75 5.75 0.31 0.82	
***** WARNING: STORAG	GE COEFF. I	S SMALLER	THAN TIME	STEP!		
(i) CN PROCEDU CN* = { (ii) TIME STEP THAN THE S (iii) PEAK FLOW	JRE SELECTE 33.0 Ia (DT) SHOUL STORAGE COE DOES NOT I	D FOR PERV = Dep. Sto D BE SMALI FFICIENT. NCLUDE BAS	/IOUS LOSSE prage (Abo LER OR EQUA SEFLOW IF A	S: We) NL		
RESERVOIR( 0152)    IN= 2> OUT= 1     DT= 5.0 min	OVERFL OUTFLO (cms) 0.000	OW IS OFF W STOR/ (ha.r 0 0.00	AGE   OU n.)   ( DOO   O QPEAK	TFLOW ST (cms) (h .5870 TPEAK	ORAGE a.m.) 0.2573 R.V.	
INFLOW : ID= 2 (	0151)	(ha) 7.770	(cms) 1.256	(hrs) 2.75	(mm) 65.75	
OUTFLOW: ID= 1 (	0152)	7.770	0.512	3.17	65.74	
PE TJ M4	EAK FLOW IME SHIFT O AXIMUM STO	REDUCTIO F PEAK FLO RAGE USI	DN [Qout/Qi DW ED (h	n](%)= 40.7 (min)= 25.0 ma.m.)= 0.2	7 0 247	
$\begin{vmatrix} ADD & HYD & ( & 0081) \\ 1 & + & 2 & = & 3 \end{vmatrix}$ ID1= 1 ( & 019	AR (h 52): 7.	EA QPE/ a) (cms 77 0.512	AK TPEAK s) (hrs) 2 3.17	R.V. (mm) 65.74		
+ ID2= 2 ( 007	·9): 0.	60 0.119	2.75	75.83		
ID = 3 ( 008	81): 8.	37 0.56	L 2.75	66.46		
NOTE: PEAK FLOW	VS DO NOT I	NCLUDE BAS	SEFLOWS IF	ANY.		
ADD HYD ( 0081)						
	AD			P V		
TD1= 3 ( 00	AR (h	EA QPE/ a) (cm: 37 0.56	AK TPEAK s) (hrs)	R.V. (mm)		

	11.10	1.924	2.75	75.83		
ID = 1 ( 0081):	19.47	2.485	2.75	71.80		
NOTE: PEAK FLOWS DO !	NOT INCLU	DE BASEFLO	WS IF AN	Υ.		
						-
ADD HYD ( 0005) 1 + 2 = 3	AREA	OPEAK	TPEAK	R.V.		
TD1= 1 ( 0002):	(ha) 2,27	(cms) 0.212	(hrs) 2.92	(mm) 44,53		
+ ID2= 2 ( 0004):	2.00	0.397	2.75	75.83		
ID = 3 ( 0005):	4.27	0.578	2.75	59.19		
NOTE: PEAK FLOWS DO N	NOT INCLU	DE BASEFLO	WS IF AN	Y.		
ADD HYD ( 0005)     3 + 2 = 1	AREA	QPEAK	TPEAK	R.V.		
ID1= 3 ( 0005):	(ha) 4.27	(cms) 0.578	(hrs) 2.75	(mm) 59.19		
+ ID2= 2 ( 0070):	6.71	0.443	3.17	65.73		
ID = 1 ( 0005):	10.98	0.962	2.75	63.19		
NOTE: PEAK FLOWS DO	NOT INCLU	DE BASEFLO	WS IF AN	Y.		-
ADD HYD ( 0005) 1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.		
ID1= 1 ( 0005):	(ha) 10.98	(cms) 0.962	(hrs) 2.75	(mm) 63.19		
+ ID2= 2 ( 0081):	19.47	2.485	2.75	71.80		
ID = 3 ( 0005):	30.45	3.447	2.75	68.70		
NOTE: PEAK FLOWS DO N	NOT INCLU	DE BASEFLO	WS IF AN	Y.		
RESERVOIR( 0006)  0	VERFLOW I	S OFF				
TN- 2> OUT- 1						
DT= 5.0 min 00	JTFLOW	STORAGE	OUTF	LOW S	TORAGE	
DT= 5.0 min 00	UTFLOW (cms) 0.0000	STORAGE (ha.m.) 0.0000	0UTF (cm 0.3	LOW S s) ( 320	TORAGE ha.m.) 1.0067	
DT= 5.0 min 0	UTFLOW (cms) 0.0000 0.1470 0.2180	STORAGE (ha.m.) 0.0000 0.5184 0.7112	OUTF   (cm   0.3   0.3	LOW S s) ( 320 840 370	TORAGE ha.m.) 1.0067 1.1307 1.2536	
DT= 5.0 min 0	UTFLOW (cms) 0.0000 0.1470 0.2180 0.2660	STORAGE (ha.m.) 0.0000 0.5184 0.7112 0.8419	OUTF (cm 0.3 0.3 0.4 0.0	LOW S s) ( 320 840 370 000	TORAGE ha.m.) 1.0067 1.1307 1.2536 0.0000	
DT= 5.0 min 0	UTFLOW (cms) 0.0000 0.1470 0.2180 0.2660 ARE (ha	STORAGE (ha.m.) 0.0000 0.5184 0.7112 0.8419 A OPEA ) (cms	OUTF   (cm   0.3   0.4   0.0 K TP ) (h	LOW S s) ( 320 840 370 000 EAK rs)	TORAGE ha.m.) 1.0067 1.1307 1.2536 0.0000 R.V. (mm)	
INFLOW : ID= 2 ( 0005) OUTFLOW : ID= 1 ( 0006)	UTFLOW (cms) 0.0000 0.1470 0.2180 0.2660 ARE (ha 30.4 30.4	STORAGE (ha.m.) 0.0000 0.5184 0.7112 0.8419 A QPEA ) (cms 50 3. 50 0.	UTF (cm 0.3 0.3 0.4 0.4 0.0 K TP (h 447 526	LOW S s) ( 320 840 370 000 EAK rs) 2.75 5.00	TORAGE ha.m.) 1.0067 1.1307 1.2536 0.0000 R.V. (mm) 68.70 68.67	
INFLOW : ID= 2 ( 0005) OUTFLOW: ID= 1 ( 0006) PEAK	UTFLOW (cms) 0.0000 0.1470 0.2180 0.2660 ARE (ha 30.4 30.4 FLOW RE	STORAGE (ha.m.) 0.0000 0.5184 0.7112 0.8419 A QPEA b) (cms 50 3. 50 0. DUCTION [Q	UTF (cm 0.3 0.3 0.4 0.0 K TP (h 447 526 out/Qin]	LOW S s) ( 320 840 370 000 EAK rs) 2.75 5.00 (%)= 15.	TORAGE ha.m.) 1.0067 1.1307 1.2536 0.0000 R.V. (mm) 68.70 68.67 27	
INFLOW : ID= 2 ( 0005) OUTFLOW: ID= 1 ( 0006) PEAK I TIME SHI MAXIMUM	UTFLOW (cms) 0.0000 0.2180 0.22660 ARE (ha 30.4 30.4 FLOW RE IFT OF PE STORAGE	STORAGE (ha.m.) 0.0000 0.5184 0.7112 0.8419 A OPEA ) (cms 50 3. 50 0. DUCTION [Q AK FLOW USED	OUTF   (cm 0.3   0.4   0.0 0.0 K TP ) (h 447 526 out/Qin] (m (ha.	LOW S s) ( 320 840 370 000 EAK rs) 2.75 5.00 (%)= 15. in)=135.	TORAGE ha.m.) 1.0067 1.1307 1.2536 0.0000 R.V. (mm) 68.70 68.67 27 00 4610	
INFLOW : ID= 2 ( 0005) OUTFLOW: ID= 1 ( 0006) PEAK I TIME SHI MAXIMUM	UTFLOW (cms) 0.0000 0.1470 0.2180 0.2660 ARE (ha 30.4 30.4 30.4 FLOW RE IFT OF PE STORAGE	STORAGE (ha.m.) 0.0000 0.5184 0.7112 0.8419 A QPEA ) (cms 50 3. 50 3. 50 3. 50 0. DUCTION [Q AK FLOW USED	OUTF   (cm 0.3   0.3   0.4   0.0 K TP ) (h 447 526 wout/Qin] (m (ha.	LOW S s) ( 320 840 370 000 EAK rs) 2.75 5.00 (%) = 15. in)=135. m.)= 1.	TORAGE ha.m.) 1.0067 1.1307 1.2536 0.0000 R.V. (mm) 68.70 68.67 27 00 4610	
INFLOW : ID= 2 ( 0005) OUTFLOW: ID= 1 ( 0006) PEAK I TIME SH: MAXIMUM	UTFLOW (cms) 0.0000 0.1470 0.2180 0.2660 ARE (ha 30.4 30.4 50.4 FLOW RE IFT OF PE STORAGE	STORAGE (ha.m.) 0.0000 0.5184 0.7112 0.8419 A QPEA ) (cms 50 3. 50 0. DUCTION [Q AK FLOW USED	OUTF   (cm 0.3   0.3   0.4   0.0 0.4   0.0 (h 447 526 [wout/Qin] (m (ha.	LOW S s) ( 320 840 370 000 EAK rs) 2.75 5.00 (%)= 15. in)=135. m.)= 1.	TORAGE ha.m.) 1.0067 1.1307 1.2536 0.0000 R.V. (mm) 68.70 68.67 27 00 4610	_
INFLOW : ID= 2 ( 0005)         OUTFLOW : ID= 1 ( 0006)         PEAK I         TIME SH:         MAXIMUM	UTFLOW (cms) 0.0000 0.1470 0.2180 0.2660 ARE (ha 30.4 5LOW RE STORAGE STORAGE (ha) (mm) . Tp(hrs)	STORAGE (ha.m.) 0.0000 0.5184 0.7112 0.8419 A (cms 50 3. 50 0. DUCTION [Q AK FLOW USED = 4.52 = 5.00 = 0.43	OUTF   (cm 0.3   0.4   0.0 0.0 K TP ) (h 447 526 out/Qin] (m (ha. 	LOW S s) ( 320 840 370 000 EAK rs) 2.75 5.00 (%) = 15. in) = 135. m.) = 1. 	TORAGE ha.m.) 1.0067 1.1307 1.2536 0.0000 R.V. (mm) 68.70 68.67 27 00 4610 	
INFLOW : ID= 2 ( 0005)         OUTFLOW : ID= 1 ( 0006)         PEAK I         TIME SH:         MAXIMUM	UTFLOW (cms) 0.0000 0.1470 0.2180 0.22660 ARE (ha 30.4 50.4 FLOW RE STORAGE STORAGE (ha) (mm) Tp(hrs)	STORAGE (ha.m.) 0.0000 0.5184 0.7112 0.8419 A) (cms 50 3. 50 0. DUCTION [Q AK FLOW USED = 4.52 = 5.00 = 0.43 FORMED TO	OUTF   (cm 0.3   0.4   0.0 0.0 (ha. ) (h (ha. ) Curve N # of Li 5.0 MIN	LOW S s) ( 320 840 370 000 EAK rs) 2.75 5.00 (%) = 15. in) = 135. m.) = 1. 	TORAGE ha.m.) 1.0067 1.1307 1.2536 0.0000 R.V. (mm) 68.70 68.67 27 00 4610 	
INFLOW : ID= 2 ( 0005) OUTFLOW: ID= 1 ( 0006)         PEAK I TIME SHI MAXIMUM	UTFLOW (cms) 0.0000 0.1470 0.2180 0.2660 ARE (ha 30.4 30.4 30.4 HELOW RE IFT OF PE STORAGE AS TRANSF	STORAGE (ha.m.) 0.0000 0.5184 0.7112 0.8419 A QPEA () (cms 50 3. 50 0. DUCTION [Q AK FLOW USED = 4.52 = 5.00 = 0.43 FORMED TO	OUTF   (cm 0.3   0.4   0.0 (n.4 0.0 K TP ) (h 447 526 out/Qin] (m (ha.1 	LOW S s) ( 320 840 370 000 EAK rs) 2.75 5.00 (%) = 15. in) = 135. m.) = 1.  umber near Res . TIME S GRAPH	TORAGE ha.m.) 1.0067 1.1307 1.2536 0.0000 R.V. (mm) 68.70 68.67 27 00 4610 	
INFLOW : ID= 2 ( 0005) OUTFLOW: ID= 1 ( 0006)         PEAK I TIME SH: MAXIMUM	UTFLOW (cms) 0.0000 0.1470 0.2180 0.2660 ARE (ha 30.4 FLOW RE IFT OF PE STORAGE (mm) . Tp(hrs) AS TRANSF	STORAGE (ha.m.)           0.0000           0.5184           0.7112           0.8419           A           QPEA           )           (cms           50           50           0.0000           0.0000           0.8419           A           QPEA           (cms           50           0.0000           0.00000           0.00000           0.00000           0.000000           0.0000000           0.000000000           0.00000000000           0.00000000000000000000000000000000000	OUTF   (cm 0.3 0.3 0.4 0.0 K TP ) (h 447 526 wout/Qin] (m (ha. 	LOW S s) ( 320 840 370 000 EAK rs) 2.75 5.00 (%)=15. in)=135. m.)= 1.  umber near Res . TIME S GRAPH E RAI s mm/h	TORAGE ha.m.) 1.0067 1.1307 1.2536 0.0000 R.V. (mm) 68.70 68.67 27 00 4610 	
INFLOW : ID= 2 ( 0005) OUTFLOW: ID= 1 ( 0006)         PEAK I TIME SH: MAXIMUM	JTFLOW (cms) 0.0000 0.1470 0.2180 0.2660 ARE (ha 30.4 5LOW RE STORAGE STORAGE 	STORAGE (ha.m.) 0.0000 0.5184 0.7112 0.8419 A OPEA ) (cms 50 3. 50 0. DUCTION [Q AK FLOW USED = 4.52 = 5.00 = 0.43 FORMED TO TRANSFORM ME RAIN ME RAIN ME RAIN ME RAIN ME RAIN	OUTF   (cm 0.3 0.4 0.4 0.0 K TP ) (h 447 526 out/Qin] (ha.  Curve N # of Li 5.0 MIN ED HYETO   1 IM   5.250 3.333	LOW S s) ( 320 840 370 000 EAK rs) 2.75 5.00 (%)= 15. in)=135. m.)= 1.  umber near Res . TIME S GRAPH E RAI S mm/h 20.88 11.24	TORAGE ha.m.) 1.0067 1.1307 1.2536 0.0000 R.V. (mm) 68.70 68.67 27 00 4610 	
INFLOW : ID= 2 ( 0005) OUTFLOW: ID= 1 ( 0006)         PEAK I TIME SHI MAXIMUM	UTFLOW (cms) 0.0000 0.1470 0.2180 0.2660 ARE (ha 30.4 30.4 ELOW RE IFT OF PE STORAGE STORAGE 	STORAGE (ha.m.) 0.0000 0.5184 0.7112 0.8419 A QPEA () (cms 50 3. 50 0. DUCTION [Q AK FLOW USED = 4.52 = 5.00 = 0.43 FORMED TO TRANSFORM ME RAIN FORMED TO TRANSFORM ME RAIN FORMED TO TRANSFORM ME RAIN FORMED TO TRANSFORM	OUTF   (cm 0.3 0.4 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7	LOW S s) ( 320 840 370 000 EAK rs) 2.75 5.00 (%) = 15. in) = 135. m.) = 1.  umber near Res . TIME S GRAPH E RAI S mm/h 20.88 11.24 11.24	TORAGE ha.m.) 1.0067 1.1307 1.2536 0.0000 R.V. (mm) 68.70 68.67 27 00 4610 	
INFLOW : ID= 2 ( 0005) OUTFLOW: ID= 1 ( 0006)           PEAK I TIME SH: MAXIMUM	JTFLOW (cms) 0.0000 0.1470 0.2180 0.2660 ARE (ha 30.4 FLOW RE IFT OF PE STORAGE (ha) (mm) . Tp(hrs) AS TRANSF AIN   TI /hr   h 000   1.6 000   1.7 000   1.8 61   2.0	STORAGE (ha.m.) 0.0000 0.5184 0.7112 0.8419 A QPEA ) (cms 50 3. 50 0. DUCTION [Q AK FLOW USED = 4.52 = 5.00 = 0.43 FRANSFORM ME RAIN I's mm/hr 67 9.64 50 9.64 33 27.30 10 27.30	UUTF (cm 0.3 0.4 0.0 K TP (h 447 526 out/Qin] (m (ha. Curve N # of Li 5.0 MIN ED HYETO I TIM S.250 3.333 3.417 3.500 3.583 3.667	LOW S s) ( 320 840 370 000 EAK rs) 2.75 5.00 (%)= 15. in)=135. m.)= 1.  (%)= 15. in)=135. m.)= 1.  gRAPH E RAI S mm/h 20.88 S 11.24 11.24 11.24 11.24 11.24	TORAGE ha.m.) 1.0067 1.1307 1.2536 0.0000 R.V. (mm) 68.70 68.67 27 00 4610 	
INFLOW : ID= 2 ( 0005) OUTFLOW: ID= 1 ( 0006)         PEAK I TIME SH: MAXIMUM	JTFLOW (cms) 0.0000 0.2180 0.2660 ARE (ha 30.4 FLOW RE IFT OF PE STORAGE 	STORAGE (ha.m.) 0.0000 0.5184 0.7112 0.8419 A (cms 50 3. 50 0. DUCTION [Q AK FLOW USED = 4.52 = 5.00 = 0.43 ORMED TO TRANSFORM ME RAIN ITS mm/hr 167 9.64 50 9.64 33 27.30 00 27.30 50 27.30	OUTF   (cm 0.3 0.4 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7	LOW S s) ( 320 840 370 000 EAK rs) 2.75 5.00 (%)=15. in)=135. m.)= 1.  umber near Res . TIME S GRAPH E RAI S mm/h 20.88 11.24 11.24 11.24 11.24 11.24 11.24 11.24	TORAGE ha.m.) 1.0067 1.1307 1.2536 0.0000 R.V. (mm) 68.70 68.70 68.67 27 00 4610 	

0.917	1.61	2.500	73.88	4.083	6.42	5.67	1.61
1.000	1.01	2.583	/3.88	4.16/	6.42	5.75	1.01
1.083	1.61	2.667	73.88	4.250	6.42	5.83	1.61
1.167	1.61	2.750	73.88	4.333	3.21	5.92	1.61
1.250	1.61	2.833	20.88	4.417	3.21	6.00	1.61
1.333	9.64	2.917	20.88	4.500	3.21	6.08	1.61
1.417	9.64	3.000	20.88	4.583	3.21	6.17	1.61
1.500	9.64	3.083	20.88	4.667	3.21	6.25	1.61
1.583	9.64	3.167	20.88	4.750	3.21		

Unit Hyd Qpeak (cms)= 0.401

PEAK FLOW	(cms)=	0.375	(i)
TIME TO PEAK	(hrs)=	3.000	
RUNOFF VOLUME	(mm)=	44.537	
TOTAL RAINFALL	(mm)=	80.310	
RUNOFF COEFFICI	ENT =	0.555	

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

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CALIB STANDHYD ( 0010) ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	0.88 90.00	Dir.	Conn.(%)=	90.00
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	IMPERVI 0.7 1.0 1.0 76.5 0.01	OUS 9 0 9 9 3	PERVIOU 0.09 5.00 2.00 40.00 0.250	s (i)	

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

		TR/	ANSFORME	D HYETOGRA	APH	-	
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	9.64	3.250	20.88	4.83	1.61
0.16/	0.00	1.750	9.64	3.333	11.24	4.92	1.61
0.250	0.00	1.833	27.30	3.41/	11.24	5.00	1.61
0.333	1.61	2 000	27.30	3.500	11.24	5.00	1.61
0.417	1.61	2.000	27.30	3 667	11 24	5 25	1 61
0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61
0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61
0.750	1.61	2.333	73.88	3.917	6.42	5.50	1.61
0.833	1.61	2.417	73.88	4.000	6.42	5.58	1.61
0.917	1.61	2.500	73.88	4.083	6.42	5.67	1.61
1.000	1.61	2.583	73.88	4.167	6.42	5.75	1.61
1.083	1.61	2.667	73.88	4.250	6.42	5.83	1.61
1.16/	1.61	2.750	/3.88	4.333	3.21	5.92	1.61
1 222	0.64	2.033	20.88	4.417	2 21	6.00	1.61
1.333	9.04	3 000	20.00	4.500	3 21	6.00	1.61
1.500	9.64	3.083	20.88	4.667	3.21	6.25	1.61
1.583	9.64	3.167	20.88	4.750	3.21	0.25	1.01
Max.Eff.Inten.(m	m/hr)=	73.88		52.93			
over	(min)	5.00		10.00			
Storage Coeff.	(min)=	2.46	(ii)	5.77 (ii)	)		
Unit Hyd. Tpeak	(min)=	5.00		10.00			
Unit Hyd. peak	(cms)=	0.30		0.15			
					*T01	TALS*	
PEAK FLOW	(cms)=	0.16		0.01	0.	175 (111	)
TIME TO PEAK	(nrs)=	2.75		2.75	7		
TOTAL DATNEALL	(mm)=	79.31 80.31		90 31	/:	. 03	
RUNOFE COFFETCIE	NT =	0.99		0.55	00	0.94	
Colline Colline		5.55		0.00			

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

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 83.0 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( 0055)	OVERFLOW	IS OFF		
DT= 5.0 min	OUTFLOW	STORAGE	OUTFLOW	STORAGE

	(cms) 0.0000	(ha.m.) 0.0000	(cms) 0.193	(ha 3 0	.m.) .0000	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	AR (h 0010) 0. 0055) 0.	EA QPEA a) (cms) 880 0. 880 0.	( TPEA ) (hrs 175 2 175 2	K ) .75 .75	R.V. (mm) 75.83 75.83	
PE TI MA MA	AK FLOW R ME SHIFT OF P XIMUM STORAG XIMUM STORAG	EDUCTION [Q EAK FLOW E USED E USED	out/Qin](% (min (ha.m. (cu.m.	)=100.23 )= 0.00 )= 0.00 )= 0.03	00 1448	
**** WARNING : H	YDROGRAPH PEA CHECK OUTFLOW	k was not ri /storage tai	EDUCED. BLE OR RE	DUCE DT.		
CALIB   STANDHYD ( 0012)   ID= 1 DT= 5.0 min	Area (ha Total Imp(%	)= 2.19 )= 90.00	Dir. Conn	.(%)= 9	0.00	
Surface Area Dep. Storage Average Slope Length Mannings n	$ \begin{array}{c} \text{IMPE} \\ \text{(ha)} = \\ \text{(mm)} = \\ \text{(\%)} = \\ \text{(m)} = 12 \\ = 0 \end{array} $	RVIOUS P 1.97 1.00 1.00 0.83 .013	ERVIOUS (1 0.22 5.00 2.00 40.00 0.250	)		
NOTE: RAINF	ALL WAS TRANS	FORMED TO	5.0 MIN.	TIME STE	Ρ.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417	RAIN       T         mm/hr       0.00       1.         0.00       1.       1.         0.00       1.       1.         1.61       2.       1.         1.61       2.       1.         1.61       2.       1.         1.61       2.       1.         1.61       2.       1.         1.61       2.       1.         1.61       2.       1.         1.61       2.       1.         1.61       2.       1.         1.61       2.       1.         1.61       2.       1.         1.61       2.       1.         1.61       2.       1.         1.61       2.       1.         9.64       3.       9.64         9.64       3.       9.64	- TRANSFORM IME RAIN hrs mm/hr 667 9.64 750 9.64 833 27.30 0917 27.30 000 27.30 000 27.30 083 27.30 167 27.30 250 27.30 333 73.88 417 73.88 500 73.88 567 73.88 667 73.88 667 73.88 667 73.88 617 20.88 917 20.88 917 20.88 917 20.88 917 20.88	ED HYETOGR TIME TIME TIME TIME TIME TIME TIME TS 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.583 4.667	APH RAIN mm/hr 20.88 11.24 11.2	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.58 5.58 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
1.583 Max.Eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	9.64   3. (min)= (min)= (min)= (cms)= (cms)= (hrs)= (mm)= (mm)= NT =	167 20.88 3.88 5.00 0.27 0.40 2.75 9.31 0.31 0.99	4.750 52.93 10.00 6.54 (ii) 10.00 0.14 0.03 2.75 44.54 80.31 0.55	3.21   *TOT. 0. 2 75 80 0	ALS* 434 (iii) .75 .83 .31 .94	
***** WARNING: STORAG (i) CN PROCEDU CN* = 8 (ii) TIME STEP THAN THE S (iii) PEAK FLOW	E COEFF. IS S RE SELECTED F 3.0 Ia = D (DT) SHOULD B TORAGE COEFFI DOES NOT INCL	MALLER THAN OR PERVIOUS ep. Storage E SMALLER OI CIENT. UDE BASEFLOI	TIME STEP LOSSES: (Above) R EQUAL W IF ANY.	1		
CALIB   STANDHYD ( 0056)  ID= 1 DT= 5.0 min	Area (ha Total Imp(%	)= 5.50 )= 61.00	Dir. Conn	.(%)= 6	1.00	
Surface Area Dep. Storage Average Slope	IMPE (ha)= (mm)= (%)=	RVIOUS P 3.36 1.00 1.00	ERVIOUS (i 2.14 5.00 1.00	)		

Length Mannings n	(m)= =	191.49 0.013	40.00 0.250		
NOTE: RAI	NFALL WAS TH	ANSFORMED TO	5.0 MIN. TIME	STEP.	
TI h 0.0 0.1 0.2 0.3 0.4 0.5 0.4 0.5 0.6 0.7 0.8 0.9 1.0 1.0 1.1 1.2 1.3 1.4 1.5	ME         RAIN           rs         mm/hr           83         0.00           67         0.00           50         0.00           33         1.61           17         1.61           00         1.61           83         1.61           17         1.61           167         1.61           133         1.61           17         1.61           133         1.61           167         1.61           163         1.61           167         1.61           163         9.64           17         9.64           183         9.64	TRANSFORM TIME RAIT hrs mm/h1 1.667 9.64 1.750 9.64 1.833 27.33 2.000 27.33 2.000 27.33 2.083 27.33 2.167 27.33 2.250 27.33 2.333 73.84 2.417 73.84 2.500 73.84 2.500 73.84 2.583 73.84 2.5667 73.84 2.5667 73.84 2.553 20.84 2.833 20.84 3.000 20.84 3.000 20.84 3.003 20.84 3.167 20.84	MED         HYETOGRAPH           I         TIME         RA           I         hrs         mm           I         3.250         20.3           I         3.333         11.2           I         3.333         11.2           I         3.500         11.2           I         3.503         11.2           I         3.667         11.2           I         3.750         11.2           I         3.750         11.2           I         3.750         11.2           I         3.637         16.4           I         4.000         6.4           I         4.083         6.4           I         4.083         6.4           I         4.250         6.4           I         4.250         6.4           I         4.250         6.4           I         4.500         3.2           I         4.500         3.2           I         4.567         3.2           I         4.667         3.2           I         4.750         3.2	AIN         TIME           Thr         hrs           38         4.83           24         4.92           24         5.00           24         5.00           24         5.00           24         5.03           42         5.25           24         5.25           24         5.25           24         5.50           42         5.50           42         5.50           42         5.56           42         5.67           42         5.75           42         5.83           21         5.92           21         6.08           21         6.17           21         6.25           21         6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.Eff.Inten. ove Storage Coeff. Unit Hyd. Tpea Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL PUNDEE COFFETC	(mm/hr)= r (min)= k (min)= (cms)= (cms)= (hrs)= (mm)= restr =	73.88 5.00 4.26 (ii) 5.00 0.23 0.69 2.75 79.31 80.31	51.42 20.00 15.60 (ii) 20.00 0.07 0.22 2.92 44.54 80.31	*TOTALS* 0.892 (iii) 2.75 65.75 80.31 82	
***** WARNING: STOR (i) CN PROCE CN* = (ii) TIME STE THAN THE (iii) PEAK FLO	AGE COEFF. ] DURE SELECTE 83.0 Ia P (DT) SHOUL STORAGE COE W DOES NOT ]	S SMALLER THAN D FOR PERVIOUS Dep. Storage D BE SMALLER ( FFICIENT. INCLUDE BASEFLO	N TIME STEP! 5 LOSSES: 2 (Above) DR EQUAL DW IF ANY.		
RESERVOIR( 0057)   IN= 2> OUT= 1   DT= 5.0 min	- OVERFL OUTFLC - (cms) 0.000	OW IS OFF W STORAGE (ha.m.) 00 0.0000	OUTFLOW   (cms)   0.4170	STORAGE (ha.m.) 0.1822	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0056) 0057)	AREA QPE/ (ha) (cms 5.500 0. 5.500 0.	K TPEAK 5) (hrs) 892 2.75 363 3.08	R.V. (mm) 65.75 65.73	
	TIME SHIFT O MAXIMUM STO	DF PEAK FLOW DRAGE USED	(min)= 20 (ha.m.)= (	).00 ).1590	
ADD HYD ( 0009) 1 + 2 = 3 ID1= 1 ( 0 + ID2= 2 ( 0 ID = 3 ( 0	- (l 011): 4, 012): 2 009): 6.	REA QPEAK na) (cms) 52 0.375 19 0.434 71 0.720	TPEAK R.V. (hrs) (mm) 3.00 44.54 2.75 75.83 2.75 54.75		
ADD HYD ( 0009) 3 + 2 = 1	-     AF - (H	REA OPEAK na) (cms)	TPEAK R.V. (hrs) (mm)	;	

ID1= 3 ( 000 + ID2= 2 ( 005	99): 6.7 55): 0.8	1 0.720 8 0.175	2.75	54.75 75.83		
ID = 1 (000)	9): 7.5	9 0.895	2.75	57.19		
NOTE: PEAK FLOW	S DO NOT IN	CLUDE BASEFLO	WS IF ANY	<u>.</u>		
ADD HYD ( 0009)    1 + 2 = 3   IDI= 1 ( 000	ARE/ (ha) (9): 7.5	A QPEAK ) (cms) 9 0.895	TPEAK (hrs) 2.75	R.V. (mm) 57.19		
+ 1D2= 2 ( 00:	5.5	0 0.363	3.08	65.73		
ID = 3 ( 000	9): 13.0	9 1.212	2.75	60.78		
NOTE: PEAK FLOW	S DO NOT IN	CLUDE BASEFLO	WS IF ANY	·		
RESERVOIR( 0063)    IN= 2> OUT= 1     DT= 5.0 min	OVERFLO OUTFLOW (cms) 0.0000 0.0700 0.1000 0.1000	W IS OFF STORAGE (ha.m.) 0.0000 0.1180 0.1585 0.1851	OUTFL (cms) 0.16 0.18 0.20 0.00	OW STO ) (ha 00 0 00 0 80 0 00 0	RAGE .m.) .2188 .2432 .2682 .0000	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0009) 1 0063) 1	AREA QPEAI (ha) (cms) 3.090 1.2 3.090 0.3	K TPE ) (hr 212 386	AK s) 2.75 4.33	R.V. (mm) 60.78 60.75	
PE TJ M/	AK FLOW ME SHIFT OF XIMUM STOR	REDUCTION [Q PEAK FLOW AGE USED	out/Qin]( (mi (ha.m	%)= 31.83 n)= 95.00 1.)= 0.42	70	
CALIB STANDHYD ( 0058) ID= 1 DT= 5.0 min	Area ( Total Imp	ha)= 1.63 (%)= 90.00	Dir. Con	ın.(%)= 9	0.00	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	PERVIOUS PI 1.47 1.00 1.00 104.24 0.013	ERVIOUS ( 0.16 5.00 1.00 40.00 0.250	i)		
NOTE: RAINE	ALL WAS TRA	NSFORMED TO	5.0 MIN.	TIME STE	Ρ.	
TIMM hrs 0.08 0.166 0.250 0.33 0.41 0.500 0.58 0.666 0.750 0.83 0.91 1.000 1.08 1.166 1.250 1.33 1.41 1.500 1.58	RAIN mm/hr 0.00 0.00 0.00 0.00 0.00 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61 0.1.61 1.61 0.0.00 0.00	TRANSFORM TIME RAIN hrs mm/hr 1.667 9.64 1.750 9.64 1.833 27.30 2.000 27.30 2.083 27.30 2.167 27.30 2.333 73.88 2.417 73.88 2.417 73.88 2.583 73.88 2.583 73.88 2.667 73.88	ED HYETOG TIME hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.500 4.583 4.667 4.750	RAPH RAIN mm/hr 20.88 11.24 11.24 11.24 11.24 11.24 11.24 11.24 6.42 6.42 6.42 6.42 6.42 6.42 6.42 6	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN nmm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.Eff.Inten.(n over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	m/hr)= (min) (min)= (min)= (cms)=	73.88 5.00 2.96 (ii) 5.00 0.28	52.93 10.00 7.03 (i 10.00 0.14	i)		
PEAK FLOW	(cms)=	0.30	0.02	*TOT 0.	ALS* 323 (iii)	

TIME TO PEAK	(hrs)=	2.75	2.75	2.75
RUNOFF VOLUME	(mm)=	79.31	44.54	75.83
TOTAL RAINFALL	(mm)=	80.31	80.31	80.31
RUNOFF COEFFICI	ENT =	0.99	0.55	0.94

- (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 83.0 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( 0073)	OVERFL	OW IS OF	F				
IN= 2> OUT= 1 DT= 5.0 min	OUTFLC (cms) 0.000 0.012 0.017 0.021	W STO (ha 0 0. 20 0. 78 0. 6 0.	RAGE .m.) 0000 0426 0560 0670	OUTFLOW (cms) 0.0270 0.0313 0.0356 0.0000	V STO (ha ) 0 3 0 5 0 0 0	RAGE .m.) .0780 .0880 .0949 .0000	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 (	0058) 0073)	AREA (ha) 1.630 1.630	QPEAK (cms) 0.3 0.0	TPEAK (hrs) 23 2. 36 3.	( ) .75 .83	R.V. (mm) 75.83 75.28	
י ד א	TIME SHIFT O	DF PEAK F DRAGE U	LOW LOW SED	(min) (ha.m.)	)= 11.14 )= 65.00 )= 0.09	56	
CALIB STANDHYD ( 0071) ID= 1 DT= 5.0 min	Area Total Im	(ha)= ıp(%)= 9	0.25	Dir. Conn.	. (%)= 9	0.00	
Surface Area Dep. Storage Average Slope Length Mannings n	(ha)= (mm)= (%)= (m)= =	MPERVIOU 0.22 1.00 1.00 40.82 0.013	S PE	RVIOUS (i) 0.03 5.00 2.00 40.00 0.250			
NOTE: RAIN	NFALL WAS TR	ANSFORME	d to	5.0 MIN. 1	TIME STE	Ρ.	
		TPA	NSEORME	D HYETOGRA	APH		
TIM	E RATN I	TIME	RATN	I' TIME	RATN	I TIME	RATN
hr	s mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.08	33 0.00	1.667	9.64	3.250	20.88	4.83	1.61
0.16	0.00	1.750	9.64	3.333	11.24	4.92	1.61
0.23	0 0.00	1.833	27.30	3.41/	11.24	5.00	1.61
0.41	1.61	2.000	27.30	3.583	11.24	5.17	1.61
0.50	0 1.61	2.083	27.30	3.667	11.24	5.25	1.61
0.58	33 1.61	2.167	27.30	3.750	11.24	5.33	1.61
0.66	57 1.61	2.250	27.30	3.833	6.42	5.42	1.61
0.75	3 1.61	2.333	73.88	4.000	6.42	5.50	1.61
0.91	7 1.61	2.500	73.88	4.083	6.42	5.67	1.61
1.00	0 1.61	2.583	73.88	4.167	6.42	5.75	1.61
1.08		2.667	73.88	4.250	6.42	5.83	1.61
1.10	50 1.61	2.833	20.88	4.333	3.21	6.00	1.61
1.33	9.64	2.917	20.88	4.500	3.21	6.08	1.61
1.41	9.64	3.000	20.88	4.583	3.21	6.17	1.61
1.50	3 9.64	3.167	20.88	4.007	3.21	0.25	1.01
May Eff Inten (	mm/hr)-	73 88		52 93			
over	(min)	5.00		5.00			
Storage Coeff.	(min)=	1.68	(ii)	4.99 (ii)	)		
Unit Hyd. Tpeak	(mnn)=	5.00		5.00			
onic nyu. peak	(clis)-	0.52		0.22	*TOT	ALS*	
PEAK FLOW	(cms)=	0.05		0.00	0.	050 (iii)	
TIME TO PEAK	(hrs)=	2.75		2.75	2	.75	
TOTAL RATNEALL	(mm)=	80.31		80.31	/ 5	. 31	
RUNOFF COEFFICI	ENT =	0.99		0.55	0	.94	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 83.0 Ia = Dep. Storage (Above)
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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CALIB     STANDHYD ( 0074)   ID= 1 DT= 5.0 min	Area Total In	(ha)= ( np(%)= 90	).21 ).00	Dir. Conn.	(%)= 9	0.00	
Surface Area Dep. Storage Average Slope Length Mannings n NOTE: RAINF	(ha)= (mm)= (%)= (m)= = ALL WAS TF	IMPERVIOUS 0.19 1.00 1.00 37.42 0.013 RANSFORMEI	5 РЕ ( ) ) ТО	RVIOUS (i) 0.02 5.00 2.00 40.00 0.250 5.0 MIN. T	IME STE	P.	
						1000	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.500	RAIN mm/hr 0.00 0.00 1.61 1.61 1.61 1.61 1.61 1.61	TRAN TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167	ISFORMEI RAIN 9.64 9.64 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.38 27.38 27.38 73.88 73.88 73.88 73.88 20.88 20.88 20.88	D HYETOGRA ' TIME ' hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.583 5.583 5.593 5.5	PH RAIN mm/hr 20.88 11.24 11.24 11.24 11.24 11.24 11.24 11.24 11.24 6.42 6.42 6.42 6.42 6.42 6.42 6.42 6	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.58 5.67 5.58 5.67 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
Max.Eff.Inten.(m over Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL	m/hr)= (min)= (min)= (cms)= (cms)= (hrs)= (mm)= (mm)=	73.88 5.00 1.60 0.32 0.04 2.75 79.31 80.31	(11)	52.93 5.00 4.91 (ii) 5.00 0.22 0.00 2.75 44.54 80.31	*TOT 0. 2 75 80	ALS* 042 (iii) 2.75 2.82 31	
RUNOFF COEFFICIE		0.99	THAN	0.55	O	.94	
(i) CN DEOCEDU		ED EOD DET		I DESEE			
CN = 8	3.0 Ta	= Dep. St	orage	(Above)			

(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

RESERVOIR( 0075)    TN= 2> OUT= 1	OVERFLOW 3	S OFF		
DT= 5.0 min	OUTFLOW (cms) 0.0000 0.0019 0.0028 0.0034	STORAGE (ha.m.) 0.0000 0.0055 0.0072 0.0086	OUTFLOW (cms) 0.0042 0.0049 0.0056 0.0000	STORAGE (ha.m.) 0.0100 0.0113 0.0122 0.0000
INFLOW : ID= 2 ( 00 OUTFLOW: ID= 1 ( 00 PEA	ARE (ha 0.2 075) 0.2 K FLOW RE	A QPEAK ) (cms) 10 0.04 10 0.00 DUCTION [Qou	TPEAK (hrs) 2 2.75 5 3.75 t/Qin](%)= 13	R.V. (mm) 75.82 72.35

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	TIME SHIFT MAXIMUM ST	OF PEAK F ORAGE U	LOW SED	(min (ha.m.	)= 60.00 )= 0.01	0 119	
ADD HYD ( 0072   1 + 2 = 3 ID1= 1 ( + ID2= 2 (	2)    A (( 0071): 0 0073): 1	REA QP ha) (c .25 0.0 .63 0.0	EAK TI ms) (1 50 2 36 3	PEAK hrs) .75 7 .83 7	R.V. (mm) 5.82 5.28		
ID = 3 (	0072): 1	.88 0.0	75 2.	.75 7	5.35		
NOTE: PEAK	LOWS DO NOT	INCLUDE B	ASEFLOWS	IF ANY.			
ADD HYD ( 0072 3 + 2 = 1 ID1= 3 ( + TD2= 2 (	 2)	REA QP ha) (c .88 0.0 21 0.0	EAK TI ms) (1 75 2	PEAK hrs) .75 7	R.V. (mm) 5.35		
$ID_{=} = 1$ (	0072) · 2	09 0.0	79 2	75 7	5 05		
		TNCLUDE B		TE ANY	5.05		
	-LOWS DO NOT		ASEFLOWS	1F ANT.			
RESERVOIR( 0065   IN= 2> OUT= 1   DT= 5.0 min	5)  OVERF   OUTFLI (cms 0.00 0.01 0.02 0.02	LOW IS OF OW STO ) (ha 00 0. 50 0. 20 0. 60 0.	F RAGE   .m.)   0000   0159   0216   0256	OUTFLO (cms) 0.033 0.038 0.043 0.043	W STC (ha 0 () 0 () 0 () 0 ()	DRAGE a.m.) D.0305 D.0340 D.0377 D.0000	
INFLOW : ID= 2 OUTFLOW: ID= 1	( 0072) ( 0065) PEAK FLOW TIME SHIFT	AREA (ha) 2.090 2.090 REDUCT OF PEAK F	QPEAK (cms) 0.079 0.034 ION [Qout	TPEA (hrs 9 2 4 5 t/Qin](% (min	K ) .75 .75 ()= 43.19 )=180.00	R.V. (mm) 75.05 74.92	
	MAXIMUM ST	ORAGE U	SED	(ha.m.	3= 0.03	314	
CALIB STANDHYD ( 0077 ID= 1 DT= 5.0 mir	7)   Area 1   Total I	(ha)= mp(%)= 9	5.46 0.00 D <sup>-</sup>	ir. Conn	. (%)=	90.00	
Surface Area	(ha)-	IMPERVIOU	S PER	VIOUS (i	)		
Dep. Storage Average Slope	(mm)= e (%)=	1.00		5.00			
Length Mannings n	(m)= =	190.79 0.013	40	0.00			
NOTE: RA	AINFALL WAS T	RANSFORME	D TO 5.	.0 MIN.	TIME ST	EP.	
1	TIME RAIN	TRA	RAIN	HYETOGR	APH RAIN	-   TIME	RAIN
	hrs         mm/hr           083         0.00           167         0.60           250         0.00           333         1.61           500         1.61           583         1.61           667         1.61           917         1.61           000         1.61           0033         1.61           1.62         1.61           250         1.61           250         1.61           250         1.61           250         1.61	hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.833	mm/hr 9.64 9.64 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 73.88 73.88 73.88 73.88 73.88 73.88 73.88 73.88 73.88	hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417	mm/hr 20.88 11.24 11.24 11.24 11.24 11.24 11.24 11.24 6.42 6.42 6.42 6.42 6.42 6.42 6.42 3.21	hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.67 5.75 5.83 5.92 6.00	<pre>mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6</pre>
1	.333 9.64 .417 9.64	2.917	20.88	4.500	3.21	6.08	1.61

$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
<pre>***** WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!     (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:     CN* = 83.0 Ia = Dep. Storage (Above)     (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.     (iii) DEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.     (ha) (cms) (hrs) (mm)     ID1=1 ( 0064): 43.54 0.900 4.58 66.29     NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.     (ha) (cms) (hrs) (mm)     ID1=3 ( 0064): 43.54 0.900 4.58 66.29     NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.     ID1=3 ( 0064): 43.54 0.900 4.58 66.29     NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.     ID1=3 ( 0064): 45.63 0.933 4.67 66.68     NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.     ID1=1 ( 0064): 45.63 0.933 4.67 66.68     NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.     ID1=1 { 0064}: 51.09 1.422 2.75 67.66     NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.     ID1=3 ( 0064): 51.09 1.422 2.75 67.66     NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.     ID1=3 ( 0064): 51.09 1.422 0.75 67.66     NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.     ID1=3 ( 0064): 51.09 1.422 0.75 67.66     NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.     ID1=3 ( 0064): 51.09 1.422 0.75 67.66     NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.     ID1=1 [ 0064]: 51.09 1.422 0.75 67.66     NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.     ID1=3 ( 0064): 51.09 1.422 0.75 67.66     NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.     ID1=3 ( 0064): 51.09 1.422 0.75 67.66     NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.     ID1=1 [ Routing time step (min)'= 5.00     ID1.50 0.0500     ID1.50 0.0500     ID0.70 0.0500     ID0.70 0.0500     ID0.70 0.0500     ID0.70 0.0500     ID0.71 0.0000 Main Channel     ISO 0.00100.70 0.0500     ISO 0.0500     ISO 0.00100.70 0.0500     ISO</pre>	i)
(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN* = 83.0 Ia = Dep. Storage (Above) (ii) TTME STORAGE COEFFICIENT. (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY. ADD HYD ( 0064) 1 + 2 = 3 AREA QPEAK TPEAK R.V. TD1= 1 ( 00060): 30.45 0.526 5.00 68.67 + ID2= 2 ( 0063): 13.09 0.386 4.33 60.75 ID = 3 ( 0064): 43.54 0.900 4.58 66.29 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. ADD HYD ( 0064): 43.54 0.900 4.58 66.29 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.	
$ \begin{vmatrix} ADD HYD & ( 0064) \\ 1 + 2 = 3 \\ \hline HDI = 1 & ( 0066) \\ HDI = 1 & ( 0066) \\ HDI = 1 & ( 0066) \\ HDI = 2 & ( 0063) \\ HDI = 3 & ( 0064) \\ HDI = 3$	
$\begin{array}{c} \text{ID1=1} ( 0006): 30.45 0.526 S.00 68.67 \\ + \text{ID2=2} ( 0063): 13.09 0.386 4.33 60.75 \\ \hline \text{ID=3} ( 0064): 43.54 0.900 4.58 66.29 \\ \hline \text{NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.} \\ \hline \end{tabular} \\ \hline tabular$	
$\overline{ID = 3 (0064): 43.54 0.900 4.58 66.29}$ NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.  ADD HYD (0064)  $3 + 2 = 1   AREA OPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) ID1= 3 (0064): 43.54 0.900 4.58 66.29 + ID2= 2 (0065): 2.09 0.034 5.75 74.92 ID = 1 (0064): 45.63 0.933 4.67 66.68 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.  ADD HYD (0064)   ADD HYD (0064)  ID1= 1 (0064): 45.63 0.933 4.67 66.68 + ID2= 2 (0077): 5.46 1.081 2.75 75.83 ID = 3 (0064): 51.09 1.422 2.75 67.66 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.  ADD HYD (0064)  ID1= 3 (0064): 51.09 1.422 2.75 67.66 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.  COTE CHN(0013)  IN= 2> OUT= 1  Routing time step (min)'= 5.00< DATA FOR SECTION (1.1)> Distance Elevation Manning 0.00 101.50 0.0500 1.00 100.70 0.0500 1.50 100.55 0.0500 (0.0300 Main Channel)$	
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. ADD HYD ( 0064) AREA OPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) ID1= 3 ( 0064): 43.54 0.900 4.58 66.29 + ID2= 2 ( 0065): 2.09 0.034 5.75 74.92 ID = 1 ( 0064): 45.63 0.933 4.67 66.68 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. ADD HYD ( 0064) AREA OPEAK TPEAK R.V. (ha) (cms) (hrs) (mm) ID1= 1 ( 0064): 45.63 0.933 4.67 66.68 + ID2= 2 ( 0077): 5.46 1.081 2.75 75.83 ID = 3 ( 0064): 51.09 1.422 2.75 67.66 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. ROUTE CHN( 0013) IN= 2> OUTI 1 Routing time step (min)'= 5.00 < DATA FOR SECTION ( 1.1)> Distance Elevation Manning 0.00 101.50 0.0500 1.00 100.70 0.0500 (0.0300 Main Channel	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. ADD HYD ( 0064) AREA QPEAK TPEAK R.V. ID1= 1 ( 0064): 45.63 0.933 4.67 66.68 + ID2= 2 ( 0077): 5.46 1.081 2.75 75.83 ID = 3 ( 0064): 51.09 1.422 2.75 67.66 NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. ROUTE CHN( 0013) Routing time step (min)'= 5.00 DATA FOR SECTION ( 1.1)> Distance Elevation Manning 0.00 101.50 0.0500 1.00 100.70 0.0500 1.50 100.55 0.0500 (0.0300 Main Channel	
$ \begin{array}{c cccc} ADD & HYD & ( & 0064) \\ \hline 1 + 2 = 3 & (ha) & (cms) & (hrs) & (mm) \\ \hline ID1 = 1 & ( & 0064) & 45.63 & 0.933 & 4.67 & 66.68 \\ + & ID2 = 2 & ( & 0077) & 5.46 & 1.081 & 2.75 & 75.83 \\ \hline ID = 3 & ( & 0064) & 51.09 & 1.422 & 2.75 & 67.66 \\ \hline NOTE: & PEAK & FLOWS DO & NOT INCLUDE BASEFLOWS IF ANY. \\ \hline \\ $	
ID = 3 ( 0064):       51.09 1.422 2.75 67.66         NOTE:       PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.         ROUTE CHN( 0013)       IN= 2> 0UT= 1         Routing time step (min)'= 5.00             Scheme Elevation       Manning         0.00       101.50       0.0500         1.00       100.70       0.0500         1.50       100.55       0.0500 /0.0300	
NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY. ROUTE CHN( 0013) IN= 2> OUT= 1 Routing time step (min)'= 5.00 DATA FOR SECTION ( 1.1)> Distance Elevation Manning 0.00 101.50 0.0500 1.00 100.70 0.0500 1.50 100.55 0.0500 /0.0300 Main Channel	
ROUTE CHN(0013)         Routing time step (min)'= 5.00           IN= 2> OUT= 1         Routing time step (min)'= 5.00           < DATA FOR SECTION (1.1)> Distance Elevation Manning 0.00 101.50 0.0500 1.00 100.70 0.0500 0.0500 /0.0300 Main Channel	
<pre>&lt; DATA FOR SECTION ( 1.1)&gt; Distance Elevation Manning</pre>	
2.00         99.50         0.0300         Main         Channel           3.50         99.60         0.0300         Main         Channel           4.50         100.65         0.0300         /0.0500         Main         Channel           6.00         101.45         0.0500         Main         Channel	
<pre>&lt;</pre>	i.

$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	.832E+03 .961E+03 .110E+04 .127E+04 .148E+04 .170E+04 .195E+04 .221E+04 .250E+04 .280E+04 .313E+04	1.5 1.8 2.2 2.7 3.4 4.1 4.9 5.8 6.7 7.7 8.8	0.91 0.96 1.00 1.14 1.20 1.25 1.30 1.34 1.38 1.41	9.18 8.72 8.32 7.80 7.31 6.94 6.65 6.41 6.22 6.04 5.90	
INFLOW : ID= 2 ( ( OUTFLOW: ID= 1 ( (	AREA (ha) 0064) 51.09 0013) 51.09	< hydr QPEAK (cms) 1.42 1.30	rograph> TPEAK R.V. (hrs) (mm) 2.75 67.66 2.75 67.66	<-pipe / cł MAX DEPTH (m) 0.83 0.79	hannel-> MAX VEL (m/s) 0.89 0.87
CALIB NASHYD ( 0018) ID= 1 DT= 5.0 min NOTE: RAINF/	Area (ha)= Ia (mm)= U.H. Tp(hrs)= NLL WAS TRANSFOR	10.38 5.00 0.89 RMED TO	Curve Number # of Linear Re 5.0 MIN. TIME :	(CN)= 83.0 s.(N)= 3.00 STEP.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.917 1.000 1.083 1.167 1.250 1.333 1.417 1.250 1.333 1.417 1.500 1.583 Unit Hyd Qpeak PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF VOLUME	RAIN   TIME         mm/hr       hrs         0.00       1.667         0.00       1.750         0.00       1.833         1.61       2.003         1.61       2.003         1.61       2.033         1.61       2.033         1.61       2.333         1.61       2.500         1.61       2.533         1.61       2.533         1.61       2.533         1.61       2.533         1.61       2.533         1.61       2.533         1.61       2.533         1.61       2.533         1.61       2.533         9.64       3.000         9.64       3.003         9.64       3.003         9.64       3.003         9.64       3.067         (cms)=       0.547 (         (hrs)=       3.583         (mm)=       44.541         (mm)=       80.310         T       0.557	RANSFORME RAIN RAIN 9.64 9.64 27.30 7.27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.38 7.3.88 7.3.88 7.3.88 7.3.88 7.3.88 7.3.88 7.3.88 7.3.88 7.73.88 7.20.88 7.20.88 7.20.88 7.20.88 7.20.88 7.20.88 7.20.88 7.20.88 7.20.88 7.20.88 7.20.88 7.20.88 7.20.88 7.20.88 7.20.88 7.20.88 7.20.88	ED HYETOGRAPH   TIME RA'   hrs mm/ 3.250 20.8 3.333 11.2 3.417 11.2 3.500 11.2 3.583 11.2 3.583 11.2 3.583 11.2 3.750 3.2 3.750 11.2 3.750 3.2 3.750 11.2 3.750 3.2 3.750 12 3.750 3.2 3.750 3.2	IN   TIME hr   hrs 8   4.83 4   5.00 4   5.08 4   5.25 4   5.25 4   5.25 4   5.25 2   5.42 2   5.50 2   5.75 2   5.75 2   5.75 2   5.75 2   5.83 1   5.92 1   6.08 1   6.25 1	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
(i) PEAK FLOW DOB	S NOT INCLUDE E	3ASEFLOW 1	IF ANY.		
ID= 1 DT= 5.0 min'  Surface Area Dep. Storage Average Slope Length Mannings n	Total Imp(%)= IMPERVI (ha)= 11.1 (mm)= 1.0 (%)= 1.0 (m)= 287.6 = 0.01	90.00 COUS PE 17 00 00 33 13	Dir. Conn.(%)= ERVIOUS (i) 1.24 5.00 2.00 40.00 0.250	90.00	
NOTE: RAINF/ TIME hrs 0.083 0.167	T RAIN   TIME mm/hr   hrs 0.00   1.667 0.00   1.750	CRANSFORME E RAIN 5 mm/hr 7 9.64 0 9.64	5.0 MIN. TIME : ED HYETOGRAPH	SIEP.  IN   TIME hr   hrs 8   4.83 4   4.92	RAIN mm/hr 1.61 1.61

0.333	3 1.61	1.917	27.30	3.500	11.24	5.08	1.61
0.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61
0.500	) 1.61	2.083	27.30	3.667	11.24	5.25	1.61
0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61
0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61
0.750	) 1.61	2.333	73.88	3.917	6.42	5.50	1.61
0.833	1.61	2.417	73.88	4.000	6.42	5.58	1.61
0.917	1.61	2.500	73.88	4.083	6.42	5.67	1.61
1.000	1.61	2.583	73.88	4.167	6.42	5.75	1.61
1.083	1.61	2.667	73.88	4.250	6.42	5.83	1.61
1.167	1.61	2.750	73.88	4.333	3.21	5.92	1.61
1.250	) 1.61	2.833	20.88	4.417	3.21	6.00	1.61
1.333	9.64	2.917	20.88	4.500	3.21	6.08	1.61
1.417	9.64	3.000	20.88	4.583	3.21	6.17	1.61
1.500	9.64	3.083	20.88	4.667	3.21	6.25	1.61
1.583	9.64	3.167	20.88	4.750	3.21		
Max.Eff.Inten.(m	m/hr)=	73.88		52.93			
over	(min)	5.00		10.00			
Storage Coeff.	(min)=	5.44	(ii)	8.74 (ii)			
Unit Hyd. Tpeak	(min)=	5.00		10.00			
Unit Hvd. peak	(cms)=	0.20		0.12			
, ,	. ,				*T0	TALS*	
PEAK FLOW	(cms)=	2.29		0.16	2	.449 (iii)	)
TIME TO PEAK	(hrs)=	2.75		2.75		2.75	
RUNOFF VOLUME	(mm)=	79.31		44.54	75	5.83	
TOTAL RAINFALL	(mm)=	80.31		80.31	80	0.31	
RUNOFF COEFFICIE	NT =	0.99		0.55	(	0.94	

0.250 0.00 | 1.833 27.30 | 3.417 11.24 | 5.00 1.61

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 83.0 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 ( 0043) ID= 1 DT= 5.0 min	Area Total	(ha)= Imp(%)=	11.15 90.00	Dir.	Conn.(%)=	90.00	
		TMPFRVT	ous	PERVTO	IS (i)		
Surface Area	(ha)=	10.0	3	1.12	2		
Dep. Storage	(mm)=	1.0	0	5.00	0		
Average Slope	(%)=	1.0	0	2.00	0		
Length	(m)=	272.6	4	40.00	0		
Mannings n	=	0.01	.3	0.250	0		

		TRA	NSFORM	ED HYETOGR	APH		
TIME	RAIN	TIME	RAIN	' TIME	RAIN	TIME	RAIN
hrs	s mm/hr	hrs	mm/hr	' hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	9.64	3.250	20.88	4.83	1.61
0.167	0.00	1.750	9.64	3.333	11.24	4.92	1.61
0.250	0.00	1.833	27.30	3.417	11.24	5.00	1.61
0.333	3 1.61	1.917	27.30	3.500	11.24	5.08	1.61
0.417	1.61	2.000	27.30	3.583	11.24	5.17	1.61
0.500	) 1.61	2.083	27.30	3.667	11.24	5.25	1.61
0.583	1.61	2.167	27.30	3.750	11.24	5.33	1.61
0.667	1.61	2.250	27.30	3.833	6.42	5.42	1.61
0.750	1.61	2.333	/3.88	3.91/	6.42	5.50	1.61
0.83	1.61	2.41/	/3.88	4.000	6.42	5.58	1.61
0.91	1.61	2.500	/3.88	4.083	6.42	5.6/	1.61
1.000	1.61	2.565	73.00	4.167	6.42	5./5	1.61
1.08	1.01	2.00/	73.00	4.230	2 21	5.85	1.61
1.10	1.01	2.750	20.00	4.333	2 21	6.00	1 61
1 223	0.64	2.033	20.00	4.417	2 21	6.00	1.61
1 413	9 64	3 000	20.88	4.500	3 21	6.17	1 61
1 500	9 64	3 083	20.88	4 667	3 21	6.25	1 61
1 58	9 64	3 167	20.88	4 750	3 21	0.25	1.01
1.50.	, 5.04	1 5.107	20.00	1 4.750	J.21		
Max.Eff.Inten.(n	m/hr)=	73.88		52.93			
over	(min)	5.00		10.00			
Storage Coeff.	(min)=	5.26	(ii)	8.57 (ii	)		
Unit Hyd. Tpeak	(min)=	5.00		10.00			
Unit Hyd. peak	(cms)=	0.21		0.12			
					*TOT	ALS*	
PEAK FLOW	(cms)=	2.06		0.15	2.	202 (iii)	)
TIME TO PEAK	(hrs)=	2.75		2.75	2	.75	

RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	(mm)= (mm)= ENT =	79.31 80.31 0.99		44.54 80.31 0.55	75. 80. 0.	.83 .31 .94	
(i) CN PROCEDU CN* = 8 (ii) TIME STEP THAN THE S (iii) PEAK FLOW	IRE SELECTE 3.0 Ia (DT) SHOUL STORAGE COE DOES NOT I	D FOR PE = Dep. S D BE SMA FFICIENT NCLUDE B	RVIOUS torage LLER OR ASEFLOW	LOSSES: (Above) EQUAL IF ANY.			
RESERVOIR( 0045) IN= 2> OUT= 1 DT= 5.0 min	OVERFL OUTFLO (cms) 0.000	OW IS OF W STO (ha 0 0.	F RAGE .m.) 0000	OUTFLO   (cms)   1.040	W STOF (ha. 0 0.	AGE .m.) .3830	
INFLOW : ID= 2 ( OUTFLOW: ID= 1 ( PE	0043) 0045) AK FLOW	AREA (ha) 11.150 11.150 REDUCT	(cms) 2.2 1.0 ION [Qc	02 2 (hrs 02 2 022 2 01/Qin](%	) ( .75 .92 )= 46.42	(.v. (mm) 75.83 75.82	
ET MA	ME SHIFT O XIMUM STO	F PEAK F RAGE U	LOW SED	(min (ha.m.	)= 10.00 )= 0.378	32	
CALIB STANDHYD ( 0044) ID= 1 DT= 5.0 min	Area Total Im	(ha)= 3 p(%)= 6	1.33 1.00	Dir. Conn	.(%)= 61	L.00	
Surface Area Dep. Storage Average Slope Length Mannings n	I (ha)= (mm)= (%)= (m)= =	MPERVIOU 19.11 1.00 1.00 457.02 0.013	S PE	RVIOUS (i 12.22 5.00 1.00 40.00 0.250	)		
NOTE: RAINF	ALL WAS TR	ANSFORME	d to	5.0 MIN.	TIME STEP	P.	
TIME hrs 0.083 0.167 0.250 0.333 0.417 0.500 0.583 0.667 0.750 0.833 0.667 0.750 0.833 0.667 1.000 1.083 1.167 1.250 1.333 1.417 1.500 1.583 Max. Eff. Inten. (n	RAIN   mm/hr 0.00 0.00 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.61 0.06 1.61 0.06 1.61 0.06 1.61 0.06 0.06 0.00 0.0	TIME hrs 1.667 1.750 1.833 1.917 2.000 2.083 2.167 2.250 2.333 2.417 2.500 2.583 2.667 2.750 2.833 2.917 3.000 3.083 3.167 73.88	NSFORME RAIN mm/hr 9.64 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.30 27.38 73.88 73.88 73.88 73.88 73.88 20.88 20.88 20.88 20.88	D HYETOGR TIME hrs 3.250 3.333 3.417 3.500 3.583 3.667 3.750 3.833 3.917 4.000 4.083 4.167 4.250 4.333 4.417 4.583 4.458 4.583 4.667 4.750 51.42	APH RAIN   mm/hr   20.88   11.24   12.21   3.21   3.21   3.21   3.21   3.21   3.21   3.21	TIME hrs 4.83 4.92 5.00 5.08 5.17 5.25 5.33 5.42 5.50 5.58 5.58 5.75 5.75 5.83 5.92 6.00 6.08 6.17 6.25	RAIN mm/hr 1.61 1.61 1.61 1.61 1.61 1.61 1.61 1.6
ver Storage Coeff. Unit Hyd. Tpeak Unit Hyd. peak	(min) (min)= (min)= (cms)=	73.88 5.00 7.18 5.00 0.17	(ii)	20.00 18.51 (ii 20.00 0.06	) *TOTA	ALS*	
PEAK FLOW TIME TO PEAK RUNOFF VOLUME TOTAL RAINFALL RUNOFF COEFFICIE	(cms)= (hrs)= (mm)= (mm)= NT =	3.88 2.75 79.31 80.31 0.99		1.20 2.92 44.54 80.31 0.55	4.9 2. 65. 80. 0.	960 (iii) .75 .75 .31 .82	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES: CN\* = 83.0 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.

RESERVOTR( 0046)	OVERELOW	TS OFF			
IN= 2> OUT= 1	OVERI LON	10 011			
DT= 5.0 min	OUTFLOW	STORAGE	OUTF	LOW	STORAGE
	0.0000	0.0000	2.2	770	1.0445
	0.0000	0.0000			1.01.02
	AR	EA QPI	EAK TP	EAK	R.V.
INFLOW : ID= 2 ( 004	4) 31.	330	4.960	2.75	65.75
OUTFLOW: ID= 1 ( 004	6) 31.	330 2	2.000	3.25	65.75
PEAK	FLOW R	EDUCTTON	[Oout/Oin]	(%) = 40	.33
TIME	SHIFT OF P	EAK FLOW	(m	in)= 30	.00
MAXIM	UM STORAG	E USED	(ha.	m.)= 0	.9182
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.	
TD1 1 ( 0010).	(ha)	(cms)	(hrs)	(mm)	
$+ TD^2 = 2 (0018)$ :	12.41	2.449	2.75	44.54	
ID = 3 (0016):	22.79	2.651	2.75	61.58	
NOTE: PEAK FLOWS D	NOT INCL	UDE BASEFI	OWS TE AN	Υ.	
ADD HYD ( 0016)					
3 + 2 = 1	AREA	<b>QPEAK</b>	TPEAK	R.V.	
TD1= 3 ( 0016):	(na)	(Cms)	(nrs) 2 75	(mm) 61 58	
+ ID2 = 2 (0045):	11.15	1.022	2.92	75.82	
TD 1 ( 0016)	22.04	2 605	2.75		
ID = I (0016):	55.94	3.605	2.75	66.26	
NOTE: PEAK FLOWS D	NOT INCL	UDE BASEFI	LOWS IF AN	Υ.	
ADD HYD ( 0016)		ODEAK	TOPAK		
1 + 2 = 3	AREA	QPEAK	TPEAK	ĸ.v.	
	(na)	(cms)	(hrs)	(mm)	
ID1= 1 ( 0016):	33.94	(cms) 3.605	(hrs) 2.75	(mm) 66.26	
ID1= 1 ( 0016): + ID2= 2 ( 0046):	33.94 31.33	(cms) 3.605 2.000	(hrs) 2.75 3.25	(mm) 66.26 65.75	
$ \begin{array}{c} ID1= 1 & ( & 0016): \\ + & ID2= 2 & ( & 0046): \\ \hline \\ ID= 3 & ( & 0016): \end{array} $	(na) 33.94 31.33 65.27	(cms) 3.605 2.000 5.237	(hrs) 2.75 3.25 2.75	(mm) 66.26 65.75 66.01	
$\begin{array}{c} ID1=1 \\ + ID2=2 \\ ID2=3 \\ ID=3 \\ \hline \end{array} \begin{array}{c} 0016 \\ 0046 \\ \hline \end{array}$	(na) 33.94 31.33 65.27	(cms) 3.605 2.000 5.237	(hrs) 2.75 3.25 2.75	(mm) 66.26 65.75 66.01	
ID1= 1 ( 0016): + ID2= 2 ( 0046): ID = 3 ( 0016): NOTE: PEAK FLOWS D	(na) 33.94 31.33 65.27 D NOT INCL	(cms) 3.605 2.000 5.237 UDE BASEFI	(hrs) 2.75 3.25 2.75 LOWS IF AN	(mm) 66.26 65.75 66.01 Y.	
HDI= 1 ( 0016): + ID2= 2 ( 0046): ID = 3 ( 0016): NOTE: PEAK FLOWS D	(na) 33.94 31.33 65.27 D NOT INCL	(cms) 3.605 2.000 5.237 JDE BASEFI	(hrs) 2.75 3.25 2.75 LOWS IF AN	(mm) 66.26 65.75 66.01 Y.	
ID1= 1 ( 0016): + ID2= 2 ( 0046): ID = 3 ( 0016): NOTE: PEAK FLOWS D 	(na) 33.94 31.33 65.27 D NOT INCL OVERFLOW	(cms) 3.605 2.000 5.237 UDE BASEFI	(hrs) 2.75 3.25 2.75 LOWS IF AN	(mm) 66.26 65.75 66.01 Y.	
ID1= 1 ( 0016): + ID2= 2 ( 0046): ID = 3 ( 0016): NOTE: PEAK FLOWS D 	(na) 33.94 31.33 65.27 D NOT INCLI OVERFLOW	(cms) 3.605 2.000 5.237 JDE BASEFI IS OFF STORAGE	(hrs) 2.75 3.25 2.75 LOWS IF AN	(mm) 66.26 65.75 66.01 Y.	STORAGE
ID1= 1 ( 0016): + ID2= 2 ( 0046): ID = 3 ( 0016): NOTE: PEAK FLOWS D 	00000000000000000000000000000000000000	(cms) 3.605 2.000 5.237 JDE BASEFI IS OFF STORAGE (ha.m.)	(hrs) 2.75 3.25 2.75 LOWS IF AN	(mm) 66.26 65.75 66.01 Y.	STORAGE (ha.m.)
ID1= 1 ( 0016): + ID2= 2 ( 0046): ID = 3 ( 0016): NOTE: PEAK FLOWS D 	(na) 33.94 31.33 65.27 D NOT INCL OVERFLOW (cms) 0.0000 0.0000	(cms) 3.605 2.000 5.237 JDE BASEFI IS OFF STORAGE (ha.m.) 0.0000	(hrs) 2.75 3.25 2.75 LOWS IF AN 0UTF (cm 0.5	(mm) 66.26 65.75 66.01 Y. LOW (s) 430	STORAGE (ha.m.) 2.2000
ID1= 1 ( 0016): + ID2= 2 ( 0046): ID = 3 ( 0016): NOTE: PEAK FLOWS D 	(na) 33.94 31.33 65.27 D NOT INCL OVERFLOW (cms) 0.0000 0.0690 0.0000	(cms) 3.605 2.000 5.237 JDE BASEFI IS OFF STORAGE (ha.m.) 0.0000 0.8600 1.2500	(hrs) 2.75 3.25 2.75 LOWS IF AN 0UTF 0.5 0.6	(mm) 66.26 65.75 66.01 Y. 50 50 430 780 830	STORAGE (ha.m.) 2.2000 2.6500 3.0000
ID1= 1 ( 0016): + ID2= 2 ( 0046): ID = 3 ( 0016): NOTE: PEAK FLOWS D 	(na) 33.94 31.33 65.27 D NOT INCL OVERFLOW (CTS) 0.0000 0.0690 0.3000 0.4450	(cms) 3.605 2.000 5.237 JDE BASEFI IS OFF STORAGE (ha.m.) 0.0000 0.8600 0.8600 1.2500 1.8500	(hrs) 2.75 3.25 2.75 LOWS IF AN 0UTF 0.5 0.6 0.7 0.8	(mm) 66.26 65.75 66.01 Y. 	STORAGE (ha.m.) 2.2000 2.6500 3.0000 3.3500
ID1= 1 ( 0016): + ID2= 2 ( 0046): ID = 3 ( 0016): NOTE: PEAK FLOWS D 	(na) 33.94 31.33 65.27 O NOT INCL OVERFLOW (CTS) 0.0000 0.0690 0.4450	(cms) 3.605 2.000 5.237 JDE BASEFI IS OFF STORAGE (ha.m.) 0.0000 0.8600 1.2500	(hrs) 2.75 3.25 2.75 LOWS IF AN 0.000 0.000 0.7 0.8	(mm) 66.275 65.75 66.01 Y. LOW s) 430 780 830 900	STORAGE (ha.m.) 2.2000 2.6500 3.0000 3.3500
ID1= 1 ( 0016): + ID2= 2 ( 0046): ID = 3 ( 0016): NOTE: PEAK FLOWS D 	(ha) 33.94 31.33 65.27 O NOT INCLI OVERFLOW (cms) 0.0000 0.0690 0.3000 0.4450 AR	(cms) 3.605 2.000 5.237 JDE BASEFI 5.237 IS OFF STORAGE (ha.m.) 0.000 0.8600 1.2500 1.2500 1.8500 6A QPI a) (m	(hrs) 2.75 3.25 2.75 LOWS IF AN 	(mm) 66.26 65.75 66.01 Y. 	STORAGE (ha.m.) 2.2000 2.6500 3.0000 3.3500 R.V. (mm)
ID1= 1 ( 0016): + ID2= 2 ( 0046): ID = 3 ( 0016): NOTE: PEAK FLOWS D 	(na) 33.94 31.33 65.27 O NOT INCLI OVERFLOW (cms) 0.0000 0.0690 0.3000 0.4450 AR (h 6) 65	(cms) 3.605 2.000 5.237 UDE BASEFI 5.0FF STORAGE (ha.m.) 0.000 0.8600 1.2500 1.2500 1.8500 6.8600 1.25000 1.25000 1.25000 1.25000 1.25000 1.25000 1.25000 1.25000000000000000000000000000000000000	(hrs) 2.75 3.25 2.75 LOWS IF AN OUTF (cm 0.5 5 0.6 0.7 0.8 EAK TP ms) (h 5.237	(mm) 66.26 65.75 66.01 Y. 	STORAGE (ha.m.) 2.2000 2.6500 3.0000 3.3500 R.V. (mm) <u>66.01</u>
ID1= 1 ( 0016): + ID2= 2 ( 0046): ID = 3 ( 0016): NOTE: PEAK FLOWS D 	(ha) 33.94 31.33 65.27 O NOT INCLI OVERFLOW (cms) 0.0000 0.0690 0.3000 0.4450 AR (h (5) 65.5 5) 65.1	(cms) 3.605 2.000 5.237 UDE BASEFI 5.237 UDE BASEFI STORAGE (ha.m.) 0.000 0.8600 1.2500 1.8500 EA 0PI a) (cr 270 (cm)	(hrs) 2.75 3.25 2.75 LOWS IF AN OUTF (Cm 0.5 0.6 0.7 0.8 EAK TP ms) (h 5.237 0.837	(mm) 66.26 65.75 66.01 Y.  V. LOW s) 430 780 830 9900 9900 EAK (rs) 2.75 5.92	STORAGE (ha.m.) 2.2000 2.6500 3.0000 3.3500 R.V. (mm) 66.01 65.80
ID1= 1 ( 0016): + ID2= 2 ( 0046): ID = 3 ( 0016): NOTE: PEAK FLOWS D 	(haj) 33.94 31.33 65.27 O NOT INCLI OVERFLOW (cms) 0.0000 0.0690 0.3000 0.4450 AR (h. 6) 65.5 5) 65.1	(cms) 3.605 2.000 5.237 UDE BASEFI 5.237 UDE BASEFI STORAGE (ha.m.) 0.000 0.8600 1.2500 1.8500 EA OPI a) (cr 270 270 (cr 270 (cr) 270 (cr)	(hrs) 2.75 3.25 2.75 LOWS IF AN 0.00 (cm 0.5 0.6 0.7 0.8 0.6 0.7 0.8 0.6 0.7 0.8 0.6 0.7 0.8 0.6 0.7 0.8 0.6 0.7 0.8 0.7 0.8 0.7 0.8 0.7 0.8 0.7 0.7 0.8 0.7 0.7 0.8 0.7 0.7 0.7 0.8 0.7 0.7 0.8 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7	(mm) 66.26 65.75 66.01 Y.  LOW s) 430 780 830 900 EAK (%) = 15 (%) = 15	STORAGE (ha.m.) 2.2000 2.6500 3.0000 3.3500 R.V. (mm) 66.01 65.80 .98
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NOTE: PEAK FLOWS	5 DO NOT INCLU	DE BASEFLO	WS IF ANY.		
ROUTE CHN( 2255) IN= 2> OUT= 1	Routing ti	me step (m	in)'= 5.00		
<pre></pre>	- DATA FOR SEC ce Elevat 50 210. 35 209. 00 209. 44 209. 44 209. 44 209. 55 209. 67 208. 18 208. 18 208. 18 208. 18 208. 29 207. 52 207. 52 207. 52 207. 52 208. 39 208. 39 208. 38 208. 38 208.	TTION ( 1 TTION ( 1 TTION ( 1 86 576 54 60 54 60 41 53 38 33 08 92 65 22 49 58 73	.1)> Manning 0.0600 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450 0.0450	Main Channel Main Channel	
195.9 226.1 238. 251.4	96         208.           50         209.           71         209.           40         209.	72 32 46 0.04 70	0.0450 0.0450 50 /0.0600 0.0600	Maın Channel Main Channel Main Channel	
DEPTH ELEV (m) (m) 0.11 207.75 0.21 207.86 0.32 207.97 0.43 208.07 0.53 208.18 0.64 208.29 0.75 208.39 0.85 208.50 0.96 208.61 1.07 208.71 1.17 208.82 1.28 208.93 1.39 209.03 1.49 209.14 1.60 209.25 1.71 209.35 1.81 209.46 1.93 209.50	VOLUME (cu.m.) .601E+03 .241E+04 .542E+04 .969E+04 .152E+05 .218E+05 .296E+05 .389E+05 .519E+05 .677E+05 .106E+06 .128E+06 .175E+06 .201E+06 .262E+06 .262E+06 .299E+06	FLOW RATE (cms) 0.0 0.3 0.8 1.8 3.3 5.5 8.0 11.2 14.2 20.3 27.7 37.5 48.7 61.5 76.0 91.6 107.8 130.3 156.6	E VELOCIT (m/s) 0.12 0.35 0.30 0.40 0.43 0.46 0.44 0.48 0.52 0.57 0.61 0.66 0.70 0.73 0.76 0.80 0.80 0.84 rograph	Y TRAV.TIME (min) 222.56 140.20 107.47 89.07 76.07 76.07 66.47 61.92 58.04 60.79 55.45 51.74 47.20 43.64 40.75 38.35 36.50 35.28 33.51 31.84	channe]->
INFLOW : ID= 2 ( 0 OUTFLOW: ID= 1 ( 2	AREA (ha) 2060) 116.36 2255) 116.36	QPEAK (cms) 1.76 1.57	TPEAK R. (hrs) (m 4.83 66. 6.50 66.	V. MAX DEPTH m) (m) 61 0.42 60 0.40	MAX VEL (m/s) 0.30 0.29

ID = 3 ( 0060): 116.36 1.761 4.83 66.61



Appendix C Hydraulic Model Outputs










































Appendix D VMC Release Rate Calculations



# **VMC** Release Rates

The 2012 TMIG report recommended:

- On-site controls for each development. The peak release rate is controlled to the 2-year post development flow rate, based on 80% level of imperviousness.
- On-site retention of 15mm over the building footprint, and an additional 15mm on-site retention over landscaped areas.
- No control from ROWs or parks

As outlined in sections 11.3.2 and 11.5 of the 2012 report, TMIG stated that each development block has:

- 79% impervious (which is the 80% referred to above)
  - 75% of this is the building footprint
    - which corresponds to 59% of total site area (75% of 79%)
  - o 25% pavement, driveways, walkways, etc.
    - Which corresponds to 20% of site (25% of 79%)
- 21% pervious & landscaping

Appendix D shows detailed calculations for each quadrant for land use values and SWM pond sizing.



TMIG used the following method to calculate the 2-year release rate.

### Steps to calculate 2-year peak flow

1. The rainfall data for the 6-hour AES storm is:

Return Period	Rainfall Depth (mm)
25mm	25.0
2	36.0
5	47.8
10	55.7
25	65.6
50	73.0
100	80.3

- 2. Determine the development impervious values, based on:
- The building footprint has C = 0.90, with 15mm retention
- Landscape has C = 0.25, with 10mm retention
  - a) Calculate the corresponding reduced C values

#### Adjusting the Building Runoff Coefficient

Return Period	Rainfall Depth (mm)	Base Runoff (mm)	15mm Runoff Reduction	<b>C</b> 15
25mm	25.0	22.50	7.50	0.30
2	36.0	32.40	17.40	0.48
5	47.8	43.02	28.02	0.59
10	55.7	50.13	35.13	0.63
25	65.6	59.04	44.04	0.67
50	73.0	65.70	50.70	0.69
100	80.3	72.27	57.27	0.71

#### Adjusting the Landscape Runoff Coefficient

Return Period	Rainfall Depth (mm)	Base Runoff (mm)	10mm Runoff Reduction	<b>C</b> 15
25mm	25.0	6.25	0.00	0.00
2	36.0	9.00	0.00	0.00
5	47.8	11.95	1.95	0.04
10	55.7	13.93	3.93	0.07
25	65.6	16.40	6.40	0.10
50	73.0	18.25	8.25	0.11
100	80.3	20.08	10.08	0.13

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	Sample Area				
		Area (Ha)	С	AC	
Residential	Building	5.59	0.71	3.99	
	Paved Area	1.86	0.90	1.67	
	Landscape	1.96	0.13	0.25	
Commercial	Building	1.04	0.71	0.74	
	Paved Area	0.35	0.90	0.32	
	Landscape	0.37	0.13	0.05	
Lum	ped Total	11.17	,	7.01	

## b) Determine lumped C values based on 100-year conditions

Corresponding C is: 7.01/11.17 = 0.63

c) Convert new C values to % impervious:

C = 0.63 x + y = 100, where x = % impervious y = % pervious Or, x = 100 - y Substituting, 0.9(100-y) + 0.2y = 63 90 - 0.7y = 63y = 38.6 % pervious x = 61.4 % impervious

Let C = 0.9 for impervious C = 0.2 for pervious Or, 0.9x + 0.2y = 63

Therefore a value of 61% should be used for T<sub>imp</sub> in VO for a development with 80% imperviousness.

- 1. Create a StandHYD command within V that uses the T<sub>imp</sub> and area, and use default values for all other input parameters. Run the 2-year 6hour AES storm to get the 2-year peak flow for the area.
- 2. Create a ROUTE RESERVOIR command that will permit only this 2-year peak flow for the 100-year storm.

But this 80% rule has been mis-applied by development applications. Consultants have used various methods to calculate the 2-year peak flow:

- C = 0.80 when using rational method, with 7 minute inlet time
- T<sub>imp</sub> = 80% in VO