FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

BOLTON NORTH HILL
OPTION 1 & OPTION 2 LANDS

TOWN OF CALEDON
REGION OF PEEL

PREPARED FOR:

BOLTON NORTH HILL LANDOWNERS GROUP

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CROZIER
CONSULTING ENGINEERS

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EXECUTIVE SUMMARY

C.F. Crozier & Associates Inc. has prepared this Functional Servicing and Stormwater Management Report to support the development of the Bolton North Hill area, as part of the Bolton Residential Expansion Study and Regional Official Plan Amendment. Specifically, Option 1 and 2 Lands, referred to as the Site, which are part of six (6) parcels of potential development areas around the existing community of Bolton (Options 1 to 6).

We have explored the municipal servicing opportunities and constraints for the Site and have summarized our findings and conclusions herein. Relevant standards from the Town of Caledon, Region of Peel, and Toronto and Region Conservation Authority have been applied to develop a functional servicing and stormwater management strategy. This report reviews water servicing, sanitary servicing, grading, pre- and post-development drainage conditions, stormwater management, water balance and low impact development, and natural heritage.

The proposed servicing strategies have been prepared with careful consideration of the Town and Region's overarching principles. The proposed strategies demonstrate the feasibility of servicing the Site by presenting technically correct and economically feasible solutions that use and improve existing infrastructure. These strategies also provide services to existing populations that are under-served and services population into the future beyond the Bolton Residential Expansion Settlement areas.

Water Servicing

R.J. Burnside & Associates Inc. was retained by the Bolton North Hill Landowners Group to develop a water servicing strategy for the Option 1, 2, and 3 Lands, which has most recently been summarized in a Technical Memorandum dated May 13, 2021.

Our proposed water servicing strategy for the Option 1 and 2 Lands is consistent with the strategy they proposed, which also provides water servicing for the Option 3 Lands to the southwest of the Site. In accordance with their memo, ultimate development of the Option 1 and 2 Lands will require the addition of Pressure Zone 7, accompanied by a new Zone 7 booster pumping station at King Street and Coleraine Drive. Water storage is proposed in the form of two elevated tanks to provide flow equalization and meet the required fire and emergency demands. One of the proposed elevated tanks is located in the north corner of Option 1 Lands, adjacent to Regional Road 50.

Sanitary Servicing

The sanitary servicing strategy proposed in this report differs from what was presented by Crozier in the past, which was to send all sanitary flows from Option 1 and 2 Lands south through the existing sanitary network to the Bolton North Hill Pump Station. The Region of Peel has expressed concerns with this approach because of existing infiltration flows in the system and the disturbance that upgrades to the existing system would cause.

Major external upgrades are required to support any other sanitary servicing strategy, so we developed a strategy for the more immediate development opportunities (Option 2 Lands and the ROPA 30 portion of Option 1 Lands) to be serviced through residual capacity and limited upgrades to the existing sanitary sewer network south of Columbia Way. The remainder of Option 1 Lands will be serviced by a gravity trunk sewer proposed within the Emil Kolb Parkway right-of-way, that will terminate at a sewage pump station at Emil Kolb Parkway and Duffy's Lane. Sanitary flows will then be pumped south along Emil Kolb Parkway to outlet to a future trunk sewer on Humber Station Road, which is proposed to convey sanitary flows from Option 3 Lands, located northwest of King Street and Humber Station Road.

Proposed Grading & Roads

A preliminary grading design was prepared to support the servicing and stormwater management strategies. The roadway elevations were constrained by the invert elevations of the existing and proposed sanitary sewer network and the normal water level of the stormwater management ponds.

The Site was graded to match post-development drainage conditions to the pre-development drainage divides. We have minimized the need for sloping or retaining walls by setting boundary grades to be within a tolerance of the existing elevations at the property lines. This is particularly evident where the Site borders natural heritage features to be cognizant of restrictions for construction within or adjacent to these protected areas. Given the restrictions for construction within or adjacent to natural heritage features, we have paid particular attention to setting boundary grades in areas where the Site borders these protected areas.

Drainage Conditions

Existing drainage patterns will be preserved as much as possible under the proposed development conditions, with topography generally sloping southwards toward the tributaries of the West Humber River. The drainage divide between sub-basin 10 of the West Humber River (which requires quantity control) and main areas of the West Humber River Watershed (which do not require quantity control) will be generally maintained by the proposed grading and servicing concept. Minor and major system flows from most of the development area will be directed to one of eleven (11) proposed stormwater management ponds. Stormwater management ponds have been located at natural topographic low-points and provide an appropriate outlet to the adjacent watercourse or ditch in accordance with the pre-development drainage conditions. Lot or park grading adjacent to Environmental Policy Areas will aim to discharge clean stormwater runoff from landscaped areas to the natural features to promote water balance.

Regional Road 50 and Emil Kolb Parkway have several existing features to allow for conveyance of overland flows through the right-of-ways. These features, consisting of culverts and bridges, will be maintained with no proposed upgrades. Additionally, we have not proposed any new crossings to the existing road networks or within the proposed road network.

Floodplain Analysis

The floodplain analysis for the Site includes a headwater drainage feature assessment, mapping of the existing floodplain, and an evaluation of the post-development floodplain. Within the Toronto and Region Conservation Authority, the Regulatory Floodplain is based on the greater of the Regional storm (Hurricane Hazel) and the 100-year event. Based on the results of the analysis, there will be modifications required to some of the tributaries in order to safely convey external runoff either through or around the proposed development.

Stormwater Management

Runoff from the Site will be directed to on-site stormwater management (SWM) wet ponds designed to provide quantity (for ponds located within sub-basin 10 only), quality, and erosion control. A total of eleven (11) end-of-pipe stormwater management wet pond facilities are proposed to treat runoff from post-development drainage areas within the West Humber River Watershed. A total of eight (8) ponds will be located within an area of the West Humber watershed that does not require quantity control; therefore, these ponds will be designed to provide quality and erosion control. The remaining three (3) SWM ponds are located within sub-basin 10 of the Humber River, which will be designed to provide quantity control as well as quality and erosion control.

Outfall elevations for the SWM pond facilities were set at or above the 25-year water level of the receiving watercourse and design of the SWM pond facilities adheres to the requirements of the Town of Caledon.

Some perimeter areas of the Site, comprising mainly of rear-yard drainage, will drain off-site uncontrolled. Since these rear-yard areas are landscaped and considered inherently 'clean', quality controls are not proposed. Development blocks that cannot be serviced by the proposed SWM ponds will require on-site controls in order to meet stormwater management criteria.

Water Balance and Low Impact Development

A site-wide water balance assessment and feature based water balance assessment will be completed for the Site as part of the Hydrogeological Report being prepared by Crozier under separate cover.

According to mapping from the Toronto and Region Conservation Authority, the Site is located within a Significant Groundwater Recharge Area and a High Groundwater Recharge Area (Stormwater Management Criteria, 2012). Due to these vulnerable areas, the Site is required to maintain pre-development groundwater recharge rates and appropriate distribution, ensuring the protection of related hydrologic and ecologic functions.

Low Impact Development (LID) methods can be implemented on-site to mitigate water balance on-site and/or to wetland. Potential LID methods explored in this report include green roofs, roof downspout disconnection, infiltration galleries, rainwater harvesting, bioretention, vegetated filter strips, permeable pavement, and enhanced grass swales. Further implementation strategies will be explored at the detailed design stage.

Secondary Plan Natural Heritage Study Report

Dillon Consulting Ltd. has prepared a Secondary Plan Natural Heritage Study Report under separate cover, dated December 2021.

Conclusions & Recommendations

The conclusions and recommendations for servicing the Site are preliminary in nature based on the level of detail derived from the Concept Plan (Bousfields, November 2021). Servicing and stormwater management solutions are expected to be refined based on correspondence with the Town of Caledon, Region of Peel, Toronto and Region Conservation Authority, and any other applicable reviewing agency. Drawings, figures, and appendices have been prepared in support of this report.

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1.0 INTRODUCTION

1.1 Study Purpose

C.F. Crozier & Associates Inc. (Crozier) was retained by Bolton North Hill Landowners Group to prepare a Functional Servicing and Stormwater Management Report in support of a Local Official Plan Amendment (LOPA) for the Bolton North Hill Secondary Plan Option 1 and 2 Lands (the Site) in the Town of Caledon, Region of Peel. The Site consists of approximately 175.3 ha (433 acres) in total and is located generally north of the intersection of Regional Road 50 and Columbia Way.

This report will demonstrate how the Site can be developed in accordance with the Town of Caledon and Region of Peel guidelines from a functional sanitary servicing and preliminary stormwater management perspective. Functional water servicing for the Site is described in a Technical Memorandum by R.J Burnside & Associates Inc. dated May 13, 2021 and will be discussed in this report.

The proposed servicing strategies included in this report have been prepared with careful consideration of the Town and Region's overarching principles. The proposed strategies demonstrate the feasibility of servicing these expansion option lands by presenting technically correct and economically feasible solutions that use and improve existing infrastructure. These strategies also provide services to existing populations that are under-served and services population into the future beyond the Bolton Residential Expansion Settlement areas.

The goal of the servicing strategy presented herein is to develop the most feasible solution for the entire Site. Per drawing C701 – Landownership Map, there are serval landowner holdouts within the Site. Should current landowners wish to progress the development of their properties, there are feasible interim servicing solutions available. These interim solutions can be explored in more detail in subsequent versions of this report and/or reports specific to the development of those properties, should they be required in support of a Draft Plan of Subdivision and/or Site Plan Application approval. A preliminary interim servicing strategy has been developed (see drawing C709B) to depict a viable servicing solution should the landowner holdouts remain.

1.2 Study Area

Option 1 Lands are approximately 171 ha and are generally located north of the intersection of Regional Road 50 and Columbia Way and north and south of Emil Kolb Parkway (east of the Humber River). Option 2 Lands are approximately 4.3 ha and are bound by Columbia Way to the south and Mount Hope Road to the west.

Both Option 1 and 2 Lands are located within the Main Humber River Watershed, and there is a minor watershed divide bisecting Option 1 Lands that directs flows east/west.

According to the Concept Plan by Bousfields Inc. dated November 23, 2021, the elements envisioned for the proposed development include:

- 1555 Single/Semi-Detached Units
- 2339 Townhouses/Back-to-Back Townhouse Units
- 632 Apartment Units
- 1.4 ha of Commercial Space
- School, Parks, Woodlot and Open Spaces
- Stormwater Management Pond Blocks

The Concept Plan, outlining the proposed development and land ownership boundaries is provided in Appendix A.

A 32.03 ha parcel, located at the southern limit of the Option 1 Lands, has been subject to Regional Official Plan Amendment 30 (ROPA 30), which was approved by the Local Planning Appeal Tribunal (LPAT) on November 30, 2020. This LPAT approval brings the 32.03 ha portion of Option 1 Lands into the Bolton Rural Service Centre Settlement Area Boundary. While the portion of the Site that is within ROPA 30 may proceed now, the balance of the lands would require the approval of the 2051 urban boundary expansion through the current Regional SABE process.

The remainder of the Site is currently designated as "Rural Area" per the Region of Peel Official Plan and "Agricultural Area" in the Town of Caledon's Official Plan. To permit development of these lands for the proposed urban uses, the Site will need to be brought into the Bolton Rural Service Centre Settlement Area Boundary. This review is currently underway at the Region of Peel through the Region's 2051 Municipal Comprehensive Review (MCR) of the Region's Official Plan. Further, a local Official Plan Amendment is required to assign urban land use designations to all the Option 1 and 2 Lands.

1.3 Preliminary Framework Plan

The Preliminary Framework Plan (Bousfields Inc., November 23, 2021) has been reviewed by the Bolton North Hill Landowners Group and conforms to the development proposals set forth by each landowner, along with the requests of external stakeholders such as the public and catholic school boards, Town of Caledon, and Region of Peel. The functional design is based on this plan and unit/population counts have been derived accordingly. Through agency review, further revisions and refinement are expected.

As illustrated in the Concept Plan, a number of major structural elements define the Bolton North Hill development, including:

- A logical hierarchy of collector and local roads that provide:
    - Internal movement in a manner that is supportive of vehicular and pedestrian modes of transportation; and
    - Connectively to the existing collector roads (Mount Hope Road, Columbia Way, Regional Road 50, Emil Kolb Parkway, and Duffy's Lane.
- Key features of the above transportation hierarchy include:
    - Extension of the roundabout at the key intersection of Regional Road 50 and Emil Kolb Parkway; and
    - Bisecting local collectors that provide internal connectivity to parks and shared spaces.
- Open Space blocks that allow for the protection of Natural Heritage features such as woodlots, wetlands, and floodplains.
- Mixed-use development including commercial, institutional, and residential.
- Mix of residential densities that focus on affordable housing solutions with apartments, back-to-back townhomes, townhomes, and single residential lots.
- Park space and integrated stormwater management blocks that provide trail connectivity through the development.
- Separate public and catholic school board space.

1.4 Background Studies & Previous Reports

This report presents updated sanitary servicing and preliminary stormwater management strategies based on assumed population statistics for the Site. This report builds upon several previous reports prepared by Crozier and other consultants to support the development of these lands. Many studies were undertaken from 2013 to 2020, which led to the decision for including a portion of Option 1 Lands within Regional Official Plan Amendment 30. This report builds upon the following studies:

1. **Without Prejudice Servicing Feasibility Report, Proposed ROPA 30 for Bolton Residential Expansion Study (September 2020):** This report provided a servicing strategy to demonstrate feasible sanitary and water servicing for Options 1/2 lands north of Columbia Way. This report was prepared as input to the Bolton Residential Expansion Study in preparation for the 2020 Local Planning Appeal Tribunal.
2. **Servicing Strategy for a 30 ha Portion of Option 1/2 Settlement Lands (October 2020):** This supplementary memo was prepared to facilitate consensus among landowners other than those of Option1/2 lands, in an effort to reach a settlement agreement as part of the Local Planning Appeal Tribunal. This memo also describes high level water and sanitary servicing strategies for approximately 30 ha of Option1/2 lands.
3. **Servicing Strategy & Cost for Option 1 & Option 3 Settlement Lands (November 2020):** This supplementary memo was prepared to clarify servicing strategies for Option 1 and Option 3 lands as part of the settlement agreement reached in the Local Planning Appeal Tribunal. This memo provided additional context for high level water and sanitary servicing strategies for approximately 60 ha of Option 3 in addition to the Option 1 settlement area.
4. **"Technical Memorandum, Bolton Option 1, 2 & 3 Lands Preliminary Water Modelling", R.J. Burnside & Associates Inc. (May 2021):** this memo provides a proposed strategy for providing water servicing to the Option 1, 2, and 3 Lands. The memo reviews various development horizons and discusses the feasibility of providing water servicing to support this variety of development expansion areas.
5. **Crozier's Response to RJ Burnside's Option 1, 2, 3 Preliminary Water Modelling (May 2021):** This memo was prepared to review a preliminary water modeling technical memorandum prepared by RJ Burnside. This review was done to summarize and better understand the sequencing of interim and ultimate water servicing strategies to allow for the development Option 1 and Option 3 lands in 2031.
6. **Option 1 & 2 Sanitary Servicing Capacity and Hydraulic Grade Line Analysis (June 2021):** This memo was prepared to analyze the feasibility and sequencing of interim and ultimate sanitary servicing opportunities and constraints for Option 1/2 lands over various planning horizons in 2031, 2051 and beyond 2051.
7. **Option 1 & 2 Lands Secondary Plan Natural Heritage Study Report (Dillon, December 2021):** This report was prepared to assess potential impacts to the Natural Heritage (NHS) Features within the Study Area to help inform the secondary Plan for the Option 1 & 2 lands.

This report has been completed in accordance with the guidelines, standards, and policies of the Town of Caledon, Region of Peel and Toronto and Region Conservation Authority with consideration for various provincial-level initiatives. The relevant background studies and reports include:

- "2020 Water and Wastewater Master Plan for the Lake-Based Systems", Region of Peel & GM BluePlan, June 2020, herein "2020 Master Plan"
- "Provincial Policy Statement", May 2020, herein "2020 PPS"
- "A Place to Grow: Growth plan for the Greater Golden Horseshoe", May 2019, herein "2019 Growth Plan"
- "Bolton Residential Expansion Regional Official Plan Amendment Discussion Paper", The Planning Partnership (TPP), April 2016
- "Bolton Residential Expansion. Analysis in support of the Regional Official Plan Amendment", Region of Peel, June 2016
- "Development Standards Manual", Town of Caledon, 2019
- "Stormwater Management Criteria", Toronto and Conservation Authority, August 2012
- "Development Charge Background Study", Region of Peel, May 2015
- "Bolton Residential Expansion Study. Infrastructure Report", GM BluePlan, June 2014
- "2013 Water and Wastewater Master Plan for the Lake-Based Systems", Region of Peel, March 2014
- "Bolton Residential Expansion Study. Recommendations: Selection of Expansion Area", June 2013
- "North Bolton Elevated Tank/Reservoir and Feedermain – Schedule C Class EA Study", AECOM, October 2011
- "Bolton Urban Community Water and Wastewater Analysis", AECOM, March 2010
- "Region of Peel Watermain Design Criteria", June 2010
- "Region of Peel Sanitary Sewer Design Criteria", July 2009 (modified March 2017)

1.5 Study Team

Members of the study team involved in the preparation of the Functional Servicing and Stormwater Management Report documents and their respective disciplines are listed below.

Bousfields Inc.	Urban Planning Land Use Design	Planning Justification Report
IBI Group	Planning and Urban Design	Fiscal Impact Study
R.J. Burnside & Associates Inc.	Water Distribution	Functional Servicing Report
C.F. Crozier & Associates Inc.	Municipal Design / Water Resources	Functional Servicing and Stormwater Management Report
	Transportation Engineering	Traffic Impact Study
Dillon Consulting Ltd.	Land Development Municipal Design	Secondary Plan Natural Heritage Study

2.0 WATER SERVICING

R.J. Burnside was retained by the Bolton North Hill Landowners Group in cooperation/ coordination with the Option 3 Landowners Group to complete an analysis on the existing water distribution system in the Bolton Residential Expansion Study (BRES) lands. The goal of this analysis was to provide a proposed water servicing strategy for the full build-out scenario of the Option 1, 2, and 3 Lands. The conclusions of their Technical Memorandum (May 13, 2021) with respect to Option 1 and 2 Lands are summarized below and Appendix A contains R.J. Burnside's Technical Memorandum from May 13, 2021.

According to the Bolton Residential Expansion Study (Region of Peel, September 24, 2020), the development of Option 1 and 2 Lands will require a new pressure zone to facilitate water servicing. The Site is outside of the range of elevations associated with the water distribution infrastructure for Pressure Zone 6 (214.5 m – 259.1 m), as stated in the Water and Wastewater Master Plan (Region of Peel, 2020). Therefore, ultimate development of Option 1 and 2 Lands will require the addition of Pressure Zone 7, accompanied by a new Zone 7 booster pumping station at King Street and Coleraine Drive.

Storage is proposed in the form of two elevated tanks to provide flow equalization and to meet the required fire and emergency demands. One of the proposed elevated tanks is in the north corner of Option 1 Lands, adjacent to Regional Road 50. The serviceable elevation of Pressure Zone 7 ranges from 243.4 m to 289.6 m as stated in the Water and Wastewater Master Plan (Region of Peel, 2020).

R.J. Burnside stated in their Technical Memorandum (May 2021) that the Regional Official Plan Amendment 30 portion of Option 1 Lands and Option 3 Lands (2031) can be supported by the water infrastructure system without the need for a new elevated tank. Their modelling showed that the system can supply the maximum daily demand to these two lands while maintaining the required system pressure between 40 psi and 100 psi. See below for an excerpt of their Technical Memorandum:

"A hydraulic model of the proposed water distribution system has been developed for the Option 1, 2, 3, 4 Zone 7, Zone 7 ROA and Zone 7 Whitebelt Lands. In addition, allowance has been made to accommodate up to approximately 7,500 existing residents and jobs currently situated at the upper limits of Pressure Zone 6, and experiencing water pressure issues, into a new Pressure Zone 7, thereby addressing long standing deficiencies in water service.

The model demonstrated that the ROPA 2031 Option 1 and 3 Lands can be serviced with a booster pumping station and without a Zone 7 elevated tank (ET). The construction of the Zone 7 ET within the Option 3 Lands can adequately service the Option 3 Draft Plan Approved Lands, the ROPA 2031 Option 1 and 3 lands, and the 2031 Option 1 and 2051 Full buildout Option 3 Lands. To satisfy storage requirements it is anticipated that once the 2051 Option 1 and Option 2 Lands commence development, a second Zone 7 ET within the Option 1 Lands will need to be constructed. The modelling demonstrated that the ultimate Zone 7 servicing solution that includes two ETs on the Option 1 and Option 3 Lands can service the full Zone 7 buildout scenario, subject to confirmation of tank sizing."

The full build-out water servicing strategy will require an elevated tank in the Option 1 Lands and a 400 mm diameter feedermain along Emil Kolb Parkway, Regional Road 50, and Columbia Way to create a loop between Option 1, 2, and 3 Lands.

Internally, water servicing is proposed to provide the necessary domestic and fire demands. A looped system will be maintained, and all Region of Peel standards will be adhered to for the design of the watermains and appurtenances. Further details of the full build-out water servicing strategy can be seen on Drawing C711 – Preliminary Water Distribution Plan.

3.0 SANITARY SERVICING

3.1 Existing Sanitary Servicing

The existing sanitary servicing infrastructure for lake-based systems within the Region of Peel is described in detail in the Water and Wastewater Master Plan (Region of Peel, 2020). Volume 3 and Volume 4 of this Master Plan discuss existing water and sanitary infrastructure in the Region, including an examination of the capacity of Bolton's existing sanitary infrastructure.

Bolton is predominantly serviced by two sanitary trunk sewers: a 900 mm diameter trunk sewer on Albion-Vaughan Road in the east end and a 750 mm diameter trunk sewer on Coleraine Drive in the west end. These two trunk sewers merge outside of the southern limits of Bolton at the intersection of Coleraine Drive and Regional Road 50. The wastewater then continues flowing south in a sanitary sewer along Regional Road 50 to the McVean Sewage Pumping Station, and ultimately for treatment at the G.E. Booth Wastewater Treatment Plant.

The 750 mm diameter sanitary trunk sewer on Coleraine Drive was installed in 1983, expanding to approximately 800 m north of George Bolton Parkway. This sanitary sewer was then extended 400 m further north at 600 mm diameter in 1989, then terminated at 375 mm diameter at King Street West in 1999.

The 900 mm diameter Albion-Vaughan (AV) trunk sewer as it exists today was completed in early 2015 and currently terminates north of the railway corridor on Albion Vaughan Road. The Region of Peel's capital works program included completing this trunk sewer by the spring of 2021 to terminate at the northern most extent of Nunnville Road, which also involves the decommissioning of the existing Albion Vaughan and Harvestview Sewage Pumping Stations along a similar timeline. The AV trunk sewer has an approximate full flow capacity of 1,000 L/s.

As identified within the "Bolton Urban Community Wastewater Analysis" (2010), the permitted wastewater peak flow capacity of the Bolton SPS is 380 L/s and experienced a theoretical peak flow of 205 L/s in 2007. The wet weather peak flows of 295 L/s and 308 L/s recorded in January and March of 2009 respectively, can be attributed to infiltration in the pipes. Therefore, existing dry weather flows consumed 50% of the station's capacity whereas wet weather flows in 2009 consumed approximately 80% of the station's capacity. Table 1 summarizes the peak wet and dry weather residual capacity of the Bolton SPS. It is our understanding that no further flow analysis of sanitary flows to the Bolton SPS has been conducted since AECOM's study in 2010.

Table 1: Bolton SPS Wet and Dry Weather Residual Capacity

Type	Peak Flow Capacity (L/s)	Peak Flow (L/s)	Residual Capacity (L/s)
Dry Weather	380	205[1]	170
Wet Weather		308[2]	70

Note:
[1]The theoretical peak flow in 2007 was 205.4 L/s per modelling completed by AECOM in 2009.
[2]The wet weather peak flow was 295 L/s and 308 L/s in January and March of 2009.

3.2 Design Sanitary Flow

The Water and Wastewater Master Plan, Volume 4 (Region of Peel, 2020) was referenced to calculate the sanitary design flows for the Site. Dry weather unit sewage flows of 290 L/capita/day and 270 L/capita/day were used for residential and employment populations, respectively. Population yields (derived from the unit count of the Concept Plan), an infiltration flow of 0.26 L/s/ha, and a peaking factor were applied to the unit sewage flow to obtain the total estimated design sanitary flow. Table 2 summarizes the results and Appendix B2 contains detailed calculations.

Table 2: Estimated Sanitary Design Flows

Land Parcel	Average Daily Flow (L/s)	Peaking Factor	Peak Flow (L/s)	Infiltration Flow (L/s)	Total Sanitary Flow (L/s)
Option 1	84.3	2.9	117.36	43.4	160.8
Option 2	5.0	4.0	4.81	3.8	8.6

Therefore, the proposed development of Option 1 and 2 Lands will generate a total of 169.4 L/s in sanitary discharge.

3.3 Proposed Sanitary Servicing

In a phone call between Crozier (Ashish Shukla and Travis Gibson) and the Region of Peel (Laura Borowiec) on September 16, 2021, the Region brought up additional considerations for the sanitary servicing capacity analysis that Crozier presented in June 2021. Our previous capacity analysis evaluated sending all wastewater flows from the Site to the existing Bolton North Hill sanitary sewer system. However, the Region has recently noted, through a flow monitoring program, that there is increased infiltration into the existing sanitary sewer system during wet weather conditions. Based on feedback and at the request of the Region, we have developed an alternative servicing strategy for the proposed development compared to previously presented strategies.

The proposed sanitary sewer design was developed based on a minor watershed divide within the Main Humber River watershed that runs north-south through Option 1 Lands. This drainage divide splits overland flows east-west through Option 1 Lands and presents an opportunity to keep wastewater flows from Option 1 Lands within their natural sewershed where feasible. In keeping wastewater flows within the natural sewershed, the depth of gravity trunk sewers required to service the subject development will be reduced.

The natural drainage divide was modified slightly to optimize the number of upgrades required to the existing system south of Columbia Way. This modification results in approximately 35.4 ha from Option 1 Lands and the Option 2 Lands (3.8 ha) of sanitary flows being directed to the existing system.

See Drawing C709 – Preliminary Internal Sanitary Drainage Plan for an illustration of the sanitary drainage areas and Appendix B1 for the sanitary design sheet, which includes detailed calculations of the sanitary flows to the existing system.

Sanitary flows were subdivided based on a connection point to the external sanitary servicing strategy and will be further subdivided by each leg of pipe when the Concept Plan is refined.

Table 3 below breaks down the flows from each drainage area being sent to the existing sanitary sewer system south of Columbia Way. A total of 43.53 L/s of sanitary flows from the proposed development will be sent to the existing system south of Columbia Way.

Table 3: Sanitary Flows to the Existing System

Drainage Area Number	Area (ha)	Average Daily Flow (L/s)	Peaking Factor	Peak Flow (L/s)	Infiltration Flow (L/s)	Total Sanitary Flow (L/s)
1	31.3	8.19	3.52	48.80	8.14	36.94
1 (Commercial Block)	0.8	0.13	4.33	0.58	0.21	0.79
8	3.3	1.47	4.00	5.87	0.86	6.72
9 (Option 2)	3.8	1.19	4.05	4.81	0.99	5.80

Sanitary flows from Drainage Area 1 (37.73 L/s) will flow by gravity to a proposed pump station in the southeast corner of the Option 1 Lands. A 150 mm diameter forcemain will be constructed south along Highway 50 from the main entrance to the Site and then east along Columbia Way to Kingsview Drive. The forcemain will connect to the existing system (250mmØ) and continue south on Kingsview. See Section 3.3.1 below for further analysis on this proposed strategy. There is already a connection from Drainage Area 8 to the existing system at Columbia Way and Kingsview Drive. Drainage Area 9 (Option 2) will be connected to the existing system at Columbia Way and Mount Hope Drive via a 250 mm diameter gravity sewer at 0.5% grade.

Drawing C709 – Preliminary Internal Sanitary Drainage Plan illustrates the proposed sanitary servicing layout.

We have excluded Rounding Out Area C from this functional design but have accounted for the future population of these lands in the analysis of the existing system. The extent of upgrades reflects the increase in sanitary flows from ROPA 30 lands, Option 2, and Rounding Out Area C.

To accommodate the increase in sanitary discharge from the proposed development, the existing sanitary sewer network in Bolton North Hill will require several upgrades. A sanitary design sheet was used to conduct an analysis of the existing system and identify sewers in the existing system that would reach greater than 100% capacity after flows from the proposed development are added. In the upgrade analysis, only individual legs of pipe were upsized where required, regardless of the upstream or downstream pipe size. This was done to limit the extent of disturbance and capital expenditure required to support the development.

The upgrades required for the existing system are summarized in Table 4 below, and detailed calculations are provided in Appendix B1.

Table 4: Upgrades to Existing Sanitary Sewer System

Description	Length (m)	Upgrade Diameter (mm)	Depth
Columbia Way & Kingsview Drive	102.5	300	<5m
Coleman Court & Kingsview Drive	89.1	300	<5m
Coleman Court & Kingsview Drive	31	375	<5m
Bridlefield Crescent	44.5	375	<5m
Foxchase Drive & Taylorwood Avenue	45	300	<5m
Foxchase Drive & Taylorwood Avenue	222.2	375	<5m
Foxbury Place & Taylorwood Avenue	50	300	<5m
Foxbury Place & Taylorwood Avenue	258.9	375	<5m
Taylorwood Avenue to St. Michael Crescent	404.3	375	<5m
St. Michael Crescent to Culpepper Court	48.7	450	<5m
Guardhouse Drive	183.8	300	>5m
Crestwood Road & Maidstone Court	46.8	450	<5m
Crestwood Road & Maidstone Court	39.6	450	>5m

According to Drawing 801 in the Functional Servicing Report, Macville Secondary Plan (Urbantech, February 2021) a 600 mm and 675 mm diameter sanitary trunk sewer will be extended along Humber Station Road to facilitate the development of Option 3 Lands within the Bolton North Hill Landowners Group. From Humber Station Road the sanitary sewer extension will connect to the Coleraine Drive trunk sewer with upgrades required to accommodate the increase in sanitary discharge. Since this extension is required to facilitate development of Option 3 Lands, it is feasible to propose that the remaining portion of Option 1 Lands outside of the ROPA 30 designation discharge to this sewer with further upgrades to accommodate additional sanitary discharge.

The remaining 114.7 ha (283 acres) of sanitary flows from the Site, consisting of Drainage Areas 2-7, are being directed to a proposed gravity trunk sewer on Emil Kolb Parkway, which will terminate at a proposed pump station at Emil Kolb and Duffy's Lane. Flows will subsequently be pumped south on Emil Kolb and west on King Street, via a 200 mm diameter forcemain, and outlet to a future trunk sewer on Humber Station Road. This trunk sewer is proposed to convey flows from the Option 3 Lands northwest of King Street and Humber Station Road. Table 5 below

breaks down the flows from each drainage area being sent to Emil Kolb Parkway, and detailed calculations are provided in Appendix B3.

A total of 132.50 L/s of sanitary flows will be sent to the proposed trunk sewer along Emil Kolb Parkway. This trunk sewer will increase from 300 mm to 450 mm diameter from east to west and range from 0.4% to 0.5% grade.

Drawing C708 – Preliminary External Sanitary Servicing Plan illustrates the proposed external sanitary servicing layout. Drawing C710 – Preliminary External Sanitary Trunk Profile shows a preliminary plan and profile of the proposed trunk sewer.

Table 5: Sanitary Flow to Emil Kolb Parkway (West)

Drainage Area Number	Area (ha)	Average Daily Flow (L/s)	Peaking Factor	Peak Flow (L/s)	Infiltration Flow (L/s)	Total Sanitary Flow (L/s)
2	40.7	14.22	3.31	47.09	10.58	57.67
3	2.6	1.27	4.03	5.13	0.68	5.81
4	0.6	0.10	4.35	0.44	0.16	0.59
5	15.4	4.83	3.69	17.82	4.00	21.83
6	36.3	14.53	3.30	47.99	14.40	62.39
7	19.1	3.96	3.75	14.85	4.97	19.81

The Emil Kolb gravity trunk sewer is proposed to be constructed via trenchless technology. There are three watercourse crossings and one crossing of Regional Road 50, which would all require trenchless technology. Therefore, it will be cost effective to construct the entire stretch via trenchless compared to switching back to open trench. This will help to minimize disturbance to existing traffic on Emil Kolb. Refer to Section 3.4 for further information on the pump station.

All proposed sanitary sewers will be Polyvinyl chloride (PVC) pipes. PVC was chosen over reinforced concrete to reduce the infiltration into the sanitary sewer system. Additionally, unless otherwise stated all sanitary sewers are proposed to be 250 mm diameter with minimum slope to provide self-cleansing velocity, in accordance with the Region of Peel standards.

3.3.1 Opportunities and Constraints

Once an overall sanitary servicing strategy was established, specific parcels of Option 1 Lands were analyzed to identify opportunities and constraints related to optimizing the overall servicing strategy. Conditions such as existing elevations, watercourse crossings, and integration of the proposed and existing sanitary networks were analyzed across the Site. Specifically, the proposed approach for the ROPA 30 Lands and the furthest west portion of the Option1 Lands presented challenges, so we conducted a cost/ benefit analysis to identify the most feasible servicing solution.

ROPA 30 Lands

The southeast corner of Option 1 is constrained by the drop in ground elevation on the east boundary of the Site. Since a natural drop in ground elevation from west to east does not

promote sanitary gravity flow outletting west to Regional Road 50, this section had to be analyzed for an optimal sanitary servicing strategy. Three sanitary servicing options were analyzed and are described below. The opportunities and constraints of the servicing options are described in Table 6.

Baseline: This consists of optimizing the earthworks while keeping the natural elevation drop from west to east. Since a gravity sewer connection to the existing system cannot be facilitated in this concept, all flows will be conveyed internally via gravity and directed to a pump station at the overall low point in the southeast corner. Flows are then pumped to the connection point at Columbia Way and Kingsview Drive.

Highway 50: This consists of extending the existing gravity sewer from Columbia Way and Kingsview Drive up Highway 50 and into the Site to collect sanitary flows internally via gravity. Significant earthworks and a retaining wall along the east boundary would be required to provide minimum cover on a gravity system.

Kingsview Right-of-Way Extension: This consists of extending the Kingsview Drive right-of-way (ROW) north into the Site. Sanitary flows would be collected internally via gravity and drain south to the existing system at Columbia Way and Kingsview Drive through a gravity sewer within the ROW extension. This scenario also requires a retaining wall and earthworks to facilitate the external gravity collection system.

Table 6: Opportunities and Constraints of ROPA 30 Lands Scenarios

Scenario	Opportunities	Constraints
Baseline	- More balanced earthworks (savings on fill) - No retaining wall required - No additional right-of-way easement required	- Costs associated with a pumping station and forcemain - Construction required on Highway 50
Highway 50	- No additional right-of-way easement required	- Largest amount of fill import required to provide minimum cover over sanitary sewers - Retaining wall required along the east and southern property limits to support fill import
Kingsview Right-of-Way	- Smaller amount of fill and retaining wall required - No construction on Highway 50	- Right-of-way extension required - More earthworks than baseline - Retaining wall still required - Impacts to density targets by replacing high-density development with a ROW

Based on our analysis, it was decided that the baseline option is the most feasible way to service the ROPA 30 land parcel.

3.3.2 West of Duffy's Lane

The northwest corner of Option 1 lands is constrained by a natural drop in ground elevation at the west end of the Site and having to cross a creek that flows under Duffy's Lane. A natural drop in ground elevation from east to west does not promote gravity sanitary flow being sent from west to east, and the creek crossing requires a deeper sewer. Three sanitary servicing

options were analyzed and are described below. The opportunities and constraints of the servicing options are described in Table 7.

Sewage Pump Station: This consists of minimizing the depth of the sewers by using an internal pumping station. Sanitary flows would be conveyed internally via gravity and pumped through a forcemain to one of two locations. The first location is further east on the internal collector road (east of Duffy's Lane), where flows would be conveyed via gravity further east to the Emil Kolb Parkway trunk sewer. The second location is directly to the pumping station at Duffy's Lane and Emil Kolb Parkway.

Gravity on Duffy's Lane: This consists of conveying all sanitary flows via gravity south on Duffy's Lane to connect into the Emil Kolb Parkway trunk sewer.

Gravity on internal collector: This consists of conveying all sanitary flows via gravity east on the internal collector road with ultimate outlet further upstream on the Emil Kolb Parkway trunk sewer.

Table 7: Opportunities and Constraints of NW Corner Scenarios

Scenario	Benefits	Disadvantages
Sewage Pumping Station	- No construction on Duffy's Lane or watercourse crossing - Trunk sewers at optimal depth	- Costs associated with pump station and forcemain
Gravity on Duffy's Lane	- Direct route to the pump station, no upsizing of internal sewers	- Deep trunk sewers required internally and deep crossing at the watercourse on Duffy's Ln - Deeper external pump station required - Construction on Duffy's Lane
Gravity on internal collector	- No construction on Duffy's Lane or watercourse crossing	- Prohibitively deep trunk sewers required (>15m) to make this connection

Based on our analysis, it was decided that the sewage pumping station with a connection to the internal gravity sewer (east on the internal collector) is the most feasible way to service the lands west of Duffy's Lane.

3.4 Proposed Sewage Pumping Stations

Three (3) sewage pumping stations (SPS) are required to provide sanitary servicing for the Site. Two (2) of these sewage pumping stations are located internal to Option 1 Lands, and one (1) is located external to the Site at the intersection of Duffy's Lane and Emil Kolb Parkway.

See Drawing C709 – Preliminary Internal Sanitary Drainage Plan for the location of the proposed sewage pumping stations.

Table 8: Sewage Pumping Stations (SPS) Breakdown

Name	Location	Internal / External	Drainage Area(s) Serviced	Design Flow (L/s)	Depth Below Grade (m)
SPS 1	Drainage Area 1	Internal	1	37.73	5
SPS 2	Drainage Area 7	Internal	7	19.81	5
SPS 3	Intersection of Emil Kolb Pkwy and Duffy's Lane	External	2, 3, 4, 5, 6, 7	132.50	6

SPS 1: Drainage Area 1

Sewage pumping station 1 is proposed in the southeast corner of Sanitary Drainage Area 1 to pump sanitary discharge to the connection point to the existing system at Columbia Way and Kingsview Drive. SPS 1 is located at the overall low point of the ROPA 30 Lands to minimize depth.

SPS 2: Drainage Area 7

Sewage pumping station 2 is proposed in the west end of Drainage Area 7 to pump sanitary discharge to the gravity sewer located within Drainage Area 6. SPS 2 is located at the overall low point of Drainage Area 7 to minimize depth.

SPS 3: Intersection of Emil Kolb Parkway& Duffy's Lane

Sewage pumping station 3 is proposed at the intersection of Emil Kolb Parkway and Duffy's Lane to pump sanitary discharge from Drainage Areas 2-7 via the proposed forcemain to the connection point at King Street and Humber Station Road. SPS 3 is located at a natural low point approaching the Humber River. This is beneficial for reducing the length of the forcemain and subsequently the pumping capacity. Locating SPS 3 west on Emil Kolb also helps to minimize the depth, as the elevations fall off faster than the slope of the trunk sewer (see Drawing C109 for a plan/profile of the trunk sewer). Existing municipal property is utilized for the location for ease of maintenance and operation.

4.0 PROPOSED GRADING & ROADS

4.1 Grading Constraints & Objectives

The following constraints were taken into consideration in preparing the grading plan for the Site:

- The existing elevations of Emil Kolb Parkway, Regional Road 50, and Columbia Way
- The existing elevations at the property lines of all land parcels
- Matching the existing drainage patterns within the Site in the post-development condition, and keeping overland flows sent to the Humber River tributaries as close to existing as possible
- Sending overland flows to the proposed Stormwater Management Pond locations
- Conveying external flows through or around the Site as necessary
- Minimum and maximum road slopes per the Town of Caledon standards

Further to the above constraints, proposed grading for the Site adheres to the following objectives:

- Optimize cut and fill operations and achieve a balanced site
    - Prevent / minimize the need for retaining walls

    - Special consideration for the preservation of existing ground elevations in the vicinity of natural features
- Maintain required cover for municipal infrastructure and utilities including reducing the need for pump stations to convey sanitary flows
- Accommodate the future lot grading, based on preliminary concepts in accordance with the Town standards
- Utilize the opportunity for walkout lot types where parcels border areas outside of the development limit
- Maximize the reuse of topsoil within the Site to limit hauling operations

4.2 Preliminary Grading Design

The preliminary grading design for the Site is shown on Drawing C704 – General Grading. The grading plans include proposed road centerline elevation and slopes, existing surface contours and the direction of overland flow routes. The following sections outline critical elements of the grading design.

Compatibility with Environmental Policy Areas

As mentioned in the above constraints, proposed elevations adjacent to Environmental Policy Areas will match existing as close as possible to minimize impact to these sensitive areas. Grading adjacent to natural heritage features considers natural heritage buffers/constraints, erosion setbacks, and external overland flow. As the concept plan and design progress we will continue to monitor the grading impacts in these areas and minimize the need for retaining walls, sloping, etc.

Lot or park grading adjacent to Environmental Policy Areas will aim to discharge clean stormwater runoff from landscaped areas to the natural features to promote water balance.

Road Centerline Gradients

The preliminary grading design conforms to the Town of Caledon design standard of maintaining a minimum and maximum asphalt gradient of 0.5% and 6.0%, respectively.

There are two areas where sawtooth grading is proposed to ensure overland conveyance to the stormwater management ponds while considering the constraints of matching boundary elevations. Where sawtooth grading is proposed, a minimum asphalt gradient of 0.5% and overall gradient of 0.3% is maintained. The maximum ponding depth has been set to 0.2m (below the maximum allowable Town standard of 0.3 m for paved areas to allow for flexibility at detailed design). The two areas are within the following Option 1 lands:

- In the ROPA 30 portion of Option 1, an overall gradient of 0.3% was proposed on the internal road adjacent to Regional Road 50 to keep centerline elevations within +-0.50 m from the existing Regional Road 50 elevations and allow conveyance south to the proposed stormwater management (SWM) Pond 210; and
- North of Emil Kolb Parkway, an overall gradient of 0.4% was proposed on the internal road from the existing Emil Kolb Parkway centreline elevation to the proposed SWM Pond 203 to achieve a low point elevation that accommodates the existing Humber River tributary and matches the existing boundary elevations of the Greenbelt lands to the west and south of the internal roadway.

Stormwater Management Ponds

In some instances, the proposed stormwater management ponds (SWMPs) create boundary conditions that the road centerline elevations must adhere to for each drainage area. This occurs where the permanent pool elevations for the SWMPs were fixed based on the respective

receiving outlet elevations, which are set at 0.10 m above the 25-year flood elevation of each tributary. These permanent pool elevations then set the road centerline elevation required to facilitate minor and major flow conveyance to the SWMPs.

Refer to Drawing C707 – Conceptual SWM Pond Plan and Section for detailed grading of Pond 211, located within the ROPA 30 section of Option 1 Lands.

Grading of roads, lots, and SWMP Blocks considers a buffer required to match proposed or existing boundary elevations. Ponds have been sized such that no retaining walls are required to facilitate grading.

Overland and Emergency Flow Routes

The roads have been graded to ensure positive drainage of major system flows towards the SWMPs within each drainage area. The major system drainage is directed overland to the SWMPs and will operate in the event of a minor system blockage or when the minor system capacity is exceeded (above the 10-year storm event). Each SWMP includes an overland flow path to direct major flow from the roadways into the ponds and an emergency spillway that will operate in the event of an outlet blockage or in the event of a large storm exceeding the pond design capacity. Emergency spillways will be sized for the Regulatory event (larger of the 100-year uncontrolled flow or the Regional uncontrolled flow).

Other Drainage Considerations

If road grading cannot accommodate the conveyance of overland flow to the SWMP, localized capture of the 100-year storm will be contemplated. This will be further determined at detailed design based on road grading and stormwater management requirements for capturing and treating flows.

There are small areas identified across the Site that propose uncontrolled runoff directed to adjacent Environmental Policy Areas. The typical location is split or walkout lots that back onto undevelopable land where the rear-yard drainage cannot be captured. The drainage from these areas is considered inherently 'clean' runoff. At this time, uncontrolled flows from developable areas have been eliminated but are subject to change based on constraints encountered at detailed design. Uncontrolled drainage has been accounted for in the sizing of the SWMPs.

4.3 Earthworks Analysis

An earthworks analysis was performed based on the preliminary grading plan for the Site to determine the locations within the Site that require cut or fill and derive a net earthworks requirement. Matching the pre-development drainage divides helps to match proposed and existing elevations closely across the site, however, the natural topography is quite undulated, and areas of large cut and fill have still resulted.

Drawing C705 – Preliminary Earthworks Map illustrates the cut and fill areas for the Site with colour coded banding and Table 9 below for the resultant volumes.

Table 9: Earthworks Volumes

Land Area	Cut (m^3)	Fill (m^3)	Net (m^3)
Option 1 Lands	1,323,053	855,862	467,191 (CUT)
Option 2 Lands	14,236	3,963	10,273 (CUT)
ROPA 30 Lands	156,485	76,785	79,700 (CUT)

The earthworks were calculated with an average topsoil depth and pre-grade across the entire Site. In absence of a geotechnical report for the Site, the stripped topsoil depth was assumed to be 0.3 m, which is consistent with historically agricultural lands across southern Ontario. The pre-grade depth was assumed to be 0.8 m, which is a weighted average of the typical pre-grade for parks (0.3 m), roads/institutional/commercial (0.6 m), single residential lots (0.8 m), townhomes (1.0 m), and apartments (2.0 m).

At this stage, the earthworks analysis was completed to understand which areas of the Site could be refined in subsequent revisions so that cut and fill and the resultant net volume (import or export) is minimized. As the development is advanced, the proposed grading will be further refined to achieve balance where possible. It is not feasible that each parcel of land will balance, and therefore collaboration between the landowners will likely be required to share cuts and fills.

In preparing subsequent development staging/phasing plans, the cut and fill areas will be further analyzed to coordinate the earthworks program between individual owners.

5.0 DRAINAGE CONDITIONS

5.1 Existing Drainage Conditions

The Site is located within the regulation limits of Toronto and Region Conservation Authority (TRCA) and discharges to the West Humber River and Cold Creek, both of which are tributary to the West Humber River. There is a total of six (6) smaller tributaries that primarily receive drainage from the Sire, which are tributary to the West Humber River and Cold Creek tributaries.

Drawing C703 – Pre-Development Drainage Plan illustrates the existing drainage patterns within the Site and surrounding area.

Hydrologic (Visual OTTHYMO v5.0) and hydraulic (HEC-RAS) models (including a shapefile of subcatchment boundaries) were received from TRCA for the West Humber River and Cold Creek. It is noted that subcatchment boundaries received from TRCA have been further refined by Crozier based on the detailed topographic data received from the Ministry of Natural Resources and Forestry and existing drainage features (ditches, culverts, bridges, etc.) to clarify existing drainage flow paths, boundaries, and outlets. The existing hydrologic and hydraulic modeling was obtained for the purposes of assessing the Floodplain. Refer to Section 6.0 for further details regarding the floodplain modeling.

Under existing conditions, Option 1 Lands have been discretized into a total of seventeen (17) internal drainage areas, comprising primarily agricultural lands. Additionally, the northern boundary of Option 1 Lands currently receives stormwater runoff from a total of eight (8) external drainage catchments, comprising largely of undeveloped area. Existing drainage, both internal and external to Option 1 Lands, generally flows south towards one of the five (5) nearby tributaries of the West Humber River (labelled as Tributaries 'A-E').

Option 2 Lands are located northeast of the intersection at Mount Hope Road and Columbia Way and has been delineated as one (1) internal drainage area. Drainage from the Option 2 Lands generally drains north towards Cold Creek, a tributary of the West Humber River (labelled as Tributary 'F' on the Pre-Development Drainage Plan).

Table 10 below provides a summary of the existing drainage catchments and parameters used for modeling. Time to peak values for each catchment were calculated using the Airport Method given that the existing areas are largely pervious, and the catchment areas are generally less than 1 km^2. The Airport Method uses the travel length and average slope within the catchment to calculate the time to peak (hours).

According to the Ontario Soil Survey mapping for Peel County, there are mainly four soil types present on Site: King Clay Loam, Bottom Land, Monoghan Clay Loam and Pontypool Sandy

Loam. King Clay Loam is the dominant soil type found across the majority of the Site. Figure SOIL-1 (provided in Appendix E – Figures) illustrates the predominant soil types across the Site and surrounding area.

Existing land use on Site is primarily agricultural, with some commercial, forest, meadow, rural residential and wetlands present. Refer to Figure LAND-1 provided in Appendix E – Figures depicting the existing land use conditions.

The weighted average tool in Visual Otthymo (VO 6.2) was used to assign an SCS Curve Number value to each catchment, which was then converted to a Modified CN* value within VO for the 2-year to 100-year storm events. For modeling of the Regional storm event, CN* values were converted to CNIII values within VO to better represent the available soil moisture storage volume during a large storm event.

Refer to Table 10 for a summary of CN* and time to peak (Tp) values applied to each catchment Refer to Appendix C1 – Hydrologic Modelling Parameters for a detailed summary of the calculated hydrologic parameters.

Table 10: Pre-Development Catchments

Catchment ID	Drainage Area (ha)	Initial Abstraction, IA (mm)	Modified Curve Number, CN*	Time to Peak (hours)	Outlet
100	5.29	7.00	84	0.48	Tributary A
101	7.93	6.94	84	0.48	Tributary B
102	2.00	6.98	84	0.21	
103	5.49	6.90	84	0.32	
104	6.51	7.06	84	0.55	Tributary C
105	11.68	7.03	84	0.36	
106	17.86	7.24	80	0.75	Tributary D
107	5.21	6.61	84	0.52	
108	5.80	7.00	84	0.34	Tributary C
109	14.92	5.56	89	0.51	Tributary D
110	15.37	6.98	84	0.75	
111	21.58	7.00	84	0.61	Tributary E
112	4.63	7.00	84	0.41	Tributary D
113	13.07	7.00	84	0.67	Tributary E
114	9.91	6.79	85	0.56	Tributary D
115	9.61	7.02	84	0.50	Tributary E
116	7.40	6.82	85	0.51	Tributary D
117	4.30	6.99	84	0.41	Cold Creek (Tributary F)
118	4.36	2.68	95	0.19	Tributary D
Total Site	**172.91**	**-**	**-**	**-**	**-**
EXT1	3.26	7.00	84	0.21	Tributary A
EXT2	13.35	7.07	84	0.56	Tributary B
EXT3	4.04	7.00	84	0.28	Tributary C
EXT4	43.99	6.82	71	0.93	
EXT5	6.22	9.04	65	0.49	Tributary D
EXT6	6.26	5.80	86	0.87	
EXT7	15.76	7.08	85	1.03	
EXT8	18.33	8.44	84	0.77	Tributary E
Total External	**111.21**	**-**	**-**	**-**	**-**

5.2 Proposed Drainage Conditions

Existing drainage patterns will be preserved as much as possible under the proposed development conditions, with topography generally sloping southwards toward the tributaries of the West Humber River. The drainage divide between sub-basin 10 of the West Humber River (which requires quantity controls) and areas of the West Humber River Watershed (which do not require quantity control) will be generally maintained by the proposed grading and servicing concept. Minor and major system flows will be directed to the SWM facilities via storm sewers and road grading.

The Option 1 lands have been discretized into a total of twelve (12) internal drainage catchments under post-development conditions. The Option 2 lands have been delineated as a single drainage catchment. Proposed land uses were assigned based on the Concept Plan (Bousfields, Nov. 23, 2021), comprising of low to high density residential, commercial, schools, parks, open space, and stormwater management ponds. Per the concept plan land uses, composite runoff coefficients for each catchment were calculated using the area-weighted method, based on the Town's standard runoff coefficients (Standard No. 103). Composite runoff coefficients were then converted to percent impervious values to be coded into Visual Otthymo software, using the following formula:

TIMP = 100 * (RC-0.25) / (0.90-0.25), where RC= runoff coefficient

Detailed runoff coefficient and percent impervious value calculations are provided in Appendix D2**.** Some perimeter areas of the Site will direct uncontrolled runoff towards the existing Natural Heritage System areas, mainly from split or walkout residential lots that back onto undevelopable land where the rear-yard drainage cannot be captured. Since these areas comprise mainly of grassed/landscaped and rooftop area, runoff from these areas is considered to be inherently 'clean', therefore quality control measures are not proposed.

Refer to Drawing C706 – Preliminary Storm Drainage depicting the proposed drainage boundaries and conceptual SWM pond locations. A summary of the proposed Site drainage areas, composite runoff coefficients, and corresponding percent impervious values are provided in Table 11 below.

Table 11: Post-Development Drainage Area Summary

Catchment ID	Drainage Area (ha)	Composite Runoff Coefficient	Drainage Area Percent Imperviousness (%)
200	5.93	0.59	54%
201	8.11	0.53	44%
202	4.95	0.59	54%
203	17.96	0.58	52%
204	17.59	0.67	67%
205	16.63	0.69	54%
206	2.56	0.75	77%
207	0.94	0.90	100%
208	15.19	0.70	70%
209	26.26	0.60	55%
210	11.51	0.65	62%
211	19.33	0.59	53%
212	4.30	0.69	67%
Total Controlled Area	**151.27**	**0.63**	**42%**
Total Uncontrolled Area	**21.64**	**0.25**	**0%**
Total Site	**172.91**	**0.58**	**51%**

Changes to the quantity (for areas within sub-basin 10) and quality of stormwater runoff resulting from the proposed development will be mitigated by a comprehensive stormwater management (SWM) strategy. This strategy includes a total of eleven (11) SWM wet pond facilities to provide stormwater management for the Site. Eight (8) of these ponds, located within the portion of the West Humber River Watershed, which does not require quantity control, will be designed to provide quality and erosion control of post-development runoff. The remaining three (3) ponds, located within sub-basin 10 of the West Humber River Watershed, will be designed to provide quantity, quality, and erosion control of post-development runoff.

Due to space constraints, stormwater management ponds cannot be accommodated within the 2.6 ha apartment block (Catchment ID 206) or the 0.8 ha commercial block (Catchment ID 207), located southwest of the intersection of Emil Kolb Parkway and Regional Road 50. Therefore, on-site controls will be required for each of these blocks to provide quality and erosion control of post-development runoff prior to discharging to the adjacent tributary of the Humber River.

External Drainage

Runoff from external areas, which previously drained through the Option 1 lands under existing conditions will not be altered by the proposed development. Positive drainage for these external catchments will be maintained by the proposed grading and servicing concept.

Minor and major drainage from external catchments EXT3 & EXT4 will be conveyed southwards through the development, via a cutoff swale along the north limit of development and ultimately discharging to the tributary of the Humber River located south of Emil Kolb Parkway. Swales along the north limit of the development will be further explored and detailed to direct runoff from the remaining external drainage catchments around the proposed development. External drainage from these areas will be directed to the adjacent tributaries, thereby maintaining existing drainage patterns/outlets.

Minor flows from external drainage area EXT3 and the western portion of external drainage area EXT4 will be captured into a storm pipe, conveyed through the Site and will outlet to the upper reaches of Tributary C (adjacent to the outlet for SWM Pond 203). Minor flows from the 4.1 ha woodlot area, external drainage area EXT5, and the eastern portion of external drainage area EXT4 will be captured into a storm sewer pipe, conveyed through the Site and will outlet to the existing culvert at Emil Kolb Parkway (adjacent to the outlet for SWM Pond 204). These storm sewer pipes were sized to convey the minor flows from the 5-year storm event, per Town of Caledon Standards (Development Standards Manual, 2019). Major flows that exceed the conveyance pipe capacity (i.e., storm events greater than the 5-year storm) will drain overland through the Site to Stormwater Management Pond 203 and 204, respectively. The emergency spillway for the ponds will be sized to allow external flows to pass through the pond unattenuated.

Minor System Drainage

Storm sewers internal to the development will be designed to convey post-development minor system flows to the stormwater management ponds. The Town of Caledon (Development Standards Manual, 2019) requires that storm sewers without foundation drains be designed to convey the 5-year storm event at a minimum. For systems where foundation drains will be connected to the storm sewers, the Town requires the system to be designed to accommodate a 10-year storm event. To be conservative at this stage in the development, the storm sewers for the Site were designed to convey the 10-year storm peak flows, which is required when foundation drains are used.

Sizing of these storm sewers was completed using the Rational Method and using the Town's standard Intensity-Duration-Frequency Rainfall Curves (Town Standard Drawing No. 103).

Major System Drainage

Major system stormwater runoff that exceeds the capacity of the storm sewers will drain overland via the proposed road right-of-ways (ROWs) to the respective stormwater management ponds. Per development standards, overland flows shall be contained within the ROWs and shall not cross private property. Depths of flooding permitted on streets and at intersections during the 100-year design storm event are as follows:

- No building shall be inundated at the ground line unless the building has been flood-proofed.

For all classes of roads, the product of depth of water (m) at the gutter times the velocity of flow (m/s) shall not exceed 0.65 m^2/s.

6.0 FLOODPLAIN ANALYSIS

6.1 Headwater Drainage Feature Assessment

The Site is situated within the headwaters of the West Humber River and the Main Humber River. A headwater drainage feature assessment specific to the Site has been prepared under separate cover as the Option 1/2 Lands Secondary Plan Natural Heritage Study Report (Dillon, December 2021).

6.2 Existing Floodplain Mapping

Existing hydraulic (HEC-RAS) models for the West Humber River and Cold Creek in the vicinity of the Site were provided by the Toronto and Region Conservation Authority (TRCA). The received models comprised of:

- Engineered HEC-RAS model for the West Humber River tributary and associated TRCA floodplain Map Sheet Hum_77, hum_81 and hum_82
- Estimated HEC-RAS model for the Middle main tributaries of the West Humber River which flow through the Option 1 lands
- Estimated HEC-RAS model for Cold Creek (located East of the Option 1 lands)

Based on consultation with TRCA, the existing Engineered hydraulic model did not require re-modelling since the floodplain is well outside of the Site area. Therefore, no changes were made to the existing Engineered HEC-RAS model of the West Humber River. As shown on Drawing C703 – Pre-Development Storm Drainage Plan, there are several smaller tributaries in the vicinity of the site which generally drain southwards, tributary to the West Humber River. Most of these tributaries were included in the Middle main estimated model which was used as a base for updated engineered model for this project. Tributaries that were not included in the TRCA models were added as new reaches to the Engineered model for the purposes of establishing existing flood elevations in the vicinity of the Site. Since the existing Engineered hydraulic model did not require further re-modelling, it was used to establish boundary conditions for the tributaries of the West Humber River within and immediately adjacent to the Site.

Three tributaries (MM_9_2, MM_9_2_trib, and Cold_10_7) were selected from the estimated HEC-RAS model for further analysis. In addition to the tributaries obtained from the estimated model, two (2) new tributaries (Main_1 and Cold_1) were added to the model to assess the flood elevations in the immediate vicinity of the Site.

The existing estimated model geometries and new reaches were uploaded to a new project in GeoHECRAS. All cross sections within the model were updated with LiDAR data to reflect the existing Site topography. Reach MM_9_2_trib was re-aligned since the flow path has changed at this location from the time the estimated hydraulic model was first developed.

Four watercourse crossings were added to the existing hydraulic model. Watercourse crossing information was obtained from as-built drawings available on the Region of Peel Public Works – Peel Asset Locator Application. At locations where as-built drawings were not available, watercourse crossings were measured manually during field visits. Watercourse crossing information is summarized in Table 12 below.

Table 12: Modelled Watercourse Crossings

Location	HECRAS River ID	Material	Culvert Length (m)	Culvert Diameter (mm)	Data Source	As-Built Drawing No.
Duffy's Ln approximately 175 m north of Emil Kolb Pkwy	Main_2	Corrugated Steel Pipe	30.4	600	Field Measurement	NA
Emil Kolb Pkwy approximately 770 m west of HWY 50	MM_9_2	Concrete Bridge with Piers	NA	NA	As-Built	55280-D
Emil Kolb Pkwy approximately 200 m west of HWY 50	MM_9_2_trib	Corrugated Steel Pipe	49.4	1250	As-Built	55205-D
Columbia Way approximately 600 m west of Mt Hope Rd	Cold_10_7	Corrugated Steel Pipe	62.5	2000	As-Built	45136-D

Existing hydrologic (Visual OTTHYMO v5.0) modeling obtained from TRCA contained scenarios for 2 through 100-year 6 hour and 12-hour AES storm events as well as the Regional (Hurricane Hazel) storm event. TRCA subcatchments 9.10, 9.08, 10.04 and 10.10 overlap with the Site and were used as the starting point for the hydrologic model for this project. These drainage boundaries were refined based on detailed topographic information obtained for this project. The existing TRCA subcatchments were modified and subdivided to provide additional detail for the study area. Refer to drawing C703 – Pre-Development Storm Drainage Plan, showing the pre-development catchment areas and Appendix D for a figure showing the location of the TRCA subcatchments within the Humber River Watershed. A summary of the pre-development catchment areas, curve numbers, and time to peak values used in the hydrologic models is provided in Section 5.1 of this report. For the Regional (Hurricane Hazel) model, CN values were converted to CNIII values to represent antecedent moisture conditions which are assumed to have been present during the Hurricane Hazel event.

For the purpose of analyzing the existing floodplain elevations, the following storm events were run in Visual OTTHYMO (VO 6.1): 100-year 6-hour AES storm event, 100-year 12-hour AES storm event, and the Regional (Hurricane Hazel) storm event. Through this modeling it was determined that Hurricane Hazel produced the highest peak flows in this area, so Hurricane Hazel is used as the regulatory event. Resultant flows from the VO 6.1 model were obtained at upstream limits of each reach, points of confluence, and at crossing locations and coded as inputs to the GeoHEC-RAS hydraulic model.

A steady flow analysis was computed in GeoHEC-RAS using the flows obtained from the existing conditions hydrologic model. Results of the hydraulic analyses confirmed that the Regional (Hurricane Hazel) storm event is the Regulatory event, resulting in higher floodplain elevations compared to the 6-hour and 12-hour AES storm events. Water surface elevations from the

Regulatory (Regional) storm event were then mapped against the existing contour data to establish the existing floodline extents.

The 6-hour, 25-year event was also modeled in Visual Otthymo in order to estimate water levels in the vicinity of proposed pond outfalls.

Refer to Drawing C712 A to D – Regional Storm Floodplain Maps depicting the existing Regional floodplain mapping. Detailed hydraulic and hydrologic modelling results for the 100-year, and Regional storm events are provided in Appendix C.

6.3 Proposed Floodplain Mapping

Since the existing hydrologic and hydraulic modeling obtained from TRCA included the Site in its existing (undeveloped) condition, a proposed condition analysis was prepared to assess the impact to the floodplain resulting from the increase in development area.

Within the Toronto and Region Conservation Authority (TRCA), the Regulatory Floodplain is based on the greater of the regional storm (Hurricane Hazel) and the 100-year event.

Proposed condition drainage catchments were delineated based on the conceptual grading strategy for the development. As discussed in Section 5.2 of this report, TIMP and XIMP values were then calculated based on the land uses proposed within the Concept Plan. The existing hydrologic model was updated accordingly based on the proposed condition drainage parameters and run for the Regional (Hurricane Hazel) storm events.

As will be discussed within Section 7.0 of this report, there are a total of three stormwater management ponds which will be designed to provide quantity controls and will discharge to tributaries of Cold Creek. For Regional modeling, peak flow attenuation from ponds was excluded since these ponds are not designed to provide control of Regional flows. Peak flows obtained from the Visual OTTHYMO model results at upstream limits of reaches, points of confluence, and crossings were then coded into the hydraulic (GeoHEC-RAS) model to facilitate a steady flow analysis.

Comparing results of the existing Regional flood model to the proposed condition Regional flood model results, minor changes (both increases and decreases) in flood elevations was generally observed as minor diversions of runoff are expected as part of the proposed development. Water surface elevations from the Regulatory (Regional) storm event were mapped against the existing contour data to establish the proposed floodline extents resulting from the proposed development. Refer to Drawing C712A to C712D depicting the existing and proposed Regional floodplain mapping. For the purposes of setting the normal water levels of the proposed SWM ponds, the 25-year 6-hour AES storm events were also run. Detailed hydraulic and hydrologic modelling results for the 25-year, 100-year, and Regional storm events are provided in Appendix C.

As can be seen from the floodplain mapping, the proposed development limit is generally outside of the Regulatory floodplain. In areas where development will impact the tributaries and floodplain additional studies will be required to demonstrate that these features can be realigned or have their functions replicated in order to safely convey external drainage through the development without negatively impacting adjacent properties. This design may include natural channel design and cut / fill analysis within the floodplain in order to maintain the current volume of floodplain storage.

7.0 STORMWATER MANAGEMENT

7.1 Stormwater Management Strategy

The proposed grading and servicing strategy for the Site will generally maintain existing drainage patterns as well as the sub-watershed divide between the two sub-basins of the Humber River Watershed; sub-basin 10, which is subject to prescribed water quantity and quality controls, and a sub-basin that does not require quantity control.

Runoff from most of the development lands will be directed to on-site stormwater management (SWM) wet ponds designed to provide quality and erosion control. A total of eleven (11) end-of-pipe stormwater management wet pond facilities are proposed to treat runoff from post-development drainage areas within the West Humber River Watershed as illustrated on Drawing C706 – Preliminary Storm Drainage Plan**.**

A total of eight (8) ponds will be located within an area of the West Humber watershed, which does not require quantity control; therefore, these ponds will be designed to provide quality and erosion control. The remaining three (3) SWM ponds are located within sub-basin 10 of the Humber River and designed to provide quantity control as well as quality and erosion control.

Conceptual locations for the SWM wet pond facilities are shown on Drawing C706 – Preliminary Storm Drainage Plan and have been selected according to the following:

- Located within natural low points, to minimize earthworks and maintain existing drainage patterns
- Proximity to an outlet, such as an existing receiving tributary, ditch, or storm sewer (there are no existing storm sewers in the vicinity of the Subject Lands, however they may be proposed if urbanization of the existing arterial roads is considered)
- Minimize storm sewer infrastructure size and avoid potential service crossing conflicts (should storm sewers be proposed as a receiver)
- Optimize land use by maximizing developable tableland and serviceable areas

Due to space constraints, a SWM wet pond cannot be accommodated within the 2.4 ha apartment block (Catchment ID 206) and 0.8 ha commercial block (Catchment ID 207), located southwest of the intersection of Emil Kolb Parkway and Regional Road 50. Therefore, on-site controls will be required to provide quality and erosion protection of post-development runoff from these development blocks. They are omitted from Tables 14 and 15 as a result.

In addition to the above, options to expand SWM ponds into adjacent Greenbelt areas, can be explored throughout further refinement of the design, in order to maximize developable area. The Greenbelt Plan 2017 identifies where urbanization should be limited in order to provide permanent protection to the agricultural land base and the ecological and hydrological features and functions occurring on the landscape within the Greater Golden Horseshoe. Existing, expanded, and new infrastructure is permitted within the Greenbelt Plan Area provided it serves significant growth and economic development expected in southern Ontario beyond the Greenbelt (Planning Act, Section 4.3.1.1 (b)). Stormwater management infrastructure is permitted within the Greenbelt Plan Area. However, stormwater management facilities are prohibited in key natural heritage features, key hydrologic features, and their associated vegetation protection zones (Planning Act, Section 4.2.3.3).

7.2 Stormwater Design Criteria & Targets

Stormwater management design for the Site is governed by criteria set out in the following documents:

- Development Standards Manual (Town of Caledon, 2019)
- Stormwater Management Criteria (Toronto and Region Conservation Authority (TRCA), 2012)
- Stormwater Management Planning and Design Manual (Ministry of Environment, Conservation and Parks (MECP), 2003)

The applicable stormwater management criteria are summarized below.

Quality Control

The Development Standards Manual (Town of Caledon, 2019) states that all new developments must adhere to the quality control requirements in the Stormwater Management and Planning & Design Manual (MECP, 2003). Additionally, all new stormwater management facilities shall be designed to meet Enhanced (Level 1) protection per the MECP SWM manual, requiring 80% removal of Total Suspended Solids (TSS) from 90% of the total annual runoff volume.

Erosion Control

The Development Standards Manual (Town of Caledon, 2019) requires that developments with proposed stormwater management ponds must provide extended detention control of the runoff volume generated from a 4-hour, 25 mm storm event over a period of 48 hours.
Since the Site is considered greenfield development, a detailed erosion analysis based on a geomorphic assessment will need to be completed to determine if more stringent erosion controls are required to mitigate erosion within the receiving tributaries.

Quantity Control

The Site is located within the Humber River Watershed, therefore post-development flow rates must be controlled to the TRCA unit flow rates for the Humber River. TRCA Stormwater Management Criteria (2012) states that the main branches of the Lower, Main, East, West and Upper Humber River watershed do not require any quantity control measures. Lands that do not discharge to these main branches are required to adhere to the quantity control flow rates for the Humber River Watershed. Most of the Site drains to one of the main branches of the Humber River, therefore quantity controls are not required for these areas. Remaining areas of the Site (generally located east of Highway 50) are located within Sub-Basin 10 and must therefore be designed to meet targets calculated using the Humber River Unit Flow Relationships for Sub-Basin 10.

The Unit Flow Relationship Equations for the 2 through 100-year storm events within Sub-Basin 10 (Stormwater Management Criteria, TRCA 2012) are presented in Table 13 below.

Table 13: Humber River Watershed - Sub-Basin 10 Unit Flow Relationships

Return Period	Equation C: Sub-Basin 10
2-Year	Q = 3.142 - 0.233 * ln(A)
5-Year	Q = 5.557 - 0.427 * ln(A)
10-Year	Q = 7.443 - 0.578 * ln(A)
25-Year	Q = 9.838 - 0.757 * ln(A)
50-Year	Q = 11.920 - 0.921 * ln(A)
100-Year	Q = 14.140 - 1.096 * ln(A)

In accordance with the Stormwater Management Criteria, Table 3-1 (TRCA, 2021), calculation of return period peak flows within the Humber River Watershed shall be based on the 6-hour and

12-hour AES storm distributions. The Town of Caledon's Intensity-Duration-Frequency Rainfall Curves (Standard Drawing No. 103) have been applied to the hydrologic analyses. A copy of Town Standard Drawing No. 103 is provided in Appendix D2.

Water Balance

Based on TRCA mapping, the Site is located within a Significant Groundwater Recharge Area and a High Groundwater Recharge Area (Stormwater Management Criteria, TRCA 2012). Due to these vulnerable areas, the Site will be required to maintain pre-development groundwater recharge rates and appropriate distribution, ensuring the protection of related hydrologic and ecologic functions. Further analysis of the water balance requirements will be conducted following the completion of a hydrogeological report.

SWM Pond Grading & Design Considerations

Each of the stormwater management (SWM) ponds shall be designed with consideration for grading, public safety, future maintenance access, and safe conveyance of emergency flows. A summary of the criteria to be taken into consideration for design of the stormwater management ponds is as follows:

- Site grading to provide safe overland conveyance of flows into the stormwater management facilities.
- Ponds graded with maximum side slopes of 4:1 from the bottom of the pond to 0.5 m below the normal water level.
- Maximum side slopes of 7:1 were applied above the 4:1 sloping to the top of pond berm / access road, with maximum 4:1 sloping from the top of berm to match into the pond block perimeter grades outside the pond.
- Permanent pool volume sized to achieve an Enhanced Level of quality protection with a depth of 1.5 m in the forebay and the main cell.
- Permanent pool elevation set above the 25-year water level of the receiving watercourse.
- Extended detention storage and drawdown of the 25-mm rainfall event over a minimum period of 48 hours, at a maximum depth of 1.0 m per MECP guidelines.
- Active storage ponds located within Sub-Basin 10, sized according to TRCA Unitary Flow Rate criteria for the Humber River Watershed (Sub-Basin 10) with a maximum active storage depth of 2.0 m.
- A minimum 0.30 m of freeboard provided above the maximum (100-year) water level to the top of pond berm.
- Emergency spillways sized to convey the unattenuated Regulatory storm event runoff, which is defined as the greater of the Regional or 100-year unattenuated flow.
- A 5.0 m wide maintenance access road located with maximum longitudinal slopes of 8.0% and a maximum cross-fall slope of 2.0%. The maintenance access road will facilitate access to the inlet structure, forebay, and outlet structure for maintenance.

7.3 Proposed Stormwater Management Facility Design

Quality Control (Permanent Pool)

As mentioned in Section 7.2, all new developments (including all new stormwater management facilities) are required to provide Enhanced (Level 1) Protection (80% removal of TSS) on an annual loading basis. This quality control criteria will be achieved by the permanent pool of each of the proposed stormwater management (SWM) wet pond facilities.

Permanent pool volumes required to achieve Enhanced (Level 1) Protection were calculated based on the drainage area and associated imperviousness (calculated per the Concept Plan) tributary to each pond, in accordance with Table 3.2 of the Planning and Design Manual (Ministry of Environment, Conservation and Parks (MECP), 2003). Detailed permanent pool volume sizing calculations are provided in Appendix D and the results are summarized in Table 14 below.

Table 14: SWM Pond Permanent Pool Volume Summary

SWM Facility	Contributing Drainage Area (ha)	Percent Impervious of Drainage Area (%)	Required Permanent Pool Volume[1] (m^3)
200	5.93	54%	868
201	8.11	44%	994
202	4.95	54%	725
203	17.96	52%	2,548
204	17.59	67%	3,139
205	16.63	54%	2,455
208	15.19	70%	2,798
209	26.26	55%	3,925
210	11.51	62%	1,926
211	19.33	53%	2,799
212	4.30	67%	768

[1] Required storage volumes interpolated from Table 3.2 of SWM Planning and Design Manual (MECP, 2003) are based on upstream impervious area, less 40 m^3/ha required for extended detention.

Each of the proposed SWM ponds will be graded to provide sufficient volume to meet or exceed the permanent pool volume required to achieve Enhanced Protection quality criteria, as shown in Table 14 above.

Conceptual grading for the Catchment 211 SWM Pond, provides a total 3,141 m^3 of permanent pool volume between the bottom of pond (258.07 masl) and normal water level (259.57 masl). Therefore, the conceptual pond grading provides sufficient permanent pool volume to achieve Enhanced Protection quality requirements.

Permanent pool water levels within each of the proposed SWM pond facilities will be set based on the 25-year water level of the receiving tributary. Per TRCA criteria, the elevation between SWM pond outfalls and the receiving channel shall be minimized, by placing the outfall as low down on the slope as possible, while still above the 25-year floodline. Hydraulic modeling discussed in Section 6.3 analyzed the 25-year flood levels within the receiving tributaries for the purposes of determining minimum pond outfall elevations. From these outfall elevations, an outlet pipe with a 1.0% slope was assumed, to establish the minimum permanent pool water level within each pond. SWM ponds within catchments 204, 208, and 210 outlet to an existing culvert or roadside ditch. Outfall inverts for these SWM pond facilities were based on the upstream ditch invert. A summary of the preliminary permanent pool water levels for each of the proposed SWM ponds is provided in Table 15 below.

Table 15: Preliminary SWM Pond Permanent Pool Water Levels

SWM Pond ID	Outfall Location	Approximate Outfall Invert (masl)	Minimum Permanent Pool Elevation (masl)
200	Tributary A	252.42	252.80
201	Tributary B	254.10	254.20
202	Tributary B	256.90	257.20
203	Tributary C	257.07	257.30
204	Existing 1.250m Diameter Culvert	263.65	264.00
205	Tributary D	245.80	260.00
208	Existing 1.83m x 1.22m Box Culvert	264.10	264.30
209	Tributary E	262.81	263.30
210	Ex. Ditch	264.50	264.70
211	Tributary E	258.82	259.57
212	Cold Creek	257.89	258.50

It is noted that the permanent pool water levels noted above are to be considered minimum elevations which can be raised as needed to tie into the site grades to minimize earthworks.

Forebay Sizing

At the detailed design stage, forebays within each of the SWM wet ponds will be designed to achieve required dispersion and settling lengths in accordance with water quality sizing objectives in Section 4.6.2. of the SWM Planning and Design Manual (MECP, 2003). Forebay berms will be used to achieve these criteria as well as to meet a minimum forebay length to width ratio of 2:1, as recommended by the MECP.

Erosion Control

At a minimum, a 40 m^3/ha erosion control volume is required (MECP, 2003). Per Town criteria, erosion controls for each SWM wet pond are required to provide extended detention and drawdown of a 25 mm rainfall event over a minimum 48-hour period.

A Visual Otthymo (VO 5.0) model was prepared for the post-development drainage conditions using the 4-hour, 25 mm Chicago design storm, to determine the resulting runoff volumes directed to each stormwater management facility. Detailed output from the Visual Otthymo model is provided in Appendix D3**.** Erosion control volume requirements are summarized in Table 16 on the following page.

Table 16: Erosion Control Volume Requirements

SWM Facility	Contributing Drainage Area (ha)	Percent Impervious of Drainage Area (%)	Required MECP Erosion Control Volume[1] (m^3)	Required 25mm Event Erosion Control Volume[2] (m^3)
200	5.93	54%	237	899
201	8.11	44%	324	1,123
202	4.95	54%	198	754
203	17.96	52%	718	2,734
204	17.59	67%	703	3,034
205	16.63	54%	665	2,534
208	15.19	70%	608	2,708
209	26.26	55%	1,050	4,084
210	11.51	62%	461	1,891
211	19.33	53%	773	2,929
212	4.30	67%	172	737

Quantity Control

As previously noted, most of the Site drains to the main branches of the Humber River, and therefore do not require quantity control, per TRCA criteria. However, for the eastern portion of the development located within Sub-basin 10 of the Humber River Watershed, control of post-development peak flows is required to meet the Unit Flow Relationships for the Humber River (Sub-basin 10), as previously identified in Table 13 of this report.

A Visual Otthymo (VO 5.0) model was prepared for the post-development drainage conditions using the 6-hour and 12-hour AES design storms. Design storms were prepared using Town's standard Intensity-Duration-Frequency Rainfall Curves (Town Standard Drawing No. 103). Target flow rates for each pond were calculated using the Unit Flow Relationships for Sub-basin 10 based on the total drainage area contributing to each pond. Target flows were then coded into VO as a route reservoir command to determine the resultant active storage volumes required. Detailed Humber River target flow calculations are provided in Appendix D2 and Visual Otthymo model outputs for the SWM Pond Designs are provided in Appendix D3.

Results of the modeling determined that the 12-hour AES storm produced the larger volume requirement compared to the 6-hour AES storm. As such, ponds shall be sized to meet the larger volume requirement for the ponds to achieve Unit Flow criteria under both 6-hour and 12-hour AES events for all storms up to and including the 100-year event. Tables 17, 18, and 19 summarize the resultant active storage volumes for each SWM pond facility located within Sub-basin 10 of the Humber River Watershed.

Table 17: Catchment 209 SWM Pond Active Storage Volume Summary

Storm Event	Contributing Area (ha)	Percent Imperviousness (%)	Target Flow[1] Rate (m^3/s)	Required Active Storage Volume[2] (m^3)
2-Year	26.26	55%	0.002	7,781
5-Year			0.004	10,643
10-Year			0.006	12,605
25-Year			0.007	15,113
50-Year			0.009	16,981
100-Year			0.011	18,859

[1] Target flow rates calculated based on contributing area to SWM pond and Unit Flow Rate Equations for Sub-Basin 10 of the Humber River Watershed (TRCA, 2012).
[2] Required active storage volumes based on the 12-hour AES event

Table 18: Catchment 211 SWM Pond Active Storage Volume Summary

Storm Event	Contributing Area (ha)	Percent Imperviousness (%)	Target Flow[1] Rate (m^3/s)	Required Active Storage Volume[2] (m^3)	Provided Active Storage Volume (m^3)
2-Year	19.33	53%	0.002	5,517	11,685
5-Year			0.004	7,605	
10-Year			0.006	9,042	
25-Year			0.008	10,862	
50-Year			0.009	12,228	
100-Year			0.011	13,602	

[1] Target flow rates calculated based on contributing area to SWM pond and Unit Flow Rate Equations for Sub-Basin 10 of the Humber River Watershed (TRCA, 2012).
[2] Required active storage volumes based on the 12-hour AES event

Table 19: Catchment 212 SWM Pond Active Storage Volume Summary

Storm Event	Contributing Area (ha)	Percent Imperviousness (%)	Target Flow[1] Rate (m^3/s)	Required Active Storage Volume[2] (m^3)
2-Year	4.30	67%	0.003	1,306
5-Year			0.005	1,754
10-Year			0.007	2,047
25-Year			0.009	2,425
50-Year			0.011	2,713
100-Year			0.013	2,998

[1] Target flow rates calculated based on contributing area to SWM pond and Unit Flow Rate Equations for Sub-Basin 10 of the Humber River Watershed (TRCA, 2012).
[2] Required active storage volumes based on the 12-hour AES event

For SWM ponds within Catchments 209 and 212, the proposed ponds provide sufficient active storage volumes to accommodate post-development runoff to be controlled to the Humber River unit flow rates.

It is noted that the proposed SWM pond within Catchment 211 is slightly undersized to achieve the required active storage volume of 13,602 m^3. Grading of this pond will be further refined throughout the design process to maximize the volumes provided to meet the requirements outlined above. An option to relocate the maintenance access road from the top of pond

berm to within the pond (above the 5-year water level in the pond) should be explored at later design stages to increase the active storage volume provided by the pond.

Stormwater Facility Outfalls

The Stormwater Management Criteria (TRCA, 2012) outlines criteria required for stormwater management outfalls to reduce the risk of erosion to the outfall structures, channels, and receiving watercourse and floodplain. The outfall criteria are listed as follows:

- Hard structure outfalls (i.e., headwalls or anything made of concrete) are required to be located outside of the 100-year erosion limit, unless not technically feasible.
- Outfalls should not impact the flood levels.
- Avoid backwater conditions in outfalls, unless explicitly accounted for in the design.
- Minimize elevation between the outfall and receiving channel, placing it as low down on the slope as possible, while still above the 25-year floodline.
- Plunge pools are to be designed at the outfall outlet, unless it can be demonstrated that it is not required to dissipate flow energy, or a plunge pool cannot reasonably be constructed due to topographic constraints.
- Outfalls that are set-back 10 m to 20 m from the channel require a flow spreader and/or a plunge pool design, where feasible.

8.0 WATER BALANCE & LOW IMPACT DEVELOPMENT

8.1 Site Water Balance and Wetland Feature-Based Water Balance

A water balance assessment and feature based water balance assessment will be completed for the Site as part of the Hydrogeological Report being prepared by Crozier under separate cover. Well drilling took place during October and November 2021 and the results of the monitoring program will be provided in the Hydrogeological Report Submission.

8.2 Low Impact Development

Per TRCA mapping, the Site is located within a Significant Groundwater Recharge Area and a High Groundwater Recharge Area (Stormwater Management Criteria, TRCA 2012). Due to these vulnerable areas, the Site will be required to maintain pre-development groundwater recharge rates and appropriate distribution, ensuring the protection of related hydrologic and ecologic functions.

Low Impact Development (LID) methods can be implemented on-site to mitigate water balance within the Subject Lands and/or to a wetland. Detailed infiltration facility sizing, including in-situ percolation tests and drawdown calculations for each facility, will be completed as part of the detailed design stage. A list of potential LID options, with comments on the feasibility of each, is presented in Table 20 below for consideration.

Table 20: LID Options Feasibility Summary

LID Option	Comments	Feasible Y/N	Rationale
Green Roof	- Retains stormwater to reduce runoff - Does not recharge groundwater	N	- Residential area does not include roof areas conducive for green roof installations.
Roof Downspout Disconnection	- Improves groundwater recharge by directing runoff	Y	- Residential development will include numerous buildings with sufficient landscape area available

	from impervious roofs to landscaped areas		near each building to support downspout disconnection. Feasibility to be confirmed at detailed design stage.
Infiltration Galleries	- Improves groundwater recharge		- Feasibility based on in-situ groundwater and soils conditions to be confirmed at the detailed design stage. - It is preferred to direct 'clean' roof runoff into infiltration galleries. -If parking/asphalt areas will be directed to infiltration galleries, quality treatment of runoff will be required to treat runoff prior to entering the infiltration gallery.
Rainwater Harvesting	- Retains stormwater to reduce runoff - Allows infiltration when used for irrigation of landscaped areas	Y	-Runoff from residential rooftops could feasibly be directed to a rain barrels and used for irrigation of landscaped areas on-site.
Bioretention	- Improves groundwater recharge		- Residential development will include numerous buildings with sufficient landscape area available near each building to support bioretention. Feasibility to be confirmed at detailed design stage. - It is preferred to direct 'clean' roof runoff into vegetated filter strips. -If parking/asphalt areas will be directed to vegetated filter strip, quality treatment of runoff will be required to treat runoff prior to entering the bioretention facility.
Vegetated Filter Strips	- Reduces stormwater runoff - Improves groundwater recharge	Y	- Residential development will include numerous buildings with sufficient landscape area available near each building to support vegetated filter strips. Feasibility to be confirmed at detailed design stage. - It is preferred to direct 'clean' roof runoff into vegetated filter strips. -If parking/asphalt areas will be directed to vegetated filter strip, quality treatment of runoff will be required to treat runoff prior to entering the vegetated filter strip.
Permeable Pavement	- Reduces stormwater runoff - Improves groundwater recharge	Y	- Driveways and local roads could feasibly be converted to permeable pavement to reduce runoff and promote infiltration. Feasibility to be confirmed at detailed design stage.

Enhanced Grass Swales	- Reduces stormwater runoff - Improves groundwater recharge	Y	- Residential development will include numerous buildings with sufficient landscape area available near each building to support enhanced grassed swales. Feasibility to be confirmed at detailed design stage.

Note that further investigation of these LID options, including understanding the feasibility of their implementation and in-situ soil and groundwater conditions, will be conducted at the detailed design stage once the results of the hydrogeological study are available.

9.0 SECONDARY PLAN NATURAL HERITAGE STUDY REPORT

Dillon Consulting Ltd. has prepared a Secondary Plan Natural Heritage Study Report (herein referred to as the Report), dated December 2021, under separate cover. The purpose of this Report is to document the existing conditions of the natural environment within 120 m of the Site. The Report also addresses the potential limits of development, evaluates potential environmental impacts associated with development, and recommends mitigation, restoration, and enhancement measures to preserve and/or restore natural features.

The Report includes discussion on the following with respect to existing conditions:

- Designated Natural Heritage Features
- Landforms, Soils and Geology
- Aquatic Environment
- Terrestrial Environment
- Significant Wildlife Habitat
- Species at Risk

Additional studies will be required for future development proposal and particularly on lands where access was not granted for preparation of the Secondary Plan Natural Heritage Study Report.

10.0 ROPA 30 Lands

It is understood that the development of the lands designated under the Regional Official Plan Amendment (2021) will advance well before the remaining Option 1 Lands. Therefore, consideration has been given to the servicing strategy for these lands and integration with the existing network of infrastructure.

Water Servicing

The R.J. Burnside Technical Memorandum (May 13, 2021) did not address the water servicing demands of the ROPA 30 Lands alone. It is anticipated that an extension of the existing feedermains on Regional Road 50 and Mount Hope Road would be sufficient to service the domestic and fire demands of the ROPA 30 Lands. This will need to be confirmed through hydrant flow tests and modelling of the existing and proposed systems. If the design and construction of the ultimate water servicing solution can advance prior to the occupancy of the ROPA 30 Lands, this would be beneficial for avoiding an interim solution and ensuring adequate flows were available.

Sanitary Servicing

The sanitary servicing solution for the ROPA 30 Lands is further detailed in Section 3.3, as the sanitary servicing strategy for the Site is predicated on the advancement of the ROPA 30 Lands. In summary, sanitary flows in the ROPA 30 Lands within Option 1 Lands will be conveyed to a pump station in the southeast corner of the Site (overall low point) and subsequently pumped via a 150 mm diameter forcemain south on Highway 50 and east on Columbia Way where it will connect and discharge to the existing system flowing south on Kingsview Drive. The Option 2 Lands will be servicing by a new trunk sewer on Mount Hope Road that will discharge into the existing system on Mount Hope south of Columbia Way. Upgrades within the existing system, required to accommodate the additional flows from the ROPA 30 Lands, are summarized in Drawing C708 - Preliminary External Sanitary Servicing Plan.

Stormwater Management

Three (3) stormwater management (SWM) wet ponds are proposed within the ROPA 30 Lands. The western most pond is situated adjacent to Regional Road 50 and will outlet to the existing ditch before ultimately being conveyed west of Regional Road 50 via an existing box culvert. This pond only requires quality and erosion control in accordance with criteria for the main branches of the West Humber River. The other two (2) ponds, situated in the southeast corner of the Option 1 Lands and in the Option 2 Lands, need to be controlled for quantity, quality, and erosion per the control requirements for sub-basin 10 of the Humber River Watershed. A plan and profile view of Pond 211 has been provided in Drawing C707 – Conceptual SWM Pond Plan and Section to show the conceptual pond grading in accordance with the Town and MECP requirements.

11.0 CONCLUSIONS & RECOMMENDATIONS

The proposed development of the Site can be serviced for water, sanitary and stormwater in accordance with the Town of Caledon and Region of Peel requirements and standards. A summary of our conclusions and recommendations includes:

1. Water servicing is in line with the R.J. Burnside Technical Memorandum dated May 13, 2021, which includes the creation of a new Pressure Zone 7 to service the north end of Bolton. An elevated water tank will be included within Option 1 and a 400 mm diameter feedermain is required along Emil Kolb Parkway and Regional Road 50 to service the Subject Lands.
2. Sanitary servicing is split based on a natural drainage divide between the western and eastern sewer sheds of Bolton North Hill. Sanitary flows from the ROPA 30 Lands of Option 1 and the Option 2 Lands are conveyed through the existing system south of Columbia Way to the Bolton North Hill pump station. The remaining Option 1 Lands are conveyed to a proposed pump station at Emil Kolb and Duffy's Lane via a gravity trunk sewer on Emil Kolb Parkway. Flows are subsequently pumped south on Emil Kolb Parkway and west on King Street via a 200 mm diameter forcemain, which will outlet to a future trunk sewer on Humber Station Road. Two additional pump stations are required internal to the development to service the Site without significant fill import or retaining walls.
3. Grading of the Site is constrained by existing elevations (matching drainage divides and elevations at the boundary), the normal water level in the stormwater management (SWM) facilities, and minimum cover on the gravity sanitary system. Stormwater flows in excess of the 10-year event are conveyed to the SWM facilities via overland flow path. Existing elevations on the arterial roadways (Regional Road 50, Emil Kolb, and Duffy's) will be maintained and matched at the entrances to the Site.

4. Several drainage divides exist throughout the Site, which direct flows to tributaries of the West Humber River. The drainage divide between sub-basin 10 of the West Humber River (which requires quantity controls) and areas of the West Humber River Watershed (which do not require quantity control) will be generally maintained by the proposed grading and servicing concept.
5. The floodplain analysis includes mapping of the existing floodplain and an evaluation of the post-development floodplain. The proposed development plan will require tributaries within the development area to be realigned in order to safely convey external drainage though or around the proposed development. Based on the findings of the Dillon headwater drainage feature assessment this realignment may need to include replication of the floodplain storage provided onsite and natural channel design.
6. Stormwater management facilities (wet ponds) will be implemented within each of the drainage divides to maintain outlets to the existing watersheds. A total of eight (8) ponds will be located within an area of the West Humber watershed, which does not require quantity control; therefore, these ponds will be designed to provide quality and erosion control. The remaining three (3) SWM ponds are located within sub-basin 10 of the Humber River and designed to provide quantity control as well as quality and erosion control. Outlets from the ponds are set at or above the 25-year water level of the receiving watercourse.
7. A water balance assessment will be included in a future hydrogeological report, which will be prepared by C.F. Crozier & Associates Inc. under separate cover. Low impact development (LID) features were investigated to assist with water balance and environmentally friendly stormwater management solutions. Potential LID methods to be utilized on Site include green roofs, roof downspout disconnection, infiltration galleries, rainwater harvesting, bioretention, vegetated filter strips, permeable pavement, and enhanced grass swales
8. A Secondary Plan Natural Heritage Study Report (the Report) was prepared by Dillon Consulting Ltd. and provided under separate cover. The Report provides a detailed background review and description of the existing terrestrial and aquatic conditions within 120 m of the Site where access was permitted.

Based on the above conclusions, we support the proposed development application of the Site from the perspective of water supply, sanitary servicing, and stormwater management.

C.F. CROZIER & ASSOCIATES INC.

Travis Gibson

Travis Gibson, P.Eng., PMP
Project Manager

C.F. CROZIER & ASSOCIATES INC.

Ashish Shukla, P.Eng.
Associate

N:\700\708-Bolton NH Landowner ...rts\2021 Master Servicing Study

APPENDIX A

Background Documentation

Bolton North Hill Concept Plan

AREA TABLE	1619 - 107sk dated December 20, 2021
Low Density Residential	46.04 ha±
Townhouses	26.08
Back-to-Back Townhouses	6.93
Apartments	6.99
High Density Residential	4.37
Schools	4.90
Commercial	1.55
Park	10.30
SWMP	9.64
Open Space / Woodlot	7.70
Elevated Tank	0.32
Roads	53.75
Total	**178.57 ha±**

UNIT COUNT		
Singles	*37.6%*	1554
Townhouses	*32.3%*	1334
Back-to-Back Townhouses	*20.1%*	831
High Density Residential / Apartments	*10.1%*	417
Total	*100.0%*	**4136 u**

- Low Density Residential
- Medium Density Residential
- High Density Residential
- Commercial / Service
- Schools
- Storm Water Ponds
- Parks
- Open Space / Woodlot
- Trails
- ROPA 30 Settlement Boundary
- Current Caledon Official Plan Settlement Boundary

BOUSFIELDS inc.

1619 - 107sk December 20, 2021

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Technical Memorandum

Date: May 13, 2021 **Project No.:** 300034976.0001

Project Name: Bolton Option 1, 2 & 3 Lands Preliminary Water Modelling

Client Name: Option 1/2 Landowners Group and Bolton Option 3 Landowners Group

Submitted To: Ms. Miriam Polga, P.Eng., Region of Peel

Submitted By: Rachel Walton, MASc., E.I.T.

Reviewed By: Jeff Langlois, P.Eng., MBA
Ian Drever, P.Eng.

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1.0 Introduction

R.J. Burnside & Associates Limited (Burnside) has been retained by the Option 1/2 Landowners and Bolton Option 3 Landowners Group to complete a preliminary hydraulic water modelling analysis of future development areas within a new pressure Zone 7 in the community of Bolton. The water distribution system in Bolton is part of the Region of Peel (Region) water distribution system.

The Town previously completed the Bolton Residential Expansion Study (BRES) to determine the best approach to meet their urban boundary expansion needs. The BRES examined six different options for expansion of the Bolton settlement area and examined how each area could be serviced. The location of the BRES Lands are shown in Figure 1.

ROPA 30, the Region of Peel Official Plan Amendment addressing growth through 2031 was appealed to the Local Planning Appeal Tribunal (LPAT). A settlement agreement was reached between the appellant parties which allocated forecast population between several expansion areas, including portions of the Option 1 and Option 3 lands within a future Bolton Pressure Zone 7.

As dictated by the Ontario Growth Plan (2019), the Region must now plan for its share of growth to 2051. The projected growth numbers are dictated by the Province of Ontario and allocated by the Region to the lower tier Municipalities through Regional Council direction and Regional Official Plan Amendment (ROPA). The Region is currently undertaking Settlement Area Boundary Expansion (SABE) studies and consultations to determine the preferred approach to

accommodate growth to 2051. Lands under consideration include lands within Bolton Pressure Zone 7.

The Bolton Option 3 Landowners Group has prepared and submitted a SABE Concept Plan (Nak Design Strategies, February 2021) identifying a proposed development horizon and growth allocation area to each of the BRES Land Areas, as shown in Figure 1 below. Lands to be developed in 2031, 2051 and beyond 2051 (Whitebelt) have been identified.

As had been determined in the previous BRES work, the Option 1, 2, 3, and Rounding Out Area (ROA) lands are generally outside of the range of elevations associated with Pressure Zone 6 of the existing water distribution infrastructure in Bolton. The northern section of Option 4 Lands will also generally be outside of the range of elevations associated with Pressure Zone 6. As such, development of the Option 1, 2, 3, 4 and ROA lands will ultimately require the development of a new Pressure Zone 7 within Bolton. Previous studies completed in support of BRES identified a new Zone 7 booster pumping station at King Street and Coleraine Drive. Ultimately, floating storage is proposed in the form of an elevated tanks (ET) to provide storage for flow equalization, fire demands and emergencies. Two ETs have been ultimately proposed, the first is to be situated in the vicinity of the northwest corner of the Option 3 lands and the second to be situated generally to the north of the Option 1 lands. The general location of the Zone 7 ETs are shown in Figure 2 below.

The purpose of this modelling exercise and supporting technical memorandum is to determine interim and ultimate water servicing arrangements, which allow for development of the Option 1, 2 and 3 lands initially, and then future lands through the creation of the ultimate Zone 7 servicing solution, based on the proposed February 2021 SABE Concept Plan

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Figure1

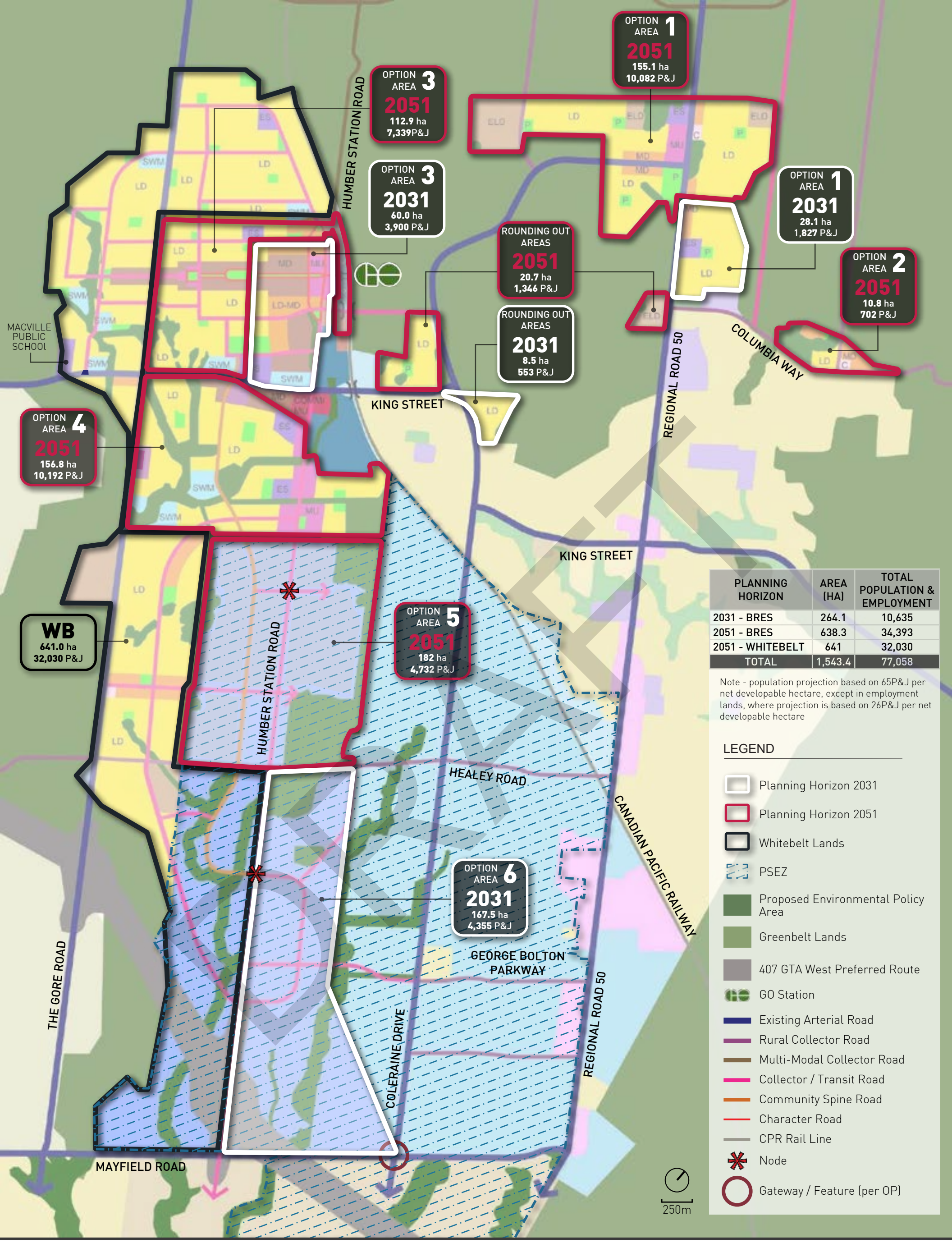
LEGEND

- EXISTING URBAN BOUNDARY
- GTA WEST CORRIDOR ROUTE PLANNING STUDY AREA
- GTA WEST CORRIDOR FOCUSED DEVELOPMENT AREA
- GTA WEST POTENTIAL DEVELOPMENT AREA
- GREEN BELT
- WATER PRESSURE ZONE
- EXISTING TRUNK WATERMAIN
- FUTURE TRUNK WATERMAIN (Region of Peel 2031a Capital Plan)
- FUTURE TRUNK WATERMAIN (Post 2031)
- CN RAIL LINE

SCALE 1:15000 (APPROX.)

BRES
INFRASTRUCTURE REQUIREMENTS
OVERALL WATER DEVELOPMENT PLAN

BURNSIDE



PLANNING HORIZON	AREA (HA)	TOTAL POPULATION & EMPLOYMENT
2031 - BRES	264.1	10,635
2051 - BRES	638.3	34,393
2051 - WHITEBELT	641	32,030
TOTAL	1,543.4	77,058

Note - population projection based on 65P&J per net developable hectare, except in employment lands, where projection is based on 26P&J per net developable hectare

LEGEND

- Planning Horizon 2031
- Planning Horizon 2051
- Whitebelt Lands
- PSEZ
- Proposed Environmental Policy Area
- Greenbelt Lands
- 407 GTA West Preferred Route
- GO Station
- Existing Arterial Road
- Rural Collector Road
- Multi-Modal Collector Road
- Collector / Transit Road
- Community Spine Road
- Character Road
- CPR Rail Line
- Node
- Gateway / Feature (per OP)

WITHOUT PREJUDICE FOR DISCUSSION PURPOSES ONLY - SUBJECT TO CHANGE

Population Allocation 2031-2051 Plan

BOLTON RESIDENTIAL EXPANSION

TOWN OF CALEDON

NAK design strategies

2.0 Background Documents

The following reports have been referenced to complete the hydraulic modelling discussed in this memorandum:

- Planning Rational Executive Summary, prepared by NAK Design Strategies, dated February 24, 2021.
- Bolton Residential Expansion Study Infrastructure Report, prepared by GM BluePlan dated June 16, 2014.
- Region of Peel 2013 Water and Wastewater Master Plan for the Lake-Based Systems, Volume III – Water Master Plan, prepared by GM BluePlan and AECOM, dated March 31, 2014.
- Proposed Regional Official Plan Amendment, An Amendment to Establish the Bolton (2031) Residential Expansion Area Planning Justification Report, prepared by Meridian Planning, dated October 2014.
- Region of Peel 2020 Water and Wastewater Master Plan for the Lake Based Systems, prepared by GM BluePlan and Region of Peel, June 2020.
- Ministry of the Environment, Conservation and Parks (MECP), “Guidelines for the Design of Water Distribution Systems”, 2008.

LiDAR data from Urbantech was provided to estimate existing ground elevations for the development areas without a preliminary grading plan. Where a preliminary grading plan has not been provided, proposed elevations have been assumed to be similar to existing elevations. The LiDAR data was also used to estimate the elevations along Emil Kolb Parkway.

2.1 System Pressure

As per the Region of Peel 2020 Water and Wastewater Master Plan for the Lake-Based Systems, Volume III – Water Master Plan, prepared by GM BluePlan and Region of Peel, dated June 2020, a minimum operating pressure of 40 psi and a maximum operating pressure of 100 psi shall be maintained within the water distribution system under maximum day demand and a minimum operating pressure of 40 psi shall be maintained under peak hour demand. The allowable operating pressure during fire flow conditions is a minimum of 20 psi.

2.2 Roughness Coefficient (“C” Value)

The friction factors “C” used in the model are based on the Ministry of Environment, Conservation and Parks (MECP) Design Guidelines for Drinking Water Systems (2008) and are as follows:

- 150 mm diameter: C=100
- 200 mm or 250 mm diameter: C=110
- 300 mm to 600 mm diameter: C=120
- > 600 mm diameter: C=130

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2.3 Peaking Factor

Peaking factors have been referenced from the 2020 Water and Wastewater Master Plan. The peaking factors used in the modelling are as follows:

- Residential Maximum Day Factor (MDF) = 1.8
- Non-Residential Maximum Day Factor (MDF) = 1.4
- Peak Hour Factor (PHF) = 3

2.4 Water Demand

Water Demands for the model have been calculated based on the following per capita demand:

- Residential 270 L/cap/d
- Employment 250 L/cap/d

These per capita demands are referenced from the Region of Peel 2020 Water and Wastewater Master Plan for the Lake Based Systems.

Preliminary Block Plans for the Option 1 2031 Lands and the Option 3 Lands were prepared by Gerrard Designs and provided for modelling purposes. Demands for the Option 1 - 2031 Lands and the Option 3 - 2031+2051 were distributed throughout the model using the polygon allocation method. Each proposed land use was assigned a per hectare water demand, based on the overall projected demand. Using the Theisen Polygon tool, each junction was assigned a coverage area in the model. The polygons were used to develop an area weighted demand based on the intersected neighbouring land uses.

To calculate the population for Option 1 and 3 using the block plans provided, the following densities were assumed:

- Townhouse – 3.1 ppu
- Single Detached – 3.7 ppu
- Mixed Use (Apartment/Townhouse) – 1.99 ppu
- Employment – 25 pp/ha

Block plans were not available for the Option 1 2051 Lands, Option 2 Lands, Option 4 Lands, 2051 Rounding Out Areas or Whitebelt Lands. As such, demands for these locations were added in at a single node in the model. If block plans are available in the future, the model can be updated to reflect the proposed demand distribution.

The following population densities were assumed in absence of a block plan:

- Residential Lands – 65 pp/ha
- Employment – 25 jobs/ha

It is anticipated that as the development design progresses the demands will be further refined. Refer to Appendix A for the demand calculations.

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2.4.1 Option 1 Lands

The calculated population yield for the 2031 Option 1 lands is based on the Preliminary Concept Plan dated March 25, 2021, prepared by Gerrard Design. This block plan includes the 2031 Option 1 lands only.

The 2051 Option 1 Land population was taken from the population target set out in the Population Allocation 2031-2051 Plan (February 2021). A population density of 65 people per hectare was assumed in the allocation plan.

The total estimated population yield for the Option 1 Lands are as follows:

- Residential 12,128 persons
- Employment 52 jobs

The calculated 2051 Option 1 lands demands are:

- Average Day Demand (ADD) = 38.1 L/s
- Maximum Day Demand (MDD) = 68.5 L/s
- Peak Hour Demand (PHD) = 114.2 L/s

Based on the Population Allocation 2031-2051 Plan (February 2021), 28.1 ha of land has been allocated for development in 2031 and an additional 155.1 ha of land has been allocated for development in 2051. The total Option 1 Land area is approximately 183.2 ha.

2.4.2 Option 2 Lands

The Option 2 Lands are entirely within the 2051 buildout scenario.

The 2051 Option 2 Land population was taken from the population target set out in the Population Allocation 2031-2051 Plan (February 2021). A population density of 65 people per hectare was assumed in the allocation plan.

The total estimated population yield for the Option 2 Lands are as follows:

- Residential 702 persons

The calculated 2051 Option 1 lands demands are:

- Average Day Demand (ADD) = 2.2 L/s
- Maximum Day Demand (MDD) = 3.9 L/s
- Peak Hour Demand (PHD) = 6.6 L/s

2.4.3 Option 3 Lands

The calculated population yield for the Option 3 lands is based on the proposed Block Plan dated January 12, 2021, prepared by Gerrard Design. This block plan includes the 2051 full

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build out of the Option 3 Lands. The population yields assume employment at the school. The estimated population yields are as follows:

- Residential 17,016 persons
- Employment 171 jobs

The calculated 2051 Option 3 lands demands are:

- Average Day Demand (ADD) = 53.7 L/s
- Maximum Day Demand (MDD) = 96.4 L/s
- Peak Hour Demand (PHD) = 161.0 L/s

Based on the Population Allocation 2031-2051 Plan (February 2021), 60 ha of land has been allocated for development in 2031 and an additional 112.9 ha of land has been allocated for development in 2051. The total Option 3 Land area is 172.9 ha.

2.4.4 Option 4 Lands

The area of Option 4 Lands that would be brought into Zone 7 was estimated based on the existing Zone 6 pressure elevation boundary of 259.1 m. Using the existing topography within Option 4, an approximate total land area of 28 ha has been established.

The 2051 Option 4 Land population was taken from the population target set out in the Population Allocation 2031-2051 Plan (February 2021). A population density of 65 people per hectare was assumed in the allocation plan.

The total estimated population yield for the Option 4 Lands are as follows:

- Residential 1,820 persons

The calculated 2051 Option 4 Demands are:

- Average Day Demand (ADD) = 5.7 L/s
- Maximum Day Demand (MDD) = 10.2 L/s
- Peak Hour Demand (PHD) = 17.1 L/s

2.4.5 Rounding Out Areas

The Zone 7 Rounding Out Areas are entirely within the 2051 buildout scenario.

The 2051 Rounding Out Area population was taken from the population target set out in the Population Allocation 2031-2051 Plan (February 2021). A population density of 65 people per hectare was assumed in the allocation plan.

The total estimated population yield for the Rounding Out Lands are as follows:

- Residential 1,346 persons

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The calculated 2051 Rounding Out Area demands are:

- Average Day Demand (ADD) = 4.2 L/s
- Maximum Day Demand (MDD) = 7.6 L/s
- Peak Hour Demand (PHD) = 12.6 L/s

2.4.6 Existing Lands

There are existing areas within Bolton Pressure Zone 6 that have ground elevations within the Pressure Zone 7 servicing range. As such, the development of Bolton Pressure Zone 7 will allow for these existing lands to move into the new Pressure Zone, thereby providing pressure improvements for existing residents.

The existing land area that would be brought into Pressure Zone 7 was estimated based on the existing Pressure Zone 6 elevation boundary of 259.1 m. Using the existing topography, an approximate total land area of 137 ha has been established. Two existing areas have been identified, west of Coleraine Drive, and largely on the south side of King Street and east of Highway 50, south of Columbia Way.

The existing population was taken from the population target set out in the Population Allocation 2031-2051 Plan (February 2021). A population density of 65 people per hectare was assumed in the allocation plan. An employment density of 25 jobs per hectare was assumed.

The total estimate population yields for the existing lands are as follows:

- Residential West of Coleraine Drive 2,860
- Employment West of Coleraine Drive 500
- Residential East of Highway 50 3,705
- Employment East of Highway 50 400

The calculated existing demands are:

- Average Day Demand (ADD) = 23.1 L/s
- Maximum Day Demand (MDD) = 40.6 L/s
- Peak Hour Demand (PHD) = 69.4 L/s

2.4.7 Whitebelt Lands

The Whitebelt Lands represent lands having future development potential beyond the 2051 planning horizon. Using ground elevation 259.1 m as an approximation of the Pressure Zone Boundary, it is estimated that approximately 290 ha of the Whitebelt Lands will be in Pressure Zone 7.

The post-2051 Whitebelt Lands population was taken from the population target set out in the Population Allocation 2031-2051 Plan (February 2021). A population density of 65 people per hectare was assumed in the allocation plan.

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The total estimated population yield for the Whitebelt lands are as follows:

- Residential 18,850

The calculated Whitebelt Lands Demands are:

- Average Day Demand (ADD) = 58.9 L/s
- Maximum Day Demand (MDD) = 106.0 L/s
- Peak Hour Demand (PHD) = 179.7 L/s

2.4.8 Total Demands

The total estimated demands considered for this exercise are summarized in Table 1 below:

Table 1: Demand Summary

	Area (ha)	Population	Demand L/s		
			ADD	MDD	PHD
Option 1 Full Buildout 2051	183.2	12,180	38.1	68.5	114.2
Option 2 Full Buildout 2051	10.8	702	2.2	3.9	6.6
Option 3 Full Buildout 2051	172.9	17,187	53.7	96.4	161
Option 4 Pressure Zone 7 Lands 2051	28.0	1,820	5.7	10.2	17.1
ROA 2051	20.7	1,346	4.2	7.6	12.6
Existing Pressure Zone 6 Lands	137.0	7,465	23.1	40.6	69.3
Whitebelt Pressure Zone 7 - Post 2051	290.0	18,850	58.9	106	179.7
Total	**802.6**	**59,550**	**185.9**	**333.2**	**560.6**

2.5 Fire Flow

The required fire flow for all lands is based on Ministry of the Environment, Conservation and Parks (MECP), “Guidelines for the Design of Water Distribution Systems”, 2008.

A minimum requirement of 220 L/s for 3 hours while maintaining a minimum system operating pressure of 20 psi, was established in the Bolton Residential Expansion Study Infrastructure Report, prepared by GM BluePlan dated June 16, 2014. Both flow and duration requirements increase from this minimum as the service population increases.

3.0 Existing Water Distribution System

Bolton receives water supply from the Tullamore Pumping Station and Reservoir, through a transmission main along Mayfield Road and Coleraine Drive. Bolton’s water distribution system is serviced in two pressure zones, Zone 5 and Zone 6. Zone 5 is serviced through Zone 6 by pressure reducing valves at the Bolton Zone 5 Standpipes. The Zone 5 Standpipes have a high-water level (HWL) of 274.1 m. Storage for Zone 6 is supplied by the Bolton ET and the North Bolton ET. The HWL of both Zone 6 ET’s is 297 m. The Zone 6 ET water level ranges from 295 m to 297 m.

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According to the 2020 Water and Wastewater Master Plan for Lake Based Systems the serviceable elevations ranges for each zone are as follows:

- **Zone 6** 214.5 m - 259.1 m
- **Zone 7** 243.4 m - 289.6 m

The existing ground elevations within the proposed development areas range from approximately 257 m to 280 m. The elevations within the Option 3 Lands range from 257 m to 280 m. The elevations within the Option 1 and Option 2 Lands range from 259 m to 279 m. These elevations fall outside of the range of elevations capable of being serviced by Zone 6 while maintaining adequate operating pressures within the system. The Region of Peel reports operating pressure issues within an existing residential subdivision on the south side on King Street in close proximity to the Option 3 lands.

The elevations along Emil Kolb Parkway range from 234 m to 265 m.

A new Pressure Zone 7 with a HGL of 327.7 m would adequately service all of the future development lands, as well as address existing operating pressure issues for some existing residents.

4.0 Hydraulic Modelling

The hydraulic model was developed using Infowater modelling software. The Option 1 (2031) and Option 3 lands water system networks were input into the model based on the proposed road network consistent with the January 12, 2021 Block Plan, and March 25, 2021 Block Plan shown in Figures 3 and 4 below. The remainder of the lands, without a block plan have been identified as a single node within the model.

As identified through previous studies undertaken by the Town of Caledon and Region of Peel, sufficient supply is available to service the domestic and fire flow requirements associated with the Bolton residential expansion through 2031. Beyond 2031, the Region may need to provide additional supply to the Bolton urban area, however that has not been the focus of this review. The servicing constraints are based on supply pressure and hydraulic losses, which is dependent on watermain size and ground elevations within the serviced area.

The existing Zone 6 Bolton ET's have been shown schematically in the model as a reservoir and set at a HWL of 297 m during regular operating scenarios and 295 m during Fire Flow scenarios. Although the existing elevated tanks and proposed booster pumping station are shown schematically in relatively close proximity to the Option 3 lands, the pipe lengths have been modelled with the actual lengths to properly reflect the friction losses and actual location of the existing and proposed infrastructure. For the purpose of this model, the Zone 7 Booster Pumping Station is proposed to be sited on land owned by the Region of Peel, on the east side of Coleraine Drive, just south of King Street. The final location of the Booster Pumping Station will depend on block sizing and available lands but is anticipated to be situated in the general area of the Coleraine Drive/King Street/Emil Kolb Parkway intersection.

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LAND USE SUMMARY

Total Site Area	32.00 ha.	79.1 ac.	
NON-DEVELOPABLE			
Road Widening	0.04 ha.	0.10 ac.	
Net Site Area	31.96 ha.	79.0 ac.	100.0%
DEVELOPABLE			
Residential (see 'UNIT SUMMARY' Below)	17.59 ha.	43.5 ac.	55.0%
Parks	1.09 ha.	2.69 ac.	3.4%
SWM Pond	2.16 ha.	5.34 ac.	6.8%
School	2.07 ha.	5.11 ac.	6.5%
Vista / Walkway	0.00 ha.	0.00 ac.	0.0%
Right of Way	9.05 ha.	22.4 ac.	28.3%
TOTAL (Developable)	31.96 ha.	79.0 ac.	100.0%

UNIT SUMMARY

		Width (m)		Dpth. (m)	Unit Count	Lot Mix	Lot Mix	Frntg. (lin.m)	Area		% Net Res.
Back To Back Townhouses	(25')	**6.40**	x	13.5	**48**	8%		313.09	0.50 ha.	1.2 ac.	2.8%
Dual FrontageTownhouses	(25')	**6.00**	x	23.0	**38**	7%		229.64	0.67 ha.	1.7 ac.	3.8%
Single Detached	(34')	**10.40**	x	27.0	**27**	5%	6%	284.47			
Single Detached	(36')	**11.00**	x	27.0	**103**	18%	21%	1137.90			
Single Detached	(38')	**11.60**	x	27.0	**269**	47%	56%	3129.22	16.42 ha.	40.6 ac.	93.3%
Single Detached	(45')	**13.72**	x	27.0	**82**	14%	17%	1137.90			
TOTAL RESIDENTIAL					**567**	100%	100%	6232.2	17.59 ha.	43.5 ac.	100.0%

ROW SCHEDULE

	(m) width	(lin.m)	(lin.m) half width
Collector Road	**22.0**	1185.3	0.0
Local Street	**18.0**	3539.5	0.0
ROW Total		4724.8	0.0

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- All Units in Metric Unless Otherwise Noted.
- Base Information Obtained from Various Sources And is Approximate.
- Schedule / Plan Information is Conceptual And Requires Verification by Appropriate Agency.
- Aerial Photo: Google Earth

GERRARD DESIGN

BRES OPTION AREA 1 | Caledon, Ontario

PRELIMINARY CONCEPT

MAR 25.2021
PROJECT 2126
SCALE 1:4000

CP-01

LEGEND:

- LOW DENSITY RESIDENTIAL
- LOW-MED DENSITY RESIDENTIAL
- MEDIUM DENSITY RESIDENTIAL
- MIXED-USE RESIDENTIAL (AT GRADE COMMERCIAL)
- GO TRANSIT LANDS
- FLEX DENSITY RESIDENTIAL/MIXED-USE
- EMPLOYMENT - OFFICE/INNOVATION
- COMMERCIAL/MIXED-USE
- SCHOOL
- PARK
- PROPOSED ENVIRONMENTAL PROTECTION AREA
- SWM POND

UNIT SPECIFIC USES

- REAR LANE TOWNHOUSE
- BACK-TO BACK TOWNHOUSES
- STANDARD TOWNHOUSES
- SHALLOW SINGLE DETACHED
- STANDARD SINGLE DETACHED

ELEMENTARY SCHOOL 2.09ha (5.16ac)

PARK 4.10ha (10.13 ac)

SWM POND 3.35ha (8.28 ac)

SECONDARY SCHOOL 5.11ha (12.63ac)

SWM POND 5.23 ha (12.92 ac)

COMMERCIAL - MIXED USE 3.03ha (7.49 ac)

THE GORE ROAD

KING STREET

HUMBER STATION ROAD

C.P.R.

EMIL KOLB PARKWAY

DRAFT

- All Units In Metric Unless Otherwise Noted.
- Base Information Obtained From Various Sources And Is Approximate.
- Schedule / Plan Information Is Conceptual And Requires Verification by Appropriate Agency.

GERRARD DESIGN

MACVILLE | Caledon, Ontario

PRELIMINARY FRAMEWORK PLAN

JAN 12, 2021

PROJECT 1420

SCALE 1:8000

4.1 Scenarios

Eight different modelling scenarios were developed to show possible servicing options over the various expansion horizons. These eight scenarios consider only lands that will be developed within the Pressure Zone 7. Table 2 below provides a summary of the demands considered in each scenario. The following sections provide a more detailed explanation of the scenarios and modelling results. All Maps referred to in the following section are in Appendix B. The model output for each scenario is in Appendix C.

Table 2: Demand Summary per Scenario

Scenario	MDD (L/s)							
	1	2	3	4	5	6	7	8
Option 1 ROPA 2031		11.7		11.7	11.7			
Option 1 Full Buildout 2051						68.5	68.5	68.5
Option 2 Full Buildout 2051						3.9	3.9	3.9
Option 3 MZO Approved 2031	52.7	52.7		52.7				
Option 3 Draft Plan Lands			70					
Option 3 Full Buildout 2051					96.4	96.4	96.4	96.4
Option 4 Zone 7 Lands 2051							10.2	10.2
ROA 2051						7.6	7.6	7.6
Existing Zone 6 Lands		40.6	18.1 (west only)	40.6	40.6	40.6	40.6	40.6
Whitebelt - post 2051								106
Total	**52.7**	**105**	**88.1**	**105**	**148.7**	**217**	**227.2**	**333.2**

4.2 Scenario 1 – Option 3 MZO Approved Lands

This scenario includes the Option 3 Lands that have received Minister's Zoning Order (MZO) approval only. This scenario was simulated without a booster pumping station (BPS) or Zone 7 ET. This scenario was modelled to determine if the Option 3 MZO Lands under the MDD could be serviced from the Zone 6 ET during a disaster or emergency situation in which the Zone 7 BPS was out of service.

The results of Scenario 1 are shown on Map 1. The model shows that the Option 3 MZO Lands can be serviced off the existing Zone 6 ET and maintain pressures greater than 36 psi during the MDD scenario.

4.3 Scenario 2 – ROPA 2031 Lands Options 1 and 3

This scenario includes the ROPA 2031 Option 1 and 3 lands and the existing Zone 6 lands experiencing pressure issues moved to Zone 7 (existing lands). The scenario was simulated

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with the BPS only. The purpose of this scenario was to see if the 2031 lands could be serviced without an ET.

It is anticipated in this scenario that a transmission watermain will be constructed along Emil Kolb Parkway to service the Option 1 Lands from the proposed BPS.

To represent the booster pumping station, a single equivalent pump was input into the model. In reality, the BPS would include several pumps to deliver the range of flows experienced within the zone at acceptable pressures. A typical pumping system arrangement would include a jockey pump, an ADD pump, large domestic service pumps, and if required a fire pump, all with built-in redundancy as per the Region and MECP Drinking Water Guideline requirements. The specific pumping arrangement would be determined during detailed design. The equivalent pump was set to deliver the required MDD of 105.0 L/s at a total dynamic head (TDH) of 30.5 m. The TDH was set to match the Zone 7 HGL of 327.7 m.

The results of Scenario 2 are shown on Map 2. The system can supply the MDD to the entirety of the Option 1 and 3 lands while maintaining system pressures between 40 psi and 100 psi. The transmission main along Emil Kolb Parkway has ground elevations outside of the Zone 7 pressure boundary, as such experiences pressures greater than 100 psi. Service connections along the transmission main are not anticipated, as such these higher pressures are generally acceptable.

4.4 Scenario 3 – Option 3 Draft Plan Lands

Scenario 3 includes the Option 3 Lands for which a formal application for Draft Plan Approval will be submitted, as well as the existing lands west of Coleraine Drive. This scenario was simulated with a Zone 7 ET adjacent the Option 3 Lands, as the elevations of the western portion of the Draft Plan are such that an ET is necessary to deliver the required fire flow. The Zone 7 ET was set to a HWL of 327.7 m, which is the Hydraulic Grade Line of Zone 7. Both the MDD and MDD + Fire Flow were simulated for Scenario 3.

It is anticipated that a transmission main from the BPS at King and Coleraine Drive will be constructed along King Street to the Gore Road and along Gore Road to the Zone 7 ET. A separate feedermain would be constructed from the Zone 7 ET to the Option 3 Lands distribution network.

Map 3 shows the results of the MDD + Fire Flow scenario. A fire flow of 220 L/s can be supplied to the majority of the system, with the exception of a few dead-end locations. Fire flow could be achieved at these dead ends with looping or upsizing of the watermain. The watermain sizing shown represents the sizing required for the ultimate scenario. Interim upsizing has not been explored at this time. The watermains in these locations have been modelled as 200 mm diameter mains. It is not recommended to increase the diameter of a dead-end watermain above 200 mm diameter given concerns around the maintenance of chlorine residual.

It is recommended that any watermains installed in the interim are looped to avoid dead ends.

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Map 3.1 shows the results of the MDD scenario. With the ET, the system can supply the MDD while maintaining system pressures between 40 psi and 100 psi.

4.5 Scenario 4 – ROPA 2031 Lands Option 1 and Option 3

Scenario 4 included the ROPA 2031 Option 1 and Option 3 Lands, and the existing lands. This scenario was simulated to show if one ET constructed within the Option 3 Lands could service the Option 1 and Option 3 Lands in the interim, before a second ET servicing lands east of Highway 50 is necessary. The Zone 7 ET was set to a HWL of 327.7, which is the HGL of Zone 7 as previously noted. Both MDD and MDD+ Fire Flow were simulated for Scenario 4.

As discussed above, it is anticipated that a transmission main from the BPS at King and Coleraine Drive will be constructed along King Street to the Gore Road and along Gore Road to the Zone 7 ET. A feeder main would be constructed from the Zone 7 ET and through the Option 3 distribution network. At the east corner of the Option 3 Lands the feedermain will loop northeast along King Street and connect into the transmission main along Emil Kolb Parkway to feed the Option 1 Lands.

Map 4 shows the results of the MDD+ Fire Flow scenario. A fire flow of 220 L/s can be supplied to the majority of the system, again with the exception of a few dead-end locations. It is recommended that any watermains installed in the interim are looped to avoid dead ends.

Map 4.1 shows the results of the MDD scenario. With the ET, the system can supply both Option 1 and Option 3 MDD while maintaining system pressures between 40 psi and 100 psi. The transmission main along Emil Kolb Parkway has ground elevations outside of the Zone 7 pressure boundary, and as such experiences pressures greater than 100 psi. Service connections along the transmission main are not anticipated, as such these higher pressures are generally acceptable.

4.6 Scenario 5 – 2031 Option 1 and 2051 Option 3

Scenario 5 included the 2031 Option 1 Lands, the 2051 Option 3 Lands and the existing lands. The purpose of this scenario was to see if the Zone 7 ET in the Option 3 Lands could service the 2051 Full Buildout of Option 3 and the 2031 Option 1 Lands.

A similar servicing arrangement to Scenario 4 is anticipated; a transmission main from the BPS to the Zone 7 ET, and then a feedermain through the Option 3 Lands, connecting into the transmission main along Emil Kolb Parkway to service the Option 1 Lands.

Map 5 shows the results of the MDD+ Fire Flow scenario. A fire flow of 220 L/s can be supplied to the majority of the system, again with the exception of a few dead-end locations. It is recommended that any watermains installed in the interim are looped to avoid dead ends.

Map 5.1 shows the results of the MDD scenario. The MDD can be supplied throughout the system while maintaining system pressures between 40 psi and 100 psi, with the exception of higher pressures along the Emil Kolb Parkway transmission main.

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4.7 Scenario 6 – 2051 Option 1, 2, 3 and ROA

Scenario 6 includes the 2051 Option 1, 2, 3, Zone 7 ROA Lands and the existing lands. It is anticipated that during the 2051 Full Buildout of the Option 1, 2 and 3 Lands, the second ET located within the Option 1 Lands will be constructed to satisfy water storage requirements. As such, it is anticipated that the connection between the Option 3 feedermain and the transmission main along Emil Kolb Parkway will be decommissioned. The Emil Kolb Parkway transmission main will be connected directly to the Zone 7 BPS, and water will be supplied to the Option 1 and 2 Lands through the ET located within the Option 1 Lands. The transmission main along Emil Kolb Parkway will feed the Option 1 Zone 7 ET, and a feedermain from the Option 1 Zone 7 ET will feed into the Option 1 and Option 2 distribution systems.

The 2051 Option 1 Lands and the Option 2 Lands have been modelled as a single equivalent node. Elevations based on the highest observed existing ground elevations within the Option 1 and 2 2051 lands were assigned to the single node location.

Map 6 shows the results of the MDD + Fire Flow scenario. 220 L/s can be supplied throughout the majority of the system.

Map 6.1 shows the results of the MDD scenario. The MDD can be supplied throughout the system while maintaining system pressures between 40 psi and 100 psi, with the exception of higher pressures along the Emil Kolb Parkway transmission main.

4.8 Scenario 7 – 2051 Option 1, 2, 3, 4 and ROA

Scenario 7 includes the same servicing configuration as Scenario 6 to service Option 1, 2, 3, Zone 7 ROA Lands, and the existing lands, with the addition of the Option 4 Zone 7 Lands.

A single node was input into the model to represent the Option 4 Lands. It is anticipated that a single connection would be made from Option 4 to the Option 3 feedermain. The highest existing ground elevation observed within the Option 4 Lands of 265 m was assigned to the single node location.

Map 7 shows the results of the MDD + Fire Flow scenario. 220 L/s can be supplied throughout the majority of the system.

Map 7.1 shows the results of the MDD scenario. The MDD can be supplied throughout the system while maintaining system pressures between 40 psi and 100 psi, with the exception of higher pressures along the Emil Kolb Parkway transmission main

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4.9 Scenario 8 – 2051 Option 1, 2, 3, 4, ROA and Whitebelt Lands

Scenario 8 includes the same servicing configuration as Scenario 7 to service Option 1, 2, 3, 4 Zone 7, the Zone 7 ROA Lands, and the existing lands, with the addition of the Whitebelt Zone 7 Lands.

The Whitebelt Lands have been represented in the model as a single node connection to the Option 3 feedermain. Based on the existing topography, the highest observed elevation within the Whitebelt Lands of 285 m was assigned to the node. A length of 1,200 m was assigned to the pipe connecting to the Option 3 feedermain to account for some of the friction losses that would occur to service the Whitebelt Lands.

Map 8 shows the results of the MDD + Fire Flow scenario. 220 L/s can be supplied throughout the majority of the system.

Map 8.1 shows the results of the MDD scenario. The MDD can be supplied throughout the system while maintaining system pressures between 40 psi and 100 psi, with the exception of higher pressures along the Emil Kolb Parkway transmission main

5.0 Conclusion

A hydraulic model of the proposed water distribution system has been developed for the Option 1, 2, 3, 4 Zone 7, Zone 7 ROA and Zone 7 Whitebelt Lands. In addition, allowance has been made to accommodate up to approximately 7500 existing residents and jobs currently situated at the upper limits of Pressure Zone 6, and experiencing water pressure issues, into a new Pressure Zone 7, thereby addressing long standing deficiencies in water service. Various scenarios have been modelled to determine how much development can be reasonably serviced before the ultimate Zone 7 servicing solution is required.

The Option 3 MZO Lands can be serviced with a booster pumping station and without a Zone 7 ET. If the booster pumping station was put out of service during an emergency situation, the Option 3 MZO Lands can maintain a pressure of 36 psi when serviced by the Zone 6 ET only.

The model demonstrated that the ROPA 2031 Option 1 and 3 Lands can be serviced with a booster pumping station and without a Zone 7 ET.

The construction of the Zone 7 ET within the Option 3 Lands can adequately service the Option 3 Draft Plan Approved Lands, the ROPA 2031 Option 1 and 3 lands, and the 2031 Option 1 and 2051 Full buildout Option 3 Lands. To satisfy storage requirements it is anticipated that once the 2051 Option 1 and Option 2 Lands commence development, the second Zone 7 ET within the Option 1 Lands will be required to constructed. The modelling demonstrated that the ultimate Zone 7 servicing solution that includes two ETs on the Option 1 and Option 3 Lands can service the full Zone 7 buildout scenario, subject to confirmation of tank sizing.

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Enclosures
Appendix A: Demands
Appendix B: Figures
Appendix C: Model Output

cc: Mr. Aaron Wisson, Argo Development Corporation (enc.) (Via Email)
Mr. Dave Leighton, C.E.T., Urbantech Consulting (enc.) (Via Email)

In the preparation of the various instruments of service contained herein, R.J. Burnside & Associates Limited (Burnside) was required to use and rely upon various sources of information (including but not limited to: reports, data, drawings, observations) produced by parties other than Burnside. For its part Burnside has proceeded based on the belief that the third party/parties in question produced this documentation using accepted industry standards and best practices and that all information was therefore accurate, correct and free of errors at the time of consultation. As such, the comments, recommendations and materials presented in this instrument of service reflect our best judgment in light of the information available at the time of preparation. Burnside, its employees, affiliates and subcontractors accept no liability for inaccuracies or errors in the instruments of service provided to the client, arising from deficiencies in the aforementioned third party materials and documents.

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[THE DIFFERENCE IS OUR PEOPLE]

Appendix A

Demands

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Bolton Zone 7 Demand Summary

Prepared by:	RW
Checked by:	JLL
Project No:	300034976
Date:	4/27/2021

	Area (ha)	Population	MDD L/s							
			Scenario 1 No ET	Scenario 2 No ET	Scenario 3 ET	Scenario 4 ET	Scenario 5 ET	Scenario 6 ET	Scenario 7 ET	Scenario 8 ET
Option 1 ROPA 2031	28.1	2098		11.7		11.7	11.7			
Option 1 Full Buildout 2051	155.1	12180						68.5	68.5	68.5
Option 2 Full Buildout 2051	10.8	702						3.9	3.9	3.9
Option 3 MZO Approved 2031	60	9376	52.7	52.7		52.7				
Option 3 Draft Plan Lands	82	12448			70					
Option 3 Full Buildout 2051	172.9	17186					96.4	96.4	96.4	96.4
Option 4 Zone 7 Lands 2051	28	1820							10.2	10.2
ROA 2051	20.7	1346						7.6	7.6	7.6
Existing Zone 6 Lands	137	5185		40.6	18.1	40.6	40.6	40.6	40.6	40.6
Whitebelt - post 2051	290	18850								106
Total	**984.6**	**81191**	**52.7**	**105**	**88.1**	**105**	**148.7**	**217**	**227.2**	**333.2**
MDD (ML/Day)			**4.6**	**9.1**	**7.6**	**9.1**	**12.8**	**18.7**	**19.6**	**28.8**

	Area (ha)	Population	Demand L/s		
			ADD	MDD	PHD
Option 1 Full Buildout 2051	183.2	12180	38.1	68.5	114.2
Option 2 Full Buildout 2051	10.8	702	2.2	3.9	6.6
Option 3 Full Buildout 2051	172.9	17187	53.7	96.4	161
Option 4 Zone 7 Lands 2051	28	1820	5.7	10.2	17.1
ROA 2051	20.7	1346	4.2	7.6	12.6
Existing Zone 6 Lands	137	7465	23.1	40.6	69.4
Whitebelt - post 2051	290	18850	58.9	106	179.7
Total	**842.6**	**59550**	**185.9**	**333.2**	**560.6**
MDD (ML/Day)			**16.1**	**28.8**	**48.4**

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Bolton Option 1 2031 Zone 7 Demand Calculations

Prepared by:	RW
Checked by:	JLL
Project No:	300034976
Date:	4/27/2021

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Assumptions

Water Demands From the Region of Peel 2020 Water & Wastewater Master Plan for the Lake-Based System

Residential	Residential Per Capita Flow	270	L/person/day
	Max Day Factor	1.8	
	Peak Hour Factor	3	
Employment	Employment Per Capita Flow	250	L/employee/day
	Max Day Factor	1.4	
	Peak Hour Factor	3	

Fire Flow

220 L/s	From Bolton Residential Expansion Study Infrastructure Report, June 16, 2014

Density

Unit Type	People Per Unit (ppu)*	People Per Hectare (pp/ha)**
Townhomes	3.1	65
Single Detached	3.7	65
Mixed Use	1.99	65
School		25

*from development plan
** from BRES Population Allocation 2031-2051 Plan
BRES assumptions used in absences of a development plan

Demand Allocation

Unit Type	Total Area (ha)	# of units	Population	L/ha/s			L/s		
				ADD	MDD	PHD	ADD	MDD	PHD
Townhome	1.17	86	267	0.7	1.3	2.1	0.8	1.5	2.5
Single Detached	16.42	481	1780	0.3	0.6	1.0	5.6	10.0	16.7
School	2.07	1	52	0.1	0.1	0.2	0.1	0.2	0.4
Total	**19.66**	**568**	**2098**	**1.1**	**2.0**	**3.4**	**6.5**	**11.7**	**19.6**

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Bolton Option 1 2051 Zone 7 Demand Calculations

Prepared by:	RW
Checked by:	JLL
Project No:	300034976
Date:	4/27/2021

Assumptions

Water Demands From the Region of Peel 2020 Water & Wastewater Master Plan for the Lake-Based System

Residential	Residential Per Capita Flow	270	L/person/day
	Max Day Factor	1.8	
	Peak Hour Factor	3	
Employment	Employment Per Capita Flow	250	L/employee/day
	Max Day Factor	1.4	
	Peak Hour Factor	3	

Fire Flow

220 L/s	From Bolton Residential Expansion Study Infrastructure Report, June 16, 2014

Density

Unit Type	People Per Unit (ppu)*	People Per Hectare (pp/ha)**
Townhomes	3.1	65
Single Detached	3.7	65
Mixed Use	1.99	65
School		25

*from development plan
** from BRES Population Allocation 2031-2051 Plan
BRES assumptions used in absences of a development plan

Demand Allocation

Unit Type	Total Area (ha)	# of units	Population	L/ha/s			L/s		
				ADD	MDD	PHD	ADD	MDD	PHD
2031	19.66	568	2098	1.1	2.0	3.4	6.5	11.7	19.6
2051	155.1	TBD	10082				31.5	56.7	94.5
Total	**143.2**	**TBD**	**12180**				**38.1**	**68.5**	**114.2**

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Bolton Option 2 2051 Zone 7 Demand Calculations

Prepared by:	RW
Checked by:	JLL
Project No:	300034976
Date:	4/27/2021

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Assumptions

Water Demands From the Region of Peel 2020 Water & Wastewater Master Plan for the Lake-Based System

Residential	Residential Per Capita Flow	270	L/person/day
	Max Day Factor	1.8	
	Peak Hour Factor	3	
Employment	Employment Per Capita Flow	250	L/employee/day
	Max Day Factor	1.4	
	Peak Hour Factor	3	

Fire Flow

220 L/s	From Bolton Residential Expansion Study Infrastructure Report, June 16, 2014

Density

Unit Type	People Per Unit (ppu)*	People Per Hectare (pp/ha)**
Townhomes	3.1	65
Single Detached	3.7	65
Mixed Use	1.99	65
School		25

*from development plan
** from BRES Population Allocation 2031-2051 Plan
BRES assumptions used in absences of a development plan

Demand Allocation

Unit Type	Total Area (ha)	# of units	Population	L/ha/s			L/s		
				ADD	MDD	PHD	ADD	MDD	PHD
2051	**10.8**	**TBD**	**702**				**2.2**	**3.9**	**6.6**

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Bolton Option 3 2031 MZO Approved Zone 7 Demand Calculations

Prepared by:	RW
Checked by:	JLL
Project No:	300034976
Date:	4/27/2021

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Assumptions

Water Demands From the Region of Peel 2020 Water & Wastewater Master Plan for the Lake-Based System

Residential	Residential Per Capita Flow	270	L/person/day
	Max Day Factor	1.8	
	Peak Hour Factor	3	
Employment	Employment Per Capita Flow	250	L/employee/day
	Max Day Factor	1.4	
	Peak Hour Factor	3	

Fire Flow

220 L/s	From Bolton Residential Expansion Study Infrastructure Report, June 16, 2014

Density

Unit Type	People Per Unit (ppu)*	People Per Hectare (pp/ha)**
Townhomes	3.1	65
Single Detached	3.7	65
Mixed Use	1.99	65
School		25

*from development plan
** from BRES Population Allocation 2031-2051 Plan
BRES assumptions used in absences of a development plan

Demand Allocation

Unit Type	Total Area (ha)	# of units	Population	L/ha/s			L/s		
				ADD	MDD	PHD	ADD	MDD	PHD
2031	**60**	**TBD**	**9376**				**29.3**	**52.7**	**87.9**

NOTE: Option 3 Lands were allocated in the model based on the full 2051 buildout. To model the Option 3 MZO approved lands and the Option 3 Draft Plan Approved Lands, the future buildout areas were turned off, and the demand was then represented by the areas left on in the model.

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Bolton Option 3 Draft Plan Approved Zone 7 Demand Calculations

Prepared by:	RW
Checked by:	JLL
Project No:	300034976
Date:	4/27/2021

Assumptions

Water Demands From the Region of Peel 2020 Water & Wastewater Master Plan for the Lake-Based System

Residential	Residential Per Capita Flow	270	L/person/day
	Max Day Factor	1.8	
	Peak Hour Factor	3	
Employment	Employment Per Capita Flow	250	L/employee/day
	Max Day Factor	1.4	
	Peak Hour Factor	3	

Fire Flow

220 L/s	From Bolton Residential Expansion Study Infrastructure Report, June 16, 2014

Density

Unit Type	People Per Unit (ppu)*	People Per Hectare (pp/ha)**
Townhomes	3.1	65
Single Detached	3.7	65
Mixed Use	1.99	65
School		25

*from development plan
** from BRES Population Allocation 2031-2051 Plan
BRES assumptions used in absences of a development plan

Demand Allocation

Unit Type	Total Area (ha)	# of units	Population	L/ha/s			L/s		
				ADD	MDD	PHD	ADD	MDD	PHD
2031	**82**	**TBD**	**12448**				**38.9**	**70.0**	**116.7**

NOTE: Option 3 Lands were allocated in the model based on the full 2051 buildout. To model the Option 3 MZO approved lands and the Option 3 Draft Plan Approved Lands, the future buildout areas were turned off, and the demand was then represented by the areas left on in the model.

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Bolton Option 3 2051 Full Buildout Zone 7 Demand Calculations

Prepared by:	RW
Checked by:	JLL
Project No:	300034976
Date:	4/27/2021

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Assumptions

Water Demands From the Region of Peel 2020 Water & Wastewater Master Plan for the Lake-Based System

Residential	Residential Per Capita Flow	270	L/person/day
	Max Day Factor	1.8	
	Peak Hour Factor	3	
Employment	Employment Per Capita Flow	250	L/employee/day
	Max Day Factor	1.4	
	Peak Hour Factor	3	

Fire Flow

220 L/s	From Bolton Residential Expansion Study Infrastructure Report, June 16, 2014

Density

Unit Type	People Per Unit (ppu)*	People Per Hectare (pp/ha)**
Townhomes	3.1	65
Single Detached	3.7	65
Mixed Use	1.99	65
School		25

*from development plan
** from BRES Population Allocation 2031-2051 Plan
BRES assumptions used in absences of a development plan

Demand Allocation

Unit Type	Total Area (ha)	# of units	Population	L/ha/s			L/s		
				ADD	MDD	PHD	ADD	MDD	PHD
Townhomes	14.4	1095	3395	0.7	1.3	2.2	10.6	19.1	31.8
Single Detached	67.5	1244	4603	0.2	0.4	0.6	14.4	25.9	43.2
Mixed Use	29.25	4532	9019	1.0	1.7	2.9	28.2	50.7	84.6
School	6.82	2	171	0.1	0.1	0.2	0.5	0.7	1.5
Total	**118.0**	**6871**	**17186**				**53.7**	**96.4**	**161.0**

DRAFT

Bolton Option 4 2051 Zone 7 Demand Calculations

Prepared by:	RW
Checked by:	JLL
Project No:	300034976
Date:	4/27/2021

BURNSIDE

Assumptions

Water Demands From the Region of Peel 2020 Water & Wastewater Master Plan for the Lake-Based System

Residential	Residential Per Capita Flow	270	L/person/day
	Max Day Factor	1.8	
	Peak Hour Factor	3	
Employment	Employment Per Capita Flow	250	L/employee/day
	Max Day Factor	1.4	
	Peak Hour Factor	3	

Fire Flow

220 L/s	From Bolton Residential Expansion Study Infrastructure Report, June 16, 2014

Density

Unit Type	People Per Unit (ppu)*	People Per Hectare (pp/ha)**
Townhomes	3.1	65
Single Detached	3.7	65
Mixed Use	1.99	65
School		25

*from development plan
** from BRES Population Allocation 2031-2051 Plan
BRES assumptions used in absences of a development plan

Demand Allocation

Unit Type	Total Area (ha)*	# of units	Population	L/ha/s			L/s		
				ADD	MDD	PHD	ADD	MDD	PHD
2051	**28**	**TBD**	**1820**				**5.7**	**10.2**	**17.1**

*area estimated based on land area within Option 4 exceeding 259 m, based on existing ground elevation

DRAFT

Bolton Existing Lands Zone 7 Demand Calculations

Prepared by:	RW
Checked by:	JLL
Project No:	300034976
Date:	4/27/2021

BURNSIDE

Assumptions

Water Demands From the Region of Peel 2020 Water & Wastewater Master Plan for the Lake-Based System

Residential	Residential Per Capita Flow	270	L/person/day
	Max Day Factor	1.8	
	Peak Hour Factor	3	
Employment	Employment Per Capita Flow	250	L/employee/day
	Max Day Factor	1.4	
	Peak Hour Factor	3	

Fire Flow

220 L/s From Bolton Residential Expansion Study Infrastructure Report, June 16, 2014

Density

Unit Type	People Per Unit (ppu)*	People Per Hectare (pp/ha)**
Townhomes	3.1	65
Single Detached	3.7	65
Mixed Use	1.99	65
Employment		25

*from development plan
** from BRES Population Allocation 2031-2051 Plan
BRES assumptions used in absences of a development plan

Demand Allocation

Unit Type	Total Area (ha)*	# of units	Population	L/ha/s			L/s		
				ADD	MDD	PHD	ADD	MDD	PHD
Single Detached West of Coleraine Drive	44	N/A	2860				8.9	16.1	26.8
Industrial West of Coleraine Drive	20	N/A	500				1.4	2.0	4.3
Single Detached East of HWY 50	57	N/A	3705				11.6	20.8	34.7
Recreation Complex East of HWY 50	16	N/A	400				1.2	1.6	3.5
Total	**137**		**7465**				**23.1**	**40.6**	**69.4**

*area estimated based on existing land area exceeding 259 m, based on existing ground elevation

DRAFT

Bolton Whitebelt Post 2051 Zone 7 Demand Calculations

Prepared by:	RW
Checked by:	JLL
Project No:	300034976
Date:	4/27/2021

BURNSIDE

Assumptions

Water Demands From the Region of Peel 2020 Water & Wastewater Master Plan for the Lake-Based System

Residential	Residential Per Capita Flow	270	L/person/day
	Max Day Factor	1.8	
	Peak Hour Factor	3	
Employment	Employment Per Capita Flow	250	L/employee/day
	Max Day Factor	1.4	
	Peak Hour Factor	3	

Fire Flow

220 L/s	From Bolton Residential Expansion Study Infrastructure Report, June 16, 2014

Density

Unit Type	People Per Unit (ppu)*	People Per Hectare (pp/ha)**
Townhomes	3.1	65
Single Detached	3.7	65
Mixed Use	1.99	65
School		25

*from development plan
** from BRES Population Allocation 2031-2051 Plan
BRES assumptions used in absences of a development plan

Demand Allocation

Unit Type	Total Area (ha)	# of units	Population	L/ha/s			L/s		
				ADD	MDD	PHD	ADD	MDD	PHD
Whitebelt	**290**	**TBD**	**18850**				**58.9**	**106.0**	**176.7**

DRAFT

BURNSIDE

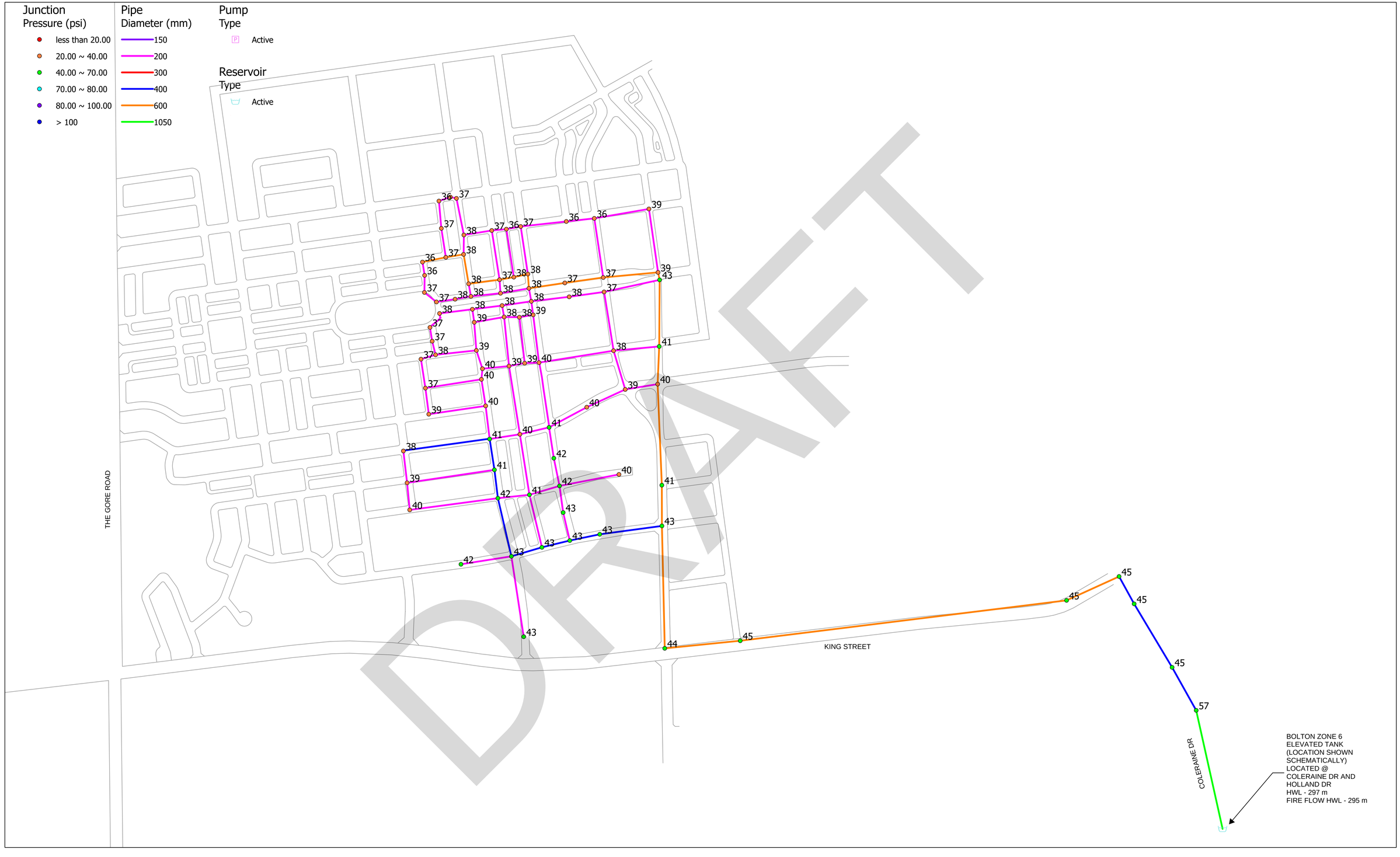
[THE DIFFERENCE IS OUR PEOPLE]

Appendix B

Figures

MDD Serviced from Zone 6 Elevated Tank 3
MDD Serviced with Booster Pumps 4
PHD Serviced with Booster Pumps 5
MDD Serviced by Zone 7 Elevated Tank 6
Fire Flow Serviced from Zone 7 Elevated Tank 7
Fire Flow Serviced from Zone 6 Elevated Tank 8
Fire Flow Serviced from Fire Pumps at Booster Pumping Station 9

DRAFT



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Datum:	
Coord. System:	
Projection:	
Central Meridian:	
False Easting: m	False Northing: m
Page Orientation: °	Scale Factor:

True North

0 100 200 300 400 500 600 700 800
Metres

BURNSIDE

Client
BOLTON OPTION 3 LANDOWNERS GROUP

Map Title
BOLTON ZONE 7 OPTIONS 1, 2 & 3
SCENARIO 1 - OPTION 3 MZO LANDS

Drawn	Checked	Date	Map No.
RW	JLL	2021/04/30	1
Scale		Project No.	
H 1:4,000		300034976	

File Path: C:\Users\RWatson\Documents\210414 Bolton Rebuild Project\210414 Bolton Inflowater New.aprx Print Date: 2021/04/30 Time: 03:28 PM

Junction
Pressure (psi)

- less than 20.00
- 20.00 ~ 40.00
- 40.00 ~ 70.00
- 70.00 ~ 80.00
- 80.00 ~ 100.00
- > 100

Pipe
Diameter (mm)

- 150
- 200
- 300
- 400
- 600
- 1050

Pump
Type

- Active

Reservoir
Type

- Active

DRAFT

EMIL KOLB PARKWAY

EXISTING EAST DEMANDS

HIGHWAY 50

THE GORE ROAD

KING STREET

EMIL KOLB PARKWAY

EXISTING WEST DEMANDS

PROPOSED BOOSTER PUMPING STATION @ KING STREET AND COLERAINE DRIVE (APPROXIMATE LOCATION)

COLERAINE DR

BOLTON ZONE 6 ELEVATED TANK (LOCATION SHOWN SCHEMATICALLY) LOCATED @ COLERAINE DR AND HOLLAND DR
HWL - 297 m
FIRE FLOW HWL - 295 m

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Datum:	
Coord. System:	
Projection:	
Central Meridian:	
False Easting: m	False Northing: m
Page Orientation: °	Scale Factor:

True North

0 100 200 300 400 500 600 700 800
Metres

BURNSIDE

Client
BOLTON OPTION 3 LANDOWNERS GROUP

Map Title
BOLTON ZONE 7 OPTIONS 1, 2 & 3
SCENARIO 2 - MDD ROPA 2031 OPTION 1 AND 3 LANDS

Drawn	Checked	Date	Map No.
RW	JLL	2021/05/10	2
Scale		Project No.	
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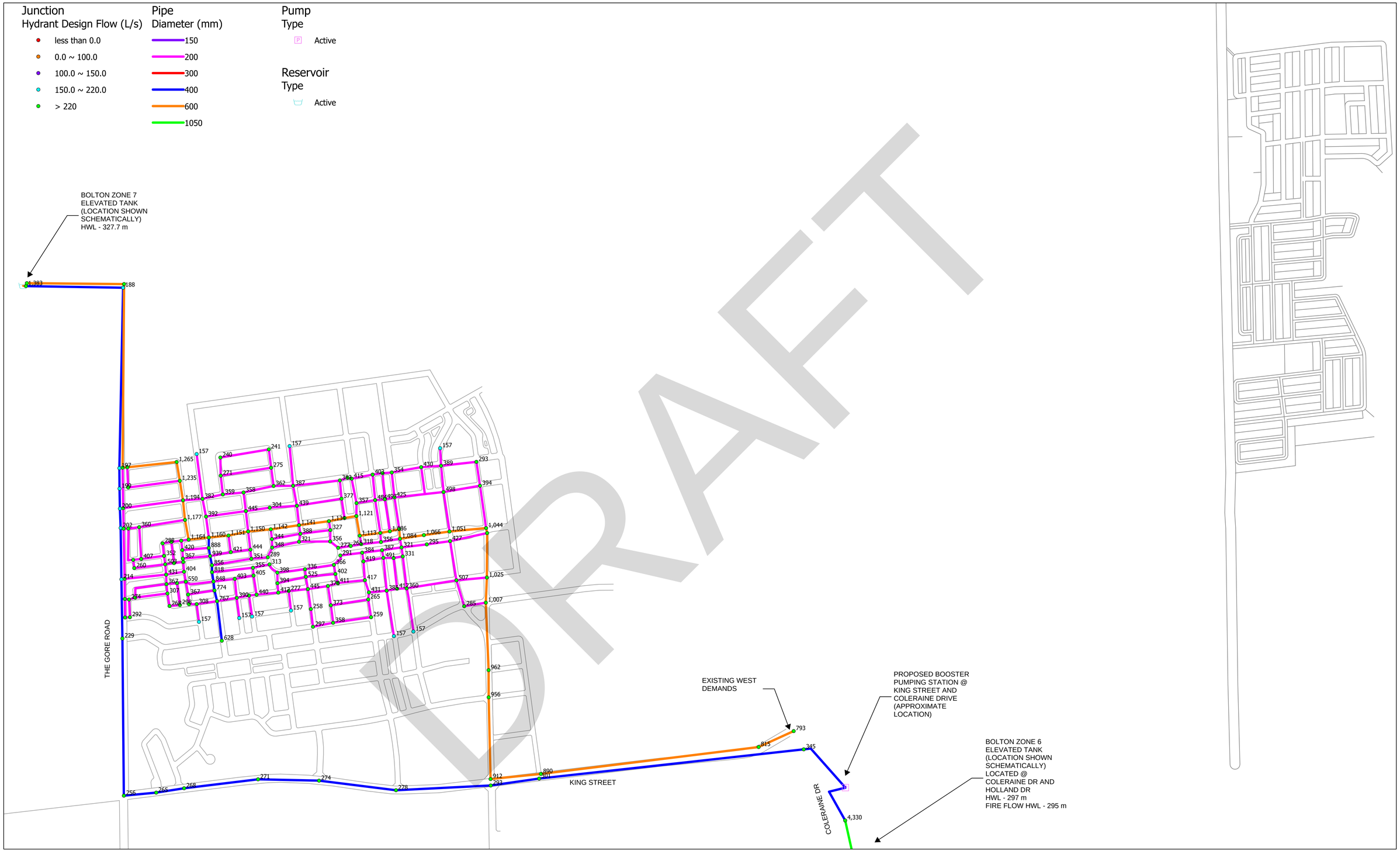
File Path: C:\Users\RWatson\Documents\210414 Bolton Rebuild Project\210414 Bolton Infowater New.apx Print Date: 2021/05/10 Time: 05:00 PM



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Datum:	
Coord. System:	
Projection:	
Central Meridian:	
False Easting: m	False Northing: m
Page Orientation: °	Scale Factor:

True North

0 100 200 300 400 500 600 700 800
Metres

BURNSIDE

Client
BOLTON OPTION 3 LANDOWNERS GROUP

Map Title
BOLTON ZONE 7 OPTIONS 1, 2 & 3
SCENARIO 3 - FIRE FLOW OPTION 3
DRAFT PLAN APPROVED LANDS

Drawn	Checked	Date	Map No.
RW	JLL	2021/05/10	3
Scale		Project No.	
H 1:6000		300034976	

File Path: C:\Users\RWilson\Documents\210414 Bolton Rebuild Project\210414 Bolton Infowater New\210414 Bolton Infowater New.aprx Print Date: 2021/05/10 Time: 05:12 PM

Junction
Pressure (psi)

- less than 20.00
- 20.00 ~ 40.00
- 40.00 ~ 70.00
- 70.00 ~ 80.00
- 80.00 ~ 100.00
- > 100

Pipe
Diameter (mm)

- 150
- 200
- 300
- 400
- 600
- 1050

Pump
Type

- Active

Reservoir
Type

- Active

BOLTON ZONE 7
ELEVATED TANK
(LOCATION SHOWN
SCHEMATICALLY)
HWL - 327.7 m

THE GORE ROAD

EXISTING WEST
DEMANDS

PROPOSED BOOSTER
PUMPING STATION @
KING STREET AND
COLERAINE DRIVE
(APPROXIMATE
LOCATION)

BOLTON ZONE 6
ELEVATED TANK
(LOCATION SHOWN
SCHEMATICALLY)
LOCATED @
COLERAINE DR AND
HOLLAND DR
HWL - 297 m
FIRE FLOW HWL - 295 m

KING STREET

COLERAINE DR

DRAFT

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Coord. System:	
Projection:	
Central Meridian:	
False Easting: m	False Northing: m
Page Orientation: °	Scale Factor:

True North

0 100 200 300 400 500 600 700 800
Metres

BURNSIDE

Client
BOLTON OPTION 3 LANDOWNERS GROUP

Map Title
BOLTON ZONE 7 OPTIONS 1, 2 & 3
SCENARIO 3 - OPTION 3 DRAFT PLAN APPROVED LANDS

Drawn	Checked	Date	Map No.
RW	JLL	2021/05/10	3.1
Scale		Project No.	
H 1:6000		300034976	

File Path: C:\Users\RWatson\Documents\210414 Bolton Inflowater New\210414 Bolton Rebuild Project\210414 Bolton Inflowater New.aprx Print Date: 2021/05/10 Time: 06:59 PM

Junction
Hydrant Design Flow (L/s)
- less than 0.0
- 0.0 ~ 100.0
- 100.0 ~ 150.0
- 150.0 ~ 220.0
- > 220

Pipe
Diameter (mm)
- 150
- 200
- 300
- 400
- 600
- 1050

Pump
Type
- Active

Reservoir
Type
- Active

BOLTON ZONE 7
ELEVATED TANK
(LOCATION SHOWN
SCHEMATICALLY)
HWL - 327.7 m

EMIL KOLB PARKWAY

EXISTING EAST
DEMANDS

HIGHWAY 50

THE GORE ROAD

EMIL KOLB PARKWAY

EXISTING WEST
DEMANDS

PROPOSED BOOSTER
PUMPING STATION @
KING STREET AND
COLERAINE DRIVE
(APPROXIMATE
LOCATION)

BOLTON ZONE 6
ELEVATED TANK
(LOCATION SHOWN
SCHEMATICALLY)
LOCATED @
COLERAINE DR AND
HOLLAND DR
HWL - 297 m
FIRE FLOW HWL - 295 m

KING STREET

COLERAINE DR

DRAFT

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Datum:	
Coord. System:	
Projection:	
Central Meridian:	
False Easting: m	False Northing: m
Page Orientation: °	Scale Factor:

True North

0 100 200 300 400 500 600 700 800
Metres

BURNSIDE

Client
BOLTON OPTION 3 LANDOWNERS GROUP

Map Title
BOLTON ZONE 7 OPTIONS 1, 2 & 3
SCENARIO 4 - FIRE FLOW 2031 OPTION 1 AND OPTION 3

Drawn	Checked	Date	Map No.
RW	JLL	2021/05/11	4
Scale		Project No.	
H 1:6000		300034976	

File Path: C:\Users\RWatson\Documents\210414 Bolton Rebuild Project\210414 Bolton Infowater New.apx Print Date: 2021/05/11 Time: 08:42 AM

Junction
PRESSURE

- less than 20.00
- 20.00 ~ 40.00
- 40.00 ~ 70.00
- 70.00 ~ 80.00
- 80.00 ~ 100.00
- > 100

Pipe
DIAMETER

- 150
- 200
- 300
- 400
- 600
- 1050

Pump
Type

- Active

Reservoir
Type

- Active

BOLTON ZONE 7
ELEVATED TANK
(LOCATION SHOWN
SCHEMATICALLY)
HWL - 327.7 m

EMIL KOLB PARKWAY

EXISTING EAST
DEMANDS

HIGHWAY 50

THE GORE ROAD

EMIL KOLB PARKWAY

EXISTING WEST
DEMANDS

PROPOSED BOOSTER
PUMPING STATION @
KING STREET AND
COLERAINE DRIVE
(APPROXIMATE
LOCATION)

KING STREET

COLERAINE DR

BOLTON ZONE 6
ELEVATED TANK
(LOCATION SHOWN
SCHEMATICALLY)
LOCATED @
COLERAINE DR AND
HOLLAND DR
HWL - 297 m
FIRE FLOW HWL - 295 m

DRAFT

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Projection:	
Central Meridian:	
False Easting: m	False Northing: m
Page Orientation: °	Scale Factor:

True North

0 100 200 300 400 500 600 700 800
Metres

BURNSIDE

Client
BOLTON OPTION 3 LANDOWNERS GROUP

Map Title
BOLTON ZONE 7 OPTIONS 1, 2 & 3
SCENARIO 4 - MDD 2031 OPTION 1 AND OPTION 3

Drawn	Checked	Date	Map No.
RW	JLL	2021/05/10	**4.1**
Scale		Project No.	
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File Path: C:\Users\RWatson\Documents\210414 Bolton Rebuild Project\210414 Bolton Infowater New.apx Print Date: 2021/05/10 Time: 04:15 PM

Junction
Hydrant Design Flow (L/s)
- less than 0.0
- 0.0 ~ 100.0
- 100.0 ~ 150.0
- 150.0 ~ 220.0
- > 220

Pipe
Diameter (mm)
- 150
- 200
- 300
- 400
- 600
- 1050

Pump
Type
- Active

Reservoir
Type
- Active

BOLTON ZONE 7
ELEVATED TANK
(LOCATION SHOWN
SCHEMATICALLY)
HWL - 327.7 m

EMIL KOLB PARKWAY

EXISTING EAST
DEMANDS

HIGHWAY 50

THE GORE ROAD

EMIL KOLB PARKWAY

EXISTING WEST
DEMANDS

PROPOSED BOOSTER
PUMPING STATION @
KING STREET AND
COLERAINE DRIVE
(APPROXIMATE
LOCATION)

BOLTON ZONE 6
ELEVATED TANK
(LOCATION SHOWN
SCHEMATICALLY)
LOCATED @
COLERAINE DR AND
HOLLAND DR
HWL - 297 m
FIRE FLOW HWL - 295 m

KING STREET

COLERAINE DR

DRAFT

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Projection:	
Central Meridian:	
False Easting: m	False Northing: m
Page Orientation: °	Scale Factor:

True North

0 100 200 300 400 500 600 700 800
Metres

BURNSIDE

Client
BOLTON OPTION 3 LANDOWNERS GROUP

Map Title
BOLTON ZONE 7 OPTIONS 1, 2 & 3
SCENARIO 5 - FIRE FLOW FULL BUILDOUT
2051 OPTION 3 + 2031 OPTION 1

Drawn	Checked	Date	Map No.
RW	JLL	2021/05/10	5
Scale		Project No.	
H 1:6000		300034976	

File Path: C:\Users\RWatson\Documents\210414 Bolton Rebuild Project\210414 Bolton Inflowater New.apx Print Date: 2021/05/10 Time: 05:21 PM

Junction
PRESSURE

- less than 20.00
- 20.00 ~ 40.00
- 40.00 ~ 70.00
- 70.00 ~ 80.00
- 80.00 ~ 100.00
- > 100

Pipe
DIAMETER

- 150
- 200
- 300
- 400
- 600
- 1050

Pump
Type

- Active

Reservoir
Type

- Active

BOLTON ZONE 7
ELEVATED TANK
(LOCATION SHOWN
SCHEMATICALLY)
HWL - 327.7 m

EMIL KOLB PARKWAY

EXISTING EAST
DEMANDS

HIGHWAY 50

THE GORE ROAD

EMIL KOLB PARKWAY

EXISTING WEST
DEMANDS

PROPOSED BOOSTER
PUMPING STATION @
KING STREET AND
COLERAINE DRIVE
(APPROXIMATE
LOCATION)

BOLTON ZONE 6
ELEVATED TANK
(LOCATION SHOWN
SCHEMATICALLY)
LOCATED @
COLERAINE DR AND
HOLLAND DR
HWL - 297 m
FIRE FLOW HWL - 295 m

KING STREET

DRAFT

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Datum:	
Coord. System:	
Projection:	
Central Meridian:	
False Easting: m	False Northing: m
Page Orientation: °	Scale Factor:

True North

0 100 200 300 400 500 600 700 800
Metres

BURNSIDE

Client
BOLTON OPTION 3 LANDOWNERS GROUP

Map Title
BOLTON ZONE 7 OPTIONS 1, 2 & 3
SCENARIO 5 - MDD FULL BUILDOUT 2051
OPTION 3 + 2031 OPTION 3

Drawn	Checked	Date	Map No.
RW	JLL	2021/05/10	5.1
Scale		Project No.	
H 1:6000		300034976	

File Path: C:\Users\RWatson\Documents\210414 Bolton Rebuild Project\210414 Bolton Inflowater New.apzx Print Date: 2021/05/10 Time: 04:32 PM

Junction
Hydrant Design Flow (L/s)

- less than 0.0
- 0.0 ~ 100.0
- 100.0 ~ 150.0
- 150.0 ~ 220.0
- > 220

Pipe
Diameter (mm)

- 150
- 200
- 300
- 400
- 600
- 1050

Pump
Type

- Active

Reservoir
Type

- Active

BOLTON ZONE 7
ELEVATED TANK
(LOCATION SHOWN
SCHEMATICALLY)
HWL - 327.7 m

2051 OPTION 1

2051 OPTION 2

EMIL KOLB PARKWAY

THE GORE ROAD

KING STREET

EXISTING EAST
DEMANDS

EXISTING WEST
DEMANDS +
2051 ROA

PROPOSED BOOSTER
PUMPING STATION @
KING STREET AND
COLERAINE DRIVE
(APPROXIMATE
LOCATION)

BOLTON ZONE 6
ELEVATED TANK
(LOCATION SHOWN
SCHEMATICALLY)
LOCATED @
COLERAINE DR AND
HOLLAND DR
HWL - 297 m
FIRE FLOW HWL - 295 m

COLERAINE DR

DRAFT

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Projection:	
Central Meridian:	
False Easting: m	False Northing: m
Page Orientation: °	Scale Factor:

True North

0 100 200 300 400 500 600 700 800
Metres

BURNSIDE

Client
BOLTON OPTION 3 LANDOWNERS GROUP

Map Title
BOLTON ZONE 7 OPTIONS 1, 2 & 3
SCENARIO 6 - FIRE FLOW FULL BUILDOUT
2051 OPTION 1, 2, 3 + ROA

Drawn	Checked	Date	Map No.
RW	JLL	2021/05/10	6
Scale		Project No.	
H 1:6000		300034976	

File Path: C:\Users\RWatson\Documents\210414 Bolton Rebuild Project\210414 Bolton Inflowater New.apx Print Date: 2021/05/10 Time: 05:25 PM

Junction PRESSURE

- less than 20.00
- 20.00 ~ 40.00
- 40.00 ~ 70.00
- 70.00 ~ 80.00
- 80.00 ~ 100.00

Pipe DIAMETER

- 150
- 200
- 300
- 400
- 600
- 1050

Pump Type

- Active

Reservoir Type

- Active

BOLTON ZONE 7 ELEVATED TANK (LOCATION SHOWN SCHEMATICALLY) HWL - 327.7 m

BOLTON ZONE 7 ELEVATED TANK (LOCATION SHOWN SCHEMATICALLY) HWL - 327.7 m

2051 OPTION 1

EMIL KOLB PARKWAY

EXISTING EAST DEMANDS

2051 OPTION 2

THE GORE ROAD

EMIL KOLB PARKWAY

EXISTING WEST DEMANDS + 2051 ROA

PROPOSED BOOSTER PUMPING STATION @ KING STREET AND COLERAINE DRIVE (APPROXIMATE LOCATION)

KING STREET

DRAFT

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Datum:	
Coord. System:	
Projection:	
Central Meridian:	
False Easting: m	False Northing: m
Page Orientation: °	Scale Factor:

True North

0 100 200 300 400 500 600 700 800

Metres

BURNSIDE

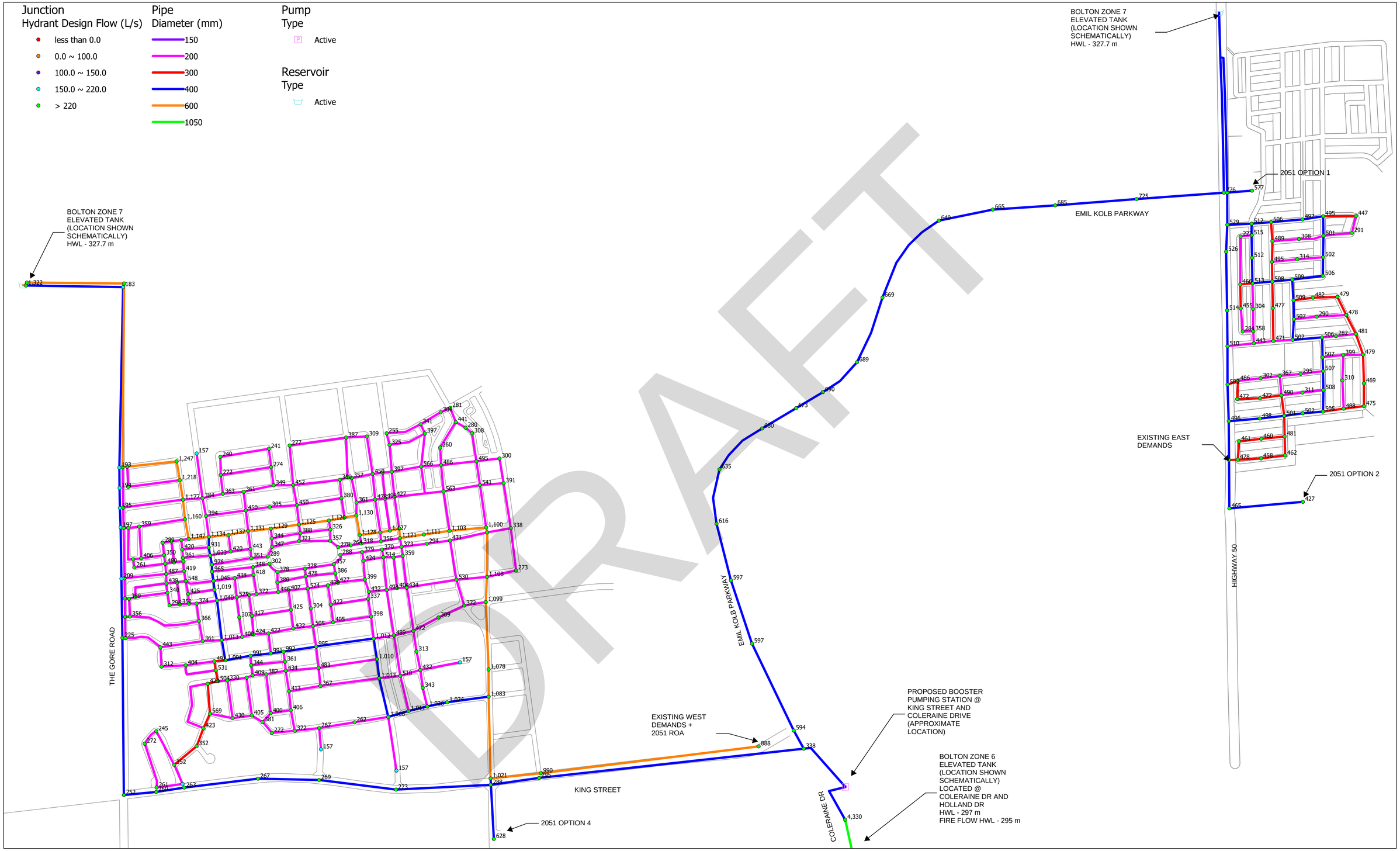
Client: **BOLTON OPTION 3 LANDOWNERS GROUP**

Map Title: **BOLTON ZONE 7 OPTIONS 1, 2 & 3**

SCENARIO 6 - MDD FULL BUILDOUT 2051 OPTION 1, 2, 3 + ROA

Drawn	Checked	Date	Map No.
RW	JLL	2021/05/10	6.1
Scale		Project No.	
H 1:6000		300034976	

File Path: C:\Users\RWatson\Documents\210414 Bolton Rebuild Project\210414 Bolton Inflowater New.apzx Print Date: 2021/05/10 Time: 04:39 PM



Sources:

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Datum:	
Coord. System:	
Projection:	
Central Meridian:	
False Easting: m	False Northing: m
Page Orientation: °	Scale Factor:

True North

0 100 200 300 400 500 600 700 800
Metres

BURNSIDE

Client
BOLTON OPTION 3 LANDOWNERS GROUP

Map Title
BOLTON ZONE 7 OPTIONS 1, 2 & 3
SCENARIO 7 - FIRE FLOW FULL BUILDOUT
2051 OPTION 1, 2, 3, 4 + ROA

Drawn	Checked	Date	Map No.
RW	JLL	2021/05/10	7
Scale		Project No.	
H 1:6000		300034976	

Junction
PRESSURE

- less than 20.00
- 20.00 ~ 40.00
- 40.00 ~ 70.00
- 70.00 ~ 80.00
- 80.00 ~ 100.00

Pipe
DIAMETER

- 150
- 200
- 300
- 400
- 600
- 1050

Pump
Type

- Active

Reservoir
Type

- Active

BOLTON ZONE 7
ELEVATED TANK
(LOCATION SHOWN
SCHEMATICALLY)
HWL - 327.7 m

THE GORE ROAD

EMIL KOLB PARKWAY

2051 OPTION 1

EXISTING EAST
DEMANDS

2051 OPTION 2

HIGHWAY 50

EXISTING WEST
DEMANDS +
2051 ROA

PROPOSED BOOSTER
PUMPING STATION @
KING STREET AND
COLERAINE DRIVE
(APPROXIMATE
LOCATION)

BOLTON ZONE 6
ELEVATED TANK
(LOCATION SHOWN
SCHEMATICALLY)
LOCATED @
COLERAINE DR AND
HOLLAND DR
HWL - 297 m
FIRE FLOW HWL - 295 m

KING STREET

COLERAINE DR

2051 OPTION 4

DRAFT

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Datum:	
Coord. System:	
Projection:	
Central Meridian:	
False Easting: m	False Northing: m
Page Orientation: °	Scale Factor:

True North

0 100 200 300 400 500 600 700 800
Metres

BURNSIDE

Client
BOLTON OPTION 3 LANDOWNERS GROUP

Map Title
BOLTON ZONE 7 OPTIONS 1, 2 & 3
SCENARIO 7 - MDD FULL BUILDOUT 2051
OPTION 1, 2, 3, 4 + ROA

Drawn	Checked	Date	Map No.
RW	JLL	2021/05/10	7.1
Scale		Project No.	
H 1:6000		300034976	

File Path: C:\Users\RWatson\Documents\210414 Bolton Rebuild Project\210414 Bolton Inflowater New.apzx Print Date: 2021/05/10 Time: 04:42 PM

Junction
Hydrant Design Flow (L/s)
- less than 0.0
- 0.0 ~ 100.0
- 100.0 ~ 150.0
- 150.0 ~ 220.0
- > 220

Pipe
Diameter (mm)
- 150
- 200
- 300
- 400
- 600
- 1050

Pump
Type
- Active

Reservoir
Type
- Active

BOLTON ZONE 7 ELEVATED TANK (LOCATION SHOWN SCHEMATICALLY) HWL - 327.7 m

WHITEBELT LANDS

BOLTON ZONE 7 ELEVATED TANK (LOCATION SHOWN SCHEMATICALLY) HWL - 327.7 m

2051 OPTION 1

EMIL KOLB PARKWAY

EXISTING EAST DEMANDS

2051 OPTION 2

HIGHWAY 50

THE GORE ROAD

EMIL KOLB PARKWAY

EXISTING WEST DEMANDS + 2051 ROA

PROPOSED BOOSTER PUMPING STATION @ KING STREET AND COLERAINE DRIVE (APPROXIMATE LOCATION)

BOLTON ZONE 6 ELEVATED TANK (LOCATION SHOWN SCHEMATICALLY) LOCATED @ COLERAINE DR AND HOLLAND DR HWL - 297 m FIRE FLOW HWL - 295 m

KING STREET

2051 OPTION 4

DRAFT

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Datum:	
Coord. System:	
Projection:	
Central Meridian:	
False Easting: m	False Northing: m
Page Orientation: °	Scale Factor:

True North

0 100 200 300 400 500 600 700 800
Metres

BURNSIDE

Client
BOLTON OPTION 3 LANDOWNERS GROUP

Map Title
BOLTON ZONE 7 OPTIONS 1, 2 & 3
SCENARIO 8 - FIRE FLOW FULL BUILDOUT
2051 OPTION 1, 2, 3, 4, ROA + WHITEBELT

Drawn	Checked	Date	Map No.
RW	JLL	2021/05/10	8
Scale		Project No.	
H 1:6000		300034976	

File Path: C:\Users\RWatson\Documents\210414 Bolton Rebuild Project\210414 Bolton InfowaterNew\210414 Bolton Infowater New.wpm Print Date: 2021/05/10 Time: 09:33 PM

Junction PRESSURE

- less than 20.00
- 20.00 ~ 40.00
- 40.00 ~ 70.00
- 70.00 ~ 80.00
- 80.00 ~ 100.00

Pipe DIAMETER

- 150
- 200
- 300
- 400
- 600
- 1050

Pump Type

- Active

Reservoir Type

- Active

BOLTON ZONE 7 ELEVATED TANK (LOCATION SHOWN SCHEMATICALLY) HWL - 327.7 m

WHITEBELT LANDS

BOLTON ZONE 7 ELEVATED TANK (LOCATION SHOWN SCHEMATICALLY) HWL - 327.7 m

2051 OPTION 1

EMIL KOLB PARKWAY

EXISTING EAST DEMANDS

2051 OPTION 2

HIGHWAY 50

THE GORE ROAD

EMIL KOLB PARKWAY

EXISTING WEST DEMANDS + 2051 ROA

PROPOSED BOOSTER PUMPING STATION @ KING STREET AND COLERAINE DRIVE (APPROXIMATE LOCATION)

KING STREET

BOLTON ZONE 6 ELEVATED TANK (LOCATION SHOWN SCHEMATICALLY) LOCATED @ COLERAINE DR AND HOLLAND DR HWL - 297 m FIRE FLOW HWL - 295 m

2051 OPTION 4

DRAFT

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Datum:	
Coord. System:	
Projection:	
Central Meridian:	
False Easting: m	False Northing: m
Page Orientation: °	Scale Factor:

True North

0 100 200 300 400 500 600 700 800

Metres

BURNSIDE

Client: **BOLTON OPTION 3 LANDOWNERS GROUP**

Map Title: **BOLTON ZONE 7 OPTIONS 1, 2 & 3**

SCENARIO 8 - MDD FULL BUILDOUT 2051 OPTION 1, 2, 3, 4, ROA + WHITEBELT

Drawn	Checked	Date	Map No.
RW	JLL	2021/05/10	8.1
Scale		Project No.	
H 1:6000		300034976	

File Path: C:\Users\RWatson\Documents\210414 Bolton Rebuild Project\210414 Bolton Inflowater New.apx Print Date: 2021/05/10 Time: 04:46 PM

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix C

Model Output

DRAFT

APPENDIX B

Sanitary Servicing Calculations

B1 – External Sanitary Sewer Design Sheet
B2 – Sanitary Design Flow Calculations
B3 – Sanitary Sewer Sizing Calculations

Appendix B1 – External Sanitary Sewer Design Sheet

CROZIER & ASSOCIATES Consulting Engineers

Peak Factor (M) = 1+(14/4+(P/1000)^0.5)
Avg. Daily Flow= 290 L/cap/d
N = 0.013
Infiltration = 0.26 L/s/ha

PROJECT: Bolton North Hill Landowners Group
PROJ. NO.: 708-3446
DESIGN: AR
CHECK: TG
DATE: 12/17/2021

SANITARY TRUNK SEWER ANALYSIS
BOLTON NORTH HILL LANDOWNERS GROUP
TO EXISTING BOLTON NORTH HILL SYSTEM

Drainage Area	Total Area Serviced (ha)	Population	Total Trib. Pop.	Pop. Flow Q(p) (L/s)	Peak	Peak Design Flow (L/s)	Infiltration Flow (L/s)	Combined Design Flow (L/s)	Pipe Diameter (mm)	Slope	Pipe Cap. (L/s)	Remaining Capacity (L/s)
Drainage Area 1	31.3	2439	2439	8.19	3.52	28.80	8.14	36.94	250	0.005	42.05	5.11
Drainage Area 1 Commercial Block	0.8	40	40	0.13	4.33	0.58	0.21	0.79	250	0.005	42.05	41.26
						Total Flow to Drainage Area 1 Pumping Station (L/s)		37.73				
Drainage Area 8	3.3	436	436	1.47	4.00	5.87	0.86	6.72	250	0.005	42.05	35.33
Drainage Area 9	3.8	354	354	1.19	4.05	4.81	0.99	5.80	250	0.005	42.05	36.25
Rounding Out Area C	7.5	538	538	1.81	3.96	7.15	0.00	7.15	250	0.005	42.05	34.90
						TOTAL TO EXISTING SYSTEM		**57.40**	**L/s**			

Notes:
Populations calculated based on unit counts taken from Preliminary Concept Plan (Bousfields Inc, November 23, 2021).
Rounding Out Area C population and area taken from IBI Statistics.
Unit breakdown by drainage area taken as a conservative estimate from the Bousfields Concept Plan (November 23, 2021) so that population within each drainage area was not understated. Therefore, total units from above is slightly higher than the summation of units in the Concept Plan.

CROZIER & ASSOCIATES Consulting Engineers

PROJECT: Bolton North Hill Landowners Group
PROJ. NO.: 708-3446
DESIGN: AR
CHECK: TG
DATE: 12/17/2021

SANITARY FLOW TO ALBION-VAUGHAN TRUNK SEWER CALCULATIONS
BOLTON NORTH HILL LANDOWNERS GROUP

Peak Factor (M) = 1+(14/4+(P/1000)^0.5)
Avg. Daily/Capita Flow = 290 L/cap.d
Q infiltration = 0.26 L/ha.s
N = 0.013
Average people per unit = 3.1

Proposed Flows - Option 1 and 2 Flows Included

Location	Notes	FROM Node	TO Node	Length (m)	Area (Ha)	Total Area Serviced (Ha)	Houses	Population	Total Trib. Pop. (House Count)	Pop. Flow Q(p) (L/s)	Peak Factor	Peak Design Flow (L/s)	Infiltration Flow (L/s)	Combined Design Flow (L/s)	Pipe Diameter (mm)	Slope (m/m)	Pipe Cap. (L/s)	Full Flow Vel. (m/s)	Spare Capacity (L/s)	Spare Capacity (with 20% reserve) (L/s)	UPGRADES: Upgraded Diameter mm	Length m	Rural/ Urban	Approximate Depth m	Upgraded Spare Capacity L/s	Upgraded Spare Capacity (with 20% reserve) L/s
Sewershed A: Existing Contributing Lands (Columbia Way & Kingsview Drive) + Option 1																										
Columbia Way & Kingsview Drive		1A	1B	102.5	42.9	42.9	-	3454	3454	11.59	3.39	39.30	11.15	50.45	250	0.005	42.0	0.86	-8.40	-16.81	300	102.5	Urban	**< 5m**	68.38	4.3
Coleman Court & Kingsview Drive		1B	1C	89.1	2.6	45.5	65	198	3652	12.26	3.37	41.29	11.83	53.12	250	0.009	56.4	1.15	3.29	-7.99	300	89.1	Urban	**< 5m**	91.74	20.3
		1C	1D	31.0	0.0	45.5	0	0	3652	12.26	3.37	41.29	11.83	53.12	250	0.004	37.6	0.77	-15.51	-23.03	375	31.0	Urban	**< 5m**	110.89	35.6
Bridlefield Crescent		1D	1E	44.5	1.7	47.2	36	110	3762	12.63	3.36	42.39	12.27	54.66	250	0.005	42.0	0.86	-12.61	-21.02	375	44.5	Urban	**< 5m**	123.98	44.5
Foxchase Drive & Taylorwood Avenue		1E	1F	108.5	2.7	49.9	31	95	3857	12.95	3.35	43.33	12.97	56.31	250	0.005	42.0	0.86	-14.26	-22.67	375	108.5	Urban	**< 5m**	123.98	42.9
		1F	1G	106.0	0.0	49.9	0	0	3857	12.95	3.35	43.33	12.97	56.31	250	0.005	42.0	0.86	-14.26	-22.67	375	106.0	Urban	**< 5m**	123.98	42.9
		1G	1H	45.0	0.0	49.9	0	0	3857	12.95	3.35	43.33	12.97	56.31	250	0.014	70.4	1.43	14.05	-0.02	300	45.0	Urban	**< 5m**	114.42	35.2
		1H	1J	7.7	0.0	49.9	0	0	3857	12.95	3.35	43.33	12.97	56.31	250	0.005	42.0	0.86	-14.26	-22.67	375	7.7	Urban	**< 5m**	123.98	42.9
Foxbury Place & Taylorwood Avenue		1J	1K	50.0	6.3	56.2	74	226	4083	13.70	3.33	45.57	14.61	60.18	250	0.011	62.4	1.27	2.19	-10.28	300	50.0	Urban	**< 5m**	101.42	21.0
		1K	1L	38.1	0.0	56.2	0	0	4083	13.70	3.33	45.57	14.61	60.18	250	0.003	32.6	0.66	-27.61	-34.12	375	38.1	Urban	**< 5m**	96.03	16.6
		1L	1M	34.5	0.0	56.2	0	0	4083	13.70	3.33	45.57	14.61	60.18	250	0.005	42.0	0.86	-18.13	-26.54	375	34.5	Urban	**< 5m**	123.98	39.0
		1M	1N	99.0	0.0	56.2	0	0	4083	13.70	3.33	45.57	14.61	60.18	250	0.005	42.0	0.86	-18.13	-26.54	375	99.0	Urban	**< 5m**	123.98	39.0
		1N	1O	32.9	0.0	56.2	0	0	4083	13.70	3.33	45.57	14.61	60.18	250	0.004	37.6	0.77	-22.57	-30.09	375	32.9	Urban	**< 5m**	110.89	28.5
		1O	1P	54.4	0.0	56.2	0	0	4083	13.70	3.33	45.57	14.61	60.18	250	0.006	46.1	0.94	-14.12	-23.33	375	54.4	Urban	**< 5m**	135.81	48.5
Taylorwood Avenue to St. Michael Crescent		1P	1Q	57.4	10.7	66.9	126	385	4467	14.99	3.29	49.33	17.39	66.72	300	0.006	74.9	1.06	8.18	-6.80	375	57.4	Urban	**< 5m**	135.81	41.9
		1Q	1R	61.6	0.0	66.9	0	0	4467	14.99	3.29	49.33	17.39	66.72	300	0.004	61.2	0.87	-5.57	-17.80	375	61.6	Urban	**< 5m**	110.89	22.0
		1R	1S	54.0	0.0	66.9	0	0	4467	14.99	3.29	49.33	17.39	66.72	300	0.003	53.0	0.75	-13.76	-24.35	375	54.0	Urban	**< 5m**	96.03	10.1
		1S	1T	84.4	0.0	66.9	0	0	4467	14.99	3.29	49.33	17.39	66.72	300	0.005	68.4	0.97	1.65	-12.02	375	84.4	Urban	**< 5m**	123.98	32.5
		1T	1U	46.7	0.0	66.9	0	0	4467	14.99	3.29	49.33	17.39	66.72	300	0.009	91.7	1.30	25.01	6.67						
		1U	1V	39.1	0.0	66.9	0	0	4467	14.99	3.29	49.33	17.39	66.72	300	0.006	74.9	1.06	8.18	-6.80	375	39.1	Urban	**< 5m**	135.81	41.9
		1V	1W	51.6	0.0	66.9	0	0	4467	14.99	3.29	49.33	17.39	66.72	300	0.007	80.9	1.14	14.18	-2.00	375	51.6	Urban	**< 5m**	146.69	50.6
		1W	1X	56.2	0.0	66.9	0	0	4467	14.99	3.29	49.33	17.39	66.72	300	0.006	74.9	1.06	8.18	-6.80	375	56.2	Urban	**< 5m**	135.81	41.9
Saint Michael Crescent to Culpepper Court		1X	1Y	27.3	7.9	74.8	98	299	4766	16.00	3.26	52.22	19.45	71.67	375	0.004	110.9	1.00	39.22	17.04						
		1Y	1Z	48.7	0.0	74.8	0	0	4766	16.00	3.26	52.22	19.45	71.67	375	0.002	78.4	0.71	6.74	-8.94	450	48.7	Urban	**< 5m**	127.50	30.3
		1Z	1Z1	57.4	0.0	74.8	0	0	4766	16.00	3.26	52.22	19.45	71.67	375	0.003	96.0	0.87	24.36	5.16						
		1Z1	1AA	10.4	1.2	76.0	9	27	4794	16.09	3.26	52.48	19.76	72.24	375	0.004	110.9	1.00	38.64	16.47						
Sewershed B: Existing Contributing Lands (Columbia Way & Mount Hope Road) + Option 2 Loading Point																										
Columbia Way & Mount Hope Road				74.0	4.2	4.2	-	354	354	1.19	4.05	4.81	1.09	5.91	250	0.004	37.6	0.77	31.70	24.18						
				110.0	0.3	4.5	10	31	385	1.29	4.03	5.21	1.17	6.38	250	0.006	46.1	0.94	39.69	30.47						
Ewart Street & Mount Hope Road				86.2	22.3	26.8	486	1483	1868	6.27	3.61	22.63	6.97	29.60	250	0.004	37.6	0.77	8.01	0.49						
				99.7	0.2	27.0	4	12	1880	6.31	3.61	22.76	7.02	29.78	250	0.005	42.0	0.86	12.27	3.86						
				22.5	0.0	27.0	0	0	1880	6.31	3.61	22.76	7.02	29.78	250	0.057	142.0	2.89	112.19	83.80						
				44.7	0.4	27.4	3	9	1890	6.34	3.60	22.86	7.12	29.99	250	0.005	42.0	0.86	12.06	3.65						
Guardhouse Drive				90.0	2.1	29.5	21	64	1954	6.56	3.59	23.57	7.67	31.24	250	0.004	37.6	0.77	6.38	-1.15	300	90.0	Urban	**>5 m**	61.16	17.7
				93.8	2.7	32.2	31	95	2048	6.87	3.58	24.60	8.37	32.97	250	0.004	37.6	0.77	4.64	-2.88	300	93.8	Urban	**>5 m**	61.16	16.0
				39.5	0.1	32.3	1	3	2051	6.89	3.58	24.63	8.40	33.03	250	0.006	46.1	0.94	13.04	3.82						
				101.6	5.9	38.2	72	220	2271	7.62	3.54	27.00	9.93	36.93	250	0.013	67.8	1.38	30.87	17.31						
Westchester Boulevard & Culpepper Court				74.8	16.5	54.7	174	531	2802	9.41	3.47	32.61	14.22	46.83	300	0.004	61.2	0.87	14.33	2.09						
				21.5	0.0	54.7	0	0	2802	9.41	3.47	32.61	14.22	46.83	300	0.028	161.8	2.29	114.98	82.62						
Culpepper Court & Hathaway Court				116.5	1.1	55.8	12	37	2839	9.53	3.46	32.99	14.51	47.50	450	0.003	156.2	0.98	108.66	77.43						
Hathaway Court cul-de-sac				63.6	1.8	57.6	20	61	2900	9.73	3.45	33.63	14.98	48.60	450	0.002	127.5	0.80	78.90	53.40						
				91.0	0.8	58.4	7	21	2921	9.80	3.45	33.85	15.18	49.03	450	0.004	180.3	1.13	131.29	95.22						
				53.4	0.0	58.4	0	0	2921	9.80	3.45	33.85	15.18	49.03	450	0.002	127.5	0.80	78.47	52.97						
Longwood Drive & Kingsview Drive				18.7	0.0	58.4	0	0	2921	9.80	3.45	33.85	15.18	49.03	450	0.003	156.2	0.98	107.13	75.90						
Sewershed C: Existing (Hershey Crescent)																										
Hershey Crescent		2A	2B	72.0	0.4	0.4	0	0	0	0.00	4.50	0.00	0.10	0.10	375	0.010	175.3	1.59	175.23	140.16						
		2B	2C	20.1	1.0	1.4	8	24	24	0.08	4.37	0.36	0.36	0.72	375	0.002	78.4	0.71	77.69	62.01						
		2C	2D	63.3	0.5	1.9	6	18	43	0.14	4.33	0.62	0.49	1.11	375	0.001	55.4	0.50	54.33	43.24						
		2D	2E	52.0	0.5	2.4	8	24	67	0.23	4.29	0.97	0.62	1.59	375	0.001	55.4	0.50	53.85	42.77						
		2E	2F	62.5	0.6	3.0	7	21	89	0.30	4.26	1.26	0.78	2.04	375	0.004	110.9	1.00	108.84	86.67						
		2F	2G	39.0	1.0	4.0	2	6	95	0.32	4.25	1.35	1.05	2.40	375	0.004	110.9	1.00	108.49	86.31						
		2G	2H	87.0	0.2	4.2	2	6	101	0.34	4.24	1.43	1.10	2.53	375	0.008	156.8	1.42	154.29	122.92						
		2H	2H1	10.0	4.7	8.9	48	146	247	0.83	4.11	3.41	2.32	5.73	375	0.023	265.9	2.41	260.17	206.99						
		2H1	2I	45.0	0.0	8.9	0	0	247	0.83	4.11	3.41	2.32	5.73	350	0.021	211.4	2.20	205.65	163.37						
		2I	2J	68.5	0.0	8.9	0	0	247	0.83	4.11	3.41	2.32	5.73	450	0.006	220.8	1.39	215.11	170.94						
		2J	2K	59.0	0.0	8.9	0	0	247	0.83	4.11	3.41	2.32	5.73	450	0.006	220.8	1.39	215.11	170.94						
		2K	2L1AF	73.0	2.1	11.0	20	61	308	1.03	4.07	4.21	2.87	7.08	450	0.006	220.8	1.39	213.76	169.59						
Sewershed D: East Route (Sewersheds A + B +C)																										
Longwood Drive & Kingsview Drive		2L1AF	2M1AG	91.0	0.0	145.4	0	0	8023	26.93	3.05	82.11	37.81	119.92	450	0.005	201.6	1.27	81.68	41.36						
		2M1AG	2N1AH	90.0	0.0	145.4	0	0	8023	26.93	3.05	82.11	37.81	119.92	450	0.005	201.6	1.27	81.68	41.36						
		2N1AH	2O1AI	90.0	0.0	145.4	0	0	8023	26.93	3.05	82.11	37.81	119.92	450	0.005	201.6	1.27	81.68	41.36						
		2O1AI	2P1AJ	35.0	0.0	145.4	0	0	8023	26.93	3.05	82.11	37.81	119.92	450	0.005	201.6	1.27	81.68	41.36						
		2P1AJ	2Q1AK	29.0	0.0	145.4	0	0	8023	26.93	3.05	82.11	37.81	119.92	450	0.005	201.6	1.27	81.68	41.36						
		2Q1AK	2R1AL	78.0	0.0	145.4	0	0	8023	26.93	3.05	82.11	37.81	119.92	450	0.005	201.6	1.27	81.68	41.36						
		2R1AL	2S1AM	37.5	0.0	145.4	0	0	8023	26.93	3.05	82.11	37.81	119.92	450	0.005	201.6	1.27	81.68	41.36						
		2S1AM	2U1AN	23.0	0.0	145.4	0	0	8023	26.93	3.05	82.11	37.81	119.92	450	0.005	201.6	1.27	81.68	41.36						
		2U1AN	2V1AD	23.5	0.0	145.4	0	0	8023	26.93	3.05	82.11	37.81	119.92	450	0.005	201.6	1.27	81.68	41.36						
		2V1AD	2W1AP	86.5	0.0	145.4	0	0	8023	26.93	3.05	82.11	37.81	119.92	450	0.005	201.6	1.27	81.68	41.36						

CROZIER & ASSOCIATES
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PROJECT: Bolton North Hill Landowners Group
PROJ. NO.: 708-3446
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CHECK: TG
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SANITARY FLOW TO ALBION-VAUGHAN TRUNK SEWER CALCULATIONS
BOLTON NORTH HILL LANDOWNERS GROUP

Peak Factor (M) = 1+(14/4+(P/1000)^0.5)
Avg. Daily/Capita Flow = 290 L/cap.d
Q infiltration = 0.26 L/ha.s
N = 0.013
Average people per unit = 3.1

Proposed Flows - Option 1 and 2 Flows Included

Location		FROM	TO	Length	Area	Total Area Serviced	Houses	Population	Total Trib. Pop.	Pop. Flow Q(p)	Peak	Peak Design Flow	Infiltration Flow	Combined Design Flow	Pipe Diameter	Slope	Pipe Cap.	Full Flow Vel.	Spare Capacity	Spare Capacity (with 20% reserve)	UPGRADES					
																					Upgraded Diameter	Length	Rural/ Urban	Approximate Depth	Upgraded Spare Capacity	Upgraded Spare Capacity (with 20% reserve)
		Node	Node	(m)	(Ha)	(Ha)			(House Count)	(L/s)	Factor	(L/s)	(L/s)	(L/s)	(mm)	(m/m)	(L/s)	(m/s)	(L/s)	(L/s)	mm	m		m	L/s	L/s
		2W1AP	2X1AQ	15.0	0.0	145.4	0	0	8023	26.93	3.05	82.11	37.81	119.92	450	0.005	201.6	1.27	81.68	41.36						
Crestwood Road & Maidstone Court		2X1AQ	2Y1AR	51.0	8.6	154.0	79	241	8264	27.74	3.04	84.23	40.05	124.27	450	0.005	201.6	1.27	77.33	37.01						
		2Y1AR	2Z1AS	46.8	0.0	154.0	0	0	8264	27.74	3.04	84.23	40.05	124.27	250	0.005	42.0	0.86	-82.22	-90.63	450	46.8	Urban	< 5 m	201.60	37.0
		2Z1AS	2AA1AT	48.5	1.3	155.3	9	27	8292	27.83	3.04	84.47	40.39	124.85	350	0.133	532.0	5.53	407.11	300.72						
		2AA1AT	2AB1AU	53.6	0.0	155.3	0	0	8292	27.83	3.04	84.47	40.39	124.85	350	0.075	399.5	4.15	274.62	194.72						
		2AB1AU	2AC1AV	93.4	0.0	155.3	0	0	8292	27.83	3.04	84.47	40.39	124.85	350	0.234	705.6	7.33	580.75	439.63						
		2AC1AV	2AD1AW	53.2	0.0	155.3	0	0	8292	27.83	3.04	84.47	40.39	124.85	450	0.005	201.6	1.27	76.75	36.43						
		2AD1AW	2AE1AX	14.7	0.0	155.3	0	0	8292	27.83	3.04	84.47	40.39	124.85	450	0.005	201.6	1.27	76.75	36.43						
	Siphon	2AE1AX	2AF1AY	39.6	0.0	155.3	0	0	8292	27.83	3.04	84.47	40.39	124.85	200	0.009	31.1	0.99	-93.74	-99.96	450	39.6	Urban	**>5 m**	270.48	91.5
Kings Street East & Old King Road		2AF1AY	3AM2AG1AZ	12.2	18.8	174.1	217	662	8954	30.05	3.00	90.23	45.27	135.50	500	0.061	932.6	4.75	797.09	610.57						

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SANITARY FLOW TO ALBION-VAUGHAN TRUNK SEWER CALCULATIONS
BOLTON NORTH HILL LANDOWNERS GROUP

Peak Factor (M) = 1+(14/4+(P/1000)^0.5)
Avg. Daily/Capita Flow = 290 L/cap.d
Q infiltration = 0.26 L/ha.s
N = 0.013
Average people per unit = 3.1

Proposed Flows - Option 1 and 2 Flows Included

Location		FROM	TO	Length	Area	Total Area Serviced	Houses	Population	Total Trib. Pop.	Pop. Flow Q(p)	Peak	Peak Design Flow	Infiltration Flow	Combined Design Flow	Pipe Diameter	Slope	Pipe Cap.	Full Flow Vel.	Spare Capacity	Spare Capacity (with 20% reserve)	UPGRADES: Upgraded Diameter	Length	Rural/ Urban	Approximate Depth	Upgraded Spare Capacity	Upgraded Spare Capacity (with 20% reserve)
		Node	Node	(m)	(Ha)	(Ha)			(House Count)	(L/s)	Factor	(L/s)	(L/s)	(L/s)	(mm)	(m/m)	(L/s)	(m/s)	(L/s)	(L/s)	mm	m		m	L/s	L/s
Sewershed E: West Route																										
Cross Country Boulevard & Highway 50		3A	3B	51.0	0.0	0.0	0	0	0	0.00	4.50	0.00	0.00	0.00	250	0.003	32.6	0.66	32.57	26.06						
		3B	3C	83.3	1.5	1.5	22	67	67	0.23	4.29	0.97	0.39	1.36	250	0.003	32.6	0.66	31.22	24.70						
		3C	3D	30.7	0.0	1.5	0	0	67	0.23	4.29	0.97	0.39	1.36	250	0.003	32.6	0.66	31.22	24.70						
		3D	3E	37.0	0.0	1.5	0	0	67	0.23	4.29	0.97	0.39	1.36	250	0.003	32.6	0.66	31.22	24.70						
Cross Country Boulevard & Laurel Park Gate		3E	3F	97.5	2.5	4.0	43	131	198	0.67	4.15	2.76	1.04	3.80	250	0.003	32.6	0.66	28.77	22.25						
		3F	3G	58.8	0.0	4.0	0	0	198	0.67	4.15	2.76	1.04	3.80	250	0.003	32.6	0.66	28.77	22.25						
		3G	3H	49.1	0.0	4.0	0	0	198	0.67	4.15	2.76	1.04	3.80	250	0.003	32.6	0.66	28.77	22.25						
		3H	3I	69.2	0.0	4.0	0	0	198	0.67	4.15	2.76	1.04	3.80	250	0.005	42.0	0.86	38.25	29.84						
		3I	3J	32.5	0.0	4.0	0	0	198	0.67	4.15	2.76	1.04	3.80	250	0.005	42.0	0.86	38.25	29.84						
		3J	3K	44.6	0.0	4.0	0	0	198	0.67	4.15	2.76	1.04	3.80	250	0.003	32.6	0.66	28.77	22.25						
		3K	3L	24.7	0.0	4.0	0	0	198	0.67	4.15	2.76	1.04	3.80	250	0.003	32.6	0.66	28.77	22.25						
		3L	3M	43.7	0.0	4.0	0	0	198	0.67	4.15	2.76	1.04	3.80	250	0.003	32.6	0.66	28.77	22.25						
		3M	3N	12.1	0.0	4.0	0	0	198	0.67	4.15	2.76	1.04	3.80	250	0.003	32.6	0.66	28.77	22.25						
		3N	3O	43.2	0.0	4.0	0	0	198	0.67	4.15	2.76	1.04	3.80	250	0.009	56.4	1.15	52.61	41.33						
		3O	3P	88.6	0.0	4.0	0	0	198	0.67	4.15	2.76	1.04	3.80	250	0.004	37.6	0.77	33.81	26.29						
Centennial Drive (Laurel Hill Cemetery)		3P	3Q	40.0	11.4	15.4	145	443	641	2.15	3.92	8.42	4.00	12.43	250	0.001	18.8	0.38	6.38	2.62						
		3Q	3R	25.0	0.0	15.4	0	0	641	2.15	3.92	8.42	4.00	12.43	250	0.060	145.7	2.97	133.24	104.10						
		3R	3S	112.6	0.0	15.4	0	0	641	2.15	3.92	8.42	4.00	12.43	250	0.073	160.7	3.27	148.24	116.11						
		3S	3T	112.6	0.0	15.4	0	0	641	2.15	3.92	8.42	4.00	12.43	250	0.073	160.7	3.27	148.24	116.11						
		3T	3U	68.0	0.0	15.4	0	0	641	2.15	3.92	8.42	4.00	12.43	250	0.070	157.3	3.21	144.91	113.44						
		3U	3V	104.5	0.0	15.4	0	0	641	2.15	3.92	8.42	4.00	12.43	250	0.030	103.0	2.10	90.57	69.97						
Hickman Street & Queen Street North		3V	3W	19.0	37.9	53.3	419	1279	1920	6.44	3.60	23.19	13.86	37.05	450	0.004	180.3	1.13	143.27	107.20						
		3W	3X	5.1	0.0	53.3	0	0	1920	6.44	3.60	23.19	13.86	37.05	450	0.003	156.2	0.98	119.11	87.88						
		3X	3Y	44.3	0.0	53.3	0	0	1920	6.44	3.60	23.19	13.86	37.05	450	0.003	156.2	0.98	119.11	87.88						
		3Y	3Z	37.1	0.0	53.3	0	0	1920	6.44	3.60	23.19	13.86	37.05	450	0.003	156.2	0.98	119.11	87.88						
		3Z	3AA	48.4	0.0	53.3	0	0	1920	6.44	3.60	23.19	13.86	37.05	450	0.003	156.2	0.98	119.11	87.88						
		3AA	3AB	52.0	0.0	53.3	0	0	1920	6.44	3.60	23.19	13.86	37.05	450	0.003	156.2	0.98	119.11	87.88						
		3AB	3AC	65.8	0.0	53.3	0	0	1920	6.44	3.60	23.19	13.86	37.05	450	0.003	156.2	0.98	119.11	87.88						
		3AC	3AD	75.3	0.0	53.3	0	0	1920	6.44	3.60	23.19	13.86	37.05	450	0.003	156.2	0.98	119.11	87.88						
		3AD	3AE	70.6	0.0	53.3	0	0	1920	6.44	3.60	23.19	13.86	37.05	450	0.003	156.2	0.98	119.11	87.88						
		3AE	3AF	62.6	0.0	53.3	0	0	1920	6.44	3.60	23.19	13.86	37.05	450	0.003	156.2	0.98	119.11	87.88						
Humber Lea Road & King Street East		3AF	3AG	46.2	49.7	103.0	469	1431	3351	11.25	3.40	38.25	26.78	65.03	525	0.003	235.6	1.09	170.52	123.41						
		3AG	3AH	12.9	0.0	103.0	0	0	3351	11.25	3.40	38.25	26.78	65.03	525	0.003	235.6	1.09	170.52	123.41						
		3AH	3AI	50.4	0.0	103.0	0	0	3351	11.25	3.40	38.25	26.78	65.03	525	0.002	192.3	0.89	127.30	88.83						
		3AI	3AJ	26.0	0.0	103.0	0	0	3351	11.25	3.40	38.25	26.78	65.03	600	0.002	274.6	0.97	209.56	154.64						
		3AJ	3AK	39.1	0.0	103.0	0	0	3351	11.25	3.40	38.25	26.78	65.03	600	0.001	194.2	0.69	129.13	90.30						
		3AK	3AL	28.5	0.0	103.0	0	0	3351	11.25	3.40	38.25	26.78	65.03	600	0.002	274.6	0.97	209.56	154.64						
Old King Road & King Street East		3AL	3AM2AG1AZ	82.5	88.0	191.0	707	2158	5509	18.49	3.21	59.27	49.66	108.93	600	0.002	274.6	0.97	165.66	110.74						
Sewershed F: Sewersheds A-E Converge																										
Old King Road & King Street East		3AM2AG1AZ	3AN2AH1BA	81.0	0.0	365.1	0	0	14462	48.54	2.79	135.64	94.93	230.57	675	0.001399	314.4	0.88	83.79	20.92						
		3AN2AH1BA	3AO2AI1BB	30.8	0.0	365.1	0	0	14462	48.54	2.79	135.64	94.93	230.57	675	0.001399	314.4	0.88	83.79	20.92						
		3AO2AI1BB	3AP2AJ1BC	54.5	0.0	365.1	0	0	14462	48.54	2.79	135.64	94.93	230.57	675	0.001399	314.4	0.88	83.79	20.92						
		3AP2AJ1BC	3AQ2AK1BD	17.3	0.0	365.1	0	0	14462	48.54	2.79	135.64	94.93	230.57	675	0.001399	314.4	0.88	83.79	20.92						
		3AQ2AK1BD	3AR2AL1BE	16.6	0.0	365.1	0	0	14462	48.54	2.79	135.64	94.93	230.57	675	0.001399	314.4	0.88	83.79	20.92						
		3AR2AK1BE	3AS2AM1BF	23.0	0.0	365.1	0	0	14462	48.54	2.79	135.64	94.93	230.57	675	0.0015	325.6	0.91	94.99	29.87						
		3AS2AM1BF	3AT2AN1BG	96.0	0.0	365.1	0	0	14462	48.54	2.79	135.64	94.93	230.57	675	0.0015	325.6	0.91	94.99	29.87						
Bolton SPS		3AT2AN1BG	**Bolton SPS**	13.0	0.0	365.1	0	0	14462	48.54	2.79	135.64	94.93	230.57	675	0.0015	325.6	0.91	94.99	29.87						

Notes
Existing Bolton North Hill land divided into drainage areas based on flow direction
Drainage areas for each existing sewer estimated from scaled plot of subject area
The estimated existing population density in Bolton of 30 ppl/Ha is approximately equaly to the SGU Population from Region of Peel
Assumed per capita flow of 302.8 L/cap.day to approximate flows to the sewage pump station

Appendix B2 – Sanitary Design Flow Calculations

CROZIER & ASSOCIATES
Consulting Engineers

PROJECT:	Bolton North Hill Landowners Group
PROJ. NO.:	708-3446
DESIGN:	AR
CHECK:	TG
DATE:	12/17/2021

POPULATION SUMMARY
BOLTON NORTH HILL LANDOWNERS GROUP

Note: Unit counts taken from Concept Plan (Bousfields, November 23, 2021)
Note: Population densities taken from IBI Group breakdown (October 10, 2021)

IBI Population Yields (10/10/21)	Persons per Unit
Single / Semi's	3.66
Townhouses	2.791
Apartments	1.764

Statistics	Option 1	Option 2	Option 1 + 2
Area	171	4.3	175.3
Units			
Single	1554	0	1554
Townhouses (Towns + B2Bs)	2038	127	2165
Apartments	417	0	417
Total Units	4009	127	4136
Population			
Population	12111	354	12466
Density	70.8	82.4	71.1
Commercial Area (ha)	1.4	-	1.4
Jobs	70	-	70
Residential + Employment Pop	**12,181**	**354**	**12,536**

CROZIER & ASSOCIATES
Consulting Engineers

PROJECT:	Bolton North Hill Landowners Group
PROJ. NO.:	708-3446
DESIGN:	AR
CHECK:	TG
DATE:	12/17/2021

SANITARY DESIGN FLOW ANALYSIS
BOLTON NORTH HILL LANDOWNERS GROUP

	Option 1	Option 2		References
Peaking Factor:				
Harmon Peak Factor: $M = 1 + 14 / (4 + P^{0.5})$				MOE Design Manual (2008), 5.5.2.1
Design population in thousands, P =	12.111	0.354		
Peaking factor, M =	2.9	4.0		
Infiltration:				
Unit infiltration allowance (Residential & Employment) =	0.26	0.26	L/s/ha	Peel Region 2020 Water & Wastewater Master Plan, Volume 4 Table 2
Area, A =	167.0	14.6	ha	
Infiltration Flows =	**43.4**	**3.8**	**L/s**	
Average Dry Weather Flow:				
Unit Dry Weather Flow, Residential =	290	290	L/person/day	Peel Region 2020 Water & Wastewater Master Plan, Volume 4 Table 2
Population, Residential =	12,111	354	persons	
Average Dry Weather Flow, Residential =	3,512,273	102,793	L/day	
	40.7	1.2	L/s	Peel Region 2020 Water & Wastewater Master Plan,
Unit Dry Weather Flow, Employment =	270	270	L/person/day	Peel Region 2020 Water & Wastewater Master Plan, Volume 4 Table 2
Population, Employment =	70	-	persons	
Average Dry Weather Flow, Employment =	18,900	-	L/day	
	0.22	-	L/s	Peel Region 2020 Water & Wastewater Master Plan, Volume 4 Table 2
Total Dry Weather Flow	**40.9**	**1.2**	**L/s**	
Total Average Daily Flow (Dry Flow and Infiltration):	**84.3**	**5.0**	**L/s**	
Peak Flow Based on Population:	117.36	4.81	L/s	
Total Peak Design Flow (Peak Flow and Infiltration):	**160.8**	**8.6**	**L/s**	Peak Day Flow + Base Infiltration

Appendix B3 – Sanitary Sewer Sizing Calculations

CROZIER & ASSOCIATES
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Peak Factor (M) = 1+(14/4+(P/1000)^0.5)
Avg. Daily Flow= 290 L/cap/d
N = 0.013
Infiltration = 0.26 L/s/ha

PROJ. NO: Bolton North Hill Landowners Group
PROJECT: 708-3446
DESIGN: AR
CHECK: TG
DATE: 12/17/2021

SANITARY TRUNK SEWER ANALYSIS
BOLTON NORTH HILL LANDOWNERS GROUP
TO EMIL KOLB TRUNK SEWER

Drainage Area	Total Area Serviced (ha)	Population	Total Trib. Pop.	Pop. Flow Q(p) (L/s)	Peak	Peak Design Flow (L/s)	Infiltration Flow (L/s)	Combined Design Flow (L/s)	Pipe Diameter (mm)	Slope	Pipe Cap. (L/s)	Remaining Capacity (L/s)	% Capacity
Drainage Area 2	40.7	4238	4238	14.22	3.31	47.09	10.58	57.68	300	0.005	68.38	10.70	84.35
Drainage Area 3	2.6	379	4617	15.50	3.28	50.78	11.26	62.04	375	0.005	123.98	61.94	50.04
Drainage Area 4	0.6	30	4647	15.60	3.27	51.07	11.41	62.49	375	0.005	123.98	61.49	50.40
Drainage Area 7	19.1	1179	1179	3.96	3.75	14.85	4.97	19.82	Connection to Emil Kolb through Drainage Area 6, population and infiltration added to Area 6.				
Drainage Area 5	15.4	1438	1438	4.83	3.69	17.82	4.00	21.83	Drainage Area 5 and 6 connect at the same point, population and infiltration added to Area 6.				
Drainage Area 6	36.3	3151	10415	34.96	2.94	102.68	29.82	132.50	450	0.005	201.60	69.10	65.72
To Duffy's Lane Pumping Station	-	-	10415	34.96	2.94	102.68	29.82	132.50	450	0.004	180.32	47.82	73.48

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DESIGN: AR
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SANITARY TRUNK SEWER ANALYSIS
BOLTON NORTH HILL LANDOWNERS GROUP
DRAINAGE AREA POPULATION BREAKDOWN

Drainage Area	Total Area Serviced (ha)	Unit Breakdown	Total Population
Drainage Area 1	32.1	Townhomes = 473 Singles = 288 Apartments = 37 Commercial = 0.6 ha	2469
Drainage Area 2	40.7	Townhomes = 692 Singles = 473 Apartments = 258 School = 2.4 ha	4238
Drainage Area 3	2.6	Apartments = 215	379
Drainage Area 4	0.6	Commercial = 0.6 ha	30
Drainage Area 5	15.4	Townhomes = 211 Singles = 232	1438
Drainage Area 6	36.3	Townhomes = 697 Singles = 257 Apartments = 79	3151
Drainage Area 7	19.1	Singles = 322	1179
Drainage Area 8	3.8	Townhomes = 127	354

Notes:
Commercial/school population density = 50 ppha (Region of Peel Public Works Design Criteria Manual - Sanitary Sewer, 2017)
Townhouse, B2B, singles and apartment population densities (PPU) are taken from IBI Population Yields (October 10, 2021) below.
Unit breakdown by drainage area taken as a conservative estimate from the Bousfields Concept Plan (November 23, 2021) so that population within each drainage area was not understated. Therefore, total units from above is slightly higher than the summation of units in the Concept Plan.

CROZIER & ASSOCIATES
Consulting Engineers

Peak Factor (M) = 1+(14/4+(P/1000)^0.5)
Avg. Daily Flow= 290 L/cap/d
N = 0.013
Infiltration = 0.26 L/s/ha

PROJECT: Bolton North Hill Landowners Group
PROJ. NO: 708-3446
DESIGN: AR
CHECK: TG
DATE: 11/17/2021

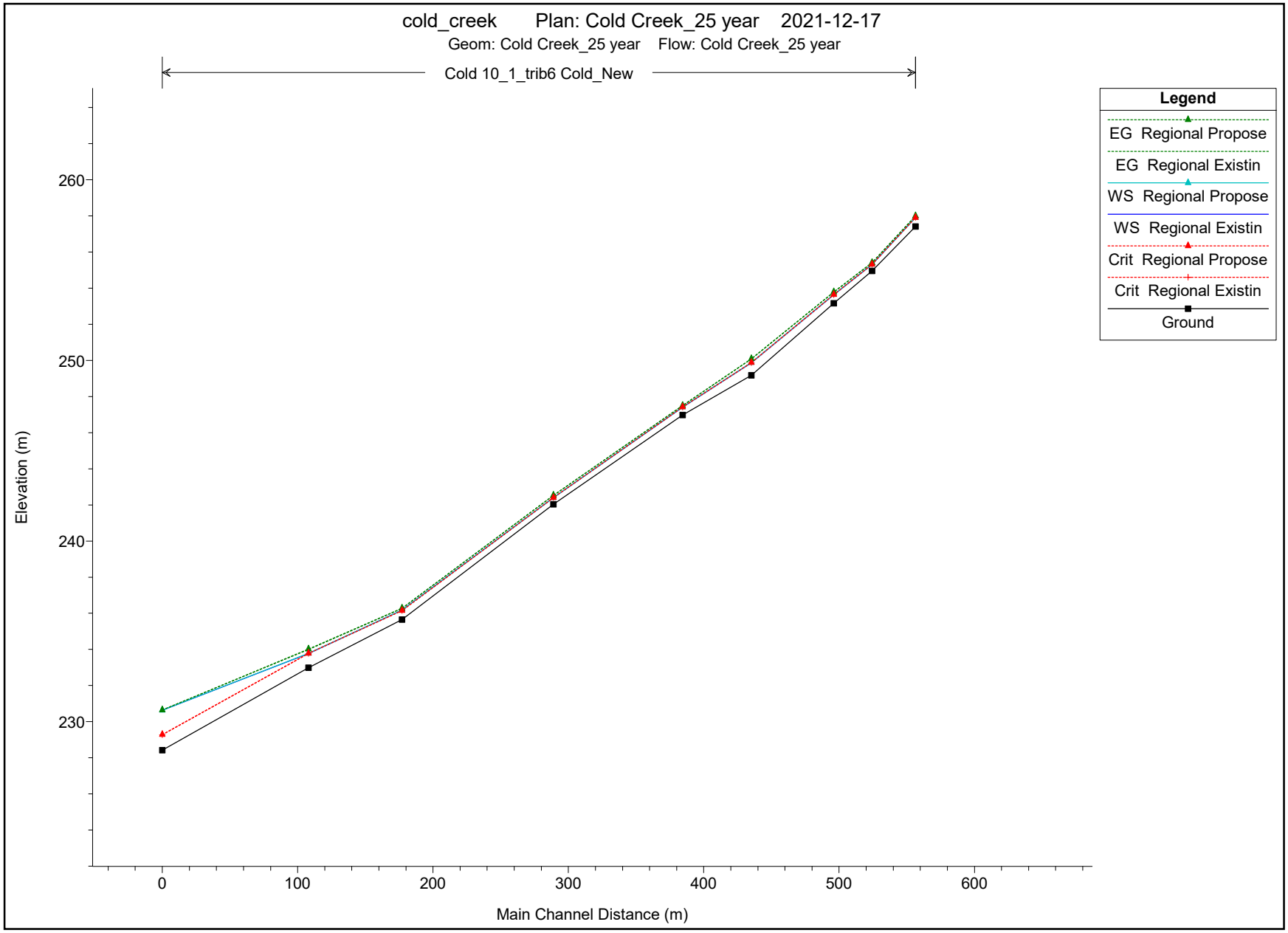
SANITARY TRUNK SEWER ANALYSIS
BOLTON NORTH HILL LANDOWNERS GROUP
INTERNAL TRUNK SEWER SIZING

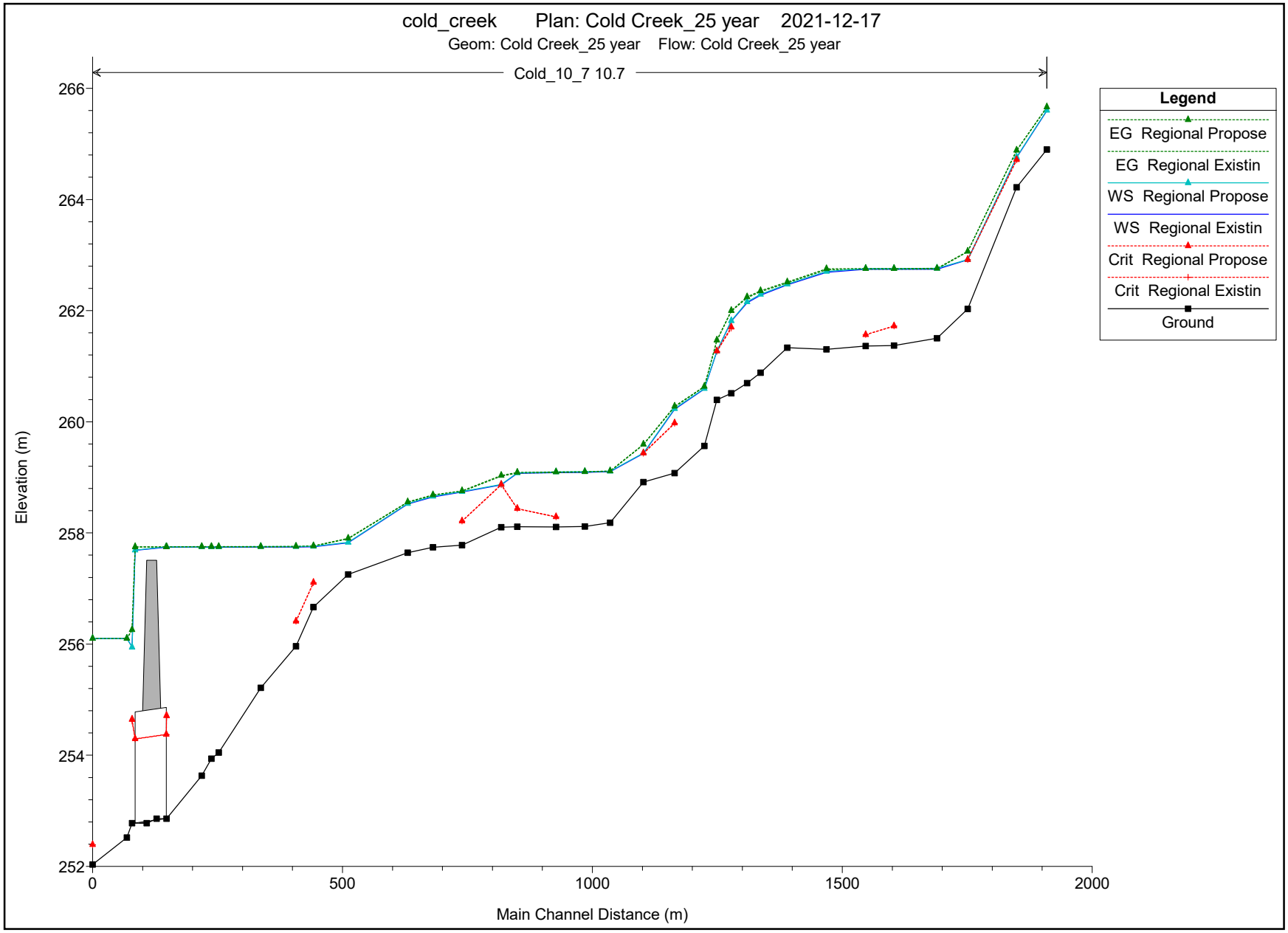
Drainage Area	Total Area Serviced (ha)	Population	Total Trib. Pop.	Pop. Flow Q(p) (L/s)	Peak	Peak Design Flow (L/s)	Infiltration Flow (L/s)	Combined Design Flow (L/s)	Pipe Diameter (mm)	Slope	Pipe Cap. (L/s)	Remaining Capacity (L/s)	% Capacity
Drainage Area 1	32.1	2469	2469	8.29	3.51	29.12	8.35	37.46	250	0.006	46.06	8.60	81.33
Drainage Area 2	40.7	4238	4238	14.22	3.31	47.09	10.58	57.67	300	0.005	68.38	10.70	84.35
Drainage Area 3	2.6	379	379	1.27	4.03	5.13	0.68	5.81	250	0.005	42.05	36.24	13.82
Drainage Area 4	0.6	30	30	0.10	4.35	0.44	0.16	0.59	250	0.005	42.05	41.46	1.41
Drainage Area 5	15.4	1438	1438	4.83	3.69	17.82	4.00	21.83	250	0.005	42.05	20.22	51.91
Drainage Area 6	36.3	3151	4329	14.53	3.30	47.99	14.40	62.39	375	0.005	123.98	61.59	50.32
Drainage Area 7	19.1	1179	1179	3.96	3.75	14.85	4.97	19.81	250	0.005	42.05	22.24	47.11
Drainage Area 9	3.8	354	354	1.19	4.05	4.81	0.99	5.80	250	0.005	42.05	36.25	13.80

Notes:
Region of Peel minimum pipe size = 250 mm dia.
Maximum pipe capacity (assumed) = 85%

APPENDIX C

Floodplain Analysis Documentation


cold_creek Plan: Cold Creek_25 year 2021-12-17
Geom: Cold Creek_25 year Flow: Cold Creek_25 year
Cold 10_1_trib6 Cold_New
Legend
EG Regional Propose
EG Regional Existin
WS Regional Propose
WS Regional Existin
Crit Regional Propose
Crit Regional Existin
Ground
Elevation (m)
260
250
240
230
0
100
200
300
400
500
600
Main Channel Distance (m)


cold_creek Plan: Cold Creek_25 year 2021-12-17
Geom: Cold Creek_25 year Flow: Cold Creek_25 year
Cold_10_7 10.7
Legend
EG Regional Propose
EG Regional Existin
WS Regional Propose
WS Regional Existin
Crit Regional Propose
Crit Regional Existin
Ground
Elevation (m)
266
264
262
260
258
256
254
252
0
500
1000
1500
2000
Main Channel Distance (m)

HEC-RAS Plan: Cold Creek_25 year

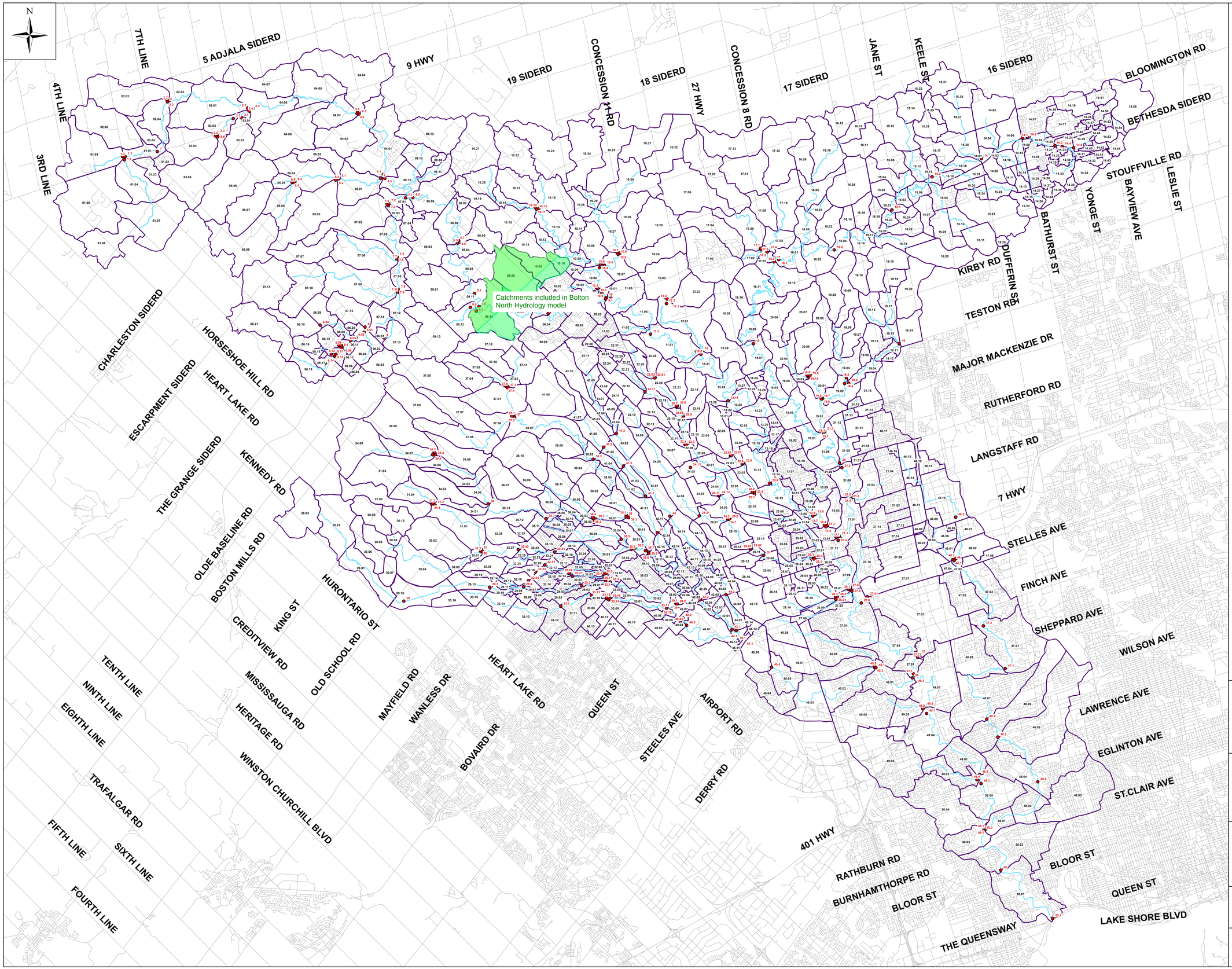
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Vel Left	Vel Right	Flow Area	Top Width	Froude # Chl
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m/s)	(m/s)	(m2)	(m)	
Cold_10_7	10.7	4370.082	25-Year	4.99	264.90	265.32		265.35	0.008914	0.79			6.28	23.03	0.49
Cold_10_7	10.7	4370.082	100-Year	6.96	264.90	265.39		265.43	0.008546	0.86			8.10	25.57	0.49
Cold_10_7	10.7	4370.082	Regional	15.06	264.90	265.60		265.66	0.007937	1.08	0.04	0.15	13.95	30.60	0.50
Cold_10_7	10.7	4370.082	Regional Post	15.52	264.90	265.60		265.67	0.007986	1.10	0.06	0.16	14.19	30.85	0.50
Cold_10_7	10.7	4370.081	25-Year	4.99	264.22	264.57		264.62	0.017148	0.99			5.06	21.87	0.65
Cold_10_7	10.7	4370.081	100-Year	6.96	264.22	264.61	264.55	264.68	0.019291	1.14			6.11	23.23	0.71
Cold_10_7	10.7	4370.081	Regional	15.06	264.22	264.75	264.71	264.88	0.023652	1.55			9.70	26.95	0.83
Cold_10_7	10.7	4370.081	Regional Post	15.52	264.22	264.76	264.71	264.89	0.023351	1.56			9.94	27.15	0.82
Cold_10_7	10.7	4370.079	25-Year	4.99	262.03	262.71	262.71	262.81	0.020035	1.36			3.66	21.18	1.05
Cold_10_7	10.7	4370.079	100-Year	6.96	262.03	262.76	262.76	262.87	0.017720	1.43			4.85	23.82	1.01
Cold_10_7	10.7	4370.079	Regional	15.06	262.03	262.91	262.91	263.06	0.014998	1.69			8.91	30.19	0.99
Cold_10_7	10.7	4370.079	Regional Post	15.52	262.03	262.92	262.92	263.07	0.015146	1.71			9.07	30.36	1.00
Cold_10_7	10.7	4370.073	25-Year	4.99	261.50	262.32		262.33	0.000031	0.13	0.01	0.03	43.00	82.14	0.05
Cold_10_7	10.7	4370.073	100-Year	6.96	261.50	262.43		262.43	0.000036	0.15	0.02	0.04	51.55	85.49	0.06
Cold_10_7	10.7	4370.073	Regional	15.06	261.50	262.74		262.75	0.000047	0.22	0.04	0.06	80.12	93.02	0.07
Cold_10_7	10.7	4370.073	Regional Post	15.52	261.50	262.76		262.76	0.000047	0.22	0.04	0.06	81.47	93.25	0.07
Cold_10_7	10.7	4370.043	25-Year	4.99	261.37	262.32	261.58	262.32	0.000018	0.09		0.01	56.37	105.67	0.04
Cold_10_7	10.7	4370.043	100-Year	6.96	261.37	262.43	261.61	262.43	0.000020	0.11	0.01	0.02	67.41	110.63	0.04
Cold_10_7	10.7	4370.043	Regional	15.06	261.37	262.74	261.72	262.74	0.000024	0.15	0.03	0.03	112.24	149.61	0.05
Cold_10_7	10.7	4370.043	Regional Post	15.52	261.37	262.76	261.72	262.76	0.000024	0.15	0.03	0.03	114.42	150.09	0.05
Cold_10_7	10.7	4369.909	25-Year	4.99	261.36	262.32	261.49	262.32	0.000003	0.05	0.01	0.02	134.48	182.22	0.02
Cold_10_7	10.7	4369.909	100-Year	6.96	261.36	262.42	261.51	262.43	0.000003	0.06	0.01	0.02	153.43	189.21	0.02
Cold_10_7	10.7	4369.909	Regional	15.06	261.36	262.74	261.57	262.74	0.000006	0.09	0.02	0.02	243.03	282.46	0.03
Cold_10_7	10.7	4369.909	Regional Post	15.52	261.36	262.76	261.57	262.76	0.000006	0.09	0.02	0.02	247.14	283.08	0.03
Cold_10_7	10.7	4368.863	25-Year	4.99	261.30	262.29		262.32	0.004704	0.71			7.03	18.59	0.37
Cold_10_7	10.7	4368.863	100-Year	6.96	261.30	262.39		262.42	0.004339	0.78	0.12	0.10	9.05	23.50	0.37
Cold_10_7	10.7	4368.863	Regional	15.06	261.30	262.69		262.74	0.003452	0.98	0.27	0.29	17.73	34.25	0.36
Cold_10_7	10.7	4368.863	Regional Post	15.52	261.30	262.70		262.75	0.003432	0.98	0.28	0.29	18.21	34.67	0.36
Cold_10_7	10.7	4361.888	25-Year	4.99	261.33	261.99		262.01	0.003256	0.69	0.18		7.64	19.54	0.32
Cold_10_7	10.7	4361.888	100-Year	6.96	261.33	262.11		262.14	0.003063	0.75	0.23		10.13	22.67	0.32
Cold_10_7	10.7	4361.888	Regional	15.06	261.33	262.46		262.50	0.002620	0.88	0.36	0.14	20.03	35.88	0.31
Cold_10_7	10.7	4361.888	Regional Post	15.52	261.33	262.48		262.52	0.002593	0.89	0.37	0.15	20.61	36.35	0.31
Cold_10_7	10.7	4308.669	25-Year	4.99	260.88	261.80		261.84	0.003463	0.77	0.13	0.13	6.63	14.76	0.33
Cold_10_7	10.7	4308.669	100-Year	6.96	260.88	261.93		261.97	0.003308	0.86	0.21	0.17	8.57	17.14	0.34
Cold_10_7	10.7	4308.669	Regional	15.06	260.88	262.28		262.34	0.003353	1.15	0.33	0.35	15.53	23.83	0.37
Cold_10_7	10.7	4308.669	Regional Post	15.52	260.88	262.29		262.36	0.003353	1.16	0.34	0.36	15.91	24.08	0.37
Cold_10_7	10.7	4281.832	25-Year	4.99	260.70	261.69		261.74	0.003663	0.95	0.19	0.26	6.09	13.98	0.36
Cold_10_7	10.7	4281.832	100-Year	6.96	260.70	261.81		261.87	0.004033	1.10	0.25	0.32	7.82	16.92	0.39
Cold_10_7	10.7	4281.832	Regional	15.06	260.70	262.14		262.23	0.004626	1.47	0.46	0.53	14.32	22.13	0.44
Cold_10_7	10.7	4281.832	Regional Post	15.52	260.70	262.16		262.25	0.004645	1.49	0.47	0.54	14.66	22.37	0.44
Cold_10_7	10.7	4249.753	25-Year	4.99	260.51	261.51		261.57	0.007966	1.10	0.21		4.65	10.82	0.49
Cold_10_7	10.7	4249.753	100-Year	6.96	260.51	261.58		261.67	0.009815	1.32	0.28	0.06	5.59	13.43	0.56
Cold_10_7	10.7	4249.753	Regional	15.06	260.51	261.81	261.68	261.99	0.013492	1.93	0.60	0.42	9.07	17.27	0.69
Cold_10_7	10.7	4249.753	Regional Post	15.52	260.51	261.82	261.70	262.00	0.013598	1.96	0.61	0.44	9.26	17.42	0.70
Cold_10_7	10.7	4221.04	25-Year	4.99	260.39	261.00	261.00	261.13	0.039284	1.60			3.12	12.07	1.00
Cold_10_7	10.7	4221.04	100-Year	6.96	260.39	261.08	261.08	261.21	0.030353	1.63		0.44	4.66	19.13	0.92
Cold_10_7	10.7	4221.04	Regional	15.06	260.39	261.27	261.27	261.46	0.026524	2.02	0.41	0.78	8.80	24.27	0.92
Cold_10_7	10.7	4221.04	Regional Post	15.52	260.39	261.27	261.27	261.47	0.026673	2.05	0.43	0.79	8.97	24.37	0.92
Cold_10_7	10.7	4196.075	25-Year	4.99	259.56	260.27		260.30	0.008218	0.99		0.49	8.44	30.12	0.48
Cold_10_7	10.7	4196.075	100-Year	6.96	259.56	260.35		260.38	0.007729	1.04		0.55	10.91	32.14	0.48
Cold_10_7	10.7	4196.075	Regional	15.06	259.56	260.59		260.63	0.007225	1.19	0.17	0.69	19.59	41.51	0.48
Cold_10_7	10.7	4196.075	Regional Post	15.52	259.56	260.60		260.64	0.007213	1.20	0.18	0.70	20.00	41.66	0.49
Cold_10_7	10.7	4136.37	25-Year	4.99	259.08	259.93	259.73	259.96	0.004212	0.82	0.21	0.39	9.47	33.52	0.37
Cold_10_7	10.7	4136.37	100-Year	6.96	259.08	260.01	259.79	260.03	0.004478	0.92	0.27	0.45	12.08	36.99	0.39
Cold_10_7	10.7	4136.37	Regional	15.06	259.08	260.22	259.97	260.27	0.005027	1.21	0.45	0.59	20.95	44.18	0.43
Cold_10_7	10.7	4136.37	Regional Post	15.52	259.08	260.24	259.98	260.28	0.005077	1.23	0.46	0.59	21.50	45.19	0.43
Cold_10_7	10.7	4074.032	25-Year	4.99	258.92	259.24	259.24	259.33	0.046045	1.34			3.73	21.38	1.02
Cold_10_7	10.7	4074.032	100-Year	6.96	258.92	259.29	259.29	259.39	0.042718	1.43			4.85	23.72	1.01
Cold_10_7	10.7	4074.032	Regional	15.06	258.92	259.43	259.43	259.58	0.037882	1.74			8.64	28.75	1.02
Cold_10_7	10.7	4074.032	Regional Post	15.52	258.92	259.44	259.44	259.59	0.037221	1.75			8.87	29.02	1.01
Cold_10_7	10.7	4007.722	25-Year	4.99	258.19	258.78		258.78	0.000309	0.18			28.10	78.06	0.09
Cold_10_7	10.7	4007.722	100-Year	6.96	258.19	258.86		258.87	0.000305	0.20			35.15	82.31	0.10
Cold_10_7	10.7	4007.722	Regional	15.06	258.19	259.10		259.11	0.000363	0.27			56.18	95.07	0.11
Cold_10_7	10.7	4007.722	Regional Post	15.52	258.19	259.11		259.12	0.000365	0.27			57.19	95.42	0.11
Cold_10_7	10.7	3956.844	25-Year	4.99	258.11	258.77		258.77	0.000087	0.12			43.20	88.65	0.05
Cold_10_7	10.7	3956.844	100-Year	6.96	258.11	258.86		258.86	0.000101	0.14			50.98	90.93	0.06
Cold_10_7	10.7	3956.844	Regional	15.06	258.11	259.09		259.09	0.000161	0.21			73.19	100.26	0.08
Cold_10_7	10.7	3956.844	Regional Post	15.52	258.11	259.10		259.10	0.000165	0.21		0.00	74.25	101.71	0.08
Cold_10_7	10.7	3899.436	25-Year	4.99	258.11	258.77	258.22	258.77	0.000029	0.07			67.45	119.82	0.03
Cold_10_7	10.7	3899.436	100-Year	6.96	258.11	258.85	258.23	258.85	0.000037	0.09			78.00	123.85	0.04
Cold_10_7	10.7	3899.436	Regional	15.06	258.11	259.09	258.29	259.09	0.000063	0.14	0.03	0.00	108.85	140.08	0.05
Cold_10_7	10.7	3899.436	Regional Post	15.52	258.11	259.10	258.29	259.10	0.000064	0.14	0.03	0.01	110.30	140.39	0.05
Cold_10_7	10.7	3821.818	25-Year	4.99	258.11	258.76	258.30	258.76	0.000244	0.18			28.03	64.99	0.09
Cold_10_7	10.7	3821.818	100-Year	6.96	258.11	258.85	258.33	258.85	0.000272	0.21		0.03	33.99	71.77	0.09
Cold_10_7	10.7	3821.818	Regional	15.06	258.11	259.07	258.44	259.08	0.000366	0.30		0.08	51.20	79.84	0.11
Cold_10_7	10.7	3821.818	Regional Post	15.52	258.11	259.08	258.44	259.09	0.000371	0.31		0.08	52.01	80.08	0.12
Cold_10_7	10.7	3789.828	25-Year	4.99	258.10	258.61	258.61	258.72	0.039731	1.47			3.38	14.96	0.99
Cold_10_7	10.7	3789.828	100-Year	6.96	258.10	258.68	258.68	258.81	0.038093	1.56			4.46	17.55	0.99

HEC-RAS Plan: Cold Creek_25 year (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Vel Left	Vel Right	Flow Area	Top Width	Froude # Chl
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m/s)	(m/s)	(m2)	(m)	
Cold_10_7	10.7	3789.828	Regional	15.06	258.10	258.87	258.87	259.02	0.034569	1.76		0.19	8.66	31.17	0.98
Cold_10_7	10.7	3789.828	Regional Post	15.52	258.10	258.87	258.87	259.03	0.034271	1.77		0.22	8.88	31.64	0.98
Cold_10_7	10.7	3711.272	25-Year	4.99	257.78	258.37	258.04	258.38	0.000857	0.32	0.03	0.10	15.94	42.79	0.16
Cold_10_7	10.7	3711.272	100-Year	6.96	257.78	258.46	258.08	258.46	0.000890	0.37	0.06	0.12	19.61	46.45	0.17
Cold_10_7	10.7	3711.272	Regional	15.06	257.78	258.73	258.21	258.75	0.000856	0.49	0.13	0.17	34.42	59.08	0.18
Cold_10_7	10.7	3711.272	Regional Post	15.52	257.78	258.75	258.22	258.76	0.000861	0.50	0.13	0.17	35.12	59.57	0.18
Cold_10_7	10.7	3653.272	25-Year	4.99	257.74	258.30		258.31	0.001784	0.45			11.09	28.47	0.23
Cold_10_7	10.7	3653.272	100-Year	6.96	257.74	258.37		258.39	0.002023	0.52			13.26	29.69	0.25
Cold_10_7	10.7	3653.272	Regional	15.06	257.74	258.65		258.67	0.002009	0.68	0.05	0.11	22.13	34.90	0.27
Cold_10_7	10.7	3653.272	Regional Post	15.52	257.74	258.66		258.68	0.002023	0.69	0.06	0.11	22.51	35.02	0.27
Cold_10_7	10.7	3602.49	25-Year	4.99	257.65	258.18		258.19	0.002910	0.53			9.38	27.04	0.29
Cold_10_7	10.7	3602.49	100-Year	6.96	257.65	258.23		258.25	0.003573	0.64			10.86	27.60	0.33
Cold_10_7	10.7	3602.49	Regional	15.06	257.65	258.52		258.55	0.003012	0.76			19.90	34.64	0.32
Cold_10_7	10.7	3602.49	Regional Post	15.52	257.65	258.53		258.56	0.003043	0.77			20.24	34.80	0.32
Cold_10_7	10.7	3483.216	25-Year	4.99	257.26	257.65		257.68	0.007202	0.67			7.41	29.59	0.43
Cold_10_7	10.7	3483.216	100-Year	6.96	257.26	257.76	257.57	257.78	0.004435	0.65			10.72	31.46	0.35
Cold_10_7	10.7	3483.216	Regional	15.06	257.26	257.82		257.89	0.012666	1.18			12.72	33.26	0.61
Cold_10_7	10.7	3483.216	Regional Post	15.52	257.26	257.83		257.90	0.012400	1.19			13.05	33.36	0.61
Cold_10_7	10.7	3413.879	25-Year	4.99	256.67	257.02	256.94	257.05	0.011695	0.76			6.53	30.94	0.53
Cold_10_7	10.7	3413.879	100-Year	6.96	256.67	256.98	256.98	257.07	0.043839	1.31			5.29	30.01	1.00
Cold_10_7	10.7	3413.879	Regional	15.06	256.67	257.75	257.10	257.76	0.000626	0.41	0.01	0.01	36.33	48.42	0.15
Cold_10_7	10.7	3413.879	Regional Post	15.52	256.67	257.76	257.11	257.77	0.000641	0.42	0.02	0.02	36.74	48.66	0.15
Cold_10_7	10.7	3378.862	25-Year	4.99	255.96	256.25	256.25	256.32	0.046007	1.19			4.18	28.36	0.99
Cold_10_7	10.7	3378.862	100-Year	6.96	255.96	256.67	256.28	256.68	0.000976	0.41			16.86	31.18	0.18
Cold_10_7	10.7	3378.862	Regional	15.06	255.96	257.75	256.41	257.75	0.000126	0.28			54.09	38.51	0.08
Cold_10_7	10.7	3378.862	Regional Post	15.52	255.96	257.75	256.41	257.76	0.000131	0.29			54.41	38.56	0.08
Cold_10_7	10.7	3308.731	25-Year	4.99	255.21	256.18		256.18	0.000078	0.18		0.01	28.21	39.46	0.07
Cold_10_7	10.7	3308.731	100-Year	6.96	255.21	256.67		256.67	0.000026	0.14	0.02	0.03	50.90	51.54	0.04
Cold_10_7	10.7	3308.731	Regional	15.06	255.21	257.75		257.75	0.000013	0.16	0.04	0.04	114.69	68.38	0.03
Cold_10_7	10.7	3308.731	Regional Post	15.52	255.21	257.75		257.75	0.000014	0.16	0.04	0.04	115.25	68.55	0.03
Cold_10_7	10.7	3216.276	25-Year	4.99	254.05	256.18		256.18	0.000014	0.13	0.02	0.03	39.77	27.93	0.03
Cold_10_7	10.7	3216.276	100-Year	6.96	254.05	256.67		256.67	0.000011	0.14	0.03	0.03	54.27	30.90	0.03
Cold_10_7	10.7	3216.276	Regional	15.06	254.05	257.74		257.75	0.000013	0.19	0.05	0.05	91.05	37.74	0.03
Cold_10_7	10.7	3216.276	Regional Post	15.52	254.05	257.75		257.75	0.000013	0.20	0.05	0.05	91.36	37.79	0.04
Cold_10_7	10.7	3198.314	25-Year	4.99	253.94	256.18		256.18	0.000014	0.13	0.02	0.01	41.04	30.16	0.03
Cold_10_7	10.7	3198.314	100-Year	6.96	253.94	256.67		256.67	0.000011	0.13	0.03	0.02	56.76	33.87	0.03
Cold_10_7	10.7	3198.314	Regional	15.06	253.94	257.74		257.75	0.000012	0.18	0.05	0.03	97.72	42.54	0.03
Cold_10_7	10.7	3198.314	Regional Post	15.52	253.94	257.75		257.75	0.000012	0.18	0.05	0.04	98.06	42.59	0.03
Cold_10_7	10.7	3190.241	25-Year	4.99	253.63	256.18		256.18	0.000002	0.04			137.29	108.34	0.01
Cold_10_7	10.7	3190.241	100-Year	6.96	253.63	256.67		256.67	0.000001	0.04			191.21	111.26	0.01
Cold_10_7	10.7	3190.241	Regional	15.06	253.63	257.74		257.74	0.000001	0.05	0.01	0.01	320.23	131.43	0.01
Cold_10_7	10.7	3190.241	Regional Post	15.52	253.63	257.75		257.75	0.000001	0.05	0.01	0.01	321.30	131.61	0.01
Cold_10_7	10.7	3115.165	25-Year	4.99	252.86	256.14	253.74	256.17	0.000193	0.76			6.53	69.22	0.14
Cold_10_7	10.7	3115.165	100-Year	6.96	252.86	256.62	253.95	256.66	0.000239	0.93			7.48	77.11	0.15
Cold_10_7	10.7	3115.165	Regional	15.06	252.86	257.74	254.68	257.74	0.000003	0.08	0.01	0.03	228.41	94.97	0.02
Cold_10_7	10.7	3115.165	Regional Post	15.52	252.86	257.75	254.72	257.75	0.000003	0.09	0.01	0.03	229.18	95.04	0.02
Cold_10_7	10.7	3083.999		Culvert											
Cold_10_7	10.7	3054.114	25-Year	4.99	252.78	255.70	253.67	255.74	0.000295	0.86			5.78	22.28	0.16
Cold_10_7	10.7	3054.114	100-Year	6.96	252.78	255.74	253.89	255.82	0.000546	1.19			5.86	22.59	0.22
Cold_10_7	10.7	3054.114	Regional	15.06	252.78	255.95	254.61	256.25	0.002031	2.40			6.28	27.43	0.43
Cold_10_7	10.7	3054.114	Regional Post	15.52	252.78	255.94	254.65	256.26	0.002181	2.48			6.26	27.32	0.45
Cold_10_7	10.7	3040.584	25-Year	4.99	252.52	255.72		255.72	0.000002	0.07	0.02	0.02	76.94	33.99	0.01
Cold_10_7	10.7	3040.584	100-Year	6.96	252.52	255.78		255.78	0.000004	0.09	0.03	0.02	78.99	34.23	0.02
Cold_10_7	10.7	3040.584	Regional	15.06	252.52	256.10		256.10	0.000012	0.17	0.06	0.05	90.12	35.39	0.03
Cold_10_7	10.7	3040.584	Regional Post	15.52	252.52	256.10		256.10	0.000013	0.18	0.06	0.05	90.11	35.39	0.03
Cold_10_7	10.7	2972.104	25-Year	4.99	252.03	255.72	252.24	255.72	0.000000	0.03	0.01	0.01	176.86	60.18	0.01
Cold_10_7	10.7	2972.104	100-Year	6.96	252.03	255.78	252.28	255.78	0.000001	0.04	0.01	0.01	180.49	60.55	0.01
Cold_10_7	10.7	2972.104	Regional	15.06	252.03	256.10	252.39	256.10	0.000002	0.08	0.03	0.03	200.25	63.07	0.01
Cold_10_7	10.7	2972.104	Regional Post	15.52	252.03	256.10	252.39	256.10	0.000002	0.08	0.03	0.03	200.25	63.07	0.01
Cold 10_1_trib6	Cold_New	1000	25-Year	0.78	257.41	257.79	257.79	257.86	0.049336	1.16			0.68	4.98	1.00
Cold 10_1_trib6	Cold_New	1000	100-Year	1.09	257.41	257.84	257.84	257.90	0.048885	1.09			1.00	8.10	0.99
Cold 10_1_trib6	Cold_New	1000	Regional	2.10	257.41	257.91	257.91	257.99	0.043212	1.24			1.69	10.16	0.98
Cold 10_1_trib6	Cold_New	1000	Regional Post	2.20	257.41	257.92	257.92	258.00	0.045794	1.29			1.71	10.18	1.01
Cold 10_1_trib6	Cold_New	999	25-Year	0.78	254.95	255.21	255.21	255.26	0.054878	1.05			0.74	6.94	1.03
Cold 10_1_trib6	Cold_New	999	100-Year	1.09	254.95	255.23	255.23	255.30	0.051179	1.16			0.94	7.21	1.02
Cold 10_1_trib6	Cold_New	999	Regional	2.10	254.95	255.31	255.31	255.41	0.044567	1.39			1.52	7.99	1.02
Cold 10_1_trib6	Cold_New	999	Regional Post	2.20	254.95	255.32	255.32	255.42	0.044247	1.40			1.57	8.07	1.02
Cold 10_1_trib6	Cold_New	998	25-Year	0.78	253.17	253.49	253.49	253.57	0.048512	1.28			0.61	3.80	1.02
Cold 10_1_trib6	Cold_New	998	100-Year	1.09	253.17	253.53	253.53	253.63	0.045824	1.39			0.78	4.10	1.02
Cold 10_1_trib6	Cold_New	998	Regional	2.10	253.17	253.64	253.64	253.78	0.041013	1.65			1.27	4.75	1.02
Cold 10_1_trib6	Cold_New	998	Regional Post	2.20	253.17	253.65	253.65	253.79	0.040810	1.67			1.32	4.80	1.02
Cold 10_1_trib6	Cold_New	997	25-Year	0.78	249.17	249.64	249.62	249.75	0.036711	1.47			0.53	1.99	0.90
Cold 10_1_trib6	Cold_New	997	100-Year	1.09	249.17	249.70	249.69	249.84	0.042411	1.70			0.64	2.12	0.99
Cold 10_1_trib6	Cold_New	997	Regional	2.10	249.17	249.87	249.87	250.08	0.041471	2.02			1.04	2.55	1.01
Cold 10_1_trib6	Cold_New	997	Regional Post	2.20	249.17	249.88	249.88	250.10	0.041192	2.04			1.08	2.60	1.01
Cold 10_1_trib6	Cold_New	996	25-Year	1.13	246.97	247.34	247.34	247.38	0.055505	0.92			1.23	14.22	0.99
Cold 10_1_trib6	Cold_New	996	100-Year	1.57	246.97	247.36	247.36	247.41	0.051319	1.01			1.55	14.50	0.99

HEC-RAS Plan: Cold Creek_25 year (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Vel Left	Vel Right	Flow Area	Top Width	Froude # Chl
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m/s)	(m/s)	(m2)	(m)	
Cold 10_1_trib6	Cold_New	996	Regional	3.02	246.97	247.42	247.42	247.50	0.047075	1.26			2.40	15.23	1.01
Cold 10_1_trib6	Cold_New	996	Regional Post	3.17	246.97	247.42	247.42	247.50	0.046471	1.27			2.50	15.49	1.01
Cold 10_1_trib6	Cold_New	995	25-Year	1.13	242.03	242.27	242.27	242.34	0.050348	1.16			0.97	7.34	1.02
Cold 10_1_trib6	Cold_New	995	100-Year	1.57	242.03	242.30	242.30	242.39	0.046757	1.28			1.23	7.54	1.01
Cold 10_1_trib6	Cold_New	995	Regional	3.02	242.03	242.40	242.40	242.52	0.041575	1.52			1.99	8.64	1.01
Cold 10_1_trib6	Cold_New	995	Regional Post	3.17	242.03	242.41	242.41	242.53	0.040559	1.53			2.07	8.71	1.00
Cold 10_1_trib6	Cold_New	994	25-Year	2.27	235.65	236.00	235.97	236.06	0.029964	1.12			2.02	10.89	0.83
Cold 10_1_trib6	Cold_New	994	100-Year	3.16	235.65	236.04	236.02	236.12	0.030712	1.27			2.50	11.42	0.86
Cold 10_1_trib6	Cold_New	994	Regional	6.09	235.65	236.17	236.15	236.27	0.030697	1.37			4.45	18.16	0.88
Cold 10_1_trib6	Cold_New	994	Regional Post	6.38	235.65	236.18	236.15	236.28	0.030716	1.39			4.59	18.27	0.89
Cold 10_1_trib6	Cold_New	993	25-Year	2.27	232.99	233.51	233.51	233.65	0.041184	1.64			1.39	5.25	1.02
Cold 10_1_trib6	Cold_New	993	100-Year	3.16	232.99	233.58	233.58	233.75	0.038743	1.79			1.77	5.59	1.02
Cold 10_1_trib6	Cold_New	993	Regional	6.09	232.99	233.77	233.77	233.99	0.035179	2.08			2.92	6.80	1.01
Cold 10_1_trib6	Cold_New	993	Regional Post	6.38	232.99	233.79	233.79	234.01	0.034801	2.11			3.03	6.87	1.01
Cold 10_1_trib6	Cold_New	992	25-Year	2.27	228.42	228.98	228.98	229.14	0.041048	1.77			1.29	4.19	1.02
Cold 10_1_trib6	Cold_New	992	100-Year	3.16	228.42	229.06	229.06	229.25	0.038809	1.94			1.63	4.37	1.01
Cold 10_1_trib6	Cold_New	992	Regional	6.09	228.42	230.63	229.27	230.64	0.000358	0.53	0.12	0.14	17.90	29.07	0.12
Cold 10_1_trib6	Cold_New	992	Regional Post	6.38	228.42	230.63	229.29	230.64	0.000393	0.55	0.13	0.14	17.90	29.07	0.13



Legend

- Flow Node
- General River
- Subcatchment

TORONTO AND REGION Conservation for The Living City

CIVICA

Humber River Hydrology

Figure 2.1 Catchments for Existing Scenario

Drawn By: M.Y. Date: Dec. 20, 2017

0 1.25 2.5 5 Kilometers

HEC-RAS Plan: Plan 01

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Vel Left	Vel Right	Flow Area	Top Width	Froude # Chl
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m/s)	(m/s)	(m2)	(m)	
MM_9_2_trib	9.204	1830.512	25-Year	0.51	268.31	268.42		268.44	0.020219	0.67			0.76	11.32	0.83
MM_9_2_trib	9.204	1830.512	100-Year	0.71	268.31	268.44	268.43	268.47	0.019262	0.72			0.98	12.56	0.83
MM_9_2_trib	9.204	1830.512	Regional Existin	1.43	268.31	268.49		268.53	0.016568	0.85			1.68	15.04	0.81
MM_9_2_trib	9.204	1830.512	Regional Propose	0.84	268.31	268.45	268.44	268.48	0.019526	0.77			1.09	12.77	0.84
MM_9_2_trib	9.204	1786.593	25-Year	0.51	267.63	267.78		267.80	0.011147	0.59			0.87	10.15	0.64
MM_9_2_trib	9.204	1786.593	100-Year	0.71	267.63	267.80		267.82	0.011424	0.64			1.12	11.71	0.66
MM_9_2_trib	9.204	1786.593	Regional Existin	1.43	267.63	267.85	267.82	267.89	0.012952	0.84			1.70	13.03	0.74
MM_9_2_trib	9.204	1786.593	Regional Propose	0.84	267.63	267.81	267.78	267.84	0.011231	0.67			1.25	11.93	0.66
MM_9_2_trib	9.204	1752.831	25-Year	0.51	267.16	267.29	267.28	267.31	0.018865	0.66			0.77	11.11	0.80
MM_9_2_trib	9.204	1752.831	100-Year	0.71	267.16	267.31	267.30	267.34	0.018753	0.74			0.96	11.74	0.82
MM_9_2_trib	9.204	1752.831	Regional Existin	1.43	267.16	267.36	267.34	267.40	0.015994	0.87			1.64	13.91	0.81
MM_9_2_trib	9.204	1752.831	Regional Propose	0.84	267.16	267.32	267.31	267.35	0.019034	0.78			1.07	12.08	0.84
MM_9_2_trib	9.204	1710.281	25-Year	0.51	266.50	266.69		266.71	0.011028	0.68			0.75	6.82	0.66
MM_9_2_trib	9.204	1710.281	100-Year	0.71	266.50	266.71		266.74	0.010815	0.75			0.94	7.29	0.67
MM_9_2_trib	9.204	1710.281	Regional Existin	1.43	266.50	266.79	266.74	266.83	0.011290	0.93			1.53	8.88	0.72
MM_9_2_trib	9.204	1710.281	Regional Propose	0.84	266.50	266.73		266.76	0.010492	0.79			1.07	7.58	0.67
MM_9_2_trib	9.204	1664.254	25-Year	0.51	265.79	265.94	265.94	265.98	0.024535	0.86			0.59	7.04	0.94
MM_9_2_trib	9.204	1664.254	100-Year	0.71	265.79	265.96	265.96	266.01	0.025572	0.96			0.74	7.63	0.99
MM_9_2_trib	9.204	1664.254	Regional Existin	1.43	265.79	266.02	266.02	266.09	0.024662	1.13			1.27	10.06	1.01
MM_9_2_trib	9.204	1664.254	Regional Propose	0.84	265.79	265.98	265.98	266.03	0.026872	1.00			0.84	8.60	1.01
MM_9_2_trib	9.204	1620.351	25-Year	0.51	264.57	264.68	264.68	264.70	0.034866	0.69			0.74	16.09	1.02
MM_9_2_trib	9.204	1620.351	100-Year	0.71	264.57	264.70	264.70	264.72	0.033926	0.70			1.01	20.65	1.02
MM_9_2_trib	9.204	1620.351	Regional Existin	1.43	264.57	264.86		264.86	0.000771	0.24			5.91	35.14	0.19
MM_9_2_trib	9.204	1620.351	Regional Propose	0.84	264.57	264.70	264.70	264.73	0.032142	0.71			1.18	22.71	1.00
MM_9_2_trib	9.204	1590.83	25-Year	0.51	263.79	264.23	264.06	264.28	0.003495	0.96			0.53	22.25	0.47
MM_9_2_trib	9.204	1590.83	100-Year	0.71	263.79	264.34	264.12	264.40	0.003075	1.05			0.68	26.78	0.46
MM_9_2_trib	9.204	1590.83	Regional Existin	1.43	263.79	264.69	264.31	264.78	0.002368	1.28			1.11	40.31	0.44
MM_9_2_trib	9.204	1590.83	Regional Propose	0.84	263.79	264.41	264.16	264.47	0.002904	1.10			0.76	28.86	0.45
MM_9_2_trib	9.204	1555.673		Culvert											
MM_9_2_trib	9.204	1195.922	25-Year	0.52	263.30	263.63	263.63	263.76	0.019383	1.61			0.32	17.42	1.01
MM_9_2_trib	9.204	1195.922	100-Year	0.72	263.30	263.69	263.69	263.86	0.017801	1.79			0.41	18.01	1.00
MM_9_2_trib	9.204	1195.922	Regional Existin	1.45	263.30	263.88	263.88	264.14	0.015174	2.25			0.65	23.31	1.00
MM_9_2_trib	9.204	1195.922	Regional Propose	0.87	263.30	263.73	263.73	263.92	0.017068	1.90			0.46	18.94	1.00
MM_9_2_trib	9.204	1195.146	25-Year	0.52	263.23	263.38		263.39	0.003842	0.31			1.67	22.57	0.37
MM_9_2_trib	9.204	1195.146	100-Year	0.72	263.23	263.40		263.41	0.003457	0.34			2.16	24.14	0.36
MM_9_2_trib	9.204	1195.146	Regional Existin	1.45	263.23	263.46		263.47	0.002773	0.39			3.69	27.48	0.34
MM_9_2_trib	9.204	1195.146	Regional Propose	0.87	263.23	263.42		263.42	0.003164	0.35			2.50	24.86	0.35
MM_9_2_trib	9.204	1193.146	25-Year	0.52	262.99	263.14	263.02	263.14	0.001737	0.22	0.21		2.52	21.84	0.25
MM_9_2_trib	9.204	1193.146	100-Year	0.72	262.99	263.17	263.04	263.17	0.001844	0.25	0.23		3.09	23.30	0.26
MM_9_2_trib	9.204	1193.146	Regional Existin	1.45	262.99	263.23	263.08	263.24	0.002063	0.34	0.30		4.77	26.83	0.30
MM_9_2_trib	9.204	1193.146	Regional Propose	0.87	262.99	263.18	263.05	263.18	0.001934	0.27	0.25		3.42	23.92	0.27
MM_9_2_trib	9.204	1193.1	25-Year	0.52	262.90	262.98	262.98	263.01	0.046748	0.54	0.76		0.71	12.14	1.07
MM_9_2_trib	9.204	1193.1	100-Year	0.72	262.90	263.00	263.00	263.03	0.042884	0.65	0.80		0.93	14.32	1.08
MM_9_2_trib	9.204	1193.1	Regional Existin	1.45	262.90	263.04	263.04	263.08	0.052134	1.07	0.78		1.75	25.50	1.32
MM_9_2_trib	9.204	1193.1	Regional Propose	0.87	262.90	263.01	263.01	263.04	0.042136	0.73	0.81		1.08	16.10	1.11
MM_9_2_trib	9.204	1193.001	25-Year	0.52	262.19	262.45		262.45	0.000302	0.14			3.62	23.21	0.12
MM_9_2_trib	9.204	1193.001	100-Year	0.72	262.19	262.48		262.48	0.000302	0.16			4.52	24.53	0.12
MM_9_2_trib	9.204	1193.001	Regional Existin	1.45	262.19	262.59		262.60	0.000283	0.19			7.49	29.12	0.12
MM_9_2_trib	9.204	1193.001	Regional Propose	0.87	262.19	262.53		262.53	0.000217	0.15			5.74	26.67	0.10
MM_9_2_trib	9.204	1192.777	25-Year	2.37	261.72	262.18		262.22	0.007691	0.85			2.80	14.16	0.61
MM_9_2_trib	9.204	1192.777	100-Year	3.21	261.72	262.24		262.28	0.006381	0.88			3.66	15.30	0.57
MM_9_2_trib	9.204	1192.777	Regional Existin	5.78	261.72	262.38		262.43	0.005210	0.97			5.95	18.33	0.54
MM_9_2_trib	9.204	1192.777	Regional Propose	4.41	261.72	262.32		262.36	0.005160	0.89			4.93	17.08	0.53
MM_9_2_trib	9.204	1192.631	25-Year	2.37	261.28	261.82		261.87	0.005004	0.92			2.57	8.18	0.53
MM_9_2_trib	9.204	1192.631	100-Year	3.21	261.28	261.90		261.95	0.005182	0.98			3.26	9.72	0.54
MM_9_2_trib	9.204	1192.631	Regional Existin	5.78	261.28	262.09		262.14	0.004882	0.97			5.93	17.22	0.53
MM_9_2_trib	9.204	1192.631	Regional Propose	4.41	261.28	262.01		262.06	0.005443	0.95			4.64	15.17	0.55
MM_9_2_trib	9.204	1192.407	25-Year	2.37	260.76	261.14		261.22	0.011597	1.27			1.87	7.03	0.78
MM_9_2_trib	9.204	1192.407	100-Year	3.21	260.76	261.20		261.30	0.011306	1.39			2.31	7.40	0.79
MM_9_2_trib	9.204	1192.407	Regional Existin	5.78	260.76	261.34	261.29	261.49	0.012023	1.72	0.14		3.38	9.40	0.85
MM_9_2_trib	9.204	1192.407	Regional Propose	4.41	260.76	261.28		261.40	0.010929	1.53			2.89	7.79	0.80
MM_9_2_trib	9.204	1192.296	25-Year	2.67	259.90	260.42	260.42	260.57	0.018993	1.72			1.56	5.29	1.01
MM_9_2_trib	9.204	1192.296	100-Year	3.62	259.90	260.50	260.50	260.67	0.018284	1.81			2.00	6.07	1.01
MM_9_2_trib	9.204	1192.296	Regional Existin	6.09	259.90	260.65	260.65	260.86	0.017098	2.04			2.98	7.18	1.01
MM_9_2_trib	9.204	1192.296	Regional Propose	5.07	259.90	260.59	260.59	260.79	0.017403	1.94			2.61	6.88	1.01
MM_9_2_trib	9.204	1192.146	25-Year	2.67	256.74	257.10	257.10	257.23	0.019239	1.60			1.67	6.45	1.00
MM_9_2_trib	9.204	1192.146	100-Year	3.62	256.74	257.17	257.17	257.32	0.018554	1.73			2.09	6.92	1.01
MM_9_2_trib	9.204	1192.146	Regional Existin	6.09	256.74	257.30	257.30	257.50	0.017058	2.00			3.04	7.60	1.01
MM_9_2_trib	9.204	1192.146	Regional Propose	5.07	256.74	257.25	257.25	257.43	0.017589	1.90			2.66	7.34	1.01
MM_9_2_trib	9.204	1158.742	25-Year	2.67	254.88	255.63	255.63	255.71	0.024316	1.22			2.19	14.97	1.02
MM_9_2_trib	9.204	1158.742	100-Year	3.62	254.88	255.68	255.67	255.76	0.018882	1.24			2.92	16.17	0.93
MM_9_2_trib	9.204	1158.742	Regional Existin	6.09	254.88	255.76	255.74	255.86	0.015333	1.40			4.34	17.09	0.89
MM_9_2_trib	9.204	1158.742	Regional Propose	5.07	254.88	255.73	255.71	255.82	0.016824	1.35			3.76	16.77	0.91
MM_9_2_trib	9.204	1117.042	25-Year	2.67	254.11	254.73	254.71	254.87	0.016791	1.66			1.61	5.20	0.95
MM_9_2_trib	9.204	1117.042	100-Year	3.62	254.11	254.79	254.79	254.97	0.018503	1.88			1.92	5.47	1.02
MM_9_2_trib	9.204	1117.042	Regional Existin	6.09	254.11	254.94	254.94	255.18	0.016977	2.15			2.83	6.17	1.01
MM_9_2_trib	9.204	1117.042	Regional Propose	5.07	254.11	254.88	254.88	255.10	0.017382	2.05			2.48	5.92	1.01
MM_9_2_trib	9.204	1085.498	25-Year	2.67	253.57	254.14	254.14	254.27	0.021101	1.59			1.68	6.80	1.02
MM_9_2_trib	9.204	1085.498	100-Year	3.62	253.57	254.21	254.21	254.36	0.019148	1.72			2.10	6.98	1.00
MM_9_2_trib	9.204	1085.498	Regional Existin	6.09	253.57	254.33	254.33	254.54	0.017486	2.01			3.03	7.37	1.00
MM_9_2_trib	9.204	1085.498	Regional Propose	5.07	253.57	254.28	254.28	254.47	0.018577	1.92			2.64	7.21	1.02

HEC-RAS Plan: Plan 01 (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Vel Left	Vel Right	Flow Area	Top Width	Froude # Chl
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m/s)	(m/s)	(m2)	(m)	
MM_9_2_trib	9.204	1056.979	25-Year	2.67	253.04	253.36	253.36	253.41	0.025592	0.95			2.80	29.13	0.98
MM_9_2_trib	9.204	1056.979	100-Year	3.62	253.04	253.38	253.38	253.44	0.028217	1.10			3.29	29.85	1.06
MM_9_2_trib	9.204	1056.979	Regional Existin	6.09	253.04	253.44	253.44	253.51	0.020786	1.22			5.00	30.88	0.97
MM_9_2_trib	9.204	1056.979	Regional Propose	5.07	253.04	253.42	253.42	253.48	0.022545	1.17			4.35	30.47	0.99
MM_9_2_trib	9.204	1006.094	25-Year	2.67	249.20	249.88	249.88	250.07	0.023434	1.96			1.36	3.56	1.01
MM_9_2_trib	9.204	1006.094	100-Year	3.62	249.20	249.97	249.97	250.20	0.022668	2.09			1.73	3.97	1.01
MM_9_2_trib	9.204	1006.094	Regional Existin	6.09	249.20	250.17	250.17	250.45	0.021483	2.33			2.61	4.83	1.01
MM_9_2_trib	9.204	1006.094	Regional Propose	5.07	249.20	250.10	250.10	250.36	0.021889	2.24			2.26	4.51	1.01
MM_9_2_trib	9.204	954.6843	25-Year	2.67	247.18	247.76	247.76	247.94	0.018875	1.90			1.41	3.93	1.01
MM_9_2_trib	9.204	954.6843	100-Year	3.62	247.18	247.84	247.84	248.06	0.018244	2.08			1.74	4.04	1.01
MM_9_2_trib	9.204	954.6843	Regional Existin	6.09	247.18	248.04	248.04	248.33	0.017226	2.39			2.55	4.43	1.01
MM_9_2_trib	9.204	954.6843	Regional Propose	5.07	247.18	247.96	247.96	248.22	0.017401	2.28			2.22	4.19	1.00
MM_9_2_trib	9.204	927.8772	25-Year	2.67	246.33	247.02	247.02	247.24	0.019230	2.06			1.30	3.04	1.01
MM_9_2_trib	9.204	927.8772	100-Year	3.62	246.33	247.12	247.12	247.38	0.018650	2.22			1.63	3.31	1.01
MM_9_2_trib	9.204	927.8772	Regional Existin	6.09	246.33	247.35	247.35	247.67	0.017427	2.50			2.44	3.88	1.01
MM_9_2_trib	9.204	927.8772	Regional Propose	5.07	246.33	247.26	247.26	247.56	0.017861	2.39			2.12	3.69	1.01
MM_9_2_trib	9.204	886.4161	25-Year	3.90	245.71	246.35		246.49	0.010830	1.62			2.40	5.13	0.76
MM_9_2_trib	9.204	886.4161	100-Year	5.38	245.71	246.46		246.63	0.011131	1.82			2.95	5.41	0.79
MM_9_2_trib	9.204	886.4161	Regional Existin	9.98	245.71	246.82		247.01	0.008107	1.96			5.09	6.52	0.71
MM_9_2_trib	9.204	886.4161	Regional Propose	9.08	245.71	246.76		246.95	0.008392	1.93			4.71	6.35	0.72
MM_9_2_trib	9.204	830.2587	25-Year	3.90	245.01	245.70		245.86	0.011308	1.79			2.18	4.45	0.82
MM_9_2_trib	9.204	830.2587	100-Year	5.38	245.01	245.84		246.02	0.010332	1.92			2.81	4.80	0.80
MM_9_2_trib	9.204	830.2587	Regional Existin	9.98	245.01	246.03	246.03	246.38	0.015454	2.65			3.77	5.29	1.00
MM_9_2_trib	9.204	830.2587	Regional Propose	9.08	245.01	245.99	245.97	246.32	0.014875	2.54			3.58	5.20	0.98
MM_9_2_trib	9.204	765.2102	25-Year	3.90	244.36	244.89	244.86	245.04	0.014227	1.68			2.32	6.55	0.90
MM_9_2_trib	9.204	765.2102	100-Year	5.38	244.36	245.02	245.01	245.14	0.017588	1.54			3.50	13.33	0.96
MM_9_2_trib	9.204	765.2102	Regional Existin	9.98	244.36	245.18	245.16	245.32	0.014711	1.67			5.98	17.67	0.92
MM_9_2_trib	9.204	765.2102	Regional Propose	9.08	244.36	245.16	245.14	245.29	0.015007	1.63			5.58	17.40	0.92
MM_9_2_trib	9.204	719.386	25-Year	3.90	244.08	244.41		244.46	0.010065	1.00			3.91	19.01	0.70
MM_9_2_trib	9.204	719.386	100-Year	5.38	244.08	244.46		244.52	0.010258	1.13			4.76	19.39	0.73
MM_9_2_trib	9.204	719.386	Regional Existin	9.98	244.08	244.54	244.51	244.66	0.013846	1.54			6.50	20.94	0.88
MM_9_2_trib	9.204	719.386	Regional Propose	9.08	244.08	244.53	244.49	244.64	0.013245	1.47			6.19	20.67	0.86
MM_9_2_trib	9.204	691.6686	25-Year	3.90	243.69	244.00	244.00	244.06	0.022077	1.13			3.44	24.89	0.97
MM_9_2_trib	9.204	691.6686	100-Year	5.38	243.69	244.03	244.03	244.11	0.023029	1.30			4.15	25.24	1.02
MM_9_2_trib	9.204	691.6686	Regional Existin	9.98	243.69	244.13	244.11	244.24	0.016781	1.48			6.75	26.65	0.94
MM_9_2_trib	9.204	691.6686	Regional Propose	9.08	243.69	244.11	244.10	244.22	0.017557	1.45			6.28	26.43	0.95
MM_9_2_trib	9.204	639.0789	25-Year	3.90	241.96	242.79		242.95	0.012419	1.78			2.20	4.90	0.85
MM_9_2_trib	9.204	639.0789	100-Year	5.38	241.96	242.92	242.84	243.10	0.011172	1.86			2.89	5.46	0.82
MM_9_2_trib	9.204	639.0789	Regional Existin	9.98	241.96	243.20	243.17	243.36	0.016561	1.77			5.62	15.97	0.96
MM_9_2_trib	9.204	639.0789	Regional Propose	9.08	241.96	243.15	243.13	243.32	0.016220	1.83			4.96	13.11	0.95
MM_9_2_trib	9.204	605.7167	25-Year	4.95	241.38	242.22	242.22	242.45	0.017109	2.12			2.34	5.14	1.00
MM_9_2_trib	9.204	605.7167	100-Year	6.84	241.38	242.44	242.44	242.58	0.020091	1.64			4.17	15.71	1.02
MM_9_2_trib	9.204	605.7167	Regional Existin	12.66	241.38	242.59	242.59	242.77	0.018251	1.90			6.66	18.81	1.02
MM_9_2_trib	9.204	605.7167	Regional Propose	11.66	241.38	242.57	242.57	242.74	0.018265	1.85			6.31	18.53	1.01
MM_9_2_trib	9.204	552.2101	25-Year	4.95	239.59	240.54	240.54	240.71	0.019828	1.87			2.65	7.87	1.03
MM_9_2_trib	9.204	552.2101	100-Year	6.84	239.59	240.64	240.63	240.83	0.017661	1.96			3.49	8.75	0.99
MM_9_2_trib	9.204	552.2101	Regional Existin	12.66	239.59	240.94	240.88	241.12	0.014713	1.89			6.69	15.59	0.92
MM_9_2_trib	9.204	552.2101	Regional Propose	11.66	239.59	240.86	240.82	241.08	0.015304	2.08			5.62	11.59	0.95
MM_9_2_trib	9.204	508.8769	25-Year	4.95	238.89	239.77	239.70	239.96	0.012611	1.92			2.59	5.19	0.87
MM_9_2_trib	9.204	508.8769	100-Year	6.84	238.89	239.87	239.86	240.11	0.015596	2.16			3.17	6.26	0.97
MM_9_2_trib	9.204	508.8769	Regional Existin	12.66	238.89	240.14	240.14	240.45	0.015741	2.46			5.14	8.44	1.01
MM_9_2_trib	9.204	508.8769	Regional Propose	11.66	238.89	240.09	240.09	240.40	0.015600	2.44			4.78	7.89	1.00
MM_9_2_trib	9.204	457.6058	25-Year	4.95	238.50	239.01	239.01	239.10	0.021132	1.32			3.74	20.56	0.99
MM_9_2_trib	9.204	457.6058	100-Year	6.84	238.50	239.06	239.06	239.17	0.020112	1.46			4.68	21.33	1.00
MM_9_2_trib	9.204	457.6058	Regional Existin	12.66	238.50	239.17	239.17	239.33	0.018637	1.80			7.01	22.02	1.02
MM_9_2_trib	9.204	457.6058	Regional Propose	11.66	238.50	239.15	239.15	239.31	0.018150	1.74			6.72	21.93	1.00
MM_9_2_trib	9.204	393.3919	25-Year	4.95	236.93	237.47	237.47	237.64	0.018276	1.83			2.71	8.21	1.01
MM_9_2_trib	9.204	393.3919	100-Year	6.84	236.93	237.57	237.57	237.75	0.017663	1.87			3.65	10.40	1.01
MM_9_2_trib	9.204	393.3919	Regional Existin	12.66	236.93	237.76	237.76	238.01	0.015683	2.18			5.80	11.94	1.00
MM_9_2_trib	9.204	393.3919	Regional Propose	11.66	236.93	237.73	237.73	237.97	0.015924	2.14			5.46	11.77	1.00
MM_9_2_trib	9.204	345.8717	25-Year	4.95	236.53	237.01		237.05	0.004683	0.96			5.15	14.83	0.52
MM_9_2_trib	9.204	345.8717	100-Year	6.84	236.53	237.07		237.13	0.005265	1.12			6.11	15.26	0.56
MM_9_2_trib	9.204	345.8717	Regional Existin	12.66	236.53	237.23		237.34	0.005933	1.46			8.69	15.90	0.63
MM_9_2_trib	9.204	345.8717	Regional Propose	11.66	236.53	237.21		237.31	0.005730	1.40			8.34	15.82	0.62
MM_9_2_trib	9.204	308.4069	25-Year	4.95	236.36	236.68	236.66	236.75	0.015857	1.19			4.15	21.61	0.87
MM_9_2_trib	9.204	308.4069	100-Year	6.84	236.36	236.73	236.71	236.82	0.015142	1.33			5.15	22.05	0.88
MM_9_2_trib	9.204	308.4069	Regional Existin	12.66	236.36	236.82	236.82	236.98	0.018245	1.78			7.12	22.57	1.01
MM_9_2_trib	9.204	308.4069	Regional Propose	11.66	236.36	236.80	236.80	236.95	0.018550	1.73			6.73	22.47	1.01
MM_9_2_trib	9.204	261.2717	25-Year	4.95	234.87	235.75	235.75	235.89	0.021074	1.63			3.04	11.57	1.01
MM_9_2_trib	9.204	261.2717	100-Year	6.84	234.87	235.82	235.82	235.98	0.020605	1.81			3.78	12.02	1.03
MM_9_2_trib	9.204	261.2717	Regional Existin	12.66	234.87	236.05	235.99	236.19	0.011737	1.66			7.61	18.35	0.82
MM_9_2_trib	9.204	261.2717	Regional Propose	11.66	234.87	236.01	235.97	236.16	0.013325	1.68			6.95	18.15	0.87
MM_9_2_trib	9.204	237.4458	25-Year	4.95	234.36	235.12	235.12	235.33	0.017840	2.03			2.44	5.83	1.00
MM_9_2_trib	9.204	237.4458	100-Year	6.84	234.36	235.23	235.23	235.48	0.017427	2.23			3.06	6.18	1.01
MM_9_2_trib	9.204	237.4458	Regional Existin	12.66	234.36	235.49	235.49	235.85	0.015860	2.63			4.81	6.97	1.01
MM_9_2_trib	9.204	237.4458	Regional Propose	11.66	234.36	235.45	235.45	235.79	0.015988	2.57			4.54	6.85	1.01
MM_9_2_trib	9.204	197.6155	25-Year	4.95	233.46	233.91		233.96	0.007190	1.05			4.74	16.31	0.62
MM_9_2_trib	9.204	197.6155	100-Year	6.84	233.46	233.98		234.05	0.006735	1.14			6.02	17.38	0.62
MM_9_2_trib	9.204	197.6155	Regional Existin	12.66	233.46	234.14		234.24	0.007328	1.41			8.97	19.94	0.67
MM_9_2_trib	9.204	197.6155	Regional Propose	11.66	233.46	234.12		234.22	0.007154	1.36			8.59	19.85	0.66

HEC-RAS Plan: Plan 01 (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Vel Left	Vel Right	Flow Area	Top Width	Froude # Chl
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m/s)	(m/s)	(m2)	(m)	
MM_9_2_trib	9.204	176.7205	25-Year	4.95	233.02	233.58	233.58	233.73	0.018920	1.67			2.97	10.62	1.01
MM_9_2_trib	9.204	176.7205	100-Year	6.84	233.02	233.66	233.66	233.82	0.018843	1.74			3.92	13.01	1.02
MM_9_2_trib	9.204	176.7205	Regional Existin	12.66	233.02	233.85	233.85	234.01	0.017313	1.80			7.05	21.03	0.99
MM_9_2_trib	9.204	176.7205	Regional Propose	11.66	233.02	233.83	233.83	233.98	0.017916	1.76			6.61	20.83	1.00
MM_9_2_trib	9.204	163.5648	25-Year	4.95	232.73	233.27	233.27	233.41	0.019863	1.62			3.06	11.90	1.02
MM_9_2_trib	9.204	163.5648	100-Year	6.84	232.73	233.35	233.35	233.50	0.018719	1.73			3.96	13.33	1.01
MM_9_2_trib	9.204	163.5648	Regional Existin	12.66	232.73	233.52	233.52	233.70	0.017229	1.87			6.77	19.03	1.00
MM_9_2_trib	9.204	163.5648	Regional Propose	11.66	232.73	233.50	233.50	233.67	0.017704	1.83			6.36	18.76	1.01
MM_9_2_trib	9.204	151.4771	25-Year	4.95	231.39	231.97	231.97	232.18	0.017483	2.04			2.43	5.84	1.01
MM_9_2_trib	9.204	151.4771	100-Year	6.84	231.39	232.08	232.08	232.33	0.016757	2.25			3.05	6.05	1.01
MM_9_2_trib	9.204	151.4771	Regional Existin	12.66	231.39	232.35	232.35	232.71	0.015362	2.65			4.77	6.75	1.01
MM_9_2_trib	9.204	151.4771	Regional Propose	11.66	231.39	232.30	232.30	232.65	0.015482	2.60			4.49	6.62	1.01
MM_9_2_trib	9.204	140.92	25-Year	4.95	231.16	231.64	231.64	231.77	0.019680	1.61			3.08	12.06	1.01
MM_9_2_trib	9.204	140.92	100-Year	6.84	231.16	231.70	231.70	231.86	0.018702	1.74			3.92	13.02	1.02
MM_9_2_trib	9.204	140.92	Regional Existin	12.66	231.16	231.86	231.86	232.08	0.016490	2.09			6.07	13.98	1.01
MM_9_2_trib	9.204	140.92	Regional Propose	11.66	231.16	231.84	231.84	232.05	0.016802	2.04			5.72	13.82	1.01
MM_9_2_trib	9.204	123.28	25-Year	4.95	229.65	230.60	230.60	230.80	0.018540	1.96			2.52	6.39	1.00
MM_9_2_trib	9.204	123.28	100-Year	6.84	229.65	230.70	230.70	230.94	0.017703	2.15			3.18	6.78	1.00
MM_9_2_trib	9.204	123.28	Regional Existin	12.66	229.65	230.96	230.96	231.28	0.016099	2.52			5.03	7.84	1.00
MM_9_2_trib	9.204	123.28	Regional Propose	11.66	229.65	230.92	230.92	231.23	0.016285	2.46			4.74	7.69	1.00
MM_9_2_trib	9.204	89.70679	25-Year	4.95	228.90	229.85	229.85	230.12	0.017696	2.28			2.17	4.16	1.01
MM_9_2_trib	9.204	89.70679	100-Year	6.84	228.90	230.00	230.00	230.30	0.016648	2.40			2.85	4.87	1.00
MM_9_2_trib	9.204	89.70679	Regional Existin	12.66	228.90	230.33	230.33	230.70	0.015462	2.66			4.75	6.63	1.00
MM_9_2_trib	9.204	89.70679	Regional Propose	11.66	228.90	230.28	230.28	230.64	0.015957	2.64			4.42	6.42	1.01
MM_9_2_trib	9.204	72.5771	25-Year	4.95	228.51	229.26	229.26	229.51	0.017422	2.20			2.25	4.63	1.01
MM_9_2_trib	9.204	72.5771	100-Year	6.84	228.51	229.39	229.39	229.68	0.016515	2.37			2.89	5.09	1.00
MM_9_2_trib	9.204	72.5771	Regional Existin	12.66	228.51	229.74	229.74	229.97	0.017814	2.14			5.90	13.27	1.03
MM_9_2_trib	9.204	72.5771	Regional Propose	11.66	228.51	229.72	229.72	229.94	0.017337	2.07			5.65	13.15	1.01
MM_9_2_trib	9.204	51.16022	25-Year	4.95	228.00	228.82	228.82	228.90	0.024372	1.30			3.80	23.76	1.04
MM_9_2_trib	9.204	51.16022	100-Year	6.84	228.00	228.86	228.86	228.96	0.022136	1.38			4.97	26.64	1.02
MM_9_2_trib	9.204	51.16022	Regional Existin	12.66	228.00	228.96	228.96	229.09	0.020702	1.58			7.99	32.97	1.03
MM_9_2_trib	9.204	51.16022	Regional Propose	11.66	228.00	228.95	228.95	229.07	0.022010	1.57			7.43	32.57	1.05
MM_9_2_trib	9.204	26.54893	25-Year	4.95	227.45	227.87	227.87	228.03	0.018238	1.77			2.80	8.83	1.01
MM_9_2_trib	9.204	26.54893	100-Year	6.84	227.45	227.96	227.96	228.14	0.017559	1.91			3.59	9.81	1.01
MM_9_2_trib	9.204	26.54893	Regional Existin	12.66	227.45	228.22	228.22	228.38	0.018292	1.74			7.29	23.82	1.00
MM_9_2_trib	9.204	26.54893	Regional Propose	11.66	227.45	228.20	228.20	228.35	0.018582	1.73			6.76	22.55	1.01
MM_9_2_trib	1	1005	25-Year	1.06	256.40	256.80	256.80	256.91	0.021421	1.47			0.72	3.34	1.01
MM_9_2_trib	1	1005	100-Year	1.48	256.40	256.86	256.86	256.99	0.020734	1.59			0.93	3.73	1.01
MM_9_2_trib	1	1005	Regional Existin	2.62	256.40	256.99	256.99	257.15	0.018669	1.78			1.47	4.59	1.00
MM_9_2_trib	1	1005	Regional Propose	2.23	256.40	256.95	256.95	257.10	0.019410	1.74			1.28	4.26	1.01
MM_9_2_trib	1	1004.6	25-Year	1.06	255.57	255.89	255.88	255.99	0.018265	1.42			0.74	3.23	0.94
MM_9_2_trib	1	1004.6	100-Year	1.48	255.57	255.94	255.94	256.07	0.019841	1.63			0.91	3.37	1.00
MM_9_2_trib	1	1004.6	Regional Existin	2.62	255.57	256.07	256.07	256.26	0.018454	1.91			1.37	3.73	1.01
MM_9_2_trib	1	1004.6	Regional Propose	2.23	255.57	256.03	256.03	256.20	0.018932	1.83			1.22	3.62	1.01
MM_9_2_trib	1	1004	25-Year	1.06	254.89	255.17	255.17	255.26	0.022381	1.35			0.78	4.32	1.01
MM_9_2_trib	1	1004	100-Year	1.48	254.89	255.22	255.22	255.33	0.021011	1.48			1.00	4.53	1.01
MM_9_2_trib	1	1004	Regional Existin	2.62	254.89	255.33	255.33	255.48	0.018831	1.71			1.53	5.15	1.00
MM_9_2_trib	1	1004	Regional Propose	2.23	254.89	255.29	255.29	255.43	0.019528	1.65			1.35	4.91	1.01
MM_9_2_trib	1	1003	25-Year	1.06	251.41	251.83	251.83	251.96	0.020683	1.60			0.66	2.52	1.00
MM_9_2_trib	1	1003	100-Year	1.48	251.41	251.90	251.90	252.05	0.020076	1.74			0.85	2.82	1.01
MM_9_2_trib	1	1003	Regional Existin	2.62	251.41	252.06	252.06	252.25	0.019073	1.91			1.37	3.76	1.01
MM_9_2_trib	1	1003	Regional Propose	2.23	251.41	252.01	252.01	252.19	0.019165	1.86			1.20	3.45	1.01
MM_9_2_trib	1	1002	25-Year	1.06	249.03	250.90		250.90	0.000020	0.11			9.34	10.34	0.04
MM_9_2_trib	1	1002	100-Year	1.48	249.03	250.98		250.98	0.000030	0.14			10.21	10.66	0.05
MM_9_2_trib	1	1002	Regional Existin	2.62	249.03	251.10		251.11	0.000066	0.23			11.51	11.03	0.07
MM_9_2_trib	1	1002	Regional Propose	2.23	249.03	251.09		251.09	0.000050	0.20			11.33	10.97	0.06
MM_9_2_trib	1	1001.4	25-Year	1.06	247.85	250.90		250.90	0.000001	0.04			27.38	15.38	0.01
MM_9_2_trib	1	1001.4	100-Year	1.48	247.85	250.98		250.98	0.000002	0.05			28.68	15.79	0.01
MM_9_2_trib	1	1001.4	Regional Existin	2.62	247.85	251.10		251.10	0.000004	0.09			30.62	16.37	0.02
MM_9_2_trib	1	1001.4	Regional Propose	2.23	247.85	251.09		251.09	0.000003	0.07			30.35	16.29	0.02
MM_9_2_trib	1	1001	25-Year	1.06	247.79	250.90		250.90	0.000001	0.03			33.22	20.37	0.01
MM_9_2_trib	1	1001	100-Year	1.48	247.79	250.98		250.98	0.000001	0.04			34.97	21.42	0.01
MM_9_2_trib	1	1001	Regional Existin	2.62	247.79	251.10		251.10	0.000003	0.07			37.60	22.12	0.02
MM_9_2_trib	1	1001	Regional Propose	2.23	247.79	251.09		251.09	0.000002	0.06			37.23	22.02	0.01
MM_9_2_trib	1	1000.8	25-Year	1.77	247.06	250.90		250.90	0.000000	0.01			202.31	71.46	0.00
MM_9_2_trib	1	1000.8	100-Year	2.48	247.06	250.98		250.98	0.000000	0.01		0.00	208.33	73.02	0.00
MM_9_2_trib	1	1000.8	Regional Existin	4.32	247.06	251.10		251.10	0.000000	0.02		0.00	217.24	74.29	0.00
MM_9_2_trib	1	1000.8	Regional Propose	3.95	247.06	251.09		251.09	0.000000	0.02		0.00	215.99	74.11	0.00
MM_9_2_trib	1	1000.2	25-Year	1.77	246.61	250.90		250.90	0.000000	0.02			110.71	35.06	0.00
MM_9_2_trib	1	1000.2	100-Year	2.48	246.61	250.98		250.98	0.000000	0.02			113.65	35.42	0.00
MM_9_2_trib	1	1000.2	Regional Existin	4.32	246.61	251.10		251.10	0.000000	0.04			117.96	35.94	0.01
MM_9_2_trib	1	1000.2	Regional Propose	3.95	246.61	251.09		251.09	0.000000	0.03			117.36	35.87	0.01
MM_9_2_trib	1	1000	25-Year	1.77	246.13	250.90	247.12	250.90	0.000000	0.02			112.79	39.07	0.00
MM_9_2_trib	1	1000	100-Year	2.48	246.13	250.98	247.36	250.98	0.000000	0.02			116.08	39.84	0.00
MM_9_2_trib	1	1000	Regional Existin	4.32	246.13	251.10	247.91	251.10	0.000000	0.04			120.96	40.84	0.01
MM_9_2_trib	1	1000	Regional Propose	3.95	246.13	251.09	247.80	251.09	0.000000	0.03			120.27	40.71	0.01
MM_9_2_trib	1	999.64		Culvert											
MM_9_2_trib	1	999	25-Year	2.15	242.53	243.64	243.64	244.19	0.011713	3.28			0.66	4.60	1.00
MM_9_2_trib	1	999	100-Year	3.04	242.53	243.92	243.92	244.61	0.010888	3.68			0.83	14.39	1.00
MM_9_2_trib	1	999	Regional Existin	5.46	242.53	244.58	244.58	245.60	0.009581	4.48			1.22	18.35	1.00
MM_9_2_trib	1	999	Regional Propose	5.15	242.53	244.51	244.51	245.48	0.009584	4.37			1.18	17.91	1.00

HEC-RAS Plan: Plan 01 (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Vel Left	Vel Right	Flow Area	Top Width	Froude # Chl
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m/s)	(m/s)	(m2)	(m)	
MM_9_2_trib	1	998	25-Year	2.15	240.54	240.92	240.92	241.06	0.019594	1.62			1.33	5.04	1.01
MM_9_2_trib	1	998	100-Year	3.04	240.54	241.00	241.00	241.16	0.018489	1.78			1.71	5.38	1.01
MM_9_2_trib	1	998	Regional Existin	5.46	240.54	241.16	241.16	241.37	0.016792	2.07			2.64	6.15	1.01
MM_9_2_trib	1	998	Regional Propose	5.15	240.54	241.14	241.14	241.35	0.016914	2.04			2.53	6.06	1.01
MM_9_2_trib	1	997.4	25-Year	2.15	238.99	239.43	239.43	239.58	0.019326	1.68			1.28	4.54	1.01
MM_9_2_trib	1	997.4	100-Year	3.04	238.99	239.51	239.51	239.68	0.018160	1.83			1.66	4.89	1.01
MM_9_2_trib	1	997.4	Regional Existin	5.46	238.99	239.68	239.68	239.92	0.016818	2.14			2.55	5.57	1.01
MM_9_2_trib	1	997.4	Regional Propose	5.15	238.99	239.66	239.66	239.89	0.016952	2.11			2.44	5.50	1.01
MM_9_2_trib	1	997	25-Year	2.15	236.98	237.40	237.40	237.49	0.019993	1.32			1.64	8.72	0.97
MM_9_2_trib	1	997	100-Year	3.04	236.98	237.44	237.44	237.56	0.020802	1.50			2.03	9.17	1.02
MM_9_2_trib	1	997	Regional Existin	5.46	236.98	237.55	237.55	237.71	0.018857	1.73			3.16	10.61	1.01
MM_9_2_trib	1	997	Regional Propose	5.15	236.98	237.54	237.54	237.69	0.019408	1.71			3.01	10.49	1.02
MM_9_2_trib	1	996	25-Year	2.15	234.23	234.74	234.74	234.83	0.021885	1.33			1.61	8.88	1.00
MM_9_2_trib	1	996	100-Year	3.04	234.23	234.79	234.79	234.90	0.020133	1.48			2.06	9.12	0.99
MM_9_2_trib	1	996	Regional Existin	5.46	234.23	234.90	234.90	235.06	0.018571	1.76			3.10	9.86	1.00
MM_9_2_trib	1	996	Regional Propose	5.15	234.23	234.89	234.89	235.04	0.019669	1.76			2.93	9.78	1.02
MM_9_2_trib	1	995.4	25-Year	2.15	229.94	230.51	230.51	230.66	0.020050	1.70			1.27	4.51	1.02
MM_9_2_trib	1	995.4	100-Year	3.04	229.94	230.59	230.59	230.77	0.018792	1.84			1.66	4.96	1.01
MM_9_2_trib	1	995.4	Regional Existin	5.46	229.94	232.02		232.02	0.000145	0.36	0.02	0.04	15.38	16.63	0.11
MM_9_2_trib	1	995.4	Regional Propose	5.15	229.94	232.02		232.02	0.000128	0.34	0.02	0.04	15.39	16.64	0.10
MM_9_2_trib	1	994.4	25-Year	2.15	228.25	228.87	228.87	229.02	0.020048	1.70			1.26	4.39	1.02
MM_9_2_trib	1	994.4	100-Year	3.04	228.25	228.96	228.96	229.12	0.019121	1.81			1.68	5.14	1.01
MM_9_2_trib	1	994.4	Regional Existin	5.46	228.25	232.02		232.02	0.000001	0.04	0.02	0.01	295.01	147.34	0.01
MM_9_2_trib	1	994.4	Regional Propose	5.15	228.25	232.02		232.02	0.000000	0.04	0.02	0.01	295.01	147.34	0.01
MM_9_2_trib	1	994	25-Year	2.15	226.94	227.97	227.47	227.99	0.001074	0.60			3.56	6.15	0.25
MM_9_2_trib	1	994	100-Year	3.04	226.94	228.27	227.56	228.28	0.000543	0.49	0.07	0.05	9.33	49.12	0.19
MM_9_2_trib	1	994	Regional Existin	5.46	226.94	232.02	227.77	232.02	0.000000	0.02	0.01	0.01	765.34	240.07	0.00
MM_9_2_trib	1	994	Regional Propose	5.15	226.94	232.02	227.74	232.02	0.000000	0.02	0.01	0.01	765.34	240.07	0.00
MM_9_2	9.203	3240.045	25-Year	1.27	266.32	266.68		266.68	0.000253	0.16			7.84	36.77	0.11
MM_9_2	9.203	3240.045	100-Year	1.81	266.32	266.73		266.73	0.000289	0.19			9.58	39.37	0.12
MM_9_2	9.203	3240.045	Regional Existin	5.75	266.32	266.93		266.93	0.000429	0.31			18.80	50.49	0.16
MM_9_2	9.203	3240.045	Regional Propose	4.97	266.32	266.90		266.90	0.000409	0.29			17.30	49.29	0.15
MM_9_2	9.203	3169.946	25-Year	1.27	265.36	266.68		266.68	0.000000	0.02	0.00	0.00	66.65	77.18	0.01
MM_9_2	9.203	3169.946	100-Year	1.81	265.36	266.73		266.73	0.000001	0.03	0.01	0.01	70.23	77.80	0.01
MM_9_2	9.203	3169.946	Regional Existin	5.75	265.36	266.93		266.93	0.000005	0.07	0.02	0.02	86.61	83.50	0.02
MM_9_2	9.203	3169.946	Regional Propose	4.97	265.36	266.90		266.90	0.000004	0.06	0.02	0.02	84.08	83.05	0.02
MM_9_2	9.203	3101.23	25-Year	1.27	266.33	266.68		266.68	0.000887	0.26			4.81	27.83	0.20
MM_9_2	9.203	3101.23	100-Year	1.81	266.33	266.73		266.73	0.000939	0.30			6.13	31.25	0.21
MM_9_2	9.203	3101.23	Regional Existin	5.75	266.33	266.92		266.93	0.001061	0.42			13.72	45.28	0.24
MM_9_2	9.203	3101.23	Regional Propose	4.97	266.33	266.89		266.90	0.001023	0.40			12.44	42.93	0.24
MM_9_2	9.203	3055.076	25-Year	1.27	266.31	266.50	266.50	266.55	0.025337	1.02			1.25	11.81	1.00
MM_9_2	9.203	3055.076	100-Year	1.81	266.31	266.53	266.53	266.59	0.024596	1.11			1.64	13.36	1.01
MM_9_2	9.203	3055.076	Regional Existin	5.75	266.31	266.68	266.68	266.78	0.020343	1.45			3.96	18.53	1.01
MM_9_2	9.203	3055.076	Regional Propose	4.97	266.31	266.65	266.65	266.75	0.020559	1.40			3.56	17.85	1.00
MM_9_2	9.203	3026.275	25-Year	1.27	266.05	266.39	266.20	266.39	0.000524	0.21			6.08	33.70	0.16
MM_9_2	9.203	3026.275	100-Year	1.81	266.05	266.43	266.23	266.44	0.000605	0.24			7.59	38.36	0.17
MM_9_2	9.203	3026.275	Regional Existin	5.75	266.05	266.63	266.34	266.63	0.000428	0.25	0.02		23.24	86.09	0.15
MM_9_2	9.203	3026.275	Regional Propose	4.97	266.05	266.60	266.32	266.60	0.000469	0.24			20.55	84.10	0.16
MM_9_2	9.203	3007.063	25-Year	1.27	265.88	266.39		266.39	0.000009	0.04			29.51	84.42	0.02
MM_9_2	9.203	3007.063	100-Year	1.81	265.88	266.43		266.43	0.000013	0.05			33.10	86.74	0.03
MM_9_2	9.203	3007.063	Regional Existin	5.75	265.88	266.63		266.63	0.000035	0.11	0.02		52.36	112.99	0.05
MM_9_2	9.203	3007.063	Regional Propose	4.97	265.88	266.60		266.60	0.000032	0.10	0.01		48.83	110.51	0.05
MM_9_2	9.203	2981.838	25-Year	1.27	265.07	266.39		266.39	0.000001	0.02	0.00	0.00	63.92	81.38	0.01
MM_9_2	9.203	2981.838	100-Year	1.81	265.07	266.43		266.43	0.000001	0.03	0.01	0.01	67.35	82.51	0.01
MM_9_2	9.203	2981.838	Regional Existin	5.75	265.07	266.63		266.63	0.000005	0.07	0.02	0.02	84.24	89.09	0.02
MM_9_2	9.203	2981.838	Regional Propose	4.97	265.07	266.60		266.60	0.000004	0.07	0.02	0.02	81.45	88.56	0.02
MM_9_2	9.203	2923.604	25-Year	1.27	266.11	266.38		266.39	0.002842	0.43			2.95	19.60	0.35
MM_9_2	9.203	2923.604	100-Year	1.81	266.11	266.42		266.43	0.002943	0.48			3.76	21.65	0.37
MM_9_2	9.203	2923.604	Regional Existin	5.75	266.11	266.60		266.63	0.003119	0.69			8.38	29.70	0.41
MM_9_2	9.203	2923.604	Regional Propose	4.97	266.11	266.57		266.60	0.003153	0.66			7.53	28.53	0.41
MM_9_2	9.203	2868.752	25-Year	1.27	265.84	266.04	266.02	266.08	0.017018	0.85			1.49	13.65	0.82
MM_9_2	9.203	2868.752	100-Year	1.81	265.84	266.07	266.05	266.11	0.016263	0.94			1.92	14.59	0.83
MM_9_2	9.203	2868.752	Regional Existin	5.75	265.84	266.22		266.30	0.013939	1.28			4.50	19.22	0.84
MM_9_2	9.203	2868.752	Regional Propose	4.97	265.84	266.20		266.27	0.014216	1.24			4.01	18.31	0.84
MM_9_2	9.203	2780.341	25-Year	1.27	265.24	265.46		265.48	0.003562	0.46			2.73	19.19	0.39
MM_9_2	9.203	2780.341	100-Year	1.81	265.24	265.50		265.52	0.003601	0.52			3.49	20.96	0.41
MM_9_2	9.203	2780.341	Regional Existin	5.75	265.24	265.67		265.70	0.003898	0.76			7.62	27.57	0.46
MM_9_2	9.203	2780.341	Regional Propose	4.97	265.24	265.64		265.67	0.003870	0.72			6.92	26.89	0.45
MM_9_2	9.203	2726.344	25-Year	1.27	264.82	265.00	265.00	265.06	0.027013	1.10			1.15	10.07	1.04
MM_9_2	9.203	2726.344	100-Year	1.81	264.82	265.04	265.04	265.10	0.025561	1.08			1.68	14.52	1.01
MM_9_2	9.203	2726.344	Regional Existin	5.75	264.82	265.18	265.18	265.28	0.020386	1.42			4.04	19.48	1.00
MM_9_2	9.203	2726.344	Regional Propose	4.97	264.82	265.15	265.15	265.25	0.020995	1.39			3.59	18.43	1.00
MM_9_2	9.203	2671.527	25-Year	1.27	264.00	264.24		264.26	0.008677	0.65			1.95	16.07	0.60
MM_9_2	9.203	2671.527	100-Year	1.81	264.00	264.28		264.30	0.007993	0.71			2.53	17.12	0.59
MM_9_2	9.203	2671.527	Regional Existin	5.75	264.00	264.44		264.49	0.007583	0.99			5.80	23.00	0.63
MM_9_2	9.203	2671.527	Regional Propose	4.97	264.00	264.41	264.34	264.46	0.007393	0.96			5.20	21.35	0.62
MM_9_2	9.203	2587.833	25-Year	1.27	263.55	263.77	263.70	263.79	0.003997	0.49			2.58	18.17	0.42
MM_9_2	9.203	2587.833	100-Year	1.81	263.55	263.81	263.72	263.83	0.004180	0.55			3.29	20.17	0.44
MM_9_2	9.203	2587.833	Regional Existin	5.75	263.55	263.97	263.85	264.01	0.004481	0.83			6.95	24.35	0.49
MM_9_2	9.203	2587.833	Regional Propose	4.97	263.55	263.95	263.83	263.98	0.004456	0.79			6.32	23.81	0.49

HEC-RAS Plan: Plan 01 (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Vel Left	Vel Right	Flow Area	Top Width	Froude # Chl
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m/s)	(m/s)	(m2)	(m)	
MM_9_2	9.203	2541.165	25-Year	1.27	263.20	263.34	263.34	263.39	0.027097	0.97			1.31	14.04	1.01
MM_9_2	9.203	2541.165	100-Year	1.81	263.20	263.37	263.37	263.43	0.025356	1.06			1.70	15.10	1.01
MM_9_2	9.203	2541.165	Regional Existin	5.75	263.20	263.50	263.50	263.61	0.020784	1.44			3.98	19.14	1.01
MM_9_2	9.203	2541.165	Regional Propose	4.97	263.20	263.48	263.48	263.58	0.021287	1.38			3.59	18.71	1.01
MM_9_2	9.203	2491.417	25-Year	1.27	262.40	262.70		262.70	0.001415	0.35			3.68	20.18	0.26
MM_9_2	9.203	2491.417	100-Year	1.81	262.40	262.75		262.75	0.001431	0.38			4.77	22.93	0.27
MM_9_2	9.203	2491.417	Regional Existin	5.75	262.40	262.98		262.99	0.001340	0.52			11.04	31.35	0.28
MM_9_2	9.203	2491.417	Regional Propose	4.97	262.40	262.94		262.95	0.001361	0.50			9.93	30.30	0.28
MM_9_2	9.203	2443.46	25-Year	1.27	262.25	262.46	262.46	262.52	0.024261	1.14			1.12	8.64	1.01
MM_9_2	9.203	2443.46	100-Year	1.81	262.25	262.49	262.49	262.57	0.022955	1.25			1.45	9.36	1.01
MM_9_2	9.203	2443.46	Regional Existin	5.75	262.25	262.67	262.67	262.82	0.018852	1.67			3.45	12.39	1.01
MM_9_2	9.203	2443.46	Regional Propose	4.97	262.25	262.65	262.65	262.78	0.019279	1.61			3.09	11.94	1.01
MM_9_2	9.203	2392.41	25-Year	1.27	260.93	261.21		261.24	0.007850	0.76			1.67	10.05	0.60
MM_9_2	9.203	2392.41	100-Year	1.81	260.93	261.26	261.19	261.29	0.008027	0.83			2.17	11.63	0.62
MM_9_2	9.203	2392.41	Regional Existin	5.75	260.93	261.45		261.52	0.008873	1.18			4.89	16.82	0.70
MM_9_2	9.203	2392.41	Regional Propose	4.97	260.93	261.42		261.48	0.008726	1.13			4.38	15.76	0.69
MM_9_2	9.203	2308.616	25-Year	1.27	259.88	260.10	260.10	260.17	0.023775	1.17			1.08	7.84	1.01
MM_9_2	9.203	2308.616	100-Year	1.81	259.88	260.15	260.15	260.23	0.022775	1.26			1.44	9.08	1.01
MM_9_2	9.203	2308.616	Regional Existin	5.75	259.88	260.33	260.33	260.47	0.018642	1.65			3.49	12.68	1.00
MM_9_2	9.203	2308.616	Regional Propose	4.97	259.88	260.30	260.30	260.43	0.019090	1.61			3.08	11.79	1.01
MM_9_2	9.203	2225.63	25-Year	1.27	258.45	258.73	258.69	258.76	0.011545	0.85			1.49	10.09	0.71
MM_9_2	9.203	2225.63	100-Year	1.81	258.45	258.77	258.73	258.81	0.011207	0.94			1.93	11.12	0.72
MM_9_2	9.203	2225.63	Regional Existin	5.75	258.45	258.95		259.04	0.012522	1.31			4.39	16.68	0.82
MM_9_2	9.203	2225.63	Regional Propose	4.97	258.45	258.92		259.00	0.012375	1.28			3.90	15.28	0.81
MM_9_2	9.203	2207.058	25-Year	1.27	258.22	258.43	258.42	258.48	0.020385	1.02			1.24	9.92	0.92
MM_9_2	9.203	2207.058	100-Year	1.81	258.22	258.46	258.45	258.53	0.022005	1.17			1.55	10.63	0.98
MM_9_2	9.203	2207.058	Regional Existin	5.75	258.22	258.62	258.62	258.75	0.019572	1.58			3.64	14.64	1.01
MM_9_2	9.203	2207.058	Regional Propose	4.97	258.22	258.59	258.59	258.71	0.020162	1.52			3.27	14.20	1.01
MM_9_2	9.203	2179.936	25-Year	1.27	257.60	257.80	257.80	257.84	0.027544	0.86			1.47	18.87	0.99
MM_9_2	9.203	2179.936	100-Year	1.81	257.60	257.82	257.82	257.87	0.026227	0.97			1.87	19.54	1.00
MM_9_2	9.203	2179.936	Regional Existin	5.75	257.60	257.93	257.93	258.03	0.021424	1.36			4.23	22.74	1.01
MM_9_2	9.203	2179.936	Regional Propose	4.97	257.60	257.92	257.92	258.00	0.021373	1.29			3.86	22.40	0.99
MM_9_2	9.203	2159.385	25-Year	2.28	256.74	256.97		256.98	0.006277	0.58			3.96	30.84	0.51
MM_9_2	9.203	2159.385	100-Year	3.22	256.74	257.01		257.03	0.005866	0.62			5.19	34.32	0.51
MM_9_2	9.203	2159.385	Regional Existin	8.07	256.74	257.15		257.18	0.004572	0.77			10.48	41.63	0.49
MM_9_2	9.203	2159.385	Regional Propose	8.01	256.74	257.14		257.17	0.004575	0.77			10.42	41.53	0.49
MM_9_2	9.203	2097.132	25-Year	2.28	256.48	256.73		256.74	0.002735	0.47			4.87	27.75	0.36
MM_9_2	9.203	2097.132	100-Year	3.22	256.48	256.77		256.78	0.002729	0.53			6.12	29.11	0.37
MM_9_2	9.203	2097.132	Regional Existin	8.07	256.48	256.94		256.97	0.002576	0.68			11.88	37.02	0.38
MM_9_2	9.203	2097.132	Regional Propose	8.01	256.48	256.94		256.96	0.002582	0.68			11.81	36.99	0.38
MM_9_2	9.203	2030.564	25-Year	2.28	256.04	256.26	256.26	256.33	0.023362	1.18			1.93	13.60	1.00
MM_9_2	9.203	2030.564	100-Year	3.22	256.04	256.29	256.29	256.38	0.022221	1.32			2.45	14.22	1.01
MM_9_2	9.203	2030.564	Regional Existin	8.07	256.04	256.44	256.44	256.59	0.018560	1.70			4.73	16.27	1.01
MM_9_2	9.203	2030.564	Regional Propose	8.01	256.04	256.44	256.44	256.59	0.018553	1.70			4.71	16.25	1.01
MM_9_2	9.203	1970.384	25-Year	2.28	255.48	256.02		256.02	0.000142	0.19			12.07	29.16	0.09
MM_9_2	9.203	1970.384	100-Year	3.22	255.48	256.10		256.10	0.000164	0.22			14.52	30.62	0.10
MM_9_2	9.203	1970.384	Regional Existin	8.07	255.48	256.40		256.40	0.000220	0.33			24.24	34.72	0.13
MM_9_2	9.203	1970.384	Regional Propose	8.01	255.48	256.39		256.40	0.000220	0.33			24.11	34.67	0.13
MM_9_2	9.203	1911.614	25-Year	2.28	255.36	256.01	255.56	256.01	0.000099	0.19			11.78	30.76	0.08
MM_9_2	9.203	1911.614	100-Year	3.22	255.36	256.09	255.58	256.10	0.000127	0.24			13.47	31.53	0.10
MM_9_2	9.203	1911.614	Regional Existin	8.07	255.36	256.38	255.70	256.39	0.000229	0.41			19.54	34.05	0.14
MM_9_2	9.203	1911.614	Regional Propose	8.01	255.36	256.38	255.69	256.39	0.000229	0.41			19.46	34.02	0.14
MM_9_2	9.203	1881.066		Bridge											
MM_9_2	9.203	1855.838	25-Year	2.80	255.52	255.75	255.75	255.83	0.022034	1.24			2.26	15.06	0.99
MM_9_2	9.203	1855.838	100-Year	3.98	255.52	255.80	255.80	255.89	0.021038	1.34			2.98	17.29	0.99
MM_9_2	9.203	1855.838	Regional Existin	9.64	255.52	255.94	255.94	256.09	0.018548	1.70			5.68	21.68	1.01
MM_9_2	9.203	1855.838	Regional Propose	9.57	255.52	255.94	255.94	256.09	0.018165	1.68			5.69	21.69	1.00
MM_9_2	9.203	1813.506	25-Year	2.80	254.73	254.95	254.91	254.99	0.008728	0.81			3.47	20.79	0.63
MM_9_2	9.203	1813.506	100-Year	3.98	254.73	254.99		255.04	0.009300	0.94			4.24	21.27	0.67
MM_9_2	9.203	1813.506	Regional Existin	9.64	254.73	255.11		255.21	0.011528	1.39			6.93	22.64	0.80
MM_9_2	9.203	1813.506	Regional Propose	9.57	254.73	255.11		255.21	0.011497	1.39			6.90	22.62	0.80
MM_9_2	9.203	1775.696	25-Year	2.80	254.12	254.32	254.31	254.36	0.016627	0.91			3.07	24.80	0.83
MM_9_2	9.203	1775.696	100-Year	3.98	254.12	254.36	254.34	254.41	0.015254	0.99			4.04	27.20	0.82
MM_9_2	9.203	1775.696	Regional Existin	9.64	254.12	254.48	254.45	254.56	0.012878	1.28			7.56	30.49	0.82
MM_9_2	9.203	1775.696	Regional Propose	9.57	254.12	254.48	254.44	254.56	0.012913	1.27			7.51	30.47	0.82
MM_9_2	9.203	1726.57	25-Year	2.80	252.83	253.24	253.20	253.29	0.012134	1.01			2.77	15.12	0.76
MM_9_2	9.203	1726.57	100-Year	3.98	252.83	253.30	253.25	253.36	0.012619	1.04			3.81	20.44	0.77
MM_9_2	9.203	1726.57	Regional Existin	9.64	252.83	253.44	253.41	253.53	0.014420	1.33			7.23	29.69	0.86
MM_9_2	9.203	1726.57	Regional Propose	9.57	252.83	253.44	253.41	253.53	0.014368	1.33			7.20	29.66	0.86
MM_9_2	9.203	1684.01	25-Year	2.80	252.26	252.52	252.52	252.59	0.024228	1.16			2.41	17.94	1.01
MM_9_2	9.203	1684.01	100-Year	3.98	252.26	252.56	252.56	252.64	0.023494	1.24			3.20	21.08	1.02
MM_9_2	9.203	1684.01	Regional Existin	9.64	252.26	252.69	252.69	252.82	0.019620	1.60			6.04	23.83	1.01
MM_9_2	9.203	1684.01	Regional Propose	9.57	252.26	252.68	252.68	252.81	0.019711	1.59			6.00	23.81	1.01
MM_9_2	9.203	1603.573	25-Year	2.80	251.65	251.93		251.93	0.000455	0.18			15.81	100.49	0.14
MM_9_2	9.203	1603.573	100-Year	3.98	251.65	251.96		251.96	0.000504	0.21			19.19	103.97	0.15
MM_9_2	9.203	1603.573	Regional Existin	9.64	251.65	252.08		252.09	0.000554	0.30			32.05	106.95	0.18
MM_9_2	9.203	1603.573	Regional Propose	9.57	251.65	252.08		252.09	0.000553	0.30			31.91	106.92	0.18
MM_9_2	9.203	1539.326	25-Year	2.80	251.65	251.82		251.84	0.010897	0.63			4.46	46.00	0.64
MM_9_2	9.203	1539.326	100-Year	3.98	251.65	251.86		251.88	0.009435	0.67			5.92	49.53	0.62
MM_9_2	9.203	1539.326	Regional Existin	9.64	251.65	251.97		252.00	0.006346	0.80			12.04	57.56	0.56
MM_9_2	9.203	1539.326	Regional Propose	9.57	251.65	251.97		252.00	0.006362	0.80			11.97	57.50	0.56

HEC-RAS Plan: Plan 01 (Continued)

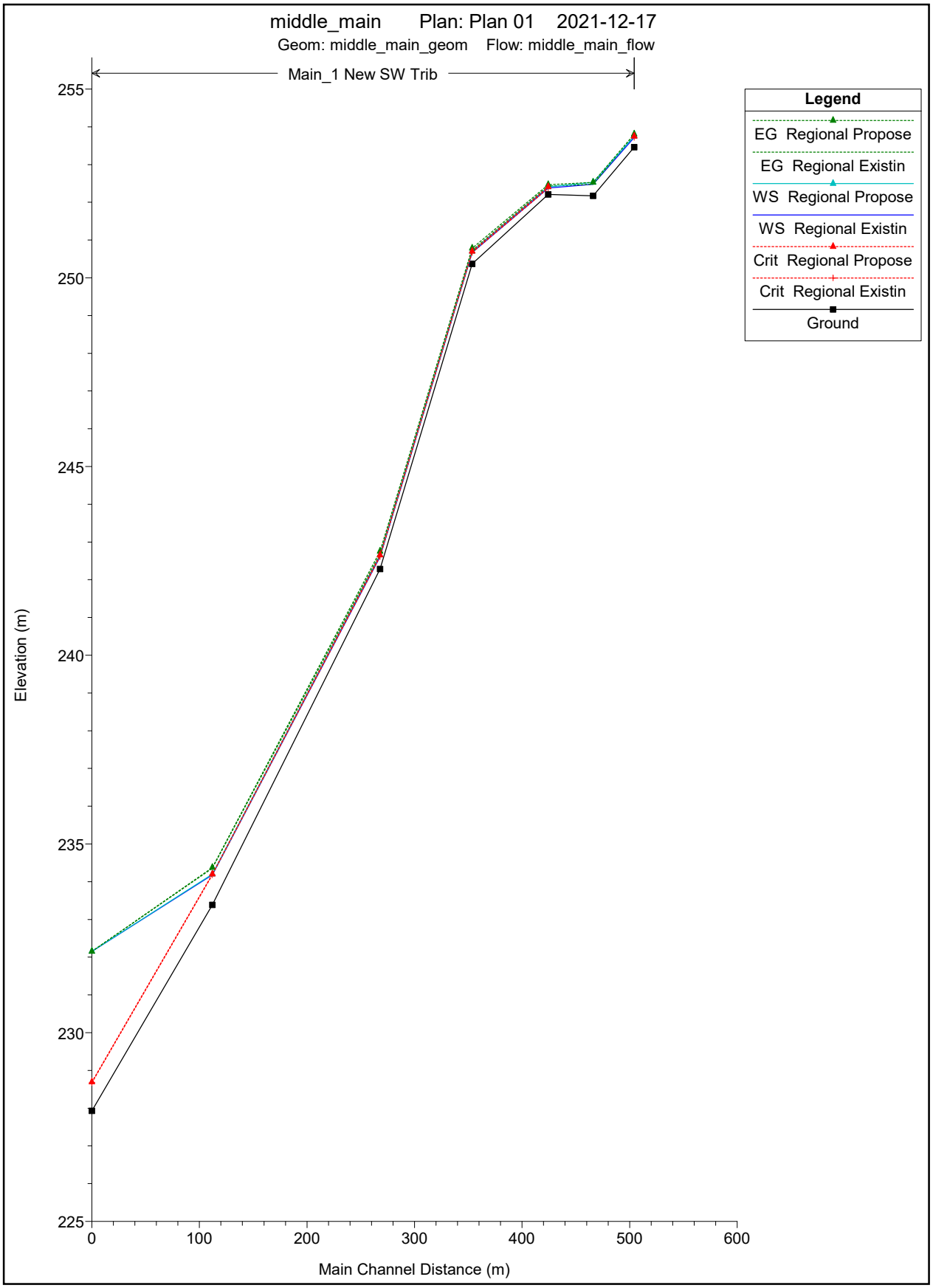
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Vel Left	Vel Right	Flow Area	Top Width	Froude # Chl
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m/s)	(m/s)	(m2)	(m)	
MM_9_2	9.203	1486.021	25-Year	2.80	250.90	251.25		251.29	0.009778	0.96			2.92	14.64	0.69
MM_9_2	9.203	1486.021	100-Year	3.98	250.90	251.30		251.36	0.010038	1.07			3.71	16.17	0.71
MM_9_2	9.203	1486.021	Regional Existin	9.64	250.90	251.47		251.57	0.010002	1.42			6.79	19.31	0.76
MM_9_2	9.203	1486.021	Regional Propose	9.57	250.90	251.47		251.57	0.010021	1.42			6.75	19.28	0.76
MM_9_2	9.203	1450.067	25-Year	2.80	250.28	250.68	250.68	250.78	0.022786	1.35			2.07	11.71	1.03
MM_9_2	9.203	1450.067	100-Year	3.98	250.28	250.73	250.73	250.85	0.021129	1.49			2.67	12.35	1.02
MM_9_2	9.203	1450.067	Regional Existin	9.64	250.28	250.91	250.91	251.10	0.017673	1.90			5.07	14.15	1.01
MM_9_2	9.203	1450.067	Regional Propose	9.57	250.28	250.91	250.91	251.09	0.017667	1.90			5.04	14.13	1.01
MM_9_2	9.203	1406.638	25-Year	2.80	249.69	250.09	250.02	250.13	0.007450	0.91			3.07	13.47	0.61
MM_9_2	9.203	1406.638	100-Year	3.98	249.69	250.15	250.07	250.20	0.007418	1.04			3.84	13.91	0.63
MM_9_2	9.203	1406.638	Regional Existin	9.64	249.69	250.33		250.44	0.008616	1.48			6.52	15.44	0.73
MM_9_2	9.203	1406.638	Regional Propose	9.57	249.69	250.34		250.44	0.008256	1.45			6.58	15.48	0.71
MM_9_2	9.203	1338.455	25-Year	2.80	248.69	249.23	249.23	249.32	0.021927	1.31			2.13	12.17	1.00
MM_9_2	9.203	1338.455	100-Year	3.98	248.69	249.28	249.28	249.39	0.021951	1.48			2.68	12.75	1.03
MM_9_2	9.203	1338.455	Regional Existin	9.64	248.69	249.46	249.46	249.63	0.017177	1.82			5.29	15.37	0.99
MM_9_2	9.203	1338.455	Regional Propose	9.57	248.69	249.45	249.45	249.63	0.018356	1.86			5.15	15.29	1.02
MM_9_2	9.203	1304.352	25-Year	3.65	247.99	248.49	248.46	248.60	0.014067	1.48			2.46	8.24	0.87
MM_9_2	9.203	1304.352	100-Year	5.20	247.99	248.56	248.54	248.71	0.015368	1.71			3.03	8.76	0.93
MM_9_2	9.203	1304.352	Regional Existin	11.97	247.99	248.86	248.84	249.00	0.016008	1.69			7.10	21.96	0.95
MM_9_2	9.203	1304.352	Regional Propose	11.24	247.99	248.83	248.81	248.98	0.015766	1.70			6.62	20.06	0.94
MM_9_2	9.203	1265.187	25-Year	3.65	247.35	247.80	247.80	247.97	0.018620	1.79			2.03	6.32	1.01
MM_9_2	9.203	1265.187	100-Year	5.20	247.35	247.92	247.92	248.09	0.016107	1.81			2.87	7.89	0.96
MM_9_2	9.203	1265.187	Regional Existin	11.97	247.35	248.16	248.16	248.35	0.017175	1.91			6.27	16.97	1.00
MM_9_2	9.203	1265.187	Regional Propose	11.24	247.35	248.15	248.15	248.33	0.017455	1.87			6.00	16.86	1.00
MM_9_2	9.203	1206.875	25-Year	3.65	246.19	246.72	246.68	246.84	0.012565	1.52			2.40	7.14	0.84
MM_9_2	9.203	1206.875	100-Year	5.20	246.19	246.80	246.77	246.96	0.014859	1.77			2.94	7.92	0.93
MM_9_2	9.203	1206.875	Regional Existin	11.97	246.19	247.04	247.04	247.27	0.016246	2.10			5.69	12.62	1.00
MM_9_2	9.203	1206.875	Regional Propose	11.24	246.19	247.02	247.02	247.24	0.016869	2.08			5.39	12.49	1.01
MM_9_2	9.203	1175.661	25-Year	3.65	245.83	246.23	246.23	246.33	0.021774	1.39			2.62	13.75	1.02
MM_9_2	9.203	1175.661	100-Year	5.20	245.83	246.28	246.28	246.41	0.020213	1.55			3.34	13.98	1.02
MM_9_2	9.203	1175.661	Regional Existin	11.97	245.83	246.47	246.47	246.67	0.017041	2.01			5.96	14.89	1.01
MM_9_2	9.203	1175.661	Regional Propose	11.24	245.83	246.45	246.45	246.65	0.017243	1.97			5.71	14.81	1.01
MM_9_2	9.203	1120.613	25-Year	3.65	244.63	245.27		245.33	0.007613	1.09			3.34	11.11	0.63
MM_9_2	9.203	1120.613	100-Year	5.20	244.63	245.36		245.43	0.006368	1.17			4.43	11.49	0.60
MM_9_2	9.203	1120.613	Regional Existin	11.97	244.63	245.63		245.72	0.007604	1.37			8.72	20.63	0.67
MM_9_2	9.203	1120.613	Regional Propose	11.24	244.63	245.61		245.70	0.007532	1.34			8.39	20.45	0.67
MM_9_2	9.203	1083.716	25-Year	3.65	244.05	244.68	244.68	244.90	0.017631	2.09			1.74	3.95	1.01
MM_9_2	9.203	1083.716	100-Year	5.20	244.05	244.88	244.88	245.05	0.018647	1.85			2.82	8.24	1.01
MM_9_2	9.203	1083.716	Regional Existin	11.97	244.05	245.12	245.12	245.31	0.017438	1.91	0.16	0.20	6.28	17.22	1.00
MM_9_2	9.203	1083.716	Regional Propose	11.24	244.05	245.11	245.11	245.28	0.017784	1.87	0.14	0.17	6.00	17.16	1.00
MM_9_2	9.203	1042.153	25-Year	3.65	243.04	243.65		243.71	0.010554	1.05			3.46	15.76	0.72
MM_9_2	9.203	1042.153	100-Year	5.20	243.04	243.72		243.79	0.009427	1.15			4.52	16.56	0.70
MM_9_2	9.203	1042.153	Regional Existin	11.97	243.04	243.93		244.04	0.007587	1.46			8.21	17.88	0.69
MM_9_2	9.203	1042.153	Regional Propose	11.24	243.04	243.91		244.02	0.007672	1.43			7.86	17.79	0.69
MM_9_2	9.203	1006.177	25-Year	3.65	242.45	243.04	243.04	243.21	0.018665	1.79			2.03	6.22	1.00
MM_9_2	9.203	1006.177	100-Year	5.20	242.45	243.16	243.16	243.32	0.018588	1.78			2.93	9.14	1.00
MM_9_2	9.203	1006.177	Regional Existin	11.97	242.45	243.40	243.40	243.65	0.016251	2.19			5.47	11.26	1.00
MM_9_2	9.203	1006.177	Regional Propose	11.24	242.45	243.38	243.38	243.62	0.016427	2.15			5.22	11.13	1.00
MM_9_2	9.203	993.3609	25-Year	3.65	241.83	242.67		242.73	0.003888	1.05			3.48	7.39	0.49
MM_9_2	9.203	993.3609	100-Year	5.20	241.83	242.83		242.89	0.003786	1.10			4.71	9.08	0.49
MM_9_2	9.203	993.3609	Regional Existin	11.97	241.83	243.18		243.25	0.004503	1.15			10.43	22.11	0.53
MM_9_2	9.203	993.3609	Regional Propose	11.24	241.83	243.16		243.22	0.004547	1.13			9.96	21.80	0.53
MM_9_2	9.203	935.4169	25-Year	3.65	241.33	242.06	242.06	242.29	0.018027	2.11			1.73	3.84	1.01
MM_9_2	9.203	935.4169	100-Year	5.20	241.33	242.21	242.21	242.46	0.017612	2.20			2.36	4.89	1.01
MM_9_2	9.203	935.4169	Regional Existin	11.97	241.33	242.55	242.55	242.78	0.016658	2.11			5.67	12.56	1.00
MM_9_2	9.203	935.4169	Regional Propose	11.24	241.33	242.53	242.53	242.75	0.016922	2.08			5.41	12.45	1.01
MM_9_2	9.203	870.5434	25-Year	3.65	239.51	240.27	240.27	240.52	0.018700	2.22			1.64	3.30	1.01
MM_9_2	9.203	870.5434	100-Year	5.20	239.51	240.42	240.42	240.71	0.017752	2.37			2.20	3.88	1.01
MM_9_2	9.203	870.5434	Regional Existin	11.97	239.51	240.86	240.86	241.28	0.016235	2.86			4.19	5.11	1.01
MM_9_2	9.203	870.5434	Regional Propose	11.24	239.51	240.82	240.82	241.23	0.016367	2.82			3.98	4.99	1.01
MM_9_2	9.203	836.4684	25-Year	3.65	238.61	239.22	239.22	239.45	0.017854	2.12			1.72	3.82	1.01
MM_9_2	9.203	836.4684	100-Year	5.20	238.61	239.35	239.35	239.62	0.017059	2.32			2.24	4.13	1.00
MM_9_2	9.203	836.4684	Regional Existin	11.97	238.61	239.78	239.78	240.18	0.015404	2.82			4.24	5.22	1.00
MM_9_2	9.203	836.4684	Regional Propose	11.24	238.61	239.74	239.74	240.13	0.015515	2.78			4.04	5.12	1.00
MM_9_2	9.203	799.8246	25-Year	4.00	237.89	238.51	238.51	238.72	0.017986	2.02			1.98	4.87	1.01
MM_9_2	9.203	799.8246	100-Year	5.72	237.89	238.63	238.63	238.89	0.016984	2.23			2.56	5.11	1.01
MM_9_2	9.203	799.8246	Regional Existin	13.11	237.89	239.02	239.02	239.41	0.015254	2.76			4.76	6.24	1.01
MM_9_2	9.203	799.8246	Regional Propose	12.36	237.89	238.99	238.99	239.36	0.015377	2.72			4.55	6.14	1.01
MM_9_2	9.203	745.4448	25-Year	4.00	235.79	236.30	236.30	236.50	0.017747	1.97			2.03	5.20	1.01
MM_9_2	9.203	745.4448	100-Year	5.72	235.79	236.42	236.42	236.65	0.016689	2.13			2.69	5.86	1.00
MM_9_2	9.203	745.4448	Regional Existin	13.11	235.79	236.77	236.77	237.12	0.015150	2.63			4.99	7.20	1.01
MM_9_2	9.203	745.4448	Regional Propose	12.36	235.79	236.74	236.74	237.08	0.015273	2.59			4.78	7.10	1.01
MM_9_2	9.203	716.4415	25-Year	4.00	234.84	235.35		235.47	0.011248	1.52			2.63	7.00	0.79
MM_9_2	9.203	716.4415	100-Year	5.72	234.84	235.43	235.39	235.60	0.012683	1.79			3.19	7.25	0.86
MM_9_2	9.203	716.4415	Regional Existin	13.11	234.84	235.69	235.69	236.01	0.015584	2.49			5.26	8.41	1.01
MM_9_2	9.203	716.4415	Regional Propose	12.36	234.84	235.67	235.67	235.98	0.015702	2.46			5.03	8.29	1.01
MM_9_2	9.203	687.3773	25-Year	4.00	234.27	234.90	234.90	235.04	0.020109	1.67			2.39	8.73	1.02
MM_9_2	9.203	687.3773	100-Year	5.72	234.27	235.01	235.01	235.15	0.018525	1.66			3.44	11.96	0.99
MM_9_2	9.203	687.3773	Regional Existin	13.11	234.27	235.21	235.21	235.40	0.017359	1.94			6.76	17.88	1.01
MM_9_2	9.203	687.3773	Regional Propose	12.36	234.27	235.20	235.20	235.38	0.017208	1.90			6.52	17.72	1.00

HEC-RAS Plan: Plan 01 (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Vel Left	Vel Right	Flow Area	Top Width	Froude # Chl
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m/s)	(m/s)	(m2)	(m)	
MM_9_2	9.203	661.4518	25-Year	4.00	233.56	234.05	234.05	234.24	0.017790	1.94			2.05	5.42	1.01
MM_9_2	9.203	661.4518	100-Year	5.72	233.56	234.15	234.15	234.39	0.016826	2.16			2.65	5.69	1.01
MM_9_2	9.203	661.4518	Regional Existin	13.11	233.56	234.51	234.51	234.89	0.014960	2.70			4.86	6.60	1.01
MM_9_2	9.203	661.4518	Regional Propose	12.36	233.56	234.48	234.48	234.84	0.015067	2.66			4.65	6.52	1.01
MM_9_2	9.203	627.6722	25-Year	4.00	232.58	233.17	233.17	233.37	0.018703	1.99			2.01	5.05	1.01
MM_9_2	9.203	627.6722	100-Year	5.72	232.58	233.28	233.28	233.53	0.017662	2.19			2.61	5.44	1.01
MM_9_2	9.203	627.6722	Regional Existin	13.11	232.58	233.66	233.66	234.02	0.015389	2.65			4.95	6.93	1.00
MM_9_2	9.203	627.6722	Regional Propose	12.36	232.58	233.63	233.63	233.98	0.015514	2.61			4.73	6.81	1.00
MM_9_2	9.203	589.2625	25-Year	4.00	231.90	232.52		232.59	0.005618	1.13			3.55	9.06	0.58
MM_9_2	9.203	589.2625	100-Year	5.72	231.90	232.64		232.71	0.005327	1.24			4.61	9.77	0.58
MM_9_2	9.203	589.2625	Regional Existin	13.11	231.90	233.01		233.13	0.004409	1.55			8.48	11.01	0.56
MM_9_2	9.203	589.2625	Regional Propose	12.36	231.90	232.97		233.09	0.004486	1.53			8.10	10.90	0.57
MM_9_2	9.203	540.5079	25-Year	4.00	231.39	231.93	231.93	232.13	0.017865	1.94			2.06	5.45	1.01
MM_9_2	9.203	540.5079	100-Year	5.72	231.39	232.05	232.05	232.28	0.016732	2.12			2.71	5.97	1.00
MM_9_2	9.203	540.5079	Regional Existin	13.11	231.39	232.40	232.40	232.74	0.015008	2.60			5.05	7.47	1.01
MM_9_2	9.203	540.5079	Regional Propose	12.36	231.39	232.37	232.37	232.70	0.014969	2.55			4.84	7.33	1.00
MM_9_2	9.203	510.2238	25-Year	4.00	230.56	231.03	231.03	231.17	0.019997	1.66			2.40	8.76	1.02
MM_9_2	9.203	510.2238	100-Year	5.72	230.56	231.11	231.11	231.28	0.018292	1.84			3.10	9.06	1.01
MM_9_2	9.203	510.2238	Regional Existin	13.11	230.56	231.42	231.42	231.63	0.016157	2.03			6.47	14.95	0.98
MM_9_2	9.203	510.2238	Regional Propose	12.36	230.56	231.39	231.39	231.61	0.017532	2.09			5.92	13.94	1.02
MM_9_2	9.203	457.5412	25-Year	4.00	228.97	229.68	229.65	229.89	0.015830	2.03			1.96	4.04	0.93
MM_9_2	9.203	457.5412	100-Year	5.72	228.97	229.81	229.79	230.07	0.015923	2.26			2.54	4.48	0.96
MM_9_2	9.203	457.5412	Regional Existin	13.11	228.97	230.22	230.22	230.62	0.015869	2.79			4.69	5.97	1.01
MM_9_2	9.203	457.5412	Regional Propose	12.36	228.97	230.18	230.18	230.58	0.015953	2.77			4.46	5.78	1.01
MM_9_2	9.203	414.0466	25-Year	4.00	228.37	229.11	229.05	229.26	0.012548	1.72			2.33	5.55	0.85
MM_9_2	9.203	414.0466	100-Year	5.72	228.37	229.20	229.17	229.41	0.013962	1.99			2.88	5.93	0.91
MM_9_2	9.203	414.0466	Regional Existin	13.11	228.37	229.63	229.59	229.76	0.013568	1.60			8.19	23.80	0.87
MM_9_2	9.203	414.0466	Regional Propose	12.36	228.37	229.61	229.57	229.74	0.014173	1.59			7.78	23.66	0.88
MM_9_2	9.203	374.4607	25-Year	4.00	227.94	228.50	228.50	228.66	0.018630	1.78			2.24	7.11	1.01
MM_9_2	9.203	374.4607	100-Year	5.72	227.94	228.59	228.59	228.79	0.017561	1.96			2.91	7.59	1.01
MM_9_2	9.203	374.4607	Regional Existin	13.11	227.94	228.93	228.93	229.15	0.017428	2.05			6.40	15.59	1.02
MM_9_2	9.203	374.4607	Regional Propose	12.36	227.94	228.92	228.92	229.12	0.016948	1.99			6.21	15.52	1.00
MM_9_2	9.203	330.2584	25-Year	4.00	227.43	227.83		227.85	0.003921	0.59			6.77	35.28	0.43
MM_9_2	9.203	330.2584	100-Year	5.72	227.43	227.88		227.90	0.004075	0.67			8.59	38.44	0.45
MM_9_2	9.203	330.2584	Regional Existin	13.11	227.43	228.01		228.06	0.004769	0.95			13.79	40.78	0.52
MM_9_2	9.203	330.2584	Regional Propose	12.36	227.43	228.00		228.04	0.004993	0.94			13.10	40.52	0.53
MM_9_2	9.205	295.2569	25-Year	9.10	227.02	227.37	227.37	227.45	0.023316	1.24			7.31	47.86	1.02
MM_9_2	9.205	295.2569	100-Year	12.81	227.02	227.41	227.41	227.51	0.022256	1.38			9.28	50.29	1.03
MM_9_2	9.205	295.2569	Regional Existin	26.42	227.02	227.53	227.53	227.68	0.018823	1.71			15.41	53.14	1.02
MM_9_2	9.205	295.2569	Regional Propose	24.02	227.02	227.51	227.51	227.65	0.019209	1.66			14.43	52.85	1.02
MM_9_2	9.205	266.3048	25-Year	9.10	224.85	225.62	225.62	225.80	0.018044	1.89			4.82	13.63	1.01
MM_9_2	9.205	266.3048	100-Year	12.81	224.85	225.73	225.73	225.93	0.017130	1.99			6.44	16.18	1.01
MM_9_2	9.205	266.3048	Regional Existin	26.42	224.85	226.00	226.00	226.25	0.015856	2.19			12.07	24.84	1.00
MM_9_2	9.205	266.3048	Regional Propose	24.02	224.85	225.96	225.96	226.20	0.016283	2.17			11.09	23.65	1.01
MM_9_2	9.205	236.2558	25-Year	9.10	223.38	224.51		224.71	0.009450	1.96			4.65	7.41	0.79
MM_9_2	9.205	236.2558	100-Year	12.81	223.38	224.72		224.92	0.008602	1.98			6.46	9.47	0.77
MM_9_2	9.205	236.2558	Regional Existin	26.42	223.38	225.19		225.41	0.007753	2.06			12.80	16.57	0.75
MM_9_2	9.205	236.2558	Regional Propose	24.02	223.38	225.12		225.34	0.007819	2.05			11.70	15.33	0.75
MM_9_2	9.205	205.6305	25-Year	9.10	222.98	224.00	224.00	224.32	0.016281	2.52			3.61	5.69	1.01
MM_9_2	9.205	205.6305	100-Year	12.81	222.98	224.18	224.18	224.56	0.015271	2.73			4.70	6.21	1.00
MM_9_2	9.205	205.6305	Regional Existin	26.42	222.98	224.68	224.68	225.07	0.015159	2.77			9.56	12.69	1.02
MM_9_2	9.205	205.6305	Regional Propose	24.02	222.98	224.63	224.63	225.00	0.015206	2.68			8.96	12.50	1.01
MM_9_2	9.205	173.8239	25-Year	9.10	222.27	223.11	223.11	223.40	0.016008	2.39			3.81	6.70	1.01
MM_9_2	9.205	173.8239	100-Year	12.81	222.27	223.27	223.27	223.61	0.014937	2.60			4.93	7.18	1.00
MM_9_2	9.205	173.8239	Regional Existin	26.42	222.27	224.12		224.37	0.005001	2.22			11.91	9.16	0.62
MM_9_2	9.205	173.8239	Regional Propose	24.02	222.27	224.15		224.35	0.003860	1.97			12.20	9.22	0.55
MM_9_2	9.205	151.7834	25-Year	9.10	221.52	222.51	222.42	222.70	0.010979	1.94			4.69	8.58	0.84
MM_9_2	9.205	151.7834	100-Year	12.81	221.52	222.61	222.59	222.88	0.014220	2.29			5.60	9.75	0.96
MM_9_2	9.205	151.7834	Regional Existin	26.42	221.52	224.24		224.28	0.000521	0.80			33.19	23.62	0.21
MM_9_2	9.205	151.7834	Regional Propose	24.02	221.52	224.25		224.27	0.000428	0.72			33.26	23.64	0.19
MM_9_2	9.205	116.6732	25-Year	9.10	221.27	222.05	222.05	222.19	0.019092	1.63			5.58	20.75	1.00
MM_9_2	9.205	116.6732	100-Year	12.81	221.27	222.12	222.12	222.29	0.017819	1.80			7.10	21.53	1.00
MM_9_2	9.205	116.6732	Regional Existin	26.42	221.27	224.26		224.26	0.000068	0.33			79.58	46.53	0.08
MM_9_2	9.205	116.6732	Regional Propose	24.02	221.27	224.26		224.26	0.000056	0.30			79.59	46.53	0.07
MM_9_2	9.205	66.5837	25-Year	9.10	220.30	221.44		221.48	0.002933	0.92			9.92	21.26	0.43
MM_9_2	9.205	66.5837	100-Year	12.81	220.30	221.70		221.74	0.001400	0.80			15.93	23.88	0.31
MM_9_2	9.205	66.5837	Regional Existin	26.42	220.30	224.26		224.26	0.000014	0.18	0.01	0.03	145.80	69.00	0.04
MM_9_2	9.205	66.5837	Regional Propose	24.02	220.30	224.26		224.26	0.000012	0.17	0.01	0.02	145.81	69.00	0.04
MM_9_2	9.205	34.76245	25-Year	9.10	219.88	221.42	220.84	221.43	0.000804	0.40			22.88	65.83	0.22
MM_9_2	9.205	34.76245	100-Year	12.81	219.88	221.71	221.02	221.71	0.000223	0.30			42.93	72.82	0.12
MM_9_2	9.205	34.76245	Regional Existin	26.42	219.88	224.26	221.30	224.26	0.000003	0.10	0.02	0.02	296.20	117.53	0.02
MM_9_2	9.205	34.76245	Regional Propose	24.02	219.88	224.26	221.28	224.26	0.000002	0.09	0.02	0.02	296.20	117.53	0.02
Main_1	New SW Trib	1000	25-Year	0.35	253.46	253.66	253.66	253.69	0.032946	0.82			0.43	6.79	1.04
Main_1	New SW Trib	1000	100-Year	0.49	253.46	253.68	253.68	253.72	0.028354	0.86			0.58	7.63	1.00
Main_1	New SW Trib	1000	Regional Existin	0.88	253.46	253.72	253.72	253.77	0.027691	0.98			0.90	9.67	1.02
Main_1	New SW Trib	1000	Regional Propose	1.31	253.46	253.75	253.75	253.81	0.026225	1.09			1.20	10.44	1.03
Main_1	New SW Trib	999	25-Year	0.35	252.17	252.39		252.39	0.000274	0.09			3.72	24.90	0.08
Main_1	New SW Trib	999	100-Year	0.49	252.17	252.42		252.42	0.000321	0.11			4.45	25.89	0.09
Main_1	New SW Trib	999	Regional Existin	0.88	252.17	252.48		252.48	0.000395	0.15			6.06	27.29	0.10
Main_1	New SW Trib	999	Regional Propose	1.31	252.17	252.53		252.53	0.000467	0.18			7.43	28.54	0.11
Main_1	New SW Trib	998.6	25-Year	0.35	252.21	252.33	252.32	252.35	0.024171	0.71			0.49	7.52	0.90

HEC-RAS Plan: Plan 01 (Continued)

River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Vel Left	Vel Right	Flow Area	Top Width	Froude # Chl
				(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m/s)	(m/s)	(m2)	(m)	
Main_1	New SW Trib	998.6	100-Year	0.49	252.21	252.35	252.33	252.38	0.020812	0.77			0.64	7.93	0.86
Main_1	New SW Trib	998.6	Regional Existin	0.88	252.21	252.38	252.37	252.43	0.025573	0.98			0.90	9.08	0.99
Main_1	New SW Trib	998.6	Regional Propose	1.31	252.21	252.41	252.41	252.47	0.023623	1.04			1.26	10.98	0.98
Main_1	New SW Trib	998	25-Year	0.35	250.37	250.56	250.56	250.63	0.024526	1.12			0.31	2.41	1.00
Main_1	New SW Trib	998	100-Year	0.49	250.37	250.62	250.62	250.67	0.028336	0.96			0.51	5.67	1.02
Main_1	New SW Trib	998	Regional Existin	0.88	250.37	250.67	250.67	250.73	0.022535	1.06			0.83	6.64	0.96
Main_1	New SW Trib	998	Regional Propose	1.31	250.37	250.70	250.70	250.78	0.024049	1.25			1.04	6.82	1.02
Main_1	New SW Trib	997	25-Year	0.35	242.29	242.53	242.53	242.57	0.026783	0.96			0.36	3.86	1.00
Main_1	New SW Trib	997	100-Year	0.49	242.29	242.55	242.55	242.61	0.026797	1.07			0.46	4.14	1.03
Main_1	New SW Trib	997	Regional Existin	0.88	242.29	242.61	242.61	242.69	0.024130	1.25			0.71	4.59	1.02
Main_1	New SW Trib	997	Regional Propose	1.31	242.29	242.65	242.65	242.76	0.022420	1.41			0.93	4.71	1.02
Main_1	New SW Trib	996	25-Year	1.60	233.39	233.92	233.92	234.07	0.020001	1.67			0.96	3.43	1.01
Main_1	New SW Trib	996	100-Year	2.27	233.39	234.01	234.01	234.17	0.019351	1.75			1.30	4.25	1.01
Main_1	New SW Trib	996	Regional Existin	4.05	233.39	234.18	234.18	234.36	0.018571	1.86			2.17	6.35	1.02
Main_1	New SW Trib	996	Regional Propose	4.24	233.39	234.20	234.20	234.37	0.018115	1.86			2.28	6.57	1.01
Main_1	New SW Trib	995	25-Year	1.60	227.93	228.39	228.39	228.55	0.019893	1.76			0.91	2.90	1.01
Main_1	New SW Trib	995	100-Year	2.27	227.93	228.60	228.48	228.70	0.008491	1.42			1.60	3.71	0.69
Main_1	New SW Trib	995	Regional Existin	4.05	227.93	232.15	228.67	232.15	0.000001	0.05	0.01	0.02	127.94	73.39	0.01
Main_1	New SW Trib	995	Regional Propose	4.24	227.93	232.15	228.69	232.15	0.000001	0.05	0.01	0.02	127.94	73.39	0.01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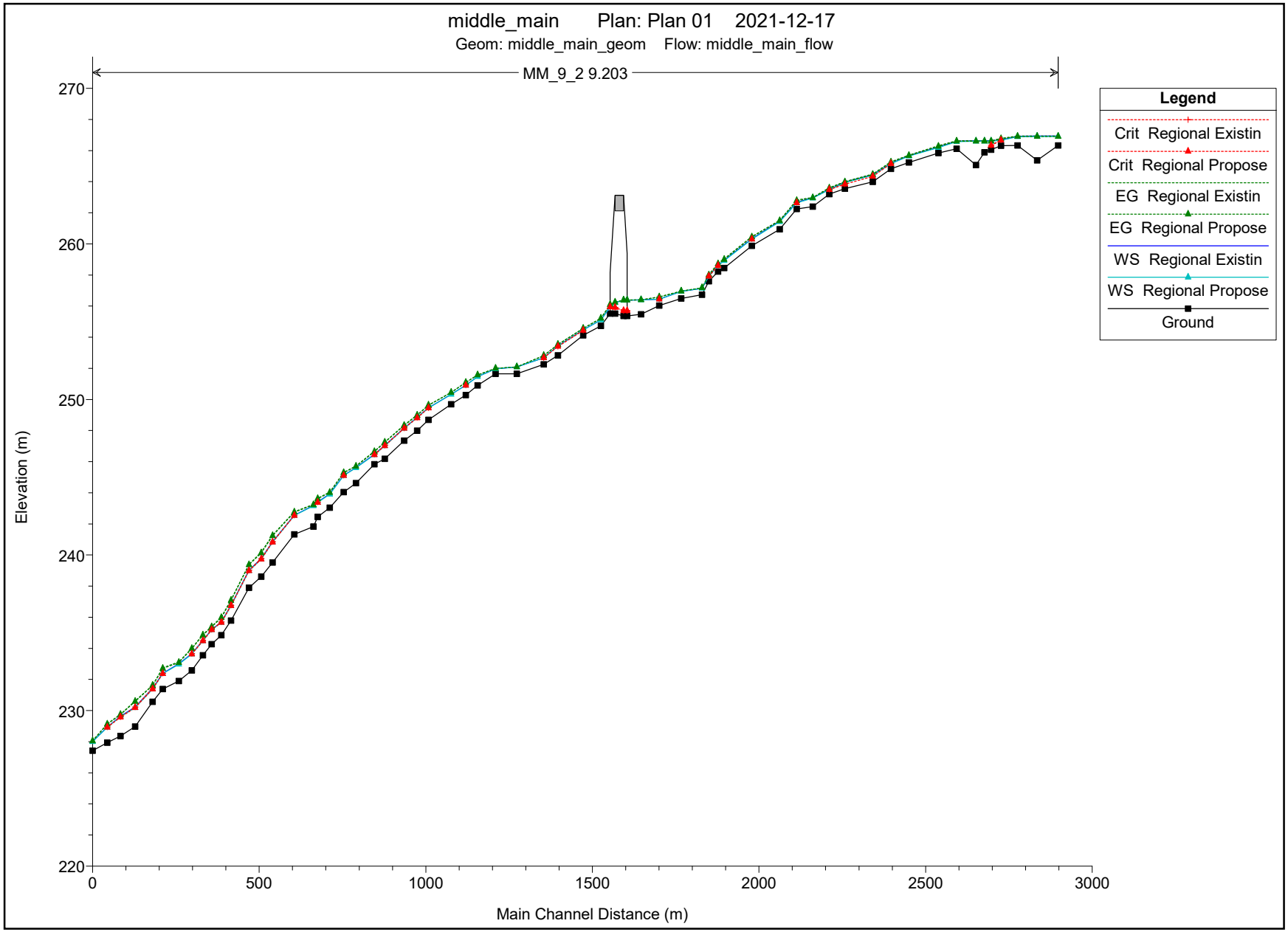
Geom: middle_main_geom Flow: middle_main_flow
Main_1 New SW Trib
Legend
EG Regional Propose
EG Regional Existin
WS Regional Propose
WS Regional Existin
Crit Regional Propose
Crit Regional Existin
Ground
Elevation (m)
255
250
245
240
235
230
225
0
100
200
300
400
500
600
Main Channel Distance (m)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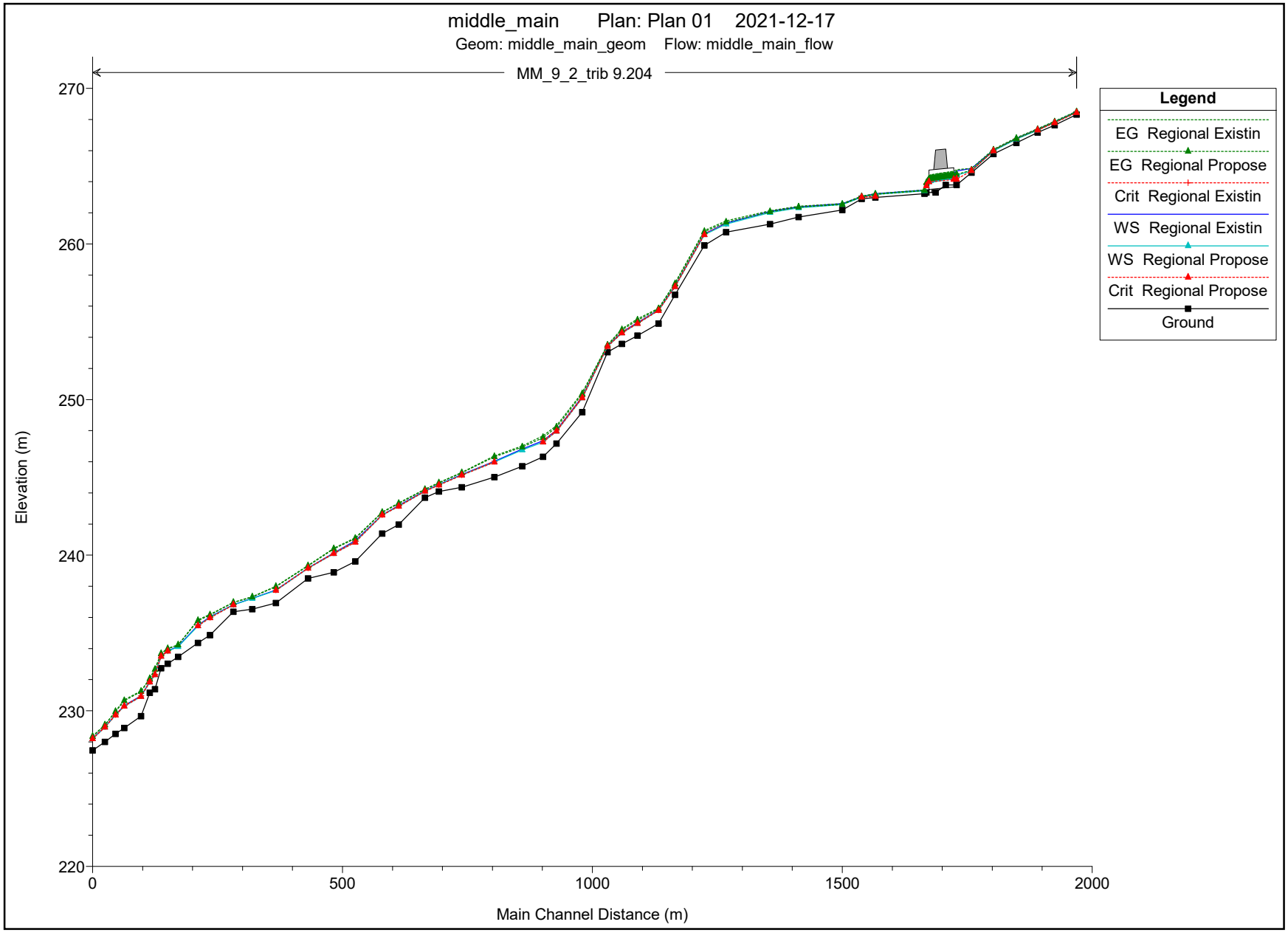
Geom: middle_main_geom Flow: middle_main_flow
MM_9_2 9.203
Legend
Crit Regional Existin
Crit Regional Propose
EG Regional Existin
EG Regional Propose
WS Regional Existin
WS Regional Propose
Ground
Elevation (m)
270
260
250
240
230
220
0
500
1000
1500
2000
2500
3000
Main Channel Distance (m)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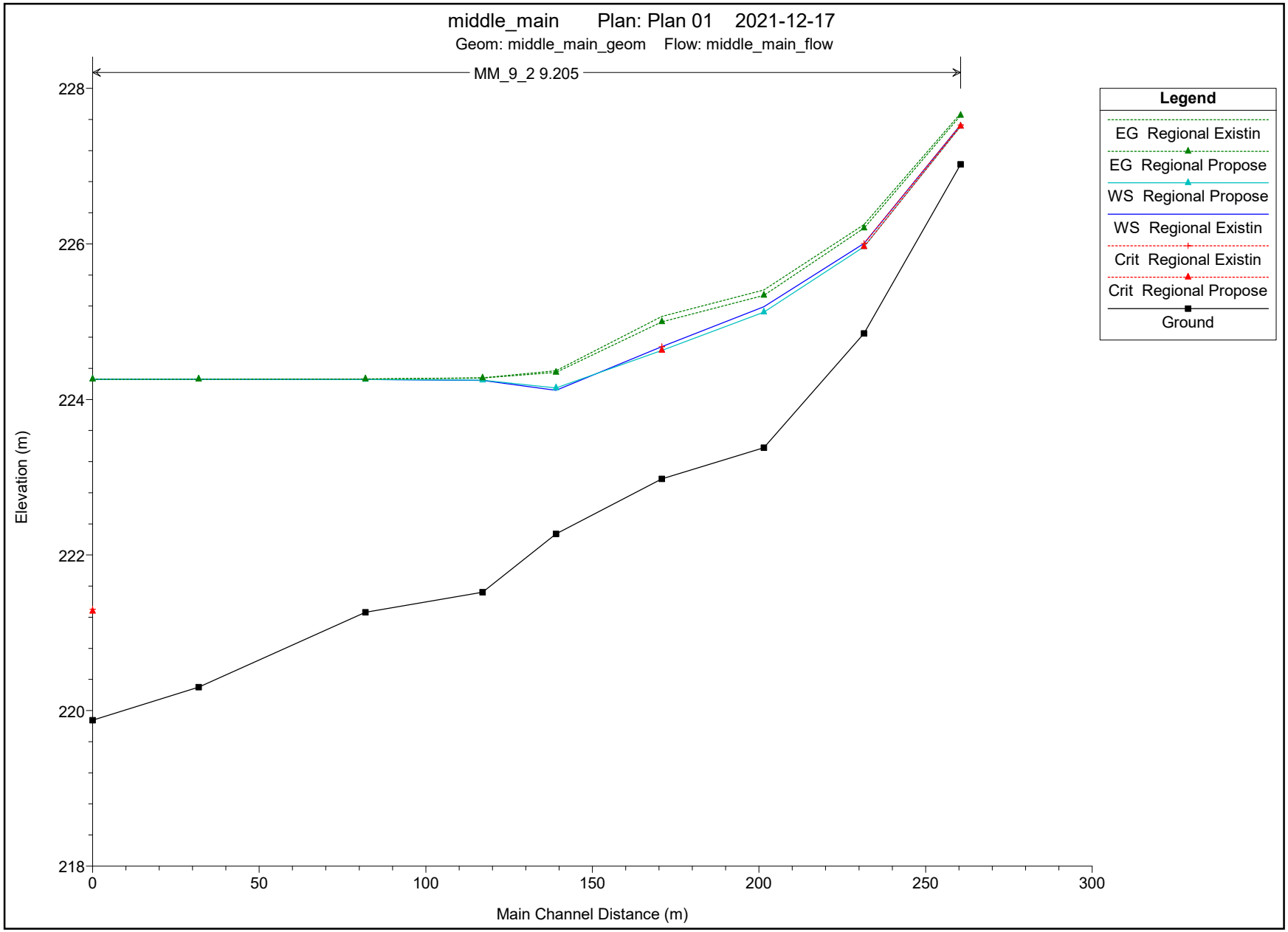
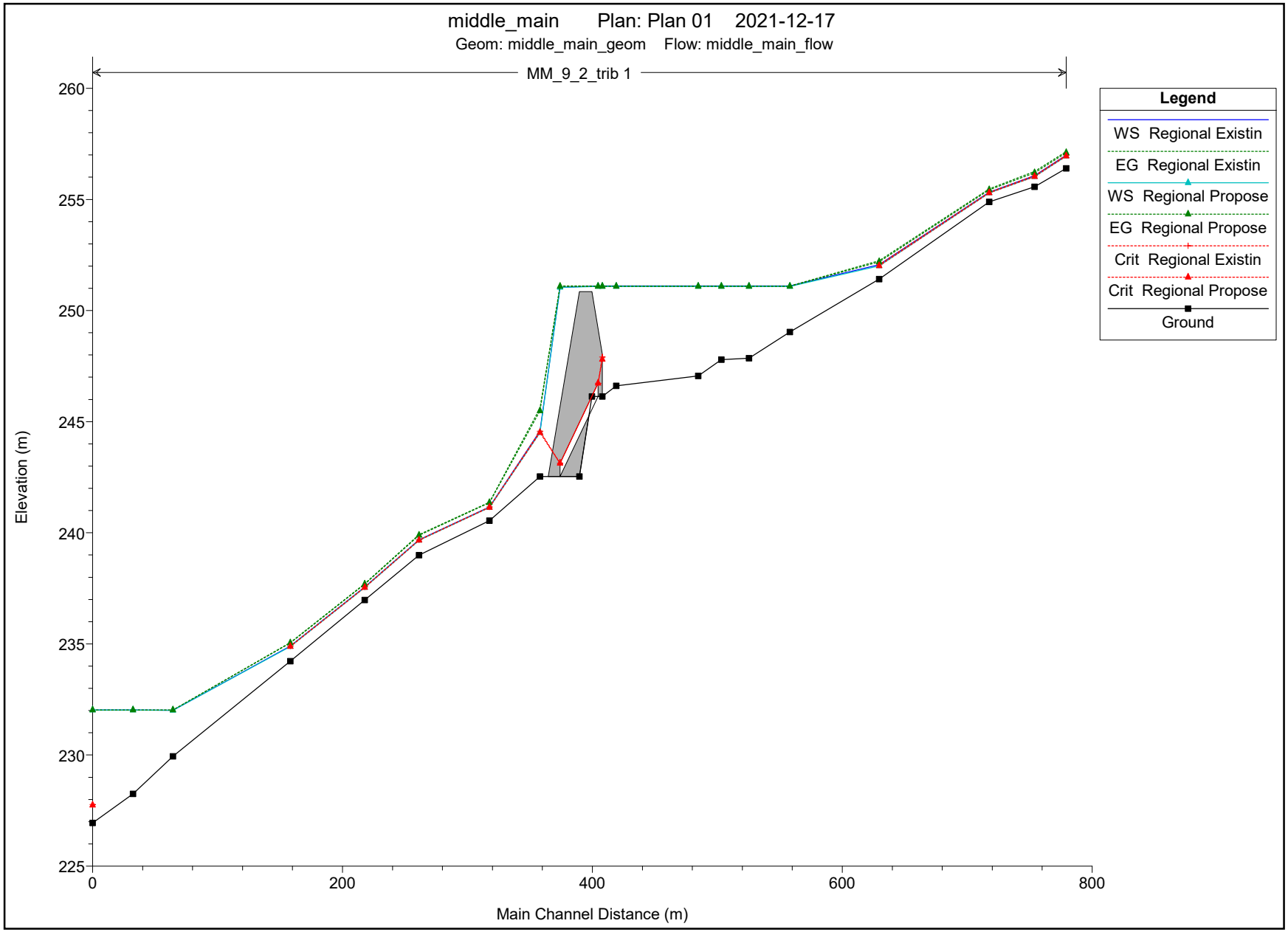
Geom: middle_main_geom Flow: middle_main_flow
MM_9_2_trib 9.204
Legend
EG Regional Existin
EG Regional Propose
Crit Regional Existin
WS Regional Existin
WS Regional Propose
Crit Regional Propose
Ground
Elevation (m)
270
260
250
240
230
220
0
500
1000
1500
2000
Main Channel Distance (m)


middle_main Plan: Plan 01 2021-12-17
Geom: middle_main_geom Flow: middle_main_flow
MM_9_2 9.205
Legend
EG Regional Existin
EG Regional Propose
WS Regional Propose
WS Regional Existin
Crit Regional Existin
Crit Regional Propose
Ground
Elevation (m)
228
226
224
222
220
218
0
50
100
150
200
250
300
Main Channel Distance (m)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Geom: middle_main_geom Flow: middle_main_flow
MM_9_2_trib 1
Legend
WS Regional Existin
EG Regional Existin
WS Regional Propose
EG Regional Propose
Crit Regional Existin
Crit Regional Propose
Ground
Elevation (m)
260
255
250
245
240
235
230
225
0
200
400
600
800
Main Channel Distance (m)

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================================================================================
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       V    V   I    SSSSS  U   U    A    L              (v 6.1.2003)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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


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DATE: 12-17-2021                          TIME: 12:53:15

USER:


COMMENTS: _____________________________________________________________

--------------------------------------------------------------------------------
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  ************************************************
  ** SIMULATION : Hazel                         **
  ************************************************


--------------------
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|                  |              ata\Local\Temp\
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| Ptotal=212.00 mm |    Comments: Hazel
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                1.00    6.00 |  4.00   13.00 |  7.00   23.00 | 10.00   53.00
                2.00    4.00 |  5.00   17.00 |  8.00   13.00 | 11.00   38.00
                3.00    6.00 |  6.00   13.00 |  9.00   13.00 | 12.00   13.00

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| CALIB            |
| NASHYD   (  0116)|   Area    (ha)=   7.40   Curve Number    (CN)= 92.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.82   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.51

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

                    ---- TRANSFORMED HYETOGRAPH ----
 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   0.555

     PEAK FLOW       (cms)=   0.939 (i)
     TIME TO PEAK    (hrs)=  10.250
     RUNOFF VOLUME    (mm)= 185.229
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.874

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

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| CALIB            |
| NASHYD   (  0117)|   Area    (ha)=   4.30   Curve Number    (CN)= 91.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   6.99   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

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


                          ---- TRANSFORMED HYETOGRAPH ----
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.401

PEAK FLOW (cms)= 0.572 (i)
TIME TO PEAK (hrs)= 10.167
RUNOFF VOLUME (mm)= 182.607
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.861

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

ROUTE CHN(0080)	
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.272E+02	0.0	0.19	33.70
0.19	99.69	.864E+02	0.1	0.37	17.55
0.29	99.79	.151E+03	0.2	0.49	13.14
0.38	99.88	.220E+03	0.3	0.59	10.97
0.48	99.98	.294E+03	0.5	0.67	9.64
0.57	100.07	.374E+03	0.7	0.74	8.73
0.67	100.17	.458E+03	0.9	0.80	8.05
0.76	100.26	.547E+03	1.2	0.86	7.51
0.86	100.36	.642E+03	1.5	0.91	7.08
0.95	100.45	.741E+03	1.8	0.96	6.72
1.05	100.55	.845E+03	2.2	1.00	6.41
1.16	100.66	.982E+03	2.7	1.07	6.02
1.28	100.78	.114E+04	3.4	1.14	5.64
1.39	100.89	.131E+04	4.1	1.20	5.35
1.50	101.00	.150E+04	4.9	1.25	5.13
1.61	101.11	.171E+04	5.8	1.30	4.95
1.72	101.22	.193E+04	6.7	1.34	4.79
1.84	101.34	.216E+04	7.7	1.38	4.66
1.95	101.45	.241E+04	8.8	1.41	4.55

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0117)	4.30	0.57	10.17	182.61	0.51	0.69
OUTFLOW: ID= 1 (0080)	4.30	0.56	10.25	182.57	0.50	0.68

CALIB		
NASHYD (0022)	Area (ha)= 52.82	Curve Number (CN)= 91.0
ID= 1 DT= 5.0 min	Ia (mm)= 7.40	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.79	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00

1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 2.554

PEAK FLOW (cms)= 5.928 (i)
TIME TO PEAK (hrs)= 10.833
RUNOFF VOLUME (mm)= 182.225
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.860

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

ADD HYD (0188)		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0022):		52.82	5.928	10.83	182.23
+ ID2= 2 (0080):		4.30	0.562	10.25	182.57
ID = 3 (0188):		57.12	6.423	10.75	182.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0101)	Area	(ha)=	7.93	Curve Number	(CN)= 91.0
ID= 1 DT= 5.0 min	Ia	(mm)=	6.93	# of Linear Res.	(N)= 3.00
	U.H. Tp	(hrs)=	0.48		

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.631

PEAK FLOW (cms)= 1.016 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 182.675
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.862

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

CALIB					
NASHYD (0002)	Area	(ha)=	13.35	Curve Number	(CN)= 91.0
ID= 1 DT= 5.0 min	Ia	(mm)=	7.07	# of Linear Res.	(N)= 3.00
	U.H. Tp	(hrs)=	0.56		

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00

1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.910

PEAK FLOW (cms)= 1.641 (i)
TIME TO PEAK (hrs)= 10.333
RUNOFF VOLUME (mm)= 182.546
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.861

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

CALIB					
NASHYD (0102)	Area (ha)=	2.00	Curve Number (CN)=	91.0	
ID= 1 DT= 5.0 min	Ia (mm)=	6.98	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.21			

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.364

PEAK FLOW (cms)= 0.287 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 182.353
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.860

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

CALIB					
STANDHYD (0070)	Area (ha)=	0.35			
ID= 1 DT= 5.0 min	Total Imp(%)=	90.00	Dir. Conn.(%)=	90.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.32	0.04
Dep. Storage	(mm)=	1.00	4.96
Average Slope	(%)=	1.00	2.00
Length	(m)=	48.36	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00

1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	51.44		
over (min)	5.00	10.00		
Storage Coeff. (min)=	2.13 (ii)	5.91 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.31	0.15		
			TOTALS	
PEAK FLOW (cms)=	0.05	0.01	0.051 (iii)	
TIME TO PEAK (hrs)=	9.58	10.00	10.00	
RUNOFF VOLUME (mm)=	211.00	179.78	207.87	
TOTAL RAINFALL (mm)=	212.00	212.00	212.00	
RUNOFF COEFFICIENT =	1.00	0.85	0.98	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 89.0 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 (0098)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	13.35	1.641	10.33	182.55
+ ID2= 2 (0102):	2.00	0.287	10.00	182.35
ID = 3 (0098):	15.35	1.878	10.25	182.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0098)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0098):	15.35	1.878	10.25	182.52
+ ID2= 2 (0070):	0.35	0.051	10.00	207.87
ID = 1 (0098):	15.70	1.915	10.25	183.09

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0099)					
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		
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			

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.231E+02	0.0	0.19	28.62
0.19	99.69	.734E+02	0.1	0.37	14.91
0.29	99.79	.128E+03	0.2	0.49	11.16
0.38	99.88	.187E+03	0.3	0.59	9.32
0.48	99.98	.250E+03	0.5	0.67	8.19
0.57	100.07	.317E+03	0.7	0.74	7.41
0.67	100.17	.389E+03	0.9	0.80	6.84
0.76	100.26	.465E+03	1.2	0.86	6.38
0.86	100.36	.545E+03	1.5	0.91	6.02
0.95	100.45	.629E+03	1.8	0.96	5.71
1.05	100.55	.718E+03	2.2	1.00	5.45
1.16	100.66	.834E+03	2.7	1.07	5.11
1.28	100.78	.968E+03	3.4	1.14	4.79
1.39	100.89	.112E+04	4.1	1.20	4.55
1.50	101.00	.128E+04	4.9	1.25	4.36
1.61	101.11	.145E+04	5.8	1.30	4.20
1.72	101.22	.164E+04	6.7	1.34	4.07
1.84	101.34	.184E+04	7.7	1.38	3.96
1.95	101.45	.205E+04	8.8	1.41	3.86

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0098)		15.70	1.91	10.25	183.09	0.98	0.97
OUTFLOW: ID= 1 (0099)		15.70	1.90	10.33	183.08	0.97	0.96

CALIB				
NASHYD (0103)	Area (ha)=	5.49	Curve Number (CN)=	91.0
ID= 1 DT= 5.0 min	Ia (mm)=	6.90	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.32		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00

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 0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
 0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
 0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
 0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
 0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
 1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
 1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
 1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
 1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
 1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
 1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
 1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
 1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
 1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
 1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
 1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
 1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
 2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
 2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
 2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
 2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
 2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
 2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
 2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
 2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
 2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
 2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
 2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
 2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
 3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

    Unit Hyd Qpeak  (cms)=   0.656

    PEAK FLOW       (cms)=   0.762 (i)
    TIME TO PEAK    (hrs)=  10.000
    RUNOFF VOLUME    (mm)= 182.663
    TOTAL RAINFALL   (mm)= 212.000
    RUNOFF COEFFICIENT   =   0.862

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

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--------------------
| ADD HYD  (  0181)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0103):     5.49   0.762    10.00   182.66
     + ID2= 2 (  0099):    15.70   1.905    10.33   183.08
       ================================================
       ID = 3 (  0181):    21.19   2.619    10.17   182.97

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ROUTE CHN(  0119)|
| 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
                  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

          <---------------------- TRAVEL TIME TABLE ---------------------->
           DEPTH     ELEV       VOLUME     FLOW RATE     VELOCITY   TRAV.TIME
            (m)       (m)     (cu.m.)       (cms)         (m/s)       (min)
           0.10     99.60     .287E+02        0.0          0.19       35.58
           0.19     99.69     .912E+02        0.1          0.37       18.54
           0.29     99.79     .159E+03        0.2          0.49       13.87
           0.38     99.88     .232E+03        0.3          0.59       11.59
           0.48     99.98     .311E+03        0.5          0.67       10.18
           0.57    100.07     .394E+03        0.7          0.74        9.22
           0.67    100.17     .483E+03        0.9          0.80        8.50
           0.76    100.26     .578E+03        1.2          0.86        7.93
           0.86    100.36     .677E+03        1.5          0.91        7.48
           0.95    100.45     .782E+03        1.8          0.96        7.10
           1.05    100.55     .893E+03        2.2          1.00        6.77
           1.16    100.66     .104E+04        2.7          1.07        6.35
           1.28    100.78     .120E+04        3.4          1.14        5.95
           1.39    100.89     .139E+04        4.1          1.20        5.65
           1.50    101.00     .159E+04        4.9          1.25        5.42
           1.61    101.11     .180E+04        5.8          1.30        5.22
           1.72    101.22     .203E+04        6.7          1.34        5.06
           1.84    101.34     .228E+04        7.7          1.38        4.92
           1.95    101.45     .255E+04        8.8          1.41        4.80

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK    TPEAK    R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)    (hrs)    (mm)       (m)       (m/s)
   INFLOW : ID= 2 (  0181)    21.19     2.62    10.17 182.97       1.14       1.05
  OUTFLOW: ID= 1 (  0119)    21.19     2.60    10.33 182.97       1.13       1.05

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0011)|   Area     (ha)=   5.33   Curve Number    (CN)= 90.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.63   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.50

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

                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
         0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
         0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
         0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
         0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
         0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
         0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
         0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
         0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
         0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
         0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
         1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
         1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
         1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
         1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
         1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
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1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.407

PEAK FLOW (cms)= 0.672 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 179.564
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.847

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

CALIB		
STANDHYD (0062)	Area (ha)=	0.29
ID= 1 DT= 5.0 min	Total Imp(%)=	90.00 Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.03
Dep. Storage	(mm)=	1.00	3.51
Average Slope	(%)=	1.00	2.00
Length	(m)=	44.10	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	52.16		
over (min)	5.00	10.00		
Storage Coeff. (min)=	2.02 (ii)	5.79 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.31	0.15		
				TOTALS
PEAK FLOW (cms)=	0.04	0.00		0.043 (iii)
TIME TO PEAK (hrs)=	9.50	10.00		10.00
RUNOFF VOLUME (mm)=	211.00	188.51		208.74
TOTAL RAINFALL (mm)=	212.00	212.00		212.00
RUNOFF COEFFICIENT =	1.00	0.89		0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 92.0 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 (0120)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0011):	5.33	0.672	10.25	179.56
	+ ID2= 2 (0101):	7.93	1.016	10.25	182.67
	ID = 3 (0120):	13.26	1.688	10.25	181.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0120)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1	ID1= 3 (0120):	13.26	1.688	10.25	181.42
	+ ID2= 2 (0119):	21.19	2.599	10.33	182.97

```
       ID = 1 (  0120):    34.45   4.286    10.25   182.37

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

--------------------
| ADD HYD  (  0120)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0120):    34.45   4.286    10.25   182.37
     + ID2= 2 (  0062):     0.29   0.043    10.00   208.74
       ================================================
       ID = 3 (  0120):    34.75   4.317    10.25   182.59

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0122)|
| 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
                   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

     <---------------------- TRAVEL TIME TABLE ----------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.10    99.60    .293E+02        0.0         0.19       36.31
       0.19    99.69    .931E+02        0.1         0.37       18.92
       0.29    99.79    .162E+03        0.2         0.49       14.16
       0.38    99.88    .237E+03        0.3         0.59       11.82
       0.48    99.98    .317E+03        0.5         0.67       10.39
       0.57   100.07    .403E+03        0.7         0.74        9.41
       0.67   100.17    .493E+03        0.9         0.80        8.67
       0.76   100.26    .590E+03        1.2         0.86        8.10
       0.86   100.36    .691E+03        1.5         0.91        7.63
       0.95   100.45    .799E+03        1.8         0.96        7.24
       1.05   100.55    .911E+03        2.2         1.00        6.91
       1.16   100.66    .106E+04        2.7         1.07        6.48
       1.28   100.78    .123E+04        3.4         1.14        6.08
       1.39   100.89    .142E+04        4.1         1.20        5.77
       1.50   101.00    .162E+04        4.9         1.25        5.53
       1.61   101.11    .184E+04        5.8         1.30        5.33
       1.72   101.22    .208E+04        6.7         1.34        5.17
       1.84   101.34    .233E+04        7.7         1.38        5.02
       1.95   101.45    .260E+04        8.8         1.41        4.90

                                  <---- hydrograph ---->   <-pipe / channel->
                             AREA    QPEAK    TPEAK   R.V.   MAX DEPTH  MAX VEL
                             (ha)    (cms)    (hrs)   (mm)       (m)       (m/s)
   INFLOW : ID= 2 (  0120)   34.75     4.32   10.25 182.59      1.42      1.22
   OUTFLOW: ID= 1 (  0122)   34.75     4.29   10.33 182.59      1.41      1.21


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0010)|   Area     (ha)=   9.22   Curve Number   (CN)= 89.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   9.45   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.35

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


                        ---- TRANSFORMED HYETOGRAPH ----
     TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
      hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
    0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
    0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
    0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
    0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
    0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
    0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
    0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
    0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
    0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
    0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
    0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
    1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
    1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
    1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
    1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
    1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
    1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
    1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
    1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
    1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
    1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
    1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
    1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
    2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
    2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
    2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
    2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
    2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
    2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
    2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
    2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
    2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
    2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
    2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
    2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
    3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   1.006

     PEAK FLOW       (cms)=   1.249 (i)
     TIME TO PEAK    (hrs)=  10.083
     RUNOFF VOLUME    (mm)= 175.331
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.827

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

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--------------------
| ADD HYD  (  0121)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0010):     9.22   1.249    10.08   175.33
```

```
      + ID2= 2 (  0122):    34.75   4.288    10.33   182.59
        ========================================================
        ID = 3 (  0121):    43.96   5.458    10.25   181.07

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| NASHYD   (  0110)|   Area     (ha)=  15.37   Curve Number    (CN)= 91.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   6.98   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.75

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

```
    Unit Hyd Qpeak  (cms)=   0.783

    PEAK FLOW       (cms)=   1.747 (i)
    TIME TO PEAK    (hrs)=  10.750
    RUNOFF VOLUME    (mm)= 182.642
    TOTAL RAINFALL   (mm)= 212.000
    RUNOFF COEFFICIENT   =   0.862

    (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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--------------------
| CALIB            |
| NASHYD   (  0007)|   Area     (ha)=  15.76   Curve Number    (CN)= 92.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.08   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.03

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

```
    Unit Hyd Qpeak  (cms)=   0.584

    PEAK FLOW       (cms)=   1.661 (i)
    TIME TO PEAK    (hrs)=  11.167
    RUNOFF VOLUME    (mm)= 184.985
    TOTAL RAINFALL   (mm)= 212.000
    RUNOFF COEFFICIENT   =   0.873

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

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| ROUTE CHN(  0164)|
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| 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
                  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

     <---------------------- TRAVEL TIME TABLE ----------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.10    99.60    .523E+02       0.0         0.19       64.86
       0.19    99.69    .166E+03       0.1         0.37       33.79
       0.29    99.79    .290E+03       0.2         0.49       25.29
       0.38    99.88    .423E+03       0.3         0.59       21.12
       0.48    99.98    .566E+03       0.5         0.67       18.56
       0.57   100.07    .719E+03       0.7         0.74       16.80
       0.67   100.17    .881E+03       0.9         0.80       15.49
       0.76   100.26    .105E+04       1.2         0.86       14.46
       0.86   100.36    .123E+04       1.5         0.91       13.63
       0.95   100.45    .143E+04       1.8         0.96       12.94
       1.05   100.55    .163E+04       2.2         1.00       12.34
       1.16   100.66    .189E+04       2.7         1.07       11.58
       1.28   100.78    .219E+04       3.4         1.14       10.85
       1.39   100.89    .253E+04       4.1         1.20       10.31
       1.50   101.00    .289E+04       4.9         1.25        9.87
       1.61   101.11    .328E+04       5.8         1.30        9.52
       1.72   101.22    .371E+04       6.7         1.34        9.23
       1.84   101.34    .416E+04       7.7         1.38        8.97
       1.95   101.45    .464E+04       8.8         1.41        8.75

                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK    TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)    (hrs)    (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0007)   15.76     1.66   11.17 184.98      0.90      0.93
   OUTFLOW: ID= 1 (  0164)   15.76     1.64   11.25 184.96      0.90      0.93



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--------------------
| CALIB            |
| STANDHYD (  0064)|   Area    (ha)=   1.35
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.22         0.14
     Dep. Storage     (mm)=       1.00         4.16
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      94.89        40.00
     Mannings n           =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
              TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                hrs   mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
              0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
              0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
              0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
              0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
              0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
              0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
              0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
              0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
              0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
              0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
              0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
              1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
              1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
              1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
              1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
              1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
              1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
              1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
              1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
              1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
              1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
              1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
              1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
              2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
              2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
              2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
              2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
              2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
              2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
              2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
              2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
              2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
              2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
              2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
              2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
              3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        51.94
                 over (min)        5.00        10.00
     Storage Coeff.  (min)=       3.19 (ii)    6.97 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.27         0.14
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.18         0.02        0.198 (iii)
     TIME TO PEAK    (hrs)=       9.83        10.00       10.00
     RUNOFF VOLUME    (mm)=     211.00       185.42      208.44
     TOTAL RAINFALL   (mm)=     212.00       212.00      212.00
     RUNOFF COEFFICIENT   =       1.00         0.87        0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  91.0    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  (  0161)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)      (mm)
        ID1= 1 (  0110):    15.37    1.747    10.75    182.64
      + ID2= 2 (  0164):    15.76    1.640    11.25    184.96
        ================================================
```

```
       ID = 3 (  0161):    31.14   3.336    11.08   183.82

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

--------------------
| ADD HYD  (  0161)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0161):    31.14   3.336    11.08   183.82
     + ID2= 2 (  0064):     1.35   0.198    10.00   208.44
       ================================================
       ID = 1 (  0161):    32.49   3.472    11.00   184.84

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0166)|   Area     (ha)=   0.56
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.50         0.06
     Dep. Storage     (mm)=       1.00         4.08
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      61.16        40.00
     Mannings n           =      0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
  TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
   hrs   mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
 0.083     6.00 | 3.083    13.00 | 6.083    23.00 |  9.08    53.00
 0.167     6.00 | 3.167    13.00 | 6.167    23.00 |  9.17    53.00
 0.250     6.00 | 3.250    13.00 | 6.250    23.00 |  9.25    53.00
 0.333     6.00 | 3.333    13.00 | 6.333    23.00 |  9.33    53.00
 0.417     6.00 | 3.417    13.00 | 6.417    23.00 |  9.42    53.00
 0.500     6.00 | 3.500    13.00 | 6.500    23.00 |  9.50    53.00
 0.583     6.00 | 3.583    13.00 | 6.583    23.00 |  9.58    53.00
 0.667     6.00 | 3.667    13.00 | 6.667    23.00 |  9.67    53.00
 0.750     6.00 | 3.750    13.00 | 6.750    23.00 |  9.75    53.00
 0.833     6.00 | 3.833    13.00 | 6.833    23.00 |  9.83    53.00
 0.917     6.00 | 3.917    13.00 | 6.917    23.00 |  9.92    53.00
 1.000     6.00 | 4.000    13.00 | 7.000    23.00 | 10.00    53.00
 1.083     4.00 | 4.083    17.00 | 7.083    13.00 | 10.08    38.00
 1.167     4.00 | 4.167    17.00 | 7.167    13.00 | 10.17    38.00
 1.250     4.00 | 4.250    17.00 | 7.250    13.00 | 10.25    38.00
 1.333     4.00 | 4.333    17.00 | 7.333    13.00 | 10.33    38.00
 1.417     4.00 | 4.417    17.00 | 7.417    13.00 | 10.42    38.00
 1.500     4.00 | 4.500    17.00 | 7.500    13.00 | 10.50    38.00
 1.583     4.00 | 4.583    17.00 | 7.583    13.00 | 10.58    38.00
 1.667     4.00 | 4.667    17.00 | 7.667    13.00 | 10.67    38.00
 1.750     4.00 | 4.750    17.00 | 7.750    13.00 | 10.75    38.00
 1.833     4.00 | 4.833    17.00 | 7.833    13.00 | 10.83    38.00
 1.917     4.00 | 4.917    17.00 | 7.917    13.00 | 10.92    38.00
 2.000     4.00 | 5.000    17.00 | 8.000    13.00 | 11.00    38.00
 2.083     6.00 | 5.083    13.00 | 8.083    13.00 | 11.08    13.00
 2.167     6.00 | 5.167    13.00 | 8.167    13.00 | 11.17    13.00
 2.250     6.00 | 5.250    13.00 | 8.250    13.00 | 11.25    13.00
 2.333     6.00 | 5.333    13.00 | 8.333    13.00 | 11.33    13.00
 2.417     6.00 | 5.417    13.00 | 8.417    13.00 | 11.42    13.00
 2.500     6.00 | 5.500    13.00 | 8.500    13.00 | 11.50    13.00
 2.583     6.00 | 5.583    13.00 | 8.583    13.00 | 11.58    13.00
 2.667     6.00 | 5.667    13.00 | 8.667    13.00 | 11.67    13.00
 2.750     6.00 | 5.750    13.00 | 8.750    13.00 | 11.75    13.00
 2.833     6.00 | 5.833    13.00 | 8.833    13.00 | 11.83    13.00
 2.917     6.00 | 5.917    13.00 | 8.917    13.00 | 11.92    13.00
 3.000     6.00 | 6.000    13.00 | 9.000    13.00 | 12.00    13.00

     Max.Eff.Inten.(mm/hr)=      53.00        51.71
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      2.45 (ii)    6.23 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.30         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.07         0.01        0.082 (iii)
     TIME TO PEAK    (hrs)=      9.67        10.00       10.00
     RUNOFF VOLUME    (mm)=    211.00       183.07      208.20
     TOTAL RAINFALL   (mm)=    212.00       212.00      212.00
     RUNOFF COEFFICIENT   =      1.00         0.86        0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  90.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0168)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0161):    32.49   3.472    11.00   184.84
     + ID2= 2 (  0166):     0.56   0.082    10.00   208.20
       ================================================
       ID = 3 (  0168):    33.05   3.531    11.00   185.24

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0163)|
| 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
                   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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)    (cu.m.)      (cms)        (m/s)      (min)
       0.10    99.60    .132E+02       0.0         0.19      16.38
       0.19    99.69    .420E+02       0.1         0.37       8.53
       0.29    99.79    .732E+02       0.2         0.49       6.39
       0.38    99.88    .107E+03       0.3         0.59       5.33
       0.48    99.98    .143E+03       0.5         0.67       4.69
       0.57   100.07    .182E+03       0.7         0.74       4.24
       0.67   100.17    .223E+03       0.9         0.80       3.91
```

0.76	100.26	.266E+03	1.2	0.86	3.65
0.86	100.36	.312E+03	1.5	0.91	3.44
0.95	100.45	.360E+03	1.8	0.96	3.27
1.05	100.55	.411E+03	2.2	1.00	3.12
1.16	100.66	.477E+03	2.7	1.07	2.92
1.28	100.78	.554E+03	3.4	1.14	2.74
1.39	100.89	.638E+03	4.1	1.20	2.60
1.50	101.00	.730E+03	4.9	1.25	2.49
1.61	101.11	.829E+03	5.8	1.30	2.40
1.72	101.22	.936E+03	6.7	1.34	2.33
1.84	101.34	.105E+04	7.7	1.38	2.27
1.95	101.45	.117E+04	8.8	1.41	2.21

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
	<---- hydrograph ---->				<-pipe / channel->	
INFLOW : ID= 2 (0168)	33.05	3.53	11.00	185.24	1.30	1.15
OUTFLOW: ID= 1 (0163)	33.05	3.52	11.00	185.24	1.30	1.15

CALIB			
NASHYD (0008)	Area (ha)= 18.33	Curve Number (CN)= 91.0	
ID= 1 DT= 5.0 min	Ia (mm)= 8.44	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.77		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.909

PEAK FLOW (cms)= 2.069 (i)
TIME TO PEAK (hrs)= 10.750
RUNOFF VOLUME (mm)= 181.198
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.855

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

ROUTE CHN(0093)		
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.305E+02	0.0	0.19	37.74
0.19	99.69	.967E+02	0.1	0.37	19.66
0.29	99.79	.169E+03	0.2	0.49	14.72
0.38	99.88	.246E+03	0.3	0.59	12.29
0.48	99.98	.330E+03	0.5	0.67	10.80
0.57	100.07	.418E+03	0.7	0.74	9.78
0.67	100.17	.513E+03	0.9	0.80	9.01
0.76	100.26	.613E+03	1.2	0.86	8.42
0.86	100.36	.719E+03	1.5	0.91	7.93
0.95	100.45	.830E+03	1.8	0.96	7.53
1.05	100.55	.947E+03	2.2	1.00	7.18
1.16	100.66	.110E+04	2.7	1.07	6.74
1.28	100.78	.128E+04	3.4	1.14	6.32
1.39	100.89	.147E+04	4.1	1.20	6.00
1.50	101.00	.168E+04	4.9	1.25	5.75
1.61	101.11	.191E+04	5.8	1.30	5.54
1.72	101.22	.216E+04	6.7	1.34	5.37
1.84	101.34	.242E+04	7.7	1.38	5.22
1.95	101.45	.270E+04	8.8	1.41	5.09

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
	<---- hydrograph ---->				<-pipe / channel->	
INFLOW : ID= 2 (0008)	18.33	2.07	10.75	181.20	1.02	0.99
OUTFLOW: ID= 1 (0093)	18.33	2.06	10.92	181.19	1.01	0.98

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--------------------
| CALIB            |
| NASHYD   (  0111)|   Area    (ha)=  21.58   Curve Number    (CN)= 91.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.61

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

```
     Unit Hyd Qpeak  (cms)=   1.351

     PEAK FLOW       (cms)=   2.591 (i)
     TIME TO PEAK    (hrs)=  10.417
     RUNOFF VOLUME    (mm)= 182.617
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.861

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

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--------------------
| ADD HYD  (  0091)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0111):    21.58   2.591    10.42   182.62
     + ID2= 2 (  0093):    18.33   2.062    10.92   181.19
       ================================================
       ID = 3 (  0091):    39.92   4.590    10.67   181.96

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0094)|
| 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
                   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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE     VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)         (m/s)      (min)
       0.10    99.60    .727E+02        0.0          0.19      90.12
       0.19    99.69    .231E+03        0.1          0.37      46.95
       0.29    99.79    .403E+03        0.2          0.49      35.14
       0.38    99.88    .588E+03        0.3          0.59      29.35
       0.48    99.98    .787E+03        0.5          0.67      25.80
       0.57   100.07    .999E+03        0.7          0.74      23.35
       0.67   100.17    .122E+04        0.9          0.80      21.52
       0.76   100.26    .146E+04        1.2          0.86      20.10
       0.86   100.36    .172E+04        1.5          0.91      18.94
       0.95   100.45    .198E+04        1.8          0.96      17.98
       1.05   100.55    .226E+04        2.2          1.00      17.15
       1.16   100.66    .263E+04        2.7          1.07      16.09
       1.28   100.78    .305E+04        3.4          1.14      15.08
       1.39   100.89    .351E+04        4.1          1.20      14.32
       1.50   101.00    .402E+04        4.9          1.25      13.72
       1.61   101.11    .456E+04        5.8          1.30      13.23
       1.72   101.22    .515E+04        6.7          1.34      12.82
       1.84   101.34    .578E+04        7.7          1.38      12.47
       1.95   101.45    .645E+04        8.8          1.41      12.16

                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                               (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0091)   39.92     4.59   10.67 181.96      1.46      1.23
   OUTFLOW: ID= 1 (  0094)   39.92     4.52   10.92 181.95      1.45      1.23

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0113)|   Area    (ha)=  13.07   Curve Number    (CN)= 91.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.67

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

                              ---- TRANSFORMED HYETOGRAPH ----
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TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.745

PEAK FLOW (cms)= 1.529 (i)
TIME TO PEAK (hrs)= 10.583
RUNOFF VOLUME (mm)= 182.619
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.861

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

ROUTE CHN(0173)	
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.230E+02	0.0	0.19	28.46
0.19	99.69	.729E+02	0.1	0.37	14.83
0.29	99.79	.127E+03	0.2	0.49	11.10
0.38	99.88	.186E+03	0.3	0.59	9.27
0.48	99.98	.248E+03	0.5	0.67	8.15
0.57	100.07	.315E+03	0.7	0.74	7.37
0.67	100.17	.387E+03	0.9	0.80	6.80
0.76	100.26	.462E+03	1.2	0.86	6.35
0.86	100.36	.542E+03	1.5	0.91	5.98
0.95	100.45	.626E+03	1.8	0.96	5.68
1.05	100.55	.714E+03	2.2	1.00	5.42
1.16	100.66	.829E+03	2.7	1.07	5.08
1.28	100.78	.963E+03	3.4	1.14	4.76
1.39	100.89	.111E+04	4.1	1.20	4.52
1.50	101.00	.127E+04	4.9	1.25	4.33
1.61	101.11	.144E+04	5.8	1.30	4.18
1.72	101.22	.163E+04	6.7	1.34	4.05
1.84	101.34	.182E+04	7.7	1.38	3.94
1.95	101.45	.204E+04	8.8	1.41	3.84

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0113)	13.07	1.53	10.58	182.62	0.86	0.91
OUTFLOW: ID= 1 (0173)	13.07	1.53	10.67	182.62	0.86	0.91

CALIB		
NASHYD (0019)	Area (ha)= 19.14	Curve Number (CN)= 91.0
ID= 1 DT= 5.0 min	Ia (mm)= 8.07	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 1.05	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00

1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.696

PEAK FLOW (cms)= 1.995 (i)
TIME TO PEAK (hrs)= 11.167
RUNOFF VOLUME (mm)= 181.566
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.856

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

ADD HYD (0172)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0019):	19.14	1.995	11.17	181.57
	+ ID2= 2 (0173):	13.07	1.525	10.67	182.62
	ID = 3 (0172):	32.21	3.466	11.00	181.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0172)		AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1		(ha)	(cms)	(hrs)	(mm)
	ID1= 3 (0172):	32.21	3.466	11.00	181.99
	+ ID2= 2 (0094):	39.92	4.520	10.92	181.95
	ID = 1 (0172):	72.12	7.978	11.00	181.97

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0174)
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.179E+02	0.0	0.19	22.14
0.19	99.69	.568E+02	0.1	0.37	11.54
0.29	99.79	.990E+02	0.2	0.49	8.63
0.38	99.88	.145E+03	0.3	0.59	7.21
0.48	99.98	.193E+03	0.5	0.67	6.34
0.57	100.07	.245E+03	0.7	0.74	5.74
0.67	100.17	.301E+03	0.9	0.80	5.29
0.76	100.26	.360E+03	1.2	0.86	4.94
0.86	100.36	.422E+03	1.5	0.91	4.65
0.95	100.45	.487E+03	1.8	0.96	4.42
1.05	100.55	.556E+03	2.2	1.00	4.21
1.16	100.66	.645E+03	2.7	1.07	3.95
1.28	100.78	.749E+03	3.4	1.14	3.71
1.39	100.89	.863E+03	4.1	1.20	3.52
1.50	101.00	.987E+03	4.9	1.25	3.37
1.61	101.11	.112E+04	5.8	1.30	3.25
1.72	101.22	.127E+04	6.7	1.34	3.15
1.84	101.34	.142E+04	7.7	1.38	3.06
1.95	101.45	.158E+04	8.8	1.41	2.99

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0172)		72.12	7.98	11.00	181.97	1.86	1.39
OUTFLOW: ID= 1 (0174)		72.12	7.98	11.00	181.97	1.86	1.39

CALIB					
NASHYD (0020)	Area (ha)=	20.69	Curve Number (CN)=	91.0	
ID= 1 DT= 5.0 min	Ia (mm)=	7.84	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	1.05			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00

1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.753

PEAK FLOW (cms)= 2.157 (i)
TIME TO PEAK (hrs)= 11.167
RUNOFF VOLUME (mm)= 181.786
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.857

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

ADD HYD (0175)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0020):		20.69	2.157	11.17	181.79
+ ID2= 2 (0174):		72.12	7.979	11.00	181.97
ID = 3 (0175):		92.82	10.116	11.08	181.93

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0081)				
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	
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		

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.472E+02	0.0	0.19	58.56
0.19	99.69	.150E+03	0.1	0.37	30.51
0.29	99.79	.262E+03	0.2	0.49	22.83
0.38	99.88	.382E+03	0.3	0.59	19.07
0.48	99.98	.511E+03	0.5	0.67	16.76
0.57	100.07	.649E+03	0.7	0.74	15.17
0.67	100.17	.796E+03	0.9	0.80	13.99
0.76	100.26	.951E+03	1.2	0.86	13.06
0.86	100.36	.111E+04	1.5	0.91	12.31
0.95	100.45	.129E+04	1.8	0.96	11.68
1.05	100.55	.147E+04	2.2	1.00	11.15
1.16	100.66	.171E+04	2.7	1.07	10.45
1.28	100.78	.198E+04	3.4	1.14	9.80
1.39	100.89	.228E+04	4.1	1.20	9.30
1.50	101.00	.261E+04	4.9	1.25	8.91
1.61	101.11	.297E+04	5.8	1.30	8.60
1.72	101.22	.335E+04	6.7	1.34	8.33
1.84	101.34	.376E+04	7.7	1.38	8.10
1.95	101.45	.419E+04	8.8	1.41	7.90

**** WARNING: TRAVEL TIME TABLE EXCEEDED

		AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0175)		92.82	10.12	11.08	181.93	1.92	1.40
OUTFLOW: ID= 1 (0081)		92.82	10.08	11.17	181.92	1.95	1.41

CALIB					
NASHYD (0021)	Area (ha)=	50.74	Curve Number (CN)=	91.0	
ID= 1 DT= 5.0 min	Ia (mm)=	7.53	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	1.37			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00

2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.415

PEAK FLOW (cms)= 4.797 (i)
TIME TO PEAK (hrs)= 11.417
RUNOFF VOLUME (mm)= 182.102
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.859

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

CALIB					
NASHYD (0115)	Area (ha)=	9.61	Curve Number (CN)=	91.0	
ID= 1 DT= 5.0 min	Ia (mm)=	7.02	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.50			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.734

PEAK FLOW (cms)= 1.218 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 182.596
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.861

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

ADD HYD (0176)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (0021):	50.74	4.797	11.42	182.10
+ ID2= 2 (0115):	9.61	1.218	10.25	182.60
ID = 3 (0176):	60.35	5.717	11.17	182.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0176)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1				
ID1= 3 (0176):	60.35	5.717	11.17	182.18
+ ID2= 2 (0081):	92.82	10.078	11.17	181.92
ID = 1 (0176):	153.17	15.794	11.17	182.02

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0001)	Area (ha)=	3.26	Curve Number (CN)=	91.0	
ID= 1 DT= 5.0 min	Ia (mm)=	7.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.21			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00

1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.592

PEAK FLOW (cms)= 0.466 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 182.334
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.860

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

ROUTE CHN(0095)
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.212E+02	0.0	0.19	26.30
0.19	99.69	.674E+02	0.1	0.37	13.70
0.29	99.79	.118E+03	0.2	0.49	10.25
0.38	99.88	.172E+03	0.3	0.59	8.56
0.48	99.98	.230E+03	0.5	0.67	7.53
0.57	100.07	.292E+03	0.7	0.74	6.81
0.67	100.17	.357E+03	0.9	0.80	6.28
0.76	100.26	.427E+03	1.2	0.86	5.87
0.86	100.36	.501E+03	1.5	0.91	5.53
0.95	100.45	.578E+03	1.8	0.96	5.25
1.05	100.55	.660E+03	2.2	1.00	5.01
1.16	100.66	.766E+03	2.7	1.07	4.70
1.28	100.78	.890E+03	3.4	1.14	4.40
1.39	100.89	.103E+04	4.1	1.20	4.18
1.50	101.00	.117E+04	4.9	1.25	4.00
1.61	101.11	.133E+04	5.8	1.30	3.86
1.72	101.22	.150E+04	6.7	1.34	3.74
1.84	101.34	.169E+04	7.7	1.38	3.64
1.95	101.45	.188E+04	8.8	1.41	3.55

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0001)	3.26	0.47	10.00	182.33	0.45	0.64
OUTFLOW: ID= 1 (0095)	3.26	0.46	10.00	182.29	0.45	0.64

CALIB			
NASHYD (0100)	Area (ha)= 5.29	Curve Number (CN)= 91.0	
ID= 1 DT= 5.0 min	Ia (mm)= 7.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.48		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00

2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.421

PEAK FLOW (cms)= 0.677 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 182.610
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.861

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

ADD HYD (0096)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0100):	5.29	0.677	10.25	182.61
+ ID2= 2 (0095):	3.26	0.463	10.00	182.29
ID = 3 (0096):	8.54	1.125	10.08	182.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0097)	
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.552E+02	0.0	0.19	68.42
0.19	99.69	.175E+03	0.1	0.37	35.64
0.29	99.79	.306E+03	0.2	0.49	26.67
0.38	99.88	.447E+03	0.3	0.59	22.28
0.48	99.98	.597E+03	0.5	0.67	19.58
0.57	100.07	.758E+03	0.7	0.74	17.72
0.67	100.17	.930E+03	0.9	0.80	16.34
0.76	100.26	.111E+04	1.2	0.86	15.26
0.86	100.36	.130E+04	1.5	0.91	14.38
0.95	100.45	.150E+04	1.8	0.96	13.65
1.05	100.55	.172E+04	2.2	1.00	13.02
1.16	100.66	.199E+04	2.7	1.07	12.21
1.28	100.78	.231E+04	3.4	1.14	11.45
1.39	100.89	.267E+04	4.1	1.20	10.87
1.50	101.00	.305E+04	4.9	1.25	10.42
1.61	101.11	.347E+04	5.8	1.30	10.04
1.72	101.22	.391E+04	6.7	1.34	9.73
1.84	101.34	.439E+04	7.7	1.38	9.47
1.95	101.45	.489E+04	8.8	1.41	9.23

<---- hydrograph ----> <-pipe / channel->

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0096)	8.54	1.13	10.08	182.49	0.73	0.84
OUTFLOW: ID= 1 (0097)	8.54	1.07	10.25	182.44	0.71	0.82

CALIB				
NASHYD (0009)	Area (ha)=	24.11	Curve Number (CN)=	90.0
ID= 1 DT= 5.0 min	Ia (mm)=	8.46	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.52		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.771

PEAK FLOW (cms)= 3.005 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 178.744
TOTAL RAINFALL (mm)= 212.000

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     RUNOFF COEFFICIENT   =   0.843

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

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| ADD HYD  (  0177)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0009):    24.11   3.005    10.25   178.74
      + ID2= 2 (  0097):     8.54   1.069    10.25   182.44
        ====================================================
        ID = 3 (  0177):    32.66   4.074    10.25   179.71

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| NASHYD   (  0104)|   Area     (ha)=   6.51   Curve Number    (CN)= 91.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.06   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.55

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

                          ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
 0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
 0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
 0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
 0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
 0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
 0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
 0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
 0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
 0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
 0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
 1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
 1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
 1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
 1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
 1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
 1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
 1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
 1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
 1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
 1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
 1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
 1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
 2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
 2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
 2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
 2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
 2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
 2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
 2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
 2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
 2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
 2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
 2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
 2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
 3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   0.452

     PEAK FLOW       (cms)=   0.804 (i)
     TIME TO PEAK    (hrs)=  10.333
     RUNOFF VOLUME    (mm)= 182.552
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.861

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

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--------------------
| CALIB            |
| NASHYD   (  0003)|   Area     (ha)=   4.04   Curve Number    (CN)= 91.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.28

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

                          ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
 0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
 0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
 0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
 0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
 0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
 0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
 0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
 0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
 0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
 0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
 1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
 1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
 1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
 1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
 1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
 1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
 1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
 1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
 1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
 1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
 1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
 1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
 2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
 2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
 2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
 2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
 2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
 2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
 2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
 2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
 2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
 2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
 2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
 2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
 3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   0.552
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     PEAK FLOW       (cms)=   0.571 (i)
     TIME TO PEAK    (hrs)=  10.000
     RUNOFF VOLUME    (mm)= 182.529
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.861

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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| ROUTE CHN(  0126)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
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<------ 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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.235E+02	0.0	0.19	29.14
0.19	99.69	.747E+02	0.1	0.37	15.18
0.29	99.79	.130E+03	0.2	0.49	11.36
0.38	99.88	.190E+03	0.3	0.59	9.49
0.48	99.98	.254E+03	0.5	0.67	8.34
0.57	100.07	.323E+03	0.7	0.74	7.55
0.67	100.17	.396E+03	0.9	0.80	6.96
0.76	100.26	.473E+03	1.2	0.86	6.50
0.86	100.36	.555E+03	1.5	0.91	6.12
0.95	100.45	.641E+03	1.8	0.96	5.81
1.05	100.55	.731E+03	2.2	1.00	5.55
1.16	100.66	.849E+03	2.7	1.07	5.20
1.28	100.78	.985E+03	3.4	1.14	4.88
1.39	100.89	.114E+04	4.1	1.20	4.63
1.50	101.00	.130E+04	4.9	1.25	4.44
1.61	101.11	.148E+04	5.8	1.30	4.28
1.72	101.22	.167E+04	6.7	1.34	4.14
1.84	101.34	.187E+04	7.7	1.38	4.03
1.95	101.45	.208E+04	8.8	1.41	3.93

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0003)	4.04	0.57	10.00	182.53	0.51	0.69
OUTFLOW: ID= 1 (0126)	4.04	0.56	10.08	182.49	0.50	0.68

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--------------------
| ADD HYD  (  0129)|
|   1 +  2 =  3    |
--------------------
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0104):	6.51	0.804	10.33	182.55
+ ID2= 2 (0126):	4.04	0.563	10.08	182.49
ID = 3 (0129):	10.55	1.347	10.17	182.53

```
     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------
| ROUTE CHN(  0133)|
| 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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.171E+02	0.0	0.19	21.23
0.19	99.69	.544E+02	0.1	0.37	11.06
0.29	99.79	.949E+02	0.2	0.49	8.28
0.38	99.88	.139E+03	0.3	0.59	6.91
0.48	99.98	.185E+03	0.5	0.67	6.08
0.57	100.07	.235E+03	0.7	0.74	5.50
0.67	100.17	.288E+03	0.9	0.80	5.07
0.76	100.26	.345E+03	1.2	0.86	4.73
0.86	100.36	.404E+03	1.5	0.91	4.46
0.95	100.45	.467E+03	1.8	0.96	4.23
1.05	100.55	.533E+03	2.2	1.00	4.04
1.16	100.66	.619E+03	2.7	1.07	3.79
1.28	100.78	.718E+03	3.4	1.14	3.55
1.39	100.89	.827E+03	4.1	1.20	3.37
1.50	101.00	.946E+03	4.9	1.25	3.23
1.61	101.11	.108E+04	5.8	1.30	3.12
1.72	101.22	.121E+04	6.7	1.34	3.02
1.84	101.34	.136E+04	7.7	1.38	2.94
1.95	101.45	.152E+04	8.8	1.41	2.86

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0129)	10.55	1.35	10.17	182.53	0.81	0.88
OUTFLOW: ID= 1 (0133)	10.55	1.34	10.25	182.53	0.80	0.88

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--------------------
| CALIB            |
| NASHYD   (  0004)|   Area     (ha)=  43.99   Curve Number   (CN)= 85.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   6.82   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.93

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00

0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.807

PEAK FLOW (cms)= 4.578 (i)
TIME TO PEAK (hrs)= 11.083
RUNOFF VOLUME (mm)= 168.392
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.794

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

ROUTE CHN(0125)
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.287E+02	0.0	0.19	35.51
0.19	99.69	.910E+02	0.1	0.37	18.50
0.29	99.79	.159E+03	0.2	0.49	13.85
0.38	99.88	.232E+03	0.3	0.59	11.56
0.48	99.98	.310E+03	0.5	0.67	10.16
0.57	100.07	.394E+03	0.7	0.74	9.20
0.67	100.17	.483E+03	0.9	0.80	8.48
0.76	100.26	.577E+03	1.2	0.86	7.92
0.86	100.36	.676E+03	1.5	0.91	7.46
0.95	100.45	.781E+03	1.8	0.96	7.08
1.05	100.55	.891E+03	2.2	1.00	6.76
1.16	100.66	.103E+04	2.7	1.07	6.34
1.28	100.78	.120E+04	3.4	1.14	5.94
1.39	100.89	.138E+04	4.1	1.20	5.64
1.50	101.00	.158E+04	4.9	1.25	5.41
1.61	101.11	.180E+04	5.8	1.30	5.21
1.72	101.22	.203E+04	6.7	1.34	5.05
1.84	101.34	.228E+04	7.7	1.38	4.91
1.95	101.45	.254E+04	8.8	1.41	4.79

<---- hydrograph ----> <-pipe / channel->

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0004)		43.99	4.58	11.08	168.39	1.46	1.23
OUTFLOW: ID= 1 (0125)		43.99	4.56	11.17	168.39	1.46	1.23

CALIB				
NASHYD (0105)|	Area (ha)= 11.68	Curve Number (CN)= 91.0
ID= 1 DT= 5.0 min |	Ia (mm)= 7.03	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.20	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00

2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 2.230

PEAK FLOW (cms)= 1.673 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 182.249
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.860

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

ADD HYD (0130)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0105):	11.68	1.673	10.00	182.25
+ ID2= 2 (0125):	43.99	4.563	11.17	168.39
ID = 3 (0130):	55.66	5.753	11.00	171.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0128)	
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.180E+02	0.0	0.19	22.33
0.19	99.69	.572E+02	0.1	0.37	11.63
0.29	99.79	.998E+02	0.2	0.49	8.70
0.38	99.88	.146E+03	0.3	0.59	7.27
0.48	99.98	.195E+03	0.5	0.67	6.39
0.57	100.07	.247E+03	0.7	0.74	5.78
0.67	100.17	.303E+03	0.9	0.80	5.33
0.76	100.26	.363E+03	1.2	0.86	4.98
0.86	100.36	.425E+03	1.5	0.91	4.69
0.95	100.45	.491E+03	1.8	0.96	4.45
1.05	100.55	.560E+03	2.2	1.00	4.25
1.16	100.66	.651E+03	2.7	1.07	3.99
1.28	100.78	.755E+03	3.4	1.14	3.74
1.39	100.89	.870E+03	4.1	1.20	3.55
1.50	101.00	.996E+03	4.9	1.25	3.40
1.61	101.11	.113E+04	5.8	1.30	3.28
1.72	101.22	.128E+04	6.7	1.34	3.18
1.84	101.34	.143E+04	7.7	1.38	3.09
1.95	101.45	.160E+04	8.8	1.41	3.01

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0130)		55.66	5.75	11.00	171.30	1.61	1.30
OUTFLOW: ID= 1 (0128)		55.66	5.73	11.00	171.30	1.61	1.30

CALIB			
NASHYD (0012)	Area (ha)= 10.18	Curve Number (CN)= 90.0	
ID= 1 DT= 5.0 min	Ia (mm)= 8.17	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.51		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00

```
              3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   0.762

     PEAK FLOW       (cms)=   1.276 (i)
     TIME TO PEAK    (hrs)=  10.250
     RUNOFF VOLUME    (mm)= 179.035
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.845

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

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--------------------
| CALIB            |
| STANDHYD (  0136)|   Area    (ha)=   0.37
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.34         0.04
     Dep. Storage     (mm)=       1.00         6.58
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      49.87        40.00
     Mannings n           =      0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
  TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
 0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
 0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
 0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
 0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
 0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
 0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
 0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
 0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
 0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
 0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
 1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
 1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
 1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
 1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
 1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
 1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
 1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
 1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
 1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
 1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
 1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
 1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
 2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
 2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
 2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
 2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
 2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
 2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
 2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
 2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
 2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
 2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
 2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
 2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
 3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        49.48
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      2.17 (ii)    5.95 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.31         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.05         0.01        0.055 (iii)
     TIME TO PEAK    (hrs)=      9.58        10.00        10.00
     RUNOFF VOLUME    (mm)=    211.00       163.90       206.28
     TOTAL RAINFALL   (mm)=    212.00       212.00       212.00
     RUNOFF COEFFICIENT   =      1.00         0.77         0.97

***** 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.

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--------------------
| ADD HYD  (  0131)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
        ID1= 1 (  0012):    10.18    1.276    10.25   179.03
      + ID2= 2 (  0128):    55.66    5.732    11.00   171.30
        ================================================
        ID = 3 (  0131):    65.84    6.859    11.00   172.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0131)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
        ID1= 3 (  0131):    65.84    6.859    11.00   172.49
      + ID2= 2 (  0133):    10.55    1.340    10.25   182.53
        ================================================
        ID = 1 (  0131):    76.39    8.026    11.00   173.88

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

--------------------
| ADD HYD  (  0131)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
        ID1= 1 (  0131):    76.39    8.026    11.00   173.88
      + ID2= 2 (  0136):     0.37    0.055    10.00   206.28
        ================================================
        ID = 3 (  0131):    76.76    8.066    11.00   174.04

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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| CALIB            |
| STANDHYD (  0137)|   Area    (ha)=   0.32
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|ID= 1 DT= 5.0 min | Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.29	0.03
Dep. Storage	(mm)=	1.00	2.33
Average Slope	(%)=	1.00	2.00
Length	(m)=	46.33	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.	(mm/hr)=	53.00	52.88	
over	(min)	5.00	10.00	
Storage Coeff.	(min)=	2.08 (ii)	5.85 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.31	0.15	
				TOTALS
PEAK FLOW	(cms)=	0.04	0.00	0.047 (iii)
TIME TO PEAK	(hrs)=	9.58	10.00	10.00
RUNOFF VOLUME	(mm)=	211.00	202.10	210.10
TOTAL RAINFALL	(mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT	=	1.00	0.95	0.99

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 97.0 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 (0147)|	AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
1 + 2 = 3	ID1= 1 (0131):	76.76	8.066	11.00	174.04
	+ ID2= 2 (0137):	0.32	0.047	10.00	210.10
	ID = 3 (0147):	77.09	8.100	11.00	174.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ROUTE CHN(0132)| | 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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.433E+02	0.0	0.19	53.63
0.19	99.69	.137E+03	0.1	0.37	27.94
0.29	99.79	.240E+03	0.2	0.49	20.91
0.38	99.88	.350E+03	0.3	0.59	17.46
0.48	99.98	.468E+03	0.5	0.67	15.35
0.57	100.07	.594E+03	0.7	0.74	13.89
0.67	100.17	.729E+03	0.9	0.80	12.81
0.76	100.26	.871E+03	1.2	0.86	11.96
0.86	100.36	.102E+04	1.5	0.91	11.27
0.95	100.45	.118E+04	1.8	0.96	10.70
1.05	100.55	.135E+04	2.2	1.00	10.21
1.16	100.66	.156E+04	2.7	1.07	9.57
1.28	100.78	.181E+04	3.4	1.14	8.97
1.39	100.89	.209E+04	4.1	1.20	8.52
1.50	101.00	.239E+04	4.9	1.25	8.16
1.61	101.11	.272E+04	5.8	1.30	7.87
1.72	101.22	.307E+04	6.7	1.34	7.63
1.84	101.34	.344E+04	7.7	1.38	7.42
1.95	101.45	.384E+04	8.8	1.41	7.24

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0147)	77.09	8.10	11.00	174.19	1.88	1.39
OUTFLOW:	ID= 1 (0132)	77.09	8.07	11.00	174.18	1.87	1.39

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--------------------
| CALIB            |
| NASHYD   (  0013)|   Area     (ha)=  13.98   Curve Number    (CN)= 89.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   9.60   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.69

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

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    Unit Hyd Qpeak  (cms)=   0.774

    PEAK FLOW       (cms)=   1.603 (i)
    TIME TO PEAK    (hrs)=  10.583
    RUNOFF VOLUME    (mm)= 175.224
    TOTAL RAINFALL   (mm)= 212.000
    RUNOFF COEFFICIENT   =   0.827

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

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--------------------
| ADD HYD  (  0134)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0013):    13.98   1.603    10.58   175.22
     + ID2= 2 (  0132):    77.09   8.071    11.00   174.18
       ================================================
       ID = 3 (  0134):    91.07   9.638    11.00   174.34

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0140)|
| 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
                   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

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)       (cms)         (m/s)      (min)
        0.10    99.60    .359E+02         0.0          0.19      44.49
        0.19    99.69    .114E+03         0.1          0.37      23.18
        0.29    99.79    .199E+03         0.2          0.49      17.34
        0.38    99.88    .290E+03         0.3          0.59      14.49
        0.48    99.98    .388E+03         0.5          0.67      12.73
        0.57   100.07    .493E+03         0.7          0.74      11.52
        0.67   100.17    .604E+03         0.9          0.80      10.62
        0.76   100.26    .722E+03         1.2          0.86       9.92
        0.86   100.36    .847E+03         1.5          0.91       9.35
        0.95   100.45    .978E+03         1.8          0.96       8.87
        1.05   100.55    .112E+04         2.2          1.00       8.47
        1.16   100.66    .130E+04         2.7          1.07       7.94
        1.28   100.78    .150E+04         3.4          1.14       7.44
        1.39   100.89    .173E+04         4.1          1.20       7.07
        1.50   101.00    .198E+04         4.9          1.25       6.77
        1.61   101.11    .225E+04         5.8          1.30       6.53
        1.72   101.22    .254E+04         6.7          1.34       6.33
        1.84   101.34    .285E+04         7.7          1.38       6.15
        1.95   101.45    .318E+04         8.8          1.41       6.00

    **** WARNING:  TRAVEL TIME TABLE EXCEEDED
                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK    TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)    (hrs)   (mm)       (m)       (m/s)
   INFLOW : ID= 2 (  0134)   91.07     9.64   11.00 174.34      1.94      1.41
   OUTFLOW: ID= 1 (  0140)   91.07     9.62   11.00 174.34      1.95      1.41


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| CALIB            |
| NASHYD   (  0108)|   Area     (ha)=   5.80   Curve Number    (CN)= 91.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.34
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NOTE: RAINFALL WAS TRANSFORMED TO 5.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.652

PEAK FLOW (cms)= 0.800 (i)
TIME TO PEAK (hrs)= 10.083
RUNOFF VOLUME (mm)= 182.581
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.861

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

ROUTE CHN(0142)
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.244E+02	0.0	0.19	30.23
0.19	99.69	.775E+02	0.1	0.37	15.75
0.29	99.79	.135E+03	0.2	0.49	11.79
0.38	99.88	.197E+03	0.3	0.59	9.84
0.48	99.98	.264E+03	0.5	0.67	8.65
0.57	100.07	.335E+03	0.7	0.74	7.83
0.67	100.17	.411E+03	0.9	0.80	7.22
0.76	100.26	.491E+03	1.2	0.86	6.74
0.86	100.36	.576E+03	1.5	0.91	6.35
0.95	100.45	.665E+03	1.8	0.96	6.03
1.05	100.55	.758E+03	2.2	1.00	5.75
1.16	100.66	.881E+03	2.7	1.07	5.40
1.28	100.78	.102E+04	3.4	1.14	5.06
1.39	100.89	.118E+04	4.1	1.20	4.80
1.50	101.00	.135E+04	4.9	1.25	4.60
1.61	101.11	.153E+04	5.8	1.30	4.44
1.72	101.22	.173E+04	6.7	1.34	4.30
1.84	101.34	.194E+04	7.7	1.38	4.18
1.95	101.45	.216E+04	8.8	1.41	4.08

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0108)	5.80	0.80	10.08	182.58	0.61	0.76
OUTFLOW: ID= 1 (0142)	5.80	0.79	10.17	182.55	0.60	0.75

CALIB	
NASHYD (0014)|	Area (ha)= 15.33 Curve Number (CN)= 89.0
ID= 1 DT= 5.0 min |	Ia (mm)= 9.35 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.59

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00

1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.992

PEAK FLOW (cms)= 1.834 (i)
TIME TO PEAK (hrs)= 10.417
RUNOFF VOLUME (mm)= 175.460
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.828

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

ADD HYD (0141)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0014):		15.33	1.834	10.42	175.46
+ ID2= 2 (0140):		91.07	9.621	11.00	174.34
ID = 3 (0141):		106.39	11.334	11.00	174.50

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0141)		AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1		(ha)	(cms)	(hrs)	(mm)
ID1= 3 (0141):		106.39	11.334	11.00	174.50
+ ID2= 2 (0142):		5.80	0.788	10.17	182.55
ID = 1 (0141):		112.20	11.966	10.92	174.92

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0143)	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
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

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.340E+02	0.0	0.19	42.17
0.19	99.69	.108E+03	0.1	0.37	21.97
0.29	99.79	.188E+03	0.2	0.49	16.44
0.38	99.88	.275E+03	0.3	0.59	13.73
0.48	99.98	.368E+03	0.5	0.67	12.07
0.57	100.07	.467E+03	0.7	0.74	10.92
0.67	100.17	.573E+03	0.9	0.80	10.07
0.76	100.26	.685E+03	1.2	0.86	9.40
0.86	100.36	.803E+03	1.5	0.91	8.86
0.95	100.45	.927E+03	1.8	0.96	8.41
1.05	100.55	.106E+04	2.2	1.00	8.03
1.16	100.66	.123E+04	2.7	1.07	7.53
1.28	100.78	.143E+04	3.4	1.14	7.06
1.39	100.89	.164E+04	4.1	1.20	6.70
1.50	101.00	.188E+04	4.9	1.25	6.42
1.61	101.11	.214E+04	5.8	1.30	6.19
1.72	101.22	.241E+04	6.7	1.34	6.00
1.84	101.34	.270E+04	7.7	1.38	5.83
1.95	101.45	.302E+04	8.8	1.41	5.69

**** WARNING: TRAVEL TIME TABLE EXCEEDED

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
		<---- hydrograph ---->				<-pipe / channel->	
INFLOW : ID= 2 (0141)		112.20	11.97	10.92	174.92	1.95	1.41
OUTFLOW: ID= 1 (0143)		112.20	11.96	11.00	174.92	1.95	1.41

CALIB				
NASHYD (0017)	Area (ha)= 10.44	Curve Number (CN)= 88.0		
ID= 1 DT= 5.0 min	Ia (mm)= 9.73	# of Linear Res.(N)= 3.00		
	U.H. Tp(hrs)= 0.50			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00

1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.798

PEAK FLOW (cms)= 1.298 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 172.689
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.815

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

ADD HYD (0144)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0017):		10.44	1.298	10.25	172.69
+ ID2= 2 (0143):		112.20	11.958	11.00	174.92
ID = 3 (0144):		122.64	13.111	10.92	174.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0016)	Area	(ha)=	22.20	Curve Number	(CN)= 91.0
ID= 1 DT= 5.0 min	Ia	(mm)=	7.86	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=		0.55		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.542

PEAK FLOW (cms)= 2.743 (i)
TIME TO PEAK (hrs)= 10.333
RUNOFF VOLUME (mm)= 181.764
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.857

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

CALIB					
NASHYD (0106)	Area	(ha)=	17.85	Curve Number	(CN)= 89.0
ID= 1 DT= 5.0 min	Ia	(mm)=	7.24	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=		0.75		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00

0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.909

PEAK FLOW (cms)= 2.007 (i)
TIME TO PEAK (hrs)= 10.750
RUNOFF VOLUME (mm)= 177.542
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.837

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

CALIB					
NASHYD (0005)	Area (ha)=	6.22	Curve Number (CN)=	80.0	
ID= 1 DT= 5.0 min	Ia (mm)=	9.04	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.49			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.485

PEAK FLOW (cms)= 0.726 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 154.588
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.729

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

ROUTE CHN(0150)		
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.482E+02	0.0	0.19	59.75
0.19	99.69	.153E+03	0.1	0.37	31.13
0.29	99.79	.267E+03	0.2	0.49	23.29
0.38	99.88	.390E+03	0.3	0.59	19.46
0.48	99.98	.522E+03	0.5	0.67	17.10
0.57	100.07	.662E+03	0.7	0.74	15.48
0.67	100.17	.812E+03	0.9	0.80	14.27
0.76	100.26	.970E+03	1.2	0.86	13.32
0.86	100.36	.114E+04	1.5	0.91	12.56
0.95	100.45	.131E+04	1.8	0.96	11.92
1.05	100.55	.150E+04	2.2	1.00	11.37
1.16	100.66	.174E+04	2.7	1.07	10.67

1.28	100.78	.202E+04	3.4	1.14	10.00
1.39	100.89	.233E+04	4.1	1.20	9.49
1.50	101.00	.266E+04	4.9	1.25	9.10
1.61	101.11	.303E+04	5.8	1.30	8.77
1.72	101.22	.342E+04	6.7	1.34	8.50
1.84	101.34	.383E+04	7.7	1.38	8.27
1.95	101.45	.427E+04	8.8	1.41	8.06

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0005)	6.22	0.73	10.25	154.59	0.58	0.74
OUTFLOW: ID= 1 (0150)	6.22	0.70	10.50	154.53	0.57	0.73

CALIB			
STANDHYD (0086)	Area (ha)=	0.31	
ID= 1 DT= 5.0 min	Total Imp(%)=	90.00	Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.28	0.03
Dep. Storage	(mm)=	1.00	7.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.39	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	49.09		
over (min)	5.00	10.00		
Storage Coeff. (min)=	2.05 (ii)	5.83 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.31	0.15		
				TOTALS
PEAK FLOW (cms)=	0.04	0.00		0.045 (iii)
TIME TO PEAK (hrs)=	9.50	10.00		10.00
RUNOFF VOLUME (mm)=	211.00	161.17		206.01
TOTAL RAINFALL (mm)=	212.00	212.00		212.00
RUNOFF COEFFICIENT =	1.00	0.76		0.97

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

(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 (0151)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0106):	17.85	2.007	10.75	177.54
+ ID2= 2 (0150):	6.22	0.700	10.50	154.53
ID = 3 (0151):	24.07	2.696	10.67	171.60

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0151)					
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0151):	24.07	2.696	10.67	171.60
+ ID2= 2 (0086):	0.31	0.045	10.00	206.01
ID = 1 (0151):	24.38	2.728	10.67	172.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0107)	Area (ha)=	5.21	Curve Number (CN)= 91.0
ID= 1 DT= 5.0 min	Ia (mm)=	6.61	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.52	

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN

hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.383

PEAK FLOW (cms)= 0.654 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 182.994
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.863

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

CALIB					
NASHYD (0006)	Area (ha)=	6.26	Curve Number (CN)=	92.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.80	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.87			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.275

PEAK FLOW (cms)= 0.691 (i)
TIME TO PEAK (hrs)= 11.000
RUNOFF VOLUME (mm)= 186.245
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.879

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

ROUTE CHN(0148)		
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.454E+02	0.0	0.19	56.26
0.19	99.69	.144E+03	0.1	0.37	29.31

0.29	99.79	.251E+03	0.2	0.49	21.93
0.38	99.88	.367E+03	0.3	0.59	18.32
0.48	99.98	.491E+03	0.5	0.67	16.10
0.57	100.07	.624E+03	0.7	0.74	14.57
0.67	100.17	.764E+03	0.9	0.80	13.44
0.76	100.26	.914E+03	1.2	0.86	12.55
0.86	100.36	.107E+04	1.5	0.91	11.82
0.95	100.45	.124E+04	1.8	0.96	11.22
1.05	100.55	.141E+04	2.2	1.00	10.71
1.16	100.66	.164E+04	2.7	1.07	10.04
1.28	100.78	.190E+04	3.4	1.14	9.41
1.39	100.89	.219E+04	4.1	1.20	8.94
1.50	101.00	.251E+04	4.9	1.25	8.56
1.61	101.11	.285E+04	5.8	1.30	8.26
1.72	101.22	.322E+04	6.7	1.34	8.00
1.84	101.34	.361E+04	7.7	1.38	7.78
1.95	101.45	.402E+04	8.8	1.41	7.59

		<---- hydrograph ---->			<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0006)	6.26	0.69	11.00	186.24	0.56	0.73
OUTFLOW: ID= 1 (0148)	6.26	0.68	11.17	186.20	0.56	0.73

CALIB	
STANDHYD (0065)	Area (ha)= 1.53
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.37	0.15
Dep. Storage	(mm)=	1.00	4.85
Average Slope	(%)=	1.00	2.00
Length	(m)=	100.86	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

				TOTALS
Max.Eff.Inten.(mm/hr)=	53.00	51.17		
over (min)	5.00	10.00		
Storage Coeff. (min)=	3.31 (ii)	7.09 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.26	0.14		
PEAK FLOW (cms)=	0.20	0.02		0.224 (iii)
TIME TO PEAK (hrs)=	9.83	10.00		10.00
RUNOFF VOLUME (mm)=	211.00	177.48		207.65
TOTAL RAINFALL (mm)=	212.00	212.00		212.00
RUNOFF COEFFICIENT =	1.00	0.84		0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 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 (0145)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0107):	5.21	0.654	10.25	182.99
+ ID2= 2 (0148):	6.26	0.684	11.17	186.20
ID = 3 (0145):	11.48	1.265	10.83	184.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0145)				
3 + 2 = 1	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 3 (0145):	11.48	1.265	10.83	184.74
+ ID2= 2 (0065):	1.53	0.224	10.00	207.65
ID = 1 (0145):	13.00	1.426	10.83	187.43

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| CALIB             |
| STANDHYD (  0165)|   Area     (ha)=   0.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------

                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.22         0.03
     Dep. Storage     (mm)=      1.00         6.59
     Average Slope     (%)=      1.00         2.00
     Length            (m)=     40.82        40.00
     Mannings n           =     0.013        0.250

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

```
     Max.Eff.Inten.(mm/hr)=      53.00        49.48
               over (min)         5.00        10.00
     Storage Coeff.  (min)=      1.92 (ii)    5.70 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.31         0.15
                                                  *TOTALS*
     PEAK FLOW       (cms)=      0.03         0.00          0.037 (iii)
     TIME TO PEAK    (hrs)=      9.50        10.00
     RUNOFF VOLUME    (mm)=    211.00       163.90        206.28
     TOTAL RAINFALL   (mm)=    212.00       212.00        212.00

          RUNOFF COEFFICIENT   =       1.00         0.77          0.97

     ***** 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.

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

     --------------------
     | ADD HYD  (  0149)|
     |   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
     --------------------          (ha)    (cms)    (hrs)      (mm)
            ID1= 1 (  0145):    13.00    1.426    10.83   187.43
          + ID2= 2 (  0165):     0.25    0.037    10.00   206.28
            ==========================================================
            ID = 3 (  0149):    13.25    1.452    10.83   187.79

         NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
     ------------------------------------------------------------------------------
     --------------------
     | ROUTE CHN(  0154)|
     | 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
                       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
```

<-------------------- TRAVEL TIME TABLE ---------------------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.125E+02	0.0	0.19	15.45
0.19	99.69	.396E+02	0.1	0.37	8.05
0.29	99.79	.691E+02	0.2	0.49	6.03
0.38	99.88	.101E+03	0.3	0.59	5.03
0.48	99.98	.135E+03	0.5	0.67	4.42
0.57	100.07	.171E+03	0.7	0.74	4.00
0.67	100.17	.210E+03	0.9	0.80	3.69
0.76	100.26	.251E+03	1.2	0.86	3.45
0.86	100.36	.294E+03	1.5	0.91	3.25
0.95	100.45	.340E+03	1.8	0.96	3.08
1.05	100.55	.388E+03	2.2	1.00	2.94
1.16	100.66	.450E+03	2.7	1.07	2.76
1.28	100.78	.523E+03	3.4	1.14	2.59
1.39	100.89	.602E+03	4.1	1.20	2.46
1.50	101.00	.689E+03	4.9	1.25	2.35
1.61	101.11	.783E+03	5.8	1.30	2.27
1.72	101.22	.883E+03	6.7	1.34	2.20
1.84	101.34	.991E+03	7.7	1.38	2.14
1.95	101.45	.111E+04	8.8	1.41	2.09

```
                                      <---- hydrograph ---->   <-pipe / channel->
                                 AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                 (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
       INFLOW : ID= 2 (  0149)   13.25     1.45   10.83 187.79      0.84      0.90
```

```
   OUTFLOW: ID= 1 (  0154)   13.25     1.45   10.83 187.78      0.84      0.90



--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0066)|   Area    (ha)=   0.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.29         0.03
     Dep. Storage     (mm)=       1.00         3.81
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      46.14        40.00
     Mannings n           =      0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
              TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
               hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
             0.083     6.00 | 3.083    13.00 | 6.083    23.00 |  9.08    53.00
             0.167     6.00 | 3.167    13.00 | 6.167    23.00 |  9.17    53.00
             0.250     6.00 | 3.250    13.00 | 6.250    23.00 |  9.25    53.00
             0.333     6.00 | 3.333    13.00 | 6.333    23.00 |  9.33    53.00
             0.417     6.00 | 3.417    13.00 | 6.417    23.00 |  9.42    53.00
             0.500     6.00 | 3.500    13.00 | 6.500    23.00 |  9.50    53.00
             0.583     6.00 | 3.583    13.00 | 6.583    23.00 |  9.58    53.00
             0.667     6.00 | 3.667    13.00 | 6.667    23.00 |  9.67    53.00
             0.750     6.00 | 3.750    13.00 | 6.750    23.00 |  9.75    53.00
             0.833     6.00 | 3.833    13.00 | 6.833    23.00 |  9.83    53.00
             0.917     6.00 | 3.917    13.00 | 6.917    23.00 |  9.92    53.00
             1.000     6.00 | 4.000    13.00 | 7.000    23.00 | 10.00    53.00
             1.083     4.00 | 4.083    17.00 | 7.083    13.00 | 10.08    38.00
             1.167     4.00 | 4.167    17.00 | 7.167    13.00 | 10.17    38.00
             1.250     4.00 | 4.250    17.00 | 7.250    13.00 | 10.25    38.00
             1.333     4.00 | 4.333    17.00 | 7.333    13.00 | 10.33    38.00
             1.417     4.00 | 4.417    17.00 | 7.417    13.00 | 10.42    38.00
             1.500     4.00 | 4.500    17.00 | 7.500    13.00 | 10.50    38.00
             1.583     4.00 | 4.583    17.00 | 7.583    13.00 | 10.58    38.00
             1.667     4.00 | 4.667    17.00 | 7.667    13.00 | 10.67    38.00
             1.750     4.00 | 4.750    17.00 | 7.750    13.00 | 10.75    38.00
             1.833     4.00 | 4.833    17.00 | 7.833    13.00 | 10.83    38.00
             1.917     4.00 | 4.917    17.00 | 7.917    13.00 | 10.92    38.00
             2.000     4.00 | 5.000    17.00 | 8.000    13.00 | 11.00    38.00
             2.083     6.00 | 5.083    13.00 | 8.083    13.00 | 11.08    13.00
             2.167     6.00 | 5.167    13.00 | 8.167    13.00 | 11.17    13.00
             2.250     6.00 | 5.250    13.00 | 8.250    13.00 | 11.25    13.00
             2.333     6.00 | 5.333    13.00 | 8.333    13.00 | 11.33    13.00
             2.417     6.00 | 5.417    13.00 | 8.417    13.00 | 11.42    13.00
             2.500     6.00 | 5.500    13.00 | 8.500    13.00 | 11.50    13.00
             2.583     6.00 | 5.583    13.00 | 8.583    13.00 | 11.58    13.00
             2.667     6.00 | 5.667    13.00 | 8.667    13.00 | 11.67    13.00
             2.750     6.00 | 5.750    13.00 | 8.750    13.00 | 11.75    13.00
             2.833     6.00 | 5.833    13.00 | 8.833    13.00 | 11.83    13.00
             2.917     6.00 | 5.917    13.00 | 8.917    13.00 | 11.92    13.00
             3.000     6.00 | 6.000    13.00 | 9.000    13.00 | 12.00    13.00

     Max.Eff.Inten.(mm/hr)=      53.00        52.15
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      2.07 (ii)    5.85 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.31        0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.04        0.00        0.047 (iii)
     TIME TO PEAK    (hrs)=      9.58       10.00       10.00
     RUNOFF VOLUME    (mm)=    211.00      188.22      208.71
     TOTAL RAINFALL   (mm)=    212.00      212.00      212.00
     RUNOFF COEFFICIENT   =      1.00        0.89        0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  92.0    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  (  0152)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0151):    24.38   2.728    10.67   172.03
     + ID2= 2 (  0154):    13.25   1.452    10.83   187.78
       ================================================
       ID = 3 (  0152):    37.63   4.175    10.67   177.58

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

--------------------
| ADD HYD  (  0152)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0152):    37.63   4.175    10.67   177.58
     + ID2= 2 (  0066):     0.32   0.047    10.00   208.71
       ================================================
       ID = 1 (  0152):    37.95   4.209    10.67   177.84

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0155)|
| 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
                   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

     <--------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV       VOLUME     FLOW RATE     VELOCITY   TRAV.TIME
        (m)      (m)      (cu.m.)       (cms)         (m/s)       (min)
       0.10    99.60    .203E+02         0.0          0.19       25.11
       0.19    99.69    .644E+02         0.1          0.37       13.08
       0.29    99.79    .112E+03         0.2          0.49        9.79
       0.38    99.88    .164E+03         0.3          0.59        8.18
       0.48    99.98    .219E+03         0.5          0.67        7.19
       0.57   100.07    .278E+03         0.7          0.74        6.51
```

0.67	100.17	.341E+03	0.9	0.80	6.00
0.76	100.26	.408E+03	1.2	0.86	5.60
0.86	100.36	.478E+03	1.5	0.91	5.28
0.95	100.45	.552E+03	1.8	0.96	5.01
1.05	100.55	.630E+03	2.2	1.00	4.78
1.16	100.66	.732E+03	2.7	1.07	4.48
1.28	100.78	.849E+03	3.4	1.14	4.20
1.39	100.89	.979E+03	4.1	1.20	3.99
1.50	101.00	.112E+04	4.9	1.25	3.82
1.61	101.11	.127E+04	5.8	1.30	3.69
1.72	101.22	.144E+04	6.7	1.34	3.57
1.84	101.34	.161E+04	7.7	1.38	3.47
1.95	101.45	.180E+04	8.8	1.41	3.39

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (| 0152)	37.95	4.21	10.67	177.84	1.40	1.21
OUTFLOW: ID= 1 (| 0155)	37.95	4.20	10.83	177.84	1.40	1.21

CALIB					
NASHYD (0109)	Area	(ha)= 14.91	Curve Number	(CN)= 94.0	
ID= 1 DT= 5.0 min	Ia	(mm)= 5.56	# of Linear Res.	(N)= 3.00	
	U.H. Tp	(hrs)= 0.20			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 2.848

PEAK FLOW (cms)= 2.165 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 191.048
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.901

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

ADD HYD (0156)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0109):	14.91	2.165	10.00	191.05
+ ID2= 2 (0155):	37.95	4.200	10.83	177.84
ID = 3 (0156):	52.87	5.775	10.67	181.56

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0187)					
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	
	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		

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.522E+02	0.0	0.19	64.71
0.19	99.69	.166E+03	0.1	0.37	33.71
0.29	99.79	.289E+03	0.2	0.49	25.23
0.38	99.88	.422E+03	0.3	0.59	21.07
0.48	99.98	.565E+03	0.5	0.67	18.52
0.57	100.07	.717E+03	0.7	0.74	16.76
0.67	100.17	.879E+03	0.9	0.80	15.45
0.76	100.26	.105E+04	1.2	0.86	14.43
0.86	100.36	.123E+04	1.5	0.91	13.60
0.95	100.45	.142E+04	1.8	0.96	12.91
1.05	100.55	.162E+04	2.2	1.00	12.32
1.16	100.66	.189E+04	2.7	1.07	11.55
1.28	100.78	.219E+04	3.4	1.14	10.83
1.39	100.89	.252E+04	4.1	1.20	10.28
1.50	101.00	.289E+04	4.9	1.25	9.85
1.61	101.11	.328E+04	5.8	1.30	9.50

1.72	101.22	.370E+04	6.7	1.34	9.20
1.84	101.34	.415E+04	7.7	1.38	8.95
1.95	101.45	.463E+04	8.8	1.41	8.73

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0156)	52.87	5.78	10.67	181.56	1.62	1.30
OUTFLOW: ID= 1 (0187)	52.87	5.76	10.83	181.56	1.61	1.30

CALIB					
NASHYD (0015)	Area (ha)=	15.31	Curve Number (CN)=	92.0	
ID= 1 DT= 5.0 min	Ia (mm)=	6.90	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.58			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.008

PEAK FLOW (cms)= 1.873 (i)
TIME TO PEAK (hrs)= 10.417
RUNOFF VOLUME (mm)= 185.153
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.873

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

CALIB					
NASHYD (0112)	Area (ha)=	4.63	Curve Number (CN)=	91.0	
ID= 1 DT= 5.0 min	Ia (mm)=	7.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.41			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.431

PEAK FLOW (cms)= 0.615 (i)
TIME TO PEAK (hrs)= 10.167
RUNOFF VOLUME (mm)= 182.601
TOTAL RAINFALL (mm)= 212.000

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     RUNOFF COEFFICIENT   =   0.861

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

-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0139)|   Area    (ha)=   0.51
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.46         0.05
     Dep. Storage     (mm)=       1.00         4.16
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      58.08        40.00
     Mannings n           =      0.013        0.250

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

                        ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
              0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
              0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
              0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
              0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
              0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
              0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
              0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
              0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
              0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
              0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
              1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
              1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
              1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
              1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
              1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
              1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
              1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
              1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
              1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
              1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
              1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
              1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
              2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
              2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
              2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
              2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
              2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
              2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
              2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
              2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
              2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
              2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
              2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
              2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
              3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        51.94
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      2.38 (ii)    6.16 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.30         0.15
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.07         0.01         0.074 (iii)
     TIME TO PEAK    (hrs)=      9.58        10.00         10.00
     RUNOFF VOLUME    (mm)=    211.00       185.43        208.44
     TOTAL RAINFALL   (mm)=    212.00       212.00        212.00
     RUNOFF COEFFICIENT   =      1.00         0.87          0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  91.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0160)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0112):     4.63    0.615    10.17   182.60
     + ID2= 2 (  0139):     0.51    0.074    10.00   208.44
       ================================================
       ID = 3 (  0160):     5.13    0.678    10.00   185.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0138)|   Area    (ha)=   0.56
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.50         0.06
     Dep. Storage     (mm)=       1.00         2.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      60.94        40.00
     Mannings n           =      0.013        0.250

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

                        ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
              0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
              0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
              0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
              0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
              0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
              0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
              0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
              0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
              0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
              0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
              1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
              1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
              1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
              1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
              1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
              1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
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                1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
                1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
                1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
                1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
                1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
                1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
                2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
                2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
                2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
                2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
                2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
                2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
                2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
                2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
                2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
                2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
                2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
                2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
                3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        52.99
                 over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.45 (ii)    6.22 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.30         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.07         0.01          0.082 (iii)
     TIME TO PEAK    (hrs)=       9.67        10.00         10.00
     RUNOFF VOLUME    (mm)=     211.00       207.47        210.64
     TOTAL RAINFALL   (mm)=     212.00       212.00        212.00
     RUNOFF COEFFICIENT   =       1.00         0.98          0.99

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  99.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0169)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0138):     5.56    0.082    10.00   210.64
      + ID2= 2 (  0160):     5.13    0.678    10.00   185.15
        ================================================
        ID = 3 (  0169):     5.69    0.760    10.00   187.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0184)|
| 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
                   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

          <---------------------- TRAVEL TIME TABLE ---------------------->
           DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY    TRAV.TIME
            (m)       (m)     (cu.m.)       (cms)         (m/s)       (min)
           0.10     99.60    .164E+02         0.0          0.19       20.34
           0.19     99.69    .521E+02         0.1          0.37       10.60
           0.29     99.79    .909E+02         0.2          0.49        7.93
           0.38     99.88    .133E+03         0.3          0.59        6.62
           0.48     99.98    .178E+03         0.5          0.67        5.82
           0.57    100.07    .225E+03         0.7          0.74        5.27
           0.67    100.17    .276E+03         0.9          0.80        4.86
           0.76    100.26    .330E+03         1.2          0.86        4.54
           0.86    100.36    .387E+03         1.5          0.91        4.28
           0.95    100.45    .447E+03         1.8          0.96        4.06
           1.05    100.55    .510E+03         2.2          1.00        3.87
           1.16    100.66    .593E+03         2.7          1.07        3.63
           1.28    100.78    .688E+03         3.4          1.14        3.40
           1.39    100.89    .793E+03         4.1          1.20        3.23
           1.50    101.00    .907E+03         4.9          1.25        3.10
           1.61    101.11    .103E+04         5.8          1.30        2.99
           1.72    101.22    .116E+04         6.7          1.34        2.89
           1.84    101.34    .130E+04         7.7          1.38        2.81
           1.95    101.45    .146E+04         8.8          1.41        2.74

                                      <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)    (mm)      (m)       (m/s)
     INFLOW : ID= 2 (  0169)    5.69     0.76   10.00 187.64      0.59      0.75
     OUTFLOW: ID= 1 (  0184)    5.69     0.74   10.08 187.64      0.59      0.74

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| CALIB            |
| NASHYD   (  0114)|   Area     (ha)=   9.91   Curve Number    (CN)= 92.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   6.79   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.56

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

                          ---- TRANSFORMED HYETOGRAPH ----
             TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
              hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
            0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
            0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
            0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
            0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
            0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
            0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
            0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
            0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
            0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
            0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
            0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
            1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
            1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
            1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
            1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
            1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
            1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
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1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.676

PEAK FLOW (cms)= 1.225 (i)
TIME TO PEAK (hrs)= 10.333
RUNOFF VOLUME (mm)= 185.268
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.874

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

CALIB					
NASHYD (0118)	Area (ha)=	4.36	Curve Number (CN)=	97.0	
ID= 1 DT= 5.0 min	Ia (mm)=	2.68	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.20			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.832

PEAK FLOW (cms)= 0.638 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 201.364
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.950

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

ADD HYD (0185)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0114):	9.91	1.225	10.33	185.27
	+ ID2= 2 (0118):	4.36	0.638	10.00	201.36
	ID = 3 (0185):	14.27	1.784	10.08	190.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0185)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
3 + 2 = 1	ID1= 3 (0185):	14.27	1.784	10.08	190.18
	+ ID2= 2 (0184):	5.69	0.743	10.08	187.64
	ID = 1 (0185):	19.96	2.527	10.08	189.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0186)		
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
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	

<-------------------- TRAVEL TIME TABLE ---------------------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.616E+02	0.0	0.19	76.29
0.19	99.69	.196E+03	0.1	0.37	39.74
0.29	99.79	.341E+03	0.2	0.49	29.74
0.38	99.88	.498E+03	0.3	0.59	24.84
0.48	99.98	.666E+03	0.5	0.67	21.84
0.57	100.07	.846E+03	0.7	0.74	19.76
0.67	100.17	.104E+04	0.9	0.80	18.22
0.76	100.26	.124E+04	1.2	0.86	17.01
0.86	100.36	.145E+04	1.5	0.91	16.03
0.95	100.45	.168E+04	1.8	0.96	15.22
1.05	100.55	.191E+04	2.2	1.00	14.52
1.16	100.66	.222E+04	2.7	1.07	13.62
1.28	100.78	.258E+04	3.4	1.14	12.77
1.39	100.89	.297E+04	4.1	1.20	12.12
1.50	101.00	.340E+04	4.9	1.25	11.61
1.61	101.11	.386E+04	5.8	1.30	11.20
1.72	101.22	.436E+04	6.7	1.34	10.85
1.84	101.34	.489E+04	7.7	1.38	10.56
1.95	101.45	.546E+04	8.8	1.41	10.30

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0185)	19.96	2.53	10.08	189.46	1.12	1.04
OUTFLOW:	ID= 1 (0186)	19.96	2.43	10.33	189.44	1.10	1.03

ADD HYD (0183)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0015):		15.31	1.873	10.42	185.15
+ ID2= 2 (0186):		19.96	2.429	10.33	189.44
ID = 3 (0183):		35.27	4.301	10.33	187.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0183)					
3 + 2 = 1		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0183):		35.27	4.301	10.33	187.58
+ ID2= 2 (0187):		52.87	5.760	10.83	181.56
ID = 1 (0183):		88.14	9.982	10.42	183.97

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0180)		
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
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	

<-------------------- TRAVEL TIME TABLE ---------------------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.371E+02	0.0	0.19	45.93
0.19	99.69	.118E+03	0.1	0.37	23.93
0.29	99.79	.205E+03	0.2	0.49	17.91
0.38	99.88	.300E+03	0.3	0.59	14.96
0.48	99.98	.401E+03	0.5	0.67	13.15
0.57	100.07	.509E+03	0.7	0.74	11.90
0.67	100.17	.624E+03	0.9	0.80	10.97
0.76	100.26	.746E+03	1.2	0.86	10.24
0.86	100.36	.875E+03	1.5	0.91	9.65
0.95	100.45	.101E+04	1.8	0.96	9.16
1.05	100.55	.115E+04	2.2	1.00	8.74
1.16	100.66	.134E+04	2.7	1.07	8.20
1.28	100.78	.155E+04	3.4	1.14	7.69
1.39	100.89	.179E+04	4.1	1.20	7.30
1.50	101.00	.205E+04	4.9	1.25	6.99
1.61	101.11	.233E+04	5.8	1.30	6.74
1.72	101.22	.263E+04	6.7	1.34	6.53
1.84	101.34	.295E+04	7.7	1.38	6.36
1.95	101.45	.329E+04	8.8	1.41	6.20

**** WARNING: TRAVEL TIME TABLE EXCEEDED

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0183)	88.14	9.98	10.42	183.97	1.94	1.41
OUTFLOW:	ID= 1 (0180)	88.14	9.96	10.58	183.96	1.95	1.41

ADD HYD (0189)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0016):		22.20	2.743	10.33	181.76
+ ID2= 2 (0180):		88.14	9.962	10.58	183.96
ID = 3 (0189):		110.34	12.656	10.50	183.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0190)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0144):		122.64	13.111	10.92	174.73
+ ID2= 2 (0189):		110.34	12.656	10.50	183.52
ID = 3 (0190):		232.98	25.652	10.67	178.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ROUTE CHN(  0179)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
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<------ 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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.223E+02	0.0	0.19	27.60
0.19	99.69	.707E+02	0.1	0.37	14.38
0.29	99.79	.123E+03	0.2	0.49	10.76
0.38	99.88	.180E+03	0.3	0.59	8.99
0.48	99.98	.241E+03	0.5	0.67	7.90
0.57	100.07	.306E+03	0.7	0.74	7.15
0.67	100.17	.375E+03	0.9	0.80	6.59
0.76	100.26	.448E+03	1.2	0.86	6.16
0.86	100.36	.526E+03	1.5	0.91	5.80
0.95	100.45	.607E+03	1.8	0.96	5.51
1.05	100.55	.692E+03	2.2	1.00	5.25
1.16	100.66	.804E+03	2.7	1.07	4.93
1.28	100.78	.934E+03	3.4	1.14	4.62
1.39	100.89	.108E+04	4.1	1.20	4.39
1.50	101.00	.123E+04	4.9	1.25	4.20
1.61	101.11	.140E+04	5.8	1.30	4.05
1.72	101.22	.158E+04	6.7	1.34	3.93
1.84	101.34	.177E+04	7.7	1.38	3.82
1.95	101.45	.197E+04	8.8	1.41	3.72

**** WARNING: TRAVEL TIME TABLE EXCEEDED

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (	0190)	232.98	25.65	10.67	178.89	1.94	1.41
OUTFLOW: ID= 1 (	0179)	232.98	25.63	10.75	178.89	1.95	1.41

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| CALIB            |
| NASHYD   (  0018)|   Area     (ha)=   6.98   Curve Number    (CN)= 88.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=  10.16   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.42

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

```
     Unit Hyd Qpeak  (cms)=   0.635

     PEAK FLOW       (cms)=   0.905 (i)
     TIME TO PEAK    (hrs)=  10.167
     RUNOFF VOLUME    (mm)= 172.263
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.813

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

--------------------
| ADD HYD  (  0178)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0018):     6.98   0.905    10.17   172.26
     + ID2= 2 (  0179):   232.98  25.634    10.75   178.89
       ==========================================================
       ID = 3 (  0178):   239.96  26.420    10.67   178.70

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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 FINISH
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       V    V   I    SSSSS  U   U    A    L             (v 6.1.2003)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output  filename: C:\Users\rarcher\AppData\Local\Civica\VH5\e5d0a268-d0b9-4109-
8320-f15a73aa9d73\7e04f450-db44-492b-b4c9-aa435401f699\scen
  Summary filename: C:\Users\rarcher\AppData\Local\Civica\VH5\e5d0a268-d0b9-4109-
8320-f15a73aa9d73\7e04f450-db44-492b-b4c9-aa435401f699\scen


DATE: 12-17-2021                          TIME: 12:53:09

USER:



COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------
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  ***********************************************
  ** SIMULATION : Hazel                        **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\rarcher\AppD
|                  |              ata\Local\Temp\
|                  |              b637ca48-a9d3-4245-ac51-876b3bb67e6e\e1817229
| Ptotal=212.00 mm |    Comments: Hazel
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                1.00    6.00 |  4.00   13.00 |  7.00   23.00 | 10.00   53.00
                2.00    4.00 |  5.00   17.00 |  8.00   13.00 | 11.00   38.00
                3.00    6.00 |  6.00   13.00 |  9.00   13.00 | 12.00   13.00

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--------------------
| CALIB            |
| NASHYD   (  0022)|   Area     (ha)=  52.82   Curve Number    (CN)= 91.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.40   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.79

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


                  ---- TRANSFORMED HYETOGRAPH ----
 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   2.554

     PEAK FLOW       (cms)=   5.928 (i)
     TIME TO PEAK    (hrs)=  10.833
     RUNOFF VOLUME    (mm)= 182.225
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.860

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

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--------------------
| CALIB            |
| STANDHYD (  0200)|   Area     (ha)=   4.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  35.00
--------------------

                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.15          2.15
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     169.37         40.00
     Mannings n           =      0.013         0.250
```

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

			TOTALS
Max.Eff.Inten.(mm/hr)=	53.00	68.37	
over (min)	5.00	15.00	
Storage Coeff. (min)=	4.52 (ii)	12.74 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.23	0.08	
PEAK FLOW (cms)=	0.22	0.40	0.625 (iii)
TIME TO PEAK (hrs)=	10.00	10.00	10.00
RUNOFF VOLUME (mm)=	211.00	194.42	200.22
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	1.00	0.92	0.94

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 93.0 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.

| ROUTE CHN(0080)|
| 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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.272E+02	0.0	0.19	33.70
0.19	99.69	.864E+02	0.1	0.37	17.55
0.29	99.79	.151E+03	0.2	0.49	13.14
0.38	99.88	.220E+03	0.3	0.59	10.97
0.48	99.98	.294E+03	0.5	0.67	9.64
0.57	100.07	.374E+03	0.7	0.74	8.73
0.67	100.17	.458E+03	0.9	0.80	8.05
0.76	100.26	.547E+03	1.2	0.86	7.51
0.86	100.36	.642E+03	1.5	0.91	7.08
0.95	100.45	.741E+03	1.8	0.96	6.72
1.05	100.55	.845E+03	2.2	1.00	6.41
1.16	100.66	.982E+03	2.7	1.07	6.02
1.28	100.78	.114E+04	3.4	1.14	5.64
1.39	100.89	.131E+04	4.1	1.20	5.35
1.50	101.00	.150E+04	4.9	1.25	5.13
1.61	101.11	.171E+04	5.8	1.30	4.95
1.72	101.22	.193E+04	6.7	1.34	4.79
1.84	101.34	.216E+04	7.7	1.38	4.66
1.95	101.45	.241E+04	8.8	1.41	4.55

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0200)	4.30	0.63	10.00	200.22	0.53	0.70
OUTFLOW: ID= 1 (0080)	4.30	0.62	10.00	200.18	0.53	0.70

ADD HYD (0188)|	1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0022):	52.82	5.928	10.83	182.23
+ ID2= 2 (0080):	4.30	0.618	10.00	200.18
ID = 3 (0188):	57.12	6.389	10.83	183.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB				
NASHYD (0002)	ID= 1 DT= 5.0 min	Area (ha)= 13.35	Curve Number (CN)= 91.0
		Ia (mm)= 7.07	# of Linear Res.(N)= 3.00
		U.H. Tp(hrs)= 0.56	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.910

PEAK FLOW (cms)= 1.641 (i)
TIME TO PEAK (hrs)= 10.333
RUNOFF VOLUME (mm)= 182.546
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.861

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

CALIB	
STANDHYD (0070)	Area (ha)= 0.35
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.32	0.04
Dep. Storage	(mm)=	1.00	4.96
Average Slope	(%)=	1.00	2.00
Length	(m)=	48.36	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

				TOTALS
Max.Eff.Inten.	(mm/hr)=	53.00	51.44	
over	(min)	5.00	10.00	
Storage Coeff.	(min)=	2.13 (ii)	5.91 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.31	0.15	
PEAK FLOW	(cms)=	0.05	0.01	0.051 (iii)
TIME TO PEAK	(hrs)=	9.58	10.00	10.00
RUNOFF VOLUME	(mm)=	211.00	179.78	207.87
TOTAL RAINFALL	(mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT	=	1.00	0.85	0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 89.0 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 (0098)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):		13.35	1.641	10.33	182.55
+ ID2= 2 (0070):		0.35	0.051	10.00	207.87
ID = 3 (0098):		13.70	1.678	10.33	183.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0099)		
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.231E+02	0.0	0.19	28.62
0.19	99.69	.734E+02	0.1	0.37	14.91
0.29	99.79	.128E+03	0.2	0.49	11.16
0.38	99.88	.187E+03	0.3	0.59	9.32
0.48	99.98	.250E+03	0.5	0.67	8.19
0.57	100.07	.317E+03	0.7	0.74	7.41
0.67	100.17	.389E+03	0.9	0.80	6.84
0.76	100.26	.465E+03	1.2	0.86	6.38
0.86	100.36	.545E+03	1.5	0.91	6.02
0.95	100.45	.629E+03	1.8	0.96	5.71
1.05	100.55	.718E+03	2.2	1.00	5.45
1.16	100.66	.834E+03	2.7	1.07	5.11
1.28	100.78	.968E+03	3.4	1.14	4.79
1.39	100.89	.112E+04	4.1	1.20	4.55
1.50	101.00	.128E+04	4.9	1.25	4.36
1.61	101.11	.145E+04	5.8	1.30	4.20
1.72	101.22	.164E+04	6.7	1.34	4.07
1.84	101.34	.184E+04	7.7	1.38	3.96
1.95	101.45	.205E+04	8.8	1.41	3.86

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
		<---- hydrograph ---->				<-pipe / channel->	
INFLOW : ID= 2 (0098)		13.70	1.68	10.33	183.19	0.91	0.93
OUTFLOW: ID= 1 (0099)		13.70	1.67	10.42	183.19	0.90	0.93

CALIB			
STANDHYD (0191)|	Area	(ha)=	4.95

\|ID= 1 DT= 5.0 min \| Total Imp(%)= 54.00 Dir. Conn.(%)= 37.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.67	2.28
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	181.66	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

				TOTALS
Max.Eff.Inten.(mm/hr)=		53.00	72.08	
over (min)		5.00	15.00	
Storage Coeff. (min)=		4.71 (ii)	12.76 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.22	0.08	
PEAK FLOW	(cms)=	0.27	0.45	0.720 (iii)
TIME TO PEAK	(hrs)=	10.00	10.00	10.00
RUNOFF VOLUME	(mm)=	211.00	195.27	201.09
TOTAL RAINFALL	(mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT	=	1.00	0.92	0.95

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  93.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0181)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0191):     4.95   0.720    10.00   201.09
      + ID2= 2 (  0099):    13.70   1.669    10.42   183.19
        ==========================================================
        ID = 3 (  0181):    18.65   2.226    10.25   187.94

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ROUTE CHN(  0119)|
| 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
                   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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.10    99.60    .287E+02       0.0         0.19       35.58
       0.19    99.69    .912E+02       0.1         0.37       18.54
       0.29    99.79    .159E+03       0.2         0.49       13.87
       0.38    99.88    .232E+03       0.3         0.59       11.59
       0.48    99.98    .311E+03       0.5         0.67       10.18
       0.57   100.07    .394E+03       0.7         0.74        9.22
       0.67   100.17    .483E+03       0.9         0.80        8.50
       0.76   100.26    .578E+03       1.2         0.86        7.93
       0.86   100.36    .677E+03       1.5         0.91        7.48
       0.95   100.45    .782E+03       1.8         0.96        7.10
       1.05   100.55    .893E+03       2.2         1.00        6.77
       1.16   100.66    .104E+04       2.7         1.07        6.35
       1.28   100.78    .120E+04       3.4         1.14        5.95
       1.39   100.89    .139E+04       4.1         1.20        5.65
       1.50   101.00    .159E+04       4.9         1.25        5.42
       1.61   101.11    .180E+04       5.8         1.30        5.22
       1.72   101.22    .203E+04       6.7         1.34        5.06
       1.84   101.34    .228E+04       7.7         1.38        4.92
       1.95   101.45    .255E+04       8.8         1.41        4.80

                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0181)   18.65     2.23   10.25 187.94      1.06      1.01
   OUTFLOW: ID= 1 (  0119)   18.65     2.22   10.42 187.93      1.05      1.00

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| CALIB            |
| NASHYD   (  0011)|   Area     (ha)=   5.33   Curve Number    (CN)= 90.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.63   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.50

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

                              ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
               0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
               0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
               0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
               0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
               0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
               0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
               0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
               0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
               0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
               0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
               1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
               1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
               1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
               1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
               1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
               1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
               1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
               1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
               1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
               1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   0.407

     PEAK FLOW       (cms)=   0.672 (i)
     TIME TO PEAK    (hrs)=  10.250
     RUNOFF VOLUME    (mm)= 179.564
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.847

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

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| CALIB            |
| STANDHYD (  0062)|   Area     (ha)=   0.29
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
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                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.26         0.03
     Dep. Storage     (mm)=       1.00         3.51
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      44.10        40.00
     Mannings n           =      0.013        0.250

         NOTE:  RAINFALL WAS TRANSFORMED TO   5.0 MIN. TIME STEP.
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---- TRANSFORMED HYETOGRAPH ----							
TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

```
Max.Eff.Inten.(mm/hr)=      53.00        52.16
           over (min)         5.00        10.00
Storage Coeff.  (min)=       2.02 (ii)    5.79 (ii)
Unit Hyd. Tpeak (min)=       5.00        10.00
Unit Hyd. peak  (cms)=       0.31         0.15
                                                 *TOTALS*
PEAK FLOW       (cms)=       0.04         0.00          0.043 (iii)
TIME TO PEAK    (hrs)=       9.50        10.00           10.00
RUNOFF VOLUME    (mm)=     211.00       188.51         208.74
TOTAL RAINFALL   (mm)=     212.00       212.00         212.00

     RUNOFF COEFFICIENT   =       1.00         0.89           0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  92.0    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 (  0190)|   Area     (ha)=   8.11
|ID= 1 DT= 5.0 min |   Total Imp(%)=  44.00   Dir. Conn.(%)=  30.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.57         4.54
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     232.52        40.00
     Mannings n           =      0.013        0.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00

```
              3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        65.70
               over (min)        5.00        15.00
     Storage Coeff.  (min)=      5.46 (ii)   13.81 (ii)
     Unit Hyd. Tpeak (min)=      5.00        15.00
     Unit Hyd. peak  (cms)=      0.20         0.08
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.36         0.81        1.173 (iii)
     TIME TO PEAK    (hrs)=     10.00        10.00       10.00
     RUNOFF VOLUME    (mm)=    211.00       193.75      198.93
     TOTAL RAINFALL   (mm)=    212.00       212.00      212.00
     RUNOFF COEFFICIENT   =      1.00         0.91        0.94


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  93.0    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  (  0120)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0011):     5.33   0.672    10.25   179.56
      + ID2= 2 (  0119):    18.65   2.216    10.42   187.93
        ==========================================================
        ID = 3 (  0120):    23.98   2.885    10.33   186.07

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

--------------------
| ADD HYD  (  0120)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0120):    23.98   2.885    10.33   186.07
      + ID2= 2 (  0190):     8.11   1.173    10.00   198.93
        ==========================================================
        ID = 1 (  0120):    32.09   3.913    10.08   189.32

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

--------------------
| ADD HYD  (  0120)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0120):    32.09   3.913    10.08   189.32
      + ID2= 2 (  0062):     0.29   0.043    10.00   208.74
        ==========================================================
        ID = 3 (  0120):    32.38   3.945    10.08   189.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0122)|
| 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
                 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

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY   TRAV.TIME
        (m)       (m)     (cu.m.)       (cms)         (m/s)       (min)
       0.10     99.60    .293E+02        0.0          0.19       36.31
       0.19     99.69    .931E+02        0.1          0.37       18.92
       0.29     99.79    .162E+03        0.2          0.49       14.16
       0.38     99.88    .237E+03        0.3          0.59       11.82
       0.48     99.98    .317E+03        0.5          0.67       10.39
       0.57    100.07    .403E+03        0.7          0.74        9.41
       0.67    100.17    .493E+03        0.9          0.80        8.67
       0.76    100.26    .590E+03        1.2          0.86        8.10
       0.86    100.36    .691E+03        1.5          0.91        7.63
       0.95    100.45    .799E+03        1.8          0.96        7.24
       1.05    100.55    .911E+03        2.2          1.00        6.91
       1.16    100.66    .106E+04        2.7          1.07        6.48
       1.28    100.78    .123E+04        3.4          1.14        6.08
       1.39    100.89    .142E+04        4.1          1.20        5.77
       1.50    101.00    .162E+04        4.9          1.25        5.53
       1.61    101.11    .184E+04        5.8          1.30        5.33
       1.72    101.22    .208E+04        6.7          1.34        5.17
       1.84    101.34    .233E+04        7.7          1.38        5.02
       1.95    101.45    .260E+04        8.8          1.41        4.90

                                  <---- hydrograph ---->   <-pipe / channel->
                            AREA    QPEAK    TPEAK    R.V.   MAX DEPTH  MAX VEL
                            (ha)    (cms)    (hrs)    (mm)       (m)       (m/s)
  INFLOW : ID= 2 (  0120)   32.38     3.95   10.08 189.49      1.37      1.19
  OUTFLOW: ID= 1 (  0122)   32.38     3.91   10.17 189.49      1.36      1.18


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0010)|   Area     (ha)=   9.22   Curve Number    (CN)= 89.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   9.45   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.35

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

                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
         0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
         0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
         0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
         0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
         0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
         0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
         0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
         0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
         0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
         0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
         1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
```

1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.006

PEAK FLOW (cms)= 1.249 (i)
TIME TO PEAK (hrs)= 10.083
RUNOFF VOLUME (mm)= 175.331
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.827

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

ADD HYD (0121)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0010):	9.22	1.249	10.08	175.33
	+ ID2= 2 (0122):	32.38	3.912	10.17	189.49
	ID = 3 (0121):	41.60	5.148	10.08	186.35

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	NASHYD (0007)	ID= 1 DT= 5.0 min	Area (ha)= 15.76	Curve Number (CN)= 92.0	Ia (mm)= 7.08	# of Linear Res.(N)= 3.00	U.H. Tp(hrs)= 1.03

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.584

PEAK FLOW (cms)= 1.661 (i)
TIME TO PEAK (hrs)= 11.167
RUNOFF VOLUME (mm)= 184.985
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.873

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

ROUTE CHN(0164)	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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.523E+02	0.0	0.19	64.86
0.19	99.69	.166E+03	0.1	0.37	33.79
0.29	99.79	.290E+03	0.2	0.49	25.29

0.38	99.88	.423E+03	0.3	0.59	21.12
0.48	99.98	.566E+03	0.5	0.67	18.56
0.57	100.07	.719E+03	0.7	0.74	16.80
0.67	100.17	.881E+03	0.9	0.80	15.49
0.76	100.26	.105E+04	1.2	0.86	14.46
0.86	100.36	.123E+04	1.5	0.91	13.63
0.95	100.45	.143E+04	1.8	0.96	12.94
1.05	100.55	.163E+04	2.2	1.00	12.34
1.16	100.66	.189E+04	2.7	1.07	11.58
1.28	100.78	.219E+04	3.4	1.14	10.85
1.39	100.89	.253E+04	4.1	1.20	10.31
1.50	101.00	.289E+04	4.9	1.25	9.87
1.61	101.11	.328E+04	5.8	1.30	9.52
1.72	101.22	.371E+04	6.7	1.34	9.23
1.84	101.34	.416E+04	7.7	1.38	8.97
1.95	101.45	.464E+04	8.8	1.41	8.75

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0007)	15.76	1.66	11.17	184.98	0.90	0.93
OUTFLOW:	ID= 1 (0164)	15.76	1.64	11.25	184.96	0.90	0.93

CALIB	
STANDHYD (0064)	Area (ha)= 1.35
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.22	0.14
Dep. Storage	(mm)=	1.00	4.16
Average Slope	(%)=	1.00	2.00
Length	(m)=	94.89	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

				TOTALS
Max.Eff.Inten.(mm/hr)=		53.00	51.94	
over (min)		5.00	10.00	
Storage Coeff. (min)=		3.19 (ii)	6.97 (ii)	
Unit Hyd. Tpeak (min)=		5.00	10.00	
Unit Hyd. peak (cms)=		0.27	0.14	
PEAK FLOW	(cms)=	0.18	0.02	0.198 (iii)
TIME TO PEAK	(hrs)=	9.83	10.00	10.00
RUNOFF VOLUME	(mm)=	211.00	185.42	208.44
TOTAL RAINFALL	(mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT	=	1.00	0.87	0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 91.0 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 (0207)	Area (ha)= 15.19
ID= 1 DT= 5.0 min	Total Imp(%)= 70.00 Dir. Conn.(%)= 52.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	10.63	4.56
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	318.22	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00

0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	84.36	
over (min)	5.00	15.00	
Storage Coeff. (min)=	6.60 (ii)	14.15 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.18	0.08	
			TOTALS
PEAK FLOW (cms)=	1.16	1.05	2.211 (iii)
TIME TO PEAK (hrs)=	10.00	10.00	10.00
RUNOFF VOLUME (mm)=	211.00	197.57	204.55
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	1.00	0.93	0.96

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 93.0 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 (0161)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0164):	15.76	1.640	11.25	184.96
+ ID2= 2 (0207):	15.19	2.211	10.00	204.55
ID = 3 (0161):	30.95	3.206	11.00	194.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0161)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0161):	30.95	3.206	11.00	194.58
+ ID2= 2 (0064):	1.35	0.198	10.00	208.44
ID = 1 (0161):	32.30	3.397	10.00	195.16

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	
STANDHYD (0166)	Area (ha)= 0.56
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.50	0.06
Dep. Storage	(mm)=	1.00	4.08
Average Slope	(%)=	1.00	2.00
Length	(m)=	61.16	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

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     Max.Eff.Inten.(mm/hr)=      53.00        51.71
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.45 (ii)    6.23 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.30         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.07         0.01          0.082 (iii)
     TIME TO PEAK    (hrs)=       9.67        10.00         10.00
     RUNOFF VOLUME    (mm)=     211.00       183.07        208.20
     TOTAL RAINFALL   (mm)=     212.00       212.00        212.00
     RUNOFF COEFFICIENT   =       1.00         0.86          0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  90.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0168)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0161):    32.30    3.397    10.00   195.16
      + ID2= 2 (  0166):     0.56    0.082    10.00   208.20
        ==================================================
        ID = 3 (  0168):    32.86    3.479    10.00   195.38

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ROUTE CHN(  0163)|
| 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
                   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

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        0.10    99.60    .132E+02        0.0          0.19      16.38
        0.19    99.69    .420E+02        0.1          0.37       8.53
        0.29    99.79    .732E+02        0.2          0.49       6.39
        0.38    99.88    .107E+03        0.3          0.59       5.33
        0.48    99.98    .143E+03        0.5          0.67       4.69
        0.57   100.07    .182E+03        0.7          0.74       4.24
        0.67   100.17    .223E+03        0.9          0.80       3.91
        0.76   100.26    .266E+03        1.2          0.86       3.65
        0.86   100.36    .312E+03        1.5          0.91       3.44
        0.95   100.45    .360E+03        1.8          0.96       3.27
        1.05   100.55    .411E+03        2.2          1.00       3.12
        1.16   100.66    .477E+03        2.7          1.07       2.92
        1.28   100.78    .554E+03        3.4          1.14       2.74
        1.39   100.89    .638E+03        4.1          1.20       2.60
        1.50   101.00    .730E+03        4.9          1.25       2.49
        1.61   101.11    .829E+03        5.8          1.30       2.40
        1.72   101.22    .936E+03        6.7          1.34       2.33
        1.84   101.34    .105E+04        7.7          1.38       2.27
        1.95   101.45    .117E+04        8.8          1.41       2.21

                                      <---- hydrograph ---->   <-pipe / channel->
                                 AREA    QPEAK    TPEAK   R.V.   MAX DEPTH  MAX VEL
                                 (ha)    (cms)    (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0168)    32.86     3.48    10.00 195.38       1.29      1.15
   OUTFLOW: ID= 1 (  0163)    32.86     3.45    10.00 195.38       1.29      1.15

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| CALIB            |
| NASHYD   (  0008)|   Area     (ha)=  18.33   Curve Number    (CN)= 91.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.44   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.77

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

                          ---- TRANSFORMED HYETOGRAPH ----
      TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
       hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
     0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
     0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
     0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
     0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
     0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
     0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
     0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
     0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
     0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
     0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
     0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
     1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
     1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
     1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
     1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
     1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
     1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
     1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
     1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
     1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
     1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
     1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
     1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
     2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
     2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
     2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
     2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
     2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
     2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
     2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
     2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
     2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
     2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
     2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
     2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
     3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00
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     Unit Hyd Qpeak  (cms)=   0.909

     PEAK FLOW       (cms)=   2.069 (i)
     TIME TO PEAK    (hrs)=  10.750
     RUNOFF VOLUME    (mm)= 181.198
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.855

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

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| ROUTE CHN(  0093)|
| 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
                   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

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        0.10    99.60    .305E+02       0.0         0.19       37.74
        0.19    99.69    .967E+02       0.1         0.37       19.66
        0.29    99.79    .169E+03       0.2         0.49       14.72
        0.38    99.88    .246E+03       0.3         0.59       12.29
        0.48    99.98    .330E+03       0.5         0.67       10.80
        0.57   100.07    .418E+03       0.7         0.74        9.78
        0.67   100.17    .513E+03       0.9         0.80        9.01
        0.76   100.26    .613E+03       1.2         0.86        8.42
        0.86   100.36    .719E+03       1.5         0.91        7.93
        0.95   100.45    .830E+03       1.8         0.96        7.53
        1.05   100.55    .947E+03       2.2         1.00        7.18
        1.16   100.66    .110E+04       2.7         1.07        6.74
        1.28   100.78    .128E+04       3.4         1.14        6.32
        1.39   100.89    .147E+04       4.1         1.20        6.00
        1.50   101.00    .168E+04       4.9         1.25        5.75
        1.61   101.11    .191E+04       5.8         1.30        5.54
        1.72   101.22    .216E+04       6.7         1.34        5.37
        1.84   101.34    .242E+04       7.7         1.38        5.22
        1.95   101.45    .270E+04       8.8         1.41        5.09

                                  <---- hydrograph ---->   <-pipe / channel->
                             AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                             (ha)    (cms)   (hrs)   (mm)       (m)       (m/s)
   INFLOW : ID= 2 (  0008)   18.33     2.07   10.75 181.20      1.02      0.99
   OUTFLOW: ID= 1 (  0093)   18.33     2.06   10.92 181.19      1.01      0.98



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| ROUTE CHN(  0094)|
| 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
                   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

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        0.10    99.60    .727E+02       0.0         0.19       90.12
        0.19    99.69    .231E+03       0.1         0.37       46.95
        0.29    99.79    .403E+03       0.2         0.49       35.14
        0.38    99.88    .588E+03       0.3         0.59       29.35
        0.48    99.98    .787E+03       0.5         0.67       25.80
        0.57   100.07    .999E+03       0.7         0.74       23.35
        0.67   100.17    .122E+04       0.9         0.80       21.52
        0.76   100.26    .146E+04       1.2         0.86       20.10
        0.86   100.36    .172E+04       1.5         0.91       18.94
        0.95   100.45    .198E+04       1.8         0.96       17.98
        1.05   100.55    .226E+04       2.2         1.00       17.15
        1.16   100.66    .263E+04       2.7         1.07       16.09
        1.28   100.78    .305E+04       3.4         1.14       15.08
        1.39   100.89    .351E+04       4.1         1.20       14.32
        1.50   101.00    .402E+04       4.9         1.25       13.72
        1.61   101.11    .456E+04       5.8         1.30       13.23
        1.72   101.22    .515E+04       6.7         1.34       12.82
        1.84   101.34    .578E+04       7.7         1.38       12.47
        1.95   101.45    .645E+04       8.8         1.41       12.16

                                  <---- hydrograph ---->   <-pipe / channel->
                             AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                             (ha)    (cms)   (hrs)   (mm)       (m)       (m/s)
   INFLOW : ID= 2 (  0093)   18.33     2.06   10.92 181.19      1.01      0.98
   OUTFLOW: ID= 1 (  0094)   18.33     2.02   11.17 181.17      1.00      0.98



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--------------------
| CALIB             |
| NASHYD   (  0019)|   Area     (ha)=  19.14   Curve Number   (CN)= 91.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.07   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.05

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

                        ---- TRANSFORMED HYETOGRAPH ----
     TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
      hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
    0.083     6.00 | 3.083    13.00 | 6.083    23.00 |  9.08    53.00
    0.167     6.00 | 3.167    13.00 | 6.167    23.00 |  9.17    53.00
    0.250     6.00 | 3.250    13.00 | 6.250    23.00 |  9.25    53.00
    0.333     6.00 | 3.333    13.00 | 6.333    23.00 |  9.33    53.00
    0.417     6.00 | 3.417    13.00 | 6.417    23.00 |  9.42    53.00
    0.500     6.00 | 3.500    13.00 | 6.500    23.00 |  9.50    53.00
    0.583     6.00 | 3.583    13.00 | 6.583    23.00 |  9.58    53.00
    0.667     6.00 | 3.667    13.00 | 6.667    23.00 |  9.67    53.00
    0.750     6.00 | 3.750    13.00 | 6.750    23.00 |  9.75    53.00
    0.833     6.00 | 3.833    13.00 | 6.833    23.00 |  9.83    53.00
    0.917     6.00 | 3.917    13.00 | 6.917    23.00 |  9.92    53.00
    1.000     6.00 | 4.000    13.00 | 7.000    23.00 | 10.00    53.00
    1.083     4.00 | 4.083    17.00 | 7.083    13.00 | 10.08    38.00
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1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.696

PEAK FLOW (cms)= 1.995 (i)
TIME TO PEAK (hrs)= 11.167
RUNOFF VOLUME (mm)= 181.566
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.856

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

CALIB	
STANDHYD (0196)	Area (ha)= 26.26
ID= 1 DT= 5.0 min	Total Imp(%)= 55.00 Dir. Conn.(%)= 40.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	14.44	11.82
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	418.41	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00

1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	70.15	
over (min)	10.00	20.00	
Storage Coeff. (min)=	7.77 (ii)	15.91 (ii)	
Unit Hyd. Tpeak (min)=	10.00	20.00	
Unit Hyd. peak (cms)=	0.13	0.07	
			TOTALS
PEAK FLOW (cms)=	1.55	2.23	3.771 (iii)
TIME TO PEAK (hrs)=	10.00	10.00	10.00
RUNOFF VOLUME (mm)=	211.00	194.83	201.30
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	1.00	0.92	0.95

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 93.0 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.

ROUTE CHN(0173)	
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.230E+02	0.0	0.19	28.46

0.19	99.69	.729E+02	0.1	0.37	14.83
0.29	99.79	.127E+03	0.2	0.49	11.10
0.38	99.88	.186E+03	0.3	0.59	9.27
0.48	99.98	.248E+03	0.5	0.67	8.15
0.57	100.07	.315E+03	0.7	0.74	7.37
0.67	100.17	.387E+03	0.9	0.80	6.80
0.76	100.26	.462E+03	1.2	0.86	6.35
0.86	100.36	.542E+03	1.5	0.91	5.98
0.95	100.45	.626E+03	1.8	0.96	5.68
1.05	100.55	.714E+03	2.2	1.00	5.42
1.16	100.66	.829E+03	2.7	1.07	5.08
1.28	100.78	.963E+03	3.4	1.14	4.76
1.39	100.89	.111E+04	4.1	1.20	4.52
1.50	101.00	.127E+04	4.9	1.25	4.33
1.61	101.11	.144E+04	5.8	1.30	4.18
1.72	101.22	.163E+04	6.7	1.34	4.05
1.84	101.34	.182E+04	7.7	1.38	3.94
1.95	101.45	.204E+04	8.8	1.41	3.84

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (| 0196)	26.26	3.77	10.00	201.30	1.34	1.17
OUTFLOW: ID= 1 (| 0173)	26.26	3.75	10.00	201.30	1.33	1.17

ADD HYD (0172)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (	0019):	19.14	1.995	11.17	181.57
+ ID2= 2 (	0173):	26.26	3.746	10.00	201.30
ID = 3 (	0172):	45.40	5.144	10.08	192.98

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0172)					
3 + 2 = 1		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (	0172):	45.40	5.144	10.08	192.98
+ ID2= 2 (	0094):	18.33	2.024	11.17	181.17
ID = 1 (	0172):	63.73	6.785	11.00	189.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0174)
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.179E+02	0.0	0.19	22.14
0.19	99.69	.568E+02	0.1	0.37	11.54
0.29	99.79	.990E+02	0.2	0.49	8.63
0.38	99.88	.145E+03	0.3	0.59	7.21
0.48	99.98	.193E+03	0.5	0.67	6.34
0.57	100.07	.245E+03	0.7	0.74	5.74
0.67	100.17	.301E+03	0.9	0.80	5.29
0.76	100.26	.360E+03	1.2	0.86	4.94
0.86	100.36	.422E+03	1.5	0.91	4.65
0.95	100.45	.487E+03	1.8	0.96	4.42
1.05	100.55	.556E+03	2.2	1.00	4.21
1.16	100.66	.645E+03	2.7	1.07	3.95
1.28	100.78	.749E+03	3.4	1.14	3.71
1.39	100.89	.863E+03	4.1	1.20	3.52
1.50	101.00	.987E+03	4.9	1.25	3.37
1.61	101.11	.112E+04	5.8	1.30	3.25
1.72	101.22	.127E+04	6.7	1.34	3.15
1.84	101.34	.142E+04	7.7	1.38	3.06
1.95	101.45	.158E+04	8.8	1.41	2.99

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (| 0172)	63.73	6.79	11.00	189.58	1.73	1.34
OUTFLOW: ID= 1 (| 0174)	63.73	6.77	11.00	189.58	1.73	1.34

CALIB
NASHYD (0020) | Area (ha)= 20.69 Curve Number (CN)= 91.0
ID= 1 DT= 5.0 min | Ia (mm)= 7.84 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.05

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00

1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.753

PEAK FLOW (cms)= 2.157 (i)
TIME TO PEAK (hrs)= 11.167
RUNOFF VOLUME (mm)= 181.786
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.857

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

CALIB
STANDHYD (0199)
ID= 1 DT= 5.0 min

Area (ha)= 19.33
Total Imp(%)= 53.00 Dir. Conn.(%)= 37.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	10.24	9.09
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	358.98	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

				TOTALS
Max.Eff.Inten.(mm/hr)=	53.00	70.52		
over (min)	5.00	20.00		
Storage Coeff. (min)=	7.09 (ii)	15.21 (ii)		
Unit Hyd. Tpeak (min)=	5.00	20.00		
Unit Hyd. peak (cms)=	0.17	0.07		
PEAK FLOW (cms)=	1.05	1.73		2.781 (iii)
TIME TO PEAK (hrs)=	10.00	10.00		10.00
RUNOFF VOLUME (mm)=	211.00	194.92		200.87
TOTAL RAINFALL (mm)=	212.00	212.00		212.00
RUNOFF COEFFICIENT =	1.00	0.92		0.95

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 93.0 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 (0175)
1 + 2 = 3

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0020):		20.69	2.157	11.17	181.79
+ ID2= 2 (0174):		63.73	6.767	11.00	189.58
ID = 3 (0175):		84.42	8.903	11.00	187.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0175)
3 + 2 = 1

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0175):		84.42	8.903	11.00	187.67
+ ID2= 2 (0199):		19.33	2.781	10.00	200.87
ID = 1 (0175):		103.75	10.954	11.00	190.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ROUTE CHN(  0081)|
| 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
                  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


     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.10    99.60    .472E+02       0.0         0.19       58.56
       0.19    99.69    .150E+03       0.1         0.37       30.51
       0.29    99.79    .262E+03       0.2         0.49       22.83
       0.38    99.88    .382E+03       0.3         0.59       19.07
       0.48    99.98    .511E+03       0.5         0.67       16.76
       0.57   100.07    .649E+03       0.7         0.74       15.17
       0.67   100.17    .796E+03       0.9         0.80       13.99
       0.76   100.26    .951E+03       1.2         0.86       13.06
       0.86   100.36    .111E+04       1.5         0.91       12.31
       0.95   100.45    .129E+04       1.8         0.96       11.68
       1.05   100.55    .147E+04       2.2         1.00       11.15
       1.16   100.66    .171E+04       2.7         1.07       10.45
       1.28   100.78    .198E+04       3.4         1.14        9.80
       1.39   100.89    .228E+04       4.1         1.20        9.30
       1.50   101.00    .261E+04       4.9         1.25        8.91
       1.61   101.11    .297E+04       5.8         1.30        8.60
       1.72   101.22    .335E+04       6.7         1.34        8.33
       1.84   101.34    .376E+04       7.7         1.38        8.10
       1.95   101.45    .419E+04       8.8         1.41        7.90

    **** WARNING:  TRAVEL TIME TABLE EXCEEDED
                                <---- hydrograph ---->   <-pipe / channel->
                             AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                             (ha)    (cms)   (hrs)   (mm)       (m)       (m/s)
  INFLOW : ID= 2 (  0175)  103.75    10.95   11.00 190.13      1.95      1.41
  OUTFLOW: ID= 1 (  0081)  103.75    10.89   11.00 190.12      1.95      1.41



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| CALIB            |
| NASHYD   (  0021)|   Area     (ha)=  50.74   Curve Number    (CN)= 91.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.53   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.37

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


                          ---- TRANSFORMED HYETOGRAPH ----
            TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
             hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
           0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
           0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
           0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
           0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
           0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
           0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
           0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
           0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
           0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
           0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
           0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
           1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
           1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
           1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
           1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
           1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
           1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
           1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
           1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
           1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
           1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
           1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
           1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
           2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
           2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
           2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
           2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
           2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
           2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
           2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
           2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
           2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
           2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
           2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
           2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
           3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   1.415

     PEAK FLOW       (cms)=   4.797 (i)
     TIME TO PEAK    (hrs)=  11.417
     RUNOFF VOLUME    (mm)= 182.102
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.859

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

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| CALIB            |
| NASHYD   (  0115)|   Area     (ha)=   0.99   Curve Number    (CN)= 91.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.02   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.17

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


                          ---- TRANSFORMED HYETOGRAPH ----
            TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
             hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
           0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
           0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
           0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
           0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
           0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
           0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
           0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
           0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
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0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.222

PEAK FLOW (cms)= 0.142 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 181.953
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.858

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

ADD HYD (0176)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0021):		50.74	4.797	11.42	182.10
+ ID2= 2 (0115):		0.99	0.142	10.00	181.95
ID = 3 (0176):		51.73	4.838	11.42	182.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0176)		AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1		(ha)	(cms)	(hrs)	(mm)
ID1= 3 (0176):		51.73	4.838	11.42	182.10
+ ID2= 2 (0081):		103.75	10.885	11.00	190.12
ID = 1 (0176):		155.49	15.571	11.08	187.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0001)	Area (ha)=	3.26	Curve Number (CN)=	91.0	
ID= 1 DT= 5.0 min	Ia (mm)=	7.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.21			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.592

PEAK FLOW (cms)= 0.466 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 182.334
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.860

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

ROUTE CHN(0095)		
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
                  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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.10    99.60    .212E+02       0.0          0.19      26.30
       0.19    99.69    .674E+02       0.1          0.37      13.70
       0.29    99.79    .118E+03       0.2          0.49      10.25
       0.38    99.88    .172E+03       0.3          0.59       8.56
       0.48    99.98    .230E+03       0.5          0.67       7.53
       0.57   100.07    .292E+03       0.7          0.74       6.81
       0.67   100.17    .357E+03       0.9          0.80       6.28
       0.76   100.26    .427E+03       1.2          0.86       5.87
       0.86   100.36    .501E+03       1.5          0.91       5.53
       0.95   100.45    .578E+03       1.8          0.96       5.25
       1.05   100.55    .660E+03       2.2          1.00       5.01
       1.16   100.66    .766E+03       2.7          1.07       4.70
       1.28   100.78    .890E+03       3.4          1.14       4.40
       1.39   100.89    .103E+04       4.1          1.20       4.18
       1.50   101.00    .117E+04       4.9          1.25       4.00
       1.61   101.11    .133E+04       5.8          1.30       3.86
       1.72   101.22    .150E+04       6.7          1.34       3.74
       1.84   101.34    .169E+04       7.7          1.38       3.64
       1.95   101.45    .188E+04       8.8          1.41       3.55

                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK    TPEAK    R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)    (hrs)    (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0001)    3.26     0.47    10.00  182.33      0.45      0.64
   OUTFLOW: ID= 1 (  0095)    3.26     0.46    10.00  182.29      0.45      0.64


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--------------------
| CALIB             |
| STANDHYD (  0189)|   Area    (ha)=   5.93
|ID= 1 DT= 5.0 min |   Total Imp(%)=  53.00   Dir. Conn.(%)=  37.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.14         2.79
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     198.83        40.00
     Mannings n             =     0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
              0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
              0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
              0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
              0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
              0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
              0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
              0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
              0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
              0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
              0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
              1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
              1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
              1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
              1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
              1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
              1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
              1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
              1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
              1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
              1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
              1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
              1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
              2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
              2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
              2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
              2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
              2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
              2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
              2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
              2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
              2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
              2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
              2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
              2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
              3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        70.52
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       4.97 (ii)   13.09 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.22         0.08
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.32         0.54          0.861 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.00          10.00
     RUNOFF VOLUME     (mm)=    211.00       194.92         200.87
     TOTAL RAINFALL    (mm)=    212.00       212.00         212.00
     RUNOFF COEFFICIENT   =       1.00         0.92           0.95

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  93.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0096)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0189):     5.93    0.861    10.00   200.87
      + ID2= 2 (  0095):     3.26    0.463    10.00   182.29
        ====================================================
        ID = 3 (  0096):     9.19    1.324    10.00   194.29
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     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0097)|
| 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
                   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

     <---------------------- TRAVEL TIME TABLE ----------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)       (cms)        (m/s)       (min)
       0.10    99.60    .552E+02         0.0         0.19       68.42
       0.19    99.69    .175E+03         0.1         0.37       35.64
       0.29    99.79    .306E+03         0.2         0.49       26.67
       0.38    99.88    .447E+03         0.3         0.59       22.28
       0.48    99.98    .597E+03         0.5         0.67       19.58
       0.57   100.07    .758E+03         0.7         0.74       17.72
       0.67   100.17    .930E+03         0.9         0.80       16.34
       0.76   100.26    .111E+04         1.2         0.86       15.26
       0.86   100.36    .130E+04         1.5         0.91       14.38
       0.95   100.45    .150E+04         1.8         0.96       13.65
       1.05   100.55    .172E+04         2.2         1.00       13.02
       1.16   100.66    .199E+04         2.7         1.07       12.21
       1.28   100.78    .231E+04         3.4         1.14       11.45
       1.39   100.89    .267E+04         4.1         1.20       10.87
       1.50   101.00    .305E+04         4.9         1.25       10.42
       1.61   101.11    .347E+04         5.8         1.30       10.04
       1.72   101.22    .391E+04         6.7         1.34        9.73
       1.84   101.34    .439E+04         7.7         1.38        9.47
       1.95   101.45    .489E+04         8.8         1.41        9.23

                                    <---- hydrograph ---->   <-pipe / channel->
                               AREA    QPEAK    TPEAK    R.V.   MAX DEPTH  MAX VEL
                               (ha)    (cms)    (hrs)    (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0096)     9.19     1.32    10.00  194.29      0.80      0.87
   OUTFLOW: ID= 1 (  0097)     9.19     1.26    10.08  194.24      0.78      0.86



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--------------------
| CALIB            |
| NASHYD   (  0009)|   Area     (ha)=  24.11   Curve Number    (CN)= 90.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.46   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.52

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
         0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
         0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
         0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
         0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
         0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
         0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
         0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
         0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
         0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
         0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
         1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
         1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
         1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
         1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
         1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
         1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
         1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
         1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
         1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
         1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
         1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
         1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
         2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
         2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
         2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
         2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
         2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
         2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
         2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
         2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
         2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
         2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
         2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
         2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
         3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   1.771

     PEAK FLOW       (cms)=   3.005 (i)
     TIME TO PEAK    (hrs)=  10.250
     RUNOFF VOLUME    (mm)= 178.744
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.843

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

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--------------------
| ADD HYD  (  0177)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0009):    24.11    3.005    10.25   178.74
      + ID2= 2 (  0097):     9.19    1.262    10.08   194.24
        ================================================
        ID = 3 (  0177):    33.30    4.214    10.17   183.02

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0005)|   Area     (ha)=  10.45   Curve Number    (CN)= 80.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   9.04   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.28

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.425

PEAK FLOW (cms)= 1.353 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 154.518
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.729

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

ROUTE CHN(0150)
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.482E+02	0.0	0.19	59.75
0.19	99.69	.153E+03	0.1	0.37	31.13
0.29	99.79	.267E+03	0.2	0.49	23.29
0.38	99.88	.390E+03	0.3	0.59	19.46
0.48	99.98	.522E+03	0.5	0.67	17.10
0.57	100.07	.662E+03	0.7	0.74	15.48
0.67	100.17	.812E+03	0.9	0.80	14.27
0.76	100.26	.970E+03	1.2	0.86	13.32
0.86	100.36	.114E+04	1.5	0.91	12.56
0.95	100.45	.131E+04	1.8	0.96	11.92
1.05	100.55	.150E+04	2.2	1.00	11.37
1.16	100.66	.174E+04	2.7	1.07	10.67
1.28	100.78	.202E+04	3.4	1.14	10.00
1.39	100.89	.233E+04	4.1	1.20	9.49
1.50	101.00	.266E+04	4.9	1.25	9.10
1.61	101.11	.303E+04	5.8	1.30	8.77
1.72	101.22	.342E+04	6.7	1.34	8.50
1.84	101.34	.383E+04	7.7	1.38	8.27
1.95	101.45	.427E+04	8.8	1.41	8.06

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (	0005)	10.45	1.35	10.00	154.52	0.81	0.88
OUTFLOW: ID= 1 (	0150)	10.45	1.30	10.17	154.49	0.79	0.87

CALIB
STANDHYD (0086)
ID= 1 DT= 5.0 min

Area (ha)= 0.31
Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.28	0.03
Dep. Storage	(mm)=	1.00	7.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	45.39	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00

1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	49.09		
over (min)	5.00	10.00		
Storage Coeff. (min)=	2.05 (ii)	5.83 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.31	0.15		
			TOTALS	
PEAK FLOW (cms)=	0.04	0.00	0.045 (iii)	
TIME TO PEAK (hrs)=	9.50	10.00	10.00	
RUNOFF VOLUME (mm)=	211.00	161.17	206.01	
TOTAL RAINFALL (mm)=	212.00	212.00	212.00	
RUNOFF COEFFICIENT =	1.00	0.76	0.97	

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

(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.

CALIB			
STANDHYD (0193)	Area (ha)=	17.59	
ID= 1 DT= 5.0 min	Total Imp(%)=	67.00	Dir. Conn.(%)= 48.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	11.79	5.80
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	342.44	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	83.07		
over (min)	5.00	15.00		
Storage Coeff. (min)=	6.89 (ii)	14.49 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.18	0.08		
			TOTALS	
PEAK FLOW (cms)=	1.24	1.31	2.556 (iii)	
TIME TO PEAK (hrs)=	10.00	10.00	10.00	
RUNOFF VOLUME (mm)=	211.00	197.36	203.91	
TOTAL RAINFALL (mm)=	212.00	212.00	212.00	
RUNOFF COEFFICIENT =	1.00	0.93	0.96	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 93.0 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 (0151)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0150):	10.45	1.300	10.17	154.49
+ ID2= 2 (0193):	17.59	2.556	10.00	203.91

```
        ==================================================
        ID = 3 (  0151):    28.04   3.827    10.00   185.49

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

--------------------
| ADD HYD  (  0151)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0151):    28.04   3.827    10.00   185.49
      + ID2= 2 (  0086):     0.31   0.045    10.00   206.01
        ==================================================
        ID = 1 (  0151):    28.35   3.872    10.00   185.71

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| CALIB            |
| NASHYD   (  0006)|   Area    (ha)=   6.26   Curve Number    (CN)= 92.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.80   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.87

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

                        ---- TRANSFORMED HYETOGRAPH ----
 TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
  hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   0.275

     PEAK FLOW       (cms)=   0.691 (i)
     TIME TO PEAK    (hrs)=  11.000
     RUNOFF VOLUME    (mm)= 186.245
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.879

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

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--------------------
| ROUTE CHN(  0148)|
| 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
                   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

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)       (cms)         (m/s)       (min)
        0.10    99.60    .454E+02         0.0          0.19       56.26
        0.19    99.69    .144E+03         0.1          0.37       29.31
        0.29    99.79    .251E+03         0.2          0.49       21.93
        0.38    99.88    .367E+03         0.3          0.59       18.32
        0.48    99.98    .491E+03         0.5          0.67       16.10
        0.57   100.07    .624E+03         0.7          0.74       14.57
        0.67   100.17    .764E+03         0.9          0.80       13.44
        0.76   100.26    .914E+03         1.2          0.86       12.55
        0.86   100.36    .107E+04         1.5          0.91       11.82
        0.95   100.45    .124E+04         1.8          0.96       11.22
        1.05   100.55    .141E+04         2.2          1.00       10.71
        1.16   100.66    .164E+04         2.7          1.07       10.04
        1.28   100.78    .190E+04         3.4          1.14        9.41
        1.39   100.89    .219E+04         4.1          1.20        8.94
        1.50   101.00    .251E+04         4.9          1.25        8.56
        1.61   101.11    .285E+04         5.8          1.30        8.26
        1.72   101.22    .322E+04         6.7          1.34        8.00
        1.84   101.34    .361E+04         7.7          1.38        7.78
        1.95   101.45    .402E+04         8.8          1.41        7.59

                                    <---- hydrograph ---->   <-pipe / channel->
                             AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                             (ha)    (cms)   (hrs)   (mm)       (m)       (m/s)
  INFLOW : ID= 2 (  0006)    6.26     0.69   11.00 186.24       0.56       0.73
 OUTFLOW: ID= 1 (  0148)     6.26     0.68   11.17 186.20       0.56       0.73


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0065)|   Area    (ha)=   1.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.37	0.15
Dep. Storage	(mm)=	1.00	4.85
Average Slope	(%)=	1.00	2.00
Length	(m)=	100.86	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

				TOTALS
Max.Eff.Inten.	(mm/hr)=	53.00	51.17	
over	(min)	5.00	10.00	
Storage Coeff.	(min)=	3.31 (ii)	7.09 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.26	0.14	
PEAK FLOW	(cms)=	0.20	0.02	0.224 (iii)
TIME TO PEAK	(hrs)=	9.83	10.00	10.00
RUNOFF VOLUME	(mm)=	211.00	177.48	207.65
TOTAL RAINFALL	(mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT	=	1.00	0.84	0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 88.0 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 (0145)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0148):		6.26	0.684	11.17	186.20
+ ID2= 2 (0065):		1.53	0.224	10.00	207.65
ID = 3 (0145):		7.79	0.840	11.00	190.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB (0165)	Area (ha)= 0.25
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.22	0.03
Dep. Storage	(mm)=	1.00	6.59
Average Slope	(%)=	1.00	2.00
Length	(m)=	40.82	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00

2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	49.48	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.92 (ii)	5.70 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.31	0.15	
			TOTALS
PEAK FLOW (cms)=	0.03	0.00	0.037 (iii)
TIME TO PEAK (hrs)=	9.50	10.00	10.00
RUNOFF VOLUME (mm)=	211.00	163.90	206.28
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	1.00	0.77	0.97

***** 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.

ADD HYD (0149)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0145):		7.79	0.840	11.00	190.40
+ ID2= 2 (0165):		0.25	0.037	10.00	206.28
ID = 3 (0149):		8.04	0.867	11.00	190.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0154)	
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.125E+02	0.0	0.19	15.45
0.19	99.69	.396E+02	0.1	0.37	8.05
0.29	99.79	.691E+02	0.2	0.49	6.03
0.38	99.88	.101E+03	0.3	0.59	5.03
0.48	99.98	.135E+03	0.5	0.67	4.42
0.57	100.07	.171E+03	0.7	0.74	4.00
0.67	100.17	.210E+03	0.9	0.80	3.69
0.76	100.26	.251E+03	1.2	0.86	3.45
0.86	100.36	.294E+03	1.5	0.91	3.25
0.95	100.45	.340E+03	1.8	0.96	3.08
1.05	100.55	.388E+03	2.2	1.00	2.94
1.16	100.66	.450E+03	2.7	1.07	2.76
1.28	100.78	.523E+03	3.4	1.14	2.59
1.39	100.89	.602E+03	4.1	1.20	2.46
1.50	101.00	.689E+03	4.9	1.25	2.35
1.61	101.11	.783E+03	5.8	1.30	2.27
1.72	101.22	.883E+03	6.7	1.34	2.20
1.84	101.34	.991E+03	7.7	1.38	2.14
1.95	101.45	.111E+04	8.8	1.41	2.09

		<---- hydrograph ---->			<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0149)	8.04	0.87	11.00	190.89	0.64	0.78
OUTFLOW: ID= 1 (0154)	8.04	0.86	11.00	190.89	0.63	0.77

CALIB	
STANDHYD (0066)	Area (ha)= 0.32
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.29	0.03
Dep. Storage	(mm)=	1.00	3.81
Average Slope	(%)=	1.00	2.00
Length	(m)=	46.14	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00

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               1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
               1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
               2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
               2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
               2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
               2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
               2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
               2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
               2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
               2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
               2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
               2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
               2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
               2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
               3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        52.15
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.07 (ii)    5.85 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.31         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.04         0.00          0.047 (iii)
     TIME TO PEAK    (hrs)=       9.58        10.00          10.00
     RUNOFF VOLUME    (mm)=     211.00       188.22         208.71
     TOTAL RAINFALL   (mm)=     212.00       212.00         212.00
     RUNOFF COEFFICIENT   =       1.00         0.89           0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  92.0    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  (  0152)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0151):    28.35   3.872    10.00   185.71
     + ID2= 2 (  0154):     8.04   0.864    11.00   190.89
       ==========================================================
       ID = 3 (  0152):    36.39   4.553    10.00   186.86

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

--------------------
| ADD HYD  (  0152)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0152):    36.39   4.553    10.00   186.86
     + ID2= 2 (  0066):     0.32   0.047    10.00   208.71
       ==========================================================
       ID = 1 (  0152):    36.71   4.600    10.00   187.05

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0155)|
| 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
                   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

          <---------------------- TRAVEL TIME TABLE ---------------------->
           DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
            (m)       (m)    (cu.m.)      (cms)        (m/s)      (min)
           0.10     99.60    .203E+02       0.0         0.19      25.11
           0.19     99.69    .644E+02       0.1         0.37      13.08
           0.29     99.79    .112E+03       0.2         0.49       9.79
           0.38     99.88    .164E+03       0.3         0.59       8.18
           0.48     99.98    .219E+03       0.5         0.67       7.19
           0.57    100.07    .278E+03       0.7         0.74       6.51
           0.67    100.17    .341E+03       0.9         0.80       6.00
           0.76    100.26    .408E+03       1.2         0.86       5.60
           0.86    100.36    .478E+03       1.5         0.91       5.28
           0.95    100.45    .552E+03       1.8         0.96       5.01
           1.05    100.55    .630E+03       2.2         1.00       4.78
           1.16    100.66    .732E+03       2.7         1.07       4.48
           1.28    100.78    .849E+03       3.4         1.14       4.20
           1.39    100.89    .979E+03       4.1         1.20       3.99
           1.50    101.00    .112E+04       4.9         1.25       3.82
           1.61    101.11    .127E+04       5.8         1.30       3.69
           1.72    101.22    .144E+04       6.7         1.34       3.57
           1.84    101.34    .161E+04       7.7         1.38       3.47
           1.95    101.45    .180E+04       8.8         1.41       3.39

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)       (m)       (m/s)
     INFLOW : ID= 2 (  0152)   36.71     4.60   10.00 187.05      1.46      1.23
     OUTFLOW: ID= 1 (  0155)   36.71     4.55   10.00 187.04      1.45      1.23

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0187)|
| 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
                   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

          <---------------------- TRAVEL TIME TABLE ---------------------->
           DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
            (m)       (m)    (cu.m.)      (cms)        (m/s)      (min)
           0.10     99.60    .522E+02       0.0         0.19      64.71
           0.19     99.69    .166E+03       0.1         0.37      33.71
           0.29     99.79    .289E+03       0.2         0.49      25.23
           0.38     99.88    .422E+03       0.3         0.59      21.07
```

0.48	99.98	.565E+03	0.5	0.67	18.52
0.57	100.07	.717E+03	0.7	0.74	16.76
0.67	100.17	.879E+03	0.9	0.80	15.45
0.76	100.26	.105E+04	1.2	0.86	14.43
0.86	100.36	.123E+04	1.5	0.91	13.60
0.95	100.45	.142E+04	1.8	0.96	12.91
1.05	100.55	.162E+04	2.2	1.00	12.32
1.16	100.66	.189E+04	2.7	1.07	11.55
1.28	100.78	.219E+04	3.4	1.14	10.83
1.39	100.89	.252E+04	4.1	1.20	10.28
1.50	101.00	.289E+04	4.9	1.25	9.85
1.61	101.11	.328E+04	5.8	1.30	9.50
1.72	101.22	.370E+04	6.7	1.34	9.20
1.84	101.34	.415E+04	7.7	1.38	8.95
1.95	101.45	.463E+04	8.8	1.41	8.73

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0155)	36.71	4.55	10.00	187.04	1.45	1.23
OUTFLOW: ID= 1 (0187)	36.71	4.41	10.08	187.03	1.43	1.22

CALIB					
NASHYD (0015)	Area	(ha)=	15.31	Curve Number	(CN)= 92.0
ID= 1 DT= 5.0 min	Ia	(mm)=	6.90	# of Linear Res.	(N)= 3.00
	U.H. Tp	(hrs)=	0.58		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.008

PEAK FLOW (cms)= 1.873 (i)
TIME TO PEAK (hrs)= 10.417
RUNOFF VOLUME (mm)= 185.153
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.873

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

CALIB					
STANDHYD (0138)	Area	(ha)=	0.56		
ID= 1 DT= 5.0 min	Total Imp	(%)=	90.00	Dir. Conn. (%)=	90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.50	0.06
Dep. Storage	(mm)=	1.00	2.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	60.94	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00

2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	52.99		
over (min)	5.00	10.00		
Storage Coeff. (min)=	2.45 (ii)	6.22 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.30	0.15		
			TOTALS	
PEAK FLOW (cms)=	0.07	0.01	0.082 (iii)	
TIME TO PEAK (hrs)=	9.67	10.00	10.00	
RUNOFF VOLUME (mm)=	211.00	207.47	210.64	
TOTAL RAINFALL (mm)=	212.00	212.00	212.00	
RUNOFF COEFFICIENT =	1.00	0.98	0.99	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 99.0 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 (0139)	Area (ha)= 0.51
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00 Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.46	0.05
Dep. Storage	(mm)=	1.00	4.16
Average Slope	(%)=	1.00	2.00
Length	(m)=	58.08	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	51.94		
over (min)	5.00	10.00		
Storage Coeff. (min)=	2.38 (ii)	6.16 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.30	0.15		
			TOTALS	
PEAK FLOW (cms)=	0.07	0.01	0.074 (iii)	
TIME TO PEAK (hrs)=	9.58	10.00	10.00	
RUNOFF VOLUME (mm)=	211.00	185.43	208.44	
TOTAL RAINFALL (mm)=	212.00	212.00	212.00	
RUNOFF COEFFICIENT =	1.00	0.87	0.98	

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 91.0 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 (0169)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0138):	0.56	0.082	10.00	210.64
+ ID2= 2 (0139):	0.51	0.074	10.00	208.44
ID = 3 (0169):	1.06	0.156	10.00	209.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0184)	
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.164E+02	0.0	0.19	20.34
0.19	99.69	.521E+02	0.1	0.37	10.60
0.29	99.79	.909E+02	0.2	0.49	7.93
0.38	99.88	.133E+03	0.3	0.59	6.62
0.48	99.98	.178E+03	0.5	0.67	5.82
0.57	100.07	.225E+03	0.7	0.74	5.27
0.67	100.17	.276E+03	0.9	0.80	4.86
0.76	100.26	.330E+03	1.2	0.86	4.54
0.86	100.36	.387E+03	1.5	0.91	4.28
0.95	100.45	.447E+03	1.8	0.96	4.06
1.05	100.55	.510E+03	2.2	1.00	3.87
1.16	100.66	.593E+03	2.7	1.07	3.63
1.28	100.78	.688E+03	3.4	1.14	3.40
1.39	100.89	.793E+03	4.1	1.20	3.23
1.50	101.00	.907E+03	4.9	1.25	3.10
1.61	101.11	.103E+04	5.8	1.30	2.99
1.72	101.22	.116E+04	6.7	1.34	2.89
1.84	101.34	.130E+04	7.7	1.38	2.81
1.95	101.45	.146E+04	8.8	1.41	2.74

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0169)	1.06	0.16	10.00	209.59	0.26	0.44
OUTFLOW: ID= 1 (0184)	1.06	0.16	10.00	209.50	0.26	0.44

CALIB	
STANDHYD (0205)	Area (ha)= 0.94
ID= 1 DT= 5.0 min	Total Imp(%)= 99.00 Dir. Conn.(%)= 99.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.93	0.01
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	79.16	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

				TOTALS
Max.Eff.Inten.(mm/hr)=		53.00	52.33	
over (min)		5.00	5.00	
Storage Coeff. (min)=		2.86 (ii)	4.31 (ii)	
Unit Hyd. Tpeak (min)=		5.00	5.00	
Unit Hyd. peak (cms)=		0.28	0.23	
PEAK FLOW	(cms)=	0.14	0.00	0.138 (iii)
TIME TO PEAK	(hrs)=	9.75	10.00	10.00
RUNOFF VOLUME	(mm)=	211.00	189.50	210.78
TOTAL RAINFALL	(mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT	=	1.00	0.89	0.99

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 93.0 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 (0206)	Area (ha)= 2.56
ID= 1 DT= 5.0 min	Total Imp(%)= 77.00 Dir. Conn.(%)= 69.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.97	0.59
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	130.64	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	70.92	
over (min)	5.00	15.00	
Storage Coeff. (min)=	3.87 (ii)	11.96 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.25	0.09	
			TOTALS
PEAK FLOW (cms)=	0.26	0.11	0.375 (iii)
TIME TO PEAK (hrs)=	10.00	10.00	10.00
RUNOFF VOLUME (mm)=	211.00	195.01	206.04
TOTAL RAINFALL (mm)=	212.00	212.00	212.00
RUNOFF COEFFICIENT =	1.00	0.92	0.97

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 93.0 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 (0185)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0184):	1.06	0.156	10.00	209.50
+ ID2= 2 (0205):	0.94	0.138	10.00	210.78
ID = 3 (0185):	2.00	0.295	10.00	210.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0185)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0185):	2.00	0.295	10.00	210.10
+ ID2= 2 (0206):	2.56	0.375	10.00	206.04
ID = 1 (0185):	4.56	0.670	10.00	207.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0186)	
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.616E+02	0.0	0.19	76.29
0.19	99.69	.196E+03	0.1	0.37	39.74
0.29	99.79	.341E+03	0.2	0.49	29.74
0.38	99.88	.498E+03	0.3	0.59	24.84
0.48	99.98	.666E+03	0.5	0.67	21.84
0.57	100.07	.846E+03	0.7	0.74	19.76
0.67	100.17	.104E+04	0.9	0.80	18.22
0.76	100.26	.124E+04	1.2	0.86	17.01
0.86	100.36	.145E+04	1.5	0.91	16.03
0.95	100.45	.168E+04	1.8	0.96	15.22
1.05	100.55	.191E+04	2.2	1.00	14.52
1.16	100.66	.222E+04	2.7	1.07	13.62
1.28	100.78	.258E+04	3.4	1.14	12.77
1.39	100.89	.297E+04	4.1	1.20	12.12
1.50	101.00	.340E+04	4.9	1.25	11.61
1.61	101.11	.386E+04	5.8	1.30	11.20
1.72	101.22	.436E+04	6.7	1.34	10.85
1.84	101.34	.489E+04	7.7	1.38	10.56
1.95	101.45	.546E+04	8.8	1.41	10.30

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0185)	4.56	0.67	10.00	207.82	0.55	0.72

```
   OUTFLOW: ID= 1 (  0186)    4.56     0.64   10.00 207.73      0.54      0.71



--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0194)|   Area    (ha)=  16.63
|ID= 1 DT= 5.0 min |   Total Imp(%)=  54.00   Dir. Conn.(%)=  37.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.98         7.65
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     332.97        40.00
     Mannings n           =      0.013        0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
              0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
              0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
              0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
              0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
              0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
              0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
              0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
              0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
              0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
              0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
              1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
              1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
              1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
              1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
              1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
              1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
              1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
              1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
              1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
              1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
              1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
              1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
              2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
              2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
              2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
              2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
              2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
              2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
              2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
              2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
              2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
              2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
              2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
              2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
              3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        72.08
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       6.78 (ii)   14.82 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.18         0.08
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.91         1.50          2.405 (iii)
     TIME TO PEAK    (hrs)=      10.00        10.00          10.00
     RUNOFF VOLUME    (mm)=     211.00       195.27         201.09
     TOTAL RAINFALL   (mm)=     212.00       212.00         212.00
     RUNOFF COEFFICIENT   =       1.00         0.92           0.95

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  93.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT)  SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0183)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
       ID1= 1 (  0015):    15.31    1.873    10.42   185.15
     + ID2= 2 (  0186):     4.56    0.641    10.00   207.73
       ================================================
       ID = 3 (  0183):    19.87    2.427    10.25   190.34

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

--------------------
| ADD HYD  (  0183)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
       ID1= 3 (  0183):    19.87    2.427    10.25   190.34
     + ID2= 2 (  0187):    36.71    4.411    10.08   187.03
       ================================================
       ID = 1 (  0183):    56.58    6.806    10.08   188.19

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0183)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
       ID1= 1 (  0183):    56.58    6.806    10.08   188.19
     + ID2= 2 (  0194):    16.63    2.405    10.00   201.09
       ================================================
       ID = 3 (  0183):    73.21    9.084    10.00   191.12

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0180)|
| 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
                   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

<-------------------- TRAVEL TIME TABLE ---------------------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.371E+02	0.0	0.19	45.93
0.19	99.69	.118E+03	0.1	0.37	23.93
0.29	99.79	.205E+03	0.2	0.49	17.91
0.38	99.88	.300E+03	0.3	0.59	14.96
0.48	99.98	.401E+03	0.5	0.67	13.15
0.57	100.07	.509E+03	0.7	0.74	11.90
0.67	100.17	.624E+03	0.9	0.80	10.97
0.76	100.26	.746E+03	1.2	0.86	10.24
0.86	100.36	.875E+03	1.5	0.91	9.65
0.95	100.45	.101E+04	1.8	0.96	9.16
1.05	100.55	.115E+04	2.2	1.00	8.74
1.16	100.66	.134E+04	2.7	1.07	8.20
1.28	100.78	.155E+04	3.4	1.14	7.69
1.39	100.89	.179E+04	4.1	1.20	7.30
1.50	101.00	.205E+04	4.9	1.25	6.99
1.61	101.11	.233E+04	5.8	1.30	6.74
1.72	101.22	.263E+04	6.7	1.34	6.53
1.84	101.34	.295E+04	7.7	1.38	6.36
1.95	101.45	.329E+04	8.8	1.41	6.20

**** WARNING: TRAVEL TIME TABLE EXCEEDED

	AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0183)	73.21	9.08	10.00	191.12	1.94	1.41
OUTFLOW: ID= 1 (0180)	73.21	8.97	10.17	191.12	1.95	1.41

CALIB NASHYD (0016) ID= 1 DT= 5.0 min	Area (ha)= 22.20 Curve Number (CN)= 91.0 Ia (mm)= 7.86 # of Linear Res.(N)= 3.00 U.H. Tp(hrs)= 0.55

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 1.542

PEAK FLOW (cms)= 2.743 (i)
TIME TO PEAK (hrs)= 10.333
RUNOFF VOLUME (mm)= 181.764
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.857

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

ADD HYD (0144) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0016):	22.20	2.743	10.33	181.76
+ ID2= 2 (0180):	73.21	8.967	10.17	191.12
ID = 3 (0144):	95.41	11.662	10.17	188.94

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0003) ID= 1 DT= 5.0 min	Area (ha)= 4.04 Curve Number (CN)= 91.0 Ia (mm)= 7.00 # of Linear Res.(N)= 3.00 U.H. Tp(hrs)= 0.28

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00

0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.552

PEAK FLOW (cms)= 0.571 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 182.529
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.861

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

ROUTE CHN(0126)	
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.235E+02	0.0	0.19	29.14
0.19	99.69	.747E+02	0.1	0.37	15.18
0.29	99.79	.130E+03	0.2	0.49	11.36
0.38	99.88	.190E+03	0.3	0.59	9.49
0.48	99.98	.254E+03	0.5	0.67	8.34
0.57	100.07	.323E+03	0.7	0.74	7.55
0.67	100.17	.396E+03	0.9	0.80	6.96
0.76	100.26	.473E+03	1.2	0.86	6.50
0.86	100.36	.555E+03	1.5	0.91	6.12
0.95	100.45	.641E+03	1.8	0.96	5.81
1.05	100.55	.731E+03	2.2	1.00	5.55
1.16	100.66	.849E+03	2.7	1.07	5.20
1.28	100.78	.985E+03	3.4	1.14	4.88
1.39	100.89	.114E+04	4.1	1.20	4.63
1.50	101.00	.130E+04	4.9	1.25	4.44
1.61	101.11	.148E+04	5.8	1.30	4.28
1.72	101.22	.167E+04	6.7	1.34	4.14
1.84	101.34	.187E+04	7.7	1.38	4.03
1.95	101.45	.208E+04	8.8	1.41	3.93

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0003)	4.04	0.57	10.00	182.53	0.51	0.69
OUTFLOW: ID= 1 (0126)	4.04	0.56	10.08	182.49	0.50	0.68

CALIB			
NASHYD (0004)	Area (ha)= 43.99	Curve Number (CN)= 85.0	
ID= 1 DT= 5.0 min	Ia (mm)= 6.82	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.93		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00

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              2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
              2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
              2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
              2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
              3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   1.807

     PEAK FLOW       (cms)=   4.578 (i)
     TIME TO PEAK    (hrs)=  11.083
     RUNOFF VOLUME    (mm)= 168.392
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.794

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

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0125)|
| 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
                   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

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.10    99.60    .287E+02        0.0         0.19       35.51
       0.19    99.69    .910E+02        0.1         0.37       18.50
       0.29    99.79    .159E+03        0.2         0.49       13.85
       0.38    99.88    .232E+03        0.3         0.59       11.56
       0.48    99.98    .310E+03        0.5         0.67       10.16
       0.57   100.07    .394E+03        0.7         0.74        9.20
       0.67   100.17    .483E+03        0.9         0.80        8.48
       0.76   100.26    .577E+03        1.2         0.86        7.92
       0.86   100.36    .676E+03        1.5         0.91        7.46
       0.95   100.45    .781E+03        1.8         0.96        7.08
       1.05   100.55    .891E+03        2.2         1.00        6.76
       1.16   100.66    .103E+04        2.7         1.07        6.34
       1.28   100.78    .120E+04        3.4         1.14        5.94
       1.39   100.89    .138E+04        4.1         1.20        5.64
       1.50   101.00    .158E+04        4.9         1.25        5.41
       1.61   101.11    .180E+04        5.8         1.30        5.21
       1.72   101.22    .203E+04        6.7         1.34        5.05
       1.84   101.34    .228E+04        7.7         1.38        4.91
       1.95   101.45    .254E+04        8.8         1.41        4.79

                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                               (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0004)   43.99     4.58   11.08 168.39      1.46      1.23
   OUTFLOW: ID= 1 (  0125)   43.99     4.56   11.17 168.39      1.46      1.23


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--------------------
| ROUTE CHN(  0128)|
| 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
                   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

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.10    99.60    .180E+02        0.0         0.19       22.33
       0.19    99.69    .572E+02        0.1         0.37       11.63
       0.29    99.79    .998E+02        0.2         0.49        8.70
       0.38    99.88    .146E+03        0.3         0.59        7.27
       0.48    99.98    .195E+03        0.5         0.67        6.39
       0.57   100.07    .247E+03        0.7         0.74        5.78
       0.67   100.17    .303E+03        0.9         0.80        5.33
       0.76   100.26    .363E+03        1.2         0.86        4.98
       0.86   100.36    .425E+03        1.5         0.91        4.69
       0.95   100.45    .491E+03        1.8         0.96        4.45
       1.05   100.55    .560E+03        2.2         1.00        4.25
       1.16   100.66    .651E+03        2.7         1.07        3.99
       1.28   100.78    .755E+03        3.4         1.14        3.74
       1.39   100.89    .870E+03        4.1         1.20        3.55
       1.50   101.00    .996E+03        4.9         1.25        3.40
       1.61   101.11    .113E+04        5.8         1.30        3.28
       1.72   101.22    .128E+04        6.7         1.34        3.18
       1.84   101.34    .143E+04        7.7         1.38        3.09
       1.95   101.45    .160E+04        8.8         1.41        3.01

                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                               (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0125)   43.99     4.56   11.17 168.39      1.45      1.23
   OUTFLOW: ID= 1 (  0128)   43.99     4.55   11.17 168.39      1.45      1.23


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--------------------
| ADD HYD  (  0129)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0126):     4.04    0.563    10.08    182.49
     + ID2= 2 (  0128):    43.99    4.553    11.17    168.39
       ==========================================================
       ID = 3 (  0129):    48.03    4.968    11.08    169.58

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0133)|
| 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
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	

<-------------------- TRAVEL TIME TABLE ---------------------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.171E+02	0.0	0.19	21.23
0.19	99.69	.544E+02	0.1	0.37	11.06
0.29	99.79	.949E+02	0.2	0.49	8.28
0.38	99.88	.139E+03	0.3	0.59	6.91
0.48	99.98	.185E+03	0.5	0.67	6.08
0.57	100.07	.235E+03	0.7	0.74	5.50
0.67	100.17	.288E+03	0.9	0.80	5.07
0.76	100.26	.345E+03	1.2	0.86	4.73
0.86	100.36	.404E+03	1.5	0.91	4.46
0.95	100.45	.467E+03	1.8	0.96	4.23
1.05	100.55	.533E+03	2.2	1.00	4.04
1.16	100.66	.619E+03	2.7	1.07	3.79
1.28	100.78	.718E+03	3.4	1.14	3.55
1.39	100.89	.827E+03	4.1	1.20	3.37
1.50	101.00	.946E+03	4.9	1.25	3.23
1.61	101.11	.108E+04	5.8	1.30	3.12
1.72	101.22	.121E+04	6.7	1.34	3.02
1.84	101.34	.136E+04	7.7	1.38	2.94
1.95	101.45	.152E+04	8.8	1.41	2.86

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0129)	48.03	4.97	11.08	169.58	1.51	1.26
OUTFLOW: ID= 1 (0133)	48.03	4.96	11.08	169.58	1.51	1.26

CALIB					
NASHYD (0012)	Area	(ha)=	10.18	Curve Number	(CN)= 90.0
ID= 1 DT= 5.0 min	Ia	(mm)=	8.17	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=		0.51		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.762

PEAK FLOW (cms)= 1.276 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 179.035
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.845

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

CALIB					
STANDHYD (0136)	Area	(ha)=	0.37		
ID= 1 DT= 5.0 min	Total Imp(%)=		90.00	Dir. Conn.(%)=	90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.34	0.04
Dep. Storage	(mm)=	1.00	6.58
Average Slope	(%)=	1.00	2.00
Length	(m)=	49.87	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00

1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

				TOTALS
Max.Eff.Inten.(mm/hr)=	53.00	49.48		
over (min)	5.00	10.00		
Storage Coeff. (min)=	2.17 (ii)	5.95 (ii)		
Unit Hyd. Tpeak (min)=	5.00	10.00		
Unit Hyd. peak (cms)=	0.31	0.15		
PEAK FLOW (cms)=	0.05	0.01	0.055 (iii)	
TIME TO PEAK (hrs)=	9.58	10.00	10.00	
RUNOFF VOLUME (mm)=	211.00	163.90	206.28	
TOTAL RAINFALL (mm)=	212.00	212.00	212.00	
RUNOFF COEFFICIENT =	1.00	0.77	0.97	

***** 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 (0203)	Area (ha)= 17.96
ID= 1 DT= 5.0 min	Total Imp(%)= 52.00 Dir. Conn.(%)= 39.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	9.34	8.62
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	346.03	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

				TOTALS
Max.Eff.Inten.(mm/hr)=	53.00	66.81		
over (min)	5.00	20.00		
Storage Coeff. (min)=	6.94 (ii)	15.23 (ii)		
Unit Hyd. Tpeak (min)=	5.00	20.00		
Unit Hyd. peak (cms)=	0.17	0.07		
PEAK FLOW (cms)=	1.03	1.55	2.584 (iii)	
TIME TO PEAK (hrs)=	10.00	10.00	10.00	
RUNOFF VOLUME (mm)=	211.00	194.03	200.65	
TOTAL RAINFALL (mm)=	212.00	212.00	212.00	
RUNOFF COEFFICIENT =	1.00	0.92	0.95	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 93.0 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 (0131)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0012):	10.18	1.276	10.25	179.03

```
      + ID2= 2 (  0133):    48.03   4.957    11.08   169.58
        ========================================================
        ID = 3 (  0131):    58.21   6.063    11.08   171.23

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

--------------------
| ADD HYD  (  0131)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0131):    58.21   6.063    11.08   171.23
      + ID2= 2 (  0136):     0.37   0.055    10.00   206.28
        ========================================================
        ID = 1 (  0131):    58.58   6.101    11.00   171.45

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

--------------------
| ADD HYD  (  0131)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0131):    58.58   6.101    11.00   171.45
      + ID2= 2 (  0203):    17.96   2.584    10.00   200.65
        ================================================
        ID = 3 (  0131):    76.54   8.005    11.00   178.30

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0137)|   Area    (ha)=   0.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.29         0.03
     Dep. Storage     (mm)=       1.00         2.33
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      46.33        40.00
     Mannings n           =      0.013        0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
  TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
   hrs   mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
 0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
 0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
 0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
 0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
 0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
 0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
 0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
 0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
 0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
 0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
 0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
 1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
 1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
 1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
 1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
 1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
 1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
 1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
 1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
 1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
 1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
 1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
 1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
 2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
 2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
 2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
 2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
 2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
 2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
 2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
 2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
 2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
 2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
 2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
 2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
 3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Max.Eff.Inten.(mm/hr)=      53.00        52.88
                  over (min)       5.00        10.00
     Storage Coeff.  (min)=       2.08 (ii)    5.85 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.31         0.15
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.04         0.00          0.047 (iii)
     TIME TO PEAK    (hrs)=       9.58        10.00         10.00
     RUNOFF VOLUME    (mm)=     211.00       202.10        210.10
     TOTAL RAINFALL   (mm)=     212.00       212.00        212.00
     RUNOFF COEFFICIENT   =       1.00         0.95          0.99

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  97.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0147)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0131):    76.54   8.005    11.00   178.30
      + ID2= 2 (  0137):     0.32   0.047    10.00   210.10
        ================================================
        ID = 3 (  0147):    76.86   8.039    11.00   178.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0132)|
| 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
                   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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV       VOLUME     FLOW RATE     VELOCITY    TRAV.TIME
        (m)      (m)      (cu.m.)       (cms)         (m/s)       (min)
       0.10    99.60     .433E+02        0.0          0.19        53.63
       0.19    99.69     .137E+03        0.1          0.37        27.94
       0.29    99.79     .240E+03        0.2          0.49        20.91
       0.38    99.88     .350E+03        0.3          0.59        17.46
       0.48    99.98     .468E+03        0.5          0.67        15.35
       0.57   100.07     .594E+03        0.7          0.74        13.89
       0.67   100.17     .729E+03        0.9          0.80        12.81
       0.76   100.26     .871E+03        1.2          0.86        11.96
       0.86   100.36     .102E+04        1.5          0.91        11.27
       0.95   100.45     .118E+04        1.8          0.96        10.70
       1.05   100.55     .135E+04        2.2          1.00        10.21
       1.16   100.66     .156E+04        2.7          1.07         9.57
       1.28   100.78     .181E+04        3.4          1.14         8.97
       1.39   100.89     .209E+04        4.1          1.20         8.52
       1.50   101.00     .239E+04        4.9          1.25         8.16
       1.61   101.11     .272E+04        5.8          1.30         7.87
       1.72   101.22     .307E+04        6.7          1.34         7.63
       1.84   101.34     .344E+04        7.7          1.38         7.42
       1.95   101.45     .384E+04        8.8          1.41         7.24

                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0147)   76.86     8.04   11.00 178.44      1.87      1.39
   OUTFLOW: ID= 1 (  0132)   76.86     8.00   11.00 178.43      1.86      1.38


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0013)|   Area     (ha)=  13.98   Curve Number    (CN)= 89.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   9.60   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.69

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
           hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
         0.083     6.00 | 3.083    13.00 | 6.083    23.00 |  9.08    53.00
         0.167     6.00 | 3.167    13.00 | 6.167    23.00 |  9.17    53.00
         0.250     6.00 | 3.250    13.00 | 6.250    23.00 |  9.25    53.00
         0.333     6.00 | 3.333    13.00 | 6.333    23.00 |  9.33    53.00
         0.417     6.00 | 3.417    13.00 | 6.417    23.00 |  9.42    53.00
         0.500     6.00 | 3.500    13.00 | 6.500    23.00 |  9.50    53.00
         0.583     6.00 | 3.583    13.00 | 6.583    23.00 |  9.58    53.00
         0.667     6.00 | 3.667    13.00 | 6.667    23.00 |  9.67    53.00
         0.750     6.00 | 3.750    13.00 | 6.750    23.00 |  9.75    53.00
         0.833     6.00 | 3.833    13.00 | 6.833    23.00 |  9.83    53.00
         0.917     6.00 | 3.917    13.00 | 6.917    23.00 |  9.92    53.00
         1.000     6.00 | 4.000    13.00 | 7.000    23.00 | 10.00    53.00
         1.083     4.00 | 4.083    17.00 | 7.083    13.00 | 10.08    38.00
         1.167     4.00 | 4.167    17.00 | 7.167    13.00 | 10.17    38.00
         1.250     4.00 | 4.250    17.00 | 7.250    13.00 | 10.25    38.00
         1.333     4.00 | 4.333    17.00 | 7.333    13.00 | 10.33    38.00
         1.417     4.00 | 4.417    17.00 | 7.417    13.00 | 10.42    38.00
         1.500     4.00 | 4.500    17.00 | 7.500    13.00 | 10.50    38.00
         1.583     4.00 | 4.583    17.00 | 7.583    13.00 | 10.58    38.00
         1.667     4.00 | 4.667    17.00 | 7.667    13.00 | 10.67    38.00
         1.750     4.00 | 4.750    17.00 | 7.750    13.00 | 10.75    38.00
         1.833     4.00 | 4.833    17.00 | 7.833    13.00 | 10.83    38.00
         1.917     4.00 | 4.917    17.00 | 7.917    13.00 | 10.92    38.00
         2.000     4.00 | 5.000    17.00 | 8.000    13.00 | 11.00    38.00
         2.083     6.00 | 5.083    13.00 | 8.083    13.00 | 11.08    13.00
         2.167     6.00 | 5.167    13.00 | 8.167    13.00 | 11.17    13.00
         2.250     6.00 | 5.250    13.00 | 8.250    13.00 | 11.25    13.00
         2.333     6.00 | 5.333    13.00 | 8.333    13.00 | 11.33    13.00
         2.417     6.00 | 5.417    13.00 | 8.417    13.00 | 11.42    13.00
         2.500     6.00 | 5.500    13.00 | 8.500    13.00 | 11.50    13.00
         2.583     6.00 | 5.583    13.00 | 8.583    13.00 | 11.58    13.00
         2.667     6.00 | 5.667    13.00 | 8.667    13.00 | 11.67    13.00
         2.750     6.00 | 5.750    13.00 | 8.750    13.00 | 11.75    13.00
         2.833     6.00 | 5.833    13.00 | 8.833    13.00 | 11.83    13.00
         2.917     6.00 | 5.917    13.00 | 8.917    13.00 | 11.92    13.00
         3.000     6.00 | 6.000    13.00 | 9.000    13.00 | 12.00    13.00

     Unit Hyd Qpeak  (cms)=   0.774

     PEAK FLOW       (cms)=   1.603 (i)
     TIME TO PEAK    (hrs)=  10.583
     RUNOFF VOLUME    (mm)= 175.224
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.827

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

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--------------------
| ADD HYD  (  0134)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0013):    13.98   1.603    10.58   175.22
     + ID2= 2 (  0132):    76.86   7.999    11.00   178.43
       ==========================================================
       ID = 3 (  0134):    90.85   9.565    11.00   177.94

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0140)|
| 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
                   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

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV       VOLUME     FLOW RATE     VELOCITY    TRAV.TIME
         (m)      (m)      (cu.m.)       (cms)         (m/s)       (min)
        0.10    99.60     .359E+02        0.0          0.19        44.49
        0.19    99.69     .114E+03        0.1          0.37        23.18
        0.29    99.79     .199E+03        0.2          0.49        17.34
```

0.38	99.88	.290E+03	0.3	0.59	14.49
0.48	99.98	.388E+03	0.5	0.67	12.73
0.57	100.07	.493E+03	0.7	0.74	11.52
0.67	100.17	.604E+03	0.9	0.80	10.62
0.76	100.26	.722E+03	1.2	0.86	9.92
0.86	100.36	.847E+03	1.5	0.91	9.35
0.95	100.45	.978E+03	1.8	0.96	8.87
1.05	100.55	.112E+04	2.2	1.00	8.47
1.16	100.66	.130E+04	2.7	1.07	7.94
1.28	100.78	.150E+04	3.4	1.14	7.44
1.39	100.89	.173E+04	4.1	1.20	7.07
1.50	101.00	.198E+04	4.9	1.25	6.77
1.61	101.11	.225E+04	5.8	1.30	6.53
1.72	101.22	.254E+04	6.7	1.34	6.33
1.84	101.34	.285E+04	7.7	1.38	6.15
1.95	101.45	.318E+04	8.8	1.41	6.00

**** WARNING: TRAVEL TIME TABLE EXCEEDED

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0134)	90.85	9.57	11.00	177.94	1.94	1.41
OUTFLOW: ID= 1 (0140)	90.85	9.52	11.00	177.94	1.95	1.41

CALIB					
NASHYD (0014)	Area (ha)=	15.33	Curve Number (CN)=	89.0
ID= 1 DT= 5.0 min	Ia (mm)=	9.35	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.59		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.992

PEAK FLOW (cms)= 1.834 (i)
TIME TO PEAK (hrs)= 10.417
RUNOFF VOLUME (mm)= 175.460
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.828

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

ADD HYD (0141)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0014):	15.33	1.834	10.42	175.46
+ ID2= 2 (0140):	90.85	9.524	11.00	177.94
ID = 3 (0141):	106.17	11.237	11.00	177.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0143)				
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.340E+02	0.0	0.19	42.17
0.19	99.69	.108E+03	0.1	0.37	21.97
0.29	99.79	.188E+03	0.2	0.49	16.44
0.38	99.88	.275E+03	0.3	0.59	13.73
0.48	99.98	.368E+03	0.5	0.67	12.07
0.57	100.07	.467E+03	0.7	0.74	10.92
0.67	100.17	.573E+03	0.9	0.80	10.07
0.76	100.26	.685E+03	1.2	0.86	9.40
0.86	100.36	.803E+03	1.5	0.91	8.86
0.95	100.45	.927E+03	1.8	0.96	8.41
1.05	100.55	.106E+04	2.2	1.00	8.03
1.16	100.66	.123E+04	2.7	1.07	7.53

```
      1.28   100.78    .143E+04       3.4          1.14       7.06
      1.39   100.89    .164E+04       4.1          1.20       6.70
      1.50   101.00    .188E+04       4.9          1.25       6.42
      1.61   101.11    .214E+04       5.8          1.30       6.19
      1.72   101.22    .241E+04       6.7          1.34       6.00
      1.84   101.34    .270E+04       7.7          1.38       5.83
      1.95   101.45    .302E+04       8.8          1.41       5.69

    **** WARNING:  TRAVEL TIME TABLE EXCEEDED
                                <---- hydrograph ---->   <-pipe / channel->
                           AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                           (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
  INFLOW : ID= 2 (  0141)  106.17   11.24  11.00 177.58      1.91      1.40
  OUTFLOW: ID= 1 (  0143)  106.17   11.22  11.08 177.58      1.95      1.41


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0017)|   Area     (ha)=  10.44   Curve Number    (CN)= 88.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   9.73   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.50

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


                    ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.083    6.00 | 3.083   13.00 | 6.083   23.00 |  9.08   53.00
 0.167    6.00 | 3.167   13.00 | 6.167   23.00 |  9.17   53.00
 0.250    6.00 | 3.250   13.00 | 6.250   23.00 |  9.25   53.00
 0.333    6.00 | 3.333   13.00 | 6.333   23.00 |  9.33   53.00
 0.417    6.00 | 3.417   13.00 | 6.417   23.00 |  9.42   53.00
 0.500    6.00 | 3.500   13.00 | 6.500   23.00 |  9.50   53.00
 0.583    6.00 | 3.583   13.00 | 6.583   23.00 |  9.58   53.00
 0.667    6.00 | 3.667   13.00 | 6.667   23.00 |  9.67   53.00
 0.750    6.00 | 3.750   13.00 | 6.750   23.00 |  9.75   53.00
 0.833    6.00 | 3.833   13.00 | 6.833   23.00 |  9.83   53.00
 0.917    6.00 | 3.917   13.00 | 6.917   23.00 |  9.92   53.00
 1.000    6.00 | 4.000   13.00 | 7.000   23.00 | 10.00   53.00
 1.083    4.00 | 4.083   17.00 | 7.083   13.00 | 10.08   38.00
 1.167    4.00 | 4.167   17.00 | 7.167   13.00 | 10.17   38.00
 1.250    4.00 | 4.250   17.00 | 7.250   13.00 | 10.25   38.00
 1.333    4.00 | 4.333   17.00 | 7.333   13.00 | 10.33   38.00
 1.417    4.00 | 4.417   17.00 | 7.417   13.00 | 10.42   38.00
 1.500    4.00 | 4.500   17.00 | 7.500   13.00 | 10.50   38.00
 1.583    4.00 | 4.583   17.00 | 7.583   13.00 | 10.58   38.00
 1.667    4.00 | 4.667   17.00 | 7.667   13.00 | 10.67   38.00
 1.750    4.00 | 4.750   17.00 | 7.750   13.00 | 10.75   38.00
 1.833    4.00 | 4.833   17.00 | 7.833   13.00 | 10.83   38.00
 1.917    4.00 | 4.917   17.00 | 7.917   13.00 | 10.92   38.00
 2.000    4.00 | 5.000   17.00 | 8.000   13.00 | 11.00   38.00
 2.083    6.00 | 5.083   13.00 | 8.083   13.00 | 11.08   13.00
 2.167    6.00 | 5.167   13.00 | 8.167   13.00 | 11.17   13.00
 2.250    6.00 | 5.250   13.00 | 8.250   13.00 | 11.25   13.00
 2.333    6.00 | 5.333   13.00 | 8.333   13.00 | 11.33   13.00
 2.417    6.00 | 5.417   13.00 | 8.417   13.00 | 11.42   13.00
 2.500    6.00 | 5.500   13.00 | 8.500   13.00 | 11.50   13.00
 2.583    6.00 | 5.583   13.00 | 8.583   13.00 | 11.58   13.00
 2.667    6.00 | 5.667   13.00 | 8.667   13.00 | 11.67   13.00
 2.750    6.00 | 5.750   13.00 | 8.750   13.00 | 11.75   13.00
 2.833    6.00 | 5.833   13.00 | 8.833   13.00 | 11.83   13.00
 2.917    6.00 | 5.917   13.00 | 8.917   13.00 | 11.92   13.00
 3.000    6.00 | 6.000   13.00 | 9.000   13.00 | 12.00   13.00

     Unit Hyd Qpeak  (cms)=   0.798

     PEAK FLOW       (cms)=   1.298 (i)
     TIME TO PEAK    (hrs)=  10.250
     RUNOFF VOLUME    (mm)= 172.689
     TOTAL RAINFALL   (mm)= 212.000
     RUNOFF COEFFICIENT   =   0.815

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

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--------------------
| ADD HYD  (  0209)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0017):    10.44    1.298    10.25   172.69
     + ID2= 2 (  0143):   106.17   11.216    11.08   177.58
       ================================================
       ID = 3 (  0209):   116.62   12.356    11.00   177.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0210)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0144):    95.41   11.662    10.17   188.94
     + ID2= 2 (  0209):   116.62   12.356    11.00   177.14
       ================================================
       ID = 3 (  0210):   212.03   23.197    10.42   182.45

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0179)|
| 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
                   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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)       (cms)         (m/s)      (min)
       0.10    99.60    .223E+02         0.0          0.19       27.60
       0.19    99.69    .707E+02         0.1          0.37       14.38
       0.29    99.79    .123E+03         0.2          0.49       10.76
       0.38    99.88    .180E+03         0.3          0.59        8.99
       0.48    99.98    .241E+03         0.5          0.67        7.90
       0.57   100.07    .306E+03         0.7          0.74        7.15
       0.67   100.17    .375E+03         0.9          0.80        6.59
       0.76   100.26    .448E+03         1.2          0.86        6.16
       0.86   100.36    .526E+03         1.5          0.91        5.80
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0.95	100.45	.607E+03	1.8	0.96	5.51
1.05	100.55	.692E+03	2.2	1.00	5.25
1.16	100.66	.804E+03	2.7	1.07	4.93
1.28	100.78	.934E+03	3.4	1.14	4.62
1.39	100.89	.108E+04	4.1	1.20	4.39
1.50	101.00	.123E+04	4.9	1.25	4.20
1.61	101.11	.140E+04	5.8	1.30	4.05
1.72	101.22	.158E+04	6.7	1.34	3.93
1.84	101.34	.177E+04	7.7	1.38	3.82
1.95	101.45	.197E+04	8.8	1.41	3.72

**** WARNING: TRAVEL TIME TABLE EXCEEDED

		<---- hydrograph ---->			<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0210)	212.03	23.20	10.42	182.45	1.95	1.41
OUTFLOW: ID= 1 (0179)	212.03	23.18	10.50	182.45	1.95	1.41

CALIB					
NASHYD (0018)	Area	(ha)= 6.98	Curve Number	(CN)= 88.0	
ID= 1 DT= 5.0 min	Ia	(mm)= 10.16	# of Linear Res.	(N)= 3.00	
	U.H. Tp	(hrs)= 0.42			

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
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.635

PEAK FLOW (cms)= 0.905 (i)
TIME TO PEAK (hrs)= 10.167
RUNOFF VOLUME (mm)= 172.263
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.813

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

ADD HYD (0178)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0018):	6.98	0.905	10.17	172.26
+ ID2= 2 (0179):	212.03	23.184	10.50	182.45
ID = 3 (0178):	219.01	24.021	10.50	182.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0208)	Area	(ha)= 5.65	Curve Number	(CN)= 85.0	
ID= 1 DT= 5.0 min	Ia	(mm)= 6.82	# of Linear Res.	(N)= 3.00	
	U.H. Tp	(hrs)= 0.51			

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
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00

2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Unit Hyd Qpeak (cms)= 0.423

PEAK FLOW (cms)= 0.684 (i)
TIME TO PEAK (hrs)= 10.250
RUNOFF VOLUME (mm)= 168.385
TOTAL RAINFALL (mm)= 212.000
RUNOFF COEFFICIENT = 0.794

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

CALIB	
STANDHYD (0198)	Area (ha)= 11.51
ID= 1 DT= 5.0 min	Total Imp(%)= 62.00 Dir. Conn.(%)= 43.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	7.14	4.37
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	277.01	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	6.00	3.083	13.00	6.083	23.00	9.08	53.00
0.167	6.00	3.167	13.00	6.167	23.00	9.17	53.00
0.250	6.00	3.250	13.00	6.250	23.00	9.25	53.00
0.333	6.00	3.333	13.00	6.333	23.00	9.33	53.00
0.417	6.00	3.417	13.00	6.417	23.00	9.42	53.00
0.500	6.00	3.500	13.00	6.500	23.00	9.50	53.00
0.583	6.00	3.583	13.00	6.583	23.00	9.58	53.00
0.667	6.00	3.667	13.00	6.667	23.00	9.67	53.00
0.750	6.00	3.750	13.00	6.750	23.00	9.75	53.00
0.833	6.00	3.833	13.00	6.833	23.00	9.83	53.00
0.917	6.00	3.917	13.00	6.917	23.00	9.92	53.00
1.000	6.00	4.000	13.00	7.000	23.00	10.00	53.00
1.083	4.00	4.083	17.00	7.083	13.00	10.08	38.00
1.167	4.00	4.167	17.00	7.167	13.00	10.17	38.00
1.250	4.00	4.250	17.00	7.250	13.00	10.25	38.00
1.333	4.00	4.333	17.00	7.333	13.00	10.33	38.00
1.417	4.00	4.417	17.00	7.417	13.00	10.42	38.00
1.500	4.00	4.500	17.00	7.500	13.00	10.50	38.00
1.583	4.00	4.583	17.00	7.583	13.00	10.58	38.00
1.667	4.00	4.667	17.00	7.667	13.00	10.67	38.00
1.750	4.00	4.750	17.00	7.750	13.00	10.75	38.00
1.833	4.00	4.833	17.00	7.833	13.00	10.83	38.00
1.917	4.00	4.917	17.00	7.917	13.00	10.92	38.00
2.000	4.00	5.000	17.00	8.000	13.00	11.00	38.00
2.083	6.00	5.083	13.00	8.083	13.00	11.08	13.00
2.167	6.00	5.167	13.00	8.167	13.00	11.17	13.00
2.250	6.00	5.250	13.00	8.250	13.00	11.25	13.00
2.333	6.00	5.333	13.00	8.333	13.00	11.33	13.00
2.417	6.00	5.417	13.00	8.417	13.00	11.42	13.00
2.500	6.00	5.500	13.00	8.500	13.00	11.50	13.00
2.583	6.00	5.583	13.00	8.583	13.00	11.58	13.00
2.667	6.00	5.667	13.00	8.667	13.00	11.67	13.00
2.750	6.00	5.750	13.00	8.750	13.00	11.75	13.00
2.833	6.00	5.833	13.00	8.833	13.00	11.83	13.00
2.917	6.00	5.917	13.00	8.917	13.00	11.92	13.00
3.000	6.00	6.000	13.00	9.000	13.00	12.00	13.00

Max.Eff.Inten.(mm/hr)=	53.00	79.03		
over (min)	5.00	15.00		
Storage Coeff. (min)=	6.07 (ii)	13.82 (ii)		
Unit Hyd. Tpeak (min)=	5.00	15.00		
Unit Hyd. peak (cms)=	0.19	0.08		
			TOTALS	
PEAK FLOW (cms)=	0.73	0.94	1.673 (iii)	
TIME TO PEAK (hrs)=	10.00	10.00	10.00	
RUNOFF VOLUME (mm)=	211.00	196.65	202.82	
TOTAL RAINFALL (mm)=	212.00	212.00	212.00	
RUNOFF COEFFICIENT =	1.00	0.93	0.96	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 93.0 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 (0204)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0198):		11.51	1.673	10.00	202.82
+ ID2= 2 (0208):		5.65	0.684	10.25	168.38
ID = 3 (0204):		17.16	2.313	10.00	191.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

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       V    V   I    SSSSS  U   U    A    L             (v 6.1.2003)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output  filename: C:\Users\rarcher\AppData\Local\Civica\VH5\e5d0a268-d0b9-4109-
8320-f15a73aa9d73\94866950-ac66-45a6-bc45-9d775e6b8c8c\scen
  Summary filename: C:\Users\rarcher\AppData\Local\Civica\VH5\e5d0a268-d0b9-4109-
8320-f15a73aa9d73\94866950-ac66-45a6-bc45-9d775e6b8c8c\scen


DATE: 12-17-2021                          TIME: 01:16:03

USER:


COMMENTS: _____________________________________________________________


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  ************************************************
  ** SIMULATION : 100 Year 6 Hour AES (Bloor, T **
  ************************************************


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|    READ STORM    |    Filename: C:\Users\rarcher\AppD
|                  |              ata\Local\Temp\
|                  |              b62780ea-b7fc-429e-9502-9901ba76ea5d\1316cbbb
| Ptotal= 80.31 mm |    Comments: 100 Year 6 Hour AES (Bloor, TRCA)
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.25    0.00 |  2.00   27.30 |  3.75   11.24 |  5.50    1.61
                0.50    1.61 |  2.25   27.30 |  4.00    6.42 |  5.75    1.61
                0.75    1.61 |  2.50   73.88 |  4.25    6.42 |  6.00    1.61
                1.00    1.61 |  2.75   73.88 |  4.50    3.21 |  6.25    1.61
                1.25    1.61 |  3.00   20.88 |  4.75    3.21 |
                1.50    9.64 |  3.25   20.88 |  5.00    1.61 |
                1.75    9.64 |  3.50   11.24 |  5.25    1.61 |

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--------------------
| CALIB            |
| NASHYD   (  0022)|   Area     (ha)=  52.82   Curve Number    (CN)= 83.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.40   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.79

        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)=   2.554

    PEAK FLOW       (cms)=   2.882 (i)
    TIME TO PEAK    (hrs)=   3.500
    RUNOFF VOLUME    (mm)=  42.550
    TOTAL RAINFALL   (mm)=  80.310
    RUNOFF COEFFICIENT   =   0.530

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

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--------------------
| CALIB            |
| STANDHYD (  0203)|   Area     (ha)=  10.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  35.00
--------------------

                                  IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=          5.00          5.00
    Dep. Storage     (mm)=          1.00          5.00
    Average Slope     (%)=          1.00          2.00
    Length            (m)=        258.20         40.00
    Mannings n           =         0.013         0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
            TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
```

hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	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	78.75	
over (min)	5.00	15.00	
Storage Coeff. (min)=	5.09 (ii)	12.86 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	0.21	0.08	
			TOTALS
PEAK FLOW (cms)=	0.72	0.88	1.584 (iii)
TIME TO PEAK (hrs)=	2.75	2.83	2.75
RUNOFF VOLUME (mm)=	79.31	52.70	62.01
TOTAL RAINFALL (mm)=	80.31	80.31	80.31
RUNOFF COEFFICIENT =	0.99	0.66	0.77

(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(0209)| OVERFLOW IS OFF
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0090	0.2436
0.0030	0.1314	0.0110	0.2924
0.0050	0.1763	0.0130	0.3009
0.0070	0.2056	0.0000	0.0000

**** WARNING : STORAGE-DISCHARGE TABLE WAS EXCEEDED.

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0203)	10.000	1.584	2.75	62.01
OUTFLOW: ID= 1 (0209)	10.000	0.071	4.92	54.39

PEAK FLOW REDUCTION [Qout/Qin](%)= 4.51
TIME SHIFT OF PEAK FLOW (min)=130.00
MAXIMUM STORAGE USED (ha.m.)= 0.5494

ROUTE CHN(0080)|
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.272E+02	0.0	0.19	33.70
0.19	99.69	.864E+02	0.1	0.37	17.55
0.29	99.79	.151E+03	0.2	0.49	13.14
0.38	99.88	.220E+03	0.3	0.59	10.97
0.48	99.98	.294E+03	0.5	0.67	9.64
0.57	100.07	.374E+03	0.7	0.74	8.73
0.67	100.17	.458E+03	0.9	0.80	8.05
0.76	100.26	.547E+03	1.2	0.86	7.51
0.86	100.36	.642E+03	1.5	0.91	7.08
0.95	100.45	.741E+03	1.8	0.96	6.72
1.05	100.55	.845E+03	2.2	1.00	6.41
1.16	100.66	.982E+03	2.7	1.07	6.02
1.28	100.78	.114E+04	3.4	1.14	5.64
1.39	100.89	.131E+04	4.1	1.20	5.35
1.50	101.00	.150E+04	4.9	1.25	5.13
1.61	101.11	.171E+04	5.8	1.30	4.95
1.72	101.22	.193E+04	6.7	1.34	4.79
1.84	101.34	.216E+04	7.7	1.38	4.66
1.95	101.45	.241E+04	8.8	1.41	4.55

<---- hydrograph ----> <-pipe / channel->

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0209)	10.00	0.07	4.92	54.39	0.18	0.32
OUTFLOW: ID= 1 (0080)	10.00	0.07	5.00	54.35	0.18	0.32

ADD HYD (0088)|
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0022):	52.82	2.882	3.50	42.55
+ ID2= 2 (0080):	10.00	0.071	5.00	54.35
ID = 3 (0088):	62.82	2.920	3.50	44.43

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB |

```
| NASHYD   (  0002)|   Area     (ha)=  13.35   Curve Number    (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.07   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.56

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	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)=   0.910

     PEAK FLOW       (cms)=   0.938 (i)
     TIME TO PEAK    (hrs)=   3.250
     RUNOFF VOLUME    (mm)=  44.104
     TOTAL RAINFALL   (mm)=  80.310
     RUNOFF COEFFICIENT   =   0.549

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

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--------------------
| CALIB              |
| STANDHYD (  0070)|   Area     (ha)=   0.35
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.32         0.04
     Dep. Storage     (mm)=       1.00         4.96
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      48.36        40.00
     Mannings n            =      0.013        0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	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        64.57
               over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.86 (ii)    5.17 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.16
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.06         0.01         0.071 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75          2.75
     RUNOFF VOLUME    (mm)=      79.31        56.51         77.02
     TOTAL RAINFALL   (mm)=      80.31        80.31         80.31
     RUNOFF COEFFICIENT   =       0.99         0.70          0.96

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  91.0    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  (  0098)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
        ID1= 1 (  0002):    13.35   0.938     3.25     44.10
      + ID2= 2 (  0070):     0.35   0.071     2.75     77.02
        ================================================
        ID = 3 (  0098):    13.70   0.958     3.25     44.95

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0099)|
| 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
                   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

     <---------------------- TRAVEL TIME TABLE ----------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
       (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
      0.10     99.60    .231E+02       0.0          0.19      28.62
      0.19     99.69    .734E+02       0.1          0.37      14.91
      0.29     99.79    .128E+03       0.2          0.49      11.16
      0.38     99.88    .187E+03       0.3          0.59       9.32
      0.48     99.98    .250E+03       0.5          0.67       8.19
      0.57    100.07    .317E+03       0.7          0.74       7.41
      0.67    100.17    .389E+03       0.9          0.80       6.84
      0.76    100.26    .465E+03       1.2          0.86       6.38
      0.86    100.36    .545E+03       1.5          0.91       6.02
      0.95    100.45    .629E+03       1.8          0.96       5.71
      1.05    100.55    .718E+03       2.2          1.00       5.45
      1.16    100.66    .834E+03       2.7          1.07       5.11
      1.28    100.78    .968E+03       3.4          1.14       4.79
      1.39    100.89    .112E+04       4.1          1.20       4.55
      1.50    101.00    .128E+04       4.9          1.25       4.36
      1.61    101.11    .145E+04       5.8          1.30       4.20
      1.72    101.22    .164E+04       6.7          1.34       4.07
      1.84    101.34    .184E+04       7.7          1.38       3.96
      1.95    101.45    .205E+04       8.8          1.41       3.86

                                  <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)     (m)       (m/s)
   INFLOW : ID= 2 (  0098)    13.70     0.96    3.25  44.95      0.67       0.80
   OUTFLOW: ID= 1 (  0099)    13.70     0.94    3.25  44.94      0.66       0.80


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--------------------
| CALIB            |
| STANDHYD (  0193)|   Area    (ha)=  10.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  35.00
--------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.00          5.00
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     258.20         40.00
     Mannings n             =     0.013         0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
              TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    0.00 | 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        78.75
               over (min)        5.00        15.00
     Storage Coeff.  (min)=      5.09 (ii)   12.86 (ii)
     Unit Hyd. Tpeak (min)=      5.00        15.00
     Unit Hyd. peak  (cms)=      0.21         0.08
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.72         0.88          1.584 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.83           2.75
     RUNOFF VOLUME    (mm)=     79.31        52.70          62.01
     TOTAL RAINFALL   (mm)=     80.31        80.31          80.31
     RUNOFF COEFFICIENT   =      0.99         0.66           0.77


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

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--------------------
| ADD HYD  (  0181)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
       ID1= 1 (  0193):    10.00    1.584     2.75     62.01
     + ID2= 2 (  0099):    13.70    0.939     3.25     44.94
       ==========================================================
       ID = 3 (  0181):    23.70    2.070     2.75     52.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0119)|
| 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
                   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

     <---------------------- TRAVEL TIME TABLE ----------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
```

(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.10	99.60	.287E+02	0.0	0.19	35.58
0.19	99.69	.912E+02	0.1	0.37	18.54
0.29	99.79	.159E+03	0.2	0.49	13.87
0.38	99.88	.232E+03	0.3	0.59	11.59
0.48	99.98	.311E+03	0.5	0.67	10.18
0.57	100.07	.394E+03	0.7	0.74	9.22
0.67	100.17	.483E+03	0.9	0.80	8.50
0.76	100.26	.578E+03	1.2	0.86	7.93
0.86	100.36	.677E+03	1.5	0.91	7.48
0.95	100.45	.782E+03	1.8	0.96	7.10
1.05	100.55	.893E+03	2.2	1.00	6.77
1.16	100.66	.104E+04	2.7	1.07	6.35
1.28	100.78	.120E+04	3.4	1.14	5.95
1.39	100.89	.139E+04	4.1	1.20	5.65
1.50	101.00	.159E+04	4.9	1.25	5.42
1.61	101.11	.180E+04	5.8	1.30	5.22
1.72	101.22	.203E+04	6.7	1.34	5.06
1.84	101.34	.228E+04	7.7	1.38	4.92
1.95	101.45	.255E+04	8.8	1.41	4.80

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0181)	23.70	2.07	2.75	52.15	1.02	0.99
OUTFLOW:	ID= 1 (0119)	23.70	1.89	2.83	52.14	0.97	0.96

CALIB					
NASHYD (0011)	Area (ha)= 5.33	Curve Number (CN)= 82.0			
ID= 1 DT= 5.0 min	Ia (mm)= 7.63	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.50				

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	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)= 0.407

PEAK FLOW (cms)= 0.371 (i)
TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 41.127
TOTAL RAINFALL (mm)= 80.310
RUNOFF COEFFICIENT = 0.512

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

CALIB			
STANDHYD (0062)	Area (ha)= 0.29		
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00	Dir. Conn.(%)= 90.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.26	0.03
Dep. Storage	(mm)=	1.00	3.51
Average Slope	(%)=	1.00	2.00
Length	(m)=	44.10	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	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	69.03	
over	(min)	5.00	10.00	
Storage Coeff.	(min)=	1.76 (ii)	5.07 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	10.00	
Unit Hyd. peak	(cms)=	0.32	0.16	
				TOTALS
PEAK FLOW	(cms)=	0.05	0.01	0.059 (iii)
TIME TO PEAK	(hrs)=	2.75	2.75	2.75
RUNOFF VOLUME	(mm)=	79.31	63.41	77.71
TOTAL RAINFALL	(mm)=	80.31	80.31	80.31
RUNOFF COEFFICIENT	=	0.99	0.79	0.97

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  94.0    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)|   Area    (ha)=  10.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  35.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.00         5.00
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     258.20        40.00
     Mannings n           =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
              TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    0.00 | 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        78.75
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.09 (ii)   12.86 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.21         0.08
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.72         0.88          1.584 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.83           2.75
     RUNOFF VOLUME    (mm)=      79.31        52.70          62.01
     TOTAL RAINFALL   (mm)=      80.31        80.31          80.31
     RUNOFF COEFFICIENT   =       0.99         0.66           0.77

       (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  (  0120)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0011):     5.33   0.371     3.17    41.13
     + ID2= 2 (  0119):    23.70   1.888     2.83    52.14
       ================================================
       ID = 3 (  0120):    29.03   2.183     2.83    50.12

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

--------------------
| ADD HYD  (  0120)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0120):    29.03   2.183     2.83    50.12
     + ID2= 2 (  0201):    10.00   1.584     2.75    62.01
       ================================================
       ID = 1 (  0120):    39.03   3.646     2.75    53.16

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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--------------------
| ADD HYD  (  0120)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0120):    39.03   3.646     2.75    53.16
     + ID2= 2 (  0062):     0.29   0.059     2.75    77.71
       ================================================
       ID = 3 (  0120):    39.32   3.706     2.75    53.35

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0122)|
| 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
                   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

     <---------------------- TRAVEL TIME TABLE ----------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
       (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
      0.10     99.60    .293E+02       0.0          0.19      36.31
```

0.19	99.69	.931E+02	0.1	0.37	18.92
0.29	99.79	.162E+03	0.2	0.49	14.16
0.38	99.88	.237E+03	0.3	0.59	11.82
0.48	99.98	.317E+03	0.5	0.67	10.39
0.57	100.07	.403E+03	0.7	0.74	9.41
0.67	100.17	.493E+03	0.9	0.80	8.67
0.76	100.26	.590E+03	1.2	0.86	8.10
0.86	100.36	.691E+03	1.5	0.91	7.63
0.95	100.45	.799E+03	1.8	0.96	7.24
1.05	100.55	.911E+03	2.2	1.00	6.91
1.16	100.66	.106E+04	2.7	1.07	6.48
1.28	100.78	.123E+04	3.4	1.14	6.08
1.39	100.89	.142E+04	4.1	1.20	5.77
1.50	101.00	.162E+04	4.9	1.25	5.53
1.61	101.11	.184E+04	5.8	1.30	5.33
1.72	101.22	.208E+04	6.7	1.34	5.17
1.84	101.34	.233E+04	7.7	1.38	5.02
1.95	101.45	.260E+04	8.8	1.41	4.90

		<---- hydrograph ---->			<-pipe / channel->	
		AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
		(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW :	ID= 2 (0120)	39.32	3.71	2.75	53.35	1.33	1.17
OUTFLOW:	ID= 1 (0122)	39.32	3.47	2.83	53.34	1.29	1.15

CALIB					
NASHYD	(0010)	Area	(ha)= 9.22	Curve Number	(CN)= 81.0
ID= 1 DT= 5.0 min		Ia	(mm)= 9.45	# of Linear Res.	(N)= 3.00
		U.H. Tp	(hrs)= 0.35		

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)= 1.006

PEAK FLOW (cms)= 0.740 (i)
TIME TO PEAK (hrs)= 2.917
RUNOFF VOLUME (mm)= 38.485
TOTAL RAINFALL (mm)= 80.310
RUNOFF COEFFICIENT = 0.479

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

ADD HYD (0121)					
1 + 2 = 3		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0010):		9.22	0.740	2.92	38.48
+ ID2= 2 (0122):		39.32	3.473	2.83	53.34
ID = 3 (0121):		48.54	4.174	2.83	50.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD	(0007)	Area	(ha)= 15.76	Curve Number	(CN)= 85.0
ID= 1 DT= 5.0 min		Ia	(mm)= 7.08	# of Linear Res.	(N)= 3.00
		U.H. Tp	(hrs)= 1.03		

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)= 0.584

PEAK FLOW (cms)= 0.771 (i)
TIME TO PEAK (hrs)= 3.833
RUNOFF VOLUME (mm)= 45.428
TOTAL RAINFALL (mm)= 80.310
RUNOFF COEFFICIENT = 0.566

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

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--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0164)|
| 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
                   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

     <---------------------- TRAVEL TIME TABLE ----------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)       (cms)        (m/s)       (min)
       0.10    99.60    .523E+02         0.0         0.19       64.86
       0.19    99.69    .166E+03         0.1         0.37       33.79
       0.29    99.79    .290E+03         0.2         0.49       25.29
       0.38    99.88    .423E+03         0.3         0.59       21.12
       0.48    99.98    .566E+03         0.5         0.67       18.56
       0.57   100.07    .719E+03         0.7         0.74       16.80
       0.67   100.17    .881E+03         0.9         0.80       15.49
       0.76   100.26    .105E+04         1.2         0.86       14.46
       0.86   100.36    .123E+04         1.5         0.91       13.63
       0.95   100.45    .143E+04         1.8         0.96       12.94
       1.05   100.55    .163E+04         2.2         1.00       12.34
       1.16   100.66    .189E+04         2.7         1.07       11.58
       1.28   100.78    .219E+04         3.4         1.14       10.85
       1.39   100.89    .253E+04         4.1         1.20       10.31
       1.50   101.00    .289E+04         4.9         1.25        9.87
       1.61   101.11    .328E+04         5.8         1.30        9.52
       1.72   101.22    .371E+04         6.7         1.34        9.23
       1.84   101.34    .416E+04         7.7         1.38        8.97
       1.95   101.45    .464E+04         8.8         1.41        8.75

                                  <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0007)   15.76     0.77    3.83  45.43      0.60      0.75
   OUTFLOW: ID= 1 (  0164)   15.76     0.74    4.08  45.41      0.58      0.74
```

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--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0064)|   Area    (ha)=   1.35
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.22         0.14
     Dep. Storage     (mm)=       1.00         4.16
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      94.89        40.00
     Mannings n           =      0.013        0.250
```

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	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        67.59
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.79 (ii)    6.10 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.28         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.25         0.02        0.274 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75         2.75
     RUNOFF VOLUME    (mm)=      79.31        60.86        77.46
     TOTAL RAINFALL   (mm)=      80.31        80.31        80.31
     RUNOFF COEFFICIENT   =       0.99         0.76         0.96

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  93.0    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 (  0198)|   Area    (ha)=  10.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  35.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.00         5.00
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     258.20        40.00
     Mannings n           =      0.013        0.250

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

```
                    ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.083    0.00 | 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        78.75
           over (min)        5.00        15.00
Storage Coeff.  (min)=       5.09 (ii)   12.86 (ii)
Unit Hyd. Tpeak (min)=       5.00        15.00
Unit Hyd. peak  (cms)=       0.21         0.08
                                                  *TOTALS*
PEAK FLOW       (cms)=       0.72         0.88      1.584 (iii)
TIME TO PEAK    (hrs)=       2.75         2.83       2.75
RUNOFF VOLUME    (mm)=      79.31        52.70      62.01
TOTAL RAINFALL   (mm)=      80.31        80.31      80.31
RUNOFF COEFFICIENT   =       0.99         0.66       0.77


  (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  (  0161)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0164):    15.76   0.742     4.08    45.41
     + ID2= 2 (  0198):    10.00   1.584     2.75    62.01
       ====================================================
       ID = 3 (  0161):    25.76   1.646     2.75    51.85

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

```
--------------------
| ADD HYD  (  0161)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0161):    25.76   1.646     2.75    51.85
     + ID2= 2 (  0064):     1.35   0.274     2.75    77.46
       ====================================================
       ID = 1 (  0161):    27.11   1.920     2.75    53.13

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

```
--------------------
| CALIB            |
| STANDHYD (  0166)|   Area     (ha)=   0.56
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------

                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.50         0.06
     Dep. Storage     (mm)=       1.00         4.08
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      61.16        40.00
     Mannings n           =      0.013        0.250

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


                    ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.083    0.00 | 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        53.32
           over (min)        5.00        10.00
Storage Coeff.  (min)=       2.15 (ii)    5.45 (ii)
Unit Hyd. Tpeak (min)=       5.00        10.00
Unit Hyd. peak  (cms)=       0.31         0.16
                                                  *TOTALS*
PEAK FLOW       (cms)=       0.10         0.01      0.112 (iii)
TIME TO PEAK    (hrs)=       2.75         2.75       2.75
RUNOFF VOLUME    (mm)=      79.31        45.31      75.90
TOTAL RAINFALL   (mm)=      80.31        80.31      80.31
RUNOFF COEFFICIENT   =       0.99         0.56       0.95

***** 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.

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--------------------
| ADD HYD  (  0168)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)      (mm)
        ID1= 1 (  0161):    27.11    1.920     2.75     53.13
      + ID2= 2 (  0166):     0.56    0.112     2.75     75.90
        ================================================
        ID = 3 (  0168):    27.67    2.031     2.75     53.59

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0163)|
| 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
                   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

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)    (cu.m.)      (cms)        (m/s)      (min)
        0.10    99.60    .132E+02        0.0          0.19      16.38
        0.19    99.69    .420E+02        0.1          0.37       8.53
        0.29    99.79    .732E+02        0.2          0.49       6.39
        0.38    99.88    .107E+03        0.3          0.59       5.33
        0.48    99.98    .143E+03        0.5          0.67       4.69
        0.57   100.07    .182E+03        0.7          0.74       4.24
        0.67   100.17    .223E+03        0.9          0.80       3.91
        0.76   100.26    .266E+03        1.2          0.86       3.65
        0.86   100.36    .312E+03        1.5          0.91       3.44
        0.95   100.45    .360E+03        1.8          0.96       3.27
        1.05   100.55    .411E+03        2.2          1.00       3.12
        1.16   100.66    .477E+03        2.7          1.07       2.92
        1.28   100.78    .554E+03        3.4          1.14       2.74
        1.39   100.89    .638E+03        4.1          1.20       2.60
        1.50   101.00    .730E+03        4.9          1.25       2.49
        1.61   101.11    .829E+03        5.8          1.30       2.40
        1.72   101.22    .936E+03        6.7          1.34       2.33
        1.84   101.34    .105E+04        7.7          1.38       2.27
        1.95   101.45    .117E+04        8.8          1.41       2.21

                                    <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK    TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)    (hrs)   (mm)      (m)       (m/s)
   INFLOW : ID= 2 (  0168)   27.67     2.03     2.75  53.59      1.01       0.98
   OUTFLOW: ID= 1 (  0163)   27.67     1.97     2.75  53.59      0.99       0.97

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0008)|   Area     (ha)=  18.33   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.44   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.77

        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)=   0.909

     PEAK FLOW       (cms)=   1.029 (i)
     TIME TO PEAK    (hrs)=   3.500
     RUNOFF VOLUME    (mm)=  42.955
     TOTAL RAINFALL   (mm)=  80.310
     RUNOFF COEFFICIENT   =   0.535

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

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0093)|
| 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
                   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

      <---------------------- TRAVEL TIME TABLE ----------------------->
```

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.305E+02	0.0	0.19	37.74
0.19	99.69	.967E+02	0.1	0.37	19.66
0.29	99.79	.169E+03	0.2	0.49	14.72
0.38	99.88	.246E+03	0.3	0.59	12.29
0.48	99.98	.330E+03	0.5	0.67	10.80
0.57	100.07	.418E+03	0.7	0.74	9.78
0.67	100.17	.513E+03	0.9	0.80	9.01
0.76	100.26	.613E+03	1.2	0.86	8.42
0.86	100.36	.719E+03	1.5	0.91	7.93
0.95	100.45	.830E+03	1.8	0.96	7.53
1.05	100.55	.947E+03	2.2	1.00	7.18
1.16	100.66	.110E+04	2.7	1.07	6.74
1.28	100.78	.128E+04	3.4	1.14	6.32
1.39	100.89	.147E+04	4.1	1.20	6.00
1.50	101.00	.168E+04	4.9	1.25	5.75
1.61	101.11	.191E+04	5.8	1.30	5.54
1.72	101.22	.216E+04	6.7	1.34	5.37
1.84	101.34	.242E+04	7.7	1.38	5.22
1.95	101.45	.270E+04	8.8	1.41	5.09

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0008)	18.33	1.03	3.50	42.95	0.70	0.82
OUTFLOW: ID= 1 (0093)	18.33	1.01	3.58	42.95	0.69	0.81

ROUTE CHN(0094)
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.727E+02	0.0	0.19	90.12
0.19	99.69	.231E+03	0.1	0.37	46.95
0.29	99.79	.403E+03	0.2	0.49	35.14
0.38	99.88	.588E+03	0.3	0.59	29.35
0.48	99.98	.787E+03	0.5	0.67	25.80
0.57	100.07	.999E+03	0.7	0.74	23.35
0.67	100.17	.122E+04	0.9	0.80	21.52
0.76	100.26	.146E+04	1.2	0.86	20.10
0.86	100.36	.172E+04	1.5	0.91	18.94
0.95	100.45	.198E+04	1.8	0.96	17.98
1.05	100.55	.226E+04	2.2	1.00	17.15
1.16	100.66	.263E+04	2.7	1.07	16.09
1.28	100.78	.305E+04	3.4	1.14	15.08
1.39	100.89	.351E+04	4.1	1.20	14.32
1.50	101.00	.402E+04	4.9	1.25	13.72
1.61	101.11	.456E+04	5.8	1.30	13.23
1.72	101.22	.515E+04	6.7	1.34	12.82
1.84	101.34	.578E+04	7.7	1.38	12.47
1.95	101.45	.645E+04	8.8	1.41	12.16

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0093)	18.33	1.01	3.58	42.95	0.69	0.81
OUTFLOW: ID= 1 (0094)	18.33	0.92	3.92	42.92	0.65	0.79

CALIB
NASHYD (0019)| Area (ha)= 19.14 Curve Number (CN)= 85.0
ID= 1 DT= 5.0 min | Ia (mm)= 8.07 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.05

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	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)= 0.696

PEAK FLOW (cms)= 0.906 (i)
TIME TO PEAK (hrs)= 3.833
RUNOFF VOLUME (mm)= 44.581
TOTAL RAINFALL (mm)= 80.310
RUNOFF COEFFICIENT = 0.555

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

CALIB

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| STANDHYD (  0199)|   Area     (ha)=  10.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  35.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.00         5.00
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     258.20        40.00
     Mannings n           =      0.013        0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
               TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
                hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
              0.083     0.00 | 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        78.75
                   over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.09 (ii)   12.86 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.21         0.08
                                                  *TOTALS*
     PEAK FLOW       (cms)=       0.72         0.88          1.584 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.83           2.75
     RUNOFF VOLUME    (mm)=      79.31        52.70          62.01
     TOTAL RAINFALL   (mm)=      80.31        80.31          80.31
     RUNOFF COEFFICIENT   =       0.99         0.66           0.77

       (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(  0207)|     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   |   0.0070     1.4742
                         0.0020     0.7580   |   0.0090     1.6571
                         0.0040     1.0378   |   0.0110     1.8406
                         0.0060     1.2294   |   0.0000     0.0000

                                    AREA     QPEAK     TPEAK       R.V.
                                    (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0199)        10.000     1.584      2.75      62.01
   OUTFLOW: ID= 1 (  0207)        10.000     0.002      6.92       8.93

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.10
                  TIME SHIFT OF PEAK FLOW          (min)=250.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.6177

--------------------------------------------------------------------------------
-------------------
| ROUTE CHN(  0173)|
| 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
                   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

    <---------------------- TRAVEL TIME TABLE ---------------------->
     DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY   TRAV.TIME
       (m)      (m)     (cu.m.)       (cms)         (m/s)      (min)
      0.10    99.60    .230E+02         0.0          0.19      28.46
      0.19    99.69    .729E+02         0.1          0.37      14.83
      0.29    99.79    .127E+03         0.2          0.49      11.10
      0.38    99.88    .186E+03         0.3          0.59       9.27
      0.48    99.98    .248E+03         0.5          0.67       8.15
      0.57   100.07    .315E+03         0.7          0.74       7.37
      0.67   100.17    .387E+03         0.9          0.80       6.80
      0.76   100.26    .462E+03         1.2          0.86       6.35
      0.86   100.36    .542E+03         1.5          0.91       5.98
      0.95   100.45    .626E+03         1.8          0.96       5.68
      1.05   100.55    .714E+03         2.2          1.00       5.42
      1.16   100.66    .829E+03         2.7          1.07       5.08
      1.28   100.78    .963E+03         3.4          1.14       4.76
      1.39   100.89    .111E+04         4.1          1.20       4.52
      1.50   101.00    .127E+04         4.9          1.25       4.33
      1.61   101.11    .144E+04         5.8          1.30       4.18
      1.72   101.22    .163E+04         6.7          1.34       4.05
      1.84   101.34    .182E+04         7.7          1.38       3.94
      1.95   101.45    .204E+04         8.8          1.41       3.84

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK    TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)    (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0207)    10.00     0.00     6.92    8.93       0.01      0.19
   OUTFLOW: ID= 1 (  0173)    10.00     0.00     8.17    8.90       0.01      0.19

--------------------------------------------------------------------------------
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```
--------------------
| ADD HYD  (  0172)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0019):     19.14   0.906     3.83    44.58
      + ID2= 2 (  0173):     10.00   0.002     8.17     8.90
        ================================================
        ID = 3 (  0172):     29.14   0.907     3.83    32.34

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

--------------------
| ADD HYD  (  0172)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0172):     29.14   0.907     3.83    32.34
      + ID2= 2 (  0094):     18.33   0.919     3.92    42.92
        ================================================
        ID = 1 (  0172):     47.47   1.824     3.92    36.43

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0174)|
| 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
                   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

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        0.10    99.60    .179E+02       0.0          0.19      22.14
        0.19    99.69    .568E+02       0.1          0.37      11.54
        0.29    99.79    .990E+02       0.2          0.49       8.63
        0.38    99.88    .145E+03       0.3          0.59       7.21
        0.48    99.98    .193E+03       0.5          0.67       6.34
        0.57   100.07    .245E+03       0.7          0.74       5.74
        0.67   100.17    .301E+03       0.9          0.80       5.29
        0.76   100.26    .360E+03       1.2          0.86       4.94
        0.86   100.36    .422E+03       1.5          0.91       4.65
        0.95   100.45    .487E+03       1.8          0.96       4.42
        1.05   100.55    .556E+03       2.2          1.00       4.21
        1.16   100.66    .645E+03       2.7          1.07       3.95
        1.28   100.78    .749E+03       3.4          1.14       3.71
        1.39   100.89    .863E+03       4.1          1.20       3.52
        1.50   101.00    .987E+03       4.9          1.25       3.37
        1.61   101.11    .112E+04       5.8          1.30       3.25
        1.72   101.22    .127E+04       6.7          1.34       3.15
        1.84   101.34    .142E+04       7.7          1.38       3.06
        1.95   101.45    .158E+04       8.8          1.41       2.99
```

```
                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)       (m)       (m/s)
   INFLOW : ID= 2 (  0172)    47.47     1.82    3.92  36.43      0.95       0.95
   OUTFLOW: ID= 1 (  0174)    47.47     1.82    4.00  36.42      0.94       0.95


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0020)|   Area     (ha)=  21.65   Curve Number    (CN)= 85.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.84   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.05

        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)=   0.788

     PEAK FLOW       (cms)=   1.029 (i)
     TIME TO PEAK    (hrs)=   3.833
     RUNOFF VOLUME    (mm)=  44.772
     TOTAL RAINFALL   (mm)=  80.310
     RUNOFF COEFFICIENT   =   0.557

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0202)|   Area     (ha)=  10.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  35.00
--------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.00         5.00
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
```

```
Length            (m)=     258.20        40.00
Mannings n          =      0.013        0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	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        78.75
            over (min)        5.00        15.00
Storage Coeff.  (min)=       5.09 (ii)   12.86 (ii)
Unit Hyd. Tpeak (min)=       5.00        15.00
Unit Hyd. peak  (cms)=       0.21         0.08
                                                  *TOTALS*
PEAK FLOW       (cms)=       0.72         0.88       1.584 (iii)
TIME TO PEAK    (hrs)=       2.75         2.83        2.75
RUNOFF VOLUME    (mm)=      79.31        52.70       62.01
TOTAL RAINFALL   (mm)=      80.31        80.31       80.31
RUNOFF COEFFICIENT   =       0.99         0.66        0.77

  (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(  0208)|     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    |  0.0076      1.0979
                         0.0025     0.5624    |  0.0092      1.2357
                         0.0043     0.7721    |  0.0109      1.3737
                         0.0057     0.9156    |  0.0000      0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0202)     10.000      1.584      2.75      62.01
   OUTFLOW: ID= 1 (  0208)     10.000      0.003      6.83      14.47

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.19
                    TIME SHIFT OF PEAK FLOW          (min)=245.00
                    MAXIMUM  STORAGE   USED        (ha.m.)=  0.6160

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

--------------------
| ADD HYD  (  0175)|
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)     (cms)     (hrs)      (mm)
       ID1= 1 (  0020):     21.65     1.029      3.83     44.77
     + ID2= 2 (  0174):     47.47     1.817      4.00     36.42
       ================================================
       ID = 3 (  0175):     69.12     2.843      3.92     39.04

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

--------------------
| ADD HYD  (  0175)|
|   3 +  2 =  1    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)     (cms)     (hrs)      (mm)
       ID1= 3 (  0175):     69.12     2.843      3.92     39.04
     + ID2= 2 (  0208):     10.00     0.003      6.83     14.47
       ================================================
       ID = 1 (  0175):     79.12     2.846      3.92     35.93

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0081)|
| 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
                  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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY    TRAV.TIME
       (m)       (m)     (cu.m.)       (cms)         (m/s)       (min)
      0.10     99.60    .472E+02        0.0          0.19       58.56
      0.19     99.69    .150E+03        0.1          0.37       30.51
      0.29     99.79    .262E+03        0.2          0.49       22.83
      0.38     99.88    .382E+03        0.3          0.59       19.07
      0.48     99.98    .511E+03        0.5          0.67       16.76
      0.57    100.07    .649E+03        0.7          0.74       15.17
      0.67    100.17    .796E+03        0.9          0.80       13.99
      0.76    100.26    .951E+03        1.2          0.86       13.06
      0.86    100.36    .111E+04        1.5          0.91       12.31
      0.95    100.45    .129E+04        1.8          0.96       11.68
      1.05    100.55    .147E+04        2.2          1.00       11.15
      1.16    100.66    .171E+04        2.7          1.07       10.45
```

1.28	100.78	.198E+04	3.4	1.14	9.80
1.39	100.89	.228E+04	4.1	1.20	9.30
1.50	101.00	.261E+04	4.9	1.25	8.91
1.61	101.11	.297E+04	5.8	1.30	8.60
1.72	101.22	.335E+04	6.7	1.34	8.33
1.84	101.34	.376E+04	7.7	1.38	8.10
1.95	101.45	.419E+04	8.8	1.41	7.90

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0175)	79.12	2.85	3.92	35.93	1.18	1.08
OUTFLOW: ID= 1 (0081)	79.12	2.79	4.08	35.92	1.17	1.08

CALIB					
NASHYD (0021)	Area (ha)=	50.74	Curve Number (CN)=	83.0
ID= 1 DT= 5.0 min	Ia (mm)=	7.53	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	1.37		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	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)= 1.415

PEAK FLOW (cms)= 1.883 (i)
TIME TO PEAK (hrs)= 4.250
RUNOFF VOLUME (mm)= 42.445
TOTAL RAINFALL (mm)= 80.310
RUNOFF COEFFICIENT = 0.529

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

CALIB					
NASHYD (0115)	Area (ha)=	0.99	Curve Number (CN)=	84.0
ID= 1 DT= 5.0 min	Ia (mm)=	7.02	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.17		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	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)= 0.222

PEAK FLOW (cms)= 0.128 (i)
TIME TO PEAK (hrs)= 2.750
RUNOFF VOLUME (mm)= 43.992
TOTAL RAINFALL (mm)= 80.310
RUNOFF COEFFICIENT = 0.548

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

ADD HYD (0176)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0021):	50.74	1.883	4.25	42.45
	+ ID2= 2 (0115):	0.99	0.128	2.75	43.99
	ID = 3 (0176):	51.73	1.898	4.25	42.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0176)		AREA	QPEAK	TPEAK	R.V.
3 + 2 = 1		(ha)	(cms)	(hrs)	(mm)
	ID1= 3 (0176):	51.73	1.898	4.25	42.47
	+ ID2= 2 (0081):	79.12	2.794	4.08	35.92

```
       ================================================
       ID = 1 (  0176):   130.86   4.677     4.08    38.51

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)=   3.26   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.21

         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)=   0.592

     PEAK FLOW       (cms)=   0.384 (i)
     TIME TO PEAK    (hrs)=   2.750
     RUNOFF VOLUME    (mm)=  44.094
     TOTAL RAINFALL   (mm)=  80.310
     RUNOFF COEFFICIENT   =   0.549

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

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0095)|
| 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
                    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
```

```
                <---------------------- TRAVEL TIME TABLE ---------------------->
                 DEPTH     ELEV       VOLUME     FLOW RATE     VELOCITY    TRAV.TIME
                  (m)       (m)      (cu.m.)       (cms)         (m/s)       (min)
                 0.10     99.60     .212E+02        0.0          0.19       26.30
                 0.19     99.69     .674E+02        0.1          0.37       13.70
                 0.29     99.79     .118E+03        0.2          0.49       10.25
                 0.38     99.88     .172E+03        0.3          0.59        8.56
                 0.48     99.98     .230E+03        0.5          0.67        7.53
                 0.57    100.07     .292E+03        0.7          0.74        6.81
                 0.67    100.17     .357E+03        0.9          0.80        6.28
                 0.76    100.26     .427E+03        1.2          0.86        5.87
                 0.86    100.36     .501E+03        1.5          0.91        5.53
                 0.95    100.45     .578E+03        1.8          0.96        5.25
                 1.05    100.55     .660E+03        2.2          1.00        5.01
                 1.16    100.66     .766E+03        2.7          1.07        4.70
                 1.28    100.78     .890E+03        3.4          1.14        4.40
                 1.39    100.89     .103E+04        4.1          1.20        4.18
                 1.50    101.00     .117E+04        4.9          1.25        4.00
                 1.61    101.11     .133E+04        5.8          1.30        3.86
                 1.72    101.22     .150E+04        6.7          1.34        3.74
                 1.84    101.34     .169E+04        7.7          1.38        3.64
                 1.95    101.45     .188E+04        8.8          1.41        3.55

                                                 <---- hydrograph ---->   <-pipe / channel->
                                        AREA     QPEAK    TPEAK    R.V.   MAX DEPTH  MAX VEL
                                        (ha)     (cms)    (hrs)    (mm)       (m)       (m/s)
           INFLOW : ID= 2 (  0001)     3.26      0.38     2.75   44.09       0.41       0.61
           OUTFLOW: ID= 1 (  0095)     3.26      0.35     2.83   44.05       0.39       0.59
```

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0190)|   Area    (ha)=  10.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  35.00
--------------------

                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.00          5.00
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     258.20         40.00
     Mannings n            =      0.013         0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    0.00 | 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        78.75
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       5.09 (ii)   12.86 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.21         0.08
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.72         0.88          1.584 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.83          2.75
     RUNOFF VOLUME    (mm)=      79.31        52.70         62.01
     TOTAL RAINFALL   (mm)=      80.31        80.31         80.31
     RUNOFF COEFFICIENT   =       0.99         0.66          0.77


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

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--------------------
| ADD HYD  (  0096)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0190):    10.00   1.584     2.75    62.01
      + ID2= 2 (  0095):     3.26   0.352     2.83    44.05
        ================================================
        ID = 3 (  0096):    13.26   1.898     2.75    57.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0097)|
| 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
                   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

      <--------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)       (cms)        (m/s)      (min)
        0.10    99.60    .552E+02         0.0         0.19      68.42
        0.19    99.69    .175E+03         0.1         0.37      35.64
        0.29    99.79    .306E+03         0.2         0.49      26.67
        0.38    99.88    .447E+03         0.3         0.59      22.28
        0.48    99.98    .597E+03         0.5         0.67      19.58
        0.57   100.07    .758E+03         0.7         0.74      17.72
        0.67   100.17    .930E+03         0.9         0.80      16.34
        0.76   100.26    .111E+04         1.2         0.86      15.26
        0.86   100.36    .130E+04         1.5         0.91      14.38
        0.95   100.45    .150E+04         1.8         0.96      13.65
        1.05   100.55    .172E+04         2.2         1.00      13.02
        1.16   100.66    .199E+04         2.7         1.07      12.21
        1.28   100.78    .231E+04         3.4         1.14      11.45
        1.39   100.89    .267E+04         4.1         1.20      10.87
        1.50   101.00    .305E+04         4.9         1.25      10.42
        1.61   101.11    .347E+04         5.8         1.30      10.04
        1.72   101.22    .391E+04         6.7         1.34       9.73
        1.84   101.34    .439E+04         7.7         1.38       9.47
        1.95   101.45    .489E+04         8.8         1.41       9.23

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0096)   13.26     1.90    2.75   57.60      0.97      0.96
   OUTFLOW: ID= 1 (  0097)   13.26     1.54    2.83   57.57      0.87      0.91


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0009)|   Area     (ha)=  24.11   Curve Number    (CN)= 83.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.46   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.52

        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)=   1.771
```

```
     PEAK FLOW       (cms)=   1.670 (i)
     TIME TO PEAK    (hrs)=   3.167
     RUNOFF VOLUME    (mm)=  41.670
     TOTAL RAINFALL   (mm)=  80.310
     RUNOFF COEFFICIENT   =   0.519

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

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--------------------
| ADD HYD  (  0177)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0009):    24.11   1.670     3.17    41.67
     + ID2= 2 (  0097):    13.26   1.543     2.83    57.57
       ========================================================
       ID = 3 (  0177):    37.37   2.973     3.00    47.31

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0003)|   Area     (ha)=   4.04   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.28

         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)=   0.552

     PEAK FLOW       (cms)=   0.425 (i)
     TIME TO PEAK    (hrs)=   2.833
     RUNOFF VOLUME    (mm)=  44.141
     TOTAL RAINFALL   (mm)=  80.310
     RUNOFF COEFFICIENT   =   0.550

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

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0126)|
| 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
                   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

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV       VOLUME     FLOW RATE     VELOCITY   TRAV.TIME
        (m)       (m)      (cu.m.)       (cms)         (m/s)      (min)
       0.10     99.60     .235E+02        0.0          0.19       29.14
       0.19     99.69     .747E+02        0.1          0.37       15.18
       0.29     99.79     .130E+03        0.2          0.49       11.36
       0.38     99.88     .190E+03        0.3          0.59        9.49
       0.48     99.98     .254E+03        0.5          0.67        8.34
       0.57    100.07     .323E+03        0.7          0.74        7.55
       0.67    100.17     .396E+03        0.9          0.80        6.96
       0.76    100.26     .473E+03        1.2          0.86        6.50
       0.86    100.36     .555E+03        1.5          0.91        6.12
       0.95    100.45     .641E+03        1.8          0.96        5.81
       1.05    100.55     .731E+03        2.2          1.00        5.55
       1.16    100.66     .849E+03        2.7          1.07        5.20
       1.28    100.78     .985E+03        3.4          1.14        4.88
       1.39    100.89     .114E+04        4.1          1.20        4.63
       1.50    101.00     .130E+04        4.9          1.25        4.44
       1.61    101.11     .148E+04        5.8          1.30        4.28
       1.72    101.22     .167E+04        6.7          1.34        4.14
       1.84    101.34     .187E+04        7.7          1.38        4.03
       1.95    101.45     .208E+04        8.8          1.41        3.93

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0003)    4.04     0.42    2.83   44.14       0.43       0.63
   OUTFLOW: ID= 1 (  0126)    4.04     0.39    2.92   44.10       0.41       0.61


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0004)|   Area     (ha)=  43.99   Curve Number   (CN)= 71.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   6.82   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.93

         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)=   1.807

     PEAK FLOW       (cms)=   1.512 (i)
     TIME TO PEAK    (hrs)=   3.750
     RUNOFF VOLUME    (mm)=  30.472
     TOTAL RAINFALL   (mm)=  80.310
     RUNOFF COEFFICIENT   =   0.379

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

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0125)|
| 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
                   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

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY    TRAV.TIME
         (m)      (m)     (cu.m.)       (cms)         (m/s)       (min)
        0.10    99.60    .287E+02         0.0          0.19       35.51
        0.19    99.69    .910E+02         0.1          0.37       18.50
        0.29    99.79    .159E+03         0.2          0.49       13.85
        0.38    99.88    .232E+03         0.3          0.59       11.56
        0.48    99.98    .310E+03         0.5          0.67       10.16
        0.57   100.07    .394E+03         0.7          0.74        9.20
        0.67   100.17    .483E+03         0.9          0.80        8.48
        0.76   100.26    .577E+03         1.2          0.86        7.92
        0.86   100.36    .676E+03         1.5          0.91        7.46
        0.95   100.45    .781E+03         1.8          0.96        7.08
        1.05   100.55    .891E+03         2.2          1.00        6.76
        1.16   100.66    .103E+04         2.7          1.07        6.34
        1.28   100.78    .120E+04         3.4          1.14        5.94
        1.39   100.89    .138E+04         4.1          1.20        5.64
        1.50   101.00    .158E+04         4.9          1.25        5.41
        1.61   101.11    .180E+04         5.8          1.30        5.21
        1.72   101.22    .203E+04         6.7          1.34        5.05
        1.84   101.34    .228E+04         7.7          1.38        4.91
        1.95   101.45    .254E+04         8.8          1.41        4.79

                                      <---- hydrograph ---->   <-pipe / channel->
                                 AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                 (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0004)    43.99     1.51    3.75  30.47      0.86      0.91
   OUTFLOW: ID= 1 (  0125)    43.99     1.50    3.83  30.47      0.85      0.90

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

--------------------
| ADD HYD  (  0130)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  0125):    43.99   1.498     3.83     30.47
      + ID2= 2 (  0126):     4.04   0.388     2.92     44.10
        ================================================
        ID = 3 (  0130):    48.03   1.646     3.75     31.62

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0128)|
| 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
                   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

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY    TRAV.TIME
         (m)      (m)     (cu.m.)       (cms)         (m/s)       (min)
        0.10    99.60    .180E+02         0.0          0.19       22.33
        0.19    99.69    .572E+02         0.1          0.37       11.63
        0.29    99.79    .998E+02         0.2          0.49        8.70
        0.38    99.88    .146E+03         0.3          0.59        7.27
        0.48    99.98    .195E+03         0.5          0.67        6.39
        0.57   100.07    .247E+03         0.7          0.74        5.78
        0.67   100.17    .303E+03         0.9          0.80        5.33
        0.76   100.26    .363E+03         1.2          0.86        4.98
        0.86   100.36    .425E+03         1.5          0.91        4.69
        0.95   100.45    .491E+03         1.8          0.96        4.45
        1.05   100.55    .560E+03         2.2          1.00        4.25
        1.16   100.66    .651E+03         2.7          1.07        3.99
        1.28   100.78    .755E+03         3.4          1.14        3.74
        1.39   100.89    .870E+03         4.1          1.20        3.55
        1.50   101.00    .996E+03         4.9          1.25        3.40
        1.61   101.11    .113E+04         5.8          1.30        3.28
```

```
      1.72   101.22    .128E+04       6.7          1.34       3.18
      1.84   101.34    .143E+04       7.7          1.38       3.09
      1.95   101.45    .160E+04       8.8          1.41       3.01

                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK    TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)    (hrs)   (mm)     (m)       (m/s)
   INFLOW : ID= 2 (  0130)   48.03     1.65     3.75  31.62      0.90      0.93
   OUTFLOW: ID= 1 (  0128)   48.03     1.64     3.83  31.62      0.89      0.92
```

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--------------------
| CALIB            |
| NASHYD   (  0012)|   Area    (ha)=  10.18   Curve Number   (CN)= 83.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   8.17   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.51

        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)=   0.762

    PEAK FLOW       (cms)=   0.717 (i)
    TIME TO PEAK    (hrs)=   3.167
    RUNOFF VOLUME    (mm)=  41.914
    TOTAL RAINFALL   (mm)=  80.310
    RUNOFF COEFFICIENT   =   0.522

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

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--------------------
| CALIB            |
| STANDHYD (  0136)|   Area    (ha)=   0.37
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       0.34         0.04
    Dep. Storage     (mm)=       1.00         6.58
    Average Slope     (%)=       1.00         2.00
    Length            (m)=      49.87        40.00
    Mannings n           =      0.013        0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
    TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
     hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
   0.083    0.00 | 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        55.09
              over (min)        5.00        10.00
    Storage Coeff.  (min)=      1.90 (ii)    5.21 (ii)
    Unit Hyd. Tpeak (min)=      5.00        10.00
    Unit Hyd. peak  (cms)=      0.32         0.16
                                                      *TOTALS*
    PEAK FLOW       (cms)=      0.07         0.01        0.074 (iii)
    TIME TO PEAK    (hrs)=      2.75         2.75         2.75
    RUNOFF VOLUME    (mm)=     79.31        45.85        75.96
    TOTAL RAINFALL   (mm)=     80.31        80.31        80.31
    RUNOFF COEFFICIENT   =      0.99         0.57         0.95

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

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

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--------------------
| CALIB            |
| STANDHYD (  0194)|   Area    (ha)=  10.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  35.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
    Surface Area     (ha)=       5.00         5.00
```

Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	258.20	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	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	78.75	
over	(min)	5.00	15.00	
Storage Coeff.	(min)=	5.09 (ii)	12.86 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	15.00	
Unit Hyd. peak	(cms)=	0.21	0.08	
				TOTALS
PEAK FLOW	(cms)=	0.72	0.88	1.584 (iii)
TIME TO PEAK	(hrs)=	2.75	2.83	2.75
RUNOFF VOLUME	(mm)=	79.31	52.70	62.01
TOTAL RAINFALL	(mm)=	80.31	80.31	80.31
RUNOFF COEFFICIENT	=	0.99	0.66	0.77

(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 (0131)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0012):	10.18	0.717	3.17	41.91
+ ID2= 2 (0128):	48.03	1.641	3.83	31.62
ID = 3 (0131):	58.21	2.179	3.58	33.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0131)				
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0131):	58.21	2.179	3.58	33.42
+ ID2= 2 (0136):	0.37	0.074	2.75	75.96
ID = 1 (0131):	58.58	2.191	3.50	33.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0131)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0131):	58.58	2.191	3.50	33.69
+ ID2= 2 (0194):	10.00	1.584	2.75	62.01
ID = 3 (0131):	68.58	2.697	3.25	37.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0137)	Area (ha)=	0.32	
ID= 1 DT= 5.0 min	Total Imp(%)=	90.00	Dir. Conn.(%)= 90.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.29	0.03
Dep. Storage	(mm)=	1.00	2.33
Average Slope	(%)=	1.00	2.00
Length	(m)=	46.33	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	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        73.69
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.82 (ii)    5.13 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.16
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.06         0.01        0.066 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75         2.75
     RUNOFF VOLUME    (mm)=      79.31        75.49        78.92
     TOTAL RAINFALL   (mm)=      80.31        80.31        80.31
     RUNOFF COEFFICIENT   =       0.99         0.94         0.98

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  99.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0147)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0131):    68.58    2.697     3.25    37.82
      + ID2= 2 (  0137):     0.32    0.066     2.75    78.92
        ================================================
        ID = 3 (  0147):    68.90    2.715     3.25    38.01

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0132)|
| 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
                   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

      <--------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        0.10    99.60    .433E+02        0.0          0.19      53.63
        0.19    99.69    .137E+03        0.1          0.37      27.94
        0.29    99.79    .240E+03        0.2          0.49      20.91
        0.38    99.88    .350E+03        0.3          0.59      17.46
        0.48    99.98    .468E+03        0.5          0.67      15.35
        0.57   100.07    .594E+03        0.7          0.74      13.89
        0.67   100.17    .729E+03        0.9          0.80      12.81
        0.76   100.26    .871E+03        1.2          0.86      11.96
        0.86   100.36    .102E+04        1.5          0.91      11.27
        0.95   100.45    .118E+04        1.8          0.96      10.70
        1.05   100.55    .135E+04        2.2          1.00      10.21
        1.16   100.66    .156E+04        2.7          1.07       9.57
        1.28   100.78    .181E+04        3.4          1.14       8.97
        1.39   100.89    .209E+04        4.1          1.20       8.52
        1.50   101.00    .239E+04        4.9          1.25       8.16
        1.61   101.11    .272E+04        5.8          1.30       7.87
        1.72   101.22    .307E+04        6.7          1.34       7.63
        1.84   101.34    .344E+04        7.7          1.38       7.42
        1.95   101.45    .384E+04        8.8          1.41       7.24

                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0147)   68.90     2.72    3.25  38.01      1.16      1.07
   OUTFLOW: ID= 1 (  0132)   68.90     2.66    3.33  38.01      1.14      1.06

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| CALIB            |
| NASHYD   (  0013)|   Area     (ha)=  13.98   Curve Number   (CN)= 83.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   9.60   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.69

        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)=   0.774

     PEAK FLOW       (cms)=   0.796 (i)
     TIME TO PEAK    (hrs)=   3.417
     RUNOFF VOLUME    (mm)=  40.740
     TOTAL RAINFALL   (mm)=  80.310
     RUNOFF COEFFICIENT   =   0.507
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     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0134)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  0013):    13.98   0.796     3.42     40.74
      + ID2= 2 (  0132):    68.90   2.656     3.33     38.01
        ================================================
        ID = 3 (  0134):    82.89   3.448     3.33     38.47

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
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| ROUTE CHN(  0140)|
| 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
                   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

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY    TRAV.TIME
        (m)       (m)     (cu.m.)       (cms)         (m/s)       (min)
       0.10     99.60    .359E+02        0.0          0.19       44.49
       0.19     99.69    .114E+03        0.1          0.37       23.18
       0.29     99.79    .199E+03        0.2          0.49       17.34
       0.38     99.88    .290E+03        0.3          0.59       14.49
       0.48     99.98    .388E+03        0.5          0.67       12.73
       0.57    100.07    .493E+03        0.7          0.74       11.52
       0.67    100.17    .604E+03        0.9          0.80       10.62
       0.76    100.26    .722E+03        1.2          0.86        9.92
       0.86    100.36    .847E+03        1.5          0.91        9.35
       0.95    100.45    .978E+03        1.8          0.96        8.87
       1.05    100.55    .112E+04        2.2          1.00        8.47
       1.16    100.66    .130E+04        2.7          1.07        7.94
       1.28    100.78    .150E+04        3.4          1.14        7.44
       1.39    100.89    .173E+04        4.1          1.20        7.07
       1.50    101.00    .198E+04        4.9          1.25        6.77
       1.61    101.11    .225E+04        5.8          1.30        6.53
       1.72    101.22    .254E+04        6.7          1.34        6.33
       1.84    101.34    .285E+04        7.7          1.38        6.15
       1.95    101.45    .318E+04        8.8          1.41        6.00

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)     (m)       (m/s)
   INFLOW : ID= 2 (  0134)    82.89    3.45    3.33   38.47      1.29       1.15
   OUTFLOW: ID= 1 (  0140)    82.89    3.41    3.50   38.46      1.28       1.14


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0014)|   Area     (ha)=  15.33   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   9.35   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.59

        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)=   0.992

     PEAK FLOW       (cms)=   0.904 (i)
     TIME TO PEAK    (hrs)=   3.250
     RUNOFF VOLUME    (mm)=  38.569
     TOTAL RAINFALL   (mm)=  80.310
     RUNOFF COEFFICIENT   =   0.480

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

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--------------------
| ADD HYD  (  0141)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  0014):    15.33   0.904     3.25     38.57
      + ID2= 2 (  0140):    82.89   3.409     3.50     38.46
        ================================================
        ID = 3 (  0141):    98.21   4.291     3.42     38.48

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0143)|
| 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
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	

<-------------------- TRAVEL TIME TABLE ---------------------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.340E+02	0.0	0.19	42.17
0.19	99.69	.108E+03	0.1	0.37	21.97
0.29	99.79	.188E+03	0.2	0.49	16.44
0.38	99.88	.275E+03	0.3	0.59	13.73
0.48	99.98	.368E+03	0.5	0.67	12.07
0.57	100.07	.467E+03	0.7	0.74	10.92
0.67	100.17	.573E+03	0.9	0.80	10.07
0.76	100.26	.685E+03	1.2	0.86	9.40
0.86	100.36	.803E+03	1.5	0.91	8.86
0.95	100.45	.927E+03	1.8	0.96	8.41
1.05	100.55	.106E+04	2.2	1.00	8.03
1.16	100.66	.123E+04	2.7	1.07	7.53
1.28	100.78	.143E+04	3.4	1.14	7.06
1.39	100.89	.164E+04	4.1	1.20	6.70
1.50	101.00	.188E+04	4.9	1.25	6.42
1.61	101.11	.214E+04	5.8	1.30	6.19
1.72	101.22	.241E+04	6.7	1.34	6.00
1.84	101.34	.270E+04	7.7	1.38	5.83
1.95	101.45	.302E+04	8.8	1.41	5.69

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0141)	98.21	4.29	3.42	38.48	1.42	1.21
OUTFLOW:	ID= 1 (0143)	98.21	4.24	3.50	38.48	1.41	1.21

CALIB					
NASHYD	(0017)	Area	(ha)= 10.44	Curve Number	(CN)= 80.0
ID= 1 DT= 5.0 min		Ia	(mm)= 9.73	# of Linear Res.	(N)= 3.00
		U.H. Tp	(hrs)= 0.50		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	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)= 0.798

PEAK FLOW (cms)= 0.653 (i)
TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 37.152
TOTAL RAINFALL (mm)= 80.310
RUNOFF COEFFICIENT = 0.463

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

ADD HYD (0188)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0017):	10.44	0.653	3.17	37.15
	+ ID2= 2 (0143):	98.21	4.243	3.50	38.48
	ID = 3 (0188):	108.66	4.813	3.42	38.35

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD	(0005)	Area	(ha)= 6.22	Curve Number	(CN)= 65.0
ID= 1 DT= 5.0 min		Ia	(mm)= 9.04	# of Linear Res.	(N)= 3.00
		U.H. Tp	(hrs)= 0.49		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	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)=   0.485

    PEAK FLOW       (cms)=   0.249 (i)
    TIME TO PEAK    (hrs)=   3.167
    RUNOFF VOLUME    (mm)=  24.416
    TOTAL RAINFALL   (mm)=  80.310
    RUNOFF COEFFICIENT   =   0.304

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

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-------------------
| ROUTE CHN(  0150)|
| 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
                  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

     <---------------------- TRAVEL TIME TABLE ----------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.10    99.60    .482E+02       0.0         0.19       59.75
       0.19    99.69    .153E+03       0.1         0.37       31.13
       0.29    99.79    .267E+03       0.2         0.49       23.29
       0.38    99.88    .390E+03       0.3         0.59       19.46
       0.48    99.98    .522E+03       0.5         0.67       17.10
       0.57   100.07    .662E+03       0.7         0.74       15.48
       0.67   100.17    .812E+03       0.9         0.80       14.27
       0.76   100.26    .970E+03       1.2         0.86       13.32
       0.86   100.36    .114E+04       1.5         0.91       12.56
       0.95   100.45    .131E+04       1.8         0.96       11.92
       1.05   100.55    .150E+04       2.2         1.00       11.37
       1.16   100.66    .174E+04       2.7         1.07       10.67
       1.28   100.78    .202E+04       3.4         1.14       10.00
       1.39   100.89    .233E+04       4.1         1.20        9.49
       1.50   101.00    .266E+04       4.9         1.25        9.10
       1.61   101.11    .303E+04       5.8         1.30        8.77
       1.72   101.22    .342E+04       6.7         1.34        8.50
       1.84   101.34    .383E+04       7.7         1.38        8.27
       1.95   101.45    .427E+04       8.8         1.41        8.06

                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0005)    6.22     0.25    3.17  24.42      0.33      0.52
   OUTFLOW: ID= 1 (  0150)    6.22     0.21    3.50  24.36      0.30      0.50

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| CALIB            |
| STANDHYD (  0086)|   Area     (ha)=   0.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
-------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.28         0.03
     Dep. Storage     (mm)=       1.00         7.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      45.39        40.00
     Mannings n           =      0.013        0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    0.00 | 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        68.44
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.80 (ii)    5.10 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.16
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.06         0.01          0.063 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75           2.75
     RUNOFF VOLUME    (mm)=      79.31        60.03          77.38
     TOTAL RAINFALL   (mm)=      80.31        80.31          80.31
     RUNOFF COEFFICIENT   =       0.99         0.75           0.96

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  94.0    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 (  0195)|   Area    (ha)=  10.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  35.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.00         5.00
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     258.20        40.00
     Mannings n           =      0.013        0.250

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	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        78.75
                over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.09 (ii)   12.86 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.21         0.08
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.72         0.88          1.584 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.83           2.75
     RUNOFF VOLUME    (mm)=      79.31        52.70          62.01
     TOTAL RAINFALL   (mm)=      80.31        80.31          80.31
     RUNOFF COEFFICIENT   =       0.99         0.66           0.77

       (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  (  0151)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)     (hrs)      (mm)
       ID1= 1 (  0150):     6.22    0.215     3.50     24.36
     + ID2= 2 (  0195):    10.00    1.584     2.75     62.01
       ================================================
       ID = 3 (  0151):    16.22    1.621     2.75     47.57

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

--------------------
| ADD HYD  (  0151)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)     (hrs)      (mm)
       ID1= 3 (  0151):    16.22    1.621     2.75     47.57
     + ID2= 2 (  0086):     0.31    0.063     2.75     77.38
       ================================================
       ID = 1 (  0151):    16.53    1.684     2.75     48.13

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

--------------------
| CALIB             |
| NASHYD   (  0006)|   Area     (ha)=   6.26   Curve Number   (CN)= 86.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.80   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.87

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	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)=   0.275

     PEAK FLOW       (cms)=   0.363 (i)
     TIME TO PEAK    (hrs)=   3.583
     RUNOFF VOLUME    (mm)=  47.914
     TOTAL RAINFALL   (mm)=  80.310
     RUNOFF COEFFICIENT   =   0.597

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

```
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0148)|
| 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
                   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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.10    99.60    .454E+02        0.0          0.19       56.26
       0.19    99.69    .144E+03        0.1          0.37       29.31
       0.29    99.79    .251E+03        0.2          0.49       21.93
       0.38    99.88    .367E+03        0.3          0.59       18.32
       0.48    99.98    .491E+03        0.5          0.67       16.10
       0.57   100.07    .624E+03        0.7          0.74       14.57
       0.67   100.17    .764E+03        0.9          0.80       13.44
       0.76   100.26    .914E+03        1.2          0.86       12.55
       0.86   100.36    .107E+04        1.5          0.91       11.82
       0.95   100.45    .124E+04        1.8          0.96       11.22
       1.05   100.55    .141E+04        2.2          1.00       10.71
       1.16   100.66    .164E+04        2.7          1.07       10.04
       1.28   100.78    .190E+04        3.4          1.14        9.41
       1.39   100.89    .219E+04        4.1          1.20        8.94
       1.50   101.00    .251E+04        4.9          1.25        8.56
       1.61   101.11    .285E+04        5.8          1.30        8.26
       1.72   101.22    .322E+04        6.7          1.34        8.00
       1.84   101.34    .361E+04        7.7          1.38        7.78
       1.95   101.45    .402E+04        8.8          1.41        7.59

                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)    (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0006)    6.26     0.36    3.58  47.91      0.40      0.60
   OUTFLOW: ID= 1 (  0148)    6.26     0.34    3.83  47.88      0.39      0.59


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0065)|   Area    (ha)=   1.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.37         0.15
     Dep. Storage     (mm)=       1.00         4.85
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     100.86        40.00
     Mannings n           =      0.013        0.250

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

```
                        ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.083    0.00 | 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        63.13
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.90 (ii)    6.21 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.28         0.15
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.28         0.03        0.307 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75         2.75
     RUNOFF VOLUME    (mm)=      79.31        54.92        76.87
     TOTAL RAINFALL   (mm)=      80.31        80.31        80.31
     RUNOFF COEFFICIENT   =       0.99         0.68         0.96

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  90.0    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  (  0145)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0148):     6.26    0.345     3.83    47.88
     + ID2= 2 (  0065):     1.53    0.307     2.75    76.87
       ==========================================================
       ID = 3 (  0145):     7.79    0.390     3.75    53.56

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0165)|   Area    (ha)=   0.25
```

```
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.22         0.03
     Dep. Storage     (mm)=       1.00         6.59
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      40.82        40.00
     Mannings n           =      0.013        0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    0.00 | 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        55.09
               over (min)        5.00         5.00
     Storage Coeff.  (min)=      1.68 (ii)    4.99 (ii)
     Unit Hyd. Tpeak (min)=      5.00         5.00
     Unit Hyd. peak  (cms)=      0.32         0.22
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.05         0.00        0.050 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.75         2.75
     RUNOFF VOLUME    (mm)=     79.31        45.85        75.95
     TOTAL RAINFALL   (mm)=     80.31        80.31        80.31
     RUNOFF COEFFICIENT   =      0.99         0.57         0.95

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

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

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

--------------------
| ADD HYD  (  0149)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (  0145):     7.79   0.390     3.75    53.56
   + ID2= 2 (  0165):     0.25   0.050     2.75    75.95
     ==================================================
     ID = 3 (  0149):     8.04   0.398     2.75    54.26

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0154)|
| 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
                   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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)       (cms)         (m/s)      (min)
       0.10    99.60    .125E+02         0.0          0.19      15.45
       0.19    99.69    .396E+02         0.1          0.37       8.05
       0.29    99.79    .691E+02         0.2          0.49       6.03
       0.38    99.88    .101E+03         0.3          0.59       5.03
       0.48    99.98    .135E+03         0.5          0.67       4.42
       0.57   100.07    .171E+03         0.7          0.74       4.00
       0.67   100.17    .210E+03         0.9          0.80       3.69
       0.76   100.26    .251E+03         1.2          0.86       3.45
       0.86   100.36    .294E+03         1.5          0.91       3.25
       0.95   100.45    .340E+03         1.8          0.96       3.08
       1.05   100.55    .388E+03         2.2          1.00       2.94
       1.16   100.66    .450E+03         2.7          1.07       2.76
       1.28   100.78    .523E+03         3.4          1.14       2.59
       1.39   100.89    .602E+03         4.1          1.20       2.46
       1.50   101.00    .689E+03         4.9          1.25       2.35
       1.61   101.11    .783E+03         5.8          1.30       2.27
       1.72   101.22    .883E+03         6.7          1.34       2.20
       1.84   101.34    .991E+03         7.7          1.38       2.14
       1.95   101.45    .111E+04         8.8          1.41       2.09

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK    TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)    (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0149)     8.04     0.40     2.75  54.26      0.42      0.61
   OUTFLOW: ID= 1 (  0154)     8.04     0.39     3.75  54.25      0.41      0.61

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0066)|   Area     (ha)=   0.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.29         0.03
     Dep. Storage     (mm)=       1.00         3.81
```

```
Average Slope     (%)=       1.00         2.00
Length            (m)=      46.14        40.00
Mannings n           =      0.013        0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	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        68.98
          over (min)        5.00        10.00
Storage Coeff.  (min)=      1.81 (ii)    5.12 (ii)
Unit Hyd. Tpeak (min)=      5.00        10.00
Unit Hyd. peak  (cms)=      0.32         0.16
                                                 *TOTALS*
PEAK FLOW       (cms)=      0.06         0.01        0.065 (iii)
TIME TO PEAK    (hrs)=      2.75         2.75         2.75
RUNOFF VOLUME    (mm)=     79.31        63.12        77.68
TOTAL RAINFALL   (mm)=     80.31        80.31        80.31
RUNOFF COEFFICIENT   =      0.99         0.79         0.97

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  94.0    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  (  0152)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)      (mm)
        ID1= 1 (  0151):     16.53    1.684     2.75     48.13
      + ID2= 2 (  0154):      8.04    0.393     3.75     54.25
        ================================================
        ID = 3 (  0152):     24.57    2.071     2.75     50.13

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

--------------------
| ADD HYD  (  0152)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)      (mm)
        ID1= 3 (  0152):     24.57    2.071     2.75     50.13
      + ID2= 2 (  0066):      0.32    0.065     2.75     77.68
        ================================================
        ID = 1 (  0152):     24.89    2.136     2.75     50.49

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

--------------------
| ROUTE CHN(  0155)|
| 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
                  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
```

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.203E+02	0.0	0.19	25.11
0.19	99.69	.644E+02	0.1	0.37	13.08
0.29	99.79	.112E+03	0.2	0.49	9.79
0.38	99.88	.164E+03	0.3	0.59	8.18
0.48	99.98	.219E+03	0.5	0.67	7.19
0.57	100.07	.278E+03	0.7	0.74	6.51
0.67	100.17	.341E+03	0.9	0.80	6.00
0.76	100.26	.408E+03	1.2	0.86	5.60
0.86	100.36	.478E+03	1.5	0.91	5.28
0.95	100.45	.552E+03	1.8	0.96	5.01
1.05	100.55	.630E+03	2.2	1.00	4.78
1.16	100.66	.732E+03	2.7	1.07	4.48
1.28	100.78	.849E+03	3.4	1.14	4.20
1.39	100.89	.979E+03	4.1	1.20	3.99
1.50	101.00	.112E+04	4.9	1.25	3.82
1.61	101.11	.127E+04	5.8	1.30	3.69
1.72	101.22	.144E+04	6.7	1.34	3.57
1.84	101.34	.161E+04	7.7	1.38	3.47
1.95	101.45	.180E+04	8.8	1.41	3.39

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0152)	24.89	2.14	2.75	50.49	1.03	0.99
OUTFLOW:	ID= 1 (0155)	24.89	2.03	2.75	50.48	1.01	0.98

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```
| ROUTE CHN(  0187)|
| 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
                   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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV       VOLUME     FLOW RATE     VELOCITY    TRAV.TIME
        (m)      (m)      (cu.m.)       (cms)         (m/s)       (min)
       0.10    99.60    .522E+02        0.0          0.19        64.71
       0.19    99.69    .166E+03        0.1          0.37        33.71
       0.29    99.79    .289E+03        0.2          0.49        25.23
       0.38    99.88    .422E+03        0.3          0.59        21.07
       0.48    99.98    .565E+03        0.5          0.67        18.52
       0.57   100.07    .717E+03        0.7          0.74        16.76
       0.67   100.17    .879E+03        0.9          0.80        15.45
       0.76   100.26    .105E+04        1.2          0.86        14.43
       0.86   100.36    .123E+04        1.5          0.91        13.60
       0.95   100.45    .142E+04        1.8          0.96        12.91
       1.05   100.55    .162E+04        2.2          1.00        12.32
       1.16   100.66    .189E+04        2.7          1.07        11.55
       1.28   100.78    .219E+04        3.4          1.14        10.83
       1.39   100.89    .252E+04        4.1          1.20        10.28
       1.50   101.00    .289E+04        4.9          1.25         9.85
       1.61   101.11    .328E+04        5.8          1.30         9.50
       1.72   101.22    .370E+04        6.7          1.34         9.20
       1.84   101.34    .415E+04        7.7          1.38         8.95
       1.95   101.45    .463E+04        8.8          1.41         8.73

                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0155)   24.89     2.03    2.75  50.48      1.00      0.98
   OUTFLOW: ID= 1 (  0187)   24.89     1.73    2.83  50.47      0.92      0.94
```

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--------------------
| CALIB            |
| NASHYD   (  0015)|   Area     (ha)=  15.31   Curve Number    (CN)= 87.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   6.90   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.58

        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)=   1.008

     PEAK FLOW       (cms)=   1.167 (i)
     TIME TO PEAK    (hrs)=   3.250
     RUNOFF VOLUME    (mm)=  48.387
     TOTAL RAINFALL   (mm)=  80.310
     RUNOFF COEFFICIENT   =   0.603

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

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--------------------
| CALIB            |
| STANDHYD (  0138)|   Area     (ha)=   0.56
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.50          0.06
     Dep. Storage     (mm)=       1.00          2.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      60.94         40.00
     Mannings n             =     0.013         0.250

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


                        ---- TRANSFORMED HYETOGRAPH ----
          TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
           hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
         0.083    0.00 | 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
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               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        69.25
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      2.14 (ii)    5.45 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.31         0.16
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.10         0.01        0.113 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.75         2.75
     RUNOFF VOLUME    (mm)=     79.31        64.88        77.86
     TOTAL RAINFALL   (mm)=     80.31        80.31        80.31
     RUNOFF COEFFICIENT   =      0.99         0.81         0.97

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  94.0    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 (  0139)|   Area     (ha)=   0.51
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.46         0.05
     Dep. Storage     (mm)=       1.00         4.16
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      58.08        40.00
     Mannings n           =      0.013        0.250

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

                         ---- TRANSFORMED HYETOGRAPH ----
      TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
       hrs   mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
     0.083     0.00 | 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        67.59
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      2.08 (ii)    5.39 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.31         0.16
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.09         0.01         0.103 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.75         2.75
     RUNOFF VOLUME    (mm)=     79.31        60.87        77.46
     TOTAL RAINFALL   (mm)=     80.31        80.31        80.31
     RUNOFF COEFFICIENT   =      0.99         0.76         0.96

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  93.0    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  (  0169)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)     (mm)
       ID1= 1 (  0138):      0.56    0.113     2.75    77.86
     + ID2= 2 (  0139):      0.51    0.103     2.75    77.46
       ================================================
       ID = 3 (  0169):      1.06    0.216     2.75    77.67

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0184)|
| 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
                   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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)       (cms)         (m/s)       (min)
       0.10    99.60    .164E+02         0.0          0.19       20.34
       0.19    99.69    .521E+02         0.1          0.37       10.60
       0.29    99.79    .909E+02         0.2          0.49        7.93
       0.38    99.88    .133E+03         0.3          0.59        6.62
       0.48    99.98    .178E+03         0.5          0.67        5.82
       0.57   100.07    .225E+03         0.7          0.74        5.27
       0.67   100.17    .276E+03         0.9          0.80        4.86
       0.76   100.26    .330E+03         1.2          0.86        4.54
       0.86   100.36    .387E+03         1.5          0.91        4.28
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      0.95   100.45    .447E+03       1.8          0.96       4.06
      1.05   100.55    .510E+03       2.2          1.00       3.87
      1.16   100.66    .593E+03       2.7          1.07       3.63
      1.28   100.78    .688E+03       3.4          1.14       3.40
      1.39   100.89    .793E+03       4.1          1.20       3.23
      1.50   101.00    .907E+03       4.9          1.25       3.10
      1.61   101.11    .103E+04       5.8          1.30       2.99
      1.72   101.22    .116E+04       6.7          1.34       2.89
      1.84   101.34    .130E+04       7.7          1.38       2.81
      1.95   101.45    .146E+04       8.8          1.41       2.74

                                    <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0169)    1.06     0.22    2.75  77.67      0.30      0.50
   OUTFLOW: ID= 1 (  0184)    1.06     0.21    2.75  77.59      0.30      0.50
```

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--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0197)|   Area    (ha)=  10.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  35.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.00         5.00
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     258.20        40.00
     Mannings n           =      0.013        0.250

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

                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    0.00 | 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        78.75
               over (min)        5.00        15.00
     Storage Coeff.  (min)=      5.09 (ii)   12.86 (ii)
     Unit Hyd. Tpeak (min)=      5.00        15.00
     Unit Hyd. peak  (cms)=      0.21         0.08
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.72         0.88          1.584 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.83           2.75
     RUNOFF VOLUME    (mm)=     79.31        52.70          62.01
     TOTAL RAINFALL   (mm)=     80.31        80.31          80.31
     RUNOFF COEFFICIENT   =      0.99         0.66           0.77

       (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 (  0206)|   Area    (ha)=  10.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  35.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.00         5.00
     Dep. Storage     (mm)=       1.00         5.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     258.20        40.00
     Mannings n           =      0.013        0.250

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

                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    0.00 | 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        78.75
               over (min)        5.00        15.00
     Storage Coeff.  (min)=      5.09 (ii)   12.86 (ii)
     Unit Hyd. Tpeak (min)=      5.00        15.00
     Unit Hyd. peak  (cms)=      0.21         0.08
                                                        *TOTALS*
```

```
     PEAK FLOW       (cms)=       0.72         0.88          1.584 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.83           2.75
     RUNOFF VOLUME    (mm)=      79.31        52.70          62.01
     TOTAL RAINFALL   (mm)=      80.31        80.31          80.31
     RUNOFF COEFFICIENT   =       0.99         0.66           0.77


       (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  (  0185)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0184):     1.06    0.213     2.75    77.59
     + ID2= 2 (  0197):    10.00    1.584     2.75    62.01
       ====================================================
       ID = 3 (  0185):    11.06    1.797     2.75    63.51

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

--------------------
| ADD HYD  (  0185)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0185):    11.06    1.797     2.75    63.51
     + ID2= 2 (  0206):    10.00    1.584     2.75    62.01
       ====================================================
       ID = 1 (  0185):    21.06    3.380     2.75    62.80

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0186)|
| 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
                   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

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY    TRAV.TIME
         (m)      (m)     (cu.m.)       (cms)         (m/s)       (min)
        0.10    99.60    .616E+02         0.0          0.19       76.29
        0.19    99.69    .196E+03         0.1          0.37       39.74
        0.29    99.79    .341E+03         0.2          0.49       29.74
        0.38    99.88    .498E+03         0.3          0.59       24.84
        0.48    99.98    .666E+03         0.5          0.67       21.84
        0.57   100.07    .846E+03         0.7          0.74       19.76
        0.67   100.17    .104E+04         0.9          0.80       18.22
        0.76   100.26    .124E+04         1.2          0.86       17.01
        0.86   100.36    .145E+04         1.5          0.91       16.03
        0.95   100.45    .168E+04         1.8          0.96       15.22
        1.05   100.55    .191E+04         2.2          1.00       14.52
        1.16   100.66    .222E+04         2.7          1.07       13.62
        1.28   100.78    .258E+04         3.4          1.14       12.77
        1.39   100.89    .297E+04         4.1          1.20       12.12
        1.50   101.00    .340E+04         4.9          1.25       11.61
        1.61   101.11    .386E+04         5.8          1.30       11.20
        1.72   101.22    .436E+04         6.7          1.34       10.85
        1.84   101.34    .489E+04         7.7          1.38       10.56
        1.95   101.45    .546E+04         8.8          1.41       10.30

                                      <---- hydrograph ---->   <-pipe / channel->
                                 AREA    QPEAK    TPEAK   R.V.   MAX DEPTH  MAX VEL
                                 (ha)    (cms)    (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0185)    21.06     3.38     2.75  62.80      1.28      1.14
   OUTFLOW: ID= 1 (  0186)    21.06     2.80     2.83  62.78      1.18      1.08


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0196)|   Area     (ha)=  10.00
|ID= 1 DT= 5.0 min |   Total Imp(%)=  50.00   Dir. Conn.(%)=  35.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.00          5.00
     Dep. Storage     (mm)=       1.00          5.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     258.20         40.00
     Mannings n             =     0.013         0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
      TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
       hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
     0.083     0.00 | 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        78.75
               over (min)        5.00        15.00
     Storage Coeff.  (min)=       5.09 (ii)   12.86 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.21         0.08
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.72         0.88          1.584 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.83           2.75
     RUNOFF VOLUME    (mm)=      79.31        52.70          62.01
     TOTAL RAINFALL   (mm)=      80.31        80.31          80.31
     RUNOFF COEFFICIENT   =       0.99         0.66           0.77


       (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  (  0183)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  0015):    15.31    1.167     3.25    48.39
      + ID2= 2 (  0186):    21.06    2.803     2.83    62.78
        ================================================
        ID = 3 (  0183):    36.37    3.659     2.83    56.72

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

--------------------
| ADD HYD  (  0183)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
        ID1= 3 (  0183):    36.37    3.659     2.83    56.72
      + ID2= 2 (  0187):    24.89    1.730     2.83    50.47
        ========================================================
        ID = 1 (  0183):    61.26    5.390     2.83    54.18

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

--------------------
| ADD HYD  (  0183)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  0183):    61.26    5.390     2.83    54.18
      + ID2= 2 (  0196):    10.00    1.584     2.75    62.01
        ================================================
        ID = 3 (  0183):    71.26    6.673     2.75    55.28

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0180)|
| 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
                    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

          <---------------------- TRAVEL TIME TABLE ---------------------->
           DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY   TRAV.TIME
            (m)       (m)     (cu.m.)       (cms)         (m/s)       (min)
           0.10     99.60    .371E+02         0.0          0.19       45.93
           0.19     99.69    .118E+03         0.1          0.37       23.93
           0.29     99.79    .205E+03         0.2          0.49       17.91
           0.38     99.88    .300E+03         0.3          0.59       14.96
           0.48     99.98    .401E+03         0.5          0.67       13.15
           0.57    100.07    .509E+03         0.7          0.74       11.90
           0.67    100.17    .624E+03         0.9          0.80       10.97
           0.76    100.26    .746E+03         1.2          0.86       10.24
           0.86    100.36    .875E+03         1.5          0.91        9.65
           0.95    100.45    .101E+04         1.8          0.96        9.16
           1.05    100.55    .115E+04         2.2          1.00        8.74
           1.16    100.66    .134E+04         2.7          1.07        8.20
           1.28    100.78    .155E+04         3.4          1.14        7.69
           1.39    100.89    .179E+04         4.1          1.20        7.30
           1.50    101.00    .205E+04         4.9          1.25        6.99
           1.61    101.11    .233E+04         5.8          1.30        6.74
           1.72    101.22    .263E+04         6.7          1.34        6.53
           1.84    101.34    .295E+04         7.7          1.38        6.36
           1.95    101.45    .329E+04         8.8          1.41        6.20

                                      <---- hydrograph ---->   <-pipe / channel->
                                 AREA    QPEAK    TPEAK    R.V.   MAX DEPTH  MAX VEL
                                 (ha)    (cms)    (hrs)    (mm)       (m)      (m/s)
     INFLOW : ID= 2 (  0183)    71.26     6.67     2.75   55.28       1.72      1.34
     OUTFLOW: ID= 1 (  0180)    71.26     6.30     2.92   55.28       1.68      1.32


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0016)|   Area     (ha)=  22.20   Curve Number    (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.86   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.55

        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)=   1.542

     PEAK FLOW       (cms)=   1.552 (i)
     TIME TO PEAK    (hrs)=   3.167
     RUNOFF VOLUME    (mm)=  43.438
     TOTAL RAINFALL   (mm)=  80.310
     RUNOFF COEFFICIENT   =   0.541

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

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

--------------------
| ADD HYD  (  0189)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  0016):    22.20   1.552     3.17    43.44
      + ID2= 2 (  0180):    71.26   6.302     2.92    55.28
        ==========================================================
        ID = 3 (  0189):    93.46   7.631     2.92    52.46

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

--------------------
| ADD HYD  (  0144)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)      (mm)
        ID1= 1 (  0188):   108.66   4.813     3.42    38.35
      + ID2= 2 (  0189):    93.46   7.631     2.92    52.46
        ==========================================================
        ID = 3 (  0144):   202.12  11.403     3.08    44.88

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

--------------------
| ROUTE CHN(  0179)|
| 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
                  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
```

```
    <---------------------- TRAVEL TIME TABLE ---------------------->
     DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY   TRAV.TIME
      (m)       (m)     (cu.m.)       (cms)         (m/s)      (min)
      0.10     99.60    .223E+02        0.0          0.19      27.60
      0.19     99.69    .707E+02        0.1          0.37      14.38
      0.29     99.79    .123E+03        0.2          0.49      10.76
      0.38     99.88    .180E+03        0.3          0.59       8.99
      0.48     99.98    .241E+03        0.5          0.67       7.90
      0.57    100.07    .306E+03        0.7          0.74       7.15
      0.67    100.17    .375E+03        0.9          0.80       6.59
      0.76    100.26    .448E+03        1.2          0.86       6.16
      0.86    100.36    .526E+03        1.5          0.91       5.80
      0.95    100.45    .607E+03        1.8          0.96       5.51
      1.05    100.55    .692E+03        2.2          1.00       5.25
      1.16    100.66    .804E+03        2.7          1.07       4.93
      1.28    100.78    .934E+03        3.4          1.14       4.62
      1.39    100.89    .108E+04        4.1          1.20       4.39
      1.50    101.00    .123E+04        4.9          1.25       4.20
      1.61    101.11    .140E+04        5.8          1.30       4.05
      1.72    101.22    .158E+04        6.7          1.34       3.93
      1.84    101.34    .177E+04        7.7          1.38       3.82
      1.95    101.45    .197E+04        8.8          1.41       3.72

    **** WARNING:  TRAVEL TIME TABLE EXCEEDED
                                        <---- hydrograph ---->   <-pipe / channel->
                                  AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                  (ha)    (cms)   (hrs)   (mm)       (m)       (m/s)
  INFLOW : ID= 2 (  0144)  202.12   11.40    3.08   44.88       1.94       1.41
  OUTFLOW: ID= 1 (  0179)  202.12   11.37    3.17   44.88       1.95       1.41
```

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0018)|   Area     (ha)=   6.98   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=  10.16   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.42

       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)= 0.635

PEAK FLOW (cms)= 0.494 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 37.932
TOTAL RAINFALL (mm)= 80.310
RUNOFF COEFFICIENT = 0.472

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

ADD HYD (0178)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0018):	6.98	0.494	3.00	37.93
+	ID2= 2 (0179):	202.12	11.367	3.17	44.88
	ID = 3 (0178):	209.10	11.847	3.17	44.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0116)	Area (ha)=	5.65	Curve Number (CN)=	85.0	
ID= 1 DT= 5.0 min	Ia (mm)=	6.82	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.51			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	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)= 0.423

PEAK FLOW (cms)= 0.436 (i)
TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 45.644
TOTAL RAINFALL (mm)= 80.310
RUNOFF COEFFICIENT = 0.568

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

CALIB					
STANDHYD (0200)	Area (ha)=	10.00			
ID= 1 DT= 5.0 min	Total Imp(%)=	50.00	Dir. Conn.(%)=	35.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	5.00	5.00
Dep. Storage	(mm)=	1.00	5.00
Average Slope	(%)=	1.00	2.00
Length	(m)=	258.20	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	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		

				TOTALS
Max.Eff.Inten.(mm/hr)=		73.88	78.75	
over (min)		5.00	15.00	
Storage Coeff. (min)=		5.09 (ii)	12.86 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.21	0.08	
PEAK FLOW	(cms)=	0.72	0.88	1.584 (iii)
TIME TO PEAK	(hrs)=	2.75	2.83	2.75
RUNOFF VOLUME	(mm)=	79.31	52.70	62.01
TOTAL RAINFALL	(mm)=	80.31	80.31	80.31
RUNOFF COEFFICIENT	=	0.99	0.66	0.77

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:

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

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--------------------
| ADD HYD  (  0204)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)      (mm)
        ID1= 1 (  0116):     5.65   0.436     3.17    45.64
      + ID2= 2 (  0200):    10.00   1.584     2.75    62.01
        ====================================================
        ID = 3 (  0204):    15.65   1.873     2.75    56.10

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

 FINISH
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       V    V   I    SSSSS  U   U    A    L              (v 6.1.2003)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.1\VO2\voin.dat
  Output  filename: C:\Users\rarcher\AppData\Local\Civica\VH5\e5d0a268-d0b9-4109-
8320-f15a73aa9d73\c6235ef4-df0d-4a5f-adf1-10e4bb2bd2a1\scen
  Summary filename: C:\Users\rarcher\AppData\Local\Civica\VH5\e5d0a268-d0b9-4109-
8320-f15a73aa9d73\c6235ef4-df0d-4a5f-adf1-10e4bb2bd2a1\scen


DATE: 12-17-2021                          TIME: 01:08:43

USER:


COMMENTS: _____________________________________________________________


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  ***********************************************
  ** SIMULATION : 25 Year, 6 Hour AES           **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\rarcher\AppD
|                  |              ata\Local\Temp\
|                  |              0d0c43fb-e992-40e3-a52f-9217c8977945\ce7ff5c0
| Ptotal= 65.59 mm |    Comments: 25 Year 6 Hour AES (Bloor, TRCA)
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.25    0.00 |  2.00   22.30 |  3.75    9.18 |  5.50    1.31
                0.50    1.31 |  2.25   22.30 |  4.00    5.25 |  5.75    1.31
                0.75    1.31 |  2.50   60.35 |  4.25    5.25 |  6.00    1.31
                1.00    1.31 |  2.75   60.35 |  4.50    2.62 |  6.25    1.31
                1.25    1.31 |  3.00   17.06 |  4.75    2.62 |
                1.50    7.87 |  3.25   17.06 |  5.00    1.31 |
                1.75    7.87 |  3.50    9.18 |  5.25    1.31 |

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--------------------
| CALIB            |
| NASHYD   (  0116)|   Area     (ha)=   7.40   Curve Number   (CN)= 85.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   6.82   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.51

        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    7.87 | 3.250   17.06 |  4.83    1.31
               0.167    0.00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
               0.250    0.00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
               0.333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
               0.417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
               0.500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
               0.583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
               0.667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
               0.750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
               0.833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
               0.917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
               1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
               1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
               1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
               1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
               1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
               1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
               1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
               1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

     Unit Hyd Qpeak  (cms)=   0.555

     PEAK FLOW       (cms)=   0.414 (i)
     TIME TO PEAK    (hrs)=   3.167
     RUNOFF VOLUME    (mm)=  33.338
     TOTAL RAINFALL   (mm)=  65.590
     RUNOFF COEFFICIENT   =   0.508

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0117)|   Area     (ha)=   4.30   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   6.99   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

        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    7.87 | 3.250   17.06 |  4.83    1.31
               0.167    0.00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
               0.250    0.00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
               0.333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
               0.417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
```

0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Unit Hyd Qpeak (cms)= 0.401

PEAK FLOW (cms)= 0.263 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 32.092
TOTAL RAINFALL (mm)= 65.590
RUNOFF COEFFICIENT = 0.489

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

ROUTE CHN(0080)
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.272E+02	0.0	0.19	33.70
0.19	99.69	.864E+02	0.1	0.37	17.55
0.29	99.79	.151E+03	0.2	0.49	13.14
0.38	99.88	.220E+03	0.3	0.59	10.97
0.48	99.98	.294E+03	0.5	0.67	9.64
0.57	100.07	.374E+03	0.7	0.74	8.73
0.67	100.17	.458E+03	0.9	0.80	8.05
0.76	100.26	.547E+03	1.2	0.86	7.51
0.86	100.36	.642E+03	1.5	0.91	7.08
0.95	100.45	.741E+03	1.8	0.96	6.72
1.05	100.55	.845E+03	2.2	1.00	6.41
1.16	100.66	.982E+03	2.7	1.07	6.02
1.28	100.78	.114E+04	3.4	1.14	5.64
1.39	100.89	.131E+04	4.1	1.20	5.35
1.50	101.00	.150E+04	4.9	1.25	5.13
1.61	101.11	.171E+04	5.8	1.30	4.95
1.72	101.22	.193E+04	6.7	1.34	4.79
1.84	101.34	.216E+04	7.7	1.38	4.66
1.95	101.45	.241E+04	8.8	1.41	4.55

<---- hydrograph ----> <-pipe / channel->

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0117)	4.30	0.26	3.00	32.09	0.33	0.53
OUTFLOW: ID= 1 (0080)	4.30	0.24	3.17	32.05	0.32	0.52

CALIB
NASHYD (0022)| Area (ha)= 52.82 Curve Number (CN)= 83.0
ID= 1 DT= 5.0 min | Ia (mm)= 7.40 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.79

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Unit Hyd Qpeak (cms)= 2.554

PEAK FLOW (cms)= 2.062 (i)
TIME TO PEAK (hrs)= 3.583
RUNOFF VOLUME (mm)= 30.723
TOTAL RAINFALL (mm)= 65.590
RUNOFF COEFFICIENT = 0.468

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

ADD HYD (0088)|	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0022):	52.82	2.062	3.58	30.72
+ ID2= 2 (0080):	4.30	0.242	3.17	32.05

```
       ================================================
       ID = 3 (  0088):    57.12   2.273     3.50    30.82

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0101)|   Area     (ha)=   7.93   Curve Number    (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   6.93   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.48

        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    7.87 | 3.250   17.06 |  4.83    1.31
   0.167    0.00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
   0.250    0.00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
   0.333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
   0.417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
   0.500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
   0.583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
   0.667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
   0.750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
   0.833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
   0.917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
   1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
   1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
   1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
   1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
   1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
   1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
   1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
   1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

    Unit Hyd Qpeak  (cms)=   0.631

    PEAK FLOW       (cms)=   0.441 (i)
    TIME TO PEAK    (hrs)=   3.083
    RUNOFF VOLUME    (mm)=  32.141
    TOTAL RAINFALL   (mm)=  65.590
    RUNOFF COEFFICIENT   =   0.490

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0002)|   Area     (ha)=  13.35   Curve Number    (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.07   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.56

        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    7.87 | 3.250   17.06 |  4.83    1.31
   0.167    0.00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
   0.250    0.00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
   0.333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
   0.417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
   0.500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
   0.583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
   0.667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
   0.750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
   0.833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
   0.917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
   1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
   1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
   1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
   1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
   1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
   1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
   1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
   1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

    Unit Hyd Qpeak  (cms)=   0.910

    PEAK FLOW       (cms)=   0.676 (i)
    TIME TO PEAK    (hrs)=   3.250
    RUNOFF VOLUME    (mm)=  32.034
    TOTAL RAINFALL   (mm)=  65.590
    RUNOFF COEFFICIENT   =   0.488

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0102)|   Area     (ha)=   2.00   Curve Number    (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   6.98   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.21

        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    7.87 | 3.250   17.06 |  4.83    1.31
   0.167    0.00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
   0.250    0.00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
   0.333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
   0.417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
   0.500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
   0.583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
   0.667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
   0.750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
   0.833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
   0.917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
   1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
   1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
   1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
   1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
   1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
   1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
   1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
   1.583    7.87 | 3.167   17.06 | 4.750    2.62 |
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     Unit Hyd Qpeak  (cms)=   0.364

     PEAK FLOW       (cms)=   0.171 (i)
     TIME TO PEAK    (hrs)=   2.833
     RUNOFF VOLUME    (mm)=  32.055
     TOTAL RAINFALL   (mm)=  65.590
     RUNOFF COEFFICIENT   =   0.489

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0070)|   Area     (ha)=   0.35
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.32         0.04
     Dep. Storage     (mm)=       1.00         4.96
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      48.36        40.00
     Mannings n             =     0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
              TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    0.00 | 1.667    7.87 | 3.250   17.06 |  4.83    1.31
             0.167    0.00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
             0.250    0.00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
             0.333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
             0.417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
             0.500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
             0.583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
             0.667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
             0.750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
             0.833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
             0.917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
             1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
             1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
             1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
             1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
             1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
             1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
             1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
             1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

     Max.Eff.Inten.(mm/hr)=      60.35        50.28
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      2.02 (ii)    5.61 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.31         0.15
                                                    *TOTALS*
     PEAK FLOW       (cms)=      0.05         0.00          0.058 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.75           2.75
     RUNOFF VOLUME    (mm)=     64.59        42.87          62.41
     TOTAL RAINFALL   (mm)=     65.59        65.59          65.59
     RUNOFF COEFFICIENT   =      0.98         0.65           0.95

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  91.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0098)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0002):    13.35   0.676     3.25    32.03
      + ID2= 2 (  0102):     2.00   0.171     2.83    32.06
        ================================================
        ID = 3 (  0098):    15.35   0.765     3.17    32.04

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

--------------------
| ADD HYD  (  0098)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0098):    15.35   0.765     3.17    32.04
      + ID2= 2 (  0070):     0.35   0.058     2.75    62.41
        ================================================
        ID = 1 (  0098):    15.70   0.782     3.17    32.72

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0099)|
| 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
                   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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE     VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)       (min)
       0.10    99.60    .231E+02        0.0         0.19       28.62
       0.19    99.69    .734E+02        0.1         0.37       14.91
       0.29    99.79    .128E+03        0.2         0.49       11.16
       0.38    99.88    .187E+03        0.3         0.59        9.32
       0.48    99.98    .250E+03        0.5         0.67        8.19
       0.57   100.07    .317E+03        0.7         0.74        7.41
       0.67   100.17    .389E+03        0.9         0.80        6.84
       0.76   100.26    .465E+03        1.2         0.86        6.38
       0.86   100.36    .545E+03        1.5         0.91        6.02
       0.95   100.45    .629E+03        1.8         0.96        5.71
```

1.05	100.55	.718E+03	2.2	1.00	5.45
1.16	100.66	.834E+03	2.7	1.07	5.11
1.28	100.78	.968E+03	3.4	1.14	4.79
1.39	100.89	.112E+04	4.1	1.20	4.55
1.50	101.00	.128E+04	4.9	1.25	4.36
1.61	101.11	.145E+04	5.8	1.30	4.20
1.72	101.22	.164E+04	6.7	1.34	4.07
1.84	101.34	.184E+04	7.7	1.38	3.96
1.95	101.45	.205E+04	8.8	1.41	3.86

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0098)	15.70	0.78	3.17	32.72	0.60	0.75
OUTFLOW: ID= 1 (0099)	15.70	0.77	3.25	32.71	0.59	0.75

CALIB NASHYD (0103) ID= 1 DT= 5.0 min				
	Area (ha)=	5.49	Curve Number (CN)=	84.0
	Ia (mm)=	6.90	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.32		

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

---- TRANSFORMED HYETOGRAPH ---- TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Unit Hyd Qpeak (cms)= 0.656

PEAK FLOW (cms)= 0.389 (i)
TIME TO PEAK (hrs)= 2.917
RUNOFF VOLUME (mm)= 32.159
TOTAL RAINFALL (mm)= 65.590
RUNOFF COEFFICIENT = 0.490

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

ADD HYD (0181) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0103):	5.49	0.389	2.92	32.16
+ ID2= 2 (0099):	15.70	0.770	3.25	32.71
ID = 3 (0181):	21.19	1.091	3.08	32.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0119) 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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.287E+02	0.0	0.19	35.58
0.19	99.69	.912E+02	0.1	0.37	18.54
0.29	99.79	.159E+03	0.2	0.49	13.87
0.38	99.88	.232E+03	0.3	0.59	11.59
0.48	99.98	.311E+03	0.5	0.67	10.18
0.57	100.07	.394E+03	0.7	0.74	9.22
0.67	100.17	.483E+03	0.9	0.80	8.50
0.76	100.26	.578E+03	1.2	0.86	7.93
0.86	100.36	.677E+03	1.5	0.91	7.48
0.95	100.45	.782E+03	1.8	0.96	7.10
1.05	100.55	.893E+03	2.2	1.00	6.77
1.16	100.66	.104E+04	2.7	1.07	6.35
1.28	100.78	.120E+04	3.4	1.14	5.95
1.39	100.89	.139E+04	4.1	1.20	5.65
1.50	101.00	.159E+04	4.9	1.25	5.42
1.61	101.11	.180E+04	5.8	1.30	5.22
1.72	101.22	.203E+04	6.7	1.34	5.06
1.84	101.34	.228E+04	7.7	1.38	4.92
1.95	101.45	.255E+04	8.8	1.41	4.80

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0181)	21.19	1.09	3.08	32.57	0.72	0.83
OUTFLOW: ID= 1 (0119)	21.19	1.06	3.25	32.56	0.71	0.82

CALIB

```
| NASHYD   (  0011)|   Area     (ha)=   5.33   Curve Number    (CN)= 82.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.63   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.50

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

```
     Unit Hyd Qpeak  (cms)=   0.407

     PEAK FLOW       (cms)=   0.264 (i)
     TIME TO PEAK    (hrs)=   3.167
     RUNOFF VOLUME    (mm)=  29.541
     TOTAL RAINFALL   (mm)=  65.590
     RUNOFF COEFFICIENT   =   0.450

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0062)|   Area     (ha)=   0.29
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      0.26         0.03
     Dep. Storage     (mm)=      1.00         3.51
     Average Slope     (%)=      1.00         2.00
     Length            (m)=     44.10        40.00
     Mannings n            =     0.013        0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

```
     Max.Eff.Inten.(mm/hr)=      60.35        54.91
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       1.91 (ii)    5.50 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.31         0.16
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.04         0.00         0.048 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75          2.75
     RUNOFF VOLUME    (mm)=      64.59        49.22         63.05
     TOTAL RAINFALL   (mm)=      65.59        65.59         65.59
     RUNOFF COEFFICIENT   =       0.98         0.75          0.96

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  94.0    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  (  0120)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)      (mm)
       ID1= 1 (  0011):      5.33   0.264     3.17     29.54
     + ID2= 2 (  0101):      7.93   0.441     3.08     32.14
       ================================================
       ID = 3 (  0120):     13.26   0.704     3.17     31.10

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0120)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)      (mm)
       ID1= 3 (  0120):     13.26   0.704     3.17     31.10
     + ID2= 2 (  0119):     21.19   1.056     3.25     32.56
       ================================================
       ID = 1 (  0120):     34.45   1.757     3.17     32.00
```

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

--------------------
| ADD HYD  (  0120)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0120):    34.45   1.757     3.17    32.00
      + ID2= 2 (  0062):     0.29   0.048     2.75    63.05
        ================================================
        ID = 3 (  0120):    34.75   1.771     3.17    32.26

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0122)|
| 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
                   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

     <---------------------- TRAVEL TIME TABLE ----------------------->
      DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY    TRAV.TIME
        (m)      (m)     (cu.m.)       (cms)         (m/s)       (min)
       0.10    99.60    .293E+02         0.0          0.19        36.31
       0.19    99.69    .931E+02         0.1          0.37        18.92
       0.29    99.79    .162E+03         0.2          0.49        14.16
       0.38    99.88    .237E+03         0.3          0.59        11.82
       0.48    99.98    .317E+03         0.5          0.67        10.39
       0.57   100.07    .403E+03         0.7          0.74         9.41
       0.67   100.17    .493E+03         0.9          0.80         8.67
       0.76   100.26    .590E+03         1.2          0.86         8.10
       0.86   100.36    .691E+03         1.5          0.91         7.63
       0.95   100.45    .799E+03         1.8          0.96         7.24
       1.05   100.55    .911E+03         2.2          1.00         6.91
       1.16   100.66    .106E+04         2.7          1.07         6.48
       1.28   100.78    .123E+04         3.4          1.14         6.08
       1.39   100.89    .142E+04         4.1          1.20         5.77
       1.50   101.00    .162E+04         4.9          1.25         5.53
       1.61   101.11    .184E+04         5.8          1.30         5.33
       1.72   101.22    .208E+04         6.7          1.34         5.17
       1.84   101.34    .233E+04         7.7          1.38         5.02
       1.95   101.45    .260E+04         8.8          1.41         4.90

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0120)    34.75     1.77    3.17  32.26      0.94      0.95
   OUTFLOW: ID= 1 (  0122)    34.75     1.72    3.25  32.25      0.92      0.94



--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0010)|   Area     (ha)=   9.22   Curve Number   (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   9.45   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.35

        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    7.87 | 3.250   17.06 |  4.83    1.31
         0.167    0.00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
         0.250    0.00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
         0.333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
         0.417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
         0.500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
         0.583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
         0.667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
         0.750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
         0.833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
         0.917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
         1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
         1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
         1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
         1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
         1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
         1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
         1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
         1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

     Unit Hyd Qpeak  (cms)=   1.006

     PEAK FLOW       (cms)=   0.513 (i)
     TIME TO PEAK    (hrs)=   2.917
     RUNOFF VOLUME    (mm)=  27.229
     TOTAL RAINFALL   (mm)=  65.590
     RUNOFF COEFFICIENT   =   0.415

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

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

--------------------
| ADD HYD  (  0121)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0010):     9.22   0.513     2.92    27.23
      + ID2= 2 (  0122):    34.75   1.721     3.25    32.25
        ================================================
        ID = 3 (  0121):    43.96   2.153     3.25    31.20

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0110)|   Area     (ha)=  15.37   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   6.98   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.75

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Unit Hyd Qpeak (cms)= 0.783

PEAK FLOW (cms)= 0.652 (i)
TIME TO PEAK (hrs)= 3.500
RUNOFF VOLUME (mm)= 32.108
TOTAL RAINFALL (mm)= 65.590
RUNOFF COEFFICIENT = 0.490

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

CALIB	
NASHYD (0007)	Area (ha)= 15.76 Curve Number (CN)= 85.0
ID= 1 DT= 5.0 min	Ia (mm)= 7.08 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 1.03

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Unit Hyd Qpeak (cms)= 0.584

PEAK FLOW (cms)= 0.559 (i)
TIME TO PEAK (hrs)= 3.833
RUNOFF VOLUME (mm)= 33.132
TOTAL RAINFALL (mm)= 65.590
RUNOFF COEFFICIENT = 0.505

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

ROUTE CHN(0164)	
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.523E+02	0.0	0.19	64.86
0.19	99.69	.166E+03	0.1	0.37	33.79
0.29	99.79	.290E+03	0.2	0.49	25.29
0.38	99.88	.423E+03	0.3	0.59	21.12
0.48	99.98	.566E+03	0.5	0.67	18.56
0.57	100.07	.719E+03	0.7	0.74	16.80
0.67	100.17	.881E+03	0.9	0.80	15.49
0.76	100.26	.105E+04	1.2	0.86	14.46
0.86	100.36	.123E+04	1.5	0.91	13.63
0.95	100.45	.143E+04	1.8	0.96	12.94
1.05	100.55	.163E+04	2.2	1.00	12.34
1.16	100.66	.189E+04	2.7	1.07	11.58
1.28	100.78	.219E+04	3.4	1.14	10.85
1.39	100.89	.253E+04	4.1	1.20	10.31
1.50	101.00	.289E+04	4.9	1.25	9.87
1.61	101.11	.328E+04	5.8	1.30	9.52
1.72	101.22	.371E+04	6.7	1.34	9.23
1.84	101.34	.416E+04	7.7	1.38	8.97
1.95	101.45	.464E+04	8.8	1.41	8.75

		<---- hydrograph ---->				<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0007)	15.76	0.56	3.83	33.13	0.50	0.68
OUTFLOW:	ID= 1 (0164)	15.76	0.54	4.08	33.12	0.49	0.67

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0064)|   Area    (ha)=   1.35
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.22         0.14
     Dep. Storage     (mm)=       1.00         4.16
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      94.89        40.00
     Mannings n           =      0.013        0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    0.00 | 1.667    7.87 | 3.250   17.06 |  4.83    1.31
              0.167    0.00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
              0.250    0.00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
              0.333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
              0.417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
              0.500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
              0.583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
              0.667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
              0.750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
              0.833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
              0.917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
              1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
              1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
              1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
              1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
              1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
              1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
              1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
              1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

     Max.Eff.Inten.(mm/hr)=      60.35        53.38
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      3.03 (ii)    6.62 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.27         0.14
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.20         0.02          0.223 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.75           2.75
     RUNOFF VOLUME    (mm)=     64.59        46.85          62.81
     TOTAL RAINFALL   (mm)=     65.59        65.59          65.59
     RUNOFF COEFFICIENT   =      0.98         0.71           0.96

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  93.0    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  (  0161)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0110):    15.37    0.652     3.50    32.11
      + ID2= 2 (  0164):    15.76    0.535     4.08    33.12
        ==========================================================
        ID = 3 (  0161):    31.14    1.116     3.75    32.62

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0161)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0161):    31.14    1.116     3.75    32.62
      + ID2= 2 (  0064):     1.35    0.223     2.75    62.81
        ==========================================================
        ID = 1 (  0161):    32.49    1.150     3.75    33.87

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0166)|   Area    (ha)=   0.56
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.50         0.06
     Dep. Storage     (mm)=       1.00         4.08
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      61.16        40.00
     Mannings n           =      0.013        0.250

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


                              ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    0.00 | 1.667    7.87 | 3.250   17.06 |  4.83    1.31
              0.167    0.00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
              0.250    0.00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
              0.333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
              0.417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
              0.500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
              0.583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
              0.667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
              0.750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
              0.833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
              0.917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
              1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
              1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
              1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
              1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
              1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
              1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
              1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
```

```
                1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

     Max.Eff.Inten.(mm/hr)=      60.35        39.89
                 over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.33 (ii)    5.91 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.30         0.15
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.08         0.01          0.090 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75          2.75
     RUNOFF VOLUME    (mm)=      64.59        33.33         61.46
     TOTAL RAINFALL   (mm)=      65.59        65.59         65.59
     RUNOFF COEFFICIENT   =       0.98         0.51          0.94

***** 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.

--------------------------------------------------------------------------------
--------------------
| ADD HYD  (  0168)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)     (cms)    (hrs)      (mm)
        ID1= 1 (  0161):    32.49    1.150     3.75     33.87
      + ID2= 2 (  0166):     0.56    0.090     2.75     61.46
        ====================================================
        ID = 3 (  0168):    33.05    1.164     3.75     34.34

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0163)|
| 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
                   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

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        0.10    99.60    .132E+02        0.0          0.19       16.38
        0.19    99.69    .420E+02        0.1          0.37        8.53
        0.29    99.79    .732E+02        0.2          0.49        6.39
        0.38    99.88    .107E+03        0.3          0.59        5.33
        0.48    99.98    .143E+03        0.5          0.67        4.69
        0.57   100.07    .182E+03        0.7          0.74        4.24
        0.67   100.17    .223E+03        0.9          0.80        3.91
        0.76   100.26    .266E+03        1.2          0.86        3.65
        0.86   100.36    .312E+03        1.5          0.91        3.44
        0.95   100.45    .360E+03        1.8          0.96        3.27
        1.05   100.55    .411E+03        2.2          1.00        3.12
        1.16   100.66    .477E+03        2.7          1.07        2.92
        1.28   100.78    .554E+03        3.4          1.14        2.74
        1.39   100.89    .638E+03        4.1          1.20        2.60
        1.50   101.00    .730E+03        4.9          1.25        2.49
        1.61   101.11    .829E+03        5.8          1.30        2.40
        1.72   101.22    .936E+03        6.7          1.34        2.33
        1.84   101.34    .105E+04        7.7          1.38        2.27
        1.95   101.45    .117E+04        8.8          1.41        2.21

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK    TPEAK   R.V.   MAX DEPTH  MAX VEL
                                 (ha)    (cms)    (hrs)   (mm)      (m)       (m/s)
   INFLOW : ID= 2 (  0168)    33.05     1.16     3.75   34.34      0.75       0.84
   OUTFLOW: ID= 1 (  0163)    33.05     1.16     3.75   34.34      0.74       0.84

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--------------------
| CALIB            |
| NASHYD   (  0008)|   Area     (ha)=  18.33   Curve Number    (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   8.44   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.77

        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     7.87 | 3.250    17.06 |  4.83     1.31
             0.167     0.00 | 1.750     7.87 | 3.333     9.18 |  4.92     1.31
             0.250     0.00 | 1.833    22.30 | 3.417     9.18 |  5.00     1.31
             0.333     1.31 | 1.917    22.30 | 3.500     9.18 |  5.08     1.31
             0.417     1.31 | 2.000    22.30 | 3.583     9.18 |  5.17     1.31
             0.500     1.31 | 2.083    22.30 | 3.667     9.18 |  5.25     1.31
             0.583     1.31 | 2.167    22.30 | 3.750     9.18 |  5.33     1.31
             0.667     1.31 | 2.250    22.30 | 3.833     5.25 |  5.42     1.31
             0.750     1.31 | 2.333    60.35 | 3.917     5.25 |  5.50     1.31
             0.833     1.31 | 2.417    60.35 | 4.000     5.25 |  5.58     1.31
             0.917     1.31 | 2.500    60.35 | 4.083     5.25 |  5.67     1.31
             1.000     1.31 | 2.583    60.35 | 4.167     5.25 |  5.75     1.31
             1.083     1.31 | 2.667    60.35 | 4.250     5.25 |  5.83     1.31
             1.167     1.31 | 2.750    60.35 | 4.333     2.62 |  5.92     1.31
             1.250     1.31 | 2.833    17.06 | 4.417     2.62 |  6.00     1.31
             1.333     7.87 | 2.917    17.06 | 4.500     2.62 |  6.08     1.31
             1.417     7.87 | 3.000    17.06 | 4.583     2.62 |  6.17     1.31
             1.500     7.87 | 3.083    17.06 | 4.667     2.62 |  6.25     1.31
             1.583     7.87 | 3.167    17.06 | 4.750     2.62 |

     Unit Hyd Qpeak  (cms)=   0.909

     PEAK FLOW       (cms)=   0.735 (i)
     TIME TO PEAK    (hrs)=   3.500
     RUNOFF VOLUME    (mm)=  30.950
     TOTAL RAINFALL   (mm)=  65.590
     RUNOFF COEFFICIENT   =   0.472

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

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--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0093)|
| 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
                  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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.10    99.60    .305E+02       0.0         0.19       37.74
       0.19    99.69    .967E+02       0.1         0.37       19.66
       0.29    99.79    .169E+03       0.2         0.49       14.72
       0.38    99.88    .246E+03       0.3         0.59       12.29
       0.48    99.98    .330E+03       0.5         0.67       10.80
       0.57   100.07    .418E+03       0.7         0.74        9.78
       0.67   100.17    .513E+03       0.9         0.80        9.01
       0.76   100.26    .613E+03       1.2         0.86        8.42
       0.86   100.36    .719E+03       1.5         0.91        7.93
       0.95   100.45    .830E+03       1.8         0.96        7.53
       1.05   100.55    .947E+03       2.2         1.00        7.18
       1.16   100.66    .110E+04       2.7         1.07        6.74
       1.28   100.78    .128E+04       3.4         1.14        6.32
       1.39   100.89    .147E+04       4.1         1.20        6.00
       1.50   101.00    .168E+04       4.9         1.25        5.75
       1.61   101.11    .191E+04       5.8         1.30        5.54
       1.72   101.22    .216E+04       6.7         1.34        5.37
       1.84   101.34    .242E+04       7.7         1.38        5.22
       1.95   101.45    .270E+04       8.8         1.41        5.09

                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0008)   18.33     0.73    3.50  30.95      0.58      0.74
   OUTFLOW: ID= 1 (  0093)   18.33     0.72    3.67  30.95      0.57      0.74


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0111)|   Area    (ha)=  21.58   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.61

        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     7.87 | 3.250    17.06 |  4.83     1.31
             0.167     0.00 | 1.750     7.87 | 3.333     9.18 |  4.92     1.31
             0.250     0.00 | 1.833    22.30 | 3.417     9.18 |  5.00     1.31
             0.333     1.31 | 1.917    22.30 | 3.500     9.18 |  5.08     1.31
             0.417     1.31 | 2.000    22.30 | 3.583     9.18 |  5.17     1.31
             0.500     1.31 | 2.083    22.30 | 3.667     9.18 |  5.25     1.31
             0.583     1.31 | 2.167    22.30 | 3.750     9.18 |  5.33     1.31
             0.667     1.31 | 2.250    22.30 | 3.833     5.25 |  5.42     1.31
             0.750     1.31 | 2.333    60.35 | 3.917     5.25 |  5.50     1.31
             0.833     1.31 | 2.417    60.35 | 4.000     5.25 |  5.58     1.31
             0.917     1.31 | 2.500    60.35 | 4.083     5.25 |  5.67     1.31
             1.000     1.31 | 2.583    60.35 | 4.167     5.25 |  5.75     1.31
             1.083     1.31 | 2.667    60.35 | 4.250     5.25 |  5.83     1.31
             1.167     1.31 | 2.750    60.35 | 4.333     2.62 |  5.92     1.31
             1.250     1.31 | 2.833    17.06 | 4.417     2.62 |  6.00     1.31
             1.333     7.87 | 2.917    17.06 | 4.500     2.62 |  6.08     1.31
             1.417     7.87 | 3.000    17.06 | 4.583     2.62 |  6.17     1.31
             1.500     7.87 | 3.083    17.06 | 4.667     2.62 |  6.25     1.31
             1.583     7.87 | 3.167    17.06 | 4.750     2.62 |

     Unit Hyd Qpeak  (cms)=   1.351

     PEAK FLOW       (cms)=   1.040 (i)
     TIME TO PEAK    (hrs)=   3.333
     RUNOFF VOLUME    (mm)=  32.090
     TOTAL RAINFALL   (mm)=  65.590
     RUNOFF COEFFICIENT   =   0.489

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

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--------------------
| ADD HYD  (  0091)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0111):    21.58   1.040     3.33    32.09
      + ID2= 2 (  0093):    18.33   0.720     3.67    30.95
        ================================================
        ID = 3 (  0091):    39.92   1.706     3.42    31.56

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0094)|
| 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
                  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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.10    99.60    .727E+02       0.0         0.19       90.12
       0.19    99.69    .231E+03       0.1         0.37       46.95
```

0.29	99.79	.403E+03	0.2	0.49	35.14
0.38	99.88	.588E+03	0.3	0.59	29.35
0.48	99.98	.787E+03	0.5	0.67	25.80
0.57	100.07	.999E+03	0.7	0.74	23.35
0.67	100.17	.122E+04	0.9	0.80	21.52
0.76	100.26	.146E+04	1.2	0.86	20.10
0.86	100.36	.172E+04	1.5	0.91	18.94
0.95	100.45	.198E+04	1.8	0.96	17.98
1.05	100.55	.226E+04	2.2	1.00	17.15
1.16	100.66	.263E+04	2.7	1.07	16.09
1.28	100.78	.305E+04	3.4	1.14	15.08
1.39	100.89	.351E+04	4.1	1.20	14.32
1.50	101.00	.402E+04	4.9	1.25	13.72
1.61	101.11	.456E+04	5.8	1.30	13.23
1.72	101.22	.515E+04	6.7	1.34	12.82
1.84	101.34	.578E+04	7.7	1.38	12.47
1.95	101.45	.645E+04	8.8	1.41	12.16

		<---- hydrograph ---->			<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0091)	39.92	1.71	3.42	31.56	0.92	0.94
OUTFLOW: ID= 1 (0094)	39.92	1.56	3.75	31.55	0.87	0.91

CALIB			
NASHYD (0113)	Area (ha)=	13.07	Curve Number (CN)= 84.0
ID= 1 DT= 5.0 min	Ia (mm)=	7.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.67	

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	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Unit Hyd Qpeak (cms)= 0.745

PEAK FLOW (cms)= 0.594 (i)
TIME TO PEAK (hrs)= 3.417
RUNOFF VOLUME (mm)= 32.090
TOTAL RAINFALL (mm)= 65.590
RUNOFF COEFFICIENT = 0.489

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

ROUTE CHN(0173)			
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.10	99.60	.230E+02	0.0	0.19	28.46
0.19	99.69	.729E+02	0.1	0.37	14.83
0.29	99.79	.127E+03	0.2	0.49	11.10
0.38	99.88	.186E+03	0.3	0.59	9.27
0.48	99.98	.248E+03	0.5	0.67	8.15
0.57	100.07	.315E+03	0.7	0.74	7.37
0.67	100.17	.387E+03	0.9	0.80	6.80
0.76	100.26	.462E+03	1.2	0.86	6.35
0.86	100.36	.542E+03	1.5	0.91	5.98
0.95	100.45	.626E+03	1.8	0.96	5.68
1.05	100.55	.714E+03	2.2	1.00	5.42
1.16	100.66	.829E+03	2.7	1.07	5.08
1.28	100.78	.963E+03	3.4	1.14	4.76
1.39	100.89	.111E+04	4.1	1.20	4.52
1.50	101.00	.127E+04	4.9	1.25	4.33
1.61	101.11	.144E+04	5.8	1.30	4.18
1.72	101.22	.163E+04	6.7	1.34	4.05
1.84	101.34	.182E+04	7.7	1.38	3.94
1.95	101.45	.204E+04	8.8	1.41	3.84

		<---- hydrograph ---->			<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0113)	13.07	0.59	3.42	32.09	0.52	0.69
OUTFLOW: ID= 1 (0173)	13.07	0.58	3.50	32.09	0.51	0.69

CALIB			
NASHYD (0019)	Area (ha)=	19.14	Curve Number (CN)= 85.0
ID= 1 DT= 5.0 min	Ia (mm)=	8.07	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	1.05	

```
        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    7.87 | 3.250   17.06 |  4.83    1.31
    0.167    0.00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
    0.250    0.00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
    0.333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
    0.417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
    0.500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
    0.583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
    0.667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
    0.750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
    0.833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
    0.917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
    1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
    1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
    1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
    1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
    1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
    1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
    1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
    1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

    Unit Hyd Qpeak  (cms)=   0.696

    PEAK FLOW       (cms)=   0.653 (i)
    TIME TO PEAK    (hrs)=   3.917
    RUNOFF VOLUME    (mm)=  32.329
    TOTAL RAINFALL   (mm)=  65.590
    RUNOFF COEFFICIENT   =   0.493

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

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

--------------------
| ADD HYD  (  0172)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
       ID1= 1 (  0019):    19.14   0.653     3.92    32.33
     + ID2= 2 (  0173):    13.07   0.585     3.50    32.09
       ================================================
       ID = 3 (  0172):    32.21   1.204     3.67    32.23

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

--------------------
| ADD HYD  (  0172)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)      (mm)
       ID1= 3 (  0172):    32.21   1.204     3.67    32.23
     + ID2= 2 (  0094):    39.92   1.562     3.75    31.55
       ================================================
       ID = 1 (  0172):    72.12   2.764     3.67    31.86

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

--------------------
| ROUTE CHN(  0174)|
| 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
                   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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE     VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)       (cms)        (m/s)       (min)
       0.10    99.60    .179E+02         0.0         0.19       22.14
       0.19    99.69    .568E+02         0.1         0.37       11.54
       0.29    99.79    .990E+02         0.2         0.49        8.63
       0.38    99.88    .145E+03         0.3         0.59        7.21
       0.48    99.98    .193E+03         0.5         0.67        6.34
       0.57   100.07    .245E+03         0.7         0.74        5.74
       0.67   100.17    .301E+03         0.9         0.80        5.29
       0.76   100.26    .360E+03         1.2         0.86        4.94
       0.86   100.36    .422E+03         1.5         0.91        4.65
       0.95   100.45    .487E+03         1.8         0.96        4.42
       1.05   100.55    .556E+03         2.2         1.00        4.21
       1.16   100.66    .645E+03         2.7         1.07        3.95
       1.28   100.78    .749E+03         3.4         1.14        3.71
       1.39   100.89    .863E+03         4.1         1.20        3.52
       1.50   101.00    .987E+03         4.9         1.25        3.37
       1.61   101.11    .112E+04         5.8         1.30        3.25
       1.72   101.22    .127E+04         6.7         1.34        3.15
       1.84   101.34    .142E+04         7.7         1.38        3.06
       1.95   101.45    .158E+04         8.8         1.41        2.99

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0172)   72.12     2.76    3.67  31.86       1.17      1.07
   OUTFLOW: ID= 1 (  0174)   72.12     2.76    3.75  31.85       1.17      1.07

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

--------------------
| CALIB            |
| NASHYD   (  0020)|   Area     (ha)=  20.69   Curve Number    (CN)= 85.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.84   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.05

        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    7.87 | 3.250   17.06 |  4.83    1.31
    0.167    0.00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
    0.250    0.00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
```

0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Unit Hyd Qpeak (cms)= 0.753

PEAK FLOW (cms)= 0.710 (i)
TIME TO PEAK (hrs)= 3.917
RUNOFF VOLUME (mm)= 32.510
TOTAL RAINFALL (mm)= 65.590
RUNOFF COEFFICIENT = 0.496

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

ADD HYD (0175)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0020):		20.69	0.710	3.92	32.51
+ ID2= 2 (0174):		72.12	2.757	3.75	31.85
ID = 3 (0175):		92.82	3.460	3.75	32.00

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0081)	
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.472E+02	0.0	0.19	58.56
0.19	99.69	.150E+03	0.1	0.37	30.51
0.29	99.79	.262E+03	0.2	0.49	22.83
0.38	99.88	.382E+03	0.3	0.59	19.07
0.48	99.98	.511E+03	0.5	0.67	16.76
0.57	100.07	.649E+03	0.7	0.74	15.17
0.67	100.17	.796E+03	0.9	0.80	13.99
0.76	100.26	.951E+03	1.2	0.86	13.06
0.86	100.36	.111E+04	1.5	0.91	12.31
0.95	100.45	.129E+04	1.8	0.96	11.68
1.05	100.55	.147E+04	2.2	1.00	11.15
1.16	100.66	.171E+04	2.7	1.07	10.45
1.28	100.78	.198E+04	3.4	1.14	9.80
1.39	100.89	.228E+04	4.1	1.20	9.30
1.50	101.00	.261E+04	4.9	1.25	8.91
1.61	101.11	.297E+04	5.8	1.30	8.60
1.72	101.22	.335E+04	6.7	1.34	8.33
1.84	101.34	.376E+04	7.7	1.38	8.10
1.95	101.45	.419E+04	8.8	1.41	7.90

<---- hydrograph ----> <-pipe / channel->

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (	0175)	92.82	3.46	3.75	32.00	1.29	1.15
OUTFLOW: ID= 1 (	0081)	92.82	3.39	3.92	32.00	1.28	1.14

CALIB					
NASHYD (0021)	Area	(ha)= 50.74	Curve Number	(CN)= 83.0	
ID= 1 DT= 5.0 min	Ia	(mm)= 7.53	# of Linear Res.(N)= 3.00		
	U.H. Tp(hrs)= 1.37				

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Unit Hyd Qpeak (cms)= 1.415

PEAK FLOW (cms)= 1.353 (i)
TIME TO PEAK (hrs)= 4.250

```
     RUNOFF VOLUME     (mm)=  30.625
     TOTAL RAINFALL    (mm)=  65.590
     RUNOFF COEFFICIENT    =   0.467

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

```
--------------------
| CALIB              |
| NASHYD   (  0115)|   Area     (ha)=   9.61   Curve Number    (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.02   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.50

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

```
     Unit Hyd Qpeak  (cms)=   0.734

     PEAK FLOW       (cms)=   0.520 (i)
     TIME TO PEAK    (hrs)=   3.167
     RUNOFF VOLUME    (mm)=  32.076
     TOTAL RAINFALL   (mm)=  65.590
     RUNOFF COEFFICIENT   =   0.489

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

```
--------------------
| ADD HYD  (  0176)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)     (cms)    (hrs)      (mm)
        ID1= 1 (  0021):    50.74   1.353     4.25     30.62
      + ID2= 2 (  0115):     9.61   0.520     3.17     32.08
        ==================================================
        ID = 3 (  0176):    60.35   1.594     4.00     30.86

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

```
--------------------
| ADD HYD  (  0176)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)     (cms)    (hrs)      (mm)
        ID1= 3 (  0176):    60.35   1.594     4.00     30.86
      + ID2= 2 (  0081):    92.82   3.395     3.92     32.00
        ==================================================
        ID = 1 (  0176):   153.17   4.988     3.92     31.55

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

```
--------------------
| CALIB              |
| NASHYD   (  0001)|   Area     (ha)=   3.26   Curve Number    (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.21

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

```
     Unit Hyd Qpeak  (cms)=   0.592

     PEAK FLOW       (cms)=   0.279 (i)
     TIME TO PEAK    (hrs)=   2.833
     RUNOFF VOLUME    (mm)=  32.040
     TOTAL RAINFALL   (mm)=  65.590
     RUNOFF COEFFICIENT   =   0.488

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

```
--------------------
| ROUTE CHN(  0095)|
| 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
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	

<-------------------- TRAVEL TIME TABLE ---------------------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.212E+02	0.0	0.19	26.30
0.19	99.69	.674E+02	0.1	0.37	13.70
0.29	99.79	.118E+03	0.2	0.49	10.25
0.38	99.88	.172E+03	0.3	0.59	8.56
0.48	99.98	.230E+03	0.5	0.67	7.53
0.57	100.07	.292E+03	0.7	0.74	6.81
0.67	100.17	.357E+03	0.9	0.80	6.28
0.76	100.26	.427E+03	1.2	0.86	5.87
0.86	100.36	.501E+03	1.5	0.91	5.53
0.95	100.45	.578E+03	1.8	0.96	5.25
1.05	100.55	.660E+03	2.2	1.00	5.01
1.16	100.66	.766E+03	2.7	1.07	4.70
1.28	100.78	.890E+03	3.4	1.14	4.40
1.39	100.89	.103E+04	4.1	1.20	4.18
1.50	101.00	.117E+04	4.9	1.25	4.00
1.61	101.11	.133E+04	5.8	1.30	3.86
1.72	101.22	.150E+04	6.7	1.34	3.74
1.84	101.34	.169E+04	7.7	1.38	3.64
1.95	101.45	.188E+04	8.8	1.41	3.55

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0001)	3.26	0.28	2.83	32.04	0.34	0.54
OUTFLOW: ID= 1 (0095)	3.26	0.25	2.92	32.00	0.33	0.53

CALIB			
NASHYD (0100)	Area (ha)= 5.29	Curve Number (CN)= 84.0	
ID= 1 DT= 5.0 min	Ia (mm)= 7.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.48		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Unit Hyd Qpeak (cms)= 0.421

PEAK FLOW (cms)= 0.293 (i)
TIME TO PEAK (hrs)= 3.083
RUNOFF VOLUME (mm)= 32.089
TOTAL RAINFALL (mm)= 65.590
RUNOFF COEFFICIENT = 0.489

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

ADD HYD (0096)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0100):	5.29	0.293	3.08	32.09
+ ID2= 2 (0095):	3.26	0.251	2.92	32.00
ID = 3 (0096):	8.54	0.521	3.00	32.06

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0097)	
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
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	

<-------------------- TRAVEL TIME TABLE ---------------------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.552E+02	0.0	0.19	68.42
0.19	99.69	.175E+03	0.1	0.37	35.64
0.29	99.79	.306E+03	0.2	0.49	26.67
0.38	99.88	.447E+03	0.3	0.59	22.28
0.48	99.98	.597E+03	0.5	0.67	19.58
0.57	100.07	.758E+03	0.7	0.74	17.72
0.67	100.17	.930E+03	0.9	0.80	16.34
0.76	100.26	.111E+04	1.2	0.86	15.26
0.86	100.36	.130E+04	1.5	0.91	14.38

0.95	100.45	.150E+04	1.8	0.96	13.65
1.05	100.55	.172E+04	2.2	1.00	13.02
1.16	100.66	.199E+04	2.7	1.07	12.21
1.28	100.78	.231E+04	3.4	1.14	11.45
1.39	100.89	.267E+04	4.1	1.20	10.87
1.50	101.00	.305E+04	4.9	1.25	10.42
1.61	101.11	.347E+04	5.8	1.30	10.04
1.72	101.22	.391E+04	6.7	1.34	9.73
1.84	101.34	.439E+04	7.7	1.38	9.47
1.95	101.45	.489E+04	8.8	1.41	9.23

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0096)	8.54	0.52	3.00	32.06	0.48	0.67
OUTFLOW: ID= 1 (0097)	8.54	0.42	3.25	32.01	0.43	0.62

CALIB			
NASHYD (0009)	Area (ha)= 24.11	Curve Number (CN)= 83.0
ID= 1 DT= 5.0 min	Ia (mm)= 8.46	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.52	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Unit Hyd Qpeak (cms)= 1.771

PEAK FLOW (cms)= 1.183 (i)
TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 29.897
TOTAL RAINFALL (mm)= 65.590
RUNOFF COEFFICIENT = 0.456

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

ADD HYD (0177)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0009):	24.11	1.183	3.17	29.90
+ ID2= 2 (0097):	8.54	0.421	3.25	32.01
ID = 3 (0177):	32.66	1.600	3.25	30.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0104)	Area (ha)= 6.51	Curve Number (CN)= 84.0
ID= 1 DT= 5.0 min	Ia (mm)= 7.06	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.55	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Unit Hyd Qpeak (cms)= 0.452

PEAK FLOW (cms)= 0.333 (i)
TIME TO PEAK (hrs)= 3.250
RUNOFF VOLUME (mm)= 32.039
TOTAL RAINFALL (mm)= 65.590
RUNOFF COEFFICIENT = 0.488

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

CALIB			
NASHYD (0003)	Area (ha)= 4.04	Curve Number (CN)= 84.0
ID= 1 DT= 5.0 min	Ia (mm)= 7.00	# of Linear Res.(N)= 3.00

```
--------------------   U.H. Tp(hrs)=   0.28

         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    7.87 | 3.250   17.06 |  4.83    1.31
               0.167    0.00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
               0.250    0.00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
               0.333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
               0.417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
               0.500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
               0.583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
               0.667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
               0.750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
               0.833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
               0.917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
               1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
               1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
               1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
               1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
               1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
               1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
               1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
               1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

    Unit Hyd Qpeak  (cms)=   0.552

    PEAK FLOW       (cms)=   0.306 (i)
    TIME TO PEAK    (hrs)=   2.833
    RUNOFF VOLUME    (mm)=  32.074
    TOTAL RAINFALL   (mm)=  65.590
    RUNOFF COEFFICIENT   =   0.489

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

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0126)|
| 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
                  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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.10    99.60    .235E+02       0.0          0.19      29.14
       0.19    99.69    .747E+02       0.1          0.37      15.18
       0.29    99.79    .130E+03       0.2          0.49      11.36
       0.38    99.88    .190E+03       0.3          0.59       9.49
       0.48    99.98    .254E+03       0.5          0.67       8.34
       0.57   100.07    .323E+03       0.7          0.74       7.55
       0.67   100.17    .396E+03       0.9          0.80       6.96
       0.76   100.26    .473E+03       1.2          0.86       6.50
       0.86   100.36    .555E+03       1.5          0.91       6.12
       0.95   100.45    .641E+03       1.8          0.96       5.81
       1.05   100.55    .731E+03       2.2          1.00       5.55
       1.16   100.66    .849E+03       2.7          1.07       5.20
       1.28   100.78    .985E+03       3.4          1.14       4.88
       1.39   100.89    .114E+04       4.1          1.20       4.63
       1.50   101.00    .130E+04       4.9          1.25       4.44
       1.61   101.11    .148E+04       5.8          1.30       4.28
       1.72   101.22    .167E+04       6.7          1.34       4.14
       1.84   101.34    .187E+04       7.7          1.38       4.03
       1.95   101.45    .208E+04       8.8          1.41       3.93

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0003)     4.04     0.31    2.83  32.07       0.36      0.56
   OUTFLOW: ID= 1 (  0126)     4.04     0.28    3.00  32.04       0.34      0.54


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--------------------
| ADD HYD  (  0129)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0104):     6.51    0.333     3.25    32.04
     + ID2= 2 (  0126):     4.04    0.277     3.00    32.04
       ==================================================
       ID = 3 (  0129):    10.55    0.589     3.08    32.04

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0133)|
| 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
                  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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.10    99.60    .171E+02       0.0          0.19      21.23
       0.19    99.69    .544E+02       0.1          0.37      11.06
       0.29    99.79    .949E+02       0.2          0.49       8.28
       0.38    99.88    .139E+03       0.3          0.59       6.91
       0.48    99.98    .185E+03       0.5          0.67       6.08
       0.57   100.07    .235E+03       0.7          0.74       5.50
       0.67   100.17    .288E+03       0.9          0.80       5.07
       0.76   100.26    .345E+03       1.2          0.86       4.73
```

0.86	100.36	.404E+03	1.5	0.91	4.46
0.95	100.45	.467E+03	1.8	0.96	4.23
1.05	100.55	.533E+03	2.2	1.00	4.04
1.16	100.66	.619E+03	2.7	1.07	3.79
1.28	100.78	.718E+03	3.4	1.14	3.55
1.39	100.89	.827E+03	4.1	1.20	3.37
1.50	101.00	.946E+03	4.9	1.25	3.23
1.61	101.11	.108E+04	5.8	1.30	3.12
1.72	101.22	.121E+04	6.7	1.34	3.02
1.84	101.34	.136E+04	7.7	1.38	2.94
1.95	101.45	.152E+04	8.8	1.41	2.86

		<---- hydrograph ---->			<-pipe / channel->	
		AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
		(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (| 0129)	10.55	0.59	3.08	32.04	0.52	0.69
OUTFLOW: ID= 1 (| 0133)	10.55	0.58	3.17	32.04	0.51	0.69

CALIB					
NASHYD (0004)	Area	(ha)= 43.99	Curve Number	(CN)= 71.0	
ID= 1 DT= 5.0 min	Ia	(mm)= 6.82	# of Linear Res.	(N)= 3.00	
	U.H. Tp	(hrs)= 0.93			

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	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Unit Hyd Qpeak (cms)= 1.807

PEAK FLOW (cms)= 1.048 (i)
TIME TO PEAK (hrs)= 3.750
RUNOFF VOLUME (mm)= 21.252
TOTAL RAINFALL (mm)= 65.590
RUNOFF COEFFICIENT = 0.324

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

ROUTE CHN(0125)		
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH	ELEV	VOLUME	FLOW RATE	VELOCITY	TRAV.TIME
(m)	(m)	(cu.m.)	(cms)	(m/s)	(min)
0.10	99.60	.287E+02	0.0	0.19	35.51
0.19	99.69	.910E+02	0.1	0.37	18.50
0.29	99.79	.159E+03	0.2	0.49	13.85
0.38	99.88	.232E+03	0.3	0.59	11.56
0.48	99.98	.310E+03	0.5	0.67	10.16
0.57	100.07	.394E+03	0.7	0.74	9.20
0.67	100.17	.483E+03	0.9	0.80	8.48
0.76	100.26	.577E+03	1.2	0.86	7.92
0.86	100.36	.676E+03	1.5	0.91	7.46
0.95	100.45	.781E+03	1.8	0.96	7.08
1.05	100.55	.891E+03	2.2	1.00	6.76
1.16	100.66	.103E+04	2.7	1.07	6.34
1.28	100.78	.120E+04	3.4	1.14	5.94
1.39	100.89	.138E+04	4.1	1.20	5.64
1.50	101.00	.158E+04	4.9	1.25	5.41
1.61	101.11	.180E+04	5.8	1.30	5.21
1.72	101.22	.203E+04	6.7	1.34	5.05
1.84	101.34	.228E+04	7.7	1.38	4.91
1.95	101.45	.254E+04	8.8	1.41	4.79

		<---- hydrograph ---->			<-pipe / channel->	
		AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
		(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (| 0004)	43.99	1.05	3.75	21.25	0.70	0.82
OUTFLOW: ID= 1 (| 0125)	43.99	1.04	3.92	21.25	0.70	0.82

CALIB					
NASHYD (0105)	Area	(ha)= 11.68	Curve Number	(CN)= 84.0	
ID= 1 DT= 5.0 min	Ia	(mm)= 7.03	# of Linear Res.	(N)= 3.00	
	U.H. Tp	(hrs)= 0.20			

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	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Unit Hyd Qpeak (cms)= 2.230

PEAK FLOW (cms)= 1.017 (i)
TIME TO PEAK (hrs)= 2.750
RUNOFF VOLUME (mm)= 32.010
TOTAL RAINFALL (mm)= 65.590
RUNOFF COEFFICIENT = 0.488

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

ADD HYD (0130)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0105):		11.68	1.017	2.75	32.01
+ ID2= 2 (0125):		43.99	1.036	3.92	21.25
ID = 3 (0130):		55.66	1.269	3.75	23.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0128)		
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.180E+02	0.0	0.19	22.33
0.19	99.69	.572E+02	0.1	0.37	11.63
0.29	99.79	.998E+02	0.2	0.49	8.70
0.38	99.88	.146E+03	0.3	0.59	7.27
0.48	99.98	.195E+03	0.5	0.67	6.39
0.57	100.07	.247E+03	0.7	0.74	5.78
0.67	100.17	.303E+03	0.9	0.80	5.33
0.76	100.26	.363E+03	1.2	0.86	4.98
0.86	100.36	.425E+03	1.5	0.91	4.69
0.95	100.45	.491E+03	1.8	0.96	4.45
1.05	100.55	.560E+03	2.2	1.00	4.25
1.16	100.66	.651E+03	2.7	1.07	3.99
1.28	100.78	.755E+03	3.4	1.14	3.74
1.39	100.89	.870E+03	4.1	1.20	3.55
1.50	101.00	.996E+03	4.9	1.25	3.40
1.61	101.11	.113E+04	5.8	1.30	3.28
1.72	101.22	.128E+04	6.7	1.34	3.18
1.84	101.34	.143E+04	7.7	1.38	3.09
1.95	101.45	.160E+04	8.8	1.41	3.01

<---- hydrograph ----> <-pipe / channel->

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0130)	55.66	1.27	3.75	23.51	0.78	0.86
OUTFLOW: ID= 1 (0128)	55.66	1.26	3.75	23.51	0.78	0.86

CALIB			
NASHYD (0012)	Area (ha)=	10.18	Curve Number (CN)= 83.0
ID= 1 DT= 5.0 min	Ia (mm)=	8.17	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.51	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Unit Hyd Qpeak (cms)= 0.762

```
     PEAK FLOW       (cms)=   0.509 (i)
     TIME TO PEAK    (hrs)=   3.167
     RUNOFF VOLUME    (mm)=  30.126
     TOTAL RAINFALL   (mm)=  65.590
     RUNOFF COEFFICIENT   =   0.459

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0136)|   Area    (ha)=   0.37
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.34         0.04
     Dep. Storage     (mm)=       1.00         6.58
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      49.87        40.00
     Mannings n            =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
              TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    0.00 | 1.667    7.87 | 3.250   17.06 |  4.83    1.31
             0.167    0.00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
             0.250    0.00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
             0.333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
             0.417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
             0.500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
             0.583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
             0.667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
             0.750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
             0.833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
             0.917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
             1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
             1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
             1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
             1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
             1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
             1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
             1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
             1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

     Max.Eff.Inten.(mm/hr)=      60.35        41.22
                 over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.06 (ii)    5.65 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.31         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.06         0.00          0.060 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75           2.75
     RUNOFF VOLUME    (mm)=      64.59        33.53          61.48
     TOTAL RAINFALL   (mm)=      65.59        65.59          65.59
     RUNOFF COEFFICIENT   =       0.98         0.51           0.94

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

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

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

--------------------
| ADD HYD  (  0131)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0012):    10.18    0.509     3.17    30.13
      + ID2= 2 (  0128):    55.66    1.264     3.75    23.51
        ================================================
        ID = 3 (  0131):    65.84    1.710     3.33    24.53

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

--------------------
| ADD HYD  (  0131)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0131):    65.84    1.710     3.33    24.53
      + ID2= 2 (  0133):    10.55    0.577     3.17    32.04
        ================================================
        ID = 1 (  0131):    76.39    2.263     3.25    25.57

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

--------------------
| ADD HYD  (  0131)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0131):    76.39    2.263     3.25    25.57
      + ID2= 2 (  0136):     0.37    0.060     2.75    61.48
        ================================================
        ID = 3 (  0131):    76.76    2.280     3.25    25.74

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0137)|   Area    (ha)=   0.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.29         0.03
     Dep. Storage     (mm)=       1.00         2.33
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      46.33        40.00
     Mannings n            =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
              TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
```

hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

			TOTALS
Max.Eff.Inten.(mm/hr)=	60.35	60.12	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.97 (ii)	5.56 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.31	0.16	
PEAK FLOW (cms)=	0.05	0.01	0.054 (iii)
TIME TO PEAK (hrs)=	2.75	2.75	2.75
RUNOFF VOLUME (mm)=	64.59	60.79	64.20
TOTAL RAINFALL (mm)=	65.59	65.59	65.59
RUNOFF COEFFICIENT =	0.98	0.93	0.98

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 99.0 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 (0147)		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
1 + 2 = 3	ID1= 1 (0131):	76.76	2.280	3.25	25.74
	+ ID2= 2 (0137):	0.32	0.054	2.75	64.20
	ID = 3 (0147):	77.09	2.296	3.25	25.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0132)	
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
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

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.433E+02	0.0	0.19	53.63
0.19	99.69	.137E+03	0.1	0.37	27.94
0.29	99.79	.240E+03	0.2	0.49	20.91
0.38	99.88	.350E+03	0.3	0.59	17.46
0.48	99.98	.468E+03	0.5	0.67	15.35
0.57	100.07	.594E+03	0.7	0.74	13.89
0.67	100.17	.729E+03	0.9	0.80	12.81
0.76	100.26	.871E+03	1.2	0.86	11.96
0.86	100.36	.102E+04	1.5	0.91	11.27
0.95	100.45	.118E+04	1.8	0.96	10.70
1.05	100.55	.135E+04	2.2	1.00	10.21
1.16	100.66	.156E+04	2.7	1.07	9.57
1.28	100.78	.181E+04	3.4	1.14	8.97
1.39	100.89	.209E+04	4.1	1.20	8.52
1.50	101.00	.239E+04	4.9	1.25	8.16
1.61	101.11	.272E+04	5.8	1.30	7.87
1.72	101.22	.307E+04	6.7	1.34	7.63
1.84	101.34	.344E+04	7.7	1.38	7.42
1.95	101.45	.384E+04	8.8	1.41	7.24

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (	0147)	77.09	2.30	3.25	25.90	1.07	1.01
OUTFLOW: ID= 1 (	0132)	77.09	2.24	3.42	25.90	1.06	1.01

CALIB		
NASHYD (0013)	Area (ha)= 13.98	Curve Number (CN)= 83.0
ID= 1 DT= 5.0 min	Ia (mm)= 9.60	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.69	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31

```
              0.917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
              1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
              1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
              1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
              1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
              1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
              1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
              1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
              1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

     Unit Hyd Qpeak  (cms)=   0.774

     PEAK FLOW       (cms)=   0.561 (i)
     TIME TO PEAK    (hrs)=   3.417
     RUNOFF VOLUME    (mm)=  29.026
     TOTAL RAINFALL   (mm)=  65.590
     RUNOFF COEFFICIENT   =   0.443

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

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--------------------
| ADD HYD  (  0134)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0013):    13.98   0.561     3.42    29.03
      + ID2= 2 (  0132):    77.09   2.242     3.42    25.90
        ================================================
        ID = 3 (  0134):    91.07   2.803     3.42    26.38

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0140)|
| 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
                  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

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV       VOLUME     FLOW RATE     VELOCITY    TRAV.TIME
         (m)      (m)      (cu.m.)       (cms)         (m/s)       (min)
        0.10    99.60     .359E+02        0.0          0.19        44.49
        0.19    99.69     .114E+03        0.1          0.37        23.18
        0.29    99.79     .199E+03        0.2          0.49        17.34
        0.38    99.88     .290E+03        0.3          0.59        14.49
        0.48    99.98     .388E+03        0.5          0.67        12.73
        0.57   100.07     .493E+03        0.7          0.74        11.52
        0.67   100.17     .604E+03        0.9          0.80        10.62
        0.76   100.26     .722E+03        1.2          0.86         9.92
        0.86   100.36     .847E+03        1.5          0.91         9.35
        0.95   100.45     .978E+03        1.8          0.96         8.87
        1.05   100.55     .112E+04        2.2          1.00         8.47
        1.16   100.66     .130E+04        2.7          1.07         7.94
        1.28   100.78     .150E+04        3.4          1.14         7.44
        1.39   100.89     .173E+04        4.1          1.20         7.07
        1.50   101.00     .198E+04        4.9          1.25         6.77
        1.61   101.11     .225E+04        5.8          1.30         6.53
        1.72   101.22     .254E+04        6.7          1.34         6.33
        1.84   101.34     .285E+04        7.7          1.38         6.15
        1.95   101.45     .318E+04        8.8          1.41         6.00

                                      <---- hydrograph ---->   <-pipe / channel->
                                 AREA    QPEAK    TPEAK    R.V.   MAX DEPTH  MAX VEL
                                 (ha)    (cms)    (hrs)    (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0134)    91.07     2.80     3.42   26.38       1.18      1.08
   OUTFLOW: ID= 1 (  0140)    91.07     2.76     3.50   26.38       1.17      1.07

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0108)|   Area     (ha)=   5.80   Curve Number   (CN)= 84.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   7.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.34

        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     7.87 | 3.250    17.06 |  4.83     1.31
               0.167     0.00 | 1.750     7.87 | 3.333     9.18 |  4.92     1.31
               0.250     0.00 | 1.833    22.30 | 3.417     9.18 |  5.00     1.31
               0.333     1.31 | 1.917    22.30 | 3.500     9.18 |  5.08     1.31
               0.417     1.31 | 2.000    22.30 | 3.583     9.18 |  5.17     1.31
               0.500     1.31 | 2.083    22.30 | 3.667     9.18 |  5.25     1.31
               0.583     1.31 | 2.167    22.30 | 3.750     9.18 |  5.33     1.31
               0.667     1.31 | 2.250    22.30 | 3.833     5.25 |  5.42     1.31
               0.750     1.31 | 2.333    60.35 | 3.917     5.25 |  5.50     1.31
               0.833     1.31 | 2.417    60.35 | 4.000     5.25 |  5.58     1.31
               0.917     1.31 | 2.500    60.35 | 4.083     5.25 |  5.67     1.31
               1.000     1.31 | 2.583    60.35 | 4.167     5.25 |  5.75     1.31
               1.083     1.31 | 2.667    60.35 | 4.250     5.25 |  5.83     1.31
               1.167     1.31 | 2.750    60.35 | 4.333     2.62 |  5.92     1.31
               1.250     1.31 | 2.833    17.06 | 4.417     2.62 |  6.00     1.31
               1.333     7.87 | 2.917    17.06 | 4.500     2.62 |  6.08     1.31
               1.417     7.87 | 3.000    17.06 | 4.583     2.62 |  6.17     1.31
               1.500     7.87 | 3.083    17.06 | 4.667     2.62 |  6.25     1.31
               1.583     7.87 | 3.167    17.06 | 4.750     2.62 |

     Unit Hyd Qpeak  (cms)=   0.652

     PEAK FLOW       (cms)=   0.396 (i)
     TIME TO PEAK    (hrs)=   2.917
     RUNOFF VOLUME    (mm)=  32.085
     TOTAL RAINFALL   (mm)=  65.590
     RUNOFF COEFFICIENT   =   0.489

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

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--------------------
| ROUTE CHN(  0142)|
| 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
                   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

     <---------------------- TRAVEL TIME TABLE ----------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.10    99.60    .244E+02       0.0         0.19       30.23
       0.19    99.69    .775E+02       0.1         0.37       15.75
       0.29    99.79    .135E+03       0.2         0.49       11.79
       0.38    99.88    .197E+03       0.3         0.59        9.84
       0.48    99.98    .264E+03       0.5         0.67        8.65
       0.57   100.07    .335E+03       0.7         0.74        7.83
       0.67   100.17    .411E+03       0.9         0.80        7.22
       0.76   100.26    .491E+03       1.2         0.86        6.74
       0.86   100.36    .576E+03       1.5         0.91        6.35
       0.95   100.45    .665E+03       1.8         0.96        6.03
       1.05   100.55    .758E+03       2.2         1.00        5.75
       1.16   100.66    .881E+03       2.7         1.07        5.40
       1.28   100.78    .102E+04       3.4         1.14        5.06
       1.39   100.89    .118E+04       4.1         1.20        4.80
       1.50   101.00    .135E+04       4.9         1.25        4.60
       1.61   101.11    .153E+04       5.8         1.30        4.44
       1.72   101.22    .173E+04       6.7         1.34        4.30
       1.84   101.34    .194E+04       7.7         1.38        4.18
       1.95   101.45    .216E+04       8.8         1.41        4.08

                                <---- hydrograph ---->   <-pipe / channel->
                           AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                            (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0108)    5.80     0.40    2.92  32.09      0.42      0.61
   OUTFLOW: ID= 1 (  0142)    5.80     0.37    3.08  32.06      0.40      0.60



--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0014)|   Area     (ha)=  15.33   Curve Number    (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   9.35   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.59

        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    7.87 | 3.250   17.06 |  4.83    1.31
             0.167    0.00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
             0.250    0.00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
             0.333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
             0.417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
             0.500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
             0.583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
             0.667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
             0.750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
             0.833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
             0.917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
             1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
             1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
             1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
             1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
             1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
             1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
             1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
             1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

     Unit Hyd Qpeak  (cms)=   0.992

     PEAK FLOW       (cms)=   0.633 (i)
     TIME TO PEAK    (hrs)=   3.333
     RUNOFF VOLUME    (mm)=  27.306
     TOTAL RAINFALL   (mm)=  65.590
     RUNOFF COEFFICIENT   =   0.416

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

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--------------------
| ADD HYD  (  0141)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0014):    15.33    0.633     3.33    27.31
     + ID2= 2 (  0140):    91.07    2.760     3.50    26.38
       ================================================
       ID = 3 (  0141):   106.39    3.369     3.50    26.51

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

--------------------
| ADD HYD  (  0141)|
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0141):   106.39    3.369     3.50    26.51
     + ID2= 2 (  0142):     5.80    0.367     3.08    32.06
       ================================================
       ID = 1 (  0141):   112.20    3.647     3.42    26.80

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0143)|
| 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
```

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	

<-------------------- TRAVEL TIME TABLE ---------------------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.340E+02	0.0	0.19	42.17
0.19	99.69	.108E+03	0.1	0.37	21.97
0.29	99.79	.188E+03	0.2	0.49	16.44
0.38	99.88	.275E+03	0.3	0.59	13.73
0.48	99.98	.368E+03	0.5	0.67	12.07
0.57	100.07	.467E+03	0.7	0.74	10.92
0.67	100.17	.573E+03	0.9	0.80	10.07
0.76	100.26	.685E+03	1.2	0.86	9.40
0.86	100.36	.803E+03	1.5	0.91	8.86
0.95	100.45	.927E+03	1.8	0.96	8.41
1.05	100.55	.106E+04	2.2	1.00	8.03
1.16	100.66	.123E+04	2.7	1.07	7.53
1.28	100.78	.143E+04	3.4	1.14	7.06
1.39	100.89	.164E+04	4.1	1.20	6.70
1.50	101.00	.188E+04	4.9	1.25	6.42
1.61	101.11	.214E+04	5.8	1.30	6.19
1.72	101.22	.241E+04	6.7	1.34	6.00
1.84	101.34	.270E+04	7.7	1.38	5.83
1.95	101.45	.302E+04	8.8	1.41	5.69

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0141)	112.20	3.65	3.42	26.80	1.32	1.16
OUTFLOW:	ID= 1 (0143)	112.20	3.59	3.50	26.80	1.31	1.16

CALIB					
NASHYD	(0017)	Area	(ha)= 10.44	Curve Number	(CN)= 80.0
ID= 1 DT= 5.0 min		Ia	(mm)= 9.73	# of Linear Res.	(N)= 3.00
		U.H. Tp	(hrs)= 0.50		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Unit Hyd Qpeak (cms)= 0.798

PEAK FLOW (cms)= 0.452 (i)
TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 26.141
TOTAL RAINFALL (mm)= 65.590
RUNOFF COEFFICIENT = 0.399

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

ADD HYD (0188)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0017):	10.44	0.452	3.17	26.14
	+ ID2= 2 (0143):	112.20	3.594	3.50	26.80
	ID = 3 (0188):	122.64	3.996	3.50	26.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD	(0106)	Area	(ha)= 17.85	Curve Number	(CN)= 80.0
ID= 1 DT= 5.0 min		Ia	(mm)= 7.24	# of Linear Res.	(N)= 3.00
		U.H. Tp	(hrs)= 0.75		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31

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              1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

     Unit Hyd Qpeak  (cms)=   0.909

     PEAK FLOW       (cms)=   0.652 (i)
     TIME TO PEAK    (hrs)=   3.500
     RUNOFF VOLUME    (mm)=  27.944
     TOTAL RAINFALL   (mm)=  65.590
     RUNOFF COEFFICIENT   =   0.426

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

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--------------------
| CALIB            |
| NASHYD   (  0005)|   Area    (ha)=   6.22   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   9.04   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.49

         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    7.87 | 3.250   17.06 |  4.83    1.31
              0.167    0.00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
              0.250    0.00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
              0.333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
              0.417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
              0.500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
              0.583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
              0.667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
              0.750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
              0.833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
              0.917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
              1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
              1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
              1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
              1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
              1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
              1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
              1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
              1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

     Unit Hyd Qpeak  (cms)=   0.485

     PEAK FLOW       (cms)=   0.166 (i)
     TIME TO PEAK    (hrs)=   3.167
     RUNOFF VOLUME    (mm)=  16.543
     TOTAL RAINFALL   (mm)=  65.590
     RUNOFF COEFFICIENT   =   0.252

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

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0150)|
| 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
                    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

          <---------------------- TRAVEL TIME TABLE ---------------------->
           DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY   TRAV.TIME
            (m)       (m)    (cu.m.)       (cms)         (m/s)      (min)
           0.10     99.60    .482E+02        0.0          0.19       59.75
           0.19     99.69    .153E+03        0.1          0.37       31.13
           0.29     99.79    .267E+03        0.2          0.49       23.29
           0.38     99.88    .390E+03        0.3          0.59       19.46
           0.48     99.98    .522E+03        0.5          0.67       17.10
           0.57    100.07    .662E+03        0.7          0.74       15.48
           0.67    100.17    .812E+03        0.9          0.80       14.27
           0.76    100.26    .970E+03        1.2          0.86       13.32
           0.86    100.36    .114E+04        1.5          0.91       12.56
           0.95    100.45    .131E+04        1.8          0.96       11.92
           1.05    100.55    .150E+04        2.2          1.00       11.37
           1.16    100.66    .174E+04        2.7          1.07       10.67
           1.28    100.78    .202E+04        3.4          1.14       10.00
           1.39    100.89    .233E+04        4.1          1.20        9.49
           1.50    101.00    .266E+04        4.9          1.25        9.10
           1.61    101.11    .303E+04        5.8          1.30        8.77
           1.72    101.22    .342E+04        6.7          1.34        8.50
           1.84    101.34    .383E+04        7.7          1.38        8.27
           1.95    101.45    .427E+04        8.8          1.41        8.06

                                      <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
        INFLOW : ID= 2 (  0005)    6.22     0.17    3.17  16.54      0.26      0.45
        OUTFLOW: ID= 1 (  0150)    6.22     0.14    3.58  16.49      0.24      0.42


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0086)|   Area    (ha)=   0.31
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------

                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.28          0.03
     Dep. Storage     (mm)=       1.00          7.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=      45.39         40.00
     Mannings n             =     0.013         0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    0.00 | 1.667    7.87 | 3.250   17.06 |  4.83    1.31
              0.167    0.00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
```

0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Max.Eff.Inten.(mm/hr)=	60.35	54.13	
over (min)	5.00	10.00	
Storage Coeff. (min)=	1.95 (ii)	5.53 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	0.31	0.16	
			TOTALS
PEAK FLOW (cms)=	0.05	0.00	0.051 (iii)
TIME TO PEAK (hrs)=	2.75	2.75	2.75
RUNOFF VOLUME (mm)=	64.59	45.89	62.71
TOTAL RAINFALL (mm)=	65.59	65.59	65.59
RUNOFF COEFFICIENT =	0.98	0.70	0.96

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

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 94.0 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 (0151)					
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0106):	17.85	0.652	3.50	27.94
+ ID2= 2 (0150):	6.22	0.137	3.58	16.49
ID = 3 (0151):	24.07	0.789	3.50	24.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0151)					
3 + 2 = 1	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 3 (0151):	24.07	0.789	3.50	24.99
+ ID2= 2 (0086):	0.31	0.051	2.75	62.71
ID = 1 (0151):	24.38	0.797	3.50	25.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
NASHYD (0107)	Area (ha)=	5.21	Curve Number (CN)= 84.0
ID= 1 DT= 5.0 min	Ia (mm)=	6.61	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.52	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Unit Hyd Qpeak (cms)=	0.383	
PEAK FLOW (cms)=	0.279 (i)	
TIME TO PEAK (hrs)=	3.167	
RUNOFF VOLUME (mm)=	32.396	
TOTAL RAINFALL (mm)=	65.590	
RUNOFF COEFFICIENT =	0.494	

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

CALIB			
NASHYD (0006)	Area (ha)=	6.26	Curve Number (CN)= 86.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.80	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.87	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31

```
              0.417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
              0.500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
              0.583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
              0.667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
              0.750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
              0.833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
              0.917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
              1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
              1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
              1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
              1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
              1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
              1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
              1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
              1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

    Unit Hyd Qpeak  (cms)=   0.275

    PEAK FLOW       (cms)=   0.266 (i)
    TIME TO PEAK    (hrs)=   3.583
    RUNOFF VOLUME    (mm)=  35.342
    TOTAL RAINFALL   (mm)=  65.590
    RUNOFF COEFFICIENT   =   0.539

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

--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0148)|
| 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
                  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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.10    99.60    .454E+02       0.0         0.19       56.26
       0.19    99.69    .144E+03       0.1         0.37       29.31
       0.29    99.79    .251E+03       0.2         0.49       21.93
       0.38    99.88    .367E+03       0.3         0.59       18.32
       0.48    99.98    .491E+03       0.5         0.67       16.10
       0.57   100.07    .624E+03       0.7         0.74       14.57
       0.67   100.17    .764E+03       0.9         0.80       13.44
       0.76   100.26    .914E+03       1.2         0.86       12.55
       0.86   100.36    .107E+04       1.5         0.91       11.82
       0.95   100.45    .124E+04       1.8         0.96       11.22
       1.05   100.55    .141E+04       2.2         1.00       10.71
       1.16   100.66    .164E+04       2.7         1.07       10.04
       1.28   100.78    .190E+04       3.4         1.14        9.41
       1.39   100.89    .219E+04       4.1         1.20        8.94
       1.50   101.00    .251E+04       4.9         1.25        8.56
       1.61   101.11    .285E+04       5.8         1.30        8.26
       1.72   101.22    .322E+04       6.7         1.34        8.00
       1.84   101.34    .361E+04       7.7         1.38        7.78
       1.95   101.45    .402E+04       8.8         1.41        7.59

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0006)     6.26     0.27    3.58  35.34       0.34      0.54
   OUTFLOW: ID= 1 (  0148)     6.26     0.25    3.92  35.31       0.32      0.52

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0065)|   Area     (ha)=   1.53
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.37         0.15
     Dep. Storage     (mm)=       1.00         4.85
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     100.86        40.00
     Mannings n             =     0.013        0.250

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

                          ---- TRANSFORMED HYETOGRAPH ----
      TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
       hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
     0.083     0.00 | 1.667     7.87 | 3.250    17.06 |  4.83     1.31
     0.167     0.00 | 1.750     7.87 | 3.333     9.18 |  4.92     1.31
     0.250     0.00 | 1.833    22.30 | 3.417     9.18 |  5.00     1.31
     0.333     1.31 | 1.917    22.30 | 3.500     9.18 |  5.08     1.31
     0.417     1.31 | 2.000    22.30 | 3.583     9.18 |  5.17     1.31
     0.500     1.31 | 2.083    22.30 | 3.667     9.18 |  5.25     1.31
     0.583     1.31 | 2.167    22.30 | 3.750     9.18 |  5.33     1.31
     0.667     1.31 | 2.250    22.30 | 3.833     5.25 |  5.42     1.31
     0.750     1.31 | 2.333    60.35 | 3.917     5.25 |  5.50     1.31
     0.833     1.31 | 2.417    60.35 | 4.000     5.25 |  5.58     1.31
     0.917     1.31 | 2.500    60.35 | 4.083     5.25 |  5.67     1.31
     1.000     1.31 | 2.583    60.35 | 4.167     5.25 |  5.75     1.31
     1.083     1.31 | 2.667    60.35 | 4.250     5.25 |  5.83     1.31
     1.167     1.31 | 2.750    60.35 | 4.333     2.62 |  5.92     1.31
     1.250     1.31 | 2.833    17.06 | 4.417     2.62 |  6.00     1.31
     1.333     7.87 | 2.917    17.06 | 4.500     2.62 |  6.08     1.31
     1.417     7.87 | 3.000    17.06 | 4.583     2.62 |  6.17     1.31
     1.500     7.87 | 3.083    17.06 | 4.667     2.62 |  6.25     1.31
     1.583     7.87 | 3.167    17.06 | 4.750     2.62 |

    Max.Eff.Inten.(mm/hr)=      60.35        48.87
              over (min)        5.00        10.00
    Storage Coeff.  (min)=      3.14 (ii)    6.73 (ii)
    Unit Hyd. Tpeak (min)=      5.00        10.00
    Unit Hyd. peak  (cms)=      0.27         0.14
                                                        *TOTALS*
    PEAK FLOW       (cms)=      0.23         0.02          0.250 (iii)
    TIME TO PEAK    (hrs)=      2.75         2.75           2.75
    RUNOFF VOLUME    (mm)=     64.59        41.47          62.28
    TOTAL RAINFALL   (mm)=     65.59        65.59          65.59
    RUNOFF COEFFICIENT   =      0.98         0.63           0.95
```

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  90.0    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  (  0145)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0107):     5.21   0.279     3.17    32.40
      + ID2= 2 (  0148):     6.26   0.249     3.92    35.31
        ================================================
        ID = 3 (  0145):    11.48   0.465     3.50    33.99

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

--------------------
| ADD HYD  (  0145)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 3 (  0145):    11.48   0.465     3.50    33.99
      + ID2= 2 (  0065):     1.53   0.250     2.75    62.28
        ================================================
        ID = 1 (  0145):    13.00   0.509     3.25    37.31

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0165)|   Area    (ha)=   0.25
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.22         0.03
     Dep. Storage     (mm)=       1.00         6.59
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      40.82        40.00
     Mannings n           =      0.013        0.250

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

                        ---- TRANSFORMED HYETOGRAPH ----
  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
 0.083    0.00 | 1.667    7.87 | 3.250   17.06 |  4.83    1.31
 0.167    0.00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
 0.250    0.00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
 0.333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
 0.417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
 0.500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
 0.583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
 0.667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
 0.750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
 0.833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
 0.917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
 1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
 1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
 1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
 1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
 1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
 1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
 1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
 1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

     Max.Eff.Inten.(mm/hr)=      60.35        41.22
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.83 (ii)    5.41 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.16
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.04         0.00        0.040 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75         2.75
     RUNOFF VOLUME    (mm)=      64.59        33.53        61.48
     TOTAL RAINFALL   (mm)=      65.59        65.59        65.59
     RUNOFF COEFFICIENT   =       0.98         0.51         0.94

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

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

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

--------------------
| ADD HYD  (  0149)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0145):    13.00   0.509     3.25    37.31
      + ID2= 2 (  0165):     0.25   0.040     2.75    61.48
        ================================================
        ID = 3 (  0149):    13.25   0.521     3.25    37.76

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0154)|
| 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
                   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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY   TRAV.TIME
        (m)       (m)     (cu.m.)       (cms)         (m/s)      (min)
```

```
      0.10    99.60    .125E+02       0.0          0.19      15.45
      0.19    99.69    .396E+02       0.1          0.37       8.05
      0.29    99.79    .691E+02       0.2          0.49       6.03
      0.38    99.88    .101E+03       0.3          0.59       5.03
      0.48    99.98    .135E+03       0.5          0.67       4.42
      0.57   100.07    .171E+03       0.7          0.74       4.00
      0.67   100.17    .210E+03       0.9          0.80       3.69
      0.76   100.26    .251E+03       1.2          0.86       3.45
      0.86   100.36    .294E+03       1.5          0.91       3.25
      0.95   100.45    .340E+03       1.8          0.96       3.08
      1.05   100.55    .388E+03       2.2          1.00       2.94
      1.16   100.66    .450E+03       2.7          1.07       2.76
      1.28   100.78    .523E+03       3.4          1.14       2.59
      1.39   100.89    .602E+03       4.1          1.20       2.46
      1.50   101.00    .689E+03       4.9          1.25       2.35
      1.61   101.11    .783E+03       5.8          1.30       2.27
      1.72   101.22    .883E+03       6.7          1.34       2.20
      1.84   101.34    .991E+03       7.7          1.38       2.14
      1.95   101.45    .111E+04       8.8          1.41       2.09

                                  <---- hydrograph ---->   <-pipe / channel->
                            AREA    QPEAK    TPEAK    R.V.   MAX DEPTH  MAX VEL
                             (ha)    (cms)    (hrs)    (mm)       (m)      (m/s)
 INFLOW : ID= 2 (  0149)    13.25     0.52     3.25   37.76      0.48      0.67
 OUTFLOW: ID= 1 (  0154)    13.25     0.51     3.33   37.76      0.48      0.67


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0066)|   Area     (ha)=   0.32
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.29         0.03
     Dep. Storage     (mm)=       1.00         3.81
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      46.14        40.00
     Mannings n           =      0.013        0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
              TIME     RAIN |  TIME     RAIN |'  TIME     RAIN |  TIME     RAIN
               hrs    mm/hr |   hrs    mm/hr |'   hrs    mm/hr |   hrs    mm/hr
             0.083     0.00 | 1.667     7.87 | 3.250    17.06 |  4.83     1.31
             0.167     0.00 | 1.750     7.87 | 3.333     9.18 |  4.92     1.31
             0.250     0.00 | 1.833    22.30 | 3.417     9.18 |  5.00     1.31
             0.333     1.31 | 1.917    22.30 | 3.500     9.18 |  5.08     1.31
             0.417     1.31 | 2.000    22.30 | 3.583     9.18 |  5.17     1.31
             0.500     1.31 | 2.083    22.30 | 3.667     9.18 |  5.25     1.31
             0.583     1.31 | 2.167    22.30 | 3.750     9.18 |  5.33     1.31
             0.667     1.31 | 2.250    22.30 | 3.833     5.25 |  5.42     1.31
             0.750     1.31 | 2.333    60.35 | 3.917     5.25 |  5.50     1.31
             0.833     1.31 | 2.417    60.35 | 4.000     5.25 |  5.58     1.31
             0.917     1.31 | 2.500    60.35 | 4.083     5.25 |  5.67     1.31
             1.000     1.31 | 2.583    60.35 | 4.167     5.25 |  5.75     1.31
             1.083     1.31 | 2.667    60.35 | 4.250     5.25 |  5.83     1.31
             1.167     1.31 | 2.750    60.35 | 4.333     2.62 |  5.92     1.31
             1.250     1.31 | 2.833    17.06 | 4.417     2.62 |  6.00     1.31
             1.333     7.87 | 2.917    17.06 | 4.500     2.62 |  6.08     1.31
             1.417     7.87 | 3.000    17.06 | 4.583     2.62 |  6.17     1.31
             1.500     7.87 | 3.083    17.06 | 4.667     2.62 |  6.25     1.31
             1.583     7.87 | 3.167    17.06 | 4.750     2.62 |

     Max.Eff.Inten.(mm/hr)=      60.35        54.85
               over (min)        5.00        10.00
     Storage Coeff.  (min)=      1.97 (ii)    5.55 (ii)
     Unit Hyd. Tpeak (min)=      5.00        10.00
     Unit Hyd. peak  (cms)=      0.31         0.16
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.05         0.00        0.053 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.75         2.75
     RUNOFF VOLUME    (mm)=     64.59        48.93        63.02
     TOTAL RAINFALL   (mm)=     65.59        65.59        65.59
     RUNOFF COEFFICIENT   =      0.98         0.75         0.96

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN*  =  94.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0152)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0151):    24.38    0.797     3.50    25.46
     + ID2= 2 (  0154):    13.25    0.513     3.33    37.76
       ================================================
       ID = 3 (  0152):    37.63    1.307     3.50    29.79

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

--------------------
| ADD HYD  (  0152)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0152):    37.63    1.307     3.50    29.79
     + ID2= 2 (  0066):     0.32    0.053     2.75    63.02
       ================================================
       ID = 1 (  0152):    37.95    1.316     3.50    30.07

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0155)|
| 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
                   2.00          99.50        0.0300      Main Channel
```

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                3.50         99.60        0.0300      Main Channel
                4.50        100.65    0.0300 /0.0500  Main Channel
                6.00        101.45        0.0500

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
       (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
      0.10     99.60    .203E+02       0.0          0.19      25.11
      0.19     99.69    .644E+02       0.1          0.37      13.08
      0.29     99.79    .112E+03       0.2          0.49       9.79
      0.38     99.88    .164E+03       0.3          0.59       8.18
      0.48     99.98    .219E+03       0.5          0.67       7.19
      0.57    100.07    .278E+03       0.7          0.74       6.51
      0.67    100.17    .341E+03       0.9          0.80       6.00
      0.76    100.26    .408E+03       1.2          0.86       5.60
      0.86    100.36    .478E+03       1.5          0.91       5.28
      0.95    100.45    .552E+03       1.8          0.96       5.01
      1.05    100.55    .630E+03       2.2          1.00       4.78
      1.16    100.66    .732E+03       2.7          1.07       4.48
      1.28    100.78    .849E+03       3.4          1.14       4.20
      1.39    100.89    .979E+03       4.1          1.20       3.99
      1.50    101.00    .112E+04       4.9          1.25       3.82
      1.61    101.11    .127E+04       5.8          1.30       3.69
      1.72    101.22    .144E+04       6.7          1.34       3.57
      1.84    101.34    .161E+04       7.7          1.38       3.47
      1.95    101.45    .180E+04       8.8          1.41       3.39

                                  <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK    TPEAK    R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)    (hrs)    (mm)     (m)       (m/s)
   INFLOW : ID= 2 (  0152)    37.95     1.32     3.50   30.07      0.80       0.87
   OUTFLOW: ID= 1 (  0155)    37.95     1.31     3.58   30.07      0.79       0.87


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0109)|   Area     (ha)=  14.91   Curve Number    (CN)= 89.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   5.56   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.20

         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     7.87 | 3.250    17.06 |  4.83     1.31
               0.167     0.00 | 1.750     7.87 | 3.333     9.18 |  4.92     1.31
               0.250     0.00 | 1.833    22.30 | 3.417     9.18 |  5.00     1.31
               0.333     1.31 | 1.917    22.30 | 3.500     9.18 |  5.08     1.31
               0.417     1.31 | 2.000    22.30 | 3.583     9.18 |  5.17     1.31
               0.500     1.31 | 2.083    22.30 | 3.667     9.18 |  5.25     1.31
               0.583     1.31 | 2.167    22.30 | 3.750     9.18 |  5.33     1.31
               0.667     1.31 | 2.250    22.30 | 3.833     5.25 |  5.42     1.31
               0.750     1.31 | 2.333    60.35 | 3.917     5.25 |  5.50     1.31
               0.833     1.31 | 2.417    60.35 | 4.000     5.25 |  5.58     1.31
               0.917     1.31 | 2.500    60.35 | 4.083     5.25 |  5.67     1.31
               1.000     1.31 | 2.583    60.35 | 4.167     5.25 |  5.75     1.31
               1.083     1.31 | 2.667    60.35 | 4.250     5.25 |  5.83     1.31
               1.167     1.31 | 2.750    60.35 | 4.333     2.62 |  5.92     1.31
               1.250     1.31 | 2.833    17.06 | 4.417     2.62 |  6.00     1.31
               1.333     7.87 | 2.917    17.06 | 4.500     2.62 |  6.08     1.31
               1.417     7.87 | 3.000    17.06 | 4.583     2.62 |  6.17     1.31
               1.500     7.87 | 3.083    17.06 | 4.667     2.62 |  6.25     1.31
               1.583     7.87 | 3.167    17.06 | 4.750     2.62 |

     Unit Hyd Qpeak  (cms)=   2.848

     PEAK FLOW       (cms)=   1.621 (i)
     TIME TO PEAK    (hrs)=   2.750
     RUNOFF VOLUME    (mm)=  39.345
     TOTAL RAINFALL   (mm)=  65.590
     RUNOFF COEFFICIENT   =   0.600

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

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--------------------
| ADD HYD  (  0156)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0109):    14.91    1.621     2.75    39.35
      + ID2= 2 (  0155):    37.95    1.308     3.58    30.07
        ================================================
        ID = 3 (  0156):    52.87    2.372     2.83    32.69

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0187)|
| 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
                   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

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.10     99.60    .522E+02       0.0          0.19      64.71
       0.19     99.69    .166E+03       0.1          0.37      33.71
       0.29     99.79    .289E+03       0.2          0.49      25.23
       0.38     99.88    .422E+03       0.3          0.59      21.07
       0.48     99.98    .565E+03       0.5          0.67      18.52
       0.57    100.07    .717E+03       0.7          0.74      16.76
       0.67    100.17    .879E+03       0.9          0.80      15.45
       0.76    100.26    .105E+04       1.2          0.86      14.43
       0.86    100.36    .123E+04       1.5          0.91      13.60
       0.95    100.45    .142E+04       1.8          0.96      12.91
       1.05    100.55    .162E+04       2.2          1.00      12.32
       1.16    100.66    .189E+04       2.7          1.07      11.55
       1.28    100.78    .219E+04       3.4          1.14      10.83
       1.39    100.89    .252E+04       4.1          1.20      10.28
```

1.50	101.00	.289E+04	4.9	1.25	9.85
1.61	101.11	.328E+04	5.8	1.30	9.50
1.72	101.22	.370E+04	6.7	1.34	9.20
1.84	101.34	.415E+04	7.7	1.38	8.95
1.95	101.45	.463E+04	8.8	1.41	8.73

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (| 0156)	52.87	2.37	2.83	32.69	1.09	1.02
OUTFLOW: ID= 1 (| 0187)	52.87	2.04	2.92	32.68	1.01	0.98

CALIB					
NASHYD (0015)	Area (ha)= 15.31	Curve Number (CN)= 87.0			
ID= 1 DT= 5.0 min	Ia (mm)= 6.90	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.58				

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Unit Hyd Qpeak (cms)= 1.008

PEAK FLOW (cms)= 0.854 (i)
TIME TO PEAK (hrs)= 3.250
RUNOFF VOLUME (mm)= 35.638
TOTAL RAINFALL (mm)= 65.590
RUNOFF COEFFICIENT = 0.543

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

CALIB					
NASHYD (0112)	Area (ha)= 4.63	Curve Number (CN)= 84.0			
ID= 1 DT= 5.0 min	Ia (mm)= 7.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.41				

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Unit Hyd Qpeak (cms)= 0.431

PEAK FLOW (cms)= 0.283 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 32.087
TOTAL RAINFALL (mm)= 65.590
RUNOFF COEFFICIENT = 0.489

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

CALIB					
STANDHYD (0139)	Area (ha)= 0.51				
ID= 1 DT= 5.0 min	Total Imp(%)= 90.00	Dir. Conn.(%)= 90.00			

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	0.46	0.05
Dep. Storage	(mm)=	1.00	4.16
Average Slope	(%)=	1.00	2.00
Length	(m)=	58.08	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31

```
                0.333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
                0.417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
                0.500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
                0.583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
                0.667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
                0.750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
                0.833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
                0.917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
                1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
                1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
                1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
                1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
                1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
                1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
                1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
                1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

     Max.Eff.Inten.(mm/hr)=      60.35        53.38
                  over (min)       5.00        10.00
     Storage Coeff.  (min)=       2.26 (ii)    5.84 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.30         0.15
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.08         0.01        0.084 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75         2.75
     RUNOFF VOLUME    (mm)=      64.59        46.85        62.81
     TOTAL RAINFALL   (mm)=      65.59        65.59        65.59
     RUNOFF COEFFICIENT   =       0.98         0.71         0.96

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  93.0    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  (  0160)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0112):     4.63   0.283     3.00    32.09
      + ID2= 2 (  0139):     0.51   0.084     2.75    62.81
        ================================================
        ID = 3 (  0160):     5.13   0.307     3.00    35.12

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0138)|   Area    (ha)=   0.56
|ID= 1 DT= 5.0 min |   Total Imp(%)=  90.00   Dir. Conn.(%)=  90.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.50         0.06
     Dep. Storage     (mm)=       1.00         2.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      60.94        40.00
     Mannings n           =      0.013        0.250
```

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

                              ---- TRANSFORMED HYETOGRAPH ----
              TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
               hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
             0.083    0.00 | 1.667    7.87 | 3.250   17.06 |  4.83    1.31
             0.167    0.00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
             0.250    0.00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
             0.333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
             0.417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
             0.500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
             0.583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
             0.667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
             0.750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
             0.833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
             0.917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
             1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
             1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
             1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
             1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
             1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
             1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
             1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
             1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

     Max.Eff.Inten.(mm/hr)=      60.35        55.20
                  over (min)       5.00        10.00
     Storage Coeff.  (min)=       2.32 (ii)    5.91 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.30         0.15
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.08         0.01        0.092 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75         2.75
     RUNOFF VOLUME    (mm)=      64.59        50.67        63.19
     TOTAL RAINFALL   (mm)=      65.59        65.59        65.59
     RUNOFF COEFFICIENT   =       0.98         0.77         0.96

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  94.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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--------------------
| ADD HYD  (  0169)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0138):     0.56   0.092     2.75    63.19
      + ID2= 2 (  0160):     5.13   0.307     3.00    35.12
        ================================================
        ID = 3 (  0169):     5.69   0.387     2.75    37.87

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

```
| ROUTE CHN(  0184)|
| 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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.164E+02	0.0	0.19	20.34
0.19	99.69	.521E+02	0.1	0.37	10.60
0.29	99.79	.909E+02	0.2	0.49	7.93
0.38	99.88	.133E+03	0.3	0.59	6.62
0.48	99.98	.178E+03	0.5	0.67	5.82
0.57	100.07	.225E+03	0.7	0.74	5.27
0.67	100.17	.276E+03	0.9	0.80	4.86
0.76	100.26	.330E+03	1.2	0.86	4.54
0.86	100.36	.387E+03	1.5	0.91	4.28
0.95	100.45	.447E+03	1.8	0.96	4.06
1.05	100.55	.510E+03	2.2	1.00	3.87
1.16	100.66	.593E+03	2.7	1.07	3.63
1.28	100.78	.688E+03	3.4	1.14	3.40
1.39	100.89	.793E+03	4.1	1.20	3.23
1.50	101.00	.907E+03	4.9	1.25	3.10
1.61	101.11	.103E+04	5.8	1.30	2.99
1.72	101.22	.116E+04	6.7	1.34	2.89
1.84	101.34	.130E+04	7.7	1.38	2.81
1.95	101.45	.146E+04	8.8	1.41	2.74

	<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0169)	5.69	0.39	2.75	37.87	0.41	0.61
OUTFLOW: ID= 1 (0184)	5.69	0.35	2.83	37.86	0.39	0.59

```
--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD   (  0114)|   Area     (ha)=   9.91   Curve Number    (CN)= 85.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   6.79   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.56

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

```
     Unit Hyd Qpeak  (cms)=   0.676

     PEAK FLOW       (cms)=   0.525 (i)
     TIME TO PEAK    (hrs)=   3.250
     RUNOFF VOLUME    (mm)=  33.368
     TOTAL RAINFALL   (mm)=  65.590
     RUNOFF COEFFICIENT   =   0.509

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

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD   (  0118)|   Area     (ha)=   4.36   Curve Number    (CN)= 95.0
|ID= 1 DT= 5.0 min |   Ia       (mm)=   2.68   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.20

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

```
     Unit Hyd Qpeak  (cms)=   0.832
```

```
     PEAK FLOW       (cms)=   0.611 (i)
     TIME TO PEAK    (hrs)=   2.750
     RUNOFF VOLUME    (mm)=  51.785
     TOTAL RAINFALL   (mm)=  65.590
     RUNOFF COEFFICIENT   =   0.790

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

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

--------------------
| ADD HYD  (  0185)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0114):     9.91   0.525     3.25    33.37
     + ID2= 2 (  0118):     4.36   0.611     2.75    51.79
       ====================================================
       ID = 3 (  0185):    14.27   0.956     2.83    38.99

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

--------------------
| ADD HYD  (  0185)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0185):    14.27   0.956     2.83    38.99
     + ID2= 2 (  0184):     5.69   0.347     2.83    37.86
       ====================================================
       ID = 1 (  0185):    19.96   1.303     2.83    38.67

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0186)|
| 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
                  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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV       VOLUME     FLOW RATE     VELOCITY    TRAV.TIME
        (m)      (m)     (cu.m.)       (cms)         (m/s)       (min)
       0.10    99.60    .616E+02        0.0          0.19        76.29
       0.19    99.69    .196E+03        0.1          0.37        39.74
       0.29    99.79    .341E+03        0.2          0.49        29.74
       0.38    99.88    .498E+03        0.3          0.59        24.84
       0.48    99.98    .666E+03        0.5          0.67        21.84
       0.57   100.07    .846E+03        0.7          0.74        19.76
       0.67   100.17    .104E+04        0.9          0.80        18.22
       0.76   100.26    .124E+04        1.2          0.86        17.01
       0.86   100.36    .145E+04        1.5          0.91        16.03
       0.95   100.45    .168E+04        1.8          0.96        15.22
       1.05   100.55    .191E+04        2.2          1.00        14.52
       1.16   100.66    .222E+04        2.7          1.07        13.62
       1.28   100.78    .258E+04        3.4          1.14        12.77
       1.39   100.89    .297E+04        4.1          1.20        12.12
       1.50   101.00    .340E+04        4.9          1.25        11.61
       1.61   101.11    .386E+04        5.8          1.30        11.20
       1.72   101.22    .436E+04        6.7          1.34        10.85
       1.84   101.34    .489E+04        7.7          1.38        10.56
       1.95   101.45    .546E+04        8.8          1.41        10.30

                                    <---- hydrograph ---->   <-pipe / channel->
                                      AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                      (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0185)   19.96     1.30    2.83  38.67      0.79      0.87
   OUTFLOW: ID= 1 (  0186)   19.96     1.10    3.17  38.65      0.72      0.83


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--------------------
| ADD HYD  (  0183)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0015):    15.31   0.854     3.25    35.64
     + ID2= 2 (  0186):    19.96   1.102     3.17    38.65
       ====================================================
       ID = 3 (  0183):    35.27   1.948     3.17    37.34

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

--------------------
| ADD HYD  (  0183)|
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 3 (  0183):    35.27   1.948     3.17    37.34
     + ID2= 2 (  0187):    52.87   2.043     2.92    32.68
       ====================================================
       ID = 1 (  0183):    88.14   3.901     3.08    34.54

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0180)|
| 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
                  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

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV       VOLUME     FLOW RATE     VELOCITY    TRAV.TIME
        (m)      (m)     (cu.m.)       (cms)         (m/s)       (min)
       0.10    99.60    .371E+02        0.0          0.19        45.93
       0.19    99.69    .118E+03        0.1          0.37        23.93
```

0.29	99.79	.205E+03	0.2	0.49	17.91
0.38	99.88	.300E+03	0.3	0.59	14.96
0.48	99.98	.401E+03	0.5	0.67	13.15
0.57	100.07	.509E+03	0.7	0.74	11.90
0.67	100.17	.624E+03	0.9	0.80	10.97
0.76	100.26	.746E+03	1.2	0.86	10.24
0.86	100.36	.875E+03	1.5	0.91	9.65
0.95	100.45	.101E+04	1.8	0.96	9.16
1.05	100.55	.115E+04	2.2	1.00	8.74
1.16	100.66	.134E+04	2.7	1.07	8.20
1.28	100.78	.155E+04	3.4	1.14	7.69
1.39	100.89	.179E+04	4.1	1.20	7.30
1.50	101.00	.205E+04	4.9	1.25	6.99
1.61	101.11	.233E+04	5.8	1.30	6.74
1.72	101.22	.263E+04	6.7	1.34	6.53
1.84	101.34	.295E+04	7.7	1.38	6.36
1.95	101.45	.329E+04	8.8	1.41	6.20

	<---- hydrograph ---->				<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0183)	88.14	3.90	3.08	34.54	1.36	1.18
OUTFLOW: ID= 1 (0180)	88.14	3.84	3.25	34.54	1.34	1.18

CALIB					
NASHYD (0016)	Area (ha)=	22.20	Curve Number (CN)=	84.0	
ID= 1 DT= 5.0 min	Ia (mm)=	7.86	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.55			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Unit Hyd Qpeak (cms)= 1.542

PEAK FLOW (cms)= 1.113 (i)
TIME TO PEAK (hrs)= 3.250
RUNOFF VOLUME (mm)= 31.406
TOTAL RAINFALL (mm)= 65.590
RUNOFF COEFFICIENT = 0.479

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

ADD HYD (0189)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0016):	22.20	1.113	3.25	31.41
+ ID2= 2 (0180):	88.14	3.840	3.25	34.54
ID = 3 (0189):	110.34	4.953	3.25	33.91

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0144)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0188):	122.64	3.996	3.50	26.74
+ ID2= 2 (0189):	110.34	4.953	3.25	33.91
ID = 3 (0144):	232.98	8.837	3.42	30.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0179)		
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
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	

<---------- TRAVEL TIME TABLE ---------->

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.10	99.60	.223E+02	0.0	0.19	27.60
0.19	99.69	.707E+02	0.1	0.37	14.38
0.29	99.79	.123E+03	0.2	0.49	10.76
0.38	99.88	.180E+03	0.3	0.59	8.99
0.48	99.98	.241E+03	0.5	0.67	7.90
0.57	100.07	.306E+03	0.7	0.74	7.15
0.67	100.17	.375E+03	0.9	0.80	6.59
0.76	100.26	.448E+03	1.2	0.86	6.16
0.86	100.36	.526E+03	1.5	0.91	5.80
0.95	100.45	.607E+03	1.8	0.96	5.51
1.05	100.55	.692E+03	2.2	1.00	5.25

```
      1.16   100.66    .804E+03       2.7          1.07       4.93
      1.28   100.78    .934E+03       3.4          1.14       4.62
      1.39   100.89    .108E+04       4.1          1.20       4.39
      1.50   101.00    .123E+04       4.9          1.25       4.20
      1.61   101.11    .140E+04       5.8          1.30       4.05
      1.72   101.22    .158E+04       6.7          1.34       3.93
      1.84   101.34    .177E+04       7.7          1.38       3.82
      1.95   101.45    .197E+04       8.8          1.41       3.72

    **** WARNING:  TRAVEL TIME TABLE EXCEEDED
                                <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
  INFLOW : ID= 2 (  0144)  232.98     8.84    3.42  30.14      1.94      1.41
  OUTFLOW: ID= 1 (  0179)  232.98     8.81    3.42  30.13      1.94      1.41


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0018)|   Area    (ha)=   6.98   Curve Number   (CN)= 81.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=  10.16   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.42

        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    7.87 | 3.250   17.06 |  4.83    1.31
             0.167    0.00 | 1.750    7.87 | 3.333    9.18 |  4.92    1.31
             0.250    0.00 | 1.833   22.30 | 3.417    9.18 |  5.00    1.31
             0.333    1.31 | 1.917   22.30 | 3.500    9.18 |  5.08    1.31
             0.417    1.31 | 2.000   22.30 | 3.583    9.18 |  5.17    1.31
             0.500    1.31 | 2.083   22.30 | 3.667    9.18 |  5.25    1.31
             0.583    1.31 | 2.167   22.30 | 3.750    9.18 |  5.33    1.31
             0.667    1.31 | 2.250   22.30 | 3.833    5.25 |  5.42    1.31
             0.750    1.31 | 2.333   60.35 | 3.917    5.25 |  5.50    1.31
             0.833    1.31 | 2.417   60.35 | 4.000    5.25 |  5.58    1.31
             0.917    1.31 | 2.500   60.35 | 4.083    5.25 |  5.67    1.31
             1.000    1.31 | 2.583   60.35 | 4.167    5.25 |  5.75    1.31
             1.083    1.31 | 2.667   60.35 | 4.250    5.25 |  5.83    1.31
             1.167    1.31 | 2.750   60.35 | 4.333    2.62 |  5.92    1.31
             1.250    1.31 | 2.833   17.06 | 4.417    2.62 |  6.00    1.31
             1.333    7.87 | 2.917   17.06 | 4.500    2.62 |  6.08    1.31
             1.417    7.87 | 3.000   17.06 | 4.583    2.62 |  6.17    1.31
             1.500    7.87 | 3.083   17.06 | 4.667    2.62 |  6.25    1.31
             1.583    7.87 | 3.167   17.06 | 4.750    2.62 |

    Unit Hyd Qpeak  (cms)=   0.635

    PEAK FLOW       (cms)=   0.343 (i)
    TIME TO PEAK    (hrs)=   3.083
    RUNOFF VOLUME    (mm)=  26.715
    TOTAL RAINFALL   (mm)=  65.590
    RUNOFF COEFFICIENT   =   0.407

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


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

--------------------
| ADD HYD  (  0178)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0018):     6.98    0.343     3.08    26.72
     + ID2= 2 (  0179):   232.98    8.812     3.42    30.13
       ==========================================================
       ID = 3 (  0178):   239.96    9.099     3.42    30.04

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

Hi Josh,
Thanks for your email.
I noticed that the engineered model was not properly transferred into the shared online folder. Please access the shared folder now and check whether you can download the engineered model.

Please let me know if you have any difficulty.

Thanks,

Priyantha Hunukumbura, Ph.D., P.Eng.
Technologist, Water Resources
Engineering Services | Development and Engineering Services

T: (416) 661-6600 ext. 6480
E: priyantha.hunukumbura@trca.ca
A: 101 Exchange Avenue, Vaughan, ON, L4K 5R6 | trca.ca

From: Josh Wagemaker <jwagemaker@cfcrozier.ca>
Sent: November 23, 2021 10:16 AM
To: Priyantha Hunukumbura <PRIYANTHA.HUNUKUMBURA@trca.ca>
Cc: Jason Wagler <Jason.Wagler@trca.ca>; Dilnesaw Chekol <Dilnesaw.Chekol@trca.ca>; Jessica Lysecki <jlysecki@cfcrozier.ca>; Travis Gibson <tgibson@cfcrozier.ca>; Erin Dodd <edodd@cfcrozier.ca>
Subject: RE: TRCA Data Request

Hi Priyantha,

I have been working on the estimated portion of the hydraulic model and need to begin looking at the engineered watercourses of the Main Humber and Cold Creek. As per our data sharing agreement, we had requested the hec ras projects for the engineered and estimated models. From what I can see, the Cold Creek and Main Humber models only contain the estimated reaches (no geometry for the engineered model).

Can you please confirm that the engineered hydraulic models were sent to us? I think that I only received the CAD drawings for the engineered model.

Thank you,

Josh Wagemaker | Engineering Intern
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
T: 905.875.0026

Crozier Connections:

Read our latest news and announcements here.

From: Priyantha Hunukumbura <PRIYANTHA.HUNUKUMBURA@trca.ca>
Sent: November 4, 2021 2:43 PM
To: Josh Wagemaker <jwagemaker@cfcrozier.ca>
Cc: Jason Wagler <Jason.Wagler@trca.ca>; Dilnesaw Chekol <Dilnesaw.Chekol@trca.ca>; Jessica Lysecki <jlysecki@cfcrozier.ca>; Travis Gibson <tgibson@cfcrozier.ca>
Subject: RE: TRCA Data Request

Hi Josh,
Please access the following link to download the Hydraulic models.

Regional Road 50 and Emil Kolb Parkway_Corzier(Josh Wagemaker)

As mentioned in my previous emails, please note that TRCA's Estimated floodplain modeling and mapping was intended to be used as a screening tool for development applications submitted to the TRCA, to determine whether existing or proposed sites, properties, or structures are potentially susceptible to flooding. This information is the best available at this time but is not appropriate for many uses since the model doesn't include crossing structures, doesn't have refined Manning's n values, and the crossing geometry is not detailed. Thus, the TRCA water resources engineering staff recommend that the proponent use TRCA's available modeling and mapping to conduct the hydraulic analysis for their project, refine the model and create an engineered HEC-RAS model. The Estimated HEC-RAS model is based on old topographic information and therefore updating the topographic information will also be required.

If you need any clarification, please let me know.

Thanks,

Priyantha Hunukumbura, Ph.D., P.Eng.
Technologist, Water Resources
Engineering Services | Development and Engineering Services

T: (416) 661-6600 ext. 6480

E: priyantha.hunukumbura@trca.ca
A: 101 Exchange Avenue, Vaughan, ON, L4K 5R6 | trca.ca

From: Priyantha Hunukumbura
Sent: November 2, 2021 12:03 PM
To: Josh Wagemaker <jwagemaker@cfcrozier.ca>
Cc: Jason Wagler <Jason.Wagler@trca.ca>; Dilnesaw Chekol <Dilnesaw.Chekol@trca.ca>; Jessica Lysecki <jlysecki@cfcrozier.ca>; Travis Gibson <tgibson@cfcrozier.ca>
Subject: RE: TRCA Data Request

Hi Josh,
Thanks for completing the online payment. Please access the following link to download the Hydrologic model, hydrology report, subcatchment shape file and the floodplain mapping (CAD) sheets(hum_81, hum_82 & hum_77). Once I prepare the hydraulic models, I will copy them to the same location and let you know.

Regional Road 50 and Emil Kolb Parkway_Corzier(Josh Wagemaker)

If you have any difficulty to access the above link, please let me know.

Thanks,

Priyantha Hunukumbura, Ph.D., P.Eng.
Technologist, Water Resources
Engineering Services | Development and Engineering Services

T: (416) 661-6600 ext. 6480
E: priyantha.hunukumbura@trca.ca
A: 101 Exchange Avenue, Vaughan, ON, L4K 5R6 | trca.ca

From: Josh Wagemaker <jwagemaker@cfcrozier.ca>
Sent: November 2, 2021 10:18 AM
To: Priyantha Hunukumbura <PRIYANTHA.HUNUKUMBURA@trca.ca>
Cc: Jason Wagler <Jason.Wagler@trca.ca>; Dilnesaw Chekol <Dilnesaw.Chekol@trca.ca>; Jessica Lysecki

<jlysecki@cfcrozier.ca>; Travis Gibson <tgibson@cfcrozier.ca>
Subject: RE: TRCA Data Request

Hi Priyantha,

I have processed payment. Thanks again for your help.

Based on past experience, the hydraulic model usually takes some time to prepare. If this is the case, and if it isn't too much trouble, would it be possible to receive the subcatchments as soon as possible?

Regards,

Josh Wagemaker | Engineering Intern
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
T: 905.875.0026

Crozier Connections:

Read our latest news and announcements here.

From: Priyantha Hunukumbura <PRIYANTHA.HUNUKUMBURA@trca.ca>
Sent: Monday, November 1, 2021 1:22 PM
To: Josh Wagemaker <jwagemaker@cfcrozier.ca>
Cc: Jason Wagler <Jason.Wagler@trca.ca>; Dilnesaw Chekol <Dilnesaw.Chekol@trca.ca>
Subject: RE: TRCA Data Request

Hi Josh,
Thanks for sending us the completed data sharing agreement.
The invoice for the requested data has been sent through TRCA's online payment system. Once we have received the payment and data has been prepared, I will direct you on how to access the data.

If you need any other information, please let me know.

Thank you.

Priyantha Hunukumbura, Ph.D., P.Eng.
Technologist, Water Resources

Engineering Services | Development and Engineering Services

T: (416) 661-6600 ext. 6480
E: priyantha.hunukumbura@trca.ca
A: 101 Exchange Avenue, Vaughan, ON, L4K 5R6 | trca.ca

From: Josh Wagemaker <jwagemaker@cfcrozier.ca>
Sent: October 29, 2021 2:15 PM
To: Priyantha Hunukumbura <PRIYANTHA.HUNUKUMBURA@trca.ca>
Cc: Jessica Lysecki <jlysecki@cfcrozier.ca>; Andrea Giampuzzi <agiampuzzi@cfcrozier.ca>; Jason Wagler <Jason.Wagler@trca.ca>; Dilnesaw Chekol <Dilnesaw.Chekol@trca.ca>; Travis Gibson <tgibson@cfcrozier.ca>
Subject: RE: TRCA Data Request

Hi Priyantha,

Thank you for your help. I have attached our data sharing agreement. Please send the invoice and we will provide payment as soon as possible.

Regards,

Josh Wagemaker | Engineering Intern
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
T: 905.875.0026

Crozier Connections:

Read our latest news and announcements here.

From: Priyantha Hunukumbura <PRIYANTHA.HUNUKUMBURA@trca.ca>
Sent: Friday, October 29, 2021 10:01 AM

To: Josh Wagemaker <jwagemaker@cfcrozier.ca>
Subject: RE: TRCA Data Request

Hi Josh,
The buffer shown in the figure (in Pink Color) is just for the Floodplain Mapping Sheet reference.
You can get some information on regulatory area mapping from Regulated Area Search - Toronto and Region Conservation Authority (TRCA) .
if you need the engineered HEC-RAS model as well, we can provide. In this case we will charge only $150 for the hydraulic Modelling.

Thanks,

Priyantha Hunukumbura, Ph.D., P.Eng.
Technologist, Water Resources
Engineering Services | Development and Engineering Services

T: (416) 661-6600 ext. 6480
E: priyantha.hunukumbura@trca.ca
A: 101 Exchange Avenue, Vaughan, ON, L4K 5R6 | trca.ca

From: Josh Wagemaker <jwagemaker@cfcrozier.ca>
Sent: October 29, 2021 9:32 AM
To: Priyantha Hunukumbura <PRIYANTHA.HUNUKUMBURA@trca.ca>
Subject: RE: TRCA Data Request

Hi Priyantha,

I am a little concerned about the buffer from **hum_82** and **hum_77** encroaching on the property. The shapefile provided may be a little coarse, it is possible that the property boundary is touching.
I wasn't aware that the estimated and engineered models were completely separate. Would it be another $150 for the engineered model?

I am having an internal meeting to discuss if we will need the sheets. I will get back to you with the Data Sharing Agreeement shortly.

Thanks,

Josh Wagemaker | Engineering Intern
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
T: 905.875.0026

Crozier Connections:

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From: Priyantha Hunukumbura <PRIYANTHA.HUNUKUMBURA@trca.ca>
Sent: Thursday, October 28, 2021 3:31 PM
To: Josh Wagemaker <jwagemaker@cfcrozier.ca>
Subject: RE: TRCA Data Request

Hi Josh,
No worries.
Please see the figure below. As I mentioned before, your subject area is outside of TRCA's Engineered Floodplain. However, if you need the Engineered Floodplain sheets (Hum_82, Hum_81 or Hum_77), please include them in the data sharing agreement. Those sheets are available in CAD($125 +Tax per sheet) or in PDF ($30+ Tax per sheet) . We typically do not provide Estimated floodplain shapefile as you will be able to generate it from the Estimated HEC-RAS model.

Thanks,

Priyantha Hunukumbura, Ph.D., P.Eng.
Technologist, Water Resources
Engineering Services | Development and Engineering Services

T: (416) 661-6600 ext. 6480
E: priyantha.hunukumbura@trca.ca
A: 101 Exchange Avenue, Vaughan, ON, L4K 5R6 | trca.ca

From: Josh Wagemaker <jwagemaker@cfcrozier.ca>
Sent: October 28, 2021 3:01 PM
To: Priyantha Hunukumbura <PRIYANTHA.HUNUKUMBURA@trca.ca>
Subject: RE: TRCA Data Request

I apologize for the number of emails but could we get the shapefile for the combined engineered-estimated floodplain map. I think that I have downloaded this before but the link on the TRCA website appears to be broken right now..

Thanks,

Josh Wagemaker | Engineering Intern
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
T: 905.875.0026

CROZIER
CONSULTING ENGINEERS

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Read our latest news and announcements here.

From: Josh Wagemaker
Sent: Thursday, October 28, 2021 2:56 PM
To: Priyantha Hunukumbura <PRIYANTHA.HUNUKUMBURA@trca.ca>
Cc: Jason Wagler <Jason.Wagler@trca.ca>; Dilnesaw Chekol <Dilnesaw.Chekol@trca.ca>
Subject: RE: TRCA Data Request

Hi Priyantha,

Thank you for your response. Would it be possible to get the shapefile of subcatchments without requesting the entire hydrologic model? Or does the $150 fee still apply?

Thanks,

From: Priyantha Hunukumbura <PRIYANTHA.HUNUKUMBURA@trca.ca>
Sent: Thursday, October 28, 2021 2:24 PM
To: Josh Wagemaker <jwagemaker@cfcrozier.ca>
Cc: Jason Wagler <Jason.Wagler@trca.ca>; Dilnesaw Chekol <Dilnesaw.Chekol@trca.ca>
Subject: RE: TRCA Data Request

Hi Josh,
Thanks for your email.
Information on the data availability is shown in Red below.

1. **The hydraulic model for the area previously identified. – You can purchase the Estimated Hydraulic model ($150 + Tax)**
2. **Shapefile of Subcatchments (not subwatersheds) – (If you need the hydrologic model for the Humber River($150 + Tax), please list it in the data sharing agreement. We can provide the Subcatchment shapefile)**
3. **Shapefile of Floodplain and Associated Maps - The subject area is within our Estimated Hydraulic modeling area. therefore, we do not have Engineered Floodplain maps for the area.**
4. **Infrastructure – Crossings (culverts and bridges only)- Please contact the Region/Town to obtain culvert information**
5. **Shapefile of Erosion/Hazardous Areas – Not available**

Based on the information provided, the subject site is within TRCA's Estimated Hydraulic Modeling boundary. Therefore, please note that the Estimated floodplain modeling and mapping was intended to be used as a screening tool for development applications submitted to the TRCA, to determine whether existing or proposed sites, properties, or structures are potentially susceptible to flooding. This information is the best available at this time but is not appropriate for many uses since the model doesn't include crossing structures, doesn't have refined Manning's n values, and the crossing geometry is not detailed. Thus, the TRCA water resources engineering staff recommend that the proponent use TRCA's available modeling and mapping to conduct the hydraulic analysis for their project, refine the model and create an engineered HEC-RAS model. The Estimated HEC-RAS model is based on old topographic information and therefore updating the topographic information will also be required.

Herewith I attached TRCA's data sharing agreement. Please complete it and send me back. Once we received the signed data sharing agreement, I will prepare the requested data and send you an invoice. Once we have received the necessary fee, I will make an arrangement to send you the data.

If you need further clarification, please do contact me.

Thanks,

Priyantha Hunukumbura, Ph.D., P.Eng.
Technologist, Water Resources
Engineering Services | Development and Engineering Services

T: (416) 661-6600 ext. 6480
E: priyantha.hunukumbura@trca.ca
A: 101 Exchange Avenue, Vaughan, ON, L4K 5R6 | trca.ca

From: Josh Wagemaker <jwagemaker@cfcrozier.ca>
Sent: October 28, 2021 1:22 PM
To: Priyantha Hunukumbura <PRIYANTHA.HUNUKUMBURA@trca.ca>
Subject: RE: TRCA Data Request

Hi Priyantha,

I have found some of the information that I had requested before. I thought that I should send you an updated list so that you don't have to collect everything. The reduced list of items includes:

1. **The hydraulic model for the area previously identified.**
2. **Shapefile of Subcatchments (not subwatersheds)**
3. **Shapefile of Floodplain and Associated Maps**
4. **Infrastructure – Crossings (culverts and bridges only)**
5. **Shapefile of Erosion/Hazardous Areas**

I understand that this process takes some time but if you are able to provide an approximate ETA it would be much appreciated.

Thank you,

Josh Wagemaker | Engineering Intern
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
T: 905.875.0026

Crozier Connections:

Read our latest news and announcements here.

From: Priyantha Hunukumbura <PRIYANTHA.HUNUKUMBURA@trca.ca>
Sent: Tuesday, October 26, 2021 2:56 PM
To: Josh Wagemaker <jwagemaker@cfcrozier.ca>
Subject: RE: TRCA Data Request

Hi Josh,
Thanks.
I will discuss with the planner and will let you know if I need to clarify anything.
Otherwise, I will send you TRCA's data sharing agreement for you to complete and send me back.

Thanks,

Priyantha Hunukumbura, Ph.D., P.Eng.
Technologist, Water Resources
Engineering Services | Development and Engineering Services

T: (416) 661-6600 ext. 6480
E: priyantha.hunukumbura@trca.ca
A: 101 Exchange Avenue, Vaughan, ON, L4K 5R6 | trca.ca

From: Josh Wagemaker <jwagemaker@cfcrozier.ca>
Sent: October 26, 2021 2:53 PM
To: Priyantha Hunukumbura <PRIYANTHA.HUNUKUMBURA@trca.ca>
Subject: RE: TRCA Data Request

Hello,

No permit applications have been made yet. Let me know if there is anything I can do.

Thanks,

Josh Wagemaker | Engineering Intern
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
T: 905.875.0026

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From: Priyantha Hunukumbura <PRIYANTHA.HUNUKUMBURA@trca.ca>
Sent: Tuesday, October 26, 2021 2:25 PM
To: Josh Wagemaker <jwagemaker@cfcrozier.ca>
Subject: RE: TRCA Data Request

Hi Josh,
Yes, I received the data you sent yesterday. Thanks.
As you need various types of data, I will discuss with the corresponding planner and get back to you on how we should proceed.
Can you please let me know whether the data is for a current/ existing permit application?

Thanks,

Priyantha Hunukumbura, Ph.D., P.Eng.
Technologist, Water Resources
Engineering Services | Development and Engineering Services

T: (416) 661-6600 ext. 6480
E: priyantha.hunukumbura@trca.ca
A: 101 Exchange Avenue, Vaughan, ON, L4K 5R6 | trca.ca

From: Josh Wagemaker <jwagemaker@cfcrozier.ca>
Sent: October 26, 2021 2:18 PM
To: Priyantha Hunukumbura <PRIYANTHA.HUNUKUMBURA@trca.ca>
Subject: RE: TRCA Data Request

Hi Priyantha,

Could you please confirm receipt of my email that was sent yesterday? I have provided the same information in a zip file just in case there is an issue with file size. Thank you for your help.

Sincerely,

Josh Wagemaker | Engineering Intern
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
T: 905.875.0026

Crozier Connections:

Read our latest news and announcements here.

From: Josh Wagemaker
Sent: Monday, October 25, 2021 12:47 PM
To: Priyantha Hunukumbura <PRIYANTHA.HUNUKUMBURA@trca.ca>
Subject: RE: TRCA Data Request

Hi Priyantha,

I apologize but I believe that your email went to my spam. I was just about to email you asking for an update. Below is the information that you had requested.

There is not a specific address for the project. It is owned the Bolton North Hill Landowners Group and is a collection of properties. One of the addresses is 14475 Hwy 50, Kleinburg, ON. One of the large areas is located north of Columbia Way, at Columbia Way and Mount Hope Rd. The other Site is located at HWY 50 and Emil Kolb Parkway. I have attached a map and shapefile for reference.

Assuming that the entire hydraulic model is too much data to send, I had sent Alwish a shapefile of the extents of the watercourse that we require. I have attached this shapefile and map as well.

In addition to the **Hydraulic Model**, we would like to request the following data.

2. **Hydrologic Model of Humber River Watershed**
3. **Shapefile of Subwatershed Drainage Areas or Subcatchments**
4. **Shapefile of Existing Land Use Conditions**
5. **Any Available Contour/Topographic Data**
6. **Shapefile of Floodplain and Associated Maps**
7. **Stormwater Management Ponds and Infrastructure**
8. **Shapefile of Erosion/Hazardous Areas**

We are running a little short on time for this project, so please let me know if there is anything that I can do to help with the process. I would really appreciate it if you could send the data that is immediately available, just in case the hydraulics part takes a some time to complete.

Please do not hesitate to call at (807)-356-4282. We are happy to take care of any licensing agreements or fees.

Thank you,

From: Priyantha Hunukumbura <PRIYANTHA.HUNUKUMBURA@trca.ca>
Sent: Tuesday, October 19, 2021 1:03 PM
To: Jessica Lysecki <jlysecki@cfcrozier.ca>
Cc: Andrea Giampuzzi <agiampuzzi@cfcrozier.ca>; Josh Wagemaker <jwagemaker@cfcrozier.ca>
Subject: RE: TRCA Data Request

Hi Josh,
Can you please provide me the address of the subject property and a clear map (or Shape File) showing the project boundary for me to check the data availability?

Thanks,

Priyantha Hunukumbura, Ph.D., P.Eng.
Technologist, Water Resources
Engineering Services | Development and Engineering Services

T: (416) 661-6600 ext. 6480
E: priyantha.hunukumbura@trca.ca
A: 101 Exchange Avenue, Vaughan, ON, L4K 5R6 | trca.ca

From: Alwish Gnanaraj <Alwish.Gnanaraj@trca.ca>
Sent: October 19, 2021 10:01 AM
To: Priyantha Hunukumbura <PRIYANTHA.HUNUKUMBURA@trca.ca>
Cc: Jessica Lysecki <jlysecki@cfcrozier.ca>; Andrea Giampuzzi <agiampuzzi@cfcrozier.ca>; Josh Wagemaker <jwagemaker@cfcrozier.ca>
Subject: Fw: TRCA Data Request

Hi Priyantha,

Could you please send this data request to Josh Wagemaker <jwagemaker@cfcrozier.ca>?

Josh: Peel region is in Priyantha's jurisdiction. He will be able to help you.

Thanks,
Alwish.

Alwish Gnanaraj, M.A.Sc.
Technologist, Water Resources Engineering
Engineering Services | Development and Engineering Services

T: (416) 661-6600 ext. 5390
E: alwish.gnanaraj@trca.ca
A: 101 Exchange Avenue, Vaughan, Ontario L4K 5R6

Toronto and Region Conservation Authority (TRCA) | trca.ca

From: Josh Wagemaker <jwagemaker@cfcrozier.ca>
Sent: October 19, 2021 9:56 AM
To: Alwish Gnanaraj <Alwish.Gnanaraj@trca.ca>
Cc: Jessica Lysecki <jlysecki@cfcrozier.ca>; Andrea Giampuzzi <agiampuzzi@cfcrozier.ca>
Subject: FW: TRCA Data Request

Hey Alwish,

I just wanted to follow up on my email last week. Would you be able to provide the license agreement and timeline for this information?

I could also try going through Development Planning if you are very busy right now.

Thank you,

Josh Wagemaker | Engineering Intern
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
T: 905.875.0026

Crozier Connections:

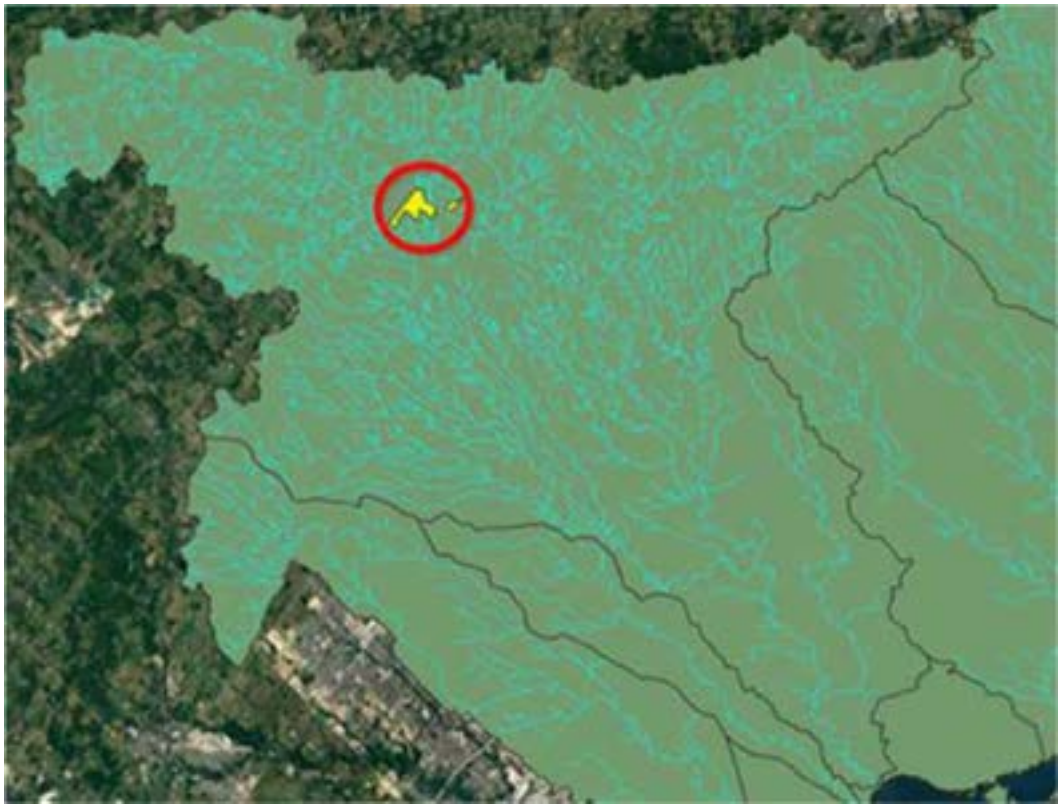
Read our latest news and announcements here.

From: Josh Wagemaker
Sent: Thursday, October 14, 2021 2:27 PM
To: alwish.gnanaraj@trca.ca
Cc: Jessica Lysecki <jlysecki@cfcrozier.ca>
Subject: TRCA Data Request

Hi Alwish,

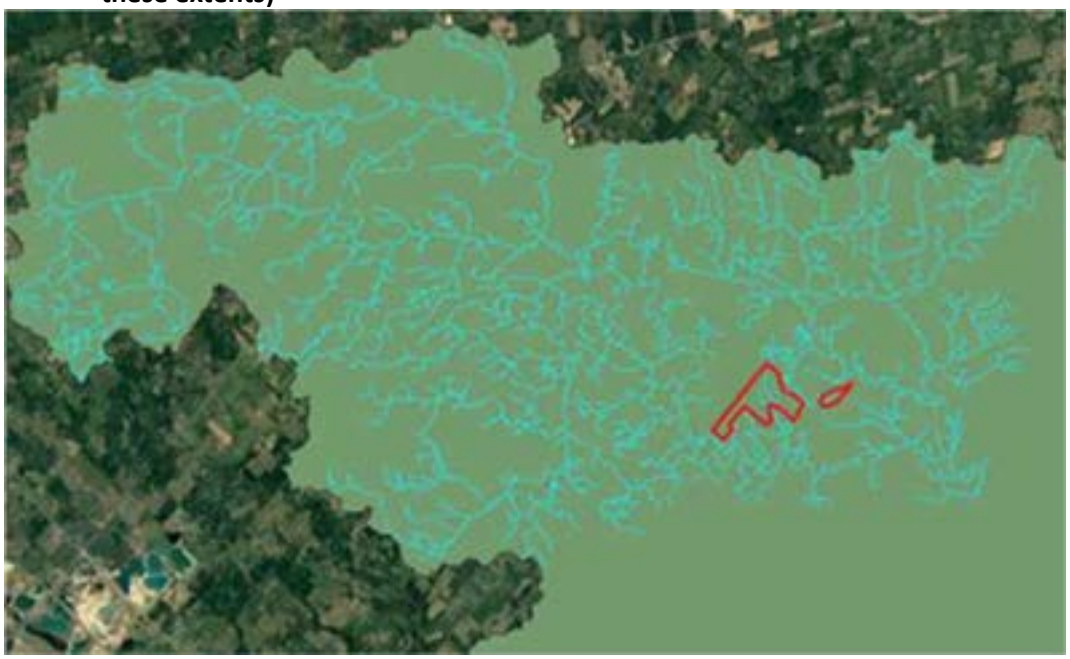
I hope that you are doing well. I am emailing you because I require some data that is not available on the TRCA's online portal. Last year I was in a similar situation and I remember that you were very helpful.

I am currently working on a project for the Bolton North Hill Landowners Group. We are developing the Functional Servicing Report with a focus on stormwater management. Our project is located within the Humber River Watershed at the intersection of Regional Road 50 and Emil Kolb Parkway. An overview of our sites location is shown below.



Below is a list of the data that I would like to request:

1. **Hydraulic Model for Watercourse Area Shown Below (I have attached a shapefile that includes these extents)**



2. **Hydrologic Model of Humber River Watershed**

3. **Shapefile of Subwatershed Drainage Areas or Subcatchments**
4. **Shapefile of Existing Land Use Conditions**
5. **Any Available Contour/Topographic Data**
6. **Shapefile of Floodplain and Associated Maps**
7. **Stormwater Management Ponds and Infrastructure**
8. **Shapefile of Erosion/Hazardous Areas**

Please let me know if you require any more information. Feel free to email me back or call me directly at (807) 356-4282.

Thank you and have a great day,

APPENDIX D

Stormwater Management Design Calculations

D1 – Storm Sewer Sizing Calculations
D2 – Stormwater Management Pond Calculations
D3 – Pond Design Visual OTTHYMO Model Output

Appendix D1 – Storm Sewer Sizing Calculations

Inlet flows are extracted from the 10-year, 12 hour AES storm in the post-development VO model prepared by Crozier.
Outlet flows for SWM Ponds 200-208 and 210 are extracted from the 100-year, 6 hour AES storm in the post-development VO model prepared by Crozier.
Outlet flows for SWM Ponds 209, 211 and 212 are from the unit flow rates (TRCA) and extracted from the post-development VO model prepared by Crozier.

Mannings "n" = 0.013

PROJ. NO: Bolton North Hill Landowners Group
PROJECT: 708-3446
DESIGN: AR
CHECK: TG
DATE: 12/17/2021

STORM SEWER PIPE SIZES
BOLTON NORTH HILL LANDOWNERS GROUP

SWM POND DRAINAGE AREA	Area (ha)	Composite Runoff Coefficient	INLET FLOW (L/s)	INLET PIPE DIA. (mm)	INLET PIPE SLOPE (m/m)	PIPE CAPACITY (L/s)	REMAINING CAPACITY (L/s)	VELOCITY (m/s)	% CAPACITY	OUTLET FLOW (L/s)	OUTLET PIPE DIA. (mm)	OUTLET PIPE SLOPE (m/m)	PIPE CAPACITY (L/s)	REMAINING CAPACITY (L/s)	VELOCITY (m/s)	% CAPACITY
200	5.93	0.59	869	750	0.01	1113.28	244.18	2.52	78.07	972.70	750	0.01	1113.28	140.58	2.52	87.37
201	8.11	0.53	1124	825	0.01	1435.44	311.94	2.69	78.27	1127.19	825	0.01	1435.44	308.25	2.69	78.53
202	4.95	0.59	731	675	0.01	840.59	109.29	2.35	87.00	816.90	750	0.01	1113.28	296.38	2.52	73.38
203	17.96	0.58	2563.4	1200	0.01	3898.73	1335.33	3.45	65.75	1530.60	900	0.01	1810.31	279.71	2.85	84.55
204	17.59	0.67	2725	1200	0.01	3898.73	1174.03	3.45	69.89	1578.10	900	0.01	1810.31	232.21	2.85	87.17
205	16.63	0.69	1530	900	0.01	1810.31	280.01	2.85	84.53	2701.80	1200	0.01	3898.73	1196.93	3.45	69.30
208	2.56	0.75	2401	1050	0.01	2730.73	329.43	3.15	87.94	1530.50	900	0.01	1810.31	279.81	2.85	84.54
209	0.94	0.9	3640	1350	0.007	4465.59	825.79	3.12	81.51	11.00	250	0.01	59.47	48.47	1.21	18.50
210	15.19	0.7	1737	1050	0.01	2730.73	993.53	3.15	63.62	1530.10	900	0.01	1810.31	280.21	2.85	84.52
211	26.26	0.6	2736	1200	0.01	3898.73	1162.33	3.45	70.19	11.00	250	0.01	59.47	48.47	1.21	18.50
212	11.51	0.65	682	675	0.01	840.59	158.49	2.35	81.15	13.00	250	0.01	59.47	46.47	1.21	21.86
Woodlot	10.45	-	182	600	0.01	614.01	431.91	2.17	29.66	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Notes:
Development Standards Manual (Town of Caledon, 2019)
Min cover = 1.5 m
Min velocity = 0.75 m/s
Max velocity = 4.0 m/s
Max capacity = 90%
Min pipe size = 300 mm
Min slope = 0.40%

Appendix D2 – Stormwater Management Pond Calculations

PROJECT: Bolton North Hill
PROJECT No.: 0708-3446
CREATED BY: ED
UPDATED BY: JW
CHECKED BY:
DATE: 2021-10-25
UPDATED: 2021-12-16

Existing Conditions VO Parameters

Existing Site Conditions

CN, CN*, CN III and IA values were determined through the Area Weighted calculator capabilities of Visual Otthymo 6.2

VO Parameters

Catchment #	Area (ha)	CN	CN*	CN III	IA (mm)	Tp (hr)
100	5.29	82	84	91	7.00	0.48
101	7.93	82	84	91	6.94	0.48
102	2.00	82	84	91	6.98	0.21
103	5.49	82	84	91	6.90	0.32
104	6.51	82	84	91	7.06	0.55
105	11.68	82	84	91	7.03	0.36
106	17.86	78	80	89	7.24	0.75
107	5.21	82	84	91	6.61	0.52
108	5.80	82	84	91	7.00	0.34
109	14.92	87	89	94	5.56	0.51
110	15.37	82	84	91	6.98	0.75
111	21.58	82	84	91	7.00	0.61
112	4.63	82	84	91	7.00	0.41
113	13.07	82	84	91	7.00	0.67
114	9.91	83	85	92	6.79	0.56
115	9.61	82	84	91	7.02	0.50
116	7.40	83	85	92	6.82	0.51
117	4.30	82	84	91	6.99	0.41
118	4.36	94	95	97	2.68	0.19
Total Site:	**172.91**	**82**	**84**	**91**	**6.76**	**0.54**

PROJECT: Bolton North Hill
PROJECT No.: 0708-3446
CREATED BY: ED
UPDATED BY: JW
CHECKED BY:
DATE: 2021-10-25
UPDATED: 2021-12-16

Existing Conditions VO Parameters

Existing Site Conditions

CN, CN*, CN III and IA values were determined through the Area Weighted calculator capabilities of Visual Otthymo 6.2

VO Parameters

Catchment #	Area (ha)	CN	CN*	CN III	IA (mm)	Tp (hr)
EXT1	3.26	82	84	91	7.00	0.21
EXT2	13.35	82	84	91	7.07	0.56
EXT3	4.04	82	84	91	7.00	0.28
EXT4	43.99	71	71	85	6.82	0.93
EXT5	6.22	63	65	80	9.04	0.49
EXT6	6.26	84	86	92	5.80	0.87
EXT7	15.76	83	85	92	7.08	1.03
EXT8	18.33	81	84	91	8.44	0.77
EXT9	24.12	79	83	90	8.46	0.52
EXT10	9.22	77	81	89	9.45	0.35
EXT11	5.33	80	82	90	7.63	0.50
EXT12	10.18	80	83	90	8.17	0.51
EXT13	13.98	78	83	90	9.60	0.69
EXT14	15.33	77	81	89	9.35	0.59
EXT15	15.31	84	87	92	6.90	0.58
EXT16	22.20	81	84	91	7.86	0.55
EXT17	10.44	76	80	88	9.73	0.50
EXT18	6.98	76	81	88	10.16	0.42
EXT19	19.14	82	85	91	8.07	1.05
EXT20	20.69	82	85	91	7.84	0.99
EXT21	50.74	81	83	91	7.53	1.37
EXT22	52.82	81	83	91	7.40	0.79
Total Site + EXT:	**560.61**	**80**	**83**	**90**	**7.50**	**0.72**

PROJECT: Bolton North Hill **CREATED BY:** ED **DATE:** 2021-10-25
PROJECT No.: 0708-3446 **CHECKED BY:**

Time to Peak Calculations

Time to Peak Inputs						Airport	
Drainage Area ID	Area (ha)	C	Length (m)	Drop (m)	Slope (%)	Tc (hr)	**Tp(hr)**
100	5.29	0.25	486.3	14.3	2.9%	0.71	**0.48**
101	7.93	0.25	480.3	13.3	2.8%	0.72	**0.48**
102	2.00	0.25	115.9	4.9	4.2%	0.31	**0.21**
103	5.49	0.25	224.5	6.8	3.0%	0.48	**0.32**
104	6.51	0.25	445.6	7.4	1.7%	0.83	**0.55**
105	11.68	0.25	253.9	6.5	2.6%	0.54	**0.36**
106	17.86	0.25	731.3	10.4	1.4%	1.11	**0.75**
107	5.21	0.25	407.5	7.0	1.7%	0.78	**0.52**
108	5.80	0.25	204.3	4.5	2.2%	0.51	**0.34**
109	14.92	0.25	446.1	9.2	2.1%	0.77	**0.51**
110	15.37	0.25	691.5	9.0	1.3%	1.11	**0.75**
111	21.58	0.25	414.5	4.5	1.1%	0.92	**0.61**
112	4.63	0.25	280.7	5.7	2.0%	0.61	**0.41**
113	13.07	0.25	542.7	6.8	1.3%	1.00	**0.67**
114	9.91	0.25	363.6	4.3	1.2%	0.83	**0.56**
115	9.61	0.25	362.0	6.0	1.7%	0.74	**0.50**
116	7.40	0.25	247.0	2.2	0.9%	0.76	**0.51**
117	4.30	0.25	186.8	2.0	1.1%	0.62	**0.41**
118	4.36	0.25	170.1	18.0	10.6%	0.28	**0.19**
EXT1	3.26	0.25	124.2	6.0	4.8%	0.31	**0.21**
EXT2	13.35	0.25	447.3	7.0	1.6%	0.84	**0.56**
EXT3	4.04	0.25	194.5	6.9	3.5%	0.42	**0.28**
EXT4	43.99	0.25	939.1	9.9	1.1%	1.39	**0.93**
EXT5	6.22	0.25	355.5	6.0	1.7%	0.73	**0.49**
EXT6	6.26	0.25	610.5	4.1	0.7%	1.30	**0.87**
EXT7	15.76	0.25	772.1	4.5	0.6%	1.53	**1.03**
EXT8	18.33	0.25	705.6	8.5	1.2%	1.15	**0.77**
EXT9	24.12	0.25	737.3	31.8	4.3%	0.77	**0.52**
EXT10	9.22	0.25	406.9	24.1	5.9%	0.52	**0.35**
EXT11	5.33	0.25	404.5	7.7	1.9%	0.75	**0.50**
EXT12	10.18	0.25	353.2	5.2	1.5%	0.77	**0.51**
EXT13	13.98	0.25	612.5	8.5	1.4%	1.02	**0.69**
EXT14	15.33	0.25	509.1	8.6	1.7%	0.88	**0.59**
EXT15	15.31	0.25	712.1	20.5	2.9%	0.87	**0.58**
EXT16	22.20	0.25	552.8	13.3	2.4%	0.81	**0.55**
EXT17	10.44	0.25	482.6	12.4	2.6%	0.74	**0.50**
EXT18	6.98	0.25	320.3	7.5	2.4%	0.62	**0.42**
EXT19	19.14	0.25	979.1	7.8	0.8%	1.56	**1.05**
EXT20	20.69	0.25	685.0	3.8	0.5%	1.47	**0.99**
EXT21	50.76	0.25	1231.3	6.1	0.5%	2.04	**1.37**
EXT22	52.82	0.25	1219.5	31.0	2.5%	1.19	**0.79**

CROZIER CONSULTING ENGINEERS

PROJECT: Bolton North Hill
PROJECT No.: 0708-3446

CREATED BY: ED
UPDATED BY: ED
CHECKED BY:

DATE: 2021-10-25
UPDATED: 2021-12-16

Rational Method - Proposed Conditions

Town of Caledon Standard Runoff Coefficients:

Landuse	C
Residential (Low-Density)	0.60
Residential (Medium-Density)	0.70
Residential (High-Density)	0.75
Commercial	0.90

Landuse	C
Institutional (Schools & Churches)	0.75
Parks / Open Space	0.25
Woodlot	0.25
SWM Pond	0.50

Runof coefficients, C, as per Town of Caledon Development Standards Manual 2019 - STD DWG 103.
CN Values as per MTO Design Chart 1.09, based on Soil Type 'King Clay Loam' from Ontario Soils Map

Proposed Site Conditions

TIMP = 100* (RC - 0.25) / (0.90 - 0.25)

Weighted Runoff Coefficient C:

Catchment #	Landuse	Area (ha)	C	XIMP	TIMP
200	Residential (Low-Density)	5.40	0.60	36%	54%
	SWM Pond	0.54	0.50	50%	50%
	Total/ Weighted C:	**5.93**	**0.59**	**37%**	**53%**
201	Residential (Low-Density)	6.24	0.60	36%	54%
	Parks and Open Space	1.42	0.25	0%	0%
	SWM Pond	0.45	0.50	50%	50%
	Total/ Weighted C:	**8.11**	**0.53**	**30%**	**44%**
202	Residential (Low-Density)	4.58	0.60	36%	54%
	SWM Pond	0.37	0.50	50%	50%
	Total/ Weighted C:	**4.95**	**0.59**	**37%**	**54%**
203	Residential (Low-Density)	6.80	0.60	36%	54%
	Residential (Medium-Density)	4.53	0.70	46%	69%
	Institutional (School)	2.63	0.75	77%	77%
	Parks and Open Space	3.04	0.25	0%	0%
	SWM Pond	0.96	0.50	50%	50%
	Total/ Weighted C:	**17.96**	**0.58**	**39%**	**52%**
204	Residential (Low-Density)	1.33	0.60	36%	54%
	Residential (Medium-Density)	12.38	0.70	46%	69%
	Residential (High-Density)	1.53	0.75	69%	77%
	Commercial	0.80	0.90	100%	100%
	Parks and Open Space	0.52	0.00	0%	0%
	SWM Pond	1.02	0.50	50%	50%
	Total/ Weighted C:	**17.59**	**0.67**	**48%**	**67%**
205	Residential (Low-Density)	8.05	0.60	36%	54%
	Residential (Medium-Density)	6.07	0.70	46%	69%
	Parks and Open Space	1.60	0.25	0%	0%
	SWM Pond	0.90	0.50	50%	50%
	Total/ Weighted C:	**16.63**	**0.69**	**37%**	**54%**
206	Residential (High-Density)	2.56	0.75	69%	77%
	Total/ Weighted C:	**2.56**	**0.75**	**69%**	**77%**
207	Commercial	0.94	0.90	100%	100%
	Total/ Weighted C:	**0.94**	**0.90**	**100%**	**100%**

CROZIER CONSULTING ENGINEERS

PROJECT: Bolton North Hill
PROJECT No.: 0708-3446

CREATED BY: ED
UPDATED BY: ED
CHECKED BY:

DATE: 2021-10-25
UPDATED: 2021-12-16

Rational Method - Proposed Conditions

Town of Caledon Standard Runoff Coefficients:

Landuse	C
Residential (Low-Density)	0.60
Residential (Medium-Density)	0.70
Residential (High-Density)	0.75
Commercial	0.90

Landuse	C
Institutional (Schools & Churches)	0.75
Parks / Open Space	0.25
Woodlot	0.25
SWM Pond	0.50

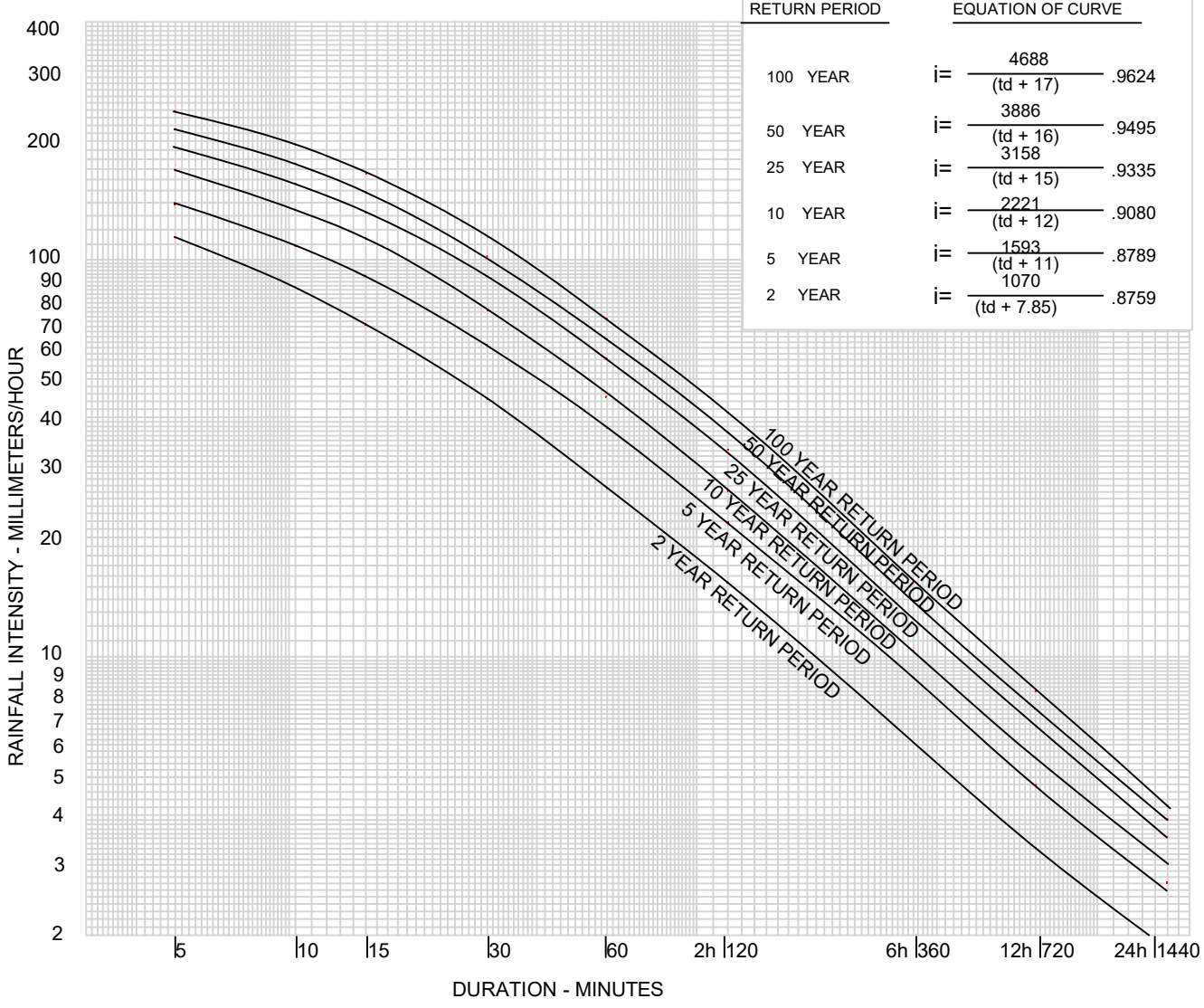
Runof coefficients, C, as per Town of Caledon Development Standards Manual 2019 - STD DWG 103.
CN Values as per MTO Design Chart 1.09, based on Soil Type 'King Clay Loam' from Ontario Soils Map

Proposed Site Conditions

TIMP = 100* (RC - 0.25) / (0.90 - 0.25)

Weighted Runoff Coefficient C:

Catchment #	Landuse	Area (ha)	C	XIMP	TIMP
208	Residential (Low-Density)	0.65	0.60	36%	54%
	Residential (Medium-Density)	9.94	0.70	46%	69%
	Residential (High-Density)	3.57	0.75	69%	77%
	Commercial	0.16	0.90	100%	100%
	SWM Pond	0.88	0.50	50%	50%
	Total/ Weighted C:	**15.19**	**0.70**	**52%**	**70%**
209	Residential (Low-Density)	17.77	0.60	36%	54%
	Residential (Medium-Density)	2.91	0.70	46%	69%
	Institutional (School)	2.40	0.75	77%	77%
	Parks and Open Space	1.27	0.25	0%	0%
	SWM Pond	1.90	0.50	50%	50%
	Total/ Weighted C:	**26.26**	**0.60**	**40%**	**55%**
210	Residential (Medium-Density)	9.38	0.70	46%	69%
	Residential (High-Density)	0.40	0.75	69%	77%
	Parks and Open Space	1.05	0.25	0%	0%
	SWM Pond	0.69	0.50	50%	50%
	Total/ Weighted C:	**11.51**	**0.65**	**43%**	**62%**
211	Residential (Low-Density)	14.18	0.60	36%	54%
	Residential (Medium-Density)	1.52	0.70	46%	69%
	Residential (High-Density)	1.03	0.75	69%	77%
	Parks and Open Space	1.10	0.25	0%	0%
	SWM Pond	1.51	0.50	50%	50%
	Total/ Weighted C:	**19.33**	**0.59**	**37%**	**53%**
212	Residential (Medium-Density)	3.81	0.70	46%	69%
	Parks and Open Space	0.00	0.25	0%	0%
	SWM Pond	0.50	0.50	50%	50%
	Total/ Weighted C:	**4.30**	**0.68**	**46%**	**67%**
	Total Site/ Weighted C:	**151.27**	**0.63**	**42%**	**58%**



RETURN PERIOD	EQUATION OF CURVE	
100 YEAR	$i = \frac{4688}{(td + 17)}$	.9624
50 YEAR	$i = \frac{3886}{(td + 16)}$	.9495
25 YEAR	$i = \frac{3158}{(td + 15)}$	.9335
10 YEAR	$i = \frac{2221}{(td + 12)}$	.9080
5 YEAR	$i = \frac{1593}{(td + 11)}$	.8789
2 YEAR	$i = \frac{1070}{(td + 7.85)}$	.8759

INLET TIMES

SUBURBAN RESIDENTIAL	
(ROOF DRAINS UNCONNECTED)	15 min
(ROOF DRAINS CONNECTED)	10 min
SUBURBAN, COMMERCIAL, INDUSTRIAL MULTIPLE FAMILY	10 min
DOWNTOWN COMMERCIAL, HIGH DENSITY APARTMENTS, EXPRESSWAYS	5 min

RUNOFF COEFFICIENT

COMMERCIAL	
- DOWNTOWN & SUBURBAN SHOPPING	0.90
INDUSTRIAL	
- DOWNTOWN	0.90
- SUBURBAN INDUSTRIAL PARKS	0.75
RESIDENTIAL	
- APARTMENTS	0.75
- ROW DWELLINGS	0.70
- DUPLEX DWELLINGS	0.70
- SEMIDETACHED - DOWNTOWN	0.60
- SINGLE FAMILY - DOWNTOWN	0.60
- SEMIDETACHED - SUBURBAN	0.50
- SINGLE FAMILY - SUBURBAN	0.40
SCHOOLS, CHURCHES, HOSPITALS	0.75
PARKS, CEMETERIES, RAIL YARDS	
(OVER 4 Ha)	0.20
(UNDER 4 Ha)	0.25
PARKING LOTS ASPHALT & GRAVEL	0.90

TOWN OF CALEDON

RAINFALL INTENSITY CURVES

NO.	REVISION	APR'D	DATE
3	ADDITION OF TEXT		APR 19
2	STANDARD 104 NOW 103		JAN 08
1	STANDARD 112.01 NOW 104		JUNE 08

APR'D: C.C. DATE: FEB 2000

DRAWN: BJM SCALE: N.T.S.

STANDARD No. 103

CROZIER
CONSULTING ENGINEERS

Project: Bolton North Hill
File: 0708-3446
Designed by: Erin Dodd
Checked by: Jessica Lysecki
Date: December 2, 2021

TRCA Unit Flow Rate Calculations

		Pond 209			Pond 211			Pond 212		
Storm Event	**TRCA Equation C Sub-Basin 10[1]** Q (L/s/ha) A (ha)	**Pre-Development Area to Pond Outlet** (ha)	**Target Flow Rate** (L/s)	**Target Flow Rate** (m^3/s)	**Pre-Development Area to Pond Outlet** (ha)	**Target Flow Rate** (L/s)	**Target Flow Rate** (m^3/s)	**Pre-Development Area to Pond Outlet** (ha)	**Target Flow Rate** (L/s)	**Target Flow Rate** (m^3/s)
2-Year	Q=3.142-0.233*ln(A)	26.26	2.4	0.002	19.33	2.5	0.002	4.30	2.8	0.003
5-Year	Q=5.557-0.427*ln(A)		4.2	0.004		4.3	0.004		4.9	0.005
10-Year	Q=7.443-0.578*ln(A)		5.6	0.006		5.7	0.006		6.6	0.007
25-Year	Q=9.838-0.757*ln(A)		7.4	0.007		7.6	0.008		8.7	0.009
50-Year	Q=11.920-0.921*ln(A)		8.9	0.009		9.2	0.009		10.6	0.011
100-Year	Q=14.140-1.096*ln(A)		10.6	0.011		10.9	0.011		12.5	0.013

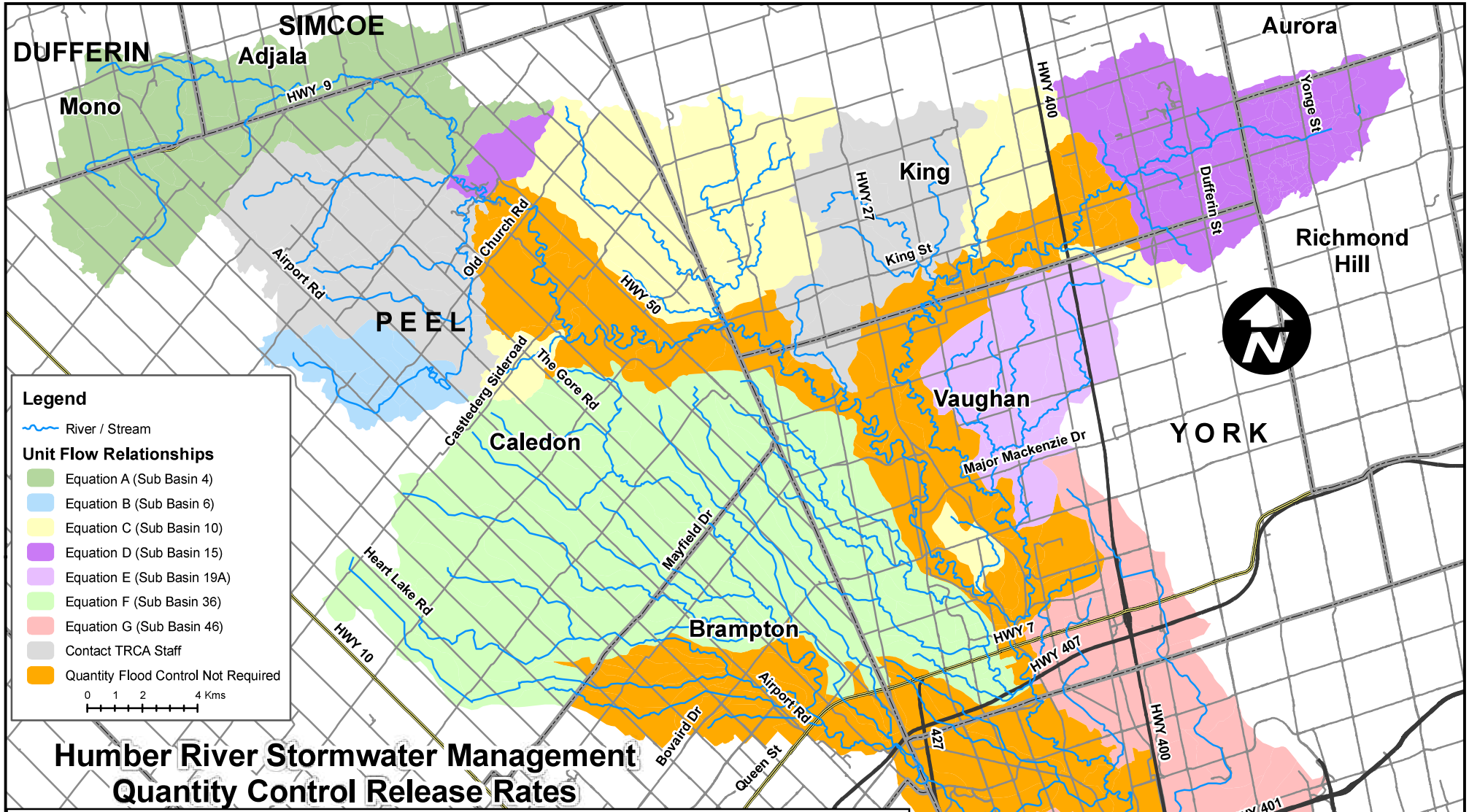
Notes: 1) Unitary flow rates obtained from Toronto and Region Conservation Authority Stormwater Management Criteria (August 2012) Table E.1: Summary of Unit Flow Relationships (Humber River Watershed) for Sub-Basin 10 (Equation C)

TABLE E.1: SUMMARY OF UNIT FLOW RELATIONSHIPS
HUMBER RIVER WATERSHED

Conservation for The Living City

Return Period	Equation A Sub-Basin 4	Equation B Sub-Basin 6	Equation C Sub-Basin 10	Equation D Sub-Basin 15	Equation E Sub-Basin 19A	Equation F Sub-Basin 36	Equation G Sub-Basin 46
100-Year	Q=6.086-0.445*ln(A)	Q=15.199-0.751* ln(A)	Q=14.140-1.096* ln(A)	Q=20.389-1.899 *ln(A)	Q=15.911-1.785 *ln(A))	Q=29.912-2.316 *ln(A)	Q=22.973-2.256 *ln(A)
50-Year	Q=5.147-0.376 *ln(A)	Q=12.692-0.623 *ln(A)	Q=11.920-0.921*ln(A)	Q= 17.051-1.577 *ln(A)	Q=13.700-1.531 *ln(A)	Q=26.568-2.082 *ln(A)	Q=20.164-1.973 *ln(A)
25-Year	Q=4.272-0.312 *ln(A)	Q= 10.488-0.522 *ln(A)	Q=9.838-0.757 *ln(A)	Q=14.037-1.293 *ln(A)	Q=11.553-1.297 *ln(A)	Q=22.639-1.741 *ln(A)	Q=17.381-1.690 *ln(A)
10-Year	Q=3.192-0.233 *ln(A)	Q=7.707-0.382 *ln(A)	Q=7.443-0.578 *ln(A)	Q=10.409-0.953 *ln(A)	Q=9.213-1.031 *ln(A)	Q=17.957-1.373 *ln(A)	Q=13.877-1.342 *ln(A)
5-Year	Q=2.410-0.175 *ln(A)	Q=5.755-0.283 *ln(A)	Q=5.557-0.427 *ln(A)	Q=7.930-0.738 *ln(A)	Q=7.358-0.829 *ln(A)	Q=14.652-1.136 *ln(A)	Q=11.468-1.123 *ln(A)
2-Year	Q=1.439-0.106 *ln(A)	Q=3.288-0.159 *ln(A)	Q=3.142-0.233 *ln(A)	Q=4.722-0.454 *ln(A)	Q=4.567-0.503 *ln(A)	Q=9.606-0.719 *ln(A)	Q=7.745-0.762 *ln(A)

Note:
1. Q - Unit flow (L/s/ha - litres per second per hectare)
2. A - Area in hectares (ha)



Humber River Stormwater Management Quantity Control Release Rates

TABLE E.1: SUMMARY OF UNIT FLOW RELATIONSHIPS
HUMBER RIVER WATERSHED

Conservation for The Living City

Return Period	Equation A Sub-Basin 4	Equation B Sub-Basin 6	Equation C Sub-Basin 10	Equation D Sub-Basin 15	Equation E Sub-Basin 19A	Equation F Sub-Basin 36	Equation G Sub-Basin 46
100-Year	Q=6.086-0.440*ln(A)	Q=15.199-0.751*ln(A)	Q=14.140-1.096*ln(A)	Q=20.388-1.886*ln(A)	Q=15.911-1.785*ln(A))	Q=29.912-2.358*ln(A)	Q=22.973-2.256*ln(A)
50-Year	Q=5.147-0.376*ln(A)	Q=12.692-0.623*ln(A)	Q=11.920-0.921*ln(A)	Q=17.051-1.577*ln(A)	Q=13.700-1.531*ln(A)	Q=26.566-2.082*ln(A)	Q=20.104-1.973*ln(A)
25-Year	Q=4.272-0.312*ln(A)	Q=10.498-0.522*ln(A)	Q=9.838-0.757*ln(A)	Q=14.037-1.293*ln(A)	Q=11.553-1.297*ln(A)	Q=22.639-1.741*ln(A)	Q=17.381-1.690*ln(A)
10-Year	Q=3.152-0.233*ln(A)	Q=7.707-0.382*ln(A)	Q=7.443-0.578*ln(A)	Q=10.400-0.953*ln(A)	Q=9.213-1.031*ln(A)	Q=17.957-1.373*ln(A)	Q=13.677-1.342*ln(A)
5-Year	Q=2.410-0.175*ln(A)	Q=5.755-0.283*ln(A)	Q=5.557-0.427*ln(A)	Q=7.930-0.738*ln(A)	Q=7.358-0.829*ln(A)	Q=14.552-1.136*ln(A)	Q=8.460-1.123*ln(A)
2-Year	Q=1.439-0.108*ln(A)	Q=3.286-0.158*ln(A)	Q=3.142-0.235*ln(A)	Q=4.722-0.454*ln(A)	Q=4.507-0.503*ln(A)	Q=9.506-0.719*ln(A)	Q=7.745-0.762*ln(A)

Note:
1. Q - Unit Flow (Litres per second per hectare)
2. A - Area in hectares (ha)

CROZIER
CONSULTING ENGINEERS

Project: Bolton North Hill
File: 0708-3446
Designed by: E.D.
Checked by: J.L.
Date: October 15, 2021
Updated: December 3, 2021

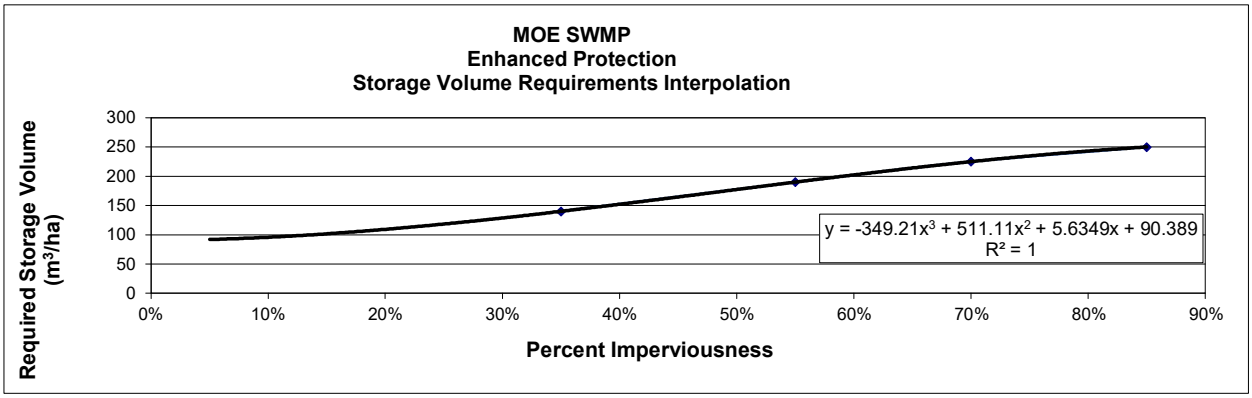
SWM Pond Permanent Pool Volume Calculations

Pond Name	Area to Pond (ha)	Percent Impervious (%)	Storage Vol. Req'd (m^3/ha)	Extended Detention Volume Req'd (m^3/ha)	Permanent Pool Vol. Req'd (m^3/ha)	Extended Detention Volume Req'd (m^3)	Permanent Pool Vol. Req'd (m^3)
200	5.93	54%	186	40	146	237	868
201	8.11	44%	163	40	123	324	994
202	4.95	54%	186	40	146	198	725
203	17.96	52%	182	40	142	718	2,548
204	17.59	67%	218	40	178	703	3,139
205	16.63	54%	188	40	148	665	2,455
208	15.19	70%	224	40	184	608	2,798
209	26.26	55%	189	40	149	1,050	3,925
210	11.51	62%	207	40	167	461	1,926
211	19.33	53%	185	40	145	773	2,799
212	4.30	67%	219	40	179	172	768

MOE 2003 SWMP Manual: Water Quality Storage Requirements based on Receiving Waters *

PROTECTION LEVEL	SWMP Type	STORAGE VOLUME (m^3 / ha) FOR IMPERVIOUS LEVEL			
		35%	55%	70%	85%
Enhanced	Wet Pond	140	190	225	250
Normal	Wet Pond	90	110	130	150
Basic	Wet Pond	60	75	85	95

** Table 3.2 from the MOE SWMP Planning & Design Manual, 2004, pg 3-10*



CROZIER
CONSULTING ENGINEERS

Project: Bolton North Hill
File: 0708-3446
Designed by: E.D.
Checked by: J.N.L.
Date: October 15, 2021
Updated: December 3, 2021

SWM Pond Extended Detention Volume Calculations

Pond Name	Area to Pond (ha)	Percent Impervious (%)	MOE Extended Detention Volume[1] (m^3/ha)	MOE Extended Detention Volume (m^3)	25mm Event Runoff Volume[2] (mm)	25mm Event Runoff Volume (m^3)
200	5.93	54%	40	237	15.15	899
201	8.11	44%	40	324	13.85	1,123
202	4.95	54%	40	198	15.24	754
203	17.96	52%	40	718	15.22	2,734
204	17.59	67%	40	703	17.25	3,034
205	16.63	54%	40	665	15.24	2,534
208	15.19	70%	40	608	17.82	2,708
209	26.26	55%	40	1,050	15.55	4,084
210	11.51	62%	40	461	16.42	1,891
211	19.33	53%	40	773	15.15	2,929
212	4.30	67%	40	172	17.13	737

Notes:
1) MOE Extended Detention Volume requirement of 40m^3/ha obtained from MOE SWMP Planning & Design Manual, 2004, Pg 3-10
2) 25mm Event Runoff Volume obtained from Visual Otthymo model

D3 – Pond Design Visual OTTHYMO Model Output

Bolton North Hill - Option 1 & 2 Lands
Town of Caledon, Region of Peel
VO Modelling Results – Pond Design
25mm 4 Hour Chicago Storm Event

Project No. 0708-3446
Date: December 2021

VO Schematic:

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

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

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


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DATE: 12-16-2021                          TIME: 01:22:54

USER:


COMMENTS: _____________________________________________________

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  ***********************************************
  ** SIMULATION : 0.0 - 25mm_4hr_Chicago        **
  ***********************************************


--------------------
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| Ptotal= 25.00 mm |    Comments: 25mm_4hr_Chicago
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.17    1.46 |  1.33    5.86 |  2.50    3.75 |  3.67    1.65
                0.33    1.62 |  1.50   11.76 |  2.67    3.14 |  3.83    1.53
                0.50    1.82 |  1.67   51.29 |  2.83    2.71 |  4.00    1.44
                0.67    2.09 |  1.83   21.52 |  3.00    2.39 |  4.17    0.00
                0.83    2.46 |  2.00    9.73 |  3.17    2.14 |
                1.00    3.02 |  2.17    6.30 |  3.33    1.94 |
                1.17    3.96 |  2.33    4.68 |  3.50    1.78 |

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

--------------------
| CALIB            |
| STANDHYD (  0212)|   Area    (ha)=   4.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  46.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.88         1.42
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     169.37        40.00
     Mannings n           =      0.013        0.250

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

```
                        ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.083   1.46 | 1.167    3.96 | 2.250    4.68 |  3.33    1.94
                0.167   1.46 | 1.250    5.86 | 2.333    4.68 |  3.42    1.78
                0.250   1.62 | 1.333    5.86 | 2.417    3.75 |  3.50    1.78
                0.333   1.62 | 1.417   11.76 | 2.500    3.75 |  3.58    1.65
                0.417   1.82 | 1.500   11.76 | 2.583    3.14 |  3.67    1.65
                0.500   1.82 | 1.583   51.29 | 2.667    3.14 |  3.75    1.53
                0.583   2.09 | 1.667   51.29 | 2.750    2.71 |  3.83    1.53
                0.667   2.09 | 1.750   21.52 | 2.833    2.71 |  3.92    1.44
                0.750   2.46 | 1.833   21.52 | 2.917    2.39 |  4.00    1.44
                0.833   2.46 | 1.917    9.73 | 3.000    2.39 |  4.08    0.00
                0.917   3.02 | 2.000    9.73 | 3.083    2.14 |  4.17    0.00
                1.000   3.02 | 2.083    6.30 | 3.167    2.14 |
                1.083   3.96 | 2.167    6.30 | 3.250    1.94 |

     Max.Eff.Inten.(mm/hr)=      51.29        30.51
               over (min)        5.00        20.00
     Storage Coeff.  (min)=      4.58 (ii)   15.92 (ii)
     Unit Hyd. Tpeak (min)=      5.00        20.00
     Unit Hyd. peak  (cms)=      0.23         0.07
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.26         0.07         0.284 (iii)
     TIME TO PEAK    (hrs)=      1.67         1.92          1.67
     RUNOFF VOLUME    (mm)=     24.00        11.27         17.13
     TOTAL RAINFALL   (mm)=     25.00        25.00         25.00
     RUNOFF COEFFICIENT   =      0.96         0.45          0.68

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

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0012)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000    |  1.5300      0.0100
                         0.5000     0.0050    |  1.5400      3.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0212)      4.303     0.284      1.67      17.13
   OUTFLOW: ID= 1 (  0012)      4.303     0.271      1.67      17.13

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 95.32
                    TIME SHIFT OF PEAK FLOW          (min)=  0.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.0029

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0200)|   Area    (ha)=   5.93
|ID= 1 DT= 5.0 min |   Total Imp(%)=  53.00   Dir. Conn.(%)=  37.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.14         2.79
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     198.83        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      51.29        21.69
               over (min)        5.00        20.00
     Storage Coeff.  (min)=      5.04 (ii)   18.05 (ii)
     Unit Hyd. Tpeak (min)=      5.00        20.00
     Unit Hyd. peak  (cms)=      0.21         0.06
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.28         0.10         0.312 (iii)
```

```
     TIME TO PEAK    (hrs)=       1.67         1.92          1.67
     RUNOFF VOLUME    (mm)=      24.00         9.95         15.15
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =       0.96         0.40          0.61


       (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(  0020)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000    |  1.5300      0.0100
                         0.5000     0.0050    |  1.5400      3.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0200)     5.930     0.312     1.67       15.15
   OUTFLOW: ID= 1 (  0020)     5.930     0.295     1.67       15.15

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 94.42
                  TIME SHIFT OF PEAK FLOW          (min)=  0.00
                  MAXIMUM  STORAGE   USED        (ha.m.)=  0.0032

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0205)|   Area    (ha)=  16.63
|ID= 1 DT= 5.0 min |   Total Imp(%)=  54.00   Dir. Conn.(%)=  37.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       8.98         7.65
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     332.97        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      51.29        22.52
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       6.87 (ii)   19.68 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.18         0.06
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.71         0.26          0.804 (iii)
     TIME TO PEAK    (hrs)=       1.67         1.92          1.67
     RUNOFF VOLUME    (mm)=      24.00        10.09         15.24
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =       0.96         0.40          0.61


       (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(  0005)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000    |  1.5300      0.0100
                         0.5000     0.0050    |  1.5400      3.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0205)    16.630     0.804     1.67       15.24
   OUTFLOW: ID= 1 (  0005)    16.630     0.808     1.67       15.24

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=100.48
                  TIME SHIFT OF PEAK FLOW          (min)=  0.00
                  MAXIMUM  STORAGE   USED        (ha.m.)=  0.0068

     **** WARNING : HYDROGRAPH PEAK WAS NOT REDUCED.
                    CHECK OUTFLOW/STORAGE TABLE  OR REDUCE DT.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0201)|   Area    (ha)=   8.11
|ID= 1 DT= 5.0 min |   Total Imp(%)=  44.00   Dir. Conn.(%)=  30.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.57         4.54
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     232.52        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      51.29        19.18
                over (min)        5.00        20.00
     Storage Coeff.  (min)=       5.54 (ii)   19.20 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.20         0.06
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.30         0.13          0.348 (iii)
     TIME TO PEAK    (hrs)=       1.67         2.00          1.67
     RUNOFF VOLUME    (mm)=      24.00         9.50         13.85
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =       0.96         0.38          0.55


       (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(  0001)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000    |  1.5300      0.0100
                         0.5000     0.0050    |  1.5400      3.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0201)     8.110     0.348     1.67       13.85
   OUTFLOW: ID= 1 (  0001)     8.110     0.325     1.67       13.85

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 93.43
                  TIME SHIFT OF PEAK FLOW          (min)=  0.00
                  MAXIMUM  STORAGE   USED        (ha.m.)=  0.0036

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0211)|   Area    (ha)=  19.33
|ID= 1 DT= 5.0 min |   Total Imp(%)=  53.00   Dir. Conn.(%)=  37.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.24         9.09
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     358.98        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      51.29        21.69
                over (min)        5.00        25.00
     Storage Coeff.  (min)=       7.18 (ii)   20.19 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=       0.17         0.05
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.82         0.29          0.895 (iii)
```

```
     TIME TO PEAK     (hrs)=       1.67         2.00          1.67
     RUNOFF VOLUME     (mm)=      24.00         9.95         15.15
     TOTAL RAINFALL    (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =       0.96         0.40          0.61


       (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(  0011)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0076     1.0979
                         0.0025     0.5624   |   0.0092     1.2357
                         0.0043     0.7721   |   0.0109     1.3737
                         0.0057     0.9156   |   0.0000     0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0211)     19.330     0.895      1.67      15.15
   OUTFLOW: ID= 1 (  0011)     19.330     0.001      5.33       3.51

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.14
                  TIME SHIFT OF PEAK FLOW          (min)=220.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.2913

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0202)|   Area    (ha)=   4.95
|ID= 1 DT= 5.0 min |   Total Imp(%)=  54.00   Dir. Conn.(%)=  37.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.67         2.28
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     181.66        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      51.29        22.52
                 over (min)        5.00        20.00
     Storage Coeff.  (min)=       4.77 (ii)   17.59 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.22         0.06
                                                          *TOTALS*
     PEAK FLOW        (cms)=      0.24         0.08          0.265 (iii)
     TIME TO PEAK     (hrs)=      1.67         1.92          1.67
     RUNOFF VOLUME     (mm)=     24.00        10.09         15.24
     TOTAL RAINFALL    (mm)=     25.00        25.00         25.00
     RUNOFF COEFFICIENT   =      0.96         0.40          0.61

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

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

--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  0002)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   1.5300     0.0100
                         0.5000     0.0050   |   1.5400     3.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0202)      4.950      0.265      1.67      15.24
   OUTFLOW: ID= 1 (  0002)      4.950      0.251      1.67      15.24

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 94.74
                  TIME SHIFT OF PEAK FLOW          (min)=  0.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0027

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0203)|   Area    (ha)=  17.96
|ID= 1 DT= 5.0 min |   Total Imp(%)=  52.00   Dir. Conn.(%)=  39.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       9.34         8.62
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     346.03        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      51.29        19.75
                 over (min)        5.00        25.00
     Storage Coeff.  (min)=       7.03 (ii)   20.53 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=       0.17         0.05
                                                          *TOTALS*
     PEAK FLOW        (cms)=      0.81         0.25          0.872 (iii)
     TIME TO PEAK     (hrs)=      1.67         2.00          1.67
     RUNOFF VOLUME     (mm)=     24.00         9.60         15.22
     TOTAL RAINFALL    (mm)=     25.00        25.00         25.00
     RUNOFF COEFFICIENT   =      0.96         0.38          0.61


       (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(  0003)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   1.5300     0.0100
                         0.5000     0.0050   |   1.5400     3.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0203)     17.960      0.872      1.67      15.22
   OUTFLOW: ID= 1 (  0003)     17.960      0.892      1.67      15.22

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=102.26
                  TIME SHIFT OF PEAK FLOW          (min)=  0.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0073

     **** WARNING : HYDROGRAPH PEAK WAS NOT REDUCED.
                    CHECK OUTFLOW/STORAGE TABLE  OR REDUCE DT.
--------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0204)|   Area    (ha)=  17.59
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  48.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      11.79         5.80
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     342.44        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      51.29        28.64
                 over (min)        5.00        20.00
     Storage Coeff.  (min)=       6.98 (ii)   18.62 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
```

```
     Unit Hyd. peak  (cms)=       0.17         0.06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.97         0.26          1.066 (iii)
     TIME TO PEAK    (hrs)=       1.67         1.92          1.67
     RUNOFF VOLUME    (mm)=      24.00        11.02         17.25
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =       0.96         0.44          0.69

       (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(  0004)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   1.5300     0.0100
                         0.5000     0.0050   |   1.5400     3.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0204)     17.590      1.066      1.67      17.25
   OUTFLOW: ID= 1 (  0004)     17.590      1.090      1.67      17.25

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=102.26
                  TIME SHIFT OF PEAK FLOW         (min)=  0.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0084

     **** WARNING : HYDROGRAPH PEAK WAS NOT REDUCED.
                    CHECK OUTFLOW/STORAGE TABLE  OR REDUCE DT.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0209)|   Area    (ha)=  26.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  55.00   Dir. Conn.(%)=  40.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.44        11.82
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     418.41        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      51.29        21.49
               over (min)        10.00        25.00
     Storage Coeff.  (min)=       7.88 (ii)   20.93 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=       0.13         0.05
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.06         0.37          1.222 (iii)
     TIME TO PEAK    (hrs)=       1.75         2.00          1.75
     RUNOFF VOLUME    (mm)=      24.00         9.92         15.55
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =       0.96         0.40          0.62

       (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(  0009)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   1.5300     0.0100
                         0.5000     0.0050   |   1.5400     3.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0209)     26.260      1.222      1.75      15.55
   OUTFLOW: ID= 1 (  0009)     26.260      1.229      1.75      15.55

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=100.52
                  TIME SHIFT OF PEAK FLOW         (min)=  0.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0086

     **** WARNING : HYDROGRAPH PEAK WAS NOT REDUCED.
                    CHECK OUTFLOW/STORAGE TABLE  OR REDUCE DT.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0208)|   Area    (ha)=  15.19
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  52.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.63         4.56
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     318.22        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      51.29        29.38
               over (min)         5.00        20.00
     Storage Coeff.  (min)=       6.68 (ii)   18.20 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.18         0.06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.92         0.21          1.000 (iii)
     TIME TO PEAK    (hrs)=       1.67         1.92          1.67
     RUNOFF VOLUME    (mm)=      24.00        11.12         17.82
     TOTAL RAINFALL   (mm)=      25.00        25.00         25.00
     RUNOFF COEFFICIENT   =       0.96         0.44          0.71

       (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(  0008)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   1.5300     0.0100
                         0.5000     0.0050   |   1.5400     3.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0208)     15.190      1.000      1.67      17.82
   OUTFLOW: ID= 1 (  0008)     15.190      1.030      1.67      17.82

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=102.98
                  TIME SHIFT OF PEAK FLOW         (min)=  0.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0081

     **** WARNING : HYDROGRAPH PEAK WAS NOT REDUCED.
                    CHECK OUTFLOW/STORAGE TABLE  OR REDUCE DT.
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0210)|   Area    (ha)=  11.51
|ID= 1 DT= 5.0 min |   Total Imp(%)=  62.00   Dir. Conn.(%)=  43.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       7.14         4.37
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     277.01        40.00
     Mannings n           =      0.013        0.250
```

```
     Max.Eff.Inten.(mm/hr)=      51.29        26.34
               over (min)         5.00        20.00
     Storage Coeff.  (min)=       6.15 (ii)   18.18 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.19         0.06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.59         0.18          0.660 (iii)
     TIME TO PEAK    (hrs)=       1.67         1.92           1.67
     RUNOFF VOLUME    (mm)=      24.00        10.69          16.42
     TOTAL RAINFALL   (mm)=      25.00        25.00          25.00
     RUNOFF COEFFICIENT   =       0.96         0.43           0.66


       (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(  0010)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   1.5300      0.0100
                         0.5000     0.0050   |   1.5400      3.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0210)    11.510     0.660      1.67      16.42
   OUTFLOW: ID= 1 (  0010)    11.510     0.647      1.67      16.42

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)= 97.99
                  TIME SHIFT OF PEAK FLOW         (min)=  0.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.0059

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

 FINISH
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Bolton North Hill - Option 1 & 2 Lands
Town of Caledon, Region of Peel
VO Modelling Results – Pond Design
2-year through 100-year 6 Hour AES

Project No. 0708-3446
Date: December 2021

VO Schematic:

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 5.0\VO2\voin.dat
  Output  filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-
5bc5a1b3e645\f5af02b6-74f3-4544-bb99-e895e7d97412\sce
  Summary filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-
5bc5a1b3e645\f5af02b6-74f3-4544-bb99-e895e7d97412\sce


DATE: 12-16-2021                          TIME: 01:24:29

USER:



COMMENTS: _____________________________________________________

------------------------------------------------------------------------------------------------
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  ***********************************************
  ** SIMULATION : 1.0 - 2 Year 6 Hour AES (Bloo **
  ***********************************************


-------------------
|    READ STORM    |    Filename: C:\Users\jlysecki\AppD
|                  |              ata\Local\Temp\
|                  |              5ed60d5d-fef1-45ca-87d6-2fa3bb3cc069\a76fd3cd
| Ptotal= 36.00 mm |    Comments: 2 Year 6 Hour AES (Bloor, TRCA)
-------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.25    0.00 |  2.00   12.24 |  3.75    5.04 |  5.50    0.72
                0.50    0.72 |  2.25   12.24 |  4.00    2.88 |  5.75    0.72
                0.75    0.72 |  2.50   33.12 |  4.25    2.88 |  6.00    0.72
                1.00    0.72 |  2.75   33.12 |  4.50    1.44 |  6.25    0.72
                1.25    0.72 |  3.00    9.36 |  4.75    1.44 |
                1.50    4.32 |  3.25    9.36 |  5.00    0.72 |
                1.75    4.32 |  3.50    5.04 |  5.25    0.72 |

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

-------------------
| CALIB            |
| STANDHYD (  0212)|   Area     (ha)=   4.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  46.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.88         1.42
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     169.37        40.00
     Mannings n           =      0.013        0.250

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

```
                    ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    0.00 | 1.667    4.32 | 3.250    9.36 |  4.83    0.72
               0.167    0.00 | 1.750    4.32 | 3.333    5.04 |  4.92    0.72
               0.250    0.00 | 1.833   12.24 | 3.417    5.04 |  5.00    0.72
               0.333    0.72 | 1.917   12.24 | 3.500    5.04 |  5.08    0.72
               0.417    0.72 | 2.000   12.24 | 3.583    5.04 |  5.17    0.72
               0.500    0.72 | 2.083   12.24 | 3.667    5.04 |  5.25    0.72
               0.583    0.72 | 2.167   12.24 | 3.750    5.04 |  5.33    0.72
               0.667    0.72 | 2.250   12.24 | 3.833    2.88 |  5.42    0.72
               0.750    0.72 | 2.333   33.12 | 3.917    2.88 |  5.50    0.72
               0.833    0.72 | 2.417   33.12 | 4.000    2.88 |  5.58    0.72
               0.917    0.72 | 2.500   33.12 | 4.083    2.88 |  5.67    0.72
               1.000    0.72 | 2.583   33.12 | 4.167    2.88 |  5.75    0.72
               1.083    0.72 | 2.667   33.12 | 4.250    2.88 |  5.83    0.72
               1.167    0.72 | 2.750   33.12 | 4.333    1.44 |  5.92    0.72
               1.250    0.72 | 2.833    9.36 | 4.417    1.44 |  6.00    0.72
               1.333    4.32 | 2.917    9.36 | 4.500    1.44 |  6.08    0.72
               1.417    4.32 | 3.000    9.36 | 4.583    1.44 |  6.17    0.72
               1.500    4.32 | 3.083    9.36 | 4.667    1.44 |  6.25    0.72
               1.583    4.32 | 3.167    9.36 | 4.750    1.44 |

  Max.Eff.Inten.(mm/hr)=      33.12        36.34
            over (min)        5.00        20.00
  Storage Coeff.  (min)=      5.45 (ii)   16.03 (ii)
  Unit Hyd. Tpeak (min)=      5.00        20.00
  Unit Hyd. peak  (cms)=      0.20         0.06
                                                  *TOTALS*
  PEAK FLOW       (cms)=      0.18         0.10        0.277 (iii)
  TIME TO PEAK    (hrs)=      2.75         2.92         2.75
  RUNOFF VOLUME    (mm)=     35.00        19.70        26.74
  TOTAL RAINFALL   (mm)=     36.00        36.00        36.00
  RUNOFF COEFFICIENT   =      0.97         0.55         0.74

    (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(  0012)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0090     0.2436
                         0.0030     0.1314   |   0.0110     0.2924
                         0.0050     0.1763   |   0.0130     0.3009
                         0.0070     0.2056   |   0.0000     0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0212)       4.303     0.277      2.75      26.74
   OUTFLOW: ID= 1 (  0012)       4.303     0.003      6.50      19.77

                PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.92
                TIME SHIFT OF PEAK FLOW          (min)=225.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  0.1115

------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0211)|   Area     (ha)=  19.33
|ID= 1 DT= 5.0 min |   Total Imp(%)=  52.00   Dir. Conn.(%)=  33.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.05         9.28
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     358.98        40.00
     Mannings n           =      0.013        0.250
```

```
     Max.Eff.Inten.(mm/hr)=      33.12        28.80
               over (min)        10.00        25.00
     Storage Coeff.  (min)=       8.56 (ii)   20.17 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=       0.12         0.05
                                              *TOTALS*
     PEAK FLOW       (cms)=       0.57         0.48          0.962 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00          2.75
     RUNOFF VOLUME    (mm)=      35.00        18.20         23.74
     TOTAL RAINFALL   (mm)=      36.00        36.00         36.00
     RUNOFF COEFFICIENT   =       0.97         0.51          0.66


       (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(  0011)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0076      1.0979
                         0.0025     0.5624   |   0.0092      1.2357
                         0.0043     0.7721   |   0.0109      1.3737
                         0.0057     0.9156   |   0.0000      0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0211)     19.330      0.962      2.75      23.74
   OUTFLOW: ID= 1 (  0011)     19.330      0.002      7.25       5.46

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.21
                  TIME SHIFT OF PEAK FLOW         (min)=270.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.4557

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0209)|   Area    (ha)=  26.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  55.00   Dir. Conn.(%)=  40.00
-------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.44        11.82
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     418.41        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      33.12        26.89
               over (min)        10.00        25.00
     Storage Coeff.  (min)=       9.38 (ii)   21.32 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=       0.12         0.05
                                              *TOTALS*
     PEAK FLOW       (cms)=       0.93         0.56          1.381 (iii)
     TIME TO PEAK    (hrs)=       2.75         3.00          2.75
     RUNOFF VOLUME    (mm)=      35.00        17.76         24.65
     TOTAL RAINFALL   (mm)=      36.00        36.00         36.00
     RUNOFF COEFFICIENT   =       0.97         0.49          0.68


       (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(  0009)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0070      1.4742
                         0.0020     0.7580   |   0.0090      1.6571
                         0.0040     1.0378   |   0.0110      1.8406
                         0.0060     1.2294   |   0.0000      0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0209)     26.260      1.381      2.75      24.65
   OUTFLOW: ID= 1 (  0009)     26.260      0.002      7.42       3.55

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.12
                  TIME SHIFT OF PEAK FLOW         (min)=280.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.6446

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 5.0\VO2\voin.dat
  Output  filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-
5bc5a1b3e645\7b0244e2-543b-446d-8c6b-bc5522df8400\sce
  Summary filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-
5bc5a1b3e645\7b0244e2-543b-446d-8c6b-bc5522df8400\sce


DATE: 12-16-2021                          TIME: 01:24:29

USER:


COMMENTS: _____

--------------------------------------------------------------------------------
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  ***********************************************
  ** SIMULATION : 2.0 - 5 Year 6 Hour AES (Bloo **
  ***********************************************


-------------------
|    READ STORM    |    Filename: C:\Users\jlysecki\AppD
|                  |              ata\Local\Temp\
|                  |              5ed60d5d-fef1-45ca-87d6-2fa3bb3cc069\905f9c2b
| Ptotal= 47.81 mm |    Comments: 5 Year 6 Hour AES (Bloor, TRCA)
-------------------
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.25    0.00 |  2.00   16.25 |  3.75    6.69 |  5.50    0.96
               0.50    0.96 |  2.25   16.25 |  4.00    3.82 |  5.75    0.96
               0.75    0.96 |  2.50   43.98 |  4.25    3.82 |  6.00    0.96
               1.00    0.96 |  2.75   43.98 |  4.50    1.91 |  6.25    0.96
               1.25    0.96 |  3.00   12.43 |  4.75    1.91 |
               1.50    5.74 |  3.25   12.43 |  5.00    0.96 |
               1.75    5.74 |  3.50    6.69 |  5.25    0.96 |
```

```
| CALIB             |
| STANDHYD (  0212)|   Area    (ha)=   4.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  46.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.88         1.42
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     169.37        40.00
     Mannings n           =      0.013        0.250

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


                         ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    0.00 | 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        55.13
               over (min)        5.00        15.00
     Storage Coeff.  (min)=      4.87 (ii)   13.82 (ii)
     Unit Hyd. Tpeak (min)=      5.00        15.00
     Unit Hyd. peak  (cms)=      0.22         0.08
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.24         0.17        0.408 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.83         2.75
     RUNOFF VOLUME    (mm)=     46.81        29.60        37.52
     TOTAL RAINFALL   (mm)=     47.81        47.81        47.81
     RUNOFF COEFFICIENT   =      0.98         0.62         0.78

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

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0012)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |  0.0090      0.2436
                         0.0030     0.1314   |  0.0110      0.2924
                         0.0050     0.1763   |  0.0130      0.3009
                         0.0070     0.2056   |  0.0000      0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0212)     4.303     0.408      2.75      37.52
   OUTFLOW: ID= 1 (  0012)     4.303     0.004      6.42      27.89

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.01
                    TIME SHIFT OF PEAK FLOW         (min)=220.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.1562

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| STANDHYD (  0211)|   Area    (ha)=  19.33
|ID= 1 DT= 5.0 min |   Total Imp(%)=  52.00   Dir. Conn.(%)=  33.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.05         9.28
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     358.98        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      43.98        44.49
               over (min)        10.00        20.00
     Storage Coeff.  (min)=      7.64 (ii)   17.40 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=      0.13         0.06
                                                      *TOTALS*
     PEAK FLOW       (cms)=      0.76         0.80        1.494 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.92         2.75
     RUNOFF VOLUME    (mm)=     46.81        27.70        34.01
     TOTAL RAINFALL   (mm)=     47.81        47.81        47.81
     RUNOFF COEFFICIENT   =      0.98         0.58         0.71


       (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(  0011)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |  0.0076      1.0979
                         0.0025     0.5624   |  0.0092      1.2357
                         0.0043     0.7721   |  0.0109      1.3737
                         0.0057     0.9156   |  0.0000      0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0211)     19.330      1.494      2.75      34.01
   OUTFLOW: ID= 1 (  0011)     19.330      0.003      7.08       8.08

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.22
                    TIME SHIFT OF PEAK FLOW         (min)=260.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.6526

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| STANDHYD (  0209)|   Area    (ha)=  26.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  55.00   Dir. Conn.(%)=  40.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.44        11.82
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     418.41        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      43.98        40.65
               over (min)        10.00        20.00
     Storage Coeff.  (min)=      8.38 (ii)   18.49 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=      0.12         0.06
                                                      *TOTALS*
     PEAK FLOW       (cms)=      1.25         0.93        2.094 (iii)
```

TIME TO PEAK (hrs)=	2.75	2.92	2.75
RUNOFF VOLUME (mm)=	46.81	27.14	35.01
TOTAL RAINFALL (mm)=	47.81	47.81	47.81
RUNOFF COEFFICIENT =	0.98	0.57	0.73

(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(0009) IN= 2---> OUT= 1 DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0070	1.4742
	0.0020	0.7580	0.0090	1.6571
	0.0040	1.0378	0.0110	1.8406
	0.0060	1.2294	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0209)	26.260	2.094	2.75	35.01
OUTFLOW: ID= 1 (0009)	26.260	0.003	7.17	5.76

PEAK FLOW REDUCTION [Qout/Qin](%)= 0.15
TIME SHIFT OF PEAK FLOW (min)=265.00
MAXIMUM STORAGE USED (ha.m.)= 0.9148

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

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 5.0\VO2\voin.dat
Output filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-5bc5a1b3e645\dd6167b6-a9c3-4cf1-980e-f6ef981df96f\sce
Summary filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-5bc5a1b3e645\dd6167b6-a9c3-4cf1-980e-f6ef981df96f\sce

DATE: 12-16-2021 TIME: 01:24:29

USER:

COMMENTS: _____

```
  ************************************************
  ** SIMULATION : 3.0 - 10 Year 6 Hour AES (Blo **
  ************************************************
```

READ STORM	Filename: C:\Users\jlysecki\AppData\Local\Temp\5ed60d5d-fef1-45ca-87d6-2fa3bb3cc069\ad0a28b7
Ptotal= 55.69 mm	Comments: 10 Year 6 Hour AES (Bloor, TRCA)

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.00	2.00	18.94	3.75	7.80	5.50	1.11
0.50	1.11	2.25	18.94	4.00	4.46	5.75	1.11
0.75	1.11	2.50	51.24	4.25	4.46	6.00	1.11
1.00	1.11	2.75	51.24	4.50	2.23	6.25	1.11
1.25	1.11	3.00	14.48	4.75	2.23		
1.50	6.68	3.25	14.48	5.00	1.11		
1.75	6.68	3.50	7.80	5.25	1.11		

CALIB STANDHYD (0212) ID= 1 DT= 5.0 min	Area (ha)= 4.30 Total Imp(%)= 67.00 Dir. Conn.(%)= 46.00		
		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.88	1.42
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	169.37	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	6.68	3.250	14.48	4.83	1.11
0.167	0.00	1.750	6.68	3.333	7.80	4.92	1.11
0.250	0.00	1.833	18.94	3.417	7.80	5.00	1.11
0.333	1.11	1.917	18.94	3.500	7.80	5.08	1.11
0.417	1.11	2.000	18.94	3.583	7.80	5.17	1.11
0.500	1.11	2.083	18.94	3.667	7.80	5.25	1.11
0.583	1.11	2.167	18.94	3.750	7.80	5.33	1.11
0.667	1.11	2.250	18.94	3.833	4.46	5.42	1.11
0.750	1.11	2.333	51.24	3.917	4.46	5.50	1.11
0.833	1.11	2.417	51.24	4.000	4.46	5.58	1.11
0.917	1.11	2.500	51.24	4.083	4.46	5.67	1.11
1.000	1.11	2.583	51.24	4.167	4.46	5.75	1.11
1.083	1.11	2.667	51.24	4.250	4.46	5.83	1.11
1.167	1.11	2.750	51.24	4.333	2.23	5.92	1.11
1.250	1.11	2.833	14.48	4.417	2.23	6.00	1.11
1.333	6.68	2.917	14.48	4.500	2.23	6.08	1.11
1.417	6.68	3.000	14.48	4.583	2.23	6.17	1.11
1.500	6.68	3.083	14.48	4.667	2.23	6.25	1.11
1.583	6.68	3.167	14.48	4.750	2.23		

Max.Eff.Inten.(mm/hr)=		51.24	67.27	
over (min)		5.00	15.00	
Storage Coeff. (min)=		4.58 (ii)	12.85 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.23	0.08	
				TOTALS
PEAK FLOW	(cms)=	0.28	0.21	0.493 (iii)
TIME TO PEAK	(hrs)=	2.75	2.83	2.75
RUNOFF VOLUME	(mm)=	54.69	36.51	44.87
TOTAL RAINFALL	(mm)=	55.69	55.69	55.69
RUNOFF COEFFICIENT	=	0.98	0.66	0.81

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

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

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--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  0012)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0090     0.2436
                         0.0030     0.1314   |   0.0110     0.2924
                         0.0050     0.1763   |   0.0130     0.3009
                         0.0070     0.2056   |   0.0000     0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0212)    4.303     0.493      2.75      44.87
   OUTFLOW: ID= 1 (  0012)    4.303     0.006      6.42      33.77

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.15
                  TIME SHIFT OF PEAK FLOW          (min)=220.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1861

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD (  0211)|   Area    (ha)=  19.33
|ID= 1 DT= 5.0 min |   Total Imp(%)=  52.00   Dir. Conn.(%)=  33.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.05          9.28
     Dep. Storage     (mm)=       1.00          1.50
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     358.98         40.00
     Mannings n           =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=      51.24         54.68
                 over (min)        5.00         20.00
     Storage Coeff.  (min)=       7.19 (ii)    16.17 (ii)
     Unit Hyd. Tpeak (min)=       5.00         20.00
     Unit Hyd. peak  (cms)=       0.17          0.06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.90          1.01          1.842 (iii)
     TIME TO PEAK    (hrs)=       2.75          2.83          2.75
     RUNOFF VOLUME    (mm)=      54.69         34.39         41.09
     TOTAL RAINFALL   (mm)=      55.69         55.69         55.69
     RUNOFF COEFFICIENT   =       0.98          0.62          0.74


       (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(  0011)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0076     1.0979
                         0.0025     0.5624   |   0.0092     1.2357
                         0.0043     0.7721   |   0.0109     1.3737
                         0.0057     0.9156   |   0.0000     0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0211)   19.330     1.842      2.75      41.09
   OUTFLOW: ID= 1 (  0011)   19.330     0.004      7.00      10.73

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.24
                  TIME SHIFT OF PEAK FLOW          (min)=255.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.7880

--------------------------------------------------------------------------------
-------------------
| CALIB             |
| STANDHYD (  0209)|   Area    (ha)=  26.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  55.00   Dir. Conn.(%)=  40.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.44         11.82
     Dep. Storage     (mm)=       1.00          1.50
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     418.41         40.00
     Mannings n           =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=      51.24         51.44
                 over (min)       10.00         20.00
     Storage Coeff.  (min)=       7.88 (ii)    17.09 (ii)
     Unit Hyd. Tpeak (min)=      10.00         20.00
     Unit Hyd. peak  (cms)=       0.13          0.06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.46          1.19          2.561 (iii)
     TIME TO PEAK    (hrs)=       2.75          2.92          2.75
     RUNOFF VOLUME    (mm)=      54.69         33.76         42.13
     TOTAL RAINFALL   (mm)=      55.69         55.69         55.69
     RUNOFF COEFFICIENT   =       0.98          0.61          0.76


       (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(  0009)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0070     1.4742
                         0.0020     0.7580   |   0.0090     1.6571
                         0.0040     1.0378   |   0.0110     1.8406
                         0.0060     1.2294   |   0.0000     0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0209)   26.260     2.561      2.75      42.13
   OUTFLOW: ID= 1 (  0009)   26.260     0.005      7.08       8.24

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.18
                  TIME SHIFT OF PEAK FLOW          (min)=260.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.1001

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 5.0\VO2\voin.dat
  Output  filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-
5bc5a1b3e645\6da65445-c9c9-40ab-bd5c-223001bc2d73\sce
  Summary filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-
5bc5a1b3e645\6da65445-c9c9-40ab-bd5c-223001bc2d73\sce
```

DATE: 12-16-2021 TIME: 01:24:29

USER:

COMMENTS: _____

****
** SIMULATION : 4.0 - 25 Year 6 Hour AES (Blo **
****

READ STORM	Filename: C:\Users\j1ysecki\AppData\Local\Temp\5ed60d5d-fef1-45ca-87d6-2fa3bb3cc069\ff2c16e1
Ptotal= 65.59 mm	Comments: 25 Year 6 Hour AES (Bloor, TRCA)

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.00	2.00	22.30	3.75	9.18	5.50	1.31
0.50	1.31	2.25	22.30	4.00	5.25	5.75	1.31
0.75	1.31	2.50	60.35	4.25	5.25	6.00	1.31
1.00	1.31	2.75	60.35	4.50	2.62	6.25	1.31
1.25	1.31	3.00	17.06	4.75	2.62		
1.50	7.87	3.25	17.06	5.00	1.31		
1.75	7.87	3.50	9.18	5.25	1.31		

CALIB	
STANDHYD (0212)	Area (ha)= 4.30
ID= 1 DT= 5.0 min	Total Imp(%)= 67.00 Dir. Conn.(%)= 46.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.88	1.42
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	169.37	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	1.667	7.87	3.250	17.06	4.83	1.31
0.167	0.00	1.750	7.87	3.333	9.18	4.92	1.31
0.250	0.00	1.833	22.30	3.417	9.18	5.00	1.31
0.333	1.31	1.917	22.30	3.500	9.18	5.08	1.31
0.417	1.31	2.000	22.30	3.583	9.18	5.17	1.31
0.500	1.31	2.083	22.30	3.667	9.18	5.25	1.31
0.583	1.31	2.167	22.30	3.750	9.18	5.33	1.31
0.667	1.31	2.250	22.30	3.833	5.25	5.42	1.31
0.750	1.31	2.333	60.35	3.917	5.25	5.50	1.31
0.833	1.31	2.417	60.35	4.000	5.25	5.58	1.31
0.917	1.31	2.500	60.35	4.083	5.25	5.67	1.31
1.000	1.31	2.583	60.35	4.167	5.25	5.75	1.31
1.083	1.31	2.667	60.35	4.250	5.25	5.83	1.31
1.167	1.31	2.750	60.35	4.333	2.62	5.92	1.31
1.250	1.31	2.833	17.06	4.417	2.62	6.00	1.31
1.333	7.87	2.917	17.06	4.500	2.62	6.08	1.31
1.417	7.87	3.000	17.06	4.583	2.62	6.17	1.31
1.500	7.87	3.083	17.06	4.667	2.62	6.25	1.31
1.583	7.87	3.167	17.06	4.750	2.62		

Max.Eff.Inten.(mm/hr)=		60.35	82.65
over (min)		5.00	15.00
Storage Coeff. (min)=		4.29 (ii)	11.91 (ii)
Unit Hyd. Tpeak (min)=		5.00	15.00
Unit Hyd. peak (cms)=		0.23	0.09
			TOTALS
PEAK FLOW	(cms)=	0.33	0.27 0.600 (iii)
TIME TO PEAK	(hrs)=	2.75	2.75 2.75
RUNOFF VOLUME	(mm)=	64.59	45.43 54.24
TOTAL RAINFALL	(mm)=	65.59	65.59 65.59
RUNOFF COEFFICIENT	=	0.98	0.69 0.83

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

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

RESERVOIR(0012)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0090	0.2436
	0.0030	0.1314	0.0110	0.2924
	0.0050	0.1763	0.0130	0.3009
	0.0070	0.2056	0.0000	0.0000

		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (	0212)	4.303	0.600	2.75	54.24
OUTFLOW: ID= 1 (	0012)	4.303	0.008	6.33	41.66

PEAK FLOW REDUCTION [Qout/Qin](%)= 1.32
TIME SHIFT OF PEAK FLOW (min)=215.00
MAXIMUM STORAGE USED (ha.m.)= 0.2236

CALIB	
STANDHYD (0211)	Area (ha)= 19.33
ID= 1 DT= 5.0 min	Total Imp(%)= 52.00 Dir. Conn.(%)= 33.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	10.05	9.28
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	358.98	40.00
Mannings n	=	0.013	0.250
Max.Eff.Inten.(mm/hr)=		60.35	67.67
over (min)		5.00	15.00
Storage Coeff. (min)=		6.73 (ii)	14.98 (ii)
Unit Hyd. Tpeak (min)=		5.00	15.00
Unit Hyd. peak (cms)=		0.18	0.08
			TOTALS
PEAK FLOW	(cms)=	1.06	1.35 2.383 (iii)
TIME TO PEAK	(hrs)=	2.75	2.83 2.75
RUNOFF VOLUME	(mm)=	64.59	43.07 50.17
TOTAL RAINFALL	(mm)=	65.59	65.59 65.59
RUNOFF COEFFICIENT	=	0.98	0.66 0.76

(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(0011)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)

```
                        0.0000     0.0000   |   0.0076      1.0979
                        0.0025     0.5624   |   0.0092      1.2357
                        0.0043     0.7721   |   0.0109      1.3737
                        0.0057     0.9156   |   0.0000      0.0000

                             AREA     QPEAK     TPEAK       R.V.
                             (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0211)     19.330      2.383      2.75      50.17
   OUTFLOW: ID= 1 (  0011)     19.330      0.006      6.83      14.47

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.26
                  TIME SHIFT OF PEAK FLOW         (min)=245.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.9614

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0209)|   Area    (ha)=  26.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  55.00   Dir. Conn.(%)=  40.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.44        11.82
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     418.41        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      60.35        63.80
               over (min)        5.00        20.00
     Storage Coeff.  (min)=       7.38 (ii)   15.83 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.17         0.07
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.74         1.53          3.177 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.83          2.75
     RUNOFF VOLUME    (mm)=      64.59        42.37         51.26
     TOTAL RAINFALL   (mm)=      65.59        65.59         65.59
     RUNOFF COEFFICIENT   =       0.98         0.65          0.78


       (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(  0009)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                        0.0000     0.0000   |   0.0070      1.4742
                        0.0020     0.7580   |   0.0090      1.6571
                        0.0040     1.0378   |   0.0110      1.8406
                        0.0060     1.2294   |   0.0000      0.0000

                             AREA     QPEAK     TPEAK       R.V.
                             (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0209)     26.260      3.177      2.75      51.26
   OUTFLOW: ID= 1 (  0009)     26.260      0.006      7.00      11.93

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.20
                  TIME SHIFT OF PEAK FLOW         (min)=255.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.3369

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

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


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5bc5a1b3e645\16c4645e-f0d7-4d2e-924d-0bbb28c0e69a\sce
  Summary filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-
5bc5a1b3e645\16c4645e-f0d7-4d2e-924d-0bbb28c0e69a\sce


DATE: 12-16-2021                          TIME: 01:24:29

USER:


COMMENTS: _____


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  ***********************************************
  ** SIMULATION : 5.0 - 50 Year 6 Hour AES (Blo **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\jlysecki\AppD
|                  |              ata\Local\Temp\
|                  |              5ed60d5d-fef1-45ca-87d6-2fa3bb3cc069\dd46fde2
| Ptotal= 73.00 mm |    Comments: 50 Year 6 Hour AES (Bloor, TRCA)
--------------------
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.25    0.00 |  2.00   24.82 |  3.75   10.22 |  5.50    1.46
               0.50    1.46 |  2.25   24.82 |  4.00    5.84 |  5.75    1.46
               0.75    1.46 |  2.50   67.16 |  4.25    5.84 |  6.00    1.46
               1.00    1.46 |  2.75   67.16 |  4.50    2.92 |  6.25    1.46
               1.25    1.46 |  3.00   18.98 |  4.75    2.92 |
               1.50    8.76 |  3.25   18.98 |  5.00    1.46 |
               1.75    8.76 |  3.50   10.22 |  5.25    1.46 |

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

--------------------
| CALIB            |
| STANDHYD (  0212)|   Area    (ha)=   4.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  46.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.88         1.42
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     169.37        40.00
     Mannings n           =      0.013        0.250

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

                        ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    0.00 | 1.667    8.76 | 3.250   18.98 |  4.83    1.46
              0.167    0.00 | 1.750    8.76 | 3.333   10.22 |  4.92    1.46
              0.250    0.00 | 1.833   24.82 | 3.417   10.22 |  5.00    1.46
              0.333    1.46 | 1.917   24.82 | 3.500   10.22 |  5.08    1.46
              0.417    1.46 | 2.000   24.82 | 3.583   10.22 |  5.17    1.46
```

```
                0.500    1.46 | 2.083   24.82 | 3.667   10.22 |  5.25    1.46
                0.583    1.46 | 2.167   24.82 | 3.750   10.22 |  5.33    1.46
                0.667    1.46 | 2.250   24.82 | 3.833    5.84 |  5.42    1.46
                0.750    1.46 | 2.333   67.16 | 3.917    5.84 |  5.50    1.46
                0.833    1.46 | 2.417   67.16 | 4.000    5.84 |  5.58    1.46
                0.917    1.46 | 2.500   67.16 | 4.083    5.84 |  5.67    1.46
                1.000    1.46 | 2.583   67.16 | 4.167    5.84 |  5.75    1.46
                1.083    1.46 | 2.667   67.16 | 4.250    5.84 |  5.83    1.46
                1.167    1.46 | 2.750   67.16 | 4.333    2.92 |  5.92    1.46
                1.250    1.46 | 2.833   18.98 | 4.417    2.92 |  6.00    1.46
                1.333    8.76 | 2.917   18.98 | 4.500    2.92 |  6.08    1.46
                1.417    8.76 | 3.000   18.98 | 4.583    2.92 |  6.17    1.46
                1.500    8.76 | 3.083   18.98 | 4.667    2.92 |  6.25    1.46
                1.583    8.76 | 3.167   18.98 | 4.750    2.92 |

     Max.Eff.Inten.(mm/hr)=      67.16        94.21
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       4.11 (ii)   11.34 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.24         0.09
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.37         0.31        0.682 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.75         2.75
     RUNOFF VOLUME    (mm)=      72.00        52.23        61.32
     TOTAL RAINFALL   (mm)=      73.00        73.00        73.00
     RUNOFF COEFFICIENT   =       0.99         0.72         0.84

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

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

--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  0012)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0090     0.2436
                         0.0030     0.1314   |   0.0110     0.2924
                         0.0050     0.1763   |   0.0130     0.3009
                         0.0070     0.2056   |   0.0000     0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0212)     4.303     0.682      2.75      61.32
   OUTFLOW: ID= 1 (  0012)     4.303     0.009      6.33      47.76

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.37
                  TIME SHIFT OF PEAK FLOW         (min)=215.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.2521

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0211)|   Area    (ha)=  19.33
|ID= 1 DT= 5.0 min |   Total Imp(%)=  52.00   Dir. Conn.(%)=  33.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.05         9.28
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     358.98        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      67.16        77.47
               over (min)         5.00        15.00
     Storage Coeff.  (min)=       6.45 (ii)   14.27 (ii)
     Unit Hyd. Tpeak (min)=       5.00        15.00
     Unit Hyd. peak  (cms)=       0.18         0.08
                                                        *TOTALS*
     PEAK FLOW       (cms)=       1.18         1.58        2.736 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.83         2.75
     RUNOFF VOLUME    (mm)=      72.00        49.72        57.08
     TOTAL RAINFALL   (mm)=      73.00        73.00        73.00
     RUNOFF COEFFICIENT   =       0.99         0.68         0.78

       (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(  0011)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0076     1.0979
                         0.0025     0.5624   |   0.0092     1.2357
                         0.0043     0.7721   |   0.0109     1.3737
                         0.0057     0.9156   |   0.0000     0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0211)     19.330     2.736      2.75      57.08
   OUTFLOW: ID= 1 (  0011)     19.330     0.008      6.83      17.49

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.28
                  TIME SHIFT OF PEAK FLOW         (min)=245.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.0930

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0209)|   Area    (ha)=  26.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  55.00   Dir. Conn.(%)=  40.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.44        11.82
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     418.41        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      67.16        73.14
               over (min)         5.00        20.00
     Storage Coeff.  (min)=       7.07 (ii)   15.07 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.17         0.07
                                                        *TOTALS*
     PEAK FLOW       (cms)=       1.94         1.80        3.640 (iii)
     TIME TO PEAK    (hrs)=       2.75         2.83         2.75
     RUNOFF VOLUME    (mm)=      72.00        48.97        58.18
     TOTAL RAINFALL   (mm)=      73.00        73.00        73.00
     RUNOFF COEFFICIENT   =       0.99         0.67         0.80

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

--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  0009)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0070     1.4742
                         0.0020     0.7580   |   0.0090     1.6571
                         0.0040     1.0378   |   0.0110     1.8406
                         0.0060     1.2294   |   0.0000     0.0000

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

```
   INFLOW : ID= 2 (  0209)     26.260      3.640      2.75      58.18
   OUTFLOW: ID= 1 (  0009)     26.260      0.007      6.92      14.28

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.21
                  TIME SHIFT OF PEAK FLOW         (min)=250.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.5174

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 5.0\VO2\voin.dat
  Output  filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-
5bc5a1b3e645\e97637e2-4fd9-432a-8b40-cedd7af0afaa\sce
  Summary filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-
5bc5a1b3e645\e97637e2-4fd9-432a-8b40-cedd7af0afaa\sce


DATE: 12-16-2021                          TIME: 01:24:29

USER:


COMMENTS: _____

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  ************************************************
  ** SIMULATION : 6.0 - 100 Year 6 Hour AES (Bl **
  ************************************************


-------------------
|    READ STORM    |    Filename: C:\Users\jlysecki\AppD
|                  |              ata\Local\Temp\
|                  |              5ed60d5d-fef1-45ca-87d6-2fa3bb3cc069\786f20c5
| Ptotal= 80.31 mm |    Comments: 100 Year 6 Hour AES (Bloor, TRCA)
-------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.25    0.00 |  2.00   27.30 |  3.75   11.24 |  5.50    1.61
                0.50    1.61 |  2.25   27.30 |  4.00    6.42 |  5.75    1.61
                0.75    1.61 |  2.50   73.88 |  4.25    6.42 |  6.00    1.61
                1.00    1.61 |  2.75   73.88 |  4.50    3.21 |  6.25    1.61
                1.25    1.61 |  3.00   20.88 |  4.75    3.21 |
                1.50    9.64 |  3.25   20.88 |  5.00    1.61 |
                1.75    9.64 |  3.50   11.24 |  5.25    1.61 |

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

-------------------
| CALIB            |
| STANDHYD (  0212)|   Area    (ha)=   4.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  46.00
-------------------
                         IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.88         1.42
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     169.37        40.00
     Mannings n             =     0.013        0.250

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


                                  ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    0.00 | 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       105.63
               over (min)        5.00        15.00
     Storage Coeff.  (min)=      3.96 (ii)   10.86 (ii)
     Unit Hyd. Tpeak (min)=      5.00        15.00
     Unit Hyd. peak  (cms)=      0.24         0.09
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.41         0.36        0.763 (iii)
     TIME TO PEAK    (hrs)=      2.75         2.75        2.75
     RUNOFF VOLUME    (mm)=     79.31        59.03       68.36
     TOTAL RAINFALL   (mm)=     80.31        80.31       80.31
     RUNOFF COEFFICIENT   =      0.99         0.73        0.85

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

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

--------------------------------------------------------------------------------
-------------------
| RESERVOIR(  0012)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                        0.0000      0.0000   |   0.0090      0.2436
                        0.0030      0.1314   |   0.0110      0.2924
                        0.0050      0.1763   |   0.0130      0.3009
                        0.0070      0.2056   |   0.0000      0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0212)     4.303     0.763      2.75      68.36
   OUTFLOW: ID= 1 (  0012)     4.303     0.011      6.33      53.87

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.38
                  TIME SHIFT OF PEAK FLOW         (min)=215.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.2807

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0211)|   Area    (ha)=  19.33
```

```
|ID= 1 DT= 5.0 min |   Total Imp(%)=  52.00   Dir. Conn.(%)=  33.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.05          9.28
     Dep. Storage     (mm)=       1.00          1.50
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     358.98         40.00
     Mannings n           =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=      73.88         87.18
               over (min)        5.00         15.00
     Storage Coeff.  (min)=       6.21 (ii)    13.66 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=       0.19          0.08
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.30          1.80          3.090 (iii)
     TIME TO PEAK    (hrs)=       2.75          2.83           2.75
     RUNOFF VOLUME    (mm)=      79.31         56.38          63.95
     TOTAL RAINFALL   (mm)=      80.31         80.31          80.31
     RUNOFF COEFFICIENT   =       0.99          0.70           0.80


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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR(  0011)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0076      1.0979
                         0.0025     0.5624   |   0.0092      1.2357
                         0.0043     0.7721   |   0.0109      1.3737
                         0.0057     0.9156   |   0.0000      0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0211)     19.330      3.090      2.75      63.95
   OUTFLOW: ID= 1 (  0011)     19.330      0.009      6.75      20.62

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.29
                  TIME SHIFT OF PEAK FLOW          (min)=240.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.2240

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0209)|   Area    (ha)=  26.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  55.00   Dir. Conn.(%)=  40.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.44         11.82
     Dep. Storage     (mm)=       1.00          1.50
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     418.41         40.00
     Mannings n           =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=      73.88         82.40
               over (min)        5.00         15.00
     Storage Coeff.  (min)=       6.81 (ii)    14.43 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=       0.18          0.08
                                                      *TOTALS*
     PEAK FLOW       (cms)=       2.14          2.14          4.245 (iii)
     TIME TO PEAK    (hrs)=       2.75          2.83           2.75
     RUNOFF VOLUME    (mm)=      79.31         55.59          65.08
     TOTAL RAINFALL   (mm)=      80.31         80.31          80.31
     RUNOFF COEFFICIENT   =       0.99          0.69           0.81


       (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(  0009)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0070      1.4742
                         0.0020     0.7580   |   0.0090      1.6571
                         0.0040     1.0378   |   0.0110      1.8406
                         0.0060     1.2294   |   0.0000      0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0209)     26.260      4.245      2.75      65.08
   OUTFLOW: ID= 1 (  0009)     26.260      0.009      6.83      16.51

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.22
                  TIME SHIFT OF PEAK FLOW          (min)=245.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.6962

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 FINISH
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Bolton North Hill - Option 1 & 2 Lands
Town of Caledon, Region of Peel
VO Modelling Results – Pond Design
2-year through 100-year 12 Hour AES

Project No. 0708-3446
Date: December 2021

VO Schematic:

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

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 5.0\VO2\voin.dat
  Output  filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-
5bc5a1b3e645\a6e519a3-be0e-41a2-88fa-004ae6470725\sce
  Summary filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-
5bc5a1b3e645\a6e519a3-be0e-41a2-88fa-004ae6470725\sce


DATE: 12-16-2021                          TIME: 01:27:50

USER:


COMMENTS: _____

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  ************************************************
  ** SIMULATION : 1.1 - 2 Year 12 Hour AES (Blo **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\jlysecki\AppD
|                  |              ata\Local\Temp\
|                  |              bbdd3476-4b04-4a4c-9024-790da4e7a5f2\0f072317
| Ptotal= 42.00 mm |    Comments: 2 Year 12 Hour AES (Bloor, TRCA)
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.25    0.00 |  3.50    7.14 |  6.75    2.94 | 10.00    0.42
                0.50    0.42 |  3.75    7.14 |  7.00    2.94 | 10.25    0.42
                0.75    0.42 |  4.00    7.14 |  7.25    2.94 | 10.50    0.42
                1.00    0.42 |  4.25    7.14 |  7.50    1.68 | 10.75    0.42
                1.25    0.42 |  4.50   19.32 |  7.75    1.68 | 11.00    0.42
                1.50    0.42 |  4.75   19.32 |  8.00    1.68 | 11.25    0.42
                1.75    0.42 |  5.00   19.32 |  8.25    1.68 | 11.50    0.42
                2.00    0.42 |  5.25   19.32 |  8.50    0.84 | 11.75    0.42
                2.25    0.42 |  5.50    5.46 |  8.75    0.84 | 12.00    0.42
                2.50    2.52 |  5.75    5.46 |  9.00    0.84 | 12.25    0.42
                2.75    2.52 |  6.00    5.46 |  9.25    0.84 |
                3.00    2.52 |  6.25    5.46 |  9.50    0.42 |
                3.25    2.52 |  6.50    2.94 |  9.75    0.42 |

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

--------------------
| CALIB            |
| STANDHYD (  0212)|   Area     (ha)=   4.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  46.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.88         1.42
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope    (%)=       1.00         2.00
     Length           (m)=     169.37        40.00
     Mannings n         =      0.013        0.250

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

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

     Max.Eff.Inten.(mm/hr)=      19.32        23.43
               over (min)          5.00        20.00
     Storage Coeff.  (min)=       6.76 (ii)   19.38 (ii)
     Unit Hyd. Tpeak (min)=       5.00        20.00
     Unit Hyd. peak  (cms)=       0.18         0.06
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.11         0.08         0.185 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.33         5.25
     RUNOFF VOLUME    (mm)=      41.00        24.65        32.17
     TOTAL RAINFALL   (mm)=      42.00        42.00        42.00
     RUNOFF COEFFICIENT   =       0.98         0.59         0.77

       (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(  0012)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000    |  0.0090      0.2436
                         0.0030     0.1314    |  0.0110      0.2924
                         0.0050     0.1763    |  0.0130      0.3009
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                        0.0070     0.2056   |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0212)       4.303     0.185      5.25      32.17
   OUTFLOW: ID= 1 (  0012)       4.303     0.003     12.33      23.61

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.61
                  TIME SHIFT OF PEAK FLOW          (min)=425.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.1306

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-------------------
| CALIB           |
| STANDHYD (  0211)|   Area    (ha)=  19.33
|ID= 1 DT= 5.0 min |   Total Imp(%)=  52.00   Dir. Conn.(%)=  33.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.05         9.28
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     358.98        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      19.32        18.81
               over (min)        10.00        25.00
     Storage Coeff.  (min)=      10.62 (ii)   24.39 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=       0.11         0.05
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.34         0.38          0.715 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.33           5.25
     RUNOFF VOLUME    (mm)=      41.00        22.93          28.89
     TOTAL RAINFALL   (mm)=      42.00        42.00          42.00
     RUNOFF COEFFICIENT   =       0.98         0.55           0.69

       (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(  0011)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                        0.0000     0.0000   |   0.0076      1.0979
                        0.0025     0.5624   |   0.0092      1.2357
                        0.0043     0.7721   |   0.0109      1.3737
                        0.0057     0.9156   |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0211)      19.330     0.715      5.25      28.89
   OUTFLOW: ID= 1 (  0011)      19.330     0.002     13.08       6.56

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.34
                  TIME SHIFT OF PEAK FLOW          (min)=470.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.5517

--------------------------------------------------------------------------------
-------------------
| CALIB           |
| STANDHYD (  0209)|   Area    (ha)=  26.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  55.00   Dir. Conn.(%)=  40.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.44        11.82
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     418.41        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      19.32        17.63
               over (min)        10.00        30.00
     Storage Coeff.  (min)=      11.64 (ii)   25.77 (ii)
     Unit Hyd. Tpeak (min)=      10.00        30.00
     Unit Hyd. peak  (cms)=       0.10         0.04
                                                    *TOTALS*
     PEAK FLOW       (cms)=       0.56         0.44          0.981 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.42           5.25
     RUNOFF VOLUME    (mm)=      41.00        22.43          29.86
     TOTAL RAINFALL   (mm)=      42.00        42.00          42.00
     RUNOFF COEFFICIENT   =       0.98         0.53           0.71

       (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(  0009)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                        0.0000     0.0000   |   0.0070      1.4742
                        0.0020     0.7580   |   0.0090      1.6571
                        0.0040     1.0378   |   0.0110      1.8406
                        0.0060     1.2294   |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0209)      26.260     0.981      5.25      29.86
   OUTFLOW: ID= 1 (  0009)      26.260     0.002     13.33       4.25

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.22
                  TIME SHIFT OF PEAK FLOW          (min)=485.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.7781

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 5.0\VO2\voin.dat
  Output  filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-
5bc5a1b3e645\4dd88b1f-f63d-476f-aea9-5571849e9c7e\sce
  Summary filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-
5bc5a1b3e645\4dd88b1f-f63d-476f-aea9-5571849e9c7e\sce


DATE: 12-16-2021                          TIME: 01:27:50

USER:


COMMENTS: _____________________________________________________
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  ************************************************
  ** SIMULATION : 2.1 - 5 Year 12 Hour AES (Blo **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\jlysecki\AppD
|                  |              ata\Local\Temp\
|                  |              bbdd3476-4b04-4a4c-9024-790da4e7a5f2\e75e2400
| Ptotal= 54.38 mm |    Comments: 5 Year 12 Hour AES (Bloor, TRCA)
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.25    0.00 |  3.50    9.25 |   6.75    3.81 | 10.00    0.54
                0.50    0.54 |  3.75    9.25 |   7.00    3.81 | 10.25    0.54
                0.75    0.54 |  4.00    9.25 |   7.25    3.81 | 10.50    0.54
                1.00    0.54 |  4.25    9.25 |   7.50    2.18 | 10.75    0.54
                1.25    0.54 |  4.50   25.02 |   7.75    2.18 | 11.00    0.54
                1.50    0.54 |  4.75   25.02 |   8.00    2.18 | 11.25    0.54
                1.75    0.54 |  5.00   25.02 |   8.25    2.18 | 11.50    0.54
                2.00    0.54 |  5.25   25.02 |   8.50    1.09 | 11.75    0.54
                2.25    0.54 |  5.50    7.07 |   8.75    1.09 | 12.00    0.54
                2.50    3.26 |  5.75    7.07 |   9.00    1.09 | 12.25    0.54
                2.75    3.26 |  6.00    7.07 |   9.25    1.09 |
                3.00    3.26 |  6.25    7.07 |   9.50    0.54 |
                3.25    3.26 |  6.50    3.81 |   9.75    0.54 |

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--------------------
| CALIB            |
| STANDHYD (  0212)|   Area    (ha)=   4.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  46.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       2.88         1.42
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     169.37        40.00
     Mannings n           =      0.013        0.250

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


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

     Max.Eff.Inten.(mm/hr)=      25.02        32.92
               over (min)        5.00        20.00
     Storage Coeff.  (min)=      6.10 (ii)   17.11 (ii)
     Unit Hyd. Tpeak (min)=      5.00        20.00
     Unit Hyd. peak  (cms)=      0.19         0.06
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.14         0.12        0.253 (iii)
     TIME TO PEAK    (hrs)=      5.25         5.25         5.25
     RUNOFF VOLUME    (mm)=     53.38        35.35        43.64
     TOTAL RAINFALL   (mm)=     54.38        54.38        54.38
     RUNOFF COEFFICIENT   =      0.98         0.65         0.80


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

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| RESERVOIR(  0012)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.0090     0.2436
                          0.0030     0.1314   |   0.0110     0.2924
                          0.0050     0.1763   |   0.0130     0.3009
                          0.0070     0.2056   |   0.0000     0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0212)    4.303     0.253      5.25      43.64
   OUTFLOW: ID= 1 (  0012)    4.303     0.005     12.33      32.50

                 PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.96
                 TIME SHIFT OF PEAK FLOW          (min)=425.00
                 MAXIMUM  STORAGE   USED       (ha.m.)=  0.1754

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| CALIB            |
| STANDHYD (  0211)|   Area    (ha)=  19.33
|ID= 1 DT= 5.0 min |   Total Imp(%)=  52.00   Dir. Conn.(%)=  33.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.05         9.28
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     358.98        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      25.02        26.77
               over (min)        10.00        25.00
     Storage Coeff.  (min)=      9.57 (ii)   21.53 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=      0.11         0.05
                                                        *TOTALS*
     PEAK FLOW       (cms)=      0.44         0.57        1.007 (iii)
     TIME TO PEAK    (hrs)=      5.25         5.33         5.25
     RUNOFF VOLUME    (mm)=     53.38        33.27        39.90
     TOTAL RAINFALL   (mm)=     54.38        54.38        54.38
     RUNOFF COEFFICIENT   =      0.98         0.61         0.73
```

```
      (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(  0011)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0076     1.0979
                         0.0025     0.5624   |   0.0092     1.2357
                         0.0043     0.7721   |   0.0109     1.3737
                         0.0057     0.9156   |   0.0000     0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0211)     19.330     1.007      5.25      39.90
   OUTFLOW: ID= 1 (  0011)     19.330     0.004     13.00      10.11

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.42
                  TIME SHIFT OF PEAK FLOW         (min)=465.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.7605

--------------------------------------------------------------------------------
-------------------
| CALIB            |
| STANDHYD (  0209)|   Area    (ha)=  26.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  55.00   Dir. Conn.(%)=  40.00
-------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.44        11.82
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     418.41        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      25.02        25.18
               over (min)        10.00        25.00
     Storage Coeff.  (min)=      10.50 (ii)   22.75 (ii)
     Unit Hyd. Tpeak (min)=      10.00        25.00
     Unit Hyd. peak  (cms)=       0.11         0.05
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.73         0.68          1.392 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.33           5.25
     RUNOFF VOLUME    (mm)=      53.38        32.65          40.94
     TOTAL RAINFALL   (mm)=      54.38        54.38          54.38
     RUNOFF COEFFICIENT   =       0.98         0.60           0.75


      (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(  0009)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
-------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0070     1.4742
                         0.0020     0.7580   |   0.0090     1.6571
                         0.0040     1.0378   |   0.0110     1.8406
                         0.0060     1.2294   |   0.0000     0.0000

                              AREA     QPEAK     TPEAK       R.V.
                              (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0209)     26.260     1.392      5.25      40.94
   OUTFLOW: ID= 1 (  0009)     26.260     0.004     13.08       7.69

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.31
                  TIME SHIFT OF PEAK FLOW         (min)=470.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.0643

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

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

  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 5.0\VO2\voin.dat
  Output  filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-
5bc5a1b3e645\bb4f3b66-bdaf-495b-a35f-3761ec56ff19\sce
  Summary filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-
5bc5a1b3e645\bb4f3b66-bdaf-495b-a35f-3761ec56ff19\sce


DATE: 12-16-2021                          TIME: 01:27:50

USER:


COMMENTS: _____________________________________________________


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  ***********************************************
  ** SIMULATION : 3.1 - 10 Year 12 Hour AES (B1 **
  ***********************************************


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|    READ STORM    |    Filename: C:\Users\jlysecki\AppD
|                  |              ata\Local\Temp\
|                  |              bbdd3476-4b04-4a4c-9024-790da4e7a5f2\5149a6d2
| Ptotal= 62.71 mm |    Comments: 10 Year 12 Hour AES (Bloor, TRCA)
-------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.25    0.00 |  3.50   10.66 |  6.75    4.39 | 10.00    0.63
                0.50    0.63 |  3.75   10.66 |  7.00    4.39 | 10.25    0.63
                0.75    0.63 |  4.00   10.66 |  7.25    4.39 | 10.50    0.63
                1.00    0.63 |  4.25   10.66 |  7.50    2.51 | 10.75    0.63
                1.25    0.63 |  4.50   28.84 |  7.75    2.51 | 11.00    0.63
                1.50    0.63 |  4.75   28.84 |  8.00    2.51 | 11.25    0.63
                1.75    0.63 |  5.00   28.84 |  8.25    2.51 | 11.50    0.63
                2.00    0.63 |  5.25   28.84 |  8.50    1.25 | 11.75    0.63
                2.25    0.63 |  5.50    8.15 |  8.75    1.25 | 12.00    0.63
                2.50    3.76 |  5.75    8.15 |  9.00    1.25 | 12.25    0.63
                2.75    3.76 |  6.00    8.15 |  9.25    1.25 |
                3.00    3.76 |  6.25    8.15 |  9.50    0.63 |
                3.25    3.76 |  6.50    4.39 |  9.75    0.63 |

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

-------------------
| CALIB            |
| STANDHYD (  0212)|   Area    (ha)=   4.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  46.00
```

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.88	1.42
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	169.37	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	3.76	6.250	8.15	9.33	0.63
0.167	0.00	3.250	3.76	6.333	4.39	9.42	0.63
0.250	0.00	3.333	10.66	6.417	4.39	9.50	0.63
0.333	0.63	3.417	10.66	6.500	4.39	9.58	0.63
0.417	0.63	3.500	10.66	6.583	4.39	9.67	0.63
0.500	0.63	3.583	10.66	6.667	4.39	9.75	0.63
0.583	0.63	3.667	10.66	6.750	4.39	9.83	0.63
0.667	0.63	3.750	10.66	6.833	4.39	9.92	0.63
0.750	0.63	3.833	10.66	6.917	4.39	10.00	0.63
0.833	0.63	3.917	10.66	7.000	4.39	10.08	0.63
0.917	0.63	4.000	10.66	7.083	4.39	10.17	0.63
1.000	0.63	4.083	10.66	7.167	4.39	10.25	0.63
1.083	0.63	4.167	10.66	7.250	4.39	10.33	0.63
1.167	0.63	4.250	10.66	7.333	2.51	10.42	0.63
1.250	0.63	4.333	28.84	7.417	2.51	10.50	0.63
1.333	0.63	4.417	28.84	7.500	2.51	10.58	0.63
1.417	0.63	4.500	28.84	7.583	2.51	10.67	0.63
1.500	0.63	4.583	28.84	7.667	2.51	10.75	0.63
1.583	0.63	4.667	28.84	7.750	2.51	10.83	0.63
1.667	0.63	4.750	28.84	7.833	2.51	10.92	0.63
1.750	0.63	4.833	28.84	7.917	2.51	11.00	0.63
1.833	0.63	4.917	28.84	8.000	2.51	11.08	0.63
1.917	0.63	5.000	28.84	8.083	2.51	11.17	0.63
2.000	0.63	5.083	28.84	8.167	2.51	11.25	0.63
2.083	0.63	5.167	28.84	8.250	2.51	11.33	0.63
2.167	0.63	5.250	28.84	8.333	1.25	11.42	0.63
2.250	0.63	5.333	8.15	8.417	1.25	11.50	0.63
2.333	3.76	5.417	8.15	8.500	1.25	11.58	0.63
2.417	3.76	5.500	8.15	8.583	1.25	11.67	0.63
2.500	3.76	5.583	8.15	8.667	1.25	11.75	0.63
2.583	3.76	5.667	8.15	8.750	1.25	11.83	0.63
2.667	3.76	5.750	8.15	8.833	1.25	11.92	0.63
2.750	3.76	5.833	8.15	8.917	1.25	12.00	0.63
2.833	3.76	5.917	8.15	9.000	1.25	12.08	0.63
2.917	3.76	6.000	8.15	9.083	1.25	12.17	0.63
3.000	3.76	6.083	8.15	9.167	1.25	12.25	0.63
3.083	3.76	6.167	8.15	9.250	1.25		

				TOTALS
Max.Eff.Inten.	(mm/hr)=	28.84	39.37	
over	(min)	5.00	20.00	
Storage Coeff.	(min)=	5.76 (ii)	16.01 (ii)	
Unit Hyd. Tpeak	(min)=	5.00	20.00	
Unit Hyd. peak	(cms)=	0.20	0.07	
PEAK FLOW	(cms)=	0.16	0.14	0.300 (iii)
TIME TO PEAK	(hrs)=	5.25	5.25	5.25
RUNOFF VOLUME	(mm)=	61.71	42.81	51.50
TOTAL RAINFALL	(mm)=	62.71	62.71	62.71
RUNOFF COEFFICIENT	=	0.98	0.68	0.82

(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(0012)						
IN= 2---> OUT= 1						
DT= 5.0 min		OUTFLOW	STORAGE		OUTFLOW	STORAGE
		(cms)	(ha.m.)		(cms)	(ha.m.)
		0.0000	0.0000		0.0090	0.2436
		0.0030	0.1314		0.0110	0.2924
		0.0050	0.1763		0.0130	0.3009
		0.0070	0.2056		0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0212)	4.303	0.300	5.25	51.50
OUTFLOW: ID= 1 (0012)	4.303	0.007	12.25	39.03

PEAK FLOW REDUCTION [Qout/Qin](%)= 2.31
TIME SHIFT OF PEAK FLOW (min)=420.00
MAXIMUM STORAGE USED (ha.m.)= 0.2047

CALIB	
STANDHYD (0211)	Area (ha)= 19.33
ID= 1 DT= 5.0 min	Total Imp(%)= 52.00 Dir. Conn.(%)= 33.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	10.05	9.28
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	358.98	40.00
Mannings n	=	0.013	0.250
Max.Eff.Inten.	(mm/hr)=	28.84	32.22
over	(min)	10.00	25.00
Storage Coeff.	(min)=	9.04 (ii)	20.15 (ii)
Unit Hyd. Tpeak	(min)=	10.00	25.00
Unit Hyd. peak	(cms)=	0.12	0.05

				TOTALS
PEAK FLOW	(cms)=	0.51	0.71	1.210 (iii)
TIME TO PEAK	(hrs)=	5.25	5.33	5.25
RUNOFF VOLUME	(mm)=	61.71	40.52	47.51
TOTAL RAINFALL	(mm)=	62.71	62.71	62.71
RUNOFF COEFFICIENT	=	0.98	0.65	0.76

(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(0011)						
IN= 2---> OUT= 1						
DT= 5.0 min		OUTFLOW	STORAGE		OUTFLOW	STORAGE
		(cms)	(ha.m.)		(cms)	(ha.m.)
		0.0000	0.0000		0.0076	1.0979
		0.0025	0.5624		0.0092	1.2357
		0.0043	0.7721		0.0109	1.3737
		0.0057	0.9156		0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0211)	19.330	1.210	5.25	47.51
OUTFLOW: ID= 1 (0011)	19.330	0.006	12.92	13.17

PEAK FLOW REDUCTION [Qout/Qin](%)= 0.46
TIME SHIFT OF PEAK FLOW (min)=460.00
MAXIMUM STORAGE USED (ha.m.)= 0.9042

CALIB	
STANDHYD (0209)	Area (ha)= 26.26
ID= 1 DT= 5.0 min	Total Imp(%)= 55.00 Dir. Conn.(%)= 40.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	14.44	11.82
Dep. Storage	(mm)=	1.00	1.50

Average Slope	(%)=	1.00	2.00
Length	(m)=	418.41	40.00
Mannings n	=	0.013	0.250
Max.Eff.Inten.	(mm/hr)=	28.84	30.37
over	(min)	10.00	25.00
Storage Coeff.	(min)=	9.92 (ii)	21.28 (ii)
Unit Hyd. Tpeak	(min)=	10.00	25.00
Unit Hyd. peak	(cms)=	0.11	0.05
			TOTALS
PEAK FLOW	(cms)=	0.84	0.84 1.666 (iii)
TIME TO PEAK	(hrs)=	5.25	5.33 5.25
RUNOFF VOLUME	(mm)=	61.71	39.84 48.59
TOTAL RAINFALL	(mm)=	62.71	62.71 62.71
RUNOFF COEFFICIENT	=	0.98	0.64 0.77

(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(0009)
| IN= 2---> OUT= 1
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0070	1.4742
	0.0020	0.7580	0.0090	1.6571
	0.0040	1.0378	0.0110	1.8406
	0.0060	1.2294	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0209)	26.260	1.666	5.25	48.59
OUTFLOW: ID= 1 (0009)	26.260	0.006	13.00	10.71

PEAK FLOW REDUCTION [Qout/Qin](%)= 0.37
TIME SHIFT OF PEAK FLOW (min)=465.00
MAXIMUM STORAGE USED (ha.m.)= 1.2605

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 5.0\VO2\voin.dat
Output filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-5bc5a1b3e645\8f6ffedc-1e20-49fd-9026-5344a2ddde72\sce
Summary filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-5bc5a1b3e645\8f6ffedc-1e20-49fd-9026-5344a2ddde72\sce

DATE: 12-16-2021 TIME: 01:27:50

USER:

COMMENTS: _____

** SIMULATION : 4.1 - 25 Year 12 Hour AES (B1 **

READ STORM	Filename: C:\Users\jlysecki\AppData\Local\Temp\bbdd3476-4b04-4a4c-9024-790da4e7a5f2\324961af
Ptotal= 73.10 mm	Comments: 25 Year 12 Hour AES (Bloor, TRCA)

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.00	3.50	12.43	6.75	5.12	10.00	0.73
0.50	0.73	3.75	12.43	7.00	5.12	10.25	0.73
0.75	0.73	4.00	12.43	7.25	5.12	10.50	0.73
1.00	0.73	4.25	12.43	7.50	2.92	10.75	0.73
1.25	0.73	4.50	33.63	7.75	2.92	11.00	0.73
1.50	0.73	4.75	33.63	8.00	2.92	11.25	0.73
1.75	0.73	5.00	33.63	8.25	2.92	11.50	0.73
2.00	0.73	5.25	33.63	8.50	1.46	11.75	0.73
2.25	0.73	5.50	9.50	8.75	1.46	12.00	0.73
2.50	4.39	5.75	9.50	9.00	1.46	12.25	0.73
2.75	4.39	6.00	9.50	9.25	1.46		
3.00	4.39	6.25	9.50	9.50	0.73		
3.25	4.39	6.50	5.12	9.75	0.73		

| CALIB
|---
| STANDHYD (0212) | Area (ha)= 4.30
| ID= 1 DT= 5.0 min | Total Imp(%)= 67.00 Dir. Conn.(%)= 46.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.88	1.42
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	169.37	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	4.39	6.250	9.50	9.33	0.73
0.167	0.00	3.250	4.39	6.333	5.12	9.42	0.73
0.250	0.00	3.333	12.43	6.417	5.12	9.50	0.73
0.333	0.73	3.417	12.43	6.500	5.12	9.58	0.73
0.417	0.73	3.500	12.43	6.583	5.12	9.67	0.73
0.500	0.73	3.583	12.43	6.667	5.12	9.75	0.73
0.583	0.73	3.667	12.43	6.750	5.12	9.83	0.73
0.667	0.73	3.750	12.43	6.833	5.12	9.92	0.73
0.750	0.73	3.833	12.43	6.917	5.12	10.00	0.73
0.833	0.73	3.917	12.43	7.000	5.12	10.08	0.73
0.917	0.73	4.000	12.43	7.083	5.12	10.17	0.73
1.000	0.73	4.083	12.43	7.167	5.12	10.25	0.73
1.083	0.73	4.167	12.43	7.250	5.12	10.33	0.73
1.167	0.73	4.250	12.43	7.333	2.92	10.42	0.73
1.250	0.73	4.333	33.63	7.417	2.92	10.50	0.73
1.333	0.73	4.417	33.63	7.500	2.92	10.58	0.73
1.417	0.73	4.500	33.63	7.583	2.92	10.67	0.73
1.500	0.73	4.583	33.63	7.667	2.92	10.75	0.73
1.583	0.73	4.667	33.63	7.750	2.92	10.83	0.73
1.667	0.73	4.750	33.63	7.833	2.92	10.92	0.73
1.750	0.73	4.833	33.63	7.917	2.92	11.00	0.73
1.833	0.73	4.917	33.63	8.000	2.92	11.08	0.73

1.917	0.73	5.000	33.63	8.083	2.92	11.17	0.73
2.000	0.73	5.083	33.63	8.167	2.92	11.25	0.73
2.083	0.73	5.167	33.63	8.250	2.92	11.33	0.73
2.167	0.73	5.250	33.63	8.333	1.46	11.42	0.73
2.250	0.73	5.333	9.50	8.417	1.46	11.50	0.73
2.333	4.39	5.417	9.50	8.500	1.46	11.58	0.73
2.417	4.39	5.500	9.50	8.583	1.46	11.67	0.73
2.500	4.39	5.583	9.50	8.667	1.46	11.75	0.73
2.583	4.39	5.667	9.50	8.750	1.46	11.83	0.73
2.667	4.39	5.750	9.50	8.833	1.46	11.92	0.73
2.750	4.39	5.833	9.50	8.917	1.46	12.00	0.73
2.833	4.39	5.917	9.50	9.000	1.46	12.08	0.73
2.917	4.39	6.000	9.50	9.083	1.46	12.17	0.73
3.000	4.39	6.083	9.50	9.167	1.46	12.25	0.73
3.083	4.39	6.167	9.50	9.250	1.46		

Max.Eff.Inten.(mm/hr)=		33.63	47.79	
over (min)		5.00	15.00	
Storage Coeff. (min)=		5.42 (ii)	14.90 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.20	0.08	
				TOTALS
PEAK FLOW	(cms)=	0.18	0.18	0.361 (iii)
TIME TO PEAK	(hrs)=	5.25	5.25	5.25
RUNOFF VOLUME	(mm)=	72.10	52.33	61.42
TOTAL RAINFALL	(mm)=	73.10	73.10	73.10
RUNOFF COEFFICIENT	=	0.99	0.72	0.84

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

RESERVOIR(0012)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0090	0.2436
	0.0030	0.1314	0.0110	0.2924
	0.0050	0.1763	0.0130	0.3009
	0.0070	0.2056	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0212)	4.303	0.361	5.25	61.42
OUTFLOW: ID= 1 (0012)	4.303	0.009	9.83	47.53

PEAK FLOW REDUCTION [Qout/Qin](%)= 2.48
TIME SHIFT OF PEAK FLOW (min)=275.00
MAXIMUM STORAGE USED (ha.m.)= 0.2425

CALIB				
STANDHYD (0211)	Area (ha)= 19.33			
ID= 1 DT= 5.0 min	Total Imp(%)= 52.00		Dir. Conn.(%)= 33.00	
		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	10.05	9.28	
Dep. Storage	(mm)=	1.00	1.50	
Average Slope	(%)=	1.00	2.00	
Length	(m)=	358.98	40.00	
Mannings n	=	0.013	0.250	
Max.Eff.Inten.(mm/hr)=		33.63	39.11	
over (min)		10.00	20.00	
Storage Coeff. (min)=		8.51 (ii)	18.78 (ii)	
Unit Hyd. Tpeak (min)=		10.00	20.00	
Unit Hyd. peak (cms)=		0.12	0.06	
				TOTALS
PEAK FLOW	(cms)=	0.60	0.89	1.489 (iii)
TIME TO PEAK	(hrs)=	5.25	5.25	5.25
RUNOFF VOLUME	(mm)=	72.10	49.82	57.17
TOTAL RAINFALL	(mm)=	73.10	73.10	73.10
RUNOFF COEFFICIENT	=	0.99	0.68	0.78

(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(0011)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0076	1.0979
	0.0025	0.5624	0.0092	1.2357
	0.0043	0.7721	0.0109	1.3737
	0.0057	0.9156	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0211)	19.330	1.489	5.25	57.17
OUTFLOW: ID= 1 (0011)	19.330	0.007	12.75	17.30

PEAK FLOW REDUCTION [Qout/Qin](%)= 0.50
TIME SHIFT OF PEAK FLOW (min)=450.00
MAXIMUM STORAGE USED (ha.m.)= 1.0862

CALIB				
STANDHYD (0209)	Area (ha)= 26.26			
ID= 1 DT= 5.0 min	Total Imp(%)= 55.00		Dir. Conn.(%)= 40.00	
		IMPERVIOUS	PERVIOUS (i)	
Surface Area	(ha)=	14.44	11.82	
Dep. Storage	(mm)=	1.00	1.50	
Average Slope	(%)=	1.00	2.00	
Length	(m)=	418.41	40.00	
Mannings n	=	0.013	0.250	
Max.Eff.Inten.(mm/hr)=		33.63	36.94	
over (min)		10.00	20.00	
Storage Coeff. (min)=		9.32 (ii)	19.84 (ii)	
Unit Hyd. Tpeak (min)=		10.00	20.00	
Unit Hyd. peak (cms)=		0.12	0.06	
				TOTALS
PEAK FLOW	(cms)=	0.98	1.06	2.040 (iii)
TIME TO PEAK	(hrs)=	5.25	5.25	5.25
RUNOFF VOLUME	(mm)=	72.10	49.06	58.28
TOTAL RAINFALL	(mm)=	73.10	73.10	73.10
RUNOFF COEFFICIENT	=	0.99	0.67	0.80

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

RESERVOIR(0009)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0070	1.4742
	0.0020	0.7580	0.0090	1.6571
	0.0040	1.0378	0.0110	1.8406
	0.0060	1.2294	0.0000	0.0000

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

```
   INFLOW : ID= 2 (  0209)     26.260      2.040      5.25      58.28
   OUTFLOW: ID= 1 (  0009)     26.260      0.007     12.92      14.11

                PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.36
                TIME SHIFT OF PEAK FLOW         (min)=460.00
                MAXIMUM  STORAGE   USED       (ha.m.)=  1.5113

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 5.0\VO2\voin.dat
  Output  filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-
5bc5a1b3e645\ccc50550-7bd0-4f2b-b2f3-7fd5d8d156b0\sce
  Summary filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-
5bc5a1b3e645\ccc50550-7bd0-4f2b-b2f3-7fd5d8d156b0\sce


DATE: 12-16-2021                          TIME: 01:27:50

USER:


COMMENTS: _____________________________________________________


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  ************************************************
  ** SIMULATION : 5.1 - 50 Year 12 Hour AES (Bl **
  ************************************************


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|    READ STORM    |    Filename: C:\Users\jlysecki\AppD
|                  |              ata\Local\Temp\
|                  |              bbdd3476-4b04-4a4c-9024-790da4e7a5f2\3ef06238
| Ptotal= 80.82 mm |    Comments: 50 Year 12 Hour AES (Bloor, TRCA)
-------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.25    0.00 |  3.50   13.74 |   6.75    5.66 | 10.00    0.81
                0.50    0.81 |  3.75   13.74 |   7.00    5.66 | 10.25    0.81
                0.75    0.81 |  4.00   13.74 |   7.25    5.66 | 10.50    0.81
                1.00    0.81 |  4.25   13.74 |   7.50    3.23 | 10.75    0.81
                1.25    0.81 |  4.50   37.17 |   7.75    3.23 | 11.00    0.81
                1.50    0.81 |  4.75   37.17 |   8.00    3.23 | 11.25    0.81
                1.75    0.81 |  5.00   37.17 |   8.25    3.23 | 11.50    0.81
                2.00    0.81 |  5.25   37.17 |   8.50    1.62 | 11.75    0.81
                2.25    0.81 |  5.50   10.50 |   8.75    1.62 | 12.00    0.81
                2.50    4.85 |  5.75   10.50 |   9.00    1.62 | 12.25    0.81
                2.75    4.85 |  6.00   10.50 |   9.25    1.62 |
                3.00    4.85 |  6.25   10.50 |   9.50    0.81 |
                3.25    4.85 |  6.50    5.66 |   9.75    0.81 |

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| CALIB            |
| STANDHYD (  0212)|   Area    (ha)=   4.30
|ID= 1 DT= 5.0 min |   Total Imp(%)=  67.00   Dir. Conn.(%)=  46.00
-------------------

                                  IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=           2.88          1.42
     Dep. Storage     (mm)=           1.00          1.50
     Average Slope     (%)=           1.00          2.00
     Length            (m)=         169.37         40.00
     Mannings n           =          0.013         0.250

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    0.00 | 3.167    4.85 | 6.250   10.50 |  9.33    0.81
               0.167    0.00 | 3.250    4.85 | 6.333    5.66 |  9.42    0.81
               0.250    0.00 | 3.333   13.74 | 6.417    5.66 |  9.50    0.81
               0.333    0.81 | 3.417   13.74 | 6.500    5.66 |  9.58    0.81
               0.417    0.81 | 3.500   13.74 | 6.583    5.66 |  9.67    0.81
               0.500    0.81 | 3.583   13.74 | 6.667    5.66 |  9.75    0.81
               0.583    0.81 | 3.667   13.74 | 6.750    5.66 |  9.83    0.81
               0.667    0.81 | 3.750   13.74 | 6.833    5.66 |  9.92    0.81
               0.750    0.81 | 3.833   13.74 | 6.917    5.66 | 10.00    0.81
               0.833    0.81 | 3.917   13.74 | 7.000    5.66 | 10.08    0.81
               0.917    0.81 | 4.000   13.74 | 7.083    5.66 | 10.17    0.81
               1.000    0.81 | 4.083   13.74 | 7.167    5.66 | 10.25    0.81
               1.083    0.81 | 4.167   13.74 | 7.250    5.66 | 10.33    0.81
               1.167    0.81 | 4.250   13.74 | 7.333    3.23 | 10.42    0.81
               1.250    0.81 | 4.333   37.17 | 7.417    3.23 | 10.50    0.81
               1.333    0.81 | 4.417   37.17 | 7.500    3.23 | 10.58    0.81
               1.417    0.81 | 4.500   37.17 | 7.583    3.23 | 10.67    0.81
               1.500    0.81 | 4.583   37.17 | 7.667    3.23 | 10.75    0.81
               1.583    0.81 | 4.667   37.17 | 7.750    3.23 | 10.83    0.81
               1.667    0.81 | 4.750   37.17 | 7.833    3.23 | 10.92    0.81
               1.750    0.81 | 4.833   37.17 | 7.917    3.23 | 11.00    0.81
               1.833    0.81 | 4.917   37.17 | 8.000    3.23 | 11.08    0.81
               1.917    0.81 | 5.000   37.17 | 8.083    3.23 | 11.17    0.81
               2.000    0.81 | 5.083   37.17 | 8.167    3.23 | 11.25    0.81
               2.083    0.81 | 5.167   37.17 | 8.250    3.23 | 11.33    0.81
               2.167    0.81 | 5.250   37.17 | 8.333    1.62 | 11.42    0.81
               2.250    0.81 | 5.333   10.50 | 8.417    1.62 | 11.50    0.81
               2.333    4.85 | 5.417   10.50 | 8.500    1.62 | 11.58    0.81
               2.417    4.85 | 5.500   10.50 | 8.583    1.62 | 11.67    0.81
               2.500    4.85 | 5.583   10.50 | 8.667    1.62 | 11.75    0.81
               2.583    4.85 | 5.667   10.50 | 8.750    1.62 | 11.83    0.81
               2.667    4.85 | 5.750   10.50 | 8.833    1.62 | 11.92    0.81
               2.750    4.85 | 5.833   10.50 | 8.917    1.62 | 12.00    0.81
               2.833    4.85 | 5.917   10.50 | 9.000    1.62 | 12.08    0.81
               2.917    4.85 | 6.000   10.50 | 9.083    1.62 | 12.17    0.81
               3.000    4.85 | 6.083   10.50 | 9.167    1.62 | 12.25    0.81
               3.083    4.85 | 6.167   10.50 | 9.250    1.62 |

     Max.Eff.Inten.(mm/hr)=      37.17         53.82
               over (min)         5.00         15.00
     Storage Coeff.  (min)=       5.21 (ii)    14.25 (ii)
     Unit Hyd. Tpeak (min)=       5.00         15.00
     Unit Hyd. peak  (cms)=       0.21          0.08

                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.20          0.20          0.405 (iii)
     TIME TO PEAK    (hrs)=       5.25          5.25          5.25
     RUNOFF VOLUME    (mm)=      79.82         59.50         68.85
     TOTAL RAINFALL   (mm)=      80.82         80.82         80.82
     RUNOFF COEFFICIENT   =       0.99          0.74          0.85


       (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(  0012)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.0090     0.2436
                          0.0030     0.1314   |   0.0110     0.2924
                          0.0050     0.1763   |   0.0130     0.3009
                          0.0070     0.2056   |   0.0000     0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0212)     4.303     0.405      5.25      68.85
   OUTFLOW: ID= 1 (  0012)     4.303     0.010      9.83      53.97

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.50
                  TIME SHIFT OF PEAK FLOW         (min)=275.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  0.2713

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--------------------
| CALIB            |
| STANDHYD (  0211)|   Area    (ha)=  19.33
|ID= 1 DT= 5.0 min |   Total Imp(%)=  52.00   Dir. Conn.(%)=  33.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      10.05         9.28
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     358.98        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      37.17        44.52
                 over (min)      10.00        20.00
     Storage Coeff.  (min)=       8.17 (ii)   17.93 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=       0.13         0.06
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.66         1.03          1.684 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=      79.82        56.85          64.43
     TOTAL RAINFALL   (mm)=      80.82        80.82          80.82
     RUNOFF COEFFICIENT   =       0.99         0.70           0.80

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

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--------------------
| RESERVOIR(  0011)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.0076     1.0979
                          0.0025     0.5624   |   0.0092     1.2357
                          0.0043     0.7721   |   0.0109     1.3737
                          0.0057     0.9156   |   0.0000     0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0211)    19.330     1.684      5.25      64.43
   OUTFLOW: ID= 1 (  0011)    19.330     0.009     12.75      20.57

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.54
                  TIME SHIFT OF PEAK FLOW         (min)=450.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.2228

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--------------------
| CALIB            |
| STANDHYD (  0209)|   Area    (ha)=  26.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  55.00   Dir. Conn.(%)=  40.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.44        11.82
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     418.41        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      37.17        42.11
                 over (min)      10.00        20.00
     Storage Coeff.  (min)=       8.96 (ii)   18.93 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=       0.12         0.06
                                                        *TOTALS*
     PEAK FLOW       (cms)=       1.08         1.22          2.303 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25           5.25
     RUNOFF VOLUME    (mm)=      79.82        56.05          65.56
     TOTAL RAINFALL   (mm)=      80.82        80.82          80.82
     RUNOFF COEFFICIENT   =       0.99         0.69           0.81

       (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(  0009)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.0070     1.4742
                          0.0020     0.7580   |   0.0090     1.6571
                          0.0040     1.0378   |   0.0110     1.8406
                          0.0060     1.2294   |   0.0000     0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0209)    26.260     2.303      5.25      65.56
   OUTFLOW: ID= 1 (  0009)    26.260     0.009     12.83      16.43

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.41
                  TIME SHIFT OF PEAK FLOW         (min)=455.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.6981

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

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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 5.0\VO2\voin.dat
  Output  filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-
5bc5a1b3e645\64b0d3b6-bcd3-42ca-9417-1c83268b7737\sce
  Summary filename: C:\Users\jlysecki\AppData\Local\Civica\VH5\3e4dc0fa-3f7b-44e5-bcd4-
5bc5a1b3e645\64b0d3b6-bcd3-42ca-9417-1c83268b7737\sce
```

DATE: 12-16-2021 TIME: 01:27:50

USER:

COMMENTS: _____

```
  ************************************************
  ** SIMULATION : 6.1 - 100 Year 12 Hour AES (B **
  ************************************************
```

READ STORM	Filename: C:\Users\jlysecki\AppData\Local\Temp\bbdd3476-4b04-4a4c-9024-790da4e7a5f2\d3ad1fa0
Ptotal= 88.54 mm	Comments: 100 Year 12 Hour AES (Bloor, TRCA)

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.00	3.50	15.05	6.75	6.20	10.00	0.89
0.50	0.89	3.75	15.05	7.00	6.20	10.25	0.89
0.75	0.89	4.00	15.05	7.25	6.20	10.50	0.89
1.00	0.89	4.25	15.05	7.50	3.54	10.75	0.89
1.25	0.89	4.50	40.71	7.75	3.54	11.00	0.89
1.50	0.89	4.75	40.71	8.00	3.54	11.25	0.89
1.75	0.89	5.00	40.71	8.25	3.54	11.50	0.89
2.00	0.89	5.25	40.71	8.50	1.77	11.75	0.89
2.25	0.89	5.50	11.51	8.75	1.77	12.00	0.89
2.50	5.31	5.75	11.51	9.00	1.77	12.25	0.89
2.75	5.31	6.00	11.51	9.25	1.77		
3.00	5.31	6.25	11.51	9.50	0.89		
3.25	5.31	6.50	6.20	9.75	0.89		

CALIB			
STANDHYD (0212)	Area (ha)= 4.30		
ID= 1 DT= 5.0 min	Total Imp(%)= 67.00	Dir. Conn.(%)= 46.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	2.88	1.42
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	169.37	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	5.31	6.250	11.51	9.33	0.89
0.167	0.00	3.250	5.31	6.333	6.20	9.42	0.89
0.250	0.00	3.333	15.05	6.417	6.20	9.50	0.89
0.333	0.89	3.417	15.05	6.500	6.20	9.58	0.89
0.417	0.89	3.500	15.05	6.583	6.20	9.67	0.89
0.500	0.89	3.583	15.05	6.667	6.20	9.75	0.89
0.583	0.89	3.667	15.05	6.750	6.20	9.83	0.89
0.667	0.89	3.750	15.05	6.833	6.20	9.92	0.89
0.750	0.89	3.833	15.05	6.917	6.20	10.00	0.89
0.833	0.89	3.917	15.05	7.000	6.20	10.08	0.89
0.917	0.89	4.000	15.05	7.083	6.20	10.17	0.89
1.000	0.89	4.083	15.05	7.167	6.20	10.25	0.89
1.083	0.89	4.167	15.05	7.250	6.20	10.33	0.89
1.167	0.89	4.250	15.05	7.333	3.54	10.42	0.89
1.250	0.89	4.333	40.71	7.417	3.54	10.50	0.89
1.333	0.89	4.417	40.71	7.500	3.54	10.58	0.89
1.417	0.89	4.500	40.71	7.583	3.54	10.67	0.89
1.500	0.89	4.583	40.71	7.667	3.54	10.75	0.89
1.583	0.89	4.667	40.71	7.750	3.54	10.83	0.89
1.667	0.89	4.750	40.71	7.833	3.54	10.92	0.89
1.750	0.89	4.833	40.71	7.917	3.54	11.00	0.89
1.833	0.89	4.917	40.71	8.000	3.54	11.08	0.89
1.917	0.89	5.000	40.71	8.083	3.54	11.17	0.89
2.000	0.89	5.083	40.71	8.167	3.54	11.25	0.89
2.083	0.89	5.167	40.71	8.250	3.54	11.33	0.89
2.167	0.89	5.250	40.71	8.333	1.77	11.42	0.89
2.250	0.89	5.333	11.51	8.417	1.77	11.50	0.89
2.333	5.31	5.417	11.51	8.500	1.77	11.58	0.89
2.417	5.31	5.500	11.51	8.583	1.77	11.67	0.89
2.500	5.31	5.583	11.51	8.667	1.77	11.75	0.89
2.583	5.31	5.667	11.51	8.750	1.77	11.83	0.89
2.667	5.31	5.750	11.51	8.833	1.77	11.92	0.89
2.750	5.31	5.833	11.51	8.917	1.77	12.00	0.89
2.833	5.31	5.917	11.51	9.000	1.77	12.08	0.89
2.917	5.31	6.000	11.51	9.083	1.77	12.17	0.89
3.000	5.31	6.083	11.51	9.167	1.77	12.25	0.89
3.083	5.31	6.167	11.51	9.250	1.77		

				TOTALS
Max.Eff.Inten.(mm/hr)=		40.71	59.84	
over (min)		5.00	15.00	
Storage Coeff. (min)=		5.02 (ii)	13.69 (ii)	
Unit Hyd. Tpeak (min)=		5.00	15.00	
Unit Hyd. peak (cms)=		0.21	0.08	
PEAK FLOW	(cms)=	0.22	0.22	0.448 (iii)
TIME TO PEAK	(hrs)=	5.25	5.25	5.25
RUNOFF VOLUME	(mm)=	87.54	66.75	76.31
TOTAL RAINFALL	(mm)=	88.54	88.54	88.54
RUNOFF COEFFICIENT	=	0.99	0.75	0.86

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

RESERVOIR(0012)				
IN= 2---> OUT= 1				
DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0090	0.2436
	0.0030	0.1314	0.0110	0.2924
	0.0050	0.1763	0.0130	0.3009
	0.0070	0.2056	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0212)	4.303	0.448	5.25	76.31
OUTFLOW: ID= 1 (0012)	4.303	0.013	9.58	60.55

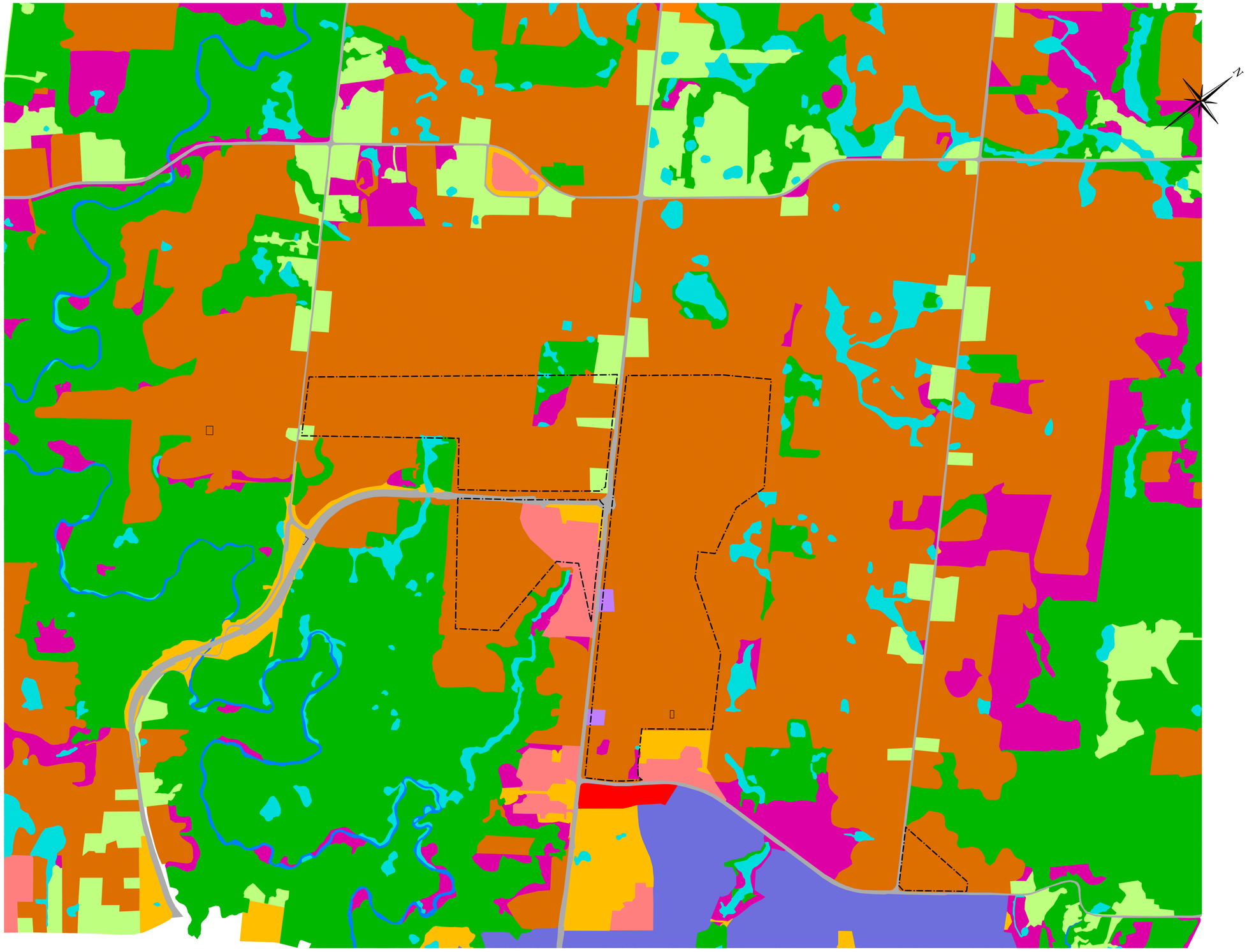
PEAK FLOW REDUCTION [Qout/Qin](%)= 2.84
TIME SHIFT OF PEAK FLOW (min)=260.00
MAXIMUM STORAGE USED (ha.m.)= 0.2998

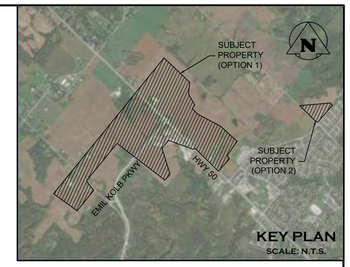
CALIB			
STANDHYD (0211)	Area (ha)= 19.33		
ID= 1 DT= 5.0 min	Total Imp(%)= 52.00	Dir. Conn.(%)= 33.00	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	10.05	9.28
Dep. Storage	(mm)=	1.00	1.50
Average Slope	(%)=	1.00	2.00
Length	(m)=	358.98	40.00
Mannings n	=	0.013	0.250
Max.Eff.Inten.(mm/hr)=		40.71	49.66
over (min)		10.00	20.00
Storage Coeff. (min)=		7.88 (ii)	17.22 (ii)

```
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=       0.13         0.06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.72         1.16          1.879 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=      87.54        63.98         71.75
     TOTAL RAINFALL   (mm)=      88.54        88.54         88.54
     RUNOFF COEFFICIENT   =       0.99         0.72          0.81


       (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(  0011)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.0076      1.0979
                          0.0025     0.5624   |   0.0092      1.2357
                          0.0043     0.7721   |   0.0109      1.3737
                          0.0057     0.9156   |   0.0000      0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0211)     19.330     1.879      5.25      71.75
   OUTFLOW: ID= 1 (  0011)     19.330     0.011     12.75      24.01

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.57
                  TIME SHIFT OF PEAK FLOW          (min)=450.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.3602

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0209)|   Area    (ha)=  26.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  55.00   Dir. Conn.(%)=  40.00
--------------------
                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      14.44        11.82
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     418.41        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      40.71        47.01
               over (min)        10.00        20.00
     Storage Coeff.  (min)=       8.64 (ii)   18.18 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=       0.12         0.06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.19         1.38          2.567 (iii)
     TIME TO PEAK    (hrs)=       5.25         5.25          5.25
     RUNOFF VOLUME    (mm)=      87.54        63.13         72.90
     TOTAL RAINFALL   (mm)=      88.54        88.54         88.54
     RUNOFF COEFFICIENT   =       0.99         0.71          0.82


       (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(  0009)|
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.0070      1.4742
                          0.0020     0.7580   |   0.0090      1.6571
                          0.0040     1.0378   |   0.0110      1.8406
                          0.0060     1.2294   |   0.0000      0.0000
     **** WARNING : STORAGE-DISCHARGE TABLE WAS EXCEEDED.

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
   INFLOW : ID= 2 (  0209)     26.260     2.567      5.25      72.90
   OUTFLOW: ID= 1 (  0009)     26.260     0.011     12.75      19.33

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  0.45
                  TIME SHIFT OF PEAK FLOW          (min)=450.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.8859

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

 FINISH
================================================================================================
======
```

Appendix E – FIGURES





KEY PLAN
SCALE: N.T.S.

LEGEND

- PROPERTY BOUNDARY
- AGRICULTURAL LAND
- COMMERCIAL
- FOREST
- HIGH-DENSITY RESIDENTIAL
- INDUSTRIAL/INSTITUIONAL
- MEADOW
- MEDIUM-DENSITY RESIDENTIAL
- RECREATIONAL / OPEN SPACE
- RIVERINE
- ROADS
- RURAL RESIDENTIAL
- WETLANDS

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EXISTING GROUND CONTOURS DERIVED FROM AERIAL SURVEY BY DRONE SURVEY CANADA (JULY 2021). ADDITIONAL CONTOUR DATA ADAPTED FROM THE ONTARIO DIGITAL TERRAIN MODEL (LIDAR-DERIVED) LAND INFORMATION ONTARIO (LIO) DATASET (MINISTRY OF NATURAL RESOURCES AND FORESTRY, 2017).

No.	ISSUE	DATE: MM/DD/YYYY
1	ISSUED FOR FIRST SUBMISSION	12/17/2021

Engineer

Engineer

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Project

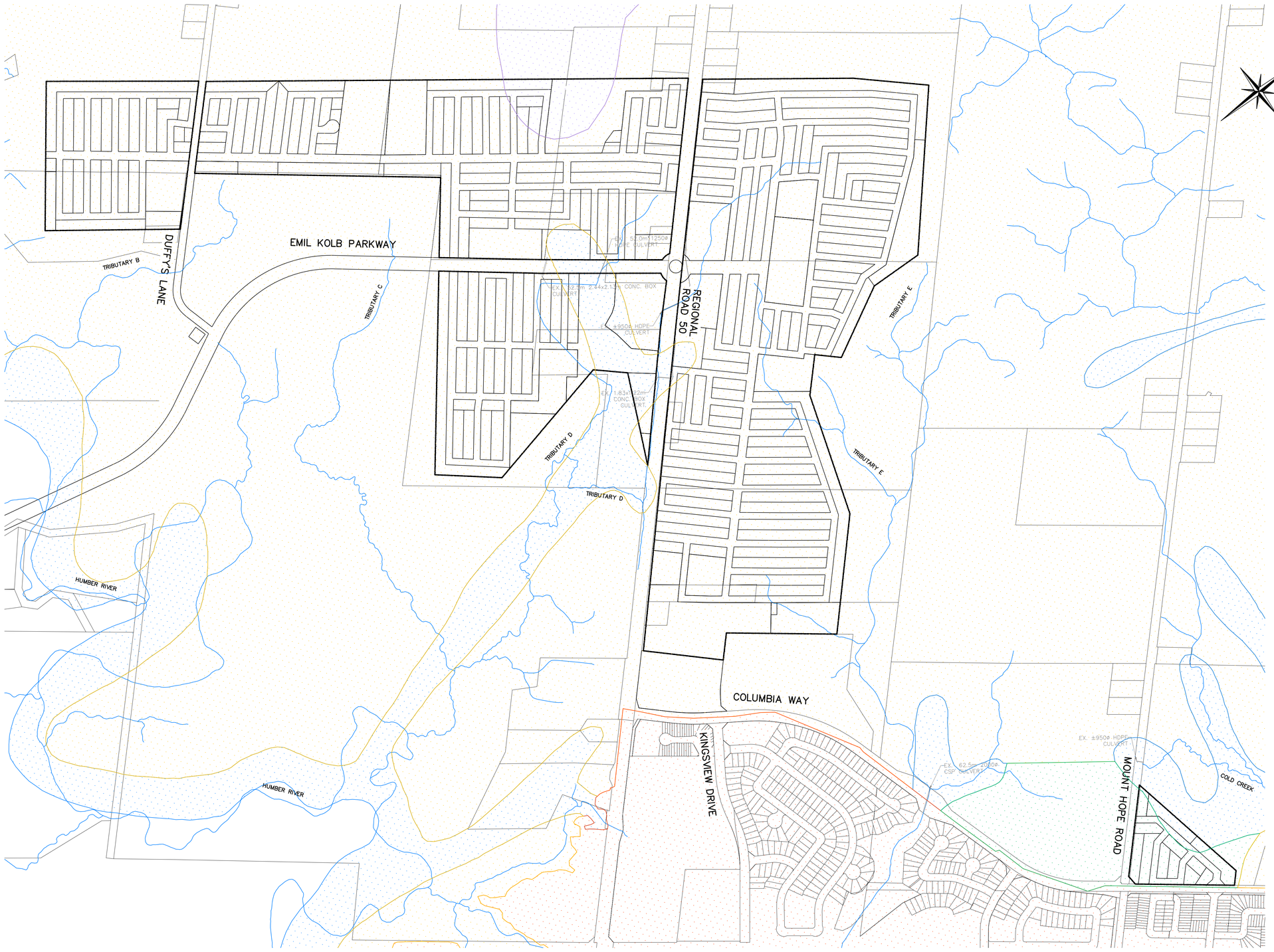
BOLTON NORTH HILL
TOWN OF CALEDON

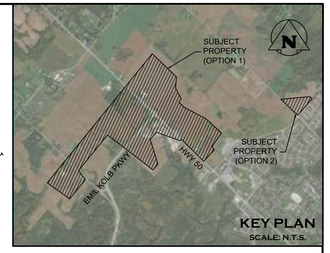
Drawing

EXISTING LANDUSE
CONDITIONS

CROZIER
CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON, L9T 6P4
905-875-0026 T
905-875-4915 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	Design By	Project	
E.D.	T.G.		708-3446
Check By	Check By	Scale	Figure
T.G.	S.C.	1: 5000	LAND-1





KEY PLAN
SCALE: N.T.S.

LEGEND

198.00	EXISTING MAJOR CONTOURS
198.50	EXISTING MINOR CONTOURS
x199.11	EXISTING ELEVATION
	PROPERTY BOUNDARY
	BOTTOM LAND
	BUILT–UP AREA
	KING CLAY LOAM
	MONOGHAN CLAY LOAM
	PONTYPOOL SANDY LOAM

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EXISTING GROUND CONTOURS DERIVED FROM AERIAL SURVEY BY DRONE SURVEY CANADA (JULY 2021). ADDITIONAL CONTOUR DATA ADAPTED FROM THE ONTARIO DIGITAL TERRAIN MODEL (LIDAR–DERIVED) LAND INFORMATION ONTARIO (LIO) DATASET (MINISTRY OF NATURAL RESOURCES AND FORESTRY, 2017).

No.	ISSUE	DATE: MM/DD/YYYY
1	ISSUED FOR FIRST SUBMISSION	12/17/2021

Engineer

Engineer

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Project

BOLTON NORTH HILL
TOWN OF CALEDON

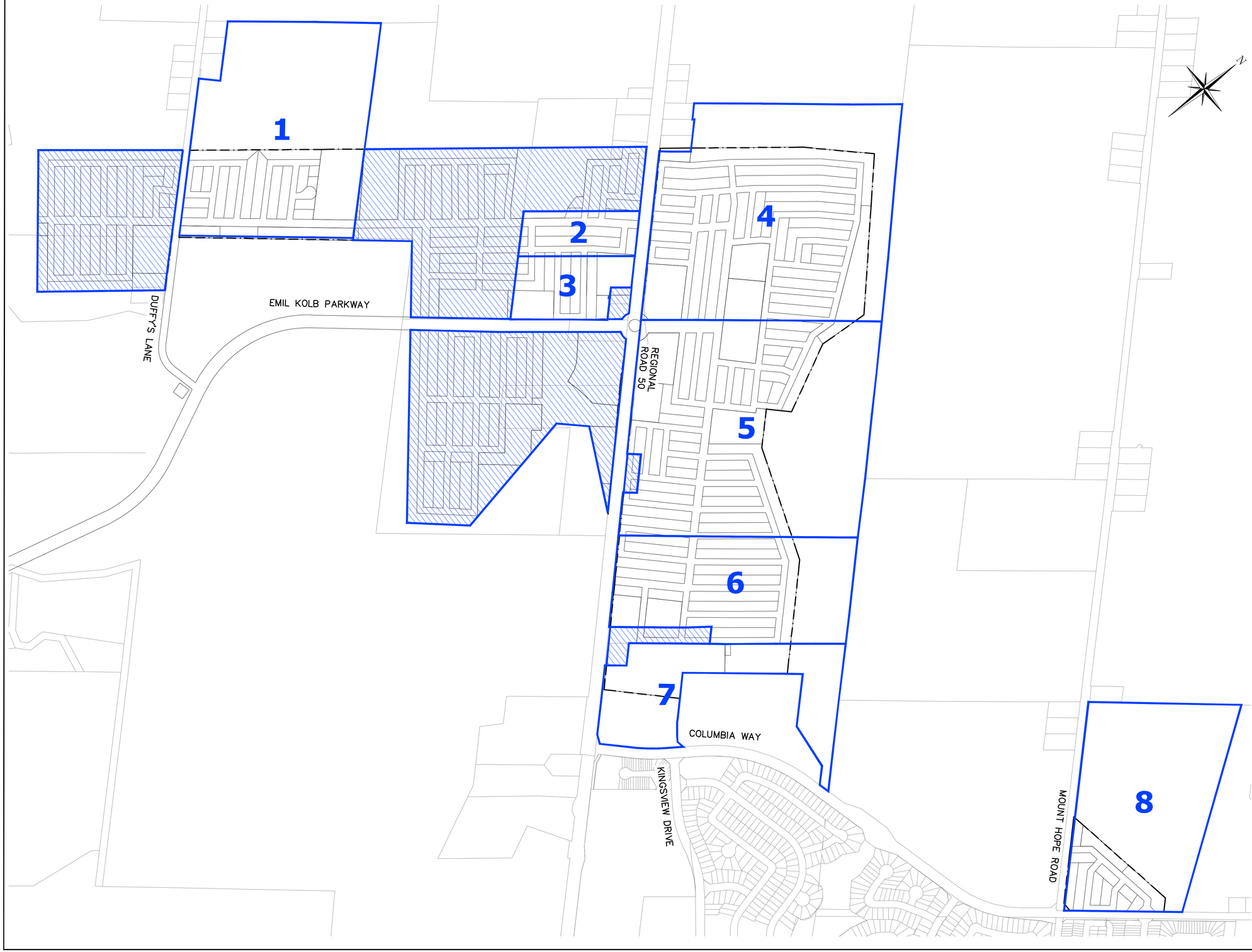
Drawing

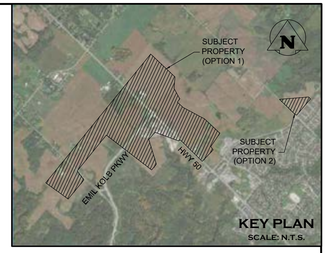
SOIL MAPPING PLAN

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON, L9T 6P4
905-875-0026 T
905-875-4915 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By E.D.	Design By T.G.	Project	708–3446
Check By T.G.	Check By S.C.	Scale 1:5000	Figure SOIL–1

APPENDIX F – DRAWINGS





LEGEND

1 — PROPERTY BOUNDARY AND BOLTON NORTH HILL OWNERSHIP ID

HOLDOUT PROPERTY

PROPERTY BOUNDARY

OWNERS

1 – PACIFIC
2 – POLSINELLI
3 – PACIFIC
4 – COUNTRY HOMES
5 – OAKBANK ESTATES INC.
6 – MARHOME VENTURES
7 – GEORGIAN HUMBERVALE INC.
8 – COLD CREEK DEVELOPMENTS

PLAN PREPARED BY BOUSFIELDS INC. DATED NOVEMBER 2021

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4. DO NOT SCALE THE DRAWINGS.
5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

EXISTING GROUND CONTOURS DERIVED FROM AERIAL SURVEY BY DRONE SURVEY CANADA (JULY 2021). ADDITIONAL CONTOUR DATA ADAPTED FROM THE ONTARIO DIGITAL TERRAIN MODEL (LIDAR-DERIVED) LAND INFORMATION ONTARIO (LIO) DATASET (MINISTRY OF NATURAL RESOURCES AND FORESTRY, 2017).

No.	ISSUE	DATE: MM/DD/YYYY
1	ISSUED FOR FIRST SUBMISSION	12/17/2021

Engineer

Engineer

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Project

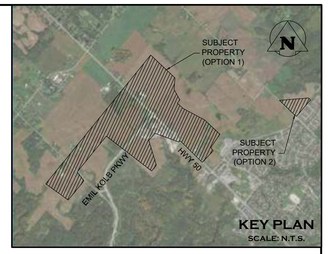
BOLTON NORTH HILL
TOWN OF CALEDON

Drawing

LANDOWNERSHIP MAP

CROZIER CONSULTING ENGINEERS
2800 High Point Drive
Suite 100
Milton, ON, L9T 6P4
905-875-0026 T
905-875-4915 F
www.cfcrozier.ca
info@cfcrozier.ca

Drawn By	Design By	Project	
S.C.	T.G.		708–3446
Check By	Check By	Scale	Drawing
T.G.	S.C.	1:5000	C701



KEY PLAN
SCALE: N.T.S.

EMIL KOLB PARKWAY

DUFFY'S LANE

REGIONAL ROAD 50

COLUMBIA WAY

KINGSVIEW DRIVE

MOUNT HOPE ROAD

LEGEND

- PROPERTY BOUNDARY
- LOW DENSITY SINGLES
- MEDIUM DENSITY (TOWNS)
- HIGH DENSITY (APARTMENTS)
- COMMERCIAL
- SCHOOLS
- PARKS
- OPEN SPACE
- STORM WATER PONDS
- ROUNDING OUT AREA

PLAN PREPARED BY BOUSFIELDS INC. DATED NOVEMBER 2021

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EXISTING GROUND CONTOURS DERIVED FROM AERIAL SURVEY BY DRONE SURVEY CANADA (JULY 2021). ADDITIONAL CONTOUR DATA ADAPTED FROM THE ONTARIO DIGITAL TERRAIN MODEL (LIDAR-DERIVED) LAND INFORMATION ONTARIO (LIO) DATASET (MINISTRY OF NATURAL RESOURCES AND FORESTRY, 2017).

No.	ISSUE	DATE: MM/DD/YYYY
1	ISSUED FOR FIRST SUBMISSION	12/17/2021

Engineer

Engineer

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Project

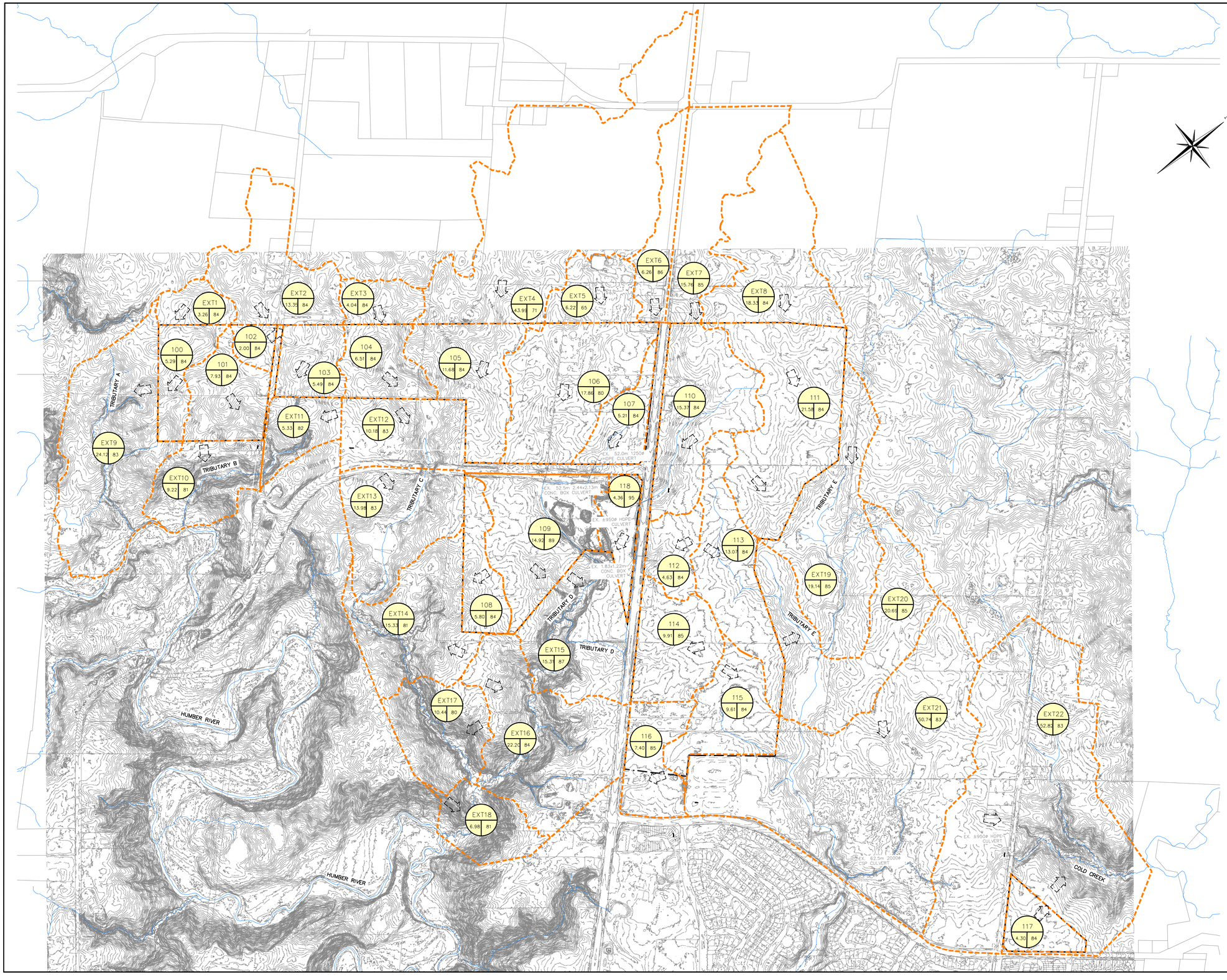
BOLTON NORTH HILL
TOWN OF CALEDON

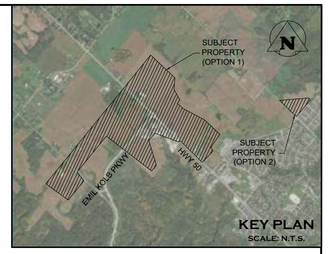
Drawing

PRELIMINARY FRAMEWORK PLAN

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON. L9T 6P4
905-875-0026 T
905-875-4915 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	Design By	Project	
S.C.	T.G.		708-3446
Check By	Check By	Scale	Drawing
T.G.	S.C.	1:5000	C702





KEY PLAN
SCALE: N.T.S.

LEGEND

- 198.00 — EXISTING MAJOR CONTOURS
- 198.50 — EXISTING MINOR CONTOURS
- x199.11 — EXISTING ELEVATION
- DRAINAGE AREA
- EXISTING OVERLAND FLOW ARROW
- 100 / 5.28 / 92 — CATCHMENT ID / CURVE NUMBER / CATCHMENT AREA (ha)

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EXISTING GROUND CONTOURS DERIVED FROM AERIAL SURVEY BY DRONE SURVEY CANADA (JULY 2021). ADDITIONAL CONTOUR DATA ADAPTED FROM THE ONTARIO DIGITAL TERRAIN MODEL (LIDAR-DERIVED) LAND INFORMATION ONTARIO (LIO) DATASET (MINISTRY OF NATURAL RESOURCES AND FORESTRY, 2017).

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BOLTON NORTH HILL
TOWN OF CALEDON

Drawing

PRE-DEVELOPMENT STORM DRAINAGE AREA PLAN

CROZIER CONSULTING ENGINEERS
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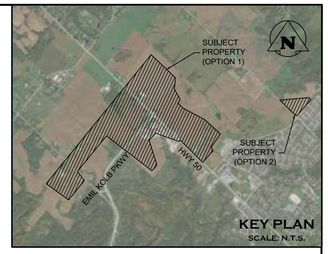
Drawn By	Design By	Project	708-3446
S.C.	T.G.		
Check By	Check By	Scale	Drawing
T.G.	S.C.	1:6000	C703



LEGEND

- 264.42 — EXISTING ELEVATION
- ×198.11 — PROPOSED ELEVATION
- 1.6% — PROPOSED SLOPE
- PROPERTY BOUNDARY
- OVERLAND FLOW ARROW
- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOUR

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BOLTON NORTH HILL
TOWN OF CALEDON

Drawing

GENERAL GRADING

CROZIER CONSULTING ENGINEERS
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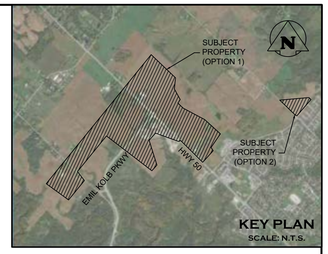
Drawn By	Design By	Project	
S.C.	T.G.		708-3446
Check By	Check By	Scale	Drawing
T.G.	S.C.	1:5000	C704



KEY PLAN
SCALE: N.T.S.

EMIL KOLB PARKWAY

DUFFY'S LANE

REGIONAL ROAD 50

COLUMBIA WAY

KINGSVIEW DRIVE

MOUNT HOPE ROAD

N

LEGEND

PROPERTY BOUNDARY

CUT AREA

FILL AREA

EARTHWORKS SUMMARY

	CUT (m^3)	FILL (m^3)	NET (m^3)
OPTION 1 LAND	1,323,053	855,862	467,191(CUT)
OPTION 2 LAND	14,236	3,963	10,273(CUT)
ROPA 30 LAND	156,485	76,785	79,700(CUT)

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BOLTON NORTH HILL
TOWN OF CALEDON

Drawing

PRELIMINARY
EARTHWORKS MAP

CROZIER
CONSULTING ENGINEERS

2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON, L9T 6P4
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S.C.	T.G.		708-3446
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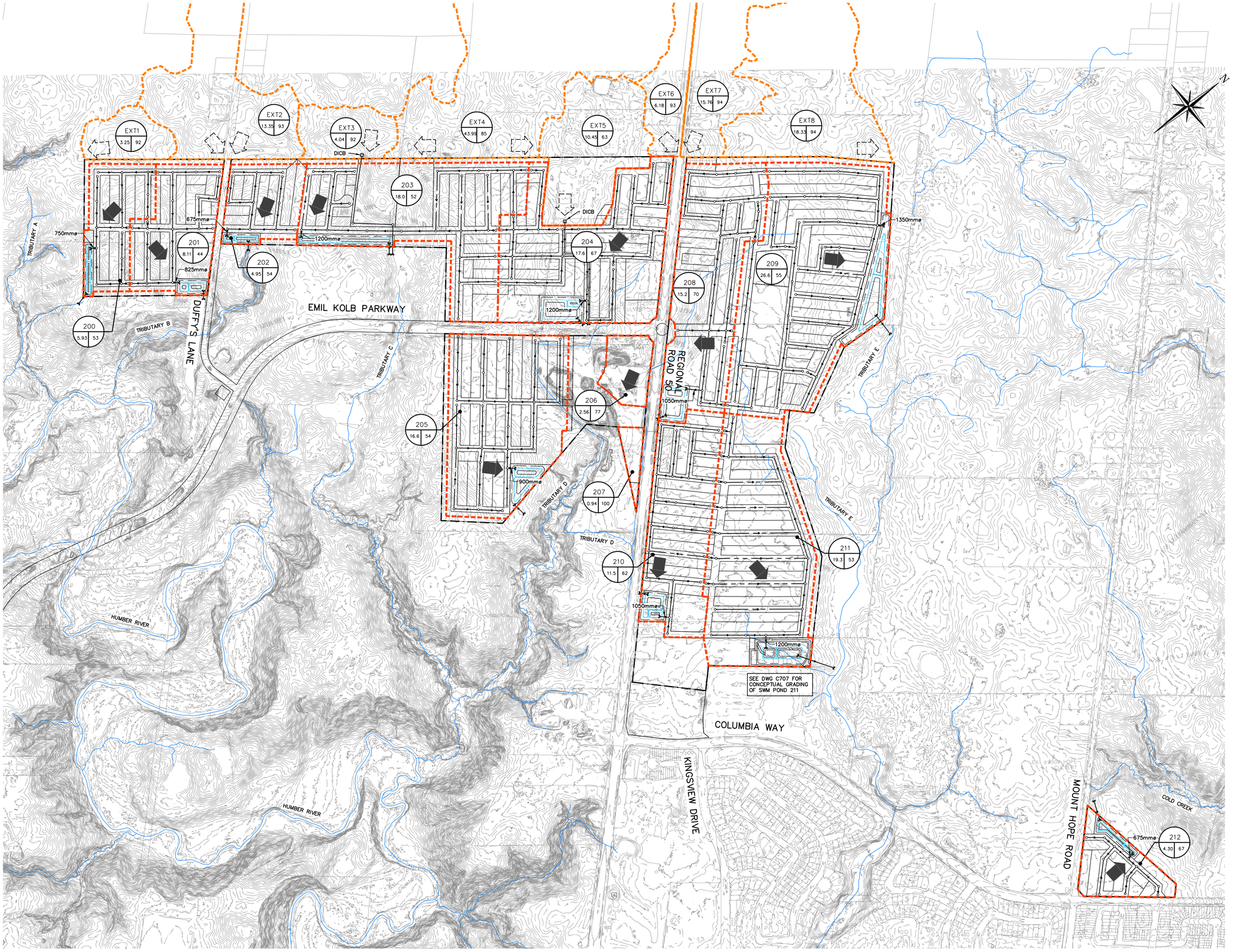
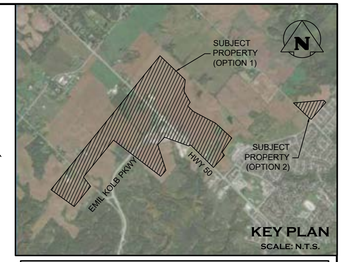
T.G.	S.C.	1:5000	C705





KEY PLAN
SCALE: N.T.S.

LEGEND

- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- PROPERTY BOUNDARY
- DRAINAGE AREA
- EXTERNAL DRAINAGE AREA
- PROPOSED STORM SEWER
- OVERLAND FLOW ARROW
- EXISTING OVERLAND FLOW ARROW
- CATCHMENT/SWM POND ID (209)
- CURVE NUMBER (26.6 | 55)
- CATCHMENT AREA (ha)

SWM Pond ID	Minimum Permanent Pool Elevation (masl)
200	252.80
201	254.20
202	257.20
203	257.30
204	264.00
205	260.00
208	264.30
209	263.30
210	264.70
211	259.57
212	258.50

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EXISTING GROUND CONTOURS DERIVED FROM AERIAL SURVEY BY DRONE SURVEY CANADA (JULY 2021). ADDITIONAL CONTOUR DATA ADAPTED FROM THE ONTARIO DIGITAL TERRAIN MODEL (LIDAR-DERIVED) LAND INFORMATION ONTARIO (LIO) DATASET (MINISTRY OF NATURAL RESOURCES AND FORESTRY, 2017).

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BOLTON NORTH HILL
TOWN OF CALEDON

Drawing

PRELIMINARY STORM DRAINAGE PLAN

CROZIER CONSULTING ENGINEERS
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MILTON, ON, L9T 6P4
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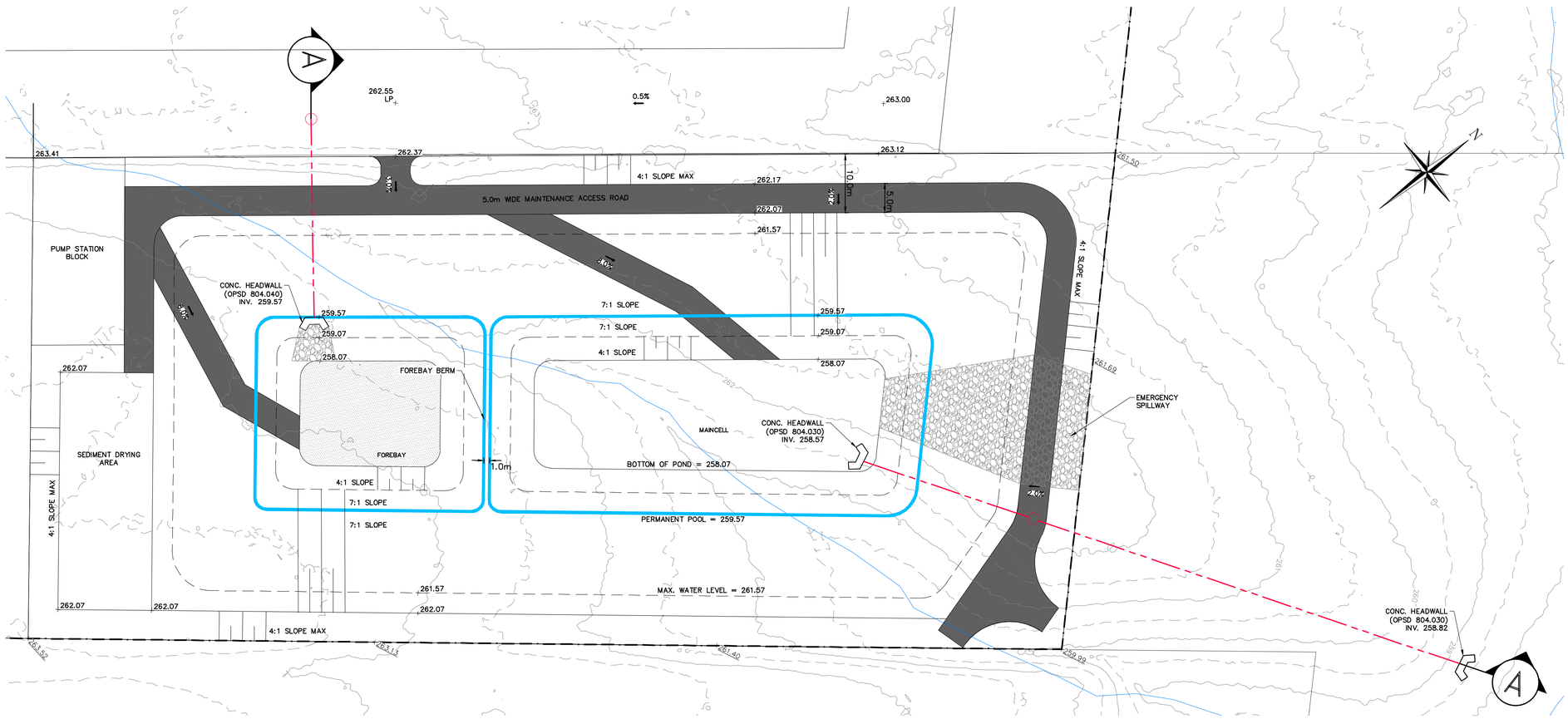
S.C.	T.G.		708-3446
Check By	Check By	Scale	Drawing
T.G.	S.C.	1: 5000	C706



LEGEND

- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- PROPOSED STORM SEWER
- PROPOSED RIP RAP
- PROPOSED PAVED ACCESS ROAD
- CRUSHER RUN LIMESTONE (CRL)
- PROPOSED HEADWALL

SWM POND '211'		
	ELEVATION (m)	STORAGE (m³)
BOTTOM OF POOL	258.07	--
PERMANENT POOL	259.57	3642*
MAX WATER LEVEL	262.07	12122

* DENOTES NON-ACTIVE STORAGE

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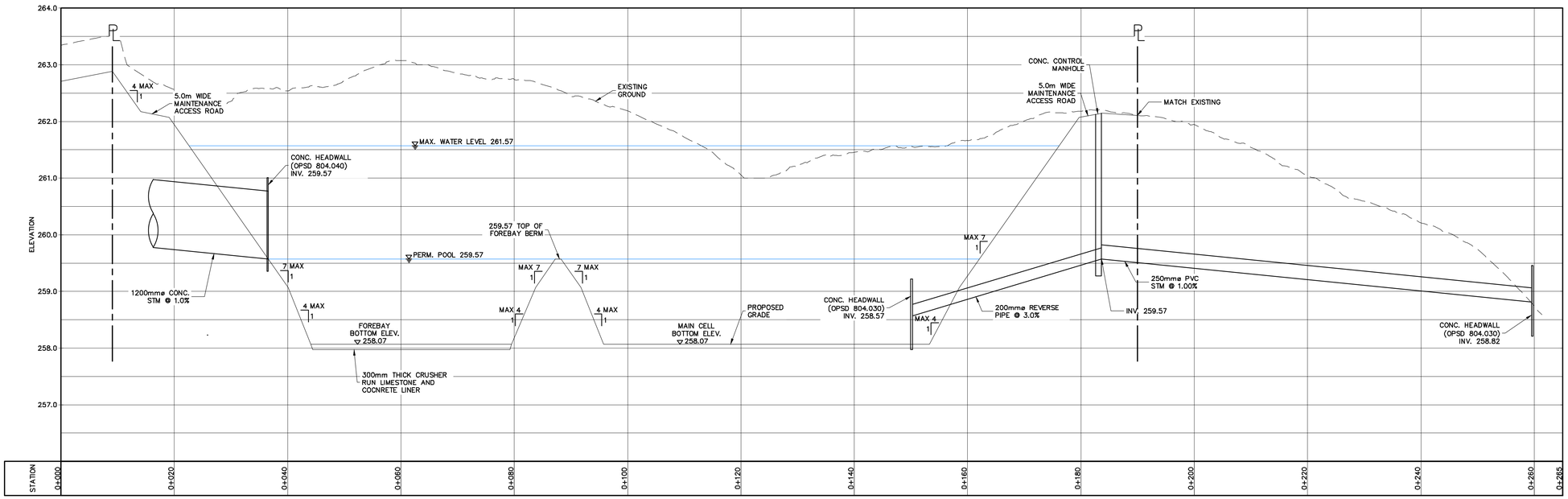
CROSS SECTION A-A

SCALE: HOR-1:400
VERT-1:40



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BOLTON NORTH HILL
TOWN OF CALEDON

Drawing

CONCEPTUAL SWM POND
PLAN AND SECTION

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON. L9T 6P4
905-875-0026 T
905-875-4915 F
WWW.CFCROZIER.CA
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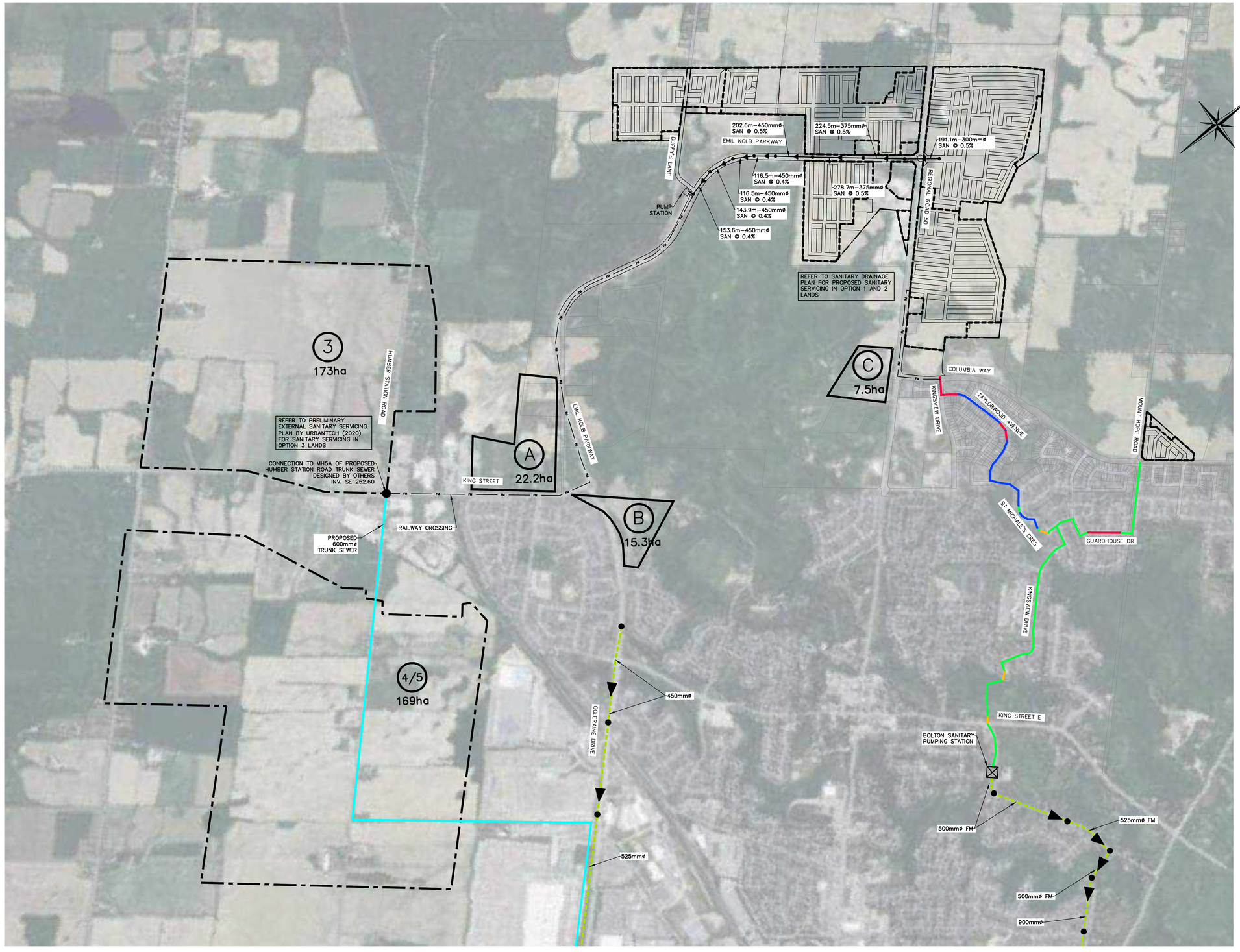
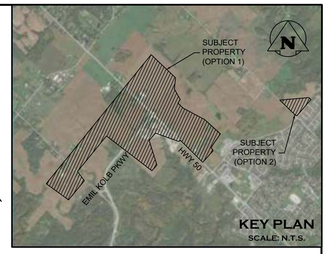
S.C.	T.G.		708-3446
Check By	Check By	Scale	Drawing
T.G.	S.C.	1:400	C707





KEY PLAN
SCALE: N.T.S.

LEGEND

- PROPOSED GRAVITY SEWER TRUNK ON EMIL KOLB PKWY
- EX. SANITARY SEWER UPGRADE TO 300mm
- EX. SANITARY SEWER UPGRADE TO 375mm
- EX. SANITARY SEWER UPGRADE TO 450mm
- EX. SANITARY SEWER WITH NO UPGRADE
- PROPOSED FORCEMAIN
- PROPOSED LOT LINES
- PROPERTY LIMITS
- PROPOSED SANITARY CATCHMENT
- 3 — AREA I.D.; 173ha — LAND AREA (ha)
- B.R.E.S. OPTION LANDS / B.R.E.S. ROUNDING OUT AREAS
- EX. SANITARY PUMPING STATION
- EX. SANITARY SEWER
- PROPOSED SANITARY TRUNK SEWER BY OTHERS

TO LIMIT THE EXTENT OF DISTURBANCE IN THE EXISTING SYSTEM SOUTH OF COLUMBIA WAY, THE CAPACITY ANALYSIS WAS LIMITED TO INDIVIDUAL LEGS OF SEWER, RATHER THAN UPGRADING THE ENTIRE SYSTEM DOWNSTREAM.

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BOLTON NORTH HILL
TOWN OF CALEDON

Drawing

PRELIMINARY EXTERNAL SANITARY SERVICING PLAN

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
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MILTON, ON L9T 6P4
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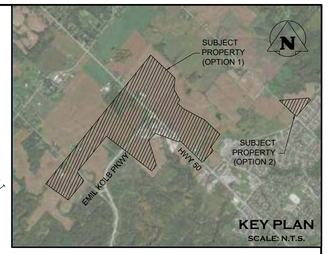
S.C.	T.G.		708–3446
Check By	Check By	Scale	Drawing
T.G.	S.C.	1:10000	C708



KEY PLAN
SCALE: N.T.S.

LEGEND

- PROPOSED SANITARY SEWER
- PROPOSED 150mmø FORCEMAIN
- PS — PROPOSED PUMP STATION
- PROPOSED SANITARY CATCHMENT
- PROPOSED LOT LINES
- PROPERTY LIMITS
- EXISTING SANITARY SEWER
- 1 / 320 / 3.8 — CATCHMENT AREA ID; AREA (ha); POPULATION

NOTE: ALL SANITARY PIPES ARE 250mmø @ 0.5% UNLESS STATED OTHERWISE

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BOLTON NORTH HILL
TOWN OF CALEDON

Drawing

PRELIMINARY INTERNAL
SANITARY DRAINAGE PLAN

CROZIER CONSULTING ENGINEERS
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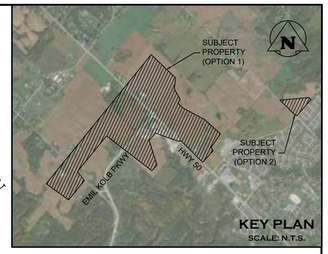
S.C.	T.G.		708–3446
Check By	Check By	Scale	Drawing
T.G.	S.C.	1:5000	C709



KEY PLAN
SCALE: N.T.S.

LEGEND

- PROPOSED SANITARY SEWER
- PROPOSED 150mmø FORCEMAIN
- PS — PROPOSED PUMP STATION
- PROPOSED SANITARY CATCHMENT
- PROPOSED LOT LINES
- PROPERTY LIMITS
- EXISTING SANITARY SEWER

NOTE: ALL SANITARY PIPES ARE 250mmø @ 0.5% UNLESS STATED OTHERWISE

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BOLTON NORTH HILL
TOWN OF CALEDON

Drawing

INTERIM INTERNAL
SANITARY SERVICING PLAN
(LANDOWNER AREAS)

CROZIER
CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON, L9T 6P4
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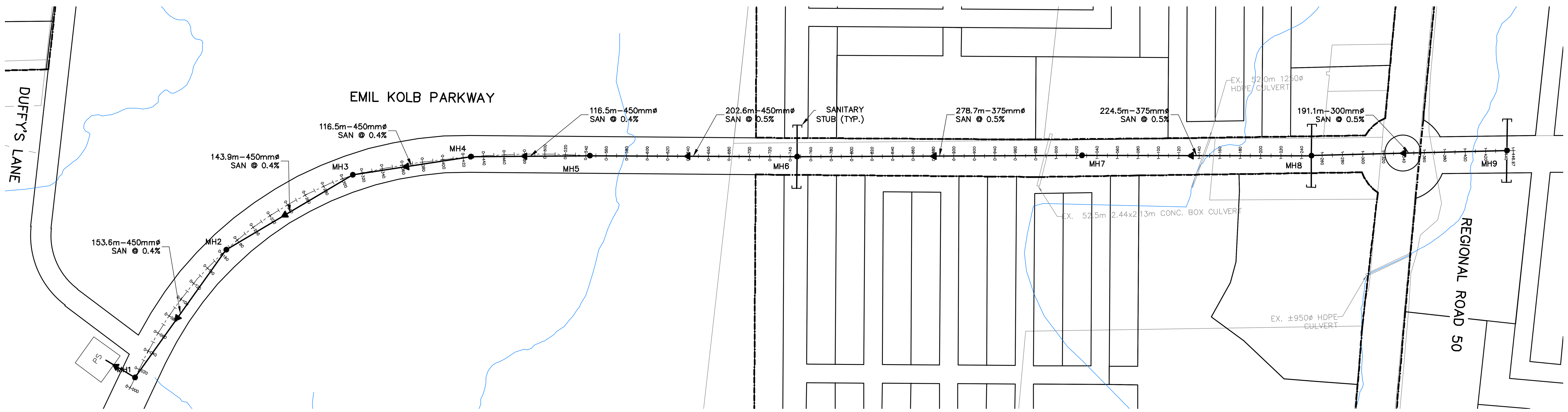
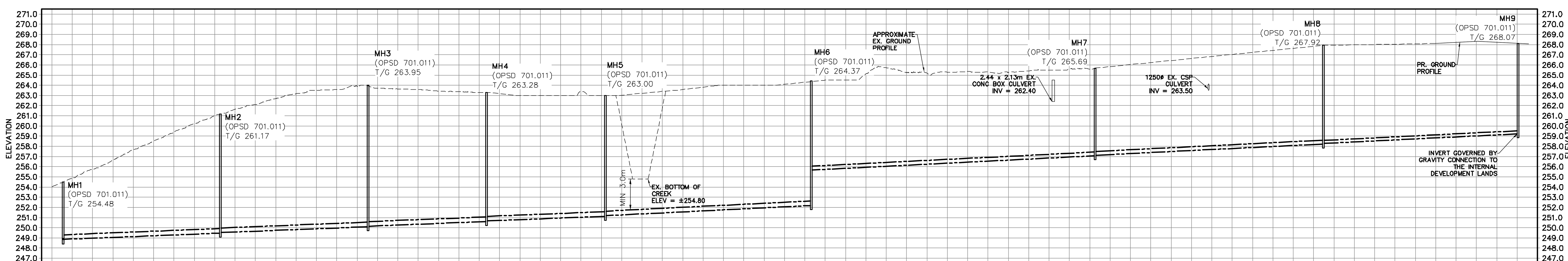
Drawn By	Design By	Project	
S.C.	T.G.		708–3446
Check By	Check By	Scale	Drawing
T.G.	S.C.	1:5000	C709B

REFER TO SANITARY DRAINAGE PLAN FOR EXTENT OF INTERNAL SANITARY PIPES CONNECTING TO EXTERNAL SANITARY TRUNK



EMIL KOLB PARKWAY

SCALE: HOR–1:2500
VERT–1:200

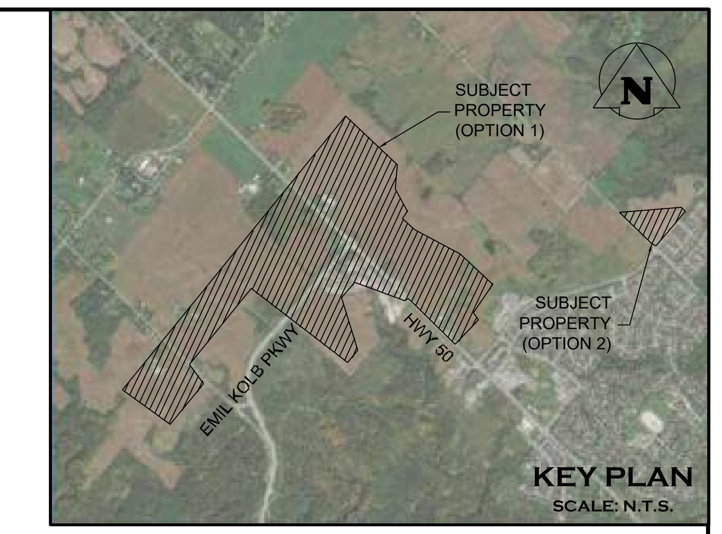


SANITARY INVERT

Manhole	Inverts	Pipe (downstream of manhole)
MH1	W 248.80, N 248.86	153.6m–450mmø PVC SAN @ 0.4%
MH2	S 249.48, N 249.52	143.9m–450mmø PVC SAN @ 0.4%
MH3	S 250.10, NE 250.15	116.5m–450mmø PVC SAN @ 0.4%
MH4	SW 250.62, NE 250.66	116.5m–450mmø PVC SAN @ 0.4%
MH5	SW 251.13, NE 251.18	202.6m–450mmø PVC SAN @ 0.5%
MH6	SW 252.19, NE 255.67	278.7m–375mmø PVC SAN @ 0.5%
MH7	SW 257.07, NE 257.12	224.5m–375mmø PVC SAN @ 0.5%
MH8	SW 258.23, NE 258.28	191.1m–300mmø PVC SAN @ 0.5%
MH9	SW 259.23	

EXISTING CENTERLINE / STATION

Station	Existing Centerline	Station	Existing Centerline
–0+010		0+740	264.30
0+000	254.02	0+760	264.50
0+020	254.89	0+780	264.50
0+040	255.76	0+800	265.13
0+060	256.64	0+820	265.73
0+080	257.66	0+840	265.26
0+100	258.52	0+860	265.19
0+120	259.38	0+880	265.29
0+140	260.21	0+900	265.35
0+160	261.02	0+920	265.31
0+180	261.64	0+940	265.26
0+200	262.09	0+960	265.41
0+220	262.69	0+980	265.50
0+240	263.16	1+000	265.57
0+260	263.51	1+020	265.59
0+280	263.58	1+040	266.38
0+300	263.88	1+060	267.12
0+320	263.72	1+080	267.51
0+340	263.64	1+100	266.85
0+360	263.58	1+120	266.85
0+380	263.44	1+140	266.50
0+400	263.37	1+160	266.50
0+420	263.28	1+180	266.70
0+440	263.19	1+200	267.50
0+460	263.00	1+220	267.26
0+480	263.00	1+240	267.83
0+500	263.00	1+260	268.68
0+520	263.36	1+280	266.63
0+540	263.01	1+300	266.50
0+560	260.81	1+320	267.50
0+580	256.93	1+340	267.90
0+600	257.69	1+360	268.16
0+620	263.58	1+380	267.00
0+640	263.82	1+400	264.12
0+660	264.00	1+420	263.96
0+680	264.00	1+440	265.26
0+700	264.00	1+460	
0+720	264.09		



LEGEND

—●—►	PROPOSED EXTERNAL SANITARY SEWER
PS	PROPOSED PUMP STATION
——	PROPOSED LOT LINES
—·—·—	PROPERTY LIMITS

EMIL KOLB SANITARY TRUNK PROPSOED TO BE INSTALLED ENTIRELY BY TRENCHLESS METHODOLOGY (MICROTUNNELLING OR APPROVED EQUIVALENT), WHICH WOULD BE REQUIRED TO PASS UNDER WATERCOURSES AND WILL MINIMIZE IMPACT TO EXISTING ROADWAY. PVC PIPES ARE PROPOSED TO LIMIT INFILTRATION

MANHOLES COINCIDE WITH ACCESS / EGRESS SHAFTS. SPACING 300m MAX

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No.	ISSUE	DATE: MM/DD/YYYY
1	ISSUED FOR FIRST SUBMISSION	12/17/2021

Engineer | Engineer

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Project
BOLTON NORTH HILL
TOWN OF CALEDON

Drawing
PRELIMINARY
EXTERNAL SANITARY
TRUNK PROFILE

CROZIER
CONSULTING ENGINEERS
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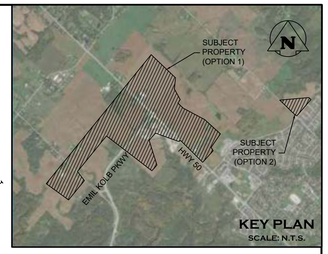
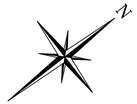
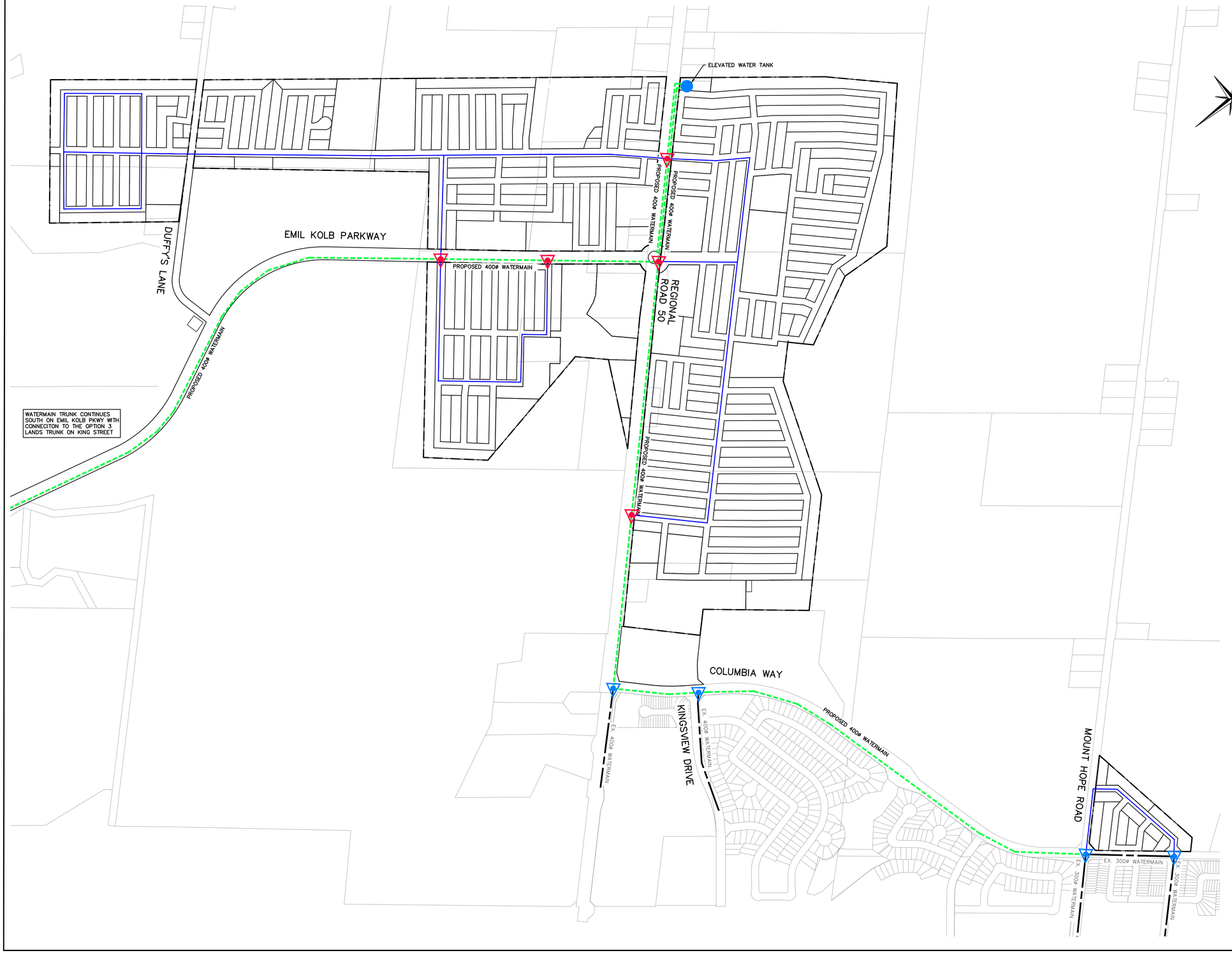
Drawn By	Design By	Project
S.C.	T.G.	708–3446
Check By T.G.	Check By S.C.	Scale AS SHOWN — Drawing C710



KEY PLAN
SCALE: N.T.S.





LEGEND

- PROPOSED SUB-TRUNK WATERMAIN
- PROPOSED 400ø WATERMAIN
- EXISTING WATERMAIN
- PROPOSED ELEVATED TANK
- PROPOSED CONNECTION TO EXISTING
- PROPOSED CONNECTION
- PROPOSED LOT LINES
- PROPERTY LIMITS

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No.	ISSUE	DATE: MM/DD/YYYY
1	ISSUED FOR FIRST SUBMISSION	12/17/2021

Engineer

Engineer

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Project

BOLTON NORTH HILL
TOWN OF CALEDON

Drawing

PRELIMINARY WATER DISTRIBUTION PLAN

CROZIER
CONSULTING ENGINEERS

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SUITE 100
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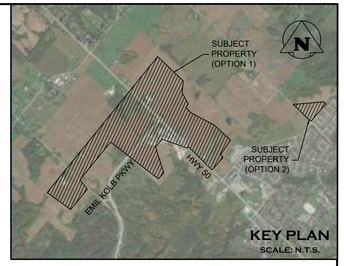
Drawn By	Design By	Project	708-3446
S.C.	T.G.		
Check By	Check By	Scale	Drawing
T.G.	S.C.	1:5000	C711



KEY PLAN
SCALE: N.T.S.

LEGEND

- PROPERTY BOUNDARY
- EXISTING REGIONAL FLOODLINE
- PROPOSED REGIONAL FLOODLINE
- EXISTING REGIONAL FLOODPLAIN – CHANNEL TO BE REALIGNED

CROSS-SECTION ID — EXISTING REGIONAL WSEL / PROPOSED REGIONAL WSEL

AN ASTERISK (*) BEFORE THE CROSS-SECTION ID INDICATES A CROSS-SECTION FROM THE ENGINEERED TRCA MODEL. THE WATER SURFACE ELEVATION IS UNCHANGING FROM EXISTING TO PROPOSED CONDITIONS.

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Engineer

Engineer

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Project

BOLTON NORTH HILL
TOWN OF CALEDON

Drawing

REGIONAL STORM
FLOODPLAIN MAPPING

CROZIER
CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
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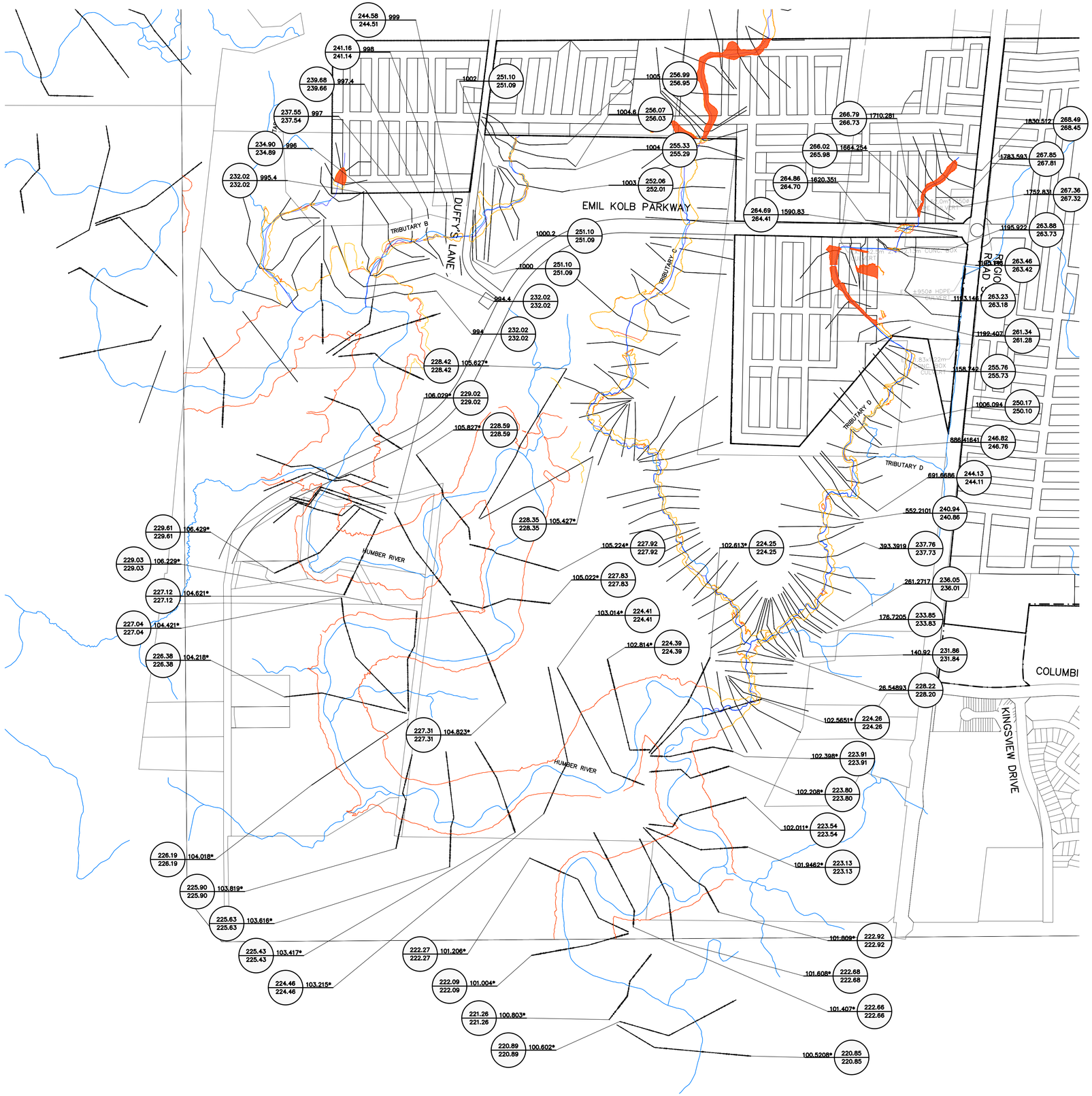
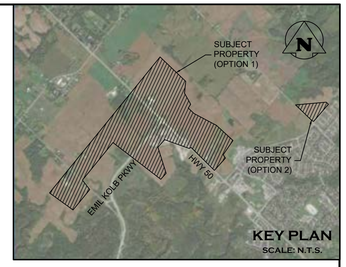
Drawn By	Design By	Project	
E.D.	T.G.		708-3446
Check By	Check By	Scale	Drawing
T.G.	S.C.	1:5000	C712A





LEGEND

- PROPERTY BOUNDARY
- EXISTING REGIONAL FLOODLINE
- PROPOSED REGIONAL FLOODLINE
- EXISTING REGIONAL FLOODPLAIN – CHANNEL TO BE REALIGNED

CROSS–SECTION ID — 1830.512 — 268.49 / 268.44 — EXISTING REGIONAL WSEL / PROPOSED REGIONAL WSEL

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Engineer

Engineer

PRELIMINARY
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Project

BOLTON NORTH HILL
TOWN OF CALEDON

Drawing

REGIONAL STORM
FLOODPLAIN MAPPING

CROZIER
CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
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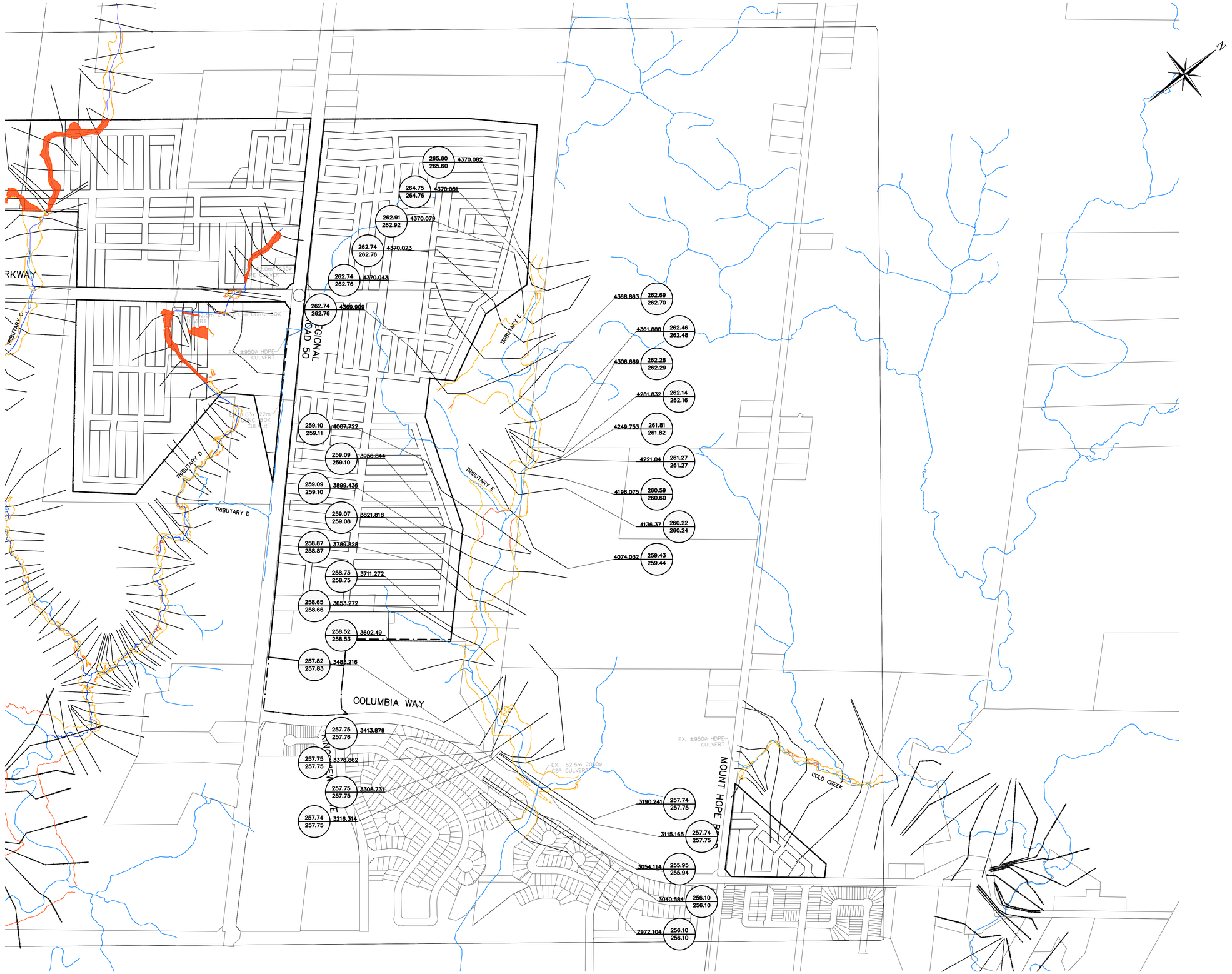
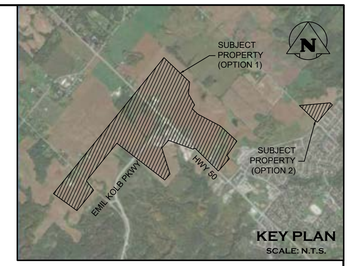
Drawn By	Design By	Project	
E.D.	T.G.		708–3446
Check By	Check By	Scale	Drawing
T.G.	S.C.	1: 5000	C712B





KEY PLAN
SCALE: N.T.S.

LEGEND

- PROPERTY BOUNDARY
- EXISTING REGIONAL FLOODLINE
- PROPOSED REGIONAL FLOODLINE
- EXISTING REGIONAL FLOODPLAIN – CHANNEL TO BE REALIGNED

CROSS–SECTION ID — EXISTING REGIONAL WSEL
1830.512 — 268.49 / 268.44
PROPOSED REGIONAL WSEL

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Engineer

Engineer

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Project

BOLTON NORTH HILL
TOWN OF CALEDON

Drawing

REGIONAL STORM
FLOODPLAIN MAPPING

CROZIER
CONSULTING ENGINEERS
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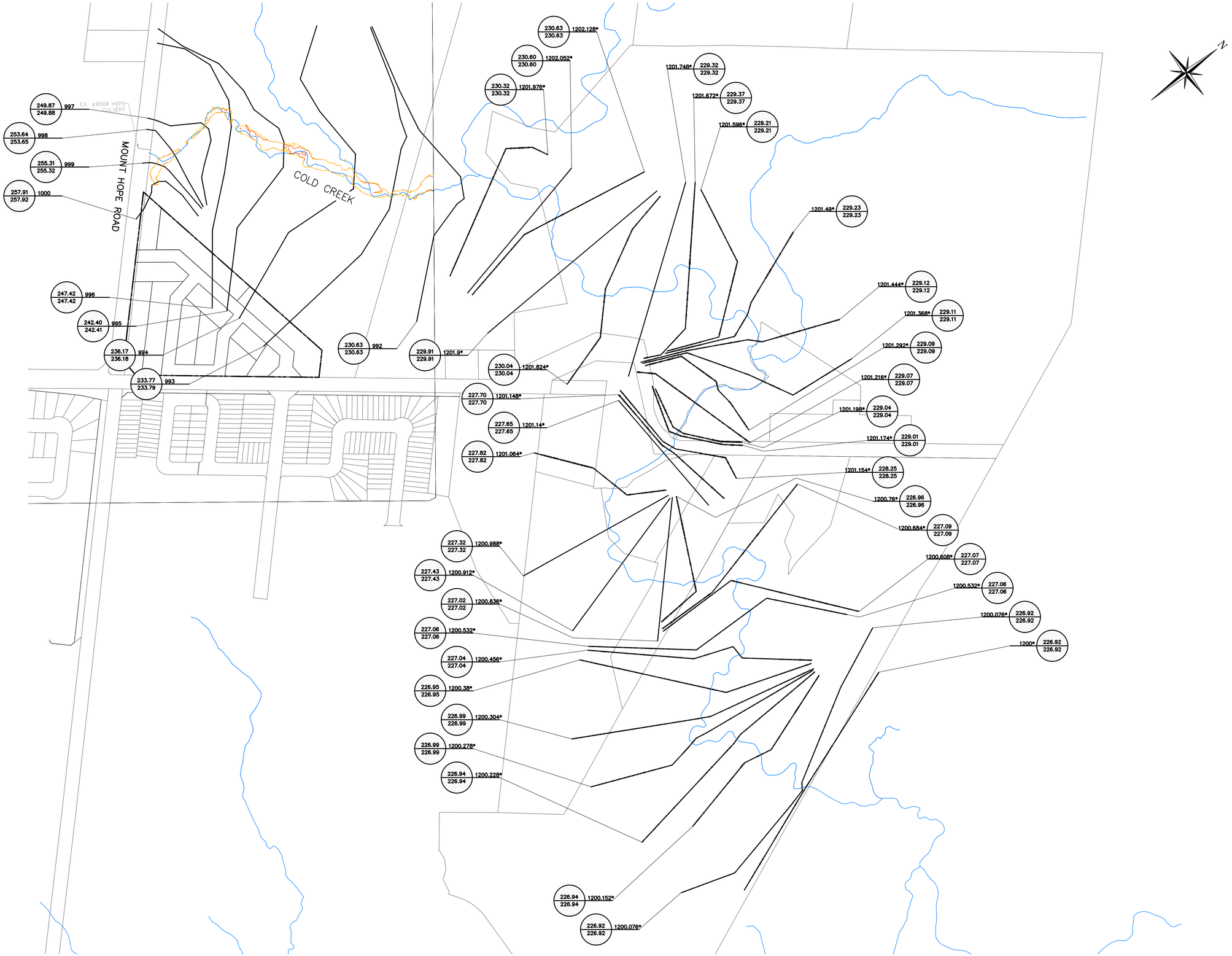
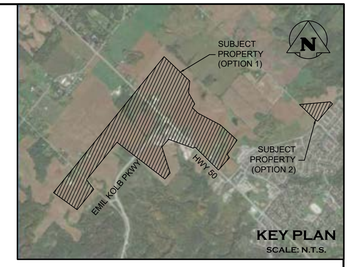
Drawn By	Design By	Project	
E.D.	T.G.		708–3446
Check By	Check By	Scale	Drawing
T.G.	S.C.	1: 5000	C712C





LEGEND

- PROPERTY BOUNDARY
- EXISTING REGIONAL FLOODLINE
- PROPOSED REGIONAL FLOODLINE
- EXISTING REGIONAL FLOODPLAIN – CHANNEL TO BE REALIGNED

CROSS–SECTION ID — EXISTING REGIONAL WSEL / PROPOSED REGIONAL WSEL

1830.512 — 268.49 / 268.48

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Engineer

Engineer

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Project

BOLTON NORTH HILL
TOWN OF CALEDON

Drawing

REGIONAL STORM
FLOODPLAIN MAPPING

CROZIER CONSULTING ENGINEERS

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Drawn By	Design By	Project
E.D.	T.G.	708–3446
Check By	Check By	Scale / Drawing
T.G.	S.C.	1:5000 / C712D