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FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

FOR

COBOURG TRAILS - PHASE 2 TRIBUTE (COBOURG) LIMITED DRAFT PLAN

SECONDARY PLAN DEVELOPMENT AREA C PART LOTS 11, 12 & 13, CONCESSIONS A & 1, TOWN OF COBOURG

PROJECT NO. 119076 **JANUARY 2022**

D. G. Biddle & Associates Limited
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e-mail: info@dgbiddle.com

January 25, 2022

Cobourg Trails
Tribute (Cobourg) Limited
1815 Ironstone Manor Unit 1
Pickering, ON L1W 3W9

Attention: Mr. J. Solly

Re: Functional Servicing and Stormwater Management Report
Cobourg Trails – Phase 2
Town of Cobourg
Our File: 119076

Dear Sir:

Please find enclosed our Functional Servicing and Stormwater Management Report prepared in support of an Application for a Draft Plan of Subdivision for Phase 2 for the noted file.

This report is intended to be reviewed by the Town of Cobourg, Lakefront Utilities and Ganaraska Region Conservation to confirm that the necessary infrastructure is available to service the subject lands. We believe that the appropriate approval authorities can issue positive comments and conditions on the Draft Plan application.

If you should require anything further, please contact our office at your convenience.

Yours truly,

D.G. BIDDLE & ASSOCIATES LIMITED

D.D. McNaull, P.Eng.
Municipal Design Engineer

M.B. Carswell, P.Eng.
Senior Project Engineer, President

DDM/ddm
Encl.
\\FSHR\Staff\Job Files\119000\119076 Villages of Central Park Ph 2 & 3\119076 Reports\119076 20220125 Functional Servicing and SWM Report.doc

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VISUAL OTTHYMO OUTPUT

1.0 INTRODUCTION

1.1 Purpose

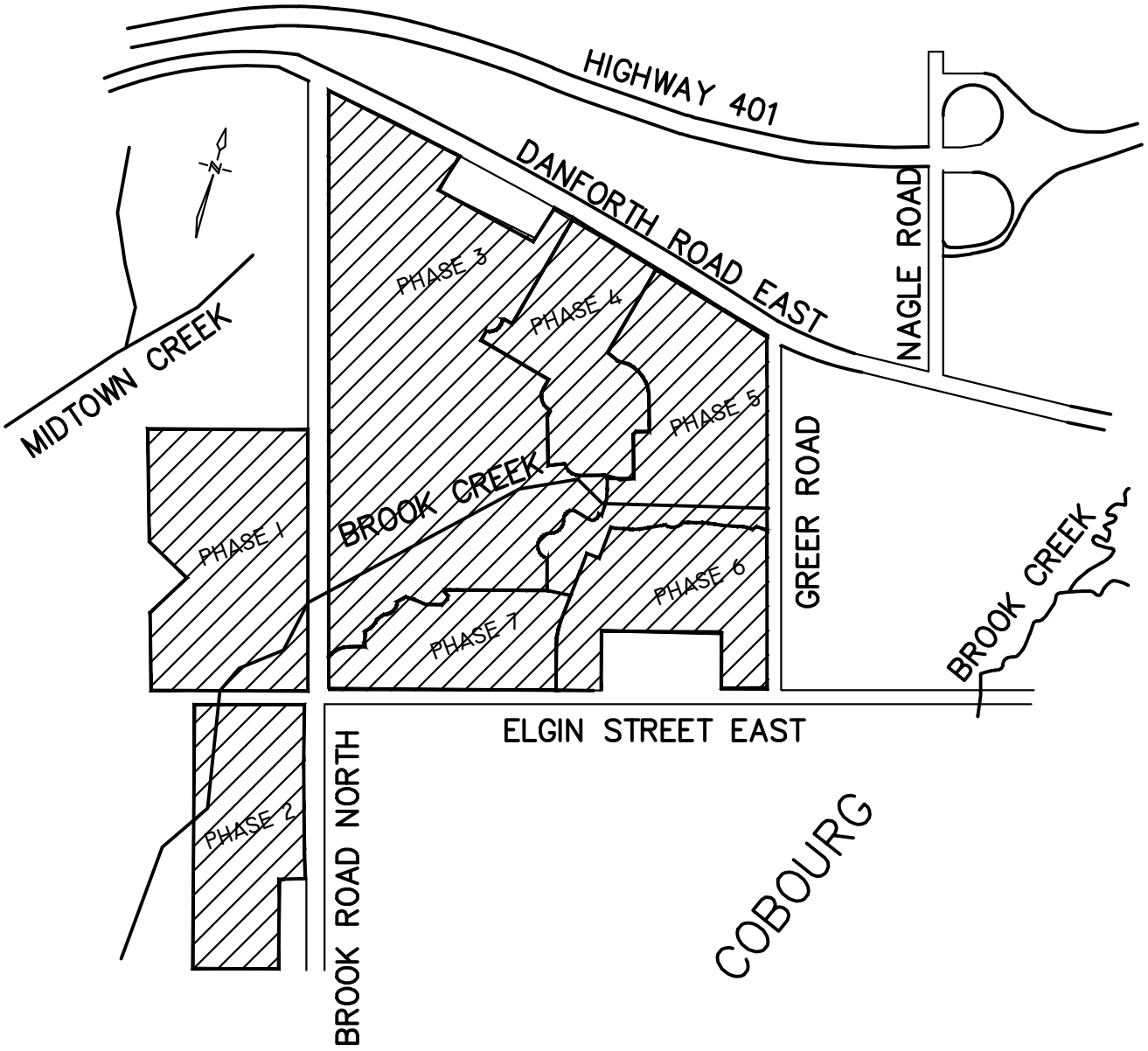
In support of the application for Phase 2 of a Draft Plan of Subdivision by Tribute (Cobourg) Limited, D.G. Biddle & Associates Limited has been retained to prepare a Functional Servicing and Stormwater Management Report for the lands subject to the application. This report is intended to address the sanitary sewers, water distribution, storm drainage and the road network in conceptual form.

This report is intended to be reviewed by the Town of Cobourg, Lakefront Utilities and Ganaraska Region Conservation Staff to confirm that the necessary infrastructure is in place, or available to service the subject lands. The report is also intended to confirm that the proposed method of servicing meets the current criteria of each approval agency. While the report includes preliminary details for the entire holdings, it is intended to focus on Phase 2 of the development located south of Elgin Street.

1.2 Site Location and Description

The entire holdings are located within Part of Lot 11, 12 and 13, Concessions A and 1. Phase 2 specifically is located on Part of Lot 13, Concession A. A Site Location Plan is attached as Figure 1 to provide context of the entire holdings noting the location of each phase. The overall plan is largely composed of residential units in various building forms. Phase 2 will consist of single family detached dwellings, street townhomes, community park, buffers and a stormwater management block. The plan has been developed in consultation with the Town of Cobourg and various consultants to produce a plan that is respectful of existing landforms, environmental features and desired land use. The preliminary Draft Plan for Phase 2 is attached as Drawing A.

Phase 2 of the plan extends along the west side of Brook Road, south of Elgin Street and is approximately 17.0ha in size. Drainage within this phase is primarily east to west to Brook Creek.



TRIBUTE (COBOURG) LIMITED

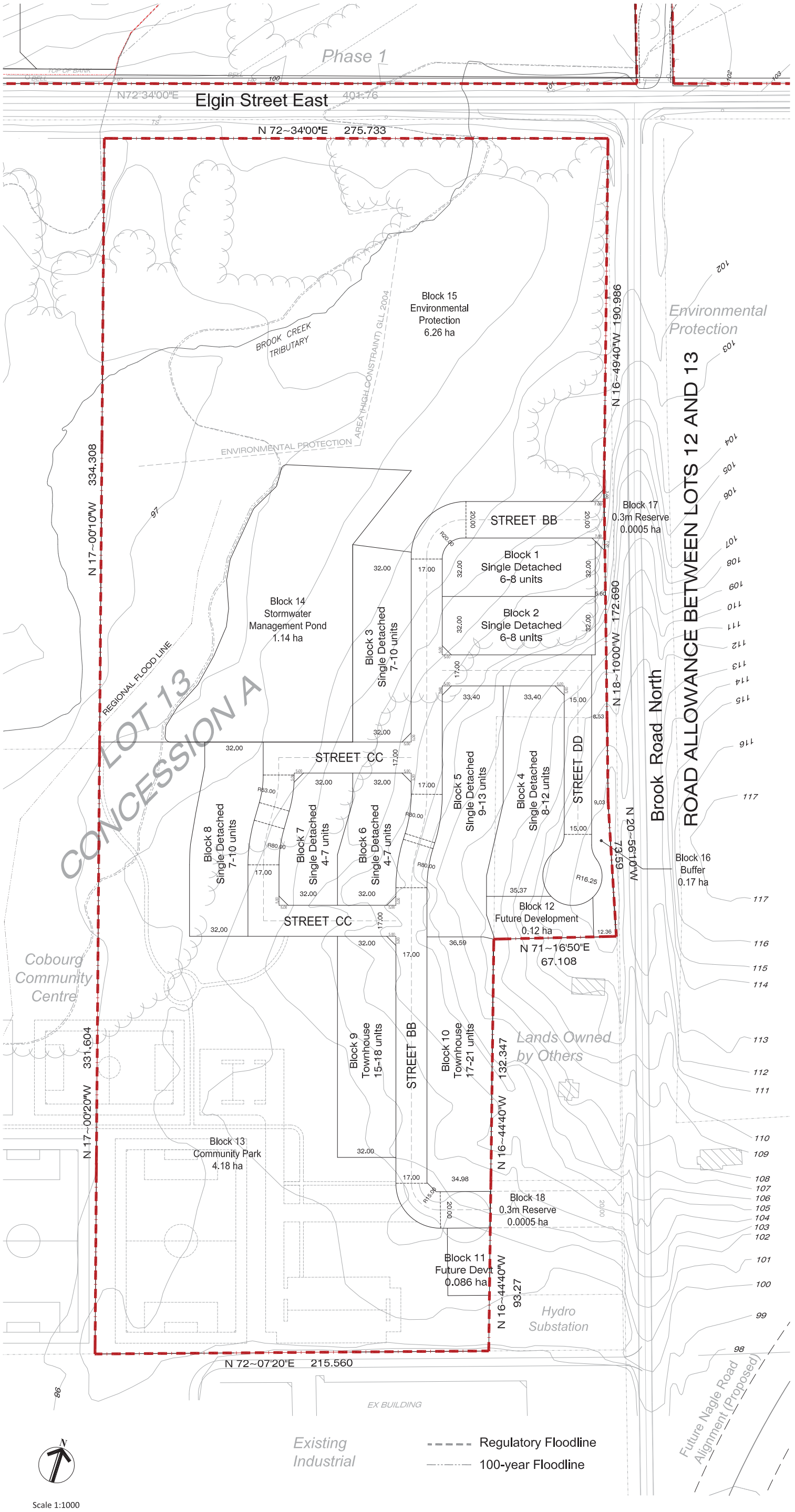
SITE LOCATION PLAN

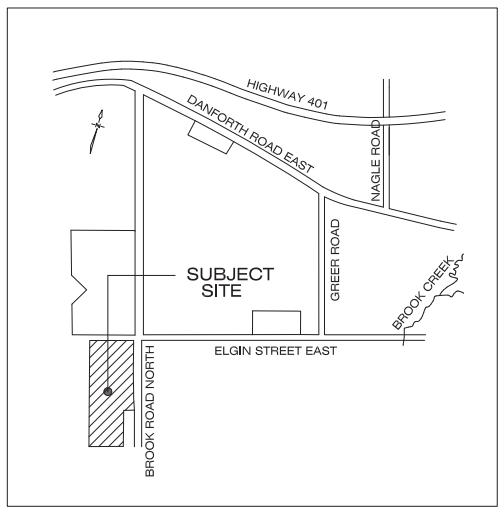
D.G. Biddle & Associates Limited
consulting engineers and planners
96 KING STREET EAST • OSHAWA,ON • L1H 1B6
PHONE (905)576-8500 • FAX (905)576-9730
info@dgbiddle.com

SCALE	N.T.S.
DRAWN	D.D.M.
DESIGN	D.D.M.
CHECKED	M.B.C.
DATE	JAN 2022

PROJECT 119076

DWG FIG 1





Key Map NTS

DRAFT PLAN OF SUBDIVISION

Section 51, Planning Act

a) As shown on the draft plan
b) As shown on the draft plan
c) As shown on the draft plan
d) As shown on the Land Use Table
e) As shown on the draft plan
f) As shown on the draft plan
g) As shown on the draft plan
h) Municipal piped water
i) Sandy Loam
j) As shown on the draft plan
k) Full Municipal services
l) As shown on the draft plan

Land Use Table	Lot/Block No.	Area (ha)
Residential		
Single Detached / Townhouse	Bocks 1-10	3.407
Future Development	Block 11-12	0.206
Community Park	Blocks 13	4.18
Stormwater Management	Blocks 14	1.14
Environmental Protection	Blocks 15	6.26
Buffer	Block 16	0.17
0.3m Reserve	Blocks 17-18	0.001
Public Right-of-Way	---	1.671
TOTAL		17.035 ha

Unit Table	No. of Units
13.72 m Single Detached 11.6 m Single Detached 9.2 m Single Detached 6.1 m Townhouse	Range of units 81-114
TOTAL	81-114 units

R.O.W.	Length (m)	Area (ha)
20.0m Local	161.27	0.32
17.0m Local	660.0	1.12
15.0m Local	144.0	0.216
Daylighting		0.015
TOTAL	965.27 metres	1.671 ha

Owners Authorization
We being the registered owners of the subject lands hereby authorize THE PLANNING PARTNERSHIP to prepare a draft plan of subdivision and to make application to the Town of Cobourg for approval thereof:

Date: _____, 2022 Signed: _____

Steve Llibfeld, Secretary
Tribute (Cobourg) Limited
1815 Ironstone Manor, Unit 1
Pickering, ON L1W 3W9

Surveyor's Certificate
I hereby certify that the boundaries of the land to be subdivided and their relationship to the adjacent lands are accurately and correctly shown on this plan.

Date: _____, 2022 Signed: _____

Merill McLean, Ontario Land Surveyor
DFP Surveyors
1101 Boundary Rd.
Oshawa, ON L1J 8P8

Revisions

Drawing No.	Date	Description
A	Jan 2022	New Draft Plan 'A' for Phase 2 Lands

Draft Plan of Subdivision
Cobourg Trails Phase 2

Part of Lot 13
Concession A
Town of Cobourg
County of Northumberland

METRIC: DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

The Planning Partnership
1255 Bay Street, Suite 500
Toronto, Ontario M5R 2A9

Job.No.	Designed:
1613-16	SLM
Date: Jan.14, 2022	Drawn: SLM
Scale: 1:1000	Checked: DHL

Drawing No. A

2.0 SANITARY SEWERAGE

2.1 Existing Sanitary Sewer Location

Sanitary sewer service is available at one location adjacent to the site. An existing 250mm connection is available approximately 200m west of the proposed subdivision on Elgin Street with an invert elevation of 97.12m ASL. Through discussions with the Town of Cobourg, this outlet has been approved temporarily for Phase 1 only. The remaining phases must discharge to the WPCP Plant #2 located at the intersection of Thompson Street and Normar Road.

2.2 Proposed Sanitary Sewer Scheme

The internal sanitary sewer has been sized in accordance with the Town of Cobourg design criteria, with consideration on minimum and maximum grades, depths and velocity. The minimum sewer diameter within all Phases of development will be 200mm, with all terminal legs having a minimum grade of 1.00%. All service laterals will be 150mm diameter at 2.00% minimum grade. The Sanitary Sewer Drainage Area Scheme and trunk sewer location and size are depicted on Drawing D-3, attached to this report. The Sanitary Sewer Design Sheet is attached in Schedule 1.

It is noted that Phase 1 has been approved by the Town of Cobourg to temporarily discharge to Elgin Street, west of the development. In order to service Phase 2 and the subsequent phases of the plan, a sanitary trunk sewer is proposed to be extended northerly from WPCP#2, which is located at the intersection of Thompson Street and Normar Road. The trunk sewer is proposed to extend north on Brook Road to the south limit of Phase 2. From this location, the sewer will traverse the west side of the development, around the drumlin on Brook Road, to ensure the sewer depths are not excessive for long term maintenance of the system. It will then connect back into Brook Road before continuing north to Elgin Street and ultimately west on Elgin Street to connect Phase 1. This overall servicing strategy was based on an extensive pre-consultation process with the Town of Cobourg to establish the preferred option.

The developer has retained the services of CIMA+ to complete the design of the sanitary trunk sewer that will service all of the Tribute (Cobourg) Limited lands as well as the remainder of Cobourg East Secondary Plan Area. Functional servicing details of this trunk sewer can be found in the Functional Servicing Report prepared by CIMA+.

Local sewers in Phase 2 will connect to the trunk sewer at Street 'CC', west of Street 'BB,' as per the Functional Servicing Plan attached as Drawing D-1. The Sanitary Sewer Design Sheet is attached at the end of this report in Schedule 1.

3.0 WATER DISTRIBUTION SYSTEM

3.1 Existing Water System Location

The proposed Plan of Subdivision is located within the Zone 2 and Zone 3 water pressure districts of the water supply system. It is noted that Phase 2 is located wholly within the Zone 2 district. The existing 400mm watermain on Elgin Street is proposed to be extended easterly to Street A within Phase 1.

3.2 Proposed Watermain System

The existing 400mm watermain on Elgin Street is proposed to be extended easterly to Brook Road and then southerly to service the Phase 2 lands. This watermain is required to loop the network back to D'Arcy Street and the future Zone 2 booster pumping station located near the intersection of Alexandria Drive and D'Arcy Street. The future Zone 2 pumping station will be required to proceed through a Schedule B Class Environmental Assessment, which LUSI is anticipated to commence in 2022.

CIMA+ has conceptually reviewed the ability to advance Phase 2 of the Cobourg Trails development ahead of the completion of the future Zone 2 booster pumping station. Based on their high-level calculations and pending LUSI approval, Phase 2 may be supported with the interconnection of the Elgin Street and D'Arcy Street watermains along Brook Road and through the Cobourg Community Centre. The external water distribution system is detailed further in the Functional Servicing Report prepared by CIMA+.

Phase 2 will connect to the proposed watermain on Brook Road and loop on Street 'BB' as illustrated on the Functional Servicing Plan, Drawing D-1. The 400mm trunk watermain on Brook Road and along the south limit of the hydro sub-station is also schematically illustrated on D-2. The detailed design for the water distribution system will include piping, valves and hydrant spacing in accordance with the Lakefront Utilities Criteria and Design Standards for Watermains.

4.0 STORMWATER MANAGEMENT

Through conversations with Conservation Authority Staff, many issues and opportunities for storm water and its management exist within the East Cobourg Secondary Planning Area. We reviewed the KMK documentation as the basis to follow for local storm water controls draining to Midtown and Brook Creek. However, through further discussion, the Conservation Authority revealed that the Midtown and Brook Creeks both have numerous downstream flood damage centres contained in the Regional storm floodline. (121 structures in Midtown Creek, 63 structures in Brook Creek). Thus, the stormwater management iniative must maintain post-development peak flows equal to or below pre-development levels.

The minor and major systems will guide post-development flows towards several storm water management ponds. This office had prepared a functional level design for each of these facilities with the overall development plan. Details for these stormwater facilities can be found in the Conceptual Servicing Report dated March 22, 2018. The stormwater management ponds have been sized to reduce the post-development peak flows to be equal to or less than pre-development levels, discharging to Midtown and Brook Creeks.

Since a Draft Plan Application is required for each Phase of the Cobourg Trails development plan, an updated Stormwater Management Report will be prepared to support each application. The overall stormwater model will be updated as each phase is developed to ensure continuity through the functional and detailed design. The stormwater component of this report has focused on Phase 2 only and the reader shall refer to the 2018 report for context of the overall development plan.

4.1 Proposed Storm Drainage Scheme

4.1.1 Minor Storm Sewer System

The storm sewer design criteria for the Town of Cobourg requires that a minor storm sewer system be constructed in new developments which provides for the conveyance of minor storm events up to the 5-year storm. The storm sewer system shall also be designed to accommodate the house foundation drains such that the hydraulic grade line (HGL) does not rise closer than 0.3m below the underside of the basement floor during a 25-year storm. Given the above, the attached Functional Storm Sewer Servicing Plan, Drawing D-1, provides a conceptual design for the minor storm sewer system for Phase 2 of this development. This plan indicates the conceptual location of manholes, pipe sizes, and pipe grades.

The storm drainage system will convey minor flows to Stormwater Facility 'E' located within Block 14 on the west side of the plan. Minor system flows will be conveyed to the north end of the facility to extend the distance between the inlet and outlets. The storm sewer will discharge to a sediment forebay which will be lined with cable concrete to facilitate cleaning.

4.1.2 Major Storm Drainage System

In addition to providing a minor storm sewer system to convey frequent storm sewer events, the Town of Cobourg Design Criteria requires that overland flows from major storm events, including the 100-year storm, be contained within the road right-of-way or conveyance routes. Consequently, road grades and lot grades are designed to positively convey the major storm system to an acceptable outfall.

The road grades have been set to drain through the subdivision lands to the low point on Street 'CC' adjacent to the stormwater facility. Overland flows are proposed to discharge to the main cell of the facility to reduce resuspension of sediment collected in the forebay.

5.0 PERMANENT STORMWATER QUALITY CONTROLS

As previously mentioned, a Stormwater Management Pond is proposed to provide quality, erosion and quantity controls at the end of the proposed storm sewer system as required by Ganaraska Region Conservation Authority's Technical and Engineering Guidelines for Stormwater Management Submissions.

Enhanced detention wet ponds have been selected as the end of pipe facility to provide water quality control for the development. Engineering drawings illustrating the details of the Stormwater Management Facility 'E' will be provided at detailed engineering stage.

The minor storm sewer drainage area tributary to the pond is 7.084ha, including the pond block. This tributary mainly consists of low density and medium density residential lots and open space. According to the GRCA guidelines, low and medium density residential lots should have an impervious level of 60% and 75% respectively. An average imperviousness of 70%, including the pond block, was used in sizing the facility. Quality control volume requirements for Level 1 Enhanced fisheries protection were extracted from the Stormwater Management Practices Planning and Design Manual (MOEE, March 2003). Given the above information, the permanent and active (fluctuating) water quality storage requirements are tabulated below:

TABLE 1 – PERMANENT POOL STORAGE VOLUME REQUIREMENTS

IMPERVIOUS LEVEL (%)	PERMANENT STORAGE VOLUME REQUIRED (m^3/ha)	FLUCTUATING STORAGE VOLUME REQUIRED (m^3/ha)	TOTAL DRAINAGE AREA (ha)	PERMANENT VOLUME REQUIRED (m^3)	FLUCTUATING VOLUME REQUIRED (m^3)
70 (Site Area)	185	40	5.95	1100.2	238
70 (Pond)	185	40	1.14	210.3	45
				1311	283

In addition to the above requirements for quality controls, additional fluctuating volume is recommended within the stormwater facilities to minimize further erosion in the Brook Creek. The active (fluctuating) storage volume has been extended to include the runoff generated by a 25mm storm event. This volume will be detained for a minimum duration of 24 hours. The required volumes for erosion control are as follows:

TABLE 2 – PERMANENT POOL STORAGE VOLUME REQUIREMENTS

IMPERVIOUS LEVEL (%)	TOTAL RAINFALL (mm)	RUN-OFF DEPTH (mm)	TOTAL DRAINAGE AREA (ha)	VOLUME REQUIRED (m^3)
70	25	19.13	5.95	1138
70	25	19.13	1.14	218
			7.08	1355

The Visual Otthymo Summary Files for determining the erosion control volume are attached in Schedule 3 of this report.

5.1 Extended Detention Wet Pond Design Characteristics

The proposed design for the wet pond, shown on Figure 4, has the following characteristics:

- 7:1 side slopes above active (fluctuating) water surface elevation;
- 4:1 side slopes below permanent pool water surface elevation;
- 6:1 bench at permanent pool water surface elevation;
- 3:1 side slopes above the 100-year water surface elevation;
- 98.00m permanent pool elevation;
- 1.00m permanent pool depth;
- 1,749m^3 permanent volume provided;
- 0.50m water surface fluctuation;
- 98.50m maximum water quality fluctuating elevation;
- 1,415m^3 water quality fluctuating volume provided;
- sediment forebay at inlet location;
- detention time between 24-48 hours;
- 3.0m maintenance access;
- 99.50m maximum 100-year water surface elevation;
- 5,815m^3 maximum fluctuating volume provided;

The pond discharges to Brook Creek tributary via a proposed 375mm storm sewer outfall and outfall channel. Given the above characteristics, the proposed stormwater management pond will provide the permanent and fluctuating volumes required to obtain Level 1 fisheries habitat protection in addition to minimizing downstream erosion.

5.2 Sediment Forebay

One storm sewer outfall is proposed for the stormwater management facility. The sediment forebay is proposed with a hard bottom surface consisting of cable concrete blocks to facilitate maintenance. The forebay will be separated from the rest of the pond by a submerged earth berm which is set at the permanent water surface level. A 300mm flow through culvert has also been proposed as per GRCA guidelines. In addition to the above, the sediment forebay has been designed with the following characteristics:

- the forebay will be designed to settle out 150 µm particles;
- the forebay will not exceed 1/3 of the pond surface area;
- the forebay length will be such that the dispersion velocity will be 0.5m/s at the forebay berm;

5.3 Mitigating Thermal Impacts

In accordance with Section 4.4 of the MOE Stormwater Management Planning and Design Manual, the following mitigation measures were reviewed with the design to minimize increased temperature of the stormwater effluent.

5.3.1 Pond Configuration

The proposed pond has been configured with a length to width ratio of approximately 3:1 to prevent the occurrence of large open areas of water which cannot be shaded with the planting strategy. In addition, the location of the pond outlet is proposed at the opposite end of the facility from the inlet to ensure conveyance of stormwater through the facility and minimize the occurrence of ‘dead-zones’.

5.3.2 Riparian Planting Strategy

The purpose of providing planting for a wet pond facility is to provide shading, aesthetics, safety and enhanced pollutant removal. In wet ponds there are varying zones for plantings based on water depths and the expected frequency of wetting.

5.3.3 Bottom Draw Outlet

The design proposed for the water quality pond discharge structure for the stormwater management pond will be a combination of a reverse slope outlet pipe and an internal perforated riser with a control discharge orifice plate. The reverse slope pipe allows flows to discharge the pond from the lower permanent pool, while the perforated riser with a 100mm control discharge orifice plate provides the minimum 24 hour drawdown time to allow sediment removal. Calculations for the water quality discharge structure orifice sizing can be found in Schedule 3. The discharge structure is proposed with a 300mm gate valve to assist in pond draw down for maintenance of the facility.

5.3.4 Night-time Release

The outlet of the facility has been designed to operate hydraulically, to minimize monitoring and maintenance requirements. Therefore, the implementation of electrical and mechanical devices to provide real time outlet controls is not recommended.

5.4 Monitoring and Maintenance

In order to ensure that the stormwater management pond will function and operate as intended, a monitoring and maintenance plan must be developed. The following monitoring and inspection program is recommended for the wet pond facility. The monitoring program described below is recommended for the Town of Cobourg Maintenance Staff once the facilities have been assumed by the Town.

- Monitoring and inspection after every significant rainfall event during the first two years of operation (approximately 4 inspections per year). Annual inspections after the initial two years.

- The monitoring and inspections should include observations of the hydraulic operation (draw down time, inlet and outlet function); condition of vegetation in of the pond (wet and dry); evidence of grease/oil contamination; trash build-up.

The following maintenance program is recommended for the wet pond facility:

- Grass cutting and weed control is not recommended.
- Once the upland plantings are stabilized there will be little need of maintenance in this area. Shoreline plantings and aquatic plantings may require re-establishment every 2-5 years as observation dictates.
- Sediment removal frequency is dependent on a number of factors from upstream land use and development activities to municipal street sanding practices. We have recommended an annual measurement of sediment depth accumulation and removal frequency should be based on this observation with a suggested removal frequency of every 10 years.
- Inlet and outlet structures should be maintained to clear blockage as required by observation. Maintenance replacement of these structures is based on life span of the materials.
- Trash removal is recommended on a yearly basis or as observation requires based on surrounding airborne trash accumulation.

Monitoring and maintenance of the facility prior to being assumed by the Town is the responsibility of the Developer. The same schedule described above is recommended.

5.5 Water Quality During Construction

During the construction period, the removal of the natural vegetation could cause the transport of large amounts of sediment from the site during rainfall events. Therefore, measures to prevent this sediment removal from the site must be implemented. As a minimum, the following sediment and erosion control techniques will be implemented for this development:

1) Perimeter Enviro / Snow Fence with perimeter swales

2) Controlled Construction Vehicle Access Route
3) Restricted Catch Basin Inlets
4) Temporary Sediment Control Ponds
5) Rock Check Dams
6) Good Housekeeping Practices

A perimeter enviro-fence and interceptor swale shall be installed along the property limits with a snow fence being installed to add additional support. Perimeter enviro fencing will be installed along the edge of the tree line and forest edge prior to any activities on-site to prevent encroachment during construction.

A “mud mat” will be installed, at all construction entry points, to control mud and sediment removal at the site entrance during construction. This mud mat is to be installed prior to rough grading the site and is to be left in place until the road is being prepared for asphalt. In order to provide a control of sediment during construction, it is recommended that when construction phasing is better known the plan will need to be evaluated for the need of temporary erosion control.

During detail design, the outlet design and pond placement will be further clarified. In accordance with the *Storm Water Management Planning and Design Manual (MOEE, 2003)* temporary sediment ponds are to be sized to provide a volume equal to 125m^3/ha. Cleaning of accumulated sediment during construction will be necessary.

The proposed storm water detention facilities may be considered for dual purpose temporary sediment ponds, as well as the permanent quality and quantity control facility. Should the storm water pond blocks be used as temporary sediment pond, any accumulated sediment shall be removed, as the permanent facility evolves as the tributary areas are stabilized with final construction and landscaping.

Upon completion of the minor storm sewer system, catch basin filters should be provided to restrict the amount of sediment entering the storm sewer system and

discharging into Brook Creek.

The use of good housekeeping practices should be employed during construction. These measures should include, but not be limited to inspection and maintenance of the temporary sediment ponds, as well as, the storage and stockpiling of topsoil and contractor materials and equipment within the perimeter enviro fence.

Through the implementation of the above temporary sediment control measures, the sediment laden storm water leaving the site will be reduced significantly.

6.0 STORMWATER QUANTITY CONTROLS

6.1 Storm Water Ponds - Quantity Control

Ultimate storm drainage for the development area will be collected at several storm water ponds and will control post development flow releases to Brook Creek. Pre-development and post-development flows were calculated for the drainage area to the tributaries of Brook Creek using the VISUAL OTTHYMO program. Upon urbanization, roads will be drained via catch basins and storm sewer network that will discharge to the stormwater facility for quality treatment.

The storm water ponds throughout the plan have been sized to control all post-development discharges for the subdivision lands to be equal to or below the pre-development levels.

6.1.1 Pre-Development Conditions

As noted in Section 4.0, the hydrology model has been prepared for the entire Cobourg Trails development, and update for Phase 2. As illustrated on Figure 2, Pre-Development Drainage Scheme, the pre-development drainage area tributary to the Brook Creek watershed is 106.0ha. The pre-development drainage area to Midtown Creek is not relevant to Phase 2 and therefore not reported. Using the computer program Visual Otthymo 3.0, pre-development flows were computed using a 24-hour Chicago distribution rainfall event for the 2 to 100-year events. Tabulated below, in Table 3 & 4, are the anticipated pre-development peak flows to Brook Creek and Midtown Creek. Pre-development peak flows for Brook Creek were calculated at two points along the creek system, at the Elgin Street culvert crossing and south of Elgin Street.

LEGEND

- REGULATORY FLOOD LINE
- 100–YR FLOOD LINE
- DRAINAGE BOUNDARY
- PROPERTY BOUNDARY
- 24.58 (COEF | ID# | CN) DRAINAGE AREA
- OVERLAND FLOW DIRECTION
- (A) (B) HYDROLOGIC REFERENCE POINTS

BENCHMARK

ELEV. 105.214m

68–69: CONCRETE BRIDGE CARRYING HWY 45 OVER HWY 401 AT INTERCHANGE 83 AT COBOURG, 1.3Km EAST OF ONTARIO ST AND 0.8Km EAST OF COBOURG CREEK. TABLET IS SET HORIZONTALLY IN N.E. FACE OF MOST WESTERLY CONCRETE PILLAR AT SOUTH END OF BRIDGE, 61cm ABOVE G ROUND LEVEL AND 21.3m SOUTH OF CENTRELINE OF HWY 401.

DANFORTH ROAD EAST

MIDTOWN CREEK

DRAINAGE AREA FLOWING TO MIDTOWN CREEK (POST–DEV. BOUNDARIES ON WESTERN SIDE)

6.69 (– | 48 | 65)

25.82 (– | 82 | 65)

8.69 (– | 49 | 65)

12.70 (– | 84 | 65)

16.55 (– | 88, 62 | 65)

17.89 (– | 86 | 65)

BROOK CREEK

REGULATORY FLOODLINE

100–YR FLOODLINE

CULVERT CROSSING

ELGIN STREET EAST

GREER ROAD

9.67 (– | 92, 64 | 65)

14.48 (– | 90, 65 | 65)

4.57 (– | 93 | 65)

BROOK ROAD NORTH

CULVERT CROSSING

DRAINAGE AREA EAST OF GREER ROAD

12.25 (– | 80, 63 | 65)

NOTE: THIS PLAN IS FOR STORM DRAINAGE AREAS ONLY

TOPOGRAPHIC INFORMATION OBTAINED FROM FIELD SURVEY CONDUCTED BY D.G. BIDDLE & ASSOCIATES

TRIBUTE (COBOURG) LIMITED

PRE–DEVELOPMENT DRAINAGE SCHEME

D.G. Biddle & Associates Limited
consulting engineers and planners
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SCALE	1:5000
DRAWN	D.D.M.
DESIGN	D.D.M.
CHECKED	M.B.C.
DATE	1/25/22

PROJECT 119076

DWG FIG 2

\\FSHR\STAFF\JOB FILES\119000\119076 VILLAGES OF CENTRAL PARK PH 2 & 3\119076 DRAWINGS\119076 DRAWINGS CIVIL\119076 FIGURES\119076 – FIGURE 1 AND 2.DWG

TABLE 3 – PRE-DEVELOPMENT PEAK FLOWS – BROOK CREEK

RETURN PERIOD years	24hr CHICAGO PRE-DEVLOPMENT PEAK FLOW (m^3/s)	
	POINT A (ELGIN CROSSING)	POINT B (SOUTH OF ELGIN)
2	0.534	0.702
5	1.037	1.365
10	1.368	1.797
25	2.484	3.259
50	3.321	4.382
100	4.420	5.746

The subject property consists of a fine to medium sandy loam with poor to good soil moisture according to the Hydrogeological Assessment prepared by GOFFCO Limited (July 2006). Based on Design Chart 1.09 from the MTO Drainage Manual a CN value of 65 was used to simulate pre development conditions.

6.1.2 Post Development Conditions

We have reviewed the post-development watershed using the STANDHYD sub-routines of the computer modelling software Visual Otthymo 3.0. For a direct comparison with pre-development, the post development watershed for the subdivision has been modelled using a 24-hour Chicago distribution rainfall event for the 2, 5, 10, 25, 50 and 100 year events. A total impervious ratio of 65% was used along with a total directly connected ratio of 55%. As with pre-development, the 24-hour Chicago storm generated the greatest post-development runoff peak flows and volumes. The stormwater model has been updated based on the current Draft Plan for phase 2, as well as the detailed design of the facility approved with Phase 1.

The quantity control storage for Pond ‘E’ is achieved through the excavation and berming of the facility, providing 300mm freeboard above the maximum 100 year

water surface elevation. The ROUTE RESERVOIR sub-routine was used to simulate the performance of the facility. A comparison of the post and routed post development peak flows is tabulated below in Table 3 for the 24-hour Chicago design storm. Standard values were used in the model as outlined in the "Technical and Engineering Guidelines for Stormwater Management for Submissions" prepared by GRCA (December 2014). Appendix C of the Guideline is attached at the end of the report in Appendix 3. The Visual Otthymo output files are also attached at the end of this report. The post development drainage scheme is illustrated on Figure 3.

TABLE 4 – PRE-DEVELOPMENT vs POST DEVELOPMENT PEAK FLOWS

RETURN PERIOD years	PRE-DEVELOPMENT FLOW @ POINT A (m^3/s)	PRE-DEVELOPMENT FLOW @ POINT B (m^3/s)	ROUTED POST-DEVELOPMENT FLOW @ POINT A (m^3/s)	ROUTED POST-DEVELOPMENT FLOW @ POINT B (m^3/s)
2	0.534	0.702	0.503	0.549
5	1.037	1.365	1.003	1.213
10	1.368	1.797	1.378	1.621
25	2.484	3.259	2.314	2.712
50	3.321	4.382	2.761	3.322
100	4.420	5.746	4.024	4.345

*Controlled Post Development Flows *includes* the uncontrolled discharge (node 32 & 54)

As reported above, all post development flows up to and including the 100-year return frequency, will be attenuated to their respective pre-development levels for Brook Creek. Therefore, no adverse impact to the downstream drainage system is anticipated. Functional level details of stormwater facility 'E' which services Phase 2 is attached as Figure 4.

LEGEND

DRAINAGE BOUNDARY

24.58 (%IMP | ID# | CN) DRAINAGE AREA

(A) (B) HYDROLOGIC REFERENCE POINTS

OVERLAND FLOW

0.747 (0.70 | 52 | 85.0)

POND F A=0.747ha

DANFORTH ROAD EAST

4.910 (0.65 | 51 | 85.0)

20.286 (0.65 | 2 | 85.0)

MIDTOWN CREEK

POND A A=2.63ha

2.631 (0.70 | 3 | 85.0)

1.761 (0.25 | 106 | 65)

5.369 (0.65 | 4, 13 | 85.0)

GREER ROAD

3.149 (– | 107 | 65)

16.528 (– | 62 | 65.0)

NEIGHBOURHOOD PARK

1.330 (– | 71 | 65.0)

1.079 (0.65 | 61 | 85.0)

0.970 (0.80 | 68 | 85.0)

DENTON DRIVE

8.846 (0.65 | 22 | 85.0)

SCHOOL BLOCK

POND B A=1.071ha

1.410 (0.80 | 70 | 85.0)

BROOK CREEK

1.071 (0.70 | 12 | 85.0)

POND C

MIXED USE A = 6.63ha

10.262 (0.65 | 11 | 85.0)

POND D A=0.877ha

1.071 (– | 59 | –)

6.63 (0.70 | 35 | 85.0)

0.877 (0.70 | 60 | 85.0)

(A)

ELGIN STREET

0.580 (0.65 | 29 | 85.0)

10.52 (– | 64 | 65.0)

14.48 (– | 65 | 65.0)

BROOK ROAD

POND E A = 1.137

(B)

5.947 (0.70 | 27 | 85.0)

1.137 (0.70 | 28 | 85.0)

GREER ROAD

12.25 (– | 63 | 65.0)

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POST–DEVELOPMENT DRAINAGE SCHEME

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SCALE	1:5000
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DESIGN	D.D.M.
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DATE	1/25/22

PROJECT 119076

DWG FIG 3

\\FSHR\STAFF\JOB FILES\119000\119076 VILLAGES OF CENTRAL PARK PH 2 & 3\119076 DRAWINGS\119076 DRAWINGS CIVIL\119076 FIGURES\119076 – FIGURE 3 POST–DEVELOPMENT DRAINAGE SCHEME.DWG

NOTE: SEDIMENT DRYING AREAS SHALL HAVE 2–5% CROSSFALL

N

98.07
97.92
97.82
97.66
97.61
97.84
97.96
97.97

SEDIMENT DRYING AREA

3.0m MAIN. ACCESS

FOREBAY INV 97.00

99.50
99.80
101.23
98.00
99.80
98.00

PERMANENT POOL 98.00
MAX WSE 99.50
6.0m BUFFER

FLOW SPREADER

PROP STM SEWER

HEADWALL INV 97.90

POND INV 97.00

EMERGENCY OVERFLOW

4:1 SLOPE
6:1 SLOPE
7:1 SLOPE

100.65

101.90

OVERLAND FLOW LOCATION

LPT 101.75

STREET BB

STREET CC

STREET DD

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STORMWATER MANAGEMENT FACILITY 'E'

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SCALE	1:750
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DATE	1/25/22
PROJECT	114057
DWG	FIG 4

\\FSHR\STAFF\JOB FILES\114000\114057 RONDEAU COBOURG\114057 DRAWINGS CIVIL\114057 CONCEPTUAL DEVELOPMENT AND PRELIMINARY ENGINEERING\114057–POND PLANS.DWG

6.2 Time of Concentration Calculation

The time of concentration for the pre-development has been determined based on cumulative travel time through the watershed. Two hydraulic points of analysis have been chosen to compare pre-development and post-development flows, as mentioned above. The time of concentration calculations associated with the pre-development flows are provided in Appendix 2.

7.0 LOT LEVEL CONTROLS AND LOW IMPACT DEVELOPMENT

Lot level controls include those that are applied to individual lots or blocks within the plan. To promote infiltration on the individual residential building lots, roof water leaders will be discharged to grade and lots will be dressed with 300mm of topsoil. Discharging roof water leaders to grade will lengthen the time available for run off to infiltrate into the topsoil or an LID before entering the storm sewer.

PGL Environmental has been retained to complete a water balance for the proposed draft plan. Low Impact Development techniques will be implemented to maximize infiltration and provide a best efforts approach to maintain pre-development infiltration levels. Potential areas for low impact development techniques have been identified on Figure 5 with a typical bioretention swale detail on Figure 6. These details will be fine tuned at the detailed engineering stage.

POND F
A=0.747ha

BROOK CREEK

ELGIN STREET

BROOK ROAD

POND E

LEGEND

BIO RETENTION SWALE

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POTENTIAL LOW IMPACT DEVELOPMENT SCHEME FOR PHASE 2

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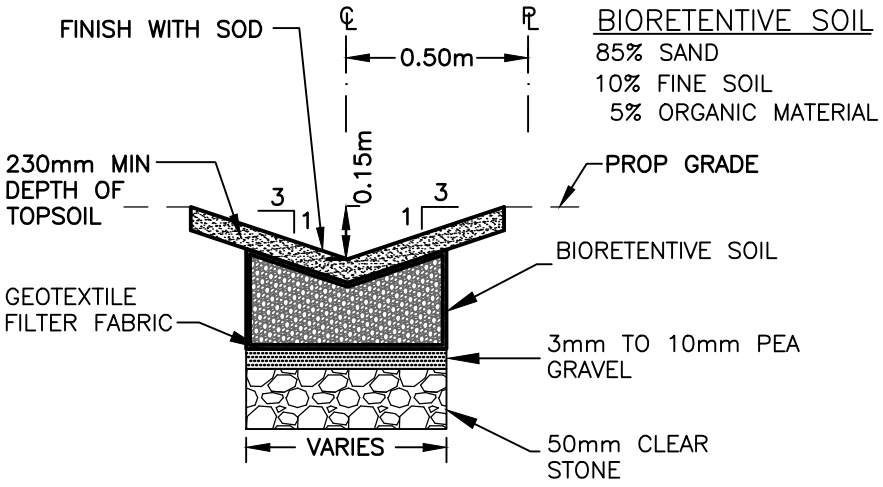
DATE	1/25/22

PROJECT 119076

DWG FIG 5

\\FSHR\STAFF\JOB FILES\119000\119076 VILLAGES OF CENTRAL PARK PH 2 & 3\119076 DRAWINGS\119076 DRAWINGS CIVIL\119076 FIGURES\119076 – FIGURE 5-6 LID.DWG



NOTE:

BIOSWALES SHOULD BE SET BACK AT LEAST 4m FROM BUILDING FOUNDATION. IF NOT, IMPERMEABLE LINER TO BE USED.

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TYPICAL BIO RETENTION SWALE DETAIL

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DRAWN	D.D.M.
DESIGN	D.D.M.
CHECKED	M.B.C.
DATE	JAN 2022

PROJECT 119076

DWG FIG 6

8.0 ROAD NETWORK AND SITE GRADING

The proposed draft plan includes for a right-of-way width of 17.0m for all internal roads. The right-of-way width on Street 'BB' will increase to 20.0m where it connects to Brook Road to accommodate left and right turning lanes. Ultimately two access points will be provided, one at the north end and one at the south. Due to grading constraints between the development and adjacent private properties, Street 'DD' is proposed to terminate as a cul-de-sac.

It is noted that Brook Road North has a significant crest between the two access points. R.J. Burnside has been retained by the developer to review the impact of this crest as it relates to traffic sight lines. The R.J. Burnside report concluded that based on the proposed design speed of 80 km/h, there is a stopping sight distance deficiency along Brook Road for the existing condition. This deficiency exists independent of any development proposal and rectification to address this deficiency requires a profile adjustment to Brook Road. As such, they have recommended the profile be reduced by approximately 1.0m. With the lower profile for Brook Road, the Burnside report concluded that both access points could be supported.

We have prepared the lot grading plans based on both the existing and future profiles for Brook Road North. Since the timing of the profile adjustment to Brook Road is unknown, we have provided adequate separation in the buffer strip to accommodate the transition in grading for both conditions. Moreover, if the development proceeds before the profile adjustments along Brook Road, some lots fronting the west-east section of Street 'BB,' along the north entrance will be required to be temporarily placed on hold.

It is noted that there is a significant elevation difference between the crest of Brook Road North and the Brook Creek Valley. A significant cut/fill plan is proposed to tier the streets from east to west. A buffer strip is proposed adjacent to Brook Road North to accommodate grading as mentioned above. In preparing the preliminary grading

plans, we have assumed a 300mm deep ditch on the west side of Brook Road North to contain the drainage from the County Road, with a 2.5:1 slope to Street ‘DD’ in the interim condition. When the road profile is lowered, the transition slope between Brook Road and Street ‘DD’ can be reduced to 3:1.

The Phase 2 development will require movement of fill from Phase 1 to accommodate the proposed grading. Phase 1 does have adequate surplus material that will need to be trucked to Phase 2. Permission for rough grading Phase 2 has been provided by the Municipality in accordance with the Site Alteration Agreement dated June 9, 2021. A preliminary lot grading plan is attached as drawings, LG-1 and LG-2.

9.0 CONCLUSIONS

1. This Functional Servicing and Stormwater Management Report is intended to address, in functional form, issues relating to sanitary sewerage, water distribution, storm drainage, and road network. The report is intended to confirm the necessary infrastructure is in place, or available to service the subject lands and that the proposed method of servicing meets with current criteria or goal of each approval agency. This report provides some information for the entire Cobourg Trails development, but focuses on the Phase 2 lands.

2. The existing 250mm sanitary sewer on Elgin Street will be extended easterly to the intersection of Street A to temporarily service Phase 1 of the development. Subsequent phases of the plan will be serviced when the sanitary trunk sewer from WPCP#2 is extended north on Brook Road to service Phase 2 of the development (Bell Property). CIMA+ has prepared a Functional Servicing report for the required external sanitary trunk sewer and watermain works. A diversion manhole is proposed at the intersection of Street A and Elgin Street to divert flows from subsequent phases, as well as Phase 1, to Brook Road once the extension is complete.

3. An 400mm watermain connection is available at Elgin Street. This watermain will need to be extended easterly to Brook Road and then southerly to the LUSI hydro sub-station. A 400mm watermain is proposed to loop the network back to D'Arcy Street and the future Zone 2 booster pumping station. Pending LUSI approval, Phase 2 may be supported with the interconnection of the watermain system without the future Zone 2 booster pump. The external water distribution system required to service Phase 2 as well as the East Cobourg Secondary Plan is detailed further in the Functional Servicing Report prepared by CIMA+.

4. Conceptual storm water ponds have been proposed for the tributary drainage areas. Post-development controls will be provided for the proposed

development within the stormwater management ponds. Stormwater facility ‘E’ is located on Block 14 within Phase 2 to provide Level 1 enhanced quality control and post to pre-development quantity control.

5. Minor system flows will be conveyed by a conventional storm sewer system. The conceptual storm sewer system has been shown on the Storm Sewer Drainage Scheme. The storm sewer will discharge into a hard bottom sediment forebay in pond ‘E’ located on Block 14 of the Draft Plan.

6. Overland flows will be conveyed to the main cell of the proposed storm water facility. It will be necessary to control the 100-year post-development peak flows to pre-development levels.

7. Through the implementation of temporary sediment control measures as set out in Section 4.2 - Water Quality During Construction, the sediment laden storm water leaving the site will be significantly reduced.

8. The road network for the Cobourg Trails Phase 2 Draft Plan consists of a 17.0m north-south collector road. This road allowance width is proposed to widen to 20.0m where it connects to Brook Road to facilitate vehicle maneuvers by accommodating left and right auxiliary lanes. The road network is generally consistent with the East Cobourg Secondary Plan. A single access is provided at the north end of the phase with the provision for a secondary access at the south. The Transportation Brief prepared by R.J. Burnside concludes that the development can be supported by a single access to Brook Road.

9. The Draft Plan for Phase 2 has been prepared to ensure adequate spatial separation to accommodate grading between Street ‘DD’ and the existing and future profiles for Brook Road North. Phase 2 will require fill material to be moved from Phase 1 to meet the lot grading proposal.

10.0 RECOMMENDATIONS

The above report confirms that the necessary infrastructure is in place, or available, to service the subject lands and that the proposed method of servicing meets with the current criteria and goal of the approval authorities at the Town of Cobourg, Lakefront Utilities and Ganaraska Region Conservation. Given the above, it would now be appropriate for these approval authorities to issue Conditions of Approval on the Draft Plan Application.

APPENDIX 1

SANITARY SEWER SYSTEM

STORM SEWER DESIGN SHEETS

SANITARY SEWER DESIGN SHEET

PHASE 2

D.G.BIDDLE & ASSOCIATES LTD.

consulting engineers

MUNICPALITY TOWN OF COBOURG
PROJECT TRIBUTE (COBOURG) LIMITED
PROJECT # 119076

DESIGN BY D.D.M.
CHK'D BY M.B.C.
DATE JAN 2022

CRITERIA
n 0.013

SINGLE FAMILY 3.23 persons/unit
TOWNHOUSE 2.68 persons/unit

LOCATION			RESIDENTIAL						COMMERCIAL			INDUS TRIAL	INSTITUT'N	FLOW (l/s)						PIPE DATA			
STREET	FROM MH	TO MH	GROSS AREA (ha)	DEN-SITY	POPU-LATION	PFF	TOTAL POPU-LATION	TOTAL AREA (ha)	LOT AREA (ha)	FLOOR SPACE INDEX	FLOOR AREA (ha)	LOT AREA (ha)	LOT AREA (ha)	RES INFIL 0.26	SEWAGE 0.0042	COMM 2.08	INDUS 1.04	INST 1.30	TOTAL FLOW l/s	SIZE mm	GRADE %	CAPACITY l/s	VELOCITY m/s
				3.23						0.50													
STREET BB	SA-1	SA-2	0.77		57	3.80	57	0.77						0.20	0.91	0.00	0.00	0.00	1.11	200	1.00	34.21	1.06
	SA-2	SA-3	0.04		0	3.80	57	0.81						0.21	0.91	0.00	0.00	0.00	1.12	200	0.50	24.19	0.75
	SA-3	SA-4	0.58		49	3.80	106	1.39						0.36	1.69	0.00	0.00	0.00	2.05	200	0.50	24.19	0.75
	SA-4	SA-5	0.55		46	3.80	152	1.94						0.50	2.43	0.00	0.00	0.00	2.93	200	0.50	24.19	0.75
	SA-5	SA-6A	0.53		33	3.80	185	2.47						0.64	2.95	0.00	0.00	0.00	3.60	200	0.50	24.19	0.75
	SA-6A	SA-6	0.00		0	3.80	185	2.47						0.64	2.95	0.00	0.00	0.00	3.60	200	1.00	34.21	1.06
	SA-6	SA-19	0.17		10	3.80	195	2.64						0.69	3.11	0.00	0.00	0.00	3.80	200	2.20	50.75	1.56
	SA-11	SA-12	0.41		20	3.80	20	0.41						0.11	0.32	0.00	0.00	0.00	0.43	200	3.00	59.26	1.83
	SA-12	SA-13	0.05		0	3.80	20	0.46						0.12	0.32	0.00	0.00	0.00	0.44	200	0.60	26.50	0.82
	SA-13	SA-14	0.32		16	3.80	36	0.78						0.20	0.57	0.00	0.00	0.00	0.78	200	1.20	37.48	1.16
STREET DD	SA-15	SA-16	0.17		10	3.80	10	0.17						0.04	0.16	0.00	0.00	0.00	0.20	200	1.00	34.21	1.06
	SA-16	SA-17	0.42		29	3.80	39	0.59						0.15	0.62	0.00	0.00	0.00	0.78	200	2.00	48.39	1.49
	SA-17	SA-18	0.08		3	3.80	42	0.67						0.17	0.67	0.00	0.00	0.00	0.84	200	2.50	54.10	1.67
	SA-18	SA-14	0.34		20	3.80	62	1.01						0.26	0.99	0.00	0.00	0.00	1.25	200	2.00	48.39	1.49
STREET BB	SA-14	SA-19	0.12		3	3.80	101	1.91						0.50	1.61	0.00	0.00	0.00	2.11	200	2.70	56.22	1.73
STREET CC	SA-19	SA-10	0.11		0	3.80	296	4.66						1.21	4.72	0.00	0.00	0.00	5.94	200	1.20	37.48	1.16
STREET CC	SA-7	SA-8	0.38		23	3.80	23	0.38						0.10	0.37	0.00	0.00	0.00	0.47	200	1.00	34.21	1.06
	SA-8	SA-9	0.30		16	3.80	39	0.68						0.18	0.62	0.00	0.00	0.00	0.80	200	0.50	24.19	0.75
	SA-9	SA-10	0.08		3	3.80	42	0.76						0.20	0.67	0.00	0.00	0.00	0.87	200	1.00	34.21	1.06
	SA-10	SA-E11-A	0.01		0	3.80	338	5.43						1.41	5.39	0.00	0.00	0.00	6.81	200	0.50	24.19	0.75

STORM SEWER DESIGN SHEET

D.G.BIDDLE & ASSOCIATES LTD.

consulting engineers

MUNICPALITY TOWN OF COBOURG
PROJECT TRIBUTE (COBOURG) LIMITED
PROJECT # 119076

DESIGN BY H.R.
CHK'D BY M.B.C.
DATE 26-Jan-22

CRITERIA

n	0.013
STORM	5 YEAR

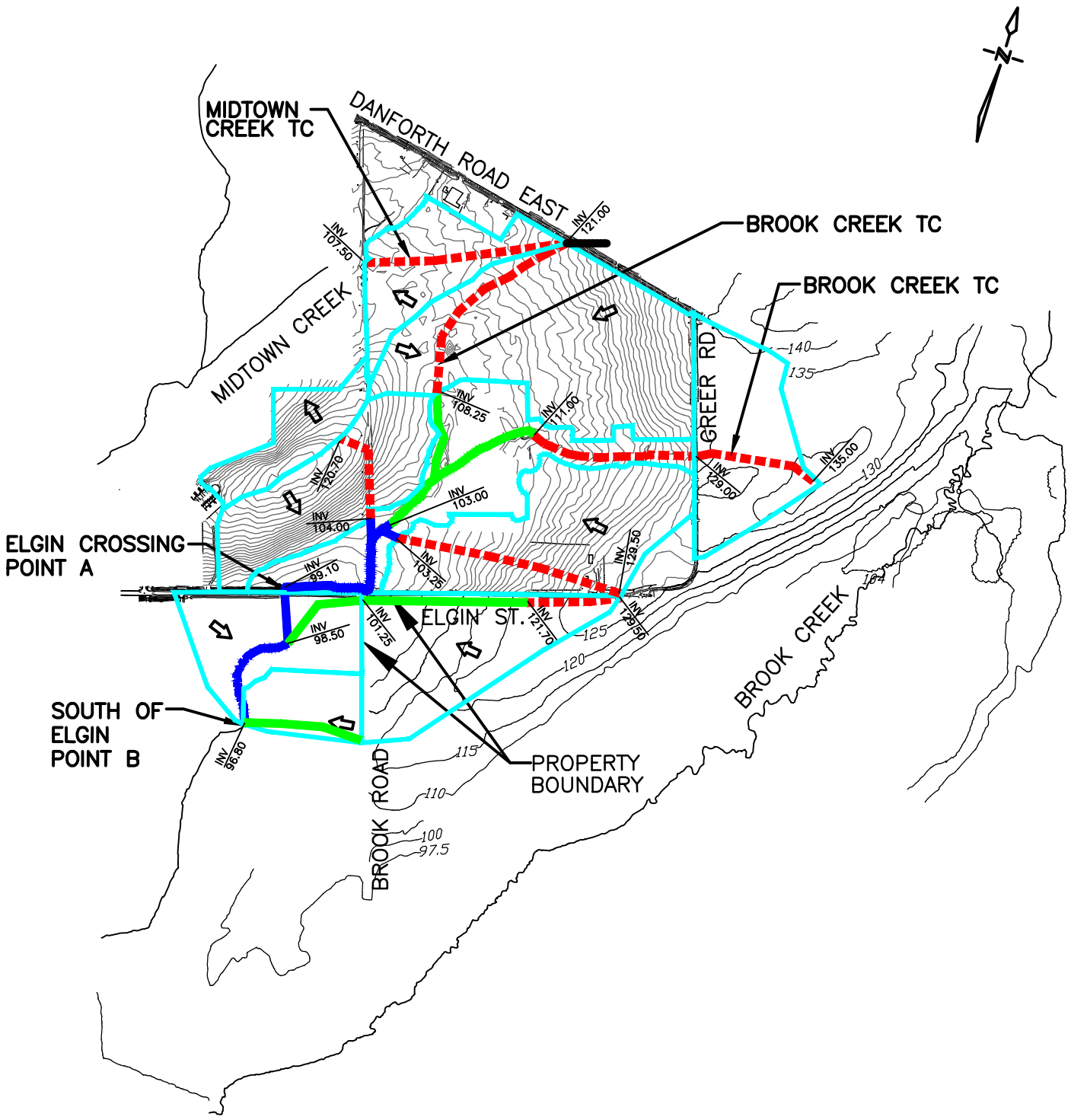
RUN OFF CO-EFFICIENTS

PARK	I=0.25
SINGLE,SEMI	I=0.45
TOWNHOUSES,SCHOOL	I=0.75
APARTMENTS	I=0.75
COMMERCIAL	I=0.90

LOCATION			DRAINAGE DATA				RATIONAL DESIGN			PIPE DATA							
STREET	FROM MH	TO MH	AREA (ha)	I	AxI	ACCUM AxI	T.C min	R mm/hr	FLOW L/sec	SIZE mm	GRADE %	CAPACITY L/sec	VELOCITY m/s	LENGTH m	TIME min	TOTAL TIME	% LOAD
																15.00	
STREET BB	ST-1	CBMH 2			0.00	0.00	15.00	79.48	0.00	300	1.00	100.87	1.38	96.17	1.16	16.16	0.00
	CBMH 2	ST-3	0.63	0.75	0.47	0.47	16.16	76.62	100.11	450	0.50	210.30	1.28	14.74	0.19	16.35	47.60
	ST-3	CBMH 4			0.00	0.47	16.35	76.16	99.52	450	0.50	210.30	1.28	76.46	0.99	17.35	47.32
	CBMH 4	DCBMH 5	0.47	0.75	0.35	0.82	17.35	73.89	168.44	525	0.50	317.23	1.42	56.16	0.66	18.01	53.10
	DCBMH 5	CBMH 6	0.56	0.75	0.42	1.24	18.01	72.46	249.78	600	0.50	452.92	1.55	28.49	0.31	18.31	55.15
	CBMH 6	ST-7A	0.44	0.60	0.26	1.50	18.31	71.81	299.46	600	0.50	452.92	1.55	45.34	0.49	18.80	66.12
	ST-7A	ST-7			0.00	1.50	18.80	70.81	295.27	600	0.50	452.92	1.55	33.43	0.36	19.16	65.19
STREET CC	CBMH 8	ST-9	0.17	0.60	0.10	0.10	15.00	79.48	22.10	300	0.50	71.33	0.98	17.73	0.30	15.30	30.98
	ST-9	CBMH 10			0.00	0.10	15.30	78.72	21.88	300	0.35	59.68	0.82	42.27	0.86	16.16	36.67
	CBMH 10	ST-11	0.26	0.60	0.16	0.26	16.16	76.61	55.37	375	0.35	108.20	0.95	56.27	0.99	17.15	51.17
	ST-11	DCBMH 12			0.00	0.26	17.15	74.32	53.72	375	0.35	108.20	0.95	13.71	0.24	17.39	49.65
	DCBMH 12	ST-7	0.61	0.60	0.37	0.63	17.39	73.79	129.23	525	0.35	265.41	1.19	69.42	0.97	18.37	48.69
STREET BB	ST-7	CBMH 14			0.00	2.13	19.16	70.09	415.00	750	0.35	687.06	1.51	9.02	0.10	19.26	60.40
	CBMH 14	CBMH15	0.48	0.60	0.29	2.42	19.26	69.89	470.17	825	0.35	885.89	1.61	47.55	0.49	19.75	53.07
STREET DD	ST-16	CBMH 17			0.00	0.00	15.00	79.48	0.00	300	1.40	119.35	1.64	98.32	1.00	16.00	0.00
	CBMH 17	ST-18	0.65	0.60	0.39	0.39	16.00	77.00	83.48	300	1.70	131.52	1.80	18.30	0.17	16.17	63.47
	ST-18	CBMH-19			0.00	0.39	16.17	76.59	83.04	300	3.00	174.72	2.39	74.58	0.52	16.69	47.53
	CBMH-19	CBMH15	0.65	0.60	0.39	0.78	16.69	75.37	163.44	450	1.50	364.25	2.22	12.75	0.10	16.79	44.87
STREET BB	CBMH15	ST-20	0.30	0.60	0.18	3.38	19.75	68.92	647.62	900	0.35	1117.25	1.70	66.12	0.65	20.40	57.97
	ST-21	CBMH 22			0.00	0.00	15.00	79.48	0.00	300	4.00	201.75	2.76	84.69	0.51	15.51	0.00
	CBMH 22	ST-20	0.35	0.60	0.21	0.21	15.51	78.20	45.65	300	2.00	142.66	1.96	17.01	0.14	15.66	32.00
	ST-20	OUTFALL			0.00	3.59	20.40	67.70	675.61	900	0.35	1117.25	1.70	57.36	0.56	20.96	60.47

APPENDIX 2

TIME OF CONCENTRATION CALCULATIONS



LEGEND

- TIME OF CONC. PATH – PASTURE
- TIME OF CONC. PATH – WOODLAND
- TIME OF CONC. PATH – GRASSED WATERWAY
- DRAINAGE BOUNDARY

NO.	DATE	REVISION	BY

REVISIONS

STORMWATER MANGEMENT REPORT

TIME OF CONCENTRATION PLAN

D.B. Biddle & Associates Limited
consulting engineers and planners
96 KING STREET EAST, OSHAWA,ON L1H 1B6
PHONE (905)576-8500. FAX (905)576-9730
dgbiddle@idirect.com

SCALE:	N.T.S.
DRAWN BY:	D.D.M.
DESIGN BY:	D.D.M.
CHECKED BY:	M.B.C.
DATE:	JAN2022

PROJECT NO. 119076

DRAWING NO. FIGURE 7

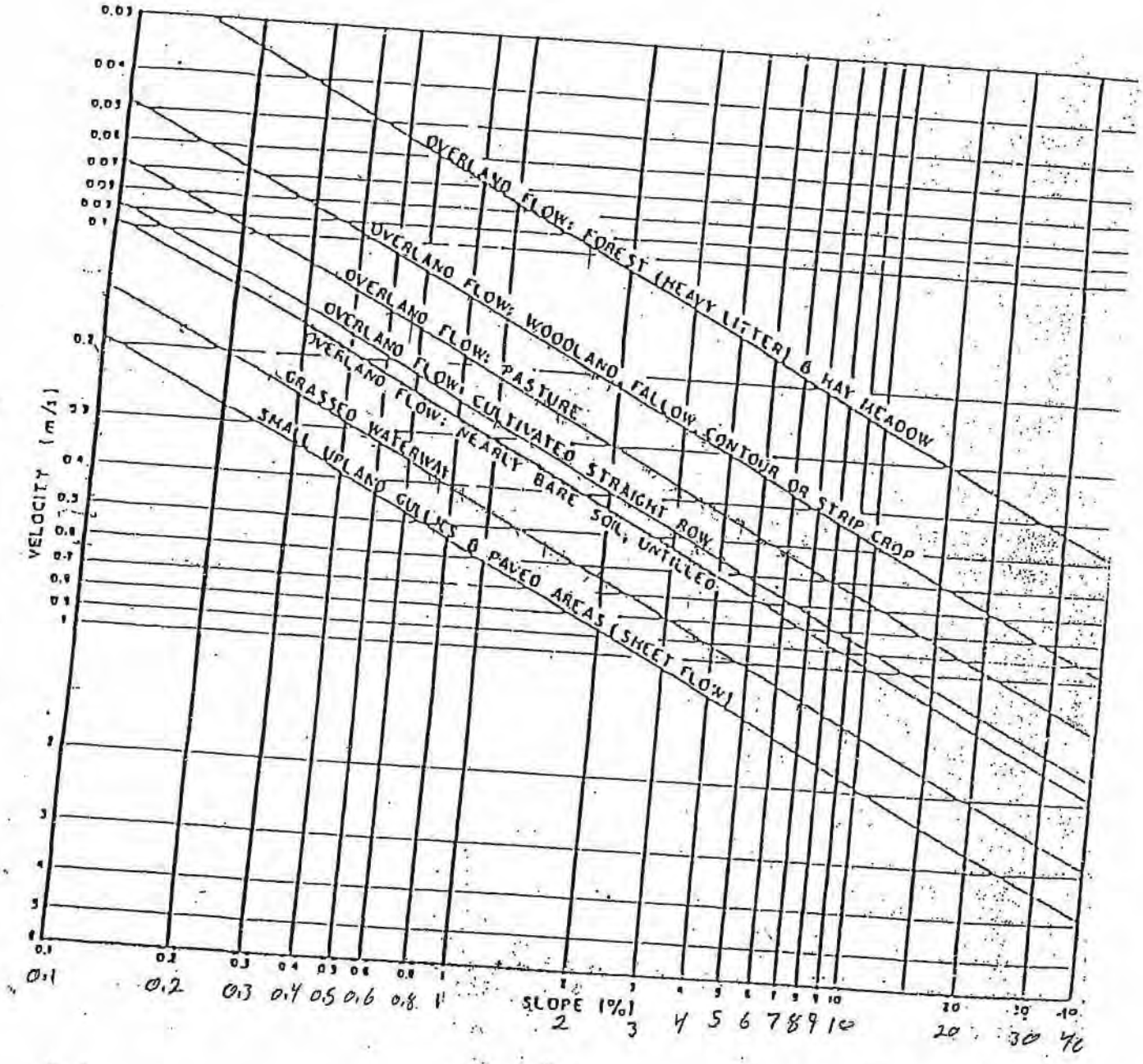


Figure A.5.2: Upland Method for Estimating Time of Concentration
(SCS National Engineering Handbook, 1971)

Time to Peak Calculations

Elgin Crossing - Point A Refer to Figure 3.

NHYD 80 - East of Greer

$D = 305m$

$S = \frac{135-129}{305}$

$S = 1.97\%$

$V = 0.30 m/sec$ (Pasture)

$t = \frac{305}{0.30}$

$t = 1,016.7 sec$

$t = 0.28 hrs$

$t_p = 2/3\ t_c$

$t_p = 0.19 hrs$

NHYD 81 - Travel time for Drainage east of Greer to reach Elgin Crossing - Point A.

$D_1 = 418m$

$S_1 = \frac{129-111}{418}$

$S_1 = 4.3\%$

$V_1 = 0.43 m/sec$ (Pasture)

$t_{c_1} = \frac{418}{0.43}$

$t_{c_1} = 991 sec$

$t_{c_1} = 0.28 hrs$

$D_2 = 451m$

$S_2 = \frac{111-103}{451m}$

$S_2 = 1.80\%$

$V_2 = 0.19 m/sec$ (Wooded land)

$t_{c_2} = \frac{451}{0.19}$

$t_{c_2} = 2,373.7 sec$

$t_{c_2} = 0.66 hrs$

$D_3 = 406m$

$S_3 = \frac{103-99.10}{406}$

$S_3 = 1.0\%$ (Grassed Waterway)

$V_3 = 0.55 m/sec$

$t_{c_3} = \frac{406}{0.55}$

$t_{c_3} = 738.1 sec$

$t_{c_3} = 0.21 hrs$

$t_{c\,TOT} = 0.28 + 0.66 + 0.21$

$t_{c\,TOT} = 1.15 hrs \rightarrow 69 min$

NHYD 82 - North Drainage Area.

$D_1 = 539$

$S_1 = \frac{121 - 108.25}{539}$

$S_1 = 2.4\%$

$V_1 = 0.32 m/sec$ (Pasture)

$t_{c_1} = \frac{539}{0.32}$

$t_{c_1} = 1684 sec$

$t_{c_1} = 0.47 hrs$ $\quad t_p = 0.31 hrs$

NHYD 83 - Travel time for North Drainage Area to reach Elgin Crossing

$D_1 = 388 m$

$S_1 = \frac{108.25 - 103.00}{388}$

$S_1 = 1.4\%$

$V_1 = 0.18 m/sec$ (Weed Fallow)

$t_{c_1} = \frac{388}{0.18}$

$t_{c_1} = 2156 sec$

$t_{c_1} = 0.60 hrs$

$D_2 = 406 m \rightarrow t_c = 0.21 hrs$ - refer to previous page under 'NHYD 81'

$t_{c\,TOT} = 0.60 + 0.21$

$t_{c\,TOT} = 0.81 hrs$

$t_{c\,TOT} = 48.6 min.$

NHYD 88

$D_1 = 418 m$ $\quad t_c = 0.28 hrs \rightarrow$ Refer to previous page under 'NHYD 81'

$D_2 = 451 m$ $\quad t_c = 0.66 hrs$

$D_3 = 406 m$ $\quad t_c = 0.21 hrs$

$t_{c\,TOT} = 0.69 min$

$t_p = 2/3\, t_c$

$t_p = 0.46 hrs$

NHYD 84

$D_1 = 253m$

$S_1 = \frac{120.70 - 104.00}{253m}$

$S_1 = 6.6\%$

$V_1 = 0.56 m/s$ (Pasture)

$t_{c_1} = \frac{253m}{0.56 m/sec}$

$t_{c_1} = 452 sec$

$t_{c_1} = 0.13 hrs$ $\quad t_p = 0.09$

NHYD 85 - Travel time for Drainage Area (NHYD84) to Elgin Crossing

$D_2 = 398m$

$S_2 = \frac{104.00 - 99.10}{398}$

$S_2 = 1.2\%$

$V_2 = 0.5 m/sec$

$t_{c_2} = \frac{398}{0.5}$

$t_{c_2} = 796 sec$

$t_{c_2} = 13.3 min$

NHYD 86

$D_3 = 574m$

$S_1 = \frac{129.5 - 103.25}{574}$

$S_1 = 4.6\%$

$V_1 = 0.46 m/sec$ (Pasture)

$t_{c_1} = \frac{574}{0.46}$

$t_{c_1} = 1248 sec$

$t_{c_1} = 0.35 hrs$ $\quad t_{p_1} = 0.23 hrs$

NHYD 87 - Travel time for Drainage Area (NHYD 86) to Elgin Crossing

$D_2 = 426m$

$S_1 = \frac{103.25 - 99.10}{426}$

$S_1 = 1.00\%$

$V_1 = 0.55 m/sec$ (Grassed Waterway)

$t_{c_1} = \frac{426}{0.55}$

$t_{c_1} = 775 sec$

$t_{c_1} = 12.9 min$

South of Elgin - Point B

NHYD 90

$D_1 = 235m$

$S_1 = \frac{129.5m - 121.70m}{235}$

$S = 3.3\%$

$V_1 = 0.39 m/sec$ (Pasture)

$t_{c_1} = \frac{235}{0.39}$

$t_{c_1} = 631 sec$

$t_{c_1} = 0.18 hrs$ $t_p = 0.12 hrs.$

$D_2 = 416m$

$S_2 = \frac{121.70 - 101.25}{416}$

$S_2 = 4.9\%$

$V_2 = 0.33 m/sec$ (Woodland Fallow)

$t_{c_2} = \frac{416}{0.33}$

$t_{c_2} = 1261 sec$

$t_{c_2} = 0.35 hrs$ $t_p = 0.23 hrs.$

$t_{p\,TOT} = 0.12 + 0.23$

$t_{p\,TOT} = 0.35 hrs.$

NHYD 91 - Travel time for Drainage Area (NHYD 90) to Point B South of Elgin Crossing

$D_1 = 234m$

$S_1 = \frac{101.25 - 98.50}{234}$

$S_1 = 1.20\%$

$V_1 = 0.18 m/sec$ (Woodland Fallow)

$t_{c_1} = \frac{234}{0.18}$

$t_{c_1} = 1300 sec$

$t_{c_1} = 21.7 min$

$D_2 = 302m$

$S_2 = \frac{98.50 - 96.80}{302}$

$S_2 = 0.55\%$

$V_2 = 0.34 m/sec$ (Grassed Waterway.)

$t_{c_2} = \frac{302}{0.34}$

$t_{c_2} = 888 sec$

$t_{c_2} = 14.8 min$

$t_{c\,TOT} = 14.8 + 21.7$

$t_{c\,TOT} = 36.5 min.$

NHYD 92:
t_c = 36.5 min (Refer to NHYD 91)
t_c = 0.61 hrs
t_p = 0.41 hrs

NHYD 93

D = 298 m
S = $\frac{112.5 - 96.80}{298 m}$
S = 5.3%
V = 0.34 m/sec (Woodland Fallow)

$t_c = \frac{298}{0.34}$
t_c = 876 sec
t_c = 0.24 hrs t_p = 0.16 hrs

Midtown Creek

NHYD 49

D = 534 m
S = $\frac{121 - 107}{534}$
S = 2.6%
V = 0.35 m/sec (Pastures)

$t_c = \frac{534}{0.35}$
t_c = 1526 sec
t_c = 0.42 hrs t_p = 0.28 hrs

APPENDIX 3

POND DESIGN CALCULATIONS (STAGE / STORAGE / DISCHARGE)

APPENDIX C OF "TECHNICAL ENGINEERING GUIDELINES FOR STORMWATER MANAGEMENT SUBMISSIONS"

VISUAL OTTHYMO OUTPUTS

POND E VOLUME REQUIREMENTS

IMPERVIOUS LEVEL	PERMANENT STOREAGE VOLUME REQUIRED(m^3/ha)	FLUCTUATING STORAGE VOLUME REQUIRED (m^3/ha)	TOTAL DRAINAGE AREA (ha)	PERMANENT VOLUME REQUIRED (m^3)	FLUCTUATING VOLUME REQUIRED (m^3)
70%	185	40	5.95	1100.2	238
70%	185	40	1.14	210.3	45
Total			7.08	1311	283

IMPERVIOUS LEVEL	TOTAL RAINFALL (mm)	RUN-OFF DEPTH (mm)	TOTAL DRAINAGE AREA (ha)	VOLUME REQUIRED (m^3)
70%	25	19.13	5.95	1138
70%	25	19.13	1.14	218
Total			7.08	1355

POND E FOREBAY CALCULATIONS

CONTRIBUTING AREA=	7.08	ha
Permanent Pool Required	1311	m^3
Active Pool Required	283	m^3

Pond Characteristics

Permanent Pool Elevation=	98.00	m
Pond Invert Elevation=	97.00	m
Active Pool Elevation=	98.50	m
Permanent Pool Volume Provided	1749.03	m^3
Active Pool Volume Provided	1415.05	m^3

Pond Characteristics

Permanent Pool Elevation=	98.00	m
Pond Invert Elevation=	97.00	m
Active Pool Elevation=	98.25	m
Permanent Pool Volume Provided	1749.03	m^3
Active Pool Volume Provided	1415.05	m^3

POND E FOREBAY CALCULATIONS

Orifice Sizing Calculations
From MOE Stormwater Management Practices Manual

$$t = \frac{2xA_p}{CxA_o(2g)^{0.5}} \times (h_1^{0.5}-h_2^{0.5})$$

$$172800 = \frac{2x5669.32}{0.61xA_o(2x9.81)^{0.5}} \times (0.38^{0.5}-0.13^{0.5})$$

$$A_o = \frac{2901.40}{172800x \quad 2.70196}$$

A_o= 0.006214 m^2

t=Drawdown Time(s)			172800	s
A_p= Pond Area(@ Max WSE)=			5669.32	m^2
C= Discharge Coefficient=			0.61	
h_1=Max. head(m)				
=	98.25	97.87	0.38	m
h_2=Min. head(m)				
=	98.00	97.87	0.13	m
C/L Orifice=			97.87	m
A_o= Orifice Area				m^2
g=Gravity=			9.81	m/s^2

Orifice Diameter

$$Dia = \frac{4xA_o}{PI}$$

Dia= 0.08895 m

Check Drawdown time

Ave Q= $CxA_ox(2gh)^{0.5}$

= 0.010716 m^3/s

$$t = \frac{Vol}{Q}$$

$$= \frac{1415.053}{0.011} = 132048 \text{ s} \quad 36.6801 \text{ hrs}$$

D= Orifice Diameter	0.1	m
A_o= Orifice Area	0.00785	m^2
g=Gravity=	9.81	m/s^2
Average Head=	0.255	m
C= Discharge Coefficient=	0.61	

Maximum Discharge

Q= $CxA_ox(2gh)^{0.5}$

= 0.0131 m^3/s

D= Orifice Diameter	0.1	m
A_o= Orifice Area	0.0079	m^2
g=Gravity=	9.81	m/s^2
Maximum Head(h)=	0.38	m
C= Discharge Coefficient=	0.61	

Equation 4.5 - Forebay Settling Length

$$\text{Distance} = \sqrt{\frac{rxQ_p}{V_s}}$$

$$= \sqrt{\frac{0.03924}{0.0003}}$$

$$= 11.4 \text{ m}$$

r=Length:Width Ratio	3	:1
Qp=Orifice Peak Discharge=	0.01308	m^3/s
V_s=Settling Velocity	0.0003	m/s

Equation 4.6 - Forebay Dispersion Length

$$\text{Distance} = \frac{8xQ}{dxV_p}$$

$$= \frac{4.832}{0.5}$$

$$= 6.9 \text{ m}$$

d=Depth of Forebay	1	m
Vp=Velocity in Forebay	0.5	m/s
$Q = \frac{CiA}{360}$ m^3/s	0.43296	m^3/s
Q (25mm4hr) =	0.604	m^3/s
C=Runoff Coefficient	0.65	
i=43xC+5.9	33.85	mm/hr
A=Area(ha)	7.08	ha

Equation 4.7 - Minimum Bottom Width

$$\text{Width} = \frac{\text{Distance}}{8}$$

$$= 0.8625 \text{ m}$$

Pond E Volmes and Discharge

Orifice 1			Orifice 2			
Q=CA(2gh)^0.5			Q=CA(2gh)^0.5			
Diameter=	0.1	m	Diameter=	0.13	m	
Area=	0.0079	m2	Area=	0.0133	m2	
C=	0.61		C=	0.61	(PLATE)	
C/L Elev=	97.87	m	C/L Elev=	97.50	m	
RIM	99.80	m	RIM	98.50	m	

	ELEV	AREA	AVERAGE AREA	DEPTH	VOLUME	TOTAL VOLUME	ORIFCE 1		ORIFICE 2		WEIR 1		TOTAL FLOW
							HEAD	FLOW	HEAD	FLOW	HEAD	FLOW	
	m	m2	m2	m	m3	m3	m	cms	m	cms	m	cms	cms
Permanent	97.00	1222.67				0.00							
Pool			1329.71	0.25	332.43								
	97.25	1436.76				332.43							
			1559.32	0.25	389.83								
	97.50	1681.88				722.26							
			1808.27	0.25	452.07								
	97.75	1934.67				1174.33							
			2298.83	0.25	574.71								
	98.00	2663.00				1749.03							
Fluctuating	98.00	2394.57				0.00	0.00	0.0000					0.0000
Pool			2601.63	0.25	650.41								
	98.25	2808.69				650.41	0.38	0.0131					0.0131
			3058.58	0.25	764.65								
	98.50	3308.47				1415.05	0.63	0.0168					0.0168
			3567.02	0.25	891.76								
	98.75	3825.57				2306.81	0.88	0.0199	1.25	0.0401			0.0600
			4093.94	0.25	1023.49								
	99.00	4362.32				3330.29	1.13	0.0226	1.50	0.0439			0.0665
			4643.28	0.25	1160.82								
	99.25	4924.25				4491.11	1.38	0.0249	1.75	0.0474			0.0724
			5296.78	0.25	1324.20								
	99.50	5669.32				5815.31	1.63	0.0271	2.00	0.0507			0.0778

APPENDIX C

Hydrological Values
And
Recommended Modeling Parameters

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VO_2 Hydrology Modeling Parameters Selection

<table>
<tr><th>COMMAND</th><th>PARAMETER</th><th>PARAMETER VALUE RECOMMENDATIONS</th></tr>
<tr><td rowspan="2">STANDHYD when catchment area T_{imp}>20%</td><td>AREA</td><td>Digital delineation using software such as GIS or AutoCAD must be used to delineate subcatchment areas.</td></tr>
<tr><td>X_{imp}</td><td>Directly connected imperviousness shall be measured, if possible. Otherwise, use:
<table>
<tr><th>Land use</th><th>X_{IMP}[1] (Roof Leaders to Road)</th><th>X_{IMP}[2] (Roof Leaders to Lawn)</th></tr>
<tr><td>Estate Residential (>3/4 Acre Lot)</td><td>0.14</td><td>0.09</td></tr>
<tr><td>2 Acre Lot (180 ft wide)</td><td>0.11</td><td>0.08</td></tr>
<tr><td>1½Acre Lot (150 ft wide)</td><td>0.14</td><td>0.09</td></tr>
<tr><td>1 Acre Lot (130 ft wide)</td><td>0.17</td><td>0.10</td></tr>
<tr><td>Low Density Residential (1/3 to 3/4 Acre Lot)</td><td>0.23</td><td>0.15</td></tr>
<tr><td>¾ Acre Lot (110 ft wide)</td><td>0.18</td><td>0.13</td></tr>
<tr><td>½ Acre Lot (90 ft wide)</td><td>0.23</td><td>0.15</td></tr>
<tr><td>1/3 Acre Lot (70 ft wide)</td><td>0.29</td><td>0.18</td></tr>
<tr><td>Medium Density Residential (1/10 to 1/4 Acre Lot)</td><td>0.47</td><td>0.24</td></tr>
<tr><td>¼ Acre Lot (60 ft wide)</td><td>0.35</td><td>0.20</td></tr>
<tr><td>1/8 Acre Lot (50 ft wide)</td><td>0.52</td><td>0.25</td></tr>
<tr><td>1/10 Acre Lot (40 ft wide)</td><td>0.55</td><td>0.28</td></tr>
<tr><td>High Density Residential (<1/10 Acre Lot)</td><td>0.65</td><td>0.35</td></tr>
<tr><td>Institutional (e.g. school, religious centre)</td><td>0.55</td><td>0.30</td></tr>
<tr><td>Industrial</td><td>0.80</td><td>0.70</td></tr>
<tr><td>Commercial/ Business</td><td>0.90</td><td>0.90</td></tr>
<tr><td>Park</td><td>0.01</td><td>0.01</td></tr>
</table>
1. Roof leaders connected to impervious area (e.g. driveway) and to storm sewer for X_{imp} calculations.
2. Roof leaders are connected to pervious area (e.g. lawn) for X_{imp} calculations,
Public roads are included in all reported X_{imp} values.</td></tr>
</table>

<table>
<tr>
<td rowspan="2">STANDHYD
(con't)</td>
<td>T_{imp}</td>
<td>Total imperviousness shall be measured, if possible. Otherwise, T_{imp} based on:
<table>
<tr><th>Land use</th><th>T_{Imp}
(Roof Leaders to Road)</th><th>Corresponding C</th></tr>
<tr><td>Estate Residential (>3/4 Acre Lot)</td><td>0.14</td><td>.3</td></tr>
<tr><td>2 Acre Lot (180 ft wide)</td><td>0.11</td><td>.28</td></tr>
<tr><td>1½Acre Lot (150 ft wide)</td><td>0.14</td><td>.3</td></tr>
<tr><td>1 Acre Lot (130 ft wide)</td><td>0.17</td><td>.32</td></tr>
<tr><td>Low Density Residential (1/3 to 3/4 Acre Lot)</td><td>0.23</td><td>.36</td></tr>
<tr><td>¾ Acre Lot (110 ft wide)</td><td>0.18</td><td>.32</td></tr>
<tr><td>½ Acre Lot (90 ft wide)</td><td>0.23</td><td>.36</td></tr>
<tr><td>1/3 Acre Lot (70 ft wide)</td><td>0.29</td><td>.40</td></tr>
<tr><td>Medium Density Residential (1/10 to ¼ Acre Lot)</td><td>0.47</td><td>.53</td></tr>
<tr><td>¼ Acre Lot (60 ft wide)</td><td>0.35</td><td>.45</td></tr>
<tr><td>1/8 Acre Lot (50 ft wide)</td><td>0.52</td><td>.56</td></tr>
<tr><td>1/10 Acre Lot (40 ft wide)</td><td>0.55</td><td>.59</td></tr>
<tr><td>High Density Residential (<1/10 Acre Lot)</td><td>0.65</td><td>.65 - .6</td></tr>
<tr><td>Institutional (e.g. school, religious centre)</td><td>0.55</td><td>.59 - .75</td></tr>
<tr><td>Industrial</td><td>0.80</td><td>.75 - .90</td></tr>
<tr><td>Commercial/ Business</td><td>0.90</td><td>.84 - .90</td></tr>
<tr><td>Park</td><td>0.01</td><td>.21 - .2</td></tr>
</table>
STANDHYD command shall only be used for catchments with a T_{imp}>20%. In case where T_{imp} is <20% and there is a sizeable development area, split the catchment into two using both NASHYD and STANDHYD.</td>
</tr>
<tr>
<td>LOSS</td>
<td>VO2 uses Horton's, SCS Modified Curve Number, or Proportional Loss Coefficient Method. The preferred method is SCS Modified Curve Number Method to calculate pervious area losses due to the following reasons:

Horton is not recommended for storm durations ≥ 12 hours as predicted flows are often erroneous (may under estimate runoff if rainfall intensity is < sol infiltration capacity rate);
Horton's not recommended if there is significant soil variability;
Horton's typically used for urban conditions with short duration, high intensity storms (e.g. Chicago distribution) and not much soil variability; and
SCS Modified CN Method is generally more suitable for subwatershed studies and master drainage plans.

</td>
</tr>
</table>

STANDHYD (con't)

CN

Same approach as NASHYD. Typically, the pervious component within STANDHYD represents lawn or other grassed area. The pervious area curve number value shall be determined as per Attachment 1. If the assumed pervious area is lawn, the following CN values are recommended:

Land Use	Hydrologic Soil Group (HSG)						
	A	AB	B	BC	C	CD	D
Lawn, other open grassed area in good condition (covering > 75% of the area)	39	50	61	68	74	77	80
Lawn, other open grassed area in fair condition (covering 50-75% of the area)	49	59	69	74	79	82	84

I_a

Land Use	I_a
Commercial	2
Residential High Density	2
Residential Medium/Low Density	2
Residential Estate	2
Major Roads	2
Crop	7
Pasture	8
Woodlot	10
Open Space, Green space	5

SLPP — Pervious surface slope, preferably measured digitally, other wise assume 2%.

LGP — Length of pervious overland flow typically set to 40 m, unless can be calculated otherwise.

MNP — Manning's pervious "n" value determined by looking at tables, otherwise assume 0.25

DPSI — For roads, driveways and roofs typically use value between 0.8 and 1.5 mm, otherwise assume 2.0 mm

SLPI — Impervious surface slope preferably measured digitally, otherwise assume 1%

LGI — Length of impervious overland flow can be measured if subdivision plans available, however, typically best to use $A = 1.5 (LGI)^2$

MNI — Manning's impervious "n" value determined using tables if nature of impervious surface is known, otherwise assume 0.013.

NASHYD	AREA	Digital delineation (GIS, AutoCAD) will be used to delineate subcatchment areas.
	CN	CN values are a function of land use and HSG. Use the same table as STANDHYD CN based on the following approach: 1. Area-weighted land use and soils data to be calculated using digital measurements. Soils information must be transformed to hydrologic soil group (HSG) classification using Chart 1.09 MTO Drainage Manual 2. CN values to be calculated on an area-weighted basis using Attachment1. 3. CN to be transformed to CN* using procedure outlined in the VO_2 Reference Manual.
	I_a	Same as STANDHYD (typically set between 1.0 and 5.0 if using CN*)
	N	Number of linear reservoir typically set to 3.0.
	T_p	Time to peak (T_p) is calculated based on time of concentration (T_c). T_p is estimated based on $T_p=(N-1)/N*T_c$ or $T_p=0.67Tc$. Refer to Tc Calculations The airport method is to be used when C<0.4 and the Bransby-Williams Method is to be used when c>0.4

ATTACHMENT 1
PROPOSED CN AND C-VALUE TABLES

Land Use	CN (AMC II) Values for Hydrologic Soil Group						
	A	AB	B	BC	C	CD	D
Commercial (> 85% impervious)	89	91	92	93	94	95	95
Commercial (75%-85% impervious)	81	85	88	90	91	92	93
Residential (<1/8 acre lot size)	77	81	85	88	90	91	92
Residential (1/4 acre lot size)	61	68	75	79	83	85	87
Residential (1/4 acre lot size)	54	62	70	75	80	83	85
Residential (1 acre lot size)	51	60	68	74	79	82	84
Paved Areas	98	98	98	98	98	98	98
Cultivated, fallow	77	82	86	89	91	93	94
Cultivated, row crops	66	72	77	81	85	87	89
Pasture, good condition	39	50	61	68	74	77	80
Pasture, poor condition	68	74	79	83	86	88	89
Meadow	30	44	58	65	71	75	78
Wood, good cover	25	40	55	63	70	74	77
Wood, poor cover	45	56	66	72	77	80	83

Design Chart 1.09: Soil Conservation Service Curve Numbers (Continued)

Land Use or Surface	Hydrologic Soil Group						
	A	AB	B	BC	C	CD	D
Fallow (special cases only)	77	82	86	89	91	93	94
Crop and other improved land	66** (62)	70** (68)	74	78	82	84	86 AMC I
Pasture & other unimproved land	58* (38)	62* (51)	65	71	76	79	81
Woodlots and forest	50* (30)	54* (44)	58	65	71	74	77
Impervious areas (paved)							98
Bare bedrock draining directly to stream by surface flow							98
Bare bedrock draining indirectly to stream as groundwater (usual case)							70
Lakes and wetlands							50

Notes

(i) All values are based on AMC II except those marked by * (AMC III) or ** (mean of AMC II and AMC III).

(ii) Values in brackets are AMC II and are to be used only for special cases.

(iii) Table is not applicable to frozen soils or to periods in which snowmelt contributes to runoff.

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

       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)\VH Suite 3.0\VO2\voin.dat
  Output  filename: C:\Users\david.mcnaull\AppData\Local\Temp\2e1d9823-ac65-4037-aadc-8deeba27e614\Scenario.ou
  Summary filename: C:\Users\david.mcnaull\AppData\Local\Temp\2e1d9823-ac65-4037-aadc-8deeba27e614\Scenario.su


DATE: 01/25/2022                          TIME: 11:51:03

USER:

            25mm STM
COMMENTS: _____________________________________________________


----------------------------------------------------------------------------------------------------------------
  ****************************
** SIMULATION NUMBER:   1 **     25mm STM
  ****************************


--------------------
|    READ STORM    |    Filename: C:\Users\david.mcnaull\AppD
|                  |              ata\Local\Temp\
|                  |              2e1d9823-ac65-4037-aadc-8deeba27e614\3914cff5
| Ptotal= 25.00 mm |    Comments: Twenty five mm Four Hour Chicago Storm
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.17    2.07 |  1.17    5.70 |  2.17    5.19 |  3.17    2.80
                0.33    2.27 |  1.33   10.78 |  2.33    4.47 |  3.33    2.62
                0.50    2.52 |  1.50   50.21 |  2.50    3.95 |  3.50    2.48
                0.67    2.88 |  1.67   13.37 |  2.67    3.56 |  3.67    2.35
                0.83    3.38 |  1.83    8.29 |  2.83    3.25 |  3.83    2.23
                1.00    4.18 |  2.00    6.30 |  3.00    3.01 |  4.00    2.14

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

--------------------
| CALIB            |
| STANDHYD  (0110) |   Area    (ha)=   5.95
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.16         1.78
     Dep. Storage     (mm)=       1.00         2.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     199.11        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    2.07 | 1.083    5.70 | 2.083    5.19 |  3.08    2.80
               0.167    2.07 | 1.167    5.70 | 2.167    5.19 |  3.17    2.80
               0.250    2.27 | 1.250   10.78 | 2.250    4.47 |  3.25    2.62
               0.333    2.27 | 1.333   10.78 | 2.333    4.47 |  3.33    2.62
               0.417    2.52 | 1.417   50.21 | 2.417    3.95 |  3.42    2.48
               0.500    2.52 | 1.500   50.21 | 2.500    3.95 |  3.50    2.48
               0.583    2.88 | 1.583   13.37 | 2.583    3.56 |  3.58    2.35
               0.667    2.88 | 1.667   13.37 | 2.667    3.56 |  3.67    2.35
               0.750    3.38 | 1.750    8.29 | 2.750    3.25 |  3.75    2.23
```

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                0.833    3.38 | 1.833    8.29 | 2.833    3.25 |  3.83    2.23
                0.917    4.18 | 1.917    6.30 | 2.917    3.01 |  3.92    2.14
                1.000    4.18 | 2.000    6.30 | 3.000    3.01 |  4.00    2.14

     Max.Eff.Inten.(mm/hr)=      50.21         9.47
               over (min)         5.00        25.00
     Storage Coeff.  (min)=       5.09 (ii)   23.21 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=       0.21         0.05
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.52         0.03          0.522 (iii)
     TIME TO PEAK    (hrs)=       1.50         1.83           1.50
     RUNOFF VOLUME    (mm)=      24.00         7.80          19.13
     TOTAL RAINFALL   (mm)=      25.00        25.00          25.00
     RUNOFF COEFFICIENT   =       0.96         0.31           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.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0111) |   Area    (ha)=   1.14
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.80         0.34
     Dep. Storage     (mm)=       1.00         2.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      87.06        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      50.21         9.47
               over (min)         5.00        25.00
     Storage Coeff.  (min)=       3.10 (ii)   21.22 (ii)
     Unit Hyd. Tpeak (min)=       5.00        25.00
     Unit Hyd. peak  (cms)=       0.27         0.05
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.11         0.01          0.109 (iii)
     TIME TO PEAK    (hrs)=       1.50         1.83           1.50
     RUNOFF VOLUME    (mm)=      24.00         7.80          19.13
     TOTAL RAINFALL   (mm)=      25.00        25.00          25.00
     RUNOFF COEFFICIENT   =       0.96         0.31           0.77

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

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

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 FINISH
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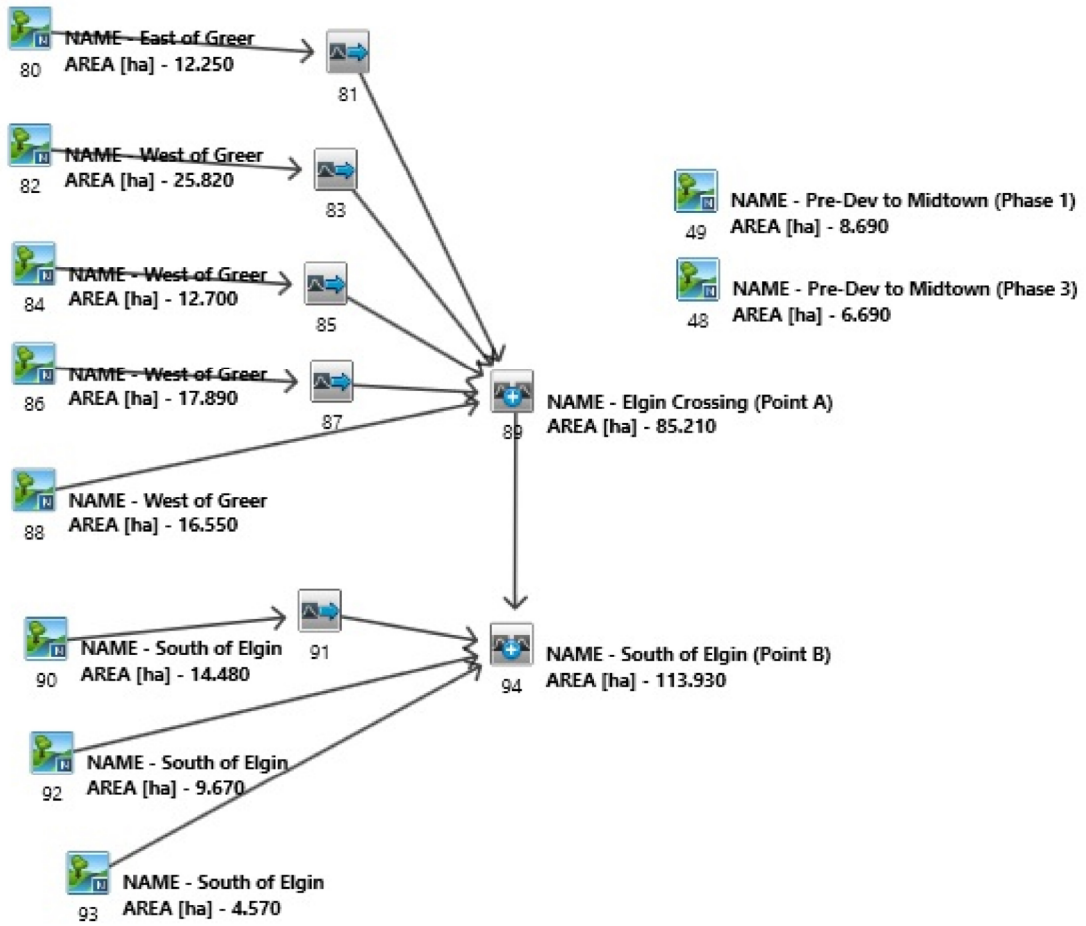
```


NAME - East of Greer
AREA [ha] - 12.250
80
81
NAME - West of Greer
AREA [ha] - 25.820
82
83
NAME - West of Greer
AREA [ha] - 12.700
84
85
NAME - West of Greer
AREA [ha] - 17.890
86
87
NAME - West of Greer
AREA [ha] - 16.550
88
NAME - Pre-Dev to Midtown (Phase 1)
AREA [ha] - 8.690
49
NAME - Pre-Dev to Midtown (Phase 3)
AREA [ha] - 6.690
48
NAME - Elgin Crossing (Point A)
AREA [ha] - 85.210
89
NAME - South of Elgin
AREA [ha] - 14.480
90
91
NAME - South of Elgin
AREA [ha] - 9.670
92
NAME - South of Elgin
AREA [ha] - 4.570
93
NAME - South of Elgin (Point B)
AREA [ha] - 113.930
94

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

       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)\VH Suite 3.0\VO2\voin.dat
  Output  filename: C:\Users\david.mcnaull\AppData\Local\Temp\1926d99f-8d54-4cca-aaa3-9f7990bdf5e9\Scenario.ou
  Summary filename: C:\Users\david.mcnaull\AppData\Local\Temp\1926d99f-8d54-4cca-aaa3-9f7990bdf5e9\Scenario.su


DATE: 01/18/2022                          TIME: 11:47:34

USER:


COMMENTS: Pre Development - 2yr - 100yr Storm - Brook Creek (Pt. A & B)
          ____________________________________________________

----------------------------------------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   0 **   2yr
  ****************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1778.000
| Ptotal= 29.37 mm |                          B=  13.000
--------------------                          C=   1.000
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  = 24.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                  0.17    0.01 |  6.17    0.20 | 12.17    0.15 | 18.17    0.03
                  0.33    0.01 |  6.33    0.24 | 12.33    0.14 | 18.33    0.03
                  0.50    0.01 |  6.50    0.30 | 12.50    0.13 | 18.50    0.03
                  0.67    0.01 |  6.67    0.38 | 12.67    0.12 | 18.67    0.02
                  0.83    0.01 |  6.83    0.49 | 12.83    0.11 | 18.83    0.02
                  1.00    0.01 |  7.00    0.66 | 13.00    0.11 | 19.00    0.02
                  1.17    0.02 |  7.17    0.93 | 13.17    0.10 | 19.17    0.02
                  1.33    0.02 |  7.33    1.43 | 13.33    0.09 | 19.33    0.02
                  1.50    0.02 |  7.50    2.46 | 13.50    0.09 | 19.50    0.02
                  1.67    0.02 |  7.67    5.25 | 13.67    0.08 | 19.67    0.02
                  1.83    0.02 |  7.83   18.95 | 13.83    0.08 | 19.83    0.02
                  2.00    0.02 |  8.00   77.30 | 14.00    0.07 | 20.00    0.02
                  2.17    0.02 |  8.17   26.45 | 14.17    0.07 | 20.17    0.02
                  2.33    0.02 |  8.33   11.48 | 14.33    0.07 | 20.33    0.02
                  2.50    0.02 |  8.50    6.42 | 14.50    0.06 | 20.50    0.02
                  2.67    0.02 |  8.67    4.10 | 14.67    0.06 | 20.67    0.02
                  2.83    0.03 |  8.83    2.84 | 14.83    0.06 | 20.83    0.02
                  3.00    0.03 |  9.00    2.09 | 15.00    0.06 | 21.00    0.02
                  3.17    0.03 |  9.17    1.60 | 15.17    0.05 | 21.17    0.02
                  3.33    0.03 |  9.33    1.26 | 15.33    0.05 | 21.33    0.02
                  3.50    0.03 |  9.50    1.02 | 15.50    0.05 | 21.50    0.02
                  3.67    0.04 |  9.67    0.85 | 15.67    0.05 | 21.67    0.01
                  3.83    0.04 |  9.83    0.71 | 15.83    0.04 | 21.83    0.01
                  4.00    0.04 | 10.00    0.61 | 16.00    0.04 | 22.00    0.01
                  4.17    0.05 | 10.17    0.52 | 16.17    0.04 | 22.17    0.01
                  4.33    0.05 | 10.33    0.46 | 16.33    0.04 | 22.33    0.01
                  4.50    0.06 | 10.50    0.40 | 16.50    0.04 | 22.50    0.01
                  4.67    0.06 | 10.67    0.35 | 16.67    0.04 | 22.67    0.01
                  4.83    0.07 | 10.83    0.32 | 16.83    0.04 | 22.83    0.01
                  5.00    0.08 | 11.00    0.28 | 17.00    0.03 | 23.00    0.01
                  5.17    0.09 | 11.17    0.26 | 17.17    0.03 | 23.17    0.01
                  5.33    0.10 | 11.33    0.23 | 17.33    0.03 | 23.33    0.01
                  5.50    0.11 | 11.50    0.21 | 17.50    0.03 | 23.50    0.01
```

5.67	0.13	11.67	0.19	17.67	0.03	23.67	0.01
5.83	0.15	11.83	0.18	17.83	0.03	23.83	0.01
6.00	0.17	12.00	0.16	18.00	0.03	24.00	0.01

CALIB			
NASHYD (0093)	Area (ha)=	4.57	Curve Number (CN)= 65.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)=	0.16	

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	0.01	6.083	0.20	12.083	0.15	18.08	0.03
0.167	0.01	6.167	0.20	12.167	0.15	18.17	0.03
0.250	0.01	6.250	0.24	12.250	0.14	18.25	0.03
0.333	0.01	6.333	0.24	12.333	0.14	18.33	0.03
0.417	0.01	6.417	0.30	12.417	0.13	18.42	0.03
0.500	0.01	6.500	0.30	12.500	0.13	18.50	0.03
0.583	0.01	6.583	0.38	12.583	0.12	18.58	0.02
0.667	0.01	6.667	0.38	12.667	0.12	18.67	0.02
0.750	0.01	6.750	0.49	12.750	0.11	18.75	0.02
0.833	0.01	6.833	0.49	12.833	0.11	18.83	0.02
0.917	0.01	6.917	0.66	12.917	0.11	18.92	0.02
1.000	0.01	7.000	0.66	13.000	0.11	19.00	0.02
1.083	0.02	7.083	0.93	13.083	0.10	19.08	0.02
1.167	0.02	7.167	0.93	13.167	0.10	19.17	0.02
1.250	0.02	7.250	1.43	13.250	0.09	19.25	0.02
1.333	0.02	7.333	1.43	13.333	0.09	19.33	0.02
1.417	0.02	7.417	2.46	13.417	0.09	19.42	0.02
1.500	0.02	7.500	2.46	13.500	0.09	19.50	0.02
1.583	0.02	7.583	5.25	13.583	0.08	19.58	0.02
1.667	0.02	7.667	5.25	13.667	0.08	19.67	0.02
1.750	0.02	7.750	18.95	13.750	0.08	19.75	0.02
1.833	0.02	7.833	18.95	13.833	0.08	19.83	0.02
1.917	0.02	7.917	77.30	13.917	0.07	19.92	0.02
2.000	0.02	8.000	77.30	14.000	0.07	20.00	0.02
2.083	0.02	8.083	26.45	14.083	0.07	20.08	0.02
2.167	0.02	8.167	26.45	14.167	0.07	20.17	0.02
2.250	0.02	8.250	11.48	14.250	0.07	20.25	0.02
2.333	0.02	8.333	11.48	14.333	0.07	20.33	0.02
2.417	0.02	8.417	6.42	14.417	0.06	20.42	0.02
2.500	0.02	8.500	6.42	14.500	0.06	20.50	0.02
2.583	0.02	8.583	4.10	14.583	0.06	20.58	0.02
2.667	0.02	8.667	4.10	14.667	0.06	20.67	0.02
2.750	0.03	8.750	2.84	14.750	0.06	20.75	0.02
2.833	0.03	8.833	2.84	14.833	0.06	20.83	0.02
2.917	0.03	8.917	2.09	14.917	0.06	20.92	0.02
3.000	0.03	9.000	2.09	15.000	0.06	21.00	0.02
3.083	0.03	9.083	1.60	15.083	0.05	21.08	0.02
3.167	0.03	9.167	1.60	15.167	0.05	21.17	0.02
3.250	0.03	9.250	1.26	15.250	0.05	21.25	0.02
3.333	0.03	9.333	1.26	15.333	0.05	21.33	0.02
3.417	0.03	9.417	1.02	15.417	0.05	21.42	0.02
3.500	0.03	9.500	1.02	15.500	0.05	21.50	0.02
3.583	0.04	9.583	0.85	15.583	0.05	21.58	0.01
3.667	0.04	9.667	0.85	15.667	0.05	21.67	0.01
3.750	0.04	9.750	0.71	15.750	0.04	21.75	0.01
3.833	0.04	9.833	0.71	15.833	0.04	21.83	0.01
3.917	0.04	9.917	0.61	15.917	0.04	21.92	0.01
4.000	0.04	10.000	0.61	16.000	0.04	22.00	0.01
4.083	0.05	10.083	0.52	16.083	0.04	22.08	0.01
4.167	0.05	10.167	0.52	16.167	0.04	22.17	0.01
4.250	0.05	10.250	0.46	16.250	0.04	22.25	0.01
4.333	0.05	10.333	0.46	16.333	0.04	22.33	0.01
4.417	0.06	10.417	0.40	16.417	0.04	22.42	0.01
4.500	0.06	10.500	0.40	16.500	0.04	22.50	0.01
4.583	0.06	10.583	0.35	16.583	0.04	22.58	0.01
4.667	0.06	10.667	0.35	16.667	0.04	22.67	0.01
4.750	0.07	10.750	0.32	16.750	0.04	22.75	0.01
4.833	0.07	10.833	0.32	16.833	0.04	22.83	0.01
4.917	0.08	10.917	0.28	16.917	0.03	22.92	0.01
5.000	0.08	11.000	0.28	17.000	0.03	23.00	0.01
5.083	0.09	11.083	0.26	17.083	0.03	23.08	0.01
5.167	0.09	11.167	0.26	17.167	0.03	23.17	0.01
5.250	0.10	11.250	0.23	17.250	0.03	23.25	0.01
5.333	0.10	11.333	0.23	17.333	0.03	23.33	0.01
5.417	0.11	11.417	0.21	17.417	0.03	23.42	0.01
5.500	0.11	11.500	0.21	17.500	0.03	23.50	0.01

5.583	0.13	11.583	0.19	17.583	0.03	23.58	0.01
5.667	0.13	11.667	0.19	17.667	0.03	23.67	0.01
5.750	0.15	11.750	0.18	17.750	0.03	23.75	0.01
5.833	0.15	11.833	0.18	17.833	0.03	23.83	0.01
5.917	0.17	11.917	0.16	17.917	0.03	23.92	0.01
6.000	0.17	12.000	0.16	18.000	0.03	24.00	0.01

Unit Hyd Qpeak (cms)= 1.091

PEAK FLOW (cms)= 0.067 (i)
TIME TO PEAK (hrs)= 8.167
RUNOFF VOLUME (mm)= 3.668
TOTAL RAINFALL (mm)= 29.368
RUNOFF COEFFICIENT = 0.125

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

CALIB NASHYD (0082) | Area (ha)= 25.82 Curve Number (CN)= 65.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.31

Unit Hyd Qpeak (cms)= 3.181

PEAK FLOW (cms)= 0.262 (i)
TIME TO PEAK (hrs)= 8.333
RUNOFF VOLUME (mm)= 3.684
TOTAL RAINFALL (mm)= 29.368
RUNOFF COEFFICIENT = 0.125

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

SHIFT HYD (0083)
IN= 2---> OUT= 1
SHIFT= 48.6 min

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID= 2 (0082):	25.82	0.26	8.33	3.68
SHIFT ID= 1 (0083):	25.82	0.26	9.08	3.68

CALIB NASHYD (0080) | Area (ha)= 12.25 Curve Number (CN)= 65.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.19

Unit Hyd Qpeak (cms)= 2.463

PEAK FLOW (cms)= 0.163 (i)
TIME TO PEAK (hrs)= 8.167
RUNOFF VOLUME (mm)= 3.677
TOTAL RAINFALL (mm)= 29.368
RUNOFF COEFFICIENT = 0.125

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

SHIFT HYD (0081)
IN= 2---> OUT= 1
SHIFT= 69.0 min

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID= 2 (0080):	12.25	0.16	8.17	3.68
SHIFT ID= 1 (0081):	12.25	0.16	9.25	3.68

CALIB NASHYD (0084) | Area (ha)= 12.70 Curve Number (CN)= 65.0
ID= 1 DT= 5.0 min | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.09

Unit Hyd Qpeak (cms)= 5.390

PEAK FLOW (cms)= 0.225 (i)
TIME TO PEAK (hrs)= 8.000
RUNOFF VOLUME (mm)= 3.546
TOTAL RAINFALL (mm)= 29.368
RUNOFF COEFFICIENT = 0.121

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

--------------------------------------------------------------------------------
--------------------
| SHIFT HYD (0085) |
| IN= 2---> OUT= 1 |
| SHIFT= 13.3 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0084):   12.70     0.22      8.00      3.55
    SHIFT ID= 1 (0085):   12.70     0.22      8.17      3.55

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0088) |   Area    (ha)=  16.55   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.46

     Unit Hyd Qpeak  (cms)=   1.374

     PEAK FLOW       (cms)=   0.129 (i)
     TIME TO PEAK    (hrs)=   8.583
     RUNOFF VOLUME    (mm)=   3.685
     TOTAL RAINFALL   (mm)=  29.368
     RUNOFF COEFFICIENT   =   0.125

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0086) |   Area    (ha)=  17.89   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.23

     Unit Hyd Qpeak  (cms)=   2.971

     PEAK FLOW       (cms)=   0.218 (i)
     TIME TO PEAK    (hrs)=   8.250
     RUNOFF VOLUME    (mm)=   3.681
     TOTAL RAINFALL   (mm)=  29.368
     RUNOFF COEFFICIENT   =   0.125

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

--------------------------------------------------------------------------------
--------------------
| SHIFT HYD (0087) |
| IN= 2---> OUT= 1 |
| SHIFT= 12.9 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0086):   17.89     0.22      8.25      3.68
    SHIFT ID= 1 (0087):   17.89     0.22      8.42      3.68

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

--------------------
| ADD HYD   (0089) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0081):    12.25   0.163     9.25     3.68
        + ID2= 2 (0083):    25.82   0.262     9.08     3.68
          ================================================
          ID = 3 (0089):    38.07   0.407     9.25     3.68

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0089) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0089):    38.07   0.407     9.25     3.68
        + ID2= 2 (0085):    12.70   0.225     8.17     3.55
          ================================================
          ID = 1 (0089):    50.77   0.423     9.25     3.65

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0089) |
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```
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0089):    50.77   0.423     9.25     3.65
        + ID2= 2 (0087):    17.89   0.218     8.42     3.68
          ================================================
          ID = 3 (0089):    68.66   0.464     9.25     3.66

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0089) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0089):    68.66   0.464     9.25     3.66
        + ID2= 2 (0088):    16.55   0.129     8.58     3.68
          ================================================
          ID = 1 (0089):    85.21   0.534     9.17     3.66

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0092) |   Area    (ha)=   9.67   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

     Unit Hyd Qpeak  (cms)=   0.901

     PEAK FLOW       (cms)=   0.082 (i)
     TIME TO PEAK    (hrs)=   8.500
     RUNOFF VOLUME    (mm)=   3.685
     TOTAL RAINFALL   (mm)=  29.368
     RUNOFF COEFFICIENT   =   0.125

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0090) |   Area    (ha)=  14.48   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.35

     Unit Hyd Qpeak  (cms)=   1.580

     PEAK FLOW       (cms)=   0.137 (i)
     TIME TO PEAK    (hrs)=   8.417
     RUNOFF VOLUME    (mm)=   3.684
     TOTAL RAINFALL   (mm)=  29.368
     RUNOFF COEFFICIENT   =   0.125

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

--------------------------------------------------------------------------------
--------------------
| SHIFT HYD (0091) |
| IN= 2---> OUT= 1 |
| SHIFT= 36.5 min  |       AREA     QPEAK     TPEAK      R.V.
------------------            (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0090):    14.48      0.14      8.42      3.68
    SHIFT ID= 1 (0091):    14.48      0.14      9.00      3.68

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--------------------
| ADD HYD   (0094) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0089):    85.21   0.534     9.17     3.66
        + ID2= 2 (0091):    14.48   0.137     9.00     3.68
          ================================================
          ID = 3 (0094):    99.69   0.658     9.17     3.67

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0094) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
------------------           (ha)    (cms)    (hrs)     (mm)
```

```
          ID1= 3 (0094):    99.69   0.658     9.17     3.67
        + ID2= 2 (0092):     9.67   0.082     8.50     3.68
          ================================================
          ID = 1 (0094):   109.36   0.695     9.17     3.67

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0094) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0094):   109.36   0.695     9.17     3.67
        + ID2= 2 (0093):     4.57   0.067     8.17     3.67
          ================================================
          ID = 3 (0094):   113.93   0.702     9.17     3.67

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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  ****************************
  ** SIMULATION NUMBER:   0 **
  ****************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=2464.000
| Ptotal= 40.62 mm |                          B=  16.000
--------------------                          C=   1.000
                         used in:   INTENSITY =  A / (t + B)^C

                         Duration of storm  = 24.00 hrs
                         Storm time step    = 10.00 min
                         Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.17    0.02 |  6.17    0.34 | 12.17    0.25 | 18.17    0.05
                0.33    0.02 |  6.33    0.41 | 12.33    0.24 | 18.33    0.04
                0.50    0.02 |  6.50    0.50 | 12.50    0.22 | 18.50    0.04
                0.67    0.02 |  6.67    0.63 | 12.67    0.21 | 18.67    0.04
                0.83    0.02 |  6.83    0.81 | 12.83    0.19 | 18.83    0.04
                1.00    0.02 |  7.00    1.09 | 13.00    0.18 | 19.00    0.04
                1.17    0.03 |  7.17    1.53 | 13.17    0.17 | 19.17    0.04
                1.33    0.03 |  7.33    2.32 | 13.33    0.16 | 19.33    0.04
                1.50    0.03 |  7.50    3.95 | 13.50    0.15 | 19.50    0.04
                1.67    0.03 |  7.67    8.18 | 13.67    0.14 | 19.67    0.03
                1.83    0.03 |  7.83   27.06 | 13.83    0.13 | 19.83    0.03
                2.00    0.03 |  8.00   94.77 | 14.00    0.13 | 20.00    0.03
                2.17    0.03 |  8.17   36.99 | 14.17    0.12 | 20.17    0.03
                2.33    0.04 |  8.33   17.18 | 14.33    0.11 | 20.33    0.03
                2.50    0.04 |  8.50    9.92 | 14.50    0.11 | 20.50    0.03
                2.67    0.04 |  8.67    6.46 | 14.67    0.10 | 20.67    0.03
                2.83    0.04 |  8.83    4.54 | 14.83    0.10 | 20.83    0.03
                3.00    0.05 |  9.00    3.37 | 15.00    0.09 | 21.00    0.03
                3.17    0.05 |  9.17    2.60 | 15.17    0.09 | 21.17    0.03
                3.33    0.05 |  9.33    2.06 | 15.33    0.09 | 21.33    0.03
                3.50    0.06 |  9.50    1.68 | 15.50    0.08 | 21.50    0.03
                3.67    0.06 |  9.67    1.39 | 15.67    0.08 | 21.67    0.03
                3.83    0.07 |  9.83    1.17 | 15.83    0.08 | 21.83    0.02
                4.00    0.07 | 10.00    1.00 | 16.00    0.07 | 22.00    0.02
                4.17    0.08 | 10.17    0.87 | 16.17    0.07 | 22.17    0.02
                4.33    0.09 | 10.33    0.76 | 16.33    0.07 | 22.33    0.02
                4.50    0.10 | 10.50    0.67 | 16.50    0.06 | 22.50    0.02
                4.67    0.11 | 10.67    0.59 | 16.67    0.06 | 22.67    0.02
                4.83    0.12 | 10.83    0.53 | 16.83    0.06 | 22.83    0.02
                5.00    0.13 | 11.00    0.47 | 17.00    0.06 | 23.00    0.02
                5.17    0.15 | 11.17    0.43 | 17.17    0.06 | 23.17    0.02
                5.33    0.16 | 11.33    0.39 | 17.33    0.05 | 23.33    0.02
                5.50    0.19 | 11.50    0.35 | 17.50    0.05 | 23.50    0.02
                5.67    0.21 | 11.67    0.33 | 17.67    0.05 | 23.67    0.02
                5.83    0.25 | 11.83    0.30 | 17.83    0.05 | 23.83    0.02
                6.00    0.29 | 12.00    0.28 | 18.00    0.05 | 24.00    0.02


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--------------------
| CALIB            |
| NASHYD    (0093) |   Area    (ha)=   4.57   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.16

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

5yr

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.02	6.083	0.34	12.083	0.25	18.08	0.05
0.167	0.02	6.167	0.34	12.167	0.25	18.17	0.05
0.250	0.02	6.250	0.41	12.250	0.24	18.25	0.04
0.333	0.02	6.333	0.41	12.333	0.24	18.33	0.04
0.417	0.02	6.417	0.50	12.417	0.22	18.42	0.04
0.500	0.02	6.500	0.50	12.500	0.22	18.50	0.04
0.583	0.02	6.583	0.63	12.583	0.21	18.58	0.04
0.667	0.02	6.667	0.63	12.667	0.21	18.67	0.04
0.750	0.02	6.750	0.81	12.750	0.19	18.75	0.04
0.833	0.02	6.833	0.81	12.833	0.19	18.83	0.04
0.917	0.02	6.917	1.09	12.917	0.18	18.92	0.04
1.000	0.02	7.000	1.09	13.000	0.18	19.00	0.04
1.083	0.03	7.083	1.53	13.083	0.17	19.08	0.04
1.167	0.03	7.167	1.53	13.167	0.17	19.17	0.04
1.250	0.03	7.250	2.32	13.250	0.16	19.25	0.04
1.333	0.03	7.333	2.32	13.333	0.16	19.33	0.04
1.417	0.03	7.417	3.95	13.417	0.15	19.42	0.04
1.500	0.03	7.500	3.95	13.500	0.15	19.50	0.04
1.583	0.03	7.583	8.18	13.583	0.14	19.58	0.03
1.667	0.03	7.667	8.18	13.667	0.14	19.67	0.03
1.750	0.03	7.750	27.06	13.750	0.13	19.75	0.03
1.833	0.03	7.833	27.07	13.833	0.13	19.83	0.03
1.917	0.03	7.917	94.77	13.917	0.13	19.92	0.03
2.000	0.03	8.000	94.77	14.000	0.13	20.00	0.03
2.083	0.03	8.083	36.99	14.083	0.12	20.08	0.03
2.167	0.03	8.167	36.99	14.167	0.12	20.17	0.03
2.250	0.04	8.250	17.18	14.250	0.11	20.25	0.03
2.333	0.04	8.333	17.18	14.333	0.11	20.33	0.03
2.417	0.04	8.417	9.92	14.417	0.11	20.42	0.03
2.500	0.04	8.500	9.92	14.500	0.11	20.50	0.03
2.583	0.04	8.583	6.46	14.583	0.10	20.58	0.03
2.667	0.04	8.667	6.46	14.667	0.10	20.67	0.03
2.750	0.04	8.750	4.54	14.750	0.10	20.75	0.03
2.833	0.04	8.833	4.54	14.833	0.10	20.83	0.03
2.917	0.05	8.917	3.37	14.917	0.09	20.92	0.03
3.000	0.05	9.000	3.37	15.000	0.09	21.00	0.03
3.083	0.05	9.083	2.60	15.083	0.09	21.08	0.03
3.167	0.05	9.167	2.60	15.167	0.09	21.17	0.03
3.250	0.05	9.250	2.06	15.250	0.09	21.25	0.03
3.333	0.05	9.333	2.06	15.333	0.09	21.33	0.03
3.417	0.06	9.417	1.68	15.417	0.08	21.42	0.03
3.500	0.06	9.500	1.68	15.500	0.08	21.50	0.03
3.583	0.06	9.583	1.39	15.583	0.08	21.58	0.03
3.667	0.06	9.667	1.39	15.667	0.08	21.67	0.03
3.750	0.07	9.750	1.17	15.750	0.08	21.75	0.02
3.833	0.07	9.833	1.17	15.833	0.08	21.83	0.02
3.917	0.07	9.917	1.00	15.917	0.07	21.92	0.02
4.000	0.07	10.000	1.00	16.000	0.07	22.00	0.02
4.083	0.08	10.083	0.87	16.083	0.07	22.08	0.02
4.167	0.08	10.167	0.87	16.167	0.07	22.17	0.02
4.250	0.09	10.250	0.76	16.250	0.07	22.25	0.02
4.333	0.09	10.333	0.76	16.333	0.07	22.33	0.02
4.417	0.10	10.417	0.67	16.417	0.06	22.42	0.02
4.500	0.10	10.500	0.67	16.500	0.06	22.50	0.02
4.583	0.11	10.583	0.59	16.583	0.06	22.58	0.02
4.667	0.11	10.667	0.59	16.667	0.06	22.67	0.02
4.750	0.12	10.750	0.53	16.750	0.06	22.75	0.02
4.833	0.12	10.833	0.53	16.833	0.06	22.83	0.02
4.917	0.13	10.917	0.47	16.917	0.06	22.92	0.02
5.000	0.13	11.000	0.47	17.000	0.06	23.00	0.02
5.083	0.15	11.083	0.43	17.083	0.06	23.08	0.02
5.167	0.15	11.167	0.43	17.167	0.06	23.17	0.02
5.250	0.16	11.250	0.39	17.250	0.05	23.25	0.02
5.333	0.16	11.333	0.39	17.333	0.05	23.33	0.02
5.417	0.19	11.417	0.35	17.417	0.05	23.42	0.02
5.500	0.19	11.500	0.35	17.500	0.05	23.50	0.02
5.583	0.21	11.583	0.33	17.583	0.05	23.58	0.02
5.667	0.21	11.667	0.33	17.667	0.05	23.67	0.02
5.750	0.25	11.750	0.30	17.750	0.05	23.75	0.02
5.833	0.25	11.833	0.30	17.833	0.05	23.83	0.02
5.917	0.29	11.917	0.28	17.917	0.05	23.92	0.02
6.000	0.29	12.000	0.28	18.000	0.05	24.00	0.02

Unit Hyd Qpeak (cms)= 1.091

PEAK FLOW (cms)= 0.126 (i)
TIME TO PEAK (hrs)= 8.167
RUNOFF VOLUME (mm)= 7.325
TOTAL RAINFALL (mm)= 40.615
RUNOFF COEFFICIENT = 0.180

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

CALIB					
NASHYD (0082)	Area (ha)= 25.82	Curve Number (CN)= 65.0			
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.31				

Unit Hyd Qpeak (cms)= 3.181

PEAK FLOW (cms)= 0.499 (i)
TIME TO PEAK (hrs)= 8.333
RUNOFF VOLUME (mm)= 7.356
TOTAL RAINFALL (mm)= 40.615
RUNOFF COEFFICIENT = 0.181

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

SHIFT HYD (0083)				
IN= 2---> OUT= 1				
SHIFT= 48.6 min	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID= 2 (0082):	25.82	0.50	8.33	7.36
SHIFT ID= 1 (0083):	25.82	0.50	9.08	7.36

CALIB					
NASHYD (0080)	Area (ha)= 12.25	Curve Number (CN)= 65.0			
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.19				

Unit Hyd Qpeak (cms)= 2.463

PEAK FLOW (cms)= 0.307 (i)
TIME TO PEAK (hrs)= 8.167
RUNOFF VOLUME (mm)= 7.341
TOTAL RAINFALL (mm)= 40.615
RUNOFF COEFFICIENT = 0.181

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

SHIFT HYD (0081)				
IN= 2---> OUT= 1				
SHIFT= 69.0 min	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID= 2 (0080):	12.25	0.31	8.17	7.34
SHIFT ID= 1 (0081):	12.25	0.31	9.25	7.34

CALIB					
NASHYD (0084)	Area (ha)= 12.70	Curve Number (CN)= 65.0			
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00			
	U.H. Tp(hrs)= 0.09				

Unit Hyd Qpeak (cms)= 5.390

PEAK FLOW (cms)= 0.419 (i)
TIME TO PEAK (hrs)= 8.000
RUNOFF VOLUME (mm)= 7.080
TOTAL RAINFALL (mm)= 40.615
RUNOFF COEFFICIENT = 0.174

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

SHIFT HYD (0085)				
IN= 2---> OUT= 1				
SHIFT= 13.3 min	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID= 2 (0084):	12.70	0.42	8.00	7.08
SHIFT ID= 1 (0085):	12.70	0.42	8.17	7.08

CALIB

```
| NASHYD    (0088) |   Area    (ha)=  16.55   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.46

     Unit Hyd Qpeak  (cms)=   1.374

     PEAK FLOW       (cms)=   0.249 (i)
     TIME TO PEAK    (hrs)=   8.583
     RUNOFF VOLUME    (mm)=   7.358
     TOTAL RAINFALL   (mm)=  40.615
     RUNOFF COEFFICIENT   =   0.181

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

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| NASHYD    (0086) |   Area    (ha)=  17.89   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.23

     Unit Hyd Qpeak  (cms)=   2.971

     PEAK FLOW       (cms)=   0.411 (i)
     TIME TO PEAK    (hrs)=   8.250
     RUNOFF VOLUME    (mm)=   7.350
     TOTAL RAINFALL   (mm)=  40.615
     RUNOFF COEFFICIENT   =   0.181

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

--------------------------------------------------------------------------------
--------------------
| SHIFT HYD (0087) |
| IN= 2---> OUT= 1 |
| SHIFT= 12.9 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0086):   17.89     0.41      8.25      7.35
    SHIFT ID= 1 (0087):   17.89     0.41      8.42      7.35

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

--------------------
| ADD HYD   (0089) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0081):    12.25   0.307     9.25     7.34
        + ID2= 2 (0083):    25.82   0.499     9.08     7.36
          ================================================
          ID = 3 (0089):    38.07   0.774     9.25     7.35

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0089) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0089):    38.07   0.774     9.25     7.35
        + ID2= 2 (0085):    12.70   0.419     8.17     7.08
          ================================================
          ID = 1 (0089):    50.77   0.810     9.25     7.28

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0089) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0089):    50.77   0.810     9.25     7.28
        + ID2= 2 (0087):    17.89   0.411     8.42     7.35
          ================================================
          ID = 3 (0089):    68.66   0.895     9.17     7.30

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0089) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
```

```
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0089):    68.66   0.895     9.17     7.30
        + ID2= 2 (0088):    16.55   0.249     8.58     7.36
          ================================================
          ID = 1 (0089):    85.21   1.037     9.17     7.31

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| NASHYD    (0092)  |   Area    (ha)=   9.67   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

     Unit Hyd Qpeak  (cms)=   0.901

     PEAK FLOW       (cms)=   0.157 (i)
     TIME TO PEAK    (hrs)=   8.500
     RUNOFF VOLUME    (mm)=   7.357
     TOTAL RAINFALL   (mm)=  40.615
     RUNOFF COEFFICIENT   =   0.181

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

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| NASHYD    (0090)  |   Area    (ha)=  14.48   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.35

     Unit Hyd Qpeak  (cms)=   1.580

     PEAK FLOW       (cms)=   0.261 (i)
     TIME TO PEAK    (hrs)=   8.417
     RUNOFF VOLUME    (mm)=   7.357
     TOTAL RAINFALL   (mm)=  40.615
     RUNOFF COEFFICIENT   =   0.181

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

--------------------------------------------------------------------------------
--------------------
| SHIFT HYD (0091)  |
| IN= 2---> OUT= 1  |
| SHIFT= 36.5 min   |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0090):   14.48     0.26      8.42      7.36
    SHIFT ID= 1 (0091):   14.48     0.26      9.00      7.36

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

--------------------
| ADD HYD   (0094)  |
|   1 +  2 =  3     |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0089):    85.21   1.037     9.17     7.31
        + ID2= 2 (0091):    14.48   0.261     9.00     7.36
          ================================================
          ID = 3 (0094):    99.69   1.276     9.17     7.32

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0094)  |
|   3 +  2 =  1     |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0094):    99.69   1.276     9.17     7.32
        + ID2= 2 (0092):     9.67   0.157     8.50     7.36
          ================================================
          ID = 1 (0094):   109.36   1.351     9.17     7.32

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0094)  |
|   1 +  2 =  3     |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0094):   109.36   1.351     9.17     7.32
```

```
       + ID2= 2 (0093):     4.57   0.126     8.17     7.33
         ================================================
         ID = 3 (0094):   113.93   1.365     9.17     7.32

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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  ****************************
  ** SIMULATION NUMBER:   0 **  10yr
  ****************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A=2819.000
| Ptotal= 46.47 mm |                          B=  16.000
--------------------                          C=   1.000
                         used in:   INTENSITY =  A / (t + B)^C

                         Duration of storm  = 24.00 hrs
                         Storm time step    = 10.00 min
                         Time to peak ratio =  0.33
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.17	0.02	6.17	0.39	12.17	0.29	18.17	0.05
0.33	0.02	6.33	0.47	12.33	0.27	18.33	0.05
0.50	0.02	6.50	0.57	12.50	0.25	18.50	0.05
0.67	0.03	6.67	0.72	12.67	0.23	18.67	0.05
0.83	0.03	6.83	0.93	12.83	0.22	18.83	0.05
1.00	0.03	7.00	1.24	13.00	0.21	19.00	0.04
1.17	0.03	7.17	1.75	13.17	0.19	19.17	0.04
1.33	0.03	7.33	2.66	13.33	0.18	19.33	0.04
1.50	0.03	7.50	4.51	13.50	0.17	19.50	0.04
1.67	0.03	7.67	9.35	13.67	0.16	19.67	0.04
1.83	0.04	7.83	30.96	13.83	0.15	19.83	0.04
2.00	0.04	8.00	108.42	14.00	0.14	20.00	0.04
2.17	0.04	8.17	42.32	14.17	0.14	20.17	0.04
2.33	0.04	8.33	19.65	14.33	0.13	20.33	0.04
2.50	0.04	8.50	11.35	14.50	0.12	20.50	0.03
2.67	0.05	8.67	7.39	14.67	0.12	20.67	0.03
2.83	0.05	8.83	5.20	14.83	0.11	20.83	0.03
3.00	0.05	9.00	3.85	15.00	0.11	21.00	0.03
3.17	0.06	9.17	2.97	15.17	0.10	21.17	0.03
3.33	0.06	9.33	2.36	15.33	0.10	21.33	0.03
3.50	0.07	9.50	1.92	15.50	0.09	21.50	0.03
3.67	0.07	9.67	1.59	15.67	0.09	21.67	0.03
3.83	0.08	9.83	1.34	15.83	0.09	21.83	0.03
4.00	0.08	10.00	1.15	16.00	0.08	22.00	0.03
4.17	0.09	10.17	0.99	16.17	0.08	22.17	0.03
4.33	0.10	10.33	0.87	16.33	0.08	22.33	0.03
4.50	0.11	10.50	0.76	16.50	0.07	22.50	0.03
4.67	0.12	10.67	0.68	16.67	0.07	22.67	0.03
4.83	0.13	10.83	0.60	16.83	0.07	22.83	0.02
5.00	0.15	11.00	0.54	17.00	0.07	23.00	0.02
5.17	0.17	11.17	0.49	17.17	0.06	23.17	0.02
5.33	0.19	11.33	0.45	17.33	0.06	23.33	0.02
5.50	0.21	11.50	0.41	17.50	0.06	23.50	0.02
5.67	0.24	11.67	0.37	17.67	0.06	23.67	0.02
5.83	0.28	11.83	0.34	17.83	0.06	23.83	0.02
6.00	0.33	12.00	0.32	18.00	0.05	24.00	0.02

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--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0093) |   Area    (ha)=   4.57   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.16

        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	0.02	6.083	0.39	12.083	0.29	18.08	0.05
0.167	0.02	6.167	0.39	12.167	0.29	18.17	0.05
0.250	0.02	6.250	0.47	12.250	0.27	18.25	0.05
0.333	0.02	6.333	0.47	12.333	0.27	18.33	0.05
0.417	0.02	6.417	0.57	12.417	0.25	18.42	0.05
0.500	0.02	6.500	0.57	12.500	0.25	18.50	0.05
0.583	0.03	6.583	0.72	12.583	0.23	18.58	0.05
0.667	0.03	6.667	0.72	12.667	0.23	18.67	0.05
0.750	0.03	6.750	0.93	12.750	0.22	18.75	0.05
0.833	0.03	6.833	0.93	12.833	0.22	18.83	0.05

0.917	0.03	6.917	1.24	12.917	0.21	18.92	0.04
1.000	0.03	7.000	1.24	13.000	0.21	19.00	0.04
1.083	0.03	7.083	1.75	13.083	0.19	19.08	0.04
1.167	0.03	7.167	1.75	13.167	0.19	19.17	0.04
1.250	0.03	7.250	2.66	13.250	0.18	19.25	0.04
1.333	0.03	7.333	2.66	13.333	0.18	19.33	0.04
1.417	0.03	7.417	4.51	13.417	0.17	19.42	0.04
1.500	0.03	7.500	4.51	13.500	0.17	19.50	0.04
1.583	0.03	7.583	9.35	13.583	0.16	19.58	0.04
1.667	0.03	7.667	9.36	13.667	0.16	19.67	0.04
1.750	0.04	7.750	30.96	13.750	0.15	19.75	0.04
1.833	0.04	7.833	30.97	13.833	0.15	19.83	0.04
1.917	0.04	7.917	108.42	13.917	0.14	19.92	0.04
2.000	0.04	8.000	108.42	14.000	0.14	20.00	0.04
2.083	0.04	8.083	42.32	14.083	0.14	20.08	0.04
2.167	0.04	8.167	42.32	14.167	0.14	20.17	0.04
2.250	0.04	8.250	19.65	14.250	0.13	20.25	0.04
2.333	0.04	8.333	19.65	14.333	0.13	20.33	0.04
2.417	0.04	8.417	11.35	14.417	0.12	20.42	0.03
2.500	0.04	8.500	11.35	14.500	0.12	20.50	0.03
2.583	0.05	8.583	7.39	14.583	0.12	20.58	0.03
2.667	0.05	8.667	7.39	14.667	0.12	20.67	0.03
2.750	0.05	8.750	5.20	14.750	0.11	20.75	0.03
2.833	0.05	8.833	5.20	14.833	0.11	20.83	0.03
2.917	0.05	8.917	3.85	14.917	0.11	20.92	0.03
3.000	0.05	9.000	3.85	15.000	0.11	21.00	0.03
3.083	0.06	9.083	2.97	15.083	0.10	21.08	0.03
3.167	0.06	9.167	2.97	15.167	0.10	21.17	0.03
3.250	0.06	9.250	2.36	15.250	0.10	21.25	0.03
3.333	0.06	9.333	2.36	15.333	0.10	21.33	0.03
3.417	0.07	9.417	1.92	15.417	0.09	21.42	0.03
3.500	0.07	9.500	1.92	15.500	0.09	21.50	0.03
3.583	0.07	9.583	1.59	15.583	0.09	21.58	0.03
3.667	0.07	9.667	1.59	15.667	0.09	21.67	0.03
3.750	0.08	9.750	1.34	15.750	0.09	21.75	0.03
3.833	0.08	9.833	1.34	15.833	0.09	21.83	0.03
3.917	0.08	9.917	1.15	15.917	0.08	21.92	0.03
4.000	0.08	10.000	1.15	16.000	0.08	22.00	0.03
4.083	0.09	10.083	0.99	16.083	0.08	22.08	0.03
4.167	0.09	10.167	0.99	16.167	0.08	22.17	0.03
4.250	0.10	10.250	0.87	16.250	0.08	22.25	0.03
4.333	0.10	10.333	0.87	16.333	0.08	22.33	0.03
4.417	0.11	10.417	0.76	16.417	0.07	22.42	0.03
4.500	0.11	10.500	0.76	16.500	0.07	22.50	0.03
4.583	0.12	10.583	0.68	16.583	0.07	22.58	0.03
4.667	0.12	10.667	0.68	16.667	0.07	22.67	0.03
4.750	0.13	10.750	0.60	16.750	0.07	22.75	0.02
4.833	0.13	10.833	0.60	16.833	0.07	22.83	0.02
4.917	0.15	10.917	0.54	16.917	0.07	22.92	0.02
5.000	0.15	11.000	0.54	17.000	0.07	23.00	0.02
5.083	0.17	11.083	0.49	17.083	0.06	23.08	0.02
5.167	0.17	11.167	0.49	17.167	0.06	23.17	0.02
5.250	0.19	11.250	0.45	17.250	0.06	23.25	0.02
5.333	0.19	11.333	0.45	17.333	0.06	23.33	0.02
5.417	0.21	11.417	0.41	17.417	0.06	23.42	0.02
5.500	0.21	11.500	0.41	17.500	0.06	23.50	0.02
5.583	0.24	11.583	0.37	17.583	0.06	23.58	0.02
5.667	0.24	11.667	0.37	17.667	0.06	23.67	0.02
5.750	0.28	11.750	0.34	17.750	0.06	23.75	0.02
5.833	0.28	11.833	0.34	17.833	0.06	23.83	0.02
5.917	0.33	11.917	0.32	17.917	0.05	23.92	0.02
6.000	0.33	12.000	0.32	18.000	0.05	24.00	0.02

Unit Hyd Qpeak (cms)= 1.091

PEAK FLOW (cms)= 0.167 (i)
TIME TO PEAK (hrs)= 8.167
RUNOFF VOLUME (mm)= 9.604
TOTAL RAINFALL (mm)= 46.467
RUNOFF COEFFICIENT = 0.207

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

CALIB			
NASHYD (0082)	Area (ha)= 25.82	Curve Number (CN)= 65.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.31		

Unit Hyd Qpeak (cms)= 3.181

PEAK FLOW (cms)= 0.662 (i)
TIME TO PEAK (hrs)= 8.333

```
     RUNOFF VOLUME    (mm)=   9.644
     TOTAL RAINFALL   (mm)=  46.467
     RUNOFF COEFFICIENT   =   0.208

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

--------------------------------------------------------------------------------
--------------------
| SHIFT HYD (0083) |
| IN= 2---> OUT= 1 |
| SHIFT= 48.6 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0082):   25.82      0.66      8.33      9.64
    SHIFT ID= 1 (0083):   25.82      0.66      9.08      9.64

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD    (0080) |   Area    (ha)=  12.25   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.19

     Unit Hyd Qpeak  (cms)=   2.463

     PEAK FLOW       (cms)=   0.409 (i)
     TIME TO PEAK    (hrs)=   8.167
     RUNOFF VOLUME    (mm)=   9.625
     TOTAL RAINFALL   (mm)=  46.467
     RUNOFF COEFFICIENT   =   0.207

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

--------------------------------------------------------------------------------
--------------------
| SHIFT HYD (0081) |
| IN= 2---> OUT= 1 |
| SHIFT= 69.0 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0080):   12.25      0.41      8.17      9.62
    SHIFT ID= 1 (0081):   12.25      0.41      9.25      9.62

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD    (0084) |   Area    (ha)=  12.70   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.09

     Unit Hyd Qpeak  (cms)=   5.390

     PEAK FLOW       (cms)=   0.564 (i)
     TIME TO PEAK    (hrs)=   8.000
     RUNOFF VOLUME    (mm)=   9.283
     TOTAL RAINFALL   (mm)=  46.467
     RUNOFF COEFFICIENT   =   0.200

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

--------------------------------------------------------------------------------
--------------------
| SHIFT HYD (0085) |
| IN= 2---> OUT= 1 |
| SHIFT= 13.3 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0084):   12.70      0.56      8.00      9.28
    SHIFT ID= 1 (0085):   12.70      0.56      8.17      9.28

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD    (0088) |   Area    (ha)=  16.55   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.46

     Unit Hyd Qpeak  (cms)=   1.374

     PEAK FLOW       (cms)=   0.329 (i)
     TIME TO PEAK    (hrs)=   8.583
     RUNOFF VOLUME    (mm)=   9.647
     TOTAL RAINFALL   (mm)=  46.467
     RUNOFF COEFFICIENT   =   0.208

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0086) |   Area    (ha)=  17.89   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.23

     Unit Hyd Qpeak  (cms)=   2.971

     PEAK FLOW       (cms)=   0.546 (i)
     TIME TO PEAK    (hrs)=   8.250
     RUNOFF VOLUME    (mm)=   9.637
     TOTAL RAINFALL   (mm)=  46.467
     RUNOFF COEFFICIENT   =   0.207

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

--------------------------------------------------------------------------------
--------------------
| SHIFT HYD (0087) |
| IN= 2---> OUT= 1 |
| SHIFT= 12.9 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0086):   17.89     0.55      8.25      9.64
    SHIFT ID= 1 (0087):   17.89     0.55      8.42      9.64

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

--------------------
| ADD HYD   (0089) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0081):    12.25   0.409     9.25     9.62
        + ID2= 2 (0083):    25.82   0.662     9.08     9.64
          ================================================
          ID = 3 (0089):    38.07   1.023     9.25     9.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0089) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0089):    38.07   1.023     9.25     9.64
        + ID2= 2 (0085):    12.70   0.564     8.17     9.28
          ================================================
          ID = 1 (0089):    50.77   1.068     9.25     9.55

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0089) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0089):    50.77   1.068     9.25     9.55
        + ID2= 2 (0087):    17.89   0.546     8.42     9.64
          ================================================
          ID = 3 (0089):    68.66   1.184     9.17     9.57

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0089) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0089):    68.66   1.184     9.17     9.57
        + ID2= 2 (0088):    16.55   0.329     8.58     9.65
          ================================================
          ID = 1 (0089):    85.21   1.368     9.17     9.59

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0092) |   Area    (ha)=   9.67   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41
```

```
     Unit Hyd Qpeak  (cms)=   0.901

     PEAK FLOW       (cms)=   0.208 (i)
     TIME TO PEAK    (hrs)=   8.500
     RUNOFF VOLUME    (mm)=   9.646
     TOTAL RAINFALL   (mm)=  46.467
     RUNOFF COEFFICIENT   =   0.208

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0090) |   Area    (ha)=  14.48   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.35

     Unit Hyd Qpeak  (cms)=   1.580

     PEAK FLOW       (cms)=   0.346 (i)
     TIME TO PEAK    (hrs)=   8.417
     RUNOFF VOLUME    (mm)=   9.645
     TOTAL RAINFALL   (mm)=  46.467
     RUNOFF COEFFICIENT   =   0.208

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

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--------------------
| SHIFT HYD (0091) |
| IN= 2---> OUT= 1 |
| SHIFT= 36.5 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0090):   14.48     0.35      8.42      9.65
    SHIFT ID= 1 (0091):   14.48     0.35      9.00      9.65

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--------------------
| ADD HYD   (0094) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0089):    85.21   1.368     9.17     9.59
        + ID2= 2 (0091):    14.48   0.346     9.00     9.65
          ================================================
          ID = 3 (0094):    99.69   1.683     9.17     9.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0094) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0094):    99.69   1.683     9.17     9.60
        + ID2= 2 (0092):     9.67   0.208     8.50     9.65
          ================================================
          ID = 1 (0094):   109.36   1.779     9.17     9.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0094) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0094):   109.36   1.779     9.17     9.60
        + ID2= 2 (0093):     4.57   0.167     8.17     9.60
          ================================================
          ID = 3 (0094):   113.93   1.797     9.17     9.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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  ****************************
  ** SIMULATION NUMBER:   0 **
  ****************************

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| CHICAGO STORM    |    IDF curve parameters: A=3886.000
| Ptotal= 63.97 mm |                          B=  18.000
```

25yr

---------- C= 1.000
used in: INTENSITY = A / (t + B)^C

Duration of storm = 24.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.17	0.03	6.17	0.59	12.17	0.45	18.17	0.08
0.33	0.04	6.33	0.71	12.33	0.42	18.33	0.08
0.50	0.04	6.50	0.87	12.50	0.39	18.50	0.08
0.67	0.04	6.67	1.09	12.67	0.36	18.67	0.07
0.83	0.04	6.83	1.41	12.83	0.34	18.83	0.07
1.00	0.04	7.00	1.89	13.00	0.32	19.00	0.07
1.17	0.05	7.17	2.65	13.17	0.30	19.17	0.07
1.33	0.05	7.33	4.00	13.33	0.28	19.33	0.06
1.50	0.05	7.50	6.73	13.50	0.26	19.50	0.06
1.67	0.05	7.67	13.69	13.67	0.25	19.67	0.06
1.83	0.06	7.83	43.05	13.83	0.24	19.83	0.06
2.00	0.06	8.00	138.79	14.00	0.22	20.00	0.06
2.17	0.06	8.17	58.11	14.17	0.21	20.17	0.06
2.33	0.07	8.33	28.06	14.33	0.20	20.33	0.05
2.50	0.07	8.50	16.53	14.50	0.19	20.50	0.05
2.67	0.07	8.67	10.90	14.67	0.18	20.67	0.05
2.83	0.08	8.83	7.72	14.83	0.17	20.83	0.05
3.00	0.08	9.00	5.76	15.00	0.17	21.00	0.05
3.17	0.09	9.17	4.46	15.17	0.16	21.17	0.05
3.33	0.10	9.33	3.56	15.33	0.15	21.33	0.05
3.50	0.10	9.50	2.90	15.50	0.14	21.50	0.05
3.67	0.11	9.67	2.41	15.67	0.14	21.67	0.04
3.83	0.12	9.83	2.04	15.83	0.13	21.83	0.04
4.00	0.13	10.00	1.74	16.00	0.13	22.00	0.04
4.17	0.14	10.17	1.51	16.17	0.12	22.17	0.04
4.33	0.15	10.33	1.32	16.33	0.12	22.33	0.04
4.50	0.17	10.50	1.16	16.50	0.11	22.50	0.04
4.67	0.19	10.67	1.03	16.67	0.11	22.67	0.04
4.83	0.21	10.83	0.92	16.83	0.11	22.83	0.04
5.00	0.23	11.00	0.83	17.00	0.10	23.00	0.04
5.17	0.26	11.17	0.75	17.17	0.10	23.17	0.04
5.33	0.29	11.33	0.68	17.33	0.09	23.33	0.04
5.50	0.33	11.50	0.62	17.50	0.09	23.50	0.03
5.67	0.37	11.67	0.57	17.67	0.09	23.67	0.03
5.83	0.43	11.83	0.52	17.83	0.09	23.83	0.03
6.00	0.50	12.00	0.48	18.00	0.08	24.00	0.03

CALIB	
NASHYD (0093)	Area (ha)= 4.57 Curve Number (CN)= 65.0
ID= 1 DT= 5.0 min	Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 0.16

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	0.03	6.083	0.59	12.083	0.45	18.08	0.08
0.167	0.03	6.167	0.59	12.167	0.45	18.17	0.08
0.250	0.04	6.250	0.71	12.250	0.42	18.25	0.08
0.333	0.04	6.333	0.71	12.333	0.42	18.33	0.08
0.417	0.04	6.417	0.87	12.417	0.39	18.42	0.08
0.500	0.04	6.500	0.87	12.500	0.39	18.50	0.08
0.583	0.04	6.583	1.09	12.583	0.36	18.58	0.07
0.667	0.04	6.667	1.09	12.667	0.36	18.67	0.07
0.750	0.04	6.750	1.41	12.750	0.34	18.75	0.07
0.833	0.04	6.833	1.41	12.833	0.34	18.83	0.07
0.917	0.04	6.917	1.89	12.917	0.32	18.92	0.07
1.000	0.04	7.000	1.89	13.000	0.32	19.00	0.07
1.083	0.05	7.083	2.65	13.083	0.30	19.08	0.07
1.167	0.05	7.167	2.65	13.167	0.30	19.17	0.07
1.250	0.05	7.250	4.00	13.250	0.28	19.25	0.06
1.333	0.05	7.333	4.00	13.333	0.28	19.33	0.06
1.417	0.05	7.417	6.73	13.417	0.26	19.42	0.06
1.500	0.05	7.500	6.73	13.500	0.26	19.50	0.06
1.583	0.05	7.583	13.69	13.583	0.25	19.58	0.06
1.667	0.05	7.667	13.69	13.667	0.25	19.67	0.06
1.750	0.06	7.750	43.05	13.750	0.24	19.75	0.06
1.833	0.06	7.833	43.06	13.833	0.24	19.83	0.06
1.917	0.06	7.917	138.79	13.917	0.22	19.92	0.06
2.000	0.06	8.000	138.78	14.000	0.22	20.00	0.06

2.083	0.06	8.083	58.11	14.083	0.21	20.08	0.06
2.167	0.06	8.167	58.10	14.167	0.21	20.17	0.06
2.250	0.07	8.250	28.06	14.250	0.20	20.25	0.05
2.333	0.07	8.333	28.06	14.333	0.20	20.33	0.05
2.417	0.07	8.417	16.53	14.417	0.19	20.42	0.05
2.500	0.07	8.500	16.53	14.500	0.19	20.50	0.05
2.583	0.07	8.583	10.90	14.583	0.18	20.58	0.05
2.667	0.07	8.667	10.90	14.667	0.18	20.67	0.05
2.750	0.08	8.750	7.72	14.750	0.17	20.75	0.05
2.833	0.08	8.833	7.72	14.833	0.17	20.83	0.05
2.917	0.08	8.917	5.76	14.917	0.17	20.92	0.05
3.000	0.08	9.000	5.76	15.000	0.17	21.00	0.05
3.083	0.09	9.083	4.46	15.083	0.16	21.08	0.05
3.167	0.09	9.167	4.46	15.167	0.16	21.17	0.05
3.250	0.10	9.250	3.56	15.250	0.15	21.25	0.05
3.333	0.10	9.333	3.56	15.333	0.15	21.33	0.05
3.417	0.10	9.417	2.90	15.417	0.14	21.42	0.05
3.500	0.10	9.500	2.90	15.500	0.14	21.50	0.05
3.583	0.11	9.583	2.41	15.583	0.14	21.58	0.04
3.667	0.11	9.667	2.41	15.667	0.14	21.67	0.04
3.750	0.12	9.750	2.04	15.750	0.13	21.75	0.04
3.833	0.12	9.833	2.04	15.833	0.13	21.83	0.04
3.917	0.13	9.917	1.74	15.917	0.13	21.92	0.04
4.000	0.13	10.000	1.74	16.000	0.13	22.00	0.04
4.083	0.14	10.083	1.51	16.083	0.12	22.08	0.04
4.167	0.14	10.167	1.51	16.167	0.12	22.17	0.04
4.250	0.15	10.250	1.32	16.250	0.12	22.25	0.04
4.333	0.15	10.333	1.32	16.333	0.12	22.33	0.04
4.417	0.17	10.417	1.16	16.417	0.11	22.42	0.04
4.500	0.17	10.500	1.16	16.500	0.11	22.50	0.04
4.583	0.19	10.583	1.03	16.583	0.11	22.58	0.04
4.667	0.19	10.667	1.03	16.667	0.11	22.67	0.04
4.750	0.21	10.750	0.92	16.750	0.11	22.75	0.04
4.833	0.21	10.833	0.92	16.833	0.11	22.83	0.04
4.917	0.23	10.917	0.83	16.917	0.10	22.92	0.04
5.000	0.23	11.000	0.83	17.000	0.10	23.00	0.04
5.083	0.26	11.083	0.75	17.083	0.10	23.08	0.04
5.167	0.26	11.167	0.75	17.167	0.10	23.17	0.04
5.250	0.29	11.250	0.68	17.250	0.09	23.25	0.04
5.333	0.29	11.333	0.68	17.333	0.09	23.33	0.04
5.417	0.33	11.417	0.62	17.417	0.09	23.42	0.03
5.500	0.33	11.500	0.62	17.500	0.09	23.50	0.03
5.583	0.37	11.583	0.57	17.583	0.09	23.58	0.03
5.667	0.37	11.667	0.57	17.667	0.09	23.67	0.03
5.750	0.43	11.750	0.52	17.750	0.09	23.75	0.03
5.833	0.43	11.833	0.52	17.833	0.09	23.83	0.03
5.917	0.50	11.917	0.48	17.917	0.08	23.92	0.03
6.000	0.50	12.000	0.48	18.000	0.08	24.00	0.03

Unit Hyd Qpeak (cms)= 1.091

PEAK FLOW (cms)= 0.297 (i)
TIME TO PEAK (hrs)= 8.167
RUNOFF VOLUME (mm)= 17.684
TOTAL RAINFALL (mm)= 63.967
RUNOFF COEFFICIENT = 0.276

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

CALIB			
NASHYD (0082)	Area (ha)= 25.82	Curve Number (CN)= 65.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.31		

Unit Hyd Qpeak (cms)= 3.181

PEAK FLOW (cms)= 1.194 (i)
TIME TO PEAK (hrs)= 8.333
RUNOFF VOLUME (mm)= 17.758
TOTAL RAINFALL (mm)= 63.967
RUNOFF COEFFICIENT = 0.278

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

SHIFT HYD (0083)				
IN= 2---> OUT= 1				
SHIFT= 48.6 min	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID= 2 (0082):	25.82	1.19	8.33	17.76
SHIFT ID= 1 (0083):	25.82	1.19	9.08	17.76

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--------------------
| CALIB             |
| NASHYD    (0080) |   Area    (ha)=  12.25   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.19

     Unit Hyd Qpeak  (cms)=   2.463

     PEAK FLOW       (cms)=   0.733 (i)
     TIME TO PEAK    (hrs)=   8.167
     RUNOFF VOLUME    (mm)=  17.723
     TOTAL RAINFALL   (mm)=  63.967
     RUNOFF COEFFICIENT   =   0.277

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

--------------------------------------------------------------------------------
--------------------
| SHIFT HYD (0081) |
| IN= 2---> OUT= 1 |
| SHIFT= 69.0 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0080):   12.25     0.73      8.17     17.72
    SHIFT ID= 1 (0081):   12.25     0.73      9.25     17.72

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| NASHYD    (0084) |   Area    (ha)=  12.70   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.09

     Unit Hyd Qpeak  (cms)=   5.390

     PEAK FLOW       (cms)=   1.007 (i)
     TIME TO PEAK    (hrs)=   8.000
     RUNOFF VOLUME    (mm)=  17.094
     TOTAL RAINFALL   (mm)=  63.967
     RUNOFF COEFFICIENT   =   0.267

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

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--------------------
| SHIFT HYD (0085) |
| IN= 2---> OUT= 1 |
| SHIFT= 13.3 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0084):   12.70     1.01      8.00     17.09
    SHIFT ID= 1 (0085):   12.70     1.01      8.17     17.09

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| NASHYD    (0088) |   Area    (ha)=  16.55   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.46

     Unit Hyd Qpeak  (cms)=   1.374

     PEAK FLOW       (cms)=   0.596 (i)
     TIME TO PEAK    (hrs)=   8.583
     RUNOFF VOLUME    (mm)=  17.763
     TOTAL RAINFALL   (mm)=  63.967
     RUNOFF COEFFICIENT   =   0.278

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

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--------------------
| CALIB             |
| NASHYD    (0086) |   Area    (ha)=  17.89   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.23

     Unit Hyd Qpeak  (cms)=   2.971

     PEAK FLOW       (cms)=   0.979 (i)
     TIME TO PEAK    (hrs)=   8.250
     RUNOFF VOLUME    (mm)=  17.745
     TOTAL RAINFALL   (mm)=  63.967
     RUNOFF COEFFICIENT   =   0.277
```

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

SHIFT HYD (0087)					
IN= 2---> OUT= 1					
SHIFT= 12.9 min		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID= 2 (0086):	17.89	0.98	8.25	17.74
SHIFT	ID= 1 (0087):	17.89	0.98	8.42	17.74

ADD HYD (0089)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0081):	12.25	0.733	9.25	17.72
+	ID2= 2 (0083):	25.82	1.194	9.08	17.76
	ID = 3 (0089):	38.07	1.838	9.25	17.75

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0089)					
3 + 2 = 1		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 3 (0089):	38.07	1.838	9.25	17.75
+	ID2= 2 (0085):	12.70	1.007	8.17	17.09
	ID = 1 (0089):	50.77	1.923	9.25	17.58

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0089)					
1 + 2 = 3		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 1 (0089):	50.77	1.923	9.25	17.58
+	ID2= 2 (0087):	17.89	0.979	8.42	17.74
	ID = 3 (0089):	68.66	2.149	9.17	17.63

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0089)					
3 + 2 = 1		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	ID1= 3 (0089):	68.66	2.149	9.17	17.63
+	ID2= 2 (0088):	16.55	0.596	8.58	17.76
	ID = 1 (0089):	85.21	2.484	9.17	17.65

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB					
NASHYD (0092)	Area (ha)=	9.67	Curve Number (CN)=	65.0	
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00	
	U.H. Tp(hrs)=	0.41			

Unit Hyd Qpeak (cms)= 0.901

PEAK FLOW (cms)= 0.376 (i)
TIME TO PEAK (hrs)= 8.500
RUNOFF VOLUME (mm)= 17.762
TOTAL RAINFALL (mm)= 63.967
RUNOFF COEFFICIENT = 0.278

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

CALIB

```
| NASHYD    (0090) |   Area    (ha)=  14.48   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.35

     Unit Hyd Qpeak  (cms)=   1.580

     PEAK FLOW       (cms)=   0.623 (i)
     TIME TO PEAK    (hrs)=   8.417
     RUNOFF VOLUME    (mm)=  17.760
     TOTAL RAINFALL   (mm)=  63.967
     RUNOFF COEFFICIENT   =   0.278

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

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| SHIFT HYD (0091) |
| IN= 2---> OUT= 1 |
| SHIFT= 36.5 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0090):   14.48     0.62      8.42     17.76
    SHIFT ID= 1 (0091):   14.48     0.62      9.00     17.76

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--------------------
| ADD HYD   (0094) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0089):    85.21   2.484     9.17    17.65
        + ID2= 2 (0091):    14.48   0.623     9.00    17.76
          ================================================
          ID = 3 (0094):    99.69   3.050     9.17    17.67

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0094) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0094):    99.69   3.050     9.17    17.67
        + ID2= 2 (0092):     9.67   0.376     8.50    17.76
          ================================================
          ID = 1 (0094):   109.36   3.226     9.17    17.68

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0094) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0094):   109.36   3.226     9.17    17.68
        + ID2= 2 (0093):     4.57   0.297     8.17    17.68
          ================================================
          ID = 3 (0094):   113.93   3.259     9.17    17.68

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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  ****************************
  ** SIMULATION NUMBER:   0 **   50yr
  ****************************

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| CHICAGO STORM    |    IDF curve parameters: A=4750.000
| Ptotal= 77.87 mm |                          B=  24.000
--------------------                          C=   1.000
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  = 24.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.17    0.06 |  6.17    0.94 | 12.17    0.71 | 18.17    0.13
                0.33    0.06 |  6.33    1.12 | 12.33    0.66 | 18.33    0.12
                0.50    0.06 |  6.50    1.37 | 12.50    0.61 | 18.50    0.12
                0.67    0.06 |  6.67    1.70 | 12.67    0.57 | 18.67    0.12
                0.83    0.07 |  6.83    2.18 | 12.83    0.54 | 18.83    0.11
```

1.00	0.07	7.00	2.89	13.00	0.50	19.00	0.11
1.17	0.07	7.17	4.02	13.17	0.47	19.17	0.11
1.33	0.08	7.33	5.96	13.33	0.44	19.33	0.10
1.50	0.08	7.50	9.77	13.50	0.42	19.50	0.10
1.67	0.08	7.67	18.93	13.67	0.40	19.67	0.10
1.83	0.09	7.83	52.37	13.83	0.38	19.83	0.10
2.00	0.09	8.00	139.71	14.00	0.36	20.00	0.09
2.17	0.10	8.17	68.44	14.17	0.34	20.17	0.09
2.33	0.11	8.33	36.37	14.33	0.32	20.33	0.09
2.50	0.11	8.50	22.56	14.50	0.31	20.50	0.09
2.67	0.12	8.67	15.36	14.67	0.29	20.67	0.08
2.83	0.13	8.83	11.13	14.83	0.28	20.83	0.08
3.00	0.13	9.00	8.44	15.00	0.26	21.00	0.08
3.17	0.14	9.17	6.62	15.17	0.25	21.17	0.08
3.33	0.15	9.33	5.33	15.33	0.24	21.33	0.08
3.50	0.17	9.50	4.38	15.50	0.23	21.50	0.07
3.67	0.18	9.67	3.67	15.67	0.22	21.67	0.07
3.83	0.19	9.83	3.12	15.83	0.21	21.83	0.07
4.00	0.21	10.00	2.68	16.00	0.20	22.00	0.07
4.17	0.23	10.17	2.33	16.17	0.20	22.17	0.07
4.33	0.25	10.33	2.04	16.33	0.19	22.33	0.07
4.50	0.27	10.50	1.81	16.50	0.18	22.50	0.06
4.67	0.30	10.67	1.61	16.67	0.18	22.67	0.06
4.83	0.33	10.83	1.44	16.83	0.17	22.83	0.06
5.00	0.36	11.00	1.30	17.00	0.16	23.00	0.06
5.17	0.41	11.17	1.18	17.17	0.16	23.17	0.06
5.33	0.46	11.33	1.07	17.33	0.15	23.33	0.06
5.50	0.52	11.50	0.98	17.50	0.15	23.50	0.06
5.67	0.59	11.67	0.90	17.67	0.14	23.67	0.06
5.83	0.68	11.83	0.83	17.83	0.14	23.83	0.05
6.00	0.79	12.00	0.76	18.00	0.13	24.00	0.05

CALIB			
NASHYD (0093)	Area (ha)= 4.57	Curve Number (CN)= 65.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.16		

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	0.06	6.083	0.94	12.083	0.71	18.08	0.13
0.167	0.06	6.167	0.94	12.167	0.71	18.17	0.13
0.250	0.06	6.250	1.12	12.250	0.66	18.25	0.12
0.333	0.06	6.333	1.12	12.333	0.66	18.33	0.12
0.417	0.06	6.417	1.37	12.417	0.61	18.42	0.12
0.500	0.06	6.500	1.37	12.500	0.61	18.50	0.12
0.583	0.06	6.583	1.70	12.583	0.57	18.58	0.12
0.667	0.06	6.667	1.70	12.667	0.57	18.67	0.12
0.750	0.07	6.750	2.18	12.750	0.54	18.75	0.11
0.833	0.07	6.833	2.18	12.833	0.54	18.83	0.11
0.917	0.07	6.917	2.89	12.917	0.50	18.92	0.11
1.000	0.07	7.000	2.89	13.000	0.50	19.00	0.11
1.083	0.07	7.083	4.02	13.083	0.47	19.08	0.11
1.167	0.07	7.167	4.02	13.167	0.47	19.17	0.11
1.250	0.08	7.250	5.96	13.250	0.44	19.25	0.10
1.333	0.08	7.333	5.96	13.333	0.44	19.33	0.10
1.417	0.08	7.417	9.77	13.417	0.42	19.42	0.10
1.500	0.08	7.500	9.77	13.500	0.42	19.50	0.10
1.583	0.08	7.583	18.93	13.583	0.40	19.58	0.10
1.667	0.08	7.667	18.93	13.667	0.40	19.67	0.10
1.750	0.09	7.750	52.37	13.750	0.38	19.75	0.10
1.833	0.09	7.833	52.37	13.833	0.38	19.83	0.10
1.917	0.09	7.917	139.71	13.917	0.36	19.92	0.09
2.000	0.09	8.000	139.70	14.000	0.36	20.00	0.09
2.083	0.10	8.083	68.44	14.083	0.34	20.08	0.09
2.167	0.10	8.167	68.44	14.167	0.34	20.17	0.09
2.250	0.11	8.250	36.37	14.250	0.32	20.25	0.09
2.333	0.11	8.333	36.37	14.333	0.32	20.33	0.09
2.417	0.11	8.417	22.56	14.417	0.31	20.42	0.09
2.500	0.11	8.500	22.56	14.500	0.31	20.50	0.09
2.583	0.12	8.583	15.36	14.583	0.29	20.58	0.08
2.667	0.12	8.667	15.36	14.667	0.29	20.67	0.08
2.750	0.13	8.750	11.13	14.750	0.28	20.75	0.08
2.833	0.13	8.833	11.13	14.833	0.28	20.83	0.08
2.917	0.13	8.917	8.44	14.917	0.26	20.92	0.08
3.000	0.13	9.000	8.44	15.000	0.26	21.00	0.08
3.083	0.14	9.083	6.62	15.083	0.25	21.08	0.08
3.167	0.14	9.167	6.62	15.167	0.25	21.17	0.08

3.250	0.15	9.250	5.33	15.250	0.24	21.25	0.08
3.333	0.15	9.333	5.33	15.333	0.24	21.33	0.08
3.417	0.17	9.417	4.38	15.417	0.23	21.42	0.07
3.500	0.17	9.500	4.38	15.500	0.23	21.50	0.07
3.583	0.18	9.583	3.67	15.583	0.22	21.58	0.07
3.667	0.18	9.667	3.67	15.667	0.22	21.67	0.07
3.750	0.19	9.750	3.12	15.750	0.21	21.75	0.07
3.833	0.19	9.833	3.12	15.833	0.21	21.83	0.07
3.917	0.21	9.917	2.68	15.917	0.20	21.92	0.07
4.000	0.21	10.000	2.68	16.000	0.20	22.00	0.07
4.083	0.23	10.083	2.33	16.083	0.20	22.08	0.07
4.167	0.23	10.167	2.33	16.167	0.20	22.17	0.07
4.250	0.25	10.250	2.04	16.250	0.19	22.25	0.07
4.333	0.25	10.333	2.04	16.333	0.19	22.33	0.07
4.417	0.27	10.417	1.81	16.417	0.18	22.42	0.06
4.500	0.27	10.500	1.81	16.500	0.18	22.50	0.06
4.583	0.30	10.583	1.61	16.583	0.18	22.58	0.06
4.667	0.30	10.667	1.61	16.667	0.18	22.67	0.06
4.750	0.33	10.750	1.44	16.750	0.17	22.75	0.06
4.833	0.33	10.833	1.44	16.833	0.17	22.83	0.06
4.917	0.36	10.917	1.30	16.917	0.16	22.92	0.06
5.000	0.36	11.000	1.30	17.000	0.16	23.00	0.06
5.083	0.41	11.083	1.18	17.083	0.16	23.08	0.06
5.167	0.41	11.167	1.18	17.167	0.16	23.17	0.06
5.250	0.46	11.250	1.07	17.250	0.15	23.25	0.06
5.333	0.46	11.333	1.07	17.333	0.15	23.33	0.06
5.417	0.52	11.417	0.98	17.417	0.15	23.42	0.06
5.500	0.52	11.500	0.98	17.500	0.15	23.50	0.06
5.583	0.59	11.583	0.90	17.583	0.14	23.58	0.06
5.667	0.59	11.667	0.90	17.667	0.14	23.67	0.06
5.750	0.68	11.750	0.83	17.750	0.14	23.75	0.05
5.833	0.68	11.833	0.83	17.833	0.14	23.83	0.05
5.917	0.79	11.917	0.76	17.917	0.13	23.92	0.05
6.000	0.79	12.000	0.76	18.000	0.13	24.00	0.05

Unit Hyd Qpeak (cms)= 1.091

PEAK FLOW (cms)= 0.370 (i)
TIME TO PEAK (hrs)= 8.167
RUNOFF VOLUME (mm)= 25.215
TOTAL RAINFALL (mm)= 77.869
RUNOFF COEFFICIENT = 0.324

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

CALIB					
NASHYD (0082)	Area (ha)=	25.82	Curve Number (CN)=	65.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.31		

Unit Hyd Qpeak (cms)= 3.181

PEAK FLOW (cms)= 1.530 (i)
TIME TO PEAK (hrs)= 8.333
RUNOFF VOLUME (mm)= 25.320
TOTAL RAINFALL (mm)= 77.869
RUNOFF COEFFICIENT = 0.325

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

SHIFT HYD (0083)
IN= 2---> OUT= 1
SHIFT= 48.6 min

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID= 2 (0082):	25.82	1.53	8.33	25.32
SHIFT ID= 1 (0083):	25.82	1.53	9.08	25.32

CALIB					
NASHYD (0080)	Area (ha)=	12.25	Curve Number (CN)=	65.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.19		

Unit Hyd Qpeak (cms)= 2.463

PEAK FLOW (cms)= 0.916 (i)
TIME TO PEAK (hrs)= 8.167
RUNOFF VOLUME (mm)= 25.270
TOTAL RAINFALL (mm)= 77.869

```
     RUNOFF COEFFICIENT   =   0.325

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

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--------------------
| SHIFT HYD (0081) |
| IN= 2---> OUT= 1 |
| SHIFT= 69.0 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0080):   12.25     0.92      8.17     25.27
    SHIFT ID= 1 (0081):   12.25     0.92      9.25     25.27

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD    (0084) |   Area    (ha)=  12.70   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.09

     Unit Hyd Qpeak  (cms)=   5.390

     PEAK FLOW       (cms)=   1.201 (i)
     TIME TO PEAK    (hrs)=   8.000
     RUNOFF VOLUME    (mm)=  24.373
     TOTAL RAINFALL   (mm)=  77.869
     RUNOFF COEFFICIENT   =   0.313

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

--------------------------------------------------------------------------------
--------------------
| SHIFT HYD (0085) |
| IN= 2---> OUT= 1 |
| SHIFT= 13.3 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0084):   12.70     1.20      8.00     24.37
    SHIFT ID= 1 (0085):   12.70     1.20      8.17     24.37

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD    (0088) |   Area    (ha)=  16.55   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.46

     Unit Hyd Qpeak  (cms)=   1.374

     PEAK FLOW       (cms)=   0.784 (i)
     TIME TO PEAK    (hrs)=   8.583
     RUNOFF VOLUME    (mm)=  25.327
     TOTAL RAINFALL   (mm)=  77.869
     RUNOFF COEFFICIENT   =   0.325

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

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--------------------
| CALIB              |
| NASHYD    (0086) |   Area    (ha)=  17.89   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.23

     Unit Hyd Qpeak  (cms)=   2.971

     PEAK FLOW       (cms)=   1.239 (i)
     TIME TO PEAK    (hrs)=   8.250
     RUNOFF VOLUME    (mm)=  25.301
     TOTAL RAINFALL   (mm)=  77.869
     RUNOFF COEFFICIENT   =   0.325

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

--------------------------------------------------------------------------------
--------------------
| SHIFT HYD (0087) |
| IN= 2---> OUT= 1 |
| SHIFT= 12.9 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0086):   17.89     1.24      8.25     25.30
    SHIFT ID= 1 (0087):   17.89     1.24      8.42     25.30

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--------------------
| ADD HYD   (0089) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0081):    12.25   0.916     9.25    25.27
        + ID2= 2 (0083):    25.82   1.530     9.08    25.32
          ================================================
          ID = 3 (0089):    38.07   2.370     9.25    25.30

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0089) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0089):    38.07   2.370     9.25    25.30
        + ID2= 2 (0085):    12.70   1.201     8.17    24.37
          ================================================
          ID = 1 (0089):    50.77   2.508     9.25    25.07

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0089) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0089):    50.77   2.508     9.25    25.07
        + ID2= 2 (0087):    17.89   1.239     8.42    25.30
          ================================================
          ID = 3 (0089):    68.66   2.844     9.17    25.13

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0089) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0089):    68.66   2.844     9.17    25.13
        + ID2= 2 (0088):    16.55   0.784     8.58    25.33
          ================================================
          ID = 1 (0089):    85.21   3.321     9.17    25.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0092) |   Area    (ha)=   9.67   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

     Unit Hyd Qpeak  (cms)=   0.901

     PEAK FLOW       (cms)=   0.492 (i)
     TIME TO PEAK    (hrs)=   8.500
     RUNOFF VOLUME    (mm)=  25.326
     TOTAL RAINFALL   (mm)=  77.869
     RUNOFF COEFFICIENT   =   0.325

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0090) |   Area    (ha)=  14.48   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.35

     Unit Hyd Qpeak  (cms)=   1.580

     PEAK FLOW       (cms)=   0.807 (i)
     TIME TO PEAK    (hrs)=   8.417
     RUNOFF VOLUME    (mm)=  25.323
     TOTAL RAINFALL   (mm)=  77.869
     RUNOFF COEFFICIENT   =   0.325

     (i) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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--------------------
| SHIFT HYD (0091) |
| IN= 2---> OUT= 1 |
| SHIFT= 36.5 min  |       AREA     QPEAK     TPEAK      R.V.
--------------------       (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0090):    14.48      0.81      8.42     25.32
    SHIFT ID= 1 (0091):    14.48      0.81      9.00     25.32

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--------------------
| ADD HYD   (0094) |
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)     (cms)     (hrs)      (mm)
          ID1= 1 (0089):     85.21     3.321      9.17     25.17
        + ID2= 2 (0091):     14.48     0.807      9.00     25.32
          ================================================
          ID = 3 (0094):     99.69     4.073      9.17     25.19

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0094) |
|   3 +  2 =  1    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)     (cms)     (hrs)      (mm)
          ID1= 3 (0094):     99.69     4.073      9.17     25.19
        + ID2= 2 (0092):      9.67     0.492      8.50     25.33
          ================================================
          ID = 1 (0094):    109.36     4.327      9.17     25.20

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0094) |
|   1 +  2 =  3    |          AREA     QPEAK     TPEAK      R.V.
--------------------          (ha)     (cms)     (hrs)      (mm)
          ID1= 1 (0094):    109.36     4.327      9.17     25.20
        + ID2= 2 (0093):      4.57     0.370      8.17     25.21
          ================================================
          ID = 3 (0094):    113.93     4.382      9.17     25.20

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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  ****************************
  ** SIMULATION NUMBER:    0 **   100yr
  ****************************

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| CHICAGO STORM    |    IDF curve parameters: A=1770.000
| Ptotal=108.98 mm |                          B=   4.000
--------------------                          C=   0.820
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  = 24.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.17    0.84 |  6.17    2.90 | 12.17    2.55 | 18.17    1.21
                0.33    0.86 |  6.33    3.15 | 12.33    2.47 | 18.33    1.19
                0.50    0.88 |  6.50    3.46 | 12.50    2.39 | 18.50    1.17
                0.67    0.89 |  6.67    3.85 | 12.67    2.32 | 18.67    1.16
                0.83    0.91 |  6.83    4.34 | 12.83    2.25 | 18.83    1.14
                1.00    0.93 |  7.00    5.00 | 13.00    2.19 | 19.00    1.13
                1.17    0.95 |  7.17    5.92 | 13.17    2.13 | 19.17    1.11
                1.33    0.97 |  7.33    7.33 | 13.33    2.07 | 19.33    1.10
                1.50    0.99 |  7.50    9.77 | 13.50    2.02 | 19.50    1.09
                1.67    1.01 |  7.67   15.10 | 13.67    1.97 | 19.67    1.07
                1.83    1.03 |  7.83   38.21 | 13.83    1.92 | 19.83    1.06
                2.00    1.05 |  8.00  203.31 | 14.00    1.87 | 20.00    1.05
                2.17    1.08 |  8.17   50.96 | 14.17    1.83 | 20.17    1.04
                2.33    1.11 |  8.33   25.51 | 14.33    1.79 | 20.33    1.03
                2.50    1.13 |  8.50   17.18 | 14.50    1.75 | 20.50    1.01
                2.67    1.16 |  8.67   13.06 | 14.67    1.72 | 20.67    1.00
                2.83    1.20 |  8.83   10.60 | 14.83    1.68 | 20.83    0.99
                3.00    1.23 |  9.00    8.96 | 15.00    1.65 | 21.00    0.98
                3.17    1.26 |  9.17    7.78 | 15.17    1.61 | 21.17    0.97
```

3.33	1.30	9.33	6.90	15.33	1.58	21.33	0.96
3.50	1.34	9.50	6.21	15.50	1.55	21.50	0.95
3.67	1.39	9.67	5.65	15.67	1.53	21.67	0.94
3.83	1.43	9.83	5.19	15.83	1.50	21.83	0.93
4.00	1.48	10.00	4.81	16.00	1.47	22.00	0.92
4.17	1.54	10.17	4.48	16.17	1.45	22.17	0.91
4.33	1.60	10.33	4.20	16.33	1.42	22.33	0.91
4.50	1.66	10.50	3.96	16.50	1.40	22.50	0.90
4.67	1.73	10.67	3.74	16.67	1.38	22.67	0.89
4.83	1.81	10.83	3.55	16.83	1.36	22.83	0.88
5.00	1.89	11.00	3.38	17.00	1.33	23.00	0.87
5.17	1.99	11.17	3.23	17.17	1.31	23.17	0.86
5.33	2.10	11.33	3.09	17.33	1.29	23.33	0.86
5.50	2.22	11.50	2.96	17.50	1.28	23.50	0.85
5.67	2.35	11.67	2.85	17.67	1.26	23.67	0.84
5.83	2.51	11.83	2.74	17.83	1.24	23.83	0.83
6.00	2.69	12.00	2.64	18.00	1.22	24.00	0.83

CALIB				
NASHYD (0093)	Area (ha)=	4.57	Curve Number (CN)=	65.0
ID= 1 DT= 5.0 min	Ia (mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=	0.16		

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	0.84	6.083	2.90	12.083	2.55	18.08	1.21
0.167	0.84	6.167	2.90	12.167	2.55	18.17	1.21
0.250	0.86	6.250	3.15	12.250	2.47	18.25	1.19
0.333	0.86	6.333	3.15	12.333	2.47	18.33	1.19
0.417	0.88	6.417	3.46	12.417	2.39	18.42	1.17
0.500	0.88	6.500	3.46	12.500	2.39	18.50	1.17
0.583	0.89	6.583	3.85	12.583	2.32	18.58	1.16
0.667	0.89	6.667	3.85	12.667	2.32	18.67	1.16
0.750	0.91	6.750	4.34	12.750	2.25	18.75	1.14
0.833	0.91	6.833	4.34	12.833	2.25	18.83	1.14
0.917	0.93	6.917	5.00	12.917	2.19	18.92	1.13
1.000	0.93	7.000	5.00	13.000	2.19	19.00	1.13
1.083	0.95	7.083	5.92	13.083	2.13	19.08	1.11
1.167	0.95	7.167	5.92	13.167	2.13	19.17	1.11
1.250	0.97	7.250	7.33	13.250	2.07	19.25	1.10
1.333	0.97	7.333	7.33	13.333	2.07	19.33	1.10
1.417	0.99	7.417	9.77	13.417	2.02	19.42	1.09
1.500	0.99	7.500	9.77	13.500	2.02	19.50	1.09
1.583	1.01	7.583	15.10	13.583	1.97	19.58	1.07
1.667	1.01	7.667	15.11	13.667	1.97	19.67	1.07
1.750	1.03	7.750	38.21	13.750	1.92	19.75	1.06
1.833	1.03	7.833	38.22	13.833	1.92	19.83	1.06
1.917	1.05	7.917	203.31	13.917	1.87	19.92	1.05
2.000	1.05	8.000	203.30	14.000	1.87	20.00	1.05
2.083	1.08	8.083	50.96	14.083	1.83	20.08	1.04
2.167	1.08	8.167	50.96	14.167	1.83	20.17	1.04
2.250	1.11	8.250	25.51	14.250	1.79	20.25	1.03
2.333	1.11	8.333	25.51	14.333	1.79	20.33	1.03
2.417	1.13	8.417	17.18	14.417	1.75	20.42	1.01
2.500	1.13	8.500	17.18	14.500	1.75	20.50	1.01
2.583	1.16	8.583	13.06	14.583	1.72	20.58	1.00
2.667	1.16	8.667	13.06	14.667	1.72	20.67	1.00
2.750	1.20	8.750	10.60	14.750	1.68	20.75	0.99
2.833	1.20	8.833	10.60	14.833	1.68	20.83	0.99
2.917	1.23	8.917	8.96	14.917	1.65	20.92	0.98
3.000	1.23	9.000	8.96	15.000	1.65	21.00	0.98
3.083	1.26	9.083	7.78	15.083	1.61	21.08	0.97
3.167	1.26	9.167	7.78	15.167	1.61	21.17	0.97
3.250	1.30	9.250	6.90	15.250	1.58	21.25	0.96
3.333	1.30	9.333	6.90	15.333	1.58	21.33	0.96
3.417	1.34	9.417	6.21	15.417	1.55	21.42	0.95
3.500	1.34	9.500	6.21	15.500	1.55	21.50	0.95
3.583	1.39	9.583	5.65	15.583	1.53	21.58	0.94
3.667	1.39	9.667	5.65	15.667	1.53	21.67	0.94
3.750	1.43	9.750	5.19	15.750	1.50	21.75	0.93
3.833	1.43	9.833	5.19	15.833	1.50	21.83	0.93
3.917	1.48	9.917	4.81	15.917	1.47	21.92	0.92
4.000	1.48	10.000	4.81	16.000	1.47	22.00	0.92
4.083	1.54	10.083	4.48	16.083	1.45	22.08	0.91
4.167	1.54	10.167	4.48	16.167	1.45	22.17	0.91
4.250	1.60	10.250	4.20	16.250	1.42	22.25	0.91
4.333	1.60	10.333	4.20	16.333	1.42	22.33	0.91

4.417	1.66	10.417	3.96	16.417	1.40	22.42	0.90
4.500	1.66	10.500	3.96	16.500	1.40	22.50	0.90
4.583	1.73	10.583	3.74	16.583	1.38	22.58	0.89
4.667	1.73	10.667	3.74	16.667	1.38	22.67	0.89
4.750	1.81	10.750	3.55	16.750	1.36	22.75	0.88
4.833	1.81	10.833	3.55	16.833	1.36	22.83	0.88
4.917	1.89	10.917	3.38	16.917	1.33	22.92	0.87
5.000	1.89	11.000	3.38	17.000	1.33	23.00	0.87
5.083	1.99	11.083	3.23	17.083	1.31	23.08	0.86
5.167	1.99	11.167	3.23	17.167	1.31	23.17	0.86
5.250	2.10	11.250	3.09	17.250	1.29	23.25	0.86
5.333	2.10	11.333	3.09	17.333	1.29	23.33	0.86
5.417	2.22	11.417	2.96	17.417	1.28	23.42	0.85
5.500	2.22	11.500	2.96	17.500	1.28	23.50	0.85
5.583	2.35	11.583	2.85	17.583	1.26	23.58	0.84
5.667	2.35	11.667	2.85	17.667	1.26	23.67	0.84
5.750	2.51	11.750	2.74	17.750	1.24	23.75	0.83
5.833	2.51	11.833	2.74	17.833	1.24	23.83	0.83
5.917	2.69	11.917	2.64	17.917	1.22	23.92	0.83
6.000	2.69	12.000	2.64	18.000	1.22	24.00	0.83

Unit Hyd Qpeak (cms)= 1.091

PEAK FLOW (cms)= 0.584 (i)
TIME TO PEAK (hrs)= 8.083
RUNOFF VOLUME (mm)= 44.705
TOTAL RAINFALL (mm)= 108.977
RUNOFF COEFFICIENT = 0.410

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

CALIB				
NASHYD (0082)	Area (ha)= 25.82	Curve Number (CN)= 65.0		
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00		
	U.H. Tp(hrs)= 0.31			

Unit Hyd Qpeak (cms)= 3.181

PEAK FLOW (cms)= 2.159 (i)
TIME TO PEAK (hrs)= 8.250
RUNOFF VOLUME (mm)= 44.892
TOTAL RAINFALL (mm)= 108.977
RUNOFF COEFFICIENT = 0.412

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

SHIFT HYD (0083)
IN= 2---> OUT= 1
SHIFT= 48.6 min

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID= 2 (0082):	25.82	2.16	8.25	44.89
SHIFT ID= 1 (0083):	25.82	2.16	9.00	44.89

CALIB				
NASHYD (0080)	Area (ha)= 12.25	Curve Number (CN)= 65.0		
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00		
	U.H. Tp(hrs)= 0.19			

Unit Hyd Qpeak (cms)= 2.463

PEAK FLOW (cms)= 1.385 (i)
TIME TO PEAK (hrs)= 8.167
RUNOFF VOLUME (mm)= 44.803
TOTAL RAINFALL (mm)= 108.977
RUNOFF COEFFICIENT = 0.411

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

SHIFT HYD (0081)
IN= 2---> OUT= 1
SHIFT= 69.0 min

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID= 2 (0080):	12.25	1.38	8.17	44.80
SHIFT ID= 1 (0081):	12.25	1.38	9.25	44.80

```
--------------------
| CALIB            |
| NASHYD    (0084) |   Area    (ha)=  12.70   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.09

     Unit Hyd Qpeak  (cms)=   5.390

     PEAK FLOW       (cms)=   2.297 (i)
     TIME TO PEAK    (hrs)=   8.000
     RUNOFF VOLUME    (mm)=  43.212
     TOTAL RAINFALL   (mm)= 108.977
     RUNOFF COEFFICIENT   =   0.397

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

--------------------------------------------------------------------------------
--------------------
| SHIFT HYD (0085) |
| IN= 2---> OUT= 1 |
| SHIFT= 13.3 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0084):   12.70     2.30      8.00     43.21
    SHIFT ID= 1 (0085):   12.70     2.30      8.17     43.21

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0088) |   Area    (ha)=  16.55   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.46

     Unit Hyd Qpeak  (cms)=   1.374

     PEAK FLOW       (cms)=   1.048 (i)
     TIME TO PEAK    (hrs)=   8.500
     RUNOFF VOLUME    (mm)=  44.904
     TOTAL RAINFALL   (mm)= 108.977
     RUNOFF COEFFICIENT   =   0.412

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0086) |   Area    (ha)=  17.89   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.23

     Unit Hyd Qpeak  (cms)=   2.971

     PEAK FLOW       (cms)=   1.830 (i)
     TIME TO PEAK    (hrs)=   8.167
     RUNOFF VOLUME    (mm)=  44.858
     TOTAL RAINFALL   (mm)= 108.977
     RUNOFF COEFFICIENT   =   0.412

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

--------------------------------------------------------------------------------
--------------------
| SHIFT HYD (0087) |
| IN= 2---> OUT= 1 |
| SHIFT= 12.9 min  |      AREA     QPEAK     TPEAK      R.V.
--------------------      (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0086):   17.89     1.83      8.17     44.86
    SHIFT ID= 1 (0087):   17.89     1.83      8.33     44.86

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--------------------
| ADD HYD   (0089) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0081):    12.25   1.385     9.25    44.80
        + ID2= 2 (0083):    25.82   2.159     9.00    44.89
          ================================================
          ID = 3 (0089):    38.07   3.352     9.17    44.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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| ADD HYD   (0089) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0089):    38.07   3.352     9.17    44.86
        + ID2= 2 (0085):    12.70   2.297     8.17    43.21
          ================================================
          ID = 1 (0089):    50.77   3.533     9.17    44.45

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0089) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0089):    50.77   3.533     9.17    44.45
        + ID2= 2 (0087):    17.89   1.830     8.33    44.86
          ================================================
          ID = 3 (0089):    68.66   3.894     9.17    44.56

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0089) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
-------------------           (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0089):    68.66   3.894     9.17    44.56
        + ID2= 2 (0088):    16.55   1.048     8.50    44.90
          ================================================
          ID = 1 (0089):    85.21   4.420     9.17    44.62

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| NASHYD    (0092)  |   Area    (ha)=   9.67   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

     Unit Hyd Qpeak  (cms)=   0.901

     PEAK FLOW       (cms)=   0.667 (i)
     TIME TO PEAK    (hrs)=   8.417
     RUNOFF VOLUME    (mm)=  44.902
     TOTAL RAINFALL   (mm)= 108.977
     RUNOFF COEFFICIENT   =   0.412

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

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| NASHYD    (0090)  |   Area    (ha)=  14.48   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min  |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.35

     Unit Hyd Qpeak  (cms)=   1.580

     PEAK FLOW       (cms)=   1.117 (i)
     TIME TO PEAK    (hrs)=   8.333
     RUNOFF VOLUME    (mm)=  44.898
     TOTAL RAINFALL   (mm)= 108.977
     RUNOFF COEFFICIENT   =   0.412

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

--------------------------------------------------------------------------------
--------------------
| SHIFT HYD (0091) |
| IN= 2---> OUT= 1 |
| SHIFT= 36.5 min  |       AREA     QPEAK     TPEAK      R.V.
-------------------            (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0090):    14.48     1.12      8.33     44.90
    SHIFT ID= 1 (0091):    14.48     1.12      8.92     44.90

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--------------------
| ADD HYD   (0094) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
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```
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0089):    85.21   4.420     9.17    44.62
        + ID2= 2 (0091):    14.48   1.117     8.92    44.90
          ================================================
          ID = 3 (0094):    99.69   5.367     9.08    44.66

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0094) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0094):    99.69   5.367     9.08    44.66
        + ID2= 2 (0092):     9.67   0.667     8.42    44.90
          ================================================
          ID = 1 (0094):   109.36   5.677     9.08    44.68

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0094) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0094):   109.36   5.677     9.08    44.68
        + ID2= 2 (0093):     4.57   0.584     8.08    44.70
          ================================================
          ID = 3 (0094):   113.93   5.746     9.08    44.69

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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 FINISH
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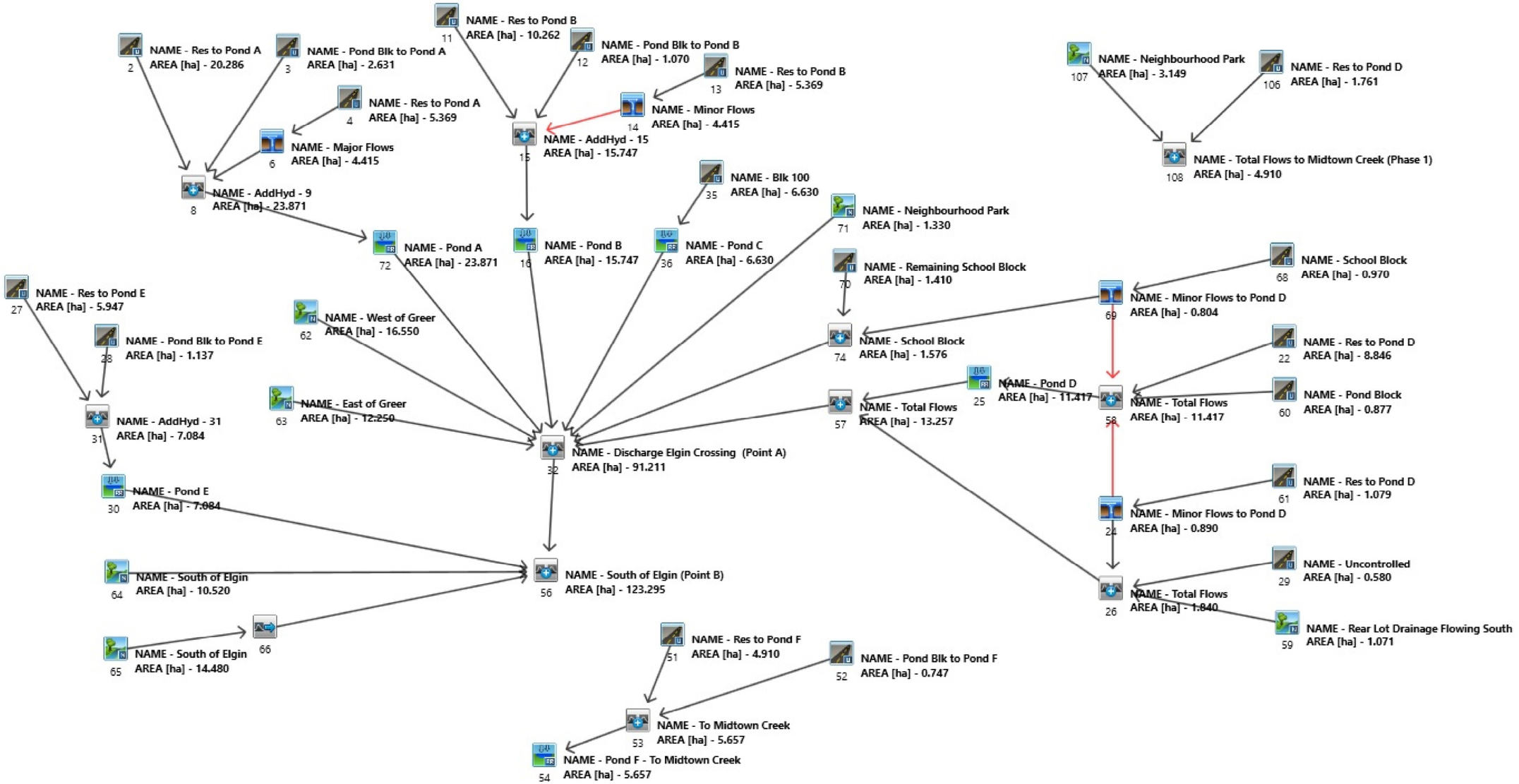
2
NAME - Res to Pond A
AREA [ha] - 20.286
3
NAME - Pond Blk to Pond A
AREA [ha] - 2.631
4
NAME - Res to Pond A
AREA [ha] - 5.369
6
NAME - Major Flows
AREA [ha] - 4.415
8
NAME - AddHyd - 9
AREA [ha] - 23.871
11
NAME - Res to Pond B
AREA [ha] - 10.262
12
NAME - Pond Blk to Pond B
AREA [ha] - 1.070
13
NAME - Res to Pond B
AREA [ha] - 5.369
14
NAME - Minor Flows
AREA [ha] - 4.415
15
NAME - AddHyd - 15
AREA [ha] - 15.747
72
NAME - Pond A
AREA [ha] - 23.871
16
NAME - Pond B
AREA [ha] - 15.747
36
NAME - Pond C
AREA [ha] - 6.630
35
NAME - Blk 100
AREA [ha] - 6.630
71
NAME - Neighbourhood Park
AREA [ha] - 1.330
70
NAME - Remaining School Block
AREA [ha] - 1.410
74
NAME - School Block
AREA [ha] - 1.576
107
NAME - Neighbourhood Park
AREA [ha] - 3.149
106
NAME - Res to Pond D
AREA [ha] - 1.761
108
NAME - Total Flows to Midtown Creek (Phase 1)
AREA [ha] - 4.910
68
NAME - School Block
AREA [ha] - 0.970
69
NAME - Minor Flows to Pond D
AREA [ha] - 0.804
22
NAME - Res to Pond D
AREA [ha] - 8.846
60
NAME - Pond Block
AREA [ha] - 0.877
25
NAME - Pond D
AREA [ha] - 11.417
58
NAME - Total Flows
AREA [ha] - 11.417
57
NAME - Total Flows
AREA [ha] - 13.257
61
NAME - Res to Pond D
AREA [ha] - 1.079
24
NAME - Minor Flows to Pond D
AREA [ha] - 0.890
29
NAME - Uncontrolled
AREA [ha] - 0.580
26
NAME - Total Flows
AREA [ha] - 1.840
59
NAME - Rear Lot Drainage Flowing South
AREA [ha] - 1.071
27
NAME - Res to Pond E
AREA [ha] - 5.947
28
NAME - Pond Blk to Pond E
AREA [ha] - 1.137
62
NAME - West of Greer
AREA [ha] - 16.550
63
NAME - East of Greer
AREA [ha] - 12.250
31
NAME - AddHyd - 31
AREA [ha] - 7.084
30
NAME - Pond E
AREA [ha] - 7.084
32
NAME - Discharge Elgin Crossing (Point A)
AREA [ha] - 91.211
64
NAME - South of Elgin
AREA [ha] - 10.520
65
NAME - South of Elgin
AREA [ha] - 14.480
66
56
NAME - South of Elgin (Point B)
AREA [ha] - 123.295
51
NAME - Res to Pond F
AREA [ha] - 4.910
52
NAME - Pond Blk to Pond F
AREA [ha] - 0.747
53
NAME - To Midtown Creek
AREA [ha] - 5.657
54
NAME - Pond F - To Midtown Creek
AREA [ha] - 5.657

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

       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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                  *****  S U M M A R Y   O U T P U T  *****


  Input   filename: C:\Program Files (x86)\VH Suite 3.0\VO2\voin.dat
  Output  filename: C:\Users\david.mcnaull\AppData\Local\Temp\5ec4cb1d-d51c-4ebe-9c01-d71efa304eac\Scenario.ou
  Summary filename: C:\Users\david.mcnaull\AppData\Local\Temp\5ec4cb1d-d51c-4ebe-9c01-d71efa304eac\Scenario.su


DATE: 01/18/2022                          TIME: 11:09:07

USER:

COMMENTS: Post Development 24 hour Chicago
          2-100yr Storm (Summary Report)

  ****************************
  ** SIMULATION NUMBER:   0 **   2-yr
  ****************************

  W/E COMMAND              HYD ID   DT    AREA   ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha    '  cms   hrs     mm           cms

      START @  0.00 hrs
      --------------------
      CHIC STORM                 10.0
      [ Ptot= 29.37 mm ]
*
  **  CALIB NASHYD       0062  1  5.0   16.55    0.13  8.58   3.68 0.13   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.46]
*
  **  CALIB NASHYD       0063  1  5.0   12.25    0.16  8.17   3.68 0.13   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.19]
*
  **  CALIB NASHYD       0059  1  5.0    1.07    0.04  8.17   8.56 0.29   0.000
      [CN=85.0        ]
      [ N = 3.0:Tp 0.18]
*
   *  CALIB STANDHYD     0029  1  5.0    0.58    0.07  8.00  20.92 0.71   0.000
      [I%=55.0:S%= 2.00]
*
   *  CALIB STANDHYD     0061  1  5.0    1.08    0.14  8.00  21.02 0.72   0.000
      [I%=55.0:S%= 2.00]
*
      DUHYD              0024  1  5.0    1.08    0.14  8.00  21.02  n/a   0.000
         MAJOR SYSTEM:   0024  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
         MINOR SYSTEM:   0024  3  5.0    1.08    0.14  8.00  21.02  n/a   0.000
*
      ADD [0024 + 0029]  0026  3  5.0    0.58    0.07  8.00  20.92  n/a   0.000
*
      ADD [0026 + 0059]  0026  1  5.0    1.65    0.09  8.00  12.90  n/a   0.000
*
   *  CALIB STANDHYD     0022  1  5.0    8.85    1.08  8.00  21.16 0.72   0.000
      [I%=55.0:S%= 2.00]
*
   *  CALIB STANDHYD     0060  1  5.0    0.88    0.13  8.00  22.80 0.78   0.000
      [I%=70.0:S%= 2.00]
*
   *  CALIB STANDHYD     0068  1  5.0    0.97    0.17  8.00  24.62 0.84   0.000
      [I%=80.0:S%= 2.00]
*
      DUHYD              0069  1  5.0    0.97    0.17  8.00  24.62  n/a   0.000
         MAJOR SYSTEM:   0069  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
         MINOR SYSTEM:   0069  3  5.0    0.97    0.17  8.00  24.62  n/a   0.000
*
      ADD [0022 + 0024]  0058  3  5.0    9.92    1.22  8.00  21.14  n/a   0.000
*
      ADD [0058 + 0060]  0058  1  5.0   10.80    1.35  8.00  21.28  n/a   0.000
*
      ADD [0058 + 0069]  0058  3  5.0   11.77    1.53  8.00  21.55  n/a   0.000
*
      RESRVR [ 2 : 0058] 0025  1  5.0   11.77    0.03  9.67  21.55  n/a   0.000
      {ST=  0.22 ha.m }
*
      ADD [0025 + 0026]  0057  3  5.0   13.42    0.12  8.00  20.49  n/a   0.000
*
  **  CALIB NASHYD       0071  1  5.0    1.33    0.02  8.17   3.67 0.13   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.17]
*
   *  CALIB STANDHYD     0002  1  5.0   20.29    2.14  8.00  21.16 0.72   0.000
      [I%=55.0:S%= 2.00]
*
   *  CALIB STANDHYD     0003  1  5.0    2.63    0.39  8.00  22.94 0.78   0.000
      [I%=70.0:S%= 2.00]
*
   *  CALIB STANDHYD     0004  1  5.0    5.37    0.62  8.00  21.15 0.72   0.000
      [I%=55.0:S%= 2.00]
*
      DUHYD              0006  1  5.0    5.37    0.62  8.00  21.15  n/a   0.000
         MAJOR SYSTEM:   0006  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
         MINOR SYSTEM:   0006  3  5.0    5.37    0.62  8.00  21.15  n/a   0.000
*
      ADD [0002 + 0003]  0008  3  5.0   22.92    2.52  8.00  21.36  n/a   0.000
*
      ADD [0008 + 0006]  0008  1  5.0   22.92    2.52  8.00  21.36  n/a   0.000
*
      RESRVR [ 2 : 0008] 0072  1  5.0   22.92    0.03 10.25  21.22  n/a   0.000
      {ST=  0.44 ha.m }
*
   *  CALIB STANDHYD     0011  1  5.0   10.26    1.14  8.00  21.16 0.72   0.000
      [I%=55.0:S%= 2.00]
*
   *  CALIB STANDHYD     0012  1  5.0    1.07    0.16  8.00  22.83 0.78   0.000
      [I%=70.0:S%= 2.00]
*
   *  CALIB STANDHYD     0013  1  5.0    5.37    0.62  8.00  21.15 0.72   0.000
      [I%=55.0:S%= 2.00]
*
      DUHYD              0014  1  5.0    5.37    0.62  8.00  21.15  n/a   0.000
         MAJOR SYSTEM:   0014  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
         MINOR SYSTEM:   0014  3  5.0    5.37    0.62  8.00  21.15  n/a   0.000
*
      ADD [0011 + 0012]  0015  3  5.0   11.33    1.31  8.00  21.31  n/a   0.000
*
      ADD [0015 + 0014]  0015  1  5.0   16.70    1.93  8.00  21.26  n/a   0.000
*
      RESRVR [ 2 : 0015] 0016  1  5.0   16.70    0.08  9.25  21.14  n/a   0.000
      {ST=  0.30 ha.m }
*
   *  CALIB STANDHYD     0035  1  5.0    6.63    0.94  8.00  22.97 0.78   0.000
      [I%=70.0:S%= 2.00]
*
      RESRVR [ 2 : 0035] 0036  1  5.0    6.63    0.01  9.83  22.58  n/a   0.000
      {ST=  0.14 ha.m }
*
   *  CALIB STANDHYD     0070  1  5.0    1.41    0.25  8.00  24.67 0.84   0.000
      [I%=80.0:S%= 2.00]
*
      ADD [0069 + 0070]  0074  3  5.0    1.41    0.25  8.00  24.67  n/a   0.000
*
      ADD [0016 + 0036]  0032  3  5.0   23.33    0.10  9.25  21.55  n/a   0.000
*
      ADD [0032 + 0057]  0032  1  5.0   36.75    0.13  9.17  21.16  n/a   0.000
*
      ADD [0032 + 0062]  0032  3  5.0   53.30    0.25  8.67  15.74  n/a   0.000
*
      ADD [0032 + 0063]  0032  1  5.0   65.55    0.36  8.25  13.48  n/a   0.000
*
      ADD [0032 + 0071]  0032  3  5.0   66.88    0.37  8.25  13.29  n/a   0.000
*
      ADD [0032 + 0072]  0032  1  5.0   89.80    0.40  8.25  15.31  n/a   0.000
*
      ADD [0032 + 0074]  0032  3  5.0   91.21    0.50  8.00  15.46  n/a   0.000
*
   *  CALIB NASHYD       0064  1  5.0   10.52    0.09  8.50   3.68 0.13   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.41]
```

```
*
  *   CALIB NASHYD      0065  1  5.0   14.48    0.14  8.42   3.68 0.13   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.35]
*
      SHIFT  [ 2 : 0065] 0066  1  5.0   14.48    0.14  9.00   3.68  n/a   0.000
      [SHIFT= 36.5 min]
*
  *   CALIB STANDHYD    0027  1  5.0    5.95    0.84  8.00  22.97 0.78   0.000
      [I%=70.0:S%= 2.00]
*
  *   CALIB STANDHYD    0028  1  5.0    1.14    0.17  8.00  22.84 0.78   0.000
      [I%=70.0:S%= 2.00]
*
      ADD [0027 + 0028]  0031  3  5.0    7.08    1.02  8.00  22.95  n/a   0.000
*
      RESRVR [ 2 : 0031] 0030  1  5.0    7.08    0.02  9.67  22.77  n/a   0.000
      {ST=  0.14 ha.m }
*
      ADD [0030 + 0032]  0056  3  5.0   98.29    0.52  8.00  15.98  n/a   0.000
*
      ADD [0056 + 0064]  0056  1  5.0  108.82    0.55  8.17  14.80  n/a   0.000
*
      ADD [0056 + 0066]  0056  3  5.0  123.30    0.55  8.17  13.49  n/a   0.000
*
  *   CALIB STANDHYD    0052  1  5.0    0.75    0.11  8.00  22.87 0.78   0.000
      [I%=70.0:S%= 2.00]
*
  *   CALIB STANDHYD    0051  1  5.0    4.91    0.57  8.00  21.28 0.72   0.000
      [I%=55.0:S%= 2.00]
*
      ADD [0051 + 0052]  0053  3  5.0    5.66    0.69  8.00  21.49  n/a   0.000
*
      RESRVR [ 2 : 0053] 0054  1  5.0    5.66    0.08  8.75  21.49  n/a   0.000
      {ST=  0.09 ha.m }
*
  *   CALIB NASHYD      0107  1  5.0    3.15    0.04  8.17   3.67 0.13   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.17]
*
  *   CALIB STANDHYD    0106  1  5.0    1.76    0.10  8.00  10.43 0.36   0.000
      [I%=25.0:S%= 2.00]
*
      ADD [0106 + 0107]  0108  3  5.0    4.91    0.12  8.00   6.10  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:    0 **
  ****************************

  W/E COMMAND             HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min     ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      CHIC STORM               10.0
      [ Ptot= 40.62 mm ]
*
  **  CALIB NASHYD      0062  1  5.0   16.55    0.25  8.58   7.36 0.18   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.46]
*
  **  CALIB NASHYD      0063  1  5.0   12.25    0.31  8.17   7.34 0.18   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.19]
*
  **  CALIB NASHYD      0059  1  5.0    1.07    0.06  8.17  15.72 0.39   0.000
      [CN=85.0        ]
      [ N = 3.0:Tp 0.18]
*
  *   CALIB STANDHYD    0029  1  5.0    0.58    0.10  8.00  30.82 0.76   0.000
      [I%=55.0:S%= 2.00]
*
  *   CALIB STANDHYD    0061  1  5.0    1.08    0.18  8.00  30.96 0.76   0.000
      [I%=55.0:S%= 2.00]
*
      DUHYD             0024  1  5.0    1.08    0.18  8.00  30.96  n/a   0.000
         MAJOR SYSTEM:  0024  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
         MINOR SYSTEM:  0024  3  5.0    1.08    0.18  8.00  30.96  n/a   0.000
*
      ADD [0024 + 0029]  0026  3  5.0    0.58    0.10  8.00  30.82  n/a   0.000
*
      ADD [0026 + 0059]  0026  1  5.0    1.65    0.14  8.00  21.03  n/a   0.000
*
  *   CALIB STANDHYD    0022  1  5.0    8.85    1.39  8.00  31.08 0.77   0.000
      [I%=55.0:S%= 2.00]
*
  *   CALIB STANDHYD    0060  1  5.0    0.88    0.17  8.00  32.94 0.81   0.000
      [I%=70.0:S%= 2.00]
*
  *   CALIB STANDHYD    0068  1  5.0    0.97    0.22  8.00  35.13 0.87   0.000
      [I%=80.0:S%= 2.00]
*
      DUHYD             0069  1  5.0    0.97    0.22  8.00  35.13  n/a   0.000
         MAJOR SYSTEM:  0069  2  5.0    0.00    0.00  0.00   0.00  n/a   0.000
         MINOR SYSTEM:  0069  3  5.0    0.97    0.22  8.00  35.13  n/a   0.000
*
      ADD [0022 + 0024]  0058  3  5.0    9.92    1.57  8.00  31.06  n/a   0.000
*
      ADD [0058 + 0060]  0058  1  5.0   10.80    1.74  8.00  31.22  n/a   0.000
*
      ADD [0058 + 0069]  0058  3  5.0   11.77    1.96  8.00  31.54  n/a   0.000
*
      RESRVR [ 2 : 0058] 0025  1  5.0   11.77    0.26  8.67  31.55  n/a   0.000
      {ST=  0.27 ha.m }
*
      ADD [0025 + 0026]  0057  3  5.0   13.42    0.29  8.58  30.25  n/a   0.000
*
  **  CALIB NASHYD      0071  1  5.0    1.33    0.04  8.17   7.33 0.18   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.17]
*
  *   CALIB STANDHYD    0002  1  5.0   20.29    2.87  8.00  31.08 0.77   0.000
      [I%=55.0:S%= 2.00]
*
  *   CALIB STANDHYD    0003  1  5.0    2.63    0.49  8.00  33.09 0.81   0.000
      [I%=70.0:S%= 2.00]
*
  *   CALIB STANDHYD    0004  1  5.0    5.37    0.83  8.00  31.07 0.77   0.000
      [I%=55.0:S%= 2.00]
*
      DUHYD             0006  1  5.0    5.37    0.83  8.00  31.07  n/a   0.000
         MAJOR SYSTEM:  0006  2  5.0    0.00    0.00  8.00  31.07  n/a   0.000
         MINOR SYSTEM:  0006  3  5.0    5.37    0.83  8.00  31.07  n/a   0.000
*
      ADD [0002 + 0003]  0008  3  5.0   22.92    3.36  8.00  31.31  n/a   0.000
*
      ADD [0008 + 0006]  0008  1  5.0   22.92    3.36  8.00  31.31  n/a   0.000
*
      RESRVR [ 2 : 0008] 0072  1  5.0   22.92    0.04 10.67  31.07  n/a   0.000
      {ST=  0.65 ha.m }
*
  *   CALIB STANDHYD    0011  1  5.0   10.26    1.52  8.00  31.08 0.77   0.000
      [I%=55.0:S%= 2.00]
*
  *   CALIB STANDHYD    0012  1  5.0    1.07    0.20  8.00  32.98 0.81   0.000
      [I%=70.0:S%= 2.00]
*
  *   CALIB STANDHYD    0013  1  5.0    5.37    0.83  8.00  31.07 0.77   0.000
      [I%=55.0:S%= 2.00]
*
      DUHYD             0014  1  5.0    5.37    0.83  8.00  31.07  n/a   0.000
         MAJOR SYSTEM:  0014  2  5.0    0.00    0.00  8.00  31.07  n/a   0.000
         MINOR SYSTEM:  0014  3  5.0    5.37    0.83  8.00  31.07  n/a   0.000
*
      ADD [0011 + 0012]  0015  3  5.0   11.33    1.73  8.00  31.26  n/a   0.000
*
      ADD [0015 + 0014]  0015  1  5.0   16.70    2.56  8.00  31.20  n/a   0.000
*
      RESRVR [ 2 : 0015] 0016  1  5.0   16.70    0.16  9.08  31.07  n/a   0.000
      {ST=  0.41 ha.m }
*
  *   CALIB STANDHYD    0035  1  5.0    6.63    1.18  8.00  33.09 0.81   0.000
      [I%=70.0:S%= 2.00]
*
      RESRVR [ 2 : 0035] 0036  1  5.0    6.63    0.02 10.00  32.70  n/a   0.000
      {ST=  0.19 ha.m }
*
  *   CALIB STANDHYD    0070  1  5.0    1.41    0.32  8.00  35.21 0.87   0.000
      [I%=80.0:S%= 2.00]
*
      ADD [0069 + 0070]  0074  3  5.0    1.41    0.32  8.00  35.21  n/a   0.000
*
      ADD [0016 + 0036]  0032  3  5.0   23.33    0.18  9.17  31.54  n/a   0.000
*
      ADD [0032 + 0057]  0032  1  5.0   36.75    0.46  8.58  31.07  n/a   0.000
*
      ADD [0032 + 0062]  0032  3  5.0   53.30    0.71  8.58  23.71  n/a   0.000
*
```

5-yr

```
      ADD [0032 + 0063]  0032  1  5.0    65.55    0.90  8.42  20.65  n/a   0.000
*
      ADD [0032 + 0071]  0032  3  5.0    66.88    0.93  8.42  20.38  n/a   0.000
*
      ADD [0032 + 0072]  0032  1  5.0    89.80    0.96  8.42  23.11  n/a   0.000
*
      ADD [0032 + 0074]  0032  3  5.0    91.21    1.00  8.42  23.30  n/a   0.000
*
   *  CALIB NASHYD       0064  1  5.0    10.52    0.17  8.50   7.36 0.18   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.41]
*
   *  CALIB NASHYD       0065  1  5.0    14.48    0.26  8.42   7.36 0.18   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.35]
*
      SHIFT  [ 2 : 0065] 0066  1  5.0    14.48    0.26  9.00   7.36  n/a   0.000
      [SHIFT= 36.5 min]
*
   *  CALIB STANDHYD     0027  1  5.0     5.95    1.08  8.00  33.09 0.81   0.000
      [I%=70.0:S%= 2.00]
*
   *  CALIB STANDHYD     0028  1  5.0     1.14    0.22  8.00  32.99 0.81   0.000
      [I%=70.0:S%= 2.00]
*
      ADD [0027 + 0028]  0031  3  5.0     7.08    1.30  8.00  33.07  n/a   0.000
*
      RESRVR [ 2 : 0031] 0030  1  5.0     7.08    0.04  9.33  32.90  n/a   0.000
      {ST=  0.20 ha.m }
*
      ADD [0030 + 0032]  0056  3  5.0    98.29    1.03  8.42  23.99  n/a   0.000
*
      ADD [0056 + 0064]  0056  1  5.0   108.82    1.20  8.42  22.38  n/a   0.000
*
      ADD [0056 + 0066]  0056  3  5.0   123.30    1.22  8.67  20.62  n/a   0.000
*
   *  CALIB STANDHYD     0052  1  5.0     0.75    0.14  8.00  33.01 0.81   0.000
      [I%=70.0:S%= 2.00]
*
   *  CALIB STANDHYD     0051  1  5.0     4.91    0.76  8.00  31.21 0.77   0.000
      [I%=55.0:S%= 2.00]
*
      ADD [0051 + 0052]  0053  3  5.0     5.66    0.91  8.00  31.45  n/a   0.000
*
      RESRVR [ 2 : 0053] 0054  1  5.0     5.66    0.17  8.58  31.46  n/a   0.000
      {ST=  0.12 ha.m }
*
   *  CALIB NASHYD       0107  1  5.0     3.15    0.08  8.17   7.33 0.18   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.17]
*
   *  CALIB STANDHYD     0106  1  5.0     1.76    0.12  8.00  16.21 0.40   0.000
      [I%=25.0:S%= 2.00]
*
      ADD [0106 + 0107]  0108  3  5.0     4.91    0.18  8.00  10.52  n/a   0.000
*
  ****************************
  ** SIMULATION NUMBER:    0 **
  ****************************

  W/E COMMAND             HYD ID   DT     AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                   min      ha   '  cms   hrs     mm          cms

      START @  0.00 hrs
      --------------------
      CHIC STORM               10.0
      [ Ptot= 46.47 mm ]
*
  **  CALIB NASHYD       0062  1  5.0    16.55    0.33  8.58   9.65 0.21   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.46]
*
  **  CALIB NASHYD       0063  1  5.0    12.25    0.41  8.17   9.62 0.21   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.19]
*
  **  CALIB NASHYD       0059  1  5.0     1.07    0.08  8.17  19.87 0.43   0.000
      [CN=85.0        ]
      [ N = 3.0:Tp 0.18]
*
   *  CALIB STANDHYD     0029  1  5.0     0.58    0.12  8.00  36.14 0.78   0.000
      [I%=55.0:S%= 2.00]
*
   *  CALIB STANDHYD     0061  1  5.0     1.08    0.22  8.00  36.29 0.78   0.000
```

10-yr

```
      [I%=55.0:S%= 2.00]
*
      DUHYD              0024  1  5.0     1.08    0.22  8.00  36.29  n/a   0.000
         MAJOR SYSTEM:   0024  2  5.0     0.05    0.04  8.00  36.29  n/a   0.000
         MINOR SYSTEM:   0024  3  5.0     1.03    0.18  7.92  36.29  n/a   0.000
*
      ADD [0024 + 0029]  0026  3  5.0     0.63    0.16  8.00  36.15  n/a   0.000
*
      ADD [0026 + 0059]  0026  1  5.0     1.70    0.21  8.00  25.89  n/a   0.000
*
   *  CALIB STANDHYD     0022  1  5.0     8.85    1.63  8.00  36.38 0.78   0.000
      [I%=55.0:S%= 2.00]
*
   *  CALIB STANDHYD     0060  1  5.0     0.88    0.21  8.00  38.33 0.82   0.000
      [I%=70.0:S%= 2.00]
*
   *  CALIB STANDHYD     0068  1  5.0     0.97    0.25  8.00  40.68 0.88   0.000
      [I%=80.0:S%= 2.00]
*
      DUHYD              0069  1  5.0     0.97    0.25  8.00  40.68  n/a   0.000
         MAJOR SYSTEM:   0069  2  5.0     0.04    0.03  8.00  40.68  n/a   0.000
         MINOR SYSTEM:   0069  3  5.0     0.93    0.22  7.92  40.68  n/a   0.000
*
      ADD [0022 + 0024]  0058  3  5.0     9.88    1.81  8.00  36.37  n/a   0.000
*
      ADD [0058 + 0060]  0058  1  5.0    10.75    2.01  8.00  36.53  n/a   0.000
*
      ADD [0058 + 0069]  0058  3  5.0    11.69    2.23  8.00  36.86  n/a   0.000
*
      RESRVR [ 2 : 0058] 0025  1  5.0    11.69    0.38  8.58  36.87  n/a   0.000
      {ST=  0.29 ha.m }
*
      ADD [0025 + 0026]  0057  3  5.0    13.39    0.44  8.50  35.47  n/a   0.000
*
  **  CALIB NASHYD       0071  1  5.0     1.33    0.05  8.17   9.61 0.21   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.17]
*
   *  CALIB STANDHYD     0002  1  5.0    20.29    3.38  8.00  36.38 0.78   0.000
      [I%=55.0:S%= 2.00]
*
   *  CALIB STANDHYD     0003  1  5.0     2.63    0.60  8.00  38.47 0.83   0.000
      [I%=70.0:S%= 2.00]
*
   *  CALIB STANDHYD     0004  1  5.0     5.37    0.97  8.00  36.38 0.78   0.000
      [I%=55.0:S%= 2.00]
*
      DUHYD              0006  1  5.0     5.37    0.97  8.00  36.38  n/a   0.000
         MAJOR SYSTEM:   0006  2  5.0     0.12    0.14  8.00  36.38  n/a   0.000
         MINOR SYSTEM:   0006  3  5.0     5.25    0.83  8.00  36.38  n/a   0.000
*
      ADD [0002 + 0003]  0008  3  5.0    22.92    3.99  8.00  36.62  n/a   0.000
*
      ADD [0008 + 0006]  0008  1  5.0    23.03    4.13  8.00  36.62  n/a   0.000
*
      RESRVR [ 2 : 0008] 0072  1  5.0    23.03    0.05 10.42  36.32  n/a   0.000
      {ST=  0.76 ha.m }
*
   *  CALIB STANDHYD     0011  1  5.0    10.26    1.79  8.00  36.38 0.78   0.000
      [I%=55.0:S%= 2.00]
*
   *  CALIB STANDHYD     0012  1  5.0     1.07    0.25  8.00  38.37 0.83   0.000
      [I%=70.0:S%= 2.00]
*
   *  CALIB STANDHYD     0013  1  5.0     5.37    0.97  8.00  36.38 0.78   0.000
      [I%=55.0:S%= 2.00]
*
      DUHYD              0014  1  5.0     5.37    0.97  8.00  36.38  n/a   0.000
         MAJOR SYSTEM:   0014  2  5.0     0.12    0.14  8.00  36.38  n/a   0.000
         MINOR SYSTEM:   0014  3  5.0     5.25    0.83  8.00  36.38  n/a   0.000
*
      ADD [0011 + 0012]  0015  3  5.0    11.33    2.04  8.00  36.57  n/a   0.000
*
      ADD [0015 + 0014]  0015  1  5.0    16.58    2.87  8.00  36.51  n/a   0.000
*
      RESRVR [ 2 : 0015] 0016  1  5.0    16.58    0.17  9.17  36.39  n/a   0.000
      {ST=  0.48 ha.m }
*
   *  CALIB STANDHYD     0035  1  5.0     6.63    1.47  8.00  38.47 0.83   0.000
      [I%=70.0:S%= 2.00]
*
      RESRVR [ 2 : 0035] 0036  1  5.0     6.63    0.02 10.00  38.08  n/a   0.000
      {ST=  0.23 ha.m }
*
```

```
   *   CALIB STANDHYD     0070  1  5.0     1.41    0.36  8.00  40.76 0.88   0.000
       [I%=80.0:S%= 2.00]
   *
       ADD [0069 + 0070]  0074  3  5.0     1.45    0.40  8.00  40.76  n/a   0.000
   *
       ADD [0016 + 0036]  0032  3  5.0    23.21    0.19  9.17  36.87  n/a   0.000
   *
       ADD [0032 + 0057]  0032  1  5.0    36.60    0.62  8.50  36.36  n/a   0.000
   *
       ADD [0032 + 0062]  0032  3  5.0    53.15    0.95  8.50  28.04  n/a   0.000
   *
       ADD [0032 + 0063]  0032  1  5.0    65.40    1.23  8.42  24.59  n/a   0.000
   *
       ADD [0032 + 0071]  0032  3  5.0    66.73    1.27  8.33  24.29  n/a   0.000
   *
       ADD [0032 + 0072]  0032  1  5.0    89.76    1.30  8.33  27.38  n/a   0.000
   *
       ADD [0032 + 0074]  0032  3  5.0    91.21    1.38  8.33  27.59  n/a   0.000
   *
   *   CALIB NASHYD       0064  1  5.0    10.52    0.23  8.50   9.65 0.21   0.000
       [CN=65.0         ]
       [ N = 3.0:Tp 0.41]
   *
   *   CALIB NASHYD       0065  1  5.0    14.48    0.35  8.42   9.65 0.21   0.000
       [CN=65.0         ]
       [ N = 3.0:Tp 0.35]
   *
       SHIFT  [ 2 : 0065] 0066  1  5.0    14.48    0.35  9.00   9.65  n/a   0.000
       [SHIFT= 36.5 min]
   *
   *   CALIB STANDHYD     0027  1  5.0     5.95    1.32  8.00  38.47 0.83   0.000
       [I%=70.0:S%= 2.00]
   *
   *   CALIB STANDHYD     0028  1  5.0     1.14    0.27  8.00  38.38 0.83   0.000
       [I%=70.0:S%= 2.00]
   *
       ADD [0027 + 0028]  0031  3  5.0     7.08    1.59  8.00  38.46  n/a   0.000
   *
       RESRVR [ 2 : 0031] 0030  1  5.0     7.08    0.06  9.17  38.28  n/a   0.000
       {ST=  0.23 ha.m }
   *
       ADD [0030 + 0032]  0056  3  5.0    98.29    1.42  8.33  28.36  n/a   0.000
   *
       ADD [0056 + 0064]  0056  1  5.0   108.82    1.63  8.33  26.55  n/a   0.000
   *
       ADD [0056 + 0066]  0056  3  5.0   123.30    1.63  8.33  24.57  n/a   0.000
   *
   *   CALIB STANDHYD     0052  1  5.0     0.75    0.18  8.00  38.40 0.83   0.000
       [I%=70.0:S%= 2.00]
   *
   *   CALIB STANDHYD     0051  1  5.0     4.91    0.89  8.00  36.53 0.79   0.000
       [I%=55.0:S%= 2.00]
   *
       ADD [0051 + 0052]  0053  3  5.0     5.66    1.07  8.00  36.77  n/a   0.000
   *
       RESRVR [ 2 : 0053] 0054  1  5.0     5.66    0.22  8.50  36.78  n/a   0.000
       {ST=  0.13 ha.m }
   *
   *   CALIB NASHYD       0107  1  5.0     3.15    0.11  8.17   9.61 0.21   0.000
       [CN=65.0         ]
       [ N = 3.0:Tp 0.17]
   *
   *   CALIB STANDHYD     0106  1  5.0     1.76    0.15  8.00  19.49 0.42   0.000
       [I%=25.0:S%= 2.00]
   *
       ADD [0106 + 0107]  0108  3  5.0     4.91    0.22  8.00  13.16  n/a   0.000
   *
   ****************************
   ** SIMULATION NUMBER:    0 **
   ****************************

   W/E COMMAND              HYD ID   DT     AREA   ' Qpeak Tpeak   R.V. R.C.   Qbase
                                     min      ha    '  cms   hrs     mm          cms

       START @  0.00 hrs
       --------------------
       CHIC STORM               10.0
       [ Ptot= 63.97 mm ]
   *
   **  CALIB NASHYD       0062  1  5.0    16.55    0.60  8.58  17.76 0.28   0.000
       [CN=65.0         ]
       [ N = 3.0:Tp 0.46]
   *
   **  CALIB NASHYD       0063  1  5.0    12.25    0.73  8.17  17.72 0.28   0.000
```

25-yr

```
       [CN=65.0         ]
       [ N = 3.0:Tp 0.19]
   *
   **  CALIB NASHYD       0059  1  5.0     1.07    0.13  8.17  33.40 0.52   0.000
       [CN=85.0         ]
       [ N = 3.0:Tp 0.18]
   *
   *   CALIB STANDHYD     0029  1  5.0     0.58    0.16  8.00  52.44 0.82   0.000
       [I%=55.0:S%= 2.00]
   *
   *   CALIB STANDHYD     0061  1  5.0     1.08    0.30  8.00  52.63 0.82   0.000
       [I%=55.0:S%= 2.00]
   *
       DUHYD              0024  1  5.0     1.08    0.30  8.00  52.63  n/a   0.000
          MAJOR SYSTEM:   0024  2  5.0     0.12    0.12  8.00  52.63  n/a   0.000
          MINOR SYSTEM:   0024  3  5.0     0.96    0.18  7.92  52.63  n/a   0.000
   *
       ADD [0024 + 0029]  0026  3  5.0     0.70    0.28  8.00  52.47  n/a   0.000
   *
       ADD [0026 + 0059]  0026  1  5.0     1.77    0.38  8.00  40.94  n/a   0.000
   *
   *   CALIB STANDHYD     0022  1  5.0     8.85    2.37  8.00  52.65 0.82   0.000
       [I%=55.0:S%= 2.00]
   *
   *   CALIB STANDHYD     0060  1  5.0     0.88    0.27  8.00  54.79 0.86   0.000
       [I%=70.0:S%= 2.00]
   *
   *   CALIB STANDHYD     0068  1  5.0     0.97    0.34  8.00  57.52 0.90   0.000
       [I%=80.0:S%= 2.00]
   *
       DUHYD              0069  1  5.0     0.97    0.34  8.00  57.52  n/a   0.000
          MAJOR SYSTEM:   0069  2  5.0     0.11    0.12  8.00  57.52  n/a   0.000
          MINOR SYSTEM:   0069  3  5.0     0.86    0.22  7.92  57.52  n/a   0.000
   *
       ADD [0022 + 0024]  0058  3  5.0     9.80    2.55  8.00  52.65  n/a   0.000
   *
       ADD [0058 + 0060]  0058  1  5.0    10.68    2.82  8.00  52.82  n/a   0.000
   *
       ADD [0058 + 0069]  0058  3  5.0    11.54    3.04  8.00  53.17  n/a   0.000
   *
       RESRVR [ 2 : 0058] 0025  1  5.0    11.54    0.53  8.58  53.18  n/a   0.000
       {ST=  0.39 ha.m }
   *
       ADD [0025 + 0026]  0057  3  5.0    13.31    0.73  8.17  51.55  n/a   0.000
   *
   **  CALIB NASHYD       0071  1  5.0     1.33    0.08  8.17  17.70 0.28   0.000
       [CN=65.0         ]
       [ N = 3.0:Tp 0.17]
   *
   *   CALIB STANDHYD     0002  1  5.0    20.29    4.63  8.00  52.65 0.82   0.000
       [I%=55.0:S%= 2.00]
   *
   *   CALIB STANDHYD     0003  1  5.0     2.63    0.80  8.00  54.86 0.86   0.000
       [I%=70.0:S%= 2.00]
   *
   *   CALIB STANDHYD     0004  1  5.0     5.37    1.31  8.00  52.65 0.82   0.000
       [I%=55.0:S%= 2.00]
   *
       DUHYD              0006  1  5.0     5.37    1.31  8.00  52.65  n/a   0.000
          MAJOR SYSTEM:   0006  2  5.0     0.51    0.48  8.00  52.65  n/a   0.000
          MINOR SYSTEM:   0006  3  5.0     4.86    0.83  7.92  52.65  n/a   0.000
   *
       ADD [0002 + 0003]  0008  3  5.0    22.92    5.44  8.00  52.91  n/a   0.000
   *
       ADD [0008 + 0006]  0008  1  5.0    23.43    5.92  8.00  52.90  n/a   0.000
   *
       RESRVR [ 2 : 0008] 0072  1  5.0    23.43    0.10 10.17  52.47  n/a   0.000
       {ST=  1.10 ha.m }
   *
   *   CALIB STANDHYD     0011  1  5.0    10.26    2.44  8.00  52.65 0.82   0.000
       [I%=55.0:S%= 2.00]
   *
   *   CALIB STANDHYD     0012  1  5.0     1.07    0.33  8.00  54.84 0.86   0.000
       [I%=70.0:S%= 2.00]
   *
   *   CALIB STANDHYD     0013  1  5.0     5.37    1.31  8.00  52.65 0.82   0.000
       [I%=55.0:S%= 2.00]
   *
       DUHYD              0014  1  5.0     5.37    1.31  8.00  52.65  n/a   0.000
          MAJOR SYSTEM:   0014  2  5.0     0.51    0.48  8.00  52.65  n/a   0.000
          MINOR SYSTEM:   0014  3  5.0     4.86    0.83  7.92  52.65  n/a   0.000
   *
       ADD [0011 + 0012]  0015  3  5.0    11.33    2.77  8.00  52.86  n/a   0.000
   *
```

```
      ADD [0015 + 0014]  0015  1  5.0    16.19    3.60  8.00  52.80  n/a   0.000
*
      RESRVR [ 2 : 0015] 0016  1  5.0    16.19    0.19  9.33  52.67  n/a   0.000
      {ST=  0.68 ha.m }
*
   *  CALIB STANDHYD     0035  1  5.0     6.63    1.97  8.00  54.86 0.86   0.000
      [I%=70.0:S%= 2.00]
*
      RESRVR [ 2 : 0035] 0036  1  5.0     6.63    0.02 10.33  54.47  n/a   0.000
      {ST=  0.33 ha.m }
*
   *  CALIB STANDHYD     0070  1  5.0     1.41    0.48  8.00  57.56 0.90   0.000
      [I%=80.0:S%= 2.00]
*
      ADD [0069 + 0070]  0074  3  5.0     1.52    0.60  8.00  57.56  n/a   0.000
*
      ADD [0016 + 0036]  0032  3  5.0    22.82    0.21  9.33  53.19  n/a   0.000
*
      ADD [0032 + 0057]  0032  1  5.0    36.13    0.91  8.17  52.59  n/a   0.000
*
      ADD [0032 + 0062]  0032  3  5.0    52.68    1.42  8.50  41.65  n/a   0.000
*
      ADD [0032 + 0063]  0032  1  5.0    64.93    2.04  8.25  37.13  n/a   0.000
*
      ADD [0032 + 0071]  0032  3  5.0    66.26    2.12  8.25  36.74  n/a   0.000
*
      ADD [0032 + 0072]  0032  1  5.0    89.69    2.17  8.25  40.85  n/a   0.000
*
      ADD [0032 + 0074]  0032  3  5.0    91.21    2.31  8.17  41.13  n/a   0.000
*
   *  CALIB NASHYD       0064  1  5.0    10.52    0.41  8.50  17.76 0.28   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.41]
*
   *  CALIB NASHYD       0065  1  5.0    14.48    0.62  8.42  17.76 0.28   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.35]
*
      SHIFT  [ 2 : 0065] 0066  1  5.0    14.48    0.62  9.00  17.76  n/a   0.000
      [SHIFT= 36.5 min]
*
   *  CALIB STANDHYD     0027  1  5.0     5.95    1.77  8.00  54.86 0.86   0.000
      [I%=70.0:S%= 2.00]
*
   *  CALIB STANDHYD     0028  1  5.0     1.14    0.35  8.00  54.86 0.86   0.000
      [I%=70.0:S%= 2.00]
*
      ADD [0027 + 0028]  0031  3  5.0     7.08    2.13  8.00  54.86  n/a   0.000
*
      RESRVR [ 2 : 0031] 0030  1  5.0     7.08    0.07  9.33  54.69  n/a   0.000
      {ST=  0.32 ha.m }
*
      ADD [0030 + 0032]  0056  3  5.0    98.29    2.37  8.17  42.11  n/a   0.000
*
      ADD [0056 + 0064]  0056  1  5.0   108.82    2.71  8.33  39.75  n/a   0.000
*
      ADD [0056 + 0066]  0056  3  5.0   123.30    2.71  8.33  37.17  n/a   0.000
*
   *  CALIB STANDHYD     0052  1  5.0     0.75    0.23  8.00  54.87 0.86   0.000
      [I%=70.0:S%= 2.00]
*
   *  CALIB STANDHYD     0051  1  5.0     4.91    1.30  8.00  52.80 0.83   0.000
      [I%=55.0:S%= 2.00]
*
      ADD [0051 + 0052]  0053  3  5.0     5.66    1.53  8.00  53.08  n/a   0.000
*
      RESRVR [ 2 : 0053] 0054  1  5.0     5.66    0.31  8.50  53.08  n/a   0.000
      {ST=  0.18 ha.m }
*
   *  CALIB NASHYD       0107  1  5.0     3.15    0.20  8.17  17.70 0.28   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.17]
*
   *  CALIB STANDHYD     0106  1  5.0     1.76    0.21  8.00  30.23 0.47   0.000
      [I%=25.0:S%= 2.00]
*
      ADD [0106 + 0107]  0108  3  5.0     4.91    0.35  8.17  22.19  n/a   0.000
*
   ****************************
   ** SIMULATION NUMBER:    0 **
   ****************************

   W/E COMMAND            HYD ID   DT    AREA  ' Qpeak Tpeak   R.V. R.C.   Qbase
                                  min     ha   '  cms   hrs     mm          cms
```

50-yr

```
      START @  0.00 hrs
      --------------------
      CHIC STORM                 10.0
      [ Ptot= 77.87 mm ]
*
  **  CALIB NASHYD       0062  1  5.0    16.55    0.78  8.58  25.33 0.33   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.46]
*
  **  CALIB NASHYD       0063  1  5.0    12.25    0.92  8.17  25.27 0.32   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.19]
*
  **  CALIB NASHYD       0059  1  5.0     1.07    0.16  8.17  44.99 0.58   0.000
      [CN=85.0        ]
      [ N = 3.0:Tp 0.18]
*
   *  CALIB STANDHYD     0029  1  5.0     0.58    0.17  8.00  65.76 0.84   0.000
      [I%=55.0:S%= 2.00]
*
   *  CALIB STANDHYD     0061  1  5.0     1.08    0.31  8.00  65.85 0.85   0.000
      [I%=55.0:S%= 2.00]
*
      DUHYD              0024  1  5.0     1.08    0.31  8.00  65.85  n/a   0.000
         MAJOR SYSTEM:   0024  2  5.0     0.13    0.14  8.00  65.85  n/a   0.000
         MINOR SYSTEM:   0024  3  5.0     0.95    0.18  7.92  65.85  n/a   0.000
*
      ADD [0024 + 0029]  0026  3  5.0     0.71    0.31  8.00  65.77  n/a   0.000
*
      ADD [0026 + 0059]  0026  1  5.0     1.78    0.42  8.00  53.28  n/a   0.000
*
   *  CALIB STANDHYD     0022  1  5.0     8.85    2.48  8.00  65.85 0.85   0.000
      [I%=55.0:S%= 2.00]
*
   *  CALIB STANDHYD     0060  1  5.0     0.88    0.28  8.00  68.11 0.87   0.000
      [I%=70.0:S%= 2.00]
*
   *  CALIB STANDHYD     0068  1  5.0     0.97    0.34  8.00  71.03 0.91   0.000
      [I%=80.0:S%= 2.00]
*
      DUHYD              0069  1  5.0     0.97    0.34  8.00  71.03  n/a   0.000
         MAJOR SYSTEM:   0069  2  5.0     0.10    0.13  8.00  71.03  n/a   0.000
         MINOR SYSTEM:   0069  3  5.0     0.87    0.22  7.92  71.03  n/a   0.000
*
      ADD [0022 + 0024]  0058  3  5.0     9.79    2.66  8.00  65.85  n/a   0.000
*
      ADD [0058 + 0060]  0058  1  5.0    10.67    2.94  8.00  66.04  n/a   0.000
*
      ADD [0058 + 0069]  0058  3  5.0    11.54    3.16  8.00  66.41  n/a   0.000
*
      RESRVR [ 2 : 0058] 0025  1  5.0    11.54    0.56  8.67  66.42  n/a   0.000
      {ST=  0.47 ha.m }
*
      ADD [0025 + 0026]  0057  3  5.0    13.32    0.81  8.17  64.67  n/a   0.000
*
  **  CALIB NASHYD       0071  1  5.0     1.33    0.11  8.17  25.24 0.32   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.17]
*
   *  CALIB STANDHYD     0002  1  5.0    20.29    4.87  8.00  65.85 0.85   0.000
      [I%=55.0:S%= 2.00]
*
   *  CALIB STANDHYD     0003  1  5.0     2.63    0.83  8.00  68.11 0.87   0.000
      [I%=70.0:S%= 2.00]
*
   *  CALIB STANDHYD     0004  1  5.0     5.37    1.48  8.00  65.85 0.85   0.000
      [I%=55.0:S%= 2.00]
*
      DUHYD              0006  1  5.0     5.37    1.48  8.00  65.85  n/a   0.000
         MAJOR SYSTEM:   0006  2  5.0     0.68    0.65  8.00  65.85  n/a   0.000
         MINOR SYSTEM:   0006  3  5.0     4.69    0.83  7.92  65.85  n/a   0.000
*
      ADD [0002 + 0003]  0008  3  5.0    22.92    5.70  8.00  66.11  n/a   0.000
*
      ADD [0008 + 0006]  0008  1  5.0    23.59    6.35  8.00  66.10  n/a   0.000
*
      RESRVR [ 2 : 0008] 0072  1  5.0    23.59    0.11 10.58  65.55  n/a   0.000
      {ST=  1.37 ha.m }
*
   *  CALIB STANDHYD     0011  1  5.0    10.26    2.56  8.00  65.85 0.85   0.000
      [I%=55.0:S%= 2.00]
*
   *  CALIB STANDHYD     0012  1  5.0     1.07    0.34  8.00  68.11 0.87   0.000
```

```
      [I%=70.0:S%= 2.00]
*
   *  CALIB STANDHYD     0013  1  5.0    5.37    1.48  8.00  65.85 0.85   0.000
      [I%=55.0:S%= 2.00]
*
      DUHYD              0014  1  5.0    5.37    1.48  8.00  65.85  n/a   0.000
         MAJOR SYSTEM:   0014  2  5.0    0.68    0.65  8.00  65.85  n/a   0.000
         MINOR SYSTEM:   0014  3  5.0    4.69    0.83  7.92  65.85  n/a   0.000
*
      ADD [0011 + 0012]  0015  3  5.0   11.33    2.90  8.00  66.06  n/a   0.000
*
      ADD [0015 + 0014]  0015  1  5.0   16.02    3.72  8.00  66.00  n/a   0.000
*
      RESRVR [ 2 : 0015] 0016  1  5.0   16.02    0.20  9.58  65.87  n/a   0.000
      {ST=  0.83 ha.m }
*
   *  CALIB STANDHYD     0035  1  5.0    6.63    2.03  8.00  68.12 0.87   0.000
      [I%=70.0:S%= 2.00]
*
      RESRVR [ 2 : 0035] 0036  1  5.0    6.63    0.03 10.83  67.73  n/a   0.000
      {ST=  0.40 ha.m }
*
   *  CALIB STANDHYD     0070  1  5.0    1.41    0.49  8.00  71.03 0.91   0.000
      [I%=80.0:S%= 2.00]
*
      ADD [0069 + 0070]  0074  3  5.0    1.51    0.61  8.00  71.03  n/a   0.000
*
      ADD [0016 + 0036]  0032  3  5.0   22.65    0.23  9.58  66.41  n/a   0.000
*
      ADD [0032 + 0057]  0032  1  5.0   35.98    1.00  8.17  65.77  n/a   0.000
*
      ADD [0032 + 0062]  0032  3  5.0   52.53    1.67  8.50  53.03  n/a   0.000
*
      ADD [0032 + 0063]  0032  1  5.0   64.78    2.44  8.33  47.78  n/a   0.000
*
      ADD [0032 + 0071]  0032  3  5.0   66.11    2.53  8.33  47.32  n/a   0.000
*
      ADD [0032 + 0072]  0032  1  5.0   89.70    2.62  8.33  52.12  n/a   0.000
*
      ADD [0032 + 0074]  0032  3  5.0   91.21    2.76  8.17  52.43  n/a   0.000
*
   *  CALIB NASHYD       0064  1  5.0   10.52    0.53  8.50  25.33 0.33   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.41]
*
   *  CALIB NASHYD       0065  1  5.0   14.48    0.81  8.42  25.32 0.33   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.35]
*
      SHIFT  [ 2 : 0065] 0066  1  5.0   14.48    0.81  9.00  25.32  n/a   0.000
      [SHIFT= 36.5 min]
*
   *  CALIB STANDHYD     0027  1  5.0    5.95    1.83  8.00  68.12 0.87   0.000
      [I%=70.0:S%= 2.00]
*
   *  CALIB STANDHYD     0028  1  5.0    1.14    0.36  8.00  68.11 0.87   0.000
      [I%=70.0:S%= 2.00]
*
      ADD [0027 + 0028]  0031  3  5.0    7.08    2.19  8.00  68.11  n/a   0.000
*
      RESRVR [ 2 : 0031] 0030  1  5.0    7.08    0.07  9.67  67.94  n/a   0.000
      {ST=  0.40 ha.m }
*
      ADD [0030 + 0032]  0056  3  5.0   98.29    2.83  8.33  53.55  n/a   0.000
*
      ADD [0056 + 0064]  0056  1  5.0  108.82    3.31  8.33  50.82  n/a   0.000
*
      ADD [0056 + 0066]  0056  3  5.0  123.30    3.32  8.33  47.83  n/a   0.000
*
   *  CALIB STANDHYD     0052  1  5.0    0.75    0.24  8.00  68.24 0.88   0.000
      [I%=70.0:S%= 2.00]
*
   *  CALIB STANDHYD     0051  1  5.0    4.91    1.36  8.00  66.01 0.85   0.000
      [I%=55.0:S%= 2.00]
*
      ADD [0051 + 0052]  0053  3  5.0    5.66    1.60  8.00  66.30  n/a   0.000
*
      RESRVR [ 2 : 0053] 0054  1  5.0    5.66    0.31  8.58  66.31  n/a   0.000
      {ST=  0.22 ha.m }
*
   *  CALIB NASHYD       0107  1  5.0    3.15    0.25  8.17  25.24 0.32   0.000
      [CN=65.0        ]
      [ N = 3.0:Tp 0.17]
*
```

```
   *  CALIB STANDHYD     0106  1  5.0    1.76    0.22  8.00  39.52 0.51   0.000
      [I%=25.0:S%= 2.00]
*
      ADD [0106 + 0107]  0108  3  5.0    4.91    0.44  8.17  30.36  n/a   0.000
*
   ****************************
   ** SIMULATION NUMBER:   0 **   100-yr
   ****************************

   W/E COMMAND              HYD ID   DT    AREA   ' Qpeak Tpeak   R.V. R.C.   Qbase
                                     min     ha    '  cms   hrs     mm          cms

       START @  0.00 hrs
       --------------------
       CHIC STORM                   10.0
       [ Ptot=108.98 mm ]
*
   **  CALIB NASHYD       0062  1  5.0   16.55    1.05  8.50  44.90 0.41   0.000
       [CN=65.0        ]
       [ N = 3.0:Tp 0.46]
*
   **  CALIB NASHYD       0063  1  5.0   12.25    1.38  8.17  44.80 0.41   0.000
       [CN=65.0        ]
       [ N = 3.0:Tp 0.19]
*
   **  CALIB NASHYD       0059  1  5.0    1.07    0.23  8.08  72.45 0.66   0.000
       [CN=85.0        ]
       [ N = 3.0:Tp 0.18]
*
   *   CALIB STANDHYD     0029  1  5.0    0.58    0.26  8.00  95.88 0.88   0.000
       [I%=55.0:S%= 2.00]
*
   *   CALIB STANDHYD     0061  1  5.0    1.08    0.49  8.00  95.88 0.88   0.000
       [I%=55.0:S%= 2.00]
*
       DUHYD              0024  1  5.0    1.08    0.49  8.00  95.88  n/a   0.000
          MAJOR SYSTEM:   0024  2  5.0    0.19    0.31  8.00  95.88  n/a   0.000
          MINOR SYSTEM:   0024  3  5.0    0.89    0.18  7.92  95.88  n/a   0.000
*
       ADD [0024 + 0029]  0026  3  5.0    0.77    0.57  8.00  95.88  n/a   0.000
*
       ADD [0026 + 0059]  0026  1  5.0    1.84    0.76  8.00  82.24  n/a   0.000
*
   *   CALIB STANDHYD     0022  1  5.0    8.85    3.85  8.00  95.88 0.88   0.000
       [I%=55.0:S%= 2.00]
*
   *   CALIB STANDHYD     0060  1  5.0    0.88    0.42  8.00  98.20 0.90   0.000
       [I%=70.0:S%= 2.00]
*
   *   CALIB STANDHYD     0068  1  5.0    0.97    0.51  8.00 101.46 0.93   0.000
       [I%=80.0:S%= 2.00]
*
       DUHYD              0069  1  5.0    0.97    0.51  8.00 101.46  n/a   0.000
          MAJOR SYSTEM:   0069  2  5.0    0.17    0.29  8.00 101.46  n/a   0.000
          MINOR SYSTEM:   0069  3  5.0    0.80    0.22  7.92 101.46  n/a   0.000
*
       ADD [0022 + 0024]  0058  3  5.0    9.74    4.03  8.00  95.88  n/a   0.000
*
       ADD [0058 + 0060]  0058  1  5.0   10.61    4.45  8.00  96.07  n/a   0.000
*
       ADD [0058 + 0069]  0058  3  5.0   11.42    4.67  8.00  96.45  n/a   0.000
*
       RESRVR [ 2 : 0058] 0025  1  5.0   11.42    0.58  8.50  96.46  n/a   0.000
       {ST=  0.54 ha.m }
*
       ADD [0025 + 0026]  0057  3  5.0   13.26    1.27  8.00  94.49  n/a   0.000
*
   **  CALIB NASHYD       0071  1  5.0    1.33    0.16  8.08  44.75 0.41   0.000
       [CN=65.0        ]
       [ N = 3.0:Tp 0.17]
*
   *   CALIB STANDHYD     0002  1  5.0   20.29    8.14  8.00  95.88 0.88   0.000
       [I%=55.0:S%= 2.00]
*
   *   CALIB STANDHYD     0003  1  5.0    2.63    1.24  8.00  98.20 0.90   0.000
       [I%=70.0:S%= 2.00]
*
   *   CALIB STANDHYD     0004  1  5.0    5.37    2.30  8.00  95.88 0.88   0.000
       [I%=55.0:S%= 2.00]
*
       DUHYD              0006  1  5.0    5.37    2.30  8.00  95.88  n/a   0.000
          MAJOR SYSTEM:   0006  2  5.0    0.95    1.47  8.00  95.88  n/a   0.000
          MINOR SYSTEM:   0006  3  5.0    4.41    0.83  7.92  95.88  n/a   0.000
*
```

```
      ADD [0002 + 0003]  0008  3  5.0   22.92    9.38  8.00  96.15  n/a   0.000
*
      ADD [0008 + 0006]  0008  1  5.0   23.87   10.85  8.00  96.14  n/a   0.000
*
      RESRVR [ 2 : 0008] 0072  1  5.0   23.87    0.12 13.92  95.20  n/a   0.000
      {ST=  1.76 ha.m }
*
   *  CALIB STANDHYD     0011  1  5.0   10.26    4.28  8.00  95.88 0.88   0.000
      [I%=55.0:S%= 2.00]
*
   *  CALIB STANDHYD     0012  1  5.0    1.07    0.51  8.00  98.20 0.90   0.000
      [I%=70.0:S%= 2.00]
*
   *  CALIB STANDHYD     0013  1  5.0    5.37    2.30  8.00  95.88 0.88   0.000
      [I%=55.0:S%= 2.00]
*
      DUHYD              0014  1  5.0    5.37    2.30  8.00  95.88  n/a   0.000
         MAJOR SYSTEM:   0014  2  5.0    0.95    1.47  8.00  95.88  n/a   0.000
         MINOR SYSTEM:   0014  3  5.0    4.41    0.83  7.92  95.88  n/a   0.000
*
      ADD [0011 + 0012]  0015  3  5.0   11.33    4.79  8.00  96.10  n/a   0.000
*
      ADD [0015 + 0014]  0015  1  5.0   15.75    5.61  8.00  96.04  n/a   0.000
*
      RESRVR [ 2 : 0015] 0016  1  5.0   15.75    0.21 10.08  95.91  n/a   0.000
      {ST=  0.96 ha.m }
*
   *  CALIB STANDHYD     0035  1  5.0    6.63    3.06  8.00  98.20 0.90   0.000
      [I%=70.0:S%= 2.00]
*
      RESRVR [ 2 : 0035] 0036  1  5.0    6.63    0.04 12.42  97.69  n/a   0.000
      {ST=  0.49 ha.m }
*
   *  CALIB STANDHYD     0070  1  5.0    1.41    0.74  8.00 101.46 0.93   0.000
      [I%=80.0:S%= 2.00]
*
      ADD [0069 + 0070]  0074  3  5.0    1.58    1.04  8.00 101.46  n/a   0.000
*
      ADD [0016 + 0036]  0032  3  5.0   22.38    0.25 11.08  96.44  n/a   0.000
*
      ADD [0032 + 0057]  0032  1  5.0   35.63    1.46  8.00  95.71  n/a   0.000
*
      ADD [0032 + 0062]  0032  3  5.0   52.18    1.99  8.42  79.60  n/a   0.000
*
      ADD [0032 + 0063]  0032  1  5.0   64.43    3.22  8.17  72.98  n/a   0.000
*
      ADD [0032 + 0071]  0032  3  5.0   65.76    3.37  8.17  72.41  n/a   0.000
*
      ADD [0032 + 0072]  0032  1  5.0   89.64    3.47  8.17  78.48  n/a   0.000
*
      ADD [0032 + 0074]  0032  3  5.0   91.21    4.02  8.00  78.88  n/a   0.000
*
   *  CALIB NASHYD       0064  1  5.0   10.52    0.73  8.42  44.90 0.41   0.000
      [CN=65.0         ]
      [ N = 3.0:Tp 0.41]
*
   *  CALIB NASHYD       0065  1  5.0   14.48    1.12  8.33  44.90 0.41   0.000
      [CN=65.0         ]
      [ N = 3.0:Tp 0.35]
*
      SHIFT  [ 2 : 0065] 0066  1  5.0   14.48    1.12  8.92  44.90  n/a   0.000
      [SHIFT= 36.5 min]
*
   *  CALIB STANDHYD     0027  1  5.0    5.95    2.75  8.00  98.20 0.90   0.000
      [I%=70.0:S%= 2.00]
*
   *  CALIB STANDHYD     0028  1  5.0    1.14    0.54  8.00  98.20 0.90   0.000
      [I%=70.0:S%= 2.00]
*
      ADD [0027 + 0028]  0031  3  5.0    7.08    3.30  8.00  98.20  n/a   0.000
*
      RESRVR [ 2 : 0031] 0030  1  5.0    7.08    0.07 10.58  98.02  n/a   0.000
      {ST=  0.47 ha.m }
*
      ADD [0030 + 0032]  0056  3  5.0   98.29    4.08  8.00  80.26  n/a   0.000
*
      ADD [0056 + 0064]  0056  1  5.0  108.81    4.33  8.00  76.84  n/a   0.000
*
      ADD [0056 + 0066]  0056  3  5.0  123.29    4.35  8.00  73.09  n/a   0.000
*
   *  CALIB STANDHYD     0052  1  5.0    0.75    0.36  8.00  98.33 0.90   0.000
      [I%=70.0:S%= 2.00]
*
   *  CALIB STANDHYD     0051  1  5.0    4.91    2.11  8.00  96.05 0.88   0.000
      [I%=55.0:S%= 2.00]
*
      ADD [0051 + 0052]  0053  3  5.0    5.66    2.47  8.00  96.35  n/a   0.000
*
      RESRVR [ 2 : 0053] 0054  1  5.0    5.66    0.32  8.50  96.35  n/a   0.000
      {ST=  0.27 ha.m }
*
   *  CALIB NASHYD       0107  1  5.0    3.15    0.39  8.08  44.75 0.41   0.000
      [CN=65.0         ]
      [ N = 3.0:Tp 0.17]
*
   *  CALIB STANDHYD     0106  1  5.0    1.76    0.41  8.00  62.21 0.57   0.000
      [I%=25.0:S%= 2.00]
*
      ADD [0106 + 0107]  0108  3  5.0    4.91    0.72  8.00  51.01  n/a   0.000
*
 FINISH

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

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

       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)\VH Suite 3.0\VO2\voin.dat
  Output  filename: C:\Users\david.mcnaull\AppData\Local\Temp\6bd8e7f2-e8e7-445f-b7cb-440c2fb2e708\Scenario.ou
  Summary filename: C:\Users\david.mcnaull\AppData\Local\Temp\6bd8e7f2-e8e7-445f-b7cb-440c2fb2e708\Scenario.su


DATE: 01/18/2022                          TIME: 11:27:57

USER:


COMMENTS: 24 hour Chicago 100yr Storm (Detailed Report)
_____________________________________________________

----------------------------------------------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   0 **   100yr Storm
  ****************************


--------------------
| CHICAGO STORM    |    IDF curve parameters: A=1770.000
| Ptotal=108.98 mm |                          B=   4.000
--------------------                          C=   0.820
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  = 24.00 hrs
                       Storm time step    = 10.00 min
                       Time to peak ratio =  0.33

                  TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                   hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                  0.17    0.84 |  6.17    2.90 | 12.17    2.55 | 18.17    1.21
                  0.33    0.86 |  6.33    3.15 | 12.33    2.47 | 18.33    1.19
                  0.50    0.88 |  6.50    3.46 | 12.50    2.39 | 18.50    1.17
                  0.67    0.89 |  6.67    3.85 | 12.67    2.32 | 18.67    1.16
                  0.83    0.91 |  6.83    4.34 | 12.83    2.25 | 18.83    1.14
                  1.00    0.93 |  7.00    5.00 | 13.00    2.19 | 19.00    1.13
                  1.17    0.95 |  7.17    5.92 | 13.17    2.13 | 19.17    1.11
                  1.33    0.97 |  7.33    7.33 | 13.33    2.07 | 19.33    1.10
                  1.50    0.99 |  7.50    9.77 | 13.50    2.02 | 19.50    1.09
                  1.67    1.01 |  7.67   15.10 | 13.67    1.97 | 19.67    1.07
                  1.83    1.03 |  7.83   38.21 | 13.83    1.92 | 19.83    1.06
                  2.00    1.05 |  8.00  203.31 | 14.00    1.87 | 20.00    1.05
                  2.17    1.08 |  8.17   50.96 | 14.17    1.83 | 20.17    1.04
                  2.33    1.11 |  8.33   25.51 | 14.33    1.79 | 20.33    1.03
                  2.50    1.13 |  8.50   17.18 | 14.50    1.75 | 20.50    1.01
                  2.67    1.16 |  8.67   13.06 | 14.67    1.72 | 20.67    1.00
                  2.83    1.20 |  8.83   10.60 | 14.83    1.68 | 20.83    0.99
                  3.00    1.23 |  9.00    8.96 | 15.00    1.65 | 21.00    0.98
                  3.17    1.26 |  9.17    7.78 | 15.17    1.61 | 21.17    0.97
                  3.33    1.30 |  9.33    6.90 | 15.33    1.58 | 21.33    0.96
                  3.50    1.34 |  9.50    6.21 | 15.50    1.55 | 21.50    0.95
                  3.67    1.39 |  9.67    5.65 | 15.67    1.53 | 21.67    0.94
                  3.83    1.43 |  9.83    5.19 | 15.83    1.50 | 21.83    0.93
                  4.00    1.48 | 10.00    4.81 | 16.00    1.47 | 22.00    0.92
                  4.17    1.54 | 10.17    4.48 | 16.17    1.45 | 22.17    0.91
                  4.33    1.60 | 10.33    4.20 | 16.33    1.42 | 22.33    0.91
                  4.50    1.66 | 10.50    3.96 | 16.50    1.40 | 22.50    0.90
                  4.67    1.73 | 10.67    3.74 | 16.67    1.38 | 22.67    0.89
                  4.83    1.81 | 10.83    3.55 | 16.83    1.36 | 22.83    0.88
                  5.00    1.89 | 11.00    3.38 | 17.00    1.33 | 23.00    0.87
                  5.17    1.99 | 11.17    3.23 | 17.17    1.31 | 23.17    0.86
                  5.33    2.10 | 11.33    3.09 | 17.33    1.29 | 23.33    0.86
                  5.50    2.22 | 11.50    2.96 | 17.50    1.28 | 23.50    0.85
```

5.67	2.35	11.67	2.85	17.67	1.26	23.67	0.84
5.83	2.51	11.83	2.74	17.83	1.24	23.83	0.83
6.00	2.69	12.00	2.64	18.00	1.22	24.00	0.83

CALIB			
NASHYD (0062)	Area (ha)= 16.55	Curve Number (CN)= 65.0	
ID= 1 DT= 5.0 min	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 0.46		

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	0.84	6.083	2.90	12.083	2.55	18.08	1.21
0.167	0.84	6.167	2.90	12.167	2.55	18.17	1.21
0.250	0.86	6.250	3.15	12.250	2.47	18.25	1.19
0.333	0.86	6.333	3.15	12.333	2.47	18.33	1.19
0.417	0.88	6.417	3.46	12.417	2.39	18.42	1.17
0.500	0.88	6.500	3.46	12.500	2.39	18.50	1.17
0.583	0.89	6.583	3.85	12.583	2.32	18.58	1.16
0.667	0.89	6.667	3.85	12.667	2.32	18.67	1.16
0.750	0.91	6.750	4.34	12.750	2.25	18.75	1.14
0.833	0.91	6.833	4.34	12.833	2.25	18.83	1.14
0.917	0.93	6.917	5.00	12.917	2.19	18.92	1.13
1.000	0.93	7.000	5.00	13.000	2.19	19.00	1.13
1.083	0.95	7.083	5.92	13.083	2.13	19.08	1.11
1.167	0.95	7.167	5.92	13.167	2.13	19.17	1.11
1.250	0.97	7.250	7.33	13.250	2.07	19.25	1.10
1.333	0.97	7.333	7.33	13.333	2.07	19.33	1.10
1.417	0.99	7.417	9.77	13.417	2.02	19.42	1.09
1.500	0.99	7.500	9.77	13.500	2.02	19.50	1.09
1.583	1.01	7.583	15.10	13.583	1.97	19.58	1.07
1.667	1.01	7.667	15.11	13.667	1.97	19.67	1.07
1.750	1.03	7.750	38.21	13.750	1.92	19.75	1.06
1.833	1.03	7.833	38.22	13.833	1.92	19.83	1.06
1.917	1.05	7.917	203.31	13.917	1.87	19.92	1.05
2.000	1.05	8.000	203.30	14.000	1.87	20.00	1.05
2.083	1.08	8.083	50.96	14.083	1.83	20.08	1.04
2.167	1.08	8.167	50.96	14.167	1.83	20.17	1.04
2.250	1.11	8.250	25.51	14.250	1.79	20.25	1.03
2.333	1.11	8.333	25.51	14.333	1.79	20.33	1.03
2.417	1.13	8.417	17.18	14.417	1.75	20.42	1.01
2.500	1.13	8.500	17.18	14.500	1.75	20.50	1.01
2.583	1.16	8.583	13.06	14.583	1.72	20.58	1.00
2.667	1.16	8.667	13.06	14.667	1.72	20.67	1.00
2.750	1.20	8.750	10.60	14.750	1.68	20.75	0.99
2.833	1.20	8.833	10.60	14.833	1.68	20.83	0.99
2.917	1.23	8.917	8.96	14.917	1.65	20.92	0.98
3.000	1.23	9.000	8.96	15.000	1.65	21.00	0.98
3.083	1.26	9.083	7.78	15.083	1.61	21.08	0.97
3.167	1.26	9.167	7.78	15.167	1.61	21.17	0.97
3.250	1.30	9.250	6.90	15.250	1.58	21.25	0.96
3.333	1.30	9.333	6.90	15.333	1.58	21.33	0.96
3.417	1.34	9.417	6.21	15.417	1.55	21.42	0.95
3.500	1.34	9.500	6.21	15.500	1.55	21.50	0.95
3.583	1.39	9.583	5.65	15.583	1.53	21.58	0.94
3.667	1.39	9.667	5.65	15.667	1.53	21.67	0.94
3.750	1.43	9.750	5.19	15.750	1.50	21.75	0.93
3.833	1.43	9.833	5.19	15.833	1.50	21.83	0.93
3.917	1.48	9.917	4.81	15.917	1.47	21.92	0.92
4.000	1.48	10.000	4.81	16.000	1.47	22.00	0.92
4.083	1.54	10.083	4.48	16.083	1.45	22.08	0.91
4.167	1.54	10.167	4.48	16.167	1.45	22.17	0.91
4.250	1.60	10.250	4.20	16.250	1.42	22.25	0.91
4.333	1.60	10.333	4.20	16.333	1.42	22.33	0.91
4.417	1.66	10.417	3.96	16.417	1.40	22.42	0.90
4.500	1.66	10.500	3.96	16.500	1.40	22.50	0.90
4.583	1.73	10.583	3.74	16.583	1.38	22.58	0.89
4.667	1.73	10.667	3.74	16.667	1.38	22.67	0.89
4.750	1.81	10.750	3.55	16.750	1.36	22.75	0.88
4.833	1.81	10.833	3.55	16.833	1.36	22.83	0.88
4.917	1.89	10.917	3.38	16.917	1.33	22.92	0.87
5.000	1.89	11.000	3.38	17.000	1.33	23.00	0.87
5.083	1.99	11.083	3.23	17.083	1.31	23.08	0.86
5.167	1.99	11.167	3.23	17.167	1.31	23.17	0.86
5.250	2.10	11.250	3.09	17.250	1.29	23.25	0.86
5.333	2.10	11.333	3.09	17.333	1.29	23.33	0.86
5.417	2.22	11.417	2.96	17.417	1.28	23.42	0.85
5.500	2.22	11.500	2.96	17.500	1.28	23.50	0.85

```
               5.583    2.35 |11.583    2.85 |17.583    1.26 | 23.58    0.84
               5.667    2.35 |11.667    2.85 |17.667    1.26 | 23.67    0.84
               5.750    2.51 |11.750    2.74 |17.750    1.24 | 23.75    0.83
               5.833    2.51 |11.833    2.74 |17.833    1.24 | 23.83    0.83
               5.917    2.69 |11.917    2.64 |17.917    1.22 | 23.92    0.83
               6.000    2.69 |12.000    2.64 |18.000    1.22 | 24.00    0.83

     Unit Hyd Qpeak  (cms)=   1.374

     PEAK FLOW       (cms)=   1.048 (i)
     TIME TO PEAK    (hrs)=   8.500
     RUNOFF VOLUME    (mm)=  44.904
     TOTAL RAINFALL   (mm)= 108.977
     RUNOFF COEFFICIENT   =   0.412

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

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| NASHYD    (0063) |   Area    (ha)=  12.25   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.19

     Unit Hyd Qpeak  (cms)=   2.463

     PEAK FLOW       (cms)=   1.385 (i)
     TIME TO PEAK    (hrs)=   8.167
     RUNOFF VOLUME    (mm)=  44.803
     TOTAL RAINFALL   (mm)= 108.977
     RUNOFF COEFFICIENT   =   0.411

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

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--------------------
| CALIB             |
| NASHYD    (0059) |   Area    (ha)=   1.07   Curve Number   (CN)= 85.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.18

     Unit Hyd Qpeak  (cms)=   0.227

     PEAK FLOW       (cms)=   0.231 (i)
     TIME TO PEAK    (hrs)=   8.083
     RUNOFF VOLUME    (mm)=  72.448
     TOTAL RAINFALL   (mm)= 108.977
     RUNOFF COEFFICIENT   =   0.665

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

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--------------------
| CALIB             |
| STANDHYD  (0029) |   Area    (ha)=   0.58
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.38         0.20
     Dep. Storage     (mm)=       1.00         2.00
     Average Slope     (%)=       5.00         2.00
     Length            (m)=      62.18        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     203.31      NaN
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       0.89 (ii)    5.33 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.34         0.16
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.18         0.09         0.263 (iii)
     TIME TO PEAK    (hrs)=       8.00         8.08          8.00
     RUNOFF VOLUME    (mm)=     107.98        81.10         95.88
     TOTAL RAINFALL   (mm)=     108.98       108.98        108.98
     RUNOFF COEFFICIENT   =       0.99         0.74          0.88

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.
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| CALIB            |
| STANDHYD  (0061) |   Area    (ha)=   1.08
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.70         0.38
     Dep. Storage     (mm)=       1.00         2.00
     Average Slope     (%)=       5.00         2.00
     Length            (m)=      84.81        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     203.31       202.15
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       1.08 (ii)    5.51 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.34         0.16
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.34         0.16          0.487 (iii)
     TIME TO PEAK    (hrs)=       8.00         8.08           8.00
     RUNOFF VOLUME    (mm)=     107.98        81.10          95.88
     TOTAL RAINFALL   (mm)=     108.98       108.98         108.98
     RUNOFF COEFFICIENT   =       0.99         0.74           0.88

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

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

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0024) |
| Inlet Cap.=0.177 |
| #of Inlets=    1 |
| Total(cms)=  0.2 |      AREA     QPEAK     TPEAK    R.V.
--------------------     (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1):   1.08      0.49      8.00   95.88
     ================================================
     MAJOR SYS.(ID= 2):   0.19      0.31      8.00   95.88
     MINOR SYS.(ID= 3):   0.89      0.18      7.92   95.88

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0026) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0024):     0.19   0.310     8.00    95.88
        + ID2= 2 (0029):     0.58   0.263     8.00    95.88
          ================================================
          ID = 3 (0026):     0.77   0.572     8.00    95.88

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0026) |
|   3 +  2 =  1    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0026):     0.77   0.572     8.00    95.88
        + ID2= 2 (0059):     1.07   0.231     8.08    72.45
          ================================================
          ID = 1 (0026):     1.84   0.761     8.00    82.24

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0022) |   Area    (ha)=   8.85
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       5.75         3.10
     Dep. Storage     (mm)=       1.00         2.00
     Average Slope     (%)=       3.00         2.00
     Length            (m)=     242.84        40.00
```

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     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     203.31       202.15
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       2.36 (ii)    6.79 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.30         0.14
                                                        *TOTALS*
     PEAK FLOW       (cms)=       2.72         1.23         3.852 (iii)
     TIME TO PEAK    (hrs)=       8.00         8.08          8.00
     RUNOFF VOLUME    (mm)=     107.98        81.10         95.88
     TOTAL RAINFALL   (mm)=     108.98       108.98        108.98
     RUNOFF COEFFICIENT   =       0.99         0.74          0.88

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

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

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--------------------
| CALIB             |
| STANDHYD  (0060)  |   Area    (ha)=   0.88
|ID= 1 DT= 5.0 min  |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.61         0.26
     Dep. Storage     (mm)=       1.00         2.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      76.46        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     203.31       143.97
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       1.64 (ii)    5.42 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.16
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.35         0.08         0.421 (iii)
     TIME TO PEAK    (hrs)=       8.00         8.08          8.00
     RUNOFF VOLUME    (mm)=     107.98        75.39         98.20
     TOTAL RAINFALL   (mm)=     108.98       108.98        108.98
     RUNOFF COEFFICIENT   =       0.99         0.69          0.90

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

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

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| STANDHYD  (0068)  |   Area    (ha)=   0.97
|ID= 1 DT= 5.0 min  |   Total Imp(%)=  80.00   Dir. Conn.(%)=  80.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.78         0.19
     Dep. Storage     (mm)=       1.00         2.00
     Average Slope     (%)=       3.00         2.00
     Length            (m)=      80.42        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     203.31       143.97
               over (min)         5.00         5.00
     Storage Coeff.  (min)=       1.21 (ii)    4.27 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.23
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.44         0.07         0.512 (iii)
     TIME TO PEAK    (hrs)=       8.00         8.00          8.00
     RUNOFF VOLUME    (mm)=     107.98        75.39        101.46
     TOTAL RAINFALL   (mm)=     108.98       108.98        108.98
     RUNOFF COEFFICIENT   =       0.99         0.69          0.93

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  85.0    Ia = Dep. Storage  (Above)
```

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

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--------------------
| DUHYD     (0069) |
| Inlet Cap.=0.218 |
| #of Inlets=    1 |
| Total(cms)=  0.2 |      AREA     QPEAK     TPEAK    R.V.
--------------------      (ha)     (cms)     (hrs)    (mm)
     TOTAL HYD.(ID= 1):   0.97      0.51      8.00  101.46
     ==========================================================
     MAJOR SYS.(ID= 2):   0.17      0.29      8.00  101.46
     MINOR SYS.(ID= 3):   0.80      0.22      7.92  101.46

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0058) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0022):     8.85   3.852     8.00    95.88
        + ID2= 2 (0024):     0.89   0.177     7.92    95.88
          ================================================
          ID = 3 (0058):     9.74   4.029     8.00    95.88

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0058) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0058):     9.74   4.029     8.00    95.88
        + ID2= 2 (0060):     0.88   0.421     8.00    98.20
          ================================================
          ID = 1 (0058):    10.61   4.450     8.00    96.07

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0058) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0058):    10.61   4.450     8.00    96.07
        + ID2= 2 (0069):     0.80   0.218     7.92   101.46
          ================================================
          ID = 3 (0058):    11.42   4.668     8.00    96.45

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0025) |  Pond D
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
                          0.0000     0.0000    |   0.0287      0.2221
                          0.0110     0.0000    |   0.5019      0.3187
                          0.0188     0.0632    |   0.5430      0.4273
                          0.0243     0.1371    |   0.5811      0.5484

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0058)     11.417      4.668      8.00      96.45
     OUTFLOW: ID= 1 (0025)     11.417      0.579      8.50      96.46

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 12.41
                    TIME SHIFT OF PEAK FLOW         (min)= 30.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.5437

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--------------------
| ADD HYD   (0057) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0025):    11.42   0.579     8.50    96.46
```

```
        + ID2= 2 (0026):     1.84   0.761     8.00    82.24
          ================================================
          ID = 3 (0057):    13.26   1.269     8.00    94.49

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0071) |   Area    (ha)=   1.33   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.17

     Unit Hyd Qpeak  (cms)=   0.299

     PEAK FLOW       (cms)=   0.163 (i)
     TIME TO PEAK    (hrs)=   8.083
     RUNOFF VOLUME    (mm)=  44.747
     TOTAL RAINFALL   (mm)= 108.977
     RUNOFF COEFFICIENT   =   0.411

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0002) |   Area    (ha)=  20.29
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      13.19         7.10
     Dep. Storage     (mm)=       1.00         2.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     367.75        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     203.31      NaN
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       4.20 (ii)    8.64 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.24         0.12
                                                      *TOTALS*
     PEAK FLOW       (cms)=       5.82         2.60         8.138 (iii)
     TIME TO PEAK    (hrs)=       8.00         8.08          8.00
     RUNOFF VOLUME    (mm)=     107.98        81.10         95.88
     TOTAL RAINFALL   (mm)=     108.98       108.98        108.98
     RUNOFF COEFFICIENT   =       0.99         0.74          0.88

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

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0003) |   Area    (ha)=   2.63
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
--------------------

                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.84         0.79
     Dep. Storage     (mm)=       1.00         2.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     132.44        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     203.31      NaN
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       2.28 (ii)    6.06 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.30         0.15
                                                      *TOTALS*
     PEAK FLOW       (cms)=       1.03         0.23         1.245 (iii)
     TIME TO PEAK    (hrs)=       8.00         8.08          8.00
     RUNOFF VOLUME    (mm)=     107.98        75.39         98.20
     TOTAL RAINFALL   (mm)=     108.98       108.98        108.98
     RUNOFF COEFFICIENT   =       0.99         0.69          0.90

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
```

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0004) |   Area    (ha)=   5.37
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.49          1.88
     Dep. Storage     (mm)=       1.00          2.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     189.19         40.00
     Mannings n           =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=     203.31        202.15
               over (min)          5.00         10.00
     Storage Coeff.  (min)=       2.82 (ii)     7.25 (ii)
     Unit Hyd. Tpeak (min)=       5.00         10.00
     Unit Hyd. peak  (cms)=       0.28          0.14
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.63          0.73          2.297 (iii)
     TIME TO PEAK    (hrs)=       8.00          8.08           8.00
     RUNOFF VOLUME    (mm)=     107.98         81.10          95.88
     TOTAL RAINFALL   (mm)=     108.98        108.98         108.98
     RUNOFF COEFFICIENT   =       0.99          0.74           0.88

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

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

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0006) |
| Inlet Cap.=0.826 |
| #of Inlets=    1 |
| Total(cms)=  0.8 |      AREA     QPEAK     TPEAK     R.V.
--------------------      (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1):   5.37      2.30      8.00    95.88
     ================================================
     MAJOR SYS.(ID= 2):   0.95      1.47      8.00    95.88
     MINOR SYS.(ID= 3):   4.41      0.83      7.92    95.88

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0008) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0002):    20.29   8.138     8.00    95.88
        + ID2= 2 (0003):     2.63   1.245     8.00    98.20
          ================================================
          ID = 3 (0008):    22.92   9.382     8.00    96.15

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0008) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0008):    22.92   9.382     8.00    96.15
        + ID2= 2 (0006):     0.95   1.471     8.00    95.88
          ================================================
          ID = 1 (0008):    23.87  10.854     8.00    96.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0072) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)    |   (cms)     (ha.m.)
```

Pond A

```
                          0.0000     0.0000   |   0.1092      1.4110
                          0.0294     0.3280   |   0.1193      1.8005
                          0.0379     0.6747   |   0.1320      2.3703
                          0.0982     1.0358   |   0.0000      0.0000

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0008)     23.871     10.854      8.00      96.14
     OUTFLOW: ID= 1 (0072)     23.871      0.118     13.92      95.20

                  PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.09
                  TIME SHIFT OF PEAK FLOW         (min)=355.00
                  MAXIMUM  STORAGE   USED       (ha.m.)=  1.7593

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--------------------
| CALIB            |
| STANDHYD  (0011) |   Area    (ha)=  10.26
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       6.67         3.59
     Dep. Storage     (mm)=       1.00         2.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     261.56        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     203.31      NaN
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       3.42 (ii)    7.86 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.26         0.13
                                                          *TOTALS*
     PEAK FLOW       (cms)=       3.05         1.36          4.276 (iii)
     TIME TO PEAK    (hrs)=       8.00         8.08           8.00
     RUNOFF VOLUME    (mm)=     107.98        81.10          95.88
     TOTAL RAINFALL   (mm)=     108.98       108.98         108.98
     RUNOFF COEFFICIENT   =       0.99         0.74           0.88

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

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0012) |   Area    (ha)=   1.07
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
--------------------
                                IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.75         0.32
     Dep. Storage     (mm)=       1.00         2.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      84.46        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     203.31      NaN
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       1.74 (ii)    5.52 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.16
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.42         0.10          0.513 (iii)
     TIME TO PEAK    (hrs)=       8.00         8.08           8.00
     RUNOFF VOLUME    (mm)=     107.98        75.39          98.20
     TOTAL RAINFALL   (mm)=     108.98       108.98         108.98
     RUNOFF COEFFICIENT   =       0.99         0.69           0.90

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

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

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--------------------
| CALIB            |
| STANDHYD  (0013) |   Area    (ha)=   5.37
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```
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.49         1.88
     Dep. Storage     (mm)=       1.00         2.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     189.19        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     203.31       202.15
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       2.82 (ii)    7.25 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.28         0.14
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.63         0.73          2.297 (iii)
     TIME TO PEAK    (hrs)=       8.00         8.08          8.00
     RUNOFF VOLUME    (mm)=     107.98        81.10         95.88
     TOTAL RAINFALL   (mm)=     108.98       108.98        108.98
     RUNOFF COEFFICIENT   =       0.99         0.74          0.88

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

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

--------------------------------------------------------------------------------
--------------------
| DUHYD     (0014) |
| Inlet Cap.=0.826 |
| #of Inlets=    1 |
| Total(cms)=  0.8 |      AREA     QPEAK     TPEAK     R.V.
--------------------      (ha)     (cms)     (hrs)     (mm)
     TOTAL HYD.(ID= 1):   5.37      2.30      8.00    95.88
     ==========================================================
     MAJOR SYS.(ID= 2):   0.95      1.47      8.00    95.88
     MINOR SYS.(ID= 3):   4.41      0.83      7.92    95.88

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0015) |
|   1 +  2 =  3    |         AREA    QPEAK     TPEAK      R.V.
--------------------         (ha)    (cms)     (hrs)      (mm)
          ID1= 1 (0011):    10.26   4.276     8.00     95.88
        + ID2= 2 (0012):     1.07   0.513     8.00     98.20
          ================================================
          ID = 3 (0015):    11.33   4.789     8.00     96.10

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0015) |
|   3 +  2 =  1    |         AREA    QPEAK     TPEAK      R.V.
--------------------         (ha)    (cms)     (hrs)      (mm)
          ID1= 3 (0015):    11.33   4.789     8.00     96.10
        + ID2= 2 (0014):     4.41   0.826     7.92     95.88
          ================================================
          ID = 1 (0015):    15.75   5.615     8.00     96.04

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------------
--------------------  Pond B
| RESERVOIR (0016) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE    |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)    |    (cms)     (ha.m.)
                         0.0000     0.0000    |   0.1657      0.4612
                         0.0084     0.0680    |   0.1790      0.5805
                         0.0108     0.1541    |   0.1915      0.7082
                         0.0127     0.2482    |   0.2032      0.8444
                         0.1511     0.3505    |   0.2142      0.9890

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0015)    15.747     5.615      8.00       96.04
```

```
     OUTFLOW: ID= 1 (0016)     15.747      0.212     10.08      95.91

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  3.78
                   TIME SHIFT OF PEAK FLOW         (min)=125.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  0.9647

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0035) |   Area    (ha)=   6.63
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.64         1.99
     Dep. Storage     (mm)=       1.00         2.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     210.24        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     203.31       143.97
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       3.00 (ii)    6.79 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.28         0.14
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.54         0.56          3.059 (iii)
     TIME TO PEAK    (hrs)=       8.00         8.08          8.00
     RUNOFF VOLUME    (mm)=     107.98        75.39         98.20
     TOTAL RAINFALL   (mm)=     108.98       108.98        108.98
     RUNOFF COEFFICIENT   =       0.99         0.69          0.90

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

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0036) |   Pond C
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                         0.0000     0.0000   |   0.0925      0.6716
                         0.0199     0.2020   |   0.1221      0.9409
                         0.0269     0.4256   |   0.1454      1.2343

                                  AREA     QPEAK     TPEAK       R.V.
                                  (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0035)      6.630      3.059      8.00       98.20
     OUTFLOW: ID= 1 (0036)      6.630      0.043     12.42       97.69

                   PEAK   FLOW   REDUCTION [Qout/Qin](%)=  1.41
                   TIME SHIFT OF PEAK FLOW         (min)=265.00
                   MAXIMUM  STORAGE   USED       (ha.m.)=  0.4863

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0070) |   Area    (ha)=   1.41
|ID= 1 DT= 5.0 min |   Total Imp(%)=  80.00   Dir. Conn.(%)=  80.00
--------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.13         0.28
     Dep. Storage     (mm)=       1.00         2.00
     Average Slope     (%)=       3.00         2.00
     Length            (m)=      96.95        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     203.31       143.97
               over (min)         5.00         5.00
     Storage Coeff.  (min)=       1.36 (ii)    4.41 (ii)
     Unit Hyd. Tpeak (min)=       5.00         5.00
     Unit Hyd. peak  (cms)=       0.33         0.23
                                                          *TOTALS*
     PEAK FLOW       (cms)=       0.64         0.11          0.744 (iii)
     TIME TO PEAK    (hrs)=       8.00         8.00          8.00
     RUNOFF VOLUME    (mm)=     107.98        75.39        101.46
     TOTAL RAINFALL   (mm)=     108.98       108.98        108.98
     RUNOFF COEFFICIENT   =       0.99         0.69          0.93

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

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

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--------------------
| ADD HYD   (0074) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0069):     0.17   0.294     8.00   101.46
        + ID2= 2 (0070):     1.41   0.744     8.00   101.46
          ================================================
          ID = 3 (0074):     1.58   1.038     8.00   101.46

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0032) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0016):    15.75   0.212    10.08    95.91
        + ID2= 2 (0036):     6.63   0.043    12.42    97.69
          ================================================
          ID = 3 (0032):    22.38   0.253    11.08    96.44

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0032) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0032):    22.38   0.253    11.08    96.44
        + ID2= 2 (0057):    13.26   1.269     8.00    94.49
          ================================================
          ID = 1 (0032):    35.63   1.456     8.00    95.71

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0032) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0032):    35.63   1.456     8.00    95.71
        + ID2= 2 (0062):    16.55   1.048     8.50    44.90
          ================================================
          ID = 3 (0032):    52.18   1.993     8.42    79.60

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0032) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0032):    52.18   1.993     8.42    79.60
        + ID2= 2 (0063):    12.25   1.385     8.17    44.80
          ================================================
          ID = 1 (0032):    64.43   3.216     8.17    72.98

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0032) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0032):    64.43   3.216     8.17    72.98
        + ID2= 2 (0071):     1.33   0.163     8.08    44.75
          ================================================
          ID = 3 (0032):    65.76   3.370     8.17    72.41

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

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--------------------
| ADD HYD   (0032) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0032):    65.76   3.370     8.17    72.41
        + ID2= 2 (0072):    23.87   0.118    13.92    95.20
          ================================================
          ID = 1 (0032):    89.64   3.472     8.17    78.48

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

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--------------------
| ADD HYD   (0032) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0032):    89.64   3.472     8.17    78.48
        + ID2= 2 (0074):     1.58   1.038     8.00   101.46
          ================================================
          ID = 3 (0032):    91.21   4.024     8.00    78.88

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

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--------------------
| CALIB             |
| NASHYD    (0064) |   Area    (ha)=  10.52   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.41

     Unit Hyd Qpeak  (cms)=   0.980

     PEAK FLOW       (cms)=   0.725 (i)
     TIME TO PEAK    (hrs)=   8.417
     RUNOFF VOLUME    (mm)=  44.902
     TOTAL RAINFALL   (mm)= 108.977
     RUNOFF COEFFICIENT   =   0.412

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

```
--------------------
| CALIB             |
| NASHYD    (0065) |   Area    (ha)=  14.48   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.35

     Unit Hyd Qpeak  (cms)=   1.580

     PEAK FLOW       (cms)=   1.117 (i)
     TIME TO PEAK    (hrs)=   8.333
     RUNOFF VOLUME    (mm)=  44.898
     TOTAL RAINFALL   (mm)= 108.977
     RUNOFF COEFFICIENT   =   0.412

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

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--------------------
| SHIFT HYD (0066) |
| IN= 2---> OUT= 1 |
| SHIFT= 36.5 min  |       AREA     QPEAK     TPEAK      R.V.
--------------------       (ha)     (cms)     (hrs)      (mm)
          ID= 2 (0065):   14.48      1.12      8.33     44.90
    SHIFT ID= 1 (0066):   14.48      1.12      8.92     44.90
```

```
--------------------
| CALIB             |
| STANDHYD  (0027) |   Area    (ha)=   5.95
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       4.16          1.78
     Dep. Storage     (mm)=       1.00          2.00
     Average Slope     (%)=       1.00          2.00
     Length            (m)=     199.11         40.00
     Mannings n           =      0.013         0.250

     Max.Eff.Inten.(mm/hr)=     203.31        143.97
```

```
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       2.91 (ii)    6.69 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.28         0.14
                                                      *TOTALS*
     PEAK FLOW       (cms)=       2.29         0.51      2.754 (iii)
     TIME TO PEAK    (hrs)=       8.00         8.08       8.00
     RUNOFF VOLUME    (mm)=     107.98        75.39      98.20
     TOTAL RAINFALL   (mm)=     108.98       108.98     108.98
     RUNOFF COEFFICIENT   =       0.99         0.69       0.90

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

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD  (0028) |   Area    (ha)=   1.14
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.80         0.34
     Dep. Storage     (mm)=       1.00         2.00
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      87.06        40.00
     Mannings n             =     0.013        0.250

     Max.Eff.Inten.(mm/hr)=     203.31       143.97
                over (min)        5.00        10.00
     Storage Coeff.  (min)=       1.77 (ii)    5.56 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.32         0.16
                                                      *TOTALS*
     PEAK FLOW       (cms)=       0.45         0.10      0.545 (iii)
     TIME TO PEAK    (hrs)=       8.00         8.08       8.00
     RUNOFF VOLUME    (mm)=     107.98        75.39      98.20
     TOTAL RAINFALL   (mm)=     108.98       108.98     108.98
     RUNOFF COEFFICIENT   =       0.99         0.69       0.90

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

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

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--------------------
| ADD HYD   (0031) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0027):     5.95   2.754     8.00    98.20
        + ID2= 2 (0028):     1.14   0.545     8.00    98.20
          ================================================
          ID = 3 (0031):     7.08   3.299     8.00    98.20

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0030) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.0665      0.3330
                          0.0131     0.0650   |   0.0724      0.4491
                          0.0168     0.1415   |   0.0778      0.5815
                          0.0600     0.2307   |   0.0000      0.0000

                                AREA     QPEAK     TPEAK       R.V.
                                (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0031)      7.084      3.299      8.00      98.20
     OUTFLOW: ID= 1 (0030)      7.084      0.073     10.58      98.02

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=  2.22
                    TIME SHIFT OF PEAK FLOW         (min)=155.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.4715
```

Pond E

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--------------------
| ADD HYD   (0056) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0030):     7.08   0.073    10.58    98.02
        + ID2= 2 (0032):    91.21   4.024     8.00    78.88
          ================================================
          ID = 3 (0056):    98.29   4.085     8.00    80.26

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0056) |
|   3 +  2 =  1    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 3 (0056):    98.29   4.085     8.00    80.26
        + ID2= 2 (0064):    10.52   0.725     8.42    44.90
          ================================================
          ID = 1 (0056):   108.81   4.325     8.00    76.84

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| ADD HYD   (0056) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0056):   108.81   4.325     8.00    76.84
        + ID2= 2 (0066):    14.48   1.117     8.92    44.90
          ================================================
          ID = 3 (0056):   123.29   4.348     8.00    73.09

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| CALIB            |
| STANDHYD  (0052) |   Area    (ha)=   0.75
|ID= 1 DT= 5.0 min |   Total Imp(%)=  70.00   Dir. Conn.(%)=  70.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.52         0.22
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=      70.57        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     203.31       144.70
               over (min)          5.00        10.00
     Storage Coeff.  (min)=       1.56 (ii)    5.35 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.16
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.29         0.07        0.360 (iii)
     TIME TO PEAK    (hrs)=       8.00         8.08         8.00
     RUNOFF VOLUME    (mm)=     107.98        75.85        98.33
     TOTAL RAINFALL   (mm)=     108.98       108.98       108.98
     RUNOFF COEFFICIENT   =       0.99         0.70         0.90

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

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

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--------------------
| CALIB            |
| STANDHYD  (0051) |   Area    (ha)=   4.91
|ID= 1 DT= 5.0 min |   Total Imp(%)=  65.00   Dir. Conn.(%)=  55.00
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       3.19         1.72
     Dep. Storage     (mm)=       1.00         1.50
     Average Slope     (%)=       1.00         2.00
     Length            (m)=     180.92        40.00
```

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     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=     203.31       202.79
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       2.75 (ii)    7.18 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.28         0.14
                                                          *TOTALS*
     PEAK FLOW       (cms)=       1.49         0.67         2.110 (iii)
     TIME TO PEAK    (hrs)=       8.00         8.08          8.00
     RUNOFF VOLUME    (mm)=     107.98        81.47         96.05
     TOTAL RAINFALL   (mm)=     108.98       108.98        108.98
     RUNOFF COEFFICIENT   =       0.99         0.75          0.88

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

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

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--------------------
| ADD HYD   (0053) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0051):     4.91   2.110     8.00    96.05
        + ID2= 2 (0052):     0.75   0.360     8.00    98.33
          ================================================
          ID = 3 (0053):     5.66   2.469     8.00    96.35

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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--------------------
| RESERVOIR (0054) |   Pond F
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)   |   (cms)     (ha.m.)
                          0.0000     0.0000   |   0.3017     0.1533
                          0.0043     0.0000   |   0.3214     0.2868
                          0.0078     0.0688   |   0.0000     0.0000

                               AREA     QPEAK     TPEAK       R.V.
                               (ha)     (cms)     (hrs)       (mm)
     INFLOW : ID= 2 (0053)     5.657     2.469      8.00       96.35
     OUTFLOW: ID= 1 (0054)     5.657     0.318      8.50       96.35

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 12.90
                    TIME SHIFT OF PEAK FLOW         (min)= 30.00
                    MAXIMUM  STORAGE   USED       (ha.m.)=  0.2671

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0107) |   Area    (ha)=   3.15   Curve Number   (CN)= 65.0
|ID= 1 DT= 5.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   0.17

     Unit Hyd Qpeak  (cms)=   0.708

     PEAK FLOW       (cms)=   0.387 (i)
     TIME TO PEAK    (hrs)=   8.083
     RUNOFF VOLUME    (mm)=  44.747
     TOTAL RAINFALL   (mm)= 108.977
     RUNOFF COEFFICIENT   =   0.411

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

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--------------------
| CALIB            |
| STANDHYD  (0106) |   Area    (ha)=   1.76
|ID= 1 DT= 5.0 min |   Total Imp(%)=  25.00   Dir. Conn.(%)=  25.00
--------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       0.44         1.32
     Dep. Storage     (mm)=       1.00         2.00
     Average Slope     (%)=       3.00         2.00
     Length            (m)=     108.35        40.00
     Mannings n           =      0.013        0.250
```

```
     Max.Eff.Inten.(mm/hr)=     203.31        80.28
               over (min)         5.00        10.00
     Storage Coeff.  (min)=       1.45 (ii)    9.16 (ii)
     Unit Hyd. Tpeak (min)=       5.00        10.00
     Unit Hyd. peak  (cms)=       0.33         0.12
                                                        *TOTALS*
     PEAK FLOW       (cms)=       0.25         0.19        0.407 (iii)
     TIME TO PEAK    (hrs)=       8.00         8.08         8.00
     RUNOFF VOLUME    (mm)=     107.98        46.95        62.21
     TOTAL RAINFALL   (mm)=     108.98       108.98       108.98
     RUNOFF COEFFICIENT   =       0.99         0.43         0.57

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

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  65.0    Ia = Dep. 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   (0108) |
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
          ID1= 1 (0106):     1.76   0.407     8.00    62.21
        + ID2= 2 (0107):     3.15   0.387     8.08    44.75
          ================================================
          ID = 3 (0108):     4.91   0.720     8.00    51.01

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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 FINISH
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