FLOODPLAIN REPORT

HAWK RIDGE DEVELOPMENT
LIV (HAWKRIDGE) LP
TOWNSHIP OF SEVERN

PREPARED BY:

C.F. CROZIER & ASSOCIATES INC.
70 HURON STREET, SUITE 100
COLLINGWOOD, ONTARIO
L9Y 4L4

CFCA FILE NO. 1935-6133

CROZIER
CONSULTING ENGINEERS

THE MATERIAL IN THIS REPORT REFLECTS BEST JUDGMENT IN LIGHT OF THE INFORMATION AVAILABLE AT THE TIME OF PREPARATION. ANY USE WHICH A THIRD PARTY MAKES OF THIS REPORT, OR ANY RELIANCE ON OR DECISIONS MADE BASED ON IT, ARE THE RESPONSIBILITIES OF SUCH THIRD PARTIES. C.F. CROZIER & ASSOCIATES INC. ACCEPTS NO RESPONSIBILITY FOR DAMAGES, IF ANY, SUFFERED BY ANY THIRD PARTY AS A RESULT OF DECISIONS MADE OR ACTIONS BASED ON THIS REPORT.

TABLE OF CONTENTS

1.0 INTRODUCTION 1
2.0 SITE DESCRIPTION 1
3.0 EXISTING FLOODPLAIN MODELING 1
3.1 TOPOGRAPHIC DATA 1
3.2 HYDROLOGIC MODEL & FLOW RATES 2
3.3 HYDRAULIC MODEL SETUP 3
3.4 DOWNSTREAM BOUNDARY CONDITIONS & FLOW REGIME 3
3.5 CROSSING INVENTORY 4
3.6 RESULTS 4
4.0 SENSITIVITY ANALYSIS 5
5.0 PRELIMINARY CROSSING SIZING 7
6.0 FLOODPLAIN REGULARIZATION 7
7.0 CONCLUSIONS 8

LIST OF APPENDICES

Appendix A: Hydrologic Parameters

Appendix B: Visual OTTHYMO Outputs

Appendix C: Bridge Inventory

Appendix D: HEC-RAS Outputs

Appendix E: Sensitivity Analysis Outputs

Appendix F: Floodplain Regularization

LIST OF FIGURES

Figure 1: Site Location Plan

Figure 2: Concept Plan

Figure 3: Watershed Delineation

Figure 4: Crossing Location Assessment

Figure 5: Manning's N Location

Figure 6: Floodplain Delineation

Figure 7: Crossing Location Plan

Figure 8: Existing Floodplain and Proposed Regularization

Figure 9: Proposed Regularization Plan

Revision No.	Submission	Submission Date
0	1st Submission Draft Plan Approval	September 2024

1.0 INTRODUCTION

C.F. Crozier & Associates Inc. (Crozier) has been retained by LIV (Hawk Ridge) LP (LIV Communities) to complete a Floodplain Report in support of an Official Plan Amendment (OPA), Zoning By-Law Amendment (ZBA) and Draft Plan of Subdivision Application for the proposed development located at 1151 Hurlwood Lane in the Township of Severn (Township), County of Simcoe (County). The proposed development will herein be referred to as the Subject Development/Subject Lands.

The Subject Lands are approximately 126 ha and are bounded by agricultural lands and open space to the north, Burnside Line to the east, the proposed Inch Farm Development Lands and Highway 11 to the south, and Uhthoff Line to the west. The municipal boundary between the Township of Severn and City of Orillia is located west of the site, along Highway 11. Approximately 26 ha of the Subject Lands are proposed for re-development. Refer to **Figure 1** for the Site Location Plan.

The Concept Plan for the Subject Development was prepared by Biglieri Group (August 2024) and has been included as **Figure 2**. The elements envisioned within the Concept Plan include a mix of low density single detached units (290) and medium density townhouse units (560) for a total of 850 units. The Concept Plan also includes two (2) stormwater management blocks, a series of municipal infrastructure blocks to support sanitary and water servicing, and 20 m right-of-way allowances and parkland/natural heritage area.

This report has been prepared to establish a Regulatory Floodline on the Subject Lands in support of establishing development constraints.

2.0 SITE DESCRIPTION

The Subject Lands are characterized by golf course features including tee decks, bunkers, and offline irrigation ponds.

The Subject Development is located within the Silver Creek Watershed Area, which drains to the North River and then ultimately, the Georgian Bay. The Silver Creek bisects the Subject Development and flows from the south to the north, consistent with the general topography of the Subject Development. The watercourse is gently winding and contained in a shallow well-defined channel.

The Subject Lands can be described as a shallow valley. The on-site soils are classified as a mixture of Alliston Sandy Loam, Grandby Sandy Loam and Guerin Loam which are classified as Hydrologic Soil Groups B, C, and B respectively (OMAFRA, 2019).

3.0 EXISTING FLOODPLAIN MODELLING

3.1 Topographic Data

Three sources of topographic data were used as part of the floodplain analysis:

LiDAR topographic info obtained from Equator Studios (January 2023) was used to identify the catchments contributing to the Silver Creek for the hydraulic model discussed in Section 3.2.

Within the Subject Lands itself, topographic survey was completed by Rudy Mak Surveying Ltd. (November 2023) This data was used in the hydraulic model discussed in Section 3.3. Furthermore, a second LiDAR topographic data source was acquired from First Base Mapping Solutions (December 2023) to supplement the topographic survey immediately around the Subject Lands.

3.2 Hydrologic Model & Flow Rates

As no hydrological model of the Silver Creek was available, it was necessary to prepare a hydrological model of the Silver Creek to establish flow rates throughout the Subject Lands.

The hydraulic modeling of the Silver Creek was prepared extending from the two southernmost tributaries at the upstream end of the watercourse to the north end of the site where the watercourse exits the Subject Lands.

The total contributing watershed was separated into five (5) sub-catchments. Catchments 1, 2 and 3 were identified and delineated using topographic data, whereas Catchments 4 and 5 were identified as being part of the Silver Creek Basin in the City of Orillia Comprehensive Stormwater Management Master Plan, this figure has been provided in **Appendix B**. Please refer to **Figure 3 – Watershed Delineation** for the identified catchments within the Silver Creek Watershed.

Land use for all catchments was identified using satellite imagery. Soil types were obtained from the Ontario Soil Survey Complex. The following is a description of the catchments:

Catchment Pre-1: This catchment consists of the north and northwestern portion of the site as well as external lands to the west of Uhthoff Line. This catchment is approximately 160 ha and is generally rural.

Catchment Pre-2: This catchment consists of the lands to the west of the site which enter the Subject Lands through a culvert on Uhthoff Line. This catchment is approximately 150 ha and features significant impervious area due to the presents of an aggregate quarry.

Catchment Pre-3: This catchment consists of the south and southwestern portion of the site as well as external lands to the west of Uhthoff Line. This catchment is approximately 220 ha and is generally rural.

Catchment Pre-4: This catchment consists of the lands to the south of the site in the City of Orillia. This catchment is approximately 260 ha and features residential subdivisions / roads and parking areas.

Catchment Pre-5: This catchment consists of the lands to the south of the site in the City of Orillia. This catchment is approximately 200 ha and features residential subdivisions / roads and parking areas.

Once the contributing watershed was delineated, a hydrologic model was prepared using Visual OTTHYMO Version 6.1.

With the aforementioned data collected, the Curve Number (CN) and Impervious cover values for the watershed could be established. Time of concentration was calculated using the Airport Method. Refer to **Appendix A** for the hydrologic parameter sheets. Refer to **Appendix B** for the Silver Creek Hydrologic Model Output.

Based on the results of the hydrologic modelling it was determined that the 100-year - 24-hour SCS flow rate governs the peak flow rate in the Silver Creek throughout the development area. As such, the SCS distribution values were applied to the hydraulic model.

The peak flows for the main contributing reaches of the Silver Creek have been summarized below in **Table 1**.

Table 1: Summary of Catchment Information and Flow Rates

Location	Flow (m^3/s) (100-year SCS)	Flow (m^3/s) (Regional)
Silver Creek North	73.51	52.44
Silver Creek Southwest	16.9	10.5
Silver Creek Southeast	58.8	42.2

The peak flow rates presented in **Table 1** represent the flow rates used in the hydraulic model presented in Section 3.3.

3.3 Hydraulic Model Setup

Floodplain analysis for the Subject Lands was performed using U.S. Army Corps' HEC-RAS hydraulic computer model, Version 6.4.1. The purpose of the analysis is to establish the existing Regulatory floodline across the site based on topographic survey of the Subject Lands.

As previously stated, the Silver Creek enters the site from the south and the southwest and flows in a northerly direction where it exits the subject lands to the north. A topographic survey (Rudy Mak Surveying Ltd.,2023) was used to establish the culvert inverts and channel/riverbank elevations. Further site visits were conducted in order to assess the state of the golf course crossings that exist throughout the site as well as the general flow characteristics of the creek.

Twenty-Nine (29) cross sections with three (3) additional bridge crossing sections were extended across the Subject Lands. Several other crossings were identified throughout the watercourse, however due to the temporary nature of several of these crossings, they were not modelled as they would have negligible impact on conveyance. Please Refer to **Figure 4** for the Bridge Location Assessment.

Based on observation during site reconnaissance, Manning's roughness values were selected at 0.035 for the main channel which reflects natural watercourse with some weeds and heavy brush on the banks; while the overbank areas were selected to be either 0.045 or 0.070 which reflects areas with light to medium brush and trees and areas of medium to dense brush and trees respectively. Please refer to **Figure 5** for the Manning's n Location Plan.

A subcritical flow regime was modelled to conservatively estimate the hydraulic profile. The downstream boundary condition was set at normal depth with an energy slope of 0.003 m/m.

3.4 Downstream Boundary Conditions & Flow Regime

To accurately capture any downstream impacts of the Silver Creek on the Subject Lands, a "Normal Depth" boundary condition with the friction slope matching the energy grade line of 0.003 m/m was set. This value was estimated by measuring the slope of the stream bed of the entire watercourse.

A subcritical flow regime was modelled to conservatively estimate the hydraulic profile. Preliminary checks of the Froude Number were completed to ensure that it was less than 1, which confirms that a subcritical flow regime is adequate to model the watercourse.

3.5 Crossing Inventory

Based on a site walk completed on November 11, 2023, several types of crossings were identified within the site. These crossings were grouped into three (3) distinct categories which determined how they were modelled.

Type 1 crossings are described as having minimal surface area and are temporary in nature, therefore these crossings have not been included in the hydraulic model. Type 2 Crossings are characterized by having minimal surface area while still being permanent structures, these crossings lacked embankments on either side. Type 2 crossings have been included in the hydraulic model as lids. Type 3 crossings are characterized as being permanent and having significant surface area against the watercourse. Type 3 crossings have been modelled as typical road crossings or bridges.

To further validate the bridge modelling methodology, the cross-sectional area of each modelled crossing was compared to measurements taken during site visits to ensure that the HEC-RAS modelling reflects the on-site conditions.

Refer to **Appendix C** for an overview of crossings located within the Subject Lands, as well as a cross-sectional area comparison.

3.6 Results

Results from the existing condition hydraulic analysis of the Silver Creek are presented in **Table 2** and the extent of the 100-year floodplain has been illustrated on **Figure 6**. Refer to **Appendix D** for the detailed HEC-RAS outputs.

Table 2: Existing Conditions Regional Water Surface Elevations

Cross Section ID	Reach	100 Year Water Surface Elevation (m)
2368	South Reach	234.75
2269		233.43
2143.97		231.55
2046.75		230.73
2042.31		230.74
2039.01		230.65
2030.51		230.49
1964.99		230.27
1912.13		230.05
1736	North Reach	229.13
1734		229.09
1733		229.03
1729		229.00
1641.52		228.77
1500.82		228.44
1397.98		228.21

Cross Section ID	Reach	100 Year Water Surface Elevation (m)
1213.2	North Reach	227.93
1036		227.63
1032		227.59
1029		227.33
1021.93		227.37
891.36		227.10
766.43		226.88
681.47		226.79
550.45		226.57
505.6		226.44
404.98		226.17
145.71		225.16
104		224.99
333.26	Southwest Reach	230.08
332		230.07
280.82		229.93
279		229.73
221.41		229.62

As shown in **Figure 5,** the floodplain limit at the majority of the floodplain is contained to the center of the Subject Lands.

4.0 SENSITIVITY ANALYSIS

A sensitivity analysis was completed to assess the impact of variation in modelling parameters including channel and overbank roughness coefficients, increased flows, and expansion and contraction coefficients. The results of these analyses were used to confirm the validity of the prepared pre-development floodplain model.

Channel and Overbank Roughness Coefficients

For this portion of the sensitivity analysis the Manning's n value for both the main channel, as well as the overbank were increased. The values used in the sensitivity analysis were based on the acceptable range of Manning's n roughness coefficient values for types of land cover present on site. **Table 3** below shows the original Manning's n values as well as the increased value.

Table 3: Original vs. Increased Manning's n

Description	Original Run Manning's n	Sensitivity Run Manning's n	Percent Increase
Main Channel	0.035	0.04	14%
Light / Medium Brush	0.045	0.05	11%
Medium / Dense Treed	0.07	0.075	7%

This increase in the Manning'n roughness coefficient led to an increase in water surface elevations ranging from 0.03 m to 0.12 m with an increased average of 0.05 m across the Subject Lands. Consequently, the overall inundated area expanded by approximately 8%. The resulting change would not significantly impact the developable limits as shown in **Figure 6**.

Increased Flows

For this portion of the analysis, the flows from the governing storm event (100-year 24-hour SCS) were increased by 15%. See **Table 4** below for the summary of these flows.

Table 4: Summary of Catchment Information and Flow Rates

Location	Flow (m^3/s) (100-year SCS)	Flow (m^3/s) (100-year SCS + 15%)
Silver Creek North	73.5	84.5
Silver Creek Southwest	16.9	19.4
Silver Creek Southeast	58.8	67.6

These increased flows contributed to an average increase of 0.08 m to the water surface elevations with a maximum increase of 0.13 m and a minimum of 0.03 m. The increased flows also led to an increase in inundation area of around 13%.

As expected, the floodplain did increase with increased flows, the increased floodplain does not encroach on the developed area of the site and is contained primarily to the northern, downstream end of the site.

Further investigation of appropriate freeboard measures will be conducted to ensure adequate floodproofing is provided for the development.

Expansion & Contraction Coefficients

For this portion of the sensitivity analysis, the expansion and contraction coefficients for all cross sections has been increased by 20% from the typical values as outlined in the HEC-RAS Hydraulic Reference Manual.

Results from this analysis yielded insignificant changes in water surface elevations across the site and a negligible change in the inundated area.

This analysis confirms that the model is not sensitive to changes in the expansion & contraction coefficients.

Sensitivity Analysis Summary

As a result of the sensitivity analysis, it can be concluded that there are impacts to floodplain elevation across the Subject Lands through the alteration of floodplain peak flows, as well as channel and overbank roughness coefficients. The observed changes did not exceed 0.15 m and therefore the typical 0.3 m of floodplain freeboard to the proposed grades of the development area is sufficient to withstand minor variance in hydrologic and hydraulic parameters. A summary of the outputs from each of the sensitivity runs can be found in **Appendix E.**

5.0 PRELIMINARY CROSSING SIZING

A new watercourse crossing is proposed to be installed to support the development road network. The crossing will be open bottom to protect fish habitat and sized to minimize upstream flooding. The preliminary crossing design indicates that a 9.75 m wide span bridge will be sufficient to convey design flows. A summary of culvert statistics is shown in **Table 5**. The proposed culvert location is shown on **Figure 7.**

Table 5: Proposed Culvert Summary

Tributary	Span (m)	Proposed Culvert Size (H x L)	Proposed Culvert Slope (m)
Silver Creek South	9.75	1.8 m x 20.0 m	1.8%

Floodplain elevations are increased immediately upstream of the proposed crossing due to flow restriction associated with the culvert installation, however these floodplain elevation increases are localized and do not extend beyond the limit of the Subject Lands. The development will be graded such that a minimum vertical freeboard of 0.3 m is provided from the proposed Regulatory floodplain elevation to the development limit.

6.0 FLOODPLAIN REGULARIZATION

A wide and shallow floodplain condition occurs on the west side of Silver Creek North floodplain. This portion of the floodplain was targeted as a location for potential floodplain regularization. An assessment of the existing floodplain storage within the targeted regularization area was conducted in 0.3 m vertical increments to establish the target floodplain storage to be provided under proposed conditions.

Fill was proposed to raise a portion of the area out of the floodplain and a corresponding cut volume was proposed to offset the fill within the 100 Year (Regulatory) floodplain. The floodplain storage was successfully balanced between existing and proposed conditions and resulted in a net increase in floodplain storage of approximately 70 m^3. The resulting floodplain is shown on **Figure 8**, preliminary grading is shown on **Figure 9,** and the supporting calculations are included in **Appendix F** and summarized in **Table 6** below.

Table 6: Proposed Floodplain Storage Balancing

Increment Elevation Range	Incremental Cut Volume (m^3)	Incremental Fill Volume (m^3)	Proposed Additional Floodplain Storage Volume (m^3)
226.68 - 226.98	0.0	0.0	0.0
226.98 - 227.28	0.2	5.1	-4.9
227.28 - 227.58	115.9	106.2	9.7
227.58 - 227.89	839.7	868.2	-28.5
227.89 - 228.20	634.5	536.1	98.4
228.20 - 228.50	112.9	115.9	-3.0
228.50 - 228.80	0	2.3	-2.3
Net Increase in Floodplain Storage			**69.4**

An additional floodplain modelling scenario was generated in HEC-RAS to reflect the proposed floodplain regularization. Resultant floodplain elevations were compared to the existing floodplain elevations and there was no notable impact associated with the proposed regularization earthworks.

7.0 CONCLUSIONS

Based on the foregoing we conclude the following:

- The existing 100-year event governs the floodline within the Subject Lands.
- The main flood flows from the south and southwest branches flow into the site from Uhthoff Line, these branches combine at Cross Section 1641.52 where they flow in northernly direction.
- A 9.75 m wide open bottom span bridge is proposed to provide connectivity within the Subject Lands. The floodplain elevation increases associated with the proposed crossing are localized and do not extend beyond the limit of the Subject Lands.
- Floodplain regularization is proposed on the west side of the Silver Creek North floodplain resulting in a net increase of floodplain storage of approximately 70 m^3.

Given the above noted conclusions, the proposed development as shown on the proposed Concept Plan is supportable with respect to flood and erosion hazards.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

Brendan Hummelen, P.Eng.
Project Engineer

C.F. CROZIER & ASSOCIATES INC.

Tyler Mills, E.I.T.
Engineering Intern

J:\1900\1935- LIV Communities\6133- Hawk Ridge\Reports

APPENDIX A

Hydrologic Parameters

CROZIER CONSULTING ENGINEERS

Project Name: Hawk Ridge Golf Course
Project No.: 1935-6133
Date: 2022-02-08
By: J.Chowen
Checked By: B.Hummelen

D.A. NAME **PRE-1**
D.A. AREA (ha) **161.19**

Hydrologic Parameters: CALIB NASHYD Command
Post Development Drainage Area: Catchment PRE-1

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area (ha)
Vasey Sandy Loam	VSY	B	54%	86.90
Granby Sandy Loam	GNY	C	30%	47.59
Guerin Loam	GUR	B	7%	11.69
Alliston Sandy Loam	ALT	B	5%	7.59
Tioga Loamy Sand	TIG	A	5%	7.42
Total Area			100%	161.19

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
VSY	3.60	98		98		98	1.99	98		98	5.59	547.82
GNY	0.24	98		98		98		98		98	0.24	23.52
GUR	1.67	98		98		98	1.97	98		98	3.64	356.72
ALT		98		98		98		98		98	0	0
TIG		98		98		98		98		98	0	0
Subtotal	0		0		0		3.96		0			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
VSY	50.38	60	0.00	65	0.36	50	4.08	69	26.49	74	81.31	5282.58
GNY	7.33	73	0.00	76	0.90	50	0.00	79	39.12	82	47.35	3787.93
GUR	0.00	60	0.00	65	0.00	50	1.72	69	6.33	74	8.05	587.10
ALT	0.33	60	0.00	65	0.48	50	0.00	69	6.78	74	7.59	545.52
TIG	3.86	32	0.00	38	0.00	50	0.00	49	3.56	62	7.42	344.24
Subtotal	61.90		0.00		1.74		5.80		82.28			

Composite Area Calculations		
	Total Pervious Area	151.72
	Total Impervious Area	9.47
	% Impervious	5.88%
	Composite Curve Number	71.2
	Total Area Check	161.19

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
Landuse	IA (mm)	Area (ha)	A * IA	Soil Type A		Soil Type B		Soil Type C				
				RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	61.90	619.00	0.08	3.86	0.25	50.71	0.35	7.33			15.5518
Meadow	8	0.00	0.00	0.10	0.00	0.28	0.00	0.40	0.00			0.00
Wetland	16	1.74	27.84	0.05	0.00	0.05	0.84	0.05	0.90			0.087
Lawn	5	5.80	29.00	0.20	0.00	0.20	5.80	0.20	0.00			1.16
Cultivated	7	82.28	575.96	0.22	3.56	0.35	39.60	0.55	39.12			36.1592
Impervious	2	9.47	18.94	0.95	0.00	0.95	9.23	0.95	0.24			8.9965
Composite		161.19	7.9	Composite Runoff Coefficient								0.38

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
Overland	1091	18	1.65%	2.7	0.35	0.87	0.59	0.59	1.26	0.84	3.00	2.01
Channel	897	2	0.22%	4.6	0.22	1.15	0.77	0.77				

Appropriate calculated time to	2.01	Appropriate Method:	Airport

CROZIER CONSULTING ENGINEERS

Project Name:	Hawk Ridge Golf Course	**D.A. NAME**	**PRE-2**
Project No.:	1935-6133	**D.A. AREA (ha)**	**149.59**
Date:	2023-02-08		
By:	J.Chowen		
Checked By:	B.Hummelen		

Hydrologic Parameters: CALIB STANDHYD Command
Post Development Drainage Area: Catchment PRE-2

Curve Number Calculation

Soil Types Present:

Type	ID	Hydrologic	% Area	Area
Vasey Sandy Loam	VSY	B	45%	67.96
Alliston Sandy Loam	ALT	B	6%	8.38
Sargent Gravelly Sandy Lo	SGT	A	49%	73.25
Total Area Check			100%	149.59

Impervious Landuses Present:

	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
VSY	3.04	98		98		98	2.85	98	4.49	98	10.39	1017.83
ALT	0.76	98		98		98	0.27	98		98	1.03	100.94
SGT	11.04	98		98		98	8.69	98	1.08	98	20.818	2040.164
	0.00	98		98		98	0.00	98		98	0	0
	0.00	98		98		98	0.00	98	0	98	0	0
Subtotal Area	14.85		0.00		0.00		11.82		5.57			

Pervious Landuses Present:

	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
VSY	36.23	60	0	65	0	50	0.00	69	21.34	74	57.57	3753.26
ALT	0.00	60	0	65	0	50	0.41	69	6.94	74	7.35	541.85
SGT	11.11	32	0	38	0	50	0.00	49	41.32	62	52.43	2917.484
Subtotal Area	47.34		0		0		0.41		69.606			

Pervious Area Calculations	Total Pervious Area	117.36
	Composite Pervious Curve Number	61
	Composite Initial Abstraction	8.20
Impervious Area Calculations	Total Directly Connected Area	20.42
	Total Indirectly Connected Area	11.82
	Total Impervious Area	32.23
	% X imp	13.6
	% T imp	21.5
	Total Area Check	149.59

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	47.34	473.4
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	0.41	2.05
Cultivated	7	69.606	487.242

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	8.2	2	40	0.025
Impervious	2.0	0.50	999	0.013

CROZIER CONSULTING ENGINEERS

Project Name: Hawk Ridge Golf Course
Project No.: 1935-6133
Date: 2022-02-08
By: J.Chowen
Checked By: B.Hummelen

D.A. NAME **PRE-3**
D.A. AREA (ha) **221.02**

Hydrologic Parameters: CALIB NASHYD Command
Post Development Drainage Area: Catchment PRE-3

Curve Number Calculation

Soil Types Present:				
Type	ID	Hydrologic	% Area	Area (ha)
Vasey Sandy Loam	VSY	B	4%	9.04
Otonabee Loam	OBE	B	7%	15.87
Guerin Loam	GUR	B	20%	45.20
Alliston Sandy Loam	ALT	B	15%	34.01
Sargent Gravelly	SGT	A	24%	53.02
Tioga Sandy Loam	TIG	A	29%	63.88
Total Area			100%	221.02

Impervious Landuses Present:												
	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
VSY	0.00	98		98		98		98		98	0	0
OBE	0.00	98		98		98		98		98	0	0
GUR	2.47	98		98		98		98		98	2.47	242.06
ALT	1.78	98		98		98	0.29	98	0.55	98	2.62	256.76
SGT	1.78	98		98		98		98		98	1.78	174.44
TIG	3.56	98		98		98		98	0.43	98	3.99	391.02
Subtotal	9.59		0		0		0.29		0.98			

Pervious Landuses Present:												
	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area	CN	Area	CN	Area	CN	Area (ha)	CN	Area	CN	Area	A*CN
VSY	7.50	60	0.00	65	0.00	50	0.00	69	1.54	74	9.04	563.96
OBE	1.64	60	0.00	65	0.65	50	0.00	69	13.58	74	15.87	1135.82
GUR	12.55	60	0.00	65	0.80	50	0.00	69	29.38	74	42.73	2967.12
ALT	15.69	60	0.00	65	0.58	50	0.36	69	14.76	74	31.39	2087.48
SGT	6.01	32	0.00	38	0.00	50	0.00	49	45.23	62	51.24	2996.58
TIG	30.81	32	0.00	38	0.15	50	0.00	49	28.93	62	59.89	2787.08
Subtotal	74.20		0.00		2.18		0.36		133.42			

Composite Area Calculations		
	Total Pervious Area	210.16
	Total Impervious Area	10.86
	% Impervious	4.91%
	Composite Curve Number	61.5
	Total Area Check	221.02

Initial Abstraction and Tp Calculations

Initial Abstraction				Composite Runoff Coefficient								
Landuse	IA (mm)	Area (ha)	A * IA	Soil Type A		Soil Type B						
				RC	Area	RC	Area	RC	Area	RC	Area	A*RC
Woodland	10	74.20	742.00	0.08	36.82	0.25	37.38					12.2906
Meadow	8	0.00	0.00	0.10	0.00	0.28	0.00					0.00
Wetland	16	2.18	34.88	0.05	0.15	0.05	2.03					0.109
Lawn	5	0.36	1.80	0.20	0.00	0.20	0.36					0.072
Cultivated	7	133.42	933.94	0.22	74.16	0.35	59.26					37.0562
Impervious	2	10.86	21.72	0.95	5.77	0.95	5.09					10.317
Composite		221.02	7.8	Composite Runoff Coefficient								0.27

Time to Peak Inputs						Uplands			Bransby Williams		Airport	
Flow Path Description	Length (m)	Drop (m)	Slope (%)	$V/S^{0.5}$	Velocity (m/s)	Tc (hr)	Tp(hr)	TOTAL Tp (hr)	Tc (hr)	Tp(hr)	Tc (hr)	Tp(hr)
Overland	2000	48	2.40%	2.7	0.42	1.33	0.89	0.89	1.26	0.85	2.88	1.93
Channel	503	2	0.40%	4.6	0.29	0.48	0.32	0.32				

Appropriate calculated time to	1.93	Appropriate Method:	Airport

CROZIER CONSULTING ENGINEERS

Project Name:	Hawk Ridge Golf Course	**D.A. NAME**	**PRE-4**
Project No.:	1935-6133	**D.A. AREA (ha)**	**264.40**
Date:	2023-02-08		
By:	J.Chowen		
Checked By:	B.Hummelen		

Hydrologic Parameters: CALIB STANDHYD Command
Post Development Drainage Area: Catchment PRE-4

Curve Number Calculation

Soil Types Present:

Type	ID	Hydrologic	% Area	Area
Otonabee Loam	OBE	B	1%	3.65
Sargent Gravelly Sandy	SGT	A	6%	15.79
Vasey Sandy Loam	VSY	B	17%	44.67
Tioga Loamy Sand	TIG	A	23%	60.72
Urban	U	B	53%	139.6
Total Area Check			100%	264.40

Impervious Landuses Present:

	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
OBE	1.23	98		98		98	0.23	98		98	1.45	142.20
SGT	5.56	98		98		98	2.39	98		98	7.94	778.12
VSY	17.06	98		98		98	14.35	98		98	31.414	3078.572
TIG	14.67	98		98		98	6.94	98		98	21.6	2116.8
U	39.97	98		98		98	29.27	98	3.39	98	72.631	7117.838
Subtotal Area	78.48		0.00		0.00		53.17		3.39			

Pervious Landuses Present:

	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
OBE	1.92	60	0	65	0	50	0.27	69	0		2.20	134.41
SGT	0.00	32	0	38	0	50	7.85	49	0		7.85	384.65
VSY	2.99	60	0	65	0	50	10.27	69	0		13.26	887.7956
TIG	8.41	32	0	38	0	50	30.71	49	0		39.12	1773.898
U	10.43	60	0	65	0	50	56.51	69	0		66.94	4524.921
Subtotal Area	23.75		0		0		105.61		0			

Pervious Area Calculations	Total Pervious Area	129.36
	Composite Pervious Curve Number	60
	Composite Initial Abstraction	5.92
Impervious Area Calculations	Total Directly Connected Area	109.34
	Total Indirectly Connected Area	25.70
	Total Impervious Area	135.04
	% X imp	41.4
	% T imp	51.1
	Total Area Check	264.40

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	23.751	237.5082
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	105.61	528.07
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.9	2	20	0.025
Impervious	2.0	0.50	1328	0.013

CROZIER CONSULTING ENGINEERS

Project Name:	Hawk Ridge Golf Course	**D.A. NAME**	**PRE-5**
Project No.:	1935-6133	**D.A. AREA (ha)**	**199.48**
Date:	2023-02-08		
By:	J.Chowen		
Checked By:	B.Hummelen		

Hydrologic Parameters: CALIB STANDHYD Command
Post Development Drainage Area: Catchment PRE-5

Curve Number Calculation

Soil Types Present:

Type	ID	Hydrologic	% Area	Area
Otonabee Loam	OBE	B	2%	3.09
Sargent Gravelly Sandy	SGT	A	12%	24.49
Vasey Sandy Loam	VSY	B	5%	10.8
Tioga Loamy Sand	TIG	A	2%	3.55
Urban	U	B	79%	157.6
Total Area Check			100%	199.48

Impervious Landuses Present:

	Roadway		Sidewalk		Driveway		Building		SWMF		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
OBE	1.00	98		98		98	0.00	98		98	1.00	98.00
SGT	12.28	98		98		98	2.64	98		98	14.92	1462.45
VSY	5.40	98		98		98	2.16	98		98	7.56	740.88
TIG	2.54	98		98		98	0.00	98		98	2.54	248.92
U	49.12	98		98		98	33.87	98		98	82.9905	8133.069
Subtotal Area	70.34		0.00		0.00		38.67		0			

Pervious Landuses Present:

	Woodland		Meadow		Wetland		Lawn		Cultivated		Subtotals	
Soils	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area (ha)	CN	Area	A*CN
OBE	0.00	60	0	65	0	50	2.09	69	0		2.09	144.21
SGT	2.03	32	0	38	0	50	7.54	49	0		9.57	434.27
VSY	1.75	60	0	65	0	50	1.49	69	0		3.24	207.81
TIG	0.00	32	0	38	0	50	1.01	49	0		1.01	49.49
U	0.00	60	0	65	0	50	74.56	69	0		74.5595	5144.606
Subtotal Area	3.78		0		0		86.69		0			

Pervious Area Calculations	Total Pervious Area	90.47
	Composite Pervious Curve Number	66
	Composite Initial Abstraction	5.21
Impervious Area Calculations	Total Directly Connected Area	81.64
	Total Indirectly Connected Area	27.37
	Total Impervious Area	109.01
	% X imp	40.9
	% T imp	54.6
	Total Area Check	199.48

Initial Abstraction and Tp Calculations

Landuse	IA (mm)	Area (ha)	A * IA
Woodland	10	3.78	37.8
Meadow	8	0	0
Wetland	16	0	0
Lawn	5	86.69	433.43
Cultivated	7	0	0

Land Use	IA (mm)	Slope (%)	Travel Length (m)	Manning's n
Pervious	5.2	2	20	0.025
Impervious	2.0	0.50	1153	0.013

APPENDIX B

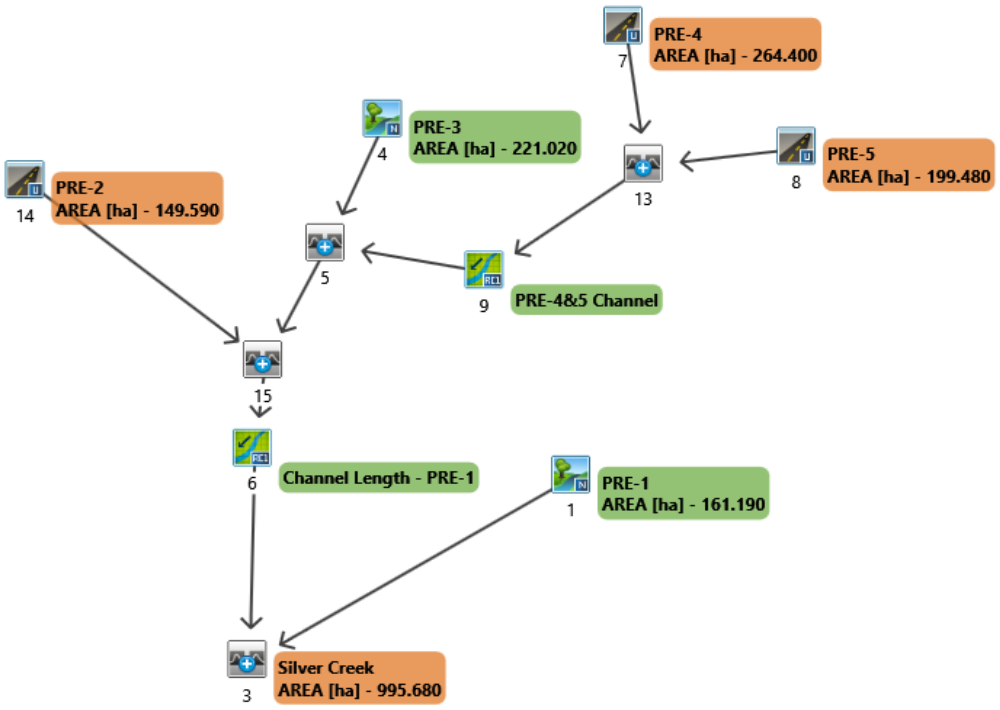
Visual OTTHYMO Outputs

CROZIER & ASSOCIATES
Consulting Engineers

Project: Hawrk Ridge
Project No.: 1935-6133-3
File: Model Schematic
By: TM
Date: 2024-01-11

Visual OTTHYMO 6.0 Model Schematic

Contributing Watershed Model



```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2008)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2021 Smart City Water Inc
All rights reserved.


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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\639f99d5-a1
  Summary filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\639f99d5-a1


DATE: 02-27-2023                          TIME: 10:10:59

USER:



COMMENTS: _____________________________________________________________

-------------------------------------------------------------------------------------------------------------
  ***********************************************
  ** SIMULATION : 25mm                         **
  ***********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\jchowen\AppD
|                  |              ata\Local\Temp\
|                  |              50702b2f-89c2-43ff-9553-8a4048d6a62f\1668b51d
| Ptotal= 26.26 mm |    Comments: 25mm
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    2.10 |  0.83   30.00 |  1.67    4.67 |  2.50    2.37
                0.08    2.29 |  0.92   80.70 |  1.75    4.23 |  2.58    2.26
                0.17    2.52 |  1.00   37.00 |  1.83    3.88 |  2.67    2.17
                0.25    2.81 |  1.08   20.30 |  1.92    3.58 |  2.75    2.08
                0.33    3.18 |  1.17   13.27 |  2.00    3.33 |  2.83    2.00
                0.42    3.68 |  1.25   10.09 |  2.08    3.11 |  2.92    1.93
                0.50    4.39 |  1.33    8.15 |  2.17    2.92 |  3.00    1.93
                0.58    5.49 |  1.42    6.85 |  2.25    2.76 |  3.08    1.93
                0.67    7.40 |  1.50    5.92 |  2.33    2.61 |  3.17    1.93
                0.75   11.54 |  1.58    5.22 |  2.42    2.48 |

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

--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)= 161.19   Curve Number   (CN)= 71.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.90   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   2.01

     Unit Hyd Qpeak  (cms)=   3.063

     PEAK FLOW       (cms)=   0.299 (i)
     TIME TO PEAK    (hrs)=   3.833
     RUNOFF VOLUME    (mm)=   2.782
     TOTAL RAINFALL   (mm)=  26.256
     RUNOFF COEFFICIENT   =   0.106

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

-------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0014)|   Area    (ha)= 149.59
|ID= 1 DT= 5.0 min |   Total Imp(%)=  21.50   Dir. Conn.(%)=  13.60
--------------------
                           IMPERVIOUS    PERVIOUS (i)
```

```
     Surface Area     (ha)=      32.16       117.43
     Dep. Storage     (mm)=       1.00         8.20
     Average Slope     (%)=       0.50         2.00
     Length            (m)=     998.63        40.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      42.00         2.14
               over (min)        20.00        55.00
     Storage Coeff.  (min)=      17.70 (ii)   50.52 (ii)
     Unit Hyd. Tpeak (min)=      20.00        55.00
     Unit Hyd. peak  (cms)=       0.06         0.02
                                                        *TOTALS*
     PEAK FLOW       (cms)=       1.60         0.32       1.659 (iii)
     TIME TO PEAK    (hrs)=       1.25         2.17        1.25
     RUNOFF VOLUME    (mm)=      25.26         2.13        5.27
     TOTAL RAINFALL   (mm)=      26.26        26.26       26.26
     RUNOFF COEFFICIENT   =       0.96         0.08        0.20

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  61.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0004)|   Area    (ha)= 221.02   Curve Number   (CN)= 61.5
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.80   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.93

     Unit Hyd Qpeak  (cms)=   4.374

     PEAK FLOW       (cms)=   0.291 (i)
     TIME TO PEAK    (hrs)=   3.750
     RUNOFF VOLUME    (mm)=   1.919
     TOTAL RAINFALL   (mm)=  26.256
     RUNOFF COEFFICIENT   =   0.073

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0007)|   Area    (ha)= 264.40
|ID= 1 DT= 5.0 min |   Total Imp(%)=  51.10   Dir. Conn.(%)=  41.40
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     135.11       129.29
     Dep. Storage     (mm)=       2.00         5.90
     Average Slope     (%)=       0.50         2.00
     Length            (m)=    1327.65        20.00
     Mannings n           =      0.013        0.250

     Max.Eff.Inten.(mm/hr)=      42.00         4.47
               over (min)        20.00        40.00
     Storage Coeff.  (min)=      21.00 (ii)   37.14 (ii)
     Unit Hyd. Tpeak (min)=      20.00        40.00
     Unit Hyd. peak  (cms)=       0.05         0.03
                                                        *TOTALS*
     PEAK FLOW       (cms)=       7.69         0.63       7.893 (iii)
     TIME TO PEAK    (hrs)=       1.25         1.75        1.25
     RUNOFF VOLUME    (mm)=      24.26         2.80       11.68
     TOTAL RAINFALL   (mm)=      26.26        26.26       26.26
     RUNOFF COEFFICIENT   =       0.92         0.11        0.44


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  60.0    Ia = Dep. 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 (  0008)|   Area    (ha)= 199.48
|ID= 1 DT= 5.0 min |   Total Imp(%)=  54.60   Dir. Conn.(%)=  40.90
--------------------
                           IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     108.92        90.56
```

Dep. Storage (mm)=	2.00	5.20		
Average Slope (%)=	0.50	2.00		
Length (m)=	1153.20	20.00		
Mannings n =	0.013	0.250		
Max.Eff.Inten.(mm/hr)=	42.00	8.40		
over (min)	20.00	35.00		
Storage Coeff. (min)=	19.30 (ii)	31.84 (ii)		
Unit Hyd. Tpeak (min)=	20.00	35.00		
Unit Hyd. peak (cms)=	0.06	0.03		
			TOTALS	
PEAK FLOW (cms)=	6.02	0.78	6.343 (iii)	
TIME TO PEAK (hrs)=	1.25	1.67	1.25	
RUNOFF VOLUME (mm)=	24.26	4.04	12.31	
TOTAL RAINFALL (mm)=	26.26	26.26	26.26	
RUNOFF COEFFICIENT =	0.92	0.15	0.47	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 66.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0013)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0007):	264.40	7.893	1.25	11.68
	+ ID2= 2 (0008):	199.48	6.343	1.25	12.31
	ID = 3 (0013):	463.88	14.236	1.25	11.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0009)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	232.00	0.0500	
15.83	231.70	0.0500	
47.63	231.09	0.0500	
57.14	230.76	0.0500	
66.39	229.94	0.0500	
69.72	229.37	0.0500	
102.15	229.37	0.0500	
106.00	229.60	0.0500	
111.50	229.47	0.0500	
143.51	229.14	0.0350	Main Channel
143.80	229.14	0.0350	Main Channel
153.45	229.10	0.0350	Main Channel
157.09	229.15	0.0350	Main Channel
188.81	230.05	0.0350 /0.0500	Main Channel
195.46	230.69	0.0500	
203.04	231.10	0.0500	
226.79	230.80	0.0500	
246.87	230.34	0.0500	
268.22	231.18	0.0500	
298.24	232.00	0.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.05	229.14	.488E+03	0.1	0.26	100.03
0.20	229.29	.601E+04	2.9	0.74	34.93
0.35	229.44	.199E+05	10.9	0.85	30.35
0.50	229.60	.425E+05	30.1	1.10	23.56
0.65	229.75	.676E+05	60.1	1.38	18.75
0.80	229.90	.942E+05	99.6	1.64	15.77
0.95	230.05	.122E+06	147.9	1.88	13.78
1.10	230.20	.152E+06	209.6	2.15	12.05
1.25	230.35	.182E+06	280.3	2.40	10.80
1.40	230.50	.214E+06	359.8	2.62	9.90
1.55	230.65	.249E+06	449.1	2.80	9.25
1.70	230.80	.288E+06	547.2	2.96	8.77
1.85	230.95	.331E+06	651.9	3.06	8.46
2.00	231.10	.380E+06	768.9	3.15	8.23
2.15	231.25	.432E+06	894.7	3.22	8.05
2.30	231.40	.488E+06	1034.8	3.30	7.86
2.45	231.55	.547E+06	1189.4	3.38	7.66

2.60	231.70	.609E+06	1358.9	3.47	7.47
2.75	231.85	.674E+06	1543.0	3.56	7.28

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0013)	463.88	14.24	1.25	11.95	0.37	0.89
OUTFLOW:	ID= 1 (0009)	463.88	8.61	1.67	11.95	0.30	0.82

ADD HYD (0005)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0004):	221.02	0.291	3.75	1.92
	+ ID2= 2 (0009):	463.88	8.609	1.67	11.95
	ID = 3 (0005):	684.90	8.669	1.67	8.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0015)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0014):	149.59	1.659	1.25	5.27
	+ ID2= 2 (0005):	684.90	8.669	1.67	8.71
	ID = 3 (0015):	834.49	9.696	1.67	8.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0006)
IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	228.00	0.0500	
212.52	225.39	0.0350	Main Channel
213.15	225.38	0.0350	Main Channel
213.73	225.38	0.0350	Main Channel
214.27	225.38	0.0350	Main Channel
214.91	225.37	0.0350	Main Channel
226.52	222.62	0.0350	Main Channel
226.60	222.60	0.0350	Main Channel
226.65	222.60	0.0350	Main Channel
229.30	222.50	0.0350	Main Channel
233.70	222.33	0.0350	Main Channel
236.82	222.33	0.0350	Main Channel
247.01	222.75	0.0350	Main Channel
247.81	223.00	0.0350	Main Channel
257.03	225.86	0.0500	
257.30	225.87	0.0500	
257.55	225.87	0.0500	
257.81	225.88	0.0500	
367.45	228.00	0.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.28	222.61	.312E+04	1.8	0.63	29.35
0.56	222.89	.939E+04	9.3	1.10	16.83
0.83	223.17	.165E+05	22.5	1.51	12.27
1.11	223.44	.243E+05	40.4	1.85	10.04
1.39	223.72	.328E+05	63.0	2.14	8.67
1.67	224.00	.418E+05	90.2	2.40	7.73
1.95	224.28	.516E+05	122.1	2.64	7.04
2.23	224.56	.619E+05	158.8	2.86	6.50
2.50	224.83	.729E+05	200.5	3.06	6.06
2.78	225.11	.846E+05	247.2	3.25	5.70
3.06	225.39	.969E+05	288.7	3.32	5.59
3.39	225.72	.118E+06	367.2	3.48	5.33
3.71	226.04	.149E+06	465.5	3.48	5.34
4.04	226.37	.196E+06	591.4	3.36	5.52
4.36	226.70	.258E+06	749.5	3.23	5.74
4.69	227.02	.337E+06	946.2	3.13	5.93
5.02	227.35	.431E+06	1187.1	3.07	6.05
5.34	227.67	.540E+06	1477.5	3.04	6.10
5.67	228.00	.666E+06	1822.2	3.05	6.09

```
                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0015)  834.49     9.70    1.67   8.10      0.56      1.11
   OUTFLOW: ID= 1 (  0006)  834.49     8.90    1.92   8.10      0.54      1.06



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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):   161.19   0.299     3.83     2.78
      + ID2= 2 (  0006):   834.49   8.903     1.92     8.10
        ==================================================
        ID = 3 (  0003):   995.68   9.002     1.92     7.24

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

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

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2008)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2021 Smart City Water Inc
All rights reserved.


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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\5c473b33-dc
  Summary filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\5c473b33-dc


DATE: 02-27-2023                          TIME: 10:10:58

USER:


COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------------------------------------------------------
  **********************************************
  ** SIMULATION : A - 100yr 4hr 10min Chicago   **
  **********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 961.159
| Ptotal= 73.48 mm |                          B=   0.000
--------------------                          C=   0.722
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  4.00 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
                0.00     5.73 |  1.00    28.56 |  2.00    11.58 |  3.00     6.63
                0.17     6.42 |  1.17   182.30 |  2.17    10.19 |  3.17     6.23
                0.33     7.36 |  1.33    35.26 |  2.33     9.14 |  3.33     5.88
                0.50     8.72 |  1.50    21.89 |  2.50     8.31 |  3.50     5.58
                0.67    10.87 |  1.67    16.54 |  2.67     7.65 |  3.67     5.31
                0.83    15.03 |  1.83    13.54 |  2.83     7.09 |  3.83     5.07
```

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)= 161.19   Curve Number   (CN)= 71.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.90   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   2.01

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


                            ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    5.73 | 1.083   28.56 | 2.083   11.58 |  3.08    6.63
               0.167    5.73 | 1.167   28.56 | 2.167   11.58 |  3.17    6.63
               0.250    6.42 | 1.250  182.30 | 2.250   10.19 |  3.25    6.23
               0.333    6.42 | 1.333  182.30 | 2.333   10.19 |  3.33    6.23
               0.417    7.36 | 1.417   35.26 | 2.417    9.14 |  3.42    5.88
               0.500    7.36 | 1.500   35.26 | 2.500    9.14 |  3.50    5.88
               0.583    8.72 | 1.583   21.89 | 2.583    8.31 |  3.58    5.58
               0.667    8.72 | 1.667   21.89 | 2.667    8.31 |  3.67    5.58
               0.750   10.87 | 1.750   16.54 | 2.750    7.65 |  3.75    5.31
               0.833   10.87 | 1.833   16.54 | 2.833    7.65 |  3.83    5.31
               0.917   15.03 | 1.917   13.54 | 2.917    7.09 |  3.92    5.07
               1.000   15.03 | 2.000   13.54 | 3.000    7.09 |  4.00    5.07

     Unit Hyd Qpeak  (cms)=   3.063

     PEAK FLOW       (cms)=   2.584 (i)
     TIME TO PEAK    (hrs)=   4.083
     RUNOFF VOLUME    (mm)=  25.553
     TOTAL RAINFALL   (mm)=  73.484
     RUNOFF COEFFICIENT   =   0.348

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| STANDHYD (  0014)|   Area    (ha)= 149.59
|ID= 1 DT= 5.0 min |   Total Imp(%)=  21.50   Dir. Conn.(%)=  13.60
--------------------

                               IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=      32.16        117.43
     Dep. Storage     (mm)=       1.00          8.20
     Average Slope     (%)=       0.50          2.00
     Length            (m)=     998.63         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    5.73 | 1.083   28.56 | 2.083   11.58 |  3.08    6.63
               0.167    5.73 | 1.167   28.56 | 2.167   11.58 |  3.17    6.63
               0.250    6.42 | 1.250  182.30 | 2.250   10.19 |  3.25    6.23
               0.333    6.42 | 1.333  182.30 | 2.333   10.19 |  3.33    6.23
               0.417    7.36 | 1.417   35.26 | 2.417    9.14 |  3.42    5.88
               0.500    7.36 | 1.500   35.26 | 2.500    9.14 |  3.50    5.88
               0.583    8.72 | 1.583   21.89 | 2.583    8.31 |  3.58    5.58
               0.667    8.72 | 1.667   21.89 | 2.667    8.31 |  3.67    5.58
               0.750   10.87 | 1.750   16.54 | 2.750    7.65 |  3.75    5.31
               0.833   10.87 | 1.833   16.54 | 2.833    7.65 |  3.83    5.31
               0.917   15.03 | 1.917   13.54 | 2.917    7.09 |  3.92    5.07
               1.000   15.03 | 2.000   13.54 | 3.000    7.09 |  4.00    5.07

     Max.Eff.Inten.(mm/hr)=     182.30        46.59
                over (min)       10.00        20.00
     Storage Coeff.  (min)=       9.84 (ii)   19.42 (ii)
     Unit Hyd. Tpeak (min)=      10.00        20.00
     Unit Hyd. peak  (cms)=       0.11         0.06
                                                      *TOTALS*
     PEAK FLOW       (cms)=       6.20         5.98      9.599 (iii)
     TIME TO PEAK    (hrs)=       1.42         1.58       1.42
     RUNOFF VOLUME    (mm)=      72.48        20.42      27.50
     TOTAL RAINFALL   (mm)=      73.48        73.48      73.48
     RUNOFF COEFFICIENT   =       0.99         0.28       0.37

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.
```

```
       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  61.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| NASHYD   (  0004)|   Area    (ha)= 221.02   Curve Number   (CN)= 61.5
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.80   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.93

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


                          ---- TRANSFORMED HYETOGRAPH ----
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
               0.083    5.73 | 1.083   28.56 | 2.083   11.58 |  3.08    6.63
               0.167    5.73 | 1.167   28.56 | 2.167   11.58 |  3.17    6.63
               0.250    6.42 | 1.250  182.30 | 2.250   10.19 |  3.25    6.23
               0.333    6.42 | 1.333  182.30 | 2.333   10.19 |  3.33    6.23
               0.417    7.36 | 1.417   35.26 | 2.417    9.14 |  3.42    5.88
               0.500    7.36 | 1.500   35.26 | 2.500    9.14 |  3.50    5.88
               0.583    8.72 | 1.583   21.89 | 2.583    8.31 |  3.58    5.58
               0.667    8.72 | 1.667   21.89 | 2.667    8.31 |  3.67    5.58
               0.750   10.87 | 1.750   16.54 | 2.750    7.65 |  3.75    5.31
               0.833   10.87 | 1.833   16.54 | 2.833    7.65 |  3.83    5.31
               0.917   15.03 | 1.917   13.54 | 2.917    7.09 |  3.92    5.07
               1.000   15.03 | 2.000   13.54 | 3.000    7.09 |  4.00    5.07

     Unit Hyd Qpeak  (cms)=   4.374

     PEAK FLOW       (cms)=   2.726 (i)
     TIME TO PEAK    (hrs)=   4.000
     RUNOFF VOLUME    (mm)=  19.201
     TOTAL RAINFALL   (mm)=  73.484
     RUNOFF COEFFICIENT   =   0.261

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

--------------------------------------------------------------------------------
--------------------
| CALIB              |
| STANDHYD (  0007)|   Area    (ha)= 264.40
|ID= 1 DT= 5.0 min |   Total Imp(%)=  51.10   Dir. Conn.(%)=  41.40
--------------------

                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     135.11       129.29
     Dep. Storage     (mm)=       2.00         5.90
     Average Slope     (%)=       0.50         2.00
     Length            (m)=    1327.65        20.00
     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    5.73 | 1.083   28.56 | 2.083   11.58 |  3.08    6.63
               0.167    5.73 | 1.167   28.56 | 2.167   11.58 |  3.17    6.63
               0.250    6.42 | 1.250  182.30 | 2.250   10.19 |  3.25    6.23
               0.333    6.42 | 1.333  182.30 | 2.333   10.19 |  3.33    6.23
               0.417    7.36 | 1.417   35.26 | 2.417    9.14 |  3.42    5.88
               0.500    7.36 | 1.500   35.26 | 2.500    9.14 |  3.50    5.88
               0.583    8.72 | 1.583   21.89 | 2.583    8.31 |  3.58    5.58
               0.667    8.72 | 1.667   21.89 | 2.667    8.31 |  3.67    5.58
               0.750   10.87 | 1.750   16.54 | 2.750    7.65 |  3.75    5.31
               0.833   10.87 | 1.833   16.54 | 2.833    7.65 |  3.83    5.31
               0.917   15.03 | 1.917   13.54 | 2.917    7.09 |  3.92    5.07
               1.000   15.03 | 2.000   13.54 | 3.000    7.09 |  4.00    5.07

     Max.Eff.Inten.(mm/hr)=     133.29     ********
               over (min)        15.00        20.00
     Storage Coeff.  (min)=      13.23 (ii)   17.14 (ii)
     Unit Hyd. Tpeak (min)=      15.00        20.00
     Unit Hyd. peak  (cms)=       0.08         0.06
                                                      *TOTALS*
     PEAK FLOW       (cms)=      27.19         8.69         34.723 (iii)
     TIME TO PEAK    (hrs)=       1.50         1.58           1.50
     RUNOFF VOLUME    (mm)=      71.48        22.40          42.72
     TOTAL RAINFALL   (mm)=      73.48        73.48          73.48
```

```
     RUNOFF COEFFICIENT   =       0.97         0.30           0.58


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  60.0    Ia = Dep. 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 (  0008)|   Area    (ha)= 199.48
|ID= 1 DT= 5.0 min |   Total Imp(%)=  54.60   Dir. Conn.(%)=  40.90
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     108.92         90.56
     Dep. Storage     (mm)=       2.00          5.20
     Average Slope     (%)=       0.50          2.00
     Length            (m)=    1153.20         20.00
     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     5.73 | 1.083    28.56 | 2.083    11.58 |  3.08     6.63
              0.167     5.73 | 1.167    28.56 | 2.167    11.58 |  3.17     6.63
              0.250     6.42 | 1.250   182.30 | 2.250    10.19 |  3.25     6.23
              0.333     6.42 | 1.333   182.30 | 2.333    10.19 |  3.33     6.23
              0.417     7.36 | 1.417    35.26 | 2.417     9.14 |  3.42     5.88
              0.500     7.36 | 1.500    35.26 | 2.500     9.14 |  3.50     5.88
              0.583     8.72 | 1.583    21.89 | 2.583     8.31 |  3.58     5.58
              0.667     8.72 | 1.667    21.89 | 2.667     8.31 |  3.67     5.58
              0.750    10.87 | 1.750    16.54 | 2.750     7.65 |  3.75     5.31
              0.833    10.87 | 1.833    16.54 | 2.833     7.65 |  3.83     5.31
              0.917    15.03 | 1.917    13.54 | 2.917     7.09 |  3.92     5.07
              1.000    15.03 | 2.000    13.54 | 3.000     7.09 |  4.00     5.07

     Max.Eff.Inten.(mm/hr)=     182.30     ********
                over (min)       10.00        15.00
     Storage Coeff.  (min)=      10.73 (ii)   14.55 (ii)
     Unit Hyd. Tpeak (min)=      10.00        15.00
     Unit Hyd. peak  (cms)=       0.11         0.08
                                                          *TOTALS*
     PEAK FLOW       (cms)=      24.05         9.94         32.362 (iii)
     TIME TO PEAK    (hrs)=       1.42         1.50           1.42
     RUNOFF VOLUME    (mm)=      71.48        28.40          46.02
     TOTAL RAINFALL   (mm)=      73.48        73.48          73.48
     RUNOFF COEFFICIENT   =       0.97         0.39           0.63


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  66.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0013)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0007):   264.40  34.723     1.50    42.72
     + ID2= 2 (  0008):   199.48  32.362     1.42    46.02
       ==========================================================
       ID = 3 (  0013):   463.88  63.804     1.42    44.14

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0009)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         232.00        0.0500
                  15.83         231.70        0.0500
                  47.63         231.09        0.0500
                  57.14         230.76        0.0500
                  66.39         229.94        0.0500
```

```
                 69.72        229.37        0.0500
                102.15        229.37        0.0500
                106.00        229.60        0.0500
                111.50        229.47        0.0500
                143.51        229.14        0.0350      Main Channel
                143.80        229.14        0.0350      Main Channel
                153.45        229.10        0.0350      Main Channel
                157.09        229.15        0.0350      Main Channel
                188.81        230.05    0.0350 /0.0500  Main Channel
                195.46        230.69        0.0500
                203.04        231.10        0.0500
                226.79        230.80        0.0500
                246.87        230.34        0.0500
                268.22        231.18        0.0500
                298.24        232.00        0.0500

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
       (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
      0.05   229.14    .488E+03       0.1          0.26      100.03
      0.20   229.29    .601E+04       2.9          0.74       34.93
      0.35   229.44    .199E+05      10.9          0.85       30.35
      0.50   229.60    .425E+05      30.1          1.10       23.56
      0.65   229.75    .676E+05      60.1          1.38       18.75
      0.80   229.90    .942E+05      99.6          1.64       15.77
      0.95   230.05    .122E+06     147.9          1.88       13.78
      1.10   230.20    .152E+06     209.6          2.15       12.05
      1.25   230.35    .182E+06     280.3          2.40       10.80
      1.40   230.50    .214E+06     359.8          2.62        9.90
      1.55   230.65    .249E+06     449.1          2.80        9.25
      1.70   230.80    .288E+06     547.2          2.96        8.77
      1.85   230.95    .331E+06     651.9          3.06        8.46
      2.00   231.10    .380E+06     768.9          3.15        8.23
      2.15   231.25    .432E+06     894.7          3.22        8.05
      2.30   231.40    .488E+06    1034.8          3.30        7.86
      2.45   231.55    .547E+06    1189.4          3.38        7.66
      2.60   231.70    .609E+06    1358.9          3.47        7.47
      2.75   231.85    .674E+06    1543.0          3.56        7.28

                                  <---- hydrograph ---->   <-pipe / channel->
                            AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                            (ha)    (cms)   (hrs)   (mm)       (m)      (m/s)
   INFLOW : ID= 2 (  0013)  463.88    63.80    1.42  44.14      0.66      1.40
   OUTFLOW: ID= 1 (  0009)  463.88    40.12    1.67  44.14      0.55      1.18



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

--------------------
| ADD HYD  (  0005)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0004):   221.02   2.726     4.00    19.20
     + ID2= 2 (  0009):   463.88  40.117     1.67    44.14
       ================================================
       ID = 3 (  0005):   684.90  40.465     1.67    36.09

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

--------------------
| ADD HYD  (  0015)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0014):   149.59   9.599     1.42    27.50
     + ID2= 2 (  0005):   684.90  40.465     1.67    36.09
       ================================================
       ID = 3 (  0015):   834.49  48.577     1.58    34.55

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0006)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
              <------ DATA FOR SECTION (   1.1) ------>
              Distance      Elevation       Manning
                  0.00        228.00        0.0500
                212.52        225.39        0.0350      Main Channel
                213.15        225.38        0.0350      Main Channel
                213.73        225.38        0.0350      Main Channel
                214.27        225.38        0.0350      Main Channel
                214.91        225.37        0.0350      Main Channel
```

```
                226.52        222.62        0.0350      Main Channel
                226.60        222.60        0.0350      Main Channel
                226.65        222.60        0.0350      Main Channel
                229.30        222.50        0.0350      Main Channel
                233.70        222.33        0.0350      Main Channel
                236.82        222.33        0.0350      Main Channel
                247.01        222.75        0.0350      Main Channel
                247.81        223.00        0.0350      Main Channel
                257.03        225.86        0.0500
                257.30        225.87        0.0500
                257.55        225.87        0.0500
                257.81        225.88        0.0500
                367.45        228.00        0.0500

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.28   222.61    .312E+04       1.8          0.63      29.35
       0.56   222.89    .939E+04       9.3          1.10      16.83
       0.83   223.17    .165E+05      22.5          1.51      12.27
       1.11   223.44    .243E+05      40.4          1.85      10.04
       1.39   223.72    .328E+05      63.0          2.14       8.67
       1.67   224.00    .418E+05      90.2          2.40       7.73
       1.95   224.28    .516E+05     122.1          2.64       7.04
       2.23   224.56    .619E+05     158.8          2.86       6.50
       2.50   224.83    .729E+05     200.5          3.06       6.06
       2.78   225.11    .846E+05     247.2          3.25       5.70
       3.06   225.39    .969E+05     288.7          3.32       5.59
       3.39   225.72    .118E+06     367.2          3.48       5.33
       3.71   226.04    .149E+06     465.5          3.48       5.34
       4.04   226.37    .196E+06     591.4          3.36       5.52
       4.36   226.70    .258E+06     749.5          3.23       5.74
       4.69   227.02    .337E+06     946.2          3.13       5.93
       5.02   227.35    .431E+06    1187.1          3.07       6.05
       5.34   227.67    .540E+06    1477.5          3.04       6.10
       5.67   228.00    .666E+06    1822.2          3.05       6.09

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0015)  834.49    48.58    1.58  34.55      1.21      1.94
   OUTFLOW: ID= 1 (  0006)  834.49    44.94    1.75  34.55      1.17      1.90



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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):   161.19   2.584     4.08    25.55
      + ID2= 2 (  0006):   834.49  44.944     1.75    34.55
        ================================================
        ID = 3 (  0003):   995.68  45.371     1.75    33.09

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2008)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2021 Smart City Water Inc
All rights reserved.


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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\44187926-b9
  Summary filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\44187926-b9


DATE: 02-27-2023                          TIME: 10:10:58
```

USER:

COMMENTS: _____

****
** SIMULATION : A - 10yr 4hr 10min Chicago **
****

CHICAGO STORM	Ptotal= 51.00 mm

IDF curve parameters: A= 674.467
B= 0.000
C= 0.724
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 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
0.00	3.95	1.00	19.78	2.00	8.00	3.00	4.57
0.17	4.43	1.17	127.34	2.17	7.03	3.17	4.30
0.33	5.08	1.33	24.43	2.33	6.31	3.33	4.06
0.50	6.01	1.50	15.15	2.50	5.74	3.50	3.85
0.67	7.51	1.67	11.44	2.67	5.27	3.67	3.66
0.83	10.39	1.83	9.36	2.83	4.89	3.83	3.50

CALIB NASHYD (0001) | ID= 1 DT= 5.0 min

Area (ha)= 161.19 Curve Number (CN)= 71.2
Ia (mm)= 7.90 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 2.01

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	3.95	1.083	19.78	2.083	8.00	3.08	4.57
0.167	3.95	1.167	19.78	2.167	8.00	3.17	4.57
0.250	4.43	1.250	127.34	2.250	7.03	3.25	4.30
0.333	4.43	1.333	127.34	2.333	7.03	3.33	4.30
0.417	5.08	1.417	24.43	2.417	6.31	3.42	4.06
0.500	5.08	1.500	24.43	2.500	6.31	3.50	4.06
0.583	6.01	1.583	15.15	2.583	5.74	3.58	3.85
0.667	6.01	1.667	15.15	2.667	5.74	3.67	3.85
0.750	7.51	1.750	11.44	2.750	5.27	3.75	3.66
0.833	7.51	1.833	11.44	2.833	5.27	3.83	3.66
0.917	10.39	1.917	9.36	2.917	4.89	3.92	3.50
1.000	10.39	2.000	9.36	3.000	4.89	4.00	3.50

Unit Hyd Qpeak (cms)= 3.063

PEAK FLOW (cms)= 1.284 (i)
TIME TO PEAK (hrs)= 4.167
RUNOFF VOLUME (mm)= 12.739
TOTAL RAINFALL (mm)= 51.003
RUNOFF COEFFICIENT = 0.250

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

CALIB STANDHYD (0014) | ID= 1 DT= 5.0 min

Area (ha)= 149.59
Total Imp(%)= 21.50 Dir. Conn.(%)= 13.60

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	32.16	117.43
Dep. Storage	(mm)=	1.00	8.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	998.63	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.95	1.083	19.78	2.083	8.00	3.08	4.57
0.167	3.95	1.167	19.78	2.167	8.00	3.17	4.57
0.250	4.43	1.250	127.34	2.250	7.03	3.25	4.30
0.333	4.43	1.333	127.34	2.333	7.03	3.33	4.30
0.417	5.08	1.417	24.43	2.417	6.31	3.42	4.06
0.500	5.08	1.500	24.43	2.500	6.31	3.50	4.06
0.583	6.01	1.583	15.15	2.583	5.74	3.58	3.85
0.667	6.01	1.667	15.15	2.667	5.74	3.67	3.85
0.750	7.51	1.750	11.44	2.750	5.27	3.75	3.66
0.833	7.51	1.833	11.44	2.833	5.27	3.83	3.66
0.917	10.39	1.917	9.36	2.917	4.89	3.92	3.50
1.000	10.39	2.000	9.36	3.000	4.89	4.00	3.50

			TOTALS
Max.Eff.Inten.(mm/hr)=	93.04	16.22	
over (min)	15.00	30.00	
Storage Coeff. (min)=	12.88 (ii)	27.49 (ii)	
Unit Hyd. Tpeak (min)=	15.00	30.00	
Unit Hyd. peak (cms)=	0.08	0.04	
PEAK FLOW (cms)=	3.56	2.12	4.593 (iii)
TIME TO PEAK (hrs)=	1.50	1.75	1.50
RUNOFF VOLUME (mm)=	50.00	9.93	15.38
TOTAL RAINFALL (mm)=	51.00	51.00	51.00
RUNOFF COEFFICIENT =	0.98	0.19	0.30

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 61.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
NASHYD (0004)	Area (ha)= 221.02	Curve Number (CN)= 61.5	
ID= 1 DT= 5.0 min	Ia (mm)= 7.80	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.93		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.95	1.083	19.78	2.083	8.00	3.08	4.57
0.167	3.95	1.167	19.78	2.167	8.00	3.17	4.57
0.250	4.43	1.250	127.34	2.250	7.03	3.25	4.30
0.333	4.43	1.333	127.34	2.333	7.03	3.33	4.30
0.417	5.08	1.417	24.43	2.417	6.31	3.42	4.06
0.500	5.08	1.500	24.43	2.500	6.31	3.50	4.06
0.583	6.01	1.583	15.15	2.583	5.74	3.58	3.85
0.667	6.01	1.667	15.15	2.667	5.74	3.67	3.85
0.750	7.51	1.750	11.44	2.750	5.27	3.75	3.66
0.833	7.51	1.833	11.44	2.833	5.27	3.83	3.66
0.917	10.39	1.917	9.36	2.917	4.89	3.92	3.50
1.000	10.39	2.000	9.36	3.000	4.89	4.00	3.50

Unit Hyd Qpeak (cms)= 4.374

PEAK FLOW (cms)= 1.307 (i)
TIME TO PEAK (hrs)= 4.083
RUNOFF VOLUME (mm)= 9.230
TOTAL RAINFALL (mm)= 51.003
RUNOFF COEFFICIENT = 0.181

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

CALIB		
STANDHYD (0007)	Area (ha)= 264.40	
ID= 1 DT= 5.0 min	Total Imp(%)= 51.10	Dir. Conn.(%)= 41.40

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	135.11	129.29
Dep. Storage (mm)=	2.00	5.90
Average Slope (%)=	0.50	2.00

Length (m)=	1327.65	20.00	
Mannings n =	0.013	0.250	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.95	1.083	19.78	2.083	8.00	3.08	4.57
0.167	3.95	1.167	19.78	2.167	8.00	3.17	4.57
0.250	4.43	1.250	127.34	2.250	7.03	3.25	4.30
0.333	4.43	1.333	127.34	2.333	7.03	3.33	4.30
0.417	5.08	1.417	24.43	2.417	6.31	3.42	4.06
0.500	5.08	1.500	24.43	2.500	6.31	3.50	4.06
0.583	6.01	1.583	15.15	2.583	5.74	3.58	3.85
0.667	6.01	1.667	15.15	2.667	5.74	3.67	3.85
0.750	7.51	1.750	11.44	2.750	5.27	3.75	3.66
0.833	7.51	1.833	11.44	2.833	5.27	3.83	3.66
0.917	10.39	1.917	9.36	2.917	4.89	3.92	3.50
1.000	10.39	2.000	9.36	3.000	4.89	4.00	3.50

Max.Eff.Inten.(mm/hr)=	93.04	********		
over (min)	15.00	20.00		
Storage Coeff. (min)=	15.28 (ii)	19.80 (ii)		
Unit Hyd. Tpeak (min)=	15.00	20.00		
Unit Hyd. peak (cms)=	0.07	0.06		
			TOTALS	
PEAK FLOW (cms)=	17.83	3.88	21.092 (iii)	
TIME TO PEAK (hrs)=	1.50	1.58	1.50	
RUNOFF VOLUME (mm)=	49.00	11.33	26.93	
TOTAL RAINFALL (mm)=	51.00	51.00	51.00	
RUNOFF COEFFICIENT =	0.96	0.22	0.53	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 60.0 Ia = Dep. 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 (0008)	Area (ha)= 199.48
ID= 1 DT= 5.0 min	Total Imp(%)= 54.60 Dir. Conn.(%)= 40.90

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	108.92	90.56
Dep. Storage	(mm)=	2.00	5.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	1153.20	20.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.95	1.083	19.78	2.083	8.00	3.08	4.57
0.167	3.95	1.167	19.78	2.167	8.00	3.17	4.57
0.250	4.43	1.250	127.34	2.250	7.03	3.25	4.30
0.333	4.43	1.333	127.34	2.333	7.03	3.33	4.30
0.417	5.08	1.417	24.43	2.417	6.31	3.42	4.06
0.500	5.08	1.500	24.43	2.500	6.31	3.50	4.06
0.583	6.01	1.583	15.15	2.583	5.74	3.58	3.85
0.667	6.01	1.667	15.15	2.667	5.74	3.67	3.85
0.750	7.51	1.750	11.44	2.750	5.27	3.75	3.66
0.833	7.51	1.833	11.44	2.833	5.27	3.83	3.66
0.917	10.39	1.917	9.36	2.917	4.89	3.92	3.50
1.000	10.39	2.000	9.36	3.000	4.89	4.00	3.50

Max.Eff.Inten.(mm/hr)=	93.04	********		
over (min)	15.00	20.00		
Storage Coeff. (min)=	14.04 (ii)	18.45 (ii)		
Unit Hyd. Tpeak (min)=	15.00	20.00		
Unit Hyd. peak (cms)=	0.08	0.06		
			TOTALS	
PEAK FLOW (cms)=	13.79	4.23	17.415 (iii)	
TIME TO PEAK (hrs)=	1.50	1.58	1.50	
RUNOFF VOLUME (mm)=	49.00	14.98	28.89	
TOTAL RAINFALL (mm)=	51.00	51.00	51.00	
RUNOFF COEFFICIENT =	0.96	0.29	0.57	

```
       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  66.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0013)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0007):   264.40  21.092     1.50    26.93
      + ID2= 2 (  0008):   199.48  17.415     1.50    28.89
        ================================================
        ID = 3 (  0013):   463.88  38.507     1.50    27.77

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0009)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         232.00        0.0500
                  15.83         231.70        0.0500
                  47.63         231.09        0.0500
                  57.14         230.76        0.0500
                  66.39         229.94        0.0500
                  69.72         229.37        0.0500
                 102.15         229.37        0.0500
                 106.00         229.60        0.0500
                 111.50         229.47        0.0500
                 143.51         229.14        0.0350      Main Channel
                 143.80         229.14        0.0350      Main Channel
                 153.45         229.10        0.0350      Main Channel
                 157.09         229.15        0.0350      Main Channel
                 188.81         230.05    0.0350 /0.0500  Main Channel
                 195.46         230.69        0.0500
                 203.04         231.10        0.0500
                 226.79         230.80        0.0500
                 246.87         230.34        0.0500
                 268.22         231.18        0.0500
                 298.24         232.00        0.0500

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        0.05   229.14    .488E+03       0.1          0.26     100.03
        0.20   229.29    .601E+04       2.9          0.74      34.93
        0.35   229.44    .199E+05      10.9          0.85      30.35
        0.50   229.60    .425E+05      30.1          1.10      23.56
        0.65   229.75    .676E+05      60.1          1.38      18.75
        0.80   229.90    .942E+05      99.6          1.64      15.77
        0.95   230.05    .122E+06     147.9          1.88      13.78
        1.10   230.20    .152E+06     209.6          2.15      12.05
        1.25   230.35    .182E+06     280.3          2.40      10.80
        1.40   230.50    .214E+06     359.8          2.62       9.90
        1.55   230.65    .249E+06     449.1          2.80       9.25
        1.70   230.80    .288E+06     547.2          2.96       8.77
        1.85   230.95    .331E+06     651.9          3.06       8.46
        2.00   231.10    .380E+06     768.9          3.15       8.23
        2.15   231.25    .432E+06     894.7          3.22       8.05
        2.30   231.40    .488E+06    1034.8          3.30       7.86
        2.45   231.55    .547E+06    1189.4          3.38       7.66
        2.60   231.70    .609E+06    1358.9          3.47       7.47
        2.75   231.85    .674E+06    1543.0          3.56       7.28

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)      (m)       (m/s)
   INFLOW : ID= 2 (  0013)  463.88    38.51    1.50  27.77      0.54       1.17
   OUTFLOW: ID= 1 (  0009)  463.88    22.39    1.75  27.77      0.44       0.99



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

--------------------
| ADD HYD  (  0005)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
```

```
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0004):   221.02   1.307     4.08     9.23
      + ID2= 2 (  0009):   463.88  22.394     1.75    27.77
        ================================================
        ID = 3 (  0005):   684.90  22.595     1.75    21.79

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

--------------------
| ADD HYD  (  0015)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0014):   149.59   4.593     1.50    15.38
      + ID2= 2 (  0005):   684.90  22.595     1.75    21.79
        ================================================
        ID = 3 (  0015):   834.49  26.507     1.75    20.64

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0006)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         228.00        0.0500
                 212.52         225.39        0.0350      Main Channel
                 213.15         225.38        0.0350      Main Channel
                 213.73         225.38        0.0350      Main Channel
                 214.27         225.38        0.0350      Main Channel
                 214.91         225.37        0.0350      Main Channel
                 226.52         222.62        0.0350      Main Channel
                 226.60         222.60        0.0350      Main Channel
                 226.65         222.60        0.0350      Main Channel
                 229.30         222.50        0.0350      Main Channel
                 233.70         222.33        0.0350      Main Channel
                 236.82         222.33        0.0350      Main Channel
                 247.01         222.75        0.0350      Main Channel
                 247.81         223.00        0.0350      Main Channel
                 257.03         225.86        0.0500
                 257.30         225.87        0.0500
                 257.55         225.87        0.0500
                 257.81         225.88        0.0500
                 367.45         228.00        0.0500

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)       (cms)         (m/s)      (min)
        0.28   222.61    .312E+04         1.8          0.63      29.35
        0.56   222.89    .939E+04         9.3          1.10      16.83
        0.83   223.17    .165E+05        22.5          1.51      12.27
        1.11   223.44    .243E+05        40.4          1.85      10.04
        1.39   223.72    .328E+05        63.0          2.14       8.67
        1.67   224.00    .418E+05        90.2          2.40       7.73
        1.95   224.28    .516E+05       122.1          2.64       7.04
        2.23   224.56    .619E+05       158.8          2.86       6.50
        2.50   224.83    .729E+05       200.5          3.06       6.06
        2.78   225.11    .846E+05       247.2          3.25       5.70
        3.06   225.39    .969E+05       288.7          3.32       5.59
        3.39   225.72    .118E+06       367.2          3.48       5.33
        3.71   226.04    .149E+06       465.5          3.48       5.34
        4.04   226.37    .196E+06       591.4          3.36       5.52
        4.36   226.70    .258E+06       749.5          3.23       5.74
        4.69   227.02    .337E+06       946.2          3.13       5.93
        5.02   227.35    .431E+06      1187.1          3.07       6.05
        5.34   227.67    .540E+06      1477.5          3.04       6.10
        5.67   228.00    .666E+06      1822.2          3.05       6.09

                                     <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)      (m)       (m/s)
   INFLOW : ID= 2 (  0015)  834.49    26.51    1.75  20.64       0.90       1.58
   OUTFLOW: ID= 1 (  0006)  834.49    24.32    1.92  20.64       0.86       1.54



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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):   161.19   1.284     4.17    12.74
```

```
      + ID2= 2 (  0006):   834.49  24.321     1.92    20.64
        ================================================
        ID = 3 (  0003):   995.68  24.623     1.92    19.36

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2008)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2021 Smart City Water Inc
All rights reserved.


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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\49b361e0-d0
  Summary filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\49b361e0-d0


DATE: 02-27-2023                          TIME: 10:10:58

USER:


COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------------------------------------------
  ***********************************************
  ** SIMULATION : A - 25yr 4hr 10min Chicago    **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 789.454
| Ptotal= 60.03 mm |                          B=   0.000
--------------------                          C=   0.723
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  4.00 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
               0.00    4.66 |  1.00   23.30 |  2.00    9.44 |  3.00    5.40
               0.17    5.23 |  1.17  149.39 |  2.17    8.30 |  3.17    5.07
               0.33    6.00 |  1.33   28.78 |  2.33    7.44 |  3.33    4.79
               0.50    7.10 |  1.50   17.85 |  2.50    6.77 |  3.50    4.54
               0.67    8.86 |  1.67   13.49 |  2.67    6.23 |  3.67    4.32
               0.83   12.25 |  1.83   11.04 |  2.83    5.78 |  3.83    4.13


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)= 161.19   Curve Number   (CN)= 71.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.90   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   2.01

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


                        ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    4.66 | 1.083   23.30 | 2.083    9.44 |  3.08    5.40
              0.167    4.66 | 1.167   23.30 | 2.167    9.44 |  3.17    5.40
              0.250    5.23 | 1.250  149.39 | 2.250    8.30 |  3.25    5.07
              0.333    5.23 | 1.333  149.39 | 2.333    8.30 |  3.33    5.07
              0.417    6.00 | 1.417   28.78 | 2.417    7.44 |  3.42    4.79
              0.500    6.00 | 1.500   28.78 | 2.500    7.44 |  3.50    4.79
```

0.583	7.10	1.583	17.85	2.583	6.77	3.58	4.54
0.667	7.10	1.667	17.85	2.667	6.77	3.67	4.54
0.750	8.86	1.750	13.49	2.750	6.23	3.75	4.32
0.833	8.86	1.833	13.49	2.833	6.23	3.83	4.32
0.917	12.25	1.917	11.04	2.917	5.78	3.92	4.13
1.000	12.25	2.000	11.04	3.000	5.78	4.00	4.13

Unit Hyd Qpeak (cms)= 3.063

PEAK FLOW (cms)= 1.770 (i)
TIME TO PEAK (hrs)= 4.167
RUNOFF VOLUME (mm)= 17.545
TOTAL RAINFALL (mm)= 60.026
RUNOFF COEFFICIENT = 0.292

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

CALIB	
STANDHYD (0014)	Area (ha)= 149.59
ID= 1 DT= 5.0 min	Total Imp(%)= 21.50 Dir. Conn.(%)= 13.60

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	32.16	117.43
Dep. Storage	(mm)=	1.00	8.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	998.63	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.66	1.083	23.30	2.083	9.44	3.08	5.40
0.167	4.66	1.167	23.30	2.167	9.44	3.17	5.40
0.250	5.23	1.250	149.39	2.250	8.30	3.25	5.07
0.333	5.23	1.333	149.39	2.333	8.30	3.33	5.07
0.417	6.00	1.417	28.78	2.417	7.44	3.42	4.79
0.500	6.00	1.500	28.78	2.500	7.44	3.50	4.79
0.583	7.10	1.583	17.85	2.583	6.77	3.58	4.54
0.667	7.10	1.667	17.85	2.667	6.77	3.67	4.54
0.750	8.86	1.750	13.49	2.750	6.23	3.75	4.32
0.833	8.86	1.833	13.49	2.833	6.23	3.83	4.32
0.917	12.25	1.917	11.04	2.917	5.78	3.92	4.13
1.000	12.25	2.000	11.04	3.000	5.78	4.00	4.13

Max.Eff.Inten.(mm/hr)=	149.39	23.39		
over (min)	10.00	25.00		
Storage Coeff. (min)=	10.66 (ii)	23.27 (ii)		
Unit Hyd. Tpeak (min)=	10.00	25.00		
Unit Hyd. peak (cms)=	0.11	0.05		
			TOTALS	
PEAK FLOW (cms)=	4.93	3.43	6.344 (iii)	
TIME TO PEAK (hrs)=	1.42	1.67	1.42	
RUNOFF VOLUME (mm)=	59.03	13.81	19.96	
TOTAL RAINFALL (mm)=	60.03	60.03	60.03	
RUNOFF COEFFICIENT =	0.98	0.23	0.33	

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 61.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
NASHYD (0004)	Area (ha)= 221.02 Curve Number (CN)= 61.5
ID= 1 DT= 5.0 min	Ia (mm)= 7.80 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 1.93

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.66	1.083	23.30	2.083	9.44	3.08	5.40

0.167	4.66	1.167	23.30	2.167	9.44	3.17	5.40
0.250	5.23	1.250	149.39	2.250	8.30	3.25	5.07
0.333	5.23	1.333	149.39	2.333	8.30	3.33	5.07
0.417	6.00	1.417	28.78	2.417	7.44	3.42	4.79
0.500	6.00	1.500	28.78	2.500	7.44	3.50	4.79
0.583	7.10	1.583	17.85	2.583	6.77	3.58	4.54
0.667	7.10	1.667	17.85	2.667	6.77	3.67	4.54
0.750	8.86	1.750	13.49	2.750	6.23	3.75	4.32
0.833	8.86	1.833	13.49	2.833	6.23	3.83	4.32
0.917	12.25	1.917	11.04	2.917	5.78	3.92	4.13
1.000	12.25	2.000	11.04	3.000	5.78	4.00	4.13

Unit Hyd Qpeak (cms)= 4.374

PEAK FLOW (cms)= 1.830 (i)
TIME TO PEAK (hrs)= 4.083
RUNOFF VOLUME (mm)= 12.913
TOTAL RAINFALL (mm)= 60.026
RUNOFF COEFFICIENT = 0.215

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

CALIB	
STANDHYD (0007)	Area (ha)= 264.40
ID= 1 DT= 5.0 min	Total Imp(%)= 51.10 Dir. Conn.(%)= 41.40

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	135.11	129.29
Dep. Storage	(mm)=	2.00	5.90
Average Slope	(%)=	0.50	2.00
Length	(m)=	1327.65	20.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.66	1.083	23.30	2.083	9.44	3.08	5.40
0.167	4.66	1.167	23.30	2.167	9.44	3.17	5.40
0.250	5.23	1.250	149.39	2.250	8.30	3.25	5.07
0.333	5.23	1.333	149.39	2.333	8.30	3.33	5.07
0.417	6.00	1.417	28.78	2.417	7.44	3.42	4.79
0.500	6.00	1.500	28.78	2.500	7.44	3.50	4.79
0.583	7.10	1.583	17.85	2.583	6.77	3.58	4.54
0.667	7.10	1.667	17.85	2.667	6.77	3.67	4.54
0.750	8.86	1.750	13.49	2.750	6.23	3.75	4.32
0.833	8.86	1.833	13.49	2.833	6.23	3.83	4.32
0.917	12.25	1.917	11.04	2.917	5.78	3.92	4.13
1.000	12.25	2.000	11.04	3.000	5.78	4.00	4.13

Max.Eff.Inten.(mm/hr)=		109.19	********	
over (min)		15.00	20.00	
Storage Coeff. (min)=		14.33 (ii)	18.57 (ii)	
Unit Hyd. Tpeak (min)=		15.00	20.00	
Unit Hyd. peak (cms)=		0.08	0.06	
				TOTALS
PEAK FLOW	(cms)=	21.54	5.61	26.320 (iii)
TIME TO PEAK	(hrs)=	1.50	1.58	1.50
RUNOFF VOLUME	(mm)=	58.03	15.46	33.08
TOTAL RAINFALL	(mm)=	60.03	60.03	60.03
RUNOFF COEFFICIENT	=	0.97	0.26	0.55

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 60.0 Ia = Dep. 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 (0008)	Area (ha)= 199.48
ID= 1 DT= 5.0 min	Total Imp(%)= 54.60 Dir. Conn.(%)= 40.90

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	108.92	90.56
Dep. Storage	(mm)=	2.00	5.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	1153.20	20.00

Mannings n = 0.013 0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	4.66	1.083	23.30	2.083	9.44	3.08	5.40
0.167	4.66	1.167	23.30	2.167	9.44	3.17	5.40
0.250	5.23	1.250	149.39	2.250	8.30	3.25	5.07
0.333	5.23	1.333	149.39	2.333	8.30	3.33	5.07
0.417	6.00	1.417	28.78	2.417	7.44	3.42	4.79
0.500	6.00	1.500	28.78	2.500	7.44	3.50	4.79
0.583	7.10	1.583	17.85	2.583	6.77	3.58	4.54
0.667	7.10	1.667	17.85	2.667	6.77	3.67	4.54
0.750	8.86	1.750	13.49	2.750	6.23	3.75	4.32
0.833	8.86	1.833	13.49	2.833	6.23	3.83	4.32
0.917	12.25	1.917	11.04	2.917	5.78	3.92	4.13
1.000	12.25	2.000	11.04	3.000	5.78	4.00	4.13

			TOTALS
Max.Eff.Inten.(mm/hr)=	109.19	********	
over (min)	15.00	20.00	
Storage Coeff. (min)=	13.17 (ii)	17.30 (ii)	
Unit Hyd. Tpeak (min)=	15.00	20.00	
Unit Hyd. peak (cms)=	0.08	0.06	
PEAK FLOW (cms)=	16.62	5.97	21.816 (iii)
TIME TO PEAK (hrs)=	1.50	1.58	1.50
RUNOFF VOLUME (mm)=	58.03	20.05	35.59
TOTAL RAINFALL (mm)=	60.03	60.03	60.03
RUNOFF COEFFICIENT =	0.97	0.33	0.59

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 66.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0013)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0007):	264.40	26.320	1.50	33.08
+ ID2= 2 (0008):	199.48	21.816	1.50	35.59
ID = 3 (0013):	463.88	48.136	1.50	34.16

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0009)
IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	232.00	0.0500	
15.83	231.70	0.0500	
47.63	231.09	0.0500	
57.14	230.76	0.0500	
66.39	229.94	0.0500	
69.72	229.37	0.0500	
102.15	229.37	0.0500	
106.00	229.60	0.0500	
111.50	229.47	0.0500	
143.51	229.14	0.0350	Main Channel
143.80	229.14	0.0350	Main Channel
153.45	229.10	0.0350	Main Channel
157.09	229.15	0.0350	Main Channel
188.81	230.05	0.0350 /0.0500	Main Channel
195.46	230.69	0.0500	
203.04	231.10	0.0500	
226.79	230.80	0.0500	
246.87	230.34	0.0500	
268.22	231.18	0.0500	
298.24	232.00	0.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.05	229.14	.488E+03	0.1	0.26	100.03

0.20	229.29	.601E+04	2.9	0.74	34.93
0.35	229.44	.199E+05	10.9	0.85	30.35
0.50	229.60	.425E+05	30.1	1.10	23.56
0.65	229.75	.676E+05	60.1	1.38	18.75
0.80	229.90	.942E+05	99.6	1.64	15.77
0.95	230.05	.122E+06	147.9	1.88	13.78
1.10	230.20	.152E+06	209.6	2.15	12.05
1.25	230.35	.182E+06	280.3	2.40	10.80
1.40	230.50	.214E+06	359.8	2.62	9.90
1.55	230.65	.249E+06	449.1	2.80	9.25
1.70	230.80	.288E+06	547.2	2.96	8.77
1.85	230.95	.331E+06	651.9	3.06	8.46
2.00	231.10	.380E+06	768.9	3.15	8.23
2.15	231.25	.432E+06	894.7	3.22	8.05
2.30	231.40	.488E+06	1034.8	3.30	7.86
2.45	231.55	.547E+06	1189.4	3.38	7.66
2.60	231.70	.609E+06	1358.9	3.47	7.47
2.75	231.85	.674E+06	1543.0	3.56	7.28

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0013)		463.88	48.14	1.50	34.16	0.59	1.25
OUTFLOW: ID= 1 (0009)		463.88	29.07	1.75	34.16	0.49	1.08

ADD HYD (0005)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0004):	221.02	1.830	4.08	12.91
	+ ID2= 2 (0009):	463.88	29.071	1.75	34.16
	ID = 3 (0005):	684.90	29.367	1.75	27.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0015)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0014):	149.59	6.344	1.42	19.96
	+ ID2= 2 (0005):	684.90	29.367	1.75	27.30
	ID = 3 (0015):	834.49	34.399	1.67	25.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0006)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	228.00	0.0500	
212.52	225.39	0.0350	Main Channel
213.15	225.38	0.0350	Main Channel
213.73	225.38	0.0350	Main Channel
214.27	225.38	0.0350	Main Channel
214.91	225.37	0.0350	Main Channel
226.52	222.62	0.0350	Main Channel
226.60	222.60	0.0350	Main Channel
226.65	222.60	0.0350	Main Channel
229.30	222.50	0.0350	Main Channel
233.70	222.33	0.0350	Main Channel
236.82	222.33	0.0350	Main Channel
247.01	222.75	0.0350	Main Channel
247.81	223.00	0.0350	Main Channel
257.03	225.86	0.0500	
257.30	225.87	0.0500	
257.55	225.87	0.0500	
257.81	225.88	0.0500	
367.45	228.00	0.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.28	222.61	.312E+04	1.8	0.63	29.35
0.56	222.89	.939E+04	9.3	1.10	16.83
0.83	223.17	.165E+05	22.5	1.51	12.27

1.11	223.44	.243E+05	40.4	1.85	10.04
1.39	223.72	.328E+05	63.0	2.14	8.67
1.67	224.00	.418E+05	90.2	2.40	7.73
1.95	224.28	.516E+05	122.1	2.64	7.04
2.23	224.56	.619E+05	158.8	2.86	6.50
2.50	224.83	.729E+05	200.5	3.06	6.06
2.78	225.11	.846E+05	247.2	3.25	5.70
3.06	225.39	.969E+05	288.7	3.32	5.59
3.39	225.72	.118E+06	367.2	3.48	5.33
3.71	226.04	.149E+06	465.5	3.48	5.34
4.04	226.37	.196E+06	591.4	3.36	5.52
4.36	226.70	.258E+06	749.5	3.23	5.74
4.69	227.02	.337E+06	946.2	3.13	5.93
5.02	227.35	.431E+06	1187.1	3.07	6.05
5.34	227.67	.540E+06	1477.5	3.04	6.10
5.67	228.00	.666E+06	1822.2	3.05	6.09

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0015)		834.49	34.40	1.67	25.99	1.02	1.72
OUTFLOW: ID= 1 (0006)		834.49	31.64	1.83	25.99	0.98	1.67

ADD HYD (0003)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0001):	161.19	1.770	4.17	17.55
	+ ID2= 2 (0006):	834.49	31.641	1.83	25.99
	ID = 3 (0003):	995.68	31.995	1.83	24.62

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2008)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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

Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2021 Smart City Water Inc
All rights reserved.

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\5cf2f4e0-35
Summary filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\5cf2f4e0-35

DATE: 02-27-2023 TIME: 10:10:57

USER:

COMMENTS: _____

****
** SIMULATION : A - 2yr 4hr 10min Chicago **
****

CHICAGO STORM		IDF curve parameters: A= 443.278
Ptotal= 32.79 mm		B= 0.000
		C= 0.728

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

Duration of storm = 4.00 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
0.00	2.50	1.00	12.66	2.00	5.09	3.00	2.90
0.17	2.81	1.17	82.92	2.17	4.47	3.17	2.72
0.33	3.22	1.33	15.65	2.33	4.01	3.33	2.57
0.50	3.82	1.50	9.68	2.50	3.64	3.50	2.44
0.67	4.78	1.67	7.30	2.67	3.35	3.67	2.32
0.83	6.62	1.83	5.96	2.83	3.11	3.83	2.22

CALIB NASHYD (0001)	Area (ha)= 161.19	Curve Number (CN)= 71.2
ID= 1 DT= 5.0 min	Ia (mm)= 7.90	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 2.01	

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	2.50	1.083	12.66	2.083	5.09	3.08	2.90
0.167	2.50	1.167	12.66	2.167	5.09	3.17	2.90
0.250	2.81	1.250	82.92	2.250	4.47	3.25	2.72
0.333	2.81	1.333	82.92	2.333	4.47	3.33	2.72
0.417	3.22	1.417	15.65	2.417	4.01	3.42	2.57
0.500	3.22	1.500	15.65	2.500	4.01	3.50	2.57
0.583	3.82	1.583	9.68	2.583	3.64	3.58	2.44
0.667	3.82	1.667	9.68	2.667	3.64	3.67	2.44
0.750	4.78	1.750	7.30	2.750	3.35	3.75	2.32
0.833	4.78	1.833	7.30	2.833	3.35	3.83	2.32
0.917	6.62	1.917	5.96	2.917	3.11	3.92	2.22
1.000	6.62	2.000	5.96	3.000	3.11	4.00	2.22

Unit Hyd Qpeak (cms)= 3.063

PEAK FLOW (cms)= 0.489 (i)
TIME TO PEAK (hrs)= 4.333
RUNOFF VOLUME (mm)= 4.855
TOTAL RAINFALL (mm)= 32.794
RUNOFF COEFFICIENT = 0.148

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

CALIB STANDHYD (0014)	Area (ha)= 149.59	
ID= 1 DT= 5.0 min	Total Imp(%)= 21.50	Dir. Conn.(%)= 13.60

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	32.16	117.43
Dep. Storage	(mm)=	1.00	8.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	998.63	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.50	1.083	12.66	2.083	5.09	3.08	2.90
0.167	2.50	1.167	12.66	2.167	5.09	3.17	2.90
0.250	2.81	1.250	82.92	2.250	4.47	3.25	2.72
0.333	2.81	1.333	82.92	2.333	4.47	3.33	2.72
0.417	3.22	1.417	15.65	2.417	4.01	3.42	2.57
0.500	3.22	1.500	15.65	2.500	4.01	3.50	2.57
0.583	3.82	1.583	9.68	2.583	3.64	3.58	2.44
0.667	3.82	1.667	9.68	2.667	3.64	3.67	2.44
0.750	4.78	1.750	7.30	2.750	3.35	3.75	2.32
0.833	4.78	1.833	7.30	2.833	3.35	3.83	2.32
0.917	6.62	1.917	5.96	2.917	3.11	3.92	2.22
1.000	6.62	2.000	5.96	3.000	3.11	4.00	2.22

Max.Eff.Inten.(mm/hr)=		60.50	3.72
over (min)		15.00	45.00
Storage Coeff. (min)=		15.30 (ii)	41.62 (ii)

```
     Unit Hyd. Tpeak (min)=      15.00        45.00
     Unit Hyd. peak  (cms)=       0.07         0.03
                                                          *TOTALS*
     PEAK FLOW       (cms)=       2.15         0.55          2.290 (iii)
     TIME TO PEAK    (hrs)=       1.50         2.17           1.50
     RUNOFF VOLUME    (mm)=      31.79         3.72           7.53
     TOTAL RAINFALL   (mm)=      32.79        32.79          32.79
     RUNOFF COEFFICIENT   =       0.97         0.11           0.23

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
              YOU SHOULD CONSIDER SPLITTING THE AREA.

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  61.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| NASHYD   (  0004)|   Area    (ha)= 221.02   Curve Number   (CN)= 61.5
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.80   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.93

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


                          ---- TRANSFORMED HYETOGRAPH ----
               TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
              0.083    2.50 | 1.083   12.66 | 2.083    5.09 |  3.08    2.90
              0.167    2.50 | 1.167   12.66 | 2.167    5.09 |  3.17    2.90
              0.250    2.81 | 1.250   82.92 | 2.250    4.47 |  3.25    2.72
              0.333    2.81 | 1.333   82.92 | 2.333    4.47 |  3.33    2.72
              0.417    3.22 | 1.417   15.65 | 2.417    4.01 |  3.42    2.57
              0.500    3.22 | 1.500   15.65 | 2.500    4.01 |  3.50    2.57
              0.583    3.82 | 1.583    9.68 | 2.583    3.64 |  3.58    2.44
              0.667    3.82 | 1.667    9.68 | 2.667    3.64 |  3.67    2.44
              0.750    4.78 | 1.750    7.30 | 2.750    3.35 |  3.75    2.32
              0.833    4.78 | 1.833    7.30 | 2.833    3.35 |  3.83    2.32
              0.917    6.62 | 1.917    5.96 | 2.917    3.11 |  3.92    2.22
              1.000    6.62 | 2.000    5.96 | 3.000    3.11 |  4.00    2.22

     Unit Hyd Qpeak  (cms)=   4.374

     PEAK FLOW       (cms)=   0.480 (i)
     TIME TO PEAK    (hrs)=   4.250
     RUNOFF VOLUME    (mm)=   3.395
     TOTAL RAINFALL   (mm)=  32.794
     RUNOFF COEFFICIENT   =   0.104

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

--------------------------------------------------------------------------------
--------------------
| CALIB             |
| STANDHYD (  0007)|   Area    (ha)= 264.40
|ID= 1 DT= 5.0 min |   Total Imp(%)=  51.10   Dir. Conn.(%)=  41.40
--------------------

                          IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     135.11       129.29
     Dep. Storage     (mm)=       2.00         5.90
     Average Slope     (%)=       0.50         2.00
     Length            (m)=    1327.65        20.00
     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    2.50 | 1.083   12.66 | 2.083    5.09 |  3.08    2.90
              0.167    2.50 | 1.167   12.66 | 2.167    5.09 |  3.17    2.90
              0.250    2.81 | 1.250   82.92 | 2.250    4.47 |  3.25    2.72
              0.333    2.81 | 1.333   82.92 | 2.333    4.47 |  3.33    2.72
              0.417    3.22 | 1.417   15.65 | 2.417    4.01 |  3.42    2.57
              0.500    3.22 | 1.500   15.65 | 2.500    4.01 |  3.50    2.57
              0.583    3.82 | 1.583    9.68 | 2.583    3.64 |  3.58    2.44
              0.667    3.82 | 1.667    9.68 | 2.667    3.64 |  3.67    2.44
              0.750    4.78 | 1.750    7.30 | 2.750    3.35 |  3.75    2.32
              0.833    4.78 | 1.833    7.30 | 2.833    3.35 |  3.83    2.32
              0.917    6.62 | 1.917    5.96 | 2.917    3.11 |  3.92    2.22
```

1.000	6.62	2.000	5.96	3.000	3.11	4.00	2.22

Max.Eff.Inten.(mm/hr)=	49.29	8.01	
over (min)	20.00	35.00	
Storage Coeff. (min)=	19.70 (ii)	32.48 (ii)	
Unit Hyd. Tpeak (min)=	20.00	35.00	
Unit Hyd. peak (cms)=	0.06	0.03	
			TOTALS
PEAK FLOW (cms)=	9.64	1.03	10.201 (iii)
TIME TO PEAK (hrs)=	1.58	1.83	1.58
RUNOFF VOLUME (mm)=	30.79	4.59	15.44
TOTAL RAINFALL (mm)=	32.79	32.79	32.79
RUNOFF COEFFICIENT =	0.94	0.14	0.47

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 60.0 Ia = Dep. 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 (0008)	Area (ha)= 199.48
ID= 1 DT= 5.0 min	Total Imp(%)= 54.60 Dir. Conn.(%)= 40.90

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	108.92	90.56
Dep. Storage	(mm)=	2.00	5.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	1153.20	20.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.50	1.083	12.66	2.083	5.09	3.08	2.90
0.167	2.50	1.167	12.66	2.167	5.09	3.17	2.90
0.250	2.81	1.250	82.92	2.250	4.47	3.25	2.72
0.333	2.81	1.333	82.92	2.333	4.47	3.33	2.72
0.417	3.22	1.417	15.65	2.417	4.01	3.42	2.57
0.500	3.22	1.500	15.65	2.500	4.01	3.50	2.57
0.583	3.82	1.583	9.68	2.583	3.64	3.58	2.44
0.667	3.82	1.667	9.68	2.667	3.64	3.67	2.44
0.750	4.78	1.750	7.30	2.750	3.35	3.75	2.32
0.833	4.78	1.833	7.30	2.833	3.35	3.83	2.32
0.917	6.62	1.917	5.96	2.917	3.11	3.92	2.22
1.000	6.62	2.000	5.96	3.000	3.11	4.00	2.22

Max.Eff.Inten.(mm/hr)=	49.29	16.62	
over (min)	20.00	30.00	
Storage Coeff. (min)=	18.10 (ii)	27.65 (ii)	
Unit Hyd. Tpeak (min)=	20.00	30.00	
Unit Hyd. peak (cms)=	0.06	0.04	
			TOTALS
PEAK FLOW (cms)=	7.48	1.29	8.353 (iii)
TIME TO PEAK (hrs)=	1.58	1.75	1.58
RUNOFF VOLUME (mm)=	30.79	6.41	16.39
TOTAL RAINFALL (mm)=	32.79	32.79	32.79
RUNOFF COEFFICIENT =	0.94	0.20	0.50

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 66.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0013)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0007):	264.40	10.201	1.58	15.44
+ ID2= 2 (0008):	199.48	8.353	1.58	16.39
ID = 3 (0013):	463.88	18.554	1.58	15.85

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0009)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         232.00        0.0500
                  15.83         231.70        0.0500
                  47.63         231.09        0.0500
                  57.14         230.76        0.0500
                  66.39         229.94        0.0500
                  69.72         229.37        0.0500
                 102.15         229.37        0.0500
                 106.00         229.60        0.0500
                 111.50         229.47        0.0500
                 143.51         229.14        0.0350      Main Channel
                 143.80         229.14        0.0350      Main Channel
                 153.45         229.10        0.0350      Main Channel
                 157.09         229.15        0.0350      Main Channel
                 188.81         230.05    0.0350 /0.0500  Main Channel
                 195.46         230.69        0.0500
                 203.04         231.10        0.0500
                 226.79         230.80        0.0500
                 246.87         230.34        0.0500
                 268.22         231.18        0.0500
                 298.24         232.00        0.0500

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        0.05   229.14    .488E+03       0.1          0.26     100.03
        0.20   229.29    .601E+04       2.9          0.74      34.93
        0.35   229.44    .199E+05      10.9          0.85      30.35
        0.50   229.60    .425E+05      30.1          1.10      23.56
        0.65   229.75    .676E+05      60.1          1.38      18.75
        0.80   229.90    .942E+05      99.6          1.64      15.77
        0.95   230.05    .122E+06     147.9          1.88      13.78
        1.10   230.20    .152E+06     209.6          2.15      12.05
        1.25   230.35    .182E+06     280.3          2.40      10.80
        1.40   230.50    .214E+06     359.8          2.62       9.90
        1.55   230.65    .249E+06     449.1          2.80       9.25
        1.70   230.80    .288E+06     547.2          2.96       8.77
        1.85   230.95    .331E+06     651.9          3.06       8.46
        2.00   231.10    .380E+06     768.9          3.15       8.23
        2.15   231.25    .432E+06     894.7          3.22       8.05
        2.30   231.40    .488E+06    1034.8          3.30       7.86
        2.45   231.55    .547E+06    1189.4          3.38       7.66
        2.60   231.70    .609E+06    1358.9          3.47       7.47
        2.75   231.85    .674E+06    1543.0          3.56       7.28

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0013)  463.88    18.55    1.58  15.85      0.41      0.94
   OUTFLOW: ID= 1 (  0009)  463.88    11.02    1.92  15.84      0.35      0.85



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

--------------------
| ADD HYD  (  0005)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0004):   221.02   0.480     4.25     3.40
      + ID2= 2 (  0009):   463.88  11.021     1.92    15.84
        ==========================================
        ID = 3 (  0005):   684.90  11.122     1.92    11.83

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

--------------------
| ADD HYD  (  0015)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0014):   149.59   2.290     1.50     7.53
      + ID2= 2 (  0005):   684.90  11.122     1.92    11.83
        ==========================================
        ID = 3 (  0015):   834.49  12.425     1.92    11.06

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

```
--------------------
| ROUTE CHN(  0006)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                  0.00         228.00        0.0500
                212.52         225.39        0.0350      Main Channel
                213.15         225.38        0.0350      Main Channel
                213.73         225.38        0.0350      Main Channel
                214.27         225.38        0.0350      Main Channel
                214.91         225.37        0.0350      Main Channel
                226.52         222.62        0.0350      Main Channel
                226.60         222.60        0.0350      Main Channel
                226.65         222.60        0.0350      Main Channel
                229.30         222.50        0.0350      Main Channel
                233.70         222.33        0.0350      Main Channel
                236.82         222.33        0.0350      Main Channel
                247.01         222.75        0.0350      Main Channel
                247.81         223.00        0.0350      Main Channel
                257.03         225.86        0.0500
                257.30         225.87        0.0500
                257.55         225.87        0.0500
                257.81         225.88        0.0500
                367.45         228.00        0.0500

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.28   222.61    .312E+04        1.8          0.63      29.35
       0.56   222.89    .939E+04        9.3          1.10      16.83
       0.83   223.17    .165E+05       22.5          1.51      12.27
       1.11   223.44    .243E+05       40.4          1.85      10.04
       1.39   223.72    .328E+05       63.0          2.14       8.67
       1.67   224.00    .418E+05       90.2          2.40       7.73
       1.95   224.28    .516E+05      122.1          2.64       7.04
       2.23   224.56    .619E+05      158.8          2.86       6.50
       2.50   224.83    .729E+05      200.5          3.06       6.06
       2.78   225.11    .846E+05      247.2          3.25       5.70
       3.06   225.39    .969E+05      288.7          3.32       5.59
       3.39   225.72    .118E+06      367.2          3.48       5.33
       3.71   226.04    .149E+06      465.5          3.48       5.34
       4.04   226.37    .196E+06      591.4          3.36       5.52
       4.36   226.70    .258E+06      749.5          3.23       5.74
       4.69   227.02    .337E+06      946.2          3.13       5.93
       5.02   227.35    .431E+06     1187.1          3.07       6.05
       5.34   227.67    .540E+06     1477.5          3.04       6.10
       5.67   228.00    .666E+06     1822.2          3.05       6.09

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0015)  834.49    12.43    1.92  11.06      0.62      1.18
   OUTFLOW: ID= 1 (  0006)  834.49    11.37    2.17  11.06      0.60      1.15



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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0001):   161.19   0.489     4.33     4.86
     + ID2= 2 (  0006):   834.49  11.368     2.17    11.06
       ==========================================================
       ID = 3 (  0003):   995.68  11.531     2.17    10.05

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2008)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2021 Smart City Water Inc
```

All rights reserved.

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\12cea2ba-03
Summary filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\12cea2ba-03

DATE: 02-27-2023 TIME: 10:10:58

USER:

COMMENTS: _____

** SIMULATION : A - 50yr 4hr 10min Chicago **

| CHICAGO STORM |
| Ptotal= 66.87 mm |

IDF curve parameters: A= 874.655
B= 0.000
C= 0.722
used in: INTENSITY = A / (t + B)^C

Duration of storm = 4.00 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
0.00	5.21	1.00	25.99	2.00	10.54	3.00	6.03
0.17	5.84	1.17	165.90	2.17	9.27	3.17	5.67
0.33	6.70	1.33	32.09	2.33	8.31	3.33	5.36
0.50	7.93	1.50	19.92	2.50	7.56	3.50	5.08
0.67	9.89	1.67	15.06	2.67	6.96	3.67	4.83
0.83	13.68	1.83	12.32	2.83	6.46	3.83	4.62

| CALIB |
| NASHYD (0001)|
|ID= 1 DT= 5.0 min |

Area (ha)= 161.19 Curve Number (CN)= 71.2
Ia (mm)= 7.90 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 2.01

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	5.21	1.083	25.99	2.083	10.54	3.08	6.03
0.167	5.21	1.167	25.99	2.167	10.54	3.17	6.03
0.250	5.84	1.250	165.90	2.250	9.27	3.25	5.67
0.333	5.84	1.333	165.90	2.333	9.27	3.33	5.67
0.417	6.70	1.417	32.09	2.417	8.31	3.42	5.36
0.500	6.70	1.500	32.09	2.500	8.31	3.50	5.36
0.583	7.93	1.583	19.92	2.583	7.56	3.58	5.08
0.667	7.93	1.667	19.92	2.667	7.56	3.67	5.08
0.750	9.89	1.750	15.06	2.750	6.96	3.75	4.83
0.833	9.89	1.833	15.06	2.833	6.96	3.83	4.83
0.917	13.68	1.917	12.32	2.917	6.46	3.92	4.62
1.000	13.68	2.000	12.32	3.000	6.46	4.00	4.62

Unit Hyd Qpeak (cms)= 3.063

PEAK FLOW (cms)= 2.172 (i)
TIME TO PEAK (hrs)= 4.083
RUNOFF VOLUME (mm)= 21.504
TOTAL RAINFALL (mm)= 66.870
RUNOFF COEFFICIENT = 0.322

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

| CALIB |

| STANDHYD (0014)| Area (ha)= 149.59
|ID= 1 DT= 5.0 min | Total Imp(%)= 21.50 Dir. Conn.(%)= 13.60

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	32.16	117.43
Dep. Storage	(mm)=	1.00	8.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	998.63	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.21	1.083	25.99	2.083	10.54	3.08	6.03
0.167	5.21	1.167	25.99	2.167	10.54	3.17	6.03
0.250	5.84	1.250	165.90	2.250	9.27	3.25	5.67
0.333	5.84	1.333	165.90	2.333	9.27	3.33	5.67
0.417	6.70	1.417	32.09	2.417	8.31	3.42	5.36
0.500	6.70	1.500	32.09	2.500	8.31	3.50	5.36
0.583	7.93	1.583	19.92	2.583	7.56	3.58	5.08
0.667	7.93	1.667	19.92	2.667	7.56	3.67	5.08
0.750	9.89	1.750	15.06	2.750	6.96	3.75	4.83
0.833	9.89	1.833	15.06	2.833	6.96	3.83	4.83
0.917	13.68	1.917	12.32	2.917	6.46	3.92	4.62
1.000	13.68	2.000	12.32	3.000	6.46	4.00	4.62

Max.Eff.Inten.(mm/hr)=		165.90	29.43	
over (min)		10.00	25.00	
Storage Coeff. (min)=		10.22 (ii)	21.73 (ii)	
Unit Hyd. Tpeak (min)=		10.00	25.00	
Unit Hyd. peak (cms)=		0.11	0.05	
				TOTALS
PEAK FLOW	(cms)=	5.57	4.49	7.470 (iii)
TIME TO PEAK	(hrs)=	1.42	1.67	1.42
RUNOFF VOLUME	(mm)=	65.87	17.06	23.70
TOTAL RAINFALL	(mm)=	66.87	66.87	66.87
RUNOFF COEFFICIENT	=	0.99	0.26	0.35

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 61.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB	
NASHYD (0004)|	Area (ha)= 221.02 Curve Number (CN)= 61.5
ID= 1 DT= 5.0 min	Ia (mm)= 7.80 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 1.93

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.21	1.083	25.99	2.083	10.54	3.08	6.03
0.167	5.21	1.167	25.99	2.167	10.54	3.17	6.03
0.250	5.84	1.250	165.90	2.250	9.27	3.25	5.67
0.333	5.84	1.333	165.90	2.333	9.27	3.33	5.67
0.417	6.70	1.417	32.09	2.417	8.31	3.42	5.36
0.500	6.70	1.500	32.09	2.500	8.31	3.50	5.36
0.583	7.93	1.583	19.92	2.583	7.56	3.58	5.08
0.667	7.93	1.667	19.92	2.667	7.56	3.67	5.08
0.750	9.89	1.750	15.06	2.750	6.96	3.75	4.83
0.833	9.89	1.833	15.06	2.833	6.96	3.83	4.83
0.917	13.68	1.917	12.32	2.917	6.46	3.92	4.62
1.000	13.68	2.000	12.32	3.000	6.46	4.00	4.62

Unit Hyd Qpeak (cms)=		4.374
PEAK FLOW	(cms)=	2.269 (i)
TIME TO PEAK	(hrs)=	4.083
RUNOFF VOLUME	(mm)=	16.000
TOTAL RAINFALL	(mm)=	66.870
RUNOFF COEFFICIENT	=	0.239

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

CALIB		
STANDHYD (0007)	Area (ha)= 264.40	
ID= 1 DT= 5.0 min	Total Imp(%)= 51.10	Dir. Conn.(%)= 41.40

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	135.11	129.29
Dep. Storage	(mm)=	2.00	5.90
Average Slope	(%)=	0.50	2.00
Length	(m)=	1327.65	20.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.21	1.083	25.99	2.083	10.54	3.08	6.03
0.167	5.21	1.167	25.99	2.167	10.54	3.17	6.03
0.250	5.84	1.250	165.90	2.250	9.27	3.25	5.67
0.333	5.84	1.333	165.90	2.333	9.27	3.33	5.67
0.417	6.70	1.417	32.09	2.417	8.31	3.42	5.36
0.500	6.70	1.500	32.09	2.500	8.31	3.50	5.36
0.583	7.93	1.583	19.92	2.583	7.56	3.58	5.08
0.667	7.93	1.667	19.92	2.667	7.56	3.67	5.08
0.750	9.89	1.750	15.06	2.750	6.96	3.75	4.83
0.833	9.89	1.833	15.06	2.833	6.96	3.83	4.83
0.917	13.68	1.917	12.32	2.917	6.46	3.92	4.62
1.000	13.68	2.000	12.32	3.000	6.46	4.00	4.62

Max.Eff.Inten.(mm/hr)=	121.29	********		
over (min)	15.00	20.00		
Storage Coeff. (min)=	13.74 (ii)	17.80 (ii)		
Unit Hyd. Tpeak (min)=	15.00	20.00		
Unit Hyd. peak (cms)=	0.08	0.06		
			TOTALS	
PEAK FLOW (cms)=	24.37	7.09	30.467 (iii)	
TIME TO PEAK (hrs)=	1.50	1.58	1.50	
RUNOFF VOLUME (mm)=	64.87	18.88	37.92	
TOTAL RAINFALL (mm)=	66.87	66.87	66.87	
RUNOFF COEFFICIENT =	0.97	0.28	0.57	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 60.0 Ia = Dep. 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 (0008)	Area (ha)= 199.48	
ID= 1 DT= 5.0 min	Total Imp(%)= 54.60	Dir. Conn.(%)= 40.90

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	108.92	90.56
Dep. Storage	(mm)=	2.00	5.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	1153.20	20.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	5.21	1.083	25.99	2.083	10.54	3.08	6.03
0.167	5.21	1.167	25.99	2.167	10.54	3.17	6.03
0.250	5.84	1.250	165.90	2.250	9.27	3.25	5.67
0.333	5.84	1.333	165.90	2.333	9.27	3.33	5.67
0.417	6.70	1.417	32.09	2.417	8.31	3.42	5.36
0.500	6.70	1.500	32.09	2.500	8.31	3.50	5.36
0.583	7.93	1.583	19.92	2.583	7.56	3.58	5.08
0.667	7.93	1.667	19.92	2.667	7.56	3.67	5.08
0.750	9.89	1.750	15.06	2.750	6.96	3.75	4.83
0.833	9.89	1.833	15.06	2.833	6.96	3.83	4.83
0.917	13.68	1.917	12.32	2.917	6.46	3.92	4.62
1.000	13.68	2.000	12.32	3.000	6.46	4.00	4.62

```
     Max.Eff.Inten.(mm/hr)=     121.29     ********
                 over (min)      15.00       20.00
     Storage Coeff.  (min)=      12.63 (ii)   16.59 (ii)
     Unit Hyd. Tpeak (min)=      15.00       20.00
     Unit Hyd. peak  (cms)=       0.08        0.06
                                                        *TOTALS*
     PEAK FLOW       (cms)=      18.78        7.44        25.310 (iii)
     TIME TO PEAK    (hrs)=       1.50        1.58          1.50
     RUNOFF VOLUME    (mm)=      64.87       24.20         40.83
     TOTAL RAINFALL   (mm)=      66.87       66.87         66.87
     RUNOFF COEFFICIENT   =       0.97        0.36          0.61


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  66.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0013)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0007):   264.40  30.467     1.50    37.92
      + ID2= 2 (  0008):   199.48  25.310     1.50    40.83
        ================================================
        ID = 3 (  0013):   463.88  55.777     1.50    39.17

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0009)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         232.00        0.0500
                  15.83         231.70        0.0500
                  47.63         231.09        0.0500
                  57.14         230.76        0.0500
                  66.39         229.94        0.0500
                  69.72         229.37        0.0500
                 102.15         229.37        0.0500
                 106.00         229.60        0.0500
                 111.50         229.47        0.0500
                 143.51         229.14        0.0350      Main Channel
                 143.80         229.14        0.0350      Main Channel
                 153.45         229.10        0.0350      Main Channel
                 157.09         229.15        0.0350      Main Channel
                 188.81         230.05    0.0350 /0.0500  Main Channel
                 195.46         230.69        0.0500
                 203.04         231.10        0.0500
                 226.79         230.80        0.0500
                 246.87         230.34        0.0500
                 268.22         231.18        0.0500
                 298.24         232.00        0.0500

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)       (cms)         (m/s)      (min)
       0.05   229.14    .488E+03        0.1          0.26      100.03
       0.20   229.29    .601E+04        2.9          0.74       34.93
       0.35   229.44    .199E+05       10.9          0.85       30.35
       0.50   229.60    .425E+05       30.1          1.10       23.56
       0.65   229.75    .676E+05       60.1          1.38       18.75
       0.80   229.90    .942E+05       99.6          1.64       15.77
       0.95   230.05    .122E+06      147.9          1.88       13.78
       1.10   230.20    .152E+06      209.6          2.15       12.05
       1.25   230.35    .182E+06      280.3          2.40       10.80
       1.40   230.50    .214E+06      359.8          2.62        9.90
       1.55   230.65    .249E+06      449.1          2.80        9.25
       1.70   230.80    .288E+06      547.2          2.96        8.77
       1.85   230.95    .331E+06      651.9          3.06        8.46
       2.00   231.10    .380E+06      768.9          3.15        8.23
       2.15   231.25    .432E+06      894.7          3.22        8.05
       2.30   231.40    .488E+06     1034.8          3.30        7.86
       2.45   231.55    .547E+06     1189.4          3.38        7.66
       2.60   231.70    .609E+06     1358.9          3.47        7.47
       2.75   231.85    .674E+06     1543.0          3.56        7.28

                                    <---- hydrograph ---->   <-pipe / channel->
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0013)	463.88	55.78	1.50	39.17	0.63	1.33
OUTFLOW: ID= 1 (0009)	463.88	34.03	1.67	39.17	0.52	1.13

ADD HYD (0005)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0004):	221.02	2.269	4.08	16.00
+ ID2= 2 (0009):	463.88	34.026	1.67	39.17
ID = 3 (0005):	684.90	34.364	1.75	31.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0015)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0014):	149.59	7.470	1.42	23.70
+ ID2= 2 (0005):	684.90	34.364	1.75	31.69
ID = 3 (0015):	834.49	41.136	1.67	30.26

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0006) | IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	228.00	0.0500	
212.52	225.39	0.0350	Main Channel
213.15	225.38	0.0350	Main Channel
213.73	225.38	0.0350	Main Channel
214.27	225.38	0.0350	Main Channel
214.91	225.37	0.0350	Main Channel
226.52	222.62	0.0350	Main Channel
226.60	222.60	0.0350	Main Channel
226.65	222.60	0.0350	Main Channel
229.30	222.50	0.0350	Main Channel
233.70	222.33	0.0350	Main Channel
236.82	222.33	0.0350	Main Channel
247.01	222.75	0.0350	Main Channel
247.81	223.00	0.0350	Main Channel
257.03	225.86	0.0500	
257.30	225.87	0.0500	
257.55	225.87	0.0500	
257.81	225.88	0.0500	
367.45	228.00	0.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.28	222.61	.312E+04	1.8	0.63	29.35
0.56	222.89	.939E+04	9.3	1.10	16.83
0.83	223.17	.165E+05	22.5	1.51	12.27
1.11	223.44	.243E+05	40.4	1.85	10.04
1.39	223.72	.328E+05	63.0	2.14	8.67
1.67	224.00	.418E+05	90.2	2.40	7.73
1.95	224.28	.516E+05	122.1	2.64	7.04
2.23	224.56	.619E+05	158.8	2.86	6.50
2.50	224.83	.729E+05	200.5	3.06	6.06
2.78	225.11	.846E+05	247.2	3.25	5.70
3.06	225.39	.969E+05	288.7	3.32	5.59
3.39	225.72	.118E+06	367.2	3.48	5.33
3.71	226.04	.149E+06	465.5	3.48	5.34
4.04	226.37	.196E+06	591.4	3.36	5.52
4.36	226.70	.258E+06	749.5	3.23	5.74
4.69	227.02	.337E+06	946.2	3.13	5.93
5.02	227.35	.431E+06	1187.1	3.07	6.05
5.34	227.67	.540E+06	1477.5	3.04	6.10
5.67	228.00	.666E+06	1822.2	3.05	6.09

	<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)

```
   INFLOW : ID= 2 (  0015)  834.49    41.14    1.67  30.26      1.12      1.86
   OUTFLOW: ID= 1 (  0006)  834.49    37.96    1.83  30.26      1.07      1.79



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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0001):   161.19   2.172     4.08    21.50
     + ID2= 2 (  0006):   834.49  37.958     1.83    30.26
       ================================================
       ID = 3 (  0003):   995.68  38.404     1.83    28.84

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2008)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2021 Smart City Water Inc
All rights reserved.


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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\55e43bfb-b8
  Summary filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\55e43bfb-b8


DATE: 02-27-2023                          TIME: 10:10:58

USER:


COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------------------------------------------------------
  ***********************************************
  ** SIMULATION : A - 5yr 4hr 10min Chicago     **
  ***********************************************

--------------------
| CHICAGO STORM    |    IDF curve parameters: A= 581.877
| Ptotal= 43.76 mm |                          B=   0.000
--------------------                          C=   0.725
                       used in:   INTENSITY =  A / (t + B)^C

                       Duration of storm  =  4.00 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
               0.00    3.38 |  1.00   16.95 |  2.00    6.85 |  3.00    3.91
               0.17    3.79 |  1.17  109.61 |  2.17    6.02 |  3.17    3.67
               0.33    4.34 |  1.33   20.94 |  2.33    5.39 |  3.33    3.47
               0.50    5.15 |  1.50   12.97 |  2.50    4.91 |  3.50    3.29
               0.67    6.43 |  1.67    9.79 |  2.67    4.51 |  3.67    3.13
               0.83    8.89 |  1.83    8.01 |  2.83    4.18 |  3.83    2.99


--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)= 161.19   Curve Number   (CN)= 71.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.90   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   2.01
```

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	3.38	1.083	16.95	2.083	6.85	3.08	3.91
0.167	3.38	1.167	16.95	2.167	6.85	3.17	3.91
0.250	3.79	1.250	109.61	2.250	6.02	3.25	3.67
0.333	3.79	1.333	109.61	2.333	6.02	3.33	3.67
0.417	4.34	1.417	20.94	2.417	5.39	3.42	3.47
0.500	4.34	1.500	20.94	2.500	5.39	3.50	3.47
0.583	5.15	1.583	12.97	2.583	4.91	3.58	3.29
0.667	5.15	1.667	12.97	2.667	4.91	3.67	3.29
0.750	6.43	1.750	9.79	2.750	4.51	3.75	3.13
0.833	6.43	1.833	9.79	2.833	4.51	3.83	3.13
0.917	8.89	1.917	8.01	2.917	4.18	3.92	2.99
1.000	8.89	2.000	8.01	3.000	4.18	4.00	2.99

Unit Hyd Qpeak (cms)= 3.063

PEAK FLOW (cms)= 0.934 (i)
TIME TO PEAK (hrs)= 4.250
RUNOFF VOLUME (mm)= 9.278
TOTAL RAINFALL (mm)= 43.761
RUNOFF COEFFICIENT = 0.212

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

CALIB STANDHYD (0014) ID= 1 DT= 5.0 min	Area (ha)= 149.59 Total Imp(%)= 21.50 Dir. Conn.(%)= 13.60

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	32.16	117.43
Dep. Storage	(mm)=	1.00	8.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	998.63	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.38	1.083	16.95	2.083	6.85	3.08	3.91
0.167	3.38	1.167	16.95	2.167	6.85	3.17	3.91
0.250	3.79	1.250	109.61	2.250	6.02	3.25	3.67
0.333	3.79	1.333	109.61	2.333	6.02	3.33	3.67
0.417	4.34	1.417	20.94	2.417	5.39	3.42	3.47
0.500	4.34	1.500	20.94	2.500	5.39	3.50	3.47
0.583	5.15	1.583	12.97	2.583	4.91	3.58	3.29
0.667	5.15	1.667	12.97	2.667	4.91	3.67	3.29
0.750	6.43	1.750	9.79	2.750	4.51	3.75	3.13
0.833	6.43	1.833	9.79	2.833	4.51	3.83	3.13
0.917	8.89	1.917	8.01	2.917	4.18	3.92	2.99
1.000	8.89	2.000	8.01	3.000	4.18	4.00	2.99

Max.Eff.Inten.(mm/hr)=		80.05	9.79	
over (min)		15.00	35.00	
Storage Coeff. (min)=		13.68 (ii)	31.56 (ii)	
Unit Hyd. Tpeak (min)=		15.00	35.00	
Unit Hyd. peak (cms)=		0.08	0.03	
				TOTALS
PEAK FLOW	(cms)=	2.99	1.35	3.511 (iii)
TIME TO PEAK	(hrs)=	1.50	1.83	1.50
RUNOFF VOLUME	(mm)=	42.76	7.17	12.01
TOTAL RAINFALL	(mm)=	43.76	43.76	43.76
RUNOFF COEFFICIENT	=	0.98	0.16	0.27

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 61.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB				
NASHYD (0004)	Area (ha)= 221.02	Curve Number (CN)= 61.5		
ID= 1 DT= 5.0 min	Ia (mm)= 7.80	# of Linear Res.(N)= 3.00		
	U.H. Tp(hrs)= 1.93			

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.38	1.083	16.95	2.083	6.85	3.08	3.91
0.167	3.38	1.167	16.95	2.167	6.85	3.17	3.91
0.250	3.79	1.250	109.61	2.250	6.02	3.25	3.67
0.333	3.79	1.333	109.61	2.333	6.02	3.33	3.67
0.417	4.34	1.417	20.94	2.417	5.39	3.42	3.47
0.500	4.34	1.500	20.94	2.500	5.39	3.50	3.47
0.583	5.15	1.583	12.97	2.583	4.91	3.58	3.29
0.667	5.15	1.667	12.97	2.667	4.91	3.67	3.29
0.750	6.43	1.750	9.79	2.750	4.51	3.75	3.13
0.833	6.43	1.833	9.79	2.833	4.51	3.83	3.13
0.917	8.89	1.917	8.01	2.917	4.18	3.92	2.99
1.000	8.89	2.000	8.01	3.000	4.18	4.00	2.99

Unit Hyd Qpeak (cms)= 4.374

PEAK FLOW (cms)= 0.938 (i)
TIME TO PEAK (hrs)= 4.167
RUNOFF VOLUME (mm)= 6.633
TOTAL RAINFALL (mm)= 43.761
RUNOFF COEFFICIENT = 0.152

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

CALIB			
STANDHYD (0007)	Area (ha)= 264.40		
ID= 1 DT= 5.0 min	Total Imp(%)= 51.10	Dir. Conn.(%)= 41.40	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	135.11	129.29
Dep. Storage	(mm)=	2.00	5.90
Average Slope	(%)=	0.50	2.00
Length	(m)=	1327.65	20.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.38	1.083	16.95	2.083	6.85	3.08	3.91
0.167	3.38	1.167	16.95	2.167	6.85	3.17	3.91
0.250	3.79	1.250	109.61	2.250	6.02	3.25	3.67
0.333	3.79	1.333	109.61	2.333	6.02	3.33	3.67
0.417	4.34	1.417	20.94	2.417	5.39	3.42	3.47
0.500	4.34	1.500	20.94	2.500	5.39	3.50	3.47
0.583	5.15	1.583	12.97	2.583	4.91	3.58	3.29
0.667	5.15	1.667	12.97	2.667	4.91	3.67	3.29
0.750	6.43	1.750	9.79	2.750	4.51	3.75	3.13
0.833	6.43	1.833	9.79	2.833	4.51	3.83	3.13
0.917	8.89	1.917	8.01	2.917	4.18	3.92	2.99
1.000	8.89	2.000	8.01	3.000	4.18	4.00	2.99

Max.Eff.Inten.(mm/hr)=	65.27	********		
over (min)	20.00	25.00		
Storage Coeff. (min)=	17.60 (ii)	22.40 (ii)		
Unit Hyd. Tpeak (min)=	20.00	25.00		
Unit Hyd. peak (cms)=	0.06	0.05		
			TOTALS	
PEAK FLOW (cms)=	13.51	2.55	15.696 (iii)	
TIME TO PEAK (hrs)=	1.58	1.67	1.58	
RUNOFF VOLUME (mm)=	41.76	8.37	22.20	
TOTAL RAINFALL (mm)=	43.76	43.76	43.76	
RUNOFF COEFFICIENT =	0.95	0.19	0.51	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 60.0 Ia = Dep. 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 (  0008)|   Area    (ha)= 199.48
|ID= 1 DT= 5.0 min |   Total Imp(%)=  54.60   Dir. Conn.(%)=  40.90
--------------------
                            IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=     108.92         90.56
     Dep. Storage     (mm)=       2.00          5.20
     Average Slope     (%)=       0.50          2.00
     Length            (m)=    1153.20         20.00
     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    3.38 | 1.083   16.95 | 2.083    6.85 |  3.08    3.91
               0.167    3.38 | 1.167   16.95 | 2.167    6.85 |  3.17    3.91
               0.250    3.79 | 1.250  109.61 | 2.250    6.02 |  3.25    3.67
               0.333    3.79 | 1.333  109.61 | 2.333    6.02 |  3.33    3.67
               0.417    4.34 | 1.417   20.94 | 2.417    5.39 |  3.42    3.47
               0.500    4.34 | 1.500   20.94 | 2.500    5.39 |  3.50    3.47
               0.583    5.15 | 1.583   12.97 | 2.583    4.91 |  3.58    3.29
               0.667    5.15 | 1.667   12.97 | 2.667    4.91 |  3.67    3.29
               0.750    6.43 | 1.750    9.79 | 2.750    4.51 |  3.75    3.13
               0.833    6.43 | 1.833    9.79 | 2.833    4.51 |  3.83    3.13
               0.917    8.89 | 1.917    8.01 | 2.917    4.18 |  3.92    2.99
               1.000    8.89 | 2.000    8.01 | 3.000    4.18 |  4.00    2.99

     Max.Eff.Inten.(mm/hr)=      80.05     ********
               over (min)        15.00        20.00
     Storage Coeff.  (min)=      14.91 (ii)   19.59 (ii)
     Unit Hyd. Tpeak (min)=      15.00        20.00
     Unit Hyd. peak  (cms)=       0.08         0.06
                                                          *TOTALS*
     PEAK FLOW       (cms)=      11.55         3.02        14.101 (iii)
     TIME TO PEAK    (hrs)=       1.50         1.58          1.50
     RUNOFF VOLUME    (mm)=      41.76        11.27         23.74
     TOTAL RAINFALL   (mm)=      43.76        43.76         43.76
     RUNOFF COEFFICIENT   =       0.95         0.26          0.54


       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN*  =  66.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--------------------
| ADD HYD  (  0013)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0007):   264.40  15.696     1.58    22.20
      + ID2= 2 (  0008):   199.48  14.101     1.50    23.74
        ==========================================================
        ID = 3 (  0013):   463.88  28.896     1.50    22.86

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0009)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         232.00        0.0500
                  15.83         231.70        0.0500
                  47.63         231.09        0.0500
                  57.14         230.76        0.0500
                  66.39         229.94        0.0500
                  69.72         229.37        0.0500
                 102.15         229.37        0.0500
                 106.00         229.60        0.0500
                 111.50         229.47        0.0500
                 143.51         229.14        0.0350      Main Channel
                 143.80         229.14        0.0350      Main Channel
                 153.45         229.10        0.0350      Main Channel
                 157.09         229.15        0.0350      Main Channel
```

```
                188.81        230.05    0.0350 /0.0500  Main Channel
                195.46        230.69        0.0500
                203.04        231.10        0.0500
                226.79        230.80        0.0500
                246.87        230.34        0.0500
                268.22        231.18        0.0500
                298.24        232.00        0.0500

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.05   229.14    .488E+03       0.1          0.26      100.03
       0.20   229.29    .601E+04       2.9          0.74       34.93
       0.35   229.44    .199E+05      10.9          0.85       30.35
       0.50   229.60    .425E+05      30.1          1.10       23.56
       0.65   229.75    .676E+05      60.1          1.38       18.75
       0.80   229.90    .942E+05      99.6          1.64       15.77
       0.95   230.05    .122E+06     147.9          1.88       13.78
       1.10   230.20    .152E+06     209.6          2.15       12.05
       1.25   230.35    .182E+06     280.3          2.40       10.80
       1.40   230.50    .214E+06     359.8          2.62        9.90
       1.55   230.65    .249E+06     449.1          2.80        9.25
       1.70   230.80    .288E+06     547.2          2.96        8.77
       1.85   230.95    .331E+06     651.9          3.06        8.46
       2.00   231.10    .380E+06     768.9          3.15        8.23
       2.15   231.25    .432E+06     894.7          3.22        8.05
       2.30   231.40    .488E+06    1034.8          3.30        7.86
       2.45   231.55    .547E+06    1189.4          3.38        7.66
       2.60   231.70    .609E+06    1358.9          3.47        7.47
       2.75   231.85    .674E+06    1543.0          3.56        7.28

                                   <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0013)  463.88    28.90    1.50  22.86      0.49      1.08
   OUTFLOW: ID= 1 (  0009)  463.88    17.23    1.83  22.86      0.40      0.92



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

--------------------
| ADD HYD  (  0005)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0004):   221.02   0.938     4.17     6.63
     + ID2= 2 (  0009):   463.88  17.234     1.83    22.86
       ================================================
       ID = 3 (  0005):   684.90  17.411     1.83    17.62

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

--------------------
| ADD HYD  (  0015)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0014):   149.59   3.511     1.50    12.01
     + ID2= 2 (  0005):   684.90  17.411     1.83    17.62
       ================================================
       ID = 3 (  0015):   834.49  20.035     1.83    16.62

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0006)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
              <------ DATA FOR SECTION (   1.1) ------>
              Distance      Elevation       Manning
                  0.00        228.00        0.0500
                212.52        225.39        0.0350      Main Channel
                213.15        225.38        0.0350      Main Channel
                213.73        225.38        0.0350      Main Channel
                214.27        225.38        0.0350      Main Channel
                214.91        225.37        0.0350      Main Channel
                226.52        222.62        0.0350      Main Channel
                226.60        222.60        0.0350      Main Channel
                226.65        222.60        0.0350      Main Channel
                229.30        222.50        0.0350      Main Channel
                233.70        222.33        0.0350      Main Channel
                236.82        222.33        0.0350      Main Channel
                247.01        222.75        0.0350      Main Channel
                247.81        223.00        0.0350      Main Channel
```

```
                257.03        225.86        0.0500
                257.30        225.87        0.0500
                257.55        225.87        0.0500
                257.81        225.88        0.0500
                367.45        228.00        0.0500

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        0.28   222.61    .312E+04       1.8          0.63      29.35
        0.56   222.89    .939E+04       9.3          1.10      16.83
        0.83   223.17    .165E+05      22.5          1.51      12.27
        1.11   223.44    .243E+05      40.4          1.85      10.04
        1.39   223.72    .328E+05      63.0          2.14       8.67
        1.67   224.00    .418E+05      90.2          2.40       7.73
        1.95   224.28    .516E+05     122.1          2.64       7.04
        2.23   224.56    .619E+05     158.8          2.86       6.50
        2.50   224.83    .729E+05     200.5          3.06       6.06
        2.78   225.11    .846E+05     247.2          3.25       5.70
        3.06   225.39    .969E+05     288.7          3.32       5.59
        3.39   225.72    .118E+06     367.2          3.48       5.33
        3.71   226.04    .149E+06     465.5          3.48       5.34
        4.04   226.37    .196E+06     591.4          3.36       5.52
        4.36   226.70    .258E+06     749.5          3.23       5.74
        4.69   227.02    .337E+06     946.2          3.13       5.93
        5.02   227.35    .431E+06    1187.1          3.07       6.05
        5.34   227.67    .540E+06    1477.5          3.04       6.10
        5.67   228.00    .666E+06    1822.2          3.05       6.09

                                    <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                               (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0015)  834.49    20.03    1.83  16.62      0.78      1.42
   OUTFLOW: ID= 1 (  0006)  834.49    18.40    2.00  16.62      0.75      1.36



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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):   161.19   0.934     4.25     9.28
      + ID2= 2 (  0006):   834.49  18.399     2.00    16.62
        ================================================
        ID = 3 (  0003):   995.68  18.651     2.00    15.43

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2008)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2021 Smart City Water Inc
All rights reserved.


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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\5a6d55fb-8d
  Summary filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\5a6d55fb-8d


DATE: 02-27-2023                          TIME: 10:10:59

USER:


COMMENTS: _____________________________________________________________
```

```
**********************************************
** SIMULATION : B - 100yr 24hr 15min SCS      **
**********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\jchowen\AppD
|                  |              ata\Local\Temp\
|                  |              50702b2f-89c2-43ff-9553-8a4048d6a62f\e6e94906
| Ptotal=120.97 mm |    Comments: 100yr 24hr 15min SCS
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	2.18	12.50	17.42	18.75	2.18
0.25	1.33	6.50	2.18	12.75	8.95	19.00	2.18
0.50	1.33	6.75	2.18	13.00	8.95	19.25	2.18
0.75	1.33	7.00	2.18	13.25	6.53	19.50	2.18
1.00	1.33	7.25	2.66	13.50	6.53	19.75	2.18
1.25	1.33	7.50	2.66	13.75	5.08	20.00	2.18
1.50	1.33	7.75	2.66	14.00	5.08	20.25	1.45
1.75	1.33	8.00	2.66	14.25	3.63	20.50	1.45
2.00	1.33	8.25	3.15	14.50	3.63	20.75	1.45
2.25	1.57	8.50	3.15	14.75	3.63	21.00	1.45
2.50	1.57	8.75	3.39	15.00	3.63	21.25	1.45
2.75	1.57	9.00	3.39	15.25	3.63	21.50	1.45
3.00	1.57	9.25	3.87	15.50	3.63	21.75	1.45
3.25	1.57	9.50	3.87	15.75	3.63	22.00	1.45
3.50	1.57	9.75	4.35	16.00	3.63	22.25	1.45
3.75	1.57	10.00	4.35	16.25	2.18	22.50	1.45
4.00	1.57	10.25	5.56	16.50	2.18	22.75	1.45
4.25	1.94	10.50	5.56	16.75	2.18	23.00	1.45
4.50	1.94	10.75	7.50	17.00	2.18	23.25	1.45
4.75	1.94	11.00	7.50	17.25	2.18	23.50	1.45
5.00	1.94	11.25	11.61	17.50	2.18	23.75	1.45
5.25	1.94	11.50	11.61	17.75	2.18	24.00	1.45
5.50	1.94	11.75	35.81	18.00	2.18		
5.75	1.94	12.00	148.07	18.25	2.18		
6.00	1.94	12.25	17.42	18.50	2.18		

```
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)= 161.19   Curve Number   (CN)= 71.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.90   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   2.01

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.94	12.250	148.07	18.33	2.18
0.167	0.00	6.250	1.94	12.333	17.44	18.42	2.18
0.250	0.00	6.333	2.18	12.417	17.42	18.50	2.18
0.333	1.33	6.417	2.18	12.500	17.42	18.58	2.18
0.417	1.33	6.500	2.18	12.583	17.42	18.67	2.18
0.500	1.33	6.583	2.18	12.667	17.42	18.75	2.18
0.583	1.33	6.667	2.18	12.750	17.42	18.83	2.18
0.667	1.33	6.750	2.18	12.833	8.95	18.92	2.18
0.750	1.33	6.833	2.18	12.917	8.95	19.00	2.18
0.833	1.33	6.917	2.18	13.000	8.95	19.08	2.18
0.917	1.33	7.000	2.18	13.083	8.95	19.17	2.18
1.000	1.33	7.083	2.18	13.167	8.95	19.25	2.18
1.083	1.33	7.167	2.18	13.250	8.95	19.33	2.18
1.167	1.33	7.250	2.18	13.333	6.53	19.42	2.18
1.250	1.33	7.333	2.66	13.417	6.53	19.50	2.18
1.333	1.33	7.417	2.66	13.500	6.53	19.58	2.18
1.417	1.33	7.500	2.66	13.583	6.53	19.67	2.18
1.500	1.33	7.583	2.66	13.667	6.53	19.75	2.18
1.583	1.33	7.667	2.66	13.750	6.53	19.83	2.18
1.667	1.33	7.750	2.66	13.833	5.08	19.92	2.18
1.750	1.33	7.833	2.66	13.917	5.08	20.00	2.18
1.833	1.33	7.917	2.66	14.000	5.08	20.08	2.18
1.917	1.33	8.000	2.66	14.083	5.08	20.17	2.18
2.000	1.33	8.083	2.66	14.167	5.08	20.25	2.18
2.083	1.33	8.167	2.66	14.250	5.08	20.33	1.45
2.167	1.33	8.250	2.66	14.333	3.63	20.42	1.45
2.250	1.33	8.333	3.15	14.417	3.63	20.50	1.45
2.333	1.57	8.417	3.15	14.500	3.63	20.58	1.45
2.417	1.57	8.500	3.15	14.583	3.63	20.67	1.45
2.500	1.57	8.583	3.15	14.667	3.63	20.75	1.45

2.583	1.57	8.667	3.15	14.750	3.63	20.83	1.45
2.667	1.57	8.750	3.15	14.833	3.63	20.92	1.45
2.750	1.57	8.833	3.39	14.917	3.63	21.00	1.45
2.833	1.57	8.917	3.39	15.000	3.63	21.08	1.45
2.917	1.57	9.000	3.39	15.083	3.63	21.17	1.45
3.000	1.57	9.083	3.39	15.167	3.63	21.25	1.45
3.083	1.57	9.167	3.39	15.250	3.63	21.33	1.45
3.167	1.57	9.250	3.39	15.333	3.63	21.42	1.45
3.250	1.57	9.333	3.87	15.417	3.63	21.50	1.45
3.333	1.57	9.417	3.87	15.500	3.63	21.58	1.45
3.417	1.57	9.500	3.87	15.583	3.63	21.67	1.45
3.500	1.57	9.583	3.87	15.667	3.63	21.75	1.45
3.583	1.57	9.667	3.87	15.750	3.63	21.83	1.45
3.667	1.57	9.750	3.87	15.833	3.63	21.92	1.45
3.750	1.57	9.833	4.35	15.917	3.63	22.00	1.45
3.833	1.57	9.917	4.35	16.000	3.63	22.08	1.45
3.917	1.57	10.000	4.35	16.083	3.63	22.17	1.45
4.000	1.57	10.083	4.35	16.167	3.63	22.25	1.45
4.083	1.57	10.167	4.35	16.250	3.63	22.33	1.45
4.167	1.57	10.250	4.35	16.333	2.18	22.42	1.45
4.250	1.57	10.333	5.56	16.417	2.18	22.50	1.45
4.333	1.94	10.417	5.56	16.500	2.18	22.58	1.45
4.417	1.94	10.500	5.56	16.583	2.18	22.67	1.45
4.500	1.94	10.583	5.56	16.667	2.18	22.75	1.45
4.583	1.94	10.667	5.56	16.750	2.18	22.83	1.45
4.667	1.94	10.750	5.56	16.833	2.18	22.92	1.45
4.750	1.94	10.833	7.50	16.917	2.18	23.00	1.45
4.833	1.94	10.917	7.50	17.000	2.18	23.08	1.45
4.917	1.94	11.000	7.50	17.083	2.18	23.17	1.45
5.000	1.94	11.083	7.50	17.167	2.18	23.25	1.45
5.083	1.94	11.167	7.50	17.250	2.18	23.33	1.45
5.167	1.94	11.250	7.50	17.333	2.18	23.42	1.45
5.250	1.94	11.333	11.61	17.417	2.18	23.50	1.45
5.333	1.94	11.417	11.61	17.500	2.18	23.58	1.45
5.417	1.94	11.500	11.61	17.583	2.18	23.67	1.45
5.500	1.94	11.583	11.61	17.667	2.18	23.75	1.45
5.583	1.94	11.667	11.61	17.750	2.18	23.83	1.45
5.667	1.94	11.750	11.61	17.833	2.18	23.92	1.45
5.750	1.94	11.833	35.80	17.917	2.18	24.00	1.45
5.833	1.94	11.917	35.81	18.000	2.18	24.08	1.45
5.917	1.94	12.000	35.81	18.083	2.18	24.17	1.45
6.000	1.94	12.083	148.05	18.167	2.18	24.25	1.45
6.083	1.94	12.167	148.07	18.250	2.18		

Unit Hyd Qpeak (cms)= 3.063

PEAK FLOW (cms)= 4.530 (i)
TIME TO PEAK (hrs)= 14.417
RUNOFF VOLUME (mm)= 59.241
TOTAL RAINFALL (mm)= 120.970
RUNOFF COEFFICIENT = 0.490

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

CALIB	
STANDHYD (0014)	Area (ha)= 149.59
ID= 1 DT= 5.0 min	Total Imp(%)= 21.50 Dir. Conn.(%)= 13.60

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	32.16	117.43
Dep. Storage	(mm)=	1.00	8.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	998.63	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.94	12.250	148.07	18.33	2.18
0.167	0.00	6.250	1.94	12.333	17.44	18.42	2.18
0.250	0.00	6.333	2.18	12.417	17.42	18.50	2.18
0.333	1.33	6.417	2.18	12.500	17.42	18.58	2.18
0.417	1.33	6.500	2.18	12.583	17.42	18.67	2.18
0.500	1.33	6.583	2.18	12.667	17.42	18.75	2.18
0.583	1.33	6.667	2.18	12.750	17.42	18.83	2.18
0.667	1.33	6.750	2.18	12.833	8.95	18.92	2.18
0.750	1.33	6.833	2.18	12.917	8.95	19.00	2.18
0.833	1.33	6.917	2.18	13.000	8.95	19.08	2.18
0.917	1.33	7.000	2.18	13.083	8.95	19.17	2.18

1.000	1.33	7.083	2.18	13.167	8.95	19.25	2.18
1.083	1.33	7.167	2.18	13.250	8.95	19.33	2.18
1.167	1.33	7.250	2.18	13.333	6.53	19.42	2.18
1.250	1.33	7.333	2.66	13.417	6.53	19.50	2.18
1.333	1.33	7.417	2.66	13.500	6.53	19.58	2.18
1.417	1.33	7.500	2.66	13.583	6.53	19.67	2.18
1.500	1.33	7.583	2.66	13.667	6.53	19.75	2.18
1.583	1.33	7.667	2.66	13.750	6.53	19.83	2.18
1.667	1.33	7.750	2.66	13.833	5.08	19.92	2.18
1.750	1.33	7.833	2.66	13.917	5.08	20.00	2.18
1.833	1.33	7.917	2.66	14.000	5.08	20.08	2.18
1.917	1.33	8.000	2.66	14.083	5.08	20.17	2.18
2.000	1.33	8.083	2.66	14.167	5.08	20.25	2.18
2.083	1.33	8.167	2.66	14.250	5.08	20.33	1.45
2.167	1.33	8.250	2.66	14.333	3.63	20.42	1.45
2.250	1.33	8.333	3.15	14.417	3.63	20.50	1.45
2.333	1.57	8.417	3.15	14.500	3.63	20.58	1.45
2.417	1.57	8.500	3.15	14.583	3.63	20.67	1.45
2.500	1.57	8.583	3.15	14.667	3.63	20.75	1.45
2.583	1.57	8.667	3.15	14.750	3.63	20.83	1.45
2.667	1.57	8.750	3.15	14.833	3.63	20.92	1.45
2.750	1.57	8.833	3.39	14.917	3.63	21.00	1.45
2.833	1.57	8.917	3.39	15.000	3.63	21.08	1.45
2.917	1.57	9.000	3.39	15.083	3.63	21.17	1.45
3.000	1.57	9.083	3.39	15.167	3.63	21.25	1.45
3.083	1.57	9.167	3.39	15.250	3.63	21.33	1.45
3.167	1.57	9.250	3.39	15.333	3.63	21.42	1.45
3.250	1.57	9.333	3.87	15.417	3.63	21.50	1.45
3.333	1.57	9.417	3.87	15.500	3.63	21.58	1.45
3.417	1.57	9.500	3.87	15.583	3.63	21.67	1.45
3.500	1.57	9.583	3.87	15.667	3.63	21.75	1.45
3.583	1.57	9.667	3.87	15.750	3.63	21.83	1.45
3.667	1.57	9.750	3.87	15.833	3.63	21.92	1.45
3.750	1.57	9.833	4.35	15.917	3.63	22.00	1.45
3.833	1.57	9.917	4.35	16.000	3.63	22.08	1.45
3.917	1.57	10.000	4.35	16.083	3.63	22.17	1.45
4.000	1.57	10.083	4.35	16.167	3.63	22.25	1.45
4.083	1.57	10.167	4.35	16.250	3.63	22.33	1.45
4.167	1.57	10.250	4.35	16.333	2.18	22.42	1.45
4.250	1.57	10.333	5.56	16.417	2.18	22.50	1.45
4.333	1.94	10.417	5.56	16.500	2.18	22.58	1.45
4.417	1.94	10.500	5.56	16.583	2.18	22.67	1.45
4.500	1.94	10.583	5.56	16.667	2.18	22.75	1.45
4.583	1.94	10.667	5.56	16.750	2.18	22.83	1.45
4.667	1.94	10.750	5.56	16.833	2.18	22.92	1.45
4.750	1.94	10.833	7.50	16.917	2.18	23.00	1.45
4.833	1.94	10.917	7.50	17.000	2.18	23.08	1.45
4.917	1.94	11.000	7.50	17.083	2.18	23.17	1.45
5.000	1.94	11.083	7.50	17.167	2.18	23.25	1.45
5.083	1.94	11.167	7.50	17.250	2.18	23.33	1.45
5.167	1.94	11.250	7.50	17.333	2.18	23.42	1.45
5.250	1.94	11.333	11.61	17.417	2.18	23.50	1.45
5.333	1.94	11.417	11.61	17.500	2.18	23.58	1.45
5.417	1.94	11.500	11.61	17.583	2.18	23.67	1.45
5.500	1.94	11.583	11.61	17.667	2.18	23.75	1.45
5.583	1.94	11.667	11.61	17.750	2.18	23.83	1.45
5.667	1.94	11.750	11.61	17.833	2.18	23.92	1.45
5.750	1.94	11.833	35.80	17.917	2.18	24.00	1.45
5.833	1.94	11.917	35.81	18.000	2.18	24.08	1.45
5.917	1.94	12.000	35.81	18.083	2.18	24.17	1.45
6.000	1.94	12.083	148.05	18.167	2.18	24.25	1.45
6.083	1.94	12.167	148.07	18.250	2.18		

Max.Eff.Inten.(mm/hr)=	148.07	80.64		
over (min)	10.00	20.00		
Storage Coeff. (min)=	10.69 (ii)	18.39 (ii)		
Unit Hyd. Tpeak (min)=	10.00	20.00		
Unit Hyd. peak (cms)=	0.11	0.06		
			TOTALS	
PEAK FLOW (cms)=	6.16	12.43	16.882 (iii)	
TIME TO PEAK (hrs)=	12.25	12.42	12.33	
RUNOFF VOLUME (mm)=	119.97	49.36	58.97	
TOTAL RAINFALL (mm)=	120.97	120.97	120.97	
RUNOFF COEFFICIENT =	0.99	0.41	0.49	

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 61.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
--------------------------------------------------------------------------------
--------------------
| CALIB             |
| NASHYD   (  0004)|   Area    (ha)= 221.02   Curve Number   (CN)= 61.5
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.80   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.93

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.94	12.250	148.07	18.33	2.18
0.167	0.00	6.250	1.94	12.333	17.44	18.42	2.18
0.250	0.00	6.333	2.18	12.417	17.42	18.50	2.18
0.333	1.33	6.417	2.18	12.500	17.42	18.58	2.18
0.417	1.33	6.500	2.18	12.583	17.42	18.67	2.18
0.500	1.33	6.583	2.18	12.667	17.42	18.75	2.18
0.583	1.33	6.667	2.18	12.750	17.42	18.83	2.18
0.667	1.33	6.750	2.18	12.833	8.95	18.92	2.18
0.750	1.33	6.833	2.18	12.917	8.95	19.00	2.18
0.833	1.33	6.917	2.18	13.000	8.95	19.08	2.18
0.917	1.33	7.000	2.18	13.083	8.95	19.17	2.18
1.000	1.33	7.083	2.18	13.167	8.95	19.25	2.18
1.083	1.33	7.167	2.18	13.250	8.95	19.33	2.18
1.167	1.33	7.250	2.18	13.333	6.53	19.42	2.18
1.250	1.33	7.333	2.66	13.417	6.53	19.50	2.18
1.333	1.33	7.417	2.66	13.500	6.53	19.58	2.18
1.417	1.33	7.500	2.66	13.583	6.53	19.67	2.18
1.500	1.33	7.583	2.66	13.667	6.53	19.75	2.18
1.583	1.33	7.667	2.66	13.750	6.53	19.83	2.18
1.667	1.33	7.750	2.66	13.833	5.08	19.92	2.18
1.750	1.33	7.833	2.66	13.917	5.08	20.00	2.18
1.833	1.33	7.917	2.66	14.000	5.08	20.08	2.18
1.917	1.33	8.000	2.66	14.083	5.08	20.17	2.18
2.000	1.33	8.083	2.66	14.167	5.08	20.25	2.18
2.083	1.33	8.167	2.66	14.250	5.08	20.33	1.45
2.167	1.33	8.250	2.66	14.333	3.63	20.42	1.45
2.250	1.33	8.333	3.15	14.417	3.63	20.50	1.45
2.333	1.57	8.417	3.15	14.500	3.63	20.58	1.45
2.417	1.57	8.500	3.15	14.583	3.63	20.67	1.45
2.500	1.57	8.583	3.15	14.667	3.63	20.75	1.45
2.583	1.57	8.667	3.15	14.750	3.63	20.83	1.45
2.667	1.57	8.750	3.15	14.833	3.63	20.92	1.45
2.750	1.57	8.833	3.39	14.917	3.63	21.00	1.45
2.833	1.57	8.917	3.39	15.000	3.63	21.08	1.45
2.917	1.57	9.000	3.39	15.083	3.63	21.17	1.45
3.000	1.57	9.083	3.39	15.167	3.63	21.25	1.45
3.083	1.57	9.167	3.39	15.250	3.63	21.33	1.45
3.167	1.57	9.250	3.39	15.333	3.63	21.42	1.45
3.250	1.57	9.333	3.87	15.417	3.63	21.50	1.45
3.333	1.57	9.417	3.87	15.500	3.63	21.58	1.45
3.417	1.57	9.500	3.87	15.583	3.63	21.67	1.45
3.500	1.57	9.583	3.87	15.667	3.63	21.75	1.45
3.583	1.57	9.667	3.87	15.750	3.63	21.83	1.45
3.667	1.57	9.750	3.87	15.833	3.63	21.92	1.45
3.750	1.57	9.833	4.35	15.917	3.63	22.00	1.45
3.833	1.57	9.917	4.35	16.000	3.63	22.08	1.45
3.917	1.57	10.000	4.35	16.083	3.63	22.17	1.45
4.000	1.57	10.083	4.35	16.167	3.63	22.25	1.45
4.083	1.57	10.167	4.35	16.250	3.63	22.33	1.45
4.167	1.57	10.250	4.35	16.333	2.18	22.42	1.45
4.250	1.57	10.333	5.56	16.417	2.18	22.50	1.45
4.333	1.94	10.417	5.56	16.500	2.18	22.58	1.45
4.417	1.94	10.500	5.56	16.583	2.18	22.67	1.45
4.500	1.94	10.583	5.56	16.667	2.18	22.75	1.45
4.583	1.94	10.667	5.56	16.750	2.18	22.83	1.45
4.667	1.94	10.750	5.56	16.833	2.18	22.92	1.45
4.750	1.94	10.833	7.50	16.917	2.18	23.00	1.45
4.833	1.94	10.917	7.50	17.000	2.18	23.08	1.45
4.917	1.94	11.000	7.50	17.083	2.18	23.17	1.45
5.000	1.94	11.083	7.50	17.167	2.18	23.25	1.45
5.083	1.94	11.167	7.50	17.250	2.18	23.33	1.45
5.167	1.94	11.250	7.50	17.333	2.18	23.42	1.45
5.250	1.94	11.333	11.61	17.417	2.18	23.50	1.45
5.333	1.94	11.417	11.61	17.500	2.18	23.58	1.45
5.417	1.94	11.500	11.61	17.583	2.18	23.67	1.45
5.500	1.94	11.583	11.61	17.667	2.18	23.75	1.45
5.583	1.94	11.667	11.61	17.750	2.18	23.83	1.45
5.667	1.94	11.750	11.61	17.833	2.18	23.92	1.45
5.750	1.94	11.833	35.80	17.917	2.18	24.00	1.45
5.833	1.94	11.917	35.81	18.000	2.18	24.08	1.45
5.917	1.94	12.000	35.81	18.083	2.18	24.17	1.45

6.000	1.94	12.083	148.05	18.167	2.18	24.25	1.45
6.083	1.94	12.167	148.07	18.250	2.18		

Unit Hyd Qpeak (cms)= 4.374

PEAK FLOW (cms)= 4.990 (i)
TIME TO PEAK (hrs)= 14.333
RUNOFF VOLUME (mm)= 47.056
TOTAL RAINFALL (mm)= 120.970
RUNOFF COEFFICIENT = 0.389

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

CALIB
STANDHYD (0007)
ID= 1 DT= 5.0 min

Area (ha)= 264.40
Total Imp(%)= 51.10 Dir. Conn.(%)= 41.40

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	135.11	129.29
Dep. Storage	(mm)=	2.00	5.90
Average Slope	(%)=	0.50	2.00
Length	(m)=	1327.65	20.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.94	12.250	148.07	18.33	2.18
0.167	0.00	6.250	1.94	12.333	17.44	18.42	2.18
0.250	0.00	6.333	2.18	12.417	17.42	18.50	2.18
0.333	1.33	6.417	2.18	12.500	17.42	18.58	2.18
0.417	1.33	6.500	2.18	12.583	17.42	18.67	2.18
0.500	1.33	6.583	2.18	12.667	17.42	18.75	2.18
0.583	1.33	6.667	2.18	12.750	17.42	18.83	2.18
0.667	1.33	6.750	2.18	12.833	8.95	18.92	2.18
0.750	1.33	6.833	2.18	12.917	8.95	19.00	2.18
0.833	1.33	6.917	2.18	13.000	8.95	19.08	2.18
0.917	1.33	7.000	2.18	13.083	8.95	19.17	2.18
1.000	1.33	7.083	2.18	13.167	8.95	19.25	2.18
1.083	1.33	7.167	2.18	13.250	8.95	19.33	2.18
1.167	1.33	7.250	2.18	13.333	6.53	19.42	2.18
1.250	1.33	7.333	2.66	13.417	6.53	19.50	2.18
1.333	1.33	7.417	2.66	13.500	6.53	19.58	2.18
1.417	1.33	7.500	2.66	13.583	6.53	19.67	2.18
1.500	1.33	7.583	2.66	13.667	6.53	19.75	2.18
1.583	1.33	7.667	2.66	13.750	6.53	19.83	2.18
1.667	1.33	7.750	2.66	13.833	5.08	19.92	2.18
1.750	1.33	7.833	2.66	13.917	5.08	20.00	2.18
1.833	1.33	7.917	2.66	14.000	5.08	20.08	2.18
1.917	1.33	8.000	2.66	14.083	5.08	20.17	2.18
2.000	1.33	8.083	2.66	14.167	5.08	20.25	2.18
2.083	1.33	8.167	2.66	14.250	5.08	20.33	1.45
2.167	1.33	8.250	2.66	14.333	3.63	20.42	1.45
2.250	1.33	8.333	3.15	14.417	3.63	20.50	1.45
2.333	1.57	8.417	3.15	14.500	3.63	20.58	1.45
2.417	1.57	8.500	3.15	14.583	3.63	20.67	1.45
2.500	1.57	8.583	3.15	14.667	3.63	20.75	1.45
2.583	1.57	8.667	3.15	14.750	3.63	20.83	1.45
2.667	1.57	8.750	3.15	14.833	3.63	20.92	1.45
2.750	1.57	8.833	3.39	14.917	3.63	21.00	1.45
2.833	1.57	8.917	3.39	15.000	3.63	21.08	1.45
2.917	1.57	9.000	3.39	15.083	3.63	21.17	1.45
3.000	1.57	9.083	3.39	15.167	3.63	21.25	1.45
3.083	1.57	9.167	3.39	15.250	3.63	21.33	1.45
3.167	1.57	9.250	3.39	15.333	3.63	21.42	1.45
3.250	1.57	9.333	3.87	15.417	3.63	21.50	1.45
3.333	1.57	9.417	3.87	15.500	3.63	21.58	1.45
3.417	1.57	9.500	3.87	15.583	3.63	21.67	1.45
3.500	1.57	9.583	3.87	15.667	3.63	21.75	1.45
3.583	1.57	9.667	3.87	15.750	3.63	21.83	1.45
3.667	1.57	9.750	3.87	15.833	3.63	21.92	1.45
3.750	1.57	9.833	4.35	15.917	3.63	22.00	1.45
3.833	1.57	9.917	4.35	16.000	3.63	22.08	1.45
3.917	1.57	10.000	4.35	16.083	3.63	22.17	1.45
4.000	1.57	10.083	4.35	16.167	3.63	22.25	1.45
4.083	1.57	10.167	4.35	16.250	3.63	22.33	1.45
4.167	1.57	10.250	4.35	16.333	2.18	22.42	1.45
4.250	1.57	10.333	5.56	16.417	2.18	22.50	1.45
4.333	1.94	10.417	5.56	16.500	2.18	22.58	1.45

4.417	1.94	10.500	5.56	16.583	2.18	22.67	1.45
4.500	1.94	10.583	5.56	16.667	2.18	22.75	1.45
4.583	1.94	10.667	5.56	16.750	2.18	22.83	1.45
4.667	1.94	10.750	5.56	16.833	2.18	22.92	1.45
4.750	1.94	10.833	7.50	16.917	2.18	23.00	1.45
4.833	1.94	10.917	7.50	17.000	2.18	23.08	1.45
4.917	1.94	11.000	7.50	17.083	2.18	23.17	1.45
5.000	1.94	11.083	7.50	17.167	2.18	23.25	1.45
5.083	1.94	11.167	7.50	17.250	2.18	23.33	1.45
5.167	1.94	11.250	7.50	17.333	2.18	23.42	1.45
5.250	1.94	11.333	11.61	17.417	2.18	23.50	1.45
5.333	1.94	11.417	11.61	17.500	2.18	23.58	1.45
5.417	1.94	11.500	11.61	17.583	2.18	23.67	1.45
5.500	1.94	11.583	11.61	17.667	2.18	23.75	1.45
5.583	1.94	11.667	11.61	17.750	2.18	23.83	1.45
5.667	1.94	11.750	11.61	17.833	2.18	23.92	1.45
5.750	1.94	11.833	35.80	17.917	2.18	24.00	1.45
5.833	1.94	11.917	35.81	18.000	2.18	24.08	1.45
5.917	1.94	12.000	35.81	18.083	2.18	24.17	1.45
6.000	1.94	12.083	148.05	18.167	2.18	24.25	1.45
6.083	1.94	12.167	148.07	18.250	2.18		

Max.Eff.Inten.(mm/hr)=	148.06	92.20	
over (min)	15.00	20.00	
Storage Coeff. (min)=	12.69 (ii)	16.94 (ii)	
Unit Hyd. Tpeak (min)=	15.00	20.00	
Unit Hyd. peak (cms)=	0.08	0.06	
			TOTALS
PEAK FLOW (cms)=	29.28	16.41	44.009 (iii)
TIME TO PEAK (hrs)=	12.33	12.42	12.33
RUNOFF VOLUME (mm)=	118.97	52.33	79.92
TOTAL RAINFALL (mm)=	120.97	120.97	120.97
RUNOFF COEFFICIENT =	0.98	0.43	0.66

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 60.0 Ia = Dep. 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 (0008)	Area (ha)= 199.48
ID= 1 DT= 5.0 min	Total Imp(%)= 54.60 Dir. Conn.(%)= 40.90

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	108.92	90.56
Dep. Storage	(mm)=	2.00	5.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	1153.20	20.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.94	12.250	148.07	18.33	2.18
0.167	0.00	6.250	1.94	12.333	17.44	18.42	2.18
0.250	0.00	6.333	2.18	12.417	17.42	18.50	2.18
0.333	1.33	6.417	2.18	12.500	17.42	18.58	2.18
0.417	1.33	6.500	2.18	12.583	17.42	18.67	2.18
0.500	1.33	6.583	2.18	12.667	17.42	18.75	2.18
0.583	1.33	6.667	2.18	12.750	17.42	18.83	2.18
0.667	1.33	6.750	2.18	12.833	8.95	18.92	2.18
0.750	1.33	6.833	2.18	12.917	8.95	19.00	2.18
0.833	1.33	6.917	2.18	13.000	8.95	19.08	2.18
0.917	1.33	7.000	2.18	13.083	8.95	19.17	2.18
1.000	1.33	7.083	2.18	13.167	8.95	19.25	2.18
1.083	1.33	7.167	2.18	13.250	8.95	19.33	2.18
1.167	1.33	7.250	2.18	13.333	6.53	19.42	2.18
1.250	1.33	7.333	2.66	13.417	6.53	19.50	2.18
1.333	1.33	7.417	2.66	13.500	6.53	19.58	2.18
1.417	1.33	7.500	2.66	13.583	6.53	19.67	2.18
1.500	1.33	7.583	2.66	13.667	6.53	19.75	2.18
1.583	1.33	7.667	2.66	13.750	6.53	19.83	2.18
1.667	1.33	7.750	2.66	13.833	5.08	19.92	2.18
1.750	1.33	7.833	2.66	13.917	5.08	20.00	2.18
1.833	1.33	7.917	2.66	14.000	5.08	20.08	2.18
1.917	1.33	8.000	2.66	14.083	5.08	20.17	2.18
2.000	1.33	8.083	2.66	14.167	5.08	20.25	2.18

2.083	1.33	8.167	2.66	14.250	5.08	20.33	1.45
2.167	1.33	8.250	2.66	14.333	3.63	20.42	1.45
2.250	1.33	8.333	3.15	14.417	3.63	20.50	1.45
2.333	1.57	8.417	3.15	14.500	3.63	20.58	1.45
2.417	1.57	8.500	3.15	14.583	3.63	20.67	1.45
2.500	1.57	8.583	3.15	14.667	3.63	20.75	1.45
2.583	1.57	8.667	3.15	14.750	3.63	20.83	1.45
2.667	1.57	8.750	3.15	14.833	3.63	20.92	1.45
2.750	1.57	8.833	3.39	14.917	3.63	21.00	1.45
2.833	1.57	8.917	3.39	15.000	3.63	21.08	1.45
2.917	1.57	9.000	3.39	15.083	3.63	21.17	1.45
3.000	1.57	9.083	3.39	15.167	3.63	21.25	1.45
3.083	1.57	9.167	3.39	15.250	3.63	21.33	1.45
3.167	1.57	9.250	3.39	15.333	3.63	21.42	1.45
3.250	1.57	9.333	3.87	15.417	3.63	21.50	1.45
3.333	1.57	9.417	3.87	15.500	3.63	21.58	1.45
3.417	1.57	9.500	3.87	15.583	3.63	21.67	1.45
3.500	1.57	9.583	3.87	15.667	3.63	21.75	1.45
3.583	1.57	9.667	3.87	15.750	3.63	21.83	1.45
3.667	1.57	9.750	3.87	15.833	3.63	21.92	1.45
3.750	1.57	9.833	4.35	15.917	3.63	22.00	1.45
3.833	1.57	9.917	4.35	16.000	3.63	22.08	1.45
3.917	1.57	10.000	4.35	16.083	3.63	22.17	1.45
4.000	1.57	10.083	4.35	16.167	3.63	22.25	1.45
4.083	1.57	10.167	4.35	16.250	3.63	22.33	1.45
4.167	1.57	10.250	4.35	16.333	2.18	22.42	1.45
4.250	1.57	10.333	5.56	16.417	2.18	22.50	1.45
4.333	1.94	10.417	5.56	16.500	2.18	22.58	1.45
4.417	1.94	10.500	5.56	16.583	2.18	22.67	1.45
4.500	1.94	10.583	5.56	16.667	2.18	22.75	1.45
4.583	1.94	10.667	5.56	16.750	2.18	22.83	1.45
4.667	1.94	10.750	5.56	16.833	2.18	22.92	1.45
4.750	1.94	10.833	7.50	16.917	2.18	23.00	1.45
4.833	1.94	10.917	7.50	17.000	2.18	23.08	1.45
4.917	1.94	11.000	7.50	17.083	2.18	23.17	1.45
5.000	1.94	11.083	7.50	17.167	2.18	23.25	1.45
5.083	1.94	11.167	7.50	17.250	2.18	23.33	1.45
5.167	1.94	11.250	7.50	17.333	2.18	23.42	1.45
5.250	1.94	11.333	11.61	17.417	2.18	23.50	1.45
5.333	1.94	11.417	11.61	17.500	2.18	23.58	1.45
5.417	1.94	11.500	11.61	17.583	2.18	23.67	1.45
5.500	1.94	11.583	11.61	17.667	2.18	23.75	1.45
5.583	1.94	11.667	11.61	17.750	2.18	23.83	1.45
5.667	1.94	11.750	11.61	17.833	2.18	23.92	1.45
5.750	1.94	11.833	35.80	17.917	2.18	24.00	1.45
5.833	1.94	11.917	35.81	18.000	2.18	24.08	1.45
5.917	1.94	12.000	35.81	18.083	2.18	24.17	1.45
6.000	1.94	12.083	148.05	18.167	2.18	24.25	1.45
6.083	1.94	12.167	148.07	18.250	2.18		

Max.Eff.Inten.(mm/hr)=	148.07	120.27		
over (min)	10.00	20.00		
Storage Coeff. (min)=	11.66 (ii)	15.81 (ii)		
Unit Hyd. Tpeak (min)=	10.00	20.00		
Unit Hyd. peak (cms)=	0.10	0.07		
			TOTALS	
PEAK FLOW (cms)=	23.81	15.70	37.088 (iii)	
TIME TO PEAK (hrs)=	12.25	12.42	12.33	
RUNOFF VOLUME (mm)=	118.97	62.91	85.84	
TOTAL RAINFALL (mm)=	120.97	120.97	120.97	
RUNOFF COEFFICIENT =	0.98	0.52	0.71	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 66.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0013)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0007):	264.40	44.009	12.33	79.92
+ ID2= 2 (0008):	199.48	37.088	12.33	85.84
ID = 3 (0013):	463.88	81.097	12.33	82.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0009)

```
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         232.00        0.0500
                  15.83         231.70        0.0500
                  47.63         231.09        0.0500
                  57.14         230.76        0.0500
                  66.39         229.94        0.0500
                  69.72         229.37        0.0500
                 102.15         229.37        0.0500
                 106.00         229.60        0.0500
                 111.50         229.47        0.0500
                 143.51         229.14        0.0350      Main Channel
                 143.80         229.14        0.0350      Main Channel
                 153.45         229.10        0.0350      Main Channel
                 157.09         229.15        0.0350      Main Channel
                 188.81         230.05    0.0350 /0.0500  Main Channel
                 195.46         230.69        0.0500
                 203.04         231.10        0.0500
                 226.79         230.80        0.0500
                 246.87         230.34        0.0500
                 268.22         231.18        0.0500
                 298.24         232.00        0.0500

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME     FLOW RATE     VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)       (cms)         (m/s)      (min)
        0.05   229.14    .488E+03        0.1          0.26      100.03
        0.20   229.29    .601E+04        2.9          0.74       34.93
        0.35   229.44    .199E+05       10.9          0.85       30.35
        0.50   229.60    .425E+05       30.1          1.10       23.56
        0.65   229.75    .676E+05       60.1          1.38       18.75
        0.80   229.90    .942E+05       99.6          1.64       15.77
        0.95   230.05    .122E+06      147.9          1.88       13.78
        1.10   230.20    .152E+06      209.6          2.15       12.05
        1.25   230.35    .182E+06      280.3          2.40       10.80
        1.40   230.50    .214E+06      359.8          2.62        9.90
        1.55   230.65    .249E+06      449.1          2.80        9.25
        1.70   230.80    .288E+06      547.2          2.96        8.77
        1.85   230.95    .331E+06      651.9          3.06        8.46
        2.00   231.10    .380E+06      768.9          3.15        8.23
        2.15   231.25    .432E+06      894.7          3.22        8.05
        2.30   231.40    .488E+06     1034.8          3.30        7.86
        2.45   231.55    .547E+06     1189.4          3.38        7.66
        2.60   231.70    .609E+06     1358.9          3.47        7.47
        2.75   231.85    .674E+06     1543.0          3.56        7.28

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0013)  463.88    81.10   12.33  82.47      0.73      1.51
   OUTFLOW: ID= 1 (  0009)  463.88    57.16   12.50  82.46      0.63      1.34



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

--------------------
| ADD HYD  (  0005)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0004):   221.02   4.990    14.33    47.06
     + ID2= 2 (  0009):   463.88  57.161    12.50    82.46
       ================================================
       ID = 3 (  0005):   684.90  58.494    12.50    71.04

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

--------------------
| ADD HYD  (  0015)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0014):   149.59  16.882    12.33    58.97
     + ID2= 2 (  0005):   684.90  58.494    12.50    71.04
       ================================================
       ID = 3 (  0015):   834.49  73.519    12.50    68.87

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0006)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
```

```
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                  0.00        228.00        0.0500
                212.52        225.39        0.0350      Main Channel
                213.15        225.38        0.0350      Main Channel
                213.73        225.38        0.0350      Main Channel
                214.27        225.38        0.0350      Main Channel
                214.91        225.37        0.0350      Main Channel
                226.52        222.62        0.0350      Main Channel
                226.60        222.60        0.0350      Main Channel
                226.65        222.60        0.0350      Main Channel
                229.30        222.50        0.0350      Main Channel
                233.70        222.33        0.0350      Main Channel
                236.82        222.33        0.0350      Main Channel
                247.01        222.75        0.0350      Main Channel
                247.81        223.00        0.0350      Main Channel
                257.03        225.86        0.0500
                257.30        225.87        0.0500
                257.55        225.87        0.0500
                257.81        225.88        0.0500
                367.45        228.00        0.0500

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.28   222.61    .312E+04       1.8          0.63       29.35
       0.56   222.89    .939E+04       9.3          1.10       16.83
       0.83   223.17    .165E+05      22.5          1.51       12.27
       1.11   223.44    .243E+05      40.4          1.85       10.04
       1.39   223.72    .328E+05      63.0          2.14        8.67
       1.67   224.00    .418E+05      90.2          2.40        7.73
       1.95   224.28    .516E+05     122.1          2.64        7.04
       2.23   224.56    .619E+05     158.8          2.86        6.50
       2.50   224.83    .729E+05     200.5          3.06        6.06
       2.78   225.11    .846E+05     247.2          3.25        5.70
       3.06   225.39    .969E+05     288.7          3.32        5.59
       3.39   225.72    .118E+06     367.2          3.48        5.33
       3.71   226.04    .149E+06     465.5          3.48        5.34
       4.04   226.37    .196E+06     591.4          3.36        5.52
       4.36   226.70    .258E+06     749.5          3.23        5.74
       4.69   227.02    .337E+06     946.2          3.13        5.93
       5.02   227.35    .431E+06    1187.1          3.07        6.05
       5.34   227.67    .540E+06    1477.5          3.04        6.10
       5.67   228.00    .666E+06    1822.2          3.05        6.09

                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0015)  834.49    73.52   12.50  68.87      1.50      2.23
   OUTFLOW: ID= 1 (  0006)  834.49    68.24   12.58  68.87      1.44      2.18



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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):   161.19   4.530    14.42    59.24
      + ID2= 2 (  0006):   834.49  68.243    12.58    68.87
        ==============================================
        ID = 3 (  0003):   995.68  69.686    12.58    67.31

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2008)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2021 Smart City Water Inc
All rights reserved.
```

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\50f62b10-d4
Summary filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\50f62b10-d4

DATE: 02-27-2023 TIME: 10:10:58

USER:

COMMENTS: _____

****
** SIMULATION : B - 10yr 24hr 15min SCS **
****

READ STORM	Filename: C:\Users\jchowen\AppD ata\Local\Temp\ 50702b2f-89c2-43ff-9553-8a4048d6a62f\b090e611
Ptotal= 83.66 mm	Comments: 10yr 24hr 15min SCS

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.51	12.50	12.05	18.75	1.51
0.25	0.92	6.50	1.51	12.75	6.19	19.00	1.51
0.50	0.92	6.75	1.51	13.00	6.19	19.25	1.51
0.75	0.92	7.00	1.51	13.25	4.52	19.50	1.51
1.00	0.92	7.25	1.84	13.50	4.52	19.75	1.51
1.25	0.92	7.50	1.84	13.75	3.51	20.00	1.51
1.50	0.92	7.75	1.84	14.00	3.51	20.25	1.00
1.75	0.92	8.00	1.84	14.25	2.51	20.50	1.00
2.00	0.92	8.25	2.18	14.50	2.51	20.75	1.00
2.25	1.09	8.50	2.18	14.75	2.51	21.00	1.00
2.50	1.09	8.75	2.34	15.00	2.51	21.25	1.00
2.75	1.09	9.00	2.34	15.25	2.51	21.50	1.00
3.00	1.09	9.25	2.68	15.50	2.51	21.75	1.00
3.25	1.09	9.50	2.68	15.75	2.51	22.00	1.00
3.50	1.09	9.75	3.01	16.00	2.51	22.25	1.00
3.75	1.09	10.00	3.01	16.25	1.51	22.50	1.00
4.00	1.09	10.25	3.85	16.50	1.51	22.75	1.00
4.25	1.34	10.50	3.85	16.75	1.51	23.00	1.00
4.50	1.34	10.75	5.19	17.00	1.51	23.25	1.00
4.75	1.34	11.00	5.19	17.25	1.51	23.50	1.00
5.00	1.34	11.25	8.03	17.50	1.51	23.75	1.00
5.25	1.34	11.50	8.03	17.75	1.51	24.00	1.00
5.50	1.34	11.75	24.76	18.00	1.51		
5.75	1.34	12.00	102.40	18.25	1.51		
6.00	1.34	12.25	12.05	18.50	1.51		

CALIB NASHYD (0001)	Area (ha)= 161.19	Curve Number (CN)= 71.2
ID= 1 DT= 5.0 min	Ia (mm)= 7.90	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 2.01	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.34	12.250	102.40	18.33	1.51
0.167	0.00	6.250	1.34	12.333	12.06	18.42	1.51
0.250	0.00	6.333	1.51	12.417	12.05	18.50	1.51
0.333	0.92	6.417	1.51	12.500	12.05	18.58	1.51
0.417	0.92	6.500	1.51	12.583	12.05	18.67	1.51
0.500	0.92	6.583	1.51	12.667	12.05	18.75	1.51
0.583	0.92	6.667	1.51	12.750	12.05	18.83	1.51
0.667	0.92	6.750	1.51	12.833	6.19	18.92	1.51
0.750	0.92	6.833	1.51	12.917	6.19	19.00	1.51
0.833	0.92	6.917	1.51	13.000	6.19	19.08	1.51
0.917	0.92	7.000	1.51	13.083	6.19	19.17	1.51
1.000	0.92	7.083	1.51	13.167	6.19	19.25	1.51
1.083	0.92	7.167	1.51	13.250	6.19	19.33	1.51

1.167	0.92	7.250	1.51	13.333	4.52	19.42	1.51
1.250	0.92	7.333	1.84	13.417	4.52	19.50	1.51
1.333	0.92	7.417	1.84	13.500	4.52	19.58	1.51
1.417	0.92	7.500	1.84	13.583	4.52	19.67	1.51
1.500	0.92	7.583	1.84	13.667	4.52	19.75	1.51
1.583	0.92	7.667	1.84	13.750	4.52	19.83	1.51
1.667	0.92	7.750	1.84	13.833	3.51	19.92	1.51
1.750	0.92	7.833	1.84	13.917	3.51	20.00	1.51
1.833	0.92	7.917	1.84	14.000	3.51	20.08	1.51
1.917	0.92	8.000	1.84	14.083	3.51	20.17	1.51
2.000	0.92	8.083	1.84	14.167	3.51	20.25	1.51
2.083	0.92	8.167	1.84	14.250	3.51	20.33	1.00
2.167	0.92	8.250	1.84	14.333	2.51	20.42	1.00
2.250	0.92	8.333	2.18	14.417	2.51	20.50	1.00
2.333	1.09	8.417	2.18	14.500	2.51	20.58	1.00
2.417	1.09	8.500	2.18	14.583	2.51	20.67	1.00
2.500	1.09	8.583	2.18	14.667	2.51	20.75	1.00
2.583	1.09	8.667	2.18	14.750	2.51	20.83	1.00
2.667	1.09	8.750	2.18	14.833	2.51	20.92	1.00
2.750	1.09	8.833	2.34	14.917	2.51	21.00	1.00
2.833	1.09	8.917	2.34	15.000	2.51	21.08	1.00
2.917	1.09	9.000	2.34	15.083	2.51	21.17	1.00
3.000	1.09	9.083	2.34	15.167	2.51	21.25	1.00
3.083	1.09	9.167	2.34	15.250	2.51	21.33	1.00
3.167	1.09	9.250	2.34	15.333	2.51	21.42	1.00
3.250	1.09	9.333	2.68	15.417	2.51	21.50	1.00
3.333	1.09	9.417	2.68	15.500	2.51	21.58	1.00
3.417	1.09	9.500	2.68	15.583	2.51	21.67	1.00
3.500	1.09	9.583	2.68	15.667	2.51	21.75	1.00
3.583	1.09	9.667	2.68	15.750	2.51	21.83	1.00
3.667	1.09	9.750	2.68	15.833	2.51	21.92	1.00
3.750	1.09	9.833	3.01	15.917	2.51	22.00	1.00
3.833	1.09	9.917	3.01	16.000	2.51	22.08	1.00
3.917	1.09	10.000	3.01	16.083	2.51	22.17	1.00
4.000	1.09	10.083	3.01	16.167	2.51	22.25	1.00
4.083	1.09	10.167	3.01	16.250	2.51	22.33	1.00
4.167	1.09	10.250	3.01	16.333	1.51	22.42	1.00
4.250	1.09	10.333	3.85	16.417	1.51	22.50	1.00
4.333	1.34	10.417	3.85	16.500	1.51	22.58	1.00
4.417	1.34	10.500	3.85	16.583	1.51	22.67	1.00
4.500	1.34	10.583	3.85	16.667	1.51	22.75	1.00
4.583	1.34	10.667	3.85	16.750	1.51	22.83	1.00
4.667	1.34	10.750	3.85	16.833	1.51	22.92	1.00
4.750	1.34	10.833	5.19	16.917	1.51	23.00	1.00
4.833	1.34	10.917	5.19	17.000	1.51	23.08	1.00
4.917	1.34	11.000	5.19	17.083	1.51	23.17	1.00
5.000	1.34	11.083	5.19	17.167	1.51	23.25	1.00
5.083	1.34	11.167	5.19	17.250	1.51	23.33	1.00
5.167	1.34	11.250	5.19	17.333	1.51	23.42	1.00
5.250	1.34	11.333	8.03	17.417	1.51	23.50	1.00
5.333	1.34	11.417	8.03	17.500	1.51	23.58	1.00
5.417	1.34	11.500	8.03	17.583	1.51	23.67	1.00
5.500	1.34	11.583	8.03	17.667	1.51	23.75	1.00
5.583	1.34	11.667	8.03	17.750	1.51	23.83	1.00
5.667	1.34	11.750	8.03	17.833	1.51	23.92	1.00
5.750	1.34	11.833	24.76	17.917	1.51	24.00	1.00
5.833	1.34	11.917	24.76	18.000	1.51	24.08	1.00
5.917	1.34	12.000	24.76	18.083	1.51	24.17	1.00
6.000	1.34	12.083	102.39	18.167	1.51	24.25	1.00
6.083	1.34	12.167	102.40	18.250	1.51		

Unit Hyd Qpeak (cms)= 3.063

PEAK FLOW (cms)= 2.411 (i)
TIME TO PEAK (hrs)= 14.417
RUNOFF VOLUME (mm)= 32.154
TOTAL RAINFALL (mm)= 83.660
RUNOFF COEFFICIENT = 0.384

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

CALIB STANDHYD (0014)	Area (ha)= 149.59
ID= 1 DT= 5.0 min	Total Imp(%)= 21.50 Dir. Conn.(%)= 13.60

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	32.16	117.43
Dep. Storage	(mm)=	1.00	8.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	998.63	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.34	12.250	102.40	18.33	1.51
0.167	0.00	6.250	1.34	12.333	12.06	18.42	1.51
0.250	0.00	6.333	1.51	12.417	12.05	18.50	1.51
0.333	0.92	6.417	1.51	12.500	12.05	18.58	1.51
0.417	0.92	6.500	1.51	12.583	12.05	18.67	1.51
0.500	0.92	6.583	1.51	12.667	12.05	18.75	1.51
0.583	0.92	6.667	1.51	12.750	12.05	18.83	1.51
0.667	0.92	6.750	1.51	12.833	6.19	18.92	1.51
0.750	0.92	6.833	1.51	12.917	6.19	19.00	1.51
0.833	0.92	6.917	1.51	13.000	6.19	19.08	1.51
0.917	0.92	7.000	1.51	13.083	6.19	19.17	1.51
1.000	0.92	7.083	1.51	13.167	6.19	19.25	1.51
1.083	0.92	7.167	1.51	13.250	6.19	19.33	1.51
1.167	0.92	7.250	1.51	13.333	4.52	19.42	1.51
1.250	0.92	7.333	1.84	13.417	4.52	19.50	1.51
1.333	0.92	7.417	1.84	13.500	4.52	19.58	1.51
1.417	0.92	7.500	1.84	13.583	4.52	19.67	1.51
1.500	0.92	7.583	1.84	13.667	4.52	19.75	1.51
1.583	0.92	7.667	1.84	13.750	4.52	19.83	1.51
1.667	0.92	7.750	1.84	13.833	3.51	19.92	1.51
1.750	0.92	7.833	1.84	13.917	3.51	20.00	1.51
1.833	0.92	7.917	1.84	14.000	3.51	20.08	1.51
1.917	0.92	8.000	1.84	14.083	3.51	20.17	1.51
2.000	0.92	8.083	1.84	14.167	3.51	20.25	1.51
2.083	0.92	8.167	1.84	14.250	3.51	20.33	1.00
2.167	0.92	8.250	1.84	14.333	2.51	20.42	1.00
2.250	0.92	8.333	2.18	14.417	2.51	20.50	1.00
2.333	1.09	8.417	2.18	14.500	2.51	20.58	1.00
2.417	1.09	8.500	2.18	14.583	2.51	20.67	1.00
2.500	1.09	8.583	2.18	14.667	2.51	20.75	1.00
2.583	1.09	8.667	2.18	14.750	2.51	20.83	1.00
2.667	1.09	8.750	2.18	14.833	2.51	20.92	1.00
2.750	1.09	8.833	2.34	14.917	2.51	21.00	1.00
2.833	1.09	8.917	2.34	15.000	2.51	21.08	1.00
2.917	1.09	9.000	2.34	15.083	2.51	21.17	1.00
3.000	1.09	9.083	2.34	15.167	2.51	21.25	1.00
3.083	1.09	9.167	2.34	15.250	2.51	21.33	1.00
3.167	1.09	9.250	2.34	15.333	2.51	21.42	1.00
3.250	1.09	9.333	2.68	15.417	2.51	21.50	1.00
3.333	1.09	9.417	2.68	15.500	2.51	21.58	1.00
3.417	1.09	9.500	2.68	15.583	2.51	21.67	1.00
3.500	1.09	9.583	2.68	15.667	2.51	21.75	1.00
3.583	1.09	9.667	2.68	15.750	2.51	21.83	1.00
3.667	1.09	9.750	2.68	15.833	2.51	21.92	1.00
3.750	1.09	9.833	3.01	15.917	2.51	22.00	1.00
3.833	1.09	9.917	3.01	16.000	2.51	22.08	1.00
3.917	1.09	10.000	3.01	16.083	2.51	22.17	1.00
4.000	1.09	10.083	3.01	16.167	2.51	22.25	1.00
4.083	1.09	10.167	3.01	16.250	2.51	22.33	1.00
4.167	1.09	10.250	3.01	16.333	1.51	22.42	1.00
4.250	1.09	10.333	3.85	16.417	1.51	22.50	1.00
4.333	1.34	10.417	3.85	16.500	1.51	22.58	1.00
4.417	1.34	10.500	3.85	16.583	1.51	22.67	1.00
4.500	1.34	10.583	3.85	16.667	1.51	22.75	1.00
4.583	1.34	10.667	3.85	16.750	1.51	22.83	1.00
4.667	1.34	10.750	3.85	16.833	1.51	22.92	1.00
4.750	1.34	10.833	5.19	16.917	1.51	23.00	1.00
4.833	1.34	10.917	5.19	17.000	1.51	23.08	1.00
4.917	1.34	11.000	5.19	17.083	1.51	23.17	1.00
5.000	1.34	11.083	5.19	17.167	1.51	23.25	1.00
5.083	1.34	11.167	5.19	17.250	1.51	23.33	1.00
5.167	1.34	11.250	5.19	17.333	1.51	23.42	1.00
5.250	1.34	11.333	8.03	17.417	1.51	23.50	1.00
5.333	1.34	11.417	8.03	17.500	1.51	23.58	1.00
5.417	1.34	11.500	8.03	17.583	1.51	23.67	1.00
5.500	1.34	11.583	8.03	17.667	1.51	23.75	1.00
5.583	1.34	11.667	8.03	17.750	1.51	23.83	1.00
5.667	1.34	11.750	8.03	17.833	1.51	23.92	1.00
5.750	1.34	11.833	24.76	17.917	1.51	24.00	1.00
5.833	1.34	11.917	24.76	18.000	1.51	24.08	1.00
5.917	1.34	12.000	24.76	18.083	1.51	24.17	1.00
6.000	1.34	12.083	102.39	18.167	1.51	24.25	1.00
6.083	1.34	12.167	102.40	18.250	1.51		

Max.Eff.Inten.(mm/hr)=	102.40	42.42
over (min)	10.00	25.00
Storage Coeff. (min)=	12.39 (ii)	22.34 (ii)
Unit Hyd. Tpeak (min)=	10.00	25.00

Unit Hyd. peak (cms)=	0.10	0.05	
			TOTALS
PEAK FLOW (cms)=	4.00	5.58	7.898 (iii)
TIME TO PEAK (hrs)=	12.25	12.50	12.33
RUNOFF VOLUME (mm)=	82.66	25.96	33.67
TOTAL RAINFALL (mm)=	83.66	83.66	83.66
RUNOFF COEFFICIENT =	0.99	0.31	0.40

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 61.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB NASHYD (0004) ID= 1 DT= 5.0 min	Area (ha)= 221.02 Curve Number (CN)= 61.5 Ia (mm)= 7.80 # of Linear Res.(N)= 3.00 U.H. Tp(hrs)= 1.93

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.34	12.250	102.40	18.33	1.51
0.167	0.00	6.250	1.34	12.333	12.06	18.42	1.51
0.250	0.00	6.333	1.51	12.417	12.05	18.50	1.51
0.333	0.92	6.417	1.51	12.500	12.05	18.58	1.51
0.417	0.92	6.500	1.51	12.583	12.05	18.67	1.51
0.500	0.92	6.583	1.51	12.667	12.05	18.75	1.51
0.583	0.92	6.667	1.51	12.750	12.05	18.83	1.51
0.667	0.92	6.750	1.51	12.833	6.19	18.92	1.51
0.750	0.92	6.833	1.51	12.917	6.19	19.00	1.51
0.833	0.92	6.917	1.51	13.000	6.19	19.08	1.51
0.917	0.92	7.000	1.51	13.083	6.19	19.17	1.51
1.000	0.92	7.083	1.51	13.167	6.19	19.25	1.51
1.083	0.92	7.167	1.51	13.250	6.19	19.33	1.51
1.167	0.92	7.250	1.51	13.333	4.52	19.42	1.51
1.250	0.92	7.333	1.84	13.417	4.52	19.50	1.51
1.333	0.92	7.417	1.84	13.500	4.52	19.58	1.51
1.417	0.92	7.500	1.84	13.583	4.52	19.67	1.51
1.500	0.92	7.583	1.84	13.667	4.52	19.75	1.51
1.583	0.92	7.667	1.84	13.750	4.52	19.83	1.51
1.667	0.92	7.750	1.84	13.833	3.51	19.92	1.51
1.750	0.92	7.833	1.84	13.917	3.51	20.00	1.51
1.833	0.92	7.917	1.84	14.000	3.51	20.08	1.51
1.917	0.92	8.000	1.84	14.083	3.51	20.17	1.51
2.000	0.92	8.083	1.84	14.167	3.51	20.25	1.51
2.083	0.92	8.167	1.84	14.250	3.51	20.33	1.00
2.167	0.92	8.250	1.84	14.333	2.51	20.42	1.00
2.250	0.92	8.333	2.18	14.417	2.51	20.50	1.00
2.333	1.09	8.417	2.18	14.500	2.51	20.58	1.00
2.417	1.09	8.500	2.18	14.583	2.51	20.67	1.00
2.500	1.09	8.583	2.18	14.667	2.51	20.75	1.00
2.583	1.09	8.667	2.18	14.750	2.51	20.83	1.00
2.667	1.09	8.750	2.18	14.833	2.51	20.92	1.00
2.750	1.09	8.833	2.34	14.917	2.51	21.00	1.00
2.833	1.09	8.917	2.34	15.000	2.51	21.08	1.00
2.917	1.09	9.000	2.34	15.083	2.51	21.17	1.00
3.000	1.09	9.083	2.34	15.167	2.51	21.25	1.00
3.083	1.09	9.167	2.34	15.250	2.51	21.33	1.00
3.167	1.09	9.250	2.34	15.333	2.51	21.42	1.00
3.250	1.09	9.333	2.68	15.417	2.51	21.50	1.00
3.333	1.09	9.417	2.68	15.500	2.51	21.58	1.00
3.417	1.09	9.500	2.68	15.583	2.51	21.67	1.00
3.500	1.09	9.583	2.68	15.667	2.51	21.75	1.00
3.583	1.09	9.667	2.68	15.750	2.51	21.83	1.00
3.667	1.09	9.750	2.68	15.833	2.51	21.92	1.00
3.750	1.09	9.833	3.01	15.917	2.51	22.00	1.00
3.833	1.09	9.917	3.01	16.000	2.51	22.08	1.00
3.917	1.09	10.000	3.01	16.083	2.51	22.17	1.00
4.000	1.09	10.083	3.01	16.167	2.51	22.25	1.00
4.083	1.09	10.167	3.01	16.250	2.51	22.33	1.00
4.167	1.09	10.250	3.01	16.333	1.51	22.42	1.00
4.250	1.09	10.333	3.85	16.417	1.51	22.50	1.00
4.333	1.34	10.417	3.85	16.500	1.51	22.58	1.00
4.417	1.34	10.500	3.85	16.583	1.51	22.67	1.00
4.500	1.34	10.583	3.85	16.667	1.51	22.75	1.00

4.583	1.34	10.667	3.85	16.750	1.51	22.83	1.00
4.667	1.34	10.750	3.85	16.833	1.51	22.92	1.00
4.750	1.34	10.833	5.19	16.917	1.51	23.00	1.00
4.833	1.34	10.917	5.19	17.000	1.51	23.08	1.00
4.917	1.34	11.000	5.19	17.083	1.51	23.17	1.00
5.000	1.34	11.083	5.19	17.167	1.51	23.25	1.00
5.083	1.34	11.167	5.19	17.250	1.51	23.33	1.00
5.167	1.34	11.250	5.19	17.333	1.51	23.42	1.00
5.250	1.34	11.333	8.03	17.417	1.51	23.50	1.00
5.333	1.34	11.417	8.03	17.500	1.51	23.58	1.00
5.417	1.34	11.500	8.03	17.583	1.51	23.67	1.00
5.500	1.34	11.583	8.03	17.667	1.51	23.75	1.00
5.583	1.34	11.667	8.03	17.750	1.51	23.83	1.00
5.667	1.34	11.750	8.03	17.833	1.51	23.92	1.00
5.750	1.34	11.833	24.76	17.917	1.51	24.00	1.00
5.833	1.34	11.917	24.76	18.000	1.51	24.08	1.00
5.917	1.34	12.000	24.76	18.083	1.51	24.17	1.00
6.000	1.34	12.083	102.39	18.167	1.51	24.25	1.00
6.083	1.34	12.167	102.40	18.250	1.51		

Unit Hyd Qpeak (cms)= 4.374

PEAK FLOW (cms)= 2.545 (i)
TIME TO PEAK (hrs)= 14.417
RUNOFF VOLUME (mm)= 24.502
TOTAL RAINFALL (mm)= 83.660
RUNOFF COEFFICIENT = 0.293

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

CALIB STANDHYD (0007)	Area (ha)= 264.40
ID= 1 DT= 5.0 min	Total Imp(%)= 51.10 Dir. Conn.(%)= 41.40

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	135.11	129.29
Dep. Storage	(mm)=	2.00	5.90
Average Slope	(%)=	0.50	2.00
Length	(m)=	1327.65	20.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.34	12.250	102.40	18.33	1.51
0.167	0.00	6.250	1.34	12.333	12.06	18.42	1.51
0.250	0.00	6.333	1.51	12.417	12.05	18.50	1.51
0.333	0.92	6.417	1.51	12.500	12.05	18.58	1.51
0.417	0.92	6.500	1.51	12.583	12.05	18.67	1.51
0.500	0.92	6.583	1.51	12.667	12.05	18.75	1.51
0.583	0.92	6.667	1.51	12.750	12.05	18.83	1.51
0.667	0.92	6.750	1.51	12.833	6.19	18.92	1.51
0.750	0.92	6.833	1.51	12.917	6.19	19.00	1.51
0.833	0.92	6.917	1.51	13.000	6.19	19.08	1.51
0.917	0.92	7.000	1.51	13.083	6.19	19.17	1.51
1.000	0.92	7.083	1.51	13.167	6.19	19.25	1.51
1.083	0.92	7.167	1.51	13.250	6.19	19.33	1.51
1.167	0.92	7.250	1.51	13.333	4.52	19.42	1.51
1.250	0.92	7.333	1.84	13.417	4.52	19.50	1.51
1.333	0.92	7.417	1.84	13.500	4.52	19.58	1.51
1.417	0.92	7.500	1.84	13.583	4.52	19.67	1.51
1.500	0.92	7.583	1.84	13.667	4.52	19.75	1.51
1.583	0.92	7.667	1.84	13.750	4.52	19.83	1.51
1.667	0.92	7.750	1.84	13.833	3.51	19.92	1.51
1.750	0.92	7.833	1.84	13.917	3.51	20.00	1.51
1.833	0.92	7.917	1.84	14.000	3.51	20.08	1.51
1.917	0.92	8.000	1.84	14.083	3.51	20.17	1.51
2.000	0.92	8.083	1.84	14.167	3.51	20.25	1.51
2.083	0.92	8.167	1.84	14.250	3.51	20.33	1.00
2.167	0.92	8.250	1.84	14.333	2.51	20.42	1.00
2.250	0.92	8.333	2.18	14.417	2.51	20.50	1.00
2.333	1.09	8.417	2.18	14.500	2.51	20.58	1.00
2.417	1.09	8.500	2.18	14.583	2.51	20.67	1.00
2.500	1.09	8.583	2.18	14.667	2.51	20.75	1.00
2.583	1.09	8.667	2.18	14.750	2.51	20.83	1.00
2.667	1.09	8.750	2.18	14.833	2.51	20.92	1.00
2.750	1.09	8.833	2.34	14.917	2.51	21.00	1.00
2.833	1.09	8.917	2.34	15.000	2.51	21.08	1.00
2.917	1.09	9.000	2.34	15.083	2.51	21.17	1.00

3.000	1.09	9.083	2.34	15.167	2.51	21.25	1.00
3.083	1.09	9.167	2.34	15.250	2.51	21.33	1.00
3.167	1.09	9.250	2.34	15.333	2.51	21.42	1.00
3.250	1.09	9.333	2.68	15.417	2.51	21.50	1.00
3.333	1.09	9.417	2.68	15.500	2.51	21.58	1.00
3.417	1.09	9.500	2.68	15.583	2.51	21.67	1.00
3.500	1.09	9.583	2.68	15.667	2.51	21.75	1.00
3.583	1.09	9.667	2.68	15.750	2.51	21.83	1.00
3.667	1.09	9.750	2.68	15.833	2.51	21.92	1.00
3.750	1.09	9.833	3.01	15.917	2.51	22.00	1.00
3.833	1.09	9.917	3.01	16.000	2.51	22.08	1.00
3.917	1.09	10.000	3.01	16.083	2.51	22.17	1.00
4.000	1.09	10.083	3.01	16.167	2.51	22.25	1.00
4.083	1.09	10.167	3.01	16.250	2.51	22.33	1.00
4.167	1.09	10.250	3.01	16.333	1.51	22.42	1.00
4.250	1.09	10.333	3.85	16.417	1.51	22.50	1.00
4.333	1.34	10.417	3.85	16.500	1.51	22.58	1.00
4.417	1.34	10.500	3.85	16.583	1.51	22.67	1.00
4.500	1.34	10.583	3.85	16.667	1.51	22.75	1.00
4.583	1.34	10.667	3.85	16.750	1.51	22.83	1.00
4.667	1.34	10.750	3.85	16.833	1.51	22.92	1.00
4.750	1.34	10.833	5.19	16.917	1.51	23.00	1.00
4.833	1.34	10.917	5.19	17.000	1.51	23.08	1.00
4.917	1.34	11.000	5.19	17.083	1.51	23.17	1.00
5.000	1.34	11.083	5.19	17.167	1.51	23.25	1.00
5.083	1.34	11.167	5.19	17.250	1.51	23.33	1.00
5.167	1.34	11.250	5.19	17.333	1.51	23.42	1.00
5.250	1.34	11.333	8.03	17.417	1.51	23.50	1.00
5.333	1.34	11.417	8.03	17.500	1.51	23.58	1.00
5.417	1.34	11.500	8.03	17.583	1.51	23.67	1.00
5.500	1.34	11.583	8.03	17.667	1.51	23.75	1.00
5.583	1.34	11.667	8.03	17.750	1.51	23.83	1.00
5.667	1.34	11.750	8.03	17.833	1.51	23.92	1.00
5.750	1.34	11.833	24.76	17.917	1.51	24.00	1.00
5.833	1.34	11.917	24.76	18.000	1.51	24.08	1.00
5.917	1.34	12.000	24.76	18.083	1.51	24.17	1.00
6.000	1.34	12.083	102.39	18.167	1.51	24.25	1.00
6.083	1.34	12.167	102.40	18.250	1.51		

Max.Eff.Inten.(mm/hr)=	102.40	49.64	
over (min)	15.00	20.00	
Storage Coeff. (min)=	14.70 (ii)	19.63 (ii)	
Unit Hyd. Tpeak (min)=	15.00	20.00	
Unit Hyd. peak (cms)=	0.08	0.06	
			TOTALS
PEAK FLOW (cms)=	19.07	8.07	26.185 (iii)
TIME TO PEAK (hrs)=	12.33	12.42	12.33
RUNOFF VOLUME (mm)=	81.66	28.17	50.32
TOTAL RAINFALL (mm)=	83.66	83.66	83.66
RUNOFF COEFFICIENT =	0.98	0.34	0.60

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 60.0 Ia = Dep. 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 (0008)	Area (ha)= 199.48
ID= 1 DT= 5.0 min	Total Imp(%)= 54.60 Dir. Conn.(%)= 40.90

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	108.92	90.56
Dep. Storage	(mm)=	2.00	5.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	1153.20	20.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.34	12.250	102.40	18.33	1.51
0.167	0.00	6.250	1.34	12.333	12.06	18.42	1.51
0.250	0.00	6.333	1.51	12.417	12.05	18.50	1.51
0.333	0.92	6.417	1.51	12.500	12.05	18.58	1.51
0.417	0.92	6.500	1.51	12.583	12.05	18.67	1.51
0.500	0.92	6.583	1.51	12.667	12.05	18.75	1.51
0.583	0.92	6.667	1.51	12.750	12.05	18.83	1.51

0.667	0.92	6.750	1.51	12.833	6.19	18.92	1.51
0.750	0.92	6.833	1.51	12.917	6.19	19.00	1.51
0.833	0.92	6.917	1.51	13.000	6.19	19.08	1.51
0.917	0.92	7.000	1.51	13.083	6.19	19.17	1.51
1.000	0.92	7.083	1.51	13.167	6.19	19.25	1.51
1.083	0.92	7.167	1.51	13.250	6.19	19.33	1.51
1.167	0.92	7.250	1.51	13.333	4.52	19.42	1.51
1.250	0.92	7.333	1.84	13.417	4.52	19.50	1.51
1.333	0.92	7.417	1.84	13.500	4.52	19.58	1.51
1.417	0.92	7.500	1.84	13.583	4.52	19.67	1.51
1.500	0.92	7.583	1.84	13.667	4.52	19.75	1.51
1.583	0.92	7.667	1.84	13.750	4.52	19.83	1.51
1.667	0.92	7.750	1.84	13.833	3.51	19.92	1.51
1.750	0.92	7.833	1.84	13.917	3.51	20.00	1.51
1.833	0.92	7.917	1.84	14.000	3.51	20.08	1.51
1.917	0.92	8.000	1.84	14.083	3.51	20.17	1.51
2.000	0.92	8.083	1.84	14.167	3.51	20.25	1.51
2.083	0.92	8.167	1.84	14.250	3.51	20.33	1.00
2.167	0.92	8.250	1.84	14.333	2.51	20.42	1.00
2.250	0.92	8.333	2.18	14.417	2.51	20.50	1.00
2.333	1.09	8.417	2.18	14.500	2.51	20.58	1.00
2.417	1.09	8.500	2.18	14.583	2.51	20.67	1.00
2.500	1.09	8.583	2.18	14.667	2.51	20.75	1.00
2.583	1.09	8.667	2.18	14.750	2.51	20.83	1.00
2.667	1.09	8.750	2.18	14.833	2.51	20.92	1.00
2.750	1.09	8.833	2.34	14.917	2.51	21.00	1.00
2.833	1.09	8.917	2.34	15.000	2.51	21.08	1.00
2.917	1.09	9.000	2.34	15.083	2.51	21.17	1.00
3.000	1.09	9.083	2.34	15.167	2.51	21.25	1.00
3.083	1.09	9.167	2.34	15.250	2.51	21.33	1.00
3.167	1.09	9.250	2.34	15.333	2.51	21.42	1.00
3.250	1.09	9.333	2.68	15.417	2.51	21.50	1.00
3.333	1.09	9.417	2.68	15.500	2.51	21.58	1.00
3.417	1.09	9.500	2.68	15.583	2.51	21.67	1.00
3.500	1.09	9.583	2.68	15.667	2.51	21.75	1.00
3.583	1.09	9.667	2.68	15.750	2.51	21.83	1.00
3.667	1.09	9.750	2.68	15.833	2.51	21.92	1.00
3.750	1.09	9.833	3.01	15.917	2.51	22.00	1.00
3.833	1.09	9.917	3.01	16.000	2.51	22.08	1.00
3.917	1.09	10.000	3.01	16.083	2.51	22.17	1.00
4.000	1.09	10.083	3.01	16.167	2.51	22.25	1.00
4.083	1.09	10.167	3.01	16.250	2.51	22.33	1.00
4.167	1.09	10.250	3.01	16.333	1.51	22.42	1.00
4.250	1.09	10.333	3.85	16.417	1.51	22.50	1.00
4.333	1.34	10.417	3.85	16.500	1.51	22.58	1.00
4.417	1.34	10.500	3.85	16.583	1.51	22.67	1.00
4.500	1.34	10.583	3.85	16.667	1.51	22.75	1.00
4.583	1.34	10.667	3.85	16.750	1.51	22.83	1.00
4.667	1.34	10.750	3.85	16.833	1.51	22.92	1.00
4.750	1.34	10.833	5.19	16.917	1.51	23.00	1.00
4.833	1.34	10.917	5.19	17.000	1.51	23.08	1.00
4.917	1.34	11.000	5.19	17.083	1.51	23.17	1.00
5.000	1.34	11.083	5.19	17.167	1.51	23.25	1.00
5.083	1.34	11.167	5.19	17.250	1.51	23.33	1.00
5.167	1.34	11.250	5.19	17.333	1.51	23.42	1.00
5.250	1.34	11.333	8.03	17.417	1.51	23.50	1.00
5.333	1.34	11.417	8.03	17.500	1.51	23.58	1.00
5.417	1.34	11.500	8.03	17.583	1.51	23.67	1.00
5.500	1.34	11.583	8.03	17.667	1.51	23.75	1.00
5.583	1.34	11.667	8.03	17.750	1.51	23.83	1.00
5.667	1.34	11.750	8.03	17.833	1.51	23.92	1.00
5.750	1.34	11.833	24.76	17.917	1.51	24.00	1.00
5.833	1.34	11.917	24.76	18.000	1.51	24.08	1.00
5.917	1.34	12.000	24.76	18.083	1.51	24.17	1.00
6.000	1.34	12.083	102.39	18.167	1.51	24.25	1.00
6.083	1.34	12.167	102.40	18.250	1.51		

Max.Eff.Inten.(mm/hr)=	102.40	67.62	
over (min)	15.00	20.00	
Storage Coeff. (min)=	13.51 (ii)	18.32 (ii)	
Unit Hyd. Tpeak (min)=	15.00	20.00	
Unit Hyd. peak (cms)=	0.08	0.06	
			TOTALS
PEAK FLOW (cms)=	14.72	8.10	21.944 (iii)
TIME TO PEAK (hrs)=	12.33	12.42	12.33
RUNOFF VOLUME (mm)=	81.66	35.22	54.22
TOTAL RAINFALL (mm)=	83.66	83.66	83.66
RUNOFF COEFFICIENT =	0.98	0.42	0.65

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 66.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.

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

ADD HYD (0013)|	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0007):		264.40	26.185	12.33	50.32
+ ID2= 2 (0008):		199.48	21.944	12.33	54.22
ID = 3 (0013):		463.88	48.129	12.33	51.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0009)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

<-------- DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	232.00	0.0500	
15.83	231.70	0.0500	
47.63	231.09	0.0500	
57.14	230.76	0.0500	
66.39	229.94	0.0500	
69.72	229.37	0.0500	
102.15	229.37	0.0500	
106.00	229.60	0.0500	
111.50	229.47	0.0500	
143.51	229.14	0.0350	Main Channel
143.80	229.14	0.0350	Main Channel
153.45	229.10	0.0350	Main Channel
157.09	229.15	0.0350	Main Channel
188.81	230.05	0.0350 /0.0500	Main Channel
195.46	230.69	0.0500	
203.04	231.10	0.0500	
226.79	230.80	0.0500	
246.87	230.34	0.0500	
268.22	231.18	0.0500	
298.24	232.00	0.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.05	229.14	.488E+03	0.1	0.26	100.03
0.20	229.29	.601E+04	2.9	0.74	34.93
0.35	229.44	.199E+05	10.9	0.85	30.35
0.50	229.60	.425E+05	30.1	1.10	23.56
0.65	229.75	.676E+05	60.1	1.38	18.75
0.80	229.90	.942E+05	99.6	1.64	15.77
0.95	230.05	.122E+06	147.9	1.88	13.78
1.10	230.20	.152E+06	209.6	2.15	12.05
1.25	230.35	.182E+06	280.3	2.40	10.80
1.40	230.50	.214E+06	359.8	2.62	9.90
1.55	230.65	.249E+06	449.1	2.80	9.25
1.70	230.80	.288E+06	547.2	2.96	8.77
1.85	230.95	.331E+06	651.9	3.06	8.46
2.00	231.10	.380E+06	768.9	3.15	8.23
2.15	231.25	.432E+06	894.7	3.22	8.05
2.30	231.40	.488E+06	1034.8	3.30	7.86
2.45	231.55	.547E+06	1189.4	3.38	7.66
2.60	231.70	.609E+06	1358.9	3.47	7.47
2.75	231.85	.674E+06	1543.0	3.56	7.28

		<---- hydrograph ---->				<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0013)	463.88	48.13	12.33	51.99	0.59	1.25
OUTFLOW:	ID= 1 (0009)	463.88	31.85	12.58	51.99	0.51	1.11

ADD HYD (0005)|	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0004):		221.02	2.545	14.42	24.50
+ ID2= 2 (0009):		463.88	31.845	12.58	51.99
ID = 3 (0005):		684.90	32.592	12.58	43.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0015)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0014):	149.59	7.898	12.33	33.67
	+ ID2= 2 (0005):	684.90	32.592	12.58	43.12
	ID = 3 (0015):	834.49	39.739	12.58	41.43

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0006)		
IN= 2---> OUT= 1	Routing time step (min)'=	5.00

<-------- DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	228.00	0.0500	
212.52	225.39	0.0350	Main Channel
213.15	225.38	0.0350	Main Channel
213.73	225.38	0.0350	Main Channel
214.27	225.38	0.0350	Main Channel
214.91	225.37	0.0350	Main Channel
226.52	222.62	0.0350	Main Channel
226.60	222.60	0.0350	Main Channel
226.65	222.60	0.0350	Main Channel
229.30	222.50	0.0350	Main Channel
233.70	222.33	0.0350	Main Channel
236.82	222.33	0.0350	Main Channel
247.01	222.75	0.0350	Main Channel
247.81	223.00	0.0350	Main Channel
257.03	225.86	0.0500	
257.30	225.87	0.0500	
257.55	225.87	0.0500	
257.81	225.88	0.0500	
367.45	228.00	0.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.28	222.61	.312E+04	1.8	0.63	29.35
0.56	222.89	.939E+04	9.3	1.10	16.83
0.83	223.17	.165E+05	22.5	1.51	12.27
1.11	223.44	.243E+05	40.4	1.85	10.04
1.39	223.72	.328E+05	63.0	2.14	8.67
1.67	224.00	.418E+05	90.2	2.40	7.73
1.95	224.28	.516E+05	122.1	2.64	7.04
2.23	224.56	.619E+05	158.8	2.86	6.50
2.50	224.83	.729E+05	200.5	3.06	6.06
2.78	225.11	.846E+05	247.2	3.25	5.70
3.06	225.39	.969E+05	288.7	3.32	5.59
3.39	225.72	.118E+06	367.2	3.48	5.33
3.71	226.04	.149E+06	465.5	3.48	5.34
4.04	226.37	.196E+06	591.4	3.36	5.52
4.36	226.70	.258E+06	749.5	3.23	5.74
4.69	227.02	.337E+06	946.2	3.13	5.93
5.02	227.35	.431E+06	1187.1	3.07	6.05
5.34	227.67	.540E+06	1477.5	3.04	6.10
5.67	228.00	.666E+06	1822.2	3.05	6.09

		<---- hydrograph ---->			<-pipe / channel->	
	AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL
	(ha)	(cms)	(hrs)	(mm)	(m)	(m/s)
INFLOW : ID= 2 (0015)	834.49	39.74	12.58	41.43	1.10	1.83
OUTFLOW: ID= 1 (0006)	834.49	37.00	12.67	41.43	1.06	1.77

ADD HYD (0003)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0001):	161.19	2.411	14.42	32.15
	+ ID2= 2 (0006):	834.49	36.995	12.67	41.43
	ID = 3 (0003):	995.68	37.818	12.67	39.93

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
       V    V   I    SSSSS  U   U    A    L             (v 6.2.2008)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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

Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2021 Smart City Water Inc
All rights reserved.

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\281c9b33-3d
Summary filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\281c9b33-3d

DATE: 02-27-2023 TIME: 10:10:58

USER:

COMMENTS: _____

****
** SIMULATION : B - 25yr 24hr 15min SCS **
****

READ STORM	Filename: C:\Users\jchowen\AppData\Local\Temp\50702b2f-89c2-43ff-9553-8a4048d6a62f\1ed50804
Ptotal= 98.64 mm	Comments: 25yr 24hr 15min SCS

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.78	12.50	14.20	18.75	1.78
0.25	1.09	6.50	1.78	12.75	7.30	19.00	1.78
0.50	1.09	6.75	1.78	13.00	7.30	19.25	1.78
0.75	1.09	7.00	1.78	13.25	5.33	19.50	1.78
1.00	1.09	7.25	2.17	13.50	5.33	19.75	1.78
1.25	1.09	7.50	2.17	13.75	4.14	20.00	1.78
1.50	1.09	7.75	2.17	14.00	4.14	20.25	1.18
1.75	1.09	8.00	2.17	14.25	2.96	20.50	1.18
2.00	1.09	8.25	2.56	14.50	2.96	20.75	1.18
2.25	1.28	8.50	2.56	14.75	2.96	21.00	1.18
2.50	1.28	8.75	2.76	15.00	2.96	21.25	1.18
2.75	1.28	9.00	2.76	15.25	2.96	21.50	1.18
3.00	1.28	9.25	3.16	15.50	2.96	21.75	1.18
3.25	1.28	9.50	3.16	15.75	2.96	22.00	1.18
3.50	1.28	9.75	3.55	16.00	2.96	22.25	1.18
3.75	1.28	10.00	3.55	16.25	1.78	22.50	1.18
4.00	1.28	10.25	4.54	16.50	1.78	22.75	1.18
4.25	1.58	10.50	4.54	16.75	1.78	23.00	1.18
4.50	1.58	10.75	6.12	17.00	1.78	23.25	1.18
4.75	1.58	11.00	6.12	17.25	1.78	23.50	1.18
5.00	1.58	11.25	9.47	17.50	1.78	23.75	1.18
5.25	1.58	11.50	9.47	17.75	1.78	24.00	1.18
5.50	1.58	11.75	29.20	18.00	1.78		
5.75	1.58	12.00	120.74	18.25	1.78		
6.00	1.58	12.25	14.20	18.50	1.78		

CALIB	
NASHYD (0001)	Area (ha)= 161.19 Curve Number (CN)= 71.2
ID= 1 DT= 5.0 min	Ia (mm)= 7.90 # of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 2.01

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.58	12.250	120.74	18.33	1.78
0.167	0.00	6.250	1.58	12.333	14.22	18.42	1.78
0.250	0.00	6.333	1.78	12.417	14.20	18.50	1.78
0.333	1.09	6.417	1.78	12.500	14.20	18.58	1.78
0.417	1.09	6.500	1.78	12.583	14.20	18.67	1.78
0.500	1.09	6.583	1.78	12.667	14.20	18.75	1.78
0.583	1.09	6.667	1.78	12.750	14.20	18.83	1.78
0.667	1.09	6.750	1.78	12.833	7.30	18.92	1.78
0.750	1.09	6.833	1.78	12.917	7.30	19.00	1.78
0.833	1.09	6.917	1.78	13.000	7.30	19.08	1.78
0.917	1.09	7.000	1.78	13.083	7.30	19.17	1.78
1.000	1.09	7.083	1.78	13.167	7.30	19.25	1.78
1.083	1.09	7.167	1.78	13.250	7.30	19.33	1.78
1.167	1.09	7.250	1.78	13.333	5.33	19.42	1.78
1.250	1.09	7.333	2.17	13.417	5.33	19.50	1.78
1.333	1.09	7.417	2.17	13.500	5.33	19.58	1.78
1.417	1.09	7.500	2.17	13.583	5.33	19.67	1.78
1.500	1.09	7.583	2.17	13.667	5.33	19.75	1.78
1.583	1.09	7.667	2.17	13.750	5.33	19.83	1.78
1.667	1.09	7.750	2.17	13.833	4.14	19.92	1.78
1.750	1.09	7.833	2.17	13.917	4.14	20.00	1.78
1.833	1.09	7.917	2.17	14.000	4.14	20.08	1.78
1.917	1.09	8.000	2.17	14.083	4.14	20.17	1.78
2.000	1.09	8.083	2.17	14.167	4.14	20.25	1.78
2.083	1.09	8.167	2.17	14.250	4.14	20.33	1.18
2.167	1.09	8.250	2.17	14.333	2.96	20.42	1.18
2.250	1.09	8.333	2.56	14.417	2.96	20.50	1.18
2.333	1.28	8.417	2.56	14.500	2.96	20.58	1.18
2.417	1.28	8.500	2.56	14.583	2.96	20.67	1.18
2.500	1.28	8.583	2.56	14.667	2.96	20.75	1.18
2.583	1.28	8.667	2.56	14.750	2.96	20.83	1.18
2.667	1.28	8.750	2.56	14.833	2.96	20.92	1.18
2.750	1.28	8.833	2.76	14.917	2.96	21.00	1.18
2.833	1.28	8.917	2.76	15.000	2.96	21.08	1.18
2.917	1.28	9.000	2.76	15.083	2.96	21.17	1.18
3.000	1.28	9.083	2.76	15.167	2.96	21.25	1.18
3.083	1.28	9.167	2.76	15.250	2.96	21.33	1.18
3.167	1.28	9.250	2.76	15.333	2.96	21.42	1.18
3.250	1.28	9.333	3.16	15.417	2.96	21.50	1.18
3.333	1.28	9.417	3.16	15.500	2.96	21.58	1.18
3.417	1.28	9.500	3.16	15.583	2.96	21.67	1.18
3.500	1.28	9.583	3.16	15.667	2.96	21.75	1.18
3.583	1.28	9.667	3.16	15.750	2.96	21.83	1.18
3.667	1.28	9.750	3.16	15.833	2.96	21.92	1.18
3.750	1.28	9.833	3.55	15.917	2.96	22.00	1.18
3.833	1.28	9.917	3.55	16.000	2.96	22.08	1.18
3.917	1.28	10.000	3.55	16.083	2.96	22.17	1.18
4.000	1.28	10.083	3.55	16.167	2.96	22.25	1.18
4.083	1.28	10.167	3.55	16.250	2.96	22.33	1.18
4.167	1.28	10.250	3.55	16.333	1.78	22.42	1.18
4.250	1.28	10.333	4.54	16.417	1.78	22.50	1.18
4.333	1.58	10.417	4.54	16.500	1.78	22.58	1.18
4.417	1.58	10.500	4.54	16.583	1.78	22.67	1.18
4.500	1.58	10.583	4.54	16.667	1.78	22.75	1.18
4.583	1.58	10.667	4.54	16.750	1.78	22.83	1.18
4.667	1.58	10.750	4.54	16.833	1.78	22.92	1.18
4.750	1.58	10.833	6.12	16.917	1.78	23.00	1.18
4.833	1.58	10.917	6.12	17.000	1.78	23.08	1.18
4.917	1.58	11.000	6.12	17.083	1.78	23.17	1.18
5.000	1.58	11.083	6.12	17.167	1.78	23.25	1.18
5.083	1.58	11.167	6.12	17.250	1.78	23.33	1.18
5.167	1.58	11.250	6.12	17.333	1.78	23.42	1.18
5.250	1.58	11.333	9.47	17.417	1.78	23.50	1.18
5.333	1.58	11.417	9.47	17.500	1.78	23.58	1.18
5.417	1.58	11.500	9.47	17.583	1.78	23.67	1.18
5.500	1.58	11.583	9.47	17.667	1.78	23.75	1.18
5.583	1.58	11.667	9.47	17.750	1.78	23.83	1.18
5.667	1.58	11.750	9.47	17.833	1.78	23.92	1.18
5.750	1.58	11.833	29.20	17.917	1.78	24.00	1.18
5.833	1.58	11.917	29.20	18.000	1.78	24.08	1.18
5.917	1.58	12.000	29.20	18.083	1.78	24.17	1.18
6.000	1.58	12.083	120.72	18.167	1.78	24.25	1.18
6.083	1.58	12.167	120.74	18.250	1.78		

Unit Hyd Qpeak (cms)= 3.063

PEAK FLOW (cms)= 3.223 (i)
TIME TO PEAK (hrs)= 14.417
RUNOFF VOLUME (mm)= 42.556
TOTAL RAINFALL (mm)= 98.640

RUNOFF COEFFICIENT = 0.431

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

CALIB	
STANDHYD (0014)	Area (ha)= 149.59
ID= 1 DT= 5.0 min	Total Imp(%)= 21.50 Dir. Conn.(%)= 13.60

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	32.16	117.43
Dep. Storage	(mm)=	1.00	8.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	998.63	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.58	12.250	120.74	18.33	1.78
0.167	0.00	6.250	1.58	12.333	14.22	18.42	1.78
0.250	0.00	6.333	1.78	12.417	14.20	18.50	1.78
0.333	1.09	6.417	1.78	12.500	14.20	18.58	1.78
0.417	1.09	6.500	1.78	12.583	14.20	18.67	1.78
0.500	1.09	6.583	1.78	12.667	14.20	18.75	1.78
0.583	1.09	6.667	1.78	12.750	14.20	18.83	1.78
0.667	1.09	6.750	1.78	12.833	7.30	18.92	1.78
0.750	1.09	6.833	1.78	12.917	7.30	19.00	1.78
0.833	1.09	6.917	1.78	13.000	7.30	19.08	1.78
0.917	1.09	7.000	1.78	13.083	7.30	19.17	1.78
1.000	1.09	7.083	1.78	13.167	7.30	19.25	1.78
1.083	1.09	7.167	1.78	13.250	7.30	19.33	1.78
1.167	1.09	7.250	1.78	13.333	5.33	19.42	1.78
1.250	1.09	7.333	2.17	13.417	5.33	19.50	1.78
1.333	1.09	7.417	2.17	13.500	5.33	19.58	1.78
1.417	1.09	7.500	2.17	13.583	5.33	19.67	1.78
1.500	1.09	7.583	2.17	13.667	5.33	19.75	1.78
1.583	1.09	7.667	2.17	13.750	5.33	19.83	1.78
1.667	1.09	7.750	2.17	13.833	4.14	19.92	1.78
1.750	1.09	7.833	2.17	13.917	4.14	20.00	1.78
1.833	1.09	7.917	2.17	14.000	4.14	20.08	1.78
1.917	1.09	8.000	2.17	14.083	4.14	20.17	1.78
2.000	1.09	8.083	2.17	14.167	4.14	20.25	1.78
2.083	1.09	8.167	2.17	14.250	4.14	20.33	1.18
2.167	1.09	8.250	2.17	14.333	2.96	20.42	1.18
2.250	1.09	8.333	2.56	14.417	2.96	20.50	1.18
2.333	1.28	8.417	2.56	14.500	2.96	20.58	1.18
2.417	1.28	8.500	2.56	14.583	2.96	20.67	1.18
2.500	1.28	8.583	2.56	14.667	2.96	20.75	1.18
2.583	1.28	8.667	2.56	14.750	2.96	20.83	1.18
2.667	1.28	8.750	2.56	14.833	2.96	20.92	1.18
2.750	1.28	8.833	2.76	14.917	2.96	21.00	1.18
2.833	1.28	8.917	2.76	15.000	2.96	21.08	1.18
2.917	1.28	9.000	2.76	15.083	2.96	21.17	1.18
3.000	1.28	9.083	2.76	15.167	2.96	21.25	1.18
3.083	1.28	9.167	2.76	15.250	2.96	21.33	1.18
3.167	1.28	9.250	2.76	15.333	2.96	21.42	1.18
3.250	1.28	9.333	3.16	15.417	2.96	21.50	1.18
3.333	1.28	9.417	3.16	15.500	2.96	21.58	1.18
3.417	1.28	9.500	3.16	15.583	2.96	21.67	1.18
3.500	1.28	9.583	3.16	15.667	2.96	21.75	1.18
3.583	1.28	9.667	3.16	15.750	2.96	21.83	1.18
3.667	1.28	9.750	3.16	15.833	2.96	21.92	1.18
3.750	1.28	9.833	3.55	15.917	2.96	22.00	1.18
3.833	1.28	9.917	3.55	16.000	2.96	22.08	1.18
3.917	1.28	10.000	3.55	16.083	2.96	22.17	1.18
4.000	1.28	10.083	3.55	16.167	2.96	22.25	1.18
4.083	1.28	10.167	3.55	16.250	2.96	22.33	1.18
4.167	1.28	10.250	3.55	16.333	1.78	22.42	1.18
4.250	1.28	10.333	4.54	16.417	1.78	22.50	1.18
4.333	1.58	10.417	4.54	16.500	1.78	22.58	1.18
4.417	1.58	10.500	4.54	16.583	1.78	22.67	1.18
4.500	1.58	10.583	4.54	16.667	1.78	22.75	1.18
4.583	1.58	10.667	4.54	16.750	1.78	22.83	1.18
4.667	1.58	10.750	4.54	16.833	1.78	22.92	1.18
4.750	1.58	10.833	6.12	16.917	1.78	23.00	1.18
4.833	1.58	10.917	6.12	17.000	1.78	23.08	1.18
4.917	1.58	11.000	6.12	17.083	1.78	23.17	1.18
5.000	1.58	11.083	6.12	17.167	1.78	23.25	1.18
5.083	1.58	11.167	6.12	17.250	1.78	23.33	1.18

5.167	1.58	11.250	6.12	17.333	1.78	23.42	1.18
5.250	1.58	11.333	9.47	17.417	1.78	23.50	1.18
5.333	1.58	11.417	9.47	17.500	1.78	23.58	1.18
5.417	1.58	11.500	9.47	17.583	1.78	23.67	1.18
5.500	1.58	11.583	9.47	17.667	1.78	23.75	1.18
5.583	1.58	11.667	9.47	17.750	1.78	23.83	1.18
5.667	1.58	11.750	9.47	17.833	1.78	23.92	1.18
5.750	1.58	11.833	29.20	17.917	1.78	24.00	1.18
5.833	1.58	11.917	29.20	18.000	1.78	24.08	1.18
5.917	1.58	12.000	29.20	18.083	1.78	24.17	1.18
6.000	1.58	12.083	120.72	18.167	1.78	24.25	1.18
6.083	1.58	12.167	120.74	18.250	1.78		

Max.Eff.Inten.(mm/hr)=	120.74	56.94	
over (min)	10.00	25.00	
Storage Coeff. (min)=	11.60 (ii)	20.44 (ii)	
Unit Hyd. Tpeak (min)=	10.00	25.00	
Unit Hyd. peak (cms)=	0.10	0.05	
			TOTALS
PEAK FLOW (cms)=	4.85	7.92	10.540 (iii)
TIME TO PEAK (hrs)=	12.25	12.50	12.42
RUNOFF VOLUME (mm)=	97.64	34.83	43.37
TOTAL RAINFALL (mm)=	98.64	98.64	98.64
RUNOFF COEFFICIENT =	0.99	0.35	0.44

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 61.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
NASHYD (0004)	Area (ha)= 221.02	Curve Number (CN)= 61.5	
ID= 1 DT= 5.0 min	Ia (mm)= 7.80	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.93		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.58	12.250	120.74	18.33	1.78
0.167	0.00	6.250	1.58	12.333	14.22	18.42	1.78
0.250	0.00	6.333	1.78	12.417	14.20	18.50	1.78
0.333	1.09	6.417	1.78	12.500	14.20	18.58	1.78
0.417	1.09	6.500	1.78	12.583	14.20	18.67	1.78
0.500	1.09	6.583	1.78	12.667	14.20	18.75	1.78
0.583	1.09	6.667	1.78	12.750	14.20	18.83	1.78
0.667	1.09	6.750	1.78	12.833	7.30	18.92	1.78
0.750	1.09	6.833	1.78	12.917	7.30	19.00	1.78
0.833	1.09	6.917	1.78	13.000	7.30	19.08	1.78
0.917	1.09	7.000	1.78	13.083	7.30	19.17	1.78
1.000	1.09	7.083	1.78	13.167	7.30	19.25	1.78
1.083	1.09	7.167	1.78	13.250	7.30	19.33	1.78
1.167	1.09	7.250	1.78	13.333	5.33	19.42	1.78
1.250	1.09	7.333	2.17	13.417	5.33	19.50	1.78
1.333	1.09	7.417	2.17	13.500	5.33	19.58	1.78
1.417	1.09	7.500	2.17	13.583	5.33	19.67	1.78
1.500	1.09	7.583	2.17	13.667	5.33	19.75	1.78
1.583	1.09	7.667	2.17	13.750	5.33	19.83	1.78
1.667	1.09	7.750	2.17	13.833	4.14	19.92	1.78
1.750	1.09	7.833	2.17	13.917	4.14	20.00	1.78
1.833	1.09	7.917	2.17	14.000	4.14	20.08	1.78
1.917	1.09	8.000	2.17	14.083	4.14	20.17	1.78
2.000	1.09	8.083	2.17	14.167	4.14	20.25	1.78
2.083	1.09	8.167	2.17	14.250	4.14	20.33	1.18
2.167	1.09	8.250	2.17	14.333	2.96	20.42	1.18
2.250	1.09	8.333	2.56	14.417	2.96	20.50	1.18
2.333	1.28	8.417	2.56	14.500	2.96	20.58	1.18
2.417	1.28	8.500	2.56	14.583	2.96	20.67	1.18
2.500	1.28	8.583	2.56	14.667	2.96	20.75	1.18
2.583	1.28	8.667	2.56	14.750	2.96	20.83	1.18
2.667	1.28	8.750	2.56	14.833	2.96	20.92	1.18
2.750	1.28	8.833	2.76	14.917	2.96	21.00	1.18
2.833	1.28	8.917	2.76	15.000	2.96	21.08	1.18
2.917	1.28	9.000	2.76	15.083	2.96	21.17	1.18
3.000	1.28	9.083	2.76	15.167	2.96	21.25	1.18
3.083	1.28	9.167	2.76	15.250	2.96	21.33	1.18

3.167	1.28	9.250	2.76	15.333	2.96	21.42	1.18
3.250	1.28	9.333	3.16	15.417	2.96	21.50	1.18
3.333	1.28	9.417	3.16	15.500	2.96	21.58	1.18
3.417	1.28	9.500	3.16	15.583	2.96	21.67	1.18
3.500	1.28	9.583	3.16	15.667	2.96	21.75	1.18
3.583	1.28	9.667	3.16	15.750	2.96	21.83	1.18
3.667	1.28	9.750	3.16	15.833	2.96	21.92	1.18
3.750	1.28	9.833	3.55	15.917	2.96	22.00	1.18
3.833	1.28	9.917	3.55	16.000	2.96	22.08	1.18
3.917	1.28	10.000	3.55	16.083	2.96	22.17	1.18
4.000	1.28	10.083	3.55	16.167	2.96	22.25	1.18
4.083	1.28	10.167	3.55	16.250	2.96	22.33	1.18
4.167	1.28	10.250	3.55	16.333	1.78	22.42	1.18
4.250	1.28	10.333	4.54	16.417	1.78	22.50	1.18
4.333	1.58	10.417	4.54	16.500	1.78	22.58	1.18
4.417	1.58	10.500	4.54	16.583	1.78	22.67	1.18
4.500	1.58	10.583	4.54	16.667	1.78	22.75	1.18
4.583	1.58	10.667	4.54	16.750	1.78	22.83	1.18
4.667	1.58	10.750	4.54	16.833	1.78	22.92	1.18
4.750	1.58	10.833	6.12	16.917	1.78	23.00	1.18
4.833	1.58	10.917	6.12	17.000	1.78	23.08	1.18
4.917	1.58	11.000	6.12	17.083	1.78	23.17	1.18
5.000	1.58	11.083	6.12	17.167	1.78	23.25	1.18
5.083	1.58	11.167	6.12	17.250	1.78	23.33	1.18
5.167	1.58	11.250	6.12	17.333	1.78	23.42	1.18
5.250	1.58	11.333	9.47	17.417	1.78	23.50	1.18
5.333	1.58	11.417	9.47	17.500	1.78	23.58	1.18
5.417	1.58	11.500	9.47	17.583	1.78	23.67	1.18
5.500	1.58	11.583	9.47	17.667	1.78	23.75	1.18
5.583	1.58	11.667	9.47	17.750	1.78	23.83	1.18
5.667	1.58	11.750	9.47	17.833	1.78	23.92	1.18
5.750	1.58	11.833	29.20	17.917	1.78	24.00	1.18
5.833	1.58	11.917	29.20	18.000	1.78	24.08	1.18
5.917	1.58	12.000	29.20	18.083	1.78	24.17	1.18
6.000	1.58	12.083	120.72	18.167	1.78	24.25	1.18
6.083	1.58	12.167	120.74	18.250	1.78		

Unit Hyd Qpeak (cms)= 4.374

PEAK FLOW (cms)= 3.465 (i)
TIME TO PEAK (hrs)= 14.333
RUNOFF VOLUME (mm)= 33.028
TOTAL RAINFALL (mm)= 98.640
RUNOFF COEFFICIENT = 0.335

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

CALIB
STANDHYD (0007)
ID= 1 DT= 5.0 min

Area (ha)= 264.40
Total Imp(%)= 51.10 Dir. Conn.(%)= 41.40

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	135.11	129.29
Dep. Storage	(mm)=	2.00	5.90
Average Slope	(%)=	0.50	2.00
Length	(m)=	1327.65	20.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.58	12.250	120.74	18.33	1.78
0.167	0.00	6.250	1.58	12.333	14.22	18.42	1.78
0.250	0.00	6.333	1.78	12.417	14.20	18.50	1.78
0.333	1.09	6.417	1.78	12.500	14.20	18.58	1.78
0.417	1.09	6.500	1.78	12.583	14.20	18.67	1.78
0.500	1.09	6.583	1.78	12.667	14.20	18.75	1.78
0.583	1.09	6.667	1.78	12.750	14.20	18.83	1.78
0.667	1.09	6.750	1.78	12.833	7.30	18.92	1.78
0.750	1.09	6.833	1.78	12.917	7.30	19.00	1.78
0.833	1.09	6.917	1.78	13.000	7.30	19.08	1.78
0.917	1.09	7.000	1.78	13.083	7.30	19.17	1.78
1.000	1.09	7.083	1.78	13.167	7.30	19.25	1.78
1.083	1.09	7.167	1.78	13.250	7.30	19.33	1.78
1.167	1.09	7.250	1.78	13.333	5.33	19.42	1.78
1.250	1.09	7.333	2.17	13.417	5.33	19.50	1.78
1.333	1.09	7.417	2.17	13.500	5.33	19.58	1.78
1.417	1.09	7.500	2.17	13.583	5.33	19.67	1.78
1.500	1.09	7.583	2.17	13.667	5.33	19.75	1.78

1.583	1.09	7.667	2.17	13.750	5.33	19.83	1.78
1.667	1.09	7.750	2.17	13.833	4.14	19.92	1.78
1.750	1.09	7.833	2.17	13.917	4.14	20.00	1.78
1.833	1.09	7.917	2.17	14.000	4.14	20.08	1.78
1.917	1.09	8.000	2.17	14.083	4.14	20.17	1.78
2.000	1.09	8.083	2.17	14.167	4.14	20.25	1.78
2.083	1.09	8.167	2.17	14.250	4.14	20.33	1.18
2.167	1.09	8.250	2.17	14.333	2.96	20.42	1.18
2.250	1.09	8.333	2.56	14.417	2.96	20.50	1.18
2.333	1.28	8.417	2.56	14.500	2.96	20.58	1.18
2.417	1.28	8.500	2.56	14.583	2.96	20.67	1.18
2.500	1.28	8.583	2.56	14.667	2.96	20.75	1.18
2.583	1.28	8.667	2.56	14.750	2.96	20.83	1.18
2.667	1.28	8.750	2.56	14.833	2.96	20.92	1.18
2.750	1.28	8.833	2.76	14.917	2.96	21.00	1.18
2.833	1.28	8.917	2.76	15.000	2.96	21.08	1.18
2.917	1.28	9.000	2.76	15.083	2.96	21.17	1.18
3.000	1.28	9.083	2.76	15.167	2.96	21.25	1.18
3.083	1.28	9.167	2.76	15.250	2.96	21.33	1.18
3.167	1.28	9.250	2.76	15.333	2.96	21.42	1.18
3.250	1.28	9.333	3.16	15.417	2.96	21.50	1.18
3.333	1.28	9.417	3.16	15.500	2.96	21.58	1.18
3.417	1.28	9.500	3.16	15.583	2.96	21.67	1.18
3.500	1.28	9.583	3.16	15.667	2.96	21.75	1.18
3.583	1.28	9.667	3.16	15.750	2.96	21.83	1.18
3.667	1.28	9.750	3.16	15.833	2.96	21.92	1.18
3.750	1.28	9.833	3.55	15.917	2.96	22.00	1.18
3.833	1.28	9.917	3.55	16.000	2.96	22.08	1.18
3.917	1.28	10.000	3.55	16.083	2.96	22.17	1.18
4.000	1.28	10.083	3.55	16.167	2.96	22.25	1.18
4.083	1.28	10.167	3.55	16.250	2.96	22.33	1.18
4.167	1.28	10.250	3.55	16.333	1.78	22.42	1.18
4.250	1.28	10.333	4.54	16.417	1.78	22.50	1.18
4.333	1.58	10.417	4.54	16.500	1.78	22.58	1.18
4.417	1.58	10.500	4.54	16.583	1.78	22.67	1.18
4.500	1.58	10.583	4.54	16.667	1.78	22.75	1.18
4.583	1.58	10.667	4.54	16.750	1.78	22.83	1.18
4.667	1.58	10.750	4.54	16.833	1.78	22.92	1.18
4.750	1.58	10.833	6.12	16.917	1.78	23.00	1.18
4.833	1.58	10.917	6.12	17.000	1.78	23.08	1.18
4.917	1.58	11.000	6.12	17.083	1.78	23.17	1.18
5.000	1.58	11.083	6.12	17.167	1.78	23.25	1.18
5.083	1.58	11.167	6.12	17.250	1.78	23.33	1.18
5.167	1.58	11.250	6.12	17.333	1.78	23.42	1.18
5.250	1.58	11.333	9.47	17.417	1.78	23.50	1.18
5.333	1.58	11.417	9.47	17.500	1.78	23.58	1.18
5.417	1.58	11.500	9.47	17.583	1.78	23.67	1.18
5.500	1.58	11.583	9.47	17.667	1.78	23.75	1.18
5.583	1.58	11.667	9.47	17.750	1.78	23.83	1.18
5.667	1.58	11.750	9.47	17.833	1.78	23.92	1.18
5.750	1.58	11.833	29.20	17.917	1.78	24.00	1.18
5.833	1.58	11.917	29.20	18.000	1.78	24.08	1.18
5.917	1.58	12.000	29.20	18.083	1.78	24.17	1.18
6.000	1.58	12.083	120.72	18.167	1.78	24.25	1.18
6.083	1.58	12.167	120.74	18.250	1.78		

Max.Eff.Inten.(mm/hr)=	120.73	65.87	
over (min)	15.00	20.00	
Storage Coeff. (min)=	13.76 (ii)	18.38 (ii)	
Unit Hyd. Tpeak (min)=	15.00	20.00	
Unit Hyd. peak (cms)=	0.08	0.06	
			TOTALS
PEAK FLOW (cms)=	23.11	11.17	33.033 (iii)
TIME TO PEAK (hrs)=	12.33	12.42	12.33
RUNOFF VOLUME (mm)=	96.64	37.37	61.91
TOTAL RAINFALL (mm)=	98.64	98.64	98.64
RUNOFF COEFFICIENT =	0.98	0.38	0.63

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 60.0 Ia = Dep. 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 (0008)	Area (ha)= 199.48
ID= 1 DT= 5.0 min	Total Imp(%)= 54.60 Dir. Conn.(%)= 40.90

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	108.92	90.56
Dep. Storage	(mm)=	2.00	5.20

Average Slope	(%)=	0.50	2.00
Length	(m)=	1153.20	20.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.58	12.250	120.74	18.33	1.78
0.167	0.00	6.250	1.58	12.333	14.22	18.42	1.78
0.250	0.00	6.333	1.78	12.417	14.20	18.50	1.78
0.333	1.09	6.417	1.78	12.500	14.20	18.58	1.78
0.417	1.09	6.500	1.78	12.583	14.20	18.67	1.78
0.500	1.09	6.583	1.78	12.667	14.20	18.75	1.78
0.583	1.09	6.667	1.78	12.750	14.20	18.83	1.78
0.667	1.09	6.750	1.78	12.833	7.30	18.92	1.78
0.750	1.09	6.833	1.78	12.917	7.30	19.00	1.78
0.833	1.09	6.917	1.78	13.000	7.30	19.08	1.78
0.917	1.09	7.000	1.78	13.083	7.30	19.17	1.78
1.000	1.09	7.083	1.78	13.167	7.30	19.25	1.78
1.083	1.09	7.167	1.78	13.250	7.30	19.33	1.78
1.167	1.09	7.250	1.78	13.333	5.33	19.42	1.78
1.250	1.09	7.333	2.17	13.417	5.33	19.50	1.78
1.333	1.09	7.417	2.17	13.500	5.33	19.58	1.78
1.417	1.09	7.500	2.17	13.583	5.33	19.67	1.78
1.500	1.09	7.583	2.17	13.667	5.33	19.75	1.78
1.583	1.09	7.667	2.17	13.750	5.33	19.83	1.78
1.667	1.09	7.750	2.17	13.833	4.14	19.92	1.78
1.750	1.09	7.833	2.17	13.917	4.14	20.00	1.78
1.833	1.09	7.917	2.17	14.000	4.14	20.08	1.78
1.917	1.09	8.000	2.17	14.083	4.14	20.17	1.78
2.000	1.09	8.083	2.17	14.167	4.14	20.25	1.78
2.083	1.09	8.167	2.17	14.250	4.14	20.33	1.18
2.167	1.09	8.250	2.17	14.333	2.96	20.42	1.18
2.250	1.09	8.333	2.56	14.417	2.96	20.50	1.18
2.333	1.28	8.417	2.56	14.500	2.96	20.58	1.18
2.417	1.28	8.500	2.56	14.583	2.96	20.67	1.18
2.500	1.28	8.583	2.56	14.667	2.96	20.75	1.18
2.583	1.28	8.667	2.56	14.750	2.96	20.83	1.18
2.667	1.28	8.750	2.56	14.833	2.96	20.92	1.18
2.750	1.28	8.833	2.76	14.917	2.96	21.00	1.18
2.833	1.28	8.917	2.76	15.000	2.96	21.08	1.18
2.917	1.28	9.000	2.76	15.083	2.96	21.17	1.18
3.000	1.28	9.083	2.76	15.167	2.96	21.25	1.18
3.083	1.28	9.167	2.76	15.250	2.96	21.33	1.18
3.167	1.28	9.250	2.76	15.333	2.96	21.42	1.18
3.250	1.28	9.333	3.16	15.417	2.96	21.50	1.18
3.333	1.28	9.417	3.16	15.500	2.96	21.58	1.18
3.417	1.28	9.500	3.16	15.583	2.96	21.67	1.18
3.500	1.28	9.583	3.16	15.667	2.96	21.75	1.18
3.583	1.28	9.667	3.16	15.750	2.96	21.83	1.18
3.667	1.28	9.750	3.16	15.833	2.96	21.92	1.18
3.750	1.28	9.833	3.55	15.917	2.96	22.00	1.18
3.833	1.28	9.917	3.55	16.000	2.96	22.08	1.18
3.917	1.28	10.000	3.55	16.083	2.96	22.17	1.18
4.000	1.28	10.083	3.55	16.167	2.96	22.25	1.18
4.083	1.28	10.167	3.55	16.250	2.96	22.33	1.18
4.167	1.28	10.250	3.55	16.333	1.78	22.42	1.18
4.250	1.28	10.333	4.54	16.417	1.78	22.50	1.18
4.333	1.58	10.417	4.54	16.500	1.78	22.58	1.18
4.417	1.58	10.500	4.54	16.583	1.78	22.67	1.18
4.500	1.58	10.583	4.54	16.667	1.78	22.75	1.18
4.583	1.58	10.667	4.54	16.750	1.78	22.83	1.18
4.667	1.58	10.750	4.54	16.833	1.78	22.92	1.18
4.750	1.58	10.833	6.12	16.917	1.78	23.00	1.18
4.833	1.58	10.917	6.12	17.000	1.78	23.08	1.18
4.917	1.58	11.000	6.12	17.083	1.78	23.17	1.18
5.000	1.58	11.083	6.12	17.167	1.78	23.25	1.18
5.083	1.58	11.167	6.12	17.250	1.78	23.33	1.18
5.167	1.58	11.250	6.12	17.333	1.78	23.42	1.18
5.250	1.58	11.333	9.47	17.417	1.78	23.50	1.18
5.333	1.58	11.417	9.47	17.500	1.78	23.58	1.18
5.417	1.58	11.500	9.47	17.583	1.78	23.67	1.18
5.500	1.58	11.583	9.47	17.667	1.78	23.75	1.18
5.583	1.58	11.667	9.47	17.750	1.78	23.83	1.18
5.667	1.58	11.750	9.47	17.833	1.78	23.92	1.18
5.750	1.58	11.833	29.20	17.917	1.78	24.00	1.18
5.833	1.58	11.917	29.20	18.000	1.78	24.08	1.18
5.917	1.58	12.000	29.20	18.083	1.78	24.17	1.18
6.000	1.58	12.083	120.72	18.167	1.78	24.25	1.18
6.083	1.58	12.167	120.74	18.250	1.78		

Max.Eff.Inten.(mm/hr)=	120.73	88.01	
over (min)	15.00	20.00	
Storage Coeff. (min)=	12.65 (ii)	17.15 (ii)	
Unit Hyd. Tpeak (min)=	15.00	20.00	
Unit Hyd. peak (cms)=	0.08	0.06	
			TOTALS
PEAK FLOW (cms)=	17.81	10.97	27.676 (iii)
TIME TO PEAK (hrs)=	12.33	12.42	12.33
RUNOFF VOLUME (mm)=	96.64	45.90	66.65
TOTAL RAINFALL (mm)=	98.64	98.64	98.64
RUNOFF COEFFICIENT =	0.98	0.47	0.68

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 66.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0013)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0007):		264.40	33.033	12.33	61.91
+ ID2= 2 (0008):		199.48	27.676	12.33	66.65
ID = 3 (0013):		463.88	60.709	12.33	63.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0009)
IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	232.00	0.0500	
15.83	231.70	0.0500	
47.63	231.09	0.0500	
57.14	230.76	0.0500	
66.39	229.94	0.0500	
69.72	229.37	0.0500	
102.15	229.37	0.0500	
106.00	229.60	0.0500	
111.50	229.47	0.0500	
143.51	229.14	0.0350	Main Channel
143.80	229.14	0.0350	Main Channel
153.45	229.10	0.0350	Main Channel
157.09	229.15	0.0350	Main Channel
188.81	230.05	0.0350 /0.0500	Main Channel
195.46	230.69	0.0500	
203.04	231.10	0.0500	
226.79	230.80	0.0500	
246.87	230.34	0.0500	
268.22	231.18	0.0500	
298.24	232.00	0.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.05	229.14	.488E+03	0.1	0.26	100.03
0.20	229.29	.601E+04	2.9	0.74	34.93
0.35	229.44	.199E+05	10.9	0.85	30.35
0.50	229.60	.425E+05	30.1	1.10	23.56
0.65	229.75	.676E+05	60.1	1.38	18.75
0.80	229.90	.942E+05	99.6	1.64	15.77
0.95	230.05	.122E+06	147.9	1.88	13.78
1.10	230.20	.152E+06	209.6	2.15	12.05
1.25	230.35	.182E+06	280.3	2.40	10.80
1.40	230.50	.214E+06	359.8	2.62	9.90
1.55	230.65	.249E+06	449.1	2.80	9.25
1.70	230.80	.288E+06	547.2	2.96	8.77
1.85	230.95	.331E+06	651.9	3.06	8.46
2.00	231.10	.380E+06	768.9	3.15	8.23
2.15	231.25	.432E+06	894.7	3.22	8.05
2.30	231.40	.488E+06	1034.8	3.30	7.86
2.45	231.55	.547E+06	1189.4	3.38	7.66
2.60	231.70	.609E+06	1358.9	3.47	7.47
2.75	231.85	.674E+06	1543.0	3.56	7.28

<---- hydrograph ----> <-pipe / channel->

AREA	QPEAK	TPEAK	R.V.	MAX DEPTH	MAX VEL

```
                              (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0013)  463.88    60.71   12.33  63.95      0.65      1.39
   OUTFLOW: ID= 1 (  0009)  463.88    41.10   12.50  63.95      0.55      1.19



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

--------------------
| ADD HYD  (  0005)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0004):   221.02   3.465    14.33    33.03
     + ID2= 2 (  0009):   463.88  41.102    12.50    63.95
       ================================================
       ID = 3 (  0005):   684.90  41.980    12.50    53.97

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

--------------------
| ADD HYD  (  0015)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0014):   149.59  10.540    12.42    43.37
     + ID2= 2 (  0005):   684.90  41.980    12.50    53.97
       ================================================
       ID = 3 (  0015):   834.49  52.322    12.50    52.07

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0006)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00        228.00        0.0500
                 212.52        225.39        0.0350      Main Channel
                 213.15        225.38        0.0350      Main Channel
                 213.73        225.38        0.0350      Main Channel
                 214.27        225.38        0.0350      Main Channel
                 214.91        225.37        0.0350      Main Channel
                 226.52        222.62        0.0350      Main Channel
                 226.60        222.60        0.0350      Main Channel
                 226.65        222.60        0.0350      Main Channel
                 229.30        222.50        0.0350      Main Channel
                 233.70        222.33        0.0350      Main Channel
                 236.82        222.33        0.0350      Main Channel
                 247.01        222.75        0.0350      Main Channel
                 247.81        223.00        0.0350      Main Channel
                 257.03        225.86        0.0500
                 257.30        225.87        0.0500
                 257.55        225.87        0.0500
                 257.81        225.88        0.0500
                 367.45        228.00        0.0500

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        0.28   222.61    .312E+04       1.8          0.63       29.35
        0.56   222.89    .939E+04       9.3          1.10       16.83
        0.83   223.17    .165E+05      22.5          1.51       12.27
        1.11   223.44    .243E+05      40.4          1.85       10.04
        1.39   223.72    .328E+05      63.0          2.14        8.67
        1.67   224.00    .418E+05      90.2          2.40        7.73
        1.95   224.28    .516E+05     122.1          2.64        7.04
        2.23   224.56    .619E+05     158.8          2.86        6.50
        2.50   224.83    .729E+05     200.5          3.06        6.06
        2.78   225.11    .846E+05     247.2          3.25        5.70
        3.06   225.39    .969E+05     288.7          3.32        5.59
        3.39   225.72    .118E+06     367.2          3.48        5.33
        3.71   226.04    .149E+06     465.5          3.48        5.34
        4.04   226.37    .196E+06     591.4          3.36        5.52
        4.36   226.70    .258E+06     749.5          3.23        5.74
        4.69   227.02    .337E+06     946.2          3.13        5.93
        5.02   227.35    .431E+06    1187.1          3.07        6.05
        5.34   227.67    .540E+06    1477.5          3.04        6.10
        5.67   228.00    .666E+06    1822.2          3.05        6.09

                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0015)  834.49    52.32   12.50  52.07      1.26      1.99
```

```
   OUTFLOW: ID= 1 (  0006)  834.49    48.29   12.67  52.07      1.21      1.94


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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0001):   161.19   3.223    14.42    42.56
     + ID2= 2 (  0006):   834.49  48.290    12.67    52.07
       ================================================
       ID = 3 (  0003):   995.68  49.435    12.67    50.53

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2008)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2021 Smart City Water Inc
All rights reserved.


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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\09faae9e-f0
  Summary filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\09faae9e-f0


DATE: 02-27-2023                          TIME: 10:10:58

USER:


COMMENTS: _____________________________________________________________


--------------------------------------------------------------------------------------------------------------------------------
  ********************************************
  ** SIMULATION : B - 2yr 24hr 15min SCS      **
  ********************************************


--------------------
|    READ STORM    |    Filename: C:\Users\jchowen\AppD
|                  |              ata\Local\Temp\
|                  |              50702b2f-89c2-43ff-9553-8a4048d6a62f\0306d502
| Ptotal= 53.41 mm |    Comments: 2yr 24hr 15min SCS
--------------------
                TIME    RAIN |  TIME    RAIN |'  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |'   hrs   mm/hr |   hrs   mm/hr
                0.00    0.00 |  6.25    0.96 | 12.50    7.69 | 18.75    0.96
                0.25    0.59 |  6.50    0.96 | 12.75    3.95 | 19.00    0.96
                0.50    0.59 |  6.75    0.96 | 13.00    3.95 | 19.25    0.96
                0.75    0.59 |  7.00    0.96 | 13.25    2.88 | 19.50    0.96
                1.00    0.59 |  7.25    1.18 | 13.50    2.88 | 19.75    0.96
                1.25    0.59 |  7.50    1.18 | 13.75    2.24 | 20.00    0.96
                1.50    0.59 |  7.75    1.18 | 14.00    2.24 | 20.25    0.64
                1.75    0.59 |  8.00    1.18 | 14.25    1.60 | 20.50    0.64
                2.00    0.59 |  8.25    1.39 | 14.50    1.60 | 20.75    0.64
                2.25    0.69 |  8.50    1.39 | 14.75    1.60 | 21.00    0.64
                2.50    0.69 |  8.75    1.50 | 15.00    1.60 | 21.25    0.64
                2.75    0.69 |  9.00    1.50 | 15.25    1.60 | 21.50    0.64
                3.00    0.69 |  9.25    1.71 | 15.50    1.60 | 21.75    0.64
                3.25    0.69 |  9.50    1.71 | 15.75    1.60 | 22.00    0.64
                3.50    0.69 |  9.75    1.92 | 16.00    1.60 | 22.25    0.64
                3.75    0.69 | 10.00    1.92 | 16.25    0.96 | 22.50    0.64
                4.00    0.69 | 10.25    2.46 | 16.50    0.96 | 22.75    0.64
                4.25    0.85 | 10.50    2.46 | 16.75    0.96 | 23.00    0.64
                4.50    0.85 | 10.75    3.31 | 17.00    0.96 | 23.25    0.64
```

4.75	0.85	11.00	3.31	17.25	0.96	23.50	0.64
5.00	0.85	11.25	5.13	17.50	0.96	23.75	0.64
5.25	0.85	11.50	5.13	17.75	0.96	24.00	0.64
5.50	0.85	11.75	15.81	18.00	0.96		
5.75	0.85	12.00	65.37	18.25	0.96		
6.00	0.85	12.25	7.69	18.50	0.96		

CALIB			
NASHYD (0001)	Area (ha)= 161.19	Curve Number (CN)= 71.2	
ID= 1 DT= 5.0 min	Ia (mm)= 7.90	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 2.01		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.85	12.250	65.37	18.33	0.96
0.167	0.00	6.250	0.85	12.333	7.70	18.42	0.96
0.250	0.00	6.333	0.96	12.417	7.69	18.50	0.96
0.333	0.59	6.417	0.96	12.500	7.69	18.58	0.96
0.417	0.59	6.500	0.96	12.583	7.69	18.67	0.96
0.500	0.59	6.583	0.96	12.667	7.69	18.75	0.96
0.583	0.59	6.667	0.96	12.750	7.69	18.83	0.96
0.667	0.59	6.750	0.96	12.833	3.95	18.92	0.96
0.750	0.59	6.833	0.96	12.917	3.95	19.00	0.96
0.833	0.59	6.917	0.96	13.000	3.95	19.08	0.96
0.917	0.59	7.000	0.96	13.083	3.95	19.17	0.96
1.000	0.59	7.083	0.96	13.167	3.95	19.25	0.96
1.083	0.59	7.167	0.96	13.250	3.95	19.33	0.96
1.167	0.59	7.250	0.96	13.333	2.88	19.42	0.96
1.250	0.59	7.333	1.18	13.417	2.88	19.50	0.96
1.333	0.59	7.417	1.18	13.500	2.88	19.58	0.96
1.417	0.59	7.500	1.18	13.583	2.88	19.67	0.96
1.500	0.59	7.583	1.18	13.667	2.88	19.75	0.96
1.583	0.59	7.667	1.18	13.750	2.88	19.83	0.96
1.667	0.59	7.750	1.18	13.833	2.24	19.92	0.96
1.750	0.59	7.833	1.18	13.917	2.24	20.00	0.96
1.833	0.59	7.917	1.18	14.000	2.24	20.08	0.96
1.917	0.59	8.000	1.18	14.083	2.24	20.17	0.96
2.000	0.59	8.083	1.18	14.167	2.24	20.25	0.96
2.083	0.59	8.167	1.18	14.250	2.24	20.33	0.64
2.167	0.59	8.250	1.18	14.333	1.60	20.42	0.64
2.250	0.59	8.333	1.39	14.417	1.60	20.50	0.64
2.333	0.69	8.417	1.39	14.500	1.60	20.58	0.64
2.417	0.69	8.500	1.39	14.583	1.60	20.67	0.64
2.500	0.69	8.583	1.39	14.667	1.60	20.75	0.64
2.583	0.69	8.667	1.39	14.750	1.60	20.83	0.64
2.667	0.69	8.750	1.39	14.833	1.60	20.92	0.64
2.750	0.69	8.833	1.50	14.917	1.60	21.00	0.64
2.833	0.69	8.917	1.50	15.000	1.60	21.08	0.64
2.917	0.69	9.000	1.50	15.083	1.60	21.17	0.64
3.000	0.69	9.083	1.50	15.167	1.60	21.25	0.64
3.083	0.69	9.167	1.50	15.250	1.60	21.33	0.64
3.167	0.69	9.250	1.50	15.333	1.60	21.42	0.64
3.250	0.69	9.333	1.71	15.417	1.60	21.50	0.64
3.333	0.69	9.417	1.71	15.500	1.60	21.58	0.64
3.417	0.69	9.500	1.71	15.583	1.60	21.67	0.64
3.500	0.69	9.583	1.71	15.667	1.60	21.75	0.64
3.583	0.69	9.667	1.71	15.750	1.60	21.83	0.64
3.667	0.69	9.750	1.71	15.833	1.60	21.92	0.64
3.750	0.69	9.833	1.92	15.917	1.60	22.00	0.64
3.833	0.69	9.917	1.92	16.000	1.60	22.08	0.64
3.917	0.69	10.000	1.92	16.083	1.60	22.17	0.64
4.000	0.69	10.083	1.92	16.167	1.60	22.25	0.64
4.083	0.69	10.167	1.92	16.250	1.60	22.33	0.64
4.167	0.69	10.250	1.92	16.333	0.96	22.42	0.64
4.250	0.69	10.333	2.46	16.417	0.96	22.50	0.64
4.333	0.85	10.417	2.46	16.500	0.96	22.58	0.64
4.417	0.85	10.500	2.46	16.583	0.96	22.67	0.64
4.500	0.85	10.583	2.46	16.667	0.96	22.75	0.64
4.583	0.85	10.667	2.46	16.750	0.96	22.83	0.64
4.667	0.85	10.750	2.46	16.833	0.96	22.92	0.64
4.750	0.85	10.833	3.31	16.917	0.96	23.00	0.64
4.833	0.85	10.917	3.31	17.000	0.96	23.08	0.64
4.917	0.85	11.000	3.31	17.083	0.96	23.17	0.64
5.000	0.85	11.083	3.31	17.167	0.96	23.25	0.64
5.083	0.85	11.167	3.31	17.250	0.96	23.33	0.64
5.167	0.85	11.250	3.31	17.333	0.96	23.42	0.64
5.250	0.85	11.333	5.13	17.417	0.96	23.50	0.64

5.333	0.85	11.417	5.13	17.500	0.96	23.58	0.64
5.417	0.85	11.500	5.13	17.583	0.96	23.67	0.64
5.500	0.85	11.583	5.13	17.667	0.96	23.75	0.64
5.583	0.85	11.667	5.13	17.750	0.96	23.83	0.64
5.667	0.85	11.750	5.13	17.833	0.96	23.92	0.64
5.750	0.85	11.833	15.81	17.917	0.96	24.00	0.64
5.833	0.85	11.917	15.81	18.000	0.96	24.08	0.64
5.917	0.85	12.000	15.81	18.083	0.96	24.17	0.64
6.000	0.85	12.083	65.37	18.167	0.96	24.25	0.64
6.083	0.85	12.167	65.37	18.250	0.96		

Unit Hyd Qpeak (cms)= 3.063

PEAK FLOW (cms)= 1.008 (i)
TIME TO PEAK (hrs)= 14.583
RUNOFF VOLUME (mm)= 13.971
TOTAL RAINFALL (mm)= 53.410
RUNOFF COEFFICIENT = 0.262

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

CALIB
STANDHYD (0014)
ID= 1 DT= 5.0 min

Area (ha)= 149.59
Total Imp(%)= 21.50 Dir. Conn.(%)= 13.60

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	32.16	117.43
Dep. Storage	(mm)=	1.00	8.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	998.63	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.85	12.250	65.37	18.33	0.96
0.167	0.00	6.250	0.85	12.333	7.70	18.42	0.96
0.250	0.00	6.333	0.96	12.417	7.69	18.50	0.96
0.333	0.59	6.417	0.96	12.500	7.69	18.58	0.96
0.417	0.59	6.500	0.96	12.583	7.69	18.67	0.96
0.500	0.59	6.583	0.96	12.667	7.69	18.75	0.96
0.583	0.59	6.667	0.96	12.750	7.69	18.83	0.96
0.667	0.59	6.750	0.96	12.833	3.95	18.92	0.96
0.750	0.59	6.833	0.96	12.917	3.95	19.00	0.96
0.833	0.59	6.917	0.96	13.000	3.95	19.08	0.96
0.917	0.59	7.000	0.96	13.083	3.95	19.17	0.96
1.000	0.59	7.083	0.96	13.167	3.95	19.25	0.96
1.083	0.59	7.167	0.96	13.250	3.95	19.33	0.96
1.167	0.59	7.250	0.96	13.333	2.88	19.42	0.96
1.250	0.59	7.333	1.18	13.417	2.88	19.50	0.96
1.333	0.59	7.417	1.18	13.500	2.88	19.58	0.96
1.417	0.59	7.500	1.18	13.583	2.88	19.67	0.96
1.500	0.59	7.583	1.18	13.667	2.88	19.75	0.96
1.583	0.59	7.667	1.18	13.750	2.88	19.83	0.96
1.667	0.59	7.750	1.18	13.833	2.24	19.92	0.96
1.750	0.59	7.833	1.18	13.917	2.24	20.00	0.96
1.833	0.59	7.917	1.18	14.000	2.24	20.08	0.96
1.917	0.59	8.000	1.18	14.083	2.24	20.17	0.96
2.000	0.59	8.083	1.18	14.167	2.24	20.25	0.96
2.083	0.59	8.167	1.18	14.250	2.24	20.33	0.64
2.167	0.59	8.250	1.18	14.333	1.60	20.42	0.64
2.250	0.59	8.333	1.39	14.417	1.60	20.50	0.64
2.333	0.69	8.417	1.39	14.500	1.60	20.58	0.64
2.417	0.69	8.500	1.39	14.583	1.60	20.67	0.64
2.500	0.69	8.583	1.39	14.667	1.60	20.75	0.64
2.583	0.69	8.667	1.39	14.750	1.60	20.83	0.64
2.667	0.69	8.750	1.39	14.833	1.60	20.92	0.64
2.750	0.69	8.833	1.50	14.917	1.60	21.00	0.64
2.833	0.69	8.917	1.50	15.000	1.60	21.08	0.64
2.917	0.69	9.000	1.50	15.083	1.60	21.17	0.64
3.000	0.69	9.083	1.50	15.167	1.60	21.25	0.64
3.083	0.69	9.167	1.50	15.250	1.60	21.33	0.64
3.167	0.69	9.250	1.50	15.333	1.60	21.42	0.64
3.250	0.69	9.333	1.71	15.417	1.60	21.50	0.64
3.333	0.69	9.417	1.71	15.500	1.60	21.58	0.64
3.417	0.69	9.500	1.71	15.583	1.60	21.67	0.64
3.500	0.69	9.583	1.71	15.667	1.60	21.75	0.64
3.583	0.69	9.667	1.71	15.750	1.60	21.83	0.64
3.667	0.69	9.750	1.71	15.833	1.60	21.92	0.64

3.750	0.69	9.833	1.92	15.917	1.60	22.00	0.64
3.833	0.69	9.917	1.92	16.000	1.60	22.08	0.64
3.917	0.69	10.000	1.92	16.083	1.60	22.17	0.64
4.000	0.69	10.083	1.92	16.167	1.60	22.25	0.64
4.083	0.69	10.167	1.92	16.250	1.60	22.33	0.64
4.167	0.69	10.250	1.92	16.333	0.96	22.42	0.64
4.250	0.69	10.333	2.46	16.417	0.96	22.50	0.64
4.333	0.85	10.417	2.46	16.500	0.96	22.58	0.64
4.417	0.85	10.500	2.46	16.583	0.96	22.67	0.64
4.500	0.85	10.583	2.46	16.667	0.96	22.75	0.64
4.583	0.85	10.667	2.46	16.750	0.96	22.83	0.64
4.667	0.85	10.750	2.46	16.833	0.96	22.92	0.64
4.750	0.85	10.833	3.31	16.917	0.96	23.00	0.64
4.833	0.85	10.917	3.31	17.000	0.96	23.08	0.64
4.917	0.85	11.000	3.31	17.083	0.96	23.17	0.64
5.000	0.85	11.083	3.31	17.167	0.96	23.25	0.64
5.083	0.85	11.167	3.31	17.250	0.96	23.33	0.64
5.167	0.85	11.250	3.31	17.333	0.96	23.42	0.64
5.250	0.85	11.333	5.13	17.417	0.96	23.50	0.64
5.333	0.85	11.417	5.13	17.500	0.96	23.58	0.64
5.417	0.85	11.500	5.13	17.583	0.96	23.67	0.64
5.500	0.85	11.583	5.13	17.667	0.96	23.75	0.64
5.583	0.85	11.667	5.13	17.750	0.96	23.83	0.64
5.667	0.85	11.750	5.13	17.833	0.96	23.92	0.64
5.750	0.85	11.833	15.81	17.917	0.96	24.00	0.64
5.833	0.85	11.917	15.81	18.000	0.96	24.08	0.64
5.917	0.85	12.000	15.81	18.083	0.96	24.17	0.64
6.000	0.85	12.083	65.37	18.167	0.96	24.25	0.64
6.083	0.85	12.167	65.37	18.250	0.96		

Max.Eff.Inten.(mm/hr)=	65.37	15.88		
over (min)	15.00	30.00		
Storage Coeff. (min)=	14.83 (ii)	29.56 (ii)		
Unit Hyd. Tpeak (min)=	15.00	30.00		
Unit Hyd. peak (cms)=	0.08	0.04		
			TOTALS	
PEAK FLOW (cms)=	2.25	1.90	3.522 (iii)	
TIME TO PEAK (hrs)=	12.33	12.67	12.42	
RUNOFF VOLUME (mm)=	52.41	10.92	16.56	
TOTAL RAINFALL (mm)=	53.41	53.41	53.41	
RUNOFF COEFFICIENT =	0.98	0.20	0.31	

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 61.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB NASHYD (0004) ID= 1 DT= 5.0 min	Area (ha)= 221.02	Curve Number (CN)= 61.5
	Ia (mm)= 7.80	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= 1.93	

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.85	12.250	65.37	18.33	0.96
0.167	0.00	6.250	0.85	12.333	7.70	18.42	0.96
0.250	0.00	6.333	0.96	12.417	7.69	18.50	0.96
0.333	0.59	6.417	0.96	12.500	7.69	18.58	0.96
0.417	0.59	6.500	0.96	12.583	7.69	18.67	0.96
0.500	0.59	6.583	0.96	12.667	7.69	18.75	0.96
0.583	0.59	6.667	0.96	12.750	7.69	18.83	0.96
0.667	0.59	6.750	0.96	12.833	3.95	18.92	0.96
0.750	0.59	6.833	0.96	12.917	3.95	19.00	0.96
0.833	0.59	6.917	0.96	13.000	3.95	19.08	0.96
0.917	0.59	7.000	0.96	13.083	3.95	19.17	0.96
1.000	0.59	7.083	0.96	13.167	3.95	19.25	0.96
1.083	0.59	7.167	0.96	13.250	3.95	19.33	0.96
1.167	0.59	7.250	0.96	13.333	2.88	19.42	0.96
1.250	0.59	7.333	1.18	13.417	2.88	19.50	0.96
1.333	0.59	7.417	1.18	13.500	2.88	19.58	0.96
1.417	0.59	7.500	1.18	13.583	2.88	19.67	0.96
1.500	0.59	7.583	1.18	13.667	2.88	19.75	0.96
1.583	0.59	7.667	1.18	13.750	2.88	19.83	0.96
1.667	0.59	7.750	1.18	13.833	2.24	19.92	0.96

1.750	0.59	7.833	1.18	13.917	2.24	20.00	0.96
1.833	0.59	7.917	1.18	14.000	2.24	20.08	0.96
1.917	0.59	8.000	1.18	14.083	2.24	20.17	0.96
2.000	0.59	8.083	1.18	14.167	2.24	20.25	0.96
2.083	0.59	8.167	1.18	14.250	2.24	20.33	0.64
2.167	0.59	8.250	1.18	14.333	1.60	20.42	0.64
2.250	0.59	8.333	1.39	14.417	1.60	20.50	0.64
2.333	0.69	8.417	1.39	14.500	1.60	20.58	0.64
2.417	0.69	8.500	1.39	14.583	1.60	20.67	0.64
2.500	0.69	8.583	1.39	14.667	1.60	20.75	0.64
2.583	0.69	8.667	1.39	14.750	1.60	20.83	0.64
2.667	0.69	8.750	1.39	14.833	1.60	20.92	0.64
2.750	0.69	8.833	1.50	14.917	1.60	21.00	0.64
2.833	0.69	8.917	1.50	15.000	1.60	21.08	0.64
2.917	0.69	9.000	1.50	15.083	1.60	21.17	0.64
3.000	0.69	9.083	1.50	15.167	1.60	21.25	0.64
3.083	0.69	9.167	1.50	15.250	1.60	21.33	0.64
3.167	0.69	9.250	1.50	15.333	1.60	21.42	0.64
3.250	0.69	9.333	1.71	15.417	1.60	21.50	0.64
3.333	0.69	9.417	1.71	15.500	1.60	21.58	0.64
3.417	0.69	9.500	1.71	15.583	1.60	21.67	0.64
3.500	0.69	9.583	1.71	15.667	1.60	21.75	0.64
3.583	0.69	9.667	1.71	15.750	1.60	21.83	0.64
3.667	0.69	9.750	1.71	15.833	1.60	21.92	0.64
3.750	0.69	9.833	1.92	15.917	1.60	22.00	0.64
3.833	0.69	9.917	1.92	16.000	1.60	22.08	0.64
3.917	0.69	10.000	1.92	16.083	1.60	22.17	0.64
4.000	0.69	10.083	1.92	16.167	1.60	22.25	0.64
4.083	0.69	10.167	1.92	16.250	1.60	22.33	0.64
4.167	0.69	10.250	1.92	16.333	0.96	22.42	0.64
4.250	0.69	10.333	2.46	16.417	0.96	22.50	0.64
4.333	0.85	10.417	2.46	16.500	0.96	22.58	0.64
4.417	0.85	10.500	2.46	16.583	0.96	22.67	0.64
4.500	0.85	10.583	2.46	16.667	0.96	22.75	0.64
4.583	0.85	10.667	2.46	16.750	0.96	22.83	0.64
4.667	0.85	10.750	2.46	16.833	0.96	22.92	0.64
4.750	0.85	10.833	3.31	16.917	0.96	23.00	0.64
4.833	0.85	10.917	3.31	17.000	0.96	23.08	0.64
4.917	0.85	11.000	3.31	17.083	0.96	23.17	0.64
5.000	0.85	11.083	3.31	17.167	0.96	23.25	0.64
5.083	0.85	11.167	3.31	17.250	0.96	23.33	0.64
5.167	0.85	11.250	3.31	17.333	0.96	23.42	0.64
5.250	0.85	11.333	5.13	17.417	0.96	23.50	0.64
5.333	0.85	11.417	5.13	17.500	0.96	23.58	0.64
5.417	0.85	11.500	5.13	17.583	0.96	23.67	0.64
5.500	0.85	11.583	5.13	17.667	0.96	23.75	0.64
5.583	0.85	11.667	5.13	17.750	0.96	23.83	0.64
5.667	0.85	11.750	5.13	17.833	0.96	23.92	0.64
5.750	0.85	11.833	15.81	17.917	0.96	24.00	0.64
5.833	0.85	11.917	15.81	18.000	0.96	24.08	0.64
5.917	0.85	12.000	15.81	18.083	0.96	24.17	0.64
6.000	0.85	12.083	65.37	18.167	0.96	24.25	0.64
6.083	0.85	12.167	65.37	18.250	0.96		

Unit Hyd Qpeak (cms)= 4.374

PEAK FLOW (cms)= 1.019 (i)
TIME TO PEAK (hrs)= 14.500
RUNOFF VOLUME (mm)= 10.167
TOTAL RAINFALL (mm)= 53.410
RUNOFF COEFFICIENT = 0.190

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

CALIB STANDHYD (0007)	Area (ha)= 264.40
ID= 1 DT= 5.0 min	Total Imp(%)= 51.10 Dir. Conn.(%)= 41.40

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	135.11	129.29
Dep. Storage	(mm)=	2.00	5.90
Average Slope	(%)=	0.50	2.00
Length	(m)=	1327.65	20.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.85	12.250	65.37	18.33	0.96

0.167	0.00	6.250	0.85	12.333	7.70	18.42	0.96
0.250	0.00	6.333	0.96	12.417	7.69	18.50	0.96
0.333	0.59	6.417	0.96	12.500	7.69	18.58	0.96
0.417	0.59	6.500	0.96	12.583	7.69	18.67	0.96
0.500	0.59	6.583	0.96	12.667	7.69	18.75	0.96
0.583	0.59	6.667	0.96	12.750	7.69	18.83	0.96
0.667	0.59	6.750	0.96	12.833	3.95	18.92	0.96
0.750	0.59	6.833	0.96	12.917	3.95	19.00	0.96
0.833	0.59	6.917	0.96	13.000	3.95	19.08	0.96
0.917	0.59	7.000	0.96	13.083	3.95	19.17	0.96
1.000	0.59	7.083	0.96	13.167	3.95	19.25	0.96
1.083	0.59	7.167	0.96	13.250	3.95	19.33	0.96
1.167	0.59	7.250	0.96	13.333	2.88	19.42	0.96
1.250	0.59	7.333	1.18	13.417	2.88	19.50	0.96
1.333	0.59	7.417	1.18	13.500	2.88	19.58	0.96
1.417	0.59	7.500	1.18	13.583	2.88	19.67	0.96
1.500	0.59	7.583	1.18	13.667	2.88	19.75	0.96
1.583	0.59	7.667	1.18	13.750	2.88	19.83	0.96
1.667	0.59	7.750	1.18	13.833	2.24	19.92	0.96
1.750	0.59	7.833	1.18	13.917	2.24	20.00	0.96
1.833	0.59	7.917	1.18	14.000	2.24	20.08	0.96
1.917	0.59	8.000	1.18	14.083	2.24	20.17	0.96
2.000	0.59	8.083	1.18	14.167	2.24	20.25	0.96
2.083	0.59	8.167	1.18	14.250	2.24	20.33	0.64
2.167	0.59	8.250	1.18	14.333	1.60	20.42	0.64
2.250	0.59	8.333	1.39	14.417	1.60	20.50	0.64
2.333	0.69	8.417	1.39	14.500	1.60	20.58	0.64
2.417	0.69	8.500	1.39	14.583	1.60	20.67	0.64
2.500	0.69	8.583	1.39	14.667	1.60	20.75	0.64
2.583	0.69	8.667	1.39	14.750	1.60	20.83	0.64
2.667	0.69	8.750	1.39	14.833	1.60	20.92	0.64
2.750	0.69	8.833	1.50	14.917	1.60	21.00	0.64
2.833	0.69	8.917	1.50	15.000	1.60	21.08	0.64
2.917	0.69	9.000	1.50	15.083	1.60	21.17	0.64
3.000	0.69	9.083	1.50	15.167	1.60	21.25	0.64
3.083	0.69	9.167	1.50	15.250	1.60	21.33	0.64
3.167	0.69	9.250	1.50	15.333	1.60	21.42	0.64
3.250	0.69	9.333	1.71	15.417	1.60	21.50	0.64
3.333	0.69	9.417	1.71	15.500	1.60	21.58	0.64
3.417	0.69	9.500	1.71	15.583	1.60	21.67	0.64
3.500	0.69	9.583	1.71	15.667	1.60	21.75	0.64
3.583	0.69	9.667	1.71	15.750	1.60	21.83	0.64
3.667	0.69	9.750	1.71	15.833	1.60	21.92	0.64
3.750	0.69	9.833	1.92	15.917	1.60	22.00	0.64
3.833	0.69	9.917	1.92	16.000	1.60	22.08	0.64
3.917	0.69	10.000	1.92	16.083	1.60	22.17	0.64
4.000	0.69	10.083	1.92	16.167	1.60	22.25	0.64
4.083	0.69	10.167	1.92	16.250	1.60	22.33	0.64
4.167	0.69	10.250	1.92	16.333	0.96	22.42	0.64
4.250	0.69	10.333	2.46	16.417	0.96	22.50	0.64
4.333	0.85	10.417	2.46	16.500	0.96	22.58	0.64
4.417	0.85	10.500	2.46	16.583	0.96	22.67	0.64
4.500	0.85	10.583	2.46	16.667	0.96	22.75	0.64
4.583	0.85	10.667	2.46	16.750	0.96	22.83	0.64
4.667	0.85	10.750	2.46	16.833	0.96	22.92	0.64
4.750	0.85	10.833	3.31	16.917	0.96	23.00	0.64
4.833	0.85	10.917	3.31	17.000	0.96	23.08	0.64
4.917	0.85	11.000	3.31	17.083	0.96	23.17	0.64
5.000	0.85	11.083	3.31	17.167	0.96	23.25	0.64
5.083	0.85	11.167	3.31	17.250	0.96	23.33	0.64
5.167	0.85	11.250	3.31	17.333	0.96	23.42	0.64
5.250	0.85	11.333	5.13	17.417	0.96	23.50	0.64
5.333	0.85	11.417	5.13	17.500	0.96	23.58	0.64
5.417	0.85	11.500	5.13	17.583	0.96	23.67	0.64
5.500	0.85	11.583	5.13	17.667	0.96	23.75	0.64
5.583	0.85	11.667	5.13	17.750	0.96	23.83	0.64
5.667	0.85	11.750	5.13	17.833	0.96	23.92	0.64
5.750	0.85	11.833	15.81	17.917	0.96	24.00	0.64
5.833	0.85	11.917	15.81	18.000	0.96	24.08	0.64
5.917	0.85	12.000	15.81	18.083	0.96	24.17	0.64
6.000	0.85	12.083	65.37	18.167	0.96	24.25	0.64
6.083	0.85	12.167	65.37	18.250	0.96		

Max.Eff.Inten.(mm/hr)=	52.98	21.75	
over (min)	20.00	30.00	
Storage Coeff. (min)=	19.14 (ii)	27.71 (ii)	
Unit Hyd. Tpeak (min)=	20.00	30.00	
Unit Hyd. peak (cms)=	0.06	0.04	
			TOTALS
PEAK FLOW (cms)=	10.30	2.70	12.368 (iii)
TIME TO PEAK (hrs)=	12.42	12.58	12.42
RUNOFF VOLUME (mm)=	51.41	12.39	28.54
TOTAL RAINFALL (mm)=	53.41	53.41	53.41
RUNOFF COEFFICIENT =	0.96	0.23	0.53

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 60.0 Ia = Dep. 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	Area (ha)= 199.48
STANDHYD (0008)	Total Imp(%)= 54.60 Dir. Conn.(%)= 40.90
ID= 1 DT= 5.0 min	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	108.92	90.56
Dep. Storage	(mm)=	2.00	5.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	1153.20	20.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	0.85	12.250	65.37	18.33	0.96
0.167	0.00	6.250	0.85	12.333	7.70	18.42	0.96
0.250	0.00	6.333	0.96	12.417	7.69	18.50	0.96
0.333	0.59	6.417	0.96	12.500	7.69	18.58	0.96
0.417	0.59	6.500	0.96	12.583	7.69	18.67	0.96
0.500	0.59	6.583	0.96	12.667	7.69	18.75	0.96
0.583	0.59	6.667	0.96	12.750	7.69	18.83	0.96
0.667	0.59	6.750	0.96	12.833	3.95	18.92	0.96
0.750	0.59	6.833	0.96	12.917	3.95	19.00	0.96
0.833	0.59	6.917	0.96	13.000	3.95	19.08	0.96
0.917	0.59	7.000	0.96	13.083	3.95	19.17	0.96
1.000	0.59	7.083	0.96	13.167	3.95	19.25	0.96
1.083	0.59	7.167	0.96	13.250	3.95	19.33	0.96
1.167	0.59	7.250	0.96	13.333	2.88	19.42	0.96
1.250	0.59	7.333	1.18	13.417	2.88	19.50	0.96
1.333	0.59	7.417	1.18	13.500	2.88	19.58	0.96
1.417	0.59	7.500	1.18	13.583	2.88	19.67	0.96
1.500	0.59	7.583	1.18	13.667	2.88	19.75	0.96
1.583	0.59	7.667	1.18	13.750	2.88	19.83	0.96
1.667	0.59	7.750	1.18	13.833	2.24	19.92	0.96
1.750	0.59	7.833	1.18	13.917	2.24	20.00	0.96
1.833	0.59	7.917	1.18	14.000	2.24	20.08	0.96
1.917	0.59	8.000	1.18	14.083	2.24	20.17	0.96
2.000	0.59	8.083	1.18	14.167	2.24	20.25	0.96
2.083	0.59	8.167	1.18	14.250	2.24	20.33	0.64
2.167	0.59	8.250	1.18	14.333	1.60	20.42	0.64
2.250	0.59	8.333	1.39	14.417	1.60	20.50	0.64
2.333	0.69	8.417	1.39	14.500	1.60	20.58	0.64
2.417	0.69	8.500	1.39	14.583	1.60	20.67	0.64
2.500	0.69	8.583	1.39	14.667	1.60	20.75	0.64
2.583	0.69	8.667	1.39	14.750	1.60	20.83	0.64
2.667	0.69	8.750	1.39	14.833	1.60	20.92	0.64
2.750	0.69	8.833	1.50	14.917	1.60	21.00	0.64
2.833	0.69	8.917	1.50	15.000	1.60	21.08	0.64
2.917	0.69	9.000	1.50	15.083	1.60	21.17	0.64
3.000	0.69	9.083	1.50	15.167	1.60	21.25	0.64
3.083	0.69	9.167	1.50	15.250	1.60	21.33	0.64
3.167	0.69	9.250	1.50	15.333	1.60	21.42	0.64
3.250	0.69	9.333	1.71	15.417	1.60	21.50	0.64
3.333	0.69	9.417	1.71	15.500	1.60	21.58	0.64
3.417	0.69	9.500	1.71	15.583	1.60	21.67	0.64
3.500	0.69	9.583	1.71	15.667	1.60	21.75	0.64
3.583	0.69	9.667	1.71	15.750	1.60	21.83	0.64
3.667	0.69	9.750	1.71	15.833	1.60	21.92	0.64
3.750	0.69	9.833	1.92	15.917	1.60	22.00	0.64
3.833	0.69	9.917	1.92	16.000	1.60	22.08	0.64
3.917	0.69	10.000	1.92	16.083	1.60	22.17	0.64
4.000	0.69	10.083	1.92	16.167	1.60	22.25	0.64
4.083	0.69	10.167	1.92	16.250	1.60	22.33	0.64
4.167	0.69	10.250	1.92	16.333	0.96	22.42	0.64
4.250	0.69	10.333	2.46	16.417	0.96	22.50	0.64
4.333	0.85	10.417	2.46	16.500	0.96	22.58	0.64
4.417	0.85	10.500	2.46	16.583	0.96	22.67	0.64
4.500	0.85	10.583	2.46	16.667	0.96	22.75	0.64
4.583	0.85	10.667	2.46	16.750	0.96	22.83	0.64
4.667	0.85	10.750	2.46	16.833	0.96	22.92	0.64
4.750	0.85	10.833	3.31	16.917	0.96	23.00	0.64

4.833	0.85	10.917	3.31	17.000	0.96	23.08	0.64
4.917	0.85	11.000	3.31	17.083	0.96	23.17	0.64
5.000	0.85	11.083	3.31	17.167	0.96	23.25	0.64
5.083	0.85	11.167	3.31	17.250	0.96	23.33	0.64
5.167	0.85	11.250	3.31	17.333	0.96	23.42	0.64
5.250	0.85	11.333	5.13	17.417	0.96	23.50	0.64
5.333	0.85	11.417	5.13	17.500	0.96	23.58	0.64
5.417	0.85	11.500	5.13	17.583	0.96	23.67	0.64
5.500	0.85	11.583	5.13	17.667	0.96	23.75	0.64
5.583	0.85	11.667	5.13	17.750	0.96	23.83	0.64
5.667	0.85	11.750	5.13	17.833	0.96	23.92	0.64
5.750	0.85	11.833	15.81	17.917	0.96	24.00	0.64
5.833	0.85	11.917	15.81	18.000	0.96	24.08	0.64
5.917	0.85	12.000	15.81	18.083	0.96	24.17	0.64
6.000	0.85	12.083	65.37	18.167	0.96	24.25	0.64
6.083	0.85	12.167	65.37	18.250	0.96		

Max.Eff.Inten.(mm/hr)=	52.98	31.26	
over (min)	20.00	25.00	
Storage Coeff. (min)=	17.59 (ii)	25.00 (ii)	
Unit Hyd. Tpeak (min)=	20.00	25.00	
Unit Hyd. peak (cms)=	0.06	0.05	
			TOTALS
PEAK FLOW (cms)=	7.97	3.00	10.681 (iii)
TIME TO PEAK (hrs)=	12.42	12.50	12.42
RUNOFF VOLUME (mm)=	51.41	16.29	30.65
TOTAL RAINFALL (mm)=	53.41	53.41	53.41
RUNOFF COEFFICIENT =	0.96	0.30	0.57

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 66.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0013)		AREA	QPEAK	TPEAK	R.V.
		(ha)	(cms)	(hrs)	(mm)
1 + 2 = 3	ID1= 1 (0007):	264.40	12.368	12.42	28.54
	+ ID2= 2 (0008):	199.48	10.681	12.42	30.65
	ID = 3 (0013):	463.88	23.049	12.42	29.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0009)
IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	232.00	0.0500	
15.83	231.70	0.0500	
47.63	231.09	0.0500	
57.14	230.76	0.0500	
66.39	229.94	0.0500	
69.72	229.37	0.0500	
102.15	229.37	0.0500	
106.00	229.60	0.0500	
111.50	229.47	0.0500	
143.51	229.14	0.0350	Main Channel
143.80	229.14	0.0350	Main Channel
153.45	229.10	0.0350	Main Channel
157.09	229.15	0.0350	Main Channel
188.81	230.05	0.0350 /0.0500	Main Channel
195.46	230.69	0.0500	
203.04	231.10	0.0500	
226.79	230.80	0.0500	
246.87	230.34	0.0500	
268.22	231.18	0.0500	
298.24	232.00	0.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.05	229.14	.488E+03	0.1	0.26	100.03
0.20	229.29	.601E+04	2.9	0.74	34.93
0.35	229.44	.199E+05	10.9	0.85	30.35
0.50	229.60	.425E+05	30.1	1.10	23.56
0.65	229.75	.676E+05	60.1	1.38	18.75

0.80	229.90	.942E+05	99.6	1.64	15.77
0.95	230.05	.122E+06	147.9	1.88	13.78
1.10	230.20	.152E+06	209.6	2.15	12.05
1.25	230.35	.182E+06	280.3	2.40	10.80
1.40	230.50	.214E+06	359.8	2.62	9.90
1.55	230.65	.249E+06	449.1	2.80	9.25
1.70	230.80	.288E+06	547.2	2.96	8.77
1.85	230.95	.331E+06	651.9	3.06	8.46
2.00	231.10	.380E+06	768.9	3.15	8.23
2.15	231.25	.432E+06	894.7	3.22	8.05
2.30	231.40	.488E+06	1034.8	3.30	7.86
2.45	231.55	.547E+06	1189.4	3.38	7.66
2.60	231.70	.609E+06	1358.9	3.47	7.47
2.75	231.85	.674E+06	1543.0	3.56	7.28

		AREA (ha)	<---- hydrograph ----> QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW :	ID= 2 (0013)	463.88	23.05	12.42	29.45	0.44	0.99
OUTFLOW:	ID= 1 (0009)	463.88	14.90	12.67	29.45	0.38	0.90

ADD HYD (0005)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0004):	221.02	1.019	14.50	10.17
+ ID2= 2 (0009):	463.88	14.896	12.67	29.45
ID = 3 (0005):	684.90	15.223	12.75	23.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0015)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0014):	149.59	3.522	12.42	16.56
+ ID2= 2 (0005):	684.90	15.223	12.75	23.23
ID = 3 (0015):	834.49	18.158	12.67	22.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0006)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	228.00	0.0500	
212.52	225.39	0.0350	Main Channel
213.15	225.38	0.0350	Main Channel
213.73	225.38	0.0350	Main Channel
214.27	225.38	0.0350	Main Channel
214.91	225.37	0.0350	Main Channel
226.52	222.62	0.0350	Main Channel
226.60	222.60	0.0350	Main Channel
226.65	222.60	0.0350	Main Channel
229.30	222.50	0.0350	Main Channel
233.70	222.33	0.0350	Main Channel
236.82	222.33	0.0350	Main Channel
247.01	222.75	0.0350	Main Channel
247.81	223.00	0.0350	Main Channel
257.03	225.86	0.0500	
257.30	225.87	0.0500	
257.55	225.87	0.0500	
257.81	225.88	0.0500	
367.45	228.00	0.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.28	222.61	.312E+04	1.8	0.63	29.35
0.56	222.89	.939E+04	9.3	1.10	16.83
0.83	223.17	.165E+05	22.5	1.51	12.27
1.11	223.44	.243E+05	40.4	1.85	10.04
1.39	223.72	.328E+05	63.0	2.14	8.67
1.67	224.00	.418E+05	90.2	2.40	7.73
1.95	224.28	.516E+05	122.1	2.64	7.04

2.23	224.56	.619E+05	158.8	2.86	6.50
2.50	224.83	.729E+05	200.5	3.06	6.06
2.78	225.11	.846E+05	247.2	3.25	5.70
3.06	225.39	.969E+05	288.7	3.32	5.59
3.39	225.72	.118E+06	367.2	3.48	5.33
3.71	226.04	.149E+06	465.5	3.48	5.34
4.04	226.37	.196E+06	591.4	3.36	5.52
4.36	226.70	.258E+06	749.5	3.23	5.74
4.69	227.02	.337E+06	946.2	3.13	5.93
5.02	227.35	.431E+06	1187.1	3.07	6.05
5.34	227.67	.540E+06	1477.5	3.04	6.10
5.67	228.00	.666E+06	1822.2	3.05	6.09

		<---- hydrograph ---->			<-pipe / channel->	
		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0015)		834.49	18.16	12.67	22.03	0.74	1.35
OUTFLOW: ID= 1 (0006)		834.49	16.73	12.83	22.03	0.71	1.30

ADD HYD (0003)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0001):	161.19	1.008	14.58	13.97
	+ ID2= 2 (0006):	834.49	16.734	12.83	22.03
	ID = 3 (0003):	995.68	17.141	12.83	20.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
       V    V   I    SSSSS  U   U    A    L              (v 6.2.2008)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

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

Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2021 Smart City Water Inc
All rights reserved.

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\7f432ff3-aa
Summary filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\7f432ff3-aa

DATE: 02-27-2023 TIME: 10:10:58

USER:

COMMENTS: _____

****
** SIMULATION : B - 50yr 24hr 15min SCS **
****

READ STORM	Filename: C:\Users\jchowen\AppData\Local\Temp\50702b2f-89c2-43ff-9553-8a4048d6a62f\a9d6c4cc
Ptotal=110.08 mm	Comments: 50yr 24hr 15min SCS

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.98	12.50	15.85	18.75	1.98
0.25	1.21	6.50	1.98	12.75	8.15	19.00	1.98

0.50	1.21	6.75	1.98	13.00	8.15	19.25	1.98
0.75	1.21	7.00	1.98	13.25	5.94	19.50	1.98
1.00	1.21	7.25	2.42	13.50	5.94	19.75	1.98
1.25	1.21	7.50	2.42	13.75	4.62	20.00	1.98
1.50	1.21	7.75	2.42	14.00	4.62	20.25	1.32
1.75	1.21	8.00	2.42	14.25	3.30	20.50	1.32
2.00	1.21	8.25	2.86	14.50	3.30	20.75	1.32
2.25	1.43	8.50	2.86	14.75	3.30	21.00	1.32
2.50	1.43	8.75	3.08	15.00	3.30	21.25	1.32
2.75	1.43	9.00	3.08	15.25	3.30	21.50	1.32
3.00	1.43	9.25	3.52	15.50	3.30	21.75	1.32
3.25	1.43	9.50	3.52	15.75	3.30	22.00	1.32
3.50	1.43	9.75	3.96	16.00	3.30	22.25	1.32
3.75	1.43	10.00	3.96	16.25	1.98	22.50	1.32
4.00	1.43	10.25	5.06	16.50	1.98	22.75	1.32
4.25	1.76	10.50	5.06	16.75	1.98	23.00	1.32
4.50	1.76	10.75	6.82	17.00	1.98	23.25	1.32
4.75	1.76	11.00	6.82	17.25	1.98	23.50	1.32
5.00	1.76	11.25	10.57	17.50	1.98	23.75	1.32
5.25	1.76	11.50	10.57	17.75	1.98	24.00	1.32
5.50	1.76	11.75	32.58	18.00	1.98		
5.75	1.76	12.00	134.74	18.25	1.98		
6.00	1.76	12.25	15.85	18.50	1.98		

CALIB			
NASHYD (0001)	Area (ha)= 161.19	Curve Number (CN)= 71.2	
ID= 1 DT= 5.0 min	Ia (mm)= 7.90	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 2.01		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.76	12.250	134.74	18.33	1.98
0.167	0.00	6.250	1.76	12.333	15.87	18.42	1.98
0.250	0.00	6.333	1.98	12.417	15.85	18.50	1.98
0.333	1.21	6.417	1.98	12.500	15.85	18.58	1.98
0.417	1.21	6.500	1.98	12.583	15.85	18.67	1.98
0.500	1.21	6.583	1.98	12.667	15.85	18.75	1.98
0.583	1.21	6.667	1.98	12.750	15.85	18.83	1.98
0.667	1.21	6.750	1.98	12.833	8.15	18.92	1.98
0.750	1.21	6.833	1.98	12.917	8.15	19.00	1.98
0.833	1.21	6.917	1.98	13.000	8.15	19.08	1.98
0.917	1.21	7.000	1.98	13.083	8.15	19.17	1.98
1.000	1.21	7.083	1.98	13.167	8.15	19.25	1.98
1.083	1.21	7.167	1.98	13.250	8.15	19.33	1.98
1.167	1.21	7.250	1.98	13.333	5.94	19.42	1.98
1.250	1.21	7.333	2.42	13.417	5.94	19.50	1.98
1.333	1.21	7.417	2.42	13.500	5.94	19.58	1.98
1.417	1.21	7.500	2.42	13.583	5.94	19.67	1.98
1.500	1.21	7.583	2.42	13.667	5.94	19.75	1.98
1.583	1.21	7.667	2.42	13.750	5.94	19.83	1.98
1.667	1.21	7.750	2.42	13.833	4.62	19.92	1.98
1.750	1.21	7.833	2.42	13.917	4.62	20.00	1.98
1.833	1.21	7.917	2.42	14.000	4.62	20.08	1.98
1.917	1.21	8.000	2.42	14.083	4.62	20.17	1.98
2.000	1.21	8.083	2.42	14.167	4.62	20.25	1.98
2.083	1.21	8.167	2.42	14.250	4.62	20.33	1.32
2.167	1.21	8.250	2.42	14.333	3.30	20.42	1.32
2.250	1.21	8.333	2.86	14.417	3.30	20.50	1.32
2.333	1.43	8.417	2.86	14.500	3.30	20.58	1.32
2.417	1.43	8.500	2.86	14.583	3.30	20.67	1.32
2.500	1.43	8.583	2.86	14.667	3.30	20.75	1.32
2.583	1.43	8.667	2.86	14.750	3.30	20.83	1.32
2.667	1.43	8.750	2.86	14.833	3.30	20.92	1.32
2.750	1.43	8.833	3.08	14.917	3.30	21.00	1.32
2.833	1.43	8.917	3.08	15.000	3.30	21.08	1.32
2.917	1.43	9.000	3.08	15.083	3.30	21.17	1.32
3.000	1.43	9.083	3.08	15.167	3.30	21.25	1.32
3.083	1.43	9.167	3.08	15.250	3.30	21.33	1.32
3.167	1.43	9.250	3.08	15.333	3.30	21.42	1.32
3.250	1.43	9.333	3.52	15.417	3.30	21.50	1.32
3.333	1.43	9.417	3.52	15.500	3.30	21.58	1.32
3.417	1.43	9.500	3.52	15.583	3.30	21.67	1.32
3.500	1.43	9.583	3.52	15.667	3.30	21.75	1.32
3.583	1.43	9.667	3.52	15.750	3.30	21.83	1.32
3.667	1.43	9.750	3.52	15.833	3.30	21.92	1.32
3.750	1.43	9.833	3.96	15.917	3.30	22.00	1.32
3.833	1.43	9.917	3.96	16.000	3.30	22.08	1.32

3.917	1.43	10.000	3.96	16.083	3.30	22.17	1.32
4.000	1.43	10.083	3.96	16.167	3.30	22.25	1.32
4.083	1.43	10.167	3.96	16.250	3.30	22.33	1.32
4.167	1.43	10.250	3.96	16.333	1.98	22.42	1.32
4.250	1.43	10.333	5.06	16.417	1.98	22.50	1.32
4.333	1.76	10.417	5.06	16.500	1.98	22.58	1.32
4.417	1.76	10.500	5.06	16.583	1.98	22.67	1.32
4.500	1.76	10.583	5.06	16.667	1.98	22.75	1.32
4.583	1.76	10.667	5.06	16.750	1.98	22.83	1.32
4.667	1.76	10.750	5.06	16.833	1.98	22.92	1.32
4.750	1.76	10.833	6.82	16.917	1.98	23.00	1.32
4.833	1.76	10.917	6.82	17.000	1.98	23.08	1.32
4.917	1.76	11.000	6.82	17.083	1.98	23.17	1.32
5.000	1.76	11.083	6.82	17.167	1.98	23.25	1.32
5.083	1.76	11.167	6.82	17.250	1.98	23.33	1.32
5.167	1.76	11.250	6.82	17.333	1.98	23.42	1.32
5.250	1.76	11.333	10.57	17.417	1.98	23.50	1.32
5.333	1.76	11.417	10.57	17.500	1.98	23.58	1.32
5.417	1.76	11.500	10.57	17.583	1.98	23.67	1.32
5.500	1.76	11.583	10.57	17.667	1.98	23.75	1.32
5.583	1.76	11.667	10.57	17.750	1.98	23.83	1.32
5.667	1.76	11.750	10.57	17.833	1.98	23.92	1.32
5.750	1.76	11.833	32.58	17.917	1.98	24.00	1.32
5.833	1.76	11.917	32.58	18.000	1.98	24.08	1.32
5.917	1.76	12.000	32.58	18.083	1.98	24.17	1.32
6.000	1.76	12.083	134.73	18.167	1.98	24.25	1.32
6.083	1.76	12.167	134.74	18.250	1.98		

Unit Hyd Qpeak (cms)= 3.063

PEAK FLOW (cms)= 3.880 (i)
TIME TO PEAK (hrs)= 14.417
RUNOFF VOLUME (mm)= 50.950
TOTAL RAINFALL (mm)= 110.080
RUNOFF COEFFICIENT = 0.463

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

CALIB	
STANDHYD (0014)	Area (ha)= 149.59
ID= 1 DT= 5.0 min	Total Imp(%)= 21.50 Dir. Conn.(%)= 13.60

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	32.16	117.43
Dep. Storage	(mm)=	1.00	8.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	998.63	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.76	12.250	134.74	18.33	1.98
0.167	0.00	6.250	1.76	12.333	15.87	18.42	1.98
0.250	0.00	6.333	1.98	12.417	15.85	18.50	1.98
0.333	1.21	6.417	1.98	12.500	15.85	18.58	1.98
0.417	1.21	6.500	1.98	12.583	15.85	18.67	1.98
0.500	1.21	6.583	1.98	12.667	15.85	18.75	1.98
0.583	1.21	6.667	1.98	12.750	15.85	18.83	1.98
0.667	1.21	6.750	1.98	12.833	8.15	18.92	1.98
0.750	1.21	6.833	1.98	12.917	8.15	19.00	1.98
0.833	1.21	6.917	1.98	13.000	8.15	19.08	1.98
0.917	1.21	7.000	1.98	13.083	8.15	19.17	1.98
1.000	1.21	7.083	1.98	13.167	8.15	19.25	1.98
1.083	1.21	7.167	1.98	13.250	8.15	19.33	1.98
1.167	1.21	7.250	1.98	13.333	5.94	19.42	1.98
1.250	1.21	7.333	2.42	13.417	5.94	19.50	1.98
1.333	1.21	7.417	2.42	13.500	5.94	19.58	1.98
1.417	1.21	7.500	2.42	13.583	5.94	19.67	1.98
1.500	1.21	7.583	2.42	13.667	5.94	19.75	1.98
1.583	1.21	7.667	2.42	13.750	5.94	19.83	1.98
1.667	1.21	7.750	2.42	13.833	4.62	19.92	1.98
1.750	1.21	7.833	2.42	13.917	4.62	20.00	1.98
1.833	1.21	7.917	2.42	14.000	4.62	20.08	1.98
1.917	1.21	8.000	2.42	14.083	4.62	20.17	1.98
2.000	1.21	8.083	2.42	14.167	4.62	20.25	1.98
2.083	1.21	8.167	2.42	14.250	4.62	20.33	1.32
2.167	1.21	8.250	2.42	14.333	3.30	20.42	1.32
2.250	1.21	8.333	2.86	14.417	3.30	20.50	1.32

2.333	1.43	8.417	2.86	14.500	3.30	20.58	1.32
2.417	1.43	8.500	2.86	14.583	3.30	20.67	1.32
2.500	1.43	8.583	2.86	14.667	3.30	20.75	1.32
2.583	1.43	8.667	2.86	14.750	3.30	20.83	1.32
2.667	1.43	8.750	2.86	14.833	3.30	20.92	1.32
2.750	1.43	8.833	3.08	14.917	3.30	21.00	1.32
2.833	1.43	8.917	3.08	15.000	3.30	21.08	1.32
2.917	1.43	9.000	3.08	15.083	3.30	21.17	1.32
3.000	1.43	9.083	3.08	15.167	3.30	21.25	1.32
3.083	1.43	9.167	3.08	15.250	3.30	21.33	1.32
3.167	1.43	9.250	3.08	15.333	3.30	21.42	1.32
3.250	1.43	9.333	3.52	15.417	3.30	21.50	1.32
3.333	1.43	9.417	3.52	15.500	3.30	21.58	1.32
3.417	1.43	9.500	3.52	15.583	3.30	21.67	1.32
3.500	1.43	9.583	3.52	15.667	3.30	21.75	1.32
3.583	1.43	9.667	3.52	15.750	3.30	21.83	1.32
3.667	1.43	9.750	3.52	15.833	3.30	21.92	1.32
3.750	1.43	9.833	3.96	15.917	3.30	22.00	1.32
3.833	1.43	9.917	3.96	16.000	3.30	22.08	1.32
3.917	1.43	10.000	3.96	16.083	3.30	22.17	1.32
4.000	1.43	10.083	3.96	16.167	3.30	22.25	1.32
4.083	1.43	10.167	3.96	16.250	3.30	22.33	1.32
4.167	1.43	10.250	3.96	16.333	1.98	22.42	1.32
4.250	1.43	10.333	5.06	16.417	1.98	22.50	1.32
4.333	1.76	10.417	5.06	16.500	1.98	22.58	1.32
4.417	1.76	10.500	5.06	16.583	1.98	22.67	1.32
4.500	1.76	10.583	5.06	16.667	1.98	22.75	1.32
4.583	1.76	10.667	5.06	16.750	1.98	22.83	1.32
4.667	1.76	10.750	5.06	16.833	1.98	22.92	1.32
4.750	1.76	10.833	6.82	16.917	1.98	23.00	1.32
4.833	1.76	10.917	6.82	17.000	1.98	23.08	1.32
4.917	1.76	11.000	6.82	17.083	1.98	23.17	1.32
5.000	1.76	11.083	6.82	17.167	1.98	23.25	1.32
5.083	1.76	11.167	6.82	17.250	1.98	23.33	1.32
5.167	1.76	11.250	6.82	17.333	1.98	23.42	1.32
5.250	1.76	11.333	10.57	17.417	1.98	23.50	1.32
5.333	1.76	11.417	10.57	17.500	1.98	23.58	1.32
5.417	1.76	11.500	10.57	17.583	1.98	23.67	1.32
5.500	1.76	11.583	10.57	17.667	1.98	23.75	1.32
5.583	1.76	11.667	10.57	17.750	1.98	23.83	1.32
5.667	1.76	11.750	10.57	17.833	1.98	23.92	1.32
5.750	1.76	11.833	32.58	17.917	1.98	24.00	1.32
5.833	1.76	11.917	32.58	18.000	1.98	24.08	1.32
5.917	1.76	12.000	32.58	18.083	1.98	24.17	1.32
6.000	1.76	12.083	134.73	18.167	1.98	24.25	1.32
6.083	1.76	12.167	134.74	18.250	1.98		

Max.Eff.Inten.(mm/hr)=	134.74	68.81		
over (min)	10.00	20.00		
Storage Coeff. (min)=	11.10 (ii)	19.30 (ii)		
Unit Hyd. Tpeak (min)=	10.00	20.00		
Unit Hyd. peak (cms)=	0.10	0.06		
			TOTALS	
PEAK FLOW (cms)=	5.52	10.30	14.357 (iii)	
TIME TO PEAK (hrs)=	12.25	12.42	12.33	
RUNOFF VOLUME (mm)=	109.08	42.10	51.21	
TOTAL RAINFALL (mm)=	110.08	110.08	110.08	
RUNOFF COEFFICIENT =	0.99	0.38	0.47	

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 61.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
NASHYD (0004)	Area (ha)= 221.02	Curve Number (CN)= 61.5	
ID= 1 DT= 5.0 min	Ia (mm)= 7.80	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.93		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.76	12.250	134.74	18.33	1.98
0.167	0.00	6.250	1.76	12.333	15.87	18.42	1.98
0.250	0.00	6.333	1.98	12.417	15.85	18.50	1.98

0.333	1.21	6.417	1.98	12.500	15.85	18.58	1.98
0.417	1.21	6.500	1.98	12.583	15.85	18.67	1.98
0.500	1.21	6.583	1.98	12.667	15.85	18.75	1.98
0.583	1.21	6.667	1.98	12.750	15.85	18.83	1.98
0.667	1.21	6.750	1.98	12.833	8.15	18.92	1.98
0.750	1.21	6.833	1.98	12.917	8.15	19.00	1.98
0.833	1.21	6.917	1.98	13.000	8.15	19.08	1.98
0.917	1.21	7.000	1.98	13.083	8.15	19.17	1.98
1.000	1.21	7.083	1.98	13.167	8.15	19.25	1.98
1.083	1.21	7.167	1.98	13.250	8.15	19.33	1.98
1.167	1.21	7.250	1.98	13.333	5.94	19.42	1.98
1.250	1.21	7.333	2.42	13.417	5.94	19.50	1.98
1.333	1.21	7.417	2.42	13.500	5.94	19.58	1.98
1.417	1.21	7.500	2.42	13.583	5.94	19.67	1.98
1.500	1.21	7.583	2.42	13.667	5.94	19.75	1.98
1.583	1.21	7.667	2.42	13.750	5.94	19.83	1.98
1.667	1.21	7.750	2.42	13.833	4.62	19.92	1.98
1.750	1.21	7.833	2.42	13.917	4.62	20.00	1.98
1.833	1.21	7.917	2.42	14.000	4.62	20.08	1.98
1.917	1.21	8.000	2.42	14.083	4.62	20.17	1.98
2.000	1.21	8.083	2.42	14.167	4.62	20.25	1.98
2.083	1.21	8.167	2.42	14.250	4.62	20.33	1.32
2.167	1.21	8.250	2.42	14.333	3.30	20.42	1.32
2.250	1.21	8.333	2.86	14.417	3.30	20.50	1.32
2.333	1.43	8.417	2.86	14.500	3.30	20.58	1.32
2.417	1.43	8.500	2.86	14.583	3.30	20.67	1.32
2.500	1.43	8.583	2.86	14.667	3.30	20.75	1.32
2.583	1.43	8.667	2.86	14.750	3.30	20.83	1.32
2.667	1.43	8.750	2.86	14.833	3.30	20.92	1.32
2.750	1.43	8.833	3.08	14.917	3.30	21.00	1.32
2.833	1.43	8.917	3.08	15.000	3.30	21.08	1.32
2.917	1.43	9.000	3.08	15.083	3.30	21.17	1.32
3.000	1.43	9.083	3.08	15.167	3.30	21.25	1.32
3.083	1.43	9.167	3.08	15.250	3.30	21.33	1.32
3.167	1.43	9.250	3.08	15.333	3.30	21.42	1.32
3.250	1.43	9.333	3.52	15.417	3.30	21.50	1.32
3.333	1.43	9.417	3.52	15.500	3.30	21.58	1.32
3.417	1.43	9.500	3.52	15.583	3.30	21.67	1.32
3.500	1.43	9.583	3.52	15.667	3.30	21.75	1.32
3.583	1.43	9.667	3.52	15.750	3.30	21.83	1.32
3.667	1.43	9.750	3.52	15.833	3.30	21.92	1.32
3.750	1.43	9.833	3.96	15.917	3.30	22.00	1.32
3.833	1.43	9.917	3.96	16.000	3.30	22.08	1.32
3.917	1.43	10.000	3.96	16.083	3.30	22.17	1.32
4.000	1.43	10.083	3.96	16.167	3.30	22.25	1.32
4.083	1.43	10.167	3.96	16.250	3.30	22.33	1.32
4.167	1.43	10.250	3.96	16.333	1.98	22.42	1.32
4.250	1.43	10.333	5.06	16.417	1.98	22.50	1.32
4.333	1.76	10.417	5.06	16.500	1.98	22.58	1.32
4.417	1.76	10.500	5.06	16.583	1.98	22.67	1.32
4.500	1.76	10.583	5.06	16.667	1.98	22.75	1.32
4.583	1.76	10.667	5.06	16.750	1.98	22.83	1.32
4.667	1.76	10.750	5.06	16.833	1.98	22.92	1.32
4.750	1.76	10.833	6.82	16.917	1.98	23.00	1.32
4.833	1.76	10.917	6.82	17.000	1.98	23.08	1.32
4.917	1.76	11.000	6.82	17.083	1.98	23.17	1.32
5.000	1.76	11.083	6.82	17.167	1.98	23.25	1.32
5.083	1.76	11.167	6.82	17.250	1.98	23.33	1.32
5.167	1.76	11.250	6.82	17.333	1.98	23.42	1.32
5.250	1.76	11.333	10.57	17.417	1.98	23.50	1.32
5.333	1.76	11.417	10.57	17.500	1.98	23.58	1.32
5.417	1.76	11.500	10.57	17.583	1.98	23.67	1.32
5.500	1.76	11.583	10.57	17.667	1.98	23.75	1.32
5.583	1.76	11.667	10.57	17.750	1.98	23.83	1.32
5.667	1.76	11.750	10.57	17.833	1.98	23.92	1.32
5.750	1.76	11.833	32.58	17.917	1.98	24.00	1.32
5.833	1.76	11.917	32.58	18.000	1.98	24.08	1.32
5.917	1.76	12.000	32.58	18.083	1.98	24.17	1.32
6.000	1.76	12.083	134.73	18.167	1.98	24.25	1.32
6.083	1.76	12.167	134.74	18.250	1.98		

Unit Hyd Qpeak (cms)= 4.374

PEAK FLOW (cms)= 4.225 (i)
TIME TO PEAK (hrs)= 14.333
RUNOFF VOLUME (mm)= 40.037
TOTAL RAINFALL (mm)= 110.080
RUNOFF COEFFICIENT = 0.364

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

CALIB

| STANDHYD (0007)| Area (ha)= 264.40
|ID= 1 DT= 5.0 min | Total Imp(%)= 51.10 Dir. Conn.(%)= 41.40

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	135.11	129.29
Dep. Storage	(mm)=	2.00	5.90
Average Slope	(%)=	0.50	2.00
Length	(m)=	1327.65	20.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.76	12.250	134.74	18.33	1.98
0.167	0.00	6.250	1.76	12.333	15.87	18.42	1.98
0.250	0.00	6.333	1.98	12.417	15.85	18.50	1.98
0.333	1.21	6.417	1.98	12.500	15.85	18.58	1.98
0.417	1.21	6.500	1.98	12.583	15.85	18.67	1.98
0.500	1.21	6.583	1.98	12.667	15.85	18.75	1.98
0.583	1.21	6.667	1.98	12.750	15.85	18.83	1.98
0.667	1.21	6.750	1.98	12.833	8.15	18.92	1.98
0.750	1.21	6.833	1.98	12.917	8.15	19.00	1.98
0.833	1.21	6.917	1.98	13.000	8.15	19.08	1.98
0.917	1.21	7.000	1.98	13.083	8.15	19.17	1.98
1.000	1.21	7.083	1.98	13.167	8.15	19.25	1.98
1.083	1.21	7.167	1.98	13.250	8.15	19.33	1.98
1.167	1.21	7.250	1.98	13.333	5.94	19.42	1.98
1.250	1.21	7.333	2.42	13.417	5.94	19.50	1.98
1.333	1.21	7.417	2.42	13.500	5.94	19.58	1.98
1.417	1.21	7.500	2.42	13.583	5.94	19.67	1.98
1.500	1.21	7.583	2.42	13.667	5.94	19.75	1.98
1.583	1.21	7.667	2.42	13.750	5.94	19.83	1.98
1.667	1.21	7.750	2.42	13.833	4.62	19.92	1.98
1.750	1.21	7.833	2.42	13.917	4.62	20.00	1.98
1.833	1.21	7.917	2.42	14.000	4.62	20.08	1.98
1.917	1.21	8.000	2.42	14.083	4.62	20.17	1.98
2.000	1.21	8.083	2.42	14.167	4.62	20.25	1.98
2.083	1.21	8.167	2.42	14.250	4.62	20.33	1.32
2.167	1.21	8.250	2.42	14.333	3.30	20.42	1.32
2.250	1.21	8.333	2.86	14.417	3.30	20.50	1.32
2.333	1.43	8.417	2.86	14.500	3.30	20.58	1.32
2.417	1.43	8.500	2.86	14.583	3.30	20.67	1.32
2.500	1.43	8.583	2.86	14.667	3.30	20.75	1.32
2.583	1.43	8.667	2.86	14.750	3.30	20.83	1.32
2.667	1.43	8.750	2.86	14.833	3.30	20.92	1.32
2.750	1.43	8.833	3.08	14.917	3.30	21.00	1.32
2.833	1.43	8.917	3.08	15.000	3.30	21.08	1.32
2.917	1.43	9.000	3.08	15.083	3.30	21.17	1.32
3.000	1.43	9.083	3.08	15.167	3.30	21.25	1.32
3.083	1.43	9.167	3.08	15.250	3.30	21.33	1.32
3.167	1.43	9.250	3.08	15.333	3.30	21.42	1.32
3.250	1.43	9.333	3.52	15.417	3.30	21.50	1.32
3.333	1.43	9.417	3.52	15.500	3.30	21.58	1.32
3.417	1.43	9.500	3.52	15.583	3.30	21.67	1.32
3.500	1.43	9.583	3.52	15.667	3.30	21.75	1.32
3.583	1.43	9.667	3.52	15.750	3.30	21.83	1.32
3.667	1.43	9.750	3.52	15.833	3.30	21.92	1.32
3.750	1.43	9.833	3.96	15.917	3.30	22.00	1.32
3.833	1.43	9.917	3.96	16.000	3.30	22.08	1.32
3.917	1.43	10.000	3.96	16.083	3.30	22.17	1.32
4.000	1.43	10.083	3.96	16.167	3.30	22.25	1.32
4.083	1.43	10.167	3.96	16.250	3.30	22.33	1.32
4.167	1.43	10.250	3.96	16.333	1.98	22.42	1.32
4.250	1.43	10.333	5.06	16.417	1.98	22.50	1.32
4.333	1.76	10.417	5.06	16.500	1.98	22.58	1.32
4.417	1.76	10.500	5.06	16.583	1.98	22.67	1.32
4.500	1.76	10.583	5.06	16.667	1.98	22.75	1.32
4.583	1.76	10.667	5.06	16.750	1.98	22.83	1.32
4.667	1.76	10.750	5.06	16.833	1.98	22.92	1.32
4.750	1.76	10.833	6.82	16.917	1.98	23.00	1.32
4.833	1.76	10.917	6.82	17.000	1.98	23.08	1.32
4.917	1.76	11.000	6.82	17.083	1.98	23.17	1.32
5.000	1.76	11.083	6.82	17.167	1.98	23.25	1.32
5.083	1.76	11.167	6.82	17.250	1.98	23.33	1.32
5.167	1.76	11.250	6.82	17.333	1.98	23.42	1.32
5.250	1.76	11.333	10.57	17.417	1.98	23.50	1.32
5.333	1.76	11.417	10.57	17.500	1.98	23.58	1.32
5.417	1.76	11.500	10.57	17.583	1.98	23.67	1.32
5.500	1.76	11.583	10.57	17.667	1.98	23.75	1.32
5.583	1.76	11.667	10.57	17.750	1.98	23.83	1.32
5.667	1.76	11.750	10.57	17.833	1.98	23.92	1.32

5.750	1.76	11.833	32.58	17.917	1.98	24.00	1.32
5.833	1.76	11.917	32.58	18.000	1.98	24.08	1.32
5.917	1.76	12.000	32.58	18.083	1.98	24.17	1.32
6.000	1.76	12.083	134.73	18.167	1.98	24.25	1.32
6.083	1.76	12.167	134.74	18.250	1.98		

Max.Eff.Inten.(mm/hr)=	134.73	79.08	
over (min)	15.00	20.00	
Storage Coeff. (min)=	13.17 (ii)	17.59 (ii)	
Unit Hyd. Tpeak (min)=	15.00	20.00	
Unit Hyd. peak (cms)=	0.08	0.06	
			TOTALS
PEAK FLOW (cms)=	26.25	13.77	38.550 (iii)
TIME TO PEAK (hrs)=	12.33	12.42	12.33
RUNOFF VOLUME (mm)=	108.08	44.87	71.04
TOTAL RAINFALL (mm)=	110.08	110.08	110.08
RUNOFF COEFFICIENT =	0.98	0.41	0.65

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 60.0 Ia = Dep. 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 (0008) | Area (ha)= 199.48
ID= 1 DT= 5.0 min | Total Imp(%)= 54.60 Dir. Conn.(%)= 40.90

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	108.92	90.56
Dep. Storage	(mm)=	2.00	5.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	1153.20	20.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.76	12.250	134.74	18.33	1.98
0.167	0.00	6.250	1.76	12.333	15.87	18.42	1.98
0.250	0.00	6.333	1.98	12.417	15.85	18.50	1.98
0.333	1.21	6.417	1.98	12.500	15.85	18.58	1.98
0.417	1.21	6.500	1.98	12.583	15.85	18.67	1.98
0.500	1.21	6.583	1.98	12.667	15.85	18.75	1.98
0.583	1.21	6.667	1.98	12.750	15.85	18.83	1.98
0.667	1.21	6.750	1.98	12.833	8.15	18.92	1.98
0.750	1.21	6.833	1.98	12.917	8.15	19.00	1.98
0.833	1.21	6.917	1.98	13.000	8.15	19.08	1.98
0.917	1.21	7.000	1.98	13.083	8.15	19.17	1.98
1.000	1.21	7.083	1.98	13.167	8.15	19.25	1.98
1.083	1.21	7.167	1.98	13.250	8.15	19.33	1.98
1.167	1.21	7.250	1.98	13.333	5.94	19.42	1.98
1.250	1.21	7.333	2.42	13.417	5.94	19.50	1.98
1.333	1.21	7.417	2.42	13.500	5.94	19.58	1.98
1.417	1.21	7.500	2.42	13.583	5.94	19.67	1.98
1.500	1.21	7.583	2.42	13.667	5.94	19.75	1.98
1.583	1.21	7.667	2.42	13.750	5.94	19.83	1.98
1.667	1.21	7.750	2.42	13.833	4.62	19.92	1.98
1.750	1.21	7.833	2.42	13.917	4.62	20.00	1.98
1.833	1.21	7.917	2.42	14.000	4.62	20.08	1.98
1.917	1.21	8.000	2.42	14.083	4.62	20.17	1.98
2.000	1.21	8.083	2.42	14.167	4.62	20.25	1.98
2.083	1.21	8.167	2.42	14.250	4.62	20.33	1.32
2.167	1.21	8.250	2.42	14.333	3.30	20.42	1.32
2.250	1.21	8.333	2.86	14.417	3.30	20.50	1.32
2.333	1.43	8.417	2.86	14.500	3.30	20.58	1.32
2.417	1.43	8.500	2.86	14.583	3.30	20.67	1.32
2.500	1.43	8.583	2.86	14.667	3.30	20.75	1.32
2.583	1.43	8.667	2.86	14.750	3.30	20.83	1.32
2.667	1.43	8.750	2.86	14.833	3.30	20.92	1.32
2.750	1.43	8.833	3.08	14.917	3.30	21.00	1.32
2.833	1.43	8.917	3.08	15.000	3.30	21.08	1.32
2.917	1.43	9.000	3.08	15.083	3.30	21.17	1.32
3.000	1.43	9.083	3.08	15.167	3.30	21.25	1.32
3.083	1.43	9.167	3.08	15.250	3.30	21.33	1.32
3.167	1.43	9.250	3.08	15.333	3.30	21.42	1.32
3.250	1.43	9.333	3.52	15.417	3.30	21.50	1.32
3.333	1.43	9.417	3.52	15.500	3.30	21.58	1.32

3.417	1.43	9.500	3.52	15.583	3.30	21.67	1.32
3.500	1.43	9.583	3.52	15.667	3.30	21.75	1.32
3.583	1.43	9.667	3.52	15.750	3.30	21.83	1.32
3.667	1.43	9.750	3.52	15.833	3.30	21.92	1.32
3.750	1.43	9.833	3.96	15.917	3.30	22.00	1.32
3.833	1.43	9.917	3.96	16.000	3.30	22.08	1.32
3.917	1.43	10.000	3.96	16.083	3.30	22.17	1.32
4.000	1.43	10.083	3.96	16.167	3.30	22.25	1.32
4.083	1.43	10.167	3.96	16.250	3.30	22.33	1.32
4.167	1.43	10.250	3.96	16.333	1.98	22.42	1.32
4.250	1.43	10.333	5.06	16.417	1.98	22.50	1.32
4.333	1.76	10.417	5.06	16.500	1.98	22.58	1.32
4.417	1.76	10.500	5.06	16.583	1.98	22.67	1.32
4.500	1.76	10.583	5.06	16.667	1.98	22.75	1.32
4.583	1.76	10.667	5.06	16.750	1.98	22.83	1.32
4.667	1.76	10.750	5.06	16.833	1.98	22.92	1.32
4.750	1.76	10.833	6.82	16.917	1.98	23.00	1.32
4.833	1.76	10.917	6.82	17.000	1.98	23.08	1.32
4.917	1.76	11.000	6.82	17.083	1.98	23.17	1.32
5.000	1.76	11.083	6.82	17.167	1.98	23.25	1.32
5.083	1.76	11.167	6.82	17.250	1.98	23.33	1.32
5.167	1.76	11.250	6.82	17.333	1.98	23.42	1.32
5.250	1.76	11.333	10.57	17.417	1.98	23.50	1.32
5.333	1.76	11.417	10.57	17.500	1.98	23.58	1.32
5.417	1.76	11.500	10.57	17.583	1.98	23.67	1.32
5.500	1.76	11.583	10.57	17.667	1.98	23.75	1.32
5.583	1.76	11.667	10.57	17.750	1.98	23.83	1.32
5.667	1.76	11.750	10.57	17.833	1.98	23.92	1.32
5.750	1.76	11.833	32.58	17.917	1.98	24.00	1.32
5.833	1.76	11.917	32.58	18.000	1.98	24.08	1.32
5.917	1.76	12.000	32.58	18.083	1.98	24.17	1.32
6.000	1.76	12.083	134.73	18.167	1.98	24.25	1.32
6.083	1.76	12.167	134.74	18.250	1.98		

Max.Eff.Inten.(mm/hr)=	134.74	104.30		
over (min)	10.00	20.00		
Storage Coeff. (min)=	12.11 (ii)	16.41 (ii)		
Unit Hyd. Tpeak (min)=	10.00	20.00		
Unit Hyd. peak (cms)=	0.10	0.06		
			TOTALS	
PEAK FLOW (cms)=	21.32	13.33	32.596 (iii)	
TIME TO PEAK (hrs)=	12.25	12.42	12.33	
RUNOFF VOLUME (mm)=	108.08	54.47	76.40	
TOTAL RAINFALL (mm)=	110.08	110.08	110.08	
RUNOFF COEFFICIENT =	0.98	0.49	0.69	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 66.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0013)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0007):		264.40	38.550	12.33	71.04
+ ID2= 2 (0008):		199.48	32.596	12.33	76.40
ID = 3 (0013):		463.88	71.146	12.33	73.34

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0009)		
IN= 2---> OUT= 1	Routing time step (min)'=	5.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	232.00	0.0500	
15.83	231.70	0.0500	
47.63	231.09	0.0500	
57.14	230.76	0.0500	
66.39	229.94	0.0500	
69.72	229.37	0.0500	
102.15	229.37	0.0500	
106.00	229.60	0.0500	
111.50	229.47	0.0500	
143.51	229.14	0.0350	Main Channel
143.80	229.14	0.0350	Main Channel
153.45	229.10	0.0350	Main Channel

```
                157.09        229.15        0.0350      Main Channel
                188.81        230.05    0.0350 /0.0500  Main Channel
                195.46        230.69        0.0500
                203.04        231.10        0.0500
                226.79        230.80        0.0500
                246.87        230.34        0.0500
                268.22        231.18        0.0500
                298.24        232.00        0.0500

     <---------------------- TRAVEL TIME TABLE ---------------------->
      DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
       (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
      0.05   229.14    .488E+03       0.1          0.26      100.03
      0.20   229.29    .601E+04       2.9          0.74       34.93
      0.35   229.44    .199E+05      10.9          0.85       30.35
      0.50   229.60    .425E+05      30.1          1.10       23.56
      0.65   229.75    .676E+05      60.1          1.38       18.75
      0.80   229.90    .942E+05      99.6          1.64       15.77
      0.95   230.05    .122E+06     147.9          1.88       13.78
      1.10   230.20    .152E+06     209.6          2.15       12.05
      1.25   230.35    .182E+06     280.3          2.40       10.80
      1.40   230.50    .214E+06     359.8          2.62        9.90
      1.55   230.65    .249E+06     449.1          2.80        9.25
      1.70   230.80    .288E+06     547.2          2.96        8.77
      1.85   230.95    .331E+06     651.9          3.06        8.46
      2.00   231.10    .380E+06     768.9          3.15        8.23
      2.15   231.25    .432E+06     894.7          3.22        8.05
      2.30   231.40    .488E+06    1034.8          3.30        7.86
      2.45   231.55    .547E+06    1189.4          3.38        7.66
      2.60   231.70    .609E+06    1358.9          3.47        7.47
      2.75   231.85    .674E+06    1543.0          3.56        7.28

                                  <---- hydrograph ---->   <-pipe / channel->
                              AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                              (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0013)  463.88    71.15   12.33  73.34      0.69      1.45
   OUTFLOW: ID= 1 (  0009)  463.88    48.88   12.50  73.34      0.59      1.26



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

--------------------
| ADD HYD  (  0005)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0004):   221.02   4.225    14.33    40.04
     + ID2= 2 (  0009):   463.88  48.878    12.50    73.34
       ================================================
       ID = 3 (  0005):   684.90  49.980    12.50    62.59

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

--------------------
| ADD HYD  (  0015)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0014):   149.59  14.357    12.33    51.21
     + ID2= 2 (  0005):   684.90  49.980    12.50    62.59
       ================================================
       ID = 3 (  0015):   834.49  62.774    12.50    60.55

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0006)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
              <------ DATA FOR SECTION (   1.1) ------>
              Distance      Elevation       Manning
                  0.00        228.00        0.0500
                212.52        225.39        0.0350      Main Channel
                213.15        225.38        0.0350      Main Channel
                213.73        225.38        0.0350      Main Channel
                214.27        225.38        0.0350      Main Channel
                214.91        225.37        0.0350      Main Channel
                226.52        222.62        0.0350      Main Channel
                226.60        222.60        0.0350      Main Channel
                226.65        222.60        0.0350      Main Channel
                229.30        222.50        0.0350      Main Channel
                233.70        222.33        0.0350      Main Channel
                236.82        222.33        0.0350      Main Channel
                247.01        222.75        0.0350      Main Channel
```

```
                247.81        223.00        0.0350      Main Channel
                257.03        225.86        0.0500
                257.30        225.87        0.0500
                257.55        225.87        0.0500
                257.81        225.88        0.0500
                367.45        228.00        0.0500

      <---------------------- TRAVEL TIME TABLE ----------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
        (m)       (m)     (cu.m.)      (cms)        (m/s)      (min)
       0.28   222.61    .312E+04       1.8          0.63      29.35
       0.56   222.89    .939E+04       9.3          1.10      16.83
       0.83   223.17    .165E+05      22.5          1.51      12.27
       1.11   223.44    .243E+05      40.4          1.85      10.04
       1.39   223.72    .328E+05      63.0          2.14       8.67
       1.67   224.00    .418E+05      90.2          2.40       7.73
       1.95   224.28    .516E+05     122.1          2.64       7.04
       2.23   224.56    .619E+05     158.8          2.86       6.50
       2.50   224.83    .729E+05     200.5          3.06       6.06
       2.78   225.11    .846E+05     247.2          3.25       5.70
       3.06   225.39    .969E+05     288.7          3.32       5.59
       3.39   225.72    .118E+06     367.2          3.48       5.33
       3.71   226.04    .149E+06     465.5          3.48       5.34
       4.04   226.37    .196E+06     591.4          3.36       5.52
       4.36   226.70    .258E+06     749.5          3.23       5.74
       4.69   227.02    .337E+06     946.2          3.13       5.93
       5.02   227.35    .431E+06    1187.1          3.07       6.05
       5.34   227.67    .540E+06    1477.5          3.04       6.10
       5.67   228.00    .666E+06    1822.2          3.05       6.09

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0015)  834.49    62.77   12.50  60.55      1.39      2.14
   OUTFLOW: ID= 1 (  0006)  834.49    58.02   12.58  60.55      1.33      2.07



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

--------------------
| ADD HYD  (  0003)|
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (  0001):   161.19   3.880    14.42    50.95
      + ID2= 2 (  0006):   834.49  58.015    12.58    60.55
        ================================================
        ID = 3 (  0003):   995.68  59.223    12.58    59.00

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

       V    V   I    SSSSS  U   U    A    L              (v 6.2.2008)
       V    V   I    SS     U   U   A A   L
        V  V    I     SS    U   U  AAAAA  L
        V  V    I      SS   U   U  A   A  L
         VV     I    SSSSS  UUUUU  A   A  LLLLL

        OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM
       O   O    T      T    H   H   Y Y   MM MM  O   O
       O   O    T      T    H   H    Y    M   M  O   O
        OOO     T      T    H   H    Y    M   M   OOO
Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2021 Smart City Water Inc
All rights reserved.


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


  Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
  Output  filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\b34d782b-53
  Summary filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\b34d782b-53


DATE: 02-27-2023                          TIME: 10:10:58

USER:



COMMENTS: _____________________________________________________________
```

```
  ************************************************
  ** SIMULATION : B - 5yr 24hr 15min SCS        **
  ************************************************


--------------------
|    READ STORM    |    Filename: C:\Users\jchowen\AppD
|                  |              ata\Local\Temp\
|                  |              50702b2f-89c2-43ff-9553-8a4048d6a62f\db31f950
| Ptotal= 71.65 mm |    Comments: 5yr 24hr 15min SCS
--------------------
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	0.00	6.25	1.29	12.50	10.32	18.75	1.29
0.25	0.79	6.50	1.29	12.75	5.30	19.00	1.29
0.50	0.79	6.75	1.29	13.00	5.30	19.25	1.29
0.75	0.79	7.00	1.29	13.25	3.87	19.50	1.29
1.00	0.79	7.25	1.58	13.50	3.87	19.75	1.29
1.25	0.79	7.50	1.58	13.75	3.01	20.00	1.29
1.50	0.79	7.75	1.58	14.00	3.01	20.25	0.86
1.75	0.79	8.00	1.58	14.25	2.15	20.50	0.86
2.00	0.79	8.25	1.86	14.50	2.15	20.75	0.86
2.25	0.93	8.50	1.86	14.75	2.15	21.00	0.86
2.50	0.93	8.75	2.01	15.00	2.15	21.25	0.86
2.75	0.93	9.00	2.01	15.25	2.15	21.50	0.86
3.00	0.93	9.25	2.29	15.50	2.15	21.75	0.86
3.25	0.93	9.50	2.29	15.75	2.15	22.00	0.86
3.50	0.93	9.75	2.58	16.00	2.15	22.25	0.86
3.75	0.93	10.00	2.58	16.25	1.29	22.50	0.86
4.00	0.93	10.25	3.30	16.50	1.29	22.75	0.86
4.25	1.15	10.50	3.30	16.75	1.29	23.00	0.86
4.50	1.15	10.75	4.44	17.00	1.29	23.25	0.86
4.75	1.15	11.00	4.44	17.25	1.29	23.50	0.86
5.00	1.15	11.25	6.88	17.50	1.29	23.75	0.86
5.25	1.15	11.50	6.88	17.75	1.29	24.00	0.86
5.50	1.15	11.75	21.21	18.00	1.29		
5.75	1.15	12.00	87.70	18.25	1.29		
6.00	1.15	12.25	10.32	18.50	1.29		

```
--------------------
| CALIB            |
| NASHYD   (  0001)|   Area    (ha)= 161.19   Curve Number   (CN)= 71.2
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.90   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   2.01

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.15	12.250	87.70	18.33	1.29
0.167	0.00	6.250	1.15	12.333	10.33	18.42	1.29
0.250	0.00	6.333	1.29	12.417	10.32	18.50	1.29
0.333	0.79	6.417	1.29	12.500	10.32	18.58	1.29
0.417	0.79	6.500	1.29	12.583	10.32	18.67	1.29
0.500	0.79	6.583	1.29	12.667	10.32	18.75	1.29
0.583	0.79	6.667	1.29	12.750	10.32	18.83	1.29
0.667	0.79	6.750	1.29	12.833	5.30	18.92	1.29
0.750	0.79	6.833	1.29	12.917	5.30	19.00	1.29
0.833	0.79	6.917	1.29	13.000	5.30	19.08	1.29
0.917	0.79	7.000	1.29	13.083	5.30	19.17	1.29
1.000	0.79	7.083	1.29	13.167	5.30	19.25	1.29
1.083	0.79	7.167	1.29	13.250	5.30	19.33	1.29
1.167	0.79	7.250	1.29	13.333	3.87	19.42	1.29
1.250	0.79	7.333	1.58	13.417	3.87	19.50	1.29
1.333	0.79	7.417	1.58	13.500	3.87	19.58	1.29
1.417	0.79	7.500	1.58	13.583	3.87	19.67	1.29
1.500	0.79	7.583	1.58	13.667	3.87	19.75	1.29
1.583	0.79	7.667	1.58	13.750	3.87	19.83	1.29
1.667	0.79	7.750	1.58	13.833	3.01	19.92	1.29
1.750	0.79	7.833	1.58	13.917	3.01	20.00	1.29
1.833	0.79	7.917	1.58	14.000	3.01	20.08	1.29
1.917	0.79	8.000	1.58	14.083	3.01	20.17	1.29
2.000	0.79	8.083	1.58	14.167	3.01	20.25	1.29
2.083	0.79	8.167	1.58	14.250	3.01	20.33	0.86
2.167	0.79	8.250	1.58	14.333	2.15	20.42	0.86
2.250	0.79	8.333	1.86	14.417	2.15	20.50	0.86
2.333	0.93	8.417	1.86	14.500	2.15	20.58	0.86
2.417	0.93	8.500	1.86	14.583	2.15	20.67	0.86

2.500	0.93	8.583	1.86	14.667	2.15	20.75	0.86
2.583	0.93	8.667	1.86	14.750	2.15	20.83	0.86
2.667	0.93	8.750	1.86	14.833	2.15	20.92	0.86
2.750	0.93	8.833	2.01	14.917	2.15	21.00	0.86
2.833	0.93	8.917	2.01	15.000	2.15	21.08	0.86
2.917	0.93	9.000	2.01	15.083	2.15	21.17	0.86
3.000	0.93	9.083	2.01	15.167	2.15	21.25	0.86
3.083	0.93	9.167	2.01	15.250	2.15	21.33	0.86
3.167	0.93	9.250	2.01	15.333	2.15	21.42	0.86
3.250	0.93	9.333	2.29	15.417	2.15	21.50	0.86
3.333	0.93	9.417	2.29	15.500	2.15	21.58	0.86
3.417	0.93	9.500	2.29	15.583	2.15	21.67	0.86
3.500	0.93	9.583	2.29	15.667	2.15	21.75	0.86
3.583	0.93	9.667	2.29	15.750	2.15	21.83	0.86
3.667	0.93	9.750	2.29	15.833	2.15	21.92	0.86
3.750	0.93	9.833	2.58	15.917	2.15	22.00	0.86
3.833	0.93	9.917	2.58	16.000	2.15	22.08	0.86
3.917	0.93	10.000	2.58	16.083	2.15	22.17	0.86
4.000	0.93	10.083	2.58	16.167	2.15	22.25	0.86
4.083	0.93	10.167	2.58	16.250	2.15	22.33	0.86
4.167	0.93	10.250	2.58	16.333	1.29	22.42	0.86
4.250	0.93	10.333	3.30	16.417	1.29	22.50	0.86
4.333	1.15	10.417	3.30	16.500	1.29	22.58	0.86
4.417	1.15	10.500	3.30	16.583	1.29	22.67	0.86
4.500	1.15	10.583	3.30	16.667	1.29	22.75	0.86
4.583	1.15	10.667	3.30	16.750	1.29	22.83	0.86
4.667	1.15	10.750	3.30	16.833	1.29	22.92	0.86
4.750	1.15	10.833	4.44	16.917	1.29	23.00	0.86
4.833	1.15	10.917	4.44	17.000	1.29	23.08	0.86
4.917	1.15	11.000	4.44	17.083	1.29	23.17	0.86
5.000	1.15	11.083	4.44	17.167	1.29	23.25	0.86
5.083	1.15	11.167	4.44	17.250	1.29	23.33	0.86
5.167	1.15	11.250	4.44	17.333	1.29	23.42	0.86
5.250	1.15	11.333	6.88	17.417	1.29	23.50	0.86
5.333	1.15	11.417	6.88	17.500	1.29	23.58	0.86
5.417	1.15	11.500	6.88	17.583	1.29	23.67	0.86
5.500	1.15	11.583	6.88	17.667	1.29	23.75	0.86
5.583	1.15	11.667	6.88	17.750	1.29	23.83	0.86
5.667	1.15	11.750	6.88	17.833	1.29	23.92	0.86
5.750	1.15	11.833	21.21	17.917	1.29	24.00	0.86
5.833	1.15	11.917	21.21	18.000	1.29	24.08	0.86
5.917	1.15	12.000	21.21	18.083	1.29	24.17	0.86
6.000	1.15	12.083	87.69	18.167	1.29	24.25	0.86
6.083	1.15	12.167	87.70	18.250	1.29		

Unit Hyd Qpeak (cms)= 3.063

PEAK FLOW (cms)= 1.811 (i)
TIME TO PEAK (hrs)= 14.500
RUNOFF VOLUME (mm)= 24.410
TOTAL RAINFALL (mm)= 71.650
RUNOFF COEFFICIENT = 0.341

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

CALIB STANDHYD (0014) ID= 1 DT= 5.0 min	Area (ha)= 149.59 Total Imp(%)= 21.50 Dir. Conn.(%)= 13.60

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	32.16	117.43
Dep. Storage	(mm)=	1.00	8.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	998.63	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.15	12.250	87.70	18.33	1.29
0.167	0.00	6.250	1.15	12.333	10.33	18.42	1.29
0.250	0.00	6.333	1.29	12.417	10.32	18.50	1.29
0.333	0.79	6.417	1.29	12.500	10.32	18.58	1.29
0.417	0.79	6.500	1.29	12.583	10.32	18.67	1.29
0.500	0.79	6.583	1.29	12.667	10.32	18.75	1.29
0.583	0.79	6.667	1.29	12.750	10.32	18.83	1.29
0.667	0.79	6.750	1.29	12.833	5.30	18.92	1.29
0.750	0.79	6.833	1.29	12.917	5.30	19.00	1.29
0.833	0.79	6.917	1.29	13.000	5.30	19.08	1.29

0.917	0.79	7.000	1.29	13.083	5.30	19.17	1.29
1.000	0.79	7.083	1.29	13.167	5.30	19.25	1.29
1.083	0.79	7.167	1.29	13.250	5.30	19.33	1.29
1.167	0.79	7.250	1.29	13.333	3.87	19.42	1.29
1.250	0.79	7.333	1.58	13.417	3.87	19.50	1.29
1.333	0.79	7.417	1.58	13.500	3.87	19.58	1.29
1.417	0.79	7.500	1.58	13.583	3.87	19.67	1.29
1.500	0.79	7.583	1.58	13.667	3.87	19.75	1.29
1.583	0.79	7.667	1.58	13.750	3.87	19.83	1.29
1.667	0.79	7.750	1.58	13.833	3.01	19.92	1.29
1.750	0.79	7.833	1.58	13.917	3.01	20.00	1.29
1.833	0.79	7.917	1.58	14.000	3.01	20.08	1.29
1.917	0.79	8.000	1.58	14.083	3.01	20.17	1.29
2.000	0.79	8.083	1.58	14.167	3.01	20.25	1.29
2.083	0.79	8.167	1.58	14.250	3.01	20.33	0.86
2.167	0.79	8.250	1.58	14.333	2.15	20.42	0.86
2.250	0.79	8.333	1.86	14.417	2.15	20.50	0.86
2.333	0.93	8.417	1.86	14.500	2.15	20.58	0.86
2.417	0.93	8.500	1.86	14.583	2.15	20.67	0.86
2.500	0.93	8.583	1.86	14.667	2.15	20.75	0.86
2.583	0.93	8.667	1.86	14.750	2.15	20.83	0.86
2.667	0.93	8.750	1.86	14.833	2.15	20.92	0.86
2.750	0.93	8.833	2.01	14.917	2.15	21.00	0.86
2.833	0.93	8.917	2.01	15.000	2.15	21.08	0.86
2.917	0.93	9.000	2.01	15.083	2.15	21.17	0.86
3.000	0.93	9.083	2.01	15.167	2.15	21.25	0.86
3.083	0.93	9.167	2.01	15.250	2.15	21.33	0.86
3.167	0.93	9.250	2.01	15.333	2.15	21.42	0.86
3.250	0.93	9.333	2.29	15.417	2.15	21.50	0.86
3.333	0.93	9.417	2.29	15.500	2.15	21.58	0.86
3.417	0.93	9.500	2.29	15.583	2.15	21.67	0.86
3.500	0.93	9.583	2.29	15.667	2.15	21.75	0.86
3.583	0.93	9.667	2.29	15.750	2.15	21.83	0.86
3.667	0.93	9.750	2.29	15.833	2.15	21.92	0.86
3.750	0.93	9.833	2.58	15.917	2.15	22.00	0.86
3.833	0.93	9.917	2.58	16.000	2.15	22.08	0.86
3.917	0.93	10.000	2.58	16.083	2.15	22.17	0.86
4.000	0.93	10.083	2.58	16.167	2.15	22.25	0.86
4.083	0.93	10.167	2.58	16.250	2.15	22.33	0.86
4.167	0.93	10.250	2.58	16.333	1.29	22.42	0.86
4.250	0.93	10.333	3.30	16.417	1.29	22.50	0.86
4.333	1.15	10.417	3.30	16.500	1.29	22.58	0.86
4.417	1.15	10.500	3.30	16.583	1.29	22.67	0.86
4.500	1.15	10.583	3.30	16.667	1.29	22.75	0.86
4.583	1.15	10.667	3.30	16.750	1.29	22.83	0.86
4.667	1.15	10.750	3.30	16.833	1.29	22.92	0.86
4.750	1.15	10.833	4.44	16.917	1.29	23.00	0.86
4.833	1.15	10.917	4.44	17.000	1.29	23.08	0.86
4.917	1.15	11.000	4.44	17.083	1.29	23.17	0.86
5.000	1.15	11.083	4.44	17.167	1.29	23.25	0.86
5.083	1.15	11.167	4.44	17.250	1.29	23.33	0.86
5.167	1.15	11.250	4.44	17.333	1.29	23.42	0.86
5.250	1.15	11.333	6.88	17.417	1.29	23.50	0.86
5.333	1.15	11.417	6.88	17.500	1.29	23.58	0.86
5.417	1.15	11.500	6.88	17.583	1.29	23.67	0.86
5.500	1.15	11.583	6.88	17.667	1.29	23.75	0.86
5.583	1.15	11.667	6.88	17.750	1.29	23.83	0.86
5.667	1.15	11.750	6.88	17.833	1.29	23.92	0.86
5.750	1.15	11.833	21.21	17.917	1.29	24.00	0.86
5.833	1.15	11.917	21.21	18.000	1.29	24.08	0.86
5.917	1.15	12.000	21.21	18.083	1.29	24.17	0.86
6.000	1.15	12.083	87.69	18.167	1.29	24.25	0.86
6.083	1.15	12.167	87.70	18.250	1.29		

Max.Eff.Inten.(mm/hr)=	87.70	28.91	
over (min)	15.00	25.00	
Storage Coeff. (min)=	13.19 (ii)	24.78 (ii)	
Unit Hyd. Tpeak (min)=	15.00	25.00	
Unit Hyd. peak (cms)=	0.08	0.05	
			TOTALS
PEAK FLOW (cms)=	3.17	3.92	6.445 (iii)
TIME TO PEAK (hrs)=	12.33	12.58	12.42
RUNOFF VOLUME (mm)=	70.65	19.46	26.43
TOTAL RAINFALL (mm)=	71.65	71.65	71.65
RUNOFF COEFFICIENT =	0.99	0.27	0.37

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 61.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

```
--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (  0004)|   Area    (ha)= 221.02   Curve Number   (CN)= 61.5
|ID= 1 DT= 5.0 min |   Ia      (mm)=   7.80   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=   1.93

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.15	12.250	87.70	18.33	1.29
0.167	0.00	6.250	1.15	12.333	10.33	18.42	1.29
0.250	0.00	6.333	1.29	12.417	10.32	18.50	1.29
0.333	0.79	6.417	1.29	12.500	10.32	18.58	1.29
0.417	0.79	6.500	1.29	12.583	10.32	18.67	1.29
0.500	0.79	6.583	1.29	12.667	10.32	18.75	1.29
0.583	0.79	6.667	1.29	12.750	10.32	18.83	1.29
0.667	0.79	6.750	1.29	12.833	5.30	18.92	1.29
0.750	0.79	6.833	1.29	12.917	5.30	19.00	1.29
0.833	0.79	6.917	1.29	13.000	5.30	19.08	1.29
0.917	0.79	7.000	1.29	13.083	5.30	19.17	1.29
1.000	0.79	7.083	1.29	13.167	5.30	19.25	1.29
1.083	0.79	7.167	1.29	13.250	5.30	19.33	1.29
1.167	0.79	7.250	1.29	13.333	3.87	19.42	1.29
1.250	0.79	7.333	1.58	13.417	3.87	19.50	1.29
1.333	0.79	7.417	1.58	13.500	3.87	19.58	1.29
1.417	0.79	7.500	1.58	13.583	3.87	19.67	1.29
1.500	0.79	7.583	1.58	13.667	3.87	19.75	1.29
1.583	0.79	7.667	1.58	13.750	3.87	19.83	1.29
1.667	0.79	7.750	1.58	13.833	3.01	19.92	1.29
1.750	0.79	7.833	1.58	13.917	3.01	20.00	1.29
1.833	0.79	7.917	1.58	14.000	3.01	20.08	1.29
1.917	0.79	8.000	1.58	14.083	3.01	20.17	1.29
2.000	0.79	8.083	1.58	14.167	3.01	20.25	1.29
2.083	0.79	8.167	1.58	14.250	3.01	20.33	0.86
2.167	0.79	8.250	1.58	14.333	2.15	20.42	0.86
2.250	0.79	8.333	1.86	14.417	2.15	20.50	0.86
2.333	0.93	8.417	1.86	14.500	2.15	20.58	0.86
2.417	0.93	8.500	1.86	14.583	2.15	20.67	0.86
2.500	0.93	8.583	1.86	14.667	2.15	20.75	0.86
2.583	0.93	8.667	1.86	14.750	2.15	20.83	0.86
2.667	0.93	8.750	1.86	14.833	2.15	20.92	0.86
2.750	0.93	8.833	2.01	14.917	2.15	21.00	0.86
2.833	0.93	8.917	2.01	15.000	2.15	21.08	0.86
2.917	0.93	9.000	2.01	15.083	2.15	21.17	0.86
3.000	0.93	9.083	2.01	15.167	2.15	21.25	0.86
3.083	0.93	9.167	2.01	15.250	2.15	21.33	0.86
3.167	0.93	9.250	2.01	15.333	2.15	21.42	0.86
3.250	0.93	9.333	2.29	15.417	2.15	21.50	0.86
3.333	0.93	9.417	2.29	15.500	2.15	21.58	0.86
3.417	0.93	9.500	2.29	15.583	2.15	21.67	0.86
3.500	0.93	9.583	2.29	15.667	2.15	21.75	0.86
3.583	0.93	9.667	2.29	15.750	2.15	21.83	0.86
3.667	0.93	9.750	2.29	15.833	2.15	21.92	0.86
3.750	0.93	9.833	2.58	15.917	2.15	22.00	0.86
3.833	0.93	9.917	2.58	16.000	2.15	22.08	0.86
3.917	0.93	10.000	2.58	16.083	2.15	22.17	0.86
4.000	0.93	10.083	2.58	16.167	2.15	22.25	0.86
4.083	0.93	10.167	2.58	16.250	2.15	22.33	0.86
4.167	0.93	10.250	2.58	16.333	1.29	22.42	0.86
4.250	0.93	10.333	3.30	16.417	1.29	22.50	0.86
4.333	1.15	10.417	3.30	16.500	1.29	22.58	0.86
4.417	1.15	10.500	3.30	16.583	1.29	22.67	0.86
4.500	1.15	10.583	3.30	16.667	1.29	22.75	0.86
4.583	1.15	10.667	3.30	16.750	1.29	22.83	0.86
4.667	1.15	10.750	3.30	16.833	1.29	22.92	0.86
4.750	1.15	10.833	4.44	16.917	1.29	23.00	0.86
4.833	1.15	10.917	4.44	17.000	1.29	23.08	0.86
4.917	1.15	11.000	4.44	17.083	1.29	23.17	0.86
5.000	1.15	11.083	4.44	17.167	1.29	23.25	0.86
5.083	1.15	11.167	4.44	17.250	1.29	23.33	0.86
5.167	1.15	11.250	4.44	17.333	1.29	23.42	0.86
5.250	1.15	11.333	6.88	17.417	1.29	23.50	0.86
5.333	1.15	11.417	6.88	17.500	1.29	23.58	0.86
5.417	1.15	11.500	6.88	17.583	1.29	23.67	0.86
5.500	1.15	11.583	6.88	17.667	1.29	23.75	0.86
5.583	1.15	11.667	6.88	17.750	1.29	23.83	0.86
5.667	1.15	11.750	6.88	17.833	1.29	23.92	0.86
5.750	1.15	11.833	21.21	17.917	1.29	24.00	0.86
5.833	1.15	11.917	21.21	18.000	1.29	24.08	0.86

5.917	1.15	12.000	21.21	18.083	1.29	24.17	0.86
6.000	1.15	12.083	87.69	18.167	1.29	24.25	0.86
6.083	1.15	12.167	87.70	18.250	1.29		

Unit Hyd Qpeak (cms)= 4.374

PEAK FLOW (cms)= 1.881 (i)
TIME TO PEAK (hrs)= 14.417
RUNOFF VOLUME (mm)= 18.293
TOTAL RAINFALL (mm)= 71.650
RUNOFF COEFFICIENT = 0.255

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

CALIB	
STANDHYD (0007)	Area (ha)= 264.40
ID= 1 DT= 5.0 min	Total Imp(%)= 51.10 Dir. Conn.(%)= 41.40

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	135.11	129.29
Dep. Storage	(mm)=	2.00	5.90
Average Slope	(%)=	0.50	2.00
Length	(m)=	1327.65	20.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.15	12.250	87.70	18.33	1.29
0.167	0.00	6.250	1.15	12.333	10.33	18.42	1.29
0.250	0.00	6.333	1.29	12.417	10.32	18.50	1.29
0.333	0.79	6.417	1.29	12.500	10.32	18.58	1.29
0.417	0.79	6.500	1.29	12.583	10.32	18.67	1.29
0.500	0.79	6.583	1.29	12.667	10.32	18.75	1.29
0.583	0.79	6.667	1.29	12.750	10.32	18.83	1.29
0.667	0.79	6.750	1.29	12.833	5.30	18.92	1.29
0.750	0.79	6.833	1.29	12.917	5.30	19.00	1.29
0.833	0.79	6.917	1.29	13.000	5.30	19.08	1.29
0.917	0.79	7.000	1.29	13.083	5.30	19.17	1.29
1.000	0.79	7.083	1.29	13.167	5.30	19.25	1.29
1.083	0.79	7.167	1.29	13.250	5.30	19.33	1.29
1.167	0.79	7.250	1.29	13.333	3.87	19.42	1.29
1.250	0.79	7.333	1.58	13.417	3.87	19.50	1.29
1.333	0.79	7.417	1.58	13.500	3.87	19.58	1.29
1.417	0.79	7.500	1.58	13.583	3.87	19.67	1.29
1.500	0.79	7.583	1.58	13.667	3.87	19.75	1.29
1.583	0.79	7.667	1.58	13.750	3.87	19.83	1.29
1.667	0.79	7.750	1.58	13.833	3.01	19.92	1.29
1.750	0.79	7.833	1.58	13.917	3.01	20.00	1.29
1.833	0.79	7.917	1.58	14.000	3.01	20.08	1.29
1.917	0.79	8.000	1.58	14.083	3.01	20.17	1.29
2.000	0.79	8.083	1.58	14.167	3.01	20.25	1.29
2.083	0.79	8.167	1.58	14.250	3.01	20.33	0.86
2.167	0.79	8.250	1.58	14.333	2.15	20.42	0.86
2.250	0.79	8.333	1.86	14.417	2.15	20.50	0.86
2.333	0.93	8.417	1.86	14.500	2.15	20.58	0.86
2.417	0.93	8.500	1.86	14.583	2.15	20.67	0.86
2.500	0.93	8.583	1.86	14.667	2.15	20.75	0.86
2.583	0.93	8.667	1.86	14.750	2.15	20.83	0.86
2.667	0.93	8.750	1.86	14.833	2.15	20.92	0.86
2.750	0.93	8.833	2.01	14.917	2.15	21.00	0.86
2.833	0.93	8.917	2.01	15.000	2.15	21.08	0.86
2.917	0.93	9.000	2.01	15.083	2.15	21.17	0.86
3.000	0.93	9.083	2.01	15.167	2.15	21.25	0.86
3.083	0.93	9.167	2.01	15.250	2.15	21.33	0.86
3.167	0.93	9.250	2.01	15.333	2.15	21.42	0.86
3.250	0.93	9.333	2.29	15.417	2.15	21.50	0.86
3.333	0.93	9.417	2.29	15.500	2.15	21.58	0.86
3.417	0.93	9.500	2.29	15.583	2.15	21.67	0.86
3.500	0.93	9.583	2.29	15.667	2.15	21.75	0.86
3.583	0.93	9.667	2.29	15.750	2.15	21.83	0.86
3.667	0.93	9.750	2.29	15.833	2.15	21.92	0.86
3.750	0.93	9.833	2.58	15.917	2.15	22.00	0.86
3.833	0.93	9.917	2.58	16.000	2.15	22.08	0.86
3.917	0.93	10.000	2.58	16.083	2.15	22.17	0.86
4.000	0.93	10.083	2.58	16.167	2.15	22.25	0.86
4.083	0.93	10.167	2.58	16.250	2.15	22.33	0.86
4.167	0.93	10.250	2.58	16.333	1.29	22.42	0.86
4.250	0.93	10.333	3.30	16.417	1.29	22.50	0.86

4.333	1.15	10.417	3.30	16.500	1.29	22.58	0.86
4.417	1.15	10.500	3.30	16.583	1.29	22.67	0.86
4.500	1.15	10.583	3.30	16.667	1.29	22.75	0.86
4.583	1.15	10.667	3.30	16.750	1.29	22.83	0.86
4.667	1.15	10.750	3.30	16.833	1.29	22.92	0.86
4.750	1.15	10.833	4.44	16.917	1.29	23.00	0.86
4.833	1.15	10.917	4.44	17.000	1.29	23.08	0.86
4.917	1.15	11.000	4.44	17.083	1.29	23.17	0.86
5.000	1.15	11.083	4.44	17.167	1.29	23.25	0.86
5.083	1.15	11.167	4.44	17.250	1.29	23.33	0.86
5.167	1.15	11.250	4.44	17.333	1.29	23.42	0.86
5.250	1.15	11.333	6.88	17.417	1.29	23.50	0.86
5.333	1.15	11.417	6.88	17.500	1.29	23.58	0.86
5.417	1.15	11.500	6.88	17.583	1.29	23.67	0.86
5.500	1.15	11.583	6.88	17.667	1.29	23.75	0.86
5.583	1.15	11.667	6.88	17.750	1.29	23.83	0.86
5.667	1.15	11.750	6.88	17.833	1.29	23.92	0.86
5.750	1.15	11.833	21.21	17.917	1.29	24.00	0.86
5.833	1.15	11.917	21.21	18.000	1.29	24.08	0.86
5.917	1.15	12.000	21.21	18.083	1.29	24.17	0.86
6.000	1.15	12.083	87.69	18.167	1.29	24.25	0.86
6.083	1.15	12.167	87.70	18.250	1.29		

Max.Eff.Inten.(mm/hr)=	87.70	37.68		
over (min)	15.00	25.00		
Storage Coeff. (min)=	15.64 (ii)	22.52 (ii)		
Unit Hyd. Tpeak (min)=	15.00	25.00		
Unit Hyd. peak (cms)=	0.07	0.05		
			TOTALS	
PEAK FLOW (cms)=	15.89	5.47	19.974 (iii)	
TIME TO PEAK (hrs)=	12.33	12.50	12.42	
RUNOFF VOLUME (mm)=	69.65	21.40	41.38	
TOTAL RAINFALL (mm)=	71.65	71.65	71.65	
RUNOFF COEFFICIENT =	0.97	0.30	0.58	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 60.0 Ia = Dep. 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 (0008)	Area (ha)= 199.48
ID= 1 DT= 5.0 min	Total Imp(%)= 54.60 Dir. Conn.(%)= 40.90

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	108.92	90.56
Dep. Storage	(mm)=	2.00	5.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	1153.20	20.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	6.167	1.15	12.250	87.70	18.33	1.29
0.167	0.00	6.250	1.15	12.333	10.33	18.42	1.29
0.250	0.00	6.333	1.29	12.417	10.32	18.50	1.29
0.333	0.79	6.417	1.29	12.500	10.32	18.58	1.29
0.417	0.79	6.500	1.29	12.583	10.32	18.67	1.29
0.500	0.79	6.583	1.29	12.667	10.32	18.75	1.29
0.583	0.79	6.667	1.29	12.750	10.32	18.83	1.29
0.667	0.79	6.750	1.29	12.833	5.30	18.92	1.29
0.750	0.79	6.833	1.29	12.917	5.30	19.00	1.29
0.833	0.79	6.917	1.29	13.000	5.30	19.08	1.29
0.917	0.79	7.000	1.29	13.083	5.30	19.17	1.29
1.000	0.79	7.083	1.29	13.167	5.30	19.25	1.29
1.083	0.79	7.167	1.29	13.250	5.30	19.33	1.29
1.167	0.79	7.250	1.29	13.333	3.87	19.42	1.29
1.250	0.79	7.333	1.58	13.417	3.87	19.50	1.29
1.333	0.79	7.417	1.58	13.500	3.87	19.58	1.29
1.417	0.79	7.500	1.58	13.583	3.87	19.67	1.29
1.500	0.79	7.583	1.58	13.667	3.87	19.75	1.29
1.583	0.79	7.667	1.58	13.750	3.87	19.83	1.29
1.667	0.79	7.750	1.58	13.833	3.01	19.92	1.29
1.750	0.79	7.833	1.58	13.917	3.01	20.00	1.29
1.833	0.79	7.917	1.58	14.000	3.01	20.08	1.29
1.917	0.79	8.000	1.58	14.083	3.01	20.17	1.29

2.000	0.79	8.083	1.58	14.167	3.01	20.25	1.29
2.083	0.79	8.167	1.58	14.250	3.01	20.33	0.86
2.167	0.79	8.250	1.58	14.333	2.15	20.42	0.86
2.250	0.79	8.333	1.86	14.417	2.15	20.50	0.86
2.333	0.93	8.417	1.86	14.500	2.15	20.58	0.86
2.417	0.93	8.500	1.86	14.583	2.15	20.67	0.86
2.500	0.93	8.583	1.86	14.667	2.15	20.75	0.86
2.583	0.93	8.667	1.86	14.750	2.15	20.83	0.86
2.667	0.93	8.750	1.86	14.833	2.15	20.92	0.86
2.750	0.93	8.833	2.01	14.917	2.15	21.00	0.86
2.833	0.93	8.917	2.01	15.000	2.15	21.08	0.86
2.917	0.93	9.000	2.01	15.083	2.15	21.17	0.86
3.000	0.93	9.083	2.01	15.167	2.15	21.25	0.86
3.083	0.93	9.167	2.01	15.250	2.15	21.33	0.86
3.167	0.93	9.250	2.01	15.333	2.15	21.42	0.86
3.250	0.93	9.333	2.29	15.417	2.15	21.50	0.86
3.333	0.93	9.417	2.29	15.500	2.15	21.58	0.86
3.417	0.93	9.500	2.29	15.583	2.15	21.67	0.86
3.500	0.93	9.583	2.29	15.667	2.15	21.75	0.86
3.583	0.93	9.667	2.29	15.750	2.15	21.83	0.86
3.667	0.93	9.750	2.29	15.833	2.15	21.92	0.86
3.750	0.93	9.833	2.58	15.917	2.15	22.00	0.86
3.833	0.93	9.917	2.58	16.000	2.15	22.08	0.86
3.917	0.93	10.000	2.58	16.083	2.15	22.17	0.86
4.000	0.93	10.083	2.58	16.167	2.15	22.25	0.86
4.083	0.93	10.167	2.58	16.250	2.15	22.33	0.86
4.167	0.93	10.250	2.58	16.333	1.29	22.42	0.86
4.250	0.93	10.333	3.30	16.417	1.29	22.50	0.86
4.333	1.15	10.417	3.30	16.500	1.29	22.58	0.86
4.417	1.15	10.500	3.30	16.583	1.29	22.67	0.86
4.500	1.15	10.583	3.30	16.667	1.29	22.75	0.86
4.583	1.15	10.667	3.30	16.750	1.29	22.83	0.86
4.667	1.15	10.750	3.30	16.833	1.29	22.92	0.86
4.750	1.15	10.833	4.44	16.917	1.29	23.00	0.86
4.833	1.15	10.917	4.44	17.000	1.29	23.08	0.86
4.917	1.15	11.000	4.44	17.083	1.29	23.17	0.86
5.000	1.15	11.083	4.44	17.167	1.29	23.25	0.86
5.083	1.15	11.167	4.44	17.250	1.29	23.33	0.86
5.167	1.15	11.250	4.44	17.333	1.29	23.42	0.86
5.250	1.15	11.333	6.88	17.417	1.29	23.50	0.86
5.333	1.15	11.417	6.88	17.500	1.29	23.58	0.86
5.417	1.15	11.500	6.88	17.583	1.29	23.67	0.86
5.500	1.15	11.583	6.88	17.667	1.29	23.75	0.86
5.583	1.15	11.667	6.88	17.750	1.29	23.83	0.86
5.667	1.15	11.750	6.88	17.833	1.29	23.92	0.86
5.750	1.15	11.833	21.21	17.917	1.29	24.00	0.86
5.833	1.15	11.917	21.21	18.000	1.29	24.08	0.86
5.917	1.15	12.000	21.21	18.083	1.29	24.17	0.86
6.000	1.15	12.083	87.69	18.167	1.29	24.25	0.86
6.083	1.15	12.167	87.70	18.250	1.29		

Max.Eff.Inten.(mm/hr)=	87.70	52.28		
over (min)	15.00	25.00		
Storage Coeff. (min)=	14.37 (ii)	20.41 (ii)		
Unit Hyd. Tpeak (min)=	15.00	25.00		
Unit Hyd. peak (cms)=	0.08	0.05		
			TOTALS	
PEAK FLOW (cms)=	12.29	5.66	16.671 (iii)	
TIME TO PEAK (hrs)=	12.33	12.50	12.42	
RUNOFF VOLUME (mm)=	69.65	27.22	44.57	
TOTAL RAINFALL (mm)=	71.65	71.65	71.65	
RUNOFF COEFFICIENT =	0.97	0.38	0.62	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 66.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0013)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0007):		264.40	19.974	12.42	41.38
+ ID2= 2 (0008):		199.48	16.671	12.42	44.57
ID = 3 (0013):		463.88	36.645	12.42	42.75

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
| ROUTE CHN(  0009)|
| IN= 2---> OUT= 1 |     Routing time step (min)'=  5.00
--------------------
               <------ DATA FOR SECTION (   1.1) ------>
               Distance      Elevation       Manning
                   0.00         232.00        0.0500
                  15.83         231.70        0.0500
                  47.63         231.09        0.0500
                  57.14         230.76        0.0500
                  66.39         229.94        0.0500
                  69.72         229.37        0.0500
                 102.15         229.37        0.0500
                 106.00         229.60        0.0500
                 111.50         229.47        0.0500
                 143.51         229.14        0.0350      Main Channel
                 143.80         229.14        0.0350      Main Channel
                 153.45         229.10        0.0350      Main Channel
                 157.09         229.15        0.0350      Main Channel
                 188.81         230.05    0.0350 /0.0500  Main Channel
                 195.46         230.69        0.0500
                 203.04         231.10        0.0500
                 226.79         230.80        0.0500
                 246.87         230.34        0.0500
                 268.22         231.18        0.0500
                 298.24         232.00        0.0500

      <---------------------- TRAVEL TIME TABLE ---------------------->
       DEPTH     ELEV      VOLUME    FLOW RATE    VELOCITY   TRAV.TIME
         (m)      (m)     (cu.m.)      (cms)        (m/s)      (min)
        0.05   229.14    .488E+03       0.1          0.26     100.03
        0.20   229.29    .601E+04       2.9          0.74      34.93
        0.35   229.44    .199E+05      10.9          0.85      30.35
        0.50   229.60    .425E+05      30.1          1.10      23.56
        0.65   229.75    .676E+05      60.1          1.38      18.75
        0.80   229.90    .942E+05      99.6          1.64      15.77
        0.95   230.05    .122E+06     147.9          1.88      13.78
        1.10   230.20    .152E+06     209.6          2.15      12.05
        1.25   230.35    .182E+06     280.3          2.40      10.80
        1.40   230.50    .214E+06     359.8          2.62       9.90
        1.55   230.65    .249E+06     449.1          2.80       9.25
        1.70   230.80    .288E+06     547.2          2.96       8.77
        1.85   230.95    .331E+06     651.9          3.06       8.46
        2.00   231.10    .380E+06     768.9          3.15       8.23
        2.15   231.25    .432E+06     894.7          3.22       8.05
        2.30   231.40    .488E+06    1034.8          3.30       7.86
        2.45   231.55    .547E+06    1189.4          3.38       7.66
        2.60   231.70    .609E+06    1358.9          3.47       7.47
        2.75   231.85    .674E+06    1543.0          3.56       7.28

                                    <---- hydrograph ---->   <-pipe / channel->
                                AREA    QPEAK   TPEAK   R.V.   MAX DEPTH  MAX VEL
                                (ha)    (cms)   (hrs)   (mm)      (m)      (m/s)
   INFLOW : ID= 2 (  0013)  463.88    36.64   12.42  42.75      0.53      1.15
   OUTFLOW: ID= 1 (  0009)  463.88    24.01   12.58  42.75      0.45      1.01



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

--------------------
| ADD HYD  (  0005)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0004):   221.02   1.881    14.42    18.29
     + ID2= 2 (  0009):   463.88  24.011    12.58    42.75
       ================================================
       ID = 3 (  0005):   684.90  24.539    12.58    34.86

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

--------------------
| ADD HYD  (  0015)|
|   1 +  2 =  3    |         AREA    QPEAK    TPEAK     R.V.
--------------------         (ha)    (cms)    (hrs)     (mm)
       ID1= 1 (  0014):   149.59   6.445    12.42    26.43
     + ID2= 2 (  0005):   684.90  24.539    12.58    34.86
       ================================================
       ID = 3 (  0015):   834.49  30.139    12.58    33.35

     NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
--------------------------------------------------------------------------------
--------------------
| ROUTE CHN(  0006)|
```

| IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	228.00	0.0500	
212.52	225.39	0.0350	Main Channel
213.15	225.38	0.0350	Main Channel
213.73	225.38	0.0350	Main Channel
214.27	225.38	0.0350	Main Channel
214.91	225.37	0.0350	Main Channel
226.52	222.62	0.0350	Main Channel
226.60	222.60	0.0350	Main Channel
226.65	222.60	0.0350	Main Channel
229.30	222.50	0.0350	Main Channel
233.70	222.33	0.0350	Main Channel
236.82	222.33	0.0350	Main Channel
247.01	222.75	0.0350	Main Channel
247.81	223.00	0.0350	Main Channel
257.03	225.86	0.0500	
257.30	225.87	0.0500	
257.55	225.87	0.0500	
257.81	225.88	0.0500	
367.45	228.00	0.0500	

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.28	222.61	.312E+04	1.8	0.63	29.35
0.56	222.89	.939E+04	9.3	1.10	16.83
0.83	223.17	.165E+05	22.5	1.51	12.27
1.11	223.44	.243E+05	40.4	1.85	10.04
1.39	223.72	.328E+05	63.0	2.14	8.67
1.67	224.00	.418E+05	90.2	2.40	7.73
1.95	224.28	.516E+05	122.1	2.64	7.04
2.23	224.56	.619E+05	158.8	2.86	6.50
2.50	224.83	.729E+05	200.5	3.06	6.06
2.78	225.11	.846E+05	247.2	3.25	5.70
3.06	225.39	.969E+05	288.7	3.32	5.59
3.39	225.72	.118E+06	367.2	3.48	5.33
3.71	226.04	.149E+06	465.5	3.48	5.34
4.04	226.37	.196E+06	591.4	3.36	5.52
4.36	226.70	.258E+06	749.5	3.23	5.74
4.69	227.02	.337E+06	946.2	3.13	5.93
5.02	227.35	.431E+06	1187.1	3.07	6.05
5.34	227.67	.540E+06	1477.5	3.04	6.10
5.67	228.00	.666E+06	1822.2	3.05	6.09

		<---- hydrograph ----> AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	<-pipe / channel-> MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0015)		834.49	30.14	12.58	33.35	0.95	1.64
OUTFLOW: ID= 1 (0006)		834.49	27.67	12.75	33.35	0.91	1.59

ADD HYD (0003)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0001):	161.19	1.811	14.50	24.41
	+ ID2= 2 (0006):	834.49	27.673	12.75	33.35
	ID = 3 (0003):	995.68	28.362	12.75	31.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
V    V   I    SSSSS  U   U    A    L              (v 6.2.2008)
V    V   I    SS     U   U   A A   L
 V  V    I     SS    U   U  AAAAA  L
 V  V    I      SS   U   U  A   A  L
  VV     I    SSSSS  UUUUU  A   A  LLLLL

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

Developed and Distributed by Smart City Water Inc
Copyright 2007 - 2021 Smart City Water Inc
All rights reserved.

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\b4016a71-d3
Summary filename: C:\Users\jchowen\AppData\Local\Civica\VH5\826232ee-cb0f-4e97-8751-4958421f10c2\b4016a71-d3

DATE: 02-27-2023 TIME: 10:10:59

USER:

COMMENTS: _____

****
** SIMULATION : tim **
****

| READ STORM | Filename: C:\Users\jchowen\AppData\Local\Temp\50702b2f-89c2-43ff-9553-8a4048d6a62f\bf879cac
| Ptotal=193.00 mm | Comments: tim

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.00	15.00	3.00	3.00	6.00	43.00	9.00	13.00
1.00	20.00	4.00	5.00	7.00	20.00	10.00	13.00
2.00	10.00	5.00	20.00	8.00	23.00	11.00	8.00

| CALIB NASHYD (0001) ID= 1 DT= 5.0 min | Area (ha)= 161.19 Curve Number (CN)= 71.2 Ia (mm)= 7.90 # of Linear Res.(N)= 3.00 U.H. Tp(hrs)= 2.01

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	15.00	3.083	3.00	6.083	43.00	9.08	13.00
0.167	15.00	3.167	3.00	6.167	43.00	9.17	13.00
0.250	15.00	3.250	3.00	6.250	43.00	9.25	13.00
0.333	15.00	3.333	3.00	6.333	43.00	9.33	13.00
0.417	15.00	3.417	3.00	6.417	43.00	9.42	13.00
0.500	15.00	3.500	3.00	6.500	43.00	9.50	13.00
0.583	15.00	3.583	3.00	6.583	43.00	9.58	13.00
0.667	15.00	3.667	3.00	6.667	43.00	9.67	13.00
0.750	15.00	3.750	3.00	6.750	43.00	9.75	13.00
0.833	15.00	3.833	3.00	6.833	43.00	9.83	13.00
0.917	15.00	3.917	3.00	6.917	43.00	9.92	13.00
1.000	15.00	4.000	3.00	7.000	43.00	10.00	13.00
1.083	20.00	4.083	5.00	7.083	20.00	10.08	13.00
1.167	20.00	4.167	5.00	7.167	20.00	10.17	13.00
1.250	20.00	4.250	5.00	7.250	20.00	10.25	13.00
1.333	20.00	4.333	5.00	7.333	20.00	10.33	13.00
1.417	20.00	4.417	5.00	7.417	20.00	10.42	13.00
1.500	20.00	4.500	5.00	7.500	20.00	10.50	13.00
1.583	20.00	4.583	5.00	7.583	20.00	10.58	13.00
1.667	20.00	4.667	5.00	7.667	20.00	10.67	13.00
1.750	20.00	4.750	5.00	7.750	20.00	10.75	13.00
1.833	20.00	4.833	5.00	7.833	20.00	10.83	13.00
1.917	20.00	4.917	5.00	7.917	20.00	10.92	13.00
2.000	20.00	5.000	5.00	8.000	20.00	11.00	13.00
2.083	10.00	5.083	20.00	8.083	23.00	11.08	8.00
2.167	10.00	5.167	20.00	8.167	23.00	11.17	8.00
2.250	10.00	5.250	20.00	8.250	23.00	11.25	8.00
2.333	10.00	5.333	20.00	8.333	23.00	11.33	8.00
2.417	10.00	5.417	20.00	8.417	23.00	11.42	8.00
2.500	10.00	5.500	20.00	8.500	23.00	11.50	8.00
2.583	10.00	5.583	20.00	8.583	23.00	11.58	8.00
2.667	10.00	5.667	20.00	8.667	23.00	11.67	8.00
2.750	10.00	5.750	20.00	8.750	23.00	11.75	8.00
2.833	10.00	5.833	20.00	8.833	23.00	11.83	8.00

2.917	10.00	5.917	20.00	8.917	23.00	11.92	8.00
3.000	10.00	6.000	20.00	9.000	23.00	12.00	8.00

Unit Hyd Qpeak (cms)= 3.063

PEAK FLOW (cms)= 7.466 (i)
TIME TO PEAK (hrs)= 9.833
RUNOFF VOLUME (mm)= 119.031
TOTAL RAINFALL (mm)= 193.000
RUNOFF COEFFICIENT = 0.617

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

CALIB STANDHYD (0014)	Area (ha)= 149.59
ID= 1 DT= 5.0 min	Total Imp(%)= 21.50 Dir. Conn.(%)= 13.60

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	32.16	117.43
Dep. Storage	(mm)=	1.00	8.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	998.63	40.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	15.00	3.083	3.00	6.083	43.00	9.08	13.00
0.167	15.00	3.167	3.00	6.167	43.00	9.17	13.00
0.250	15.00	3.250	3.00	6.250	43.00	9.25	13.00
0.333	15.00	3.333	3.00	6.333	43.00	9.33	13.00
0.417	15.00	3.417	3.00	6.417	43.00	9.42	13.00
0.500	15.00	3.500	3.00	6.500	43.00	9.50	13.00
0.583	15.00	3.583	3.00	6.583	43.00	9.58	13.00
0.667	15.00	3.667	3.00	6.667	43.00	9.67	13.00
0.750	15.00	3.750	3.00	6.750	43.00	9.75	13.00
0.833	15.00	3.833	3.00	6.833	43.00	9.83	13.00
0.917	15.00	3.917	3.00	6.917	43.00	9.92	13.00
1.000	15.00	4.000	3.00	7.000	43.00	10.00	13.00
1.083	20.00	4.083	5.00	7.083	20.00	10.08	13.00
1.167	20.00	4.167	5.00	7.167	20.00	10.17	13.00
1.250	20.00	4.250	5.00	7.250	20.00	10.25	13.00
1.333	20.00	4.333	5.00	7.333	20.00	10.33	13.00
1.417	20.00	4.417	5.00	7.417	20.00	10.42	13.00
1.500	20.00	4.500	5.00	7.500	20.00	10.50	13.00
1.583	20.00	4.583	5.00	7.583	20.00	10.58	13.00
1.667	20.00	4.667	5.00	7.667	20.00	10.67	13.00
1.750	20.00	4.750	5.00	7.750	20.00	10.75	13.00
1.833	20.00	4.833	5.00	7.833	20.00	10.83	13.00
1.917	20.00	4.917	5.00	7.917	20.00	10.92	13.00
2.000	20.00	5.000	5.00	8.000	20.00	11.00	13.00
2.083	10.00	5.083	20.00	8.083	23.00	11.08	8.00
2.167	10.00	5.167	20.00	8.167	23.00	11.17	8.00
2.250	10.00	5.250	20.00	8.250	23.00	11.25	8.00
2.333	10.00	5.333	20.00	8.333	23.00	11.33	8.00
2.417	10.00	5.417	20.00	8.417	23.00	11.42	8.00
2.500	10.00	5.500	20.00	8.500	23.00	11.50	8.00
2.583	10.00	5.583	20.00	8.583	23.00	11.58	8.00
2.667	10.00	5.667	20.00	8.667	23.00	11.67	8.00
2.750	10.00	5.750	20.00	8.750	23.00	11.75	8.00
2.833	10.00	5.833	20.00	8.833	23.00	11.83	8.00
2.917	10.00	5.917	20.00	8.917	23.00	11.92	8.00
3.000	10.00	6.000	20.00	9.000	23.00	12.00	8.00

Max.Eff.Inten.(mm/hr)=	43.00	30.93		
over (min)	20.00	30.00		
Storage Coeff. (min)=	17.53 (ii)	28.82 (ii)		
Unit Hyd. Tpeak (min)=	20.00	30.00		
Unit Hyd. peak (cms)=	0.06	0.04		
			TOTALS	
PEAK FLOW (cms)=	2.36	8.26	10.496 (iii)	
TIME TO PEAK (hrs)=	7.00	7.17	7.08	
RUNOFF VOLUME (mm)=	192.00	103.36	115.41	
TOTAL RAINFALL (mm)=	193.00	193.00	193.00	
RUNOFF COEFFICIENT =	0.99	0.54	0.60	

***** WARNING:FOR AREAS WITH IMPERVIOUS RATIOS BELOW 20%
YOU SHOULD CONSIDER SPLITTING THE AREA.

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 61.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
NASHYD (0004)	Area (ha)= 221.02	Curve Number (CN)= 61.5	
ID= 1 DT= 5.0 min	Ia (mm)= 7.80	# of Linear Res.(N)= 3.00	
	U.H. Tp(hrs)= 1.93		

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	15.00	3.083	3.00	6.083	43.00	9.08	13.00
0.167	15.00	3.167	3.00	6.167	43.00	9.17	13.00
0.250	15.00	3.250	3.00	6.250	43.00	9.25	13.00
0.333	15.00	3.333	3.00	6.333	43.00	9.33	13.00
0.417	15.00	3.417	3.00	6.417	43.00	9.42	13.00
0.500	15.00	3.500	3.00	6.500	43.00	9.50	13.00
0.583	15.00	3.583	3.00	6.583	43.00	9.58	13.00
0.667	15.00	3.667	3.00	6.667	43.00	9.67	13.00
0.750	15.00	3.750	3.00	6.750	43.00	9.75	13.00
0.833	15.00	3.833	3.00	6.833	43.00	9.83	13.00
0.917	15.00	3.917	3.00	6.917	43.00	9.92	13.00
1.000	15.00	4.000	3.00	7.000	43.00	10.00	13.00
1.083	20.00	4.083	5.00	7.083	20.00	10.08	13.00
1.167	20.00	4.167	5.00	7.167	20.00	10.17	13.00
1.250	20.00	4.250	5.00	7.250	20.00	10.25	13.00
1.333	20.00	4.333	5.00	7.333	20.00	10.33	13.00
1.417	20.00	4.417	5.00	7.417	20.00	10.42	13.00
1.500	20.00	4.500	5.00	7.500	20.00	10.50	13.00
1.583	20.00	4.583	5.00	7.583	20.00	10.58	13.00
1.667	20.00	4.667	5.00	7.667	20.00	10.67	13.00
1.750	20.00	4.750	5.00	7.750	20.00	10.75	13.00
1.833	20.00	4.833	5.00	7.833	20.00	10.83	13.00
1.917	20.00	4.917	5.00	7.917	20.00	10.92	13.00
2.000	20.00	5.000	5.00	8.000	20.00	11.00	13.00
2.083	10.00	5.083	20.00	8.083	23.00	11.08	8.00
2.167	10.00	5.167	20.00	8.167	23.00	11.17	8.00
2.250	10.00	5.250	20.00	8.250	23.00	11.25	8.00
2.333	10.00	5.333	20.00	8.333	23.00	11.33	8.00
2.417	10.00	5.417	20.00	8.417	23.00	11.42	8.00
2.500	10.00	5.500	20.00	8.500	23.00	11.50	8.00
2.583	10.00	5.583	20.00	8.583	23.00	11.58	8.00
2.667	10.00	5.667	20.00	8.667	23.00	11.67	8.00
2.750	10.00	5.750	20.00	8.750	23.00	11.75	8.00
2.833	10.00	5.833	20.00	8.833	23.00	11.83	8.00
2.917	10.00	5.917	20.00	8.917	23.00	11.92	8.00
3.000	10.00	6.000	20.00	9.000	23.00	12.00	8.00

Unit Hyd Qpeak (cms)= 4.374

PEAK FLOW (cms)= 8.757 (i)
TIME TO PEAK (hrs)= 9.833
RUNOFF VOLUME (mm)= 99.646
TOTAL RAINFALL (mm)= 193.000
RUNOFF COEFFICIENT = 0.516

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

CALIB			
STANDHYD (0007)	Area (ha)= 264.40		
ID= 1 DT= 5.0 min	Total Imp(%)= 51.10	Dir. Conn.(%)= 41.40	

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	135.11	129.29
Dep. Storage	(mm)=	2.00	5.90
Average Slope	(%)=	0.50	2.00
Length	(m)=	1327.65	20.00
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	15.00	3.083	3.00	6.083	43.00	9.08	13.00
0.167	15.00	3.167	3.00	6.167	43.00	9.17	13.00
0.250	15.00	3.250	3.00	6.250	43.00	9.25	13.00
0.333	15.00	3.333	3.00	6.333	43.00	9.33	13.00
0.417	15.00	3.417	3.00	6.417	43.00	9.42	13.00
0.500	15.00	3.500	3.00	6.500	43.00	9.50	13.00
0.583	15.00	3.583	3.00	6.583	43.00	9.58	13.00
0.667	15.00	3.667	3.00	6.667	43.00	9.67	13.00
0.750	15.00	3.750	3.00	6.750	43.00	9.75	13.00
0.833	15.00	3.833	3.00	6.833	43.00	9.83	13.00
0.917	15.00	3.917	3.00	6.917	43.00	9.92	13.00
1.000	15.00	4.000	3.00	7.000	43.00	10.00	13.00
1.083	20.00	4.083	5.00	7.083	20.00	10.08	13.00
1.167	20.00	4.167	5.00	7.167	20.00	10.17	13.00
1.250	20.00	4.250	5.00	7.250	20.00	10.25	13.00
1.333	20.00	4.333	5.00	7.333	20.00	10.33	13.00
1.417	20.00	4.417	5.00	7.417	20.00	10.42	13.00
1.500	20.00	4.500	5.00	7.500	20.00	10.50	13.00
1.583	20.00	4.583	5.00	7.583	20.00	10.58	13.00
1.667	20.00	4.667	5.00	7.667	20.00	10.67	13.00
1.750	20.00	4.750	5.00	7.750	20.00	10.75	13.00
1.833	20.00	4.833	5.00	7.833	20.00	10.83	13.00
1.917	20.00	4.917	5.00	7.917	20.00	10.92	13.00
2.000	20.00	5.000	5.00	8.000	20.00	11.00	13.00
2.083	10.00	5.083	20.00	8.083	23.00	11.08	8.00
2.167	10.00	5.167	20.00	8.167	23.00	11.17	8.00
2.250	10.00	5.250	20.00	8.250	23.00	11.25	8.00
2.333	10.00	5.333	20.00	8.333	23.00	11.33	8.00
2.417	10.00	5.417	20.00	8.417	23.00	11.42	8.00
2.500	10.00	5.500	20.00	8.500	23.00	11.50	8.00
2.583	10.00	5.583	20.00	8.583	23.00	11.58	8.00
2.667	10.00	5.667	20.00	8.667	23.00	11.67	8.00
2.750	10.00	5.750	20.00	8.750	23.00	11.75	8.00
2.833	10.00	5.833	20.00	8.833	23.00	11.83	8.00
2.917	10.00	5.917	20.00	8.917	23.00	11.92	8.00
3.000	10.00	6.000	20.00	9.000	23.00	12.00	8.00

Max.Eff.Inten.(mm/hr)=	43.00	34.90		
over (min)	20.00	30.00		
Storage Coeff. (min)=	20.80 (ii)	27.90 (ii)		
Unit Hyd. Tpeak (min)=	20.00	30.00		
Unit Hyd. peak (cms)=	0.05	0.04		
			TOTALS	
PEAK FLOW (cms)=	12.44	10.31	22.532 (iii)	
TIME TO PEAK (hrs)=	7.00	7.17	7.08	
RUNOFF VOLUME (mm)=	191.00	107.39	142.01	
TOTAL RAINFALL (mm)=	193.00	193.00	193.00	
RUNOFF COEFFICIENT =	0.99	0.56	0.74	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 60.0 Ia = Dep. 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 (0008)	Area (ha)= 199.48
ID= 1 DT= 5.0 min	Total Imp(%)= 54.60 Dir. Conn.(%)= 40.90

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	108.92	90.56
Dep. Storage	(mm)=	2.00	5.20
Average Slope	(%)=	0.50	2.00
Length	(m)=	1153.20	20.00
Mannings n	=	0.013	0.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	15.00	3.083	3.00	6.083	43.00	9.08	13.00
0.167	15.00	3.167	3.00	6.167	43.00	9.17	13.00
0.250	15.00	3.250	3.00	6.250	43.00	9.25	13.00
0.333	15.00	3.333	3.00	6.333	43.00	9.33	13.00
0.417	15.00	3.417	3.00	6.417	43.00	9.42	13.00
0.500	15.00	3.500	3.00	6.500	43.00	9.50	13.00
0.583	15.00	3.583	3.00	6.583	43.00	9.58	13.00
0.667	15.00	3.667	3.00	6.667	43.00	9.67	13.00

0.750	15.00	3.750	3.00	6.750	43.00	9.75	13.00
0.833	15.00	3.833	3.00	6.833	43.00	9.83	13.00
0.917	15.00	3.917	3.00	6.917	43.00	9.92	13.00
1.000	15.00	4.000	3.00	7.000	43.00	10.00	13.00
1.083	20.00	4.083	5.00	7.083	20.00	10.08	13.00
1.167	20.00	4.167	5.00	7.167	20.00	10.17	13.00
1.250	20.00	4.250	5.00	7.250	20.00	10.25	13.00
1.333	20.00	4.333	5.00	7.333	20.00	10.33	13.00
1.417	20.00	4.417	5.00	7.417	20.00	10.42	13.00
1.500	20.00	4.500	5.00	7.500	20.00	10.50	13.00
1.583	20.00	4.583	5.00	7.583	20.00	10.58	13.00
1.667	20.00	4.667	5.00	7.667	20.00	10.67	13.00
1.750	20.00	4.750	5.00	7.750	20.00	10.75	13.00
1.833	20.00	4.833	5.00	7.833	20.00	10.83	13.00
1.917	20.00	4.917	5.00	7.917	20.00	10.92	13.00
2.000	20.00	5.000	5.00	8.000	20.00	11.00	13.00
2.083	10.00	5.083	20.00	8.083	23.00	11.08	8.00
2.167	10.00	5.167	20.00	8.167	23.00	11.17	8.00
2.250	10.00	5.250	20.00	8.250	23.00	11.25	8.00
2.333	10.00	5.333	20.00	8.333	23.00	11.33	8.00
2.417	10.00	5.417	20.00	8.417	23.00	11.42	8.00
2.500	10.00	5.500	20.00	8.500	23.00	11.50	8.00
2.583	10.00	5.583	20.00	8.583	23.00	11.58	8.00
2.667	10.00	5.667	20.00	8.667	23.00	11.67	8.00
2.750	10.00	5.750	20.00	8.750	23.00	11.75	8.00
2.833	10.00	5.833	20.00	8.833	23.00	11.83	8.00
2.917	10.00	5.917	20.00	8.917	23.00	11.92	8.00
3.000	10.00	6.000	20.00	9.000	23.00	12.00	8.00

Max.Eff.Inten.(mm/hr)=	43.00	43.02		
over (min)	20.00	30.00		
Storage Coeff. (min)=	19.12 (ii)	25.64 (ii)		
Unit Hyd. Tpeak (min)=	20.00	30.00		
Unit Hyd. peak (cms)=	0.06	0.04		
			TOTALS	
PEAK FLOW (cms)=	9.37	9.20	18.414 (iii)	
TIME TO PEAK (hrs)=	7.00	7.17	7.08	
RUNOFF VOLUME (mm)=	191.00	123.39	151.04	
TOTAL RAINFALL (mm)=	193.00	193.00	193.00	
RUNOFF COEFFICIENT =	0.99	0.64	0.78	

(i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
CN* = 66.0 Ia = Dep. Storage (Above)
(ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
THAN THE STORAGE COEFFICIENT.
(iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (0013)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0007):		264.40	22.532	7.08	142.01
+ ID2= 2 (0008):		199.48	18.414	7.08	151.04
ID = 3 (0013):		463.88	40.945	7.08	145.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0009)
IN= 2---> OUT= 1 | Routing time step (min)'= 5.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	232.00	0.0500	
15.83	231.70	0.0500	
47.63	231.09	0.0500	
57.14	230.76	0.0500	
66.39	229.94	0.0500	
69.72	229.37	0.0500	
102.15	229.37	0.0500	
106.00	229.60	0.0500	
111.50	229.47	0.0500	
143.51	229.14	0.0350	Main Channel
143.80	229.14	0.0350	Main Channel
153.45	229.10	0.0350	Main Channel
157.09	229.15	0.0350	Main Channel
188.81	230.05	0.0350 /0.0500	Main Channel
195.46	230.69	0.0500	
203.04	231.10	0.0500	
226.79	230.80	0.0500	

246.87	230.34	0.0500
268.22	231.18	0.0500
298.24	232.00	0.0500

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.05	229.14	.488E+03	0.1	0.26	100.03
0.20	229.29	.601E+04	2.9	0.74	34.93
0.35	229.44	.199E+05	10.9	0.85	30.35
0.50	229.60	.425E+05	30.1	1.10	23.56
0.65	229.75	.676E+05	60.1	1.38	18.75
0.80	229.90	.942E+05	99.6	1.64	15.77
0.95	230.05	.122E+06	147.9	1.88	13.78
1.10	230.20	.152E+06	209.6	2.15	12.05
1.25	230.35	.182E+06	280.3	2.40	10.80
1.40	230.50	.214E+06	359.8	2.62	9.90
1.55	230.65	.249E+06	449.1	2.80	9.25
1.70	230.80	.288E+06	547.2	2.96	8.77
1.85	230.95	.331E+06	651.9	3.06	8.46
2.00	231.10	.380E+06	768.9	3.15	8.23
2.15	231.25	.432E+06	894.7	3.22	8.05
2.30	231.40	.488E+06	1034.8	3.30	7.86
2.45	231.55	.547E+06	1189.4	3.38	7.66
2.60	231.70	.609E+06	1358.9	3.47	7.47
2.75	231.85	.674E+06	1543.0	3.56	7.28

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0013)	463.88	40.95	7.08	145.89	0.55	1.19
OUTFLOW: ID= 1 (0009)	463.88	37.81	7.25	145.89	0.53	1.16

ADD HYD (0005)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0004):	221.02	8.757	9.83	99.65
	+ ID2= 2 (0009):	463.88	37.809	7.25	145.89
	ID = 3 (0005):	684.90	42.192	7.25	130.97

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0015)		AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3	ID1= 1 (0014):	149.59	10.496	7.08	115.41
	+ ID2= 2 (0005):	684.90	42.192	7.25	130.97
	ID = 3 (0015):	834.49	52.440	7.25	128.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ROUTE CHN(0006)	
IN= 2---> OUT= 1	Routing time step (min)'= 5.00

<------ DATA FOR SECTION (1.1) ------>

Distance	Elevation	Manning	
0.00	228.00	0.0500	
212.52	225.39	0.0350	Main Channel
213.15	225.38	0.0350	Main Channel
213.73	225.38	0.0350	Main Channel
214.27	225.38	0.0350	Main Channel
214.91	225.37	0.0350	Main Channel
226.52	222.62	0.0350	Main Channel
226.60	222.60	0.0350	Main Channel
226.65	222.60	0.0350	Main Channel
229.30	222.50	0.0350	Main Channel
233.70	222.33	0.0350	Main Channel
236.82	222.33	0.0350	Main Channel
247.01	222.75	0.0350	Main Channel
247.81	223.00	0.0350	Main Channel
257.03	225.86	0.0500	
257.30	225.87	0.0500	
257.55	225.87	0.0500	
257.81	225.88	0.0500	

367.45 228.00 0.0500

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

DEPTH (m)	ELEV (m)	VOLUME (cu.m.)	FLOW RATE (cms)	VELOCITY (m/s)	TRAV.TIME (min)
0.28	222.61	.312E+04	1.8	0.63	29.35
0.56	222.89	.939E+04	9.3	1.10	16.83
0.83	223.17	.165E+05	22.5	1.51	12.27
1.11	223.44	.243E+05	40.4	1.85	10.04
1.39	223.72	.328E+05	63.0	2.14	8.67
1.67	224.00	.418E+05	90.2	2.40	7.73
1.95	224.28	.516E+05	122.1	2.64	7.04
2.23	224.56	.619E+05	158.8	2.86	6.50
2.50	224.83	.729E+05	200.5	3.06	6.06
2.78	225.11	.846E+05	247.2	3.25	5.70
3.06	225.39	.969E+05	288.7	3.32	5.59
3.39	225.72	.118E+06	367.2	3.48	5.33
3.71	226.04	.149E+06	465.5	3.48	5.34
4.04	226.37	.196E+06	591.4	3.36	5.52
4.36	226.70	.258E+06	749.5	3.23	5.74
4.69	227.02	.337E+06	946.2	3.13	5.93
5.02	227.35	.431E+06	1187.1	3.07	6.05
5.34	227.67	.540E+06	1477.5	3.04	6.10
5.67	228.00	.666E+06	1822.2	3.05	6.09

		<---- hydrograph ---->			<-pipe / channel->	
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)	MAX DEPTH (m)	MAX VEL (m/s)
INFLOW : ID= 2 (0015)	834.49	52.44	7.25	128.18	1.26	1.99
OUTFLOW: ID= 1 (0006)	834.49	51.67	7.33	128.18	1.25	1.98

ADD HYD (0003)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	161.19	7.466	9.83	119.03
+ ID2= 2 (0006):	834.49	51.671	7.33	128.18
ID = 3 (0003):	995.68	55.757	7.42	126.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

APPENDIX C

Crossing Inventory

CROZIER CONSULTING ENGINEERS

Project No.: 1935-6133-3
Date: 2024-01-10
Completed by: TM
Checked by: BH

Hawk Ridge Formal Floodplain Analysis
Crossing Inventory

Crossing 1

Description

Crossing 1 is a approximately 4m wide 0.5m thick golf cart bridge traversing the low flow channel. Due to the minimal surface area the crossing will have on flow conveyance and lack of embankments on either side of the crossing, Crossing 1 was modeled as a Lid.5

CROZIER CONSULTING ENGINEERS

Project No.: 1935-6133-3
Date: 2024-01-10
Completed by: TM
Checked by: BH

Hawk Ridge Formal Floodplain Analysis
Crossing Inventory

Crossing 2

Description

Crossing 2 is a approximately 4m wide 0.7m thick golf cart bridge traversing the low flow channel. Due to the minimal surface area the crossing will have on flow conveyance and lack of embankments on either side of the crossing, Crossing 2 was modeled as a Lid.

CROZIER CONSULTING ENGINEERS

Project No.: 1935-6133-3
Date: 2024-01-10
Completed by: TM
Checked by: BH

Hawk Ridge Formal Floodplain Analysis
Crossing Inventory

Crossing 3

Description

Crossing 3 is a approximately 4m wide 0.7m thick golf cart bridge traversing the low flow channel. Due to the minimal surface area the crossing will have on flow conveyance and lack of embankments on either side of the crossing, Crossing 3 was modeled as a Lid.

CROZIER CONSULTING ENGINEERS

Project No.: 1935-6133-3

Date: 2024-01-10

Completed by: TM

Checked by: BH

Hawk Ridge Formal Floodplain Analysis
Crossing Inventory

Crossing 4

Description

Crossing 4 is approximately 8m wide and 2.5m thick golf cart bridge traversing the low flow channel. Due to this crossing having a significant surface area with the channel, it is deemed that a 4 cross section bridge method was required to adequately model this feature.

CROZIER CONSULTING ENGINEERS

Project No.: 1935-6133-3

Date: 2024-01-10

Completed by: TM

Checked by: BH

Hawk Ridge Formal Floodplain Analysis
Crossing Inventory

Culvert 1

Description

Culvert 1 is approximately 5m long and is 1m in diameter. Since this crossing restricts the entirety of the watercourse this feature was deemed to have significant impact on the floodplain and therefor was modeled as a 4 cross section bridge complete with ineffective flow areas as well as expansion and contraction coefficients. Culvert 1 and Culvert 2 were moddled within the same 4 cross sections as it was deemed that the floodplains between the Silver Creek Southeast Reach and the South West Reach overlapped.

CROZIER CONSULTING ENGINEERS

Project No.: 1935-6133-3

Date: 2024-01-10

Completed by: TM

Checked by: BH

Hawk Ridge Formal Floodplain Analysis
Crossing Inventory

Culvert 2

Description

Culvert 2 is approximately 7m long and is 1m in diameter. Since this crossing restricts the entirety of the watercourse this feature was deemed to have significant impact on the floodplain and therefor was modeled as a 4 cross section bridge complete with ineffective flow areas as well as expansion and contraction coefficients. Culvert 1 and Culvert 2 were moddled within the same 4 cross sections as it was deemed that the floodplains between the Silver Creek Southeast Reach and the South West Reach overlapped.

CROZIER CONSULTING ENGINEERS

Project No.: 1935-6133-3

Date: 2024-01-10

Completed by: TM

Checked by: BH

Hawk Ridge Formal Floodplain Analysis
Crossing Inventory

Crossing 5

Description

Crossing 5 is a approximately 3.5m wide 0.3m thick golf cart bridge traversing the low flow channel. Due to the minimal surface area the crossing will have on flow conveyance and lack of embankments on either side of the crossing, Crossing 5 was modeled as a Lid.5

CROZIER CONSULTING ENGINEERS

Project No.: 1935-6133-3
Date: 2024-01-10
Completed by: TM
Checked by: BH

Hawk Ridge Formal Floodplain Analysis
Crossing Inventory

Crossing 6

Description

Crossing 6 is a approximately 3.5m wide 0.3m thick golf cart bridge traversing the low flow channel. Due to the minimal surface area the crossing will have on flow conveyance and lack of embankments on either side of the crossing, Crossing 6 was modeled as a Lid.

CROZIER CONSULTING ENGINEERS

Project No.: 1935-6133-3

Date: 2024-01-10

Completed by: TM

Checked by: BH

Hawk Ridge Formal Floodplain Analysis
Bridge Inventory

Crossing 7

Description

Crossing 7 is a approximately 3.5m wide 0.3m thick golf cart bridge traversing the low flow channel. Due to the minimal surface area the crossing will have on flow conveyance and lack of embankments on either side of the crossing, Crossing 7 was modeled as a Lid.

CROZIER CONSULTING ENGINEERS

Project No.: 1935-6133-3

Date: 2024-01-10

Completed by: TM

Checked by: BH

Hawk Ridge Formal Floodplain Analysis
Bridge Inventory

Crossing 8

Description

Crossing 8 is approximately 8m wide and 1.5m thick golf cart bridge traversing the low flow channel. Due to this crossing having a significant surface area with the channel, it is deemed that a 4 cross section bridge method was required to adequately model this feature.

CROZIER CONSULTING ENGINEERS

Project No.: 1935-6133-3

Date: 2024-01-10

Completed by: TM

Checked by: BH

Hawk Ridge Formal Floodplain Analysis
Crossing Inventory

Crossing 9

Description

Crossing 9 is a approximately 3.5m wide 0.3m thick golf cart bridge traversing the low flow channel. Due to the minimal surface area the crossing will have on flow conveyance and lack of embankments on either side of the crossing, Crossing 9 was modeled as a Lid.

CROZIER CONSULTING ENGINEERS

Project No.: 1935-6133-3

Date: 2024-01-10

Completed by: TM

Checked by: BH

Hawk Ridge Formal Floodplain Analysis
Crossing Inventory

Crossing A

Description

Crossing A is a approximately 2m wide 0.2m thick maintenance bridge traversing the low flow channel. Due to this crossing having a minimal surface area against the water course and the temporary nature of the feature, Crossing A was not included in the model.

CROZIER CONSULTING ENGINEERS

Project No.: 1935-6133-3

Date: 2024-01-10

Completed by: TM

Checked by: BH

Hawk Ridge Formal Floodplain Analysis
Crossing Inventory

Crossing B

Description

Crossing B is a approximately .7m wide 0.2m thick maintenance bridge traversing the low flow channel. Due to this crossing having a minimal surface area against the water course and the temporary nature of the feature, Crossing B was not included in the model.

CROZIER CONSULTING ENGINEERS

Project No.: 1935-6133-3

Date: 2024-01-10

Completed by: TM

Checked by: BH

Hawk Ridge Formal Floodplain Analysis
Crossing Inventory

Crossing C

Description

Crossing C is a approximately .7m wide 0.2m thick maintenance bridge traversing the low flow channel. Due to this crossing having a minimal surface area against the water course and the temporary nature of the feature, Crossing C was not included in the model.

CROZIER CONSULTING ENGINEERS

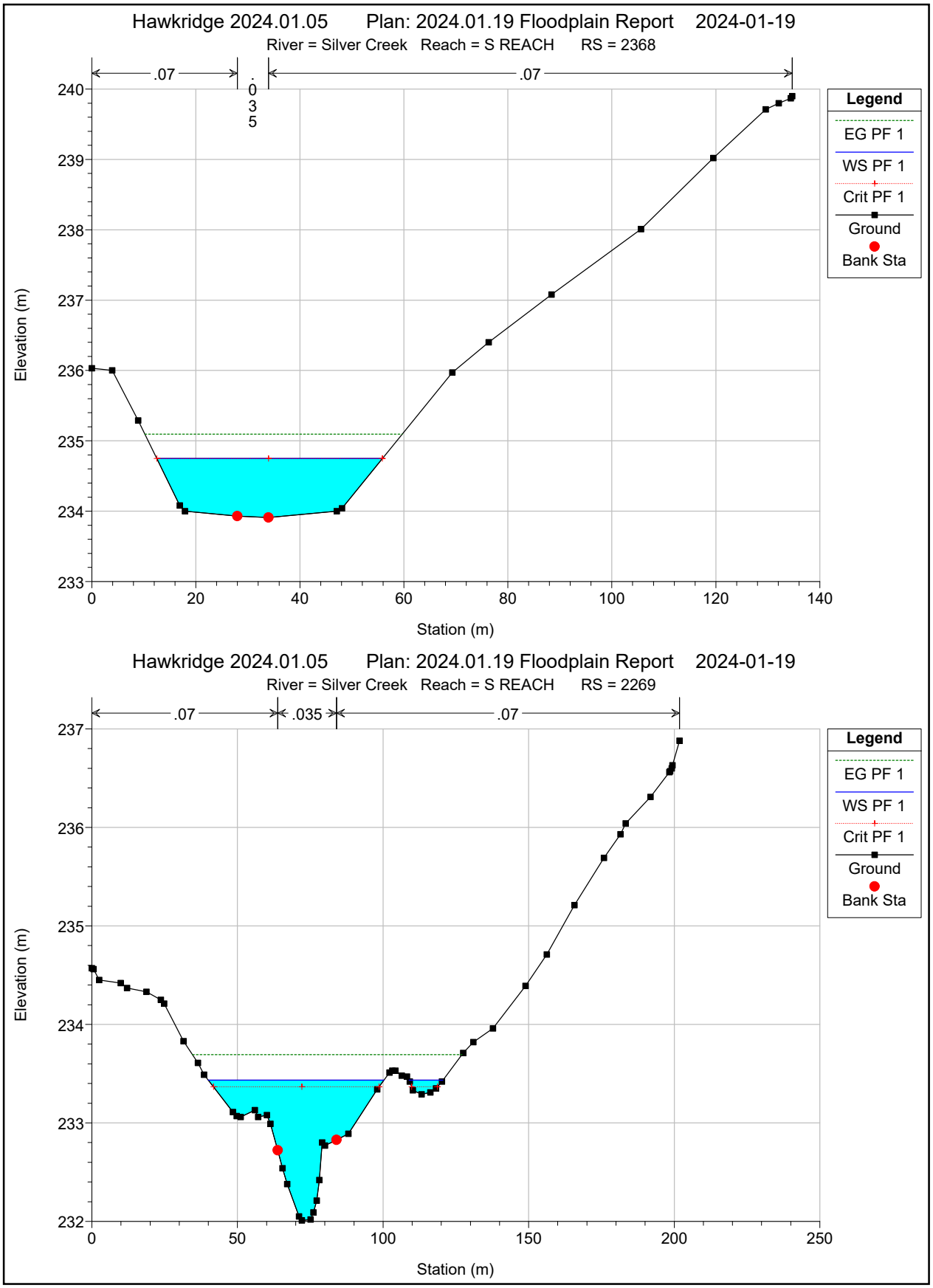
Project No.: 1935-6133-3
Date: 2024-01-19
Completed by: TM
Checked by: BH

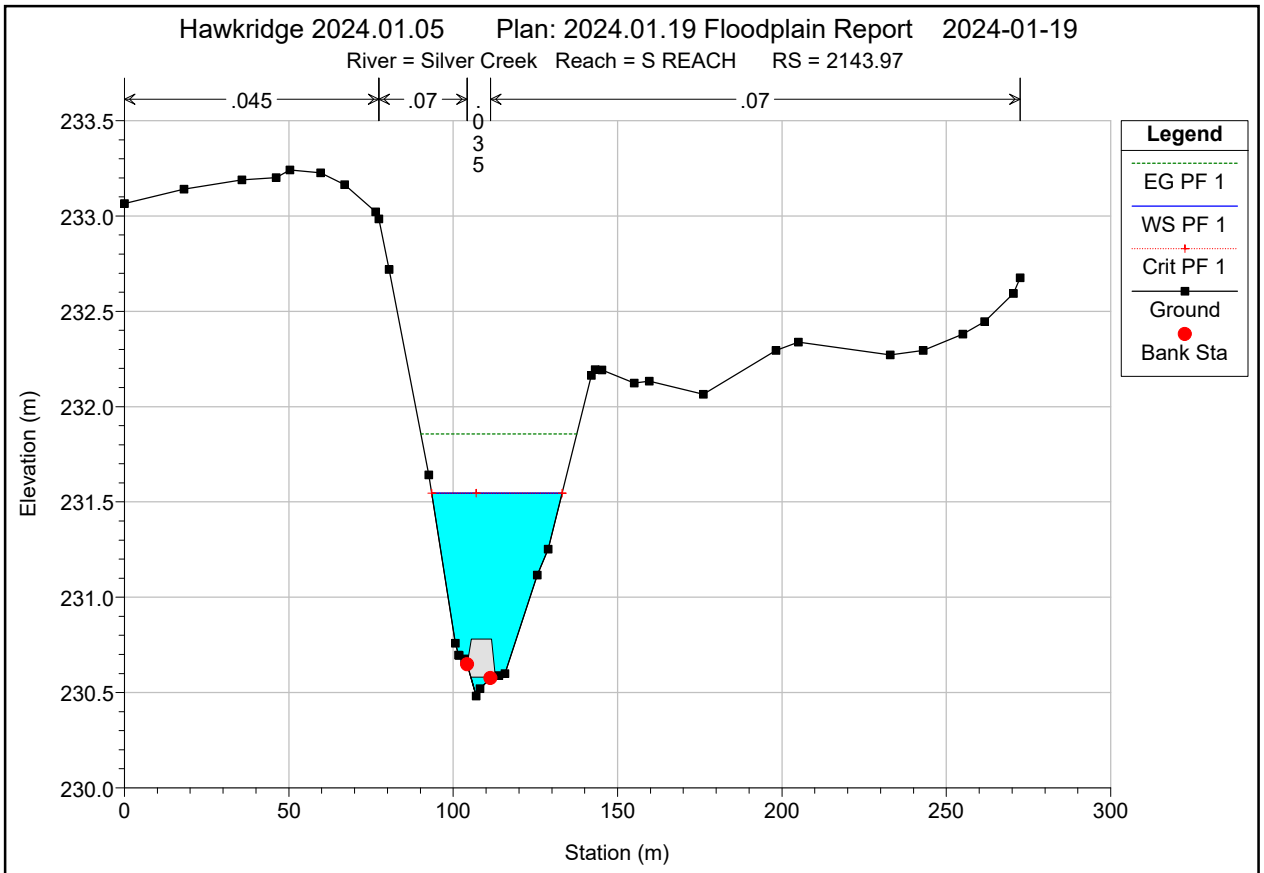
Crossing Area Comparison

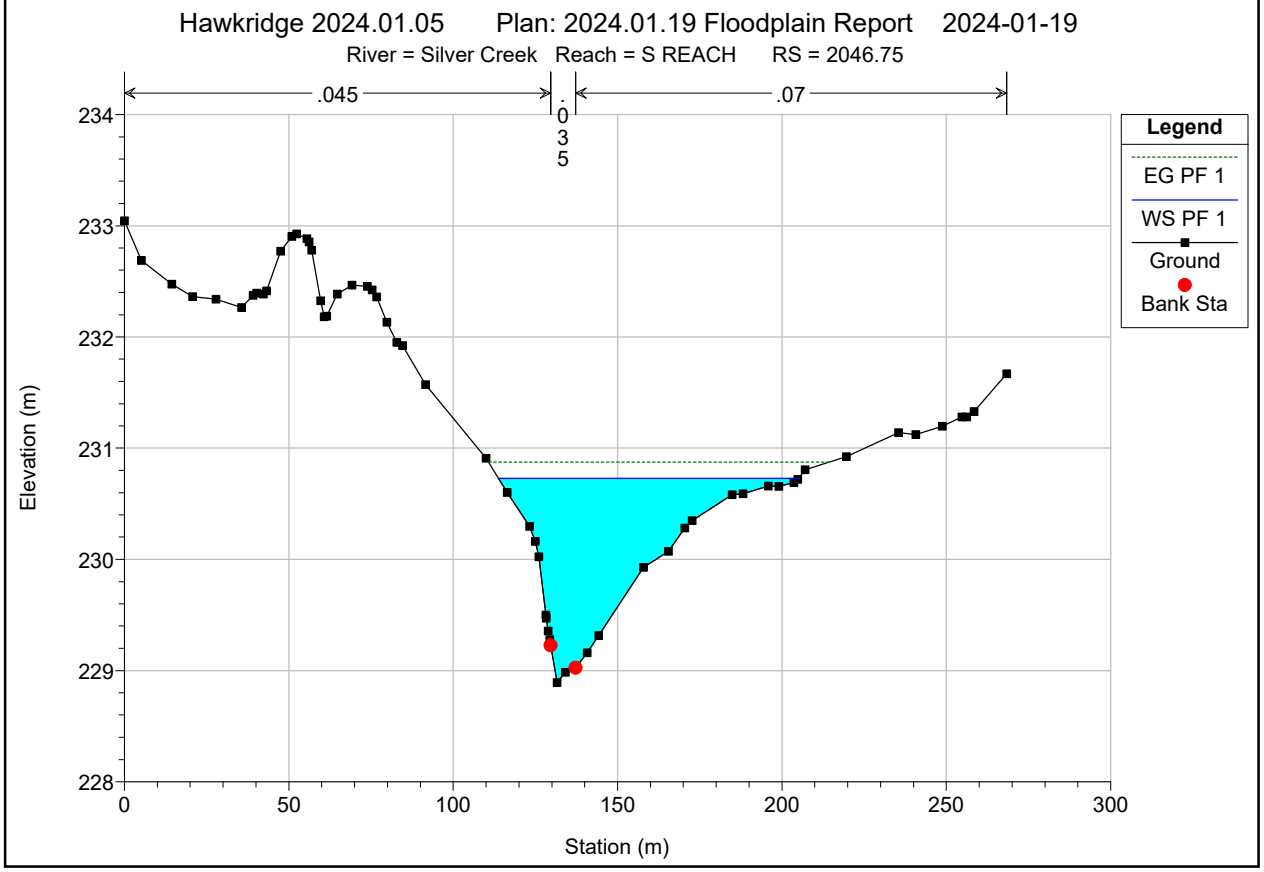
Crossing	Measured Area (m^2)	Modelled Cross Section Area (m^2)
1	2.135	2.145
2	4.332	13.500
3	4.636	8.190
4	15.010	13.51
5	0.880	1.900
6	0.944	2.110
7	0.880	0.870
8	6.643	6.790
9	0.852	1.270

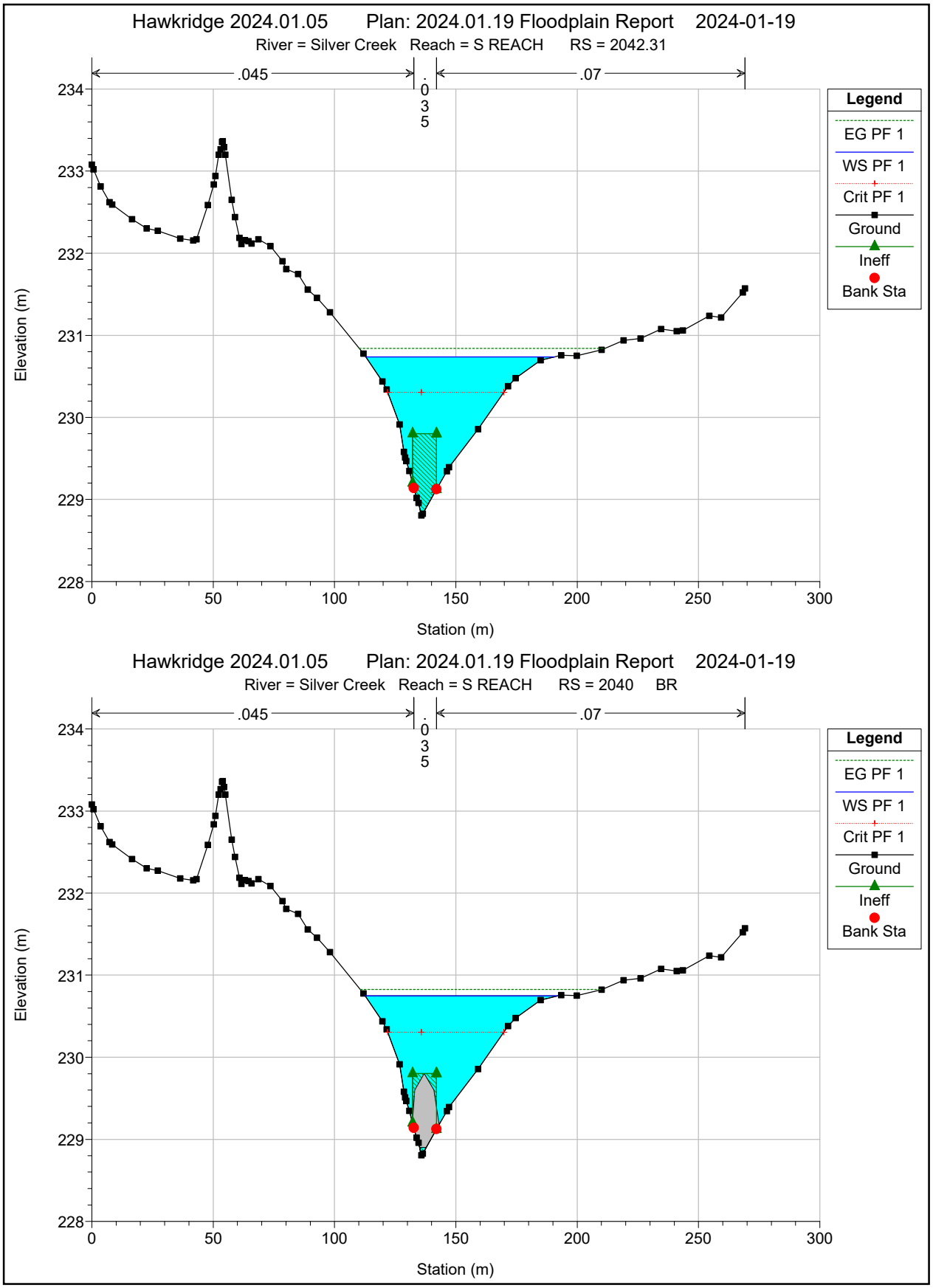
APPENDIX D

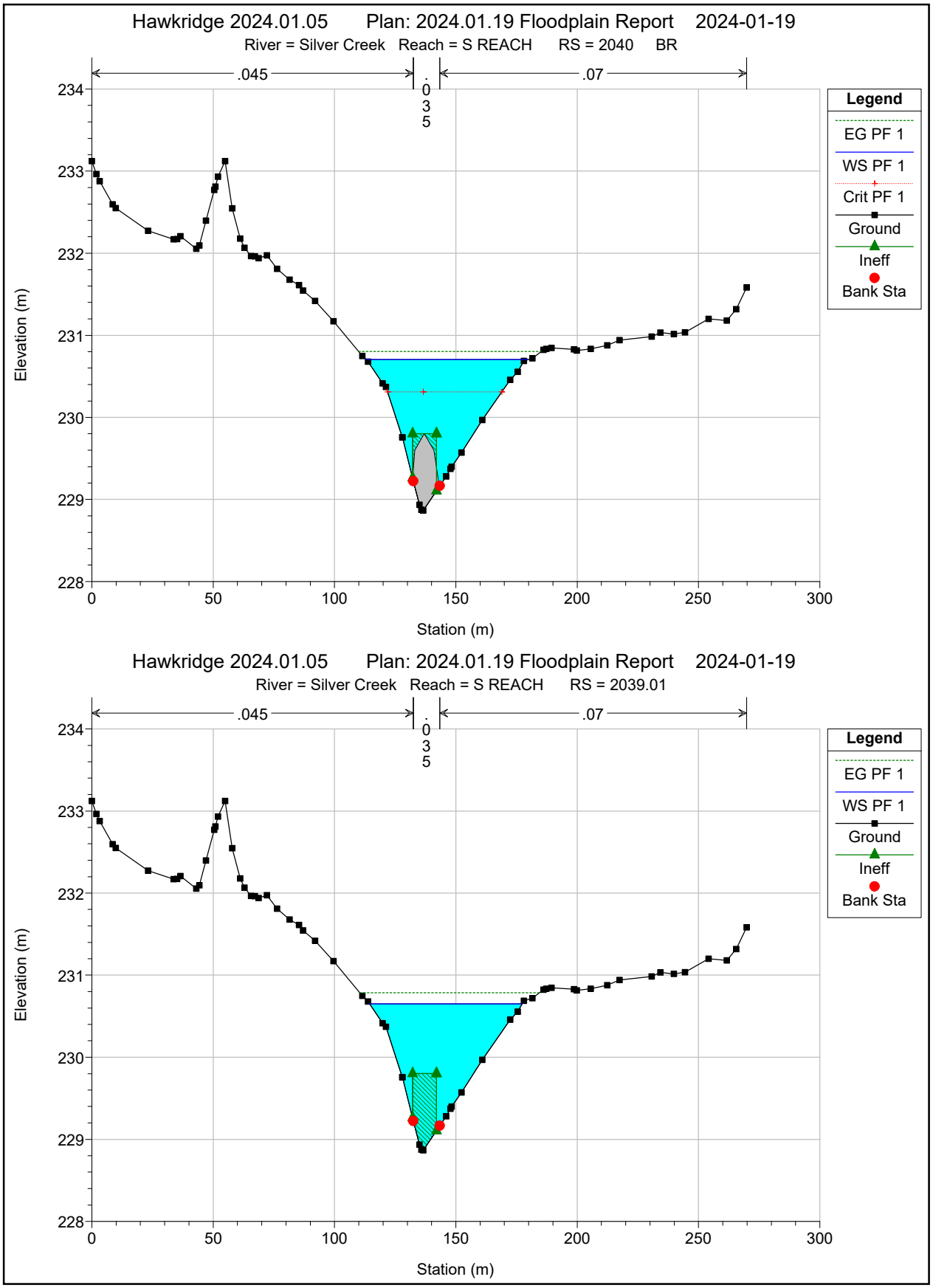
HEC-RAS Outputs

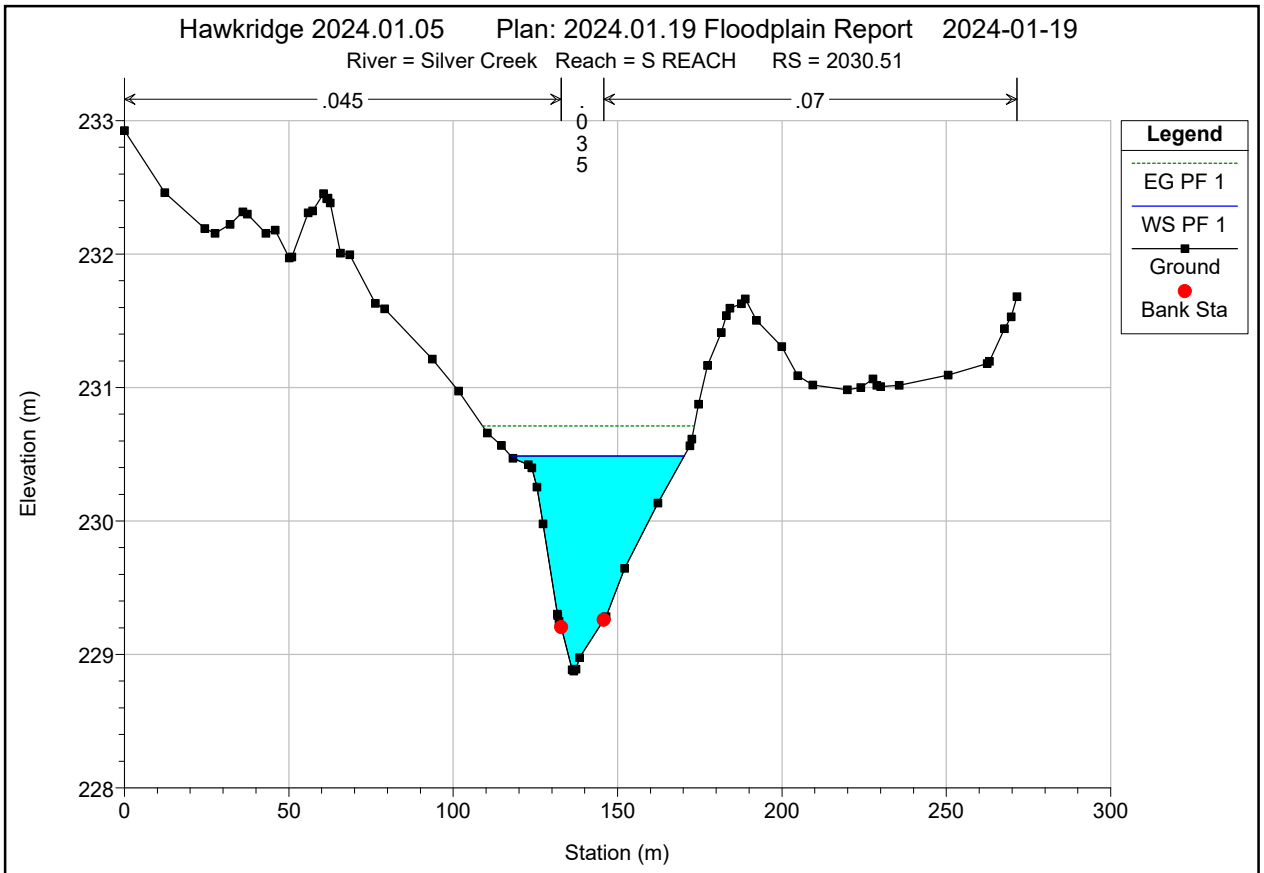

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = S REACH RS = 2368
.07
.035
.07
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = S REACH RS = 2269
.07
.035
.07
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

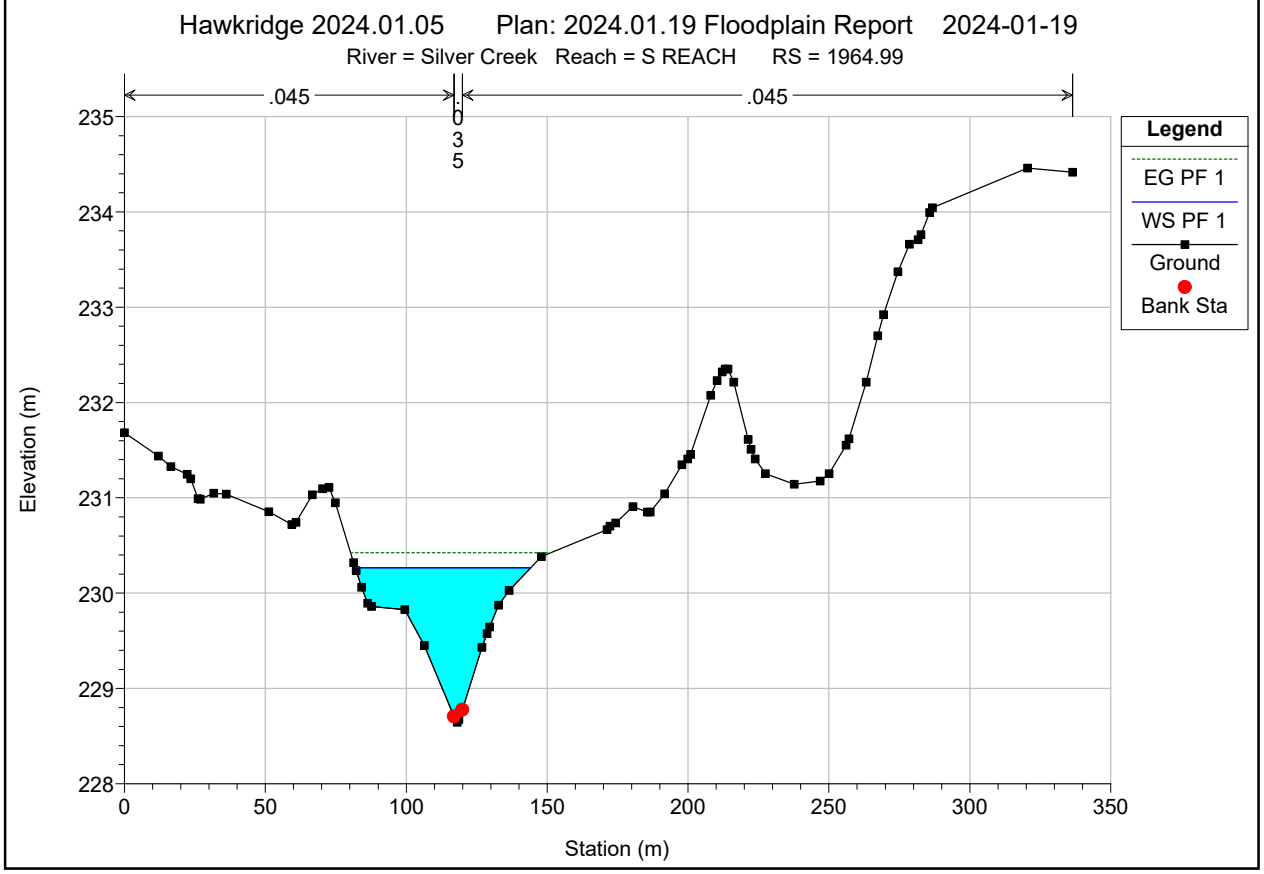

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = S REACH RS = 2143.97
.045
.07
.035
.07
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

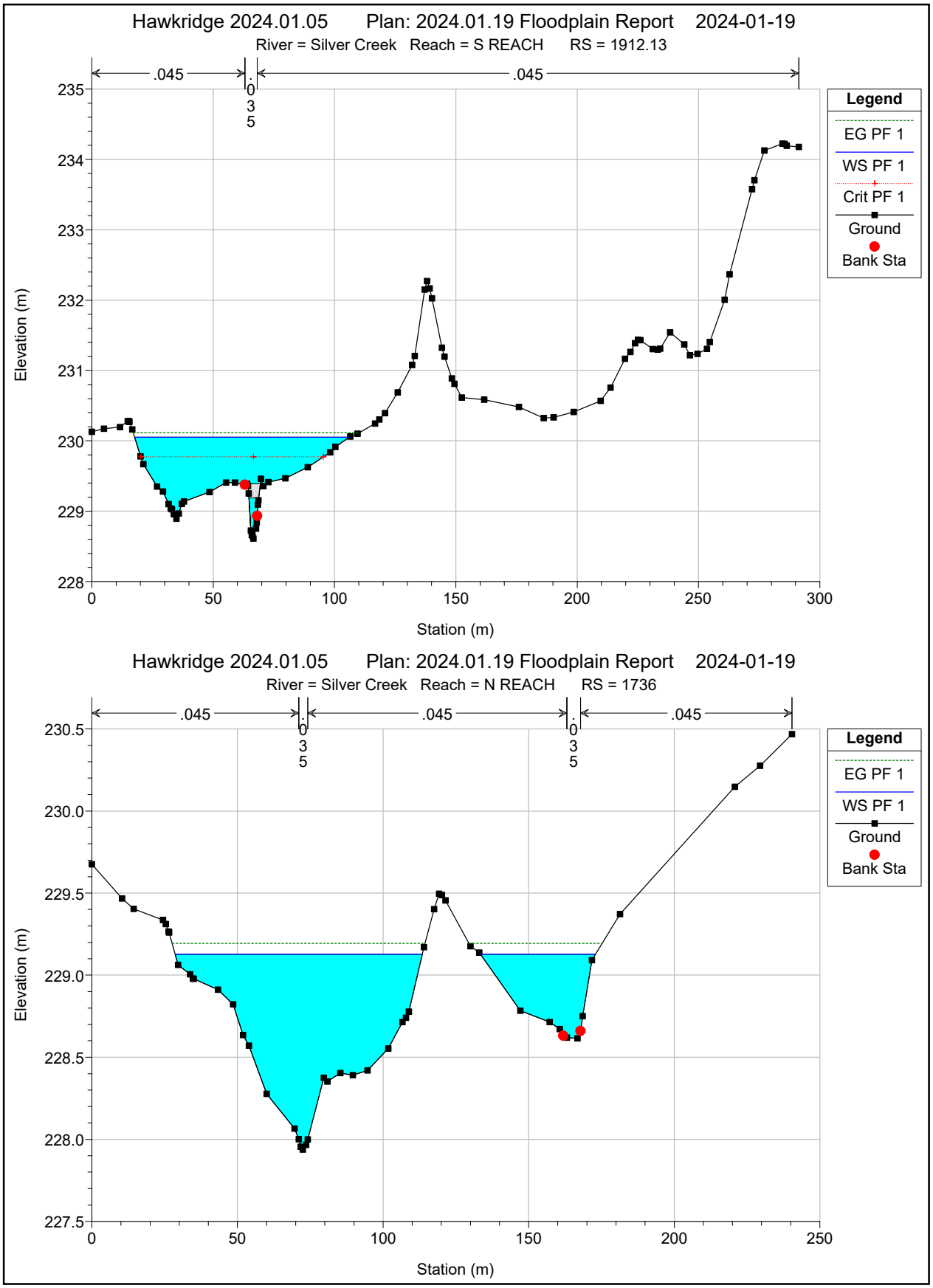

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = S REACH RS = 2046.75
.045
.035
.07
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

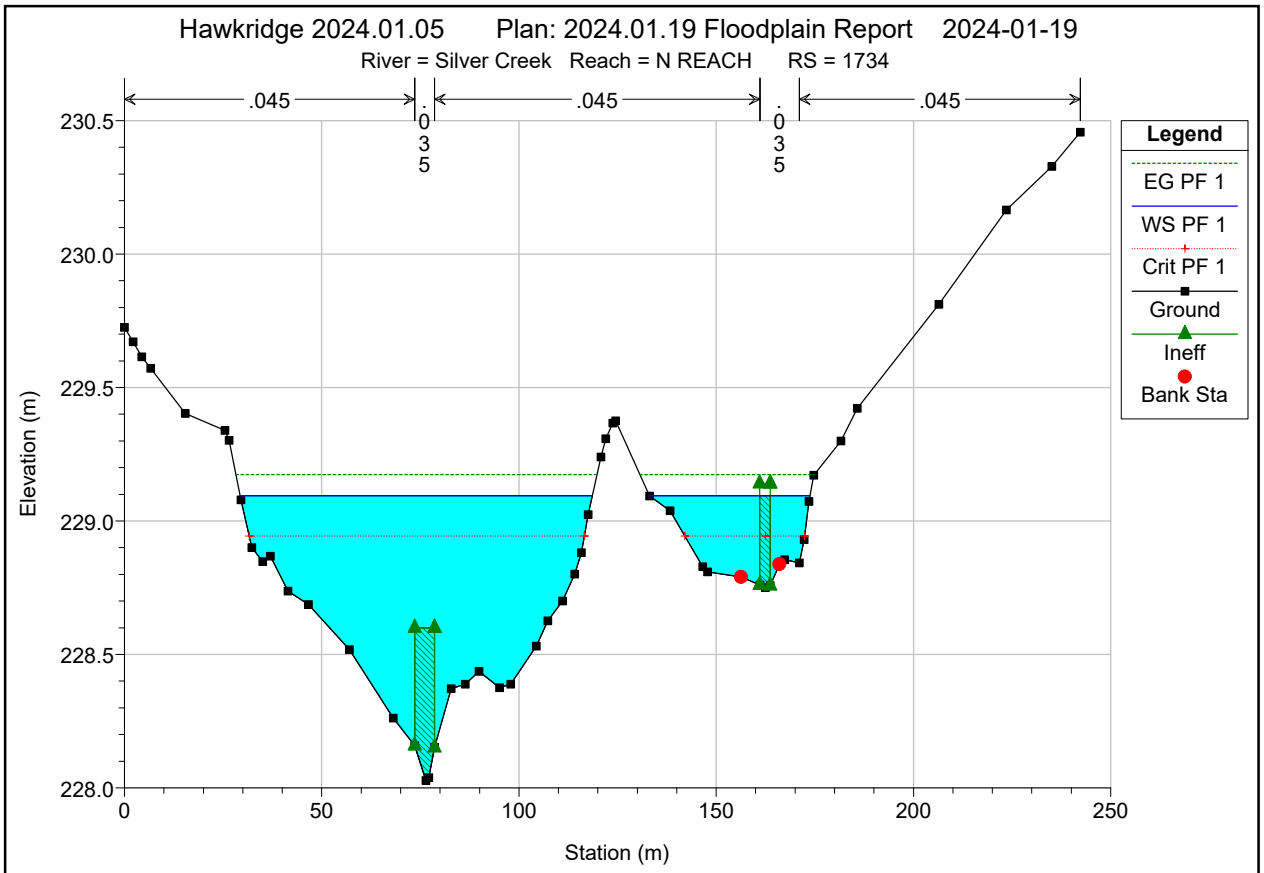

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = S REACH RS = 2042.31
.045
.035
.07
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = S REACH RS = 2040 BR
.045
.035
.07
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

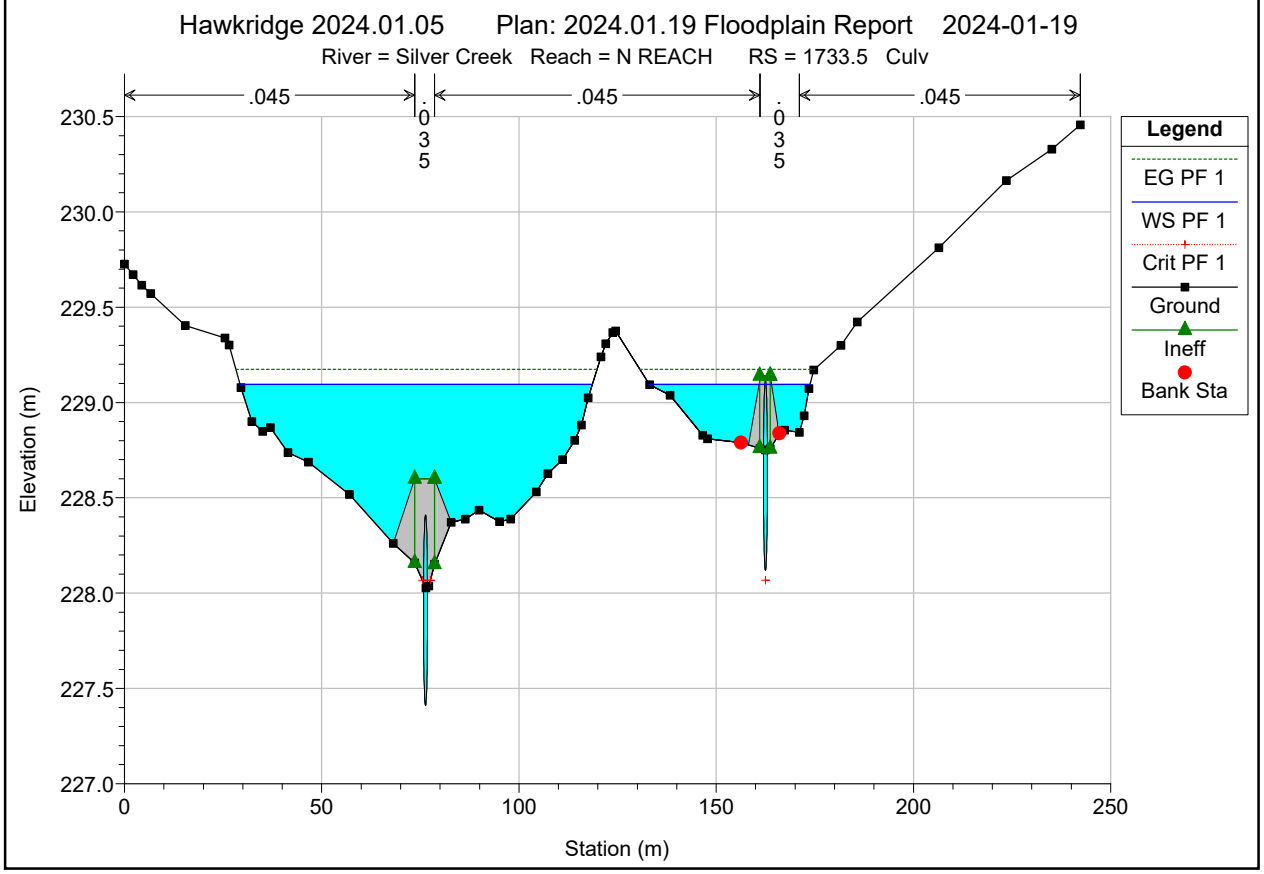

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = S REACH RS = 2040 BR
.045
.035
.07
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = S REACH RS = 2039.01
.045
.035
.07
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta

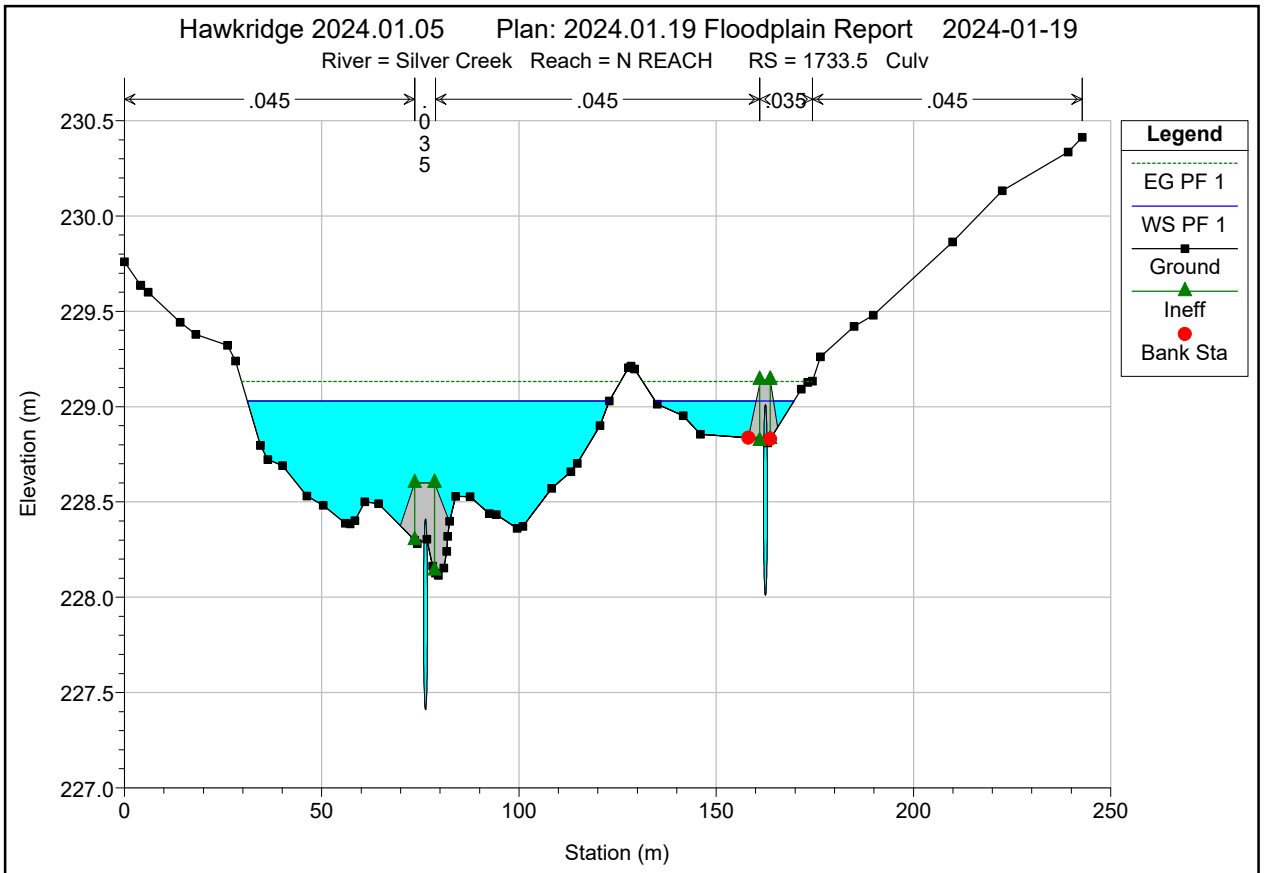

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = S REACH RS = 2030.51
.045
.035
.07
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
233
232
231
230
229
228
0
50
100
150
200
250
300

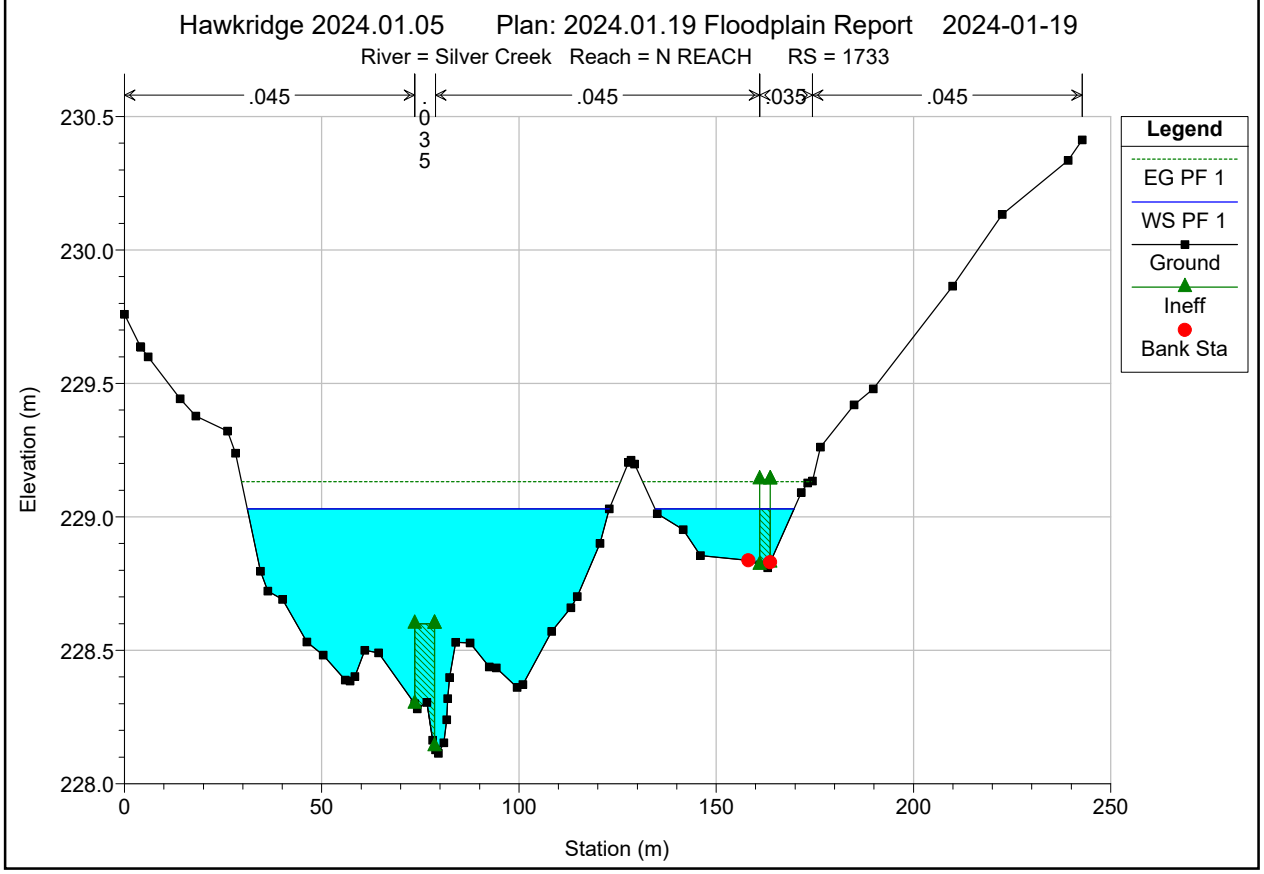

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = S REACH RS = 1964.99
.045
.035
.045
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
235
234
233
232
231
230
229
228
0
50
100
150
200
250
300
350

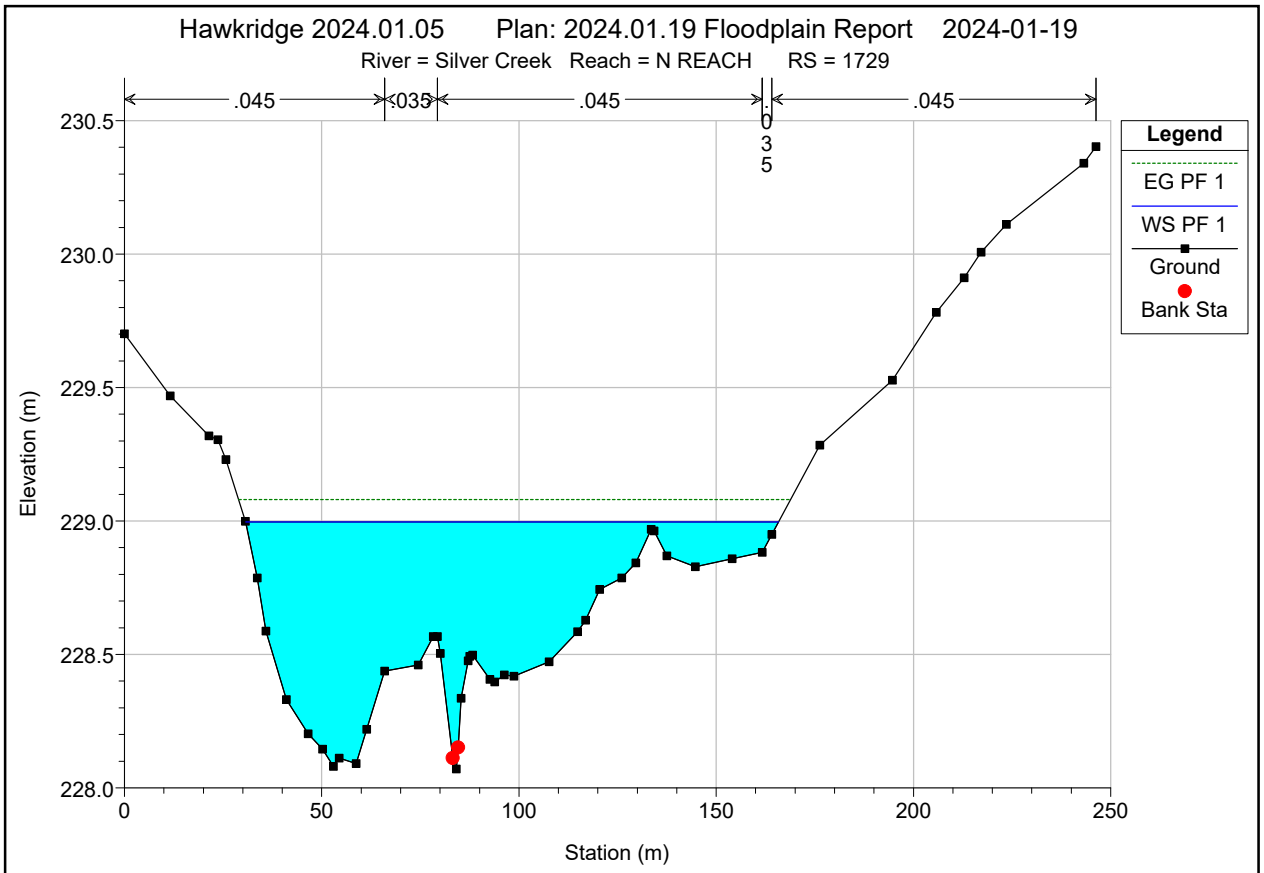

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = S REACH RS = 1912.13
.045
.035
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 1736
.045
.035
.045
.035
.045
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

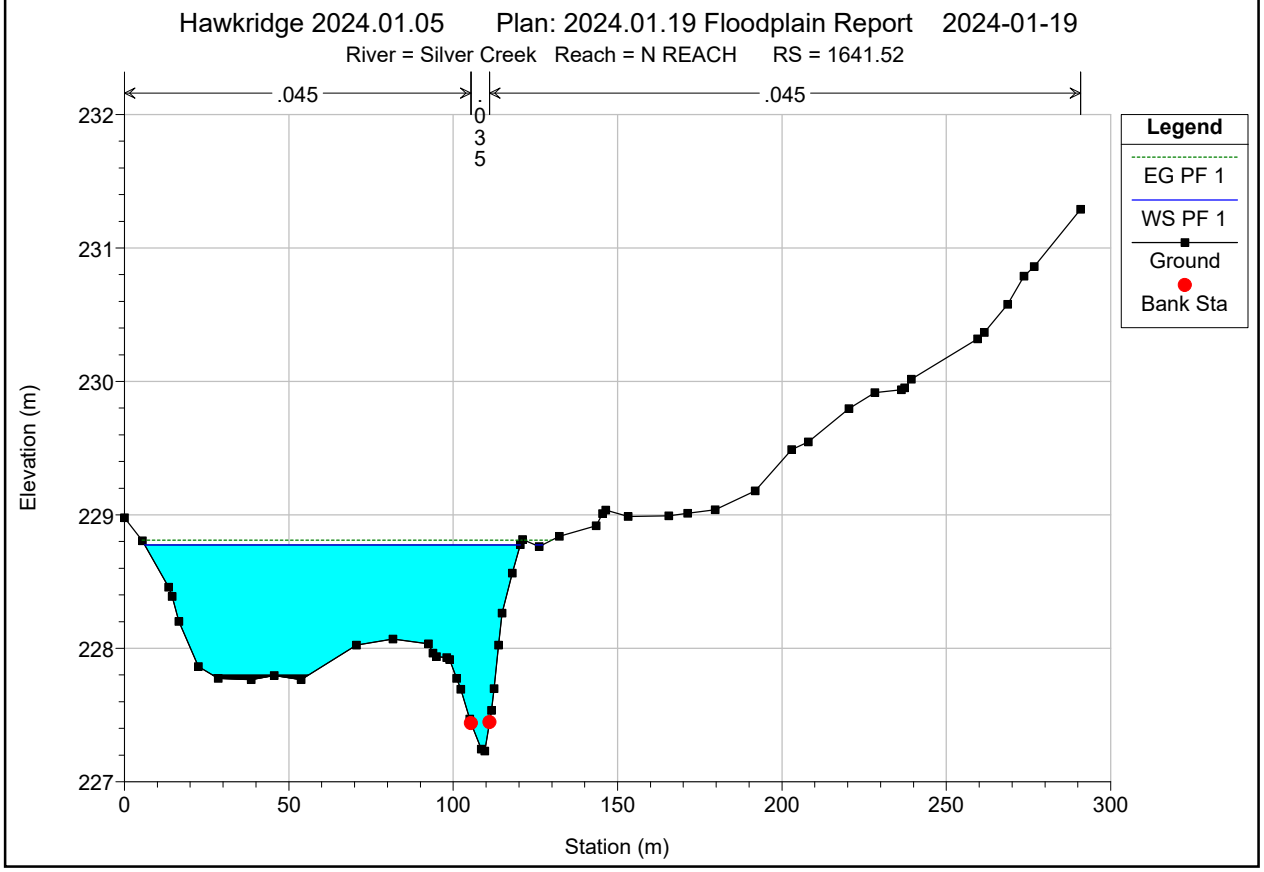

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 1734
.045
.035
.045
.035
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
230.5
230.0
229.5
229.0
228.5
228.0
0
50
100
150
200
250

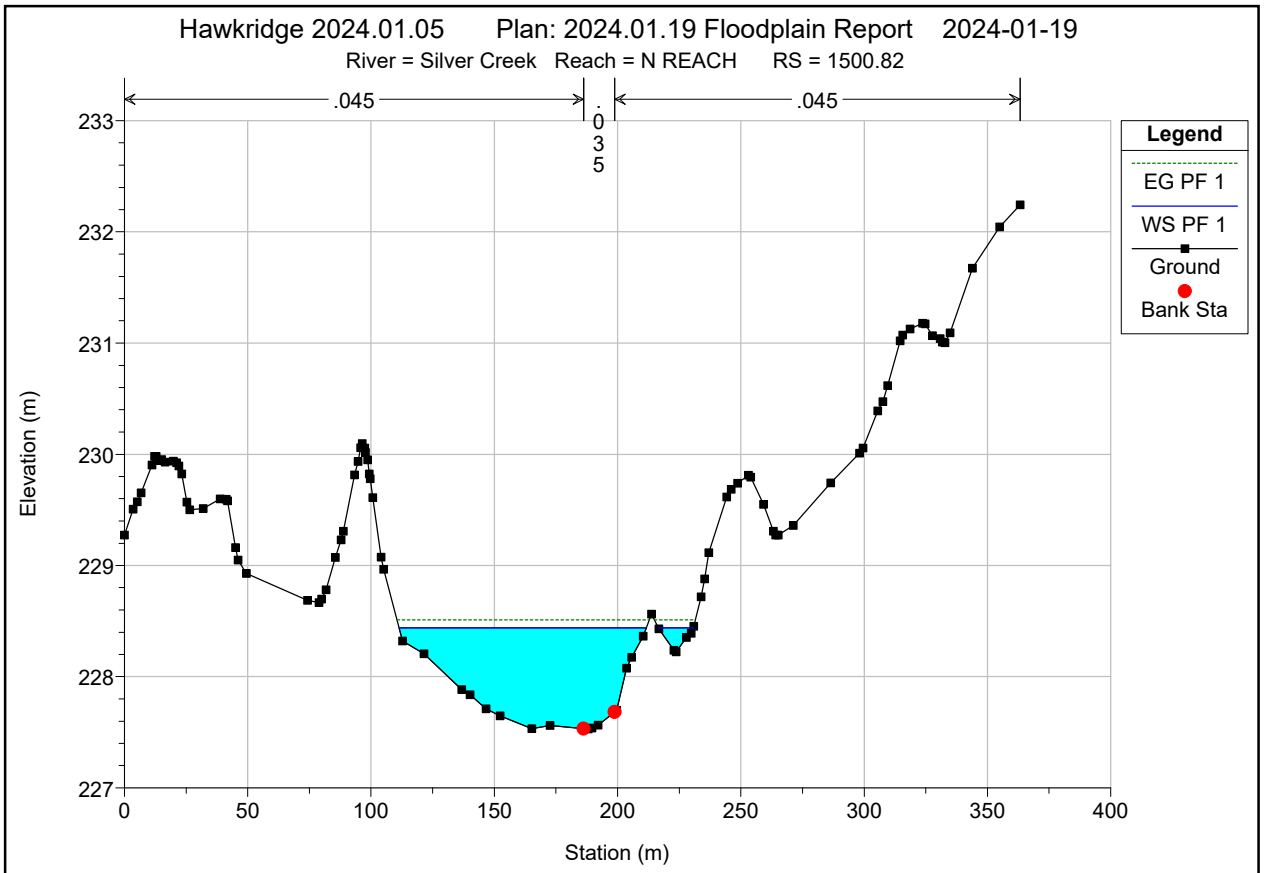

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 1733.5 Culv
.045
.035
.045
.035
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
230.5
230.0
229.5
229.0
228.5
228.0
227.5
227.0
0
50
100
150
200
250

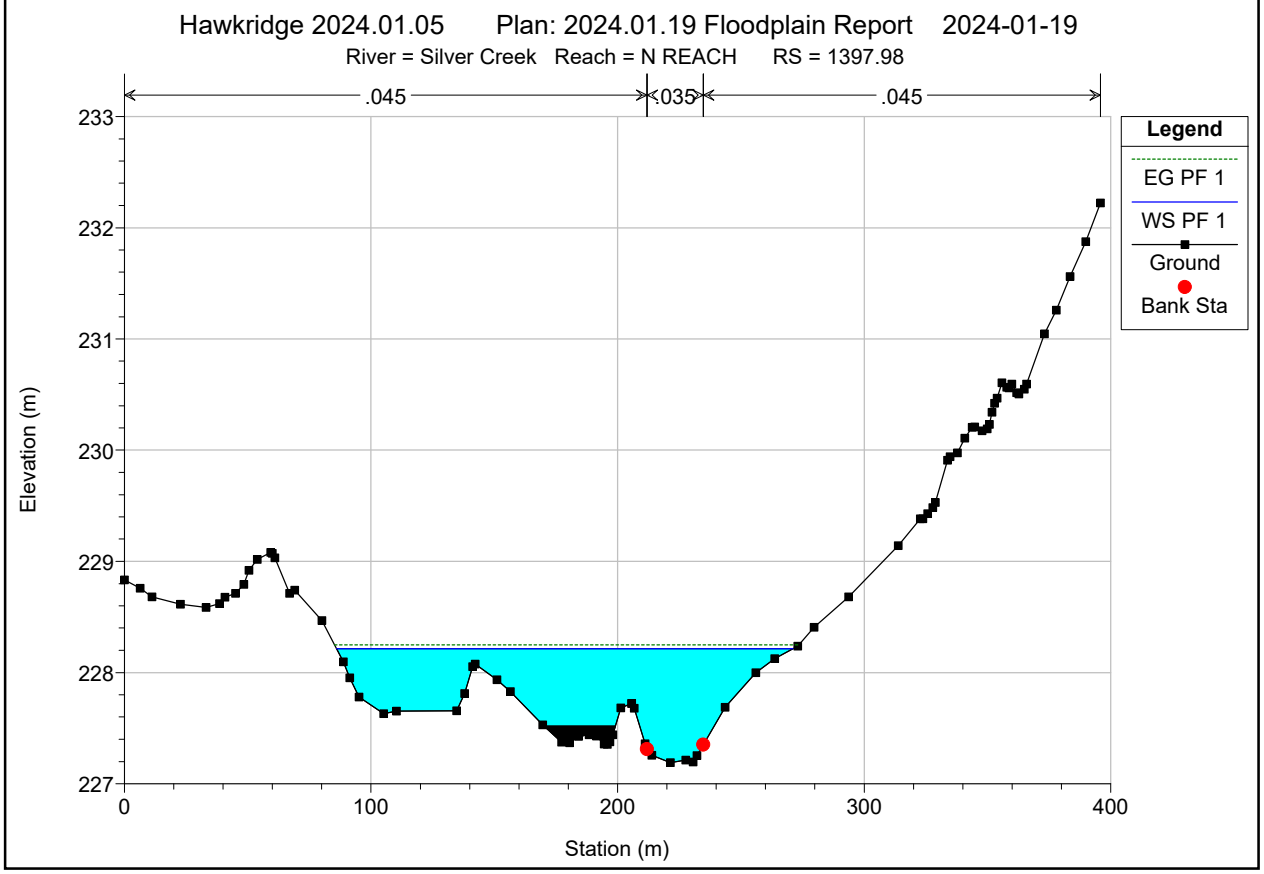

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 1733.5 Culv
.045
.035
.045
.045
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)

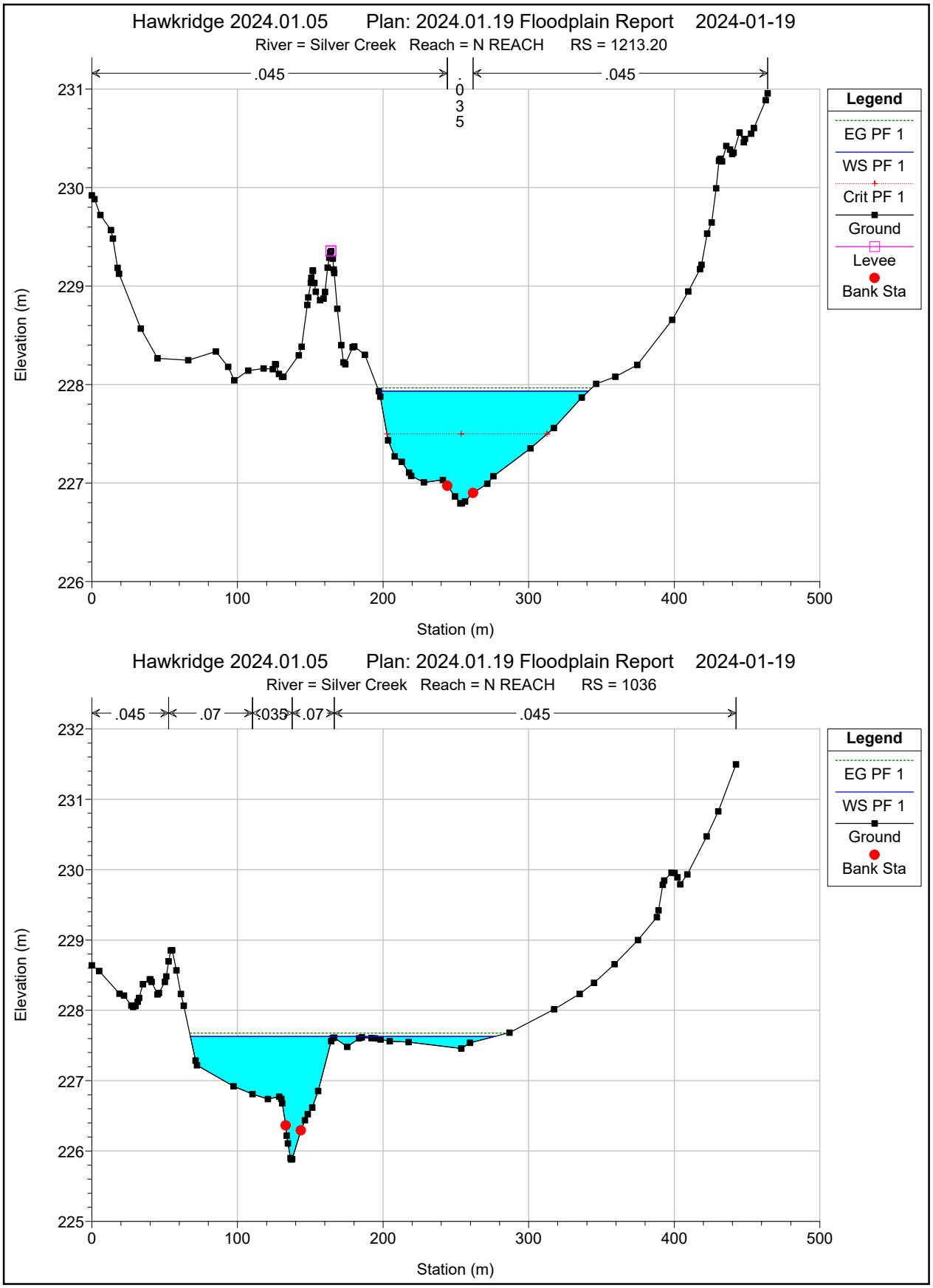

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 1733
.045
.035
.045
.045
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)

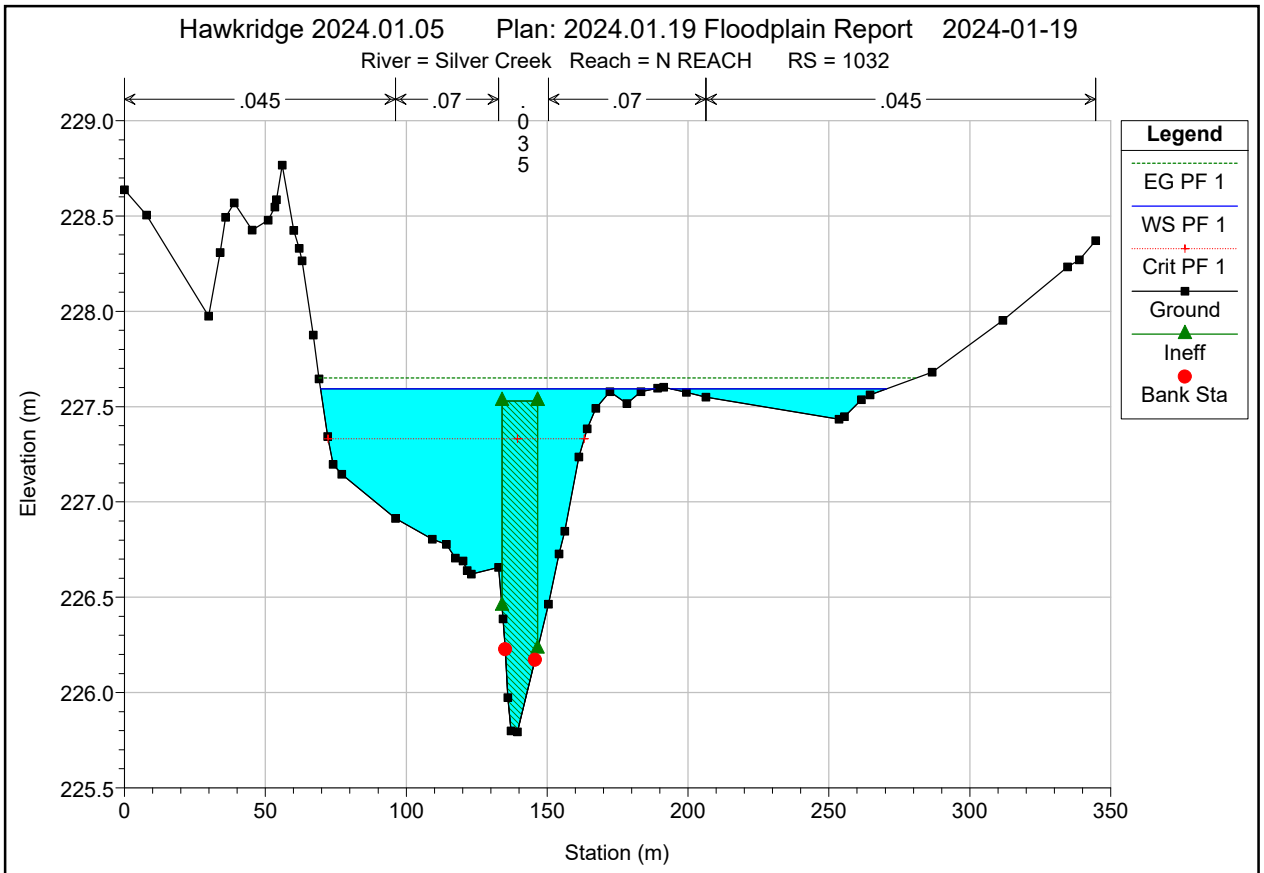

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 1729
.045
.035
.045
.035
.045
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

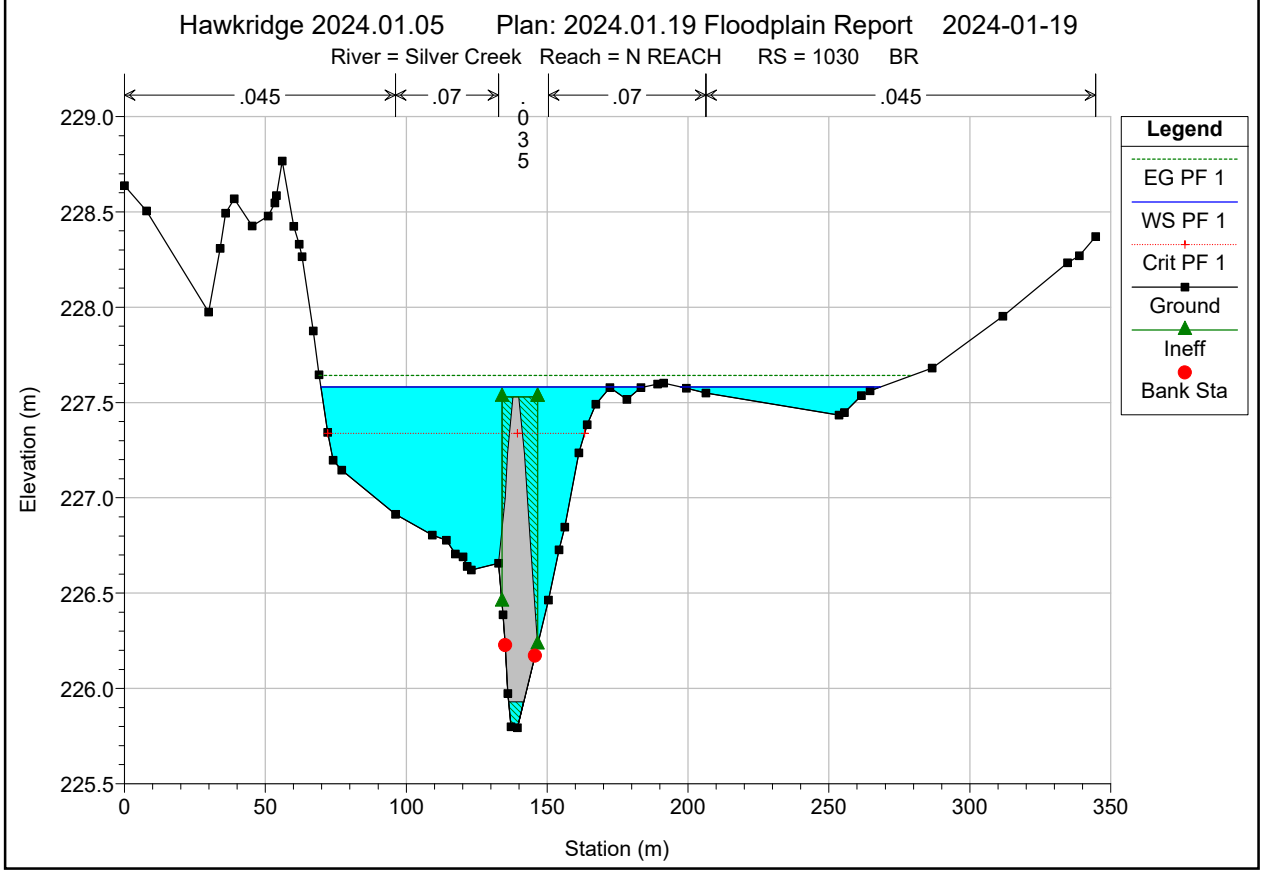

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 1641.52
.045
.035
.045
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

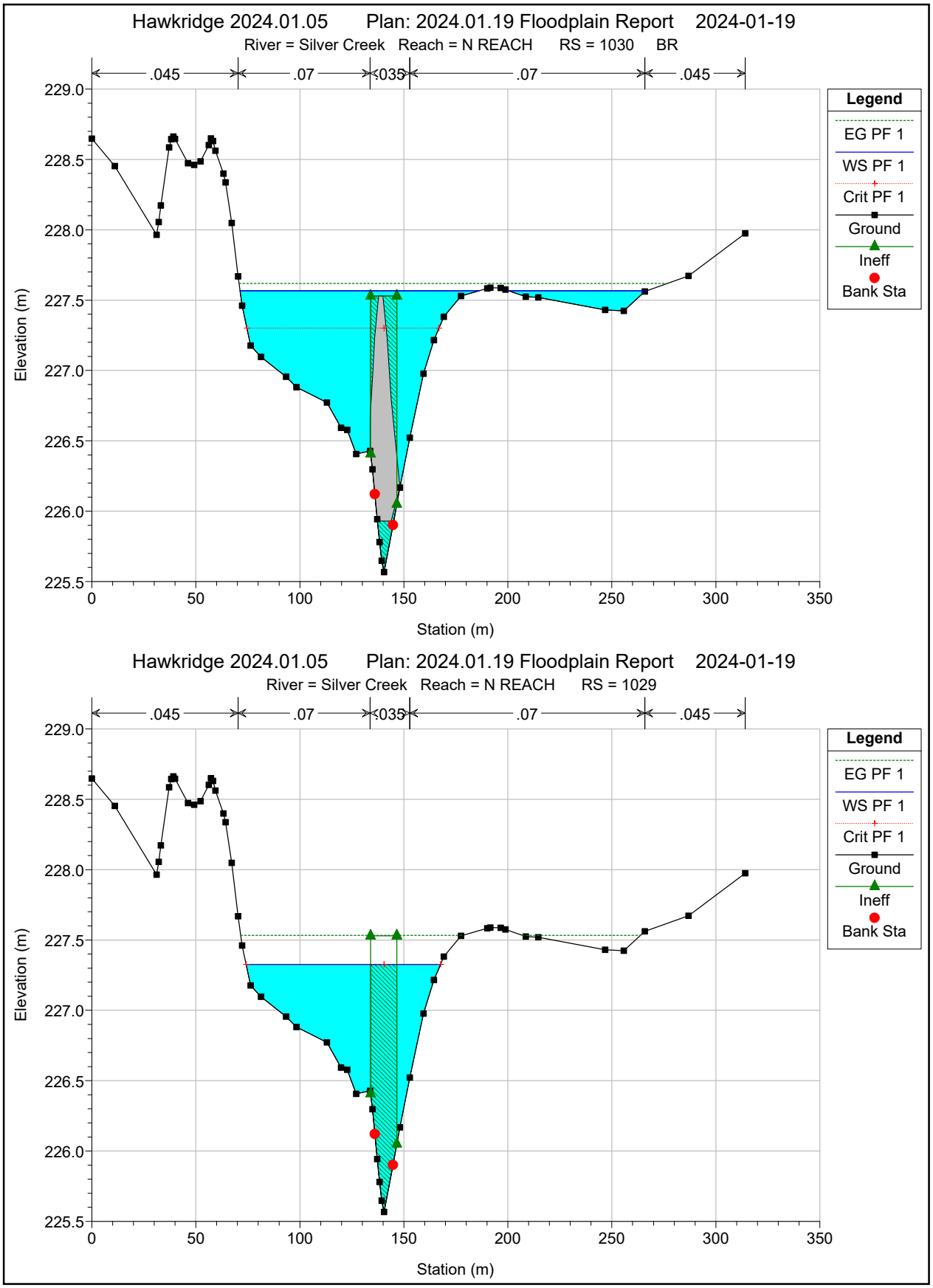

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 1500.82
.045
.035
.045
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
227
228
229
230
231
232
233
0
50
100
150
200
250
300
350
400

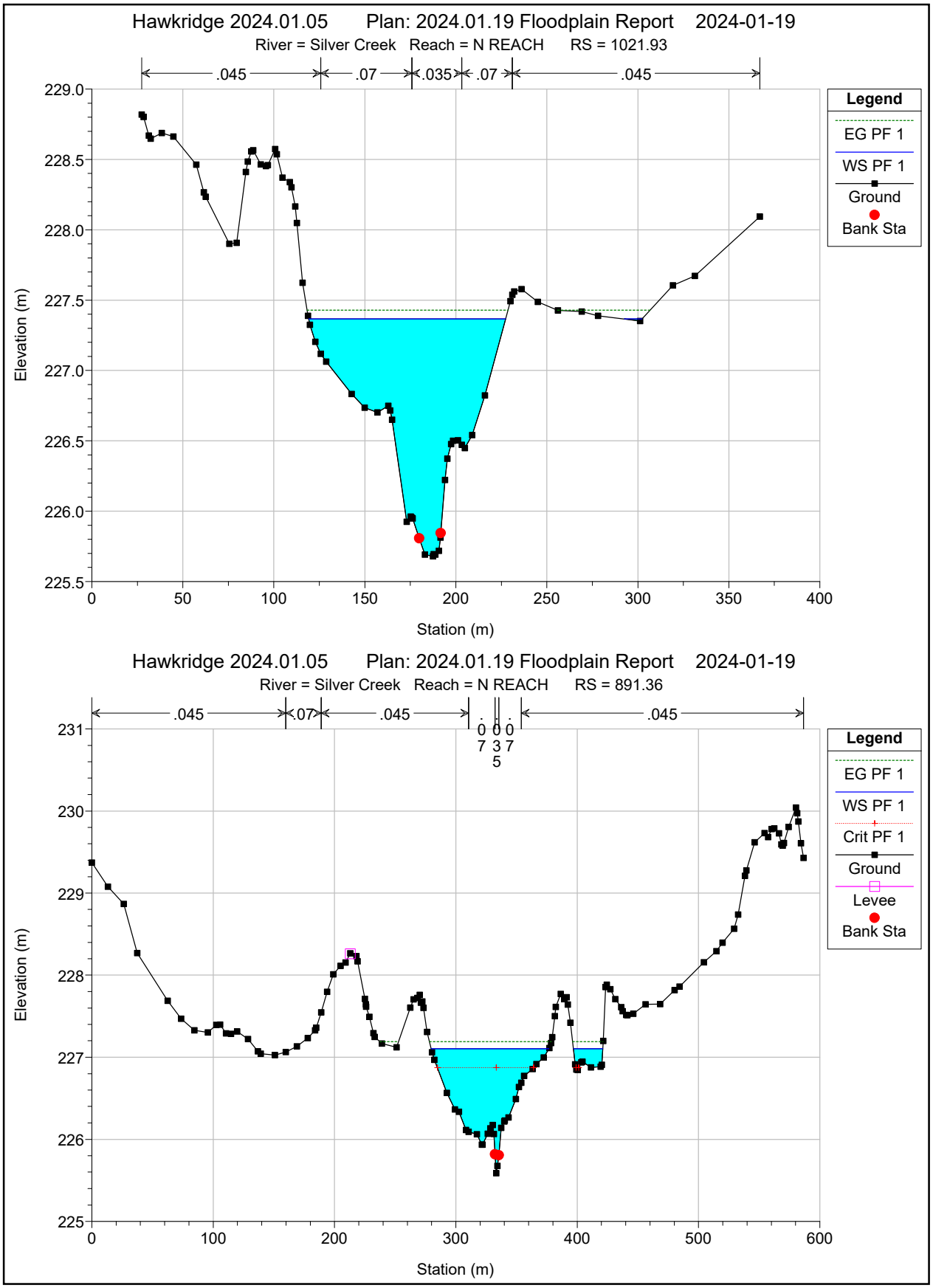

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 1397.98
.045
.035
.045
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
227
228
229
230
231
232
233
0
100
200
300
400

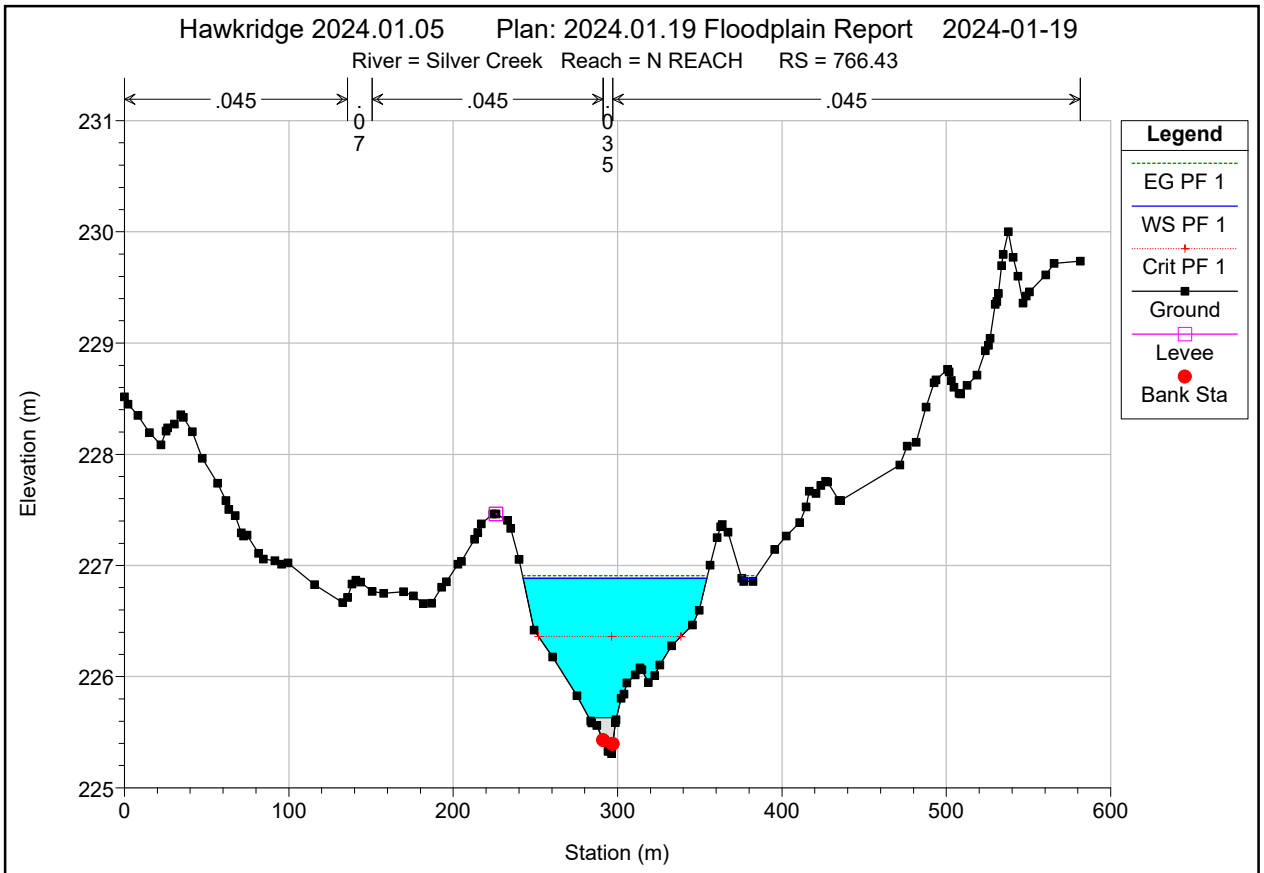

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 1213.20
.045
.035
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 1036
.045
.07
.035
.07
.045
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

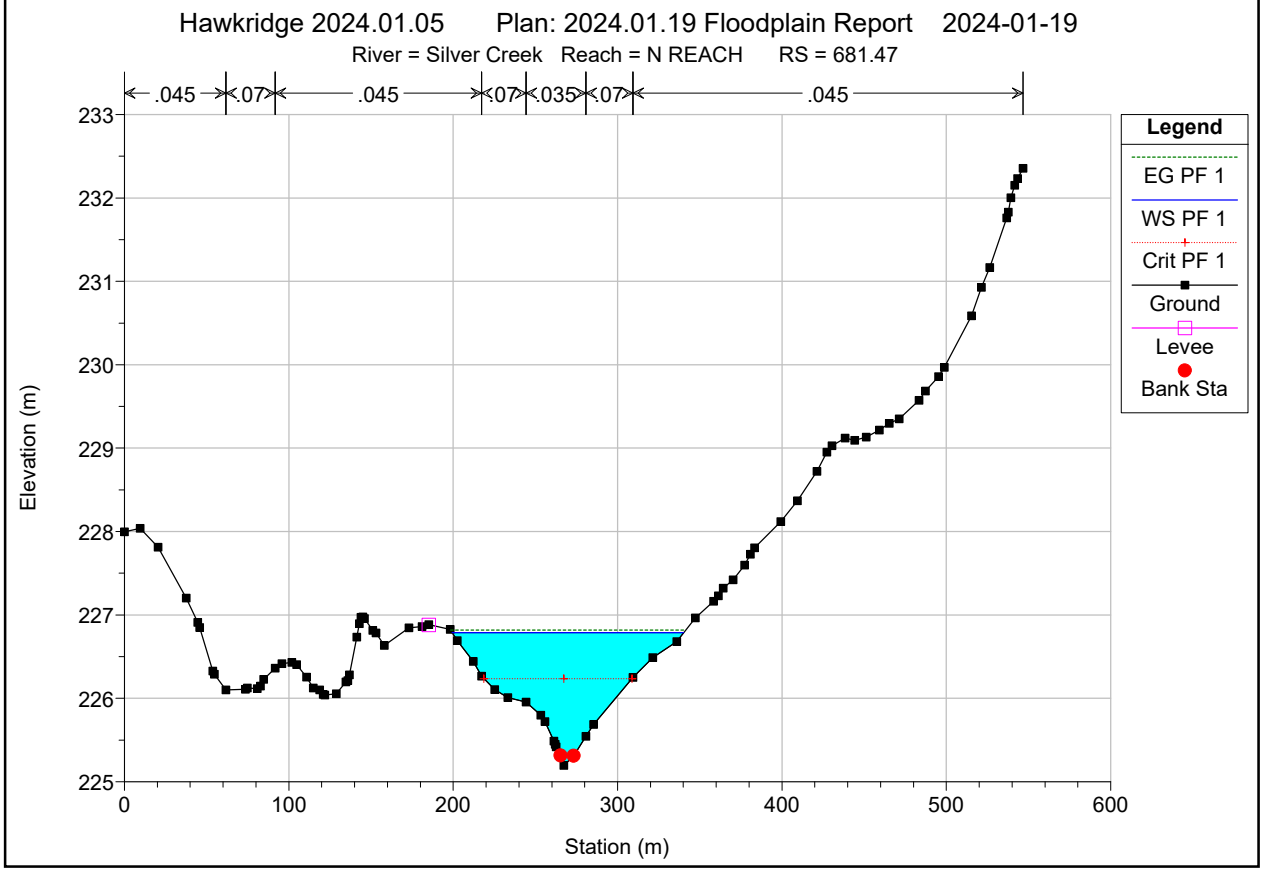

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 1032
.045
.07
.035
.07
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
229.0
228.5
228.0
227.5
227.0
226.5
226.0
225.5
0
50
100
150
200
250
300
350

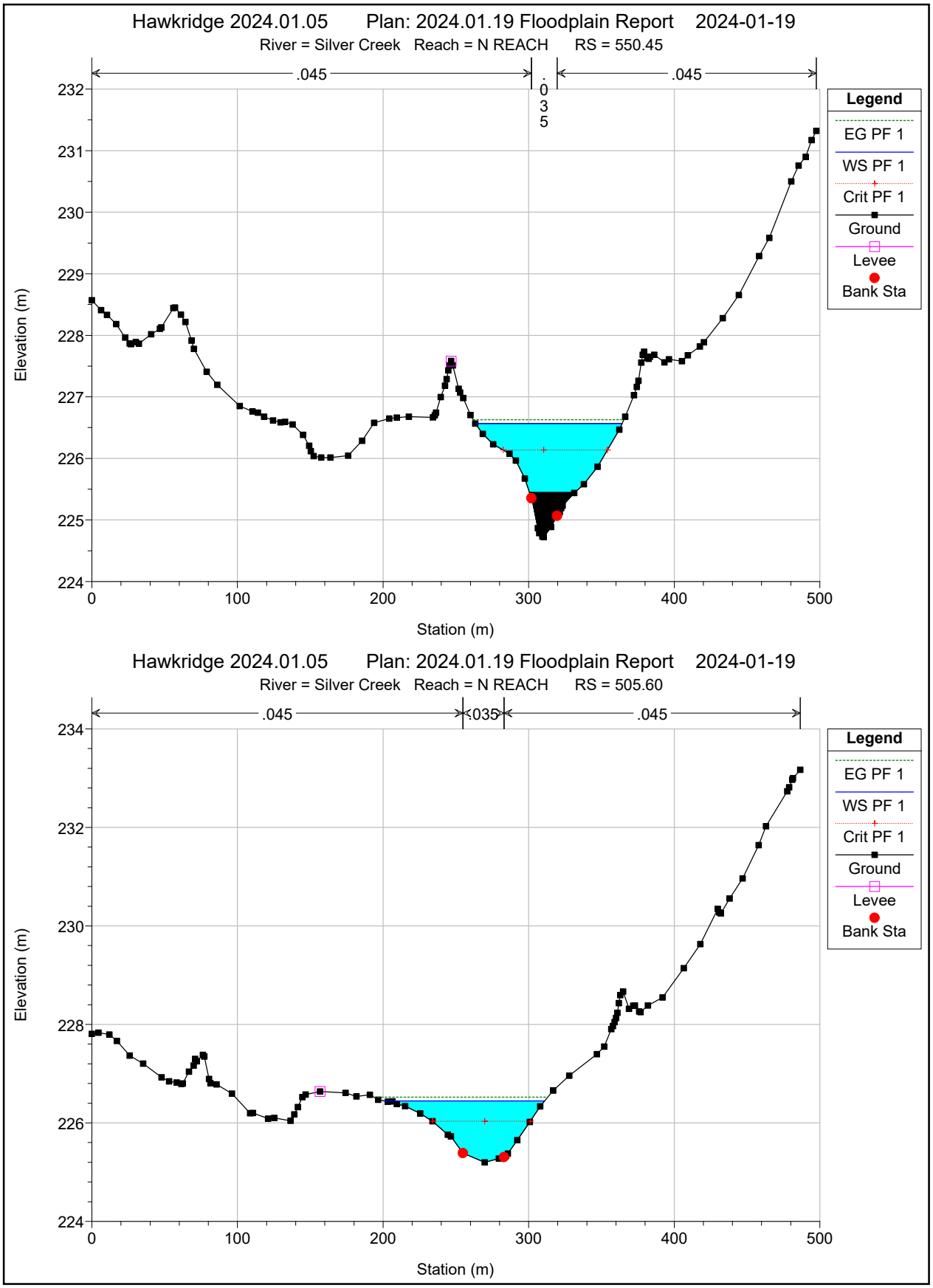

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 1030 BR
.045
.07
.035
.07
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (m)
Station (m)
229.0
228.5
228.0
227.5
227.0
226.5
226.0
225.5
0
50
100
150
200
250
300
350

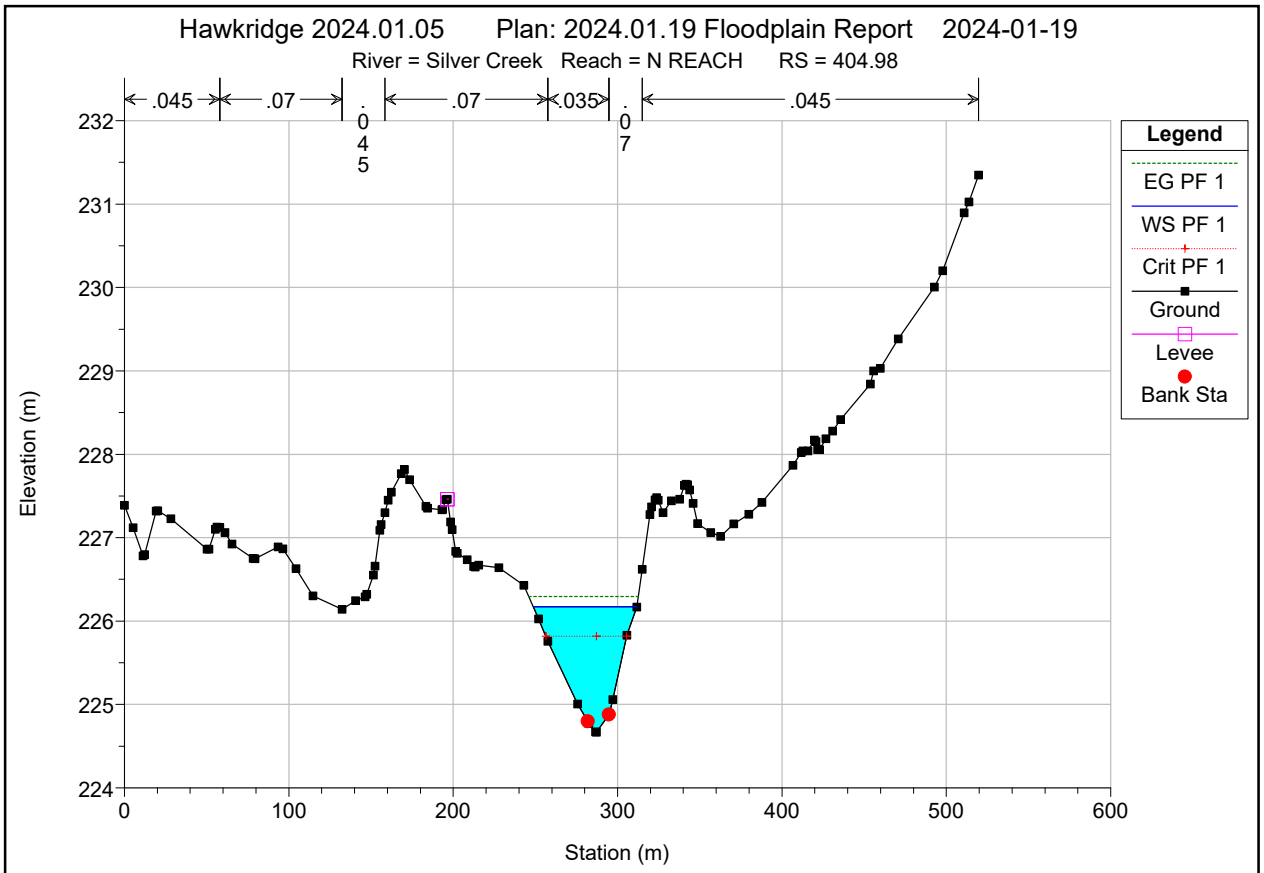

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 1030 BR
.045
.07
.035
.07
.045
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 1029
.045
.07
.035
.07
.045
Elevation (m)
Station (m)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

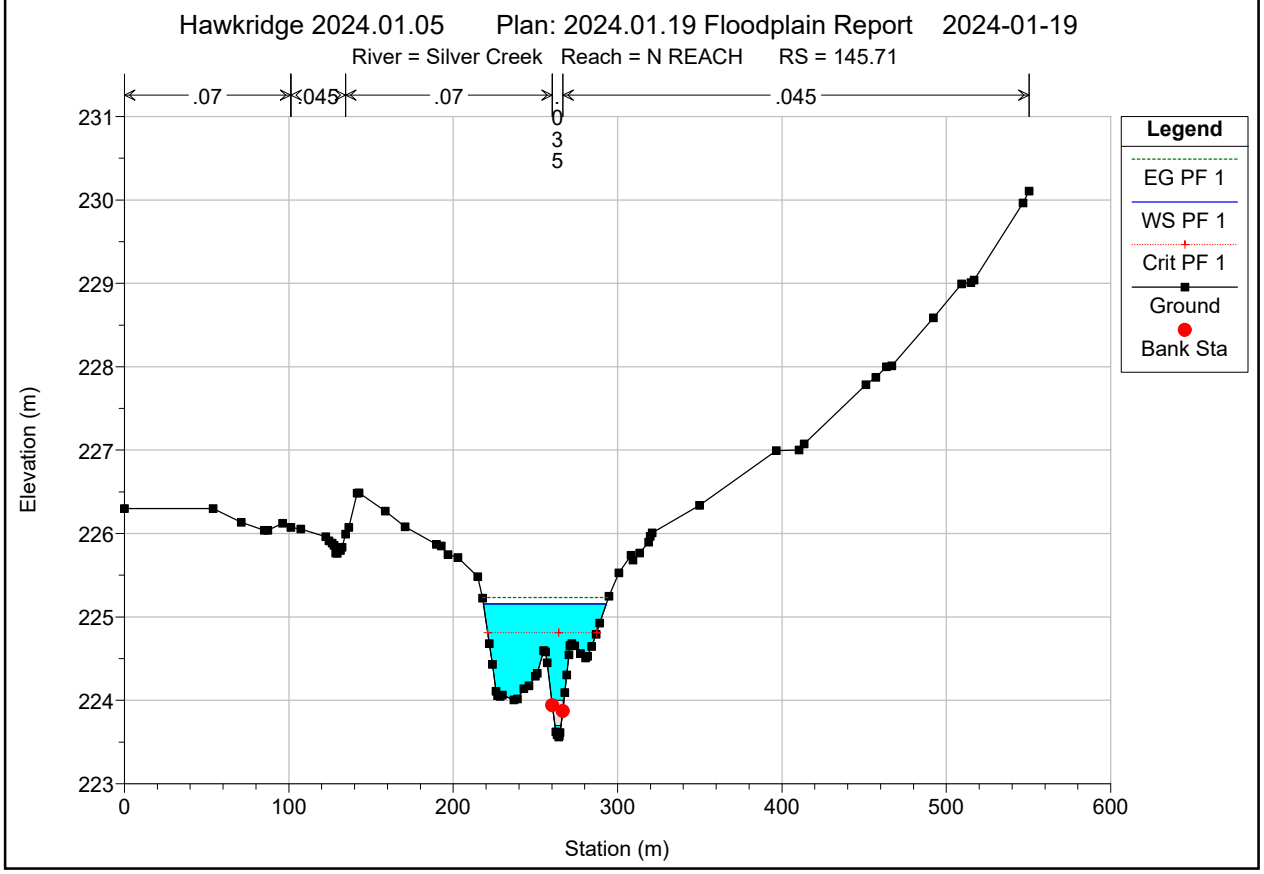

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 1021.93
.045
.07
.035
.07
.045
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 891.36
.045
.07
.045
.07
.035
.07
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)

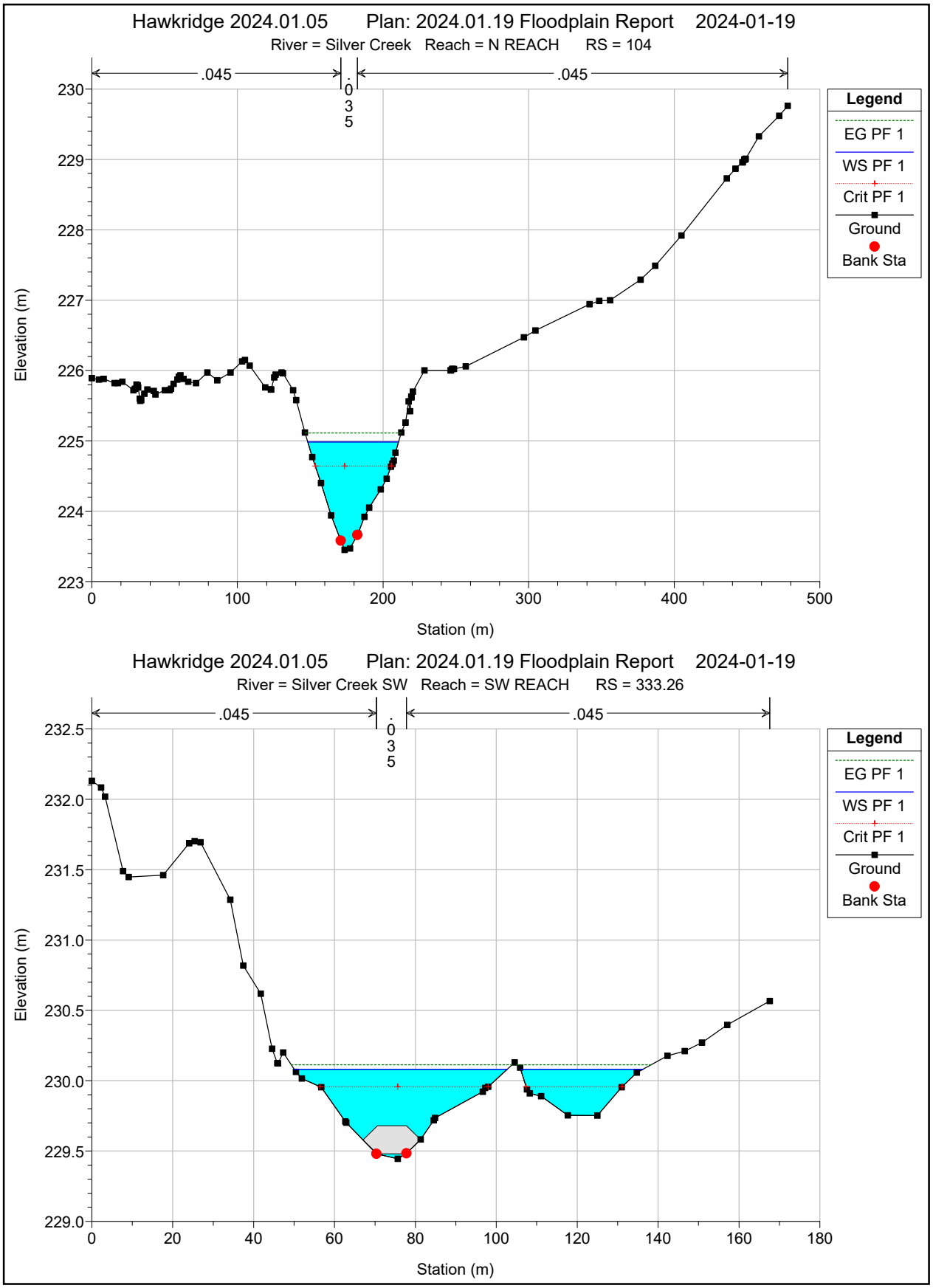

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 766.43
.045
.07
.045
.035
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
231
230
229
228
227
226
225
0
100
200
300
400
500
600

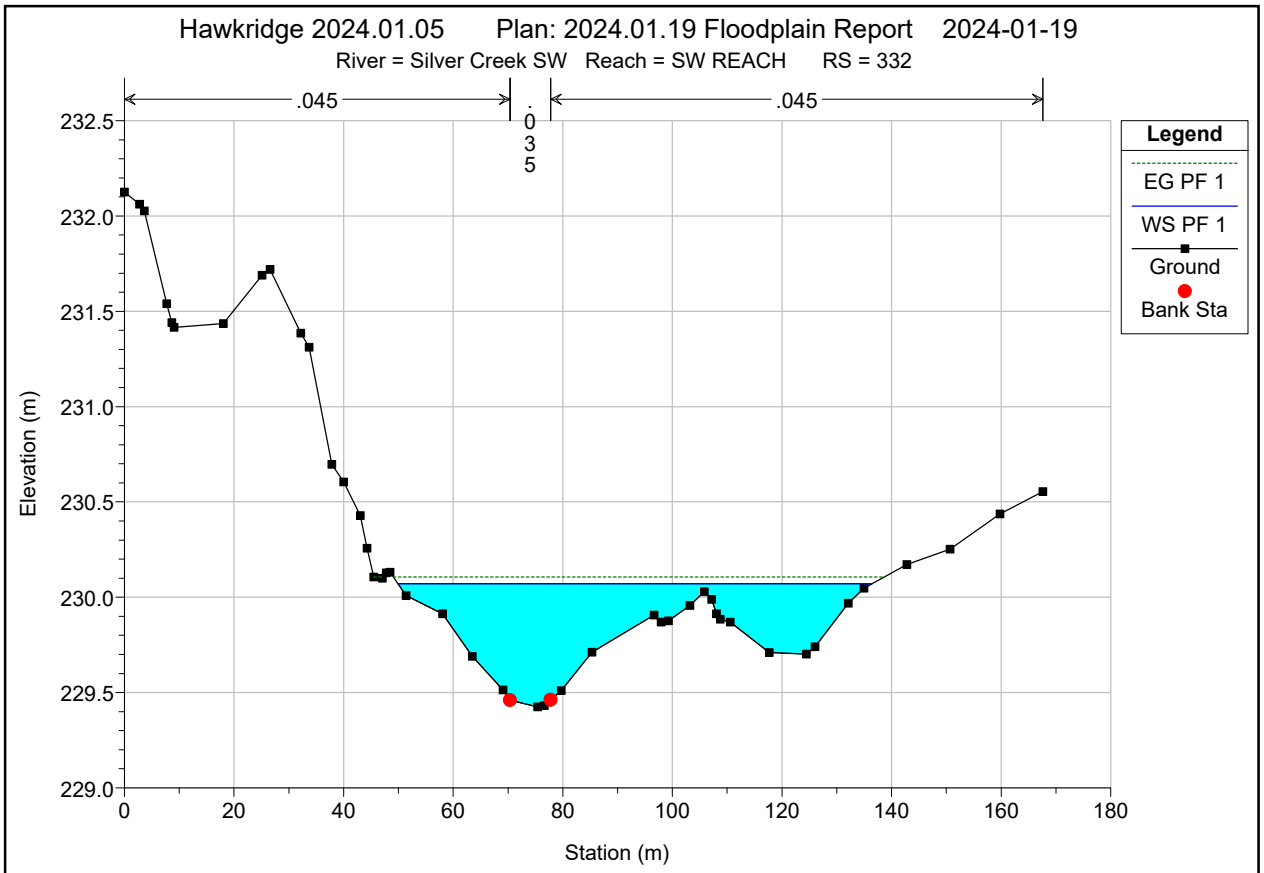

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 681.47
.045
.07
.045
.07
.035
.07
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
233
232
231
230
229
228
227
226
225
0
100
200
300
400
500
600

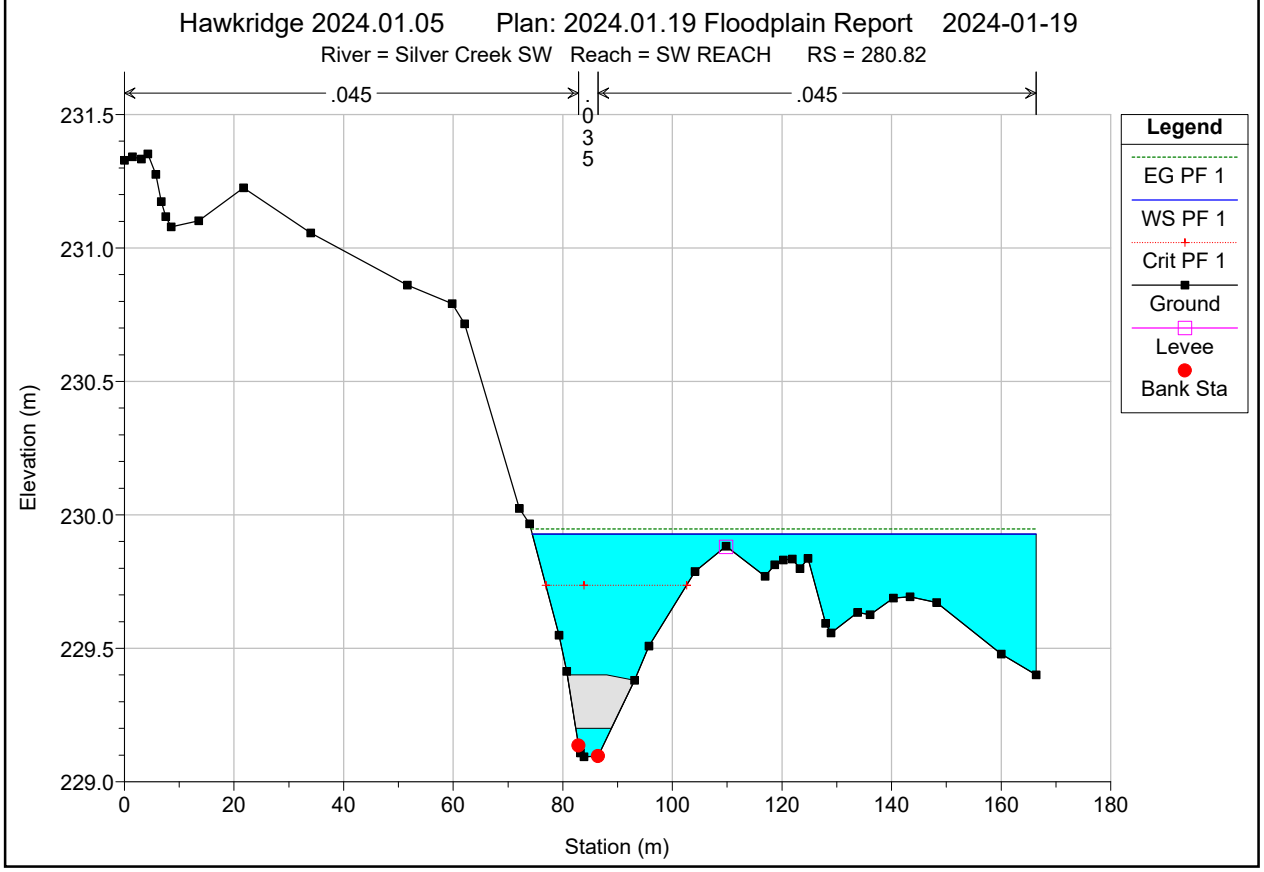

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 550.45
.045
.035
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)
Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 505.60
.045
.035
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)

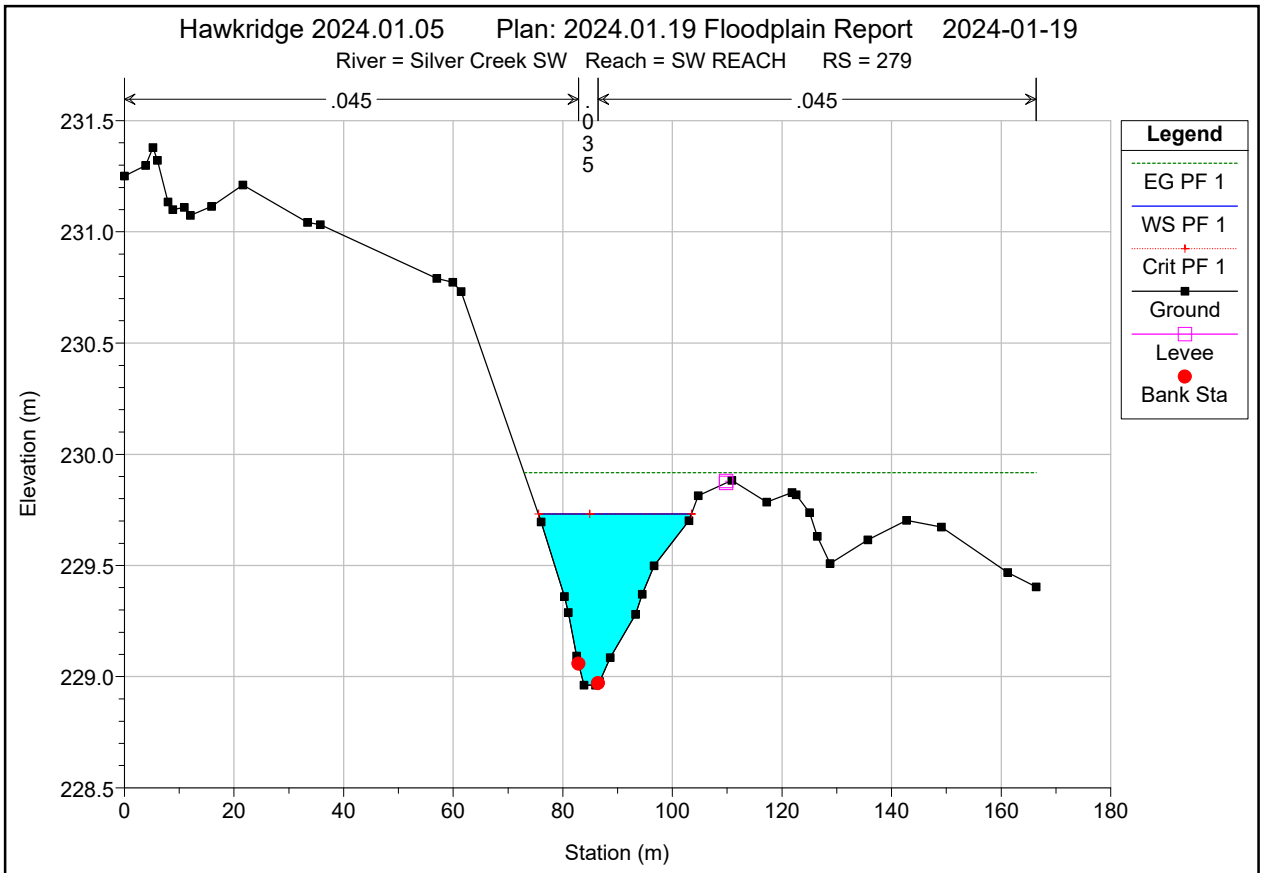

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 404.98
.045
.07
.045
.07
.035
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)

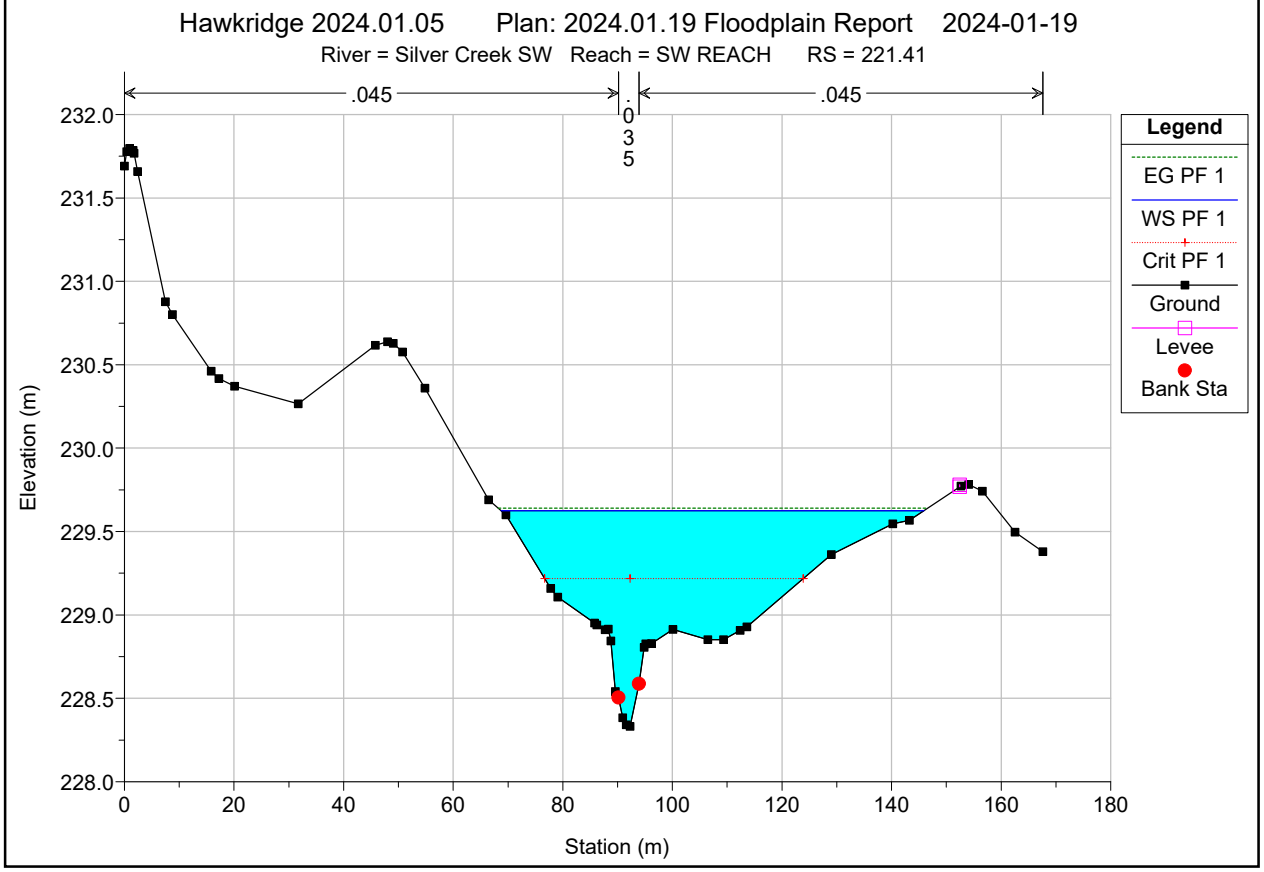

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 145.71
.07
.045
.07
.035
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

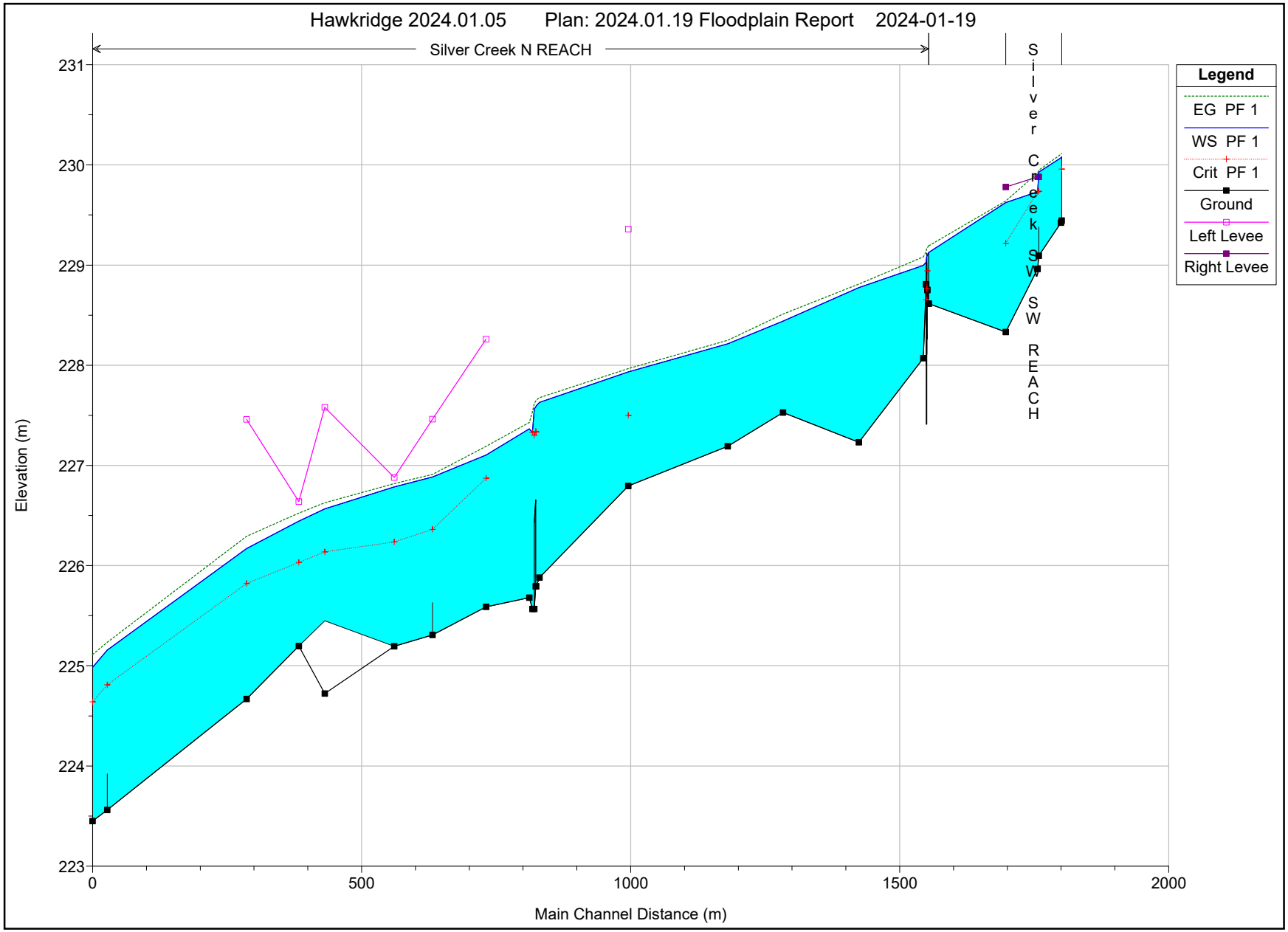

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek Reach = N REACH RS = 104
.045
.035
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)
Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek SW Reach = SW REACH RS = 333.26
.045
.035
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (m)
Station (m)

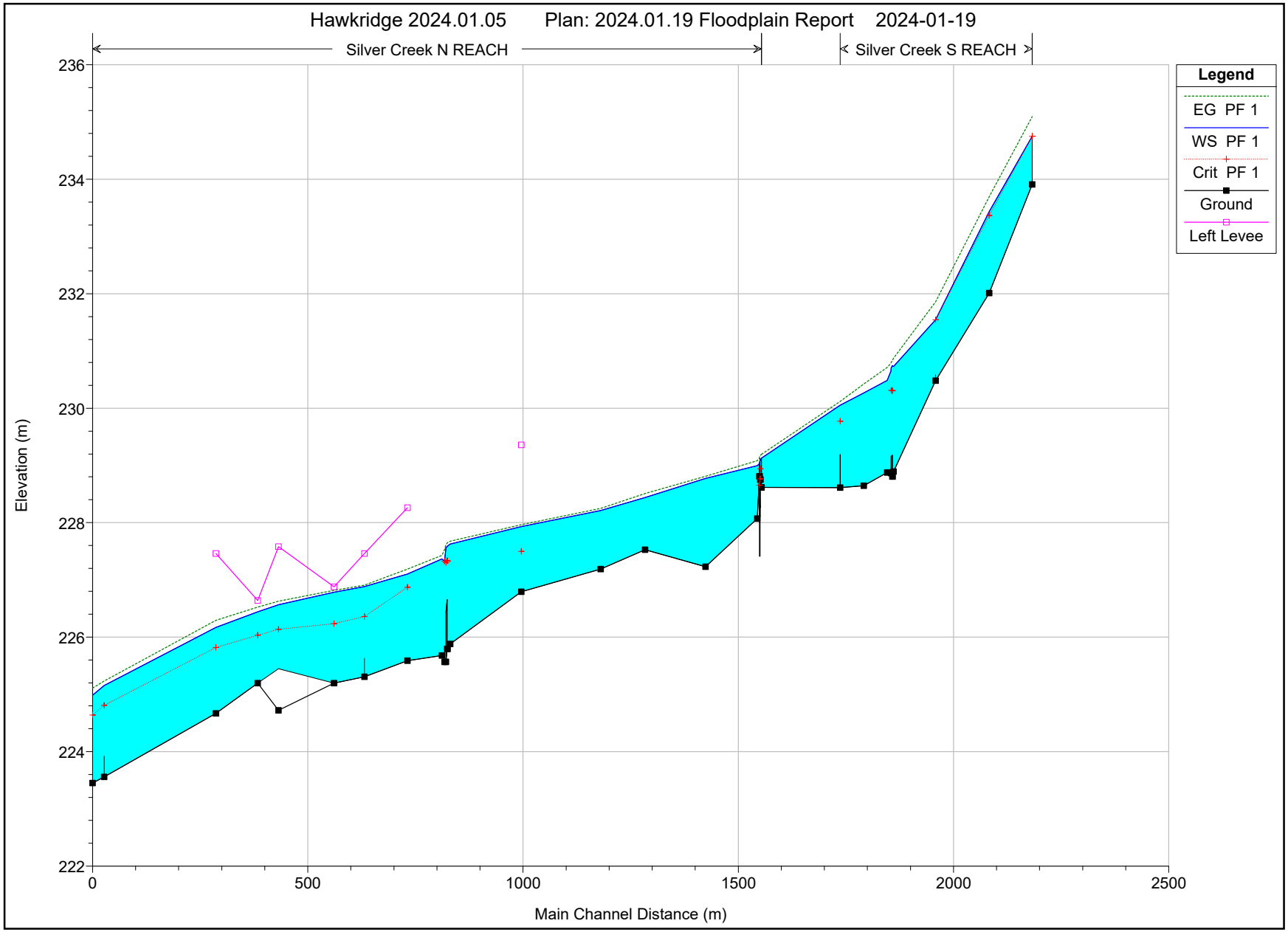

Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek SW Reach = SW REACH RS = 332
.045
.035
.045
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (m)
Station (m)


Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek SW Reach = SW REACH RS = 280.82
.045
.035
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)


Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek SW Reach = SW REACH RS = 279
.045
.035
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)


Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
River = Silver Creek SW Reach = SW REACH RS = 221.41
.045
.035
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (m)
Station (m)


Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
Silver Creek N REACH
Silver Creek SW SW REACH
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Left Levee
Right Levee
Elevation (m)
231
230
229
228
227
226
225
224
223
0
500
1000
1500
2000
Main Channel Distance (m)


Hawkridge 2024.01.05 Plan: 2024.01.19 Floodplain Report 2024-01-19
Silver Creek N REACH
Silver Creek S REACH
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Left Levee
Elevation (m)
236
234
232
230
228
226
224
222
0
500
1000
1500
2000
2500
Main Channel Distance (m)

HEC-RAS Plan: 12 Profile: PF 1

River	Reach	River Sta	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
Silver Creek SW	SW REACH	333.26	16.90	229.44	230.08	229.96	230.11	0.008939	0.74	21.66	83.03	0.31
Silver Creek SW	SW REACH	332	16.90	229.42	230.07		230.11	0.003446	1.23	25.47	86.48	0.50
Silver Creek SW	SW REACH	280.82	16.90	229.09	229.93	229.74	229.95	0.004047	0.64	28.11	91.97	0.21
Silver Creek SW	SW REACH	279	16.90	228.96	229.73	229.73	229.92	0.012070	2.60	11.00	27.95	0.96
Silver Creek SW	SW REACH	221.41	16.90	228.33	229.62	229.22	229.64	0.000762	0.89	39.18	77.15	0.26
Silver Creek	S REACH	2368	58.50	233.91	234.75	234.75	235.09	0.023781	3.89	28.94	43.40	1.36
Silver Creek	S REACH	2269	58.50	232.01	233.43	233.37	233.69	0.006738	2.41	35.28	71.89	0.75
Silver Creek	S REACH	2143.97	58.50	230.48	231.55	231.55	231.86	0.053533	2.99	24.37	39.69	0.76
Silver Creek	S REACH	2046.75	58.50	228.89	230.73		230.87	0.003103	2.29	60.95	91.16	0.56
Silver Creek	S REACH	2042.31	58.50	228.81	230.74	230.31	230.84	0.005885	2.10	52.01	77.78	0.69
Silver Creek	S REACH	2040	Bridge									
Silver Creek	S REACH	2039.01	58.50	228.87	230.65		230.79	0.006772	2.24	44.78	62.92	0.74
Silver Creek	S REACH	2030.51	58.50	228.87	230.49		230.71	0.004379	2.39	38.89	52.59	0.64
Silver Creek	S REACH	1964.99	58.50	228.65	230.27		230.42	0.005583	2.88	41.71	62.31	0.73
Silver Creek	S REACH	1912.13	58.50	228.61	230.05	229.77	230.12	0.004668	1.06	53.50	88.39	0.30
Silver Creek	N REACH	1736	69.70	228.61	229.13		229.19	0.005416	1.27	61.52	124.34	0.57
Silver Creek	N REACH	1734	69.70	228.75	229.09	228.94	229.17	0.007841	0.98	56.09	130.03	0.56
Silver Creek	N REACH	1733.5	Culvert									
Silver Creek	N REACH	1733	69.70	228.81	229.03		229.13	0.011163	0.81	49.42	126.97	0.58
Silver Creek	N REACH	1729	69.70	228.07	229.00		229.08	0.006723	1.69	58.92	135.05	0.57
Silver Creek	N REACH	1641.52	69.70	227.23	228.77		228.81	0.001317	1.33	93.48	116.53	0.35
Silver Creek	N REACH	1500.82	69.70	227.53	228.44		228.51	0.003847	1.60	64.66	114.41	0.55
Silver Creek	N REACH	1397.98	69.70	227.19	228.21		228.25	0.001683	1.16	99.87	185.06	0.37
Silver Creek	N REACH	1213.20	69.70	226.79	227.93	227.50	227.97	0.001391	1.12	98.04	144.05	0.34
Silver Creek	N REACH	1036	69.70	225.88	227.63		227.68	0.002285	1.31	87.11	209.04	0.34
Silver Creek	N REACH	1032	69.70	225.79	227.59	227.33	227.65	0.007074	0.38	67.15	195.27	0.48
Silver Creek	N REACH	1030	Bridge									
Silver Creek	N REACH	1029	69.70	225.57	227.33	227.33	227.53	0.018932		42.23	93.54	0.00
Silver Creek	N REACH	1021.93	69.70	225.68	227.37		227.43	0.001466	1.53	84.28	117.86	0.38
Silver Creek	N REACH	891.36	69.70	225.59	227.10	226.87	227.19	0.004820	2.48	68.72	121.37	0.67
Silver Creek	N REACH	766.43	69.70	225.31	226.88	226.36	226.91	0.001655	0.71	99.87	206.12	0.18
Silver Creek	N REACH	681.47	69.70	225.20	226.79	226.24	226.82	0.001025	1.22	102.44	140.78	0.31
Silver Creek	N REACH	550.45	69.70	225.45	226.57	226.14	226.63	0.002181	1.44	72.40	100.84	0.43
Silver Creek	N REACH	505.60	69.70	225.20	226.44	226.03	226.52	0.002070	1.45	69.24	110.02	0.43
Silver Creek	N REACH	404.98	69.70	224.67	226.17	225.82	226.29	0.002644	1.85	52.12	62.99	0.50
Silver Creek	N REACH	145.71	69.70	223.56	225.16	224.81	225.23	0.006918	1.63	58.73	74.79	0.31
Silver Creek	N REACH	104	69.70	223.45	224.99	224.64	225.11	0.003003	2.02	53.45	62.37	0.53

APPENDIX E

Sensitivity Analysis Outputs

EXPANSION AND CONTRACTION COEFFICEINT SENSITIVITY ANALYSIS - OUTPUTS

HEC-RAS Plan: 16 Profile: PF 1

River	Reach	River Sta	Profile	W.S. Elev	Area	Top Width
				(m)	(m2)	(m)
Silver Creek SW	SW REACH	333.26	PF 1	230.08	21.73	83.15
Silver Creek SW	SW REACH	332	PF 1	230.07	25.55	86.57
Silver Creek SW	SW REACH	280.82	PF 1	229.93	28.43	92.01
Silver Creek SW	SW REACH	279	PF 1	229.73	11.00	27.95
Silver Creek SW	SW REACH	221.41	PF 1	229.62	39.17	77.14
Silver Creek	S REACH	2368	PF 1	234.75	28.94	43.40
Silver Creek	S REACH	2269	PF 1	233.43	35.29	71.91
Silver Creek	S REACH	2143.97	PF 1	231.55	24.37	39.69
Silver Creek	S REACH	2046.75	PF 1	230.75	62.69	92.06
Silver Creek	S REACH	2042.31	PF 1	230.75	61.15	79.84
Silver Creek	S REACH	2040		Bridge		
Silver Creek	S REACH	2039.01	PF 1	230.66	53.34	63.37
Silver Creek	S REACH	2030.51	PF 1	230.49	39.13	52.86
Silver Creek	S REACH	1964.99	PF 1	230.27	41.99	62.50
Silver Creek	S REACH	1912.13	PF 1	230.05	53.40	88.33
Silver Creek	N REACH	1736	PF 1	229.13	61.72	124.51
Silver Creek	N REACH	1734	PF 1	229.10	59.67	130.08
Silver Creek	N REACH	1733.5		Culvert		
Silver Creek	N REACH	1733	PF 1	229.03	52.23	127.41
Silver Creek	N REACH	1729	PF 1	229.00	59.30	135.19
Silver Creek	N REACH	1641.52	PF 1	228.78	93.55	116.65
Silver Creek	N REACH	1500.82	PF 1	228.44	64.84	114.52
Silver Creek	N REACH	1397.98	PF 1	228.21	99.94	185.10
Silver Creek	N REACH	1213.20	PF 1	227.93	98.20	144.16
Silver Creek	N REACH	1036	PF 1	227.64	88.53	210.38
Silver Creek	N REACH	1032	PF 1	227.60	88.18	202.18
Silver Creek	N REACH	1030		Bridge		
Silver Creek	N REACH	1029	PF 1	227.33	61.12	93.84
Silver Creek	N REACH	1021.93	PF 1	227.37	84.39	118.56
Silver Creek	N REACH	891.36	PF 1	227.11	69.10	121.59
Silver Creek	N REACH	766.43	PF 1	226.89	100.01	206.28
Silver Creek	N REACH	681.47	PF 1	226.79	102.56	140.84
Silver Creek	N REACH	550.45	PF 1	226.57	72.49	100.89
Silver Creek	N REACH	505.60	PF 1	226.45	69.35	110.20
Silver Creek	N REACH	404.98	PF 1	226.17	52.16	63.01
Silver Creek	N REACH	145.71	PF 1	225.16	58.81	74.82
Silver Creek	N REACH	104	PF 1	224.99	53.45	62.37

INCREASED FLOWS
SENSITIVITY ANALYSIS - OUTPUTS

HEC-RAS Plan: 61 Profile: PF 1

River	Reach	River Sta	Profile	W.S. Elev	Area	Top Width
				(m)	(m2)	(m)
Silver Creek SW	SW REACH	333.26	PF 1	230.11	24.49	88.03
Silver Creek SW	SW REACH	332	PF 1	230.10	28.40	90.67
Silver Creek SW	SW REACH	280.82	PF 1	229.98	33.04	92.97
Silver Creek SW	SW REACH	279	PF 1	229.77	12.19	29.17
Silver Creek SW	SW REACH	221.41	PF 1	229.70	44.84	82.74
Silver Creek	S REACH	2368	PF 1	234.82	32.24	44.72
Silver Creek	S REACH	2269	PF 1	233.51	40.80	80.93
Silver Creek	S REACH	2143.97	PF 1	231.62	27.24	41.35
Silver Creek	S REACH	2046.75	PF 1	230.84	71.41	99.05
Silver Creek	S REACH	2042.31	PF 1	230.84	69.55	101.07
Silver Creek	S REACH	2040		Bridge		
Silver Creek	S REACH	2039.01	PF 1	230.75	59.15	71.34
Silver Creek	S REACH	2030.51	PF 1	230.56	42.71	56.75
Silver Creek	S REACH	1964.99	PF 1	230.33	45.85	65.11
Silver Creek	S REACH	1912.13	PF 1	230.11	58.83	92.76
Silver Creek	N REACH	1736	PF 1	229.21	72.96	134.65
Silver Creek	N REACH	1734	PF 1	229.19	72.77	137.99
Silver Creek	N REACH	1733.5		Culvert		
Silver Creek	N REACH	1733	PF 1	229.13	64.52	137.55
Silver Creek	N REACH	1729	PF 1	229.10	73.81	141.28
Silver Creek	N REACH	1641.52	PF 1	228.87	105.55	133.35
Silver Creek	N REACH	1500.82	PF 1	228.52	73.62	119.26
Silver Creek	N REACH	1397.98	PF 1	228.30	117.10	191.85
Silver Creek	N REACH	1213.20	PF 1	228.02	111.22	154.30
Silver Creek	N REACH	1036	PF 1	227.70	103.34	221.88
Silver Creek	N REACH	1032	PF 1	227.67	103.40	216.75
Silver Creek	N REACH	1030		Bridge		
Silver Creek	N REACH	1029	PF 1	227.42	69.41	98.59
Silver Creek	N REACH	1021.93	PF 1	227.46	98.32	170.61
Silver Creek	N REACH	891.36	PF 1	227.18	79.24	140.22
Silver Creek	N REACH	766.43	PF 1	226.94	112.00	218.91
Silver Creek	N REACH	681.47	PF 1	226.88	180.19	291.73
Silver Creek	N REACH	550.45	PF 1	226.69	85.16	106.13
Silver Creek	N REACH	505.60	PF 1	226.57	84.22	136.09
Silver Creek	N REACH	404.98	PF 1	226.28	59.48	66.42
Silver Creek	N REACH	145.71	PF 1	225.29	68.92	78.57
Silver Creek	N REACH	104	PF 1	225.12	61.79	66.06

MANNING'S n
SENSITIVITY ANALYSIS - OUTPUTS

HEC-RAS Plan: 14 Profile: 100 yr SCS

River	Reach	River Sta	Profile	W.S. Elev	Area	Top Width
				(m)	(m2)	(m)
Silver Creek SW	SW REACH	333.26	100 yr SCS	230.08	21.66	83.03
Silver Creek SW	SW REACH	332	100 yr SCS	230.07	25.47	86.48
Silver Creek SW	SW REACH	280.82	100 yr SCS	229.93	28.11	91.97
Silver Creek SW	SW REACH	279	100 yr SCS	229.73	11.00	27.95
Silver Creek SW	SW REACH	221.41	100 yr SCS	229.67	42.67	80.69
Silver Creek	S REACH	2368	100 yr SCS	234.75	28.94	43.40
Silver Creek	S REACH	2269	100 yr SCS	233.43	35.28	71.89
Silver Creek	S REACH	2143.97	100 yr SCS	231.55	24.37	39.69
Silver Creek	S REACH	2046.75	100 yr SCS	230.73	60.97	91.17
Silver Creek	S REACH	2042.31	100 yr SCS	230.74	60.16	77.82
Silver Creek	S REACH	2040		Bridge		
Silver Creek	S REACH	2039.01	100 yr SCS	230.65	52.69	62.94
Silver Creek	S REACH	2030.51	100 yr SCS	230.49	38.93	52.64
Silver Creek	S REACH	1964.99	100 yr SCS	230.27	42.10	62.57
Silver Creek	S REACH	1912.13	100 yr SCS	230.08	56.32	90.66
Silver Creek	N REACH	1736	100 yr SCS	229.18	68.05	131.10
Silver Creek	N REACH	1734	100 yr SCS	229.15	66.86	133.98
Silver Creek	N REACH	1733.5		Culvert		
Silver Creek	N REACH	1733	100 yr SCS	229.12	63.80	136.92
Silver Creek	N REACH	1729	100 yr SCS	229.10	72.73	140.84
Silver Creek	N REACH	1641.52	100 yr SCS	228.86	103.79	131.07
Silver Creek	N REACH	1500.82	100 yr SCS	228.52	73.45	119.17
Silver Creek	N REACH	1397.98	100 yr SCS	228.29	115.23	191.24
Silver Creek	N REACH	1213.20	100 yr SCS	228.01	108.92	151.20
Silver Creek	N REACH	1036	100 yr SCS	227.66	93.57	215.09
Silver Creek	N REACH	1032	100 yr SCS	227.62	91.08	205.30
Silver Creek	N REACH	1030		Bridge		
Silver Creek	N REACH	1029	100 yr SCS	227.43	69.95	101.73
Silver Creek	N REACH	1021.93	100 yr SCS	227.45	96.01	166.70
Silver Creek	N REACH	891.36	100 yr SCS	227.18	79.10	140.08
Silver Creek	N REACH	766.43	100 yr SCS	226.95	113.20	220.13
Silver Creek	N REACH	681.47	100 yr SCS	226.89	182.48	293.68
Silver Creek	N REACH	550.45	100 yr SCS	226.67	83.03	105.29
Silver Creek	N REACH	505.60	100 yr SCS	226.56	82.29	129.08
Silver Creek	N REACH	404.98	100 yr SCS	226.28	59.20	66.29
Silver Creek	N REACH	145.71	100 yr SCS	225.27	67.04	77.77
Silver Creek	N REACH	104	100 yr SCS	225.11	61.37	65.88

APPENDIX F

Floodplain Regularization

CROZIER
CONSULTING ENGINEERS

Project Name:	Hawk Ridge Golf Course
Project No.:	1935-6133
Date:	2024-09-16
By:	V. Parovyk
Checked By:	N. O'Connor

Floodplain Regularization: Incremental Storage Report
AutoCAD Surface Assessment Summary

Name	FROM ELEV	TO ELEV	Cut (m3)	Level Cut	Fill (m3)	Level Fill	Level Net
CUT-GR-CREEK to OG-MOD-ABOVE LP-MOD	LP=	226.675	0				
CUT-GR-CREEK to OG-MOD-ABOVE 1ft-MOD	226.675	226.9798	0	0			
CUT-GR-CREEK to OG-MOD-ABOVE 2ft-MOD	226.9798	227.2846	0.17	0.17			
CUT-GR-CREEK to OG-MOD-ABOVE 3ft-MOD	227.2846	227.5894	116.07	115.9			
CUT-GR-CREEK to OG-MOD-ABOVE 4ft-MOD	227.5894	227.8942	955.81	839.74			
CUT-GR-CREEK to OG-MOD-ABOVE 5ft-MOD	227.8942	228.199	1590.26	634.45			
CUT-GR-CREEK to OG-MOD-ABOVE 6ft-MOD	228.199	228.5038	1703.14	112.88			
CUT-GR-CREEK to OG-MOD-ABOVE FP	228.5038	FP	1703.07	-0.07			

FILL-GR-CREEK to OG-MOD-BELOW LP-MOD	LP=	226.675			4295.85		
FILL-GR-CREEK to OG-MOD-BELOW 1ft-MOD	226.675	226.9798			4295.85	0	
FILL-GR-CREEK to OG-MOD-BELOW 2ft-MOD	226.9798	227.2846			4290.78	5.07	
FILL-GR-CREEK to OG-MOD-BELOW 3ft-MOD	227.2846	227.5894			4184.63	106.15	
FILL-GR-CREEK to OG-MOD-BELOW 4ft-MOD	227.5894	227.8942			3316.43	868.2	
FILL-GR-CREEK to OG-MOD-BELOW 5ft-MOD	227.8942	228.199			2780.37	536.06	
FILL-GR-CREEK to OG-MOD-BELOW 6ft-MOD	228.199	228.5038			2664.5	115.87	
FILL-GR-CREEK to OG-MOD-BELOW FP	228.5038	FP			2662.26	2.24	

LP	LP=	226.675		Level Cut		Level Fill	Level Net
LEVEL 1ft	226.675	226.9798		0		0	0
LEVEL 2ft	226.9798	227.2846		0.17		5.07	4.9
LEVEL 3ft	227.2846	227.5894		115.9		106.15	-9.75
LEVEL 4ft	227.5894	227.8942		839.74		868.2	28.46
LEVEL 5ft	227.8942	228.199		634.45		536.06	-98.39
LEVEL 6ft	228.199	228.5038		112.88		115.87	2.99
FP	228.5038	FP		-0.07		2.24	2.31

Total -69.48

LIST OF FIGURES

Figure 1: Site Location Plan

Figure 2: Concept Plan

Figure 3: Watershed Delineation

Figure 4: Bridge Location Assessment

Figure 5: Manning's N Location

Figure 6: Floodline Delineation

Figure 7: Crossing Location Plan

Figure 8: Existing Floodline and Proposed Regularization

Figure 9: Proposed Floodplain Regularization Plan

Legend

PROPERTY LINE

Project

HAWK RIDGE GOLF COURSE
TOWNSHIP OF SEVERN

Drawing

SITE LOCATION

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
T.M.	T.M.	1935-6133

Scale	Date	Check By	Drawing
N.T.S.	2024.01.11	B.H.	FIGURE 1

LEGEND

- SINGLE
- TOWNHOUSES
- GOLF VILLA
- PARKLAND AND OPEN SPACE
- SWM POND
- BUFFER
- NHS
- TREATMENT PLANT / UTILITIES
- FOREST
- WOODLAND
- MIXED MEADOW - MEMM3
- POND (BASKING TURTLE HABITAT/SURVEY)
- POND
- 30m BUFFER TO WATERCOURSE
- BLACK ASH LOCATION
- WATERCOURSE
- FLOODPLAIN LINE
- PROPOSED FLOODPLAIN ADJUSTMENT FOR NEW DEVELOPABLE AREA
- SITE BOUNDARY

Treatment Plant 0.97ha
SWM Pond 0.74ha
Park 0.56ha
SWM Pond 1.97 ha
Well Pump House 0.20ha
Golf Villas 0.74 ha
Golf Villas 1.66 ha
Entry Feature
Park 0.91 ha
Existing Golf Club
Entry Feature
Existing Golf Course/NHS
Golf Villas 1.68 ha
Park 0.16 ha
Park 0.39 ha
Water Tower 028ha

Schedule of Land Use

Description	Residential Units	Area (ha
Single detached	290	11.95
Total Single Detached	**290**	**11.95**
Townhouses	310	6.65
Golf Villas (Stacked Townhouses)	250	4.05
Net Developable Total	**850**	**22.65**
Stormwater Management Pond		2.70
Parkland and Trails		2.17
Buffer		0.25
Natural Heritage System		3.92
Right of Way		9.29
Treatment Plant		0.97
Utility		0.20
Water Tower		0.28
Golf Course		83.15
Total Site Area		**125.58**

C:\Users\mpettigrew\The Biglieri Group\TBG_Project - 2020-2024\2023\23979\2 - TBG Design\1 - TBG Working Drawings\1 - AutoCAD\2024-08\23979_DP_24.08.22

CONCEPT DRAFT PLAN

ADDRESS: HAWKRIDGE GOLF COURSE

Project No: 23979

Scale: 1:2500

August 22, 2024

Designed By: MP

Urbantypology Jeff Mingay GOLF COURSE ARCHITECT

BIGLIERI GROUP

LEGEND

PROPERTY BOUNDARY

WATERSHED AREA

WATERSHED I.D.

AREA (ha)

IMPERVIOUS PERCENTAGE (%) / CURVE NUMBER

102
12.3 44.4%

PRE-1
161.19 71.2%

PRE-2
149.59 21.5%

PRE-3
121.02 61.5%

PRE-4
264.40 51.1%

PRE-5
199.48 54.6%

SILVER CREEK

UHTHOFF LINE

BURNSIDE LINE

HURLWOOD LANE

MURPHY ROAD

HIGHWAY 11

HIGHWAY 12

KEY PLAN
SCALE: N.T.S.

SEVERNSIDE LINE

SUBJECT PROPERTY

UHTHOFF LINE

HIGHWAY 11

1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE MODIFICATION AND/OR REPRODUCTION OF ANY PART OF THIS DRAWING IS STRICTLY PROHIBITED WITHOUT WRITTEN AUTHORIZATION FROM THIS OFFICE.
2. THE DIGITAL FILES CONTAIN INTELLECTUAL AND DIGITAL DATA PROPERTY THAT IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC.
3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO C.F. CROZIER & ASSOCIATES INC. PRIOR TO CONSTRUCTION.
4. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.
5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
6. DO NOT SCALE DRAWINGS.

SURVEY RECEIVED ON NOVEMBER 6th, 2023 FROM RUDY MAK SURVEYING LTD.

SATELLITE LIDAR TOPOGRAPHY DATA (DATED SPRING, 2002) PURCHASED FROM FIRST BASE MAPPING SOLUTIONS ON FEBRUARY 1st 2023

Township of SEVERN

No.	ISSUE	DATE: YYYY/MM/DD
0	ISSUED FOR CLIENT COORDINATION	2024/09/16
1	ISSUED FOR FIRST SUB OFFICIAL PLAN AMENDMENT	2024/09/30

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Project: HAWK RIDGE DEVELOPMENT
SEVERN, ONTARIO

Drawing: WATERSHED DELINEATION (AERIAL)

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
T.M.	T.M.	1935-6133
Check By	Check By	Drawing
B.H.	B.H.	FIGURE 3

LEGEND

EXISTING WATERCOURSE AS MAPPED BY AZIMUTH (JAN, 2024) & RUDY MACK (NOV, 2023)

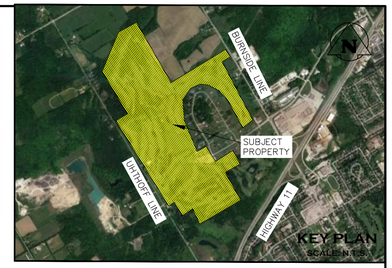
PROPERTY BOUNDARY

HEC–RAS CROSS SECTION

CONTOUR ELEVATION ——XXX.X——

CROSS SECTION ID — 104

WATER SURFACE ELEVATION — 232.5



BURNSIDE LINE
HURWOOD LANE
HAWKRIDGE CRESCENT
INCH FARM DEVELOPMENT
UNTHOFF LINE
SILVER CREEK SOUTH
SILVER CREEK NORTH
SILVER CREEK SOUTHWEST
CROSSING 1
CROSSING 2
CROSSING 3
CROSSING 4
CROSSING A
CROSSING B
CROSSING C
CROSSING 5
CROSSING 6
CROSSING 7
CROSSING 8
CROSSING 9
CULVERT 1
CULVERT 2

104 224.99
145.71 225.15
404.98 226.15
505.60 226.44
550.45 226.56
681.47 226.79
766.43 226.88
891.36 227.10
1021.93 227.37
1029 227.33
1032 227.59
1036 227.63
1213.20 227.93
1397.98 228.21
1500.82 228.44
1641.52 228.77
1729 229.00
1733 229.03
1734 229.09
1736 229.13
1912.13 230.05
1964.99 230.27
2030.51 230.49
2046.75 230.73
2143.97 231.55
2269 233.43
2368 234.75
333.26 230.08
2039.01 230.65
2042.30 230.74
221.41 229.62
280.82 229.93

100 0m 100 200
SCALE: 1:3000

CROSSING MODELING METHODOLOGY

CROSSING NAME	MODELING METHOD
1	LID
2	LID
3	LID
4	4 XS BRIDGE
CULVERT 1	4 XS BRIDGE
CULVER 2	4 XS BRIDGE
5	LID
6	LID
7	LID
8	4 XS BRIDGE
9	LID
A	N/A
B	N/A
C	N/A

1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE MODIFICATION AND/OR REPRODUCTION OF ANY PART OF THIS DRAWING IS STRICTLY PROHIBITED WITHOUT WRITTEN AUTHORIZATION FROM THIS OFFICE.
2. THE DIGITAL FILES CONTAIN INTELLECTUAL AND DIGITAL DATA PROPERTY THAT IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC.
3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO C.F. CROZIER & ASSOCIATES INC. PRIOR TO CONSTRUCTION.
4. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.
5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
6. DO NOT SCALE DRAWINGS.

SURVEY RECEIVED ON NOVEMBER 6th, 2023 FROM RUDY MAK SURVEYING LTD.

SATELLITE LIDAR TOPOGRAPHY DATA (DATED SPRING, 2002) PURCHASED FROM FIRST BASE MAPPING SOLUTIONS ON FEBRUARY 1st 2023

Township of SEVERN

No.	ISSUE	DATE: YYYY/MM/DD
0	ISSUED FOR CLIENT COORDINATION	2024/09/16
1	ISSUED FOR FIRST SUB OFFICIAL PLAN AMENDMENT	2024/09/30

Engineer

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Engineer

Project: HAWK RIDGE DEVELOPMENT
SEVERN, ONTARIO

Drawing: CROSSING LOCATION ASSESSMENT

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
T.M.	T.M.	1935–6133
Check By	Check By	Drawing
B.H.	B.H.	FIGURE 4

LEGEND

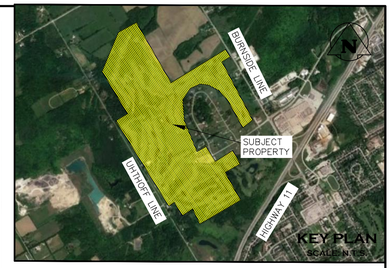
EXISTING WATERCOURSE AS MAPPED BY AZIMUTH (JAN, 2024) & RUDY MACK (NOV, 2023)

PROPERTY BOUNDARY

HEC–RAS CROSS SECTION

CROSS SECTION ID — 104 / 232.5 — WATER SURFACE ELEVATION

MANNING'S n		
VALUE	LINE TYPE	Description
0.035		MAIN CHANNEL – CLEAN, STRAIGHT, FULL, NO RIFTS OR DEEP POOLS WITH SOME WEEDS AND STONES
0.045		FLOODPLAIN – BRUSH, LIGHT BRUSH AND TREES (WINTER & SUMMER AVERAGE)
0.07		FLOODPLAIN – TREES, MEDIUM TO DENSE BRUSH (WINTER & SUMMER AVERAGE)



BURNSIDE LINE
HURWOOD LANE
HAWKRIDGE CRESCENT
INCH FARM DEVELOPMENT
UNTHOFF LINE
SILVER CREEK SOUTH
SILVER CREEK NORTH
SILVER CREEK SOUTHWEST
N

104 / 224.99
145.71 / 225.15
404.98 / 226.15
505.60 / 226.44
550.45 / 226.56
681.47 / 226.79
766.43 / 226.88
891.36 / 227.10
1021.93 / 227.37
1029 / 227.33
1032 / 227.59
1036 / 227.63
1213.20 / 227.93
1397.98 / 228.21
1500.82 / 228.44
1641.52 / 228.77
1729 / 229.00
1733 / 229.03
1734 / 229.09
1736 / 229.13
221.41 / 229.62
280.82 / 229.93
333.26 / 230.08
1912.13 / 230.05
1964.99 / 230.27
2030.51 / 230.49
2039.01 / 230.65
2042.31 / 230.74
2046.75 / 230.73
2143.97 / 231.55
2269 / 233.43
2368 / 234.75

100 0m 100 200
SCALE: 1:3000

1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE MODIFICATION AND/OR REPRODUCTION OF ANY PART OF THIS DRAWING IS STRICTLY PROHIBITED WITHOUT WRITTEN AUTHORIZATION FROM THIS OFFICE.
2. THE DIGITAL FILES CONTAIN INTELLECTUAL AND DIGITAL DATA PROPERTY THAT IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC.
3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO C.F. CROZIER & ASSOCIATES INC. PRIOR TO CONSTRUCTION.
4. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.
5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
6. DO NOT SCALE DRAWINGS.

SURVEY RECEIVED ON NOVEMBER 6th, 2023 FROM RUDY MAK SURVEYING LTD.

SATELLITE LiDAR TOPOGRAPHY DATA (DATED SPRING, 2002) PURCHASED FROM FIRST BASE MAPPING SOLUTIONS ON FEBRUARY 1st 2023

Township of SEVERN

No.	ISSUE	DATE: YYYY/MM/DD
0	ISSUED FOR CLIENT COORDINATION	2024/09/16
1	ISSUED FOR FIRST SUB OFFICIAL PLAN AMENDMENT	2024/09/30

Engineer

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Engineer

Project: HAWK RIDGE DEVELOPMENT
SEVERN, ONTARIO

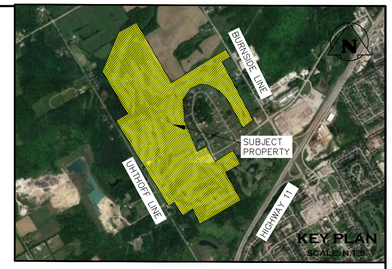
Drawing: MANNING'S n LOCATION

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
T.M.	T.M.	1935–6133
Check By B.H.	Check By B.H.	Drawing FIGURE 5

LEGEND

- EXISTING WATERCOURSE AS MAPPED BY AZIMUTH (JAN, 2024) & RUDY MACK (NOV, 2023)
- PROPERTY BOUNDARY
- HEC-RAS CROSS SECTION
- PRELIMINARY FLOODLIMIT
- CONTOUR ELEVATION — XXX.X
- CROSS SECTION ID — 104 / 232.5
- WATER SURFACE ELEVATION



BURNSIDE LINE
HURLWOOD LANE
HAWKRIDGE CRESCENT
INCH FARM DEVELOPMENT
URTHOFF LINE
SILVER CREEK SOUTH
SILVER CREEK NORTH
SILVER CREEK SOUTHWEST

104 / 224.99
145.71 / 225.15
404.98 / 226.15
505.60 / 226.44
550.45 / 226.56
681.47 / 226.79
766.43 / 226.88
891.36 / 227.10
1021.93 / 227.37
1036 / 227.63
1213.20 / 227.93
1397.98 / 228.21
1500.82 / 228.44
1641.52 / 228.77
1729 / 229.00
1733 / 229.03
1736 / 229.13
1734 / 229.09
1029 / 227.33
1032 / 227.59
221.41 / 229.62
280.82 / 229.93
333.26 / 230.08
2039.01 / 230.65
2042.31 / 230.74
2143.97 / 231.55
2030.51 / 230.49
1964.99 / 230.27
1912.13 / 230.05
2046.75 / 230.73
2269 / 233.43
2368 / 234.75

N

100 0m 100 200
SCALE: 1:3000

1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE MODIFICATION AND/OR REPRODUCTION OF ANY PART OF THIS DRAWING IS STRICTLY PROHIBITED WITHOUT WRITTEN AUTHORIZATION FROM THIS OFFICE.
2. THE DIGITAL FILES CONTAIN INTELLECTUAL AND DIGITAL DATA PROPERTY THAT IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC.
3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO C.F. CROZIER & ASSOCIATES INC. PRIOR TO CONSTRUCTION.
4. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.
5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
6. DO NOT SCALE DRAWINGS.

SURVEY RECEIVED ON NOVEMBER 6th, 2023 FROM RUDY MAK SURVEYING LTD.

SATELLITE LIDAR TOPOGRAPHY DATA (DATED SPRING, 2002) PURCHASED FROM FIRST BASE MAPPING SOLUTIONS ON FEBRUARY 1st 2023

Town: Township of SEVERN

No.	ISSUE	DATE: YYYY/MM/DD
0	ISSUED FOR CLIENT COORDINATION	2024/09/16
1	ISSUED FOR FIRST SUB OFFICIAL PLAN AMENDMENT	2024/09/30

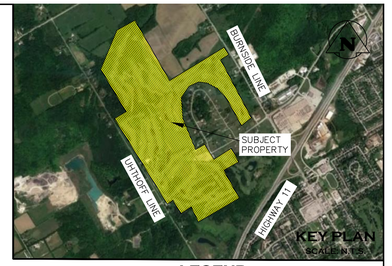
Engineer / Engineer: PRELIMINARY — NOT TO BE USED FOR CONSTRUCTION

Project: HAWK RIDGE DEVELOPMENT
SEVERN, ONTARIO

Drawing: FLOODLINE DELINEATION

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
T.M.	T.M.	1935-6133
Check By	Check By	Drawing
B.H.	B.H.	FIGURE 6



LEGEND

PROPERTY LINE

N

HIGH PRESSURE GAS MAIN EASEMENT

SILVER CREEK NORTH

EXISTING WATERCOURSE

DEVELOPMENT CONSTRAINT LINES

EXISTING WATERCOURSE

HIGH PRESSURE GAS MAIN EASEMENT

SILVER CREEK SOUTH

DEVELOPMENT CONSTRAINT LINES

PROP. OPEN BOTTOM SPAN

EXISTING WATERCOURSE

SILVER CREEK SOUTHWEST

PR. RET.WALL

PR. RET.WALL

Existing Golf Course/NHS

Existing Golf Club

SWM Pond 1.97 ha

Golf Villas 1.68 ha

Park 0.39 ha

Park 0.16 ha

Water Tower 0.28ha

Park 0.91 ha

Golf Villas 0.74 ha

Golf Villas 1.66 ha

Treatment Plant 0.97ha

SWM Pond 0.74ha

Park 0.56ha

Well Pump House 0.20ha

MW1 GW = 235.52
MW2 GW = 235.46
MW3 GW = 246.90
MW4 GW = 241.72
MW5 GW = 237.40
MW6 GW = 240.44
MW7
MW8 GW = 229.19
MW9 GW = 231.91
MW10 GW = 236.04
MW11 GW = 227.40
MW12 GW = 231.44
MW13 GW = 228.47
MW14 GW = 228.91
MW15 GW = 230.45
MW16 GW = 229.78
MW17 GW = 231.33

50 0m 50 100 150
SCALE: 1:2000

1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE MODIFICATION AND/OR REPRODUCTION OF ANY PART OF THIS DRAWING IS STRICTLY PROHIBITED WITHOUT WRITTEN AUTHORIZATION FROM THIS OFFICE.
2. THE DIGITAL FILES CONTAIN INTELLECTUAL AND DIGITAL DATA PROPERTY THAT IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC.
3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO C.F. CROZIER & ASSOCIATES INC. PRIOR TO CONSTRUCTION.
4. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.
5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
6. DO NOT SCALE DRAWINGS.

SURVEY RECEIVED ON NOVEMBER 6th, 2023 FROM RUDY MAK SURVEYING LTD.

SATELLITE LIDAR TOPOGRAPHY DATA (DATED SPRING, 2002) PURCHASED FROM FIRST BASE MAPPING SOLUTIONS ON FEBRUARY 1st 2023

Township of SEVERN

No.	ISSUE	DATE: YYYY/MM/DD
0	ISSUED FOR CLIENT COORDINATION	2024/09/16
1	ISSUED FOR FIRST SUB OFFICIAL PLAN AMENDMENT	2024/09/30

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Project: HAWK RIDGE DEVELOPMENT
SEVERN, ONTARIO

Drawing: CROSSING LOCATION PLAN

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
T.M.	T.M.	1935-6133
Check By	Check By	Drawing
B.H./N.C.O	B.H./N.C.O.	FIGURE 7

LEGEND

EXISTING WATERCOURSE AS MAPPED BY AZIMUTH (JAN, 2024) & RUDY MACK (NOV, 2023).

OFFLINE POND (AZIMUTH)

PROPERTY BOUNDARY

CONTOUR ELEVATION — XXX.X

EXISTING CONDITION FLOODPLAIN (CROZIER)

POST CONDITION FLOODPLAIN (CROZIER)

PROPOSED FLOODPLAIN REGULARIZATION (CROZIER)

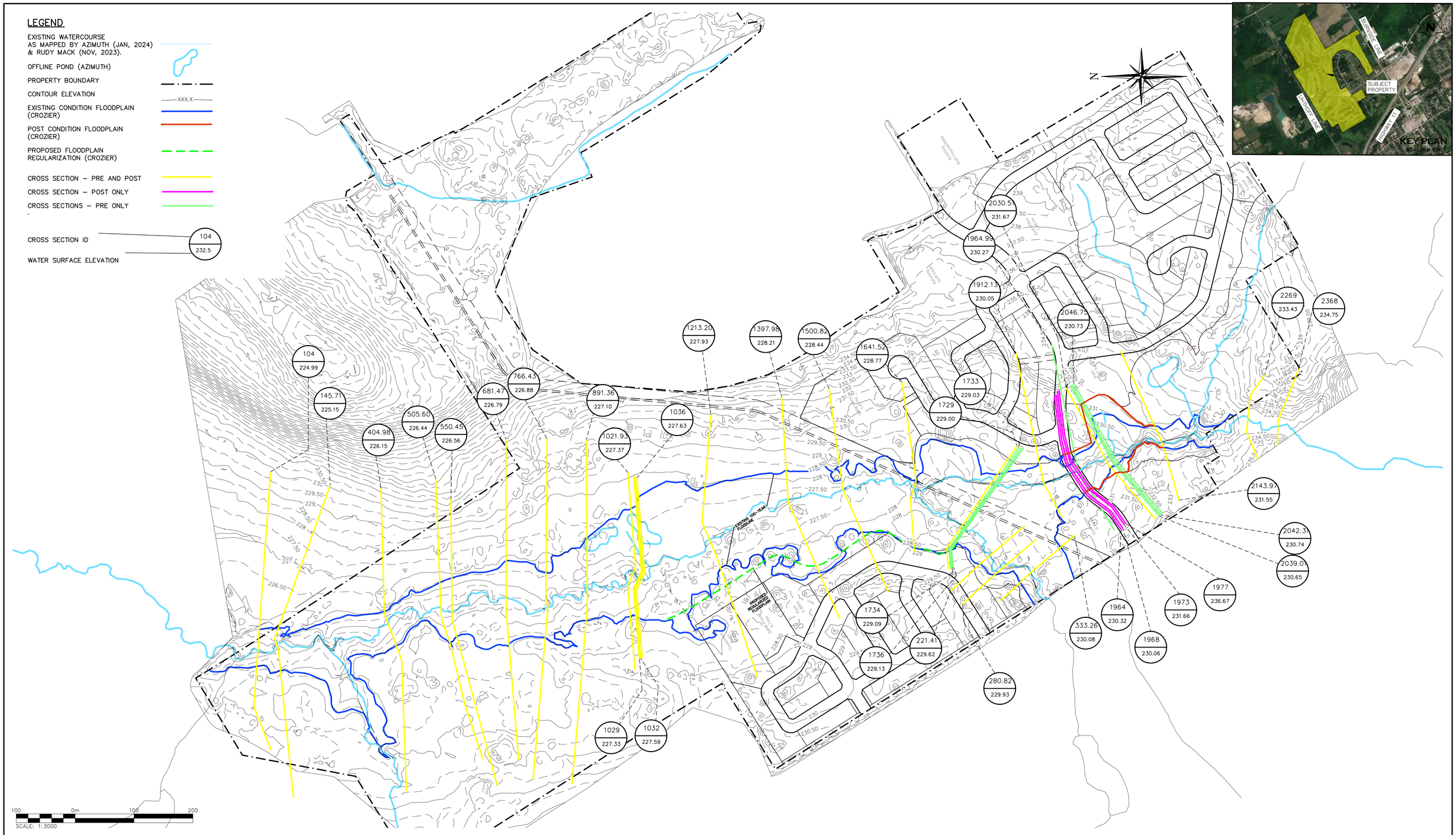
CROSS SECTION – PRE AND POST

CROSS SECTION – POST ONLY

CROSS SECTIONS – PRE ONLY

CROSS SECTION ID — 104 / 232.5

WATER SURFACE ELEVATION



1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE MODIFICATION AND/OR REPRODUCTION OF ANY PART OF THIS DRAWING IS STRICTLY PROHIBITED WITHOUT WRITTEN AUTHORIZATION FROM THIS OFFICE.
2. THE DIGITAL FILES CONTAIN INTELLECTUAL AND DIGITAL DATA PROPERTY THAT IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC.
3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO C.F. CROZIER & ASSOCIATES INC. PRIOR TO CONSTRUCTION.
4. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.
5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
6. DO NOT SCALE DRAWINGS.

SURVEY RECEIVED ON NOVEMBER 6th, 2023 FROM RUDY MAK SURVEYING LTD.

SATELLITE LiDAR TOPOGRAPHY DATA (DATED SPRING, 2002) PURCHASED FROM FIRST BASE MAPPING SOLUTIONS ON FEBRUARY 1st 2023

Town: Township of SEVERN

No.	ISSUE	DATE: YYYY/MM/DD
0	ISSUED FOR CLIENT COORDINATION	2024/09/16
1	ISSUED FOR FIRST SUB OFFICIAL PLAN AMENDMENT	2024/09/30

Engineer

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

Engineer

Project: HAWK RIDGE DEVELOPMENT
SEVERN, ONTARIO

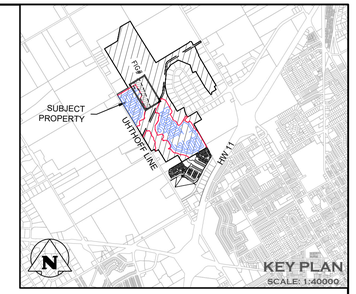
Drawing: EXISTING FLOODPLAIN AND PROPOSED REGULARIZATION PLAN

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
T.M.	T.M.	1935–6133
Check By B.H.	Check By B.H.	Drawing FIGURE 8

LEGEND

- ×219.06 EX. ELEVATION
- ×219.06 PROPOSED ELEVATION
- ×219.06 MATCH EXISTING ELEVATION
- DRAINAGE DIRECTION
- PRE-DEVELOPMENT FLOOD LINE
- POST-DEVELOPMENT FLOOD LINE
- LIMIT GRADING TO SUPPORT FLOODPLAIN REGULARIZATION



KEY PLAN
SCALE: 1:40000

DEVELOPMENT AREA 2

POND BLOCK

PARK BLOCK

1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE MODIFICATION AND/OR REPRODUCTION OF ANY PART OF THIS DRAWING IS STRICTLY PROHIBITED WITHOUT WRITTEN AUTHORIZATION FROM THIS OFFICE.
2. THE DIGITAL FILES CONTAIN INTELLECTUAL AND DIGITAL DATA PROPERTY THAT IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC.
3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO C.F. CROZIER & ASSOCIATES INC. PRIOR TO CONSTRUCTION.
4. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.
5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
6. DO NOT SCALE DRAWINGS.

BENCHMARKS

•

Township of SEVERN

No.	ISSUE	DATE: YYYY/MM/DD
1	ISSUED FOR PRE-DEVELOPMENT CONSTRAINTS	2023/02/27
2	ISSUED FOR PRE-DEVELOPMENT CONSTRAINTS	2024/03/11

Project: HAWK RIDGE GOLF COURSE
TOWNSHIP OF SEVERN

Drawing: PROPOSED FLOODPLAIN REGULARIZATION PLAN

CROZIER CONSULTING ENGINEERS

Drawn By	Design By	Project
V.P.	V.P./N.O.C/B.H.	1935-6133
Check By	Check By	Drawing
N.O.C/B.H.	N.O.C/B.H.	FIG9