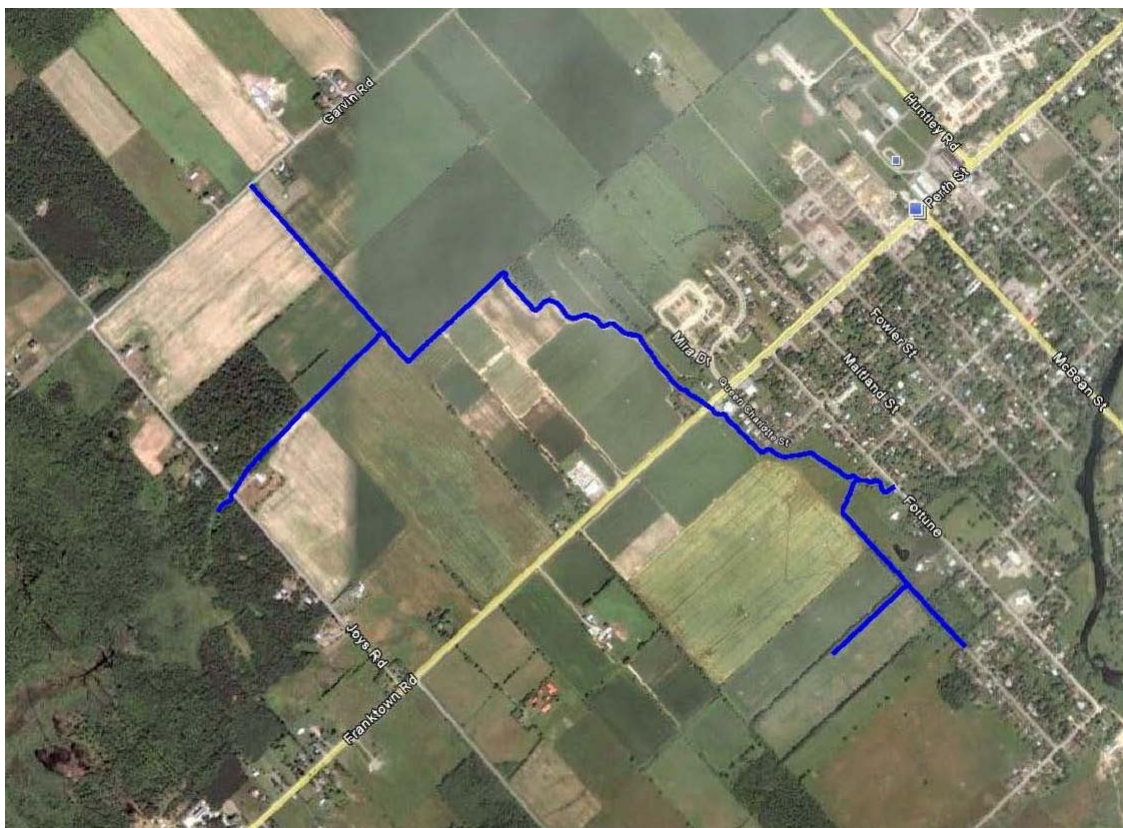


FLOODPLAIN MAPPING REPORT FOR THE VAN GAAL AND ARBUCKLE MUNICIPAL DRAINS IN THE VILLAGE OF RICHMOND

City of Ottawa
November 2009



Project No. 709-08



Prepared for:
Rideau Valley Conservation Authority

Prepared by:
J.F. Sabourin and Associates Inc.



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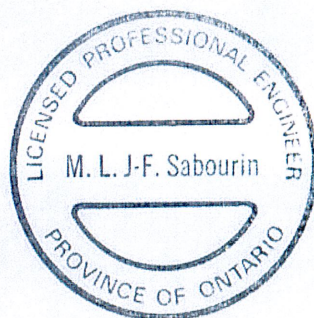
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Bryan Willcott, EIT

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Village of Richmond
November 2009

1.0 Introduction

J.F. Sabourin and Associates Inc. (JFSA) were retained by the Rideau Valley Conservation Authority (RVCA) to delineate flood risk limits along the Van Gaal and Arbutle Municipal Drains in the Village of Richmond, a tributary to the Jock River. As provided by the City of Ottawa, Appendix A presents the Floodplain Mapping that was to be completed within the present study. Flood risk mapping for the Jock River as well as the portion of the drain between Perth Street and the Jock River has previously been completed in 2005 by PSR Group. For general location of the study area, refer to Figure 1.

The flood risk mapping is to conform to MNR Natural Hazards Guidelines. The maps must be suitable for use in land use planning and development control in accordance with Provincial Policy Statement. The mapping will also be suitable for RVCA's regulation limits mapping associated with O. Reg. 174/06, as per the Terms of Reference.

Flood risk mapping requires the development of hydraulic simulation models to estimate the 100 year water level based on reliable flow estimates. Flow estimates on the Jock River have been determined through the combined use of the SWMHYMO model and statistical analyses of recorded annual peak flows, all of which is described in the "Hydrology Report – July 2004, Jock River Flood Risk Mapping (within the City of Ottawa)". Similarly, flow estimates from the catchment area which drains to the Van Gaal and Arbutle municipal drains have been developed in this report.

To determine peak flows, a hydrologic analysis was performed using SWMHYMO. This modeling is based on a drainage map and input parameters provided by the City of Ottawa, which was prepared for a separate project being worked on by David Schaeffer Engineering Ltd. (DSEL). This information was checked and adjusted as required for this study. Included in these adjustments was the need to further delineate upstream sub-catchment areas for the purpose of calculating flows at key locations to be used in the hydraulic model.

The hydraulic analysis, for the portions of the drain to be mapped, was conducted using HEC-RAS (version 3.1.3 – May 2005). While a complete topographical survey of the subject watercourse was initially anticipated, this could not be undertaken during the course of this study as we were not granted access to the subject properties. Consequently, the



cross-section and overbank data that were entered in the hydraulic model were generally established from the 2005, 1:2000 base mapping (produced from aerial photos dated September 2001) provided by the City of Ottawa, combined with information provided by Robinson Consultants Inc. (RCI).

For the portion of the drain that is located between Fortune Street and Perth Street, the surveyed information (for existing conditions) from an ongoing RCI study for the Arbuckle Drain was used to define the geometry of the main channel of the watercourse. For the portion of the drain that is located upstream of Perth Street, and for approximately 775 m, the proposed channel configuration in the RCI's Engineer's Report Van Gaal Municipal Drain report (July 2003) was used to define the geometry of the main channel of the watercourse in this area. As with the other portions of the drain, the overbanks of the watercourse were estimated from the available base mapping.

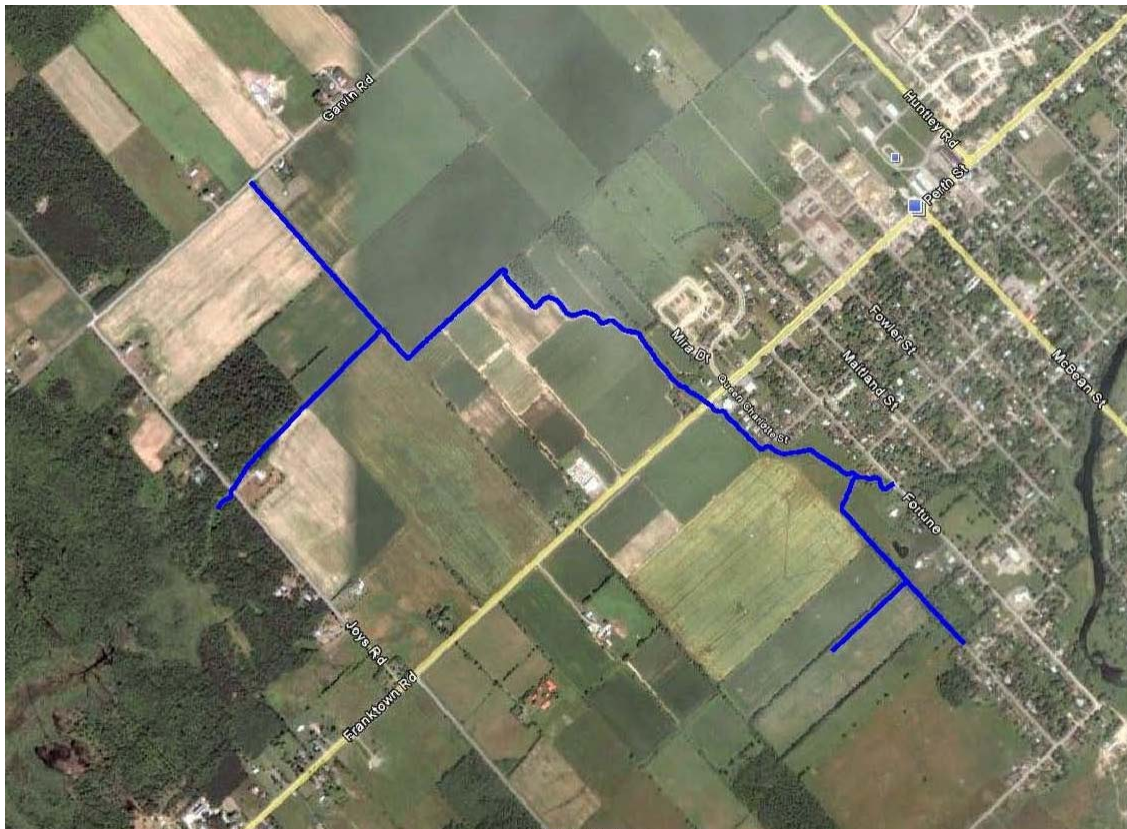


Figure 1: General Location of Subject Site and Watercourses for Flood Plain Mapping

2.0 BACKGROUND INFORMATION

A number of sources of background information were used in the preparation of this report including the RVCA, City of Ottawa and RCI and DSEL, via the City of Ottawa. A list of such information is provided below.

RVCA

- Jock River Flood Risk Mapping (within the City of Ottawa) Hydrology Report – July 2004 and Appendices (including Hydrology model inputs and outputs for Spring (Snowmelt +rainfall) events, and Summer events)
- Jock River Flood Risk Mapping (within the City of Ottawa) Hydraulics Report – November 2004 and Appendices (including Hydraulic model output for 2 year through 100 year storms and floodplain maps)
- Jock River HEC-RAS model
- Jock River SWMHYMO models
- Current flood lines along Jock River and its tributaries
- Richmond aerial photo
- Cedarstone Subdivision grading plans (by Capital Engineering Group – April 2000)
- Application under Ontario Reg. 174/06 for fill placement in a regulated area, lot 22, Concession 3, Goulbourn Township, now in City of Ottawa, dated May 11th 2009, in response to an application from Mattamy Homes.

City of Ottawa

- Culvert, bridges, stream crossing information
- Map showing areas requiring floodplain mapping
- Individual base maps 1:2000 – 0.5m contours
- Existing conditions storm drainage plan (prepared by DSEL)
- Van Gaal and Arbuckle SWMHYMO models and input parameters for Spring (snowmelt + rainfall) and Summer events (prepared by DSEL)
- Map showing proposed DSEL berm to be located to the West of the Arbuckle Drain

Robinson Consultants Inc.

- Richmond Master Drainage Plan Update – March 1998
- Engineer's Report Van Gaal Municipal Drain – July 2003
- Typical cross sections of Arbuckle Drain – October 2008

AECOM

- Survey of existing farming practices within the study area



3.0 HYDROLOGIC MODEL

3.1 Van Gaal and Arbuckle Drain Flows

3.1.1 DSEL Models

- City of Ottawa provided JFSA two hydrologic models (SWMHYMO) prepared by DSEL.
- The purpose of these models is to simulate design flows through the Van Gaal drain.
- The two models received include one using summer design storms (24 hr SCS and 4 hr Chicago) and one using spring rainfall plus ten day snow melt design storms.
- DSEL delineated the total catchment area into thirteen sub-catchments, three of which drain directly to the Jock River and the remaining ten via the Van Gaal drain. The total drainage area at the outlet of the drain to the Jock River was estimated at 1147 ha. This value is lower than the lumped drainage area of 1332 ha that was estimated in the Jock River Flood Risk Mapping Hydrology Report of July 2004.
- Based on our review of the detailed drainage area delineation evaluated by DSEL and provided by the City, we have concluded that the value of 1147 ha accurately represents the total drainage area to Arbuckle and Van Gaal Municipal Drains.

3.1.2 Selection of Design Parameters

- Input parameters, previously derived by DSEL, for the sub-catchments of each of the two hydrologic models – Spring rainfall + 10 day snowmelt and Summer rainfall, were reviewed and adjusted where necessary and where more detailed modeling was required. Checks were performed on overland flow lengths, CN values and T_p calculations. The determination of CN values also take into account a survey of farming practices provided by AECOM. The resulting SWMHYMO model drainage plan and model parameters are presented in Appendix B.
- Some of the differences between the spring and summer hydrologic models are;
 - The spring model makes use of increased CN values to reflect saturated and partially frozen soils,
 - The design storms used in the summer model include the 24 hour SCS as well as the 4 hour Chicago 2 year, 5 year and 100 year events, based on the City of Ottawa IDF curves,
 - The design events in the spring model uses 5 year and 100 year rainfall plus 10 day snowmelt based on Atmospheric Environment Services' (AES) Model 5 for Ottawa CAD. As per the Jock River Flood Risk Mapping Hydrology Report – July 2004, daily snowmelt + rain volumes were distributed, with a 12 hour sine wave function, to simulate the heating and cooling cycle that typically occurs during the Spring (see Appendix L for additional details),



- In the absence of measured flow data, design flows must be estimated with the use of synthetic storms. Recognized design storm events in Eastern Ontario include the SCS Type II 24 hour and Chicago design storms. The rationale for selection of design storms was also to provide consistency with the previous Jock River watershed model,
- In the Spring model, the Manning's roughness coefficients for the channel overbanks are set to 0.05 (instead of 0.08) to reflect the lack of standing vegetation during that time of the year,
- Weighted CN values were determined based on the percentage of land use area within each sub-catchment (see Appendix B),
- Simulated hydrographs were routed through channels of typical geometry between key locations. The SWMHYMO model schematic can be found in Appendix J.

3.1.3 Hydrologic Models Used

Various hydrologic models were used to determine the necessary flow data for use in the hydraulic modeling. These models include:

- Jock River spring and summer models prepared in 2004 for the Jock River Flood Risk Mapping project. These models were used to establish the timing of the Jock River peak flow at the outlet of the Van Gaal / Arbuckle Municipal Drains.
- Individual Van Gaal / Arbuckle Municipal Drain models for spring and summer conditions prepared for this report (see Appendix C for SWMHYMO model input and output files).
- Modified versions of the Jock River spring and summer models which include the simulated outflow hydrographs from the individual Van Gaal / Arbuckle Municipal Drain models.

3.1.4 Results of Simulated Flows

The results of the simulated summer and spring flows at the outlet of the Van Gaal / Arbuckle Municipal Drains are presented in Table 1.

The results of simulated flows showed that the 4 hour Chicago storms produced lower flows than the 24 hours SCS storms. For this reason, further analysis using the Chicago storms was not required.



TABLE 1	
COMPARISON OF SIMULATED PEAK FLOWS AT THE OUTLET OF THE VAN GAAL DRAIN TO THE JOCK RIVER	
SUMMER AND SPRING CONDITIONS (cms)	
DESIGN EVENT	JFSA
Summer 100 YR SCS	16.419
Summer 100 YR Chicago	13.433
Snowmelt+Rain 100 yr	15.777
Summer 5 YR SCS	8.110
Summer 5 YR Chicago	6.318
Snowmelt+Rain 5 yr	10.007
Summer 2 YR SCS	5.366
Summer 2 YR Chicago	4.022
Snowmelt+Rain 2 yr	7.883



3.2 Approach Taken in Determining Flows Required for Hydraulic Modeling

In order to determine the flows required for hydraulic modeling in this study, an approach was taken to investigate four scenarios, taking into account the timing of peak flows on the Van Gaal drain (VGD) and Jock River (JR). The four scenarios involve determining peak flows at specific locations at the time when:

1. The Van Gaal Drain 100 year summer peak flow reaches the Jock River
2. The Van Gaal Drain 100 year spring peak flow reaches the Jock River
3. The Jock River 100 year summer peak flow reaches the outlet of the Van Gaal Drain
4. The Jock River 100 year spring peak flow reaches the outlet of the Van Gaal Drain

A summary of these four scenarios including peak flows and time to peak on the Van Gaal Drain and Jock River is shown in Table 2.

TABLE 2				
SUMMARY OF FLOW SCENARIOS				
Scenario	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
Event Description	<i>VGD 100 Yr Summer Peak</i>	<i>VGD 100 Yr Spring Peak</i>	<i>JR 100 Yr Summer Peak at VGD Outlet</i>	<i>JR 100 Yr Spring Peak at VGD Outlet</i>
Time Since Beginning of Event (hrs)	16.00	113.50	60.00	122.00
Flow in VGD (cms)	16.42	15.78	0.00	4.37
Flow in JR (cms)	17.62	88.34	60.33	166.76

For each of these times to peak, hydrographs (see Appendices F through I) were analyzed for all cross sections indicated on Table 3. These flow combinations create the input flow data for the hydraulic analysis and used to determine maximum water surface elevations along the Van Gaal and Arbuckle Drains.

Peak flows on the Jock River were determined using a modified version of the Jock River SWMHYMO model provided by RVCA (from 2004 Jock River Flood Risk Mapping Hydrology report) with the exception of scenario 4. For scenarios 1, 2 and 3 the Jock River SWMHYMO model was adjusted to include new catchment area information for the Van Gaal drain determined in this study.

For scenario 4, 100 year peak flows on the Jock River were taken from those in the Jock River HEC-RAS model provided by RVCA, which corresponds to springtime –

observed/prorated flows determined in the 2004 Jock River Flood Risk Mapping Hydrology report. This information was not available for the other scenarios.

Through the calculations performed, it was found that Scenario 3 produced the lowest flows and resulting water levels across the Van Gaal drain. For this reason, further analysis of this scenario was not required.

The governing flow scenarios for cross sections along the drain are shown on Table 4.

It is noted that the approach taken in this study, to evaluate the 100 year flood elevations along the Van Gaal / Arbuckle Drains, differs from that taken in the previous floodplain mapping completed by PSR Group. Some of the main differences are that; i) the PSR Group HEC-RAS model extended to Fortune Street - in the current study the model is extended up to Garvin Road, ii) the flows in PSR Group HEC-RAS model on the Van Gaal/ Arbuckle Drains were assumed to be negligible when the Jock River water levels reached its 100 year peak, hence the flood elevation on the Van Gaal / Arbuckle Drains were similar to the 100 year water level of the Jock River up to Perth Street - in the current study, the timing of the 100 year peak flows on both water courses were considered to more accurately evaluate the 100 year water levels within the study area.

4.0 HYDRAULIC MODEL

- Maximum flood levels on portion of the Van Gaal / Arbuckle Municipal Drains will be influenced by flood levels on the Jock River and the greatest impact of these levels will be seen in the downstream sections closest to the River.
- Hydraulic simulations were done using the HEC-RAS software (version 3.1.3 – May 2005) to compute the 100 year water elevations to be plotted on the appropriate maps.

4.1 Base Mapping

- City of Ottawa has provided 1:2000 mapping with 0.5m contours for the majority of the area along the Van Gaal drain requiring flood plain mapping.
- The 1:2000 mapping that was not available was the area furthest upstream on the drain on the Northwest side Garvin Road (see Figure 2).



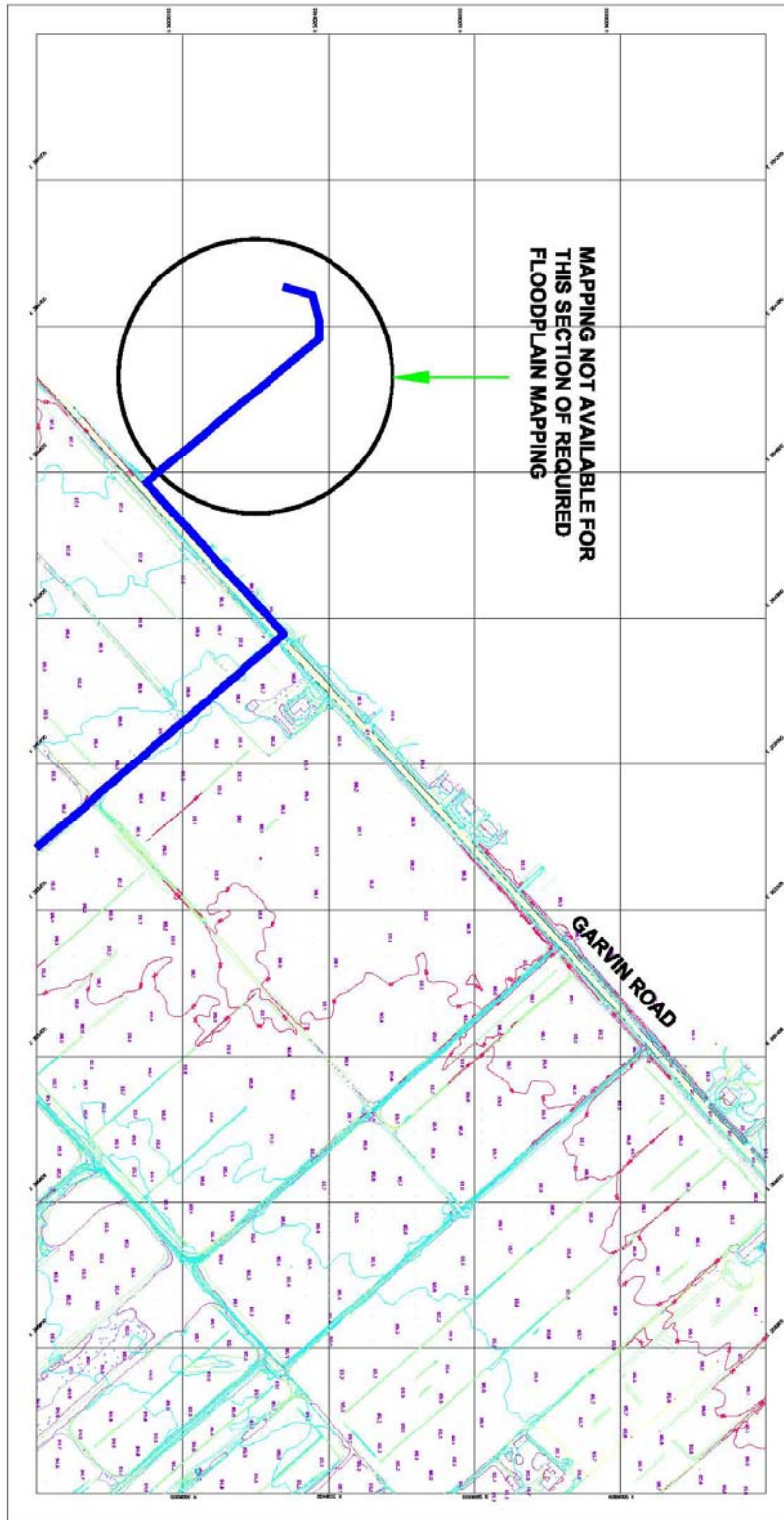


Figure 2: Limit of Base Mapping Information Available



4.2 Cross Sections

- The cross sections in the HEC-RAS model provided to us by RVCA (Jock –Lower Reach – March 2005) were unaltered (furthest upstream cross section provided on Van Gaal drain was 668 m upstream of the Jock River at Fortune Street), with the exception of cross sections 277 and 521. The channel bottom elevations were lowered at these cross sections to correspond with existing elevations indicated on 2008 drawings produced by Robinson Consultants for a separate study.
- New cross sections upstream of Fortune Street were developed using the 1:2000 mapping provided by the City of Ottawa.
- Field checks for channel and overbank (floodplain) elevations could not be completed for the majority of areas due to the denial of permission to enter private property along the drain, therefore the available 1:2000 mapping was heavily relied on.
- Cross sections were taken at locations of intervals not greater than 300m (but on average approximately 90m or less) and where there are significant changes in stream alignment.
- Manning’s n values, used to characterize the friction effect of the channel and overbank material on flow were estimated using Toronto Regional Conservation Authority’s “Standard Manning’s Roughness Coefficients for TRCA Watershed Hydraulic Modeling”. As such, a value of 0.035 was taken for all channel sections along the Van Gaal drain and 0.08 was chosen for the floodplain (pasture, agricultural, brush and forest) for summer conditions and 0.05 for spring conditions to reflect the lack of standing vegetation during that time of the year.
- Expansion and contraction coefficients of 0.1 and 0.3 respectively were used for all ‘new’ cross sections except at culvert locations where values of 0.3 and 0.5 were used.

4.2.1 Improvements to Cross Section Geometry

- Concerted effort was made to improve the accuracy of cross sectional geometry beyond what could be taken from 1:2000 mapping in the absence of being granted permission to undertake a complete topographical survey.
- Previous work in 2003 by Robinson Consultants (Engineer’s Report Van Gaal Municipal Drain – July 2003) provided topographical information for the portion of the drain from the culvert at Perth Street and upstream to the confluence of Van Gaal East and West Main drains with the Van Gaal West Tributaries (see Appendix A).
- The information used in this study from the 2003 report was the ‘proposed’ cross sections, as it was indicated by Robinson Consultants that the drain was inspected at the time of construction and it is anticipated that it is built to the specifications/proposed drawings within normal limitation. However, no ‘as-built’ survey was taken.



- Previous work in 2008 by Robinson Consultants provided topographical information along the Arbuckle Award Drain from the culvert at Perth Street downstream to the culvert at Fortune Street. The information used in this study from the 2008 report was the ‘existing’ topographical data. Proposed changes to the drain were not included in our analysis as it is our understanding that the proposed works from this report have not yet been constructed.
- For the 2008 report mentioned above, it has been indicated to JFSA by Robinson Consultants that there are limitations to the information provided. First, the drawings were not completed to the level required for mapping or floodplain assessment. The intended purpose involves a 2-5 year assessment required under the Drainage Act. The drainage scheme is interior to the floodplain (main channel) and may not be relevant in the definition of the perimeter of the floodplain. As well, the 2008 report has not yet received RVCA or Department of Fisheries and Oceans approval and therefore is considered preliminary in nature. It has been indicated that similar limitations exist for the 2003 report, although those works have already been constructed.
- Although there are limitations, JFSA has only adopted topographic information for the low flow channel, interior to the floodplain and used 1:2000 mapping to extend cross section lines to the outer boundary of the floodplain. The implementation of the information from these two Robinson Consultant reports has been discussed with and agreed upon for inclusion in this study by RVCA and the City of Ottawa.
- The use of this information has resulted in the overall lowering of low flow channel elevations along these sections of the drain when compared to just using 1:2000 mapping.
- RVCA has provided JFSA with a proposed plan by DSEL for the construction of a berm to the West of the Arbuckle Drain. The proposed geometry of this berm has been included in the JFSA cross sections for the hydraulic analysis.

4.3 Structures

- Field surveying was only completed on the Garvin Road cross culvert, the driveway culvert just upstream and Joy’s Road culvert.
- Information on the Perth Street culvert was obtained from a field survey completed by JD Barnes on 07/30/2008, from the July 2003 Robinson Consultants “Engineer’s Report Van Gaal Municipal Drain” and a field investigation by JFSA on November 19, 2009.
- A number of culverts along the drain that were shown on the 1:2000 mapping could not be entered into the HEC-RAS model due to the fact that detailed information (dimensions, material, etc.) was not available.
- Details of the structures considered for this study are shown in Appendix K.



4.4 Flow Combinations to Determine Maximum 100 Year Water Levels

To determine the worst case flood elevation at each cross section, the following flow scenarios, shown on Table 3, were run for the spring and summer storm events. The scenario numbers correspond to those described in Section 3.2.

TABLE 3					
HEC-RAS FLOW INPUT TABLE (cms)					
<i>River</i>	<i>Reach</i>	<i>River Station*</i>	SCENARIO**		
			<i>1</i>	<i>2</i>	<i>4</i>
Jock River	Reach 1	22026	5.540	167.682	156.00
Jock River	Reach 2	21359	5.773	74.628	161.76
Jock River	Reach 3	18677	17.624	88.341	166.76
Jock River	Reach 4	16872	15.385	85.979	181.76
Jock River	Reach 5	16112	16.168	143.467	180.00
Jock River	Reach 6	11769	10.864	153.565	185.00
Jock River	Reach 7	10144	8.741	152.939	196.00
Jock River	Reach 7	6550	9.652	189.823	201.00
Jock River	Reach 7	3699	5.067	211.402	205.00
Joys Road Trib	Reach 1	705	2.619	3.166	0.883
Moore Drain	Reach 1	298	2.172	2.132	0.322
Van Gaal Drain	Reach 3	3494	3.701	4.228	1.636
Van Gaal Drain	Reach 3	3322	4.021	4.588	1.651
Van Gaal Drain	Reach 3	3175	4.813	5.235	1.653
Van Gaal Drain	Reach 2	2554	7.272	8.316	2.857
Van Gaal Drain	Reach 2	2076	9.543	10.808	3.286
Van Gaal Drain	Reach 2	1340	11.434	11.619	3.426
Van Gaal Drain	Reach 2	1312	12.200	12.204	3.439
Van Gaal Drain	Reach 1	746	16.377	15.739	4.056
Van Gaal Drain	Reach 1	666	16.377	15.739	4.056
Van Gaal Drain	Reach 1	226	16.419	15.777	4.371

Note: * Refer to Appendix M for river station locations

**Scenario Descriptions:

1. The Van Gaal Drain 100 year summer peak flow reaches the Jock River
2. The Van Gaal Drain 100 year spring peak flow reaches the Jock River
4. The Jock River 100 year spring peak flow reaches the outlet of the Van Gaal Drain



4.5 Water Surface Elevation Summary

The following table summarizes the water surface elevations simulated in the hydraulic models using flow scenarios described in Section 3.2. The governing scenario and corresponding maximum water surface elevations are used to generate the floodplain area. HEC-RAS profiles and cross sections are located in Appendix D and E.

TABLE 4 SIMULATED MAXIMUM WATER ELEVATIONS ON VAN GAAL AND ARBUCKLE DRAINS (m)							
<i>River</i>	<i>Reach</i>	<i>River Station*</i>	SCENARIO**			<i>Governing Scenario #</i>	<i>Maximum WL</i>
			<i>1</i>	<i>2</i>	<i>4</i>		
Van Gaal Drain	Reach 3	3165	96.75	96.74	96.55	1	96.75
Van Gaal Drain	Reach 3	3149	96.72	96.71	96.51	1	96.72
Van Gaal Drain	Reach 3	3086	96.64	96.63	96.40	1	96.64
Van Gaal Drain	Reach 3	3016	96.61	96.59	96.33	1	96.61
Van Gaal Drain	Reach 3	2980	96.57	96.56	96.28	1	96.57
Van Gaal Drain	Reach 3	2851	96.41	96.42	96.03	2	96.42
Van Gaal Drain	Reach 3	2808	96.38	96.39	96.01	2	96.39
Van Gaal Drain	Reach 3	2658	96.28	96.29	95.95	2	96.29
Van Gaal Drain	Reach 2	2554	96.27	96.28	95.94	2	96.28
Van Gaal Drain	Reach 2	2478	96.16	96.15	95.88	1	96.16
Van Gaal Drain	Reach 2	2157	95.47	95.48	95.03	2	95.48
Van Gaal Drain	Reach 2	2076	95.26	95.27	94.84	2	95.27
Van Gaal Drain	Reach 2	1974	95.10	95.11	94.73	2	95.11
Van Gaal Drain	Reach 2	1922	94.99	94.99	94.68	2	94.99
Van Gaal Drain	Reach 2	1833	94.85	94.85	94.62	2	94.85
Van Gaal Drain	Reach 2	1796	94.80	94.81	94.59	2	94.81
Van Gaal Drain	Reach 2	1735	94.71	94.72	94.57	2	94.72
Van Gaal Drain	Reach 2	1728	94.69	94.69	94.56	2	94.69
Van Gaal Drain	Reach 2	1727 Farm Culvert	-	-	-	-	-
Van Gaal Drain	Reach 2	1717	94.69	94.69	94.31	2	94.69
Van Gaal Drain	Reach 2	1615	94.60	94.61	94.24	2	94.61
Van Gaal Drain	Reach 2	1555	94.53	94.55	94.21	2	94.55
Van Gaal Drain	Reach 2	1488	94.45	94.45	94.18	2	94.45
Van Gaal Drain	Reach 2	1416	94.39	94.41	94.14	2	94.41

Note: * Refer to Appendix M for river station locations

**Scenario Descriptions:

1. The Van Gaal Drain 100 year summer peak flow reaches the Jock River
2. The Van Gaal Drain 100 year spring peak flow reaches the Jock River
4. The Jock River 100 year spring peak flow reaches the outlet of the Van Gaal Drain



TABLE 4 SIMULATED MAXIMUM WATER ELEVATIONS ON VAN GAAL AND ARBUCKLE DRAINS (m)							
<i>River</i>	<i>Reach</i>	<i>River Station*</i>	SCENARIO**			<i>Governing Scenario #</i>	<i>Maximum WL</i>
			<i>1</i>	<i>2</i>	<i>4</i>		
Van Gaal Drain	Reach 2	1400	94.36	94.36	94.14	2	94.36
Van Gaal Drain	Reach 2	1364	94.31	94.29	94.13	1	94.31
Van Gaal Drain	Reach 2	1340	94.21	94.19	94.13	1	94.21
Van Gaal Drain	Reach 2	1339 Perth St. Culvert	-	-	-	-	-
Van Gaal Drain	Reach 2	1312	94.13	94.12	94.12	1	94.13
Van Gaal Drain	Reach 2	1302	94.15	94.14	94.12	1	94.15
Van Gaal Drain	Reach 2	1268	94.14	94.13	94.12	1	94.14
Van Gaal Drain	Reach 2	1212	94.10	94.11	94.12	4	94.12
Van Gaal Drain	Reach 2	1169	94.04	94.08	94.12	4	94.12
Van Gaal Drain	Reach 2	1091	93.97	94.04	94.12	4	94.12
Van Gaal Drain	Reach 2	1002	93.92	94.02	94.12	4	94.12
Van Gaal Drain	Reach 2	961	93.92	94.02	94.11	4	94.11
Van Gaal Drain	Reach 2	910	93.91	94.02	94.11	4	94.11
Van Gaal Drain	Reach 2	840	93.91	94.02	94.11	4	94.11
Van Gaal Drain	Reach 1	746	93.90	94.01	94.11	4	94.11
Van Gaal Drain	Reach 1	705	93.89	94.01	94.11	4	94.11
Van Gaal Drain	Reach 1	668	93.84	93.99	94.11	4	94.11
Van Gaal Drain	Reach 1	666	93.32	93.68	94.10	4	94.10
Van Gaal Drain	Reach 1	656 Fortune St. Culvert	-	-	-	-	-
Moore Drain	Reach 1	298	93.90	94.02	94.11	4	94.11
Moore Drain	Reach 1	130	93.91	94.02	94.11	4	94.11

Note: * Refer to Appendix M for river station locations

**Scenario Descriptions:

1. The Van Gaal Drain 100 year summer peak flow reaches the Jock River
2. The Van Gaal Drain 100 year spring peak flow reaches the Jock River
4. The Jock River 100 year spring peak flow reaches the outlet of the Van Gaal Drain



TABLE 4							
SIMULATED MAXIMUM WATER ELEVATIONS ON VAN GAAL AND ARBUCKLE DRAINS (m)							
<i>River</i>	<i>Reach</i>	<i>River Station*</i>	SCENARIO**			<i>Governing Scenario #</i>	<i>Maximum WL</i>
			<i>1</i>	<i>2</i>	<i>4</i>		
Joys Road Trib	Reach 1	705	97.59	97.79	97.10	2	97.79
Joys Road Trib	Reach 1	664	97.60	97.79	97.04	2	97.79
Joys Road Trib	Reach 1	635	97.50	97.67	97.00	2	97.67
Joys Road Trib	Reach 1	634 Joys Rd Culvert	-	-	-	-	-
Joys Road Trib	Reach 1	622	97.21	97.26	96.96	2	97.26
Joys Road Trib	Reach 1	602	97.21	97.27	96.95	2	97.27
Joys Road Trib	Reach 1	322	96.65	96.71	96.45	2	96.71
Joys Road Trib	Reach 1	275	96.50	96.56	96.20	2	96.56
Joys Road Trib	Reach 1	30	96.29	96.29	95.95	2	96.29

Note: * Refer to Appendix M for river station locations

**Scenario Descriptions:

1. The Van Gaal Drain 100 year summer peak flow reaches the Jock River
2. The Van Gaal Drain 100 year spring peak flow reaches the Jock River
4. The Jock River 100 year spring peak flow reaches the outlet of the Van Gaal Drain

The results from Table 4 indicate that the governing scenario for the cross sections between 3165 (at Garvin Road) and 1268 (approximately 70 m downstream of Perth Street) is either the Van Gaal peak summer event (Scenario 1) or the Van Gaal peak spring event (Scenario 2). The simulated water levels for these two scenarios in this area are very similar and within 0.02 m of each other.

The governing scenario for cross sections between 1212 and 656 (Fortune Street) is the Jock River Spring event during which the Jock River is simulated to back up into the Van Gaal drain.



4.5.1 Sensitivity Analysis

Hydrologic models, such as SWMHYMO (used for the Jock River and Van Gaal Drain), require numerous input data, which initially must be approximated from various sources of information (eg. watershed maps, soil maps, topographic maps, farming practices, aerial photos, etc.). These approximations can inherently introduce some uncertainty in the model results. Improved results can be achieved when measured rainfall and flow data are available and model parameters can be calibrated. As this was not available for the current analysis, a variability of +/- 20% in the simulated 100 year design flows was considered to investigate the sensitivity of HEC-RAS computed water levels along the Van Gaal and Arbuckle Drains. A table of the resulting governing water surface elevations is presented in Appendix N.

The results of this analysis can be summarized as follows:

- For an increase in design flow of 20%, the change in governing water levels along the drain is a rise up to a maximum of 0.26 m noted just upstream of the Joys Road culvert (approximately 630 m South East from Garvin Road).
- For a decrease in design flow of 20%, the change in governing water levels along the drain is a drop up to a maximum of 0.37 m noted again at the upstream side of the Joys Road culvert.
- For the area between Perth Street and approximately 740 m upstream, the change in water level under a 20% increase in flow is between 0.03 m and 0.15 m and for a 20% decrease in flow the change is between -0.01 m and -0.17 m.
- For the area between Perth Street and Fortune Street, the change in water level under a 20% increase in flow is between 0 m and 0.13 m and for a 20% decrease in flow the change is between 0 m and -0.04 m.
- For an estimate of the lands which may be affected most significantly by a 20% increase or decrease in flow estimate, please refer to Appendix N.



References

1. Toronto Regional Conservation Authority - Standard Manning's Roughness Coefficients for TRCA Watershed Hydraulic Modeling
2. Jock River Flood Risk Mapping (within the City of Ottawa) Hydraulics Report – November 2004 by PSR Group Ltd and JF Sabourin and Associates Inc.
3. Jock River Flood Risk Mapping (within the City of Ottawa) Hydrology Report – July 2004 by PSR Group Ltd and JF Sabourin and Associates Inc.
4. Richmond Master Drainage Plan Update – Robinson Consultants March 1998
5. Engineer's Report Van Gaal Municipal Drain – Robinson Consultants July 2003
6. Typical Cross Sections – Arbuckle Drain – Robinson Consultants October 2008
7. HEC-RAS Hydraulic Reference Manual – USACE 2005



APPENDIX A

Richmond Floodplain Mapping Required

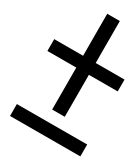
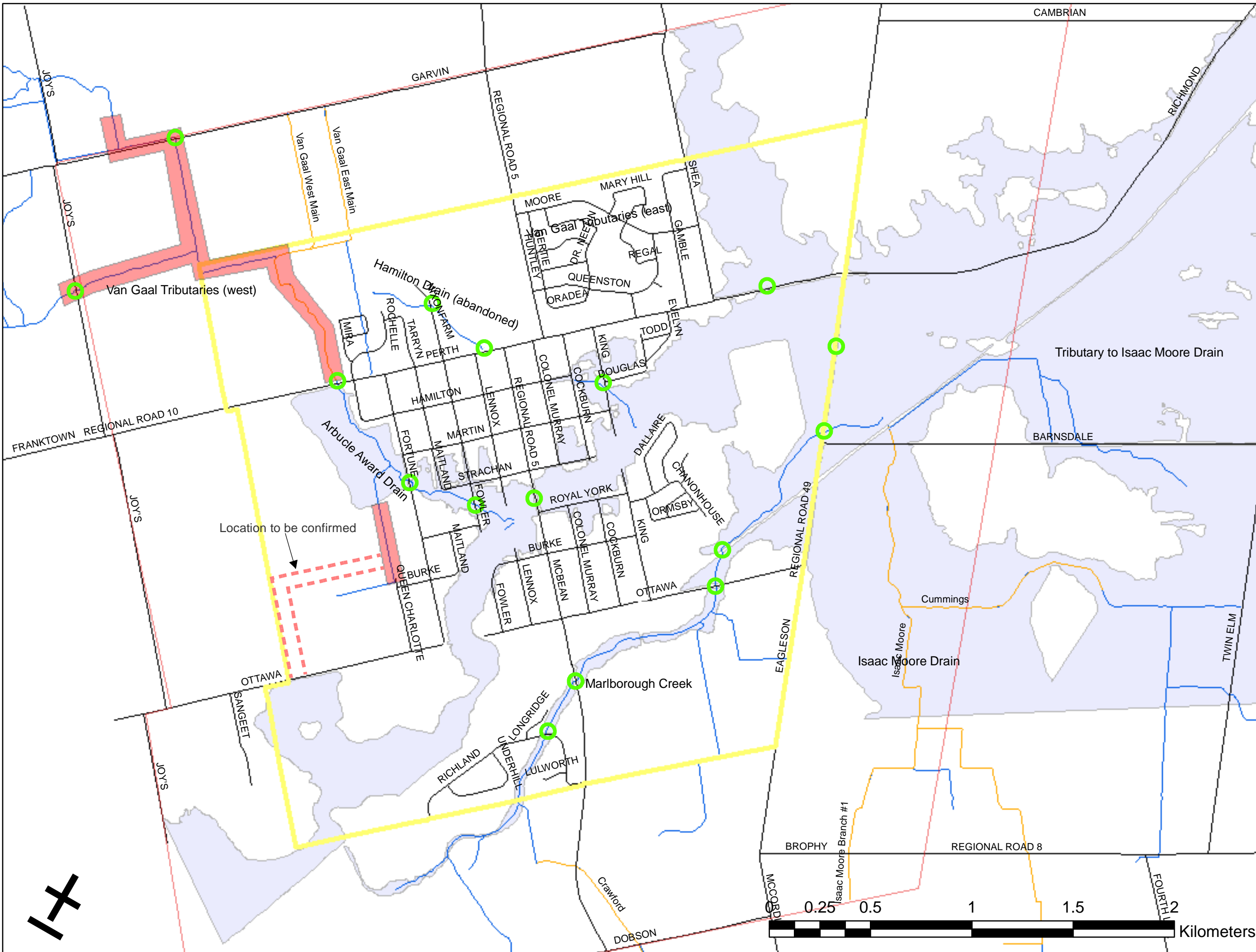




Richmond Floodplain Mapping

Legend

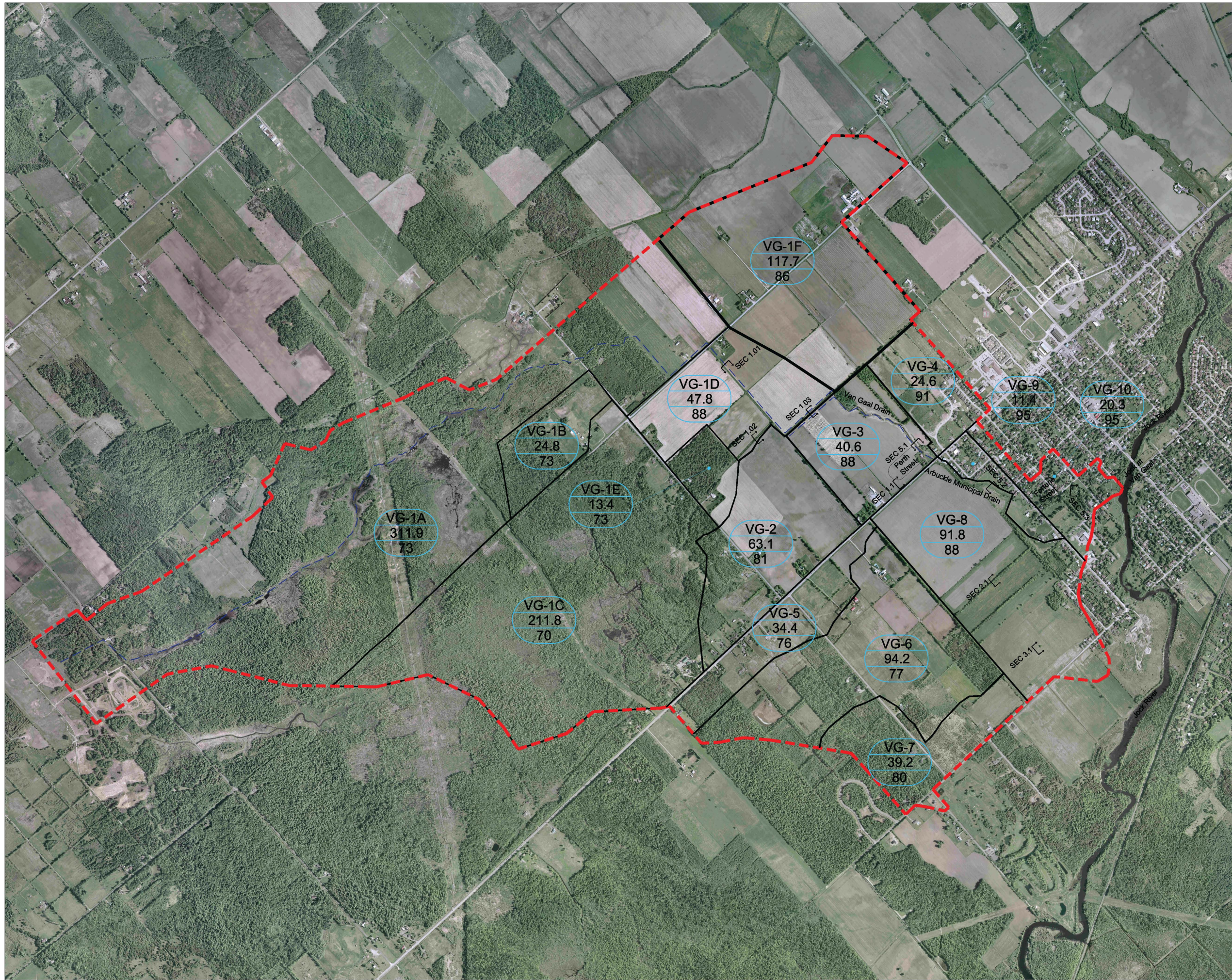
- Location_to_be_confirmed
- Watercourse Crossings
- Areas Requiring Floodplain Mapping
- Village Boundary
- Study Area
- Roads
- Municipal Drains
- Watercourses
- FloodPlains



APPENDIX B

JFSA Drainage Plan and SWMHYMO Input Parameters





LEGEND :

- VG-1C**
211.8
70 SUBCATCHMENT NAME
AREA (ha)
CN(SUMMER)
- SUB-CATCHMENT LIMITS
- CATCHMENT LIMITS
- ↙ SWMHYMO ROUTE CHANNEL LOCATION AND ID



J.F. Sabourin & Associates Inc.
WATER RESOURCES AND ENVIRONMENTAL CONSULTANTS
OTTAWA (613) 836-3884
GATINEAU (819) 243-6858

CLIENT :
RIDEAU VALLEY CONSERVATION AUTHORITY
3889 RIDEAU VALLEY DRIVE
MANTICK, ONTARIO, K4M 1A5
(613) 692-3571

PROJECT :
RICHMOND FLOODPLAIN MAPPING

No.	BY	DATE	DESCRIPTION	BY
1	BW	27/11/2009	REVISED AS PER RVCA COMMENTS	BW
1	BW	05/06/2009	ISSUED FOR REVIEW	BW

TITLE :
STORM DRAINAGE PLAN

DRAWING REF.	DESIGNED:	
	DRAWN:	BW
	VERIFIED:	JFS
	APPROVED:	JFS
	DATE	PROJECT No.
	NOV/09	709(08)

CALIB NASHYD Input Parameters

Area ID	VG-1A	VG-1B	VG-1C	VG-1D	VG-1E	VG-1F	VG-2	VG-3	VG-5	VG-6	VG-7	VG-8
A (ha)	311.9	24.8	211.8	47.8	13.4	117.7	63.1	40.6	34.4	94.2	39.2	91.8
CN (-)	73	73	70	88	73	86	81	88	76	77	80	88
la	3.9	4.0	3.9	2.5	4.0	2.6	2.8	2.5	3.0	2.9	3.5	2.6
Tp (hrs)	5.3	2.7	4.7	1.8	0.6	2.9	1.6	1.6	2.3	3.2	2.9	2.1

Assumptions:

- 1) Refer to Appendix B for subcatchment descritization and detailed CN value calculations
- 2) Assuming antecedent Moisture Conditions II.
- 3) Based on 2003 City of Ottawa aerial photographs and survey of farming practices provided by AECOM, land cover is generally corn, alfalfa, soy/grain, hay and wooded with summer CN values of 88, 85, 84, 71 and 73 (70 under good hydrologic condition)
- 4) Initial abstraction values range from 2.5 to 4.0 mm.
- 5) Where subdrainage area has combined land cover the CN parameter was calculated on a weighted average of land area cover.
- 6) Time to peak calculated based on $T_p = 0.67T_c$.
- 7) Since land use is primarily agricultural the SCS lag equation was used to determine T_p .

Area ID	VG-1A	VG-1B	VG-1C	VG-1D	VG-1E	VG-1F	VG-2	VG-3	VG-5	VG-6	VG-7	VG-8
L (m)	4545	1710	2220	1335	335	1815	1220	1060	1540	1990	1520	1480
S (%)	0.5	0.4	0.2	0.2	0.5	0.2	0.4	0.2	0.4	0.3	0.2	0.2
Tc (min)	479.7	245.3	424.9	161.7	57.5	263.7	147.6	146.3	207.1	285.1	256.9	191.1

$$t_c = \frac{100L^{0.8} \left[\left(\frac{1000}{CN} \right) - 9 \right]^{0.7}}{1900S^{0.5}}$$

L, length in ft
 CN, SCS runoff curve number
 S, average watershed slope in (%)

LAND USE AREAS (HA) AND WEIGHTED CN FOR INPUT INTO CALIB NASHYD							
AREA ID	Weighted CN	CORN (CN=88)	ALFALFA (CN=85)	SOY/GRAIN (CN=84)	HAY (CN=71)	WOODED (CN=73/70) ¹⁾	TOTAL
VG-1A	73	10.2	-	-	19.7	282.0	311.9
VG-1B	73	-	-	-	-	24.8	24.8
VG-1C	70	-	-	-	-	211.8	211.8
VG-1D	88	47.8	-	-	-	-	47.8
VG-1E	73	2.9	-	-	-	10.5	13.4
VG-1F	86	81.2	14.1	10.6	11.8	-	117.7
VG-2	81	37.9	-	-	6.3	18.9	63.1
VG-3	88	40.6	-	-	-	-	40.6
VG-5	76	-	-	12.4	15.2	6.9	34.4
VG-6	77	-	-	41.3	23.0	29.9	94.2
VG-7	80	16.7	-	-	-	22.5	39.2
VG-8	88	91.8	-	-	-	-	91.8

NOTES: ¹⁾ Two CN values for Wooded areas represents good hydrologic conditions (CN=70) and poor hydrologic conditions (CN=73)

APPENDIX C

JFSA SWMHYMO Inputs and Outputs

sum6JFSA.dat: JFSA input file for summer flows

sum6JFSA.sum: JFSA summary output file for summer flows

spr7JFSA.dat: JFSA summary input file for spring rainfall+snow melt

spr7JFSA.sum: JFSA summary output file for spring rainfall+snow melt



```

00001> 2      Metric units
00002> *#*****
00003> *# SWMHYMO Ver:5.02/Jan 2001 <BETA> / INPUT DATA FILE
00004> *#*****
00005> *# Project Name: [Richmond FPM]      Project Number: [709]
00006> *# Date       : 04-21-2009
00007> *# Revised    : 05-27-2009; 07-22-2009; 08-06-2009; 08-31-2009; 11-16-2009
00008> *# Modeller   : [Bryan Willcott B.Eng.]
00009> *# Company    : J.F. Sabourin and Associates
00010> *# License #   : 3410370
00011> *#*****
00012>
00013> *#*****
00014> *# [BW] May 27, 2009
00015> *# This model has been updated using revised values for Tp. Previous versions
00016> *# of this model used a calculated Tp=0.6Tc. This model used a calculated
00017> *# Tp=0.6Tc.
00018> *#*****
00019> *# [BW] July 22, 2009
00020> *# This model has been revised to include "existing" cross section information
00021> *# received from Robinson Consultants. The Cross section revised in the model
00022> *# is Sec 5.2 (channel receiving flow from "arbucks"). Also, channel and
00023> *# floodplain slopes for ROUTE CHANNEL commands were updated to be equal
00024> *#*****
00025> *# [BW] August 6, 2009
00026> *# This model has been revised to include cross section information
00027> *# from Robinson Consultants Engineer's Report July 2003. The cross
00028> *# section revised in the model is Sec 5.1. Cross sections Sec 1.03
00029> *# and Sec 5.3 have also been revised
00030> *#*****
00031> *# [BW] August 31, 2009
00032> *# Model updated to include the proposed DSEL berm. This affects the geometry
00033> *# of Route Channel Sect 5.2 located on the Arbuckle drain. Route Channels 5.2
00034> *# and 1.03 have also been revised to reduce the number of values in the
00035> *# x-y matrix.
00036> *#*****
00037> *# [BW] November 16, 2009
00038> *# Model updated to include revised CN and Tp values subsequent to review of
00039> *# memo received from AECOM on Oct. 2, 2009
00040> *#*****
00041> *#
00042> *# 25mm 4HR Chicago Storm
00043> *# START          TZERO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[001]
00044> *#                ["4HR-25mm.stm"]
00045> *#-----|
00046> *# READ STORM     STORM_FILENAME=["STORM.001"]
00047> *#-----|
00048> *#*****
00049> *# Van Gaal / Arbuckle Drain
00050> *#*****
00051> *# DSEL SUBCATCHMENT VG-1 HAS BEEN BROKEN INTO 6 SUB-AREAS (BW)
00052> *#*****
00053> *#-----|
00054> *# CALIB NASHYD  ID=[1], NHYD=["VG-1A"], DT=[5]min, AREA=[311.9](ha),
00055> *#                DWF=[0](cms), CN/C=[73], IA=[3.9](mm),
00056> *#                N=[3], TP=[5.3]hrs,
00057> *#                RAINFALL=[ , , , ](mm/hr), END=-1
00058> *#-----|
00059> *# SAVE HYD      ID=[1], # OF PCYCLES=[-1], ICASEsh=[1]
00060> *#                HYD_COMMENT=["VG-1A"]
00061> *#-----|
00062> *#*****
00063> *# Tp FOR VG-1B HAS BEEN REVISED TO REFLECT A HYDRAULIC LENGTH OF 1710 m, A
00064> *# LENGTH THAT INCLUDES DISTANCE TO THE VG1-1 CONFLUENCE IN ADDITION TO THE
00065> *# LONGEST FLOW PATH WITHIN VG-1B. THIS IS DONE TO SIMULATE CHANNEL ROUTING
00066> *#*****
00067> *# CALIB NASHYD  ID=[2], NHYD=["VG-1B"], DT=[5]min, AREA=[24.8](ha),
00068> *#                DWF=[0](cms), CN/C=[73], IA=[4.0](mm),
00069> *#                N=[3], TP=[2.7]hrs,
00070> *#                RAINFALL=[ , , , ](mm/hr), END=-1
00071> *#-----|

```

```

00072> *#*****
00073> *# VG1-1 IS THE SUM OF FLOWS TO THE CONFLUENCE OF NORTHERN MOST WATERCOURSE IN
00074> *# OUR AREA OF STUDY WITH THE ROADSIDE DITCH ON GARVIN ROAD
00075> *#*****
00076> *#
00077> *# ADD HYD        IDsum=[3], NHYD=["VG1-1"], IDs to add=[1 2]
00078> *#-----|
00079> *# SAVE HYD      ID=[3], # OF PCYCLES=[-1], ICASEsh=[1]
00080> *#                HYD_COMMENT=["VG1-1"]
00081> *#-----|
00082> *# CALIB NASHYD  ID=[4], NHYD=["VG-1D"], DT=[5]min, AREA=[47.8](ha),
00083> *#                DWF=[0](cms), CN/C=[88], IA=[2.5](mm),
00084> *#                N=[3], TP=[1.8]hrs,
00085> *#                RAINFALL=[ , , , ](mm/hr), END=-1
00086> *#-----|
00087> *#*****
00088> *# VG1-2 IS THE SUM OF FLOWS AT THE GARVIN ROAD CROSS CULVERT AND
00089> *# CONSERVATIVELY INCLUDES THE AREA VG-1D, WHICH IS LOCATED JUST DOWNSTREAM
00090> *# OF THE CULVERT
00091> *#*****
00092> *#
00093> *# ADD HYD        IDsum=[5], NHYD=["VG1-2"], IDs to add=[3 4]
00094> *#-----|
00095> *# SAVE HYD      ID=[5], # OF PCYCLES=[-1], ICASEsh=[1]
00096> *#                HYD_COMMENT=["VG1-2"]
00097> *#-----|
00098> *# ROUTE CHANNEL IDout=[6], NHYD=["VG1R-2"], IDin=[5],
00099> *#                RDT=[5](min),
00100> *#                CHLGT=[865](m), CHSLOPE=[0.15](%),
00101> *#                FPSLOPE=[0.15](%),
00102> *#                SECNUM=[1.01], NSEG=[3]
00103> *#                ( SEGROUGH, SEGDIST (m))=[0.08,51.41 -0.035,55.58 0.08,228.3
00104> *#                ( DISTANCE (m), ELEVATION (m))=[0, 96.719]
00105> *#                [22.98, 96.598]
00106> *#                [42.45, 96.66]
00107> *#                [47.63, 96.5]
00108> *#                [49.64, 96.424]
00109> *#                [51.41, 96]
00110> *#                [53.36, 95.79]
00111> *#                [55.58, 95.887]
00112> *#                [57.42, 96.242]
00113> *#                [87.69, 96.5]
00114> *#                [119.62, 96.509]
00115> *#                [140.1, 96.601]
00116> *#                [179.39, 96.722]
00117> *#                [200.6, 96.89]
00118> *#                [228.39, 97]
00119> *#-----|
00120> *# CALIB NASHYD  ID=[7], NHYD=["VG-1C"], DT=[5]min, AREA=[211.8](ha),
00121> *#                DWF=[0](cms), CN/C=[70], IA=[3.9](mm),
00122> *#                N=[3], TP=[4.7]hrs,
00123> *#                RAINFALL=[ , , , ](mm/hr), END=-1
00124> *#-----|
00125> *# CALIB NASHYD  ID=[8], NHYD=["VG-1E"], DT=[5]min, AREA=[13.4](ha),
00126> *#                DWF=[0](cms), CN/C=[73], IA=[4.0](mm),
00127> *#                N=[3], TP=[0.64]hrs,
00128> *#                RAINFALL=[ , , , ](mm/hr), END=-1
00129> *#-----|
00130> *#*****
00131> *# VG1-3 IS THE SUM OF FLOWS TO JOY'S ROAD CROSS CULVERT AND CONSERVATIVELY
00132> *# INCLUDES THE AREA VG-1E, WHICH IS LOCATED JUST DOWNSTREAM OF THE CULVERT
00133> *#*****
00134> *#
00135> *# ADD HYD        IDsum=[9], NHYD=["VG1-3"], IDs to add=[7 8]
00136> *#-----|
00137> *# SAVE HYD      ID=[9], # OF PCYCLES=[-1], ICASEsh=[1]
00138> *#                HYD_COMMENT=["VG1-3"]
00139> *#-----|
00140> *# ROUTE CHANNEL IDout=[10], NHYD=["VG1R-3"], IDin=[9],
00141> *#                RDT=[5](min),
00142> *#                CHLGT=[630](m), CHSLOPE=[0.20](%),

```

```

00143>                                FPSLOPE=[0.20](%),
00144> SECNUM=[1.02], NSEGE=[3]
00145> ( SEGROUGH, SEGDIST (m))=[0.08,80.53 -0.035,82.4 0.08,124.53
00146> ( DISTANCE (m), ELEVATION (m))=[0 97
00147>                                0.61 97.01
00148>                                3.8 97.03
00149>                                17.49 97.18
00150>                                19.18 97.17
00151>                                26.62 97.15
00152>                                46.29 97.12
00153>                                73.97 97.17
00154>                                76.3 97.04
00155>                                77.53 97
00156>                                80.53 96.86
00157>                                81.38 96.5
00158>                                82.4 96.07
00159>                                87.91 96.07
00160>                                89.65 96.5
00161>                                90.75 96.78
00162>                                91.88 96.91
00163>                                96.2 97
00164>                                99.01 97.1
00165>                                119.73 97.14
00166>                                124.53 97]
00167> *%-----|-----|
00168> *#*****|-----|
00169> *# VG1-4 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE WATERCOURSE FROM JOY'S
00170> *# ROAD WITH THE MAIN DRAIN
00171> *#*****|-----|
00172> *#
00173> ADD HYD IDsum=[1], NHYD=["VG1-4"], IDs to add=[6 10]
00174> *%-----|-----|
00175> SAVE HYD ID=[1], # OF PCYCLES=[-1], ICASEsh=[1]
00176> HYD_COMMENT=["VG1-4"]
00177> *%-----|-----|
00178> ROUTE CHANNEL IDout=[2], NHYD=["VG1R-4"], IDin=[1],
00179> RDT=[5](min),
00180> CHLGT=[485](m), CHSLOPE=[0.20](%),
00181> FPSLOPE=[0.20](%),
00182> SECNUM=[1.03], NSEGE=[3]
00183> ( SEGROUGH, SEGDIST (m))=[0.08,44.17 -0.035,53.58 0.08,243.3
00184> ( DISTANCE (m), ELEVATION (m))=
00185> [-44.2, 95.7
00186> 0, 95.5
00187> 19.69, 95.421
00188> 27.91, 95.5
00189> 31.73, 95.5
00190> 32.29, 95.325
00191> 32.71, 95.5
00192> 41.04, 95.5
00193> 44.17, 95.449
00194> 45.63, 95.389
00195> 48.22, 95
00196> 48.54, 94.882
00197> 49.35, 94.5
00198> 49.64, 94.311
00199> 50.46, 94.497
00200> 52.21, 94.993
00201> 53.58, 95.406
00202> 55.08, 95.333
00203> 55.94, 95.157
00204> 76.35, 95.275
00205> 131, 95.403
00206> 213.2, 95.5
00207> 243.3, 95.8]
00208> *%-----|-----|
00209> CALIB NASHYD ID=[3], NHYD=["VG-1F"], DT=[5]min, AREA=[117.7](ha),
00210> DWF=[0](cms), CN/C=[86], IA=[2.6](mm),
00211> N=[3], TP=[2.9]hrs,
00212> RAINFALL=[, , , , ](mm/hr), END=-1
00213> *%-----|-----|

```

```

00214> *#*****|-----|
00215> *# VG1 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE VAN GAAL WEST MAIN DRAIN
00216> *# WITH VAN GAAL WEST TRIBUTARY
00217> *#*****|-----|
00218> *#
00219> ADD HYD IDsum=[4], NHYD=["VG1"], IDs to add=[2 3]
00220> *%-----|-----|
00221> SAVE HYD ID=[4], # OF PCYCLES=[-1], ICASEsh=[1]
00222> HYD_COMMENT=["VG1"]
00223> *%-----|-----|
00224> ROUTE CHANNEL IDout=[5], NHYD=["VGR2-1"], IDin=[4],
00225> RDT=[5](min),
00226> CHLGT=[755](m), CHSLOPE=[0.2](%),
00227> FPSLOPE=[0.2](%),
00228> SECNUM=[5.1], NSEGE=[3]
00229> ( SEGROUGH, SEGDIST (m))=[0.08,98.046 -0.035,105.496 0.08,51
00230> ( DISTANCE (m), ELEVATION (m))=[0, 96.11
00231> 20, 94.4
00232> 26.106, 94.5
00233> 41.686, 94.465
00234> 63.506, 94.427
00235> 84.666, 94.492
00236> 95.476, 94.363
00237> 97.736, 94
00238> 98.046, 93.967
00239> 100.336, 92.8193
00240> 101.536, 92.8193
00241> 102.736, 92.8193
00242> 105.496, 94.199
00243> 127.006, 94.345
00244> 142.116, 94.5
00245> 148.376, 94.568
00246> 478.406, 94.7
00247> 518.306, 95]
00248> *%-----|-----|
00249> CALIB NASHYD ID=[6], NHYD=["VG-2"], DT=[5]min, AREA=[63.1](ha),
00250> DWF=[0](cms), CN/C=[81], IA=[2.8](mm),
00251> N=[3], TP=[1.6]hrs,
00252> RAINFALL=[, , , , ](mm/hr), END=-1
00253> *%-----|-----|
00254> ROUTE CHANNEL IDout=[7], NHYD=["PerN"], IDin=[6],
00255> RDT=[5](min),
00256> CHLGT=[550](m), CHSLOPE=[0.2](%),
00257> FPSLOPE=[0.2](%),
00258> SECNUM=[1.1], NSEGE=[3]
00259> ( SEGROUGH, SEGDIST (m))=[0.08,70 -0.035,72 0.08,77] NSEGE ti
00260> ( DISTANCE (m), ELEVATION (m))=[0, 94.4]
00261> [70, 94.0]
00262> [71, 93.5]
00263> [72, 94.0]
00264> [77, 94.4]
00265> *%-----|-----|
00266> CALIB NASHYD ID=[8], NHYD=["VG-3"], DT=[5]min, AREA=[40.6](ha),
00267> DWF=[0](cms), CN/C=[88], IA=[2.5](mm),
00268> N=[3], TP=[1.6]hrs,
00269> RAINFALL=[, , , , ](mm/hr), END=-1
00270> *%-----|-----|
00271> CALIB STANDHYD ID=[9], NHYD=["VG-4"], DT=[5](min), AREA=[24.6](ha),
00272> XIMP=[0.4], TIMP=[0.5], DWF=[0](cms), LOSS=[1],
00273> Horton: Fo=[76.20](mm/hr), Fc=[13.20](mm/hr),
00274> DCAY=[4.14](/hr), F=[0](mm),
00275> Pervious surfaces: IAper=[1.5](mm), SLPP=[1.5](%),
00276> LGP=[35](m), MNP=[0.250], SCP=[0](min),
00277> Impervious surfaces: IAimp=[0.8](mm), SLPI=[0.3](%),
00278> LGI=[1000](m), MNI=[0.013], SCI=[0](min
00279> RAINFALL=[, , , , ](mm/hr), END=-1
00280> *%-----|-----|
00281> ADD HYD IDsum=[1], NHYD=["perthst"], IDs to add=[5 7 8 9]
00282> *%-----|-----|
00283> SAVE HYD ID=[1], # OF PCYCLES=[-1], ICASEsh=[1]
00284> HYD_COMMENT=["perthst"]

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```

00285> *%-----|-----|
00286> CALIB NASHYD ID=[2], NHYD=["VG-5"], DT=[5]min, AREA=[34.4](ha),
00287> DWF=[0](cms), CN/C=[76], IA=[3.0](mm),
00288> N=[3], TP=[2.3]hrs,
00289> RAINFALL=[ , , , ](mm/hr), END=-1
00290> *%-----|-----|
00291> ROUTE CHANNEL IDout=[3], NHYD=["PerS"], IDin=[2],
00292> RDT=[5](min),
00293> CHLGTH=[550](m), CHSLOPE=[0.2](%),
00294> FPSLOPE=[0.2](%),
00295> SECNUM=[1.1], NSEG=[3]
00296> ( SEGROUGH, SEGDIST (m))=[0.08,70 -0.035,72 0.08,77] NSEG ti
00297> ( DISTANCE (m), ELEVATION (m))=[0, 94.4]
00298> [70, 94.0]
00299> [71, 93.5]
00300> [72, 94.0]
00301> [77, 94.4]
00302> *%-----|-----|
00303> ADD HYD IDsum=[2], NHYD=["arbuck"], IDs to add=[1 3]
00304> *%-----|-----|
00305> SAVE HYD ID=[2], # OF PCYCLES=[-1], ICASEsh=[1]
00306> HYD_COMMENT=["arbuck"]
00307> *%-----|-----|
00308> ROUTE CHANNEL IDout=[9], NHYD=["VGR2-2"], IDin=[2],
00309> RDT=[5](min),
00310> CHLGTH=[520](m), CHSLOPE=[0.15](%),
00311> FPSLOPE=[0.15](%),
00312> SECNUM=[5.2], NSEG=[3]
00313> ( SEGROUGH, SEGDIST (m))=[0.08,65.27 -0.035,72.03 0.08,317.3]
00314> ( DISTANCE (m), ELEVATION (m))=
00315> [1.87 94
00316> 3.26 93.815
00317> 25.32 93.589
00318> 40.32 93.586
00319> 53.15 93.49
00320> 65.27 92.99
00321> 67.31 92.06
00322> 69.39 91.93
00323> 69.99 92.03
00324> 70.75 92.68
00325> 72.03 93
00326> 78.14 93
00327> 87.57 92.828
00328> 98.82 93
00329> 131.96 93.341
00330> 152.55 93.318
00331> 220.7 93.525
00332> 262.64 93.983
00333> 274.22 94
00334> 286.88 94
00335> 297.86 93.981
00336> 314.39 94.09
00337> 317.39, 95.09]
00338> *%-----|-----|
00339> CALIB NASHYD ID=[1], NHYD=["VG-6"], DT=[5]min, AREA=[94.2](ha),
00340> DWF=[0](cms), CN/C=[77], IA=[2.9](mm),
00341> N=[3], TP=[3.2]hrs,
00342> RAINFALL=[ , , , ](mm/hr), END=-1
00343> *%-----|-----|
00344> ROUTE CHANNEL IDout=[2], NHYD=["VG-6"], IDin=[1],
00345> RDT=[5](min),
00346> CHLGTH=[600](m), CHSLOPE=[0.18](%),
00347> FPSLOPE=[0.18](%),
00348> SECNUM=[2.1], NSEG=[3]
00349> ( SEGROUGH, SEGDIST (m))=[0.08,700 -0.035,703 0.08,1000] NSE
00350> ( DISTANCE (m), ELEVATION (m))=[0, 94.6]
00351> [700, 94.5]
00352> [701.4, 94.1]
00353> [701.6, 94.1]
00354> [703, 94.5]
00355> [1000, 95.1]

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```

00356> *%-----|-----|
00357> SAVE HYD ID=[2], # OF PCYCLES=[-1], ICASEsh=[1]
00358> HYD_COMMENT=["VG-6"]
00359> *%-----|-----|
00360> CALIB NASHYD ID=[3], NHYD=["VG-7"], DT=[5]min, AREA=[39.2](ha),
00361> DWF=[0](cms), CN/C=[80], IA=[3.5](mm),
00362> N=[3], TP=[2.9]hrs,
00363> RAINFALL=[ , , , ](mm/hr), END=-1
00364> *%-----|-----|
00365> SAVE HYD ID=[3], # OF PCYCLES=[-1], ICASEsh=[1]
00366> HYD_COMMENT=["VG-7"]
00367> *%-----|-----|
00368> ROUTE CHANNEL IDout=[4], NHYD=["VG-7"], IDin=[3],
00369> RDT=[5](min),
00370> CHLGTH=[1480](m), CHSLOPE=[0.2](%),
00371> FPSLOPE=[0.2](%),
00372> SECNUM=[3.1], NSEG=[3]
00373> ( SEGROUGH, SEGDIST (m))=[0.08,50 -0.035,52 0.08,102] NSEG t
00374> ( DISTANCE (m), ELEVATION (m))=[0,95.2]
00375> [50,95.0]
00376> [51,94.5]
00377> [52,95.0]
00378> [102,95.2]
00379> *%-----|-----|
00380> ADD HYD IDsum=[5], NHYD=["Moore"], IDs to add=[2 4](maximum ten)
00381> *%-----|-----|
00382> SAVE HYD ID=[5], # OF PCYCLES=[-1], ICASEsh=[1]
00383> HYD_COMMENT=["Moore"]
00384> *%-----|-----|
00385> CALIB NASHYD ID=[5], NHYD=["VG-8"], DT=[5]min, AREA=[91.8](ha),
00386> DWF=[0](cms), CN/C=[88], IA=[2.6](mm),
00387> N=[3], TP=[2.1]hrs,
00388> RAINFALL=[ , , , ](mm/hr), END=-1
00389> *%-----|-----|
00390> CALIB STANDHYD ID=[6], NHYD=["VG-9"], DT=[5](min), AREA=[11.4](ha),
00391> XIMP=[0.4], TIMP=[0.5], DWF=[0](cms), LOSS=[1],
00392> Horton: Fo=[76.20](mm/hr), Fc=[13.20](mm/hr),
00393> DCAy=[4.14](/hr), F=[0](mm),
00394> Pervious surfaces: Iaper=[1.5](mm), SLPP=[1.5](%),
00395> LGP=[50](m), MNP=[0.250], SCP=[0](min),
00396> Impervious surfaces: IAimp=[0.8](mm), SLPI=[0.3](%),
00397> LGI=[530](m), MNI=[0.013], SCI=[0](min)
00398> RAINFALL=[ , , , ](mm/hr), END=-1
00399> *%-----|-----|
00400> ADD HYD IDsum=[1], NHYD=["Fortune"], IDs to add=[2 4 5 6 9]
00401> *%-----|-----|
00402> SAVE HYD ID=[1], # OF PCYCLES=[-1], ICASEsh=[1]
00403> HYD_COMMENT=["Fortune"]
00404> *%-----|-----|
00405> ROUTE CHANNEL IDout=[3], NHYD=["VGR2-3"], IDin=[1],
00406> RDT=[5](min),
00407> CHLGTH=[750](m), CHSLOPE=[0.2](%),
00408> FPSLOPE=[0.2](%),
00409> SECNUM=[5.3], NSEG=[3]
00410> ( SEGROUGH, SEGDIST (m))=[0.05,3.22 -0.035,47.84 0.05,77.80]
00411> ( DISTANCE (m), ELEVATION (m))=[0, 93.5]
00412> 3.22, 93
00413> 20.87, 92.5
00414> 42.19, 92
00415> 47.84, 92
00416> 48.60, 92.5
00417> 50.14, 93
00418> 72.67, 93.526
00419> 77.80, 93.5]
00420> *%-----|-----|
00421> CALIB STANDHYD ID=[2], NHYD=["VG-10"], DT=[5](min), AREA=[20.3](ha),
00422> XIMP=[0.4], TIMP=[0.5], DWF=[0](cms), LOSS=[1],
00423> Horton: Fo=[76.20](mm/hr), Fc=[13.20](mm/hr),
00424> DCAy=[4.14](/hr), F=[0](mm),
00425> Pervious surfaces: Iaper=[1.5](mm), SLPP=[1.5](%),
00426> LGP=[50](m), MNP=[0.250], SCP=[0](min),

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00427> Impervious surfaces: IAimp=[0.8](mm), SLPI=[0.3](%),
00428> LGI=[560](m), MNI=[0.013], SCI=[0](min)
00429> RAINFALL=[ , , , ](mm/hr) , END=-1
00430> *%-----|-----|
00431> ADD HYD IDsum=[9], NHYD=["JockVG"], IDs to add=[2 3]
00432> *%-----|-----|
00433> SAVE HYD ID=[9], # OF PCYCLES=[-1], ICASEsh=[1]
00434> HYD_COMMENT=["Flow from Van Gaal Drain at Jock River"]
00435> *%-----|-----|
00436> *% 2 year 24 Hour SCS Type II Storm used in Jock River Model
00437> START TZERO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[002]
00438> ["SC24002x.stm"]
00439> *%-----|-----|
00440> *% 5 year 24 Hour SCS Type II Storm used in Jock River Model
00441> START TZERO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[005]
00442> ["SC24005x.stm"]
00443> *%-----|-----|
00444> *% 100 year 24 Hour SCS Type II Storm used in Jock River Model
00445> START TZERO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[100]
00446> ["SC24100x.stm"]
00447> *%-----|-----|
00448> *% 4 hour - 2 year Chicago Storm
00449> START TZERO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[102]
00450> ["CH4H002x.stm"]
00451> *%-----|-----|
00452> *% 4 hour - 5 year Chicago Storm
00453> START TZERO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[105]
00454> ["CH4H005x.stm"]
00455> *%-----|-----|
00456> *% 4 hour - 100 year Chicago Storm
00457> START TZERO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[199]
00458> ["CH4H100x.stm"]
00459> *%-----|-----|
00460> FINISH
00461>
00462>
00463>
00464>
00465>
```



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00001> =====
00002>
00003> SSSSS W W M M H H Y Y M M OOO 999 999 =====
00004> S W W W MM MM H H Y Y MM MM O O 9 9 9 9
00005> SSSSS W W W M M M HHHH Y M M M O O ## 9 9 9 9 Ver5 Beta
00006> S W W M M H H Y M M O O 9999 9999 Sept 2000
00007> SSSSS W W M M H H Y M M OOO 9 9 9 =====
00008>
00009> StormWater Management HYdrologic Model 999 999 =====
00010>
00011> *****
00012> ***** SWMHYMO Ver/5 Beta *****
00013> ***** A single event and continuous hydrologic simulation model *****
00014> ***** based on the principles of HYMO and its successors *****
00015> ***** OTTHYMO-83 and OTTHYMO-89. *****
00016> *****
00017> ***** Distributed by: J.F. Sabourin and Associates Inc. *****
00018> ***** Ottawa, Ontario: (613) 727-5199 *****
00019> ***** Gatineau, Quebec: (819) 243-6858 *****
00020> ***** E-Mail: swmhymo@jfsa.Com *****
00021> *****
00022>
00023> ++++++
00024> ++++++ Licensed user: JFSaInc Ottawa ++++++
00025> ++++++ Ottawa SERIAL#:3410370 ++++++
00026> ++++++
00027>
00028> *****
00029> ***** ++++++ PROGRAM ARRAY DIMENSIONS ++++++ *****
00030> ***** Maximum value for ID numbers : 10 *****
00031> ***** Max. number of rainfall points: 52750 *****
00032> ***** Max. number of flow points : 52750 *****
00033> *****
00034>
00035> *** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) ***
00036> ***-----***
00037> *** ID: Hydrograph IDentification numbers, (1-10). ***
00038> *** NHYD: Hydrograph reference numbers, (6 digits or characters). ***
00039> *** AREA: Drainage area associated with hydrograph, (ac.) or (ha.). ***
00040> *** QPEAK: Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s). ***
00041> *** TpeakDate_hh:mm is the date and time of the peak flow. ***
00042> *** R.V.: Runoff Volume of simulated hydrograph, (in) or (mm). ***
00043> *** R.C.: Runoff Coefficient of simulated hydrograph, (ratio). ***
00044> *** *: see WARNING or NOTE message printed at end of run. ***
00045> *** **: see ERROR message printed at end of run. ***
00046> *****
00047> *****
00048>
00049> ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
00050>
00051> *****
00052>
00053> ***** SUMMARY OUTPUT *****
00054> *****
00055> * DATE: 2009-11-25 TIME: 18:46:27 RUN COUNTER: 001266 *
00056> *****
00057> * Input filename: Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\sum6JFSA.D*
00058> * Output filename: Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\sum6JFSA.o*
00059> * Summary filename: Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\sum6JFSA.s*
00060> * User comments: *
00061> * 1: *
00062> * 2: *
00063> * 3: *
00064> *****
00065>
00066>
00067> #*****
00068> # SWMHYMO Ver:5.02/Jan 2001 <BETA> / INPUT DATA FILE
00069> #*****
00070> # Project Name: [Richmond FPM] Project Number: [709]
00071> # Date : 04-21-2009

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00072> # Revised : 05-27-2009; 07-22-2009; 08-06-2009; 08-31-2009; 11-16-2009
00073> # Modeller : [Bryan Willcott B.Eng.]
00074> # Company : J.F. Sabourin and Associates
00075> # License # : 3410370
00076> #*****
00077> #*****
00078> # [BW] May 27, 2009
00079> # This model has been updated using revised values for Tp. Previous versions
00080> # of this model used a calculated Tp=0.6Tc. This model used a calculated
00081> # Tp=0.67Tc.
00082> #*****
00083> # [BW] July 22, 2009
00084> # This model has been revised to include "existing" cross section information
00085> # received from Robinson Consultants. The Cross section revised in the model
00086> # is Sec 5.2 (channel receiving flow from "arbuck"). Also, channel and
00087> # floodplain slopes for ROUTE CHANNEL commands were updated to be equal
00088> #*****
00089> # [BW] August 6, 2009
00090> # This model has been revised to include cross section information
00091> # from Robinson Consultants Engineer's Report July 2003. The cross
00092> # section revised in the model is Sec 5.1. Cross sections Sec 1.03
00093> # and Sec 5.3 have also been revised
00094> #*****
00095> # [BW] August 31, 2009
00096> # Model updated to include the proposed DSEL berm. This affects the geometry
00097> # of Route Channel Sect 5.2 located on the Arbuckle drain. Route Channels 5.2
00098> # and 1.03 have also been revised to reduce the number of values in the
00099> # x-y matrix.
00100> #*****
00101> # [BW] November 16, 2009
00102> # Model updated to include revised CN and Tp values subsequent to review of
00103> # memo received from AECOM on Oct. 2, 2009
00104> #*****
00105> #
00106> RUN:COMMAND#
00107> 001:0001-----
00108> START
00109> [TZERO = .00 hrs on 0]
00110> [METOUT= 2 (1=imperial, 2=metric output)]
00111> [NSTORM= 1 ]
00112> [NRUN = 1 ]
00113> 001:0002-----
00114> READ STORM
00115> Filename = STORM.001
00116> Comment = 25 mm Storm 4 Hours step 10 min, City of Ottawa
00117> [SDT=10.00:SDUR= 4.00:PTOT= 33.89]
00118> #*****
00119> # Van Gaal / Arbuckle Drain
00120> #*****
00121> # DSEL SUBCATCHMENT VG-1 HAS BEEN BROKEN INTO 6 SUB-AREAS (BW)
00122> #*****
00123> 001:0003-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00124> CALIB NASHYD 01:VG-1A 311.90 .631 No_date 7:15 7.26 .214
00125> [CN= 73.0: N= 3.00]
00126> [Tp= 5.30:DT= 5.00]
00127> 001:0004-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00128> SAVE HYD 01:VG-1A 311.90 .631 No_date 7:15 7.26 n/a
00129> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-1A.001
00130> remark:VG-1A
00131> #*****
00132> # Tp FOR VG-1B HAS BEEN REVISED TO REFLECT A HYDRAULIC LENGTH OF 1710 m, A
00133> # LENGTH THAT INCLUDES DISTANCE TO THE VG1-1 CONFLUENCE IN ADDITION TO THE
00134> # LONGEST FLOW PATH WITHIN VG-1B. THIS IS DONE TO SIMULATE CHANNEL ROUTING
00135> #*****
00136>
00137> 001:0005-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00138> CALIB NASHYD 02:VG-1B 24.80 .091 No_date 4:45 7.21 .213
00139> [CN= 73.0: N= 3.00]
00140> [Tp= 2.70:DT= 5.00]
00141> #*****
00141> # VG1-1 IS THE SUM OF FLOWS TO THE CONFLUENCE OF NORTHERN MOST WATERCOURSE IN
00142> # OUR AREA OF STUDY WITH THE ROADSIDE DITCH ON GARVIN ROAD

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00143> #*****
00144> #
00145> 001:0006-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00146>   ADD HYD          01:VG-1A  311.90   .631 No_date  7:15  7.26 n/a
00147>         + 02:VG-1B  24.80   .091 No_date  4:45  7.21 n/a
00148>         [DT= 5.00] SUM= 03:VG1-1  336.70   .689 No_date  6:50  7.25 n/a
00149> 001:0007-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00150>   SAVE HYD          03:VG1-1  336.70   .689 No_date  6:50  7.25 n/a
00151>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-1.001
00152>   remark:VG1-1
00153> 001:0008-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00154>   CALIB NASHYD      04:VG-1D  47.80   .502 No_date  3:35  14.92 .440
00155>   [CN= 88.0: N= 3.00]
00156>   [Tp= 1.80:DT= 5.00]
00157> #*****
00158> # VGL-2 IS THE SUM OF FLOWS AT THE GARVIN ROAD CROSS CULVERT AND
00159> # CONSERVATIVELY INCLUDES THE AREA VG-1D, WHICH IS LOCATED JUST DOWNSTREAM
00160> # OF THE CULVERT
00161> #*****
00162> #
00163> 001:0009-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00164>   ADD HYD          03:VG1-1  336.70   .689 No_date  6:50  7.25 n/a
00165>         + 04:VG-1D  47.80   .502 No_date  3:35  14.92 n/a
00166>         [DT= 5.00] SUM= 05:VG1-2  384.50   .966 No_date  4:45  8.21 n/a
00167> 001:0010-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00168>   SAVE HYD          05:VG1-2  384.50   .966 No_date  4:45  8.21 n/a
00169>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-2.001
00170>   remark:VG1-2
00171> 001:0011-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00172>   ROUTE CHANNEL    -> 05:VG1-2  384.50   .966 No_date  4:45  8.21 n/a
00173>   [RDT= 5.00] out<- 06:VG1R-2  384.50   .948 No_date  5:20  8.21 n/a
00174>   [L/S/n= 865./ .150/.035]
00175>   {Vmax= .473:Dmax= .452}
00176> 001:0012-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00177>   CALIB NASHYD      07:VG-1C  211.80   .428 No_date  6:40  6.48 .191
00178>   [CN= 70.0: N= 3.00]
00179>   [Tp= 4.70:DT= 5.00]
00180> 001:0013-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00181>   CALIB NASHYD      08:VG-1E  13.40   .138 No_date  2:10  7.21 .213
00182>   [CN= 73.0: N= 3.00]
00183>   [Tp= .64:DT= 5.00]
00184> #*****
00185> # VGL-3 IS THE SUM OF FLOWS TO JOY'S ROAD CROSS CULVERT AND CONSERVATIVELY
00186> # INCLUDES THE AREA VG-1E, WHICH IS LOCATED JUST DOWNSTREAM OF THE CULVERT
00187> #*****
00188> #
00189> 001:0014-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00190>   ADD HYD          07:VG-1C  211.80   .428 No_date  6:40  6.48 n/a
00191>         + 08:VG-1E  13.40   .138 No_date  2:10  7.21 n/a
00192>         [DT= 5.00] SUM= 09:VG1-3  225.20   .428 No_date  6:40  6.52 n/a
00193> 001:0015-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00194>   SAVE HYD          09:VG1-3  225.20   .428 No_date  6:40  6.52 n/a
00195>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-3.001
00196>   remark:VG1-3
00197> 001:0016-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00198>   ROUTE CHANNEL    -> 09:VG1-3  225.20   .428 No_date  6:40  6.52 n/a
00199>   [RDT= 5.00] out<- 10:VG1R-3  225.20   .422 No_date  7:05  6.52 n/a
00200>   [L/S/n= 630./ .200/.035]
00201>   {Vmax= .232:Dmax= .285}
00202> #*****
00203> # VGL-4 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE WATERCOURSE FROM JOY'S
00204> # ROAD WITH THE MAIN DRAIN
00205> #*****
00206> #
00207> 001:0017-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00208>   ADD HYD          06:VG1R-2  384.50   .948 No_date  5:20  8.21 n/a
00209>         + 10:VG1R-3  225.20   .422 No_date  7:05  6.52 n/a
00210>         [DT= 5.00] SUM= 01:VG1-4  609.70   1.325 No_date  5:50  7.58 n/a
00211> 001:0018-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00212>   SAVE HYD          01:VG1-4  609.70   1.325 No_date  5:50  7.58 n/a
00213>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-4.001

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00214>   remark:VG1-4
00215> 001:0019-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00216>   ROUTE CHANNEL    -> 01:VG1-4  609.70   1.325 No_date  5:50  7.58 n/a
00217>   [RDT= 5.00] out<- 02:VG1R-4  609.70   1.322 No_date  6:00  7.58 n/a
00218>   [L/S/n= 485./ .200/.035]
00219>   {Vmax= .637:Dmax= .830}
00220> 001:0020-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00221>   CALIB NASHYD      03:VG-1F  117.70   .766 No_date  4:50  13.48 .398
00222>   [CN= 86.0: N= 3.00]
00223>   [Tp= 2.90:DT= 5.00]
00224> #*****
00225> # VGL1 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE VAN GAAL WEST MAIN DRAIN
00226> # WITH VAN GAAL WEST TRIBUTARY
00227> #*****
00228> #
00229> 001:0021-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00230>   ADD HYD          02:VG1R-4  609.70   1.322 No_date  6:00  7.58 n/a
00231>         + 03:VG-1F  117.70   .766 No_date  4:50  13.48 n/a
00232>         [DT= 5.00] SUM= 04:VG1  727.40   2.037 No_date  5:25  8.54 n/a
00233> 001:0022-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00234>   SAVE HYD          04:VG1  727.40   2.037 No_date  5:25  8.54 n/a
00235>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1.001
00236>   remark:VG1
00237> 001:0023-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00238>   ROUTE CHANNEL    -> 04:VG1  727.40   2.037 No_date  5:25  8.54 n/a
00239>   [RDT= 5.00] out<- 05:VGR2-1  727.40   2.030 No_date  5:35  8.54 n/a
00240>   [L/S/n= 755./ .200/.035]
00241>   {Vmax= .779:Dmax= .691}
00242> 001:0024-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00243>   CALIB NASHYD      06:VG-2  63.10   .512 No_date  3:20  10.66 .315
00244>   [CN= 81.0: N= 3.00]
00245>   [Tp= 1.60:DT= 5.00]
00246> 001:0025-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00247>   ROUTE CHANNEL    -> 06:VG-2  63.10   .512 No_date  3:20  10.66 n/a
00248>   [RDT= 5.00] out<- 07:PerN  63.10   .474 No_date  4:15  10.66 n/a
00249>   [L/S/n= 550./ .200/.035]
00250>   {Vmax= .289:Dmax= .606}
00251> 001:0026-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00252>   CALIB NASHYD      08:VG-3  40.60   .466 No_date  3:20  14.92 .440
00253>   [CN= 88.0: N= 3.00]
00254>   [Tp= 1.60:DT= 5.00]
00255> 001:0027-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00256>   CALIB STANDHYD   09:VG-4  24.60   1.122 No_date  1:35  17.49 .516
00257>   [XIMP= 40:TIMP= 50]
00258>   {Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14: F= .00]
00259>   {Pervious area: Iaper= 1.50:SLPP=1.50:LGP= 35.:MNP=.250:SCP= .0]
00260>   {Impervious area: Iaimp= .80:SLPI= .30:LGI=1000.:MNI=.013:SCI= .0]
00261> 001:0028-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00262>   ADD HYD          05:VGR2-1  727.40   2.030 No_date  5:35  8.54 n/a
00263>         + 07:PerN  63.10   .474 No_date  4:15  10.66 n/a
00264>         + 08:VG-3  40.60   .466 No_date  3:20  14.92 n/a
00265>         + 09:VG-4  24.60   1.122 No_date  1:35  17.49 n/a
00266>         [DT= 5.00] SUM= 01:perths  855.70  2.723 No_date  4:50  9.26 n/a
00267> 001:0029-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00268>   SAVE HYD          01:perths  855.70  2.723 No_date  4:50  9.26 n/a
00269>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-perths.001
00270>   remark:perthst
00271> 001:0030-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00272>   CALIB NASHYD      02:VG-5  34.40   .172 No_date  4:15  8.59 .253
00273>   [CN= 76.0: N= 3.00]
00274>   [Tp= 2.30:DT= 5.00]
00275> 001:0031-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00276>   ROUTE CHANNEL    -> 02:VG-5  34.40   .172 No_date  4:15  8.59 n/a
00277>   [RDT= 5.00] out<- 03:PerS  34.40   .169 No_date  4:35  8.59 n/a
00278>   [L/S/n= 550./ .200/.035]
00279>   {Vmax= .434:Dmax= .443}
00280> 001:0032-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00281>   ADD HYD          01:perths  855.70  2.723 No_date  4:50  9.26 n/a
00282>         + 03:PerS  34.40   .169 No_date  4:35  8.59 n/a
00283>         [DT= 5.00] SUM= 02:arback  890.10  2.890 No_date  4:45  9.23 n/a
00284> 001:0033-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.

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00285> SAVE HYD 02:arbuck 890.10 2.890 No_date 4:45 9.23 n/a
00286> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-arbuck.001
00287> remark:arbuck
00288> 001:0034-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00289> ROUTE CHANNEL -> 02:arbuck 890.10 2.890 No_date 4:45 9.23 n/a
00290> [RDT= 5.00] out<- 09:VGR2-2 890.10 2.863 No_date 5:10 9.23 n/a
00291> [L/S/n= 520./ .150/.035]
00292> {Vmax= .684:Dmax= .977}
00293> 001:0035-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00294> CALIB NASHYD 01:VG-6 94.20 .375 No_date 5:10 8.99 .265
00295> [CN= 77.0: N= 3.00]
00296> [Tp= 3.20:DT= 5.00]
00297> 001:0036-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00298> ROUTE CHANNEL -> 01:VG-6 94.20 .375 No_date 5:10 8.99 n/a
00299> [RDT= 5.00] out<- 02:VG-6 94.20 .356 No_date 7:10 8.99 n/a
00300> [L/S/n= 600./ .180/.035]
00301> {Vmax= .166:Dmax= .416}
00302> 001:0037-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00303> SAVE HYD 02:VG-6 94.20 .356 No_date 7:10 8.99 n/a
00304> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-6.001
00305> remark:VG-6
00306> 001:0038-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00307> CALIB NASHYD 03:VG-7 39.20 .186 No_date 4:50 9.84 .290
00308> [CN= 80.0: N= 3.00]
00309> [Tp= 2.90:DT= 5.00]
00310> 001:0039-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00311> SAVE HYD 03:VG-7 39.20 .186 No_date 4:50 9.84 n/a
00312> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-7.001
00313> remark:VG-7
00314> 001:0040-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00315> ROUTE CHANNEL -> 03:VG-7 39.20 .186 No_date 4:50 9.84 n/a
00316> [RDT= 5.00] out<- 04:VG-7 39.20 .172 No_date 5:40 9.84 n/a
00317> [L/S/n= 1480./ .200/.035]
00318> {Vmax= .443:Dmax= .457}
00319> 001:0041-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00320> ADD HYD 02:VG-6 94.20 .356 No_date 7:10 8.99 n/a
00321> + 04:VG-7 39.20 .172 No_date 5:40 9.84 n/a
00322> [DT= 5.00] SUM= 05:Moore 133.40 .510 No_date 6:35 9.24 n/a
00323> 001:0042-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00324> SAVE HYD 05:Moore 133.40 .510 No_date 6:35 9.24 n/a
00325> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-Moore.001
00326> remark:Moore
00327> 001:0043-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00328> CALIB NASHYD 05:VG-8 91.80 .853 No_date 4:00 14.85 .438
00329> [CN= 88.0: N= 3.00]
00330> [Tp= 2.10:DT= 5.00]
00331> 001:0044-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00332> CALIB STANDHYD 06:VG-9 11.40 .667 No_date 1:25 17.49 .516
00333> [XIMP=.40:TIMP=.50]
00334> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14: F= .00]
00335> [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 50.:MNP=.250:SCP= .0]
00336> [Impervious area: IAimp= .80:SLPI= .30:LGI= 530.:MNI=.013:SCI= .0]
00337> 001:0045-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00338> ADD HYD 02:VG-6 94.20 .356 No_date 7:10 8.99 n/a
00339> + 04:VG-7 39.20 .172 No_date 5:40 9.84 n/a
00340> + 05:VG-8 91.80 .853 No_date 4:00 14.85 n/a
00341> + 06:VG-9 11.40 .667 No_date 1:25 17.49 n/a
00342> + 09:VGR2-2 890.10 2.863 No_date 5:10 9.23 n/a
00343> [DT= 5.00] SUM= 01:Fortun 1126.70 4.068 No_date 4:50 9.77 n/a
00344> 001:0046-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00345> SAVE HYD 01:Fortun 1126.70 4.068 No_date 4:50 9.77 n/a
00346> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-Fortun.001
00347> remark:Fortune
00348> 001:0047-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00349> ROUTE CHANNEL -> 01:Fortun 1126.70 4.068 No_date 4:50 9.77 n/a
00350> [RDT= 5.00] out<- 03:VGR2-3 1126.70 4.021 No_date 5:10 9.77 n/a
00351> [L/S/n= 750./ .200/.035]
00352> {Vmax= .545:Dmax= .465}
00353> 001:0048-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00354> CALIB STANDHYD 02:VG-10 20.30 1.172 No_date 1:25 17.49 .516
00355> [XIMP=.40:TIMP=.50]

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00356> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14: F= .00]
00357> [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 50.:MNP=.250:SCP= .0]
00358> [Impervious area: IAimp= .80:SLPI= .30:LGI= 560.:MNI=.013:SCI= .0]
00359> 001:0049-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00360> ADD HYD 02:VG-10 20.30 1.172 No_date 1:25 17.49 n/a
00361> + 03:VGR2-3 1126.70 4.021 No_date 5:10 9.77 n/a
00362> [DT= 5.00] SUM= 09:JockVG 1147.00 4.022 No_date 5:10 9.91 n/a
00363> 001:0050-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00364> SAVE HYD 09:JockVG 1147.00 4.022 No_date 5:10 9.91 n/a
00365> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-JockVG.001
00366> remark:Flow from Van Gaal Drain at Jock River
00367> ** END OF RUN : 1
00368>
00369> *****
00370>
00371>
00372>
00373>
00374>
00375> RUN:COMMAND#
00376> 002:0001-----
00377> START
00378> [TZERO = .00 hrs on 0]
00379> [METOUT= 2 (1=imperial, 2=metric output)]
00380> [NSTORM= 1]
00381> [NRUN = 2]
00382> #*****
00383> # SWMHYMO Ver:5.02/Jan 2001 <BETA> / INPUT DATA FILE
00384> #*****
00385> # Project Name: [Richmond FPM] Project Number: [709]
00386> # Date : 04-21-2009
00387> # Revised : 05-27-2009; 07-22-2009; 08-06-2009; 08-31-2009; 11-16-2009
00388> # Modeller : [Bryan Willcott B.Eng.]
00389> # Company : J.F. Sabourin and Associates
00390> # License # : 3410370
00391> #*****
00392> #*****
00393> # [BW] May 27, 2009
00394> # This model has been updated using revised values for Tp. Previous versions
00395> # of this model used a calculated Tp=0.6Tc. This model used a calculated
00396> # Tp=0.67Tc.
00397> #*****
00398> # [BW] July 22, 2009
00399> # This model has been revised to include "existing" cross section information
00400> # received from Robinson Consultants. The Cross section revised in the model
00401> # is Sec 5.2 (channel receiving flow from "arbuck"). Also, channel and
00402> # floodplain slopes for ROUTE CHANNEL commands were updated to be equal
00403> #*****
00404> # [BW] August 6, 2009
00405> # This model has been revised to include cross section information
00406> # from Robinson Consultants Engineer's Report July 2003. The cross
00407> # section revised in the model is Sec 5.1. Cross sections Sec 1.03
00408> # and Sec 5.3 have also been revised
00409> #*****
00410> # [BW] August 31, 2009
00411> # Model updated to include the proposed DSEL berm. This affects the geometry
00412> # of Route Channel Sect 5.2 located on the Arbuckle drain. Route Channels 5.2
00413> # and 1.03 have also been revised to reduce the number of values in the
00414> # x-y matrix.
00415> #*****
00416> # [BW] November 16, 2009
00417> # Model updated to include revised CN and Tp values subsequent to review of
00418> # memo received from AECOM on Oct. 2, 2009
00419> #*****
00420> #
00421> 002:0002-----
00422> READ STORM
00423> Filename = STORM.001
00424> Comment = 2 years SCS Type 2 Storm 24 Hours step 10 min, City of Ottawa
00425> [SDT=10.00:SDUR= 24.00:PTOT= 48.46]
00426> #*****

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00427> # Van Gaal / Ar buckle Drain
00428> #*****
00429> # DSEL SUBCATCHMENT VG-1 HAS BEEN BROKEN INTO 6 SUB-AREAS (BW)
00430> #*****
00431> 002:0003-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00432> CALIB NASHYD 01:VG-1A 311.90 .965 No_date 18:20 14.33 .296
00433> [CN= 73.0: N= 3.00]
00434> [Tp= 5.30:DT= 5.00]
00435> 002:0004-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00436> SAVE HYD 01:VG-1A 311.90 .965 No_date 18:20 14.33 n/a
00437> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-1A.002
00438> remark:VG-1A
00439> #*****
00440> # Tp FOR VG-1B HAS BEEN REVISED TO REFLECT A HYDRAULIC LENGTH OF 1710 m, A
00441> # LENGTH THAT INCLUDES DISTANCE TO THE VG1-1 CONFLUENCE IN ADDITION TO THE
00442> # LONGEST FLOW PATH WITHIN VG-1B. THIS IS DONE TO SIMULATE CHANNEL ROUTING
00443> #*****
00444> 002:0005-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00445> CALIB NASHYD 02:VG-1B 24.80 .129 No_date 15:05 14.28 .295
00446> [CN= 73.0: N= 3.00]
00447> [Tp= 2.70:DT= 5.00]
00448> #*****
00449> # VG1-1 IS THE SUM OF FLOWS TO THE CONFLUENCE OF NORTHERN MOST WATERCOURSE IN
00450> # OUR AREA OF STUDY WITH THE ROADSIDE DITCH ON GARVIN ROAD
00451> #*****
00452> #
00453> 002:0006-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00454> ADD HYD 01:VG-1A 311.90 .965 No_date 18:20 14.33 n/a
00455> + 02:VG-1B 24.80 .129 No_date 15:05 14.28 n/a
00456> [DT= 5.00] SUM= 03:VG1-1 336.70 1.047 No_date 17:55 14.33 n/a
00457> 002:0007-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00458> SAVE HYD 03:VG1-1 336.70 1.047 No_date 17:55 14.33 n/a
00459> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-1.002
00460> remark:VG1-1
00461> 002:0008-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00462> CALIB NASHYD 04:VG-1D 47.80 .652 No_date 13:50 26.20 .541
00463> [CN= 88.0: N= 3.00]
00464> [Tp= 1.80:DT= 5.00]
00465> #*****
00466> # VG1-2 IS THE SUM OF FLOWS AT THE GARVIN ROAD CROSS CULVERT AND
00467> # CONSERVATIVELY INCLUDES THE AREA VG-1D, WHICH IS LOCATED JUST DOWNSTREAM
00468> # OF THE CULVERT
00469> #*****
00470> #
00471> 002:0009-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00472> ADD HYD 03:VG1-1 336.70 1.047 No_date 17:55 14.33 n/a
00473> + 04:VG-1D 47.80 .652 No_date 13:50 26.20 n/a
00474> [DT= 5.00] SUM= 05:VG1-2 384.50 1.329 No_date 15:35 15.81 n/a
00475> 002:0010-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00476> SAVE HYD 05:VG1-2 384.50 1.329 No_date 15:35 15.81 n/a
00477> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-2.002
00478> remark:VG1-2
00479> 002:0011-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00480> ROUTE CHANNEL -> 05:VG1-2 384.50 1.329 No_date 15:35 15.81 n/a
00481> [RDT= 5.00] out<- 06:VG1R-2 384.50 1.314 No_date 16:30 15.81 n/a
00482> [L/S/n= 865./ .150/.035]
00483> {Vmax= .457:Dmax= .527}
00484> 002:0012-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00485> CALIB NASHYD 07:VG-1C 211.80 .647 No_date 17:35 12.94 .267
00486> [CN= 70.0: N= 3.00]
00487> [Tp= 4.70:DT= 5.00]
00488> 002:0013-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00489> CALIB NASHYD 08:VG-1E 13.40 .206 No_date 12:35 14.28 .295
00490> [CN= 73.0: N= 3.00]
00491> [Tp= .64:DT= 5.00]
00492> #*****
00493> # VG1-3 IS THE SUM OF FLOWS TO JOY'S ROAD CROSS CULVERT AND CONSERVATIVELY
00494> # INCLUDES THE AREA VG-1E, WHICH IS LOCATED JUST DOWNSTREAM OF THE CULVERT
00495> #*****
00496> #
00497> 002:0014-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.

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00498> ADD HYD 07:VG-1C 211.80 .647 No_date 17:35 12.94 n/a
00499> + 08:VG-1E 13.40 .206 No_date 12:35 14.28 n/a
00500> [DT= 5.00] SUM= 09:VG1-3 225.20 .664 No_date 17:30 13.02 n/a
00501> 002:0015-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00502> SAVE HYD 09:VG1-3 225.20 .664 No_date 17:30 13.02 n/a
00503> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-3.002
00504> remark:VG1-3
00505> 002:0016-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00506> ROUTE CHANNEL -> 09:VG1R-3 225.20 .664 No_date 17:30 13.02 n/a
00507> [RDT= 5.00] out<- 10:VG1R-3 225.20 .659 No_date 18:00 13.02 n/a
00508> [L/S/n= 630./ .200/.035]
00509> {Vmax= .271:Dmax= .365}
00510> #*****
00511> # VG1-4 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE WATERCOURSE FROM JOY'S
00512> # ROAD WITH THE MAIN DRAIN
00513> #*****
00514> #
00515> 002:0017-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00516> ADD HYD 06:VG1R-2 384.50 1.314 No_date 16:30 15.81 n/a
00517> + 10:VG1R-3 225.20 .659 No_date 18:00 13.02 n/a
00518> [DT= 5.00] SUM= 01:VG1-4 609.70 1.948 No_date 17:20 14.78 n/a
00519> 002:0018-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00520> SAVE HYD 01:VG1-4 609.70 1.948 No_date 17:20 14.78 n/a
00521> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-4.002
00522> remark:VG1-4
00523> 002:0019-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00524> ROUTE CHANNEL -> 01:VG1-4 609.70 1.948 No_date 17:20 14.78 n/a
00525> [RDT= 5.00] out<- 02:VG1R-4 609.70 1.944 No_date 17:35 14.78 n/a
00526> [L/S/n= 485./ .200/.035]
00527> {Vmax= .542:Dmax= .944}
00528> 002:0020-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00529> CALIB NASHYD 03:VG-1F 117.70 1.010 No_date 15:10 24.11 .498
00530> [CN= 86.0: N= 3.00]
00531> [Tp= 2.90:DT= 5.00]
00532> #*****
00533> # VG1 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE VAN GAAL WEST MAIN DRAIN
00534> # WITH VAN GAAL WEST TRIBUTARY
00535> #*****
00536> #
00537> 002:0021-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00538> ADD HYD 02:VG1R-4 609.70 1.944 No_date 17:35 14.78 n/a
00539> + 03:VG-1F 117.70 1.010 No_date 15:10 24.11 n/a
00540> [DT= 5.00] SUM= 04:VG1 727.40 2.796 No_date 16:35 16.29 n/a
00541> 002:0022-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00542> SAVE HYD 04:VG1 727.40 2.796 No_date 16:35 16.29 n/a
00543> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1.002
00544> remark:VG1
00545> 002:0023-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00546> ROUTE CHANNEL -> 04:VG1 727.40 2.796 No_date 16:35 16.29 n/a
00547> [RDT= 5.00] out<- 05:VGR2-1 727.40 2.792 No_date 16:35 16.29 n/a
00548> [L/S/n= 755./ .200/.035]
00549> {Vmax= .850:Dmax= .815}
00550> 002:0024-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00551> CALIB NASHYD 06:VG-2 63.10 .695 No_date 13:40 19.81 .409
00552> [CN= 81.0: N= 3.00]
00553> [Tp= 1.60:DT= 5.00]
00554> 002:0025-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00555> ROUTE CHANNEL -> 06:VG-2 63.10 .695 No_date 13:40 19.81 n/a
00556> [RDT= 5.00] out<- 07:PerN 63.10 .628 No_date 14:30 19.81 n/a
00557> [L/S/n= 550./ .200/.035]
00558> {Vmax= .254:Dmax= .644}
00559> 002:0026-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00560> CALIB NASHYD 08:VG-3 40.60 .606 No_date 13:40 26.20 .541
00561> [CN= 88.0: N= 3.00]
00562> [Tp= 1.60:DT= 5.00]
00563> 002:0027-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00564> CALIB STANDHYD 09:VG-4 24.60 1.220 No_date 12:15 25.41 .524
00565> [XIMP=.40:TIMP=.50]
00566> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14: F= .00]
00567> [Pervious area: IAPER= 1.50:SLPP=1.50:LGP= 35.:MNP=.250:SCP= .0]
00568> [Impervious area: IAIMP= .80:SLPI= .30:LGI=1000.:MNI=.013:SCI= .0]

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00569> 002:0028-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00570>   ADD HYD          05:VGR2-1  727.40  2.792 No_date 16:35 16.29 n/a
00571>   + 07:PerN      63.10      .628 No_date 14:30 19.81 n/a
00572>   + 08:VG-3     40.60      .606 No_date 13:40 26.20 n/a
00573>   + 09:VG-4     24.60      1.220 No_date 12:15 25.41 n/a
00574>   [DT= 5.00] SUM= 01:perths 855.70  3.640 No_date 15:20 17.28 n/a
00575> 002:0029-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00576>   SAVE HYD        01:perths 855.70  3.640 No_date 15:20 17.28 n/a
00577>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-perths.002
00578>   remark:perthst
00579> 002:0030-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00580>   CALIB NASHYD    02:VG-5     34.40      .235 No_date 14:30 16.44 .339
00581>   [CN= 76.0: N= 3.00]
00582>   [Tp= 2.30:DT= 5.00]
00583> 002:0031-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00584>   ROUTE CHANNEL  -> 02:VG-5     34.40      .235 No_date 14:30 16.44 n/a
00585>   [RDT= 5.00] out<- 03:PerS  34.40      .232 No_date 14:50 16.44 n/a
00586>   [L/S/n= 550./ .200/.035]
00587>   [Vmax= .470:Dmax= .500]
00588> 002:0032-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00589>   ADD HYD        01:perths 855.70  3.640 No_date 15:20 17.28 n/a
00590>   + 03:PerS      34.40      .232 No_date 14:50 16.44 n/a
00591>   [DT= 5.00] SUM= 02:arbuch 890.10  3.867 No_date 15:10 17.25 n/a
00592> 002:0033-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00593>   SAVE HYD        02:arbuch 890.10  3.867 No_date 15:10 17.25 n/a
00594>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-arbuch.002
00595>   remark:arbuch
00596> 002:0034-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00597>   ROUTE CHANNEL  -> 02:arbuch 890.10  3.867 No_date 15:10 17.25 n/a
00598>   [RDT= 5.00] out<- 09:VGR2-2 890.10  3.841 No_date 15:40 17.25 n/a
00599>   [L/S/n= 520./ .150/.035]
00600>   [Vmax= .570:Dmax= 1.086]
00601> 002:0035-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00602>   CALIB NASHYD    01:VG-6     94.20      .518 No_date 15:35 17.09 .353
00603>   [CN= 77.0: N= 3.00]
00604>   [Tp= 3.20:DT= 5.00]
00605> 002:0036-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00606>   ROUTE CHANNEL  -> 01:VG-6     94.20      .518 No_date 15:35 17.09 n/a
00607>   [RDT= 5.00] out<- 02:VG-6     94.20      .460 No_date 19:00 17.09 n/a
00608>   [L/S/n= 600./ .180/.035]
00609>   [Vmax= .098:Dmax= .435]
00610> 002:0037-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00611>   SAVE HYD        02:VG-6     94.20      .460 No_date 19:00 17.09 n/a
00612>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-6.002
00613>   remark:VG-6
00614> 002:0038-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00615>   CALIB NASHYD    03:VG-7     39.20      .255 No_date 15:15 18.63 .385
00616>   [CN= 80.0: N= 3.00]
00617>   [Tp= 2.90:DT= 5.00]
00618> 002:0039-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00619>   SAVE HYD        03:VG-7     39.20      .255 No_date 15:15 18.63 n/a
00620>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-7.002
00621>   remark:VG-7
00622> 002:0040-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00623>   ROUTE CHANNEL  -> 03:VG-7     39.20      .255 No_date 15:15 18.63 n/a
00624>   [RDT= 5.00] out<- 04:VG-7     39.20      .244 No_date 16:20 18.63 n/a
00625>   [L/S/n= 1480./ .200/.035]
00626>   [Vmax= .427:Dmax= .510]
00627> 002:0041-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00628>   ADD HYD        02:VG-6     94.20      .460 No_date 19:00 17.09 n/a
00629>   + 04:VG-7     39.20      .244 No_date 16:20 18.63 n/a
00630>   [DT= 5.00] SUM= 05:Moore  133.40  .665 No_date 17:15 17.54 n/a
00631> 002:0042-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00632>   SAVE HYD        05:Moore  133.40  .665 No_date 17:15 17.54 n/a
00633>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-Moore.002
00634>   remark:Moore
00635> 002:0043-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00636>   CALIB NASHYD    05:VG-8     91.80      1.108 No_date 14:15 26.12 .539
00637>   [CN= 88.0: N= 3.00]
00638>   [Tp= 2.10:DT= 5.00]
00639> 002:0044-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.

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00640>   CALIB STANDHYD  06:VG-9     11.40      .625 No_date 12:10 25.41 .524
00641>   [XIMP=.40:TIMP=.50]
00642>   [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14: F= .00]
00643>   [Pervious area: Iaper= 1.50:SLPP=1.50:LGP= 50.:MNP=.250:SCP=. .0]
00644>   [Impervious area: Iaimp= .80:SLPI=.30:LGI= 530.:MNI=.013:SCI=. .0]
00645> 002:0045-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00646>   ADD HYD        02:VG-6     94.20      .460 No_date 19:00 17.09 n/a
00647>   + 04:VG-7     39.20      .244 No_date 16:20 18.63 n/a
00648>   + 05:VG-8     91.80      1.108 No_date 14:15 26.12 n/a
00649>   + 06:VG-9     11.40      .625 No_date 12:10 25.41 n/a
00650>   + 09:VGR2-2   890.10      3.841 No_date 15:40 17.25 n/a
00651>   [DT= 5.00] SUM= 01:Fortun 1126.70  5.365 No_date 15:25 18.09 n/a
00652> 002:0046-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00653>   SAVE HYD        01:Fortun 1126.70  5.365 No_date 15:25 18.09 n/a
00654>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-Fortun.002
00655>   remark:Fortune
00656> 002:0047-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00657>   ROUTE CHANNEL  -> 01:Fortun 1126.70  5.365 No_date 15:25 18.09 n/a
00658>   [RDT= 5.00] out<- 03:VGR2-3 1126.70  5.333 No_date 15:40 18.09 n/a
00659>   [L/S/n= 750./ .200/.035]
00660>   [Vmax= .587:Dmax= .525]
00661> 002:0048-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00662>   CALIB STANDHYD  02:VG-10    20.30      1.103 No_date 12:10 25.41 .524
00663>   [XIMP=.40:TIMP=.50]
00664>   [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14: F= .00]
00665>   [Pervious area: Iaper= 1.50:SLPP=1.50:LGP= 50.:MNP=.250:SCP=. .0]
00666>   [Impervious area: Iaimp= .80:SLPI=.30:LGI= 560.:MNI=.013:SCI=. .0]
00667> 002:0049-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00668>   ADD HYD        02:VG-10    20.30      1.103 No_date 12:10 25.41 n/a
00669>   + 03:VGR2-3   1126.70  5.333 No_date 15:40 18.09 n/a
00670>   [DT= 5.00] SUM= 09:JockVG  1147.00  5.366 No_date 15:40 18.22 n/a
00671> 002:0050-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00672>   SAVE HYD        09:JockVG  1147.00  5.366 No_date 15:40 18.22 n/a
00673>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-JockVG.002
00674>   remark:Flow from Van Gaal Drain at Jock River
00675>   ** END OF RUN : 4
00676>
00677> *****
00678>
00679>
00680>
00681>
00682>
00683> RUN:COMMAND#
00684> 005:0001-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00685>   START
00686>   [TZERO = .00 hrs on 0]
00687>   [METOUT= 2 (1=imperial, 2=metric output)]
00688>   [NSTORM= 1]
00689>   [NRUN = 5]
00690> *****
00691> # SWMHYMO Ver:5.02/Jan 2001 <BETA> / INPUT DATA FILE
00692> *****
00693> # Project Name: [Richmond FPM] Project Number: [709]
00694> # Date : 04-21-2009
00695> # Revised : 05-27-2009; 07-22-2009; 08-06-2009; 08-31-2009; 11-16-2009
00696> # Modeller : [Bryan Willcott B.Eng.]
00697> # Company : J.F. Sabourin and Associates
00698> # License # : 3410370
00699> *****
00700> *****
00701> # [BW] May 27, 2009
00702> # This model has been updated using revised values for Tp. Previous versions
00703> # of this model used a calculated Tp=0.6Tc. This model used a calculated
00704> # Tp=0.67Tc.
00705> *****
00706> # [BW] July 22, 2009
00707> # This model has been revised to include "existing" cross section information
00708> # received from Robinson Consultants. The Cross section revised in the model
00709> # is Sec 5.2 (channel receiving flow from "arbuch"). Also, channel and
00710> # floodplain slopes for ROUTE CHANNEL commands were updated to be equal

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00711> #*****
00712> # [BW] August 6, 2009
00713> # This model has been revised to include cross section information
00714> # from Robinson Consultants Engineer's Report July 2003. The cross
00715> # section revised in the model is Sec 5.1. Cross sections Sec 1.03
00716> # and Sec 5.3 have also been revised
00717> #*****
00718> # [BW] August 31, 2009
00719> # Model updated to include the proposed DSEL berm. This affects the geometry
00720> # of Route Channel Sect 5.2 located on the Arbutuckle drain. Route Channels 5.2
00721> # and 1.03 have also been revised to reduce the number of values in the
00722> # x-y matrix.
00723> #*****
00724> # [BW] November 16, 2009
00725> # Model updated to include revised CN and Tp values subsequent to review of
00726> # memo received from AECOM on Oct. 2, 2009
00727> #*****
00728> #
00729> 005:0002-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00730> READ STORM
00731>   Filename = STORM.001
00732>   Comment = 5 years SCS Type 2 Storm 24 Hours step 10 min, City of Ottawa
00733>   [SDT=10.00:SDUR= 24.00:PTOT= 64.11]
00734> #*****
00735> # Van Gaal / Arbutuckle Drain
00736> #*****
00737> # DSEL SUBCATCHMENT VG-1 HAS BEEN BROKEN INTO 6 SUB-AREAS (BW)
00738> #*****
00739> 005:0003-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00740> CALIB NASHYD 01:VG-1A 311.90 1.597 No_date 18:15 23.51 .367
00741>   [CN= 73.0: N= 3.00]
00742>   [Tp= 5.30:DT= 5.00]
00743> 005:0004-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00744> SAVE HYD 01:VG-1A 311.90 1.597 No_date 18:15 23.51 n/a
00745>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-1A.005
00746>   remark:VG-1A
00747> #*****
00748> # Tp FOR VG-1B HAS BEEN REVISED TO REFLECT A HYDRAULIC LENGTH OF 1710 m, A
00749> # LENGTH THAT INCLUDES DISTANCE TO THE VG1-1 CONFLUENCE IN ADDITION TO THE
00750> # LONGEST FLOW PATH WITHIN VG-1B. THIS IS DONE TO SIMULATE CHANNEL ROUTING
00751> #*****
00752> 005:0005-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00753> CALIB NASHYD 02:VG-1B 24.80 .214 No_date 15:00 23.45 .366
00754>   [CN= 73.0: N= 3.00]
00755>   [Tp= 2.70:DT= 5.00]
00756> #*****
00757> # VG1-1 IS THE SUM OF FLOWS TO THE CONFLUENCE OF NORTHERN MOST WATERCOURSE IN
00758> # OUR AREA OF STUDY WITH THE ROADSIDE DITCH ON GARVIN ROAD
00759> #*****
00760> #
00761> 005:0006-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00762> ADD HYD 01:VG-1A 311.90 1.597 No_date 18:15 23.51 n/a
00763>   + 02:VG-1B 24.80 .214 No_date 15:00 23.45 n/a
00764>   [DT= 5.00] SUM= 03:VG1-1 336.70 1.734 No_date 17:50 23.51 n/a
00765> 005:0007-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00766> SAVE HYD 03:VG1-1 336.70 1.734 No_date 17:50 23.51 n/a
00767>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-1.005
00768>   remark:VG1-1
00769> 005:0008-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00770> CALIB NASHYD 04:VG-1D 47.80 .989 No_date 13:50 39.43 .615
00771>   [CN= 88.0: N= 3.00]
00772>   [Tp= 1.80:DT= 5.00]
00773> #*****
00774> # VG1-2 IS THE SUM OF FLOWS AT THE GARVIN ROAD CROSS CULVERT AND
00775> # CONSERVATIVELY INCLUDES THE AREA VG-1D, WHICH IS LOCATED JUST DOWNSTREAM
00776> # OF THE CULVERT
00777> #*****
00778> #
00779> 005:0009-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00780> ADD HYD 03:VG1-1 336.70 1.734 No_date 17:50 23.51 n/a
00781>   + 04:VG-1D 47.80 .989 No_date 13:50 39.43 n/a

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00782> [DT= 5.00] SUM= 05:VG1-2 384.50 2.148 No_date 15:40 25.49 n/a
00783> 005:0010-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00784> SAVE HYD 05:VG1-2 384.50 2.148 No_date 15:40 25.49 n/a
00785>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-2.005
00786>   remark:VG1-2
00787> 005:0011-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00788> ROUTE CHANNEL -> 05:VG1-2 384.50 2.148 No_date 15:40 25.49 n/a
00789>   [RDT= 5.00] out<- 06:VG1R-2 384.50 2.116 No_date 16:45 25.49 n/a
00790>   [L/S/n= 865./ .150/.035]
00791>   {Vmax= .394:Dmax= .639}
00792> 005:0012-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00793> CALIB NASHYD 07:VG-1C 211.80 1.082 No_date 17:30 21.44 .334
00794>   [CN= 70.0: N= 3.00]
00795>   [Tp= 4.70:DT= 5.00]
00796> 005:0013-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00797> CALIB NASHYD 08:VG-1E 13.40 .344 No_date 12:35 23.45 .366
00798>   [CN= 73.0: N= 3.00]
00799>   [Tp= .64:DT= 5.00]
00800> #*****
00801> # VG1-3 IS THE SUM OF FLOWS TO JOY'S ROAD CROSS CULVERT AND CONSERVATIVELY
00802> # INCLUDES THE AREA VG-1E, WHICH IS LOCATED JUST DOWNSTREAM OF THE CULVERT
00803> #*****
00804> #
00805> 005:0014-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00806> ADD HYD 07:VG-1C 211.80 1.082 No_date 17:30 21.44 n/a
00807>   + 08:VG-1E 13.40 .344 No_date 12:35 23.45 n/a
00808>   [DT= 5.00] SUM= 09:VG1-3 225.20 1.110 No_date 17:25 21.56 n/a
00809> 005:0015-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00810> SAVE HYD 09:VG1-3 225.20 1.110 No_date 17:25 21.56 n/a
00811>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-3.005
00812>   remark:VG1-3
00813> 005:0016-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00814> ROUTE CHANNEL -> 09:VG1-3 225.20 1.110 No_date 17:25 21.56 n/a
00815>   [RDT= 5.00] out<- 10:VG1R-3 225.20 1.103 No_date 17:50 21.56 n/a
00816>   [L/S/n= 630./ .200/.035]
00817>   {Vmax= .324:Dmax= .483}
00818> #*****
00819> # VG1-4 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE WATERCOURSE FROM JOY'S
00820> # ROAD WITH THE MAIN DRAIN
00821> #*****
00822> #
00823> 005:0017-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00824> ADD HYD 06:VG1R-2 384.50 2.116 No_date 16:45 25.49 n/a
00825>   + 10:VG1R-3 225.20 1.103 No_date 17:50 21.56 n/a
00826>   [DT= 5.00] SUM= 10:VG1-4 609.70 3.198 No_date 17:15 24.04 n/a
00827> 005:0018-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00828> SAVE HYD 01:VG1-4 609.70 3.198 No_date 17:15 24.04 n/a
00829>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-4.005
00830>   remark:VG1-4
00831> 005:0019-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00832> ROUTE CHANNEL -> 01:VG1-4 609.70 3.198 No_date 17:15 24.04 n/a
00833>   [RDT= 5.00] out<- 02:VG1R-4 609.70 3.179 No_date 17:55 24.04 n/a
00834>   [L/S/n= 485./ .200/.035]
00835>   {Vmax= .363:Dmax= 1.058}
00836> 005:0020-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00837> CALIB NASHYD 03:VG-1F 117.70 1.554 No_date 15:05 36.78 .574
00838>   [CN= 86.0: N= 3.00]
00839>   [Tp= 2.90:DT= 5.00]
00840> #*****
00841> # VG1 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE VAN GAAL WEST MAIN DRAIN
00842> # WITH VAN GAAL WEST TRIBUTARY
00843> #*****
00844> #
00845> 005:0021-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00846> ADD HYD 02:VG1R-4 609.70 3.179 No_date 17:55 24.04 n/a
00847>   + 03:VG-1F 117.70 1.554 No_date 15:05 36.78 n/a
00848>   [DT= 5.00] SUM= 04:VG1 727.40 4.407 No_date 16:50 26.10 n/a
00849> 005:0022-----ID:NHYD-----AREA-----QPEAK-TpeakDate_hh:mm-----R.V.-R.C.
00850> SAVE HYD 04:VG1 727.40 4.407 No_date 16:50 26.10 n/a
00851>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1.005
00852>   remark:VG1

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00853> 005:0023-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00854> ROUTE CHANNEL -> 04:VG1 727.40 4.407 No_date 16:50 26.10 n/a
00855> [RDT= 5.00] out<- 05:VGR2-1 727.40 4.402 No_date 16:50 26.10 n/a
00856> [L/S/n= 755./ .200/.035]
00857> {Vmax= .963:Dmax= 1.027}
00858> 005:0024-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00859> CALIB NASHYD 06:VG-2 63.10 1.104 No_date 13:40 31.09 .485
00860> [CN= 81.0: N= 3.00]
00861> [Tp= 1.60:DT= 5.00]
00862> 005:0025-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00863> ROUTE CHANNEL -> 06:VG-2 63.10 1.104 No_date 13:40 31.09 n/a
00864> [RDT= 5.00] out<- 07:PerN 63.10 .982 No_date 14:25 31.09 n/a
00865> [L/S/n= 550./ .200/.035]
00866> {Vmax= .232:Dmax= .703}
00867> 005:0026-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00868> CALIB NASHYD 08:VG-3 40.60 .919 No_date 13:35 39.43 .615
00869> [CN= 88.0: N= 3.00]
00870> [Tp= 1.60:DT= 5.00]
00871> 005:0027-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00872> CALIB STANDHYD 09:VG-4 24.60 2.005 No_date 12:10 35.83 .559
00873> [XIMP=.40:TIMP=.50]
00874> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14: F= .00]
00875> [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 35.:MNP=.250:SCP= .0]
00876> [Impervious area: IAimp= .80:SLPI= .30:LGI=1000.:MNI=.013:SCI= .0]
00877> 005:0028-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00878> ADD HYD 05:VGR2-1 727.40 4.402 No_date 16:50 26.10 n/a
00879> + 07:PerN 63.10 .982 No_date 14:25 31.09 n/a
00880> + 08:VG-3 40.60 .919 No_date 13:35 39.43 n/a
00881> + 09:VG-4 24.60 2.005 No_date 12:10 35.83 n/a
00882> [DT= 5.00] SUM= 01:perths 855.70 5.568 No_date 15:30 27.38 n/a
00883> 005:0029-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00884> SAVE HYD 01:perths 855.70 5.568 No_date 15:30 27.38 n/a
00885> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-perths.005
00886> remark:pertbst
00887> 005:0030-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00888> CALIB NASHYD 02:VG-5 34.40 .382 No_date 14:30 26.42 .412
00889> [CN= 76.0: N= 3.00]
00890> [Tp= 2.30:DT= 5.00]
00891> 005:0031-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00892> ROUTE CHANNEL -> 02:VG-5 34.40 .382 No_date 14:30 26.42 n/a
00893> [RDT= 5.00] out<- 03:PerS 34.40 .368 No_date 15:05 26.42 n/a
00894> [L/S/n= 550./ .200/.035]
00895> {Vmax= .355:Dmax= .567}
00896> 005:0032-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00897> ADD HYD 01:perths 855.70 5.568 No_date 15:30 27.38 n/a
00898> + 03:PerS 34.40 .368 No_date 15:05 26.42 n/a
00899> [DT= 5.00] SUM= 02:arbuck 890.10 5.933 No_date 15:30 27.34 n/a
00900> 005:0033-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00901> SAVE HYD 02:arbuck 890.10 5.933 No_date 15:30 27.34 n/a
00902> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-arbuck.005
00903> remark:arbuck
00904> 005:0034-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00905> ROUTE CHANNEL -> 02:arbuck 890.10 5.933 No_date 15:30 27.34 n/a
00906> [RDT= 5.00] out<- 09:VGR2-2 890.10 5.894 No_date 15:50 27.34 n/a
00907> [L/S/n= 520./ .150/.035]
00908> {Vmax= .475:Dmax= 1.217}
00909> 005:0035-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00910> CALIB NASHYD 01:VG-6 94.20 .837 No_date 15:35 27.33 .426
00911> [CN= 77.0: N= 3.00]
00912> [Tp= 3.20:DT= 5.00]
00913> 005:0036-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00914> ROUTE CHANNEL -> 01:VG-6 94.20 .837 No_date 15:35 27.33 n/a
00915> [RDT= 5.00] out<- 02:VG-6 94.20 .696 No_date 17:45 27.33 n/a
00916> [L/S/n= 600./ .180/.035]
00917> {Vmax= .089:Dmax= .447}
00918> 005:0037-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00919> SAVE HYD 02:VG-6 94.20 .696 No_date 17:45 27.33 n/a
00920> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-6.005
00921> remark:VG-6
00922> 005:0038-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00923> CALIB NASHYD 03:VG-7 39.20 .410 No_date 15:10 29.60 .462

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00924> [CN= 80.0: N= 3.00]
00925> [Tp= 2.90:DT= 5.00]
00926> 005:0039-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00927> SAVE HYD 03:VG-7 39.20 .410 No_date 15:10 29.60 n/a
00928> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-7.005
00929> remark:VG-7
00930> 005:0040-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00931> ROUTE CHANNEL -> 03:VG-7 39.20 .410 No_date 15:10 29.60 n/a
00932> [RDT= 5.00] out<- 04:VG-7 39.20 .361 No_date 17:15 29.60 n/a
00933> [L/S/n= 1480./ .200/.035]
00934> {Vmax= .246:Dmax= .563}
00935> 005:0041-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00936> ADD HYD 02:VG-6 94.20 .696 No_date 17:45 27.33 n/a
00937> + 04:VG-7 39.20 .361 No_date 17:15 29.60 n/a
00938> [DT= 5.00] SUM= 05:Moore 133.40 1.055 No_date 17:40 28.00 n/a
00939> 005:0042-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00940> SAVE HYD 05:Moore 133.40 1.055 No_date 17:40 28.00 n/a
00941> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-Moore.005
00942> remark:Moore
00943> 005:0043-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00944> CALIB NASHYD 05:VG-8 91.80 1.682 No_date 14:10 39.35 .614
00945> [CN= 88.0: N= 3.00]
00946> [Tp= 2.10:DT= 5.00]
00947> 005:0044-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00948> CALIB STANDHYD 06:VG-9 11.40 1.119 No_date 12:05 35.83 .559
00949> [XIMP=.40:TIMP=.50]
00950> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14: F= .00]
00951> [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 50.:MNP=.250:SCP= .0]
00952> [Impervious area: IAimp= .80:SLPI= .30:LGI= 530.:MNI=.013:SCI= .0]
00953> 005:0045-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00954> ADD HYD 02:VG-6 94.20 .696 No_date 17:45 27.33 n/a
00955> + 04:VG-7 39.20 .361 No_date 17:15 29.60 n/a
00956> + 05:VG-8 91.80 1.682 No_date 14:10 39.35 n/a
00957> + 06:VG-9 11.40 1.119 No_date 12:05 35.83 n/a
00958> + 09:VGR2-2 890.10 5.894 No_date 15:50 27.34 n/a
00959> [DT= 5.00] SUM= 01:Fortun 1126.70 8.094 No_date 15:40 28.48 n/a
00960> 005:0046-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00961> SAVE HYD 01:Fortun 1126.70 8.094 No_date 15:40 28.48 n/a
00962> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-Fortun.005
00963> remark:Fortune
00964> 005:0047-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00965> ROUTE CHANNEL -> 01:Fortun 1126.70 8.094 No_date 15:40 28.48 n/a
00966> [RDT= 5.00] out<- 03:VGR2-3 1126.70 8.067 No_date 15:50 28.48 n/a
00967> [L/S/n= 750./ .200/.035]
00968> {Vmax= .659:Dmax= .629}
00969> 005:0048-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00970> CALIB STANDHYD 02:VG-10 20.30 1.824 No_date 12:05 35.83 .559
00971> [XIMP=.40:TIMP=.50]
00972> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14: F= .00]
00973> [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 50.:MNP=.250:SCP= .0]
00974> [Impervious area: IAimp= .80:SLPI= .30:LGI= 560.:MNI=.013:SCI= .0]
00975> 005:0049-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00976> ADD HYD 02:VG-10 20.30 1.824 No_date 12:05 35.83 n/a
00977> + 03:VGR2-3 1126.70 8.067 No_date 15:50 28.48 n/a
00978> [DT= 5.00] SUM= 09:JockVG 1147.00 8.110 No_date 15:50 28.61 n/a
00979> 005:0050-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00980> SAVE HYD 09:JockVG 1147.00 8.110 No_date 15:50 28.61 n/a
00981> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-JockVG.005
00982> remark:Flow from Van Gaal Drain at Jock River
00983> ** END OF RUN : 99
00984>
00985> *****
00986>
00987>
00988>
00989>
00990>
00991> RUN:COMMAND#
00992> 100:0001-----
00993> START
00994> [TZERO = .00 hrs on 0]

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00995> [METOUT= 2 (1=imperial, 2=metric output)]
00996> [NSTORM= 1 ]
00997> [NRUN = 100 ]
00998> #*****
00999> # SWMHYMO Ver:5.02/Jan 2001 <BETA> / INPUT DATA FILE
01000> #*****
01001> # Project Name: [Richmond FPM] Project Number: [709]
01002> # Date : 04-21-2009
01003> # Revised : 05-27-2009; 07-22-2009; 08-06-2009; 08-31-2009; 11-16-2009
01004> # Modeller : [Bryan Willcott B.Eng.]
01005> # Company : J.F. Sabourin and Associates
01006> # License # : 3410370
01007> #*****
01008> #*****
01009> # [BW] May 27, 2009
01010> # This model has been updated using revised values for Tp. Previous versions
01011> # of this model used a calculated Tp=0.67Tc. This model used a calculated
01012> # Tp=0.67Tc.
01013> #*****
01014> # [BW] July 22, 2009
01015> # This model has been revised to include "existing" cross section information
01016> # received from Robinson Consultants. The Cross section revised in the model
01017> # is Sec 5.2 (channel receiving flow from "arbuck"). Also, channel and
01018> # floodplain slopes for ROUTE CHANNEL commands were updated to be equal
01019> #*****
01020> # [BW] August 6, 2009
01021> # This model has been revised to include cross section information
01022> # from Robinson Consultants Engineer's Report July 2003. The cross
01023> # section revised in the model is Sec 5.1. Cross sections Sec 1.03
01024> # and Sec 5.3 have also been revised
01025> #*****
01026> # [BW] August 31, 2009
01027> # Model updated to include the proposed DSEL berm. This affects the geometry
01028> # of Route Channel Sect 5.2 located on the Arbuckle drain. Route Channels 5.2
01029> # and 1.03 have also been revised to reduce the number of values in the
01030> # x-y matrix.
01031> #*****
01032> # [BW] November 16, 2009
01033> # Model updated to include revised CN and Tp values subsequent to review of
01034> # memo received from AECOM on Oct. 2, 2009
01035> #*****
01036> #
01037> 100:0002-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01038> READ STORM
01039> Filename = STORM.001
01040> Comment = 100 years SCS Type 2 Storm 24 Hours step 10 min, City of Ott
01041> [SDT=10.00:SDUR= 24.00:PTOT= 106.73]
01042> #*****
01043> # Van Gaal / Arbuckle Drain
01044> #*****
01045> # DSEL SUBCATCHMENT VG-1 HAS BEEN BROKEN INTO 6 SUB-AREAS (BW)
01046> #*****
01047> 100:0003-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01048> CALIB NASHYD 01:VG-1A 311.90 3.701 No_date 18:00 53.74 .503
01049> [CN= 73.0: N= 3.00]
01050> [Tp= 5.30:DT= 5.00]
01051> 100:0004-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01052> SAVE HYD 01:VG-1A 311.90 3.701 No_date 18:00 53.74 n/a
01053> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-1A.100
01054> remark:VG-1A
01055> #*****
01056> # Tp FOR VG-1B HAS BEEN REVISED TO REFLECT A HYDRAULIC LENGTH OF 1710 m, A
01057> # LENGTH THAT INCLUDES DISTANCE TO THE VG-1 CONFLUENCE IN ADDITION TO THE
01058> # LONGEST FLOW PATH WITHIN VG-1B. THIS IS DONE TO SIMULATE CHANNEL ROUTING
01059> #*****
01060> 100:0005-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01061> CALIB NASHYD 02:VG-1B 24.80 .500 No_date 14:55 53.66 .503
01062> [CN= 73.0: N= 3.00]
01063> [Tp= 2.70:DT= 5.00]
01064> #*****
01065> # VG1-1 IS THE SUM OF FLOWS TO THE CONFLUENCE OF NORTHERN MOST WATERCOURSE IN

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01066> # OUR AREA OF STUDY WITH THE ROADSIDE DITCH ON GARVIN ROAD
01067> #*****
01068> #
01069> 100:0006-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01070> ADD HYD 01:VG-1A 311.90 3.701 No_date 18:00 53.74 n/a
01071> + 02:VG-1B 24.80 .500 No_date 14:55 53.66 n/a
01072> [DT= 5.00] SUM= 03:VG1-1 336.70 4.021 No_date 17:35 53.73 n/a
01073> 100:0007-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01074> SAVE HYD 03:VG1-1 336.70 4.021 No_date 17:35 53.73 n/a
01075> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-1.100
01076> remark:VG1-1
01077> 100:0008-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01078> CALIB NASHYD 04:VG-1D 47.80 1.970 No_date 13:45 78.23 .733
01079> [CN= 88.0: N= 3.00]
01080> [Tp= 1.80:DT= 5.00]
01081> #*****
01082> # VG1-2 IS THE SUM OF FLOWS AT THE GARVIN ROAD CROSS CULVERT AND
01083> # CONSERVATIVELY INCLUDES THE AREA VG-1D, WHICH IS LOCATED JUST DOWNSTREAM
01084> # OF THE CULVERT
01085> #*****
01086> #
01087> 100:0009-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01088> ADD HYD 03:VG1-1 336.70 4.021 No_date 17:35 53.73 n/a
01089> + 04:VG-1D 47.80 1.970 No_date 13:45 78.23 n/a
01090> [DT= 5.00] SUM= 05:VG1-2 384.50 4.813 No_date 15:55 56.78 n/a
01091> 100:0010-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01092> SAVE HYD 05:VG1-2 384.50 4.813 No_date 15:55 56.78 n/a
01093> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-2.100
01094> remark:VG1-2
01095> 100:0011-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01096> ROUTE CHANNEL -> 05:VG1-2 384.50 4.813 No_date 15:55 56.78 n/a
01097> [RDT= 5.00] out<- 06:VG1R-2 384.50 4.667 No_date 17:25 56.78 n/a
01098> [L/S/n= 865./ .150/.035]
01099> {Vmax= .269:Dmax= .827}
01100> 100:0012-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01101> CALIB NASHYD 07:VG-1C 211.80 2.559 No_date 17:20 49.95 .468
01102> [CN= 70.0: N= 3.00]
01103> [Tp= 4.70:DT= 5.00]
01104> 100:0013-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01105> CALIB NASHYD 08:VG-1E 13.40 .804 No_date 12:35 53.66 .503
01106> [CN= 73.0: N= 3.00]
01107> [Tp= .64:DT= 5.00]
01108> #*****
01109> # VG1-3 IS THE SUM OF FLOWS TO JOY'S ROAD CROSS CULVERT AND CONSERVATIVELY
01110> # INCLUDES THE AREA VG-1E, WHICH IS LOCATED JUST DOWNSTREAM OF THE CULVERT
01111> #*****
01112> #
01113> 100:0014-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01114> ADD HYD 07:VG-1C 211.80 2.559 No_date 17:20 49.95 n/a
01115> + 08:VG-1E 13.40 .804 No_date 12:35 53.66 n/a
01116> [DT= 5.00] SUM= 09:VG1-3 225.20 2.619 No_date 17:15 50.17 n/a
01117> 100:0015-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01118> SAVE HYD 09:VG1-3 225.20 2.619 No_date 17:15 50.17 n/a
01119> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-3.100
01120> remark:VG1-3
01121> 100:0016-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01122> ROUTE CHANNEL -> 09:VG1-3 225.20 2.619 No_date 17:15 50.17 n/a
01123> [RDT= 5.00] out<- 10:VG1R-3 225.20 2.607 No_date 17:35 50.17 n/a
01124> [L/S/n= 630./ .200/.035]
01125> {Vmax= .428:Dmax= .767}
01126> #*****
01127> # VG1-4 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE WATERCOURSE FROM JOY'S
01128> # ROAD WITH THE MAIN DRAIN
01129> #*****
01130> #
01131> 100:0017-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01132> ADD HYD 06:VG1R-2 384.50 4.667 No_date 17:25 56.78 n/a
01133> + 10:VG1R-3 225.20 2.607 No_date 17:35 50.17 n/a
01134> [DT= 5.00] SUM= 01:VG1-4 609.70 7.272 No_date 17:30 54.34 n/a
01135> 100:0018-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01136> SAVE HYD 01:VG1-4 609.70 7.272 No_date 17:30 54.34 n/a

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01137>      fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-4.100
01138>      remark:VG1-4
01139> 100:0019-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01140> ROUTE CHANNEL -> 01:VG1-4 609.70 7.272 No_date 17:30 54.34 n/a
01141> [RDT= 5.00] out<- 02:VG1R-4 609.70 7.210 No_date 18:05 54.34 n/a
01142> [L/S/n= 485./ .200/.035]
01143> {Vmax= .260:Dmax= 1.201}
01144> 100:0020-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01145> CALIB NASHYD 03:VG-1F 117.70 3.178 No_date 15:00 74.54 .698
01146> [CN= 86.0: N= 3.00]
01147> [Tp= 2.90:DT= 5.00]
01148> *****
01149> # VG1 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE VAN GAAL WEST MAIN DRAIN
01150> # WITH VAN GAAL WEST TRIBUTARY
01151> *****
01152> #
01153> 100:0021-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01154> ADD HYD 02:VG1R-4 609.70 7.210 No_date 18:05 54.34 n/a
01155> + 03:VG-1F 117.70 3.178 No_date 15:00 74.54 n/a
01156> [DT= 5.00] SUM= 04:VG1 727.40 9.543 No_date 16:55 57.61 n/a
01157> 100:0022-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01158> SAVE HYD 04:VG1 727.40 9.543 No_date 16:55 57.61 n/a
01159> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1.100
01160> remark:VG1
01161> 100:0023-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01162> ROUTE CHANNEL -> 04:VG1 727.40 9.543 No_date 16:55 57.61 n/a
01163> [RDT= 5.00] out<- 05:VGR2-1 727.40 9.529 No_date 17:05 57.61 n/a
01164> [L/S/n= 755./ .200/.035]
01165> {Vmax= 1.110:Dmax= 1.457}
01166> 100:0024-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01167> CALIB NASHYD 06:VG-2 63.10 2.381 No_date 13:35 66.06 .619
01168> [CN= 81.0: N= 3.00]
01169> [Tp= 1.60:DT= 5.00]
01170> 100:0025-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01171> ROUTE CHANNEL -> 06:VG-2 63.10 2.381 No_date 13:35 66.06 n/a
01172> [RDT= 5.00] out<- 07:PerN 63.10 2.120 No_date 14:20 66.06 n/a
01173> [L/S/n= 550./ .200/.035]
01174> {Vmax= .233:Dmax= .811}
01175> 100:0026-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01176> CALIB NASHYD 08:VG-3 40.60 1.832 No_date 13:35 78.23 .733
01177> [CN= 88.0: N= 3.00]
01178> [Tp= 1.60:DT= 5.00]
01179> 100:0027-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01180> CALIB STANDHYD 09:VG-4 24.60 4.230 No_date 12:10 64.71 .606
01181> [XIMP=.40:TIMP=.50]
01182> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14: F= .00]
01183> [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 35.:MNP=.250:SCP= .0]
01184> [Impervious area: IAimp=.80:SLPI=.30:LGI=1000.:MNI=.013:SCI=.0]
01185> 100:0028-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01186> ADD HYD 05:VGR2-1 727.40 9.529 No_date 17:05 57.61 n/a
01187> + 07:PerN 63.10 2.120 No_date 14:20 66.06 n/a
01188> + 08:VG-3 40.60 1.832 No_date 13:35 78.23 n/a
01189> + 09:VG-4 24.60 4.230 No_date 12:10 64.71 n/a
01190> [DT= 5.00] SUM= 01:perths 855.70 11.434 No_date 16:00 59.41 n/a
01191> 100:0029-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01192> SAVE HYD 01:perths 855.70 11.434 No_date 16:00 59.41 n/a
01193> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-perths.100
01194> remark:perthst
01195> 100:0030-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01196> CALIB NASHYD 02:VG-5 34.40 .861 No_date 14:25 58.50 .548
01197> [CN= 76.0: N= 3.00]
01198> [Tp= 2.30:DT= 5.00]
01199> 100:0031-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01200> ROUTE CHANNEL -> 02:VG-5 34.40 .861 No_date 14:25 58.50 n/a
01201> [RDT= 5.00] out<- 03:PerS 34.40 .804 No_date 15:15 58.50 n/a
01202> [L/S/n= 550./ .200/.035]
01203> {Vmax= .242:Dmax= .669}
01204> 100:0032-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01205> ADD HYD 01:perths 855.70 11.434 No_date 16:00 59.41 n/a
01206> + 03:PerS 34.40 .804 No_date 15:15 58.50 n/a
01207> [DT= 5.00] SUM= 02:arbuck 890.10 12.200 No_date 15:55 59.38 n/a

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01208> 100:0033-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01209> SAVE HYD 02:arbuck 890.10 12.200 No_date 15:55 59.38 n/a
01210> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-arbuck.100
01211> remark:arbuck
01212> 100:0034-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01213> ROUTE CHANNEL -> 02:arbuck 890.10 12.200 No_date 15:55 59.38 n/a
01214> [RDT= 5.00] out<- 09:VGR2-2 890.10 12.094 No_date 16:25 59.38 n/a
01215> [L/S/n= 520./ .150/.035]
01216> {Vmax= .382:Dmax= 1.469}
01217> 100:0035-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01218> CALIB NASHYD 01:VG-6 94.20 1.866 No_date 15:30 59.99 .562
01219> [CN= 77.0: N= 3.00]
01220> [Tp= 3.20:DT= 5.00]
01221> 100:0036-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01222> ROUTE CHANNEL -> 01:VG-6 94.20 1.866 No_date 15:30 59.99 n/a
01223> [RDT= 5.00] out<- 02:VG-6 94.20 1.483 No_date 17:40 59.99 n/a
01224> [L/S/n= 600./ .180/.035]
01225> {Vmax= .078:Dmax= .476}
01226> 100:0037-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01227> SAVE HYD 02:VG-6 94.20 1.483 No_date 17:40 59.99 n/a
01228> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-6.100
01229> remark:VG-6
01230> 100:0038-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01231> CALIB NASHYD 03:VG-7 39.20 .900 No_date 15:05 63.92 .599
01232> [CN= 80.0: N= 3.00]
01233> [Tp= 2.90:DT= 5.00]
01234> 100:0039-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01235> SAVE HYD 03:VG-7 39.20 .900 No_date 15:05 63.92 n/a
01236> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-7.100
01237> remark:VG-7
01238> 100:0040-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01239> ROUTE CHANNEL -> 03:VG-7 39.20 .900 No_date 15:05 63.92 n/a
01240> [RDT= 5.00] out<- 04:VG-7 39.20 .690 No_date 17:50 63.92 n/a
01241> [L/S/n= 1480./ .200/.035]
01242> {Vmax= .173:Dmax= .632}
01243> 100:0041-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01244> ADD HYD 02:VG-6 94.20 1.483 No_date 17:40 59.99 n/a
01245> + 04:VG-7 39.20 .690 No_date 17:50 63.92 n/a
01246> [DT= 5.00] SUM= 05:Moore 133.40 2.172 No_date 17:45 61.15 n/a
01247> 100:0042-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01248> SAVE HYD 05:Moore 133.40 2.172 No_date 17:45 61.15 n/a
01249> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-Moore.100
01250> remark:Moore
01251> 100:0043-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01252> CALIB NASHYD 05:VG-8 91.80 3.356 No_date 14:05 78.14 .732
01253> [CN= 88.0: N= 3.00]
01254> [Tp= 2.10:DT= 5.00]
01255> 100:0044-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01256> CALIB STANDHYD 06:VG-9 11.40 2.347 No_date 12:05 64.71 .606
01257> [XIMP=.40:TIMP=.50]
01258> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14: F= .00]
01259> [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 50.:MNP=.250:SCP= .0]
01260> [Impervious area: IAimp=.80:SLPI=.30:LGI= 530.:MNI=.013:SCI=.0]
01261> 100:0045-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01262> ADD HYD 02:VG-6 94.20 1.483 No_date 17:40 59.99 n/a
01263> + 04:VG-7 39.20 .690 No_date 17:50 63.92 n/a
01264> + 05:VG-8 91.80 3.356 No_date 14:05 78.14 n/a
01265> + 06:VG-9 11.40 2.347 No_date 12:05 64.71 n/a
01266> + 09:VGR2-2 890.10 12.094 No_date 16:25 59.38 n/a
01267> [DT= 5.00] SUM= 01:Fortun 1126.70 16.377 No_date 15:55 61.17 n/a
01268> 100:0046-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01269> SAVE HYD 01:Fortun 1126.70 16.377 No_date 15:55 61.17 n/a
01270> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-Fortun.100
01271> remark:Fortune
01272> 100:0047-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01273> ROUTE CHANNEL -> 01:Fortun 1126.70 16.377 No_date 15:55 61.17 n/a
01274> [RDT= 5.00] out<- 03:VGR2-3 1126.70 16.347 No_date 16:00 61.17 n/a
01275> [L/S/n= 750./ .200/.035]
01276> {Vmax= .795:Dmax= .852}
01277> 100:0048-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01278> CALIB STANDHYD 02:VG-10 20.30 4.148 No_date 12:05 64.71 .606

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01279> [XIMP=.40:TIMP=.50]
01280> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAV=4.14: F= .00]
01281> [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 50.:MNP=.250:SCP= .0]
01282> [Impervious area: IAimp= .80:SLPI= .30:LGI= 560.:MNI=.013:SCI= .0]
01283> 100:0049-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01284> ADD HYD 02:VG-10 20.30 4.148 No_date 12:05 64.71 n/a
01285> + 03:VGR2-3 1126.70 16.347 No_date 16:00 61.17 n/a
01286> [DT= 5.00] SUM= 09:JockVG 1147.00 16.419 No_date 16:00 61.23 n/a
01287> 100:0050-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01288> SAVE HYD 09:JockVG 1147.00 16.419 No_date 16:00 61.23 n/a
01289> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-JockVG.100
01290> remark:Flow from Van Gaal Drain at Jock River
01291> ** END OF RUN : 101
01292>
01293> *****
01294>
01295>
01296>
01297>
01298>
01299> RUN:COMMAND#
01300> 102:0001-----
01301> START
01302> [TZERO = .00 hrs on 0]
01303> [METOUT= 2 (1=imperial, 2=metric output)]
01304> [NSTORM= 1 ]
01305> [NRUN = 102 ]
01306> *****
01307> # SWMHYMO Ver:5.02/Jan 2001 <BETA> / INPUT DATA FILE
01308> *****
01309> # Project Name: [Richmond FPM] Project Number: [709]
01310> # Date : 04-21-2009
01311> # Revised : 05-27-2009; 07-22-2009; 08-06-2009; 08-31-2009; 11-16-2009
01312> # Modeller : [Bryan Willcott B.Eng.]
01313> # Company : J.F. Sabourin and Associates
01314> # License # : 3410370
01315> *****
01316> *****
01317> # [BW] May 27, 2009
01318> # This model has been updated using revised values for Tp. Previous versions
01319> # of this model used a calculated Tp=0.67Tc. This model used a calculated
01320> # Tp=0.67Tc.
01321> *****
01322> # [BW] July 22, 2009
01323> # This model has been revised to include "existing" cross section information
01324> # received from Robinson Consultants. The Cross section revised in the model
01325> # is Sec 5.2 (channel receiving flow from "arbutck"). Also, channel and
01326> # floodplain slopes for ROUTE CHANNEL commands were updated to be equal
01327> *****
01328> # [BW] August 6, 2009
01329> # This model has been revised to include cross section information
01330> # from Robinson Consultants Engineer's Report July 2003. The cross
01331> # section revised in the model is Sec 5.1. Cross sections Sec 1.03
01332> # and Sec 5.3 have also been revised
01333> *****
01334> # [BW] August 31, 2009
01335> # Model updated to include the proposed DSEL berm. This affects the geometry
01336> # of Route Channel Sect 5.2 located on the Arbutck drain. Route Channels 5.2
01337> # and 1.03 have also been revised to reduce the number of values in the
01338> # x-y matrix.
01339> *****
01340> # [BW] November 16, 2009
01341> # Model updated to include revised CN and Tp values subsequent to review of
01342> # memo received from AECOM on Oct. 2, 2009
01343> *****
01344> #
01345> 102:0002-----
01346> READ STORM
01347> Filename = STORM.001
01348> Comment = 2 years Chicago Storm 4 Hours step 10 min, City of Ottawa
01349> [SDT=10.00:SDUR= 4.00:PTOT= 33.89]

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01350> *****
01351> # Van Gaal / Arbutck Drain
01352> *****
01353> # DSEL SUBCATCHMENT VG-1 HAS BEEN BROKEN INTO 6 SUB-AREAS (BW)
01354> *****
01355> 102:0003-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01356> CALIB NASHYD 01:VG-1A 311.90 .631 No_date 7:15 7.26 .214
01357> [CN= 73.0: N= 3.00]
01358> [Tp= 5.30:DT= 5.00]
01359> 102:0004-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01360> SAVE HYD 01:VG-1A 311.90 .631 No_date 7:15 7.26 n/a
01361> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-1A.102
01362> remark:VG-1A
01363> *****
01364> # Tp FOR VG-1B HAS BEEN REVISED TO REFLECT A HYDRAULIC LENGTH OF 1710 m, A
01365> # LENGTH THAT INCLUDES DISTANCE TO THE VG1-1 CONFLUENCE IN ADDITION TO THE
01366> # LONGEST FLOW PATH WITHIN VG-1B. THIS IS DONE TO SIMULATE CHANNEL ROUTING
01367> *****
01368> 102:0005-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01369> CALIB NASHYD 02:VG-1B 24.80 .091 No_date 4:45 7.21 .213
01370> [CN= 73.0: N= 3.00]
01371> [Tp= 2.70:DT= 5.00]
01372> *****
01373> # VG1-1 IS THE SUM OF FLOWS TO THE CONFLUENCE OF NORTHERN MOST WATERCOURSE IN
01374> # OUR AREA OF STUDY WITH THE ROADSIDE DITCH ON GARVIN ROAD
01375> *****
01376> #
01377> 102:0006-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01378> ADD HYD 01:VG-1A 311.90 .631 No_date 7:15 7.26 n/a
01379> + 02:VG-1B 24.80 .091 No_date 4:45 7.21 n/a
01380> [DT= 5.00] SUM= 03:VG1-1 336.70 .689 No_date 6:50 7.25 n/a
01381> 102:0007-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01382> SAVE HYD 03:VG1-1 336.70 .689 No_date 6:50 7.25 n/a
01383> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-1.102
01384> remark:VG1-1
01385> 102:0008-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01386> CALIB NASHYD 04:VG-1D 47.80 .502 No_date 3:35 14.92 .440
01387> [CN= 88.0: N= 3.00]
01388> [Tp= 1.80:DT= 5.00]
01389> *****
01390> # VG1-2 IS THE SUM OF FLOWS AT THE GARVIN ROAD CROSS CULVERT AND
01391> # CONSERVATIVELY INCLUDES THE AREA VG-1D, WHICH IS LOCATED JUST DOWNSTREAM
01392> # OF THE CULVERT
01393> *****
01394> #
01395> 102:0009-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01396> ADD HYD 03:VG1-1 336.70 .689 No_date 6:50 7.25 n/a
01397> + 04:VG-1D 47.80 .502 No_date 3:35 14.92 n/a
01398> [DT= 5.00] SUM= 05:VG1-2 384.50 .966 No_date 4:45 8.21 n/a
01399> 102:0010-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01400> SAVE HYD 05:VG1-2 384.50 .966 No_date 4:45 8.21 n/a
01401> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-2.102
01402> remark:VG1-2
01403> 102:0011-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01404> ROUTE CHANNEL -> 05:VG1-2 384.50 .966 No_date 4:45 8.21 n/a
01405> [RDT= 5.00] out<- 06:VG1R-2 384.50 .948 No_date 5:20 8.21 n/a
01406> [L/S/n= 865./ .150/.035]
01407> {Vmax= .473:Dmax= .452}
01408> 102:0012-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01409> CALIB NASHYD 07:VG-1C 211.80 .428 No_date 6:40 6.48 .191
01410> [CN= 70.0: N= 3.00]
01411> [Tp= 4.70:DT= 5.00]
01412> 102:0013-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01413> CALIB NASHYD 08:VG-1E 13.40 .138 No_date 2:10 7.21 .213
01414> [CN= 73.0: N= 3.00]
01415> [Tp= .64:DT= 5.00]
01416> *****
01417> # VG1-3 IS THE SUM OF FLOWS TO JOY'S ROAD CROSS CULVERT AND CONSERVATIVELY
01418> # INCLUDES THE AREA VG-1E, WHICH IS LOCATED JUST DOWNSTREAM OF THE CULVERT
01419> *****
01420> #

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01421> 102:0014-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01422>   ADD HYD          07:VG-1C  211.80   .428 No_date  6:40  6.48  n/a
01423>   + 08:VG-1E  13.40   .138 No_date  2:10  7.21  n/a
01424>   [DT= 5.00] SUM= 09:VG1-3  225.20   .428 No_date  6:40  6.52  n/a
01425> 102:0015-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01426>   SAVE HYD          09:VG1-3  225.20   .428 No_date  6:40  6.52  n/a
01427>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-3.102
01428>   remark:VG1-3
01429> 102:0016-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01430>   ROUTE CHANNEL   -> 09:VG1-3  225.20   .428 No_date  6:40  6.52  n/a
01431>   [RDT= 5.00] out<- 10:VG1R-3  225.20   .422 No_date  7:05  6.52  n/a
01432>   [L/S/n= 630./ .200/.035]
01433>   {Vmax= .232:Dmax= .285}
01434> #*****
01435> # VG1-4 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE WATERCOURSE FROM JOY'S
01436> # ROAD WITH THE MAIN DRAIN
01437> #*****
01438> #
01439> 102:0017-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01440>   ADD HYD          06:VG1R-2  384.50   .948 No_date  5:20  8.21  n/a
01441>   + 10:VG1R-3  225.20   .422 No_date  7:05  6.52  n/a
01442>   [DT= 5.00] SUM= 01:VG1-4  609.70   1.325 No_date  5:50  7.58  n/a
01443> 102:0018-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01444>   SAVE HYD          01:VG1-4  609.70   1.325 No_date  5:50  7.58  n/a
01445>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-4.102
01446>   remark:VG1-4
01447> 102:0019-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01448>   ROUTE CHANNEL   -> 01:VG1-4  609.70   1.325 No_date  5:50  7.58  n/a
01449>   [RDT= 5.00] out<- 02:VG1R-4  609.70   1.322 No_date  6:00  7.58  n/a
01450>   [L/S/n= 485./ .200/.035]
01451>   {Vmax= .637:Dmax= .830}
01452> 102:0020-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01453>   CALIB NASHYD     03:VG-1F  117.70   .766 No_date  4:50  13.48  .398
01454>   [CN= 86.0: N= 3.00]
01455>   [Tp= 2.90:DT= 5.00]
01456> #*****
01457> # VG1 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE VAN GAAL WEST MAIN DRAIN
01458> # WITH VAN GAAL WEST TRIBUTARY
01459> #*****
01460> #
01461> 102:0021-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01462>   ADD HYD          02:VG1R-4  609.70   1.322 No_date  6:00  7.58  n/a
01463>   + 03:VG-1F  117.70   .766 No_date  4:50  13.48  n/a
01464>   [DT= 5.00] SUM= 04:VG1  727.40   2.037 No_date  5:25  8.54  n/a
01465> 102:0022-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01466>   SAVE HYD          04:VG1  727.40   2.037 No_date  5:25  8.54  n/a
01467>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1.102
01468>   remark:VG1
01469> 102:0023-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01470>   ROUTE CHANNEL   -> 04:VG1  727.40   2.037 No_date  5:25  8.54  n/a
01471>   [RDT= 5.00] out<- 05:VGR2-1  727.40   2.030 No_date  5:35  8.54  n/a
01472>   [L/S/n= 755./ .200/.035]
01473>   {Vmax= .779:Dmax= .691}
01474> 102:0024-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01475>   CALIB NASHYD     06:VG-2  63.10   .512 No_date  3:20  10.66  .315
01476>   [CN= 81.0: N= 3.00]
01477>   [Tp= 1.60:DT= 5.00]
01478> 102:0025-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01479>   ROUTE CHANNEL   -> 06:VG-2  63.10   .512 No_date  3:20  10.66  n/a
01480>   [RDT= 5.00] out<- 07:PerN  63.10   .474 No_date  4:15  10.66  n/a
01481>   [L/S/n= 550./ .200/.035]
01482>   {Vmax= .289:Dmax= .606}
01483> 102:0026-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01484>   CALIB NASHYD     08:VG-3  40.60   .466 No_date  3:20  14.92  .440
01485>   [CN= 88.0: N= 3.00]
01486>   [Tp= 1.60:DT= 5.00]
01487> 102:0027-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01488>   CALIB STANDHYD  09:VG-4  24.60   1.122 No_date  1:35  17.49  .516
01489>   [XIMP=.40:TIMP=.50]
01490>   [Horton parameters: Fo= 76.20:Fc= 13.20:DCAV=4.14: F= .00]
01491>   [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 35.:MNP=.250:SCP= .0]

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01492>   [Impervious area: IAimp= .80:SLPI= .30:LGI=1000.:MNI=.013:SCI= .0]
01493> 102:0028-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01494>   ADD HYD          05:VGR2-1  727.40   2.030 No_date  5:35  8.54  n/a
01495>   + 07:PerN  63.10   .474 No_date  4:15  10.66  n/a
01496>   + 08:VG-3  40.60   .466 No_date  3:20  14.92  n/a
01497>   + 09:VG-4  24.60   1.122 No_date  1:35  17.49  n/a
01498>   [DT= 5.00] SUM= 01:perths  855.70   2.723 No_date  4:50  9.26  n/a
01499> 102:0029-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01500>   SAVE HYD          01:perths  855.70   2.723 No_date  4:50  9.26  n/a
01501>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-perths.102
01502>   remark:perthst
01503> 102:0030-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01504>   CALIB NASHYD     02:VG-5  34.40   .172 No_date  4:15  8.59  .253
01505>   [CN= 76.0: N= 3.00]
01506>   [Tp= 2.30:DT= 5.00]
01507> 102:0031-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01508>   ROUTE CHANNEL   -> 02:VG-5  34.40   .172 No_date  4:15  8.59  n/a
01509>   [RDT= 5.00] out<- 03:PerS  34.40   .169 No_date  4:35  8.59  n/a
01510>   [L/S/n= 550./ .200/.035]
01511>   {Vmax= .434:Dmax= .443}
01512> 102:0032-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01513>   ADD HYD          01:perths  855.70   2.723 No_date  4:50  9.26  n/a
01514>   + 03:PerS  34.40   .169 No_date  4:35  8.59  n/a
01515>   [DT= 5.00] SUM= 02:arbuck  890.10   2.890 No_date  4:45  9.23  n/a
01516> 102:0033-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01517>   SAVE HYD          02:arbuck  890.10   2.890 No_date  4:45  9.23  n/a
01518>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-arbuck.102
01519>   remark:arbuck
01520> 102:0034-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01521>   ROUTE CHANNEL   -> 02:arbuck  890.10   2.890 No_date  4:45  9.23  n/a
01522>   [RDT= 5.00] out<- 09:VGR2-2  890.10   2.863 No_date  5:10  9.23  n/a
01523>   [L/S/n= 520./ .150/.035]
01524>   {Vmax= .684:Dmax= .977}
01525> 102:0035-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01526>   CALIB NASHYD     01:VG-6  94.20   .375 No_date  5:10  8.99  .265
01527>   [CN= 77.0: N= 3.00]
01528>   [Tp= 3.20:DT= 5.00]
01529> 102:0036-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01530>   ROUTE CHANNEL   -> 01:VG-6  94.20   .375 No_date  5:10  8.99  n/a
01531>   [RDT= 5.00] out<- 02:VG-6  94.20   .356 No_date  7:10  8.99  n/a
01532>   [L/S/n= 600./ .180/.035]
01533>   {Vmax= .166:Dmax= .416}
01534> 102:0037-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01535>   SAVE HYD          02:VG-6  94.20   .356 No_date  7:10  8.99  n/a
01536>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-6.102
01537>   remark:VG-6
01538> 102:0038-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01539>   CALIB NASHYD     03:VG-7  39.20   .186 No_date  4:50  9.84  .290
01540>   [CN= 80.0: N= 3.00]
01541>   [Tp= 2.90:DT= 5.00]
01542> 102:0039-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01543>   SAVE HYD          03:VG-7  39.20   .186 No_date  4:50  9.84  n/a
01544>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-7.102
01545>   remark:VG-7
01546> 102:0040-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01547>   ROUTE CHANNEL   -> 03:VG-7  39.20   .186 No_date  4:50  9.84  n/a
01548>   [RDT= 5.00] out<- 04:VG-7  39.20   .172 No_date  5:40  9.84  n/a
01549>   [L/S/n= 1480./ .200/.035]
01550>   {Vmax= .443:Dmax= .457}
01551> 102:0041-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01552>   ADD HYD          02:VG-6  94.20   .356 No_date  7:10  8.99  n/a
01553>   + 04:VG-7  39.20   .172 No_date  5:40  9.84  n/a
01554>   [DT= 5.00] SUM= 05:Moore  133.40   .510 No_date  6:35  9.24  n/a
01555> 102:0042-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01556>   SAVE HYD          05:Moore  133.40   .510 No_date  6:35  9.24  n/a
01557>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-Moore.102
01558>   remark:Moore
01559> 102:0043-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01560>   CALIB NASHYD     05:VG-8  91.80   .853 No_date  4:00  14.85  .438
01561>   [CN= 88.0: N= 3.00]
01562>   [Tp= 2.10:DT= 5.00]

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01563> 102:0044-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01564> CALIB STANDHYD 06:VG-9 11.40 .667 No_date 1:25 17.49 5.16
01565> [XIMP=.40:TIMP=.50]
01566> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14: F= .00]
01567> [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 50.:MNP=.250:SCP= .0]
01568> [Impervious area: IAimp= .80:SLPI= .30:LGI= 530.:MNI=.013:SCI= .0]
01569> 102:0045-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01570> ADD HYD 02:VG-6 94.20 .356 No_date 7:10 8.99 n/a
01571> + 04:VG-7 39.20 .172 No_date 5:40 9.84 n/a
01572> + 05:VG-8 91.80 .853 No_date 4:00 14.85 n/a
01573> + 06:VG-9 11.40 .667 No_date 1:25 17.49 n/a
01574> + 09:VGR2-2 890.10 2.863 No_date 5:10 9.23 n/a
01575> [DT= 5.00] SUM= 01:Fortun 1126.70 4.068 No_date 4:50 9.77 n/a
01576> 102:0046-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01577> SAVE HYD 01:Fortun 1126.70 4.068 No_date 4:50 9.77 n/a
01578> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-Fortun.102
01579> remark:Fortune
01580> 102:0047-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01581> ROUTE CHANNEL -> 01:Fortun 1126.70 4.068 No_date 4:50 9.77 n/a
01582> [RDT= 5.00] out<- 03:VGR2-3 1126.70 4.021 No_date 5:10 9.77 n/a
01583> [L/S/n= 750./ .200/.035]
01584> [Vmax=.545:Dmax=.465]
01585> 102:0048-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01586> CALIB STANDHYD 02:VG-10 20.30 1.172 No_date 1:25 17.49 5.16
01587> [XIMP=.40:TIMP=.50]
01588> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14: F= .00]
01589> [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 50.:MNP=.250:SCP= .0]
01590> [Impervious area: IAimp= .80:SLPI= .30:LGI= 560.:MNI=.013:SCI= .0]
01591> 102:0049-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01592> ADD HYD 02:VG-10 20.30 1.172 No_date 1:25 17.49 n/a
01593> + 03:VGR2-3 1126.70 4.021 No_date 5:10 9.77 n/a
01594> [DT= 5.00] SUM= 09:JockVG 1147.00 4.022 No_date 5:10 9.91 n/a
01595> 102:0050-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01596> SAVE HYD 09:JockVG 1147.00 4.022 No_date 5:10 9.91 n/a
01597> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-JockVG.102
01598> remark:Flow from Van Gaal Drain at Jock River
01599> ** END OF RUN : 104
01600>
01601> *****
01602>
01603>
01604>
01605>
01606>
01607> RUN:COMMAND#
01608> 105:0001-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01609> START
01610> [TZERO = .00 hrs on 0]
01611> [METOUT= 2 (1=imperial, 2=metric output)]
01612> [NSTORM= 1]
01613> [NRUN = 105]
01614> *****
01615> # SWMHYMO Ver:5.02/Jan 2001 <BETA> / INPUT DATA FILE
01616> *****
01617> # Project Name: [Richmond FPM] Project Number: [709]
01618> # Date : 04-21-2009
01619> # Revised : 05-27-2009; 07-22-2009; 08-06-2009; 08-31-2009; 11-16-2009
01620> # Modeller : [Bryan Willcott B.Eng.]
01621> # Company : J.F. Sabourin and Associates
01622> # License # : 3410370
01623> *****
01624> *****
01625> # [BW] May 27, 2009
01626> # This model has been updated using revised values for Tp. Previous versions
01627> # of this model used a calculated Tp=0.6Tc. This model used a calculated
01628> # Tp=0.67Tc.
01629> *****
01630> # [BW] July 22, 2009
01631> # This model has been revised to include "existing" cross section information
01632> # received from Robinson Consultants. The Cross section revised in the model
01633> # is Sec 5.2 (channel receiving flow from "arbuck"). Also, channel and

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01634> # floodplain slopes for ROUTE CHANNEL commands were updated to be equal
01635> *****
01636> # [BW] August 6, 2009
01637> # This model has been revised to include cross section information
01638> # from Robinson Consultants Engineer's Report July 2003. The cross
01639> # section revised in the model is Sec 5.1. Cross sections Sec 1.03
01640> # and Sec 5.3 have also been revised
01641> *****
01642> # [BW] August 31, 2009
01643> # Model updated to include the proposed DSEL berm. This affects the geometry
01644> # of Route Channel Sect 5.2 located on the Arbuckle drain. Route Channels 5.2
01645> # and 1.03 have also been revised to reduce the number of values in the
01646> # x-y matrix.
01647> *****
01648> # [BW] November 16, 2009
01649> # Model updated to include revised CN and Tp values subsequent to review of
01650> # memo received from AECOM on Oct. 2, 2009
01651> *****
01652> #
01653> 105:0002-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01654> READ STORM
01655> Filename = STORM.001
01656> Comment = 5 years Chicago Storm 4 Hours step 10 min, City of Ottawa
01657> [SDT=10.00:SDUR= 4.00:PTOT= 45.17]
01658> *****
01659> # Van Gaal / Arbuckle Drain
01660> *****
01661> # DSEL SUBCATCHMENT VG-1 HAS BEEN BROKEN INTO 6 SUB-AREAS (BW)
01662> *****
01663> 105:0003-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01664> CALIB NASHYD 01:VG-1A 311.90 1.095 No_date 7:10 12.59 .279
01665> [CN= 73.0: N= 3.00]
01666> [Tp= 5.30:DT= 5.00]
01667> 105:0004-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01668> SAVE HYD 01:VG-1A 311.90 1.095 No_date 7:10 12.59 n/a
01669> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-1A.105
01670> remark:VG-1A
01671> *****
01672> # Tp FOR VG-1B HAS BEEN REVISED TO REFLECT A HYDRAULIC LENGTH OF 1710 m, A
01673> # LENGTH THAT INCLUDES DISTANCE TO THE VG1-1 CONFLUENCE IN ADDITION TO THE
01674> # LONGEST FLOW PATH WITHIN VG-1B. THIS IS DONE TO SIMULATE CHANNEL ROUTING
01675> *****
01676> 105:0005-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01677> CALIB NASHYD 02:VG-1B 24.80 .159 No_date 4:40 12.54 .278
01678> [CN= 73.0: N= 3.00]
01679> [Tp= 2.70:DT= 5.00]
01680> *****
01681> # VG1-1 IS THE SUM OF FLOWS TO THE CONFLUENCE OF NORTHERN MOST WATERCOURSE IN
01682> # OUR AREA OF STUDY WITH THE ROADSIDE DITCH ON GARVIN ROAD
01683> *****
01684> #
01685> 105:0006-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01686> ADD HYD 01:VG-1A 311.90 1.095 No_date 7:10 12.59 n/a
01687> + 02:VG-1B 24.80 .159 No_date 4:40 12.54 n/a
01688> [DT= 5.00] SUM= 03:VG1-1 336.70 1.197 No_date 6:45 12.59 n/a
01689> 105:0007-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01690> SAVE HYD 03:VG1-1 336.70 1.197 No_date 6:45 12.59 n/a
01691> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-1.105
01692> remark:VG1-1
01693> 105:0008-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01694> CALIB NASHYD 04:VG-1D 47.80 .799 No_date 3:30 23.55 .521
01695> [CN= 88.0: N= 3.00]
01696> [Tp= 1.80:DT= 5.00]
01697> *****
01698> # VG1-2 IS THE SUM OF FLOWS AT THE GARVIN ROAD CROSS CULVERT AND
01699> # CONSERVATIVELY INCLUDES THE AREA VG-1D, WHICH IS LOCATED JUST DOWNSTREAM
01700> # OF THE CULVERT
01701> *****
01702> #
01703> 105:0009-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01704> ADD HYD 03:VG1-1 336.70 1.197 No_date 6:45 12.59 n/a

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01705>          + 04:VG-1D  47.80  .799 No_date  3:30  23.55  n/a
01706> [DT= 5.00] SUM= 05:VG1-2  384.50  1.615 No_date  4:50  13.95  n/a
01707> 105:0010-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01708> SAVE HYD          05:VG1-2  384.50  1.615 No_date  4:50  13.95  n/a
01709>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-2.105
01710>   remark:VG1-2
01711> 105:0011-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01712> ROUTE CHANNEL -> 05:VG1-2  384.50  1.615 No_date  4:50  13.95  n/a
01713> [RDT= 5.00] out<- 06:VG1R-2  384.50  1.570 No_date  5:40  13.95  n/a
01714> [L/S/n= 865./ .150/.035]
01715> {Vmax= .431:Dmax= .572}
01716> 105:0012-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01717> CALIB NASHYD      07:VG-1C  211.80  .750 No_date  6:35  11.34  .251
01718> [CN= 70.0: N= 3.00]
01719> [Tp= 4.70:DT= 5.00]
01720> 105:0013-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01721> CALIB NASHYD      08:VG-1E  13.40  .247 No_date  2:05  12.54  .278
01722> [CN= 73.0: N= 3.00]
01723> [Tp= .64:DT= 5.00]
01724> *****
01725> # VG1-3 IS THE SUM OF FLOWS TO JOY'S ROAD CROSS CULVERT AND CONSERVATIVELY
01726> # INCLUDES THE AREA VG-1E, WHICH IS LOCATED JUST DOWNSTREAM OF THE CULVERT
01727> *****
01728> #
01729> 105:0014-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01730> ADD HYD          07:VG-1C  211.80  .750 No_date  6:35  11.34  n/a
01731>          + 08:VG-1E  13.40  .247 No_date  2:05  12.54  n/a
01732> [DT= 5.00] SUM= 09:VG1-3  225.20  .751 No_date  6:35  11.41  n/a
01733> 105:0015-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01734> SAVE HYD          09:VG1-3  225.20  .751 No_date  6:35  11.41  n/a
01735>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-3.105
01736>   remark:VG1-3
01737> 105:0016-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01738> ROUTE CHANNEL -> 09:VG1-3  225.20  .751 No_date  6:35  11.41  n/a
01739> [RDT= 5.00] out<- 10:VG1R-3  225.20  .742 No_date  7:00  11.41  n/a
01740> [L/S/n= 630./ .200/.035]
01741> {Vmax= .283:Dmax= .390}
01742> *****
01743> # VG1-4 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE WATERCOURSE FROM JOY'S
01744> # ROAD WITH THE MAIN DRAIN
01745> *****
01746> #
01747> 105:0017-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01748> ADD HYD          06:VG1R-2  384.50  1.570 No_date  5:40  13.95  n/a
01749>          + 10:VG1R-3  225.20  .742 No_date  7:00  11.41  n/a
01750> [DT= 5.00] SUM= 01:VG1-4  609.70  2.268 No_date  6:05  13.01  n/a
01751> 105:0018-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01752> SAVE HYD          01:VG1-4  609.70  2.268 No_date  6:05  13.01  n/a
01753>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-4.105
01754>   remark:VG1-4
01755> 105:0019-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01756> ROUTE CHANNEL -> 01:VG1-4  609.70  2.268 No_date  6:05  13.01  n/a
01757> [RDT= 5.00] out<- 02:VG1R-4  609.70  2.253 No_date  6:40  13.01  n/a
01758> [L/S/n= 485./ .200/.035]
01759> {Vmax= .476:Dmax= .980}
01760> 105:0020-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01761> CALIB NASHYD      03:VG-1F  117.70  1.230 No_date  4:45  21.59  .478
01762> [CN= 86.0: N= 3.00]
01763> [Tp= 2.90:DT= 5.00]
01764> *****
01765> # VG1 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE VAN GAAL WEST MAIN DRAIN
01766> # WITH VAN GAAL WEST TRIBUTARY
01767> *****
01768> #
01769> 105:0021-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01770> ADD HYD          02:VG1R-4  609.70  2.253 No_date  6:40  13.01  n/a
01771>          + 03:VG-1F  117.70  1.230 No_date  4:45  21.59  n/a
01772> [DT= 5.00] SUM= 04:VG1  727.40  3.314 No_date  5:40  14.40  n/a
01773> 105:0022-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01774> SAVE HYD          04:VG1  727.40  3.314 No_date  5:40  14.40  n/a
01775>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1.105

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01776>   remark:VG1
01777> 105:0023-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01778> ROUTE CHANNEL -> 04:VG1  727.40  3.314 No_date  5:40  14.40  n/a
01779> [RDT= 5.00] out<- 05:VGR2-1  727.40  3.306 No_date  5:55  14.40  n/a
01780> [L/S/n= 755./ .200/.035]
01781> {Vmax= .890:Dmax= .888}
01782> 105:0024-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01783> CALIB NASHYD      06:VG-2  63.10  .855 No_date  3:20  17.61  .390
01784> [CN= 81.0: N= 3.00]
01785> [Tp= 1.60:DT= 5.00]
01786> 105:0025-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01787> ROUTE CHANNEL -> 06:VG-2  63.10  .855 No_date  3:20  17.61  n/a
01788> [RDT= 5.00] out<- 07:PerN  63.10  .767 No_date  4:05  17.61  n/a
01789> [L/S/n= 550./ .200/.035]
01790> {Vmax= .243:Dmax= .668}
01791> 105:0026-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01792> CALIB NASHYD      08:VG-3  40.60  .744 No_date  3:15  23.55  .521
01793> [CN= 88.0: N= 3.00]
01794> [Tp= 1.60:DT= 5.00]
01795> 105:0027-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01796> CALIB STANDHYD    09:VG-4  24.60  1.982 No_date  1:35  26.23  .581
01797> [XIMP= 40:TIMP= 50]
01798> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14: F= .00]
01799> [Pervious area: Iaper= 1.50:SLPP=1.50:LGP= 35.:MNP=.250:SCP= .0]
01800> [Impervious area: Iaimp= .80:SLPI= .30:LGI=1000.:MNI=.013:SCI= .0]
01801> 105:0028-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01802> ADD HYD          05:VGR2-1  727.40  3.306 No_date  5:55  14.40  n/a
01803>          + 07:PerN  63.10  .767 No_date  4:05  17.61  n/a
01804>          + 08:VG-3  40.60  .744 No_date  3:15  23.55  n/a
01805>          + 09:VG-4  24.60  1.982 No_date  1:35  26.23  n/a
01806> [DT= 5.00] SUM= 01:perths  855.70  4.332 No_date  4:50  15.41  n/a
01807> 105:0029-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01808> SAVE HYD          01:perths  855.70  4.332 No_date  4:50  15.41  n/a
01809>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-perths.105
01810>   remark:perthst
01811> 105:0030-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01812> CALIB NASHYD      02:VG-5  34.40  .291 No_date  4:15  14.53  .322
01813> [CN= 76.0: N= 3.00]
01814> [Tp= 2.30:DT= 5.00]
01815> 105:0031-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01816> ROUTE CHANNEL -> 02:VG-5  34.40  .291 No_date  4:15  14.53  n/a
01817> [RDT= 5.00] out<- 03:PerS  34.40  .284 No_date  4:45  14.53  n/a
01818> [L/S/n= 550./ .200/.035]
01819> {Vmax= .424:Dmax= .529}
01820> 105:0032-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01821> ADD HYD          01:perths  855.70  4.332 No_date  4:50  15.41  n/a
01822>          + 03:PerS  34.40  .284 No_date  4:45  14.53  n/a
01823> [DT= 5.00] SUM= 02:arbutck  890.10  4.616 No_date  4:50  15.38  n/a
01824> 105:0033-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01825> SAVE HYD          02:arbutck  890.10  4.616 No_date  4:50  15.38  n/a
01826>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-arbutck.105
01827>   remark:arbutck
01828> 105:0034-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01829> ROUTE CHANNEL -> 02:arbutck  890.10  4.616 No_date  4:50  15.38  n/a
01830> [RDT= 5.00] out<- 09:VGR2-2  890.10  4.564 No_date  5:15  15.38  n/a
01831> [L/S/n= 520./ .150/.035]
01832> {Vmax= .520:Dmax= 1.140}
01833> 105:0035-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01834> CALIB NASHYD      01:VG-6  94.20  .632 No_date  5:05  15.12  .335
01835> [CN= 77.0: N= 3.00]
01836> [Tp= 3.20:DT= 5.00]
01837> 105:0036-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01838> ROUTE CHANNEL -> 01:VG-6  94.20  .632 No_date  5:05  15.12  n/a
01839> [RDT= 5.00] out<- 02:VG-6  94.20  .537 No_date  8:10  15.12  n/a
01840> [L/S/n= 600./ .180/.035]
01841> {Vmax= .095:Dmax= .439}
01842> 105:0037-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01843> SAVE HYD          02:VG-6  94.20  .537 No_date  8:10  15.12  n/a
01844>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-6.105
01845>   remark:VG-6
01846> 105:0038-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.

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01847> CALIB NASHYD 03:VG-7 39.20 .313 No_date 4:50 16.51 .365
01848> [CN= 80.0: N= 3.00]
01849> [Tp= 2.90:DT= 5.00]
01850> 105:0039-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01851> SAVE HYD 03:VG-7 39.20 .313 No_date 4:50 16.51 n/a
01852> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-7.105
01853> remark:VG-7
01854> 105:0040-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01855> ROUTE CHANNEL -> 03:VG-7 39.20 .313 No_date 4:50 16.51 n/a
01856> [RDT= 5.00] out<- 04:VG-7 39.20 .285 No_date 6:30 16.51 n/a
01857> [L/S/n= 1480./ .200/.035]
01858> {Vmax= .336:Dmax= .537}
01859> 105:0041-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01860> ADD HYD 02:VG-6 94.20 .537 No_date 8:10 15.12 n/a
01861> + 04:VG-7 39.20 .285 No_date 6:30 16.51 n/a
01862> [DT= 5.00] SUM= 05:Moore 133.40 .774 No_date 6:40 15.53 n/a
01863> 105:0042-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01864> SAVE HYD 05:Moore 133.40 .774 No_date 6:40 15.53 n/a
01865> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-Moore.105
01866> remark:Moore
01867> 105:0043-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01868> CALIB NASHYD 05:VG-8 91.80 1.356 No_date 3:55 23.47 .520
01869> [CN= 88.0: N= 3.00]
01870> [Tp= 2.10:DT= 5.00]
01871> 105:0044-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01872> CALIB STANDHYD 06:VG-9 11.40 1.122 No_date 1:25 26.23 .581
01873> [XIMP=.40:TIMP=.50]
01874> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAV=4.14: F= .00]
01875> [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 50.:MNP=.250:SCP= .0]
01876> [Impervious area: IAimp= .80:SLPI= .30:LGI= 530.:MNI=.013:SCI= .0]
01877> 105:0045-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01878> ADD HYD 02:VG-6 94.20 .537 No_date 8:10 15.12 n/a
01879> + 04:VG-7 39.20 .285 No_date 6:30 16.51 n/a
01880> + 05:VG-8 91.80 1.356 No_date 3:55 23.47 n/a
01881> + 06:VG-9 11.40 1.122 No_date 1:25 26.23 n/a
01882> + 09:VGR2-2 890.10 4.564 No_date 5:15 15.38 n/a
01883> [DT= 5.00] SUM= 01:Fortun 1126.70 6.366 No_date 4:55 16.17 n/a
01884> 105:0046-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01885> SAVE HYD 01:Fortun 1126.70 6.366 No_date 4:55 16.17 n/a
01886> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-Fortun.105
01887> remark:Fortune
01888> 105:0047-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01889> ROUTE CHANNEL -> 01:Fortun 1126.70 6.366 No_date 4:55 16.17 n/a
01890> [RDT= 5.00] out<- 03:VGR2-3 1126.70 6.318 No_date 5:15 16.17 n/a
01891> [L/S/n= 750./ .200/.035]
01892> {Vmax= .618:Dmax= .567}
01893> 105:0048-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01894> CALIB STANDHYD 02:VG-10 20.30 1.974 No_date 1:25 26.23 .581
01895> [XIMP=.40:TIMP=.50]
01896> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAV=4.14: F= .00]
01897> [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 50.:MNP=.250:SCP= .0]
01898> [Impervious area: IAimp= .80:SLPI= .30:LGI= 560.:MNI=.013:SCI= .0]
01899> 105:0049-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01900> ADD HYD 02:VG-10 20.30 1.974 No_date 1:25 26.23 n/a
01901> + 03:VGR2-3 1126.70 6.318 No_date 5:15 16.17 n/a
01902> [DT= 5.00] SUM= 09:JockVG 1147.00 6.318 No_date 5:15 16.34 n/a
01903> 105:0050-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01904> SAVE HYD 09:JockVG 1147.00 6.318 No_date 5:15 16.34 n/a
01905> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-JockVG.105
01906> remark:Flow from Van Gaal Drain at Jock River
01907> ** END OF RUN : 198
01908>
01909> *****
01910>
01911>
01912>
01913>
01914>
01915> RUN:COMMAND#
01916> 199:0001-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01917> START

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01918> [TZERO = .00 hrs on 0]
01919> [METOUT= 2 (1=imperial, 2=metric output)]
01920> [NSTORM= 1]
01921> [NRUN = 199]
01922> *****
01923> # SWMHYMO Ver:5.02/Jan 2001 <BETA> / INPUT DATA FILE
01924> *****
01925> # Project Name: [Richmond FPM] Project Number: [709]
01926> # Date : 04-21-2009
01927> # Revised : 05-27-2009; 07-22-2009; 08-06-2009; 08-31-2009; 11-16-2009
01928> # Modeller : [Bryan Willcott B.Eng.]
01929> # Company : J.F. Sabourin and Associates
01930> # License # : 3410370
01931> *****
01932> *****
01933> # [BW] May 27, 2009
01934> # This model has been updated using revised values for Tp. Previous versions
01935> # of this model used a calculated Tp=0.6Tc. This model used a calculated
01936> # Tp=0.67Tc.
01937> *****
01938> # [BW] July 22, 2009
01939> # This model has been revised to include "existing" cross section information
01940> # received from Robinson Consultants. The Cross section revised in the model
01941> # is Sec 5.2 (channel receiving flow from "arbruck"). Also, channel and
01942> # floodplain slopes for ROUTE CHANNEL commands were updated to be equal
01943> *****
01944> # [BW] August 6, 2009
01945> # This model has been revised to include cross section information
01946> # from Robinson Consultants Engineer's Report July 2003. The cross
01947> # section revised in the model is Sec 5.1. Cross sections Sec 1.03
01948> # and Sec 5.3 have also been revised
01949> *****
01950> # [BW] August 31, 2009
01951> # Model updated to include the proposed DSEL berm. This affects the geometry
01952> # of Route Channel Sect 5.2 located on the Arbuckle drain. Route Channels 5.2
01953> # and 1.03 have also been revised to reduce the number of values in the
01954> # x-y matrix.
01955> *****
01956> # [BW] November 16, 2009
01957> # Model updated to include revised CN and Tp values subsequent to review of
01958> # memo received from AECOM on Oct. 2, 2009
01959> *****
01960> #
01961> 199:0002-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01962> READ STORM
01963> Filename = STORM.001
01964> Comment = 100 years Chicago Storm 4 Hours step 10 min, City of Ottawa
01965> [SDT=10.00:SDUR= 4.00:PTOT= 76.00]
01966> *****
01967> # Van Gaal / Arbuckle Drain
01968> *****
01969> # DSEL SUBCATCHMENT VG-1 HAS BEEN BROKEN INTO 6 SUB-AREAS (BW)
01970> *****
01971> 199:0003-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01972> CALIB NASHYD 01:VG-1A 311.90 2.725 No_date 7:05 31.31 .412
01973> [CN= 73.0: N= 3.00]
01974> [Tp= 5.30:DT= 5.00]
01975> 199:0004-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01976> SAVE HYD 01:VG-1A 311.90 2.725 No_date 7:05 31.31 n/a
01977> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-1A.199
01978> remark:VG-1A
01979> *****
01980> # Tp FOR VG-1B HAS BEEN REVISED TO REFLECT A HYDRAULIC LENGTH OF 1710 m, A
01981> # LENGTH THAT INCLUDES DISTANCE TO THE VG1-1 CONFLUENCE IN ADDITION TO THE
01982> # LONGEST FLOW PATH WITHIN VG-1B. THIS IS DONE TO SIMULATE CHANNEL ROUTING
01983> *****
01984> 199:0005-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01985> CALIB NASHYD 02:VG-1B 24.80 .398 No_date 4:35 31.24 .411
01986> [CN= 73.0: N= 3.00]
01987> [Tp= 2.70:DT= 5.00]
01988> *****

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01989> # VG1-1 IS THE SUM OF FLOWS TO THE CONFLUENCE OF NORTHERN MOST WATERCOURSE IN
01990> # OUR AREA OF STUDY WITH THE ROADSIDE DITCH ON GARVIN ROAD
01991> #*****
01992> #
01993> 199:0006-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01994>   ADD HYD          01:VG-1A  311.90  2.725 No_date  7:05  31.31  n/a
01995>           + 02:VG-1B  24.80    .398 No_date  4:35  31.24  n/a
01996>           [DT= 5.00] SUM= 03:VG1-1  336.70  2.980 No_date  6:40  31.30  n/a
01997> 199:0007-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
01998>   SAVE HYD          03:VG1-1  336.70  2.980 No_date  6:40  31.30  n/a
01999>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-1.199
02000>   remark:VG1-1
02001> 199:0008-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02002>   CALIB NASHYD      04:VG-1D  47.80  1.718 No_date  3:25  49.96  .657
02003>   [CN= 88.0: N= 3.00]
02004>   [Tp= 1.80:DT= 5.00]
02005> #*****
02006> # VG1-2 IS THE SUM OF FLOWS AT THE GARVIN ROAD CROSS CULVERT AND
02007> # CONSERVATIVELY INCLUDES THE AREA VG-1D, WHICH IS LOCATED JUST DOWNSTREAM
02008> # OF THE CULVERT
02009> #*****
02010> #
02011> 199:0009-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02012>   ADD HYD          03:VG1-1  336.70  2.980 No_date  6:40  31.30  n/a
02013>           + 04:VG-1D  47.80    1.718 No_date  3:25  49.96  n/a
02014>           [DT= 5.00] SUM= 05:VG1-2  384.50  3.803 No_date  4:55  33.62  n/a
02015> 199:0010-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02016>   SAVE HYD          05:VG1-2  384.50  3.803 No_date  4:55  33.62  n/a
02017>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-2.199
02018>   remark:VG1-2
02019> 199:0011-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02020>   ROUTE CHANNEL    -> 05:VG1-2  384.50  3.803 No_date  4:55  33.62  n/a
02021>   [RDT= 5.00] out<- 06:VG1R-2  384.50  3.604 No_date  6:15  33.62  n/a
02022>   [L/S/n= 865./ .150/.035]
02023>   {Vmax= .288:Dmax= .778}
02024> 199:0012-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02025>   CALIB NASHYD      07:VG-1C  211.80  1.903 No_date  6:30  28.73  .378
02026>   [CN= 70.0: N= 3.00]
02027>   [Tp= 4.70:DT= 5.00]
02028> 199:0013-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02029>   CALIB NASHYD      08:VG-1E  13.40    .643 No_date  2:05  31.24  .411
02030>   [CN= 73.0: N= 3.00]
02031>   [Tp= .64:DT= 5.00]
02032> #*****
02033> # VG1-3 IS THE SUM OF FLOWS TO JOY'S ROAD CROSS CULVERT AND CONSERVATIVELY
02034> # INCLUDES THE AREA VG-1E, WHICH IS LOCATED JUST DOWNSTREAM OF THE CULVERT
02035> #*****
02036> #
02037> 199:0014-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02038>   ADD HYD          07:VG-1C  211.80  1.903 No_date  6:30  28.73  n/a
02039>           + 08:VG-1E  13.40    .643 No_date  2:05  31.24  n/a
02040>           [DT= 5.00] SUM= 09:VG1-3  225.20  1.904 No_date  6:30  28.88  n/a
02041> 199:0015-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02042>   SAVE HYD          09:VG1-3  225.20  1.904 No_date  6:30  28.88  n/a
02043>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-3.199
02044>   remark:VG1-3
02045> 199:0016-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02046>   ROUTE CHANNEL    -> 09:VG1-3  225.20  1.904 No_date  6:30  28.88  n/a
02047>   [RDT= 5.00] out<- 10:VG1R-3  225.20  1.892 No_date  6:50  28.88  n/a
02048>   [L/S/n= 630./ .200/.035]
02049>   {Vmax= .390:Dmax= .645}
02050> #*****
02051> # VG1-4 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE WATERCOURSE FROM JOY'S
02052> # ROAD WITH THE MAIN DRAIN
02053> #*****
02054> #
02055> 199:0017-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02056>   ADD HYD          06:VG1R-2  384.50  3.604 No_date  6:15  33.62  n/a
02057>           + 10:VG1R-3  225.20  1.892 No_date  6:50  28.88  n/a
02058>           [DT= 5.00] SUM= 01:VG1-4  609.70  5.477 No_date  6:25  31.87  n/a
02059> 199:0018-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.

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02060>   SAVE HYD          01:VG1-4  609.70  5.477 No_date  6:25  31.87  n/a
02061>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-4.199
02062>   remark:VG1-4
02063> 199:0019-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02064>   ROUTE CHANNEL    -> 01:VG1-4  609.70  5.477 No_date  6:25  31.87  n/a
02065>   [RDT= 5.00] out<- 02:VG1R-4  609.70  5.385 No_date  7:15  31.87  n/a
02066>   [L/S/n= 485./ .200/.035]
02067>   {Vmax= .264:Dmax= 1.166}
02068> 199:0020-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02069>   CALIB NASHYD      03:VG-1F  117.70  2.686 No_date  4:40  46.95  .618
02070>   [CN= 86.0: N= 3.00]
02071>   [Tp= 2.90:DT= 5.00]
02072> #*****
02073> # VG1 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE VAN GAAL WEST MAIN DRAIN
02074> # WITH VAN GAAL WEST TRIBUTARY
02075> #*****
02076> #
02077> 199:0021-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02078>   ADD HYD          02:VG1R-4  609.70  5.385 No_date  7:15  31.87  n/a
02079>           + 03:VG-1F  117.70  2.686 No_date  4:40  46.95  n/a
02080>           [DT= 5.00] SUM= 04:VG1  727.40  7.378 No_date  6:00  34.31  n/a
02081> 199:0022-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02082>   SAVE HYD          04:VG1  727.40  7.378 No_date  6:00  34.31  n/a
02083>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1.199
02084>   remark:VG1
02085> 199:0023-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02086>   ROUTE CHANNEL    -> 04:VG1  727.40  7.378 No_date  6:00  34.31  n/a
02087>   [RDT= 5.00] out<- 05:VGR2-1  727.40  7.367 No_date  6:15  34.31  n/a
02088>   [L/S/n= 755./ .200/.035]
02089>   {Vmax= 1.110:Dmax= 1.307}
02090> 199:0024-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02091>   CALIB NASHYD      06:VG-2  63.10  1.992 No_date  3:15  40.35  .531
02092>   [CN= 81.0: N= 3.00]
02093>   [Tp= 1.60:DT= 5.00]
02094> 199:0025-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02095>   ROUTE CHANNEL    -> 06:VG-2  63.10  1.992 No_date  3:15  40.35  n/a
02096>   [RDT= 5.00] out<- 07:PerN  63.10  1.774 No_date  4:00  40.35  n/a
02097>   [L/S/n= 550./ .200/.035]
02098>   {Vmax= .230:Dmax= .783}
02099> 199:0026-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02100>   CALIB NASHYD      08:VG-3  40.60  1.603 No_date  3:10  49.96  .657
02101>   [CN= 88.0: N= 3.00]
02102>   [Tp= 1.60:DT= 5.00]
02103> 199:0027-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02104>   CALIB STANDHYD   09:VG-4  24.60  4.669 No_date  1:30  52.46  .690
02105>   [XIMP=.40:TIMP=.50]
02106>   [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14: F= .00]
02107>   [Pervious area: IAPER= 1.50:SLPP=1.50:LGP= 35.:MNP=.250:SCP= .0]
02108>   [Impervious area: IAIMP= .80:SLPI= .30:LGI=1000.:MNI=.013:SCI= .0]
02109> 199:0028-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02110>   ADD HYD          05:VGR2-1  727.40  7.367 No_date  6:15  34.31  n/a
02111>           + 07:PerN  63.10  1.774 No_date  4:00  40.35  n/a
02112>           + 08:VG-3  40.60  1.603 No_date  3:10  49.96  n/a
02113>           + 09:VG-4  24.60  4.669 No_date  1:30  52.46  n/a
02114>           [DT= 5.00] SUM= 01:perths  855.70  9.297 No_date  4:55  36.02  n/a
02115> 199:0029-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02116>   SAVE HYD          01:perths  855.70  9.297 No_date  4:55  36.02  n/a
02117>   fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-perths.199
02118>   remark:perthst
02119> 199:0030-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02120>   CALIB NASHYD      02:VG-5  34.40  .701 No_date  4:10  34.78  .458
02121>   [CN= 76.0: N= 3.00]
02122>   [Tp= 2.30:DT= 5.00]
02123> 199:0031-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02124>   ROUTE CHANNEL    -> 02:VG-5  34.40  .701 No_date  4:10  34.78  n/a
02125>   [RDT= 5.00] out<- 03:PerS  34.40  .657 No_date  4:50  34.78  n/a
02126>   [L/S/n= 550./ .200/.035]
02127>   {Vmax= .253:Dmax= .645}
02128> 199:0032-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
02129>   ADD HYD          01:perths  855.70  9.297 No_date  4:55  36.02  n/a
02130>           + 03:PerS  34.40  .657 No_date  4:50  34.78  n/a

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02131> [DT= 5.00] SUM= 02:arbusck 890.10 9.954 No_date 4:55 35.97 n/a
02132> 199:0033-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
02133> SAVE HYD 02:arbusck 890.10 9.954 No_date 4:55 35.97 n/a
02134> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-arbusck.199
02135> remark:arbusck
02136> 199:0034-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
02137> ROUTE CHANNEL -> 02:arbusck 890.10 9.954 No_date 4:55 35.97 n/a
02138> [RDT= 5.00] out<- 09:VGR2-2 890.10 9.812 No_date 5:15 35.97 n/a
02139> [L/S/n= 520./ .150/.035]
02140> {Vmax= .415:Dmax= 1.400}
02141> 199:0035-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
02142> CALIB NASHYD 01:VG-6 94.20 1.503 No_date 5:00 35.87 .472
02143> [CN= 77.0: N= 3.00]
02144> [Tp= 3.20:DT= 5.00]
02145> 199:0036-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
02146> ROUTE CHANNEL -> 01:VG-6 94.20 1.503 No_date 5:00 35.87 n/a
02147> [RDT= 5.00] out<- 02:VG-6 94.20 1.174 No_date 7:15 35.87 n/a
02148> [L/S/n= 600./ .180/.035]
02149> {Vmax= .077:Dmax= .470}
02150> 199:0037-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
02151> SAVE HYD 02:VG-6 94.20 1.174 No_date 7:15 35.87 n/a
02152> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-6.199
02153> remark:VG-6
02154> 199:0038-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
02155> CALIB NASHYD 03:VG-7 39.20 .735 No_date 4:45 38.65 .509
02156> [CN= 80.0: N= 3.00]
02157> [Tp= 2.90:DT= 5.00]
02158> 199:0039-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
02159> SAVE HYD 03:VG-7 39.20 .735 No_date 4:45 38.65 n/a
02160> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-7.199
02161> remark:VG-7
02162> 199:0040-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
02163> ROUTE CHANNEL -> 03:VG-7 39.20 .735 No_date 4:45 38.65 n/a
02164> [RDT= 5.00] out<- 04:VG-7 39.20 .566 No_date 7:45 38.65 n/a
02165> [L/S/n= 1480./ .200/.035]
02166> {Vmax= .177:Dmax= .617}
02167> 199:0041-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
02168> ADD HYD 02:VG-6 94.20 1.174 No_date 7:15 35.87 n/a
02169> + 04:VG-7 39.20 .566 No_date 7:45 38.65 n/a
02170> [DT= 5.00] SUM= 05:Moore 133.40 1.736 No_date 7:10 36.69 n/a
02171> 199:0042-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
02172> SAVE HYD 05:Moore 133.40 1.736 No_date 7:10 36.69 n/a
02173> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-Moore.199
02174> remark:Moore
02175> 199:0043-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
02176> CALIB NASHYD 05:VG-8 91.80 2.908 No_date 3:50 49.87 .656
02177> [CN= 88.0: N= 3.00]
02178> [Tp= 2.10:DT= 5.00]
02179> 199:0044-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
02180> CALIB STANDHYD 06:VG-9 11.40 2.701 No_date 1:25 52.46 .690
02181> [XIMP=.40:TIMP=.50]
02182> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAI=4.14: F= .00]
02183> [Pervious area: IAPER= 1.50:SLPP=1.50:LGP= 50.:MNP=.250:SCP= .0]
02184> [Impervious area: IAimp= .80:SLPI=.30:LGI= 530.:MNI=.013:SCI= .0]
02185> 199:0045-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
02186> ADD HYD 02:VG-6 94.20 1.174 No_date 7:15 35.87 n/a
02187> + 04:VG-7 39.20 .566 No_date 7:45 38.65 n/a
02188> + 05:VG-8 91.80 2.908 No_date 3:50 49.87 n/a
02189> + 06:VG-9 11.40 2.701 No_date 1:25 52.46 n/a
02190> + 09:VGR2-2 890.10 9.812 No_date 5:15 35.97 n/a
02191> [DT= 5.00] SUM= 01:Fortun 1126.70 13.483 No_date 5:10 37.35 n/a
02192> 199:0046-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
02193> SAVE HYD 01:Fortun 1126.70 13.483 No_date 5:10 37.35 n/a
02194> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-Fortun.199
02195> remark:Fortune
02196> 199:0047-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
02197> ROUTE CHANNEL -> 01:Fortun 1126.70 13.483 No_date 5:10 37.35 n/a
02198> [RDT= 5.00] out<- 03:VGR2-3 1126.70 13.433 No_date 5:20 37.35 n/a
02199> [L/S/n= 750./ .200/.035]
02200> {Vmax= .756:Dmax= .784}
02201> 199:0048-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.

02202> CALIB STANDHYD 02:VG-10 20.30 4.760 No_date 1:25 52.46 .690
02203> [XIMP=.40:TIMP=.50]
02204> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAI=4.14: F= .00]
02205> [Pervious area: IAPER= 1.50:SLPP=1.50:LGP= 50.:MNP=.250:SCP= .0]
02206> [Impervious area: IAimp= .80:SLPI=.30:LGI= 560.:MNI=.013:SCI= .0]
02207> 199:0049-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
02208> ADD HYD 02:VG-10 20.30 4.760 No_date 1:25 52.46 n/a
02209> + 03:VGR2-3 1126.70 13.433 No_date 5:20 37.35 n/a
02210> [DT= 5.00] SUM= 09:JockVG 1147.00 13.433 No_date 5:20 37.62 n/a
02211> 199:0050-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
02212> SAVE HYD 09:JockVG 1147.00 13.433 No_date 5:20 37.62 n/a
02213> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-JockVG.199
02214> remark:Flow from Van Gaal Drain at Jock River
02215> 199:0002-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
02216> FINISH
02217> -----
02218> *****
02219> WARNINGS / ERRORS / NOTES
02220> -----
02221> Simulation ended on 2009-11-25 at 18:46:35
02222> =====
02223> -----
02224> -----


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00001> 2      Metric units
00002> *#*****
00003> *# SWMHYMO Ver:5.02/Jan 2001 <BETA> / INPUT DATA FILE
00004> *#*****
00005> *# Project Name: [Richmond FPM]      Project Number: [709]
00006> *# Date       : 04-21-2009
00007> *# Revised    : 04-31-2009; 05-25-2009; 07-22-2009; 08-06-2009; 08-31-2009
00008> *#           : 11-16-2009
00009> *# Modeller   : [Bryan Willcott B.Eng.]
00010> *# Company    : J.F. Sabourin and Associates
00011> *# License #   : 3410370
00012> *#*****
00013> *# [BW] April 31, 2009
00014> *# This model is the same as the JFSA summer model with the exception of the
00015> *# storm files used and the CN values have been increased to 95
00016> *#*****
00017> *# [BW] May 25, 2009
00018> *# This model has been updated using revised values for Tp. Previous versions
00019> *# of this model used a calculated Tp=0.6Tc. This model used a calculated
00020> *# Tp=0.67Tc. Manning's n values for the overbanks in the ROUTE CHANNEL
00021> *# commands have been changed to 0.05 for Spring conditions. Design storms
00022> *# have changed to match those used in the Jock River Model
00023> *#*****
00024> *# [BW] July 22, 2009
00025> *# This model has been revised to include "existing" cross section information
00026> *# received from Robinson Consultants. The Cross section revised in the model
00027> *# is Sec 5.2 (channel receiving flow from "arbucks"). Also, channel and
00028> *# floodplain slopes for ROUTE CHANNEL commands were updated to be equal
00029> *#*****
00030> *# [BW] August 6, 2009
00031> *# This model has been revised to include cross section information
00032> *# from Robinson Consultants Engineer's Report July 2003. The cross
00033> *# section revised in the model is Sec 5.1. Cross sections Sec 1.03
00034> *# and Sec 5.3 have also been revised
00035> *#*****
00036> *# [BW] August 31, 2009
00037> *# Model updated to include the proposed DSEL berm. This affects the geometry
00038> *# of Route Channel Sect 5.2 located on the Arbuttle drain. Route Channels 5.2
00039> *# and 1.03 have also been revised to reduce the number of values in the
00040> *# x-y matrix
00041> *#*****
00042> *# [BW] November 16, 2009
00043> *# Model updated to include revised Tp values subsequent to review of
00044> *# memo received from AECOM on Oct. 2, 2009
00045> *#*****
00046> *#
00047> *# 10 day - 2 year storm with snow melt
00048> *# START          TZERO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[002]
00049> *#               ["50021012.STM"]
00050> *#-----|-----|
00051> *# READ STORM      STORM_FILENAME=["STORM.001"]
00052> *#-----|-----|
00053> *# SAVE HYD        ICASEsh=[1] START saving all simulated hydrographs
00054> *#               {All hydrologographs will be saved as NHYD.NRUN}
00055> *#               {Use SAVE HYD with ICASEsh=[-2] to cancel the autosave.}
00056> *#-----|-----|
00057> *#-----|-----|
00058> *#*****
00059> *# Van Gaal / Arbuttle Drain
00060> *#*****
00061> *# DSEL SUBCATCHMENT VG-1 HAS BEEN BROKEN INTO 6 SUB-AREAS (BW)
00062> *#*****
00063> *#-----|-----|
00064> *# CALIB NASHYD    ID=[1], NHYD=["VG-1A"], DT=[5]min, AREA=[311.9](ha),
00065> *#               DWF=[0](cms), CN/C=[95], IA=[3.9](mm),
00066> *#               N=[3], TP=[5.3]hrs,
00067> *#               RAINFALL=[ , , , ](mm/hr), END=-1
00068> *#-----|-----|
00069> *# SAVE HYD        ID=[1], # OF PCYCLES=[-1], ICASEsh=[1]
00070> *#               HYD_COMMENT=["VG-1A"]
00071> *#-----|-----|

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00072> *#*****
00073> *# Tp FOR VG-1B HAS BEEN REVISED TO REFLECT A HYDRAULIC LENGTH OF 1710 m, A
00074> *# LENGTH THAT INCLUDES DISTANCE TO THE VG1-1 CONFLUENCE IN ADDITION TO THE
00075> *# LONGEST FLOW PATH WITHIN VG-1B. THIS IS DONE TO SIMULATE CHANNEL ROUTING
00076> *#*****
00077> *# CALIB NASHYD    ID=[2], NHYD=["VG-1B"], DT=[5]min, AREA=[24.8](ha),
00078> *#               DWF=[0](cms), CN/C=[95], IA=[4.0](mm),
00079> *#               N=[3], TP=[2.7]hrs,
00080> *#               RAINFALL=[ , , , ](mm/hr), END=-1
00081> *#-----|-----|
00082> *#*****
00083> *# VG1-1 IS THE SUM OF FLOWS TO THE CONFLUENCE OF NORTHERN MOST WATERCOURSE IN
00084> *# OUR AREA OF STUDY WITH THE ROADSIDE DITCH ON GARVIN ROAD
00085> *#*****
00086> *#
00087> *# ADD HYD         IDsum=[3], NHYD=["VG1-1"], IDs to add=[1 2]
00088> *#-----|-----|
00089> *# SAVE HYD        ID=[3], # OF PCYCLES=[-1], ICASEsh=[1]
00090> *#               HYD_COMMENT=["VG1-1"]
00091> *#-----|-----|
00092> *# CALIB NASHYD    ID=[4], NHYD=["VG-1D"], DT=[5]min, AREA=[47.8](ha),
00093> *#               DWF=[0](cms), CN/C=[95], IA=[2.5](mm),
00094> *#               N=[3], TP=[1.8]hrs,
00095> *#               RAINFALL=[ , , , ](mm/hr), END=-1
00096> *#-----|-----|
00097> *#*****
00098> *# VG1-2 IS THE SUM OF FLOWS AT THE GARVIN ROAD CROSS CULVERT AND
00099> *# CONSERVATIVELY INCLUDES THE AREA VG-1D, WHICH IS LOCATED JUST DOWNSTREAM
00100> *# OF THE CULVERT
00101> *#*****
00102> *#
00103> *# ADD HYD         IDsum=[5], NHYD=["VG1-2"], IDs to add=[3 4]
00104> *#-----|-----|
00105> *# SAVE HYD        ID=[5], # OF PCYCLES=[-1], ICASEsh=[1]
00106> *#               HYD_COMMENT=["VG1-2"]
00107> *#-----|-----|
00108> *# ROUTE CHANNEL   IDout=[6], NHYD=["VG1R-2"], IDin=[5],
00109> *#               RDT=[5](min),
00110> *#               CHLGTH=[865](m), CHSLOPE=[0.15](%),
00111> *#               FPSLOPE=[0.15](%),
00112> *#               NSEG=[3]
00113> *#               ( SEGROUGH, SEGDIST (m))=[0.05,51.41 -0.035,55.58 0.05,228.3
00114> *#               ( DISTANCE (m), ELEVATION (m))=[0, 96.719]
00115> *#               [22.98, 96.598]
00116> *#               [42.45, 96.66]
00117> *#               [47.63, 96.5]
00118> *#               [49.64, 96.424]
00119> *#               [51.41, 96]
00120> *#               [53.36, 95.79]
00121> *#               [55.58, 95.887]
00122> *#               [57.42, 96.242]
00123> *#               [87.69, 96.5]
00124> *#               [119.62, 96.509]
00125> *#               [140.1, 96.601]
00126> *#               [179.39, 96.722]
00127> *#               [200.6, 96.89]
00128> *#               [228.39, 97]
00129> *#-----|-----|
00130> *# CALIB NASHYD    ID=[7], NHYD=["VG-1C"], DT=[5]min, AREA=[211.8](ha),
00131> *#               DWF=[0](cms), CN/C=[95], IA=[3.9](mm),
00132> *#               N=[3], TP=[4.7]hrs,
00133> *#               RAINFALL=[ , , , ](mm/hr), END=-1
00134> *#-----|-----|
00135> *# CALIB NASHYD    ID=[8], NHYD=["VG-1E"], DT=[5]min, AREA=[13.4](ha),
00136> *#               DWF=[0](cms), CN/C=[95], IA=[4.0](mm),
00137> *#               N=[3], TP=[0.64]hrs,
00138> *#               RAINFALL=[ , , , ](mm/hr), END=-1
00139> *#-----|-----|
00140> *#*****
00141> *# VG1-3 IS THE SUM OF FLOWS TO JOY'S ROAD CROSS CULVERT AND CONSERVATIVELY
00142> *# INCLUDES THE AREA VG-1E, WHICH IS LOCATED JUST DOWNSTREAM OF THE CULVERT

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00143> *#*****
00144> *#
00145> ADD HYD          IDsum=[9], NHYD=["VG1-3"], IDs to add=[7 8]
00146> *#-----|-----|
00147> SAVE HYD          ID=[9], # OF PCYCLES=[-1], ICASEsh=[1]
00148>                   HYD_COMMENT=["VG1-3"]
00149> *#-----|-----|
00150> ROUTE CHANNEL     IDout=[10], NHYD=["VGR-3"], IDin=[9],
00151>                   RDT=[5](min),
00152>                   CHLGTH=[630](m),  CHSLOPE=[0.20](%),
00153>                   FPSLOPE=[0.20](%),
00154>                   SECNUM=[1.02],    NSEG=[3]
00155>                   ( SEGROUGH, SEGDIST (m))=[0.05,80.53 -0.035,82.4 0.05,124.53
00156>                   ( DISTANCE (m), ELEVATION (m))=[0,
00157>                   0.61, 97.01
00158>                   3.8, 97.03
00159>                   17.49, 97.18
00160>                   19.18, 97.17
00161>                   26.62, 97.15
00162>                   46.29, 97.12
00163>                   73.97, 97.17
00164>                   76.3, 97.04
00165>                   77.53, 97
00166>                   80.53, 96.86
00167>                   81.38, 96.5
00168>                   82.4, 96.07
00169>                   87.91, 96.07
00170>                   89.65, 96.5
00171>                   90.75, 96.78
00172>                   91.88, 96.91
00173>                   96.2, 97
00174>                   99.01, 97.1
00175>                   119.73, 97.14
00176>                   124.53, 97]
00177> *#-----|-----|
00178> *#*****
00179> *# VG1-4 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE WATERCOURSE FROM JOY'S
00180> *# ROAD WITH THE MAIN DRAIN
00181> *#*****
00182> *#
00183> ADD HYD          IDsum=[1], NHYD=["VG1-4"], IDs to add=[6 10]
00184> *#-----|-----|
00185> SAVE HYD          ID=[1], # OF PCYCLES=[-1], ICASEsh=[1]
00186>                   HYD_COMMENT=["VG1-4"]
00187> *#-----|-----|
00188> ROUTE CHANNEL     IDout=[2], NHYD=["VGR1-4"], IDin=[1],
00189>                   RDT=[5](min),
00190>                   CHLGTH=[485](m),  CHSLOPE=[0.20](%),
00191>                   FPSLOPE=[0.20](%),
00192>                   SECNUM=[1.03],    NSEG=[3]
00193>                   ( SEGROUGH, SEGDIST (m))=[0.05,44.17 -0.035,53.58 0.05,243.3
00194>                   ( DISTANCE (m), ELEVATION (m))=
00195>                   [-44.2, 95.7
00196>                   0, 95.5
00197>                   19.69, 95.421
00198>                   27.91, 95.5
00199>                   31.73, 95.5
00200>                   32.29, 95.325
00201>                   32.71, 95.5
00202>                   41.04, 95.5
00203>                   44.17, 95.449
00204>                   45.63, 95.389
00205>                   48.22, 95
00206>                   48.54, 94.882
00207>                   49.35, 94.5
00208>                   49.64, 94.311
00209>                   50.46, 94.497
00210>                   52.21, 94.993
00211>                   53.58, 95.406
00212>                   55.08, 95.333
00213>                   55.94, 95.157

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00214>                   76.35, 95.275
00215>                   131, 95.403
00216>                   213.2, 95.5
00217>                   243.3, 95.8]
00218> *#-----|-----|
00219> CALIB NASHYD      ID=[3], NHYD=["VG-1F"], DT=[5]min, AREA=[117.7](ha),
00220>                   DWF=[0](cms),  CN/C=[95], IA=[2.6](mm),
00221>                   N=[3], TP=[2.9]hrs,
00222>                   RAINFALL=[ , , , ](mm/hr),  END=-1
00223> *#-----|-----|
00224> *#*****
00225> *# VG1 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE VAN GAAL WEST MAIN DRAIN
00226> *# WITH VAN GAAL WEST TRIBUTARY
00227> *#*****
00228> *#
00229> ADD HYD          IDsum=[4], NHYD=["VG1"], IDs to add=[2 3]
00230> *#-----|-----|
00231> SAVE HYD          ID=[4], # OF PCYCLES=[-1], ICASEsh=[1]
00232>                   HYD_COMMENT=["VG1"]
00233> *#-----|-----|
00234> ROUTE CHANNEL     IDout=[5], NHYD=["VGR2-1"], IDin=[4],
00235>                   RDT=[5](min),
00236>                   CHLGTH=[755](m),  CHSLOPE=[0.2](%),
00237>                   FPSLOPE=[0.2](%),
00238>                   SECNUM=[5.1],    NSEG=[3]
00239>                   ( SEGROUGH, SEGDIST (m))=[0.05,98.046 -0.035,105.496 0.05,51
00240>                   ( DISTANCE (m), ELEVATION (m))=[0,
00241>                   20, 96.11
00242>                   26.106, 94.5
00243>                   41.686, 94.465
00244>                   63.506, 94.427
00245>                   84.666, 94.492
00246>                   95.476, 94.363
00247>                   97.736, 94
00248>                   98.046, 93.967
00249>                   100.336, 92.8193
00250>                   101.536, 92.8193
00251>                   102.736, 92.8193
00252>                   105.496, 94.199
00253>                   127.006, 94.345
00254>                   142.116, 94.5
00255>                   148.376, 94.568
00256>                   478.406, 94.7
00257>                   518.306, 95]
00258> *#-----|-----|
00259> CALIB NASHYD      ID=[6], NHYD=["VG-2"], DT=[5]min, AREA=[63.1](ha),
00260>                   DWF=[0](cms),  CN/C=[95], IA=[2.8](mm),
00261>                   N=[3], TP=[1.6]hrs,
00262>                   RAINFALL=[ , , , ](mm/hr),  END=-1
00263> *#-----|-----|
00264> ROUTE CHANNEL     IDout=[7], NHYD=["PerN"], IDin=[6],
00265>                   RDT=[5](min),
00266>                   CHLGTH=[550](m),  CHSLOPE=[0.2](%),
00267>                   FPSLOPE=[0.2](%),
00268>                   SECNUM=[1.1],    NSEG=[3]
00269>                   ( SEGROUGH, SEGDIST (m))=[0.05,70 -0.035,72 0.05,77] NSEG ti
00270>                   ( DISTANCE (m), ELEVATION (m))=[0, 94.4]
00271>                   [70, 94.0]
00272>                   [71, 93.5]
00273>                   [72, 94.0]
00274>                   [77, 94.4]
00275> *#-----|-----|
00276> CALIB NASHYD      ID=[8], NHYD=["VG-3"], DT=[5]min, AREA=[40.6](ha),
00277>                   DWF=[0](cms),  CN/C=[95], IA=[2.5](mm),
00278>                   N=[3], TP=[1.6]hrs,
00279>                   RAINFALL=[ , , , ](mm/hr),  END=-1
00280> *#-----|-----|
00281> CALIB STANDHYD   ID=[9], NHYD=["VG-4"], DT=[5](min), AREA=[24.6](ha),
00282>                   XIMP=[0.4], TIMP=[0.5], DWF=[0](cms), LOSS=[1],
00283>                   Horton: Fo=[76.20](mm/hr), Fc=[13.20](mm/hr),
00284>                   DCAY=[4.14](/hr), F=[0](mm),

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00285> Pervious surfaces: IAPER=[1.5](mm), SLPP=[1.5](%),
00286> LGP=[35](m), MNP=[0.250], SCP=[0](min),
00287> Impervious surfaces: IAimp=[0.8](mm), SLPI=[0.3](%),
00288> LGI=[1000](m), MNI=[0.013], SCI=[0](min)
00289> RAINFALL=[ , , , ](mm/hr) , END=-1
00290> *%-----|-----|
00291> ADD HYD IDsum=[1], NHYD=["perthst"], IDs to add=[5 7 8 9]
00292> *%-----|-----|
00293> SAVE HYD ID=[1], # OF PCYCLES=[-1], ICASEsh=[1]
00294> HYD_COMMENT=["perthst"]
00295> *%-----|-----|
00296> CALIB NASHYD ID=[2], NHYD=["VG-5"], DT=[5]min, AREA=[34.4](ha),
00297> DWF=[0](cms), CN/C=[95], IA=[3.0](mm),
00298> N=[3], TP=[2.3]hrs,
00299> RAINFALL=[ , , , ](mm/hr) , END=-1
00300> *%-----|-----|
00301> ROUTE CHANNEL IDout=[3], NHYD=["PerS"], IDin=[2],
00302> RDT=[5](min),
00303> CHLGT=[550](m), CHSLOPE=[0.2](%),
00304> FPSLOPE=[0.2](%),
00305> SECNUM=[1.1], NSEG=[3]
00306> ( SEGROUGH, SEGDIST (m))=[0.05,70 -0.035,72 0.05,77] NSEG ti
00307> ( DISTANCE (m), ELEVATION (m))=[0, 94.4]
00308> [70, 94.0]
00309> [71, 93.5]
00310> [72, 94.0]
00311> [77, 94.4]
00312> *%-----|-----|
00313> ADD HYD IDsum=[2], NHYD=["ar buck"], IDs to add=[1 3]
00314> *%-----|-----|
00315> SAVE HYD ID=[2], # OF PCYCLES=[-1], ICASEsh=[1]
00316> HYD_COMMENT=["ar buck"]
00317> *%-----|-----|
00318> ROUTE CHANNEL IDout=[9], NHYD=["VGR2-2"], IDin=[2],
00319> RDT=[5](min),
00320> CHLGT=[520](m), CHSLOPE=[0.15](%),
00321> FPSLOPE=[0.15](%),
00322> SECNUM=[5.2], NSEG=[3]
00323> ( SEGROUGH, SEGDIST (m))=[0.05,65.27 -0.035,72.03 0.05,317.3]
00324> ( DISTANCE (m), ELEVATION (m))=
00325> [1.87 94
00326> 3.26 93.815
00327> 25.32 93.589
00328> 40.32 93.586
00329> 53.15 93.49
00330> 65.27 92.99
00331> 67.31 92.06
00332> 69.39 91.93
00333> 69.99 92.03
00334> 70.75 92.68
00335> 72.03 93
00336> 78.14 93
00337> 87.57 92.828
00338> 98.82 93
00339> 131.96 93.341
00340> 152.55 93.318
00341> 220.7 93.525
00342> 262.64 93.983
00343> 274.22 94
00344> 286.88 94
00345> 297.86 93.981
00346> 314.39 94.09
00347> 317.39, 95.09]
00348> *%-----|-----|
00349> CALIB NASHYD ID=[1], NHYD=["VG-6"], DT=[5]min, AREA=[94.2](ha),
00350> DWF=[0](cms), CN/C=[95], IA=[2.9](mm),
00351> N=[3], TP=[3.2]hrs,
00352> RAINFALL=[ , , , ](mm/hr) , END=-1
00353> *%-----|-----|
00354> ROUTE CHANNEL IDout=[2], NHYD=["VG-6"], IDin=[1],
00355> RDT=[5](min),

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00356> CHLGT=[600](m), CHSLOPE=[0.18](%),
00357> FPSLOPE=[0.18](%),
00358> SECNUM=[2.1], NSEG=[3]
00359> ( SEGROUGH, SEGDIST (m))=[0.05,700 -0.035,703 0.05,1000] NSE
00360> ( DISTANCE (m), ELEVATION (m))=[0, 94.6]
00361> [700, 94.5]
00362> [701.4, 94.1]
00363> [701.6, 94.1]
00364> [703, 94.5]
00365> [1000, 95.1]
00366> *%-----|-----|
00367> SAVE HYD ID=[2], # OF PCYCLES=[-1], ICASEsh=[1]
00368> HYD_COMMENT=["VG-6"]
00369> *%-----|-----|
00370> CALIB NASHYD ID=[3], NHYD=["VG-7"], DT=[5]min, AREA=[39.2](ha),
00371> DWF=[0](cms), CN/C=[95], IA=[3.5](mm),
00372> N=[3], TP=[2.9]hrs,
00373> RAINFALL=[ , , , ](mm/hr) , END=-1
00374> *%-----|-----|
00375> SAVE HYD ID=[3], # OF PCYCLES=[-1], ICASEsh=[1]
00376> HYD_COMMENT=["VG-7"]
00377> *%-----|-----|
00378> ROUTE CHANNEL IDout=[4], NHYD=["VG-7"], IDin=[3],
00379> RDT=[5](min),
00380> CHLGT=[1480](m), CHSLOPE=[0.2](%),
00381> FPSLOPE=[0.2](%),
00382> SECNUM=[3.1], NSEG=[3]
00383> ( SEGROUGH, SEGDIST (m))=[0.05,50 -0.035,52 0.05,102] NSEG t
00384> ( DISTANCE (m), ELEVATION (m))=[0,95.2]
00385> [50,95.0]
00386> [51,94.5]
00387> [52,95.0]
00388> [102,95.2]
00389> *%-----|-----|
00390> ADD HYD IDsum=[5], NHYD=["Moore"], IDs to add=[2 4](maximum ten)
00391> *%-----|-----|
00392> SAVE HYD ID=[5], # OF PCYCLES=[-1], ICASEsh=[1]
00393> HYD_COMMENT=["Moore"]
00394> *%-----|-----|
00395> CALIB NASHYD ID=[5], NHYD=["VG-8"], DT=[5]min, AREA=[91.8](ha),
00396> DWF=[0](cms), CN/C=[95], IA=[2.6](mm),
00397> N=[3], TP=[2.1]hrs,
00398> RAINFALL=[ , , , ](mm/hr) , END=-1
00399> *%-----|-----|
00400> CALIB STANDHYD ID=[6], NHYD=["VG-9"], DT=[5](min), AREA=[11.4](ha),
00401> XIMP=[0.4], TIMP=[0.5], DWF=[0](cms), LOSS=[1],
00402> Horton: Fo=[76.20](mm/hr), Fc=[13.20](mm/hr),
00403> DCAY=[4.14](/hr), F=[0](mm),
00404> Pervious surfaces: IAPER=[1.5](mm), SLPP=[1.5](%),
00405> LGP=[50](m), MNP=[0.250], SCP=[0](min),
00406> Impervious surfaces: IAimp=[0.8](mm), SLPI=[0.3](%),
00407> LGI=[530](m), MNI=[0.013], SCI=[0](min)
00408> RAINFALL=[ , , , ](mm/hr) , END=-1
00409> *%-----|-----|
00410> ADD HYD IDsum=[1], NHYD=["Fortune"], IDs to add=[2 4 5 6 9]
00411> *%-----|-----|
00412> SAVE HYD ID=[1], # OF PCYCLES=[-1], ICASEsh=[1]
00413> HYD_COMMENT=["Fortune"]
00414> *%-----|-----|
00415> ROUTE CHANNEL IDout=[3], NHYD=["VGR2-3"], IDin=[1],
00416> RDT=[5](min),
00417> CHLGT=[750](m), CHSLOPE=[0.2](%),
00418> FPSLOPE=[0.2](%),
00419> SECNUM=[5.3], NSEG=[3]
00420> ( SEGROUGH, SEGDIST (m))=[0.05,3.22 -0.035,47.84 0.05,77.80]
00421> ( DISTANCE (m), ELEVATION (m))=[0, 93.5]
00422> 3.22, 93
00423> 20.87, 92.5
00424> 42.19, 92
00425> 47.84, 92
00426> 48.60, 92.5

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00427>                               50.14,    93
00428>                               72.67,    93.526
00429>                               77.80,    93.5]
00430> *-----|-----|
00431> CALIB STANDHYD      ID=[2], NHYD=["VG-10"], DT=[5](min), AREA=[20.3](ha),
00432>                    XIMP=[0.4], TIMP=[0.5], DWF=[0](cms), LOSS=[1],
00433>                    Horton: Fo=[76.20](mm/hr), Fc=[13.20](mm/hr),
00434>                    DCAY=[4.14](/hr), F=[0](mm),
00435>                    Pervious surfaces: IAper=[1.5](mm), SLPP=[1.5](%),
00436>                    LGP=[50](m), MNP=[0.250], SCP=[0](min),
00437>                    Impervious surfaces: IAimp=[0.8](mm), SLPI=[0.3](%),
00438>                    LGI=[560](m), MNI=[0.013], SCI=[0](min)
00439>                    RAINFALL=[ , , , ](mm/hr) , END=-1
00440> *-----|-----|
00441> ADD HYD              IDsum=[9], NHYD=["JockVG"], IDs to add=[2 3]
00442> *-----|-----|
00443> SAVE HYD            ID=[9], # OF PCYCLES=[-1], ICASEsh=[-1]
00444>                    HYD_FILENAME=["JockVG"]
00445>                    HYD_COMMENT=["Flow from Van Gaal at Jock River"]
00446> *-----|-----|
00447> *% 10 day - 5 year storm with snow melt
00448> START               TZERO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[005]
00449>                    ["50051012.STM"]
00450> *-----|-----|
00451> *% 10 day - 100 year storm with snow melt
00452> START               TZERO=[0.0], METOUT=[2], NSTORM=[1], NRUN=[100]
00453>                    ["51001012.STM"]
00454> *-----|-----|
00455> FINISH
00456>
00457>
00458>
00459>
00460>

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00001> =====
00002>
00003> SSSSS W W M M H H Y Y M M OOO 999 999 =====
00004> S W W W MM MM H H Y Y MM MM O O 9 9 9 9
00005> SSSSS W W W M M M HHHH Y M M M O O ## 9 9 9 9 Ver5 Beta
00006> S W W M M H H Y M M O O 9999 9999 Sept 2000
00007> SSSSS W W M M H H Y M M OOO 9 9 9 =====
00008> 9 9 9 9 # 3410370
00009> StormWater Management HYdrologic Model 999 999 =====
00010>
00011> *****
00012> ***** SWMHYMO Ver/5 Beta *****
00013> ***** A single event and continuous hydrologic simulation model *****
00014> ***** based on the principles of HYMO and its successors *****
00015> ***** OTTHYMO-83 and OTTHYMO-89. *****
00016> *****
00017> ***** Distributed by: J.F. Sabourin and Associates Inc. *****
00018> ***** Ottawa, Ontario: (613) 727-5199 *****
00019> ***** Gatineau, Quebec: (819) 243-6858 *****
00020> ***** E-Mail: swmhymo@jfsa.Com *****
00021> *****
00022>
00023> ++++++
00024> ++++++ Licensed user: JFSaInc Ottawa ++++++
00025> ++++++ Ottawa SERIAL#:3410370 ++++++
00026> ++++++
00027>
00028> *****
00029> ***** ++++++ PROGRAM ARRAY DIMENSIONS ++++++ *****
00030> ***** Maximum value for ID numbers : 10 *****
00031> ***** Max. number of rainfall points: 52750 *****
00032> ***** Max. number of flow points : 52750 *****
00033> *****
00034>
00035> *** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) ***
00036> *** ----- ***
00037> *** ID: Hydrograph IDentification numbers, (1-10). ***
00038> *** NHYD: Hydrograph reference numbers, (6 digits or characters). ***
00039> *** AREA: Drainage area associated with hydrograph, (ac.) or (ha.). ***
00040> *** QPEAK: Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s). ***
00041> *** TpeakDate_hh:mm is the date and time of the peak flow. ***
00042> *** R.V.: Runoff Volume of simulated hydrograph, (in) or (mm). ***
00043> *** R.C.: Runoff Coefficient of simulated hydrograph, (ratio). ***
00044> *** *: see WARNING or NOTE message printed at end of run. ***
00045> *** **: see ERROR message printed at end of run. ***
00046> *****
00047> *****
00048>
00049> ::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
00050>
00051> *****
00052>
00053> ***** SUMMARY OUTPUT *****
00054> *****
00055> * DATE: 2009-11-23 TIME: 10:09:40 RUN COUNTER: 001265 *
00056> *****
00057> * Input filename: Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\spr7JFSA.D*
00058> * Output filename: Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\spr7JFSA.o*
00059> * Summary filename: Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\spr7JFSA.s*
00060> * User comments: *
00061> * 1: _____ *
00062> * 2: _____ *
00063> * 3: _____ *
00064> *****
00065>
00066>
00067> *****
00068> # SWMHYMO Ver:5.02/Jan 2001 <BETA> / INPUT DATA FILE
00069> *****
00070> # Project Name: [Richmond FPM] Project Number: [709]
00071> # Date : 04-21-2009

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00072> # Revised : 04-31-2009; 05-25-2009; 07-22-2009; 08-06-2009; 08-31-2009
00073> # 11-16-2009
00074> # Modeller : [Bryan Willcott B.Eng.]
00075> # Company : J.F. Sabourin and Associates
00076> # License # : 3410370
00077> *****
00078> # [BW] April 31, 2009
00079> # This model is the same as the JFSA summer model with the exception of the
00080> # storm files used and the CN values have been increased to 95
00081> *****
00082> # [BW] May 25, 2009
00083> # This model has been updated using revised values for Tp. Previous versions
00084> # of this model used a calculated Tp=0.6Tc. This model used a calculated
00085> # Tp=0.67Tc. Manning's n values for the overbanks in the ROUTE CHANNEL
00086> # commands have been changed to 0.05 for Spring conditions. Design storms
00087> # have changed to match those used in the Jock River Model
00088> *****
00089> # [BW] July 22, 2009
00090> # This model has been revised to include "existing" cross section information
00091> # received from Robinson Consultants. The Cross section revised in the model
00092> # is Sec 5.2 (channel receiving flow from "arbuck"). Also, channel and
00093> # floodplain slopes for ROUTE CHANNEL commands were updated to be equal
00094> *****
00095> # [BW] August 6, 2009
00096> # This model has been revised to include cross section information
00097> # from Robinson Consultants Engineer's Report July 2003. The cross
00098> # section revised in the model is Sec 5.1. Cross sections Sec 1.03
00099> # and Sec 5.3 have also been revised
00100> *****
00101> # [BW] August 31, 2009
00102> # Model updated to include the proposed DSEL berm. This affects the geometry
00103> # of Route Channel Sect 5.2 located on the Arbuckle drain. Route Channels 5.2
00104> # and 1.03 have also been revised to reduce the number of values in the
00105> # x-y matrix
00106> *****
00107> # [BW] November 16, 2009
00108> # Model updated to include revised Tp values subsequent to review of
00109> # memo received from AECOM on Oct. 2, 2009
00110> *****
00111> #
00112> ** END OF RUN : 1
00113>
00114> *****
00115>
00116>
00117>
00118>
00119>
00120> RUN:COMMAND#
00121> 002:0001-----
00122> START
00123> [TZERO = .00 hrs on 0]
00124> [METOUT= 2 (1=imperial, 2=metric output)]
00125> [NSTORM= 1]
00126> [NRUN = 2]
00127> *****
00128> # SWMHYMO Ver:5.02/Jan 2001 <BETA> / INPUT DATA FILE
00129> *****
00130> # Project Name: [Richmond FPM] Project Number: [709]
00131> # Date : 04-21-2009
00132> # Revised : 04-31-2009; 05-25-2009; 07-22-2009; 08-06-2009; 08-31-2009
00133> # 11-16-2009
00134> # Modeller : [Bryan Willcott B.Eng.]
00135> # Company : J.F. Sabourin and Associates
00136> # License # : 3410370
00137> *****
00138> # [BW] April 31, 2009
00139> # This model is the same as the JFSA summer model with the exception of the
00140> # storm files used and the CN values have been increased to 95
00141> *****
00142> # [BW] May 25, 2009

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00143> # This model has been updated using revised values for Tp. Previous versions
00144> # of this model used a calculated Tp=0.6Tc. This model used a calculated
00145> # Tp=0.67Tc. Manning's n values for the overbanks in the ROUTE CHANNEL
00146> # commands have been changed to 0.05 for Spring conditions. Design storms
00147> # have changed to match those used in the Jock River Model
00148> #*****
00149> # [BW] July 22, 2009
00150> # This model has been revised to include "existing" cross section information
00151> # received from Robinson Consultants. The Cross section revised in the model
00152> # is Sec 5.2 (channel receiving flow from "arbuck"). Also, channel and
00153> # floodplain slopes for ROUTE CHANNEL commands were updated to be equal
00154> #*****
00155> # [BW] August 6, 2009
00156> # This model has been revised to include cross section information
00157> # from Robinson Consultants Engineer's Report July 2003. The cross
00158> # section revised in the model is Sec 5.1. Cross sections Sec 1.03
00159> # and Sec 5.3 have also been revised
00160> #*****
00161> # [BW] August 31, 2009
00162> # Model updated to include the proposed DSEL berm. This affects the geometry
00163> # of Route Channel Sect 5.2 located on the Arbuck drain. Route Channels 5.2
00164> # and 1.03 have also been revised to reduce the number of values in the
00165> # x-y matrix
00166> #*****
00167> # [BW] November 16, 2009
00168> # Model updated to include revised Tp values subsequent to review of
00169> # memo received from AECOM on Oct. 2, 2009
00170> #*****
00171> #
00172> 002:0002-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00173> READ STORM
00174> Filename = STORM.001
00175> Comment = Model 5 CDA - S+Rain 12hr/day, RTP 2 years, 10 Days.
00176> [SDT=60.00:SDUR= 240.00:PTOT= 115.69]
00177> #*****
00178> # Van Gaal / Arbuckle Drain
00179> #*****
00180> # DSEL SUBCATCHMENT VG-1 HAS BEEN BROKEN INTO 6 SUB-AREAS (BW)
00181> #*****
00182> 002:0003-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00183> CALIB NASHYD 01:VG-1A 311.90 2.093 No_date 114:35 99.85 .863
00184> [CN= 95.0: N= 3.00]
00185> [Tp= 5.30:DT= 5.00]
00186> 002:0004-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00187> SAVE HYD 01:VG-1A 311.90 2.093 No_date 114:35 99.85 n/a
00188> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG-1A.002
00189> remark:VG-1A
00190> #*****
00191> # Tp FOR VG-1B HAS BEEN REVISED TO REFLECT A HYDRAULIC LENGTH OF 1710 m, A
00192> # LENGTH THAT INCLUDES DISTANCE TO THE VG1-1 CONFLUENCE IN ADDITION TO THE
00193> # LONGEST FLOW PATH WITHIN VG-1B. THIS IS DONE TO SIMULATE CHANNEL ROUTING
00194> #*****
00195> 002:0005-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00196> CALIB NASHYD 02:VG-1B 24.80 .218 No_date 111:50 99.75 .862
00197> [CN= 95.0: N= 3.00]
00198> [Tp= 2.70:DT= 5.00]
00199> #*****
00200> # VG1-1 IS THE SUM OF FLOWS TO THE CONFLUENCE OF NORTHERN MOST WATERCOURSE IN
00201> # OUR AREA OF STUDY WITH THE ROADSIDE DITCH ON GARVIN ROAD
00202> #*****
00203> #
00204> 002:0006-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00205> ADD HYD 01:VG-1A 311.90 2.093 No_date 114:35 99.85 n/a
00206> + 02:VG-1B 24.80 .218 No_date 111:50 99.75 n/a
00207> [DT= 5.00] SUM= 03:VG1-1 336.70 2.271 No_date 114:15 99.84 n/a
00208> 002:0007-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00209> SAVE HYD 03:VG1-1 336.70 2.271 No_date 114:15 99.84 n/a
00210> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG1-1.002
00211> remark:VG1-1
00212> 002:0008-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00213> CALIB NASHYD 04:VG-1D 47.80 .454 No_date 110:40 101.23 .875

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00214> [CN= 95.0: N= 3.00]
00215> [Tp= 1.80:DT= 5.00]
00216> #*****
00217> # VG1-2 IS THE SUM OF FLOWS AT THE GARVIN ROAD CROSS CULVERT AND
00218> # CONSERVATIVELY INCLUDES THE AREA VG-1D, WHICH IS LOCATED JUST DOWNSTREAM
00219> # OF THE CULVERT
00220> #*****
00221> #
00222> 002:0009-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00223> ADD HYD 03:VG1-1 336.70 2.271 No_date 114:15 99.84 n/a
00224> + 04:VG-1D 47.80 .454 No_date 110:40 101.23 n/a
00225> [DT= 5.00] SUM= 05:VG1-2 384.50 2.592 No_date 113:35 100.01 n/a
00226> 002:0010-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00227> SAVE HYD 05:VG1-2 384.50 2.592 No_date 113:35 100.01 n/a
00228> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG1-2.002
00229> remark:VG1-2
00230> 002:0011-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00231> ROUTE CHANNEL -> 05:VG1-2 384.50 2.592 No_date 113:35 100.01 n/a
00232> [RDT= 5.00] out<- 06:VG1R-2 384.50 2.569 No_date 114:10 100.01 n/a
00233> [L/S/n= 865./ .150/.035]
00234> {Vmax= .429:Dmax= .657}
00235> 002:0012-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00236> CALIB NASHYD 07:VG-1C 211.80 1.516 No_date 114:00 99.85 .863
00237> [CN= 95.0: N= 3.00]
00238> [Tp= 4.70:DT= 5.00]
00239> 002:0013-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00240> CALIB NASHYD 08:VG-1E 13.40 .135 No_date 109:05 99.75 .862
00241> [CN= 95.0: N= 3.00]
00242> [Tp= .64:DT= 5.00]
00243> #*****
00244> # VG1-3 IS THE SUM OF FLOWS TO JOY'S ROAD CROSS CULVERT AND CONSERVATIVELY
00245> # INCLUDES THE AREA VG-1E, WHICH IS LOCATED JUST DOWNSTREAM OF THE CULVERT
00246> #*****
00247> #
00248> 002:0014-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00249> ADD HYD 07:VG-1C 211.80 1.516 No_date 114:00 99.85 n/a
00250> + 08:VG-1E 13.40 .135 No_date 109:05 99.75 n/a
00251> [DT= 5.00] SUM= 09:VG1-3 225.20 1.567 No_date 113:35 99.84 n/a
00252> 002:0015-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00253> SAVE HYD 09:VG1-3 225.20 1.567 No_date 113:35 99.84 n/a
00254> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG1-3.002
00255> remark:VG1-3
00256> 002:0016-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00257> ROUTE CHANNEL -> 09:VG1-3 225.20 1.567 No_date 113:35 99.84 n/a
00258> [RDT= 5.00] out<- 10:VG1R-3 225.20 1.564 No_date 113:50 99.84 n/a
00259> [L/S/n= 630./ .200/.035]
00260> {Vmax= .484:Dmax= .462}
00261> #*****
00262> # VG1-4 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE WATERCOURSE FROM JOY'S
00263> # ROAD WITH THE MAIN DRAIN
00264> #*****
00265> #
00266> 002:0017-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00267> ADD HYD 06:VG1R-2 384.50 2.569 No_date 114:10 100.01 n/a
00268> + 10:VG1R-3 225.20 1.564 No_date 113:50 99.84 n/a
00269> [DT= 5.00] SUM= 01:VG1-4 609.70 4.130 No_date 114:05 99.95 n/a
00270> 002:0018-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00271> SAVE HYD 01:VG1-4 609.70 4.130 No_date 114:05 99.95 n/a
00272> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG1-4.002
00273> remark:VG1-4
00274> 002:0019-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00275> ROUTE CHANNEL -> 01:VG1-4 609.70 4.130 No_date 114:05 99.95 n/a
00276> [RDT= 5.00] out<- 02:VG1R-4 609.70 4.111 No_date 114:35 99.95 n/a
00277> [L/S/n= 485./ .200/.035]
00278> {Vmax= .377:Dmax= 1.087}
00279> 002:0020-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00280> CALIB NASHYD 03:VG-1F 117.70 1.018 No_date 112:10 101.13 .874
00281> [CN= 95.0: N= 3.00]
00282> [Tp= 2.90:DT= 5.00]
00283> #*****
00284> # VG1 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE VAN GAAL WEST MAIN DRAIN

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00285> # WITH VAN GAAL WEST TRIBUTARY
00286> #*****
00287> #
00288> 002:0021-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00289> ADD HYD          02:VGR1R-4  609.70  4.111 No_date 114:35  99.95 n/a
00290>                + 03:VG-1F  117.70  1.018 No_date 112:10  101.13 n/a
00291> [DT= 5.00] SUM= 04:VGL1  727.40  4.999 No_date 113:55  100.14 n/a
00292> 002:0022-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00293> SAVE HYD          04:VGL1  727.40  4.999 No_date 113:55  100.14 n/a
00294> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VGL1.002
00295> remark:VGL1
00296> 002:0023-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00297> ROUTE CHANNEL -> 04:VGL1  727.40  4.999 No_date 113:55  100.14 n/a
00298> [RDT= 5.00] out<- 05:VGR2-1  727.40  4.991 No_date 114:00  100.14 n/a
00299> [L/S/n= 755./ .200/.035]
00300> {Vmax= .994:Dmax= 1.092}
00301> 002:0024-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00302> CALIB NASHYD     06:VG-2  63.10  .608 No_date 110:25  100.94 .872
00303> [CN= 95.0: N= 3.00]
00304> [Tp= 1.60:DT= 5.00]
00305> 002:0025-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00306> ROUTE CHANNEL -> 06:VG-2  63.10  .608 No_date 110:25  100.94 n/a
00307> [RDT= 5.00] out<- 07:PerN  63.10  .603 No_date 111:00  100.94 n/a
00308> [L/S/n= 550./ .200/.035]
00309> {Vmax= .313:Dmax= .613}
00310> 002:0026-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00311> CALIB NASHYD     08:VG-3  40.60  .392 No_date 110:25  101.23 .875
00312> [CN= 95.0: N= 3.00]
00313> [Tp= 1.60:DT= 5.00]
00314> 002:0027-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00315> * CALIB STANDHYD 09:VG-4  24.60  .102 No_date 109:20  45.96 .397
00316> [XIMP=.40:TIMP=.50]
00317> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14: F= .00]
00318> [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 35.:MNP=.250:SCP= .0]
00319> [Impervious area: IAimp= .80:SLPI= .30:LGI=1000.:MNI=.013:SCI= .0]
00320> 002:0028-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00321> ADD HYD          05:VGR2-1  727.40  4.991 No_date 114:00  100.14 n/a
00322>                + 07:PerN  63.10  .603 No_date 111:00  100.94 n/a
00323>                + 08:VG-3  40.60  .392 No_date 110:25  101.23 n/a
00324>                + 09:VG-4  24.60  .102 No_date 109:20  45.96 n/a
00325> [DT= 5.00] SUM= 01:perths  855.70  5.788 No_date 113:25  98.69 n/a
00326> 002:0029-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00327> SAVE HYD          01:perths  855.70  5.788 No_date 113:25  98.69 n/a
00328> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-perths.002
00329> remark:perthst
00330> 002:0030-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00331> CALIB NASHYD     02:VG-5  34.40  .314 No_date 111:20  100.74 .871
00332> [CN= 95.0: N= 3.00]
00333> [Tp= 2.30:DT= 5.00]
00334> 002:0031-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00335> ROUTE CHANNEL -> 02:VG-5  34.40  .314 No_date 111:20  100.74 n/a
00336> [RDT= 5.00] out<- 03:PerS  34.40  .312 No_date 111:50  100.74 n/a
00337> [L/S/n= 550./ .200/.035]
00338> {Vmax= .417:Dmax= .539}
00339> 002:0032-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00340> ADD HYD          01:perths  855.70  5.788 No_date 113:25  98.69 n/a
00341>                + 03:PerS  34.40  .312 No_date 111:50  100.74 n/a
00342> [DT= 5.00] SUM= 02:arbuck  890.10  6.078 No_date 113:25  98.77 n/a
00343> 002:0033-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00344> SAVE HYD          02:arbuck  890.10  6.078 No_date 113:25  98.77 n/a
00345> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-arbuck.002
00346> remark:arbuck
00347> 002:0034-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00348> ROUTE CHANNEL -> 02:arbuck  890.10  6.078 No_date 113:25  98.77 n/a
00349> [RDT= 5.00] out<- 09:VGR2-2  890.10  6.064 No_date 113:35  98.77 n/a
00350> [L/S/n= 520./ .150/.035]
00351> {Vmax= .528:Dmax= 1.197}
00352> 002:0035-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00353> CALIB NASHYD     01:VG-6  94.20  .791 No_date 112:30  100.84 .872
00354> [CN= 95.0: N= 3.00]
00355> [Tp= 3.20:DT= 5.00]

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00356> 002:0036-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00357> ROUTE CHANNEL -> 01:VG-6  94.20  .791 No_date 112:30  100.84 n/a
00358> [RDT= 5.00] out<- 02:VG-6  94.20  .742 No_date 114:00  100.84 n/a
00359> [L/S/n= 600./ .180/.035]
00360> {Vmax= .116:Dmax= .439}
00361> 002:0037-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00362> SAVE HYD          02:VG-6  94.20  .742 No_date 114:00  100.84 n/a
00363> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG-6.002
00364> remark:VG-6
00365> 002:0038-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00366> CALIB NASHYD     03:VG-7  39.20  .339 No_date 112:10  100.24 .866
00367> [CN= 95.0: N= 3.00]
00368> [Tp= 2.90:DT= 5.00]
00369> 002:0039-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00370> SAVE HYD          03:VG-7  39.20  .339 No_date 112:10  100.24 n/a
00371> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG-7.002
00372> remark:VG-7
00373> 002:0040-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00374> ROUTE CHANNEL -> 03:VG-7  39.20  .339 No_date 112:10  100.24 n/a
00375> [RDT= 5.00] out<- 04:VG-7  39.20  .323 No_date 114:05  100.24 n/a
00376> [L/S/n= 1480./ .200/.035]
00377> {Vmax= .334:Dmax= .541}
00378> 002:0041-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00379> ADD HYD          02:VG-6  94.20  .742 No_date 114:00  100.84 n/a
00380>                + 04:VG-7  39.20  .323 No_date 114:05  100.24 n/a
00381> [DT= 5.00] SUM= 05:Moore  133.40  1.065 No_date 114:00  100.66 n/a
00382> 002:0042-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00383> SAVE HYD          05:Moore  133.40  1.065 No_date 114:00  100.66 n/a
00384> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-Moore.002
00385> remark:Moore
00386> 002:0043-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00387> CALIB NASHYD     05:VG-8  91.80  .853 No_date 111:05  101.13 .874
00388> [CN= 95.0: N= 3.00]
00389> [Tp= 2.10:DT= 5.00]
00390> 002:0044-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00391> * CALIB STANDHYD 06:VG-9  11.40  .048 No_date 109:00  45.96 .397
00392> [XIMP=.40:TIMP=.50]
00393> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14: F= .00]
00394> [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 50.:MNP=.250:SCP= .0]
00395> [Impervious area: IAimp= .80:SLPI= .30:LGI= 530.:MNI=.013:SCI= .0]
00396> 002:0045-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00397> ADD HYD          02:VG-6  94.20  .742 No_date 114:00  100.84 n/a
00398>                + 04:VG-7  39.20  .323 No_date 114:05  100.24 n/a
00399>                + 05:VG-8  91.80  .853 No_date 111:05  101.13 n/a
00400>                + 06:VG-9  11.40  .048 No_date 109:00  45.96 n/a
00401>                + 09:VGR2-2  890.10  6.064 No_date 113:35  98.77 n/a
00402> [DT= 5.00] SUM= 01:Fortun  1126.70  7.858 No_date 113:20  98.65 n/a
00403> 002:0046-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00404> SAVE HYD          01:Fortun  1126.70  7.858 No_date 113:20  98.65 n/a
00405> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-Fortun.002
00406> remark:Fortune
00407> 002:0047-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00408> ROUTE CHANNEL -> 01:Fortun  1126.70  7.858 No_date 113:20  98.65 n/a
00409> [RDT= 5.00] out<- 03:VGR2-3  1126.70  7.844 No_date 113:35  98.65 n/a
00410> [L/S/n= 750./ .200/.035]
00411> {Vmax= .653:Dmax= .620}
00412> 002:0048-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00413> * CALIB STANDHYD 02:VG-10  20.30  .086 No_date 109:05  45.96 .397
00414> [XIMP=.40:TIMP=.50]
00415> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14: F= .00]
00416> [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 50.:MNP=.250:SCP= .0]
00417> [Impervious area: IAimp= .80:SLPI= .30:LGI= 560.:MNI=.013:SCI= .0]
00418> 002:0049-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00419> ADD HYD          02:VG-10  20.30  .086 No_date 109:05  45.96 n/a
00420>                + 03:VGR2-3  1126.70  7.844 No_date 113:35  98.65 n/a
00421> [DT= 5.00] SUM= 09:JockVG  1147.00  7.883 No_date 113:30  97.72 n/a
00422> 002:0050-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00423> SAVE HYD          09:JockVG  1147.00  7.883 No_date 113:30  97.72 n/a
00424> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\JockVG.002
00425> remark:Flow from Van Gaal at Jock River
00426> ** END OF RUN : 4

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00427>
00428> *****
00429>
00430>
00431>
00432>
00433>
00434> RUN:COMMAND#
00435> 005:0001-----
00436> START
00437> [TZERO = .00 hrs on 0]
00438> [METOUT= 2 (1=imperial, 2=metric output)]
00439> [NSTORM= 1 ]
00440> [NRUN = 5 ]
00441> *****
00442> # SWMHYMO Ver:5.02/Jan 2001 <BETA> / INPUT DATA FILE
00443> *****
00444> # Project Name: [Richmond FPM] Project Number: [709]
00445> # Date : 04-21-2009
00446> # Revised : 04-31-2009; 05-25-2009; 07-22-2009; 08-06-2009; 08-31-2009
00447> # 11-16-2009
00448> # Modeller : [Bryan Willcott B.Eng.]
00449> # Company : J.F. Sabourin and Associates
00450> # License # : 3410370
00451> *****
00452> # [BW] April 31, 2009
00453> # This model is the same as the JFSA summer model with the exception of the
00454> # storm files used and the CN values have been increased to 95
00455> *****
00456> # [BW] May 25, 2009
00457> # This model has been updated using revised values for Tp. Previous versions
00458> # of this model used a calculated Tp=0.6Tc. This model used a calculated
00459> # Tp=0.67Tc. Manning's n values for the overbanks in the ROUTE CHANNEL
00460> # commands have been changed to 0.05 for Spring conditions. Design storms
00461> # have changed to match those used in the Jock River Model.
00462> *****
00463> # [BW] July 22, 2009
00464> # This model has been revised to include "existing" cross section information
00465> # received from Robinson Consultants. The Cross section revised in the model
00466> # is Sec 5.2 (channel receiving flow from "arbuck"). Also, channel and
00467> # floodplain slopes for ROUTE CHANNEL commands were updated to be equal
00468> *****
00469> # [BW] August 6, 2009
00470> # This model has been revised to include cross section information
00471> # from Robinson Consultants Engineer's Report July 2003. The cross
00472> # section revised in the model is Sec 5.1. Cross sections Sec 1.03
00473> # and Sec 5.3 have also been revised
00474> *****
00475> # [BW] August 31, 2009
00476> # Model updated to include the proposed DSEL berm. This affects the geometry
00477> # of Route Channel Sect 5.2 located on the Arbuckle drain. Route Channels 5.2
00478> # and 1.03 have also been revised to reduce the number of values in the
00479> # x-y matrix
00480> *****
00481> # [BW] November 16, 2009
00482> # Model updated to include revised Tp values subsequent to review of
00483> # memo received from AECOM on Oct. 2, 2009
00484> *****
00485> #
00486> 005:0002-----
00487> READ STORM
00488> Filename = STORM.001
00489> Comment = Model 5 CDA - S+Rain 12hr/day, RTP 5 years, 10 Days.
00490> [SDT=60.00:SDUR= 240.00:PTOT= 156.28]
00491> *****
00492> # Van Gaal / Arbuckle Drain
00493> *****
00494> # DSEL SUBCATCHMENT VG-1 HAS BEEN BROKEN INTO 6 SUB-AREAS (BW)
00495> *****
00496> 005:0003-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00497> CALIB NASHYD 01:VG-1A 311.90 2.677 No_date 114:35 140.09 .896

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00498> [CN= 95.0: N= 3.00]
00499> [Tp= 5.30:DT= 5.00]
00500> 005:0004-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00501> SAVE HYD 01:VG-1A 311.90 2.677 No_date 114:35 140.09 n/a
00502> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG-1A.005
00503> remark:VG-1A
00504> *****
00505> # Tp FOR VG-1B HAS BEEN REVISED TO REFLECT A HYDRAULIC LENGTH OF 1710 m, A
00506> # LENGTH THAT INCLUDES DISTANCE TO THE VG1-1 CONFLUENCE IN ADDITION TO THE
00507> # LONGEST FLOW PATH WITHIN VG-1B. THIS IS DONE TO SIMULATE CHANNEL ROUTING
00508> *****
00509> 005:0005-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00510> CALIB NASHYD 02:VG-1B 24.80 .279 No_date 111:50 139.99 .896
00511> [CN= 95.0: N= 3.00]
00512> [Tp= 2.70:DT= 5.00]
00513> *****
00514> # VG1-1 IS THE SUM OF FLOWS TO THE CONFLUENCE OF NORTHERN MOST WATERCOURSE IN
00515> # OUR AREA OF STUDY WITH THE ROADSIDE DITCH ON GARVIN ROAD
00516> *****
00517> #
00518> 005:0006-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00519> ADD HYD 01:VG-1A 311.90 2.677 No_date 114:35 140.09 n/a
00520> + 02:VG-1B 24.80 .279 No_date 111:50 139.99 n/a
00521> [DT= 5.00] SUM= 03:VG1-1 336.70 2.905 No_date 114:15 140.08 n/a
00522> 005:0007-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00523> SAVE HYD 03:VG1-1 336.70 2.905 No_date 114:15 140.08 n/a
00524> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG1-1.005
00525> remark:VG1-1
00526> 005:0008-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00527> CALIB NASHYD 04:VG-1D 47.80 .580 No_date 110:40 141.48 .905
00528> [CN= 95.0: N= 3.00]
00529> [Tp= 1.80:DT= 5.00]
00530> *****
00531> # VG1-2 IS THE SUM OF FLOWS AT THE GARVIN ROAD CROSS CULVERT AND
00532> # CONSERVATIVELY INCLUDES THE AREA VG-1D, WHICH IS LOCATED JUST DOWNSTREAM
00533> # OF THE CULVERT
00534> *****
00535> #
00536> 005:0009-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00537> ADD HYD 03:VG1-1 336.70 2.905 No_date 114:15 140.08 n/a
00538> + 04:VG-1D 47.80 .580 No_date 110:40 141.48 n/a
00539> [DT= 5.00] SUM= 05:VG1-2 384.50 3.315 No_date 113:35 140.25 n/a
00540> 005:0010-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00541> SAVE HYD 05:VG1-2 384.50 3.315 No_date 113:35 140.25 n/a
00542> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG1-2.005
00543> remark:VG1-2
00544> 005:0011-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00545> ROUTE CHANNEL -> 05:VG1-2 384.50 3.315 No_date 113:35 140.25 n/a
00546> [RDT= 5.00] out< 06:VG1R-2 384.50 3.253 No_date 114:45 140.25 n/a
00547> [L/S/n= 865./ .150/.035]
00548> {Vmax= .366:Dmax= .725}
00549> 005:0012-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00550> CALIB NASHYD 07:VG-1C 211.80 1.939 No_date 114:00 140.09 .896
00551> [CN= 95.0: N= 3.00]
00552> [Tp= 4.70:DT= 5.00]
00553> 005:0013-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00554> CALIB NASHYD 08:VG-1E 13.40 .173 No_date 109:05 139.99 .896
00555> [CN= 95.0: N= 3.00]
00556> [Tp= .64:DT= 5.00]
00557> *****
00558> # VG1-3 IS THE SUM OF FLOWS TO JOY'S ROAD CROSS CULVERT AND CONSERVATIVELY
00559> # INCLUDES THE AREA VG-1E, WHICH IS LOCATED JUST DOWNSTREAM OF THE CULVERT
00560> *****
00561> #
00562> 005:0014-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00563> ADD HYD 07:VG-1C 211.80 1.939 No_date 114:00 140.09 n/a
00564> + 08:VG-1E 13.40 .173 No_date 109:05 139.99 n/a
00565> [DT= 5.00] SUM= 09:VG1-3 225.20 2.004 No_date 113:30 140.08 n/a
00566> 005:0015-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00567> SAVE HYD 09:VG1-3 225.20 2.004 No_date 113:30 140.08 n/a
00568> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG1-3.005

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00569>      remark:VGL-3
00570> 005:0016-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00571> ROUTE CHANNEL -> 09:VGL-3 225.20 2.004 No_date 113:30 140.08 n/a
00572> [RDT= 5.00] out<- 10:VGLR-3 225.20 2.000 No_date 113:50 140.08 n/a
00573> [L/S/n= 630./ .200/.035]
00574> {Vmax= .524:Dmax= .530}
00575> *****
00576> # VGL-4 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE WATERCOURSE FROM JOY'S
00577> # ROAD WITH THE MAIN DRAIN
00578> *****
00579> #
00580> 005:0017-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00581> ADD HYD 06:VGLR-2 384.50 3.253 No_date 114:45 140.25 n/a
00582> + 10:VGLR-3 225.20 2.000 No_date 113:50 140.08 n/a
00583> [DT= 5.00] SUM= 01:VGL-4 609.70 5.243 No_date 114:15 140.19 n/a
00584> 005:0018-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00585> SAVE HYD 01:VGL-4 609.70 5.243 No_date 114:15 140.19 n/a
00586> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VGL-4.005
00587> remark:VGL-4
00588> 005:0019-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00589> ROUTE CHANNEL -> 01:VGL-4 609.70 5.243 No_date 114:15 140.19 n/a
00590> [RDT= 5.00] out<- 02:VGLR-4 609.70 5.213 No_date 114:45 140.19 n/a
00591> [L/S/n= 485./ .200/.035]
00592> {Vmax= .350:Dmax= 1.123}
00593> 005:0020-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00594> CALIB NASHYD 03:VG-1F 117.70 1.300 No_date 112:05 141.38 .905
00595> [CN= 95.0: N= 3.00]
00596> [Tp= 2.90:DT= 5.00]
00597> *****
00598> # VGL IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE VAN GAAL WEST MAIN DRAIN
00599> # WITH VAN GAAL WEST TRIBUTARY
00600> *****
00601> #
00602> 005:0021-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00603> ADD HYD 02:VGLR-4 609.70 5.213 No_date 114:45 140.19 n/a
00604> + 03:VG-1F 117.70 1.300 No_date 112:05 141.38 n/a
00605> [DT= 5.00] SUM= 04:VGL 727.40 6.318 No_date 114:00 140.38 n/a
00606> 005:0022-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00607> SAVE HYD 04:VGL 727.40 6.318 No_date 114:00 140.38 n/a
00608> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VGL.005
00609> remark:VGL
00610> 005:0023-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00611> ROUTE CHANNEL -> 04:VGL 727.40 6.318 No_date 114:00 140.38 n/a
00612> [RDT= 5.00] out<- 05:VGR2-1 727.40 6.311 No_date 114:20 140.38 n/a
00613> [L/S/n= 755./ .200/.035]
00614> {Vmax= 1.063:Dmax= 1.219}
00615> 005:0024-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00616> CALIB NASHYD 06:VG-2 63.10 .776 No_date 110:20 141.18 .903
00617> [CN= 95.0: N= 3.00]
00618> [Tp= 1.60:DT= 5.00]
00619> 005:0025-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00620> ROUTE CHANNEL -> 06:VG-2 63.10 .776 No_date 110:20 141.18 n/a
00621> [RDT= 5.00] out<- 07:PerN 63.10 .768 No_date 111:00 141.18 n/a
00622> [L/S/n= 550./ .200/.035]
00623> {Vmax= .299:Dmax= .639}
00624> 005:0026-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00625> CALIB NASHYD 08:VG-3 40.60 .500 No_date 110:20 141.48 .905
00626> [CN= 95.0: N= 3.00]
00627> [Tp= 1.60:DT= 5.00]
00628> 005:0027-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00629> * CALIB STANDHYD 09:VG-4 24.60 .129 No_date 109:15 62.19 .398
00630> [XIMP=.40:TIMP=.50]
00631> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAV=4.14: F= .00]
00632> [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 35.:MNP=.250:SCP= .0]
00633> [Impervious area: IAimp= .80:SLPI= .30:LGI=1000.:MNI=.013:SCI= .0]
00634> 005:0028-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00635> ADD HYD 05:VGR2-1 727.40 6.311 No_date 114:20 140.38 n/a
00636> + 07:PerN 63.10 .768 No_date 111:00 141.18 n/a
00637> + 08:VG-3 40.60 .500 No_date 110:20 141.48 n/a
00638> + 09:VG-4 24.60 .129 No_date 109:15 62.19 n/a
00639> [DT= 5.00] SUM= 01:perths 855.70 7.316 No_date 113:15 138.24 n/a

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00640> 005:0029-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00641> SAVE HYD 01:perths 855.70 7.316 No_date 113:15 138.24 n/a
00642> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-perths.005
00643> remark:perthst
00644> 005:0030-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00645> CALIB NASHYD 02:VG-5 34.40 .401 No_date 111:20 140.98 .902
00646> [CN= 95.0: N= 3.00]
00647> [Tp= 2.30:DT= 5.00]
00648> 005:0031-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00649> ROUTE CHANNEL -> 02:VG-5 34.40 .401 No_date 111:20 140.98 n/a
00650> [RDT= 5.00] out<- 03:PerS 34.40 .398 No_date 111:55 140.98 n/a
00651> [L/S/n= 550./ .200/.035]
00652> {Vmax= .371:Dmax= .567}
00653> 005:0032-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00654> ADD HYD 01:perths 855.70 7.316 No_date 113:15 138.24 n/a
00655> + 03:PerS 34.40 .398 No_date 111:55 140.98 n/a
00656> [DT= 5.00] SUM= 02:arbuch 890.10 7.694 No_date 113:15 138.35 n/a
00657> 005:0033-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00658> SAVE HYD 02:arbuch 890.10 7.694 No_date 113:15 138.35 n/a
00659> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-arbuch.005
00660> remark:arbuch
00661> 005:0034-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00662> ROUTE CHANNEL -> 02:arbuch 890.10 7.694 No_date 113:15 138.35 n/a
00663> [RDT= 5.00] out<- 09:VGR2-2 890.10 7.673 No_date 113:30 138.35 n/a
00664> [L/S/n= 520./ .150/.035]
00665> {Vmax= .516:Dmax= 1.261}
00666> 005:0035-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00667> CALIB NASHYD 01:VG-6 94.20 1.010 No_date 112:25 141.08 .903
00668> [CN= 95.0: N= 3.00]
00669> [Tp= 3.20:DT= 5.00]
00670> 005:0036-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00671> ROUTE CHANNEL -> 01:VG-6 94.20 1.010 No_date 112:25 141.08 n/a
00672> [RDT= 5.00] out<- 02:VG-6 94.20 .954 No_date 113:55 141.08 n/a
00673> [L/S/n= 600./ .180/.035]
00674> {Vmax= .114:Dmax= .444}
00675> 005:0037-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00676> SAVE HYD 02:VG-6 94.20 .954 No_date 113:55 141.08 n/a
00677> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG-6.005
00678> remark:VG-6
00679> 005:0038-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00680> CALIB NASHYD 03:VG-7 39.20 .433 No_date 112:05 140.48 .899
00681> [CN= 95.0: N= 3.00]
00682> [Tp= 2.90:DT= 5.00]
00683> 005:0039-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00684> SAVE HYD 03:VG-7 39.20 .433 No_date 112:05 140.48 n/a
00685> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG-7.005
00686> remark:VG-7
00687> 005:0040-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00688> ROUTE CHANNEL -> 03:VG-7 39.20 .433 No_date 112:05 140.48 n/a
00689> [RDT= 5.00] out<- 04:VG-7 39.20 .408 No_date 114:05 140.48 n/a
00690> [L/S/n= 1480./ .200/.035]
00691> {Vmax= .278:Dmax= .560}
00692> 005:0041-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00693> ADD HYD 02:VG-6 94.20 .954 No_date 113:55 141.08 n/a
00694> + 04:VG-7 39.20 .408 No_date 114:05 140.48 n/a
00695> [DT= 5.00] SUM= 05:Moore 133.40 1.361 No_date 114:00 140.91 n/a
00696> 005:0042-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00697> SAVE HYD 05:Moore 133.40 1.361 No_date 114:00 140.91 n/a
00698> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-Moore.005
00699> remark:Moore
00700> 005:0043-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00701> CALIB NASHYD 05:VG-8 91.80 1.089 No_date 111:05 141.38 .905
00702> [CN= 95.0: N= 3.00]
00703> [Tp= 2.10:DT= 5.00]
00704> 005:0044-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00705> * CALIB STANDHYD 06:VG-9 11.40 .060 No_date 109:00 62.19 .398
00706> [XIMP=.40:TIMP=.50]
00707> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAV=4.14: F= .00]
00708> [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 50.:MNP=.250:SCP= .0]
00709> [Impervious area: IAimp= .80:SLPI= .30:LGI= 530.:MNI=.013:SCI= .0]
00710> 005:0045-----ID:NHYD-----AREA---QPEAK-TpeakDate_hh:mm---R.V.-R.C.

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00711> ADD HYD          02:VG-6      94.20      .954 No_date 113:55 141.08 n/a
00712>                + 04:VG-7      39.20      .408 No_date 114:05 140.48 n/a
00713>                + 05:VG-8      91.80      1.089 No_date 111:05 141.38 n/a
00714>                + 06:VG-9      11.40      .060 No_date 109:00 62.19 n/a
00715>                + 09:VGR2-2  890.10     7.673 No_date 113:30 138.35 n/a
00716> [DT= 5.00] SUM= 01:Fortun 1126.70  9.972 No_date 113:20 138.13 n/a
00717> 005:0046-----ID:NHYD-----AREA----OPEAK-TpeakDate_hh:mm---R.V.-R.C.
00718> SAVE HYD          01:Fortun 1126.70  9.972 No_date 113:20 138.13 n/a
00719> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-Portun.005
00720> remark:Fortune
00721> 005:0047-----ID:NHYD-----AREA----OPEAK-TpeakDate_hh:mm---R.V.-R.C.
00722> ROUTE CHANNEL -> 01:Fortun 1126.70  9.972 No_date 113:20 138.13 n/a
00723> [RDT= 5.00] out<- 03:VGR2-3 1126.70  9.958 No_date 113:25 138.13 n/a
00724> [L/S/n= 750./ .200/.035]
00725> {Vmax= .696:Dmax= .688}
00726> 005:0048-----ID:NHYD-----AREA----OPEAK-TpeakDate_hh:mm---R.V.-R.C.
00727> * CALIB STANDHYD 02:VG-10     20.30      .107 No_date 109:00 62.19 .398
00728> [XIMP=.40:TIMP=.50]
00729> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAV=4.14: F= .00]
00730> [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 50.:MNP=.250:SCP= .0]
00731> [Impervious area: IAimp= .80:SLPI= .30:LGI= 560.:MNI=.013:SCI= .0]
00732> 005:0049-----ID:NHYD-----AREA----OPEAK-TpeakDate_hh:mm---R.V.-R.C.
00733> ADD HYD          02:VG-10     20.30      .107 No_date 109:00 62.19 n/a
00734>                + 03:VGR2-3 1126.70  9.958 No_date 113:25 138.13 n/a
00735> [DT= 5.00] SUM= 09:JockVG 1147.00 10.007 No_date 113:25 136.78 n/a
00736> 005:0050-----ID:NHYD-----AREA----OPEAK-TpeakDate_hh:mm---R.V.-R.C.
00737> SAVE HYD          09:JockVG 1147.00 10.007 No_date 113:25 136.78 n/a
00738> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\JockVG.005
00739> remark:Flow from Van Gaal at Jock River
00740> ** END OF RUN : 99
00741>
00742> *****
00743>
00744>
00745>
00746>
00747>
00748> RUN:COMMAND#
00749> 100:0001-----
00750> START
00751> [TZERO = .00 hrs on 0]
00752> [METOUT= 2 (1=imperial, 2=metric output)]
00753> [NSTORM= 1]
00754> [NRUN = 100]
00755> *****
00756> # SWMHYMO Ver:5.02/Jan 2001 <BETA> / INPUT DATA FILE
00757> *****
00758> # Project Name: [Richmond FPM] Project Number: [709]
00759> # Date : 04-21-2009
00760> # Revised : 04-31-2009; 05-25-2009; 07-22-2009; 08-06-2009; 08-31-2009
00761> # 11-16-2009
00762> # Modeller : [Bryan Willcott B.Eng.]
00763> # Company : J.F. Sabourin and Associates
00764> # License # : 3410370
00765> *****
00766> # [BW] April 31, 2009
00767> # This model is the same as the JFSA summer model with the exception of the
00768> # storm files used and the CN values have been increased to 95
00769> *****
00770> # [BW] May 25, 2009
00771> # This model has been updated using revised values for Tp. Previous versions
00772> # of this model used a calculated Tp=0.6Tc. This model used a calculated
00773> # Tp=0.67Tc. Manning's n values for the overbanks in the ROUTE CHANNEL
00774> # commands have been changed to 0.05 for Spring conditions. Design storms
00775> # have changed to match those used in the Jock River Model
00776> *****
00777> # [BW] July 22, 2009
00778> # This model has been revised to include "existing" cross section information
00779> # received from Robinson Consultants. The Cross section revised in the model
00780> # is Sec 5.2 (channel receiving flow from "arbucks"). Also, channel and
00781> # floodplain slopes for ROUTE CHANNEL commands were updated to be equal

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00782> *****
00783> # [BW] August 6, 2009
00784> # This model has been revised to include cross section information
00785> # from Robinson Consultants Engineer's Report July 2003. The cross
00786> # section revised in the model is Sec 5.1. Cross sections Sec 1.03
00787> # and Sec 5.3 have also been revised
00788> *****
00789> # [BW] August 31, 2009
00790> # Model updated to include the proposed DSEL berm. This affects the geometry
00791> # of Route Channel Sect 5.2 located on the Arbucksle drain. Route Channels 5.2
00792> # and 1.03 have also been revised to reduce the number of values in the
00793> # x-y matrix
00794> *****
00795> # [BW] November 16, 2009
00796> # Model updated to include revised Tp values subsequent to review of
00797> # memo received from AECOM on Oct. 2, 2009
00798> *****
00799> #
00800> 100:0002-----
00801> READ STORM
00802> Filename = STORM.001
00803> Comment = Model 5 CDA - S+Rain 12hr/day, RTP 100 years, 10 Days.
00804> [SDT=60.00:SDUR= 240.00:PTOT= 267.43]
00805> *****
00806> # Van Gaal / Arbucksle Drain
00807> *****
00808> # DSEL SUBCATCHMENT VG-1 HAS BEEN BROKEN INTO 6 SUB-AREAS (BW)
00809> *****
00810> 100:0003-----ID:NHYD-----AREA----OPEAK-TpeakDate_hh:mm---R.V.-R.C.
00811> CALIB NASHYD 01:VG-1A 311.90 4.228 No_date 114:30 250.81 .938
00812> [CN= 95.0: N= 3.00]
00813> [Tp= 5.30:DT= 5.00]
00814> 100:0004-----ID:NHYD-----AREA----OPEAK-TpeakDate_hh:mm---R.V.-R.C.
00815> SAVE HYD 01:VG-1A 311.90 4.228 No_date 114:30 250.81 n/a
00816> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG-1A.100
00817> remark:VG-1A
00818> *****
00819> # Tp FOR VG-1B HAS BEEN REVISED TO REFLECT A HYDRAULIC LENGTH OF 1710 m, A
00820> # LENGTH THAT INCLUDES DISTANCE TO THE VG1-1 CONFLUENCE IN ADDITION TO THE
00821> # LONGEST FLOW PATH WITHIN VG-1B. THIS IS DONE TO SIMULATE CHANNEL ROUTING
00822> *****
00823> 100:0005-----ID:NHYD-----AREA----OPEAK-TpeakDate_hh:mm---R.V.-R.C.
00824> CALIB NASHYD 02:VG-1B 24.80 .440 No_date 111:50 250.71 .937
00825> [CN= 95.0: N= 3.00]
00826> [Tp= 2.70:DT= 5.00]
00827> *****
00828> # VG1-1 IS THE SUM OF FLOWS TO THE CONFLUENCE OF NORTHERN MOST WATERCOURSE IN
00829> # OUR AREA OF STUDY WITH THE ROADSIDE DITCH ON GARVIN ROAD
00830> *****
00831> #
00832> 100:0006-----ID:NHYD-----AREA----OPEAK-TpeakDate_hh:mm---R.V.-R.C.
00833> ADD HYD 01:VG-1A 311.90 4.228 No_date 114:30 250.81 n/a
00834> + 02:VG-1B 24.80 .440 No_date 111:50 250.71 n/a
00835> [DT= 5.00] SUM= 03:VG1-1 336.70 4.588 No_date 114:15 250.80 n/a
00836> 100:0007-----ID:NHYD-----AREA----OPEAK-TpeakDate_hh:mm---R.V.-R.C.
00837> SAVE HYD 03:VG1-1 336.70 4.588 No_date 114:15 250.80 n/a
00838> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG1-1.100
00839> remark:VG1-1
00840> 100:0008-----ID:NHYD-----AREA----OPEAK-TpeakDate_hh:mm---R.V.-R.C.
00841> CALIB NASHYD 04:VG-1D 47.80 .915 No_date 110:35 252.21 .943
00842> [CN= 95.0: N= 3.00]
00843> [Tp= 1.80:DT= 5.00]
00844> *****
00845> # VG1-2 IS THE SUM OF FLOWS AT THE GARVIN ROAD CROSS CULVERT AND
00846> # CONSERVATIVELY INCLUDES THE AREA VG-1D, WHICH IS LOCATED JUST DOWNSTREAM
00847> # OF THE CULVERT
00848> *****
00849> #
00850> 100:0009-----ID:NHYD-----AREA----OPEAK-TpeakDate_hh:mm---R.V.-R.C.
00851> ADD HYD 03:VG1-1 336.70 4.588 No_date 114:15 250.80 n/a
00852> + 04:VG-1D 47.80 .915 No_date 110:35 252.21 n/a

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00853> [DT= 5.00] SUM= 05:VG1-2 384.50 5.235 No_date 113:30 250.98 n/a
00854> 100:0010-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00855> SAVE HYD 05:VG1-2 384.50 5.235 No_date 113:30 250.98 n/a
00856> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG1-2.100
00857> remark:VG1-2
00858> 100:0011-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00859> ROUTE CHANNEL -> 05:VG1-2 384.50 5.235 No_date 113:30 250.98 n/a
00860> [RDT= 5.00] out<- 06:VG1R-2 384.50 5.162 No_date 114:10 250.98 n/a
00861> [L/S/n= 865./ .150/.035]
00862> {Vmax= .339:Dmax= .802}
00863> 100:0012-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00864> CALIB NASHYD 07:VG-1C 211.80 3.062 No_date 114:00 250.81 .938
00865> [CN= 95.0: N= 3.00]
00866> [Tp= 4.70:DT= 5.00]
00867> 100:0013-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00868> CALIB NASHYD 08:VG-1E 13.40 .272 No_date 109:05 250.71 .937
00869> [CN= 95.0: N= 3.00]
00870> [Tp= .64:DT= 5.00]
00871> *****
00872> # VG1-3 IS THE SUM OF FLOWS TO JOY'S ROAD CROSS CULVERT AND CONSERVATIVELY
00873> # INCLUDES THE AREA VG-1E, WHICH IS LOCATED JUST DOWNSTREAM OF THE CULVERT
00874> *****
00875> #
00876> 100:0014-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00877> ADD HYD 07:VG-1C 211.80 3.062 No_date 114:00 250.81 n/a
00878> + 08:VG-1E 13.40 .272 No_date 109:05 250.71 n/a
00879> [DT= 5.00] SUM= 09:VG1-3 225.20 3.166 No_date 113:30 250.81 n/a
00880> 100:0015-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00881> SAVE HYD 09:VG1-3 225.20 3.166 No_date 113:30 250.81 n/a
00882> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG1-3.100
00883> remark:VG1-3
00884> 100:0016-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00885> ROUTE CHANNEL -> 09:VG1-3 225.20 3.166 No_date 113:30 250.81 n/a
00886> [RDT= 5.00] out<- 10:VG1R-3 225.20 3.161 No_date 113:45 250.81 n/a
00887> [L/S/n= 630./ .200/.035]
00888> {Vmax= .606:Dmax= .678}
00889> *****
00890> # VG1-4 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE WATERCOURSE FROM JOY'S
00891> # ROAD WITH THE MAIN DRAIN
00892> *****
00893> #
00894> 100:0017-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00895> ADD HYD 06:VG1R-2 384.50 5.162 No_date 114:10 250.98 n/a
00896> + 10:VG1R-3 225.20 3.161 No_date 113:45 250.81 n/a
00897> [DT= 5.00] SUM= 01:VG1-4 609.70 8.316 No_date 114:05 250.91 n/a
00898> 100:0018-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00899> SAVE HYD 01:VG1-4 609.70 8.316 No_date 114:05 250.91 n/a
00900> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG1-4.100
00901> remark:VG1-4
00902> 100:0019-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00903> ROUTE CHANNEL -> 01:VG1-4 609.70 8.316 No_date 114:05 250.91 n/a
00904> [RDT= 5.00] out<- 02:VG1R-4 609.70 8.280 No_date 114:30 250.91 n/a
00905> [L/S/n= 485./ .200/.035]
00906> {Vmax= .326:Dmax= 1.188}
00907> 100:0020-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00908> CALIB NASHYD 03:VG-1F 117.70 2.050 No_date 112:05 252.11 .943
00909> [CN= 95.0: N= 3.00]
00910> [Tp= 2.90:DT= 5.00]
00911> *****
00912> # VG1 IS THE SUM OF FLOWS AT THE CONFLUENCE OF THE VAN GAAL WEST MAIN DRAIN
00913> # WITH VAN GAAL WEST TRIBUTARY
00914> *****
00915> #
00916> 100:0021-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00917> ADD HYD 02:VG1R-4 609.70 8.280 No_date 114:30 250.91 n/a
00918> + 03:VG-1F 117.70 2.050 No_date 112:05 252.11 n/a
00919> [DT= 5.00] SUM= 04:VG1 727.40 10.080 No_date 113:55 251.11 n/a
00920> 100:0022-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00921> SAVE HYD 04:VG1 727.40 10.080 No_date 113:55 251.11 n/a
00922> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG1.100
00923> remark:VG1

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00924> 100:0023-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00925> ROUTE CHANNEL -> 04:VG1 727.40 10.080 No_date 113:55 251.11 n/a
00926> [RDT= 5.00] out<- 05:VGR2-1 727.40 10.070 No_date 114:05 251.11 n/a
00927> [L/S/n= 755./ .200/.035]
00928> {Vmax= 1.108:Dmax= 1.485}
00929> 100:0024-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00930> CALIB NASHYD 06:VG-2 63.10 1.225 No_date 110:20 251.91 .942
00931> [CN= 95.0: N= 3.00]
00932> [Tp= 1.60:DT= 5.00]
00933> 100:0025-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00934> ROUTE CHANNEL -> 06:VG-2 63.10 1.225 No_date 110:20 251.91 n/a
00935> [RDT= 5.00] out<- 07:PerN 63.10 1.214 No_date 110:50 251.91 n/a
00936> [L/S/n= 550./ .200/.035]
00937> {Vmax= .291:Dmax= .688}
00938> 100:0026-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00939> CALIB NASHYD 08:VG-3 40.60 .788 No_date 110:20 252.21 .943
00940> [CN= 95.0: N= 3.00]
00941> [Tp= 1.60:DT= 5.00]
00942> 100:0027-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00943> * CALIB STANDHYD 09:VG-4 24.60 .201 No_date 109:05 106.65 .399
00944> [XIMP=.40:TIMP=.50]
00945> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAY=4.14: F= .00]
00946> [Pervious area: Iaper= 1.50:SLPP=1.50:LGP= 35.:MNP=.250:SCP= .0]
00947> [Impervious area: IAimp= .80:SLPI= .30:LGI=1000.:MNI=.013:SCI= .0]
00948> 100:0028-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00949> ADD HYD 05:VGR2-1 727.40 10.070 No_date 114:05 251.11 n/a
00950> + 07:PerN 63.10 1.214 No_date 110:50 251.91 n/a
00951> + 08:VG-3 40.60 .788 No_date 110:20 252.21 n/a
00952> + 09:VG-4 24.60 .201 No_date 109:05 106.65 n/a
00953> [DT= 5.00] SUM= 01:perths 855.70 11.619 No_date 113:25 247.07 n/a
00954> 100:0029-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00955> SAVE HYD 01:perths 855.70 11.619 No_date 113:25 247.07 n/a
00956> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-perths.100
00957> remark:perthst
00958> 100:0030-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00959> CALIB NASHYD 02:VG-5 34.40 .633 No_date 111:20 251.71 .941
00960> [CN= 95.0: N= 3.00]
00961> [Tp= 2.30:DT= 5.00]
00962> 100:0031-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00963> ROUTE CHANNEL -> 02:VG-5 34.40 .633 No_date 111:20 251.71 n/a
00964> [RDT= 5.00] out<- 03:PerS 34.40 .627 No_date 111:50 251.71 n/a
00965> [L/S/n= 550./ .200/.035]
00966> {Vmax= .311:Dmax= .616}
00967> 100:0032-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00968> ADD HYD 01:perths 855.70 11.619 No_date 113:25 247.07 n/a
00969> + 03:PerS 34.40 .627 No_date 111:50 251.71 n/a
00970> [DT= 5.00] SUM= 02:arbucl 890.10 12.204 No_date 113:25 247.25 n/a
00971> 100:0033-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00972> SAVE HYD 02:arbucl 890.10 12.204 No_date 113:25 247.25 n/a
00973> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-arbucl.100
00974> remark:arbucl
00975> 100:0034-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00976> ROUTE CHANNEL -> 02:arbucl 890.10 12.204 No_date 113:25 247.25 n/a
00977> [RDT= 5.00] out<- 09:VGR2-2 890.10 12.157 No_date 113:40 247.25 n/a
00978> [L/S/n= 520./ .150/.035]
00979> {Vmax= .489:Dmax= 1.408}
00980> 100:0035-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00981> CALIB NASHYD 01:VG-6 94.20 1.594 No_date 112:25 251.81 .942
00982> [CN= 95.0: N= 3.00]
00983> [Tp= 3.20:DT= 5.00]
00984> 100:0036-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00985> ROUTE CHANNEL -> 01:VG-6 94.20 1.594 No_date 112:25 251.81 n/a
00986> [RDT= 5.00] out<- 02:VG-6 94.20 1.504 No_date 113:55 251.81 n/a
00987> [L/S/n= 600./ .180/.035]
00988> {Vmax= .110:Dmax= .459}
00989> 100:0037-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00990> SAVE HYD 02:VG-6 94.20 1.504 No_date 113:55 251.81 n/a
00991> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG-6.100
00992> remark:VG-6
00993> 100:0038-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm---R.V.-R.C.
00994> CALIB NASHYD 03:VG-7 39.20 .683 No_date 112:05 251.21 .939

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00995> [CN= 95.0: N= 3.00]
00996> [Tp= 2.90:DT= 5.00]
00997> 100:0039-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
00998> SAVE HYD 03:VG-7 39.20 .683 No_date 112:05 251.21 n/a
00999> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-VG-7.100
01000> remark:VG-7
01001> 100:0040-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01002> ROUTE CHANNEL -> 03:VG-7 39.20 .683 No_date 112:05 251.21 n/a
01003> [RDT= 5.00] out<- 04:VG-7 39.20 .628 No_date 113:55 251.21 n/a
01004> [L/S/n= 1480./ .200/.035]
01005> {Vmax= .232:Dmax= .594}
01006> 100:0041-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01007> ADD HYD 02:VG-6 94.20 1.504 No_date 113:55 251.81 n/a
01008> + 04:VG-7 39.20 .628 No_date 113:55 251.21 n/a
01009> [DT= 5.00] SUM= 05:Moore 133.40 2.132 No_date 113:55 251.63 n/a
01010> 100:0042-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01011> SAVE HYD 05:Moore 133.40 2.132 No_date 113:55 251.63 n/a
01012> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-Moore.100
01013> remark:Moore
01014> 100:0043-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01015> CALIB NASHYD 05:VG-8 91.80 1.717 No_date 111:05 252.11 .943
01016> [CN= 95.0: N= 3.00]
01017> [Tp= 2.10:DT= 5.00]
01018> 100:0044-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01019> * CALIB STANDHYD 06:VG-9 11.40 .094 No_date 109:00 106.65 .399
01020> [XIMP=.40:TIMP=.50]
01021> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAV=4.14: F= .00]
01022> [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 50.:MNP=.250:SCP= .0]
01023> [Impervious area: IAimp= .80:SLPI= .30:LGI= 530.:MNI=.013:SCI= .0]
01024> 100:0045-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01025> ADD HYD 02:VG-6 94.20 1.504 No_date 113:55 251.81 n/a
01026> + 04:VG-7 39.20 .628 No_date 113:55 251.21 n/a
01027> + 05:VG-8 91.80 1.717 No_date 111:05 252.11 n/a
01028> + 06:VG-9 11.40 .094 No_date 109:00 106.65 n/a
01029> + 09:VGR2-2 890.10 12.157 No_date 113:40 247.25 n/a
01030> [DT= 5.00] SUM= 01:Fortun 1126.70 15.739 No_date 113:25 246.74 n/a
01031> 100:0046-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01032> SAVE HYD 01:Fortun 1126.70 15.739 No_date 113:25 246.74 n/a
01033> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\H-Fortun.100
01034> remark:Fortune
01035> 100:0047-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01036> ROUTE CHANNEL -> 01:Fortun 1126.70 15.739 No_date 113:25 246.74 n/a
01037> [RDT= 5.00] out<- 03:VGR2-3 1126.70 15.714 No_date 113:35 246.74 n/a
01038> [L/S/n= 750./ .200/.035]
01039> {Vmax= .787:Dmax= .838}
01040> 100:0048-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01041> * CALIB STANDHYD 02:VG-10 20.30 .167 No_date 109:00 106.65 .399
01042> [XIMP=.40:TIMP=.50]
01043> [Horton parameters: Fo= 76.20:Fc= 13.20:DCAV=4.14: F= .00]
01044> [Pervious area: IAper= 1.50:SLPP=1.50:LGP= 50.:MNP=.250:SCP= .0]
01045> [Impervious area: IAimp= .80:SLPI= .30:LGI= 560.:MNI=.013:SCI= .0]
01046> 100:0049-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01047> ADD HYD 02:VG-10 20.30 .167 No_date 109:00 106.65 n/a
01048> + 03:VGR2-3 1126.70 15.714 No_date 113:35 246.74 n/a
01049> [DT= 5.00] SUM= 09:JockVG 1147.00 15.777 No_date 113:30 244.26 n/a
01050> 100:0050-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01051> SAVE HYD 09:JockVG 1147.00 15.777 No_date 113:30 244.26 n/a
01052> fname :Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSPRI-1\JockVG.100
01053> remark:Flow from Van Gaal at Jock River
01054> 100:0002-----ID:NHYD-----AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.
01055> FINISH
01056> -----
01057> *****
01058> WARNINGS / ERRORS / NOTES
01059> -----
01060> 002:0027 CALIB STANDHYD
01061> *** NOTE: The pervious area has no runoff.
01062> 002:0044 CALIB STANDHYD
01063> *** NOTE: The pervious area has no runoff.
01064> 002:0048 CALIB STANDHYD
01065> *** NOTE: The pervious area has no runoff.

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01066> 005:0027 CALIB STANDHYD
01067> *** NOTE: The pervious area has no runoff.
01068> 005:0044 CALIB STANDHYD
01069> *** NOTE: The pervious area has no runoff.
01070> 005:0048 CALIB STANDHYD
01071> *** NOTE: The pervious area has no runoff.
01072> 100:0027 CALIB STANDHYD
01073> *** NOTE: The pervious area has no runoff.
01074> 100:0044 CALIB STANDHYD
01075> *** NOTE: The pervious area has no runoff.
01076> 100:0048 CALIB STANDHYD
01077> *** NOTE: The pervious area has no runoff.
01078> Simulation ended on 2009-11-23 at 10:09:46
01079> =====
01080>
01081>

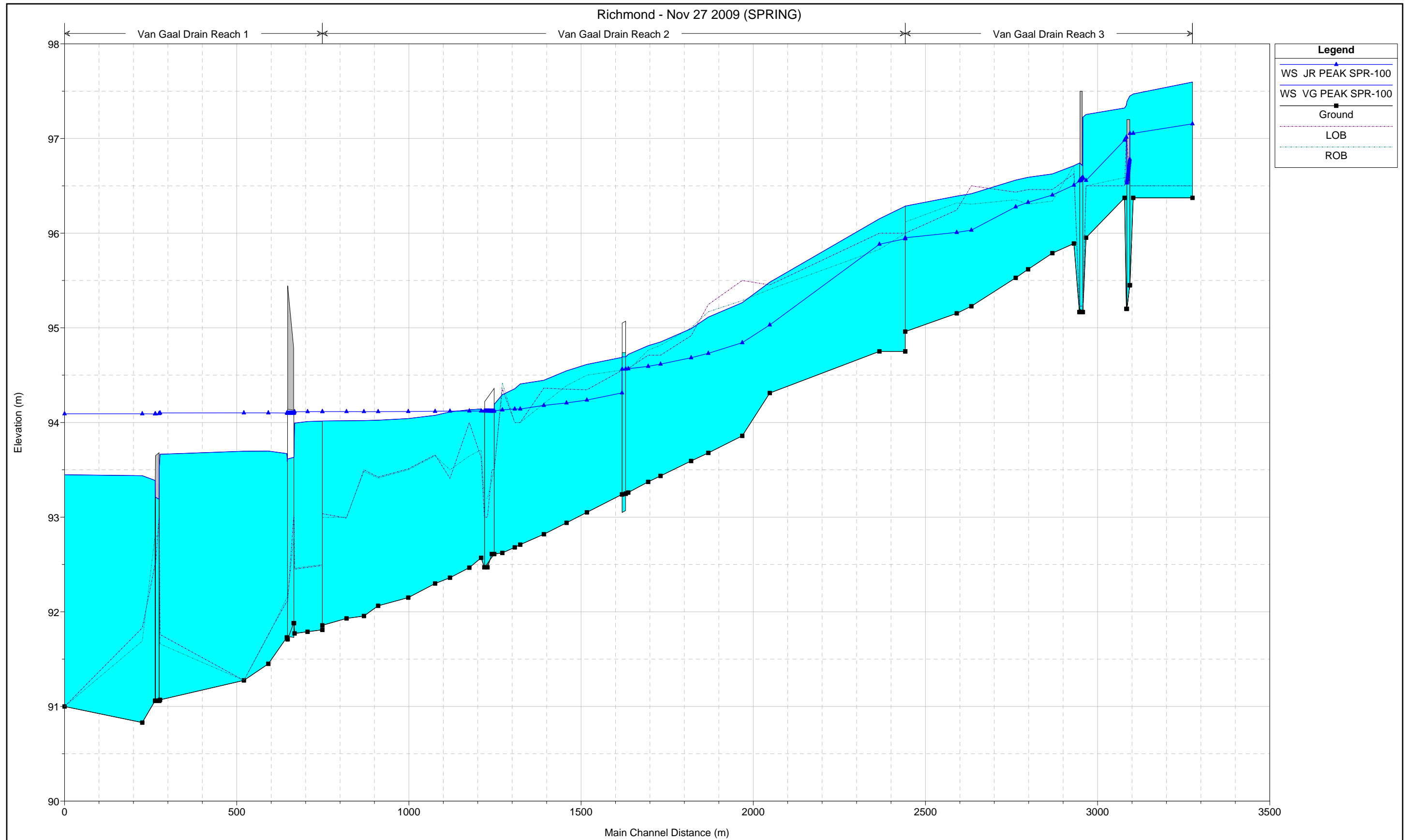
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APPENDIX D

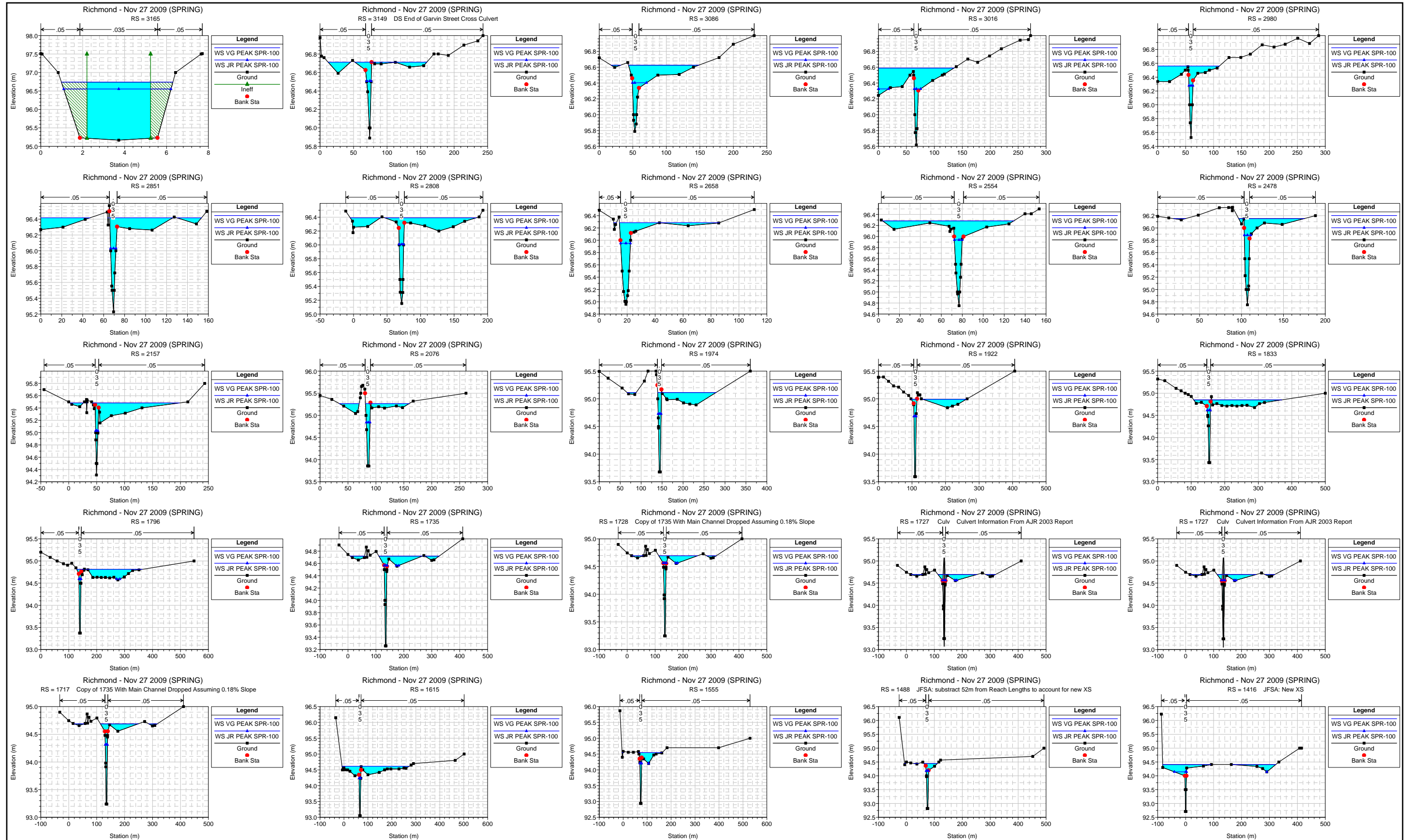
JFSA HEC-RAS Profiles and Cross Sections (Spring)



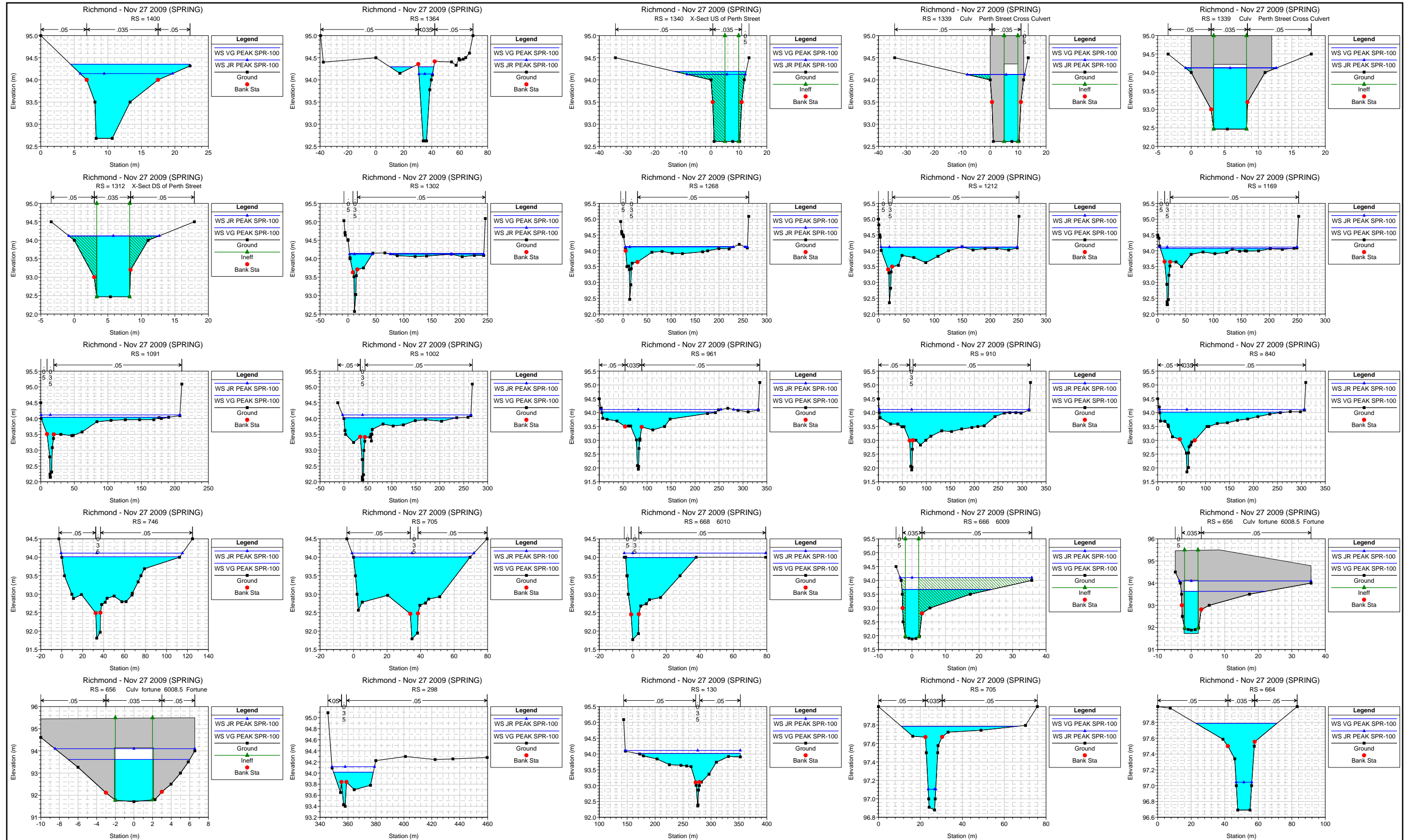
Richmond HEC-RAS Profile (Spring)



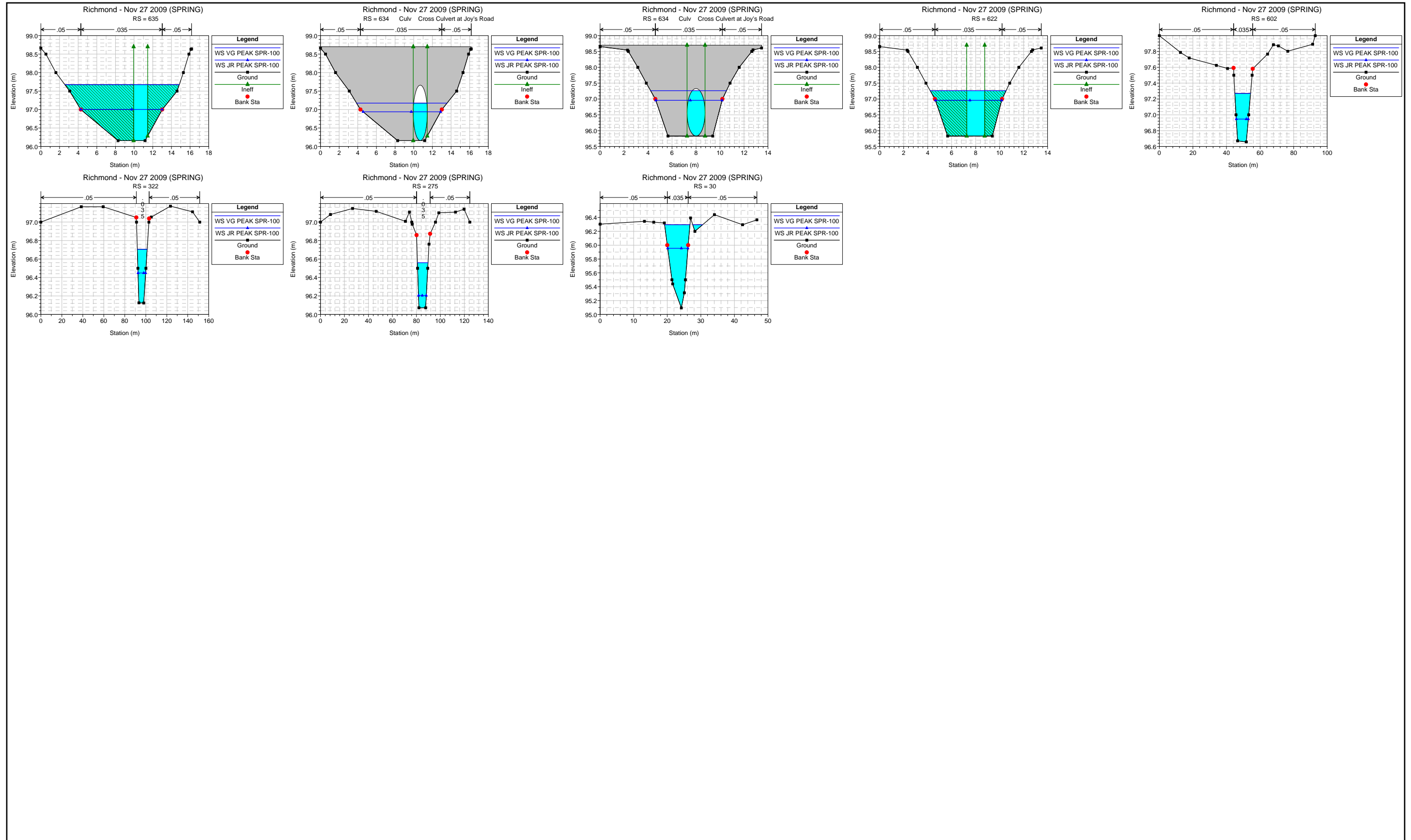
Richmond HEC-RAS Cross Sections (Spring)



Richmond HEC-RAS Cross Sections (Spring)



Richmond HEC-RAS Cross Sections (Spring)

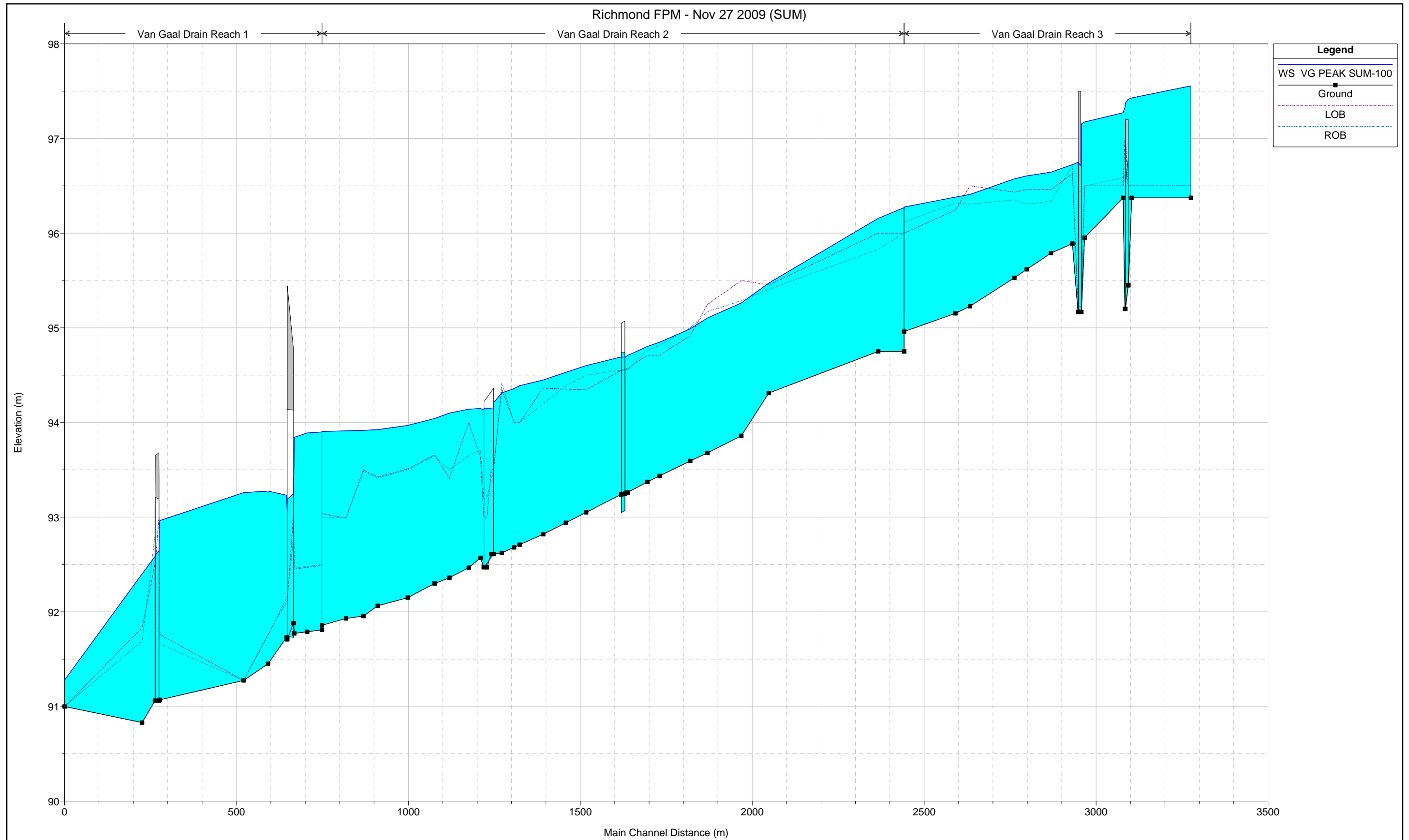


APPENDIX E

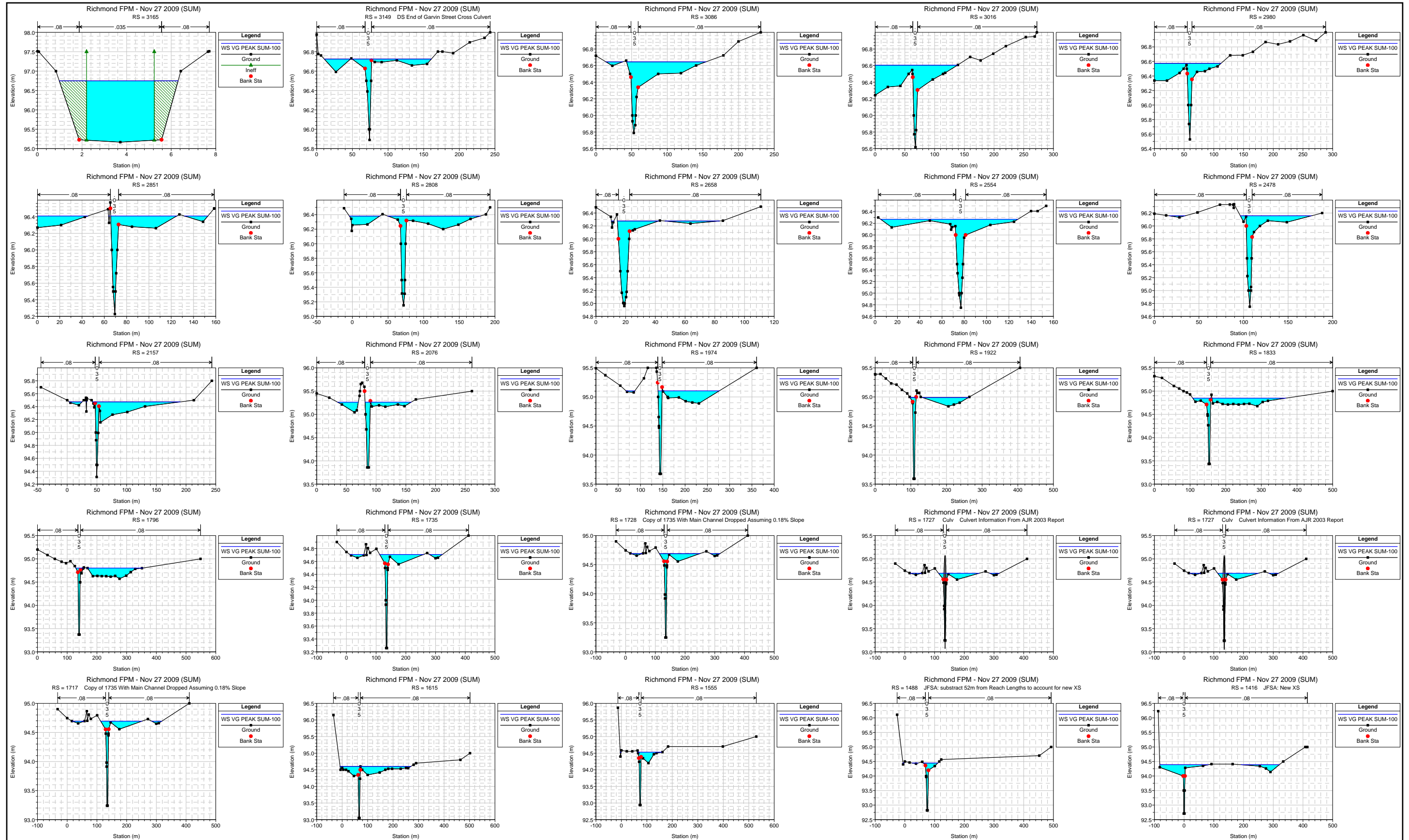
JFSA HEC-RAS Profiles and Cross Sections (Summer)



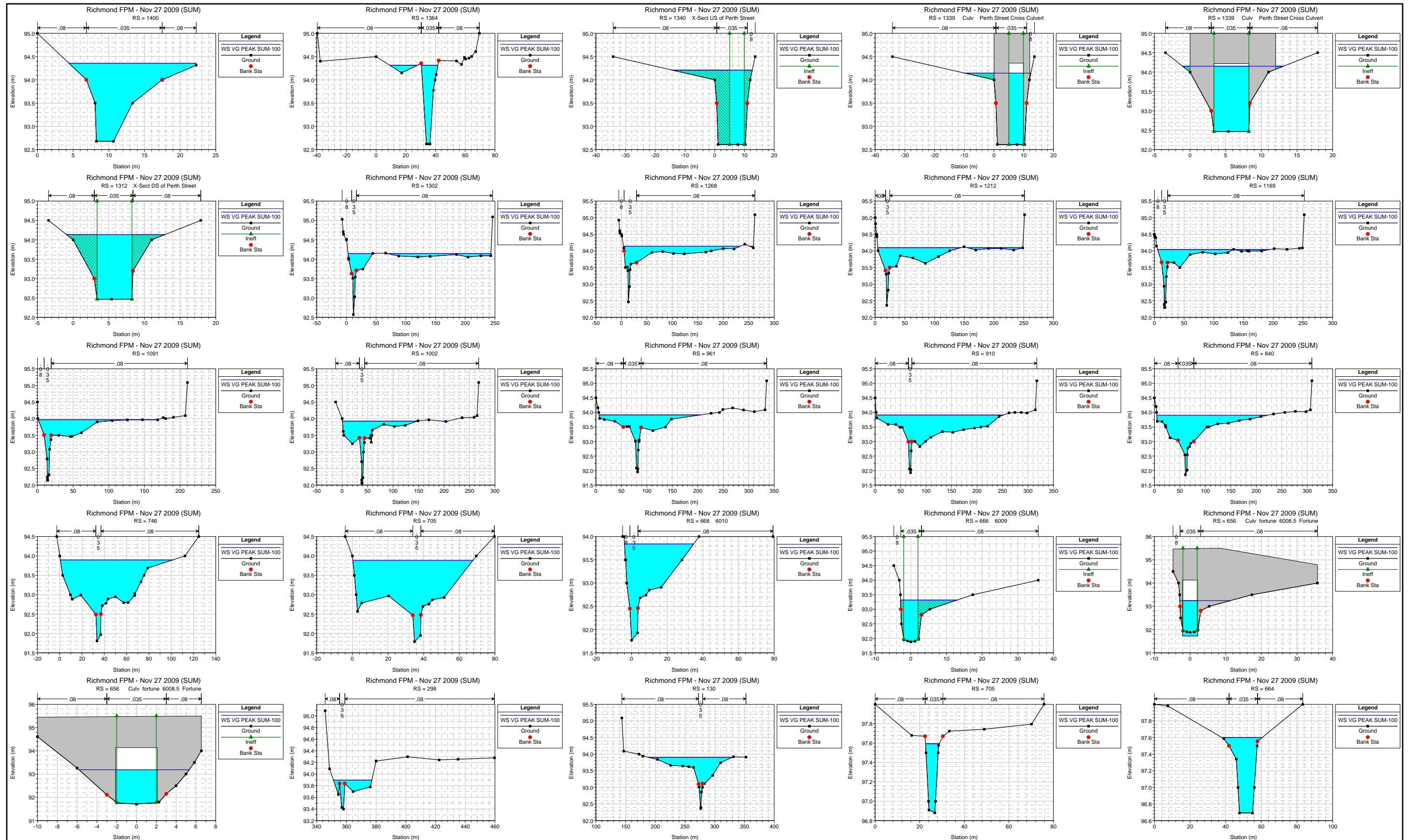
Richmond HEC-RAS Profile (Summer)



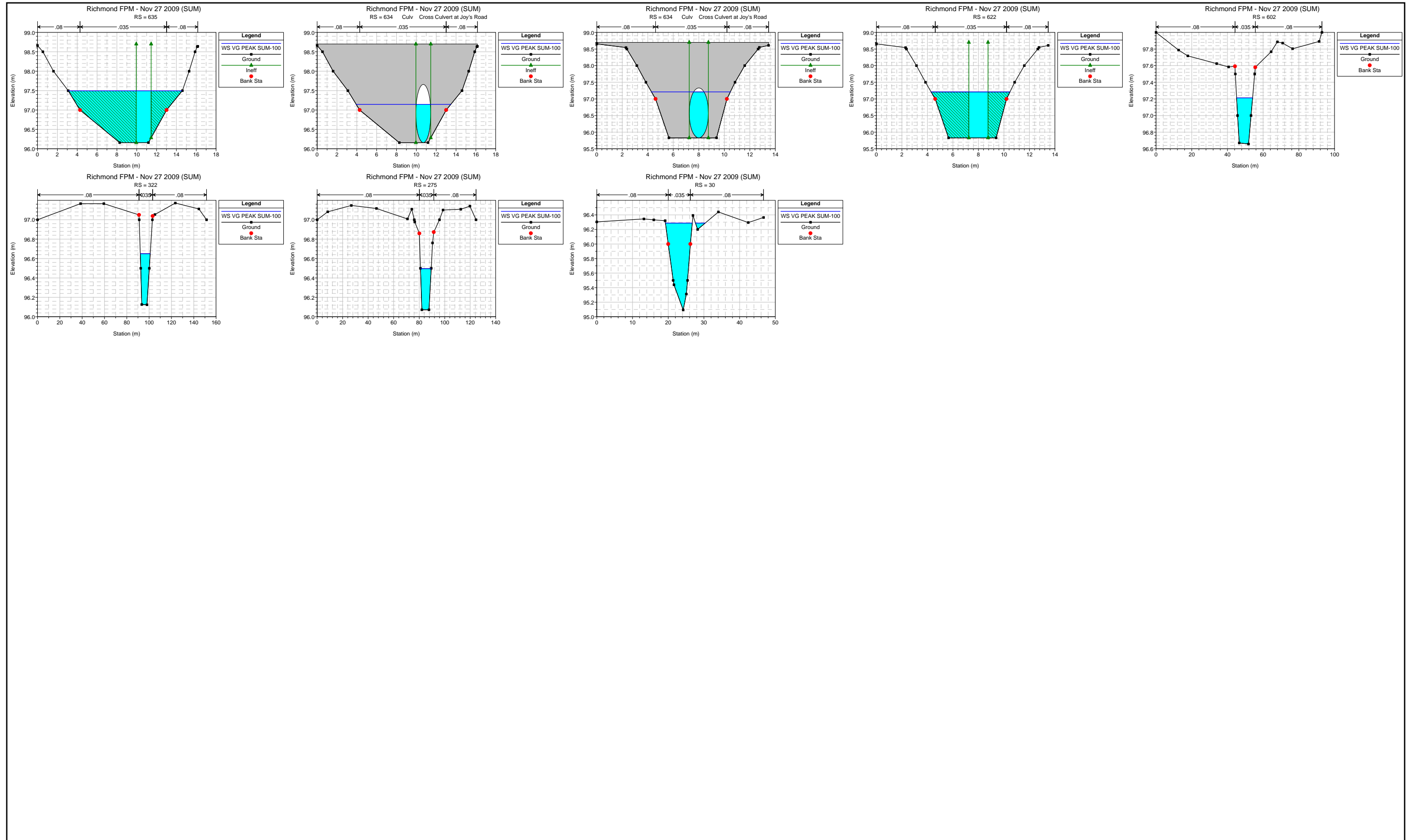
Richmond HEC-RAS Cross Sections (Summer)



Richmond HEC-RAS Cross Sections (Summer)



Richmond HEC-RAS Cross Sections (Summer)

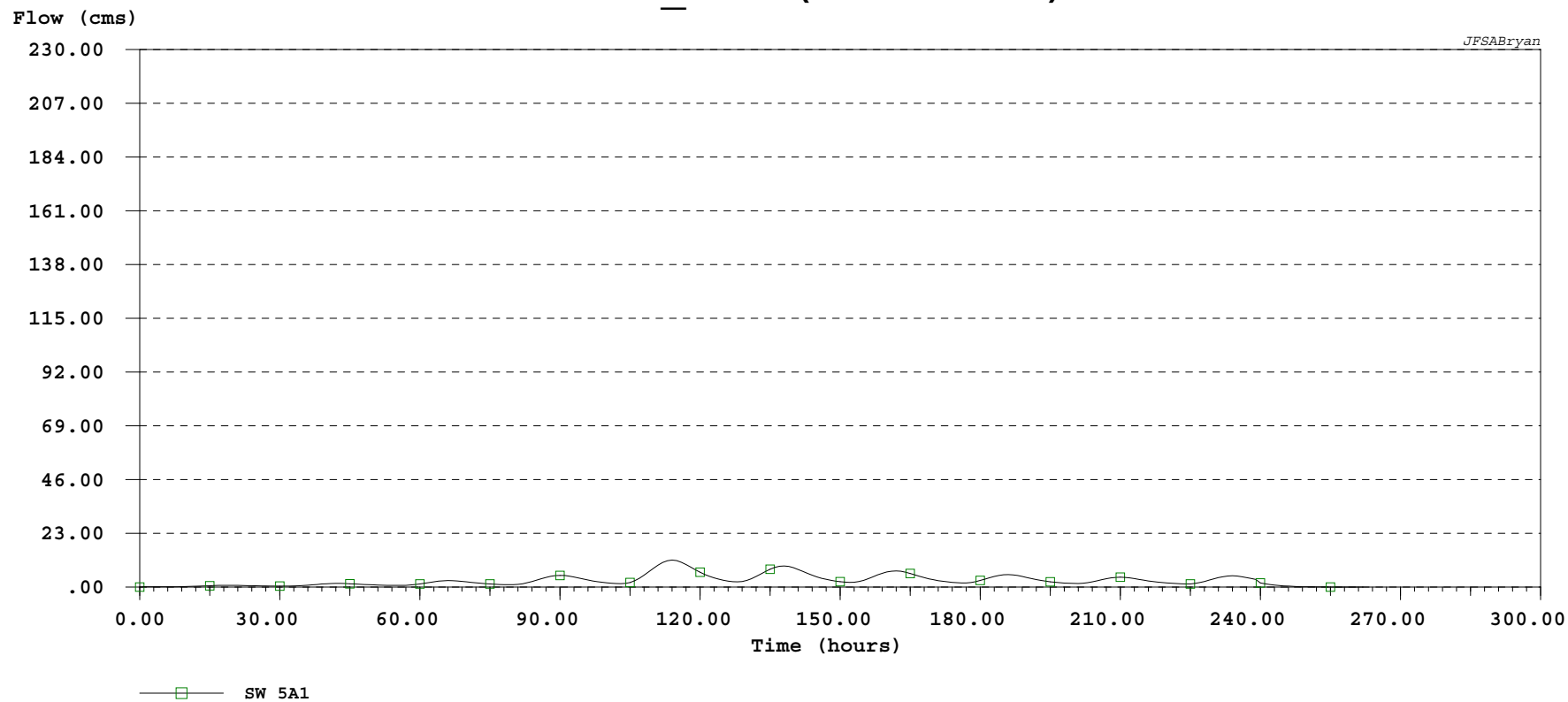


APPENDIX F

Jock River Hydrographs (1:100 Year Spring)



SW_5A1 (JR SPRING)



Hydrograph Statistics:

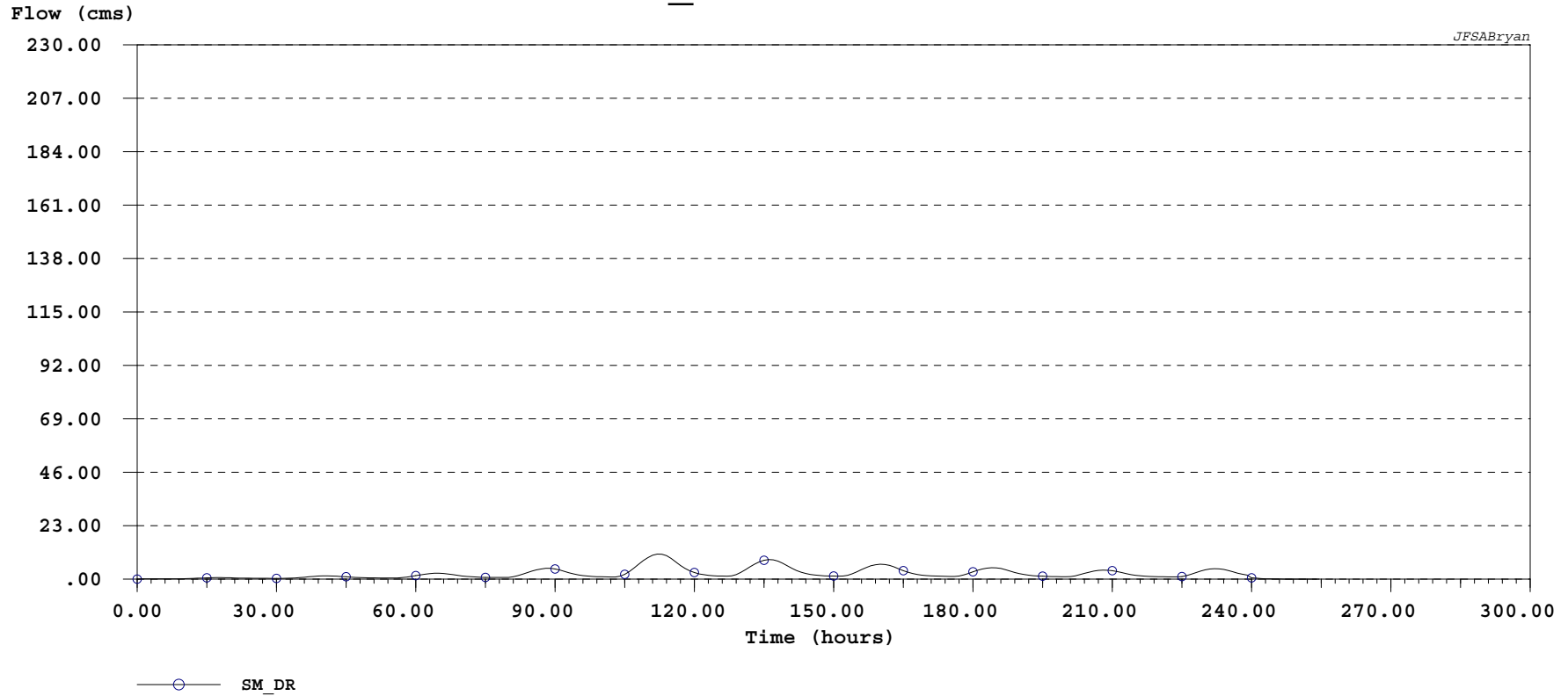
Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—□—	H-SW_5A1.100: SW_5A1	60.00	1412.00	11.536	114.000	186.01	2.626E+06	262.000	2.785

Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\JRSPRI~1\H-SW_5A1.100
 Comment in file : SW_5A1

#	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #
#	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #
0.00	0.000		41.00	1.520	82.00	1.433	123.00	3.931	164.00	6.367	205.00	2.691	246.00	0.396
1.00	0.131		42.00	1.565	83.00	1.848	124.00	3.376	165.00	5.825	206.00	3.153	247.00	0.299
2.00	0.130		43.00	1.559	84.00	2.373	125.00	2.930	166.00	5.220	207.00	3.578	248.00	0.224
3.00	0.129		44.00	1.504	85.00	2.964	126.00	2.576	167.00	4.614	208.00	3.920	249.00	0.167
4.00	0.128		45.00	1.418	86.00	3.568	127.00	2.313	168.00	4.048	209.00	4.143	250.00	0.123
5.00	0.127		46.00	1.315	87.00	4.127	128.00	2.203	169.00	3.543	210.00	4.221	251.00	0.091
6.00	0.125		47.00	1.209	88.00	4.586	129.00	2.356	170.00	3.109	211.00	4.143	252.00	0.067
7.00	0.124		48.00	1.107	89.00	4.896	130.00	2.818	171.00	2.746	212.00	3.931	253.00	0.048
8.00	0.150		49.00	1.015	90.00	5.017	131.00	3.564	172.00	2.448	213.00	3.635	254.00	0.034
9.00	0.188		50.00	0.935	91.00	4.934	132.00	4.519	173.00	2.208	214.00	3.300	255.00	0.023
10.00	0.233		51.00	0.867	92.00	4.673	133.00	5.586	174.00	2.017	215.00	2.963	256.00	0.016
11.00	0.286		52.00	0.810	93.00	4.295	134.00	6.659	175.00	1.865	216.00	2.646	257.00	0.010
12.00	0.347		53.00	0.763	94.00	3.864	135.00	7.631	176.00	1.756	217.00	2.364	258.00	0.006
13.00	0.416		54.00	0.725	95.00	3.426	136.00	8.402	177.00	1.758	218.00	2.120	259.00	0.003
14.00	0.491		55.00	0.701	96.00	3.014	137.00	8.892	178.00	1.943	219.00	1.915	260.00	0.002
15.00	0.568		56.00	0.712	97.00	2.645	138.00	9.038	179.00	2.311	220.00	1.746	261.00	0.000
16.00	0.638		57.00	0.769	98.00	2.326	139.00	8.814	180.00	2.817	221.00	1.609	262.00	0.000
17.00	0.693		58.00	0.901	99.00	2.058	140.00	8.273	181.00	3.400	222.00	1.500	263.00	0.000
18.00	0.725		59.00	1.106	100.00	1.838	141.00	7.531	182.00	3.993	223.00	1.413	264.00	0.000
19.00	0.736		60.00	1.371	101.00	1.660	142.00	6.701	183.00	4.532	224.00	1.351	265.00	0.000
20.00	0.727		61.00	1.673	102.00	1.520	143.00	5.870	184.00	4.961	225.00	1.374	266.00	0.000
21.00	0.702		62.00	1.985	103.00	1.453	144.00	5.094	185.00	5.235	226.00	1.556	267.00	0.000
22.00	0.667		63.00	2.278	104.00	1.556	145.00	4.402	186.00	5.322	227.00	1.909	268.00	0.000
23.00	0.630		64.00	2.522	105.00	1.962	146.00	3.808	187.00	5.208	228.00	2.394	269.00	0.000
24.00	0.592		65.00	2.690	106.00	2.712	147.00	3.311	188.00	4.923	229.00	2.954	270.00	0.000
25.00	0.557		66.00	2.761	107.00	3.781	148.00	2.904	189.00	4.529	230.00	3.525	271.00	0.000
26.00	0.526		67.00	2.729	108.00	5.099	149.00	2.576	190.00	4.087	231.00	4.045	272.00	0.000
27.00	0.499		68.00	2.607	109.00	6.561	150.00	2.315	191.00	3.645	232.00	4.461	273.00	0.000
28.00	0.476		69.00	2.425	110.00	8.041	151.00	2.114	192.00	3.230	233.00	4.728	274.00	0.000
29.00	0.457		70.00	2.215	111.00	9.405	152.00	2.002	193.00	2.860	234.00	4.818	275.00	0.000
30.00	0.441		71.00	2.000	112.00	10.518	153.00	2.065	194.00	2.542	235.00	4.717	276.00	0.000
31.00	0.428		72.00	1.796	113.00	11.261	154.00	2.368	195.00	2.275	236.00	4.453	277.00	0.000
32.00	0.445		73.00	1.613	<u>114.00</u>	<u>11.536</u>	155.00	2.898	196.00	2.055	237.00	4.086	278.00	0.000
33.00	0.485		74.00	1.454	115.00	11.298	156.00	3.595	197.00	1.878	238.00	3.672	279.00	0.000
34.00	0.558		75.00	1.320	116.00	10.611	157.00	4.382	198.00	1.736	239.00	3.257	280.00	0.000
35.00	0.665		76.00	1.210	117.00	9.635	158.00	5.176	199.00	1.624	240.00	1.750	281.00	0.000
36.00	0.803		77.00	1.120	118.00	8.526	159.00	5.893	200.00	1.539	241.00	1.411	282.00	0.000
37.00	0.962		78.00	1.047	119.00	7.406	160.00	6.461	201.00	1.518	242.00	1.120	283.00	0.000
38.00	1.128		79.00	1.008	120.00	6.355	161.00	6.820	202.00	1.622	243.00	0.877	284.00	0.000
39.00	1.287		80.00	1.029	121.00	5.416	162.00	6.927	203.00	1.874	244.00	0.679	285.00	0.000
40.00	1.423		81.00	1.158	122.00	4.607	163.00	6.763	204.00	2.247	245.00	0.521	286.00	0.000

SM_DR (JR SPRING)



Hydrograph Statistics:

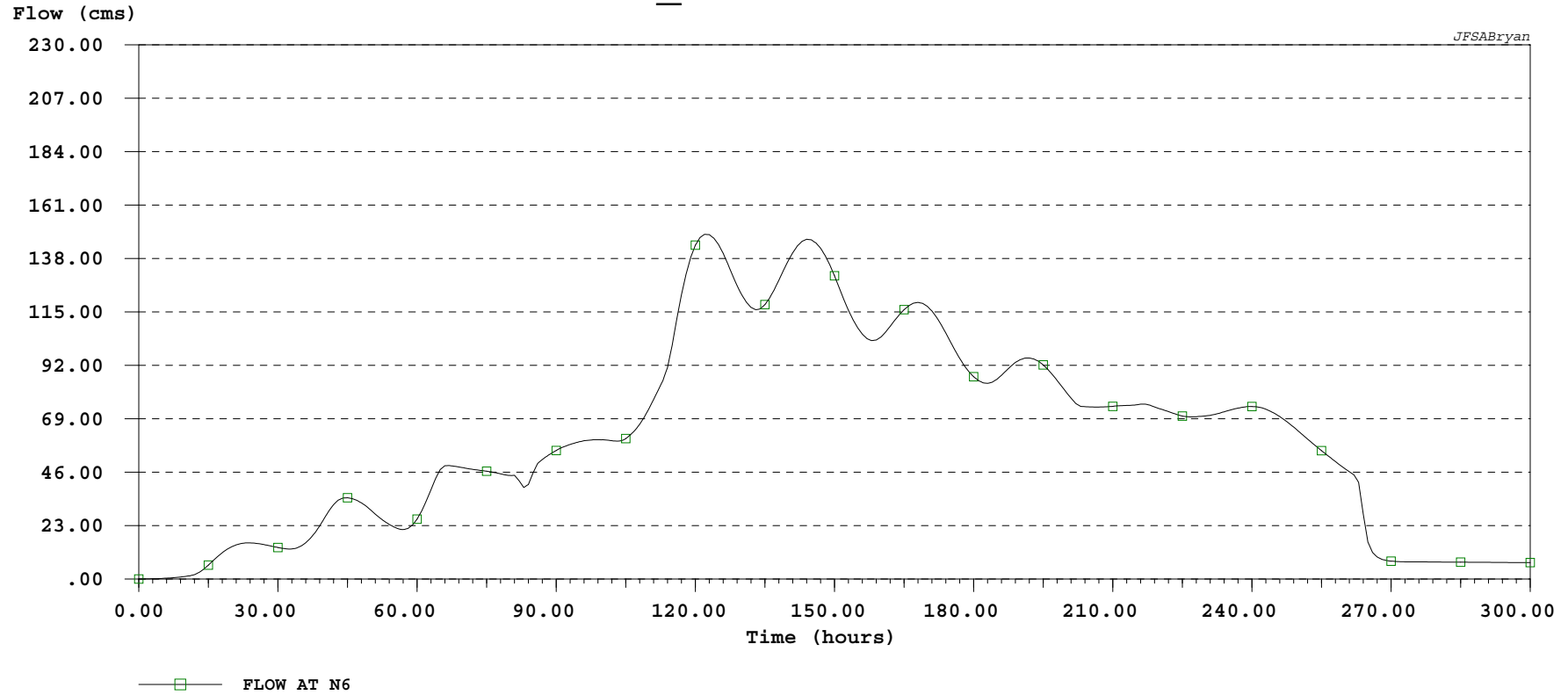
Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—○—	H-SM_DR.100 : SM_DR	60.00	1122.00	10.775	112.000	186.01	2.087E+06	254.000	2.282

Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\JRSPRI-1\H-SM_DR.100
 Comment in file : SM_DR

#	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #
#	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #
#	---	#	---	#	---	#	---	#	---	#	---	#	---	#
	0.00	0.000	41.00	1.419	82.00	1.505	123.00	1.648	164.00	4.444	205.00	2.992	246.00	0.039
	1.00	0.104	42.00	1.377	83.00	2.112	124.00	1.477	165.00	3.649	206.00	3.440	247.00	0.023
	2.00	0.103	43.00	1.272	84.00	2.777	125.00	1.362	166.00	2.966	207.00	3.750	248.00	0.014
	3.00	0.102	44.00	1.130	85.00	3.424	126.00	1.287	167.00	2.428	208.00	3.892	249.00	0.008
	4.00	0.101	45.00	0.984	86.00	3.984	127.00	1.248	168.00	2.026	209.00	3.856	250.00	0.004
	5.00	0.101	46.00	0.856	87.00	4.399	128.00	1.418	169.00	1.738	210.00	3.642	251.00	0.002
	6.00	0.100	47.00	0.752	88.00	4.622	129.00	1.981	170.00	1.538	211.00	3.267	252.00	0.001
	7.00	0.099	48.00	0.674	89.00	4.621	130.00	2.922	171.00	1.401	212.00	2.809	253.00	0.000
	8.00	0.119	49.00	0.617	90.00	4.381	131.00	4.095	172.00	1.308	213.00	2.361	254.00	0.000
	9.00	0.150	50.00	0.576	91.00	3.915	132.00	5.337	173.00	1.245	214.00	1.976	255.00	0.000
	10.00	0.189	51.00	0.547	92.00	3.326	133.00	6.498	174.00	1.201	215.00	1.672	256.00	0.000
	11.00	0.241	52.00	0.527	93.00	2.742	134.00	7.456	175.00	1.171	216.00	1.444	257.00	0.000
	12.00	0.306	53.00	0.513	94.00	2.235	135.00	8.114	176.00	1.157	217.00	1.280	258.00	0.000
	13.00	0.383	54.00	0.503	95.00	1.833	136.00	8.404	177.00	1.339	218.00	1.165	259.00	0.000
	14.00	0.467	55.00	0.499	96.00	1.532	137.00	8.289	178.00	1.798	219.00	1.086	260.00	0.000
	15.00	0.548	56.00	0.525	97.00	1.315	138.00	7.759	179.00	2.446	220.00	1.032	261.00	0.000
	16.00	0.614	57.00	0.634	98.00	1.164	139.00	6.842	180.00	3.159	221.00	0.994	262.00	0.000
	17.00	0.653	58.00	0.856	99.00	1.060	140.00	5.726	181.00	3.830	222.00	0.968	263.00	0.000
	18.00	0.658	59.00	1.159	100.00	0.990	141.00	4.635	182.00	4.380	223.00	0.949	264.00	0.000
	19.00	0.630	60.00	1.501	101.00	0.942	142.00	3.699	183.00	4.754	224.00	0.940	265.00	0.000
	20.00	0.580	61.00	1.841	102.00	0.911	143.00	2.960	184.00	4.918	225.00	1.092	266.00	0.000
	21.00	0.525	62.00	2.142	103.00	0.927	144.00	2.409	185.00	4.855	226.00	1.502	267.00	0.000
	22.00	0.474	63.00	2.372	104.00	1.255	145.00	2.015	186.00	4.568	227.00	2.106	268.00	0.000
	23.00	0.431	64.00	2.506	105.00	2.068	146.00	1.740	187.00	4.074	228.00	2.785	269.00	0.000
	24.00	0.398	65.00	2.524	106.00	3.300	147.00	1.554	188.00	3.476	229.00	3.430	270.00	0.000
	25.00	0.374	66.00	2.416	107.00	4.807	148.00	1.428	189.00	2.892	230.00	3.961	271.00	0.000
	26.00	0.356	67.00	2.192	108.00	6.420	149.00	1.344	190.00	2.391	231.00	4.323	272.00	0.000
	27.00	0.343	68.00	1.902	109.00	7.971	150.00	1.287	191.00	1.995	232.00	4.484	273.00	0.000
	28.00	0.334	69.00	1.612	110.00	9.303	151.00	1.251	192.00	1.699	233.00	4.430	274.00	0.000
	29.00	0.327	70.00	1.359	111.00	10.275	152.00	1.310	193.00	1.487	234.00	4.162	275.00	0.000
	30.00	0.322	71.00	1.158	<u>112.00</u>	<u>10.775</u>	153.00	1.654	194.00	1.339	235.00	3.698	276.00	0.000
	31.00	0.318	72.00	1.006	113.00	10.722	154.00	2.322	195.00	1.237	236.00	3.135	277.00	0.000
	32.00	0.336	73.00	0.896	114.00	10.082	155.00	3.196	196.00	1.167	237.00	2.585	278.00	0.000
	33.00	0.390	74.00	0.819	115.00	8.881	156.00	4.134	197.00	1.120	238.00	2.113	279.00	0.000
	34.00	0.495	75.00	0.766	116.00	7.377	157.00	5.009	198.00	1.086	239.00	1.741	280.00	0.000
	35.00	0.643	76.00	0.729	117.00	5.889	158.00	5.725	199.00	1.063	240.00	0.574	281.00	0.000
	36.00	0.817	77.00	0.703	118.00	4.604	159.00	6.211	200.00	1.049	241.00	0.381	282.00	0.000
	37.00	0.998	78.00	0.685	119.00	3.586	160.00	6.419	201.00	1.133	242.00	0.248	283.00	0.000
	38.00	1.165	79.00	0.687	120.00	2.826	161.00	6.327	202.00	1.424	243.00	0.159	284.00	0.000
	39.00	1.302	80.00	0.770	121.00	2.282	162.00	5.933	203.00	1.898	244.00	0.101	285.00	0.000
	40.00	1.391	81.00	1.036	122.00	1.904	163.00	5.260	204.00	2.454	245.00	0.063	286.00	0.000

S_N6 (JR SPRING)

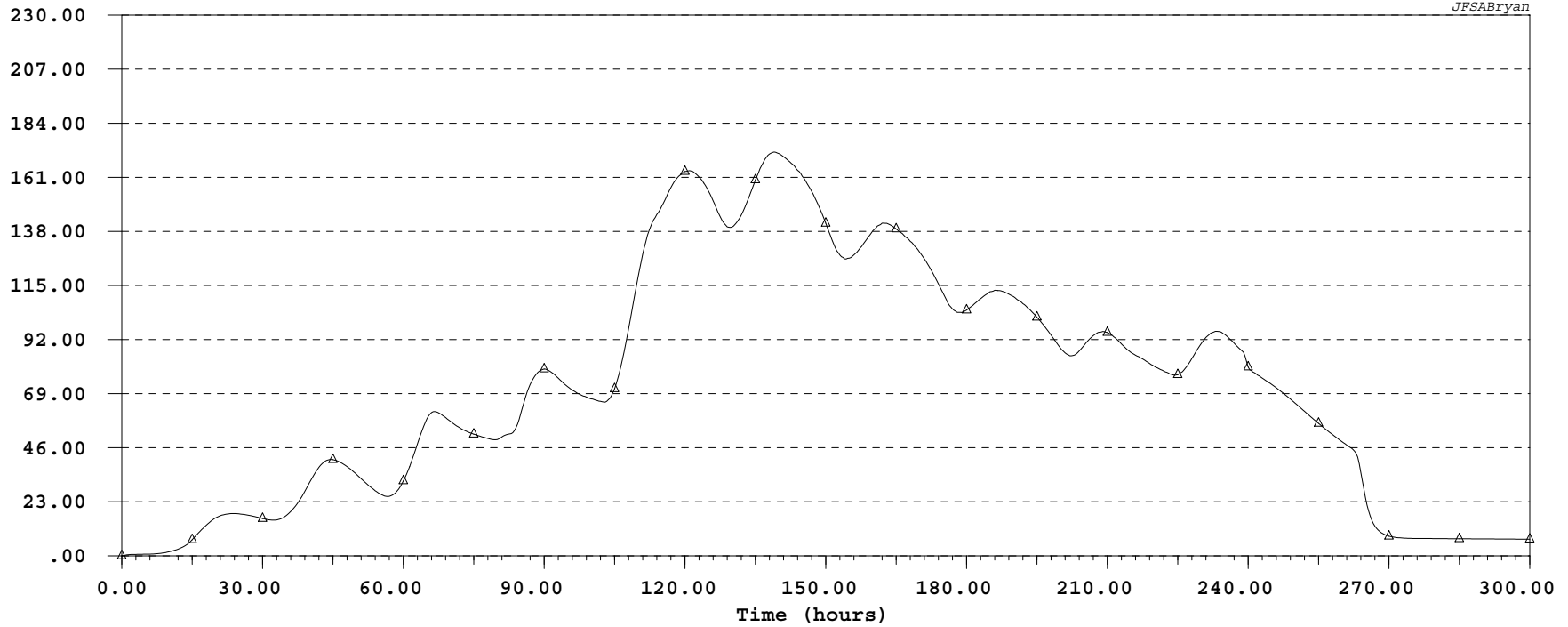


Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—□—	H-S_N6.100 : FLOW AT N6	20.00	40055.00	148.447	122.000	164.60	6.593E+07	300.000	61.047

S_N5A (JR SPRING)

Flow (cms)

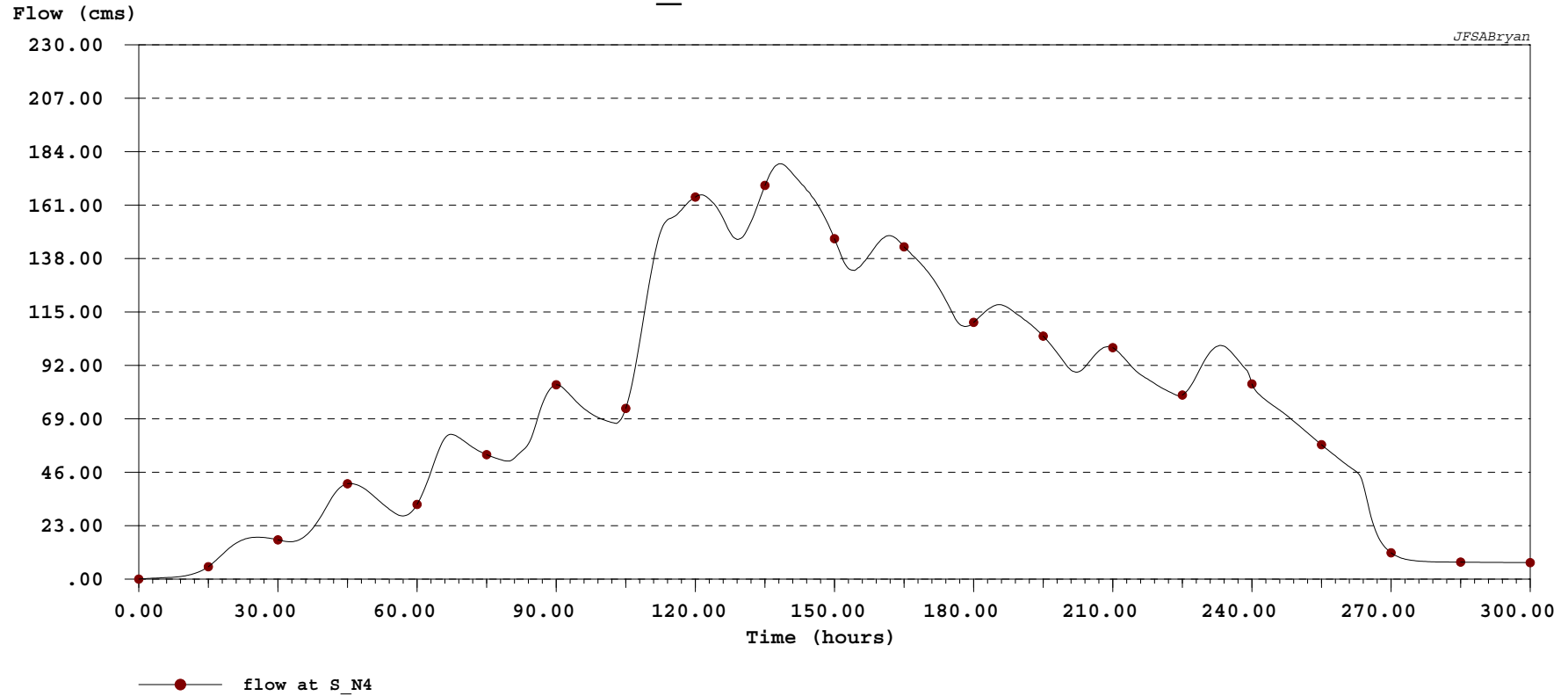


—△— S_N5A

Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—△—	H-S_NSA.100 : S_N5A	20.00	46656.00	171.781	139.000	160.82	7.503E+07	253.000	82.381

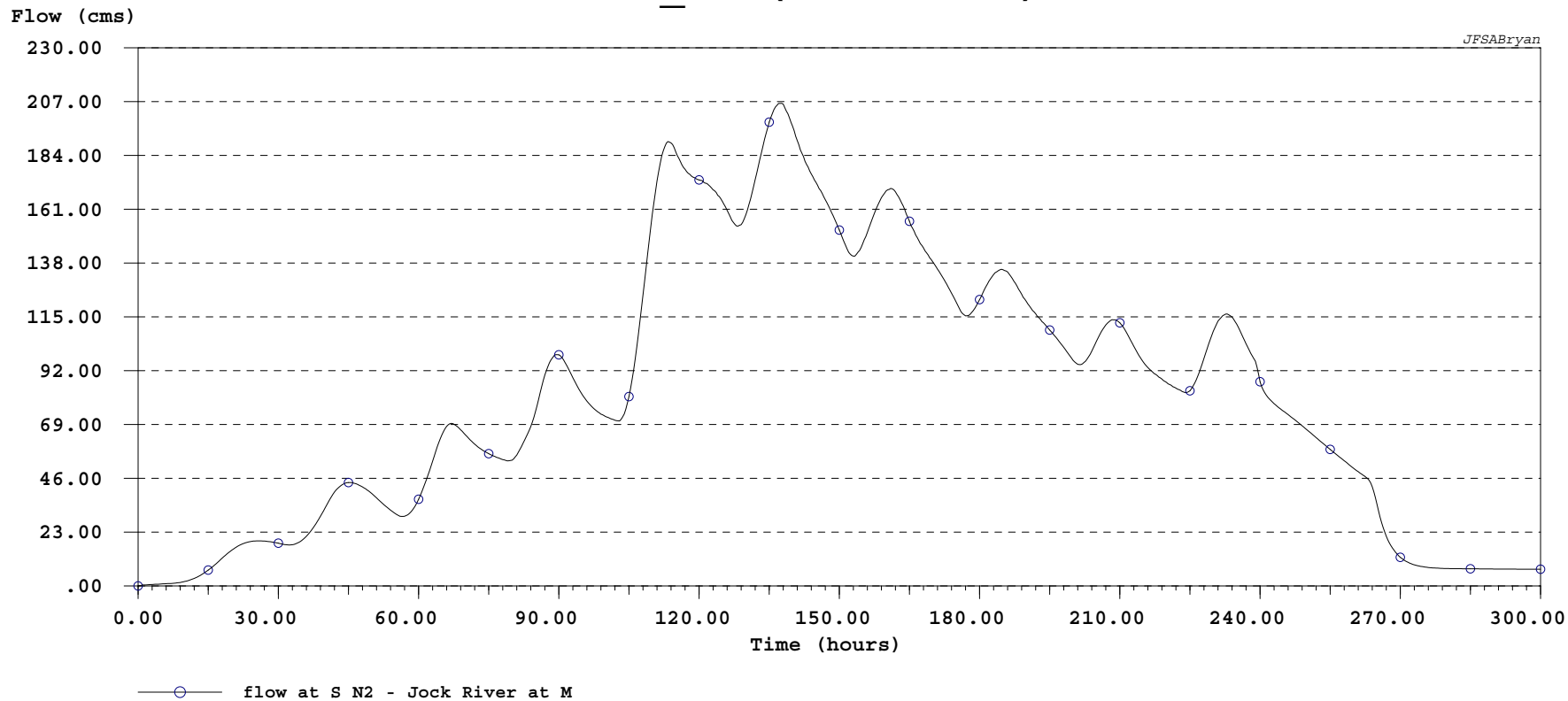
S_N4 (JR SPRING)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—●—	H-S_N4.100 : flow at S_N4	20.00	48262.00	178.812	138.000	161.08	7.774E+07	253.000	85.354

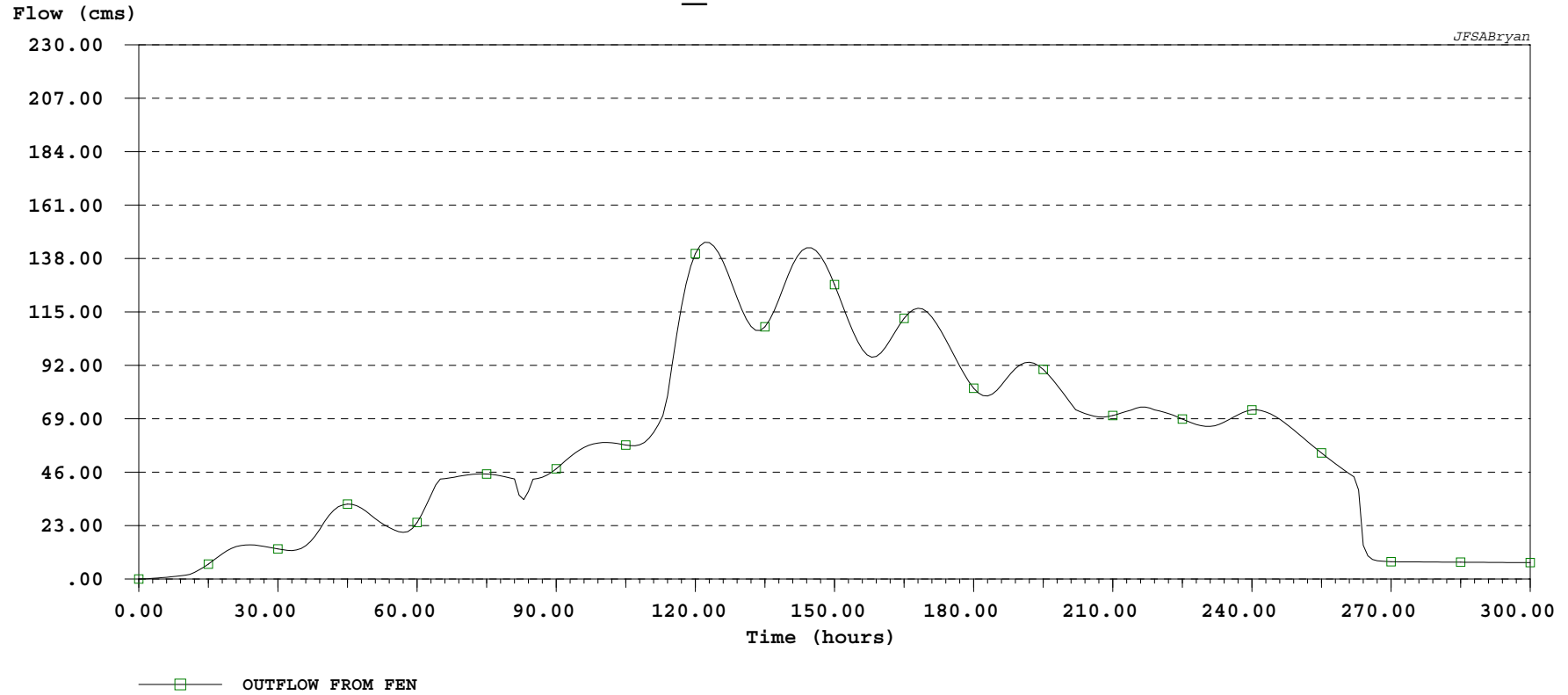
S_N2 (JR SPRING)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—○—	H-S_N2.100 : flow at S_N2 - Jock River at Moodie	20.00	52298.00	206.287	137.667	169.40	8.859E+07	300.000	82.030

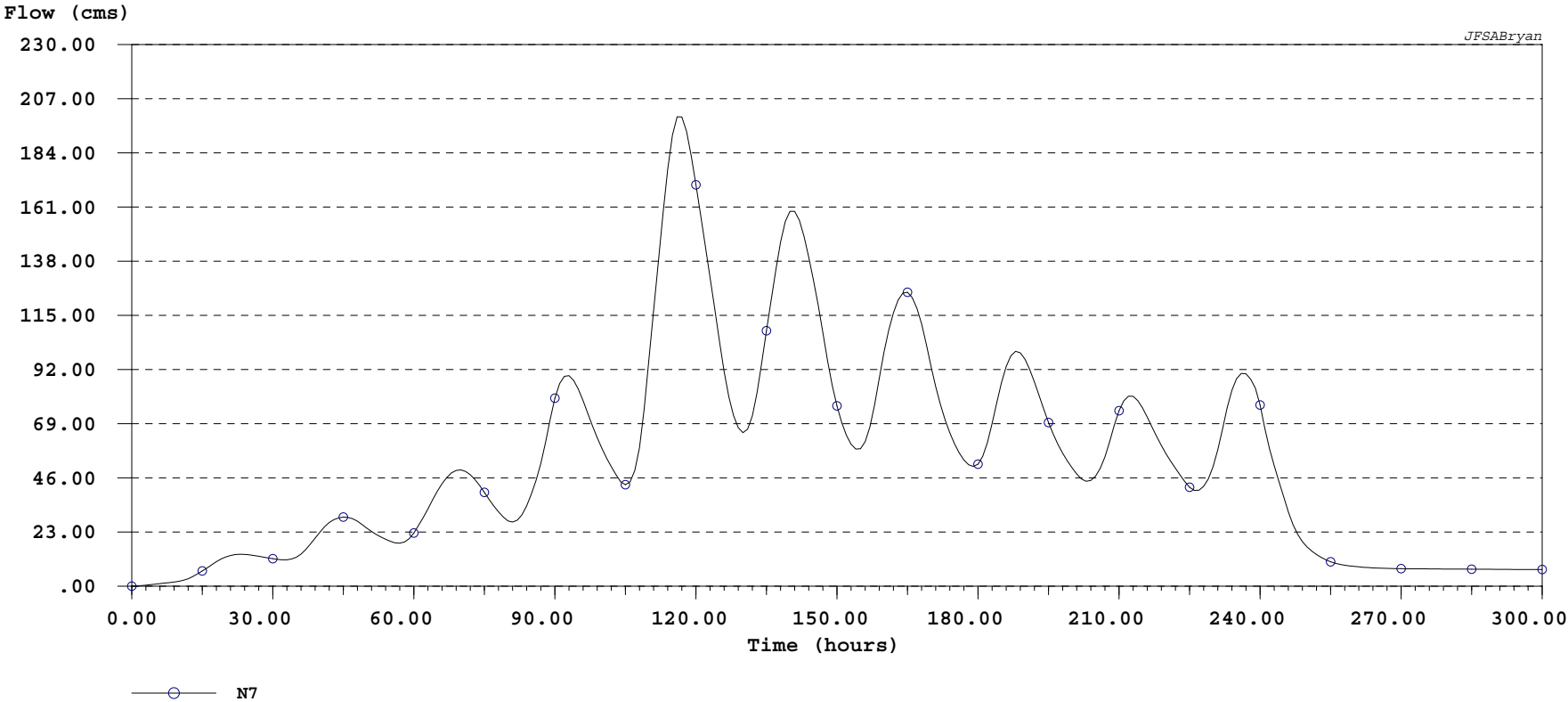
RES_RF (JR SPRING)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
—□—	H-RES_RF.100: OUTFLOW FROM FEN	60.00	38743.00	144.980	122.000	162.28	6.287E+07	300.000	58.215

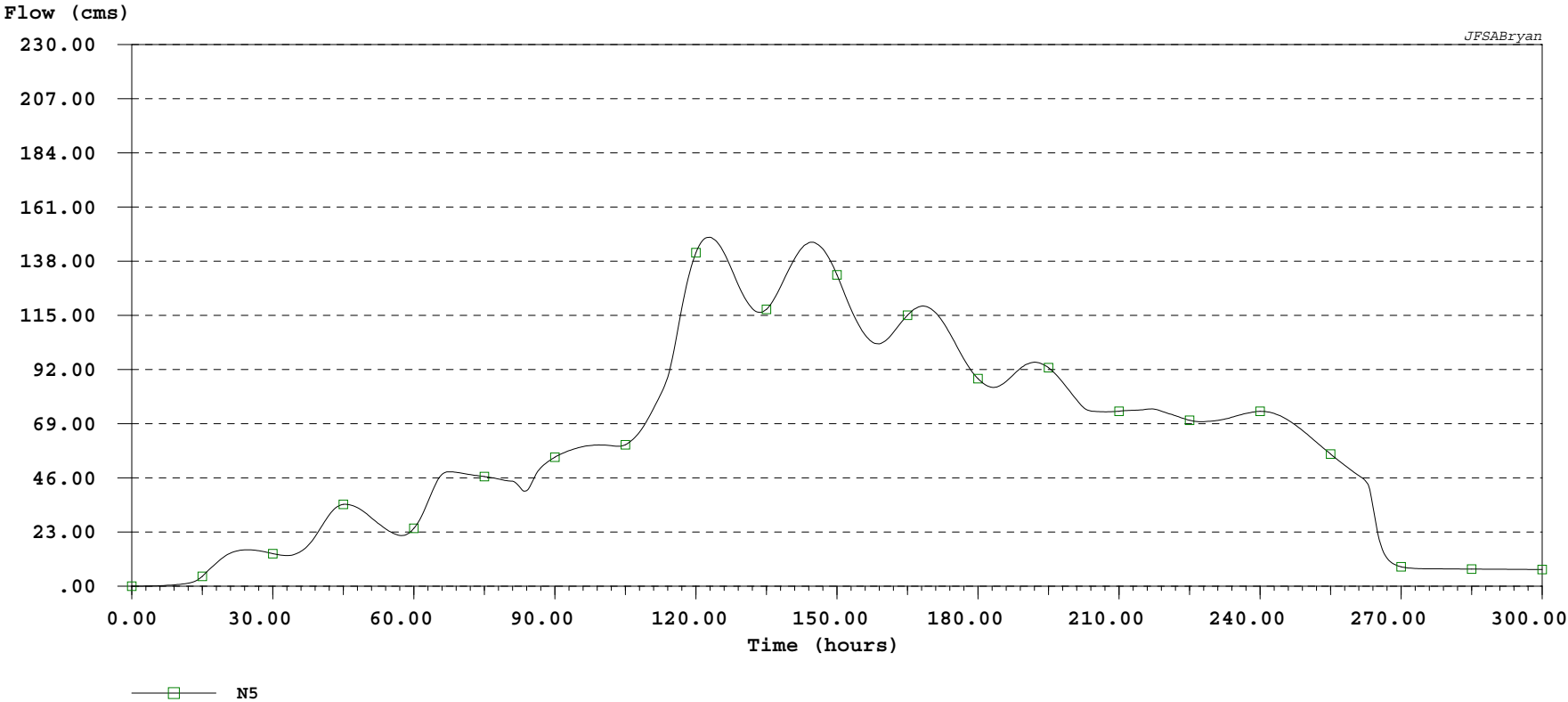
N7 (JR SPRING)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—○—	H-N7.100 : N7	60.00	35546.00	199.309	116.000	160.27	5.697E+07	300.000	52.750

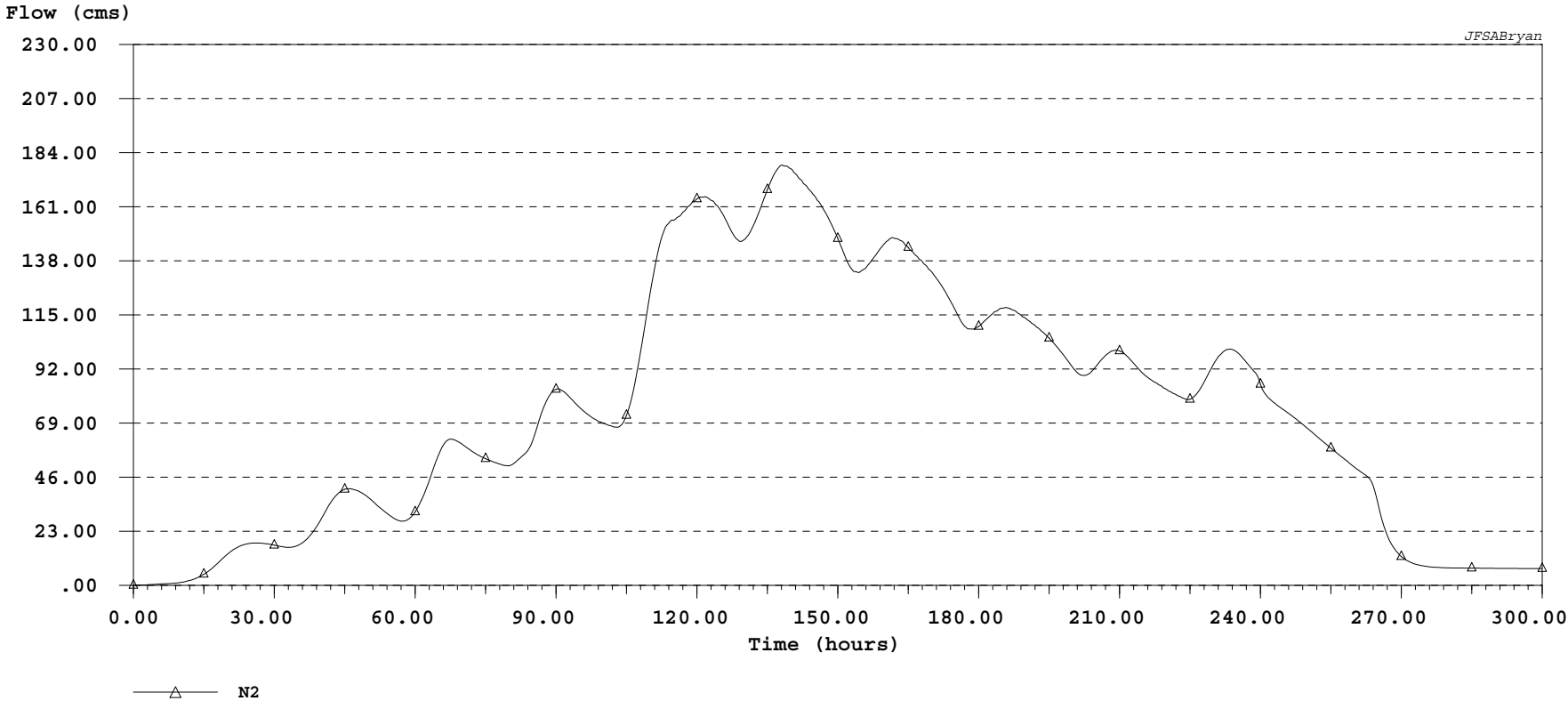
N5 (JR SPRING)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—□—	H-NS.100 : N5	20.00	40055.00	148.198	123.000	164.52	6.590E+07	300.000	61.017

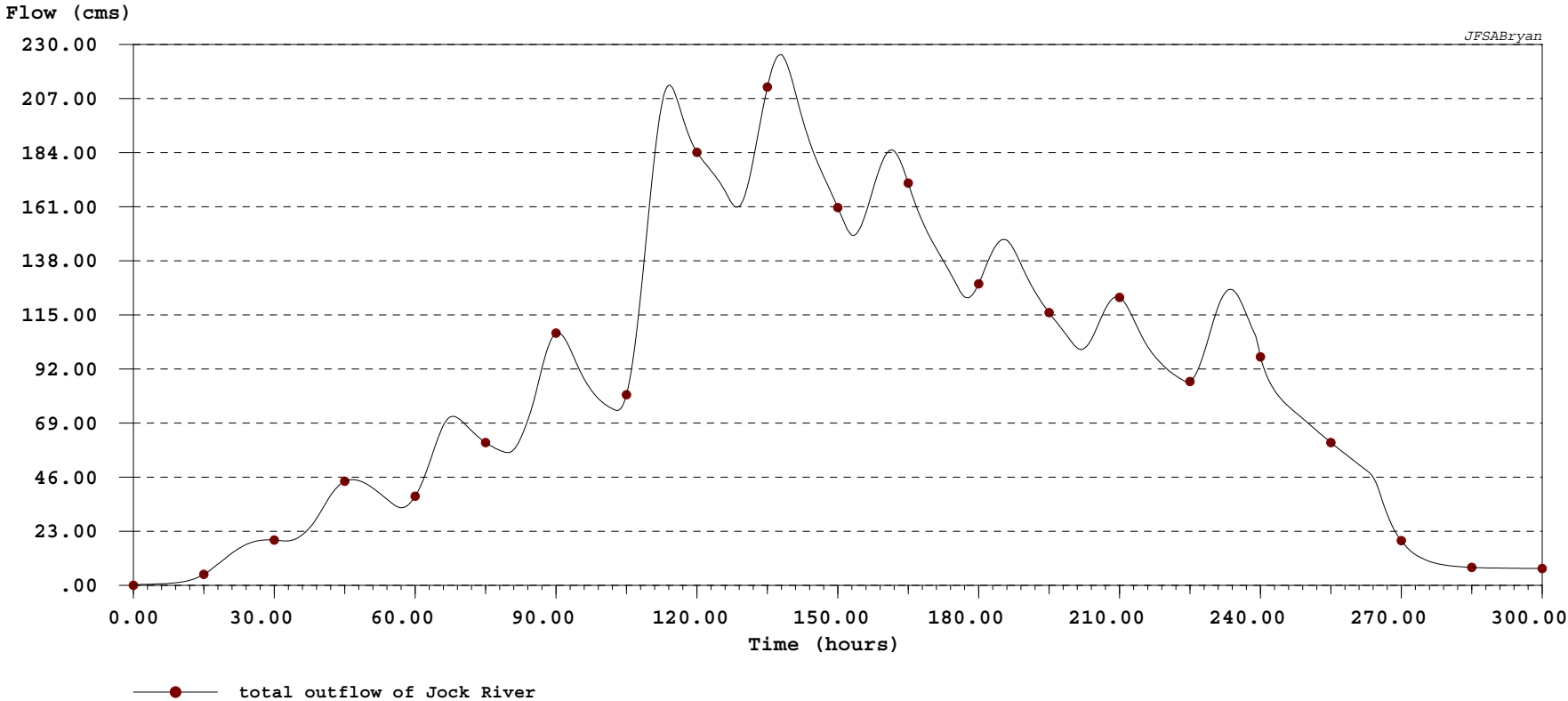
N2 (JR SPRING)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—△—	H-N2.100 : N2	20.00	48262.00	178.757	138.000	168.01	8.108E+07	300.000	75.079

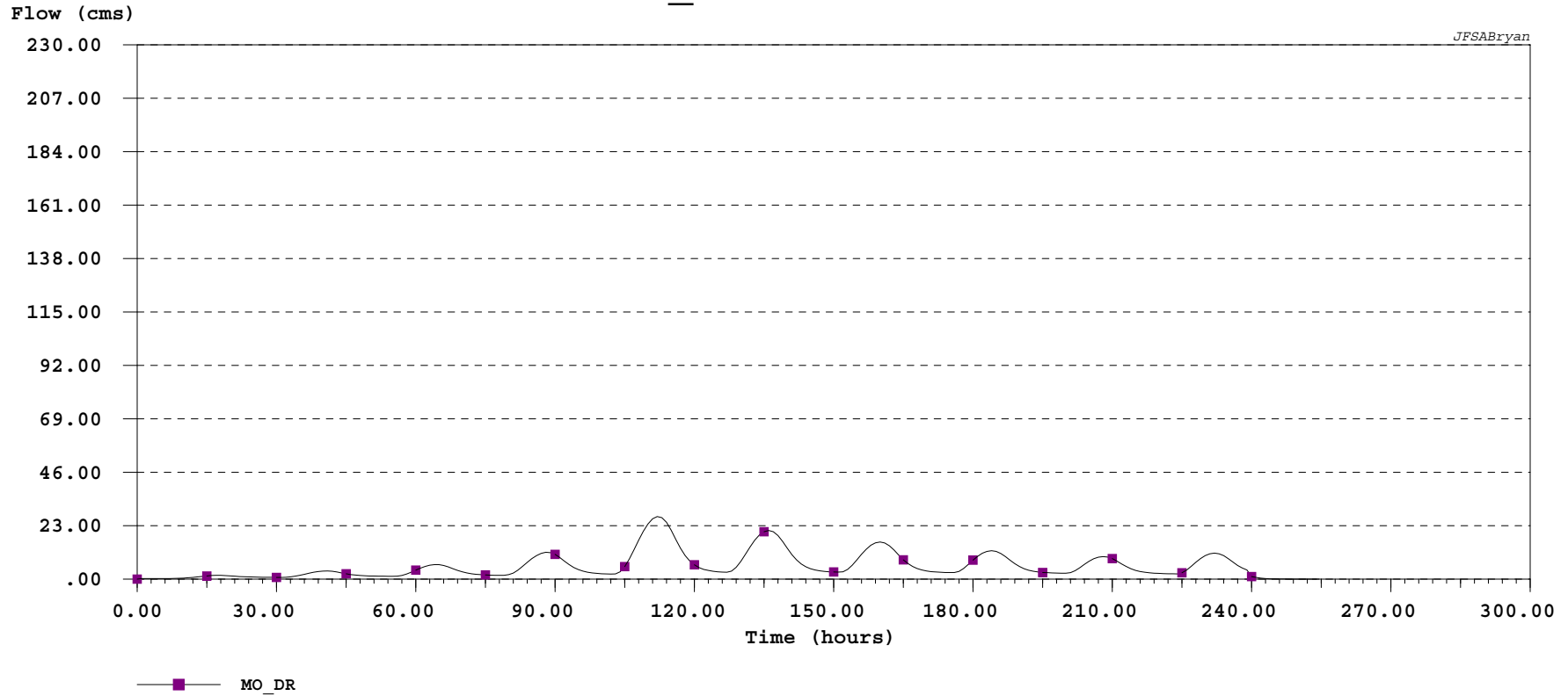
N1 (JR SPRING)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—●—	H-N1.100 : total outflow of Jock River	20.00	55474.00	225.788	138.000	170.15	9.439E+07	300.000	87.397

MO_DR (JR SPRING)



Hydrograph Statistics:

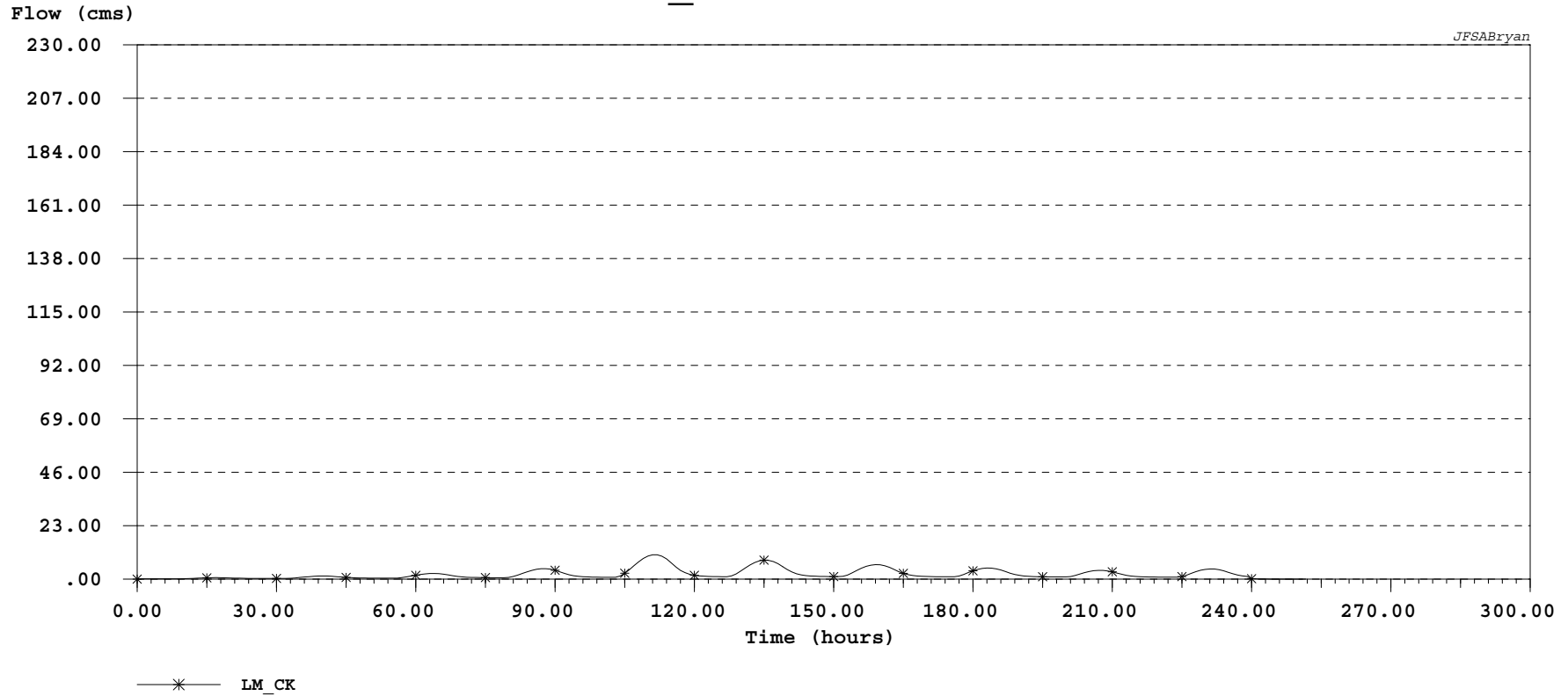
Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—■—	H-MO_DR.100 : MO_DR	60.00	2737.00	26.915	112.000	186.01	5.091E+06	254.000	5.568

Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\JRSPRI-1\H-MO_DR.100
 Comment in file : MO_DR

#	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #
#	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #
#	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	0.00	0.000	41.00	3.510	82.00	3.905	123.00	3.709	164.00	10.346	205.00	7.693	246.00	0.059
	1.00	0.254	42.00	3.367	83.00	5.501	124.00	3.384	165.00	8.337	206.00	8.767	247.00	0.034
	2.00	0.252	43.00	3.064	84.00	7.204	125.00	3.176	166.00	6.686	207.00	9.454	248.00	0.019
	3.00	0.250	44.00	2.679	85.00	8.813	126.00	3.041	167.00	5.439	208.00	9.701	249.00	0.011
	4.00	0.247	45.00	2.305	86.00	10.160	127.00	2.981	168.00	4.547	209.00	9.490	250.00	0.005
	5.00	0.245	46.00	1.989	87.00	11.105	128.00	3.499	169.00	3.934	210.00	8.837	251.00	0.003
	6.00	0.243	47.00	1.747	88.00	11.540	129.00	5.087	170.00	3.524	211.00	7.792	252.00	0.001
	7.00	0.241	48.00	1.570	89.00	11.396	130.00	7.636	171.00	3.253	212.00	6.580	253.00	0.000
	8.00	0.290	49.00	1.446	90.00	10.645	131.00	10.715	172.00	3.076	213.00	5.447	254.00	0.000
	9.00	0.366	50.00	1.362	91.00	9.337	132.00	13.874	173.00	2.959	214.00	4.514	255.00	0.000
	10.00	0.465	51.00	1.304	92.00	7.770	133.00	16.736	174.00	2.880	215.00	3.808	256.00	0.000
	11.00	0.596	52.00	1.265	93.00	6.283	134.00	19.001	175.00	2.825	216.00	3.301	257.00	0.000
	12.00	0.763	53.00	1.237	94.00	5.051	135.00	20.449	176.00	2.803	217.00	2.951	258.00	0.000
	13.00	0.962	54.00	1.216	95.00	4.114	136.00	20.931	177.00	3.336	218.00	2.715	259.00	0.000
	14.00	1.176	55.00	1.212	96.00	3.442	137.00	20.374	178.00	4.614	219.00	2.558	260.00	0.000
	15.00	1.379	56.00	1.278	97.00	2.979	138.00	18.780	179.00	6.345	220.00	2.453	261.00	0.000
	16.00	1.539	57.00	1.581	98.00	2.668	139.00	16.239	180.00	8.182	221.00	2.382	262.00	0.000
	17.00	1.628	58.00	2.184	99.00	2.463	140.00	13.291	181.00	9.850	222.00	2.333	263.00	0.000
	18.00	1.623	59.00	2.987	100.00	2.329	141.00	10.534	182.00	11.155	223.00	2.296	264.00	0.000
	19.00	1.534	60.00	3.867	101.00	2.239	142.00	8.268	183.00	11.976	224.00	2.282	265.00	0.000
	20.00	1.395	61.00	4.718	102.00	2.184	143.00	6.555	184.00	12.245	225.00	2.724	266.00	0.000
	21.00	1.248	62.00	5.449	103.00	2.240	144.00	5.331	185.00	11.937	226.00	3.866	267.00	0.000
	22.00	1.120	63.00	5.982	104.00	3.178	145.00	4.492	186.00	11.069	227.00	5.486	268.00	0.000
	23.00	1.018	64.00	6.256	105.00	5.422	146.00	3.932	187.00	9.700	228.00	7.241	269.00	0.000
	24.00	0.943	65.00	6.230	106.00	8.726	147.00	3.565	188.00	8.119	229.00	8.848	270.00	0.000
	25.00	0.889	66.00	5.885	107.00	12.655	148.00	3.327	189.00	6.643	230.00	10.111	271.00	0.000
	26.00	0.851	67.00	5.249	108.00	16.754	149.00	3.172	190.00	5.430	231.00	10.910	272.00	0.000
	27.00	0.824	68.00	4.475	109.00	20.592	150.00	3.069	191.00	4.513	232.00	11.179	273.00	0.000
	28.00	0.805	69.00	3.735	110.00	23.778	151.00	3.008	192.00	3.856	233.00	10.898	274.00	0.000
	29.00	0.791	70.00	3.119	111.00	25.975	152.00	3.201	193.00	3.403	234.00	10.085	275.00	0.000
	30.00	0.781	71.00	2.648	<u>112.00</u>	<u>26.915</u>	153.00	4.183	194.00	3.099	235.00	8.797	276.00	0.000
	31.00	0.772	72.00	2.309	113.00	26.428	154.00	6.014	195.00	2.897	236.00	7.308	277.00	0.000
	32.00	0.819	73.00	2.073	114.00	24.457	155.00	8.326	196.00	2.764	237.00	5.918	278.00	0.000
	33.00	0.962	74.00	1.914	115.00	21.097	156.00	10.723	197.00	2.675	238.00	4.776	279.00	0.000
	34.00	1.243	75.00	1.807	116.00	17.100	157.00	12.886	198.00	2.613	239.00	3.913	280.00	0.000
	35.00	1.635	76.00	1.736	117.00	13.323	158.00	14.580	199.00	2.569	240.00	1.128	281.00	0.000
	36.00	2.085	77.00	1.687	118.00	10.201	159.00	15.643	200.00	2.544	241.00	0.718	282.00	0.000
	37.00	2.541	78.00	1.653	119.00	7.834	160.00	15.980	201.00	2.796	242.00	0.449	283.00	0.000
	38.00	2.954	79.00	1.664	120.00	6.143	161.00	15.549	202.00	3.614	243.00	0.276	284.00	0.000
	39.00	3.279	80.00	1.897	121.00	4.983	162.00	14.365	203.00	4.896	244.00	0.167	285.00	0.000
	40.00	3.475	81.00	2.637	122.00	4.211	163.00	12.499	204.00	6.343	245.00	0.100	286.00	0.000

LM_CK (JR SPRING)



Hydrograph Statistics:

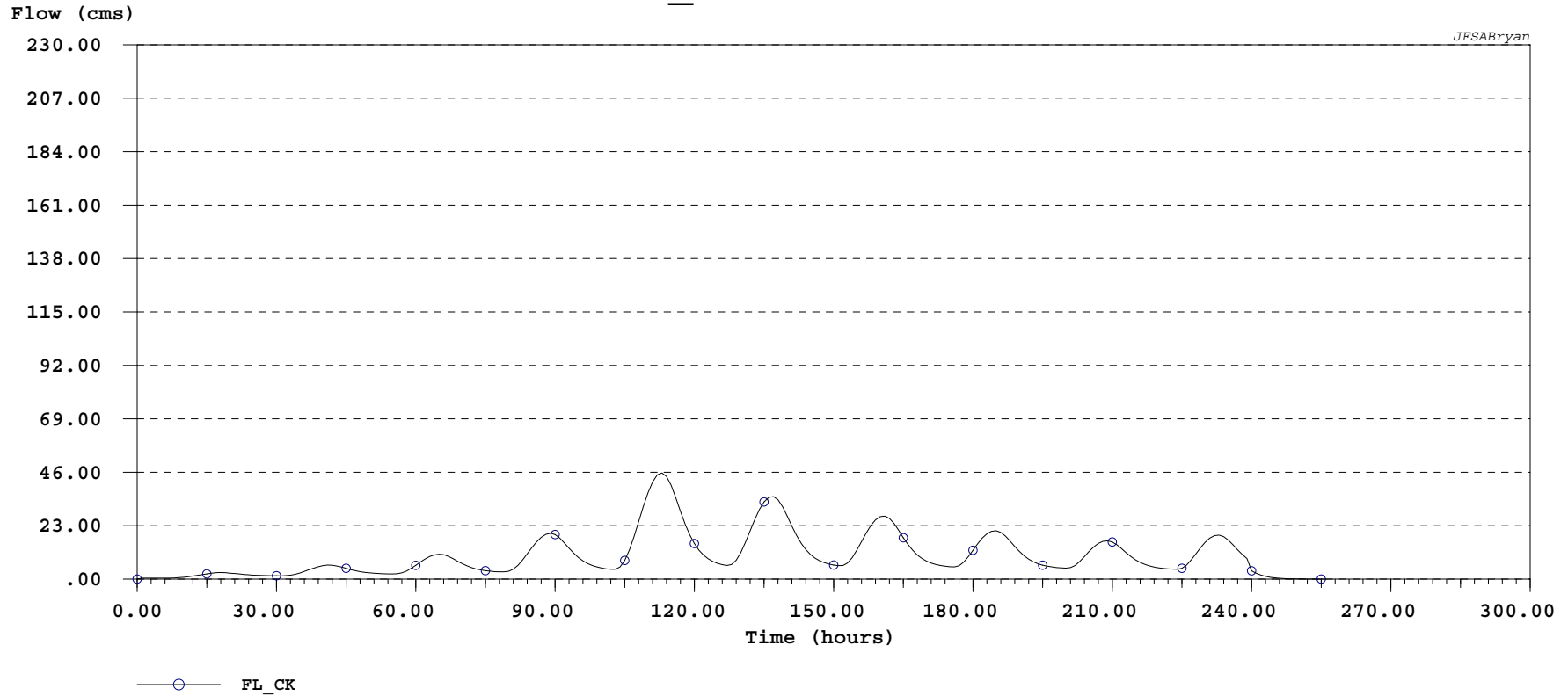
Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
-----*	H-LM_CK.100 : LM_CK	60.00	1021.00	10.485	112.000	186.01	1.899E+06	251.000	2.102

Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\JRSPRI~1\H-LM_CK.100
 Comment in file : LM_CK

#	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #
#	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #
#	---	---	#	---	#	---	#	---	#	---	#	---	#	---
	0.00	0.000	41.00	1.336	82.00	1.760	123.00	1.181	164.00	3.246	205.00	3.294	246.00	0.004
	1.00	0.095	42.00	1.235	83.00	2.473	124.00	1.133	165.00	2.486	206.00	3.637	247.00	0.002
	2.00	0.094	43.00	1.073	84.00	3.169	125.00	1.103	166.00	1.943	207.00	3.793	248.00	0.001
	3.00	0.093	44.00	0.896	85.00	3.770	126.00	1.084	167.00	1.587	208.00	3.758	249.00	0.000
	4.00	0.092	45.00	0.748	86.00	4.219	127.00	1.082	168.00	1.366	209.00	3.541	250.00	0.000
	5.00	0.092	46.00	0.640	87.00	4.472	128.00	1.406	169.00	1.234	210.00	3.159	251.00	0.000
	6.00	0.091	47.00	0.569	88.00	4.497	129.00	2.268	170.00	1.155	211.00	2.640	252.00	0.000
	7.00	0.090	48.00	0.523	89.00	4.278	130.00	3.506	171.00	1.109	212.00	2.112	253.00	0.000
	8.00	0.108	49.00	0.495	90.00	3.820	131.00	4.859	172.00	1.080	213.00	1.682	254.00	0.000
	9.00	0.137	50.00	0.477	91.00	3.155	132.00	6.121	173.00	1.061	214.00	1.375	255.00	0.000
	10.00	0.177	51.00	0.466	92.00	2.460	133.00	7.153	174.00	1.048	215.00	1.172	256.00	0.000
	11.00	0.233	52.00	0.459	93.00	1.887	134.00	7.859	175.00	1.038	216.00	1.046	257.00	0.000
	12.00	0.307	53.00	0.453	94.00	1.476	135.00	8.181	176.00	1.036	217.00	0.969	258.00	0.000
	13.00	0.393	54.00	0.449	95.00	1.205	136.00	8.085	177.00	1.361	218.00	0.923	259.00	0.000
	14.00	0.482	55.00	0.449	96.00	1.036	137.00	7.568	178.00	2.034	219.00	0.895	260.00	0.000
	15.00	0.561	56.00	0.478	97.00	0.935	138.00	6.654	179.00	2.838	220.00	0.877	261.00	0.000
	16.00	0.616	57.00	0.643	98.00	0.875	139.00	5.400	180.00	3.596	221.00	0.865	262.00	0.000
	17.00	0.637	58.00	0.945	99.00	0.839	140.00	4.118	181.00	4.206	222.00	0.855	263.00	0.000
	18.00	0.615	59.00	1.311	100.00	0.818	141.00	3.072	182.00	4.612	223.00	0.848	264.00	0.000
	19.00	0.557	60.00	1.679	101.00	0.803	142.00	2.326	183.00	4.789	224.00	0.846	265.00	0.000
	20.00	0.487	61.00	2.004	102.00	0.795	143.00	1.837	184.00	4.729	225.00	1.114	266.00	0.000
	21.00	0.425	62.00	2.255	103.00	0.827	144.00	1.534	185.00	4.440	226.00	1.721	267.00	0.000
	22.00	0.378	63.00	2.408	104.00	1.372	145.00	1.353	186.00	3.941	227.00	2.483	268.00	0.000
	23.00	0.347	64.00	2.443	105.00	2.542	146.00	1.247	187.00	3.266	228.00	3.217	269.00	0.000
	24.00	0.326	65.00	2.351	106.00	4.105	147.00	1.185	188.00	2.580	229.00	3.810	270.00	0.000
	25.00	0.313	66.00	2.131	107.00	5.810	148.00	1.148	189.00	2.021	230.00	4.206	271.00	0.000
	26.00	0.305	67.00	1.803	108.00	7.454	149.00	1.125	190.00	1.622	231.00	4.381	272.00	0.000
	27.00	0.299	68.00	1.456	109.00	8.869	150.00	1.109	191.00	1.360	232.00	4.328	273.00	0.000
	28.00	0.295	69.00	1.169	110.00	9.916	151.00	1.100	192.00	1.197	233.00	4.057	274.00	0.000
	29.00	0.292	70.00	0.961	111.00	10.481	152.00	1.229	193.00	1.098	234.00	3.586	275.00	0.000
	30.00	0.289	71.00	0.824	<u>112.00</u>	<u>10.485</u>	153.00	1.786	194.00	1.039	235.00	2.949	276.00	0.000
	31.00	0.287	72.00	0.738	113.00	9.891	154.00	2.707	195.00	1.004	236.00	2.303	277.00	0.000
	32.00	0.305	73.00	0.686	114.00	8.709	155.00	3.747	196.00	0.982	237.00	1.776	278.00	0.000
	33.00	0.376	74.00	0.654	115.00	7.014	156.00	4.717	197.00	0.967	238.00	1.401	279.00	0.000
	34.00	0.514	75.00	0.634	116.00	5.251	157.00	5.498	198.00	0.956	239.00	1.155	280.00	0.000
	35.00	0.694	76.00	0.622	117.00	3.801	158.00	6.022	199.00	0.947	240.00	0.193	281.00	0.000
	36.00	0.885	77.00	0.613	118.00	2.763	159.00	6.249	200.00	0.942	241.00	0.107	282.00	0.000
	37.00	1.066	78.00	0.607	119.00	2.082	160.00	6.165	201.00	1.098	242.00	0.058	283.00	0.000
	38.00	1.216	79.00	0.615	120.00	1.661	161.00	5.774	202.00	1.544	243.00	0.030	284.00	0.000
	39.00	1.320	80.00	0.743	121.00	1.411	162.00	5.097	203.00	2.165	244.00	0.016	285.00	0.000
	40.00	1.363	81.00	1.140	122.00	1.265	163.00	4.180	204.00	2.785	245.00	0.008	286.00	0.000

FL_CK (JR SPRING)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—○—	H-FL_CK.100 : FL_CK	60.00	4945.00	45.695	113.000	186.01	9.198E+06	256.000	9.981

Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\JRSPRI-1\H-FL_CK.100
 Comment in file : FL_CK

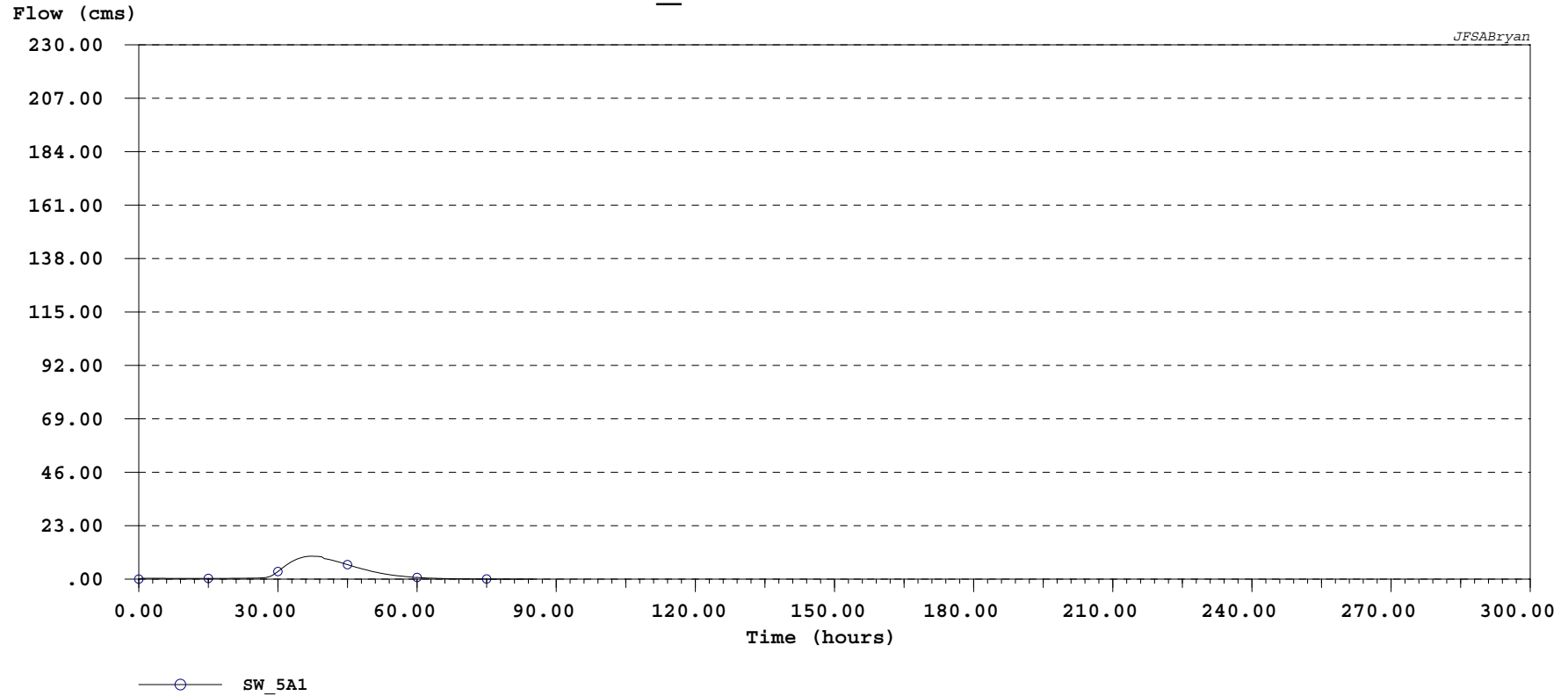
#	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #
#	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #
0.00	0.000		41.00	6.036	82.00	5.962	123.00	8.701	164.00	20.973	205.00	11.892	246.00	0.373
1.00	0.459		42.00	5.981	83.00	8.246	124.00	7.579	165.00	17.829	206.00	13.855	247.00	0.244
2.00	0.455		43.00	5.669	84.00	10.871	125.00	6.787	166.00	14.916	207.00	15.368	248.00	0.158
3.00	0.451		44.00	5.176	85.00	13.550	126.00	6.229	167.00	12.437	208.00	16.278	249.00	0.100
4.00	0.447		45.00	4.619	86.00	16.007	127.00	5.890	168.00	10.446	209.00	16.494	250.00	0.061
5.00	0.443		46.00	4.086	87.00	17.987	128.00	6.300	169.00	8.912	210.00	15.984	251.00	0.036
6.00	0.439		47.00	3.622	88.00	19.273	129.00	8.128	170.00	7.766	211.00	14.781	252.00	0.020
7.00	0.435		48.00	3.244	89.00	19.701	130.00	11.447	171.00	6.928	212.00	13.131	253.00	0.010
8.00	0.524		49.00	2.947	90.00	19.169	131.00	15.849	172.00	6.325	213.00	11.371	254.00	0.004
9.00	0.659		50.00	2.721	91.00	17.699	132.00	20.772	173.00	5.895	214.00	9.734	255.00	0.001
10.00	0.827		51.00	2.553	92.00	15.599	133.00	25.644	174.00	5.588	215.00	8.337	256.00	0.000
11.00	1.037		52.00	2.430	93.00	13.319	134.00	29.943	175.00	5.367	216.00	7.212	257.00	0.000
12.00	1.298		53.00	2.339	94.00	11.181	135.00	33.229	176.00	5.241	217.00	6.342	258.00	0.000
13.00	1.605		54.00	2.271	95.00	9.346	136.00	35.162	177.00	5.771	218.00	5.690	259.00	0.000
14.00	1.941		55.00	2.240	96.00	7.866	137.00	35.514	178.00	7.317	219.00	5.210	260.00	0.000
15.00	2.273		56.00	2.334	97.00	6.721	138.00	34.173	179.00	9.666	220.00	4.862	261.00	0.000
16.00	2.558		57.00	2.711	98.00	5.863	139.00	31.187	180.00	12.426	221.00	4.612	262.00	0.000
17.00	2.751		58.00	3.501	99.00	5.235	140.00	27.136	181.00	15.198	222.00	4.431	263.00	0.000
18.00	2.812		59.00	4.633	100.00	4.782	141.00	22.830	182.00	17.646	223.00	4.298	264.00	0.000
19.00	2.752		60.00	5.970	101.00	4.458	142.00	18.835	183.00	19.507	224.00	4.224	265.00	0.000
20.00	2.597		61.00	7.362	102.00	4.234	143.00	15.434	184.00	20.598	225.00	4.681	266.00	0.000
21.00	2.397		62.00	8.663	103.00	4.235	144.00	12.703	185.00	20.807	226.00	6.066	267.00	0.000
22.00	2.195		63.00	9.737	104.00	5.283	145.00	10.601	186.00	20.092	227.00	8.252	268.00	0.000
23.00	2.012		64.00	10.465	105.00	8.077	146.00	9.033	187.00	18.492	228.00	10.867	269.00	0.000
24.00	1.858		65.00	10.753	106.00	12.558	147.00	7.889	188.00	16.323	229.00	13.518	270.00	0.000
25.00	1.736		66.00	10.540	107.00	18.304	148.00	7.069	189.00	14.019	230.00	15.870	271.00	0.000
26.00	1.641		67.00	9.845	108.00	24.741	149.00	6.487	190.00	11.882	231.00	17.666	272.00	0.000
27.00	1.568		68.00	8.823	109.00	31.230	150.00	6.075	191.00	10.062	232.00	18.727	273.00	0.000
28.00	1.514		69.00	7.700	110.00	37.131	151.00	5.798	192.00	8.598	233.00	18.948	274.00	0.000
29.00	1.472		70.00	6.639	111.00	41.837	152.00	5.881	193.00	7.469	234.00	18.291	275.00	0.000
30.00	1.440		71.00	5.725	112.00	44.825	153.00	6.958	194.00	6.623	235.00	16.793	276.00	0.000
31.00	1.415		72.00	4.984	113.00	45.695	154.00	9.268	195.00	6.003	236.00	14.756	277.00	0.000
32.00	1.494		73.00	4.408	114.00	44.209	155.00	12.501	196.00	5.555	237.00	12.590	278.00	0.000
33.00	1.694		74.00	3.974	115.00	40.376	156.00	16.181	197.00	5.234	238.00	10.580	279.00	0.000
34.00	2.079		75.00	3.654	116.00	34.980	157.00	19.834	198.00	5.004	239.00	8.868	280.00	0.000
35.00	2.638		76.00	3.421	117.00	29.157	158.00	23.044	199.00	4.835	240.00	3.576	281.00	0.000
36.00	3.317		77.00	3.252	118.00	23.713	159.00	25.479	200.00	4.727	241.00	2.543	282.00	0.000
37.00	4.048		78.00	3.130	119.00	19.058	160.00	26.893	201.00	4.957	242.00	1.777	283.00	0.000
38.00	4.757		79.00	3.105	120.00	15.312	161.00	27.132	202.00	5.914	243.00	1.223	284.00	0.000
39.00	5.371		80.00	3.374	121.00	12.425	162.00	26.132	203.00	7.599	244.00	0.832	285.00	0.000
40.00	5.818		81.00	4.283	122.00	10.270	163.00	23.936	204.00	9.707	245.00	0.559	286.00	0.000

APPENDIX G

Jock River Hydrographs (1:100 Year Summer)



SW_5A1 (JR SUMMER)



Hydrograph Statistics:

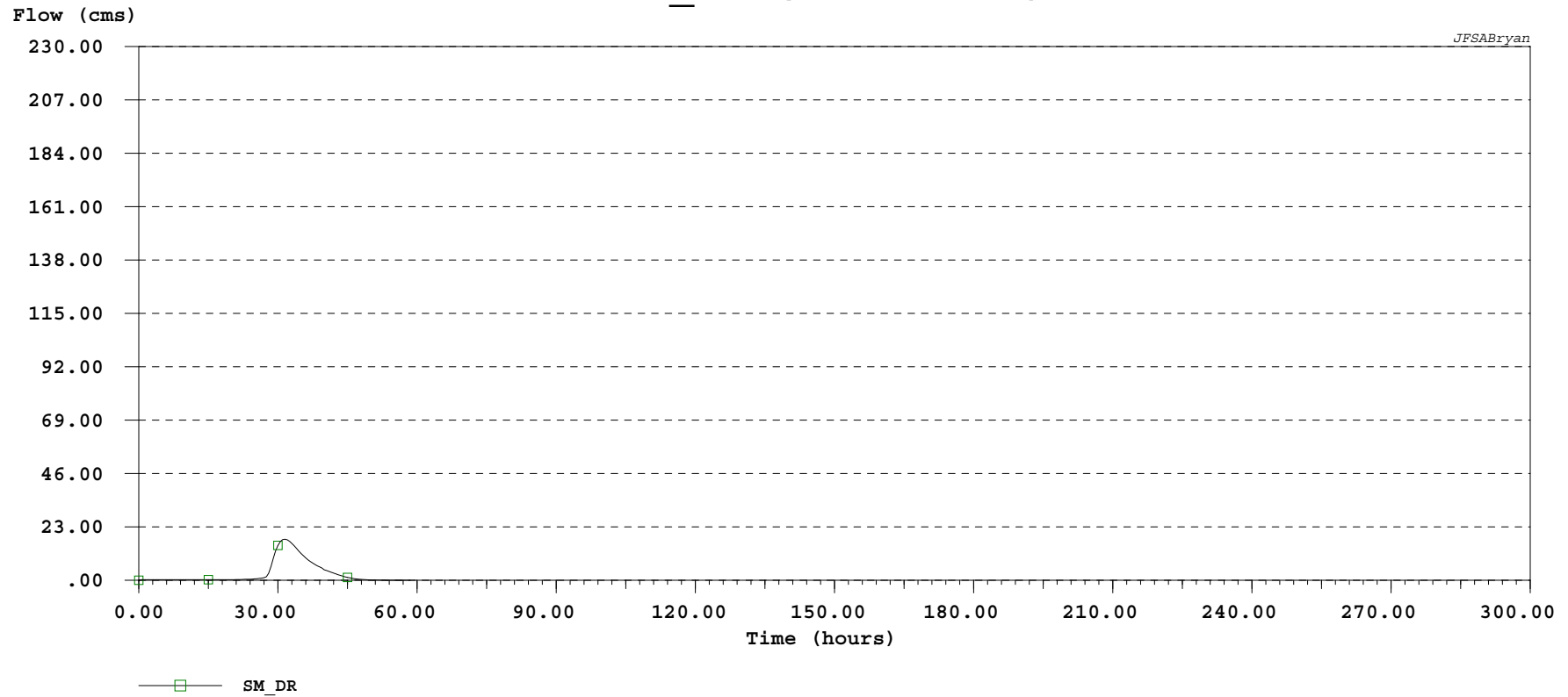
Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—○—	H-SW_5A1.100: SW_5A1	30.00	1412.00	9.884	37.500	45.86	6.475E+05	85.000	2.116

Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\JRSUMM-1\H-SW_5A1.100
 Comment in file : SW_5A1

#	TIME	FLOW	#	TIME	FLOW	#	TIME	FLOW	#	TIME	FLOW	#		
#	hrs	cms	#	hrs	cms	#	hrs	cms	#	hrs	cms	#		
#	0.00	0.000	#	19.00	0.324	#	38.00	9.860	#	57.00	1.186	#	76.00	0.019
	0.50	0.333		19.50	0.327		38.50	9.797		57.50	1.091		76.50	0.017
	1.00	0.332		20.00	0.331		39.00	9.699		58.00	1.002		77.00	0.014
	1.50	0.332		20.50	0.336		39.50	9.570		58.50	0.920		77.50	0.013
	2.00	0.332		21.00	0.341		40.00	8.830		59.00	0.843		78.00	0.011
	2.50	0.331		21.50	0.347		40.50	8.653		59.50	0.773		78.50	0.009
	3.00	0.331		22.00	0.354		41.00	8.454		60.00	0.708		79.00	0.008
	3.50	0.330		22.50	0.362		41.50	8.232		60.50	0.648		79.50	0.007
	4.00	0.330		23.00	0.372		42.00	7.990		61.00	0.593		80.00	0.006
	4.50	0.329		23.50	0.384		42.50	7.730		61.50	0.542		80.50	0.005
	5.00	0.329		24.00	0.398		43.00	7.456		62.00	0.495		81.00	0.004
	5.50	0.328		24.50	0.416		43.50	7.170		62.50	0.452		81.50	0.003
	6.00	0.328		25.00	0.437		44.00	6.875		63.00	0.413		82.00	0.003
	6.50	0.327		25.50	0.463		44.50	6.575		63.50	0.376		82.50	0.002
	7.00	0.327		26.00	0.496		45.00	6.271		64.00	0.343		83.00	0.002
	7.50	0.326		26.50	0.539		45.50	5.966		64.50	0.313		83.50	0.001
	8.00	0.326		27.00	0.597		46.00	5.663		65.00	0.285		84.00	0.001
	8.50	0.326		27.50	0.776		46.50	5.363		65.50	0.259		84.50	0.000
	9.00	0.325		28.00	0.949		47.00	5.068		66.00	0.236		85.00	0.000
	9.50	0.325		28.50	1.323		47.50	4.780		66.50	0.214		85.50	0.000
	10.00	0.324		29.00	1.868		48.00	4.499		67.00	0.195		86.00	0.000
	10.50	0.324		29.50	2.535		48.50	4.227		67.50	0.177		86.50	0.000
	11.00	0.323		30.00	3.277		49.00	3.965		68.00	0.161		87.00	0.000
	11.50	0.323		30.50	4.054		49.50	3.713		68.50	0.146		87.50	0.000
	12.00	0.322		31.00	4.833		50.00	3.471		69.00	0.132		88.00	0.000
	12.50	0.322		31.50	5.589		50.50	3.240		69.50	0.120		88.50	0.000
	13.00	0.321		32.00	6.304		51.00	3.020		70.00	0.109		89.00	0.000
	13.50	0.321		32.50	6.967		51.50	2.811		70.50	0.098		89.50	0.000
	14.00	0.320		33.00	7.565		52.00	2.614		71.00	0.089		90.00	0.000
	14.50	0.320		33.50	8.092		52.50	2.427		71.50	0.080		90.50	0.000
	15.00	0.320		34.00	8.546		53.00	2.251		72.00	0.072		91.00	0.000
	15.50	0.319		34.50	8.927		53.50	2.085		72.50	0.065		91.50	0.000
	16.00	0.319		35.00	9.238		54.00	1.929		73.00	0.048		92.00	0.000
	16.50	0.318		35.50	9.483		54.50	1.783		73.50	0.039		92.50	0.000
	17.00	0.318		36.00	9.665		55.00	1.647		74.00	0.034		93.00	0.000
	17.50	0.317		36.50	9.791		55.50	1.519		74.50	0.029		93.50	0.000
	18.00	0.317		37.00	9.862		56.00	1.400		75.00	0.025		94.00	0.000
	18.50	0.320		<u>37.50</u>	<u>9.884</u>		56.50	1.289		75.50	0.022		94.50	0.000

SM_DR (JR SUMMER)



Hydrograph Statistics:

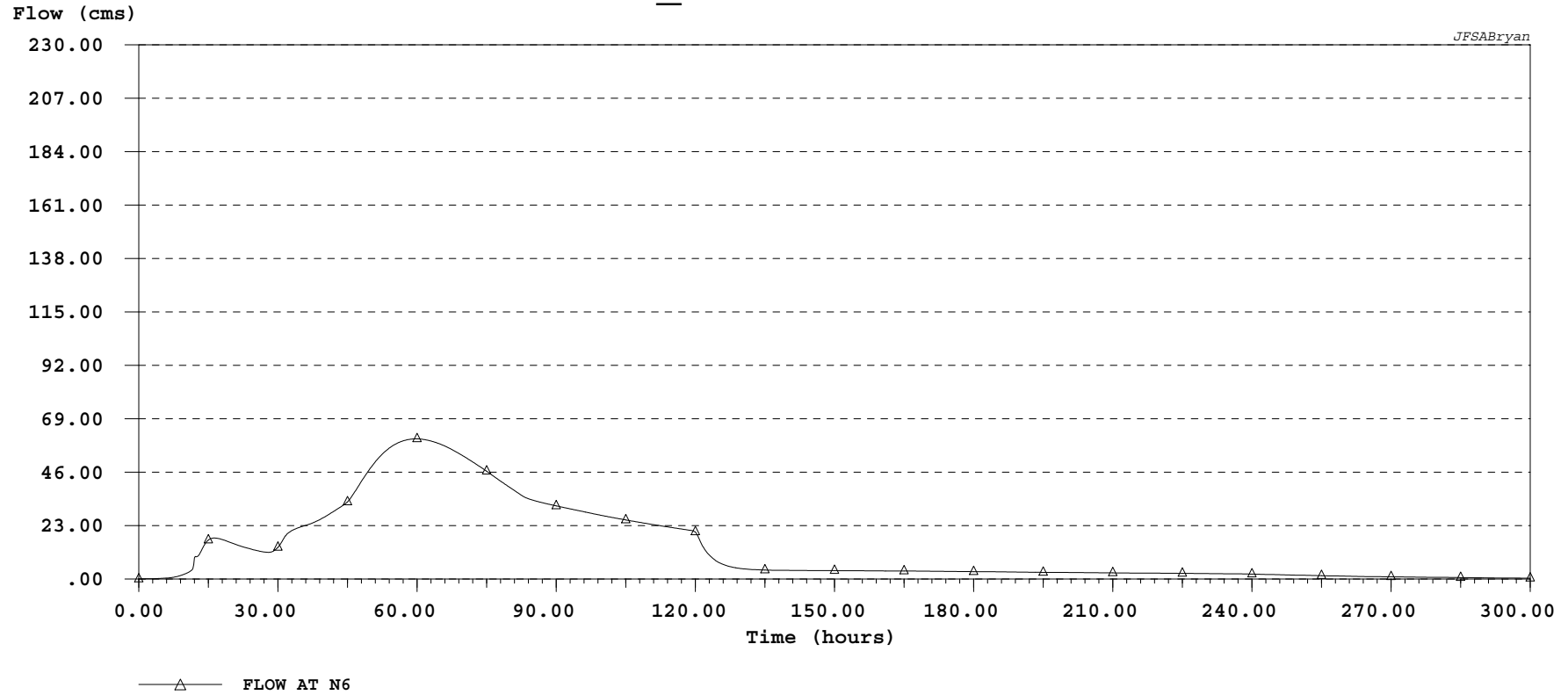
Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
SM_DR	H-SM_DR.100 : SM_DR	30.00	1122.00	17.710	31.500	52.03	5.838E+05	58.500	2.772

Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\JRSUMM-1\H-SM_DR.100
Comment in file : SM_DR

#	TIME	FLOW	#	TIME	FLOW	#	TIME	FLOW	#	TIME	FLOW	#
#	hrs	cms	#	hrs	cms	#	hrs	cms	#	hrs	cms	#
#	0.00	0.000	#	19.00	0.257	#	38.00	6.756	#	57.00	0.003	#
	0.50	0.265		19.50	0.261		38.50	6.209		57.50	0.001	
	1.00	0.264		20.00	0.267		39.00	5.728		58.00	0.001	
	1.50	0.264		20.50	0.275		39.50	5.308		58.50	0.000	
	2.00	0.263		21.00	0.287		40.00	4.512		59.00	0.000	
	2.50	0.263		21.50	0.302		40.50	4.174		59.50	0.000	
	3.00	0.263		22.00	0.323		41.00	3.826		60.00	0.000	
	3.50	0.262		22.50	0.348		41.50	3.464		60.50	0.000	
	4.00	0.262		23.00	0.380		42.00	3.094		61.00	0.000	
	4.50	0.262		23.50	0.418		42.50	2.728		61.50	0.000	
	5.00	0.261		24.00	0.465		43.00	2.376		62.00	0.000	
	5.50	0.261		24.50	0.522		43.50	2.047		62.50	0.000	
	6.00	0.260		25.00	0.593		44.00	1.745		63.00	0.000	
	6.50	0.260		25.50	0.680		44.50	1.474		63.50	0.000	
	7.00	0.260		26.00	0.790		45.00	1.235		64.00	0.000	
	7.50	0.259		26.50	0.933		45.50	1.027		64.50	0.000	
	8.00	0.259		27.00	1.132		46.00	0.847		65.00	0.000	
	8.50	0.259		27.50	1.504		46.50	0.677		65.50	0.000	
	9.00	0.258		28.00	3.012		47.00	0.547		66.00	0.000	
	9.50	0.258		28.50	5.998		47.50	0.442		66.50	0.000	
	10.00	0.258		29.00	9.448		48.00	0.356		67.00	0.000	
	10.50	0.257		29.50	12.585		48.50	0.286		67.50	0.000	
	11.00	0.257		30.00	15.030		49.00	0.229		68.00	0.000	
	11.50	0.256		30.50	16.658		49.50	0.182		68.50	0.000	
	12.00	0.256		31.00	17.506		50.00	0.144		69.00	0.000	
	12.50	0.256		31.50	17.710		50.50	0.114		69.50	0.000	
	13.00	0.255		32.00	17.432		51.00	0.090		70.00	0.000	
	13.50	0.255		32.50	16.796		51.50	0.070		70.50	0.000	
	14.00	0.255		33.00	15.902		52.00	0.055		71.00	0.000	
	14.50	0.254		33.50	14.850		52.50	0.043		71.50	0.000	
	15.00	0.254		34.00	13.727		53.00	0.033		72.00	0.000	
	15.50	0.254		34.50	12.601		53.50	0.025		72.50	0.000	
	16.00	0.253		35.00	11.521		54.00	0.019		73.00	0.000	
	16.50	0.253		35.50	10.519		54.50	0.014		73.50	0.000	
	17.00	0.252		36.00	9.612		55.00	0.010		74.00	0.000	
	17.50	0.252		36.50	8.793		55.50	0.008		74.50	0.000	
	18.00	0.252		37.00	8.047		56.00	0.006		75.00	0.000	
	18.50	0.255		37.50	7.368		56.50	0.004		75.50	0.000	

S_N6 (JR SUMMER)



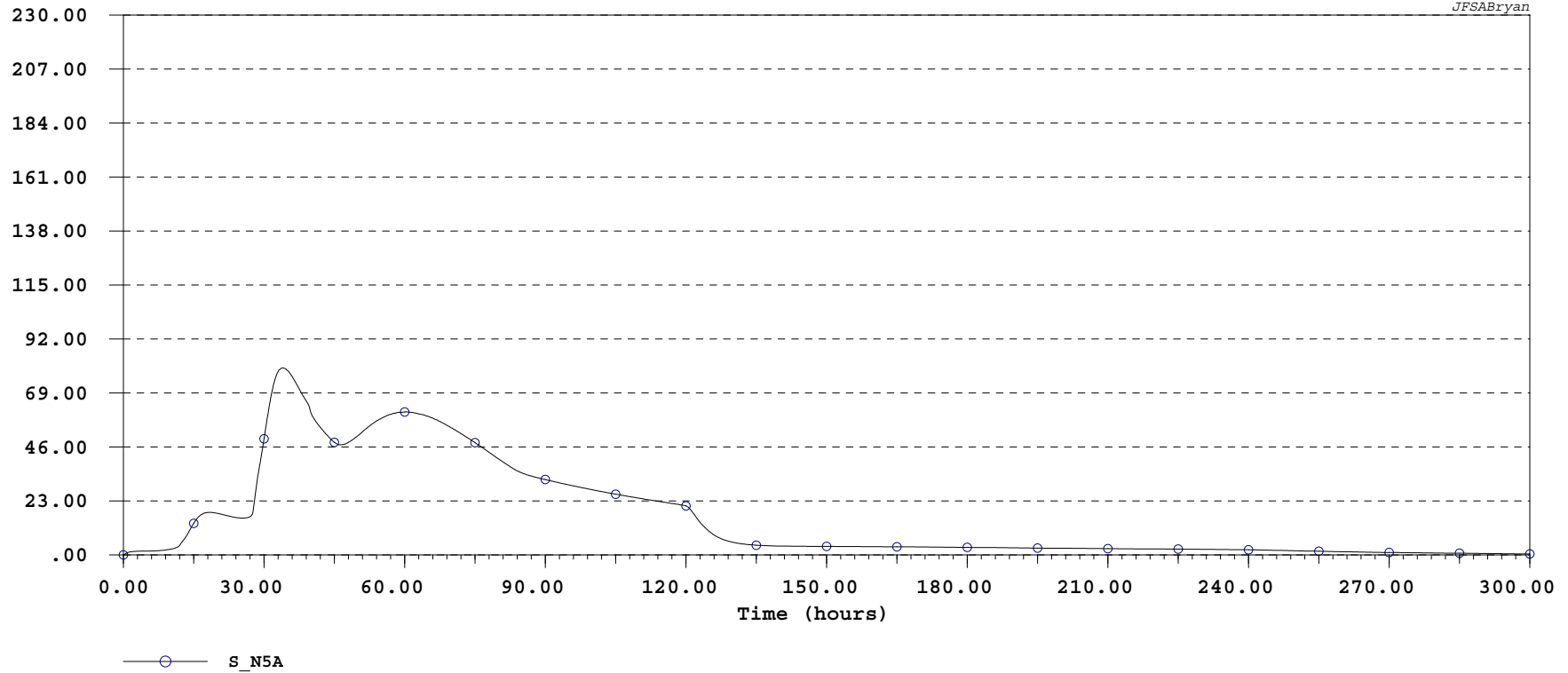
Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—△—	H-S_N6.100 : FLOW AT N6	10.00	40055.00	60.337	60.000	36.34	1.456E+07	300.000	13.478

S_N5A (JR SUMMER)

Flow (cms)

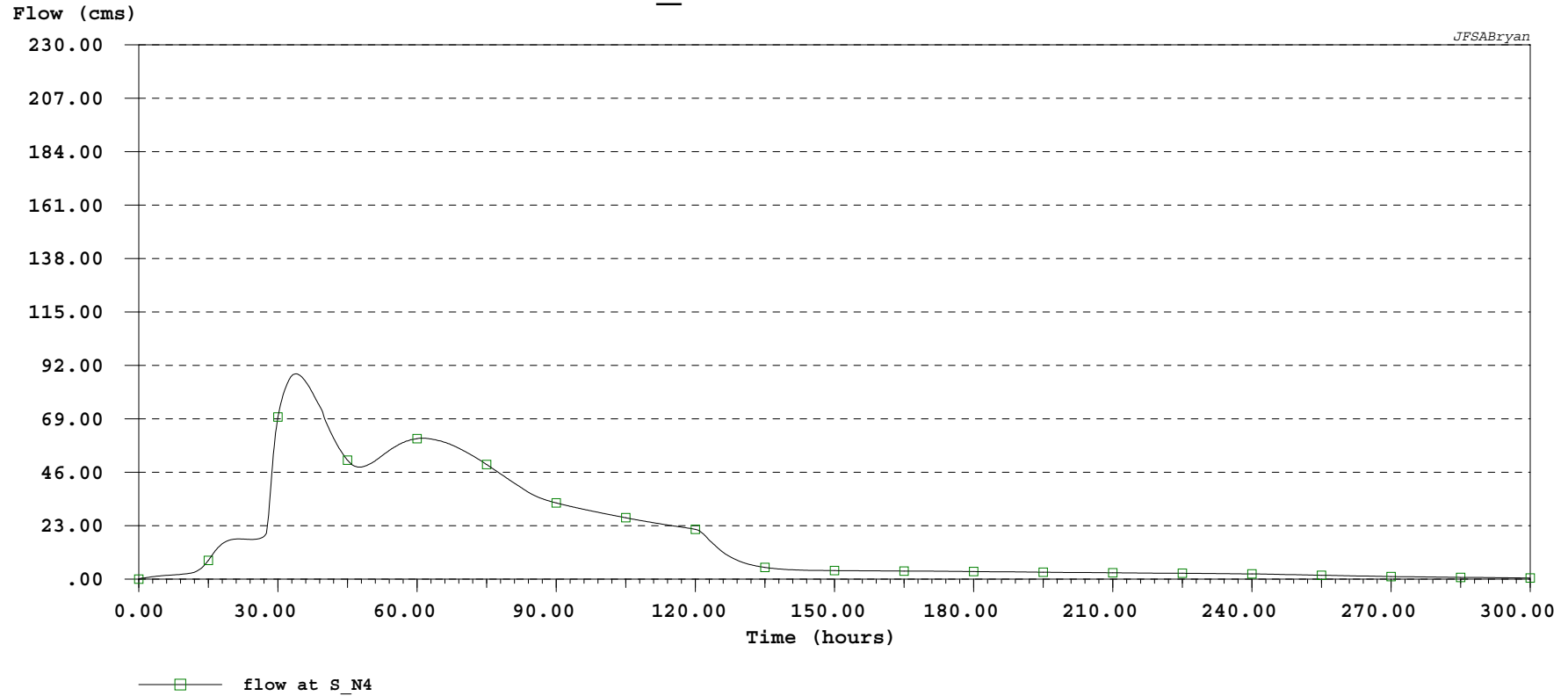
JFSABryan



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—○—	H-S_N5A.100 : S_N5A	10.00	46656.00	79.695	34.000	37.50	1.750E+07	300.000	16.200

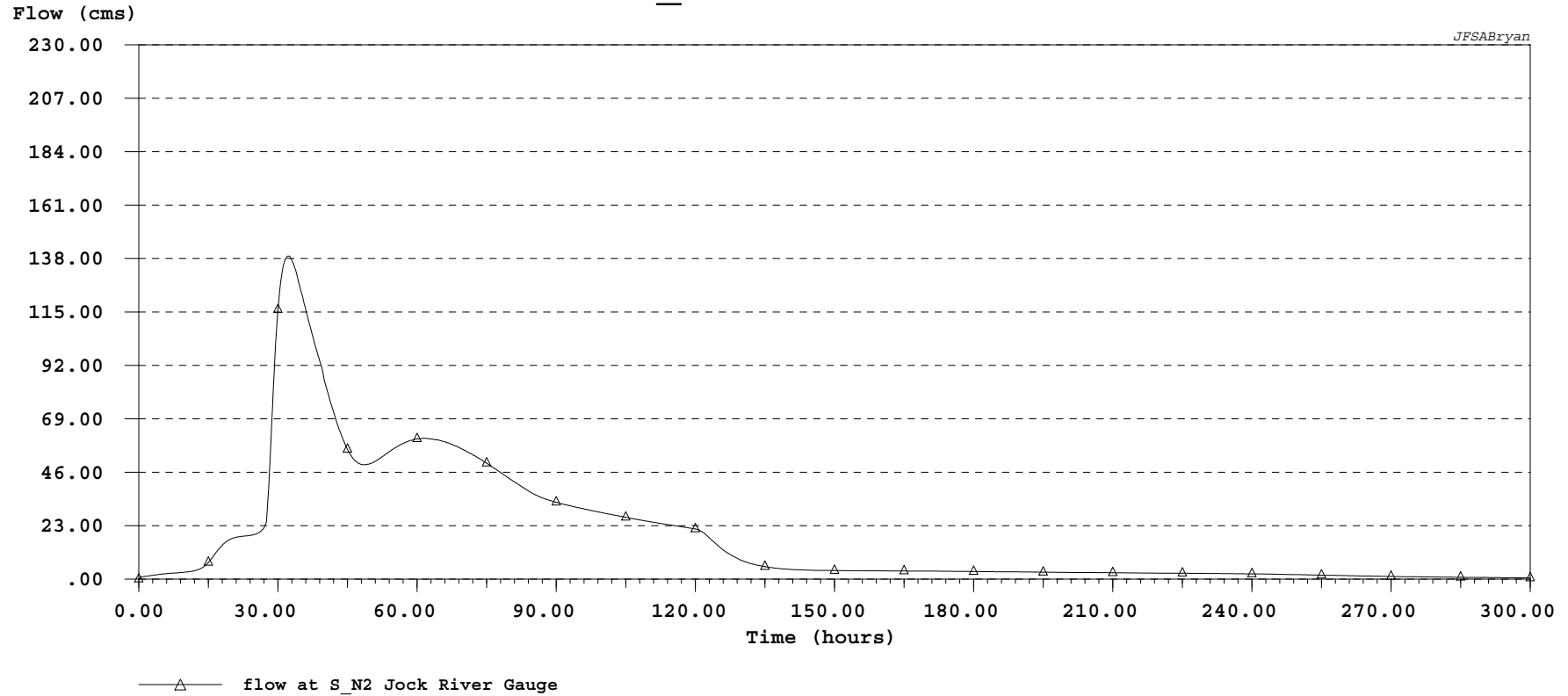
S_N4 (JR SUMMER)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—□—	H-S_N4.100 : flow at S_N4	10.00	48262.00	88.385	33.833	37.95	1.832E+07	464.000	10.965

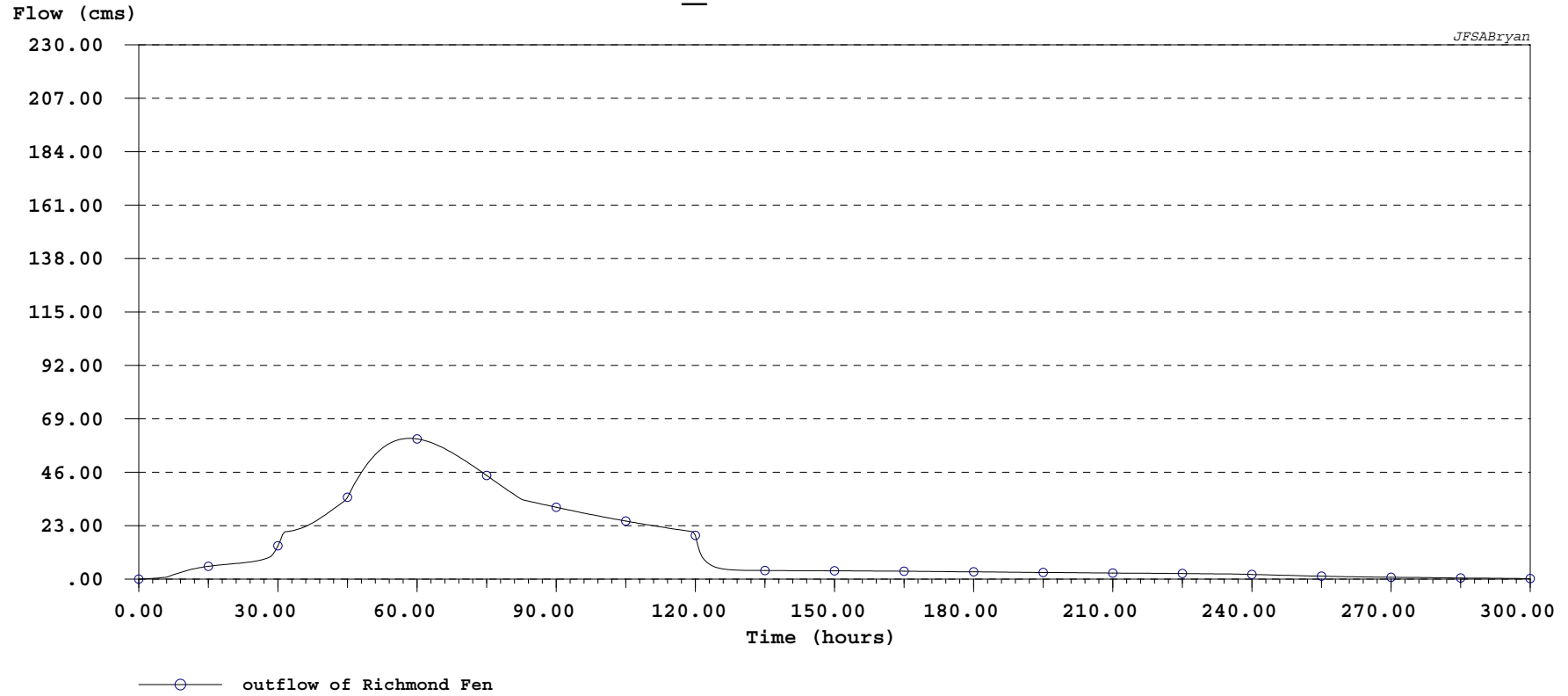
S_N2 (JR SUMMER)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—△—	H_SN2.100 : flow at S_N2 Jock River Gauge at Moodie Dr.	10.00	52298.00	139.047	32.500	38.74	2.026E+07	467.000	12.051

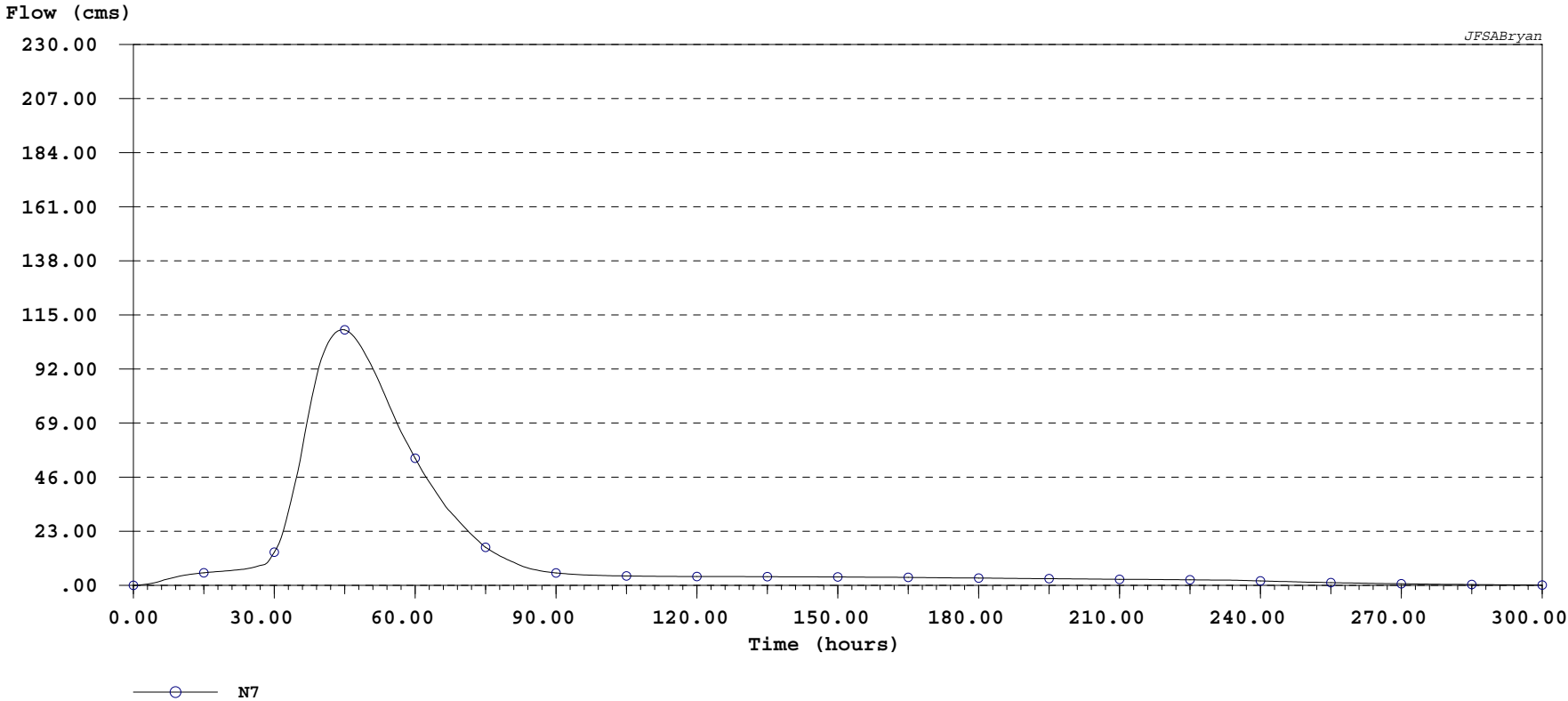
RES_RF (JR SUMMER)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—○—	H_RESRF.100 : outflow of Richmond Fen	30.00	38743.00	60.593	58.500	36.09	1.398E+07	440.500	8.817

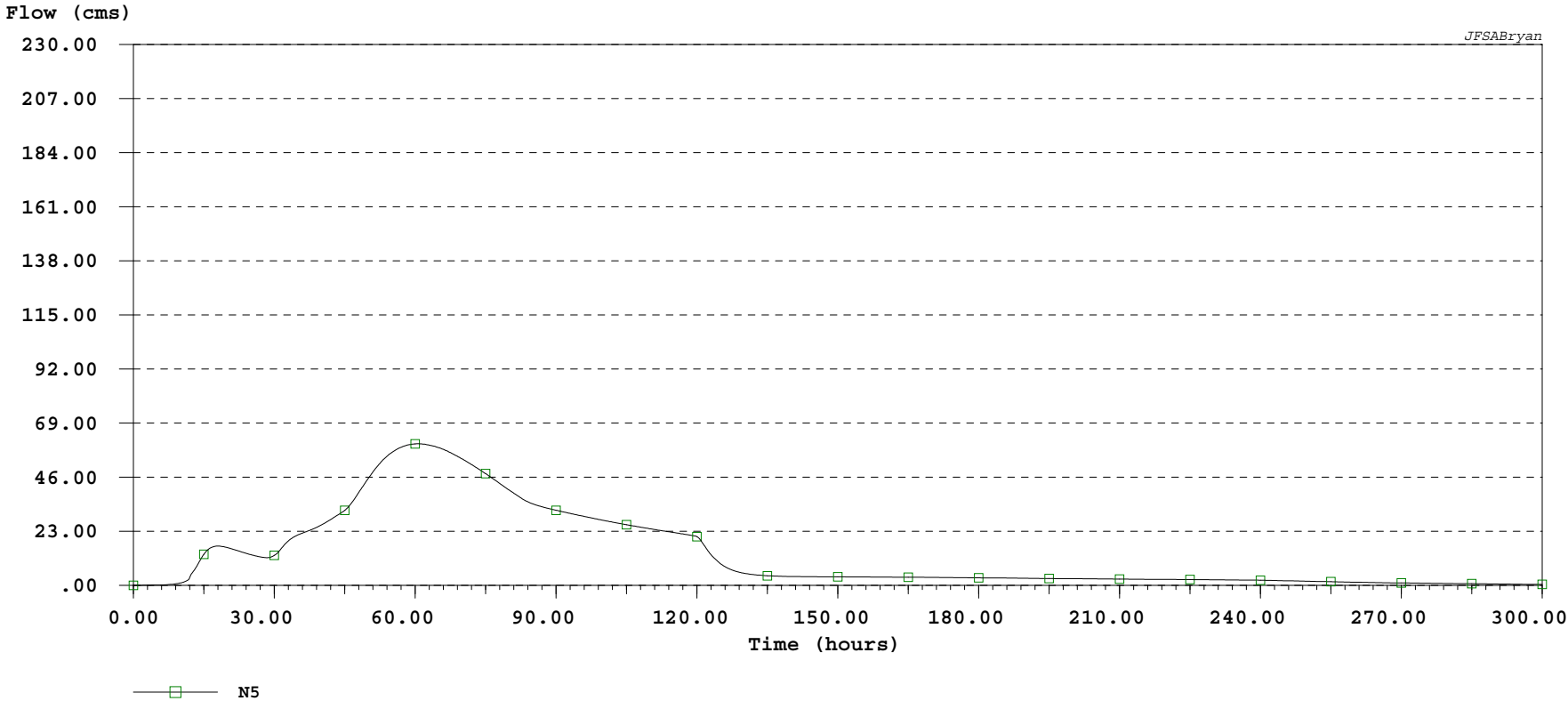
N7 (JR SUMMER)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—○—	H-N7.100 : N7	30.00	35546.00	108.761	44.500	36.63	1.302E+07	300.000	12.056

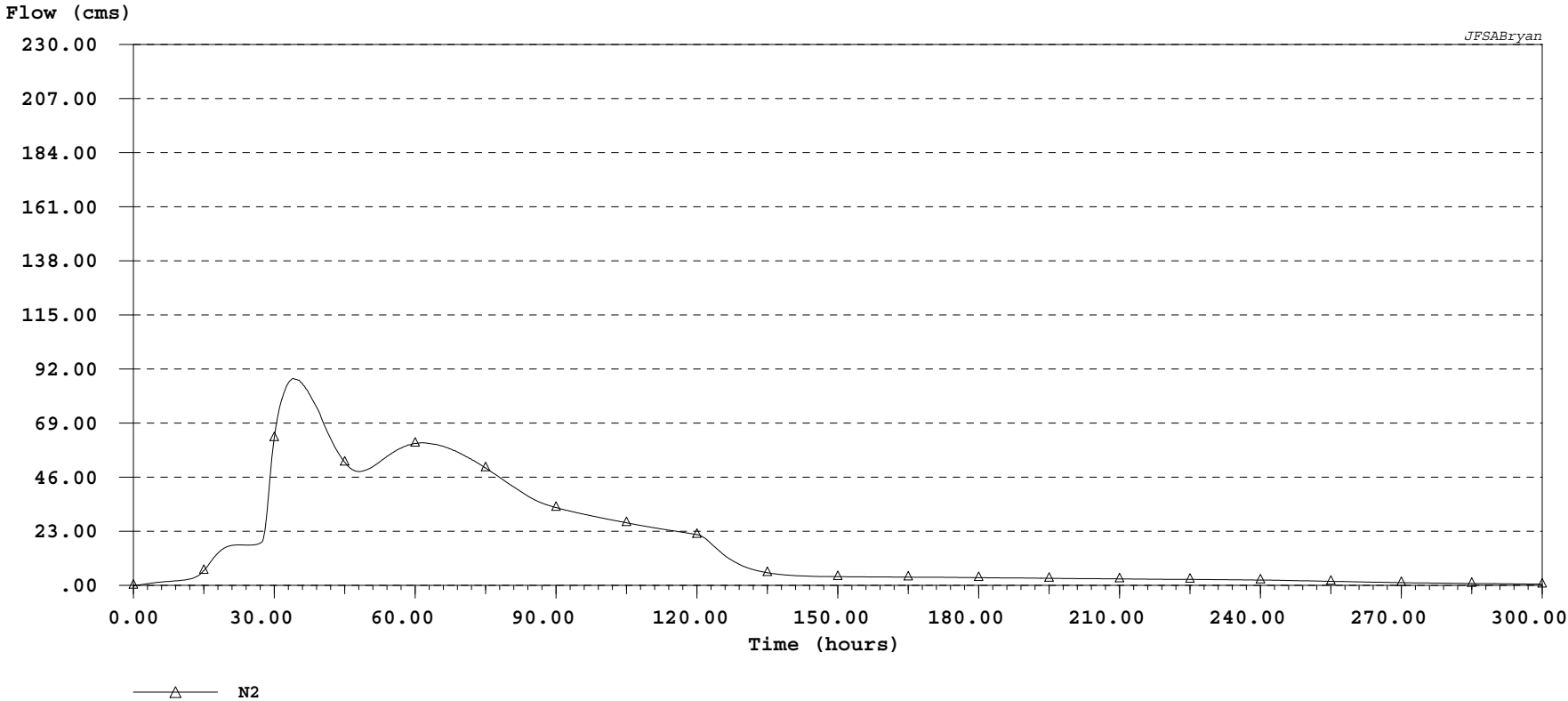
N5 (JR SUMMER)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—□—	H-NS.100 : N5	10.00	40055.00	60.214	60.500	36.33	1.455E+07	300.000	13.474

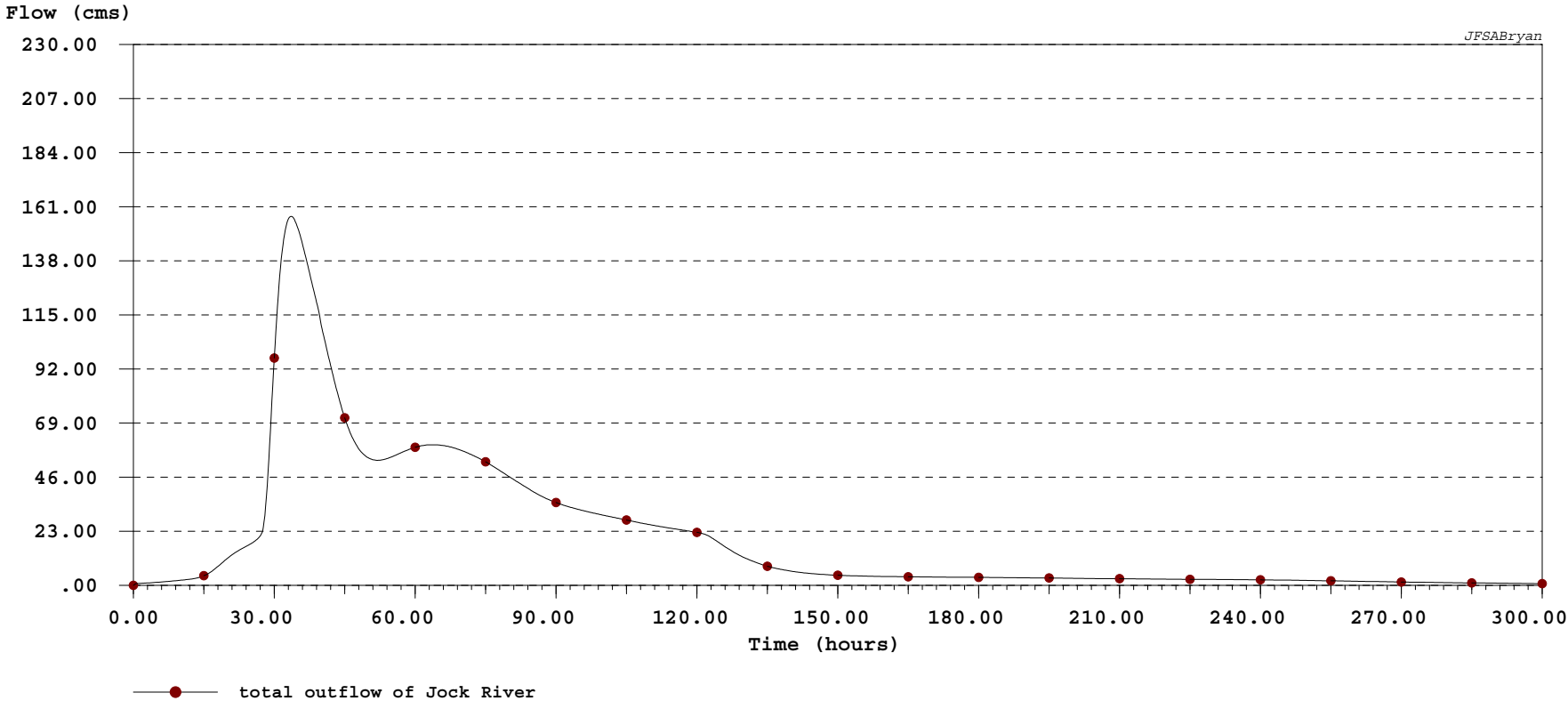
N2 (JR SUMMER)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—△—	H-N2.100 : N2	10.00	48262.00	88.035	34.000	37.94	1.831E+07	300.000	16.954

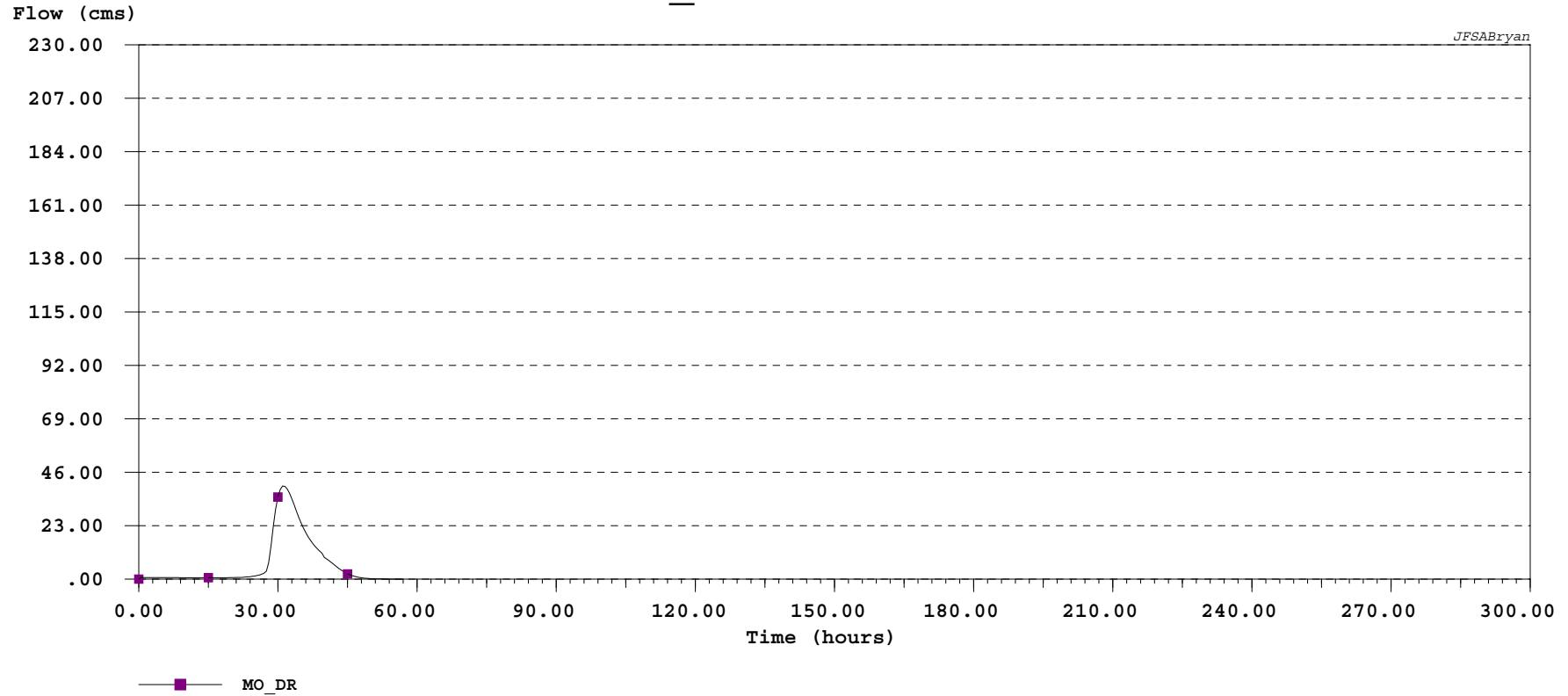
N1 (JR SUMMER)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—●—	H-N1.100 : total outflow of Jock River	10.00	55474.00	156.926	33.500	39.23	2.176E+07	300.000	20.150

MO_DR (JR SUMMER)



Hydrograph Statistics:

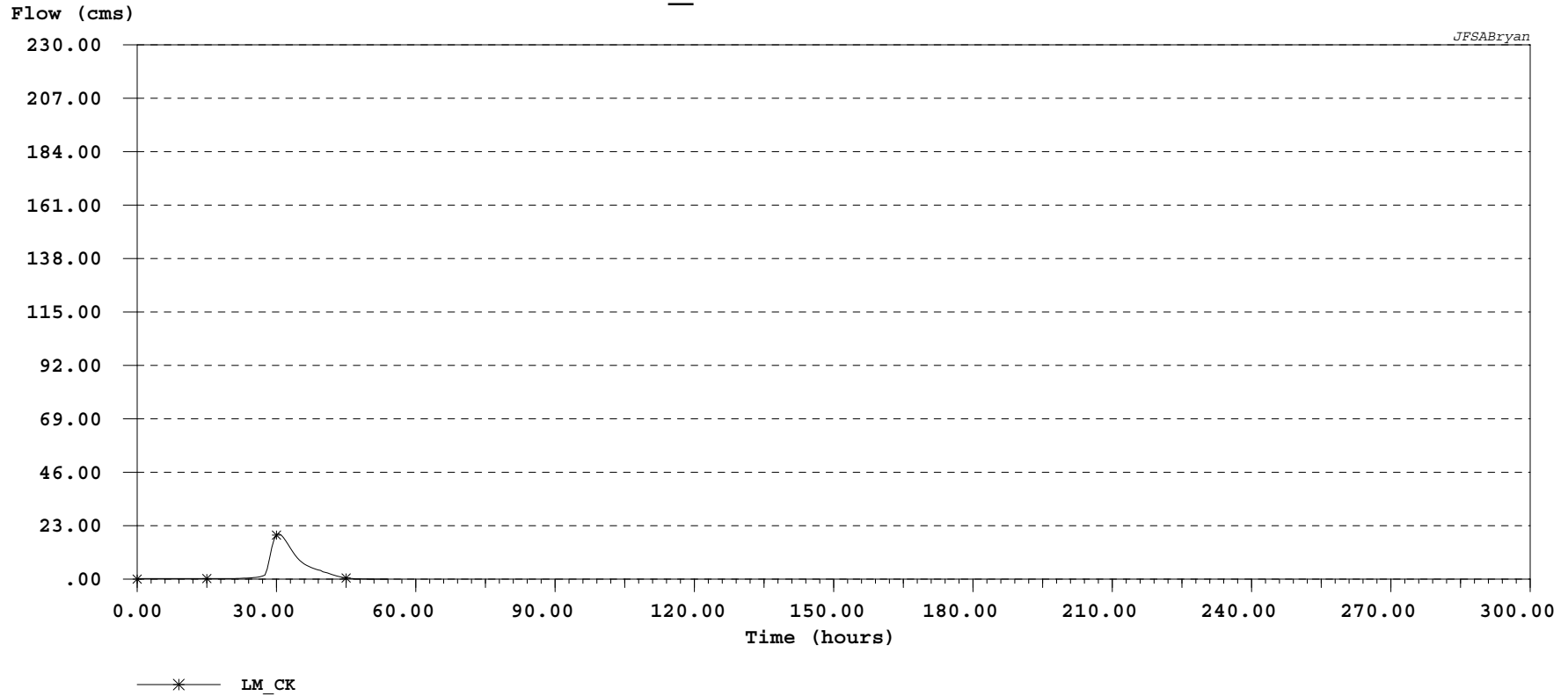
Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—■—	H-MO_DR.100 : MO_DR	30.00	2737.00	40.026	31.000	46.72	1.279E+06	57.000	6.232

Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\JRSUMM-1\H-MO_DR.100
 Comment in file : MO_DR

#	TIME	FLOW	#	TIME	FLOW	#	TIME	FLOW	#
#	hrs	cms	#	hrs	cms	#	hrs	cms	#
#	-----		#	-----		#	-----		#
	0.00	0.000		19.00	0.628		38.00	14.101	
	0.50	0.645		19.50	0.636		38.50	12.997	
	1.00	0.644		20.00	0.650		39.00	12.034	
	1.50	0.643		20.50	0.669		39.50	11.205	
	2.00	0.643		21.00	0.695		40.00	9.373	
	2.50	0.642		21.50	0.731		40.50	8.700	
	3.00	0.641		22.00	0.776		41.00	7.975	
	3.50	0.640		22.50	0.831		41.50	7.194	
	4.00	0.639		23.00	0.900		42.00	6.381	
	4.50	0.638		23.50	0.982		42.50	5.573	
	5.00	0.637		24.00	1.083		43.00	4.797	
	5.50	0.636		24.50	1.206		43.50	4.076	
	6.00	0.635		25.00	1.358		44.00	3.423	
	6.50	0.634		25.50	1.547		44.50	2.843	
	7.00	0.634		26.00	1.784		45.00	2.295	
	7.50	0.633		26.50	2.096		45.50	1.860	
	8.00	0.632		27.00	2.538		46.00	1.505	
	8.50	0.631		27.50	3.418		46.50	1.210	
	9.00	0.630		28.00	7.132		47.00	0.967	
	9.50	0.629		28.50	14.443		47.50	0.769	
	10.00	0.628		29.00	22.702		48.00	0.608	
	10.50	0.627		29.50	29.956		48.50	0.478	
	11.00	0.626		30.00	35.335		49.00	0.374	
	11.50	0.626		30.50	38.629		49.50	0.291	
	12.00	0.625		<u>31.00</u>	<u>40.026</u>		50.00	0.226	
	12.50	0.624		31.50	39.934		50.50	0.174	
	13.00	0.623		32.00	38.793		51.00	0.134	
	13.50	0.622		32.50	36.918		51.50	0.102	
	14.00	0.621		33.00	34.546		52.00	0.077	
	14.50	0.620		33.50	31.911		52.50	0.057	
	15.00	0.619		34.00	29.211		53.00	0.042	
	15.50	0.618		34.50	26.593		53.50	0.031	
	16.00	0.618		35.00	24.154		54.00	0.023	
	16.50	0.617		35.50	21.952		54.50	0.016	
	17.00	0.616		36.00	20.011		55.00	0.011	
	17.50	0.615		36.50	18.293		55.50	0.007	
	18.00	0.614		37.00	16.746		56.00	0.004	
	18.50	0.621		37.50	15.350		56.50	0.002	

LM_CK (JR SUMMER)



Hydrograph Statistics:

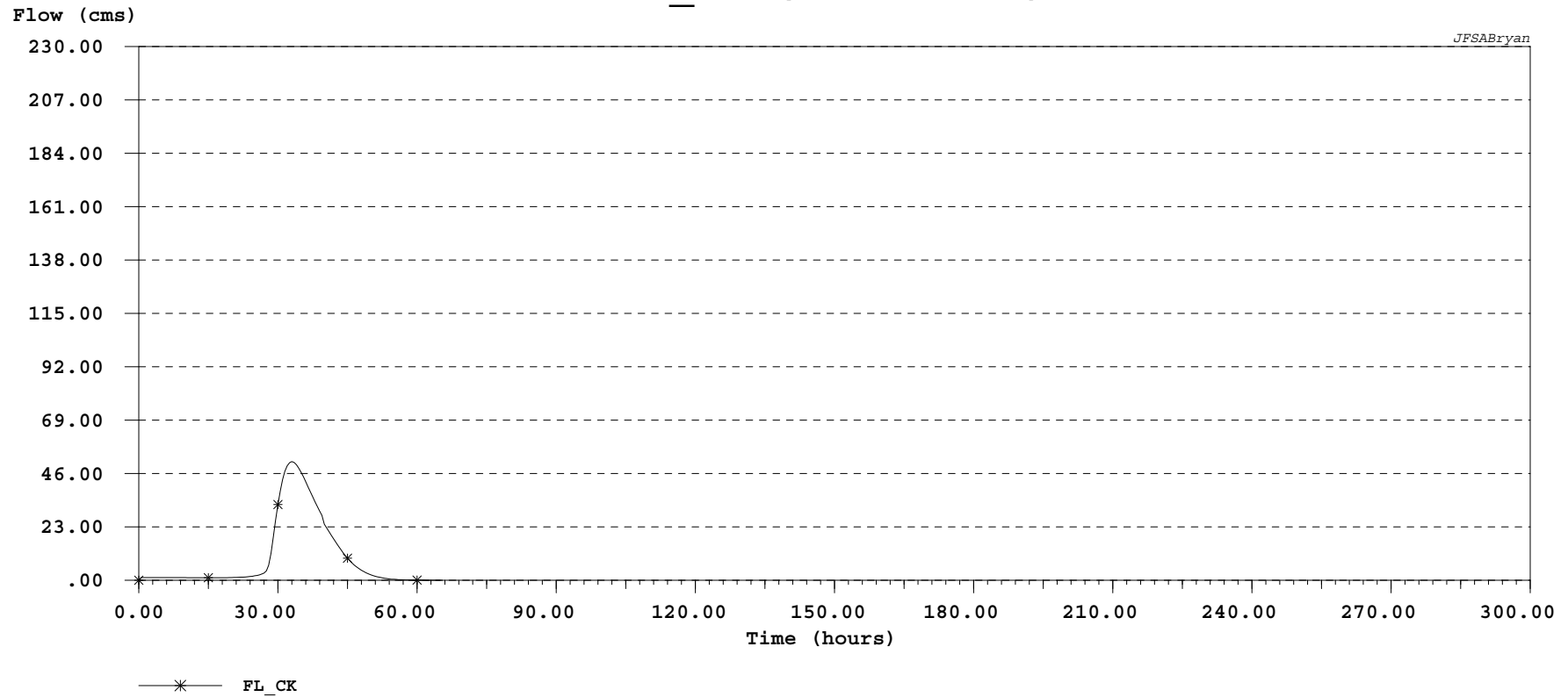
Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—*—	H-LM_CK.100 : LM_CK	30.00	1021.00	19.515	30.500	51.13	5.220E+05	54.000	2.685

Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\JRSUMM-1\H-LM_CK.100
Comment in file : LM_CK

#	TIME	FLOW	#	TIME	FLOW	#	TIME	FLOW	#
#	hrs	cms	#	hrs	cms	#	hrs	cms	#
#	0.00	0.000	#	19.00	0.234	#	38.00	4.583	#
	0.50	0.241		19.50	0.238		38.50	4.242	
	1.00	0.240		20.00	0.245		39.00	3.954	
	1.50	0.240		20.50	0.256		39.50	3.717	
	2.00	0.240		21.00	0.271		40.00	3.127	
	2.50	0.239		21.50	0.292		40.50	2.919	
	3.00	0.239		22.00	0.318		41.00	2.651	
	3.50	0.239		22.50	0.349		41.50	2.335	
	4.00	0.238		23.00	0.387		42.00	1.982	
	4.50	0.238		23.50	0.432		42.50	1.653	
	5.00	0.238		24.00	0.488		43.00	1.355	
	5.50	0.237		24.50	0.555		43.50	1.090	
	6.00	0.237		25.00	0.639		44.00	0.864	
	6.50	0.237		25.50	0.742		44.50	0.676	
	7.00	0.236		26.00	0.873		45.00	0.522	
	7.50	0.236		26.50	1.046		45.50	0.399	
	8.00	0.236		27.00	1.297		46.00	0.302	
	8.50	0.235		27.50	1.768		46.50	0.227	
	9.00	0.235		28.00	4.358		47.00	0.169	
	9.50	0.235		28.50	9.043		47.50	0.125	
	10.00	0.234		29.00	13.685		48.00	0.092	
	10.50	0.234		29.50	17.090		48.50	0.067	
	11.00	0.234		30.00	18.983		49.00	0.048	
	11.50	0.233		<u>30.50</u>	<u>19.515</u>		49.50	0.035	
	12.00	0.233		31.00	19.028		50.00	0.024	
	12.50	0.233		31.50	17.905		50.50	0.017	
	13.00	0.232		32.00	16.469		51.00	0.012	
	13.50	0.232		32.50	14.896		51.50	0.008	
	14.00	0.232		33.00	13.291		52.00	0.005	
	14.50	0.231		33.50	11.753		52.50	0.003	
	15.00	0.231		34.00	10.351		53.00	0.002	
	15.50	0.231		34.50	9.124		53.50	0.001	
	16.00	0.230		35.00	8.082		54.00	0.000	
	16.50	0.230		35.50	7.222		54.50	0.000	
	17.00	0.230		36.00	6.526		55.00	0.000	
	17.50	0.229		36.50	5.944		55.50	0.000	
	18.00	0.229		37.00	5.433		56.00	0.000	
	18.50	0.232		37.50	4.980		56.50	0.000	

FL_CK (JR SUMMER)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—*—	H-FL_CK.100 : FL_CK	30.00	4945.00	51.121	33.000	44.15	2.183E+06	65.000	9.330

Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\JRSUMM-1\H-FL_CK.100
 Comment in file : FL_CK

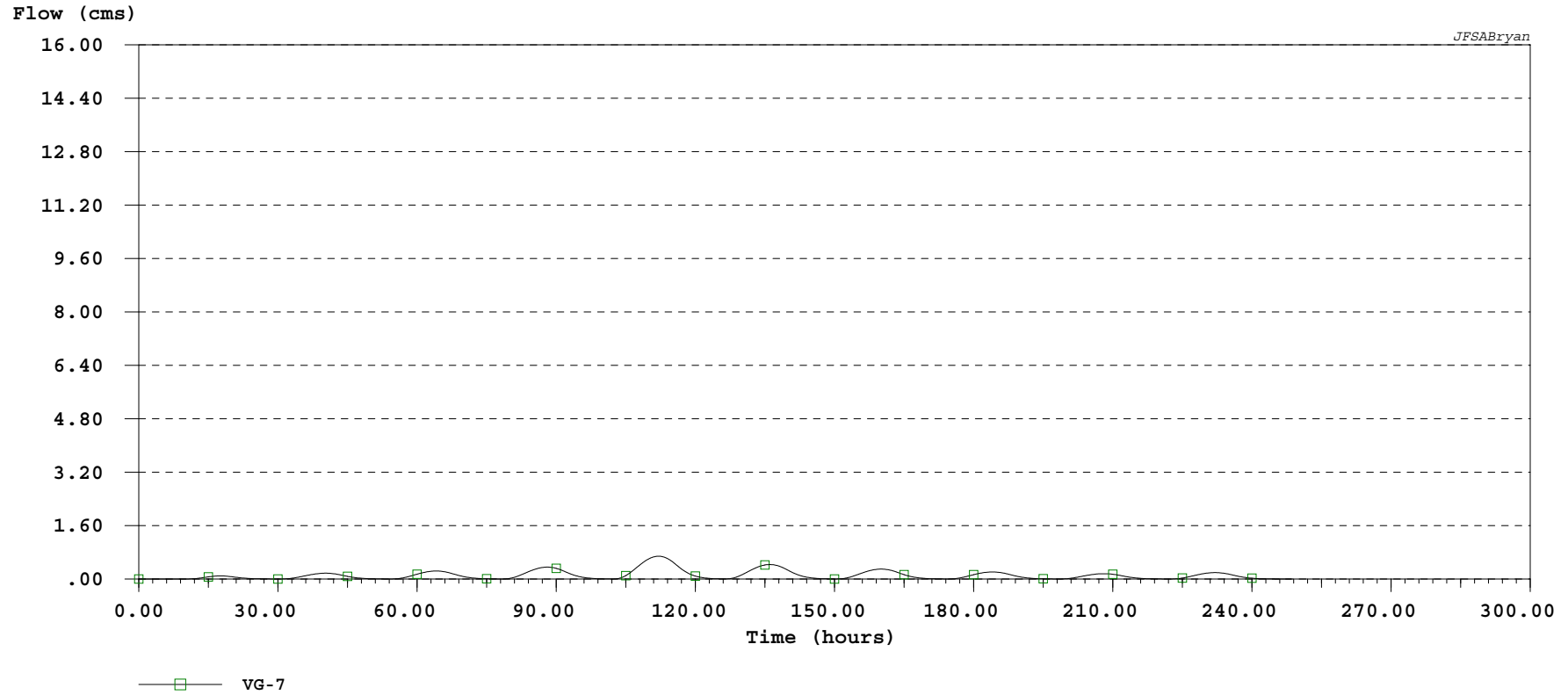
#	TIME	FLOW	#	TIME	FLOW	#	TIME	FLOW	#	TIME	FLOW	#
#	hrs	cms	#	hrs	cms	#	hrs	cms	#	hrs	cms	#
#	-----		#	-----		#	-----		#	-----		#
	0.00	0.000		19.00	1.134		38.00	33.787		57.00	0.187	
	0.50	1.166		19.50	1.146		38.50	31.740		57.50	0.155	
	1.00	1.164		20.00	1.165		39.00	29.794		58.00	0.127	
	1.50	1.163		20.50	1.186		39.50	27.965		58.50	0.104	
	2.00	1.161		21.00	1.214		40.00	24.170		59.00	0.085	
	2.50	1.159		21.50	1.249		40.50	22.558		59.50	0.068	
	3.00	1.158		22.00	1.294		41.00	20.976		60.00	0.055	
	3.50	1.156		22.50	1.349		41.50	19.405		60.50	0.043	
	4.00	1.154		23.00	1.420		42.00	17.847		61.00	0.033	
	4.50	1.153		23.50	1.504		42.50	16.313		61.50	0.026	
	5.00	1.151		24.00	1.609		43.00	14.821		62.00	0.020	
	5.50	1.150		24.50	1.737		43.50	13.385		62.50	0.015	
	6.00	1.148		25.00	1.894		44.00	12.021		63.00	0.011	
	6.50	1.146		25.50	2.088		44.50	10.738		63.50	0.007	
	7.00	1.145		26.00	2.333		45.00	9.545		64.00	0.005	
	7.50	1.143		26.50	2.650		45.50	8.444		64.50	0.002	
	8.00	1.141		27.00	3.089		46.00	7.438		65.00	0.000	
	8.50	1.140		27.50	4.092		46.50	6.525		65.50	0.000	
	9.00	1.138		28.00	6.530		47.00	5.703		66.00	0.000	
	9.50	1.137		28.50	11.724		47.50	4.967		66.50	0.000	
	10.00	1.135		29.00	18.540		48.00	4.311		67.00	0.000	
	10.50	1.133		29.50	25.784		48.50	3.730		67.50	0.000	
	11.00	1.132		30.00	32.631		49.00	3.219		68.00	0.000	
	11.50	1.130		30.50	38.567		49.50	2.770		68.50	0.000	
	12.00	1.129		31.00	43.336		50.00	2.377		69.00	0.000	
	12.50	1.127		31.50	46.892		50.50	2.035		69.50	0.000	
	13.00	1.125		32.00	49.311		51.00	1.738		70.00	0.000	
	13.50	1.124		32.50	50.686		51.50	1.480		70.50	0.000	
	14.00	1.122		<u>33.00</u>	<u>51.121</u>		52.00	1.257		71.00	0.000	
	14.50	1.121		33.50	50.764		52.50	1.064		71.50	0.000	
	15.00	1.119		34.00	49.776		53.00	0.842		72.00	0.000	
	15.50	1.117		34.50	48.315		53.50	0.690		72.50	0.000	
	16.00	1.116		35.00	46.524		54.00	0.574		73.00	0.000	
	16.50	1.114		35.50	44.524		54.50	0.479		73.50	0.000	
	17.00	1.113		36.00	42.417		55.00	0.398		74.00	0.000	
	17.50	1.111		36.50	40.259		55.50	0.332		74.50	0.000	
	18.00	1.110		37.00	38.079		56.00	0.276		75.00	0.000	
	18.50	1.122		37.50	35.910		56.50	0.228		75.50	0.000	

APPENDIX H

Van Gaal Hydrographs (1:100 Year Spring)



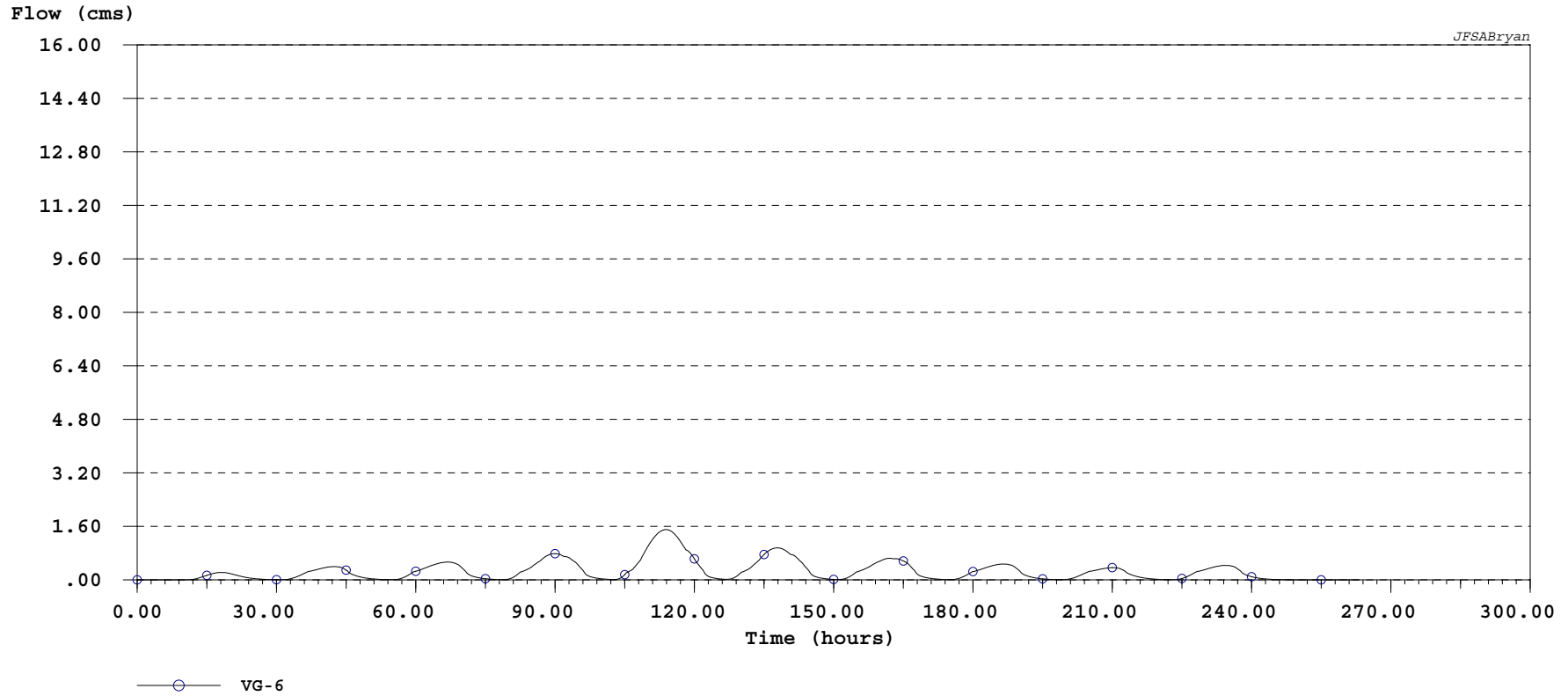
VG-7 (VG SPRING)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—□—	H-VG-7.100 : VG-7	5.00	39.20	0.683	112.083	251.21	9.847E+04	248.417	0.110

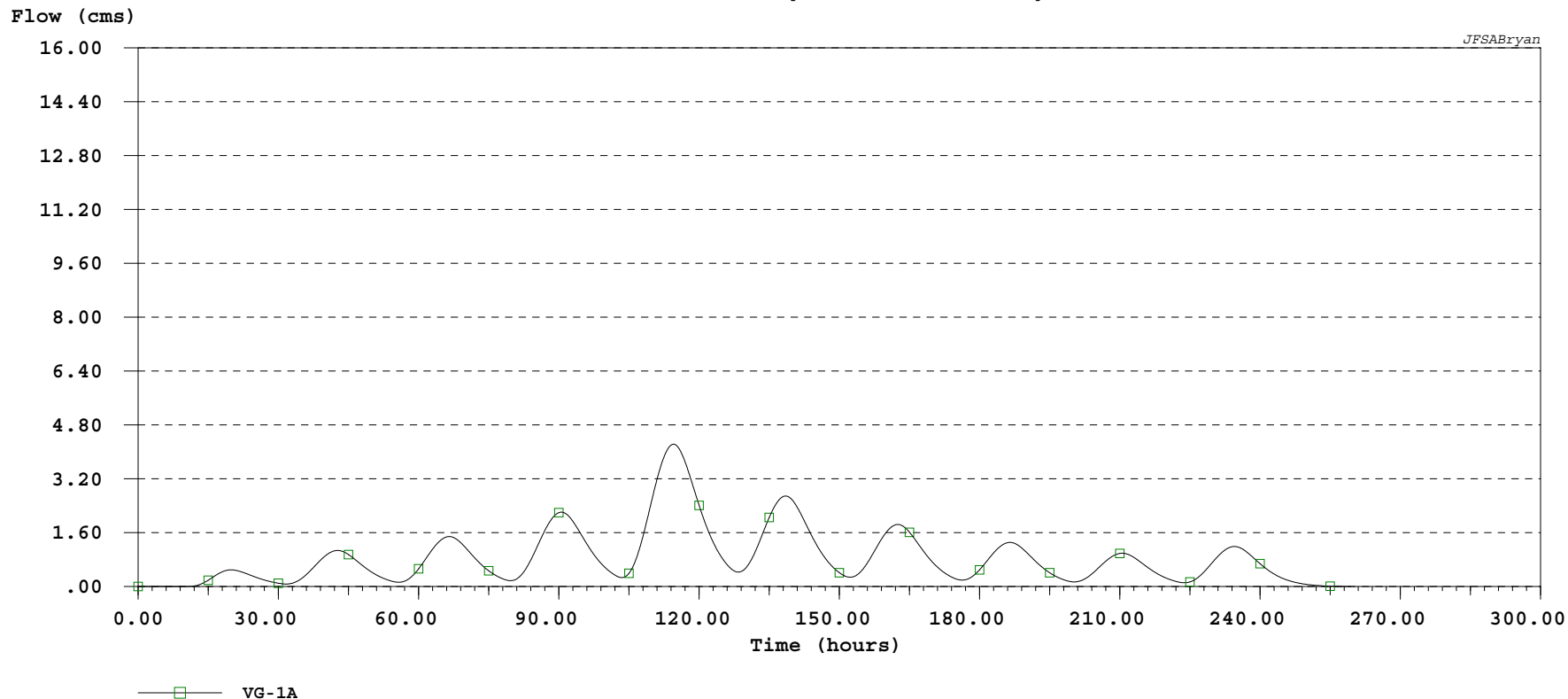
VG-6 (VG SPRING)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—○—	H-VG-6.100 : VG-6	5.00	94.20	1.504	113.917	251.81	2.372E+05	262.917	0.251

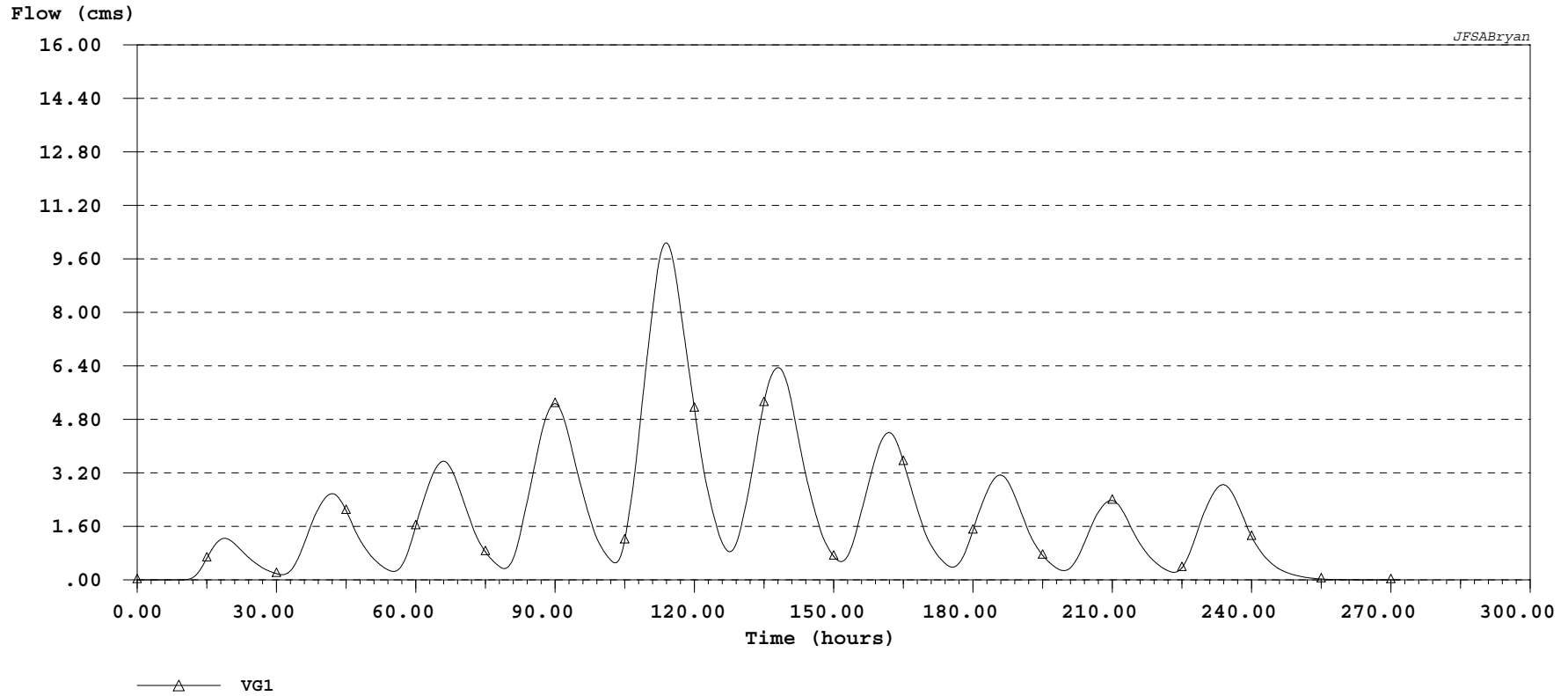
VG-1A (VG SPRING)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—□—	H-VG-1A.100 : VG-1A	5.00	311.90	4.228	114.500	250.81	7.823E+05	259.333	0.838

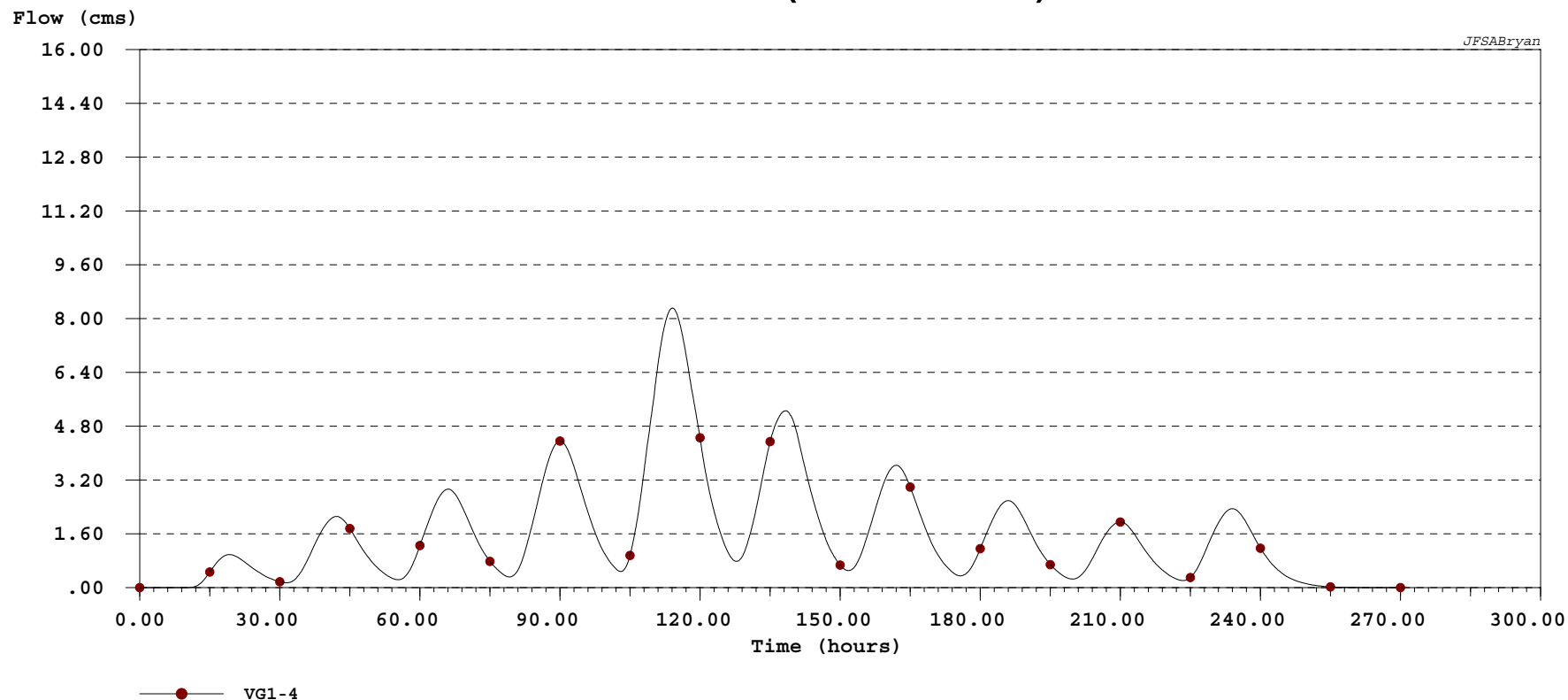
VG1 (VG SPRING)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—△—	H-VG1.100 : VG1	5.00	727.40	10.080	113.917	251.11	1.827E+06	272.000	1.865

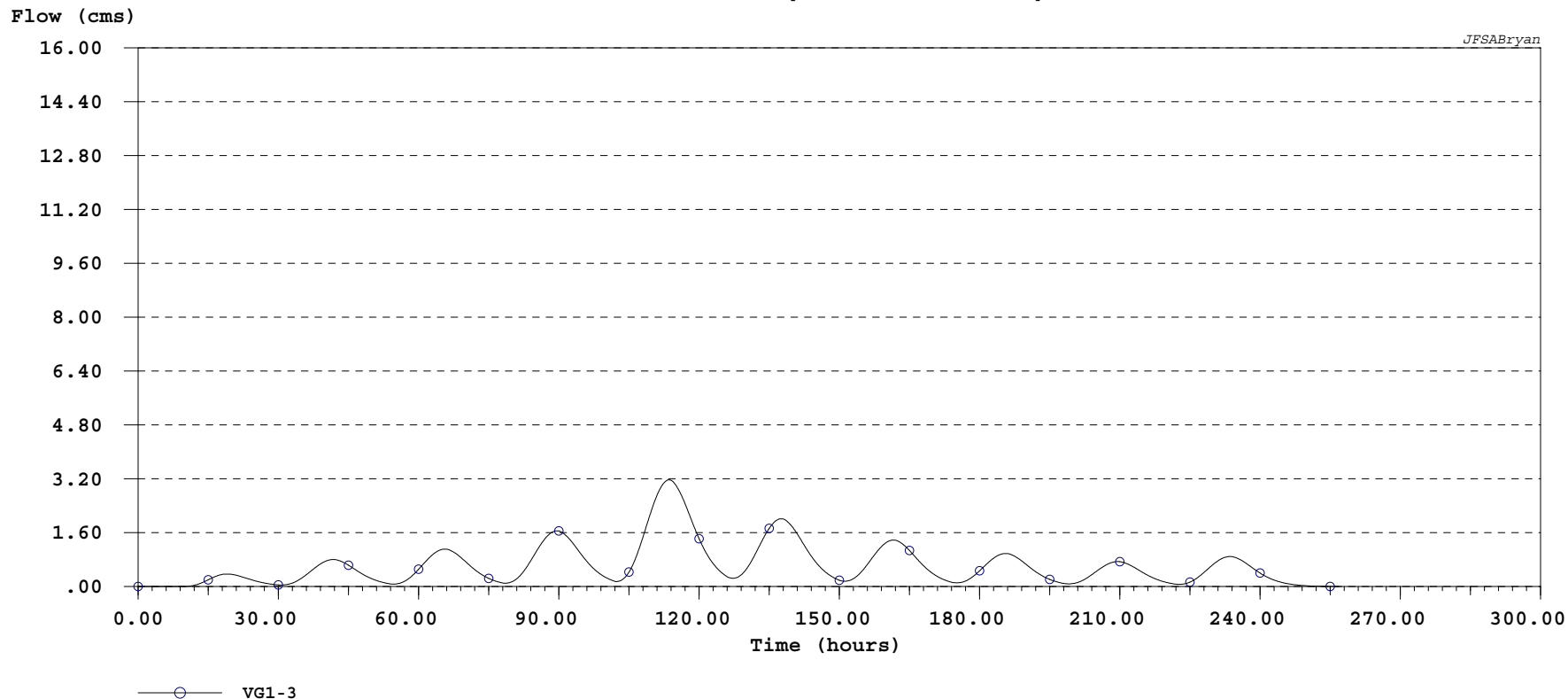
VG1-4 (VG SPRING)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—●—	H-VG1-4.100 : VG1-4	5.00	609.70	8.316	114.083	250.92	1.530E+06	270.750	1.570

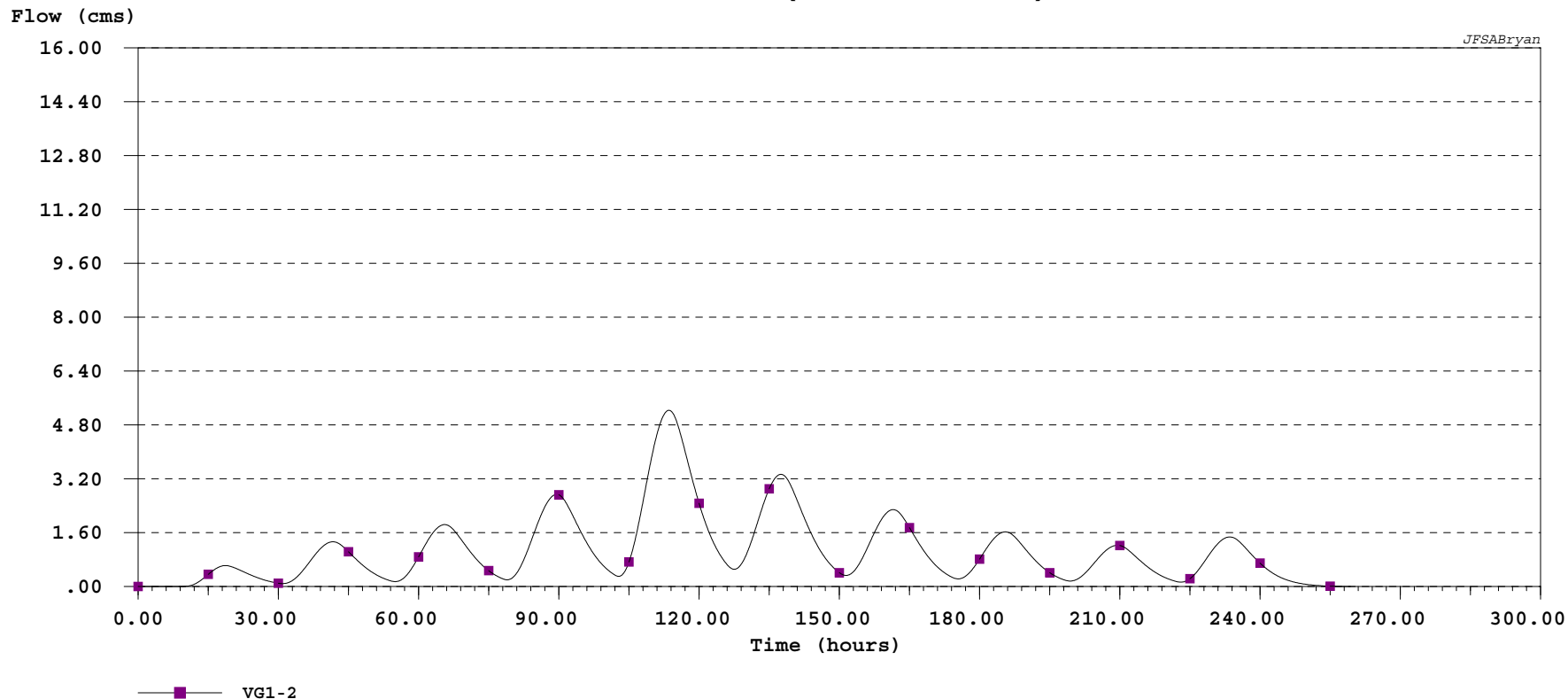
VG1-3 (VG SPRING)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—○—	H-VG1-3.100 : VG1-3	5.00	225.20	3.166	113.500	250.81	5.648E+05	256.833	0.611

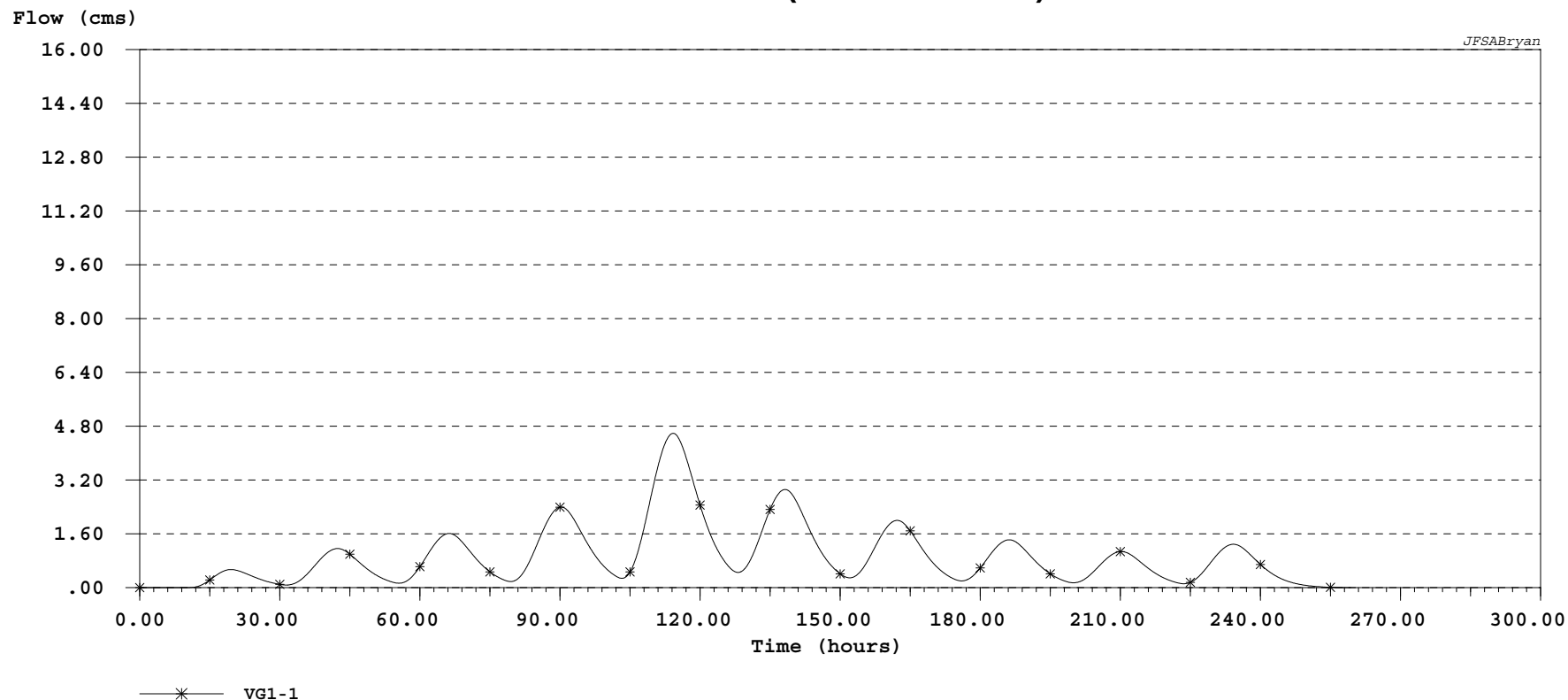
VG1-2 (VG SPRING)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—■—	H-VG1-2.100 : VG1-2	5.00	384.50	5.235	113.500	250.98	9.650E+05	259.333	1.034

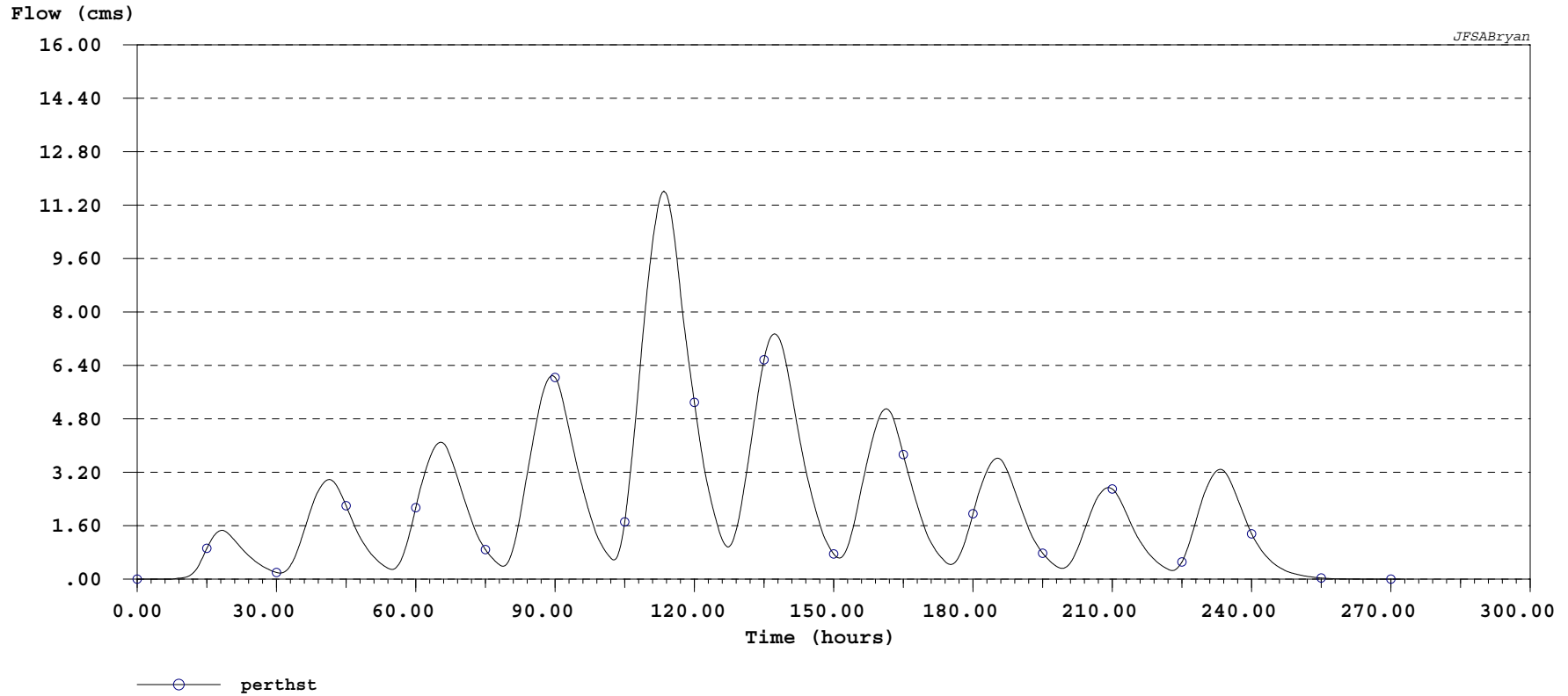
VG1-1 (VG SPRING)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—*—	H-VG1-1.100 : VG1-1	5.00	336.70	4.588	114.250	250.81	8.445E+05	259.333	0.905

PERTHST (VG SPRING)



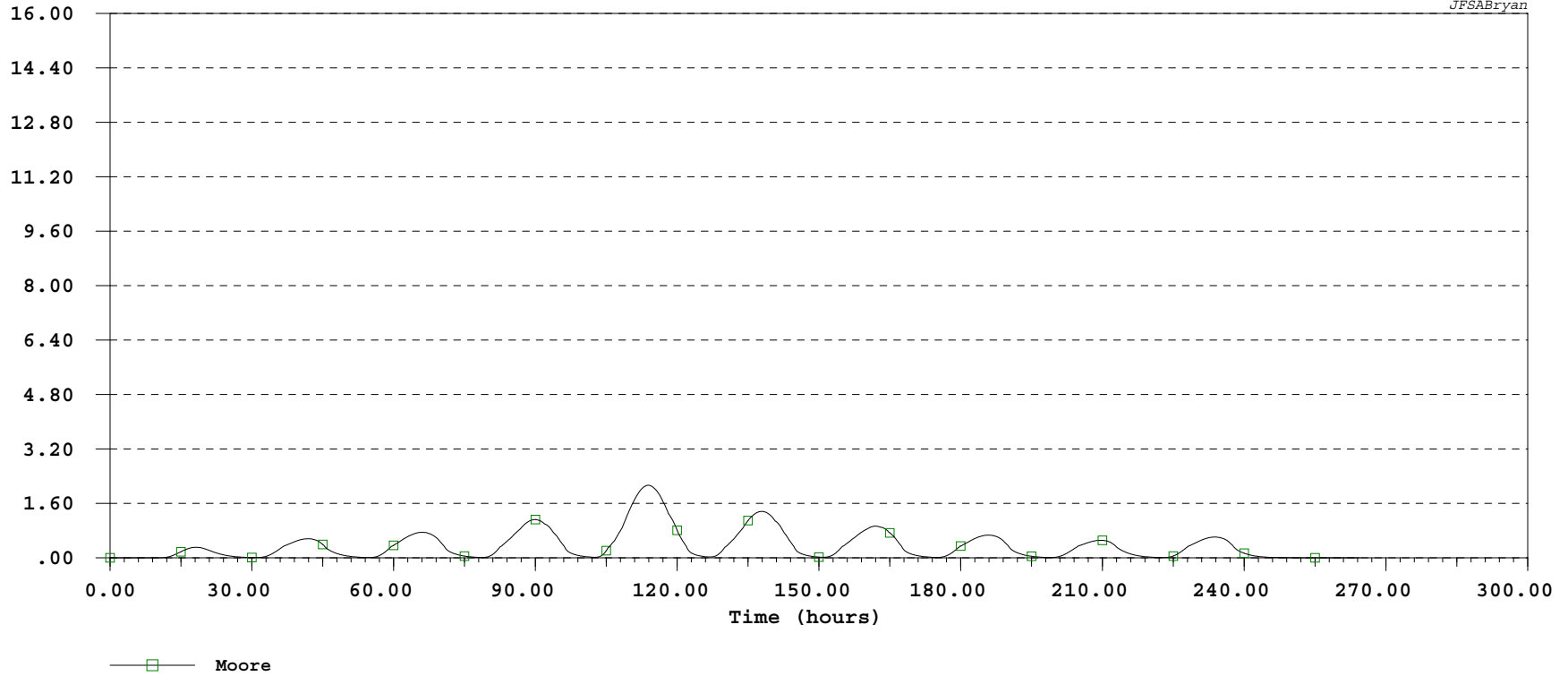
Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—○—	H-PERTHS.100: perthst	5.00	855.70	11.619	113.417	247.07	2.114E+06	272.833	2.152

MOORE (VG SPRING)

Flow (cms)

JFSABryan



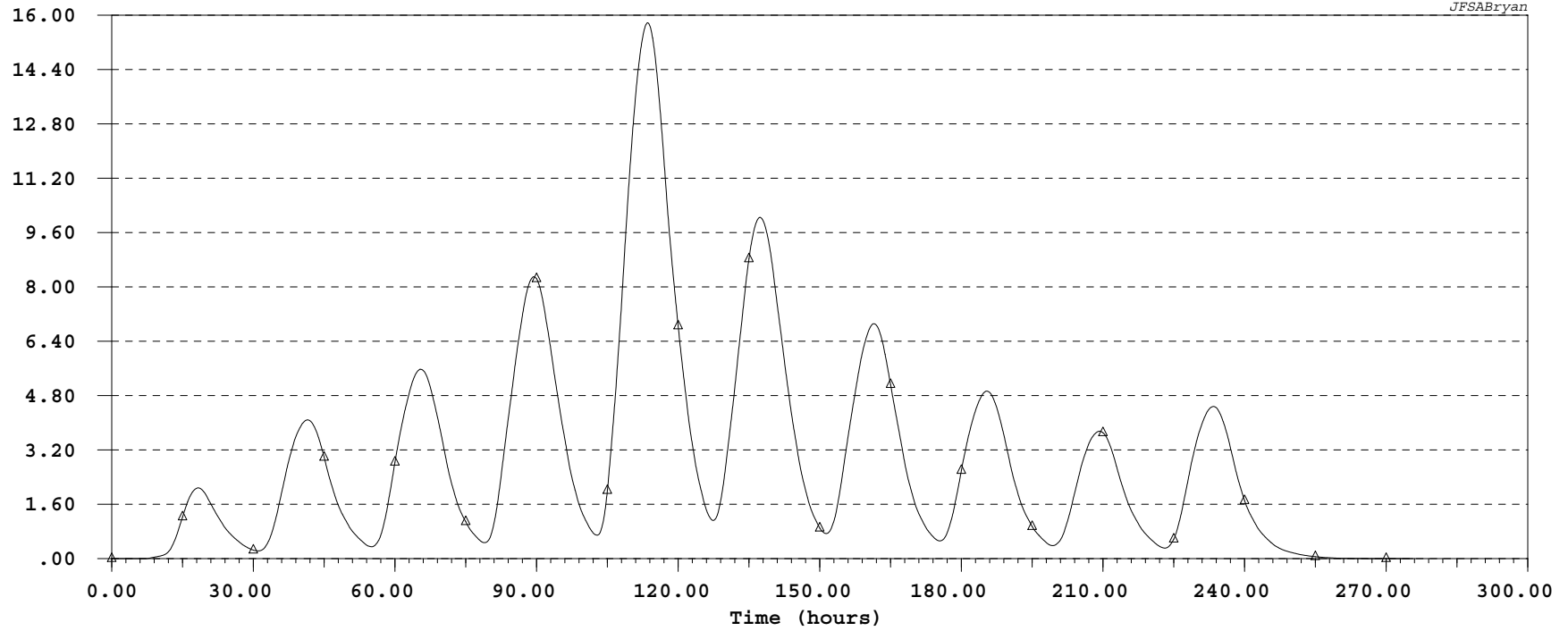
Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—□— Moore	H-MOORE.100 : Moore	5.00	133.40	2.132	113.917	251.64	3.357E+05	264.417	0.353

JOCKVG (VG SPRING)

Flow (cms)

JFSABryan

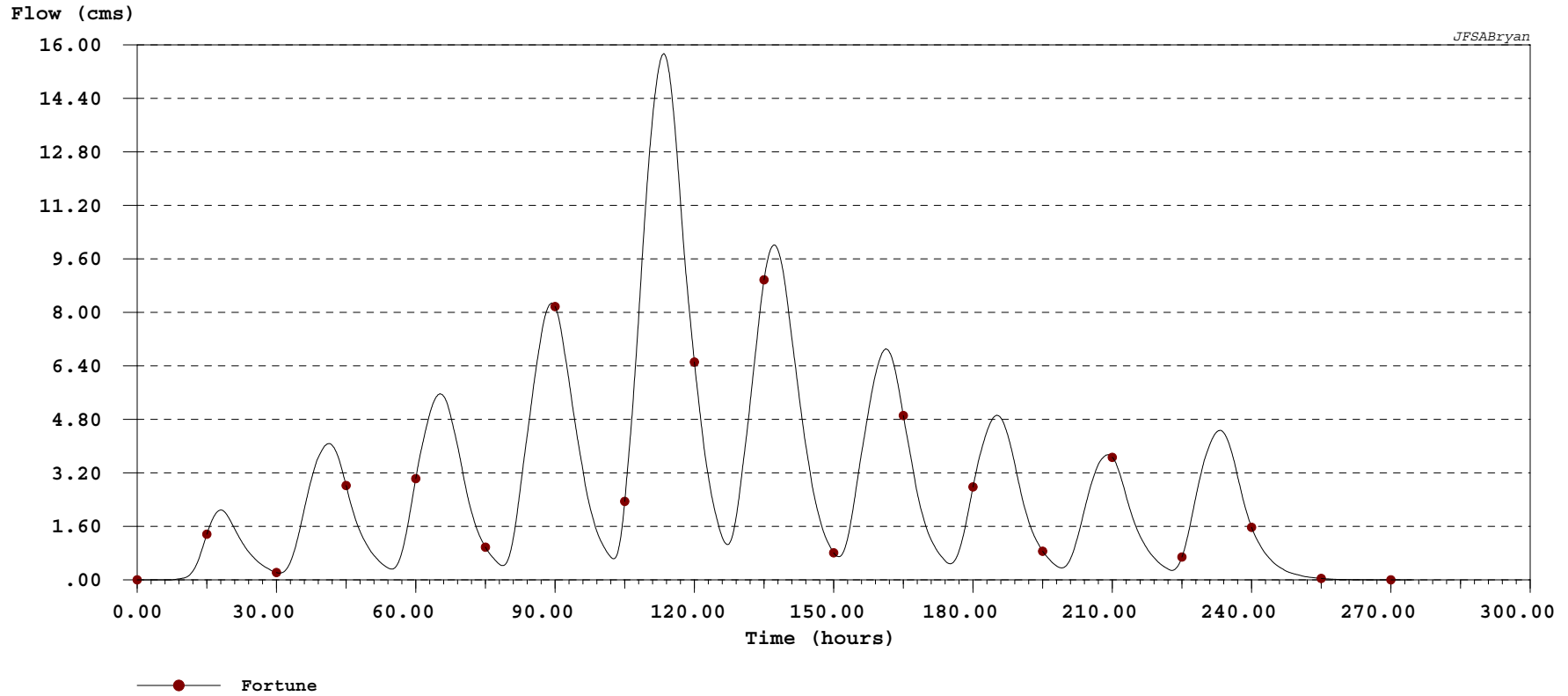


—△— Flow from Van Gaal at Jock Riv

Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—△—	JOCKVG.100 : Flow from Van Gaal at Jock River	5.00	1147.00	15.777	113.500	244.26	2.802E+06	275.667	2.823

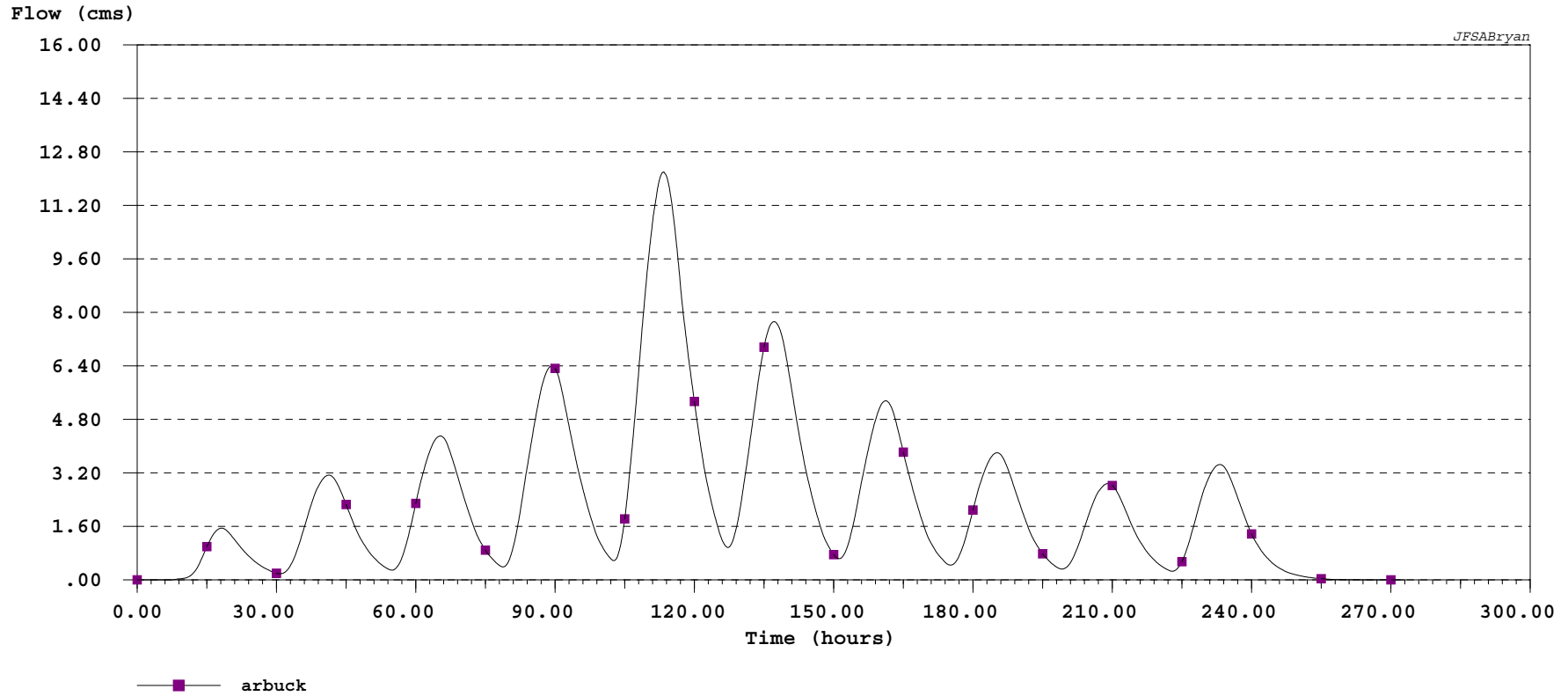
FORTUNE (VG SPRING)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—●—	H-FORTUN.100: Fortune	5.00	1126.70	15.740	113.417	246.74	2.780E+06	274.417	2.814

ARBUCK (VG SPRING)



Hydrograph Statistics:

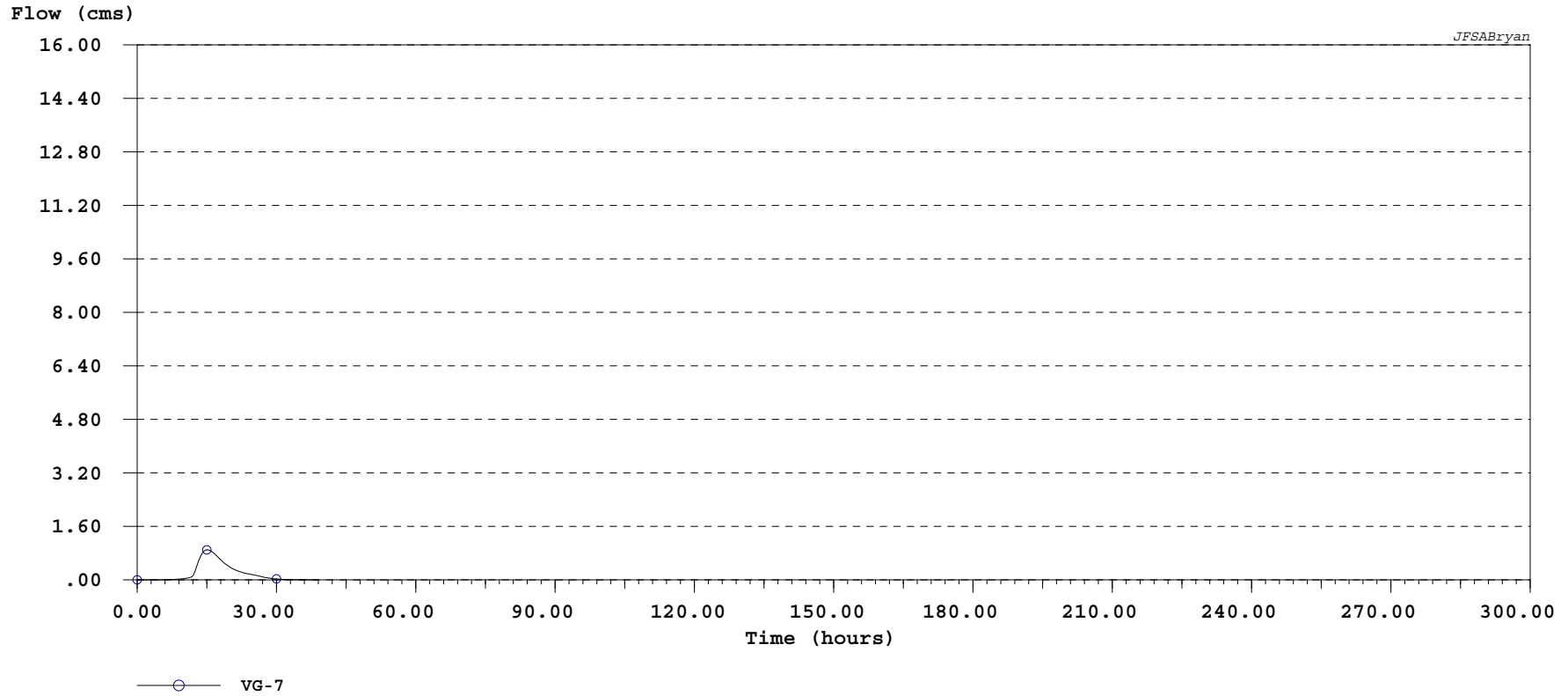
Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—■—	H-ARBUCK.100: arbruck	5.00	890.10	12.204	113.417	247.25	2.201E+06	272.833	2.241

APPENDIX I

Van Gaal Hydrographs (1:100 Year Summer)



VG-7 (VG SUMMER)



Hydrograph Statistics:

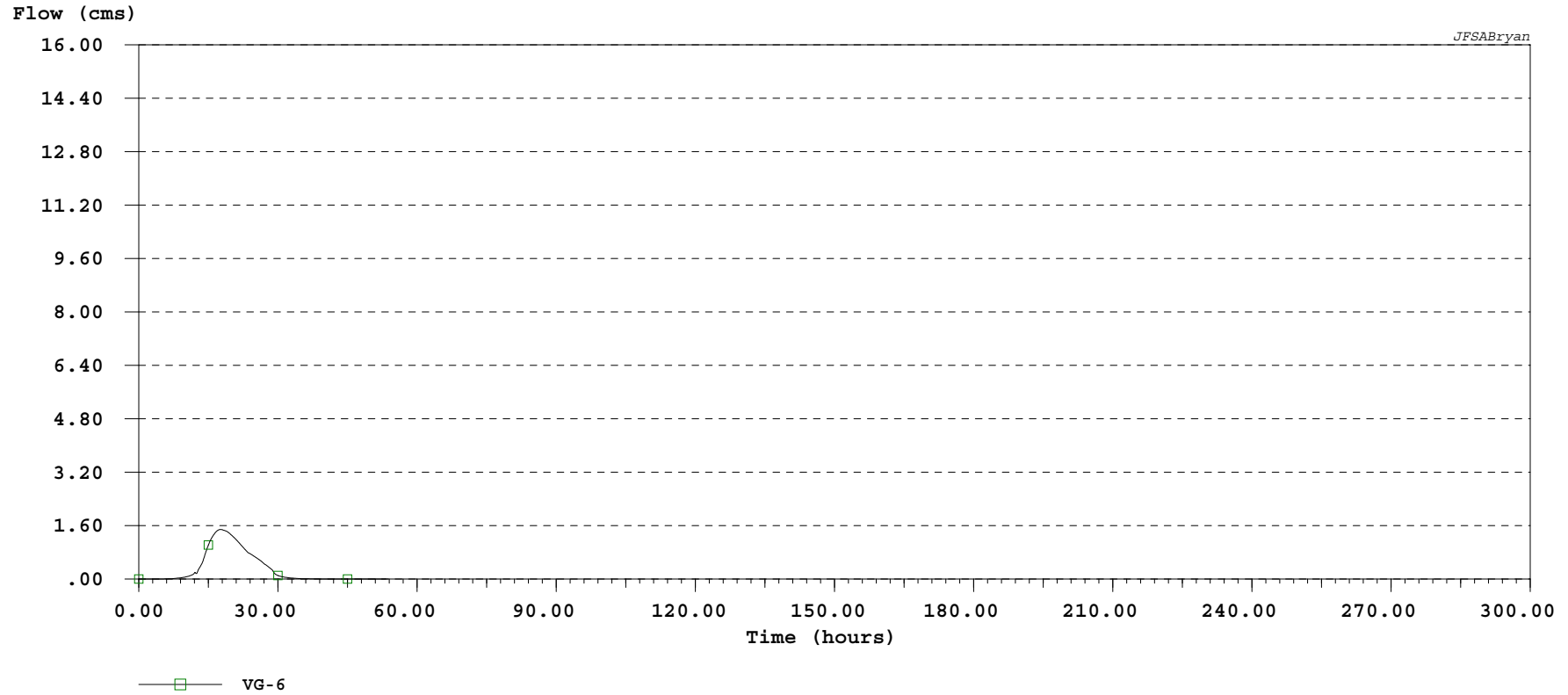
Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—○—	H-VG-7.100 : VG-7	5.00	39.20	0.900	15.083	63.92	2.506E+04	38.750	0.180

Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-7.100
 Comment in file : VG-7

#	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #
#	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms
	0.00	0.000	4.33	0.000	8.67	0.019	13.00	0.478	17.33	0.690	21.67	0.267	26.00	0.122	30.33	0.023	34.67	0.002
	0.08	0.000	4.42	0.000	8.75	0.020	13.08	0.511	17.42	0.679	21.75	0.263	26.08	0.119	30.42	0.022	34.75	0.002
	0.17	0.000	4.50	0.000	8.83	0.021	13.17	0.543	17.50	0.667	21.83	0.258	26.17	0.117	30.50	0.022	34.83	0.002
	0.25	0.000	4.58	0.001	8.92	0.022	13.25	0.574	17.58	0.656	21.92	0.254	26.25	0.114	30.58	0.021	34.92	0.002
	0.33	0.000	4.67	0.001	9.00	0.023	13.33	0.604	17.67	0.645	22.00	0.250	26.33	0.111	30.67	0.020	35.00	0.002
	0.42	0.000	4.75	0.001	9.08	0.024	13.42	0.632	17.75	0.633	22.08	0.246	26.42	0.109	30.75	0.019	35.08	0.002
	0.50	0.000	4.83	0.001	9.17	0.025	13.50	0.660	17.83	0.622	22.17	0.242	26.50	0.106	30.83	0.018	35.17	0.002
	0.58	0.000	4.92	0.001	9.25	0.026	13.58	0.686	17.92	0.611	22.25	0.238	26.58	0.103	30.92	0.018	35.25	0.002
	0.67	0.000	5.00	0.001	9.33	0.027	13.67	0.710	18.00	0.599	22.33	0.234	26.67	0.101	31.00	0.017	35.33	0.002
	0.75	0.000	5.08	0.001	9.42	0.028	13.75	0.733	18.08	0.588	22.42	0.231	26.75	0.098	31.08	0.016	35.42	0.002
	0.83	0.000	5.17	0.001	9.50	0.029	13.83	0.755	18.17	0.578	22.50	0.227	26.83	0.095	31.17	0.016	35.50	0.001
	0.92	0.000	5.25	0.001	9.58	0.030	13.92	0.774	18.25	0.567	22.58	0.224	26.92	0.091	31.25	0.015	35.58	0.001
	1.00	0.000	5.33	0.002	9.67	0.031	14.00	0.793	18.33	0.556	22.67	0.220	27.00	0.088	31.33	0.015	35.67	0.001
	1.08	0.000	5.42	0.002	9.75	0.033	14.08	0.810	18.42	0.546	22.75	0.217	27.08	0.086	31.42	0.014	35.75	0.001
	1.17	0.000	5.50	0.002	9.83	0.034	14.17	0.825	18.50	0.535	22.83	0.214	27.17	0.083	31.50	0.013	35.83	0.001
	1.25	0.000	5.58	0.002	9.92	0.035	14.25	0.839	18.58	0.525	22.92	0.211	27.25	0.081	31.58	0.013	35.92	0.001
	1.33	0.000	5.67	0.002	10.00	0.037	14.33	0.851	18.67	0.515	23.00	0.208	27.33	0.079	31.67	0.012	36.00	0.001
	1.42	0.000	5.75	0.003	10.08	0.038	14.42	0.862	18.75	0.505	23.08	0.205	27.42	0.076	31.75	0.012	36.08	0.001
	1.50	0.000	5.83	0.003	10.17	0.040	14.50	0.871	18.83	0.495	23.17	0.202	27.50	0.074	31.83	0.011	36.17	0.001
	1.58	0.000	5.92	0.003	10.25	0.041	14.58	0.879	18.92	0.486	23.25	0.199	27.58	0.072	31.92	0.011	36.25	0.001
	1.67	0.000	6.00	0.003	10.33	0.043	14.67	0.886	19.00	0.476	23.33	0.196	27.67	0.070	32.00	0.010	36.33	0.001
	1.75	0.000	6.08	0.004	10.42	0.044	14.75	0.891	19.08	0.467	23.42	0.194	27.75	0.068	32.08	0.010	36.42	0.001
	1.83	0.000	6.17	0.004	10.50	0.046	14.83	0.895	19.17	0.458	23.50	0.191	27.83	0.066	32.17	0.010	36.50	0.001
	1.92	0.000	6.25	0.004	10.58	0.048	14.92	0.898	19.25	0.449	23.58	0.188	27.92	0.064	32.25	0.009	36.58	0.001
	2.00	0.000	6.33	0.004	10.67	0.050	15.00	0.900	19.33	0.441	23.67	0.186	28.00	0.062	32.33	0.009	36.67	0.001
	2.08	0.000	6.42	0.005	10.75	0.052	15.08	0.900	19.42	0.432	23.75	0.184	28.08	0.060	32.42	0.008	36.75	0.001
	2.17	0.000	6.50	0.005	10.83	0.054	15.17	0.900	19.50	0.424	23.83	0.181	28.17	0.058	32.50	0.008	36.83	0.001
	2.25	0.000	6.58	0.005	10.92	0.056	15.25	0.899	19.58	0.416	23.92	0.179	28.25	0.056	32.58	0.008	36.92	0.001
	2.33	0.000	6.67	0.006	11.00	0.059	15.33	0.896	19.67	0.408	24.00	0.177	28.33	0.055	32.67	0.007	37.00	0.001
	2.42	0.000	6.75	0.006	11.08	0.061	15.42	0.893	19.75	0.401	24.08	0.175	28.42	0.053	32.75	0.007	37.08	0.001
	2.50	0.000	6.83	0.007	11.17	0.064	15.50	0.889	19.83	0.393	24.17	0.173	28.50	0.051	32.83	0.007	37.17	0.000
	2.58	0.000	6.92	0.007	11.25	0.067	15.58	0.885	19.92	0.386	24.25	0.171	28.58	0.050	32.92	0.007	37.25	0.000
	2.67	0.000	7.00	0.007	11.33	0.070	15.67	0.879	20.00	0.379	24.33	0.169	28.67	0.048	33.00	0.006	37.33	0.000
	2.75	0.000	7.08	0.008	11.42	0.074	15.75	0.874	20.08	0.372	24.42	0.167	28.75	0.046	33.08	0.006	37.42	0.000
	2.83	0.000	7.17	0.008	11.50	0.077	15.83	0.867	20.17	0.365	24.50	0.165	28.83	0.045	33.17	0.006	37.50	0.000
	2.92	0.000	7.25	0.009	11.58	0.081	15.92	0.860	20.25	0.359	24.58	0.163	28.92	0.043	33.25	0.005	37.58	0.000
	3.00	0.000	7.33	0.009	11.67	0.086	16.00	0.852	20.33	0.352	24.67	0.160	29.00	0.042	33.33	0.005	37.67	0.000
	3.08	0.000	7.42	0.010	11.75	0.092	16.08	0.845	20.42	0.346	24.75	0.158	29.08	0.040	33.42	0.005	37.75	0.000
	3.17	0.000	7.50	0.010	11.83	0.099	16.17	0.836	20.50	0.340	24.83	0.156	29.17	0.039	33.50	0.005	37.83	0.000
	3.25	0.000	7.58	0.011	11.92	0.109	16.25	0.827	20.58	0.334	24.92	0.154	29.25	0.038	33.58	0.005	37.92	0.000
	3.33	0.000	7.67	0.011	12.00	0.124	16.33	0.818	20.67	0.328	25.00	0.152	29.33	0.036	33.67	0.004	38.00	0.000
	3.42	0.000	7.75	0.012	12.08	0.142	16.42	0.809	20.75	0.323	25.08	0.149	29.42	0.035	33.75	0.004	38.08	0.000
	3.50	0.000	7.83	0.012	12.17	0.164	16.50	0.799	20.83	0.317	25.17	0.147	29.50	0.034	33.83	0.004	38.17	0.000
	3.58	0.000	7.92	0.013	12.25	0.189	16.58	0.789	20.92	0.311	25.25	0.145	29.58	0.033	33.92	0.004	38.25	0.000
	3.67	0.000	8.00	0.014	12.33	0.217	16.67	0.779	21.00	0.306	25.33	0.142	29.67	0.032	34.00	0.004	38.33	0.000
	3.75	0.000	8.08	0.014	12.42	0.246	16.75	0.768	21.08	0.301	25.42	0.140	29.75	0.030	34.08	0.003	38.42	0.000
	3.83	0.000	8.17	0.015	12.50	0.278	16.83	0.757	21.17	0.296	25.50	0.137	29.83	0.029	34.17	0.003	38.50	0.000
	3.92	0.000	8.25	0.016	12.58	0.310	16.92	0.746	21.25	0.291	25.58	0.135	29.92	0.028	34.25	0.003	38.58	0.000
	4.00	0.000	8.33	0.016	12.67	0.344	17.00	0.735	21.33	0.286	25.67	0.132	30.00	0.027	34.33	0.003	38.67	0.000
	4.08	0.000	8.42	0.017	12.75	0.377	17.08	0.724	21.42	0.281	25.75	0.130	30.08	0.026	34.42	0.003	38.75	0.000
	4.17	0.000	8.50	0.018	12.83	0.411	17.17	0.713	21.50	0.276	25.83	0.127	30.17	0.025	34.50	0.003	38.83	0.000
	4.25	0.000	8.58	0.019	12.92	0.445	17.25	0.702	21.58	0.272	25.92	0.124	30.25	0.024	34.58	0.003	38.92	0.000

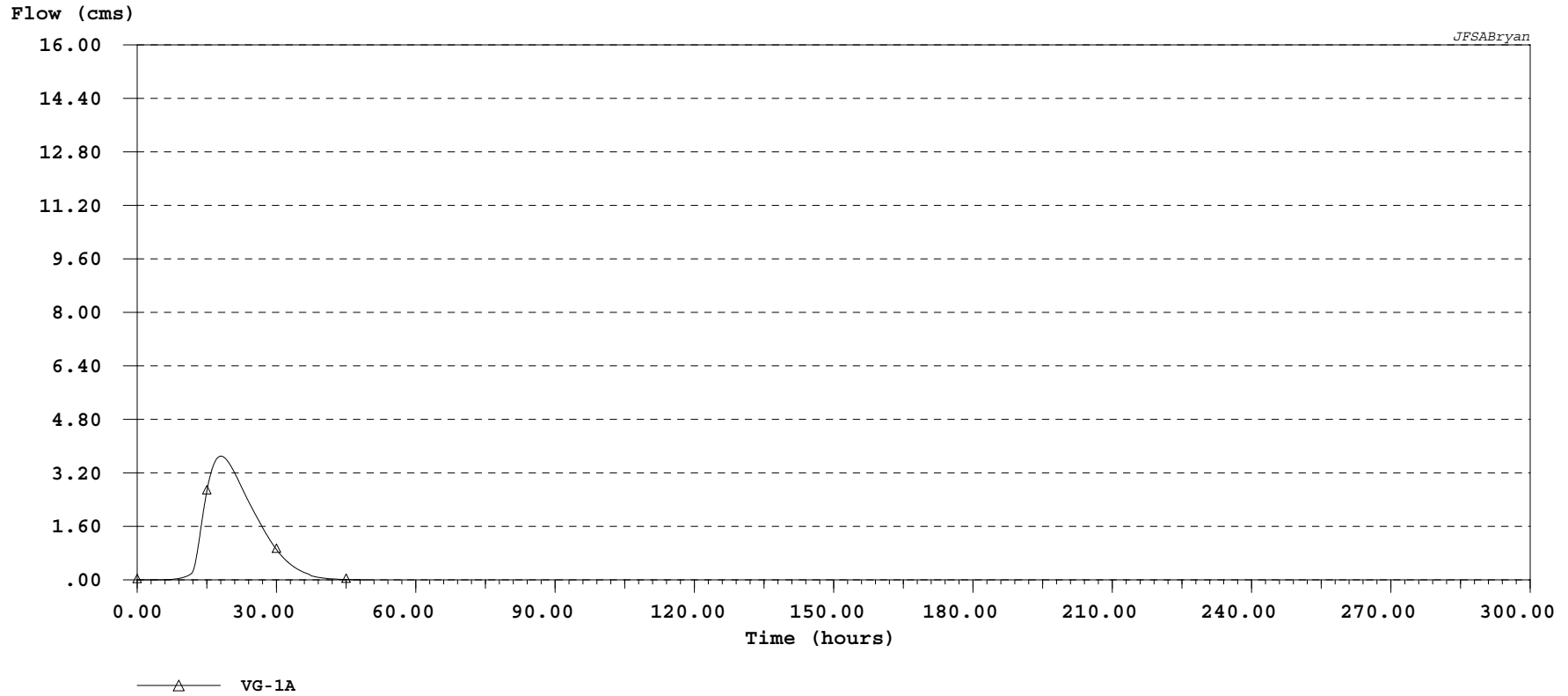
VG-6 (VG SUMMER)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—□—	H-VG-6.100 : VG-6	5.00	94.20	1.483	17.667	60.00	5.652E+04	53.250	0.295

VG-1A (VG SUMMER)



Hydrograph Statistics:

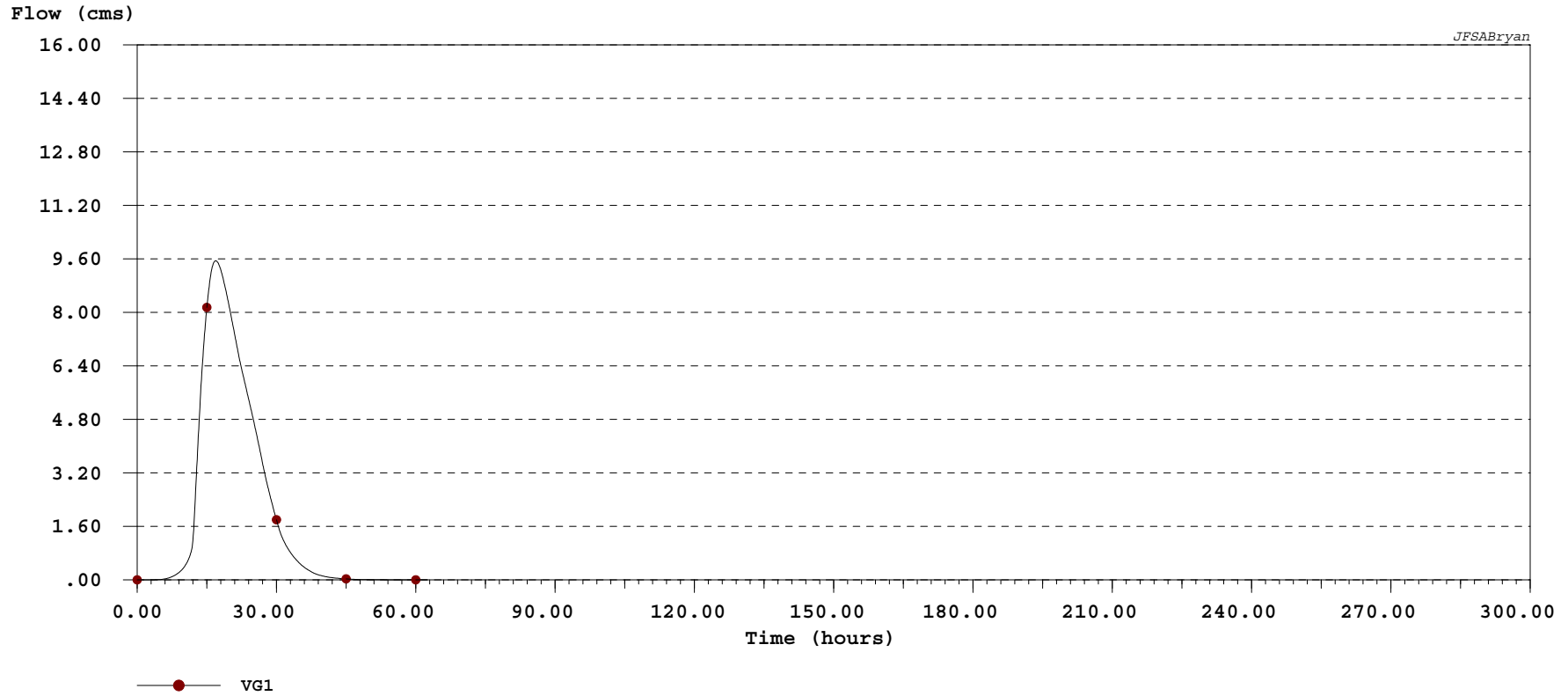
Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—△—	H-VG-1A.100 : VG-1A	5.00	311.90	3.701	18.000	53.74	1.676E+05	49.417	0.942

Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG-1A.100
 Comment in file : VG-1A

#	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #
#	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms
0.00	0.000	4.92	0.001	9.83	0.070	14.75	2.461	19.67	3.515	24.58	2.184	29.50	1.002	34.42	0.331	39.33	0.068	44.25	0.013	
0.08	0.000	5.00	0.001	9.92	0.073	14.83	2.527	19.75	3.498	24.67	2.163	29.58	0.986	34.50	0.324	39.42	0.067	44.33	0.012	
0.17	0.000	5.08	0.001	10.00	0.076	14.92	2.591	19.83	3.481	24.75	2.141	29.67	0.969	34.58	0.317	39.50	0.065	44.42	0.012	
0.25	0.000	5.17	0.001	10.08	0.080	15.00	2.653	19.92	3.463	24.83	2.119	29.75	0.953	34.67	0.310	39.58	0.063	44.50	0.012	
0.33	0.000	5.25	0.001	10.17	0.083	15.08	2.713	20.00	3.445	24.92	2.097	29.83	0.938	34.75	0.304	39.67	0.062	44.58	0.011	
0.42	0.000	5.33	0.001	10.25	0.087	15.17	2.771	20.08	3.426	25.00	2.076	29.92	0.922	34.83	0.298	39.75	0.060	44.67	0.011	
0.50	0.000	5.42	0.002	10.33	0.091	15.25	2.828	20.17	3.407	25.08	2.054	30.00	0.906	34.92	0.291	39.83	0.059	44.75	0.010	
0.58	0.000	5.50	0.002	10.42	0.095	15.33	2.883	20.25	3.387	25.17	2.032	30.08	0.891	35.00	0.285	39.92	0.057	44.83	0.010	
0.67	0.000	5.58	0.002	10.50	0.099	15.42	2.936	20.33	3.367	25.25	2.011	30.17	0.876	35.08	0.279	40.00	0.056	44.92	0.010	
0.75	0.000	5.67	0.002	10.58	0.104	15.50	2.987	20.42	3.347	25.33	1.989	30.25	0.861	35.17	0.273	40.08	0.054	45.00	0.009	
0.83	0.000	5.75	0.003	10.67	0.109	15.58	3.037	20.50	3.326	25.42	1.967	30.33	0.846	35.25	0.268	40.17	0.053	45.08	0.009	
0.92	0.000	5.83	0.003	10.75	0.114	15.67	3.084	20.58	3.305	25.50	1.946	30.42	0.832	35.33	0.262	40.25	0.051	45.17	0.009	
1.00	0.000	5.92	0.003	10.83	0.119	15.75	3.130	20.67	3.283	25.58	1.924	30.50	0.817	35.42	0.256	40.33	0.050	45.25	0.008	
1.08	0.000	6.00	0.004	10.92	0.124	15.83	3.173	20.75	3.262	25.67	1.903	30.58	0.803	35.50	0.251	40.42	0.049	45.33	0.008	
1.17	0.000	6.08	0.004	11.00	0.130	15.92	3.215	20.83	3.240	25.75	1.881	30.67	0.789	35.58	0.245	40.50	0.047	45.42	0.008	
1.25	0.000	6.17	0.005	11.08	0.136	16.00	3.255	20.92	3.218	25.83	1.860	30.75	0.775	35.67	0.240	40.58	0.046	45.50	0.007	
1.33	0.000	6.25	0.005	11.17	0.142	16.08	3.294	21.00	3.195	25.92	1.838	30.83	0.762	35.75	0.235	40.67	0.045	45.58	0.007	
1.42	0.000	6.33	0.006	11.25	0.149	16.17	3.330	21.08	3.173	26.00	1.817	30.92	0.748	35.83	0.230	40.75	0.044	45.67	0.007	
1.50	0.000	6.42	0.006	11.33	0.156	16.25	3.365	21.17	3.150	26.08	1.796	31.00	0.735	35.92	0.225	40.83	0.042	45.75	0.007	
1.58	0.000	6.50	0.007	11.42	0.163	16.33	3.397	21.25	3.127	26.17	1.774	31.08	0.722	36.00	0.220	40.92	0.041	45.83	0.006	
1.67	0.000	6.58	0.007	11.50	0.171	16.42	3.428	21.33	3.103	26.25	1.753	31.17	0.709	36.08	0.215	41.00	0.040	45.92	0.006	
1.75	0.000	6.67	0.008	11.58	0.180	16.50	3.457	21.42	3.080	26.33	1.732	31.25	0.696	36.17	0.210	41.08	0.039	46.00	0.006	
1.83	0.000	6.75	0.008	11.67	0.190	16.58	3.485	21.50	3.056	26.42	1.711	31.33	0.683	36.25	0.205	41.17	0.038	46.08	0.006	
1.92	0.000	6.83	0.009	11.75	0.201	16.67	3.510	21.58	3.033	26.50	1.690	31.42	0.671	36.33	0.201	41.25	0.037	46.17	0.006	
2.00	0.000	6.92	0.010	11.83	0.214	16.75	3.534	21.67	3.009	26.58	1.669	31.50	0.659	36.42	0.196	41.33	0.036	46.25	0.005	
2.08	0.000	7.00	0.010	11.92	0.231	16.83	3.556	21.75	2.985	26.67	1.648	31.58	0.647	36.50	0.192	41.42	0.035	46.33	0.005	
2.17	0.000	7.08	0.011	12.00	0.253	16.92	3.577	21.83	2.961	26.75	1.627	31.67	0.635	36.58	0.187	41.50	0.034	46.42	0.005	
2.25	0.000	7.17	0.012	12.08	0.281	17.00	3.595	21.92	2.936	26.83	1.606	31.75	0.623	36.67	0.183	41.58	0.033	46.50	0.005	
2.33	0.000	7.25	0.013	12.17	0.315	17.08	3.612	22.00	2.912	26.92	1.585	31.83	0.611	36.75	0.179	41.67	0.032	46.58	0.004	
2.42	0.000	7.33	0.014	12.25	0.354	17.17	3.628	22.08	2.888	27.00	1.565	31.92	0.600	36.83	0.174	41.75	0.031	46.67	0.004	
2.50	0.000	7.42	0.015	12.33	0.397	17.25	3.642	22.17	2.864	27.08	1.544	32.00	0.589	36.92	0.170	41.83	0.030	46.75	0.004	
2.58	0.000	7.50	0.016	12.42	0.446	17.33	3.654	22.25	2.839	27.17	1.524	32.08	0.578	37.00	0.166	41.92	0.030	46.83	0.004	
2.67	0.000	7.58	0.017	12.50	0.498	17.42	3.665	22.33	2.815	27.25	1.503	32.17	0.567	37.08	0.161	42.00	0.029	46.92	0.004	
2.75	0.000	7.67	0.018	12.58	0.555	17.50	3.674	22.42	2.790	27.33	1.483	32.25	0.556	37.17	0.154	42.08	0.028	47.00	0.004	
2.83	0.000	7.75	0.019	12.67	0.615	17.58	3.682	22.50	2.766	27.42	1.463	32.33	0.546	37.25	0.147	42.17	0.027	47.08	0.003	
2.92	0.000	7.83	0.020	12.75	0.678	17.67	3.688	22.58	2.742	27.50	1.443	32.42	0.535	37.33	0.138	42.25	0.026	47.17	0.003	
3.00	0.000	7.92	0.021	12.83	0.744	17.75	3.693	22.67	2.717	27.58	1.423	32.50	0.525	37.42	0.128	42.33	0.026	47.25	0.003	
3.08	0.000	8.00	0.023	12.92	0.813	17.83	3.697	22.75	2.693	27.67	1.403	32.58	0.515	37.50	0.124	42.42	0.025	47.33	0.003	
3.17	0.000	8.08	0.024	13.00	0.883	17.92	3.700	22.83	2.669	27.75	1.383	32.67	0.505	37.58	0.121	42.50	0.024	47.42	0.003	
3.25	0.000	8.17	0.026	13.08	0.956	18.00	3.701	22.92	2.645	27.83	1.363	32.75	0.495	37.67	0.117	42.58	0.024	47.50	0.003	
3.33	0.000	8.25	0.027	13.17	1.030	18.08	3.701	23.00	2.621	27.92	1.344	32.83	0.486	37.75	0.114	42.67	0.023	47.58	0.002	
3.42	0.000	8.33	0.029	13.25	1.106	18.17	3.699	23.08	2.597	28.00	1.325	32.92	0.476	37.83	0.110	42.75	0.022	47.67	0.002	
3.50	0.000	8.42	0.030	13.33	1.183	18.25	3.697	23.17	2.573	28.08	1.305	33.00	0.467	37.92	0.107	42.83	0.022	47.75	0.002	
3.58	0.000	8.50	0.032	13.42	1.260	18.33	3.693	23.25	2.549	28.17	1.286	33.08	0.458	38.00	0.104	42.92	0.021	47.83	0.002	
3.67	0.000	8.58	0.033	13.50	1.339	18.42	3.689	23.33	2.525	28.25	1.267	33.17	0.449	38.08	0.102	43.00	0.020	47.92	0.002	
3.75	0.000	8.67	0.035	13.58	1.417	18.50	3.683	23.42	2.501	28.33	1.249	33.25	0.440	38.17	0.099	43.08	0.020	48.00	0.002	
3.83	0.000	8.75	0.037	13.67	1.496	18.58	3.677	23.50	2.478	28.42	1.230	33.33	0.431	38.25	0.096	43.17	0.019	48.08	0.002	
3.92	0.000	8.83	0.039	13.75	1.575	18.67	3.669	23.58	2.454	28.50	1.211	33.42	0.423	38.33	0.094	43.25	0.019	48.17	0.002	
4.00	0.000	8.92	0.041	13.83	1.653	18.75	3.660	23.67	2.431	28.58	1.193	33.50	0.414	38.42	0.091	43.33	0.018	48.25	0.001	
4.08	0.000	9.00	0.043	13.92	1.731	18.83	3.651	23.75	2.408	28.67	1.175	33.58	0.406	38.50	0.089	43.42	0.018	48.33	0.001	
4.17	0.000	9.08	0.045	14.00	1.809	18.92	3.641	23.83	2.385	28.75	1.157	33.67	0.398	38.58	0.087	43.50	0.017	48.42	0.001	
4.25	0.000	9.17	0.048	14.08	1.886	19.00	3.630	23.92	2.362	28.83	1.139	33.75	0.390	38.67	0.084	43.58	0.017	48.50	0.001	
4.33	0.000	9.25	0.050	14.17	1.962	19.08	3.618	24.00	2.340	28.92	1.121	33.83	0.382	38.75	0.082	43.67	0.016	48.58	0.001	
4.42	0.000	9.33	0.053	14.25	2.037	19.17	3.605	24.08	2.317	29.00	1.104	33.92	0.374	38.83	0.080	43.75	0.016	48.67	0.001	
4.50	0.000	9.42	0.055	14.33	2.111	19.25	3.592	24.17	2.295	29.08	1.086	34.00	0.367	38.92	0.078	43.83	0.015	48.75	0.001	
4.58	0.000	9.50	0.058	14.42	2.184	19.33	3.578	24.25	2.273	29.17	1.069	34.08	0.359	39.00	0.076	43.92	0.015	48.83	0.001	
4.67	0.000	9.58	0.061	14.50	2.256	19.42	3.563	24.33	2.250	29.25	1.052	34.17	0.352	39.08	0.074	44.00	0.014	48.92	0.001	
4.75	0.001	9.67	0.064	14.58	2.326	19.50	3.548	24.42	2.228	29.33	1.035	34.25	0.345	39.17	0.072	44.08	0.014	49.00	0.000	
4.83	0.001	9.75	0.067	14.67	2.394	19.58	3.532	24.50	2.206	29.42	1.									

VG1 (VG SUMMER)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—●—	H-VG1.100 : VG1	5.00	727.40	9.543	16.917	57.61	4.191E+05	62.417	1.865

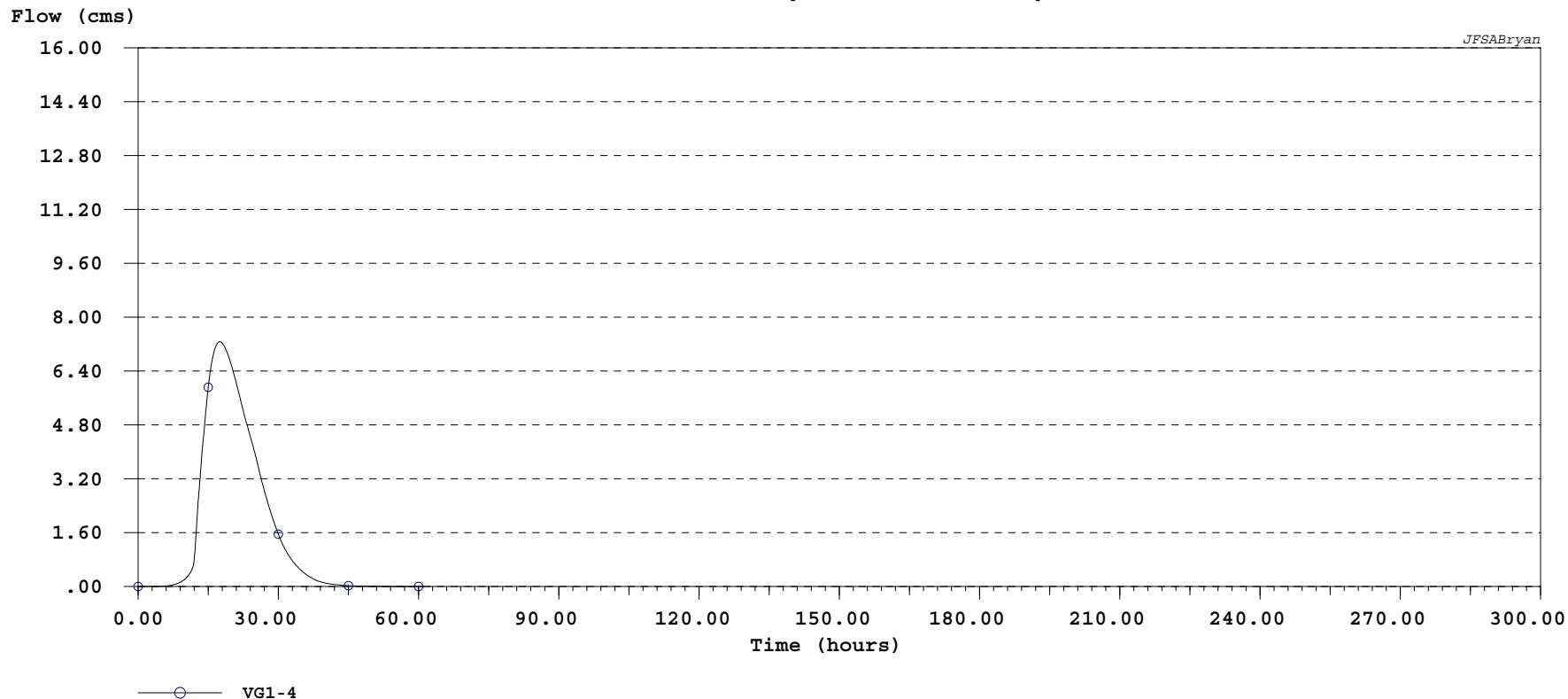
Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM~1\H-VG1.100

Comment in file : VG1

#	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW				
#	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms
0.00	0.000		5.75	0.024	11.50	0.785	17.25	9.514	23.00	6.003	28.75	2.442	34.50	0.564	40.25	0.107	46.00	0.020	51.75	0.003	57.50	0.000																				
0.08	0.000		5.83	0.026	11.58	0.825	17.33	9.496	23.08	5.954	28.83	2.398	34.58	0.551	40.33	0.104	46.08	0.019	51.83	0.003	57.58	0.000																				
0.17	0.000		5.92	0.028	11.67	0.869	17.42	9.480	23.17	5.904	28.92	2.352	34.67	0.539	40.42	0.102	46.17	0.019	51.92	0.003	57.67	0.000																				
0.25	0.000		6.00	0.030	11.75	0.921	17.50	9.459	23.25	5.855	29.00	2.311	34.75	0.526	40.50	0.099	46.25	0.019	52.00	0.003	57.75	0.000																				
0.33	0.000		6.08	0.032	11.83	0.984	17.58	9.432	23.33	5.805	29.08	2.261	34.83	0.514	40.58	0.097	46.33	0.018	52.08	0.003	57.83	0.000																				
0.42	0.000		6.17	0.035	11.92	1.066	17.67	9.403	23.42	5.755	29.17	2.217	34.92	0.502	40.67	0.095	46.42	0.018	52.17	0.003	57.92	0.000																				
0.50	0.000		6.25	0.037	12.00	1.176	17.75	9.374	23.50	5.705	29.25	2.171	35.00	0.491	40.75	0.092	46.50	0.017	52.25	0.003	58.00	0.000																				
0.58	0.000		6.33	0.040	12.08	1.320	17.83	9.343	23.58	5.656	29.33	2.127	35.08	0.480	40.83	0.090	46.58	0.017	52.33	0.002	58.08	0.000																				
0.67	0.000		6.42	0.043	12.17	1.499	17.92	9.309	23.67	5.605	29.42	2.083	35.17	0.469	40.92	0.088	46.67	0.016	52.42	0.002	58.17	0.000																				
0.75	0.000		6.50	0.046	12.25	1.710	18.00	9.273	23.75	5.556	29.50	2.040	35.25	0.459	41.00	0.085	46.75	0.016	52.50	0.002	58.25	0.000																				
0.83	0.000		6.58	0.050	12.33	1.945	18.08	9.234	23.83	5.505	29.58	1.997	35.33	0.449	41.08	0.083	46.83	0.015	52.58	0.002	58.33	0.000																				
0.92	0.000		6.67	0.053	12.42	2.190	18.17	9.193	23.92	5.455	29.67	1.956	35.42	0.440	41.17	0.081	46.92	0.015	52.67	0.002	58.42	0.000																				
1.00	0.000		6.75	0.056	12.50	2.428	18.25	9.151	24.00	5.405	29.75	1.915	35.50	0.430	41.25	0.079	47.00	0.014	52.75	0.002	58.50	0.000																				
1.08	0.000		6.83	0.060	12.58	2.667	18.33	9.106	24.08	5.355	29.83	1.875	35.58	0.421	41.33	0.078	47.08	0.014	52.83	0.002	58.58	0.000																				
1.17	0.000		6.92	0.064	12.67	2.903	18.42	9.061	24.17	5.305	29.92	1.836	35.67	0.412	41.42	0.076	47.17	0.014	52.92	0.002	58.67	0.000																				
1.25	0.000		7.00	0.068	12.75	3.131	18.50	9.015	24.25	5.255	30.00	1.797	35.75	0.402	41.50	0.074	47.25	0.013	53.00	0.002	58.75	0.000																				
1.33	0.000		7.08	0.072	12.83	3.363	18.58	8.967	24.33	5.206	30.08	1.759	35.83	0.393	41.58	0.073	47.33	0.013	53.08	0.002	58.83	0.000																				
1.42	0.000		7.17	0.076	12.92	3.599	18.67	8.918	24.42	5.156	30.17	1.718	35.92	0.383	41.67	0.071	47.42	0.012	53.17	0.002	58.92	0.000																				
1.50	0.000		7.25	0.081	13.00	3.837	18.75	8.868	24.50	5.107	30.25	1.675	36.00	0.374	41.75	0.069	47.50	0.012	53.25	0.002	59.00	0.000																				
1.58	0.000		7.33	0.085	13.08	4.071	18.83	8.817	24.58	5.057	30.33	1.634	36.08	0.365	41.83	0.068	47.58	0.012	53.33	0.002	59.08	0.000																				
1.67	0.000		7.42	0.090	13.17	4.296	18.92	8.765	24.67	5.007	30.42	1.594	36.17	0.357	41.92	0.067	47.67	0.011	53.42	0.002	59.17	0.000																				
1.75	0.000		7.50	0.095	13.25	4.517	19.00	8.716	24.75	4.956	30.50	1.553	36.25	0.349	42.00	0.065	47.75	0.011	53.50	0.002	59.25	0.000																				
1.83	0.000		7.58	0.100	13.33	4.734	19.08	8.665	24.83	4.906	30.58	1.512	36.33	0.341	42.08	0.064	47.83	0.011	53.58	0.002	59.33	0.000																				
1.92	0.000		7.67	0.106	13.42	4.947	19.17	8.610	24.92	4.854	30.67	1.475	36.42	0.333	42.17	0.063	47.92	0.010	53.67	0.002	59.42	0.000																				
2.00	0.000		7.75	0.111	13.50	5.161	19.25	8.553	25.00	4.803	30.75	1.440	36.50	0.325	42.25	0.061	48.00	0.010	53.75	0.001	59.50	0.000																				
2.08	0.000		7.83	0.117	13.58	5.378	19.33	8.501	25.08	4.751	30.83	1.407	36.58	0.318	42.33	0.060	48.08	0.010	53.83	0.001	59.58	0.000																				
2.17	0.000		7.92	0.122	13.67	5.592	19.42	8.447	25.17	4.699	30.92	1.376	36.67	0.310	42.42	0.059	48.17	0.010	53.92	0.001	59.67	0.000																				
2.25	0.000		8.00	0.129	13.75	5.799	19.50	8.389	25.25	4.647	31.00	1.346	36.75	0.303	42.50	0.057	48.25	0.009	54.00	0.001	59.75	0.000																				
2.33	0.000		8.08	0.135	13.83	5.990	19.58	8.334	25.33	4.594	31.08	1.317	36.83	0.296	42.58	0.056	48.33	0.009	54.08	0.001	59.83	0.000																				
2.42	0.000		8.17	0.142	13.92	6.176	19.67	8.278	25.42	4.541	31.17	1.288	36.92	0.290	42.67	0.055	48.42	0.009	54.17	0.001	59.92	0.000																				
2.50	0.000		8.25	0.149	14.00	6.357	19.75	8.218	25.50	4.489	31.25	1.260	37.00	0.283	42.75	0.054	48.50	0.009	54.25	0.001	60.00	0.000																				
2.58	0.000		8.33	0.156	14.08	6.528	19.83	8.162	25.58	4.437	31.33	1.234	37.08	0.277	42.83	0.053	48.58	0.008	54.33	0.001	60.08	0.000																				
2.67	0.000		8.42	0.164	14.17	6.693	19.92	8.106	25.67	4.382	31.42	1.208	37.17	0.271	42.92	0.052	48.67	0.008	54.42	0.001	60.17	0.000																				
2.75	0.000		8.50	0.171	14.25	6.859	20.00	8.045	25.75	4.327	31.50	1.183	37.25	0.264	43.00	0.050	48.75	0.008	54.50	0.001	60.25	0.000																				
2.83	0.000		8.58	0.179	14.33	7.025	20.08	7.989	25.83	4.271	31.58	1.159	37.33	0.258	43.08	0.049	48.83	0.008	54.58	0.001	60.33	0.000																				
2.92	0.000		8.67	0.187	14.42	7.183	20.17	7.931	25.92	4.215	31.67	1.135	37.42	0.250	43.17	0.048	48.92	0.008	54.67	0.001	60.42	0.000																				
3.00	0.000		8.75	0.195	14.50	7.334	20.25	7.872	26.00	4.157	31.75	1.113	37.50	0.243	43.25	0.047	49.00	0.007	54.75	0.001	60.50	0.000																				
3.08	0.000		8.83	0.203	14.58	7.480	20.33	7.814	26.08	4.104	31.83	1.090	37.58	0.235	43.33	0.046	49.08	0.007	54.83	0.001	60.58	0.000																				
3.17	0.000		8.92	0.212	14.67	7.618	20.42	7.754	26.17	4.049	31.92	1.069	37.67	0.229	43.42	0.045	49.17	0.007	54.92	0.001	60.67	0.000																				
3.25	0.000		9.00	0.221	14.75	7.755	20.50	7.695	26.25	3.996	32.00	1.047	37.75	0.222	43.50	0.043	49.25	0.007	55.00	0.001	60.75	0.000																				
3.33	0.001		9.08	0.231	14.83	7.892	20.58	7.636	26.33	3.942	32.08	1.026	37.83	0.216	43.58	0.042	49.33	0.007	55.08	0.001	60.83	0.000																				
3.42	0.001		9.17	0.241	14.92	8.025	20.67	7.576	26.42	3.887	32.17	1.006	37.92	0.211	43.67	0.041	49.42	0.007	55.17	0.001	60.92	0.000																				
3.50	0.001		9.25	0.251	15.00	8.149	20.75	7.516	26.50	3.831	32.25	0.985	38.00	0.205	43.75	0.040	49.50	0.006	55.25	0.001	61.00	0.000																				
3.58	0.001		9.33	0.262	15.08	8.265	20.83	7.456	26.58	3.775	32.33	0.965	38.08	0.200	43.83	0.039	49.58	0.006	55.33	0.001	61.08	0.000																				
3.67	0.001		9.42	0.273	15.17	8.375	20.92	7.396	26.67	3.719	32.42	0.945	38.17	0.195	43.92	0.038	49.67	0.006	55.42	0.001	61.17	0.000																				
3.75	0.002		9.50	0.284	15.25	8.478	21.00	7.335	26.75	3.661	32.50	0.926	38.25	0.190	44.00	0.037	49.75	0.006	55.50	0.001	61.25	0.000																				
3.83	0.002		9.58	0.296	15.33	8.574	21.08	7.275	26.83	3.603	32.58	0.908	38.33	0.185	44.08	0.036	49.83	0.006	55.58	0.001	61.33	0.000																				
3.92	0.002		9.67	0.309	15.42	8.664	21.17	7.215	26.92	3.545	32.67	0.890	38.42	0.180	44.17	0.035	49.92	0.006	55.67	0.001	61.42	0.000																				
4.00	0.002		9.75	0.321	15.50	8.764	21.25	7.154	27.00	3.486	32.75	0.872	38.50	0.176	44.25	0.034	50.00	0.005	55.75	0.001	61.50	0.000																				
4.08	0.003		9.83	0.334	15.58	8.869	21.33	7.094	27.08	3.431	32.83	0.854	38.58	0.172	44.33	0.033	50.08	0.005	55.83	0.001	61.58	0.000																				
4.17	0.003		9.92	0.348	15.67	8.964	21.42	7.033	27.17	3.377	32.92	0.837	38.67	0.168	44.42	0.032	50.17	0.005	55.92	0.001	61.67	0.000																				
4.25																																										

VG1-4 (VG SUMMER)



Hydrograph Statistics:

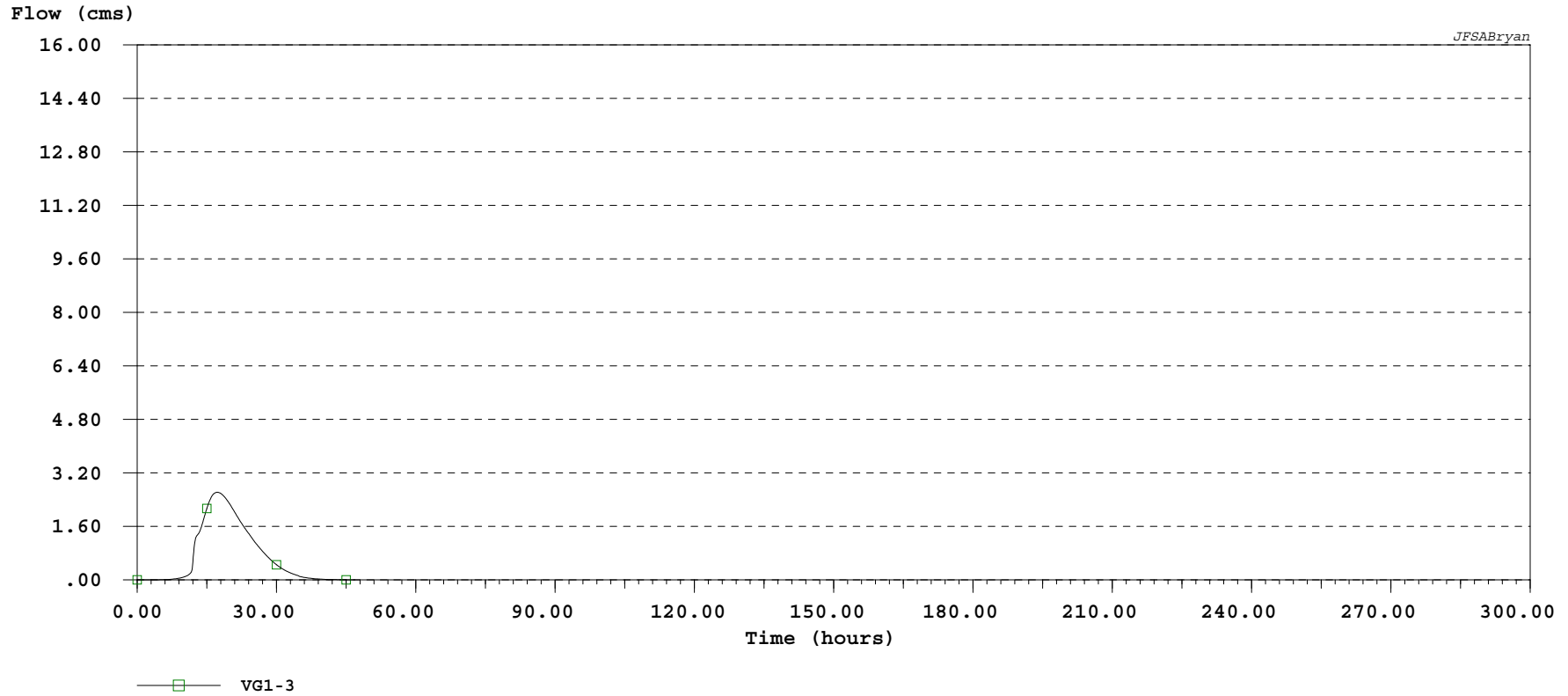
Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—○—	H-VG1-4.100 : VG1-4	5.00	609.70	7.272	17.500	54.34	3.313E+05	61.083	1.507

Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-4.100
 Comment in file : VG1-4

#	TIME hrs	FLOW # cms #	TIME hrs	FLOW # cms #	TIME hrs	FLOW # cms #	TIME hrs	FLOW # cms #	TIME hrs	FLOW # cms #	TIME hrs	FLOW # cms #	TIME hrs	FLOW # cms #	TIME hrs	FLOW # cms #	TIME hrs	FLOW # cms #	TIME hrs	FLOW # cms #	TIME hrs	FLOW # cms #
0.00	0.000		5.58	0.008	11.17	0.414	16.75	7.175	22.33	5.304	27.92	2.406	33.50	0.679	39.08	0.138	44.67	0.026	50.25	0.004	55.83	0.000
0.08	0.000		5.67	0.009	11.25	0.434	16.83	7.192	22.42	5.257	28.00	2.369	33.58	0.666	39.17	0.135	44.75	0.025	50.33	0.004	55.92	0.000
0.17	0.000		5.75	0.010	11.33	0.456	16.92	7.213	22.50	5.210	28.08	2.331	33.67	0.652	39.25	0.132	44.83	0.025	50.42	0.003	56.00	0.000
0.25	0.000		5.83	0.011	11.42	0.479	17.00	7.230	22.58	5.163	28.17	2.293	33.75	0.639	39.33	0.129	44.92	0.024	50.50	0.003	56.08	0.000
0.33	0.000		5.92	0.012	11.50	0.504	17.08	7.244	22.67	5.117	28.25	2.256	33.83	0.626	39.42	0.125	45.00	0.023	50.58	0.003	56.17	0.000
0.42	0.000		6.00	0.013	11.58	0.532	17.17	7.255	22.75	5.070	28.33	2.219	33.92	0.613	39.50	0.122	45.08	0.023	50.67	0.003	56.25	0.000
0.50	0.000		6.08	0.014	11.67	0.563	17.25	7.264	22.83	5.025	28.42	2.183	34.00	0.601	39.58	0.119	45.17	0.022	50.75	0.003	56.33	0.000
0.58	0.000		6.17	0.015	11.75	0.600	17.33	7.269	22.92	4.985	28.50	2.147	34.08	0.588	39.67	0.116	45.25	0.022	50.83	0.003	56.42	0.000
0.67	0.000		6.25	0.017	11.83	0.648	17.42	7.272	23.00	4.946	28.58	2.112	34.17	0.576	39.75	0.113	45.33	0.021	50.92	0.003	56.50	0.000
0.75	0.000		6.33	0.018	11.92	0.712	<u>17.50</u>	<u>7.272</u>	23.08	4.906	28.67	2.077	34.25	0.563	39.83	0.110	45.42	0.021	51.00	0.003	56.58	0.000
0.83	0.000		6.42	0.020	12.00	0.800	17.58	7.270	23.17	4.866	28.75	2.042	34.33	0.551	39.92	0.108	45.50	0.020	51.08	0.003	56.67	0.000
0.92	0.000		6.50	0.021	12.08	0.921	17.67	7.265	23.25	4.825	28.83	2.007	34.42	0.539	40.00	0.105	45.58	0.019	51.17	0.003	56.75	0.000
1.00	0.000		6.58	0.023	12.17	1.071	17.75	7.258	23.33	4.784	28.92	1.973	34.50	0.528	40.08	0.103	45.67	0.019	51.25	0.002	56.83	0.000
1.08	0.000		6.67	0.025	12.25	1.239	17.83	7.250	23.42	4.742	29.00	1.939	34.58	0.516	40.17	0.100	45.75	0.018	51.33	0.002	56.92	0.000
1.17	0.000		6.75	0.028	12.33	1.419	17.92	7.239	23.50	4.700	29.08	1.905	34.67	0.504	40.25	0.098	45.83	0.018	51.42	0.002	57.00	0.000
1.25	0.000		6.83	0.030	12.42	1.605	18.00	7.226	23.58	4.658	29.17	1.871	34.75	0.493	40.33	0.095	45.92	0.018	51.50	0.002	57.08	0.000
1.33	0.000		6.92	0.032	12.50	1.790	18.08	7.211	23.67	4.616	29.25	1.836	34.83	0.482	40.42	0.093	46.00	0.017	51.58	0.002	57.17	0.000
1.42	0.000		7.00	0.034	12.58	1.975	18.17	7.195	23.75	4.574	29.33	1.802	34.92	0.470	40.50	0.090	46.08	0.017	51.67	0.002	57.25	0.000
1.50	0.000		7.08	0.036	12.67	2.157	18.25	7.177	23.83	4.532	29.42	1.769	35.00	0.459	40.58	0.088	46.17	0.016	51.75	0.002	57.33	0.000
1.58	0.000		7.17	0.038	12.75	2.333	18.33	7.157	23.92	4.490	29.50	1.737	35.08	0.450	40.67	0.086	46.25	0.016	51.83	0.002	57.42	0.000
1.67	0.000		7.25	0.041	12.83	2.505	18.42	7.141	24.00	4.448	29.58	1.705	35.17	0.440	40.75	0.084	46.33	0.015	51.92	0.002	57.50	0.000
1.75	0.000		7.33	0.043	12.92	2.666	18.50	7.124	24.08	4.406	29.67	1.674	35.25	0.431	40.83	0.082	46.42	0.015	52.00	0.002	57.58	0.000
1.83	0.000		7.42	0.046	13.00	2.802	18.58	7.099	24.17	4.371	29.75	1.644	35.33	0.422	40.92	0.080	46.50	0.015	52.08	0.002	57.67	0.000
1.92	0.000		7.50	0.049	13.08	2.927	18.67	7.072	24.25	4.330	29.83	1.613	35.42	0.412	41.00	0.078	46.58	0.014	52.17	0.002	57.75	0.000
2.00	0.000		7.58	0.053	13.17	3.070	18.75	7.049	24.33	4.290	29.92	1.583	35.50	0.403	41.08	0.077	46.67	0.014	52.25	0.002	57.83	0.000
2.08	0.000		7.67	0.056	13.25	3.226	18.83	7.026	24.42	4.249	30.00	1.553	35.58	0.394	41.17	0.075	46.75	0.013	52.33	0.002	57.92	0.000
2.17	0.000		7.75	0.059	13.33	3.379	18.92	6.994	24.50	4.207	30.08	1.524	35.67	0.385	41.25	0.073	46.83	0.013	52.42	0.002	58.00	0.000
2.25	0.000		7.83	0.062	13.42	3.532	19.00	6.967	24.58	4.165	30.17	1.494	35.75	0.376	41.33	0.072	46.92	0.013	52.50	0.002	58.08	0.000
2.33	0.000		7.92	0.066	13.50	3.683	19.08	6.939	24.67	4.123	30.25	1.464	35.83	0.367	41.42	0.070	47.00	0.012	52.58	0.001	58.17	0.000
2.42	0.000		8.00	0.069	13.58	3.830	19.17	6.904	24.75	4.080	30.33	1.435	35.92	0.358	41.50	0.068	47.08	0.012	52.67	0.001	58.25	0.000
2.50	0.000		8.08	0.073	13.67	3.974	19.25	6.874	24.83	4.037	30.42	1.407	36.00	0.350	41.58	0.067	47.17	0.012	52.75	0.001	58.33	0.000
2.58	0.000		8.17	0.077	13.75	4.107	19.33	6.843	24.92	3.994	30.50	1.380	36.08	0.342	41.67	0.065	47.25	0.011	52.83	0.001	58.42	0.000
2.67	0.000		8.25	0.082	13.83	4.228	19.42	6.805	25.00	3.951	30.58	1.353	36.17	0.334	41.75	0.064	47.33	0.011	52.92	0.001	58.50	0.000
2.75	0.000		8.33	0.087	13.92	4.343	19.50	6.773	25.08	3.908	30.67	1.326	36.25	0.327	41.83	0.063	47.42	0.011	53.00	0.001	58.58	0.000
2.83	0.000		8.42	0.091	14.00	4.458	19.58	6.739	25.17	3.865	30.75	1.298	36.33	0.319	41.92	0.061	47.50	0.010	53.08	0.001	58.67	0.000
2.92	0.000		8.50	0.095	14.08	4.573	19.67	6.698	25.25	3.822	30.83	1.272	36.42	0.311	42.00	0.060	47.58	0.010	53.17	0.001	58.75	0.000
3.00	0.000		8.58	0.099	14.17	4.703	19.75	6.664	25.33	3.774	30.92	1.247	36.50	0.304	42.08	0.059	47.67	0.010	53.25	0.001	58.83	0.000
3.08	0.000		8.67	0.104	14.25	4.846	19.83	6.629	25.42	3.727	31.00	1.223	36.58	0.296	42.17	0.057	47.75	0.010	53.33	0.001	58.92	0.000
3.17	0.000		8.75	0.109	14.33	4.980	19.92	6.586	25.50	3.673	31.08	1.199	36.67	0.290	42.25	0.056	47.83	0.009	53.42	0.001	59.00	0.000
3.25	0.000		8.83	0.114	14.42	5.112	20.00	6.550	25.58	3.625	31.17	1.176	36.75	0.283	42.33	0.055	47.92	0.009	53.50	0.001	59.08	0.000
3.33	0.000		8.92	0.120	14.50	5.239	20.08	6.513	25.67	3.575	31.25	1.154	36.83	0.277	42.42	0.054	48.00	0.009	53.58	0.001	59.17	0.000
3.42	0.000		9.00	0.126	14.58	5.362	20.17	6.467	25.75	3.526	31.33	1.132	36.92	0.270	42.50	0.052	48.08	0.008	53.67	0.001	59.25	0.000
3.50	0.000		9.08	0.132	14.67	5.480	20.25	6.429	25.83	3.477	31.42	1.110	37.00	0.264	42.58	0.051	48.17	0.008	53.75	0.001	59.33	0.000
3.58	0.000		9.17	0.138	14.75	5.595	20.33	6.390	25.92	3.429	31.50	1.089	37.08	0.258	42.67	0.050	48.25	0.008	53.83	0.001	59.42	0.000
3.67	0.000		9.25	0.144	14.83	5.705	20.42	6.344	26.00	3.380	31.58	1.069	37.17	0.252	42.75	0.049	48.33	0.008	53.92	0.001	59.50	0.000
3.75	0.000		9.33	0.150	14.92	5.811	20.50	6.304	26.08	3.333	31.67	1.048	37.25	0.246	42.83	0.048	48.42	0.008	54.00	0.001	59.58	0.000
3.83	0.000		9.42	0.158	15.00	5.915	20.58	6.263	26.17	3.286	31.75	1.028	37.33	0.239	42.92	0.046	48.50	0.007	54.08	0.001	59.67	0.000
3.92	0.001		9.50	0.165	15.08	6.016	20.67	6.219	26.25	3.239	31.83	1.007	37.42	0.230	43.00	0.045	48.58	0.007	54.17	0.001	59.75	0.000
4.00	0.001		9.58	0.173	15.17	6.113	20.75	6.174	26.33	3.193	31.92	0.988	37.50	0.223	43.08	0.044	48.67	0.007	54.25	0.001	59.83	0.000
4.08	0.001		9.67	0.181	15.25	6.205	20.83	6.130	26.42	3.148	32.00	0.968	37.58	0.216	43.17	0.043	48.75	0.007	54.33	0.001	59.92	0.000
4.17	0.001		9.75	0.190	15.33	6.292	20.92	6.085	26.50	3.103	32.08	0.950	37.67	0.210	43.25	0.042	48.83	0.006	54.42	0.001	60.00	0.000
4.25	0.001		9.83	0.198	15.42	6.374	21.00	6.040	26.58	3.059	32.17	0.932	37.75	0.205	43.33	0.040	48.92	0.006	54.50	0.001	60.08	0.000
4.33	0.001		9.92	0.207	15.50	6.453	21.08	5.995	26.67	3.015	32.25	0.914										

VG1-3 (VG SUMMER)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—□—	H-VG1-3.100 : VG1-3	5.00	225.20	2.619	17.250	50.17	1.130E+05	46.917	0.669

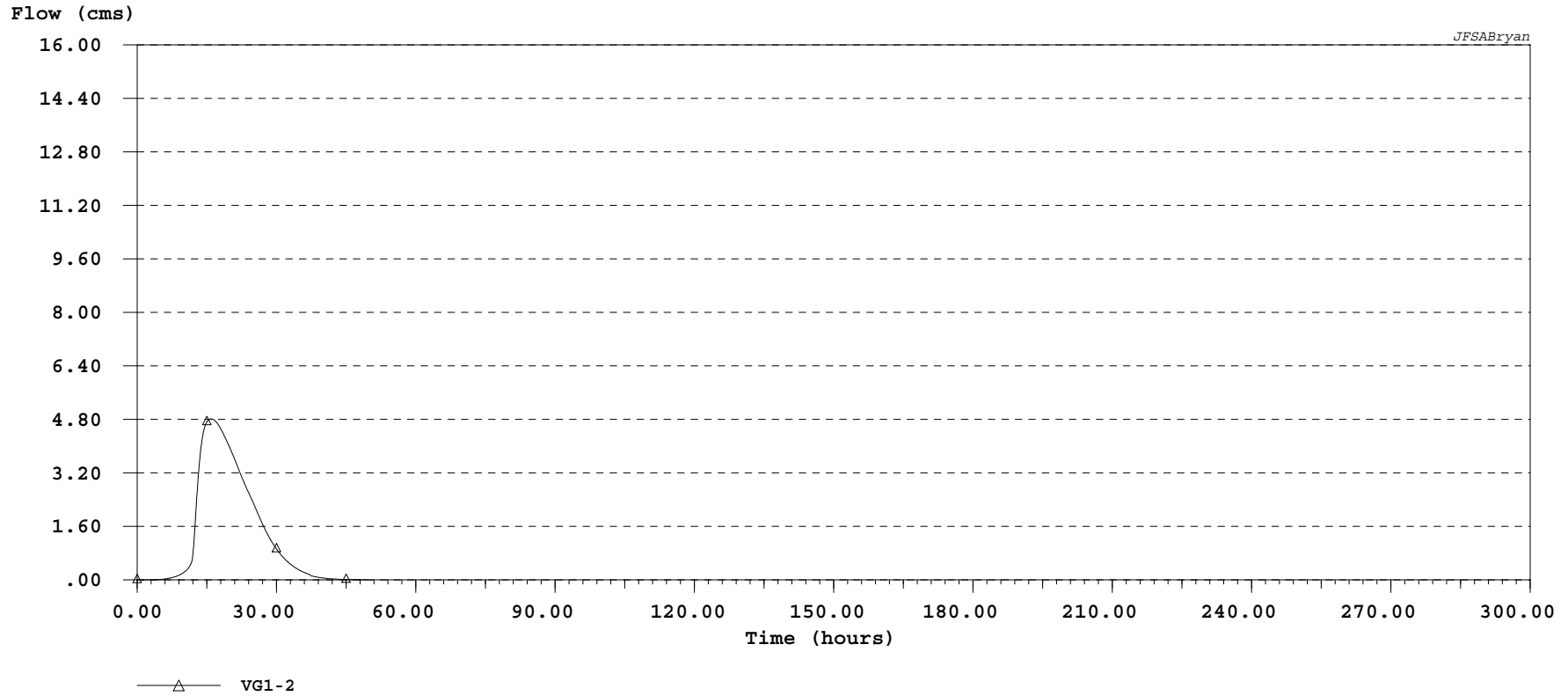
Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-3.100

Comment in file : VG1-3

#	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #
#	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #
0.00	0.000		4.92	0.002	9.83	0.076	14.75	2.025	19.67	2.322	24.58	1.277	29.50	0.509	34.42	0.138	39.33	0.023	44.25	0.003
0.08	0.000		5.00	0.002	9.92	0.080	14.83	2.064	19.75	2.305	24.67	1.260	29.58	0.499	34.50	0.134	39.42	0.023	44.33	0.003
0.17	0.000		5.08	0.003	10.00	0.083	14.92	2.101	19.83	2.288	24.75	1.243	29.67	0.490	34.58	0.130	39.50	0.022	44.42	0.003
0.25	0.000		5.17	0.003	10.08	0.087	15.00	2.138	19.92	2.271	24.83	1.227	29.75	0.480	34.67	0.125	39.58	0.021	44.50	0.002
0.33	0.000		5.25	0.003	10.17	0.091	15.08	2.173	20.00	2.253	24.92	1.210	29.83	0.471	34.75	0.120	39.67	0.021	44.58	0.002
0.42	0.000		5.33	0.004	10.25	0.095	15.17	2.208	20.08	2.236	25.00	1.194	29.92	0.462	34.83	0.113	39.75	0.020	44.67	0.002
0.50	0.000		5.42	0.004	10.33	0.099	15.25	2.241	20.17	2.218	25.08	1.178	30.00	0.453	34.92	0.106	39.83	0.019	44.75	0.002
0.58	0.000		5.50	0.004	10.42	0.104	15.33	2.274	20.25	2.199	25.17	1.163	30.08	0.444	35.00	0.103	39.92	0.019	44.83	0.002
0.67	0.000		5.58	0.005	10.50	0.108	15.42	2.304	20.33	2.180	25.25	1.147	30.17	0.435	35.08	0.100	40.00	0.018	44.92	0.002
0.75	0.000		5.67	0.005	10.58	0.114	15.50	2.334	20.42	2.161	25.33	1.132	30.25	0.427	35.17	0.097	40.08	0.018	45.00	0.002
0.83	0.000		5.75	0.005	10.67	0.119	15.58	2.362	20.50	2.142	25.42	1.117	30.33	0.418	35.25	0.094	40.17	0.017	45.08	0.002
0.92	0.000		5.83	0.006	10.75	0.125	15.67	2.389	20.58	2.122	25.50	1.103	30.42	0.410	35.33	0.091	40.25	0.017	45.17	0.002
1.00	0.000		5.92	0.006	10.83	0.131	15.75	2.415	20.67	2.102	25.58	1.088	30.50	0.401	35.42	0.089	40.33	0.016	45.25	0.001
1.08	0.000		6.00	0.007	10.92	0.138	15.83	2.440	20.75	2.083	25.67	1.073	30.58	0.393	35.50	0.086	40.42	0.016	45.33	0.001
1.17	0.000		6.08	0.007	11.00	0.145	15.92	2.463	20.83	2.063	25.75	1.059	30.67	0.385	35.58	0.084	40.50	0.015	45.42	0.001
1.25	0.000		6.17	0.008	11.08	0.153	16.00	2.485	20.92	2.043	25.83	1.045	30.75	0.377	35.67	0.082	40.58	0.015	45.50	0.001
1.33	0.000		6.25	0.008	11.17	0.162	16.08	2.505	21.00	2.024	25.92	1.031	30.83	0.369	35.75	0.079	40.67	0.014	45.58	0.001
1.42	0.000		6.33	0.009	11.25	0.171	16.17	2.523	21.08	2.004	26.00	1.017	30.92	0.362	35.83	0.077	40.75	0.014	45.67	0.001
1.50	0.000		6.42	0.010	11.33	0.182	16.25	2.539	21.17	1.985	26.08	1.003	31.00	0.354	35.92	0.075	40.83	0.013	45.75	0.001
1.58	0.000		6.50	0.010	11.42	0.193	16.33	2.553	21.25	1.965	26.17	0.989	31.08	0.347	36.00	0.073	40.92	0.013	45.83	0.001
1.67	0.000		6.58	0.011	11.50	0.205	16.42	2.566	21.33	1.946	26.25	0.975	31.17	0.340	36.08	0.071	41.00	0.013	45.92	0.001
1.75	0.000		6.67	0.011	11.58	0.220	16.50	2.577	21.42	1.927	26.33	0.962	31.25	0.332	36.17	0.069	41.08	0.012	46.00	0.001
1.83	0.000		6.75	0.012	11.67	0.241	16.58	2.586	21.50	1.908	26.42	0.948	31.33	0.325	36.25	0.067	41.17	0.012	46.08	0.001
1.92	0.000		6.83	0.013	11.75	0.274	16.67	2.594	21.58	1.889	26.50	0.934	31.42	0.319	36.33	0.065	41.25	0.011	46.17	0.001
2.00	0.000		6.92	0.014	11.83	0.328	16.75	2.601	21.67	1.870	26.58	0.921	31.50	0.312	36.42	0.063	41.33	0.011	46.25	0.001
2.08	0.000		7.00	0.015	11.92	0.413	16.83	2.607	21.75	1.851	26.67	0.908	31.58	0.305	36.50	0.062	41.42	0.011	46.33	0.000
2.17	0.000		7.08	0.015	12.00	0.538	16.92	2.612	21.83	1.832	26.75	0.894	31.67	0.298	36.58	0.060	41.50	0.010	46.42	0.000
2.25	0.000		7.17	0.016	12.08	0.686	17.00	2.615	21.92	1.814	26.83	0.881	31.75	0.292	36.67	0.058	41.58	0.010	46.50	0.000
2.33	0.000		7.25	0.017	12.17	0.828	17.08	2.617	22.00	1.795	26.92	0.868	31.83	0.286	36.75	0.057	41.67	0.010	46.58	0.000
2.42	0.000		7.33	0.018	12.25	0.952	17.17	2.619	22.08	1.777	27.00	0.855	31.92	0.279	36.83	0.055	41.75	0.009	46.67	0.000
2.50	0.000		7.42	0.019	12.33	1.054	17.25	2.619	22.17	1.758	27.08	0.842	32.00	0.273	36.92	0.054	41.83	0.009	46.75	0.000
2.58	0.000		7.50	0.020	12.42	1.135	17.33	2.619	22.25	1.740	27.17	0.829	32.08	0.267	37.00	0.052	41.92	0.009	46.83	0.000
2.67	0.000		7.58	0.021	12.50	1.198	17.42	2.618	22.33	1.722	27.25	0.816	32.17	0.261	37.08	0.051	42.00	0.008	46.92	0.000
2.75	0.000		7.67	0.023	12.58	1.245	17.50	2.615	22.42	1.704	27.33	0.803	32.25	0.256	37.17	0.050	42.08	0.008	47.00	0.000
2.83	0.000		7.75	0.024	12.67	1.279	17.58	2.612	22.50	1.686	27.42	0.791	32.33	0.250	37.25	0.048	42.17	0.008	47.08	0.000
2.92	0.000		7.83	0.025	12.75	1.303	17.67	2.608	22.58	1.669	27.50	0.778	32.42	0.244	37.33	0.047	42.25	0.007	47.17	0.000
3.00	0.000		7.92	0.026	12.83	1.321	17.75	2.603	22.67	1.651	27.58	0.766	32.50	0.239	37.42	0.046	42.33	0.007	47.25	0.000
3.08	0.000		8.00	0.028	12.92	1.335	17.83	2.598	22.75	1.633	27.67	0.753	32.58	0.234	37.50	0.044	42.42	0.007	47.33	0.000
3.17	0.000		8.08	0.029	13.00	1.348	17.92	2.591	22.83	1.616	27.75	0.741	32.67	0.228	37.58	0.043	42.50	0.007	47.42	0.000
3.25	0.000		8.17	0.031	13.08	1.361	18.00	2.584	22.92	1.599	27.83	0.729	32.75	0.223	37.67	0.042	42.58	0.006	47.50	0.000
3.33	0.000		8.25	0.032	13.17	1.376	18.08	2.576	23.00	1.582	27.92	0.717	32.83	0.218	37.75	0.041	42.67	0.006	47.58	0.000
3.42	0.000		8.33	0.034	13.25	1.392	18.17	2.568	23.08	1.565	28.00	0.705	32.92	0.213	37.83	0.040	42.75	0.006	47.67	0.000
3.50	0.000		8.42	0.035	13.33	1.412	18.25	2.558	23.17	1.548	28.08	0.693	33.00	0.208	37.92	0.038	42.83	0.006	47.75	0.000
3.58	0.000		8.50	0.037	13.42	1.434	18.33	2.548	23.25	1.532	28.17	0.681	33.08	0.203	38.00	0.037	42.92	0.005	47.83	0.000
3.67	0.000		8.58	0.039	13.50	1.459	18.42	2.538	23.33	1.515	28.25	0.670	33.17	0.199	38.08	0.036	43.00	0.005	47.92	0.000
3.75	0.000		8.67	0.041	13.58	1.488	18.50	2.527	23.42	1.499	28.33	0.658	33.25	0.194	38.17	0.035	43.08	0.005	48.00	0.000
3.83	0.000		8.75	0.043	13.67	1.519	18.58	2.515	23.50	1.483	28.42	0.647	33.33	0.190	38.25	0.034	43.17	0.005	48.08	0.000
3.92	0.000		8.83	0.045	13.75	1.552	18.67	2.503	23.58	1.467	28.50	0.635	33.42	0.185	38.33	0.033	43.25	0.005	48.17	0.000
4.00	0.000		8.92	0.047	13.83	1.588	18.75	2.490	23.67	1.451	28.58	0.624	33.50	0.181	38.42	0.032	43.33	0.004	48.25	0.000
4.08	0.000		9.00	0.049	13.92	1.625	18.83	2.476	23.75	1.435	28.67	0.613	33.58	0.176	38.50	0.031	43.42	0.004	48.33	0.000
4.17	0.001		9.08	0.051	14.00	1.664	18.92	2.463	23.83	1.420	28.75	0.602	33.67	0.172	38.58	0.030	43.50	0.004	48.42	0.000
4.25	0.001		9.17	0.054	14.08	1.704	19.00	2.448	23.92	1.405	28.83	0.591	33.75	0.168	38.67	0.029	43.58	0.004	48.50	0.000
4.33	0.001		9.25	0.056	14.17	1.744	19.08	2.434	24.00	1.390	28.92	0.581	33.83	0.164	38.75	0.029	43.67	0.004	48.58	0.000
4.42	0.001		9.33	0.059	14.25	1.785	19.17	2.419	24.08	1.375	29.00	0.570	33.92	0.160	38.83	0.028	43.75	0.004	48.67	0.000
4.50	0.001		9.42	0.061	14.33	1.826	19.25	2.404	24.17	1.359	29.08	0.559	34.00	0.156	38.92	0.027	43.83	0.004	48.75	0.000
4.58	0.001		9.50	0.064	14.42	1.866	19.33	2.388	24.25	1.343	29.17	0.549	34.08	0.152	39.00	0.026	43.92	0.003	48.83	0.000
4.67	0.001		9.58	0.067	14.50	1.907	19.42	2.372	24.33	1.327	29.25	0.539	34.17	0.149	39.08	0.025	44.00	0.003	48.92	0.000
4.75	0.002		9.67	0.070	1															

VG1-2 (VG SUMMER)



Hydrograph Statistics:

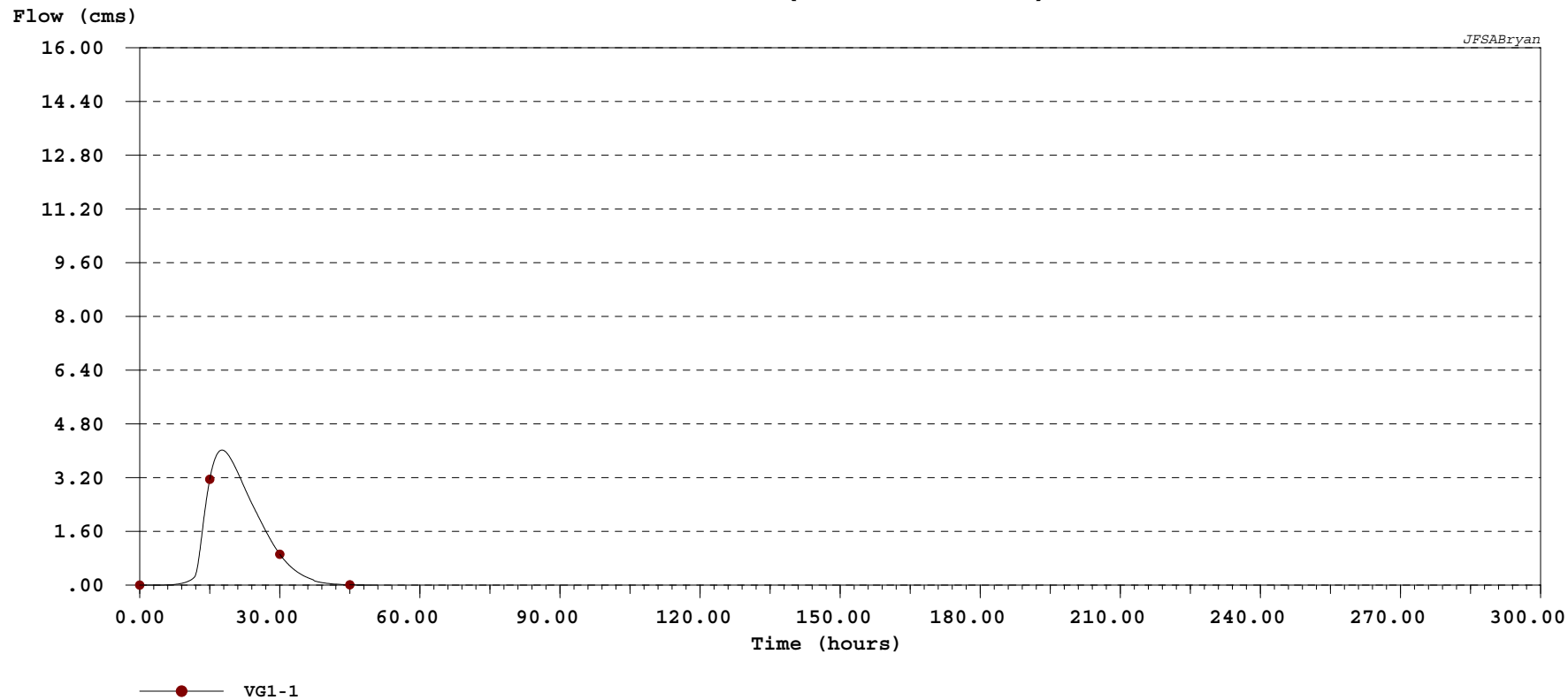
Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—△—	H-VG1-2.100 : VG1-2	5.00	384.50	4.814	15.917	56.78	2.183E+05	49.417	1.227

Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM~1\H-VG1-2.100
 Comment in file : VG1-2

#	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #
#	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #
	0.00	0.000	4.92	0.011	9.83	0.203	14.75	4.655	19.67	4.038	24.58	2.433	29.50	1.027	34.42	0.332	39.33	0.068	44.25	0.013
	0.08	0.000	5.00	0.012	9.92	0.211	14.83	4.682	19.75	4.012	24.67	2.408	29.58	1.009	34.50	0.325	39.42	0.067	44.33	0.012
	0.17	0.000	5.08	0.013	10.00	0.219	14.92	4.705	19.83	3.986	24.75	2.382	29.67	0.992	34.58	0.318	39.50	0.065	44.42	0.012
	0.25	0.000	5.17	0.014	10.08	0.227	15.00	4.726	19.92	3.960	24.83	2.356	29.75	0.975	34.67	0.311	39.58	0.063	44.50	0.012
	0.33	0.000	5.25	0.015	10.17	0.235	15.08	4.744	20.00	3.934	24.92	2.330	29.83	0.958	34.75	0.305	39.67	0.062	44.58	0.011
	0.42	0.000	5.33	0.017	10.25	0.244	15.17	4.759	20.08	3.908	25.00	2.304	29.92	0.941	34.83	0.298	39.75	0.060	44.67	0.011
	0.50	0.000	5.42	0.018	10.33	0.254	15.25	4.772	20.17	3.881	25.08	2.277	30.00	0.925	34.92	0.292	39.83	0.059	44.75	0.010
	0.58	0.000	5.50	0.019	10.42	0.263	15.33	4.783	20.25	3.855	25.17	2.250	30.08	0.908	35.00	0.286	39.92	0.057	44.83	0.010
	0.67	0.000	5.58	0.020	10.50	0.274	15.42	4.792	20.33	3.828	25.25	2.223	30.17	0.892	35.08	0.280	40.00	0.056	44.92	0.010
	0.75	0.000	5.67	0.022	10.58	0.284	15.50	4.799	20.42	3.801	25.33	2.196	30.25	0.877	35.17	0.274	40.08	0.054	45.00	0.009
	0.83	0.000	5.75	0.023	10.67	0.296	15.58	4.804	20.50	3.774	25.42	2.169	30.33	0.861	35.25	0.268	40.17	0.053	45.08	0.009
	0.92	0.000	5.83	0.025	10.75	0.308	15.67	4.809	20.58	3.746	25.50	2.142	30.42	0.846	35.33	0.262	40.25	0.051	45.17	0.009
	1.00	0.000	5.92	0.026	10.83	0.320	15.75	4.811	20.67	3.718	25.58	2.115	30.50	0.831	35.42	0.257	40.33	0.050	45.25	0.008
	1.08	0.000	6.00	0.028	10.92	0.334	15.83	4.813	20.75	3.691	25.67	2.088	30.58	0.816	35.50	0.251	40.42	0.049	45.33	0.008
	1.17	0.000	6.08	0.030	11.00	0.348	<u>15.92</u>	<u>4.814</u>	20.83	3.662	25.75	2.061	30.67	0.801	35.58	0.246	40.50	0.047	45.42	0.008
	1.25	0.000	6.17	0.031	11.08	0.363	16.00	4.813	20.92	3.634	25.83	2.033	30.75	0.787	35.67	0.240	40.58	0.046	45.50	0.007
	1.33	0.000	6.25	0.033	11.17	0.379	16.08	4.812	21.00	3.605	25.92	2.006	30.83	0.772	35.75	0.235	40.67	0.045	45.58	0.007
	1.42	0.000	6.33	0.035	11.25	0.397	16.17	4.809	21.08	3.577	26.00	1.979	30.92	0.758	35.83	0.230	40.75	0.044	45.67	0.007
	1.50	0.000	6.42	0.037	11.33	0.416	16.25	4.805	21.17	3.548	26.08	1.951	31.00	0.745	35.92	0.225	40.83	0.042	45.75	0.007
	1.58	0.000	6.50	0.039	11.42	0.436	16.33	4.801	21.25	3.519	26.17	1.924	31.08	0.731	36.00	0.220	40.92	0.041	45.83	0.006
	1.67	0.000	6.58	0.041	11.50	0.459	16.42	4.795	21.33	3.490	26.25	1.898	31.17	0.718	36.08	0.215	41.00	0.040	45.92	0.006
	1.75	0.000	6.67	0.043	11.58	0.483	16.50	4.788	21.42	3.461	26.33	1.871	31.25	0.704	36.17	0.210	41.08	0.039	46.00	0.006
	1.83	0.000	6.75	0.045	11.67	0.512	16.58	4.780	21.50	3.431	26.42	1.845	31.33	0.691	36.25	0.206	41.17	0.038	46.08	0.006
	1.92	0.000	6.83	0.047	11.75	0.548	16.67	4.771	21.58	3.402	26.50	1.819	31.42	0.678	36.33	0.201	41.25	0.037	46.17	0.006
	2.00	0.000	6.92	0.049	11.83	0.597	16.75	4.761	21.67	3.372	26.58	1.793	31.50	0.666	36.42	0.197	41.33	0.036	46.25	0.005
	2.08	0.000	7.00	0.052	11.92	0.666	16.83	4.750	21.75	3.341	26.67	1.767	31.58	0.653	36.50	0.192	41.42	0.035	46.33	0.005
	2.17	0.000	7.08	0.054	12.00	0.762	16.92	4.738	21.83	3.311	26.75	1.741	31.67	0.641	36.58	0.188	41.50	0.034	46.42	0.005
	2.25	0.000	7.17	0.057	12.08	0.886	17.00	4.725	21.92	3.282	26.83	1.716	31.75	0.629	36.67	0.183	41.58	0.033	46.50	0.005
	2.33	0.000	7.25	0.059	12.17	1.031	17.08	4.711	22.00	3.253	26.92	1.691	31.83	0.617	36.75	0.179	41.67	0.032	46.58	0.004
	2.42	0.000	7.33	0.062	12.25	1.192	17.17	4.697	22.08	3.225	27.00	1.666	31.92	0.605	36.83	0.175	41.75	0.031	46.67	0.004
	2.50	0.000	7.42	0.065	12.33	1.364	17.25	4.682	22.17	3.196	27.08	1.641	32.00	0.594	36.92	0.170	41.83	0.030	46.75	0.004
	2.58	0.000	7.50	0.067	12.42	1.544	17.33	4.666	22.25	3.167	27.17	1.616	32.08	0.583	37.00	0.166	41.92	0.030	46.83	0.004
	2.67	0.000	7.58	0.070	12.50	1.729	17.42	4.649	22.33	3.139	27.25	1.592	32.17	0.572	37.08	0.161	42.00	0.029	46.92	0.004
	2.75	0.000	7.67	0.073	12.58	1.916	17.50	4.632	22.42	3.110	27.33	1.568	32.25	0.561	37.17	0.154	42.08	0.028	47.00	0.004
	2.83	0.000	7.75	0.077	12.67	2.102	17.58	4.614	22.50	3.082	27.42	1.544	32.33	0.550	37.25	0.147	42.17	0.027	47.08	0.003
	2.92	0.000	7.83	0.080	12.75	2.286	17.67	4.595	22.58	3.054	27.50	1.520	32.42	0.539	37.33	0.138	42.25	0.026	47.17	0.003
	3.00	0.000	7.92	0.083	12.83	2.465	17.75	4.576	22.67	3.026	27.58	1.497	32.50	0.529	37.42	0.128	42.33	0.026	47.25	0.003
	3.08	0.000	8.00	0.087	12.92	2.639	17.83	4.557	22.75	2.998	27.67	1.474	32.58	0.518	37.50	0.124	42.42	0.025	47.33	0.003
	3.17	0.001	8.08	0.090	13.00	2.807	17.92	4.536	22.83	2.971	27.75	1.451	32.67	0.508	37.58	0.121	42.50	0.024	47.42	0.003
	3.25	0.001	8.17	0.094	13.08	2.968	18.00	4.516	22.92	2.943	27.83	1.428	32.75	0.498	37.67	0.117	42.58	0.024	47.50	0.003
	3.33	0.001	8.25	0.098	13.17	3.120	18.08	4.495	23.00	2.916	27.92	1.406	32.83	0.489	37.75	0.114	42.67	0.023	47.58	0.002
	3.42	0.001	8.33	0.102	13.25	3.265	18.17	4.473	23.08	2.889	28.00	1.384	32.92	0.479	37.83	0.110	42.75	0.022	47.67	0.002
	3.50	0.001	8.42	0.106	13.33	3.402	18.25	4.451	23.17	2.862	28.08	1.362	33.00	0.470	37.92	0.107	42.83	0.022	47.75	0.002
	3.58	0.002	8.50	0.110	13.42	3.531	18.33	4.429	23.25	2.835	28.17	1.340	33.08	0.460	38.00	0.104	42.92	0.021	47.83	0.002
	3.67	0.002	8.58	0.115	13.50	3.651	18.42	4.407	23.33	2.809	28.25	1.319	33.17	0.451	38.08	0.102	43.00	0.020	47.92	0.002
	3.75	0.002	8.67	0.119	13.58	3.764	18.50	4.384	23.42	2.783	28.33	1.297	33.25	0.442	38.17	0.099	43.08	0.020	48.00	0.002
	3.83	0.003	8.75	0.124	13.67	3.869	18.58	4.361	23.50	2.757	28.42	1.276	33.33	0.433	38.25	0.096	43.17	0.019	48.08	0.002
	3.92	0.003	8.83	0.129	13.75	3.966	18.67	4.337	23.58	2.731	28.50	1.256	33.42	0.425	38.33	0.094	43.25	0.019	48.17	0.002
	4.00	0.003	8.92	0.134	13.83	4.056	18.75	4.313	23.67	2.706	28.58	1.235	33.50	0.416	38.42	0.091	43.33	0.018	48.25	0.001
	4.08	0.004	9.00	0.139	13.92	4.139	18.83	4.289	23.75	2.680	28.67	1.215	33.58	0.408	38.50	0.089	43.42	0.018	48.33	0.001
	4.17	0.004	9.08	0.145	14.00	4.215	18.92	4.265	23.83	2.655	28.75	1.195	33.67	0.399	38.58	0.087	43.50	0.017	48.42	0.001
	4.25	0.005	9.17	0.150	14.08	4.285	19.00	4.240	23.92	2.630	28.83	1.176	33.75	0.391	38.67	0.084	43.58	0.017	48.50	0.001
	4.33	0.006	9.25	0.156	14.17	4.350	19.08	4.216	24.00	2.606	28.92	1.156	33.83	0.383	38.75	0.082	43.67	0.016	48.58	0.001
	4.42	0.006	9.33	0.162	14.25	4.408	19.17	4.191	24.08	2.581	29.00	1.137	33.92	0.376	38.83	0.080	43.75	0.016	48.67	0.001
	4.50	0.007	9.42	0.168	14.33	4.461	19.25	4.166	24.17	2.557	29.08	1.118	34.00	0.368	38.92	0.078	43.83	0.015	48.75	0.001
	4.58	0.008	9.50	0.175	14.42	4.508	19.33	4.140	24.25	2.533	29.17	1.099	34.08	0.360	39.00	0.076	43.92	0.015	48.83	0.001
	4.67	0.008	9.58	0.181	14.50	4.551	19.42	4.115	24.33	2.508	29.25	1.081	34.17	0.353	39.08	0.074	44.00	0.014	48.92	0.001
	4.75	0.009	9.67	0.188	14.58	4.590	19.50													

VG1-1 (VG SUMMER)



Hydrograph Statistics:

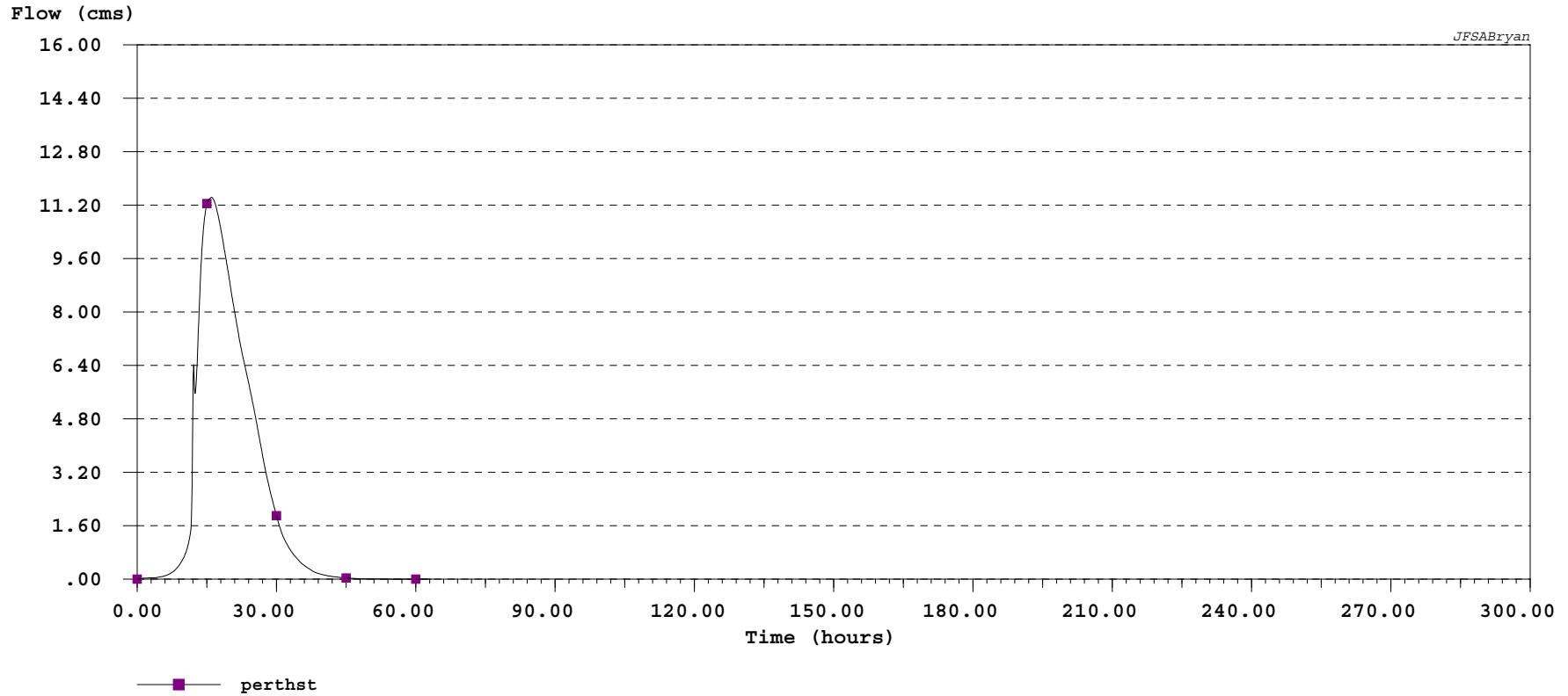
Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—●—	H-VG1-1.100 : VG1-1	5.00	336.70	4.021	17.583	53.73	1.809E+05	49.417	1.017

Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-VG1-1.100
 Comment in file : VG1-1

#	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #	TIME	FLOW #
#	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #	hrs	cms #
0.00	0.000		4.92	0.001	9.83	0.085	14.75	2.960	19.67	3.721	24.58	2.270	29.50	1.018	34.42	0.332	39.33	0.068	44.25	0.013
0.08	0.000		5.00	0.001	9.92	0.089	14.83	3.026	19.75	3.700	24.67	2.247	29.58	1.001	34.50	0.325	39.42	0.067	44.33	0.012
0.17	0.000		5.08	0.001	10.00	0.093	14.92	3.090	19.83	3.679	24.75	2.224	29.67	0.984	34.58	0.318	39.50	0.065	44.42	0.012
0.25	0.000		5.17	0.002	10.08	0.097	15.00	3.152	19.92	3.657	24.83	2.202	29.75	0.968	34.67	0.311	39.58	0.063	44.50	0.012
0.33	0.000		5.25	0.002	10.17	0.102	15.08	3.211	20.00	3.635	24.92	2.179	29.83	0.951	34.75	0.305	39.67	0.062	44.58	0.011
0.42	0.000		5.33	0.002	10.25	0.106	15.17	3.268	20.08	3.613	25.00	2.156	29.92	0.935	34.83	0.298	39.75	0.060	44.67	0.011
0.50	0.000		5.42	0.002	10.33	0.111	15.25	3.323	20.17	3.590	25.08	2.133	30.00	0.919	34.92	0.292	39.83	0.059	44.75	0.010
0.58	0.000		5.50	0.003	10.42	0.116	15.33	3.375	20.25	3.568	25.17	2.110	30.08	0.903	35.00	0.286	39.92	0.057	44.83	0.010
0.67	0.000		5.58	0.003	10.50	0.121	15.42	3.425	20.33	3.544	25.25	2.087	30.17	0.888	35.08	0.280	40.00	0.056	44.92	0.010
0.75	0.000		5.67	0.003	10.58	0.127	15.50	3.473	20.42	3.521	25.33	2.064	30.25	0.872	35.17	0.274	40.08	0.054	45.00	0.009
0.83	0.000		5.75	0.004	10.67	0.132	15.58	3.519	20.50	3.497	25.42	2.041	30.33	0.857	35.25	0.268	40.17	0.053	45.08	0.009
0.92	0.000		5.83	0.004	10.75	0.138	15.67	3.562	20.58	3.473	25.50	2.018	30.42	0.842	35.33	0.262	40.25	0.051	45.17	0.009
1.00	0.000		5.92	0.005	10.83	0.144	15.75	3.603	20.67	3.449	25.58	1.995	30.50	0.827	35.42	0.257	40.33	0.050	45.25	0.008
1.08	0.000		6.00	0.005	10.92	0.151	15.83	3.642	20.75	3.425	25.67	1.972	30.58	0.812	35.50	0.251	40.42	0.049	45.33	0.008
1.17	0.000		6.08	0.005	11.00	0.158	15.92	3.679	20.83	3.400	25.75	1.949	30.67	0.798	35.58	0.246	40.50	0.047	45.42	0.008
1.25	0.000		6.17	0.006	11.08	0.165	16.00	3.714	20.92	3.375	25.83	1.926	30.75	0.784	35.67	0.240	40.58	0.046	45.50	0.007
1.33	0.000		6.25	0.007	11.17	0.173	16.08	3.747	21.00	3.350	25.92	1.903	30.83	0.770	35.75	0.235	40.67	0.045	45.58	0.007
1.42	0.000		6.33	0.007	11.25	0.181	16.17	3.778	21.08	3.325	26.00	1.880	30.92	0.756	35.83	0.230	40.75	0.044	45.67	0.007
1.50	0.000		6.42	0.008	11.33	0.190	16.25	3.807	21.17	3.300	26.08	1.856	31.00	0.742	35.92	0.225	40.83	0.042	45.75	0.007
1.58	0.000		6.50	0.009	11.42	0.199	16.33	3.834	21.25	3.274	26.17	1.834	31.08	0.729	36.00	0.220	40.92	0.041	45.83	0.006
1.67	0.000		6.58	0.009	11.50	0.209	16.42	3.859	21.33	3.248	26.25	1.811	31.17	0.716	36.08	0.215	41.00	0.040	45.92	0.006
1.75	0.000		6.67	0.010	11.58	0.220	16.50	3.882	21.42	3.222	26.33	1.788	31.25	0.703	36.17	0.210	41.08	0.039	46.00	0.006
1.83	0.000		6.75	0.011	11.67	0.232	16.58	3.903	21.50	3.197	26.42	1.766	31.33	0.690	36.25	0.206	41.17	0.038	46.08	0.006
1.92	0.000		6.83	0.012	11.75	0.246	16.67	3.922	21.58	3.171	26.50	1.743	31.42	0.677	36.33	0.201	41.25	0.037	46.17	0.006
2.00	0.000		6.92	0.013	11.83	0.264	16.75	3.939	21.67	3.145	26.58	1.721	31.50	0.664	36.42	0.197	41.33	0.036	46.25	0.005
2.08	0.000		7.00	0.013	11.92	0.287	16.83	3.955	21.75	3.118	26.67	1.698	31.58	0.652	36.50	0.192	41.42	0.035	46.33	0.005
2.17	0.000		7.08	0.014	12.00	0.317	16.92	3.969	21.83	3.092	26.75	1.676	31.67	0.640	36.58	0.188	41.50	0.034	46.42	0.005
2.25	0.000		7.17	0.015	12.08	0.357	17.00	3.981	21.92	3.066	26.83	1.654	31.75	0.628	36.67	0.183	41.58	0.033	46.50	0.005
2.33	0.000		7.25	0.016	12.17	0.404	17.08	3.991	22.00	3.040	26.92	1.632	31.83	0.616	36.75	0.179	41.67	0.032	46.58	0.004
2.42	0.000		7.33	0.018	12.25	0.458	17.17	4.000	22.08	3.014	27.00	1.610	31.92	0.605	36.83	0.175	41.75	0.031	46.67	0.004
2.50	0.000		7.42	0.019	12.33	0.518	17.25	4.007	22.17	2.987	27.08	1.588	32.00	0.593	36.92	0.170	41.83	0.030	46.75	0.004
2.58	0.000		7.50	0.020	12.42	0.584	17.33	4.013	22.25	2.961	27.17	1.566	32.08	0.582	37.00	0.166	41.92	0.030	46.83	0.004
2.67	0.000		7.58	0.021	12.50	0.656	17.42	4.017	22.33	2.935	27.25	1.545	32.17	0.571	37.08	0.161	42.00	0.029	46.92	0.004
2.75	0.000		7.67	0.023	12.58	0.732	17.50	4.020	22.42	2.909	27.33	1.523	32.25	0.560	37.17	0.154	42.08	0.028	47.00	0.004
2.83	0.000		7.75	0.024	12.67	0.812	17.58	4.021	22.50	2.883	27.42	1.502	32.33	0.549	37.25	0.147	42.17	0.027	47.08	0.003
2.92	0.000		7.83	0.025	12.75	0.895	17.67	4.021	22.58	2.857	27.50	1.480	32.42	0.539	37.33	0.138	42.25	0.026	47.17	0.003
3.00	0.000		7.92	0.027	12.83	0.982	17.75	4.020	22.67	2.831	27.58	1.459	32.50	0.528	37.42	0.128	42.33	0.026	47.25	0.003
3.08	0.000		8.00	0.029	12.92	1.070	17.83	4.017	22.75	2.805	27.67	1.438	32.58	0.518	37.50	0.124	42.42	0.025	47.33	0.003
3.17	0.000		8.08	0.030	13.00	1.160	17.92	4.013	22.83	2.779	27.75	1.417	32.67	0.508	37.58	0.121	42.50	0.024	47.42	0.003
3.25	0.000		8.17	0.032	13.08	1.252	18.00	4.008	22.92	2.753	27.83	1.397	32.75	0.498	37.67	0.117	42.58	0.024	47.50	0.003
3.33	0.000		8.25	0.034	13.17	1.345	18.08	4.002	23.00	2.728	27.92	1.376	32.83	0.488	37.75	0.114	42.67	0.023	47.58	0.002
3.42	0.000		8.33	0.036	13.25	1.439	18.17	3.995	23.08	2.702	28.00	1.356	32.92	0.479	37.83	0.110	42.75	0.022	47.67	0.002
3.50	0.000		8.42	0.038	13.33	1.532	18.25	3.986	23.17	2.677	28.08	1.335	33.00	0.469	37.92	0.107	42.83	0.022	47.75	0.002
3.58	0.000		8.50	0.040	13.42	1.626	18.33	3.977	23.25	2.652	28.17	1.315	33.08	0.460	38.00	0.104	42.92	0.021	47.83	0.002
3.67	0.000		8.58	0.042	13.50	1.720	18.42	3.966	23.33	2.627	28.25	1.295	33.17	0.451	38.08	0.102	43.00	0.020	47.92	0.002
3.75	0.000		8.67	0.044	13.58	1.813	18.50	3.955	23.42	2.602	28.33	1.276	33.25	0.442	38.17	0.099	43.08	0.020	48.00	0.002
3.83	0.000		8.75	0.046	13.67	1.905	18.58	3.943	23.50	2.577	28.42	1.256	33.33	0.433	38.25	0.096	43.17	0.019	48.08	0.002
3.92	0.000		8.83	0.048	13.75	1.996	18.67	3.930	23.58	2.553	28.50	1.237	33.42	0.425	38.33	0.094	43.25	0.019	48.17	0.002
4.00	0.000		8.92	0.051	13.83	2.086	18.75	3.916	23.67	2.528	28.58	1.217	33.50	0.416	38.42	0.091	43.33	0.018	48.25	0.001
4.08	0.000		9.00	0.054	13.92	2.175	18.83	3.902	23.75	2.504	28.67	1.198	33.58	0.408	38.50	0.089	43.42	0.018	48.33	0.001
4.17	0.000		9.08	0.056	14.00	2.262	18.92	3.886	23.83	2.480	28.75	1.179	33.67	0.399	38.58	0.087	43.50	0.017	48.42	0.001
4.25	0.000		9.17	0.059	14.08	2.348	19.00	3.870	23.92	2.456	28.83	1.161	33.75	0.391	38.67	0.084	43.58	0.017	48.50	0.001
4.33	0.000		9.25	0.062	14.17	2.431	19.08	3.854	24.00	2.432	28.92	1.142	33.83	0.383	38.75	0.082	43.67	0.016	48.58	0.001
4.42	0.000		9.33	0.065	14.25	2.513	19.17	3.836	24.08	2.409	29.00	1.124	33.92	0.376	38.83	0.080	43.75	0.016	48.67	0.001
4.50	0.000		9.42	0.068	14.33	2.593	19.25	3.818	24.17	2.386	29.08	1.106	34.00	0.368	38.92	0.078	43.83	0.015	48.75	0.001
4.58	0.000		9.50	0.071	14.42	2.671	19.33	3.800	24.25	2.362	29.17	1.088	34.08	0.360	39.00	0.076	43.92	0.015	48.83	0.001
4.67	0.001		9.58	0.074	14.50	2.746	19.42	3.781	24.33	2.339	29.25	1.070	34.17	0.353	39.08	0.074	44.00	0.014	48.92	0.001
4.75	0.001		9.67	0.078	14.58	2.820	19.50	3.761	24.42	2.316	29.33	1.0								

PERTHST (VG SUMMER)



Hydrograph Statistics:

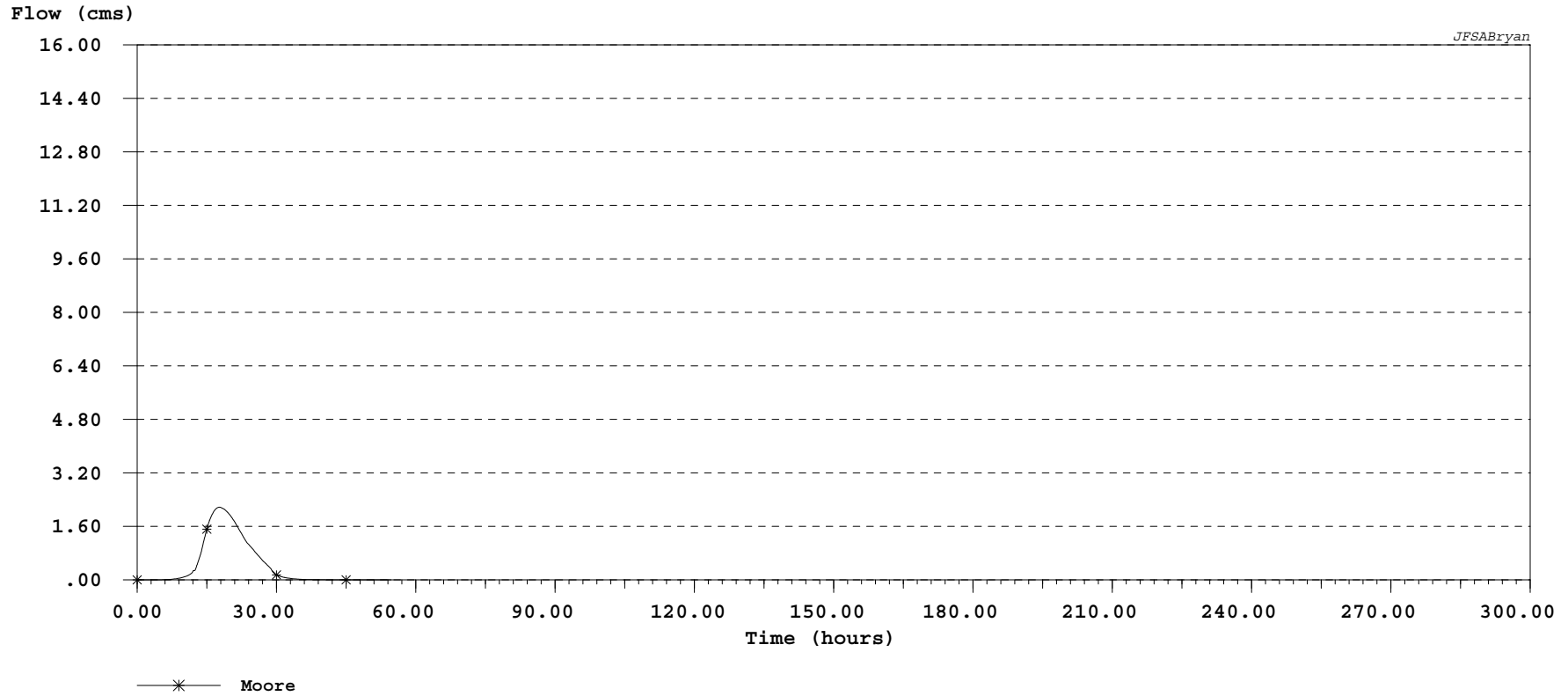
Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—■—	H-PERTHS.100: perthst	5.00	855.70	11.434	16.000	59.41	5.084E+05	63.250	2.233

Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM~1\H-PERTHS.100
 Comment in file : perthst

#	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW
#	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms
0.00	0.000	5.75	0.090	11.50	1.401	17.25	10.991	23.00	6.504	28.75	2.566	34.50	0.608	40.25	0.124	46.00	0.026	51.75	0.004	57.50	0.001	
0.08	0.000	5.83	0.093	11.58	1.543	17.33	10.946	23.08	6.451	28.83	2.519	34.58	0.594	40.33	0.121	46.08	0.025	51.83	0.004	57.58	0.001	
0.17	0.000	5.92	0.097	11.67	1.770	17.42	10.896	23.17	6.398	28.92	2.473	34.67	0.581	40.42	0.119	46.17	0.024	51.92	0.004	57.67	0.001	
0.25	0.000	6.00	0.100	11.75	2.275	17.50	10.843	23.25	6.346	29.00	2.428	34.75	0.567	40.50	0.116	46.25	0.024	52.00	0.004	57.75	0.000	
0.33	0.000	6.08	0.104	11.83	2.977	17.58	10.786	23.33	6.294	29.08	2.383	34.83	0.554	40.58	0.114	46.33	0.023	52.08	0.004	57.83	0.000	
0.42	0.000	6.17	0.108	11.92	4.022	17.67	10.726	23.42	6.242	29.17	2.336	34.92	0.540	40.67	0.111	46.42	0.023	52.17	0.003	57.92	0.000	
0.50	0.000	6.25	0.114	12.00	5.240	17.75	10.676	23.50	6.190	29.25	2.291	35.00	0.527	40.75	0.109	46.50	0.022	52.25	0.003	58.00	0.000	
0.58	0.000	6.33	0.119	12.08	6.093	17.83	10.621	23.58	6.138	29.33	2.246	35.08	0.515	40.83	0.107	46.58	0.022	52.33	0.003	58.08	0.000	
0.67	0.000	6.42	0.123	12.17	6.420	17.92	10.549	23.67	6.087	29.42	2.202	35.17	0.503	40.92	0.104	46.67	0.021	52.42	0.003	58.17	0.000	
0.75	0.002	6.50	0.128	12.25	6.125	18.00	10.479	23.75	6.036	29.50	2.157	35.25	0.492	41.00	0.102	46.75	0.021	52.50	0.003	58.25	0.000	
0.83	0.006	6.58	0.133	12.33	5.730	18.08	10.426	23.83	5.984	29.58	2.113	35.33	0.482	41.08	0.100	46.83	0.020	52.58	0.003	58.33	0.000	
0.92	0.013	6.67	0.138	12.42	5.562	18.17	10.367	23.92	5.932	29.67	2.068	35.42	0.472	41.17	0.098	46.92	0.020	52.67	0.003	58.42	0.000	
1.00	0.019	6.75	0.143	12.50	5.560	18.25	10.292	24.00	5.879	29.75	2.024	35.50	0.462	41.25	0.096	47.00	0.019	52.75	0.003	58.50	0.000	
1.08	0.023	6.83	0.148	12.58	5.651	18.33	10.233	24.08	5.824	29.83	1.981	35.58	0.453	41.33	0.094	47.08	0.018	52.83	0.003	58.58	0.000	
1.17	0.026	6.92	0.153	12.67	5.802	18.42	10.170	24.17	5.767	29.92	1.938	35.67	0.443	41.42	0.092	47.17	0.018	52.92	0.003	58.67	0.000	
1.25	0.028	7.00	0.158	12.75	5.989	18.50	10.091	24.25	5.707	30.00	1.898	35.75	0.434	41.50	0.090	47.25	0.018	53.00	0.003	58.75	0.000	
1.33	0.029	7.08	0.165	12.83	6.220	18.58	10.031	24.33	5.650	30.08	1.858	35.83	0.425	41.58	0.088	47.33	0.017	53.08	0.003	58.83	0.000	
1.42	0.030	7.17	0.172	12.92	6.495	18.67	9.967	24.42	5.593	30.17	1.818	35.92	0.416	41.67	0.086	47.42	0.017	53.17	0.002	58.92	0.000	
1.50	0.031	7.25	0.181	13.00	6.798	18.75	9.885	24.50	5.538	30.25	1.778	36.00	0.407	41.75	0.084	47.50	0.016	53.25	0.002	59.00	0.000	
1.58	0.031	7.33	0.189	13.08	7.112	18.83	9.823	24.58	5.483	30.33	1.737	36.08	0.398	41.83	0.082	47.58	0.016	53.33	0.002	59.08	0.000	
1.67	0.031	7.42	0.196	13.17	7.425	18.92	9.758	24.67	5.427	30.42	1.697	36.17	0.390	41.92	0.081	47.67	0.015	53.42	0.002	59.17	0.000	
1.75	0.032	7.50	0.204	13.25	7.728	19.00	9.685	24.75	5.371	30.50	1.658	36.25	0.381	42.00	0.079	47.75	0.015	53.50	0.002	59.25	0.000	
1.83	0.032	7.58	0.212	13.33	8.027	19.08	9.615	24.83	5.315	30.58	1.618	36.33	0.373	42.08	0.078	47.83	0.014	53.58	0.002	59.33	0.000	
1.92	0.032	7.67	0.220	13.42	8.322	19.17	9.546	24.92	5.257	30.67	1.579	36.42	0.365	42.17	0.076	47.92	0.014	53.67	0.002	59.42	0.000	
2.00	0.032	7.75	0.227	13.50	8.603	19.25	9.478	25.00	5.199	30.75	1.542	36.50	0.358	42.25	0.075	48.00	0.014	53.75	0.002	59.50	0.000	
2.08	0.032	7.83	0.235	13.58	8.875	19.33	9.410	25.08	5.141	30.83	1.505	36.58	0.350	42.33	0.073	48.08	0.013	53.83	0.002	59.58	0.000	
2.17	0.033	7.92	0.244	13.67	9.134	19.42	9.342	25.17	5.082	30.92	1.469	36.67	0.342	42.42	0.072	48.17	0.013	53.92	0.002	59.67	0.000	
2.25	0.035	8.00	0.252	13.75	9.372	19.50	9.274	25.25	5.023	31.00	1.434	36.75	0.335	42.50	0.070	48.25	0.012	54.00	0.002	59.75	0.000	
2.33	0.036	8.08	0.262	13.83	9.594	19.58	9.206	25.33	4.962	31.08	1.401	36.83	0.328	42.58	0.069	48.33	0.012	54.08	0.002	59.83	0.000	
2.42	0.036	8.17	0.274	13.92	9.802	19.67	9.138	25.42	4.901	31.17	1.369	36.92	0.321	42.67	0.068	48.42	0.012	54.17	0.002	59.92	0.000	
2.50	0.037	8.25	0.286	14.00	9.996	19.75	9.065	25.50	4.841	31.25	1.338	37.00	0.314	42.75	0.066	48.50	0.011	54.25	0.002	60.00	0.000	
2.58	0.037	8.33	0.299	14.08	10.171	19.83	8.989	25.58	4.780	31.33	1.309	37.08	0.307	42.83	0.065	48.58	0.011	54.33	0.002	60.08	0.000	
2.67	0.038	8.42	0.311	14.17	10.326	19.92	8.916	25.67	4.716	31.42	1.281	37.17	0.300	42.92	0.064	48.67	0.011	54.42	0.002	60.17	0.000	
2.75	0.038	8.50	0.323	14.25	10.464	20.00	8.835	25.75	4.652	31.50	1.254	37.25	0.292	43.00	0.062	48.75	0.011	54.50	0.002	60.25	0.000	
2.83	0.038	8.58	0.336	14.33	10.590	20.08	8.759	25.83	4.587	31.58	1.228	37.33	0.284	43.08	0.066	48.83	0.010	54.58	0.002	60.33	0.000	
2.92	0.038	8.67	0.349	14.42	10.702	20.17	8.683	25.92	4.522	31.67	1.203	37.42	0.276	43.17	0.060	48.92	0.010	54.67	0.001	60.42	0.000	
3.00	0.038	8.75	0.364	14.50	10.802	20.25	8.609	26.00	4.457	31.75	1.179	37.50	0.267	43.25	0.058	49.00	0.010	54.75	0.001	60.50	0.000	
3.08	0.039	8.83	0.378	14.58	10.894	20.33	8.537	26.08	4.393	31.83	1.156	37.58	0.258	43.33	0.057	49.08	0.010	54.83	0.001	60.58	0.000	
3.17	0.039	8.92	0.392	14.67	10.977	20.42	8.467	26.17	4.330	31.92	1.133	37.67	0.250	43.42	0.056	49.17	0.009	54.92	0.001	60.67	0.000	
3.25	0.039	9.00	0.407	14.75	11.053	20.50	8.398	26.25	4.268	32.00	1.111	37.75	0.243	43.50	0.055	49.25	0.009	55.00	0.001	60.75	0.000	
3.33	0.039	9.08	0.423	14.83	11.124	20.58	8.330	26.33	4.207	32.08	1.090	37.83	0.236	43.58	0.053	49.33	0.009	55.08	0.001	60.83	0.000	
3.42	0.040	9.17	0.441	14.92	11.189	20.67	8.262	26.42	4.145	32.17	1.069	37.92	0.230	43.67	0.052	49.42	0.009	55.17	0.001	60.92	0.000	
3.50	0.040	9.25	0.460	15.00	11.247	20.75	8.195	26.50	4.083	32.25	1.048	38.00	0.224	43.75	0.051	49.50	0.008	55.25	0.001	61.00	0.000	
3.58	0.040	9.33	0.480	15.08	11.297	20.83	8.127	26.58	4.021	32.33	1.027	38.08	0.219	43.83	0.050	49.58	0.008	55.33	0.001	61.08	0.000	
3.67	0.041	9.42	0.499	15.17	11.326	20.92	8.059	26.67	3.959	32.42	1.007	38.17	0.214	43.92	0.048	49.67	0.008	55.42	0.001	61.17	0.000	
3.75	0.041	9.50	0.519	15.25	11.342	21.00	7.992	26.75	3.897	32.50	0.986	38.25	0.209	44.00	0.047	49.75	0.008	55.50	0.001	61.25	0.000	
3.83	0.042	9.58	0.538	15.33	11.351	21.08	7.924	26.83	3.835	32.58	0.965	38.33	0.204	44.08	0.046	49.83	0.007	55.58	0.001	61.33	0.000	
3.92	0.042	9.67	0.558	15.42	11.364	21.17	7.857	26.92	3.772	32.67	0.945	38.42	0.199	44.17	0.045	49.92	0.007	55.67	0.001	61.42	0.000	
4.00	0.043	9.75	0.580	15.50	11.368	21.25	7.791	27.00	3.708	32.75	0.925	38.50	0.195	44.25	0.044	50.00	0.007	55.75	0.001	61.50	0.000	
4.08	0.045	9.83	0.600	15.58	11.380	21.33	7.724	27.08	3.644	32.83	0.905	38.58	0.190	44.33	0.043	50.08	0.007	55.83	0.001	61.58	0.000	
4.17	0.047	9.92	0.619	15.67	11.395	21.42	7.657	27.17	3.581	32.92	0.886	38.67	0.186	44.42	0.042	50.17	0.007	55.92	0.001	61.67	0.000	
4.25	0.050	10.00	0.638	15.75	11.409	21.50	7.591	27.25	3.520	33.00	0.869	38.75	0.182	44.50	0.041	50.25	0.007	56.00	0.001	61.75	0.000	
4.33	0.052	10.08	0.661	15.83	11.421	21.58	7.525	27.33	3.459	33.08	0.851	38.83	0.178	44.58	0.040	50.33	0.006	56.08	0.001	61.83	0.000	
4.42																						

MOORE (VG SUMMER)



Hydrograph Statistics:

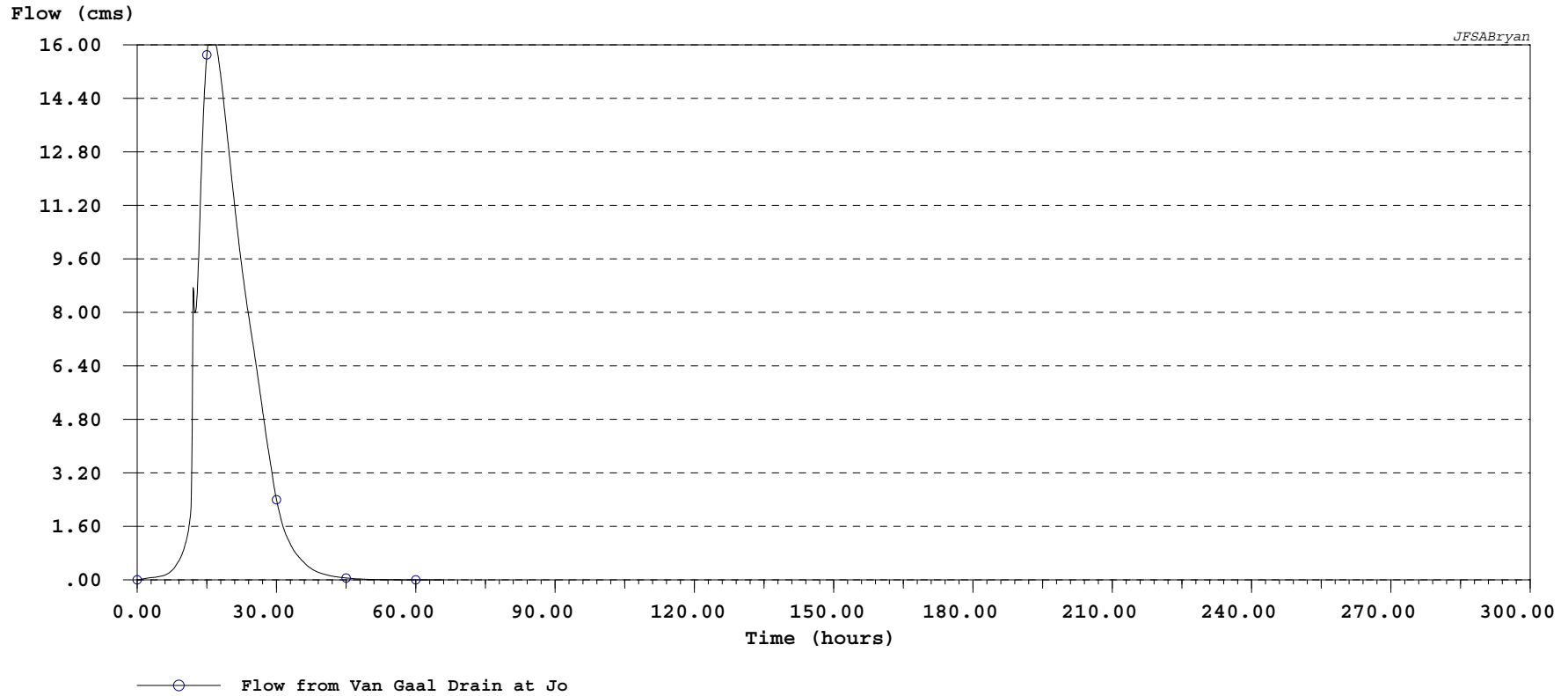
Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—*—	H-MOORE.100 : Moore	5.00	133.40	2.172	17.750	61.15	8.157E+04	54.667	0.415

Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM~1\H-MOORE.100
 Comment in file : Moore

#	TIME hrs	FLOW cms #	TIME hrs	FLOW cms #	TIME hrs	FLOW cms #	TIME hrs	FLOW cms #	TIME hrs	FLOW cms #	TIME hrs	FLOW cms #	TIME hrs	FLOW cms #	TIME hrs	FLOW cms #	TIME hrs	FLOW cms #	TIME hrs	FLOW cms #	TIME hrs	FLOW cms #
0.00	0.000		5.33	0.002	10.67	0.115	16.00	1.916	21.33	1.654	26.67	0.635	32.00	0.064	37.33	0.006	42.67	0.001	48.00	0.000	53.33	0.000
0.08	0.000		5.42	0.002	10.75	0.119	16.08	1.940	21.42	1.634	26.75	0.618	32.08	0.062	37.42	0.006	42.75	0.001	48.08	0.000	53.42	0.000
0.17	0.000		5.50	0.002	10.83	0.124	16.17	1.962	21.50	1.614	26.83	0.606	32.17	0.060	37.50	0.006	42.83	0.001	48.17	0.000	53.50	0.000
0.25	0.000		5.58	0.002	10.92	0.130	16.25	1.984	21.58	1.595	26.92	0.592	32.25	0.058	37.58	0.006	42.92	0.001	48.25	0.000	53.58	0.000
0.33	0.000		5.67	0.003	11.00	0.135	16.33	2.005	21.67	1.574	27.00	0.578	32.33	0.056	37.67	0.005	43.00	0.001	48.33	0.000	53.67	0.000
0.42	0.000		5.75	0.003	11.08	0.141	16.42	2.026	21.75	1.554	27.08	0.568	32.42	0.054	37.75	0.005	43.08	0.001	48.42	0.000	53.75	0.000
0.50	0.000		5.83	0.004	11.17	0.147	16.50	2.046	21.83	1.534	27.17	0.556	32.50	0.053	37.83	0.005	43.17	0.001	48.50	0.000	53.83	0.000
0.58	0.000		5.92	0.004	11.25	0.154	16.58	2.063	21.92	1.514	27.25	0.545	32.58	0.051	37.92	0.005	43.25	0.001	48.58	0.000	53.92	0.000
0.67	0.000		6.00	0.004	11.33	0.161	16.67	2.080	22.00	1.493	27.33	0.534	32.67	0.049	38.00	0.005	43.33	0.001	48.67	0.000	54.00	0.000
0.75	0.000		6.08	0.005	11.42	0.168	16.75	2.094	22.08	1.472	27.42	0.526	32.75	0.047	38.08	0.005	43.42	0.001	48.75	0.000	54.08	0.000
0.83	0.000		6.17	0.005	11.50	0.176	16.83	2.108	22.17	1.453	27.50	0.516	32.83	0.046	38.17	0.004	43.50	0.001	48.83	0.000	54.17	0.000
0.92	0.000		6.25	0.006	11.58	0.184	16.92	2.120	22.25	1.434	27.58	0.502	32.92	0.044	38.25	0.004	43.58	0.001	48.92	0.000	54.25	0.000
1.00	0.000		6.33	0.007	11.67	0.194	17.00	2.129	22.33	1.415	27.67	0.492	33.00	0.043	38.33	0.004	43.67	0.001	49.00	0.000	54.33	0.000
1.08	0.000		6.42	0.007	11.75	0.204	17.08	2.139	22.42	1.395	27.75	0.483	33.08	0.041	38.42	0.004	43.75	0.001	49.08	0.000	54.42	0.000
1.17	0.000		6.50	0.008	11.83	0.216	17.17	2.147	22.50	1.375	27.83	0.470	33.17	0.040	38.50	0.004	43.83	0.001	49.17	0.000	54.50	0.000
1.25	0.000		6.58	0.009	11.92	0.231	17.25	2.154	22.58	1.354	27.92	0.457	33.25	0.038	38.58	0.004	43.92	0.001	49.25	0.000	54.58	0.000
1.33	0.000		6.67	0.009	12.00	0.249	17.33	2.160	22.67	1.334	28.00	0.444	33.33	0.037	38.67	0.004	44.00	0.001	49.33	0.000	54.67	0.000
1.42	0.000		6.75	0.010	12.08	0.274	17.42	2.166	22.75	1.314	28.08	0.434	33.42	0.036	38.75	0.004	44.08	0.001	49.42	0.000	54.75	0.000
1.50	0.000		6.83	0.011	12.17	0.281	17.50	2.170	22.83	1.294	28.17	0.422	33.50	0.035	38.83	0.003	44.17	0.001	49.50	0.000	54.83	0.000
1.58	0.000		6.92	0.012	12.25	0.274	17.58	2.171	22.92	1.274	28.25	0.413	33.58	0.034	38.92	0.003	44.25	0.001	49.58	0.000	54.92	0.000
1.67	0.000		7.00	0.013	12.33	0.276	17.67	2.172	23.00	1.254	28.33	0.403	33.67	0.032	39.00	0.003	44.33	0.001	49.67	0.000	55.00	0.000
1.75	0.000		7.08	0.014	12.42	0.285	17.75	2.172	23.08	1.234	28.42	0.388	33.75	0.031	39.08	0.003	44.42	0.001	49.75	0.000	55.08	0.000
1.83	0.000		7.17	0.015	12.50	0.298	17.83	2.171	23.17	1.215	28.50	0.376	33.83	0.030	39.17	0.003	44.50	0.001	49.83	0.000	55.17	0.000
1.92	0.000		7.25	0.016	12.58	0.321	17.92	2.169	23.25	1.196	28.58	0.365	33.92	0.029	39.25	0.003	44.58	0.001	49.92	0.000	55.25	0.000
2.00	0.000		7.33	0.017	12.67	0.356	18.00	2.165	23.33	1.177	28.67	0.356	34.00	0.028	39.33	0.003	44.67	0.001	50.00	0.000	55.33	0.000
2.08	0.000		7.42	0.018	12.75	0.393	18.08	2.161	23.42	1.158	28.75	0.343	34.08	0.027	39.42	0.003	44.75	0.001	50.08	0.000	55.42	0.000
2.17	0.000		7.50	0.019	12.83	0.431	18.17	2.155	23.50	1.139	28.83	0.327	34.17	0.026	39.50	0.003	44.83	0.000	50.17	0.000	55.50	0.000
2.25	0.000		7.58	0.020	12.92	0.461	18.25	2.149	23.58	1.123	28.92	0.307	34.25	0.025	39.58	0.003	44.92	0.000	50.25	0.000	55.58	0.000
2.33	0.000		7.67	0.021	13.00	0.492	18.33	2.142	23.67	1.111	29.00	0.283	34.33	0.024	39.67	0.003	45.00	0.000	50.33	0.000	55.67	0.000
2.42	0.000		7.75	0.023	13.08	0.526	18.42	2.138	23.75	1.098	29.08	0.263	34.42	0.024	39.75	0.002	45.08	0.000	50.42	0.000	55.75	0.000
2.50	0.000		7.83	0.024	13.17	0.563	18.50	2.134	23.83	1.086	29.17	0.245	34.50	0.023	39.83	0.002	45.17	0.000	50.50	0.000	55.83	0.000
2.58	0.000		7.92	0.025	13.25	0.600	18.58	2.127	23.92	1.073	29.25	0.230	34.58	0.022	39.92	0.002	45.25	0.000	50.58	0.000	55.92	0.000
2.67	0.000		8.00	0.027	13.33	0.637	18.67	2.121	24.00	1.061	29.33	0.216	34.67	0.021	40.00	0.002	45.33	0.000	50.67	0.000	56.00	0.000
2.75	0.000		8.08	0.028	13.42	0.671	18.75	2.113	24.08	1.048	29.42	0.204	34.75	0.020	40.08	0.002	45.42	0.000	50.75	0.000	56.08	0.000
2.83	0.000		8.17	0.030	13.50	0.704	18.83	2.104	24.17	1.035	29.50	0.194	34.83	0.020	40.17	0.002	45.50	0.000	50.83	0.000	56.17	0.000
2.92	0.000		8.25	0.031	13.58	0.736	18.92	2.095	24.25	1.022	29.58	0.184	34.92	0.019	40.25	0.002	45.58	0.000	50.92	0.000	56.25	0.000
3.00	0.000		8.33	0.033	13.67	0.770	19.00	2.085	24.33	1.008	29.67	0.175	35.00	0.018	40.33	0.002	45.67	0.000	51.00	0.000	56.33	0.000
3.08	0.000		8.42	0.035	13.75	0.809	19.08	2.074	24.42	0.995	29.75	0.168	35.08	0.018	40.42	0.002	45.75	0.000	51.08	0.000	56.42	0.000
3.17	0.000		8.50	0.037	13.83	0.855	19.17	2.061	24.50	0.982	29.83	0.161	35.17	0.017	40.50	0.002	45.83	0.000	51.17	0.000	56.50	0.000
3.25	0.000		8.58	0.039	13.92	0.907	19.25	2.050	24.58	0.969	29.92	0.154	35.25	0.016	40.58	0.002	45.92	0.000	51.25	0.000	56.58	0.000
3.33	0.000		8.67	0.040	14.00	0.958	19.33	2.040	24.67	0.956	30.00	0.148	35.33	0.016	40.67	0.002	46.00	0.000	51.33	0.000	56.67	0.000
3.42	0.000		8.75	0.042	14.08	1.008	19.42	2.028	24.75	0.943	30.08	0.142	35.42	0.015	40.75	0.002	46.08	0.000	51.42	0.000	56.75	0.000
3.50	0.000		8.83	0.044	14.17	1.058	19.50	2.015	24.83	0.931	30.17	0.137	35.50	0.015	40.83	0.002	46.17	0.000	51.50	0.000	56.83	0.000
3.58	0.000		8.92	0.047	14.25	1.108	19.58	2.003	24.92	0.918	30.25	0.132	35.58	0.014	40.92	0.002	46.25	0.000	51.58	0.000	56.92	0.000
3.67	0.000		9.00	0.049	14.33	1.155	19.67	1.990	25.00	0.905	30.33	0.127	35.67	0.014	41.00	0.002	46.33	0.000	51.67	0.000	57.00	0.000
3.75	0.000		9.08	0.051	14.42	1.203	19.75	1.975	25.08	0.890	30.42	0.123	35.75	0.013	41.08	0.001	46.42	0.000	51.75	0.000	57.08	0.000
3.83	0.000		9.17	0.054	14.50	1.250	19.83	1.961	25.17	0.874	30.50	0.119	35.83	0.013	41.17	0.001	46.50	0.000	51.83	0.000	57.17	0.000
3.92	0.000		9.25	0.056	14.58	1.295	19.92	1.948	25.25	0.859	30.58	0.114	35.92	0.012	41.25	0.001	46.58	0.000	51.92	0.000	57.25	0.000
4.00	0.000		9.33	0.059	14.67	1.340	20.00	1.935	25.33	0.845	30.67	0.111	36.00	0.012	41.33	0.001	46.67	0.000	52.00	0.000	57.33	0.000
4.08	0.000		9.42	0.061	14.75	1.385	20.08	1.920	25.42	0.831	30.75	0.107	36.08	0.011	41.42	0.001	46.75	0.000	52.08	0.000	57.42	0.000
4.17	0.000		9.50	0.064	14.83	1.429	20.17	1.905	25.50	0.817	30.83	0.103	36.17	0.011	41.50	0.001	46.83	0.000	52.17	0.000	57.50	0.000
4.25	0.000		9.58	0.067	14.92	1.474	20.25	1.889	25.58	0.803	30.92	0.100	36.25	0.010	41.58	0.001	46.92	0.000	52.25	0.000	57.58	0.000
4.33	0.000		9.67	0.070	15.00	1.516	20.33	1.873	25.67	0.790	31.00	0.096	36.33	0.010	41.67	0.001	47.00	0.000	52.33	0.000		

JOCKVG (VG SUMMER)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—○—	H-JOCKVG.100: Flow from Van Gaal Drain at Jock River	5.00	1147.00	16.419	16.000	61.23	7.023E+05	66.083	2.952

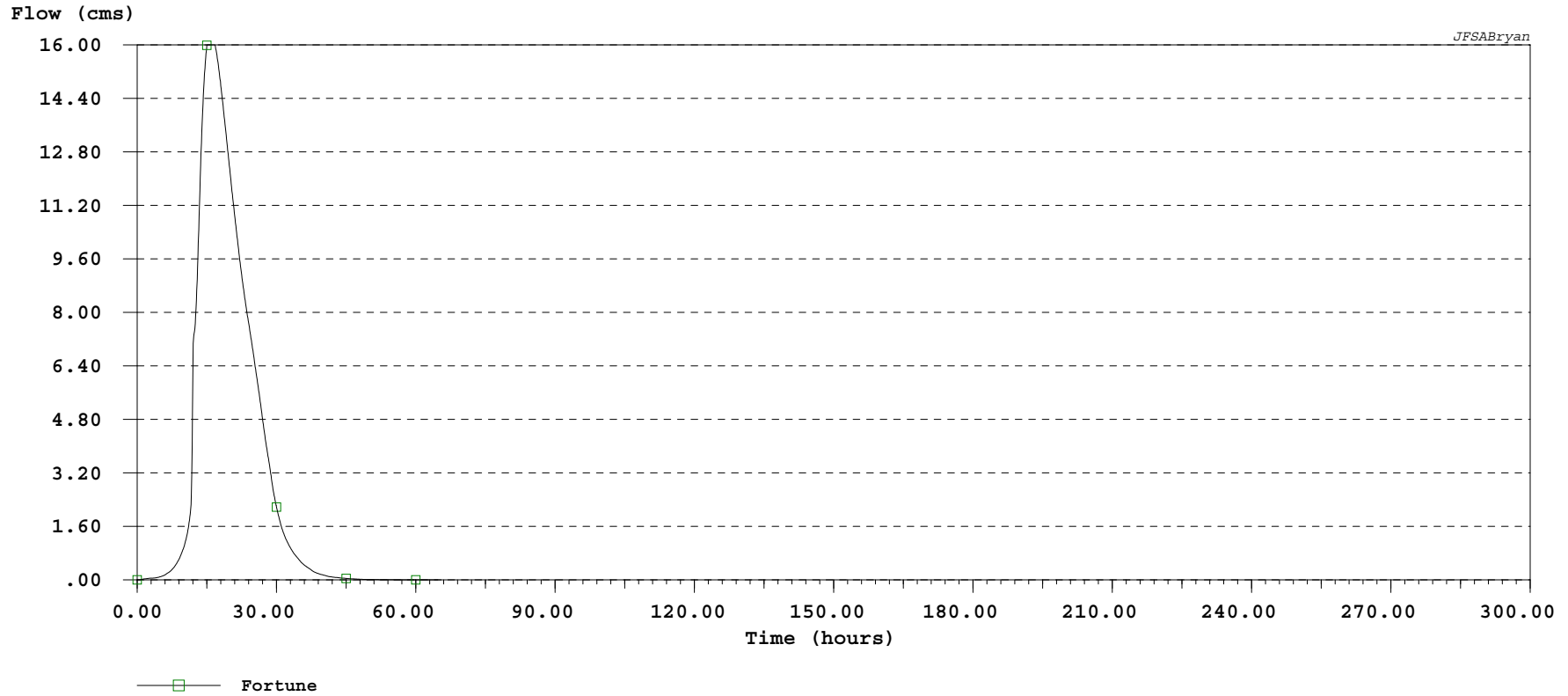
Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-JOCKVG.100

Comment in file : Flow from Van Gaal Drain at Jock River

#	TIME hrs	FLOW cms	#	TIME hrs	FLOW cms	#	TIME hrs	FLOW cms	#	TIME hrs	FLOW cms	#	TIME hrs	FLOW cms	#	TIME hrs	FLOW cms	#	TIME hrs	FLOW cms	#	TIME hrs	FLOW cms	#	TIME hrs	FLOW cms	#	TIME hrs	FLOW cms	#	TIME hrs	FLOW cms	#	TIME hrs	FLOW cms	#	TIME hrs	FLOW cms	#									
0.00	0.000		5.83	0.135	11.67	2.587	17.50	15.593	23.33	8.530	29.17	3.068	35.00	0.656	40.83	0.148	46.67	0.037	52.50	0.007	58.33	0.001	64.17	0.000	0.08	0.000	5.92	0.139	11.75	3.360	17.58	15.509	23.42	8.445	29.25	2.990	35.08	0.642	40.92	0.145	46.75	0.036	52.58	0.007	58.42	0.001	64.25	0.000
0.17	0.000		6.00	0.143	11.83	4.498	17.67	15.427	23.50	8.360	29.33	2.916	35.17	0.629	41.00	0.142	46.83	0.036	52.67	0.006	58.50	0.001	64.33	0.000	0.25	0.000	6.08	0.148	11.92	6.002	17.75	15.337	23.58	8.281	29.42	2.843	35.25	0.616	41.08	0.139	46.92	0.035	52.75	0.006	58.58	0.001	64.42	0.000
0.33	0.000		6.17	0.154	12.00	7.778	17.83	15.245	23.67	8.203	29.50	2.772	35.33	0.603	41.17	0.136	47.00	0.034	52.83	0.006	58.67	0.001	64.50	0.000	0.42	0.000	6.25	0.160	12.08	8.741	17.92	15.159	23.75	8.127	29.58	2.704	35.42	0.590	41.25	0.133	47.08	0.033	52.92	0.006	58.75	0.001	64.58	0.000
0.50	0.000		6.33	0.167	12.17	8.614	18.00	15.062	23.83	8.054	29.67	2.639	35.50	0.578	41.33	0.130	47.17	0.033	53.00	0.006	58.83	0.001	64.67	0.000	0.58	0.000	6.42	0.173	12.25	8.251	18.08	14.962	23.92	7.981	29.75	2.576	35.58	0.566	41.42	0.127	47.25	0.032	53.08	0.006	58.92	0.001	64.75	0.000
0.67	0.000		6.50	0.180	12.33	8.064	18.17	14.869	24.00	7.910	29.83	2.514	35.67	0.555	41.50	0.125	47.33	0.031	53.17	0.006	59.00	0.001	64.83	0.000	0.75	0.004	6.58	0.186	12.42	7.988	18.25	14.766	24.08	7.833	29.92	2.455	35.75	0.543	41.58	0.122	47.42	0.030	53.25	0.005	59.08	0.001	64.92	0.000
0.83	0.012		6.67	0.193	12.50	7.991	18.33	14.661	24.17	7.751	30.00	2.398	35.83	0.532	41.67	0.120	47.50	0.030	53.33	0.005	59.17	0.001	65.00	0.000	1.00	0.024	6.75	0.200	12.58	8.028	18.42	14.565	24.25	7.671	30.08	2.343	35.92	0.522	41.75	0.117	47.58	0.029	53.42	0.005	59.25	0.001	65.08	0.000
1.08	0.027		6.92	0.214	12.67	8.079	18.50	14.465	24.33	7.594	30.17	2.289	36.00	0.511	41.83	0.115	47.67	0.028	53.50	0.005	59.33	0.001	65.17	0.000	1.17	0.029	7.00	0.221	12.75	8.188	18.58	14.357	24.42	7.517	30.25	2.238	36.08	0.499	41.92	0.113	47.75	0.028	53.58	0.005	59.42	0.001	65.25	0.000
1.25	0.031		7.08	0.230	12.83	8.355	18.67	14.248	24.50	7.444	30.33	2.188	36.17	0.486	42.00	0.111	47.83	0.027	53.67	0.005	59.50	0.001	65.33	0.000	1.33	0.033	7.17	0.242	13.00	8.818	18.83	14.032	24.67	7.295	30.50	2.091	36.33	0.464	42.17	0.107	48.00	0.026	53.83	0.004	59.67	0.001	65.50	0.000
1.42	0.035		7.25	0.252	13.08	9.095	18.92	13.922	24.75	7.221	30.58	2.044	36.42	0.454	42.25	0.105	48.08	0.025	53.92	0.004	59.75	0.001	65.58	0.000	1.50	0.036	7.33	0.253	13.17	9.391	19.00	13.813	24.83	7.147	30.67	1.936	36.50	0.444	42.33	0.103	48.17	0.025	54.00	0.004	59.83	0.001	65.67	0.000
1.58	0.038		7.42	0.273	13.25	9.720	19.08	13.704	24.92	7.074	30.75	1.946	36.58	0.433	42.42	0.101	48.25	0.024	54.08	0.004	59.92	0.001	65.75	0.000	1.67	0.039	7.50	0.284	13.33	10.074	19.17	13.595	25.00	6.999	30.83	1.897	36.67	0.422	42.50	0.099	48.33	0.024	54.17	0.004	60.00	0.001	65.83	0.000
1.75	0.041		7.58	0.295	13.42	10.444	19.25	13.486	25.08	6.924	30.92	1.849	36.75	0.412	42.58	0.097	48.42	0.023	54.25	0.004	60.08	0.001	65.92	0.000	1.83	0.042	7.67	0.306	13.50	10.818	19.33	13.376	25.17	6.848	31.00	1.803	36.83	0.402	42.67	0.096	48.50	0.023	54.33	0.004	60.17	0.001	66.00	0.000
1.92	0.044		7.75	0.318	13.58	11.188	19.42	13.265	25.25	6.770	31.08	1.758	36.92	0.393	42.75	0.094	48.58	0.022	54.42	0.004	60.25	0.000	66.08	0.000	2.00	0.045	7.83	0.331	13.67	11.551	19.50	13.154	25.33	6.692	31.17	1.713	37.00	0.384	42.83	0.092	48.67	0.022	54.50	0.004	60.33	0.000	66.17	0.000
2.08	0.048		7.92	0.344	13.75	11.912	19.58	13.044	25.42	6.614	31.25	1.671	37.08	0.376	42.92	0.091	48.75	0.021	54.58	0.003	60.42	0.000	66.25	0.000	2.17	0.051	8.00	0.358	13.83	12.269	19.67	12.934	25.50	6.536	31.33	1.631	37.17	0.368	43.00	0.089	48.83	0.021	54.67	0.003	60.50	0.000	66.33	0.000
2.25	0.053		8.08	0.374	13.92	12.620	19.75	12.824	25.58	6.458	31.42	1.593	37.25	0.361	43.08	0.087	48.92	0.020	54.75	0.003	60.58	0.000	66.42	0.000	2.33	0.055	8.17	0.394	14.00	12.961	19.83	12.715	25.67	6.297	31.50	1.557	37.33	0.350	43.17	0.086	49.00	0.020	54.83	0.003	60.67	0.000	66.50	0.000
2.42	0.057		8.25	0.413	14.08	13.285	19.92	12.607	25.75	6.294	31.58	1.522	37.42	0.345	43.25	0.084	49.08	0.019	54.92	0.003	60.75	0.000	66.58	0.000	2.50	0.059	8.33	0.432	14.17	13.588	20.00	12.499	25.83	6.213	31.67	1.489	37.50	0.337	43.33	0.083	49.17	0.019	55.00	0.003	60.83	0.000	66.67	0.000
2.58	0.060		8.42	0.449	14.25	13.871	20.08	12.388	25.92	6.133	31.75	1.457	37.58	0.329	43.42	0.081	49.25	0.018	55.08	0.003	60.92	0.000	66.75	0.000	2.67	0.062	8.50	0.466	14.33	14.137	20.17	12.274	26.00	6.052	31.83	1.425	37.67	0.321	43.50	0.080	49.33	0.018	55.17	0.003	61.00	0.000	66.83	0.000
2.75	0.063		8.58	0.483	14.42	14.389	20.25	12.161	26.08	5.972	31.92	1.395	37.75	0.313	43.58	0.079	49.42	0.017	55.25	0.003	61.08	0.000	66.92	0.000	2.83	0.064	8.67	0.503	14.50	14.623	20.33	12.050	26.17	5.891	32.00	1.366	37.83	0.306	43.67	0.077	49.50	0.017	55.33	0.003	61.17	0.000	67.00	0.000
2.92	0.066		8.75	0.522	14.58	14.840	20.42	11.941	26.25	5.811	32.08	1.338	37.92	0.299	43.75	0.076	49.58	0.017	55.42	0.003	61.25	0.000	67.08	0.000	3.00	0.067	8.83	0.539	14.67	15.041	20.50	11.832	26.33	5.730	32.17	1.310	38.00	0.292	43.83	0.074	49.67	0.016	55.50	0.003	61.33	0.000	67.17	0.000
3.08	0.068		8.92	0.555	14.75	15.227	20.58	11.724	26.42	5.650	32.25	1.284	38.08	0.286	43.92	0.073	49.75	0.016	55.58	0.002	61.42	0.000	67.25	0.000	3.17	0.069	9.00	0.573	14.83	15.398	20.67	11.617	26.50	5.569	32.33	1.258	38.17	0.279	44.00	0.072	49.83	0.015	55.67	0.002	61.50	0.000	67.33	0.000
3.35	0.070		9.08	0.592	14.92	15.554	20.75	11.511	26.58	5.488	32.42	1.244	38.25	0.273	44.08	0.070	49.92	0.015	55.75	0.002	61.58	0.000	67.42	0.000	3.33	0.072	9.17	0.615	15.00	15.701	20.83	11.405	26.67	5.406	32.50	1.209	38.33	0.267	44.17	0.069	50.00	0.015	55.83	0.002	61.67	0.000	67.50	0.000
3.42	0.073		9.25	0.638	15.08	15.833	20.92	11.296	26.75	5.323	32.58	1.186	38.42	0.262	44.25	0.068	50.08	0.014	55.92	0.002	61.75	0.000	67.58	0.000	3.50	0.074	9.33	0.662	15.17	15.943	21.00	11.187	26.83	5.240	32.67	1.162	38.50	0.256	44.33	0.066	50.17	0.014	56.00	0.002	61.83	0.000	67.67	0.000
3.58	0.075		9.42	0.687	15.25	16.040	21.08	11.081	26.92	5.157	32.75	1.139	38.58	0.251	44.42	0.065	50.25	0.014	56.08	0.002	61.92	0.000	67.75	0.000	3.67	0.076	9.50	0.712	15.33	16.126	21.17	10.973	27.00	5.074	32.83	1.117	38.67	0.246	44.50	0.064	50.33	0.013	56.17	0.002	62.00	0.000	67.83	0.000
3.75	0.077		9.58	0.741	15.42	16.197	21.25	10.865	27.08	4.992	32.92	1.093	38.75	0.241	44.58	0.063	50.42	0.013	56.25	0.002	62.08	0.000	67.92	0.000	3.83	0.078	9.67	0.772	15.50	16.255	21.33	10.763	27.17	4.911	33.00	1.068	38.83	0.236	44.67	0.061	50.50	0.013	56.33	0.002	62.17	0.000	68.00	0.000
3.92	0.079		9.75	0.803	15.58	16.307	21.42	10.660	27.25	4.829	33.08	1.045	38.92	0.232	44.75	0.060	50.58	0.012	56.42	0.002	62.25	0.000	68.08	0.000	4.00	0.080	9.83	0.834	15.67	16.346	21.50	10.558	27.33	4.747	33.17	1.022	39.00	0.227	44.83	0.059	50.67	0.012	56.50	0.002	62.33	0.000	68.17	0.000
4.08	0.082		9.92	0.865	15.75	16.367	21.58	10.457	27.42	4.666	33.25	1.000	39.08	0.223	44.92	0.058	50.75	0.012</																														

FORTUNE (VG SUMMER)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—□—	H-FORTUN.100: Fortune	5.00	1126.70	16.377	15.917	61.17	6.892E+05	64.750	2.957

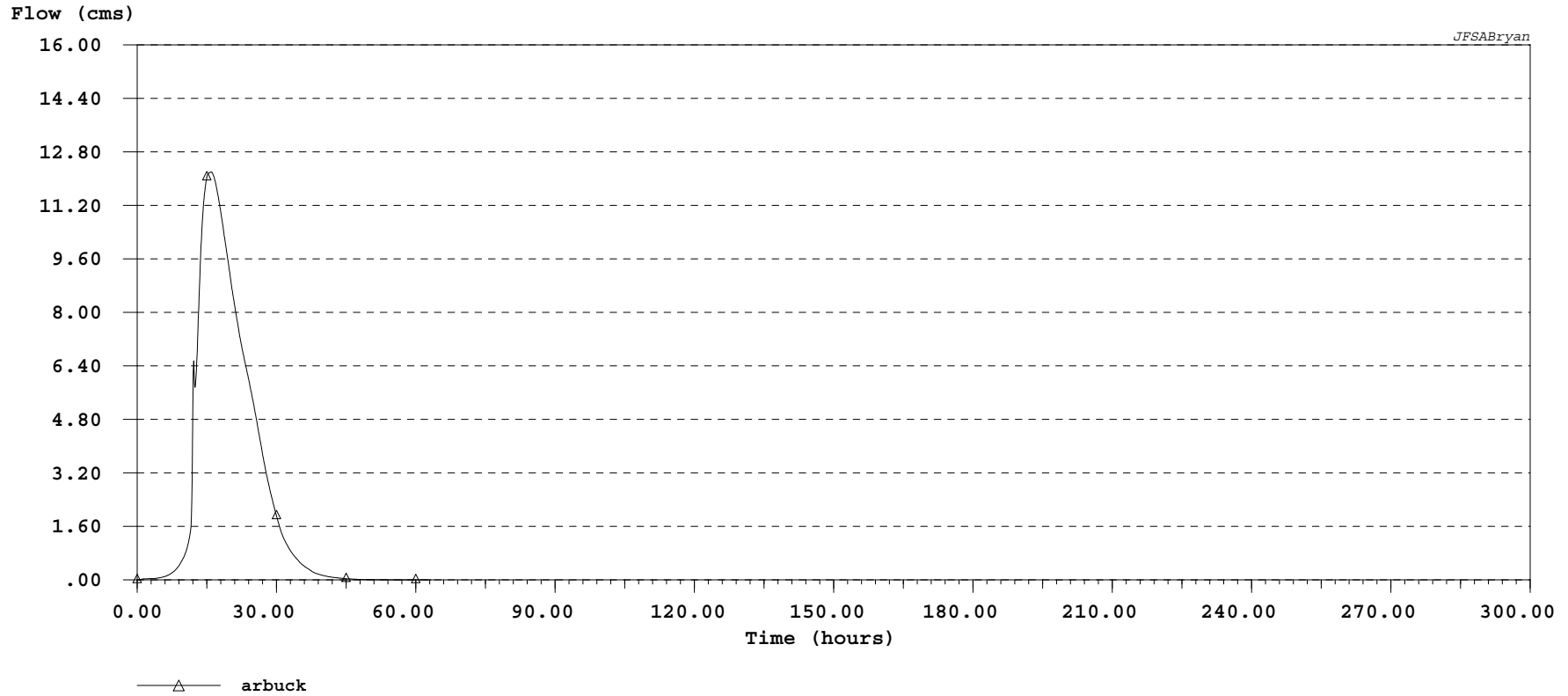
Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM-1\H-FORTUN.100

Comment in file : Fortune

#	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME	FLOW								
#	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms	hrs	cms								
0.00	0.000		5.83	0.139	11.67	2.577	17.50	15.355	23.33	8.272	29.17	2.784	35.00	0.579	40.83	0.114	46.67	0.027	52.50	0.005	58.33	0.001	64.17	0.000	70.00	0.000	75.83	0.001	81.67	0.000	87.50	0.000	93.33	0.001	99.17	0.000
0.08	0.000		5.92	0.144	11.75	3.178	17.58	15.275	23.42	8.194	29.25	2.713	35.08	0.565	40.92	0.111	46.75	0.027	52.58	0.004	58.42	0.001	64.25	0.000	70.08	0.000	75.88	0.001	81.67	0.000	87.58	0.000	93.38	0.001	99.17	0.000
0.17	0.000		6.00	0.151	11.83	4.031	17.67	15.189	23.50	8.116	29.33	2.647	35.17	0.551	41.00	0.108	46.83	0.026	52.67	0.004	58.50	0.001	64.33	0.000	70.17	0.000	75.97	0.001	81.77	0.000	87.67	0.000	93.47	0.001	99.27	0.000
0.25	0.000		6.08	0.158	11.92	5.068	17.75	15.071	23.58	8.041	29.42	2.583	35.25	0.537	41.08	0.105	46.92	0.025	52.75	0.004	58.58	0.001	64.42	0.000	70.25	0.000	76.07	0.001	81.87	0.000	87.77	0.000	93.57	0.001	99.37	0.000
0.33	0.000		6.17	0.166	12.00	6.275	17.83	14.991	23.67	7.970	29.50	2.522	35.33	0.525	41.17	0.103	47.00	0.025	52.83	0.004	58.67	0.001	64.50	0.000	70.33	0.000	76.17	0.001	81.97	0.000	87.87	0.000	93.67	0.001	99.47	0.000
0.42	0.000		6.25	0.175	12.08	7.069	17.92	14.904	23.75	7.900	29.58	2.462	35.42	0.513	41.25	0.101	47.08	0.024	52.92	0.004	58.75	0.001	64.58	0.000	70.42	0.000	76.25	0.001	82.07	0.000	87.97	0.000	93.77	0.001	99.57	0.000
0.50	0.000		6.33	0.184	12.17	7.294	18.00	14.775	23.83	7.829	29.67	2.401	35.50	0.502	41.33	0.099	47.17	0.024	53.00	0.004	58.83	0.001	64.67	0.000	70.50	0.000	76.33	0.001	82.17	0.000	88.07	0.000	93.87	0.001	99.67	0.000
0.58	0.000		6.42	0.193	12.25	7.354	18.08	14.687	23.92	7.760	29.75	2.341	35.58	0.491	41.42	0.097	47.25	0.023	53.08	0.004	58.92	0.001	64.75	0.000	70.58	0.000	76.42	0.001	82.25	0.000	88.17	0.000	93.97	0.001	99.77	0.000
0.67	0.000		6.50	0.201	12.33	7.424	18.17	14.596	24.00	7.689	29.83	2.283	35.67	0.481	41.50	0.095	47.33	0.023	53.17	0.006	59.00	0.000	64.83	0.000	70.67	0.000	76.50	0.001	82.33	0.000	88.25	0.000	94.07	0.001	99.87	0.000
0.75	0.002		6.58	0.208	12.42	7.516	18.25	14.461	24.08	7.616	29.92	2.227	35.75	0.471	41.58	0.093	47.42	0.022	53.25	0.004	59.08	0.000	64.92	0.000	70.75	0.000	76.58	0.001	82.42	0.000	88.33	0.000	94.17	0.001	99.97	0.000
0.83	0.007		6.67	0.214	12.50	7.675	18.33	14.372	24.17	7.539	30.00	2.174	35.83	0.461	41.67	0.092	47.50	0.022	53.33	0.003	59.17	0.000	65.00	0.000	70.83	0.000	76.67	0.001	82.50	0.000	88.42	0.000	94.25	0.001	100.00	0.000
0.92	0.012		6.75	0.221	12.58	7.882	18.42	14.281	24.25	7.463	30.08	2.123	35.92	0.452	41.75	0.090	47.58	0.021	53.42	0.003	59.25	0.000	65.08	0.000	70.92	0.000	76.75	0.001	82.58	0.000	88.50	0.000	94.33	0.001	100.00	0.000
1.00	0.015		6.83	0.228	12.67	8.103	18.50	14.170	24.33	7.387	30.17	2.074	36.00	0.442	41.83	0.088	47.67	0.020	53.50	0.003	59.33	0.000	65.17	0.000	71.00	0.000	76.83	0.001	82.67	0.000	88.58	0.000	94.42	0.001	100.00	0.000
1.08	0.018		6.92	0.235	12.75	8.364	18.58	14.057	24.42	7.312	30.25	2.027	36.08	0.433	41.92	0.087	47.75	0.020	53.58	0.003	59.42	0.000	65.25	0.000	71.08	0.000	76.92	0.001	82.75	0.000	88.67	0.000	94.50	0.001	100.00	0.000
1.17	0.020		7.00	0.243	12.83	8.662	18.67	13.954	24.50	7.237	30.33	1.979	36.17	0.424	42.00	0.085	47.83	0.020	53.67	0.003	59.50	0.000	65.33	0.000	71.17	0.000	77.00	0.001	82.83	0.000	88.75	0.000	94.58	0.001	100.00	0.000
1.25	0.022		7.08	0.252	12.92	8.985	18.75	13.848	24.58	7.162	30.42	1.933	36.25	0.415	42.08	0.084	47.92	0.019	53.75	0.003	59.58	0.000	65.42	0.000	71.25	0.000	77.08	0.001	82.92	0.000	88.83	0.000	94.67	0.001	100.00	0.000
1.33	0.025		7.17	0.263	13.00	9.335	18.83	13.736	24.67	7.087	30.50	1.887	36.33	0.407	42.17	0.082	48.00	0.019	53.83	0.003	59.67	0.000	65.50	0.000	71.33	0.000	77.17	0.001	83.00	0.000	88.92	0.000	94.75	0.001	100.00	0.000
1.42	0.026		7.25	0.274	13.08	9.704	18.92	13.627	24.75	7.011	30.58	1.840	36.42	0.398	42.25	0.081	48.08	0.018	53.92	0.003	59.75	0.000	65.58	0.000	71.42	0.000	77.25	0.001	83.08	0.000	89.00	0.000	94.83	0.001	100.00	0.000
1.50	0.028		7.33	0.286	13.17	10.084	19.00	13.518	24.83	6.935	30.67	1.793	36.50	0.390	42.33	0.080	48.17	0.018	54.00	0.003	59.83	0.000	65.67	0.000	71.50	0.000	77.33	0.001	83.17	0.000	89.08	0.000	94.92	0.001	100.00	0.000
1.58	0.030		7.42	0.298	13.25	10.474	19.08	13.407	24.92	6.859	30.75	1.747	36.58	0.382	42.42	0.078	48.25	0.017	54.08	0.003	59.92	0.000	65.75	0.000	71.58	0.000	77.42	0.001	83.25	0.000	89.17	0.000	95.00	0.001	100.00	0.000
1.67	0.031		7.50	0.309	13.33	10.864	19.17	13.296	25.00	6.782	30.83	1.702	36.67	0.374	42.50	0.077	48.33	0.017	54.17	0.003	60.00	0.000	65.83	0.000	71.67	0.000	77.50	0.001	83.33	0.000	89.25	0.000	95.08	0.001	100.00	0.000
1.75	0.032		7.58	0.322	13.42	11.257	19.25	13.184	25.08	6.702	30.92	1.659	36.75	0.366	42.58	0.076	48.42	0.017	54.25	0.003	60.08	0.000	65.92	0.000	71.75	0.000	77.58	0.001	83.42	0.000	89.33	0.000	95.17	0.001	100.00	0.000
1.83	0.034		7.67	0.334	13.50	11.648	19.33	13.072	25.17	6.620	31.00	1.618	36.83	0.359	42.67	0.074	48.50	0.016	54.33	0.002	60.17	0.000	66.00	0.000	71.83	0.000	77.67	0.001	83.50	0.000	89.42	0.000	95.25	0.001	100.00	0.000
1.92	0.035		7.75	0.347	13.58	12.026	19.42	12.957	25.25	6.539	31.08	1.579	36.92	0.351	42.75	0.073	48.58	0.016	54.42	0.002	60.25	0.000	66.08	0.000	71.92	0.000	77.75	0.001	83.58	0.000	89.50	0.000	95.33	0.001	100.00	0.000
2.00	0.036		7.83	0.360	13.67	12.389	19.50	12.844	25.33	6.457	31.17	1.542	37.00	0.344	42.83	0.072	48.67	0.015	54.50	0.002	60.33	0.000	66.17	0.000	72.00	0.000	77.83	0.001	83.67	0.000	89.58	0.000	95.42	0.001	100.00	0.000
2.08	0.037		7.92	0.374	13.75	12.741	19.58	12.734	25.42	6.377	31.25	1.505	37.08	0.337	42.92	0.070	48.75	0.015	54.58	0.002	60.42	0.000	66.25	0.000	72.08	0.000	77.92	0.001	83.75	0.000	89.67	0.000	95.50	0.001	100.00	0.000
2.17	0.039		8.00	0.388	13.83	13.074	19.67	12.624	25.50	6.298	31.33	1.471	37.17	0.330	43.00	0.069	48.83	0.015	54.67	0.002	60.50	0.000	66.33	0.000	72.17	0.000	78.00	0.001	83.83	0.000	89.75	0.000	95.58	0.001	100.00	0.000
2.25	0.041		8.08	0.404	13.92	13.393	19.75	12.512	25.58	6.219	31.42	1.437	37.25	0.321	43.08	0.069	48.92	0.014	54.75	0.002	60.58	0.000	66.42	0.000	72.25	0.000	78.08	0.001	83.92	0.000	89.83	0.000	95.67	0.001	100.00	0.000
2.33	0.043		8.17	0.422	14.00	13.694	19.83	12.403	25.67	6.138	31.50	1.405	37.33	0.312	43.17	0.068	49.00	0.014	54.83	0.002	60.67	0.000	66.50	0.000	72.33	0.000	78.17	0.001	84.00	0.000	89.92	0.000	95.75	0.001	100.00	0.000
2.42	0.044		8.25	0.441	14.08	13.980	19.92	12.296	25.75	6.055	31.58	1.375	37.42	0.303	43.25	0.066	49.08	0.014	54.92	0.002	60.75	0.000	66.58	0.000	72.42	0.000	78.25	0.001	84.08	0.000	90.00	0.000	95.83	0.001	100.00	0.000
2.50	0.045		8.33	0.460	14.17	14.242	20.00	12.186	25.83	5.983	31.67	1.344	37.50	0.294	43.33	0.065	49.17	0.013	55.00	0.002	60.83	0.000	66.67	0.000	72.50	0.000	78.33	0.001	84.17	0.000	90.08	0.000	95.92	0.001	100.00	0.000
2.58	0.046		8.42	0.477	14.25	14.489	20.08	12.074	25.92	5.906	31.75	1.314	37.58	0.285	43.42	0.063	49.25	0.013	55.08	0.002	60.92	0.0														

ARBUCK (VG SUMMER)



Hydrograph Statistics:

Legend	Filename & Comment	Time Step (min)	Drainage Area (ha)	Peak Flow (cms)	Time to Peak (hrs)	Runoff Volume (mm)	Runoff Volume (cu.m)	Duration of flow (hrs)	Average flow (cms)
—△—	H-ARBUCK.100: ar buck	5.00	890.10	12.200	15.917	59.38	5.285E+05	63.250	2.321

Hydrograph Table:

Hydrograph Filename : Z:\PROJ\709-08\DESIGN\SWMHYMO\JFSA\VGSUMM~1\H-ARBUCK.100
Comment in file : arbruck

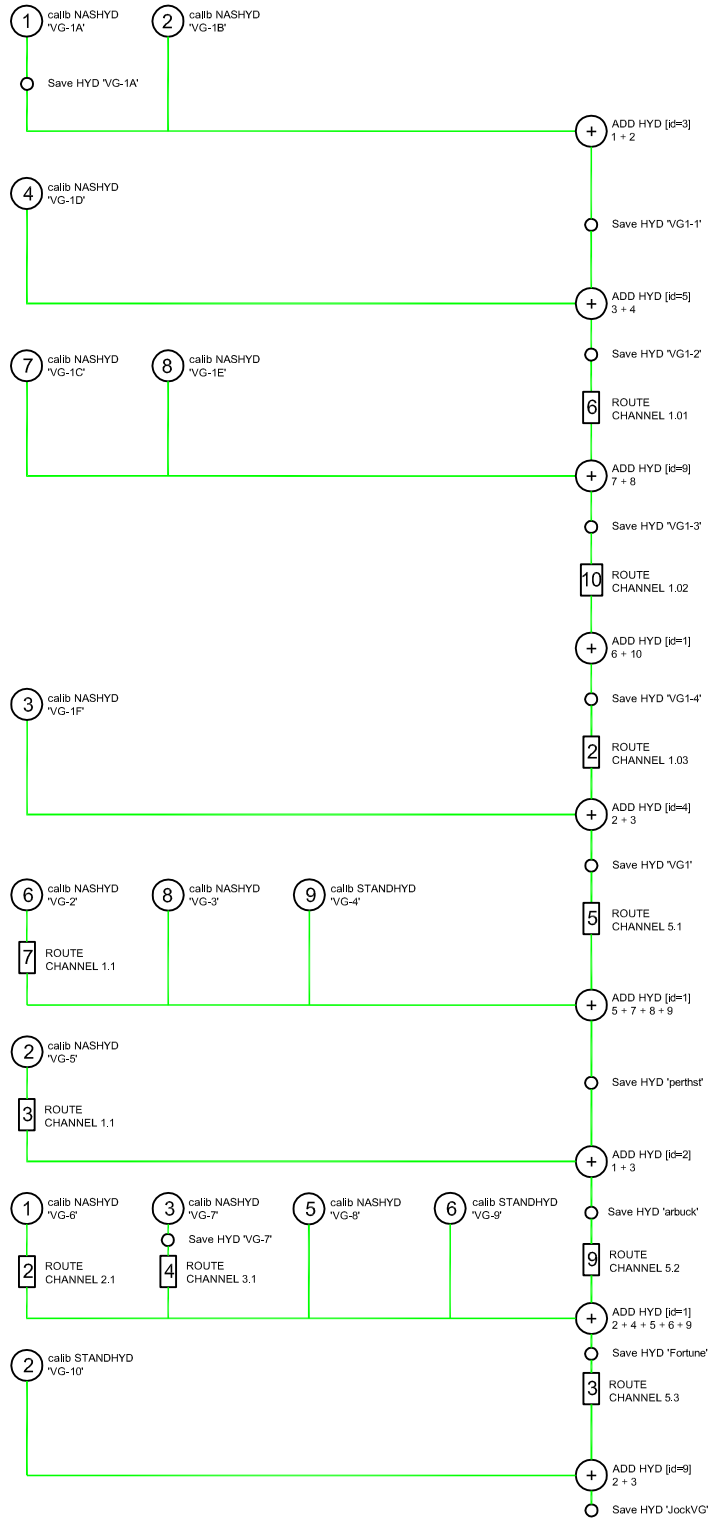
#	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms	TIME hrs	FLOW cms
0.00	0.000		5.75	0.092	11.50	1.466	17.25	11.605	23.00	6.645	28.75	2.594	34.50	0.609	40.25	0.124	46.00	0.026	51.75	0.004	57.50	0.001		
0.08	0.000		5.83	0.095	11.58	1.611	17.33	11.548	23.08	6.590	28.83	2.546	34.58	0.595	40.33	0.121	46.08	0.025	51.83	0.004	57.58	0.001		
0.17	0.000		5.92	0.099	11.67	1.842	17.42	11.487	23.17	6.536	28.92	2.499	34.67	0.582	40.42	0.119	46.17	0.024	51.92	0.004	57.67	0.001		
0.25	0.000		6.00	0.102	11.75	2.352	17.50	11.423	23.25	6.482	29.00	2.453	34.75	0.568	40.50	0.116	46.25	0.024	52.00	0.004	57.75	0.000		
0.33	0.000		6.08	0.107	11.83	3.059	17.58	11.355	23.33	6.429	29.08	2.406	34.83	0.554	40.58	0.114	46.33	0.023	52.08	0.004	57.83	0.000		
0.42	0.000		6.17	0.111	11.92	4.111	17.67	11.283	23.42	6.375	29.17	2.359	34.92	0.541	40.67	0.111	46.42	0.023	52.17	0.003	57.92	0.000		
0.50	0.000		6.25	0.117	12.00	5.339	17.75	11.222	23.50	6.322	29.25	2.313	35.00	0.528	40.75	0.109	46.50	0.022	52.25	0.003	58.00	0.000		
0.58	0.000		6.33	0.122	12.08	6.205	17.83	11.155	23.58	6.269	29.33	2.267	35.08	0.515	40.83	0.107	46.58	0.022	52.33	0.003	58.08	0.000		
0.67	0.000		6.42	0.127	12.17	6.549	17.92	11.071	23.67	6.216	29.42	2.221	35.17	0.504	40.92	0.104	46.67	0.021	52.42	0.003	58.17	0.000		
0.75	0.002		6.50	0.132	12.25	6.276	18.00	10.989	23.75	6.163	29.50	2.176	35.25	0.493	41.00	0.102	46.75	0.021	52.50	0.003	58.25	0.000		
0.83	0.006		6.58	0.137	12.33	5.903	18.08	10.923	23.83	6.111	29.58	2.131	35.33	0.482	41.08	0.100	46.83	0.020	52.58	0.003	58.33	0.000		
0.92	0.013		6.67	0.142	12.42	5.758	18.17	10.853	23.92	6.057	29.67	2.085	35.42	0.472	41.17	0.098	46.92	0.020	52.67	0.003	58.42	0.000		
1.00	0.019		6.75	0.148	12.50	5.777	18.25	10.767	24.00	6.003	29.75	2.041	35.50	0.463	41.25	0.096	47.00	0.019	52.75	0.003	58.50	0.000		
1.08	0.023		6.83	0.153	12.58	5.890	18.33	10.698	24.08	5.946	29.83	1.997	35.58	0.453	41.33	0.094	47.08	0.018	52.83	0.003	58.58	0.000		
1.17	0.026		6.92	0.158	12.67	6.062	18.42	10.624	24.17	5.888	29.92	1.954	35.67	0.444	41.42	0.092	47.17	0.018	52.92	0.003	58.67	0.000		
1.25	0.028		7.00	0.164	12.75	6.269	18.50	10.535	24.25	5.827	30.00	1.912	35.75	0.435	41.50	0.090	47.25	0.018	53.00	0.003	58.75	0.000		
1.33	0.029		7.08	0.171	12.83	6.523	18.58	10.464	24.33	5.768	30.08	1.872	35.83	0.426	41.58	0.088	47.33	0.017	53.08	0.003	58.83	0.000		
1.42	0.030		7.17	0.179	12.92	6.822	18.67	10.390	24.42	5.710	30.17	1.831	35.92	0.417	41.67	0.086	47.42	0.017	53.17	0.002	58.92	0.000		
1.50	0.031		7.25	0.186	13.00	7.151	18.75	10.296	24.50	5.654	30.25	1.790	36.00	0.408	41.75	0.084	47.50	0.016	53.25	0.002	59.00	0.000		
1.58	0.031		7.33	0.196	13.08	7.491	18.83	10.224	24.58	5.597	30.33	1.749	36.08	0.399	41.83	0.082	47.58	0.016	53.33	0.002	59.08	0.000		
1.67	0.031		7.42	0.204	13.17	7.829	18.92	10.148	24.67	5.540	30.42	1.709	36.17	0.390	41.92	0.081	47.67	0.015	53.42	0.002	59.17	0.000		
1.75	0.032		7.50	0.213	13.25	8.158	19.00	10.065	24.75	5.483	30.50	1.669	36.25	0.382	42.00	0.079	47.75	0.015	53.50	0.002	59.25	0.000		
1.83	0.032		7.58	0.221	13.33	8.481	19.08	9.984	24.83	5.425	30.58	1.628	36.33	0.374	42.08	0.078	47.83	0.014	53.58	0.002	59.33	0.000		
1.92	0.032		7.67	0.229	13.42	8.797	19.17	9.905	24.92	5.366	30.67	1.589	36.42	0.366	42.17	0.076	47.92	0.014	53.67	0.002	59.42	0.000		
2.00	0.032		7.75	0.237	13.50	9.106	19.25	9.827	25.00	5.307	30.75	1.552	36.50	0.358	42.25	0.075	48.00	0.014	53.75	0.002	59.50	0.000		
2.08	0.032		7.83	0.246	13.58	9.405	19.33	9.750	25.08	5.247	30.83	1.514	36.58	0.350	42.33	0.073	48.08	0.013	53.83	0.002	59.58	0.000		
2.17	0.033		7.92	0.254	13.67	9.691	19.42	9.673	25.17	5.186	30.92	1.477	36.67	0.343	42.42	0.072	48.17	0.013	53.92	0.002	59.67	0.000		
2.25	0.035		8.00	0.264	13.75	9.954	19.50	9.596	25.25	5.126	31.00	1.442	36.75	0.335	42.50	0.070	48.25	0.012	54.00	0.002	59.75	0.000		
2.33	0.036		8.08	0.274	13.83	10.201	19.58	9.519	25.33	5.063	31.08	1.409	36.83	0.328	42.58	0.069	48.33	0.012	54.08	0.002	59.83	0.000		
2.42	0.036		8.17	0.286	13.92	10.431	19.67	9.443	25.42	5.001	31.17	1.376	36.92	0.321	42.67	0.068	48.42	0.012	54.17	0.002	59.92	0.000		
2.50	0.037		8.25	0.299	14.00	10.646	19.75	9.361	25.50	4.938	31.25	1.345	37.00	0.314	42.75	0.066	48.50	0.011	54.25	0.002	60.00	0.000		
2.58	0.037		8.33	0.312	14.08	10.841	19.83	9.278	25.58	4.875	31.33	1.315	37.08	0.307	42.83	0.065	48.58	0.011	54.33	0.002	60.08	0.000		
2.67	0.038		8.42	0.325	14.17	11.014	19.92	9.197	25.67	4.810	31.42	1.287	37.17	0.300	42.92	0.064	48.67	0.011	54.42	0.002	60.17	0.000		
2.75	0.038		8.50	0.338	14.25	11.169	20.00	9.109	25.75	4.743	31.50	1.260	37.25	0.292	43.00	0.062	48.75	0.011	54.50	0.002	60.25	0.000		
2.83	0.038		8.58	0.351	14.33	11.309	20.08	9.024	25.83	4.677	31.58	1.234	37.33	0.284	43.08	0.066	48.83	0.010	54.58	0.002	60.33	0.000		
2.92	0.038		8.67	0.366	14.42	11.436	20.17	8.942	25.92	4.610	31.67	1.209	37.42	0.276	43.17	0.060	48.92	0.010	54.67	0.001	60.42	0.000		
3.00	0.038		8.75	0.381	14.50	11.550	20.25	8.861	26.00	4.543	31.75	1.185	37.50	0.267	43.25	0.058	49.00	0.010	54.75	0.001	60.50	0.000		
3.08	0.039		8.83	0.396	14.58	11.655	20.33	8.782	26.08	4.477	31.83	1.161	37.58	0.259	43.33	0.057	49.08	0.010	54.83	0.001	60.58	0.000		
3.17	0.039		8.92	0.411	14.67	11.749	20.42	8.707	26.17	4.412	31.92	1.138	37.67	0.250	43.42	0.056	49.17	0.009	54.92	0.001	60.67	0.000		
3.25	0.039		9.00	0.426	14.75	11.834	20.50	8.632	26.25	4.348	32.00	1.116	37.75	0.243	43.50	0.055	49.25	0.009	55.00	0.001	60.75	0.000		
3.33	0.039		9.08	0.443	14.83	11.913	20.58	8.558	26.33	4.284	32.08	1.094	37.83	0.236	43.58	0.053	49.33	0.009	55.08	0.001	60.83	0.000		
3.42	0.040		9.17	0.462	14.92	11.984	20.67	8.484	26.42	4.220	32.17	1.073	37.92	0.230	43.67	0.052	49.42	0.009	55.17	0.001	60.92	0.000		
3.50	0.040		9.25	0.482	15.00	12.046	20.75	8.411	26.50	4.156	32.25	1.052	38.00	0.224	43.75	0.051	49.50	0.008	55.25	0.001	61.00	0.000		
3.58	0.040		9.33	0.502	15.08	12.099	20.83	8.338	26.58	4.092	32.33	1.031	38.08	0.219	43.83	0.050	49.58	0.008	55.33	0.001	61.08	0.000		
3.67	0.041		9.42	0.523	15.17	12.130	20.92	8.266	26.67	4.028	32.42	1.010	38.17	0.214	43.92	0.048	49.67	0.008	55.42	0.001	61.17	0.000		
3.75	0.041		9.50	0.543	15.25	12.145	21.00	8.195	26.75	3.964	32.50	0.989	38.25	0.209	44.00	0.047	49.75	0.008	55.50	0.001	61.25	0.000		
3.83	0.042		9.58	0.563	15.33	12.154	21.08	8.124	26.83	3.899	32.58	0.968	38.33	0.204	44.08	0.046	49.83	0.007	55.58	0.001	61.33	0.000		
3.92	0.042		9.67	0.584	15.42	12.165	21.17	8.054	26.92	3.835	32.67	0.948	38.42	0.199	44.17	0.045	49.92	0.007	55.67	0.001	61.42	0.000		
4.00	0.043		9.75	0.607	15.50	12.166	21.25	7.983	27.00	3.769	32.75	0.928	38.50	0.195	44.25	0.044	50.00	0.007	55.75	0.001	61.50	0.000		
4.08	0.045		9.83	0.628	15.58	12.174	21.33	7.913	27.08	3.703	32.83	0.908	38.58	0.190	44.33	0.043	50.08	0.007	55.83	0.001	61.58	0.000		
4.17	0.047		9.92	0.648	15.67	12.184	21.42	7.844	27.17	3.638	32.92	0.889	38.67	0.186	44.42	0.042	50.17	0.007	55.92	0.001	61.67	0.000		
4.25	0.050		10.00	0.669	15.75	12.193</																		


APPENDIX J


SWMHYMO Model Schematic



SWMHYMO MODEL SCHEMATIC



BY :  WATER RESOURCES AND ENVIRONMENTAL CONSULTANTS

CLIENT :  3889 RIDEAU VALLEY DRIVE
MANDICK, ONTARIO, K4M 1A5
(613) 692-3571

PROJECT : **VILLAGE OF RICHMOND FLOODPLAIN MAPPING**

TITLE : **Hydrologic Model Schematic**

APPENDIX K

No.	BY	DATE	DESCRIPTION	APPR.

DRAWING REF.: SWMHYMO Model Schematic.dwg

LEGEND:

- 3 ROUTE CHANNEL
- + ADD HYDROGRAPH
- SAVE HYDROGRAPH

DESIGNED :
DRAWN : B.W.
VERIFIED :
APPROVED : J.F.S

DATE	PROJECT No.
June/09	709-08

APPENDIX K

Structures Details



P709 – Richmond Floodplain Mapping

Structures

MC = Main Channel

JRT = Joys Road Tributary

MD = Moore Drain

Structure Location	Material	Length (m)	Width (m)	Height (m)	Inverts		Source of Information ⁽¹⁾	Included in JFSA HEC-RAS Models (Y/N)	Comments
					Upstream (m)	Downstream (m)			
339 m Downstream of Garvin Road (MC)	-	-	-	-	-	-	No Info Available	N	-
385m Upstream of Perth Street (MC)	CSP	10.0	2.0	2.0	93.07	93.05	Robinson 2003 Report	Y	2003 Report: Proposed Culvert
100 m Upstream of Perth Street (MC)	Steel	5.0	1.2	1.2	92.49	92.45	Robinson 2003 Report	N	2003 Report: To Be Removed
Perth Street Culvert (MC)	Concrete	27.8	4.9	1.8	92.61	92.47	J.D. Barnes Survey 07/30/2008	Y	-
335 m Downstream of Perth Street (MC)	PVC	3.2	1.0	1.0	92.02	92.13	Robinson 2008 Cross Sections	N	-
Fortune Street Culvert	Concrete	18.6	4.2	2.4	91.73	91.74	Robinson 2008 Cross Sections	Y	-
Fowler Street Culvert	Concrete	10.4	4.1	2.1	91.06	91.08	2004 HEC-RAS Model	Y	-
285 m From MC (JRT)	-	5.1	-	-	-	-	No Info Available	N	-
Cross Culvert - Joy's Road (JRT)	CSP	11.0	1.5	1.5	96.16	95.83	JFSA Surveyed	Y	-
78 m From MC (MD)	CSP	6.0	1.0	1.0	92.32	92.23	Robinson 2008 Cross Sections	N	-
598 m From MC (MD)	CSP	4.2	0.6	0.6	94.33	94.12	Robinson 2008 Cross Sections	N	-

⁽¹⁾ No information available means the existence of a structure is indicated on the 1:2000 mapping, however the verification of the existence and details of the structure was not completed

APPENDIX L

Background Information on Snowmelt + Rain Events



EXPLANATION OF RAIN + SNOWMELT EXTREME VALUE ANALYSIS

**PREPARED BY THE HYDROMETEOROLOGY DIVISION, CANADIAN CLIMATE CENTRE
ATMOSPHERIC ENVIRONMENT SERVICE**

Daily rainfall and snowmelt estimates for the noted stations are analysed assuming a Gumbel extreme value distribution. Data are for the period of record shown on the attached computer printout. The results provide annual extreme values for durations from 1 to 30 days and estimated amounts for return periods up to 100 years. The snowmelt estimates were based on degree-day type equations. Five different snowmelt equations were used giving five different sets of snowmelt values.

Data

The input data used in this analysis and in the calculation of the snowmelt estimates were daily maximum and minimum temperatures, daily rainfall total and daily depth of fresh snow measurements by ruler. A snow density of 0.1 was assumed to convert snow depth into its water equivalent. Such snow measurements may not be spatially representative. The snowmelt estimates should therefore be considered with the same precaution in mind.

Snowmelt Calculation

Daily snowmelt estimates were calculated using degree-day type equations. Five different equations were used and a description of each is given below. The units of measure indicated below are the units used in the original presentation of the model. All models and resulting output have been converted to metric (SI) units in the computer software. The algorithm for accumulating and depleting the snow pack is given in Figure 1.

1) **Model 1 - Eastern Canada Forested Basin**

$$SM1 = 0.0397 (T_a - 27.6) \text{ (inches/day)}$$

T_a = mean daily air temperatures F

Ref: Pysklywec, D.W., K.S. Davar and D.I. Bray (1968): Snowmelt at an Index Plot, Water Resour. Res., 4(5), 937-946.

2) **Model 2 - Western North America Mountain Basin**

$$SM2 = (0.074 + 0.007 R) (T_a - 32) + 0.05 \text{ (inches/day)}$$

R = daily rainfall in inches

T_a = mean daily air temperature F

Ref: United States Army Corps of Engineers (1956): Snow Hydrology, North Pacific Division, Portland, Oregon

3) **Model 3 - Western Canada Mountain Basin**

$$SM3 = 3.0 (T_a + TCA) (((T_x - T_N)/8) + T_N) \text{ (mm/day)}$$

T_a = mean daily air temperatures C

T_x = maximum daily temperature C

T_N = minimum daily temperature C

$TCA = (T_N/4.4)$ but must be IN THE RANGE OF 0 TO 1.5

Ref: Quick, M.C. and A. Pipes (1975): The UBC Watershed Model, Proceedings of Symposium in Bratislava, Application of Mathematical Models in Hydrology and Water Resource Systems, IAHS Pub. No. 115

4) **Model 4 - Southern Ontario**

$$SM4 = 0.02 (T_x - 32) \text{ (inches/day)}$$

T_x = maximum daily air temperature F

Ref: Bruce, J.P. and R.H. Clark (1966): Introduction to Hydro meteorology, p. 257, Pergamon Press, Toronto

5) **Model 5 - Modification of Model 4**

$$SM5 = 0.08 (T_a - 32) \text{ (inches/day)}$$

T_a = mean daily air temperature F

Method of Analysis

The algorithm is based upon synthetic snowpacks which are accumulated according to the daily snowfall measurements and depleted according to the snowmelt as determined by each of the snowmelt models. The algorithm ceases to operate when the synthetic snowpack is reduced to zero. Daily rainfall is added to the daily snowmelt as calculated by each model and the maxima of the combined rain plus snowmelt values are used to determine the annual maximum series for the different durations.

Maximum annual values for rainfall plus snowmelt for each of the five snowmelt estimate data sets were determined for 1 to 30 day periods. These annual maximum value series were then analyzed assuming a Gumbel extreme value (EV1) distribution and using a method of moments fit (see Hogg and Carr, 1985) to derive extreme value estimates for return periods up to 100 years. The annual maximum values for each duration period have been tabulated together with the starting date of each maximum event.

No attempt was made to estimate missing data. Periods with missing data were not analyzed for maximum values but an annual maximum was still determined provided 90% of the data were available for the critical period of the year as specified on the printout. Such annual maxima based on an incomplete data year are flagged; (**).

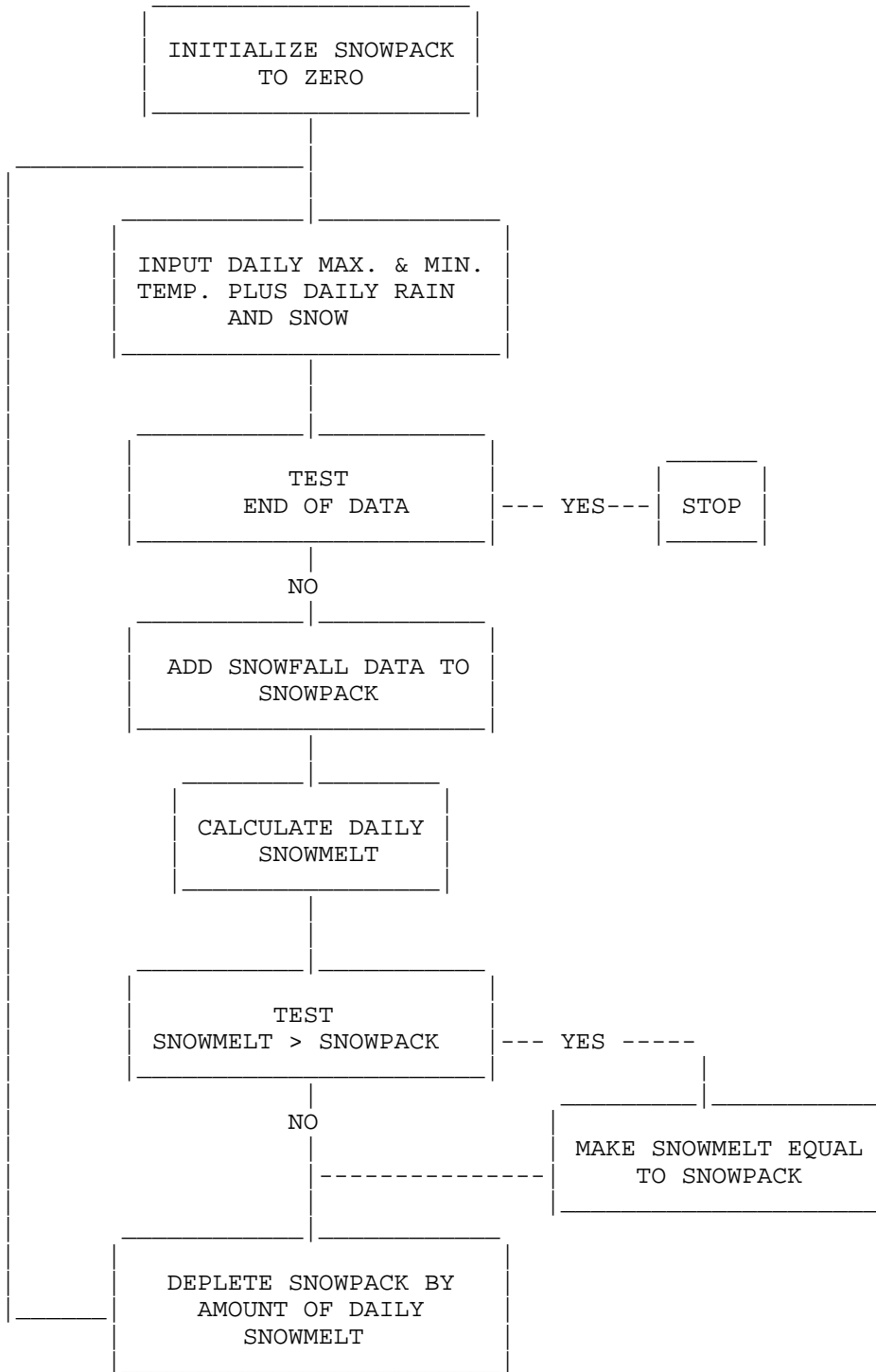
Rigorous testing of the annual maximum series for goodness of fit to the Gumbel distribution has not been done. However, plots of several randomly chosen series on Gumbel graph paper have shown reasonably good fits. (See Louie and Hogg, 1980)

References

- Hogg, W.D. and D.A. Carr, 1985. Rainfall Frequency Atlas for Canada. 90 pp., Supply & Services Canada, ISBN 0-660-52992-0, Ottawa.
- Louie, P.Y.T. and W.D. Hogg, 1980. Extreme Value Estimates of Snowmelt, Proc. CDN. Hydrol. Symp.: 80. PP 64-78. NRC Ottawa

FIGURE # 1

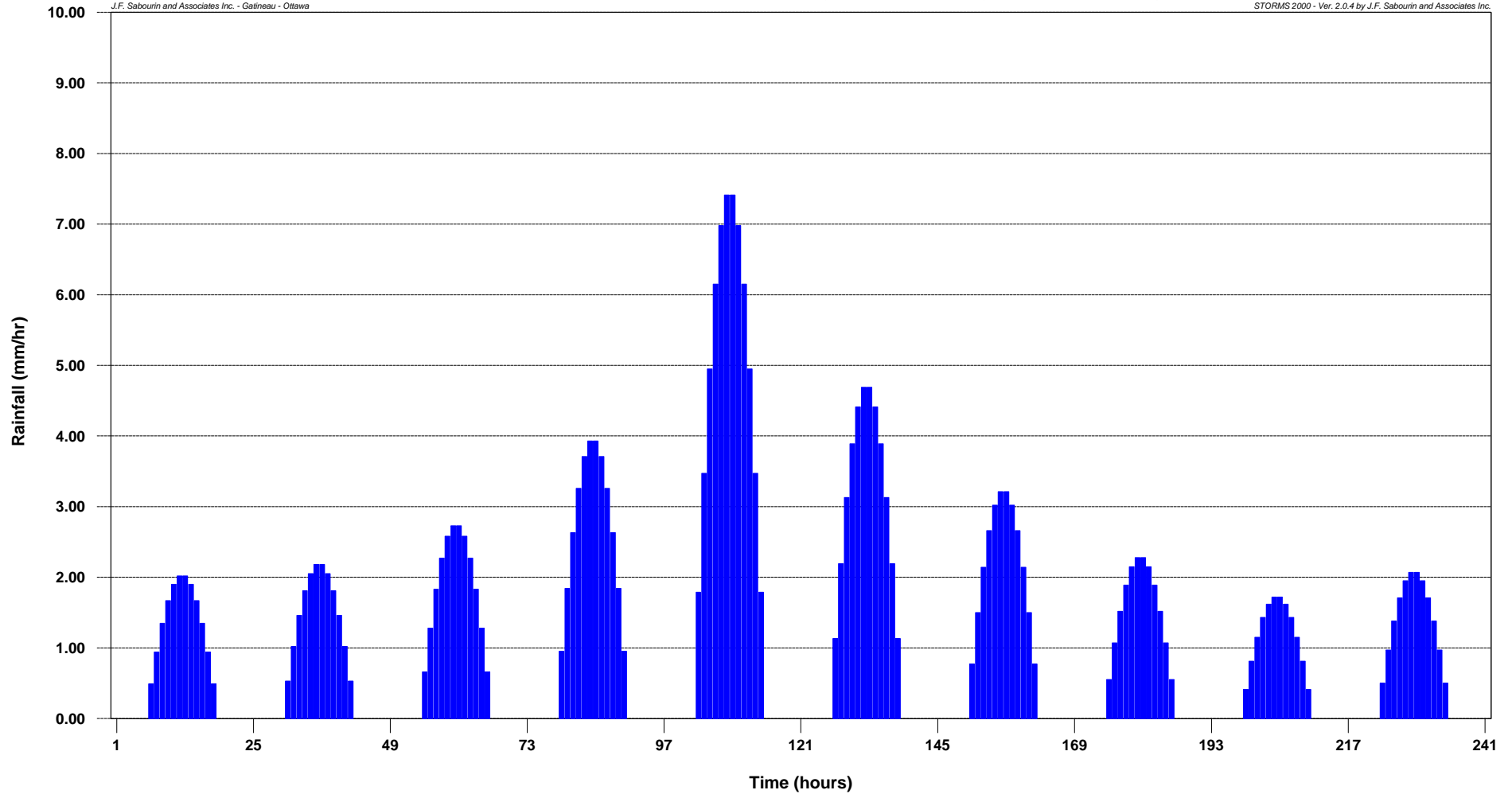
ALGORITHM FOR ACCUMULATING AND DEPLETING THE SNOWPACK



Model 5 CDA - S+Rain 12hr/day, RTP 100 years, 10 Days.

J.F. Sabourin and Associates Inc. - Gatineau - Ottawa

STORMS 2000 - Ver. 2.0.4 by J.F. Sabourin and Associates Inc.



Storm Statistics:

Storm Filename: D:\Proj\411-02\SWMHYMO\Snowmelt and Rain\51001012.stm
 Storm File Comment: Model 5 CDA - S+Rain 12hr/day, RTP 100 years, 10 Days.

Total Rain = 267.52 (mm)
 Storm Duration (hrs): = 240:00:00
 Ave. Intensity = 1.11 (mm/hr)
 Max. Intensity = 7.41 (mm/hr) at 660.00 (minutes)

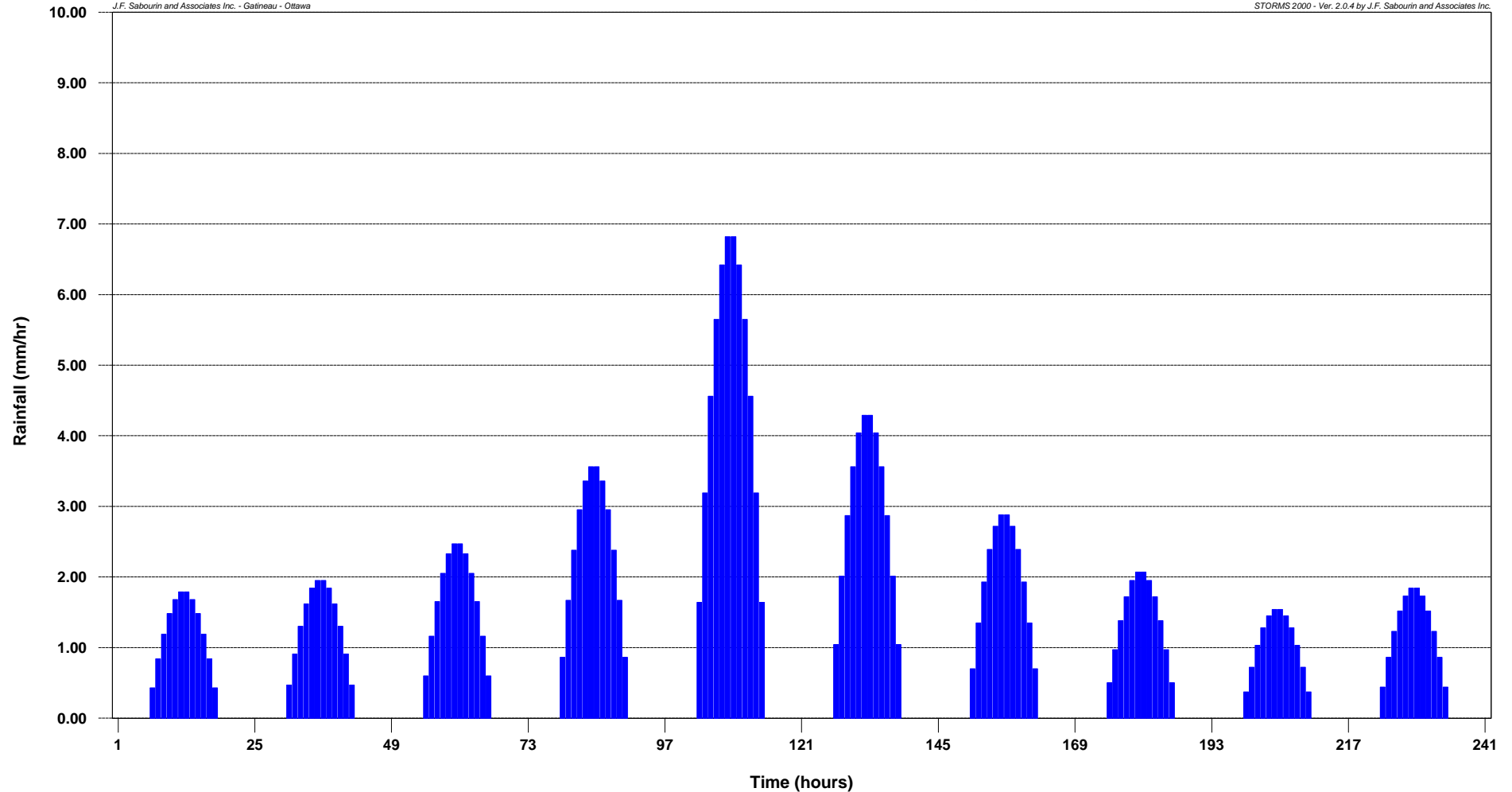
Maximum Average Intensities: (mm/hr)

Time Window	5 min	10 min	15 min	30 min	1 hr	2 hrs	3 hrs	6 hrs	12 hrs	24 hrs
Ave. Intensity (mm/hr)	7.41	7.41	7.41	7.41	7.41	7.41	7.27	6.85	5.12	2.56

Model 5 CDA - S+Rain 12hr/day, RTP 50 years, 10 Days.

J.F. Sabourin and Associates Inc. - Gatineau - Ottawa

STORMS 2000 - Ver. 2.0.4 by J.F. Sabourin and Associates Inc.



Storm Statistics:

Storm Filename: D:\Proj\411-02\SWMHYMO\Snowmelt and Rain\50501012.stm
 Storm File Comment: Model 5 CDA - S+Rain 12hr/day, RTP 50 years, 10 Days.

Total Rain = 242.40 (mm)
 Storm Duration (hrs): = 240:00:00
 Ave. Intensity = 1.01 (mm/hr)
 Max. Intensity = 6.82 (mm/hr) at 660.00 (minutes)

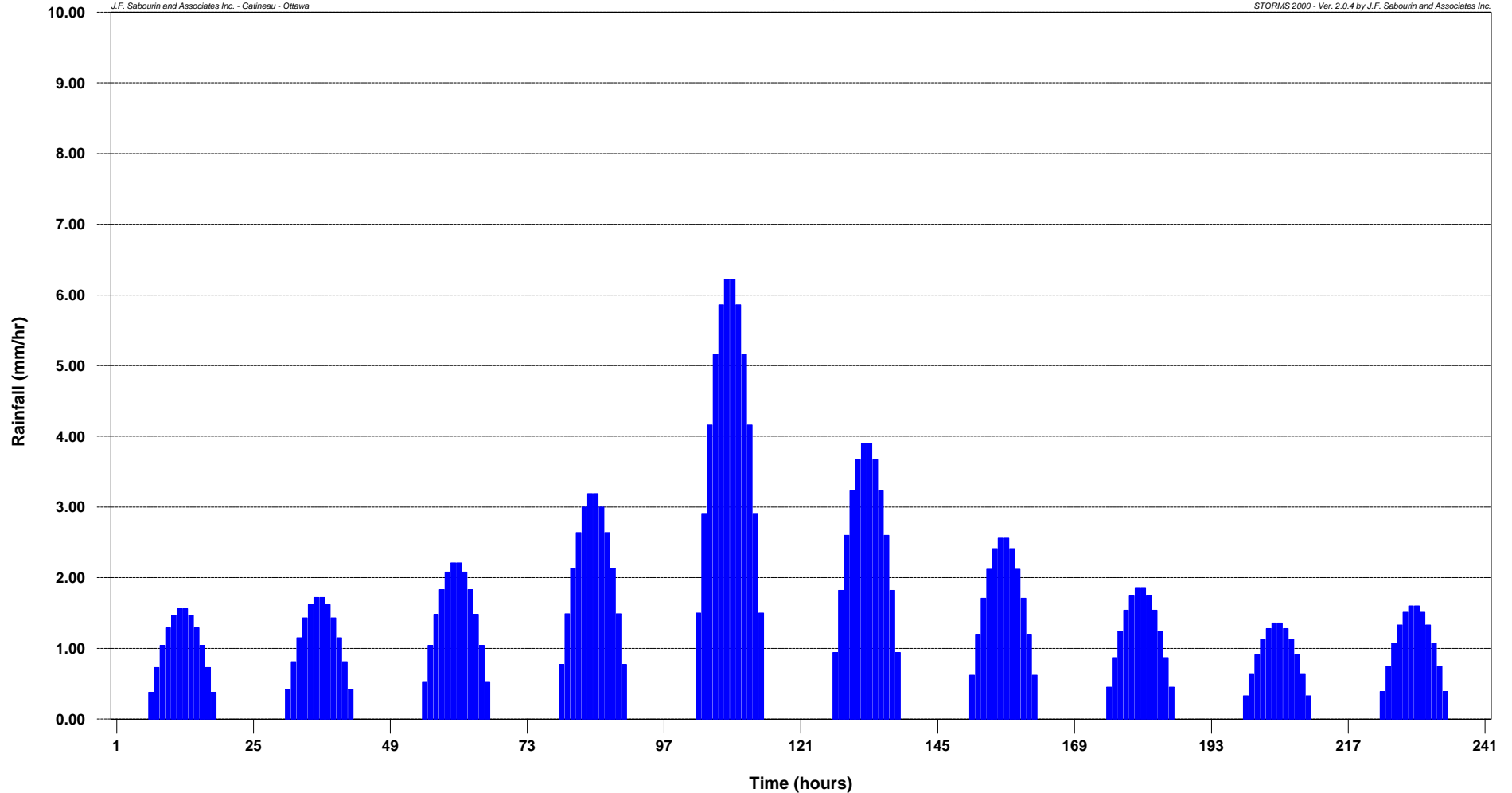
Maximum Average Intensities: (mm/hr)

Time Window	5 min	10 min	15 min	30 min	1 hr	2 hrs	3 hrs	6 hrs	12 hrs	24 hrs
Ave. Intensity (mm/hr)	6.82	6.82	6.82	6.82	6.82	6.82	6.69	6.30	4.71	2.36

Model 5 CDA - S+Rain 12hr/day, RTP 25 years, 10 Days.

J.F. Sabourin and Associates Inc. - Gatineau - Ottawa

STORMS 2000 - Ver. 2.0.4 by J.F. Sabourin and Associates Inc.



Storm Statistics:

Storm Filename: D:\Proj\411-02\SWMHYMO\Snowmelt and Rain\50251012.stm
 Storm File Comment: Model 5 CDA - S+Rain 12hr/day, RTP 25 years, 10 Days.

Total Rain = 217.22 (mm)
 Storm Duration (hrs): = 240:00:00
 Ave. Intensity = 0.91 (mm/hr)
 Max. Intensity = 6.22 (mm/hr) at 660.00 (minutes)

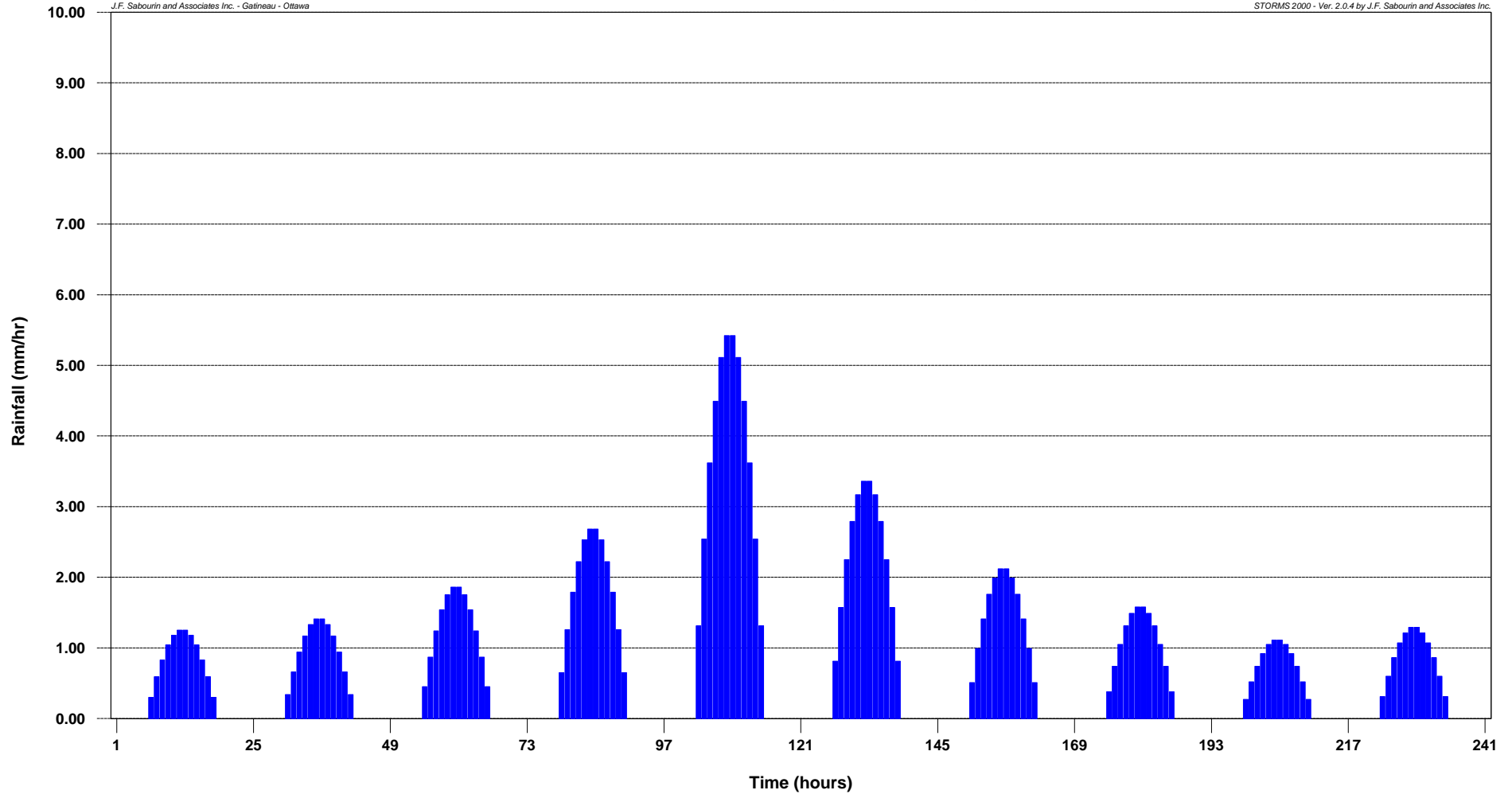
Maximum Average Intensities: (mm/hr)

Time Window	5 min	10 min	15 min	30 min	1 hr	2 hrs	3 hrs	6 hrs	12 hrs	24 hrs
Ave. Intensity (mm/hr)	6.22	6.22	6.22	6.22	6.22	6.22	6.10	5.75	4.30	2.15

Model 5 CDA - S+Rain 12hr/day, RTP 10 years, 10 Days.

J.F. Sabourin and Associates Inc. - Gatineau - Ottawa

STORMS 2000 - Ver. 2.0.4 by J.F. Sabourin and Associates Inc.



Storm Statistics:

Storm Filename: D:\Proj\411-02\SWMHYMO\Snowmelt and Rain\50101012.stm
 Storm File Comment: Model 5 CDA - S+Rain 12hr/day, RTP 10 years, 10 Days.

Total Rain = 183.20 (mm)
 Storm Duration (hrs): = 240:00:00
 Ave. Intensity = 0.76 (mm/hr)
 Max. Intensity = 5.42 (mm/hr) at 660.00 (minutes)

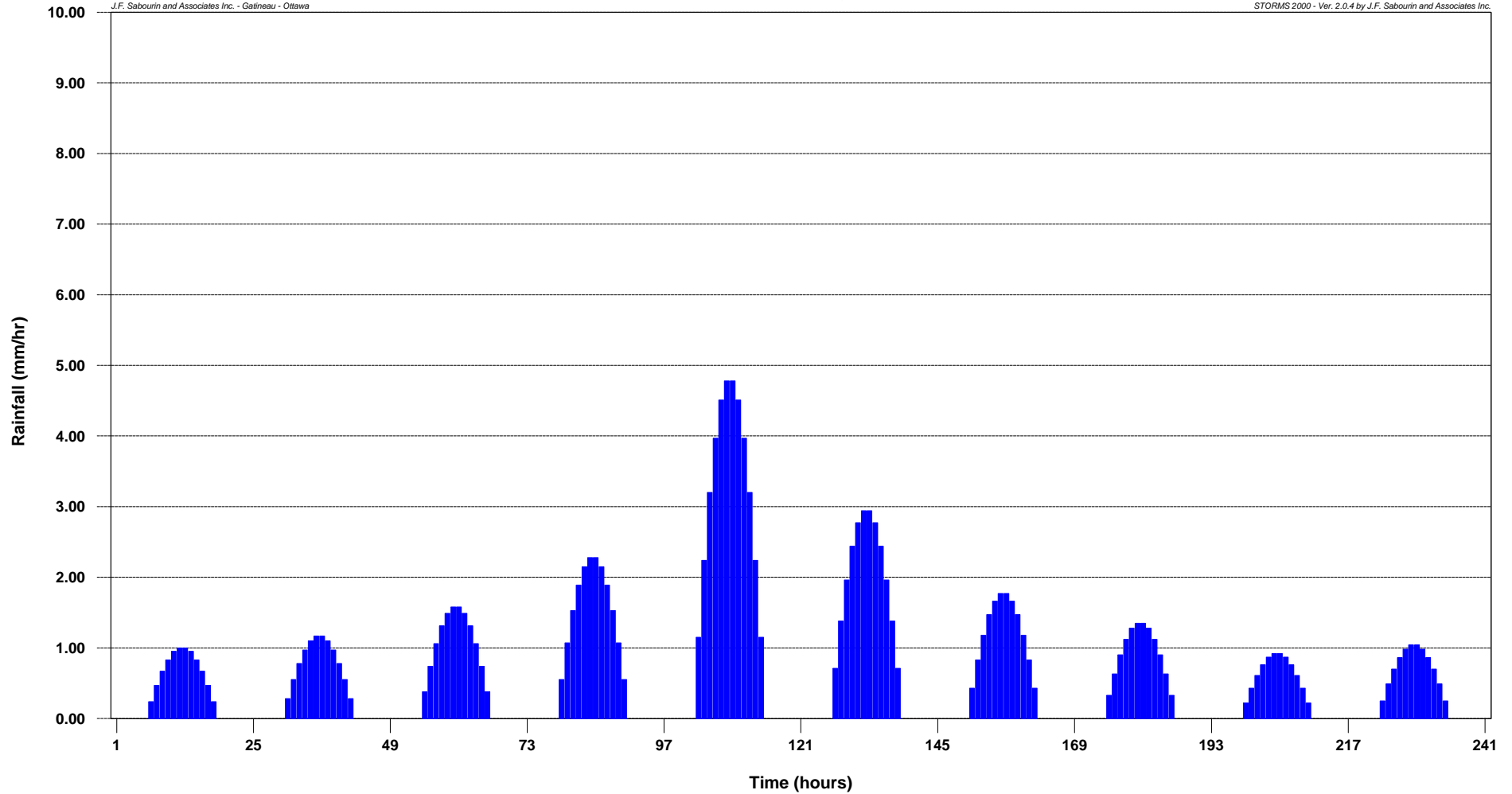
Maximum Average Intensities: (mm/hr)

Time Window	5 min	10 min	15 min	30 min	1 hr	2 hrs	3 hrs	6 hrs	12 hrs	24 hrs
Ave. Intensity (mm/hr)	5.42	5.42	5.42	5.42	5.42	5.42	5.32	5.01	3.75	1.87

Model 5 CDA - S+Rain 12hr/day, RTP 5 years, 10 Days.

J.F. Sabourin and Associates Inc. - Gatineau - Ottawa

STORMS 2000 - Ver. 2.0.4 by J.F. Sabourin and Associates Inc.



Storm Statistics:

Storm Filename: D:\Proj\411-02\SWMHYMO\Snowmelt and Rain\50051012.stm
 Storm File Comment: Model 5 CDA - S+Rain 12hr/day, RTP 5 years, 10 Days.

Total Rain = 156.34 (mm)
 Storm Duration (hrs): = 240:00:00
 Ave. Intensity = 0.65 (mm/hr)
 Max. Intensity = 4.78 (mm/hr) at 660.00 (minutes)

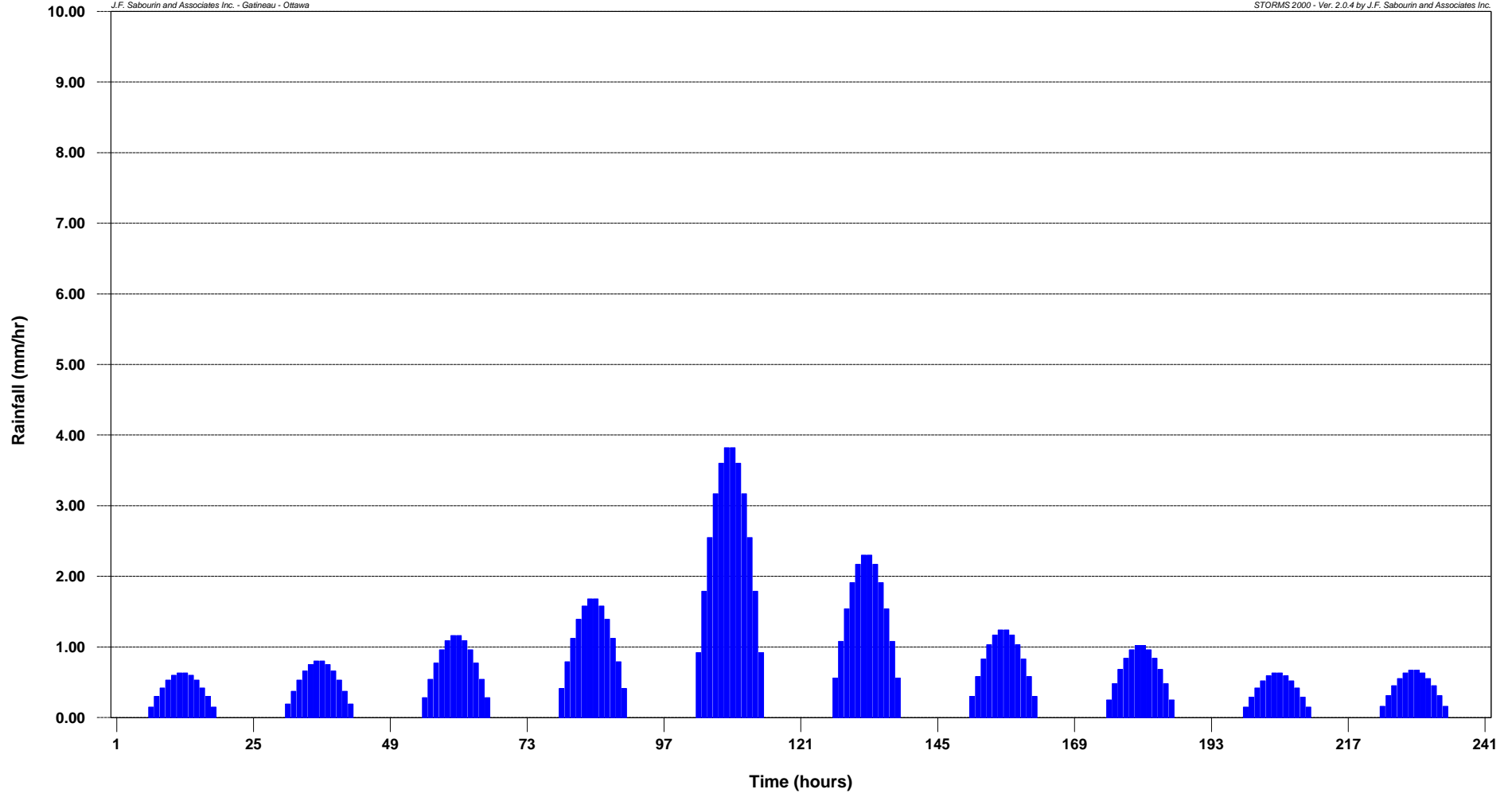
Maximum Average Intensities: (mm/hr)

Time Window	5 min	10 min	15 min	30 min	1 hr	2 hrs	3 hrs	6 hrs	12 hrs	24 hrs
Ave. Intensity (mm/hr)	4.78	4.78	4.78	4.78	4.78	4.78	4.69	4.42	3.31	1.65

Model 5 CDA - S+Rain 12hr/day, RTP 2 years, 10 Days.

J.F. Sabourin and Associates Inc. - Gatineau - Ottawa

STORMS 2000 - Ver. 2.0.4 by J.F. Sabourin and Associates Inc.



Storm Statistics:

Storm Filename: D:\Proj\411-02\SWMHYMO\Snowmelt and Rain\50021012.stm
 Storm File Comment: Model 5 CDA - S+Rain 12hr/day, RTP 2 years, 10 Days.

Total Rain = 115.72 (mm)
 Storm Duration (hrs): = 240:00:00
 Ave. Intensity = 0.48 (mm/hr)
 Max. Intensity = 3.82 (mm/hr) at 660.00 (minutes)

Maximum Average Intensities: (mm/hr)

Time Window	5 min	10 min	15 min	30 min	1 hr	2 hrs	3 hrs	6 hrs	12 hrs	24 hrs
Ave. Intensity (mm/hr)	3.82	3.82	3.82	3.82	3.82	3.82	3.75	3.53	2.64	1.32

1-30 DAY ANALYSES (0 = RAIN, 1 = RAIN+SNOWMELT) 1.0
 LOWER AND UPPER MONTHS TESTED ARE : 1 12
 VALUE OF - ITEST (0 VALID DATA CALCULATED, 1 ALL DATA VALID) 0
 MODELS ANALYSED ARE: 1 2 3 4 5

6105976 Ottawa CDA, Ontario 4523 7543 79

ATMOSPHERIC ENVIRONMENT SERVICE
 RAIN+SNOWMELT INTENSITY, DURATION, FREQUENCY VALUES
 PREPARED BY THE HYDROMETEOROLOGY DIVISION, CANADIAN CLIMATE CENTRE

STATION : Ottawa CDA, Ontario STATION NUMBER 6105976

LATITUDE: 4523 LONGITUDE: 7543 ELEVATION(M): 79

SNOWMELT MODEL 1

CRITICAL PERIOD : 1ST OF MONTH 10 TO THE END OF MONTH 5 NOTE : MODIFIED GUMBEL 12/82

YR	TOTAL DAYS	% VALID	START FLAG	START MAX	1 DAY	2 DAY	3 DAY	4 DAY	5 DAY	6 DAY	7 DAY	8 DAY	9 DAY	10 DAY	15 DAY	20 DAY	25 DAY	30 DAY	MAX SNP
					DAY	DAY	DAY	DAY	DAY	DAY	DAY	DAY	DAY	DAY	DAY	DAY	DAY	DAY	
1890	242	88	**	D/M	2/15	4/ 3	4/ 3	12/ 8	2/25	2/24	2/24	2/24	2/24	3/26	2/15	2/24	3/11	2/13	
				.1MM	295	341	341	351	417	472	472	472	472	508	522	564	564	660	
1891	273	100		D/M	3/ 9	4/10	3/21	3/21	3/ 9	3/29	3/28	3/28	3/21	3/21	3/28	3/23	3/21	3/13	
				.1MM	355	460	587	666	723	779	843	861	895	974	1186	1269	1409	1509	1788
1892	274	100		D/M	4/ 5	4/ 5	4/ 4	4/ 5	4/ 4	4/ 3	4/ 3	4/ 2	4/ 1	3/31	3/26	3/24	3/24	3/11	
				.1MM	292	537	727	916	1106	1271	1403	1482	1511	1539	1572	1651	1679	1703	1558
1893	273	100		D/M	4/13	4/12	4/11	4/10	4/10	4/ 8	4/ 8	4/ 8	4/ 8	4/ 8	3/31	3/30	3/24	3/21	
				.1MM	266	466	615	710	792	981	1063	1063	1087	1159	1188	1188	1219	1326	1673
1894	273	100		D/M	4/ 4	3/ 6	3/ 5	3/ 4	3/ 3	3/ 2	3/ 2	3/ 5	3/ 4	3/ 2	3/ 5	3/ 2	3/ 1	3/ 3	
				.1MM	211	348	530	578	626	725	739	755	803	882	950	974	988	1015	1998
1895	273	100		D/M	4/14	4/ 8	4/ 7	4/14	4/14	4/13	4/12	4/ 8	4/ 8	4/ 8	4/ 4	4/ 1	3/25	3/24	
				.1MM	305	536	688	808	1000	1139	1297	1309	1464	1649	1841	1993	2057	2131	1739
1896	274	100		D/M	3/ 2	4/16	4/15	4/14	4/13	4/12	4/11	4/10	4/ 9	4/ 8	4/ 3	3/31	3/27	3/19	
				.1MM	370	623	836	1071	1216	1345	1449	1518	1592	1646	1669	1672	1672	1672	1818
1897	273	100		D/M	3/10	3/20	3/20	3/20	3/19	3/19	3/19	3/19	3/19	3/20	3/19	3/19	3/10	3/ 5	
				.1MM	262	289	384	473	537	596	634	662	720	769	874	973	1072	1207	975
1898	273	100		D/M	12/11	3/12	3/11	3/10	3/ 9	3/ 8	3/11	3/10	3/11	3/11	3/ 9	3/ 8	3/ 7	3/ 7	
				.1MM	337	519	684	789	874	913	993	1098	1229	1359	1464	1549	1588	1632	1805
1899	242	88	**	D/M	4/ 8	4/17	4/12	4/12	4/14	4/13	4/12	4/11	4/10	4/ 8	4/ 6	4/ 3	3/29	3/23	
				.1MM	214	315	426	555	665	790	949	998	1012	1110	1300	1378	1412	1412	
1900	273	100		D/M	2/13	12/11	4/11	4/11	4/11	4/ 3	4/ 2	4/ 6	4/ 6	4/ 5	4/ 1	3/27	3/23	3/20	
				.1MM	328	360	455	569	635	692	781	883	997	1106	1180	1294	1383	1449	1579
1901	273	100		D/M	4/ 4	4/ 3	4/ 3	11/18	4/10	4/ 9	4/ 8	4/ 3	4/ 3	4/ 4	3/31	3/26	3/21	3/21	
				.1MM	287	460	587	701	834	1025	1213	1330	1470	1636	1841	2014	2098	2162	1977
1902	273	100		D/M	12/15	12/14	12/13	2/28	3/21	3/21	3/20	3/20	3/16	3/17	3/12	3/ 7	3/ 1	2/26	
				.1MM	292	538	554	597	672	797	846	873	879	994	1117	1246	1335	1439	1677
1903	273	100		D/M	3/23	3/19	3/19	3/20	3/19	3/19	3/18	3/17	3/16	3/15	3/10	3/ 5	2/28	2/27	
				.1MM	246	415	585	726	936	1065	1160	1274	1308	1326	1390	1459	1590	1719	1791
1904	274	100		D/M	4/10	4/10	4/ 9	4/ 8	4/ 8	4/ 8	4/ 7	4/ 6	4/ 5	4/ 2	3/31	4/ 7	4/ 2	3/27	
				.1MM	389	661	786	942	1057	1164	1269	1354	1388	1501	1616	1723	1792	1881	2573
1905	273	100		D/M	4/10	4/ 9	4/ 4	4/ 3	4/ 3	4/ 5	4/ 4	4/ 3	4/ 2	3/28	3/27	3/23	3/18	3/18	

1906	273	100	.1MM	210	345	467	571	646	762	952	1056	1090	1203	1300	1398	1573	1688	2012
			D/M	3/27	3/27	3/26	3/26	12/27	12/27	12/27	12/27	12/23	12/22	12/22	12/22	12/29	12/27	
			.1MM	339	382	405	405	437	437	437	437	445	463	463	463	463	468	308
1907	273	100	D/M	3/24	3/23	3/28	3/27	3/26	3/24	3/24	3/23	3/22	3/22	3/22	3/22	3/17	3/13	
			.1MM	236	371	492	602	705	794	945	1080	1175	1229	1229	1253	1298	1367	1095
1908	274	100	D/M	3/16	4/25	4/24	4/23	4/23	4/22	4/21	4/20	4/19	4/18	4/13	4/ 8	4/ 3	3/29	
			.1MM	341	449	639	814	964	1022	1081	1231	1350	1419	1457	1607	1681	1755	2370
1909	273	100	D/M	5/ 1	4/13	4/13	4/13	4/12	4/12	4/12	4/ 7	4/ 6	4/ 6	4/ 3	3/29	3/25	3/20	
			.1MM	387	642	751	906	1015	1091	1091	1096	1320	1429	1584	1669	1758	1834	1809
1910	273	100	D/M	11/23	1/21	1/21	1/21	1/18	3/ 2	3/ 1	2/28	2/27	2/27	2/27	3/ 3	2/27	2/21	
			.1MM	279	387	411	445	469	542	579	684	722	722	722	722	722	792	875
1911	273	100	D/M	4/14	4/14	4/13	4/12	4/12	4/13	4/14	4/13	4/13	4/12	4/ 7	4/ 5	3/27	3/26	
			.1MM	340	492	641	726	785	864	1030	1179	1298	1383	1427	1521	1610	1631	1685
1912	274	100	D/M	4/16	4/16	4/15	4/14	4/13	4/12	4/12	4/11	4/11	4/ 8	4/ 6	3/30	3/29	3/19	
			.1MM	342	637	706	791	900	1009	1076	1131	1131	1396	1571	1711	1778	1778	1664
1913	273	100	D/M	1/ 3	3/24	3/19	3/21	3/21	3/20	3/19	3/19	3/18	3/18	3/21	3/14	3/11	3/11	
			.1MM	309	474	536	615	784	909	1054	1101	1105	1105	1269	1438	1485	1529	1374
1914	273	100	D/M	3/30	3/26	3/30	3/30	3/26	3/26	3/26	3/26	3/26	3/26	3/26	3/26	3/26	3/18	
			.1MM	145	264	349	475	537	626	741	867	867	867	888	901	919	1034	1348
1915	273	100	D/M	11/16	11/15	11/15	11/13	11/12	3/21	3/21	3/21	3/21	3/21	3/21	3/21	3/11	3/ 6	
			.1MM	395	405	409	429	453	500	500	528	528	528	591	676	726	815	1122
1916	274	100	D/M	4/17	4/13	4/12	4/23	4/23	4/12	4/12	4/11	4/10	4/17	4/12	4/ 8	4/ 2	3/28	
			.1MM	190	360	500	658	741	854	971	1065	1174	1272	1387	1470	1616	1796	2864
1917	273	100	D/M	4/ 1	4/19	4/18	4/17	4/17	4/16	4/15	4/14	4/13	4/12	3/24	4/ 1	3/27	3/23	
			.1MM	292	489	727	877	1009	1098	1197	1281	1335	1383	1431	1455	1557	1611	2453
1918	273	100	D/M	4/ 2	4/13	4/13	4/12	4/11	4/10	4/ 2	4/ 1	4/ 6	4/ 6	4/ 1	3/28	3/22	3/17	
			.1MM	211	395	561	707	796	824	918	1098	1246	1412	1481	1529	1608	1788	2547
1919	273	100	D/M	3/17	3/17	3/17	4/ 5	3/17	4/ 3	4/ 3	3/17	3/17	3/17	3/16	3/17	3/16	3/11	
			.1MM	200	360	409	484	568	593	662	726	794	903	1074	1084	1084	1084	1334
1920	274	100	D/M	3/27	3/26	3/25	3/24	3/24	3/23	3/24	3/23	3/22	3/21	3/17	3/11	3/ 6	3/ 6	
			.1MM	236	437	642	822	995	1104	1206	1315	1354	1403	1403	1403	1497	1581	1443
1921	273	100	D/M	3/20	3/ 8	3/ 7	3/ 6	3/16	3/16	3/ 3	3/ 2	3/ 1	2/28	3/ 6	3/ 1	2/28	2/23	
			.1MM	295	316	324	403	494	494	508	605	694	745	745	782	847	855	550
1922	273	100	D/M	12/18	12/17	3/ 6	4/ 4	4/ 3	4/ 2	4/ 1	3/31	3/ 7	3/ 6	3/24	3/20	3/14	3/ 7	
			.1MM	342	378	402	484	563	638	676	680	686	724	834	908	987	1005	1104
1923	273	100	D/M	4/22	4/21	4/21	4/20	4/19	4/18	4/17	4/16	4/15	4/15	4/10	4/ 4	4/ 3	4/ 3	
			.1MM	365	717	971	1222	1296	1335	1414	1488	1516	1517	1534	1548	1650	1658	1999
1924	274	100	D/M	4/ 8	4/ 7	4/ 6	4/ 5	4/ 4	4/ 5	4/ 5	4/ 4	4/ 4	4/ 4	3/31	3/23	3/21	3/18	
			.1MM	343	533	663	848	937	1025	1165	1254	1313	1392	1449	1503	1503	1503	1916
1925	273	100	D/M	2/11	2/10	3/26	3/25	3/24	3/24	3/22	3/21	3/19	3/19	3/17	3/ 9	3/ 7	3/ 7	
			.1MM	339	484	583	743	832	832	906	994	1070	1250	1334	1362	1362	1362	981
1926	273	100	D/M	5/ 2	5/ 1	4/23	4/22	4/21	4/27	4/22	4/21	4/21	4/23	4/20	4/13	4/ 8	4/ 3	
			.1MM	219	414	573	788	938	1033	1193	1343	1471	1660	1875	2025	2038	2038	2062
1927	273	100	D/M	3/14	3/13	3/13	3/12	3/14	3/13	3/12	3/12	3/12	3/11	3/ 6	3/12	3/13	3/ 8	
			.1MM	229	367	481	590	700	838	947	1026	1080	1114	1129	1216	1295	1354	2011
1928	274	100	D/M	11/22	4/ 6	4/ 5	4/ 5	4/ 4	4/ 3	4/ 3	4/ 3	4/ 3	4/ 3	3/25	3/20	3/15	3/13	
			.1MM	288	375	548	687	782	796	796	796	796	796	796	913	1021	1140	1215
1929	273	100	D/M	1/ 6	3/15	3/14	3/13	3/13	3/13	3/13	3/13	3/13	3/13	3/13	3/ 4	3/ 4	2/27	
			.1MM	274	337	457	576	576	576	655	747	825	914	991	1068	1187	1203	756
1930	273	100	D/M	1/ 8	1/ 7	1/ 7	1/ 7	2/20	2/19	1/ 2	1/ 2	12/31	12/31	12/27	2/21	2/19	2/13	
			.1MM	276	434	434	434	481	570	648	648	652	652	652	680	729	729	927
1931	273	100	D/M	3/29	3/28	3/27	3/26	3/25	3/24	3/23	3/22	3/21	3/20	3/15	3/10	3/ 5	3/ 5	
			.1MM	210	325	420	535	630	739	828	886	925	1020	1048	1127	1181	1266	1158
1932	274	100	D/M	2/12	4/ 9	4/ 9	4/ 9	4/ 8	4/ 7	4/ 6	4/ 6	4/ 7	4/ 7	3/30	3/27	3/27	3/27	
			.1MM	315	326	461	546	615	694	702	702	702	750	798	882	920	928	627

1933	273	100	D/M	12/ 7	4/ 1	4/ 1	3/31	3/30	3/29	3/28	3/27	3/27	3/27	3/20	3/15	3/15	3/ 8		
			.1MM	199	311	402	473	507	535	569	634	634	634	634	634	678	780	450	
1934	273	100	D/M	12/31	12/31	4/10	4/ 9	4/10	4/10	4/10	4/10	4/10	4/ 6	3/31	3/26	3/26			
			.1MM	732	732	852	947	1022	1233	1424	1579	1774	1989	2084	2159	2233	2297	1836	
1935	273	100	D/M	1/ 8	1/ 7	1/ 7	1/ 7	1/ 7	4/ 5	4/ 4	4/ 3	4/ 2	4/ 1	3/28	3/22	3/16	3/12		
			.1MM	186	352	406	455	455	471	494	548	632	666	715	754	886	977	1278	
1936	274	100	D/M	3/12	3/12	3/18	3/25	3/18	3/18	3/22	3/22	3/18	3/18	3/16	3/11	3/ 5	3/11		
			.1MM	301	418	507	657	802	881	1000	1119	1240	1355	1576	1695	1759	1787	1223	
1937	273	100	D/M	4/ 5	4/ 5	4/ 4	4/ 3	4/ 2	4/ 2	4/ 1	4/ 1	4/ 1	4/ 1	2/ 8	3/19	3/18	12/10		
			.1MM	310	460	504	532	576	599	617	617	617	617	617	620	620	620	452	
1938	273	100	D/M	3/23	3/23	3/21	3/23	3/22	3/21	3/20	3/19	3/18	3/17	3/17	3/12	3/12	3/ 5		
			.1MM	241	341	460	654	748	873	1044	1126	1185	1355	1399	1470	1562	1696	1343	
1939	273	100	D/M	2/19	4/26	4/25	4/24	4/23	4/22	4/21	4/19	4/19	4/18	4/13	4/11	4/ 5	3/31		
			.1MM	310	394	539	649	827	962	1079	1206	1385	1474	1525	1543	1589	1653	1547	
1940	274	100	D/M	4/19	4/18	4/18	4/18	4/18	4/18	4/16	4/16	4/16	4/16	4/ 9	4/ 5	3/31	3/30		
			.1MM	229	437	582	699	826	936	1060	1170	1235	1235	1235	1315	1380	1471	1520	
1941	273	100	D/M	12/29	12/28	12/27	12/26	12/26	4/ 6	4/ 6	4/ 5	4/ 4	4/ 3	4/ 2	3/25	3/25	3/16		
			.1MM	414	578	697	767	836	990	1091	1186	1271	1350	1394	1394	1394	1394	1511	
1942	273	100	D/M	12/24	12/23	12/23	12/23	12/23	3/16	3/16	3/15	3/16	3/16	3/ 8	3/ 8	3/ 2	2/27		
			.1MM	369	534	534	534	534	544	628	662	691	765	830	864	864	879	861	
1943	272	99	D/M	4/25	4/24	4/23	4/23	4/23	4/23	4/22	4/22	4/21	4/20	4/17	4/12	4/ 5	3/31		
			.1MM	270	519	729	894	1087	1272	1437	1575	1690	1778	1877	1961	2009	2009	2177	
1944	274	100	D/M	4/10	3/25	3/25	3/24	3/24	3/24	3/25	3/24	3/25	3/25	3/24	3/25	3/17	3/17		
			.1MM	158	230	288	316	334	352	373	401	447	496	524	524	524	534	519	
1945	273	100	D/M	12/ 8	3/25	3/24	3/23	3/17	3/16	3/15	3/19	3/18	3/17	3/13	3/13	3/ 2	2/26		
			.1MM	193	358	528	673	815	924	1059	1217	1392	1560	1669	1804	1883	1891	1766	
1946	273	100	D/M	3/13	3/13	3/ 6	3/ 6	3/ 6	3/ 3	3/ 8	3/ 7	3/ 6	3/ 6	3/ 2	3/ 2	3/ 2	2/13		
			.1MM	208	376	414	481	481	515	645	750	881	881	914	982	1072	1072	776	
1947	273	100	D/M	12/ 8	4/23	12/ 8	12/ 8	4/10	4/10	4/ 9	4/ 5	4/ 5	4/ 5	4/10	4/ 5	4/ 2	4/ 2		
			.1MM	326	478	664	679	761	856	940	1064	1128	1257	1352	1365	1450	1606	1975	
1948	274	100	D/M	3/16	3/16	3/16	3/16	3/16	3/16	3/16	3/16	3/16	3/16	3/16	3/16	3/16	3/16		
			.1MM	333	471	471	598	693	917	1016	1134	1223	1338	1338	1548	1719	1719	1158	
1949	273	100	D/M	12/29	3/22	3/26	3/26	3/25	3/22	3/22	3/22	3/22	3/22	3/22	3/22	3/10	3/ 5		
			.1MM	181	283	378	485	572	682	782	889	968	1036	1078	1078	1078	1078	885	
1950	273	100	D/M	4/ 3	4/ 3	4/ 3	4/ 2	4/ 1	4/ 1	4/ 1	3/28	3/27	3/27	3/22	3/23	3/23	3/21		
			.1MM	295	475	560	592	646	646	660	764	871	956	1011	1080	1165	1236	1240	
1951	260	95	D/M	1/ 3	3/29	3/29	3/29	3/28	3/28	3/28	3/28	3/27	3/24	3/19	3/14	3/11	3/ 4		
			.1MM	312	485	589	734	813	884	884	884	884	916	955	955	955	978	1065	
1952	274	100	D/M	4/ 5	4/ 4	4/ 3	4/ 2	4/ 1	4/ 3	4/ 2	4/ 1	4/ 1	3/31	3/26	3/21	3/18	3/11		
			.1MM	311	444	569	704	813	923	1058	1167	1242	1290	1298	1332	1396	1396	1453	
1953	273	100	D/M	12/ 5	12/ 5	12/ 3	12/ 3	12/ 3	1/10	1/10	1/10	1/10	1/10	2/ 7	2/ 7	12/24	1/10		
			.1MM	232	237	240	245	245	271	271	271	271	271	271	271	279	279	227	
1954	271	99	D/M	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 5	4/ 5	4/ 5	4/ 2	4/ 2	4/ 2	4/ 2	4/ 2	4/ 2		
			.1MM	325	569	694	738	848	862	862	862	896	896	896	896	896	896	951	
1955	273	100	D/M	4/10	4/10	4/10	4/ 9	4/ 9	4/ 6	4/ 6	4/ 5	4/ 4	4/ 3	3/30	3/29	3/21	3/15		
			.1MM	210	385	520	635	680	725	860	995	1104	1183	1287	1386	1491	1555	1618	
1956	274	100	D/M	4/ 5	4/ 5	4/ 5	4/ 4	4/ 4	4/ 4	4/ 3	4/ 2	4/ 1	3/31	3/31	3/23	3/23	3/12		
			.1MM	206	366	505	594	678	757	775	809	877	921	921	921	921	921	885	
1957	273	100	D/M	1/22	1/21	1/21	1/21	1/21	1/21	1/21	3/ 9	3/ 8	3/ 8	3/ 8	3/ 8	2/24	2/24	2/18	
			.1MM	360	460	460	460	460	460	460	505	549	549	549	549	549	549	569	
1958	273	100	D/M	12/ 7	12/ 6	3/22	3/21	3/22	3/21	3/21	3/20	3/19	3/18	3/13	3/12	3/ 3	2/27		
			.1MM	183	230	310	384	454	528	600	634	688	756	795	843	872	911	953	
1959	273	100	D/M	4/ 8	4/14	4/ 8	4/ 8	4/ 8	4/ 6	4/ 8	4/ 8	4/ 7	4/ 6	4/ 1	3/30	3/25	3/19		
			.1MM	170	300	394	519	584	698	803	968	1032	1147	1252	1339	1451	1576	1924	
1960	274	100	D/M	4/17	4/17	4/16	4/15	4/14	4/13	4/12	4/12	4/10	4/ 9	4/ 4	3/30	3/28	3/20		

1961	273	100	.1MM	256	486	706	935	1108	1240	1347	1347	1419	1481	1509	1517	1609	1714	1883
			D/M	2/25	2/24	2/23	2/22	2/23	2/22	2/22	2/18	2/23	2/22	2/18	2/13	2/13	2/18	
			.1MM	265	308	466	514	549	597	621	677	726	774	812	812	828	937	666
1962	273	100	D/M	3/29	3/28	3/27	3/26	3/25	3/24	3/24	3/22	3/21	3/21	3/15	3/12	3/ 6	2/28	
			.1MM	180	300	389	518	632	701	729	820	906	934	934	934	974	1033	1159
1963	273	100	D/M	3/30	3/26	3/25	3/25	3/26	3/25	3/25	3/24	3/23	3/21	3/17	3/13	3/13	3/ 5	
			.1MM	185	263	375	409	529	641	695	714	722	742	796	796	796	796	1306
1964	274	100	D/M	1/ 9	1/24	3/ 3	3/ 2	1/21	1/20	1/19	1/19	1/19	1/19	1/19	1/19	1/ 3	1/ 9	
			.1MM	130	240	345	389	422	533	536	536	536	536	536	536	581	584	428
1965	273	100	D/M	12/24	12/23	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	3/ 2	3/ 2	2/25	2/25	2/25	2/ 7	
			.1MM	185	264	304	408	493	532	560	578	596	596	596	614	642	660	638
1966	273	100	D/M	12/24	2/28	2/28	2/27	2/26	2/26	2/26	2/26	2/26	2/26	12/16	2/11	2/ 9	2/ 9	
			.1MM	232	324	413	416	454	454	454	454	454	454	454	454	454	454	672
1967	273	100	D/M	4/ 2	4/ 1	3/31	3/30	3/29	3/28	3/27	3/26	3/25	3/24	3/22	3/14	3/10	3/10	
			.1MM	254	485	584	618	703	858	1046	1085	1144	1152	1176	1200	1200	1200	1271
1968	274	100	D/M	3/17	3/17	3/20	3/17	3/17	3/17	3/16	3/16	3/16	3/16	3/ 9	3/ 9	3/ 1	3/ 1	
			.1MM	222	327	473	597	748	895	908	908	908	908	908	962	1087	1106	943
1969	273	100	D/M	1/24	1/29	3/22	3/21	3/20	3/19	3/18	3/18	3/16	3/15	3/13	3/13	3/ 2	2/23	
			.1MM	235	275	332	427	509	558	592	592	596	655	689	697	697	697	638
1970	273	100	D/M	12/10	12/10	12/ 9	12/ 8	4/ 9	4/ 8	4/ 7	4/ 6	4/ 6	4/ 4	4/ 1	3/25	3/21	3/18	
			.1MM	284	362	421	434	496	625	674	682	682	696	735	779	813	813	1385
1971	273	100	D/M	4/13	4/12	4/11	4/10	4/12	4/12	4/11	4/10	4/ 9	4/ 9	4/ 3	3/29	3/29	3/20	
			.1MM	167	328	402	456	550	644	718	772	795	795	813	813	813	813	3263
1972	274	100	D/M	12/10	12/ 9	12/ 9	4/14	4/14	4/14	4/14	4/13	4/12	4/11	4/10	4/ 1	3/30	3/22	
			.1MM	231	385	489	571	680	821	1017	1106	1190	1254	1298	1298	1298	1298	1811
1973	273	100	D/M	2/ 2	3/11	3/11	3/11	3/ 8	3/ 7	3/ 7	3/ 7	3/ 7	3/ 3	3/ 3	3/ 3	2/20	2/20	
			.1MM	188	352	431	507	653	788	867	943	1071	1178	1257	1333	1461	1461	967
1974	273	100	D/M	3/ 4	3/ 4	3/ 4	3/ 4	3/ 3	3/ 3	3/ 1	2/28	3/30	3/29	2/22	2/20	2/20	3/ 4	
			.1MM	470	575	694	879	917	917	946	1021	1036	1044	1044	1044	1044	1151	972
1975	273	100	D/M	3/19	3/18	3/18	3/17	3/16	3/16	3/18	3/18	3/17	3/16	3/16	3/12	2/23	3/18	
			.1MM	371	452	521	549	593	593	671	715	743	787	787	787	826	854	827
1976	274	100	D/M	4/ 1	4/ 1	4/ 1	4/ 1	3/31	3/28	3/26	3/26	3/25	3/25	3/21	3/20	3/13	3/ 5	
			.1MM	407	557	655	770	859	980	1109	1259	1409	1507	1622	1622	1688	1803	1746
1977	273	100	D/M	3/13	3/13	3/12	3/10	3/10	3/ 9	3/ 9	3/ 8	3/ 7	3/ 6	3/ 3	2/24	2/24	2/24	
			.1MM	295	466	614	738	909	1008	1079	1113	1171	1235	1303	1374	1392	1392	1206
1978	273	100	D/M	1/25	1/25	4/10	4/10	4/10	4/10	4/ 9	4/ 8	4/ 7	4/ 4	3/31	3/27	3/21	3/19	
			.1MM	358	454	487	635	738	823	826	843	908	1013	1116	1201	1201	1291	1570
1979	273	100	D/M	12/31	12/31	3/20	3/19	3/ 3	3/ 3	3/ 3	3/ 3	3/ 2	3/ 2	2/28	3/ 3	2/27	2/22	
			.1MM	224	310	381	425	482	580	644	724	727	754	836	839	839	839	1255
1980	274	100	D/M	3/22	3/21	3/21	3/21	3/21	3/19	3/18	3/18	3/17	3/18	3/17	3/11	3/11	2/24	
			.1MM	507	653	760	872	897	919	958	983	985	999	1001	1001	1001	1001	462
1981	273	100	D/M	2/19	2/19	2/19	2/18	2/17	2/16	2/16	2/16	2/16	2/11	2/ 8	2/ 2	2/ 1	1/25	
			.1MM	203	377	520	641	757	796	796	796	796	813	956	1022	1022	1079	921
1982	273	100	D/M	3/31	3/31	3/30	3/31	3/30	3/29	3/29	3/25	3/24	3/25	3/18	3/13	3/11	3/11	
			.1MM	294	401	489	528	616	642	642	689	710	816	837	863	916	984	1033
1983	273	100	D/M	1/10	2/ 2	2/ 2	1/31	1/31	1/31	1/31	1/31	1/31	1/25	1/24	12/23	1/10	1/10	
			.1MM	282	343	343	402	402	402	402	402	402	459	493	493	493	493	131
1984	274	100	D/M	2/14	2/13	2/13	12/12	12/12	2/14	2/13	2/13	2/12	2/11	2/11	2/ 3	2/ 3	1/25	
			.1MM	298	405	489	564	602	682	789	858	899	908	910	910	912	912	636
1985	273	100	D/M	2/23	3/11	3/11	3/11	3/10	3/ 8	3/ 8	3/ 8	3/ 8	3/ 8	3/ 1	2/23	2/21	2/23	
			.1MM	291	385	479	549	583	657	727	727	727	727	727	727	797	864	1015
1986	273	100	D/M	1/20	1/19	1/18	1/18	1/18	1/18	1/18	1/18	1/12	3/10	3/ 9	3/ 2	3/ 2	2/18	
			.1MM	215	394	492	492	536	536	536	536	548	674	681	681	681	681	461
1987	273	100	D/M	12/24	12/24	12/23	12/23	12/23	12/23	12/19	12/19	12/18	12/18	3/ 7	3/ 6	2/28	2/28	
			.1MM	170	307	389	425	425	425	472	508	522	522	522	537	537	557	719

1988	274	100	D/M	3/26	3/25	3/24	3/24	3/24	3/24	3/24	3/24	3/24	3/17	3/14	3/ 8	3/ 8	3/ 1	
			.1MM	262	393	411	411	411	411	411	411	411	476	494	495	503	503	455
1989	273	100	D/M	3/28	3/27	3/26	3/25	3/24	3/24	3/24	3/24	3/24	3/14	3/14	3/ 4	3/ 4	3/ 4	
			.1MM	224	412	535	653	693	693	693	693	693	693	693	693	693	867	594
1990	273	100	D/M	1/ 4	3/11	3/10	3/10	1/24	1/24	1/24	1/24	1/24	1/17	1/17	1/25	1/17	1/ 3	
			.1MM	172	292	342	355	411	417	449	485	520	544	587	644	650	682	693
1991	273	100	D/M	12/29	12/21	12/21	12/21	2/ 3	12/18	12/17	12/17	12/21	12/21	12/17	12/17	2/19	2/ 3	
			.1MM	203	335	457	457	490	554	606	606	703	761	761	800	858	910	641
1992	274	100	D/M	3/27	3/27	3/27	3/27	3/27	3/27	3/27	3/27	3/27	3/27	3/27	3/26	3/18	3/11	
			.1MM	468	628	655	692	771	877	948	987	1019	1054	1132	1207	1347	1453	1098
1993	273	100	D/M	1/ 4	1/ 3	3/28	3/27	3/26	3/26	3/25	3/24	3/24	3/26	3/24	3/21	3/16	3/ 9	
			.1MM	379	464	507	655	765	858	937	1006	1007	1055	1148	1258	1341	1420	1303
1994	273	100	D/M	2/20	3/22	3/22	3/21	3/21	3/21	4/ 3	4/ 2	4/ 1	3/31	3/22	3/21	3/21	3/13	
			.1MM	174	272	386	462	495	520	571	678	727	802	833	885	960	984	1272
1995	273	100	D/M	1/15	1/15	1/14	1/13	1/12	1/12	1/12	1/12	1/12	1/12	1/12	1/12	1/12	12/18	
			.1MM	536	654	728	818	878	920	937	937	937	937	937	946	946	946	335
1996	274	100	D/M	1/19	1/18	1/17	2/20	2/20	2/20	2/20	2/20	2/20	2/20	2/20	2/ 8	2/20	2/20	
			.1MM	304	449	451	637	788	853	853	875	894	894	894	894	894	894	1296
1997	273	100	D/M	2/21	2/20	2/19	4/ 3	4/ 2	4/ 1	3/31	3/30	3/29	3/28	3/25	3/25	3/14	3/11	
			.1MM	399	535	718	785	897	961	1002	1063	1253	1352	1496	1556	1590	1601	1306

	1 DAY	2 DAY	3 DAY	4 DAY	5 DAY	6 DAY	7 DAY	8 DAY	9 DAY	10 DAY	15 DAY	20 DAY	25 DAY	30 DAY
MEAN EXTREME (MM)	28.3	42.0	52.3	61.7	70.0	77.6	84.8	91.0	96.5	102.7	126.7	144.3	157.1	166.9
STD. DEV. (MM)	9.2	11.2	13.8	17.4	20.5	23.4	26.6	29.2	32.3	35.4	45.8	53.2	58.6	61.4
YEARS ANALYSED	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0

** NOTE ** MEAN AND STANDARD DEVIATION HAVE BEEN ADJUSTED TO ACCOUNT FOR ONE OBSERVATION PER DAY.

NOTE ** VALUE IN FLAG INDICATES YEAR NOT INCLUDED IN ANALYSIS BASED ON % DAYS OPERATIONAL (<90.0%)

ATMOSPHERIC ENVIRONMENT SERVICE
 RAIN+SNOWMELT INTENSITY, DURATION, FREQUENCY VALUES
 PREPARED BY THE HYDROMETEOROLOGY DIVISION, CANADIAN CLIMATE CENTRE

STATION : Ottawa CDA, Ontario

STATION NUMBER 6105976

LATITUDE: 4523 LONGITUDE: 7543 ELEVATION(M): 79

SNOWMELT MODEL 1

CRITICAL PERIOD : 1ST OF MONTH 10 TO THE END OF MONTH 5

NOTE : MODIFIED GUMBEL 12/82

RETURN PERIOD VALUES (MM) WITH 50% CONFIDENCE LIMITS

RETURN PERIOD
YEARS

	1 DAY	2 DAY	3 DAY	4 DAY	5 DAY
2	26.77+/- .55	40.19+/- .67	50.01+/- .83	58.86+/- 1.05	66.63+/- 1.23
5	34.86+/- .93	50.05+/- 1.13	62.18+/- 1.39	74.25+/- 1.76	84.76+/- 2.08
10	40.22+/- 1.25	56.59+/- 1.53	70.25+/- 1.88	84.47+/- 2.38	96.79+/- 2.81
25	46.99+/- 1.69	64.85+/- 2.06	80.43+/- 2.54	97.36+/- 3.21	111.96+/- 3.78
50	52.01+/- 2.02	70.97+/- 2.46	87.97+/- 3.04	106.91+/- 3.84	123.21+/- 4.53
100	57.00+/- 2.35	77.05+/- 2.87	95.48+/- 3.54	116.41+/- 4.48	134.41+/- 5.28

RETURN PERIOD
YEARS

	6 DAY	7 DAY	8 DAY	9 DAY	10 DAY
2	73.80+/- 1.41	80.42+/- 1.60	86.17+/- 1.75	91.22+/- 1.94	96.85+/- 2.13
5	94.45+/- 2.37	103.92+/- 2.69	111.95+/- 2.95	119.71+/- 3.26	128.09+/- 3.58
10	108.16+/- 3.20	119.52+/- 3.64	129.05+/- 3.99	138.62+/- 4.41	148.83+/- 4.84
25	125.44+/- 4.31	139.19+/- 4.91	150.63+/- 5.38	162.46+/- 5.95	174.97+/- 6.52
50	138.25+/- 5.16	153.77+/- 5.87	166.63+/- 6.44	180.14+/- 7.11	194.36+/- 7.80
100	151.00+/- 6.01	168.28+/- 6.84	182.54+/- 7.50	197.72+/- 8.29	213.64+/- 9.09

RETURN PERIOD
YEARS

	15 DAY	20 DAY	25 DAY	30 DAY
2	119.17+/- 2.75	135.56+/- 3.19	147.48+/- 3.52	156.86+/- 3.69
5	159.59+/- 4.63	182.50+/- 5.38	199.19+/- 5.93	211.11+/- 6.22
10	186.41+/- 6.26	213.64+/- 7.27	233.52+/- 8.01	247.12+/- 8.40
25	220.24+/- 8.44	252.93+/- 9.80	276.80+/-10.79	292.52+/-11.32
50	245.32+/-10.09	282.06+/-11.72	308.89+/-12.91	326.19+/-13.55
100	270.27+/-11.76	311.03+/-13.66	340.81+/-15.05	359.67+/-15.78

** WARNING ** : THE 1-DAY 100-YEAR RETURN PERIOD EVENT IS EXCEEDED BY THE 1-DAY EVENT IN 1934
 ** WARNING ** : THE 3-DAY 100-YEAR RETURN PERIOD EVENT IS EXCEEDED BY THE 3-DAY EVENT IN 1923
 ** WARNING ** : THE 4-DAY 100-YEAR RETURN PERIOD EVENT IS EXCEEDED BY THE 4-DAY EVENT IN 1923

ATMOSPHERIC ENVIRONMENT SERVICE
 RAIN+SNOWMELT INTENSITY, DURATION, FREQUENCY VALUES
 PREPARED BY THE HYDROMETEOROLOGY DIVISION, CANADIAN CLIMATE CENTRE

STATION : Ottawa CDA, Ontario

STATION NUMBER 6105976

LATITUDE: 4523 LONGITUDE: 7543 ELEVATION(M): 79

SNOWMELT MODEL 2

CRITICAL PERIOD : 1ST OF MONTH 10 TO THE END OF MONTH 5

NOTE : MODIFIED GUMBEL 12/82

YR	TOTAL DAYS	% VALID	START FLAG	START MAX	START																	MAX SNPK
					1 DAY	2 DAY	3 DAY	4 DAY	5 DAY	6 DAY	7 DAY	8 DAY	9 DAY	10 DAY	15 DAY	20 DAY	25 DAY	30 DAY				
1890	242	88	**	D/M	4/ 4	4/ 3	4/ 3	4/ 4	4/ 3	4/ 3	4/ 3	4/ 3	4/ 3	4/ 3	3/26	3/21	3/14	3/11				
				.1MM	348	463	473	607	722	722	722	722	722	722	722	722	832	832				
1891	273	100		D/M	3/ 9	4/10	4/ 9	3/21	3/29	3/29	3/28	3/28	3/21	3/21	3/21	3/23	3/21	3/13				
				.1MM	329	500	653	722	778	895	944	944	1008	1086	1214	1373	1549	1666	1870			
1892	274	100		D/M	4/ 6	4/ 5	4/ 4	4/ 4	4/ 4	4/ 3	4/ 2	4/ 2	4/ 2	4/ 2	3/29	3/24	3/24	3/10				
				.1MM	388	763	1048	1287	1536	1770	1848	1848	1848	1848	1926	1926	1926	1926	1728			
1893	273	100		D/M	4/13	4/12	4/11	4/10	4/ 9	4/ 8	4/ 8	4/ 8	4/ 8	4/ 8	3/30	3/30	3/24	3/21				
				.1MM	360	648	856	963	984	1305	1305	1305	1431	1446	1446	1554	1661	1808				
1894	273	100		D/M	4/ 4	3/ 5	3/ 5	3/ 4	3/ 3	3/ 2	3/ 2	3/ 5	3/ 4	3/ 2	3/ 5	3/ 2	3/ 2	3/ 6				
				.1MM	284	473	667	688	709	824	824	852	873	951	1009	1009	1009	1089	2128			
1895	273	100		D/M	4/14	4/ 8	4/ 7	4/14	4/13	4/12	4/12	4/ 8	4/ 8	4/ 8	4/ 5	4/ 2	3/24	3/24				
				.1MM	353	632	797	1041	1231	1394	1394	1549	1768	2026	2191	2240	2308	2308	1793			
1896	274	100		D/M	4/16	4/15	4/14	4/13	4/12	4/11	4/10	4/ 9	4/ 8	4/ 8	4/ 3	3/31	3/27	3/27				
				.1MM	421	743	1112	1312	1483	1607	1667	1735	1766	1766	1766	1766	1766	1787	1889			
1897	273	100		D/M	3/10	4/ 4	4/ 2	4/ 1	3/31	3/30	3/30	3/29	3/28	3/27	3/21	3/19	3/19	3/ 9				
				.1MM	275	336	436	551	666	792	885	945	957	996	996	998	1043	1193	1133			
1898	273	100		D/M	12/11	3/12	3/11	3/10	3/ 9	3/ 8	3/11	3/10	3/11	3/11	3/ 9	3/ 7	3/ 7	3/ 9				
				.1MM	382	633	872	998	1086	1090	1214	1340	1458	1626	1752	1840	1844	1856	1831			
1899	242	88	**	D/M	4/18	4/18	4/17	4/16	4/15	4/14	4/13	4/12	4/11	4/11	4/ 7	4/ 7	3/29	3/23				
				.1MM	295	580	743	821	992	1185	1348	1512	1534	1550	1581	1797	1865	1881				
1900	273	100		D/M	2/13	4/ 6	4/11	4/11	4/11	4/ 3	4/ 2	4/ 6	4/ 5	4/ 5	4/ 1	3/29	3/29	3/20				
				.1MM	347	419	555	678	748	848	945	1081	1215	1338	1408	1526	1623	1693	1637			
1901	273	100		D/M	11/21	4/13	4/12	4/11	4/10	4/ 9	4/ 8	4/ 7	4/ 6	4/ 4	4/ 1	3/26	3/21	3/21				
				.1MM	368	509	717	909	1119	1321	1538	1645	1776	2024	2248	2431	2518	2567	2315			
1902	273	100		D/M	12/14	12/14	3/21	3/21	3/21	3/21	3/21	3/21	3/20	3/20	3/12	3/11	3/ 1	2/28				
				.1MM	330	622	685	782	906	1069	1248	1281	1303	1303	1414	1527	1560	1640	1969			
1903	273	100		D/M	3/19	3/19	3/19	3/19	3/19	3/19	3/18	3/17	3/17	3/17	3/10	3/ 5	2/28	2/28				
				.1MM	319	631	866	992	1255	1425	1524	1647	1669	1669	1696	1756	1853	2023	2103			
1904	274	100		D/M	4/10	4/10	4/ 9	4/ 8	4/ 8	4/ 7	4/ 7	4/ 6	4/ 6	4/ 2	3/31	4/ 6	4/ 1	3/27				
				.1MM	451	796	959	1146	1290	1416	1523	1611	1611	1706	1850	1957	2017	2105	2687			
1905	273	100		D/M	3/29	3/29	3/28	3/28	3/27	3/25	3/25	3/29	3/29	3/28	3/27	3/24	3/18	3/18				
				.1MM	256	475	619	734	839	913	1028	1172	1330	1474	1579	1649	1773	1878	2023			
1906	273	100		D/M	3/27	3/27	3/27	3/27	3/27	3/27	3/27	1/16	1/16	1/16	1/16	1/16	12/30	12/27				
				.1MM	369	405	405	405	405	405	405	410	410	410	410	410	410	410	418			
1907	273	100		D/M	3/28	3/28	3/28	3/27	3/26	3/24	3/23	3/23	3/22	3/22	3/22	3/22	3/22	3/13				
				.1MM	249	448	621	726	833	903	1084	1257	1364	1395	1395	1395	1455	1501	1212			
1908	274	100		D/M	4/26	4/25	4/24	4/23	4/23	4/22	4/20	4/19	4/19	4/18	4/12	4/ 7	4/ 3	3/29				

1909	273	100	.1MM	353	666	951	1207	1314	1353	1489	1642	1749	1809	1953	2060	2128	2196	2525
			D/M	4/14	4/13	4/13	4/12	4/12	4/12	4/12	4/ 7	4/ 6	4/ 6	4/ 3	3/28	3/25	4/ 3	
			.1MM	500	908	1042	1176	1274	1274	1439	1737	1871	1969	2057	2154	2212	2012	
1910	273	100	D/M	1/22	1/21	3/20	3/20	3/20	3/19	3/19	3/19	3/19	3/19	3/13	3/ 5	2/28	2/27	
			.1MM	300	402	485	563	661	681	681	681	681	681	728	728	728	1025	
1911	273	100	D/M	4/14	4/13	4/13	4/12	4/12	4/13	4/14	4/13	4/12	4/11	4/ 6	4/ 5	3/27	3/26	
			.1MM	463	671	875	963	1004	1083	1324	1532	1620	1632	1737	1834	1836	1961	1876
1912	274	100	D/M	4/16	4/ 7	4/ 6	4/ 6	4/12	4/12	4/11	4/ 6	4/ 8	4/ 7	4/ 6	3/29	3/29	3/19	
			.1MM	493	661	845	845	909	1029	1061	1145	1346	1602	1786	1906	1906	1906	1775
1913	273	100	D/M	3/24	3/24	3/19	3/21	3/21	3/19	3/19	3/19	3/19	3/19	3/19	3/14	3/13	3/13	
			.1MM	389	581	728	766	958	1129	1321	1364	1364	1364	1561	1753	1803	1842	1696
1914	273	100	D/M	4/17	4/16	4/15	4/14	4/14	4/12	4/11	3/26	3/26	4/ 8	3/26	3/29	3/26	3/26	
			.1MM	276	481	588	656	683	707	804	917	917	918	945	945	945	1022	1596
1915	273	100	D/M	11/16	11/15	4/ 4	4/ 3	4/ 3	4/ 1	4/ 1	4/ 1	4/ 1	4/ 1	3/24	3/21	3/21	3/13	
			.1MM	418	428	481	578	671	763	856	856	856	856	856	856	912	992	1209
1916	274	100	D/M	4/17	4/13	4/12	4/11	4/13	4/12	4/12	4/11	4/10	4/11	4/11	3/29	3/27	3/27	
			.1MM	285	516	703	808	970	1157	1291	1396	1530	1627	1761	1837	1877	2013	3087
1917	273	100	D/M	4/ 1	4/18	4/17	4/16	4/15	4/14	4/13	4/12	4/11	3/26	3/24	3/31	3/26	3/23	
			.1MM	380	710	920	1017	1132	1219	1250	1271	1292	1399	1514	1606	1699	1747	2531
1918	273	100	D/M	4/ 2	4/ 1	4/ 6	3/30	3/29	3/29	4/ 2	4/ 1	3/31	3/30	3/30	3/29	3/20	3/17	
			.1MM	323	565	799	928	1006	1006	1203	1445	1645	1808	1886	1894	2015	2215	2623
1919	273	100	D/M	4/ 7	4/ 9	4/ 7	4/ 7	4/ 6	4/ 5	4/ 5	4/ 3	4/ 3	4/ 3	3/27	3/23	3/17	3/16	
			.1MM	218	373	505	715	825	949	949	1019	1019	1019	1104	1114	1114	1114	1576
1920	274	100	D/M	3/27	3/26	3/25	3/24	3/23	3/23	3/22	3/21	3/21	3/18	3/13	3/12	3/ 6	3/ 6	
			.1MM	338	643	956	1222	1356	1392	1396	1418	1418	1484	1559	1595	1595	1595	1518
1921	273	100	D/M	3/20	3/20	3/19	3/ 9	3/ 8	3/16	3/15	3/ 9	3/ 8	3/12	3/ 8	3/ 2	2/28	2/23	
			.1MM	294	468	488	499	559	683	698	750	810	886	964	1064	1238	1298	761
1922	273	100	D/M	12/18	4/ 6	4/ 5	4/ 4	4/ 3	4/ 3	4/ 2	4/ 1	4/ 1	4/ 1	3/26	3/20	3/14	3/14	
			.1MM	353	543	706	792	870	946	1016	1018	1018	1018	1079	1155	1225	1301	1161
1923	273	100	D/M	4/21	4/21	4/20	4/19	4/18	4/17	4/16	4/16	4/16	4/16	4/ 8	4/ 3	4/ 3	3/24	
			.1MM	586	1049	1447	1515	1519	1597	1665	1665	1665	1665	1665	1775	1775	1775	2211
1924	274	100	D/M	4/ 8	4/ 7	4/ 6	4/ 5	4/ 4	4/ 5	4/ 5	4/ 4	4/ 4	4/ 4	3/28	3/23	3/22	3/22	
			.1MM	349	576	749	1010	1107	1194	1381	1478	1519	1597	1628	1632	1632	1639	1935
1925	273	100	D/M	2/11	2/10	3/25	3/24	3/24	3/22	3/21	3/21	3/19	3/18	3/18	3/ 8	3/ 8	2/26	
			.1MM	339	511	723	820	820	888	971	971	1230	1317	1317	1317	1317	1317	1025
1926	273	100	D/M	4/22	4/22	4/22	4/22	4/21	4/21	4/22	4/21	4/21	4/21	4/22	4/21	4/13	4/ 8	4/ 2
			.1MM	332	627	856	1151	1361	1392	1628	1838	2004	2219	2429	2429	2429	2429	2342
1927	273	100	D/M	11/16	3/13	4/ 4	3/12	3/12	3/13	3/12	3/12	3/12	3/12	3/12	3/ 6	3/12	3/13	3/ 8
			.1MM	301	420	592	696	774	914	1048	1126	1157	1157	1206	1270	1348	1389	2144
1928	274	100	D/M	11/22	4/ 6	4/ 5	4/ 4	4/ 4	4/ 4	4/ 4	4/ 4	4/ 4	4/ 4	3/25	3/20	3/15	3/13	
			.1MM	323	560	770	877	961	961	961	961	961	961	994	1114	1267	1351	1282
1929	273	100	D/M	1/ 6	3/15	3/13	3/13	3/13	3/13	3/13	3/13	3/13	3/13	3/13	3/13	3/ 4	2/27	
			.1MM	274	345	456	560	560	560	638	704	780	868	913	943	1041	1158	884
1930	273	100	D/M	1/ 8	1/ 7	1/ 7	1/ 7	2/20	2/19	1/ 2	1/ 2	1/ 2	1/ 2	1/ 2	2/19	2/19	2/13	
			.1MM	262	468	468	468	533	630	656	656	656	656	656	660	689	689	1022
1931	273	100	D/M	3/29	3/28	3/28	3/26	3/26	3/24	3/24	3/24	3/23	3/22	3/17	3/16	3/10	3/ 5	
			.1MM	259	403	520	654	771	887	1004	1111	1208	1247	1277	1358	1388	1436	1411
1932	274	100	D/M	2/12	4/ 9	4/ 9	4/ 9	4/ 9	4/ 8	4/ 7	4/ 6	4/ 6	4/ 7	3/31	3/27	3/27	3/27	
			.1MM	330	375	556	732	873	933	1011	1019	1019	1032	1053	1084	1225	1227	802
1933	273	100	D/M	12/25	4/ 1	4/ 1	4/ 1	4/ 1	4/ 1	3/31	3/31	3/31	3/31	3/27	3/20	3/20	3/20	
			.1MM	207	334	497	594	720	815	886	886	886	886	937	937	937	937	642
1934	273	100	D/M	12/31	4/10	4/10	4/16	4/15	4/14	4/10	4/11	4/11	4/10	4/ 6	4/ 1	3/26	3/26	
			.1MM	732	818	925	1066	1298	1427	1545	1790	2122	2391	2498	2568	2636	2666	2136
1935	273	100	D/M	4/10	4/10	4/ 9	4/ 9	4/ 8	4/ 8	4/ 8	4/ 8	4/ 5	4/ 5	4/ 3	3/29	3/24	3/19	3/16
			.1MM	274	522	769	944	1078	1078	1078	1109	1109	1140	1218	1218	1240	1244	1378

1936	274	100	D/M	3/12	3/12	3/26	3/25	3/25	3/25	3/22	3/22	3/22	3/20	3/16	3/11	3/11	3/12		
			.1MM	320	437	627	821	974	1113	1120	1273	1412	1501	1678	1831	1970	2019	1444	
1937	273	100	D/M	4/ 5	4/ 5	4/ 5	4/ 5	4/ 4	4/ 4	4/ 2	4/ 2	4/ 2	4/ 2	4/ 2	3/20	3/20	12/26		
			.1MM	329	539	692	807	819	823	831	835	835	835	835	835	835	835	610	
1938	273	100	D/M	3/23	3/23	3/21	3/23	3/20	3/21	3/20	3/19	3/18	3/17	3/17	3/13	3/13	3/ 5		
			.1MM	308	425	576	740	851	1008	1166	1247	1288	1422	1519	1615	1696	1775	1388	
1939	273	100	D/M	4/26	4/26	4/25	4/23	4/23	4/22	4/21	4/20	4/19	4/18	4/13	4/11	4/11	3/31		
			.1MM	332	573	773	885	1126	1307	1436	1580	1795	1875	1926	1946	1975	2007	1782	
1940	274	100	D/M	4/19	4/18	4/18	4/18	4/18	4/18	4/18	4/17	4/16	4/16	4/10	4/ 5	3/31	3/31		
			.1MM	286	532	732	866	1010	1146	1327	1461	1550	1581	1581	1581	1691	1722	1734	
1941	273	100	D/M	12/29	12/28	4/ 9	4/ 8	4/ 7	4/ 6	4/ 5	4/ 4	4/ 3	4/ 2	4/ 2	4/ 2	4/ 2	3/16		
			.1MM	432	593	796	988	1132	1361	1468	1556	1634	1646	1646	1646	1646	1646	1702	
1942	273	100	D/M	12/24	12/23	12/23	12/23	3/26	3/25	3/25	3/24	3/21	3/21	3/16	3/11	3/ 8	3/ 2		
			.1MM	337	502	502	502	502	570	614	618	663	768	812	894	945	1050	996	
1943	272	99	D/M	4/25	4/24	4/23	4/23	4/22	4/22	4/22	4/21	4/20	4/19	4/17	4/ 9	4/ 5	3/31		
			.1MM	431	819	1141	1380	1617	1825	1978	2122	2205	2312	2399	2420	2420	2420	2405	
1944	274	100	D/M	4/10	4/10	4/10	4/10	4/ 9	4/ 9	4/ 7	4/10	4/10	4/10	4/ 7	3/31	3/26	3/25		
			.1MM	221	413	454	503	505	505	507	579	779	911	913	913	915	915	836	
1945	273	100	D/M	3/18	3/18	3/18	3/18	3/17	3/16	3/18	3/18	3/17	3/16	3/14	3/14	3/ 1	2/26		
			.1MM	257	465	658	857	1026	1138	1358	1552	1721	1833	2014	2092	2092	2092	1960	
1946	273	100	D/M	3/13	3/13	3/13	3/13	3/13	3/ 9	3/ 8	3/ 7	3/ 6	3/ 6	3/ 2	3/ 2	3/ 2	2/13		
			.1MM	292	532	532	532	532	576	727	853	980	980	980	1038	1102	1102	803	
1947	273	100	D/M	4/11	4/11	4/10	4/ 9	4/10	4/10	4/ 9	4/ 5	4/ 6	4/ 5	4/10	4/ 5	4/ 5	4/ 2		
			.1MM	404	697	831	918	1051	1158	1245	1348	1445	1568	1675	1688	1747	2006	2272	
1948	274	100	D/M	3/16	3/16	3/21	3/20	3/21	3/16	3/16	3/16	3/16	3/16	3/16	3/16	3/16	3/16		
			.1MM	325	510	552	659	793	1037	1152	1296	1393	1537	1537	1785	1943	1943	1231	
1949	273	100	D/M	3/27	3/26	3/26	3/26	3/26	3/22	3/22	3/22	3/26	3/26	3/22	3/22	3/22	3/22		
			.1MM	203	347	464	566	644	720	837	939	1073	1147	1211	1291	1446	1520	1329	
1950	273	100	D/M	4/ 3	4/ 3	4/ 3	12/18	12/18	12/18	12/18	3/28	3/27	3/27	3/23	3/28	3/23	3/23		
			.1MM	333	558	646	779	779	779	861	954	1042	1078	1138	1226	1278	1311		
1951	260	95	D/M	1/ 3	3/29	3/29	3/29	3/29	3/29	3/29	3/28	3/27	3/26	3/21	3/16	3/11	3/ 6		
			.1MM	346	560	684	825	927	1042	1199	1277	1277	1277	1277	1285	1300	1300	1171	
1952	274	100	D/M	4/ 5	4/ 4	4/ 3	4/ 2	4/ 5	4/ 4	4/ 4	4/ 3	4/ 2	4/ 1	3/28	3/22	3/19	3/12		
			.1MM	340	503	658	788	970	1133	1294	1449	1579	1691	1712	1712	1712	1761	1633	
1953	273	100	D/M	12/ 5	12/ 5	12/ 5	12/ 5	12/ 5	12/ 5	12/ 5	1/10	1/10	1/15	1/10	1/10	1/10	1/10		
			.1MM	210	241	243	245	245	245	245	298	298	346	346	346	346	420	229	
1954	271	99	D/M	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6		
			.1MM	340	665	828	840	1114	1315	1315	1315	1315	1315	1315	1315	1315	1315	1098	
1955	273	100	D/M	4/10	4/10	4/ 9	4/ 9	4/ 9	4/ 6	4/ 5	4/ 5	4/ 4	4/ 3	3/29	3/29	3/21	3/15		
			.1MM	322	579	723	864	864	954	1135	1276	1410	1488	1612	1727	1853	1902	1913	
1956	274	100	D/M	4/ 5	4/ 5	4/ 5	4/ 4	4/ 5	4/ 4	4/ 4	4/ 4	4/ 1	4/ 1	3/31	3/31	3/31	3/31		
			.1MM	286	515	705	802	973	1070	1086	1086	1128	1144	1156	1156	1156	1156	1118	
1957	273	100	D/M	1/22	1/21	1/21	1/21	3/12	3/11	3/11	3/ 9	3/ 8	3/ 8	3/ 8	2/25	2/25	2/24		
			.1MM	416	533	533	533	550	568	568	617	629	629	633	633	682	694	680	
1958	273	100	D/M	12/ 7	3/30	3/29	3/28	3/27	3/26	3/25	3/24	3/23	3/22	3/18	3/13	3/13	3/ 3		
			.1MM	218	318	406	521	645	723	774	900	1036	1143	1211	1244	1244	1300	1313	
1959	273	100	D/M	4/ 8	4/14	4/ 8	4/ 8	4/ 8	4/10	4/ 8	4/ 8	4/ 7	4/ 6	4/ 1	3/30	3/30	3/20		
			.1MM	235	406	514	677	728	860	996	1221	1251	1395	1512	1602	1709	1864	2096	
1960	274	100	D/M	4/17	4/16	4/15	4/15	4/14	4/13	4/12	4/12	4/10	4/ 9	4/ 4	3/30	3/28	3/20		
			.1MM	373	713	1016	1237	1455	1629	1731	1731	1776	1803	1803	1803	1903	2029	2156	
1961	273	100	D/M	2/25	2/24	2/23	2/22	2/23	2/22	2/19	2/18	2/23	2/23	2/18	2/13	2/13	2/23		
			.1MM	241	284	420	441	442	463	472	563	605	643	664	664	664	748	708	
1962	273	100	D/M	3/29	3/28	3/28	3/26	3/26	3/25	3/24	3/24	3/22	3/21	3/16	3/12	3/12	3/12		
			.1MM	266	415	562	683	830	972	1032	1032	1176	1252	1252	1252	1252	1310	1365	
1963	273	100	D/M	3/30	3/26	3/25	3/27	3/26	3/25	3/25	3/25	3/25	3/21	3/17	3/17	3/17	3/ 5		

1964	274	100	.1MM	276	316	437	454	605	726	757	757	757	794	825	825	825	825	1454
			D/M	3/ 6	3/ 5	3/ 4	3/ 3	3/ 2	3/ 2	3/ 2	3/ 2	3/ 2	3/ 2	3/ 2	3/ 2	3/ 2	2/ 5	
			.1MM	249	371	515	649	661	661	661	661	661	661	661	661	661	661	555
1965	273	100	D/M	12/24	4/ 6	4/ 5	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	2/25	2/25	2/11	2/ 7	
			.1MM	221	297	412	481	569	573	573	573	573	573	633	637	637	637	702
1966	273	100	D/M	12/24	2/28	2/28	2/28	2/26	2/26	2/26	12/24	12/23	12/23	12/23	2/11	2/ 9	11/25	
			.1MM	220	320	417	417	419	419	419	455	501	501	501	501	501	501	676
1967	273	100	D/M	4/ 1	4/ 1	3/31	3/31	3/29	3/28	3/27	3/26	3/25	3/25	3/25	3/14	3/10	3/10	
			.1MM	361	683	798	798	886	1105	1289	1293	1334	1334	1334	1334	1334	1334	1549
1968	274	100	D/M	3/17	3/20	3/20	3/17	3/17	3/17	3/16	3/16	3/16	3/16	3/10	3/10	3/ 1	3/ 1	
			.1MM	229	385	554	674	847	1016	1029	1029	1029	1029	1029	1060	1215	1215	1003
1969	273	100	D/M	1/24	3/24	3/24	3/22	3/21	3/20	3/19	3/19	3/19	3/19	3/15	3/15	3/15	1/23	
			.1MM	243	353	353	440	547	606	628	628	628	628	669	669	669	669	836
1970	273	100	D/M	12/10	4/ 8	4/ 8	4/ 7	4/ 9	4/ 8	4/ 7	4/ 7	4/ 7	4/ 7	4/ 2	3/25	3/21	3/21	
			.1MM	284	418	459	481	642	813	835	835	835	835	839	854	854	854	1738
1971	273	100	D/M	4/13	4/12	4/11	4/10	4/12	4/12	4/11	4/10	4/10	4/10	4/ 3	3/29	3/29	3/29	
			.1MM	228	429	497	528	635	740	808	839	839	839	839	839	839	839	3353
1972	274	100	D/M	12/10	12/ 9	12/ 9	12/ 9	4/14	4/14	4/14	4/13	4/12	4/11	4/10	4/ 1	3/30	3/22	
			.1MM	265	405	529	644	754	914	1130	1218	1305	1354	1366	1366	1366	1366	2053
1973	273	100	D/M	3/17	3/16	3/15	3/14	3/13	3/12	3/11	3/10	3/ 9	3/ 8	3/ 3	3/ 3	3/ 3	2/20	
			.1MM	298	485	662	711	789	992	1178	1216	1241	1488	1653	1689	1727	1832	1208
1974	273	100	D/M	3/ 4	3/ 4	3/ 4	3/ 4	3/ 3	3/ 3	3/30	2/28	3/30	3/29	2/22	2/22	2/22	3/ 4	
			.1MM	461	587	740	1016	1018	1018	1059	1079	1092	1100	1100	1100	1100	1186	995
1975	273	100	D/M	3/19	4/17	4/16	4/15	4/14	4/14	4/14	4/14	4/14	4/14	4/ 5	3/30	3/25	3/19	
			.1MM	377	654	881	988	1095	1095	1095	1095	1095	1095	1095	1095	1095	1097	1096
1976	274	100	D/M	4/ 1	4/ 1	4/ 1	3/25	3/28	3/28	3/26	3/25	3/25	3/25	3/21	3/20	3/13	3/ 5	
			.1MM	450	636	746	867	961	1147	1342	1552	1738	1848	1931	1976	2086	2169	1803
1977	273	100	D/M	3/13	3/13	3/12	3/10	3/10	3/ 9	3/ 9	3/ 9	3/ 7	3/ 6	3/ 4	2/24	2/24	2/24	
			.1MM	342	550	750	953	1161	1276	1355	1355	1394	1443	1487	1527	1527	1527	1266
1978	273	100	D/M	1/25	1/25	4/11	4/10	4/10	4/10	4/10	4/10	4/ 7	4/ 6	3/31	3/27	3/21	3/19	
			.1MM	332	396	543	731	853	941	941	941	987	1033	1155	1243	1246	1368	1793
1979	273	100	D/M	3/22	3/21	3/21	3/20	3/19	3/19	3/19	3/ 3	3/ 3	3/14	3/ 9	3/ 4	3/ 3	2/22	
			.1MM	207	380	537	659	671	671	671	747	747	753	783	859	859	863	1425
1980	274	100	D/M	3/22	3/21	3/21	3/21	3/21	3/21	3/21	3/18	3/17	3/18	3/17	3/11	3/11	3/11	
			.1MM	528	707	838	977	1010	1010	1034	1050	1052	1074	1076	1076	1076	1076	526
1981	273	100	D/M	2/20	2/19	2/19	2/18	2/17	2/16	2/16	2/16	2/16	2/16	2/ 8	2/ 2	2/ 1	1/25	
			.1MM	235	466	660	816	964	968	968	968	968	968	1130	1196	1196	1234	1064
1982	273	100	D/M	3/31	3/31	3/30	3/31	3/30	3/30	3/30	3/25	3/25	3/25	3/20	3/13	3/11	3/12	
			.1MM	391	522	606	700	784	784	784	821	821	999	999	999	1028	1052	1221
1983	273	100	D/M	1/10	2/ 2	2/ 2	1/31	1/31	1/31	1/31	1/31	1/31	1/25	12/15	12/23	1/10	12/15	
			.1MM	282	321	321	356	356	356	356	356	356	394	492	492	492	492	288
1984	274	100	D/M	2/14	2/13	2/13	2/13	2/12	2/14	2/13	2/13	2/12	2/14	2/11	2/11	2/ 3	2/ 3	
			.1MM	321	421	508	566	573	655	755	815	822	847	966	1066	1073	1082	861
1985	273	100	D/M	2/23	2/23	3/11	3/11	3/11	3/ 8	3/ 8	3/ 8	3/ 8	3/ 8	3/ 1	2/23	2/21	2/23	
			.1MM	289	358	458	519	519	576	637	637	637	637	637	637	698	752	1057
1986	273	100	D/M	3/19	1/19	1/18	1/18	3/15	3/15	3/13	3/13	3/13	3/10	3/ 9	3/ 2	3/ 2	2/18	
			.1MM	261	428	542	542	579	579	587	587	587	702	709	709	709	709	631
1987	273	100	D/M	3/ 8	3/ 7	3/ 7	3/19	3/18	3/17	3/17	3/17	3/17	3/17	3/ 7	3/ 7	2/28	2/28	
			.1MM	222	383	383	421	487	536	536	536	536	536	536	536	539	622	916
1988	274	100	D/M	3/26	3/25	3/25	3/25	3/25	3/25	3/25	3/25	3/25	3/25	3/14	3/ 8	3/ 8	3/ 8	
			.1MM	301	472	571	571	571	571	571	571	571	571	622	622	622	630	489
1989	273	100	D/M	3/27	3/27	3/26	3/25	3/24	3/24	3/24	3/24	3/24	3/24	3/14	3/14	3/ 4	3/ 4	
			.1MM	281	558	717	836	848	848	848	848	848	848	848	848	848	1085	811
1990	273	100	D/M	3/12	3/11	3/11	3/11	3/11	3/10	3/10	3/10	3/10	3/10	3/ 2	2/22	2/22	2/13	
			.1MM	195	360	510	604	652	676	676	676	676	676	676	676	706	754	841

1991	273	100	D/M	2/ 5	2/ 4	2/ 4	2/ 4	2/ 3	2/ 3	2/ 3	2/ 3	12/21	12/21	12/17	2/ 3	2/21	2/ 3	
			.1MM	202	366	451	539	563	563	580	580	654	693	693	743	795	834	801
1992	274	100	D/M	3/27	3/27	3/26	3/26	3/27	3/27	3/27	3/26	3/26	3/26	3/27	3/26	3/26	3/26	
			.1MM	490	664	672	672	742	871	934	942	946	946	1014	1075	1246	1373	1251
1993	273	100	D/M	1/ 4	3/29	3/28	3/27	3/26	3/26	3/25	3/24	3/24	3/26	3/24	3/24	3/16	3/ 9	
			.1MM	361	542	737	944	1080	1184	1262	1322	1322	1341	1442	1578	1656	1716	1513
1994	273	100	D/M	2/20	3/22	3/22	3/21	3/21	3/21	4/ 3	4/ 2	4/ 1	3/31	3/22	3/21	3/21	3/15	
			.1MM	254	368	491	567	567	567	591	663	685	755	755	782	852	860	1386
1995	273	100	D/M	1/15	1/15	1/14	1/13	1/12	1/12	1/12	1/12	1/12	1/12	1/12	1/12	1/12	12/18	
			.1MM	608	722	782	872	932	937	937	937	937	937	937	937	937	937	335
1996	274	100	D/M	1/19	1/18	1/17	1/16	2/20	2/20	2/20	2/20	2/20	2/20	2/20	2/ 8	2/20	2/20	
			.1MM	387	584	586	622	790	841	841	863	863	863	863	863	863	863	1461
1997	273	100	D/M	2/21	4/ 4	2/19	4/ 3	4/ 2	4/ 1	3/31	3/29	3/29	3/27	3/25	3/25	3/14	3/14	
			.1MM	384	577	743	848	987	1036	1043	1175	1332	1481	1638	1681	1715	1715	1420

	1 DAY	2 DAY	3 DAY	4 DAY	5 DAY	6 DAY	7 DAY	8 DAY	9 DAY	10 DAY	15 DAY	20 DAY	25 DAY	30 DAY
MEAN EXTREME (MM)	32.9	51.7	66.0	76.9	86.5	95.2	102.4	108.8	114.7	120.6	143.2	159.3	170.6	179.4
STD. DEV. (MM)	9.2	14.5	19.8	24.0	28.0	31.5	34.8	38.0	41.6	45.1	54.5	60.7	65.8	67.7
YEARS ANALYSED	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0

** NOTE ** MEAN AND STANDARD DEVIATION HAVE BEEN ADJUSTED TO ACCOUNT FOR ONE OBSERVATION PER DAY.

NOTE ** VALUE IN FLAG INDICATES YEAR NOT INCLUDED IN ANALYSIS BASED ON % DAYS OPERATIONAL (<90.0%)

ATMOSPHERIC ENVIRONMENT SERVICE
 RAIN+SNOWMELT INTENSITY, DURATION, FREQUENCY VALUES
 PREPARED BY THE HYDROMETEOROLOGY DIVISION, CANADIAN CLIMATE CENTRE

STATION : Ottawa CDA, Ontario

STATION NUMBER 6105976

LATITUDE: 4523 LONGITUDE: 7543 ELEVATION(M): 79

SNOWMELT MODEL 2

CRITICAL PERIOD : 1ST OF MONTH 10 TO THE END OF MONTH 5

NOTE : MODIFIED GUMBEL 12/82

RETURN PERIOD VALUES (MM) WITH 50% CONFIDENCE LIMITS

RETURN PERIOD YEARS	1 DAY	2 DAY	3 DAY	4 DAY	5 DAY
2	31.39+/- .55	49.34+/- .87	62.73+/- 1.19	72.92+/- 1.44	81.87+/- 1.68
5	39.50+/- .93	62.13+/- 1.47	80.24+/- 2.01	94.15+/- 2.43	106.62+/- 2.84
10	44.89+/- 1.26	70.62+/- 1.98	91.86+/- 2.71	108.24+/- 3.29	123.05+/- 3.83
25	51.68+/- 1.69	81.33+/- 2.67	106.52+/- 3.65	126.00+/- 4.43	143.76+/- 5.17
50	56.71+/- 2.03	89.27+/- 3.20	117.39+/- 4.37	139.18+/- 5.30	159.12+/- 6.18
100	61.72+/- 2.36	97.17+/- 3.72	128.19+/- 5.09	152.28+/- 6.18	174.40+/- 7.20

RETURN PERIOD YEARS	6 DAY	7 DAY	8 DAY	9 DAY	10 DAY
2	90.06+/- 1.89	96.70+/- 2.09	102.57+/- 2.28	107.86+/- 2.50	113.19+/- 2.71
5	117.85+/- 3.18	127.47+/- 3.53	136.13+/- 3.84	144.56+/- 4.21	153.01+/- 4.56
10	136.30+/- 4.30	147.90+/- 4.76	158.39+/- 5.19	168.92+/- 5.68	179.44+/- 6.17
25	159.56+/- 5.80	173.65+/- 6.42	186.47+/- 7.00	199.64+/- 7.66	212.76+/- 8.31
50	176.81+/- 6.94	192.75+/- 7.68	207.29+/- 8.38	222.42+/- 9.17	237.48+/- 9.94
100	193.97+/- 8.09	211.74+/- 8.95	228.00+/- 9.76	245.08+/-10.68	262.05+/-11.59

RETURN PERIOD YEARS	15 DAY	20 DAY	25 DAY	30 DAY
2	134.29+/- 3.27	149.30+/- 3.65	159.83+/- 3.96	168.26+/- 4.07
5	182.38+/- 5.51	202.90+/- 6.14	217.95+/- 6.66	228.04+/- 6.85
10	214.29+/- 7.45	238.46+/- 8.30	256.53+/- 9.00	267.71+/- 9.26
25	254.54+/-10.04	283.31+/-11.19	305.17+/-12.13	317.74+/-12.48
50	284.38+/-12.01	316.57+/-13.38	341.24+/-14.51	354.84+/-14.93
100	314.06+/-13.99	349.65+/-15.59	377.11+/-16.91	391.74+/-17.39

** WARNING ** : THE 1-DAY 100-YEAR RETURN PERIOD EVENT IS EXCEEDED BY THE 1-DAY EVENT IN 1934
 ** WARNING ** : THE 2-DAY 100-YEAR RETURN PERIOD EVENT IS EXCEEDED BY THE 2-DAY EVENT IN 1923
 ** WARNING ** : THE 3-DAY 100-YEAR RETURN PERIOD EVENT IS EXCEEDED BY THE 3-DAY EVENT IN 1923

ATMOSPHERIC ENVIRONMENT SERVICE
RAIN+SNOWMELT INTENSITY, DURATION, FREQUENCY VALUES
PREPARED BY THE HYDROMETEOROLOGY DIVISION, CANADIAN CLIMATE CENTRE

STATION : Ottawa CDA, Ontario

STATION NUMBER 6105976

LATITUDE: 4523 LONGITUDE: 7543 ELEVATION(M): 79

SNOWMELT MODEL 3

CRITICAL PERIOD : 1ST OF MONTH 10 TO THE END OF MONTH 5

NOTE : MODIFIED GUMBEL 12/82

YR	TOTAL DAYS	% VALID	START FLAG	MAX	1 DAY	2 DAY	3 DAY	4 DAY	5 DAY	6 DAY	7 DAY	8 DAY	9 DAY	10 DAY	15 DAY	20 DAY	25 DAY	30 DAY	MAX SNPK
1890	242	88	**	D/M	4/ 4	4/ 3	4/ 7	4/ 4	4/ 3	4/ 4	4/ 3	4/ 3	4/ 3	4/ 3	3/26	3/21	3/21	3/12	
				.1MM	312	403	446	670	761	826	917	994	994	994	994	994	994	994	
1891	273	100		D/M	4/11	4/10	4/ 9	4/ 9	4/ 9	4/ 9	3/28	3/28	3/21	3/21	3/29	3/23	3/21	3/13	
				.1MM	342	606	730	824	824	824	844	844	991	1049	1217	1311	1455	1553	1870
1892	274	100		D/M	4/ 6	4/ 5	4/ 4	4/ 4	4/ 4	4/ 3	4/ 2	4/ 2	4/ 2	4/ 2	3/29	3/29	3/29	3/10	
				.1MM	451	827	1169	1404	1639	1869	1927	1936	1936	1936	1985	1994	1994	1994	1796
1893	273	100		D/M	4/13	4/12	4/11	4/10	4/10	4/ 8	4/ 8	4/ 8	4/ 8	4/ 8	3/31	3/31	3/25	3/21	
				.1MM	637	918	1092	1176	1223	1457	1504	1504	1504	1604	1645	1645	1658	1744	1836
1894	273	100		D/M	3/ 6	3/ 5	3/ 5	3/ 4	3/ 3	3/ 2	3/ 2	3/ 5	4/ 4	4/ 4	3/ 5	3/ 2	3/19	3/16	
				.1MM	292	536	705	712	719	822	822	836	982	982	982	1112	1225	1225	2161
1895	273	100		D/M	4/14	4/ 8	4/13	4/13	4/13	4/12	4/ 8	4/ 8	4/ 8	4/ 8	4/ 5	4/ 2	3/25	3/25	
				.1MM	394	700	925	1155	1315	1455	1476	1765	1995	2155	2295	2328	2377	2377	1821
1896	274	100		D/M	4/16	4/15	4/14	4/13	4/12	4/11	4/10	4/ 9	4/ 8	4/ 8	4/ 3	3/31	3/27	3/27	
				.1MM	699	996	1338	1521	1677	1776	1818	1867	1883	1883	1883	1883	1883	1890	1947
1897	273	100		D/M	4/ 5	4/ 4	4/ 4	4/ 2	4/ 1	3/31	3/30	3/30	3/29	3/29	3/22	3/19	3/19	3/ 9	
				.1MM	379	589	649	754	845	936	1036	1096	1138	1138	1161	1161	1161	1201	1188
1898	273	100		D/M	12/11	3/12	3/11	3/10	3/ 9	3/ 9	3/11	3/10	3/11	3/11	3/ 9	3/ 9	3/ 9	3/ 9	
				.1MM	356	661	934	1034	1101	1101	1261	1361	1465	1609	1709	1776	1776	1776	1885
1899	242	88	**	D/M	4/20	4/19	4/18	4/17	4/16	4/15	4/14	4/13	4/12	4/11	4/ 7	4/ 7	3/29	3/23	
				.1MM	396	716	988	1121	1179	1335	1539	1678	1823	1831	1831	1865	2062	2112	
1900	273	100		D/M	2/13	12/11	4/15	4/13	4/12	4/11	4/11	4/11	4/11	4/ 7	4/ 3	3/29	3/29	3/20	
				.1MM	327	374	496	633	796	937	1068	1068	1068	1204	1387	1518	1626	1653	1746
1901	273	100		D/M	11/21	4/14	4/13	4/12	4/11	4/10	4/ 9	4/ 8	4/ 7	4/ 6	4/ 1	3/27	3/24	3/21	
				.1MM	328	622	863	1037	1196	1403	1584	1783	1869	1979	2151	2442	2611	2676	2388
1902	273	100		D/M	3/22	12/14	3/21	3/21	3/21	3/21	3/22	3/21	3/20	3/20	3/16	3/11	3/11	2/28	
				.1MM	342	627	708	783	882	1015	1236	1461	1469	1469	1592	1685	1685	1980	
1903	273	100		D/M	3/20	3/19	3/19	3/19	3/19	3/19	3/18	3/17	3/19	3/18	3/11	3/ 8	3/ 5	2/28	
				.1MM	430	724	922	1022	1267	1435	1516	1620	1734	1815	1919	1919	1919	1952	2185
1904	274	100		D/M	4/25	4/10	4/ 9	4/ 8	4/ 8	4/ 7	4/ 7	4/ 6	4/ 6	4/ 2	3/31	4/ 7	4/ 2	3/27	
				.1MM	535	885	1018	1181	1303	1403	1489	1556	1556	1652	1774	1860	1902	1970	2738
1905	273	100		D/M	3/29	3/29	3/28	3/28	3/27	3/25	3/25	3/29	3/29	3/28	3/27	3/24	3/18	3/18	
				.1MM	369	599	729	820	907	962	1053	1166	1297	1427	1514	1565	1777	1907	2038
1906	273	100		D/M	3/27	1/22	3/27	3/27	2/21	2/21	2/21	1/16	1/16	1/16	1/16	2/21	12/30	12/27	
				.1MM	346	398	405	405	433	433	433	434	434	434	434	434	434	434	483
1907	273	100		D/M	3/28	3/23	3/28	3/27	3/26	3/23	3/23	3/23	3/22	3/22	3/22	3/23	3/22	3/22	
				.1MM	219	411	539	624	709	800	974	1120	1204	1220	1220	1220	1262	1300	1275
1908	274	100		D/M	4/26	4/26	4/25	4/24	4/23	4/22	4/21	4/20	4/19	4/18	4/14	4/ 8	4/ 3	3/29	

1909	273	100	.1MM	545	913	1202	1443	1678	1701	1726	1925	2049	2091	2091	2304	2353	2402	2622
			D/M	4/13	4/13	4/13	4/13	4/12	4/12	4/12	4/ 7	4/ 6	4/ 6	4/ 3	3/30	3/25	4/ 3	
			.1MM	623	1060	1168	1338	1446	1484	1484	1540	1866	1974	2144	2211	2286	2326	2094
1910	273	100	D/M	1/22	1/21	3/22	3/22	3/20	3/20	3/19	3/19	3/19	3/19	3/13	3/ 6	2/28	2/27	
			.1MM	281	383	518	617	750	849	869	869	869	869	869	869	903	903	1089
1911	273	100	D/M	4/14	4/13	4/13	4/12	4/12	4/13	4/14	4/13	4/13	4/13	4/ 7	4/ 5	3/27	3/27	
			.1MM	605	779	949	1016	1041	1099	1337	1511	1635	1716	1783	1784	1865	1940	1959
1912	274	100	D/M	4/16	4/16	4/15	4/14	4/13	4/12	4/11	4/11	4/ 8	4/ 8	4/ 6	3/29	3/29	3/19	
			.1MM	491	828	870	937	1044	1152	1169	1169	1257	1594	1861	2013	2013	2013	1825
1913	273	100	D/M	3/31	3/30	3/19	3/19	3/21	3/19	3/19	3/19	3/19	3/19	3/19	3/19	3/14	3/13	
			.1MM	446	580	733	733	855	1072	1236	1279	1279	1279	1482	1646	1859	1882	1875
1914	273	100	D/M	4/18	4/17	4/16	4/16	4/15	4/14	4/14	4/12	4/11	4/10	4/ 5	3/31	3/26	3/26	
			.1MM	321	555	734	874	958	1008	1008	1043	1118	1126	1126	1203	1203	1203	1643
1915	273	100	D/M	11/16	4/ 6	4/ 6	4/ 5	4/ 4	4/ 3	4/ 2	4/ 1	4/ 1	4/ 1	3/25	3/21	3/21	3/21	
			.1MM	384	471	693	808	883	958	1016	1100	1100	1100	1100	1100	1100	1156	1261
1916	274	100	D/M	4/13	4/13	4/12	4/25	4/23	4/12	4/12	4/10	4/10	4/11	4/13	4/ 9	3/27	3/29	
			.1MM	269	495	650	735	885	1033	1142	1235	1344	1406	1526	1583	1689	1874	3137
1917	273	100	D/M	4/19	4/18	4/18	4/17	4/16	4/15	4/14	4/13	4/12	4/11	4/ 6	4/ 1	3/27	3/23	
			.1MM	504	995	1249	1424	1499	1590	1655	1671	1678	1685	1685	1685	1685	1763	2570
1918	273	100	D/M	4/ 8	4/ 1	3/31	3/30	3/29	3/29	4/ 2	4/ 1	3/31	3/30	3/31	3/29	3/21	3/17	
			.1MM	384	682	848	996	1054	1054	1244	1566	1732	1880	1938	1946	2058	2225	2684
1919	273	100	D/M	4/11	4/10	4/ 9	4/ 9	4/ 7	4/ 7	4/ 6	4/ 5	4/ 5	4/ 3	4/ 3	3/24	3/18	3/16	
			.1MM	450	642	775	877	1064	1166	1256	1355	1355	1406	1406	1406	1406	1406	1686
1920	274	100	D/M	3/27	3/26	3/25	3/24	3/24	3/23	3/23	3/21	3/21	3/21	3/17	3/12	3/ 6	3/ 6	
			.1MM	392	662	929	1163	1362	1470	1470	1479	1479	1479	1559	1616	1616	1616	1518
1921	273	100	D/M	3/21	3/20	3/19	3/19	3/20	3/20	3/19	3/19	3/16	3/16	3/11	3/ 6	3/ 1	2/28	
			.1MM	291	564	584	584	716	866	886	886	915	1065	1080	1080	1240	1282	931
1922	273	100	D/M	4/ 7	4/ 7	4/ 6	4/ 5	4/ 4	4/ 3	4/ 2	4/ 2	4/ 2	4/ 2	3/26	3/20	3/15	3/14	
			.1MM	384	688	863	996	1062	1120	1171	1171	1171	1171	1179	1307	1356	1414	1206
1923	273	100	D/M	4/21	4/21	4/20	4/19	4/19	4/17	4/16	4/16	4/16	4/16	4/ 8	4/ 3	4/ 3	4/ 3	
			.1MM	925	1380	1721	1770	1770	1828	1877	1877	1877	1877	1877	1965	1965	1965	2283
1924	274	100	D/M	4/ 8	4/ 7	4/ 6	4/ 5	4/ 4	4/ 5	4/ 5	4/ 4	4/ 4	4/ 4	4/ 4	4/ 3	3/25	3/22	
			.1MM	322	531	680	909	984	1050	1205	1280	1305	1363	1535	1643	1743	1866	1935
1925	273	100	D/M	3/27	3/27	3/26	3/25	3/25	3/24	3/24	3/22	3/21	3/19	3/18	3/11	3/ 8	3/ 8	
			.1MM	334	613	821	1030	1143	1218	1218	1267	1331	1453	1566	1632	1632	1632	1124
1926	273	100	D/M	5/ 2	5/ 1	4/30	4/29	4/28	4/27	4/26	4/25	4/24	4/23	4/21	4/13	4/ 8	4/ 8	
			.1MM	472	744	903	1039	1258	1417	1433	1704	1896	2168	2463	2638	2638	2638	2467
1927	273	100	D/M	11/16	11/15	4/ 4	4/ 4	4/ 3	3/13	3/12	3/12	4/ 4	4/ 3	3/29	3/27	3/13	3/13	
			.1MM	324	399	519	643	685	804	912	970	1057	1099	1131	1131	1230	1332	2212
1928	274	100	D/M	4/ 7	4/ 7	4/ 6	4/ 5	4/ 4	4/ 4	4/ 4	4/ 4	4/ 4	4/ 4	3/25	3/22	3/15	3/13	
			.1MM	349	664	891	1076	1160	1160	1160	1160	1160	1160	1160	1277	1374	1512	1388
1929	273	100	D/M	1/ 6	3/15	3/13	3/13	3/13	3/25	3/26	3/25	3/25	3/26	3/14	3/13	3/13	3/ 4	
			.1MM	274	311	406	510	510	543	613	727	727	790	904	904	937	1005	979
1930	273	100	D/M	1/ 7	1/ 7	1/ 7	1/ 7	1/ 7	1/ 3	1/ 2	1/ 2	1/ 2	1/ 2	1/ 2	12/27	2/19	3/ 8	
			.1MM	284	546	546	546	546	571	699	699	699	699	699	699	732	732	994
1931	273	100	D/M	3/29	3/28	3/28	3/26	3/25	3/24	3/29	3/28	3/27	3/26	3/22	3/16	3/16	3/10	
			.1MM	254	376	471	590	688	795	921	1043	1127	1257	1355	1462	1537	1595	1514
1932	274	100	D/M	2/12	4/12	4/11	4/10	4/ 9	4/ 8	4/ 7	4/ 6	4/ 6	4/ 6	4/ 1	4/ 1	3/27	3/27	
			.1MM	301	419	569	708	905	947	1005	1013	1013	1013	1050	1139	1248	1248	907
1933	273	100	D/M	12/25	4/ 1	4/ 1	4/ 1	4/ 2	4/ 1	4/ 1	3/31	3/31	3/31	3/27	3/20	3/20	3/20	
			.1MM	228	319	458	533	639	799	918	989	1032	1032	1032	1032	1066	1066	730
1934	273	100	D/M	12/31	4/18	4/17	4/16	4/15	4/15	4/14	4/14	4/11	4/10	4/ 8	4/ 2	4/ 1	3/26	
			.1MM	732	780	963	1178	1381	1505	1609	1700	2130	2370	2494	2585	2669	2729	2247
1935	273	100	D/M	4/10	4/10	4/ 9	4/ 9	4/ 8	4/ 9	4/ 8	4/ 8	4/ 8	4/ 5	3/31	3/28	3/23	3/16	
			.1MM	286	514	741	912	1020	1214	1322	1322	1322	1338	1338	1354	1413	1413	1428

1936	274	100	D/M	3/12	3/30	3/28	3/28	3/27	3/26	3/25	3/25	3/23	3/22	3/17	3/12	3/11	3/12		
			.1MM	294	407	552	767	884	1076	1247	1272	1305	1504	1546	1687	1768	1983	1490	
1937	273	100	D/M	4/ 5	4/ 5	4/ 5	4/ 5	4/ 5	4/ 5	4/ 5	4/ 5	4/ 5	4/ 5	4/ 5	4/ 5	12/27	12/26		
			.1MM	309	516	654	745	785	851	913	913	913	913	913	913	913	913	699	
1938	273	100	D/M	3/31	3/30	3/29	3/23	3/20	3/21	3/20	3/19	3/23	3/22	3/17	3/13	3/16	3/ 5		
			.1MM	309	470	585	668	751	883	1023	1084	1261	1343	1476	1616	1690	1751	1407	
1939	273	100	D/M	4/26	4/26	4/26	4/25	4/23	4/23	4/22	4/21	4/20	4/19	4/14	4/11	4/11	3/31		
			.1MM	368	714	928	1094	1193	1407	1600	1705	1827	2025	2087	2138	2138	2171	1930	
1940	274	100	D/M	4/19	4/18	4/18	4/18	4/18	4/18	4/18	4/18	4/17	4/17	4/12	4/ 9	4/ 1	3/31		
			.1MM	278	491	703	812	967	1082	1259	1472	1580	1667	1753	1753	1753	1786	1749	
1941	273	100	D/M	12/29	4/10	4/ 9	4/ 9	4/ 8	4/ 6	4/ 6	4/ 5	4/ 4	4/ 3	4/ 3	4/ 3	4/ 3	3/16		
			.1MM	422	624	841	1034	1193	1342	1535	1619	1686	1744	1744	1744	1744	1744	1778	
1942	273	100	D/M	12/24	12/23	12/23	12/23	3/29	3/27	3/27	3/26	3/25	3/25	3/21	3/16	3/ 9	3/ 4		
			.1MM	325	490	490	490	541	577	675	766	815	815	815	900	998	998	1065	
1943	272	99	D/M	4/25	4/24	4/23	4/23	4/22	4/23	4/22	4/21	4/20	4/19	4/17	4/ 9	4/ 9	3/31		
			.1MM	688	1067	1341	1614	1813	2044	2243	2365	2432	2517	2583	2590	2590	2590	2433	
1944	274	100	D/M	4/20	4/10	4/18	4/18	4/17	4/17	4/17	4/17	4/13	4/11	4/10	4/ 2	3/31	3/25		
			.1MM	234	375	525	645	702	702	702	702	734	828	1014	1134	1134	1134	955	
1945	273	100	D/M	3/18	3/20	3/18	3/18	3/17	3/16	3/15	3/18	3/18	3/17	3/14	3/14	3/ 2	2/26		
			.1MM	253	437	675	871	1022	1123	1288	1491	1704	1855	1956	2121	2179	2179	2008	
1946	273	100	D/M	3/13	3/13	3/13	3/13	3/13	3/13	3/ 8	3/ 7	3/ 6	3/ 6	3/ 2	3/ 2	3/ 2	2/13		
			.1MM	402	681	728	728	728	728	847	959	1066	1113	1113	1113	1155	1202	905	
1947	273	100	D/M	4/11	4/11	4/10	4/ 9	4/10	4/10	4/ 6	4/ 5	4/ 6	4/ 5	4/ 9	4/ 4	4/ 5	3/25		
			.1MM	699	1284	1393	1459	1567	1651	1738	1847	1912	2021	2105	2118	2183	2292	2340	
1948	274	100	D/M	3/16	3/16	3/21	3/16	3/19	3/16	3/16	3/16	3/16	3/16	3/16	3/16	3/16	3/16		
			.1MM	325	507	532	634	743	1017	1108	1250	1325	1442	1442	1657	1797	1797	1272	
1949	273	100	D/M	4/ 5	4/ 5	4/ 4	4/ 3	4/ 2	4/ 1	3/31	3/30	3/29	3/28	3/23	3/22	3/22	3/22		
			.1MM	276	491	624	797	912	936	976	1034	1116	1214	1426	1543	1592	1592	1464	
1950	273	100	D/M	12/21	12/20	12/19	12/18	12/18	12/18	12/18	12/18	12/18	12/18	4/ 3	3/29	3/24	3/23		
			.1MM	336	614	695	850	850	850	850	972	1020	1020	1031	1102	1139	1345		
1951	260	95	D/M	3/30	3/29	3/29	3/29	3/29	3/29	3/29	3/28	3/27	3/26	3/21	3/16	3/11	3/ 6		
			.1MM	349	637	773	893	977	1073	1227	1285	1285	1285	1285	1293	1308	1308	1212	
1952	274	100	D/M	4/ 5	4/ 4	4/ 5	4/ 5	4/ 5	4/ 5	4/ 5	4/ 4	4/ 3	4/ 2	3/28	3/23	3/20	3/12		
			.1MM	306	441	613	784	973	1139	1374	1509	1649	1768	1869	1876	1876	1876	1716	
1953	273	100	D/M	12/10	12/10	12/10	12/10	12/ 6	12/ 5	12/ 5	12/ 5	12/ 5	12/ 5	12/ 5	12/ 5	12/ 5	2/15		
			.1MM	389	389	389	389	405	599	599	599	599	599	599	599	599	599	295	
1954	271	99	D/M	4/11	4/10	4/ 6	4/ 8	4/ 7	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6		
			.1MM	462	698	786	859	1173	1484	1536	1536	1536	1536	1536	1536	1536	1536	1194	
1955	273	100	D/M	4/11	4/10	4/10	4/10	4/10	4/ 9	4/ 9	4/ 7	4/ 6	4/ 5	3/31	3/30	3/21	3/16		
			.1MM	292	566	716	981	1175	1292	1292	1316	1475	1625	1733	1791	1890	1981	1973	
1956	274	100	D/M	4/ 5	4/ 5	4/ 5	4/ 4	4/ 5	4/ 5	4/ 4	4/ 4	4/ 4	4/ 1	4/ 1	4/ 1	4/ 1	4/ 1		
			.1MM	279	504	661	740	892	1000	1079	1091	1091	1119	1131	1131	1131	1131	1098	
1957	273	100	D/M	1/22	1/21	1/21	1/21	1/21	1/21	1/21	1/21	3/14	3/13	3/ 9	3/ 9	2/26	2/24		
			.1MM	414	512	512	512	512	512	512	512	539	672	742	758	776	776	775	
1958	273	100	D/M	12/ 7	4/ 2	4/ 1	3/31	3/30	3/30	3/29	3/28	3/27	3/26	3/21	3/16	3/18	3/13		
			.1MM	218	267	384	512	645	747	814	905	1004	1062	1096	1209	1311	1399	1479	
1959	273	100	D/M	4/16	4/15	4/14	4/13	4/12	4/11	4/10	4/ 9	4/ 8	4/ 7	4/ 2	3/30	3/30	3/20		
			.1MM	412	611	761	827	861	1022	1146	1246	1444	1474	1630	1724	1793	1880	2142	
1960	274	100	D/M	4/16	4/16	4/16	4/15	4/14	4/13	4/12	4/12	4/10	4/ 9	4/ 4	3/30	3/28	3/28		
			.1MM	462	805	1244	1523	1737	1923	2005	2005	2037	2060	2060	2060	2142	2254	2299	
1961	273	100	D/M	2/25	2/24	2/23	2/22	2/23	2/22	2/19	2/18	2/23	2/23	2/18	2/13	2/13	2/23		
			.1MM	241	284	404	411	413	420	427	518	552	590	597	597	597	666	756	
1962	273	100	D/M	3/30	3/29	3/28	3/27	3/26	3/25	3/24	3/24	3/22	3/21	3/16	3/12	3/12	3/12		
			.1MM	320	581	703	778	919	1034	1076	1076	1219	1277	1277	1277	1277	1317	1427	
1963	273	100	D/M	3/30	3/26	3/25	3/27	3/26	3/25	3/25	3/25	3/25	3/21	3/17	3/17	3/17	3/ 5		

			.1MM	234	292	390	390	539	637	653	653	653	686	702	702	702	709	1488
1964	274	100	D/M	3/ 6	3/ 5	3/ 4	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	2/ 5	
			.1MM	263	365	508	628	628	628	628	628	628	628	628	628	628	628	681
1965	273	100	D/M	4/ 7	4/ 6	4/ 5	4/ 5	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	2/25	2/25	2/11	2/ 7	
			.1MM	258	375	466	466	506	506	506	506	506	506	570	570	570	570	750
1966	273	100	D/M	2/11	2/28	2/28	2/28	2/28	2/28	2/28	12/24	12/23	12/23	12/23	2/11	2/ 9	12/ 2	
			.1MM	205	302	387	387	387	387	387	460	506	506	506	506	506	506	676
1967	273	100	D/M	4/ 1	4/ 1	3/31	3/31	3/29	3/28	3/27	3/27	3/25	3/25	3/25	3/25	3/10	3/10	
			.1MM	398	745	836	836	903	1103	1266	1266	1291	1291	1291	1291	1291	1291	1650
1968	274	100	D/M	3/17	3/20	3/20	3/19	3/17	3/17	3/16	3/16	3/16	3/16	3/10	3/10	3/10	3/10	
			.1MM	225	350	529	613	771	950	963	963	963	963	963	979	1106	1106	1071
1969	273	100	D/M	1/24	3/24	3/24	3/21	3/21	3/20	3/19	3/19	3/19	3/19	3/15	3/15	3/15	1/23	
			.1MM	221	311	311	381	483	527	536	536	536	536	561	561	561	561	978
1970	273	100	D/M	4/ 9	4/ 8	4/ 8	4/ 7	4/ 9	4/ 8	4/ 7	4/ 7	4/ 7	4/ 7	4/ 2	3/25	3/21	3/21	
			.1MM	303	444	469	477	654	795	803	803	803	803	803	818	818	818	1865
1971	273	100	D/M	4/13	4/12	4/11	4/10	4/12	4/12	4/11	4/10	4/10	4/10	4/ 3	3/30	3/30	3/30	
			.1MM	280	449	498	514	597	679	728	744	744	744	744	744	744	744	3390
1972	274	100	D/M	12/10	12/ 9	12/ 9	12/ 9	4/16	4/15	4/14	4/13	4/12	4/11	4/11	4/ 3	3/30	3/22	
			.1MM	232	372	471	562	652	804	1002	1070	1135	1167	1167	1167	1167	1167	2169
1973	273	100	D/M	3/17	3/16	3/15	3/14	3/13	3/12	3/11	3/10	3/10	3/ 8	3/ 3	3/ 3	3/ 3	3/ 3	
			.1MM	310	507	656	691	749	935	1098	1136	1168	1442	1584	1616	1643	1725	1362
1974	273	100	D/M	3/ 4	3/ 6	4/ 3	3/ 4	3/ 4	3/ 4	3/ 4	2/28	2/28	2/28	2/22	2/22	2/22	3/ 7	
			.1MM	439	552	679	1096	1096	1096	1096	1140	1140	1140	1140	1140	1140	1232	1045
1975	273	100	D/M	3/19	4/17	4/16	4/15	4/14	4/14	4/14	4/14	4/14	4/14	4/14	3/30	3/25	3/19	
			.1MM	350	619	809	893	977	977	977	977	977	977	977	977	977	977	1345
1976	274	100	D/M	4/ 1	4/ 1	4/ 1	3/25	3/25	3/28	3/26	3/26	3/25	3/25	3/21	3/20	3/13	3/ 5	
			.1MM	435	651	738	921	970	1073	1328	1544	1751	1838	1960	2040	2127	2249	1865
1977	273	100	D/M	3/13	3/13	3/12	3/10	3/10	3/10	3/ 9	3/ 9	3/ 7	3/ 6	3/ 4	2/24	2/24	2/24	
			.1MM	410	647	821	1026	1263	1385	1476	1476	1500	1532	1561	1589	1589	1589	1310
1978	273	100	D/M	1/25	1/25	4/10	4/10	4/10	4/10	4/10	4/10	4/ 7	4/ 4	3/31	3/27	3/21	3/20	
			.1MM	332	384	495	682	790	857	857	857	887	932	1040	1107	1113	1221	1929
1979	273	100	D/M	3/24	3/23	3/22	3/21	3/20	3/20	3/20	3/20	3/20	3/20	3/10	3/ 5	3/ 3	2/23	
			.1MM	411	613	785	927	1024	1024	1024	1024	1024	1024	1086	1116	1116	1116	1563
1980	274	100	D/M	3/22	3/21	3/21	3/21	3/21	3/21	3/21	3/21	3/21	3/18	3/17	3/11	3/11	3/11	
			.1MM	502	652	761	873	918	918	958	958	958	994	996	996	996	996	547
1981	273	100	D/M	2/20	2/20	2/19	2/18	2/17	2/17	2/17	2/17	2/17	2/17	2/ 8	2/ 2	2/ 1	1/25	
			.1MM	295	574	807	984	1153	1153	1153	1153	1153	1153	1293	1359	1359	1381	1094
1982	273	100	D/M	3/31	3/31	3/30	3/31	3/30	3/30	3/30	3/25	3/25	3/25	3/20	3/13	3/11	3/12	
			.1MM	385	522	586	678	742	742	742	769	769	925	925	925	940	946	1249
1983	273	100	D/M	1/10	2/ 2	2/ 2	1/31	1/31	1/31	3/ 8	3/ 8	3/ 6	12/15	12/15	12/23	1/10	12/15	
			.1MM	282	307	307	328	328	328	342	342	363	380	514	514	514	514	356
1984	274	100	D/M	4/ 5	4/ 4	4/ 3	4/ 2	4/ 1	3/31	3/30	3/30	3/30	3/30	3/22	3/17	3/16	3/16	
			.1MM	321	446	539	642	704	788	863	863	863	863	863	869	869	945	1020
1985	273	100	D/M	2/23	2/23	3/11	3/11	3/11	3/ 8	3/ 8	3/ 8	3/ 8	3/ 8	3/ 1	2/23	2/21	2/23	
			.1MM	271	325	400	443	443	484	527	527	527	527	527	527	570	607	1106
1986	273	100	D/M	3/19	1/19	1/18	1/18	3/15	3/15	3/13	3/13	3/13	3/10	3/ 9	3/ 2	3/ 2	2/18	
			.1MM	275	418	527	527	546	546	554	554	554	669	676	676	676	676	713
1987	273	100	D/M	3/22	3/21	3/20	3/20	3/18	3/17	3/17	3/17	3/17	3/17	3/ 8	3/ 7	2/28	2/28	
			.1MM	341	479	536	567	609	642	673	673	673	673	673	673	673	673	985
1988	274	100	D/M	1/31	3/26	3/25	3/25	3/25	3/25	3/25	3/25	3/25	3/25	3/14	3/ 8	3/ 8	3/ 8	
			.1MM	273	488	650	650	650	650	650	650	650	650	650	684	684	684	517
1989	273	100	D/M	3/28	3/27	3/26	3/25	3/24	3/24	3/24	3/24	3/24	3/24	3/14	3/14	3/ 4	3/ 4	
			.1MM	405	664	794	892	904	904	904	904	904	904	904	904	904	1142	846
1990	273	100	D/M	3/16	3/15	3/15	3/13	3/12	3/11	3/11	3/10	3/10	3/10	3/10	3/ 2	2/22	2/16	
			.1MM	232	407	494	612	796	932	1019	1029	1029	1029	1029	1029	1029	1029	950

1991	273	100	D/M	2/ 5	2/ 4	2/ 4	2/ 4	2/ 3	2/ 3	12/17	12/17	12/21	12/21	12/17	3/ 1	3/ 1	3/ 1	
			.1MM	207	375	454	523	533	533	539	539	619	642	642	708	760	783	875
1992	274	100	D/M	3/27	3/27	3/26	3/26	3/27	3/27	3/27	3/26	3/26	3/26	3/27	3/26	3/26	3/26	
			.1MM	455	614	622	622	672	777	822	830	830	830	879	923	1071	1180	1309
1993	273	100	D/M	3/29	3/29	3/28	3/27	3/26	3/26	3/25	3/24	3/24	3/26	3/25	3/24	3/16	3/16	
			.1MM	366	566	727	899	1008	1113	1171	1213	1213	1229	1321	1493	1602	1666	1563
1994	273	100	D/M	2/20	2/20	3/22	3/21	3/21	3/21	3/21	3/21	3/21	3/31	3/22	3/21	3/21	3/15	
			.1MM	372	434	439	515	515	515	515	566	579	600	630	638	706	724	1359
1995	273	100	D/M	1/15	1/15	1/14	1/13	1/12	1/12	1/12	1/13	1/12	1/12	1/12	1/12	1/12	12/18	
			.1MM	556	655	698	788	848	848	848	921	981	981	981	981	981	981	335
1996	274	100	D/M	1/19	1/18	1/17	2/20	2/20	2/20	2/20	2/20	2/20	2/20	2/20	2/ 8	2/20	2/20	
			.1MM	374	558	560	598	751	787	787	809	809	809	809	809	809	809	1510
1997	273	100	D/M	2/21	4/ 5	4/ 4	4/ 3	4/ 2	4/ 1	4/ 1	3/30	3/29	3/28	3/25	3/25	3/14	3/14	
			.1MM	384	604	878	968	1080	1112	1112	1141	1415	1501	1666	1692	1726	1726	1429

	1 DAY	2 DAY	3 DAY	4 DAY	5 DAY	6 DAY	7 DAY	8 DAY	9 DAY	10 DAY	15 DAY	20 DAY	25 DAY	30 DAY
MEAN EXTREME (MM)	36.9	57.4	71.2	82.2	91.8	100.7	107.7	113.3	119.1	124.7	146.4	162.5	172.4	182.1
STD. DEV. (MM)	12.6	20.3	25.4	29.6	32.9	35.9	38.3	41.2	44.6	47.7	57.5	64.5	68.0	71.2
YEARS ANALYSED	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0

** NOTE ** MEAN AND STANDARD DEVIATION HAVE BEEN ADJUSTED TO ACCOUNT FOR ONE OBSERVATION PER DAY.

NOTE ** VALUE IN FLAG INDICATES YEAR NOT INCLUDED IN ANALYSIS BASED ON % DAYS OPERATIONAL (<90.0%)

ATMOSPHERIC ENVIRONMENT SERVICE
 RAIN+SNOWMELT INTENSITY, DURATION, FREQUENCY VALUES
 PREPARED BY THE HYDROMETEOROLOGY DIVISION, CANADIAN CLIMATE CENTRE

STATION : Ottawa CDA, Ontario

STATION NUMBER 6105976

LATITUDE: 4523 LONGITUDE: 7543 ELEVATION(M): 79

SNOWMELT MODEL 3

CRITICAL PERIOD : 1ST OF MONTH 10 TO THE END OF MONTH 5

NOTE : MODIFIED GUMBEL 12/82

RETURN PERIOD VALUES (MM)

WITH 50% CONFIDENCE LIMITS

RETURN PERIOD
YEARS

1 DAY

2 DAY

3 DAY

4 DAY

5 DAY

2	34.88+/- .76	54.11+/- 1.22	67.08+/- 1.53	77.30+/- 1.78	86.43+/- 1.98
5	46.02+/- 1.28	72.06+/- 2.06	89.49+/- 2.57	103.44+/- 3.00	115.51+/- 3.33
10	53.41+/- 1.72	83.98+/- 2.78	104.36+/- 3.47	120.79+/- 4.05	134.80+/- 4.50
25	62.73+/- 2.32	99.00+/- 3.75	123.11+/- 4.68	142.67+/- 5.46	159.13+/- 6.07
50	69.64+/- 2.78	110.14+/- 4.48	137.02+/- 5.60	158.89+/- 6.53	177.17+/- 7.26
100	76.51+/- 3.24	121.22+/- 5.22	150.85+/- 6.52	175.03+/- 7.61	195.11+/- 8.46

RETURN PERIOD
YEARS

6 DAY

7 DAY

8 DAY

9 DAY

10 DAY

2	94.82+/- 2.16	101.46+/- 2.30	106.56+/- 2.48	111.77+/- 2.68	116.88+/- 2.87
5	126.54+/- 3.63	135.25+/- 3.87	142.95+/- 4.17	151.13+/- 4.51	158.98+/- 4.82
10	147.59+/- 4.91	157.68+/- 5.23	167.10+/- 5.63	177.26+/- 6.09	186.93+/- 6.52
25	174.14+/- 6.62	185.96+/- 7.05	197.56+/- 7.60	210.20+/- 8.22	222.17+/- 8.79
50	193.82+/- 7.92	206.93+/- 8.44	220.14+/- 9.09	234.63+/- 9.83	248.31+/-10.52
100	213.40+/- 9.23	227.79+/- 9.83	242.60+/-10.59	258.93+/-11.45	274.30+/-12.25

RETURN PERIOD
YEARS

15 DAY

20 DAY

25 DAY

30 DAY

2	136.93+/- 3.45	151.93+/- 3.87	161.24+/- 4.09	170.40+/- 4.28
5	187.70+/- 5.82	208.85+/- 6.52	221.31+/- 6.88	233.30+/- 7.21
10	221.39+/- 7.86	246.62+/- 8.81	261.18+/- 9.30	275.05+/- 9.74
25	263.87+/-10.60	294.26+/-11.88	311.46+/-12.54	327.69+/-13.13
50	295.38+/-12.68	329.59+/-14.21	348.75+/-15.00	366.73+/-15.71
100	326.71+/-14.77	364.72+/-16.56	385.83+/-17.48	405.56+/-18.30

** WARNING ** : THE 1-DAY 100-YEAR RETURN PERIOD EVENT IS EXCEEDED BY THE 1-DAY EVENT IN 1923
 ** WARNING ** : THE 2-DAY 100-YEAR RETURN PERIOD EVENT IS EXCEEDED BY THE 2-DAY EVENT IN 1923
 ** WARNING ** : THE 2-DAY 100-YEAR RETURN PERIOD EVENT IS EXCEEDED BY THE 2-DAY EVENT IN 1947
 ** WARNING ** : THE 3-DAY 100-YEAR RETURN PERIOD EVENT IS EXCEEDED BY THE 3-DAY EVENT IN 1923
 ** WARNING ** : THE 4-DAY 100-YEAR RETURN PERIOD EVENT IS EXCEEDED BY THE 4-DAY EVENT IN 1923

ATMOSPHERIC ENVIRONMENT SERVICE
 RAIN+SNOWMELT INTENSITY, DURATION, FREQUENCY VALUES
 PREPARED BY THE HYDROMETEOROLOGY DIVISION, CANADIAN CLIMATE CENTRE

STATION : Ottawa CDA, Ontario

STATION NUMBER 6105976

LATITUDE: 4523 LONGITUDE: 7543 ELEVATION(M): 79

SNOWMELT MODEL 4

CRITICAL PERIOD : 1ST OF MONTH 10 TO THE END OF MONTH 5

NOTE : MODIFIED GUMBEL 12/82

YR	TOTAL DAYS	% VALID	START FLAG	MAX	1 DAY	2 DAY	3 DAY	4 DAY	5 DAY	6 DAY	7 DAY	8 DAY	9 DAY	10 DAY	15 DAY	20 DAY	25 DAY	30 DAY	MAX SNPK
1890	242	88	**	D/M	2/15	2/14	2/13	4/ 2	4/ 1	3/31	3/30	3/30	3/30	3/26	2/15	2/13	2/ 5	1/31	
				.1MM	315	345	370	370	375	390	410	410	410	457	529	529	569	570	
1891	273	100		D/M	3/ 9	3/ 9	4/ 9	4/10	4/10	4/ 9	4/10	4/ 9	4/ 9	4/ 8	3/31	3/28	3/21	3/21	
				.1MM	337	357	444	578	712	813	886	987	1059	1089	1104	1149	1149	1257	1642
1892	274	100		D/M	4/ 5	4/ 5	4/ 4	4/ 5	4/ 4	4/ 3	4/ 3	4/ 2	4/ 2	4/ 1	4/ 2	3/28	3/24	3/23	
				.1MM	228	400	517	686	803	909	1010	1085	1136	1187	1227	1267	1318	1363	1542
1893	273	100		D/M	4/20	4/20	4/19	4/18	4/17	4/ 8	4/ 8	4/13	4/12	4/12	4/ 7	4/ 2	3/29	3/24	
				.1MM	299	433	484	580	671	735	780	820	961	1095	1216	1297	1383	1517	1608
1894	273	100		D/M	3/ 7	3/ 6	3/ 5	3/ 4	3/ 3	3/ 2	3/ 1	3/ 4	3/ 4	3/31	3/ 5	3/ 2	3/ 1	3/ 6	
				.1MM	165	256	374	429	459	504	565	591	621	679	760	790	830	858	1708
1895	273	100		D/M	4/14	4/ 8	4/18	4/17	4/16	4/14	4/14	4/13	4/12	4/11	4/ 6	4/ 1	3/28	3/22	
				.1MM	231	393	522	664	755	912	1069	1134	1283	1303	1371	1569	1726	1839	1642
1896	274	100		D/M	3/ 2	4/17	4/16	4/15	4/14	4/14	4/13	4/12	4/11	4/10	4/ 6	3/31	3/27	3/22	
				.1MM	342	449	651	811	993	1130	1221	1296	1381	1446	1501	1541	1581	1611	1719
1897	273	100		D/M	3/10	4/ 4	4/ 4	4/ 3	4/ 2	4/ 1	3/31	3/30	3/29	3/28	3/23	3/19	3/18	3/ 9	
				.1MM	218	394	490	535	616	687	762	853	914	954	984	1010	1030	1040	943
1898	273	100		D/M	12/11	3/12	3/11	3/26	3/25	3/24	3/23	3/23	3/23	3/10	3/16	3/10	3/ 7	3/ 4	
				.1MM	283	386	482	593	674	729	790	830	870	943	1026	1094	1205	1290	1872
1899	242	88	**	D/M	4/ 8	4/19	4/18	4/18	4/17	4/16	4/15	4/14	4/12	4/12	4/ 7	4/ 2	3/28	3/23	
				.1MM	165	278	420	522	618	673	748	826	908	1010	1081	1106	1209	1311	
1900	273	100		D/M	2/13	12/11	12/11	4/11	4/11	2/ 8	2/ 8	4/ 6	4/ 7	4/ 6	4/ 1	3/28	3/23	3/19	
				.1MM	274	367	367	424	525	611	651	662	752	843	908	953	1028	1089	1237
1901	273	100		D/M	11/18	11/20	4/15	11/18	4/13	4/13	4/12	4/11	4/10	4/ 9	4/ 4	3/31	3/26	3/21	
				.1MM	284	355	491	659	810	960	1081	1198	1289	1431	1565	1630	1690	1836	1938
1902	273	100		D/M	3/29	12/14	3/27	3/26	3/26	3/25	3/24	3/22	3/21	3/21	3/16	3/11	3/ 7	3/ 1	
				.1MM	361	535	609	720	811	896	967	1084	1185	1276	1321	1352	1359	1450	1691
1903	273	100		D/M	2/28	3/23	3/19	3/20	3/19	3/19	3/19	3/19	3/19	3/19	3/19	3/14	3/ 8	3/ 4	
				.1MM	196	285	404	520	677	770	821	917	988	1033	1098	1159	1280	1381	1891
1904	274	100		D/M	4/10	4/10	4/ 9	4/ 8	4/26	4/25	4/25	4/24	4/23	4/22	4/17	4/10	4/ 7	4/ 2	
				.1MM	319	511	602	708	838	1010	1143	1270	1387	1458	1478	1559	1644	1735	2466
1905	273	100		D/M	4/ 4	3/18	4/ 9	4/10	4/ 9	4/ 9	4/ 9	4/ 4	4/ 4	4/ 4	3/30	3/25	3/23	3/18	
				.1MM	146	273	349	455	577	638	709	786	877	1014	1099	1160	1231	1282	1989
1906	273	100		D/M	3/27	3/27	3/26	3/25	3/25	3/25	3/25	3/25	3/25	3/25	12/22	12/18	12/29	12/26	
				.1MM	285	345	385	405	405	405	405	405	405	405	405	405	406	411	289
1907	273	100		D/M	3/24	3/23	3/28	3/27	3/24	3/24	3/24	3/23	3/22	3/22	3/22	3/23	3/22	3/17	
				.1MM	197	268	350	426	524	630	737	808	869	914	934	949	969	1040	1098
1908	274	100		D/M	3/16	4/27	4/27	4/26	4/25	4/24	4/23	4/23	4/23	4/22	4/16	4/12	4/ 7	4/ 2	
				.1MM	307	411	564	713	865	1012	1133	1239	1328	1403	1466	1555	1630	1701	2389

1909	273	100	D/M	5/ 1	4/13	4/12	4/13	4/13	4/14	4/13	4/12	4/13	4/13	4/ 6	4/ 3	3/29	3/24	
			.1MM	370	505	606	706	807	1040	1202	1303	1403	1525	1626	1646	1646	1716	1765
1910	273	100	D/M	11/23	1/21	1/21	3/21	3/20	3/19	3/19	3/19	3/19	3/19	3/11	3/ 5	2/28	2/27	
			.1MM	279	340	360	385	487	558	594	594	594	594	594	608	659	695	884
1911	273	100	D/M	4/14	4/14	4/13	4/12	4/11	4/10	4/14	4/13	4/13	4/13	4/ 9	4/ 5	4/ 5	3/25	
			.1MM	252	366	477	558	603	668	766	877	968	1059	1165	1246	1291	1356	1352
1912	274	100	D/M	4/16	4/16	4/16	4/16	4/16	4/16	4/16	4/15	4/13	4/12	4/ 7	4/ 3	3/29	3/25	
			.1MM	279	456	547	682	798	909	971	1016	1106	1191	1253	1313	1429	1540	1665
1913	273	100	D/M	3/24	3/24	3/24	3/21	3/21	3/20	3/19	3/18	3/18	3/18	3/21	3/20	3/18	3/13	
			.1MM	277	442	490	535	700	771	846	897	945	945	1021	1173	1221	1251	1311
1914	273	100	D/M	4/17	4/16	4/15	4/14	3/29	4/12	3/27	3/26	3/25	4/ 8	3/25	3/29	3/24	3/19	
			.1MM	145	249	310	383	391	444	501	582	607	646	676	696	734	771	1142
1915	273	100	D/M	11/16	11/16	11/15	4/ 4	4/ 4	4/ 3	4/ 2	4/ 1	3/31	3/31	3/24	3/20	3/15	3/10	
			.1MM	351	366	376	429	480	531	576	627	672	672	672	702	737	797	1129
1916	274	100	D/M	4/23	4/23	4/23	4/23	4/23	4/23	4/22	4/21	4/20	4/19	4/14	4/ 9	4/ 4	3/30	
			.1MM	248	458	635	807	1004	1166	1267	1348	1465	1566	1711	1863	1980	2076	2757
1917	273	100	D/M	4/21	4/20	4/19	4/18	4/18	4/17	4/17	4/17	4/17	4/17	4/14	4/10	4/ 1	3/30	
			.1MM	258	433	590	745	892	1019	1104	1175	1276	1375	1494	1613	1674	1735	2415
1918	273	100	D/M	4/15	4/14	4/14	4/13	4/13	4/12	4/11	4/10	4/ 8	4/ 7	4/ 2	3/29	3/24	3/19	
			.1MM	208	385	547	699	809	905	976	1031	1091	1228	1370	1480	1551	1591	2443
1919	273	100	D/M	4/11	4/10	4/10	4/10	4/10	4/ 9	4/ 7	4/ 7	4/ 6	4/ 5	4/ 3	3/26	3/21	3/16	
			.1MM	203	365	471	606	697	778	873	964	1045	1110	1135	1186	1196	1196	1396
1920	274	100	D/M	4/ 6	3/26	3/25	3/24	3/24	3/25	3/24	3/23	3/23	3/23	3/23	3/18	3/13	3/11	
			.1MM	206	314	476	607	710	853	984	1065	1130	1190	1245	1320	1415	1546	1389
1921	273	100	D/M	3/20	3/20	3/19	3/19	3/16	3/16	3/15	3/ 9	3/ 8	3/12	3/ 7	3/ 2	2/28	2/23	
			.1MM	290	408	428	428	513	631	646	683	734	827	898	998	1116	1167	590
1922	273	100	D/M	12/18	4/ 7	4/ 6	4/ 5	4/ 5	4/ 3	4/ 3	4/ 2	4/ 1	3/31	3/26	3/21	3/16	3/11	
			.1MM	308	380	497	588	653	718	783	844	854	859	859	887	940	1005	1022
1923	273	100	D/M	4/21	4/21	4/20	4/20	4/20	4/20	4/20	4/19	4/18	4/17	4/12	4/ 7	4/ 3	4/ 2	
			.1MM	248	484	702	887	1018	1155	1332	1413	1448	1483	1523	1558	1582	1597	1873
1924	274	100	D/M	4/ 8	4/19	4/18	4/17	4/16	4/15	4/15	4/13	4/13	4/11	4/ 6	4/ 3	3/28	3/23	
			.1MM	299	470	581	662	747	917	980	1017	1080	1158	1233	1369	1562	1698	1757
1925	273	100	D/M	2/11	2/11	3/26	3/25	3/25	3/24	3/23	3/22	3/21	3/19	3/16	3/10	3/ 5	3/ 2	
			.1MM	289	398	518	619	717	802	807	872	956	1081	1179	1219	1249	1254	860
1926	273	100	D/M	12/ 6	5/ 2	5/ 1	4/30	4/29	4/28	4/27	4/27	4/25	4/24	4/20	4/15	4/10	4/ 5	
			.1MM	312	504	646	763	857	1034	1130	1196	1319	1446	1588	1755	1872	1938	1982
1927	273	100	D/M	11/16	11/15	11/15	4/ 4	3/14	3/13	3/12	3/11	3/11	4/ 2	3/28	3/25	3/14	3/13	
			.1MM	342	393	393	457	550	634	699	764	815	866	911	974	1059	1124	1938
1928	274	100	D/M	11/22	11/22	4/ 7	4/ 6	4/ 5	4/ 4	4/ 3	4/ 2	4/ 2	3/31	3/26	3/21	3/16	3/13	
			.1MM	284	380	464	581	705	786	837	852	852	862	877	899	1024	1088	1156
1929	273	100	D/M	1/ 6	1/18	3/14	3/13	3/12	3/14	3/13	3/14	3/13	3/12	3/13	3/12	3/ 4	2/27	
			.1MM	329	355	355	420	475	487	552	630	695	750	795	872	937	992	624
1930	273	100	D/M	1/ 8	1/ 7	1/ 6	1/ 6	1/ 6	3/31	1/ 2	1/ 2	1/ 2	1/ 2	3/25	3/20	2/18	3/ 7	
			.1MM	267	345	400	400	400	415	546	546	546	546	647	662	662	662	1003
1931	273	100	D/M	3/29	3/29	3/27	3/27	3/27	3/29	3/29	3/28	3/27	3/27	3/21	3/18	3/15	3/10	
			.1MM	187	252	333	398	459	542	641	706	787	848	919	980	1059	1134	1293
1932	274	100	D/M	2/12	2/12	4/11	4/10	4/ 9	4/ 8	4/ 7	4/ 6	4/ 5	4/ 7	4/ 7	4/ 2	3/27	3/26	
			.1MM	277	277	353	428	575	636	671	704	714	726	790	887	1012	1073	751
1933	273	100	D/M	12/ 7	3/31	3/31	3/31	3/31	4/ 1	3/31	3/31	3/31	3/30	3/25	3/20	3/17	3/17	
			.1MM	199	218	294	369	414	514	610	683	754	789	824	854	905	912	610
1934	273	100	D/M	12/31	12/31	12/31	4/ 9	4/11	4/10	4/10	4/10	4/10	4/10	4/10	4/ 5	3/31	3/26	
			.1MM	732	732	732	750	828	1000	1132	1253	1390	1517	1592	1653	1746	1918	1638
1935	273	100	D/M	4/12	4/11	4/10	4/ 9	4/ 8	4/ 7	4/ 6	4/ 5	4/ 4	4/ 3	3/29	3/24	3/19	3/16	
			.1MM	152	273	394	511	596	647	667	707	737	777	827	857	902	937	1286
1936	274	100	D/M	3/12	4/11	3/28	3/28	3/27	3/26	3/25	3/24	3/22	3/22	3/17	3/12	3/18	3/16	

			.1MM	251	326	389	548	629	725	846	876	950	1109	1158	1236	1360	1519	1267
1937	273	100	D/M	2/21	4/ 5	4/ 5	4/ 4	4/ 3	4/ 3	4/ 1	4/ 1	3/31	3/31	2/ 8	2/ 8	12/ 6	12/ 6	
			.1MM	276	347	412	447	487	512	542	567	577	577	597	597	597	686	356
1938	273	100	D/M	3/23	3/25	3/23	3/23	3/22	3/21	3/20	3/19	3/23	3/17	3/17	3/16	3/16	3/13	
			.1MM	182	261	337	494	559	640	777	815	900	972	1046	1183	1228	1266	1220
1939	273	100	D/M	2/19	2/18	4/26	4/26	4/26	4/26	4/25	4/23	4/23	4/22	4/17	4/13	4/ 8	4/ 1	
			.1MM	310	345	363	484	585	696	797	881	992	1063	1151	1242	1353	1398	1370
1940	274	100	D/M	12/19	4/18	4/18	4/16	4/16	4/16	4/16	4/16	4/18	4/18	4/15	4/10	4/ 5	3/31	
			.1MM	193	344	425	562	643	732	795	856	937	1048	1165	1304	1385	1522	1659
1941	273	100	D/M	12/29	12/28	12/27	12/26	4/ 9	4/ 8	4/ 7	4/ 6	4/ 5	4/ 4	3/31	3/25	3/21	3/15	
			.1MM	355	469	560	626	744	861	952	1053	1124	1185	1256	1291	1331	1346	1606
1942	273	100	D/M	12/24	12/23	12/23	12/23	12/23	12/19	12/18	12/18	12/16	12/23	3/16	3/11	3/ 6	3/ 1	
			.1MM	365	545	545	545	545	550	585	585	610	783	823	823	823	842	760
1943	272	99	D/M	3/16	3/15	3/15	4/22	4/23	4/22	4/23	4/23	4/22	4/23	4/21	4/16	4/11	4/ 8	
			.1MM	272	513	543	666	779	916	1053	1218	1355	1460	1608	1745	1872	1941	2057
1944	274	100	D/M	4/10	4/10	4/10	4/ 9	4/ 8	4/ 7	4/ 7	4/ 7	4/ 8	4/ 7	4/ 2	3/25	3/23	3/18	
			.1MM	147	228	289	344	384	429	454	474	505	550	561	585	605	630	580
1945	273	100	D/M	3/28	3/28	3/26	3/26	3/25	3/24	3/23	3/22	3/21	3/20	3/15	3/11	3/ 5	3/ 1	
			.1MM	234	406	599	771	913	1050	1151	1179	1275	1358	1468	1585	1704	1759	1768
1946	273	100	D/M	1/ 9	3/13	3/ 6	3/13	3/13	3/13	3/12	3/12	3/ 6	3/ 6	3/ 4	3/ 1	3/ 1	3/ 1	
			.1MM	206	255	353	401	482	554	609	609	686	751	832	913	985	985	856
1947	273	100	D/M	4/30	4/29	4/30	4/29	4/29	4/28	4/26	4/23	4/23	4/23	4/20	4/14	4/ 9	4/ 4	
			.1MM	386	538	642	794	915	976	1050	1186	1264	1442	1563	1634	1665	1719	1905
1948	274	100	D/M	3/16	3/16	3/15	3/16	3/16	3/16	3/16	3/16	3/16	3/16	3/16	3/15	3/10	3/10	
			.1MM	360	438	448	590	671	831	892	951	996	1097	1107	1299	1436	1446	974
1949	273	100	D/M	12/29	1/18	12/29	3/22	3/22	3/22	3/22	3/22	3/22	3/22	3/22	3/22	3/13	3/ 5	
			.1MM	152	217	284	303	374	473	524	597	648	688	728	813	898	917	725
1950	273	100	D/M	4/ 3	12/20	12/20	12/18	12/18	12/17	12/17	12/17	12/18	12/17	12/12	3/29	3/24	3/19	
			.1MM	245	474	568	689	783	788	788	788	923	928	928	971	971	971	1080
1951	260	95	D/M	4/12	4/12	4/10	4/ 9	4/ 9	4/10	4/ 9	4/ 9	3/27	3/26	3/21	3/16	3/11	3/ 6	
			.1MM	327	453	567	731	857	939	1103	1194	753	753	753	771	801	801	1148
1952	274	100	D/M	4/ 5	4/ 4	4/ 3	4/ 2	4/ 1	3/31	4/ 5	4/ 4	4/ 3	4/ 5	4/ 2	3/28	3/23	3/18	
			.1MM	267	356	427	508	563	638	779	868	939	1052	1141	1221	1310	1381	1430
1953	273	100	D/M	2/20	2/20	1/15	1/15	1/13	1/10	1/10	1/10	1/10	1/10	1/ 3	1/ 3	12/24	1/10	
			.1MM	116	184	229	229	254	287	332	411	411	411	411	411	411	411	185
1954	271	99	D/M	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 5	4/ 5	4/ 5	4/ 1	4/ 1	4/ 1	4/ 1	
			.1MM	291	476	541	592	772	919	990	1041	1075	1075	1075	1095	1120	1120	1028
1955	273	100	D/M	4/14	4/14	4/13	4/12	4/10	4/10	4/ 9	4/ 9	4/ 8	4/ 6	4/ 1	3/29	3/22	3/20	
			.1MM	229	389	510	606	719	879	990	1034	1064	1159	1260	1345	1396	1481	1646
1956	274	100	D/M	2/25	4/ 5	4/ 5	4/ 5	4/ 5	4/ 5	4/ 5	4/ 4	4/ 3	4/ 2	3/31	3/23	3/21	3/15	
			.1MM	155	248	349	389	470	541	626	666	696	731	771	801	801	801	764
1957	273	100	D/M	1/22	1/21	1/20	1/20	1/20	3/11	3/11	3/ 9	3/ 8	3/13	3/ 8	2/25	2/25	2/22	
			.1MM	296	347	367	367	367	369	369	399	424	492	553	571	573	601	624
1958	273	100	D/M	11/28	4/ 3	4/ 2	4/ 1	3/31	3/30	3/29	3/28	3/27	3/26	3/21	3/16	3/12	3/12	
			.1MM	182	217	313	414	515	616	687	758	823	878	929	990	1051	1096	1248
1959	273	100	D/M	4/16	4/15	4/14	4/13	4/12	4/11	4/10	4/ 9	4/ 8	4/ 7	4/ 2	3/29	3/24	3/19	
			.1MM	153	300	417	508	559	624	705	766	908	973	1024	1115	1158	1226	1750
1960	274	100	D/M	4/18	4/17	4/16	4/15	4/14	4/14	4/14	4/15	4/17	4/16	4/12	4/ 7	4/ 1	3/28	
			.1MM	317	520	657	832	946	1045	1133	1281	1471	1608	1783	1897	1965	2063	2049
1961	273	100	D/M	2/25	2/24	2/23	2/22	2/22	2/22	2/22	2/18	2/18	2/18	2/18	2/13	2/ 8	2/ 8	
			.1MM	261	304	423	478	493	528	548	684	699	734	754	759	814	889	647
1962	273	100	D/M	3/30	3/29	3/28	3/27	3/26	3/25	3/24	3/23	3/22	3/21	3/16	3/11	3/ 7	3/ 5	
			.1MM	121	242	338	419	504	579	650	675	730	778	813	853	868	908	1076
1963	273	100	D/M	3/30	3/29	3/29	3/27	3/26	3/25	3/24	3/24	3/23	3/21	3/17	3/13	3/ 8	3/ 3	
			.1MM	142	216	261	320	386	460	511	556	571	586	631	631	631	631	1319

1964	274	100	D/M	1/ 9	3/ 5	3/ 4	3/ 3	3/ 2	3/ 1	3/ 1	3/ 1	3/ 1	3/ 1	1/18	1/ 6	1/ 2	1/ 9	
			.1MM	175	245	300	355	390	400	400	400	400	400	400	400	400	400	538
1965	273	100	D/M	2/ 7	12/24	12/23	12/22	2/ 7	2/ 7	2/ 7	3/ 2	3/ 1	3/ 1	2/25	2/25	2/ 7	2/ 7	
			.1MM	187	296	357	372	400	454	454	473	493	503	503	537	567	577	622
1966	273	100	D/M	2/28	2/28	2/27	2/27	2/26	2/26	2/26	2/26	12/23	12/22	12/22	2/10	2/ 9	11/25	
			.1MM	223	296	351	386	416	416	416	416	464	474	474	474	474	474	695
1967	273	100	D/M	4/ 2	4/ 1	3/31	3/30	3/29	3/28	3/27	3/26	3/25	3/24	3/20	3/14	3/10	3/ 6	
			.1MM	185	347	418	443	514	615	769	804	885	920	920	920	945	945	1268
1968	274	100	D/M	11/22	3/20	3/19	3/17	3/17	3/17	3/16	3/16	3/16	3/16	3/ 9	3/ 5	2/27	2/27	
			.1MM	180	248	339	461	552	635	703	703	703	703	703	746	829	890	869
1969	273	100	D/M	1/30	1/29	3/23	3/22	3/21	3/20	3/19	3/18	1/22	1/22	1/18	1/16	3/ 2	2/28	
			.1MM	216	285	327	367	402	475	510	525	545	560	575	590	608	623	764
1970	273	100	D/M	12/10	12/10	12/10	12/ 9	12/ 8	12/ 7	4/ 7	4/ 6	4/ 6	4/ 4	3/31	3/25	3/20	3/17	
			.1MM	304	349	374	399	417	422	458	493	493	518	543	563	598	618	1372
1971	273	100	D/M	4/12	4/12	4/11	4/10	4/ 9	4/11	4/11	4/10	4/ 9	4/ 8	4/ 1	3/29	3/27	3/20	
			.1MM	142	235	320	365	405	485	550	595	635	655	700	751	771	793	3235
1972	274	100	D/M	12/10	12/ 9	12/ 9	12/ 9	12/ 8	4/14	4/13	4/12	4/11	4/ 9	4/ 1	3/29	3/22		
			.1MM	192	342	407	468	471	552	689	764	819	874	914	934	934	934	1676
1973	273	100	D/M	3/17	3/16	3/15	3/14	3/13	3/12	3/11	3/10	3/ 9	3/ 8	3/ 3	3/ 3	3/ 3	3/ 3	
			.1MM	271	367	473	521	566	683	825	878	918	1019	1104	1132	1182	1237	1022
1974	273	100	D/M	3/ 4	3/ 3	3/ 4	3/ 4	3/ 3	3/ 3	3/ 1	2/28	2/27	2/27	2/21	2/21	2/21	3/ 3	
			.1MM	461	536	597	693	768	768	773	834	844	844	844	849	864	960	1171
1975	273	100	D/M	3/19	3/18	3/17	3/16	4/14	4/13	4/12	4/11	4/10	4/ 9	3/11	3/11	3/12	3/19	
			.1MM	337	435	490	551	630	665	690	710	735	760	785	785	830	860	1037
1976	274	100	D/M	4/ 1	4/ 1	4/ 1	4/ 1	3/28	3/28	3/26	3/25	3/25	3/25	3/21	3/20	3/11	3/ 5	
			.1MM	347	428	502	567	640	721	797	888	969	1043	1108	1159	1201	1272	1423
1977	273	100	D/M	3/13	3/13	3/12	3/10	3/10	3/ 9	3/ 9	3/ 9	3/ 8	3/ 7	3/ 2	2/24	2/24	2/24	
			.1MM	215	317	416	522	624	715	786	867	902	922	947	995	1063	1088	1182
1978	273	100	D/M	1/25	1/25	1/25	4/10	4/10	4/10	4/ 9	4/ 4	4/ 4	4/ 4	3/31	3/27	3/21	3/14	
			.1MM	345	438	438	509	559	609	636	661	731	827	877	927	967	1021	1642
1979	273	100	D/M	12/31	12/31	3/22	3/21	3/20	3/20	3/19	3/18	3/17	3/17	3/13	3/ 6	3/ 2	2/24	
			.1MM	257	326	453	553	649	723	791	850	872	872	872	948	1022	1022	1334
1980	274	100	D/M	3/22	3/21	3/21	3/21	3/21	3/20	3/21	3/18	3/19	3/18	3/17	3/ 8	3/ 5	3/ 5	
			.1MM	454	575	634	711	752	774	817	841	848	906	908	908	908	908	420
1981	273	100	D/M	2/11	2/10	2/19	2/18	2/17	2/16	2/15	2/15	2/15	2/10	2/ 8	2/ 2	2/ 1	1/25	
			.1MM	157	282	303	357	407	466	493	493	493	613	712	775	775	829	900
1982	273	100	D/M	3/31	3/30	3/30	3/31	3/30	3/29	3/29	3/29	3/24	3/25	3/20	3/13	3/10	3/13	
			.1MM	232	308	353	449	525	570	570	570	596	704	768	804	849	853	998
1983	273	100	D/M	2/ 2	2/ 2	2/ 2	1/31	1/31	1/30	1/30	1/30	1/30	1/30	1/24	12/23	1/10	1/10	
			.1MM	291	359	381	387	409	418	418	418	418	418	436	457	457	457	160
1984	274	100	D/M	4/ 5	4/ 4	4/ 3	4/ 2	4/ 1	3/31	3/30	3/29	3/28	3/27	3/22	3/17	3/15	3/15	
			.1MM	279	372	462	547	621	677	727	759	801	805	829	839	853	916	836
1985	273	100	D/M	2/23	3/11	3/11	3/10	3/ 8	3/ 8	3/ 8	3/ 7	3/ 7	3/ 5	2/28	2/21	2/21	2/21	
			.1MM	239	352	406	459	506	560	606	626	626	636	636	641	684	730	886
1986	273	100	D/M	3/10	1/19	1/18	1/17	1/18	1/17	1/17	1/17	3/10	3/10	3/ 9	3/ 1	3/ 1	2/18	
			.1MM	173	278	319	363	368	412	412	412	439	558	565	565	565	565	522
1987	273	100	D/M	12/24	12/24	12/23	12/22	12/22	12/20	12/19	3/14	2/28	2/27	3/ 7	2/28	2/26	2/21	
			.1MM	154	284	325	343	352	377	398	452	491	493	493	493	502	559	720
1988	274	100	D/M	3/26	3/25	3/24	3/24	3/24	3/24	3/24	3/19	3/18	3/17	3/14	3/ 7	3/ 7	3/ 7	
			.1MM	222	297	372	372	372	372	372	382	396	422	454	454	462	462	386
1989	273	100	D/M	10/24	3/27	3/26	3/25	3/24	3/23	3/22	3/22	3/22	3/22	3/14	3/10	3/ 4	3/ 4	
			.1MM	185	263	345	417	468	505	509	509	509	509	509	509	536	649	412
1990	273	100	D/M	1/17	2/21	3/11	3/10	3/11	3/10	3/ 9	3/ 9	3/ 8	3/ 8	3/ 2	1/25	2/21	1/24	
			.1MM	153	201	269	326	389	446	494	540	564	564	564	564	564	564	723
1991	273	100	D/M	12/29	12/21	12/21	12/21	12/18	12/18	12/17	12/17	12/21	12/21	12/17	3/ 1	3/ 1	2/19	

			.1MM	245	324	400	400	423	499	551	551	688	710	710	787	839	861	669
1992	274	100	D/M	3/27	3/27	3/26	3/26	3/27	3/27	3/26	3/26	3/26	3/26	3/27	3/26	3/18	3/18	
			.1MM	429	535	581	591	651	711	757	787	816	840	881	936	1026	1080	1173
1993	273	100	D/M	1/ 4	4/ 9	4/ 8	4/ 7	4/ 6	4/ 5	4/ 4	4/ 3	4/ 2	4/ 2	3/27	3/22	3/21	3/16	
			.1MM	366	513	639	761	857	957	1030	1060	1073	1073	1105	1230	1356	1476	1386
1994	273	100	D/M	1/28	1/27	3/21	3/21	3/20	3/19	4/ 2	4/ 2	4/ 1	3/31	3/21	3/21	3/19	3/13	
			.1MM	173	229	300	359	380	402	448	557	581	641	683	726	757	767	1273
1995	273	100	D/M	1/15	1/15	1/13	1/13	1/12	1/12	1/12	1/12	1/12	1/12	1/12	1/12	1/12	1/12	
			.1MM	487	554	622	689	749	764	767	802	860	873	873	873	873	873	335
1996	274	100	D/M	2/20	2/20	1/17	2/20	2/20	2/20	2/20	2/20	2/20	2/20	2/20	2/ 8	2/20	2/20	
			.1MM	292	355	383	549	647	663	663	685	685	685	685	717	717	717	1405
1997	273	100	D/M	2/21	2/20	2/19	2/18	2/18	4/ 1	4/ 1	3/31	3/29	3/28	3/24	3/19	3/14	3/10	
			.1MM	396	533	642	704	710	759	805	825	913	989	1090	1136	1190	1236	1098

	1 DAY	2 DAY	3 DAY	4 DAY	5 DAY	6 DAY	7 DAY	8 DAY	9 DAY	10 DAY	15 DAY	20 DAY	25 DAY	30 DAY
MEAN EXTREME (MM)	26.2	36.8	44.8	53.1	60.8	68.6	75.2	80.5	85.6	91.2	115.7	133.1	147.5	160.3
STD. DEV. (MM)	9.1	10.2	11.5	14.4	17.5	20.7	23.4	25.8	28.2	30.6	43.5	50.0	56.2	62.4
YEARS ANALYSED	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0

** NOTE ** MEAN AND STANDARD DEVIATION HAVE BEEN ADJUSTED TO ACCOUNT FOR ONE OBSERVATION PER DAY.

NOTE ** VALUE IN FLAG INDICATES YEAR NOT INCLUDED IN ANALYSIS BASED ON % DAYS OPERATIONAL (<90.0%)

ATMOSPHERIC ENVIRONMENT SERVICE
 RAIN+SNOWMELT INTENSITY, DURATION, FREQUENCY VALUES
 PREPARED BY THE HYDROMETEOROLOGY DIVISION, CANADIAN CLIMATE CENTRE

STATION : Ottawa CDA, Ontario

STATION NUMBER 6105976

LATITUDE: 4523 LONGITUDE: 7543 ELEVATION(M): 79

SNOWMELT MODEL 4

CRITICAL PERIOD : 1ST OF MONTH 10 TO THE END OF MONTH 5

NOTE : MODIFIED GUMBEL 12/82

RETURN PERIOD VALUES (MM)

WITH 50% CONFIDENCE LIMITS

RETURN PERIOD
YEARS

1 DAY

2 DAY

3 DAY

4 DAY

5 DAY

2	24.75+/- .55	35.14+/- .61	42.94+/- .69	50.74+/- .86	57.97+/- 1.05
5	32.80+/- .92	44.16+/- 1.03	53.07+/- 1.16	63.44+/- 1.46	73.39+/- 1.77
10	38.14+/- 1.25	50.15+/- 1.40	59.79+/- 1.57	71.87+/- 1.97	83.62+/- 2.39
25	44.88+/- 1.68	57.70+/- 1.88	68.27+/- 2.11	82.50+/- 2.65	96.53+/- 3.22
50	49.87+/- 2.01	63.29+/- 2.25	74.55+/- 2.53	90.38+/- 3.17	106.10+/- 3.85
100	54.84+/- 2.34	68.86+/- 2.62	80.80+/- 2.95	98.22+/- 3.70	115.61+/- 4.49

RETURN PERIOD
YEARS

6 DAY

7 DAY

8 DAY

9 DAY

10 DAY

2	65.21+/- 1.24	71.37+/- 1.41	76.30+/- 1.55	81.00+/- 1.69	86.18+/- 1.84
5	83.47+/- 2.09	92.06+/- 2.37	99.04+/- 2.61	105.90+/- 2.85	113.24+/- 3.10
10	95.59+/- 2.83	105.78+/- 3.20	114.14+/- 3.52	122.42+/- 3.86	131.20+/- 4.19
25	110.88+/- 3.81	123.10+/- 4.32	133.17+/- 4.75	143.26+/- 5.20	153.84+/- 5.65
50	122.22+/- 4.56	135.94+/- 5.17	147.29+/- 5.68	158.72+/- 6.22	170.63+/- 6.76
100	133.49+/- 5.31	148.70+/- 6.02	161.32+/- 6.62	174.09+/- 7.24	187.33+/- 7.87

RETURN PERIOD
YEARS

15 DAY

20 DAY

25 DAY

30 DAY

2	108.60+/- 2.61	124.92+/- 3.00	138.33+/- 3.38	150.11+/- 3.75
5	147.00+/- 4.40	169.05+/- 5.06	187.93+/- 5.68	205.20+/- 6.31
10	172.49+/- 5.95	198.35+/- 6.83	220.85+/- 7.68	241.76+/- 8.53
25	204.63+/- 8.02	235.29+/- 9.21	262.36+/-10.35	287.86+/-11.50
50	228.46+/- 9.59	262.68+/-11.02	293.14+/-12.39	322.05+/-13.76
100	252.16+/-11.17	289.92+/-12.84	323.76+/-14.43	356.05+/-16.03

** WARNING ** : THE 1-DAY 100-YEAR RETURN PERIOD EVENT IS EXCEEDED BY THE 1-DAY EVENT IN 1934

** WARNING ** : THE 2-DAY 100-YEAR RETURN PERIOD EVENT IS EXCEEDED BY THE 2-DAY EVENT IN 1934

ATMOSPHERIC ENVIRONMENT SERVICE
 RAIN+SNOWMELT INTENSITY, DURATION, FREQUENCY VALUES
 PREPARED BY THE HYDROMETEOROLOGY DIVISION, CANADIAN CLIMATE CENTRE

STATION : Ottawa CDA, Ontario

STATION NUMBER 6105976

LATITUDE: 4523 LONGITUDE: 7543 ELEVATION(M): 79

SNOWMELT MODEL 5

CRITICAL PERIOD : 1ST OF MONTH 10 TO THE END OF MONTH 5

NOTE : MODIFIED GUMBEL 12/82

YR	TOTAL DAYS	% VALID	START FLAG	START MAX	START														MAX SNPK
					1 DAY	2 DAY	3 DAY	4 DAY	5 DAY	6 DAY	7 DAY	8 DAY	9 DAY	10 DAY	15 DAY	20 DAY	25 DAY	30 DAY	
1890	242	88	**	D/M	4/ 4	4/ 3	4/ 3	4/ 4	4/ 3	4/ 3	4/ 3	4/ 3	4/ 3	4/ 3	3/26	3/21	3/14	3/12	
				.1MM	341	452	462	703	814	814	814	814	814	814	814	814	918	918	
1891	273	100		D/M	3/ 9	4/10	4/ 9	4/ 9	4/ 9	3/29	3/28	3/28	3/21	3/28	3/23	3/21	3/13		
				.1MM	316	601	752	783	783	867	907	907	987	1058	1284	1325	1498	1629	1870
1892	274	100		D/M	4/ 6	4/ 5	4/ 4	4/ 4	4/ 4	4/ 3	4/ 2	4/ 2	4/ 2	4/ 2	3/29	3/29	3/29	3/10	
				.1MM	405	775	1069	1314	1568	1807	1878	1878	1878	1878	1949	1949	1949	1949	1750
1893	273	100		D/M	4/13	4/12	4/11	4/10	4/10	4/ 8	4/ 8	4/ 8	4/ 8	4/ 8	3/31	3/31	3/24	3/21	
				.1MM	442	736	948	1050	1075	1386	1411	1411	1411	1533	1552	1552	1625	1724	1832
1894	273	100		D/M	4/ 4	3/ 5	3/ 5	3/ 4	3/ 3	3/ 2	3/ 2	4/ 4	4/ 4	3/31	3/ 5	3/ 2	3/18	3/ 6	
				.1MM	285	478	663	672	681	792	792	834	834	906	1017	1111	1111	1120	2153
1895	273	100		D/M	4/14	4/ 8	4/14	4/14	4/13	4/12	4/12	4/ 8	4/ 8	4/ 8	4/ 5	4/ 2	3/25	3/25	
				.1MM	342	615	775	1060	1252	1406	1470	1513	1736	2021	2179	2243	2283	2343	1813
1896	274	100		D/M	4/16	4/15	4/14	4/13	4/12	4/11	4/10	4/ 9	4/ 8	4/ 8	4/ 3	3/31	3/27	3/27	
				.1MM	481	814	1199	1401	1572	1692	1743	1803	1823	1823	1823	1823	1823	1832	1921
1897	273	100		D/M	3/10	4/ 4	4/ 4	4/ 2	4/ 1	3/31	3/30	3/29	3/29	3/27	3/22	3/19	3/19	3/ 9	
				.1MM	264	471	471	653	764	875	997	1048	1048	1077	1077	1077	1108	1199	1163
1898	273	100		D/M	12/11	3/12	3/11	3/10	3/ 9	3/ 9	3/11	3/10	3/11	3/11	3/ 9	3/ 9	3/ 9	3/ 9	
				.1MM	369	619	864	986	1068	1068	1199	1321	1429	1596	1718	1800	1800	1800	1867
1899	242	88	**	D/M	4/18	4/18	4/18	4/17	4/16	4/15	4/14	4/13	4/12	4/11	4/ 7	4/ 7	3/29	3/23	
				.1MM	305	599	801	963	1034	1205	1400	1562	1718	1728	1728	1767	1969	2028	
1900	273	100		D/M	2/13	4/ 6	4/ 5	4/12	4/11	4/11	4/ 2	4/ 6	4/ 5	4/ 6	4/ 1	3/29	3/29	3/20	
				.1MM	334	425	556	673	844	879	921	1073	1204	1371	1502	1537	1674	1765	1703
1901	273	100		D/M	11/21	4/13	4/12	4/11	4/10	4/ 9	4/ 8	4/ 7	4/ 6	4/ 5	4/ 1	3/26	3/21	3/21	
				.1MM	364	639	851	1044	1257	1450	1660	1760	1887	2046	2345	2520	2600	2640	2379
1902	273	100		D/M	12/14	12/14	3/21	3/21	3/21	3/21	3/21	3/21	3/20	3/20	3/12	3/11	3/ 1	2/28	
				.1MM	330	622	699	790	910	1072	1249	1366	1376	1376	1393	1510	1615	1615	1983
1903	273	100		D/M	3/19	3/19	3/19	3/19	3/19	3/19	3/18	3/17	3/17	3/17	3/11	3/ 7	2/28	2/28	
				.1MM	330	653	891	1013	1265	1429	1521	1637	1728	1822	1822	1822	1862	1976	2178
1904	274	100		D/M	4/10	4/10	4/ 9	4/ 8	4/ 8	4/ 7	4/ 7	4/ 6	4/ 6	4/ 2	3/31	4/ 6	4/ 1	3/27	
				.1MM	436	776	938	1121	1263	1385	1484	1566	1566	1654	1796	1895	1946	2027	2725
1905	273	100		D/M	3/29	3/29	3/28	3/28	3/27	3/25	3/25	3/29	3/29	3/28	3/27	3/24	3/18	3/18	
				.1MM	263	486	628	739	838	902	1013	1161	1315	1457	1556	1618	1739	1858	2039
1906	273	100		D/M	3/27	3/27	3/27	3/27	2/21	2/21	2/21	2/21	2/21	2/21	2/21	2/21	12/30	12/27	
				.1MM	356	405	405	405	422	422	422	422	422	422	422	422	422	422	448
1907	273	100		D/M	3/28	3/28	3/28	3/27	3/26	3/24	3/23	3/23	3/22	3/22	3/22	3/23	3/22	3/13	
				.1MM	249	447	615	711	811	875	1057	1225	1327	1347	1347	1347	1398	1433	1239
1908	274	100		D/M	4/26	4/25	4/24	4/23	4/23	4/22	4/21	4/20	4/19	4/18	4/14	4/ 8	4/ 3	3/29	

1909	273	100	.1MM	359	684	978	1241	1456	1485	1516	1719	1870	1921	1957	2172	2232	2292	2590
			D/M	4/14	4/13	4/13	4/13	4/12	4/12	4/12	4/ 7	4/ 6	4/ 6	4/ 3	3/30	3/25	4/ 3	
			.1MM	490	917	1048	1250	1381	1409	1409	1430	1728	1859	2061	2143	2234	2283	2069
1910	273	100	D/M	1/22	1/21	3/22	3/21	3/20	3/19	3/19	3/19	3/19	3/19	3/13	3/ 5	2/28	2/27	
			.1MM	289	391	541	562	765	785	785	785	785	785	785	820	820	820	1070
1911	273	100	D/M	4/14	4/13	4/13	4/12	4/12	4/13	4/14	4/13	4/13	4/12	4/ 7	4/ 5	3/27	3/27	
			.1MM	460	672	877	959	990	1061	1307	1519	1654	1736	1736	1836	1927	1927	1952
1912	274	100	D/M	4/16	4/16	4/ 6	4/ 6	4/13	4/12	4/11	4/ 6	4/ 8	4/ 7	4/ 6	3/29	3/29	3/19	
			.1MM	497	704	842	842	968	1099	1120	1125	1309	1572	1779	1962	1962	1962	1809
1913	273	100	D/M	3/24	3/24	3/19	3/21	3/21	3/19	3/19	3/19	3/19	3/19	3/19	3/19	3/13	3/13	
			.1MM	383	569	730	749	935	1113	1299	1342	1342	1342	1532	1718	1780	1809	1787
1914	273	100	D/M	4/17	4/16	4/16	4/15	4/14	4/14	4/12	4/11	4/10	4/10	4/ 5	3/30	3/26	3/26	
			.1MM	285	491	696	798	857	857	898	989	999	999	1080	1080	1093	1633	
1915	273	100	D/M	11/16	4/ 6	4/ 5	4/ 4	4/ 3	4/ 2	4/ 1	4/ 1	4/ 1	4/ 1	3/24	3/21	3/21	3/21	
			.1MM	402	479	619	710	801	872	974	999	999	999	999	999	1030	1100	1244
1916	274	100	D/M	4/17	4/13	4/12	4/11	4/13	4/12	4/12	4/10	4/10	4/11	4/11	3/29	3/27	3/28	
			.1MM	294	528	715	815	989	1176	1305	1407	1536	1627	1758	1827	1859	2046	3118
1917	273	100	D/M	4/19	4/18	4/17	4/17	4/16	4/15	4/14	4/13	4/12	4/11	3/24	4/ 1	3/27	3/23	
			.1MM	395	777	990	1188	1279	1390	1470	1490	1499	1508	1508	1530	1614	1654	2570
1918	273	100	D/M	4/ 2	4/ 1	4/ 6	3/30	3/29	3/29	4/ 2	4/ 1	3/31	3/30	3/30	3/29	3/21	3/17	
			.1MM	336	579	818	943	1014	1014	1214	1457	1659	1821	1892	1900	2045	2247	2664
1919	273	100	D/M	4/11	4/10	4/ 9	4/ 8	4/ 7	4/ 6	4/ 5	4/ 5	4/ 3	4/ 3	4/ 3	3/23	3/18	3/16	
			.1MM	271	479	641	761	980	1081	1201	1201	1263	1263	1263	1263	1263	1263	1641
1920	274	100	D/M	3/27	3/26	3/25	3/24	3/23	3/23	3/23	3/21	3/21	3/18	3/13	3/12	3/ 6	3/ 6	
			.1MM	344	660	985	1259	1390	1442	1442	1452	1452	1496	1562	1614	1614	1614	1518
1921	273	100	D/M	3/21	3/20	3/19	3/19	3/20	3/16	3/15	3/15	3/16	3/12	3/ 8	3/ 2	2/28	2/23	
			.1MM	303	584	604	604	650	787	802	802	853	984	1055	1055	1319	1370	868
1922	273	100	D/M	11/19	4/ 6	4/ 6	4/ 5	4/ 4	4/ 3	4/ 2	4/ 2	4/ 2	4/ 2	3/26	3/20	3/14	3/14	
			.1MM	341	549	743	905	984	1055	1117	1117	1117	1117	1125	1249	1309	1380	1191
1923	273	100	D/M	4/21	4/21	4/20	4/19	4/19	4/17	4/16	4/16	4/16	4/16	4/ 8	4/ 3	4/ 3	4/ 3	
			.1MM	619	1152	1568	1628	1628	1699	1759	1759	1759	1759	1759	1863	1863	1863	2248
1924	274	100	D/M	4/ 8	4/ 7	4/ 6	4/ 5	4/ 4	4/ 5	4/ 5	4/ 4	4/ 4	4/ 4	4/ 3	3/28	3/22	3/22	
			.1MM	335	557	730	995	1086	1165	1352	1443	1474	1545	1698	1789	1809	1809	1935
1925	273	100	D/M	3/27	3/26	3/25	3/25	3/24	3/24	3/22	3/21	3/19	3/19	3/18	3/11	3/ 8	3/ 8	
			.1MM	331	585	798	964	1055	1055	1115	1190	1271	1437	1517	1517	1517	1517	1069
1926	273	100	D/M	4/22	4/22	4/22	4/22	4/21	4/21	4/22	4/21	4/21	4/22	4/21	4/13	4/ 8	4/ 8	
			.1MM	345	650	884	1180	1393	1413	1641	1854	2019	2304	2517	2569	2569	2569	2424
1927	273	100	D/M	11/16	4/ 5	4/ 4	4/ 4	4/ 3	3/13	3/12	3/12	3/30	3/29	3/27	3/12	3/13	3/12	
			.1MM	307	453	626	777	828	875	1006	1077	1107	1158	1258	1329	1329	1349	2186
1928	274	100	D/M	4/ 7	4/ 6	4/ 5	4/ 5	4/ 4	4/ 4	4/ 4	4/ 4	4/ 4	4/ 4	3/25	3/22	3/15	3/13	
			.1MM	325	579	785	975	1077	1077	1077	1077	1077	1077	1077	1194	1309	1460	1363
1929	273	100	D/M	1/ 6	3/15	3/13	3/13	3/13	3/25	3/25	3/13	3/13	3/13	3/14	3/13	3/ 4	3/ 4	
			.1MM	274	340	442	546	546	621	621	670	739	820	857	928	967	1107	945
1930	273	100	D/M	1/ 8	1/ 7	1/ 7	1/ 7	2/20	2/19	1/ 2	1/ 2	1/ 2	1/ 2	1/ 2	2/19	2/19	2/13	
			.1MM	262	467	467	467	506	597	635	635	635	635	635	635	668	668	1055
1931	273	100	D/M	3/29	3/28	3/28	3/26	3/26	3/24	3/24	3/24	3/26	3/25	3/20	3/16	3/10	3/ 5	
			.1MM	248	390	501	634	745	857	968	1070	1175	1267	1398	1489	1518	1518	1486
1932	274	100	D/M	2/12	4/12	4/11	4/10	4/ 9	4/ 8	4/ 7	4/ 6	4/ 6	4/ 7	4/ 1	3/27	3/27	3/27	
			.1MM	317	399	581	743	946	997	1068	1076	1076	1077	1086	1131	1279	1279	853
1933	273	100	D/M	12/25	4/ 2	4/ 1	4/ 1	4/ 2	4/ 1	3/31	3/31	3/31	3/31	3/27	3/20	3/20	3/20	
			.1MM	214	320	482	573	708	870	941	941	941	941	983	983	983	983	688
1934	273	100	D/M	12/31	4/10	4/ 9	4/16	4/15	4/15	4/14	4/11	4/11	4/10	4/ 6	4/ 1	4/ 1	3/26	
			.1MM	732	792	894	1087	1310	1461	1585	1742	2087	2351	2502	2604	2666	2726	2207
1935	273	100	D/M	4/10	4/ 9	4/ 9	4/ 9	4/ 8	4/ 8	4/ 8	4/ 8	4/ 8	4/ 5	3/31	3/28	3/23	3/16	
			.1MM	283	537	790	972	1103	1214	1238	1238	1238	1258	1258	1324	1348	1348	1410

1936	274	100	D/M	3/12	3/28	3/28	3/25	3/26	3/25	3/25	3/25	3/22	3/22	3/17	3/12	3/11	3/12		
			.1MM	308	419	653	811	1008	1196	1335	1335	1475	1614	1689	1828	1998	2137	1484	
1937	273	100	D/M	4/ 5	4/ 5	4/ 5	4/ 5	4/ 5	4/ 5	4/ 5	4/ 5	4/ 5	4/ 5	4/ 5	4/ 5	12/27	12/26		
			.1MM	316	529	680	791	840	891	891	891	891	891	891	891	891	891	678	
1938	273	100	D/M	3/23	3/23	3/21	3/23	3/20	3/21	3/20	3/19	3/23	3/17	3/17	3/13	3/13	3/ 5		
			.1MM	304	417	566	714	826	976	1123	1197	1245	1360	1507	1654	1728	1759	1397	
1939	273	100	D/M	4/26	4/26	4/25	4/25	4/23	4/22	4/22	4/20	4/19	4/19	4/14	4/11	4/11	3/31		
			.1MM	345	587	789	925	1137	1319	1455	1584	1792	1928	1999	2050	2050	2090	1853	
1940	274	100	D/M	4/19	4/18	4/18	4/17	4/18	4/18	4/18	4/18	4/17	4/16	4/12	4/ 9	4/ 1	3/31		
			.1MM	282	522	724	855	992	1125	1307	1460	1591	1677	1677	1677	1677	1808	1745	
1941	273	100	D/M	12/29	4/10	4/ 9	4/ 8	4/ 7	4/ 6	4/ 5	4/ 4	4/ 3	4/ 3	4/ 3	4/ 3	4/ 3	3/16		
			.1MM	416	628	893	1086	1228	1462	1564	1646	1717	1717	1717	1717	1717	1717	1764	
1942	273	100	D/M	12/24	12/23	12/23	12/23	3/27	3/26	3/26	3/25	3/25	3/22	3/16	3/16	3/ 8	3/ 4		
			.1MM	325	490	490	490	500	611	685	745	745	751	858	932	932	998	1029	
1943	272	99	D/M	4/25	4/24	4/23	4/23	4/22	4/22	4/22	4/21	4/20	4/19	4/17	4/ 9	4/ 9	3/31		
			.1MM	451	855	1189	1434	1677	1876	2107	2249	2324	2425	2505	2514	2514	2514	2427	
1944	274	100	D/M	3/26	4/10	4/18	4/17	4/17	4/17	4/17	4/13	4/10	4/10	4/10	4/ 2	3/26	3/25		
			.1MM	223	415	471	540	540	540	540	580	757	888	1026	1026	1026	1026	909	
1945	273	100	D/M	3/18	3/24	3/23	3/18	3/17	3/20	3/18	3/18	3/17	3/16	3/14	3/14	3/ 2	2/26		
			.1MM	265	508	710	859	1019	1141	1359	1613	1773	1878	2060	2131	2145	2145	1998	
1946	273	100	D/M	3/13	3/13	3/13	3/13	3/13	3/13	3/13	3/ 8	3/ 7	3/ 6	3/ 2	3/ 2	3/ 2	2/13		
			.1MM	296	590	624	624	624	624	762	884	1002	1036	1036	1051	1102	1136	838	
1947	273	100	D/M	4/11	4/23	4/10	4/11	4/10	4/10	4/ 9	4/ 5	4/ 6	4/ 5	4/10	4/ 5	4/ 5	4/ 2		
			.1MM	420	766	853	934	1064	1166	1246	1347	1447	1558	1660	1673	1726	2105	2334	
1948	274	100	D/M	3/16	3/16	3/21	3/20	3/21	3/16	3/16	3/16	3/16	3/16	3/16	3/16	3/16	3/16		
			.1MM	325	510	544	646	777	1031	1142	1283	1374	1516	1516	1758	1905	1905	1249	
1949	273	100	D/M	3/27	4/ 3	4/ 3	4/ 2	4/ 1	3/31	3/22	3/22	3/27	3/27	3/22	3/22	3/22	3/22		
			.1MM	200	354	516	656	685	734	806	899	1049	1211	1353	1406	1406	1559	1443	
1950	273	100	D/M	4/ 3	12/20	12/19	12/18	12/18	12/18	12/18	3/28	12/18	3/27	3/23	3/28	3/23	3/23		
			.1MM	322	581	666	821	821	821	821	840	943	1005	1041	1091	1173	1215	1327	
1951	260	95	D/M	1/ 3	3/29	3/29	3/29	3/29	3/29	3/29	3/28	3/27	3/26	3/21	3/16	3/11	3/ 6		
			.1MM	334	544	664	795	891	1001	1151	1222	1222	1222	1222	1230	1245	1245	1200	
1952	274	100	D/M	4/ 5	4/ 4	4/ 3	4/ 2	4/ 5	4/ 5	4/ 4	4/ 3	4/ 3	4/ 2	3/28	3/23	3/20	3/12		
			.1MM	328	488	640	761	951	1153	1313	1465	1595	1716	1821	1830	1830	1830	1686	
1953	273	100	D/M	12/10	12/10	12/10	12/10	12/ 6	12/ 5	12/ 5	12/ 5	12/ 5	12/ 5	12/ 5	12/ 5	12/ 5	12/ 5		
			.1MM	381	381	381	381	401	599	599	599	599	599	599	599	599	599	277	
1954	271	99	D/M	4/11	4/ 6	4/ 6	4/ 6	4/ 7	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6	4/ 6		
			.1MM	354	651	813	813	1111	1438	1487	1487	1487	1487	1487	1487	1487	1487	1167	
1955	273	100	D/M	4/10	4/10	4/10	4/ 9	4/ 9	4/ 9	4/ 9	4/ 5	4/ 4	4/ 3	3/30	3/30	3/21	3/15		
			.1MM	334	599	781	923	984	984	1144	1326	1457	1528	1648	1759	1881	1942	1957	
1956	274	100	D/M	4/ 5	4/ 5	4/ 5	4/ 4	4/ 5	4/ 4	4/ 4	4/ 4	4/ 4	4/ 1	4/ 1	4/ 1	4/ 1	4/ 1		
			.1MM	290	524	716	807	978	1069	1133	1133	1133	1182	1182	1182	1182	1182	1148	
1957	273	100	D/M	1/22	1/21	1/21	1/21	3/12	3/11	3/11	3/ 9	3/13	3/13	3/ 9	2/25	2/25	2/24		
			.1MM	402	515	515	515	519	537	537	577	626	678	698	716	716	756	730	
1958	273	100	D/M	12/ 7	3/30	3/30	3/30	3/28	3/27	3/27	3/26	3/24	3/23	3/19	3/16	3/16	3/ 4		
			.1MM	218	313	455	550	648	768	863	934	1003	1136	1238	1333	1393	1393	1438	
1959	273	100	D/M	4/15	4/14	4/14	4/ 8	4/ 8	4/10	4/ 9	4/ 8	4/ 8	4/ 6	4/ 1	3/30	3/30	3/20		
			.1MM	243	425	524	673	715	860	982	1220	1319	1392	1504	1603	1686	1837	2129	
1960	274	100	D/M	4/17	4/17	4/16	4/15	4/14	4/13	4/12	4/12	4/10	4/ 9	4/ 4	3/30	3/28	3/28		
			.1MM	380	744	1098	1401	1617	1791	1884	1884	1917	1940	1940	1940	2034	2156	2233	
1961	273	100	D/M	2/25	2/24	2/23	2/22	2/23	2/22	2/19	2/18	2/23	2/23	2/18	2/13	2/13	2/23		
			.1MM	241	284	408	417	418	427	437	528	580	618	627	627	700	747		
1962	273	100	D/M	3/29	3/29	3/28	3/27	3/26	3/25	3/24	3/24	3/22	3/21	3/16	3/12	3/12	3/12		
			.1MM	274	516	663	754	925	1065	1116	1116	1258	1325	1325	1325	1325	1374	1407	
1963	273	100	D/M	3/30	3/26	3/25	3/27	3/26	3/25	3/25	3/25	3/25	3/21	3/17	3/17	3/17	3/ 5		

1964	274	100	.1MM	285	309	423	459	607	721	741	741	741	781	801	801	801	804	1478
			D/M	3/ 6	3/ 5	3/ 4	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	2/ 5	
			.1MM	269	382	524	655	655	655	655	655	655	655	655	655	655	655	635
1965	273	100	D/M	4/ 7	4/ 6	4/ 5	4/ 5	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	3/ 3	2/25	2/25	2/11	2/ 7	
			.1MM	233	375	486	486	546	546	546	546	546	546	610	610	610	610	734
1966	273	100	D/M	12/24	2/28	2/28	2/28	2/28	2/28	2/28	12/24	12/23	12/23	12/23	2/11	2/ 9	12/ 2	
			.1MM	208	313	404	404	404	404	404	460	506	506	506	506	506	506	676
1967	273	100	D/M	4/ 1	4/ 1	3/31	3/31	3/29	3/28	3/27	3/27	3/25	3/25	3/25	3/25	3/10	3/10	
			.1MM	376	693	804	804	886	1109	1283	1283	1314	1314	1314	1314	1314	1314	1630
1968	274	100	D/M	3/17	3/20	3/20	3/17	3/17	3/17	3/16	3/16	3/16	3/16	3/10	3/10	3/10	3/10	
			.1MM	219	375	538	650	818	981	994	994	994	994	994	1014	1166	1166	1027
1969	273	100	D/M	1/24	3/24	3/24	3/22	3/21	3/20	3/19	3/19	3/19	3/19	3/15	3/15	3/15	1/23	
			.1MM	232	332	332	412	514	562	572	572	572	572	603	603	603	603	929
1970	273	100	D/M	12/10	4/ 8	4/ 8	4/ 7	4/ 9	4/ 8	4/ 7	4/ 7	4/ 7	4/ 7	4/ 2	3/25	3/21	3/21	
			.1MM	284	425	456	466	641	812	822	822	822	822	822	837	837	837	1807
1971	273	100	D/M	4/13	4/12	4/11	4/10	4/12	4/12	4/11	4/10	4/10	4/10	4/ 3	3/30	3/30	3/30	
			.1MM	230	428	488	508	609	709	769	789	789	789	789	789	789	789	3370
1972	274	100	D/M	12/10	12/ 9	12/ 9	12/ 9	4/14	4/14	4/14	4/13	4/12	4/11	4/11	4/ 3	3/30	3/22	
			.1MM	257	397	517	628	725	879	1087	1168	1248	1288	1288	1288	1288	1288	2109
1973	273	100	D/M	3/17	3/16	3/15	3/15	3/13	3/12	3/11	3/10	3/10	3/ 8	3/ 3	3/ 3	3/ 3	3/ 3	
			.1MM	322	504	676	713	784	982	1159	1197	1234	1476	1638	1675	1701	1801	1298
1974	273	100	D/M	3/ 4	3/ 4	3/ 4	3/ 4	3/ 4	3/ 4	3/30	2/28	2/28	2/28	2/22	2/22	2/22	3/ 4	
			.1MM	446	568	719	1004	1004	1004	1025	1056	1056	1056	1056	1056	1056	1152	1040
1975	273	100	D/M	4/18	4/17	4/16	4/15	4/14	4/14	4/14	4/14	4/14	4/14	4/14	3/30	3/25	3/20	
			.1MM	363	668	900	1002	1104	1104	1104	1104	1104	1104	1104	1104	1104	1104	1239
1976	274	100	D/M	4/ 1	4/ 1	4/ 1	3/25	3/31	3/28	3/26	3/25	3/25	3/25	3/21	3/20	3/13	3/ 5	
			.1MM	434	617	722	883	955	1115	1317	1530	1713	1818	1960	1960	2056	2198	1821
1977	273	100	D/M	3/13	3/13	3/12	3/10	3/10	3/10	3/ 9	3/ 9	3/ 9	3/ 7	3/ 4	2/24	2/24	2/24	
			.1MM	332	536	737	949	1153	1291	1402	1442	1442	1471	1511	1544	1572	1572	1299
1978	273	100	D/M	1/25	1/25	4/11	4/10	4/10	4/10	4/10	4/10	4/ 7	4/ 4	3/31	3/27	3/21	3/20	
			.1MM	332	384	536	724	842	924	924	924	959	998	1116	1198	1207	1325	1898
1979	273	100	D/M	3/23	3/22	3/21	3/21	3/20	3/20	3/20	3/20	3/20	3/20	3/10	3/ 5	3/ 3	2/23	
			.1MM	246	456	629	754	872	872	872	872	872	872	947	977	977	977	1500
1980	274	100	D/M	3/22	3/21	3/21	3/21	3/21	3/21	3/21	3/18	3/17	3/18	3/17	3/11	3/11	3/11	
			.1MM	509	685	813	950	1004	1004	1037	1040	1042	1073	1075	1075	1075	1075	537
1981	273	100	D/M	2/20	2/19	2/19	2/18	2/17	2/17	2/17	2/17	2/17	2/17	2/ 8	2/ 2	2/ 1	1/25	
			.1MM	236	460	656	811	957	957	957	957	957	957	1110	1176	1176	1203	1087
1982	273	100	D/M	3/31	3/31	3/30	3/31	3/30	3/30	3/30	3/25	3/25	3/25	3/19	3/13	3/11	3/12	
			.1MM	388	516	592	684	760	760	760	804	804	972	972	972	990	1013	1245
1983	273	100	D/M	1/10	2/ 2	2/ 2	1/31	1/31	1/31	1/31	1/31	1/31	12/15	12/15	12/23	1/10	12/15	
			.1MM	282	309	309	333	333	333	333	333	333	380	514	514	514	514	328
1984	274	100	D/M	2/14	2/13	2/13	2/13	3/31	3/30	2/13	2/13	2/13	2/14	2/11	2/11	2/ 3	2/ 3	
			.1MM	309	399	479	528	566	657	698	749	749	788	903	993	993	1002	936
1985	273	100	D/M	2/23	2/23	3/11	3/11	3/11	3/ 8	3/ 8	3/ 8	3/ 8	3/ 8	3/ 1	2/23	2/21	2/23	
			.1MM	276	334	429	482	482	528	581	581	581	581	581	581	634	679	1075
1986	273	100	D/M	3/19	1/19	1/18	1/18	3/15	3/15	3/13	3/13	3/13	3/10	3/ 9	3/ 2	3/ 2	2/18	
			.1MM	267	411	520	520	552	552	560	560	560	675	682	682	682	682	704
1987	273	100	D/M	3/ 8	3/ 7	3/20	3/19	3/18	3/17	3/17	3/17	3/17	3/17	3/ 8	3/ 7	2/28	2/28	
			.1MM	226	386	450	481	539	579	579	579	579	579	579	579	579	592	960
1988	274	100	D/M	3/26	3/25	3/25	3/25	3/25	3/25	3/25	3/25	3/25	3/25	3/14	3/ 8	3/ 8	3/ 8	
			.1MM	290	461	619	619	619	619	619	619	619	619	661	661	661	669	507
1989	273	100	D/M	3/28	3/27	3/26	3/25	3/24	3/24	3/24	3/24	3/24	3/24	3/14	3/14	3/ 4	3/ 4	
			.1MM	310	600	759	870	882	882	882	882	882	882	882	882	882	1121	838
1990	273	100	D/M	3/15	3/11	3/11	3/12	3/11	3/11	3/10	3/10	3/10	3/10	3/ 2	3/ 2	2/22	2/15	
			.1MM	192	354	502	617	781	842	854	854	854	854	854	854	854	864	906

1991	273	100	D/M	2/ 5	2/ 4	2/ 4	2/ 4	2/ 3	2/ 3	12/17	12/17	12/21	12/21	12/17	3/ 1	3/ 1	2/18	
			.1MM	204	368	446	528	540	540	553	553	633	662	662	722	774	803	855
1992	274	100	D/M	3/27	3/27	3/26	3/26	3/27	3/27	3/27	3/26	3/26	3/26	3/27	3/26	3/26	3/26	
			.1MM	472	638	646	646	709	835	889	897	897	897	958	1010	1178	1302	1300
1993	273	100	D/M	1/ 4	3/29	3/28	3/27	3/26	3/26	3/25	3/24	3/24	3/26	3/24	3/24	3/16	3/16	
			.1MM	361	559	756	966	1099	1197	1268	1319	1319	1338	1437	1570	1641	1699	1548
1994	273	100	D/M	2/20	3/22	3/22	3/21	3/21	3/21	3/21	3/21	3/21	3/31	3/22	3/21	3/21	3/15	
			.1MM	261	370	487	563	563	563	625	641	694	703	713	781	802	802	1448
1995	273	100	D/M	1/15	1/15	1/14	1/13	1/12	1/12	1/12	1/12	1/12	1/12	1/12	1/12	1/12	12/18	
			.1MM	583	689	739	829	889	889	889	927	981	981	981	981	981	981	335
1996	274	100	D/M	1/19	1/18	1/17	1/16	2/20	2/20	2/20	2/20	2/20	2/20	2/20	2/ 8	2/20	2/20	
			.1MM	381	580	582	618	758	800	800	822	822	822	822	822	822	822	1494
1997	273	100	D/M	2/21	4/ 5	4/ 4	4/ 3	4/ 2	4/ 1	4/ 1	3/29	3/29	3/28	3/25	3/25	3/14	3/14	
			.1MM	384	576	813	922	1059	1099	1099	1139	1376	1479	1680	1712	1746	1746	1450

	1 DAY	2 DAY	3 DAY	4 DAY	5 DAY	6 DAY	7 DAY	8 DAY	9 DAY	10 DAY	15 DAY	20 DAY	25 DAY	30 DAY
MEAN EXTREME (MM)	33.2	53.3	68.1	79.2	89.5	98.4	105.6	111.3	117.1	123.2	145.7	162.0	172.8	181.8
STD. DEV. (MM)	9.0	15.0	20.7	25.6	29.6	32.8	36.2	39.0	42.4	46.0	56.2	62.9	67.5	70.3
YEARS ANALYSED	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0	106.0

** NOTE ** MEAN AND STANDARD DEVIATION HAVE BEEN ADJUSTED TO ACCOUNT FOR ONE OBSERVATION PER DAY.

NOTE ** VALUE IN FLAG INDICATES YEAR NOT INCLUDED IN ANALYSIS BASED ON % DAYS OPERATIONAL (<90.0%)

ATMOSPHERIC ENVIRONMENT SERVICE
 RAIN+SNOWMELT INTENSITY, DURATION, FREQUENCY VALUES
 PREPARED BY THE HYDROMETEOROLOGY DIVISION, CANADIAN CLIMATE CENTRE

STATION : Ottawa CDA, Ontario

STATION NUMBER 6105976

LATITUDE: 4523 LONGITUDE: 7543 ELEVATION(M): 79

SNOWMELT MODEL 5

CRITICAL PERIOD : 1ST OF MONTH 10 TO THE END OF MONTH 5

NOTE : MODIFIED GUMBEL 12/82

RETURN PERIOD VALUES (MM)

WITH 50% CONFIDENCE LIMITS

RETURN PERIOD
YEARS

	1 DAY	2 DAY	3 DAY	4 DAY	5 DAY
2	31.71+/- .54	50.80+/- .90	64.73+/- 1.24	75.03+/- 1.54	84.63+/- 1.78
5	39.68+/- .91	64.06+/- 1.52	83.00+/- 2.09	97.66+/- 2.59	110.76+/- 2.99
10	44.97+/- 1.23	72.86+/- 2.05	95.12+/- 2.83	112.68+/- 3.50	128.10+/- 4.05
25	51.63+/- 1.66	83.96+/- 2.77	110.41+/- 3.81	131.62+/- 4.72	149.96+/- 5.45
50	56.58+/- 1.99	92.19+/- 3.31	121.74+/- 4.56	145.66+/- 5.65	166.18+/- 6.52
100	61.50+/- 2.32	100.38+/- 3.86	133.02+/- 5.31	159.63+/- 6.58	182.31+/- 7.60

RETURN PERIOD
YEARS

	6 DAY	7 DAY	8 DAY	9 DAY	10 DAY
2	93.07+/- 1.97	99.69+/- 2.18	104.90+/- 2.34	110.16+/- 2.55	115.69+/- 2.76
5	121.99+/- 3.31	131.69+/- 3.67	139.32+/- 3.94	147.64+/- 4.29	156.28+/- 4.65
10	141.19+/- 4.48	152.92+/- 4.95	162.16+/- 5.33	172.52+/- 5.80	183.21+/- 6.28
25	165.40+/- 6.04	179.70+/- 6.68	190.96+/- 7.18	203.89+/- 7.82	217.18+/- 8.47
50	183.35+/- 7.22	199.55+/- 7.99	212.32+/- 8.59	227.15+/- 9.36	242.37+/-10.14
100	201.21+/- 8.42	219.30+/- 9.31	233.56+/-10.01	250.29+/-10.91	267.43+/-11.81

RETURN PERIOD
YEARS

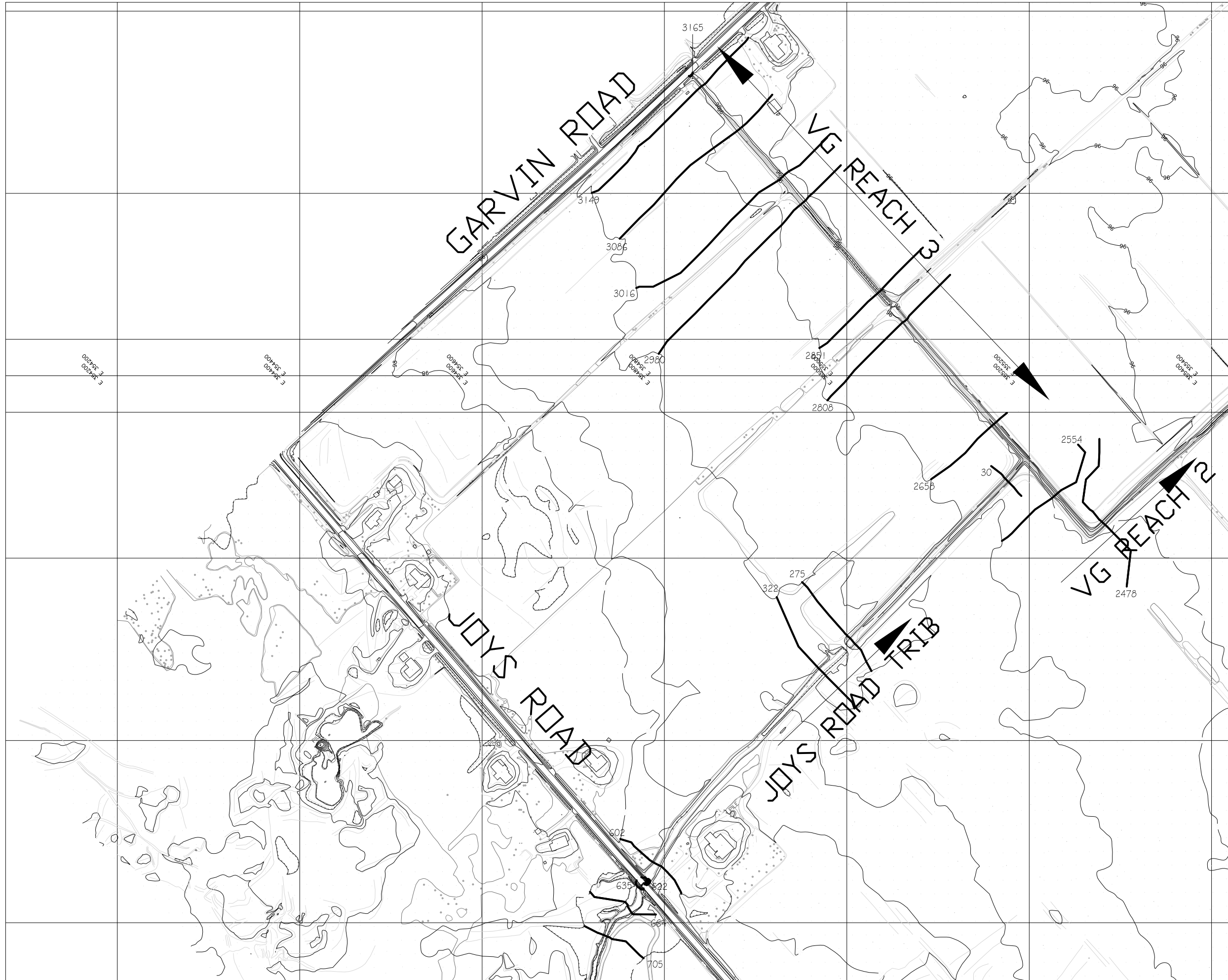
	15 DAY	20 DAY	25 DAY	30 DAY
2	136.51+/- 3.37	151.72+/- 3.78	161.74+/- 4.05	170.24+/- 4.22
5	186.10+/- 5.68	207.22+/- 6.36	221.30+/- 6.82	232.30+/- 7.11
10	219.01+/- 7.68	244.05+/- 8.59	260.82+/- 9.22	273.49+/- 9.61
25	260.51+/-10.35	290.50+/-11.58	310.67+/-12.43	325.43+/-12.95
50	291.28+/-12.38	324.94+/-13.86	347.63+/-14.87	363.94+/-15.50
100	321.89+/-14.43	359.20+/-16.15	384.39+/-17.33	402.25+/-18.06

** WARNING ** : THE 1-DAY 100-YEAR RETURN PERIOD EVENT IS EXCEEDED BY THE 1-DAY EVENT IN 1923
 ** WARNING ** : THE 1-DAY 100-YEAR RETURN PERIOD EVENT IS EXCEEDED BY THE 1-DAY EVENT IN 1934
 ** WARNING ** : THE 2-DAY 100-YEAR RETURN PERIOD EVENT IS EXCEEDED BY THE 2-DAY EVENT IN 1923
 ** WARNING ** : THE 3-DAY 100-YEAR RETURN PERIOD EVENT IS EXCEEDED BY THE 3-DAY EVENT IN 1923
 ** WARNING ** : THE 4-DAY 100-YEAR RETURN PERIOD EVENT IS EXCEEDED BY THE 4-DAY EVENT IN 1923

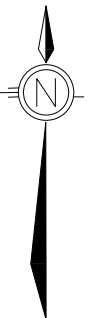
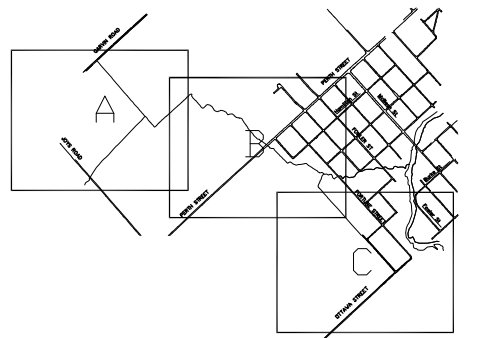
APPENDIX M

HEC-RAS Cross Section Locations





KEY PLAN :



J.F. Sabourin & Associates Inc.
 WATER RESOURCES AND ENVIRONMENTAL CONSULTANTS
 OTTAWA (613) 836-3884
 GATINEAU (819) 243-6858

CLIENT :



PROJECT :

RICHMOND FLOODPLAIN MAPPING

No.	BY	DATE	DESCRIPTION	BY
1	BW	27/11/2009	ISSUED FOR REVIEW	BW

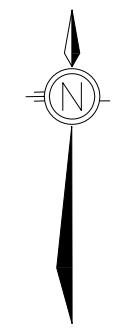
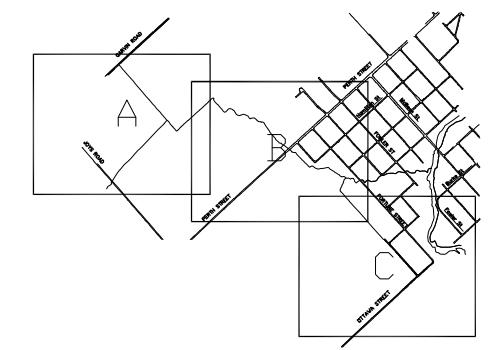
TITLE :

HEC-RAS CROSS SECTIONS (A)

DRAWING REF.	DESIGNED:	
	DRAWN:	BW
	VERIFIED:	JFS
	APPROVED:	JFS
	DATE	PROJECT No.
	NOV/09	709(08)



KEY PLAN :



J.F. Sabourin & Associates Inc.
 WATER RESOURCES AND ENVIRONMENTAL CONSULTANTS
 OTTAWA (613) 836-3884
 GATINEAU (819) 243-6858

CLIENT :
 **RIDEAU VALLEY CONSERVATION AUTHORITY**
 3889 RIDEAU VALLEY DRIVE
 MANDICK, ONTARIO, K4M 1A5
 (613) 692-3571

PROJECT :
 RICHMOND FLOODPLAIN MAPPING

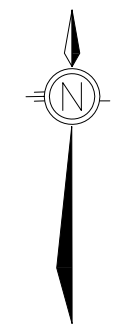
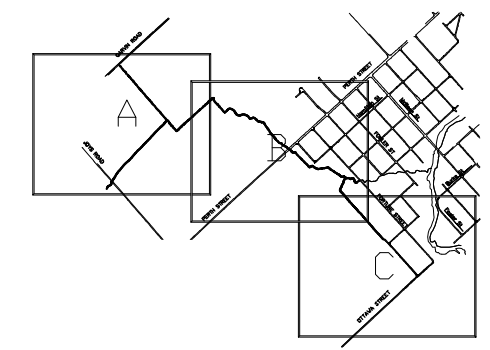
No.	BY	DATE	DESCRIPTION	BY
1	BW	27/11/2009	ISSUED FOR REVIEW	BW

TITLE :
 HEC-RAS CROSS SECTIONS (B)

DRAWING REF.	DESIGNED:	
	DRAWN:	BW
	VERIFIED:	JFS
	APPROVED:	JFS
	DATE	PROJECT No.
	NOV/09	709(08)



KEY PLAN:



J.F. Sabourin & Associates Inc.
 WATER RESOURCES AND ENVIRONMENTAL CONSULTANTS
 OTTAWA (613) 836-3884
 GATINEAU (819) 243-6858

CLIENT :



3889 RIDEAU VALLEY DRIVE
 MANDICK, ONTARIO, K4M 1A5
 (613) 692-3571

PROJECT :

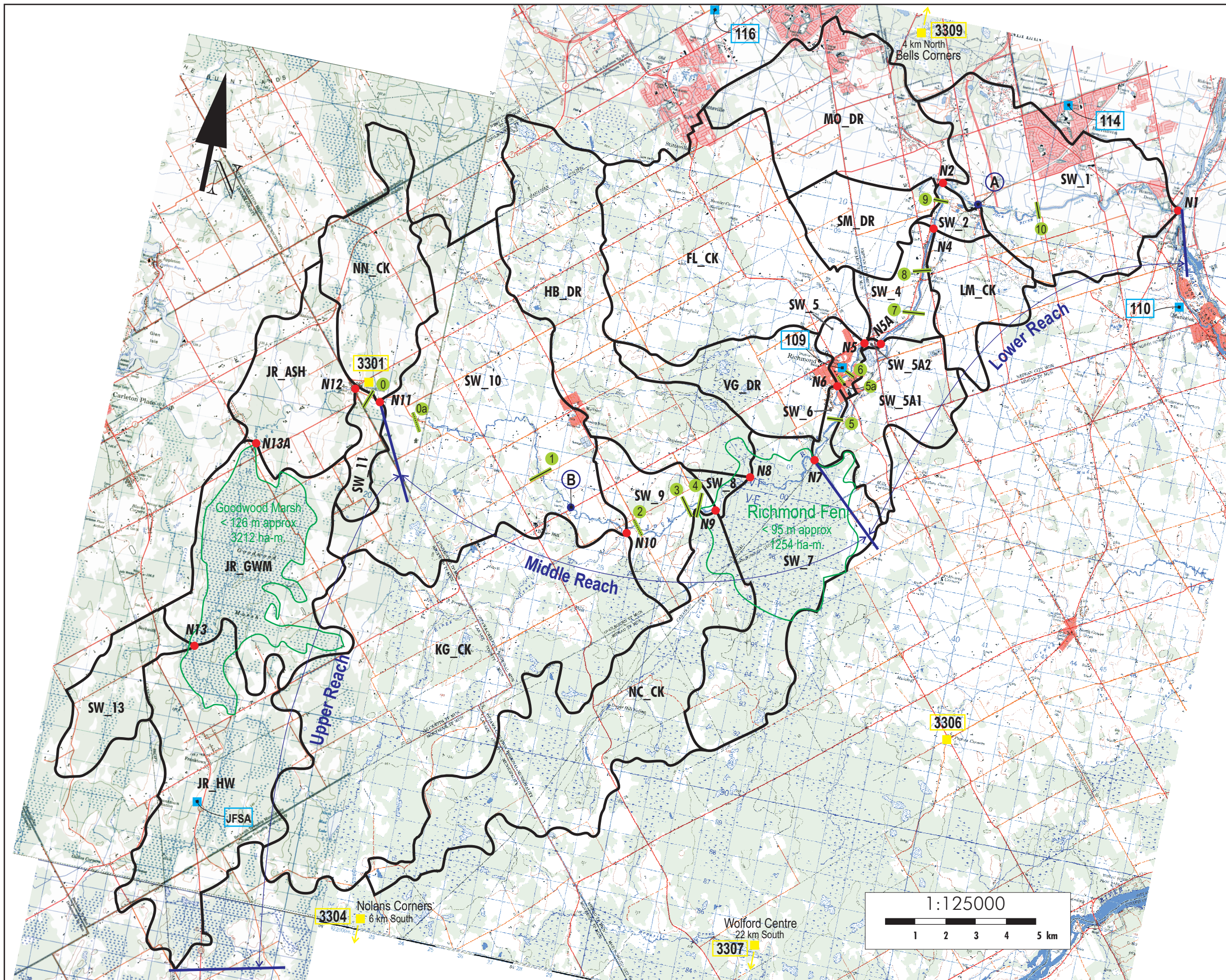
RICHMOND FLOODPLAIN MAPPING

No.	BY	DATE	DESCRIPTION	BY
1	BW	27/11/2009	ISSUED FOR REVIEW	BW

TITLE :

HEC-RAS CROSS SECTIONS (C)

DRAWING REF.	DESIGNED:	
	DRAWN:	BW
	VERIFIED:	JFS
	APPROVED:	JFS
	DATE	PROJECT No.
	NOV/09	709(08)



- Legend:**
- Watershed
 - Bogs (Reservoir)
 - Nodes
 - Flow gauges
 - Rain gauges
 - Snow course stations
 - River Cross-Sections (based on topo. maps)
 - River Cross-Sections adjusted with field data
 - Reaches limits
- Flow gauges ID**
- 02LA007- Jock River near Richmond
 - Jock River at Franktown Rd
- Rain gauges ID**
- Richmond
 - Manotick
 - Barrhaven
 - Maple Grove
 - JFSA Inc, Temporary Rain Gauge 2003
- Snow course stations ID**
- Ashton
 - Nolans Corners
 - Pierces Corners
 - Bells Corners
 - Wolford Centre

Client:

Project:
Jock River Flood Plain Mapping Study

Title:
Watershed Delineation

J.F. Sabourin & Associates Inc.
WATER RESOURCES AND ENVIRONMENTAL CONSULTANTS
OTTAWA (613) 727-5199
GATINEAU (819) 243-6858

APPENDIX N

Sensitivity Analysis Results



**SIMULATED HEC-RAS WATER ELEVATIONS
(FLOW SENSITIVITY ANALYSIS)**

<i>River</i>	<i>Reach</i>	<i>River Station*</i>	Governing Water Elevations (m)		
			<i>(Original - Used for Mapping)</i>	<i>20% Flow Increase</i>	<i>20% Flow Decrease</i>
Van Gaal Drain	Reach 3	3174 Garvin Rd Culvert	-	-	-
Van Gaal Drain	Reach 3	3165	96.75	96.77	96.74
Van Gaal Drain	Reach 3	3149	96.72	96.76	96.68
Van Gaal Drain	Reach 3	3086	96.64	96.68	96.60
Van Gaal Drain	Reach 3	3016	96.61	96.64	96.56
Van Gaal Drain	Reach 3	2980	96.57	96.61	96.53
Van Gaal Drain	Reach 3	2851	96.42	96.46	96.36
Van Gaal Drain	Reach 3	2808	96.39	96.43	96.33
Van Gaal Drain	Reach 3	2658	96.29	96.33	96.24
Van Gaal Drain	Reach 2	2554	96.28	96.33	96.23
Van Gaal Drain	Reach 2	2478	96.16	96.19	96.11
Van Gaal Drain	Reach 2	2157	95.48	95.52	95.43
Van Gaal Drain	Reach 2	2076	95.27	95.31	95.21
Van Gaal Drain	Reach 2	1974	95.11	95.15	95.06
Van Gaal Drain	Reach 2	1922	94.99	95.03	94.95
Van Gaal Drain	Reach 2	1833	94.85	94.89	94.81
Van Gaal Drain	Reach 2	1796	94.81	94.84	94.77
Van Gaal Drain	Reach 2	1735	94.72	94.76	94.70
Van Gaal Drain	Reach 2	1728	94.69	94.74	94.68
Van Gaal Drain	Reach 2	1727 Farm Culvert	-	-	-
Van Gaal Drain	Reach 2	1717	94.69	94.75	94.64
Van Gaal Drain	Reach 2	1615	94.61	94.68	94.53
Van Gaal Drain	Reach 2	1555	94.55	94.62	94.46
Van Gaal Drain	Reach 2	1488	94.45	94.55	94.37
Van Gaal Drain	Reach 2	1416	94.41	94.54	94.24
Van Gaal Drain	Reach 2	1400	94.36	94.49	94.23
Van Gaal Drain	Reach 2	1364	94.31	94.46	94.18
Van Gaal Drain	Reach 2	1340	94.21	94.32	94.11
Van Gaal Drain	Reach 2	1339 Perth St Culvert	-	-	-
Van Gaal Drain	Reach 2	1312	94.13	94.22	94.11
Van Gaal Drain	Reach 2	1302	94.15	94.28	94.11
Van Gaal Drain	Reach 2	1268	94.14	94.27	94.11
Van Gaal Drain	Reach 2	1212	94.12	94.25	94.11
Van Gaal Drain	Reach 2	1169	94.12	94.24	94.11
Van Gaal Drain	Reach 2	1091	94.12	94.23	94.11
Van Gaal Drain	Reach 2	1002	94.12	94.22	94.11
Van Gaal Drain	Reach 2	961	94.11	94.22	94.11
Van Gaal Drain	Reach 2	910	94.11	94.22	94.11
Van Gaal Drain	Reach 2	840	94.11	94.21	94.11
Van Gaal Drain	Reach 1	746	94.11	94.21	94.11
Van Gaal Drain	Reach 1	705	94.11	94.21	94.11
Van Gaal Drain	Reach 1	668	94.11	94.19	94.11

Note: * Refer to Appendix M for river station locations

**SIMULATED HEC-RAS WATER ELEVATIONS
(FLOW SENSITIVITY ANALYSIS)**

<i>River</i>	<i>Reach</i>	<i>River Station*</i>	<i>Governing Water Elevations (m)</i>		
			<i>(Original - Used for Mapping)</i>	<i>20% Flow Increase</i>	<i>20% Flow Decrease</i>
Van Gaal Drain	Reach 1	666	94.10	94.10	94.10
Van Gaal Drain	Reach 1	656 Fortune St Culvert	-	-	-
Moore Drain	Reach 1	298	94.11	94.21	94.11
Moore Drain	Reach 1	130	94.11	94.21	94.11
Joys Road Trib	Reach 1	705	97.79	98.05	97.42
Joys Road Trib	Reach 1	664	97.79	98.05	97.43
Joys Road Trib	Reach 1	635	97.67	97.93	97.34
Joys Road Trib	Reach 1	634 Joys Road Culvert	-	-	-
Joys Road Trib	Reach 1	622	97.26	97.31	97.15
Joys Road Trib	Reach 1	602	97.27	97.33	97.15
Joys Road Trib	Reach 1	322	96.71	96.77	96.59
Joys Road Trib	Reach 1	275	96.56	96.63	96.42
Joys Road Trib	Reach 1	30	96.29	96.33	96.25

Note: * Refer to Appendix M for river station locations

FLOW SENSITIVITY ANALYSIS

Scenario							
River	Reach	River Station Range	River Station Location*	20% Flow Increase		20% Flow Decrease	
				Maximum Increase In Water Level (m)	Estimated Max Increase in Floodplain Width (m)	Maximum Decrease In Water Level (m)	Estimated Max Decrease in Floodplain Width (m)
Van Gaal Drain	Reach 3	3174-1727	Garvin Rd to 388 m U/S of Perth St	0.05	40 m at 1922	-0.06	30 m at 2076
Van Gaal Drain	Reach 2	1727-1339	388 m U/S of Perth St to Perth St	0.15	40 m at 1615	-0.17	300 m at 1488
Van Gaal Drain	Reach 2	1339-746	Perth St to 90 m U/S of Fortune St	0.13	No Change	-0.04	No Change
Van Gaal Drain	Reach 1	746-656	90 m U/S of Fortune St to Fortune St	0.10	No Change	0.00	No Change
Moore Drain	Reach 1	298-130	Moore Drain (130 m U/S from Main Drain)	0.10	50 m at 298	0.00	No Change
Joys Road Trib	Reach 1	705-30	Joys Road Tributary	0.26	45 m at 705	-0.37	35 m at 705

Note: * Refer to Appendix M for river station locations