

**APPENDIX C:  
Stormwater Management Plans**



**K2 WIND POWER PROJECT  
TOWNSHIP OF ASHFIELD-COLBORNE-WAWANOSH  
HURON COUNTY, ONTARIO**

**PRELIMINARY ENGINEERING REPORT  
STORMWATER MANAGEMENT PLAN  
FOR THE PROJECT SUBSTATION**

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### APPROVALS



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July 11, 2011

Date



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July 11, 2011

Date

### REVISION HISTORY

<b>Revision</b>	<b>Date</b>	<b>Reason for Change</b>
Draft for Review	November 11, 2010	Initial draft for review
Draft for Review	October 18, 2011	Re-issue of report for review
Final Report	November 7, 2011	
Revised Final Report	July 11, 2012	Revised to reflect site plan changes and regulatory comments

## 1.0 INTRODUCTION

K2 Wind Ontario Inc., in its capacity as general partner of K2 Wind Ontario Limited Partnership (the "Proponent"), is proposing to develop, construct and operate the K2 Wind Power Project (the "Project") in the Township of Ashfield-Colborne-Wawanosh north of Goderich, Ontario (see Figure 1-1 for a map of the Project Location). The Proponent is a limited partnership formed under the *Limited Partnerships Act* (Ontario), with K2 Wind Ontario Inc. as general partner and CP K2 Holdings Inc. (an affiliate of Capital Power Corporation), Samsung Renewable Energy Inc., and Pattern K2 LP Holdings LP (an affiliate of Pattern Renewable Holdings Canada ULC), as limited partners. The Project would supply approximately 270 megawatts (MW) of electricity to the Ontario power grid. The development of the Project would help the province of Ontario meet its goal of increasing the proportion of electricity generated from renewable sources. The Project is subject to Ontario Regulation 359/09 – Renewable Energy Approvals under Part V.0.1 of the *Environmental Protection Act* (O. Reg. 359/09).

Previous stormwater management reporting for this development made reference to the Site as the "switchyard/substation". The Site has been split into two parcels, as described in this report, and the focus of this stormwater plan is now referred to as the 'Substation'. The second development property, which lies immediately to the west of the Substation is to be owned and operated by Hydro One and is referred to as the 'Ashfield 500 kV Switching Station'.

The following comments are relevant to the project:

- The K2 Wind Substation is located on the north-west corner at the junction of Tower Line and Glens Hill Road and adjacent to the Hydro One 500 kV Ashfield Switching Station.
- Stormwater systems located at the Substation will allow for appropriate management of stormwater.
- A maintenance and operations building and a substation building (housing 34.5 kV switchgear and protection and control equipment) will be located on the Substation site.

As part of the Substation development, an existing residence and associated farm buildings would likely need to be removed from the site and the area graded according to the site design.

The following are not included in this Stormwater Management Plan:

- The Hydro One 500 kV Ashfield Switching Station, which will be located adjacent to the K2 Wind Substation, and
- The K2 Wind Transformer Station, which will be located at the south west corner at the junction of Lanesville Line and Belgrave Road, which has a separate Stormwater Management Plan.

Temporary facilities would be provided during the construction phase that would be removed at the completion of the work. These would consist of:

- A temporary laydown, storage, trailer and parking area at the Substation site for the use of the construction team.
- At the Substation voltage would be increased from either 34.5 kV or 138kV to 500 kV for connection into the adjacent Hydro-One transmission line via the Hydro One 500 kV Ashfield Switching Station.

The Proponent will provide design, construction, operation, and decommissioning of the Project. The proposed schedule is to commence construction in mid-2013 and begin operation in late 2014.

The Proponent retained AMEC Environment & Infrastructure, a division of AMEC Americas Limited (AMEC) to assist in the preparation of the REA application with input from Timmins Martel Heritage Consultants Inc., and Zephyr North Canada. The REA application is a requirement under Ontario Regulation 359/09 - Renewable Energy Approvals under Part V.0.1 of the Act of the *Environmental Protection Act* (O.Reg.359/09). According to subsection 6.(3) of O.Reg. 359/09, the Project is classified as a Class 4 Wind Facility and will follow the requirements outlined in O.Reg.359/09.

This report summarizes the development of the concept stormwater management plan (SWMP) for the Substation (the "Site") for the proposed development.



**Figure 1-1: Site Location, Regional Context**  
(Source: Background Image from Google Map)

## 1.1 The Existing Site

The Site is located at 84596 Tower Line Road, at the northwest corner of Tower Line and Glen's Hill Road, in Huron County, Ontario (see Figure 1-2). The Substation development that is the subject of this report will cover approximately 3.7 ha. The drainage area of interest associated with the development is approximately 12 ha. The Site is a flat sloped agricultural property, currently covered with vegetation and the occasional wood lot. The overall slope is from north-east to south-west and drainage ditches are present along the Glen's Hill Road and Tower Line. The surface runoff is drained overland toward the Glen's Hill roadside ditch. From there, it is conveyed to the west of the site via an existing culvert under the access road of the Glen's Hill. Based on Site survey data, the size of the culvert is 450 mm diameter. The top of road elevation is approximately 240.9 m. It is anticipated that the maximum water level at Glen's Hill Road roadside ditch will be 240.9 m. Once the water level reaches this elevation, it will spill over to the west of the site of the road.

Following comments are relevant to the existing site:

- The site does not appear to be located within Maitland Valley Conservation Authority (MVCA) regulated lands as indicated in the e-mail from MVCA dated October 01, 2010 (see Appendix A).

The MVCA (see Appendix A) have indicated that flood plain mapping is not available for the Site. As such, the potential impact of flooding to this development cannot presently be ascertained.

- Based on the "Geotechnical Investigation Kingsbridge Wind Farm Phase II Proposed Wind Power Plant" (AMEC, 2006), the top soil of the site consists mainly of silty sand varying in thickness from 150 to 450mm. Underlying the topsoil, the soil mainly consists of silty clay. Five boreholes were advanced with drill depth ranging from 6.6m to 12.2m.
- Soils mapping (MVCA, 2011 : Map 3.4) indicates the Site is underlain by soils classified as "moderately" drained.
- Groundwater was found at depths of about 1.8m to 3.0m below the current grade. Based on the natural moisture content of the soil samples, it is anticipated that if the overlying silty clay aquitard is penetrated, the ground water will rise to approximately 700mm below current grade. Seasonal fluctuations in the groundwater level are also expected during wet periods of the year.
- The Site is located within the watershed of North Shore (MVCA, 2011b). North Shore is a small watershed of 152.4 km<sup>2</sup> in area of the Shoreline sub-basin. (MVCA website at [http://www.mvca.on.ca/map\\_mvca\\_watersheds.pdf](http://www.mvca.on.ca/map_mvca_watersheds.pdf)). The North Shore Watershed is referred to as part of the "MVCA Gullies NS" subwatershed area in the Ausable Bayfield & Maitland Valley Source Protection Plan (MVCA, 2011; Map 2.2).

- An unnamed watercourse traverses the southeast corner of the Site. Based on the comments from MVCA (Appendix A), the development Site should stay 15m away from the top bank of this watercourse.
- A drainage divide is located between the proposed development and the unnamed watercourse. Resolution of additional legal and permitting issues would be required if a trans-boundary diversion of stormwater runoff is required.
- The following additional information is documented in the Ausable Bayfield & Maitland Valley Source Protection Plan (MVCA, 2011):
  - The Site is not located within a wellhead protection area as documented in the (Wellhead Protection Areas Map [Draft], 2010).
  - The Site is located in an area designated as having “Medium” groundwater vulnerability (Map 4.1, 2010).
  - The Site is not located in a “Significant Groundwater Recharge Area” (Map 4.5, 2010).



**Figure 1-2: Site Location, Local Context**  
(Background Image sourced from Google Map)

## **1.2 Proposed Development Overview**

The proposed Site layout is shown in Figure 1-3. Stormwater runoff from the Substation area will drain overland toward the west drainage ditch. A drainage ditch is also proposed at the south side of the Site to prevent any drainage to the south. The south and west drainage ditches will combine at the south west corner of the development.

Four diversion ditches will be constructed along the north, west, south and east development perimeter to convey “clean” surface runoff from the upstream undeveloped areas of the Site around the developed area.

## **1.3 Stormwater Management Plan Overview**

The objective of a SWMP is to control stormwater runoff from the Site, specifically to ensure that surface water quality meet discharge guidelines, and to manage surface water quantity (i.e. runoff peak flow rates) discharging from the Site.

The surface water quantity objective of the SWMP is to maintain no increase in peak flows discharging from the Site for post-development versus pre-development conditions, up to and including the 100 year return period design event. Hydrologic modelling was carried out to assess peak flows for these two Site conditions, and the results from the two scenarios were compared to evaluate the impact of the development on stormwater drainage from the Site.

Due to the high groundwater table at the Site (minimum 1.8m below the current grade) and the low Site imperviousness (about 10% for the Site area), the SWMP includes the use of an Oil/Grit Separator (OGS) to promote water quality control. An OGS for control of stormwater runoff quality from the Site is considered appropriate given the low imperviousness (about 10%) in this area. An OGS operates based on the principles of gravity-based sedimentation for the grit and phase separation for the oil. In this regard, the OGS will provide general water quality improvement of stormwater runoff discharges from the Site.

The SWMP has been designed in compliance with the “Stormwater Management Planning and Design Manual” (MOE, 2003) and MVCA guidelines. The quality control design was based on the Normal protection level of treatment, as directed by the MVCA (see Appendix A). The overall SWMP incorporates the following considerations:

- The OGS has been designed to provide Normal level of protection with a minimum 70% removal of total suspended solids (TSS). Based on the Site plan, the approximate impervious area will be approximately 10% of the Site area. It is suggested that the OGS be located on the downstream side of the SWM pond.
- The Ministry of Natural Resources (MNR) Flood Plain Management in Ontario, Technical Guidelines (MNR, 1988) indicate the Site is located within Regulatory Flood Zone 1. As such, Hurricane Hazel (Regulatory Storm) was used as the extreme design rainfall event for this Site.

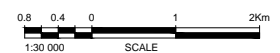
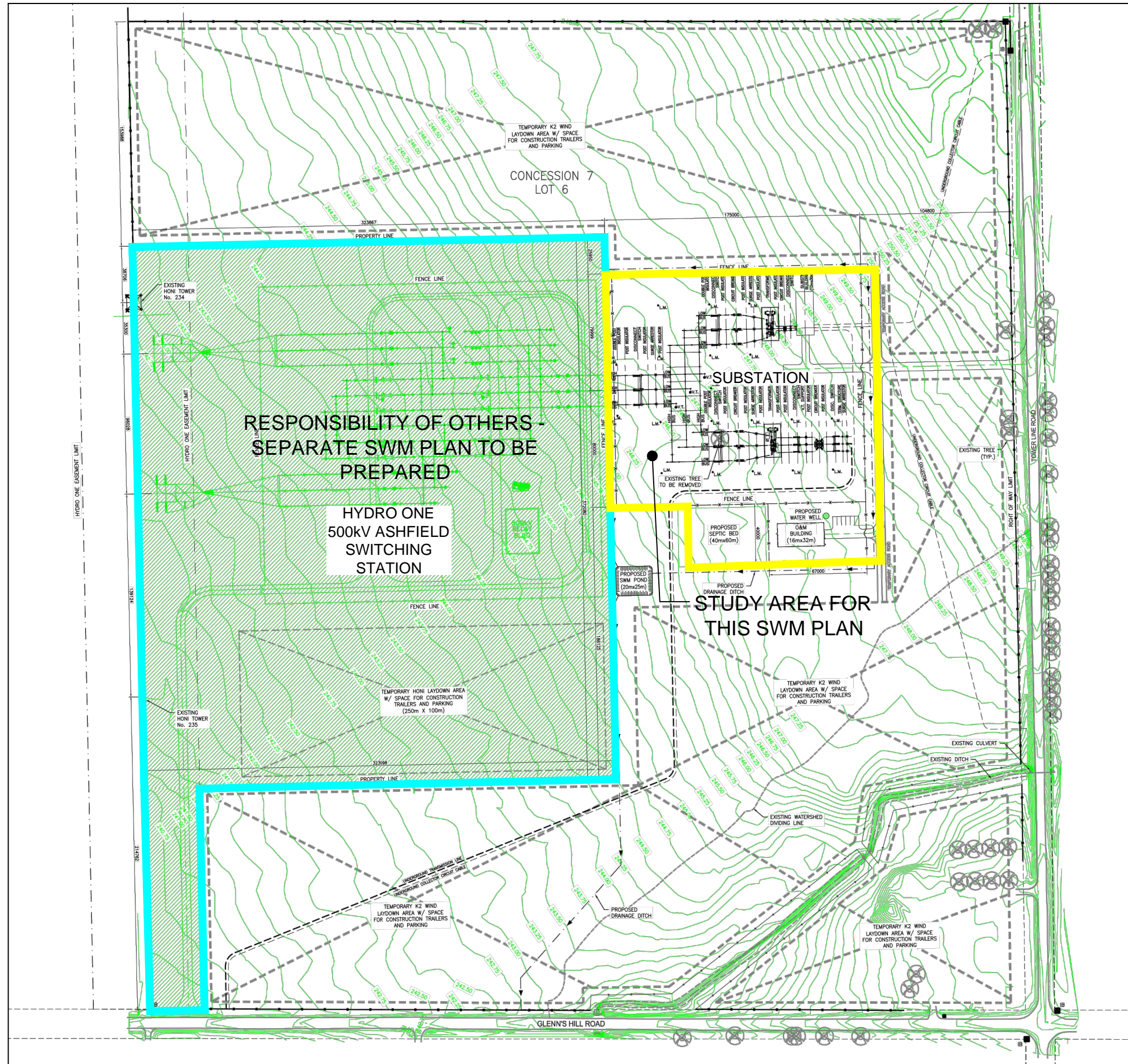


FIGURE 1-3: SITE LAYOUT

- The development Site is located more than 100 meters from the top of the bank of the unnamed watercourse.
- No trans-boundary diversion of stormwater runoff.
- There was limited information available regarding the site grading and imperviousness. The assumptions used for this study are based on the available information and need to be verified in advance of detailed design.

As noted previously, the primary objective of the SWMP is to control and treat stormwater runoff from the Site.

## **2.0 HYDROLOGIC MODELLING**

Single event hydrologic modelling has been used to obtain quantitative estimates of stormwater runoff rates and volumes for pre-development and post-development conditions for the Site.

### **2.1 Model Selection**

The surface runoff has been calculated using the computer model Visual OTTHYMO v2.0 (VO2). OTTHYMO is a hydrologic management model that has been used for watershed studies, sub-watershed studies, master drainage plans, functional stormwater management plans, site plans, and stormwater management pond design. VO2 is the second version of the INTERHYMO – OTTHYMO hydrologic modelling tool designed for Microsoft Windows OS. VO2 has been accepted by the MOE, the Ministry of Natural Resources, the Ministry of Transportation, the Ministry of Municipal Affairs, the Association of Conservation Authorities of Ontario, and most municipal governments, as a valid hydrologic simulation program.

The hydraulic modelling of the proposed SWM Pond was carried out using the XPSWMM software package. This package was selected due to the following features:

- Integrated hydrologic and hydraulic modelling. This allows the results to better represent the manner in which changes to one part of a drainage system can impact the drainage system behaviour upstream and/or downstream.
- Dynamic modelling of stormwater systems. Dynamic modelling results are considered to be more realistic than those from a steady state model. Dynamic models account for the effects of storage and backwater in conduits and floodplains and the timing of the hydrographs to yield a more accurate representation of the hydraulic grade line at any point in space and time.
- Ability to hydraulically simulate any combination of open and/or closed conduits with any boundary conditions. This is applicable for this evaluation which includes natural channels, weirs, culverts and a tunnel.
- Widely used and accepted in the industry. It is approved by US Federal Emergency Management Authority (FEMA) and was the first proprietary stormwater and wastewater management modelling software package to be tested by the EPA's Environmental Technology Verification Program.

### **2.2 Design Storms**

Precipitation data from the Atmospheric Environment Services' IDF90 publication for gauge #6122847 (Goderich Airport, Ontario) weather station was used to develop the design storms used in this assessment. Design storms with return periods of 2, 5, 10, 25, 50, and 100-years

were developed. The 12 hour Hurricane Hazel (Regional Storm) design event was used to evaluate the stormwater runoff conditions associated with an extreme rainfall event.

The Soil Conservation Service (SCS) Type II storm distribution was selected for the design storms due to its applicability in rural and urban settings and to maintain consistency with other hydrologic calculations, such as the effective rainfall and overland routing calculations. A time increment of 6 minutes was selected for all design storms. Table 2-1 provides a summary of total rainfall depth for the SCS Type II 24-hour 2, 5, 10, 25, 50, 100 year and Regional Storm design events.

A critical duration assessment was completed to determine which of the three rainfall durations evaluated produced the highest peak flows. The peak flows for the pre-development condition for the 100 year design rainfall event for the 6 hour, 12 hour and 24 hour durations were computed using SCS Type II distributions. The results of this analysis, presented in Table 2-2, indicate that the 6 hour duration generated the most conservative runoff peak flow and the 12 hour duration generated the most conservative runoff volume. Therefore, both the 6 hour and 12 hour duration design events were used, for the various return period events (2, 5, 10, 25, 50 and 100 year), for the evaluation of Site SWMP components. Generally, the design rainfall event generating the highest runoff peak flow is used for evaluation of conveyance components (such as ditching, storm sewers, etc.) and the design rainfall event generating the highest runoff volume is used for evaluation of quantity control components (i.e., the stormwater management pond).

**Table 2-1 : Total Rainfall Depth**

Event	Event Depth (mm) by Duration		
	6 hour	12 hour	24 hour
2 year	40.4	43.8	47.6
5 year	58.7	61.9	64.1
10 year	70.8	73.9	75.1
25 year	86.1	89.1	89.0
50 year	97.5	100.3	99.2
100 year	108.8	111.5	109.5
Regional	212.0		

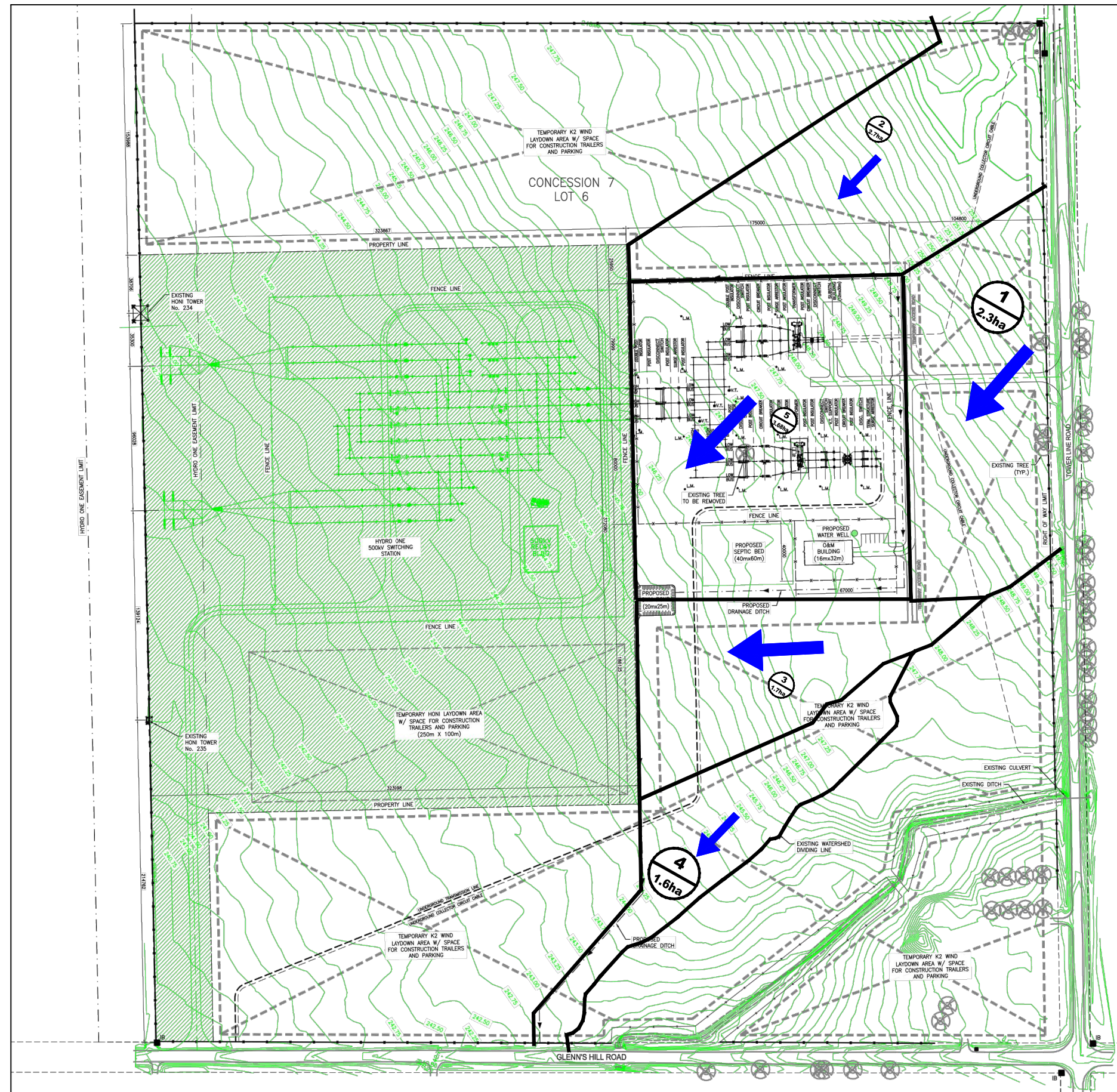
**Table 2-2 : Critical Duration Analysis Results**

100 year Design Rainfall Event Duration	at Outlet from Site	
	Peak Flow (m <sup>3</sup> /s)	Runoff Volume (mm)
6 hour	<b>0.89</b>	53.9
12 hour	0.78	<b>56.2</b>
24 hour	0.64	54.5

### 2.3 Hydrologic Modelling Input Data and Results

The following information is relevant to the development of the pre-development and post-development hydrologic simulation models for the proposed development Site.

- Soils in the study area are classified as Hydrologic Soil Group BC (AMEC, 2006). A base CN number of 76 was used for pervious areas.
- For pre-development modelling the total drainage area is approximately 12 hectares. Runoff from the pre-development drainage area (as illustrated on Figure 2-1) drains overland toward the Glen's Hill Road roadside ditch.
- The catchment areas modeled for the post-development condition are illustrated in Figure 2-2. For post development modelling purposes the Site (to be developed) was discretized into 9 sub-catchments taking into consideration the proposed layout and major impervious areas. The runoff from catchments 1, 2, 3, and 4 will drain to the south main diversion ditch via north, west, east and south diversion ditches. No changes are anticipated to catchments 1, 2, 3 and 4 from pre-development conditions. Therefore, no controls are required for these catchments. However, the runoff from these catchments were modelled and reported in table 2-3, 2-4 and Appendix B in order to design the diversion ditches and have a complete record of site flow data. Stormwater runoff from catchments 5 to 9 will drain via the OGS and south and west drainage ditches to the stormwater pond (SWM Pond).
- An imperviousness of approximately 10% of the total developed area (post-development) has been modeled with a CN value of 98.
- Time of concentration was computed using the Upland (velocity) equation. Overland flow length was abstracted from available Site plans.
- The 12 hour Hurricane Hazel (Regional Storm) design event was used to evaluate the stormwater runoff conditions associated with an extreme rainfall event. The soil moisture condition is known as the antecedent moisture condition (AMC). Three AMC conditions are defined, namely: AMC-I representing dry soil moisture conditions, AMC-II representing average conditions and AMC-III representing wet or nearly saturated watershed conditions. Consistent with the hydrologic modelling guidelines provided in The Lakes and Rivers



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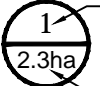
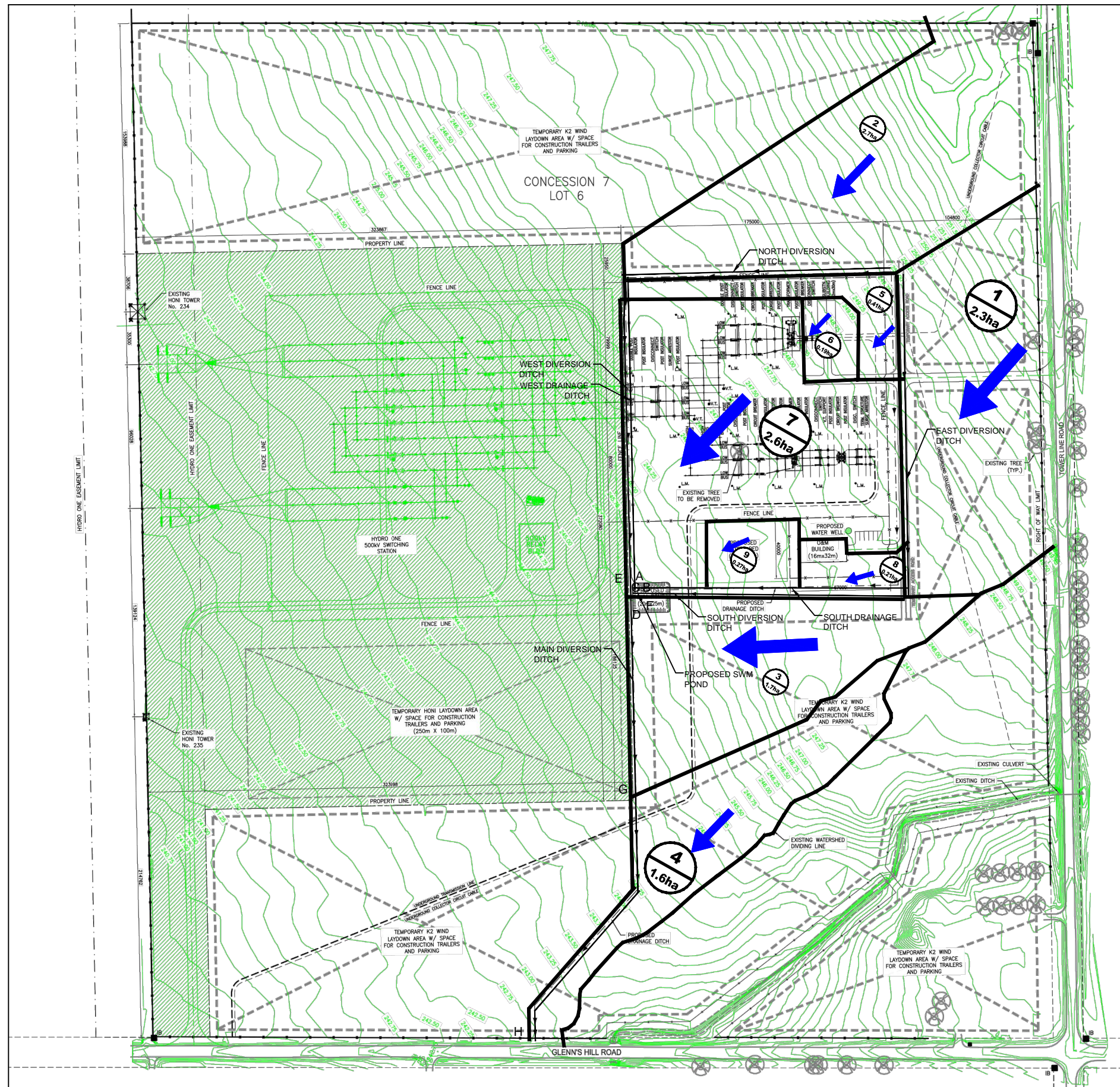
-  FLOW DIRECTION
-  CATCHMENT AREA No. 1  
2.3ha  
AREA (ha)

FIGURE 2-1: PRE-DEVELOPMENT DRAINAGE DETAILS



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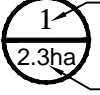

-  FLOW DIRECTION
-  SWALE
-  STORM WATER DRAINAGE AREA
-  CATCHMENT AREA No.
-  AREA (ha)

FIGURE 2-2: POST-DEVELOPMENT DRAINAGE DETAILS

Improvement Act (MNR, 2004; Appendix A – Design Floods) AMC-II has been used for runoff modelling of the return period design rainfall events and AMC-III has been used for modelling of the Regulatory Storm (i.e., Hurricane Hazel). As such, the CN values of 76 noted above is associated with the AMC-II condition. This CN value under an AMC-III condition increase to 88, respectively. The CN value of 98 remains unchanged as it represents an imperviousness surface.

- Based on the Site layout, the development will be dominated by gravels under post development conditions. The Site will be housed on a gravel pad. The gravel pad is typically constructed with a minimum depth of 0.15 m or 6 inches on the upslope side of the Site development. The gravel pad is constructed with minimal surface grade to an approximate maximum depth of about 1m. The typical specification used for the gravel material used for pad construction is crushed stone having a minimum size of 19 mm (or about 1 inch) with minimal fines. The purpose of the gravel pad is to avoid surface runoff ponding in the Site area. A result of the gravel pad, as constructed, is attenuation of stormwater runoff from the Site area although this effect cannot be effectively represented in the modelling. As such, a no increase in the CN has been applied for stormwater management modelling purposes for these areas.

Subcatchment parameterization, for both the pre-development and post-development conditions, is outlined in Tables 2-3 and 2-4. Subcatchment delineation, for both development conditions, is illustrated in Figures 2-1 and 2-2.

A comparison of pre-development to post-development stormwater runoff peak flows is provided in Table 2-5. Please also note that computational modelling points are indicated on Figures 2-1 and 2-2 and are referred to in the peak flow summary tables.

**Table 2-3 : Pre-Development Catchment Parameterization**

Catchment #	Area (ha)	CN (AMC II)	CN (AMC III)	Time to Peak <sup>1</sup> (hr)
1	2.3	76	88	0.27
2	2.7	76	88	0.59
3	1.7	76	88	0.33
4	1.6	76	88	0.19
5	3.7	76	88	0.24

**Table 2-4 : Post-Development Catchment Parameterization**

Catchment #	Area (ha)	CN (AMC II)	CN (AMC III)	Time to Peak <sup>1</sup> (hr)
1	2.3	76	88	0.27
2	2.7	76	88	0.59
3	1.7	76	88	0.33
4	1.6	76	88	0.19
5	0.41	79.5	89.7	0.23
6	0.19	85	91.9	0.20
7	2.6	77	88.4	0.19
8	0.21	81	90.2	0.14
9	0.27	76	88	0.10

**Table 2-5 : Pre- To Post-Development (no SWM) Site Peak Flow Comparison**

6 Hour Design Rainfall Event	Pre-development Peak Flows at Location C (m <sup>3</sup> /s)	Post Development Peak Flows at Location C (m <sup>3</sup> /s)	Change from Pre-Development	
			Absolute (m <sup>3</sup> /s)	%
2 Year	0.06	0.09	0.03	50%
5 Year	0.20	0.25	0.05	25%
10 Year	0.32	0.39	0.07	22%
25 Year	0.49	0.58	0.09	18%
50 Year	0.62	0.73	0.11	18%
100 Year	0.76	0.89	0.13	17%
Regional	0.44	0.46	0.02	5%

NOTES:  
 Post development peak flows in this table do not include any representation of stormwater quantity control.

Stormwater runoff within the development Site will be directed to the SWM Pond prior to discharge to the downstream drainage course. Runoff within temporary areas, such as temporary construction parking and lay down area, will be directed to the diversion ditches.

As noted previously, the surface water quantity objective of the SWMP is to maintain no increase in peak flows discharging from the Site for post-development versus pre-development conditions, up to and including the 100 year return period design event. The results noted in Table 2-4 indicate the need for quantity control for this development to achieve this objective. As such, a SWM Pond to provide water quantity control (to pre-development levels) for the 2, 5, 10, 25, 50, 100 year design rainfall events is recommended. The target release rates for the noted

design rainfall events are identified in Table 2-5, 'Pre-development Peak Flows at Location C'. Further, the SWM Pond has been designed to safely pass the runoff generated from the Regional Storm design event.

The proposed SWM Pond configuration is based on the available topographic information:

- The SWM Pond is designed to provide water quantity control only.
- A total depth of 1.3m comprised of active storage (1.0m) and freeboard (0.3m).
- Continuous side slopes of 3:1 (H:V) resulting in an overall top of pond surface area of about 900m<sup>2</sup>.
- The total storage volume is approximately 730 m<sup>3</sup> (at 1.3m depth).
- The outlet structure is designed as a detention control device consisting of one 650 mm diameter culvert with an inlet elevation of approximately 245 m. It is also recommended that a shut-off mechanism be incorporated into the design of the SWM Pond outlet chamber to provide the opportunity to close off discharge from the Site in the event of an emergency during which material other than stormwater enters the stormwater system. The discharge from the pond will be drained into the main diversion ditch which outlets at Point H as identified in Figure 2-2.
- A 2 m long overflow broad-crested weir with a crest elevation set at 245.7m (approximately) will be a component of the outlet configuration. This weir will assist in limiting the maximum depth of the SWM Pond. It will also serve the secondary purpose as emergency overflow bypass.
- The maximum SWM Pond water level for the Regional Storm is less than the maximum pond elevation (246m).

A comparison of pre-development to post-development (with the SWMP in place) stormwater runoff peak flows is provided in Table 2-6. As noted in Section 2.2, application of the 6 hour design rainfall event resulted in maximum peak flows while the 12 hour duration design rainfall event resulted in maximum runoff volume. The results of the post-development (with SWM in place) stormwater runoff modelling for both of these duration design events is provided in Table 2-6. As documented in Table 2-6, the maximum depth of the SWM Pond is not exceeded for any of the modeled design rainfall events. Further, all computed post-development (with the SWMP in place) stormwater runoff peak flows are less than the corresponding pre-development peak flows for the 2 year through 100 year return periods as required by the surface water quantity objective of the SWMP. A summary of computed peak flows at various locations within the Site are provided in Table 2-7.



Appendix D provides details for the stage-storage-discharge calculations. Elevations used in this report are based on the current topographic information only. Final grading details will be developed through the detailed design process and may provide the opportunity for further optimization of the SWM Pond configuration. The final SWM Pond elevations will need to be integrated into the final Site grading plan.

Stormwater quality control will be affected through the implementation of an OGS. The Stormceptor model STC 750 is an example of an OGS that would provide the necessary stormwater quality control. Based on calculations using Stormceptor Sizing program, the STC 750 model can provide 79% of Total Suspended Solids (TSS) Removal with capturing 89% of runoff volume. As a result, the average efficiency would be 70%, which is higher than the required normal level of protection. The detailed calculation report generated by the Stormceptor Sizing program is provided in Appendix C. Please note alternate OGS's (from other manufacturers) with similar quality control capabilities are available.

**Table 2-6: Pre- To Post-Development (with SWM) Site Peak Flow Comparison**

Design Rainfall Event	Pre-development Peak Flows at Location D (m <sup>3</sup> /s)	Post Development Peak Flows at Location D with SWM (m <sup>3</sup> /s)	Change from Pre-Development		Maximum Ponding Depth (m)
			Absolute (m <sup>3</sup> /s)	%	
<b>6 Hour Duration</b>					
2 Year	0.06	0.04	-0.02	-33%	245.20
5 Year	0.20	0.17	-0.03	-15%	245.35
10 Year	0.32	0.30	-0.02	-6%	245.45
25 Year	0.49	0.42	-0.07	-14%	245.55
50 Year	0.62	0.52	-0.10	-16%	245.65
100 Year	0.76	0.67	-0.09	-12%	245.80
<b>12 Hour Duration</b>					
2 Year	0.07	0.04	-0.03	-43%	245.15
5 Year	0.20	0.16	-0.04	-20%	245.35
10 Year	0.30	0.26	-0.04	-13%	245.45
25 Year	0.44	0.40	-0.04	-9%	245.50
50 Year	0.55	0.47	-0.08	-15%	245.60
100 Year	0.67	0.56	-0.11	-16%	245.70
Regional	0.44	0.44	0	0%	245.60



**Table 2-7: Development Site Peak Flow Summary**

6 Hour Design Rainfall Event	Post Development Peak Flows (m <sup>3</sup> /s) by Location and Computational Node <sup>1</sup>							
	A	B	C	D	E	F	G	H
2 Year	0.08	0.02	0.10	0.04	0.03	0.03	0.07	0.09
5 Year	0.22	0.05	0.25	0.17	0.08	0.11	0.23	0.30
10 Year	0.34	0.07	0.39	0.30	0.12	0.18	0.37	0.48
25 Year	0.49	0.19	0.58	0.42	0.19	0.28	0.57	0.75
50 Year	0.61	0.12	0.73	0.51	0.24	0.36	0.72	0.96
100 Year	0.75	0.14	0.89	0.67	0.30	0.44	0.89	1.10
Regional	0.39	0.06	0.46	0.44	0.29	0.27	0.76	0.96

NOTES:

- Locations descriptions:
 

A ditch flow along west drainage ditch	E outflow from north and west diversion ditch
B ditch flow along south drainage ditch	F outflow from east diversion ditch
C inflow to SWM Pond	G outflow from south diversion ditch
D outflow from SWM Pond	H outflow from the site
- Computational nodes relate to the detailed hydrologic modelling output provided in Appendix A.

## 2.4 Drainage Ditches

An estimation of ditch sizing, for planning purposes, was completed using the Manning's Equation, which is expressed as follows:

$$Q = \frac{AR^{2/3}S^{1/2}}{n}$$

where:

- “Q” is the peak flow rate in m<sup>3</sup>/s;
- “A” is the cross sectional area of the ditch in m<sup>2</sup>;
- “R” is the hydraulic radius (in metres), which is calculated as the product of channel cross sectional area divided by wetted perimeter;
- “S” is the channel slope as m/m;

The following assumptions have been made in considering the ditch sizing:

- The ditch slope was assumed to be 0.5%.
- Proposed ditches should be sized to convey the Regional storm or 100 year storm (whichever is computed to be larger)
- Proposed ditches are assumed to be earth-lined channels with some grass, weeds and gravels at the bottom. As such a Manning's roughness coefficient of 0.035 has been assumed.

### 2.4.1 North, West, South, and East Diversion Ditches

As noted previously, these ditches will convey “clean” stormwater runoff from undeveloped areas of the property, upstream of the development envelope, around the Substation operational areas.

Flow conveyed via the north diversion ditch will discharge to the west diversion ditch at the west perimeter of the development envelope. The west diversion ditch will convey the flow to the main diversion ditch located at the south west of the site and discharge to the location approximated as point H on figure 2-2. Flow conveyed via the east diversion ditch will be joined to the south diversion ditch and will discharge to the main diversion ditches as flows toward point H .

Table 2-8 provides a summary of the preliminary diversion ditches dimensions.

**Table 2-8: Diversion Ditch Dimensions Summary**

Ditch	Computational Node	Design Flow (m <sup>3</sup> /sec)	Preliminary Ditch Dimensions		
			Bottom Width (m)	Side Slope (H:V)	Minimum Depth (m)
North	E	0.3	0.5	3	0.4
West	E	0.3	0.5	3	0.4
South	F	0.45	0.5	3	0.4
East	F	0.45	0.5	3	0.4
Main <sup>2</sup> Part 1	G	1.57 <sup>1</sup>	1	3	0.6
Main Part 2	H	1.87 <sup>1</sup>	1	3	0.7

Note:

1: Design flows include the discharge from the outlet of the SWM pond

2: Part 1 is from point D to G and part 2 is from point G to H on the main diversion ditch

#### 2.4.2 South and West Drainage Ditches

As noted previously, these ditches will convey stormwater runoff from developed areas of the property to the SWM Pond. Table 2-9 summarizes the preliminary ditch dimensions of the west and south drainage ditches.

**Table 2-9: Drainage Ditch Dimensions Summary**

Ditch	Computational Node	Design Flow (m <sup>3</sup> /sec)	Preliminary Ditch Dimensions		
			Bottom Width (m)	Side Slope (H:V)	Minimum Depth (m)
West	A	0.75	1	3	0.5
South	B	0.15	0.5	3	0.5

#### 2.5 Transformer Containment

A “double containment system” will be implemented for transformers at the Site. In addition to the “first stage” of containment, namely the transformer enclosures (conservator, tank, etc.), a “second stage” of containment in the form of a transformer pit system is recommended.

The containment pit around the transformer should be sized to hold a volume of water in the amount of the transformer oil held in the unit plus an accommodation for 250 mm of rainfall in 24 hours. By comparison, the 1 in 100 year rainfall (i.e., expected once every 100 years) for this location totals 109.5 mm (Atmospheric Environment Services’ IDF90 publication for the Goderich Airport, Ontario weather station gauge #6122847). A one day rainfall total of 250 mm is greater than the total rain expected during a Regulatory Storm (212 mm) which is a design

rainfall event used for regulation of flood plains in Ontario and based on rainfall observed during Hurricane Hazel.

Drainage from the transformer pit would be removed by either manually operating a sump pump to discharge the liquid to the SWM Pond via the catch basin collection system if there is no oil/grease in the liquid or automatically operating the pump to discharge to the SWM Pond. In either case, an oil/grease sensor would be mounted on the pump to detect any oil/grease in the liquid. If there is oil/grease detected, the liquid would be removed from Site via a licensed waste hauler and the source of the leakage would be identified.

### **3.0 MAINTENANCE AND MONITORING PROGRAM**

The SWMP works will be owned, maintained and monitored by the Proponent.

#### **3.1 Maintenance**

Maintenance is important for any stormwater management infrastructure in order to ensure its continued operation and efficiency. The maintenance requirements for the stormwater management infrastructure within this development will be based on information provided in MOE (2003), and the guidelines provided by the MVCA. OGS maintenance should be compliant with information obtained from the manufacturer. The following minimal maintenance items are recommended:

- Inspect the integrity of the side slopes and vegetation viability of the SWM Pond and the drainage ditches for erosion, on a quarterly basis during the first two years of operation and as a minimum annually thereafter. Inspection should be completed after all significant rainfall events (e.g., 13 mm or greater) and repairs completed as required.
- Inspect the integrity of culverts on a quarterly basis during the first two years of operation and as a minimum annually thereafter. Repair as required.
- Suggested OGS maintenance recommendations include:
- Compliance with maintenance information/procedures/schedules obtained from the manufacturer.
- OGS units should be inspected post construction, prior to being put into service.
- Inspect OGS units every six months for the first year to determine the oil and sediment accumulation rate.
- In subsequent years, inspections can be based on first-year observations or local requirements.
- Cleaning is required once the sediment depth reaches 15% of storage capacity, (generally taking one year or longer). Local regulations for maintenance frequency may vary.
- Inspect the unit immediately after an oil, fuel or chemical spill.
- A licensed waste management company should remove oil and sediment and dispose responsibly.
- Annual inspections should be conducted during the spring.

#### **3.2 Monitoring**

Monitoring will consist of the visual inspections of the stormwater management infrastructure. The monitoring program will also include regular inspections of the erosion and sediment control features described in the following section.

#### **4.0 EROSION AND SEDIMENT CONTROL PROGRAM**

Erosion and sedimentation are naturally occurring processes that involve particle detachment, sediment transport and deposition of soil particles. Construction activities commonly alter the landscapes where they are located, exacerbating these natural processes.

The transport of sediment overland and deposition into surrounding natural areas, including watercourses (fish habitat), woodlots and wetlands as well as adjacent private lands, needs to be prevented. In this report, the erosion and sediment control measures are focused on the SWM Pond and ditches. The erosion and sediment control plan for the entire Site will be compliant with the following guidelines;

- Erosion and Sediment Control practices study technical report, MOE, 1995
- Guidelines for Evaluating Construction Activities Impacting on Water Resources, MOE, 1995.
- Stormwater Management Planning and Design Manual, MOE, 2003
- Conservation Authority Guidelines on Erosion and Sediment Control for Urban Construction Sites, 2006.

To minimize the potential operation and environmental impacts, the following erosion and sedimentation control practices should be considered in the construction of the SWM Pond and ditches:

- The SWM Pond should be excavated in the first stages of pre-grading, and should function as a temporary sediment control pond until grading and servicing are completed;
- The SWM Pond embankments not scheduled for construction within 30 days should be stabilized and seeded immediately;
- Storm drain outfalls at the location of the SWM Pond and ditches are required to have erosion protection. Riprap stone must be underlain with a geotextile. The minimum diameter of riprap stone should be 300 mm.
- Rock check dams consisting of granular material should be placed across the ditches to reduce the velocity of runoff to reduce the potential for ditch erosion.

## 5.0 CONCLUSIONS

This Report demonstrates that the K2 Wind Ontario project Substation development satisfies the requirements for stormwater management established by MOE (2003) and the MVCA. It has been demonstrated that the required targets will be met as follows:

- A stormwater management pond is to be provided and will function as a water quantity control facility, ensuring that peak flows do not exceed existing conditions for peak flows up to and including the 100 year design rainfall event; as well as the safe passage of runoff from the Regional Storm.
- An Oil/Grit Separator has been sized to meet or exceed the required water quality control Normal protection level for stormwater runoff generated within the development area. A particle size distribution specific to the Site should be determined for final OGS size determination.
- Stormwater runoff from the developed portion of the Site will be conveyed via drainage ditches to the stormwater management pond.
- A double containment system is recommended to control potential oil leakage from transformers.
- A preliminary maintenance and monitoring program has been provided.
- A preliminary erosion and sedimentation control program has been provided that is compliant with the relevant guidelines.

## 6.0 REFERENCES

- AMEC, 2006 *Geotechnical Investigation Kingsbridge Wind Farm Phase II Proposed Wind Power Plant, 84595 Tower Line Road, Kingsbridge, Ontario*, prepared by AMEC, June 2006.
- AMEC, 2011 *K2 Wind Power Project, Township of Ashfield-Colborne-Wawanosh, Huron County, Ontario, Preliminary Engineering Report, Stormwater Management Plan for the Project Substation*, K2 Wind Ontario Limited Partnership, prepared by AMEC Earth & Environmental Limited, October 2011.
- MOE, 2003 *Stormwater Management Planning and Design Manual*, Ministry of the Environment, 2003.
- MVCA, 2011 *Maitland Valley Source Protection Plan, Assessment Report – Amended May 2011*, Maitland Valley Conservation Authority, May 2011.
- MVCA, 2011b *Maitland Valley Conservation Authority Watershed Report Card – Shoreline Sub-Basin*, accessed via <http://www.mvca.on.ca/uploads/docs/Shoreline%20Watershed%20Report%20Card.pdf> on September 16, 2011.
- NEA, 2007 *Geotechnical Investigation Kingsbridge Wind Project – Phase 2*, Naylor Engineering Associates, March 2007.
- OMNR, 1988 *Flood Plain Management in Ontario Technical Guidelines*, Ontario Ministry of Natural Resources, 1988.
- OMNR, 2004 *Lakes and Rivers Improvement Act, Technical Guidelines – Criteria & Standards for Approval*, Ontario Ministry of Natural Resources, June 2004 (DRAFT)

**APPENDIX A**  
**CORRESPONDENCE**

## Chen, Kevin X (Mississauga)

---

**From:** Stephen Jackson [sjackson@mvca.on.ca]  
**Sent:** Friday, October 01, 2010 3:40 PM  
**To:** Chen, Kevin X (Mississauga)  
**Subject:** RE: stormwater requirements

Kevin,

Based on the map and location that you provided, the only MVCA regulated area on the property is adjacent to the watercourse (15 m from the top of bank). As long as the work stays 15 m from the water course, no MVCA permit is required. We don't have any flood plain mapping for this property. If the types of works are sensitive to flooding, we recommend that you conduct a flood study to determine the flood elevation.

Since the site doesn't directly outlet to the Maitland River or its main tributaries, MVCA currently doesn't normally review storm water management plans for this type of project. In general, we would normally recommend the normal level of protection for this area, with water quality control pre-post up to the 100 year flood line.

Steve Jackson  
Water Resources Engineer  
Maitland Valley Conservation Authority

---

**From:** Chen, Kevin X (Mississauga) [mailto:kevin.x.chen@amec.com]  
**Sent:** September 30, 2010 11:56 AM  
**To:** sjackson@mvca.on.ca  
**Subject:** stormwater requirements

Hi, Steve,

It's nice to talk to you on the phone. As we discussed on the phone, we are developing a Wind Power Project at Kingsbridge. The Substation location is at eastside of Glenn's Hill Road and northside of the Tower Line, see attached the map.

In terms of Stormwater Management, Would you please confirm for me which requirements we should follow?

1. Water Quality Control: Normal protection level or Enhanced protection level
2. Water Quantity Control: pre-post up to 100 year storm event or something else?
3. Is the site within the regulation limits or floodline?, and
4. Any other special requirements from conservation authority?

Thank you very much for your time,

Regards,

**Kevin Chen, M.Eng., P.Eng**  
Water Resources Engineer  
AMEC Earth and Environmental  
160 Traders Blvd East, Suite 110  
Mississauga, Ontario  
Canada L4Z 3K7

Tel: (905) 568-2929 ext: 4309  
Cell: (416) 908-5189  
Email: [kevin.chen2@amec.com](mailto:kevin.chen2@amec.com)

**APPENDIX B**

**HYDROLOGY MODELING OUTPUT**

pre development reg revised.out

```

=====
=====
V   V   I   SSSSS U   U   A   L
V   V   I   SS   U   U   A A  L
V   V   I   SS   U   U   AAAAA L
V   V   I   SS   U   U   A   A  L
  W   I   SSSSS UUUUU A   A  LLLLL

000   TTTTT TTTTT H   H   Y   Y   M   M   000   TM
0   0   T   T   H   H   Y   Y   MM  MM  0   0
0   0   T   T   H   H   Y   M   M   0   0

000   T   T   H   H   Y   M   M   000

```

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

Input filename: C:\Program Files\Visual OTTHYM0 2.2.4\vojn.dat  
 Output filename: C:\K2WIND~1\pre development reg revised.out  
 Summary filename: C:\K2WIND~1\pre development reg revised.sum

DATE: 6/14/2012

TIME: 6:24:34 PM

USER:

COMMENTS: \_\_\_\_\_

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*****
** SIMULATION NUMBER: 1 **
*****

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```

-----
| MASS STORM |
| Ptotal=108.80 mm |
-----

```

Filename: P:\W&W\Software\V02\GFE\Scs6h.mst  
 Comments: Type II 6-hr Tabular

Duration of storm = 6.00 hrs  
 Mass curve time step = 6.00 min

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.10	4.90	1.60	7.83	3.10	146.44	4.60	7.40
.20	5.00	1.70	8.27	3.20	29.27	4.70	7.07
.30	4.90	1.80	8.92	3.30	25.57	4.80	6.85
.40	4.90	1.90	9.57	3.40	22.09	4.90	6.42
.50	4.90	2.00	10.12	3.50	18.82	5.00	6.20
.60	5.00	2.10	10.88	3.60	15.12	5.10	5.77
.70	5.00	2.20	11.75	3.70	12.95	5.20	5.77

	pre development reg				revised. out			
.80	5.22	2.30	13.27	3.80	12.29	5.30	5.55	
.90	5.55	2.40	14.80	3.90	11.32	5.40	5.33	
1.00	5.88	2.50	16.32	4.00	10.55	5.50	5.22	
1.10	5.98	2.60	17.73	4.10	9.79	5.60	5.22	
1.20	6.31	2.70	36.56	4.20	9.25	5.70	5.11	
1.30	6.85	2.80	73.33	4.30	8.60	5.80	5.11	
1.40	7.07	2.90	117.61	4.40	8.38	5.90	4.90	
1.50	7.40	3.00	211.07	4.50	7.94	6.00	4.79	

---

DESIGN SCS(0001) ID= 1 DT= 6.0 min	Area (ha)= 2.30 Ia (mm)= 0.2 S U. H. Tp(hrs)= .27	Curve Number (CN) = 88.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 6.927  
Unit Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .678 (i)  
TIME TO PEAK (hrs)= 3.200  
RUNOFF VOLUME (mm)= 76.115  
TOTAL RAINFALL (mm)= 108.800  
RUNOFF COEFFICIENT = .700

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

---

DESIGN SCS(0002) ID= 1 DT= 6.0 min	Area (ha)= 2.70 Ia (mm)= 0.2 S U. H. Tp(hrs)= .59	Curve Number (CN) = 88.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 6.927  
Unit Hyd Qpeak (cms)= .252

PEAK FLOW (cms)= .469 (i)  
TIME TO PEAK (hrs)= 3.500  
RUNOFF VOLUME (mm)= 76.025  
TOTAL RAINFALL (mm)= 108.800  
RUNOFF COEFFICIENT = .699

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

---

DESIGN SCS(0003) ID= 1 DT= 6.0 min	Area (ha)= 1.70 Ia (mm)= 0.2 S U. H. Tp(hrs)= .33	Curve Number (CN) = 88.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 6.927  
Unit Hyd Qpeak (cms)= .284

PEAK FLOW (cms)= .435 (i)  
TIME TO PEAK (hrs)= 3.300  
RUNOFF VOLUME (mm)= 76.055  
TOTAL RAINFALL (mm)= 108.800  
RUNOFF COEFFICIENT = .699

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

---

DESIGN SCS(0004)	Area (ha)= 1.60	Curve Number (CN) = 88.0
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pre development reg revised.out

| ID= 1 DT= 6.0 min | Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 U. H. Tp(hrs)= .19

Ia as 0.2xS (mm)= 6.927  
 Unit Hyd Qpeak (cms)= .464

PEAK FLOW (cms)= .553 (i)  
 TIME TO PEAK (hrs)= 3.100  
 RUNOFF VOLUME (mm)= 76.532  
 TOTAL RAINFALL (mm)= 108.800  
 RUNOFF COEFFICIENT = .703

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

| DESIGN SCS(0005) | Area (ha)= 3.68 Curve Number (CN) = 88.0  
 | ID= 1 DT= 6.0 min | Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 U. H. Tp(hrs)= .24

Ia as 0.2xS (mm)= 6.927  
 Unit Hyd Qpeak (cms)= .845

PEAK FLOW (cms)= 1.145 (i)  
 TIME TO PEAK (hrs)= 3.200  
 RUNOFF VOLUME (mm)= 76.191  
 TOTAL RAINFALL (mm)= 108.800  
 RUNOFF COEFFICIENT = .700

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

ADD HYD (0015) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0001):	2.30	.678	3.20	76.12
+ ID2= 2 (0002):	2.70	.469	3.50	76.03
=====				
ID = 3 (0015):	5.00	.950	3.30	76.07

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0017) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0015):	5.00	.950	3.30	76.07
+ ID2= 2 (0003):	1.70	.435	3.30	76.06
=====				
ID = 3 (0017):	6.70	1.386	3.30	76.06

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0018) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)

	pre	development	reg	revised	out
ID1= 1 (0017):	6.70	1.386	3.30	76.06	
+ ID2= 2 (0004):	1.60	.553	3.10	76.53	
=====					
ID = 3 (0018):	8.30	1.856	3.20	76.15	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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 FINISH  
 =====  
 =====

pre development 12 hr revised.out

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=====
=====
V   V   I   SSSSS U   U   A   L
V   V   I   SS   U   U   A A  L
V   V   I   SS   U   U   AAAAA L
V   V   I   SS   U   U   A   A  L
  W   I   SSSSS UUUUU A   A  LLLLL

000  TTTTT TTTTT H   H   Y   Y   M   M   000   TM
0   0   T   T   H   H   Y   Y   MM  MM  0   0
0   0   T   T   H   H   Y   M   M   0   0

000  T   T   H   H   Y   M   M   000

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

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 Output filename: C:\K2WIND~1\pre development 12 hr revised.out  
 Summary filename: C:\K2WIND~1\pre development 12 hr revised.sum

DATE: 6/14/2012

TIME: 6:24:11 PM

USER:

COMMENTS: \_\_\_\_\_

```

*****
** SIMULATION NUMBER: 1 **
*****

```

```

-----
| MASS STORM |
| Ptotal = 43.80 mm |
-----

```

Filename: P:\W&W\Software\V02\GFE\Scs12h.mst  
 Comments: Type II 12-hr MASS CURVE

Duration of storm = 12.00 hrs  
 Mass curve time step = 6.00 min

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.10	.92	3.10	1.66	6.10	9.90	9.10	1.58
.20	.96	3.20	1.66	6.20	8.67	9.20	1.53
.30	.96	3.30	1.66	6.30	7.49	9.30	1.45
.40	1.01	3.40	1.66	6.40	6.35	9.40	1.40
.50	.92	3.50	1.66	6.50	5.08	9.50	1.40
.60	1.05	3.60	1.71	6.60	4.38	9.60	1.36
.70	1.01	3.70	1.80	6.70	4.16	9.70	1.36

	pre development		12 hr		revised		out	
.80	.96	3.80	1.84	6.80	3.85	9.80	1.31	
.90	1.05	3.90	2.01	6.90	3.55	9.90	1.23	
1.00	1.05	4.00	2.01	7.00	3.33	10.00	1.18	
1.10	1.05	4.10	2.15	7.10	3.15	10.10	1.23	
1.20	1.01	4.20	2.28	7.20	2.89	10.20	1.14	
1.30	1.09	4.30	2.41	7.30	2.80	10.30	1.18	
1.40	1.09	4.40	2.50	7.40	2.72	10.40	1.18	
1.50	1.10	4.50	2.63	7.50	2.50	10.50	1.14	
1.60	1.10	4.60	2.85	7.60	2.41	10.60	1.14	
1.70	1.09	4.70	3.02	7.70	2.28	10.70	1.09	
1.80	1.10	4.80	3.20	7.80	2.19	10.80	1.09	
1.90	1.14	4.90	3.46	7.90	2.10	10.90	1.09	
2.00	1.18	5.00	3.64	8.00	1.97	11.00	1.09	
2.10	1.14	5.10	4.03	8.10	1.93	11.10	1.01	
2.20	1.23	5.20	4.47	8.20	1.88	11.20	1.05	
2.30	1.27	5.30	4.99	8.30	1.80	11.30	1.05	
2.40	1.36	5.40	5.52	8.40	1.80	11.40	1.01	
2.50	1.36	5.50	6.00	8.50	1.75	11.50	1.01	
2.60	1.45	5.60	12.40	8.60	1.75	11.60	1.01	
2.70	1.49	5.70	24.79	8.70	1.71	11.70	1.01	
2.80	1.53	5.80	39.77	8.80	1.66	11.80	.92	
2.90	1.58	5.90	71.39	8.90	1.62	11.90	1.01	
3.00	1.66	6.00	49.54	9.00	1.53	12.00	.92	

-----

DESIGN SCS(0001)	Area (ha)= 2.30	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .27	

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .039 (i)  
TIME TO PEAK (hrs)= 6.200  
RUNOFF VOLUME (mm)= 7.145  
TOTAL RAINFALL (mm)= 43.800  
RUNOFF COEFFICIENT = .163

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

-----

DESIGN SCS(0002)	Area (ha)= 2.70	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .59	

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .252

PEAK FLOW (cms)= .027 (i)  
TIME TO PEAK (hrs)= 6.600  
RUNOFF VOLUME (mm)= 7.136  
TOTAL RAINFALL (mm)= 43.800  
RUNOFF COEFFICIENT = .163

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

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DESIGN SCS(0003)	Area (ha)= 1.70	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .33	

pre development 12 hr revised.out

I a as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .284  
 PEAK FLOW (cms)= .026 (i)  
 TIME TO PEAK (hrs)= 6.200  
 RUNOFF VOLUME (mm)= 7.139  
 TOTAL RAINFALL (mm)= 43.800  
 RUNOFF COEFFICIENT = .163

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

DESIGN SCS(0004) ID= 1 DT= 6.0 min	Area (ha)= 1.60 I a (mm)= 0.2 S U. H. Tp(hrs)= .19	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
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I a as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .464  
 PEAK FLOW (cms)= .035 (i)  
 TIME TO PEAK (hrs)= 6.100  
 RUNOFF VOLUME (mm)= 7.184  
 TOTAL RAINFALL (mm)= 43.800  
 RUNOFF COEFFICIENT = .164

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

ADD HYD (0015) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0001):	2.30	.039	6.20	7.14
+ ID2= 2 (0002):	2.70	.027	6.60	7.14
ID = 3 (0015):	5.00	.053	6.20	7.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0017) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0015):	5.00	.053	6.20	7.14
+ ID2= 2 (0003):	1.70	.026	6.20	7.14
ID = 3 (0017):	6.70	.079	6.20	7.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0018) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0017):	6.70	.079	6.20	7.14
+ ID2= 2 (0004):	1.60	.035	6.10	7.18

pre development 12 hr revised.out

=====

ID = 3 (0018):        8.30     .104        6.20        7.15

=====

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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\*\* SIMULATION NUMBER:    2 \*\*

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MASS STORM  
Ptotal = 61.90 mm

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Filename: P:\W&W\Software\V02\GFE\Scs12h.mst  
Comments: Type II 12-hr MASS CURVE

Duration of storm        = 12.00 hrs  
Mass curve time step    = 6.00 min

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.10	1.30	3.10	2.35	6.10	13.99	9.10	2.23
.20	1.36	3.20	2.35	6.20	12.26	9.20	2.17
.30	1.36	3.30	2.35	6.30	10.58	9.30	2.04
.40	1.42	3.40	2.35	6.40	8.98	9.40	1.98
.50	1.30	3.50	2.35	6.50	7.18	9.50	1.98
.60	1.49	3.60	2.41	6.60	6.19	9.60	1.92
.70	1.42	3.70	2.54	6.70	5.88	9.70	1.92
.80	1.36	3.80	2.60	6.80	5.45	9.80	1.86
.90	1.49	3.90	2.85	6.90	5.01	9.90	1.73
1.00	1.49	4.00	2.85	7.00	4.70	10.00	1.67
1.10	1.49	4.10	3.03	7.10	4.46	10.10	1.73
1.20	1.42	4.20	3.22	7.20	4.09	10.20	1.61
1.30	1.55	4.30	3.40	7.30	3.96	10.30	1.67
1.40	1.55	4.40	3.53	7.40	3.84	10.40	1.67
1.50	1.55	4.50	3.71	7.50	3.53	10.50	1.61
1.60	1.55	4.60	4.02	7.60	3.40	10.60	1.61
1.70	1.55	4.70	4.27	7.70	3.22	10.70	1.55
1.80	1.55	4.80	4.52	7.80	3.09	10.80	1.55
1.90	1.61	4.90	4.89	7.90	2.97	10.90	1.55
2.00	1.67	5.00	5.14	8.00	2.79	11.00	1.55
2.10	1.61	5.10	5.69	8.10	2.72	11.10	1.42
2.20	1.73	5.20	6.31	8.20	2.66	11.20	1.49
2.30	1.80	5.30	7.06	8.30	2.54	11.30	1.49
2.40	1.92	5.40	7.80	8.40	2.54	11.40	1.42
2.50	1.92	5.50	8.48	8.50	2.48	11.50	1.42
2.60	2.04	5.60	17.52	8.60	2.48	11.60	1.42
2.70	2.10	5.70	35.04	8.70	2.41	11.70	1.42
2.80	2.17	5.80	56.21	8.80	2.35	11.80	1.30
2.90	2.23	5.90	100.90	8.90	2.29	11.90	1.42
3.00	2.35	6.00	70.01	9.00	2.17	12.00	1.30

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DESIGN SCS(0001)  
ID= 1 DT= 6.0 min

-----

Area (ha)= 2.30        Curve Number (CN) = 76.0  
Ia (mm)= 0.2 S        # of Li near Res. (N)= 5.00  
U. H. Tp(hrs)= .27

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .111 (i)  
TIME TO PEAK (hrs)= 6.100  
RUNOFF VOLUME (mm)= 16.701  
TOTAL RAINFALL (mm)= 61.900

pre development 12 hr revised.out  
 RUNOFF COEFFICIENT = .270

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

DESIGN SCS(0002) ID= 1 DT= 6.0 min	Area (ha)= 2.70 Ia (mm)= 0.2 S U. H. Tp(hrs)= .59	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
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Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .252

PEAK FLOW (cms)= .076 (i)  
 TIME TO PEAK (hrs)= 6.500  
 RUNOFF VOLUME (mm)= 16.681  
 TOTAL RAINFALL (mm)= 61.900  
 RUNOFF COEFFICIENT = .269

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

DESIGN SCS(0003) ID= 1 DT= 6.0 min	Area (ha)= 1.70 Ia (mm)= 0.2 S U. H. Tp(hrs)= .33	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .284

PEAK FLOW (cms)= .073 (i)  
 TIME TO PEAK (hrs)= 6.200  
 RUNOFF VOLUME (mm)= 16.688  
 TOTAL RAINFALL (mm)= 61.900  
 RUNOFF COEFFICIENT = .270

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

DESIGN SCS(0004) ID= 1 DT= 6.0 min	Area (ha)= 1.60 Ia (mm)= 0.2 S U. H. Tp(hrs)= .19	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
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Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .464

PEAK FLOW (cms)= .093 (i)  
 TIME TO PEAK (hrs)= 6.100  
 RUNOFF VOLUME (mm)= 16.792  
 TOTAL RAINFALL (mm)= 61.900  
 RUNOFF COEFFICIENT = .271

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

ADD HYD (0015) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0001):	2.30	.111	6.10	16.70
+ ID2= 2 (0002):	2.70	.076	6.50	16.68

pre development 12 hr revised.out

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ID = 3 (0015):	5.00	.154	6.20	16.69
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NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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ADD HYD (0017)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0015):	5.00	.154	6.20	16.69
+ ID2= 2 (0003):	1.70	.073	6.20	16.69
	=====	=====	=====	=====
ID = 3 (0017):	6.70	.227	6.20	16.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----

ADD HYD (0018)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0017):	6.70	.227	6.20	16.69
+ ID2= 2 (0004):	1.60	.093	6.10	16.79
	=====	=====	=====	=====
ID = 3 (0018):	8.30	.295	6.10	16.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

\*\*\*\*\*  
 \*\* SIMULATION NUMBER: 3 \*\*  
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MASS STORM
Ptotal = 73.90 mm

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Filename: P:\W&W\Software\V02\GFE\Scs12h.mst  
 Comments: Type II 12-hr MASS CURVE

Duration of storm = 12.00 hrs  
 Mass curve time step = 6.00 min

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.10	1.55	3.10	2.81	6.10	16.70	9.10	2.66
.20	1.63	3.20	2.81	6.20	14.63	9.20	2.59
.30	1.63	3.30	2.81	6.30	12.64	9.30	2.44
.40	1.70	3.40	2.81	6.40	10.72	9.40	2.36
.50	1.55	3.50	2.81	6.50	8.57	9.50	2.36
.60	1.77	3.60	2.88	6.60	7.39	9.60	2.29
.70	1.70	3.70	3.03	6.70	7.02	9.70	2.29
.80	1.63	3.80	3.10	6.80	6.50	9.80	2.22
.90	1.77	3.90	3.40	6.90	5.99	9.90	2.07
1.00	1.77	4.00	3.40	7.00	5.62	10.00	2.00
1.10	1.77	4.10	3.62	7.10	5.32	10.10	2.07
1.20	1.70	4.20	3.84	7.20	4.88	10.20	1.92
1.30	1.85	4.30	4.06	7.30	4.73	10.30	2.00
1.40	1.85	4.40	4.21	7.40	4.58	10.40	2.00
1.50	1.85	4.50	4.43	7.50	4.21	10.50	1.92
1.60	1.85	4.60	4.80	7.60	4.06	10.60	1.92
1.70	1.85	4.70	5.10	7.70	3.84	10.70	1.85
1.80	1.85	4.80	5.39	7.80	3.69	10.80	1.85

	pre development 12 hr				revised out			
1.90	1.92	4.90	5.84	7.90	3.55	10.90	1.85	
2.00	2.00	5.00	6.13	8.00	3.33	11.00	1.85	
2.10	1.92	5.10	6.80	8.10	3.25	11.10	1.70	
2.20	2.07	5.20	7.54	8.20	3.18	11.20	1.77	
2.30	2.14	5.30	8.42	8.30	3.03	11.30	1.77	
2.40	2.29	5.40	9.31	8.40	3.03	11.40	1.70	
2.50	2.29	5.50	10.12	8.50	2.96	11.50	1.70	
2.60	2.44	5.60	20.91	8.60	2.96	11.60	1.70	
2.70	2.51	5.70	41.83	8.70	2.88	11.70	1.70	
2.80	2.59	5.80	67.10	8.80	2.81	11.80	1.55	
2.90	2.66	5.90	120.46	8.90	2.73	11.90	1.70	
3.00	2.81	6.00	83.58	9.00	2.59	12.00	1.55	

-----

DESIGN SCS(0001) ID= 1 DT= 6.0 min	Area (ha)= 2.30	Curve Number (CN) = 76.0
	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .27	

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .171 (i)  
TIME TO PEAK (hrs)= 6.100  
RUNOFF VOLUME (mm)= 24.274  
TOTAL RAINFALL (mm)= 73.900  
RUNOFF COEFFICIENT = .328

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

-----

DESIGN SCS(0002) ID= 1 DT= 6.0 min	Area (ha)= 2.70	Curve Number (CN) = 76.0
	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .59	

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .252

PEAK FLOW (cms)= .117 (i)  
TIME TO PEAK (hrs)= 6.500  
RUNOFF VOLUME (mm)= 24.246  
TOTAL RAINFALL (mm)= 73.900  
RUNOFF COEFFICIENT = .328

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

-----

DESIGN SCS(0003) ID= 1 DT= 6.0 min	Area (ha)= 1.70	Curve Number (CN) = 76.0
	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .33	

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .284

PEAK FLOW (cms)= .112 (i)  
TIME TO PEAK (hrs)= 6.200  
RUNOFF VOLUME (mm)= 24.255  
TOTAL RAINFALL (mm)= 73.900  
RUNOFF COEFFICIENT = .328

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

DESIGN SCS(0004)	Area (ha)= 1.60	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .19	

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .464

PEAK FLOW (cms)= .138 (i)  
 TIME TO PEAK (hrs)= 6.100  
 RUNOFF VOLUME (mm)= 24.407  
 TOTAL RAINFALL (mm)= 73.900  
 RUNOFF COEFFICIENT = .330

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

ADD HYD (0015)	AREA	OPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0001):	2.30	.171	6.10	24.27
+ ID2= 2 (0002):	2.70	.117	6.50	24.25
=====				
ID = 3 (0015):	5.00	.237	6.20	24.26

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0017)	AREA	OPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0015):	5.00	.237	6.20	24.26
+ ID2= 2 (0003):	1.70	.112	6.20	24.26
=====				
ID = 3 (0017):	6.70	.349	6.20	24.26

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0018)	AREA	OPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0017):	6.70	.349	6.20	24.26
+ ID2= 2 (0004):	1.60	.138	6.10	24.41
=====				
ID = 3 (0018):	8.30	.457	6.10	24.29

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

\*\*\*\*\*  
 \*\* SIMULATION NUMBER: 4 \*\*  
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MASS STORM  
Ptotal = 89.10 mm

pre development 12 hr revised.out  
Filename: P:\W&W\Software\V02\GFE\Scs12h.mst  
Comments: Type II 12-hr MASS CURVE

Duration of storm = 12.00 hrs  
Mass curve time step = 6.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.10	1.87	3.10	3.39	6.10	20.14	9.10	3.21
.20	1.96	3.20	3.39	6.20	17.64	9.20	3.12
.30	1.96	3.30	3.39	6.30	15.24	9.30	2.94
.40	2.05	3.40	3.39	6.40	12.92	9.40	2.85
.50	1.87	3.50	3.39	6.50	10.34	9.50	2.85
.60	2.14	3.60	3.47	6.60	8.91	9.60	2.76
.70	2.05	3.70	3.65	6.70	8.46	9.70	2.76
.80	1.96	3.80	3.74	6.80	7.84	9.80	2.67
.90	2.14	3.90	4.10	6.90	7.22	9.90	2.49
1.00	2.14	4.00	4.10	7.00	6.77	10.00	2.41
1.10	2.14	4.10	4.37	7.10	6.42	10.10	2.49
1.20	2.05	4.20	4.63	7.20	5.88	10.20	2.32
1.30	2.23	4.30	4.90	7.30	5.70	10.30	2.41
1.40	2.23	4.40	5.08	7.40	5.52	10.40	2.41
1.50	2.23	4.50	5.35	7.50	5.08	10.50	2.32
1.60	2.23	4.60	5.79	7.60	4.90	10.60	2.32
1.70	2.23	4.70	6.15	7.70	4.63	10.70	2.23
1.80	2.23	4.80	6.50	7.80	4.45	10.80	2.23
1.90	2.32	4.90	7.04	7.90	4.28	10.90	2.23
2.00	2.41	5.00	7.40	8.00	4.01	11.00	2.23
2.10	2.32	5.10	8.20	8.10	3.92	11.10	2.05
2.20	2.49	5.20	9.09	8.20	3.83	11.20	2.14
2.30	2.58	5.30	10.16	8.30	3.65	11.30	2.14
2.40	2.76	5.40	11.23	8.40	3.65	11.40	2.05
2.50	2.76	5.50	12.21	8.50	3.56	11.50	2.05
2.60	2.94	5.60	25.22	8.60	3.56	11.60	2.05
2.70	3.03	5.70	50.43	8.70	3.47	11.70	2.05
2.80	3.12	5.80	80.90	8.80	3.39	11.80	1.87
2.90	3.21	5.90	145.23	8.90	3.30	11.90	2.05
3.00	3.39	6.00	100.77	9.00	3.12	12.00	1.87

DESIGN SCS(0001)  
ID= 1 DT= 6.0 min

Area (ha)= 2.30 Curve Number (CN) = 76.0  
Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
U. H. Tp(hrs)= .27

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .255 (i)  
TIME TO PEAK (hrs)= 6.100  
RUNOFF VOLUME (mm)= 34.866  
TOTAL RAINFALL (mm)= 89.100  
RUNOFF COEFFICIENT = .391

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

DESIGN SCS(0002)  
ID= 1 DT= 6.0 min

Area (ha)= 2.70 Curve Number (CN) = 76.0  
Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
U. H. Tp(hrs)= .59

Ia as 0.2xS (mm)= 16.042

pre development 12 hr revised.out  
 Unit Hyd Qpeak (cms) = .252

PEAK FLOW (cms) = .174 (i)  
 TIME TO PEAK (hrs) = 6.500  
 RUNOFF VOLUME (mm) = 34.824  
 TOTAL RAINFALL (mm) = 89.100  
 RUNOFF COEFFICIENT = .391

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

DESIGN SCS(0003) ID= 1 DT= 6.0 min	Area (ha) = 1.70 Ia (mm) = 0.2 S U. H. Tp(hrs) = .33	Curve Number (CN) = 76.0 # of Linear Res. (N) = 5.00
---------------------------------------	--	---

Ia as 0.2xS (mm) = 16.042  
 Unit Hyd Qpeak (cms) = .284

PEAK FLOW (cms) = .166 (i)  
 TIME TO PEAK (hrs) = 6.200  
 RUNOFF VOLUME (mm) = 34.838  
 TOTAL RAINFALL (mm) = 89.100  
 RUNOFF COEFFICIENT = .391

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

DESIGN SCS(0004) ID= 1 DT= 6.0 min	Area (ha) = 1.60 Ia (mm) = 0.2 S U. H. Tp(hrs) = .19	Curve Number (CN) = 76.0 # of Linear Res. (N) = 5.00
---------------------------------------	--	---

Ia as 0.2xS (mm) = 16.042  
 Unit Hyd Qpeak (cms) = .464

PEAK FLOW (cms) = .206 (i)  
 TIME TO PEAK (hrs) = 6.000  
 RUNOFF VOLUME (mm) = 35.056  
 TOTAL RAINFALL (mm) = 89.100  
 RUNOFF COEFFICIENT = .393

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

ADD HYD (0015) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0001):	2.30	.255	6.10	34.87
+ ID2= 2 (0002):	2.70	.174	6.50	34.82
ID = 3 (0015):	5.00	.354	6.20	34.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0017) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
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pre development 12 hr revised.out

ID1= 1 (0015):	5.00	.354	6.20	34.84
+ ID2= 2 (0003):	1.70	.166	6.20	34.84
=====				
ID = 3 (0017):	6.70	.520	6.20	34.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----				
ADD HYD (0018)				
1 + 2 = 3				
-----				
	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0017):	6.70	.520	6.20	34.84
+ ID2= 2 (0004):	1.60	.206	6.00	35.06
=====				
ID = 3 (0018):	8.30	.686	6.10	34.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

\*\*\*\*\*  
 \*\* SIMULATION NUMBER: 5 \*\*  
 \*\*\*\*\*

MASS STORM	Filename: P:\W&W\Software\V02\GFE\Scs12h.mst
Ptotal=100.30 mm	Comments: Type II 12-hr MASS CURVE

Duration of storm = 12.00 hrs  
 Mass curve time step = 6.00 min

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.10	2.11	3.10	3.81	6.10	22.67	9.10	3.61
.20	2.21	3.20	3.81	6.20	19.86	9.20	3.51
.30	2.21	3.30	3.81	6.30	17.15	9.30	3.31
.40	2.31	3.40	3.81	6.40	14.54	9.40	3.21
.50	2.11	3.50	3.81	6.50	11.63	9.50	3.21
.60	2.41	3.60	3.91	6.60	10.03	9.60	3.11
.70	2.31	3.70	4.11	6.70	9.53	9.70	3.11
.80	2.21	3.80	4.21	6.80	8.83	9.80	3.01
.90	2.41	3.90	4.61	6.90	8.12	9.90	2.81
1.00	2.41	4.00	4.61	7.00	7.62	10.00	2.71
1.10	2.41	4.10	4.91	7.10	7.22	10.10	2.81
1.20	2.31	4.20	5.22	7.20	6.62	10.20	2.61
1.30	2.51	4.30	5.52	7.30	6.42	10.30	2.71
1.40	2.51	4.40	5.72	7.40	6.22	10.40	2.71
1.50	2.51	4.50	6.02	7.50	5.72	10.50	2.61
1.60	2.51	4.60	6.52	7.60	5.52	10.60	2.61
1.70	2.51	4.70	6.92	7.70	5.22	10.70	2.51
1.80	2.51	4.80	7.32	7.80	5.01	10.80	2.51
1.90	2.61	4.90	7.92	7.90	4.81	10.90	2.51
2.00	2.71	5.00	8.32	8.00	4.51	11.00	2.51
2.10	2.61	5.10	9.23	8.10	4.41	11.10	2.31
2.20	2.81	5.20	10.23	8.20	4.31	11.20	2.41
2.30	2.91	5.30	11.43	8.30	4.11	11.30	2.41
2.40	3.11	5.40	12.64	8.40	4.11	11.40	2.31
2.50	3.11	5.50	13.74	8.50	4.01	11.50	2.31
2.60	3.31	5.60	28.38	8.60	4.01	11.60	2.31
2.70	3.41	5.70	56.77	8.70	3.91	11.70	2.31
2.80	3.51	5.80	91.07	8.80	3.81	11.80	2.11
2.90	3.61	5.90	163.49	8.90	3.71	11.90	2.31

DESIGN SCS(0001)	Area (ha)= 2.30	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 mi n	I a (mm)= 0.2 S	# of Li near Res. (N)= 5.00
	U. H. Tp(hrs)= .27	

I a as 0.2xS (mm)= 16.042  
 Uni t Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .321 (i)  
 TIME TO PEAK (hrs)= 6.100  
 RUNOFF VOLUME (mm)= 43.217  
 TOTAL RAINFALL (mm)= 100.300  
 RUNOFF COEFFICIENT = .431

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

DESIGN SCS(0002)	Area (ha)= 2.70	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 mi n	I a (mm)= 0.2 S	# of Li near Res. (N)= 5.00
	U. H. Tp(hrs)= .59	

I a as 0.2xS (mm)= 16.042  
 Uni t Hyd Qpeak (cms)= .252

PEAK FLOW (cms)= .219 (i)  
 TIME TO PEAK (hrs)= 6.500  
 RUNOFF VOLUME (mm)= 43.166  
 TOTAL RAINFALL (mm)= 100.300  
 RUNOFF COEFFICIENT = .430

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

DESIGN SCS(0003)	Area (ha)= 1.70	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 mi n	I a (mm)= 0.2 S	# of Li near Res. (N)= 5.00
	U. H. Tp(hrs)= .33	

I a as 0.2xS (mm)= 16.042  
 Uni t Hyd Qpeak (cms)= .284

PEAK FLOW (cms)= .208 (i)  
 TIME TO PEAK (hrs)= 6.200  
 RUNOFF VOLUME (mm)= 43.183  
 TOTAL RAINFALL (mm)= 100.300  
 RUNOFF COEFFICIENT = .431

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

DESIGN SCS(0004)	Area (ha)= 1.60	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 mi n	I a (mm)= 0.2 S	# of Li near Res. (N)= 5.00
	U. H. Tp(hrs)= .19	

I a as 0.2xS (mm)= 16.042  
 Uni t Hyd Qpeak (cms)= .464

PEAK FLOW (cms)= .260 (i)

pre development 12 hr revised.out

TIME TO PEAK (hrs) = 6.000  
 RUNOFF VOLUME (mm) = 43.454  
 TOTAL RAINFALL (mm) = 100.300  
 RUNOFF COEFFICIENT = .433

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

ADD HYD (0015)		AREA	OPEAK	TPEAK	R. V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0001):		2.30	.321	6.10	43.22
+ ID2= 2 (0002):		2.70	.219	6.50	43.17
ID = 3 (0015):		5.00	.446	6.20	43.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0017)		AREA	OPEAK	TPEAK	R. V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0015):		5.00	.446	6.20	43.19
+ ID2= 2 (0003):		1.70	.208	6.20	43.18
ID = 3 (0017):		6.70	.654	6.20	43.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0018)		AREA	OPEAK	TPEAK	R. V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0017):		6.70	.654	6.20	43.19
+ ID2= 2 (0004):		1.60	.260	6.00	43.45
ID = 3 (0018):		8.30	.866	6.10	43.24

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

\*\*\*\*\*  
 \*\* SIMULATION NUMBER: 6 \*\*  
 \*\*\*\*\*

MASS STORM	Filename: P:\W&W\Software\VO2\GFE\Scs12h.mst
Ptotal=111.50 mm	Comments: Type II 12-hr MASS CURVE

Duration of storm = 12.00 hrs  
 Mass curve time step = 6.00 min

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.10	2.34	3.10	4.24	6.10	25.20	9.10	4.01
.20	2.45	3.20	4.24	6.20	22.08	9.20	3.90
.30	2.45	3.30	4.24	6.30	19.07	9.30	3.68

	pre development 12 hr				revised out			
.40	2.56	3.40	4.24	6.40	16.17	9.40	3.57	
.50	2.34	3.50	4.24	6.50	12.93	9.50	3.57	
.60	2.68	3.60	4.35	6.60	11.15	9.60	3.46	
.70	2.56	3.70	4.57	6.70	10.59	9.70	3.46	
.80	2.45	3.80	4.68	6.80	9.81	9.80	3.34	
.90	2.68	3.90	5.13	6.90	9.03	9.90	3.12	
1.00	2.68	4.00	5.13	7.00	8.47	10.00	3.01	
1.10	2.68	4.10	5.46	7.10	8.03	10.10	3.12	
1.20	2.56	4.20	5.80	7.20	7.36	10.20	2.90	
1.30	2.79	4.30	6.13	7.30	7.14	10.30	3.01	
1.40	2.79	4.40	6.36	7.40	6.91	10.40	3.01	
1.50	2.79	4.50	6.69	7.50	6.36	10.50	2.90	
1.60	2.79	4.60	7.25	7.60	6.13	10.60	2.90	
1.70	2.79	4.70	7.69	7.70	5.80	10.70	2.79	
1.80	2.79	4.80	8.14	7.80	5.57	10.80	2.79	
1.90	2.90	4.90	8.81	7.90	5.35	10.90	2.79	
2.00	3.01	5.00	9.25	8.00	5.02	11.00	2.79	
2.10	2.90	5.10	10.26	8.10	4.91	11.10	2.56	
2.20	3.12	5.20	11.37	8.20	4.79	11.20	2.68	
2.30	3.23	5.30	12.71	8.30	4.57	11.30	2.68	
2.40	3.46	5.40	14.05	8.40	4.57	11.40	2.56	
2.50	3.46	5.50	15.28	8.50	4.46	11.50	2.56	
2.60	3.68	5.60	31.55	8.60	4.46	11.60	2.56	
2.70	3.79	5.70	63.11	8.70	4.35	11.70	2.56	
2.80	3.90	5.80	101.24	8.80	4.24	11.80	2.34	
2.90	4.01	5.90	181.74	8.90	4.13	11.90	2.56	
3.00	4.24	6.00	126.11	9.00	3.90	12.00	2.34	

DESIGN SCS(0001) Area (ha)= 2.30 Curve Number (CN) = 76.0  
 ID= 1 DT= 6.0 min Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 U. H. Tp(hrs)= .27

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .389 (i)  
 TIME TO PEAK (hrs)= 6.100  
 RUNOFF VOLUME (mm)= 51.933  
 TOTAL RAINFALL (mm)= 111.500  
 RUNOFF COEFFICIENT = .466

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

DESIGN SCS(0002) Area (ha)= 2.70 Curve Number (CN) = 76.0  
 ID= 1 DT= 6.0 min Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 U. H. Tp(hrs)= .59

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .252

PEAK FLOW (cms)= .265 (i)  
 TIME TO PEAK (hrs)= 6.500  
 RUNOFF VOLUME (mm)= 51.872  
 TOTAL RAINFALL (mm)= 111.500  
 RUNOFF COEFFICIENT = .465

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

pre development 12 hr revised.out

DESIGN SCS(0003) ID= 1 DT= 6.0 min	Area (ha)= 1.70	Curve Number (CN) = 76.0
	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .33	

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .284

PEAK FLOW (cms)= .252 (i)  
TIME TO PEAK (hrs)= 6.200  
RUNOFF VOLUME (mm)= 51.892  
TOTAL RAINFALL (mm)= 111.500  
RUNOFF COEFFICIENT = .465

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

DESIGN SCS(0004) ID= 1 DT= 6.0 min	Area (ha)= 1.60	Curve Number (CN) = 76.0
	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .19	

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .464

PEAK FLOW (cms)= .315 (i)  
TIME TO PEAK (hrs)= 6.000  
RUNOFF VOLUME (mm)= 52.218  
TOTAL RAINFALL (mm)= 111.500  
RUNOFF COEFFICIENT = .468

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

ADD HYD (0015) 1 + 2 = 3	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0001):	2.30	.389	6.10	51.93
+ ID2= 2 (0002):	2.70	.265	6.50	51.87
=====				
ID = 3 (0015):	5.00	.542	6.20	51.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0017) 1 + 2 = 3	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0015):	5.00	.542	6.20	51.90
+ ID2= 2 (0003):	1.70	.252	6.20	51.89
=====				
ID = 3 (0017):	6.70	.794	6.20	51.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| ADD HYD (0018) |

		pre development 12 hr revised.out			
1 + 2 = 3		AREA	QPEAK	TPEAK	R. V.
-----		(ha)	(cms)	(hrs)	(mm)
ID1=	1 (0017):	6.70	.794	6.20	51.90
+	ID2= 2 (0004):	1.60	.315	6.00	52.22
=====					
ID =	3 (0018):	8.30	1.053	6.10	51.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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 FINISH  
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pre development 6 hr revised.out

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V   V   I   SSSSS U   U   A   L
V   V   I   SS   U   U   A A  L
V   V   I   SS   U   U   AAAAA L
V   V   I   SS   U   U   A   A  L
  W   I   SSSSS UUUUU A   A  LLLLL

000  TTTTT TTTTT H   H   Y   Y   M   M   000  TM
0   0   T   T   H   H   Y   Y   MM  MM  0   0
0   0   T   T   H   H   Y   M   M   0   0

000  T   T   H   H   Y   M   M   000

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

Input filename: C:\Program Files\Visual OTTHYM0 2.2.4\vojn.dat  
 Output filename: C:\K2WIND~1\pre development 6 hr revised.out  
 Summary filename: C:\K2WIND~1\pre development 6 hr revised.sum

DATE: 6/14/2012

TIME: 6:24:43 PM

USER:

COMMENTS: \_\_\_\_\_

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*****
** SIMULATION NUMBER: 1 **
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| MASS STORM |
| Ptotal=108.80 mm |
|-----|

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Filename: P:\W&W\Software\V02\GFE\Scs6h.mst  
 Comments: Type II 6-hr Tabular

Duration of storm = 6.00 hrs  
 Mass curve time step = 6.00 min

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.10	4.90	1.60	7.83	3.10	146.44	4.60	7.40
.20	5.00	1.70	8.27	3.20	29.27	4.70	7.07
.30	4.90	1.80	8.92	3.30	25.57	4.80	6.85
.40	4.90	1.90	9.57	3.40	22.09	4.90	6.42
.50	4.90	2.00	10.12	3.50	18.82	5.00	6.20
.60	5.00	2.10	10.88	3.60	15.12	5.10	5.77
.70	5.00	2.20	11.75	3.70	12.95	5.20	5.77

pre development 6 hr revised.out

.80	5.22	2.30	13.27	3.80	12.29	5.30	5.55
.90	5.55	2.40	14.80	3.90	11.32	5.40	5.33
1.00	5.88	2.50	16.32	4.00	10.55	5.50	5.22
1.10	5.98	2.60	17.73	4.10	9.79	5.60	5.22
1.20	6.31	2.70	36.56	4.20	9.25	5.70	5.11
1.30	6.85	2.80	73.33	4.30	8.60	5.80	5.11
1.40	7.07	2.90	117.61	4.40	8.38	5.90	4.90
1.50	7.40	3.00	211.07	4.50	7.94	6.00	4.79

DESIGN SCS(0001) ID= 1 DT= 6.0 min	Area (ha)= 2.30 Ia (mm)= 0.2 S U. H. Tp(hrs)= .27	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
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Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .440 (i)  
TIME TO PEAK (hrs)= 3.200  
RUNOFF VOLUME (mm)= 49.803  
TOTAL RAINFALL (mm)= 108.800  
RUNOFF COEFFICIENT = .458

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

DESIGN SCS(0002) ID= 1 DT= 6.0 min	Area (ha)= 2.70 Ia (mm)= 0.2 S U. H. Tp(hrs)= .59	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .252

PEAK FLOW (cms)= .298 (i)  
TIME TO PEAK (hrs)= 3.600  
RUNOFF VOLUME (mm)= 49.744  
TOTAL RAINFALL (mm)= 108.800  
RUNOFF COEFFICIENT = .457

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

DESIGN SCS(0003) ID= 1 DT= 6.0 min	Area (ha)= 1.70 Ia (mm)= 0.2 S U. H. Tp(hrs)= .33	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
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Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .284

PEAK FLOW (cms)= .286 (i)  
TIME TO PEAK (hrs)= 3.300  
RUNOFF VOLUME (mm)= 49.763  
TOTAL RAINFALL (mm)= 108.800  
RUNOFF COEFFICIENT = .457

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

DESIGN SCS(0004)	Area (ha)= 1.60	Curve Number (CN) = 76.0
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pre development 6 hr revised.out

| ID= 1 DT= 6.0 min | Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
U. H. Tp(hrs)= .19

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .464

PEAK FLOW (cms)= .357 (i)  
TIME TO PEAK (hrs)= 3.100  
RUNOFF VOLUME (mm)= 50.075  
TOTAL RAINFALL (mm)= 108.800  
RUNOFF COEFFICIENT = .460

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

ADD HYD (0015) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0001):	2.30	.440	3.20	49.80
+ ID2= 2 (0002):	2.70	.298	3.60	49.74
ID = 3 (0015):	5.00	.607	3.30	49.77

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0017) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0015):	5.00	.607	3.30	49.77
+ ID2= 2 (0003):	1.70	.286	3.30	49.76
ID = 3 (0017):	6.70	.893	3.30	49.77

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0018) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0017):	6.70	.893	3.30	49.77
+ ID2= 2 (0004):	1.60	.357	3.10	50.07
ID = 3 (0018):	8.30	1.180	3.20	49.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

\*\*\*\*\*  
\*\* SIMULATION NUMBER: 2 \*\*  
\*\*\*\*\*

MASS STORM  
Ptotal = 97.50 mm  
Filename: P:\W&W\Software\V02\GFE\Scs6h.mst  
Comments: Type II 6-hr Tabular

Duration of storm = 6.00 hrs  
Page 3

pre development 6 hr revised.out  
 Mass curve time step = 6.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.10	4.39	1.60	7.02	3.10	131.24	4.60	6.63
.20	4.49	1.70	7.41	3.20	26.23	4.70	6.34
.30	4.39	1.80	8.00	3.30	22.91	4.80	6.14
.40	4.39	1.90	8.58	3.40	19.79	4.90	5.75
.50	4.39	2.00	9.07	3.50	16.87	5.00	5.56
.60	4.48	2.10	9.75	3.60	13.55	5.10	5.17
.70	4.49	2.20	10.53	3.70	11.60	5.20	5.17
.80	4.68	2.30	11.89	3.80	11.02	5.30	4.97
.90	4.97	2.40	13.26	3.90	10.14	5.40	4.78
1.00	5.26	2.50	14.62	4.00	9.46	5.50	4.68
1.10	5.36	2.60	15.89	4.10	8.78	5.60	4.68
1.20	5.66	2.70	32.76	4.20	8.29	5.70	4.58
1.30	6.14	2.80	65.72	4.30	7.70	5.80	4.58
1.40	6.34	2.90	105.40	4.40	7.51	5.90	4.39
1.50	6.63	3.00	189.15	4.50	7.12	6.00	4.29

DESIGN SCS(0001) ID= 1 DT= 6.0 min	Area (ha)= 2.30 Ia (mm)= 0.2 S U. H. Tp(hrs)= .27	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .360 (i)  
 TIME TO PEAK (hrs)= 3.200  
 RUNOFF VOLUME (mm)= 41.092  
 TOTAL RAINFALL (mm)= 97.500  
 RUNOFF COEFFICIENT = .421

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

DESIGN SCS(0002) ID= 1 DT= 6.0 min	Area (ha)= 2.70 Ia (mm)= 0.2 S U. H. Tp(hrs)= .59	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .252

PEAK FLOW (cms)= .244 (i)  
 TIME TO PEAK (hrs)= 3.600  
 RUNOFF VOLUME (mm)= 41.044  
 TOTAL RAINFALL (mm)= 97.500  
 RUNOFF COEFFICIENT = .421

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

DESIGN SCS(0003) ID= 1 DT= 6.0 min	Area (ha)= 1.70 Ia (mm)= 0.2 S U. H. Tp(hrs)= .33	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .284

pre development 6 hr revised.out

PEAK FLOW (cms) = .234 (i)  
 TIME TO PEAK (hrs) = 3.300  
 RUNOFF VOLUME (mm) = 41.060  
 TOTAL RAINFALL (mm) = 97.500  
 RUNOFF COEFFICIENT = .421

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

DESIGN SCS(0004)	Area (ha) = 1.60	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm) = 0.2 S	# of Linear Res. (N) = 5.00
	U. H. Tp(hrs) = .19	

Ia as 0.2xS (mm) = 16.042  
 Unit Hyd Qpeak (cms) = .464

PEAK FLOW (cms) = .291 (i)  
 TIME TO PEAK (hrs) = 3.100  
 RUNOFF VOLUME (mm) = 41.317  
 TOTAL RAINFALL (mm) = 97.500  
 RUNOFF COEFFICIENT = .424

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

ADD HYD (0015)	AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0001):	2.30	.360	3.20	41.09
+ ID2= 2 (0002):	2.70	.244	3.60	41.04
=====				
ID = 3 (0015):	5.00	.495	3.30	41.07

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0017)	AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0015):	5.00	.495	3.30	41.07
+ ID2= 2 (0003):	1.70	.234	3.30	41.06
=====				
ID = 3 (0017):	6.70	.729	3.30	41.06

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0018)	AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0017):	6.70	.729	3.30	41.06
+ ID2= 2 (0004):	1.60	.291	3.10	41.32
=====				
ID = 3 (0018):	8.30	.961	3.20	41.11

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

pre development 6 hr revised.out

\*\*\*\*\*  
 \*\* SIMULATION NUMBER: 3 \*\*  
 \*\*\*\*\*

MASS STORM  
 Ptotal = 86.10 mm

Filename: P:\W&W\Software\V02\GFE\Scs6h.mst  
 Comments: Type II 6-hr Tabular

Duration of storm = 6.00 hrs  
 Mass curve time step = 6.00 min

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.10	3.87	1.60	6.20	3.10	115.89	4.60	5.85
.20	3.96	1.70	6.54	3.20	23.16	4.70	5.60
.30	3.87	1.80	7.06	3.30	20.23	4.80	5.42
.40	3.87	1.90	7.58	3.40	17.48	4.90	5.08
.50	3.87	2.00	8.01	3.50	14.90	5.00	4.91
.60	3.96	2.10	8.61	3.60	11.97	5.10	4.56
.70	3.96	2.20	9.30	3.70	10.25	5.20	4.56
.80	4.13	2.30	10.50	3.80	9.73	5.30	4.39
.90	4.39	2.40	11.71	3.90	8.95	5.40	4.22
1.00	4.65	2.50	12.91	4.00	8.35	5.50	4.13
1.10	4.74	2.60	14.03	4.10	7.75	5.60	4.13
1.20	4.99	2.70	28.93	4.20	7.32	5.70	4.05
1.30	5.42	2.80	58.03	4.30	6.80	5.80	4.05
1.40	5.60	2.90	93.07	4.40	6.63	5.90	3.87
1.50	5.85	3.00	167.03	4.50	6.29	6.00	3.79

DESIGN SCS(0001)  
 ID= 1 DT= 6.0 min

Area (ha)= 2.30 Curve Number (CN) = 76.0  
 Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 U. H. Tp(hrs)= .27

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .282 (i)  
 TIME TO PEAK (hrs)= 3.200  
 RUNOFF VOLUME (mm)= 32.701  
 TOTAL RAINFALL (mm)= 86.100  
 RUNOFF COEFFICIENT = .380

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

DESIGN SCS(0002)  
 ID= 1 DT= 6.0 min

Area (ha)= 2.70 Curve Number (CN) = 76.0  
 Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 U. H. Tp(hrs)= .59

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .252

PEAK FLOW (cms)= .191 (i)  
 TIME TO PEAK (hrs)= 3.600  
 RUNOFF VOLUME (mm)= 32.662  
 TOTAL RAINFALL (mm)= 86.100  
 RUNOFF COEFFICIENT = .379

pre development 6 hr revised.out

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

---

DESIGN SCS(0003)	Area (ha)= 1.70	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .33	

Ia as 0.2xS (mm)= 16.042
Unit Hyd Qpeak (cms)= .284

PEAK FLOW (cms)= .184 (i)
TIME TO PEAK (hrs)= 3.300
RUNOFF VOLUME (mm)= 32.675
TOTAL RAINFALL (mm)= 86.100
RUNOFF COEFFICIENT = .380

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

---

DESIGN SCS(0004)	Area (ha)= 1.60	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .19	

Ia as 0.2xS (mm)= 16.042
Unit Hyd Qpeak (cms)= .464

PEAK FLOW (cms)= .227 (i)
TIME TO PEAK (hrs)= 3.100
RUNOFF VOLUME (mm)= 32.880
TOTAL RAINFALL (mm)= 86.100
RUNOFF COEFFICIENT = .382

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

---

ADD HYD (0015)	AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0001):	2.30	.282	3.20	32.70
+ ID2= 2 (0002):	2.70	.191	3.60	32.66
=====				
ID = 3 (0015):	5.00	.387	3.30	32.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (0017)	AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0015):	5.00	.387	3.30	32.68
+ ID2= 2 (0003):	1.70	.184	3.30	32.68
=====				
ID = 3 (0017):	6.70	.571	3.30	32.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

pre development 6 hr revised.out

ADD HYD (0018) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0017):	6.70	.571	3.30	32.68
+ ID2= 2 (0004):	1.60	.227	3.10	32.88
=====				
ID = 3 (0018):	8.30	.750	3.20	32.72

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

\*\*\*\*\*  
 \*\* SIMULATION NUMBER: 4 \*\*  
 \*\*\*\*\*

MASS STORM  
 Ptotal = 70.80 mm

Filename: P:\W&W\Software\V02\GFE\Scs6h.mst  
 Comments: Type II 6-hr Tabular

Duration of storm = 6.00 hrs  
 Mass curve time step = 6.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.10	3.19	1.60	5.10	3.10	95.30	4.60	4.81
.20	3.26	1.70	5.38	3.20	19.05	4.70	4.60
.30	3.19	1.80	5.81	3.30	16.64	4.80	4.46
.40	3.19	1.90	6.23	3.40	14.37	4.90	4.18
.50	3.19	2.00	6.58	3.50	12.25	5.00	4.04
.60	3.26	2.10	7.08	3.60	9.84	5.10	3.75
.70	3.26	2.20	7.65	3.70	8.43	5.20	3.75
.80	3.40	2.30	8.64	3.80	8.00	5.30	3.61
.90	3.61	2.40	9.63	3.90	7.36	5.40	3.47
1.00	3.82	2.50	10.62	4.00	6.87	5.50	3.40
1.10	3.89	2.60	11.54	4.10	6.37	5.60	3.40
1.20	4.11	2.70	23.79	4.20	6.02	5.70	3.33
1.30	4.46	2.80	47.72	4.30	5.59	5.80	3.33
1.40	4.60	2.90	76.53	4.40	5.45	5.90	3.19
1.50	4.81	3.00	137.35	4.50	5.17	6.00	3.12

DESIGN SCS(0001)  
 ID= 1 DT= 6.0 min

Area (ha)= 2.30 Curve Number (CN) = 76.0  
 Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 U. H. Tp(hrs)= .27

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .470  
 PEAK FLOW (cms)= .184 (i)  
 TIME TO PEAK (hrs)= 3.200  
 RUNOFF VOLUME (mm)= 22.242  
 TOTAL RAINFALL (mm)= 70.800  
 RUNOFF COEFFICIENT = .314

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

DESIGN SCS(0002)  
 ID= 1 DT= 6.0 min

Area (ha)= 2.70 Curve Number (CN) = 76.0  
 Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 Page 8

pre development 6 hr revised.out

----- U. H. Tp(hrs)= .59

I a as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .252

PEAK FLOW (cms)= .126 (i)  
TIME TO PEAK (hrs)= 3.600  
RUNOFF VOLUME (mm)= 22.216  
TOTAL RAINFALL (mm)= 70.800  
RUNOFF COEFFICIENT = .314

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

-----  
| DESIGN SCS(0003) | Area (ha)= 1.70 Curve Number (CN) = 76.0  
| ID= 1 DT= 6.0 min | I a (mm)= 0.2 S # of Linear Res. (N)= 5.00  
----- U. H. Tp(hrs)= .33

I a as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .284

PEAK FLOW (cms)= .121 (i)  
TIME TO PEAK (hrs)= 3.300  
RUNOFF VOLUME (mm)= 22.225  
TOTAL RAINFALL (mm)= 70.800  
RUNOFF COEFFICIENT = .314

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

-----  
| DESIGN SCS(0004) | Area (ha)= 1.60 Curve Number (CN) = 76.0  
| ID= 1 DT= 6.0 min | I a (mm)= 0.2 S # of Linear Res. (N)= 5.00  
----- U. H. Tp(hrs)= .19

I a as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .464

PEAK FLOW (cms)= .153 (i)  
TIME TO PEAK (hrs)= 3.200  
RUNOFF VOLUME (mm)= 22.364  
TOTAL RAINFALL (mm)= 70.800  
RUNOFF COEFFICIENT = .316

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

-----  
| ADD HYD (0015) | AREA QPEAK TPEAK R. V.  
| 1 + 2 = 3 | (ha) (cms) (hrs) (mm)  
-----  
ID1= 1 (0001): 2.30 .184 3.20 22.24  
+ ID2= 2 (0002): 2.70 .126 3.60 22.22  
=====

ID = 3 (0015): 5.00 .254 3.30 22.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

pre development 6 hr revised.out

ADD HYD (0017) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0015):	5.00	.254	3.30	22.23
+ ID2= 2 (0003):	1.70	.121	3.30	22.22
=====				
ID = 3 (0017):	6.70	.375	3.30	22.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0018) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0017):	6.70	.375	3.30	22.23
+ ID2= 2 (0004):	1.60	.153	3.20	22.36
=====				
ID = 3 (0018):	8.30	.488	3.20	22.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

\*\*\*\*\*  
\*\* SIMULATION NUMBER: 5 \*\*  
\*\*\*\*\*

MASS STORM Ptotal = 58.70 mm	Filename: P:\W&W\Software\V02\GFE\Scs6h.mst Comments: Type II 6-hr Tabular
	Duration of storm = 6.00 hrs Mass curve time step = 6.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.10	2.64	1.60	4.23	3.10	79.01	4.60	3.99
.20	2.70	1.70	4.46	3.20	15.79	4.70	3.82
.30	2.64	1.80	4.81	3.30	13.79	4.80	3.70
.40	2.64	1.90	5.17	3.40	11.92	4.90	3.46
.50	2.64	2.00	5.46	3.50	10.16	5.00	3.35
.60	2.70	2.10	5.87	3.60	8.16	5.10	3.11
.70	2.70	2.20	6.34	3.70	6.99	5.20	3.11
.80	2.82	2.30	7.16	3.80	6.63	5.30	2.99
.90	2.99	2.40	7.98	3.90	6.10	5.40	2.88
1.00	3.17	2.50	8.81	4.00	5.69	5.50	2.82
1.10	3.23	2.60	9.57	4.10	5.28	5.60	2.82
1.20	3.40	2.70	19.72	4.20	4.99	5.70	2.76
1.30	3.70	2.80	39.56	4.30	4.64	5.80	2.76
1.40	3.82	2.90	63.45	4.40	4.52	5.90	2.64
1.50	3.99	3.00	113.88	4.50	4.29	6.00	2.58

DESIGN SCS(0001) ID= 1 DT= 6.0 min	Area (ha)= 2.30 Ia (mm)= 0.2 S U. H. Tp(hrs)= .27	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .116 (i)

pre development 6 hr revised.out

TIME TO PEAK (hrs)= 3.200  
RUNOFF VOLUME (mm)= 14.828  
TOTAL RAINFALL (mm)= 58.700  
RUNOFF COEFFICIENT = .253

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

-----  
DESIGN SCS(0002) | Area (ha)= 2.70 Curve Number (CN) = 76.0  
ID= 1 DT= 6.0 min | Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
U. H. Tp(hrs)= .59

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .252

PEAK FLOW (cms)= .080 (i)  
TIME TO PEAK (hrs)= 3.600  
RUNOFF VOLUME (mm)= 14.810  
TOTAL RAINFALL (mm)= 58.700  
RUNOFF COEFFICIENT = .252

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

-----  
DESIGN SCS(0003) | Area (ha)= 1.70 Curve Number (CN) = 76.0  
ID= 1 DT= 6.0 min | Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
U. H. Tp(hrs)= .33

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .284

PEAK FLOW (cms)= .077 (i)  
TIME TO PEAK (hrs)= 3.300  
RUNOFF VOLUME (mm)= 14.816  
TOTAL RAINFALL (mm)= 58.700  
RUNOFF COEFFICIENT = .252

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

-----  
DESIGN SCS(0004) | Area (ha)= 1.60 Curve Number (CN) = 76.0  
ID= 1 DT= 6.0 min | Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
U. H. Tp(hrs)= .19

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .464

PEAK FLOW (cms)= .100 (i)  
TIME TO PEAK (hrs)= 3.200  
RUNOFF VOLUME (mm)= 14.909  
TOTAL RAINFALL (mm)= 58.700  
RUNOFF COEFFICIENT = .254

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

-----  
ADD HYD (0015)  
1 + 2 = 3

AREA QPEAK TPEAK R. V.

pre development 6 hr revised.out

	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0001):	2.30	.116	3.20	14.83
+ ID2= 2 (0002):	2.70	.080	3.60	14.81
=====				
ID = 3 (0015):	5.00	.160	3.30	14.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0017)				
1 + 2 = 3				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0015):	5.00	.160	3.30	14.82
+ ID2= 2 (0003):	1.70	.077	3.30	14.82
=====				
ID = 3 (0017):	6.70	.237	3.30	14.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0018)				
1 + 2 = 3				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0017):	6.70	.237	3.30	14.82
+ ID2= 2 (0004):	1.60	.100	3.20	14.91
=====				
ID = 3 (0018):	8.30	.305	3.20	14.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

\*\*\*\*\*  
 \*\* SIMULATION NUMBER: 6 \*\*  
 \*\*\*\*\*

MASS STORM
Ptotal = 40.40 mm

Filename: P:\W&W\Software\V02\GFE\Scs6h.mst  
 Comments: Type II 6-hr Tabular

Duration of storm = 6.00 hrs  
 Mass curve time step = 6.00 min

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.10	1.82	1.60	2.91	3.10	54.38	4.60	2.75
.20	1.86	1.70	3.07	3.20	10.87	4.70	2.63
.30	1.82	1.80	3.31	3.30	9.49	4.80	2.55
.40	1.82	1.90	3.56	3.40	8.20	4.90	2.38
.50	1.82	2.00	3.76	3.50	6.99	5.00	2.30
.60	1.86	2.10	4.04	3.60	5.62	5.10	2.14
.70	1.86	2.20	4.36	3.70	4.81	5.20	2.14
.80	1.94	2.30	4.93	3.80	4.57	5.30	2.06
.90	2.06	2.40	5.49	3.90	4.20	5.40	1.98
1.00	2.18	2.50	6.06	4.00	3.92	5.50	1.94
1.10	2.22	2.60	6.59	4.10	3.64	5.60	1.94
1.20	2.34	2.70	13.57	4.20	3.43	5.70	1.90
1.30	2.55	2.80	27.23	4.30	3.19	5.80	1.90
1.40	2.63	2.90	43.67	4.40	3.11	5.90	1.82
1.50	2.75	3.00	78.38	4.50	2.95	6.00	1.78

pre development 6 hr revised.out

---

DESIGN SCS(0001) ID= 1 DT= 6.0 min	Area (ha)= 2.30 Ia (mm)= 0.2 S U. H. Tp(hrs)= .27	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .038 (i)  
TIME TO PEAK (hrs)= 3.300  
RUNOFF VOLUME (mm)= 5.680  
TOTAL RAINFALL (mm)= 40.400  
RUNOFF COEFFICIENT = .141

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

---

DESIGN SCS(0002) ID= 1 DT= 6.0 min	Area (ha)= 2.70 Ia (mm)= 0.2 S U. H. Tp(hrs)= .59	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .252

PEAK FLOW (cms)= .027 (i)  
TIME TO PEAK (hrs)= 3.700  
RUNOFF VOLUME (mm)= 5.674  
TOTAL RAINFALL (mm)= 40.400  
RUNOFF COEFFICIENT = .140

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

---

DESIGN SCS(0003) ID= 1 DT= 6.0 min	Area (ha)= 1.70 Ia (mm)= 0.2 S U. H. Tp(hrs)= .33	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .284

PEAK FLOW (cms)= .024 (i)  
TIME TO PEAK (hrs)= 3.400  
RUNOFF VOLUME (mm)= 5.676  
TOTAL RAINFALL (mm)= 40.400  
RUNOFF COEFFICIENT = .140

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

---

DESIGN SCS(0004) ID= 1 DT= 6.0 min	Area (ha)= 1.60 Ia (mm)= 0.2 S U. H. Tp(hrs)= .19	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .464

PEAK FLOW (cms)= .034 (i)  
TIME TO PEAK (hrs)= 3.200

pre development 6 hr revised.out

RUNOFF VOLUME (mm) = 5.712  
 TOTAL RAINFALL (mm) = 40.400  
 RUNOFF COEFFICIENT = .141

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

---

ADD HYD (0015) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0001):	2.30	.038	3.30	5.68
+ ID2= 2 (0002):	2.70	.027	3.70	5.67
<hr/>				
ID = 3 (0015):	5.00	.051	3.40	5.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (0017) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0015):	5.00	.051	3.40	5.68
+ ID2= 2 (0003):	1.70	.024	3.40	5.68
<hr/>				
ID = 3 (0017):	6.70	.075	3.40	5.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (0018) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0017):	6.70	.075	3.40	5.68
+ ID2= 2 (0004):	1.60	.034	3.20	5.71
<hr/>				
ID = 3 (0018):	8.30	.099	3.30	5.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

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post development reg new pond.out

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V   V   I   SSSSS U   U   A   L
V   V   I   SS   U   U   A A L
V   V   I   SS   U   U   AAAAA L
V   V   I   SS   U   U   A   A L
  W   I   SSSSS UUUUU A   A LLLLL

000   TTTTT TTTTT H   H   Y   Y M   M   000   TM
0   0   T   T   H   H   Y Y MM MM 0   0
0   0   T   T   H   H   Y   M   M 0   0

000   T   T   H   H   Y   M   M   000

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

Input filename: C:\Program Files\Visual OTTHYM0 2.2.4\vojn.dat  
 Output filename: C:\K2WIND~1\post development reg new pond.out  
 Summary filename: C:\K2WIND~1\post development reg new pond.sum

DATE: 6/15/2012

TIME: 2:02:37 PM

USER:

COMMENTS: \_\_\_\_\_

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*****
** SIMULATION NUMBER: 1 **
*****

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| MASS STORM |
| Ptotal=212.00 mm |
|-----|

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Filename: P:\W&W\Software\V02\GFE\Hazel 12.mst  
 Comments: Hurricane Hazel (last 12 h)

Duration of storm = 12.00 hrs  
 Mass curve time step = 60.00 min

\*\*\*\*\* WARNING : THE SUM OF THE COORDINATES IS NOT ONE.

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
1.00	2.12	4.00	6.36	7.00	21.20	10.00	14.84
2.00	12.72	5.00	21.20	8.00	25.44	11.00	8.48
3.00	2.12	6.00	48.76	9.00	12.72	12.00	19.08

post development reg new pond.out

DESIGN SCS(0001)	Area (ha)= 2.30	Curve Number (CN) = 88.0	
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00	
	U. H. Tp(hrs)= .27		

NOTE: RAINFALL WAS TRANSFORMED TO 6.0 MIN. TIME STEP.

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.100	2.12	3.100	6.36	6.100	21.20	9.10	14.84
.200	2.12	3.200	6.36	6.200	21.20	9.20	14.84
.300	2.12	3.300	6.36	6.300	21.20	9.30	14.84
.400	2.12	3.400	6.36	6.400	21.20	9.40	14.84
.500	2.12	3.500	6.36	6.500	21.20	9.50	14.84
.600	2.12	3.600	6.36	6.600	21.20	9.60	14.84
.700	2.12	3.700	6.36	6.700	21.20	9.70	14.84
.800	2.12	3.800	6.36	6.800	21.20	9.80	14.84
.900	2.12	3.900	6.36	6.900	21.20	9.90	14.84
1.000	2.12	4.000	6.36	7.000	21.20	10.00	14.84
1.100	12.72	4.100	21.20	7.100	25.44	10.10	8.48
1.200	12.72	4.200	21.20	7.200	25.44	10.20	8.48
1.300	12.72	4.300	21.20	7.300	25.44	10.30	8.48
1.400	12.72	4.400	21.20	7.400	25.44	10.40	8.48
1.500	12.72	4.500	21.20	7.500	25.44	10.50	8.48
1.600	12.72	4.600	21.20	7.600	25.44	10.60	8.48
1.700	12.72	4.700	21.20	7.700	25.44	10.70	8.48
1.800	12.72	4.800	21.20	7.800	25.44	10.80	8.48
1.900	12.72	4.900	21.20	7.900	25.44	10.90	8.48
2.000	12.72	5.000	21.20	8.000	25.44	11.00	8.48
2.100	2.12	5.100	48.76	8.100	12.72	11.10	19.08
2.200	2.12	5.200	48.76	8.200	12.72	11.20	19.08
2.300	2.12	5.300	48.76	8.300	12.72	11.30	19.08
2.400	2.12	5.400	48.76	8.400	12.72	11.40	19.08
2.500	2.12	5.500	48.76	8.500	12.72	11.50	19.08
2.600	2.12	5.600	48.76	8.600	12.72	11.60	19.08
2.700	2.12	5.700	48.76	8.700	12.72	11.70	19.08
2.800	2.12	5.800	48.76	8.800	12.72	11.80	19.08
2.900	2.12	5.900	48.76	8.900	12.72	11.90	19.08
3.000	2.12	6.000	48.76	9.000	12.72	12.00	19.08

Ia as 0.2xS (mm)= 6.927  
Unit Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .279 (i)  
TIME TO PEAK (hrs)= 6.000  
RUNOFF VOLUME (mm)= 159.051  
TOTAL RAINFALL (mm)= 195.040  
RUNOFF COEFFICIENT = .815

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

DESIGN SCS(0002)	Area (ha)= 2.70	Curve Number (CN) = 88.0	
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00	
	U. H. Tp(hrs)= .59		

Ia as 0.2xS (mm)= 6.927  
Unit Hyd Qpeak (cms)= .252

PEAK FLOW (cms)= .299 (i)  
TIME TO PEAK (hrs)= 6.200

post development reg new pond.out

RUNOFF VOLUME (mm)= 158.864  
 TOTAL RAINFALL (mm)= 195.040  
 RUNOFF COEFFICIENT = .815

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

DESIGN SCS(0003)	Area (ha)= 1.70	Curve Number (CN) = 88.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .33	

Ia as 0.2xS (mm)= 6.927  
 Unit Hyd Qpeak (cms)= .284

PEAK FLOW (cms)= .203 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 158.926  
 TOTAL RAINFALL (mm)= 195.040  
 RUNOFF COEFFICIENT = .815

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

DESIGN SCS(0004)	Area (ha)= 1.60	Curve Number (CN) = 88.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .19	

Ia as 0.2xS (mm)= 6.927  
 Unit Hyd Qpeak (cms)= .464

PEAK FLOW (cms)= .197 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 159.922  
 TOTAL RAINFALL (mm)= 195.040  
 RUNOFF COEFFICIENT = .820

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

DESIGN SCS(0006)	Area (ha)= .19	Curve Number (CN) = 91.9
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .20	

Ia as 0.2xS (mm)= 4.477  
 Unit Hyd Qpeak (cms)= .052

PEAK FLOW (cms)= .025 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 171.428  
 TOTAL RAINFALL (mm)= 195.040  
 RUNOFF COEFFICIENT = .879

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

DESIGN SCS(0005)	Area (ha)= .41	Curve Number (CN) = 89.7
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .23	

post development reg new pond.out

I a as 0.2xS (mm)= 5.833  
 Unit Hyd Qpeak (cms)= .098

PEAK FLOW (cms)= .051 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 164.379  
 TOTAL RAINFALL (mm)= 195.040  
 RUNOFF COEFFICIENT = .843

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

DESIGN SCS(0007)	Area (ha)= 2.60	Curve Number (CN) = 88.4
ID= 1 DT= 6.0 min	I a (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .19	

I a as 0.2xS (mm)= 6.666  
 Unit Hyd Qpeak (cms)= .755

PEAK FLOW (cms)= .322 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 161.122  
 TOTAL RAINFALL (mm)= 195.040  
 RUNOFF COEFFICIENT = .826

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

DESIGN SCS(0008)	Area (ha)= .21	Curve Number (CN) = 90.2
ID= 1 DT= 6.0 min	I a (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .14	

I a as 0.2xS (mm)= 5.519  
 Unit Hyd Qpeak (cms)= .083

PEAK FLOW (cms)= .027 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 169.012  
 TOTAL RAINFALL (mm)= 195.040  
 RUNOFF COEFFICIENT = .867

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

DESIGN SCS(0009)	Area (ha)= .27	Curve Number (CN) = 88.0
ID= 1 DT= 6.0 min	I a (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .10	

I a as 0.2xS (mm)= 6.927  
 Unit Hyd Qpeak (cms)= .149

PEAK FLOW (cms)= .034 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 164.104  
 TOTAL RAINFALL (mm)= 195.040  
 RUNOFF COEFFICIENT = .841

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

post development reg new pond.out

ADD HYD (0015) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0001):	2.30	.279	6.00	159.05
+ ID2= 2 (0002):	2.70	.299	6.20	158.86
ID = 3 (0015):	5.00	.564	6.10	158.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0017) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0015):	5.00	.564	6.10	158.95
+ ID2= 2 (0003):	1.70	.203	6.00	158.93
ID = 3 (0017):	6.70	.766	6.10	158.94

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0018) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0017):	6.70	.766	6.10	158.94
+ ID2= 2 (0004):	1.60	.197	6.00	159.92
ID = 3 (0018):	8.30	.960	6.00	159.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0011) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0006):	.19	.025	6.00	171.43
+ ID2= 2 (0005):	.41	.051	6.00	164.38
ID = 3 (0011):	.60	.076	6.00	166.61

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0012) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0011):	.60	.076	6.00	166.61
+ ID2= 2 (0007):	2.60	.322	6.00	161.12
ID = 3 (0012):	3.20	.398	6.00	162.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.



post development12 hr newpond.out

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V   V   I   SSSSS U   U   A   L
V   V   I   SS   U   U   A A  L
V   V   I   SS   U   U   AAAAA L
V   V   I   SS   U   U   A   A  L
  W   I   SSSSS UUUUU A   A  LLLLL

000   TTTTT TTTTT H   H   Y   Y   M   M   000   TM
0   0   T   T   H   H   Y Y   MM MM 0   0
0   0   T   T   H   H   Y   M   M   0   0

000   T   T   H   H   Y   M   M   000

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

Input filename: C:\Program Files\Visual OTTHYM0 2.2.4\vojn.dat  
 Output filename: C:\K2WIND~1\post development12 hr newpond.out  
 Summary filename: C:\K2WIND~1\post development12 hr newpond.sum

DATE: 6/15/2012

TIME: 2:01:30 PM

USER:

COMMENTS: \_\_\_\_\_

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*****
** SIMULATION NUMBER: 1 **
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| MASS STORM |
| Ptotal = 43.80 mm |
|-----|

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Filename: P:\W&W\Software\V02\GFE\Scs12h.mst  
 Comments: Type II 12-hr MASS CURVE

Duration of storm = 12.00 hrs  
 Mass curve time step = 6.00 min

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.10	.92	3.10	1.66	6.10	9.90	9.10	1.58
.20	.96	3.20	1.66	6.20	8.67	9.20	1.53
.30	.96	3.30	1.66	6.30	7.49	9.30	1.45
.40	1.01	3.40	1.66	6.40	6.35	9.40	1.40
.50	.92	3.50	1.66	6.50	5.08	9.50	1.40
.60	1.05	3.60	1.71	6.60	4.38	9.60	1.36
.70	1.01	3.70	1.80	6.70	4.16	9.70	1.36

		post development	12 hr	newpond. out			
.80	.96	3.80	1.84	6.80	3.85	9.80	1.31
.90	1.05	3.90	2.01	6.90	3.55	9.90	1.23
1.00	1.05	4.00	2.01	7.00	3.33	10.00	1.18
1.10	1.05	4.10	2.15	7.10	3.15	10.10	1.23
1.20	1.01	4.20	2.28	7.20	2.89	10.20	1.14
1.30	1.09	4.30	2.41	7.30	2.80	10.30	1.18
1.40	1.09	4.40	2.50	7.40	2.72	10.40	1.18
1.50	1.10	4.50	2.63	7.50	2.50	10.50	1.14
1.60	1.10	4.60	2.85	7.60	2.41	10.60	1.14
1.70	1.09	4.70	3.02	7.70	2.28	10.70	1.09
1.80	1.10	4.80	3.20	7.80	2.19	10.80	1.09
1.90	1.14	4.90	3.46	7.90	2.10	10.90	1.09
2.00	1.18	5.00	3.64	8.00	1.97	11.00	1.09
2.10	1.14	5.10	4.03	8.10	1.93	11.10	1.01
2.20	1.23	5.20	4.47	8.20	1.88	11.20	1.05
2.30	1.27	5.30	4.99	8.30	1.80	11.30	1.05
2.40	1.36	5.40	5.52	8.40	1.80	11.40	1.01
2.50	1.36	5.50	6.00	8.50	1.75	11.50	1.01
2.60	1.45	5.60	12.40	8.60	1.75	11.60	1.01
2.70	1.49	5.70	24.79	8.70	1.71	11.70	1.01
2.80	1.53	5.80	39.77	8.80	1.66	11.80	.92
2.90	1.58	5.90	71.39	8.90	1.62	11.90	1.01
3.00	1.66	6.00	49.54	9.00	1.53	12.00	.92

-----

DESIGN SCS(0001)	Area (ha)= 2.30	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .27	

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .470  
PEAK FLOW (cms)= .039 (i)  
TIME TO PEAK (hrs)= 6.200  
RUNOFF VOLUME (mm)= 7.145  
TOTAL RAINFALL (mm)= 43.800  
RUNOFF COEFFICIENT = .163

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

-----

DESIGN SCS(0002)	Area (ha)= 2.70	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .59	

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .252  
PEAK FLOW (cms)= .027 (i)  
TIME TO PEAK (hrs)= 6.600  
RUNOFF VOLUME (mm)= 7.136  
TOTAL RAINFALL (mm)= 43.800  
RUNOFF COEFFICIENT = .163

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

-----

DESIGN SCS(0003)	Area (ha)= 1.70	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .33	

post development12 hr newpond.out

I a as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .284  
 PEAK FLOW (cms)= .026 (i)  
 TIME TO PEAK (hrs)= 6.200  
 RUNOFF VOLUME (mm)= 7.139  
 TOTAL RAINFALL (mm)= 43.800  
 RUNOFF COEFFICIENT = .163

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

DESIGN SCS(0004) ID= 1 DT= 6.0 min	Area (ha)= 1.60 I a (mm)= 0.2 S U. H. Tp(hrs)= .19	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
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I a as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .464  
 PEAK FLOW (cms)= .035 (i)  
 TIME TO PEAK (hrs)= 6.100  
 RUNOFF VOLUME (mm)= 7.184  
 TOTAL RAINFALL (mm)= 43.800  
 RUNOFF COEFFICIENT = .164

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

DESIGN SCS(0006) ID= 1 DT= 6.0 min	Area (ha)= .19 I a (mm)= 0.2 S U. H. Tp(hrs)= .20	Curve Number (CN) = 85.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

I a as 0.2xS (mm)= 8.965  
 Unit Hyd Qpeak (cms)= .052  
 PEAK FLOW (cms)= .010 (i)  
 TIME TO PEAK (hrs)= 6.100  
 RUNOFF VOLUME (mm)= 15.313  
 TOTAL RAINFALL (mm)= 43.800  
 RUNOFF COEFFICIENT = .350

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

DESIGN SCS(0005) ID= 1 DT= 6.0 min	Area (ha)= .41 I a (mm)= 0.2 S U. H. Tp(hrs)= .23	Curve Number (CN) = 79.6 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

I a as 0.2xS (mm)= 13.019  
 Unit Hyd Qpeak (cms)= .098  
 PEAK FLOW (cms)= .013 (i)  
 TIME TO PEAK (hrs)= 6.100  
 RUNOFF VOLUME (mm)= 9.908  
 TOTAL RAINFALL (mm)= 43.800  
 RUNOFF COEFFICIENT = .226

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

post development12 hr newpond.out

-----  
 | DESIGN SCS(0007) | Area (ha)= 2.60 Curve Number (CN) = 77.0  
 | ID= 1 DT= 6.0 min | I a (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 | U. H. Tp(hrs)= .19

I a as 0.2xS (mm)= 15.174  
 Unit Hyd Qpeak (cms)= .755

PEAK FLOW (cms)= .064 (i)  
 TIME TO PEAK (hrs)= 6.100  
 RUNOFF VOLUME (mm)= 7.894  
 TOTAL RAINFALL (mm)= 43.800  
 RUNOFF COEFFICIENT = .180

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

-----  
 | DESIGN SCS(0008) | Area (ha)= .21 Curve Number (CN) = 81.0  
 | ID= 1 DT= 6.0 min | I a (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 | U. H. Tp(hrs)= .14

I a as 0.2xS (mm)= 11.916  
 Unit Hyd Qpeak (cms)= .083

PEAK FLOW (cms)= .010 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 11.354  
 TOTAL RAINFALL (mm)= 43.800  
 RUNOFF COEFFICIENT = .259

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

-----  
 | DESIGN SCS(0009) | Area (ha)= .27 Curve Number (CN) = 76.0  
 | ID= 1 DT= 6.0 min | I a (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 | U. H. Tp(hrs)= .10

I a as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .149

PEAK FLOW (cms)= .009 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 7.371  
 TOTAL RAINFALL (mm)= 43.800  
 RUNOFF COEFFICIENT = .168

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

-----  
 | ADD HYD (0015) |  
 | 1 + 2 = 3 | AREA OPEAK TPEAK R. V.  
 | (ha) (cms) (hrs) (mm)  
 | ID1= 1 (0001): 2.30 .039 6.20 7.14  
+ ID2= 2 (0002): 2.70 .027 6.60 7.14
ID = 3 (0015): 5.00 .053 6.20 7.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

post development12 hr newpond.out

ADD HYD (0017) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0015):	5.00	.053	6.20	7.14
+ ID2= 2 (0003):	1.70	.026	6.20	7.14
ID = 3 (0017):	6.70	.079	6.20	7.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0018) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0017):	6.70	.079	6.20	7.14
+ ID2= 2 (0004):	1.60	.035	6.10	7.18
ID = 3 (0018):	8.30	.104	6.20	7.15

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0011) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0006):	.19	.010	6.10	15.31
+ ID2= 2 (0005):	.41	.013	6.10	9.91
ID = 3 (0011):	.60	.023	6.10	11.62

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0012) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0011):	.60	.023	6.10	11.62
+ ID2= 2 (0007):	2.60	.064	6.10	7.89
ID = 3 (0012):	3.20	.087	6.10	8.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0013) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0008):	.21	.010	6.00	11.35
+ ID2= 2 (0009):	.27	.009	6.00	7.37
ID = 3 (0013):	.48	.019	6.00	9.11

post development12 hr newpond.out

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0014)  
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0012):	3.20	.087	6.10	8.59
+ ID2= 2 (0013):	.48	.019	6.00	9.11
<hr/>				
ID = 3 (0014):	3.68	.098	6.10	8.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0019)  
IN= 2---> OUT= 1  
DT= 6.0 min

	OUTFLOW (cms)	STORAGE (ha. m.)	OUTFLOW (cms)	STORAGE (ha. m.)
	.0000	.0000	.4620	.0350
	.0150	.0050	.5400	.0420
	.0600	.0110	.8860	.0490
	.1270	.0160	1.4500	.0570
	.2410	.0220	2.1700	.0650
	.3690	.0290	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
INFLOW : ID= 2 (0014)	3.68	.10	6.10	8.66
OUTFLOW: ID= 1 (0019)	3.68	.04	6.30	8.64

PEAK FLOW REDUCTION [Qout/Qin] (%) = 42.44  
 TIME SHIFT OF PEAK FLOW (min) = 12.00  
 MAXIMUM STORAGE USED (ha. m.) = .0086

\*\*\*\*\*  
 \*\* SIMULATION NUMBER: 2 \*\*  
 \*\*\*\*\*

MASS STORM  
Ptotal = 61.90 mm

Filename: P:\W&W\Software\V02\GFE\Scs12h.mst  
 Comments: Type II 12-hr MASS CURVE

Duration of storm = 12.00 hrs  
 Mass curve time step = 6.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.10	1.30	3.10	2.35	6.10	13.99	9.10	2.23
.20	1.36	3.20	2.35	6.20	12.26	9.20	2.17
.30	1.36	3.30	2.35	6.30	10.58	9.30	2.04
.40	1.42	3.40	2.35	6.40	8.98	9.40	1.98
.50	1.30	3.50	2.35	6.50	7.18	9.50	1.98
.60	1.49	3.60	2.41	6.60	6.19	9.60	1.92
.70	1.42	3.70	2.54	6.70	5.88	9.70	1.92
.80	1.36	3.80	2.60	6.80	5.45	9.80	1.86
.90	1.49	3.90	2.85	6.90	5.01	9.90	1.73
1.00	1.49	4.00	2.85	7.00	4.70	10.00	1.67
1.10	1.49	4.10	3.03	7.10	4.46	10.10	1.73

	post	development	12 hr	new	pond. out		
1. 20	1. 42	4. 20	3. 22	7. 20	4. 09	10. 20	1. 61
1. 30	1. 55	4. 30	3. 40	7. 30	3. 96	10. 30	1. 67
1. 40	1. 55	4. 40	3. 53	7. 40	3. 84	10. 40	1. 67
1. 50	1. 55	4. 50	3. 71	7. 50	3. 53	10. 50	1. 61
1. 60	1. 55	4. 60	4. 02	7. 60	3. 40	10. 60	1. 61
1. 70	1. 55	4. 70	4. 27	7. 70	3. 22	10. 70	1. 55
1. 80	1. 55	4. 80	4. 52	7. 80	3. 09	10. 80	1. 55
1. 90	1. 61	4. 90	4. 89	7. 90	2. 97	10. 90	1. 55
2. 00	1. 67	5. 00	5. 14	8. 00	2. 79	11. 00	1. 55
2. 10	1. 61	5. 10	5. 69	8. 10	2. 72	11. 10	1. 42
2. 20	1. 73	5. 20	6. 31	8. 20	2. 66	11. 20	1. 49
2. 30	1. 80	5. 30	7. 06	8. 30	2. 54	11. 30	1. 49
2. 40	1. 92	5. 40	7. 80	8. 40	2. 54	11. 40	1. 42
2. 50	1. 92	5. 50	8. 48	8. 50	2. 48	11. 50	1. 42
2. 60	2. 04	5. 60	17. 52	8. 60	2. 48	11. 60	1. 42
2. 70	2. 10	5. 70	35. 04	8. 70	2. 41	11. 70	1. 42
2. 80	2. 17	5. 80	56. 21	8. 80	2. 35	11. 80	1. 30
2. 90	2. 23	5. 90	100. 90	8. 90	2. 29	11. 90	1. 42
3. 00	2. 35	6. 00	70. 01	9. 00	2. 17	12. 00	1. 30

-----

DESIGN SCS(0001)	Area (ha)= 2. 30	Curve Number (CN) = 76. 0
ID= 1 DT= 6. 0 min	Ia (mm)= 0. 2 S	# of Linear Res. (N)= 5. 00
	U. H. Tp(hrs)= . 27	

Ia as 0. 2xS (mm)= 16. 042  
Unit Hyd Qpeak (cms)= . 470

PEAK FLOW (cms)= . 111 (i)  
TIME TO PEAK (hrs)= 6. 100  
RUNOFF VOLUME (mm)= 16. 701  
TOTAL RAINFALL (mm)= 61. 900  
RUNOFF COEFFICIENT = . 270

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

-----

DESIGN SCS(0002)	Area (ha)= 2. 70	Curve Number (CN) = 76. 0
ID= 1 DT= 6. 0 min	Ia (mm)= 0. 2 S	# of Linear Res. (N)= 5. 00
	U. H. Tp(hrs)= . 59	

Ia as 0. 2xS (mm)= 16. 042  
Unit Hyd Qpeak (cms)= . 252

PEAK FLOW (cms)= . 076 (i)  
TIME TO PEAK (hrs)= 6. 500  
RUNOFF VOLUME (mm)= 16. 681  
TOTAL RAINFALL (mm)= 61. 900  
RUNOFF COEFFICIENT = . 269

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

-----

DESIGN SCS(0003)	Area (ha)= 1. 70	Curve Number (CN) = 76. 0
ID= 1 DT= 6. 0 min	Ia (mm)= 0. 2 S	# of Linear Res. (N)= 5. 00
	U. H. Tp(hrs)= . 33	

Ia as 0. 2xS (mm)= 16. 042  
Unit Hyd Qpeak (cms)= . 284

post development 12 hr new pond. out

PEAK FLOW (cms) = .073 (i)  
 TIME TO PEAK (hrs) = 6.200  
 RUNOFF VOLUME (mm) = 16.688  
 TOTAL RAINFALL (mm) = 61.900  
 RUNOFF COEFFICIENT = .270

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

DESIGN SCS(0004)	Area (ha) = 1.60	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm) = 0.2 S	# of Linear Res. (N) = 5.00
	U. H. Tp(hrs) = .19	

Ia as 0.2xS (mm) = 16.042  
 Unit Hyd Qpeak (cms) = .464

PEAK FLOW (cms) = .093 (i)  
 TIME TO PEAK (hrs) = 6.100  
 RUNOFF VOLUME (mm) = 16.792  
 TOTAL RAINFALL (mm) = 61.900  
 RUNOFF COEFFICIENT = .271

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

DESIGN SCS(0006)	Area (ha) = .19	Curve Number (CN) = 85.0
ID= 1 DT= 6.0 min	Ia (mm) = 0.2 S	# of Linear Res. (N) = 5.00
	U. H. Tp(hrs) = .20	

Ia as 0.2xS (mm) = 8.965  
 Unit Hyd Qpeak (cms) = .052

PEAK FLOW (cms) = .020 (i)  
 TIME TO PEAK (hrs) = 6.000  
 RUNOFF VOLUME (mm) = 28.813  
 TOTAL RAINFALL (mm) = 61.900  
 RUNOFF COEFFICIENT = .465

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

DESIGN SCS(0005)	Area (ha) = .41	Curve Number (CN) = 79.6
ID= 1 DT= 6.0 min	Ia (mm) = 0.2 S	# of Linear Res. (N) = 5.00
	U. H. Tp(hrs) = .23	

Ia as 0.2xS (mm) = 13.019  
 Unit Hyd Qpeak (cms) = .098

PEAK FLOW (cms) = .030 (i)  
 TIME TO PEAK (hrs) = 6.100  
 RUNOFF VOLUME (mm) = 21.020  
 TOTAL RAINFALL (mm) = 61.900  
 RUNOFF COEFFICIENT = .340

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

DESIGN SCS(0007)	Area (ha) = 2.60	Curve Number (CN) = 77.0
ID= 1 DT= 6.0 min	Ia (mm) = 0.2 S	# of Linear Res. (N) = 5.00

post development 12 hr new pond. out  
 ----- U. H. Tp(hrs)= .19

I a as 0.2xS (mm)= 15.174  
 Unit Hyd Qpeak (cms)= .755

PEAK FLOW (cms)= .163 (i)  
 TIME TO PEAK (hrs)= 6.100  
 RUNOFF VOLUME (mm)= 17.928  
 TOTAL RAINFALL (mm)= 61.900  
 RUNOFF COEFFICIENT = .290

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

-----  
 | DESIGN SCS(0008) | Area (ha)= .21 Curve Number (CN) = 81.0  
 | ID= 1 DT= 6.0 min | I a (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 ----- U. H. Tp(hrs)= .14

I a as 0.2xS (mm)= 11.916  
 Unit Hyd Qpeak (cms)= .083

PEAK FLOW (cms)= .022 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 23.296  
 TOTAL RAINFALL (mm)= 61.900  
 RUNOFF COEFFICIENT = .376

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

-----  
 | DESIGN SCS(0009) | Area (ha)= .27 Curve Number (CN) = 76.0  
 | ID= 1 DT= 6.0 min | I a (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 ----- U. H. Tp(hrs)= .10

I a as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .149

PEAK FLOW (cms)= .021 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 17.231  
 TOTAL RAINFALL (mm)= 61.900  
 RUNOFF COEFFICIENT = .278

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

-----  
 | ADD HYD (0015) |  
 | 1 + 2 = 3 | AREA QPEAK TPEAK R. V.  
 (ha) (cms) (hrs) (mm)  
 ID1= 1 (0001): 2.30 .111 6.10 16.70  
 + ID2= 2 (0002): 2.70 .076 6.50 16.68  
 -----  
 ID = 3 (0015): 5.00 .154 6.20 16.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

post development 12 hr newpond.out

ADD HYD 1 + 2 = 3 (0017)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0015):	5.00	.154	6.20	16.69
+ ID2= 2 (0003):	1.70	.073	6.20	16.69
=====				
ID = 3 (0017):	6.70	.227	6.20	16.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD 1 + 2 = 3 (0018)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0017):	6.70	.227	6.20	16.69
+ ID2= 2 (0004):	1.60	.093	6.10	16.79
=====				
ID = 3 (0018):	8.30	.295	6.10	16.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD 1 + 2 = 3 (0011)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0006):	.19	.020	6.00	28.81
+ ID2= 2 (0005):	.41	.030	6.10	21.02
=====				
ID = 3 (0011):	.60	.049	6.10	23.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD 1 + 2 = 3 (0012)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0011):	.60	.049	6.10	23.49
+ ID2= 2 (0007):	2.60	.163	6.10	17.93
=====				
ID = 3 (0012):	3.20	.212	6.10	18.97

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD 1 + 2 = 3 (0013)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0008):	.21	.022	6.00	23.30
+ ID2= 2 (0009):	.27	.021	6.00	17.23
=====				
ID = 3 (0013):	.48	.043	6.00	19.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

post development12 hr newpond.out

ADD HYD (0014)  
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0012):	3.20	.212	6.10	18.97
+ ID2= 2 (0013):	.48	.043	6.00	19.88
=====				
ID = 3 (0014):	3.68	.245	6.00	19.09

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0019)  
IN= 2----> OUT= 1  
DT= 6.0 min

OUTFLOW (cms)	STORAGE (ha. m.)	OUTFLOW (cms)	STORAGE (ha. m.)
.0000	.0000	.4620	.0350
.0150	.0050	.5400	.0420
.0600	.0110	.8860	.0490
.1270	.0160	1.4500	.0570
.2410	.0220	2.1700	.0650
.3690	.0290	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
INFLOW : ID= 2 (0014)	3.68	.25	6.00	19.09
OUTFLOW: ID= 1 (0019)	3.68	.16	6.20	19.07

PEAK FLOW REDUCTION [Qout/Qin] (%) = 64.26  
 TIME SHIFT OF PEAK FLOW (min) = 12.00  
 MAXIMUM STORAGE USED (ha. m.) = .0177

\*\*\*\*\*  
 \*\* SIMULATION NUMBER: 3 \*\*  
 \*\*\*\*\*

MASS STORM  
Ptotal = 73.90 mm

Filename: P:\W&W\Software\V02\GFE\Scs12h.mst  
 Comments: Type II 12-hr MASS CURVE

Duration of storm = 12.00 hrs  
 Mass curve time step = 6.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.10	1.55	3.10	2.81	6.10	16.70	9.10	2.66
.20	1.63	3.20	2.81	6.20	14.63	9.20	2.59
.30	1.63	3.30	2.81	6.30	12.64	9.30	2.44
.40	1.70	3.40	2.81	6.40	10.72	9.40	2.36
.50	1.55	3.50	2.81	6.50	8.57	9.50	2.36
.60	1.77	3.60	2.88	6.60	7.39	9.60	2.29
.70	1.70	3.70	3.03	6.70	7.02	9.70	2.29
.80	1.63	3.80	3.10	6.80	6.50	9.80	2.22
.90	1.77	3.90	3.40	6.90	5.99	9.90	2.07
1.00	1.77	4.00	3.40	7.00	5.62	10.00	2.00
1.10	1.77	4.10	3.62	7.10	5.32	10.10	2.07
1.20	1.70	4.20	3.84	7.20	4.88	10.20	1.92
1.30	1.85	4.30	4.06	7.30	4.73	10.30	2.00
1.40	1.85	4.40	4.21	7.40	4.58	10.40	2.00
1.50	1.85	4.50	4.43	7.50	4.21	10.50	1.92

	post	development	12 hr	new	pond. out		
1.60	1.85	4.60	4.80	7.60	4.06	10.60	1.92
1.70	1.85	4.70	5.10	7.70	3.84	10.70	1.85
1.80	1.85	4.80	5.39	7.80	3.69	10.80	1.85
1.90	1.92	4.90	5.84	7.90	3.55	10.90	1.85
2.00	2.00	5.00	6.13	8.00	3.33	11.00	1.85
2.10	1.92	5.10	6.80	8.10	3.25	11.10	1.70
2.20	2.07	5.20	7.54	8.20	3.18	11.20	1.77
2.30	2.14	5.30	8.42	8.30	3.03	11.30	1.77
2.40	2.29	5.40	9.31	8.40	3.03	11.40	1.70
2.50	2.29	5.50	10.12	8.50	2.96	11.50	1.70
2.60	2.44	5.60	20.91	8.60	2.96	11.60	1.70
2.70	2.51	5.70	41.83	8.70	2.88	11.70	1.70
2.80	2.59	5.80	67.10	8.80	2.81	11.80	1.55
2.90	2.66	5.90	120.46	8.90	2.73	11.90	1.70
3.00	2.81	6.00	83.58	9.00	2.59	12.00	1.55

DESIGN SCS(0001) | Area (ha)= 2.30 | Curve Number (CN) = 76.0  
 ID= 1 DT= 6.0 min | Ia (mm)= 0.2 S | # of Linear Res. (N)= 5.00  
 U. H. Tp(hrs)= .27

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .171 (i)  
 TIME TO PEAK (hrs)= 6.100  
 RUNOFF VOLUME (mm)= 24.274  
 TOTAL RAINFALL (mm)= 73.900  
 RUNOFF COEFFICIENT = .328

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

DESIGN SCS(0002) | Area (ha)= 2.70 | Curve Number (CN) = 76.0  
 ID= 1 DT= 6.0 min | Ia (mm)= 0.2 S | # of Linear Res. (N)= 5.00  
 U. H. Tp(hrs)= .59

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .252

PEAK FLOW (cms)= .117 (i)  
 TIME TO PEAK (hrs)= 6.500  
 RUNOFF VOLUME (mm)= 24.246  
 TOTAL RAINFALL (mm)= 73.900  
 RUNOFF COEFFICIENT = .328

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

DESIGN SCS(0003) | Area (ha)= 1.70 | Curve Number (CN) = 76.0  
 ID= 1 DT= 6.0 min | Ia (mm)= 0.2 S | # of Linear Res. (N)= 5.00  
 U. H. Tp(hrs)= .33

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .284

PEAK FLOW (cms)= .112 (i)  
 TIME TO PEAK (hrs)= 6.200  
 RUNOFF VOLUME (mm)= 24.255  
 TOTAL RAINFALL (mm)= 73.900

RUNOFF COEFFICIENT = .328 post development 12 hr new pond. out

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

---

DESIGN SCS(0004) ID= 1 DT= 6.0 min	Area (ha)= 1.60 Ia (mm)= 0.2 S U. H. Tp(hrs)= .19	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .464

PEAK FLOW (cms)= .138 (i)  
TIME TO PEAK (hrs)= 6.100  
RUNOFF VOLUME (mm)= 24.407  
TOTAL RAINFALL (mm)= 73.900  
RUNOFF COEFFICIENT = .330

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

---

DESIGN SCS(0006) ID= 1 DT= 6.0 min	Area (ha)= .19 Ia (mm)= 0.2 S U. H. Tp(hrs)= .20	Curve Number (CN) = 85.0 # of Linear Res. (N)= 5.00
---------------------------------------	--	--

Ia as 0.2xS (mm)= 8.965  
Unit Hyd Qpeak (cms)= .052

PEAK FLOW (cms)= .027 (i)  
TIME TO PEAK (hrs)= 6.000  
RUNOFF VOLUME (mm)= 38.617  
TOTAL RAINFALL (mm)= 73.900  
RUNOFF COEFFICIENT = .523

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

---

DESIGN SCS(0005) ID= 1 DT= 6.0 min	Area (ha)= .41 Ia (mm)= 0.2 S U. H. Tp(hrs)= .23	Curve Number (CN) = 79.6 # of Linear Res. (N)= 5.00
---------------------------------------	--	--

Ia as 0.2xS (mm)= 13.019  
Unit Hyd Qpeak (cms)= .098

PEAK FLOW (cms)= .042 (i)  
TIME TO PEAK (hrs)= 6.100  
RUNOFF VOLUME (mm)= 29.501  
TOTAL RAINFALL (mm)= 73.900  
RUNOFF COEFFICIENT = .399

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

---

DESIGN SCS(0007) ID= 1 DT= 6.0 min	Area (ha)= 2.60 Ia (mm)= 0.2 S U. H. Tp(hrs)= .19	Curve Number (CN) = 77.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 15.174  
Unit Hyd Qpeak (cms)= .755

post development12 hr newpond.out

PEAK FLOW (cms)= .240 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 25.794  
 TOTAL RAINFALL (mm)= 73.900  
 RUNOFF COEFFICIENT = .349

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

DESIGN SCS(0008)	Area (ha)= .21	Curve Number (CN) = 81.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .14	

Ia as 0.2xS (mm)= 11.916  
 Unit Hyd Qpeak (cms)= .083

PEAK FLOW (cms)= .030 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 32.288  
 TOTAL RAINFALL (mm)= 73.900  
 RUNOFF COEFFICIENT = .437

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

DESIGN SCS(0009)	Area (ha)= .27	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .10	

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .149

PEAK FLOW (cms)= .031 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 25.045  
 TOTAL RAINFALL (mm)= 73.900  
 RUNOFF COEFFICIENT = .339

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

ADD HYD (0015)	AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0001):	2.30	.171	6.10	24.27
+ ID2= 2 (0002):	2.70	.117	6.50	24.25
=====				
ID = 3 (0015):	5.00	.237	6.20	24.26

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0017)	AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0015):	5.00	.237	6.20	24.26

		post development	12 hr new	pond. out
+ ID2= 2 (0003):	1.70	.112	6.20	24.26
=====				
ID = 3 (0017):	6.70	.349	6.20	24.26

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0018)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0017):	6.70	.349	6.20	24.26
+ ID2= 2 (0004):	1.60	.138	6.10	24.41
=====				
ID = 3 (0018):	8.30	.457	6.10	24.29

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0011)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0006):	.19	.027	6.00	38.62
+ ID2= 2 (0005):	.41	.042	6.10	29.50
=====				
ID = 3 (0011):	.60	.069	6.10	32.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0012)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0011):	.60	.069	6.10	32.39
+ ID2= 2 (0007):	2.60	.240	6.00	25.79
=====				
ID = 3 (0012):	3.20	.307	6.10	27.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0013)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0008):	.21	.030	6.00	32.29
+ ID2= 2 (0009):	.27	.031	6.00	25.05
=====				
ID = 3 (0013):	.48	.061	6.00	28.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0014)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R. V.

post development 12 hr newpond. out

	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0012):	3.20	.307	6.10	27.03
+ ID2= 2 (0013):	.48	.061	6.00	28.21
=====				
ID = 3 (0014):	3.68	.365	6.00	27.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0019)  
IN= 2---> OUT= 1  
DT= 6.0 min

OUTFLOW (cms)	STORAGE (ha. m.)	OUTFLOW (cms)	STORAGE (ha. m.)
.0000	.0000	.4620	.0350
.0150	.0050	.5400	.0420
.0600	.0110	.8860	.0490
.1270	.0160	1.4500	.0570
.2410	.0220	2.1700	.0650
.3690	.0290	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
INFLOW : ID= 2 (0014)	3.68	.36	6.00	27.18
OUTFLOW: ID= 1 (0019)	3.68	.26	6.20	27.16

PEAK FLOW REDUCTION [Qout/Qin] (%) = 70.80  
 TIME SHIFT OF PEAK FLOW (min) = 12.00  
 MAXIMUM STORAGE USED (ha. m.) = .0236

\*\*\*\*\*  
 \*\* SIMULATION NUMBER: 4 \*\*  
 \*\*\*\*\*

MASS STORM  
 Ptotal = 89.10 mm

Filename: P:\W&W\Software\V02\GFE\Scs12h.mst  
 Comments: Type II 12-hr MASS CURVE

Duration of storm = 12.00 hrs  
 Mass curve time step = 6.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.10	1.87	3.10	3.39	6.10	20.14	9.10	3.21
.20	1.96	3.20	3.39	6.20	17.64	9.20	3.12
.30	1.96	3.30	3.39	6.30	15.24	9.30	2.94
.40	2.05	3.40	3.39	6.40	12.92	9.40	2.85
.50	1.87	3.50	3.39	6.50	10.34	9.50	2.85
.60	2.14	3.60	3.47	6.60	8.91	9.60	2.76
.70	2.05	3.70	3.65	6.70	8.46	9.70	2.76
.80	1.96	3.80	3.74	6.80	7.84	9.80	2.67
.90	2.14	3.90	4.10	6.90	7.22	9.90	2.49
1.00	2.14	4.00	4.10	7.00	6.77	10.00	2.41
1.10	2.14	4.10	4.37	7.10	6.42	10.10	2.49
1.20	2.05	4.20	4.63	7.20	5.88	10.20	2.32
1.30	2.23	4.30	4.90	7.30	5.70	10.30	2.41
1.40	2.23	4.40	5.08	7.40	5.52	10.40	2.41
1.50	2.23	4.50	5.35	7.50	5.08	10.50	2.32
1.60	2.23	4.60	5.79	7.60	4.90	10.60	2.32
1.70	2.23	4.70	6.15	7.70	4.63	10.70	2.23
1.80	2.23	4.80	6.50	7.80	4.45	10.80	2.23
1.90	2.32	4.90	7.04	7.90	4.28	10.90	2.23

		post development	12 hr	newpond. out			
2.00	2.41	5.00	7.40	8.00	4.01	11.00	2.23
2.10	2.32	5.10	8.20	8.10	3.92	11.10	2.05
2.20	2.49	5.20	9.09	8.20	3.83	11.20	2.14
2.30	2.58	5.30	10.16	8.30	3.65	11.30	2.14
2.40	2.76	5.40	11.23	8.40	3.65	11.40	2.05
2.50	2.76	5.50	12.21	8.50	3.56	11.50	2.05
2.60	2.94	5.60	25.22	8.60	3.56	11.60	2.05
2.70	3.03	5.70	50.43	8.70	3.47	11.70	2.05
2.80	3.12	5.80	80.90	8.80	3.39	11.80	1.87
2.90	3.21	5.90	145.23	8.90	3.30	11.90	2.05
3.00	3.39	6.00	100.77	9.00	3.12	12.00	1.87

-----

DESIGN SCS(0001)	Area (ha)= 2.30	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .27	

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .255 (i)  
TIME TO PEAK (hrs)= 6.100  
RUNOFF VOLUME (mm)= 34.866  
TOTAL RAINFALL (mm)= 89.100  
RUNOFF COEFFICIENT = .391

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

-----

DESIGN SCS(0002)	Area (ha)= 2.70	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .59	

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .252

PEAK FLOW (cms)= .174 (i)  
TIME TO PEAK (hrs)= 6.500  
RUNOFF VOLUME (mm)= 34.824  
TOTAL RAINFALL (mm)= 89.100  
RUNOFF COEFFICIENT = .391

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

-----

DESIGN SCS(0003)	Area (ha)= 1.70	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .33	

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .284

PEAK FLOW (cms)= .166 (i)  
TIME TO PEAK (hrs)= 6.200  
RUNOFF VOLUME (mm)= 34.838  
TOTAL RAINFALL (mm)= 89.100  
RUNOFF COEFFICIENT = .391

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

post development12 hr newpond.out

-----  
 | DESIGN SCS(0004) | Area (ha)= 1.60 Curve Number (CN) = 76.0  
 | ID= 1 DT= 6.0 min | Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 -----  
 U. H. Tp(hrs)= .19

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .464

PEAK FLOW (cms)= .206 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 35.056  
 TOTAL RAINFALL (mm)= 89.100  
 RUNOFF COEFFICIENT = .393

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

-----  
 | DESIGN SCS(0006) | Area (ha)= .19 Curve Number (CN) = 85.0  
 | ID= 1 DT= 6.0 min | Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 -----  
 U. H. Tp(hrs)= .20

Ia as 0.2xS (mm)= 8.965  
 Unit Hyd Qpeak (cms)= .052

PEAK FLOW (cms)= .036 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 51.661  
 TOTAL RAINFALL (mm)= 89.100  
 RUNOFF COEFFICIENT = .580

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

-----  
 | DESIGN SCS(0005) | Area (ha)= .41 Curve Number (CN) = 79.6  
 | ID= 1 DT= 6.0 min | Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 -----  
 U. H. Tp(hrs)= .23

Ia as 0.2xS (mm)= 13.019  
 Unit Hyd Qpeak (cms)= .098

PEAK FLOW (cms)= .060 (i)  
 TIME TO PEAK (hrs)= 6.100  
 RUNOFF VOLUME (mm)= 41.111  
 TOTAL RAINFALL (mm)= 89.100  
 RUNOFF COEFFICIENT = .461

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

-----  
 | DESIGN SCS(0007) | Area (ha)= 2.60 Curve Number (CN) = 77.0  
 | ID= 1 DT= 6.0 min | Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 -----  
 U. H. Tp(hrs)= .19

Ia as 0.2xS (mm)= 15.174  
 Unit Hyd Qpeak (cms)= .755

PEAK FLOW (cms)= .354 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 36.727

post development 12 hr newpond.out

TOTAL RAINFALL (mm) = 89.100  
 RUNOFF COEFFICIENT = .412

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

DESIGN SCS(0008)	Area (ha) = .21	Curve Number (CN) = 81.0
ID= 1 DT= 6.0 min	Ia (mm) = 0.2 S	# of Linear Res. (N) = 5.00
	U. H. Tp(hrs) = .14	

Ia as 0.2xS (mm) = 11.916  
 Unit Hyd Qpeak (cms) = .083

PEAK FLOW (cms) = .041 (i)  
 TIME TO PEAK (hrs) = 6.000  
 RUNOFF VOLUME (mm) = 44.502  
 TOTAL RAINFALL (mm) = 89.100  
 RUNOFF COEFFICIENT = .499

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

DESIGN SCS(0009)	Area (ha) = .27	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm) = 0.2 S	# of Linear Res. (N) = 5.00
	U. H. Tp(hrs) = .10	

Ia as 0.2xS (mm) = 16.042  
 Unit Hyd Qpeak (cms) = .149

PEAK FLOW (cms) = .045 (i)  
 TIME TO PEAK (hrs) = 6.000  
 RUNOFF VOLUME (mm) = 35.973  
 TOTAL RAINFALL (mm) = 89.100  
 RUNOFF COEFFICIENT = .404

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

ADD HYD (0015)	AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0001):	2.30	.255	6.10	34.87
+ ID2= 2 (0002):	2.70	.174	6.50	34.82
=====				
ID = 3 (0015):	5.00	.354	6.20	34.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0017)	AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0015):	5.00	.354	6.20	34.84
+ ID2= 2 (0003):	1.70	.166	6.20	34.84
=====				
ID = 3 (0017):	6.70	.520	6.20	34.84

post development12 hr newpond.out

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (0018)		AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0017):		6.70	.520	6.20	34.84
+ ID2= 2 (0004):		1.60	.206	6.00	35.06
=====					
ID = 3 (0018):		8.30	.686	6.10	34.88

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (0011)		AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0006):		.19	.036	6.00	51.66
+ ID2= 2 (0005):		.41	.060	6.10	41.11
=====					
ID = 3 (0011):		.60	.095	6.10	44.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (0012)		AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0011):		.60	.095	6.10	44.45
+ ID2= 2 (0007):		2.60	.354	6.00	36.73
=====					
ID = 3 (0012):		3.20	.443	6.00	38.17

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (0013)		AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0008):		.21	.041	6.00	44.50
+ ID2= 2 (0009):		.27	.045	6.00	35.97
=====					
ID = 3 (0013):		.48	.086	6.00	39.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (0014)		AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0012):		3.20	.443	6.00	38.17
+ ID2= 2 (0013):		.48	.086	6.00	39.70
=====					

ID = 3 (0014): post development 12 hr newpond.out  
 3.68 .529 6.00 38.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0019)  
 IN= 2----> OUT= 1  
 DT= 6.0 min

OUTFLOW (cms)	STORAGE (ha. m.)	OUTFLOW (cms)	STORAGE (ha. m.)
.0000	.0000	.4620	.0350
.0150	.0050	.5400	.0420
.0600	.0110	.8860	.0490
.1270	.0160	1.4500	.0570
.2410	.0220	2.1700	.0650
.3690	.0290	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
INFLOW : ID= 2 (0014)	3.68	.53	6.00	38.37
OUTFLOW: ID= 1 (0019)	3.68	.38	6.20	38.35

PEAK FLOW REDUCTION [Qout/Qin] (%) = 72.47  
 TIME SHIFT OF PEAK FLOW (min) = 12.00  
 MAXIMUM STORAGE USED (ha. m.) = .0313

\*\*\*\*\*  
 \*\* SIMULATION NUMBER: 5 \*\*  
 \*\*\*\*\*

MASS STORM  
 Ptotal=100.30 mm

Filename: P:\W&W\Software\V02\GFE\Scs12h.mst  
 Comments: Type II 12-hr MASS CURVE

Duration of storm = 12.00 hrs  
 Mass curve time step = 6.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.10	2.11	3.10	3.81	6.10	22.67	9.10	3.61
.20	2.21	3.20	3.81	6.20	19.86	9.20	3.51
.30	2.21	3.30	3.81	6.30	17.15	9.30	3.31
.40	2.31	3.40	3.81	6.40	14.54	9.40	3.21
.50	2.11	3.50	3.81	6.50	11.63	9.50	3.21
.60	2.41	3.60	3.91	6.60	10.03	9.60	3.11
.70	2.31	3.70	4.11	6.70	9.53	9.70	3.11
.80	2.21	3.80	4.21	6.80	8.83	9.80	3.01
.90	2.41	3.90	4.61	6.90	8.12	9.90	2.81
1.00	2.41	4.00	4.61	7.00	7.62	10.00	2.71
1.10	2.41	4.10	4.91	7.10	7.22	10.10	2.81
1.20	2.31	4.20	5.22	7.20	6.62	10.20	2.61
1.30	2.51	4.30	5.52	7.30	6.42	10.30	2.71
1.40	2.51	4.40	5.72	7.40	6.22	10.40	2.71
1.50	2.51	4.50	6.02	7.50	5.72	10.50	2.61
1.60	2.51	4.60	6.52	7.60	5.52	10.60	2.61
1.70	2.51	4.70	6.92	7.70	5.22	10.70	2.51
1.80	2.51	4.80	7.32	7.80	5.01	10.80	2.51
1.90	2.61	4.90	7.92	7.90	4.81	10.90	2.51
2.00	2.71	5.00	8.32	8.00	4.51	11.00	2.51
2.10	2.61	5.10	9.23	8.10	4.41	11.10	2.31
2.20	2.81	5.20	10.23	8.20	4.31	11.20	2.41
2.30	2.91	5.30	11.43	8.30	4.11	11.30	2.41

		post development	12 hr new	pond. out			
2.40	3.11	5.40	12.64	8.40	4.11	11.40	2.31
2.50	3.11	5.50	13.74	8.50	4.01	11.50	2.31
2.60	3.31	5.60	28.38	8.60	4.01	11.60	2.31
2.70	3.41	5.70	56.77	8.70	3.91	11.70	2.31
2.80	3.51	5.80	91.07	8.80	3.81	11.80	2.11
2.90	3.61	5.90	163.49	8.90	3.71	11.90	2.31
3.00	3.81	6.00	113.44	9.00	3.51	12.00	2.11

---

DESIGN SCS(0001) ID= 1 DT= 6.0 mi n	Area (ha)= 2.30 Ia (mm)= 0.2 S U. H. Tp(hrs)= .27	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
--	---	--

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .321 (i)  
TIME TO PEAK (hrs)= 6.100  
RUNOFF VOLUME (mm)= 43.217  
TOTAL RAINFALL (mm)= 100.300  
RUNOFF COEFFICIENT = .431

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

---

DESIGN SCS(0002) ID= 1 DT= 6.0 mi n	Area (ha)= 2.70 Ia (mm)= 0.2 S U. H. Tp(hrs)= .59	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
--	---	--

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .252

PEAK FLOW (cms)= .219 (i)  
TIME TO PEAK (hrs)= 6.500  
RUNOFF VOLUME (mm)= 43.166  
TOTAL RAINFALL (mm)= 100.300  
RUNOFF COEFFICIENT = .430

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

---

DESIGN SCS(0003) ID= 1 DT= 6.0 mi n	Area (ha)= 1.70 Ia (mm)= 0.2 S U. H. Tp(hrs)= .33	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
--	---	--

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .284

PEAK FLOW (cms)= .208 (i)  
TIME TO PEAK (hrs)= 6.200  
RUNOFF VOLUME (mm)= 43.183  
TOTAL RAINFALL (mm)= 100.300  
RUNOFF COEFFICIENT = .431

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

---

DESIGN SCS(0004) ID= 1 DT= 6.0 mi n	Area (ha)= 1.60 Ia (mm)= 0.2 S	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
--	-----------------------------------	--

post development 12 hr newpond. out

-----  
U. H. Tp(hrs)= .19  
I a as 0.2xS (mm)= 16.042  
Uni t Hyd Qpeak (cms)= .464

PEAK FLOW (cms)= .260 (i)  
TIME TO PEAK (hrs)= 6.000  
RUNOFF VOLUME (mm)= 43.454  
TOTAL RAINFALL (mm)= 100.300  
RUNOFF COEFFICIENT = .433

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

-----  
DESIGN SCS(0006) | Area (ha)= .19 Curve Number (CN) = 85.0  
ID= 1 DT= 6.0 mi n | I a (mm)= 0.2 S # of Linear Res. (N)= 5.00  
-----  
U. H. Tp(hrs)= .20

I a as 0.2xS (mm)= 8.965  
Uni t Hyd Qpeak (cms)= .052

PEAK FLOW (cms)= .043 (i)  
TIME TO PEAK (hrs)= 6.000  
RUNOFF VOLUME (mm)= 61.591  
TOTAL RAINFALL (mm)= 100.300  
RUNOFF COEFFICIENT = .614

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

-----  
DESIGN SCS(0005) | Area (ha)= .41 Curve Number (CN) = 79.6  
ID= 1 DT= 6.0 mi n | I a (mm)= 0.2 S # of Linear Res. (N)= 5.00  
-----  
U. H. Tp(hrs)= .23

I a as 0.2xS (mm)= 13.019  
Uni t Hyd Qpeak (cms)= .098

PEAK FLOW (cms)= .073 (i)  
TIME TO PEAK (hrs)= 6.100  
RUNOFF VOLUME (mm)= 50.129  
TOTAL RAINFALL (mm)= 100.300  
RUNOFF COEFFICIENT = .500

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

-----  
DESIGN SCS(0007) | Area (ha)= 2.60 Curve Number (CN) = 77.0  
ID= 1 DT= 6.0 mi n | I a (mm)= 0.2 S # of Linear Res. (N)= 5.00  
-----  
U. H. Tp(hrs)= .19

I a as 0.2xS (mm)= 15.174  
Uni t Hyd Qpeak (cms)= .755

PEAK FLOW (cms)= .443 (i)  
TIME TO PEAK (hrs)= 6.000  
RUNOFF VOLUME (mm)= 45.310  
TOTAL RAINFALL (mm)= 100.300  
RUNOFF COEFFICIENT = .452

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

post development12 hr newpond.out

DESIGN SCS(0008) ID= 1 DT= 6.0 min	Area (ha)= .21	Curve Number (CN) = 81.0
	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .14	

Ia as 0.2xS (mm)= 11.916  
Unit Hyd Qpeak (cms)= .083

PEAK FLOW (cms)= .050 (i)  
TIME TO PEAK (hrs)= 6.000  
RUNOFF VOLUME (mm)= 53.937  
TOTAL RAINFALL (mm)= 100.300  
RUNOFF COEFFICIENT = .538

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

DESIGN SCS(0009) ID= 1 DT= 6.0 min	Area (ha)= .27	Curve Number (CN) = 76.0
	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .10	

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .149

PEAK FLOW (cms)= .055 (i)  
TIME TO PEAK (hrs)= 6.000  
RUNOFF VOLUME (mm)= 44.590  
TOTAL RAINFALL (mm)= 100.300  
RUNOFF COEFFICIENT = .445

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

ADD HYD (0015) 1 + 2 = 3	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0001):	2.30	.321	6.10	43.22
+ ID2= 2 (0002):	2.70	.219	6.50	43.17
=====				
ID = 3 (0015):	5.00	.446	6.20	43.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0017) 1 + 2 = 3	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0015):	5.00	.446	6.20	43.19
+ ID2= 2 (0003):	1.70	.208	6.20	43.18
=====				
ID = 3 (0017):	6.70	.654	6.20	43.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

post development 12 hr newpond.out

ADD HYD (0018) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0017):	6.70	.654	6.20	43.19
+ ID2= 2 (0004):	1.60	.260	6.00	43.45
=====				
ID = 3 (0018):	8.30	.866	6.10	43.24

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0011) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0006):	.19	.043	6.00	61.59
+ ID2= 2 (0005):	.41	.073	6.10	50.13
=====				
ID = 3 (0011):	.60	.114	6.10	53.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0012) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0011):	.60	.114	6.10	53.76
+ ID2= 2 (0007):	2.60	.443	6.00	45.31
=====				
ID = 3 (0012):	3.20	.551	6.00	46.89

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0013) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0008):	.21	.050	6.00	53.94
+ ID2= 2 (0009):	.27	.055	6.00	44.59
=====				
ID = 3 (0013):	.48	.105	6.00	48.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0014) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0012):	3.20	.551	6.00	46.89
+ ID2= 2 (0013):	.48	.105	6.00	48.68
=====				
ID = 3 (0014):	3.68	.656	6.00	47.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

post development12 hr newpond.out

RESERVOIR (0019)  
 IN= 2----> OUT= 1  
 DT= 6.0 min

OUTFLOW (cms)	STORAGE (ha. m.)	OUTFLOW (cms)	STORAGE (ha. m.)
.0000	.0000	.4620	.0350
.0150	.0050	.5400	.0420
.0600	.0110	.8860	.0490
.1270	.0160	1.4500	.0570
.2410	.0220	2.1700	.0650
.3690	.0290	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
INFLOW : ID= 2 (0014)	3.68	.66	6.00	47.13
OUTFLOW: ID= 1 (0019)	3.68	.47	6.20	47.11

PEAK FLOW REDUCTION [Qout/Qin] (%) = 71.85  
 TIME SHIFT OF PEAK FLOW (min) = 12.00  
 MAXIMUM STORAGE USED (ha. m.) = .0376

\*\*\*\*\*  
 \*\* SIMULATION NUMBER: 6 \*\*  
 \*\*\*\*\*

MASS STORM  
 Ptotal = 111.50 mm

Filename: P:\W&W\Software\V02\GFE\Scs12h.mst  
 Comments: Type II 12-hr MASS CURVE

Duration of storm = 12.00 hrs  
 Mass curve time step = 6.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.10	2.34	3.10	4.24	6.10	25.20	9.10	4.01
.20	2.45	3.20	4.24	6.20	22.08	9.20	3.90
.30	2.45	3.30	4.24	6.30	19.07	9.30	3.68
.40	2.56	3.40	4.24	6.40	16.17	9.40	3.57
.50	2.34	3.50	4.24	6.50	12.93	9.50	3.57
.60	2.68	3.60	4.35	6.60	11.15	9.60	3.46
.70	2.56	3.70	4.57	6.70	10.59	9.70	3.46
.80	2.45	3.80	4.68	6.80	9.81	9.80	3.34
.90	2.68	3.90	5.13	6.90	9.03	9.90	3.12
1.00	2.68	4.00	5.13	7.00	8.47	10.00	3.01
1.10	2.68	4.10	5.46	7.10	8.03	10.10	3.12
1.20	2.56	4.20	5.80	7.20	7.36	10.20	2.90
1.30	2.79	4.30	6.13	7.30	7.14	10.30	3.01
1.40	2.79	4.40	6.36	7.40	6.91	10.40	3.01
1.50	2.79	4.50	6.69	7.50	6.36	10.50	2.90
1.60	2.79	4.60	7.25	7.60	6.13	10.60	2.90
1.70	2.79	4.70	7.69	7.70	5.80	10.70	2.79
1.80	2.79	4.80	8.14	7.80	5.57	10.80	2.79
1.90	2.90	4.90	8.81	7.90	5.35	10.90	2.79
2.00	3.01	5.00	9.25	8.00	5.02	11.00	2.79
2.10	2.90	5.10	10.26	8.10	4.91	11.10	2.56
2.20	3.12	5.20	11.37	8.20	4.79	11.20	2.68
2.30	3.23	5.30	12.71	8.30	4.57	11.30	2.68
2.40	3.46	5.40	14.05	8.40	4.57	11.40	2.56
2.50	3.46	5.50	15.28	8.50	4.46	11.50	2.56
2.60	3.68	5.60	31.55	8.60	4.46	11.60	2.56
2.70	3.79	5.70	63.11	8.70	4.35	11.70	2.56

		post development		12 hr newpond. out			
2. 80	3. 90	5. 80	101. 24	8. 80	4. 24	11. 80	2. 34
2. 90	4. 01	5. 90	181. 74	8. 90	4. 13	11. 90	2. 56
3. 00	4. 24	6. 00	126. 11	9. 00	3. 90	12. 00	2. 34

-----  
 -----  
 | DESIGN SCS(0001) | Area (ha)= 2.30 Curve Number (CN) = 76.0  
 | ID= 1 DT= 6.0 min | Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 -----  
 U. H. Tp(hrs)= .27

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .389 (i)  
 TIME TO PEAK (hrs)= 6.100  
 RUNOFF VOLUME (mm)= 51.933  
 TOTAL RAINFALL (mm)= 111.500  
 RUNOFF COEFFICIENT = .466

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

-----  
 -----  
 | DESIGN SCS(0002) | Area (ha)= 2.70 Curve Number (CN) = 76.0  
 | ID= 1 DT= 6.0 min | Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 -----  
 U. H. Tp(hrs)= .59

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .252

PEAK FLOW (cms)= .265 (i)  
 TIME TO PEAK (hrs)= 6.500  
 RUNOFF VOLUME (mm)= 51.872  
 TOTAL RAINFALL (mm)= 111.500  
 RUNOFF COEFFICIENT = .465

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

-----  
 -----  
 | DESIGN SCS(0003) | Area (ha)= 1.70 Curve Number (CN) = 76.0  
 | ID= 1 DT= 6.0 min | Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 -----  
 U. H. Tp(hrs)= .33

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .284

PEAK FLOW (cms)= .252 (i)  
 TIME TO PEAK (hrs)= 6.200  
 RUNOFF VOLUME (mm)= 51.892  
 TOTAL RAINFALL (mm)= 111.500  
 RUNOFF COEFFICIENT = .465

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

-----  
 -----  
 | DESIGN SCS(0004) | Area (ha)= 1.60 Curve Number (CN) = 76.0  
 | ID= 1 DT= 6.0 min | Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 -----  
 U. H. Tp(hrs)= .19

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .464

post development12 hr newpond.out

PEAK FLOW (cms)= .315 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 52.218  
 TOTAL RAINFALL (mm)= 111.500  
 RUNOFF COEFFICIENT = .468

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

DESIGN SCS(0006) ID= 1 DT= 6.0 min	Area (ha)= .19 Ia (mm)= 0.2 S U. H. Tp(hrs)= .20	Curve Number (CN) = 85.0 # of Linear Res. (N)= 5.00
---------------------------------------	--	--

Ia as 0.2xS (mm)= 8.965  
 Unit Hyd Qpeak (cms)= .052

PEAK FLOW (cms)= .050 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 71.722  
 TOTAL RAINFALL (mm)= 111.500  
 RUNOFF COEFFICIENT = .643

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

DESIGN SCS(0005) ID= 1 DT= 6.0 min	Area (ha)= .41 Ia (mm)= 0.2 S U. H. Tp(hrs)= .23	Curve Number (CN) = 79.6 # of Linear Res. (N)= 5.00
---------------------------------------	--	--

Ia as 0.2xS (mm)= 13.019  
 Unit Hyd Qpeak (cms)= .098

PEAK FLOW (cms)= .086 (i)  
 TIME TO PEAK (hrs)= 6.100  
 RUNOFF VOLUME (mm)= 59.450  
 TOTAL RAINFALL (mm)= 111.500  
 RUNOFF COEFFICIENT = .533

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

DESIGN SCS(0007) ID= 1 DT= 6.0 min	Area (ha)= 2.60 Ia (mm)= 0.2 S U. H. Tp(hrs)= .19	Curve Number (CN) = 77.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 15.174  
 Unit Hyd Qpeak (cms)= .755

PEAK FLOW (cms)= .534 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 54.244  
 TOTAL RAINFALL (mm)= 111.500  
 RUNOFF COEFFICIENT = .486

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

DESIGN SCS(0008)	Area (ha)= .21	Curve Number (CN) = 81.0
------------------	----------------	--------------------------

post development 12 hr newpond. out  
 | ID= 1 DT= 6.0 min | Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 U. H. Tp(hrs)= .14

Ia as 0.2xS (mm)= 11.916  
 Unit Hyd Qpeak (cms)= .083

PEAK FLOW (cms)= .059 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 63.655  
 TOTAL RAINFALL (mm)= 111.500  
 RUNOFF COEFFICIENT = .571

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

DESIGN SCS(0009) Area (ha)= .27 Curve Number (CN) = 76.0  
 | ID= 1 DT= 6.0 min | Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 U. H. Tp(hrs)= .10

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .149

PEAK FLOW (cms)= .066 (i)  
 TIME TO PEAK (hrs)= 5.900  
 RUNOFF VOLUME (mm)= 53.583  
 TOTAL RAINFALL (mm)= 111.500  
 RUNOFF COEFFICIENT = .481

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

ADD HYD (0015) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0001):	2.30	.389	6.10	51.93
+ ID2= 2 (0002):	2.70	.265	6.50	51.87
=====				
ID = 3 (0015):	5.00	.542	6.20	51.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0017) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0015):	5.00	.542	6.20	51.90
+ ID2= 2 (0003):	1.70	.252	6.20	51.89
=====				
ID = 3 (0017):	6.70	.794	6.20	51.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0018) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
-----------------------------	--------------	----------------	----------------	---------------

	post development 12 hr newpond.out			
ID1= 1 (0017):	6.70	.794	6.20	51.90
+ ID2= 2 (0004):	1.60	.315	6.00	52.22
=====				
ID = 3 (0018):	8.30	1.053	6.10	51.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----				
ADD HYD (0011)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0006):	.19	.050	6.00	71.72
+ ID2= 2 (0005):	.41	.086	6.10	59.45
=====				
ID = 3 (0011):	.60	.134	6.10	63.34

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----				
ADD HYD (0012)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0011):	.60	.134	6.10	63.34
+ ID2= 2 (0007):	2.60	.534	6.00	54.24
=====				
ID = 3 (0012):	3.20	.663	6.00	55.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----				
ADD HYD (0013)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0008):	.21	.059	6.00	63.65
+ ID2= 2 (0009):	.27	.066	5.90	53.58
=====				
ID = 3 (0013):	.48	.125	6.00	57.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----				
ADD HYD (0014)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0012):	3.20	.663	6.00	55.95
+ ID2= 2 (0013):	.48	.125	6.00	57.99
=====				
ID = 3 (0014):	3.68	.787	6.00	56.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----	
RESERVOIR (0019)	
IN= 2----> OUT= 1	

DT= 6.0 min	post development		12 hr newpond. out	
	OUTFLOW (cms)	STORAGE (ha. m.)	OUTFLOW (cms)	STORAGE (ha. m.)
	.0000	.0000	.4620	.0350
	.0150	.0050	.5400	.0420
	.0600	.0110	.8860	.0490
	.1270	.0160	1.4500	.0570
	.2410	.0220	2.1700	.0650
	.3690	.0290	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
INFLOW : ID= 2 (0014)	3.68	.79	6.00	56.21
OUTFLOW: ID= 1 (0019)	3.68	.57	6.20	56.19

PEAK FLOW REDUCTION [Qout/Qin](%)= 72.16  
 TIME SHIFT OF PEAK FLOW (min)= 12.00  
 MAXIMUM STORAGE USED (ha. m.)= .0449

FINISH

post development 6 hr. out

```

=====
=====
V   V   I   SSSSS U   U   A   L
V   V   I   SS   U   U   A A  L
V   V   I   SS   U   U   AAAAA L
V   V   I   SS   U   U   A   A  L
  W   I   SSSSS UUUUU A   A  LLLLL

000   TTTTT TTTTT H   H   Y   Y   M   M   000   TM
0   0   T   T   H   H   Y   Y   MM  MM  0   0
0   0   T   T   H   H   Y   M   M   0   0

000   T   T   H   H   Y   M   M   000

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

Input filename: C:\Program Files\Visual OTTHYM0 2.2.4\vojn.dat  
 Output filename: C:\K2WIND~1\post development 6 hr. out  
 Summary filename: C:\K2WIND~1\post development 6 hr. sum

DATE: 6/13/2012

TIME: 1:56:01 PM

USER:

COMMENTS: \_\_\_\_\_

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*****
** SIMULATION NUMBER: 1 **
*****

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-----
| MASS STORM |
| Ptotal=108.80 mm |
|-----|

```

Filename: P:\W&W\Software\V02\GFE\Scs6h.mst  
 Comments: Type II 6-hr Tabular

Duration of storm = 6.00 hrs  
 Mass curve time step = 6.00 min

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.10	4.90	1.60	7.83	3.10	146.44	4.60	7.40
.20	5.00	1.70	8.27	3.20	29.27	4.70	7.07
.30	4.90	1.80	8.92	3.30	25.57	4.80	6.85
.40	4.90	1.90	9.57	3.40	22.09	4.90	6.42
.50	4.90	2.00	10.12	3.50	18.82	5.00	6.20
.60	5.00	2.10	10.88	3.60	15.12	5.10	5.77
.70	5.00	2.20	11.75	3.70	12.95	5.20	5.77

post development 6 hr. out							
.80	5.22	2.30	13.27	3.80	12.29	5.30	5.55
.90	5.55	2.40	14.80	3.90	11.32	5.40	5.33
1.00	5.88	2.50	16.32	4.00	10.55	5.50	5.22
1.10	5.98	2.60	17.73	4.10	9.79	5.60	5.22
1.20	6.31	2.70	36.56	4.20	9.25	5.70	5.11
1.30	6.85	2.80	73.33	4.30	8.60	5.80	5.11
1.40	7.07	2.90	117.61	4.40	8.38	5.90	4.90
1.50	7.40	3.00	211.07	4.50	7.94	6.00	4.79

DESIGN SCS(0005) | Area (ha)= .41 | Curve Number (CN) = 79.6  
 ID= 1 DT= 6.0 min | I a (mm)= 0.2 S | # of Linear Res. (N)= 5.00  
 U. H. Tp(hrs)= .23

I a as 0.2xS (mm)= 13.019  
 Unit Hyd Qpeak (cms)= .098

PEAK FLOW (cms)= .099 (i)  
 TIME TO PEAK (hrs)= 3.200  
 RUNOFF VOLUME (mm)= 57.179  
 TOTAL RAINFALL (mm)= 108.800  
 RUNOFF COEFFICIENT = .526

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

DESIGN SCS(0006) | Area (ha)= .19 | Curve Number (CN) = 85.0  
 ID= 1 DT= 6.0 min | I a (mm)= 0.2 S | # of Linear Res. (N)= 5.00  
 U. H. Tp(hrs)= .20

I a as 0.2xS (mm)= 8.965  
 Unit Hyd Qpeak (cms)= .052

PEAK FLOW (cms)= .057 (i)  
 TIME TO PEAK (hrs)= 3.100  
 RUNOFF VOLUME (mm)= 69.263  
 TOTAL RAINFALL (mm)= 108.800  
 RUNOFF COEFFICIENT = .637

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

DESIGN SCS(0007) | Area (ha)= 2.60 | Curve Number (CN) = 77.0  
 ID= 1 DT= 6.0 min | I a (mm)= 0.2 S | # of Linear Res. (N)= 5.00  
 U. H. Tp(hrs)= .19

I a as 0.2xS (mm)= 15.174  
 Unit Hyd Qpeak (cms)= .755

PEAK FLOW (cms)= .606 (i)  
 TIME TO PEAK (hrs)= 3.100  
 RUNOFF VOLUME (mm)= 52.062  
 TOTAL RAINFALL (mm)= 108.800  
 RUNOFF COEFFICIENT = .479

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

DESIGN SCS(0008) | Area (ha)= .21 | Curve Number (CN) = 81.0

post development 6 hr. out  
 | ID= 1 DT= 6.0 min | I a (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 ----- U. H. Tp(hrs)= .14

I a as 0.2xS (mm)= 11.916  
 Unit Hyd Qpeak (cms)= .083

PEAK FLOW (cms)= .068 (i)  
 TIME TO PEAK (hrs)= 3.100  
 RUNOFF VOLUME (mm)= 61.288  
 TOTAL RAINFALL (mm)= 108.800  
 RUNOFF COEFFICIENT = .563

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

DESIGN SCS(0009) | Area (ha)= .27 Curve Number (CN) = 98.0  
 | ID= 1 DT= 6.0 min | I a (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 ----- U. H. Tp(hrs)= .10

I a as 0.2xS (mm)= 1.037  
 Unit Hyd Qpeak (cms)= .149

PEAK FLOW (cms)= .144 (i)  
 TIME TO PEAK (hrs)= 3.000  
 RUNOFF VOLUME (mm)= 106.210  
 TOTAL RAINFALL (mm)= 108.800  
 RUNOFF COEFFICIENT = .976

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

DESIGN SCS(0001) | Area (ha)= 2.30 Curve Number (CN) = 76.0  
 | ID= 1 DT= 6.0 min | I a (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 ----- U. H. Tp(hrs)= .27

I a as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .440 (i)  
 TIME TO PEAK (hrs)= 3.200  
 RUNOFF VOLUME (mm)= 49.803  
 TOTAL RAINFALL (mm)= 108.800  
 RUNOFF COEFFICIENT = .458

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

DESIGN SCS(0002) | Area (ha)= 2.70 Curve Number (CN) = 76.0  
 | ID= 1 DT= 6.0 min | I a (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 ----- U. H. Tp(hrs)= .59

I a as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .252

PEAK FLOW (cms)= .298 (i)  
 TIME TO PEAK (hrs)= 3.600  
 RUNOFF VOLUME (mm)= 49.744  
 TOTAL RAINFALL (mm)= 108.800  
 RUNOFF COEFFICIENT = .457

post development 6 hr. out

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

---

DESIGN SCS(0003)	Area (ha)= 1.70	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 mi n	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .33	

Ia as 0.2xS (mm)= 16.042
Unit Hyd Qpeak (cms)= .284

PEAK FLOW (cms)= .286 (i)
TIME TO PEAK (hrs)= 3.300
RUNOFF VOLUME (mm)= 49.763
TOTAL RAINFALL (mm)= 108.800
RUNOFF COEFFICIENT = .457

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

---

DESIGN SCS(0004)	Area (ha)= 1.60	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 mi n	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .19	

Ia as 0.2xS (mm)= 16.042
Unit Hyd Qpeak (cms)= .464

PEAK FLOW (cms)= .357 (i)
TIME TO PEAK (hrs)= 3.100
RUNOFF VOLUME (mm)= 50.075
TOTAL RAINFALL (mm)= 108.800
RUNOFF COEFFICIENT = .460

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

---

ADD HYD (0011)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0006):	.19	.057	3.10	69.26
+ ID2= 2 (0005):	.41	.099	3.20	57.18
ID = 3 (0011):	.60	.154	3.20	61.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (0012)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0011):	.60	.154	3.20	61.01
+ ID2= 2 (0007):	2.60	.606	3.10	52.06
ID = 3 (0012):	3.20	.751	3.10	53.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

post development 6 hr. out

ADD HYD (0013) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0008):	.21	.068	3.10	61.29
+ ID2= 2 (0009):	.27	.144	3.00	106.21
ID = 3 (0013):	.48	.198	3.00	86.56

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0015) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0001):	2.30	.440	3.20	49.80
+ ID2= 2 (0002):	2.70	.298	3.60	49.74
ID = 3 (0015):	5.00	.607	3.30	49.77

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0017) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0015):	5.00	.607	3.30	49.77
+ ID2= 2 (0003):	1.70	.286	3.30	49.76
ID = 3 (0017):	6.70	.893	3.30	49.77

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0018) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0017):	6.70	.893	3.30	49.77
+ ID2= 2 (0004):	1.60	.357	3.10	50.07
ID = 3 (0018):	8.30	1.180	3.20	49.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0014) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0012):	3.20	.751	3.10	53.74
+ ID2= 2 (0013):	.48	.198	3.00	86.56
ID = 3 (0014):	3.68	.942	3.10	58.02

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

post development 6 hr. out

RESERVOIR (0019)  
 IN= 2---> OUT= 1  
 DT= 6.0 min

OUTFLOW (cms)	STORAGE (ha. m.)	OUTFLOW (cms)	STORAGE (ha. m.)
.0000	.0000	.4620	.3060
.0150	.0487	.5400	.3600
.0600	.0983	.8860	.4150
.1270	.1480	1.4500	.4710
.2410	.2000	2.1700	.5280
.3690	.2520	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
INFLOW : ID= 2 (0014)	3.68	.94	3.10	58.02
OUTFLOW: ID= 1 (0019)	3.68	.11	3.80	57.80

PEAK FLOW REDUCTION [Qout/Qin] (%) = 11.84  
 TIME SHIFT OF PEAK FLOW (min) = 42.00  
 MAXIMUM STORAGE USED (ha. m.) = .1366

\*\*\*\*\*  
 \*\* SIMULATION NUMBER: 2 \*\*  
 \*\*\*\*\*

MASS STORM  
 Ptotal = 97.50 mm

Filename: P:\W&W\Software\V02\GFE\Scs6h.mst  
 Comments: Type II 6-hr Tabular

Duration of storm = 6.00 hrs  
 Mass curve time step = 6.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.10	4.39	1.60	7.02	3.10	131.24	4.60	6.63
.20	4.49	1.70	7.41	3.20	26.23	4.70	6.34
.30	4.39	1.80	8.00	3.30	22.91	4.80	6.14
.40	4.39	1.90	8.58	3.40	19.79	4.90	5.75
.50	4.39	2.00	9.07	3.50	16.87	5.00	5.56
.60	4.48	2.10	9.75	3.60	13.55	5.10	5.17
.70	4.49	2.20	10.53	3.70	11.60	5.20	5.17
.80	4.68	2.30	11.89	3.80	11.02	5.30	4.97
.90	4.97	2.40	13.26	3.90	10.14	5.40	4.78
1.00	5.26	2.50	14.62	4.00	9.46	5.50	4.68
1.10	5.36	2.60	15.89	4.10	8.78	5.60	4.68
1.20	5.66	2.70	32.76	4.20	8.29	5.70	4.58
1.30	6.14	2.80	65.72	4.30	7.70	5.80	4.58
1.40	6.34	2.90	105.40	4.40	7.51	5.90	4.39
1.50	6.63	3.00	189.15	4.50	7.12	6.00	4.29

DESIGN SCS(0005)  
 ID= 1 DT= 6.0 min

Area (ha) = .41  
 Curve Number (CN) = 79.6  
 Ia (mm) = 0.2 S # of Linear Res. (N) = 5.00  
 U. H. Tp(hrs) = .23

Ia as 0.2xS (mm) = 13.019  
 Unit Hyd Qpeak (cms) = .098

PEAK FLOW (cms) = .083 (i)

post development 6 hr. out

TIME TO PEAK (hrs)= 3.200  
 RUNOFF VOLUME (mm)= 47.844  
 TOTAL RAINFALL (mm)= 97.500  
 RUNOFF COEFFICIENT = .491

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

DESIGN SCS(0006)	Area (ha)= .19	Curve Number (CN) = 85.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .20	

Ia as 0.2xS (mm)= 8.965  
 Unit Hyd Qpeak (cms)= .052

PEAK FLOW (cms)= .049 (i)  
 TIME TO PEAK (hrs)= 3.100  
 RUNOFF VOLUME (mm)= 59.086  
 TOTAL RAINFALL (mm)= 97.500  
 RUNOFF COEFFICIENT = .606

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

DESIGN SCS(0007)	Area (ha)= 2.60	Curve Number (CN) = 77.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .19	

Ia as 0.2xS (mm)= 15.174  
 Unit Hyd Qpeak (cms)= .755

PEAK FLOW (cms)= .497 (i)  
 TIME TO PEAK (hrs)= 3.100  
 RUNOFF VOLUME (mm)= 43.129  
 TOTAL RAINFALL (mm)= 97.500  
 RUNOFF COEFFICIENT = .442

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

DESIGN SCS(0008)	Area (ha)= .21	Curve Number (CN) = 81.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .14	

Ia as 0.2xS (mm)= 11.916  
 Unit Hyd Qpeak (cms)= .083

PEAK FLOW (cms)= .057 (i)  
 TIME TO PEAK (hrs)= 3.100  
 RUNOFF VOLUME (mm)= 51.548  
 TOTAL RAINFALL (mm)= 97.500  
 RUNOFF COEFFICIENT = .529

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

DESIGN SCS(0009)	Area (ha)= .27	Curve Number (CN) = 98.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .10	

post development 6 hr. out

Ia as 0.2xS (mm)= 1.037  
Unit Hyd Qpeak (cms)= .149  
  
PEAK FLOW (cms)= .129 (i)  
TIME TO PEAK (hrs)= 3.000  
RUNOFF VOLUME (mm)= 94.564  
TOTAL RAINFALL (mm)= 97.500  
RUNOFF COEFFICIENT = .970

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

---

DESIGN SCS(0001) ID= 1 DT= 6.0 min	Area (ha)= 2.30 Ia (mm)= 0.2 S U. H. Tp(hrs)= .27	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .470  
  
PEAK FLOW (cms)= .360 (i)  
TIME TO PEAK (hrs)= 3.200  
RUNOFF VOLUME (mm)= 41.092  
TOTAL RAINFALL (mm)= 97.500  
RUNOFF COEFFICIENT = .421

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

---

DESIGN SCS(0002) ID= 1 DT= 6.0 min	Area (ha)= 2.70 Ia (mm)= 0.2 S U. H. Tp(hrs)= .59	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .252  
  
PEAK FLOW (cms)= .244 (i)  
TIME TO PEAK (hrs)= 3.600  
RUNOFF VOLUME (mm)= 41.044  
TOTAL RAINFALL (mm)= 97.500  
RUNOFF COEFFICIENT = .421

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

---

DESIGN SCS(0003) ID= 1 DT= 6.0 min	Area (ha)= 1.70 Ia (mm)= 0.2 S U. H. Tp(hrs)= .33	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .284  
  
PEAK FLOW (cms)= .234 (i)  
TIME TO PEAK (hrs)= 3.300  
RUNOFF VOLUME (mm)= 41.060  
TOTAL RAINFALL (mm)= 97.500  
RUNOFF COEFFICIENT = .421

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

post development 6 hr. out

DESIGN SCS(0004)	Area (ha)=	1.60	Curve Number (CN) =	76.0
ID= 1 DT= 6.0 min	Ia (mm)=	0.2 S	# of Linear Res. (N)=	5.00
	U. H. Tp(hrs)=	.19		

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .464

PEAK FLOW (cms)= .291 (i)  
 TIME TO PEAK (hrs)= 3.100  
 RUNOFF VOLUME (mm)= 41.317  
 TOTAL RAINFALL (mm)= 97.500  
 RUNOFF COEFFICIENT = .424

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

ADD HYD (0011)	AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0006):	.19	.049	3.10	59.09
+ ID2= 2 (0005):	.41	.083	3.20	47.84
=====				
ID = 3 (0011):	.60	.130	3.20	51.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0012)	AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0011):	.60	.130	3.20	51.40
+ ID2= 2 (0007):	2.60	.497	3.10	43.13
=====				
ID = 3 (0012):	3.20	.618	3.10	44.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0013)	AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0008):	.21	.057	3.10	51.55
+ ID2= 2 (0009):	.27	.129	3.00	94.56
=====				
ID = 3 (0013):	.48	.173	3.00	75.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0015)	AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0001):	2.30	.360	3.20	41.09

	post development 6 hr. out			
+ ID2= 2 (0002):	2.70	.244	3.60	41.04
=====				
ID = 3 (0015):	5.00	.495	3.30	41.07

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----				
ADD HYD (0017)				
1 + 2 = 3				
-----				
	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0015):	5.00	.495	3.30	41.07
+ ID2= 2 (0003):	1.70	.234	3.30	41.06
=====				
ID = 3 (0017):	6.70	.729	3.30	41.06

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----				
ADD HYD (0018)				
1 + 2 = 3				
-----				
	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0017):	6.70	.729	3.30	41.06
+ ID2= 2 (0004):	1.60	.291	3.10	41.32
=====				
ID = 3 (0018):	8.30	.961	3.20	41.11

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----				
ADD HYD (0014)				
1 + 2 = 3				
-----				
	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0012):	3.20	.618	3.10	44.68
+ ID2= 2 (0013):	.48	.173	3.00	75.74
=====				
ID = 3 (0014):	3.68	.786	3.10	48.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

-----				
RESERVOIR (0019)				
IN= 2---> OUT= 1				
DT= 6.0 min				
-----				
	OUTFLOW	STORAGE	OUTFLOW	STORAGE
	(cms)	(ha. m.)	(cms)	(ha. m.)
	.0000	.0000	.4620	.3060
	.0150	.0487	.5400	.3600
	.0600	.0983	.8860	.4150
	.1270	.1480	1.4500	.4710
	.2410	.2000	2.1700	.5280
	.3690	.2520	.0000	.0000
-----				
	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0014)	3.68	.79	3.10	48.73
OUTFLOW: ID= 1 (0019)	3.68	.08	4.00	48.51

post development 6 hr. out  
 PEAK FLOW REDUCTION [Qout/Qin] (%) = 10.75  
 TIME SHIFT OF PEAK FLOW (min) = 54.00  
 MAXIMUM STORAGE USED (ha.m.) = .1165

\*\*\*\*\*  
 \*\* SIMULATION NUMBER: 3 \*\*  
 \*\*\*\*\*

MASS STORM  
 Ptotal = 86.10 mm

Filename: P:\W&W\Software\V02\GFE\Scs6h.mst  
 Comments: Type II 6-hr Tabular

Duration of storm = 6.00 hrs  
 Mass curve time step = 6.00 min

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.10	3.87	1.60	6.20	3.10	115.89	4.60	5.85
.20	3.96	1.70	6.54	3.20	23.16	4.70	5.60
.30	3.87	1.80	7.06	3.30	20.23	4.80	5.42
.40	3.87	1.90	7.58	3.40	17.48	4.90	5.08
.50	3.87	2.00	8.01	3.50	14.90	5.00	4.91
.60	3.96	2.10	8.61	3.60	11.97	5.10	4.56
.70	3.96	2.20	9.30	3.70	10.25	5.20	4.56
.80	4.13	2.30	10.50	3.80	9.73	5.30	4.39
.90	4.39	2.40	11.71	3.90	8.95	5.40	4.22
1.00	4.65	2.50	12.91	4.00	8.35	5.50	4.13
1.10	4.74	2.60	14.03	4.10	7.75	5.60	4.13
1.20	4.99	2.70	28.93	4.20	7.32	5.70	4.05
1.30	5.42	2.80	58.03	4.30	6.80	5.80	4.05
1.40	5.60	2.90	93.07	4.40	6.63	5.90	3.87
1.50	5.85	3.00	167.03	4.50	6.29	6.00	3.79

DESIGN SCS(0005)  
 ID= 1 DT= 6.0 min

Area (ha) = .41      Curve Number (CN) = 79.6  
 Ia (mm) = 0.2 S      # of Linear Res. (N) = 5.00  
 U. H. Tp(hrs) = .23

Ia as 0.2xS (mm) = 13.019  
 Unit Hyd Qpeak (cms) = .098

PEAK FLOW (cms) = .067 (i)  
 TIME TO PEAK (hrs) = 3.200  
 RUNOFF VOLUME (mm) = 38.756  
 TOTAL RAINFALL (mm) = 86.100  
 RUNOFF COEFFICIENT = .450

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

DESIGN SCS(0006)  
 ID= 1 DT= 6.0 min

Area (ha) = .19      Curve Number (CN) = 85.0  
 Ia (mm) = 0.2 S      # of Linear Res. (N) = 5.00  
 U. H. Tp(hrs) = .20

Ia as 0.2xS (mm) = 8.965  
 Unit Hyd Qpeak (cms) = .052

PEAK FLOW (cms) = .041 (i)  
 TIME TO PEAK (hrs) = 3.100  
 RUNOFF VOLUME (mm) = 49.042

TOTAL RAINFALL (mm)= 86.100  
 RUNOFF COEFFICIENT = .570

post development 6 hr. out

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

DESIGN SCS(0007)	Area (ha)= 2.60	Curve Number (CN) = 77.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .19	

Ia as 0.2xS (mm)= 15.174  
 Unit Hyd Qpeak (cms)= .755

PEAK FLOW (cms)= .391 (i)  
 TIME TO PEAK (hrs)= 3.100  
 RUNOFF VOLUME (mm)= 34.497  
 TOTAL RAINFALL (mm)= 86.100  
 RUNOFF COEFFICIENT = .401

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

DESIGN SCS(0008)	Area (ha)= .21	Curve Number (CN) = 81.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .14	

Ia as 0.2xS (mm)= 11.916  
 Unit Hyd Qpeak (cms)= .083

PEAK FLOW (cms)= .047 (i)  
 TIME TO PEAK (hrs)= 3.100  
 RUNOFF VOLUME (mm)= 42.031  
 TOTAL RAINFALL (mm)= 86.100  
 RUNOFF COEFFICIENT = .488

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

DESIGN SCS(0009)	Area (ha)= .27	Curve Number (CN) = 98.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .10	

Ia as 0.2xS (mm)= 1.037  
 Unit Hyd Qpeak (cms)= .149

PEAK FLOW (cms)= .113 (i)  
 TIME TO PEAK (hrs)= 3.000  
 RUNOFF VOLUME (mm)= 82.822  
 TOTAL RAINFALL (mm)= 86.100  
 RUNOFF COEFFICIENT = .962

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

DESIGN SCS(0001)	Area (ha)= 2.30	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .27	

Ia as 0.2xS (mm)= 16.042

Unit Hyd Qpeak (cms) = .470 post development 6 hr. out

PEAK FLOW (cms) = .282 (i)  
TIME TO PEAK (hrs) = 3.200  
RUNOFF VOLUME (mm) = 32.701  
TOTAL RAINFALL (mm) = 86.100  
RUNOFF COEFFICIENT = .380

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

---

DESIGN SCS(0002)	Area (ha) = 2.70	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm) = 0.2 S	# of Linear Res. (N) = 5.00
	U. H. Tp(hrs) = .59	

Ia as 0.2xS (mm) = 16.042  
Unit Hyd Qpeak (cms) = .252

PEAK FLOW (cms) = .191 (i)  
TIME TO PEAK (hrs) = 3.600  
RUNOFF VOLUME (mm) = 32.662  
TOTAL RAINFALL (mm) = 86.100  
RUNOFF COEFFICIENT = .379

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

---

DESIGN SCS(0003)	Area (ha) = 1.70	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm) = 0.2 S	# of Linear Res. (N) = 5.00
	U. H. Tp(hrs) = .33	

Ia as 0.2xS (mm) = 16.042  
Unit Hyd Qpeak (cms) = .284

PEAK FLOW (cms) = .184 (i)  
TIME TO PEAK (hrs) = 3.300  
RUNOFF VOLUME (mm) = 32.675  
TOTAL RAINFALL (mm) = 86.100  
RUNOFF COEFFICIENT = .380

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

---

DESIGN SCS(0004)	Area (ha) = 1.60	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm) = 0.2 S	# of Linear Res. (N) = 5.00
	U. H. Tp(hrs) = .19	

Ia as 0.2xS (mm) = 16.042  
Unit Hyd Qpeak (cms) = .464

PEAK FLOW (cms) = .227 (i)  
TIME TO PEAK (hrs) = 3.100  
RUNOFF VOLUME (mm) = 32.880  
TOTAL RAINFALL (mm) = 86.100  
RUNOFF COEFFICIENT = .382

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

post development 6 hr. out

ADD HYD (0011) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0006):	.19	.041	3.10	49.04
+ ID2= 2 (0005):	.41	.067	3.20	38.76
=====				
ID = 3 (0011):	.60	.107	3.20	42.01

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0012) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0011):	.60	.107	3.20	42.01
+ ID2= 2 (0007):	2.60	.391	3.10	34.50
=====				
ID = 3 (0012):	3.20	.493	3.20	35.91

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0013) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0008):	.21	.047	3.10	42.03
+ ID2= 2 (0009):	.27	.113	3.00	82.82
=====				
ID = 3 (0013):	.48	.149	3.00	64.98

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0015) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0001):	2.30	.282	3.20	32.70
+ ID2= 2 (0002):	2.70	.191	3.60	32.66
=====				
ID = 3 (0015):	5.00	.387	3.30	32.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0017) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0015):	5.00	.387	3.30	32.68
+ ID2= 2 (0003):	1.70	.184	3.30	32.68
=====				
ID = 3 (0017):	6.70	.571	3.30	32.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

post development 6 hr. out

ADD HYD (0018) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0017):	6.70	.571	3.30	32.68
+ ID2= 2 (0004):	1.60	.227	3.10	32.88
=====				
ID = 3 (0018):	8.30	.750	3.20	32.72

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0014) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0012):	3.20	.493	3.20	35.91
+ ID2= 2 (0013):	.48	.149	3.00	64.98
=====				
ID = 3 (0014):	3.68	.634	3.10	39.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0019) IN= 2---> OUT= 1 DT= 6.0 min	OUTFLOW (cms)	STORAGE (ha. m.)	OUTFLOW (cms)	STORAGE (ha. m.)
	.0000	.0000	.4620	.3060
	.0150	.0487	.5400	.3600
	.0600	.0983	.8860	.4150
	.1270	.1480	1.4500	.4710
	.2410	.2000	2.1700	.5280
	.3690	.2520	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
INFLOW : ID= 2 (0014)	3.68	.63	3.10	39.70
OUTFLOW: ID= 1 (0019)	3.68	.06	4.20	39.48

PEAK FLOW REDUCTION [Qout/Qin] (%) = 9.31  
 TIME SHIFT OF PEAK FLOW (min) = 66.00  
 MAXIMUM STORAGE USED (ha. m.) = .0972

\*\*\*\*\*  
 \*\* SIMULATION NUMBER: 4 \*\*  
 \*\*\*\*\*

MASS STORM Ptotal = 70.80 mm	Filename: P:\W&W\Software\V02\GFE\Scs6h.mst Comments: Type II 6-hr Tabular
	Duration of storm = 6.00 hrs Mass curve time step = 6.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.10	3.19	1.60	5.10	3.10	95.30	4.60	4.81

post development 6 hr. out							
.20	3.26	1.70	5.38	3.20	19.05	4.70	4.60
.30	3.19	1.80	5.81	3.30	16.64	4.80	4.46
.40	3.19	1.90	6.23	3.40	14.37	4.90	4.18
.50	3.19	2.00	6.58	3.50	12.25	5.00	4.04
.60	3.26	2.10	7.08	3.60	9.84	5.10	3.75
.70	3.26	2.20	7.65	3.70	8.43	5.20	3.75
.80	3.40	2.30	8.64	3.80	8.00	5.30	3.61
.90	3.61	2.40	9.63	3.90	7.36	5.40	3.47
1.00	3.82	2.50	10.62	4.00	6.87	5.50	3.40
1.10	3.89	2.60	11.54	4.10	6.37	5.60	3.40
1.20	4.11	2.70	23.79	4.20	6.02	5.70	3.33
1.30	4.46	2.80	47.72	4.30	5.59	5.80	3.33
1.40	4.60	2.90	76.53	4.40	5.45	5.90	3.19
1.50	4.81	3.00	137.35	4.50	5.17	6.00	3.12

DESIGN SCS(0005) ID= 1 DT= 6.0 mi n	Area (ha)= .41	Curve Number (CN) = 79.6
	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .23	

Ia as 0.2xS (mm)= 13.019  
Unit Hyd Qpeak (cms)= .098

PEAK FLOW (cms)= .047 (i)  
TIME TO PEAK (hrs)= 3.200  
RUNOFF VOLUME (mm)= 27.243  
TOTAL RAINFALL (mm)= 70.800  
RUNOFF COEFFICIENT = .385

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

DESIGN SCS(0006) ID= 1 DT= 6.0 mi n	Area (ha)= .19	Curve Number (CN) = 85.0
	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .20	

Ia as 0.2xS (mm)= 8.965  
Unit Hyd Qpeak (cms)= .052

PEAK FLOW (cms)= .029 (i)  
TIME TO PEAK (hrs)= 3.100  
RUNOFF VOLUME (mm)= 36.037  
TOTAL RAINFALL (mm)= 70.800  
RUNOFF COEFFICIENT = .509

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

DESIGN SCS(0007) ID= 1 DT= 6.0 mi n	Area (ha)= 2.60	Curve Number (CN) = 77.0
	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .19	

Ia as 0.2xS (mm)= 15.174  
Unit Hyd Qpeak (cms)= .755

PEAK FLOW (cms)= .265 (i)  
TIME TO PEAK (hrs)= 3.200  
RUNOFF VOLUME (mm)= 23.688  
TOTAL RAINFALL (mm)= 70.800  
RUNOFF COEFFICIENT = .335

post development 6 hr.out

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

---

DESIGN SCS(0008) ID= 1 DT= 6.0 min	Area (ha)= .21 Ia (mm)= 0.2 S U. H. Tp(hrs)= .14	Curve Number (CN) = 81.0 # of Linear Res. (N)= 5.00
---------------------------------------	--	--

Ia as 0.2xS (mm)= 11.916  
Unit Hyd Qpeak (cms)= .083

PEAK FLOW (cms)= .033 (i)  
TIME TO PEAK (hrs)= 3.100  
RUNOFF VOLUME (mm)= 29.902  
TOTAL RAINFALL (mm)= 70.800  
RUNOFF COEFFICIENT = .422

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

---

DESIGN SCS(0009) ID= 1 DT= 6.0 min	Area (ha)= .27 Ia (mm)= 0.2 S U. H. Tp(hrs)= .10	Curve Number (CN) = 98.0 # of Linear Res. (N)= 5.00
---------------------------------------	--	--

Ia as 0.2xS (mm)= 1.037  
Unit Hyd Qpeak (cms)= .149

PEAK FLOW (cms)= .093 (i)  
TIME TO PEAK (hrs)= 3.000  
RUNOFF VOLUME (mm)= 67.080  
TOTAL RAINFALL (mm)= 70.800  
RUNOFF COEFFICIENT = .947

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

---

DESIGN SCS(0001) ID= 1 DT= 6.0 min	Area (ha)= 2.30 Ia (mm)= 0.2 S U. H. Tp(hrs)= .27	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .184 (i)  
TIME TO PEAK (hrs)= 3.200  
RUNOFF VOLUME (mm)= 22.242  
TOTAL RAINFALL (mm)= 70.800  
RUNOFF COEFFICIENT = .314

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

---

DESIGN SCS(0002) ID= 1 DT= 6.0 min	Area (ha)= 2.70 Ia (mm)= 0.2 S U. H. Tp(hrs)= .59	Curve Number (CN) = 76.0 # of Linear Res. (N)= 5.00
---------------------------------------	---	--

Ia as 0.2xS (mm)= 16.042  
Unit Hyd Qpeak (cms)= .252

post development 6 hr. out

PEAK FLOW	(cms)=	.126 (i)
TIME TO PEAK	(hrs)=	3.600
RUNOFF VOLUME	(mm)=	22.216
TOTAL RAINFALL	(mm)=	70.800
RUNOFF COEFFICIENT	=	.314

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

DESIGN SCS(0003)	Area (ha)=	1.70	Curve Number (CN) =	76.0
ID= 1 DT= 6.0 min	Ia (mm)=	0.2 S	# of Linear Res. (N)=	5.00
	U. H. Tp(hrs)=	.33		

Ia as 0.2xS	(mm)=	16.042
Unit Hyd Qpeak	(cms)=	.284

PEAK FLOW	(cms)=	.121 (i)
TIME TO PEAK	(hrs)=	3.300
RUNOFF VOLUME	(mm)=	22.225
TOTAL RAINFALL	(mm)=	70.800
RUNOFF COEFFICIENT	=	.314

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

DESIGN SCS(0004)	Area (ha)=	1.60	Curve Number (CN) =	76.0
ID= 1 DT= 6.0 min	Ia (mm)=	0.2 S	# of Linear Res. (N)=	5.00
	U. H. Tp(hrs)=	.19		

Ia as 0.2xS	(mm)=	16.042
Unit Hyd Qpeak	(cms)=	.464

PEAK FLOW	(cms)=	.153 (i)
TIME TO PEAK	(hrs)=	3.200
RUNOFF VOLUME	(mm)=	22.364
TOTAL RAINFALL	(mm)=	70.800
RUNOFF COEFFICIENT	=	.316

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

ADD HYD (0011)	AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0006):	.19	.029	3.10	36.04
+ ID2= 2 (0005):	.41	.047	3.20	27.24
=====				
ID = 3 (0011):	.60	.076	3.20	30.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0012)	AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0011):	.60	.076	3.20	30.03
+ ID2= 2 (0007):	2.60	.265	3.20	23.69

post development 6 hr. out

ID = 3 (0012):	3.20	.341	3.20	24.88
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NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0013) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0008):	.21	.033	3.10	29.90
+ ID2= 2 (0009):	.27	.093	3.00	67.08
ID = 3 (0013):	.48	.117	3.00	50.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0015) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0001):	2.30	.184	3.20	22.24
+ ID2= 2 (0002):	2.70	.126	3.60	22.22
ID = 3 (0015):	5.00	.254	3.30	22.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0017) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0015):	5.00	.254	3.30	22.23
+ ID2= 2 (0003):	1.70	.121	3.30	22.22
ID = 3 (0017):	6.70	.375	3.30	22.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0018) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0017):	6.70	.375	3.30	22.23
+ ID2= 2 (0004):	1.60	.153	3.20	22.36
ID = 3 (0018):	8.30	.488	3.20	22.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0014) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)

post development 6 hr. out

ID1= 1 (0012):	3.20	.341	3.20	24.88
+ ID2= 2 (0013):	.48	.117	3.00	50.81
-----				
ID = 3 (0014):	3.68	.440	3.10	28.26

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0019)  
 IN= 2----> OUT= 1  
 DT= 6.0 min

OUTFLOW (cms)	STORAGE (ha. m.)	OUTFLOW (cms)	STORAGE (ha. m.)
.0000	.0000	.4620	.3060
.0150	.0487	.5400	.3600
.0600	.0983	.8860	.4150
.1270	.1480	1.4500	.4710
.2410	.2000	2.1700	.5280
.3690	.2520	.0000	.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
INFLOW : ID= 2 (0014)	3.68	.44	3.10	28.26
OUTFLOW: ID= 1 (0019)	3.68	.04	4.60	28.04

PEAK FLOW REDUCTION [Qout/Qin] (%) = 8.16  
 TIME SHIFT OF PEAK FLOW (min) = 90.00  
 MAXIMUM STORAGE USED (ha. m.) = .0717

\*\*\*\*\*  
 \*\* SIMULATION NUMBER: 5 \*\*  
 \*\*\*\*\*

MASS STORM  
 Ptotal = 58.70 mm

Filename: P:\W&W\Software\V02\GFE\Scs6h.mst  
 Comments: Type II 6-hr Tabular

Duration of storm = 6.00 hrs  
 Mass curve time step = 6.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.10	2.64	1.60	4.23	3.10	79.01	4.60	3.99
.20	2.70	1.70	4.46	3.20	15.79	4.70	3.82
.30	2.64	1.80	4.81	3.30	13.79	4.80	3.70
.40	2.64	1.90	5.17	3.40	11.92	4.90	3.46
.50	2.64	2.00	5.46	3.50	10.16	5.00	3.35
.60	2.70	2.10	5.87	3.60	8.16	5.10	3.11
.70	2.70	2.20	6.34	3.70	6.99	5.20	3.11
.80	2.82	2.30	7.16	3.80	6.63	5.30	2.99
.90	2.99	2.40	7.98	3.90	6.10	5.40	2.88
1.00	3.17	2.50	8.81	4.00	5.69	5.50	2.82
1.10	3.23	2.60	9.57	4.10	5.28	5.60	2.82
1.20	3.40	2.70	19.72	4.20	4.99	5.70	2.76
1.30	3.70	2.80	39.56	4.30	4.64	5.80	2.76
1.40	3.82	2.90	63.45	4.40	4.52	5.90	2.64
1.50	3.99	3.00	113.88	4.50	4.29	6.00	2.58

DESIGN SCS(0005)  
 ID= 1 DT= 6.0 min

Area (ha) = .41 Curve Number (CN) = 79.6  
 Ia (mm) = 0.2 S # of Linear Res. (N) = 5.00

----- U. H. post development 6 hr. out  
Tp(hrs)= .23

I a as 0.2xS (mm)= 13.019  
Uni t Hyd Qpeak (cms)= .098

PEAK FLOW (cms)= .032 (i)  
TIME TO PEAK (hrs)= 3.200  
RUNOFF VOLUME (mm)= 18.888  
TOTAL RAINFALL (mm)= 58.700  
RUNOFF COEFFICIENT = .322

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

-----  
| DESIGN SCS(0006) | Area (ha)= .19 Curve Number (CN) = 85.0  
| ID= 1 DT= 6.0 mi n | I a (mm)= 0.2 S # of Li near Res. (N)= 5.00  
----- U. H. Tp(hrs)= .20

I a as 0.2xS (mm)= 8.965  
Uni t Hyd Qpeak (cms)= .052

PEAK FLOW (cms)= .022 (i)  
TIME TO PEAK (hrs)= 3.200  
RUNOFF VOLUME (mm)= 26.297  
TOTAL RAINFALL (mm)= 58.700  
RUNOFF COEFFICIENT = .448

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

-----  
| DESIGN SCS(0007) | Area (ha)= 2.60 Curve Number (CN) = 77.0  
| ID= 1 DT= 6.0 mi n | I a (mm)= 0.2 S # of Li near Res. (N)= 5.00  
----- U. H. Tp(hrs)= .19

I a as 0.2xS (mm)= 15.174  
Uni t Hyd Qpeak (cms)= .755

PEAK FLOW (cms)= .176 (i)  
TIME TO PEAK (hrs)= 3.200  
RUNOFF VOLUME (mm)= 15.973  
TOTAL RAINFALL (mm)= 58.700  
RUNOFF COEFFICIENT = .272

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

-----  
| DESIGN SCS(0008) | Area (ha)= .21 Curve Number (CN) = 81.0  
| ID= 1 DT= 6.0 mi n | I a (mm)= 0.2 S # of Li near Res. (N)= 5.00  
----- U. H. Tp(hrs)= .14

I a as 0.2xS (mm)= 11.916  
Uni t Hyd Qpeak (cms)= .083

PEAK FLOW (cms)= .023 (i)  
TIME TO PEAK (hrs)= 3.100  
RUNOFF VOLUME (mm)= 21.023  
TOTAL RAINFALL (mm)= 58.700  
RUNOFF COEFFICIENT = .358

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

post development 6 hr. out

---

DESIGN SCS(0009)	Area (ha)= .27	Curve Number (CN) = 98.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .10	

Ia as 0.2xS (mm)= 1.037  
 Unit Hyd Qpeak (cms)= .149

PEAK FLOW (cms)= .076 (i)  
 TIME TO PEAK (hrs)= 3.000  
 RUNOFF VOLUME (mm)= 54.653  
 TOTAL RAINFALL (mm)= 58.700  
 RUNOFF COEFFICIENT = .931

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

---

DESIGN SCS(0001)	Area (ha)= 2.30	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .27	

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .116 (i)  
 TIME TO PEAK (hrs)= 3.200  
 RUNOFF VOLUME (mm)= 14.828  
 TOTAL RAINFALL (mm)= 58.700  
 RUNOFF COEFFICIENT = .253

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

---

DESIGN SCS(0002)	Area (ha)= 2.70	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .59	

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .252

PEAK FLOW (cms)= .080 (i)  
 TIME TO PEAK (hrs)= 3.600  
 RUNOFF VOLUME (mm)= 14.810  
 TOTAL RAINFALL (mm)= 58.700  
 RUNOFF COEFFICIENT = .252

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

---

DESIGN SCS(0003)	Area (ha)= 1.70	Curve Number (CN) = 76.0
ID= 1 DT= 6.0 min	Ia (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .33	

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .284

PEAK FLOW (cms)= .077 (i)  
 TIME TO PEAK (hrs)= 3.300

post development 6 hr. out  
 RUNOFF VOLUME (mm)= 14.816  
 TOTAL RAINFALL (mm)= 58.700  
 RUNOFF COEFFICIENT = .252

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

---

DESIGN SCS(0004)	Area (ha)=	1.60	Curve Number (CN) =	76.0
ID= 1 DT= 6.0 min	Ia (mm)=	0.2 S	# of Linear Res. (N)=	5.00
	U. H. Tp(hrs)=	.19		

Ia as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .464

PEAK FLOW (cms)= .100 (i)  
 TIME TO PEAK (hrs)= 3.200  
 RUNOFF VOLUME (mm)= 14.909  
 TOTAL RAINFALL (mm)= 58.700  
 RUNOFF COEFFICIENT = .254

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

---

ADD HYD (0011)	AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0006):	.19	.022	3.20	26.30
+ ID2= 2 (0005):	.41	.032	3.20	18.89
<hr/>				
ID = 3 (0011):	.60	.053	3.20	21.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (0012)	AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0011):	.60	.053	3.20	21.23
+ ID2= 2 (0007):	2.60	.176	3.20	15.97
<hr/>				
ID = 3 (0012):	3.20	.229	3.20	16.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (0013)	AREA	QPEAK	TPEAK	R. V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0008):	.21	.023	3.10	21.02
+ ID2= 2 (0009):	.27	.076	3.00	54.65
<hr/>				
ID = 3 (0013):	.48	.092	3.00	39.94

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

post development 6 hr. out

ADD HYD (0015) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0001):	2.30	.116	3.20	14.83
+ ID2= 2 (0002):	2.70	.080	3.60	14.81
ID = 3 (0015):	5.00	.160	3.30	14.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0017) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0015):	5.00	.160	3.30	14.82
+ ID2= 2 (0003):	1.70	.077	3.30	14.82
ID = 3 (0017):	6.70	.237	3.30	14.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0018) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0017):	6.70	.237	3.30	14.82
+ ID2= 2 (0004):	1.60	.100	3.20	14.91
ID = 3 (0018):	8.30	.305	3.20	14.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0014) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0012):	3.20	.229	3.20	16.96
+ ID2= 2 (0013):	.48	.092	3.00	39.94
ID = 3 (0014):	3.68	.299	3.10	19.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0019) IN= 2---> OUT= 1 DT= 6.0 mi n	OUTFLOW (cms)	STORAGE (ha. m.)	OUTFLOW (cms)	STORAGE (ha. m.)
	.0000	.0000	.4620	.3060
	.0150	.0487	.5400	.3600
	.0600	.0983	.8860	.4150
	.1270	.1480	1.4500	.4710
	.2410	.2000	2.1700	.5280
	.3690	.2520	.0000	.0000

post development 6 hr. out

	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0014)	3.68	.30	3.10	19.96
OUTFLOW: ID= 1 (0019)	3.68	.02	5.40	19.73

PEAK FLOW REDUCTION [Qout/Qin](%)= 6.68  
 TIME SHIFT OF PEAK FLOW (min)=138.00  
 MAXIMUM STORAGE USED (ha. m.)= .0542

\*\*\*\*\*  
 \*\* SIMULATION NUMBER: 6 \*\*  
 \*\*\*\*\*

MASS STORM  
 Ptotal = 40.40 mm

Filename: P:\W&W\Software\V02\GFE\Scs6h.mst  
 Comments: Type II 6-hr Tabular

Duration of storm = 6.00 hrs  
 Mass curve time step = 6.00 min

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.10	1.82	1.60	2.91	3.10	54.38	4.60	2.75
.20	1.86	1.70	3.07	3.20	10.87	4.70	2.63
.30	1.82	1.80	3.31	3.30	9.49	4.80	2.55
.40	1.82	1.90	3.56	3.40	8.20	4.90	2.38
.50	1.82	2.00	3.76	3.50	6.99	5.00	2.30
.60	1.86	2.10	4.04	3.60	5.62	5.10	2.14
.70	1.86	2.20	4.36	3.70	4.81	5.20	2.14
.80	1.94	2.30	4.93	3.80	4.57	5.30	2.06
.90	2.06	2.40	5.49	3.90	4.20	5.40	1.98
1.00	2.18	2.50	6.06	4.00	3.92	5.50	1.94
1.10	2.22	2.60	6.59	4.10	3.64	5.60	1.94
1.20	2.34	2.70	13.57	4.20	3.43	5.70	1.90
1.30	2.55	2.80	27.23	4.30	3.19	5.80	1.90
1.40	2.63	2.90	43.67	4.40	3.11	5.90	1.82
1.50	2.75	3.00	78.38	4.50	2.95	6.00	1.78

DESIGN SCS(0005)  
 ID= 1 DT= 6.0 min

Area (ha)= .41 Curve Number (CN) = 79.6  
 Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 U. H. Tp(hrs)= .23

Ia as 0.2xS (mm)= 13.019  
 Unit Hyd Qpeak (cms)= .098

PEAK FLOW (cms)= .012 (i)  
 TIME TO PEAK (hrs)= 3.200  
 RUNOFF VOLUME (mm)= 8.129  
 TOTAL RAINFALL (mm)= 40.400  
 RUNOFF COEFFICIENT = .201

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

DESIGN SCS(0006)  
 ID= 1 DT= 6.0 min

Area (ha)= .19 Curve Number (CN) = 85.0  
 Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 U. H. Tp(hrs)= .20

post development 6 hr. out

I a as 0.2xS (mm)= 8.965  
 Unit Hyd Qpeak (cms)= .052  
  
 PEAK FLOW (cms)= .011 (i)  
 TIME TO PEAK (hrs)= 3.200  
 RUNOFF VOLUME (mm)= 13.025  
 TOTAL RAINFALL (mm)= 40.400  
 RUNOFF COEFFICIENT = .322

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

DESIGN SCS(0007)	Area (ha)= 2.60	Curve Number (CN) = 77.0
ID= 1 DT= 6.0 min	I a (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .19	

I a as 0.2xS (mm)= 15.174  
 Unit Hyd Qpeak (cms)= .755  
  
 PEAK FLOW (cms)= .063 (i)  
 TIME TO PEAK (hrs)= 3.200  
 RUNOFF VOLUME (mm)= 6.336  
 TOTAL RAINFALL (mm)= 40.400  
 RUNOFF COEFFICIENT = .157

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

DESIGN SCS(0008)	Area (ha)= .21	Curve Number (CN) = 81.0
ID= 1 DT= 6.0 min	I a (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .14	

I a as 0.2xS (mm)= 11.916  
 Unit Hyd Qpeak (cms)= .083  
  
 PEAK FLOW (cms)= .010 (i)  
 TIME TO PEAK (hrs)= 3.100  
 RUNOFF VOLUME (mm)= 9.412  
 TOTAL RAINFALL (mm)= 40.400  
 RUNOFF COEFFICIENT = .233

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

DESIGN SCS(0009)	Area (ha)= .27	Curve Number (CN) = 98.0
ID= 1 DT= 6.0 min	I a (mm)= 0.2 S	# of Linear Res. (N)= 5.00
	U. H. Tp(hrs)= .10	

I a as 0.2xS (mm)= 1.037  
 Unit Hyd Qpeak (cms)= .149  
  
 PEAK FLOW (cms)= .051 (i)  
 TIME TO PEAK (hrs)= 3.000  
 RUNOFF VOLUME (mm)= 35.930  
 TOTAL RAINFALL (mm)= 40.400  
 RUNOFF COEFFICIENT = .889

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

post development 6 hr. out

-----  
 | DESIGN SCS(0001) | Area (ha)= 2.30 Curve Number (CN) = 76.0  
 | ID= 1 DT= 6.0 mi n | I a (mm)= 0.2 S # of Li near Res. (N)= 5.00  
 -----  
 U. H. Tp(hrs)= .27

I a as 0.2xS (mm)= 16.042  
 Uni t Hyd Qpeak (cms)= .470

PEAK FLOW (cms)= .038 (i)  
 TIME TO PEAK (hrs)= 3.300  
 RUNOFF VOLUME (mm)= 5.680  
 TOTAL RAINFALL (mm)= 40.400  
 RUNOFF COEFFICIENT = .141

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

-----  
 | DESIGN SCS(0002) | Area (ha)= 2.70 Curve Number (CN) = 76.0  
 | ID= 1 DT= 6.0 mi n | I a (mm)= 0.2 S # of Li near Res. (N)= 5.00  
 -----  
 U. H. Tp(hrs)= .59

I a as 0.2xS (mm)= 16.042  
 Uni t Hyd Qpeak (cms)= .252

PEAK FLOW (cms)= .027 (i)  
 TIME TO PEAK (hrs)= 3.700  
 RUNOFF VOLUME (mm)= 5.674  
 TOTAL RAINFALL (mm)= 40.400  
 RUNOFF COEFFICIENT = .140

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

-----  
 | DESIGN SCS(0003) | Area (ha)= 1.70 Curve Number (CN) = 76.0  
 | ID= 1 DT= 6.0 mi n | I a (mm)= 0.2 S # of Li near Res. (N)= 5.00  
 -----  
 U. H. Tp(hrs)= .33

I a as 0.2xS (mm)= 16.042  
 Uni t Hyd Qpeak (cms)= .284

PEAK FLOW (cms)= .024 (i)  
 TIME TO PEAK (hrs)= 3.400  
 RUNOFF VOLUME (mm)= 5.676  
 TOTAL RAINFALL (mm)= 40.400  
 RUNOFF COEFFICIENT = .140

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

-----  
 | DESIGN SCS(0004) | Area (ha)= 1.60 Curve Number (CN) = 76.0  
 | ID= 1 DT= 6.0 mi n | I a (mm)= 0.2 S # of Li near Res. (N)= 5.00  
 -----  
 U. H. Tp(hrs)= .19

I a as 0.2xS (mm)= 16.042  
 Uni t Hyd Qpeak (cms)= .464

PEAK FLOW (cms)= .034 (i)  
 TIME TO PEAK (hrs)= 3.200  
 RUNOFF VOLUME (mm)= 5.712  
 TOTAL RAINFALL (mm)= 40.400

RUNOFF COEFFICIENT = post development 6 hr. out  
.141

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

---

ADD HYD (0011) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0006):	.19	.011	3.20	13.02
+ ID2= 2 (0005):	.41	.012	3.20	8.13
=====				
ID = 3 (0011):	.60	.023	3.20	9.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (0012) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0011):	.60	.023	3.20	9.68
+ ID2= 2 (0007):	2.60	.063	3.20	6.34
=====				
ID = 3 (0012):	3.20	.085	3.20	6.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (0013) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0008):	.21	.010	3.10	9.41
+ ID2= 2 (0009):	.27	.051	3.00	35.93
=====				
ID = 3 (0013):	.48	.057	3.00	24.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (0015) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0001):	2.30	.038	3.30	5.68
+ ID2= 2 (0002):	2.70	.027	3.70	5.67
=====				
ID = 3 (0015):	5.00	.051	3.40	5.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

---

ADD HYD (0017) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0015):	5.00	.051	3.40	5.68

post development 6 hr. out

+ ID2= 2 (0003):	1.70	.024	3.40	5.68
=====				
ID = 3 (0017):	6.70	.075	3.40	5.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0018) 1 + 2 = 3	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0017):	6.70	.075	3.40	5.68
+ ID2= 2 (0004):	1.60	.034	3.20	5.71
=====				
ID = 3 (0018):	8.30	.099	3.30	5.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0014) 1 + 2 = 3	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0012):	3.20	.085	3.20	6.96
+ ID2= 2 (0013):	.48	.057	3.00	24.33
=====				
ID = 3 (0014):	3.68	.121	3.10	9.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0019) IN= 2---> OUT= 1 DT= 6.0 min	OUTFLOW	STORAGE	OUTFLOW	STORAGE
	(cms)	(ha. m.)	(cms)	(ha. m.)
	.0000	.0000	.4620	.3060
	.0150	.0487	.5400	.3600
	.0600	.0983	.8860	.4150
	.1270	.1480	1.4500	.4710
	.2410	.2000	2.1700	.5280
	.3690	.2520	.0000	.0000
=====				
	AREA	QPEAK	TPEAK	R. V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0014)	3.68	.12	3.10	9.23
OUTFLOW: ID= 1 (0019)	3.68	.01	6.10	9.01
=====				
	PEAK FLOW REDUCTI ON [Qout/Qi n](%)=	6.57		
	TIME SHIF T OF PEAK FLOW	(mi n)=180.00		
	MAXI MUM STORAGE USED	(ha. m.)= .0259		

\*\*\*\*\*  
\*\* SIMULATI ON NUMBER: 7 \*\*  
\*\*\*\*\*

MASS STORM

File name: P:\W&W\Projects\SW04090362 - First Solar\Hydrology\VO2 modeling\Superceeded\Hazel 12.mst

post development 6 hr. out  
 | Ptotal =211.00 mm | Comments: Hurricane Hazel (last 12 h)

Duration of storm = 12.00 hrs  
 Mass curve time step = 60.00 min

\*\*\*\*\* WARNING : THE SUM OF THE COORDINATES IS NOT ONE.

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
1.00	2.11	4.00	6.33	7.00	21.10	10.00	14.77
2.00	12.66	5.00	21.10	8.00	25.32	11.00	8.44
3.00	2.11	6.00	48.53	9.00	12.66	12.00	18.99

DESIGN SCS(0005) Area (ha)= .41 Curve Number (CN) = 79.6  
 ID= 1 DT= 6.0 min Ia (mm)= 0.2 S # of Linear Res. (N)= 5.00  
 U. H. Tp(hrs)= .23

NOTE: RAINFALL WAS TRANSFORMED TO 6.0 MIN. TIME STEP.

----- TRANSFORMED HYETOGRAPH -----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.100	2.11	3.100	6.33	6.100	21.10	9.10	14.77
.200	2.11	3.200	6.33	6.200	21.10	9.20	14.77
.300	2.11	3.300	6.33	6.300	21.10	9.30	14.77
.400	2.11	3.400	6.33	6.400	21.10	9.40	14.77
.500	2.11	3.500	6.33	6.500	21.10	9.50	14.77
.600	2.11	3.600	6.33	6.600	21.10	9.60	14.77
.700	2.11	3.700	6.33	6.700	21.10	9.70	14.77
.800	2.11	3.800	6.33	6.800	21.10	9.80	14.77
.900	2.11	3.900	6.33	6.900	21.10	9.90	14.77
1.000	2.11	4.000	6.33	7.000	21.10	10.00	14.77
1.100	12.66	4.100	21.10	7.100	25.32	10.10	8.44
1.200	12.66	4.200	21.10	7.200	25.32	10.20	8.44
1.300	12.66	4.300	21.10	7.300	25.32	10.30	8.44
1.400	12.66	4.400	21.10	7.400	25.32	10.40	8.44
1.500	12.66	4.500	21.10	7.500	25.32	10.50	8.44
1.600	12.66	4.600	21.10	7.600	25.32	10.60	8.44
1.700	12.66	4.700	21.10	7.700	25.32	10.70	8.44
1.800	12.66	4.800	21.10	7.800	25.32	10.80	8.44
1.900	12.66	4.900	21.10	7.900	25.32	10.90	8.44
2.000	12.66	5.000	21.10	8.000	25.32	11.00	8.44
2.100	2.11	5.100	48.53	8.100	12.66	11.10	18.99
2.200	2.11	5.200	48.53	8.200	12.66	11.20	18.99
2.300	2.11	5.300	48.53	8.300	12.66	11.30	18.99
2.400	2.11	5.400	48.53	8.400	12.66	11.40	18.99
2.500	2.11	5.500	48.53	8.500	12.66	11.50	18.99
2.600	2.11	5.600	48.53	8.600	12.66	11.60	18.99
2.700	2.11	5.700	48.53	8.700	12.66	11.70	18.99
2.800	2.11	5.800	48.53	8.800	12.66	11.80	18.99
2.900	2.11	5.900	48.53	8.900	12.66	11.90	18.99
3.000	2.11	6.000	48.53	9.000	12.66	12.00	18.99

Ia as 0.2xS (mm)= 13.019  
 Unit Hyd Qpeak (cms)= .098

PEAK FLOW (cms)= .042 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 133.577  
 TOTAL RAINFALL (mm)= 194.120  
 RUNOFF COEFFICIENT = .688

post development 6 hr.out

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

---

DESIGN SCS(0006) ID= 1 DT= 6.0 mi n	Area (ha)= .19 I a (mm)= 0.2 S U. H. Tp(hrs)= .20	Curve Number (CN) = 85.0 # of Li near Res. (N)= 5.00
--	---	---

I a as 0.2xS (mm)= 8.965  
Uni t Hyd Qpeak (cms)= .052

PEAK FLOW (cms)= .022 (i)  
TIME TO PEAK (hrs)= 6.000  
RUNOFF VOLUME (mm)= 149.854  
TOTAL RAINFALL (mm)= 194.120  
RUNOFF COEFFICIENT = .772

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

---

DESIGN SCS(0007) ID= 1 DT= 6.0 mi n	Area (ha)= 2.60 I a (mm)= 0.2 S U. H. Tp(hrs)= .19	Curve Number (CN) = 77.0 # of Li near Res. (N)= 5.00
--	--	---

I a as 0.2xS (mm)= 15.174  
Uni t Hyd Qpeak (cms)= .755

PEAK FLOW (cms)= .255 (i)  
TIME TO PEAK (hrs)= 6.000  
RUNOFF VOLUME (mm)= 126.504  
TOTAL RAINFALL (mm)= 194.120  
RUNOFF COEFFICIENT = .652

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

---

DESIGN SCS(0008) ID= 1 DT= 6.0 mi n	Area (ha)= .21 I a (mm)= 0.2 S U. H. Tp(hrs)= .14	Curve Number (CN) = 81.0 # of Li near Res. (N)= 5.00
--	---	---

I a as 0.2xS (mm)= 11.916  
Uni t Hyd Qpeak (cms)= .083

PEAK FLOW (cms)= .023 (i)  
TIME TO PEAK (hrs)= 6.000  
RUNOFF VOLUME (mm)= 140.277  
TOTAL RAINFALL (mm)= 194.120  
RUNOFF COEFFICIENT = .723

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

---

DESIGN SCS(0009) ID= 1 DT= 6.0 mi n	Area (ha)= .27 I a (mm)= 0.2 S U. H. Tp(hrs)= .10	Curve Number (CN) = 98.0 # of Li near Res. (N)= 5.00
--	---	---

I a as 0.2xS (mm)= 1.037  
Uni t Hyd Qpeak (cms)= .149

post development 6 hr. out

PEAK FLOW	(cms)=	.037 (i)
TIME TO PEAK	(hrs)=	6.000
RUNOFF VOLUME	(mm)=	194.240
TOTAL RAINFALL	(mm)=	194.120
RUNOFF COEFFICIENT	=	1.001

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

DESIGN SCS(0001)	Area (ha)=	2.30	Curve Number (CN) =	76.0
ID= 1 DT= 6.0 min	Ia (mm)=	0.2 S	# of Linear Res. (N)=	5.00
	U. H. Tp(hrs)=	.27		

Ia as 0.2xS	(mm)=	16.042
Unit Hyd Qpeak	(cms)=	.470

PEAK FLOW	(cms)=	.212 (i)
TIME TO PEAK	(hrs)=	6.000
RUNOFF VOLUME	(mm)=	122.923
TOTAL RAINFALL	(mm)=	194.120
RUNOFF COEFFICIENT	=	.633

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

DESIGN SCS(0002)	Area (ha)=	2.70	Curve Number (CN) =	76.0
ID= 1 DT= 6.0 min	Ia (mm)=	0.2 S	# of Linear Res. (N)=	5.00
	U. H. Tp(hrs)=	.59		

Ia as 0.2xS	(mm)=	16.042
Unit Hyd Qpeak	(cms)=	.252

PEAK FLOW	(cms)=	.219 (i)
TIME TO PEAK	(hrs)=	6.300
RUNOFF VOLUME	(mm)=	122.778
TOTAL RAINFALL	(mm)=	194.120
RUNOFF COEFFICIENT	=	.632

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

DESIGN SCS(0003)	Area (ha)=	1.70	Curve Number (CN) =	76.0
ID= 1 DT= 6.0 min	Ia (mm)=	0.2 S	# of Linear Res. (N)=	5.00
	U. H. Tp(hrs)=	.33		

Ia as 0.2xS	(mm)=	16.042
Unit Hyd Qpeak	(cms)=	.284

PEAK FLOW	(cms)=	.154 (i)
TIME TO PEAK	(hrs)=	6.100
RUNOFF VOLUME	(mm)=	122.826
TOTAL RAINFALL	(mm)=	194.120
RUNOFF COEFFICIENT	=	.633

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

DESIGN SCS(0004)	Area (ha)=	1.60	Curve Number (CN) =	76.0
ID= 1 DT= 6.0 min	Ia (mm)=	0.2 S	# of Linear Res. (N)=	5.00

post development 6 hr. out  
 U. H. Tp(hrs)= .19

la as 0.2xS (mm)= 16.042  
 Unit Hyd Qpeak (cms)= .464

PEAK FLOW (cms)= .153 (i)  
 TIME TO PEAK (hrs)= 6.000  
 RUNOFF VOLUME (mm)= 123.595  
 TOTAL RAINFALL (mm)= 194.120  
 RUNOFF COEFFICIENT = .637

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

ADD HYD (0011) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0006):	.19	.022	6.00	149.85
+ ID2= 2 (0005):	.41	.042	6.00	133.58
ID = 3 (0011):	.60	.064	6.00	138.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0012) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0011):	.60	.064	6.00	138.73
+ ID2= 2 (0007):	2.60	.255	6.00	126.50
ID = 3 (0012):	3.20	.319	6.00	128.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0013) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0008):	.21	.023	6.00	140.28
+ ID2= 2 (0009):	.27	.037	6.00	194.24
ID = 3 (0013):	.48	.061	6.00	170.63

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0015) 1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R. V. (mm)
ID1= 1 (0001):	2.30	.212	6.00	122.92
+ ID2= 2 (0002):	2.70	.219	6.30	122.78
ID = 3 (0015):	5.00	.418	6.10	122.84



post development 6 hr. out

-----  
FINISH  
=====

**APPENDIX C**  
**OGS DESIGN SUMMARY**



## Stormceptor Sizing Detailed Report

### PCSWMM for Stormceptor

#### Project Information

Date	14/06/2012
Project Name	mina.mirzajani
Project Number	Kingsbridge
Location	Ontario

#### Stormwater Quality Objective

This report outlines how Stormceptor System can achieve a defined water quality objective through the removal of total suspended solids (TSS). Attached to this report is the Stormceptor Sizing Summary.

#### Stormceptor System Recommendation

The Stormceptor System model STC 750 achieves the water quality objective removing 79% TSS for a City of Toronto (clay, silt and sand) particle size distribution and 90% runoff volume.

#### The Stormceptor System

The Stormceptor oil and sediment separator is sized to treat stormwater runoff by removing pollutants through gravity separation and flotation. Stormceptor's patented design generates positive TSS removal for all rainfall events, including large storms. Significant levels of pollutants such as heavy metals, free oils and nutrients are prevented from entering natural water resources and the re-suspension of previously captured sediment (scour) does not occur.

Stormceptor provides a high level of TSS removal for small frequent storm events that represent the majority of annual rainfall volume and pollutant load. Positive treatment continues for large infrequent events, however, such events have little impact on the average annual TSS removal as they represent a small percentage of the total runoff volume and pollutant load.

Stormceptor is the only oil and sediment separator on the market sized to remove TSS for a wide range of particle sizes, including fine sediments (clays and silts), that are often overlooked in the design of other stormwater treatment devices.

**Small storms dominate hydrologic activity, US EPA reports**

*“Early efforts in stormwater management focused on flood events ranging from the 2-yr to the 100-yr storm. Increasingly stormwater professionals have come to realize that small storms (i.e. < 1 in. rainfall) dominate watershed hydrologic parameters typically associated with water quality management issues and BMP design. These small storms are responsible for most annual urban runoff and groundwater recharge. Likewise, with the exception of eroded sediment, they are responsible for most pollutant washoff from urban surfaces. Therefore, the small storms are of most concern for the stormwater management objectives of ground water recharge, water quality resource protection and thermal impacts control.”*

*“Most rainfall events are much smaller than design storms used for urban drainage models. In any given area, most frequently recurrent rainfall events are small (less than 1 in. of daily rainfall).”*

*“Continuous simulation offers possibilities for designing and managing BMPs on an individual site-by-site basis that are not provided by other widely used simpler analysis methods. Therefore its application and use should be encouraged.”*

– US EPA Stormwater Best Management Practice Design Guide, Volume 1 – General Considerations, 2004

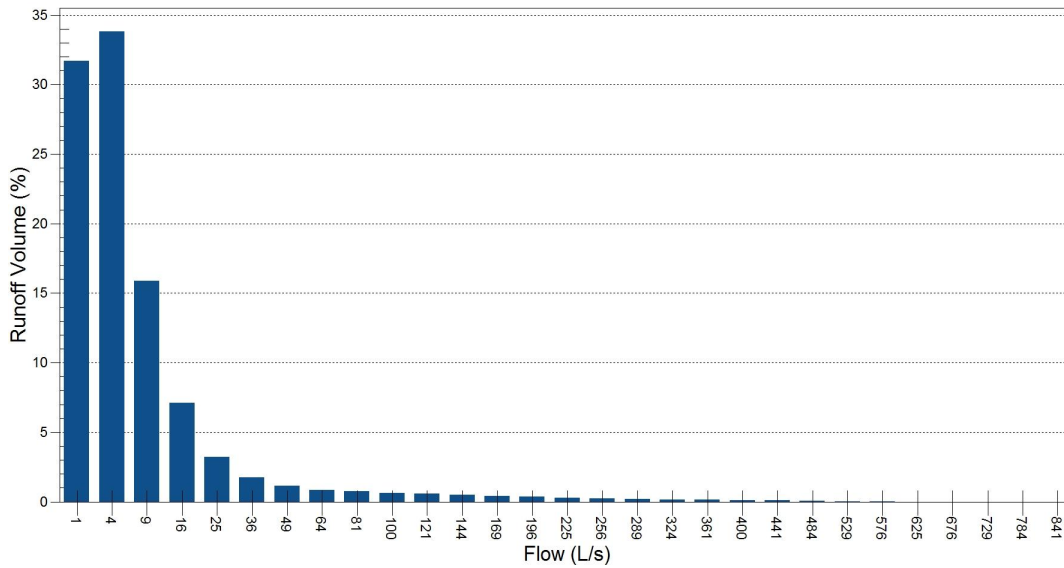
## **Design Methodology**

Each Stormceptor system is sized using PCSWMM for Stormceptor, a continuous simulation model based on US EPA SWMM. The program calculates hydrology from up-to-date local historical rainfall data and specified site parameters. With US EPA SWMM’s precision, every Stormceptor unit is designed to achieve a defined water quality objective.

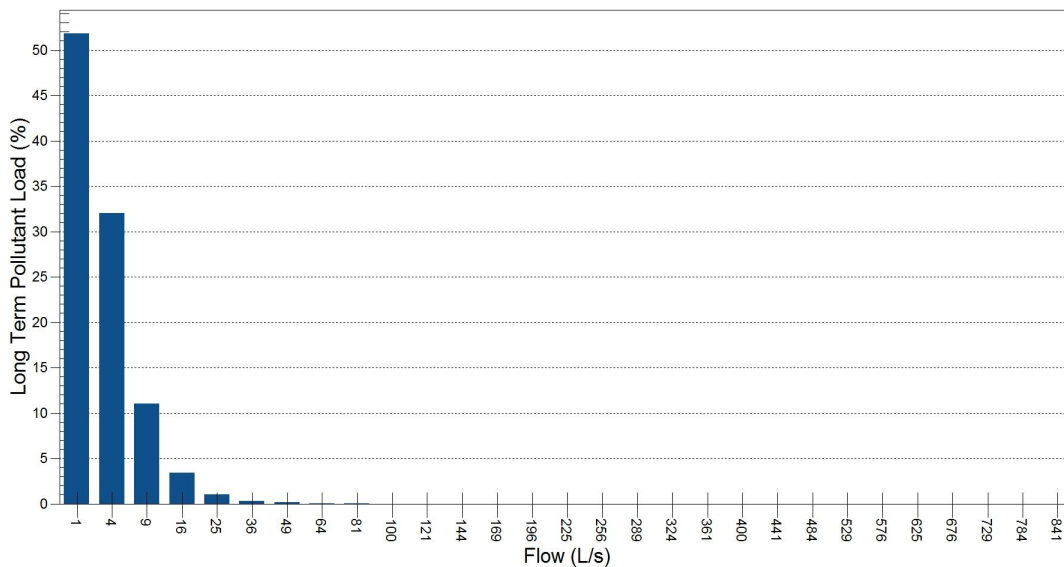
The TSS removal data presented follows US EPA guidelines to reduce the average annual TSS load. Stormceptor’s unit process for TSS removal is settling. The settling model calculates TSS removal by analyzing (summary of analysis presented in Appendix 2):

- Site parameters
- Continuous historical rainfall, including duration, distribution, peaks (Figure 1)
- Interevent periods
- Particle size distribution
- Particle settling velocities (Stokes Law, corrected for drag)
- TSS load (Figure 2)
- Detention time of the system

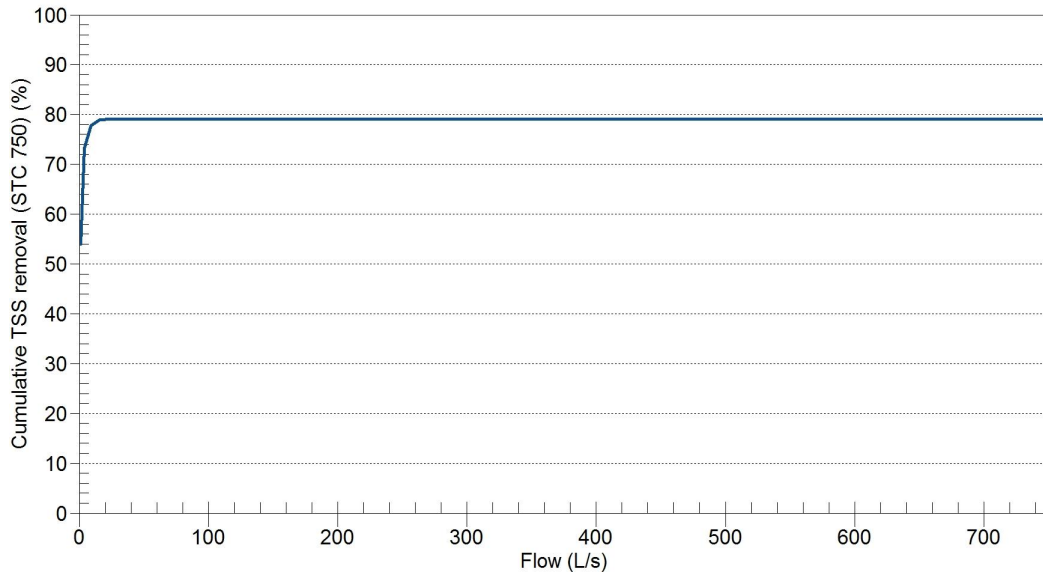
The Stormceptor System maintains continuous positive TSS removal for all influent flow rates. Figure 3 illustrates the continuous treatment by Stormceptor throughout the full range of storm events analyzed. It is clear that large events do not significantly impact the average annual TSS removal. There is no decline in cumulative TSS removal, indicating scour does not occur as the flow rate increases.



**Figure 1. Runoff Volume by Flow Rate for WATERLOO WELLINGTON A – ON 9387, 1970 to 2003 for 3.6 ha, 10% impervious.** Small frequent storm events represent the majority of annual rainfall volume. Large infrequent events have little impact on the average annual TSS removal, as they represent a small percentage of the total annual volume of runoff.



**Figure 2. Long Term Pollutant Load by Flow Rate for WATERLOO WELLINGTON A – 9387, 1970 to 2003 for 3.6 ha, 10% impervious.** The majority of the annual pollutant load is transported by small frequent storm events. Conversely, large infrequent events carry an insignificant percentage of the total annual pollutant load.



Stormceptor Model	STC 750	Drainage Area (ha)	3.6
TSS Removal (%)	79	Impervious (%)	10

**Figure 3. Cumulative TSS Removal by Flow Rate for WATERLOO WELLINGTON A – 9387, 1970 to 2003.** Stormceptor continuously removes TSS throughout the full range of storm events analyzed. Note that large events do not significantly impact the average annual TSS removal. Therefore no decline in cumulative TSS removal indicates scour does not occur as the flow rate increases.



## Appendix 1 Stormceptor Design Summary

### Project Information

Date	14/06/2012
Project Name	mina.mirzajani
Project Number	Kingsbridge
Location	Ontario

### Designer Information

Company	Amec
Contact	N/A

### Notes

N/A
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### Drainage Area

Total Area (ha)	3.6
Imperviousness (%)	10

The Stormceptor System model STC 750 achieves the water quality objective removing 79% TSS for a City of Toronto (clay, silt and sand) particle size distribution and 90% runoff volume.

### Rainfall

Name	WATERLOO WELLINGTON A
State	ON
ID	9387
Years of Records	1970 to 2003
Latitude	43°27'N
Longitude	80°23'W

### Water Quality Objective

TSS Removal (%)	70
Runoff Volume (%)	89

### Upstream Storage

Storage (ha-m)	Discharge (L/s)
0	0

## Stormceptor Sizing Summary

Stormceptor Model	TSS Removal %	Runoff Volume %
STC 300	71	80
<b>STC 750</b>	<b>79</b>	<b>90</b>
STC 1000	80	90
STC 1500	81	90
STC 2000	85	93
STC 3000	86	93
STC 4000	88	95
STC 5000	89	95
STC 6000	91	96
STC 9000	93	97
STC 10000	93	97
STC 14000	95	98



### Particle Size Distribution

Removing silt particles from runoff ensures that the majority of the pollutants, such as hydrocarbons and heavy metals that adhere to fine particles, are not discharged into our natural water courses. The table below lists the particle size distribution used to define the annual TSS removal.

City of Toronto (clay, silt and sand)

Particle Size µm	Distribution %	Specific Gravity	Settling Velocity m/s	Particle Size µm	Distribution %	Specific Gravity	Settling Velocity m/s
10	20	2.65	0.0004				
30	10	2.65	0.0008				
50	10	2.65	0.0022				
95	20	2.65	0.0063				
265	20	2.65	0.0366				
1000	20	2.65	0.1691				

### Stormceptor Design Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor version 1.0
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal.
- Only the STC 300 is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 750 to STC 6000 may accommodate multiple inlet pipes.
- Inlet and outlet invert elevation differences are as follows:

#### Inlet and Outlet Pipe Invert Elevations Differences

Inlet Pipe Configuration	STC 300	STC 750 to STC 6000	STC 9000 to STC 14000
Single inlet pipe	75 mm	25 mm	75 mm
Multiple inlet pipes	75 mm	75 mm	Only one inlet pipe.

- Design estimates are based on stable site conditions only, after construction is completed.
- Design estimates assume that the storm drain is not submerged during zero flows. For submerged applications, please contact your local Stormceptor representative.
- Design estimates may be modified for specific spills controls. Please contact your local Stormceptor representative for further assistance.
- For pricing inquiries or assistance, please contact Imbrium Systems Inc., 1-800-565-4801.

## Appendix 2 Summary of Design Assumptions

### SITE DETAILS

#### Site Drainage Area

Total Area (ha)	3.6	Imperviousness (%)	10
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#### Surface Characteristics

Width (m)	379
Slope (%)	2
Impervious Depression Storage (mm)	0.508
Pervious Depression Storage (mm)	5.08
Impervious Manning's n	0.015
Pervious Manning's n	0.25

#### Infiltration Parameters

Horton's equation is used to estimate infiltration	
Max. Infiltration Rate (mm/h)	61.98
Min. Infiltration Rate (mm/h)	10.16
Decay Rate (s <sup>-1</sup> )	0.00055
Regeneration Rate (s <sup>-1</sup> )	0.01

#### Maintenance Frequency

Sediment build-up reduces the storage volume for sedimentation. Frequency of maintenance is assumed for TSS removal calculations.	
Maintenance Frequency (months)	12

#### Evaporation

Daily Evaporation Rate (mm/day)	2.54
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#### Dry Weather Flow

Dry Weather Flow (L/s)	No
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#### Upstream Attenuation

Stage-storage and stage-discharge relationship used to model attenuation upstream of the Stormceptor System is identified in the table below.

Storage ha-m	Discharge L/s
0	0

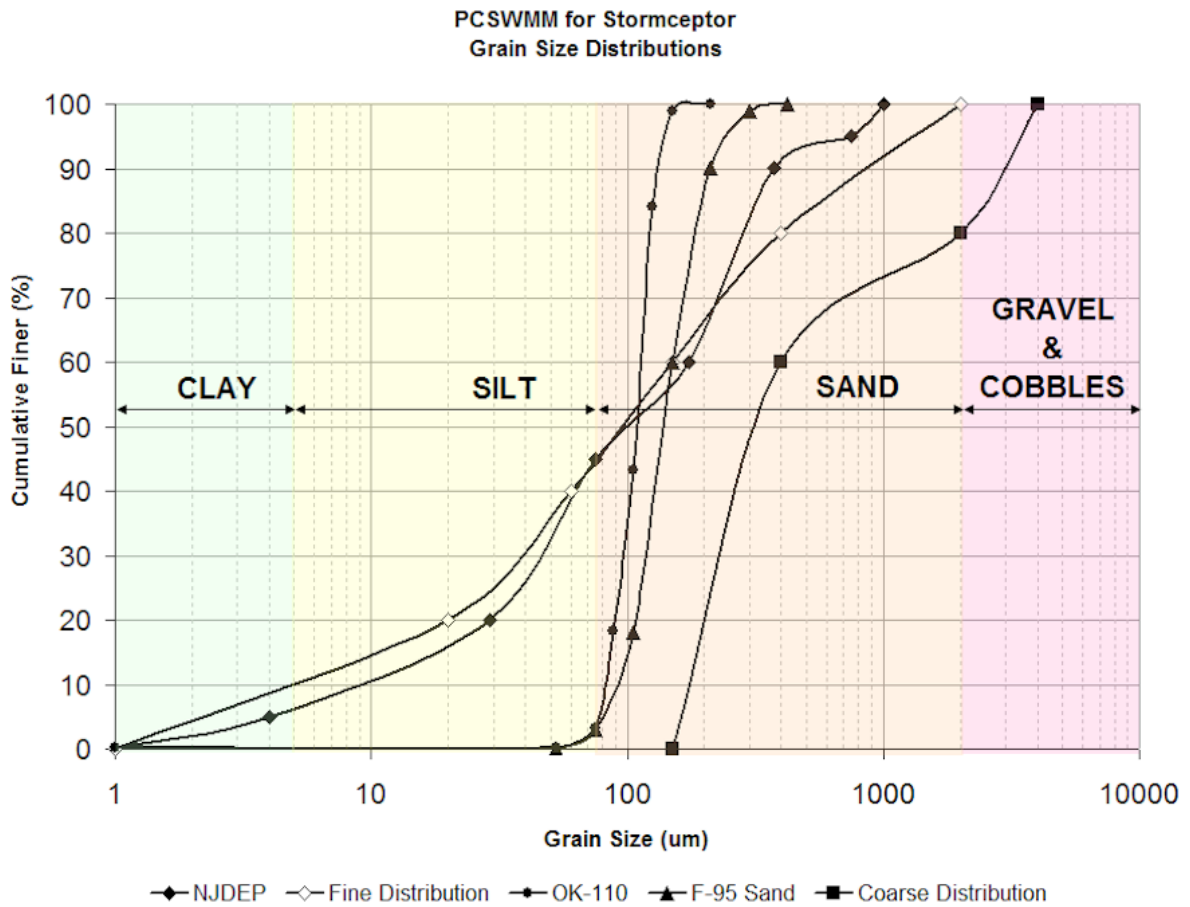
## PARTICLE SIZE DISTRIBUTION

### Particle Size Distribution

Removing fine particles from runoff ensures the majority of pollutants, such as heavy metals, hydrocarbons, free oils and nutrients are not discharged into natural water resources. The table below identifies the particle size distribution selected to define TSS removal for the design of the Stormceptor System.

City of Toronto (clay, silt and sand)

Particle Size <small>µm</small>	Distribution <small>%</small>	Specific Gravity	Settling Velocity <small>m/s</small>		Particle Size <small>µm</small>	Distribution <small>%</small>	Specific Gravity	Settling Velocity <small>m/s</small>
10	20	2.65	0.0004					
30	10	2.65	0.0008					
50	10	2.65	0.0022					
95	20	2.65	0.0063					
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1000	20	2.65	0.1691					



**Figure 1.** PCSWMM for Stormceptor standard design grain size distributions.



## TSS LOADING

### TSS Loading Parameters

TSS Loading Function	Buildup / Washoff
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#### Parameters

Target Event Mean Concentration (EMC) (mg/L)	125
Exponential Buildup Power	0.4
Exponential Washoff Exponential	0.2

## HYDROLOGY ANALYSIS

PCSWMM for Stormceptor calculates annual hydrology with the US EPA SWMM and local continuous historical rainfall data. Performance calculations of the Stormceptor System are based on the average annual removal of TSS for the selected site parameters. The Stormceptor System is engineered to capture fine particles (silts and sands) by focusing on average annual runoff volume ensuring positive removal efficiency is maintained during all rainfall events, while preventing the opportunity for negative removal efficiency (scour).

Smaller recurring storms account for the majority of rainfall events and average annual runoff volume, as observed in the historical rainfall data analyses presented in this section.

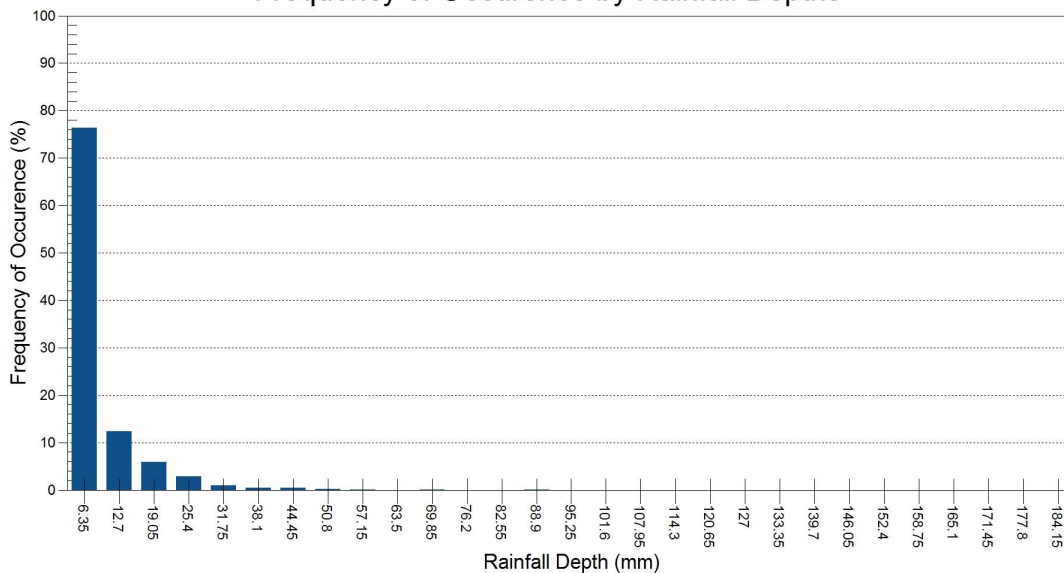
### Rainfall Station

Rainfall Station	WATERLOO WELLINGTON A		
Rainfall File Name	ON9387.NDC	Total Number of Events	3315
Latitude	43°27'N	Total Rainfall (mm)	16117.8
Longitude	80°23'W	Average Annual Rainfall (mm)	474.1
Elevation (m)	1030	Total Evaporation (mm)	133.2
Rainfall Period of Record (y)	34	Total Infiltration (mm)	14397.9
Total Rainfall Period (y)	34	Percentage of Rainfall that is Runoff (%)	9.9

### Rainfall Event Analysis

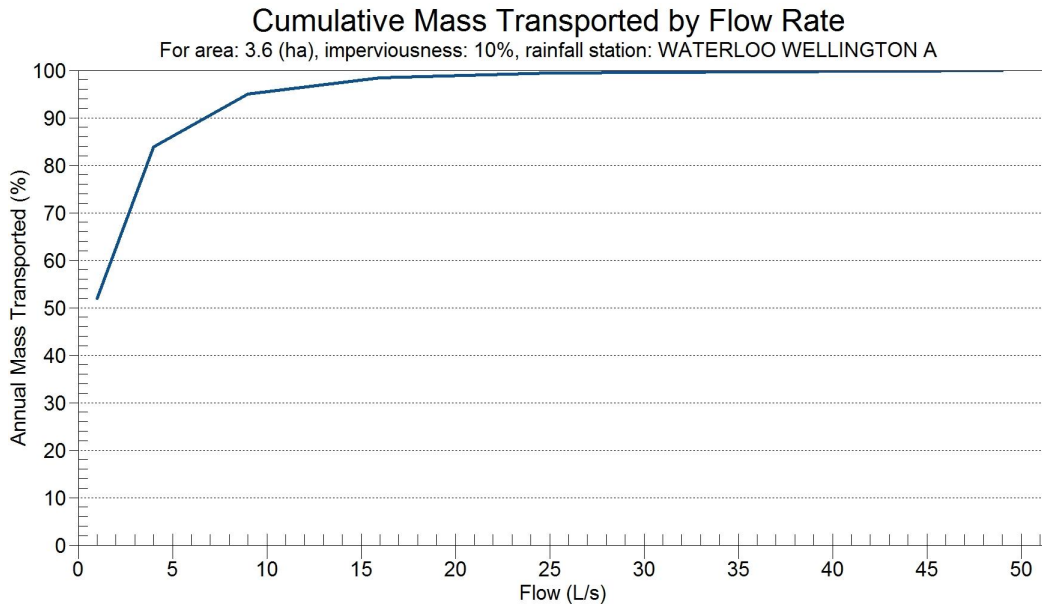
Rainfall Depth	No. of Events	Percentage of Total Events	Total Volume	Percentage of Annual Volume
mm		%	mm	%
6.35	2532	76.4	3998	24.8
12.70	412	12.4	3764	23.4
19.05	194	5.9	3039	18.9
25.40	94	2.8	2034	12.6
31.75	32	1.0	916	5.7
38.10	14	0.4	492	3.1
44.45	18	0.5	724	4.5
50.80	8	0.2	380	2.4
57.15	3	0.1	156	1.0
63.50	0	0.0	0	0.0
69.85	4	0.1	267	1.7
76.20	0	0.0	0	0.0
82.55	0	0.0	0	0.0
88.90	3	0.1	255	1.6
95.25	1	0.0	93	0.6
101.60	0	0.0	0	0.0
107.95	0	0.0	0	0.0
114.30	0	0.0	0	0.0
120.65	0	0.0	0	0.0
127.00	0	0.0	0	0.0
133.35	0	0.0	0	0.0
139.70	0	0.0	0	0.0
146.05	0	0.0	0	0.0
152.40	0	0.0	0	0.0
158.75	0	0.0	0	0.0
165.10	0	0.0	0	0.0
171.45	0	0.0	0	0.0
177.80	0	0.0	0	0.0
184.15	0	0.0	0	0.0
190.50	0	0.0	0	0.0
196.85	0	0.0	0	0.0
203.20	0	0.0	0	0.0
209.55	0	0.0	0	0.0
>209.55	0	0.0	0	0.0

Frequency of Occurrence by Rainfall Depths



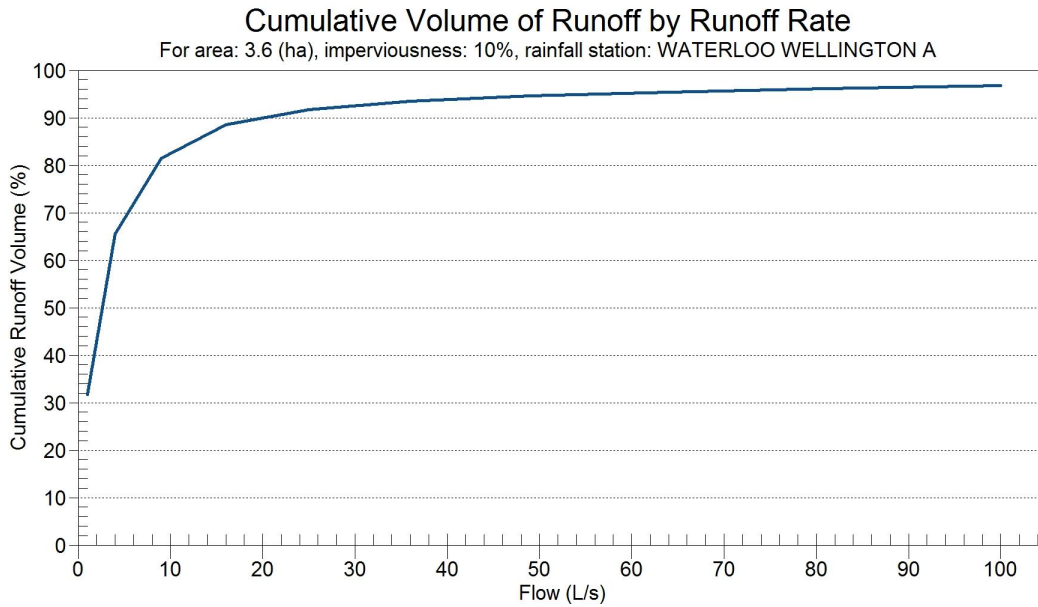
### Pollutograph

Flow Rate L/s	Cumulative Mass %
1	51.9
4	83.9
9	95.0
16	98.4
25	99.4
36	99.7
49	99.9
64	100.0
81	100.0
100	100.0
121	100.0
144	100.0
169	100.0
196	100.0
225	100.0
256	100.0
289	100.0
324	100.0
361	100.0
400	100.0
441	100.0
484	100.0
529	100.0
576	100.0
625	100.0
676	100.0
729	100.0
784	100.0
841	100.0
900	100.0



### Cumulative Runoff Volume by Runoff Rate

Runoff Rate	Runoff Volume	Cumulative Runoff Volume
L/s	m <sup>3</sup>	%
1	18250	31.7
4	37738	65.5
9	46893	81.4
16	50980	88.5
25	52844	91.7
36	53841	93.5
49	54494	94.6
64	54985	95.4
81	55410	96.2
100	55774	96.8
121	56104	97.4
144	56385	97.9
169	56617	98.3
196	56816	98.6
225	56979	98.9
256	57123	99.2
289	57245	99.4
324	57342	99.5
361	57423	99.7
400	57493	99.8
441	57544	99.9
484	57590	100.0
529	57604	100.0
576	57610	100.0
625	57610	100.0
676	57610	100.0
729	57610	100.0
784	57610	100.0
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## Stormceptor Design Summary

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**APPENDIX D**

**SWM POND STAGE-STORAGE-DISCHARGE RELATIONSHIP**

Pond

Orifice Size 650 mm  
 Orifice Invert 245 m  
 Orifice Coefficient 0.6  
 Orifice Area 0.331820938 m<sup>2</sup>  
 Orifice Centerline 245.325 m

Overflow Weir

Weir Crest Elevation 245.7 m  
 Weir Length 5.5 m  
 Weir Coefficient 1.6

Depth	Elevation	Description	Orifice m <sup>3</sup> /s	Weir Flow m <sup>3</sup> /s	Total Flow m <sup>3</sup> /s	Total Storage m <sup>3</sup>	Total Storage ha.m
0.00	245.00	Orifice #1	0.000	-	0.000	0.00	0.000
0.10	245.10		0.015	-	0.015	51.37	0.005
0.20	245.20		0.063	-	0.060	105.51	0.011
0.30	245.30		0.135	-	0.127	162.49	0.016
0.40	245.40		0.241	-	0.241	222.39	0.022
0.50	245.50		0.369	-	0.369	285.28	0.029
0.60	245.60		0.462	-	0.462	351.23	0.035
0.70	245.70	Weir Crest	0.540	0.000	0.540	420.31	0.042
0.80	245.80		0.607	0.278	0.886	492.59	0.049
0.90	245.90		0.668	0.787	1.455	568.15	0.057
1.00	246.00	Top of the Pond	0.724	1.446	2.170	647.06	0.065

**Length** 25  
**Width** 20  
**Area** 500