C.C. Tatham & Associates Ltd.
Consulting Engineers

CEDAR RUN WAKEBOARD CABLE PARK

Town of The Blue Mountains

Surface Water Management Strategy Report

prepared by:

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prepared for

2533827 Ontario Limited

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CCTA File 115232

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1 Introduction

C.C. Tatham & Associates Ltd. has been retained by 2533827 Ontario Limited to prepare a Surface Water Management Strategy Report in support of the proposed Official Plan Amendment (OPA), Rezoning, and Site Plan Approval for a proposed Wakeboard Cable Park in the Town of The Blue Mountains (TOBM). Specifically, this report has been prepared to address internal and external servicing requirements related to stormwater management associated with this development and present a water management strategy related to the filling and water level maintenance of the proposed wakeboard ponds.

1.1 Site Description

The site is located near the southwest corner of Grey Road 2 and Clark Street as depicted on Figure ODP-1 provided overleaf. The site consists of 35.78 ha of land formerly referred to as the Cedar Run Horse Park property and is bisected southwest to northeast by an intermittent tributary watercourse. The site is primarily grass covered and includes gravel roads and sand event areas from previous development. It is currently zoned as "Recreational Commercial (C4-12h)" zone and "Hazard (H)" zone under the site specific by-law (By-law 2012-49) applicable to the property. The property is legally described as part Lot 30, Concession 9, Town of the Blue Mountains in Grey County.

1.2 Objectives

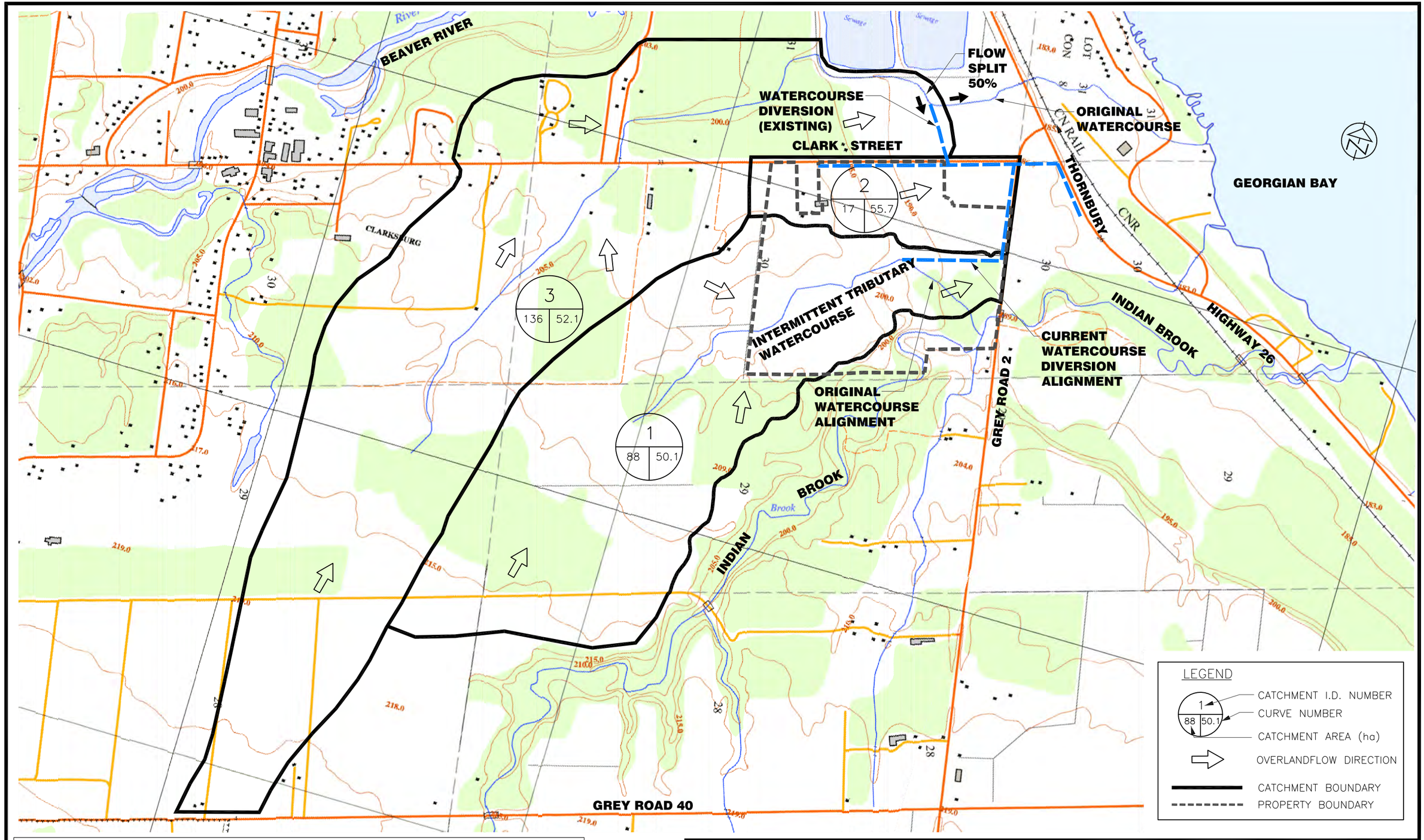
The Cedar Run Wakeboard Cable Park property has been the subject of various development reports and approvals over the past years. The primary objectives of this report are as follows:

- Present a stormwater management (SWM) plan for the development that demonstrates that a plan has been designed considering all past input from approval agencies;
- Present a surface water management strategy that will demonstrate how the wakeboard ponds are to be filled and water levels maintained in a sustainable manner; and
- Demonstrate that the development can be constructed in accordance with all applicable Municipal, Regional and Provincial guidelines while minimizing the impact of the development on the local drainage systems.

1.3 Background and Guidelines

This report was prepared recognizing the pertinent Conservation Authority, Municipality and Provincial guidelines on water resources, including the following publications:

- Stormwater Management Practices Planning and Design Manual. Ministry of the Environment (2003);



CONTRACT DRAWINGS

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie Ottawa

CEDAR RUN WAKEBOARD CABLE PARK
TOWN OF THE BLUE MOUNTAINS
EXISTING OVERALL DRAINAGE PLAN

DWG. No. **FIG. ODP1**

SCALE: 1:10,000 | DRAWN: DEP | DATE: MAR./17 | JOB NO. 115232

- Design Guidelines for Sewage Works. Ministry of the Environment (2008); and
- Engineering Standards. Town of the Blue Mountains (April 2009).

Due to the history of the area it is important to review the applicable background documents. The following summary documents background information pertinent to the SWM planning and development of the area:

- *Proposed Thornbury Horse Park Development Functional Servicing Report. C.C. Tatham & Associates Ltd. (July, 2006).* This report presented an overall analysis demonstrating serviceability of the proposed horse park in terms of traffic, stormwater, sewage flows, water supply and utilities.
- *Cedar Run – Thornbury Horse Park 2009-2010 Horse Show Approval Submission and Technical Report. C.C. Tatham & Associates Ltd. (March, 2009).* This report summarized the grading and drainage work completed on-site for the horse park from 2006-2008 and presented an overall plan summarizing the site servicing works required for the events proposed in 2009-2010.
- *Thornbury Horse Park Stormwater Management Report. C.C. Tatham & Associates Ltd. (June, 2009).* This report presented a SWM Plan for the interim drainage conditions for the Horse Park events planned in 2009 and 2010. The three ponds constructed from 2006-2008 were to provide the required quality and quantity control.
- *Thornbury Horse Park Stormwater Design Brief - Addendum. C.C. Tatham & Associates Ltd. (April, 2011).* This report presented a SWM Plan for a proposed parking area. The parking area was designed to drain to two new proposed SWM ponds. The parking area and ponds did not proceed to construction.
- *Thornbury Horse Park Approval Submission and Technical Report: Proposed 2012 Works. C.C. Tatham & Associates Ltd. (March, 2012).* This report presented the work proposed on-site in 2012. The work presented in this report did not proceed to construction. This report included the design for a proposed diversion channel. This diversion channel has been approved and the key design details are summarized within this report.

1.4 Proposed Land Use

The Cedar Run Wakeboard Cable Park is proposed to consist of a large circular wakeboard pond (Pond A), a smaller multi-level wakeboard pond, a pro shop/office, a commercial plaza, overnight accommodation cottages, a passive recreation area and associated parking and access roads.

The proposed interim development plan is to construct the 2 wakeboard ponds, pro shop/office, parking areas and associated access roads. Commercial and overnight accommodation development (residential) will be part of a future phase. The existing ponds constructed onsite as part of the previous Horse Park use will be retrofitted as required for stormwater management. An intermittent tributary watercourse that currently bisects the site will be diverted as originally proposed for the Horse Park development. The diversion will direct flows around the pond location to Indian Brook and the

Grey Road 2 roadside ditch as previously approved. The plan has also allowed for lands set aside for Clark Street to be realigned through the site. This realignment was the subject of previous discussions with the Town and a recent EA.

The proposed development plan is illustrated on the Post Development Drainage Plan (Drawing DP-2) included at the end of this report.

2 Existing Drainage Conditions

Site drainage primarily drains to an intermittent flowing watercourse that bisects the site alongside an existing gravel driveway to Grey Road 2. At Grey Road 2, the tributary ties into the roadside ditch drainage system which drains north along Grey Road 2 to Clark Street via a man-made drainage ditch then east under Clark Street and Highway 26 to Georgian Bay. Historically, the base mapping for the site area indicates that this intermittent tributary watercourse drained into Indian Brook approximately 80 m upstream of Grey Road 2. The area's existing drainage characteristics are summarized as follows and illustrated on the Existing Overall Drainage Plan (Figure ODP-1) and the Pre-Development Drainage Plan (Drawing DP-1):

- In 2007-2008, grading occurred onsite to create the Thornbury Horse Park event areas and three ponds were constructed onsite alongside the tributary watercourse. The event areas are grass covered and sand and primarily drain overland to the three ponds and ultimately the tributary watercourse. Investigations in the spring of 2012 confirmed that two of the existing ponds were functioning on-line with the tributary watercourse.

- Catchment 101 (5.13 ha) is the existing drainage area to Pond #1. The catchment is primarily grass covered and includes sand event areas. Pond #1 is currently functioning on-line with the tributary watercourse.

- Catchment 102 (2.96 ha) is the existing drainage area to Pond #2 and Pond #3. The catchment is primarily grass covered and includes sand event areas. Pond #2 is currently functioning on-line with the tributary watercourse.

- Catchment 1 (80.08 ha) is the remaining drainage area to the intermittent tributary watercourse to its connection to the Grey Road 2 roadside ditch. The catchment consists of a mix of forest and agricultural lands.

- Catchment 2 (16.83 ha) is the drainage area on the site and adjacent lands that drains directly to the roadside ditch along Grey Road 2 and Clark Street. This catchment is primarily grass covered and conveys surface runoff to the southwest corner of Grey Road 2 and Clark Street.

- Catchment 3 (136 ha) is the drainage area external to the site north of Clark Street and ultimately ties into the Grey Road 2 roadside ditch system.

2.1 Hydrologic Analysis

In order to quantify pre-development runoff rates to the intermittent tributary watercourse and downstream, a hydrologic analysis of the watershed was completed including development of a pre-development Visual OTTHYMO hydrologic model. The model includes the three ponds and the grading recently completed onsite. The model is consistent with the original approved design such that the hydrologic properties of each catchment match the approved post-development design from

earlier phases. The hydrologic analysis and associated calculations are included in Appendix A and the expected peak flow rates are summarized in the following table:

Table 1: Pre-Development Peak Flow Summary

Design Storm	Intermittent Tributary at Grey Road 2 *Hydrograph 803* (cms)	Intermittent Tributary at Highway 26 *Hydrograph 801* (cms)
2 Year	0.32	0.73
5 Year	0.54	1.24
10 Year	0.72	1.62
25 Year	0.97	1.96
50 Year	1.18	2.22
100 Year	1.39	2.50
Regional	3.14	4.53

Note: Peak Flows generated by SCS 24 Hour Type II Design Storms

3 Stormwater Management Plan

The stormwater management plan developed for the subject property is in accordance with the criteria set forth in the MOE Stormwater Management Planning and Design Manual and previous approvals for the site. The stormwater management plan has been designed in accordance with the SWM criteria established for the site and is presented in the following sections.

3.1 Design Criteria

Based on the information gathered on-site, the background information collected and our analysis of this information, a clear understanding of the SWM issues was gained. Consistent with previous SWM plans and approvals for the site, the following issues are to be addressed in the proposed SWM plan:

- Indian Brook and Georgian Bay are cold water fisheries requiring Level 1 'Enhanced' water quality treatment to Provincial standards. The proposed SWM plan must achieve 80% total suspended solids (TSS) removal prior to off-site discharge.
- To ensure that the downstream conveyance system is not adversely impacted by increased flows caused by the development, the SWM plan must attenuate post development peak flow rates off-site to existing levels for the 2-year through 100-year design storms for storm flows to the intermittent tributary.
- The Grey Road 2 roadside ditch has historically presented flood problems and as a result the intermittent tributary watercourse will be diverted to direct high flows to Indian Brook. This will significantly reduce flows to the Grey Road 2 roadside ditch. This diversion was previously designed and approved but not yet constructed.
- The stormwater management plan must accommodate the flows from the external drainage areas west of the subject property and must provide safe conveyance of the Regulatory storm event peak flows through the site to the downstream drainage system.

3.2 Diversion Channel

Under existing conditions, the tributary watercourse bisecting the site runs alongside the existing gravel driveway off Grey Road 2 through a vegetated ditch. At Grey Road 2, the tributary ties into the roadside ditch drainage system.

As previously approved with the Cedar Run development, it is proposed to divert the existing tributary watercourse around the area proposed for wakeboard Pond A to direct flows to the Indian Brook as the primary outlet and the Grey Road 2 ditch as the low flow outlet. The diversion channel will include a split constructed towards the downstream end of the diversion channel to split the flow. A baseflow channel will be constructed from the split to the Grey Road 2 roadside ditch to maintain low flows in the downstream drainage system. Overflow surface runoff will be diverted to Indian Brook. The design for the channel diversion was completed and approved by the Town of The Blue Mountains, County and

GSCA in 2012 but never constructed. The same drawings that were approved in 2012 will be used for this approval.

The proposed diversion channel cross-section has been designed to mimic the natural upstream watercourse cross-section and has a minimum conveyance capacity of 1.4 m^3/s, equal to the expected 100 year design storm peak flow. The existing culvert outlet to Indian Brook will be removed and replaced with a 600 mm diameter CSP culvert, sized to convey the expected surface runoff downstream to Indian Brook. The baseflow channel has been designed to convey baseflows while allowing for fish passage upstream. Riverstone riffles will be installed in the diversion channel to force baseflows (~10 L/s) through the baseflow channel while allowing surface runoff to spill through the diversion channel to Indian Brook.

It is noted that the tributary watercourse has been identified as a warm water fishery and the design of the diversion channel follows the principles of natural channel design. Low gradients, in-water structure, overhanging canopy, and erosion controls have all been incorporated into the design of the proposed diversion channel. Similarly, the same features have been included in the design of the baseflow channel.

3.3 Proposed Drainage Conditions

A stormwater management plan has been developed for the wakeboard park that complies with the appropriate technical SWM guidelines and achieves the SWM criteria established for the site. The proposed SWM plan maximizes the developed area draining to the existing Pond #3 as the main quantity and quality control feature for the site. The proposed site drainage characteristics are illustrated on the Post Development Drainage Plan (Drawing DP-2) and are summarized as follows:

- Catchment 201 (5.05 ha) is the proposed drainage area to Pond #1. The existing grassed area will be developed into a passive recreation area with very little land use or drainage change and will continue to be controlled by Pond #1, consistent with existing conditions.

- Catchment 202 (6.35 ha) is the proposed drainage area to retrofitted Pond #3. The existing grassed area will be developed for the pro shop/office, a commercial plaza, overnight accommodations, and associated parking and access roads. Retrofitted Pond #3 will provide quantity and quality control and discharge to the intermittent tributary watercourse upstream of the diversion.

- The wakeboard ponds shall capture all water that falls within their areas and no water will be discharged from the ponds. This water will be used to minimize required water taking.

- Catchment 1 (77.75 ha) is reduced from pre-development conditions based on the increased drainage to Pond #3 and the watercourse diversion. No development is proposed to this catchment at this time.

- Catchment 2 (10.93 ha) is reduced from pre-development conditions based on the increased drainage to Pond #3 and the construction of the wakeboard ponds. This catchment will have a small increased imperviousness based on ultimate development conditions and the potential for the Clark Street realignment. Quantity control for Catchment 2 is not required as the watercourse diversion will significantly reduce the overall flows to Grey Road 2. The impervious areas will drain via grassed swales and ditches to provide the requisite quality control.

- Catchment 3 will be unaffected from pre-development conditions.

Retrofitted Pond #3 and existing Pond #1 will provide the required level of water quality and quantity control to achieve the SWM criteria established for the entire area, as described in the following subsections.

3.3.1 Water Quantity Control

The existing runoff rates to the intermittent tributary watercourse upstream of the proposed diversion must be maintained under proposed conditions by restricting post development peak flow rates to pre-development levels for the 2-year through 100-year design storms. Safe conveyance of the Regulatory Timmins storm event must also be provided through the site. This will be achieved through a retrofit of existing Pond #3. The existing water level is approximately 194.90 m as determined through site survey and this elevation shall be maintained as the permanent pool elevation. The top of bank shall be regraded and set at 196.20 m at the approximate elevation of the trail crossing between Pond #2 and Pond #3. The proposed improvements are illustrated in the Pond Improvements Plan (Drawing PND-1). The pond retrofit improvements and existing pond modifications are described as follows:

- Site investigations confirmed that Pond #1 and #2 were functioning on-line with the tributary watercourse. The pond banks shall be re-established such that Pond #1 functions off-line in accordance with its original design and Pond #2 will also be brought off-line;

- An outlet to the existing watercourse from retrofitted Pond #3 will be installed to ensure quantity control occurs from this pond. The outlet will be comprised of a reverse grade pipe, a primary low flow control orifice, a ditch inlet catchbasin and a secondary low flow control pipe outletting to the existing watercourse;

- The low flow control pipes and the ditch inlet will be constructed to maintain the existing permanent pool of the pond and have been sized to optimize peak flow attenuation under minor storm events; and

- An emergency overflow spillway will be constructed to release major storm peak flows downstream if the primary outlets are blocked.

As described above, the area draining to Pond #3 is increased under proposed conditions. Through implementation of the outlet controls described above and as illustrated on Drawing PND-1, control of the 2-year through 100-year storms to pre-development levels is maintained. The associated Stage-Storage Discharge calculations are included in Appendix B. To confirm post-development flows to the

channel, a hydrologic analysis using Visual OTTHYMO was completed. The hydrologic analysis and associated calculations are also included in Appendix B and the results are summarized in the following table:

Table 2: Post Development Peak Flow Summary

Design Storm	Pond Outflows *Hydrograph 802* (cms)	Intermittent Tributary *Hydrograph 803* (cms)	Downstream of Grey Road 2 *Hydrograph 801* (cms)
2 Year	0.02 *(0.03)*	0.30 *(0.32)*	0.41 *(0.73)*
5 Year	0.04 *(0.04)*	0.51 *(0.54)*	0.70 *(1.24)*
10 Year	0.05 *(0.06)*	0.67 *(0.72)*	0.88 *(1.62)*
25 Year	0.06 *(0.08)*	0.91 *(0.97)*	1.03 *(1.96)*
50 Year	0.08 *(0.10)*	1.10 *(1.18)*	1.14 *(2.22)*
100 Year	0.11 *(0.13)*	1.31 *(1.39)*	1.24 *(2.50)*

Note: (0.039) – equivalent pre-development flow rate

A comparison of the post and pre-development flow summaries to the unnamed tributary watercourse from Catchments 201 and 202 and at the proposed diversion confirm that the proposed retrofit to Pond #3 can attenuate the 2-year through 100-year post development flows to levels at or below existing. The diversion of the intermittent tributary watercourse significantly decreases the peak flows at Grey Road 2.

3.3.2 Water Quality Control

As discussed, Level 1 "Enhanced" water quality treatment is required in the form of 80% total suspended solids (TSS) removal. Catchment 202 will be treated on-site through the retrofit of existing Pond #3. The following elements have been incorporated into the SWM pond retrofit to improve water quality:

- A reverse grade pipe and orifice to promote sedimentation and pollutant removal;
- Extended flow path to further promote sedimentation and pollutant removal; and
- Construction of grassed overland flow routes to provide pre-treatment and sediment removal.

Under proposed conditions, approximately 6.35 ha will drain to the retrofitted Pond #3 at a combined imperviousness level of 17%. For Level 1 water quality treatment, the required permanent pool and extended detention volumes are approximately 255 m^3 and 290 m^3 respectively. The active storage volume required is approximately 760 m^3 according to the erosion control requirements of the MOECC SWM Design Manual. Based on the original pond design, the total permanent pool volume provided is

approximately 1400 m^3. The retrofitted pond design provides approximately 910 m^3 of extended detention. Sedimentation should be cleaned out such that the minimum permanent pool depth is 1 m in accordance with MOE recommended depths for wet ponds. This will maintain the permanent pool volume well above the required storage.

The pond drawdown time for the 25-mm design storm is approximately 10 hours and the drawdown time at the extended detention water level is approximately 29 hours. The grassed swales and overland drainage shall provide pre-treatment leading into the pond. Water quality storage and drawdown calculations are included in Appendix C for reference.

4 Wakeboard Pond Surface Water Management

As previously described, the proposed development consists of a multi-level wakeboard pond and a larger circular wakeboard pond referred to as Pond A. The following sections describe the pond construction and the strategy for filling and maintaining water levels within the ponds.

4.1 Pond Construction

The wakeboard pond construction is proposed to occur in the summer of 2018. This is to facilitate collection of water from the surplus available from the fall and spring freshet runoff in 2019 to fill the ponds leading up to the proposed opening in 2019. Extensive analysis of construction and maintenance concerns related to the pond were completed in the *Geotechnical and Hydrogeological Study for Proposed Cedar Run Wakeboard Cable Park* report prepared by WSP Canada Inc. (2017) to be submitted under separate cover.

The WSP report indicates high permeability of the cohesionless deposits at the bottom and lower portions of the pond slopes. To limit seepage/piping, a clay or synthetic membrane liner is required at the bottoms and sides of the ponds. In keeping with the WSP recommendations, a clay liner is proposed with a minimum 0.5 m thickness constructed of low permeability material and compacted to at least 98% SPMDD. Furthermore, earth fill for the berms surrounding the ponds will be constructed to consist of inorganic low permeability material (clayey silt/silty clay) to limit seepage/piping and groundwater intrusion into the berm.

The potential for the pond to interface with the groundwater has also been considered in the design. As summarized in the WSP report, Pond A will extend below the groundwater table into the sandy soils below the top soil. During construction groundwater control if required will be managed by sumps in the sandy soils, but may also require excavation of drainage pits to the base of any saturated sand and gravel deposits. Further details of the proposed groundwater control are summarized in the WSP report and will be addressed during construction. Data from the borehole drilling and monitoring well testing indicates that daily pumping volumes will be less than 400,000 litres per day which would require an MOE Permit to Take Water (PTTW). However, conservative estimates indicate that the dewatering will still exceed 50,000 litres per day and thus should be registered on the Environmental Activity and Site Registry (EASR) prior to construction.

4.2 Pond Initial Filling

The total storage volume required for Pond A is 30,100 m^3 and the total storage volume required for the multi-level wakeboard pond is approximately 10,500 m^3. Water balance calculations from September to May of a typical year indicate that Pond A can collect approximately 17,400 m^3 from snow melt and rain that falls on the pond surface area and the central island within Pond A. Similarly,

the multi-level wakeboard pond can collect approximately 7,700 m^3 from September to May. Therefore, the total deficit that needs to be filled between the two ponds is approximately 15,600 m^3.

Water balance calculations for the intermittent tributary drainage area indicates that the total runoff through the on-site tributary from September to May is approximately 120,500 m^3. The proposal is to fill the remainder of the ponds by capturing and diverting a small portion of this spring runoff. Calculations in Appendix D indicate that 13% of this runoff would be diverted to the ponds to initially fill them to make up the deficit.

4.3 Pond Level Maintenance

To limit water losses within the wakeboard ponds, a clay liner is proposed for each pond to minimize any potential infiltration/exfiltration. Details of the clay liner requirements are described in greater detail in Section 4.1 and in the WSP geotechnical report.

Due to the clay liner, infiltration losses are considered negligible. Water balance calculations were completed for the pond based on evaporation losses to consider how much water needs to be added to maintain water levels. Climate normal data for precipitation in Thornbury and representative evaporation losses of small open water-bodies in Ontario were used in the water balance. These calculations indicate that the largest deficit will occur in July. Pond A and the multi-level wakeboard pond will have a total deficit of 1,195 m^3 in July. To maintain water levels in the ponds, water taking will be required during this time frame at a rate of approximately 38,540 litres/day to make up for the deficit. This is less than 50,000 litres per day and therefore would not require a PTTW. There are several on-site sources available to supplement the ponds. The intermittent tributary and Indian Brook are available surface water sources. Groundwater sources can be made available through drilled wells and the Town has a municipal water supply to the property. The current proposed supplemental water supply source is Indian Brook. It is noted that a PTTW from Indian Brook to trickle feed the on-site ponds for irrigation and recreational purposes was previously issued to the Cedar Run Corporation and expired in 2015. It is envisioned that this permit would be renewed for this project. Supporting calculations are included in Appendix D.

5 Siltation and Erosion Control

Siltation and erosion control will be implemented for all construction activities within the development site, including vegetation clearing, topsoil stripping, road construction and stockpiling of materials. The basic principles considered to minimize erosion and sedimentation and resultant negative environmental impacts include:

- Minimize disturbance activities where possible;
- Expose the smallest possible land area to erosion for the shortest possible time;
- Institute erosion control measures as-required immediately;
- Implement sediment control measures before the outset of construction activities; and
- Carry out regular inspections of erosion/sediment control measures and repair or maintain as necessary.

The detailed siltation and erosion control measures proposed to be implemented during and after construction are identified on the Siltation and Erosion Control Plan (Drawing SC-1) and include the following:

- Heavy duty silt fences will be erected around the perimeter of the site before any grading operations commence to control sediment movement sites;
- A construction vehicle entrance will be constructed and maintained consisting of a stone mud mat to reduce off-site tracking of materials; and
- Straw bale flow check dams and rock flow check dams will be installed in the on-site and off-site overland flow routes/ditches to prevent the movement of sediment downstream.

6 Conclusions

In conclusion, the proposed surface water management strategy confirms the development as proposed will have no adverse impacts on the intermittent tributary watercourse, Indian Brook or Georgian Bay. Level 1 'Enhanced' water quality control in the form of 80% TSS removal and water quantity control in the form of post to pre-development peak flow attenuation are provided within the proposed SWM plan. The wakeboard pond construction strategy will allow for the ponds to be filled within a single year and the water levels can be maintained from the available water taking sources without adverse effects.

If you have any questions or concerns please do not hesitate to call.

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Vice President,
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APPENDIX A:
PRE-DEVELOPMENT HYDROLOGY

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

Project:	Thornbury Horse Park
File No.:	106009
Date:	Apr-11
Designed By:	JA
Checked By:	DJH
Subject:	CN, IA and TP Calculations

THORNBURY HORSE PARK - CURVE NUMBER, INITIAL ABSTRACTION & TIME TO PEAK CALCULATIONS

CONDITIONS

Catchment Pre 1 **Area** 88 ha

WEIGHTED CN VALUE

Soil Series	Soil Series	Hydrologic Soil Group	Soil Texture	Runoff Coefficient Type	Catchment Soil Characteristics		Forest/Woodland			Pasture/Lawns			Meadows			Cultivated			Impervious			Wetland/Lakes/SWMF			Average CN for Soil Type
					Area	Percent	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	
Brs	BRIGHTON	A	Sand	1	51.92	0.59	15.576	0.3	32	34.786	0.67	49	0	0	38	0	0	62	1.5576	0.03	100	0	0	50	45.43
Ts	TECUMSETH	AB	Silt	1	29.92	0.34	11.968	0.4	46	17.054	0.57	59	0	0	51	0	0	68	0.8976	0.03	100	0	0	50	55.03
Gsl	GRANBY	B	Sand Loam	2	6.16	0.07	3.08	0.5	60	2.8952	0.47	69	0	0	65	0	0	74	0.1848	0.03	100	0	0	50	65.43
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
				Totals	88	1	30.624	0.348		54.736	0.622		0	0		0	0		2.64	0.03		0	0		55.1

Time of Concentration Calculations

For Runoff Coefficients greater than 0.4

Bransby-Williams Formula

Maximum Catchment Elevation	217.50	m
Minimum Catchment Elevation	186.00	m
Catchment length	1800	m
Catchment Slope	2%	
Catchment Area	88	ha
Time of Concentration (Minutes)	**58.63**	
Time of Concentration (Hours)	**0.98**	
Time to Peak (2/3 x Time of Concentration)	**0.65**	

Time to Peak	**1.24 hrs**

For Runoff Coefficients less than 0.4

Airport Method

Maximum Catchment Elevation	217.5	m
Minimum Catchment Elevation	186	m
Catchment length	1800	m
Catchment Slope	2%	
Catchment Area	88	ha
Time of Concentration (Minutes)	**111.36**	
Time of Concentration (Hours)	**1.86**	
Time to Peak (2/3 x Time of Concentration)	**1.24**	

Initial Abstraction	**0.65 mm**

Woods	10
Meadows	8
Cultivated	7
Lawns	5
Impervious	2

Runoff Coefficient	**0.13**

Landuse Type	Soil Series				
	Brs	Ts	Gsl	0	0
	1	1	2	#N/A	#N/A
Forest/Woodland	0.08	0.08	0.25	#N/A	#N/A
Cultivated	0.22	0.22	0.35	#N/A	#N/A
Pasture/Lawn	0.1	0.1	0.28	#N/A	#N/A
Impervious	0.95	0.95	0.95	#N/A	#N/A
Wetland/Lake/SWMF	0.05	0.05	0.05	#N/A	#N/A
Meadows	0.09	0.09	0.27	#N/A	#N/A
Soil Series Total	0.1195	0.1195	0.2911	#N/A	#N/A

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Consulting Engineers
Collingwood Bracebridge Orillia Barrie

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THORNBURY HORSE PARK - CURVE NUMBER, INITIAL ABSTRACTION & TIME TO PEAK CALCULATIONS

CONDITIONS

Catchment: Pre 2 Area: 17 ha

WEIGHTED CN VALUE

Soil Series	Soil Series	Hydrologic Soil Group	Soil Texture	Runoff Coefficient Type	Catchment Soil Characteristics Area	Catchment Soil Characteristics Percent	Forest/Woodland Area	Forest/Woodland Percent	Forest/Woodland CN	Pasture/Lawns Area	Pasture/Lawns Percent	Pasture/Lawns CN	Meadows Area	Meadows Percent	Meadows CN	Cultivated Area	Cultivated Percent	Cultivated CN	Impervious Area	Impervious Percent	Impervious CN	Wetland/Lake/SWMF Area	Wetland/Lake/SWMF Percent	Wetland/Lake/SWMF CN	Average CN for Soil Type
Brs	BRIGHTON	A	Sand	1	12.75	0.75	0	0	32	12.368	0.97	49	0	0	38	0	0	62	0.3825	0.03	100	0	0	50	50.53
Gsl	GRANBY	B	Sand Loam	2	4.25	0.25	0	0	60	3.9525	0.93	69	0	0	65	0	0	74	0.2975	0.07	100	0	0	50	71.17
	#N/A	#N/A	#N/A	#N/A	0		0	0	#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
				Totals	17	1	0	0		16.32	0.96		0	0		0	0		0.68	0.04		0	0		55.7

Time of Concentration Calculations

For Runoff Coefficients greater than 0.4

Bransby-Williams Formula

Maximum Catchment Elevation	205.00	m
Minimum Catchment Elevation	187.50	m
Catchment length	750	m
Catchment Slope	2%	
Catchment Area	17	ha
Time of Concentration (Minutes)	27.18	
Time of Concentration (Hours)	0.45	
Time to Peak (2/3 x Time of Concentration)	0.30	

Time to Peak	0.70 hrs

For Runoff Coefficients less than 0.4

Airport Method

Maximum Catchment Elevation	205	m
Minimum Catchment Elevation	187.5	m
Catchment length	750	m
Catchment Slope	2%	
Catchment Area	17	ha
Time of Concentration (Minutes)	62.83	
Time of Concentration (Hours)	1.05	
Time to Peak (2/3 x Time of Concentration)	0.70	

Initial Abstraction	4.58 mm

Woods	10
Meadows	8
Cultivated	7
Lawns	5
Impervious	2

Runoff Coefficient	0.17

Landuse Type	Soil Series Brs	Gsl	0	0	0
	1	2	#N/A	#N/A	#N/A
Forest/Woodland	0.08	0.25	#N/A	#N/A	#N/A
Cultivated	0.22	0.35	#N/A	#N/A	#N/A
Pasture/Lawn	0.1	0.25	#N/A	#N/A	#N/A
Impervious	0.95	0.95	#N/A	#N/A	#N/A
Wetland/Lake/SWMF	0.05	0.05	#N/A	#N/A	#N/A
Meadows	0.09	0.27	#N/A	#N/A	#N/A
Soil Series Total	0.1255	0.3001	#N/A	#N/A	#N/A

C.C. Tatham & Associates Ltd. Consulting Engineers		
Collingwood Bracebridge Orillia Barrie	Project:	Thornbury Horse Park
	File No.:	106009
	Date:	Apr-11
	Designed By:	JA
	Checked By:	DJH
	Subject:	CN, IA and TP Calculations

THORNBURY HORSE PARK - CURVE NUMBER, INITIAL ABSTRACTION & TIME TO PEAK CALCULATIONS

CONDITIONS

Catchment 101 **Area** 5.13 ha

WEIGHTED CN VALUE

Soil Series	Soil Series	Hydrologic Soil Group	Soil Texture	Runoff Coefficient Type	Catchment Soil Characteristics		Forest/Woodland			Pasture/Lawns			Meadows			Cultivated			Impervious			Wetland/Lakes/SWMF			Average CN for Soil Type
					Area	Percent	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	
Brs	BRIGHTON	A	Sand	1	5.13	1	0	0	32	4.617	0.9	49	0	0	38	0	0	89	0.513	0.1	100	0	0	50	54.1
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
				Totals	5.13	1	0	0		4.617	0.9		0	0		0	0		0.513	0.1		0	0		54.1

Time of Concentration Calculations

For Runoff Coefficients greater than 0.4

Bransby-Williams Formula

Maximum Catchment Elevation	200.00	m
Minimum Catchment Elevation	197.00	m
Catchment length	280	m
Catchment Slope	1%	
Catchment Area	5.13	ha
Time of Concentration (Minutes)	13.37	
Time of Concentration (Hours)	0.22	
Time to Peak (2/3 x Time of Concentration)	0.15	

Time to Peak	0.54 hrs

For Runoff Coefficients less than 0.4

Airport Method

Maximum Catchment Elevation	200	m
Minimum Catchment Elevation	197	m
Catchment length	280	m
Catchment Slope	1%	
Catchment Area	5.13	ha
Time of Concentration (Minutes)	48.79	
Time of Concentration (Hours)	0.81	
Time to Peak (2/3 x Time of Concentration)	0.54	

Initial Abstraction	4.7 mm

Woods	10
Meadows	8
Cultivated	7
Lawns	5
Impervious	2

Runoff Coefficient	0.19

Landuse Type	Soil Series				
	Brs	0	0	0	0
	1	#N/A	#N/A	#N/A	#N/A
Forest/Woodland	0.08	#N/A	#N/A	#N/A	#N/A
Gravel	0.6	#N/A	#N/A	#N/A	#N/A
Pasture/Lawn	0.1	#N/A	#N/A	#N/A	#N/A
Impervious	0.95	#N/A	#N/A	#N/A	#N/A
Wetland/Lake/SWMF	0.05	#N/A	#N/A	#N/A	#N/A
Meadows	0.09	#N/A	#N/A	#N/A	#N/A
Soil Series Total	0.185	#N/A	#N/A	#N/A	#N/A

C.C. Tatham & Associates Ltd. Consulting Engineers	
Collingwood · Bracebridge · Orillia · Barrie	
Project:	Thornbury Horse Park
File No.:	106009
Date:	Apr-11
Designed By:	JA
Checked By:	DJH
Subject:	CN, IA and TP Calculations

THORNBURY HORSE PARK - CURVE NUMBER, INITIAL ABSTRACTION & TIME TO FEAK CALCULATIONS

CONDITIONS

Catchment: 102 Area: 2.96 ha

WEIGHTED CN VALUE

Soil Series	Soil Series	Hydrologic Soil Group	Soil Texture	Runoff Coefficient Type	Catchment Soil Characteristics Area	Catchment Soil Characteristics Percent	Forest/Woodland Area	Forest/Woodland Percent	Forest/Woodland CN	Pasture/Lawns Area	Pasture/Lawns Percent	Pasture/Lawns CN	Meadows Area	Meadows Percent	Meadows CN	Cultivated Area	Cultivated Percent	Cultivated CN	Impervious Area	Impervious Percent	Impervious CN	Wetland/Lakes/SWMF Area	Wetland/Lakes/SWMF Percent	Wetland/Lakes/SWMF CN	Average CN for Soil Type
Brs	BRIGHTON	A	Sand	1	2.96	1	0	0	32	2.516	0.85	49	0	0	38	0	0	62	0.444	0.15	100	0	0	50	56.65
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
				Totals	2.96	1	0	0		2.516	0.85		0	0		0	0		0.444	0.15		0	0		56.7

Time of Concentration Calculations

For Runoff Coefficients greater than 0.4

Bransby-Williams Formula

Maximum Catchment Elevation	204.00	m
Minimum Catchment Elevation	197.00	m
Catchment length	200	m
Catchment Slope	4%	
Catchment Area	2.96	ha
Time of Concentration (Minutes)	7.96	
Time of Concentration (Hours)	0.13	
Time to Peak (2/3 x Time of Concentration)	0.09	

For Runoff Coefficients less than 0.4

Airport Method

Maximum Catchment Elevation	204	m
Minimum Catchment Elevation	197	m
Catchment length	200	m
Catchment Slope	4%	
Catchment Area	2.96	ha
Time of Concentration (Minutes)	26.60	
Time of Concentration (Hours)	0.44	
Time to Peak (2/3 x Time of Concentration)	0.30	

Time to Peak	0.30 hrs

Initial Abstraction	4.55 mm

Woods	10
Meadows	8
Cultivated	7
Lawns	5
Impervious	2

Runoff Coefficient	0.23

Landuse Type	Soil Series				
	Brs	0	0	0	0
	1	#N/A	#N/A	#N/A	#N/A
Forest/Woodland	0.08	#N/A	#N/A	#N/A	#N/A
Gravel	0.6	#N/A	#N/A	#N/A	#N/A
Pasture/Lawn	0.1	#N/A	#N/A	#N/A	#N/A
Impervious	0.95	#N/A	#N/A	#N/A	#N/A
Wetland/Lake/SWMF	0.05	#N/A	#N/A	#N/A	#N/A
Meadows	0.09	#N/A	#N/A	#N/A	#N/A
Soil Series Total	0.2275	#N/A	#N/A	#N/A	#N/A

C.C.Tatham & Associates Ltd.
Consulting Engineers
Bellingwood Bracebridge Delta Barrie

Project:	Thornbury Horse Park
File No.:	106009
Date:	Apr-11
Designed By:	JA
Checked By:	DJH
Subject:	CN, IA and TP Calculations

THORNBURY HORSE PARK - CURVE NUMBER, INITIAL ABSTRACTION & TIME TO PEAK CALCULATIONS

CONDITIONS

Catchment 3 Area 136 ha

WEIGHTED CN VALUE

Soil Series	Soil Series	Hydrologic Soil Group	Soil Texture	Runoff Coefficient	Catchment Soil Characteristics		Forest/Woodland			Pasture/Lawns			Meadows			Cultivated			Impervious			Wetland/Lakes/SWMF			Average CN for Soil Type
				Type	Area	Percent	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	
Brs	BRIGHTON	A	Sand	1	84.32	0.62	33.728	0.4	32	25.296	0.3	49	0	0	38	22.766	0.27	62	2.5296	0.03	100	0	0	50	47.24
Ts	TECUMSETH	AB	Silt	1	51.68	0.38	12.92	0.25	46	19.38	0.375	59	0	0	51	17.83	0.345	68	1.5504	0.03	100	0	0	50	60.085
	#N/A	#N/A	#N/A	#N/A	0	0	0	0	#N/A	0	0	#N/A	0	0	#N/A	0	0	#N/A	0	0	#N/A	0	0	#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
				Totals	136	1	46.648	0.343		44.676	0.3285		0	0		40.596	0.2985		4.08	0.03		0	0		52.1

Time of Concentration Calculations

For Runoff Coefficients greater than 0.4

Bransby-Williams Formula

Maximum Catchment Elevation	225.00 m
Minimum Catchment Elevation	187.50 m
Catchment length	3400 m
Catchment Slope	1%
Catchment Area	136 ha
Time of Concentration (Minutes)	**116.28**
Time of Concentration (Hours)	**1.94**
Time to Peak (2/3 x Time of Concentration)	**1.29**

Time to Peak	1.94 hrs

For Runoff Coefficients less than 0.4

Airport Method

Maximum Catchment Elevation	225 m
Minimum Catchment Elevation	187.5 m
Catchment length	3400 m
Catchment Slope	1%
Catchment Area	136 ha
Time of Concentration (Minutes)	**174.86**
Time of Concentration (Hours)	**2.91**
Time to Peak (2/3 x Time of Concentration)	**1.94**

Initial Abstraction	7.222 mm

Woods	10
Meadows	8
Cultivated	7
Lawns	5
Impervious	2

Runoff Coefficient	0.15

Landuse Type	Soil Series				
	Brs	Ts	0	0	0
	1	1	#N/A	#N/A	#N/A
Forest/Woodland	0.08	0.08	#N/A	#N/A	#N/A
Cultivated	0.22	0.22	#N/A	#N/A	#N/A
Pasture/Lawn	0.1	0.1	#N/A	#N/A	#N/A
Impervious	0.95	0.95	#N/A	#N/A	#N/A
Wetland/Lake/SWMF	0.05	0.05	#N/A	#N/A	#N/A
Meadows	0.09	0.09	#N/A	#N/A	#N/A
Soil Series Total	0.1499	0.1499	#N/A	#N/A	#N/A

C.C. Tatham & Associates Ltd.
Consulting Engineers

Project :	Thornbury Horse Park
File No.	106009
Date:	May 19, 2009
Designed By:	DRT
Checked By:	DJH
Subject:	Pond No.1 Stage-Volume Table

EXISTING POND No. 1 - STAGE-VOLUME TABLE

Wet Cell

Side Slope	3:1
Bottom Length	50.0 m
Bottom Width	12.0 m
Bottom Elevation	193.00 m
Water Level	196.20 m
Stage	0.1 m

STAGE-VOLUME TABLE

Elevation	Pond Depth	Pond Area	Average Pond Area	Volume					
				Dead Storage	Accum. Dead Storage	Active Storage	Accum. Active Storage	Accum. Total Storage	Accum. Total Storage
(m)	(m)	(sq.m)	(sq.m)	(cu.m)	(cu.m)	(cu.m)	(cu.m)	(cu.m)	(ha-m)
193.00	0.00	526.00							
193.10	0.10	570.30	548.15	55	55			55	0.0055
193.20	0.20	614.60	592.45	59	114			114	0.0114
193.30	0.30	658.90	636.75	64	178			178	0.0178
193.40	0.40	703.20	681.05	68	246			246	0.0246
193.50	0.50	747.50	725.35	73	318			318	0.0318
193.60	0.60	791.80	769.65	77	395			395	0.0395
193.70	0.70	836.10	813.95	81	477			477	0.0477
193.80	0.80	880.40	858.25	86	563			563	0.0563
193.90	0.90	924.70	902.55	90	653			653	0.0653
194.00	1.00	969.00	946.85	95	747			747	0.0747
194.10	1.10	1013.30	991.15	99	847			847	0.0847
194.20	1.20	1057.60	1035.45	104	950			950	0.0950
194.30	1.30	1101.90	1079.75	108	1058			1058	0.1058
194.40	1.40	1146.20	1124.05	112	1171			1171	0.1171
194.50	1.50	1190.50	1168.35	117	1287			1287	0.1287
194.60	1.60	1234.80	1212.65	121	1409			1409	0.1409
194.70	1.70	1279.10	1256.95	126	1534			1534	0.1534
194.80	1.80	1323.40	1301.25	130	1664			1664	0.1664
194.90	1.90	1367.70	1345.55	135	1799			1799	0.1799
195.00	2.00	1412.00	1389.85	139	1938			1938	0.1938
195.10	2.10	1474.55	1443.28	144	2082			2082	0.2082
195.20	2.20	1537.10	1505.83	151	2233			2233	0.2233
195.30	2.30	1599.65	1568.38	157	2390			2390	0.2390
195.40	2.40	1662.20	1630.93	163	2553			2553	0.2553
195.50	2.50	1724.75	1693.48	169	2722			2722	0.2722
195.60	2.60	1787.30	1756.03	176	2898			2898	0.2898
195.70	2.70	1849.85	1818.58	182	3080			3080	0.3080
195.80	2.80	1912.40	1881.13	188	3268			3268	0.3268
195.90	2.90	1974.95	1943.68	194	3462			3462	0.3462
196.00	3.00	2037.50	2006.23	201	3663			3663	0.3663
196.10	3.10	2100.05	2068.78	207	3870			3870	0.3870
196.20	3.20	2162.60	2131.33	213	4083			4083	0.4083
196.30	3.30	2225.15	2193.88	219	4302			4302	0.4302
196.40	3.40	2287.70	2256.43	226	4528			4528	0.4528
196.50	3.50	2350.25	2318.98	232	4760			4760	0.4760
196.60	3.60	2412.80	2381.53	238	4998			4998	0.4998
196.70	3.70	2475.35	2444.08		4998	244	244	5242	0.5242
196.80	3.80	2537.90	2506.63		4998	251	495	5493	0.5493
196.90	3.90	2600.45	2569.18		4998	257	752	5750	0.5750
197.00	4.00	2663.00	2631.73		4998	263	1015	6013	0.6013

C.C.Tatham & Associates Ltd.
Consulting Engineers

Project:	Thornbury Horse Park
File No.:	106009
Date:	May 19, 2009
Designed By:	DRT
Checked By:	DJH
Subject:	Pond No. 1 Stage-Discharge Table

EXISTING POND No. 1 - STAGE-DISCHARGE TABLE

Primary Low Flow Outlet

Type	Orifice	Pipe
Diameter (mm)	-	-
Area (sq.m)	-	-
Coefficient	-	-
Invert (m)	-	-

Secondary Outlet/Overflow Spillway

Type	DICB	Overflow
Weir Length (m)	0.6	2
Sill Elevation (m)	196.6	196.8
Coefficient	1.7	1.5
Side Slope (H:V)	-	8

STAGE-DISCHARGE TABLE

Pond Water Level	Primary Low Flow Discharge				Secondary Outlet/Overflow Spillway Discharge				Total Pond Discharge	Outlet Control
	Orifice		Pipe		DICB		Overflow			
	Head	Discharge	Head	Discharge	Head	Discharge	Head	Discharge		
(m)	(m)	(cms)	(m)	(cms)	(m)	(cms)	(m)	(cms)	(cms)	
196.20	-	-	-	-	0.00	0.0000	0.00	0.0000	0.0000	
196.30	-	-	-	-	0.00	0.0000	0.00	0.0000	0.0000	
196.40	-	-	-	-	0.00	0.0000	0.00	0.0000	0.0000	
196.50	-	-	-	-	0.00	0.0000	0.00	0.0000	0.0000	
196.60	-	-	-	-	0.00	0.0000	0.00	0.0000	0.0000	
196.70	-	-	-	-	0.10	0.0323	0.00	0.0000	0.0323	DICB
196.80	-	-	-	-	0.20	0.0912	0.00	0.0000	0.0912	DICB
196.90	-	-	-	-	0.30	0.1676	0.10	0.1328	0.3004	DICB
197.00	-	-	-	-	0.40	0.2580	0.20	0.4830	0.7410	DICB

C.C. Tatham & Associates Ltd.
Consulting Engineers

Project:	Thornbury Horse Park
File No:	106009
Date:	May 19, 2009
Designed By:	DRT
Checked By:	DJH
Subject:	Pond No. 1 Stage-Storage-Discharge Table

EXISTING POND No. 1 - STAGE-STORAGE-DISCHARGE TABLE

Wet Cell

Side Slope	3:1
Bottom Length	50 m
Bottom Width	12 m
Bottom Elevation	193.00 m
Static Water	196.20 m
Stage	0.10 m

Primary Low Flow Outlet

Type	Orifice	Pipe
Diameter (mm)	-	-
Invert(m)	-	-

Secondary Outlet/Overflow Spillway

Type	DICB	Overflow
Length(m)	0.60	2.00
Sill Elevation(m)	196.6	196.8

STAGE-STORAGE-DISCHARGE TABLE

Pond Water Level	Primary Low Flow Discharge		DICB	Overflow	Total Pond	Outlet Control	Pond Storage Volume		
	Orifice Discharge	Pipe Discharge	Discharge	Discharge	Discharge		Dead Storage	Active Storage	Total Storage
(m)	(cms)	(cms)	(cms)	(cms)	(cms)		(cu.m)	(cu.m)	(cu.m)
196.20	-	-	0.0000	0.0000	0.0000		4083	0	4083
196.30	-	-	0.0000	0.0000	0.0000		4302	0	4302
196.40	-	-	0.0000	0.0000	0.0000		4528	0	4528
196.50	-	-	0.0000	0.0000	0.0000		4760	0	4760
196.60	-	-	0.0000	0.0000	0.0000		4998	0	4998
196.70	-	-	0.0323	0.0000	0.0323	DICB	4998	244	5242
196.80	-	-	0.0912	0.0000	0.0912	DICB	4998	495	5493
196.90	-	-	0.1676	0.1328	0.3004	DICB	4998	752	5750
197.00	-	-	0.2580	0.4830	0.7410	DICB	4998	1015	6013

C.C. Tatham & Associates Ltd.
Consulting Engineers

Project :	Thornbury Horse Park
File No.	106009
Date:	May 19, 2009
Designed By:	DRT
Checked By:	DJH
Subject:	Pond No. 2&3 Storage-Volume Table

EXISTING POND No. 2&3 - STAGE-VOLUME TABLE

Wet Cell

Side Slope	3:1
Bottom Length	85.0 m
Bottom Width	4.0 m
Bottom Elevation	192.75 m
Water Level	196.15 m
Stage	0.1 m

STAGE-VOLUME TABLE

Elevation	Pond Depth	Pond Area	Average Pond Area	Volume					
				Dead Storage	Accum. Dead Storage	Active Storage	Accum. Active Storage	Accum. Total Storage	Accum. Total Storage
(m)	(m)	(sq.m)	(sq.m)	(cu.m)	(cu.m)	(cu.m)	(cu.m)	(cu.m)	(ha-m)
192.75	0.00	290.00							
192.85	0.10	372.88	331.44	33	33			33	0.0033
192.95	0.20	455.75	414.31	41	75			75	0.0075
193.05	0.30	538.63	497.19	50	124			124	0.0124
193.15	0.40	621.50	580.06	58	182			182	0.0182
193.25	0.50	704.38	662.94	66	249			249	0.0249
193.35	0.60	787.25	745.81	75	323			323	0.0323
193.45	0.70	870.13	828.69	83	406			406	0.0406
193.55	0.80	953.00	911.56	91	497			497	0.0497
193.65	0.90	1035.88	994.44	99	597			597	0.0597
193.75	1.00	1118.75	1077.31	108	704			704	0.0704
193.85	1.10	1201.63	1160.19	116	820			820	0.0820
193.95	1.20	1284.50	1243.06	124	945			945	0.0945
194.05	1.30	1367.38	1325.94	133	1077			1077	0.1077
194.15	1.40	1450.25	1408.81	141	1218			1218	0.1218
194.25	1.50	1533.13	1491.69	149	1367			1367	0.1367
194.35	1.60	1616.00	1574.56	157	1525			1525	0.1525
194.45	1.70	1698.88	1657.44	166	1691			1691	0.1691
194.55	1.80	1781.75	1740.31	174	1865			1865	0.1865
194.65	1.90	1864.63	1823.19	182	2047			2047	0.2047
194.75	2.00	1947.50	1906.06	191	2237			2237	0.2237
194.85	2.10	2030.38	1988.94	199	2436			2436	0.2436
194.95	2.20	2113.25	2071.81	207	2644			2644	0.2644
195.05	2.30	2196.13	2154.69	215	2859			2859	0.2859
195.15	2.40	2279.00	2237.56	224	3083			3083	0.3083
195.25	2.50	2361.88	2320.44	232	3315			3315	0.3315
195.35	2.60	2444.75	2403.31	240	3555			3555	0.3555
195.45	2.70	2527.63	2486.19	249	3804			3804	0.3804
195.55	2.80	2610.50	2569.06	257	4061			4061	0.4061
195.65	2.90	2693.38	2651.94	265	4326			4326	0.4326
195.75	3.00	2776.25	2734.81	273	4599			4599	0.4599
195.85	3.10	2859.13	2817.69	282	4881			4881	0.4881
195.95	3.20	2942.00	2900.56	290	5171			5171	0.5171
196.05	3.30	3024.88	2983.44	298	5470			5470	0.5470
196.15	3.40	3107.75	3066.31	307	5776			5776	0.5776
196.25	3.50	3190.63	3149.19	315	6091			6091	0.6091
196.35	3.60	3273.50	3232.06	323	6414			6414	0.6414
196.45	3.70	3356.38	3314.94		6414	331	331	6746	0.6746
196.55	3.80	3439.25	3397.81		6414	340	671	7086	0.7086
196.65	3.90	3522.13	3480.69		6414	348	1019	7434	0.7434
196.75	4.00	3605.00	3563.56		6414	356	1376	7790	0.7790

C.C. Tatham & Associates Ltd.
Consulting Engineers

Project:	Thornbury Horse Park
File No.:	106009
Date:	May 19, 2009
Designed By:	DRT
Checked By:	DJH
Subject:	Pond No. 2&3 Stage-Discharge Table

EXISTING POND No. 2&3 - STAGE-DISCHARGE TABLE

Primary Low Flow Outlet

Type	Orifice	Pipe
Diameter (mm)	-	-
Area (sq.m)	-	-
Coefficient	-	-
Invert (m)	-	-

Secondary Outlet/Overflow Spillway

Type	DICB	Overflow
Weir Length (m)	0.6	2
Sill Elevation (m)	196.35	196.55
Coefficient	1.7	1.5
Side Slope (H:V)	-	8

STAGE-DISCHARGE TABLE

Pond Water Level	Primary Low Flow Discharge				Secondary Outlet/Overflow Spillway Discharge				Total Pond Discharge	Outlet Control
	Orifice		Pipe		DICB		Overflow			
	Head	Discharge	Head	Discharge	Head	Discharge	Head	Discharge		
(m)	(m)	(cms)	(m)	(cms)	(m)	(cms)	(m)	(cms)	(cms)	
196.15	-	-	-	-	0.00	0.0000	0.00	0.0000	0.0000	
196.25	-	-	-	-	0.00	0.0000	0.00	0.0000	0.0000	
196.35	-	-	-	-	0.00	0.0000	0.00	0.0000	0.0000	
196.45	-	-	-	-	0.10	0.0323	0.00	0.0000	0.0323	DICB
196.55	-	-	-	-	0.20	0.0912	0.00	0.0000	0.0912	DICB
196.65	-	-	-	-	0.30	0.1676	0.10	0.1328	0.3004	DICB
196.75	-	-	-	-	0.40	0.2580	0.20	0.4830	0.7410	DICB

C.C.Tatham & Associates Ltd.
Consulting Engineers

Project:	Thornbury Horse Park
File No:	106009
Date:	May 19, 2009
Designed By:	DRT
Checked By:	DJH
Subject:	Pond No. 2&3 Stage-Storage-Discharge Table

EXISTING POND No. 2&3 - STAGE-STORAGE-DISCHARGE TABLE

Wet Cell	
Side Slope	3:1
Bottom Length	85 m
Bottom Width	4 m
Bottom Elevation	192.75 m
Static Water	196.15 m
Stage	0.10 m

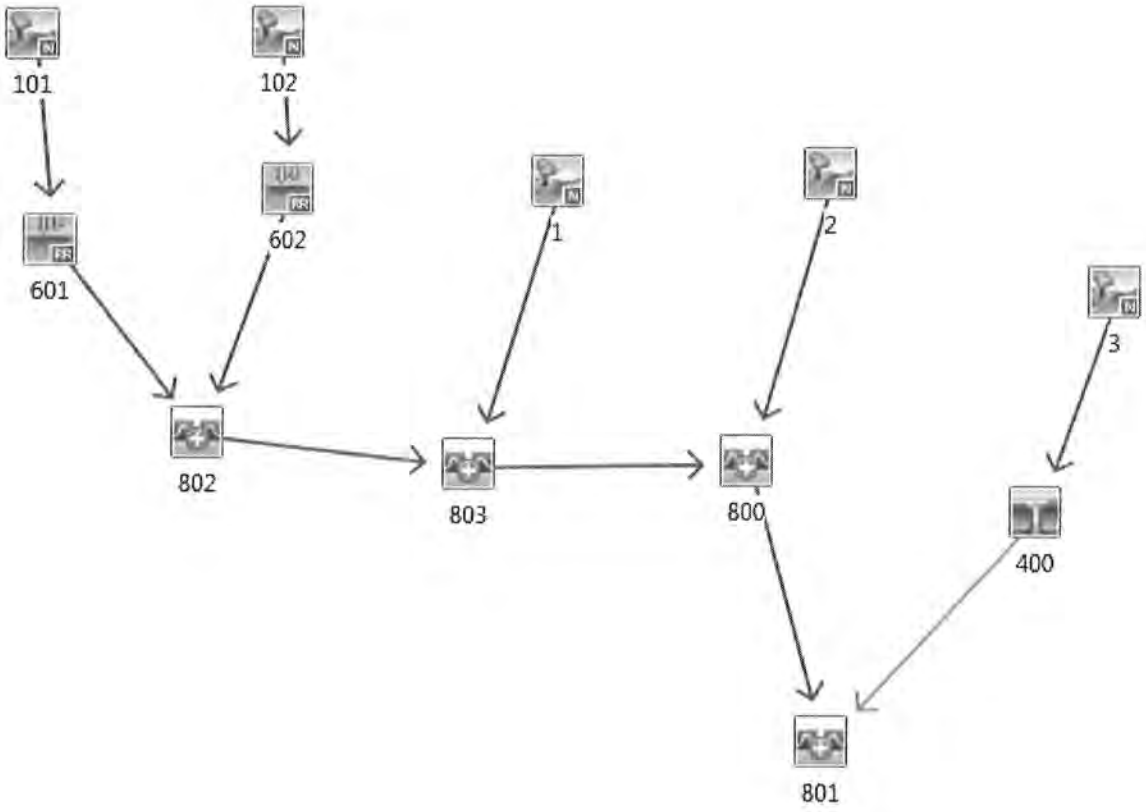
Primary Low Flow Outlet		
Type	Orifice	Pipe
Diameter (mm)	-	-
Invert(m)	-	-

Secondary Outlet/Overflow Spillway		
Type	DICB	Overflow
Length(m)	0.60	2.00
Sill Elevation(m)	196.35	196.55

STAGE-STORAGE-DISCHARGE TABLE

Pond Water Level	Primary Low Flow Discharge		DICB	Overflow	Total Pond	Outlet Control	Pond Storage Volume		
	Orifice Discharge	Pipe Discharge	Discharge	Discharge	Discharge		Dead Storage	Active Storage	Total Storage
(m)	(cms)	(cms)	(cms)	(cms)	(cms)		(cu.m)	(cu.m)	(cu.m)
196.15	-	-	0.0000	0.0000	0.0000		5776	0	5776
196.25	-	-	0.0000	0.0000	0.0000		6091	0	6091
196.35	-	-	0.0000	0.0000	0.0000		6414	0	6414
196.45	-	-	0.0323	0.0000	0.0323	DICB	6414	331	6746
196.55	-	-	0.0912	0.0000	0.0912	DICB	6414	671	7086
196.65	-	-	0.1676	0.1328	0.3004	DICB	6414	1019	7434
196.75	-	-	0.2580	0.4830	0.7410	DICB	6414	1376	7790

Existing Conditions OTTHYMO Model Schematic



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 V     V    I    SSSSS  U    U    A     L
 V     V    I    SS     U    U   A A    L
  V   V     I      SS   U    U  AAAAA   L
   V V      I       SS  U    U  A   A   L
    V       I    SSSSS   UUUU   A   A   LLLLL

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

  Input   filename: C:\Program Files (x86)\VH Suite 3.0\vo2\voin.dat
  Output  filename: C:\Users\dmarshall\AppData\Local\Temp\12b8f7c2-88bf-48ea-99b0-c1e9a31413fa\Scenario.out
  Summary filename: C:\Users\dmarshall\AppData\Local\Temp\12b8f7c2-88bf-48ea-99b0-c1e9a31413fa\Scenario.sum

DATE: 03/10/2017                          TIME: 09:49:05

USER:


COMMENTS: _____________________________________________________

**************************
** SIMULATION NUMBER:  1 **   25 mm Storm
**************************

 READ STORM
 Ptotal= 24.97 mm
   Filename: C:\Users\dmarshall\AppData\Local\Temp\12b8f7c2-88bf-48ea-99b0-c1e9a31413fa\0397bbd0
   Comments: OWEN SOUND 25 mm (from a 2 year-4hr storm

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|---|---|---|---|---|---|---|---|
| 0.10 | 1.29 | 1.10 | 2.81 | 2.10 | 13.05 | 3.10 | 2.04 |
| 0.20 | 1.36 | 1.20 | 3.22 | 2.20 | 8.44 | 3.20 | 1.89 |
| 0.30 | 1.44 | 1.30 | 3.77 | 2.30 | 6.21 | 3.30 | 1.76 |
| 0.40 | 1.53 | 1.40 | 4.55 | 2.40 | 4.91 | 3.40 | 1.65 |
| 0.50 | 1.63 | 1.50 | 5.77 | 2.50 | 4.06 | 3.50 | 1.55 |
| 0.60 | 1.75 | 1.60 | 7.86 | 2.60 | 3.47 | 3.60 | 1.46 |
| 0.70 | 1.89 | 1.70 | 12.27 | 2.70 | 3.03 | 3.70 | 1.39 |
| 0.80 | 2.06 | 1.80 | 26.17 | 2.80 | 2.70 | 3.80 | 1.32 |
| 0.90 | 2.26 | 1.90 | 72.58 | 2.90 | 2.43 | 3.90 | 1.26 |
| 1.00 | 2.50 | 2.00 | 26.96 | 3.00 | 2.22 | 4.00 | 1.20 |

 CALIB
 NASHYD  (0001)
 ID= 1 DT= 5.0 min
   Area (ha)= 80.08  Curve Number (CN)= 50.1
   Ia (mm)= 6.70  # of Linear Res.(N)= 3.00
   U.H. Tp(hrs)= 1.24

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

                  ---- TRANSFORMED HYETOGRAPH ----

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|---|---|---|---|---|---|---|---|
| 0.083 | 1.29 | 1.083 | 2.81 | 2.083 | 13.05 | 3.08 | 2.04 |
| 0.167 | 1.35 | 1.167 | 3.14 | 2.167 | 9.36 | 3.17 | 1.92 |
| 0.250 | 1.41 | 1.250 | 3.55 | 2.250 | 7.10 | 3.25 | 1.81 |
| 0.333 | 1.48 | 1.333 | 4.08 | 2.333 | 5.69 | 3.33 | 1.72 |
| 0.417 | 1.55 | 1.417 | 4.79 | 2.417 | 4.74 | 3.42 | 1.63 |
| 0.500 | 1.63 | 1.500 | 5.77 | 2.500 | 4.06 | 3.50 | 1.55 |
| 0.583 | 1.75 | 1.583 | 7.86 | 2.583 | 3.47 | 3.58 | 1.46 |
| 0.667 | 1.86 | 1.667 | 11.39 | 2.667 | 3.12 | 3.67 | 1.40 |
| 0.750 | 1.99 | 1.750 | 20.61 | 2.750 | 2.83 | 3.75 | 1.35 |
| 0.833 | 2.14 | 1.833 | 44.73 | 2.833 | 2.59 | 3.83 | 1.30 |
| 0.917 | 2.31 | 1.917 | 63.46 | 2.917 | 2.39 | 3.92 | 1.25 |
| 1.000 | 2.50 | 2.000 | 26.96 | 3.000 | 2.22 | 4.00 | 1.20 |

 Unit Hyd Qpeak (cms)= 2.467

 PEAK FLOW (cms)= 0.096 (i)
 TIME TO PEAK (hrs)= 3.500
 RUNOFF VOLUME (mm)= 1.241
 TOTAL RAINFALL (mm)= 24.971
 RUNOFF COEFFICIENT = 0.049

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

 CALIB
 NASHYD  (0101)
 ID= 1 DT= 5.0 min
   Area (ha)= 5.13  Curve Number (CN)= 54.1
   Ia (mm)= 4.70  # of Linear Res.(N)= 3.00
   U.H. Tp(hrs)= 0.54

 Unit Hyd Qpeak (cms)= 0.363

 PEAK FLOW (cms)= 0.016 (i)
 TIME TO PEAK (hrs)= 2.583
 RUNOFF VOLUME (mm)= 1.743
 TOTAL RAINFALL (mm)= 24.971
 RUNOFF COEFFICIENT = 0.070

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

 RESERVOIR (0601)
 IN= 2---> OUT= 1
 DT= 5.0 min

| OUTFLOW (cms) | STORAGE (ha.m.) | OUTFLOW (cms) | STORAGE (ha.m.) |
|---|---|---|---|
| 0.0000 | 0.0000 | 0.3000 | 0.0752 |
| 0.0320 | 0.0244 | 0.7410 | 0.1015 |
| 0.0910 | 0.0495 | 0.0000 | 0.0000 |

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| INFLOW : ID= 2 (0101) | 5.130 | 0.016 | 2.58 | 1.74 |
| OUTFLOW: ID= 1 (0601) | 5.130 | 0.006 | 3.67 | 1.71 |

 PEAK FLOW REDUCTION [Qout/Qin](%)= 38.78
 TIME SHIFT OF PEAK FLOW (min)= 65.00
 MAXIMUM STORAGE USED (ha.m.)= 0.0048

 CALIB
 NASHYD  (0102)
 ID= 1 DT= 5.0 min
   Area (ha)= 2.96  Curve Number (CN)= 56.7
   Ia (mm)= 4.60  # of Linear Res.(N)= 3.00
   U.H. Tp(hrs)= 0.30

 Unit Hyd Qpeak (cms)= 0.377

 PEAK FLOW (cms)= 0.016 (i)
 TIME TO PEAK (hrs)= 2.250
 RUNOFF VOLUME (mm)= 1.935
 TOTAL RAINFALL (mm)= 24.971
 RUNOFF COEFFICIENT = 0.077

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

 RESERVOIR (0602)
 IN= 2---> OUT= 1
 DT= 5.0 min

| OUTFLOW (cms) | STORAGE (ha.m.) | OUTFLOW (cms) | STORAGE (ha.m.) |
|---|---|---|---|
| 0.0000 | 0.0000 | 0.3000 | 0.1010 |
| 0.0320 | 0.0331 | 0.7410 | 0.1376 |
| 0.0910 | 0.0671 | 0.0000 | 0.0000 |

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| INFLOW : ID= 2 (0102) | 2.960 | 0.016 | 2.25 | 1.94 |
| OUTFLOW: ID= 1 (0602) | 2.960 | 0.003 | 3.33 | 1.85 |

 PEAK FLOW REDUCTION [Qout/Qin](%)= 22.19
 TIME SHIFT OF PEAK FLOW (min)= 65.00
 MAXIMUM STORAGE USED (ha.m.)= 0.0036

 ADD HYD  (0802)
 1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (0601): | 5.13 | 0.006 | 3.67 | 1.71 |
| + ID2= 2 (0602): | 2.96 | 0.003 | 3.33 | 1.85 |
| ID = 3 (0802): | 8.09 | 0.010 | 3.58 | 1.76 |

      NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 ADD HYD  (0803)
 1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (0001): | 80.08 | 0.096 | 3.50 | 1.23 |
| + ID2= 2 (0802): | 8.09 | 0.010 | 3.58 | 1.76 |
| ID = 3 (0803): | 88.17 | 0.106 | 3.50 | 1.28 |

      NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 CALIB
 NASHYD  (0002)
 ID= 1 DT= 5.0 min
   Area (ha)= 16.83  Curve Number (CN)= 55.7
   Ia (mm)= 4.90  # of Linear Res.(N)= 3.00
   U.H. Tp(hrs)= 0.70

 Unit Hyd Qpeak (cms)= 0.918

 PEAK FLOW (cms)= 0.046 (i)
 TIME TO PEAK (hrs)= 2.750
 RUNOFF VOLUME (mm)= 1.814
 TOTAL RAINFALL (mm)= 24.971
 RUNOFF COEFFICIENT = 0.073

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

 ADD HYD  (0800)
 1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (0002): | 16.83 | 0.046 | 2.75 | 1.81 |
| + ID2= 2 (0803): | 88.17 | 0.106 | 3.50 | 1.28 |
| ID = 3 (0800): | 105.00 | 0.141 | 3.25 | 1.36 |

      NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 CALIB
 NASHYD  (0003)
 ID= 1 DT= 5.0 min
   Area (ha)= 136.00  Curve Number (CN)= 52.1
   Ia (mm)= 7.20  # of Linear Res.(N)= 3.00
   U.H. Tp(hrs)= 1.94

 Unit Hyd Qpeak (cms)= 2.678

 PEAK FLOW (cms)= 0.120 (i)
 TIME TO PEAK (hrs)= 4.417
 RUNOFF VOLUME (mm)= 1.257
 TOTAL RAINFALL (mm)= 24.971
 RUNOFF COEFFICIENT = 0.050

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

 DUHYD  (0400)
 Inlet Cap.=0.713
 #of Inlets= 1
 Total(cms)= 0.7

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| TOTAL HYD.(ID= 1): | 136.00 | 0.12 | 4.42 | 1.26 |
| MAJOR SYS.(ID= 2): | 0.00 | 0.00 | 0.00 | 0.00 |
| MINOR SYS.(ID= 3): | 136.00 | 0.12 | 4.42 | 1.26 |

      NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

 ADD HYD  (0801)
 1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (0400): | 136.00 | 0.120 | 4.42 | 1.26 |
| + ID2= 2 (0800): | 105.00 | 0.141 | 3.25 | 1.36 |
| ID = 3 (0801): | 241.00 | 0.240 | 3.75 | 1.30 |

      NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

**************************
** SIMULATION NUMBER:  2 **   2-Year Chicago Storm
**************************

 READ STORM
 Ptotal= 33.75 mm
   Filename: C:\Users\dmarshall\AppData\Local\Temp\12b8f7c2-88bf-48ea-99b0-c1e9a31413fa\64c43018
   Comments: OWEN SOUND 2 YEAR 4 HOUR DURATION CHICAG

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|---|---|---|---|---|---|---|---|
| 0.10 | 1.75 | 1.10 | 3.80 | 2.10 | 17.64 | 3.10 | 2.75 |
| 0.20 | 1.84 | 1.20 | 4.35 | 2.20 | 11.41 | 3.20 | 2.55 |
| 0.30 | 1.95 | 1.30 | 5.09 | 2.30 | 8.39 | 3.30 | 2.38 |
| 0.40 | 2.07 | 1.40 | 6.16 | 2.40 | 6.63 | 3.40 | 2.23 |
| 0.50 | 2.21 | 1.50 | 7.80 | 2.50 | 5.49 | 3.50 | 2.09 |
| 0.60 | 2.37 | 1.60 | 10.63 | 2.60 | 4.69 | 3.60 | 1.98 |
| 0.70 | 2.56 | 1.70 | 16.59 | 2.70 | 4.10 | 3.70 | 1.88 |
| 0.80 | 2.78 | 1.80 | 35.38 | 2.80 | 3.65 | 3.80 | 1.78 |
| 0.90 | 3.05 | 1.90 | 98.09 | 2.90 | 3.29 | 3.90 | 1.70 |
| 1.00 | 3.38 | 2.00 | 36.45 | 3.00 | 2.99 | 4.00 | 1.63 |

 CALIB
 NASHYD  (0001)
 ID= 1 DT= 5.0 min
   Area (ha)= 80.08  Curve Number (CN)= 50.1
   Ia (mm)= 6.70  # of Linear Res.(N)= 3.00
   U.H. Tp(hrs)= 1.24

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

                  ---- TRANSFORMED HYETOGRAPH ----

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|---|---|---|---|---|---|---|---|
| 0.083 | 1.75 | 1.083 | 3.80 | 2.083 | 17.64 | 3.08 | 2.75 |
| 0.167 | 1.82 | 1.167 | 4.24 | 2.167 | 12.66 | 3.17 | 2.59 |
| 0.250 | 1.91 | 1.250 | 4.79 | 2.250 | 9.60 | 3.25 | 2.45 |
| 0.333 | 2.00 | 1.333 | 5.52 | 2.333 | 7.69 | 3.33 | 2.32 |
| 0.417 | 2.10 | 1.417 | 6.49 | 2.417 | 6.40 | 3.42 | 2.20 |
| 0.500 | 2.21 | 1.500 | 7.80 | 2.500 | 5.49 | 3.50 | 2.09 |
| 0.583 | 2.37 | 1.583 | 10.63 | 2.583 | 4.69 | 3.58 | 1.98 |
| 0.667 | 2.52 | 1.667 | 15.40 | 2.667 | 4.22 | 3.67 | 1.90 |
| 0.750 | 2.69 | 1.750 | 27.86 | 2.750 | 3.83 | 3.75 | 1.82 |
| 0.833 | 2.89 | 1.833 | 60.46 | 2.833 | 3.51 | 3.83 | 1.75 |
| 0.917 | 3.12 | 1.917 | 85.76 | 2.917 | 3.23 | 3.92 | 1.69 |
| 1.000 | 3.38 | 2.000 | 36.45 | 3.000 | 2.99 | 4.00 | 1.63 |

 Unit Hyd Qpeak (cms)= 2.467

 PEAK FLOW (cms)= 0.206 (i)
 TIME TO PEAK (hrs)= 3.500
 RUNOFF VOLUME (mm)= 2.614
 TOTAL RAINFALL (mm)= 33.755
 RUNOFF COEFFICIENT = 0.077

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

 CALIB
 NASHYD  (0101)
 ID= 1 DT= 5.0 min
   Area (ha)= 5.13  Curve Number (CN)= 54.1
   Ia (mm)= 4.70  # of Linear Res.(N)= 3.00
   U.H. Tp(hrs)= 0.54
```

```
Unit Hyd Qpeak  (cms)=   0.363

PEAK FLOW       (cms)=   0.033 (i)
TIME TO PEAK    (hrs)=   2.500
RUNOFF VOLUME    (mm)=   3.452
TOTAL RAINFALL   (mm)=  33.755
RUNOFF COEFFICIENT    =   0.102

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

```
| RESERVOIR (0601)
| IN= 2---> OUT= 1
| DT= 5.0 min
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	5.130	0.033	2.50	3.45
OUTFLOW: ID= 1 (0601)	5.130	0.013	3.67	3.41

```
PEAK   FLOW   REDUCTION [Qout/Qin](%)= 38.35
TIME SHIFT OF PEAK FLOW          (min)= 70.00
MAXIMUM  STORAGE   USED          (ha.m.)= 0.0096
```

```
| CALIB
| NASHYD    (0102)  | Area    (ha)=   2.96   Curve Number   (CN)= 56.7
|ID= 1 DT= 5.0 min  | Ia      (mm)=   4.60   # of Linear Res.(N)= 3.00
                    | U.H. Tp(hrs)=   0.30

Unit Hyd Qpeak  (cms)=   0.377

PEAK FLOW       (cms)=   0.031 (i)
TIME TO PEAK    (hrs)=   2.250
RUNOFF VOLUME    (mm)=   3.808
TOTAL RAINFALL   (mm)=  33.755
RUNOFF COEFFICIENT    =   0.113

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

```
| RESERVOIR (0602)
| IN= 2---> OUT= 1
| DT= 5.0 min
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.1019
0.0320	0.0331	0.7410	0.1376
0.0910	0.0671	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0102)	2.960	0.031	2.25	3.81
OUTFLOW: ID= 1 (0602)	2.960	0.007	3.25	3.72

```
PEAK   FLOW   REDUCTION [Qout/Qin](%)= 21.86
TIME SHIFT OF PEAK FLOW          (min)= 60.00
MAXIMUM  STORAGE   USED          (ha.m.)= 0.0071
```

```
| ADD HYD   (0802)
|  1 +  2 =  3
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.13	0.013	3.67	3.41
+ ID2= 2 (0602):	2.96	0.007	3.25	3.72
ID = 3 (0802):	8.09	0.019	3.58	3.53

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

```
| ADD HYD   (0803)
|  1 +  2 =  3
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	80.08	0.206	3.50	2.61
+ ID2= 2 (0802):	8.09	0.019	3.58	3.53
ID = 3 (0803):	88.17	0.226	3.50	2.70

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

```
** SIMULATION NUMBER:   3 **  5-Year Chicago Storm
*****************************
```

```
| READ STORM
|
| Ptotal= 44.07 mm
```

Filename: C:\Users\dmarshall\AppData\Local\Temp\12b8f7c2-88bf-48ea-99b0-c1e9a31413fa\34ba9feb

Comments: OWEN SOUND 5 YEAR 4 HOUR DURATION CHICAG

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.10	2.16	1.10	4.86	2.10	23.63	3.10	3.47
0.20	2.29	1.20	5.59	2.20	15.14	3.20	3.21
0.30	2.42	1.30	6.58	2.30	11.03	3.30	2.98
0.40	2.58	1.40	8.01	2.40	8.65	3.40	2.78
0.50	2.76	1.50	10.23	2.50	7.11	3.50	2.61
0.60	2.97	1.60	14.08	2.60	6.04	3.60	2.46
0.70	3.22	1.70	22.20	2.70	5.25	3.70	2.33
0.80	3.51	1.80	47.44	2.80	4.65	3.80	2.21
0.90	3.86	1.90	127.12	2.90	4.17	3.90	2.11
1.00	4.30	2.00	48.87	3.00	3.79	4.00	2.01

```
| CALIB
| NASHYD    (0001)  | Area    (ha)=  80.08   Curve Number   (CN)= 50.1
|ID= 1 DT= 5.0 min  | Ia      (mm)=   6.70   # of Linear Res.(N)= 3.00
                    | U.H. Tp(hrs)=   1.24

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.16	1.083	4.86	2.083	23.63	3.08	3.47
0.167	2.26	1.167	5.44	2.167	16.84	3.17	3.26
0.250	2.37	1.250	6.18	2.250	12.67	3.25	3.07
0.333	2.48	1.333	7.15	2.333	10.08	3.33	2.90
0.417	2.62	1.417	8.45	2.417	8.34	3.42	2.75
0.500	2.76	1.500	10.23	2.500	7.11	3.50	2.61
0.583	2.97	1.583	14.08	2.583	6.04	3.58	2.46
0.667	3.17	1.667	20.58	2.667	5.41	3.67	2.36
0.750	3.39	1.750	37.34	2.750	4.89	3.75	2.26
0.833	3.65	1.833	79.31	2.833	4.46	3.83	2.17
0.917	3.95	1.917	111.47	2.917	4.09	3.92	2.09
1.000	4.30	2.000	48.87	3.000	3.79	4.00	2.01

```
Unit Hyd Qpeak  (cms)=   2.467

PEAK FLOW       (cms)=   0.385 (i)
TIME TO PEAK    (hrs)=   3.417
RUNOFF VOLUME    (mm)=   4.809
TOTAL RAINFALL   (mm)=  44.068
RUNOFF COEFFICIENT    =   0.109

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

```
| CALIB
| NASHYD    (0101)  | Area    (ha)=   5.13   Curve Number   (CN)= 54.1
|ID= 1 DT= 5.0 min  | Ia      (mm)=   4.70   # of Linear Res.(N)= 3.00
                    | U.H. Tp(hrs)=   0.54

Unit Hyd Qpeak  (cms)=   0.363

PEAK FLOW       (cms)=   0.059 (i)
TIME TO PEAK    (hrs)=   2.500
RUNOFF VOLUME    (mm)=   6.080
TOTAL RAINFALL   (mm)=  44.068
RUNOFF COEFFICIENT    =   0.138

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

```
| RESERVOIR (0601)
| IN= 2---> OUT= 1
| DT= 5.0 min
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	5.130	0.059	2.50	6.08
OUTFLOW: ID= 1 (0601)	5.130	0.022	3.58	6.04

```
PEAK   FLOW   REDUCTION [Qout/Qin](%)= 37.78
TIME SHIFT OF PEAK FLOW          (min)= 65.00
MAXIMUM  STORAGE   USED          (ha.m.)= 0.0170
```

```
| CALIB
| NASHYD    (0102)  | Area    (ha)=   2.96   Curve Number   (CN)= 56.7
|ID= 1 DT= 5.0 min  | Ia      (mm)=   4.60   # of Linear Res.(N)= 3.00
                    | U.H. Tp(hrs)=   0.30

Unit Hyd Qpeak  (cms)=   0.377

PEAK FLOW       (cms)=   0.056 (i)
TIME TO PEAK    (hrs)=   2.250
RUNOFF VOLUME    (mm)=   6.670
TOTAL RAINFALL   (mm)=  44.068
RUNOFF COEFFICIENT    =   0.151

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

```
| RESERVOIR (0602)
| IN= 2---> OUT= 1
| DT= 5.0 min
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.1019
0.0320	0.0331	0.7410	0.1376
0.0910	0.0671	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0102)	2.960	0.056	2.25	6.67
OUTFLOW: ID= 1 (0602)	2.960	0.012	3.25	6.58

```
PEAK   FLOW   REDUCTION [Qout/Qin](%)= 21.61
TIME SHIFT OF PEAK FLOW          (min)= 60.00
MAXIMUM  STORAGE   USED          (ha.m.)= 0.0126
```

```
| ADD HYD   (0802)
|  1 +  2 =  3
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.13	0.022	3.58	6.04
+ ID2= 2 (0602):	2.96	0.012	3.25	6.58
ID = 3 (0802):	8.09	0.034	3.50	6.24

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

```
| ADD HYD   (0803)
|  1 +  2 =  3
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	80.08	0.385	3.42	4.81
+ ID2= 2 (0802):	8.09	0.034	3.50	6.24
ID = 3 (0803):	88.17	0.420	3.42	4.94

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

```
| CALIB
| NASHYD    (0002)  | Area    (ha)=  16.83   Curve Number   (CN)= 55.7
|ID= 1 DT= 5.0 min  | Ia      (mm)=   4.90   # of Linear Res.(N)= 3.00
                    | U.H. Tp(hrs)=   0.70

Unit Hyd Qpeak  (cms)=   0.918

PEAK FLOW       (cms)=   0.167 (i)
```

```
TIME TO PEAK      (hrs)=   2.750
RUNOFF VOLUME     (mm)=   6.361
TOTAL RAINFALL    (mm)=  44.068
RUNOFF COEFFICIENT    =   0.144

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

ADD HYD (0800) 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	16.83	0.167	2.75	6.36
+ ID2= 2 (0803):	88.17	0.420	3.42	4.94
ID = 3 (0800):	105.00	0.547	3.17	5.17

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0003) ID= 1 DT= 5.0 min

Area (ha)= 136.00 Curve Number (CN)= 52.1
Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

```
Unit Hyd Qpeak  (cms)=   2.678

PEAK FLOW       (cms)=   0.482 (i)
TIME TO PEAK    (hrs)=   4.250
RUNOFF VOLUME    (mm)=   5.027
TOTAL RAINFALL   (mm)=  44.068
RUNOFF COEFFICIENT    =   0.114

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

DUHYD (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	0.48	4.25	5.03
MAJOR SYS.(ID= 2):	0.00	0.00	0.00	0.00
MINOR SYS.(ID= 3):	136.00	0.48	4.25	5.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0801) 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0400):	136.00	0.482	4.25	5.03
+ ID2= 2 (0800):	105.00	0.547	3.17	5.17
ID = 3 (0801):	241.00	0.948	3.67	5.09

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

10-Year Chicago Storm

READ STORM
Ptotal= 50.59 mm

Filename: C:\Users\dmarshall\AppData\Local\Temp\12b8f7c2-88bf-48ea-99b0-c1e9a31413fa\3a95d5c4
Comments: OWEN SOUND 10 YEAR 4 HOUR DURATION CHICA

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.10	2.37	1.10	5.44	2.10	27.54	3.10	3.85
0.20	2.50	1.20	6.28	2.20	17.50	3.20	3.54
0.30	2.66	1.30	7.44	2.30	12.66	3.30	3.29
0.40	2.84	1.40	9.10	2.40	9.86	3.40	3.06
0.50	3.04	1.50	11.71	2.50	8.06	3.50	2.87
0.60	3.28	1.60	16.26	2.60	6.81	3.60	2.70
0.70	3.56	1.70	25.85	2.70	5.89	3.70	2.55
0.80	3.89	1.80	55.53	2.80	5.20	3.80	2.42
0.90	4.29	1.90	146.69	2.90	4.65	3.90	2.30
1.00	4.80	2.00	57.21	3.00	4.21	4.00	2.20

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

Area (ha)= 80.08 Curve Number (CN)= 50.1
Ia (mm)= 6.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.37	1.083	5.44	2.083	27.54	3.08	3.85
0.167	2.47	1.167	6.11	2.167	19.51	3.17	3.60
0.250	2.60	1.250	6.98	2.250	14.60	3.25	3.39
0.333	2.73	1.333	8.10	2.333	11.54	3.33	3.20
0.417	2.88	1.417	9.62	2.417	9.50	3.42	3.02
0.500	3.04	1.500	11.71	2.500	8.06	3.50	2.87
0.583	3.28	1.583	16.26	2.583	6.81	3.58	2.70
0.667	3.50	1.667	23.93	2.667	6.07	3.67	2.58
0.750	3.76	1.750	43.66	2.750	5.48	3.75	2.47
0.833	4.05	1.833	91.99	2.833	4.98	3.83	2.37
0.917	4.39	1.917	128.79	2.917	4.56	3.92	2.28
1.000	4.80	2.000	57.21	3.000	4.21	4.00	2.20

```
Unit Hyd Qpeak  (cms)=   2.467

PEAK FLOW       (cms)=   0.525 (i)
TIME TO PEAK    (hrs)=   3.417
RUNOFF VOLUME    (mm)=   6.489
TOTAL RAINFALL   (mm)=  50.590
RUNOFF COEFFICIENT    =   0.128

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

CALIB NASHYD (0101) ID= 1 DT= 5.0 min

Area (ha)= 5.13 Curve Number (CN)= 54.1
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.54

```
Unit Hyd Qpeak  (cms)=   0.363

PEAK FLOW       (cms)=   0.079 (i)
TIME TO PEAK    (hrs)=   2.500
RUNOFF VOLUME    (mm)=   8.056
TOTAL RAINFALL   (mm)=  50.590
RUNOFF COEFFICIENT    =   0.159

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	5.130	0.079	2.50	8.06
OUTFLOW: ID= 1 (0601)	5.130	0.030	3.58	8.02

PEAK FLOW REDUCTION [Qout/Qin](%)= 37.44
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= 0.0227

CALIB NASHYD (0102) ID= 1 DT= 5.0 min

Area (ha)= 2.96 Curve Number (CN)= 56.7
Ia (mm)= 4.60 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.30

```
Unit Hyd Qpeak  (cms)=   0.377

PEAK FLOW       (cms)=   0.076 (i)
TIME TO PEAK    (hrs)=   2.250
RUNOFF VOLUME    (mm)=   8.811
TOTAL RAINFALL   (mm)=  50.590
RUNOFF COEFFICIENT    =   0.174

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.1019
0.0320	0.0331	0.7410	0.1376
0.0910	0.0671	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0102)	2.960	0.076	2.25	8.81
OUTFLOW: ID= 1 (0602)	2.960	0.016	3.17	8.72

PEAK FLOW REDUCTION [Qout/Qin](%)= 21.45
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 0.0168

ADD HYD (0802) 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.13	0.030	3.58	8.02
+ ID2= 2 (0602):	2.96	0.016	3.17	8.72
ID = 3 (0802):	8.09	0.046	3.50	8.28

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803) 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	80.08	0.525	3.42	6.49
+ ID2= 2 (0802):	8.09	0.046	3.50	8.28
ID = 3 (0803):	88.17	0.570	3.42	6.65

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0002) ID= 1 DT= 5.0 min

Area (ha)= 16.83 Curve Number (CN)= 55.7
Ia (mm)= 4.90 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.70

```
Unit Hyd Qpeak  (cms)=   0.918

PEAK FLOW       (cms)=   0.224 (i)
TIME TO PEAK    (hrs)=   2.750
RUNOFF VOLUME    (mm)=   8.427
TOTAL RAINFALL   (mm)=  50.590
RUNOFF COEFFICIENT    =   0.167

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

ADD HYD (0800) 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	16.83	0.224	2.75	8.43
+ ID2= 2 (0803):	88.17	0.570	3.42	6.65
ID = 3 (0800):	105.00	0.742	3.17	6.94

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB NASHYD (0003) ID= 1 DT= 5.0 min

Area (ha)= 136.00 Curve Number (CN)= 52.1
Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

```
Unit Hyd Qpeak  (cms)=   2.678

PEAK FLOW       (cms)=   0.654 (i)
TIME TO PEAK    (hrs)=   4.250
RUNOFF VOLUME    (mm)=   6.799
TOTAL RAINFALL   (mm)=  50.590
RUNOFF COEFFICIENT    =   0.134

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

DUHYD (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	0.65	4.25	6.80
MAJOR SYS.(ID= 2):	0.00	0.00	0.00	0.00
MINOR SYS.(ID= 3):	136.00	0.65	4.25	6.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0801) 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0400):	136.00	0.654	4.25	6.80
+ ID2= 2 (0800):	105.00	0.742	3.17	6.94
ID = 3 (0801):	241.00	1.287	3.58	6.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

25-Year Chicago Storm

READ STORM
Ptotal= 59.08 mm

Filename: C:\Users\dmarshall\AppData\Local\Temp\12b8f7c2-88bf-48ea-99b0-c1e9a31413fa\51e8117f
Comments: OWEN SOUND 25 YEAR 4 HOUR DURATION CHICA

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.10	2.69	1.10	6.28	2.10	32.51	3.10	4.41
0.20	2.85	1.20	7.27	2.20	20.58	3.20	4.06
0.30	3.03	1.30	8.63	2.30	14.82	3.30	3.76
0.40	3.24	1.40	10.61	2.40	11.50	3.40	3.50
0.50	3.47	1.50	13.69	2.50	9.37	3.50	3.28
0.60	3.75	1.60	19.10	2.60	7.89	3.60	3.08
0.70	4.07	1.70	30.50	2.70	6.82	3.70	2.91
0.80	4.46	1.80	65.56	2.80	6.00	3.80	2.76
0.90	4.94	1.90	170.99	2.90	5.35	3.90	2.62
1.00	5.53	2.00	67.54	3.00	4.84	4.00	2.50

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

Area (ha)= 80.08 Curve Number (CN)= 50.1
Ia (mm)= 6.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN

hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	2.69	1.083	6.28	2.083	32.51	3.08	4.41
0.167	2.82	1.167	7.07	2.167	22.97	3.17	4.13
0.250	2.96	1.250	8.09	2.250	17.12	3.25	3.88
0.333	3.11	1.333	9.42	2.333	13.49	3.33	3.66
0.417	3.29	1.417	11.23	2.417	11.07	3.42	3.46
0.500	3.47	1.500	13.69	2.500	9.37	3.50	3.28
0.583	3.75	1.583	19.10	2.583	7.89	3.58	3.08
0.667	4.01	1.667	28.22	2.667	7.03	3.67	2.94
0.750	4.30	1.750	51.54	2.750	6.33	3.75	2.82
0.833	4.65	1.833	107.73	2.833	5.74	3.83	2.70
0.917	5.06	1.917	150.80	2.917	5.25	3.92	2.60
1.000	5.53	2.000	67.54	3.000	4.84	4.00	2.50

Unit Hyd Qpeak (cms)= 2.467

PEAK FLOW (cms)= 0.731 (i)
TIME TO PEAK (hrs)= 3.417
RUNOFF VOLUME (mm)= 8.984
TOTAL RAINFALL (mm)= 59.076
RUNOFF COEFFICIENT = 0.152

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

CALIB
NASHYD (0101)
ID= 1 DT= 5.0 min

Area (ha)= 5.13 Curve Number (CN)= 54.1
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.54

Unit Hyd Qpeak (cms)= 0.363

PEAK FLOW (cms)= 0.109 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 10.955
TOTAL RAINFALL (mm)= 59.076
RUNOFF COEFFICIENT = 0.185

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	5.130	0.109	2.50	10.96
OUTFLOW: ID= 1 (0601)	5.130	0.045	3.50	10.92

PEAK FLOW REDUCTION (Qout/Qin)(%)= 41.55
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 0.0301

CALIB
NASHYD (0102)
ID= 1 DT= 5.0 min

Area (ha)= 2.96 Curve Number (CN)= 56.7
Ia (mm)= 4.60 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.30

Unit Hyd Qpeak (cms)= 0.377

PEAK FLOW (cms)= 0.103 (i)
TIME TO PEAK (hrs)= 2.250
RUNOFF VOLUME (mm)= 11.940
TOTAL RAINFALL (mm)= 59.076
RUNOFF COEFFICIENT = 0.202

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.1019
0.0320	0.0331	0.7410	0.1376
0.0910	0.0671	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0102)	2.960	0.103	2.25	11.94
OUTFLOW: ID= 1 (0602)	2.960	0.022	3.17	11.85

PEAK FLOW REDUCTION [Qout/Qin](%)= 21.37
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 0.0279

ADD HYD (0802)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.13	0.045	3.50	10.92
+ ID2= 2 (0602):	2.96	0.022	3.17	11.85
ID = 3 (0802):	8.09	0.067	3.42	11.26

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	80.08	0.731	3.42	8.98
+ ID2= 2 (0802):	8.09	0.067	3.42	11.26
ID = 3 (0803):	88.17	0.798	3.42	9.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0002)
ID= 1 DT= 5.0 min

Area (ha)= 16.83 Curve Number (CN)= 55.7
Ia (mm)= 4.90 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.70

Unit Hyd Qpeak (cms)= 0.918

PEAK FLOW (cms)= 0.308 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 11.456
TOTAL RAINFALL (mm)= 59.076
RUNOFF COEFFICIENT = 0.194

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

ADD HYD (0800)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	16.83	0.308	2.67	11.46
+ ID2= 2 (0803):	88.17	0.798	3.42	9.19
ID = 3 (0800):	105.00	1.034	3.17	9.56

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0003)
ID= 1 DT= 5.0 min

Area (ha)= 136.00 Curve Number (CN)= 52.1
Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

Unit Hyd Qpeak (cms)= 2.678

PEAK FLOW (cms)= 0.909 (i)
TIME TO PEAK (hrs)= 4.250
RUNOFF VOLUME (mm)= 9.429
TOTAL RAINFALL (mm)= 59.076
RUNOFF COEFFICIENT = 0.160

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

DUMYD (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	0.91	4.25	9.43
MAJOR SYS.(ID= 2):	10.53	0.20	4.25	9.43
MINOR SYS.(ID= 3):	125.47	0.71	3.33	9.43

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0801)
3 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0400):	125.47	0.713	3.33	9.43
+ ID2= 2 (0800):	105.00	1.034	3.17	9.56
ID = 3 (0801):	230.47	1.740	3.25	9.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

50-Year Chicago Storm

READ STORM

Filename: C:\users\dmarshall\AppData\Local\Temp\12b8f7c2-88bf-48ea-99b0-c1e9a31413fa\bb1e6ff5
Ptotal= 65.65 mm
Comments: OWEN SOUND 50 YEAR 4 HOUR DURATION CHICA

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.10	2.87	1.10	6.88	2.10	36.04	3.10	4.78
0.20	3.04	1.20	8.01	2.20	23.25	3.20	4.39
0.30	3.24	1.30	9.55	2.30	16.64	3.30	4.05
0.40	3.47	1.40	11.81	2.40	12.83	3.40	3.76
0.50	3.73	1.50	15.34	2.50	10.39	3.50	3.52
0.60	4.04	1.60	21.55	2.60	8.71	3.60	3.30
0.70	4.40	1.70	34.62	2.70	7.49	3.70	3.11
0.80	4.84	1.80	74.20	2.80	6.56	3.80	2.94
0.90	5.37	1.90	187.94	2.90	5.84	3.90	2.79
1.00	6.03	2.00	76.42	3.00	5.26	4.00	2.65

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

Area (ha)= 80.08 Curve Number (CN)= 50.1
Ia (mm)= 6.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

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

--- TRANSFORMED HYETOGRAPH ---

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.87	1.083	6.88	2.083	36.93	3.08	4.78
0.167	3.01	1.167	7.78	2.167	25.99	3.17	4.47
0.250	3.16	1.250	8.93	2.250	19.28	3.25	4.19
0.333	3.33	1.333	10.45	2.333	15.12	3.33	3.93
0.417	3.52	1.417	12.52	2.417	12.34	3.42	3.71
0.500	3.73	1.500	15.34	2.500	10.39	3.50	3.52
0.583	4.04	1.583	21.55	2.583	8.71	3.58	3.30
0.667	4.33	1.667	32.01	2.667	7.73	3.67	3.15
0.750	4.66	1.750	58.37	2.750	6.93	3.75	3.01
0.833	5.05	1.833	119.70	2.833	6.27	3.83	2.88
0.917	5.50	1.917	165.64	2.917	5.72	3.92	2.76
1.000	6.03	2.000	76.42	3.000	5.26	4.00	2.65

Unit Hyd Qpeak (cms)= 2.467

PEAK FLOW (cms)= 0.912 (i)
TIME TO PEAK (hrs)= 3.333

RUNOFF VOLUME (mm)= 11.142
TOTAL RAINFALL (mm)= 65.654
RUNOFF COEFFICIENT = 0.170

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

CALIB
NASHYD (0101)
ID= 1 DT= 5.0 min

Area (ha)= 5.13 Curve Number (CN)= 54.1
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.54

Unit Hyd Qpeak (cms)= 0.363

PEAK FLOW (cms)= 0.135 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 13.439
TOTAL RAINFALL (mm)= 65.654
RUNOFF COEFFICIENT = 0.205

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	5.130	0.135	2.50	13.44
OUTFLOW: ID= 1 (0601)	5.130	0.059	3.42	13.40

PEAK FLOW REDUCTION [Qout/Qin](%)= 43.87
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 0.0360

CALIB
NASHYD (0102)
ID= 1 DT= 5.0 min

Area (ha)= 2.96 Curve Number (CN)= 56.7
Ia (mm)= 4.60 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.30

Unit Hyd Qpeak (cms)= 0.377

PEAK FLOW (cms)= 0.128 (i)
TIME TO PEAK (hrs)= 2.250
RUNOFF VOLUME (mm)= 14.611
TOTAL RAINFALL (mm)= 65.654
RUNOFF COEFFICIENT = 0.223

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.1019
0.0320	0.0331	0.7410	0.1376
0.0910	0.0671	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0102)	2.960	0.128	2.25	14.61
OUTFLOW: ID= 1 (0602)	2.960	0.027	3.17	14.52

PEAK FLOW REDUCTION [Qout/Qin](%)= 21.31
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 0.0282

ADD HYD (0802)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.13	0.059	3.42	13.40
+ ID2= 2 (0602):	2.96	0.027	3.17	14.52
ID = 3 (0802):	8.09	0.086	3.33	13.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	80.08	0.912	3.33	11.14
+ ID2= 2 (0802):	8.09	0.086	3.33	13.81
ID = 3 (0803):	88.17	0.998	3.33	11.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0002) | Area (ha)= 16.83 Curve Number (CN)= 55.7
ID= 1 DT= 5.0 min | Ia (mm)= 4.90 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.70

Unit Hyd Qpeak (cms)= 0.918

PEAK FLOW (cms)= 0.381 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 14.047
TOTAL RAINFALL (mm)= 65.654
RUNOFF COEFFICIENT = 0.214

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

ADD HYD (0800)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	16.83	0.381	2.67	14.05
+ ID2= 2 (0803):	88.17	0.998	3.33	11.39
ID = 3 (0800):	105.00	1.291	3.17	11.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0003) | Area (ha)= 136.00 Curve Number (CN)= 52.1
ID= 1 DT= 5.0 min | Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

Unit Hyd Qpeak (cms)= 2.678

PEAK FLOW (cms)= 1.132 (i)
TIME TO PEAK (hrs)= 4.167
RUNOFF VOLUME (mm)= 11.702
TOTAL RAINFALL (mm)= 65.654
RUNOFF COEFFICIENT = 0.178

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

DUMYD (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	1.13	4.17	11.70
MAJOR SYS.(ID= 2):	24.25	0.42	4.17	11.70
MINOR SYS.(ID= 3):	111.75	0.71	3.00	11.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

TOTAL RAINFALL (mm)= 71.769
RUNOFF COEFFICIENT = 0.222

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	5.130	0.161	2.50	15.92
OUTFLOW: ID= 1 (0601)	5.130	0.073	3.33	15.88

PEAK FLOW REDUCTION [Qout/Qin](%)= 45.22
TIME SHIFT OF PEAK FLOW (min)= 50.00
MAXIMUM STORAGE USED (ha.m.)= 0.0418

CALIB
NASHYD (0102) | Area (ha)= 2.96 Curve Number (CN)= 56.7
ID= 1 DT= 5.0 min | Ia (mm)= 4.60 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.30

Unit Hyd Qpeak (cms)= 0.377

PEAK FLOW (cms)= 0.152 (i)
TIME TO PEAK (hrs)= 2.250
RUNOFF VOLUME (mm)= 17.270
TOTAL RAINFALL (mm)= 71.769
RUNOFF COEFFICIENT = 0.241

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.1019
0.0320	0.0331	0.7410	0.1376
0.0910	0.0671	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0102)	2.960	0.152	2.25	17.27
OUTFLOW: ID= 1 (0602)	2.960	0.032	3.08	17.18

PEAK FLOW REDUCTION [Qout/Qin](%)= 21.38
TIME SHIFT OF PEAK FLOW (min)= 50.00
MAXIMUM STORAGE USED (ha.m.)= 0.0334

ADD HYD (0802)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.13	0.073	3.33	15.88
+ ID2= 2 (0602):	2.96	0.032	3.08	17.18
ID = 3 (0802):	8.09	0.105	3.33	16.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	80.08	1.094	3.33	13.31
+ ID2= 2 (0802):	8.09	0.105	3.33	16.36
ID = 3 (0803):	88.17	1.199	3.33	13.59

ADD HYD (0801)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0400):	111.75	0.713	3.00	11.70
+ ID2= 2 (0800):	105.00	1.291	3.17	11.81
ID = 3 (0801):	216.75	2.004	3.17	11.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

** SIMULATION NUMBER: 7 ** 100-Year Chicago Storm

READ STORM | Filename: C:\Users\dmarshall\AppD
ata\Local\Temp\
12b8f7c2-88bf-48ea-99b0-c1e9a31413fa\1ed51b27
Ptotal= 71.77 mm | Comments: OWEN SOUND 100 YEAR 4 HOUR DURATION CHIC

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.10	3.08	1.10	7.44	2.10	40.41	3.10	5.16
0.20	3.27	1.20	8.67	2.20	25.38	3.20	4.73
0.30	3.49	1.30	10.36	2.30	18.12	3.30	4.37
0.40	3.73	1.40	12.83	2.40	13.95	3.40	4.05
0.50	4.02	1.50	16.70	2.50	11.28	3.50	3.79
0.60	4.35	1.60	23.51	2.60	9.44	3.60	3.55
0.70	4.75	1.70	37.88	2.70	8.10	3.70	3.35
0.80	5.22	1.80	81.47	2.80	7.09	3.80	3.16
0.90	5.80	1.90	206.92	2.90	6.31	3.90	3.00
1.00	6.52	2.00	83.92	3.00	5.67	4.00	2.85

CALIB
NASHYD (0001) | Area (ha)= 80.08 Curve Number (CN)= 50.1
ID= 1 DT= 5.0 min | Ia (mm)= 6.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

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

--- TRANSFORMED HYETOGRAPH ---

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.08	1.083	7.44	2.083	40.41	3.08	5.16
0.167	3.23	1.167	8.42	2.167	28.39	3.17	4.82
0.250	3.40	1.250	9.68	2.250	21.02	3.25	4.51
0.333	3.59	1.333	11.35	2.333	16.45	3.33	4.24
0.417	3.79	1.417	13.60	2.417	13.42	3.42	4.00
0.500	4.02	1.500	16.70	2.500	11.28	3.50	3.79
0.583	4.35	1.583	23.51	2.583	9.44	3.58	3.55
0.667	4.67	1.667	35.01	2.667	8.37	3.67	3.39
0.750	5.03	1.750	64.03	2.750	7.49	3.75	3.24
0.833	5.45	1.833	131.65	2.833	6.78	3.83	3.10
0.917	5.94	1.917	182.32	2.917	6.18	3.92	2.97
1.000	6.52	2.000	83.92	3.000	5.67	4.00	2.85

Unit Hyd Qpeak (cms)= 2.467

PEAK FLOW (cms)= 1.094 (i)
TIME TO PEAK (hrs)= 3.333
RUNOFF VOLUME (mm)= 13.312
TOTAL RAINFALL (mm)= 71.769
RUNOFF COEFFICIENT = 0.185

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

CALIB
NASHYD (0101) | Area (ha)= 5.13 Curve Number (CN)= 54.1
ID= 1 DT= 5.0 min | Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.54

Unit Hyd Qpeak (cms)= 0.363

PEAK FLOW (cms)= 0.161 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 15.918

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0002) | Area (ha)= 16.83 Curve Number (CN)= 55.7
ID= 1 DT= 5.0 min | Ia (mm)= 4.90 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.70

Unit Hyd Qpeak (cms)= 0.918

PEAK FLOW (cms)= 0.454 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 16.629
TOTAL RAINFALL (mm)= 71.769
RUNOFF COEFFICIENT = 0.232

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

ADD HYD (0800)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	16.83	0.454	2.67	16.63
+ ID2= 2 (0803):	88.17	1.199	3.33	13.59
ID = 3 (0800):	105.00	1.547	3.17	14.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0003) | Area (ha)= 136.00 Curve Number (CN)= 52.1
ID= 1 DT= 5.0 min | Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

Unit Hyd Qpeak (cms)= 2.678

PEAK FLOW (cms)= 1.355 (i)
TIME TO PEAK (hrs)= 4.167
RUNOFF VOLUME (mm)= 13.986
TOTAL RAINFALL (mm)= 71.769
RUNOFF COEFFICIENT = 0.195

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

DUMYD (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	1.36	4.17	13.99
MAJOR SYS.(ID= 2):	35.85	0.64	4.17	13.99
MINOR SYS.(ID= 3):	100.15	0.71	2.83	13.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0801)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0400):	100.15	0.713	2.83	13.99
+ ID2= 2 (0800):	105.00	1.547	3.17	14.08
ID = 3 (0801):	205.15	2.260	3.17	14.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

** SIMULATION NUMBER: 8 ** Regional Timmins Storm

READ STORM | Filename: C:\Users\dmarshall\AppD

```
| Ptotal=193.00 mm |   ata\Local\Temp\12b8f7c2-88bf-48ea-99b0-c1e9a51413fa\5cf2c1d2
                     Comments: TIMMINS REGIONAL 12 HOUR DURATION STORM
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.20	15.00	3.20	3.00	6.20	43.00	9.20	13.00
0.40	15.00	3.40	3.00	6.40	43.00	9.40	13.00
0.60	15.00	3.60	3.00	6.60	43.00	9.60	13.00
0.80	15.00	3.80	3.00	6.80	43.00	9.80	13.00
1.00	15.00	4.00	3.00	7.00	43.00	10.00	13.00
1.20	20.00	4.20	5.00	7.20	20.00	10.20	13.00
1.40	20.00	4.40	5.00	7.40	20.00	10.40	13.00
1.60	20.00	4.60	5.00	7.60	20.00	10.60	13.00
1.80	20.00	4.80	5.00	7.80	20.00	10.80	13.00
2.00	20.00	5.00	5.00	8.00	20.00	11.00	13.00
2.20	10.00	5.20	20.00	8.20	23.00	11.20	8.00
2.40	10.00	5.40	20.00	8.40	23.00	11.40	8.00
2.60	10.00	5.60	20.00	8.60	23.00	11.60	8.00
2.80	10.00	5.80	20.00	8.80	23.00	11.80	8.00
3.00	10.00	6.00	20.00	9.00	23.00	12.00	8.00

```
| CALIB                |
| NASHYD    (0001)     |   Area    (ha)=  80.08   Curve Number   (CN)= 50.1
|ID= 1 DT= 5.0 min     |   Ia      (mm)=   6.70   # of Linear Res.(N)= 3.00
                         U.H. Tp(hrs)=   1.24

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

--- TRANSFORMED HYETOGRAPH ---

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	15.00	3.083	3.00	6.083	43.00	9.08	13.00
0.167	15.00	3.167	3.00	6.167	43.00	9.17	13.00
0.250	15.00	3.250	3.00	6.250	43.00	9.25	13.00
0.333	15.00	3.333	3.00	6.333	43.00	9.33	13.00
0.417	15.00	3.417	3.00	6.417	43.00	9.42	13.00
0.500	15.00	3.500	3.00	6.500	43.00	9.50	13.00
0.583	15.00	3.583	3.00	6.583	43.00	9.58	13.00
0.667	15.00	3.667	3.00	6.667	43.00	9.67	13.00
0.750	15.00	3.750	3.00	6.750	43.00	9.75	13.00
0.833	15.00	3.833	3.00	6.833	43.00	9.83	13.00
0.917	15.00	3.917	3.00	6.917	43.00	9.92	13.00
1.000	15.00	4.000	3.00	7.000	43.00	10.00	13.00
1.083	20.00	4.083	5.00	7.083	20.00	10.08	13.00
1.167	20.00	4.167	5.00	7.167	20.00	10.17	13.00
1.250	20.00	4.250	5.00	7.250	20.00	10.25	13.00
1.333	20.00	4.333	5.00	7.333	20.00	10.33	13.00
1.417	20.00	4.417	5.00	7.417	20.00	10.42	13.00
1.500	20.00	4.500	5.00	7.500	20.00	10.50	13.00
1.583	20.00	4.583	5.00	7.583	20.00	10.58	13.00
1.667	20.00	4.667	5.00	7.667	20.00	10.67	13.00
1.750	20.00	4.750	5.00	7.750	20.00	10.75	13.00
1.833	20.00	4.833	5.00	7.833	20.00	10.83	13.00
1.917	20.00	4.917	5.00	7.917	20.00	10.92	13.00
2.000	20.00	5.000	5.00	8.000	20.00	11.00	13.00
2.083	10.00	5.083	20.00	8.083	23.00	11.08	8.00
2.167	10.00	5.167	20.00	8.167	23.00	11.17	8.00
2.250	10.00	5.250	20.00	8.250	23.00	11.25	8.00
2.333	10.00	5.333	20.00	8.333	23.00	11.33	8.00
2.417	10.00	5.417	20.00	8.417	23.00	11.42	8.00
2.500	10.00	5.500	20.00	8.500	23.00	11.50	8.00
2.583	10.00	5.583	20.00	8.583	23.00	11.58	8.00
2.667	10.00	5.667	20.00	8.667	23.00	11.67	8.00
2.750	10.00	5.750	20.00	8.750	23.00	11.75	8.00
2.833	10.00	5.833	20.00	8.833	23.00	11.83	8.00
2.917	10.00	5.917	20.00	8.917	23.00	11.92	8.00
3.000	10.00	6.000	20.00	9.000	23.00	12.00	8.00

```
  Unit Hyd Qpeak  (cms)=   2.467

  PEAK FLOW       (cms)=   2.823 (i)
  TIME TO PEAK    (hrs)=   9.250
  RUNOFF VOLUME    (mm)=  79.009
  TOTAL RAINFALL   (mm)= 193.000
  RUNOFF COEFFICIENT   =   0.409

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

```
| ADD HYD   (0803)     |
|  1 + 2 =  3          |
                          AREA    QPEAK   TPEAK    R.V.
                          (ha)    (cms)   (hrs)    (mm)
       ID1= 1 (0001):    80.08   2.823    9.25   79.01
     + ID2= 2 (0802):     8.09   0.353    7.67   89.57
     =====================================================
       ID = 3 (0803):    88.17   3.143    9.17   79.98

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

```
| CALIB                |
| NASHYD    (0002)     |   Area    (ha)=  16.83   Curve Number   (CN)= 55.7
|ID= 1 DT= 5.0 min     |   Ia      (mm)=   4.90   # of Linear Res.(N)= 3.00
                         U.H. Tp(hrs)=   0.70

  Unit Hyd Qpeak  (cms)=   0.918

  PEAK FLOW       (cms)=   0.829 (i)
  TIME TO PEAK    (hrs)=   7.417
  RUNOFF VOLUME    (mm)=  90.694
  TOTAL RAINFALL   (mm)= 193.000
  RUNOFF COEFFICIENT   =   0.470

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

```
| ADD HYD   (0800)     |
|  1 + 2 =  3          |
                          AREA    QPEAK   TPEAK    R.V.
                          (ha)    (cms)   (hrs)    (mm)
       ID1= 1 (0002):    16.83   0.829    7.42   90.69
     + ID2= 2 (0803):    88.17   3.143    9.17   79.98
     =====================================================
       ID = 3 (0800):   105.00   3.820    9.17   81.70

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

```
| CALIB                |
| NASHYD    (0003)     |   Area    (ha)= 136.00   Curve Number   (CN)= 52.1
|ID= 1 DT= 5.0 min     |   Ia      (mm)=   7.20   # of Linear Res.(N)= 3.00
                         U.H. Tp(hrs)=   1.94

  Unit Hyd Qpeak  (cms)=   2.678

  PEAK FLOW       (cms)=   4.452 (i)
  TIME TO PEAK    (hrs)=  10.000
  RUNOFF VOLUME    (mm)=  82.327
  TOTAL RAINFALL   (mm)= 193.000
  RUNOFF COEFFICIENT   =   0.427

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

```
| DUMYD     (0400)     |
| Inlet Cap.=0.713     |
| #of Inlets=     1    |
| Total(cms)=  0.7     |
                          AREA    QPEAK   TPEAK    R.V.
                          (ha)    (cms)   (hrs)    (mm)
  TOTAL HYD.(ID= 1): 136.00    4.45    10.00   82.33
  =====================================================
  MAJOR SYS.(ID= 2):  92.94    3.74    10.00   82.33
  MINOR SYS.(ID= 3):  43.06    0.71     6.00   82.33

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

```
| ADD HYD   (0801)     |
|  1 + 2 =  3          |
                          AREA    QPEAK   TPEAK    R.V.
                          (ha)    (cms)   (hrs)    (mm)
       ID1= 1 (0400):    43.06   0.713    6.00   82.33
     + ID2= 2 (0800):   105.00   3.820    9.17   81.70
     =====================================================
       ID = 3 (0801):   148.06   4.533    9.17   81.88
```

```
| CALIB                |
| NASHYD    (0101)     |   Area    (ha)=   5.13   Curve Number   (CN)= 54.1
|ID= 1 DT= 5.0 min     |   Ia      (mm)=   4.70   # of Linear Res.(N)= 3.00
                         U.H. Tp(hrs)=   0.54

  Unit Hyd Qpeak  (cms)=   0.363

  PEAK FLOW       (cms)=   0.268 (i)
  TIME TO PEAK    (hrs)=   7.250
  RUNOFF VOLUME    (mm)=  87.804
  TOTAL RAINFALL   (mm)= 193.000
  RUNOFF COEFFICIENT   =   0.455

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

```
| RESERVOIR (0601)     |
| IN= 2---> OUT= 1     |
| DT=  5.0 min         |
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

```
                          AREA    QPEAK    TPEAK     R.V.
                          (ha)    (cms)    (hrs)     (mm)
  INFLOW : ID= 2 (0101)   5.130    0.268     7.25    87.80
  OUTFLOW: ID= 1 (0601)   5.130    0.239     7.58    87.77

       PEAK  FLOW  REDUCTION [Qout/Qin](%)= 89.22
       TIME SHIFT OF PEAK FLOW       (min)= 20.00
       MAXIMUM  STORAGE  USED    (ha.m.)=  0.0078
```

```
| CALIB                |
| NASHYD    (0102)     |   Area    (ha)=   2.96   Curve Number   (CN)= 56.7
|ID= 1 DT= 5.0 min     |   Ia      (mm)=   4.60   # of Linear Res.(N)= 3.00
                         U.H. Tp(hrs)=   0.30

  Unit Hyd Qpeak  (cms)=   0.377

  PEAK FLOW       (cms)=   0.190 (i)
  TIME TO PEAK    (hrs)=   7.000
  RUNOFF VOLUME    (mm)=  92.791
  TOTAL RAINFALL   (mm)= 193.000
  RUNOFF COEFFICIENT   =   0.481

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

```
| RESERVOIR (0602)     |
| IN= 2---> OUT= 1     |
| DT=  5.0 min         |
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.1019
0.0320	0.0331	0.7410	0.1376
0.0910	0.0671	0.0000	0.0000

```
                          AREA    QPEAK    TPEAK     R.V.
                          (ha)    (cms)    (hrs)     (mm)
  INFLOW : ID= 2 (0102)   2.960    0.190     7.00    92.79
  OUTFLOW: ID= 1 (0602)   2.960    0.121     9.17    92.70

       PEAK  FLOW  REDUCTION [Qout/Qin](%)= 64.71
       TIME SHIFT OF PEAK FLOW       (min)=130.00
       MAXIMUM  STORAGE  USED    (ha.m.)=  0.0721
```

```
| ADD HYD   (0802)     |
|  1 + 2 =  3          |
                          AREA    QPEAK   TPEAK    R.V.
                          (ha)    (cms)   (hrs)    (mm)
       ID1= 1 (0601):    5.13    0.239    7.58   87.77
     + ID2= 2 (0602):    2.96    0.121    9.17   92.70
     =====================================================
       ID = 3 (0802):    8.09    0.353    7.67   89.57

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

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

FINISH
```

```
      V    V   I    SSSSS  U   U    A    L
      V    V   I   SS      U   U   A A   L
       V  V    I     SS    U   U  AAAAA  L
        V V    I      SS   U   U  A   A  L
         VV    I   SSSSS   UUUUU  A   A  LLLLL

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

  Input   Filename: C:\Program Files (x86)\VH Suite 3.0\VO2\voin.dat
  Output  Filename: C:\Users\dmarshall\AppData\Local\Temp\1c420549-9f56-426b-b8c6-47a308c8d649\Scenario.out
  Summary Filename: C:\Users\dmarshall\AppData\Local\Temp\1c420549-9f56-426b-b8c6-47a308c8d649\Scenario.sum

DATE: 03/10/2017                          TIME: 09:49:11

USER:

COMMENTS: _____

**********
** SIMULATION NUMBER:   1 **
**********  2-Year SCS Storm

MASS STORM
Ptotal= 48.70 mm

Filename: C:\Users\dmarshall\AppData\Local\Temp\1c420549-9f56-426b-b8c6-47a308c8d649\Oc5069ea
Comments: SCS Type II 24 HR MASS CURVE

Duration of storm     = 23.75 hrs
Mass curve time step = 15.00 min

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|---|---|---|---|---|---|---|---|
| 0.25 | 0.58 | 6.25 | 0.97 | 12.25 | 7.01 | 18.25 | 0.78 |
| 0.50 | 0.39 | 6.50 | 0.78 | 12.50 | 3.70 | 18.50 | 0.97 |
| 0.75 | 0.58 | 6.75 | 0.97 | 12.75 | 3.51 | 18.75 | 0.78 |
| 1.00 | 0.58 | 7.00 | 0.97 | 13.00 | 2.73 | 19.00 | 0.97 |
| 1.25 | 0.58 | 7.25 | 1.17 | 13.25 | 2.53 | 19.25 | 0.78 |
| 1.50 | 0.39 | 7.50 | 0.97 | 13.50 | 2.14 | 19.50 | 0.97 |
| 1.75 | 0.58 | 7.75 | 1.17 | 13.75 | 1.95 | 19.75 | 0.78 |
| 2.00 | 0.58 | 8.00 | 1.17 | 14.00 | 1.56 | 20.00 | 0.58 |
| 2.25 | 0.78 | 8.25 | 1.36 | 14.25 | 1.36 | 20.25 | 0.58 |
| 2.50 | 0.58 | 8.50 | 1.36 | 14.50 | 1.56 | 20.50 | 0.58 |
| 2.75 | 0.58 | 8.75 | 1.36 | 14.75 | 1.36 | 20.75 | 0.58 |
| 3.00 | 0.58 | 9.00 | 1.56 | 15.00 | 1.56 | 21.00 | 0.58 |
| 3.25 | 0.78 | 9.25 | 1.56 | 15.25 | 1.36 | 21.25 | 0.58 |
| 3.50 | 0.58 | 9.50 | 1.75 | 15.50 | 1.56 | 21.50 | 0.58 |
| 3.75 | 0.58 | 9.75 | 1.75 | 15.75 | 1.36 | 21.75 | 0.58 |
| 4.00 | 0.78 | 10.00 | 2.14 | 16.00 | 0.97 | 22.00 | 0.58 |
| 4.25 | 0.78 | 10.25 | 2.34 | 16.25 | 0.78 | 22.25 | 0.58 |
| 4.50 | 0.78 | 10.50 | 2.92 | 16.50 | 0.97 | 22.50 | 0.58 |
| 4.75 | 0.78 | 10.75 | 3.12 | 16.75 | 0.78 | 22.75 | 0.58 |
| 5.00 | 0.78 | 11.00 | 4.68 | 17.00 | 0.97 | 23.00 | 0.58 |
| 5.25 | 0.78 | 11.25 | 4.68 | 17.25 | 0.78 | 23.25 | 0.58 |
| 5.50 | 0.78 | 11.50 | 14.42 | 17.50 | 0.97 | 23.50 | 0.58 |
| 5.75 | 0.78 | 11.75 | 59.61 | 17.75 | 0.78 | 23.75 | 0.58 |
| 6.00 | 0.78 | 12.00 | 7.01 | 18.00 | 0.97 | | |

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

Area (ha)= 80.08 Curve Number (CN)= 50.1
Ia (mm)= 6.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

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

---- TRANSFORMED HYETOGRAPH ----

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|---|---|---|---|---|---|---|---|
| 0.083 | 0.58 | 6.083 | 0.97 | 12.083 | 7.01 | 18.08 | 0.78 |
| 0.167 | 0.58 | 6.167 | 0.97 | 12.167 | 7.01 | 18.17 | 0.78 |
| 0.250 | 0.58 | 6.250 | 0.97 | 12.250 | 7.01 | 18.25 | 0.78 |
| 0.333 | 0.39 | 6.333 | 0.78 | 12.333 | 3.70 | 18.33 | 0.97 |
| 0.417 | 0.39 | 6.417 | 0.78 | 12.417 | 3.70 | 18.42 | 0.97 |
| 0.500 | 0.39 | 6.500 | 0.78 | 12.500 | 3.70 | 18.50 | 0.97 |
| 0.583 | 0.58 | 6.583 | 0.97 | 12.583 | 3.51 | 18.58 | 0.78 |
| 0.667 | 0.58 | 6.667 | 0.97 | 12.667 | 3.51 | 18.67 | 0.78 |
| 0.750 | 0.58 | 6.750 | 0.97 | 12.750 | 3.51 | 18.75 | 0.78 |
| 0.833 | 0.58 | 6.833 | 0.97 | 12.833 | 2.73 | 18.83 | 0.97 |
| 0.917 | 0.58 | 6.917 | 0.97 | 12.917 | 2.73 | 18.92 | 0.97 |
| 1.000 | 0.58 | 7.000 | 0.97 | 13.000 | 2.73 | 19.00 | 0.97 |
| 1.083 | 0.58 | 7.083 | 1.17 | 13.083 | 2.53 | 19.08 | 0.78 |
| 1.167 | 0.58 | 7.167 | 1.17 | 13.167 | 2.53 | 19.17 | 0.78 |
| 1.250 | 0.58 | 7.250 | 1.17 | 13.250 | 2.53 | 19.25 | 0.78 |
| 1.333 | 0.39 | 7.333 | 0.97 | 13.333 | 2.14 | 19.33 | 0.97 |
| 1.417 | 0.39 | 7.417 | 0.97 | 13.417 | 2.14 | 19.42 | 0.97 |
| 1.500 | 0.39 | 7.500 | 0.97 | 13.500 | 2.14 | 19.50 | 0.97 |
| 1.583 | 0.58 | 7.583 | 1.17 | 13.583 | 1.95 | 19.58 | 0.78 |
| 1.667 | 0.58 | 7.667 | 1.17 | 13.667 | 1.95 | 19.67 | 0.78 |
| 1.750 | 0.58 | 7.750 | 1.17 | 13.750 | 1.95 | 19.75 | 0.78 |
| 1.833 | 0.58 | 7.833 | 1.17 | 13.833 | 1.56 | 19.83 | 0.58 |
| 1.917 | 0.58 | 7.917 | 1.17 | 13.917 | 1.56 | 19.92 | 0.58 |
| 2.000 | 0.58 | 8.000 | 1.17 | 14.000 | 1.56 | 20.00 | 0.58 |
| 2.083 | 0.78 | 8.083 | 1.36 | 14.083 | 1.36 | 20.08 | 0.58 |
| 2.167 | 0.78 | 8.167 | 1.36 | 14.167 | 1.36 | 20.17 | 0.58 |
| 2.250 | 0.78 | 8.250 | 1.36 | 14.250 | 1.36 | 20.25 | 0.58 |
| 2.333 | 0.58 | 8.333 | 1.36 | 14.333 | 1.56 | 20.33 | 0.58 |
| 2.417 | 0.58 | 8.417 | 1.36 | 14.417 | 1.56 | 20.42 | 0.58 |
| 2.500 | 0.58 | 8.500 | 1.36 | 14.500 | 1.56 | 20.50 | 0.58 |
| 2.583 | 0.58 | 8.583 | 1.36 | 14.583 | 1.36 | 20.58 | 0.58 |
| 2.667 | 0.58 | 8.667 | 1.36 | 14.667 | 1.36 | 20.67 | 0.58 |
| 2.750 | 0.58 | 8.750 | 1.36 | 14.750 | 1.36 | 20.75 | 0.58 |
| 2.833 | 0.58 | 8.833 | 1.56 | 14.833 | 1.56 | 20.83 | 0.58 |
| 2.917 | 0.58 | 8.917 | 1.56 | 14.917 | 1.56 | 20.92 | 0.58 |
| 3.000 | 0.58 | 9.000 | 1.56 | 15.000 | 1.56 | 21.00 | 0.58 |
| 3.083 | 0.78 | 9.083 | 1.56 | 15.083 | 1.36 | 21.08 | 0.58 |
| 3.167 | 0.78 | 9.167 | 1.56 | 15.167 | 1.36 | 21.17 | 0.58 |
| 3.250 | 0.78 | 9.250 | 1.56 | 15.250 | 1.36 | 21.25 | 0.58 |
| 3.333 | 0.58 | 9.333 | 1.75 | 15.333 | 1.56 | 21.33 | 0.58 |
| 3.417 | 0.58 | 9.417 | 1.75 | 15.417 | 1.56 | 21.42 | 0.58 |
| 3.500 | 0.58 | 9.500 | 1.75 | 15.500 | 1.56 | 21.50 | 0.58 |
| 3.583 | 0.58 | 9.583 | 1.75 | 15.583 | 1.36 | 21.58 | 0.58 |
| 3.667 | 0.58 | 9.667 | 1.75 | 15.667 | 1.36 | 21.67 | 0.58 |
| 3.750 | 0.58 | 9.750 | 1.75 | 15.750 | 1.36 | 21.75 | 0.58 |
| 3.833 | 0.78 | 9.833 | 2.14 | 15.833 | 0.97 | 21.83 | 0.58 |
| 3.917 | 0.78 | 9.917 | 2.14 | 15.917 | 0.97 | 21.92 | 0.58 |
| 4.000 | 0.78 | 10.000 | 2.34 | 16.000 | 0.97 | 22.00 | 0.58 |
| 4.083 | 0.78 | 10.083 | 2.34 | 16.083 | 0.78 | 22.08 | 0.58 |
| 4.167 | 0.78 | 10.167 | 2.34 | 16.167 | 0.78 | 22.17 | 0.58 |
| 4.250 | 0.78 | 10.250 | 2.34 | 16.250 | 0.78 | 22.25 | 0.58 |
| 4.333 | 0.78 | 10.333 | 2.92 | 16.333 | 0.97 | 22.33 | 0.58 |
| 4.417 | 0.78 | 10.417 | 2.92 | 16.417 | 0.97 | 22.42 | 0.58 |
| 4.500 | 0.78 | 10.500 | 2.92 | 16.500 | 0.97 | 22.50 | 0.58 |
| 4.583 | 0.78 | 10.583 | 3.12 | 16.583 | 0.78 | 22.58 | 0.58 |
| 4.667 | 0.78 | 10.667 | 3.12 | 16.667 | 0.78 | 22.67 | 0.58 |
| 4.750 | 0.78 | 10.750 | 3.12 | 16.750 | 0.78 | 22.75 | 0.58 |
| 4.833 | 0.78 | 10.833 | 4.68 | 16.833 | 0.97 | 22.83 | 0.58 |
| 4.917 | 0.78 | 10.917 | 4.68 | 16.917 | 0.97 | 22.92 | 0.58 |
| 5.000 | 0.78 | 11.000 | 4.68 | 17.000 | 0.97 | 23.00 | 0.58 |
| 5.083 | 0.78 | 11.083 | 4.68 | 17.083 | 0.78 | 23.08 | 0.58 |
| 5.167 | 0.78 | 11.167 | 4.68 | 17.167 | 0.78 | 23.17 | 0.58 |
| 5.250 | 0.78 | 11.250 | 4.68 | 17.250 | 0.78 | 23.25 | 0.58 |
| 5.333 | 0.78 | 11.333 | 14.41 | 17.333 | 0.97 | 23.33 | 0.58 |
| 5.417 | 0.78 | 11.417 | 14.42 | 17.417 | 0.97 | 23.42 | 0.58 |
| 5.500 | 0.78 | 11.500 | 14.42 | 17.500 | 0.97 | 23.50 | 0.58 |
| 5.583 | 0.78 | 11.583 | 59.60 | 17.583 | 0.78 | 23.58 | 0.58 |
| 5.667 | 0.78 | 11.667 | 59.61 | 17.667 | 0.78 | 23.67 | 0.58 |
| 5.750 | 0.78 | 11.750 | 59.61 | 17.750 | 0.78 | 23.75 | 0.58 |
| 5.833 | 0.78 | 11.833 | 7.02 | 17.833 | 0.97 | | |
| 5.917 | 0.78 | 11.917 | 7.01 | 17.917 | 0.97 | | |
| 6.000 | 0.78 | 12.000 | 7.01 | 18.000 | 0.97 | | |

Unit hyd Qpeak (cms)= 2.467

PEAK FLOW (cms)= 0.296 (i)
TIME TO PEAK (hrs)= 13.083
RUNOFF VOLUME (mm)= 5.941
TOTAL RAINFALL (mm)= 48.554
RUNOFF COEFFICIENT = 0.122

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

CALIB
NASHYD (0101)
ID= 1 DT= 5.0 min

Area (ha)= 5.13 Curve Number (CN)= 54.1
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.54

Unit Hyd Qpeak (cms)= 0.363

PEAK FLOW (cms)= 0.044 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 7.415
TOTAL RAINFALL (mm)= 48.554
RUNOFF COEFFICIENT = 0.153

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

| OUTFLOW (cms) | STORAGE (ha.m.) | OUTFLOW (cms) | STORAGE (ha.m.) |
|---|---|---|---|
| 0.0000 | 0.0000 | 0.3000 | 0.0752 |
| 0.0320 | 0.0244 | 0.7410 | 0.1015 |
| 0.0910 | 0.0495 | 0.0000 | 0.0000 |

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| INFLOW : ID= 2 (0101) | 5.130 | 0.044 | 12.25 | 7.41 |
| OUTFLOW: ID= 1 (0601) | 5.130 | 0.017 | 13.33 | 7.38 |

PEAK FLOW REDUCTION [Qout/Qin](%)= 38.97
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= 0.0132

CALIB
NASHYD (0102)
ID= 1 DT= 5.0 min

Area (ha)= 2.96 Curve Number (CN)= 56.7
Ia (mm)= 4.60 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.30

Unit Hyd Qpeak (cms)= 0.377

PEAK FLOW (cms)= 0.043 (i)
TIME TO PEAK (hrs)= 11.917
RUNOFF VOLUME (mm)= 8.117
TOTAL RAINFALL (mm)= 48.554
RUNOFF COEFFICIENT = 0.167

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min

| OUTFLOW (cms) | STORAGE (ha.m.) | OUTFLOW (cms) | STORAGE (ha.m.) |
|---|---|---|---|
| 0.0000 | 0.0000 | 0.3000 | 0.1019 |
| 0.0320 | 0.0331 | 0.7410 | 0.1376 |
| 0.0910 | 0.0671 | 0.0000 | 0.0000 |

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| INFLOW : ID= 2 (0102) | 2.960 | 0.043 | 11.92 | 8.12 |
| OUTFLOW: ID= 1 (0602) | 2.960 | 0.009 | 12.92 | 8.03 |

PEAK FLOW REDUCTION [Qout/Qin](%)= 21.86
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 0.0098

ADD HYD (0802)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (0601): | 5.13 | 0.017 | 13.33 | 7.38 |
| + ID2= 2 (0602): | 2.96 | 0.009 | 12.92 | 8.03 |
| ID = 3 (0802): | 8.09 | 0.027 | 13.17 | 7.62 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (0001): | 80.08 | 0.296 | 13.08 | 5.94 |
| + ID2= 2 (0802): | 8.09 | 0.027 | 13.17 | 7.62 |
| ID = 3 (0803): | 88.17 | 0.323 | 13.08 | 6.10 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0002)
ID= 1 DT= 5.0 min

Area (ha)= 16.83 Curve Number (CN)= 55.7
Ia (mm)= 4.90 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.70

Unit Hyd Qpeak (cms)= 0.918

PEAK FLOW (cms)= 0.127 (i)
TIME TO PEAK (hrs)= 12.417
RUNOFF VOLUME (mm)= 7.757
TOTAL RAINFALL (mm)= 48.554
RUNOFF COEFFICIENT = 0.160

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

ADD HYD (0800)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (0002): | 16.83 | 0.127 | 12.42 | 7.76 |
| + ID2= 2 (0803): | 88.17 | 0.323 | 13.08 | 6.10 |
| ID = 3 (0800): | 105.00 | 0.420 | 12.83 | 6.36 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0003)
ID= 1 DT= 5.0 min

Area (ha)= 136.00 Curve Number (CN)= 52.1
Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

Unit Hyd Qpeak (cms)= 2.678

PEAK FLOW (cms)= 0.375 (i)
TIME TO PEAK (hrs)= 14.000
RUNOFF VOLUME (mm)= 6.221
TOTAL RAINFALL (mm)= 48.554
RUNOFF COEFFICIENT = 0.128

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

OUHYD (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| TOTAL HYD.(ID= 1): | 136.00 | 0.38 | 14.00 | 6.22 |
| MAJOR SYS.(ID= 2): | 0.00 | 0.00 | 0.00 | 0.00 |
| MINOR SYS.(ID= 3): | 136.00 | 0.38 | 14.00 | 6.22 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0801)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
```

ID1= 1 (0400):	136.00	0.375	14.00	6.22	
+ ID2= 2 (0800):	105.00	0.420	12.83	6.36	
ID = 3 (0801):	241.00	0.734	13.33	6.28	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION NUMBER: 2 ** 5-Year SCS Storm
****

MASS STORM
Ptotal= 62.00 mm

Filename: C:\Users\dmarshall\AppData\Local\Temp\1c420549-9f56-426b-b8c6-47a308c8d649\f4a3569d
Comments: SCS Type II 24 HR MASS CURVE

Duration of Storm = 23.75 hrs
Mass Curve time step = 15.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.74	6.25	1.24	12.25	8.93	18.25	0.99
0.50	0.50	6.50	0.99	12.50	4.71	18.50	1.24
0.75	0.74	6.75	1.24	12.75	4.46	18.75	0.99
1.00	0.74	7.00	1.24	13.00	3.47	19.00	1.24
1.25	0.74	7.25	1.49	13.25	3.22	19.25	0.99
1.50	0.50	7.50	1.24	13.50	2.73	19.50	1.24
1.75	0.74	7.75	1.49	13.75	2.48	19.75	0.99
2.00	0.74	8.00	1.49	14.00	1.98	20.00	0.74
2.25	0.99	8.25	1.74	14.25	1.74	20.25	0.74
2.50	0.74	8.50	1.74	14.50	1.98	20.50	0.74
2.75	0.74	8.75	1.74	14.75	1.74	20.75	0.74
3.00	0.74	9.00	1.98	15.00	1.98	21.00	0.74
3.25	0.99	9.25	1.98	15.25	1.74	21.25	0.74
3.50	0.74	9.50	2.23	15.50	1.98	21.50	0.74
3.75	0.74	9.75	2.23	15.75	1.74	21.75	0.74
4.00	0.99	10.00	2.73	16.00	1.24	22.00	0.74
4.25	0.99	10.25	2.08	16.25	0.99	22.25	0.74
4.50	0.99	10.50	3.72	16.50	1.24	22.50	0.74
4.75	0.99	10.75	3.97	16.75	0.99	22.75	0.74
5.00	0.99	11.00	5.95	17.00	1.24	23.00	0.74
5.25	0.99	11.25	5.95	17.25	0.99	23.25	0.74
5.50	0.99	11.50	18.35	17.50	1.24	23.50	0.74
5.75	0.99	11.75	75.89	17.75	0.99	23.75	0.74
6.00	0.99	12.00	8.93	18.00	1.24		

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

Area (ha)= 80.08 Curve Number (CN)= 50.1
Ia (mm)= 6.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

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

--- TRANSFORMED HYETOGRAPH ---

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.74	6.083	1.24	12.083	8.93	18.08	0.99
0.167	0.74	6.167	1.24	12.167	8.93	18.17	0.99
0.250	0.74	6.250	1.24	12.250	8.93	18.25	0.99
0.333	0.50	6.333	0.99	12.333	4.71	18.33	1.24
0.417	0.50	6.417	0.99	12.417	4.71	18.42	1.24
0.500	0.50	6.500	0.99	12.500	4.71	18.50	1.24
0.583	0.74	6.583	1.24	12.583	4.46	18.58	0.99
0.667	0.74	6.667	1.24	12.667	4.46	18.67	0.99
0.750	0.74	6.750	1.24	12.750	4.46	18.75	0.99
0.833	0.74	6.833	1.24	12.833	3.47	18.83	1.24
0.917	0.74	6.917	1.24	12.917	3.47	18.92	1.24
1.000	0.74	7.000	1.24	13.000	3.47	19.00	1.24
1.083	0.74	7.083	1.49	13.083	3.22	19.08	0.99
1.167	0.74	7.167	1.49	13.167	3.22	19.17	0.99
1.250	0.74	7.250	1.49	13.250	3.22	19.25	0.99
1.333	0.50	7.333	1.24	13.333	2.73	19.33	1.24
1.417	0.50	7.417	1.24	13.417	2.73	19.42	1.24
1.500	0.50	7.500	1.24	13.500	2.73	19.50	1.24
1.583	0.74	7.583	1.49	13.583	2.48	19.58	0.99
1.667	0.74	7.667	1.49	13.667	2.48	19.67	0.99
1.750	0.74	7.750	1.49	13.750	2.48	19.75	0.99
1.833	0.74	7.833	1.49	13.833	1.98	19.83	0.74
1.917	0.74	7.917	1.49	13.917	1.98	19.92	0.74
2.000	0.74	8.000	1.49	14.000	1.98	20.00	0.74
2.083	0.99	8.083	1.74	14.083	1.74	20.08	0.74
2.167	0.99	8.167	1.74	14.167	1.74	20.17	0.74
2.250	0.99	8.250	1.74	14.250	1.74	20.25	0.74
2.333	0.74	8.333	1.74	14.333	1.98	20.33	0.74
2.417	0.74	8.417	1.74	14.417	1.98	20.42	0.74
2.500	0.74	8.500	1.74	14.500	1.98	20.50	0.74
2.583	0.74	8.583	1.74	14.583	1.74	20.58	0.74
2.667	0.74	8.667	1.74	14.667	1.74	20.67	0.74
2.750	0.74	8.750	1.74	14.750	1.74	20.75	0.74
2.833	0.74	8.833	1.98	14.833	1.98	20.83	0.74
2.917	0.74	8.917	1.98	14.917	1.98	20.92	0.74
3.000	0.74	9.000	1.98	15.000	1.98	21.00	0.74
3.083	0.99	9.083	1.98	15.083	1.74	21.08	0.74
3.167	0.99	9.167	1.98	15.167	1.74	21.17	0.74
3.250	0.99	9.250	1.98	15.250	1.74	21.25	0.74
3.333	0.74	9.333	2.23	15.333	1.98	21.33	0.74
3.417	0.74	9.417	2.23	15.417	1.98	21.42	0.74
3.500	0.74	9.500	2.23	15.500	1.98	21.50	0.74
3.583	0.74	9.583	2.23	15.583	1.74	21.58	0.74
3.667	0.74	9.667	2.23	15.667	1.74	21.67	0.74
3.750	0.74	9.750	2.23	15.750	1.74	21.75	0.74
3.833	0.99	9.833	2.73	15.833	1.24	21.83	0.74
3.917	0.99	9.917	2.73	15.917	1.24	21.92	0.74
4.000	0.99	10.000	2.73	16.000	1.24	22.00	0.74
4.083	0.99	10.083	2.98	16.083	0.99	22.08	0.74
4.167	0.99	10.167	2.98	16.167	0.99	22.17	0.74
4.250	0.99	10.250	2.98	16.250	0.99	22.25	0.74
4.333	0.99	10.333	3.72	16.333	1.24	22.33	0.74
4.417	0.99	10.417	3.72	16.417	1.24	22.42	0.74
4.500	0.99	10.500	3.72	16.500	1.24	22.50	0.74
4.583	0.99	10.583	3.97	16.583	0.99	22.58	0.74
4.667	0.99	10.667	3.97	16.667	0.99	22.67	0.74
4.750	0.99	10.750	3.97	16.750	0.99	22.75	0.74
4.833	0.99	10.833	5.95	16.833	1.24	22.83	0.74
4.917	0.99	10.917	5.95	16.917	1.24	22.92	0.74
5.000	0.99	11.000	5.95	17.000	1.24	23.00	0.74
5.083	0.99	11.083	5.95	17.083	0.99	23.08	0.74
5.167	0.99	11.167	5.95	17.167	0.99	23.17	0.74
5.250	0.99	11.250	5.95	17.250	0.99	23.25	0.74
5.333	0.99	11.333	18.35	17.333	1.24	23.33	0.74
5.417	0.99	11.417	18.35	17.417	1.24	23.42	0.74
5.500	0.99	11.500	18.35	17.500	1.24	23.50	0.74
5.583	0.99	11.583	75.88	17.583	0.99	23.58	0.74
5.667	0.99	11.667	75.89	17.667	0.99	23.67	0.74
5.750	0.99	11.750	75.89	17.750	0.99	23.75	0.74
5.833	0.99	11.833	8.94	17.833	1.24		
5.917	0.99	11.917	8.93	17.917	1.24		
6.000	0.99	12.000	8.93	18.000	1.24		

Unit Hyd Qpeak (cms)= 2.467

PEAK FLOW (cms)= 0.501 (i)
TIME TO PEAK (hrs)= 13.083
RUNOFF VOLUME (mm)= 9.859
TOTAL RAINFALL (mm)= 61.814
RUNOFF COEFFICIENT = 0.159

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

CALIB
NASHYD (0101)
ID= 1 DT= 5.0 min

Area (ha)= 5.13 Curve Number (CN)= 54.1
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.54

Unit Hyd Qpeak (cms)= 0.164

PEAK FLOW (cms)= 0.073 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 11.965
TOTAL RAINFALL (mm)= 61.814
RUNOFF COEFFICIENT = 0.194

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	5.130	0.073	12.25	11.97
OUTFLOW: ID= 3 (0601)	5.130	0.028	13.25	11.93

PEAK FLOW REDUCTION [Qout/Qin](%)= 39.04
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 0.0216

CALIB
NASHYD (0102)
ID= 1 DT= 5.0 min

Area (ha)= 2.96 Curve Number (CN)= 56.7
Ia (mm)= 4.60 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.30

Unit Hyd Qpeak (cms)= 0.377

PEAK FLOW (cms)= 0.071 (i)
TIME TO PEAK (hrs)= 11.917
RUNOFF VOLUME (mm)= 11.027
TOTAL RAINFALL (mm)= 61.814
RUNOFF COEFFICIENT = 0.211

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.1019
0.0320	0.0331	0.7410	0.1376
0.0910	0.0671	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0102)	2.960	0.071	11.92	11.03
OUTFLOW: ID= 1 (0602)	2.960	0.015	12.83	10.94

PEAK FLOW REDUCTION [Qout/Qin](%)= 21.91
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 0.0160

ADD HYD (0802)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.13	0.028	13.25	11.93
+ ID2= 2 (0602):	2.96	0.015	12.83	12.94
ID = 3 (0802):	8.09	0.044	13.17	12.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	80.08	0.501	13.08	9.86
+ ID2= 2 (0802):	8.09	0.044	13.17	12.30
ID = 3 (0803):	88.17	0.545	13.08	10.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0002)
ID= 1 DT= 5.0 min

Area (ha)= 16.83 Curve Number (CN)= 55.7
Ia (mm)= 4.90 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.70

Unit Hyd Qpeak (cms)= 0.918

PEAK FLOW (cms)= 0.208 (i)

TIME TO PEAK (hrs)= 12.417
RUNOFF VOLUME (mm)= 12.510
TOTAL RAINFALL (mm)= 61.814
RUNOFF COEFFICIENT = 0.202

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

ADD HYD (0800)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	16.83	0.208	12.42	12.51
+ ID2= 2 (0803):	88.17	0.545	13.08	10.08
ID = 3 (0800):	105.00	0.705	12.83	10.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0003)
ID= 1 DT= 5.0 min

Area (ha)= 136.00 Curve Number (CN)= 52.1
Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

Unit Hyd Qpeak (cms)= 2.678

PEAK FLOW (cms)= 0.637 (i)
TIME TO PEAK (hrs)= 14.000
RUNOFF VOLUME (mm)= 10.352
TOTAL RAINFALL (mm)= 61.814
RUNOFF COEFFICIENT = 0.167

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

DUMYD (0400)
Inlet Cap.=0.711
#of Inlets= 1
Total(cms)= 0.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	0.64	14.00	10.45
MAJOR SYS.(ID= 2):	0.00	0.00	0.00	0.00
MINOR SYS.(ID= 3):	136.00	0.64	14.00	10.35

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0801)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0400):	136.00	0.637	14.00	10.35
+ ID2= 2 (0800):	105.00	0.705	12.83	10.47
ID = 3 (0801):	241.00	1.240	13.33	10.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION NUMBER: 3 ** 10-Year SCS Storm
****

MASS STORM
Ptotal= 70.90 mm

Filename: C:\Users\dmarshall\AppData\Local\Temp\1c420549-9f56-426b-b8c6-47a308c8d649\27a2b1e4
Comments: SCS Type II 24 HR MASS CURVE

Duration of Storm = 23.75 hrs
Mass Curve time step = 15.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.85	6.25	1.42	12.25	10.21	18.25	1.13
0.50	0.57	6.50	1.13	12.50	5.39	18.50	1.42
0.75	0.85	6.75	1.42	12.75	5.10	18.75	1.13
1.00	0.85	7.00	1.42	13.00	3.97	19.00	1.42

1.25	0.85	7.25	1.70	13.25	3.69	19.25	1.13
1.50	0.57	7.50	1.42	13.50	3.12	19.50	1.42
1.75	0.85	7.75	1.70	13.75	2.84	19.75	1.13
2.00	0.85	8.00	1.70	14.00	2.27	20.00	0.85
2.25	1.13	8.25	1.99	14.25	1.99	20.25	0.85
2.50	0.85	8.50	1.99	14.50	2.27	20.50	0.85
2.75	0.85	8.75	1.99	14.75	1.99	20.75	0.85
3.00	0.85	9.00	2.27	15.00	2.27	21.00	0.85
3.25	1.13	9.25	2.27	15.25	1.99	21.25	0.85
3.50	0.85	9.50	2.55	15.50	2.27	21.50	0.85
3.75	0.85	9.75	2.55	15.75	1.99	21.75	0.85
4.00	1.13	10.00	3.12	16.00	1.42	22.00	0.85
4.25	1.13	10.25	3.40	16.25	1.13	22.25	0.85
4.50	1.13	10.50	4.25	16.50	1.42	22.50	0.85
4.75	1.13	10.75	4.54	16.75	1.13	22.75	0.85
5.00	1.13	11.00	6.81	17.00	1.42	23.00	0.85
5.25	1.13	11.25	6.81	17.25	1.13	23.25	0.85
5.50	1.13	11.50	20.99	17.50	1.42	23.50	0.85
5.75	1.13	11.75	86.78	17.75	1.13	23.75	0.85
6.00	1.13	12.00	10.21	18.00	1.42		

CALIB
NASHYD (0001) | Area (ha)= 80.08 Curve Number (CN)= 50.1
ID= 1 DT= 5.0 min | Ia (mm)= 6.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.85	6.083	1.42	12.083	10.21	18.08	1.13
0.167	0.85	6.167	1.42	12.167	10.21	18.17	1.13
0.250	0.85	6.250	1.42	12.250	10.21	18.25	1.13
0.333	0.57	6.333	1.13	12.333	5.39	18.33	1.42
0.417	0.57	6.417	1.13	12.417	5.39	18.42	1.42
0.500	0.57	6.500	1.13	12.500	5.39	18.50	1.42
0.583	0.85	6.583	1.42	12.583	5.10	18.58	1.13
0.667	0.85	6.667	1.42	12.667	5.10	18.67	1.13
0.750	0.85	6.750	1.42	12.750	5.10	18.75	1.13
0.833	0.85	6.833	1.42	12.833	3.97	18.83	1.42
0.917	0.85	6.917	1.42	12.917	3.97	18.92	1.42
1.000	0.85	7.000	1.42	13.000	3.97	19.00	1.42
1.083	0.85	7.083	1.70	13.083	3.69	19.08	1.13
1.167	0.85	7.167	1.70	13.167	3.69	19.17	1.13
1.250	0.85	7.250	1.70	13.250	3.69	19.25	1.13
1.333	0.57	7.333	1.42	13.333	3.12	19.33	1.42
1.417	0.57	7.417	1.42	13.417	3.12	19.42	1.42
1.500	0.57	7.500	1.42	13.500	3.12	19.50	1.42
1.583	0.85	7.583	1.70	13.583	2.84	19.58	1.13
1.667	0.85	7.667	1.70	13.667	2.84	19.67	1.13
1.750	0.85	7.750	1.70	13.750	2.84	19.75	1.13
1.833	0.85	7.833	1.70	13.833	2.27	19.83	0.85
1.917	0.85	7.917	1.70	13.917	2.27	19.92	0.85
2.000	0.85	8.000	1.70	14.000	2.27	20.00	0.85
2.083	1.13	8.083	1.99	14.083	1.99	20.08	0.85
2.167	1.13	8.167	1.99	14.167	1.99	20.17	0.85
2.250	1.13	8.250	1.99	14.250	1.99	20.25	0.85
2.333	0.85	8.333	1.99	14.333	2.27	20.33	0.85
2.417	0.85	8.417	1.99	14.417	2.27	20.42	0.85
2.500	0.85	8.500	1.99	14.500	2.27	20.50	0.85
2.583	0.85	8.583	1.99	14.583	1.99	20.58	0.85
2.667	0.85	8.667	1.99	14.667	1.99	20.67	0.85
2.750	0.85	8.750	1.99	14.750	1.99	20.75	0.85
2.833	0.85	8.833	2.27	14.833	2.27	20.83	0.85
2.917	0.85	8.917	2.27	14.917	2.27	20.92	0.85
3.000	0.85	9.000	2.27	15.000	2.27	21.00	0.85
3.083	1.13	9.083	2.27	15.083	1.99	21.08	0.85
3.167	1.13	9.167	2.27	15.167	1.99	21.17	0.85
3.250	1.13	9.250	2.27	15.250	1.99	21.25	0.85
3.333	0.85	9.333	2.55	15.333	2.27	21.33	0.85
3.417	0.85	9.417	2.55	15.417	2.27	21.42	0.85
3.500	0.85	9.500	2.55	15.500	2.27	21.50	0.85
3.583	0.85	9.583	2.55	15.583	1.99	21.58	0.85
3.667	0.85	9.667	2.55	15.667	1.99	21.67	0.85
3.750	0.85	9.750	2.55	15.750	1.99	21.75	0.85
3.833	1.13	9.833	3.12	15.833	1.42	21.83	0.85
3.917	1.13	9.917	3.12	15.917	1.42	21.92	0.85
4.000	1.13	10.000	3.12	16.000	1.42	22.00	0.85
4.083	1.13	10.083	3.40	16.083	1.13	22.08	0.85
4.167	1.13	10.167	3.40	16.167	1.13	22.17	0.85
4.250	1.13	10.250	3.40	16.250	1.13	22.25	0.85
4.333	1.13	10.333	4.25	16.333	1.42	22.33	0.85
4.417	1.13	10.417	4.25	16.417	1.42	22.42	0.85
4.500	1.13	10.500	4.25	16.500	1.42	22.50	0.85
4.583	1.13	10.583	4.54	16.583	1.13	22.58	0.85
4.667	1.13	10.667	4.54	16.667	1.13	22.67	0.85
4.750	1.13	10.750	4.54	16.750	1.13	22.75	0.85
4.833	1.13	10.833	6.81	16.833	1.42	22.83	0.85
4.917	1.13	10.917	6.81	16.917	1.42	22.92	0.85
5.000	1.13	11.000	6.81	17.000	1.42	23.00	0.85
5.083	1.13	11.083	6.81	17.083	1.13	23.08	0.85
5.167	1.13	11.167	6.81	17.167	1.13	23.17	0.85
5.250	1.13	11.250	6.81	17.250	1.13	23.25	0.85
5.333	1.13	11.333	20.99	17.333	1.42	23.33	0.85
5.417	1.13	11.417	20.99	17.417	1.42	23.42	0.85
5.500	1.13	11.500	20.99	17.500	1.42	23.50	0.85
5.583	1.13	11.583	86.78	17.583	1.13	23.58	0.85
5.667	1.13	11.667	86.78	17.667	1.13	23.67	0.85
5.750	1.13	11.750	86.78	17.750	1.13	23.75	0.85
5.833	1.13	11.833	10.22	17.833	1.42		
5.917	1.13	11.917	10.21	17.917	1.42		
6.000	1.13	12.000	10.21	18.000	1.42		

Unit Hyd Qpeak (cms)= 2.467

PEAK FLOW (cms)= 0.662 (i)
TIME TO PEAK (hrs)= 13.083
RUNOFF VOLUME (mm)= 12.917
TOTAL RAINFALL (mm)= 70.687
RUNOFF COEFFICIENT = 0.183

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

CALIB
NASHYD (0101) | Area (ha)= 5.13 Curve Number (CN)= 54.1
ID= 1 DT= 5.0 min | Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.54

Unit Hyd Qpeak (cms)= 0.363

PEAK FLOW (cms)= 0.095 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 15.468
TOTAL RAINFALL (mm)= 70.687
RUNOFF COEFFICIENT = 0.219

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	5.130	0.095	12.25	15.47
OUTFLOW: ID= 1 (0601)	5.130	0.046	13.17	15.43

PEAK FLOW REDUCTION [Qout/Qin](%)= 42.08
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 0.0277

CALIB
NASHYD (0102) | Area (ha)= 2.96 Curve Number (CN)= 56.7
ID= 1 DT= 5.0 min | Ia (mm)= 4.60 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.30

Unit Hyd Qpeak (cms)= 0.377

PEAK FLOW (cms)= 0.092 (i)
TIME TO PEAK (hrs)= 11.917
RUNOFF VOLUME (mm)= 16.788
TOTAL RAINFALL (mm)= 70.687
RUNOFF COEFFICIENT = 0.237

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.1019
0.0320	0.0331	0.7410	0.1376
0.0910	0.0671	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0102)	2.960	0.092	11.92	16.79
OUTFLOW: ID= 1 (0602)	2.960	0.020	12.83	16.70

PEAK FLOW REDUCTION [Qout/Qin](%)= 21.94
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 0.0208

ADD HYD (0802)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.13	0.040	13.17	15.43
+ ID2= 2 (0602):	2.96	0.020	12.83	16.70
ID = 3 (0802):	8.09	0.060	13.17	15.90

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	80.08	0.662	13.08	12.92
+ ID2= 2 (0802):	8.09	0.060	13.17	15.90
ID = 3 (0803):	88.17	0.722	13.08	13.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0002) | Area (ha)= 16.83 Curve Number (CN)= 55.7
ID= 1 DT= 5.0 min | Ia (mm)= 4.90 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.70

Unit Hyd Qpeak (cms)= 0.918

PEAK FLOW (cms)= 0.270 (i)
TIME TO PEAK (hrs)= 12.417
RUNOFF VOLUME (mm)= 16.161
TOTAL RAINFALL (mm)= 70.687
RUNOFF COEFFICIENT = 0.229

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

ADD HYD (0800)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	16.83	0.270	12.42	16.16
+ ID2= 2 (0803):	88.17	0.722	13.08	13.19
ID = 3 (0800):	105.00	0.931	12.83	13.67

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0003) | Area (ha)= 136.00 Curve Number (CN)= 52.1
ID= 1 DT= 5.0 min | Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

Unit Hyd Qpeak (cms)= 7.678

PEAK FLOW (cms)= 0.843 (i)
TIME TO PEAK (hrs)= 13.917
RUNOFF VOLUME (mm)= 13.571
TOTAL RAINFALL (mm)= 70.687
RUNOFF COEFFICIENT = 0.192

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

DUHYD (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	0.84	13.92	13.57
MAJOR SYS.(ID= 2):	4.61	0.13	13.92	13.57
MINOR SYS.(ID= 3):	131.39	0.71	13.08	13.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0801)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0400):	131.39	0.713	13.08	13.57
+ ID2= 2 (0800):	105.00	0.931	12.83	13.67
ID = 3 (0801):	236.39	1.623	13.08	13.61

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION NUMBER: 4 **
****
25-Year SCS Storm

MASS STORM
Ptotal= 82.00 mm

Filename: C:\Users\dmarshall\Appdata\Local\Temp\1c420549-9f56-426b-b8c6-47a308c8d649\57c8691f
Comments: SCS Type II 24 HR MASS CURVE

Duration of storm = 23.75 hrs
Mass curve time step = 15.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.98	6.25	1.64	12.25	11.81	18.25	1.31
0.50	0.66	6.50	1.31	12.50	6.23	18.50	1.64
0.75	0.98	6.75	1.64	12.75	5.90	18.75	1.31
1.00	0.98	7.00	1.64	13.00	4.59	19.00	1.64
1.25	0.98	7.25	1.97	13.25	4.26	19.25	1.31
1.50	0.66	7.50	1.64	13.50	3.61	19.50	1.64
1.75	0.98	7.75	1.97	13.75	3.28	19.75	1.31
2.00	0.98	8.00	1.97	14.00	2.62	20.00	0.98
2.25	1.31	8.25	2.30	14.25	2.30	20.25	0.98
2.50	0.98	8.50	2.30	14.50	2.62	20.50	0.98
2.75	0.98	8.75	2.30	14.75	2.30	20.75	0.98
3.00	0.98	9.00	2.62	15.00	2.62	21.00	0.98
3.25	1.31	9.25	2.62	15.25	2.30	21.25	0.98
3.50	0.98	9.50	2.95	15.50	2.62	21.50	0.98
3.75	0.98	9.75	2.95	15.75	2.30	21.75	0.98
4.00	1.31	10.00	3.61	16.00	1.64	22.00	0.98
4.25	1.31	10.25	3.94	16.25	1.31	22.25	0.98
4.50	1.31	10.50	4.92	16.50	1.64	22.50	0.98
4.75	1.31	10.75	5.25	16.75	1.31	22.75	0.98
5.00	1.31	11.00	7.87	17.00	1.64	23.00	0.98
5.25	1.31	11.25	7.87	17.25	1.31	23.25	0.98
5.50	1.31	11.50	24.27	17.50	1.64	23.50	0.98
5.75	1.31	11.75	100.37	17.75	1.31	23.75	0.98
6.00	1.31	12.00	11.81	18.00	1.64		

CALIB
NASHYD (0001) | Area (ha)= 80.08 Curve Number (CN)= 50.1
ID= 1 DT= 5.0 min | Ia (mm)= 6.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.98	6.083	1.64	12.083	11.81	18.08	1.31
0.167	0.98	6.167	1.64	12.167	11.81	18.17	1.31
0.250	0.98	6.250	1.64	12.250	11.81	18.25	1.31
0.333	0.66	6.333	1.31	12.333	6.23	18.33	1.64
0.417	0.66	6.417	1.31	12.417	6.23	18.42	1.64
0.500	0.66	6.500	1.31	12.500	6.23	18.50	1.64
0.583	0.98	6.583	1.64	12.583	5.90	18.58	1.31
0.667	0.98	6.667	1.64	12.667	5.90	18.67	1.31
0.750	0.98	6.750	1.64	12.750	5.90	18.75	1.31
0.833	0.98	6.833	1.64	12.833	4.59	18.83	1.64
0.917	0.98	6.917	1.64	12.917	4.59	18.92	1.64
1.000	0.98	7.000	1.64	13.000	4.59	19.00	1.64
1.083	0.98	7.083	1.97	13.083	4.26	19.08	1.31
1.167	0.98	7.167	1.97	13.167	4.26	19.17	1.31
1.250	0.98	7.250	1.97	13.250	4.26	19.25	1.31
1.333	0.66	7.333	1.64	13.333	3.61	19.33	1.64
1.417	0.66	7.417	1.64	13.417	3.61	19.42	1.64
1.500	0.66	7.500	1.64	13.500	3.61	19.50	1.64
1.583	0.98	7.583	1.97	13.583	3.28	19.58	1.31
1.667	0.98	7.667	1.97	13.667	3.28	19.67	1.31
1.750	0.98	7.750	1.97	13.750	3.28	19.75	1.31
1.833	0.98	7.833	1.97	13.833	2.62	19.83	0.98
1.917	0.98	7.917	1.97	13.917	2.62	19.92	0.98
2.000	0.98	8.000	1.97	14.000	2.62	20.00	0.98
2.083	1.31	8.083	2.30	14.083	2.30	20.08	0.98
2.167	1.31	8.167	2.30	14.167	2.30	20.17	0.98
2.250	1.31	8.250	2.30	14.250	2.30	20.25	0.98
2.333	0.98	8.333	2.30	14.333	2.62	20.33	0.98
2.417	0.98	8.417	2.30	14.417	2.62	20.42	0.98
2.500	0.98	8.500	2.30	14.500	2.62	20.50	0.98
2.583	0.98	8.583	2.30	14.583	2.30	20.58	0.98
2.667	0.98	8.667	2.30	14.667	2.30	20.67	0.98
2.750	0.98	8.750	2.30	14.750	2.30	20.75	0.98
2.833	0.98	8.833	2.62	14.833	2.62	20.83	0.98
2.917	0.98	8.917	2.62	14.917	2.62	20.92	0.98
3.000	0.98	9.000	2.62	15.000	2.62	21.00	0.98
3.083	1.31	9.083	2.62	15.083	2.30	21.08	0.98
3.167	1.31	9.167	2.62	15.167	2.30	21.17	0.98
3.250	1.31	9.250	2.62	15.250	2.30	21.25	0.98
3.333	0.98	9.333	2.95	15.333	2.62	21.33	0.98
3.417	0.98	9.417	2.95	15.417	2.62	21.42	0.98
3.500	0.98	9.500	2.95	15.500	2.62	21.50	0.98
3.583	0.98	9.583	2.95	15.583	2.30	21.58	0.98
3.667	0.98	9.667	2.95	15.667	2.30	21.67	0.98
3.750	0.98	9.750	2.95	15.750	2.30	21.75	0.98
3.833	1.31	9.833	3.61	15.833	1.64	21.83	0.98
3.917	1.31	9.917	3.61	15.917	1.64	21.92	0.98
4.000	1.31	10.000	3.61	16.000	1.64	22.00	0.98
4.083	1.31	10.083	3.94	16.083	1.31	22.08	0.98
4.167	1.31	10.167	3.94	16.167	1.31	22.17	0.98
4.250	1.31	10.250	3.94	16.250	1.31	22.25	0.98
4.333	1.31	10.333	4.92	16.333	1.64	22.33	0.98
4.417	1.31	10.417	4.92	16.417	1.64	22.42	0.98
4.500	1.31	10.500	4.92	16.500	1.64	22.50	0.98
4.583	1.31	10.583	5.25	16.583	1.31	22.58	0.98
4.667	1.31	10.667	5.25	16.667	1.31	22.67	0.98
4.750	1.31	10.750	5.25	16.750	1.31	22.75	0.98
4.833	1.31	10.833	7.87	16.833	1.64	22.83	0.98
4.917	1.31	10.917	7.87	16.917	1.64	22.92	0.98
5.000	1.31	11.000	7.87	17.000	1.64	23.00	0.98
5.083	1.31	11.083	7.87	17.083	1.31	23.08	0.98
5.167	1.31	11.167	7.87	17.167	1.31	23.17	0.98
5.250	1.31	11.250	7.87	17.250	1.31	23.25	0.98
5.333	1.31	11.333	24.27	17.333	1.64	23.33	0.98
5.417	1.31	11.417	24.27	17.417	1.64	23.42	0.98
5.500	1.31	11.500	24.27	17.500	1.64	23.50	0.98
5.583	1.31	11.583	100.36	17.583	1.31	23.58	0.98
5.667	1.31	11.667	100.37	17.667	1.31	23.67	0.98
5.750	1.31	11.750	100.37	17.750	1.31	23.75	0.98
5.833	1.31	11.833	11.82	17.833	1.64		
5.917	1.31	11.917	11.81	17.917	1.64		
6.000	1.31	12.000	11.81	18.000	1.64		

Unit Hyd Qpeak (cms)= 2.467

PEAK FLOW (cms)= 0.888 (i)
TIME TO PEAK (hrs)= 13.083

	ID1= 1 (0601):	5.13	0.057	13.08	20.26
+	ID2= 2 (0602):	2.96	0.027	12.83	21.86
	ID = 3 (0802):	8.09	0.084	13.08	20.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	80.08	0.888	13.08	17.17
+ ID2= 2 (0802):	8.09	0.084	13.08	20.84
ID = 3 (0803):	88.17	0.971	13.08	17.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0002)
ID= 1 DT= 5.0 min

Area (ha)= 16.83 Curve Number (CN)= 55.7
Ia (mm)= 4.90 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.70

Unit Hyd Qpeak (cms)= 0.918

PEAK FLOW (cms)= 0.357 (i)
TIME TO PEAK (hrs)= 12.417
RUNOFF VOLUME (mm)= 21.180
TOTAL RAINFALL (mm)= 81.754
RUNOFF COEFFICIENT = 0.259

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

ADD HYD (0800)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	16.83	0.357	12.42	21.18
+ ID2= 2 (0803):	88.17	0.971	13.08	17.51
ID = 3 (0800):	105.00	1.249	12.83	18.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0003)
ID= 1 DT= 5.0 min

Area (ha)= 136.00 Curve Number (CN)= 52.1
Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

Unit Hyd Qpeak (cms)= 2.678

PEAK FLOW (cms)= 1.131 (i)
TIME TO PEAK (hrs)= 13.917
RUNOFF VOLUME (mm)= 18.042
TOTAL RAINFALL (mm)= 81.754
RUNOFF COEFFICIENT = 0.221

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

DUHYD (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	1.13	13.92	18.04
MAJOR SYS.(ID= 2):	18.24	0.42	13.92	18.04
MINOR SYS.(ID= 3):	117.76	0.71	12.67	18.04

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RUNOFF VOLUME (mm)= 17.172
TOTAL RAINFALL (mm)= 81.754
RUNOFF COEFFICIENT = 0.210

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

CALIB
NASHYD (0101)
ID= 1 DT= 5.0 min

Area (ha)= 5.13 Curve Number (CN)= 54.1
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.54

Unit Hyd Qpeak (cms)= 0.363

PEAK FLOW (cms)= 0.125 (i)
TIME TO PEAK (hrs)= 12.167
RUNOFF VOLUME (mm)= 20.294
TOTAL RAINFALL (mm)= 81.754
RUNOFF COEFFICIENT = 0.248

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	5.130	0.125	12.17	20.29
OUTFLOW: ID= 1 (0601)	5.130	0.057	13.08	20.26

PEAK FLOW REDUCTION [Qout/Qin](%)= 45.85
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 0.0352

CALIB
NASHYD (0102)
ID= 1 DT= 5.0 min

Area (ha)= 2.96 Curve Number (CN)= 56.7
Ia (mm)= 4.60 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.30

Unit Hyd Qpeak (cms)= 0.377

PEAK FLOW (cms)= 0.121 (i)
TIME TO PEAK (hrs)= 11.917
RUNOFF VOLUME (mm)= 21.947
TOTAL RAINFALL (mm)= 81.754
RUNOFF COEFFICIENT = 0.268

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.1019
0.0320	0.0331	0.7410	0.1376
0.0910	0.0671	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0102)	2.960	0.121	11.92	21.95
OUTFLOW: ID= 1 (0602)	2.960	0.027	12.83	21.86

PEAK FLOW REDUCTION [Qout/Qin](%)= 21.97
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 0.0275

ADD HYD (0802)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)

ADD HYD (0801)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0400):	117.76	0.713	12.67	18.04
+ ID2= 2 (0800):	105.00	1.249	12.83	18.10
ID = 3 (0801):	222.76	1.962	12.83	18.07

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION NUMBER: 5 **
****
50-Year SCS Storm

MASS STORM
Ptotal= 90.30 mm

Filename: C:\Users\dmarshall\AppData\Local\Temp\1c420549-9f56-426b-b8c6-47a30Rc8d649\Obcd6a48
Comments: SCS Type II 24 HR MASS CURVE

Duration of storm = 23.75 hrs
Mass curve time step = 15.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	1.08	6.25	1.81	12.25	13.00	18.25	1.44
0.50	0.72	6.50	1.44	12.50	6.86	18.50	1.81
0.75	1.08	6.75	1.81	12.75	6.50	18.75	1.44
1.00	1.08	7.00	1.81	13.00	5.06	19.00	1.81
1.25	1.08	7.25	2.17	13.25	4.70	19.25	1.44
1.50	0.72	7.50	1.81	13.50	3.97	19.50	1.81
1.75	1.08	7.75	2.17	13.75	3.61	19.75	1.44
2.00	1.08	8.00	2.17	14.00	2.89	20.00	1.08
2.25	1.44	8.25	2.53	14.25	2.53	20.25	1.08
2.50	1.08	8.50	2.53	14.50	2.89	20.50	1.08
2.75	1.08	8.75	2.53	14.75	2.53	20.75	1.08
3.00	1.08	9.00	2.89	15.00	2.89	21.00	1.08
3.25	1.44	9.25	2.89	15.25	2.53	21.25	1.08
3.50	1.08	9.50	3.25	15.50	2.89	21.50	1.08
3.75	1.08	9.75	3.25	15.75	2.53	21.75	1.08
4.00	1.44	10.00	3.97	16.00	1.81	22.00	1.08
4.25	1.44	10.25	4.33	16.25	1.44	22.25	1.08
4.50	1.44	10.50	5.42	16.50	1.81	22.50	1.08
4.75	1.44	10.75	5.78	16.75	1.44	22.75	1.08
5.00	1.44	11.00	8.67	17.00	1.81	23.00	1.08
5.25	1.44	11.25	8.67	17.25	1.44	23.25	1.08
5.50	1.44	11.50	26.73	17.50	1.81	23.50	1.08
5.75	1.44	11.75	110.53	17.75	1.44	23.75	1.08
6.00	1.44	12.00	13.00	18.00	1.81		

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

Area (ha)= 80.08 Curve Number (CN)= 50.1
Ia (mm)= 6.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.08	6.083	1.81	12.083	13.00	18.08	1.44
0.167	1.08	6.167	1.81	12.167	13.00	18.17	1.44
0.250	1.08	6.250	1.81	12.250	13.00	18.25	1.44
0.333	0.72	6.333	1.44	12.333	6.86	18.33	1.81
0.417	0.72	6.417	1.44	12.417	6.86	18.42	1.81
0.500	0.72	6.500	1.44	12.500	6.86	18.50	1.81
0.583	1.08	6.583	1.81	12.583	6.50	18.58	1.44
0.667	1.08	6.667	1.81	12.667	6.50	18.67	1.44
0.750	1.08	6.750	1.81	12.750	6.50	18.75	1.44
0.833	1.08	6.833	1.81	12.833	5.06	18.83	1.81
0.917	1.08	6.917	1.81	12.917	5.06	18.92	1.81
1.000	1.08	7.000	1.81	13.000	5.06	19.00	1.81
1.083	1.08	7.083	2.17	13.083	4.70	19.08	1.44
1.167	1.08	7.167	2.17	13.167	4.70	19.17	1.44
1.250	1.08	7.250	2.17	13.250	4.70	19.25	1.44
1.333	0.72	7.333	1.81	13.333	3.97	19.33	1.81
1.417	0.72	7.417	1.81	13.417	3.97	19.42	1.81
1.500	0.72	7.500	1.81	13.500	3.97	19.50	1.81
1.583	1.08	7.583	2.17	13.583	3.61	19.58	1.44
1.667	1.08	7.667	2.17	13.667	3.61	19.67	1.44

1.750	1.08	7.750	2.17	13.750	3.61	19.75	1.44
1.833	1.08	7.833	2.17	13.833	2.89	19.83	1.08
1.917	1.08	7.917	2.17	13.917	2.89	19.92	1.08
2.000	1.08	8.000	2.17	14.000	2.89	20.00	1.08
2.083	1.44	8.083	2.53	14.083	2.53	20.08	1.08
2.167	1.44	8.167	2.53	14.167	2.53	20.17	1.08
2.250	1.44	8.250	2.53	14.250	2.53	20.25	1.08
2.333	1.08	8.333	2.53	14.333	2.89	20.33	1.08
2.417	1.08	8.417	2.53	14.417	2.89	20.42	1.08
2.500	1.08	8.500	2.53	14.500	2.89	20.50	1.08
2.583	1.08	8.583	2.53	14.583	2.53	20.58	1.08
2.667	1.08	8.667	2.53	14.667	2.53	20.67	1.08
2.750	1.08	8.750	2.53	14.750	2.53	20.75	1.08
2.833	1.08	8.833	2.89	14.833	2.89	20.83	1.08
2.917	1.08	8.917	2.89	14.917	2.89	20.92	1.08
3.000	1.08	9.000	2.89	15.000	2.89	21.00	1.08
3.083	1.44	9.083	2.89	15.083	2.53	21.08	1.08
3.167	1.44	9.167	2.89	15.167	2.53	21.17	1.08
3.250	1.44	9.250	2.89	15.250	2.53	21.25	1.08
3.333	1.08	9.333	3.25	15.333	2.89	21.33	1.08
3.417	1.08	9.417	3.25	15.417	2.89	21.42	1.08
3.500	1.08	9.500	3.25	15.500	2.89	21.50	1.08
3.583	1.08	9.583	3.25	15.583	2.53	21.58	1.08
3.667	1.08	9.667	3.25	15.667	2.53	21.67	1.08
3.750	1.08	9.750	3.25	15.750	2.53	21.75	1.08
3.833	1.44	9.833	3.97	15.833	1.81	21.83	1.08
3.917	1.44	9.917	3.97	15.917	1.81	21.92	1.08
4.000	1.44	10.000	3.97	16.000	1.81	22.00	1.08
4.083	1.44	10.083	4.33	16.083	1.44	22.08	1.08
4.167	1.44	10.167	4.33	16.167	1.44	22.17	1.08
4.250	1.44	10.250	4.33	16.250	1.44	22.25	1.08
4.333	1.44	10.333	5.42	16.333	1.81	22.33	1.08
4.417	1.44	10.417	5.42	16.417	1.81	22.42	1.08
4.500	1.44	10.500	5.42	16.500	1.81	22.50	1.08
4.583	1.44	10.583	5.78	16.583	1.44	22.58	1.08
4.667	1.44	10.667	5.78	16.667	1.44	22.67	1.08
4.750	1.44	10.750	5.78	16.750	1.44	22.75	1.08
4.833	1.44	10.833	8.67	16.833	1.81	22.83	1.08
4.917	1.44	10.917	8.67	16.917	1.81	22.92	1.08
5.000	1.44	11.000	8.67	17.000	1.81	23.00	1.08
5.083	1.44	11.083	8.67	17.083	1.44	23.08	1.08
5.167	1.44	11.167	8.67	17.167	1.44	23.17	1.08
5.250	1.44	11.250	8.67	17.250	1.44	23.25	1.08
5.333	1.44	11.333	26.73	17.333	1.81	23.33	1.08
5.417	1.44	11.417	26.73	17.417	1.81	23.42	1.08
5.500	1.44	11.500	26.73	17.500	1.81	23.50	1.08
5.583	1.44	11.583	110.52	17.583	1.44	23.58	1.08
5.667	1.44	11.667	110.53	17.667	1.44	23.67	1.08
5.750	1.44	11.750	110.53	17.750	1.44	23.75	1.08
5.833	1.44	11.833	13.01	17.833	1.81		
5.917	1.44	11.917	13.00	17.917	1.81		
6.000	1.44	12.000	13.00	18.000	1.81		

Unit Hyd Qpeak (cms)= 2.467

PEAK FLOW (cms)= 1.073 (i)
TIME TO PEAK (hrs)= 13.083
RUNOFF VOLUME (mm)= 20.647
TOTAL RAINFALL (mm)= 90.029
RUNOFF COEFFICIENT = 0.229

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

CALIB
NASHYD (0101) ID= 1 DT= 5.0 min | Area (ha)= 5.13 Curve Number (CN)= 54.1
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.54

Unit Hyd Qpeak (cms)= 0.363

PEAK FLOW (cms)= 0.150 (i)
TIME TO PEAK (hrs)= 12.167
RUNOFF VOLUME (mm)= 24.202
TOTAL RAINFALL (mm)= 90.029
RUNOFF COEFFICIENT = 0.269

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

RESERVOIR (0601)
IN= 2---> OUT= 1

DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.3000	0.0752
	0.0320	0.0244	0.7410	0.1015
	0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	5.130	0.150	12.17	24.20
OUTFLOW: ID= 1 (0601)	5.130	0.071	13.08	24.17

PEAK FLOW REDUCTION [Qout/Qin](%)= 47.55
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 0.0411

CALIB
NASHYD (0102) ID= 1 DT= 5.0 min | Area (ha)= 2.96 Curve Number (CN)= 56.7
Ia (mm)= 4.60 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.30

Unit Hyd Qpeak (cms)= 0.377

PEAK FLOW (cms)= 0.145 (i)
TIME TO PEAK (hrs)= 11.917
RUNOFF VOLUME (mm)= 26.110
TOTAL RAINFALL (mm)= 90.029
RUNOFF COEFFICIENT = 0.290

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.1019
0.0320	0.0331	0.7410	0.1376
0.0910	0.0671	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0102)	2.960	0.145	11.92	26.11
OUTFLOW: ID= 1 (0602)	2.960	0.032	12.83	26.02

PEAK FLOW REDUCTION [Qout/Qin](%)= 21.99
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 0.0329

ADD HYD (0802)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.13	0.071	13.08	24.17
+ ID2= 2 (0602):	2.96	0.032	12.83	26.02
ID = 3 (0802):	8.09	0.103	13.00	24.85

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	80.08	1.073	13.08	20.65
+ ID2= 2 (0802):	8.09	0.103	13.00	24.85
ID = 3 (0803):	88.17	1.175	13.08	21.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0002) ID= 1 DT= 5.0 min | Area (ha)= 16.83 Curve Number (CN)= 55.7
Ia (mm)= 4.90 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.70

Unit Hyd Qpeak (cms)= 0.918

PEAK FLOW (cms)= 0.427 (i)
TIME TO PEAK (hrs)= 12.417
RUNOFF VOLUME (mm)= 25.238
TOTAL RAINFALL (mm)= 90.029
RUNOFF COEFFICIENT = 0.280

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

ADD HYD (0800)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	16.83	0.427	12.42	25.24
+ ID2= 2 (0803):	88.17	1.175	13.08	21.03
ID = 3 (0800):	105.00	1.509	12.83	21.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0003) ID= 1 DT= 5.0 min | Area (ha)= 136.00 Curve Number (CN)= 52.1
Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

Unit Hyd Qpeak (cms)= 2.678

PEAK FLOW (cms)= 1.367 (i)
TIME TO PEAK (hrs)= 13.917
RUNOFF VOLUME (mm)= 21.687
TOTAL RAINFALL (mm)= 90.029
RUNOFF COEFFICIENT = 0.241

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

OUHYD (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	1.37	13.92	21.69
MAJOR SYS.(ID= 2):	27.96	0.65	13.92	21.69
MINOR SYS.(ID= 3):	108.04	0.71	12.50	21.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0801)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0400):	108.04	0.713	12.50	21.69
+ ID2= 2 (0800):	105.00	1.509	12.83	21.71
ID = 3 (0801):	213.04	2.222	12.83	21.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

100-Year SCS Storm

MASS STORM
Ptotal= 98.50 mm

Filename: C:\Users\dmarshall\AppD
ata\Local\Temp\
1c420549-9f56-426b-b8c6-47a308c8d649\ea6490c9
Comments: SCS Type II 24 HR MASS CURVE

Duration of storm = 23.75 hrs
Mass curve time step = 15.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	1.18	6.25	1.97	12.25	14.18	18.25	1.58
0.50	0.79	6.50	1.58	12.50	7.49	18.50	1.97
0.75	1.18	6.75	1.97	12.75	7.09	18.75	1.58
1.00	1.18	7.00	1.97	13.00	5.52	19.00	1.97
1.25	1.18	7.25	2.36	13.25	5.12	19.25	1.58
1.50	0.79	7.50	1.97	13.50	4.33	19.50	1.97
1.75	1.18	7.75	2.36	13.75	3.94	19.75	1.58
2.00	1.18	8.00	2.36	14.00	3.15	20.00	1.18
2.25	1.58	8.25	2.76	14.25	2.76	20.25	1.18
2.50	1.18	8.50	2.76	14.50	3.15	20.50	1.18
2.75	1.18	8.75	2.76	14.75	2.76	20.75	1.18
3.00	1.18	9.00	3.15	15.00	3.15	21.00	1.18
3.25	1.58	9.25	3.15	15.25	2.76	21.25	1.18
3.50	1.18	9.50	3.55	15.50	3.15	21.50	1.18
3.75	1.18	9.75	3.55	15.75	2.76	21.75	1.18
4.00	1.58	10.00	4.33	16.00	1.97	22.00	1.18
4.25	1.58	10.25	4.73	16.25	1.58	22.25	1.18
4.50	1.58	10.50	5.91	16.50	1.97	22.50	1.18
4.75	1.58	10.75	6.30	16.75	1.58	22.75	1.18
5.00	1.58	11.00	9.46	17.00	1.97	23.00	1.18
5.25	1.58	11.25	9.46	17.25	1.58	23.25	1.18
5.50	1.58	11.50	29.16	17.50	1.97	23.50	1.18
5.75	1.58	11.75	120.56	17.75	1.58	23.75	1.18
6.00	1.58	12.00	14.18	18.00	1.97		

CALIB
NASHYD (0001) ID= 1 DT= 5.0 min | Area (ha)= 80.08 Curve Number (CN)= 50.1
Ia (mm)= 6.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.18	6.083	1.97	12.083	14.18	18.08	1.58
0.167	1.18	6.167	1.97	12.167	14.18	18.17	1.58
0.250	1.18	6.250	1.97	12.250	14.18	18.25	1.58
0.333	0.79	6.333	1.58	12.333	7.49	18.33	1.97
0.417	0.79	6.417	1.58	12.417	7.49	18.42	1.97
0.500	0.79	6.500	1.58	12.500	7.49	18.50	1.97
0.583	1.18	6.583	1.97	12.583	7.09	18.58	1.58
0.667	1.18	6.667	1.97	12.667	7.09	18.67	1.58
0.750	1.18	6.750	1.97	12.750	7.09	18.75	1.58
0.833	1.18	6.833	1.97	12.833	5.52	18.83	1.97
0.917	1.18	6.917	1.97	12.917	5.52	18.92	1.97
1.000	1.18	7.000	1.97	13.000	5.52	19.00	1.97
1.083	1.18	7.083	2.36	13.083	5.12	19.08	1.58
1.167	1.18	7.167	2.36	13.167	5.12	19.17	1.58
1.250	1.18	7.250	2.36	13.250	5.12	19.25	1.58
1.333	0.79	7.333	1.97	13.333	4.33	19.33	1.97
1.417	0.79	7.417	1.97	13.417	4.33	19.42	1.97
1.500	0.79	7.500	1.97	13.500	4.33	19.50	1.97
1.583	1.18	7.583	2.36	13.583	3.94	19.58	1.58
1.667	1.18	7.667	2.36	13.667	3.94	19.67	1.58
1.750	1.18	7.750	2.36	13.750	3.94	19.75	1.58
1.833	1.18	7.833	2.36	13.833	3.15	19.83	1.18
1.917	1.18	7.917	2.36	13.917	3.15	19.92	1.18
2.000	1.18	8.000	2.36	14.000	3.15	20.00	1.18
2.083	1.58	8.083	2.76	14.083	2.76	20.08	1.18
2.167	1.58	8.167	2.76	14.167	2.76	20.17	1.18
2.250	1.58	8.250	2.76	14.250	2.76	20.25	1.18
2.333	1.18	8.333	2.76	14.333	3.15	20.33	1.18
2.417	1.18	8.417	2.76	14.417	3.15	20.42	1.18
2.500	1.18	8.500	2.76	14.500	3.15	20.50	1.18
2.583	1.18	8.583	2.76	14.583	2.76	20.58	1.18
2.667	1.18	8.667	2.76	14.667	2.76	20.67	1.18
2.750	1.18	8.750	2.76	14.750	2.76	20.75	1.18
2.833	1.18	8.833	3.15	14.833	3.15	20.83	1.18
2.917	1.18	8.917	3.15	14.917	3.15	20.92	1.18
3.000	1.18	9.000	3.15	15.000	3.15	21.00	1.18
3.083	1.58	9.083	3.15	15.083	2.76	21.08	1.18
3.167	1.58	9.167	3.15	15.167	2.76	21.17	1.18
3.250	1.58	9.250	3.15	15.250	2.76	21.25	1.18
3.333	1.18	9.333	3.55	15.333	3.15	21.33	1.18
3.417	1.18	9.417	3.55	15.417	3.15	21.42	1.18
3.500	1.18	9.500	3.55	15.500	3.15	21.50	1.18
3.583	1.18	9.583	3.55	15.583	2.76	21.58	1.18
3.667	1.18	9.667	3.55	15.667	2.76	21.67	1.18
3.750	1.18	9.750	3.55	15.750	2.76	21.75	1.18
3.833	1.58	9.833	4.33	15.833	1.97	21.83	1.18
3.917	1.58	9.917	4.33	15.917	1.97	21.92	1.18

4.000	1.58	10.000	4.33	16.000	1.97	22.00	1.18
4.083	1.58	10.083	4.73	16.083	1.58	22.08	1.18
4.167	1.58	10.167	4.73	16.167	1.58	22.17	1.18
4.250	1.58	10.250	4.73	16.250	1.58	22.25	1.18
4.333	1.58	10.333	5.91	16.333	1.97	22.33	1.18
4.417	1.58	10.417	5.91	16.417	1.97	22.42	1.18
4.500	1.58	10.500	5.91	16.500	1.97	22.50	1.18
4.583	1.58	10.583	6.30	16.583	1.58	22.58	1.18
4.667	1.58	10.667	6.30	16.667	1.58	22.67	1.18
4.750	1.58	10.750	6.30	16.750	1.58	22.75	1.18
4.833	1.58	10.833	9.46	16.833	1.97	22.83	1.18
4.917	1.58	10.917	9.46	16.917	1.97	22.92	1.18
5.000	1.58	11.000	9.46	17.000	1.97	23.00	1.18
5.083	1.58	11.083	9.46	17.083	1.58	23.08	1.18
5.167	1.58	11.167	9.46	17.167	1.58	23.17	1.18
5.250	1.58	11.250	9.46	17.250	1.58	23.25	1.18
5.333	1.58	11.333	20.15	17.333	1.97	23.33	1.18
5.417	1.58	11.417	29.16	17.417	1.97	23.42	1.18
5.500	1.58	11.500	29.16	17.500	1.97	23.50	1.18
5.583	1.58	11.583	120.56	17.583	1.58	23.58	1.18
5.667	1.58	11.667	120.56	17.667	1.58	23.67	1.18
5.750	1.58	11.750	120.56	17.750	1.58	23.75	1.18
5.833	1.58	11.833	14.20	17.833	1.97		
5.917	1.58	11.917	14.18	17.917	1.97		
6.000	1.58	12.000	14.18	18.000	1.97		

Unit Hyd Qpeak (cms)= 2.467

PEAK FLOW (cms)= 1.268 (i)
TIME TO PEAK (hrs)= 13.083
RUNOFF VOLUME (mm)= 24.306
TOTAL RAINFALL (mm)= 98.205
RUNOFF COEFFICIENT = 0.248

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

CALIB
NASHYD (0101)
ID= 1 DT= 5.0 min

Area (ha)= 5.13 Curve Number (CN)= 54.1
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.54

Unit Hyd Qpeak (cms)= 0.363

PEAK FLOW (cms)= 0.176 (i)
TIME TO PEAK (hrs)= 12.167
RUNOFF VOLUME (mm)= 28.293
TOTAL RAINFALL (mm)= 98.205
RUNOFF COEFFICIENT = 0.288

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	5.130	0.176	12.17	28.29
OUTFLOW: ID= 1 (0601)	5.130	0.086	13.00	28.26

PEAK FLOW REDUCTION [Qout/Qin](%)= 48.71
TIME SHIFT OF PEAK FLOW (min)= 50.00
MAXIMUM STORAGE USED (ha.m.)= 0.0473

CALIB
NASHYD (0102)
ID= 1 DT= 5.0 min

Area (ha)= 2.96 Curve Number (CN)= 56.7
Ia (mm)= 4.60 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.30

Unit Hyd Qpeak (cms)= 0.177

PEAK FLOW (cms)= 0.169 (i)
TIME TO PEAK (hrs)= 11.917
RUNOFF VOLUME (mm)= 30.456

ID= 1 DT= 5.0 min

Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

Unit Hyd Qpeak (cms)= 2.678

PEAK FLOW (cms)= 1.615 (i)
TIME TO PEAK (hrs)= 13.917
RUNOFF VOLUME (mm)= 25.520
TOTAL RAINFALL (mm)= 98.205
RUNOFF COEFFICIENT = 0.260

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

DUHYD (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	1.62	13.92	25.52
MAJOR SYS.(ID= 2):	36.47	0.90	13.92	25.52
MINOR SYS.(ID= 3):	99.53	0.71	12.33	25.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0801)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0400):	99.53	0.713	12.33	25.52
+ ID2= 2 (0800):	105.00	1.786	12.83	25.50
ID = 3 (0801):	204.53	2.499	12.83	25.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

TOTAL RAINFALL (mm)= 98.205
RUNOFF COEFFICIENT = 0.310

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.1019
0.0320	0.0331	0.7410	0.1376
0.0910	0.0671	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0102)	2.960	0.169	11.92	30.46
OUTFLOW: ID= 1 (0602)	2.960	0.041	12.75	30.37

PEAK FLOW REDUCTION [Qout/Qin](%)= 23.98
TIME SHIFT OF PEAK FLOW (min)= 50.00
MAXIMUM STORAGE USED (ha.m.)= 0.0381

ADD HYD (0802)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.13	0.086	13.00	28.26
+ ID2= 2 (0602):	2.96	0.041	12.75	30.37
ID = 3 (0802):	8.09	0.126	13.00	29.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	80.08	1.268	13.08	24.31
+ ID2= 2 (0802):	8.09	0.126	13.00	29.03
ID = 3 (0803):	88.17	1.394	13.00	24.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0002)
ID= 1 DT= 5.0 min

Area (ha)= 16.83 Curve Number (CN)= 55.7
Ia (mm)= 4.90 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.70

Unit Hyd Qpeak (cms)= 0.918

PEAK FLOW (cms)= 0.501 (i)
TIME TO PEAK (hrs)= 12.417
RUNOFF VOLUME (mm)= 29.479
TOTAL RAINFALL (mm)= 98.205
RUNOFF COEFFICIENT = 0.300

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

ADD HYD (0800)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	16.83	0.501	12.42	29.48
+ ID2= 2 (0803):	88.17	1.394	13.00	24.74
ID = 3 (0800):	105.00	1.786	12.83	25.50

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0003)

Area (ha)= 136.00 Curve Number (CN)= 52.1

APPENDIX B:
POST-DEVELOPMENT HYDROLOGY

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

Project:	Cedar Run Wakeboard Cable Park
File No.:	115232
Date:	Mar-17
Designed By:	DAM
Checked By:	DJH
Subject:	CN, IA and TP Calculations

CEDAR RUN WAKEBOARD CABLE PARK - CURVE NUMBER, INITIAL ABSTRACTION & TIME TO PEAK CALCULATIONS

CONDITIONS

Catchment Post 1 **Area** 77.7462 ha

WEIGHTED CN VALUE

Soil Series	Soil Series	Hydrologic Soil Group	Soil Texture	Runoff Coefficient	Catchment Soil Characteristics		Forest/Woodland			Pasture/Lawns			Meadows			Cultivated			Impervious			Wetland/Lakes/SWMF			Average CN for Soil Type
				Type	Area	Percent	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	
Brs	BRIGHTON	A	Sand	1	42.76041	0.55	15.821	0.37	32	25.656	0.6	49	0	0	36	0	0	62	1.2828	0.03	100	0	0	50	44.24
Ts	TECUMSETH	AB	Silt	1	30.32102	0.39	12.128	0.4	46	17.283	0.57	59	0	0	51	0	0	68	0.9096	0.03	100	0	0	50	55.03
Gsl	GRANBY	B	Sand Loam	2	4.664772	0.06	3.0787	0.66	60	1.4461	0.31	69	0	0	65	0	0	74	0.1399	0.03	100	0	0	50	63.99
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
				Totals	77.7462	1	31.0265	0.3991		44.3853	0.5709		0	0		0	0		2.33239	0.03		0	0		49.8

Time of Concentration Calculations

For Runoff Coefficients greater than 0.4

Bransby-Williams Formula

Maximum Catchment Elevation	217.50	m
Minimum Catchment Elevation	186.00	m
Catchment length	1800	m
Catchment Slope	2%	
Catchment Area	77.7462	ha
Time of Concentration (Minutes)	**59.36**	
Time of Concentration (Hours)	**0.99**	
Time to Peak (2/3 x Time of Concentration)	**0.66**	

Time to Peak	**1.24 hrs**

For Runoff Coefficients less than 0.4

Airport Method

Maximum Catchment Elevation	217.5	m
Minimum Catchment Elevation	186	m
Catchment length	1800	m
Catchment Slope	2%	
Catchment Area	77.7462	ha
Time of Concentration (Minutes)	**111.73**	
Time of Concentration (Hours)	**1.86**	
Time to Peak (2/3 x Time of Concentration)	**1.24**	

Initial Abstraction	**5.9055 mm**

Woods	10
Meadows	8
Cultivated	7
Lawns	5
Impervious	2

Runoff Coefficient	**0.13**

Landuse Type	Soil Series				
	Brs	Ts	Gsl	0	0
	1	1	2	#N/A	#N/A
Forest/Woodland	0.08	0.08	0.25	#N/A	#N/A
Cultivated	0.22	0.22	0.35	#N/A	#N/A
Pasture/Lawn	0.1	0.1	0.28	#N/A	#N/A
Impervious	0.95	0.95	0.95	#N/A	#N/A
Wetland/Lake/SWMF	0.05	0.05	0.05	#N/A	#N/A
Meadows	0.09	0.09	0.27	#N/A	#N/A
Soil Series Total	0.1181	0.1181	0.289	#N/A	#N/A

C.C.Tatham & Associates Ltd.
Consulting Engineers
Bolingwood Brandon Guelph Barrie

Project:	Cedar Run Wakeboard Cable Park
File No.:	115232
Date:	Mar-17
Designed By:	DAM
Checked By:	DJH
Subject:	CN, IA and TP Calculations

CEDAR RUN WAKEBOARD CABLE PARK - CURVE NUMBER, INITIAL ABSTRACTION & TIME TO PEAK CALCULATIONS

CONDITIONS

Catchment Post 2 **Area** 10.9257 ha

WEIGHTED CN VALUE

Soil Series	Soil Series	Hydrologic Soil Group	Soil Texture	Runoff Coefficient Type	Catchment Soil Characteristics		Forest/Woodland			Pasture/Lawns			Meadows			Cultivated			Impervious			Wetland/Lakes/SWMF			Average CN for Soil Type
					Area	Percent	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	
Brs	BRIGHTON	A	Sand	1	3.8240	0.35	0	0	32	3.3616	0.8791	49	0	0	38	0	0	62	0.4624	0.1209	100	0	0	50	55.16692
Gsl	GRANBY	B	Sand Loam	2	7.1017	0.65	0	0	60	5.5585	0.7827	69	0	0	65	0	0	74	1.5432	0.2173	100	0	0	50	75.7363
	#N/A	#N/A	#N/A	#N/A	0	0	0	0	#N/A	0	0	#N/A	0	0	#N/A	0	0	#N/A	0	0	#N/A	0	0	#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
				Totals	10.9257	1	0	0		8.9201	0.816433		0	0		0	0		2.0056	0.183567		0	0		66.3

Time of Concentration Calculations

For Runoff Coefficients greater than 0.4

Bransby-Williams Formula

Maximum Catchment Elevation	205.00	m
Minimum Catchment Elevation	185.00	m
Catchment length	850	m
Catchment Slope	2%	
Catchment Area	10.9257	ha
Time of Concentration (Minutes)	32.15	
Time of Concentration (Hours)	0.54	
Time to Peak (2/3 x Time of Concentration)	0.36	

For Runoff Coefficients less than 0.4

Airport Method

Maximum Catchment Elevation	205	m
Minimum Catchment Elevation	185	m
Catchment length	850	m
Catchment Slope	2%	
Catchment Area	10.9257	ha
Time of Concentration (Minutes)	53.92	
Time of Concentration (Hours)	0.90	
Time to Peak (2/3 x Time of Concentration)	0.60	

Time to Peak	0.60 hrs

Initial Abstraction	4.4493 mm

Woods	10
Meadows	8
Cultivated	7
Lawns	5
Impervious	2

Runoff Coefficient	0.36

Landuse Type	Soil Series				
	Brs	Gsl	0	0	0
	1	2	#N/A	#N/A	#N/A
Forest/Woodland	0.08	0.25	#N/A	#N/A	#N/A
Cultivated	0.22	0.35	#N/A	#N/A	#N/A
Pasture/Lawn	0.1	0.28	#N/A	#N/A	#N/A
Impervious	0.95	0.95	#N/A	#N/A	#N/A
Wetland/Lake/SWMF	0.05	0.05	#N/A	#N/A	#N/A
Meadows	0.09	0.27	#N/A	#N/A	#N/A
Soil Series Total	0.2028	0.4256	#N/A	#N/A	#N/A

C.C. Tatham & Associates Ltd. Consulting Engineers		
Collingwood Bracebridge Orillia Barrie	Project:	Cedar Run Wakeboard Cable Park
	File No.:	115232
	Date:	Mar-17
	Designed By:	DAM
	Checked By:	DJH
	Subject:	CN, IA and TP Calculations

CEDAR RUN WAKEBOARD CABLE PARK - CURVE NUMBER, INITIAL ABSTRACTION & TIME TO PEAK CALCULATIONS

CONDITIONS

Catchment 201 **Area** 5.0467 ha

WEIGHTED CN VALUE																									
Soil Series	Soil Series	Hydrologic Soil Group	Soil Texture	Runoff Coefficient Type	Catchment Soil Characteristics		Forest/Woodland			Pasture/Lawns			Meadows			Gravel			Impervious			Wetland/Lakes/SWMF			Average CN for Soil Type
					Area	Percent	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	
Brs	BRIGHTON	A	Sand	1	5.0467	1	0	0	32	4.6097	0.9134	49	0	0	38	0		89	0.2321	0.046	100	0.2049	0.0406	50	51.3866
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
				Totals	5.0467	1	0	0		4.60966	0.9134		0	0		0	0		0.23215	0.046		0.2049	0.0406		51.4

Time of Concentration Calculations

For Runoff Coefficients greater than 0.4

Bransby-Williams Formula

Maximum Catchment Elevation	200.00	m
Minimum Catchment Elevation	197.00	m
Catchment length	280	m
Catchment Slope	1%	
Catchment Area	5.0467	ha

Time of Concentration (Minutes)	13.39
Time of Concentration (Hours)	0.22
Time to Peak (2/3 x Time of Concentration)	0.15

Time to Peak	0.57 hrs

For Runoff Coefficients less than 0.4

Airport Method

Maximum Catchment Elevation	200	m
Minimum Catchment Elevation	197	m
Catchment length	280	m
Catchment Slope	1%	
Catchment Area	5.0467	ha

Time of Concentration (Minutes)	51.35
Time of Concentration (Hours)	0.86
Time to Peak (2/3 x Time of Concentration)	0.57

Initial Abstraction	4.658 mm

Woods	10
Meadows	8
Gravel	3
Lawns	5
Wetland	12
Impervious	2

Runoff Coefficient	0.14

Landuse Type	Soil Series				
	Brs	0	0	0	0
	1	#N/A	#N/A	#N/A	#N/A
Forest/Woodland	0.08	#N/A	#N/A	#N/A	#N/A
Gravel	0.6	#N/A	#N/A	#N/A	#N/A
Pasture/Lawn	0.1	#N/A	#N/A	#N/A	#N/A
Impervious	0.95	#N/A	#N/A	#N/A	#N/A
Wetland/Lake/SWMF	0.05	#N/A	#N/A	#N/A	#N/A
Meadows	0.09	#N/A	#N/A	#N/A	#N/A
Soil Series Total	0.1371	#N/A	#N/A	#N/A	#N/A

C.C.Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Barrie

Project:	Cedar Run Wakeboard Cable Park
File No.:	115232
Date:	Mar-17
Designed By:	DAM
Checked By:	DJH
Subject:	CN, IA and TP Calculations

CEDAR RUN WAKEBOARD CABLE PARK - CURVE NUMBER, INITIAL ABSTRACTION & TIME TO PEAK CALCULATIONS

CONDITIONS

Catchment 202 Area 6.3465 ha

WEIGHTED CN VALUE

Soil Series	Soil Series	Hydrologic Soil Group	Soil Texture	Runoff Coefficient	Catchment Soil Characteristics		Forest/Woodland			Pasture/Lawns			Meadows			Cultivated			Impervious			Wetland/Lakes/SWMF			Average CN for Soil Type
				Type	Area	Percent	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	Area	Percent	CN	
Brs	BRIGHTON	A	Sand	1	6.3465	1	0	0	32	5.0168	0.79048	49	0	0	38	0	0	62	1.1041	0.174	100	0.2256	0.0355	50	57.90802
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0	0.89	#N/A	0	0	#N/A	0	0	#N/A	0	0	#N/A	0	0	#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0	0	#N/A	0	0	#N/A	0	0	#N/A	0	0	#N/A	0	0	#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
	#N/A	#N/A	#N/A	#N/A	0		0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0		#N/A	0
				Totals	6.3465	1	0	0		5.0168	0.790483		0	0		0	0		1.104101	0.17397		0.2256	0.035547		57.8

Time of Concentration Calculations

For Runoff Coefficients greater than 0.4

Bransby-Williams Formula

Maximum Catchment Elevation	204.00	m
Minimum Catchment Elevation	196.50	m
Catchment length	445	m
Catchment Slope	2%	
Catchment Area	6.3465	ha
Time of Concentration (Minutes)	19.00	
Time of Concentration (Hours)	0.32	
Time to Peak (2/3 x Time of Concentration)	0.21	

Time to Peak	0.55 hrs

For Runoff Coefficients less than 0.4

Airport Method

Maximum Catchment Elevation	204	m
Minimum Catchment Elevation	196.5	m
Catchment length	445	m
Catchment Slope	2%	
Catchment Area	6.3465	ha
Time of Concentration (Minutes)	49.43	
Time of Concentration (Hours)	0.82	
Time to Peak (2/3 x Time of Concentration)	0.55	

Initial Abstraction	4.72592 mm

Woods	10
Meadows	8
Cultivated	7
Lawns	5
Wetland	12
Impervious	2

Runoff Coefficient	0.25

Landuse Type	Soil Series				
	Brs	0	0	0	0
	1	#N/A	#N/A	#N/A	#N/A
Forest/Woodland	0.08	#N/A	#N/A	#N/A	#N/A
Cultivated	0.22	#N/A	#N/A	#N/A	#N/A
Pasture/Lawn	0.1	#N/A	#N/A	#N/A	#N/A
Impervious	0.95	#N/A	#N/A	#N/A	#N/A
Wetland/Lake/SWMF	0.05	#N/A	#N/A	#N/A	#N/A
Meadows	0.09	#N/A	#N/A	#N/A	#N/A
Soil Series Total	0.2461	#N/A	#N/A	#N/A	#N/A

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

Project :	Cedar Run Wakeboard Cable Park
File No.	115232
Date:	Mar-17
Designed By:	DAM
Checked By:	DJH
Subject:	Pond No. 3 Storage-Volume Table

RETROFITTED POND No. 3 - STAGE-VOLUME TABLE

Wet Cell

Side Slope	3:1
Bottom Elevation	192.75 m
Water Level	194.90 m
Stage	0.1 m

STAGE-VOLUME TABLE

Elevation	Pond Depth	Pond Area	Average Pond Area	Volume					
				Dead Storage	Accum. Dead Storage	Active Storage	Accum. Active Storage	Accum. Total Storage	Accum. Total Storage
(m)	(m)	(sq.m)	(sq.m)	(cu.m)	(cu.m)	(cu.m)	(cu.m)	(cu.m)	(ha-m)
192.75	0.00	165.00							
192.85	0.10	218.72	191.86	19	19			19	0.0019
192.95	0.20	272.44	245.58	25	44			44	0.0044
193.05	0.30	326.16	299.30	30	74			74	0.0074
193.15	0.40	379.88	353.02	35	109			109	0.0109
193.25	0.50	433.60	406.74	41	150			150	0.0150
193.35	0.60	487.33	460.47	46	196			196	0.0196
193.45	0.70	541.05	514.19	51	247			247	0.0247
193.55	0.80	594.77	567.91	57	304			304	0.0304
193.65	0.90	648.49	621.63	62	366			366	0.0366
193.75	1.00	702.21	675.35	68	434			434	0.0434
193.85	1.10	755.93	729.07	73	507			507	0.0507
193.95	1.20	809.65	782.79	78	585			585	0.0585
194.05	1.30	863.37	836.51	84	668			668	0.0668
194.15	1.40	917.09	890.23	89	757			757	0.0757
194.25	1.50	970.81	943.95	94	852			852	0.0852
194.35	1.60	1024.53	997.67	100	952			952	0.0952
194.45	1.70	1078.26	1051.40	105	1057			1057	0.1057
194.55	1.80	1131.98	1105.12	111	1167			1167	0.1167
194.65	1.90	1185.70	1158.84	116	1283			1283	0.1283
194.75	2.00	1239.42	1212.56	121	1404			1404	0.1404
194.85	2.10	1293.14	1266.28	127	1404			1404	0.1404
194.90	2.15	1320.00	1279.71	64	1404			1404	0.1404
194.95	2.20	1353.27	1323.20		1404	66	66	1471	0.1471
195.05	2.30	1419.81	1386.54		1404	139	205	1609	0.1609
195.15	2.40	1486.35	1453.08		1404	145	350	1755	0.1755
195.25	2.50	1552.88	1519.62		1404	152	502	1907	0.1907
195.35	2.60	1619.42	1586.15		1404	159	661	2065	0.2065
195.45	2.70	1685.96	1652.69		1404	165	826	2230	0.2230
195.55	2.80	1752.50	1719.23		1404	172	998	2402	0.2402
195.65	2.90	1819.04	1785.77		1404	179	1176	2581	0.2581
195.75	3.00	1885.58	1852.31		1404	185	1362	2766	0.2766
195.85	3.10	1952.12	1918.85		1404	192	1554	2958	0.2958
195.95	3.20	2018.65	1985.38		1404	199	1752	3157	0.3157
196.05	3.30	2085.19	2051.92		1404	205	1957	3362	0.3362
196.15	3.40	2151.73	2118.46		1404	212	2169	3574	0.3574
196.20	3.45	2185.00	2168.37		1404	108	2278	3682	0.3682

C.C.Tatham & Associates Ltd.
Consulting Engineers

Project:	Cedar Run Wakeboard Cable Park
File No.:	115232
Date:	Mar-17
Designed By:	DAM
Checked By:	DJH
Subject:	Pond No. 3 Stage-Discharge Table

RETROFITTED POND No. 3 - STAGE-DISCHARGE TABLE

Primary Low Flow Outlet

Type	Orifice	Pipe
Diameter (mm)	100	375
Area (sq.m)	0.007854	0.1104466
Coefficient	194.9	0.63
Invert (m)	194.9	194.9

Secondary Outlet/Overflow Spillway

Type	DICB	Overflow
Weir Length (m)	0.6	2
Sill Elevation (m)	195.5	195.9
Coefficient	-	1.41
Side Slope (H:V)	3	3

STAGE-DISCHARGE TABLE

Pond Water Level	Primary Low Flow Discharge				Secondary Outlet/Overflow Spillway Discharge				Total Pond Discharge	Outlet Control
	Orifice		Pipe		DICB		Overflow			
	Head	Discharge	Head	Discharge	Head	Discharge	Head	Discharge		
(m)	(m)	(cms)	(m)	(cms)	(m)	(cms)	(m)	(cms)	(cms)	
194.90	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.0000	0.0000	Orifice/DICB
194.95	0.05	0.00	0.05	0.00	0.00	0.0000	0.00	0.0000	0.0014	Orifice/DICB
195.05	0.10	2.14	0.15	0.03	0.00	0.0000	0.00	0.0000	0.0264	Orifice/DICB
195.15	0.20	3.03	0.06	0.08	0.00	0.0000	0.00	0.0000	0.0771	Orifice/DICB
195.25	0.30	3.71	0.16	0.12	0.00	0.0000	0.00	0.0000	0.1242	Orifice/DICB
195.35	0.40	4.29	0.26	0.16	0.00	0.0000	0.00	0.0000	0.1579	Orifice/DICB
195.45	0.50	4.79	0.36	0.19	0.00	0.0000	0.00	0.0000	0.1856	Orifice/DICB
195.55	0.60	5.25	0.46	0.21	0.05	0.0093	0.00	0.0000	0.2096	Orifice/DICB
195.65	0.70	5.67	0.56	0.23	0.15	0.0469	0.00	0.0000	0.2312	Orifice/DICB
195.75	0.80	6.06	0.66	0.25	0.25	0.1135	0.00	0.0000	0.2509	Orifice/DICB
195.85	0.90	6.43	0.76	0.27	0.35	0.2089	0.00	0.0000	0.2691	Orifice/DICB
195.95	1.00	6.78	0.86	0.29	0.45	0.3333	0.05	0.0334	0.3196	Orifice/DICB
196.05	1.10	7.11	0.96	0.30	0.55	0.4866	0.15	0.2098	0.5122	Orifice/DICB
196.15	1.20	7.43	1.06	0.32	0.65	0.6689	0.25	0.5071	0.8248	Orifice/DICB
196.20	1.25	7.58	1.11	0.33	0.70	0.7708	0.30	0.7014	1.0265	Orifice/DICB

C.C. Tatham & Associates Ltd.
Consulting Engineers

Project:	Cedar Run Wakeboard Cable Park
File No:	115232
Date:	Mar-17
Designed By:	DAM
Checked By:	DJH
Subject:	Pond No. 3 Stage-Storage-Discharge Table

RETROFITTED POND No. 3 - STAGE-STORAGE-DISCHARGE TABLE

Wet Cell

Side Slope	3:1
Bottom Elevation	192.75 m
Static Water	194.90 m
Stage	0.10 m

Primary Low Flow Outlet

Type	Orifice	Pipe
Diameter (mm)	100.00	375.00
Invert(m)	194.90	194.90

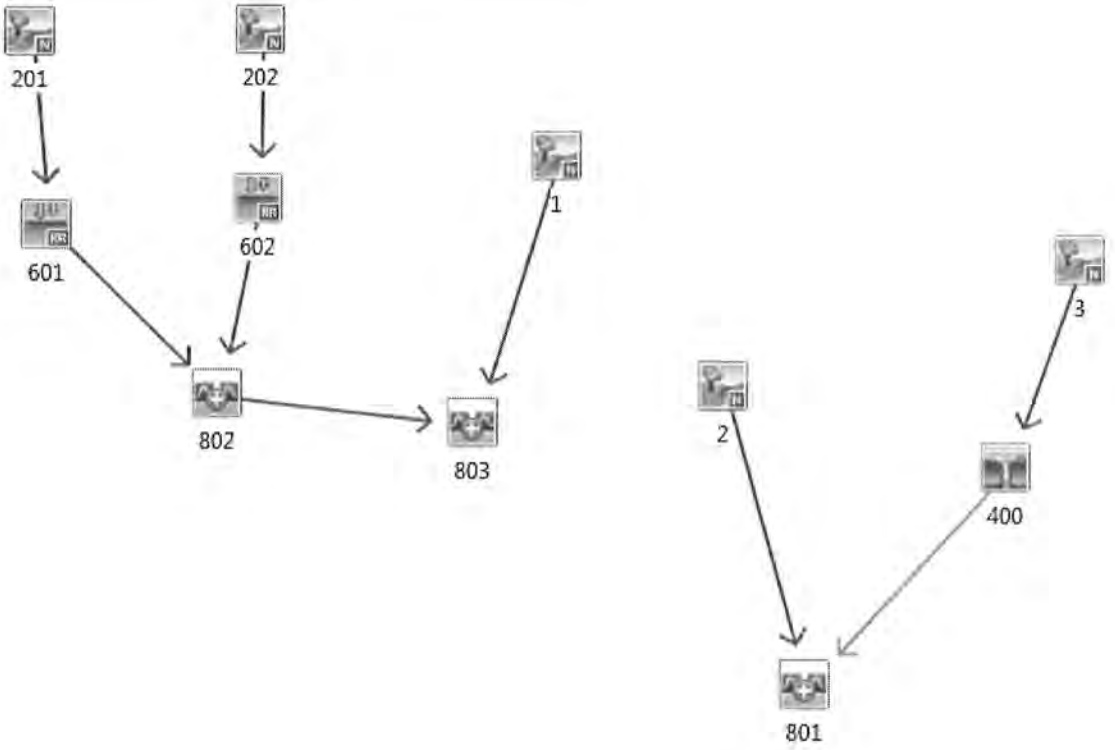
Secondary Outlet/Overflow Spillway

Type	DICB	Overflow
Length(m)	0.60	2.00
Sill Elevation(m)	195.5	195.9

STAGE-STORAGE-DISCHARGE TABLE

Pond Water Level	Primary Low Flow Discharge		DICB	Overflow	Total Pond	Outlet Control	Pond Storage Volume		
	Orifice Discharge	Pipe Discharge	Discharge	Discharge	Discharge		Dead Storage	Active Storage	Total Storage
(m)	(cms)	(cms)	(cms)	(cms)	(cms)		(cu.m)	(cu.m)	(cu.m)
194.90	0.0000	0.0000	0.0000	0.0000	0.0000	Orifice/DICB	1404	0	1404
194.95	0.0014	0.0032	0.0000	0.0000	0.0014	Orifice/DICB	1404	66	1471
195.05	2.1441	0.0264	0.0000	0.0000	0.0264	Orifice/DICB	1404	205	1609
195.15	3.0323	0.0771	0.0000	0.0000	0.0771	Orifice/DICB	1404	350	1755
195.25	3.7137	0.1242	0.0000	0.0000	0.1242	Orifice/DICB	1404	502	1907
195.35	4.2883	0.1579	0.0000	0.0000	0.1579	Orifice/DICB	1404	661	2065
195.45	4.7944	0.1856	0.0000	0.0000	0.1856	Orifice/DICB	1404	826	2230
195.55	5.2520	0.2096	0.0093	0.0000	0.2096	Orifice/DICB	1404	998	2402
195.65	5.6728	0.2312	0.0469	0.0000	0.2312	Orifice/DICB	1404	1176	2581
195.75	6.0645	0.2509	0.1135	0.0000	0.2509	Orifice/DICB	1404	1362	2766
195.85	6.4324	0.2691	0.2089	0.0000	0.2691	Orifice/DICB	1404	1554	2958
195.95	6.7803	0.2862	0.3333	0.0334	0.3196	Orifice/DICB	1404	1752	3157
196.05	7.1113	0.3024	0.4866	0.2098	0.5122	Orifice/DICB	1404	1957	3362
196.15	7.4275	0.3177	0.6689	0.5071	0.8248	Orifice/DICB	1404	2169	3574
196.20	7.5806	0.3251	0.7708	0.7014	1.0265	Orifice/DICB	1404	2278	3682

Proposed Conditions OTTHYMO Model Schematic



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

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

  Input   filename: C:\Program Files (x86)\VH Suite 3.0\V02\voin.dat
  Output  filename: C:\Users\dmarshall\AppData\Local\Temp\c476ec2e-19e9-4d3c-92ac-37f85de3ce5a\Scenario.out
  Summary filename: C:\Users\dmarshall\AppData\Local\Temp\c476ec2e-19e9-4d3c-92ac-37f85de3ce5a\Scenario.sum

DATE: 03/10/2017                          TIME: 09:49:20

USER:

COMMENTS: _____

**********
** SIMULATION NUMBER:   1 **  25 mm Storm
**********

READ STORM                Filename: C:\Users\dmarshall\AppD
                                    ata\Local\Temp\
                                    c476ec2e-19e9-4d3c-92ac-37f85de3ce5a\0397bbd0
Ptotal= 24.97 mm          Comments: OWEN SOUND 25 mm (from a 2 year-4hr stor
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.10	1.29	1.10	2.81	2.10	13.05	3.10	2.04
0.20	1.36	1.20	3.22	2.20	8.44	3.20	1.89
0.30	1.44	1.30	3.77	2.30	6.21	3.30	1.76
0.40	1.53	1.40	4.55	2.40	4.91	3.40	1.65
0.50	1.63	1.50	5.77	2.50	4.06	3.50	1.55
0.60	1.75	1.60	7.86	2.60	3.47	3.60	1.46
0.70	1.89	1.70	12.27	2.70	3.03	3.70	1.39
0.80	2.06	1.80	26.12	2.80	2.70	3.80	1.32
0.90	2.26	1.90	72.58	2.90	2.43	3.90	1.26
1.00	2.50	2.00	26.96	3.00	2.22	4.00	1.20

```
CALIB
NASHYD    (0002)   Area    (ha)=  10.93   Curve Number    (CN)= 68.5
ID= 1 DT= 5.0 min  Ia      (mm)=   4.40   # of Linear Res.(N)= 3.00
                   U.H. Tp(hrs)=   0.60

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.29	1.083	2.81	2.083	13.05	3.08	2.04
0.167	1.35	1.167	3.14	2.167	9.36	3.17	1.92
0.250	1.41	1.250	3.55	2.250	7.10	3.25	1.81
0.333	1.48	1.333	4.08	2.333	5.69	3.33	1.72
0.417	1.55	1.417	4.79	2.417	4.74	3.42	1.63
0.500	1.63	1.500	5.77	2.500	4.06	3.50	1.55
0.583	1.75	1.583	7.86	2.583	3.47	3.58	1.46
0.667	1.86	1.667	11.39	2.667	3.12	3.67	1.40
0.750	1.99	1.750	20.61	2.750	2.83	3.75	1.35
0.833	2.14	1.833	44.73	2.833	2.59	3.83	1.30
0.917	2.31	1.917	63.46	2.917	2.39	3.92	1.25

```
                   RUNOFF VOLUME    (mm)=   1.577
                   TOTAL RAINFALL   (mm)=  24.971
                   RUNOFF COEFFICIENT    =   0.063

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

```
                        AREA    QPEAK    TPEAK      R.V.
                        (ha)    (cms)    (hrs)      (mm)
INFLOW : ID= 2 (0201)   5.047    0.014     2.58      1.58
OUTFLOW: ID= 1 (0601)   5.047    0.006     3.75      1.54

          PEAK   FLOW   REDUCTION [Qout/Qin](%)= 40.00
          TIME SHIFT OF PEAK FLOW       (min)= 70.00
          MAXIMUM  STORAGE   USED      (ha.m.)=  0.0042

CALIB
NASHYD    (0202)   Area    (ha)=   6.35   Curve Number    (CN)= 57.9
ID= 1 DT= 5.0 min  Ia      (mm)=   4.70   # of Linear Res.(N)= 3.00
                   U.H. Tp(hrs)=   0.55

     Unit Hyd Qpeak  (cms)=   0.441

     PEAK FLOW       (cms)=   0.023 (i)
     TIME TO PEAK    (hrs)=   2.583
     RUNOFF VOLUME    (mm)=   2.005
     TOTAL RAINFALL   (mm)=  24.971
     RUNOFF COEFFICIENT    =   0.080

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0653	0.1176
0.0014	0.0066	0.1331	0.1362
0.0069	0.0205	0.2297	0.1554
0.0098	0.0350	0.3196	0.1752
0.0120	0.0502	0.5122	0.1957
0.0139	0.0661	0.8248	0.2169
0.0155	0.0826	1.0265	0.2278
0.0263	0.0998	0.0000	0.0000

```
                        AREA    QPEAK    TPEAK      R.V.
                        (ha)    (cms)    (hrs)      (mm)
INFLOW : ID= 2 (0202)   6.346    0.023     2.58      2.00
OUTFLOW: ID= 1 (0602)   6.346    0.003     4.67      1.82

          PEAK   FLOW   REDUCTION [Qout/Qin](%)= 12.95
          TIME SHIFT OF PEAK FLOW       (min)=125.00
          MAXIMUM  STORAGE   USED      (ha.m.)=  0.0105

ADD HYD   (0802)
  1 + 2 = 3
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.05	0.006	3.75	1.54
+ ID2= 2 (0602):	6.35	0.003	4.67	1.82
ID = 3 (0802):	11.39	0.008	4.08	1.69

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

ADD HYD   (0803)
  1 + 2 = 3
```

	AREA	QPEAK	TPEAK	R.V.
1.000	2.50	2.000	26.96	3.000	2.22	4.00	1.20

```
                   Unit Hyd Qpeak  (cms)=   0.696

                   PEAK FLOW       (cms)=   0.057 (i)
                   TIME TO PEAK    (hrs)=   2.667
                   RUNOFF VOLUME    (mm)=   3.080
                   TOTAL RAINFALL   (mm)=  24.971
                   RUNOFF COEFFICIENT    =   0.123

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

CALIB
NASHYD    (0003)   Area    (ha)= 136.00   Curve Number    (CN)= 52.1
ID= 1 DT= 5.0 min  Ia      (mm)=   7.20   # of Linear Res.(N)= 3.00
                   U.H. Tp(hrs)=   1.94

     Unit Hyd Qpeak  (cms)=   2.678

     PEAK FLOW       (cms)=   0.120 (i)
     TIME TO PEAK    (hrs)=   4.417
     RUNOFF VOLUME    (mm)=   1.257
     TOTAL RAINFALL   (mm)=  24.971
     RUNOFF COEFFICIENT    =   0.050

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

DUHYD     (0400)
Inlet Cap.=0.713
#of Inlets=   1
Total(cms)=  0.7
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	0.12	4.42	1.26
MAJOR SYS.(ID= 2):	0.00	0.00	0.00	0.00
MINOR SYS.(ID= 3):	136.00	0.12	4.42	1.26

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

ADD HYD   (0801)
  1 + 2 = 3
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	10.93	0.057	2.67	3.08
+ ID2= 2 (0400):	136.00	0.120	4.42	1.26
ID = 3 (0801):	146.93	0.135	4.08	1.39

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

CALIB
NASHYD    (0001)   Area    (ha)=  77.75   Curve Number    (CN)= 49.6
ID= 1 DT= 5.0 min  Ia      (mm)=   6.91   # of Linear Res.(N)= 3.00
                   U.H. Tp(hrs)=   1.24

     Unit Hyd Qpeak  (cms)=   2.395

     PEAK FLOW       (cms)=   0.089 (i)
     TIME TO PEAK    (hrs)=   3.583
     RUNOFF VOLUME    (mm)=   1.181
     TOTAL RAINFALL   (mm)=  24.971
     RUNOFF COEFFICIENT    =   0.047

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

CALIB
NASHYD    (0201)   Area    (ha)=   5.05   Curve Number    (CN)= 51.4
ID= 1 DT= 5.0 min  Ia      (mm)=   4.70   # of Linear Res.(N)= 3.00
                   U.H. Tp(hrs)=   0.57

     Unit Hyd Qpeak  (cms)=   0.338

     PEAK FLOW       (cms)=   0.014 (i)
     TIME TO PEAK    (hrs)=   2.583
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	77.75	0.089	3.58	1.18
+ ID2= 2 (0802):	11.39	0.008	4.08	1.69
ID = 3 (0803):	89.14	0.097	3.58	1.25

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

**********
** SIMULATION NUMBER:   2 **  2-Year Chicago Storm
**********

READ STORM                Filename: C:\Users\dmarshall\AppD
                                    ata\Local\Temp\
                                    c476ec2e-19e9-4d3c-92ac-37f85de3ce5a\64c43018
Ptotal= 33.75 mm          Comments: OWEN SOUND 2 YEAR 4 HOUR DURATION CHICAG
```

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.10	1.75	1.10	3.80	2.10	17.64	3.10	2.75
0.20	1.84	1.20	4.35	2.20	11.41	3.20	2.55
0.30	1.95	1.30	5.09	2.30	8.39	3.30	2.38
0.40	2.07	1.40	6.16	2.40	6.63	3.40	2.23
0.50	2.21	1.50	7.80	2.50	5.49	3.50	2.09
0.60	2.37	1.60	10.63	2.60	4.69	3.60	1.98
0.70	2.56	1.70	16.59	2.70	4.10	3.70	1.88
0.80	2.78	1.80	35.38	2.80	3.65	3.80	1.78
0.90	3.05	1.90	98.09	2.90	3.29	3.90	1.70
1.00	3.38	2.00	36.45	3.00	2.99	4.00	1.63

```
CALIB
NASHYD    (0002)   Area    (ha)=  10.93   Curve Number    (CN)= 68.5
ID= 1 DT= 5.0 min  Ia      (mm)=   4.40   # of Linear Res.(N)= 3.00
                   U.H. Tp(hrs)=   0.60

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.75	1.083	3.80	2.083	17.64	3.08	2.75
0.167	1.82	1.167	4.24	2.167	12.66	3.17	2.59
0.250	1.91	1.250	4.79	2.250	9.60	3.25	2.45
0.333	2.00	1.333	5.52	2.333	7.69	3.33	2.32
0.417	2.10	1.417	6.49	2.417	6.40	3.42	2.20
0.500	2.21	1.500	7.80	2.500	5.49	3.50	2.09
0.583	2.37	1.583	10.63	2.583	4.69	3.58	1.98
0.667	2.52	1.667	15.40	2.667	4.22	3.67	1.90
0.750	2.69	1.750	27.86	2.750	3.83	3.75	1.82
0.833	2.89	1.833	60.46	2.833	3.51	3.83	1.75
0.917	3.12	1.917	85.76	2.917	3.23	3.92	1.69
1.000	3.38	2.000	36.45	3.000	2.99	4.00	1.63

```
                   Unit Hyd Qpeak  (cms)=   0.696

                   PEAK FLOW       (cms)=   0.112 (i)
                   TIME TO PEAK    (hrs)=   2.583
                   RUNOFF VOLUME    (mm)=   5.896
                   TOTAL RAINFALL   (mm)=  33.755
                   RUNOFF COEFFICIENT    =   0.175

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

CALIB
NASHYD    (0003)   Area    (ha)= 136.00   Curve Number    (CN)= 52.1
ID= 1 DT= 5.0 min  Ia      (mm)=   7.20   # of Linear Res.(N)= 3.00
                   U.H. Tp(hrs)=   1.94

     Unit Hyd Qpeak  (cms)=   2.678

     PEAK FLOW       (cms)=   0.259 (i)
     TIME TO PEAK    (hrs)=   4.333
     RUNOFF VOLUME    (mm)=   2.711
     TOTAL RAINFALL   (mm)=  33.755
     RUNOFF COEFFICIENT    =   0.080
```

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

DUHYD (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	0.76	4.33	2.71
MAJOR SYS.(ID= 2):	0.00	0.00	0.00	0.00
MINOR SYS.(ID= 3):	136.00	0.76	4.33	2.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0401)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	10.93	0.112	2.58	5.90
+ ID2= 2 (0400):	136.00	0.259	4.33	2.71
ID = 3 (0801):	146.93	0.288	4.08	2.95

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

Area (ha)= 77.75 Curve Number (CN)= 49.6
Ia (mm)= 6.91 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

Unit Hyd Qpeak (cms)= 2.395

PEAK FLOW (cms)= 0.194 (i)
TIME TO PEAK (hrs)= 3.500
RUNOFF VOLUME (mm)= 2.529
TOTAL RAINFALL (mm)= 33.755
RUNOFF COEFFICIENT = 0.075

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

CALIB
NASHYD (0201)
ID= 1 DT= 5.0 min

Area (ha)= 5.05 Curve Number (CN)= 51.4
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.57

Unit Hyd Qpeak (cms)= 0.338

PEAK FLOW (cms)= 0.028 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 3.135
TOTAL RAINFALL (mm)= 33.755
RUNOFF COEFFICIENT = 0.093

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0201)	5.047	0.028	2.58	3.14
OUTFLOW: ID= 1 (0601)	5.047	0.011	3.75	3.10

PEAK FLOW REDUCTION [Qout/Qin](%)= 39.46
TIME SHIFT OF PEAK FLOW (min)= 70.00
MAXIMUM STORAGE USED (ha.m.)= 0.0085

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.50	2.76	1.50	10.23	2.50	7.11	3.50	2.61
0.60	2.97	1.60	14.08	2.60	6.04	3.60	2.46
0.70	3.22	1.70	22.20	2.70	5.25	3.70	2.33
0.80	3.51	1.80	47.44	2.80	4.65	3.80	2.21
0.90	3.86	1.90	127.12	2.90	4.17	3.90	2.11
1.00	4.30	2.00	48.87	3.00	3.79	4.00	2.01

CALIB
NASHYD (0002)
ID= 1 DT= 5.0 min

Area (ha)= 10.93 Curve Number (CN)= 68.5
Ia (mm)= 4.40 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.60

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

TRANSFORMED HYETOGRAPH

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.16	1.083	4.86	2.083	23.63	3.08	3.47
0.167	2.26	1.167	5.44	2.167	16.84	3.17	3.26
0.250	2.37	1.250	6.18	2.250	12.67	3.25	3.07
0.333	2.48	1.333	7.15	2.333	10.08	3.33	2.90
0.417	2.62	1.417	8.45	2.417	8.34	3.42	2.75
0.500	2.76	1.500	10.23	2.500	7.11	3.50	2.61
0.583	2.97	1.583	14.08	2.583	6.04	3.58	2.46
0.667	3.17	1.667	20.58	2.667	5.41	3.67	2.36
0.750	3.39	1.750	37.34	2.750	4.89	3.75	2.26
0.833	3.65	1.833	79.31	2.833	4.46	3.83	2.17
0.917	3.95	1.917	111.47	2.917	4.09	3.92	2.09
1.000	4.30	2.000	48.87	3.000	3.79	4.00	2.01

Unit Hyd Qpeak (cms)= 0.696

PEAK FLOW (cms)= 0.195 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 10.056
TOTAL RAINFALL (mm)= 44.068
RUNOFF COEFFICIENT = 0.228

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

CALIB
NASHYD (0003)
ID= 1 DT= 5.0 min

Area (ha)= 136.00 Curve Number (CN)= 52.1
Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

Unit Hyd Qpeak (cms)= 2.678

PEAK FLOW (cms)= 0.482 (i)
TIME TO PEAK (hrs)= 4.250
RUNOFF VOLUME (mm)= 5.027
TOTAL RAINFALL (mm)= 44.068
RUNOFF COEFFICIENT = 0.114

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

DUHYD (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	0.48	4.25	5.03
MAJOR SYS.(ID= 2):	0.00	0.00	0.00	0.00
MINOR SYS.(ID= 3):	136.00	0.48	4.25	5.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0801)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	10.93	0.195	2.58	10.06
+ ID2= 2 (0400):	136.00	0.482	4.25	5.03

CALIB
NASHYD (0202)
ID= 1 DT= 5.0 min

Area (ha)= 6.35 Curve Number (CN)= 57.9
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.55

Unit Hyd Qpeak (cms)= 0.441

PEAK FLOW (cms)= 0.046 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 3.949
TOTAL RAINFALL (mm)= 33.755
RUNOFF COEFFICIENT = 0.117

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0653	0.1176
0.0014	0.0066	0.1331	0.1362
0.0069	0.0205	0.2297	0.1554
0.0098	0.0350	0.3196	0.1752
0.0120	0.0502	0.5122	0.1957
0.0139	0.0661	0.8248	0.2169
0.0155	0.0826	1.0265	0.2278
0.0263	0.0998	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0202)	6.346	0.046	2.58	3.95
OUTFLOW: ID= 1 (0602)	6.346	0.007	4.50	3.76

PEAK FLOW REDUCTION [Qout/Qin](%)= 14.71
TIME SHIFT OF PEAK FLOW (min)=115.00
MAXIMUM STORAGE USED (ha.m.)= 0.0201

ADD HYD (0802)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.05	0.011	3.75	3.10
+ ID2= 2 (0602):	6.35	0.007	4.50	3.76
ID = 3 (0802):	11.39	0.017	4.00	3.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	77.75	0.194	3.50	2.53
+ ID2= 2 (0802):	11.39	0.017	4.00	3.47
ID = 3 (0803):	89.14	0.211	3.50	2.65

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

5 Year Chicago 30min

READ STORM
Ptotal= 44.07 mm

Filename: C:\Users\dmarshall\AppData\Local\Temp\c476ee2e-19e9-4d3c-92ac-37f85de3ce5a\34ba9feb
Comments: OWEN SOUND 5 YEAR 4 HOUR DURATION CHICAG

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.10	2.16	1.10	4.86	2.10	23.63	3.10	3.47
0.20	2.29	1.20	5.59	2.20	15.14	3.20	3.21
0.30	2.42	1.30	6.58	2.30	11.03	3.30	2.98
0.40	2.58	1.40	8.01	2.40	8.65	3.40	2.78

ID = 3 (0801): 146.93 0.532 4.00 5.40

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

Area (ha)= 77.75 Curve Number (CN)= 49.6
Ia (mm)= 6.91 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

Unit Hyd Qpeak (cms)= 2.395

PEAK FLOW (cms)= 0.364 (i)
TIME TO PEAK (hrs)= 3.417
RUNOFF VOLUME (mm)= 4.676
TOTAL RAINFALL (mm)= 44.068
RUNOFF COEFFICIENT = 0.106

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

CALIB
NASHYD (0201)
ID= 1 DT= 5.0 min

Area (ha)= 5.05 Curve Number (CN)= 51.4
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.57

Unit Hyd Qpeak (cms)= 0.338

PEAK FLOW (cms)= 0.051 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 5.544
TOTAL RAINFALL (mm)= 44.068
RUNOFF COEFFICIENT = 0.126

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0201)	5.047	0.051	2.58	5.54
OUTFLOW: ID= 1 (0601)	5.047	0.020	3.67	5.51

PEAK FLOW REDUCTION [Qout/Qin](%)= 38.98
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= 0.0151

CALIB
NASHYD (0202)
ID= 1 DT= 5.0 min

Area (ha)= 6.35 Curve Number (CN)= 57.9
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.55

Unit Hyd Qpeak (cms)= 0.441

PEAK FLOW (cms)= 0.082 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 6.917
TOTAL RAINFALL (mm)= 44.068
RUNOFF COEFFICIENT = 0.157

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0653	0.1176
0.0014	0.0066	0.1331	0.1362
0.0069	0.0205	0.2297	0.1554
0.0098	0.0350	0.3196	0.1752

0.0120	0.0502	0.5122	0.1957				
0.0139	0.0661	0.8248	0.2169				
0.0155	0.0826	1.0265	0.2278				
0.0263	0.0998	0.0000	0.0000				

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0202)	6.346	0.082	2.50	6.92
OUTFLOW: ID= 1 (0602)	6.346	0.010	4.58	6.73

PEAK FLOW REDUCTION [Qout/Qin](%)= 12.08
TIME SHIFT OF PEAK FLOW (min)=125.00
MAXIMUM STORAGE USED (ha.m.)= 0.0358

ADD HYD (0802)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.05	0.020	3.67	5.51
+ ID2= 2 (0602):	6.35	0.010	4.58	6.73
ID = 3 (0802):	11.39	0.029	3.83	6.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	77.75	0.364	3.42	4.68
+ ID2= 2 (0802):	11.39	0.029	3.83	6.19
ID = 3 (0803):	89.14	0.392	3.42	4.87

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

10-Year Chicago Storm

READ STORM
Ptotal= 50.59 mm

Filename: c:\Users\dmarshall\AppData\Local\Temp\c476ec2e-19e9-4d3c-92ac-37f85de3ce5a\3a95d5c4
Comments: OWEN SOUND 10 YEAR 4 HOUR DURATION CHICA

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.10	2.37	1.10	5.44	2.10	27.54	3.10	3.85
0.20	2.50	1.20	6.28	2.20	17.50	3.20	3.54
0.30	2.66	1.30	7.44	2.30	12.66	3.30	3.29
0.40	2.84	1.40	9.10	2.40	9.86	3.40	3.06
0.50	3.04	1.50	11.71	2.50	8.06	3.50	2.87
0.60	3.28	1.60	16.26	2.60	6.81	3.60	2.70
0.70	3.56	1.70	25.85	2.70	5.89	3.70	2.55
0.80	3.89	1.80	55.53	2.80	5.20	3.80	2.42
0.90	4.29	1.90	146.69	2.90	4.65	3.90	2.30
1.00	4.80	2.00	57.21	3.00	4.21	4.00	2.20

CALIB
NASHYD (0002)
ID= 1 DT= 5.0 min

Area (ha)= 10.93 Curve Number (CN)= 68.5
Ia (mm)= 4.40 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.60

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.37	1.083	5.44	2.083	27.54	3.08	3.85
0.167	2.47	1.167	6.11	2.167	19.51	3.17	3.60
0.250	2.60	1.250	6.98	2.250	14.60	3.25	3.39
0.333	2.73	1.333	8.10	2.333	11.54	3.33	3.20
0.417	2.88	1.417	9.62	2.417	9.50	3.42	3.02
0.500	3.04	1.500	11.71	2.500	8.06	3.50	2.87
0.583	3.28	1.583	16.26	2.583	6.81	3.58	2.70
0.667	3.50	1.667	23.93	2.667	6.07	3.67	2.58
0.750	3.76	1.750	43.66	2.750	5.48	3.75	2.47
0.833	4.05	1.833	91.99	2.833	4.98	3.83	2.37
0.917	4.39	1.917	128.79	2.917	4.56	3.92	2.28
1.000	4.80	2.000	57.21	3.000	4.21	4.00	2.20

U.H. Tp(hrs)= 0.57

Unit Hyd Qpeak (cms)= 0.338

PEAK FLOW (cms)= 0.068 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 7.361
TOTAL RAINFALL (mm)= 50.590
RUNOFF COEFFICIENT = 0.146

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0201)	5.047	0.068	2.58	7.36
OUTFLOW: ID= 1 (0601)	5.047	0.026	3.67	7.32

PEAK FLOW REDUCTION [Qout/Qin](%)= 38.67
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= 0.0202

CALIB
NASHYD (0202)
ID= 1 DT= 5.0 min

Area (ha)= 6.35 Curve Number (CN)= 57.9
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.55

Unit Hyd Qpeak (cms)= 0.441

PEAK FLOW (cms)= 0.110 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 9.133
TOTAL RAINFALL (mm)= 50.590
RUNOFF COEFFICIENT = 0.181

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0653	0.1176
0.0014	0.0066	0.1331	0.1362
0.0069	0.0205	0.2297	0.1554
0.0098	0.0350	0.3196	0.1752
0.0120	0.0502	0.5122	0.1957
0.0139	0.0661	0.8248	0.2169
0.0155	0.0826	1.0265	0.2278
0.0263	0.0998	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0202)	6.346	0.110	2.50	9.13
OUTFLOW: ID= 1 (0602)	6.346	0.012	4.58	8.94

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.61
TIME SHIFT OF PEAK FLOW (min)=125.00
MAXIMUM STORAGE USED (ha.m.)= 0.0480

ADD HYD (0802)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.05	0.026	3.67	7.32
+ ID2= 2 (0602):	6.35	0.012	4.58	8.94
ID = 3 (0802):	11.39	0.038	3.75	8.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

Unit Hyd Qpeak (cms)= 0.696

PEAK FLOW (cms)= 0.258 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 13.089
TOTAL RAINFALL (mm)= 50.590
RUNOFF COEFFICIENT = 0.259

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

CALIB
NASHYD (0003)
ID= 1 DT= 5.0 min

Area (ha)= 136.00 Curve Number (CN)= 52.1
Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

Unit Hyd Qpeak (cms)= 2.678

PEAK FLOW (cms)= 0.654 (i)
TIME TO PEAK (hrs)= 4.250
RUNOFF VOLUME (mm)= 6.799
TOTAL RAINFALL (mm)= 50.590
RUNOFF COEFFICIENT = 0.134

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

DUHYD (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	0.65	4.25	6.80
MAJOR SYS.(ID= 2):	0.00	0.00	0.00	0.00
MINOR SYS.(ID= 3):	136.00	0.65	4.25	6.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0801)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	10.93	0.258	2.58	13.09
+ ID2= 2 (0400):	136.00	0.654	4.25	6.80
ID = 3 (0801):	146.93	0.718	4.00	7.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

Area (ha)= 77.75 Curve Number (CN)= 49.6
Ia (mm)= 6.91 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

Unit Hyd Qpeak (cms)= 2.395

PEAK FLOW (cms)= 0.496 (i)
TIME TO PEAK (hrs)= 3.417
RUNOFF VOLUME (mm)= 6.322
TOTAL RAINFALL (mm)= 50.590
RUNOFF COEFFICIENT = 0.125

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

CALIB
NASHYD (0201)
ID= 1 DT= 5.0 min

Area (ha)= 5.05 Curve Number (CN)= 51.4
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00

ADD HYD (0803)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	77.75	0.496	3.42	6.32
+ ID2= 2 (0802):	11.39	0.038	3.75	8.23
ID = 3 (0803):	89.14	0.533	3.42	6.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

25-Year Chicago Storm

READ STORM
Ptotal= 59.08 mm

Filename: C:\Users\dmarshall\AppData\Local\Temp\c476ec2e-19e9-4d3c-92ac-37f85de3ce5a\51e8117f
Comments: OWEN SOUND 25 YEAR 4 HOUR DURATION CHICA

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.10	2.69	1.10	6.28	2.10	32.51	3.10	4.41
0.20	2.85	1.20	7.27	2.20	20.58	3.20	4.06
0.30	3.03	1.30	8.63	2.30	14.82	3.30	3.76
0.40	3.24	1.40	10.61	2.40	11.50	3.40	3.50
0.50	3.47	1.50	13.69	2.50	9.37	3.50	3.28
0.60	3.75	1.60	19.10	2.60	7.89	3.60	3.08
0.70	4.07	1.70	30.50	2.70	6.82	3.70	2.91
0.80	4.46	1.80	65.56	2.80	6.00	3.80	2.76
0.90	4.94	1.90	170.99	2.90	5.35	3.90	2.62
1.00	5.53	2.00	67.54	3.00	4.84	4.00	2.50

CALIB
NASHYD (0002)
ID= 1 DT= 5.0 min

Area (ha)= 10.93 Curve Number (CN)= 68.5
Ia (mm)= 4.40 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.60

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.69	1.083	6.28	2.083	32.51	3.08	4.41
0.167	2.82	1.167	7.07	2.167	22.97	3.17	4.13
0.250	2.96	1.250	8.09	2.250	17.12	3.25	3.88
0.333	3.11	1.333	9.42	2.333	13.49	3.33	3.66
0.417	3.29	1.417	11.23	2.417	11.07	3.42	3.46
0.500	3.47	1.500	13.69	2.500	9.37	3.50	3.28
0.583	3.75	1.583	19.10	2.583	7.89	3.58	3.08
0.667	4.01	1.667	28.22	2.667	7.03	3.67	2.94
0.750	4.30	1.750	51.54	2.750	6.33	3.75	2.82
0.833	4.65	1.833	107.73	2.833	5.74	3.83	2.70
0.917	5.06	1.917	150.30	2.917	5.25	3.92	2.60
1.000	5.53	2.000	67.54	3.000	4.84	4.00	2.50

Unit Hyd Qpeak (cms)= 0.696

PEAK FLOW (cms)= 0.347 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 17.433
TOTAL RAINFALL (mm)= 59.076
RUNOFF COEFFICIENT = 0.295

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

CALIB
NASHYD (0003)
ID= 1 DT= 5.0 min

Area (ha)= 136.00 Curve Number (CN)= 52.1
Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

Unit Hyd Qpeak (cms)= 2.678

PEAK FLOW (cms)= 0.909 (i)
TIME TO PEAK (hrs)= 4.250
RUNOFF VOLUME (mm)= 9.429
TOTAL RAINFALL (mm)= 59.076
RUNOFF COEFFICIENT = 0.160

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

DUHYD (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	0.91	4.25	9.43
MAJOR SYS.(ID= 2):	10.53	0.20	4.25	9.43
MINOR SYS.(ID= 3):	125.47	0.71	3.33	9.43

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0801)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	10.93	0.347	2.58	17.43
+ ID2= 2 (0400):	125.47	0.713	3.33	9.43
ID = 3 (0801):	136.40	0.926	3.25	10.07

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

Area (ha)= 77.75 Curve Number (CN)= 49.6
Ia (mm)= 6.91 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

Unit Hyd Qpeak (cms)= 2.395

PEAK FLOW (cms)= 0.693 (i)
TIME TO PEAK (hrs)= 3.417
RUNOFF VOLUME (mm)= 8.771
TOTAL RAINFALL (mm)= 59.076
RUNOFF COEFFICIENT = 0.148

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

CALIB
NASHYD (0201)
ID= 1 DT= 5.0 min

Area (ha)= 5.05 Curve Number (CN)= 51.4
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.57

Unit Hyd Qpeak (cms)= 0.338

PEAK FLOW (cms)= 0.094 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 10.038
TOTAL RAINFALL (mm)= 59.076
RUNOFF COEFFICIENT = 0.170

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0201)	5.047	0.094	2.58	10.04
OUTFLOW: ID= 1 (0601)	5.047	0.039	3.58	10.00

PEAK FLOW REDUCTION [Qout/Qin](%)= 41.14
TIME SHIFT OF PEAK FLOW (min)= 60.00
MAXIMUM STORAGE USED (ha.m.)= 0.0273

CALIB
NASHYD (0202)
ID= 1 DT= 5.0 min

Area (ha)= 6.35 Curve Number (CN)= 57.9
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.55

Unit Hyd Qpeak (cms)= 0.441

PEAK FLOW (cms)= 0.151 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 12.367
TOTAL RAINFALL (mm)= 59.076
RUNOFF COEFFICIENT = 0.209

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0653	0.1176
0.0014	0.0066	0.1331	0.1362
0.0069	0.0205	0.2297	0.1554
0.0098	0.0350	0.3196	0.1752
0.0120	0.0502	0.5122	0.1957
0.0139	0.0661	0.8248	0.2169
0.0155	0.0826	1.0265	0.2278
0.0263	0.0998	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0202)	6.346	0.151	2.50	12.37
OUTFLOW: ID= 1 (0602)	6.346	0.014	4.67	12.18

PEAK FLOW REDUCTION [Qout/Qin](%)= 9.23
TIME SHIFT OF PEAK FLOW (min)=130.00
MAXIMUM STORAGE USED (ha.m.)= 0.0662

ADD HYD (0802)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.05	0.039	3.58	10.00
+ ID2= 2 (0602):	6.35	0.014	4.67	12.18
ID = 3 (0802):	11.39	0.052	3.58	11.21

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	77.75	0.693	3.42	8.77
+ ID2= 2 (0802):	11.39	0.052	3.58	11.21
ID = 3 (0803):	89.14	0.743	3.42	9.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

50-Year Chicago Storm

READ STORM
Ptotal= 65.65 mm

Filename: C:\Users\dmarshall\AppD
ata\Local\Temp\
c476ec2e-19e9-4d3c-92ac-37f85de3ce5a\bb1e6ff5
Comments: OWEN SOUND 50 YEAR 4 HOUR DURATION CHICA

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.10	2.87	1.10	6.88	2.10	36.93	3.10	4.78
0.20	3.04	1.20	8.01	2.20	23.25	3.20	4.39
0.30	3.24	1.30	9.55	2.30	16.64	3.30	4.05
0.40	3.47	1.40	11.81	2.40	12.83	3.40	3.76
0.50	3.73	1.50	15.34	2.50	10.39	3.50	3.52
0.60	4.04	1.60	21.55	2.60	8.71	3.60	3.30
0.70	4.40	1.70	34.62	2.70	7.49	3.70	3.11
0.80	4.84	1.80	74.20	2.80	6.56	3.80	2.94
0.90	5.37	1.90	187.94	2.90	5.84	3.90	2.79
1.00	6.03	2.00	76.42	3.00	5.26	4.00	2.65

CALIB
NASHYD (0002)
ID= 1 DT= 5.0 min

Area (ha)= 10.93 Curve Number (CN)= 68.5
Ia (mm)= 4.40 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.60

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

--- TRANSFORMED HYETOGRAPH ---

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	2.87	1.083	6.88	2.083	36.93	3.08	4.78
0.167	3.01	1.167	7.78	2.167	25.99	3.17	4.47
0.250	3.16	1.250	8.93	2.250	19.28	3.25	4.19
0.333	3.33	1.333	10.45	2.333	15.12	3.33	3.93
0.417	3.52	1.417	12.52	2.417	12.34	3.42	3.71
0.500	3.73	1.500	15.34	2.500	10.39	3.50	3.52
0.583	4.04	1.583	21.55	2.583	8.71	3.58	3.30
0.667	4.33	1.667	32.01	2.667	7.73	3.67	3.15
0.750	4.66	1.750	58.37	2.750	6.93	3.75	3.01
0.833	5.05	1.833	119.70	2.833	6.27	3.83	2.88
0.917	5.50	1.917	165.64	2.917	5.72	3.92	2.76
1.000	6.03	2.000	76.42	3.000	5.26	4.00	2.65

Unit Hyd Qpeak (cms)= 0.696

PEAK FLOW (cms)= 0.423 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 21.072
TOTAL RAINFALL (mm)= 65.654
RUNOFF COEFFICIENT = 0.321

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

CALIB
NASHYD (0003)
ID= 1 DT= 5.0 min

Area (ha)= 136.00 Curve Number (CN)= 52.1
Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

Unit Hyd Qpeak (cms)= 2.678

PEAK FLOW (cms)= 1.132 (i)
TIME TO PEAK (hrs)= 4.167
RUNOFF VOLUME (mm)= 11.702
TOTAL RAINFALL (mm)= 65.654
RUNOFF COEFFICIENT = 0.178

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

DUHYD (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	1.13	4.17	11.70
MAJOR SYS.(ID= 2):	24.25	0.42	4.17	11.70
MINOR SYS.(ID= 3):	111.75	0.71	3.00	11.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0801)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	10.93	0.423	2.58	21.07
+ ID2= 2 (0400):	111.75	0.713	3.00	11.70
ID = 3 (0801):	122.68	1.048	3.00	12.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

Area (ha)= 77.75 Curve Number (CN)= 49.6
Ia (mm)= 6.91 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

Unit Hyd Qpeak (cms)= 2.395

PEAK FLOW (cms)= 0.865 (i)
TIME TO PEAK (hrs)= 3.333
RUNOFF VOLUME (mm)= 10.891
TOTAL RAINFALL (mm)= 65.654
RUNOFF COEFFICIENT = 0.166

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

CALIB
NASHYD (0201)
ID= 1 DT= 5.0 min

Area (ha)= 5.05 Curve Number (CN)= 51.4
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.57

Unit Hyd Qpeak (cms)= 0.338

PEAK FLOW (cms)= 0.117 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 12.338
TOTAL RAINFALL (mm)= 65.654
RUNOFF COEFFICIENT = 0.188

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0201)	5.047	0.117	2.58	12.34
OUTFLOW: ID= 1 (0601)	5.047	0.051	3.50	12.30

PEAK FLOW REDUCTION [Qout/Qin](%)= 44.05
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 0.0327

CALIB
NASHYD (0202)
ID= 1 DT= 5.0 min

Area (ha)= 6.35 Curve Number (CN)= 57.9
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.55

Unit Hyd Qpeak (cms)= 0.441

PEAK FLOW (cms)= 0.186 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 15.125
TOTAL RAINFALL (mm)= 65.654
RUNOFF COEFFICIENT = 0.230

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

RESERVOIR (0602)
IN= 2---> OUT= 1

DT= 5.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	0.0000	0.0000	0.0653	0.1176
	0.0014	0.0066	0.1331	0.1362
	0.0069	0.0205	0.2297	0.1554
	0.0098	0.0350	0.3196	0.1752
	0.0120	0.0502	0.5122	0.1957
	0.0139	0.0661	0.8248	0.2169
	0.0155	0.0826	1.0265	0.2278
	0.0263	0.0998	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0202)	6.346	0.186	2.50	15.12
OUTFLOW: ID= 1 (0602)	6.346	0.015	4.67	14.94

PEAK FLOW REDUCTION [Qout/Qin](%)= 8.30
TIME SHIFT OF PEAK FLOW (min)=130.00
MAXIMUM STORAGE USED (ha.m.)= 0.0821

ADD HYD (0802)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.05	0.051	3.50	12.30
+ ID2= 2 (0602):	6.35	0.015	4.67	14.94
ID = 3 (0802):	11.39	0.066	3.50	13.77

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	77.75	0.865	3.33	10.89
+ ID2= 2 (0802):	11.39	0.066	3.50	13.77
ID = 3 (0803):	89.14	0.931	3.42	11.26

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION NUMBER: 7 **
****

100-Year Chicago Storm

READ STORM
Ptotal= 71.77 mm

Filename: C:\Users\dmarshall\AppData\Local\Temp\c476ec2e-19e9-4d3c-92ac-37f85de3ce5a\1ed51b27
Comments: OWEN SOUND 100 YEAR 4 HOUR DURATION CHIC

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.10	3.08	1.10	7.44	2.10	40.41	3.10	5.16
0.20	3.27	1.20	8.67	2.20	25.38	3.20	4.73
0.30	3.49	1.30	10.36	2.30	18.12	3.30	4.37
0.40	3.73	1.40	12.83	2.40	13.95	3.40	4.05
0.50	4.02	1.50	16.70	2.50	11.28	3.50	3.79
0.60	4.35	1.60	23.51	2.60	9.44	3.60	3.55
0.70	4.75	1.70	37.88	2.70	8.10	3.70	3.35
0.80	5.22	1.80	81.47	2.80	7.09	3.80	3.16
0.90	5.80	1.90	206.92	2.90	6.31	3.90	3.00
1.00	6.52	2.00	83.92	3.00	5.67	4.00	2.85

CALIB
NASHYD (0002)
ID= 1 DT= 5.0 min

Area (ha)= 10.93 Curve Number (CN)= 68.5
Ia (mm)= 4.40 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.60

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	3.08	1.083	7.44	2.083	40.41	3.08	5.16
0.167	3.23	1.167	8.42	2.167	28.39	3.17	4.82
0.250	3.40	1.250	9.68	2.250	21.02	3.25	4.51
0.333	3.59	1.333	11.35	2.333	16.45	3.33	4.24
0.417	3.79	1.417	13.60	2.417	13.42	3.42	4.00
0.500	4.02	1.500	16.70	2.500	11.28	3.50	3.79
0.583	4.35	1.583	23.51	2.583	9.44	3.58	3.55
0.667	4.67	1.667	35.01	2.667	8.37	3.67	3.39
0.750	5.03	1.750	64.03	2.750	7.49	3.75	3.24
0.833	5.45	1.833	131.65	2.833	6.78	3.83	3.10
0.917	5.94	1.917	182.32	2.917	6.18	3.92	2.97
1.000	6.52	2.000	83.92	3.000	5.67	4.00	2.85

Unit Hyd Qpeak (cms)= 0.698

PEAK FLOW (cms)= 0.498 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 24.842
TOTAL RAINFALL (mm)= 71.769
RUNOFF COEFFICIENT = 0.343

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

CALIB
NASHYD (0003)
ID= 1 DT= 5.0 min

Area (ha)= 136.00 Curve Number (CN)= 52.1
Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

Unit Hyd Qpeak (cms)= 2.678

PEAK FLOW (cms)= 1.355 (i)
TIME TO PEAK (hrs)= 4.167
RUNOFF VOLUME (mm)= 13.986
TOTAL RAINFALL (mm)= 71.769
RUNOFF COEFFICIENT = 0.195

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

DUHYD (0400)
Inlet Cap.=0.713
# of Inlets= 1
Total(cms)= 0.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	1.36	4.17	13.99
MAJOR SYS.(ID= 2):	35.85	0.64	4.17	13.99
MINOR SYS.(ID= 3):	100.15	0.71	2.83	13.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0801)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	10.93	0.498	2.58	24.64
+ ID2= 2 (0400):	100.15	0.713	2.83	13.99
ID = 3 (0801):	111.08	1.162	2.83	15.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

Area (ha)= 77.75 Curve Number (CN)= 49.6
Ia (mm)= 6.91 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

Unit Hyd Qpeak (cms)= 2.395

PEAK FLOW (cms)= 1.039 (i)
TIME TO PEAK (hrs)= 3.333
RUNOFF VOLUME (mm)= 13.026
TOTAL RAINFALL (mm)= 71.769
RUNOFF COEFFICIENT = 0.181

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

CALIB
NASHYD (0201)
ID= 1 DT= 5.0 min

Area (ha)= 5.05 Curve Number (CN)= 51.4
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.57

Unit Hyd Qpeak (cms)= 0.338

PEAK FLOW (cms)= 0.139 (i)
TIME TO PEAK (hrs)= 2.583
RUNOFF VOLUME (mm)= 14.641
TOTAL RAINFALL (mm)= 71.769
RUNOFF COEFFICIENT = 0.204

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0201)	5.047	0.139	2.58	14.64
OUTFLOW: ID= 1 (0601)	5.047	0.064	3.42	14.60

PEAK FLOW REDUCTION [Qout/Qin](%)= 45.75
TIME SHIFT OF PEAK FLOW (min)= 50.00
MAXIMUM STORAGE USED (ha.m.)= 0.0379

CALIB
NASHYD (0202)
ID= 1 DT= 5.0 min

Area (ha)= 6.35 Curve Number (CN)= 57.9
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.55

Unit Hyd Qpeak (cms)= 0.441

PEAK FLOW (cms)= 0.221 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 17.867
TOTAL RAINFALL (mm)= 71.769
RUNOFF COEFFICIENT = 0.249

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0653	0.1176
0.0014	0.0066	0.1331	0.1362
0.0069	0.0205	0.2297	0.1554
0.0098	0.0350	0.3196	0.1752
0.0120	0.0502	0.5122	0.1957
0.0139	0.0661	0.8248	0.2169
0.0155	0.0826	1.0265	0.2278
0.0263	0.0998	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0202)	6.346	0.221	2.50	17.87
OUTFLOW: ID= 1 (0602)	6.346	0.024	4.50	17.68

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.75
TIME SHIFT OF PEAK FLOW (min)=120.00
MAXIMUM STORAGE USED (ha.m.)= 0.0958

ADD HYD (0802)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.05	0.064	3.42	14.60
+ ID2= 2 (0602):	6.35	0.024	4.50	17.68
ID = 3 (0802):	11.39	0.082	3.67	16.32

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	77.75	1.039	3.33	13.03
+ ID2= 2 (0802):	11.39	0.082	3.67	16.32
ID = 3 (0803):	89.14	1.118	3.33	13.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

****
** SIMULATION NUMBER: 8 **
****

Regional Timmins Storm

READ STORM
Ptotal=193.00 mm

Filename: C:\Users\dmarshall\AppData\Local\Temp\c476ec2e-19e9-4d3c-92ac-37f85de3ce5a\5cf2c1d2
Comments: TIMMINS REGIONAL 12 HOUR DURATION STORM

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.20	15.00	3.20	3.00	6.20	43.00	9.20	13.00
0.40	15.00	3.40	3.00	6.40	43.00	9.40	13.00
0.60	15.00	3.60	3.00	6.60	43.00	9.60	13.00
0.80	15.00	3.80	3.00	6.80	43.00	9.80	13.00
1.00	15.00	4.00	3.00	7.00	43.00	10.00	13.00
1.20	20.00	4.20	5.00	7.20	20.00	10.20	13.00
1.40	20.00	4.40	5.00	7.40	20.00	10.40	13.00
1.60	20.00	4.60	5.00	7.60	20.00	10.60	13.00
1.80	20.00	4.80	5.00	7.80	20.00	10.80	13.00
2.00	20.00	5.00	5.00	8.00	20.00	11.00	13.00
2.20	10.00	5.20	20.00	8.20	23.00	11.20	8.00
2.40	10.00	5.40	20.00	8.40	23.00	11.40	8.00
2.60	10.00	5.60	20.00	8.60	23.00	11.60	8.00
2.80	10.00	5.80	20.00	8.80	23.00	11.80	8.00
3.00	10.00	6.00	20.00	9.00	23.00	12.00	8.00

CALIB
NASHYD (0002)
ID= 1 DT= 5.0 min

Area (ha)= 10.93 Curve Number (CN)= 68.5
Ia (mm)= 4.40 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.60

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	15.00	3.083	3.00	6.083	43.00	9.08	13.00
0.167	15.00	3.167	3.00	6.167	43.00	9.17	13.00
0.250	15.00	3.250	3.00	6.250	43.00	9.25	13.00
0.333	15.00	3.333	3.00	6.333	43.00	9.33	13.00
0.417	15.00	3.417	3.00	6.417	43.00	9.42	13.00
0.500	15.00	3.500	3.00	6.500	43.00	9.50	13.00
0.583	15.00	3.583	3.00	6.583	43.00	9.58	13.00
0.667	15.00	3.667	3.00	6.667	43.00	9.67	13.00
0.750	15.00	3.750	3.00	6.750	43.00	9.75	13.00
0.833	15.00	3.833	3.00	6.833	43.00	9.83	13.00
0.917	15.00	3.917	3.00	6.917	43.00	9.92	13.00
1.000	15.00	4.000	3.00	7.000	43.00	10.00	13.00
1.083	20.00	4.083	5.00	7.083	20.00	10.08	13.00
1.167	20.00	4.167	5.00	7.167	20.00	10.17	13.00
1.250	20.00	4.250	5.00	7.250	20.00	10.25	13.00
1.333	20.00	4.333	5.00	7.333	20.00	10.33	13.00
1.417	20.00	4.417	5.00	7.417	20.00	10.42	13.00
1.500	20.00	4.500	5.00	7.500	20.00	10.50	13.00
1.583	20.00	4.583	5.00	7.583	20.00	10.58	13.00
1.667	20.00	4.667	5.00	7.667	20.00	10.67	13.00

1.750	20.00	4.750	5.00	7.750	20.00	10.75	13.00
1.833	20.00	4.833	5.00	7.833	20.00	10.83	13.00
1.917	20.00	4.917	5.00	7.917	20.00	10.92	13.00
2.000	20.00	5.000	5.00	8.000	20.00	11.00	13.00
2.083	10.00	5.083	20.00	8.083	23.00	11.08	8.00
2.167	10.00	5.167	20.00	8.167	23.00	11.17	8.00
2.250	10.00	5.250	20.00	8.250	23.00	11.25	8.00
2.333	10.00	5.333	20.00	8.333	23.00	11.33	8.00
2.417	10.00	5.417	20.00	8.417	23.00	11.42	8.00
2.500	10.00	5.500	20.00	8.500	23.00	11.50	8.00
2.583	10.00	5.583	20.00	8.583	23.00	11.58	8.00
2.667	10.00	5.667	20.00	8.667	23.00	11.67	8.00
2.750	10.00	5.750	20.00	8.750	23.00	11.75	8.00
2.833	10.00	5.833	20.00	8.833	23.00	11.83	8.00
2.917	10.00	5.917	20.00	8.917	23.00	11.92	8.00
3.000	10.00	6.000	20.00	9.000	23.00	12.00	8.00

Unit Hyd Qpeak (cms)= 0.696

PEAK FLOW (cms)= 0.748 (i)
TIME TO PEAK (hrs)= 7.250
RUNOFF VOLUME (mm)= 116.466
TOTAL RAINFALL (mm)= 193.000
RUNOFF COEFFICIENT = 0.603

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

CALIB
NASHYD (0003)
ID= 1 DT= 5.0 min

Area (ha)= 136.00 Curve Number (CN)= 52.1
Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

Unit Hyd Qpeak (cms)= 2.678

PEAK FLOW (cms)= 4.452 (i)
TIME TO PEAK (hrs)= 10.000
RUNOFF VOLUME (mm)= 82.327
TOTAL RAINFALL (mm)= 193.000
RUNOFF COEFFICIENT = 0.427

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

DUMYD (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	4.45	10.00	82.33
MAJOR SYS.(ID= 2):	92.94	3.74	10.00	82.33
MINOR SYS.(ID= 3):	43.06	0.71	6.00	82.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0801)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	10.93	0.748	7.25	116.47
+ ID2= 2 (0400):	43.06	0.713	6.00	82.33
ID = 3 (0801):	53.99	1.461	7.25	89.24

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

Area (ha)= 77.75 Curve Number (CN)= 49.6
Ia (mm)= 6.91 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

Unit Hyd Qpeak (cms)= 2.395

PEAK FLOW (cms)= 2.708 (i)
TIME TO PEAK (hrs)= 9.250
RUNOFF VOLUME (mm)= 77.961
TOTAL RAINFALL (mm)= 193.000

ADD HYD (0802)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.05	0.216	7.67	82.71
+ ID2= 2 (0602):	6.35	0.277	8.00	94.87
ID = 3 (0802):	11.39	0.490	7.83	89.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	77.75	2.708	9.25	77.96
+ ID2= 2 (0802):	11.39	0.490	7.83	89.49
ID = 3 (0803):	89.14	3.158	9.25	79.43

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

RUNOFF COEFFICIENT = 0.404

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

CALIB
NASHYD (0201)
ID= 1 DT= 5.0 min

Area (ha)= 5.05 Curve Number (CN)= 51.4
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.57

Unit Hyd Qpeak (cms)= 0.338

PEAK FLOW (cms)= 0.243 (i)
TIME TO PEAK (hrs)= 7.250
RUNOFF VOLUME (mm)= 82.751
TOTAL RAINFALL (mm)= 193.000
RUNOFF COEFFICIENT = 0.429

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0201)	5.047	0.243	7.25	82.75
OUTFLOW: ID= 1 (0601)	5.047	0.216	7.67	82.71

PEAK FLOW REDUCTION [Qout/Qin](%)= 88.79
TIME SHIFT OF PEAK FLOW (min)= 25.00
MAXIMUM STORAGE USED (ha.m.)= 0.0649

CALIB
NASHYD (0202)
ID= 1 DT= 5.0 min

Area (ha)= 6.35 Curve Number (CN)= 57.9
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.55

Unit Hyd Qpeak (cms)= 0.441

PEAK FLOW (cms)= 0.360 (i)
TIME TO PEAK (hrs)= 7.250
RUNOFF VOLUME (mm)= 95.058
TOTAL RAINFALL (mm)= 193.000
RUNOFF COEFFICIENT = 0.493

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0653	0.1176
0.0014	0.0066	0.1333	0.1362
0.0069	0.0205	0.2297	0.1554
0.0098	0.0350	0.3196	0.1752
0.0120	0.0502	0.5122	0.1957
0.0139	0.0661	0.8248	0.2169
0.0155	0.0826	1.0265	0.2278
0.0263	0.0998	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0202)	6.346	0.360	7.25	95.06
OUTFLOW: ID= 1 (0602)	6.346	0.277	8.00	94.87

PEAK FLOW REDUCTION [Qout/Qin](%)= 77.14
TIME SHIFT OF PEAK FLOW (min)= 45.00
MAXIMUM STORAGE USED (ha.m.)= 0.1660

```
      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
        VV     I      SS   U   U  A   A  L
        VV     I   SSSSS   UUUUU  A   A  LLLLL

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

  Input   filename: C:\Program Files (x86)\VH Suite 3.0\Vo2\voin.dat
  Output  filename: C:\Users\dmarshall\AppData\Local\Temp\8b17be1a-b429-46e4-872d-57663c09b842\Scenario.out
  Summary filename: C:\Users\dmarshall\AppData\Local\Temp\8b17be1a-b429-46e4-872d-57663c09b842\Scenario.sum

DATE: 03/10/2017                          TIME: 09:49:34

USER:

COMMENTS: _____

**********
** SIMULATION NUMBER:    1 **   2-Year SCS Storm
**********

MASS STORM
Ptotal= 48.70 mm

Filename: C:\Users\dmarshall\Appd
          ata\Local\Temp\
          8b17be1a-b429-46e4-872d-57663c09b842\9b21073d
Comments: SCS Type II 24 HR MASS CURVE

Duration of storm    = 23.75 hrs
Mass curve time step = 15.00 min

| TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr | TIME hrs | RAIN mm/hr |
|---|---|---|---|---|---|---|---|
| 0.25 | 0.58 | 6.25 | 0.97 | 12.25 | 7.01 | 18.25 | 0.78 |
| 0.50 | 0.39 | 6.50 | 0.78 | 12.50 | 3.70 | 18.50 | 0.97 |
| 0.75 | 0.58 | 6.75 | 0.97 | 12.75 | 3.51 | 18.75 | 0.78 |
| 1.00 | 0.58 | 7.00 | 0.97 | 13.00 | 2.73 | 19.00 | 0.97 |
| 1.25 | 0.58 | 7.25 | 1.17 | 13.25 | 2.53 | 19.25 | 0.78 |
| 1.50 | 0.39 | 7.50 | 0.97 | 13.50 | 2.14 | 19.50 | 0.97 |
| 1.75 | 0.58 | 7.75 | 1.17 | 13.75 | 1.95 | 19.75 | 0.78 |
| 2.00 | 0.58 | 8.00 | 1.17 | 14.00 | 1.56 | 20.00 | 0.58 |
| 2.25 | 0.78 | 8.25 | 1.36 | 14.25 | 1.36 | 20.25 | 0.58 |
| 2.50 | 0.58 | 8.50 | 1.36 | 14.50 | 1.56 | 20.50 | 0.58 |
| 2.75 | 0.58 | 8.75 | 1.36 | 14.75 | 1.36 | 20.75 | 0.58 |
| 3.00 | 0.58 | 9.00 | 1.56 | 15.00 | 1.56 | 21.00 | 0.58 |
| 3.25 | 0.78 | 9.25 | 1.56 | 15.25 | 1.36 | 21.25 | 0.58 |
| 3.50 | 0.58 | 9.50 | 1.75 | 15.50 | 1.56 | 21.50 | 0.58 |
| 3.75 | 0.58 | 9.75 | 1.75 | 15.75 | 1.36 | 21.75 | 0.58 |
| 4.00 | 0.78 | 10.00 | 2.14 | 16.00 | 0.97 | 22.00 | 0.58 |
| 4.25 | 0.78 | 10.25 | 2.34 | 16.25 | 0.78 | 22.25 | 0.58 |
| 4.50 | 0.78 | 10.50 | 2.92 | 16.50 | 0.97 | 22.50 | 0.58 |
| 4.75 | 0.78 | 10.75 | 3.12 | 16.75 | 0.78 | 22.75 | 0.58 |
| 5.00 | 0.78 | 11.00 | 4.68 | 17.00 | 0.97 | 23.00 | 0.58 |
| 5.25 | 0.78 | 11.25 | 4.68 | 17.25 | 0.78 | 23.25 | 0.58 |
| 5.50 | 0.78 | 11.50 | 14.42 | 17.50 | 0.97 | 23.50 | 0.58 |
| 5.75 | 0.78 | 11.75 | 59.61 | 17.75 | 0.78 | 23.75 | 0.58 |
| 6.00 | 0.78 | 12.00 | 7.01 | 18.00 | 0.97 | | |

CALIB
NASHYD (0003)
ID= 1 DT= 5.0 min

Area (ha)= 136.00  Curve Number (CN)= 52.1
Ia (mm)= 7.20  # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

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

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

DUHYD (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| TOTAL HYD.(ID= 1): | 136.00 | 0.38 | 14.00 | 6.22 |
| MAJOR SYS.(ID= 2): | 0.00 | 0.00 | 0.00 | 0.00 |
| MINOR SYS.(ID= 3): | 136.00 | 0.38 | 14.00 | 6.22 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0002)
ID= 1 DT= 5.0 min

Area (ha)= 10.93  Curve Number (CN)= 68.5
Ia (mm)= 4.40  # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.60

Unit Hyd Qpeak (cms)= 0.696

PEAK FLOW (cms)= 0.148 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 12.112
TOTAL RAINFALL (mm)= 48.554
RUNOFF COEFFICIENT = 0.249

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

ADD HYD (0801)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (0002): | 10.93 | 0.148 | 12.25 | 12.11 |
| + ID2= 2 (0400): | 136.00 | 0.375 | 14.00 | 6.22 |
| ID = 3 (0801): | 146.93 | 0.415 | 13.75 | 6.66 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

Area (ha)= 77.75  Curve Number (CN)= 49.6
Ia (mm)= 6.91  # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

Unit Hyd Qpeak (cms)= 2.395

PEAK FLOW (cms)= 0.279 (i)
TIME TO PEAK (hrs)= 13.083
RUNOFF VOLUME (mm)= 5.786
TOTAL RAINFALL (mm)= 48.554
RUNOFF COEFFICIENT = 0.119

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

CALIB
NASHYD (0202)
ID= 1 DT= 5.0 min

Area (ha)= 6.35  Curve Number (CN)= 57.9
Ia (mm)= 4.70  # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.55

Unit Hyd Qpeak (cms)= 0.441

PEAK FLOW (cms)= 0.062 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 8.415
TOTAL RAINFALL (mm)= 48.554
RUNOFF COEFFICIENT = 0.173

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

RESERVOIR (0602)
```

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.58	6.083	0.97	12.083	7.01	18.08	0.78
0.167	0.58	6.167	0.97	12.167	7.01	18.17	0.78
0.250	0.58	6.250	0.97	12.250	7.01	18.25	0.78
0.333	0.39	6.333	0.78	12.333	3.70	18.33	0.97
0.417	0.39	6.417	0.78	12.417	3.70	18.42	0.97
0.500	0.39	6.500	0.78	12.500	3.70	18.50	0.97
0.583	0.58	6.583	0.97	12.583	3.51	18.58	0.78
0.667	0.58	6.667	0.97	12.667	3.51	18.67	0.78
0.750	0.58	6.750	0.97	12.750	3.51	18.75	0.78
0.833	0.58	6.833	0.97	12.833	2.73	18.83	0.97
0.917	0.58	6.917	0.97	12.917	2.73	18.92	0.97
1.000	0.58	7.000	0.97	13.000	2.73	19.00	0.97
1.083	0.58	7.083	1.17	13.083	2.53	19.08	0.78
1.167	0.58	7.167	1.17	13.167	2.53	19.17	0.78
1.250	0.58	7.250	1.17	13.250	2.53	19.25	0.78
1.333	0.39	7.333	0.97	13.333	2.14	19.33	0.97
1.417	0.39	7.417	0.97	13.417	2.14	19.42	0.97
1.500	0.39	7.500	0.97	13.500	2.14	19.50	0.97
1.583	0.58	7.583	1.17	13.583	1.95	19.58	0.78
1.667	0.58	7.667	1.17	13.667	1.95	19.67	0.78
1.750	0.58	7.750	1.17	13.750	1.95	19.75	0.78
1.833	0.58	7.833	1.17	13.833	1.56	19.83	0.58
1.917	0.58	7.917	1.17	13.917	1.56	19.92	0.58
2.000	0.58	8.000	1.17	14.000	1.56	20.00	0.58
2.083	0.78	8.083	1.36	14.083	1.36	20.08	0.58
2.167	0.78	8.167	1.36	14.167	1.36	20.17	0.58
2.250	0.78	8.250	1.36	14.250	1.36	20.25	0.58
2.333	0.58	8.333	1.36	14.333	1.56	20.33	0.58
2.417	0.58	8.417	1.36	14.417	1.56	20.42	0.58
2.500	0.58	8.500	1.36	14.500	1.56	20.50	0.58
2.583	0.58	8.583	1.36	14.583	1.36	20.58	0.58
2.667	0.58	8.667	1.36	14.667	1.36	20.67	0.58
2.750	0.58	8.750	1.36	14.750	1.36	20.75	0.58
2.833	0.58	8.833	1.56	14.833	1.56	20.83	0.58
2.917	0.58	8.917	1.56	14.917	1.56	20.92	0.58
3.000	0.58	9.000	1.56	15.000	1.56	21.00	0.58
3.083	0.78	9.083	1.56	15.083	1.36	21.08	0.58
3.167	0.78	9.167	1.56	15.167	1.36	21.17	0.58
3.250	0.78	9.250	1.56	15.250	1.36	21.25	0.58
3.333	0.58	9.333	1.75	15.333	1.56	21.33	0.58
3.417	0.58	9.417	1.75	15.417	1.56	21.42	0.58
3.500	0.58	9.500	1.75	15.500	1.56	21.50	0.58
3.583	0.58	9.583	1.75	15.583	1.36	21.58	0.58
3.667	0.58	9.667	1.75	15.667	1.36	21.67	0.58
3.750	0.58	9.750	1.75	15.750	1.36	21.75	0.58
3.833	0.78	9.833	2.14	15.833	0.97	21.83	0.58
3.917	0.78	9.917	2.14	15.917	0.97	21.92	0.58
4.000	0.78	10.000	2.14	16.000	0.97	22.00	0.58
4.083	0.78	10.083	2.34	16.083	0.78	22.08	0.58
4.167	0.78	10.167	2.34	16.167	0.78	22.17	0.58
4.250	0.78	10.250	2.34	16.250	0.78	22.25	0.58
4.333	0.78	10.333	2.92	16.333	0.97	22.33	0.58
4.417	0.78	10.417	2.92	16.417	0.97	22.42	0.58
4.500	0.78	10.500	2.92	16.500	0.97	22.50	0.58
4.583	0.78	10.583	3.12	16.583	0.78	22.58	0.58
4.667	0.78	10.667	3.12	16.667	0.78	22.67	0.58
4.750	0.78	10.750	3.12	16.750	0.78	22.75	0.58
4.833	0.78	10.833	4.68	16.833	0.97	22.83	0.58
4.917	0.78	10.917	4.68	16.917	0.97	22.92	0.58
5.000	0.78	11.000	4.68	17.000	0.97	23.00	0.58
5.083	0.78	11.083	4.68	17.083	0.78	23.08	0.58
5.167	0.78	11.167	4.68	17.167	0.78	23.17	0.58
5.250	0.78	11.250	4.68	17.250	0.78	23.25	0.58
5.333	0.78	11.333	14.41	17.333	0.97	23.33	0.58
5.417	0.78	11.417	14.42	17.417	0.97	23.42	0.58
5.500	0.78	11.500	14.42	17.500	0.97	23.50	0.58
5.583	0.78	11.583	59.60	17.583	0.78	23.58	0.58
5.667	0.78	11.667	59.61	17.667	0.78	23.67	0.58
5.750	0.78	11.750	59.61	17.750	0.78	23.75	0.58
5.833	0.78	11.833	7.01	17.833	0.97		
5.917	0.78	11.917	7.01	17.917	0.97		
6.000	0.78	12.000	7.01	18.000	0.97		

```
Unit Hyd Qpeak (cms)= 2.678

PEAK FLOW (cms)= 0.375 (i)
TIME TO PEAK (hrs)= 14.000
RUNOFF VOLUME (mm)= 6.221
TOTAL RAINFALL (mm)= 48.554
RUNOFF COEFFICIENT = 0.128

IN= 2---> OUT= 1
DT= 5.0 min

| OUTFLOW (cms) | STORAGE (ha.m.) | OUTFLOW (cms) | STORAGE (ha.m.) |
|---|---|---|---|
| 0.0000 | 0.0000 | 0.0853 | 0.1176 |
| 0.0014 | 0.0066 | 0.1331 | 0.1362 |
| 0.0069 | 0.0205 | 0.2297 | 0.1554 |
| 0.0098 | 0.0350 | 0.3196 | 0.1752 |
| 0.0120 | 0.0502 | 0.5122 | 0.1957 |
| 0.0139 | 0.0661 | 0.8248 | 0.2169 |
| 0.0155 | 0.0826 | 1.0265 | 0.2278 |
| 0.0263 | 0.0998 | 0.0000 | 0.0000 |

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| INFLOW : ID= 2 (0202) | 6.346 | 0.062 | 12.25 | 8.41 |
| OUTFLOW: ID= 1 (0602) | 6.346 | 0.009 | 14.92 | 8.23 |

PEAK FLOW REDUCTION [Qout/Qin](%)= 13.79
TIME SHIFT OF PEAK FLOW (min)=160.00
MAXIMUM STORAGE USED (ha.m.)= 0.0788

CALIB
NASHYD (0201)
ID= 1 DT= 5.0 min

Area (ha)= 5.05  Curve Number (CN)= 51.4
Ia (mm)= 4.70  # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.57

Unit Hyd Qpeak (cms)= 0.338

PEAK FLOW (cms)= 0.038 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 6.771
TOTAL RAINFALL (mm)= 48.554
RUNOFF COEFFICIENT = 0.139

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

| OUTFLOW (cms) | STORAGE (ha.m.) | OUTFLOW (cms) | STORAGE (ha.m.) |
|---|---|---|---|
| 0.0000 | 0.0000 | 0.3000 | 0.0752 |
| 0.0320 | 0.0244 | 0.7410 | 0.1015 |
| 0.0910 | 0.0495 | 0.0000 | 0.0000 |

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| INFLOW : ID= 2 (0201) | 5.047 | 0.038 | 12.25 | 6.77 |
| OUTFLOW: ID= 1 (0601) | 5.047 | 0.015 | 13.33 | 6.73 |

PEAK FLOW REDUCTION [Qout/Qin](%)= 40.13
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= 0.0117

ADD HYD (0802)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (0601): | 5.05 | 0.015 | 13.33 | 6.73 |
| + ID2= 2 (0602): | 6.35 | 0.009 | 14.92 | 8.23 |
| ID = 3 (0802): | 11.39 | 0.023 | 13.50 | 7.57 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803)
1 + 2 = 3

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|---|---|---|---|---|
| ID1= 1 (0001): | 77.75 | 0.279 | 13.08 | 5.79 |
| + ID2= 2 (0802): | 11.39 | 0.023 | 13.50 | 7.57 |
| ID = 3 (0803): | 89.14 | 0.302 | 13.17 | 6.01 |

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
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**********
** SIMULATION NUMBER:  2 **  5-Year SCS Storm
**********
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```
MASS STORM

Ptotal= 87.00 mm
```

Filename: C:\Users\dmarshall\AppD
ata\Local\Temp\
8b17be1a-b429-46e4-872d-57663c09b842\aca58f75
Comments: SCS Type II 24 HR MASS CURVE

Duration of storm = 23.75 hrs
Mass curve time step = 15.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.74	6.25	1.24	12.25	8.93	18.25	0.99
0.50	0.50	6.50	0.99	12.50	4.71	18.50	1.24
0.75	0.74	6.75	1.24	12.75	4.46	18.75	0.99
1.00	0.74	7.00	1.24	13.00	3.47	19.00	1.24
1.25	0.74	7.25	1.49	13.25	3.22	19.25	0.99
1.50	0.50	7.50	1.24	13.50	2.73	19.50	1.24
1.75	0.74	7.75	1.49	13.75	2.48	19.75	0.99
2.00	0.74	8.00	1.49	14.00	1.98	20.00	0.74
2.25	0.99	8.25	1.74	14.25	1.74	20.25	0.74
2.50	0.74	8.50	1.74	14.50	1.98	20.50	0.74
2.75	0.74	8.75	1.74	14.75	1.74	20.75	0.74
3.00	0.74	9.00	1.98	15.00	1.98	21.00	0.74
3.25	0.99	9.25	1.98	15.25	1.74	21.25	0.74
3.50	0.74	9.50	2.23	15.50	1.98	21.50	0.74
3.75	0.74	9.75	2.23	15.75	1.74	21.75	0.74
4.00	0.99	10.00	2.73	16.00	1.24	22.00	0.74
4.25	0.99	10.25	2.98	16.25	0.99	22.25	0.74
4.50	0.99	10.50	3.72	16.50	1.24	22.50	0.74
4.75	0.99	10.75	3.97	16.75	0.99	22.75	0.74
5.00	0.99	11.00	5.95	17.00	1.24	23.00	0.74
5.25	0.99	11.25	5.95	17.25	0.99	23.25	0.74
5.50	0.99	11.50	18.35	17.50	1.24	23.50	0.74
5.75	0.99	11.75	75.89	17.75	0.99	23.75	0.74
6.00	0.99	12.00	8.93	18.00	1.24		

```
CALIB
NASHYD    (0003)
ID= 1 DT= 5.0 min
```

Area (ha)= 136.00 Curve Number (CN)= 52.1
Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

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

TRANSFORMED HYETOGRAPH

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.74	6.083	1.24	12.083	8.93	18.08	0.99
0.167	0.74	6.167	1.24	12.167	8.93	18.17	0.99
0.250	0.74	6.250	1.24	12.250	8.93	18.25	0.99
0.333	0.50	6.333	0.99	12.333	4.71	18.33	1.24
0.417	0.50	6.417	0.99	12.417	4.71	18.42	1.24
0.500	0.50	6.500	0.99	12.500	4.71	18.50	1.24
0.583	0.74	6.583	1.24	12.583	4.46	18.58	0.99
0.667	0.74	6.667	1.24	12.667	4.46	18.67	0.99
0.750	0.74	6.750	1.24	12.750	4.46	18.75	0.99
0.833	0.74	6.833	1.24	12.833	3.47	18.83	1.24
0.917	0.74	6.917	1.24	12.917	3.47	18.92	1.24
1.000	0.74	7.000	1.24	13.000	3.47	19.00	1.24
1.083	0.74	7.083	1.49	13.083	3.22	19.08	0.99
1.167	0.74	7.167	1.49	13.167	3.22	19.17	0.99
1.250	0.74	7.250	1.49	13.250	3.22	19.25	0.99
1.333	0.50	7.333	1.24	13.333	2.73	19.33	1.24
1.417	0.50	7.417	1.24	13.417	2.73	19.42	1.24
1.500	0.50	7.500	1.24	13.500	2.73	19.50	1.24
1.583	0.74	7.583	1.49	13.583	2.48	19.58	0.99
1.667	0.74	7.667	1.49	13.667	2.48	19.67	0.99
1.750	0.74	7.750	1.49	13.750	2.48	19.75	0.99
1.833	0.74	7.833	1.49	13.833	1.98	19.83	0.74
1.917	0.74	7.917	1.49	13.917	1.98	19.92	0.74
2.000	0.74	8.000	1.49	14.000	1.98	20.00	0.74
2.083	0.99	8.083	1.74	14.083	1.74	20.08	0.74
2.167	0.99	8.167	1.74	14.167	1.74	20.17	0.74
2.250	0.99	8.250	1.74	14.250	1.74	20.25	0.74
2.333	0.74	8.333	1.74	14.333	1.98	20.33	0.74
2.417	0.74	8.417	1.74	14.417	1.98	20.42	0.74
2.500	0.74	8.500	1.74	14.500	1.98	20.50	0.74
2.583	0.74	8.583	1.74	14.583	1.74	20.58	0.74
2.667	0.74	8.667	1.74	14.667	1.74	20.67	0.74
2.750	0.74	8.750	1.74	14.750	1.74	20.75	0.74
2.833	0.74	8.833	1.98	14.833	1.98	20.83	0.74
2.917	0.74	8.917	1.98	14.917	1.98	20.92	0.74
3.000	0.74	9.000	1.98	15.000	1.98	21.00	0.74
3.083	0.99	9.083	1.98	15.083	1.74	21.08	0.74
3.167	0.99	9.167	1.98	15.167	1.74	21.17	0.74
3.250	0.99	9.250	1.98	15.250	1.74	21.25	0.74
3.333	0.74	9.333	2.23	15.333	1.98	21.33	0.74
3.417	0.74	9.417	2.23	15.417	1.98	21.42	0.74
3.500	0.74	9.500	2.23	15.500	1.98	21.50	0.74
3.583	0.74	9.583	2.23	15.583	1.74	21.58	0.74
3.667	0.74	9.667	2.23	15.667	1.74	21.67	0.74
3.750	0.74	9.750	2.23	15.750	1.74	21.75	0.74
3.833	0.99	9.833	2.73	15.833	1.24	21.83	0.74
3.917	0.99	9.917	2.73	15.917	1.24	21.92	0.74
4.000	0.99	10.000	2.73	16.000	1.24	22.00	0.74
4.083	0.99	10.083	2.98	16.083	0.99	22.08	0.74
4.167	0.99	10.167	2.98	16.167	0.99	22.17	0.74
4.250	0.99	10.250	2.98	16.250	0.99	22.25	0.74
4.333	0.99	10.333	3.72	16.333	1.24	22.33	0.74
4.417	0.99	10.417	3.72	16.417	1.24	22.42	0.74
4.500	0.99	10.500	3.72	16.500	1.24	22.50	0.74
4.583	0.99	10.583	3.97	16.583	0.99	22.58	0.74
4.667	0.99	10.667	3.97	16.667	0.99	22.67	0.74
4.750	0.99	10.750	3.97	16.750	0.99	22.75	0.74
4.833	0.99	10.833	5.95	16.833	1.24	22.83	0.74
4.917	0.99	10.917	5.95	16.917	1.24	22.92	0.74
5.000	0.99	11.000	5.95	17.000	1.24	23.00	0.74
5.083	0.99	11.083	5.95	17.083	0.99	23.08	0.74
5.167	0.99	11.167	5.95	17.167	0.99	23.17	0.74
5.250	0.99	11.250	5.95	17.250	0.99	23.25	0.74
5.333	0.99	11.333	18.35	17.333	1.24	23.33	0.74
5.417	0.99	11.417	18.35	17.417	1.24	23.42	0.74
5.500	0.99	11.500	18.35	17.500	1.24	23.50	0.74
5.583	0.99	11.583	75.88	17.583	0.99	23.58	0.74
5.667	0.99	11.667	75.89	17.667	0.99	23.67	0.74
5.750	0.99	11.750	75.89	17.750	0.99	23.75	0.74
5.833	0.99	11.833	8.94	17.833	1.24		
5.917	0.99	11.917	8.93	17.917	1.24		
6.000	0.99	12.000	8.93	18.000	1.24		

Unit Hyd Qpeak (cms)= 2.678

PEAK FLOW (cms)= 0.637 (i)
TIME TO PEAK (hrs)= 14.000
RUNOFF VOLUME (mm)= 10.352
TOTAL RAINFALL (mm)= 61.814
RUNOFF COEFFICIENT = 0.167

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

```
DUHYD     (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	0.64	14.00	10.35
MAJOR SYS.(ID= 2):	0.00	0.00	0.00	0.00
MINOR SYS.(ID= 3):	136.00	0.64	14.00	10.35

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOW IF ANY.

```
CALIB
NASHYD    (0002)
ID= 1 DT= 5.0 min
```

Area (ha)= 10.93 Curve Number (CN)= 68.5
Ia (mm)= 4.40 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.60

Unit Hyd Qpeak (cms)= 0.696

PEAK FLOW (cms)= 0.234 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 18.921
TOTAL RAINFALL (mm)= 61.814
RUNOFF COEFFICIENT = 0.306

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

```
ADD HYD   (0401)
1 + 2 = 3
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	10.93	0.234	12.25	18.92
+ ID2= 2 (0400):	136.00	0.637	14.00	10.35
ID = 3 (0401):	146.93	0.700	13.67	10.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

Area (ha)= 77.75 Curve Number (CN)= 49.6
Ia (mm)= 6.91 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

Unit Hyd Qpeak (cms)= 2.395

PEAK FLOW (cms)= 0.474 (i)
TIME TO PEAK (hrs)= 13.083
RUNOFF VOLUME (mm)= 9.631
TOTAL RAINFALL (mm)= 61.814
RUNOFF COEFFICIENT = 0.156

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

```
RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0201)	5.047	0.063	12.25	10.97
OUTFLOW: ID= 1 (0601)	5.047	0.025	13.33	10.94

PEAK FLOW REDUCTION [Qout/Qin](%)= 40.15
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= 0.0193

```
CALIB
NASHYD    (0202)
ID= 1 DT= 5.0 min
```

Area (ha)= 6.35 Curve Number (CN)= 57.9
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.55

Unit Hyd Qpeak (cms)= 0.441

PEAK FLOW (cms)= 0.101 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 13.490
TOTAL RAINFALL (mm)= 61.814
RUNOFF COEFFICIENT = 0.218

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

```
ADD HYD   (0802)
1 + 2 = 3
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.05	0.025	13.33	10.94
+ ID2= 2 (0602):	6.35	0.012	16.00	13.30
ID = 3 (0802):	11.39	0.036	13.42	12.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min
```

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0653	0.1176
0.0014	0.0066	0.1331	0.1362
0.0069	0.0205	0.2292	0.1554
0.0098	0.0359	0.3196	0.1752
0.0120	0.0502	0.5122	0.1957
0.0139	0.0661	0.8248	0.2169
0.0155	0.0826	1.0265	0.2278
0.0263	0.0998	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0702)	6.346	0.101	12.25	13.49
OUTFLOW: ID= 1 (0602)	6.346	0.012	16.00	13.30

PEAK FLOW REDUCTION [Qout/Qin](%)= 11.69
TIME SHIFT OF PEAK FLOW (min)=225.00
MAXIMUM STORAGE USED (ha.m.)= 0.0487

```
ADD HYD   (0803)
1 + 2 = 3
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	77.75	0.474	13.08	9.63
+ ID2= 2 (0802):	11.39	0.036	13.42	12.25
ID = 3 (0803):	89.14	0.510	13.08	9.97

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
CALIB
NASHYD    (0201)
ID= 1 DT= 5.0 min
```

Area (ha)= 5.05 Curve Number (CN)= 51.4
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.57

Unit Hyd Qpeak (cms)= 0.338

PEAK FLOW (cms)= 0.063 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 10.972
TOTAL RAINFALL (mm)= 61.814
RUNOFF COEFFICIENT = 0.178

```
**********
** SIMULATION NUMBER:  3 **  10-Year SCS Storm
**********
```

```
MASS STORM

Ptotal= 70.90 mm
```

Filename: C:\Users\dmarshall\AppD
ata\Local\Temp\
8b17be1a-b429-46e4-872d-57663c09b842\1b866731
Comments: SCS Type II 24 HR MASS CURVE

Duration of storm = 23.75 hrs
Mass curve time step = 15.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.85	6.25	1.42	12.25	10.21	18.25	1.13
0.50	0.57	6.50	1.13	12.50	5.39	18.50	1.42
0.75	0.85	6.75	1.42	12.75	5.10	18.75	1.13
1.00	0.85	7.00	1.42	13.00	3.97	19.00	1.42
1.25	0.85	7.25	1.70	13.25	3.69	19.25	1.13
1.50	0.57	7.50	1.42	13.50	3.12	19.50	1.42
1.75	0.85	7.75	1.70	13.75	2.84	19.75	1.13
2.00	0.85	8.00	1.70	14.00	2.27	20.00	0.85
2.25	1.13	8.25	1.99	14.25	1.99	20.25	0.85
2.50	0.85	8.50	1.99	14.50	2.27	20.50	0.85
2.75	0.85	8.75	1.99	14.75	1.99	20.75	0.85
3.00	0.85	9.00	2.27	15.00	2.27	21.00	0.85
3.25	1.13	9.25	2.27	15.25	1.99	21.25	0.85
3.50	0.85	9.50	2.55	15.50	2.27	21.50	0.85
3.75	0.85	9.75	2.55	15.75	1.99	21.75	0.85
4.00	1.13	10.00	3.12	16.00	1.42	22.00	0.85
4.25	1.13	10.25	3.40	16.25	1.13	22.25	0.85
4.50	1.13	10.50	4.25	16.50	1.42	22.50	0.85
4.75	1.13	10.75	4.54	16.75	1.13	22.75	0.85
5.00	1.13	11.00	6.81	17.00	1.42	23.00	0.85

5.25	1.13	11.25	6.81	17.25	1.13	23.25	0.85
5.50	1.13	11.50	20.99	17.50	1.42	23.50	0.85
5.75	1.13	11.75	86.78	17.75	1.13	23.75	0.85
6.00	1.13	12.00	10.21	18.00	1.42		

CALIB
NASHYD (0003) ID= 1 DT= 5.0 min

Area (ha)= 136.00 Curve Number (CN)= 52.1
Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.85	6.083	1.42	12.083	10.21	18.08	1.13
0.167	0.85	6.167	1.42	12.167	10.21	18.17	1.13
0.250	0.85	6.250	1.42	12.250	10.21	18.25	1.13
0.333	0.57	6.333	1.13	12.333	5.39	18.33	1.42
0.417	0.57	6.417	1.13	12.417	5.39	18.42	1.42
0.500	0.57	6.500	1.13	12.500	5.39	18.50	1.42
0.583	0.85	6.583	1.42	12.583	5.10	18.58	1.13
0.667	0.85	6.667	1.42	12.667	5.10	18.67	1.13
0.750	0.85	6.750	1.42	12.750	5.10	18.75	1.13
0.833	0.85	6.833	1.42	12.833	3.97	18.83	1.42
0.917	0.85	6.917	1.42	12.917	3.97	18.92	1.42
1.000	0.85	7.000	1.42	13.000	3.97	19.00	1.42
1.083	0.85	7.083	1.70	13.083	3.69	19.08	1.13
1.167	0.85	7.167	1.70	13.167	3.69	19.17	1.13
1.250	0.85	7.250	1.70	13.250	3.69	19.25	1.13
1.333	0.57	7.333	1.42	13.333	3.12	19.33	1.42
1.417	0.57	7.417	1.42	13.417	3.12	19.42	1.42
1.500	0.57	7.500	1.42	13.500	3.12	19.50	1.42
1.583	0.85	7.583	1.70	13.583	2.84	19.58	1.13
1.667	0.85	7.667	1.70	13.667	2.84	19.67	1.13
1.750	0.85	7.750	1.70	13.750	2.84	19.75	1.13
1.833	0.85	7.833	1.70	13.833	2.27	19.83	0.85
1.917	0.85	7.917	1.70	13.917	2.27	19.92	0.85
2.000	0.85	8.000	1.70	14.000	2.27	20.00	0.85
2.083	1.13	8.083	1.99	14.083	1.99	20.08	0.85
2.167	1.13	8.167	1.99	14.167	1.99	20.17	0.85
2.250	1.13	8.250	1.99	14.250	1.99	20.25	0.85
2.333	0.85	8.333	1.99	14.333	2.27	20.33	0.85
2.417	0.85	8.417	1.99	14.417	2.27	20.42	0.85
2.500	0.85	8.500	1.99	14.500	2.27	20.50	0.85
2.583	0.85	8.583	1.99	14.583	1.99	20.58	0.85
2.667	0.85	8.667	1.99	14.667	1.99	20.67	0.85
2.750	0.85	8.750	1.99	14.750	1.99	20.75	0.85
2.833	0.85	8.833	2.27	14.833	2.27	20.83	0.85
2.917	0.85	8.917	2.27	14.917	2.27	20.92	0.85
3.000	0.85	9.000	2.27	15.000	2.27	21.00	0.85
3.083	1.13	9.083	2.27	15.083	1.99	21.08	0.85
3.167	1.13	9.167	2.27	15.167	1.99	21.17	0.85
3.250	1.13	9.250	2.27	15.250	1.99	21.25	0.85
3.333	0.85	9.333	2.55	15.333	2.27	21.33	0.85
3.417	0.85	9.417	2.55	15.417	2.27	21.42	0.85
3.500	0.85	9.500	2.55	15.500	2.27	21.50	0.85
3.583	0.85	9.583	2.55	15.583	1.99	21.58	0.85
3.667	0.85	9.667	2.55	15.667	1.99	21.67	0.85
3.750	0.85	9.750	2.55	15.750	1.99	21.75	0.85
3.833	1.13	9.833	3.12	15.833	1.42	21.83	0.85
3.917	1.13	9.917	3.12	15.917	1.42	21.92	0.85
4.000	1.13	10.000	3.12	16.000	1.42	22.00	0.85
4.083	1.13	10.083	3.40	16.083	1.13	22.08	0.85
4.167	1.13	10.167	3.40	16.167	1.13	22.17	0.85
4.250	1.13	10.250	3.40	16.250	1.13	22.25	0.85
4.333	1.13	10.333	4.25	16.333	1.42	22.33	0.85
4.417	1.13	10.417	4.25	16.417	1.42	22.42	0.85
4.500	1.13	10.500	4.25	16.500	1.42	22.50	0.85
4.583	1.13	10.583	4.54	16.583	1.13	22.58	0.85
4.667	1.13	10.667	4.54	16.667	1.13	22.67	0.85
4.750	1.13	10.750	4.54	16.750	1.13	22.75	0.85
4.833	1.13	10.833	6.81	16.833	1.42	22.83	0.85
4.917	1.13	10.917	6.81	16.917	1.42	22.92	0.85
5.000	1.13	11.000	6.81	17.000	1.42	23.00	0.85
5.083	1.13	11.083	6.81	17.083	1.13	23.08	0.85
5.167	1.13	11.167	6.81	17.167	1.13	23.17	0.85
5.250	1.13	11.250	6.81	17.250	1.13	23.25	0.85
5.333	1.13	11.333	20.99	17.333	1.42	23.33	0.85
5.417	1.13	11.417	20.99	17.417	1.42	23.42	0.85
5.500	1.13	11.500	20.99	17.500	1.42	23.50	0.85
5.583	1.13	11.583	86.78	17.583	1.13	23.58	0.85
5.667	1.13	11.667	86.78	17.667	1.13	23.67	0.85
5.750	1.13	11.750	86.78	17.750	1.13	23.75	0.85
5.833	1.13	11.833	10.22	17.833	1.42		
5.917	1.13	11.917	10.21	17.917	1.42		
6.000	1.13	12.000	10.21	18.000	1.42		

Unit Hyd Qpeak (cms)= 2.678

PEAK FLOW (cms)= 0.843 (i)
TIME TO PEAK (hrs)= 13.917
RUNOFF VOLUME (mm)= 13.571
TOTAL RAINFALL (mm)= 70.687
RUNOFF COEFFICIENT = 0.192

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

DUHYD (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	0.84	13.92	13.57
MAJOR SYS.(ID= 2):	4.61	0.13	13.92	13.57
MINOR SYS.(ID= 3):	131.39	0.71	13.08	13.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0002) ID= 1 DT= 5.0 min

Area (ha)= 10.93 Curve Number (CN)= 68.5
Ia (mm)= 4.40 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.60

Unit Hyd Qpeak (cms)= 0.696

PEAK FLOW (cms)= 0.300 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 23.999
TOTAL RAINFALL (mm)= 70.687
RUNOFF COEFFICIENT = 0.340

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

ADD HYD (0801)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	10.93	0.300	12.25	24.00
+ ID2= 2 (0400):	131.39	0.713	13.08	13.57
ID = 3 (0801):	142.32	0.877	13.08	14.37

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

Area (ha)= 77.75 Curve Number (CN)= 49.6
Ia (mm)= 6.91 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

Unit Hyd Qpeak (cms)= 2.395

PEAK FLOW (cms)= 0.628 (i)
TIME TO PEAK (hrs)= 13.083
RUNOFF VOLUME (mm)= 12.637
TOTAL RAINFALL (mm)= 70.687
RUNOFF COEFFICIENT = 0.179

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

CALIB
NASHYD (0202) ID= 1 DT= 5.0 min

Area (ha)= 6.35 Curve Number (CN)= 57.9
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.55

Unit Hyd Qpeak (cms)= 0.441

PEAK FLOW (cms)= 0.131 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 17.370
TOTAL RAINFALL (mm)= 70.687
RUNOFF COEFFICIENT = 0.246

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0653	0.1176
0.0014	0.0066	0.1331	0.1362
0.0069	0.0205	0.2297	0.1554
0.0098	0.0350	0.3196	0.1752
0.0120	0.0502	0.5122	0.1957
0.0139	0.0661	0.8248	0.2169
0.0155	0.0826	1.0265	0.2278
0.0263	0.0998	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0202)	6.346	0.131	12.25	17.37
OUTFLOW: ID= 1 (0602)	6.346	0.014	16.25	17.18

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.53
TIME SHIFT OF PEAK FLOW (min)=240.00
MAXIMUM STORAGE USED (ha.m.)= 0.0650

CALIB
NASHYD (0201) ID= 1 DT= 5.0 min

Area (ha)= 5.05 Curve Number (CN)= 51.4
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.57

Unit Hyd Qpeak (cms)= 0.338

PEAK FLOW (cms)= 0.082 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 14.222
TOTAL RAINFALL (mm)= 70.687
RUNOFF COEFFICIENT = 0.201

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0201)	5.047	0.082	12.25	14.22
OUTFLOW: ID= 1 (0601)	5.047	0.034	13.33	14.19

PEAK FLOW REDUCTION [Qout/Qin](%)= 40.94
TIME SHIFT OF PEAK FLOW (min)= 65.00
MAXIMUM STORAGE USED (ha.m.)= 0.0251

ADD HYD (0802)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.05	0.034	13.33	14.19
+ ID2= 2 (0602):	6.35	0.014	16.25	17.18
ID = 3 (0802):	11.39	0.046	13.33	15.85

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	77.75	0.628	13.08	12.64
+ ID2= 2 (0802):	11.39	0.046	13.33	15.85
ID = 3 (0803):	89.14	0.673	13.08	13.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

25-Year SCS Storm

MASS STORM
Ptotal= 82.00 mm

Filename: C:\Users\dmarshall\AppD
ata\Local\Temp\
8b17be1a-b429-46e4-872d-57663c09b842\7552F531
Comments: SCS Type II 24 HR MASS CURVE

Duration of Storm = 23.75 hrs
Mass curve time step = 15.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	0.98	6.25	1.64	12.25	11.81	18.25	1.31
0.50	0.66	6.50	1.31	12.50	6.23	18.50	1.64
0.75	0.98	6.75	1.64	12.75	5.90	18.75	1.31
1.00	0.98	7.00	1.64	13.00	4.59	19.00	1.64
1.25	0.98	7.25	1.97	13.25	4.26	19.25	1.31
1.50	0.66	7.50	1.64	13.50	3.61	19.50	1.64
1.75	0.98	7.75	1.97	13.75	3.28	19.75	1.31
2.00	0.98	8.00	1.97	14.00	2.62	20.00	0.98
2.25	1.31	8.25	2.30	14.25	2.30	20.25	0.98
2.50	0.98	8.50	2.30	14.50	2.62	20.50	0.98
2.75	0.98	8.75	2.30	14.75	2.30	20.75	0.98
3.00	0.98	9.00	2.62	15.00	2.62	21.00	0.98
3.25	1.31	9.25	2.62	15.25	2.30	21.25	0.98
3.50	0.98	9.50	2.95	15.50	2.62	21.50	0.98
3.75	0.98	9.75	2.95	15.75	2.30	21.75	0.98
4.00	1.31	10.00	3.61	16.00	1.64	22.00	0.98
4.25	1.31	10.25	3.94	16.25	1.31	22.25	0.98
4.50	1.31	10.50	4.92	16.50	1.64	22.50	0.98
4.75	1.31	10.75	5.25	16.75	1.31	22.75	0.98
5.00	1.31	11.00	7.87	17.00	1.64	23.00	0.98
5.25	1.31	11.25	7.87	17.25	1.31	23.25	0.98
5.50	1.31	11.50	24.27	17.50	1.64	23.50	0.98
5.75	1.31	11.75	100.37	17.75	1.31	23.75	0.98
6.00	1.31	12.00	11.81	18.00	1.64		

CALIB
NASHYD (0003) ID= 1 DT= 5.0 min

Area (ha)= 136.00 Curve Number (CN)= 52.1
Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.98	6.083	1.64	12.083	11.81	18.08	1.31
0.167	0.98	6.167	1.64	12.167	11.81	18.17	1.31
0.250	0.98	6.250	1.64	12.250	11.81	18.25	1.31
0.333	0.66	6.333	1.31	12.333	6.23	18.33	1.64
0.417	0.66	6.417	1.31	12.417	6.23	18.42	1.64
0.500	0.66	6.500	1.31	12.500	6.23	18.50	1.64
0.583	0.98	6.583	1.64	12.583	5.90	18.58	1.31
0.667	0.98	6.667	1.64	12.667	5.90	18.67	1.31
0.750	0.98	6.750	1.64	12.750	5.90	18.75	1.31
0.833	0.98	6.833	1.64	12.833	4.59	18.83	1.64
0.917	0.98	6.917	1.64	12.917	4.59	18.92	1.64
1.000	0.98	7.000	1.64	13.000	4.59	19.00	1.64
1.083	0.98	7.083	1.97	13.083	4.26	19.08	1.31
1.167	0.98	7.167	1.97	13.167	4.26	19.17	1.31
1.250	0.98	7.250	1.97	13.250	4.26	19.25	1.31
1.333	0.66	7.333	1.64	13.333	3.61	19.33	1.64
1.417	0.66	7.417	1.64	13.417	3.61	19.42	1.64

1.500	0.66	7.500	1.64	13.500	3.61	19.50	1.64
1.583	0.98	7.583	1.97	13.583	3.28	19.58	1.31
1.667	0.98	7.667	1.97	13.667	3.28	19.67	1.31
1.750	0.98	7.750	1.97	13.750	3.28	19.75	1.31
1.833	0.98	7.833	1.97	13.833	2.62	19.83	0.98
1.917	0.98	7.917	1.97	13.917	2.62	19.92	0.98
2.000	0.98	8.000	1.97	14.000	2.62	20.00	0.98
2.083	1.31	8.083	2.30	14.083	2.30	20.08	0.98
2.167	1.31	8.167	2.30	14.167	2.30	20.17	0.98
2.250	1.31	8.250	2.30	14.250	2.30	20.25	0.98
2.333	0.98	8.333	2.30	14.333	2.62	20.33	0.98
2.417	0.98	8.417	2.30	14.417	2.62	20.42	0.98
2.500	0.98	8.500	2.30	14.500	2.62	20.50	0.98
2.583	0.98	8.583	2.30	14.583	2.30	20.58	0.98
2.667	0.98	8.667	2.30	14.667	2.30	20.67	0.98
2.750	0.98	8.750	2.30	14.750	2.30	20.75	0.98
2.833	0.98	8.833	2.62	14.833	2.62	20.83	0.98
2.917	0.98	8.917	2.62	14.917	2.62	20.92	0.98
3.000	0.98	9.000	2.62	15.000	2.62	21.00	0.98
3.083	1.31	9.083	2.62	15.083	2.30	21.08	0.98
3.167	1.31	9.167	2.62	15.167	2.30	21.17	0.98
3.250	1.31	9.250	2.62	15.250	2.30	21.25	0.98
3.333	0.98	9.333	2.95	15.333	2.62	21.33	0.98
3.417	0.98	9.417	2.95	15.417	2.62	21.42	0.98
3.500	0.98	9.500	2.95	15.500	2.62	21.50	0.98
3.583	0.98	9.583	2.95	15.583	2.30	21.58	0.98
3.667	0.98	9.667	2.95	15.667	2.30	21.67	0.98
3.750	0.98	9.750	2.95	15.750	2.30	21.75	0.98
3.833	1.31	9.833	3.61	15.833	1.64	21.83	0.98
3.917	1.31	9.917	3.61	15.917	1.64	21.92	0.98
4.000	1.31	10.000	3.61	16.000	1.64	22.00	0.98
4.083	1.31	10.083	3.94	16.083	1.31	22.08	0.98
4.167	1.31	10.167	3.94	16.167	1.31	22.17	0.98
4.250	1.31	10.250	3.94	16.250	1.31	22.25	0.98
4.333	1.31	10.333	4.92	16.333	1.64	22.33	0.98
4.417	1.31	10.417	4.92	16.417	1.64	22.42	0.98
4.500	1.31	10.500	4.92	16.500	1.64	22.50	0.98
4.583	1.31	10.583	5.25	16.583	1.31	22.58	0.98
4.667	1.31	10.667	5.25	16.667	1.31	22.67	0.98
4.750	1.31	10.750	5.25	16.750	1.31	22.75	0.98
4.833	1.31	10.833	7.87	16.833	1.64	22.83	0.98
4.917	1.31	10.917	7.87	16.917	1.64	22.92	0.98
5.000	1.31	11.000	7.87	17.000	1.64	23.00	0.98
5.083	1.31	11.083	7.87	17.083	1.31	23.08	0.98
5.167	1.31	11.167	7.87	17.167	1.31	23.17	0.98
5.250	1.31	11.250	7.87	17.250	1.31	23.25	0.98
5.333	1.31	11.333	24.27	17.333	1.64	23.33	0.98
5.417	1.31	11.417	24.27	17.417	1.64	23.42	0.98
5.500	1.31	11.500	24.27	17.500	1.64	23.50	0.98
5.583	1.31	11.583	100.36	17.583	1.31	23.58	0.98
5.667	1.31	11.667	100.37	17.667	1.31	23.67	0.98
5.750	1.31	11.750	100.37	17.750	1.31	23.75	0.98
5.833	1.31	11.833	11.82	17.833	1.64		
5.917	1.31	11.917	11.81	17.917	1.64		
6.000	1.31	12.000	11.81	18.000	1.64		

Unit Hyd Qpeak (cms)= 2.678

PEAK FLOW (cms)= 1.131 (i)
TIME TO PEAK (hrs)= 13.917
RUNOFF VOLUME (mm)= 18.042
TOTAL RAINFALL (mm)= 81.754
RUNOFF COEFFICIENT = 0.221

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

NHHYD (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	146.00	1.13	11.92	18.04
MAJOR SYS.(ID= 2):	18.24	0.42	13.92	18.04
MINOR SYS.(ID= 3):	117.76	0.71	12.67	18.04

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0002) Area (ha)= 10.93 Curve Number (CN)= 68.5
ID= 1 DT= 5.0 min Ia (mm)= 4.40 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.60

Unit Hyd Qpeak (cms)= 0.696

PEAK FLOW (cms)= 0.388 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 30.818
TOTAL RAINFALL (mm)= 81.754
RUNOFF COEFFICIENT = 0.377

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

ADD HYD (0801)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	10.93	0.388	12.25	30.82
+ ID2= 2 (0400):	117.76	0.713	12.67	18.04
ID = 3 (0801):	128.69	1.031	12.67	19.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0001) Area (ha)= 77.75 Curve Number (CN)= 49.6
ID= 1 DT= 5.0 min Ia (mm)= 6.91 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

Unit Hyd Qpeak (cms)= 2.395

PEAK FLOW (cms)= 0.843 (i)
TIME TO PEAK (hrs)= 13.083
RUNOFF VOLUME (mm)= 16.825
TOTAL RAINFALL (mm)= 81.754
RUNOFF COEFFICIENT = 0.206

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

CALIB
NASHYD (0202) Area (ha)= 6.35 Curve Number (CN)= 57.9
ID= 1 DT= 5.0 min Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.55

Unit Hyd Qpeak (cms)= 0.441

PEAK FLOW (cms)= 0.177 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 22.683
TOTAL RAINFALL (mm)= 81.754
RUNOFF COEFFICIENT = 0.277

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0653	0.1176
0.0014	0.0066	0.1331	0.1362
0.0069	0.0205	0.2297	0.1554
0.0098	0.0350	0.3196	0.1752
0.0120	0.0502	0.5122	0.1957
0.0139	0.0661	0.8248	0.2169
0.0155	0.0826	1.0265	0.2278
0.0263	0.0998	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0202)	6.346	0.177	12.25	22.68
OUTFLOW: ID= 1 (0602)	6.346	0.018	16.17	22.49

PEAK FLOW REDUCTION [Qout/Qin](%)= 10.56
TIME SHIFT OF PEAK FLOW (min)=235.00
MAXIMUM STORAGE USED (ha.m.)= 0.0868

CALIB
NASHYD (0201) Area (ha)= 5.05 Curve Number (CN)= 51.4
ID= 1 DT= 5.0 min Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.57

Unit Hyd Qpeak (cms)= 0.338

PEAK FLOW (cms)= 0.109 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 18.716
TOTAL RAINFALL (mm)= 81.754
RUNOFF COEFFICIENT = 0.229

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0701)	5.047	0.109	12.25	18.72
OUTFLOW: ID= 1 (0601)	5.047	0.050	13.17	18.68

PEAK FLOW REDUCTION [Qout/Qin](%)= 45.77
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 0.0320

ADD HYD (0802)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.05	0.050	13.17	18.68
+ ID2= 2 (0602):	6.35	0.018	16.17	22.49
ID = 3 (0802):	11.39	0.064	13.25	20.80

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	77.75	0.843	13.08	16.82
+ ID2= 2 (0802):	11.39	0.064	13.25	20.80
ID = 3 (0803):	89.14	0.907	13.08	17.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

50-Year SCS Storm

MASS STORM
Ptotal= 90.30 mm

Filename: C:\Users\dmarshall\AppData\Local\Temp\8b17be1a-b429-46e4-872d-57663c09b842\42a3edb3
Comments: SCS Type II 24 HR MASS CURVE

Duration of Storm = 23.75 hrs
Mass curve time step = 15.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	1.08	6.25	1.81	12.25	13.00	18.25	1.44
0.50	0.72	6.50	1.44	12.50	6.86	18.50	1.81
0.75	1.08	6.75	1.81	12.75	6.50	18.75	1.44
1.00	1.08	7.00	1.81	13.00	5.06	19.00	1.81
1.25	1.08	7.25	2.17	13.25	4.70	19.25	1.44
1.50	0.72	7.50	1.81	13.50	3.97	19.50	1.81
1.75	1.08	7.75	2.17	13.75	3.61	19.75	1.44
2.00	1.08	8.00	2.17	14.00	2.89	20.00	1.08
2.25	1.44	8.25	2.53	14.25	2.53	20.25	1.08
2.50	1.08	8.50	2.53	14.50	2.89	20.50	1.08
2.75	1.08	8.75	2.53	14.75	2.53	20.75	1.08
3.00	1.08	9.00	2.89	15.00	2.89	21.00	1.08
3.25	1.44	9.25	2.89	15.25	2.53	21.25	1.08
3.50	1.08	9.50	3.25	15.50	2.89	21.50	1.08
3.75	1.08	9.75	3.25	15.75	2.53	21.75	1.08
4.00	1.44	10.00	3.97	16.00	1.81	22.00	1.08
4.25	1.44	10.25	4.33	16.25	1.44	22.25	1.08
4.50	1.44	10.50	5.42	16.50	1.81	22.50	1.08
4.75	1.44	10.75	5.78	16.75	1.44	22.75	1.08
5.00	1.44	11.00	8.67	17.00	1.81	23.00	1.08
5.25	1.44	11.25	8.67	17.25	1.44	23.25	1.08
5.50	1.44	11.50	26.73	17.50	1.81	23.50	1.08
5.75	1.44	11.75	110.53	17.75	1.44	23.75	1.08
6.00	1.44	12.00	13.00	18.00	1.81		

CALIB
NASHYD (0003) Area (ha)= 136.00 Curve Number (CN)= 52.1
ID= 1 DT= 5.0 min Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.08	6.083	1.81	12.083	13.00	18.08	1.44
0.167	1.08	6.167	1.81	12.167	13.00	18.17	1.44
0.250	1.08	6.250	1.81	12.250	13.00	18.25	1.44
0.333	0.72	6.333	1.44	12.333	6.86	18.33	1.81
0.417	0.72	6.417	1.44	12.417	6.86	18.42	1.81
0.500	0.72	6.500	1.44	12.500	6.86	18.50	1.81
0.583	1.08	6.583	1.81	12.583	6.50	18.58	1.44
0.667	1.08	6.667	1.81	12.667	6.50	18.67	1.44
0.750	1.08	6.750	1.81	12.750	6.50	18.75	1.44
0.833	1.08	6.833	1.81	12.833	5.06	18.83	1.81
0.917	1.08	6.917	1.81	12.917	5.06	18.92	1.81
1.000	1.08	7.000	1.81	13.000	5.06	19.00	1.81
1.083	1.08	7.083	2.17	13.083	4.70	19.08	1.44
1.167	1.08	7.167	2.17	13.167	4.70	19.17	1.44
1.250	1.08	7.250	2.17	13.250	4.70	19.25	1.44
1.333	0.72	7.333	1.81	13.333	3.97	19.33	1.81
1.417	0.72	7.417	1.81	13.417	3.97	19.42	1.81
1.500	0.72	7.500	1.81	13.500	3.97	19.50	1.81
1.583	1.08	7.583	2.17	13.583	3.61	19.58	1.44
1.667	1.08	7.667	2.17	13.667	3.61	19.67	1.44
1.750	1.08	7.750	2.17	13.750	3.61	19.75	1.44
1.833	1.08	7.833	2.17	13.833	2.89	19.83	1.08
1.917	1.08	7.917	2.17	13.917	2.89	19.92	1.08
2.000	1.08	8.000	2.17	14.000	2.89	20.00	1.08
2.083	1.44	8.083	2.53	14.083	2.53	20.08	1.08
2.167	1.44	8.167	2.53	14.167	2.53	20.17	1.08
2.250	1.44	8.250	2.53	14.250	2.53	20.25	1.08
2.333	1.08	8.333	2.53	14.333	2.89	20.33	1.08
2.417	1.08	8.417	2.53	14.417	2.89	20.42	1.08
2.500	1.08	8.500	2.53	14.500	2.89	20.50	1.08
2.583	1.08	8.583	2.53	14.583	2.53	20.58	1.08
2.667	1.08	8.667	2.53	14.667	2.53	20.67	1.08
2.750	1.08	8.750	2.53	14.750	2.53	20.75	1.08
2.833	1.08	8.833	2.89	14.833	2.89	20.83	1.08
2.917	1.08	8.917	2.89	14.917	2.89	20.92	1.08
3.000	1.08	9.000	2.89	15.000	2.89	21.00	1.08
3.083	1.44	9.083	2.89	15.083	2.53	21.08	1.08
3.167	1.44	9.167	2.89	15.167	2.53	21.17	1.08
3.250	1.44	9.250	2.89	15.250	2.53	21.25	1.08
3.333	1.08	9.333	3.25	15.333	2.89	21.33	1.08
3.417	1.08	9.417	3.25	15.417	2.89	21.42	1.08
3.500	1.08	9.500	3.25	15.500	2.89	21.50	1.08
3.583	1.08	9.583	3.25	15.583	2.53	21.58	1.08
3.667	1.08	9.667	3.25	15.667	2.53	21.67	1.08
3.750	1.08	9.750	3.25	15.750	2.53	21.75	1.08
3.833	1.44	9.833	3.97	15.833	1.81	21.83	1.08
3.917	1.44	9.917	3.97	15.917	1.81	21.92	1.08
4.000	1.44	10.000	3.97	16.000	1.81	22.00	1.08
4.083	1.44	10.083	4.33	16.083	1.44	22.08	1.08
4.167	1.44	10.167	4.33	16.167	1.44	22.17	1.08
4.250	1.44	10.250	4.33	16.250	1.44	22.25	1.08
4.333	1.44	10.333	5.42	16.333	1.81	22.33	1.08

4.417	1.44	10.417	5.42	16.417	1.81	22.42	1.08
4.500	1.44	10.500	5.42	16.500	1.81	22.50	1.08
4.583	1.44	10.583	5.78	16.583	1.44	22.58	1.08
4.667	1.44	10.667	5.78	16.667	1.44	22.67	1.08
4.750	1.44	10.750	5.78	16.750	1.44	22.75	1.08
4.833	1.44	10.833	8.67	16.833	1.81	22.83	1.08
4.917	1.44	10.917	8.67	16.917	1.81	22.92	1.08
5.000	1.44	11.000	8.67	17.000	1.81	23.00	1.08
5.083	1.44	11.083	8.67	17.083	1.44	23.08	1.08
5.167	1.44	11.167	8.67	17.167	1.44	23.17	1.08
5.250	1.44	11.250	8.67	17.250	1.44	23.25	1.08
5.333	1.44	11.333	26.73	17.333	1.81	23.33	1.08
5.417	1.44	11.417	26.73	17.417	1.81	23.42	1.08
5.500	1.44	11.500	26.73	17.500	1.81	23.50	1.08
5.583	1.44	11.583	110.52	17.583	1.44	23.58	1.08
5.667	1.44	11.667	110.53	17.667	1.44	23.67	1.08
5.750	1.44	11.750	110.53	17.750	1.44	23.75	1.08
5.833	1.44	11.833	13.01	17.833	1.81		
5.917	1.44	11.917	13.00	17.917	1.81		
6.000	1.44	12.000	13.00	18.000	1.81		

Unit Hyd Qpeak (cms)= 2.678

PEAK FLOW (cms)= 1.367 (i)
TIME TO PEAK (hrs)= 13.917
RUNOFF VOLUME (mm)= 21.687
TOTAL RAINFALL (mm)= 90.029
RUNOFF COEFFICIENT = 0.241

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

DUHYD (0400)
Inlet Cap.=0.713
#of Inlets= 1
Total(cms)= 0.7

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	1.37	13.92	21.69
MAJOR SYS.(ID= 2):	27.96	0.65	13.92	21.69
MINOR SYS.(ID= 3):	108.04	0.71	12.50	21.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0002)
ID= 1 DT= 5.0 min

Area (ha)= 10.93 Curve Number (CN)= 68.5
Ia (mm)= 4.40 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.60

Unit Hyd Qpeak (cms)= 0.696

PEAK FLOW (cms)= 0.458 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 36.220
TOTAL RAINFALL (mm)= 90.029
RUNOFF COEFFICIENT = 0.402

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

ADD HYD (0801)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	10.93	0.458	12.25	36.22
+ ID2= 2 (0400):	108.04	0.713	12.50	21.69
ID = 3 (0801):	118.97	1.140	12.42	23.02

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

Area (ha)= 77.75 Curve Number (CN)= 49.6
Ia (mm)= 6.91 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

Unit Hyd Qpeak (cms)= 2.395

ADD HYD (0802)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	5.05	0.062	13.17	22.33
+ ID2= 2 (0602):	6.35	0.026	14.75	26.78
ID = 3 (0802):	11.39	0.082	13.42	24.81

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	77.75	1.020	13.08	20.25
+ ID2= 2 (0802):	11.39	0.082	13.42	24.81
ID = 3 (0803):	89.14	1.099	13.08	20.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

** SIMULATION NUMBER: 6 **
100-Year SCS Storm

MASS STORM
Ptotal= 98.50 mm

Filename: C:\Users\dmarshall\AppData\Local\Temp\8b17be1a-b429-46e4-872d-57663c09b842\47afa09e
Comments: SCS Type II 24 HR MASS CURVE

Duration of storm = 23.75 hrs
Mass curve time step = 15.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.25	1.18	6.25	1.97	12.25	14.18	18.25	1.58
0.50	0.79	6.50	1.58	12.50	7.49	18.50	1.97
0.75	1.18	6.75	1.97	12.75	7.09	18.75	1.58
1.00	1.18	7.00	1.97	13.00	5.52	19.00	1.97
1.25	1.18	7.25	2.36	13.25	5.12	19.25	1.58
1.50	0.79	7.50	1.97	13.50	4.33	19.50	1.97
1.75	1.18	7.75	2.36	13.75	3.94	19.75	1.58
2.00	1.18	8.00	2.36	14.00	3.15	20.00	1.18
2.25	1.58	8.25	2.76	14.25	2.76	20.25	1.18
2.50	1.18	8.50	2.76	14.50	3.15	20.50	1.18
2.75	1.18	8.75	2.76	14.75	2.76	20.75	1.18
3.00	1.18	9.00	3.15	15.00	3.15	21.00	1.18
3.25	1.58	9.25	3.15	15.25	2.76	21.25	1.18
3.50	1.18	9.50	3.55	15.50	3.15	21.50	1.18
3.75	1.18	9.75	3.55	15.75	2.76	21.75	1.18
4.00	1.58	10.00	4.33	16.00	1.97	22.00	1.18
4.25	1.58	10.25	4.73	16.25	1.58	22.25	1.18
4.50	1.58	10.50	5.91	16.50	1.97	22.50	1.18
4.75	1.58	10.75	6.30	16.75	1.58	22.75	1.18
5.00	1.58	11.00	9.46	17.00	1.97	23.00	1.18
5.25	1.58	11.25	9.46	17.25	1.58	23.25	1.18
5.50	1.58	11.50	29.16	17.50	1.97	23.50	1.18
5.75	1.58	11.75	120.56	17.75	1.58	23.75	1.18
6.00	1.58	12.00	14.18	18.00	1.97		

CALIB
NASHYD (0003)
ID= 1 DT= 5.0 min

Area (ha)= 136.00 Curve Number (CN)= 52.1
Ia (mm)= 7.20 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.94

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	1.18	6.083	1.97	12.083	14.18	18.08	1.58
0.167	1.18	6.167	1.97	12.167	14.18	18.17	1.58
0.250	1.18	6.250	1.97	12.250	14.18	18.25	1.58

PEAK FLOW (cms)= 1.020 (i)
TIME TO PEAK (hrs)= 13.083
RUNOFF VOLUME (mm)= 20.248
TOTAL RAINFALL (mm)= 90.029
RUNOFF COEFFICIENT = 0.225

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

CALIB
NASHYD (0202)
ID= 1 DT= 5.0 min

Area (ha)= 6.35 Curve Number (CN)= 57.9
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.55

Unit Hyd Qpeak (cms)= 0.441

PEAK FLOW (cms)= 0.205 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 26.964
TOTAL RAINFALL (mm)= 90.029
RUNOFF COEFFICIENT = 0.300

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0653	0.1176
0.0014	0.0066	0.1331	0.1362
0.0069	0.0205	0.2297	0.1554
0.0098	0.0350	0.3196	0.1752
0.0120	0.0502	0.5122	0.1957
0.0139	0.0661	0.8248	0.2169
0.0155	0.0826	1.0265	0.2378
0.0263	0.0998	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0202)	6.346	0.205	12.25	26.96
OUTFLOW: ID= 1 (0602)	6.346	0.026	14.75	26.78

PEAK FLOW REDUCTION [Qout/Qin](%)= 12.78
TIME SHIFT OF PEAK FLOW (min)=150.00
MAXIMUM STORAGE USED (ha.m.)= 0.0997

CALIB
NASHYD (0201)
ID= 1 DT= 5.0 min

Area (ha)= 5.05 Curve Number (CN)= 51.4
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.57

Unit Hyd Qpeak (cms)= 0.338

PEAK FLOW (cms)= 0.131 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 22.368
TOTAL RAINFALL (mm)= 90.029
RUNOFF COEFFICIENT = 0.248

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0201)	5.047	0.131	12.25	22.37
OUTFLOW: ID= 1 (0601)	5.047	0.062	13.17	22.33

PEAK FLOW REDUCTION [Qout/Qin](%)= 47.77
TIME SHIFT OF PEAK FLOW (min)= 55.00
MAXIMUM STORAGE USED (ha.m.)= 0.0374

0.333	0.79	6.333	1.58	12.333	7.49	18.33	1.97
0.417	0.79	6.417	1.58	12.417	7.49	18.42	1.97
0.500	0.79	6.500	1.58	12.500	7.49	18.50	1.97
0.583	1.18	6.583	1.97	12.583	7.09	18.58	1.58
0.667	1.18	6.667	1.97	12.667	7.09	18.67	1.58
0.750	1.18	6.750	1.97	12.750	7.09	18.75	1.58
0.833	1.18	6.833	1.97	12.833	5.52	18.83	1.97
0.917	1.18	6.917	1.97	12.917	5.52	18.92	1.97
1.000	1.18	7.000	1.97	13.000	5.52	19.00	1.97
1.083	1.18	7.083	2.36	13.083	5.12	19.08	1.58
1.167	1.18	7.167	2.36	13.167	5.12	19.17	1.58
1.250	1.18	7.250	2.36	13.250	5.12	19.25	1.58
1.333	0.79	7.333	1.97	13.333	4.33	19.33	1.97
1.417	0.79	7.417	1.97	13.417	4.33	19.42	1.97
1.500	0.79	7.500	1.97	13.500	4.33	19.50	1.97
1.583	1.18	7.583	2.36	13.583	3.94	19.58	1.58
1.667	1.18	7.667	2.36	13.667	3.94	19.67	1.58
1.750	1.18	7.750	2.36	13.750	3.94	19.75	1.58
1.833	1.18	7.833	2.36	13.833	3.15	19.83	1.18
1.917	1.18	7.917	2.36	13.917	3.15	19.92	1.18
2.000	1.18	8.000	2.36	14.000	3.15	20.00	1.18
2.083	1.58	8.083	2.76	14.083	2.76	20.08	1.18
2.167	1.58	8.167	2.76	14.167	2.76	20.17	1.18
2.250	1.58	8.250	2.76	14.250	2.76	20.25	1.18
2.333	1.18	8.333	2.76	14.333	3.15	20.33	1.18
2.417	1.18	8.417	2.76	14.417	3.15	20.42	1.18
2.500	1.18	8.500	2.76	14.500	3.15	20.50	1.18
2.583	1.18	8.583	2.76	14.583	2.76	20.58	1.18
2.667	1.18	8.667	2.76	14.667	2.76	20.67	1.18
2.750	1.18	8.750	2.76	14.750	2.76	20.75	1.18
2.833	1.18	8.833	3.15	14.833	3.15	20.83	1.18
2.917	1.18	8.917	3.15	14.917	3.15	20.92	1.18
3.000	1.18	9.000	3.15	15.000	3.15	21.00	1.18
3.083	1.58	9.083	3.15	15.083	2.76	21.08	1.18
3.167	1.58	9.167	3.15	15.167	2.76	21.17	1.18
3.250	1.58	9.250	3.15	15.250	2.76	21.25	1.18
3.333	1.18	9.333	3.55	15.333	3.15	21.33	1.18
3.417	1.18	9.417	3.55	15.417	3.15	21.42	1.18
3.500	1.18	9.500	3.55	15.500	3.15	21.50	1.18
3.583	1.18	9.583	3.55	15.583	2.76	21.58	1.18
3.667	1.18	9.667	3.55	15.667	2.76	21.67	1.18
3.750	1.18	9.750	3.55	15.750	2.76	21.75	1.18
3.833	1.58	9.833	4.33	15.833	1.97	21.83	1.18
3.917	1.58	9.917	4.33	15.917	1.97	21.92	1.18
4.000	1.58	10.000	4.33	16.000	1.97	22.00	1.18
4.083	1.58	10.083	4.73	16.083	1.58	22.08	1.18
4.167	1.58	10.167	4.73	16.167	1.58	22.17	1.18
4.250	1.58	10.250	4.73	16.250	1.58	22.25	1.18
4.333	1.58	10.333	5.91	16.333	1.97	22.33	1.18
4.417	1.58	10.417	5.91	16.417	1.97	22.42	1.18
4.500	1.58	10.500	5.91	16.500	1.97	22.50	1.18
4.583	1.58	10.583	6.30	16.583	1.58	22.58	1.18
4.667	1.58	10.667	6.30	16.667	1.58	22.67	1.18
4.750	1.58	10.750	6.30	16.750	1.58	22.75	1.18
4.833	1.58	10.833	9.46	16.833	1.97	22.83	1.18
4.917	1.58	10.917	9.46	16.917	1.97	22.92	1.18
5.000	1.58	11.000	9.46	17.000	1.97	23.00	1.18
5.083	1.58	11.083	9.46	17.083	1.58	23.08	1.18
5.167	1.58	11.167	9.46	17.167	1.58	23.17	1.18
5.250	1.58	11.250	9.46	17.250	1.58	23.25	1.18
5.333	1.58	11.333	29.15	17.333	1.97	23.33	1.18
5.417	1.58	11.417	29.16	17.417	1.97	23.42	1.18
5.500	1.58	11.500	29.16	17.500	1.97	23.50	1.18
5.583	1.58	11.583	120.56	17.583	1.58	23.58	1.18
5.667	1.58	11.667	120.56	17.667	1.58	23.67	1.18
5.750	1.58	11.750	120.56	17.750	1.58	23.75	1.18
5.833	1.58	11.833	14.20	17.833	1.97		
5.917	1.58	11.917	14.18	17.917	1.97		
6.000	1.58	12.000	14.18	18.000	1.97		

Unit Hyd Qpeak (cms)= 2.678

PEAK FLOW (cms)= 1.615 (i)
TIME TO PEAK (hrs)= 13.917
RUNOFF VOLUME (mm)= 25.520
TOTAL RAINFALL (mm)= 98.205
RUNOFF COEFFICIENT = 0.260

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

DUHYD (0400)
Inlet Cap.=0.713

```
| #of Inlets=   1 |
| Total(cms)=  0.7 |
```

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	136.00	1.62	13.92	25.52
MAJOR SYS.(ID= 2):	36.47	0.90	13.92	25.52
MINOR SYS.(ID= 3):	99.53	0.71	12.34	25.52

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB
NASHYD (0002) ID= 1 DT= 5.0 min

Area (ha)= 10.93 Curve Number (CN)= 68.5
Ia (mm)= 4.40 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.60

Unit Hyd Qpeak (cms)= 0.696

PEAK FLOW (cms)= 0.531 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 41.779
TOTAL RAINFALL (mm)= 98.205
RUNOFF COEFFICIENT = 0.425

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

ADD HYD (0801)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0002):	10.93	0.531	12.25	41.78
+ ID2= 2 (0400):	99.53	0.713	12.33	25.52
ID = 3 (0801):	110.46	1.240	12.33	27.13

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

Area (ha)= 77.75 Curve Number (CN)= 49.6
Ia (mm)= 6.91 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 1.24

Unit Hyd Qpeak (cms)= 2.395

PEAK FLOW (cms)= 1.207 (i)
TIME TO PEAK (hrs)= 13.083
RUNOFF VOLUME (mm)= 23.855
TOTAL RAINFALL (mm)= 98.205
RUNOFF COEFFICIENT = 0.243

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

CALIB
NASHYD (0202) ID= 1 DT= 5.0 min

Area (ha)= 6.85 Curve Number (CN)= 57.9
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.55

Unit Hyd Qpeak (cms)= 0.441

PEAK FLOW (cms)= 0.240 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 31.427
TOTAL RAINFALL (mm)= 98.205
RUNOFF COEFFICIENT = 0.320

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

RESERVOIR (0602)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.0653	0.1176
0.0014	0.0066	0.1331	0.1362
0.0069	0.0205	0.2297	0.1554
0.0098	0.0350	0.3196	0.1752
0.0120	0.0502	0.5122	0.1957
0.0139	0.0661	0.8248	0.2169
0.0155	0.0826	1.0265	0.2278
0.0263	0.0998	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0202)	6.346	0.240	12.25	31.43
OUTFLOW: ID= 1 (0602)	6.346	0.048	14.00	31.24

PEAK FLOW REDUCTION [Qout/Qin](%)= 19.79
TIME SHIFT OF PEAK FLOW (min)=105.00
MAXIMUM STORAGE USED (ha.m.)= 0.1095

CALIB
NASHYD (0201) ID= 1 DT= 5.0 min

Area (ha)= 5.05 Curve Number (CN)= 51.4
Ia (mm)= 4.70 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.57

Unit Hyd Qpeak (cms)= 0.338

PEAK FLOW (cms)= 0.154 (i)
TIME TO PEAK (hrs)= 12.250
RUNOFF VOLUME (mm)= 26.202
TOTAL RAINFALL (mm)= 98.205
RUNOFF COEFFICIENT = 0.267

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

RESERVOIR (0601)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
0.0000	0.0000	0.3000	0.0752
0.0320	0.0244	0.7410	0.1015
0.0910	0.0495	0.0000	0.0000

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0201)	5.047	0.154	12.25	26.20
OUTFLOW: ID= 1 (0601)	5.047	0.076	13.08	26.17

PEAK FLOW REDUCTION [Qout/Qin](%)= 49.18
TIME SHIFT OF PEAK FLOW (min)= 50.00
MAXIMUM STORAGE USED (ha.m.)= 0.0430

ADD HYD (0802)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0601):	5.05	0.076	13.08	26.17
+ ID2= 2 (0602):	6.35	0.048	14.00	31.24
ID = 3 (0802):	11.39	0.114	13.58	28.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0803)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	77.75	1.207	13.08	23.85
+ ID2= 2 (0802):	11.39	0.114	13.58	28.99
ID = 3 (0803):	89.14	1.309	13.08	24.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

APPENDIX C:
WATER QUALITY CALCULATIONS

C.C. Tatham & Associates Ltd. Consulting Engineers	Project: Cedar Run Wakeboard Cable Park	Date: March 2017
	File No.: 115232	Designed: DAM
	Subject: Storage Volume Calculations	Checked: DJH

STORAGE VOLUME CALCULATIONS (AS PER MOE TABLE 3.2)

POND #3

Catchments:	202	
Total Area (ha):	6.35	
Total Impervious Area:	17%	
Required Pond Active Storage Volume (m^3/ha	86	*Table 3.2 MOE SWM Manual (extrapolated)
Total Storage Volume Required (m^3):	546.10	
Extended Detention Volume Required (m^3):	254.00	
Permanent Pool Volume Required (m^3):	292.10	
Extended Detention Volume Provided (m^3):	912.00	
Permanent Pool Volume Provided (m^3):	1404.00	

Therefore, the Storage Volume provided is greater than required.

C.C. Tatham & Associates Ltd. Consulting Engineers	Project: Cedar Run Wakeboard Cable Park	Date: March 2017
	File No.: 115232	Designed: DAM
	Subject: Erosion Control Calculations	Checked: DJH

SIMPLIFIED APPROACH (AS PER MOE-SWMPPD MANUAL SECTION C.4)

POND #1

No directly connected impervious area. There is no minor orifice providing active storage volume, but this is not required for Pond 1.

POND #3

Catchments:	202	
Total Area (ha):	6.35	
Total Directly Connected Impervious Area:	20%	*20% Total Impervious, 0% Directly Connected
SCS Soil Group	A	
Source Control (m^3):	0	
Required Pond Active Storage Volume (m^3/ha	120	*Fig. C1 MOE SWM Manual
Total Storage Volume Required (m^3):	762.00	
Active Storage Volume Provided (m^3):	912	*Active Storage Volume Controlled by Minor Orifice

Therefore, the Storage Volume provided is greater than required.

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

Project:	Cedar Run Wakeboard Cable Park
File No.:	115232
Date:	Mar-17
Design:	DAM
Check:	DJH
Subject:	SWMF Drawdown Calculation
Condition:	25 mm Storm

DRAWDOWN TIME FOR POND - WATER QUALITY STORM

(Using the falling head orifice equation)

$$t = \frac{0.66\, C_2\, h^{1.5} + 2\, C_3\, h^{0.5}}{2.75\, A_o}$$

where t = drawdown time in seconds

C_2 =	slope coefficient from the area-depth linear regression	665.38	
C_3 =	intercept from the area-depth linear regression	1320	
A_o =	cross-sectional area of orifice (m^2)	0.007854 m^2	100 mm diameter
h =	maximum water elevation above the orifice (m)	0.08 m	

t =	35,032.22 seconds
t =	9.73 hours

Water Quality Storage

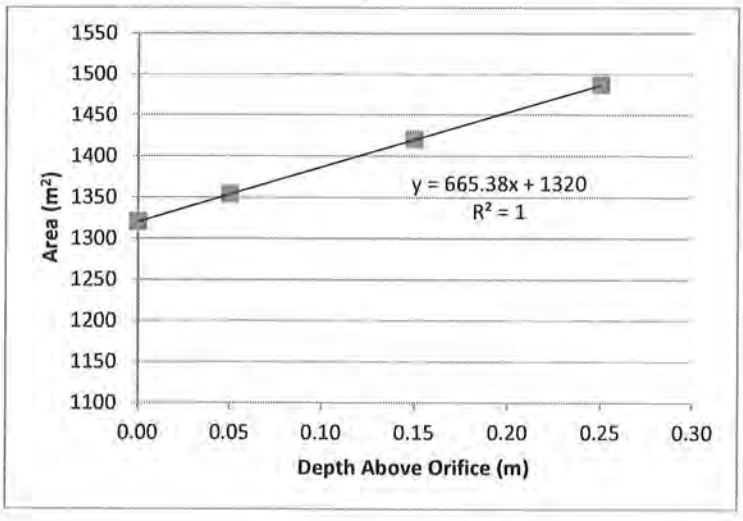
105 m^3

Associated Pond Elevation:

194.98 m

Area Depth Relationship

Area (m^2)	Depth Above Orifice Invert (m)
1320	0.00
1353	0.05
1420	0.15
1486	0.25
1553	0.35
1619	0.45



C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

Project:	Cedar Run Wakeboard Cable Park
File No.:	115232
Date:	Mar-17
Design:	DAM
Check:	DJH
Subject:	SWMF Drawdown Calculation
Condition:	Extended Detention Water Level

DRAWDOWN TIME FOR POND - EXTENDED DETENTION

(Using the falling head orifice equation)

$$t = \frac{0.66\, C_2\, h^{1.5} + 2\, C_3\, h^{0.5}}{2.75\, A_o}$$

where t = drawdown time in seconds

C_2 =	slope coefficient from the area-depth linear regression	665.38	
C_3 =	intercept from the area-depth linear regression	1320	
A_n =	cross-sectional area of orifice (m^2)	0.007854 m^2	100 mm diameter
h =	maximum water elevation above the orifice (m)	0.60 m	

t =	104,129.42 seconds
t =	28.92 hours

Extended Detention Storage

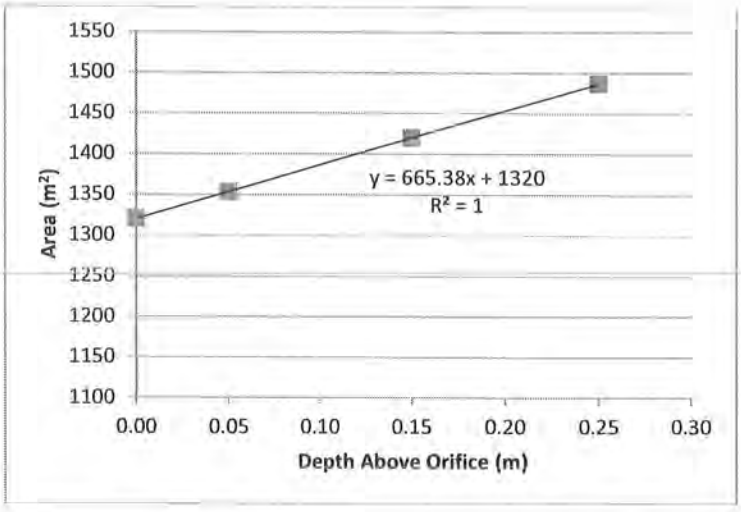
912 m^3

Associated Pond Elevation:

195.5 m

Area Depth Relationship

Area (m^2)	Depth Above Orifice Invert (m)
1320	0.00
1353	0.05
1420	0.15
1486	0.25
1553	0.35
1619	0.45



APPENDIX D:
WAKEBOARD PONDS WATER BALANCE CALCULATIONS

C.C.Tatham & Associates Ltd.
Consulting Engineers

Project:	Cedar Run Wakeboard Cable Park	**Date:**	March 2017
File No.:	115232	**Designed:**	DAM
Subject:	Wakeboard Volume Calculations	**Checked:**	DJH

Wakeboard Pond A

Pond Bottom Elevation:	187.70	m
Pond Bottom Area:	17,636.89	m^2
Pond Top of Bank Elevation:	189.50	m
Assumed Water Level (0.30 m Freeboard):	189.20	m
Water Level Top Area:	22,520.81	m^2
Pond Depth:	1.50	m
Pond Storage Volume:	30,118.27	m^3
Total Storage Volume:	**30,118.27**	**m^3**
Total Water Surface Area:	**22,520.81**	**m^2**
Total Surface Area Draining to Pond:	**28,352.42**	**m^2**

Multi-Level Wakeboard Pond

Cell 1

Pond Bottom Elevation:	203.50	m
Pond Bottom Area:	279.74	m^2
Pond Top of Bank Elevation:	205.30	m
Assumed Water Level (0.30 m Freeboard):	205.00	m
Water Level Top Area:	665.84	m^2
Pond Depth:	1.50	m
Pond Storage Volume:	709.19	m^3

Cell 2

Pond Bottom Elevation:	201.40	m
Pond Bottom Area:	654.04	m^2
Pond Top of Bank Elevation:	203.20	m
Assumed Water Level (0.30 m Freeboard):	202.90	m
Water Level Top Area:	1,211.14	m^2
Pond Depth:	1.50	m
Pond Storage Volume:	1,398.88	m^3

Cell 3

Pond Bottom Elevation:	200.80	m
Pond Bottom Area:	180.99	m^2
Pond Top of Bank Elevation:	202.60	m
Assumed Water Level (0.30 m Freeboard):	202.30	m
Water Level Top Area:	1,422.09	m^2
Pond Depth:	1.50	m
Pond Storage Volume:	1,202.31	m^3

Cell 4

Pond Bottom Elevation:	199.00	m
Pond Bottom Area:	604.81	m^2
Pond Top of Bank Elevation:	200.80	m
Assumed Water Level (0.30 m Freeboard):	200.50	m
Water Level Top Area:	1,837.81	m^2
Pond Depth:	1.50	m
Pond Storage Volume:	1,831.97	m^3

Cell 5

Pond Bottom Elevation:	199.00	m
Pond Bottom Area:	1,967.24	m^2
Pond Top of Bank Elevation:	200.80	m
Assumed Water Level (0.30 m Freeboard):	200.50	m
Water Level Top Area:	3,163.34	m^2
Pond Depth:	1.50	m
Pond Storage Volume:	3,847.94	m^3

Cell 6

Pond Bottom Elevation:	200.80	m
Pond Bottom Area:	279.74	m^2
Pond Top of Bank Elevation:	202.60	m
Assumed Water Level (0.30 m Freeboard):	202.30	m
Water Level Top Area:	665.84	m^2
Pond Depth:	1.50	m
Pond Storage Volume:	709.18	m^3

Cell 7

Pond Bottom Elevation:	200.20	m
Pond Bottom Area:	340.81	m^2
Pond Top of Bank Elevation:	202.00	m
Assumed Water Level (0.30 m Freeboard):	201.70	m
Water Level Top Area:	754.81	m^2
Pond Depth:	1.50	m
Pond Storage Volume:	821.72	m^3
Total Storage Volume:	**10,521.18**	**m^3**
Total Water Surface Area:	**9,720.87**	**m^2**
Total Surface Area Draining to Cells:	**13,300.00**	**m^2**

C.C.Tatham & Associates Ltd.
Consulting Engineers

Project :	Cedar Run Wakeboard Cable Park
File No.	115232
Date:	Mar-17
Designed By:	DAM
Checked By:	DJH
Subject:	Pond A Water Balance

CEDAR RUN WAKEBOARD CABLE PARK - 115232
EXPECTED MONTHLY DEFICITS
CLIMATE NORMALS - 1981 to 2010 CANADIAN CLIMATE NORMALS STATION DATA

Surface Area Pond A 22,520.81 m^2
Drainage Area Pond A 28,352.42 m^2

	Date	Days Per Month	Total Rain (mm)	Total Snow (cm)	Total Precip (mm)	Rainfall Volume (cu.m)	Snowfall Volume (cu.m)	Accumulated Snowfall (cu.m)	Snowmelt Volume (cu.m)	Evaporation (mm/day)	Evaporation (mm)	Evaporation (cu.m)	Balance (cu.m)
1	January	31	20.9	79.1	100.0	593	2,243	3,764	376	0.00	0.0	0	969
2	February	28	19.4	49	68.4	550	1,389	4,777	955	0.00	0.0	0	1,505
3	March	31	36.7	27.4	64.0	1,041	777	4,598	1,839	0.00	0.0	0	2,880
4	April	30	57.4	7.9	65.3	1,627	224	2,983	2,386	2.30	69.0	1,554	2,460
5	May	31	82.7	0	82.7	2,345	0	597	597	3.40	105.4	2,374	568
6	June	30	79.1	0	79.1	2,243	0	0	0	4.20	126.0	2,838	-595
7	July	31	72.1	0	72.1	2,044	0	0	0	4.20	130.2	2,932	-888
8	August	31	78.2	0	78.2	2,217	0	0	0	3.30	102.3	2,304	-87
9	September	30	95.9	0	95.9	2,719	0	0	0	1.80	54.0	1,216	1,503
10	October	31	84	3.3	87.3	2,382	94	94	94	0.70	21.7	489	1,986
11	November	30	70.4	29.2	99.6	1,996	828	828	662	0.00	0.0	0	2,658
12	December	31	28.5	70.8	99.4	808	2,007	2,173	652	0.00	0.0	0	1,460
Total			**725.3**	**266.7**	**992.0**	**20,564.0**	**7,561.6**		**7,561.6**			**13,706.2**	**14,419.4**

Notes:
1. Monthly Climate normals taken from the Thornbury SLAMA Weather Station for the 1981 to 2010 period.
2. Evaporation data taken from average values from the Hamilton RBG Weather Station for the 1981 to 2010 period.

C.C.Tatham & Associates Ltd.
Consulting Engineers

Project :	Cedar Run Wakeboard Cable Park
File No.	115232
Date:	Mar-17
Designed By:	DAM
Checked By:	DJH
Subject:	Multi-Level Pond Water Balance

CEDAR RUN WAKEBOARD CABLE PARK - 115232
EXPECTED MONTHLY DEFICITS
CLIMATE NORMALS - 1981 to 2010 CANADIAN CLIMATE NORMALS STATION DATA

Surface Area Multi-Level 9,720.87 m^2
Drainage Area Multi-Level 13,300.00 m^2

	Date	Days Per Month	Total Rain (mm)	Total Snow (cm)	Total Precip (mm)	Rainfall Volume (cu.m)	Snowfall Volume (cu.m)	Accumulated Snowfall (cu.m)	Snowmelt Volume (cu.m)	Evaporation (mm/day)	Evaporation (mm)	Evaporation (cu.m)	Balance (cu.m)
1	January	31	20.9	79.1	100.0	278	1,052	1,766	177	0.00	0.0	0	455
2	February	28	19.4	49	68.4	258	652	2,241	448	0.00	0.0	0	706
3	March	31	36.7	27.4	64.0	488	364	2,157	863	0.00	0.0	0	1,351
4	April	30	57.4	7.9	65.3	763	105	1,399	1,119	2.30	69.0	671	1,212
5	May	31	82.7	0	82.7	1,100	0	280	280	3.40	105.4	1,025	355
6	June	30	79.1	0	79.1	1,052	0	0	0	4.20	126.0	1,225	-173
7	July	31	72.1	0	72.1	959	0	0	0	4.20	130.2	1,266	-307
8	August	31	78.2	0	78.2	1,040	0	0	0	3.30	102.3	994	46
9	September	30	95.9	0	95.9	1,275	0	0	0	1.80	54.0	525	751
10	October	31	84	3.3	87.3	1,117	44	44	44	0.70	21.7	211	950
11	November	30	70.4	29.2	99.6	936	388	388	311	0.00	0.0	0	1,247
12	December	31	28.5	70.8	99.4	379	942	1,019	306	0.00	0.0	0	685
Total			**725.3**	**266.7**	**992.0**	**9,646.5**	**3,547.1**		**3,547.1**			**5,916.1**	**7,277.5**

Notes:
1. Monthly Climate normals taken from the Thornbury SLAMA Weather Station for the 1981 to 2010 period.
2. Evaporation data taken from average values from the Hamilton RBG Weather Station for the 1981 to 2010 period.

C.C.Tatham & Associates Ltd.
Consulting Engineers

Project :	Cedar Run Wakeboard Cable Park
File No.	115232
Date:	Mar-17
Designed By:	DAM
Checked By:	DJH
Subject:	Pond A Island Runoff

CEDAR RUN WAKEBOARD CABLE PARK - 115232
EXPECTED RUNOFF
CLIMATE NORMALS - 1981 to 2010 CANADIAN CLIMATE NORMALS STATION DATA

Island Area Pond A 9,357.72 m^2
Runoff Coefficient 0.28
Thornthwaite Coefficient: 1.056

	Date	Days Per Month	Total Precip (mm)	Daylight Hours	Average Temperature (°C)	Heat Index	PET (mm)	Daylight Factor	Adjusted PET (mm)	AET (mm)	Surplus (mm)	Deficit (mm)	Runoff (cu.m)
1	January	31	100.0	9.28	-6.3	0.0	0.0	0.77	0.0	0.0	100.0	0.0	262
2	February	28	68.4	10.46	-5.4	0.0	0.0	0.87	0.0	0.0	68.4	0.0	179
3	March	31	64.0	11.89	-1.5	0.0	0.0	0.99	0.0	0.0	64.0	0.0	168
4	April	30	65.3	13.43	5.5	1.2	28.8	1.12	32.2	32.2	33.1	0.0	87
5	May	31	82.7	14.73	11.5	3.5	71.0	1.23	87.1	82.7	0.0	4.4	0
6	June	30	79.1	15.43	16.7	6.2	106.8	1.29	137.3	79.1	0.0	58.2	0
7	July	31	72.1	15.14	19.8	8.0	129.5	1.26	163.4	72.1	0.0	91.3	0
8	August	31	78.2	14.01	19.2	7.7	116.0	1.17	135.4	78.2	0.0	57.2	0
9	September	30	95.9	12.54	15.5	5.5	80.2	1.04	83.7	83.7	12.2	0.0	32
10	October	31	87.3	11.05	9.1	2.5	41.6	0.92	38.4	38.4	48.9	0.0	128
11	November	30	99.6	9.68	3.1	0.5	11.3	0.81	9.1	9.1	90.5	0.0	237
12	December	31	99.4	8.94	-2.7	0.0	0.0	0.75	0.0	0.0	99.4	0.0	260
Total			**992.0**			35.1	585.2		686.7	475.5	516.5	211.2	**1,353.3**

Notes:
1. Monthly Climate normals taken from the Thornbury SLAMA Weather Station for the 1981 to 2010 period.
2. Thornthwaite method used to determine the potential Evapotranspiration.
3. PET - potential evapotranspiration; AET - actual evapotranspiration.

C.C.Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

Project :	Cedar Run Wakeboard Cable Park
File No.	115232
Date:	Mar-17
Designed By:	DAM
Checked By:	DJH
Subject:	Catchment 1 Runoff

CEDAR RUN WAKEBOARD CABLE PARK - 115232
EXPECTED RUNOFF
CLIMATE NORMALS - 1981 to 2010 CANADIAN CLIMATE NORMALS STATION DATA

Drainage to Intermittent Tributary 777,500.00 m^2
Runoff Coefficient 0.3 Based on MOE SWM Planning and Design Manual Table 3.1 for rolling cultivated land, open sandy loam.
Thornthwaite Coefficient: 1.056

	Date	Days Per Month	Total Precip (mm)	Daylight Hours	Average Temperature (°C)	Heat Index	PET (mm)	Daylight Factor	Adjusted PET (mm)	AET (mm)	Surplus (mm)	Deficit (mm)	Runoff (cu.m)
1	January	31	100.0	9.28	-6.3	0.0	0.0	0.77	0.0	0.0	100.0	0.0	23,325
2	February	28	68.4	10.46	-5.4	0.0	0.0	0.87	0.0	0.0	68.4	0.0	15,954
3	March	31	64.0	11.89	-1.5	0.0	0.0	0.99	0.0	0.0	64.0	0.0	14,928
4	April	30	65.3	13.43	5.5	1.2	28.8	1.12	32.2	32.2	33.1	0.0	7,720
5	May	31	82.7	14.73	11.5	3.5	71.0	1.23	87.1	82.7	0.0	4.4	0
6	June	30	79.1	15.43	16.7	6.2	106.8	1.29	137.3	79.1	0.0	58.2	0
7	July	31	72.1	15.14	19.8	8.0	129.5	1.26	163.4	72.1	0.0	91.3	0
8	August	31	78.2	14.01	19.2	7.7	116.0	1.17	135.4	78.2	0.0	57.2	0
9	September	30	95.9	12.54	15.5	5.5	80.2	1.04	83.7	83.7	12.2	0.0	2,836
10	October	31	87.3	11.05	9.1	2.5	41.6	0.92	38.4	38.4	48.9	0.0	11,417
11	November	30	99.6	9.68	3.1	0.5	11.3	0.81	9.1	9.1	90.5	0.0	21,103
12	December	31	99.4	8.94	-2.7	0.0	0.0	0.75	0.0	0.0	99.4	0.0	23,185
Total			**992.0**			35.1	585.2		686.7	475.5	516.5	211.2	**120,468.5**

Notes:
1. Monthly Climate normals taken from the Thornbury SLAMA Weather Station for the 1981 to 2010 period.
2. Thornthwaite method used to determine the potential Evapotranspiration.
3. PET - potential evapotranspiration; AET - actual evapotranspiration.

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie

Project:	Cedar Run Wakeboard Cable Park	**Date:**	March 2017
File No.:	115232	**Designed:**	DAM
Subject:	Wakeboard Fill and Maintenance Calculations	**Checked:**	DJH

WAKEBOARD POND FILL CALCULATIONS

Wakeboard Pond A			
Total Storage Volume:	30,118.27	m^3	
Water Balance From December to May:	9,841.44	m^3	
Runoff From Island Area From December to May:	956.09	m^3	
Pond Deficit:	19,320.75	m^3	
Multi-Level Wakeboard Pond			
Total Storage Volume:	10,521.18	m^3	
Water Balance From December to May:	4,763.69	m^3	
Pond Deficit:	5,757.49	m^3	
Total Deficit to Supplement:	**25,078.23**	**m^3**	
Catchment 1 (78 ha):			
Total Runoff From December to May:	85,112.17	m^3	
Percent of Runoff Required:	**29%**		

WAKEBOARD POND LEVEL MAINTENANCE CALCULATIONS

Wakeboard Pond A			
Greatest Deficit	(888)	m^3	
Month of Greatest Deficit	July		
Multi-Level Wakeboard Pond			
Greatest Deficit	(307)	m^3	
Month of Greatest Deficit	July		
Total Deficit to Supplement:	**(1,195)**	**m^3**	
Days in Month	31		
Required Water Taking Rate:	**38,540**	**litres/day**	<50,000 litres per day which requires Permit to Take Water.

NO.	REVISIONS	DATE	INITIAL

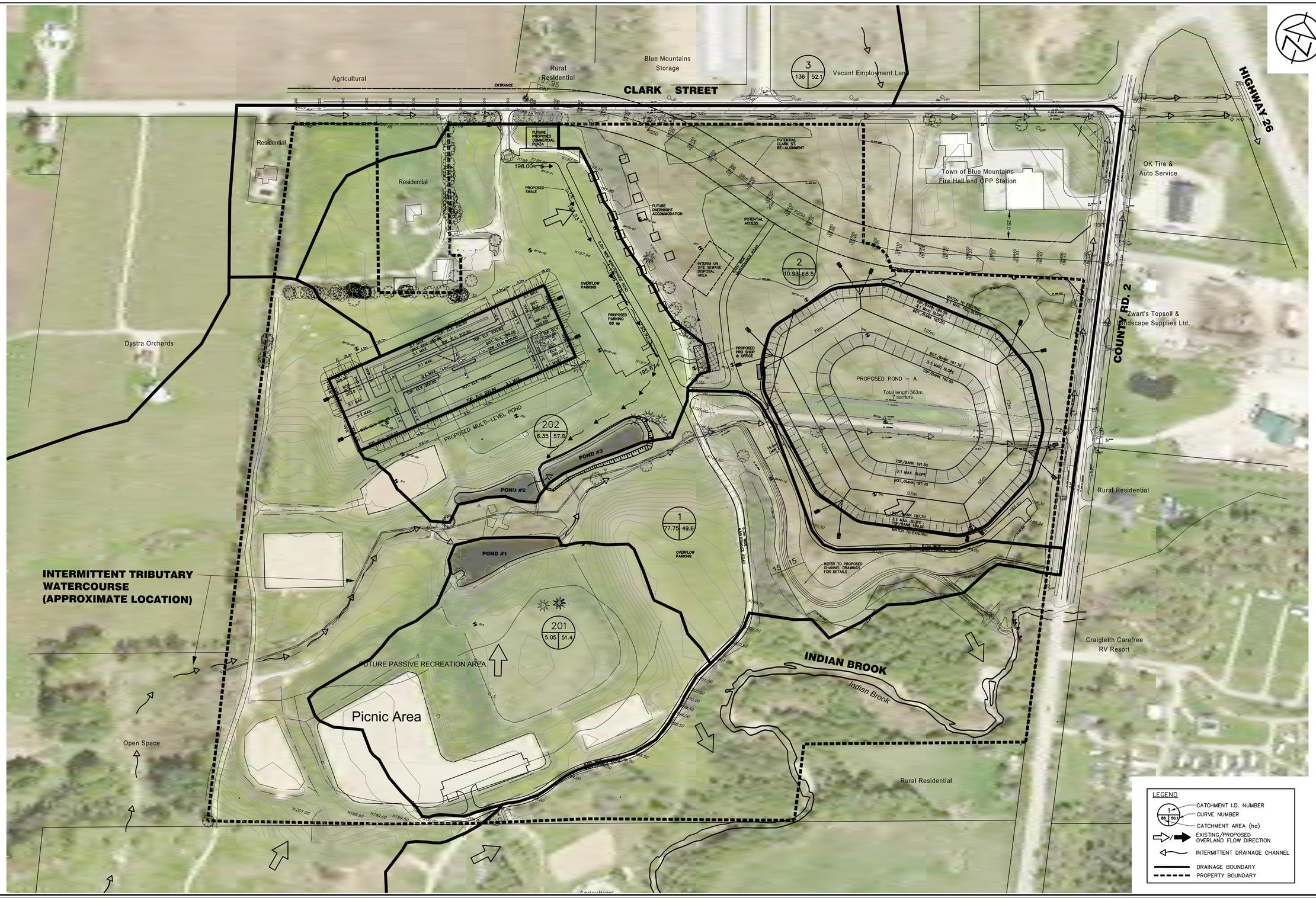
APPROVED

CEDAR RUN WAKEBOARD CABLE PARK
TOWN OF THE BLUE MOUNTAINS

PRE-DEVELOPMENT DRAINAGE PLAN

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie Ottawa

SCALE: 1 : 1,500		JOB NO.	115232
DESIGN: DAM	CHECKED: DJH	DWG.	**DP-1**
DRAWN: DEP	DATE: MAR. 2017		



CONTRACT DRAWINGS

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

NO.	REVISIONS	DATE	INITIAL

APPROVED

CEDAR RUN WAKEBOARD CABLE PARK
TOWN OF THE BLUE MOUNTAINS

POST DEVELOPMENT DRAINAGE PLAN

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie Ottawa

SCALE: 1 : 1,500		JOB NO.	115232
DESIGN: DAM	CHECKED: DJH	DWG.	**DP-2**
DRAWN: DEP	DATE: MAR. 2017		

POND TO BE BROUGHT OFFLINE.
TOP OF BANK TO BE RE-ESTABLISHED
AT 196.20. NO OUTLET TO BE PROVIDED.

EXISTING W.L. 195.80 (APPROX.)

TOP/BANK 196.20

BOTTOM/BANK 192.75
(ASSUMED)

EXISTING POND #2

EXISTING INLET CHANNEL TO BE
FILLED IN AND BLOCKED OFF

INTERMITTENT TRIBUTARY WATERCOURSE

EXISTING OUTLET CHANNELS
TO BE FILLED

200-300mmø (R50) RIP RAP
450mm THICK ON TERRAFIX
400R FILTER FABRIC OR
APPROVED EQUAL.

PROPOSED SWALE

(3:1 MAX.)

(3:1 MAX.)

MATCH EX. GRADE

BOTTOM/BANK

(3:1 MAX.)

194.60

RETROFITTED POND #3

BOTTOM/BANK 192.75
(ASSUMED)

EXISTING OUTLET CHANNEL
TO BE FILLED

300mmø REVERSE
SLOPED STM.

EXISTING W.L. 194.90 (APPROX.)

DICB
T/G 195.50
INV.194.90

TOP/BANK 196.20

(3:1 MAX.)

BOTTOM/BANK

MATCH EX.
GRADE

(3:1 MAX.)

200-300mmø (R50) RIP RAP
450mm THICK ON TERRAFIX
400R FILTER FABRIC OR
APPROVED EQUAL.

13.0m - 375mmø
STM. @ 2.0%

EMERGENCY RIP-RAP
OUTFLOW CHANNEL

194.64

EX. TOP/BANK

INTERMITTENT TRIBUTARY WATERCOURSE

EX. TOP/BANK

195.40

EXISTING OUTLET CHANNEL
AND RIP-RAP TO BE USED
TO RE-ESTABLISH
EMERGENCY OUTFLOW
CHANNEL AS PER DETAIL-C

DICB
T/G 196.60
INV.194.90

300mmø REVERSE
SLOPED STM.

196.80

OUTLET

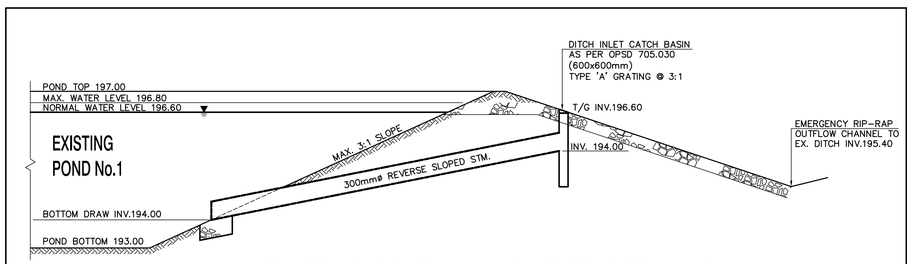
EXISTING POND #1

BOTTOM/BANK 193.00 (ASSUMED)

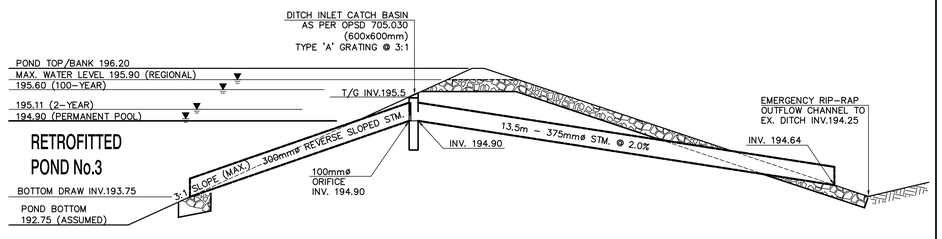
EXISTING W.L. 195.90 (APPROX.)

PROPOSED TOP/BANK 197.00

POND TO BE BROUGHT OFFLINE.
TOP OF BANK TO BE RE-ESTABLISHED
AT 197.00.

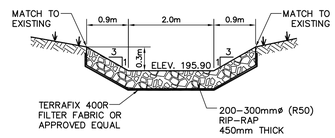


EXISTING POND No.1 OUTLET DETAIL-C



RETROFITTED POND No.3 OUTLET DETAIL-B

SCALE: NTS



SECTION A - A' OVERFLOW WEIR

SCALE: NTS

CONTRACT DRAWINGS

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NO.	REVISIONS	DATE	INITIAL

APPROVED

CEDAR RUN WAKEBOARD CABLE PARK
TOWN OF THE BLUE MOUNTAINS

POND IMPROVEMENTS PLAN

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie Ottawa

SCALE: 1 : 300		JOB NO.	115232
DESIGN: DAM	CHECKED: DJH	DWG.	**PND-1**
DRAWN: DEP	DATE: MAR. 2017		

NOTES:

A. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND SHALL REMAIN IN PLACE UNTIL ALL DISTURBED AREAS HAVE BEEN STABILIZED. SEDIMENT AND EROSION CONTROL MEASURES THAT ARE DESIGNED TO CONTROL RUNOFF FROM SPECIFIC AREAS MUST BE INSTALLED PRIOR TO ANY DISTURBANCE OF THAT PART OF THE SITE. THE LOCATION OF ALL SILTATION AND EROSION CONTROL WORKS TO BE REVIEWED ON SITE BY THE ENGINEER. THE LOCATION OF SILTATION AND EROSION CONTROL WORKS MAY BE REVISED AS DIRECTED BY THE ENGINEER.

B. THE CONTRACTOR MAY CONSIDER ALTERNATIVE SEDIMENT AND EROSION CONTROL MEASURES. SUCH MEASURES MUST BE PRESENTED IN WRITING TO THE ENGINEER FOR APPROVAL OF THE TOWN AND NOTTAWASAGA CONSERVATION AUTHORITY (NVCA).

C. THE CONTRACTOR SHALL HAVE MATERIALS AVAILABLE ON-SITE TO REPAIR SEDIMENT AND EROSION CONTROL DEVICES IN THE EVENT OF UNFORESEEN CONDITIONS: HIGH WATER, EXTREME RAINFALL EVENTS, ETC.

D. ALL EROSION AND SEDIMENT CONTROL DEVICES MUST BE INSPECTED, CLEANED AND MAINTAINED BY THE CONTRACTOR AFTER EACH STORM EVENT. ALL WORKS WILL BE INSPECTED BY THE ENGINEER BI-WEEKLY AND AFTER EACH MAJOR STORM EVENT.

E. CONSTRUCTION OF ALL SILTATION AND EROSION CONTROL WORKS ARE TO BE IN ACCORDANCE WITH THE FOLLOWING STEPS:

1. INSTALL SILT FENCE AS PER NVCA BSD-23.
2. INSTALL ROCK FLOW CHECK DAM (RFCD) AS PER OPSD 219.210.
3. INSTALL STRAW BALE FLOW CHECK (SBFC) AS PER OPSD 219.180.

G. ALL CONSTRUCTION VEHICLES TO ACCESS SITE USING THE DESIGNATED CONSTRUCTION ENTRANCES.

H. EROSION AND SEDIMENT CONTROL MEASURES TO BE REMOVED BY THE CONTRACTOR ONCE GROUND COVER IS ESTABLISHED AND LANDSCAPING IS COMPLETE AND APPROVED BY THE ENGINEER.

I. STOCKPILE LOCATIONS ARE TO BE APPROVED BY THE ENGINEER.

J. PROVIDE SNOW FENCE OR APPROVED EQUAL ACROSS ALL CONSTRUCTION ENTRANCES DURING PERIODS OF INACTIVITY.

K. CONSTRUCTION AREAS THAT EXCEED 30 DAYS OF INACTIVITY SHALL BE STABILIZED BY TOPSOIL & SEEDING.

L. THE RETROFITTED STORMWATER MANAGEMENT FACILITY, INCLUDING OUTLET STRUCTURE, SHALL BE USED AS THE TEMPORARY SEDIMENT CONTROL BASIN DURING THE COURSE OF CONSTRUCTION.

M. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SWEEPING ADJACENT ROADS AS REQUIRED THROUGHOUT CONSTRUCTION OR AS DIRECTED BY THE TOWNSHIP, THE ENGINEER, OR THE GREY SAUBLE CONSERVATION AUTHORITY (GSCA)

Residential

Vacant Employment Land

CLARK ST

GREY RD 2

ENTRANCE

STONE MUD MAT

FUTURE PROPOSED COMMERCIAL PLAZA

POTENTIAL CLARK ST. RE-ALIGNMENT

Town of Blue Mountains Fire Hall and OPP Station

PROPOSED SWALE

FUTURE OVERNIGHT ACCOMMODATION

POTENTIAL ACCESS

6.0m WIDE MAINTENANCE ROAD

INTERIM ON SITE SEWAGE DISPOSAL AREA

OVERFLOW PARKING

PROPOSED PARKING 68 sp

PROPOSED PRO SHOP & OFFICE

PROPOSED POND - A

HEAVY DUTY SILT FENCE

PROPOSED MULTI-LEVEL POND

RETROFITTED POND #3

EXISTING POND #2

15.0m (MIN.)

REFER TO PROPOSED CHANNEL DRAWINGS FOR DETAILS

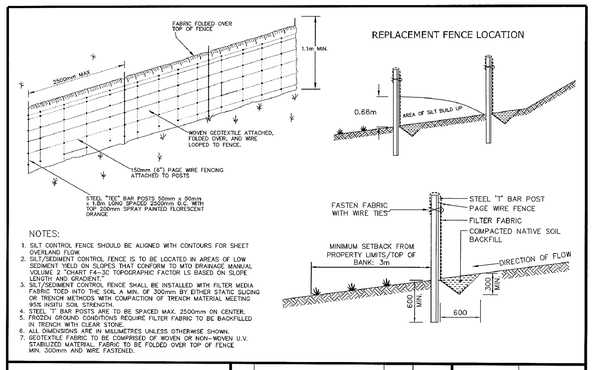
Rural Residential

Craigleith Carefree RV Resort

BH16-01 BH16-02 BH16-03 BH16-04 BH16-05 BH16-06 BH16-07 BH16-08 BH16-09 BH16-10 BH16-11 BH16-12

TP1 TP2 TP3 TP4 TP5 TP6 TP7

SBFC



NOTES:

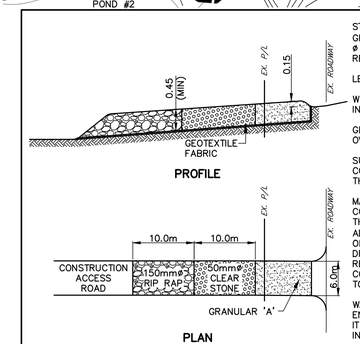
1. SILT CONTROL FENCE SHOULD BE ALIGNED WITH CONTOURS FOR SHEET OVERLAND FLOW.
2. SILT/SEDIMENT CONTROL FENCE IS TO BE LOCATED IN AREAS OF LOW SEDIMENT YIELD ON SLOPES THAT CONFORM TO MTO DRAINAGE MANUAL VOLUME 2 "CHART F4-3C TOPOGRAPHIC FACTOR LS BASED ON SLOPE LENGTH AND GRADIENT."
3. SILT/SEDIMENT CONTROL FENCE SHALL BE INSTALLED WITH FILTER MEDIA FABRIC TOED INTO THE SOIL A MIN. OF 300mm BY EITHER STATIC SLICING OR TRENCH METHODS WITH COMPACTION OF TRENCH MATERIAL MEETING 95% INSITU SOIL STRENGTH.
4. STEEL 'T' BAR POSTS ARE TO BE SPACED MAX. 2500mm ON CENTER.
5. FROZEN GROUND CONDITIONS REQUIRE FILTER FABRIC TO BE BACKFILLED IN TRENCH WITH CLEAR STONE.
6. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.
7. GEOTEXTILE FABRIC TO BE COMPRISED OF WOVEN OR NON-WOVEN U.V. STABILIZED MATERIAL. FABRIC TO BE FOLDED OVER TOP OF FENCE MIN. 200mm AND WIRE FASTENED.

Nottawasaga Valley Conservation Authority

TYPICAL DETAIL OF SILT/SEDIMENT FENCE

NO.	REVISION	APR'D	DATE

APP'D: DATE: 03.03.06
DRAWN: A.S.C SCALE: NTS
BSD-23 DRAFT



STONE SIZE - THE STONE PAD SHALL BE A MIN. 450 mm THICK. USE GRANULAR 'A' FOR THE FIRST 5 m FROM THE ENTRANCE/EXIT, 50 mm ø CLEAR STONE FOR NEXT 10 m AND 150 mm ø RIP RAP FOR THE REMAINING 10 m.

LENGTH - AS REQUIRED BUT NOT LESS THAN 25 m.

WIDTH - 6 m MIN. BUT NOT LESS THAN THE WIDTH AT POINTS WHERE INGRESS AND EGRESS OCCURS.

GEOTEXTILE FABRIC - TERRAFIX 270R OR APPROVED EQUAL TO BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.

SURFACE WATER - ALL SURFACE WATER FLOWING OR DIRECTED TOWARD CONSTRUCTION ENTRANCES SHALL BE DIRECTED ACROSS THE ENTRANCE THROUGH A TEMPORARY CULVERT,

MAINTENANCE - THE CONTRACTOR SHALL MAINTAIN THE ENTRANCE IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO THE PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO THE PUBLIC RIGHT-OF-WAY MUST BE REMOVED IMMEDIATELY BY THE CONTRACTOR. UPON OBSERVATION OF CONTINUOUS MUD TRACKING ONTO ADJACENT STREETS, THE STONE MAT IS TO BE FULLY REPLACED.

WASHING - WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO THE PUBLIC RIGHT-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.

INSPECTION & MAINTENANCE - REQUIRED MAINTENANCE AFTER EACH RAIN EVENT SHALL BE PROVIDED BY THE CONTRACTOR.

STONE MUD MAT TO BE REMOVED UPON COMPLETION OF SITE SERVICING. SEE LANDSCAPE PLANS FOR RESTORATION DETAILS.

STONE MUD MAT DETAIL
NTS

CONTRACT DRAWINGS

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

TBM#1 - ELEVATION 186.773
NAIL IN HYDRO POLE LOCATED ON WEST SIDE OF GREY ROAD #2, 3RD HYDRO POLE SOUTH OF POLICE AND EMS STATION.

TBM#2 - ELEVATION 198.028
NAIL IN HYDRO POLE LOCATED ON NORTH SIDE OF BARE ST., APPROXIMATELY 160m WEST OF INTERSECTION OF CLARK ST. & GREY ROAD #2.

TBM#2 - ELEVATION 198.028
NAIL IN HYDRO POLE LOCATED ON WEST SIDE OF CLARK ST., APPROXIMATELY 500m WEST OF INTERSECTION OF CLARK ST. & GREY ROAD #2.

PROPOSED HEAVY DUTY SILT FENCE
PROPOSED STRAW BALE FLOW CHECK DAM SBFC

NO.	REVISIONS	DATE	INITIAL

APPROVED

CEDAR RUN WAKEBOARD CABLE PARK
TOWN OF THE BLUE MOUNTAINS

SILTATION AND EROSION CONTROL PLAN

C.C. Tatham & Associates Ltd.
Consulting Engineers
Collingwood Bracebridge Orillia Barrie Ottawa

SCALE: 1 : 1,000 JOB NO. 115232
DESIGN: DAM CHECKED: DJH
DRAWN: DEP DATE: JAN. 2017
DWG. **SC-1**