DAVENPORT SUBDIVISION

Township of Georgian Bluffs (Sarawak)
Project No. 06-D-3969

FUNCTIONAL PLANNING REPORT

STORMWATER MANAGEMENT COMPONENT

M.J. DAVENPORT & ASSOCIATES LTD
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2010 Keene Road
Otonabee, ON K9J 6X7
November, 2017

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1.0 INTRODUCTION

The proposed Davenport Subdivision is located on part of Lot 27, Concession III in the geographic township of Sarawak, now in the Township of Georgian Bluffs. The owner is proposing to develop 4.41 hectares of land adjacent to Church Side Road East, and leave the remaining property undeveloped. The proposed development will result in the creation of 8 rural residential lots.

The site is located approximately ten kilometres north of the City of Owen Sound, in the area of East Linton on the west side of Owen Sound. The project site is south of Church Sideroad East, east of Grey County Road No.1, and west of Balmy Beach Road. The site is bordered by residential lands on the west, east and south sides. The area north of the project site is still rural agricultural land. The entire project site is well vegetated as either inactive pasture/meadow or wooded areas.

The development of the project site requires a stormwater management plan which addresses the potential impacts of increased surfacewater runoff with consideration given to the quality of that runoff and erosion control. Given the relatively low imperviousness which will be associated with a rural residential development it is preferred to utilize source and conveyance controls to provide the stormwater controls required. Due to the relatively low slopes (0 - 5.0%), source and conveyance controls will be feasible in providing adequate stormwater controls for the project site.

The goal of the stormwater management controls will be to meet the quantity control requirements of the Township of Georgian Bluffs and the Grey Sauble Conservation Authority (GSCA) plus the quality control requirements of GSCA and the Ontario Ministry of the Environment (MOE) 2003 guidelines. Due to the close proximity to Georgian Bay, "Enhanced" water quality treatment will be provided. It is also the intention of the project development to maintain post-development peak flow rates equal to or below pre-development levels.

2.0 EXISTING CONDITIONS

The existing project site has variable topography with good vegetation cover over the majority of the site. The topography of the site and external associated lands varies from quite flat on the project site to very steep in the east with slopes approaching 30% on the west side of Balmy Beach Road. The existing land use of the project site consists mainly of idle field and meadow with a single detached family dwelling with surrounding manicured lawn and some scrub brush in the center of the site. Runoff from the subdivision and adjacent lands crosses easterly under Balmy Beach Road

through one of two existing culverts. A 800mm diameter corrugated steel pipe (C.S.P.) culvert underneath Balmy Beach Road or a 760mm diameter corrugated steel pipe culvert near the intersection of Balmy Beach Road and Churchside Road East. Both culverts drain into Georgian Bay (Owen Sound), with the 800mm culvert across privately owned lands and the 760mm within the municipal roadway.

Based on the Grey County soil mapping from the Ministry of Agriculture and Food there are two main type of surficial soils present within the study area; Morely Bouldery Clay and Donnybrook Sandy Loam. Morely Bouldery Clay accounts for 100% of the surficial soil within the project site and is considered a poorly drained calcareous stony loam till. This loam soil is classified as type 'C' within the Soil Conservation Service (SCS) hydrologic soil grouping. Donnybrook Sandy Loam is present as surficial soil to the west of the project site, within the watershed area that drains through the site. It is considered a well drained moderately gravelly sand loam and is classified as type 'AB' within the Soil Conservation Service (SCS) hydrologic soil grouping.

Under existing conditions, the project site is considered two watershed areas based on the natural topography of the land determined by contour data (1.0m interval) from Ontario Base Maps, a stormwater management report prepared by Crozier & Associates (April, 2008) for the adjacent property to the south and a topographical survey carried out by M.J. Davenport & Associates plus a visual field inspection. The existing subwatershed areas are illustrated on Pre-Development Subwatershed Areas Drawing No. 3969-SW1.

The existing subwatershed area includes:

Subwatershed Area No. 1 (8.195 hectares) consists of a small area of the north western portion of the project site and additional area west of the site that drains towards the subject property. This subwatershed area is comprised primarily of open meadow with patches of mature trees and several single family detached dwellings and manicured landscaped areas. Under pre-development conditions this area drains mostly as sheet flow towards the roadside ditches running north-south across the subject property.

Subwatershed Area No. 2 (2.294 hectares) consists of an area within the subject property on both the east and west side of the existing driveway. This subwatershed area is comprised primarily of open pasture/meadows with a portion of a small treed area and a single family detached dwelling and manicured landscaped areas. Under pre-development conditions this area drains as sheet flow towards the existing ditches on both the east and west sides of the existing driveway.

Subwatershed Area No. 3 (1.524 hectares) consists of the easterly area within the subject property. This subwatershed area is comprised primarily of open pasture/meadows with a portion of a small treed area and a single family detached dwelling and manicured landscaped areas. Under pre-development conditions this area drains as sheet flow easterly onto adjacent lands.

3.0 POST DEVELOPMENT CONDITIONS

The development will create 8 rural residential lots with a street constructed as a rural road cross section consistent with standards specified by the Township of Georgian Bluffs. The existing ditching along the proposed Street 'A' will remain mostly as is, with the current gravel roadway paved with hot mix asphalt, and an infiltration trench installed under the existing ditching to promote infiltration and provide quality control. This configuration will affect both pre-development watersheds and will require some minor lot grading.

The proposed subwatershed areas include:

Subwatershed Area No. 1 (8.195 hectares) consists of a small area of the north western portion of the project site and additional area west of the site that drains towards the subject property. This subwatershed area will remain largely unchanged, with only the development of a single residential lot on the north east portion of the subwatershed. This lot will be developed with a single detached dwelling, driveway and manicured landscaped areas and will be constructed with lot level controls for the proposed lot. Under post-development conditions this subwatershed will continue to drain in the existing direction into the roadside ditches of Street "A".

Subwatershed Area No. 2 (2.805 hectares) consists of an area within the subject property on both the east and west side of the proposed Street "A". This subwatershed includes all of the area draining to the roadside ditches for Street "A" within the project site, with the exception of Lot 1. This subwatershed area will be developed into 7 rural residential lots complete with single family detached homes, driveways and manicured lawn areas. Under post-development conditions the front of lots 2-8 will now drain into the roadside ditches of Street "A".

Subwatershed Area No. 3 (1.014 hectares) consists of the easterly area within the subject property. The drainage for this subwatershed area will remain largely unchanged and will be developed into manicured lawn areas. Under post-development conditions this area drains in the existing direction, easterly as sheet flow onto adjacent lands.

Peak flows listed in this report were calculated using the Visual Otthymo (version 2.0) computer modeling program. Peak flows were calculated for each of the 2, 5, 10, 25, 50 and 100 year design storms. Calculations include consideration for the 6 hour SCS Type II storm distribution and the 1 Hour AES storm distribution. Rainfall data for the site was taken from the Owen Sound gauging station and is included in Appendix I.

Table 1 summarizes the 2, 5, 10, 25, 50 and 100 year peak flows for the existing condition compared to the proposed condition for all design storms mentioned discharging off-site.

Table 1 – Existing and Proposed 100 Year Peak Flows Draining Off-site

Design Storm (yr)	Peak Flows (m^3/s)								
	6 Hour Chicago			6 Hour SCS			1 Hour AES		
	Pre	Post	Diff	Pre	Post	Diff	Pre	Post	Diff
2	0.143	0.160	0.017	0.177	0.198	0.021	0.096	0.072	-0.024
5	0.262	0.309	0.047	0.309	0.363	0.054	0.190	0.198	0.008
10	0.371	0.443	0.072	0.410	0.484	0.074	0.266	0.293	0.027
25	0.489	0.584	0.095	0.549	0.643	0.094	0.374	0.431	0.057
50	0.622	0.739	0.117	0.662	0.772	0.110	0.461	0.533	0.072
100	0.717	0.848	0.131	0.779	0.907	0.128	0.556	0.649	0.093

Table 1 indicates that off-site stormwater flows will see a net increase in all storm events under post development conditions. It is important to note that the simulated conditions include consideration for the storage capacity of the proposed roadside ditch underdrain, but do not take into account lot level controls and the reduction in peak flows provided by such lot level controls. During construction of individual lots, it will be shown that low impact development lot level controls will reduce post development peak flows to be equal to or less than pre development peak flows.

The supporting calculations for the stormwater management simulation are included in Appendix I. The summary and detailed Visual Otthymo output files for all three (3) scenarios are included in Appendix I.

4.0 STORMWATER QUALITY CONTROLS

Stormwater quality control will be achieved on this site through the use of a combination of low impact development quality control measures. Surface water runoff from the proposed Right-of-Way lands will be controlled, treated and conveyed using an enhanced grassed swale with infiltration underdrain. The proposed enhanced grassed swales will be located on either side of the municipal road and are proposed to have a 0.2% longitudinal slope over the entire length of the road. The underdrain will consist of three six (6) inch diameter perforated "Big O" pipes surrounded by 3/4" washed stone. The volume of water able to contained within the underdrain structure is 68.82 cubic metres, greater than the resulting volume of rainfall from the 25mm rainfall storm event, the quality control storm. The water captured within the underdrain will slowly percolate into the underlying native soils, helping to promote groundwater recharge within the development.

Stormwater management quality and quantity control as it relates to the individual lots will be provided for during construction of the individual houses. Low Impact Development in the form of soak away pits, spreader swales, and infiltration trenches shall be utilized to control, treat and convey surface water runoff from the developed lots.

The combination of lot level controls and enhanced grassed swales with underdrain will adequately control, treat and convey surface water runoff from the proposed development and outlet into the existing roadside ditches along Church Side Road East with no negative impact on downstream land owners.

5.0 EROSION AND SEDIMENTATION CONTROL

Erosion and sedimentation control measures will be installed within the development, during every step of construction, to minimize the effects on lands external to the development as well as the infiltration techniques within the development.

Infiltration underdrains are susceptible to clogging during the construction stage of development. As a result, we are recommending that the municipal infrastructure be constructed within the Right-of-Way before the underdrain is installed. Two rows of silt fence will be installed before the ditches outlet onto Church Side Road East to capture any sedimentation that enters the road side ditches. After paving is complete on the proposed road way, the underdrain shall be installed under the road side ditches and the silt fencing can be removed.

During construction of homes on the individual lots, the municipal road side ditches shall be protected from silt entering the ditch by installing silt fence between the

proposed residence and the road side ditches.

The erosion and sedimentation control measures shall be inspected after every major rainfall event, and sediment buildup shall be cleaned and removed from the ditches as required.

6.0 CONCLUSIONS AND RECOMMENDATIONS

In our professional opinion, the use of low impact development techniques as well as lot level controls will prevent the development from having adverse negative impacts on adjacent and downstream land owners.

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APPENDIX I

STORMWATER MANAGEMENT SUPPORTING INFORMATION

FIGURE 1
DAVENPORT SUBDIVISION
WEIGHTED VALUES FOR CN & C - PRE-DEVELOPMENT
UNCALIBRATED PARAMETERS

Soil Type from Mapping	Hydrologic Soil Group for Modelling	Land Use	CN Value	Runoff Coeff. C'	Subwatershed No. 1 Area (ha.)	Subwatershed No. 1 Weighted CN Portion	Subwatershed No. 1 Weighted C Portion	Subwatershed No. 2 Area (ha.)	Subwatershed No. 2 Weighted CN Portion	Subwatershed No. 2 Weighted C Portion	Subwatershed No. 3 Area (ha.)	Subwatershed No. 3 Weighted CN Portion	Subwatershed No. 3 Weighted C Portion
Morely Bouldery Clay	C	Woodland	77	0.25	1.682	129.514	0.421	0.057	4.389	0.014	0.072	5.544	0.018
Morely Bouldery Clay	C	Meadow	71	0.28	3.995	283.645	1.119	1.834	130.214	0.514	1.087	77.177	0.304
Morely Bouldery Clay	C	Lawns	82	0.35	0.089	7.298	0.031	0.168	13.776	0.059	0.345	28.290	0.121
Morely Bouldery Clay	C	Impervious	98	0.9	0.225	22.050	0.203	0.235	23.030	0.212	0.020	1.960	0.018
Donnybrook Sandy Loam	AB	Woodland	54	0.25	2.032	109.728	0.508	0.000	0.000	0.000	0.000	0.000	0.000
Donnybrook Sandy Loam	AB	Impervious	98	0.9	0.172	16.856	0.155	0.000	0.000	0.000	0.000	0.000	0.000
				Total Area :	8.195			2.294			1.524		
				Weighted CN :		69.444			74.721			74.128	
				Weighted 'C' :			0.297			0.348			0.303

FIGURE 2
DAVENPORT SUBDIVISION
CONVERSION OF CN TO CN* - PRE-DEVELOPMENT
UNCALIBRATED PARAMETERS

Subwatershed	Command	CN (AMC II)	CN (AMC III)	S (mm)	Calculated Ia	P	Q	Standard Ia	S*	CN* (AMC III)	CN* (AMC II)
Post-Development Conditions											
1	101	69.4	84	48.38	7.26	126.8	85.10	5	52.52	83	67
2	102	74.7	88	34.64	5.20	151.3	118.11	5	34.92	88	75
3	103	74.1	88	34.64	5.20	151.3	118.11	5	34.92	88	75

The CN values used for each subcatchment are the weighted values calculated based upon the different soils and land use.

CN for Condition I	CN for Condition II	CN for Condition III	CN for Condition II
0	0	0	0
2	5	13	5
4	10	22	10
6	15	30	15
9	20	37	20
12	25	43	25
15	30	50	30
16	31	51	31
16	32	52	32
17	33	53	33
18	34	54	34
18	35	55	35
19	36	56	36
20	37	57	37
21	38	58	38
21	39	59	39
22	40	60	40
23	41	61	41
24	42	62	42
25	43	63	43
25	44	64	44
26	45	65	45
27	46	66	46
28	47	67	47
29	48	68	48
30	49	69	49
31	50	70	50
31	51	70	51
32	52	71	52
33	53	72	53
34	54	73	54
35	55	74	55
36	56	75	56
37	57	75	57
38	58	76	58
39	59	77	59
40	60	78	60
41	61	78	61
42	62	79	62
43	63	80	63
44	64	81	64
45	65	82	65
46	66	82	66
47	67	83	67
48	68	84	68
50	69	84	69
51	70	85	70
52	71	86	71
53	72	86	72
54	73	87	73
55	74	88	74
57	75	88	75
58	76	89	76
59	77	89	77
60	78	90	78
62	79	91	79
63	80	91	80
64	81	92	81
66	82	92	82
67	83	93	83
68	84	93	84
70	85	94	85
72	86	94	86
73	87	95	87
75	88	95	88
76	89	96	89
78	90	96	90
80	91	97	91
81	92	97	92
83	93	98	93
85	94	98	94
87	95	98	95
89	96	99	96
91	97	99	97
94	98	99	98
97	99	100	99
100	100	100	100

FIGURE 3
DAVENPORT SUBDIVISION
TIME TO PEAK (Tp) FOR DIFFERENT RETURN PERIODS

Subwatershed	Area (ha)	Average Slope (%)	Travel Length (m)	Runoff Coefficient - 'C'				Time to Peak (hr)			
				2/5/10 Year	25 Year	50 Year	100 Year	2/5/10 Year	25 Year	50 Year	100 Year
Pre-Development											
1	8.195	3.00	650	0.297	0.327	0.357	0.371	0.519	0.499	0.480	0.471
2	2.294	3.00	320	0.348	0.383	0.417	0.435	0.341	0.325	0.309	0.301
3	1.524	3.00	70	0.303	0.333	0.363	0.378	0.169	0.163	0.156	0.153

Bransby-Williams Method
Post-Development Urban Watersheds

Subwatershed	Average Slope (%)	Travel Length (m)	Velocity (m/s)	Time to Peak (hr)

FIGURE 4
DAVENPORT SUBDIVISION
WEIGHTED VALUES FOR CN & C - POST-DEVELOPMENT
UNCALIBRATED PARAMETERS

Soil Type from Mapping	Hydrologic Soil Group for Modelling	Land Use	CN Value	Runoff Coeff. C'	Subwatershed No. 1 Area (ha.)	Subwatershed No. 1 Weighted CN Portion	Subwatershed No. 1 Weighted C Portion	Subwatershed No. 2 Area (ha.)	Subwatershed No. 2 Weighted CN Portion	Subwatershed No. 2 Weighted C Portion	Subwatershed No. 3 Area (ha.)	Subwatershed No. 3 Weighted CN Portion	Subwatershed No. 3 Weighted C Portion
Morely Bouldery Clay	C	Woodland	77	0.25	1.682	129.514	0.421	0.000	0.000	0.000	0.000	0.000	0.000
Morely Bouldery Clay	C	Meadow	71	0.28	3.497	248.287	0.979	0.000	0.000	0.000	0.000	0.000	0.000
Morely Bouldery Clay	C	Lawns	82	0.35	0.545	44.690	0.191	2.304	188.928	0.806	1.013	83.066	0.355
Morely Bouldery Clay	C	Impervious	98	0.9	0.267	26.166	0.240	0.501	49.098	0.451	0.001	0.098	0.001
Donnybrook Sandy Loam	AB	Woodland	54	0.25	2.032	109.728	0.508	0.000	0.000	0.000	0.000	0.000	0.000
Donnybrook Sandy Loam	AB	Impervious	98	0.9	0.172	16.856	0.155	0.000	0.000	0.000	0.000	0.000	0.000
				Total Area :	8.195			2.805			1.014		
				Weighted CN :		70.194			84.858			82.016	
				Weighted 'C' :			0.304			0.448			0.351

FIGURE 5
DAVENPORT SUBDIVISION
CONVERSION OF CN TO CN* - POST-DEVELOPMENT
UNCALIBRATED PARAMETERS

Subwatershed	Command	CN (AMC II)	CN (AMC III)	S (mm)	Calculated Ia	P	Q	Standard Ia	S*	CN* (AMC III)	CN* (AMC II)
Post-Development Conditions											
1	101	70.2	85	44.82	6.72	126.8	87.44	5	47.87	84	69
2	102	84.9	93	19.12	3.82	192.7	171.52	4	18.91	93	84
3	103	82.0	92	22.09	4.42	192.7	168.51	4	22.60	92	82

The CN values used for each subcatchment are the weighted values calculated based upon the different soils and land use.

CN for Condition I	CN for Condition II	CN for Condition III	CN for Condition II
0	0	0	0
2	5	13	5
4	10	22	10
6	15	30	15
9	20	37	20
12	25	43	25
15	30	50	30
16	31	51	31
16	32	52	32
17	33	53	33
18	34	54	34
18	35	55	35
19	36	56	36
20	37	57	37
21	38	58	38
21	39	59	39
22	40	60	40
23	41	61	41
24	42	62	42
25	43	63	43
25	44	64	44
26	45	65	45
27	46	66	46
28	47	67	47
29	48	68	48
30	49	69	49
31	50	70	50
31	51	70	51
32	52	71	52
33	53	72	53
34	54	73	54
35	55	74	55
36	56	75	56
37	57	75	57
38	58	76	58
39	59	77	59
40	60	78	60
41	61	78	61
42	62	79	62
43	63	80	63
44	64	81	64
45	65	82	65
46	66	82	66
47	67	83	67
48	68	84	68
50	69	84	69
51	70	85	70
52	71	86	71
53	72	86	72
54	73	87	73
55	74	88	74
57	75	88	75
58	76	89	76
59	77	89	77
60	78	90	78
62	79	91	79
63	80	91	80
64	81	92	81
66	82	92	82
67	83	93	83
68	84	93	84
70	85	94	85
72	86	94	86
73	87	95	87
75	88	95	88
76	89	96	89
78	90	96	90
80	91	97	91
81	92	97	92
83	93	98	93
85	94	98	94
87	95	98	95
89	96	99	96
91	97	99	97
94	98	99	98
97	99	100	99
100	100	100	100

FIGURE 6
DAVENPORT SUBDIVISION
TIME TO PEAK (Tp) FOR DIFFERENT RETURN PERIODS

Subwatershed	Area (ha)	Average Slope (%)	Travel Length (m)	Runoff Coefficient - 'C' 2/5/10 Year	25 Year	50 Year	100 Year	Time to Peak (hr) 2/5/10 Year	25 Year	50 Year	100 Year
Post-Development											
1	8.195	3.00	650	0.304	0.335	0.365	0.380	0.514	0.494	0.475	0.465
2	2.805	3.00	320	0.448	0.493	0.538	0.560	0.295	0.275	0.255	0.245
3	1.014	3.00	45	0.351	0.386	0.421	0.438	0.127	0.121	0.115	0.112

Bransby-Williams Method
Post-Development Urban Watersheds

Subwatershed	Average Slope (%)	Travel Length (m)	Velocity (m/s)	Time to Peak (hr)

DITCH UNDERDRAIN DESIGN

25mm Storm Depth:

In order to contain the 25mm quality storm event, the storage volume in the proposed underdrain must meet the volume expected to accumulate during this storm event. In order to determine the volume necessary, the equation below was used.

$$V = A \times D \times C$$

Where:

V = Volume required to contain the 25mm storm (m^3)
A = Area draining to the road side ditches (m^2)
= 4991.27 m^2
D = Depth of rainfall event (m)
= 0.025 m
C = Runoff coefficient (unitless)
= 0.53

$V = 4991.27 \times 0.025 \times 0.53$
$V = 66.13\ m^3$ required to contain the 25mm storm event

The proposed underdrain with a width of 0.60 metres and a depth of 0.45 metres and extending 246 metres in length creates approximately 68.82 cubic metres of storage. This is accounting for a 40% void ratio in the gravel surrounding the triple 150mm underdrain pipes. This exceeds the required 66.13 cubic metres to completely contain the 25mm storm event for the proposed paved road.

idf_v2-3_2014_12_21_611_ON_6116132_OWEN_SOUND_MOE
Environment Canada/Environnement Canada

Short Duration Rainfall Intensity-Duration-Frequency Data
Données sur l'intensité, la durée et la fréquence des chutes de pluie de courte durée

Gumbel - Method of moments/Méthode des moments

2014/12/21

OWEN SOUND MOE ON 6116132

Latitude: 44 35'N Longitude: 80 56'W Elevation/Altitude: 178 m

Years/Années : 1965 - 2006 # Years/Années : 37

Table 1 : Annual Maximum (mm)/Maximum annuel (mm)

Year Année	5 min	10 min	15 min	30 min	1 h	2 h	6 h	12 h	24 h
1965	12.7	16.0	23.9	28.7	32.3	35.1	35.1	35.1	35.1
1966	6.9	8.9	13.2	18.8	21.8	22.1	30.5	32.0	32.3
1967	11.4	15.7	21.3	38.1	43.9	43.9	43.9	46.5	52.6
1968	14.7	19.6	24.4	31.2	43.9	56.4	63.8	68.1	75.9
1969	6.6	13.0	17.0	22.9	30.2	39.4	49.3	71.9	71.9
1970	10.2	18.8	25.4	32.5	41.4	42.7	42.7	55.6	55.6
1971	7.6	12.2	17.3	26.9	36.1	39.1	55.6	55.6	55.9
1972	7.4	13.2	18.3	19.3	20.1	23.6	36.8	42.7	42.7
1973	5.8	10.2	12.4	16.3	16.5	16.5	18.3	29.7	33.5
1974	6.6	10.4	11.7	16.3	18.8	23.9	43.9	43.9	45.0
1975	6.9	9.4	9.4	11.2	17.0	17.0	24.6	25.4	25.4
1976	7.1	13.2	17.3	22.4	22.6	22.6	29.2	31.7	34.8
1977	13.0	14.7	18.0	22.9	22.9	25.1	26.9	37.3	37.3
1979	18.4	26.0	26.4	30.4	32.1	32.2	41.1	47.1	48.3
1980	9.4	16.1	19.8	30.8	32.0	41.3	45.7	45.7	72.4
1981	-99.9	-99.9	-99.9	-99.9	14.5	19.7	29.4	40.6	41.4
1982	11.8	11.8	12.0	12.0	12.6	23.0	52.6	56.6	56.8
1983	5.6	7.8	8.2	15.7	27.3	38.2	46.8	50.0	53.4
1984	6.9	11.4	15.6	22.3	36.4	45.1	47.0	47.0	47.0
1985	10.1	16.0	18.0	22.4	25.9	32.1	44.8	62.4	73.0
1986	4.6	8.4	11.2	12.4	16.2	16.3	39.2	43.3	60.9
1987	9.0	13.5	15.1	15.1	15.5	15.8	17.0	28.0	28.0
1988	11.4	14.2	18.0	21.0	24.8	27.7	35.9	45.0	54.0
1989	6.9	12.1	12.7	13.5	13.9	14.0	-99.9	-99.9	47.2
1990	10.6	15.0	18.7	27.4	34.1	35.9	40.0	45.4	45.4
1991	5.6	7.0	8.1	8.3	10.5	18.0	27.3	28.6	38.9
1992	4.8	7.4	8.4	8.9	14.1	18.2	27.9	43.3	47.5
1993	7.7	15.4	23.1	25.9	27.9	28.6	33.1	39.0	49.9
1994	5.2	10.4	15.4	27.4	32.4	32.6	35.7	35.7	48.0
1995	7.6	12.0	12.5	12.5	16.4	21.6	30.5	33.2	38.7
1996	10.8	15.3	18.1	27.8	32.5	41.7	47.0	55.9	55.9
1999	7.2	11.1	15.2	20.6	21.7	21.7	36.5	40.8	42.4
2000	7.2	14.1	18.0	33.0	53.0	70.3	79.3	79.5	80.5
2001	5.2	9.0	11.6	14.6	21.4	24.4	30.8	35.6	42.0
2002	8.2	11.0	12.8	15.8	16.4	25.8	53.0	54.8	65.2

idf_v2-3_2014_12_21_611_ON_6116132_OWEN_SOUND_MOE

2003	11.2	16.3	20.6	24.5	30.5	32.2	32.4	32.4	48.1
2004	6.5	9.7	11.3	16.9	27.8	35.4	54.6	70.8	76.2
2006	12.2	17.4	20.0	30.6	53.1	74.8	74.8	76.6	85.8
# Yrs. Années	37	37	37	37	38	38	37	37	38
Mean Moyenne	8.7	13.1	16.2	21.5	26.6	31.4	40.6	46.3	51.2
Std. Dev. Écart-type	3.1	3.9	4.9	7.6	10.9	14.0	13.8	14.1	15.1
Skew. Dissymétrie	1.08	0.96	0.23	0.13	0.73	1.39	0.89	0.76	0.58
Kurtosis	4.39	5.17	2.55	2.32	3.23	5.37	4.30	3.09	2.87

*-99.9 Indicates Missing Data/Données manquantes

Warning: annual maximum amount greater than 100-yr return period amount
Avertissement : la quantité maximale annuelle excède la quantité pour une période de retour de 100 ans

Year/Année	Duration/Durée	Data/Données	100-yr/ans
1979	5 min	18.4	18.4
1979	10 min	26.0	25.2

****

Table 2a : Return Period Rainfall Amounts (mm)
Quantité de pluie (mm) par période de retour

****

Duration/Durée	2 yr/ans	5 yr/ans	10 yr/ans	25 yr/ans	50 yr/ans	100 yr/ans	#Years Années
5 min	8.2	10.9	12.7	15.0	16.7	18.4	37
10 min	12.4	15.9	18.1	21.0	23.1	25.2	37
15 min	15.4	19.8	22.7	26.3	29.0	31.7	37
30 min	20.3	27.0	31.5	37.1	41.3	45.5	37
1 h	24.8	34.5	40.8	48.9	54.9	60.9	38
2 h	29.1	41.5	49.7	60.1	67.8	75.5	38
6 h	38.4	50.5	58.6	68.7	76.3	83.8	37
12 h	44.0	56.5	64.7	75.2	83.0	90.7	37
24 h	48.7	62.0	70.9	82.0	90.3	98.5	38

****

Table 2b :

Return Period Rainfall Rates (mm/h) - 95% Confidence limits
Intensité de la pluie (mm/h) par période de retour - Limites de confiance de 95%

****

Duration/Durée	2 yr/ans	5 yr/ans	10 yr/ans	25 yr/ans	50 yr/ans	100 yr/ans	#Years Années
5 min	98.0	130.8	152.4	179.8	200.2	220.3	37
	+/- 11.0	+/- 18.5	+/- 24.9	+/- 33.6	+/- 40.2	+/- 46.9	37
10 min	74.6	95.2	108.7	125.9	138.7	151.3	37
	+/- 6.9	+/- 11.6	+/- 15.6	+/- 21.1	+/- 25.2	+/- 29.4	37
15 min	61.7	79.1	90.6	105.2	116.0	126.8	37
	+/- 5.8	+/- 9.8	+/- 13.3	+/- 17.9	+/- 21.4	+/- 24.9	37
30 min	40.6	54.1	63.0	74.3	82.7	91.0	37
	+/- 4.5	+/- 7.6	+/- 10.3	+/- 13.8	+/- 16.6	+/- 19.3	37
1 h	24.8	34.5	40.8	48.9	54.9	60.9	38
	+/- 3.2	+/- 5.4	+/- 7.3	+/- 9.8	+/- 11.7	+/- 13.6	38

2 h		14.6		20.8		24.9		30.1		33.9		37.7	38
	+/-	2.0	+/-	3.5	+/-	4.7	+/-	6.3	+/-	7.5	+/-	8.8	38
6 h		6.4		8.4		9.8		11.5		12.7		14.0	37
	+/-	0.7	+/-	1.1	+/-	1.5	+/-	2.1	+/-	2.5	+/-	2.9	37
12 h		3.7		4.7		5.4		6.3		6.9		7.6	37
	+/-	0.3	+/-	0.6	+/-	0.8	+/-	1.1	+/-	1.3	+/-	1.5	37
24 h		2.0		2.6		3.0		3.4		3.8		4.1	38
	+/-	0.2	+/-	0.3	+/-	0.4	+/-	0.6	+/-	0.7	+/-	0.8	38

****

Table 3 : Interpolation Equation / Équation d'interpolation: R = A*T^B

R = Interpolated Rainfall rate (mm/h)/Intensité interpolée de la pluie (mm/h)
RR = Rainfall rate (mm/h) / Intensité de la pluie (mm/h)
T = Rainfall duration (h) / Durée de la pluie (h)

****

Statistics/Statistiques	2 yr/ans	5 yr/ans	10 yr/ans	25 yr/ans	50 yr/ans	100 yr/ans
Mean of RR/Moyenne de RR	36.3	47.8	55.4	65.0	72.2	79.3
Std. Dev. /Écart-type (RR)	34.8	45.4	52.5	61.4	68.1	74.7
Std. Error/Erreur-type	10.4	13.9	16.3	19.4	21.7	24.0
Coefficient (A)	21.8	28.8	33.5	39.3	43.7	48.0
Exponent/Exposant (B)	-0.701	-0.703	-0.704	-0.705	-0.706	-0.706
Mean % Error/% erreur moyenne	10.2	12.2	13.1	13.8	14.3	14.8

Design Chart 1.07: Runoff Coefficients

- Urban for 5 to 10-Year Storms

Land Use		Runoff Coefficient	
		Min.	Max.
Pavement	- asphalt or concrete	0.80	0.95
- brick		0.70	0.85
Gravel roads and shoulders		0.40	0.60
Roofs		0.70	0.95
Business	- downtown	0.70	0.95
- neighbourhood		0.50	0.70
- light		0.50	0.80
- heavy		0.60	0.90
Residential	- single family urban	0.30	0.50
- multiple, detached		0.40	0.60
- multiple, attached		0.60	0.75
- suburban		0.25	0.40
Industrial	- light	0.50	0.80
- heavy		0.60	0.90
Apartments		0.50	0.70
Parks, cemeteries		0.10	0.25
Playgrounds (unpaved)		0.20	0.35
Railroad yards		0.20	0.35
Unimproved areas		0.10	0.30
Lawns	- Sandy soil		
- flat, to 2%		0.05	0.10
- average, 2 to 7%		0.10	0.15
- steep, over 7%		0.15	0.20
- Clayey soil			
- flat, to 2%		0.13	0.17
- average, 2 to 7%		0.18	0.22
- steep, over 7%		0.25	0.35

For flat or permeable surfaces, use the lower values. For steeper or more impervious surfaces, use the higher values. For return period of more than 10 years, increase above values as 25-year - add 10%, 50-year - add 20%, 100-year - add 25%.

The coefficients listed above are for unfrozen ground.

Design Chart 1.07: Runoff Coefficients (Continued)

- Rural

Land Use & Topography[3]	Soil Texture		
	Open Sand Loam	Loam or Silt Loam	Clay Loam or Clay
CULTIVATED			
Flat 0 - 5% Slopes	0.22	0.35	0.55
Rolling 5 - 10% Slopes	0.30	0.45	0.60
Hilly 10- 30% Slopes	0.40	0.65	0.70
PASTURE			
Flat 0 - 5% Slopes	0.10	0.28	0.40
Rolling 5 - 10% Slopes	0.15	0.35	0.45
Hilly 10- 30% Slopes	0.22	0.40	0.55
WOODLAND OR CUTOVER			
Flat 0 - 5% Slopes	0.08	0.25	0.35
Rolling 5 - 10% Slopes	0.12	0.30	0.42
Hilly 10- 30% Slopes	0.18	0.35	0.52
BARE ROCK	COVERAGE[3]		
	30%	50%	70%
Flat 0 - 5% Slopes	0.40	0.55	0.75
Rolling 5 - 10% Slopes	0.50	0.65	0.80
Hilly 10- 30% Slopes	0.55	0.70	0.85
LAKES AND WETLANDS	0.05		

[2] Terrain Slopes

[3] Interpolate for other values of % imperviousness

Sources: American Society of Civil Engineers - ASCE (1960)
U.S. Department of Agriculture (1972)

Design Chart 1.08: Hydrologic Soil Groups

- Based on Surficial Geology Maps

Map Ref.No.	Soil Type or Texture	Hydrologic Soil Group (Tentative)
	Ground Moraine	
1a	Usually sandy till, stony, varying depth. (Most widespread type in Shield).	Usually B (shallow); may be A or AB
1b	Clayey till, varying depth.	BC-C
	End or Interlobate Moraine	
2a	Sand & stones, deep. (May be rough topography).	A
2b	Sand & stones capped by till, deep.	A-C depending on type of till.
2c	Sand & stones, deep. (Smoother topography).	A
	Kames & Eskers	
3a	Sand & stones, deep. (May be rough topography).	A
3b	Sand & stones capped by till, deep.	A-C depending on type of till.
3c	Sand & stones, deep. (Smoother topography).	A
	Lacustrine	
4a	Clay & silt, in lowlands.	BC-C
4b	Fine sand, in lowlands.	AB-B
4c	Sand, in lowlands.	AB
4d	Sand (deltas & valley trains).	A-AB
	Outwash	
5	Sand, some gravel, deep.	A
	Aeolian	
6	Very fine sand & silt, shallow. (Loess)	B
	Bedrock	
7	Bare bedrock (normally negligible areas).	Varies according to rock type.

Source: Ministry of Natural Resources - MNR

Design Chart 1.08: Hydrologic Soil Groups (Continued)

- Based on Soil Texture

Sands, Sandy Loams and Gravels	
- overlying sand, gravel or limestone bedrock, very well drained	A
- ditto, imperfectly drained	AB
- shallow, overlying Precambrian bedrock or clay subsoil	B
Medium to Coarse Loams	
- overlying sand, gravel or limestone, well drained	AB
- shallow, overlying Precambrian bedrock or clay subsoil	B
Medium Textured Loams	
- shallow, overlying limestone bedrock	B
- overlying medium textured subsoil	BC
Silt Loams, Some Loams	
- with good internal drainage	BC
- with slow internal drainage and good external drainage	C
Clays, Clay Loams, Silty Clay Loams	
- with good internal drainage	C
- with imperfect or poor external drainage	C
- with slow internal drainage and good external drainage	D

Source: U.S. Department of Agriculture (1972)

Design Chart 1.09: Soil/Land Use Curve Numbers

Land Use	Treatment or Practice	Hydrologic Condition[4]	Hydrologic Soil Group			
			A	B	C	D
Fallow	Straight row	---	77	86	91	94
Row crops	"	Poor	72	81	88	91
	"	Good	67	78	85	89
	Contoured	Poor	70	79	84	88
	"	Good	65	75	82	86
	" and terraced	Poor	66	74	8	82
	" " "	Good	62	71	78	81
Small grain	Straight row	Poor	65	76	84	88
		Good	63	75	83	87
	Contoured	Poor	63	74	82	85
		Good	61	73	81	84
	" and terraced	Poor	61	72	79	82
		Good	59	70	78	81
Close-seeded	Straight row	Poor	66	77	85	89
legumes[2]	" "	Good	58	72	81	85
or	Contoured	Poor	64	75	83	85
rotation	"	Good	55	69	78	83
meadow	" and terraced	Poor	63	73	80	83
	" and terraced	Good	51	67	76	80
Pasture		Poor	68	79	86	89
or range		Fair	49	69	79	84
	Contoured	Good	39	61	74	80
	"	Poor	47	67	81	88
	"	Fair	25	59	75	83
		Good	6	35	70	79
Meadow		Good	30	58	71	78
Woods		Poor	45	66	77	83
		Fair	36	60	73	79
		Good	25	55	70	77
Farmsteads		---	59	74	82	86
		---	72	82	87	89
		---	74	84	90	92

For average anticedent soil moisture condition (AMC II)
[2] Close-drilled or broadcast.

[4] The hydrologic condition of cropland is good if a good crop rotation practice is used; it is poor if one crop is grown continuously.

Source: U.S. Department of Agriculture (1972)

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

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

Notes

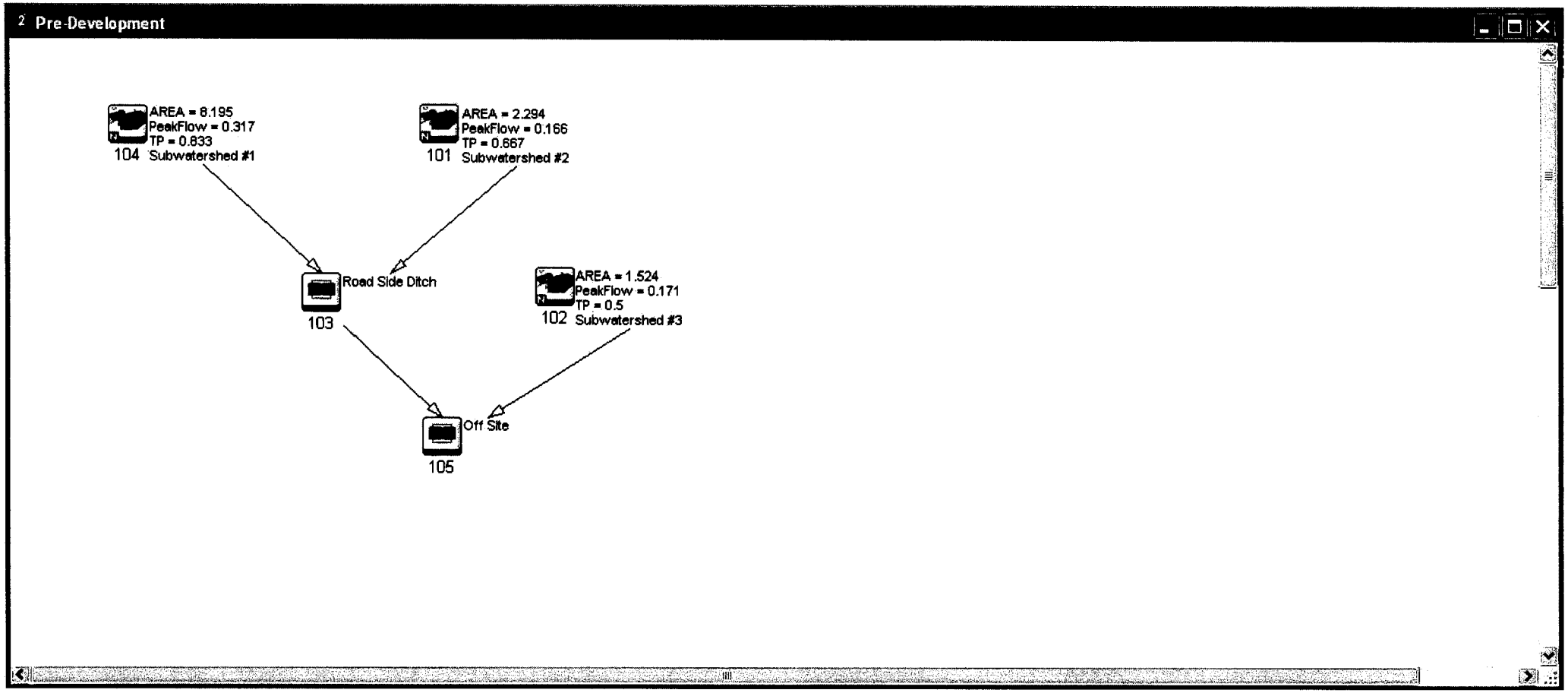
(i) All values are based on AMC II except those marked by * (AMC III) or ** (mean of AMC II and AMC III).

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

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

APPENDIX II

VISUAL OTTHYMO OUTPUT
PRE DEVELOPMENT


2 Pre-Development
AREA = 8.195
PeakFlow = 0.317
TP = 0.833
104 Subwatershed #1
AREA = 2.294
PeakFlow = 0.166
TP = 0.667
101 Subwatershed #2
Road Side Ditch
103
AREA = 1.524
PeakFlow = 0.171
TP = 0.5
102 Subwatershed #3
Off Site
105

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

     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, Version 2.0
    O   O    T      T    H   H   Y Y   MM MM  O   O
    O   O    T      T    H   H    Y    M   M  O   O   Licensed To: MJ Davenport
     OOO     T      T    H   H    Y    M   M   OOO                 vo2-0057
```

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

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  Output  filename: C:\visual otthymo
files\3969\3969-CONT-3-WATERSHEDS\Pre-Development.out

  Summary filename: C:\visual otthymo
files\3969\3969-CONT-3-WATERSHEDS\Pre-Development.sum


DATE: 11/29/2017                        TIME: 11:44:39 AM

USER:


COMMENTS: ____________________________________________________

------------------------------------------------------------------------------
------
  ****************************
  ** SIMULATION NUMBER:   9 **
  ****************************

 ---------------------
 | CHICAGO STORM      |    IDF curve parameters: A= 486.300
 | Ptotal= 25.00 mm   |                          B=   7.500
 ---------------------                           C=    .790
                           used in:   INTENSITY =  A / (t + B)^C

                           Duration of storm  =  4.00 hrs
                           Storm time step    = 10.00 min
                           Time to peak ratio =   .38

                TIME    RAIN |  TIME    RAIN |  TIME    RAIN |  TIME    RAIN
                 hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr |   hrs   mm/hr
                 .17    1.66 |  1.17    6.41 |  2.17    4.73 |  3.17    2.05
                 .33    1.87 |  1.33   14.61 |  2.33    3.84 |  3.33    1.89
```



```
                 .50    2.16 |  1.50   50.69 |  2.50    3.25 |  3.50    1.75
                 .67    2.55 |  1.67   17.59 |  2.67    2.82 |  3.67    1.63
                 .83    3.16 |  1.83    9.15 |  2.83    2.50 |  3.83    1.53
                1.00    4.20 |  2.00    6.21 |  3.00    2.25 |  4.00    1.44

------------------------------------------------------------------------------
 --------------------
 | CALIB              |
 | NASHYD     (0102)  |   Area     (ha)=   1.52   Curve Number   (CN)= 75.0
 |ID= 1 DT=10.0 min   |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
 --------------------     U.H. Tp(hrs)=     .15

     Unit Hyd Qpeak  (cms)=     .380

     PEAK FLOW         (cms)=     .016 (i)
     TIME TO PEAK      (hrs)=    1.667
     RUNOFF VOLUME      (mm)=    3.568
     TOTAL RAINFALL     (mm)=   24.995
     RUNOFF COEFFICIENT    =      .143

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

------------------------------------------------------------------------------
 --------------------
 | CALIB              |
 | NASHYD     (0101)  |   Area     (ha)=   2.29   Curve Number   (CN)= 75.0
 |ID= 1 DT=10.0 min   |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
 --------------------     U.H. Tp(hrs)=     .30

     Unit Hyd Qpeak  (cms)=     .291

     PEAK FLOW         (cms)=     .019 (i)
     TIME TO PEAK      (hrs)=    1.833
     RUNOFF VOLUME      (mm)=    3.798
     TOTAL RAINFALL     (mm)=   24.995
     RUNOFF COEFFICIENT    =      .152

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

------------------------------------------------------------------------------
 --------------------
 | CALIB              |
 | NASHYD     (0104)  |   Area     (ha)=   8.19   Curve Number   (CN)= 67.0
 |ID= 1 DT=10.0 min   |   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
 --------------------     U.H. Tp(hrs)=     .47

     Unit Hyd Qpeak  (cms)=     .665

     PEAK FLOW         (cms)=     .036 (i)
     TIME TO PEAK      (hrs)=    2.167
     RUNOFF VOLUME      (mm)=    2.753
     TOTAL RAINFALL     (mm)=   24.995
     RUNOFF COEFFICIENT    =      .110

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

------------------------------------------------------------------------------
 --------------------
 | ADD HYD    (0103)  |
 |   1 + 2 = 3        |        AREA    QPEAK    TPEAK     R.V.
 --------------------          (ha)    (cms)    (hrs)     (mm)
```



```
         ID1= 1 (0101):      2.29     .019     1.83     3.80
       + ID2= 2 (0104):      8.19     .036     2.17     2.75
         ===============================================
         ID = 3 (0103):     10.49     .053     2.00     2.98

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

------------------------------------------------------------------------------
 --------------------
 | ADD HYD    (0105)  |
 |   1 + 2 = 3        |      AREA    QPEAK    TPEAK     R.V.
 --------------------        (ha)    (cms)    (hrs)     (mm)
         ID1= 1 (0102):      1.52     .016     1.67     3.57
       + ID2= 2 (0103):     10.49     .053     2.00     2.98
         ===============================================
         ID = 3 (0105):     12.01     .062     1.83     3.06

    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, Version 2.0
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M   M  O   O   Licensed To: MJ Davenport
 OOO     T      T    H   H    Y    M   M   OOO                 vo2-0057
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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files\Visual OTTHYMO v2.0\voin.dat

Output filename: C:\visual otthymo files\3969\3969-CONT-3-WATERSHEDS\Pre-Development.out

Summary filename: C:\visual otthymo files\3969\3969-CONT-3-WATERSHEDS\Pre-Development.sum

DATE: 11/29/2017 TIME: 11:42:48 AM

USER:

COMMENTS: _____

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

CHICAGO STORM
Ptotal= 37.36 mm

IDF curve parameters: A= 662.000
B= 7.500
C= .790
used in: INTENSITY = A / (t + B)^C

Duration of storm = 6.00 hrs
Storm time step = 10.00 min
Time to peak ratio = .38

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	1.48	1.67	4.30	3.17	5.23	4.67	2.08
.33	1.59	1.83	5.71	3.33	4.42	4.83	1.96

.50 1.71	2.00 8.73	3.50 3.84	5.00 1.86
.67 1.86	2.17 19.90	3.67 3.41	5.17 1.76
.83 2.04	2.33 69.00	3.83 3.07	5.33 1.68
1.00 2.26	2.50 23.94	4.00 2.79	5.50 1.61
1.17 2.55	2.67 12.46	4.17 2.57	5.67 1.54
1.33 2.94	2.83 8.46	4.33 2.38	5.83 1.48
1.50 3.48	3.00 6.44	4.50 2.22	6.00 1.42

CALIB
NASHYD (0102)
ID= 1 DT=10.0 min

Area (ha)= 1.52 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .15

Unit Hyd Qpeak (cms)= .380

PEAK FLOW (cms)= .037 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 8.360
TOTAL RAINFALL (mm)= 37.363
RUNOFF COEFFICIENT = .224

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

CALIB
NASHYD (0101)
ID= 1 DT=10.0 min

Area (ha)= 2.29 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .30

Unit Hyd Qpeak (cms)= .291

PEAK FLOW (cms)= .042 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 8.898
TOTAL RAINFALL (mm)= 37.363
RUNOFF COEFFICIENT = .238

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

CALIB
NASHYD (0104)
ID= 1 DT=10.0 min

Area (ha)= 8.19 Curve Number (CN)= 67.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .665

PEAK FLOW (cms)= .084 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 6.645
TOTAL RAINFALL (mm)= 37.363
RUNOFF COEFFICIENT = .178

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

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):	2.29	.042	2.67	8.90
+ ID2= 2 (0104):	8.19	.084	2.83	6.64
ID = 3 (0103):	10.49	.121	2.83	7.14

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0105)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.52	.037	2.33	8.36
+ ID2= 2 (0103):	10.49	.121	2.83	7.14
ID = 3 (0105):	12.01	.143	2.67	7.29

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

CHICAGO STORM
Ptotal= 48.64 mm

IDF curve parameters: A=1098.000
B= 10.100
C= .830
used in: INTENSITY = A / (t + B)^C

Duration of storm = 6.00 hrs
Storm time step = 10.00 min
Time to peak ratio = .38

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	1.65	1.67	5.38	3.17	6.69	4.67	2.40
.33	1.78	1.83	7.38	3.33	5.55	4.83	2.25
.50	1.93	2.00	11.78	3.50	4.74	5.00	2.12
.67	2.12	2.17	28.11	3.67	4.15	5.17	2.00
.83	2.35	2.33	90.98	3.83	3.69	5.33	1.90
1.00	2.63	2.50	33.98	4.00	3.33	5.50	1.80
1.17	3.01	2.67	17.30	4.17	3.03	5.67	1.72
1.33	3.51	2.83	11.37	4.33	2.79	5.83	1.64
1.50	4.24	3.00	8.43	4.50	2.58	6.00	1.58

CALIB
NASHYD (0102)
ID= 1 DT=10.0 min

Area (ha)= 1.52 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .15

Unit Hyd Qpeak (cms)= .380

PEAK FLOW (cms)= .066 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 13.869

TOTAL RAINFALL (mm)= 48.645
RUNOFF COEFFICIENT = .285

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

CALIB
NASHYD (0101)
ID= 1 DT=10.0 min

Area (ha)= 2.29 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .30

Unit Hyd Qpeak (cms)= .291

PEAK FLOW (cms)= .076 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 14.761
TOTAL RAINFALL (mm)= 48.645
RUNOFF COEFFICIENT = .303

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

CALIB
NASHYD (0104)
ID= 1 DT=10.0 min

Area (ha)= 8.19 Curve Number (CN)= 67.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .665

PEAK FLOW (cms)= .155 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 11.277
TOTAL RAINFALL (mm)= 48.645
RUNOFF COEFFICIENT = .232

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

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):	2.29	.076	2.67	14.76
+ ID2= 2 (0104):	8.19	.155	2.83	11.28
ID = 3 (0103):	10.49	.220	2.83	12.04

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0105)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.52	.066	2.33	13.87
+ ID2= 2 (0103):	10.49	.220	2.83	12.04
ID = 3 (0105):	12.01	.262	2.67	12.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

CHICAGO STORM
Ptotal= 57.49 mm

IDF curve parameters: A=1560.000
B= 13.000
C= .860
used in: INTENSITY = A / (t + B)^C

Duration of storm = 6.00 hrs
Storm time step = 10.00 min
Time to peak ratio = .38

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	1.73	1.67	6.29	3.17	7.97	4.67	2.60
.33	1.88	1.83	8.87	3.33	6.51	4.83	2.42
.50	2.06	2.00	14.61	3.50	5.48	5.00	2.27
.67	2.27	2.17	35.36	3.67	4.74	5.17	2.13
.83	2.54	2.33	105.21	3.83	4.17	5.33	2.01
1.00	2.88	2.50	42.69	4.00	3.72	5.50	1.90
1.17	3.33	2.67	21.79	4.17	3.36	5.67	1.81
1.33	3.95	2.83	14.08	4.33	3.06	5.83	1.72
1.50	4.85	3.00	10.23	4.50	2.81	6.00	1.64

CALIB
NASHYD (0102)
ID= 1 DT=10.0 min

Area (ha)= 1.52 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .15

Unit Hyd Qpeak (cms)= .380

PEAK FLOW (cms)= .091 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 18.766
TOTAL RAINFALL (mm)= 57.490
RUNOFF COEFFICIENT = .326

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

CALIB
NASHYD (0101)
ID= 1 DT=10.0 min

Area (ha)= 2.29 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .30

Unit Hyd Qpeak (cms)= .291

PEAK FLOW (cms)= .107 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 19.974
TOTAL RAINFALL (mm)= 57.490
RUNOFF COEFFICIENT = .347

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

CALIB
NASHYD (0104)
ID= 1 DT=10.0 min

Area (ha)= 8.19 Curve Number (CN)= 67.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .665

PEAK FLOW (cms)= .222 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 15.498
TOTAL RAINFALL (mm)= 57.490
RUNOFF COEFFICIENT = .270

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

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):	2.29	.107	2.67	19.97
+ ID2= 2 (0104):	8.19	.222	2.83	15.50
ID = 3 (0103):	10.49	.313	2.83	16.48

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0105)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.52	.091	2.33	18.77
+ ID2= 2 (0103):	10.49	.313	2.83	16.48
ID = 3 (0105):	12.01	.371	2.67	16.77

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

CHICAGO STORM
Ptotal= 65.65 mm

IDF curve parameters: A=2010.000
B= 14.000
C= .880
used in: INTENSITY = A / (t + B)^C

Duration of storm = 6.00 hrs
Storm time step = 10.00 min
Time to peak ratio = .38

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	1.78	1.67	6.98	3.17	8.95	4.67	2.75
.33	1.95	1.83	10.01	3.33	7.23	4.83	2.55

.50	2.14	2.00	16.85	3.50	6.04	5.00	2.37
.67	2.38	2.17	41.62	3.67	5.17	5.17	2.22
.83	2.67	2.33	122.63	3.83	4.52	5.33	2.09
1.00	3.05	2.50	50.34	4.00	4.00	5.50	1.97
1.17	3.56	2.67	25.45	4.17	3.60	5.67	1.87
1.33	4.27	2.83	16.21	4.33	3.26	5.83	1.77
1.50	5.31	3.00	11.63	4.50	2.98	6.00	1.69

CALIB
NASHYD (0102)
ID= 1 DT=10.0 min

Area (ha)= 1.52 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .15

Unit Hyd Qpeak (cms)= .380

PEAK FLOW (cms)= .120 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 23.645
TOTAL RAINFALL (mm)= 65.646
RUNOFF COEFFICIENT = .360

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

CALIB
NASHYD (0101)
ID= 1 DT=10.0 min

Area (ha)= 2.29 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .30

Unit Hyd Qpeak (cms)= .291

PEAK FLOW (cms)= .139 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 25.166
TOTAL RAINFALL (mm)= 65.646
RUNOFF COEFFICIENT = .383

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

CALIB
NASHYD (0104)
ID= 1 DT=10.0 min

Area (ha)= 8.19 Curve Number (CN)= 67.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .665

PEAK FLOW (cms)= .294 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 19.781
TOTAL RAINFALL (mm)= 65.646
RUNOFF COEFFICIENT = .301

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

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):	2.29	.139	2.67	25.17
+ ID2= 2 (0104):	8.19	.294	2.83	19.78
ID = 3 (0103):	10.49	.411	2.83	20.96

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0105)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.52	.120	2.33	23.65
+ ID2= 2 (0103):	10.49	.411	2.83	20.96
ID = 3 (0105):	12.01	.489	2.67	21.30

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

CHICAGO STORM
Ptotal= 76.13 mm

IDF curve parameters: A=2200.000
B= 14.600
C= .870
used in: INTENSITY = A / (t + B)^C

Duration of storm = 6.00 hrs
Storm time step = 10.00 min
Time to peak ratio = .38

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	2.22	1.67	8.42	3.17	10.74	4.67	3.38
.33	2.41	1.83	11.98	3.33	8.72	4.83	3.14
.50	2.65	2.00	19.90	3.50	7.31	5.00	2.93
.67	2.93	2.17	47.86	3.67	6.28	5.17	2.75
.83	3.29	2.33	135.62	3.83	5.50	5.33	2.59
1.00	3.75	2.50	57.60	4.00	4.89	5.50	2.44
1.17	4.36	2.67	29.73	4.17	4.40	5.67	2.32
1.33	5.21	2.83	19.18	4.33	4.00	5.83	2.20
1.50	6.45	3.00	13.86	4.50	3.67	6.00	2.10

CALIB
NASHYD (0102)
ID= 1 DT=10.0 min

Area (ha)= 1.52 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .15

Unit Hyd Qpeak (cms)= .380

PEAK FLOW (cms)= .152 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 30.338

TOTAL RAINFALL (mm)= 76.131
RUNOFF COEFFICIENT = .399

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

CALIB NASHYD (0101) ID= 1 DT=10.0 min | Area (ha)= 2.29 Curve Number (CN)= 75.0 | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 | U.H. Tp(hrs)= .30

Unit Hyd Qpeak (cms)= .291

PEAK FLOW (cms)= .175 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 32.290
TOTAL RAINFALL (mm)= 76.131
RUNOFF COEFFICIENT = .424

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

CALIB NASHYD (0104) ID= 1 DT=10.0 min | Area (ha)= 8.19 Curve Number (CN)= 67.0 | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 | U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .665

PEAK FLOW (cms)= .377 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 25.757
TOTAL RAINFALL (mm)= 76.131
RUNOFF COEFFICIENT = .338

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

ADD HYD (0103) 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):	2.29	.175	2.67	32.29
+ ID2= 2 (0104):	8.19	.377	2.83	25.76
ID = 3 (0103):	10.49	.525	2.67	27.19

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0105) 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.52	.152	2.33	30.34
+ ID2= 2 (0103):	10.49	.525	2.67	27.19
ID = 3 (0105):	12.01	.622	2.67	27.59

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

CHICAGO STORM Ptotal= 81.72 mm | IDF curve parameters: A=2507.000 B= 14.800 C= .880
used in: INTENSITY = A / (t + B)^C

Duration of storm = 6.00 hrs
Storm time step = 10.00 min
Time to peak ratio = .38

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	2.25	1.67	8.85	3.17	11.36	4.67	3.47
.33	2.45	1.83	12.70	3.33	9.17	4.83	3.22
.50	2.70	2.00	21.34	3.50	7.66	5.00	3.00
.67	3.00	2.17	52.05	3.67	6.56	5.17	2.81
.83	3.38	2.33	148.61	3.83	5.72	5.33	2.64
1.00	3.86	2.50	62.77	4.00	5.07	5.50	2.49
1.17	4.51	2.67	32.11	4.17	4.55	5.67	2.36
1.33	5.41	2.83	20.54	4.33	4.12	5.83	2.24
1.50	6.73	3.00	14.75	4.50	3.77	6.00	2.13

CALIB NASHYD (0102) ID= 1 DT=10.0 min | Area (ha)= 1.52 Curve Number (CN)= 75.0 | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 | U.H. Tp(hrs)= .15

Unit Hyd Qpeak (cms)= .380

PEAK FLOW (cms)= .176 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 34.074
TOTAL RAINFALL (mm)= 81.724
RUNOFF COEFFICIENT = .417

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

CALIB NASHYD (0101) ID= 1 DT=10.0 min | Area (ha)= 2.29 Curve Number (CN)= 75.0 | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 | U.H. Tp(hrs)= .30

Unit Hyd Qpeak (cms)= .291

PEAK FLOW (cms)= .201 (i)
TIME TO PEAK (hrs)= 2.667
RUNOFF VOLUME (mm)= 36.266
TOTAL RAINFALL (mm)= 81.724
RUNOFF COEFFICIENT = .444

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

CALIB NASHYD (0104) ID= 1 DT=10.0 min | Area (ha)= 8.19 Curve Number (CN)= 67.0 | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 | U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .665

PEAK FLOW (cms)= .435 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 29.137
TOTAL RAINFALL (mm)= 81.724
RUNOFF COEFFICIENT = .357

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

ADD HYD (0103) 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):	2.29	.201	2.67	36.27
+ ID2= 2 (0104):	8.19	.435	2.83	29.14
ID = 3 (0103):	10.49	.607	2.67	30.70

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0105) 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.52	.176	2.33	34.07
+ ID2= 2 (0103):	10.49	.607	2.67	30.70
ID = 3 (0105):	12.01	.717	2.67	31.12

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, Version 2.0
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M   M  O   O   Licensed To: MJ Davenport
 OOO     T      T    H   H    Y    M   M   OOO                  vo2-0057
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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files\Visual OTTHYMO v2.0\voin.dat

Output filename: C:\visual otthymo files\3969\3969-CONT-3-WATERSHEDS\Pre-Development.out

Summary filename: C:\visual otthymo files\3969\3969-CONT-3-WATERSHEDS\Pre-Development.sum

DATE: 11/29/2017 TIME: 11:56:49 AM

USER:

COMMENTS: _____

** SIMULATION NUMBER: 1 **

MASS STORM Ptotal= 22.50 mm

Filename: C:\visual otthymo files\4456\AES 1-hr.mst
Comments: AES 1 HOUR STORM DISTRIBUTION a=21min k=

Duration of storm = 1.00 hrs
Mass curve time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	10.02	.33	69.93	.58	11.10	.83	.81
.17	30.00	.42	64.29	.67	4.62	.92	.30
.25	49.98	.50	27.03	.75	1.92	1.00	.03

CALIB NASHYD (0102) ID= 1 DT=10.0 min — Area (ha)= 1.52 Curve Number (CN)= 75.0; Ia (mm)= 5.00 # of Linear Res.(N)= 3.00; U.H. Tp(hrs)= .15

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 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
.167	20.01	.500	45.66	.833	1.36		
.333	59.95	.667	7.86	1.000	.16		

Unit Hyd Qpeak (cms)= .380

PEAK FLOW (cms)= .031 (i)
TIME TO PEAK (hrs)= .500
RUNOFF VOLUME (mm)= 2.800
TOTAL RAINFALL (mm)= 22.500
RUNOFF COEFFICIENT = .124

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

CALIB NASHYD (0101) ID= 1 DT=10.0 min — Area (ha)= 2.29 Curve Number (CN)= 75.0; Ia (mm)= 5.00 # of Linear Res.(N)= 3.00; U.H. Tp(hrs)= .30

Unit Hyd Qpeak (cms)= .291

PEAK FLOW (cms)= .030 (i)
TIME TO PEAK (hrs)= .667
RUNOFF VOLUME (mm)= 2.980
TOTAL RAINFALL (mm)= 22.500
RUNOFF COEFFICIENT = .132

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

CALIB NASHYD (0104) ID= 1 DT=10.0 min — Area (ha)= 8.19 Curve Number (CN)= 67.0; Ia (mm)= 5.00 # of Linear Res.(N)= 3.00; U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .665

PEAK FLOW (cms)= .053 (i)
TIME TO PEAK (hrs)= .833
RUNOFF VOLUME (mm)= 2.145
TOTAL RAINFALL (mm)= 22.500
RUNOFF COEFFICIENT = .095

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

ADD HYD (0103)

1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):	2.29	.030	.67	2.98
+ ID2= 2 (0104):	8.19	.053	.83	2.15
ID = 3 (0103):	10.49	.077	.67	2.33

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0105) — 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.52	.031	.50	2.80
+ ID2= 2 (0103):	10.49	.077	.67	2.33
ID = 3 (0105):	12.01	.096	.67	2.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

** SIMULATION NUMBER: 2 **

MASS STORM Ptotal= 30.50 mm

Filename: C:\visual otthymo files\4456\AES 1-hr.mst
Comments: AES 1 HOUR STORM DISTRIBUTION a=21min k=

Duration of storm = 1.00 hrs
Mass curve time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	13.58	.33	94.79	.58	15.04	.83	1.10
.17	40.66	.42	87.14	.67	6.26	.92	.40
.25	67.75	.50	36.64	.75	2.60	1.00	.04

CALIB NASHYD (0102) ID= 1 DT=10.0 min — Area (ha)= 1.52 Curve Number (CN)= 75.0; Ia (mm)= 5.00 # of Linear Res.(N)= 3.00; U.H. Tp(hrs)= .15

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 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
.167	27.12	.500	61.89	.833	1.85		
.333	81.27	.667	10.65	1.000	.22		

Unit Hyd Qpeak (cms)= .380

PEAK FLOW (cms)= .061 (i)
TIME TO PEAK (hrs)= .500
RUNOFF VOLUME (mm)= 5.514
TOTAL RAINFALL (mm)= 30.500
RUNOFF COEFFICIENT = .181

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

CALIB NASHYD (0101) ID= 1 DT=10.0 min — Area (ha)= 2.29 Curve Number (CN)= 75.0; Ia (mm)= 5.00 # of Linear Res.(N)= 3.00; U.H. Tp(hrs)= .30

Unit Hyd Qpeak (cms)= .291

PEAK FLOW (cms)= .058 (i)
TIME TO PEAK (hrs)= .667
RUNOFF VOLUME (mm)= 5.869
TOTAL RAINFALL (mm)= 30.500
RUNOFF COEFFICIENT = .192

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

CALIB NASHYD (0104) ID= 1 DT=10.0 min — Area (ha)= 8.19 Curve Number (CN)= 67.0; Ia (mm)= 5.00 # of Linear Res.(N)= 3.00; U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .665

PEAK FLOW (cms)= .106 (i)
TIME TO PEAK (hrs)= .833
RUNOFF VOLUME (mm)= 4.313
TOTAL RAINFALL (mm)= 30.500
RUNOFF COEFFICIENT = .141

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

ADD HYD (0103) — 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):	2.29	.058	.67	5.87
+ ID2= 2 (0104):	8.19	.106	.83	4.31
ID = 3 (0103):	10.49	.154	.67	4.65

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0105) — 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.52	.061	.50	5.51
+ ID2= 2 (0103):	10.49	.154	.67	4.65
ID = 3 (0105):	12.01	.190	.67	4.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM	Filename: C:\visual otthymo files\4456\AES_1-hr.mst
Ptotal= 35.80 mm	Comments: AES 1 HOUR STORM DISTRIBUTION a=21min k=

Duration of storm = 1.00 hrs
Mass curve time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	15.94	.33	111.27	.58	17.66	.83	1.29
.17	47.73	.42	102.29	.67	7.35	.92	.47
.25	79.52	.50	43.00	.75	3.05	1.00	.04

CALIB					
NASHYD (0102)	Area	(ha)=	1.52	Curve Number	(CN)= 75.0
ID= 1 DT=10.0 min	Ia	(mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=		.15		

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 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
.167	31.83	.500	72.65	.833	2.17		
.333	95.39	.667	12.50	1.000	.26		

Unit Hyd Qpeak (cms)= .380

PEAK FLOW (cms)= .084 (i)
TIME TO PEAK (hrs)= .500
RUNOFF VOLUME (mm)= 7.675
TOTAL RAINFALL (mm)= 35.800
RUNOFF COEFFICIENT = .214

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

CALIB					
NASHYD (0101)	Area	(ha)=	2.29	Curve Number	(CN)= 75.0
ID= 1 DT=10.0 min	Ia	(mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=		.30		

Unit Hyd Qpeak (cms)= .291

PEAK FLOW (cms)= .081 (i)
TIME TO PEAK (hrs)= .667
RUNOFF VOLUME (mm)= 8.169
TOTAL RAINFALL (mm)= 35.800
RUNOFF COEFFICIENT = .228

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

CALIB					
NASHYD (0104)	Area	(ha)=	8.19	Curve Number	(CN)= 67.0
ID= 1 DT=10.0 min	Ia	(mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=		.47		

Unit Hyd Qpeak (cms)= .665

PEAK FLOW (cms)= .149 (i)
TIME TO PEAK (hrs)= .833
RUNOFF VOLUME (mm)= 6.079
TOTAL RAINFALL (mm)= 35.800
RUNOFF COEFFICIENT = .170

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

ADD HYD (0103)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0101):	2.29	.081	.67	8.17
	+ ID2= 2 (0104):	8.19	.149	.83	6.08
	ID = 3 (0103):	10.49	.217	.67	6.54

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0105)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0102):	1.52	.084	.50	7.67
	+ ID2= 2 (0103):	10.49	.217	.67	6.54
	ID = 3 (0105):	12.01	.266	.67	6.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM	Filename: C:\visual otthymo files\4456\AES_1-hr.mst
Ptotal= 42.50 mm	Comments: AES 1 HOUR STORM DISTRIBUTION a=21min k=

Duration of storm = 1.00 hrs
Mass curve time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	18.92	.33	132.09	.58	20.96	.83	1.53
.17	56.66	.42	121.43	.67	8.72	.92	.56
.25	94.40	.50	51.05	.75	3.62	1.00	.05

CALIB					
NASHYD (0102)	Area	(ha)=	1.52	Curve Number	(CN)= 75.0

ID= 1 DT=10.0 min	Ia	(mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=		.15		

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 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
.167	37.79	.500	86.24	.833	2.58		
.333	113.25	.667	14.84	1.000	.31		

Unit Hyd Qpeak (cms)= .380

PEAK FLOW (cms)= .117 (i)
TIME TO PEAK (hrs)= .500
RUNOFF VOLUME (mm)= 10.753
TOTAL RAINFALL (mm)= 42.500
RUNOFF COEFFICIENT = .253

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

CALIB					
NASHYD (0101)	Area	(ha)=	2.29	Curve Number	(CN)= 75.0
ID= 1 DT=10.0 min	Ia	(mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=		.30		

Unit Hyd Qpeak (cms)= .291

PEAK FLOW (cms)= .113 (i)
TIME TO PEAK (hrs)= .667
RUNOFF VOLUME (mm)= 11.445
TOTAL RAINFALL (mm)= 42.500
RUNOFF COEFFICIENT = .269

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

CALIB					
NASHYD (0104)	Area	(ha)=	8.19	Curve Number	(CN)= 67.0
ID= 1 DT=10.0 min	Ia	(mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=		.47		

Unit Hyd Qpeak (cms)= .665

PEAK FLOW (cms)= .211 (i)
TIME TO PEAK (hrs)= .833
RUNOFF VOLUME (mm)= 8.639
TOTAL RAINFALL (mm)= 42.500
RUNOFF COEFFICIENT = .203

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

ADD HYD (0103)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0101):	2.29	.113	.67	11.45

	+ ID2= 2 (0104):	8.19	.211	.83	8.64
	ID = 3 (0103):	10.49	.307	.67	9.25

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0105)		AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3		(ha)	(cms)	(hrs)	(mm)
	ID1= 1 (0102):	1.52	.117	.50	10.75
	+ ID2= 2 (0103):	10.49	.307	.67	9.25
	ID = 3 (0105):	12.01	.374	.67	9.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM	Filename: C:\visual otthymo files\4456\AES_1-hr.mst
Ptotal= 47.40 mm	Comments: AES 1 HOUR STORM DISTRIBUTION a=21min k=

Duration of storm = 1.00 hrs
Mass curve time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	21.10	.33	147.32	.58	23.38	.83	1.71
.17	63.19	.42	135.43	.67	9.73	.92	.63
.25	105.28	.50	56.94	.75	4.04	1.00	.06

CALIB					
NASHYD (0102)	Area	(ha)=	1.52	Curve Number	(CN)= 75.0
ID= 1 DT=10.0 min	Ia	(mm)=	5.00	# of Linear Res.(N)=	3.00
	U.H. Tp(hrs)=		.15		

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 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
.167	42.15	.500	96.18	.833	2.87		
.333	126.30	.667	16.55	1.000	.34		

Unit Hyd Qpeak (cms)= .380

PEAK FLOW (cms)= .143 (i)
TIME TO PEAK (hrs)= .500
RUNOFF VOLUME (mm)= 13.217
TOTAL RAINFALL (mm)= 47.400
RUNOFF COEFFICIENT = .279

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

CALIB					
NASHYD (0101)	Area	(ha)=	2.29	Curve Number	(CN)= 75.0
ID= 1 DT=10.0 min	Ia	(mm)=	5.00	# of Linear Res.	(N)= 3.00
	U.H. Tp(hrs)=		.30		

Unit Hyd Qpeak (cms)= .291

PEAK FLOW (cms)= .138 (i)
TIME TO PEAK (hrs)= .667
RUNOFF VOLUME (mm)= 14.067
TOTAL RAINFALL (mm)= 47.400
RUNOFF COEFFICIENT = .297

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

CALIB					
NASHYD (0104)	Area	(ha)=	8.19	Curve Number	(CN)= 67.0
ID= 1 DT=10.0 min	Ia	(mm)=	5.00	# of Linear Res.	(N)= 3.00
	U.H. Tp(hrs)=		.47		

Unit Hyd Qpeak (cms)= .665

PEAK FLOW (cms)= .261 (i)
TIME TO PEAK (hrs)= .833
RUNOFF VOLUME (mm)= 10.722
TOTAL RAINFALL (mm)= 47.400
RUNOFF COEFFICIENT = .226

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

ADD HYD (0103)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0101):	2.29	.138	.67	14.07
+ ID2= 2 (0104):	8.19	.261	.83	10.72
ID = 3 (0103):	10.49	.381	.67	11.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0105)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0102):	1.52	.143	.50	13.22
+ ID2= 2 (0103):	10.49	.381	.67	11.45
ID = 3 (0105):	12.01	.461	.67	11.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

****

MASS STORM	Filename: C:\visual otthymo files\4456\AES 1-hr.mst
Ptotal= 52.40 mm	Comments: AES 1 HOUR STORM DISTRIBUTION a=21min k=

Duration of storm = 1.00 hrs
Mass curve time step = 5.00 min

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.08	23.33	.33	162.86	.58	25.84	.83	1.89
.17	69.86	.42	149.72	.67	10.75	.92	.69
.25	116.39	.50	62.94	.75	4.46	1.00	.06

CALIB					
NASHYD (0102)	Area	(ha)=	1.52	Curve Number	(CN)= 75.0
ID= 1 DT=10.0 min	Ia	(mm)=	5.00	# of Linear Res.	(N)= 3.00
	U.H. Tp(hrs)=		.15		

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 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
.167	46.59	.500	106.33	.833	3.18		
.333	139.63	.667	18.30	1.000	.38		

Unit Hyd Qpeak (cms)= .380

PEAK FLOW (cms)= .171 (i)
TIME TO PEAK (hrs)= .500
RUNOFF VOLUME (mm)= 15.893
TOTAL RAINFALL (mm)= 52.400
RUNOFF COEFFICIENT = .303

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

CALIB					
NASHYD (0101)	Area	(ha)=	2.29	Curve Number	(CN)= 75.0
ID= 1 DT=10.0 min	Ia	(mm)=	5.00	# of Linear Res.	(N)= 3.00
	U.H. Tp(hrs)=		.30		

Unit Hyd Qpeak (cms)= .291

PEAK FLOW (cms)= .166 (i)
TIME TO PEAK (hrs)= .667
RUNOFF VOLUME (mm)= 16.915
TOTAL RAINFALL (mm)= 52.400
RUNOFF COEFFICIENT = .323

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

CALIB					
NASHYD (0104)	Area	(ha)=	8.19	Curve Number	(CN)= 67.0
ID= 1 DT=10.0 min	Ia	(mm)=	5.00	# of Linear Res.	(N)= 3.00

	U.H. Tp(hrs)=		.47		

Unit Hyd Qpeak (cms)= .665

PEAK FLOW (cms)= .317 (i)
TIME TO PEAK (hrs)= .833
RUNOFF VOLUME (mm)= 13.011
TOTAL RAINFALL (mm)= 52.400
RUNOFF COEFFICIENT = .248

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

ADD HYD (0103)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0101):	2.29	.166	.67	16.92
+ ID2= 2 (0104):	8.19	.317	.83	13.01
ID = 3 (0103):	10.49	.461	.67	13.86

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0105)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0102):	1.52	.171	.50	15.89
+ ID2= 2 (0103):	10.49	.461	.67	13.86
ID = 3 (0105):	12.01	.556	.67	14.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

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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
  VV     I    SSSSS  UUUUU  A   A  LLLLL

 OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM, Version 2.0
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M   M  O   O   Licensed To: MJ Davenport
 OOO     T      T    H   H    Y    M   M   OOO                 vo2-0057
```


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

Input filename: C:\Program Files\Visual OTTHYMO v2.0\voin.dat

Output filename: C:\visual otthymo files\3969\3969-CONT-3-WATERSHEDS\Pre-Development.out

Summary filename: C:\visual otthymo files\3969\3969-CONT-3-WATERSHEDS\Pre-Development.sum

DATE: 11/29/2017 TIME: 11:58:08 AM

USER:

COMMENTS: _____

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

MASS STORM
Ptotal= 38.40 mm

Filename: C:\visual otthymo files\4456\SCS II 6-hr.mst
Comments: SCS 6 HOUR TYPE II STORM DISTRIBUTION

Duration of storm = 6.00 hrs
Mass curve time step = 10.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	1.61	1.67	3.92	3.17	8.52	4.67	2.30
.33	1.38	1.83	3.69	3.33	8.29	4.83	2.30
.50	1.61	2.00	3.92	3.50	8.52	5.00	2.30
.67	2.30	2.17	4.61	3.67	3.92	5.17	1.61
.83	2.30	2.33	4.61	3.83	3.69	5.33	1.38

1.00	2.30	2.50	4.61	4.00	3.92	5.50	1.61
1.17	2.30	2.67	23.04	4.17	3.00	5.67	1.61
1.33	2.30	2.83	41.47	4.33	3.23	5.83	1.38
1.50	2.30	3.00	59.90	4.50	3.00	6.00	1.61

CALIB
NASHYD (0102)
ID= 1 DT=10.0 min

Area (ha)= 1.52 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .15

Unit Hyd Qpeak (cms)= .380

PEAK FLOW (cms)= .057 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 8.826
TOTAL RAINFALL (mm)= 38.400
RUNOFF COEFFICIENT = .230

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

CALIB
NASHYD (0101)
ID= 1 DT=10.0 min

Area (ha)= 2.29 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .30

Unit Hyd Qpeak (cms)= .291

PEAK FLOW (cms)= .054 (i)
TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 9.394
TOTAL RAINFALL (mm)= 38.400
RUNOFF COEFFICIENT = .245

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

CALIB
NASHYD (0104)
ID= 1 DT=10.0 min

Area (ha)= 8.19 Curve Number (CN)= 67.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .665

PEAK FLOW (cms)= .102 (i)
TIME TO PEAK (hrs)= 3.333
RUNOFF VOLUME (mm)= 7.031
TOTAL RAINFALL (mm)= 38.400
RUNOFF COEFFICIENT = .183

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

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):	2.29	.054	3.17	9.39

+ ID2= 2 (0104):	8.19	.102	3.33	7.03
ID = 3 (0103):	10.49	.148	3.33	7.55

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0105)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.52	.057	3.00	8.83
+ ID2= 2 (0103):	10.49	.148	3.33	7.55
ID = 3 (0105):	12.01	.177	3.17	7.71

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM
Ptotal= 50.50 mm

Filename: C:\visual otthymo files\4456\SCS II 6-hr.mst
Comments: SCS 6 HOUR TYPE II STORM DISTRIBUTION

Duration of storm = 6.00 hrs
Mass curve time step = 10.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	2.12	1.67	5.15	3.17	11.21	4.67	3.03
.33	1.82	1.83	4.85	3.33	10.91	4.83	3.03
.50	2.12	2.00	5.15	3.50	11.21	5.00	3.03
.67	3.03	2.17	6.06	3.67	5.15	5.17	2.12
.83	3.03	2.33	6.06	3.83	4.85	5.33	1.82
1.00	3.03	2.50	6.06	4.00	5.15	5.50	2.12
1.17	3.03	2.67	30.30	4.17	3.94	5.67	2.12
1.33	3.03	2.83	54.54	4.33	4.24	5.83	1.82
1.50	3.03	3.00	78.78	4.50	3.94	6.00	2.12

CALIB
NASHYD (0102)
ID= 1 DT=10.0 min

Area (ha)= 1.52 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .15

Unit Hyd Qpeak (cms)= .380

PEAK FLOW (cms)= .097 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 14.858
TOTAL RAINFALL (mm)= 50.500
RUNOFF COEFFICIENT = .294

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

CALIB

NASHYD (0101)
ID= 1 DT=10.0 min

Area (ha)= 2.29 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .30

Unit Hyd Qpeak (cms)= .291

PEAK FLOW (cms)= .092 (i)
TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 15.814
TOTAL RAINFALL (mm)= 50.500
RUNOFF COEFFICIENT = .313

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

CALIB
NASHYD (0104)
ID= 1 DT=10.0 min

Area (ha)= 8.19 Curve Number (CN)= 67.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .665

PEAK FLOW (cms)= .180 (i)
TIME TO PEAK (hrs)= 3.333
RUNOFF VOLUME (mm)= 12.122
TOTAL RAINFALL (mm)= 50.500
RUNOFF COEFFICIENT = .240

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

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):	2.29	.092	3.17	15.81
+ ID2= 2 (0104):	8.19	.180	3.33	12.12
ID = 3 (0103):	10.49	.257	3.33	12.93

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0105)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.52	.097	3.00	14.86
+ ID2= 2 (0103):	10.49	.257	3.33	12.93
ID = 3 (0105):	12.01	.309	3.17	13.17

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM
Ptotal= 58.60 mm

Filename: C:\visual otthymo files\4456\SCS II 6-hr.mst
Comments: SCS 6 HOUR TYPE II STORM DISTRIBUTION

Duration of storm = 6.00 hrs
Mass curve time step = 10.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	2.46	1.67	5.98	3.17	13.01	4.67	3.52
.33	2.11	1.83	5.63	3.33	12.66	4.83	3.52
.50	2.46	2.00	5.98	3.50	13.01	5.00	3.52
.67	3.52	2.17	7.03	3.67	5.98	5.17	2.46
.83	3.52	2.33	7.03	3.83	5.63	5.33	2.11
1.00	3.52	2.50	7.03	4.00	5.98	5.50	2.46
1.17	3.52	2.67	35.16	4.17	4.57	5.67	2.46
1.33	3.52	2.83	63.29	4.33	4.92	5.83	2.11
1.50	3.52	3.00	91.42	4.50	4.57	6.00	2.46

CALIB
NASHYD (0102)
ID= 1 DT=10.0 min

Area (ha)= 1.52 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .15

Unit Hyd Qpeak (cms)= .380

PEAK FLOW (cms)= .127 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 19.411
TOTAL RAINFALL (mm)= 58.600
RUNOFF COEFFICIENT = .331

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

CALIB
NASHYD (0101)
ID= 1 DT=10.0 min

Area (ha)= 2.29 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .30

Unit Hyd Qpeak (cms)= .291

PEAK FLOW (cms)= .122 (i)
TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 20.660
TOTAL RAINFALL (mm)= 58.600
RUNOFF COEFFICIENT = .353

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

CALIB
NASHYD (0104)
ID= 1 DT=10.0 min

Area (ha)= 8.19 Curve Number (CN)= 67.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .665

PEAK FLOW (cms)= .241 (i)
TIME TO PEAK (hrs)= 3.333

RUNOFF VOLUME (mm)= 16.060
TOTAL RAINFALL (mm)= 58.600
RUNOFF COEFFICIENT = .274

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

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):	2.29	.122	3.17	20.66
+ ID2= 2 (0104):	8.19	.241	3.33	16.06
ID = 3 (0103):	10.49	.342	3.33	17.07

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0105)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.52	.127	3.00	19.41
+ ID2= 2 (0103):	10.49	.342	3.33	17.07
ID = 3 (0105):	12.01	.410	3.17	17.36

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM
Ptotal= 68.70 mm

Filename: C:\visual otthymo files\4456\SCS II 6-hr.mst
Comments: SCS 6 HOUR TYPE II STORM DISTRIBUTION

Duration of storm = 6.00 hrs
Mass curve time step = 10.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	2.89	1.67	7.01	3.17	15.25	4.67	4.12
.33	2.47	1.83	6.60	3.33	14.84	4.83	4.12
.50	2.89	2.00	7.01	3.50	15.25	5.00	4.12
.67	4.12	2.17	8.24	3.67	7.01	5.17	2.89
.83	4.12	2.33	8.24	3.83	6.60	5.33	2.47
1.00	4.12	2.50	8.24	4.00	7.01	5.50	2.89
1.17	4.12	2.67	41.22	4.17	5.36	5.67	2.89
1.33	4.12	2.83	74.20	4.33	5.77	5.83	2.47
1.50	4.12	3.00	107.17	4.50	5.36	6.00	2.89

CALIB
NASHYD (0102)
ID= 1 DT=10.0 min

Area (ha)= 1.52 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .15

Unit Hyd Qpeak (cms)= .380

PEAK FLOW (cms)= .167 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 25.549
TOTAL RAINFALL (mm)= 68.700
RUNOFF COEFFICIENT = .372

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

CALIB
NASHYD (0101)
ID= 1 DT=10.0 min

Area (ha)= 2.29 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .30

Unit Hyd Qpeak (cms)= .291

PEAK FLOW (cms)= .161 (i)
TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 27.193
TOTAL RAINFALL (mm)= 68.700
RUNOFF COEFFICIENT = .396

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

CALIB
NASHYD (0104)
ID= 1 DT=10.0 min

Area (ha)= 8.19 Curve Number (CN)= 67.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .665

PEAK FLOW (cms)= .325 (i)
TIME TO PEAK (hrs)= 3.333
RUNOFF VOLUME (mm)= 21.470
TOTAL RAINFALL (mm)= 68.700
RUNOFF COEFFICIENT = .313

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

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):	2.29	.161	3.17	27.19
+ ID2= 2 (0104):	8.19	.325	3.33	21.47
ID = 3 (0103):	10.49	.458	3.33	22.72

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0105)
1 + 2 = 3

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

ID1= 1 (0102):	1.52	.167	3.00	25.55
+ ID2= 2 (0103):	10.49	.458	3.17	22.72
ID = 3 (0105):	12.01	.549	3.17	23.08

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM
Ptotal= 76.30 mm

Filename: C:\visual otthymo files\4456\SCS II 6-hr.mst
Comments: SCS 6 HOUR TYPE II STORM DISTRIBUTION

Duration of storm = 6.00 hrs
Mass curve time step = 10.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	3.20	1.67	7.78	3.17	16.94	4.67	4.58
.33	2.75	1.83	7.32	3.33	16.48	4.83	4.58
.50	3.20	2.00	7.78	3.50	16.94	5.00	4.58
.67	4.58	2.17	9.16	3.67	7.78	5.17	3.20
.83	4.58	2.33	9.16	3.83	7.32	5.33	2.75
1.00	4.58	2.50	9.16	4.00	7.78	5.50	3.20
1.17	4.58	2.67	45.78	4.17	5.95	5.67	3.20
1.33	4.58	2.83	82.40	4.33	6.41	5.83	2.75
1.50	4.58	3.00	119.03	4.50	5.95	6.00	3.20

CALIB
NASHYD (0102)
ID= 1 DT=10.0 min

Area (ha)= 1.52 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .15

Unit Hyd Qpeak (cms)= .380

PEAK FLOW (cms)= .199 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 30.450
TOTAL RAINFALL (mm)= 76.300
RUNOFF COEFFICIENT = .399

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

CALIB
NASHYD (0101)
ID= 1 DT=10.0 min

Area (ha)= 2.29 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .30

Unit Hyd Qpeak (cms)= .291

PEAK FLOW (cms)= .193 (i)
TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 32.409
TOTAL RAINFALL (mm)= 76.300
RUNOFF COEFFICIENT = .425

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

CALIB
NASHYD (0104) ID= 1 DT=10.0 min

Area (ha)= 8.19 Curve Number (CN)= 67.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .665

PEAK FLOW (cms)= .394 (i)
TIME TO PEAK (hrs)= 3.333
RUNOFF VOLUME (mm)= 25.858
TOTAL RAINFALL (mm)= 76.300
RUNOFF COEFFICIENT = .339

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

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0101):	2.29	.193	3.17	32.41
+ ID2= 2 (0104):	8.19	.394	3.33	25.86
ID = 3 (0103):	10.49	.554	3.17	27.29

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0105)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.52	.199	3.00	30.45
+ ID2= 2 (0103):	10.49	.554	3.17	27.29
ID = 3 (0105):	12.01	.662	3.17	27.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM
Ptotal= 83.80 mm

Filename: C:\visual otthymo files\4456\SCS II 6-hr.mst
Comments: SCS 6 HOUR TYPE II STORM DISTRIBUTION

Duration of storm = 6.00 hrs
Mass curve time step = 10.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	3.52	1.67	8.55	3.17	18.60	4.67	5.03
.33	3.02	1.83	8.04	3.33	18.10	4.83	5.03
.50	3.52	2.00	8.55	3.50	18.60	5.00	5.03
.67	5.03	2.17	10.06	3.67	8.55	5.17	3.52

.83	5.03	2.33	10.06	3.83	8.04	5.33	3.02
1.00	5.03	2.50	10.06	4.00	8.55	5.50	3.52
1.17	5.03	2.67	50.28	4.17	6.54	5.67	3.52
1.33	5.03	2.83	90.50	4.33	7.04	5.83	3.02
1.50	5.03	3.00	130.73	4.50	6.54	6.00	3.52

CALIB
NASHYD (0102) ID= 1 DT=10.0 min

Area (ha)= 1.52 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .15

Unit Hyd Qpeak (cms)= .380

PEAK FLOW (cms)= .232 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 35.486
TOTAL RAINFALL (mm)= 83.800
RUNOFF COEFFICIENT = .423

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

CALIB
NASHYD (0101) ID= 1 DT=10.0 min

Area (ha)= 2.29 Curve Number (CN)= 75.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .30

Unit Hyd Qpeak (cms)= .291

PEAK FLOW (cms)= .225 (i)
TIME TO PEAK (hrs)= 3.167
RUNOFF VOLUME (mm)= 37.770
TOTAL RAINFALL (mm)= 83.800
RUNOFF COEFFICIENT = .451

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

CALIB
NASHYD (0104) ID= 1 DT=10.0 min

Area (ha)= 8.19 Curve Number (CN)= 67.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .665

PEAK FLOW (cms)= .466 (i)
TIME TO PEAK (hrs)= 3.333
RUNOFF VOLUME (mm)= 30.422
TOTAL RAINFALL (mm)= 83.800
RUNOFF COEFFICIENT = .363

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

ADD HYD (0103)
1 + 2 = 3

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

ID1= 1 (0101):	2.29	.225	3.17	37.77
+ ID2= 2 (0104):	8.19	.466	3.33	30.42
ID = 3 (0103):	10.49	.654	3.17	32.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0105)
1 + 2 = 3

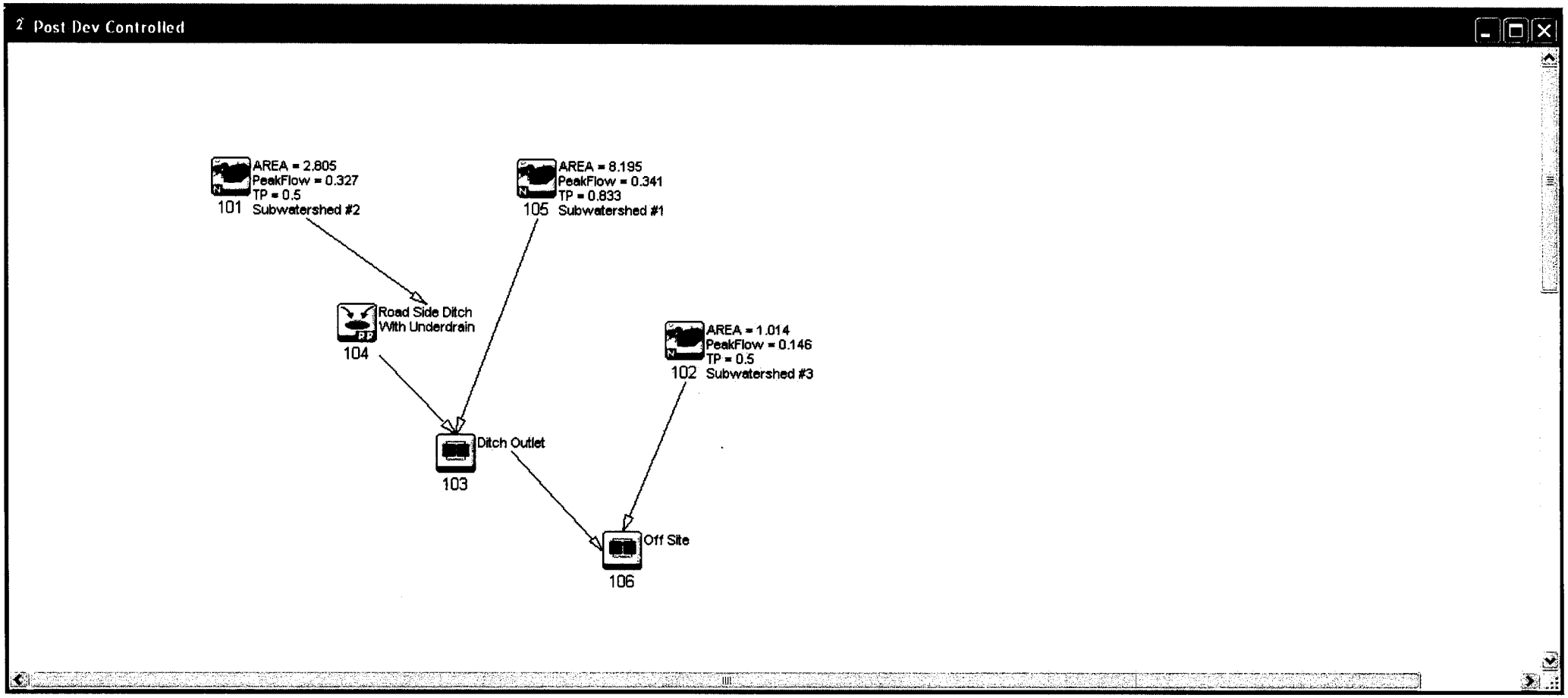
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.52	.232	3.00	35.49
+ ID2= 2 (0103):	10.49	.654	3.17	32.03
ID = 3 (0105):	12.01	.779	3.17	32.47

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

APPENDIX III

VISUAL OTTHYMO OUTPUT
POST DEVELOPMENT


2 Post Dev Controlled
AREA = 2.805
PeakFlow = 0.327
TP = 0.5
101 Subwatershed #2
AREA = 8.195
PeakFlow = 0.341
TP = 0.833
105 Subwatershed #1
Road Side Ditch
With Underdrain
104
AREA = 1.014
PeakFlow = 0.146
TP = 0.5
102 Subwatershed #3
Ditch Outlet
103
Off Site
106

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==========================================================================
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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
        VV     I    SSSSS  UUUUU  A   A  LLLLL

       OOO   TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM, Version 2.0
      O   O    T      T    H   H   Y Y   MM MM  O   O
      O   O    T      T    H   H    Y    M M M  O   O   Licensed To: MJ Davenport

       OOO     T      T    H   H    Y    M   M   OOO                vo2-0057

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

  Input   filename: C:\Program Files\Visual OTTHYMO v2.0\voin.dat

  Output  filename: C:\visual otthymo
files\3969\3969-CONT-3-WATERSHEDS\Post-Dev-Controlled.out

  Summary filename: C:\visual otthymo
files\3969\3969-CONT-3-WATERSHEDS\Post-Dev-Controlled.sum


DATE: 11/29/2017                          TIME: 11:59:35 AM

USER:


COMMENTS: _____

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  ***************************
  ** SIMULATION NUMBER:   9 **
  ***************************

--------------------
| CHICAGO STORM    |     IDF curve parameters: A= 486.300
| Ptotal= 25.00 mm |                           B=   7.500
--------------------                           C=    .790
                        used in:   INTENSITY =  A / (t + B)^C

                        Duration of storm  =  4.00 hrs
                        Storm time step    = 10.00 min
                        Time to peak ratio =   .38

  TIME    RAIN  |  TIME    RAIN  |  TIME    RAIN  |  TIME    RAIN
   hrs   mm/hr  |   hrs   mm/hr  |   hrs   mm/hr  |   hrs   mm/hr
   .17    1.66  |  1.17    6.41  |  2.17    4.73  |  3.17    2.05
   .33    1.87  |  1.33   14.61  |  2.33    3.84  |  3.33    1.89
```



```
   .50    2.16  |  1.50   50.69  |  2.50    3.25  |  3.50    1.75
   .67    2.55  |  1.67   17.59  |  2.67    2.82  |  3.67    1.63
   .83    3.16  |  1.83    9.15  |  2.83    2.50  |  3.83    1.53
  1.00    4.20  |  2.00    6.21  |  3.00    2.25  |  4.00    1.44

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (0102)  |   Area     (ha)=   1.01   Curve Number    (CN)= 82.0
| ID= 1 DT=10.0 min|   Ia       (mm)=   4.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .11

     Unit Hyd Qpeak  (cms)=    .346

     PEAK FLOW       (cms)=    .018 (i)
     TIME TO PEAK    (hrs)=   1.500
     RUNOFF VOLUME    (mm)=   4.746
     TOTAL RAINFALL   (mm)=  24.995
     RUNOFF COEFFICIENT   =    .190

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (0105)  |   Area     (ha)=   8.19   Curve Number    (CN)= 69.0
| ID= 1 DT=10.0 min|   Ia       (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .47

     Unit Hyd Qpeak  (cms)=    .673

     PEAK FLOW       (cms)=    .040 (i)
     TIME TO PEAK    (hrs)=   2.000
     RUNOFF VOLUME    (mm)=   2.978
     TOTAL RAINFALL   (mm)=  24.995
     RUNOFF COEFFICIENT   =    .119

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

--------------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD   (0101)  |   Area     (ha)=   2.81   Curve Number    (CN)= 84.0
| ID= 1 DT=10.0 min|   Ia       (mm)=   4.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .25

     Unit Hyd Qpeak  (cms)=    .437

     PEAK FLOW       (cms)=    .045 (i)
     TIME TO PEAK    (hrs)=   1.667
     RUNOFF VOLUME    (mm)=   6.275
     TOTAL RAINFALL   (mm)=  24.995
     RUNOFF COEFFICIENT   =    .251

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

--------------------------------------------------------------------------------
--------------------
| RESERVOIR (0104) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |     OUTFLOW    STORAGE   |  OUTFLOW    STORAGE
--------------------     (cms)     (ha.m.)   |    (cms)    (ha.m.)
```



```
                    .0000    .0000  |   .5200    .0302
                    .0001    .0069  |   .7200    .0358
                    .0170    .0119  |   .9600    .0421
                    .0600    .0142  |  1.2600    .0491
                    .1200    .0172  |  1.6000    .0568
                    .2200    .0209  |  2.0000    .0651
                    .3400    .0252  |  2.4400    .0741

                          AREA     QPEAK     TPEAK      R.V.
                          (ha)     (cms)     (hrs)      (mm)
INFLOW : ID= 2 (0101)     2.81      .04      1.67       6.28
OUTFLOW: ID= 1 (0104)     2.81      .01      2.75       3.81

          PEAK   FLOW   REDUCTION [Qout/Qin](%)= 27.56
          TIME SHIFT OF PEAK FLOW          (min)= 65.00
          MAXIMUM  STORAGE   USED        (ha.m.)= .0105

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

--------------------
| ADD HYD   (0103) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (0105):          8.19     .040     2.00     2.98
   + ID2= 2 (0104):          2.81     .012     2.75     3.81
     ================================================
     ID = 3 (0103):         11.00     .048     2.17     3.19

  NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

--------------------
| ADD HYD   (0106) |
|   1 +  2 =  3    |          AREA    QPEAK    TPEAK     R.V.
--------------------          (ha)    (cms)    (hrs)     (mm)
     ID1= 1 (0102):          1.01     .018     1.50     4.75
   + ID2= 2 (0103):         11.00     .048     2.17     3.19
     ================================================
     ID = 3 (0106):         12.01     .052     2.17     3.32

  NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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 FINISH
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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
   VV     I    SSSSS  UUUUU  A   A  LLLLL

  OOO    TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM, Version 2.0
 O   O     T      T    H   H   Y Y   MM MM  O   O
 O   O     T      T    H   H    Y    M M M  O   O   Licensed To: MJ Davenport

  OOO      T      T    H   H    Y    M   M   OOO                 vo2-0057
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***** D E T A I L E D O U T P U T *****

Input filename: C:\Program Files\Visual OTTHYMO v2.0\voin.dat

Output filename: C:\visual otthymo files\3969\3969-CONT-3-WATERSHEDS\Post-Dev-Controlled.out

Summary filename: C:\visual otthymo files\3969\3969-CONT-3-WATERSHEDS\Post-Dev-Controlled.sum

DATE: 11/29/2017 TIME: 12:44:19 PM

USER:

COMMENTS: _____

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

CHICAGO STORM
Ptotal= 37.36 mm

IDF curve parameters: A= 662.000
B= 7.500
C= .790
used in: INTENSITY = A / (t + B)^C

Duration of storm = 6.00 hrs
Storm time step = 10.00 min
Time to peak ratio = .38

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	1.48	1.67	4.30	3.17	5.23	4.67	2.08
.33	1.59	1.83	5.71	3.33	4.42	4.83	1.96

.50	1.71	2.00	8.73	3.50	3.84	5.00	1.86
.67	1.86	2.17	19.90	3.67	3.41	5.17	1.76
.83	2.04	2.33	69.00	3.83	3.07	5.33	1.68
1.00	2.26	2.50	23.94	4.00	2.79	5.50	1.61
1.17	2.55	2.67	12.46	4.17	2.57	5.67	1.54
1.33	2.94	2.83	8.46	4.33	2.38	5.83	1.48
1.50	3.48	3.00	6.44	4.50	2.22	6.00	1.42

CALIB
NASHYD (0102) ID= 1 DT=10.0 min
Area (ha)= 1.01 Curve Number (CN)= 82.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .11

Unit Hyd Qpeak (cms)= .346

PEAK FLOW (cms)= .041 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 10.321
TOTAL RAINFALL (mm)= 37.363
RUNOFF COEFFICIENT = .276

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

CALIB
NASHYD (0105) ID= 1 DT=10.0 min
Area (ha)= 8.19 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .673

PEAK FLOW (cms)= .092 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 7.143
TOTAL RAINFALL (mm)= 37.363
RUNOFF COEFFICIENT = .191

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

CALIB
NASHYD (0101) ID= 1 DT=10.0 min
Area (ha)= 2.81 Curve Number (CN)= 84.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .25

Unit Hyd Qpeak (cms)= .437

PEAK FLOW (cms)= .095 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 13.448
TOTAL RAINFALL (mm)= 37.363
RUNOFF COEFFICIENT = .360

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

RESERVOIR (0104)

IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5200	.0302
.0001	.0069	.7200	.0358
.0170	.0119	.9600	.0421
.0600	.0142	1.2600	.0491
.1200	.0172	1.6000	.0568
.2200	.0209	2.0000	.0651
.3400	.0252	2.4400	.0741

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	2.81	.10	2.50	13.45
OUTFLOW: ID= 1 (0104)	2.81	.06	2.92	10.98

PEAK FLOW REDUCTION [Qout/Qin](%)= 60.60
TIME SHIFT OF PEAK FLOW (min)= 25.00
MAXIMUM STORAGE USED (ha.m.)= .0141

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0105):	8.19	.092	2.83	7.14
+ ID2= 2 (0104):	2.81	.058	2.92	10.98
ID = 3 (0103):	11.00	.149	2.83	8.12

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0106)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.01	.041	2.33	10.32
+ ID2= 2 (0103):	11.00	.149	2.83	8.12
ID = 3 (0106):	12.01	.160	2.83	8.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

CHICAGO STORM
Ptotal= 48.64 mm

IDF curve parameters: A=1098.000
B= 10.100
C= .830
used in: INTENSITY = A / (t + B)^C

Duration of storm = 6.00 hrs
Storm time step = 10.00 min
Time to peak ratio = .38

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr

.17	1.65	1.67	5.38	3.17	6.69	4.67	2.40
.33	1.78	1.83	7.38	3.33	5.55	4.83	2.25
.50	1.93	2.00	11.78	3.50	4.74	5.00	2.12
.67	2.12	2.17	28.11	3.67	4.15	5.17	2.00
.83	2.35	2.33	90.98	3.83	3.69	5.33	1.90
1.00	2.63	2.50	33.98	4.00	3.33	5.50	1.80
1.17	3.01	2.67	17.30	4.17	3.03	5.67	1.72
1.33	3.51	2.83	11.37	4.33	2.79	5.83	1.64
1.50	4.24	3.00	8.43	4.50	2.58	6.00	1.58

CALIB
NASHYD (0102) ID= 1 DT=10.0 min
Area (ha)= 1.01 Curve Number (CN)= 82.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .11

Unit Hyd Qpeak (cms)= .346

PEAK FLOW (cms)= .070 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 16.405
TOTAL RAINFALL (mm)= 48.645
RUNOFF COEFFICIENT = .337

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

CALIB
NASHYD (0105) ID= 1 DT=10.0 min
Area (ha)= 8.19 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .673

PEAK FLOW (cms)= .168 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 12.062
TOTAL RAINFALL (mm)= 48.645
RUNOFF COEFFICIENT = .248

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

CALIB
NASHYD (0101) ID= 1 DT=10.0 min
Area (ha)= 2.81 Curve Number (CN)= 84.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .25

Unit Hyd Qpeak (cms)= .437

PEAK FLOW (cms)= .161 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 21.161
TOTAL RAINFALL (mm)= 48.645
RUNOFF COEFFICIENT = .435

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

RESERVOIR (0104)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5200	.0302
.0001	.0069	.7200	.0358
.0170	.0119	.9600	.0421
.0600	.0142	1.2600	.0491
.1200	.0172	1.6000	.0568
.2200	.0209	2.0000	.0651
.3400	.0252	2.4400	.0741

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	2.81	.16	2.50	21.16
OUTFLOW: ID= 1 (0104)	2.81	.12	2.75	18.69

PEAK FLOW REDUCTION [Qout/Qin](%)= 76.64
TIME SHIFT OF PEAK FLOW (min)= 15.00
MAXIMUM STORAGE USED (ha.m.)= .0173

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0105):	8.19	.168	2.83	12.06
+ ID2= 2 (0104):	2.81	.124	2.75	18.69
ID = 3 (0103):	11.00	.287	2.83	13.75

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0106)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.01	.070	2.33	16.41
+ ID2= 2 (0103):	11.00	.287	2.83	13.75
ID = 3 (0106):	12.01	.309	2.75	13.98

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

CHICAGO STORM
Ptotal= 57.49 mm

IDF curve parameters: A=1560.000
B= 13.000
C= .860
used in: INTENSITY = A / (t + B)^C

Duration of storm = 6.00 hrs
Storm time step = 10.00 min
Time to peak ratio = .38

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	1.73	1.67	6.29	3.17	7.97	4.67	2.60
.33	1.88	1.83	8.87	3.33	6.51	4.83	2.42
.50	2.06	2.00	14.61	3.50	5.48	5.00	2.27
.67	2.27	2.17	35.36	3.67	4.74	5.17	2.13
.83	2.54	2.33	105.21	3.83	4.17	5.33	2.01
1.00	2.88	2.50	42.69	4.00	3.72	5.50	1.90
1.17	3.33	2.67	21.79	4.17	3.36	5.67	1.81
1.33	3.95	2.83	14.08	4.33	3.06	5.83	1.72
1.50	4.85	3.00	10.23	4.50	2.81	6.00	1.64

CALIB
NASHYD (0102)
ID= 1 DT=10.0 min

Area (ha)= 1.01 Curve Number (CN)= 82.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .11

Unit Hyd Qpeak (cms)= .346

PEAK FLOW (cms)= .093 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 21.643
TOTAL RAINFALL (mm)= 57.490
RUNOFF COEFFICIENT = .376

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

CALIB
NASHYD (0105)
ID= 1 DT=10.0 min

Area (ha)= 8.19 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .673

PEAK FLOW (cms)= .240 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 16.520
TOTAL RAINFALL (mm)= 57.490
RUNOFF COEFFICIENT = .287

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

CALIB
NASHYD (0101)
ID= 1 DT=10.0 min

Area (ha)= 2.81 Curve Number (CN)= 84.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .25

Unit Hyd Qpeak (cms)= .437

PEAK FLOW (cms)= .217 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 27.739
TOTAL RAINFALL (mm)= 57.490
RUNOFF COEFFICIENT = .482

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

RESERVOIR (0104)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5200	.0302
.0001	.0069	.7200	.0358
.0170	.0119	.9600	.0421
.0600	.0142	1.2600	.0491
.1200	.0172	1.6000	.0568
.2200	.0209	2.0000	.0651
.3400	.0252	2.4400	.0741

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	2.81	.22	2.50	27.74
OUTFLOW: ID= 1 (0104)	2.81	.18	2.67	25.27

PEAK FLOW REDUCTION [Qout/Qin](%)= 83.75
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= .0196

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0105):	8.19	.240	2.83	16.52
+ ID2= 2 (0104):	2.81	.182	2.67	25.27
ID = 3 (0103):	11.00	.412	2.75	18.75

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0106)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.01	.093	2.33	21.64
+ ID2= 2 (0103):	11.00	.412	2.75	18.75
ID = 3 (0106):	12.01	.443	2.75	19.00

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

CHICAGO STORM
Ptotal= 65.65 mm

IDF curve parameters: A=2010.000
B= 14.000
C= .880
used in: INTENSITY = A / (t + B)^C

Duration of storm = 6.00 hrs
Storm time step = 10.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	1.78	1.67	6.98	3.17	8.95	4.67	2.75
.33	1.95	1.83	10.01	3.33	7.23	4.83	2.55
.50	2.14	2.00	16.85	3.50	6.04	5.00	2.37
.67	2.38	2.17	41.62	3.67	5.17	5.17	2.22
.83	2.67	2.33	122.63	3.83	4.52	5.33	2.09
1.00	3.05	2.50	50.34	4.00	4.00	5.50	1.97
1.17	3.56	2.67	25.45	4.17	3.60	5.67	1.87
1.33	4.27	2.83	16.21	4.33	3.26	5.83	1.77
1.50	5.31	3.00	11.63	4.50	2.98	6.00	1.69

CALIB
NASHYD (0102)
ID= 1 DT=10.0 min

Area (ha)= 1.01 Curve Number (CN)= 82.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .11

Unit Hyd Qpeak (cms)= .346

PEAK FLOW (cms)= .119 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 26.750
TOTAL RAINFALL (mm)= 65.646
RUNOFF COEFFICIENT = .407

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

CALIB
NASHYD (0105)
ID= 1 DT=10.0 min

Area (ha)= 8.19 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .673

PEAK FLOW (cms)= .317 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 21.023
TOTAL RAINFALL (mm)= 65.646
RUNOFF COEFFICIENT = .320

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

CALIB
NASHYD (0101)
ID= 1 DT=10.0 min

Area (ha)= 2.81 Curve Number (CN)= 84.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .25

Unit Hyd Qpeak (cms)= .437

PEAK FLOW (cms)= .277 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 34.112
TOTAL RAINFALL (mm)= 65.646
RUNOFF COEFFICIENT = .520

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

RESERVOIR (0104)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5200	.0302
.0001	.0069	.7200	.0358
.0170	.0119	.9600	.0421
.0600	.0142	1.2600	.0491
.1200	.0172	1.6000	.0568
.2200	.0209	2.0000	.0651
.3400	.0252	2.4400	.0741

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	2.81	.28	2.50	34.11
OUTFLOW: ID= 1 (0104)	2.81	.24	2.67	31.64

PEAK FLOW REDUCTION [Qout/Qin](%)= 86.86
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= .0217

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0105):	8.19	.317	2.83	21.02
+ ID2= 2 (0104):	2.81	.241	2.67	31.64
ID = 3 (0103):	11.00	.538	2.75	23.73

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0106)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.01	.119	2.33	26.75
+ ID2= 2 (0103):	11.00	.538	2.75	23.73
ID = 3 (0106):	12.01	.584	2.67	23.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

CHICAGO STORM
Ptotal= 76.13 mm

IDF curve parameters: A=2200.000
B= 14.600
C= .870
used in: INTENSITY = A / (t + B)^C

Duration of storm = 6.00 hrs
Storm time step = 10.00 min
Time to peak ratio = .38

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	2.22	1.67	8.42	3.17	10.74	4.67	3.38
.33	2.41	1.83	11.98	3.33	8.72	4.83	3.14
.50	2.65	2.00	19.90	3.50	7.31	5.00	2.93
.67	2.93	2.17	47.86	3.67	6.28	5.17	2.75
.83	3.29	2.33	135.62	3.83	5.50	5.33	2.59
1.00	3.75	2.50	57.60	4.00	4.89	5.50	2.44
1.17	4.36	2.67	29.73	4.17	4.40	5.67	2.32
1.33	5.21	2.83	19.18	4.33	4.00	5.83	2.20
1.50	6.45	3.00	13.86	4.50	3.67	6.00	2.10

CALIB
NASHYD (0102)
ID= 1 DT=10.0 min

Area (ha)= 1.01 Curve Number (CN)= 82.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .11

Unit Hyd Qpeak (cms)= .346

PEAK FLOW (cms)= .146 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 33.620
TOTAL RAINFALL (mm)= 76.131
RUNOFF COEFFICIENT = .442

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

CALIB
NASHYD (0105)
ID= 1 DT=10.0 min

Area (ha)= 8.19 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .673

PEAK FLOW (cms)= .404 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 27.284
TOTAL RAINFALL (mm)= 76.131
RUNOFF COEFFICIENT = .358

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

CALIB
NASHYD (0101)
ID= 1 DT=10.0 min

Area (ha)= 2.81 Curve Number (CN)= 84.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .25

Unit Hyd Qpeak (cms)= .437

PEAK FLOW (cms)= .339 (i)
TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 42.639

TOTAL RAINFALL (mm)= 76.131
RUNOFF COEFFICIENT = .560

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

RESERVOIR (0104)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5200	.0302
.0001	.0069	.7200	.0358
.0170	.0119	.9600	.0421
.0600	.0142	1.2600	.0491
.1200	.0172	1.6000	.0568
.2200	.0209	2.0000	.0651
.3400	.0252	2.4400	.0741

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	2.81	.34	2.50	42.64
OUTFLOW: ID= 1 (0104)	2.81	.30	2.67	40.17

PEAK FLOW REDUCTION [Qout/Qin](%)= 88.90
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= .0239

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0105):	8.19	.404	2.83	27.28
+ ID2= 2 (0104):	2.81	.301	2.67	40.17
ID = 3 (0103):	11.00	.680	2.67	30.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0106)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.01	.146	2.33	33.62
+ ID2= 2 (0103):	11.00	.680	2.67	30.57
ID = 3 (0106):	12.01	.739	2.67	30.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

CHICAGO STORM
Ptotal= 81.72 mm

IDF curve parameters: A=2507.000
B= 14.800
C= .880

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

Duration of storm = 6.00 hrs
Storm time step = 10.00 min
Time to peak ratio = .38

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	2.25	1.67	8.85	3.17	11.36	4.67	3.47
.33	2.45	1.83	12.70	3.33	9.17	4.83	3.22
.50	2.70	2.00	21.34	3.50	7.66	5.00	3.00
.67	3.00	2.17	52.05	3.67	6.56	5.17	2.81
.83	3.38	2.33	148.61	3.83	5.72	5.33	2.64
1.00	3.86	2.50	62.77	4.00	5.07	5.50	2.49
1.17	4.51	2.67	32.11	4.17	4.55	5.67	2.36
1.33	5.41	2.83	20.54	4.33	4.12	5.83	2.24
1.50	6.73	3.00	14.75	4.50	3.77	6.00	2.13

CALIB
NASHYD (0102)
ID= 1 DT=10.0 min

Area (ha)= 1.01 Curve Number (CN)= 82.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .11

Unit Hyd Qpeak (cms)= .346

PEAK FLOW (cms)= .167 (i)
TIME TO PEAK (hrs)= 2.333
RUNOFF VOLUME (mm)= 37.401
TOTAL RAINFALL (mm)= 81.724
RUNOFF COEFFICIENT = .458

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

CALIB
NASHYD (0105)
ID= 1 DT=10.0 min

Area (ha)= 8.19 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .673

PEAK FLOW (cms)= .466 (i)
TIME TO PEAK (hrs)= 2.833
RUNOFF VOLUME (mm)= 30.813
TOTAL RAINFALL (mm)= 81.724
RUNOFF COEFFICIENT = .377

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

CALIB
NASHYD (0101)
ID= 1 DT=10.0 min

Area (ha)= 2.81 Curve Number (CN)= 84.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .25

Unit Hyd Qpeak (cms)= .437

PEAK FLOW (cms)= .385 (i)

TIME TO PEAK (hrs)= 2.500
RUNOFF VOLUME (mm)= 47.312
TOTAL RAINFALL (mm)= 81.724
RUNOFF COEFFICIENT = .579

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

RESERVOIR (0104)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5200	.0302
.0001	.0069	.7200	.0358
.0170	.0119	.9600	.0421
.0600	.0142	1.2600	.0491
.1200	.0172	1.6000	.0568
.2200	.0209	2.0000	.0651
.3400	.0252	2.4400	.0741

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	2.81	.38	2.50	47.31
OUTFLOW: ID= 1 (0104)	2.81	.34	2.67	44.84

PEAK FLOW REDUCTION [Qout/Qin](%)= 89.20
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= .0254

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0105):	8.19	.466	2.83	30.81
+ ID2= 2 (0104):	2.81	.343	2.67	44.84
ID = 3 (0103):	11.00	.781	2.67	34.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0106)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.01	.167	2.33	37.40
+ ID2= 2 (0103):	11.00	.781	2.67	34.39
ID = 3 (0106):	12.01	.848	2.67	34.65

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, Version 2.0
O   O    T      T    H   H   Y Y   MM MM  O   O
O   O    T      T    H   H    Y    M M M  O   O   Licensed To: MJ Davenport

 OOO     T      T    H   H    Y    M   M   OOO                vo2-0057
```


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

Input filename: C:\Program Files\Visual OTTHYMO v2.0\voin.dat

Output filename: C:\visual otthymo files\3969\3969-CONT-3-WATERSHEDS\Post-Dev-Controlled.out

Summary filename: C:\visual otthymo files\3969\3969-CONT-3-WATERSHEDS\Post-Dev-Controlled.sum

DATE: 11/29/2017 TIME: 12:46:16 PM

USER:

COMMENTS: _____

** SIMULATION NUMBER: 1 **

MASS STORM Ptotal= 22.50 mm

Filename: C:\visual otthymo files\4456\AES 1-hr.mst
Comments: AES 1 HOUR STORM DISTRIBUTION a=21min k=

Duration of storm = 1.00 hrs
Mass curve time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	10.02	.33	69.93	.58	11.10	.83	.81
.17	30.00	.42	64.29	.67	4.62	.92	.30
.25	49.98	.50	27.03	.75	1.92	1.00	.03

CALIB NASHYD (0102) ID= 1 DT=10.0 min | Area (ha)= 1.01 Curve Number (CN)= 82.0 | Ia (mm)= 4.00 # of Linear Res.(N)= 3.00 | U.H. Tp(hrs)= .11

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 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
.167	20.01	.500	45.66	.833	1.36		
.333	59.95	.667	7.86	1.000	.16		

Unit Hyd Qpeak (cms)= .346

PEAK FLOW (cms)= .033 (i)
TIME TO PEAK (hrs)= .500
RUNOFF VOLUME (mm)= 3.808
TOTAL RAINFALL (mm)= 22.500
RUNOFF COEFFICIENT = .169

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

CALIB NASHYD (0105) ID= 1 DT=10.0 min | Area (ha)= 8.19 Curve Number (CN)= 69.0 | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 | U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .673

PEAK FLOW (cms)= .058 (i)
TIME TO PEAK (hrs)= .833
RUNOFF VOLUME (mm)= 2.324
TOTAL RAINFALL (mm)= 22.500
RUNOFF COEFFICIENT = .103

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

CALIB NASHYD (0101) ID= 1 DT=10.0 min | Area (ha)= 2.81 Curve Number (CN)= 84.0 | Ia (mm)= 4.00 # of Linear Res.(N)= 3.00 | U.H. Tp(hrs)= .25

Unit Hyd Qpeak (cms)= .437

PEAK FLOW (cms)= .067 (i)
TIME TO PEAK (hrs)= .667
RUNOFF VOLUME (mm)= 5.054
TOTAL RAINFALL (mm)= 22.500
RUNOFF COEFFICIENT = .225

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

RESERVOIR (0104) IN= 2---> OUT= 1

DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5200	.0302
.0001	.0069	.7200	.0358
.0170	.0119	.9600	.0421
.0600	.0142	1.2600	.0491
.1200	.0172	1.6000	.0568
.2200	.0209	2.0000	.0651
.3400	.0252	2.4400	.0741

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	2.81	.07	.67	5.05
OUTFLOW: ID= 1 (0104)	2.81	.02	1.08	2.59

PEAK FLOW REDUCTION [Qout/Qin](%)= 23.06
TIME SHIFT OF PEAK FLOW (min)= 25.00
MAXIMUM STORAGE USED (ha.m.)= .0115

ADD HYD (0103) 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0105):	8.19	.058	.83	2.32
+ ID2= 2 (0104):	2.81	.016	1.08	2.59
ID = 3 (0103):	11.00	.069	.83	2.39

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0106) 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.01	.033	.50	3.81
+ ID2= 2 (0103):	11.00	.069	.83	2.39
ID = 3 (0106):	12.01	.072	.83	2.51

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

** SIMULATION NUMBER: 2 **

MASS STORM Ptotal= 30.50 mm

Filename: C:\visual otthymo files\4456\AES 1-hr.mst
Comments: AES 1 HOUR STORM DISTRIBUTION a=21min k=

Duration of storm = 1.00 hrs
Mass curve time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	13.58	.33	94.79	.58	15.04	.83	1.10
.17	40.66	.42	87.14	.67	6.26	.92	.40
.25	67.75	.50	36.64	.75	2.60	1.00	.04

CALIB NASHYD (0102) ID= 1 DT=10.0 min | Area (ha)= 1.01 Curve Number (CN)= 82.0 | Ia (mm)= 4.00 # of Linear Res.(N)= 3.00 | U.H. Tp(hrs)= .11

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 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
.167	27.12	.500	61.89	.833	1.85		
.333	81.27	.667	10.65	1.000	.22		

Unit Hyd Qpeak (cms)= .346

PEAK FLOW (cms)= .059 (i)
TIME TO PEAK (hrs)= .500
RUNOFF VOLUME (mm)= 7.055
TOTAL RAINFALL (mm)= 30.500
RUNOFF COEFFICIENT = .231

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

CALIB NASHYD (0105) ID= 1 DT=10.0 min | Area (ha)= 8.19 Curve Number (CN)= 69.0 | Ia (mm)= 5.00 # of Linear Res.(N)= 3.00 | U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .673

PEAK FLOW (cms)= .115 (i)
TIME TO PEAK (hrs)= .833
RUNOFF VOLUME (mm)= 4.652
TOTAL RAINFALL (mm)= 30.500
RUNOFF COEFFICIENT = .153

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

CALIB NASHYD (0101) ID= 1 DT=10.0 min | Area (ha)= 2.81 Curve Number (CN)= 84.0 | Ia (mm)= 4.00 # of Linear Res.(N)= 3.00 | U.H. Tp(hrs)= .25

Unit Hyd Qpeak (cms)= .437

PEAK FLOW (cms)= .125 (i)
TIME TO PEAK (hrs)= .500
RUNOFF VOLUME (mm)= 9.262
TOTAL RAINFALL (mm)= 30.500
RUNOFF COEFFICIENT = .304

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

RESERVOIR (0104)

IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5200	.0302
.0001	.0069	.7200	.0358
.0170	.0119	.9600	.0421
.0600	.0142	1.2600	.0491
.1200	.0172	1.6000	.0568
.2200	.0209	2.0000	.0651
.3400	.0252	2.4400	.0741

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	2.81	.12	.50	9.26
OUTFLOW: ID= 1 (0104)	2.81	.08	.83	6.79

PEAK FLOW REDUCTION [Qout/Qin](%)= 62.74
TIME SHIFT OF PEAK FLOW (min)= 20.00
MAXIMUM STORAGE USED (ha.m.)= .0151

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0105):	8.19	.115	.83	4.65
+ ID2= 2 (0104):	2.81	.078	.83	6.79
ID = 3 (0103):	11.00	.193	.83	5.20

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0106)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.01	.059	.50	7.06
+ ID2= 2 (0103):	11.00	.193	.83	5.20
ID = 3 (0106):	12.01	.198	.83	5.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM
Ptotal= 35.80 mm

Filename: C:\visual otthymo files\4456\AES 1-hr.mst
Comments: AES 1 HOUR STORM DISTRIBUTION a=21min k=

Duration of storm = 1.00 hrs
Mass curve time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	15.94	.33	111.27	.58	17.66	.83	1.29
.17	47.73	.42	102.29	.67	7.35	.92	.47
.25	79.52	.50	43.00	.75	3.05	1.00	.04

CALIB NASHYD (0102) ID= 1 DT=10.0 min	Area (ha)= 1.01	Curve Number (CN)= 82.0
	Ia (mm)= 4.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .11	

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 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
.167	31.83	.500	72.65	.833	2.17		
.333	95.39	.667	12.50	1.000	.26		

Unit Hyd Qpeak (cms)= .346

PEAK FLOW (cms)= .078 (i)
TIME TO PEAK (hrs)= .500
RUNOFF VOLUME (mm)= 9.545
TOTAL RAINFALL (mm)= 35.800
RUNOFF COEFFICIENT = .267

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

CALIB NASHYD (0105) ID= 1 DT=10.0 min	Area (ha)= 8.19	Curve Number (CN)= 69.0
	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .47	

Unit Hyd Qpeak (cms)= .673

PEAK FLOW (cms)= .161 (i)
TIME TO PEAK (hrs)= .833
RUNOFF VOLUME (mm)= 6.539
TOTAL RAINFALL (mm)= 35.800
RUNOFF COEFFICIENT = .183

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

CALIB NASHYD (0101) ID= 1 DT=10.0 min	Area (ha)= 2.81	Curve Number (CN)= 84.0
	Ia (mm)= 4.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .25	

Unit Hyd Qpeak (cms)= .437

PEAK FLOW (cms)= .169 (i)
TIME TO PEAK (hrs)= .500
RUNOFF VOLUME (mm)= 12.456
TOTAL RAINFALL (mm)= 35.800
RUNOFF COEFFICIENT = .348

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

RESERVOIR (0104)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5200	.0302
.0001	.0069	.7200	.0358
.0170	.0119	.9600	.0421
.0600	.0142	1.2600	.0491
.1200	.0172	1.6000	.0568
.2200	.0209	2.0000	.0651
.3400	.0252	2.4400	.0741

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	2.81	.17	.50	12.46
OUTFLOW: ID= 1 (0104)	2.81	.12	.75	9.99

PEAK FLOW REDUCTION [Qout/Qin](%)= 71.17
TIME SHIFT OF PEAK FLOW (min)= 15.00
MAXIMUM STORAGE USED (ha.m.)= .0174

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0105):	8.19	.161	.83	6.54
+ ID2= 2 (0104):	2.81	.120	.75	9.99
ID = 3 (0103):	11.00	.279	.83	7.42

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0106)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.01	.078	.50	9.54
+ ID2= 2 (0103):	11.00	.279	.83	7.42
ID = 3 (0106):	12.01	.293	.75	7.79

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM
Ptotal= 42.50 mm

Filename: C:\visual otthymo files\4456\AES 1-hr.mst
Comments: AES 1 HOUR STORM DISTRIBUTION a=21min k=

Duration of storm = 1.00 hrs
Mass curve time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	18.92	.33	132.09	.58	20.96	.83	1.53
.17	56.66	.42	121.43	.67	8.72	.92	.56

.25	94.40	.50	51.05	.75	3.62	1.00	.05

CALIB NASHYD (0102) ID= 1 DT=10.0 min	Area (ha)= 1.01	Curve Number (CN)= 82.0
	Ia (mm)= 4.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .11	

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 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
.167	37.79	.500	86.24	.833	2.58		
.333	113.25	.667	14.84	1.000	.31		

Unit Hyd Qpeak (cms)= .346

PEAK FLOW (cms)= .104 (i)
TIME TO PEAK (hrs)= .500
RUNOFF VOLUME (mm)= 12.996
TOTAL RAINFALL (mm)= 42.500
RUNOFF COEFFICIENT = .306

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

CALIB NASHYD (0105) ID= 1 DT=10.0 min	Area (ha)= 8.19	Curve Number (CN)= 69.0
	Ia (mm)= 5.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .47	

Unit Hyd Qpeak (cms)= .673

PEAK FLOW (cms)= .228 (i)
TIME TO PEAK (hrs)= .833
RUNOFF VOLUME (mm)= 9.265
TOTAL RAINFALL (mm)= 42.500
RUNOFF COEFFICIENT = .218

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

CALIB NASHYD (0101) ID= 1 DT=10.0 min	Area (ha)= 2.81	Curve Number (CN)= 84.0
	Ia (mm)= 4.00	# of Linear Res.(N)= 3.00
	U.H. Tp(hrs)= .25	

Unit Hyd Qpeak (cms)= .437

PEAK FLOW (cms)= .229 (i)
TIME TO PEAK (hrs)= .500
RUNOFF VOLUME (mm)= 16.850
TOTAL RAINFALL (mm)= 42.500
RUNOFF COEFFICIENT = .396

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

RESERVOIR (0104)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5200	.0302
.0001	.0069	.7200	.0358
.0170	.0119	.9600	.0421
.0600	.0142	1.2600	.0491
.1200	.0172	1.6000	.0568
.2200	.0209	2.0000	.0651
.3400	.0252	2.4400	.0741

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	2.81	.23	.50	16.85
OUTFLOW: ID= 1 (0104)	2.81	.19	.75	14.38

PEAK FLOW REDUCTION [Qout/Qin](%)= 81.45
TIME SHIFT OF PEAK FLOW (min)= 15.00
MAXIMUM STORAGE USED (ha.m.)= .0198

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0105):	8.19	.228	.83	9.27
+ ID2= 2 (0104):	2.81	.187	.75	14.38
ID = 3 (0103):	11.00	.407	.75	10.57

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0106)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.01	.104	.50	13.00
+ ID2= 2 (0103):	11.00	.407	.75	10.57
ID = 3 (0106):	12.01	.431	.75	11.05

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM
Ptotal= 47.40 mm

Filename: C:\visual otthymo files\4456\AES 1-hr.mst
Comments: AES 1 HOUR STORM DISTRIBUTION a=21min k=

Duration of storm = 1.00 hrs
Mass curve time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.08	21.10	.33	147.32	.58	23.38	.83	1.71

.17	63.19	.42	135.43	.67	9.73	.92	.63
.25	105.28	.50	56.94	.75	4.04	1.00	.06

CALIB
NASHYD (0102)
ID= 1 DT=10.0 min

Area (ha)= 1.01 Curve Number (CN)= 82.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .11

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 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
.167	42.15	.500	96.18	.833	2.87		
.333	126.30	.667	16.55	1.000	.34		

Unit Hyd Qpeak (cms)= .346

PEAK FLOW (cms)= .125 (i)
TIME TO PEAK (hrs)= .500
RUNOFF VOLUME (mm)= 15.698
TOTAL RAINFALL (mm)= 47.400
RUNOFF COEFFICIENT = .331

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

CALIB
NASHYD (0105)
ID= 1 DT=10.0 min

Area (ha)= 8.19 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .673

PEAK FLOW (cms)= .282 (i)
TIME TO PEAK (hrs)= .833
RUNOFF VOLUME (mm)= 11.474
TOTAL RAINFALL (mm)= 47.400
RUNOFF COEFFICIENT = .242

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

CALIB
NASHYD (0101)
ID= 1 DT=10.0 min

Area (ha)= 2.81 Curve Number (CN)= 84.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .25

Unit Hyd Qpeak (cms)= .437

PEAK FLOW (cms)= .276 (i)
TIME TO PEAK (hrs)= .500
RUNOFF VOLUME (mm)= 20.268
TOTAL RAINFALL (mm)= 47.400
RUNOFF COEFFICIENT = .428

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

RESERVOIR (0104)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5200	.0302
.0001	.0069	.7200	.0358
.0170	.0119	.9600	.0421
.0600	.0142	1.2600	.0491
.1200	.0172	1.6000	.0568
.2200	.0209	2.0000	.0651
.3400	.0252	2.4400	.0741

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	2.81	.28	.50	20.27
OUTFLOW: ID= 1 (0104)	2.81	.23	.75	17.80

PEAK FLOW REDUCTION [Qout/Qin](%)= 83.01
TIME SHIFT OF PEAK FLOW (min)= 15.00
MAXIMUM STORAGE USED (ha.m.)= .0216

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0105):	8.19	.282	.83	11.47
+ ID2= 2 (0104):	2.81	.230	.75	17.80
ID = 3 (0103):	11.00	.503	.75	13.09

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0106)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.01	.125	.50	15.70
+ ID2= 2 (0103):	11.00	.503	.75	13.09
ID = 3 (0106):	12.01	.533	.67	13.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM
Ptotal= 52.40 mm

Filename: C:\visual otthymo files\4456\AES 1-hr.mst
Comments: AES 1 HOUR STORM DISTRIBUTION a=21min k=

Duration of storm = 1.00 hrs
Mass curve time step = 5.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr

.08	23.33	.33	162.86	.58	25.84	.83	1.89
.17	69.86	.42	149.72	.67	10.75	.92	.69
.25	116.39	.50	62.94	.75	4.46	1.00	.06

CALIB
NASHYD (0102)
ID= 1 DT=10.0 min

Area (ha)= 1.01 Curve Number (CN)= 82.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .11

NOTE: RAINFALL WAS TRANSFORMED TO 10.0 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
.167	46.59	.500	106.33	.833	3.18		
.333	139.63	.667	18.30	1.000	.38		

Unit Hyd Qpeak (cms)= .346

PEAK FLOW (cms)= .146 (i)
TIME TO PEAK (hrs)= .500
RUNOFF VOLUME (mm)= 18.586
TOTAL RAINFALL (mm)= 52.400
RUNOFF COEFFICIENT = .355

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

CALIB
NASHYD (0105)
ID= 1 DT=10.0 min

Area (ha)= 8.19 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .673

PEAK FLOW (cms)= .341 (i)
TIME TO PEAK (hrs)= .833
RUNOFF VOLUME (mm)= 13.896
TOTAL RAINFALL (mm)= 52.400
RUNOFF COEFFICIENT = .265

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

CALIB
NASHYD (0101)
ID= 1 DT=10.0 min

Area (ha)= 2.81 Curve Number (CN)= 84.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .25

Unit Hyd Qpeak (cms)= .437

PEAK FLOW (cms)= .327 (i)
TIME TO PEAK (hrs)= .500
RUNOFF VOLUME (mm)= 23.905
TOTAL RAINFALL (mm)= 52.400
RUNOFF COEFFICIENT = .456

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

RESERVOIR (0104)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5200	.0302
.0001	.0069	.7200	.0358
.0170	.0119	.9600	.0421
.0600	.0142	1.2600	.0491
.1200	.0172	1.6000	.0568
.2200	.0209	2.0000	.0651
.3400	.0252	2.4400	.0741

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	2.81	.33	.50	23.91
OUTFLOW: ID= 1 (0104)	2.81	.28	.67	21.44

PEAK FLOW REDUCTION [Qout/Qin](%)= 84.66
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= .0233

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0105):	8.19	.341	.83	13.90
+ ID2= 2 (0104):	2.81	.277	.67	21.44
ID = 3 (0103):	11.00	.606	.75	15.82

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0106)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.01	.146	.50	18.59
+ ID2= 2 (0103):	11.00	.606	.75	15.82
ID = 3 (0106):	12.01	.649	.67	16.46

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

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==========================================================================
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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    A  A   A  L
         VV    I    SSSSS  UUUUU  A   A  LLLLL

       OOO    TTTTT  TTTTT  H   H  Y   Y  M   M   OOO    TM, Version 2.0
      O   O     T      T    H   H   Y Y   MM MM  O   O
      O   O     T      T    H   H    Y    M M M  O   O   Licensed To: MJ Davenport

       OOO      T      T    H   H    Y    M   M   OOO                vo2-0057

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

  Input   filename: C:\Program Files\Visual OTTHYMO v2.0\voin.dat

  Output  filename: C:\visual otthymo
files\3969\3969-CONT-3-WATERSHEDS\Post-Dev-Controlled.out

  Summary filename: C:\visual otthymo
files\3969\3969-CONT-3-WATERSHEDS\Post-Dev-Controlled.sum


DATE: 11/29/2017                          TIME: 12:47:23 PM

USER:


COMMENTS: _____________________________________________________

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

--------------------
| MASS STORM       |    Filename: C:\visual otthymo files\4456\SCS II 6-hr.mst
| Ptotal= 38.40 mm |    Comments: SCS 6 HOUR TYPE II STORM DISTRIBUTION
--------------------

                         Duration of storm    =  6.00 hrs
                         Mass curve time step = 10.00 min

  TIME    RAIN  |  TIME    RAIN  |  TIME    RAIN  |  TIME    RAIN
   hrs   mm/hr  |   hrs   mm/hr  |   hrs   mm/hr  |   hrs   mm/hr
   .17    1.61  |  1.67    3.92  |  3.17    8.52  |  4.67    2.30
   .33    1.38  |  1.83    3.69  |  3.33    8.29  |  4.83    2.30
   .50    1.61  |  2.00    3.92  |  3.50    8.52  |  5.00    2.30
   .67    2.30  |  2.17    4.61  |  3.67    3.92  |  5.17    1.61
   .83    2.30  |  2.33    4.61  |  3.83    3.69  |  5.33    1.38
                          Page 1
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```
  1.00    2.30  |  2.50    4.61  |  4.00    3.92  |  5.50    1.61
  1.17    2.30  |  2.67   23.04  |  4.17    3.00  |  5.67    1.61
  1.33    2.30  |  2.83   41.47  |  4.33    3.23  |  5.83    1.38
  1.50    2.30  |  3.00   59.90  |  4.50    3.00  |  6.00    1.61

--------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0102) |   Area    (ha)=   1.01   Curve Number    (CN)= 82.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   4.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .11

     Unit Hyd Qpeak  (cms)=    .346

     PEAK FLOW       (cms)=    .055 (i)
     TIME TO PEAK    (hrs)=   3.000
     RUNOFF VOLUME    (mm)=  10.847
     TOTAL RAINFALL   (mm)=  38.400
     RUNOFF COEFFICIENT    =    .282

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

--------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0105) |   Area    (ha)=   8.19   Curve Number    (CN)= 69.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .47

     Unit Hyd Qpeak  (cms)=    .673

     PEAK FLOW       (cms)=    .112 (i)
     TIME TO PEAK    (hrs)=   3.333
     RUNOFF VOLUME    (mm)=   7.554
     TOTAL RAINFALL   (mm)=  38.400
     RUNOFF COEFFICIENT    =    .197

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

--------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0101) |   Area    (ha)=   2.81   Curve Number    (CN)= 84.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   4.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .25

     Unit Hyd Qpeak  (cms)=    .437

     PEAK FLOW       (cms)=    .114 (i)
     TIME TO PEAK    (hrs)=   3.000
     RUNOFF VOLUME    (mm)=  14.118
     TOTAL RAINFALL   (mm)=  38.400
     RUNOFF COEFFICIENT    =    .368

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

--------------------------------------------------------------------------
--------------------
| RESERVOIR (0104) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE    |   OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)     |    (cms)     (ha.m.)
                           .0000      .0000      |     .5200      .0302
                                  Page 2
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                          .0001      .0069      |     .7200      .0358
                          .0170      .0119      |     .9600      .0421
                          .0600      .0142      |    1.2600      .0491
                          .1200      .0172      |    1.6000      .0568
                          .2200      .0209      |    2.0000      .0651
                          .3400      .0252      |    2.4400      .0741

                                    AREA     QPEAK     TPEAK      R.V.
                                     (ha)     (cms)     (hrs)      (mm)
INFLOW : ID= 2 (0101)              2.81       .11      3.00     14.12
OUTFLOW: ID= 1 (0104)              2.81       .08      3.33     11.65

                    PEAK   FLOW   REDUCTION [Qout/Qin](%)= 65.96
                    TIME SHIFT OF PEAK FLOW          (min)= 20.00
                    MAXIMUM  STORAGE   USED        (ha.m.)=  .0150

--------------------------------------------------------------------------
--------------------
| ADD HYD   (0103) |
|  1 +  2 =  3     |                AREA    QPEAK    TPEAK     R.V.
--------------------                (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (0105):             8.19     .112     3.33     7.55
      + ID2= 2 (0104):             2.81     .075     3.33    11.65
        ================================================================
        ID = 3 (0103):            11.00     .187     3.33     8.60

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------
--------------------
| ADD HYD   (0106) |
|  1 +  2 =  3     |                AREA    QPEAK    TPEAK     R.V.
--------------------                (ha)    (cms)    (hrs)     (mm)
        ID1= 1 (0102):             1.01     .055     3.00    10.85
      + ID2= 2 (0103):            11.00     .187     3.33     8.60
        ================================================================
        ID = 3 (0106):            12.01     .198     3.33     8.79

    NOTE:  PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

--------------------------------------------------------------------------
  ****************************
  ** SIMULATION NUMBER:   2 **
  ****************************

--------------------
| MASS STORM       |    Filename: C:\visual otthymo files\4456\SCS II 6-hr.mst
| Ptotal= 50.50 mm |    Comments: SCS 6 HOUR TYPE II STORM DISTRIBUTION
--------------------

                         Duration of storm    =  6.00 hrs
                         Mass curve time step = 10.00 min

  TIME    RAIN  |  TIME    RAIN  |  TIME    RAIN  |  TIME    RAIN
   hrs   mm/hr  |   hrs   mm/hr  |   hrs   mm/hr  |   hrs   mm/hr
   .17    2.12  |  1.67    5.15  |  3.17   11.21  |  4.67    3.03
   .33    1.82  |  1.83    4.85  |  3.33   10.91  |  4.83    3.03
   .50    2.12  |  2.00    5.15  |  3.50   11.21  |  5.00    3.03
   .67    3.03  |  2.17    6.06  |  3.67    5.15  |  5.17    2.12
   .83    3.03  |  2.33    6.06  |  3.83    4.85  |  5.33    1.82
  1.00    3.03  |  2.50    6.06  |  4.00    5.15  |  5.50    2.12
  1.17    3.03  |  2.67   30.30  |  4.17    3.94  |  5.67    2.12
                          Page 3
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```
  1.33    3.03  |  2.83   54.54  |  4.33    4.24  |  5.83    1.82
  1.50    3.03  |  3.00   78.78  |  4.50    3.94  |  6.00    2.12

--------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0102) |   Area    (ha)=   1.01   Curve Number    (CN)= 82.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   4.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .11

     Unit Hyd Qpeak  (cms)=    .346

     PEAK FLOW       (cms)=    .088 (i)
     TIME TO PEAK    (hrs)=   3.000
     RUNOFF VOLUME    (mm)=  17.474
     TOTAL RAINFALL   (mm)=  50.500
     RUNOFF COEFFICIENT    =    .346

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

--------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0105) |   Area    (ha)=   8.19   Curve Number    (CN)= 69.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   5.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .47

     Unit Hyd Qpeak  (cms)=    .673

     PEAK FLOW       (cms)=    .195 (i)
     TIME TO PEAK    (hrs)=   3.333
     RUNOFF VOLUME    (mm)=  12.956
     TOTAL RAINFALL   (mm)=  50.500
     RUNOFF COEFFICIENT    =    .257

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

--------------------------------------------------------------------------
--------------------
| CALIB            |
| NASHYD    (0101) |   Area    (ha)=   2.81   Curve Number    (CN)= 84.0
|ID= 1 DT=10.0 min |   Ia      (mm)=   4.00   # of Linear Res.(N)= 3.00
--------------------   U.H. Tp(hrs)=    .25

     Unit Hyd Qpeak  (cms)=    .437

     PEAK FLOW       (cms)=    .186 (i)
     TIME TO PEAK    (hrs)=   3.000
     RUNOFF VOLUME    (mm)=  22.507
     TOTAL RAINFALL   (mm)=  50.500
     RUNOFF COEFFICIENT    =    .446

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

--------------------------------------------------------------------------
--------------------
| RESERVOIR (0104) |
| IN= 2---> OUT= 1 |
| DT=  5.0 min     |      OUTFLOW    STORAGE    |   OUTFLOW    STORAGE
--------------------      (cms)     (ha.m.)     |    (cms)     (ha.m.)
                           .0000      .0000      |     .5200      .0302
                           .0001      .0069      |     .7200      .0358
                           .0170      .0119      |     .9600      .0421
                                  Page 4
```

.0600	.0142	1.2600	.0491
.1200	.0172	1.6000	.0568
.2200	.0209	2.0000	.0651
.3400	.0252	2.4400	.0741

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	2.81	.19	3.00	22.51
OUTFLOW: ID= 1 (0104)	2.81	.15	3.25	20.04

PEAK FLOW REDUCTION [Qout/Qin](%)= 81.79
TIME SHIFT OF PEAK FLOW (min)= 15.00
MAXIMUM STORAGE USED (ha.m.)= .0184

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0105):	8.19	.195	3.33	12.96
+ ID2= 2 (0104):	2.81	.152	3.25	20.04
ID = 3 (0103):	11.00	.339	3.25	14.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0106)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.01	.088	3.00	17.47
+ ID2= 2 (0103):	11.00	.339	3.25	14.76
ID = 3 (0106):	12.01	.363	3.25	14.99

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM
Ptotal= 58.60 mm

Filename: C:\visual otthymo files\4456\SCS II 6-hr.mst
Comments: SCS 6 HOUR TYPE II STORM DISTRIBUTION

Duration of storm = 6.00 hrs
Mass curve time step = 10.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	2.46	1.67	5.98	3.17	13.01	4.67	3.52
.33	2.11	1.83	5.63	3.33	12.66	4.83	3.52
.50	2.46	2.00	5.98	3.50	13.01	5.00	3.52
.67	3.52	2.17	7.03	3.67	5.98	5.17	2.46
.83	3.52	2.33	7.03	3.83	5.63	5.33	2.11
1.00	3.52	2.50	7.03	4.00	5.98	5.50	2.46
1.17	3.52	2.67	35.16	4.17	4.57	5.67	2.46
1.33	3.52	2.83	63.29	4.33	4.92	5.83	2.11
1.50	3.52	3.00	91.42	4.50	4.57	6.00	2.46

CALIB
NASHYD (0102)
ID= 1 DT=10.0 min

Area (ha)= 1.01 Curve Number (CN)= 82.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .11

Unit Hyd Qpeak (cms)= .346

PEAK FLOW (cms)= .112 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 22.324
TOTAL RAINFALL (mm)= 58.600
RUNOFF COEFFICIENT = .381

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

CALIB
NASHYD (0105)
ID= 1 DT=10.0 min

Area (ha)= 8.19 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .673

PEAK FLOW (cms)= .261 (i)
TIME TO PEAK (hrs)= 3.333
RUNOFF VOLUME (mm)= 17.112
TOTAL RAINFALL (mm)= 58.600
RUNOFF COEFFICIENT = .292

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

CALIB
NASHYD (0101)
ID= 1 DT=10.0 min

Area (ha)= 2.81 Curve Number (CN)= 84.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .25

Unit Hyd Qpeak (cms)= .437

PEAK FLOW (cms)= .239 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 28.591
TOTAL RAINFALL (mm)= 58.600
RUNOFF COEFFICIENT = .488

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

RESERVOIR (0104)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5200	.0302
.0001	.0069	.7200	.0358
.0170	.0119	.9600	.0421
.0600	.0142	1.2600	.0491
.1200	.0172	1.6000	.0568

.2200	.0209	2.0000	.0651
.3400	.0252	2.4400	.0741

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	2.81	.24	3.00	28.59
OUTFLOW: ID= 1 (0104)	2.81	.20	3.25	26.12

PEAK FLOW REDUCTION [Qout/Qin](%)= 85.38
TIME SHIFT OF PEAK FLOW (min)= 15.00
MAXIMUM STORAGE USED (ha.m.)= .0205

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0105):	8.19	.261	3.33	17.11
+ ID2= 2 (0104):	2.81	.204	3.25	26.12
ID = 3 (0103):	11.00	.454	3.25	19.41

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0106)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.01	.112	3.00	22.32
+ ID2= 2 (0103):	11.00	.454	3.25	19.41
ID = 3 (0106):	12.01	.484	3.25	19.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM
Ptotal= 68.70 mm

Filename: C:\visual otthymo files\4456\SCS II 6-hr.mst
Comments: SCS 6 HOUR TYPE II STORM DISTRIBUTION

Duration of storm = 6.00 hrs
Mass curve time step = 10.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	2.89	1.67	7.01	3.17	15.25	4.67	4.12
.33	2.47	1.83	6.60	3.33	14.84	4.83	4.12
.50	2.89	2.00	7.01	3.50	15.25	5.00	4.12
.67	4.12	2.17	8.24	3.67	7.01	5.17	2.89
.83	4.12	2.33	8.24	3.83	6.60	5.33	2.47
1.00	4.12	2.50	8.24	4.00	7.01	5.50	2.89
1.17	4.12	2.67	41.22	4.17	5.36	5.67	2.89
1.33	4.12	2.83	74.20	4.33	5.77	5.83	2.47
1.50	4.12	3.00	107.17	4.50	5.36	6.00	2.89

CALIB
NASHYD (0102)
ID= 1 DT=10.0 min

Area (ha)= 1.01 Curve Number (CN)= 82.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .11

Unit Hyd Qpeak (cms)= .346

PEAK FLOW (cms)= .144 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 28.718
TOTAL RAINFALL (mm)= 68.700
RUNOFF COEFFICIENT = .418

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

CALIB
NASHYD (0105)
ID= 1 DT=10.0 min

Area (ha)= 8.19 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .673

PEAK FLOW (cms)= .350 (i)
TIME TO PEAK (hrs)= 3.333
RUNOFF VOLUME (mm)= 22.795
TOTAL RAINFALL (mm)= 68.700
RUNOFF COEFFICIENT = .332

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

CALIB
NASHYD (0101)
ID= 1 DT=10.0 min

Area (ha)= 2.81 Curve Number (CN)= 84.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .25

Unit Hyd Qpeak (cms)= .437

PEAK FLOW (cms)= .308 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 36.561
TOTAL RAINFALL (mm)= 68.700
RUNOFF COEFFICIENT = .532

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

RESERVOIR (0104)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5200	.0302
.0001	.0069	.7200	.0358
.0170	.0119	.9600	.0421
.0600	.0142	1.2600	.0491
.1200	.0172	1.6000	.0568
.2200	.0209	2.0000	.0651
.3400	.0252	2.4400	.0741

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	2.81	.31	3.00	36.56
OUTFLOW: ID= 1 (0104)	2.81	.27	3.17	34.09

PEAK FLOW REDUCTION [Qout/Qin](%)= 88.30
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= .0230

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0105):	8.19	.350	3.33	22.80
+ ID2= 2 (0104):	2.81	.272	3.17	34.09
ID = 3 (0103):	11.00	.603	3.25	25.68

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0106)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.01	.144	3.00	28.72
+ ID2= 2 (0103):	11.00	.603	3.25	25.68
ID = 3 (0106):	12.01	.643	3.17	25.93

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM
Ptotal= 76.30 mm

Filename: C:\visual otthymo files\4456\SCS II 6-hr.mst
Comments: SCS 6 HOUR TYPE II STORM DISTRIBUTION

Duration of storm = 6.00 hrs
Mass curve time step = 10.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	3.20	1.67	7.78	3.17	16.94	4.67	4.58
.33	2.75	1.83	7.32	3.33	16.48	4.83	4.58
.50	3.20	2.00	7.78	3.50	16.94	5.00	4.58
.67	4.58	2.17	9.16	3.67	7.78	5.17	3.20
.83	4.58	2.33	9.16	3.83	7.32	5.33	2.75
1.00	4.58	2.50	9.16	4.00	7.78	5.50	3.20
1.17	4.58	2.67	45.78	4.17	5.95	5.67	3.20
1.33	4.58	2.83	82.40	4.33	6.41	5.83	2.75
1.50	4.58	3.00	119.03	4.50	5.95	6.00	3.20

CALIB

NASHYD (0102) ID= 1 DT=10.0 min
Area (ha)= 1.01 Curve Number (CN)= 82.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .11

Unit Hyd Qpeak (cms)= .346

PEAK FLOW (cms)= .168 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 33.734
TOTAL RAINFALL (mm)= 76.300
RUNOFF COEFFICIENT = .442

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

CALIB
NASHYD (0105) ID= 1 DT=10.0 min
Area (ha)= 8.19 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .673

PEAK FLOW (cms)= .423 (i)
TIME TO PEAK (hrs)= 3.333
RUNOFF VOLUME (mm)= 27.389
TOTAL RAINFALL (mm)= 76.300
RUNOFF COEFFICIENT = .359

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

CALIB
NASHYD (0101) ID= 1 DT=10.0 min
Area (ha)= 2.81 Curve Number (CN)= 84.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .25

Unit Hyd Qpeak (cms)= .437

PEAK FLOW (cms)= .362 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 42.779
TOTAL RAINFALL (mm)= 76.300
RUNOFF COEFFICIENT = .561

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

RESERVOIR (0104)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5200	.0302
.0001	.0069	.7200	.0358
.0170	.0119	.9600	.0421
.0600	.0142	1.2600	.0491
.1200	.0172	1.6000	.0568
.2200	.0209	2.0000	.0651
.3400	.0252	2.4400	.0741

AREA QPEAK TPEAK R.V.

	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0101)	2.81	.36	3.00	42.78
OUTFLOW: ID= 1 (0104)	2.81	.32	3.17	40.31

PEAK FLOW REDUCTION [Qout/Qin](%)= 89.63
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= .0248

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0105):	8.19	.423	3.33	27.39
+ ID2= 2 (0104):	2.81	.325	3.17	40.31
ID = 3 (0103):	11.00	.721	3.25	30.69

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0106)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.01	.168	3.00	33.73
+ ID2= 2 (0103):	11.00	.721	3.25	30.69
ID = 3 (0106):	12.01	.772	3.17	30.94

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

MASS STORM
Ptotal= 83.80 mm

Filename: C:\visual otthymo files\4456\SCS II 6-hr.mst
Comments: SCS 6 HOUR TYPE II STORM DISTRIBUTION

Duration of storm = 6.00 hrs
Mass curve time step = 10.00 min

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.17	3.52	1.67	8.55	3.17	18.60	4.67	5.03
.33	3.02	1.83	8.04	3.33	18.10	4.83	5.03
.50	3.52	2.00	8.55	3.50	18.60	5.00	5.03
.67	5.03	2.17	10.06	3.67	8.55	5.17	3.52
.83	5.03	2.33	10.06	3.83	8.04	5.33	3.02
1.00	5.03	2.50	10.06	4.00	8.55	5.50	3.52
1.17	5.03	2.67	50.28	4.17	6.54	5.67	3.52
1.33	5.03	2.83	90.50	4.33	7.04	5.83	3.02
1.50	5.03	3.00	130.73	4.50	6.54	6.00	3.52

CALIB
NASHYD (0102) ID= 1 DT=10.0 min
Area (ha)= 1.01 Curve Number (CN)= 82.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= .11

Unit Hyd Qpeak (cms)= .346

PEAK FLOW (cms)= .193 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 38.822
TOTAL RAINFALL (mm)= 83.800
RUNOFF COEFFICIENT = .463

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

CALIB
NASHYD (0105) ID= 1 DT=10.0 min
Area (ha)= 8.19 Curve Number (CN)= 69.0
Ia (mm)= 5.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .47

Unit Hyd Qpeak (cms)= .673

PEAK FLOW (cms)= .498 (i)
TIME TO PEAK (hrs)= 3.333
RUNOFF VOLUME (mm)= 32.153
TOTAL RAINFALL (mm)= 83.800
RUNOFF COEFFICIENT = .384

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

CALIB
NASHYD (0101) ID= 1 DT=10.0 min
Area (ha)= 2.81 Curve Number (CN)= 84.0
Ia (mm)= 4.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= .25

Unit Hyd Qpeak (cms)= .437

PEAK FLOW (cms)= .417 (i)
TIME TO PEAK (hrs)= 3.000
RUNOFF VOLUME (mm)= 49.065
TOTAL RAINFALL (mm)= 83.800
RUNOFF COEFFICIENT = .586

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

RESERVOIR (0104)
IN= 2---> OUT= 1
DT= 5.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.5200	.0302
.0001	.0069	.7200	.0358
.0170	.0119	.9600	.0421
.0600	.0142	1.2600	.0491
.1200	.0172	1.6000	.0568
.2200	.0209	2.0000	.0651
.3400	.0252	2.4400	.0741

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0101)	2.81	.42	3.00	49.07

OUTFLOW: ID= 1 (0104) 2.81 .38 3.17 46.60

PEAK FLOW REDUCTION [Qout/Qin](%)= 91.24
TIME SHIFT OF PEAK FLOW (min)= 10.00
MAXIMUM STORAGE USED (ha.m.)= .0263

ADD HYD (0103)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0105):	8.19	.498	3.33	32.15
+ ID2= 2 (0104):	2.81	.380	3.17	46.60
ID = 3 (0103):	11.00	.843	3.17	35.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0106)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0102):	1.01	.193	3.00	38.82
+ ID2= 2 (0103):	11.00	.843	3.17	35.84
ID = 3 (0106):	12.01	.907	3.17	36.09

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH