

**Appendix K.7 - Drainage &  
Stormwater Management Report**

**APPENDIX A**

**Approved SWM Pond Release Rates and  
Storage Requirements & MESP/Addendum  
Background**

BLOCK 12  
Job# 1822

REVISED SWM POND PEAK RELEASE RATES

15-Sep-03

SUB-BASIN NUMBER 17, 19 & 21  
UNIT PEAK FLOWS (m<sup>3</sup>/s/ha)  
2-YEAR 5-YEAR 10-YEAR 25-YEAR 50-YEAR 100-YEAR  
0.0033 0.0053 0.0069 0.008 0.0116 0.0143

REVISED  
POND ID AREA (ha) PEAK RELEASE RATES (m<sup>3</sup>/s)

POND ID	AREA (ha)	2-YEAR	5-YEAR	10-YEAR	25-YEAR	50-YEAR	100-YEAR
1	5.60	0.018	0.030	0.039	0.045	0.065	0.080
2	24.17	0.080	0.128	0.167	0.193	0.280	0.346
3A	53.97	0.178	0.286	0.372	0.432	0.626	0.772
3B	4.30	0.014	0.023	0.030	0.034	0.050	0.061
4	35.20	0.116	0.187	0.243	0.282	0.408	0.503
External 4	15.00	0.490	0.780	0.994	1.281	1.300	1.722
4 Final	50.20	0.606	0.967	1.237	1.563	1.708	2.225
5	13.74	0.045	0.073	0.095	0.110	0.159	0.196
6	7.67	0.025	0.041	0.053	0.061	0.089	0.110
7	22.38	0.074	0.119	0.154	0.179	0.260	0.320
8	37.58	0.124	0.199	0.259	0.301	0.436	0.537
11	10.08	0.033	0.053	0.070	0.081	0.117	0.144
12	21.11	0.070	0.112	0.146	0.169	0.245	0.302

from OTTHYMO modelling

SUB-BASIN NUMBER 18  
UNIT PEAK FLOWS (m<sup>3</sup>/s/ha)  
2-YEAR 5-YEAR 10-YEAR 25-YEAR 50-YEAR 100-YEAR  
0.004 0.0078 0.0113 0.0147 0.0178 0.0215

REVISED  
POND ID AREA (ha) PEAK RELEASE RATES (m<sup>3</sup>/s)

POND ID	AREA (ha)	2-YEAR	5-YEAR	10-YEAR	25-YEAR	50-YEAR	100-YEAR
9	34.17	0.137	0.267	0.386	0.502	0.608	0.735
10	11.60	0.046	0.090	0.131	0.171	0.206	0.249

BLOCK 12 SWM POND VOLUMES

September 15, 2003

PERMANENT POOL VOLUMES

SWM FACILITY	Type	Drainage Area ha	Impervious Level %	% Impervious Range		Storage Vol. Range(Tab 3.2)		Required Total Storage Volume m <sup>3</sup> /ha	Active Storage Volume m <sup>3</sup> /ha	Req'd Permanent Pool Volume m <sup>3</sup>
				1st Value %	2nd Value %	1st Value m <sup>3</sup> /ha	2nd Value m <sup>3</sup> /ha			
1	Wet Pond	5.60	65	55	70	190	225	213.3	40	971
2	Wet Pond	24.17	65	55	70	190	225	213.3	40	4,189
3A	Wet Pond	53.97	65	55	70	190	225	213.3	40	9,355
3B	Wet Pond	4.30	65	55	70	190	225	213.3	40	745
4	Wet Pond	50.20	48	35	55	140	190	172.5	40	6,652
5	Wet Pond	13.74	65	55	70	190	225	213.3	40	2,382
6	Wet Pond	7.67	65	55	70	190	225	213.3	40	1,329
7	Wet Pond	22.38	65	55	70	190	225	213.3	40	3,879
8	Wet Pond	37.58	65	55	70	190	225	213.3	40	6,514
9	Wet Pond	34.17	65	55	70	190	225	213.3	40	5,923
10	Wet Pond	11.60	65	55	70	190	225	213.3	40	2,011
11	Wet Pond	10.08	65	55	70	190	225	213.3	40	1,747
12	Wet Pond	21.11	65	55	70	190	225	213.3	40	3,659

Note: The impervious level for Pond 4 is a weighted value - 15 ha external area (i=7%) & 35.20 ha (i=65%)

EXTENDED DETENTION VOLUMES

SWM FACILITY	Drainage Area ha	Impervious Level	Volumetric Runoff Coefficient	25 mm Extended Detention Vol. m <sup>3</sup>	48 hrs Avge Release Rate m <sup>3</sup> /s	48 hrs Peak Release Rate m <sup>3</sup> /s	Adapted Peak Release Rate m <sup>3</sup> /s
1	5.60	0.65	0.64	896	0.005	0.008	0.01
2	24.17	0.65	0.64	3,867	0.02	0.03	0.03
3A	53.97	0.65	0.64	8,635	0.05	0.07	*0.01
3B	4.30	0.65	0.64	688	0.004	0.006	*0.01
4	50.20	0.48	0.50	6,325	0.04	0.05	*0.01
5	13.74	0.65	0.64	2,198	0.01	0.02	0.02
6	7.67	0.65	0.64	1,227	0.01	0.01	*0.01
7	22.38	0.65	0.64	3,581	0.02	0.03	0.03
8	37.58	0.65	0.64	6,013	0.03	0.05	0.05
9	34.17	0.65	0.64	5,467	0.03	0.05	0.05
10	11.60	0.65	0.64	1,856	0.01	0.02	0.02
11	10.08	0.65	0.64	1,813	0.01	0.01	*0.01
12	21.11	0.65	0.64	3,378	0.02	0.03	*0.01

Note: \*critical discharge is used

For ponds 1 & 3B the minimum release rates should be 0.01 m<sup>3</sup>/s based on the minimum orifice plate size of 75 mm

Table 3.2 - Water Quality Storage Requirements based on Receiving Waters

Protection Level	SWMP Type	Storage Volume (m <sup>3</sup> /ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced 80% long-term S.S. removal	1 Infiltration	25	30	35	40
	2 Wetlands	80	105	120	140
	3 Hybrid Wet Pond/Wetland	110	150	175	195
	4 Wet Pond	140	190	225	250

MOE (March 2003). Stormwater Management Planning & Design Manual, page 3-10

Target Stormwater Management Flows

Revised Sept. 15, 2003

SWM Pond ID	Development Criteria	25 mm Storm Event		5-year Storm Event		100-Year Storm Event	
	Critical Discharge (m <sup>3</sup> /s)	Required Volume (m <sup>3</sup> )	Release Rate (m <sup>3</sup> /s)	Required Volume (m <sup>3</sup> )	Release Rate (m <sup>3</sup> /s)	Required Volume (m <sup>3</sup> )	Release Rate (m <sup>3</sup> /s)
1	0.01	896	0.01	1,656	0.030	2,911	0.080
2	n/a	3,867	0.03	7,170	0.128	12,611	0.346
3A	0.01	8,635	0.01	16,192	0.286	28,374	0.772
3B	0.01	688	0.01	1,265	0.023	2,228	0.061
4	0.01	6,325	0.01	10,616	0.967	18,584	2.225
5	0.32	2,198	0.02	4,073	0.073	7,158	0.196
6	0.02	1,227	0.01	2,277	0.041	3,999	0.110
7	n/a	3,581	0.03	6,634	0.119	11,662	0.320
8	0.16	6,013	0.05	11,145	0.199	19,575	0.537
9	n/a	5,467	0.05	9,856	0.267	16,970	0.735
10	n/a	1,856	0.02	3,322	0.090	5,717	0.249
11	0.01	1,613	0.01	3,004	0.053	5,269	0.144
12	0.01	3,378	0.01	6,315	0.112	11,075	0.302



**EROSION ANALYSIS REPORT  
EAST DON RIVER**

**BLOCKS 11, 12 & 18  
CITY OF VAUGHAN**

**Project: 02 - E - 2436**

**February, 2003  
Revised: July, 2003**



**SCHAEFFERS**

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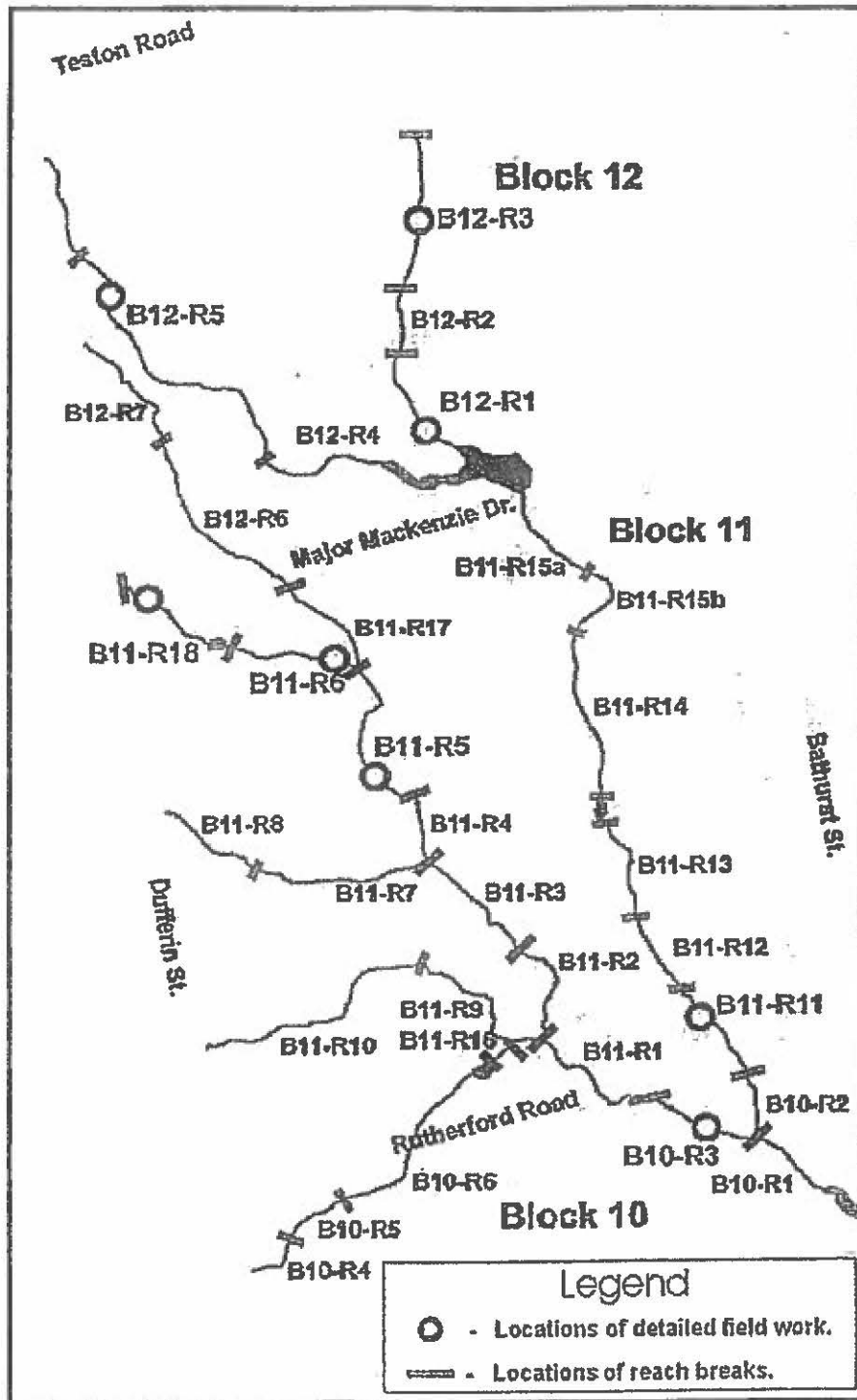


Figure 2: Location of Reaches.

As shown in Figure 2 eight stream reaches were screened for detailed investigation based on sensitivity. The approach used to establish the critical erosive flows was generally based on a “worst case” resistance scenario which should provide a safe target for stormwater management control

Table 2 summarizes the results, in terms of critical erosion thresholds, along these reaches.

**Table 2: Critical Flows for Erosion**

Reach	East Don River							
	B11-R18	B11-R6	B11-R5	B10-R3	B12-R5	B12-R3	B12-R1	B11-R11
Qcritical	0.10	0.09	0.28	0.24	0.32	0.01	0.02	0.38

Note: Qcritical = Critical flow causing erosion.

An additional location has been included on McNair Creek at Bathurst Street and Major MacKenzie Drive in Watershed 19. This will allow the effects of Ponds 1, 12, 4 and 8 in Block 12 to be compared with existing conditions.

To determine a value for the critical erosive flow and bank full flow, the unit flow rates at locations B11-R05, B10-R03, B12-R05 and B11-R11 were calculated and averaged. The critical erosive flow at Bathurst and Major MacKenzie, based on the average unit flow, was determined to be 0.28 m<sup>3</sup>/s.

## 4.2 Existing Conditions QUALHYMO Model

### 4.2.1 Model Description

The QUALHYMO hydrologic model used in the erosion analysis is based on the detailed versions of the OTTHYMO models created for the individual blocks. The overall hydrologic model was created by converting existing hydrologic models to QUALHYMO format. These models included existing development in Blocks 10 and 17 at the southern portion of the catchment area, and the Maplewood and Northdale developments in the north portion. Blocks 19 (Keele Valley Landfill) and 20 are based on models for existing conditions from Stantec Consulting Ltd. The existing conditions QUALHYMO drainage subcatchments are shown on Drawing 1, included at the back of this report.

Some of the original ‘OTTHYMO’ model catchments have been lumped into larger areas in the QUALHYMO model. Drainage areas (lumped and discretized), soil characteristics, and other model parameters are consistent with the OTTHYMO values. A table of hydrologic parameters is included in Appendix D. Figure 3 is a schematic representation of the entire model. The schematic is included, at a smaller, more legible scale, in Appendix E along with the QUALHYMO input file listing.

Reach routing was initially included in the model, using HEC-2 cross sections. It was found, however, that the reach outflow was equal to, or greater than, the reach inflow. As a result of this inconsistency, reach routing was not included in the final model.

### 4.3 Single Event Model

The QUALHYMO model was used to determine the flows at each identified erosion sensitive reach through the proposed developments. Flows were determined using the 33 years of continuous climate data and the 2, 5, 10, 25, 50 and 100 year storm events. Peak flow results at each of the erosion analysis reaches, and at other selected locations, are summarized for the 2, 5, 25 and 100 year events in Table 3.

**Table 3: Existing Conditions Peak Flows**

Location	Flow Point	Return Period / Peak Flow (m <sup>3</sup> /s)			
		2	5	25	100
Western Tributary. Blocks 19, 12, 11					
Dufferin Culv 1	105	1.35	2.81	5.54	6.65
<b>B11-R18</b>	<b>205</b>	<b>1.62</b>	<b>3.22</b>	<b>6.19</b>	<b>7.50</b>
<b>B11-R6</b>	<b>206</b>	<b>2.13</b>	<b>4.00</b>	<b>7.41</b>	<b>9.10</b>
<b>B11-R5</b>	<b>18.76</b>	<b>3.98</b>	<b>6.84</b>	<b>11.96</b>	<b>15.15</b>
	18.70	6.43	10.63	18.12	23.44
Western Trib	18.65	6.86	11.29	19.19	24.88
Blocks 18, 17, 10, 11					
SW Swale	10.01	1.67	2.55	4.08	5.44
E Swale	10.06	1.42	2.21	3.60	4.85
E + SW	18.66	3.09	4.76	7.68	10.29
<b>Confluence w western Tributary</b>	<b>18.64</b>	<b>9.95</b>	<b>16.05</b>	<b>26.87</b>	<b>35.17</b>
<b>B10-R3</b>	<b>18.56</b>	<b>10.35</b>	<b>16.68</b>	<b>27.88</b>	<b>36.54</b>
Maplewood, Blk 20, 19, 12, 11					
Culv 2,3,4, East of Dufferin		1.97	3.22	5.22	7.01
<b>B12-R5</b>	<b>17.130</b>	<b>2.25</b>	<b>3.59</b>	<b>5.82</b>	<b>8.03</b>
<b>B12-R3</b>		<b>1.50</b>	<b>2.33</b>	<b>3.78</b>	<b>5.08</b>
<b>B12-R1</b>	<b>343</b>	<b>3.56</b>	<b>5.49</b>	<b>8.84</b>	<b>11.84</b>
Major Mac	245=18.45	6.46	9.88	16.18	21.87
<b>B11-R11</b>	<b>18.21</b>	<b>8.29</b>	<b>12.71</b>	<b>20.77</b>	<b>28.03</b>
Confluence	18.2A	18.64	29.39	48.65	64.57
Bathurst south of Rutherford	356	19.28	30.32	50.08	66.42
Bathurst south of Teston	1265	2.87	4.40	7.09	9.53
Bathurst & Major MacKenzie	254	5.62	8.45	13.03	17.28

Note: Node locations are illustrated on Drawings 1 & 2 and Figures 3 & 4.

#### 4.4 Continuous Event Model, Erosion Index Results

Erosion indices were calculated using a continuous event QUALHYMO model with rainfall records from 1965 into 1997. The erosion indices corresponding to the simulated flows and corresponding erosion thresholds and Erosion Potential, as discussed in Section 2, are presented in Table 4.

**Table 4: Existing Condition Erosion Index (1965-1997)**

Location	Discharge m <sup>3</sup> /s	Erosion Index
<b>B11-R18</b>		
Q critical	0.10	1446
Q bank full	0.74	108
<b>B11-R6</b>		
Q critical	0.09	2091
Q bank full	1.27	76
<b>B11-R5</b>		
Q critical	0.28	1448
Q bank full	2.09	121
<b>B10-R3</b>		
Q critical	0.24	7777
Q bank full	4.59	294
<b>B12-R5</b>		
Q critical	0.32	2489
Q bank full	2.60	77
<b>B12-R3</b>		
Q critical	0.01	4012
Q bank full	1.80	28
<b>B12-R1</b>		
Q critical	0.02	6335
Q bank full	2.01	107
<b>B11-R11</b>		
Q critical	0.38	5917
Q bank full	2.09	720
<b>Bathurst &amp; Major MacKenzie</b>		
Q critical	0.28	5043
Q bank full	2.84	222

These represent the target values to be used when establishing the future conditions erosion management strategy.

It should be noted that the bankfull erosive flow at location B11-R11 is exceeded more frequently than any other locations because of the steep bankfull gradient (see Appendix A, Table 3).

## 5 DEVELOPED CONDITIONS

### 5.1 Developed Conditions QUALHYMO Model

As with the existing conditions QUALHYMO model, the erosion analysis for the developed scenario is based on the detailed versions of the OTTHYMO models created for the individual blocks and SWM facilities. The overall hydrologic model was created by converting existing hydrologic models to QUALHYMO format. Blocks 10 and 17 and the Maplewood and Northdale developments are common to the existing and developed models, as they are largely builtout. Block 19 (Keele Valley Landfill) is based on the model, from Stantec Consulting Ltd., for proposed development including the Eagles Nest Golf Course. The hydrology for Blocks 11, 12 and 18 is based on individual models for these sites. Drawing 2, at the back of this report, illustrates the proposed conditions QUALHYMO drainage area discretization. The hydrologic parameters for the developed condition scenario are included in Appendix F. The model schematic is shown on Figure 4, and in Appendix G, along with the model input file.

Some of the original OTTHYMO model catchments have been lumped into larger areas in the QUALHYMO model. Drainage areas (lumped and discretized), soil characteristics, and other model parameters are consistent with the OTTHYMO values. A 15 minute simulation time step was used in all the analyses.

When the erosion potential was too great, the extended detention time for several ponds was revised to allow less flow into the water course. Table 5 summarizes the criteria used to determine the extended detention for each SWM facility in Blocks 11, 12 and 18.

**Table 5: Extended Detention Criteria for SWM Facilities**

Block	Pond	Rainfall	Discharge Criteria
11	1-6, 8, 9	25 mm	72 hour detention
11	7	25 mm	48 hour detention
12	1, 2, 5, 7-12	25 mm	48 hour detention
12	3, 4, 6	25 mm	Critical erosive flow
18	All	25 mm	48 hour detention

The QUALHYMO model calculated the flows at each erosion sensitive location. These locations are illustrated on Drawing 2. Flow reference points are also shown on the schematic in Appendix G.

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TO: DAVE ASHFIELD, P.ENG., SCHAEFFERS CONSULTING ENGINEERS  
FROM: PAUL VILLARD, PH.D. SHELLEY GORENC, M.SC. AND JOHN PARISH, M.A.  
SUBJECT: EAST DON RIVER – EROSION ASSESSMENT – BLOCK 10, 11 AND 12 (DRAFT)  
DATE: JANUARY 2<sup>ND</sup>, 2003

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### Introduction

An erosion assessment was completed for the East Don River and its tributaries within development Blocks 10, 11 and 12 (Figure 1). Changes in land use upstream and within the study area may alter the frequency and duration of flows in the river. These changes will, in turn, affect the river channel as it adjusts to the new flow regime. Erosion thresholds need to be identified in order to minimise the impact of the changing flow regime. Erosion thresholds determine the magnitude of flows required to erode and transport sediment in the channel. Therefore, these thresholds provide acceptable limits that should prevent an increase in channel erosion and deposition beyond the natural rates. Results can then be applied to assist with suitable stormwater management. The erosion assessment consisted of three components: background review, field reconnaissance (geomorphic and stability assessment), and detailed data collection and analyses to identify acceptable erosion thresholds.

### Background Review

A background review used topographic mapping, geological mapping and aerial photographs to understand channel and valley form. Channel form is a product of the flow (magnitude) and the channel materials (sediment type, supply, and bed/bank strength). If one of these is altered the channel adjusts its form to retain or find a new 'dynamic equilibrium'.

The characteristics of the flow or channel materials can change along a creek or stream. In order to account for these changes, channels are separated into reaches – normally several hundred metres to several kilometres in length. A reach displays similarity with respect to its physical characteristics, such as channel form, function, and valley setting. Delineation of a reach considers sinuosity, gradient, hydrology, local geology, degree of valley confinement, and vegetative control using methods outlined in PARISH Geomorphic Ltd. (2001). Based on measurements of channel sinuosity, gradient, valley form, and geology, channel reaches were identified (Figure 1; Table 1).

This section of the East Don River and its tributaries was divided into 30 reaches (Figure 1). Reach boundaries were confirmed during a reconnaissance walk and a review of aerial photographs.



Figure 1. Study area, reach breaks and detailed field sites.



stress (Shields, modified by Miller et al., 1977) and permissible velocity (Chow, 1959; Neill, 1967; Komar, 1987; Fischenich, 2001). Thresholds were generally based on erosion thresholds for the  $D_{50}$ . In the case of reaches B11-R3, B11-R11 and B12-R3, thresholds estimated using the  $D_{50}$  provided unrealistically low values. In these three cases, it is likely that the  $D_{50}$  estimate does not represent the 'true' substrate and was biased by the seasonally deposited finer sediments. Therefore, the erosion thresholds were defined by using conservative methods of estimating entrainment of the  $D_{84}$ , which was likely a more realistic approximation of the 'true' substrate. It is apparent from comparison of the bankfull discharge values and the critical discharge values that much of the sediment can be entrained well below bankfull conditions. This is related to the moderate to steep grades and the very fine sediments (Table 3; Table 4).

Table 3. Channel parameters for detailed study reaches.

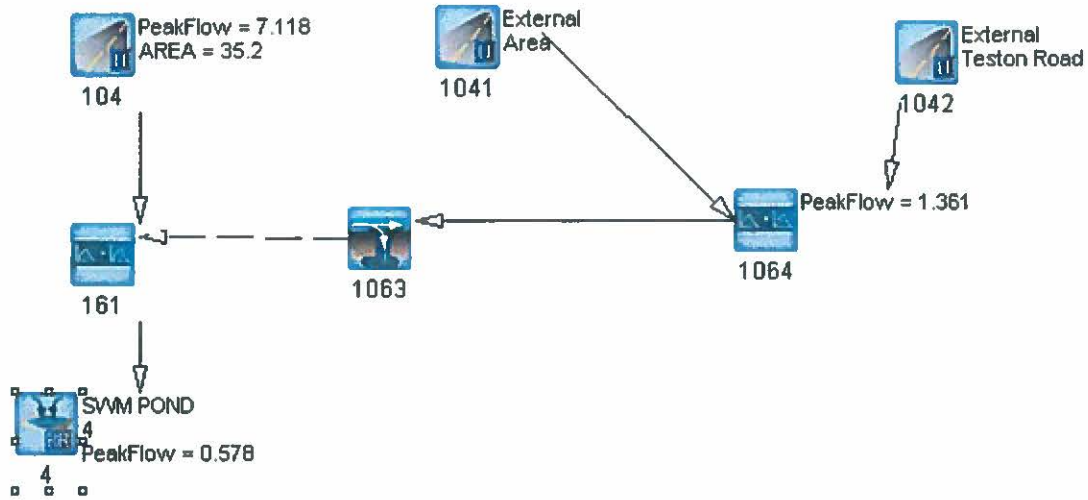
Parameter	B10-R3	B11-R5	B11-R6	B11-R11	B11-R18	B12-R1	B12-R3	B12-R5
Bankfull Width (m)	4.13	3.62	2.80	4.46	6.89	3.23	2.73	4.06
Bankfull Depth (m)	0.45	0.35	0.31	0.37	0.18	0.37	0.38	0.41
Bankfull Gradient (%)	0.99	1.24	0.73	2.16	1.77	0.58	1.78	0.77
Substrate $D_{50}$ (cm)	0.38	0.99	0.53	0.69	0.006	0.011	0.00034	0.0057
Substrate $D_{84}$ (cm)	1.21	5.59	2.10	4.43	0.008	0.0105	0.00561	0.040

Table 4. Bankfull discharge and threshold parameters for detailed study reaches.

Parameter	B10-R3	B11-R5	B11-R6	B11-R11	B11-R18	B12-R1	B12-R3	B12-R5	
Bankfull Discharge ( $m^3/s$ )	4.59	2.09	1.27	4.11	0.74	2.01	1.80	2.60	
Critical Shear Stress ( $N/m^2$ )	$D_{50}$	--	21.89	3.91	--	0.04	1.07	0.33	5.53
	$D_{84}$	12.62	--	--	32.3	--	10.19	5.44	38.80
Critical Depth (m)	$D_{50}$	--	0.18	0.13	--	0.05	0.04	--	0.12
	$D_{84}$	0.13	--	--	0.15	--	--	0.025	--
Critical Velocity ( $m/s$ )	$D_{50}$	--	0.9	0.76	--	0.34	0.40	--	0.70
	$D_{84}$	1.00	--	--	1.13	--	--	0.45	--
Critical Discharge ( $m^3/s$ )	0.24	0.28	0.09	0.38	0.10	0.02	0.01	0.32	

**APPENDIX B**

**Visual OTTHYMO Modelling for  
SWM Pond Required Storage Volumes  
(Post-Development Conditions)**



NHYD	DT [hr]	AREA [ha]	Peak flow [m <sup>3</sup> /s]	TP [hr]	Runoff Vol. [mm]	DWF [m <sup>3</sup> /s]
4	0.017	49.300	0.010	11.300	2.109	0.000
4	0.017	49.300	0.162	7.350	10.081	0.000
4	0.017	49.300	0.262	7.100	17.135	0.000
4	0.017	49.300	0.318	7.067	21.844	0.000
4	0.017	49.300	0.357	7.117	28.038	0.000
4	0.017	49.300	0.482	7.150	31.747	0.000
4	0.017	49.300	0.578	7.017	37.520	0.000



Visual OTTHYMO™ Schematic (Required Storage)  
 Andridge Homes, Major Bob Farms Inc. &  
 Lindstone Developments  
 SWM Pond 4 – Block 12  
 City of Vaughan  
 ( 25 mm to 100-Year Storm Events-12 hr. SCS Storm)

Job #: 2004 - 2644

Date: October 2013

Stormwater Management Pond 4 Final Report  
 Andridge Homes ,Major Bob Farms Inc. &  
 Lindstone Developments, Block 12  
 City of Vaughan

October 2013

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 .92 4.00 | 1.92 5.24 | 2.92 2.20 | 3.92 1.46  
 1.00 4.94 | 2.00 4.65 | 3.00 2.11 | 4.00 1.42  
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V V I SSSSS U U A L  
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 VV I SSSSS UUUUU A A LLLLL

OOO TTTT TTTT H H Y Y M M OOO TM  
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 OOO T T H H Y Y M M OOO

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\*\*\*\*\* DETAILED OUTPUT \*\*\*\*\*

Input filename: C:\Program Files\Visual OTTHYMO 2.2.4\voim.dat  
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DATE: 10/10/2013 TIME: 3:32:54 PM

USER:

COMMENTS:

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 CALIB  
 STANDHYD (0104) Area (ha)= 35.20  
 ID= 1 DT= 5.0 min Total Imp(%)= 65.00 Dir. Conn.(%)= 44.00  
 -----

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	22.88	12.32	
Dep. Storage (mm)=	.80	1.50	
Average Slope (%)=	1.90	2.00	
Length (m)=	484.42	30.00	
Mannings n =	.013	.250	
Max. Eff. Inten. (mm/hr)=	83.08	52.00	
over (min)	5.00	15.00	
Storage Coeff. (min)=	5.85 (ii)	13.56 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	.20	.08	
			*TOTALS*
PEAK FLOW (cms)=	2.37	.79	2.591 (iii)
TIME TO PEAK (hrs)=	.00	1.50	1.33
RUNOFF VOLUME (mm)=	24.20	5.48	13.72
TOTAL RAINFALL (mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT =	.97	.22	.55

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum. Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 READ STORM  
 Ptotal= 55.37 mm  
 Filename: W:\2600's\2644 - Block 12 Core Services\  
 OTTHYMO\Don River SCS Storms\scs12h5.stm  
 Comments: This 5-year, 12-hour Storm created from  
 -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.25	1.33	3.25	2.44	6.25	9.97	9.25	1.99
.50	1.11	3.50	1.99	6.50	9.97	9.50	1.77
.75	.66	3.75	2.44	6.75	4.43	9.75	1.33
1.00	1.33	4.00	1.99	7.00	4.43	10.00	1.77
1.25	1.11	4.25	4.21	7.25	3.10	10.25	1.33
1.50	1.33	4.50	3.77	7.50	3.10	10.50	.66
1.75	.66	4.75	3.77	7.75	3.77	10.75	1.33
2.00	1.33	5.00	3.77	8.00	3.10	11.00	1.11
2.25	2.44	5.25	6.87	8.25	2.44	11.25	1.33
2.50	1.77	5.50	6.87	8.50	1.99	11.50	.66
2.75	2.66	5.75	49.61	8.75	2.44	11.75	1.11
3.00	1.77	6.00	50.06	9.00	1.77	12.00	1.33

-----  
 READ STORM  
 Ptotal= 25.00 mm  
 Filename: W:\2600's\2644 - Block 12 Core Services\  
 OTTHYMO\Vaughan Storms\Vau25mm.stm  
 Comments: Vaughan 25 mm storm 4 hour - 5 min time  
 -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.08	1.52	1.08	6.56	2.08	4.19	3.08	2.02
.17	1.61	1.17	10.05	2.17	3.82	3.17	1.94
.25	1.72	1.25	23.64	2.25	3.51	3.25	1.87
.33	1.84	1.33	83.08	2.33	3.26	3.33	1.81
.42	1.98	1.42	30.71	2.42	3.04	3.42	1.75
.50	2.15	1.50	16.60	2.50	2.85	3.50	1.69
.58	2.36	1.58	11.40	2.58	2.69	3.58	1.64
.67	2.61	1.67	8.73	2.67	2.54	3.67	1.59
.75	2.94	1.75	7.11	2.75	2.42	3.75	1.55
.83	3.38	1.83	6.02	2.83	2.30	3.83	1.50

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 Lindstone Developments, Block 12  
 City of Vaughan

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CALIB  
 STANDHYD (1042) Area (ha)= 1.50  
 ID= 1 DT= 5.0 min Total Imp(%)= 79.00 Dir. Conn.(%)= 79.00

RUNOFF VOLUME (mm)= 54.57 13.26 45.90  
 TOTAL RAINFALL (mm)= 55.37 55.37 55.37  
 RUNOFF COEFFICIENT = .99 .24 .83

IMPERVIOUS PERVIOUS (i)  
 Surface Area (ha)= 1.19 .31  
 Dep. Storage (mm)= .80 1.50  
 Average Slope (%)= 1.90 2.00  
 Length (m)= 100.00 30.00  
 Mannings n = .013 .250

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--- TRANSFORMED HYETOGRAPH ---

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.083	1.33	3.083	2.44	6.083	9.97	9.08	1.99
.167	1.33	3.167	2.44	6.167	9.97	9.17	1.99
.250	1.33	3.250	2.44	6.250	9.97	9.25	1.99
.333	1.11	3.333	1.99	6.333	9.97	9.33	1.77
.417	1.11	3.417	1.99	6.417	9.97	9.42	1.77
.500	1.11	3.500	1.99	6.500	9.97	9.50	1.77
.583	.66	3.583	2.44	6.583	4.43	9.58	1.33
.667	.66	3.667	2.44	6.667	4.43	9.67	1.33
.750	.66	3.750	2.44	6.750	4.43	9.75	1.33
.833	1.33	3.833	1.99	6.833	4.43	9.83	1.77
.917	1.33	3.917	1.99	6.917	4.43	9.92	1.77
1.000	1.33	4.000	1.99	7.000	4.43	10.00	1.77
1.083	1.11	4.083	4.21	7.083	3.10	10.08	1.33
1.167	1.11	4.167	4.21	7.167	3.10	10.17	1.33
1.250	1.11	4.250	4.21	7.250	3.10	10.25	1.33
1.333	1.33	4.333	3.77	7.333	3.10	10.33	.66
1.417	1.33	4.417	3.77	7.417	3.10	10.42	.66
1.500	1.33	4.500	3.77	7.500	3.10	10.50	.66
1.583	.66	4.583	3.77	7.583	3.77	10.58	1.33
1.667	.66	4.667	3.77	7.667	3.77	10.67	1.33
1.750	.66	4.750	3.77	7.750	3.77	10.75	1.33
1.833	1.33	4.833	3.77	7.833	3.10	10.83	1.11
1.917	1.33	4.917	3.77	7.917	3.10	10.92	1.11
2.000	1.33	5.000	3.77	8.000	3.10	11.00	1.11
2.083	2.44	5.083	6.87	8.083	2.44	11.08	1.33
2.167	2.44	5.167	6.87	8.167	2.44	11.17	1.33
2.250	2.44	5.250	6.87	8.250	2.44	11.25	1.33
2.333	1.77	5.333	6.87	8.333	1.99	11.33	.66
2.417	1.77	5.417	6.87	8.417	1.99	11.42	.66
2.500	1.77	5.500	6.87	8.500	1.99	11.50	.66
2.583	2.66	5.583	49.61	8.583	2.44	11.58	1.11
2.667	2.66	5.667	49.61	8.667	2.44	11.67	1.11
2.750	2.66	5.750	49.61	8.750	2.44	11.75	1.11
2.833	1.77	5.833	50.06	8.833	1.77	11.83	1.33
2.917	1.77	5.917	50.06	8.917	1.77	11.92	1.33
3.000	1.77	6.000	50.06	9.000	1.77	12.00	1.33

CALIB  
 STANDHYD (1041) Area (ha)= 12.60  
 ID= 1 DT= 5.0 min Total Imp(%)= 36.00 Dir. Conn.(%)= 18.00

IMPERVIOUS PERVIOUS (i)  
 Surface Area (ha)= 4.54 8.06  
 Dep. Storage (mm)= .80 1.50  
 Average Slope (%)= 1.90 2.00  
 Length (m)= 289.80 30.00  
 Mannings n = .013 .250

Max.Eff.Inten.(mm/hr)= 50.06 50.17  
 over (min) 5.00 15.00  
 Storage Coeff. (min)= 5.26 (ii) 13.09 (ii)  
 Unit Hyd. Tpeak (min)= 5.00 15.00  
 Unit Hyd. peak (cms)= .21 .08

\*TOTALS\*  
 PEAK FLOW (cms)= .31 .86 1.170 (iii)  
 TIME TO PEAK (hrs)= .00 6.00 6.00  
 RUNOFF VOLUME (mm)= 54.57 17.88 24.49  
 TOTAL RAINFALL (mm)= 55.37 55.37 55.37  
 RUNOFF COEFFICIENT = .99 .32 .44

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

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

Max.Eff.Inten.(mm/hr)= 50.06 43.33  
 over (min) 5.00 10.00  
 Storage Coeff. (min)= 2.78 (ii) 7.39 (ii)  
 Unit Hyd. Tpeak (min)= 5.00 10.00  
 Unit Hyd. peak (cms)= .28 .13

\*TOTALS\*  
 PEAK FLOW (cms)= .16 .03 .191 (iii)  
 TIME TO PEAK (hrs)= .00 6.00 6.00

ADD HYD (1064)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (1042):	1.50	.191	6.00	45.90
+ ID2= 2 (1041):	12.60	1.170	6.00	24.49
ID = 3 (1064):	14.10	1.361	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.



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DUHYD (1063)  
 Inlet Cap.=1.361  
 #of Inlets= 1  
 Total(cms)= 1.4

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD. (ID= 1):	14.10	1.36	6.00	26.76
MAJOR SYS. (ID= 2):	.00	.00	6.00	26.76
MINOR SYS. (ID= 3):	14.10	1.36	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0161)  
 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (1063):	14.10	1.361	6.00	26.76
+ ID2= 2 (0104):	35.20	2.591	1.33	13.72
ID = 3 (0161):	49.30	2.603	1.33	17.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0004)  
 IN= 2---> OUT= 1  
 DT= 1.0 min

	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.3180	1.5700
	.0100	.8300	.3570	1.8280
	.1630	1.1000	.4830	1.9620
	.2620	1.3800	.5780	2.1720

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0161)	49.30	2.60	1.33	17.45
OUTFLOW: ID= 1 (0004)	49.30	.01	11.30	2.11

PEAK FLOW REDUCTION [Qout/Qin] (%) = .38  
 TIME SHIFT OF PEAK FLOW (min) = 598.00  
 MAXIMUM STORAGE USED (ha.m.) = .8296

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

READ STORM  
 Ptotal= 42.93 mm

Filename: W:\2600's\2644 - Block 12 Core Services\  
 OTTHYMO\Don River SCS Storms\scs12h2.stm  
 Comments: This 2-year, 12-hour Storm created from

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	1.03	3.25	1.89	6.25	7.73	9.25	1.55
.50	.86	3.50	1.55	6.50	7.73	9.50	1.37
.75	.52	3.75	1.89	6.75	3.43	9.75	1.03

1.00	1.03	4.00	1.55	7.00	3.43	10.00	1.37
1.25	.86	4.25	3.26	7.25	2.40	10.25	1.03
1.50	1.03	4.50	2.92	7.50	2.40	10.50	.52
1.75	.52	4.75	2.92	7.75	2.92	10.75	1.03
2.00	1.03	5.00	2.92	8.00	2.40	11.00	.86
2.25	1.89	5.25	5.32	8.25	1.89	11.25	1.03
2.50	1.37	5.50	5.32	8.50	1.55	11.50	.52
2.75	2.06	5.75	38.46	8.75	1.89	11.75	.86
3.00	1.37	6.00	38.81	9.00	1.37	12.00	1.03

CALIB  
 STANDHYD (0104)  
 ID= 1 DT= 5.0 min

Area (ha)= 35.20  
 Total Imp(%)= 65.00 Dir. Conn.(%)= 44.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	22.88	12.32
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	484.42	30.00
Mannings n =	.013	.250

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

--- TRANSFORMED HYETOGRAPH ---

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	1.03	3.083	1.89	6.083	7.73	9.08	1.55
.167	1.03	3.167	1.89	6.167	7.73	9.17	1.55
.250	1.03	3.250	1.89	6.250	7.73	9.25	1.55
.333	.86	3.333	1.55	6.333	7.73	9.33	1.37
.417	.86	3.417	1.55	6.417	7.73	9.42	1.37
.500	.86	3.500	1.55	6.500	7.73	9.50	1.37
.583	.52	3.583	1.89	6.583	3.43	9.58	1.03
.667	.52	3.667	1.89	6.667	3.43	9.67	1.03
.750	.52	3.750	1.89	6.750	3.43	9.75	1.03
.833	1.03	3.833	1.55	6.833	3.43	9.83	1.37
.917	1.03	3.917	1.55	6.917	3.43	9.92	1.37
1.000	1.03	4.000	1.55	7.000	3.43	10.00	1.37
1.083	.86	4.083	3.26	7.083	2.40	10.08	1.03
1.167	.86	4.167	3.26	7.167	2.40	10.17	1.03
1.250	.86	4.250	3.26	7.250	2.40	10.25	1.03
1.333	1.03	4.333	2.92	7.333	2.40	10.33	.52
1.417	1.03	4.417	2.92	7.417	2.40	10.42	.52
1.500	1.03	4.500	2.92	7.500	2.40	10.50	.52
1.583	.52	4.583	2.92	7.583	2.92	10.58	1.03
1.667	.52	4.667	2.92	7.667	2.92	10.67	1.03
1.750	.52	4.750	2.92	7.750	2.92	10.75	1.03
1.833	1.03	4.833	2.92	7.833	2.40	10.83	.86
1.917	1.03	4.917	2.92	7.917	2.40	10.92	.86
2.000	1.03	5.000	2.92	8.000	2.40	11.00	.86
2.083	1.89	5.083	5.32	8.083	1.89	11.08	1.03
2.167	1.89	5.167	5.32	8.167	1.89	11.17	1.03
2.250	1.89	5.250	5.32	8.250	1.89	11.25	1.03
2.333	1.37	5.333	5.32	8.333	1.55	11.33	.52
2.417	1.37	5.417	5.32	8.417	1.55	11.42	.52
2.500	1.37	5.500	5.32	8.500	1.55	11.50	.52
2.583	2.06	5.583	38.46	8.583	1.89	11.58	.86
2.667	2.06	5.667	38.46	8.667	1.89	11.67	.86

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2.750	2.06	5.750	38.46	8.750	1.89	11.75	.86
2.833	1.37	5.833	38.81	8.833	1.37	11.83	1.03
2.917	1.37	5.917	38.81	8.917	1.37	11.92	1.03
3.000	1.37	6.000	38.80	9.000	1.37	12.00	1.03

Max. Eff. Inten. (mm/hr)=	38.81	47.79	
over (min)	10.00	20.00	
Storage Coeff. (min)=	7.93 (ii)	15.91 (ii)	
Unit Hyd. Tpeak (min)=	10.00	20.00	
Unit Hyd. peak (cms)=	.13	.07	
*TOTALS*			
PEAK FLOW (cms)=	1.62	1.11	2.642 (iii)
TIME TO PEAK (hrs)=	.00	6.08	6.00
RUNOFF VOLUME (mm)=	42.13	13.35	26.01
TOTAL RAINFALL (mm)=	42.93	42.93	42.93
RUNOFF COEFFICIENT =	.98	.31	.61

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00      K (l/hr)= 2.00  
 Fc (mm/hr)= 7.50      Cum. Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

READ STORM      Filename: W:\2600's\2644 - Block 12 Core Services\OTTHYMO\Don River SCS Storms\scs12h5.stm  
 Ptotal= 55.37 mm      Comments: This 5-year, 12-hour Storm created from

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.25	1.33	3.25	2.44	6.25	9.97	9.25	1.99
.50	1.11	3.50	1.99	6.50	9.97	9.50	1.77
.75	.66	3.75	2.44	6.75	4.43	9.75	1.33
1.00	1.33	4.00	1.99	7.00	4.43	10.00	1.77
1.25	1.11	4.25	4.21	7.25	3.10	10.25	1.33
1.50	1.33	4.50	3.77	7.50	3.10	10.50	.66
1.75	.66	4.75	3.77	7.75	3.77	10.75	1.33
2.00	1.33	5.00	3.77	8.00	3.10	11.00	1.11
2.25	2.44	5.25	6.87	8.25	2.44	11.25	1.33
2.50	1.77	5.50	6.87	8.50	1.99	11.50	.66
2.75	2.66	5.75	49.61	8.75	2.44	11.75	1.11
3.00	1.77	6.00	50.06	9.00	1.77	12.00	1.33

CALIB  
 STANDHYD (1042)      Area (ha)= 1.50  
 ID= 1 DT= 5.0 min      Total Imp(%)= 79.00      Dir. Conn.(%)= 79.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.19	.31
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	100.00	30.00
Mannings n =	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.083	1.33	3.083	2.44	6.083	9.97	9.08	1.99
.167	1.33	3.167	2.44	6.167	9.97	9.17	1.99
.250	1.33	3.250	2.44	6.250	9.97	9.25	1.99
.333	1.11	3.333	1.99	6.333	9.97	9.33	1.77
.417	1.11	3.417	1.99	6.417	9.97	9.42	1.77
.500	1.11	3.500	1.99	6.500	9.97	9.50	1.77
.583	.66	3.583	2.44	6.583	4.43	9.58	1.33
.667	.66	3.667	2.44	6.667	4.43	9.67	1.33
.750	.66	3.750	2.44	6.750	4.43	9.75	1.33
.833	1.33	3.833	1.99	6.833	4.43	9.83	1.77
.917	1.33	3.917	1.99	6.917	4.43	9.92	1.77
1.000	1.33	4.000	1.99	7.000	4.43	10.00	1.77
1.083	1.11	4.083	4.21	7.083	3.10	10.08	1.33
1.167	1.11	4.167	4.21	7.167	3.10	10.17	1.33
1.250	1.11	4.250	4.21	7.250	3.10	10.25	1.33
1.333	1.33	4.333	3.77	7.333	3.10	10.33	.66
1.417	1.33	4.417	3.77	7.417	3.10	10.42	.66
1.500	1.33	4.500	3.77	7.500	3.10	10.50	.66
1.583	.66	4.583	3.77	7.583	3.77	10.58	1.33
1.667	.66	4.667	3.77	7.667	3.77	10.67	1.33
1.750	.66	4.750	3.77	7.750	3.77	10.75	1.33
1.833	1.33	4.833	3.77	7.833	3.10	10.83	1.11
1.917	1.33	4.917	3.77	7.917	3.10	10.92	1.11
2.000	1.33	5.000	3.77	8.000	3.10	11.00	1.11
2.083	2.44	5.083	6.87	8.083	2.44	11.08	1.33
2.167	2.44	5.167	6.87	8.167	2.44	11.17	1.33
2.250	2.44	5.250	6.87	8.250	2.44	11.25	1.33
2.333	1.77	5.333	6.87	8.333	1.99	11.33	.66
2.417	1.77	5.417	6.87	8.417	1.99	11.42	.66
2.500	1.77	5.500	6.87	8.500	1.99	11.50	.66
2.583	2.66	5.583	49.61	8.583	2.44	11.58	1.11
2.667	2.66	5.667	49.61	8.667	2.44	11.67	1.11
2.750	2.66	5.750	49.61	8.750	2.44	11.75	1.11
2.833	1.77	5.833	50.06	8.833	1.77	11.83	1.33
2.917	1.77	5.917	50.06	8.917	1.77	11.92	1.33
3.000	1.77	6.000	50.06	9.000	1.77	12.00	1.33

Max. Eff. Inten. (mm/hr)=	50.06	39.83	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.78 (ii)	7.39 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	.28	.13	
*TOTALS*			
PEAK FLOW (cms)=	.16	.03	.191 (iii)
TIME TO PEAK (hrs)=	.00	6.00	6.00
RUNOFF VOLUME (mm)=	54.57	13.26	45.90
TOTAL RAINFALL (mm)=	55.37	55.37	55.37
RUNOFF COEFFICIENT =	.99	.24	.83

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00      K (l/hr)= 2.00  
 Fc (mm/hr)= 7.50      Cum. Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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 Lindstone Developments, Block 12  
 City of Vaughan

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CALIB  
 STANDHYD (1041) Area (ha)= 12.60  
 ID= 1 DT= 5.0 min Total Imp(%)= 36.00 Dir. Conn.(%)= 18.00

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	4.54	8.06	
Dep. Storage (mm)=	.80	1.50	
Average Slope (%)=	1.90	2.00	
Length (m)=	289.80	30.00	
Mannings n =	.013	.250	
Max.Eff.Inten.(mm/hr)=	50.06	50.17	
over (min)	5.00	15.00	
Storage Coeff. (min)=	5.26 (ii)	13.09 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	.21	.08	
			*TOTALS*
PEAK FLOW (cms)=	.31	.86	1.170 (iii)
TIME TO PEAK (hrs)=	.00	6.00	6.00
RUNOFF VOLUME (mm)=	54.57	17.88	24.49
TOTAL RAINFALL (mm)=	55.37	55.37	55.37
RUNOFF COEFFICIENT =	.99	.32	.44

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

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (1064)  
 1 + 2 = 3

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (1042):	1.50	.191	6.00	45.90
+ ID2= 2 (1041):	12.60	1.170	6.00	24.49
=====				
ID = 3 (1064):	14.10	1.361	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

DUHYD (1063)  
 Inlet Cap.=1.361  
 #of Inlets= 1  
 Total (cms)= 1.4

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
TOTAL HYD. (ID= 1):	14.10	1.36	6.00	26.76
MAJOR SYS. (ID= 2):	.00	.00	6.00	26.76
MINOR SYS. (ID= 3):	14.10	1.36	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0161)  
 1 + 2 = 3

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (1063):	14.10	1.361	6.00	26.76
+ ID2= 2 (0104):	35.20	2.642	6.00	26.01
=====				
ID = 3 (0161):	49.30	4.003	6.00	26.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0004)  
 IN= 2---> OUT= 1  
 DT= 1.0 min

	OUTFLOW	STORAGE	OUTFLOW	STORAGE
	(cms)	(ha.m.)	(cms)	(ha.m.)
	.0000	.0000	.3180	1.5700
	.0100	.8300	.3570	1.8280
	.1630	1.1000	.4830	1.9620
	.2620	1.3800	.5780	2.1720

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0161)	49.30	4.00	6.00	26.23
OUTFLOW: ID= 1 (0004)	49.30	.16	7.35	10.08

PEAK FLOW REDUCTION (Qout/Qin) (%)= 4.04  
 TIME SHIFT OF PEAK FLOW (min)= 81.00  
 MAXIMUM STORAGE USED (ha.m.)= 1.0979

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

READ STORM  
 Ptotal= 55.37 mm

Filename: W:\2600's\2644 - Block 12 Core Services\  
 OTHYMO\Don River SCS Storms\scs12h5.stm  
 Comments: This 5-year, 12-hour Storm created from

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.25	1.33	3.25	2.44	6.25	9.97	9.25	1.99
.50	1.11	3.50	1.99	6.50	9.97	9.50	1.77
.75	.66	3.75	2.44	6.75	4.43	9.75	1.33
1.00	1.33	4.00	1.99	7.00	4.43	10.00	1.77
1.25	1.11	4.25	4.21	7.25	3.10	10.25	1.33
1.50	1.33	4.50	3.77	7.50	3.10	10.50	.66
1.75	.66	4.75	3.77	7.75	3.77	10.75	1.33
2.00	1.33	5.00	3.77	8.00	3.10	11.00	1.11
2.25	2.44	5.25	6.87	8.25	2.44	11.25	1.33
2.50	1.77	5.50	6.87	8.50	1.99	11.50	.66
2.75	2.66	5.75	49.61	8.75	2.44	11.75	1.11
3.00	1.77	6.00	50.06	9.00	1.77	12.00	1.33



**Stormwater Management Pond 4 Final Report**  
**Andridge Homes ,Major Bob Farms Inc. &**  
**Lindstone Developments, Block 12**  
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CALIB	Area (ha)= 35.20	Dir. Conn.(%)= 44.00
STANDHYD (0104)	Total Imp(%)= 65.00	
ID= 1 DT= 5.0 min		

TIME TO PEAK (hrs)=	.00	6.00	6.00
RUNOFF VOLUME (mm)=	54.57	21.74	36.19
TOTAL RAINFALL (mm)=	55.37	55.37	55.37
RUNOFF COEFFICIENT =	.99	.39	.65

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	22.88	12.32
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	484.42	30.00
Mannings n =	.013	.250

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fc (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.083	1.33	3.083	2.44	6.083	9.97	9.08	1.99
.167	1.33	3.167	2.44	6.167	9.97	9.17	1.99
.250	1.33	3.250	2.44	6.250	9.97	9.25	1.99
.333	1.11	3.333	1.99	6.333	9.97	9.33	1.77
.417	1.11	3.417	1.99	6.417	9.97	9.42	1.77
.500	1.11	3.500	1.99	6.500	9.97	9.50	1.77
.583	.66	3.583	2.44	6.583	4.43	9.58	1.33
.667	.66	3.667	2.44	6.667	4.43	9.67	1.33
.750	.66	3.750	2.44	6.750	4.43	9.75	1.33
.833	1.33	3.833	1.99	6.833	4.43	9.83	1.77
.917	1.33	3.917	1.99	6.917	4.43	9.92	1.77
1.000	1.33	4.000	1.99	7.000	4.43	10.00	1.77
1.083	1.11	4.083	4.21	7.083	3.10	10.08	1.33
1.167	1.11	4.167	4.21	7.167	3.10	10.17	1.33
1.250	1.11	4.250	4.21	7.250	3.10	10.25	1.33
1.333	1.33	4.333	3.77	7.333	3.10	10.33	.66
1.417	1.33	4.417	3.77	7.417	3.10	10.42	.66
1.500	1.33	4.500	3.77	7.500	3.10	10.50	.66
1.583	.66	4.583	3.77	7.583	3.77	10.58	1.33
1.667	.66	4.667	3.77	7.667	3.77	10.67	1.33
1.750	.66	4.750	3.77	7.750	3.77	10.75	1.33
1.833	1.33	4.833	3.77	7.833	3.10	10.83	1.11
1.917	1.33	4.917	3.77	7.917	3.10	10.92	1.11
2.000	1.33	5.000	3.77	8.000	3.10	11.00	1.11
2.083	2.44	5.083	6.87	8.083	2.44	11.08	1.33
2.167	2.44	5.167	6.87	8.167	2.44	11.17	1.33
2.250	2.44	5.250	6.87	8.250	2.44	11.25	1.33
2.333	1.77	5.333	6.87	8.333	1.99	11.33	.66
2.417	1.77	5.417	6.87	8.417	1.99	11.42	.66
2.500	1.77	5.500	6.87	8.500	1.99	11.50	.66
2.583	2.66	5.583	49.61	8.583	2.44	11.58	1.11
2.667	2.66	5.667	49.61	8.667	2.44	11.67	1.11
2.750	2.66	5.750	49.61	8.750	2.44	11.75	1.11
2.833	1.77	5.833	50.06	8.833	1.77	11.83	1.33
2.917	1.77	5.917	50.06	8.917	1.77	11.92	1.33
3.000	1.77	6.000	50.06	9.000	1.77	12.00	1.33

Max.Eff. Inten. (mm/hr)=	50.06	68.50
over (min)	5.00	15.00
Storage Coeff. (min)=	7.16 (ii)	14.07 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	.17	.08

\*TOTALS\*  
3.928 (iii)

PEAK FLOW (cms)= 2.12 1.80

READ STORM	Filename: W:\2600's\2644 - Block 12 Core Services\OTTHYMO\Don River SCS Storms\scs12h5.stm
Ptotal= 55.37 mm	Comments: This 5-year, 12-hour Storm created from

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.25	1.33	3.25	2.44	6.25	9.97	9.25	1.99
.50	1.11	3.50	1.99	6.50	9.97	9.50	1.77
.75	.66	3.75	2.44	6.75	4.43	9.75	1.33
1.00	1.33	4.00	1.99	7.00	4.43	10.00	1.77
1.25	1.11	4.25	4.21	7.25	3.10	10.25	1.33
1.50	1.33	4.50	3.77	7.50	3.10	10.50	.66
1.75	.66	4.75	3.77	7.75	3.77	10.75	1.33
2.00	1.33	5.00	3.77	8.00	3.10	11.00	1.11
2.25	2.44	5.25	6.87	8.25	2.44	11.25	1.33
2.50	1.77	5.50	6.87	8.50	1.99	11.50	.66
2.75	2.66	5.75	49.61	8.75	2.44	11.75	1.11
3.00	1.77	6.00	50.06	9.00	1.77	12.00	1.33

CALIB	Area (ha)= 1.50	Dir. Conn.(%)= 79.00
STANDHYD (1042)	Total Imp(%)= 79.00	
ID= 1 DT= 5.0 min		

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.19	.31
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	100.00	30.00
Mannings n =	.013	.250

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

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.083	1.33	3.083	2.44	6.083	9.97	9.08	1.99
.167	1.33	3.167	2.44	6.167	9.97	9.17	1.99
.250	1.33	3.250	2.44	6.250	9.97	9.25	1.99
.333	1.11	3.333	1.99	6.333	9.97	9.33	1.77
.417	1.11	3.417	1.99	6.417	9.97	9.42	1.77
.500	1.11	3.500	1.99	6.500	9.97	9.50	1.77
.583	.66	3.583	2.44	6.583	4.43	9.58	1.33

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.667	.66	3.667	2.44	6.667	4.43	9.67	1.33
.750	.66	3.750	2.44	6.750	4.43	9.75	1.33
.833	1.33	3.833	1.99	6.833	4.43	9.83	1.77
.917	1.33	3.917	1.99	6.917	4.43	9.92	1.77
1.000	1.33	4.000	1.99	7.000	4.43	10.00	1.77
1.083	1.11	4.083	4.21	7.083	3.10	10.08	1.33
1.167	1.11	4.167	4.21	7.167	3.10	10.17	1.33
1.250	1.11	4.250	4.21	7.250	3.10	10.25	1.33
1.333	1.33	4.333	3.77	7.333	3.10	10.33	.66
1.417	1.33	4.417	3.77	7.417	3.10	10.42	.66
1.500	1.33	4.500	3.77	7.500	3.10	10.50	.66
1.583	.66	4.583	3.77	7.583	3.77	10.58	1.33
1.667	.66	4.667	3.77	7.667	3.77	10.67	1.33
1.750	.66	4.750	3.77	7.750	3.77	10.75	1.33
1.833	1.33	4.833	3.77	7.833	3.10	10.83	1.11
1.917	1.33	4.917	3.77	7.917	3.10	10.92	1.11
2.000	1.33	5.000	3.77	8.000	3.10	11.00	1.11
2.083	2.44	5.083	6.87	8.083	2.44	11.08	1.33
2.167	2.44	5.167	6.87	8.167	2.44	11.17	1.33
2.250	2.44	5.250	6.87	8.250	2.44	11.25	1.33
2.333	1.77	5.333	6.87	8.333	1.99	11.33	.66
2.417	1.77	5.417	6.87	8.417	1.99	11.42	.66
2.500	1.77	5.500	6.87	8.500	1.99	11.50	.66
2.583	2.66	5.583	49.61	8.583	2.44	11.58	1.11
2.667	2.66	5.667	49.61	8.667	2.44	11.67	1.11
2.750	2.66	5.750	49.61	8.750	2.44	11.75	1.11
2.833	1.77	5.833	50.06	8.833	1.77	11.83	1.33
2.917	1.77	5.917	50.06	8.917	1.77	11.92	1.33
3.000	1.77	6.000	50.06	9.000	1.77	12.00	1.33

Max.Eff.Inten. (mm/hr)= 50.06 57.08  
 over (min) 5.00 10.00  
 Storage Coeff. (min)= 2.78 (ii) 7.39 (ii)  
 Unit Hyd. Tpeak (min)= 5.00 10.00  
 Unit Hyd. peak (cms)= .28 .13

PEAK FLOW (cms)= .16 .03 \*TOTALS\* .191 (iii)  
 TIME TO PEAK (hrs)= .00 6.00 6.00  
 RUNOFF VOLUME (mm)= 54.57 13.26 45.90  
 TOTAL RAINFALL (mm)= 55.37 55.37 55.37  
 RUNOFF COEFFICIENT = .99 .24 .83

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

Mannings n = .013 .250  
 Max.Eff.Inten. (mm/hr)= 50.06 50.17  
 over (min) 5.00 15.00  
 Storage Coeff. (min)= 5.26 (ii) 13.09 (ii)  
 Unit Hyd. Tpeak (min)= 5.00 15.00  
 Unit Hyd. peak (cms)= .21 .08

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

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (1064)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (1042):	1.50	.191	6.00	45.90
+ ID2= 2 (1041):	12.60	1.170	6.00	24.49
ID = 3 (1064):	14.10	1.361	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

DUHYD (1063)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
Inlet Cap.=1.361				
#of Inlets= 1				
Total(cms)= 1.4				
TOTAL HYD. (ID= 1):	14.10	1.36	6.00	26.76
MAJOR SYS. (ID= 2):	.00	.00	6.00	26.76
MINOR SYS. (ID= 3):	14.10	1.36	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB STANDHYD (1041)	Area (ha)	IMPERVIOUS	PERVIOUS (i)
ID= 1 DT= 5.0 min	12.60		
	Total Imp(%)= 36.00		Dir. Conn.(%)= 18.00
Surface Area (ha)=	4.54	8.06	
Dep. Storage (mm)=	.80	1.50	
Average Slope (%)=	1.90	2.00	
Length (m)=	289.80	30.00	

ADD HYD (0161)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
1 + 2 = 3				
ID1= 1 (1063):	14.10	1.361	6.00	26.76
+ ID2= 2 (0104):	35.20	3.928	6.00	36.19
ID = 3 (0161):	49.30	5.289	6.00	33.49

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**Lindstone Developments, Block 12**  
**City of Vaughan**

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NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

RESERVOIR (0004)  
 IN= 2---> OUT= 1  
 DT= 1.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.3180	1.5700
.0100	.8300	.3570	1.8280
.1630	1.1000	.4830	1.9620
.2620	1.3800	.5780	2.1720

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0161)	49.30	5.29	6.00	33.49
OUTFLOW: ID= 1 (0004)	49.30	.26	7.10	17.13

PEAK FLOW REDUCTION [Qout/Qin] (%) = 4.94  
 TIME SHIFT OF PEAK FLOW (min) = 66.00  
 MAXIMUM STORAGE USED (ha.m.) = 1.3787

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

READ STORM  
 Ptotal= 63.75 mm

Filename: W:\2600's\2644 - Block 12 Core Services\  
 OTTHYMO\Don River SCS Storms\scs12h10.stm  
 Comments: This 10-year, 12-hour Storm created from

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	1.53	3.25	2.81	6.25	11.48	9.25	2.30
.50	1.28	3.50	2.30	6.50	11.48	9.50	2.04
.75	.77	3.75	2.81	6.75	5.10	9.75	1.53
1.00	1.53	4.00	2.30	7.00	5.10	10.00	2.04
1.25	1.28	4.25	4.85	7.25	3.57	10.25	1.53
1.50	1.53	4.50	4.34	7.50	3.57	10.50	.77
1.75	.77	4.75	4.34	7.75	4.34	10.75	1.53
2.00	1.53	5.00	4.34	8.00	3.57	11.00	1.28
2.25	2.81	5.25	7.91	8.25	2.81	11.25	1.53
2.50	2.04	5.50	7.91	8.50	2.30	11.50	.77
2.75	3.06	5.75	57.12	8.75	2.81	11.75	1.28
3.00	2.04	6.00	57.63	9.00	2.04	12.00	1.53

CALIB  
 STANDHYD (0104)  
 ID= 1 DT= 5.0 min

Area (ha) = 35.20  
 Total Imp(%) = 65.00 Dir. Conn.(%) = 44.00

	IMPERVIOUS (ha)	PERVIOUS (i)
Surface Area	(ha) = 22.88	12.32
Dep. Storage	(mm) = .80	1.50
Average Slope	(%) = 1.90	2.00
Length	(m) = 484.42	30.00
Mannings n	= .013	.250

--- TRANSFORMED HYETOGRAPH ---

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	1.53	3.083	2.81	6.083	11.48	9.08	2.30
.167	1.53	3.167	2.81	6.167	11.48	9.17	2.30
.250	1.53	3.250	2.81	6.250	11.48	9.25	2.30
.333	1.28	3.333	2.30	6.333	11.48	9.33	2.04
.417	1.28	3.417	2.30	6.417	11.48	9.42	2.04
.500	1.28	3.500	2.30	6.500	11.48	9.50	2.04
.583	.77	3.583	2.81	6.583	5.10	9.58	1.53
.667	.77	3.667	2.81	6.667	5.10	9.67	1.53
.750	.77	3.750	2.81	6.750	5.10	9.75	1.53
.833	1.53	3.833	2.30	6.833	5.10	9.83	2.04
.917	1.53	3.917	2.30	6.917	5.10	9.92	2.04
1.000	1.53	4.000	2.30	7.000	5.10	10.00	2.04
1.083	1.28	4.083	4.85	7.083	3.57	10.08	1.53
1.167	1.28	4.167	4.85	7.167	3.57	10.17	1.53
1.250	1.28	4.250	4.85	7.250	3.57	10.25	1.53
1.333	1.53	4.333	4.34	7.333	3.57	10.33	.77
1.417	1.53	4.417	4.34	7.417	3.57	10.42	.77
1.500	1.53	4.500	4.34	7.500	3.57	10.50	.77
1.583	.77	4.583	4.34	7.583	4.34	10.58	1.53
1.667	.77	4.667	4.34	7.667	4.34	10.67	1.53
1.750	.77	4.750	4.34	7.750	4.34	10.75	1.53
1.833	1.53	4.833	4.34	7.833	3.57	10.83	1.28
1.917	1.53	4.917	4.34	7.917	3.57	10.92	1.28
2.000	1.53	5.000	4.34	8.000	3.57	11.00	1.28
2.083	2.81	5.083	7.91	8.083	2.81	11.08	1.53
2.167	2.81	5.167	7.91	8.167	2.81	11.17	1.53
2.250	2.81	5.250	7.91	8.250	2.81	11.25	1.53
2.333	2.04	5.333	7.91	8.333	2.30	11.33	.77
2.417	2.04	5.417	7.91	8.417	2.30	11.42	.77
2.500	2.04	5.500	7.91	8.500	2.30	11.50	.77
2.583	3.06	5.583	57.12	8.583	2.81	11.58	1.28
2.667	3.06	5.667	57.12	8.667	2.81	11.67	1.28
2.750	3.06	5.750	57.12	8.750	2.81	11.75	1.28
2.833	2.04	5.833	57.63	8.833	2.04	11.83	1.53
2.917	2.04	5.917	57.63	8.917	2.04	11.92	1.53
3.000	2.04	6.000	57.63	9.000	2.04	12.00	1.53

Max.Eff.Inten. (mm/hr) = 57.63 82.10  
 over (min) = 5.00 15.00  
 Storage Coeff. (min) = 6.77 (ii) 13.20 (ii)  
 Unit Hyd. Tpeak (min) = 5.00 15.00  
 Unit Hyd. peak (cms) = .18 .08

PEAK FLOW (cms) = 2.45 2.25 \*TOTALS\*  
 TIME TO PEAK (hrs) = .00 6.00 4.705 (iii)  
 RUNOFF VOLUME (mm) = 62.95 27.23 6.00  
 TOTAL RAINFALL (mm) = 63.75 63.75 42.95  
 RUNOFF COEFFICIENT = .99 .43 63.75  
 .67

(i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr) = 50.00 K (1/hr) = 2.00  
 Fc (mm/hr) = 7.50 Cum.Inf. (mm) = .00  
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.  
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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1.667	.66	4.667	3.77	7.667	3.77	10.67	1.33
1.750	.66	4.750	3.77	7.750	3.77	10.75	1.33
1.833	1.33	4.833	3.77	7.833	3.10	10.83	1.11
1.917	1.33	4.917	3.77	7.917	3.10	10.92	1.11
2.000	1.33	5.000	3.77	8.000	3.10	11.00	1.11
2.083	2.44	5.083	6.87	8.083	2.44	11.08	1.33
2.167	2.44	5.167	6.87	8.167	2.44	11.17	1.33
2.250	2.44	5.250	6.87	8.250	2.44	11.25	1.33
2.333	1.77	5.333	6.87	8.333	1.99	11.33	.66
2.417	1.77	5.417	6.87	8.417	1.99	11.42	.66
2.500	1.77	5.500	6.87	8.500	1.99	11.50	.66
2.583	2.66	5.583	49.61	8.583	2.44	11.58	1.11
2.667	2.66	5.667	49.61	8.667	2.44	11.67	1.11
2.750	2.66	5.750	49.61	8.750	2.44	11.75	1.11
2.833	1.77	5.833	50.06	8.833	1.77	11.83	1.33
2.917	1.77	5.917	50.06	8.917	1.77	11.92	1.33
3.000	1.77	6.000	50.06	9.000	1.77	12.00	1.33

READ STORM  
 Ptotal= 55.37 mm  
 Filename: W:\2600'a\2644 - Block 12 Core Services\  
 OTTHYMO\Don River SCS Storms\scs12h5.stm  
 Comments: This 5-year, 12-hour Storm created from

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.25	1.33	3.25	2.44	6.25	9.97	9.25	1.99
.50	1.11	3.50	1.99	6.50	9.97	9.50	1.77
.75	.66	3.75	2.44	6.75	4.43	9.75	1.33
1.00	1.33	4.00	1.99	7.00	4.43	10.00	1.77
1.25	1.11	4.25	4.21	7.25	3.10	10.25	1.33
1.50	1.33	4.50	3.77	7.50	3.10	10.50	.66
1.75	.66	4.75	3.77	7.75	3.77	10.75	1.33
2.00	1.33	5.00	3.77	8.00	3.10	11.00	1.11
2.25	2.44	5.25	6.87	8.25	2.44	11.25	1.33
2.50	1.77	5.50	6.87	8.50	1.99	11.50	.66
2.75	2.66	5.75	49.61	8.75	2.44	11.75	1.11
3.00	1.77	6.00	50.06	9.00	1.77	12.00	1.33

Max. Eff. Inten. (mm/hr) = 50.06 68.41  
 over (min) = 5.00 10.00  
 Storage Coeff. (min) = 2.78 (ii) 7.39 (ii)  
 Unit Hyd. Tpeak (min) = 5.00 10.00  
 Unit Hyd. peak (cms) = .28 .13

PEAK FLOW (cms) = .16 .03 .191 (iii)  
 TIME TO PEAK (hrs) = .00 6.00 6.00  
 RUNOFF VOLUME (mm) = 54.57 13.26 45.90  
 TOTAL RAINFALL (mm) = 55.37 55.37 55.37  
 RUNOFF COEFFICIENT = .99 .24 .83

\*TOTALS\*

CALIB  
 STANDHYD (1042)  
 ID= 1 DT= 5.0 min  
 Area (ha) = 1.50  
 Total Imp(%) = 79.00 Dir. Conn.(%) = 79.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)	1.19	.31
Dep. Storage (mm)	.80	1.50
Average Slope (%)	1.90	2.00
Length (m)	100.00	30.00
Mannings n	.013	.250

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

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

(i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr) = 50.00 K (1/hr) = 2.00  
 Fc (mm/hr) = 7.50 Cum. Inf. (mm) = .00  
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.  
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.083	1.33	3.083	2.44	6.083	9.97	9.08	1.99
.167	1.33	3.167	2.44	6.167	9.97	9.17	1.99
.250	1.33	3.250	2.44	6.250	9.97	9.25	1.99
.333	1.11	3.333	1.99	6.333	9.97	9.33	1.77
.417	1.11	3.417	1.99	6.417	9.97	9.42	1.77
.500	1.11	3.500	1.99	6.500	9.97	9.50	1.77
.583	.66	3.583	2.44	6.583	4.43	9.58	1.33
.667	.66	3.667	2.44	6.667	4.43	9.67	1.33
.750	.66	3.750	2.44	6.750	4.43	9.75	1.33
.833	1.33	3.833	1.99	6.833	4.43	9.83	1.77
.917	1.33	3.917	1.99	6.917	4.43	9.92	1.77
1.000	1.33	4.000	1.99	7.000	4.43	10.00	1.77
1.083	1.11	4.083	4.21	7.083	3.10	10.08	1.33
1.167	1.11	4.167	4.21	7.167	3.10	10.17	1.33
1.250	1.11	4.250	4.21	7.250	3.10	10.25	1.33
1.333	1.33	4.333	3.77	7.333	3.10	10.33	.66
1.417	1.33	4.417	3.77	7.417	3.10	10.42	.66
1.500	1.33	4.500	3.77	7.500	3.10	10.50	.66
1.583	.66	4.583	3.77	7.583	3.77	10.58	1.33

CALIB  
 STANDHYD (1041)  
 ID= 1 DT= 5.0 min  
 Area (ha) = 12.60  
 Total Imp(%) = 36.00 Dir. Conn.(%) = 18.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)	4.54	8.06
Dep. Storage (mm)	.80	1.50
Average Slope (%)	1.90	2.00
Length (m)	289.80	30.00
Mannings n	.013	.250

Max. Eff. Inten. (mm/hr) = 50.06 50.17  
 over (min) = 5.00 15.00  
 Storage Coeff. (min) = 5.26 (ii) 13.09 (ii)  
 Unit Hyd. Tpeak (min) = 5.00 15.00  
 Unit Hyd. peak (cms) = .21 .08

\*TOTALS\*

PEAK FLOW (cms) = .31 .86 1.170 (iii)  
 TIME TO PEAK (hrs) = .00 6.00 6.00  
 RUNOFF VOLUME (mm) = 54.57 17.88 24.49  
 TOTAL RAINFALL (mm) = 55.37 55.37 55.37

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**Lindstone Developments, Block 12**  
**City of Vaughan**

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RUNOFF COEFFICIENT = .99 .32 .44

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

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

	AREA (ha)	OPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0161)	49.30	6.07	6.00	38.32
OUTFLOW: ID= 1 (0004)	49.30	.32	7.07	21.84

PEAK FLOW REDUCTION [Qout/Qin] (%)= 5.24  
 TIME SHIFT OF PEAK FLOW (min)= 64.00  
 MAXIMUM STORAGE USED (ha.m.)= 1.5692

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

ADD HYD (1064)  
 1 + 2 = 3

	AREA (ha)	OPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (1042):	1.50	.191	6.00	45.90
+ ID2= 2 (1041):	12.60	1.170	6.00	24.49
=====				
ID = 3 (1064):	14.10	1.361	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

DUHYD (1063)  
 Inlet Cap.=1.361  
 #of Inlets= 1  
 Total(cms)= 1.4

	AREA (ha)	OPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD.(ID= 1):	14.10	1.36	6.00	26.76
=====				
MAJOR SYS.(ID= 2):	.00	.00	6.00	26.76
MINOR SYS.(ID= 3):	14.10	1.36	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0161)  
 1 + 2 = 3

	AREA (ha)	OPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (1063):	14.10	1.361	6.00	26.76
+ ID2= 2 (0104):	35.20	4.705	6.00	42.95
=====				
ID = 3 (0161):	49.30	6.066	6.00	38.32

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0004)  
 IN= 2---> OUT= 1  
 DT= 1.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.3180	1.5700
.0100	.8300	.3570	1.8280
.1630	1.1000	.4830	1.9620
.2620	1.3800	.5780	2.1720

READ STORM  
 Ptotal= 74.42 mm

Filename: W:\2600's\2644 - Block 12 Core Services\  
 OTTHYMO\Don River SCS Storms\scsl2h25.stm  
 Comments: This 25-year, 12-hour Storm created from

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	1.79	3.25	3.27	6.25	13.40	9.25	2.68
.50	1.49	3.50	2.68	6.50	13.40	9.50	2.38
.75	.89	3.75	3.27	6.75	5.95	9.75	1.79
1.00	1.79	4.00	2.68	7.00	5.95	10.00	2.38
1.25	1.49	4.25	5.66	7.25	4.17	10.25	1.79
1.50	1.79	4.50	5.06	7.50	4.17	10.50	.89
1.75	.89	4.75	5.06	7.75	5.06	10.75	1.79
2.00	1.79	5.00	5.06	8.00	4.17	11.00	1.49
2.25	3.27	5.25	9.23	8.25	3.27	11.25	1.79
2.50	2.38	5.50	9.23	8.50	2.68	11.50	.89
2.75	3.57	5.75	66.68	8.75	3.27	11.75	1.49
3.00	2.38	6.00	67.28	9.00	2.38	12.00	1.79

CALIB  
 STANDHYD (0104)  
 ID= 1 DT= 5.0 min

Area (ha)= 35.20  
 Total Imp(%)= 65.00 Dir. Conn.(%)= 44.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	22.88	12.32
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	484.42	30.00
Mannings n =	.013	.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	1.79	3.083	3.27	6.083	13.40	9.08	2.68
.167	1.79	3.167	3.27	6.167	13.40	9.17	2.68
.250	1.79	3.250	3.27	6.250	13.40	9.25	2.68
.333	1.49	3.333	2.68	6.333	13.40	9.33	2.38
.417	1.49	3.417	2.68	6.417	13.40	9.42	2.38
.500	1.49	3.500	2.68	6.500	13.40	9.50	2.38

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**Lindstone Developments, Block 12**  
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.583	.89	3.583	3.27	6.583	5.95	9.58	1.79
.667	.89	3.667	3.27	6.667	5.95	9.67	1.79
.750	.89	3.750	3.27	6.750	5.95	9.75	1.79
.833	1.79	3.833	2.68	6.833	5.95	9.83	2.38
.917	1.79	3.917	2.68	6.917	5.95	9.92	2.38
1.000	1.79	4.000	2.68	7.000	5.95	10.00	2.38
1.083	1.49	4.083	5.66	7.083	4.17	10.08	1.79
1.167	1.49	4.167	5.66	7.167	4.17	10.17	1.79
1.250	1.49	4.250	5.66	7.250	4.17	10.25	1.79
1.333	1.79	4.333	5.06	7.333	4.17	10.33	.89
1.417	1.79	4.417	5.06	7.417	4.17	10.42	.89
1.500	1.79	4.500	5.06	7.500	4.17	10.50	.89
1.583	.89	4.583	5.06	7.583	5.06	10.58	1.79
1.667	.89	4.667	5.06	7.667	5.06	10.67	1.79
1.750	.89	4.750	5.06	7.750	5.06	10.75	1.79
1.833	1.79	4.833	5.06	7.833	4.17	10.83	1.49
1.917	1.79	4.917	5.06	7.917	4.17	10.92	1.49
2.000	1.79	5.000	5.06	8.000	4.17	11.00	1.49
2.083	3.27	5.083	9.23	8.083	3.27	11.08	1.79
2.167	3.27	5.167	9.23	8.167	3.27	11.17	1.79
2.250	3.27	5.250	9.23	8.250	3.27	11.25	1.79
2.333	2.38	5.333	9.23	8.333	2.68	11.33	.89
2.417	2.38	5.417	9.23	8.417	2.68	11.42	.89
2.500	2.38	5.500	9.23	8.500	2.68	11.50	.89
2.583	3.57	5.583	66.68	8.583	3.27	11.58	1.49
2.667	3.57	5.667	66.68	8.667	3.27	11.67	1.49
2.750	3.57	5.750	66.68	8.750	3.27	11.75	1.49
2.833	2.38	5.833	67.28	8.833	2.38	11.83	1.79
2.917	2.38	5.917	67.28	8.917	2.38	11.92	1.79
3.000	2.38	6.000	67.28	9.000	2.38	12.00	1.79

CALIB	
STANDHYD (1042)	Area (ha)= 1.50
ID= 1 DT= 5.0 min	Total Imp(%)= 79.00 Dir. Conn.(%)= 79.00

IMPERVIOUS		PERVIOUS (i)	
Surface Area (ha)=	1.19		.31
Dep. Storage (mm)=	.80		1.50
Average Slope (%)=	1.90		2.00
Length (m)=	100.00		30.00
Mannings n =	.013		.250

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

Max.Eff.Inten. (mm/hr)=	67.28	98.67
over (min)	5.00	15.00
Storage Coeff. (min)=	6.36 (ii)	12.33 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	.18	.08
*TOTALS*		
PEAK FLOW (cms)=	2.87	2.83
TIME TO PEAK (hrs)=	.00	6.00
RUNOFF VOLUME (mm)=	73.62	34.71
TOTAL RAINFALL (mm)=	74.42	74.42
RUNOFF COEFFICIENT =	.99	.47

--- TRANSFORMED HYETOGRAPH ---							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.083	1.33	3.083	2.44	6.083	9.97	9.08	1.99
.167	1.33	3.167	2.44	6.167	9.97	9.17	1.99
.250	1.33	3.250	2.44	6.250	9.97	9.25	1.99
.333	1.11	3.333	1.99	6.333	9.97	9.33	1.77
.417	1.11	3.417	1.99	6.417	9.97	9.42	1.77
.500	1.11	3.500	1.99	6.500	9.97	9.50	1.77
.583	.66	3.583	2.44	6.583	4.43	9.58	1.33
.667	.66	3.667	2.44	6.667	4.43	9.67	1.33
.750	.66	3.750	2.44	6.750	4.43	9.75	1.33
.833	1.33	3.833	1.99	6.833	4.43	9.83	1.77
.917	1.33	3.917	1.99	6.917	4.43	9.92	1.77
1.000	1.33	4.000	1.99	7.000	4.43	10.00	1.77
1.083	1.11	4.083	4.21	7.083	3.10	10.08	1.33
1.167	1.11	4.167	4.21	7.167	3.10	10.17	1.33
1.250	1.11	4.250	4.21	7.250	3.10	10.25	1.33
1.333	1.33	4.333	3.77	7.333	3.10	10.33	.66
1.417	1.33	4.417	3.77	7.417	3.10	10.42	.66
1.500	1.33	4.500	3.77	7.500	3.10	10.50	.66
1.583	.66	4.583	3.77	7.583	3.77	10.58	1.33
1.667	.66	4.667	3.77	7.667	3.77	10.67	1.33
1.750	.66	4.750	3.77	7.750	3.77	10.75	1.33
1.833	1.33	4.833	3.77	7.833	3.10	10.83	1.11
1.917	1.33	4.917	3.77	7.917	3.10	10.92	1.11
2.000	1.33	5.000	3.77	8.000	3.10	11.00	1.11
2.083	2.44	5.083	6.87	8.083	2.44	11.08	1.33
2.167	2.44	5.167	6.87	8.167	2.44	11.17	1.33
2.250	2.44	5.250	6.87	8.250	2.44	11.25	1.33
2.333	1.77	5.333	6.87	8.333	1.99	11.33	.66
2.417	1.77	5.417	6.87	8.417	1.99	11.42	.66
2.500	1.77	5.500	6.87	8.500	1.99	11.50	.66
2.583	2.66	5.583	49.61	8.583	2.44	11.58	1.11

READ STORM	Filename: W:\2600's\2644 - Block 12 Core Services\OTTHYMO\Don River SCS Storms\scs12h5.stm
Ptotal= 55.37 mm	Comments: This 5-year, 12-hour Storm created from

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.25	1.33	3.25	2.44	6.25	9.97	9.25	1.99
.50	1.11	3.50	1.99	6.50	9.97	9.50	1.77



**Stormwater Management Pond 4 Final Report**  
**Andridge Homes ,Major Bob Farms Inc. &**  
**Lindstone Developments, Block 12**  
**City of Vaughan**

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2.667	2.66	5.667	49.61	8.667	2.44	11.67	1.11
2.750	2.66	5.750	49.61	8.750	2.44	11.75	1.11
2.833	1.77	5.833	50.06	8.833	1.77	11.83	1.33
2.917	1.77	5.917	50.06	8.917	1.77	11.92	1.33
3.000	1.77	6.000	50.06	9.000	1.77	12.00	1.33

Max. Eff. Inten. (mm/hr)=	50.06	82.22
over (min)	5.00	10.00
Storage Coeff. (min)=	2.78 (ii)	7.39 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	.28	.13

PEAK FLOW (cms)=	.16	.03	.191 (iii)
TIME TO PEAK (hrs)=	.00	6.00	6.00
RUNOFF VOLUME (mm)=	54.57	13.26	45.90
TOTAL RAINFALL (mm)=	55.37	55.37	55.37
RUNOFF COEFFICIENT =	.99	.24	.83

\*TOTALS\*

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum. Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (1041)	Area (ha)= 12.60		
ID= 1 DT= 5.0 min	Total Imp(%)= 36.00	Dir. Conn.(%)= 18.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.54	8.06
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	289.80	30.00
Mannings n =	.013	.250

Max. Eff. Inten. (mm/hr)=	50.06	50.17
over (min)	5.00	15.00
Storage Coeff. (min)=	5.26 (ii)	13.09 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	.21	.08

\*TOTALS\*

PEAK FLOW (cms)=	.31	.86	1.170 (iii)
TIME TO PEAK (hrs)=	.00	6.00	6.00
RUNOFF VOLUME (mm)=	54.57	17.88	24.49
TOTAL RAINFALL (mm)=	55.37	55.37	55.37
RUNOFF COEFFICIENT =	.99	.32	.44

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

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum. Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (1064)				
1 + 2 = 3	AREA (ha)	OPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (1042):	1.50	.191	6.00	45.90
+ ID2= 2 (1041):	12.60	1.170	6.00	24.49
ID = 3 (1064):	14.10	1.361	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

DUHYD (1063)				
Inlet Cap.=1.361				
#of Inlets= 1				
Total (cms)= 1.4	AREA (ha)	OPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD. (ID= 1):	14.10	1.36	6.00	26.76
MAJOR SYS. (ID= 2):	.00	.00	6.00	26.76
MINOR SYS. (ID= 3):	14.10	1.36	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0161)				
1 + 2 = 3	AREA (ha)	OPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (1063):	14.10	1.361	6.00	26.76
+ ID2= 2 (0104):	35.20	5.697	6.00	51.83
ID = 3 (0161):	49.30	7.058	6.00	44.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0004)				
IN= 2 ---> OUT= 1				
DT= 1.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.3180	1.5700
	.0100	.8300	.3570	1.8280
	.1630	1.1000	.4830	1.9620
	.2620	1.3800	.5780	2.1720

	AREA (ha)	OPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0161)	49.30	7.06	6.00	44.66
OUTFLOW: ID= 1 (0004)	49.30	.36	7.12	28.04

PEAK FLOW REDUCTION [Qout/Qin] (%)= 5.06  
 TIME SHIFT OF PEAK FLOW (min)= 67.00  
 MAXIMUM STORAGE USED (ha.m.)= 1.8269

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**Andridge Homes ,Major Bob Farms Inc. &**  
**Lindstone Developments, Block 12**  
**City of Vaughan**

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

READ STORM  
 Ptotal= 80.61 mm

Filename: W:\2600's\2644 - Block 12 Core Services\  
 OTTHYMO\Don River SCS Storms\scs12h50.stm  
 Comments: 50-YearSCSTypeI112HourStorm

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.25	.81	3.25	3.23	6.25	43.63	9.25	3.23
.50	1.62	3.50	3.23	6.50	14.54	9.50	3.23
.75	1.62	3.75	3.23	6.75	10.50	9.75	2.42
1.00	1.62	4.00	3.23	7.00	6.46	10.00	1.62
1.25	1.62	4.25	4.04	7.25	5.66	10.25	1.62
1.50	1.62	4.50	4.85	7.50	4.85	10.50	1.62
1.75	1.62	4.75	5.66	7.75	4.85	10.75	1.62
2.00	1.62	5.00	6.46	8.00	4.85	11.00	1.62
2.25	2.42	5.25	8.08	8.25	4.04	11.25	1.62
2.50	3.23	5.50	8.50	8.50	3.23	11.50	1.62
2.75	3.23	5.75	41.21	8.75	3.23	11.75	1.62
3.00	3.23	6.00	72.72	9.00	3.23	12.00	1.62

1.583	1.62	4.583	5.66	7.583	4.85	10.58	1.62
1.667	1.62	4.667	5.66	7.667	4.85	10.67	1.62
1.750	1.62	4.750	5.66	7.750	4.85	10.75	1.62
1.833	1.62	4.833	6.46	7.833	4.85	10.83	1.62
1.917	1.62	4.917	6.46	7.917	4.85	10.92	1.62
2.000	1.62	5.000	6.46	8.000	4.85	11.00	1.62
2.083	2.42	5.083	8.08	8.083	4.04	11.08	1.62
2.167	2.42	5.167	8.08	8.167	4.04	11.17	1.62
2.250	2.42	5.250	8.08	8.250	4.04	11.25	1.62
2.333	3.23	5.333	9.70	8.333	3.23	11.33	1.62
2.417	3.23	5.417	9.70	8.417	3.23	11.42	1.62
2.500	3.23	5.500	9.70	8.500	3.23	11.50	1.62
2.583	3.23	5.583	41.21	8.583	3.23	11.58	1.62
2.667	3.23	5.667	41.21	8.667	3.23	11.67	1.62
2.750	3.23	5.750	41.21	8.750	3.23	11.75	1.62
2.833	3.23	5.833	72.72	8.833	3.23	11.83	1.62
2.917	3.23	5.917	72.72	8.917	3.23	11.92	1.62
3.000	3.23	6.000	72.72	9.000	3.23	12.00	1.62

Max.Eff.Inten.(mm/hr)= 72.72 107.47  
 over (min) = 5.00 15.00  
 Storage Coeff. (min)= 6.17 (ii) 11.94 (ii)  
 Unit Hyd. Tpeak (min)= 5.00 15.00  
 Unit Hyd. peak (cms)= .19 .09

\*TOTALS\*

PEAK FLOW (cms)= 3.00 2.79 5.528 (iii)  
 TIME TO PEAK (hrs)= .00 6.08 6.00  
 RUNOFF VOLUME (mm)= 79.81 39.29 57.12  
 TOTAL RAINFALL (mm)= 80.61 80.61 80.61  
 RUNOFF COEFFICIENT = .99 .49 .71

CALIB  
 STANDHYD (0104)  
 ID= 1 DT= 5.0 min

Area (ha)= 35.20  
 Total Imp(%)= 65.00 Dir. Conn.(%)= 44.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	22.88	12.32
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	484.42	30.00
Mannings n =	.013	.250

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--- TRANSFORMED HYETOGRAPH ---

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.083	.81	3.083	3.23	6.083	43.63	9.00	3.23
.167	.81	3.167	3.23	6.167	43.63	9.17	3.23
.250	.81	3.250	3.23	6.250	43.63	9.25	3.23
.333	1.62	3.333	3.23	6.333	14.54	9.33	3.23
.417	1.62	3.417	3.23	6.417	14.54	9.42	3.23
.500	1.62	3.500	3.23	6.500	14.54	9.50	3.23
.583	1.62	3.583	3.23	6.583	10.50	9.58	2.42
.667	1.62	3.667	3.23	6.667	10.50	9.67	2.42
.750	1.62	3.750	3.23	6.750	10.50	9.75	2.42
.833	1.62	3.833	3.23	6.833	6.46	9.83	1.62
.917	1.62	3.917	3.23	6.917	6.46	9.92	1.62
1.000	1.62	4.000	3.23	7.000	6.46	10.00	1.62
1.083	1.62	4.083	4.04	7.083	5.66	10.08	1.62
1.167	1.62	4.167	4.04	7.167	5.66	10.17	1.62
1.250	1.62	4.250	4.04	7.250	5.66	10.25	1.62
1.333	1.62	4.333	4.85	7.333	4.85	10.33	1.62
1.417	1.62	4.417	4.85	7.417	4.85	10.42	1.62
1.500	1.62	4.500	4.85	7.500	4.85	10.50	1.62

READ STORM  
 Ptotal= 55.37 mm

Filename: W:\2600's\2644 - Block 12 Core Services\  
 OTTHYMO\Don River SCS Storms\scs12h5.stm  
 Comments: This 5-year, 12-hour Storm created from

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.25	1.33	3.25	2.44	6.25	9.97	9.25	1.99
.50	1.11	3.50	1.99	6.50	9.97	9.50	1.77
.75	.66	3.75	2.44	6.75	4.43	9.75	1.33
1.00	1.33	4.00	1.99	7.00	4.43	10.00	1.77
1.25	1.11	4.25	4.21	7.25	3.10	10.25	1.33
1.50	1.33	4.50	3.77	7.50	3.10	10.50	.66
1.75	.66	4.75	3.77	7.75	3.77	10.75	1.33
2.00	1.33	5.00	3.77	8.00	3.10	11.00	1.11
2.25	2.44	5.25	6.87	8.25	2.44	11.25	1.33
2.50	1.77	5.50	6.87	8.50	1.99	11.50	.66
2.75	2.66	5.75	49.61	8.75	2.44	11.75	1.11
3.00	1.77	6.00	50.06	9.00	1.77	12.00	1.33



Stormwater Management Pond 4 Final Report  
 Andridge Homes ,Major Bob Farms Inc. &  
 Lindstone Developments, Block 12  
 City of Vaughan

October 2013

CALIB  
 STANDHYD (1042)  
 ID= 1 DT= 5.0 min  
 Area (ha)= 1.50  
 Total Imp(%)= 79.00 Dir. Conn.(%)= 79.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.19	.31
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	100.00	30.00
Mannings n =	.013	.250

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

--- TRANSFORMED HYETOGRAPH ---

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	1.33	3.083	2.44	6.083	9.97	9.00	1.99
.167	1.33	3.167	2.44	6.167	9.97	9.17	1.99
.250	1.33	3.250	2.44	6.250	9.97	9.25	1.99
.333	1.11	3.333	1.99	6.333	9.97	9.33	1.77
.417	1.11	3.417	1.99	6.417	9.97	9.42	1.77
.500	1.11	3.500	1.99	6.500	9.97	9.50	1.77
.583	.66	3.583	2.44	6.583	4.43	9.58	1.33
.667	.66	3.667	2.44	6.667	4.43	9.67	1.33
.750	.66	3.750	2.44	6.750	4.43	9.75	1.33
.833	1.33	3.833	1.99	6.833	4.43	9.83	1.77
.917	1.33	3.917	1.99	6.917	4.43	9.92	1.77
1.000	1.33	4.000	1.99	7.000	4.43	10.00	1.77
1.083	1.11	4.083	4.21	7.083	3.10	10.08	1.33
1.167	1.11	4.167	4.21	7.167	3.10	10.17	1.33
1.250	1.11	4.250	4.21	7.250	3.10	10.25	1.33
1.333	1.33	4.333	3.77	7.333	3.10	10.33	.66
1.417	1.33	4.417	3.77	7.417	3.10	10.42	.66
1.500	1.33	4.500	3.77	7.500	3.10	10.50	.66
1.583	.66	4.583	3.77	7.583	3.77	10.58	1.33
1.667	.66	4.667	3.77	7.667	3.77	10.67	1.33
1.750	.66	4.750	3.77	7.750	3.77	10.75	1.33
1.833	1.33	4.833	3.77	7.833	3.10	10.83	1.11
1.917	1.33	4.917	3.77	7.917	3.10	10.92	1.11
2.000	1.33	5.000	3.77	8.000	3.10	11.00	1.11
2.083	2.44	5.083	6.87	8.083	2.44	11.08	1.33
2.167	2.44	5.167	6.87	8.167	2.44	11.17	1.33
2.250	2.44	5.250	6.87	8.250	2.44	11.25	1.33
2.333	1.77	5.333	6.87	8.333	1.99	11.33	.66
2.417	1.77	5.417	6.87	8.417	1.99	11.42	.66
2.500	1.77	5.500	6.87	8.500	1.99	11.50	.66
2.583	2.66	5.583	49.61	8.583	2.44	11.58	1.11
2.667	2.66	5.667	49.61	8.667	2.44	11.67	1.11
2.750	2.66	5.750	49.61	8.750	2.44	11.75	1.11
2.833	1.77	5.833	50.06	8.833	1.77	11.83	1.33
2.917	1.77	5.917	50.06	8.917	1.77	11.92	1.33
3.000	1.77	6.000	50.06	9.000	1.77	12.00	1.33

Max.Eff.Inten.(mm/hr)= 50.06 89.56  
 over (min) 5.00 10.00  
 Storage Coeff. (min)= 2.78 (ii) 7.39 (ii)  
 Unit Hyd. Tpeak (min)= 5.00 10.00  
 Unit Hyd. peak (cms)= .28 .13

\*TOTALS\*

PEAK FLOW (cms)= .16 .03 .191 (iii)  
 TIME TO PEAK (hrs)= .00 6.00 6.00  
 RUNOFF VOLUME (mm)= 54.57 13.26 45.90  
 TOTAL RAINFALL (mm)= 55.37 55.37 55.37  
 RUNOFF COEFFICIENT = .99 .24 .83

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fc (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB  
 STANDHYD (1041)  
 ID= 1 DT= 5.0 min  
 Area (ha)= 12.60  
 Total Imp(%)= 36.00 Dir. Conn.(%)= 18.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.54	8.06
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	289.80	30.00
Mannings n =	.013	.250

Max.Eff.Inten.(mm/hr)= 50.06 50.17  
 over (min) 5.00 15.00  
 Storage Coeff. (min)= 5.26 (ii) 13.09 (ii)  
 Unit Hyd. Tpeak (min)= 5.00 15.00  
 Unit Hyd. peak (cms)= .21 .08

\*TOTALS\*  
 PEAK FLOW (cms)= .31 .86 1.170 (iii)  
 TIME TO PEAK (hrs)= .00 6.00 6.00  
 RUNOFF VOLUME (mm)= 54.57 17.88 24.49  
 TOTAL RAINFALL (mm)= 55.37 55.37 55.37  
 RUNOFF COEFFICIENT = .99 .32 .44

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

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fc (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (1064)  
 1 + 2 = 3  
 AREA (ha) QPEAK (cms) TPEAK (hrs) R.V. (mm)  
 ID1= 1 (1042): 1.50 .191 6.00 45.90  
 + ID2= 2 (1041): 12.60 1.170 6.00 24.49  
 ID = 3 (1064): 14.10 1.361 6.00 26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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.50	1.80	3.50	3.24	6.50	16.18	9.50	2.88
.75	1.08	3.75	3.96	6.75	7.19	9.75	2.16
1.00	2.16	4.00	3.24	7.00	7.19	10.00	2.88
1.25	1.80	4.25	6.83	7.25	5.04	10.25	2.16
1.50	2.16	4.50	6.11	7.50	5.04	10.50	1.08
1.75	1.08	4.75	6.11	7.75	6.11	10.75	2.16
2.00	2.16	5.00	6.11	8.00	5.04	11.00	1.80
2.25	3.96	5.25	11.15	8.25	3.96	11.25	2.16
2.50	2.88	5.50	11.15	8.50	3.24	11.50	1.08
2.75	4.32	5.75	80.56	8.75	3.96	11.75	1.80
3.00	2.88	6.00	81.28	9.00	2.88	12.00	2.16

DURHYD (1063)  
 Inlet Cap.=1.361  
 #of Inlets= 1  
 Total(cms)= 1.4

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD. (ID= 1):	14.10	1.36	6.00	26.76
MAJOR SYS. (ID= 2):	.00	.00	6.00	26.76
MINOR SYS. (ID= 3):	14.10	1.36	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB  
 STANDHYD (0104)  
 ID= 1 DT= 5.0 min

Area (ha)= 35.20  
 Total Imp(%)= 65.00 Dir. Conn.(%)= 44.00

ADD HYD (0161)  
 1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (1063):	14.10	1.361	6.00	26.76
+ ID2= 2 (0104):	35.20	5.528	6.00	57.12
ID = 3 (0161):	49.30	6.889	6.00	48.44

	IMPERVIOUS (ha)	PERVIOUS (i)
Surface Area	22.88	12.32
Dep. Storage	.80	1.50
Average Slope	1.90	2.00
Length	484.42	30.00
Mannings n	.013	.250

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

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

RESERVOIR (0004)  
 IN= 2 ---> OUT= 1  
 DT= 1.0 min

	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.3180	1.5700	
.0100	.8300	.3570	1.8280	
.1630	1.1000	.4830	1.9620	
.2620	1.3800	.5780	2.1720	

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0161)	49.30	6.89	6.00	48.44
OUTFLOW: ID= 1 (0004)	49.30	.48	7.15	31.75

PEAK FLOW REDUCTION [Qout/Qin] (%) = 7.00  
 TIME SHIFT OF PEAK FLOW (min) = 69.00  
 MAXIMUM STORAGE USED (ha.m.) = 1.9613

--- TRANSFORMED HYETOGRAPH ---

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	2.16	3.083	3.96	6.083	16.18	9.08	3.24
.167	2.16	3.167	3.96	6.167	16.18	9.17	3.24
.250	2.16	3.250	3.96	6.250	16.18	9.25	3.24
.333	1.80	3.333	3.24	6.333	16.18	9.33	2.88
.417	1.80	3.417	3.24	6.417	16.18	9.42	2.88
.500	1.80	3.500	3.24	6.500	16.18	9.50	2.88
.583	1.08	3.583	3.96	6.583	7.19	9.58	2.16
.667	1.08	3.667	3.96	6.667	7.19	9.67	2.16
.750	1.08	3.750	3.96	6.750	7.19	9.75	2.16
.833	2.16	3.833	3.24	6.833	7.19	9.83	2.88
.917	2.16	3.917	3.24	6.917	7.19	9.92	2.88
1.000	2.16	4.000	3.24	7.000	7.19	10.00	2.88
1.083	1.80	4.083	6.83	7.083	5.04	10.08	2.16
1.167	1.80	4.167	6.83	7.167	5.04	10.17	2.16
1.250	1.80	4.250	6.83	7.250	5.04	10.25	2.16
1.333	2.16	4.333	6.11	7.333	5.04	10.33	1.08
1.417	2.16	4.417	6.11	7.417	5.04	10.42	1.08
1.500	2.16	4.500	6.11	7.500	5.04	10.50	1.08
1.583	1.08	4.583	6.11	7.583	6.11	10.58	2.16
1.667	1.08	4.667	6.11	7.667	6.11	10.67	2.16
1.750	1.08	4.750	6.11	7.750	6.11	10.75	2.16
1.833	2.16	4.833	6.11	7.833	5.04	10.83	1.80
1.917	2.16	4.917	6.11	7.917	5.04	10.92	1.80
2.000	2.16	5.000	6.11	8.000	5.04	11.00	1.80
2.083	3.96	5.083	11.15	8.083	3.96	11.08	2.16
2.167	3.96	5.167	11.15	8.167	3.96	11.17	2.16
2.250	3.96	5.250	11.15	8.250	3.96	11.25	2.16
2.333	2.88	5.333	11.15	8.333	3.24	11.33	1.08
2.417	2.88	5.417	11.15	8.417	3.24	11.42	1.08
2.500	2.88	5.500	11.15	8.500	3.24	11.50	1.08

READ STORM  
 Ptotal= 89.92 mm

Filename: W:\2600's\2644 - Block 12 Core Services\  
 OTTHYMO\Don River SCS Storms\scsl2100.stm  
 Comments: This 100-year, 12-hour Storm created fro

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	2.16	3.25	3.96	6.25	16.18	9.25	3.24

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2.583	4.32	5.583	80.56	8.583	3.96	11.58	1.80
2.667	4.32	5.667	80.56	8.667	3.96	11.67	1.80
2.750	4.32	5.750	80.56	8.750	3.96	11.75	1.80
2.833	2.88	5.833	81.28	8.833	2.88	11.83	2.16
2.917	2.88	5.917	81.28	8.917	2.88	11.92	2.16
3.000	2.88	6.000	81.28	9.000	2.88	12.00	2.16

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

Max.Eff. Inten. (mm/hr)=	81.28	121.80	
over (min)	5.00	15.00	
Storage Coeff. (min)=	5.90 (ii)	11.39 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	.19	.09	
*TOTALS*			
PEAK FLOW (cms)=	3.48	3.64	7.118 (iii)
TIME TO PEAK (hrs)=	.00	6.00	
RUNOFF VOLUME (mm)=	89.12	46.57	65.29
TOTAL RAINFALL (mm)=	89.92	89.92	89.92
RUNOFF COEFFICIENT =	.99	.52	.73

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00      K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50      Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

READ STORM  
 Ptotal= 55.37 mm

Filename: W:\2600's\2644 - Block 12 Core Services\  
 OTTHYMO\Don River SCS Storms\scs12h5.stm  
 Comments: This 5-year, 12-hour Storm created from

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.25	1.33	3.25	2.44	6.25	9.97	9.25	1.99
.50	1.11	3.50	1.99	6.50	9.97	9.50	1.77
.75	.66	3.75	2.44	6.75	4.43	9.75	1.33
1.00	1.33	4.00	1.99	7.00	4.43	10.00	1.77
1.25	1.11	4.25	4.21	7.25	3.10	10.25	1.33
1.50	1.33	4.50	3.77	7.50	3.10	10.50	.66
1.75	.66	4.75	3.77	7.75	3.77	10.75	1.33
2.00	1.33	5.00	3.77	8.00	3.10	11.00	1.11
2.25	2.44	5.25	6.87	8.25	2.44	11.25	1.33
2.50	1.77	5.50	6.87	8.50	1.99	11.50	.66
2.75	2.66	5.75	49.61	8.75	2.44	11.75	1.11
3.00	1.77	6.00	50.06	9.00	1.77	12.00	1.33

CALIB  
 STANDHYD (1042)  
 ID= 1 DT= 5.0 min

Area (ha)= 1.50  
 Total Imp(%)= 79.00      Dir. Conn.(%)= 79.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.19	.31
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	100.00	30.00
Mannings n =	.013	.250

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.083	1.33	3.083	2.44	6.083	9.97	9.08	1.99
.167	1.33	3.167	2.44	6.167	9.97	9.17	1.99
.250	1.33	3.250	2.44	6.250	9.97	9.25	1.99
.333	1.11	3.333	1.99	6.333	9.97	9.33	1.77
.417	1.11	3.417	1.99	6.417	9.97	9.42	1.77
.500	1.11	3.500	1.99	6.500	9.97	9.50	1.77
.583	.66	3.583	2.44	6.583	4.43	9.58	1.33
.667	.66	3.667	2.44	6.667	4.43	9.67	1.33
.750	.66	3.750	2.44	6.750	4.43	9.75	1.33
.833	1.33	3.833	1.99	6.833	4.43	9.83	1.77
.917	1.33	3.917	1.99	6.917	4.43	9.92	1.77
1.000	1.33	4.000	1.99	7.000	4.43	10.00	1.77
1.083	1.11	4.083	4.21	7.083	3.10	10.08	1.33
1.167	1.11	4.167	4.21	7.167	3.10	10.17	1.33
1.250	1.11	4.250	4.21	7.250	3.10	10.25	1.33
1.333	1.33	4.333	3.77	7.333	3.10	10.33	.66
1.417	1.33	4.417	3.77	7.417	3.10	10.42	.66
1.500	1.33	4.500	3.77	7.500	3.10	10.50	.66
1.583	.66	4.583	3.77	7.583	3.77	10.58	1.33
1.667	.66	4.667	3.77	7.667	3.77	10.67	1.33
1.750	.66	4.750	3.77	7.750	3.77	10.75	1.33
1.833	1.33	4.833	3.77	7.833	3.10	10.83	1.11
1.917	1.33	4.917	3.77	7.917	3.10	10.92	1.11
2.000	1.33	5.000	3.77	8.000	3.10	11.00	1.11
2.083	2.44	5.083	6.87	8.083	2.44	11.08	1.33
2.167	2.44	5.167	6.87	8.167	2.44	11.17	1.33
2.250	2.44	5.250	6.87	8.250	2.44	11.25	1.33
2.333	1.77	5.333	6.87	8.333	1.99	11.33	.66
2.417	1.77	5.417	6.87	8.417	1.99	11.42	.66
2.500	1.77	5.500	6.87	8.500	1.99	11.50	.66
2.583	2.66	5.583	49.61	8.583	2.44	11.58	1.11
2.667	2.66	5.667	49.61	8.667	2.44	11.67	1.11
2.750	2.66	5.750	49.61	8.750	2.44	11.75	1.11
2.833	1.77	5.833	50.06	8.833	1.77	11.83	1.33
2.917	1.77	5.917	50.06	8.917	1.77	11.92	1.33
3.000	1.77	6.000	50.06	9.000	1.77	12.00	1.33

Max.Eff. Inten. (mm/hr)=	50.06	101.50
over (min)	5.00	10.00
Storage Coeff. (min)=	2.78 (ii)	7.39 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	.28	.13

*TOTALS*			
PEAK FLOW (cms)=	.16	.03	.191 (iii)
TIME TO PEAK (hrs)=	.00	6.00	6.00
RUNOFF VOLUME (mm)=	54.57	13.26	45.90
TOTAL RAINFALL (mm)=	55.37	55.37	55.37
RUNOFF COEFFICIENT =	.99	.24	.83

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00      K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50      Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL

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THAN THE STORAGE COEFFICIENT.  
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (1041)			
ID= 1 DT= 5.0 min	Area (ha)=	12.60	
	Total Imp(%)=	36.00	Dir. Conn.(%)= 18.00
	IMPERVIOUS		PERVIOUS (i)
Surface Area (ha)=	4.54		8.06
Dep. Storage (mm)=	.80		1.50
Average Slope (%)=	1.90		2.00
Length (m)=	289.80		30.00
Mannings n =	.013		.250
Max.Eff.Inten.(mm/hr)=	50.06		50.17
over (min)	5.00		15.00
Storage Coeff. (min)=	5.26 (ii)		13.09 (ii)
Unit Hyd. Tpeak (min)=	5.00		15.00
Unit Hyd. peak (cms)=	.21		.08
			*TOTALS*
PEAK FLOW (cms)=	.31		.86
TIME TO PEAK (hrs)=	.00		6.00
RUNOFF VOLUME (mm)=	54.57		17.88
TOTAL RAINFALL (mm)=	55.37		55.37
RUNOFF COEFFICIENT =	.99		.44

ADD HYD (0161)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (1063):	14.10	1.361	6.00	26.76
+ ID2= 2 (0104):	35.20	7.118	6.00	65.29
=====				
ID = 3 (0161):	49.30	8.479	6.00	54.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0004)					
IN= 2---> OUT= 1	DT= 1.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
		.0000	.0000	.3180	1.5700
		.0100	.8300	.3570	1.8280
		.1630	1.1000	.4830	1.9620
		.2620	1.3800	.5780	2.1720

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

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0161)	49.30	8.48	6.00	54.27
OUTFLOW: ID= 1 (0004)	49.30	.58	7.02	37.52
PEAK FLOW REDUCTION [Qout/Qin] (%)=				6.81
TIME SHIFT OF PEAK FLOW (min)=				61.00
MAXIMUM STORAGE USED (ha.m.)=				2.1712

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

FINISH

ADD HYD (1064)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (1042):	1.50	.191	6.00	45.90
+ ID2= 2 (1041):	12.60	1.170	6.00	24.49
=====				
ID = 3 (1064):	14.10	1.361	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

DUHYD (1063)				
Inlet Cap.=1.361				
#of Inlets= 1				
Total (cms)= 1.4				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD. (ID= 1):	14.10	1.36	6.00	26.76
MAJOR SYS. (ID= 2):	.00	.00	6.00	26.76
MINOR SYS. (ID= 3):	14.10	1.36	6.00	26.76

## **APPENDIX C**

### **SWM Pond Outlet Calculations & Visual OTTHYMO Modelling for Pond Operation Confirmation (Post-Development Conditions)**

# Multiple Orifice Outlet Structure Solver

Job: 2004.2644

Job Notes: SWM Pond 4  
Oct-13

Controls Q 25mm= 0.01 m<sup>3</sup>/s  
Q5 yr= 0.262 m<sup>3</sup>/s  
Q25 yr= 0.357 m<sup>3</sup>/s  
Q100 yr= 0.578 m<sup>3</sup>/s

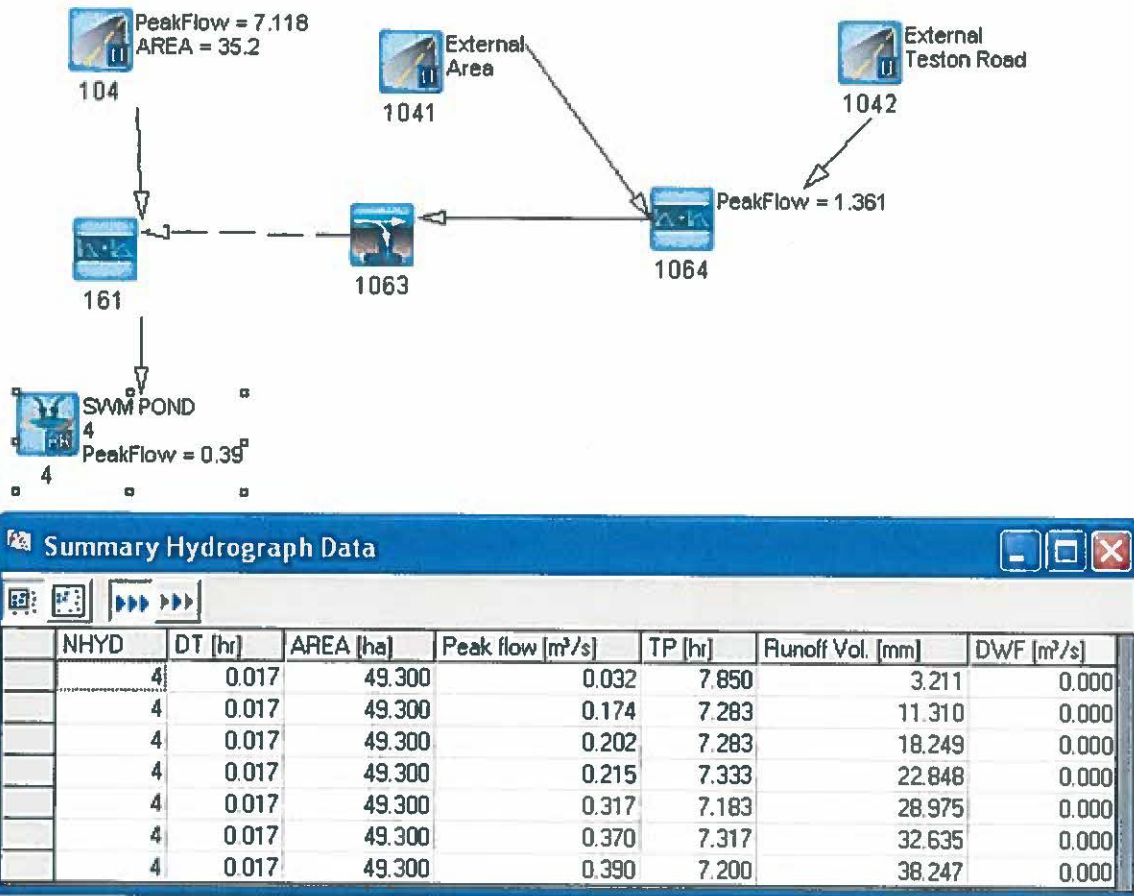
	Orifice 1	Orifice 2	Orifice 3	Weir 4
Invert of orifice plate (m)	241.06	240.82	241.17	242.70
Diameter (mm) or Length (m)	82	288	232	11
Max Area (m <sup>2</sup> )	0.005	0.065	0.042	na
Coefficient	0.82	0.82	0.82	na
Starting Flow Elevation (m)	241.06	241.70	242.35	242.70
Top Elevation (m)	242.70	242.70	242.70	243.00

## Orifice Calculations:

STAGE m	Water Elevation Above Perm. Pool m	Head 1 m	Q1 m <sup>3</sup> /s	Head 2 m	Q2 m <sup>3</sup> /s	Head 3 m	Q3 m <sup>3</sup> /s	Tail Water Elevation m	Weir			Pond Storage (m <sup>3</sup> )	Total Flow m <sup>3</sup> /s
									Head 4 m	Discharge Coefficient	Q4 m <sup>3</sup> /s		
241.06	0.00	na	0.000	na	na	na	na	240.75	0.00	1.40	na	0	0.000
241.10	0.04	na	0.002	0.04	na	na	na	240.75	0.00	1.40	na	468	0.002
241.15	0.09	0.05	0.003	0.09	na	na	na	240.76	0.00	1.40	na	1,053	0.003
241.20	0.14	0.10	0.005	0.14	na	na	na	240.77	0.00	1.40	na	1,639	0.005
241.25	0.19	0.15	0.006	0.19	na	na	na	240.77	0.00	1.40	na	2,224	0.006
241.30	0.24	0.20	0.006	0.24	na	0.01	na	240.78	0.00	1.40	na	2,809	0.006
241.35	0.29	0.25	0.007	0.29	na	0.06	na	240.78	0.00	1.40	na	3,394	0.007
241.40	0.34	0.30	0.008	0.34	na	0.11	na	240.78	0.00	1.40	na	3,979	0.008
241.45	0.39	0.35	0.009	0.39	na	0.16	na	240.80	0.00	1.40	na	4,564	0.009
241.50	0.44	0.40	0.009	0.44	na	0.21	na	240.80	0.00	1.40	na	5,150	0.009
241.55	0.49	0.45	0.010	0.49	na	0.26	na	240.81	0.00	1.40	na	5,735	0.010
241.57	0.51	0.47	0.010	0.51	na	0.28	na	240.81	0.00	1.40	na	5,968	0.010
241.60	0.54	0.50	0.010	0.54	na	0.31	na	240.81	0.00	1.40	na	6,320	0.010
241.65	0.59	0.55	0.011	0.59	na	0.36	na	240.85	0.00	1.40	na	6,998	0.011
241.70	0.64	0.60	0.011	0.64	na	0.41	na	240.95	0.00	1.40	na	7,878	0.011
241.75	0.69	0.65	0.012	0.69	0.148	0.46	na	240.96	0.00	1.40	na	8,353	0.180
241.80	0.74	0.70	0.012	0.74	0.153	0.51	na	240.96	0.00	1.40	na	9,031	0.186
241.85	0.79	0.75	0.013	0.79	0.159	0.56	na	240.97	0.00	1.40	na	9,708	0.171
241.90	0.84	0.80	0.013	0.84	0.164	0.61	na	240.97	0.00	1.40	na	10,386	0.177
241.96	0.89	0.85	0.013	0.89	0.168	0.66	na	240.98	0.00	1.40	na	11,064	0.182
242.00	0.94	0.90	0.014	0.94	0.173	0.71	na	240.98	0.00	1.40	na	11,741	0.167
242.07	1.01	0.97	0.014	1.01	0.179	0.78	na	240.99	0.00	1.40	na	12,690	0.194
242.10	1.04	1.00	0.014	1.04	0.182	0.81	na	240.99	0.00	1.40	na	13,113	0.167
242.15	1.09	1.05	0.015	1.09	0.186	0.86	na	240.99	0.00	1.40	na	13,618	0.201
242.17	1.11	1.07	0.015	1.11	0.188	0.88	na	240.99	0.00	1.40	na	14,100	0.203
242.20	1.14	1.10	0.015	1.14	0.191	0.91	na	241.00	0.00	1.40	na	14,523	0.208
242.25	1.19	1.15	0.016	1.19	0.195	0.96	na	241.00	0.00	1.40	na	15,229	0.210
242.30	1.24	1.20	0.016	1.24	0.199	1.01	na	241.06	0.00	1.40	na	15,934	0.215
242.36	1.29	1.25	0.016	1.29	0.203	1.06	na	214.26	0.00	1.40	na	16,639	0.219
242.37	1.31	1.27	0.016	1.31	0.204	1.08	0.121	203.56	0.00	1.40	na	16,921	0.342
242.40	1.34	1.30	0.017	1.34	0.207	1.11	0.123	187.49	0.00	1.40	na	17,344	0.346
242.45	1.39	1.35	0.017	1.39	0.211	1.16	0.125	160.71	0.00	1.40	na	18,049	0.353
242.50	1.44	1.40	0.017	1.44	0.214	1.21	0.128	133.92	0.00	1.40	na	18,754	0.359
242.58	1.49	1.45	0.017	1.49	0.218	1.26	0.131	107.14	0.00	1.40	na	19,460	0.366
242.57	1.51	1.47	0.018	1.51	0.220	1.28	0.132	98.42	0.00	1.40	na	19,742	0.369
242.60	1.54	1.50	0.018	1.54	0.222	1.31	0.133	80.35	0.00	1.40	na	20,165	0.373
242.65	1.59	1.55	0.018	1.59	0.225	1.36	0.136	53.57	0.00	1.40	na	20,670	0.379
242.69	1.63	1.59	0.018	1.63	0.228	1.40	0.138	32.14	0.00	1.40	na	21,434	0.384
242.78	1.64	1.60	0.018	1.64	0.229	1.41	0.138	26.78	0.00	1.40	0.000	21,676	0.388
242.75	1.69	na	na	na	na	na	na	0.00	0.05	1.40	0.172	24,815	0.172
242.80	1.74	na	na	na	na	na	na	0	0.10	1.40	0.467	25,610	0.467
242.85	1.79	na	na	na	na	na	na	0	0.15	1.40	0.895	26,405	0.695
242.90	1.84	na	na	na	na	na	na	0	0.20	1.40	1.377	27,200	1.377
242.95	1.89	na	na	na	na	na	na	0	0.25	1.40	1.925	27,995	1.925
243.00	1.94	na	na	na	na	na	na	0	0.30	1.40	2.530	28,790	2.530

25mm  
2 Year  
5 Year  
10 Year  
25 Year  
50 Year  
100 Year





**SCHAEFFERS**  
 CONSULTING ENGINEERS

**Visual OTTHYMO™ Schematic**  
 Andridge Homes, Major Bob Farms Inc. &  
 Lindstone Developments  
 SWM Pond 4 – Block 12  
 City of Vaughan

( 25 mm to 100-Year Storm Events-12 hr. SCS Storm)

**Job #: 2004 - 2644**

**Date: October 2013**

Stormwater Management Pond 4 Final Report  
 Andridge Homes ,Major Bob Farms Inc. &  
 Lindstone Developments, Block 12  
 City of Vaughan

October 2013

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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 2.2.4\voindat  
 Output filename: W:\2600's\2644-B-1\OTTHYMO\PONDDE-1\Scenario19.out  
 Summary filename: W:\2600's\2644-B-1\OTTHYMO\PONDDE-1\Scenario19.sum

DATE: 10/10/2013

TIME: 12:32:45 PM

USER:

COMMENTS:

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

READ STORM  
 Ptotal= 25.00 mm

Filename: W:\2600's\2644 - Block 12 Core Services\  
 OTTHYMO\Vaughan Storms\Vau25mm.stm  
 Comments: Vaughan 25 mm storm 4 hour - 5 min time

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.08	1.52	1.08	6.56	2.08	4.19	3.08	2.02
.17	1.61	1.17	10.05	2.17	3.82	3.17	1.94
.25	1.72	1.25	23.64	2.25	3.51	3.25	1.87
.33	1.84	1.33	83.08	2.33	3.26	3.33	1.81
.42	1.98	1.42	30.71	2.42	3.04	3.42	1.75
.50	2.15	1.50	16.60	2.50	2.85	3.50	1.69
.58	2.36	1.58	11.40	2.58	2.69	3.58	1.64
.67	2.61	1.67	8.73	2.67	2.54	3.67	1.59
.75	2.94	1.75	7.11	2.75	2.42	3.75	1.55
.83	3.38	1.83	6.02	2.83	2.30	3.83	1.50
.92	4.00	1.92	5.24	2.92	2.20	3.92	1.46
1.00	4.94	2.00	4.65	3.00	2.11	4.00	1.42

CALIB  
 STANDHYD (0104)  
 ID= 1 DT= 5.0 min

Area (ha)= 35.20  
 Total Imp(%)= 65.00 Dir. Conn.(%)= 44.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	22.88	12.32
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	484.42	30.00
Mannings n =	.013	.250
Max.Eff.Inten.(mm/hr)=	83.08	52.00
over (min)	5.00	15.00
Storage Coeff. (min)=	5.85 (ii)	13.56 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	.20	.08

			*TOTALS*
PEAK FLOW (cms)=	2.37	.79	2.591 (iii)
TIME TO PEAK (hrs)=	.00	1.50	1.33
RUNOFF VOLUME (mm)=	24.20	5.48	13.72
TOTAL RAINFALL (mm)=	25.00	25.00	25.00
RUNOFF COEFFICIENT =	.97	.22	.55

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

READ STORM  
 Ptotal= 55.37 mm

Filename: W:\2600's\2644 - Block 12 Core Services\  
 OTTHYMO\Don River SCS Storms\scs12h5.stm  
 Comments: This 5-year, 12-hour Storm created from

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.25	1.33	3.25	2.44	6.25	9.97	9.25	1.99
.50	1.11	3.50	1.99	6.50	9.97	9.50	1.77
.75	.66	3.75	2.44	6.75	4.43	9.75	1.33
1.00	1.33	4.00	1.99	7.00	4.43	10.00	1.77
1.25	1.11	4.25	4.21	7.25	3.10	10.25	1.33
1.50	1.33	4.50	3.77	7.50	3.10	10.50	.66
1.75	.66	4.75	3.77	7.75	3.77	10.75	1.33
2.00	1.33	5.00	3.77	8.00	3.10	11.00	1.11
2.25	2.44	5.25	6.87	8.25	2.44	11.25	1.33
2.50	1.77	5.50	6.87	8.50	1.99	11.50	.66
2.75	2.66	5.75	49.61	8.75	2.44	11.75	1.11
3.00	1.77	6.00	50.06	9.00	1.77	12.00	1.33

CALIB  
 STANDHYD (1041)

Area (ha)= 12.60



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 Lindstone Developments, Block 12  
 City of Vaughan

October 2013

|ID= 1 DT= 5.0 min | Total Imp(%)= 36.00 Dir. Conn.(%)= 18.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.54	8.06
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	289.80	30.00
Mannings n =	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.083	1.33	3.083	2.44	6.083	9.97	9.08	1.99
.167	1.33	3.167	2.44	6.167	9.97	9.17	1.99
.250	1.33	3.250	2.44	6.250	9.97	9.25	1.99
.333	1.11	3.333	1.99	6.333	9.97	9.33	1.77
.417	1.11	3.417	1.99	6.417	9.97	9.42	1.77
.500	1.11	3.500	1.99	6.500	9.97	9.50	1.77
.583	.66	3.583	2.44	6.583	4.43	9.58	1.33
.667	.66	3.667	2.44	6.667	4.43	9.67	1.33
.750	.66	3.750	2.44	6.750	4.43	9.75	1.33
.833	1.33	3.833	1.99	6.833	4.43	9.83	1.77
.917	1.33	3.917	1.99	6.917	4.43	9.92	1.77
1.000	1.33	4.000	1.99	7.000	4.43	10.00	1.77
1.083	1.11	4.083	4.21	7.083	3.10	10.08	1.33
1.167	1.11	4.167	4.21	7.167	3.10	10.17	1.33
1.250	1.11	4.250	4.21	7.250	3.10	10.25	1.33
1.333	1.33	4.333	3.77	7.333	3.10	10.33	.66
1.417	1.33	4.417	3.77	7.417	3.10	10.42	.66
1.500	1.33	4.500	3.77	7.500	3.10	10.50	.66
1.583	.66	4.583	3.77	7.583	3.77	10.58	1.33
1.667	.66	4.667	3.77	7.667	3.77	10.67	1.33
1.750	.66	4.750	3.77	7.750	3.77	10.75	1.33
1.833	1.33	4.833	3.77	7.833	3.10	10.83	1.11
1.917	1.33	4.917	3.77	7.917	3.10	10.92	1.11
2.000	1.33	5.000	3.77	8.000	3.10	11.00	1.11
2.083	2.44	5.083	6.87	8.083	2.44	11.08	1.33
2.167	2.44	5.167	6.87	8.167	2.44	11.17	1.33
2.250	2.44	5.250	6.87	8.250	2.44	11.25	1.33
2.333	1.77	5.333	6.87	8.333	1.99	11.33	.66
2.417	1.77	5.417	6.87	8.417	1.99	11.42	.66
2.500	1.77	5.500	6.87	8.500	1.99	11.50	.66
2.583	2.66	5.583	49.61	8.583	2.44	11.58	1.11
2.667	2.66	5.667	49.61	8.667	2.44	11.67	1.11
2.750	2.66	5.750	49.61	8.750	2.44	11.75	1.11
2.833	1.77	5.833	50.06	8.833	1.77	11.83	1.33
2.917	1.77	5.917	50.06	8.917	1.77	11.92	1.33
3.000	1.77	6.000	50.06	9.000	1.77	12.00	1.33

Max. Eff. Inten. (mm/hr)=	50.06	50.17
over (min)	5.00	15.00
Storage Coeff. (min)=	5.26 (ii)	13.09 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	.21	.08

\*TOTALS\*

PEAK FLOW (cms)=	.31	.86	1.170 (iii)
TIME TO PEAK (hrs)=	.00	6.00	6.00
RUNOFF VOLUME (mm)=	54.57	17.88	24.49
TOTAL RAINFALL (mm)=	55.37	55.37	55.37

RUNOFF COEFFICIENT = .99 .32 .44

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

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum. Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| CALIB |  
 | STANDHYD (1042) | Area (ha)= 1.50  
 | ID= 1 DT= 5.0 min | Total Imp(%)= 79.00 Dir. Conn.(%)= 79.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.19	.31
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	100.00	30.00
Mannings n =	.013	.250

Max. Eff. Inten. (mm/hr)=	50.06	76.45
over (min)	5.00	10.00
Storage Coeff. (min)=	2.78 (ii)	7.39 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	.28	.13

\*TOTALS\*

PEAK FLOW (cms)=	.16	.03	.191 (iii)
TIME TO PEAK (hrs)=	.00	6.00	6.00
RUNOFF VOLUME (mm)=	54.57	13.26	45.90
TOTAL RAINFALL (mm)=	55.37	55.37	55.37
RUNOFF COEFFICIENT =	.99	.24	.83

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum. Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

| ADD HYD (1064) |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (1041):	12.60	1.170	6.00	24.49
+ ID2= 2 (1042):	1.50	.191	6.00	45.90
ID = 3 (1064):	14.10	1.361	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

| DUHYD (1063) |

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**Andridge Homes ,Major Bob Farms Inc. &**  
**Lindstone Developments, Block 12**  
**City of Vaughan**

October 2013

Inlet Cap.=1.361					1.50	1.03	4.50	2.92	7.50	2.40	10.50	.52
#of Inlets= 1					1.75	.52	4.75	2.92	7.75	2.92	10.75	1.03
Total(cms)= 1.4	AREA	QPEAK	TPEAK	R.V.	2.00	1.03	5.00	2.92	8.00	2.40	11.00	.86
	(ha)	(cms)	(hrs)	(mm)	2.25	1.89	5.25	5.32	8.25	1.89	11.25	1.03
TOTAL HYD. (ID= 1):	14.10	1.36	6.00	26.76	2.50	1.37	5.50	5.32	8.50	1.55	11.50	.52
MAJOR SYS. (ID= 2):	.00	.00	6.00	26.76	2.75	2.06	5.75	38.46	8.75	1.89	11.75	.86
MINOR SYS. (ID= 3):	14.10	1.36	6.00	26.76	3.00	1.37	6.00	38.81	9.00	1.37	12.00	1.03

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0161)												
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.								
	(ha)	(cms)	(hrs)	(mm)								
ID1= 1 (0104):	35.20	2.591	1.33	13.72								
+ ID2= 2 (1063):	14.10	1.361	6.00	26.76								
ID = 3 (0161):	49.30	2.603	1.33	17.45								

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB			
STANDHYD (0104)	Area (ha)=	35.20	
ID= 1 DT= 5.0 min	Total Imp(%)=	65.00	Dir. Conn.(%)= 44.00

	IMPERVIOUS	PERVIOUS (±)
Surface Area (ha)=	22.88	12.32
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	484.42	30.00
Mannings n =	.013	.250

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

RESERVOIR (0004)				
IN= 2----> OUT= 1				
DT= 1.0 min				
	OUTFLOW	STORAGE	OUTFLOW	STORAGE
	(cms)	(ha.m.)	(cms)	(ha.m.)
	.0000	.0000	.2190	1.6639
	.0110	.7675	.3660	1.9460
	.1820	1.1064	.3840	2.1434
	.2030	1.4100	.3850	2.1575

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0161)	49.30	2.60	1.33	17.45
OUTFLOW: ID= 1 (0004)	49.30	.03	7.85	3.21

PEAK FLOW REDUCTION (Qout/Qin) (%) = 1.22  
 TIME SHIFT OF PEAK FLOW (min) = 391.00  
 MAXIMUM STORAGE USED (ha.m.) = .8087

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

READ STORM	Filename: W:\2600's\2644 - Block 12 Core Services\OTTHYMO\Don River SCS Storms\scs12h2.stm
Ptotal= 42.93 mm	Comments: This 2-year, 12-hour Storm created from

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.25	1.03	3.25	1.89	6.25	7.73	9.25	1.55
.50	.86	3.50	1.55	6.50	7.73	9.50	1.37
.75	.52	3.75	1.89	6.75	3.43	9.75	1.03
1.00	1.03	4.00	1.55	7.00	3.43	10.00	1.37
1.25	.86	4.25	3.26	7.25	2.40	10.25	1.03

--- TRANSFORMED HYETOGRAPH ---							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.083	1.03	3.083	1.89	6.083	7.73	9.08	1.55
.167	1.03	3.167	1.89	6.167	7.73	9.17	1.55
.250	1.03	3.250	1.89	6.250	7.73	9.25	1.55
.333	.86	3.333	1.55	6.333	7.73	9.33	1.37
.417	.86	3.417	1.55	6.417	7.73	9.42	1.37
.500	.86	3.500	1.55	6.500	7.73	9.50	1.37
.583	.52	3.583	1.89	6.583	3.43	9.58	1.03
.667	.52	3.667	1.89	6.667	3.43	9.67	1.03
.750	.52	3.750	1.89	6.750	3.43	9.75	1.03
.833	1.03	3.833	1.55	6.833	3.43	9.83	1.37
.917	1.03	3.917	1.55	6.917	3.43	9.92	1.37
1.000	1.03	4.000	1.55	7.000	3.43	10.00	1.37
1.083	.86	4.083	3.26	7.083	2.40	10.08	1.03
1.167	.86	4.167	3.26	7.167	2.40	10.17	1.03
1.250	.86	4.250	3.26	7.250	2.40	10.25	1.03
1.333	1.03	4.333	2.92	7.333	2.40	10.33	.52
1.417	1.03	4.417	2.92	7.417	2.40	10.42	.52
1.500	1.03	4.500	2.92	7.500	2.40	10.50	.52
1.583	.52	4.583	2.92	7.583	2.92	10.58	1.03
1.667	.52	4.667	2.92	7.667	2.92	10.67	1.03
1.750	.52	4.750	2.92	7.750	2.92	10.75	1.03
1.833	1.03	4.833	2.92	7.833	2.40	10.83	.86
1.917	1.03	4.917	2.92	7.917	2.40	10.92	.86
2.000	1.03	5.000	2.92	8.000	2.40	11.00	.86
2.083	1.89	5.083	5.32	8.083	1.89	11.08	1.03
2.167	1.89	5.167	5.32	8.167	1.89	11.17	1.03
2.250	1.89	5.250	5.32	8.250	1.89	11.25	1.03
2.333	1.37	5.333	5.32	8.333	1.55	11.33	.52
2.417	1.37	5.417	5.32	8.417	1.55	11.42	.52
2.500	1.37	5.500	5.32	8.500	1.55	11.50	.52
2.583	2.06	5.583	38.46	8.583	1.89	11.58	.86
2.667	2.06	5.667	38.46	8.667	1.89	11.67	.86
2.750	2.06	5.750	38.46	8.750	1.89	11.75	.86
2.833	1.37	5.833	38.81	8.833	1.37	11.83	1.03

Stormwater Management Pond 4 Final Report  
 Andridge Homes, Major Bob Farms Inc. &  
 Lindstone Developments, Block 12  
 City of Vaughan

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2.917	1.37	5.917	38.81	8.917	1.37	11.92	1.03
3.000	1.37	6.000	38.80	9.000	1.37	12.00	1.03
Max.Eff.Inten. (mm/hr) =		38.81		47.79			
over (min)		10.00		20.00			
Storage Coeff. (min) =		7.93 (ii)		15.91 (ii)			
Unit Hyd. Tpeak (min) =		10.00		20.00			
Unit Hyd. peak (cms) =		.13		.07			
PEAK FLOW (cms) =		1.62		1.11		2.642 (iii)	
TIME TO PEAK (hrs) =		.00		6.08		6.00	
RUNOFF VOLUME (mm) =		42.13		13.35		26.01	
TOTAL RAINFALL (mm) =		42.93		42.93		42.93	
RUNOFF COEFFICIENT =		.98		.31		.61	

\*TOTALS\*

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr) = 50.00      K (1/hr) = 2.00  
 Fc (mm/hr) = 7.50      Cum.Inf. (mm) = .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

READ STORM  
 Ptotal= 55.37 mm

Filename: W:\2600's\2644 - Block 12 Core Services\  
 OTTHYMO\Don River SCS Storms\scs12h5.stm  
 Comments: This 5-year, 12-hour Storm created from

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.25	1.33	3.25	2.44	6.25	9.97	9.25	1.99
.50	1.11	3.50	1.99	6.50	9.97	9.50	1.77
.75	.66	3.75	2.44	6.75	4.43	9.75	1.33
1.00	1.33	4.00	1.99	7.00	4.43	10.00	1.77
1.25	1.11	4.25	4.21	7.25	3.10	10.25	1.33
1.50	1.33	4.50	3.77	7.50	3.10	10.50	.66
1.75	.66	4.75	3.77	7.75	3.77	10.75	1.33
2.00	1.33	5.00	3.77	8.00	3.10	11.00	1.11
2.25	2.44	5.25	6.87	8.25	2.44	11.25	1.33
2.50	1.77	5.50	6.87	8.50	1.99	11.50	.66
2.75	2.66	5.75	49.61	8.75	2.44	11.75	1.11
3.00	1.77	6.00	50.06	9.00	1.77	12.00	1.33

CALIB  
 STANDHYD (1041)  
 ID= 1 DT= 5.0 min

Area (ha) = 12.60  
 Total Imp(%) = 36.00      Dir. Conn.(%) = 18.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha) =	4.54	8.06
Dep. Storage (mm) =	.80	1.50
Average Slope (%) =	1.90	2.00
Length (m) =	289.80	30.00
Mannings n =	.013	.250

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.083	1.33	3.083	2.44	6.083	9.97	9.08	1.99
.167	1.33	3.167	2.44	6.167	9.97	9.17	1.99
.250	1.33	3.250	2.44	6.250	9.97	9.25	1.99
.333	1.11	3.333	1.99	6.333	9.97	9.33	1.77
.417	1.11	3.417	1.99	6.417	9.97	9.42	1.77
.500	1.11	3.500	1.99	6.500	9.97	9.50	1.77
.583	.66	3.583	2.44	6.583	4.43	9.58	1.33
.667	.66	3.667	2.44	6.667	4.43	9.67	1.33
.750	.66	3.750	2.44	6.750	4.43	9.75	1.33
.833	1.33	3.833	1.99	6.833	4.43	9.83	1.77
.917	1.33	3.917	1.99	6.917	4.43	9.92	1.77
1.000	1.33	4.000	1.99	7.000	4.43	10.00	1.77
1.083	1.11	4.083	4.21	7.083	3.10	10.08	1.33
1.167	1.11	4.167	4.21	7.167	3.10	10.17	1.33
1.250	1.11	4.250	4.21	7.250	3.10	10.25	1.33
1.333	1.33	4.333	3.77	7.333	3.10	10.33	.66
1.417	1.33	4.417	3.77	7.417	3.10	10.42	.66
1.500	1.33	4.500	3.77	7.500	3.10	10.50	.66
1.583	.66	4.583	3.77	7.583	3.77	10.58	1.33
1.667	.66	4.667	3.77	7.667	3.77	10.67	1.33
1.750	.66	4.750	3.77	7.750	3.77	10.75	1.33
1.833	1.33	4.833	3.77	7.833	3.10	10.83	1.11
1.917	1.33	4.917	3.77	7.917	3.10	10.92	1.11
2.000	1.33	5.000	3.77	8.000	3.10	11.00	1.11
2.083	2.44	5.083	6.87	8.083	2.44	11.08	1.33
2.167	2.44	5.167	6.87	8.167	2.44	11.17	1.33
2.250	2.44	5.250	6.87	8.250	2.44	11.25	1.33
2.333	1.77	5.333	6.87	8.333	1.99	11.33	.66
2.417	1.77	5.417	6.87	8.417	1.99	11.42	.66
2.500	1.77	5.500	6.87	8.500	1.99	11.50	.66
2.583	2.66	5.583	49.61	8.583	2.44	11.58	1.11
2.667	2.66	5.667	49.61	8.667	2.44	11.67	1.11
2.750	2.66	5.750	49.61	8.750	2.44	11.75	1.11
2.833	1.77	5.833	50.06	8.833	1.77	11.83	1.33
2.917	1.77	5.917	50.06	8.917	1.77	11.92	1.33
3.000	1.77	6.000	50.06	9.000	1.77	12.00	1.33

Max.Eff.Inten. (mm/hr) =	50.06	50.17
over (min)	5.00	15.00
Storage Coeff. (min) =	5.26 (ii)	13.09 (ii)
Unit Hyd. Tpeak (min) =	5.00	15.00
Unit Hyd. peak (cms) =	.21	.08

\*TOTALS\*

PEAK FLOW (cms) =	.31	.86	1.170 (iii)
TIME TO PEAK (hrs) =	.00	6.00	6.00
RUNOFF VOLUME (mm) =	54.57	17.88	24.49
TOTAL RAINFALL (mm) =	55.37	55.37	55.37
RUNOFF COEFFICIENT =	.99	.32	.44

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

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr) = 50.00      K (1/hr) = 2.00  
 Fc (mm/hr) = 7.50      Cum.Inf. (mm) = .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

**Stormwater Management Pond 4 Final Report**  
**Andridge Homes ,Major Bob Farms Inc. &**  
**Lindstone Developments, Block 12**  
**City of Vaughan**

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CALIB  
 STANDHYD (1042)  
 ID= 1 DT= 5.0 min

Area (ha)=	1.50		
Total Imp(%)=	79.00	Dir. Conn.(%)=	79.00

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	1.19	.31	
Dep. Storage (mm)=	.80	1.50	
Average Slope (%)=	1.90	2.00	
Length (m)=	100.00	30.00	
Mannings n =	.013	.250	
Max.Eff.Inten. (mm/hr)=	50.06	76.45	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.78 (ii)	7.39 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	.28	.13	
			*TOTALS*
PEAK FLOW (cms)=	.16	.03	.191 (iii)
TIME TO PEAK (hrs)=	.00	6.00	
RUNOFF VOLUME (mm)=	54.57	13.26	45.90
TOTAL RAINFALL (mm)=	55.37	55.37	55.37
RUNOFF COEFFICIENT =	.99	.24	.83

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (1064)  
 1 + 2 = 3

ID1= 1 (1041):	12.60	1.170	6.00	24.49
+ ID2= 2 (1042):	1.50	.191	6.00	45.90
=====				
ID = 3 (1064):	14.10	1.361	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

DUHYD (1063)  
 Inlet Cap.=1.361  
 #of Inlets= 1  
 Total(cms)= 1.4

AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD. (ID= 1):	14.10	1.36	6.00 26.76
MAJOR SYS. (ID= 2):	.00	.00	6.00 26.76
MINOR SYS. (ID= 3):	14.10	1.36	6.00 26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0161)  
 1 + 2 = 3

ID1= 1 (0104):	35.20	2.642	6.00	26.01
+ ID2= 2 (1063):	14.10	1.361	6.00	26.76
=====				
ID = 3 (0161):	49.30	4.003	6.00	26.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0004)  
 IN= 2---> OUT= 1  
 DT= 1.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.2190	1.6639
.0110	.7675	.3660	1.9460
.1820	1.1064	.3840	2.1434
.2030	1.4100	.3850	2.1575

INFLOW : ID= 2 (0161)	49.30	4.00	6.00	26.23
OUTFLOW: ID= 1 (0004)	49.30	.17	7.28	11.31

PEAK FLOW REDUCTION [Qout/Qin] (%) = 4.34  
 TIME SHIFT OF PEAK FLOW (min) = 77.00  
 MAXIMUM STORAGE USED (ha.m.) = 1.0902

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

READ STORM  
 Ptotal= 55.37 mm

Filename: W:\2600's\2644 - Block 12 Core Services\OITHYMO\Don River SCS Storms\scs12h5.stm  
 Comments: This 5-year, 12-hour Storm created from

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	1.33	3.25	2.44	6.25	9.97	9.25	1.99
.50	1.11	3.50	1.99	6.50	9.97	9.50	1.77
.75	.66	3.75	2.44	6.75	4.43	9.75	1.33
1.00	1.33	4.00	1.99	7.00	4.43	10.00	1.77
1.25	1.11	4.25	4.21	7.25	3.10	10.25	1.33
1.50	1.33	4.50	3.77	7.50	3.10	10.50	.66
1.75	.66	4.75	3.77	7.75	3.77	10.75	1.33
2.00	1.33	5.00	3.77	8.00	3.10	11.00	1.11
2.25	2.44	5.25	6.87	8.25	2.44	11.25	1.33
2.50	1.77	5.50	6.87	8.50	1.99	11.50	.66
2.75	2.66	5.75	49.61	8.75	2.44	11.75	1.11
3.00	1.77	6.00	50.06	9.00	1.77	12.00	1.33

CALIB

**Stormwater Management Pond 4 Final Report**  
**Andridge Homes, Major Bob Farms Inc. &**  
**Lindstone Developments, Block 12**  
**City of Vaughan**

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STANDHYD (0104)	Area (ha)= 35.20		
ID= 1 DT= 5.0 min	Total Imp(%)= 65.00	Dir. Conn.(%)= 44.00	

TOTAL RAINFALL (mm)=	55.37	55.37	55.37
RUNOFF COEFFICIENT =	.99	.39	.65

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	22.88	12.32
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	484.42	30.00
Mannings n =	.013	.250

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00      K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50      Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

--- TRANSFORMED HYETOGRAPH ---							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.083	1.33	3.083	2.44	6.083	9.97	9.08	1.99
.167	1.33	3.167	2.44	6.167	9.97	9.17	1.99
.250	1.33	3.250	2.44	6.250	9.97	9.25	1.99
.333	1.11	3.333	1.99	6.333	9.97	9.33	1.77
.417	1.11	3.417	1.99	6.417	9.97	9.42	1.77
.500	1.11	3.500	1.99	6.500	9.97	9.50	1.77
.583	.66	3.583	2.44	6.583	4.43	9.58	1.33
.667	.66	3.667	2.44	6.667	4.43	9.67	1.33
.750	.66	3.750	2.44	6.750	4.43	9.75	1.33
.833	1.33	3.833	1.99	6.833	4.43	9.83	1.77
.917	1.33	3.917	1.99	6.917	4.43	9.92	1.77
1.000	1.33	4.000	1.99	7.000	4.43	10.00	1.77
1.083	1.11	4.083	4.21	7.083	3.10	10.08	1.33
1.167	1.11	4.167	4.21	7.167	3.10	10.17	1.33
1.250	1.11	4.250	4.21	7.250	3.10	10.25	1.33
1.333	1.33	4.333	3.77	7.333	3.10	10.33	.66
1.417	1.33	4.417	3.77	7.417	3.10	10.42	.66
1.500	1.33	4.500	3.77	7.500	3.10	10.50	.66
1.583	.66	4.583	3.77	7.583	3.77	10.58	1.33
1.667	.66	4.667	3.77	7.667	3.77	10.67	1.33
1.750	.66	4.750	3.77	7.750	3.77	10.75	1.33
1.833	1.33	4.833	3.77	7.833	3.10	10.83	1.11
1.917	1.33	4.917	3.77	7.917	3.10	10.92	1.11
2.000	1.33	5.000	3.77	8.000	3.10	11.00	1.11
2.083	2.44	5.083	6.87	8.083	2.44	11.08	1.33
2.167	2.44	5.167	6.87	8.167	2.44	11.17	1.33
2.250	2.44	5.250	6.87	8.250	2.44	11.25	1.33
2.333	1.77	5.333	6.87	8.333	1.99	11.33	.66
2.417	1.77	5.417	6.87	8.417	1.99	11.42	.66
2.500	1.77	5.500	6.87	8.500	1.99	11.50	.66
2.583	2.66	5.583	49.61	8.583	2.44	11.58	1.11
2.667	2.66	5.667	49.61	8.667	2.44	11.67	1.11
2.750	2.66	5.750	49.61	8.750	2.44	11.75	1.11
2.833	1.77	5.833	50.06	8.833	1.77	11.83	1.33
2.917	1.77	5.917	50.06	8.917	1.77	11.92	1.33
3.000	1.77	6.000	50.06	9.000	1.77	12.00	1.33

Max.Eff.Inten. (mm/hr)=	50.06	68.50
over (min)	5.00	15.00
Storage Coeff. (min)=	7.16 (ii)	14.07 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	.17	.08

PEAK FLOW (cms)=	2.12	1.80	3.928 (iii)
TIME TO PEAK (hrs)=	.00	6.00	6.00
RUNOFF VOLUME (mm)=	54.57	21.74	36.19

READ STORM	Filename: W:\2600's\2644 - Block 12 Core Services\OTTHYMO\Don River SCS Storms\scs12h5.stm
Ptotal= 55.37 mm	Comments: This 5-year, 12-hour Storm created from

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.25	1.33	3.25	2.44	6.25	9.97	9.25	1.99
.50	1.11	3.50	1.99	6.50	9.97	9.50	1.77
.75	.66	3.75	2.44	6.75	4.43	9.75	1.33
1.00	1.33	4.00	1.99	7.00	4.43	10.00	1.77
1.25	1.11	4.25	4.21	7.25	3.10	10.25	1.33
1.50	1.33	4.50	3.77	7.50	3.10	10.50	.66
1.75	.66	4.75	3.77	7.75	3.77	10.75	1.33
2.00	1.33	5.00	3.77	8.00	3.10	11.00	1.11
2.25	2.44	5.25	6.87	8.25	2.44	11.25	1.33
2.50	1.77	5.50	6.87	8.50	1.99	11.50	.66
2.75	2.66	5.75	49.61	8.75	2.44	11.75	1.11
3.00	1.77	6.00	50.06	9.00	1.77	12.00	1.33

CALIB	Area (ha)= 12.60
STANDHYD (1041)	Total Imp(%)= 36.00
ID= 1 DT= 5.0 min	Dir. Conn.(%)= 18.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.54	8.06
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	289.80	30.00
Mannings n =	.013	.250

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

--- TRANSFORMED HYETOGRAPH ---							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.083	1.33	3.083	2.44	6.083	9.97	9.08	1.99
.167	1.33	3.167	2.44	6.167	9.97	9.17	1.99
.250	1.33	3.250	2.44	6.250	9.97	9.25	1.99
.333	1.11	3.333	1.99	6.333	9.97	9.33	1.77
.417	1.11	3.417	1.99	6.417	9.97	9.42	1.77
.500	1.11	3.500	1.99	6.500	9.97	9.50	1.77
.583	.66	3.583	2.44	6.583	4.43	9.58	1.33
.667	.66	3.667	2.44	6.667	4.43	9.67	1.33
.750	.66	3.750	2.44	6.750	4.43	9.75	1.33

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October 2013

.833	1.33	3.833	1.99	6.833	4.43	9.83	1.77
.917	1.33	3.917	1.99	6.917	4.43	9.92	1.77
1.000	1.33	4.000	1.99	7.000	4.43	10.00	1.77
1.083	1.11	4.083	4.21	7.083	3.10	10.08	1.33
1.167	1.11	4.167	4.21	7.167	3.10	10.17	1.33
1.250	1.11	4.250	4.21	7.250	3.10	10.25	1.33
1.333	1.33	4.333	3.77	7.333	3.10	10.33	.66
1.417	1.33	4.417	3.77	7.417	3.10	10.42	.66
1.500	1.33	4.500	3.77	7.500	3.10	10.50	.66
1.583	.66	4.583	3.77	7.583	3.77	10.58	1.33
1.667	.66	4.667	3.77	7.667	3.77	10.67	1.33
1.750	.66	4.750	3.77	7.750	3.77	10.75	1.33
1.833	1.33	4.833	3.77	7.833	3.10	10.83	1.11
1.917	1.33	4.917	3.77	7.917	3.10	10.92	1.11
2.000	1.33	5.000	3.77	8.000	3.10	11.00	1.11
2.083	2.44	5.083	6.87	8.083	2.44	11.08	1.33
2.167	2.44	5.167	6.87	8.167	2.44	11.17	1.33
2.250	2.44	5.250	6.87	8.250	2.44	11.25	1.33
2.333	1.77	5.333	6.87	8.333	1.99	11.33	.66
2.417	1.77	5.417	6.87	8.417	1.99	11.42	.66
2.500	1.77	5.500	6.87	8.500	1.99	11.50	.66
2.583	2.66	5.583	49.61	8.583	2.44	11.58	1.11
2.667	2.66	5.667	49.61	8.667	2.44	11.67	1.11
2.750	2.66	5.750	49.61	8.750	2.44	11.75	1.11
2.833	1.77	5.833	50.06	8.833	1.77	11.83	1.33
2.917	1.77	5.917	50.06	8.917	1.77	11.92	1.33
3.000	1.77	6.000	50.06	9.000	1.77	12.00	1.33

Max.Eff.Inten. (mm/hr)=	50.06	76.45
over (min)	5.00	10.00
Storage Coeff. (min)=	2.78 (ii)	7.39 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	.28	.13
PEAK FLOW (cms)=	.16	.03
TIME TO PEAK (hrs)=	.00	6.00
RUNOFF VOLUME (mm)=	54.57	13.26
TOTAL RAINFALL (mm)=	55.37	55.37
RUNOFF COEFFICIENT =	.99	.24

\*TOTALS\*

.191 (iii)
6.00
45.90
55.37
.83

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

Max.Eff.Inten. (mm/hr)=	50.06	50.17
over (min)	5.00	15.00
Storage Coeff. (min)=	5.26 (ii)	13.09 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	.21	.08

\*TOTALS\*

1.170 (iii)
6.00
24.49
55.37
.44

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

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (1064)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (1041):	12.60	1.170	6.00	24.49
+ ID2= 2 (1042):	1.50	.191	6.00	45.90
ID = 3 (1064):	14.10	1.361	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

DUHYD (1063)	AREA	QPEAK	TPEAK	R.V.
Inlet Cap.=1.361	(ha)	(cms)	(hrs)	(mm)
#of Inlets= 1				
Total (cms)= 1.4				
TOTAL HYD. (ID= 1):	14.10	1.36	6.00	26.76
MAJOR SYS. (ID= 2):	.00	.00	6.00	26.76
MINOR SYS. (ID= 3):	14.10	1.36	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

CALIB	Area (ha)=	1.50
STANDHYD (1042)	Total Imp(%)=	79.00
ID= 1 DT= 5.0 min	Dir. Conn.(%)=	79.00

Surface Area (ha)=	1.19	.31
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	100.00	30.00
Mannings n =	.013	.250

ADD HYD (0161)	AREA	QPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0104):	35.20	3.928	6.00	36.19
+ ID2= 2 (1063):	14.10	1.361	6.00	26.76
ID = 3 (0161):	49.30	5.289	6.00	33.49

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.



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RESERVOIR (0004)  
 IN= 2---> OUT= 1  
 DT= 1.0 min

OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
.0000	.0000	.2190	1.6639
.0110	.7675	.3660	1.9460
.1820	1.1064	.3840	2.1434
.2030	1.4100	.3850	2.1575

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0161)	49.30	5.29	6.00	33.49
OUTFLOW: ID= 1 (0004)	49.30	.20	7.28	18.25

PEAK FLOW REDUCTION [Qout/Qin] (%) = 3.81  
 TIME SHIFT OF PEAK FLOW (min) = 77.00  
 MAXIMUM STORAGE USED (ha.m.) = 1.3917

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

READ STORM  
 Ptotal= 63.75 mm

Filename: W:\2600's\2644 - Block 12 Core Services\  
 OTTHYMO\Don River SCS Storms\scs12h10.stm  
 Comments: This 10-year, 12-hour Storm created from

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
.25	1.53	3.25	2.81	6.25	11.48	9.25	2.30
.50	1.28	3.50	2.30	6.50	11.48	9.50	2.04
.75	.77	3.75	2.81	6.75	5.10	9.75	1.53
1.00	1.53	4.00	2.30	7.00	5.10	10.00	2.04
1.25	1.28	4.25	4.85	7.25	3.57	10.25	1.53
1.50	1.53	4.50	4.34	7.50	3.57	10.50	.77
1.75	.77	4.75	4.34	7.75	4.34	10.75	1.53
2.00	1.53	5.00	4.34	8.00	3.57	11.00	1.28
2.25	2.81	5.25	7.91	8.25	2.81	11.25	1.53
2.50	2.04	5.50	7.91	8.50	2.30	11.50	.77
2.75	3.06	5.75	57.12	8.75	2.81	11.75	1.28
3.00	2.04	6.00	57.63	9.00	2.04	12.00	1.53

CALIB  
 STANDHYD (0104)  
 ID= 1 DT= 5.0 min

Area (ha) = 35.20  
 Total Imp(%) = 65.00 Dir. Conn.(%) = 44.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)	22.88	12.32
Dep. Storage (mm)	.80	1.50
Average Slope (%)	1.90	2.00
Length (m)	484.42	30.00
Mannings n	.013	.250

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

--- TRANSFORMED HYETOGRAPH ---

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
3.083	2.81	6.083	11.48	9.08	2.30		
3.167	2.81	6.167	11.48	9.17	2.30		
3.250	2.81	6.250	11.48	9.25	2.30		
3.333	2.30	6.333	11.48	9.33	2.04		
3.417	2.30	6.417	11.48	9.42	2.04		
3.500	2.30	6.500	11.48	9.50	2.04		
3.583	2.81	6.583	5.10	9.58	1.53		
3.667	2.81	6.667	5.10	9.67	1.53		
3.750	2.81	6.750	5.10	9.75	1.53		
3.833	2.30	6.833	5.10	9.83	2.04		
3.917	2.30	6.917	5.10	9.92	2.04		
4.000	2.30	7.000	5.10	10.00	2.04		
4.083	4.85	7.083	3.57	10.08	1.53		
4.167	4.85	7.167	3.57	10.17	1.53		
4.250	4.85	7.250	3.57	10.25	1.53		
4.333	4.34	7.333	3.57	10.33	.77		
4.417	4.34	7.417	3.57	10.42	.77		
4.500	4.34	7.500	3.57	10.50	.77		
4.583	4.34	7.583	4.34	10.58	1.53		
4.667	4.34	7.667	4.34	10.67	1.53		
4.750	4.34	7.750	4.34	10.75	1.53		
4.833	4.34	7.833	3.57	10.83	1.28		
4.917	4.34	7.917	3.57	10.92	1.28		
5.000	4.34	8.000	3.57	11.00	1.28		
5.083	7.91	8.083	2.81	11.08	1.53		
5.167	7.91	8.167	2.81	11.17	1.53		
5.250	7.91	8.250	2.81	11.25	1.53		
5.333	7.91	8.333	2.30	11.33	.77		
5.417	7.91	8.417	2.30	11.42	.77		
5.500	7.91	8.500	2.30	11.50	.77		
5.583	57.12	8.583	2.81	11.58	1.28		
5.667	57.12	8.667	2.81	11.67	1.28		
5.750	57.12	8.750	2.81	11.75	1.28		
5.833	57.63	8.833	2.04	11.83	1.53		
5.917	57.63	8.917	2.04	11.92	1.53		
6.000	57.63	9.000	2.04	12.00	1.53		

Max.Eff.Inten.(mm/hr)= 57.63 82.10  
 over (min) = 5.00 15.00  
 Storage Coeff. (min)= 6.77 (ii) 13.20 (ii)  
 Unit Hyd. Tpeak (min)= 5.00 15.00  
 Unit Hyd. peak (cms)= .18 .08

\*TOTALS\*  
 PEAK FLOW (cms) = 2.45 2.25 4.705 (iii)  
 TIME TO PEAK (hrs) = .00 6.00 6.00  
 RUNOFF VOLUME (mm) = 62.95 27.23 42.95  
 TOTAL RAINFALL (mm) = 63.75 63.75 63.75  
 RUNOFF COEFFICIENT = .99 .43 .67

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr) = 50.00 K (1/hr) = 2.00  
 Fc (mm/hr) = 7.50 Cum.Inf. (mm) = .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.



**Stormwater Management Pond 4 Final Report**  
**Andridge Homes, Major Bob Farms Inc. &**  
**Lindstone Developments, Block 12**  
**City of Vaughan**

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READ STORM  
 Ptotal= 55.37 mm

Filename: W:\2600's\2644 - Block 12 Core Services\  
 OTTHYMO\Don River SCS Storms\scs12h5.stm  
 Comments: This 5-year, 12-hour Storm created from

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.25	1.33	3.25	2.44	6.25	9.97	9.25	1.99
.50	1.11	3.50	1.99	6.50	9.97	9.50	1.77
.75	.66	3.75	2.44	6.75	4.43	9.75	1.33
1.00	1.33	4.00	1.99	7.00	4.43	10.00	1.77
1.25	1.11	4.25	4.21	7.25	3.10	10.25	1.33
1.50	1.33	4.50	3.77	7.50	3.10	10.50	.66
1.75	.66	4.75	4.75	7.75	3.77	10.75	1.33
2.00	1.33	5.00	3.77	8.00	3.10	11.00	1.11
2.25	2.44	5.25	6.87	8.25	2.44	11.25	1.33
2.50	1.77	5.50	6.87	8.50	1.99	11.50	.66
2.75	2.66	5.75	49.61	8.75	2.44	11.75	1.11
3.00	1.77	6.00	50.06	9.00	1.77	12.00	1.33

1.833	1.33	4.833	3.77	7.833	3.10	10.83	1.11
1.917	1.33	4.917	3.77	7.917	3.10	10.92	1.11
2.000	1.33	5.000	3.77	8.000	3.10	11.00	1.11
2.083	2.44	5.083	6.87	8.083	2.44	11.08	1.33
2.167	2.44	5.167	6.87	8.167	2.44	11.17	1.33
2.250	2.44	5.250	6.87	8.250	2.44	11.25	1.33
2.333	1.77	5.333	6.87	8.333	1.99	11.33	.66
2.417	1.77	5.417	6.87	8.417	1.99	11.42	.66
2.500	1.77	5.500	6.87	8.500	1.99	11.50	.66
2.583	2.66	5.583	49.61	8.583	2.44	11.58	1.11
2.667	2.66	5.667	49.61	8.667	2.44	11.67	1.11
2.750	2.66	5.750	49.61	8.750	2.44	11.75	1.11
2.833	1.77	5.833	50.06	8.833	1.77	11.83	1.33
2.917	1.77	5.917	50.06	8.917	1.77	11.92	1.33
3.000	1.77	6.000	50.06	9.000	1.77	12.00	1.33

Max.Eff.Inten.(mm/hr)= 50.06 50.17  
 over (min) 5.00 15.00  
 Storage Coeff. (min)= 5.26 (ii) 13.09 (ii)  
 Unit Hyd. Tpeak (min)= 5.00 15.00  
 Unit Hyd. peak (cms)= .21 .08

\*TOTALS\*

PEAK FLOW (cms)= .31 .86 1.170 (iii)  
 TIME TO PEAK (hrs)= .00 6.00 6.00  
 RUNOFF VOLUME (mm)= 54.57 17.88 24.49  
 TOTAL RAINFALL (mm)= 55.37 55.37 55.37  
 RUNOFF COEFFICIENT = .99 .32 .44

CALIB  
 STANDHYD (1041)  
 ID= 1 DT= 5.0 min

Area (ha)= 12.60  
 Total Imp(%)= 36.00 Dir. Conn.(%)= 18.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.54	8.06
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	289.80	30.00
Mannings n =	.013	.250

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

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

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

--- TRANSFORMED HYETOGRAPH ---

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.083	1.33	3.083	2.44	6.083	9.97	9.08	1.99
.167	1.33	3.167	2.44	6.167	9.97	9.17	1.99
.250	1.33	3.250	2.44	6.250	9.97	9.25	1.99
.333	1.11	3.333	1.99	6.333	9.97	9.33	1.77
.417	1.11	3.417	1.99	6.417	9.97	9.42	1.77
.500	1.11	3.500	1.99	6.500	9.97	9.50	1.77
.583	.66	3.583	2.44	6.583	4.43	9.58	1.33
.667	.66	3.667	2.44	6.667	4.43	9.67	1.33
.750	.66	3.750	2.44	6.750	4.43	9.75	1.33
.833	1.33	3.833	1.99	6.833	4.43	9.83	1.77
.917	1.33	3.917	1.99	6.917	4.43	9.92	1.77
1.000	1.33	4.000	1.99	7.000	4.43	10.00	1.77
1.083	1.11	4.083	4.21	7.083	3.10	10.08	1.33
1.167	1.11	4.167	4.21	7.167	3.10	10.17	1.33
1.250	1.11	4.250	4.21	7.250	3.10	10.25	1.33
1.333	1.33	4.333	3.77	7.333	3.10	10.33	.66
1.417	1.33	4.417	3.77	7.417	3.10	10.42	.66
1.500	1.33	4.500	3.77	7.500	3.10	10.50	.66
1.583	.66	4.583	3.77	7.583	3.77	10.58	1.33
1.667	.66	4.667	3.77	7.667	3.77	10.67	1.33
1.750	.66	4.750	3.77	7.750	3.77	10.75	1.33

CALIB  
 STANDHYD (1042)  
 ID= 1 DT= 5.0 min

Area (ha)= 1.50  
 Total Imp(%)= 79.00 Dir. Conn.(%)= 79.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.19	.31
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	100.00	30.00
Mannings n =	.013	.250

Max.Eff.Inten.(mm/hr)= 50.06 76.45  
 over (min) 5.00 10.00  
 Storage Coeff. (min)= 2.78 (ii) 7.39 (ii)  
 Unit Hyd. Tpeak (min)= 5.00 10.00  
 Unit Hyd. peak (cms)= .28 .13

\*TOTALS\*

PEAK FLOW (cms)= .16 .03 .191 (iii)  
 TIME TO PEAK (hrs)= .00 6.00 6.00  
 RUNOFF VOLUME (mm)= 54.57 13.26 45.90  
 TOTAL RAINFALL (mm)= 55.37 55.37 55.37  
 RUNOFF COEFFICIENT = .99 .24 .83



**Stormwater Management Pond 4 Final Report**  
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**City of Vaughan**

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.750	.89	3.750	3.27	6.750	5.95	9.75	1.79	1.25	1.11	4.25	4.21	7.25	3.10	10.25	1.33
.833	1.79	3.833	2.68	6.833	5.95	9.83	2.38	1.50	1.33	4.50	3.77	7.50	3.10	10.50	.66
.917	1.79	3.917	2.68	6.917	5.95	9.92	2.38	1.75	.66	4.75	3.77	7.75	3.77	10.75	1.33
1.000	1.79	4.000	2.68	7.000	5.95	10.00	2.38	2.00	1.33	5.00	3.77	8.00	3.10	11.00	1.11
1.083	1.49	4.083	5.66	7.083	4.17	10.08	1.79	2.25	2.44	5.25	6.87	8.25	2.44	11.25	1.33
1.167	1.49	4.167	5.66	7.167	4.17	10.17	1.79	2.50	1.77	5.50	6.87	8.50	1.99	11.50	.66
1.250	1.49	4.250	5.66	7.250	4.17	10.25	1.79	2.75	2.66	5.75	49.61	8.75	2.44	11.75	1.11
1.333	1.79	4.333	5.06	7.333	4.17	10.33	.89	3.00	1.77	6.00	50.06	9.00	1.77	12.00	1.33
1.417	1.79	4.417	5.06	7.417	4.17	10.42	.89								
1.500	1.79	4.500	5.06	7.500	4.17	10.50	.89								
1.583	.89	4.583	5.06	7.583	5.06	10.58	1.79								
1.667	.89	4.667	5.06	7.667	5.06	10.67	1.79								
1.750	.89	4.750	5.06	7.750	5.06	10.75	1.79								
1.833	1.79	4.833	5.06	7.833	4.17	10.83	1.49								
1.917	1.79	4.917	5.06	7.917	4.17	10.92	1.49								
2.000	1.79	5.000	5.06	8.000	4.17	11.00	1.49								
2.083	3.27	5.083	9.23	8.083	3.27	11.08	1.79								
2.167	3.27	5.167	9.23	8.167	3.27	11.17	1.79								
2.250	3.27	5.250	9.23	8.250	3.27	11.25	1.79								
2.333	2.38	5.333	9.23	8.333	2.68	11.33	.89								
2.417	2.38	5.417	9.23	8.417	2.68	11.42	.89								
2.500	2.38	5.500	9.23	8.500	2.68	11.50	.89								
2.583	3.57	5.583	66.68	8.583	3.27	11.58	1.49								
2.667	3.57	5.667	66.68	8.667	3.27	11.67	1.49								
2.750	3.57	5.750	66.68	8.750	3.27	11.75	1.49								
2.833	2.38	5.833	67.28	8.833	2.38	11.83	1.79								
2.917	2.38	5.917	67.28	8.917	2.38	11.92	1.79								
3.000	2.38	6.000	67.28	9.000	2.38	12.00	1.79								

-----  
 CALIB  
 STANDHYD (1041) Area (ha)= 12.60  
 ID= 1 DT= 5.0 min Total Imp(%)= 36.00 Dir. Conn.(%)= 18.00

IMPERVIOUS PERVIOUS (i)  
 Surface Area (ha)= 4.54 8.06  
 Dep. Storage (mm)= .80 1.50  
 Average Slope (%)= 1.90 2.00  
 Length (m)= 289.80 30.00  
 Mannings n = .013 .250

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

Max.Eff.Inten. (mm/hr)=	67.28	98.67	
over (min)	5.00	15.00	
Storage Coeff. (min)=	6.36 (ii)	12.33 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	.18	.08	
			*TOTALS*
PEAK FLOW (cms)=	2.87	2.83	5.697 (iii)
TIME TO PEAK (hrs)=	.00	6.00	6.00
RUNOFF VOLUME (mm)=	73.62	34.71	51.83
TOTAL RAINFALL (mm)=	74.42	74.42	74.42
RUNOFF COEFFICIENT =	.99	.47	.70

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (l/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 READ STORM  
 Ptotal= 55.37 mm  
 Filename: W:\2600's\2644 - Block 12 Core Services\OTTHYMO\Don River SCS Storms\scs12h5.stm  
 Comments: This 5-year, 12-hour Storm created from

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.25	1.33	3.25	2.44	6.25	9.97	9.25	1.99
.50	1.11	3.50	1.99	6.50	9.97	9.50	1.77
.75	.66	3.75	2.44	6.75	4.43	9.75	1.33
1.00	1.33	4.00	1.99	7.00	4.43	10.00	1.77

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.083	1.33	3.083	2.44	6.083	9.97	9.08	1.99
.167	1.33	3.167	2.44	6.167	9.97	9.17	1.99
.250	1.33	3.250	2.44	6.250	9.97	9.25	1.99
.333	1.11	3.333	1.99	6.333	9.97	9.33	1.77
.417	1.11	3.417	1.99	6.417	9.97	9.42	1.77
.500	1.11	3.500	1.99	6.500	9.97	9.50	1.77
.583	.66	3.583	2.44	6.583	4.43	9.58	1.33
.667	.66	3.667	2.44	6.667	4.43	9.67	1.33
.750	.66	3.750	2.44	6.750	4.43	9.75	1.33
.833	1.33	3.833	1.99	6.833	4.43	9.83	1.77
.917	1.33	3.917	1.99	6.917	4.43	9.92	1.77
1.000	1.33	4.000	1.99	7.000	4.43	10.00	1.77
1.083	1.11	4.083	4.21	7.083	3.10	10.08	1.33
1.167	1.11	4.167	4.21	7.167	3.10	10.17	1.33
1.250	1.11	4.250	4.21	7.250	3.10	10.25	1.33
1.333	1.33	4.333	3.77	7.333	3.10	10.33	.66
1.417	1.33	4.417	3.77	7.417	3.10	10.42	.66
1.500	1.33	4.500	3.77	7.500	3.10	10.50	.66
1.583	.66	4.583	3.77	7.583	3.77	10.58	1.33
1.667	.66	4.667	3.77	7.667	3.77	10.67	1.33
1.750	.66	4.750	3.77	7.750	3.77	10.75	1.33
1.833	1.33	4.833	3.77	7.833	3.10	10.83	1.11
1.917	1.33	4.917	3.77	7.917	3.10	10.92	1.11
2.000	1.33	5.000	3.77	8.000	3.10	11.00	1.11
2.083	2.44	5.083	6.87	8.083	2.44	11.08	1.33
2.167	2.44	5.167	6.87	8.167	2.44	11.17	1.33
2.250	2.44	5.250	6.87	8.250	2.44	11.25	1.33
2.333	1.77	5.333	6.87	8.333	1.99	11.33	.66
2.417	1.77	5.417	6.87	8.417	1.99	11.42	.66
2.500	1.77	5.500	6.87	8.500	1.99	11.50	.66
2.583	2.66	5.583	49.61	8.583	2.44	11.58	1.11
2.667	2.66	5.667	49.61	8.667	2.44	11.67	1.11
2.750	2.66	5.750	49.61	8.750	2.44	11.75	1.11

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2.833	1.77	5.833	50.06	8.833	1.77	11.83	1.33
2.917	1.77	5.917	50.06	8.917	1.77	11.92	1.33
3.000	1.77	6.000	50.06	9.000	1.77	12.00	1.33

Max.Eff.Inten. (mm/hr)=	50.06	50.17
over (min)	5.00	15.00
Storage Coeff. (min)=	5.26 (ii)	13.09 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	.21	.08

PEAK FLOW (cms)=	.31	.86	1.170 (iii)
TIME TO PEAK (hrs)=	.00	6.00	6.00
RUNOFF VOLUME (mm)=	54.57	17.88	24.49
TOTAL RAINFALL (mm)=	55.37	55.37	55.37
RUNOFF COEFFICIENT =	.99	.32	.44

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

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB			
STANDHYD (1042)	Area (ha)= 1.50		
ID= 1 DT= 5.0 min	Total Imp(%)= 79.00	Dir. Conn.(%)= 79.00	

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	1.19	.31
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	100.00	30.00
Mannings n =	.013	.250

Max.Eff.Inten. (mm/hr)=	50.06	76.45
over (min)	5.00	10.00
Storage Coeff. (min)=	2.78 (ii)	7.39 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	.28	.13

PEAK FLOW (cms)=	.16	.03	.191 (iii)
TIME TO PEAK (hrs)=	.00	6.00	6.00
RUNOFF VOLUME (mm)=	54.57	13.26	45.90
TOTAL RAINFALL (mm)=	55.37	55.37	55.37
RUNOFF COEFFICIENT =	.99	.24	.83

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (1064)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (1041):	12.60	1.170	6.00	24.49
+ ID2= 2 (1042):	1.50	.191	6.00	45.90
ID = 3 (1064):	14.10	1.361	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

DUHYD (1063)				
Inlet Cap.=1.361				
Nof Inlets= 1				
Total (cms)= 1.4	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
TOTAL HYD. (ID= 1):	14.10	1.36	6.00	26.76
MAJOR SYS. (ID= 2):	.00	.00	6.00	26.76
MINOR SYS. (ID= 3):	14.10	1.36	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0161)				
1 + 2 = 3	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0104):	35.20	5.697	6.00	51.83
+ ID2= 2 (1063):	14.10	1.361	6.00	26.76
ID = 3 (0161):	49.30	7.058	6.00	44.66

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0004)				
IN= 2----> OUT= 1				
DT= 1.0 min	OUTFLOW (cms)	STORAGE (ha.m.)	OUTFLOW (cms)	STORAGE (ha.m.)
	.0000	.0000	.2190	1.6639
	.0110	.7675	.3660	1.9460
	.1820	1.1064	.3840	2.1434
	.2030	1.4100	.3850	2.1575

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
INFLOW : ID= 2 (0161)	49.30	7.06	6.00	44.66
OUTFLOW: ID= 1 (0004)	49.30	.32	7.18	28.97

PEAK FLOW REDUCTION [Qout/Qin] (%)= 4.49  
 TIME SHIFT OF PEAK FLOW (min)= 71.00  
 MAXIMUM STORAGE USED (ha.m.)= 1.8516

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

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**Andridge Homes Major Bob Farms Inc. &**  
**Lindstone Developments, Block 12**  
**City of Vaughan**

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-----  
 READ STORM  
 Ptotal= 80.61 mm  
 Filename: W:\2600's\2644 - Block 12 Core Services\  
 OTTHYMO\Don River SCS Storms\scs12h50.stm  
 Comments: 50-YearSCSTypeI12HourStorm

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.25	.81	3.25	3.23	6.25	43.63	9.25	3.23
.50	1.62	3.50	3.23	6.50	14.54	9.50	3.23
.75	1.62	3.75	3.23	6.75	10.50	9.75	2.42
1.00	1.62	4.00	3.23	7.00	6.46	10.00	1.62
1.25	1.62	4.25	4.04	7.25	5.66	10.25	1.62
1.50	1.62	4.50	4.85	7.50	4.85	10.50	1.62
1.75	1.62	4.75	5.66	7.75	4.85	10.75	1.62
2.00	1.62	5.00	6.46	8.00	4.85	11.00	1.62
2.25	2.42	5.25	8.08	8.25	4.04	11.25	1.62
2.50	3.23	5.50	9.70	8.50	3.23	11.50	1.62
2.75	3.23	5.75	41.21	8.75	3.23	11.75	1.62
3.00	3.23	6.00	72.72	9.00	3.23	12.00	1.62

1.750	1.62	4.750	5.66	7.750	4.85	10.75	1.62
1.833	1.62	4.833	6.46	7.833	4.85	10.83	1.62
1.917	1.62	4.917	6.46	7.917	4.85	10.92	1.62
2.000	1.62	5.000	6.46	8.000	4.85	11.00	1.62
2.083	2.42	5.083	8.08	8.083	4.04	11.08	1.62
2.167	2.42	5.167	8.08	8.167	4.04	11.17	1.62
2.250	2.42	5.250	8.08	8.250	4.04	11.25	1.62
2.333	3.23	5.333	9.70	8.333	3.23	11.33	1.62
2.417	3.23	5.417	9.70	8.417	3.23	11.42	1.62
2.500	3.23	5.500	9.70	8.500	3.23	11.50	1.62
2.583	3.23	5.583	41.21	8.583	3.23	11.58	1.62
2.667	3.23	5.667	41.21	8.667	3.23	11.67	1.62
2.750	3.23	5.750	41.21	8.750	3.23	11.75	1.62
2.833	3.23	5.833	72.72	8.833	3.23	11.83	1.62
2.917	3.23	5.917	72.72	8.917	3.23	11.92	1.62
3.000	3.23	6.000	72.72	9.000	3.23	12.00	1.62

Max.Eff.Inten.(mm/hr)= 72.72 107.47  
 over (min) 5.00 15.00  
 Storage Coeff. (min)= 6.17 (ii) 11.94 (ii)  
 Unit Hyd. Tpeak (min)= 5.00 15.00  
 Unit Hyd. peak (cms)= .19 .09

-----  
 \*TOTALS\*  
 PEAK FLOW (cms)= 3.00 2.79 5.528 (iii)  
 TIME TO PEAK (hrs)= .00 6.08 6.00  
 RUNOFF VOLUME (mm)= 79.81 39.29 57.12  
 TOTAL RAINFALL (mm)= 80.61 80.61 80.61  
 RUNOFF COEFFICIENT = .99 .49 .71

-----  
 CALIB  
 STANDHYD (0104)  
 ID= 1 DT= 5.0 min  
 Area (ha)= 35.20  
 Total Imp(%)= 65.00 Dir. Conn.(%)= 44.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	22.88	12.32
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	484.42	30.00
Mannings n =	.013	.250

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00  
 (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL  
 THAN THE STORAGE COEFFICIENT.  
 (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.083	.81	3.083	3.23	6.083	43.63	9.08	3.23
.167	.81	3.167	3.23	6.167	43.63	9.17	3.23
.250	.81	3.250	3.23	6.250	43.63	9.25	3.23
.333	1.62	3.333	3.23	6.333	14.54	9.33	3.23
.417	1.62	3.417	3.23	6.417	14.54	9.42	3.23
.500	1.62	3.500	3.23	6.500	14.54	9.50	3.23
.583	1.62	3.583	3.23	6.583	10.50	9.58	2.42
.667	1.62	3.667	3.23	6.667	10.50	9.67	2.42
.750	1.62	3.750	3.23	6.750	10.50	9.75	2.42
.833	1.62	3.833	3.23	6.833	6.46	9.83	1.62
.917	1.62	3.917	3.23	6.917	6.46	9.92	1.62
1.000	1.62	4.000	3.23	7.000	6.46	10.00	1.62
1.083	1.62	4.083	4.04	7.083	5.66	10.08	1.62
1.167	1.62	4.167	4.04	7.167	5.66	10.17	1.62
1.250	1.62	4.250	4.04	7.250	5.66	10.25	1.62
1.333	1.62	4.333	4.85	7.333	4.85	10.33	1.62
1.417	1.62	4.417	4.85	7.417	4.85	10.42	1.62
1.500	1.62	4.500	4.85	7.500	4.85	10.50	1.62
1.583	1.62	4.583	5.66	7.583	4.85	10.58	1.62
1.667	1.62	4.667	5.66	7.667	4.85	10.67	1.62

-----  
 READ STORM  
 Ptotal= 55.37 mm  
 Filename: W:\2600's\2644 - Block 12 Core Services\  
 OTTHYMO\Don River SCS Storms\scs12h5.stm  
 Comments: This 5-year, 12-hour Storm created from

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.25	1.33	3.25	2.44	6.25	9.97	9.25	1.99
.50	1.11	3.50	1.99	6.50	9.97	9.50	1.77
.75	.66	3.75	2.44	6.75	4.43	9.75	1.33
1.00	1.33	4.00	1.99	7.00	4.43	10.00	1.77
1.25	1.11	4.25	4.21	7.25	3.10	10.25	1.33
1.50	1.33	4.50	3.77	7.50	3.10	10.50	.66
1.75	.66	4.75	3.77	7.75	3.77	10.75	1.33
2.00	1.33	5.00	3.77	8.00	3.10	11.00	1.11
2.25	2.44	5.25	6.87	8.25	2.44	11.25	1.33
2.50	1.77	5.50	6.87	8.50	1.99	11.50	.66
2.75	2.66	5.75	49.61	8.75	2.44	11.75	1.11
3.00	1.77	6.00	50.06	9.00	1.77	12.00	1.33

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 Lindstone Developments, Block 12  
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CALIB  
 STANDHYD (1041) | Area (ha)= 12.60  
 ID= 1 DT= 5.0 min | Total Imp(%)= 36.00 Dir. Conn.(%)= 18.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	4.54	0.06
Dep. Storage	(mm)=	.80	1.50
Average Slope	(%)=	1.90	2.00
Length	(m)=	289.80	30.00
Mannings n	=	.013	.250

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

--- TRANSFORMED HYETOGRAPH ---

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.083	1.33	3.083	2.44	6.083	9.97	9.08	1.99
.167	1.33	3.167	2.44	6.167	9.97	9.17	1.99
.250	1.33	3.250	2.44	6.250	9.97	9.25	1.99
.333	1.11	3.333	1.99	6.333	9.97	9.33	1.77
.417	1.11	3.417	1.99	6.417	9.97	9.42	1.77
.500	1.11	3.500	1.99	6.500	9.97	9.50	1.77
.583	.66	3.583	2.44	6.583	4.43	9.58	1.33
.667	.66	3.667	2.44	6.667	4.43	9.67	1.33
.750	.66	3.750	2.44	6.750	4.43	9.75	1.33
.833	1.33	3.833	1.99	6.833	4.43	9.83	1.77
.917	1.33	3.917	1.99	6.917	4.43	9.92	1.77
1.000	1.33	4.000	1.99	7.000	4.43	10.00	1.77
1.083	1.11	4.083	4.21	7.083	3.10	10.08	1.33
1.167	1.11	4.167	4.21	7.167	3.10	10.17	1.33
1.250	1.11	4.250	4.21	7.250	3.10	10.25	1.33
1.333	1.33	4.333	3.77	7.333	3.10	10.33	.66
1.417	1.33	4.417	3.77	7.417	3.10	10.42	.66
1.500	1.33	4.500	3.77	7.500	3.10	10.50	.66
1.583	.66	4.583	3.77	7.583	3.77	10.58	1.33
1.667	.66	4.667	3.77	7.667	3.77	10.67	1.33
1.750	.66	4.750	3.77	7.750	3.77	10.75	1.33
1.833	1.33	4.833	3.77	7.833	3.10	10.83	1.11
1.917	1.33	4.917	3.77	7.917	3.10	10.92	1.11
2.000	1.33	5.000	3.77	8.000	3.10	11.00	1.11
2.083	2.44	5.083	6.87	8.083	2.44	11.08	1.33
2.167	2.44	5.167	6.87	8.167	2.44	11.17	1.33
2.250	2.44	5.250	6.87	8.250	2.44	11.25	1.33
2.333	1.77	5.333	6.87	8.333	1.99	11.33	.66
2.417	1.77	5.417	6.87	8.417	1.99	11.42	.66
2.500	1.77	5.500	6.87	8.500	1.99	11.50	.66
2.583	2.66	5.583	49.61	8.583	2.44	11.58	1.11
2.667	2.66	5.667	49.61	8.667	2.44	11.67	1.11
2.750	2.66	5.750	49.61	8.750	2.44	11.75	1.11
2.833	1.77	5.833	50.06	8.833	1.77	11.83	1.33
2.917	1.77	5.917	50.06	8.917	1.77	11.92	1.33
3.000	1.77	6.000	50.06	9.000	1.77	12.00	1.33

Max. Eff. Inten. (mm/hr)=	50.06	50.17
over (min)	5.00	15.00
Storage Coeff. (min)=	5.26 (ii)	13.09 (ii)
Unit Hyd. Tpeak (min)=	5.00	15.00
Unit Hyd. peak (cms)=	.21	.08
PEAK FLOW (cms)=	.31	.86
TIME TO PEAK (hrs)=	.00	6.00

\*TOTALS\*  
 1.170 (iii)  
 6.00

RUNOFF VOLUME (mm)=	54.57	17.88	24.49
TOTAL RAINFALL (mm)=	55.37	55.37	55.37
RUNOFF COEFFICIENT =	.99	.32	.44

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

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum. Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

CALIB  
 STANDHYD (1042) | Area (ha)= 1.50  
 ID= 1 DT= 5.0 min | Total Imp(%)= 79.00 Dir. Conn.(%)= 79.00

		IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)=	1.19	.31
Dep. Storage	(mm)=	.80	1.50
Average Slope	(%)=	1.90	2.00
Length	(m)=	100.00	30.00
Mannings n	=	.013	.250

Max. Eff. Inten. (mm/hr)=	50.06	76.45
over (min)	5.00	10.00
Storage Coeff. (min)=	2.78 (ii)	7.39 (ii)
Unit Hyd. Tpeak (min)=	5.00	10.00
Unit Hyd. peak (cms)=	.28	.13

PEAK FLOW (cms)=	.16	.03	.191 (iii)
TIME TO PEAK (hrs)=	.00	6.00	6.00
RUNOFF VOLUME (mm)=	54.57	13.26	45.90
TOTAL RAINFALL (mm)=	55.37	55.37	55.37
RUNOFF COEFFICIENT =	.99	.24	.83

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum. Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (1064)	AREA	OPEAK	TPEAK	R.V.
1 + 2 = 3	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (1041):	12.60	1.170	6.00	24.49
+ ID2= 2 (1042):	1.50	.191	6.00	45.90
ID = 3 (1064):	14.10	1.361	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.



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DUHYD (1063)				
Inlet Cap.=1.361				
#of Inlets= 1				
Total(cms)= 1.4				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
TOTAL HYD. (ID= 1):	14.10	1.36	6.00	26.76
=====				
MAJOR SYS. (ID= 2):	.00	.00	6.00	26.76
MINOR SYS. (ID= 3):	14.10	1.36	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0161)				
1 + 2 = 3				
	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0104):	35.20	5.528	6.00	57.12
+ ID2= 2 (1063):	14.10	1.361	6.00	26.76
=====				
ID = 3 (0161):	49.30	6.889	6.00	48.44

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0004)				
IN= 2---> OUT= 1				
DT= 1.0 min				
	OUTFLOW	STORAGE	OUTFLOW	STORAGE
	(cms)	(ha.m.)	(cms)	(ha.m.)
	.0000	.0000	.2190	1.6639
	.0110	.7675	.3660	1.9460
	.1820	1.1064	.3840	2.1434
	.2030	1.4100	.3850	2.1575
		AREA	QPEAK	TPEAK
		(ha)	(cms)	(hrs)
INFLOW : ID= 2 (0161)		49.30	6.89	6.00
OUTFLOW: ID= 1 (0004)		49.30	.37	7.32

PEAK FLOW REDUCTION (Qout/Qin) (%) = 5.38  
 TIME SHIFT OF PEAK FLOW (min) = 79.00  
 MAXIMUM STORAGE USED (ha.m.) = 1.9945

\*\*\*\*\*  
 \*\* SIMULATION NUMBER: 7 \*\*  
 \*\*\*\*\*

READ STORM	Filename: W:\2600's\2644 - Block 12 Core Services\OTTHYMO\Don River SCS Storms\scs12100.stm
Ptotal= 89.92 mm	Comments: This 100-year, 12-hour Storm created fro

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.25	2.16	3.25	3.96	6.25	16.18	9.25	3.24
.50	1.80	3.50	3.24	6.50	16.18	9.50	2.88
.75	1.08	3.75	3.96	6.75	7.19	9.75	2.16

1.00	2.16	4.00	3.24	7.00	7.19	10.00	2.88
1.25	1.80	4.25	6.83	7.25	5.04	10.25	2.16
1.50	2.16	4.50	6.11	7.50	5.04	10.50	1.08
1.75	1.08	4.75	6.11	7.75	6.11	10.75	2.16
2.00	2.16	5.00	6.11	8.00	5.04	11.00	1.80
2.25	3.96	5.25	11.15	8.25	3.96	11.25	2.16
2.50	2.88	5.50	11.15	8.50	3.24	11.50	1.08
2.75	4.32	5.75	80.56	8.75	3.96	11.75	1.80
3.00	2.88	6.00	81.28	9.00	2.88	12.00	2.16

CALIB		Area (ha)=	35.20
STANDHYD (0104)		Total Imp(%)=	65.00
ID= 1 DT= 5.0 min		Dir. Conn.(%)=	44.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area	(ha)= 22.88	12.32
Dep. Storage	(mm)= .80	1.50
Average Slope	(%)= 1.90	2.00
Length	(m)= 484.42	30.00
Mannings n	= .013	.250

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.083	2.16	3.083	3.96	6.083	16.18	9.08	3.24
.167	2.16	3.167	3.96	6.167	16.18	9.17	3.24
.250	2.16	3.250	3.96	6.250	16.18	9.25	3.24
.333	1.80	3.333	3.24	6.333	16.18	9.33	2.88
.417	1.80	3.417	3.24	6.417	16.18	9.42	2.88
.500	1.80	3.500	3.24	6.500	16.18	9.50	2.88
.583	1.08	3.583	3.96	6.583	7.19	9.58	2.16
.667	1.08	3.667	3.96	6.667	7.19	9.67	2.16
.750	1.08	3.750	3.96	6.750	7.19	9.75	2.16
.833	2.16	3.833	3.24	6.833	7.19	9.83	2.88
.917	2.16	3.917	3.24	6.917	7.19	9.92	2.88
1.000	2.16	4.000	3.24	7.000	7.19	10.00	2.88
1.083	1.80	4.083	6.83	7.083	5.04	10.08	2.16
1.167	1.80	4.167	6.83	7.167	5.04	10.17	2.16
1.250	1.80	4.250	6.83	7.250	5.04	10.25	2.16
1.333	2.16	4.333	6.11	7.333	5.04	10.33	1.08
1.417	2.16	4.417	6.11	7.417	5.04	10.42	1.08
1.500	2.16	4.500	6.11	7.500	5.04	10.50	1.08
1.583	1.08	4.583	6.11	7.583	6.11	10.58	2.16
1.667	1.08	4.667	6.11	7.667	6.11	10.67	2.16
1.750	1.08	4.750	6.11	7.750	6.11	10.75	2.16
1.833	2.16	4.833	6.11	7.833	5.04	10.83	1.80
1.917	2.16	4.917	6.11	7.917	5.04	10.92	1.80
2.000	2.16	5.000	6.11	8.000	5.04	11.00	1.80
2.083	3.96	5.083	11.15	8.083	3.96	11.08	2.16
2.167	3.96	5.167	11.15	8.167	3.96	11.17	2.16
2.250	3.96	5.250	11.15	8.250	3.96	11.25	2.16
2.333	2.88	5.333	11.15	8.333	3.24	11.33	1.08
2.417	2.88	5.417	11.15	8.417	3.24	11.42	1.08
2.500	2.88	5.500	11.15	8.500	3.24	11.50	1.08
2.583	4.32	5.583	80.56	8.583	3.96	11.58	1.80
2.667	4.32	5.667	80.56	8.667	3.96	11.67	1.80

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2.750	4.32	5.750	80.56	8.750	3.96	11.75	1.80
2.833	2.88	5.833	81.28	8.833	2.88	11.83	2.16
2.917	2.88	5.917	81.28	8.917	2.88	11.92	2.16
3.000	2.88	6.000	81.28	9.000	2.88	12.00	2.16

Max. Eff. Inten. (mm/hr)=	81.28	121.80	
over (min)	5.00	15.00	
Storage Coeff. (min)=	5.90 (ii)	11.39 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	.19	.09	
*TOTALS*			
PEAK FLOW (cms)=	3.48	3.64	7.118 (iii)
TIME TO PEAK (hrs)=	.00	6.00	6.00
RUNOFF VOLUME (mm)=	89.12	46.57	65.29
TOTAL RAINFALL (mm)=	89.92	89.92	89.92
RUNOFF COEFFICIENT =	.99	.52	.73

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00      K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50      Cum. Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

-----  
 READ STORM  
 Ptotal= 55.37 mm

Filename: W:\2600's\2644 - Block 12 Core Services\  
 OTHYMO\Don River SCS Storms\scs12h5.stm  
 Comments: This 5-year, 12-hour Storm created from

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.25	1.33	3.25	2.44	6.25	9.97	9.25	1.99
.50	1.11	3.50	1.99	6.50	9.97	9.50	1.77
.75	.66	3.75	2.44	6.75	4.43	9.75	1.33
1.00	1.33	4.00	1.99	7.00	4.43	10.00	1.77
1.25	1.11	4.25	4.21	7.25	3.10	10.25	1.33
1.50	1.33	4.50	3.77	7.50	3.10	10.50	.66
1.75	.66	4.75	3.77	7.75	3.77	10.75	1.33
2.00	1.33	5.00	3.77	8.00	3.10	11.00	1.11
2.25	2.44	5.25	6.87	8.25	2.44	11.25	1.33
2.50	1.77	5.50	6.87	8.50	1.99	11.50	.66
2.75	2.66	5.75	49.61	8.75	2.44	11.75	1.11
3.00	1.77	6.00	50.06	9.00	1.77	12.00	1.33

-----  
 CALIB  
 STANDHYD (1041)  
 ID= 1 DT= 5.0 min

Area (ha)= 12.60  
 Total Imp(%)= 36.00      Dir. Conn.(%)= 18.00

	IMPERVIOUS	PERVIOUS (i)
Surface Area (ha)=	4.54	8.06
Dep. Storage (mm)=	.80	1.50
Average Slope (%)=	1.90	2.00
Length (m)=	289.80	30.00
Mannings n =	.013	.250

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

----- TRANSFORMED HYETOGRAPH -----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
.083	1.33	3.083	2.44	6.083	9.97	9.08	1.99
.167	1.33	3.167	2.44	6.167	9.97	9.17	1.99
.250	1.33	3.250	2.44	6.250	9.97	9.25	1.99
.333	1.11	3.333	1.99	6.333	9.97	9.33	1.77
.417	1.11	3.417	1.99	6.417	9.97	9.42	1.77
.500	1.11	3.500	1.99	6.500	9.97	9.50	1.77
.583	.66	3.583	2.44	6.583	4.43	9.58	1.33
.667	.66	3.667	2.44	6.667	4.43	9.67	1.33
.750	.66	3.750	2.44	6.750	4.43	9.75	1.33
.833	1.33	3.833	1.99	6.833	4.43	9.83	1.77
.917	1.33	3.917	1.99	6.917	4.43	9.92	1.77
1.000	1.33	4.000	1.99	7.000	4.43	10.00	1.77
1.083	1.11	4.083	4.21	7.083	3.10	10.08	1.33
1.167	1.11	4.167	4.21	7.167	3.10	10.17	1.33
1.250	1.11	4.250	4.21	7.250	3.10	10.25	1.33
1.333	1.33	4.333	3.77	7.333	3.10	10.33	.66
1.417	1.33	4.417	3.77	7.417	3.10	10.42	.66
1.500	1.33	4.500	3.77	7.500	3.10	10.50	.66
1.583	.66	4.583	3.77	7.583	3.77	10.58	1.33
1.667	.66	4.667	3.77	7.667	3.77	10.67	1.33
1.750	.66	4.750	3.77	7.750	3.77	10.75	1.33
1.833	1.33	4.833	3.77	7.833	3.10	10.83	1.11
1.917	1.33	4.917	3.77	7.917	3.10	10.92	1.11
2.000	1.33	5.000	3.77	8.000	3.10	11.00	1.11
2.083	2.44	5.083	6.87	8.083	2.44	11.08	1.33
2.167	2.44	5.167	6.87	8.167	2.44	11.17	1.33
2.250	2.44	5.250	6.87	8.250	2.44	11.25	1.33
2.333	1.77	5.333	6.87	8.333	1.99	11.33	.66
2.417	1.77	5.417	6.87	8.417	1.99	11.42	.66
2.500	1.77	5.500	6.87	8.500	1.99	11.50	.66
2.583	2.66	5.583	49.61	8.583	2.44	11.58	1.11
2.667	2.66	5.667	49.61	8.667	2.44	11.67	1.11
2.750	2.66	5.750	49.61	8.750	2.44	11.75	1.11
2.833	1.77	5.833	50.06	8.833	1.77	11.83	1.33
2.917	1.77	5.917	50.06	8.917	1.77	11.92	1.33
3.000	1.77	6.000	50.06	9.000	1.77	12.00	1.33

Max. Eff. Inten. (mm/hr)=	50.06	50.17	
over (min)	5.00	15.00	
Storage Coeff. (min)=	5.26 (ii)	13.09 (ii)	
Unit Hyd. Tpeak (min)=	5.00	15.00	
Unit Hyd. peak (cms)=	.21	.08	

*TOTALS*			
PEAK FLOW (cms)=	.31	.86	1.170 (iii)
TIME TO PEAK (hrs)=	.00	6.00	6.00
RUNOFF VOLUME (mm)=	54.57	17.88	24.49
TOTAL RAINFALL (mm)=	55.37	55.37	55.37
RUNOFF COEFFICIENT =	.99	.32	.44

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

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00      K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50      Cum. Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.

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

CALIB				
STANDHYD (1042)	Area (ha)=	1.50		
ID= 1 DT= 5.0 min	Total Imp(%)=	79.00	Dir. Conn.(%)=	79.00

	IMPERVIOUS	PERVIOUS (i)	
Surface Area (ha)=	1.19	.31	
Dep. Storage (mm)=	.80	1.50	
Average Slope (%)=	1.90	2.00	
Length (m)=	100.00	30.00	
Mannings n =	.013	.250	
Max.Eff.Inten.(mm/hr)=	50.06	76.45	
over (min)	5.00	10.00	
Storage Coeff. (min)=	2.78 (ii)	7.39 (ii)	
Unit Hyd. Tpeak (min)=	5.00	10.00	
Unit Hyd. peak (cms)=	.28	.13	
PEAK FLOW (cms)=	.16	.03	.191 (iii)
TIME TO PEAK (hrs)=	.00	6.00	6.00
RUNOFF VOLUME (mm)=	54.57	13.26	45.90
TOTAL RAINFALL (mm)=	55.37	55.37	55.37
RUNOFF COEFFICIENT =	.99	.24	.83

\*TOTALS\*

\*\*\*\*\* WARNING: STORAGE COEFF. IS SMALLER THAN TIME STEP!

- (i) HORTONS EQUATION SELECTED FOR PERVIOUS LOSSES:  
 Fo (mm/hr)= 50.00 K (1/hr)= 2.00  
 Fc (mm/hr)= 7.50 Cum.Inf. (mm)= .00
- (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL THAN THE STORAGE COEFFICIENT.
- (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

ADD HYD (1064)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (1041):	12.60	1.170	6.00	24.49
+ ID2= 2 (1042):	1.50	.191	6.00	45.90
ID = 3 (1064):	14.10	1.361	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

DUHYD (1063)				
Inlet Cap.=1.361				
#of Inlets= 1				
Total(cms)= 1.4	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
TOTAL HYD. (ID= 1):	14.10	1.36	6.00	26.76
MAJOR SYS. (ID= 2):	.00	.00	6.00	26.76
MINOR SYS. (ID= 3):	14.10	1.36	6.00	26.76

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

ADD HYD (0161)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0104):	35.20	7.118	6.00	65.29
+ ID2= 2 (1063):	14.10	1.361	6.00	26.76
ID = 3 (0161):	49.30	8.479	6.00	54.27

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

RESERVOIR (0004)				
IN= 2---> OUT= 1				
DT= 1.0 min	OUTFLOW	STORAGE	OUTFLOW	STORAGE
	(cms)	(ha.m.)	(cms)	(ha.m.)
	.0000	.0000	.2190	1.6639
	.0110	.7675	.3660	1.9460
	.1820	1.1064	.3840	2.1434
	.2030	1.4100	.3850	2.1575

\*\*\*\* WARNING : STORAGE-DISCHARGE TABLE WAS EXCEEDED.

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
INFLOW : ID= 2 (0161)	49.30	8.48	6.00	54.27
OUTFLOW: ID= 1 (0004)	49.30	.39	7.20	38.25

PEAK FLOW REDUCTION [Qout/Qin] (%) = 4.60  
 TIME SHIFT OF PEAK FLOW (min) = 72.00  
 MAXIMUM STORAGE USED (ha.m.) = 2.2279

FINISH