

APPENDIX C

Design Calculation for Sedimentation Control

STAGE 1 - TOPSOIL STRIPPING**Sediment Trap Table (OPSD 219.220, ESC guidelines by GGHA CAs - Pg. C-40)**Min. 125m³/ha water volume, and to be stabilized by seeding immediately after construction.

Sed. Basin No.	Drainage Area (ha)	Required Volume (m ³)	Bottom Length (m)	Bottom Width (m)	Top Length (m)	Top Width (m)	Side Slope (x:1)	Depth (m)	Provided Volume (m ³)
A-1	0.80	100	18.50	8.50	20.00	10.00	0.5	1.50	268
A-2	0.71	89	18.50	8.50	20.00	10.00	0.5	1.50	268
A-3	1.99	249	18.50	8.50	20.00	10.00	0.5	1.50	268
A-4	1.99	249	19.50	9.00	21.00	10.50	0.5	1.50	297
A-5	0.85	106	20.50	9.50	22.00	11.00	0.5	1.50	328

STAGE 2 - Filling

Sediment Trap Table (OPSD 219.220, ESC guidelines by GGHA CAs - Pg. C-40)

Min. 125m³/ha water volume, and to be stabilized by seeding immediately after construction.

Sed. Basin No.	Drainage Area (ha)	Required Volume (m ³)	Bottom Length (m)	Bottom Width (m)	Top Length (m)	Top Width (m)	Side Slope (x:1)	Depth (m)	Provided Volume (m ³)
B-1	1.85	231	18.50	8.50	20.00	10.00	0.5	1.50	268
B-2	1.12	140	18.50	8.50	20.00	10.00	0.5	1.50	268
B-3	1.60	200	18.50	8.50	20.00	10.00	0.5	1.50	268
B-4	1.70	213	19.50	9.00	21.00	10.50	0.5	1.50	297
B-5	1.99	249	20.50	9.50	22.00	11.00	0.5	1.50	328
B-6	1.15	144	21.50	10.00	23.00	11.50	0.5	1.50	360
B-7	1.22	153	22.50	10.50	24.00	12.00	0.5	1.50	393

Equivalent Slope



Project No.: 5354

Project: 5783 Bloomington Road - Stage 1 Pond 1A

Municipality: Township of Whitchurch-Stouffville

Last Updated: 2025-05-16

Catchment	Number of Divisions of Equal Length	Equal Lengths (m)	Upstream Elevation (mAMSL)	Downstream Elevation (mAMSL)	Slope (m/m)	Slope to the power of -0.5 (m/m)	Sum of Length (m)	Sum of Slope to the power of - 0.5	Watershed Slope, Sw (%)
	1	60.0	331.50	325.23	0.105	3.1	300	37.0	1.8
	2	60.0	325.23	320.62	0.077	3.6			
	3	60.0	320.62	319.87	0.013	8.9			
	4	60.0	319.87	319.26	0.010	9.9			
	5	60.0	319.26	318.80	0.008	11.4			

Notes:

1. The watershed slope is calculated using the Equivalent Slope Method using the Ministry of Transportation (MTO, 1997) Drainage Manual guidelines in Chapter 8 (page 27). The Equalivent Slope Method equation is provided below.

Equivalent Slope Method:

$$S_w = 100 * \left[\frac{n}{\sum (S_n^{-0.5})} \right]^2$$

Where:

S_w is the watershed slope (%);

n is the number of divisions of equal length; and

S_n is the slope of the individual divisions (m/m).

Source: (MTO, 1997)

References:

1. Ministry of Transportation (MTO). 1997. Drainage Management Manual Part 3. Drainage and Hydrology Section. Transportation Engineering Branch. Quality and Standards Division. Government of Ontario.

Runoff Coefficient & Time to Peak



Project No.: 5354

Project: 5783 Bloomington Road - Stage 1 Pond 1A

Municipality: Township of Whitchurch-Stouffville

Last Updated: May 16, 2025

C = 0.6
TIMP = 57%
XIMP = 57%

Time to Peak Calculation:

Area (ha)	NHYD	Overland Flow					Time to Peak
		S (%)	C	L (m)	T _c (min)	T _c (hr)	T _P (hr)
5.69	1	1.827743893	0.6	300	13	0.21	0.14

Note:

S = Catchment Slope (%) (See Drawing No. TA - 6A)

L = Catchment Length (m) (see Drawing No. TA - 6A)

T_c = time of concentration (min)

C = Runoff Coefficient (see Drawing No. TA-6A)

Flow Calculation - Swale Sizing



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Project No.: 5354
Project: 5783 Bloomington Road - Stage 1 Pond 1A
Municipality: Township of Whitchurch-Stouffville
Last Updated: May 16, 2025

IDF

Storm Event	A	B	Tc (min)	C	Intensity (mm/hr)
5 -year	1015.963	5.255	13	0.826	93

5-Year Peak Flows to Proposed Intercepting Swales + 100 flow from External Drainage Area

Swale No.	Area (ha)	Runoff Coefficient	Q (m ³ /s)
1	5.69	0.60	1.453
2		0.60	0.000
3		0.60	0.000
4		0.60	0.000
5		0.60	0.000
Total	5.69	0.60	

0.568 *Note 100 year flow from external drainage area included

Worksheet : Trapezoidal Channel - 1A

Uniform Flow | Gradually Varied Flow | Messages

Solve For: Normal Depth | Friction Method: Manning Formula

Roughness Coefficient: 0.024 Channel Slope: 0.700 % Normal Depth: 0.5 m Left Side Slope: 3.000 H:V Right Side Slope: 3.000 H:V Bottom Width: 0.40 m Discharge: 1.453 m ³ /s	Flow Area: 1.0 m ² Wetted Perimeter: 3.6 m Hydraulic Radius: 0.3 m Top Width: 3.47 m Critical Depth: 0.5 m Critical Slope: 0.929 % Velocity: 1.47 m/s Velocity Head: 0.11 m Specific Energy: 0.62 m Froude Number: 0.876 Flow Type: Subcritical
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Calculation Successful.

Flow Calculation - Emergency Flow



Project No.: 5354
Project: 5783 Bloomington Road - Stage 1 Pond 1A
Municipality: Township of Whitchurch-Stouffville
Last Updated: May 16, 2025

IDF

Storm Event					Intensity (mm/hr)	Modification Factor	Intensity (mm/hr)
	A	B	Tc (min)	c			
100 -year	2051.707	6.23	13	0.86	163	1.25	204

100-Year Peak Flows to Proposed Intercepting Swales + 100 flow from External Drainage Area

	Area (ha)	Runoff Coefficient	Q (m ³ /s)
1	5.69	0.60	2.504
2		0.60	0.000
3		0.60	0.000
4		0.60	0.000
5		0.60	0.000
Total	5.69	0.60	

0.568 *Note 100 year flow from external drainage area included

Sediment Pond Design



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Project No.: 5354
Project: 5783 Bloomington Road - Stage 1 Pond 1A
Municipality: Township of Whitchurch-Stouffville
Last Updated: 2025-05-16

Input		
Total Drainage Area =	5.69	ha
Required Design Parameters		
Permanent Pool Storage =	1053	185 m ³ /ha
	1053	185 m ³ /ha
Drawdown Time =	48	hrs
Average Outflow =	0.006	m ³ /s
Peak Outflow =	0.009	m ³ /s (est. 1.5x avg)
Sediment Pond Elevations		
High Water Elevation =	318.80	m
Invert Elevation =	318.30	m
Depth =	0.5	m

Calculate D Knowing Q & H		Control Manhole Orifice Plate	
Q (m ³ /s) =	0.009	D (mm) =	80
H (m) =	0.50	AREA (m ²) =	0.005
Approximate A (m ²) =	0.0047	COEFF =	0.62
Approximate D (mm) =	77		
A (m ²) =	0.005	GRAVITY =	9.81
D (mm) =	79	K =	1.0

Orifice Calculations				
Total Depth (m)	HEAD (m)	Qp (m ³ /s)	Elevation (m)	
0.000	0.000	0.000	318.30	
0.100	0.060	0.003	318.40	
0.200	0.160	0.006	318.50	
0.300	0.260	0.007	318.60	
0.500	0.460	0.009	318.80	

$$Q_p \text{ (m}^3\text{/s)} = \text{COEF} * \text{AREA} * (2 * \text{GRAVITY} * \text{HEAD} / \text{K})^{0.5}$$

Pond & Orifice Design		
Detention Time =	48 hrs	
Peak Release Rate =	0.0091 m ³ /s	
Invert Elevation of Hole =	318.30 m	
Water Surface Elevation =	318.80 m	
Hickenbottom Hole Size =	25 mm	
Perforated Pipe Diameter =	250 mm	
Orifice Discharge Coefficient =	0.62	
<i>Note* Area of Hickenbottom Holes must be greater than orifice tube reducer area</i>		
Minimum Number of Holes Required =	15	
Recommended =	50	
A _{standpipe} =	0.049	m ²
A _{holes} =	0.025	m ²

Equivalent Slope



Project No.: 5354

Project: 5783 Bloomington Road - Stage 1 Pond 1B

Municipality: Township of Whitchurch-Stouffville

Last Updated: 2025-05-16

Catchment	Number of Divisions of Equal Length	Equal Lengths (m)	Upstream Elevation (mAMSL)	Downstream Elevation (mAMSL)	Slope (m/m)	Slope to the power of -0.5 (m/m)	Sum of Length (m)	Sum of Slope to the power of - 0.5	Watershed Slope, Sw (%)
	1	73.6	326.00	322.70	0.045	4.7	368	36.7	1.9
	2	73.6	322.70	321.08	0.022	6.7			
	3	73.6	321.08	319.40	0.023	6.6			
	4	73.6	319.40	318.60	0.011	9.6			
	5	73.6	318.60	317.70	0.012	9.0			

Notes:

1. The watershed slope is calculated using the Equivalent Slope Method using the Ministry of Transportation (MTO, 1997) Drainage Manual guidelines in Chapter 8 (page 27). The Equivalent Slope Method equation is provided below.

Equivalent Slope Method:

$$S_w = 100 * \left[\frac{n}{\sum (S_n^{-0.5})} \right]^2$$

Where:

S_w is the watershed slope (%);

n is the number of divisions of equal length; and

S_n is the slope of the individual divisions (m/m).

Source: (MTO, 1997)

References:

1. Ministry of Transportation (MTO). 1997. Drainage Management Manual Part 3. Drainage and Hydrology Section. Transportation Engineering Branch. Quality and Standards Division. Government of Ontario.

Runoff Coefficient & Time to Peak



Project No.: 5354

Project: 5783 Bloomington Road - Stage 1 Pond 1B

Municipality: Township of Whitchurch-Stouffville

Last Updated: May 16, 2025

C = 0.6
TIMP = 57%
XIMP = 57%

Time to Peak Calculation:

Area (ha)	NHYD	Overland Flow					Time to Peak
		S (%)	C	L (m)	T _c (min)	T _c (hr)	T _P (hr)
5.02	1	1.9	0.6	368	16	0.26	0.18

Note:

S = Catchment Slope (%) (See Drawing No. TA - 6A)

L = Catchment Length (m) (see Drawing No. TA - 6A)

T_c = time of concentration (min)

C = Runoff Coefficient (see Drawing No. TA-6A)

Flow Calculation - Swale Sizing



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Project No.: 5354

Project: 5783 Bloomington Road - Stage 1 Pond 1B

Municipality: Township of Whitchurch-Stouffville

Last Updated: May 16, 2025

IDF

Storm Event					Intensity (mm/hr)
	A	B	Tc (min)	c	
5 -year	1015.963	5.255	16	0.826	82

5-Year Peak Flows to Proposed Intercepting Swales

Swale No.	Area (ha)	Runoff Coefficient	Q (m ³ /s)
1	5.02	0.60	0.687
2		0.60	0.000
3		0.60	0.000
4		0.60	0.000
5		0.60	0.000
Total	5.02	0.60	

Worksheet: Trapezoidal Channel - 1B

Uniform Flow | Gradually Varied Flow | Messages

Solve For: Normal Depth | Friction Method: Manning Formula

Roughness Coefficient: 0.024	Flow Area: 0.4 m ²
Channel Slope: 2.200 %	Wetted Perimeter: 2.2 m
Normal Depth: 0.3 m	Hydraulic Radius: 0.2 m
Left Side Slope: 3.000 H:V	Top Width: 2.14 m
Right Side Slope: 3.000 H:V	Critical Depth: 0.3 m
Bottom Width: 0.40 m	Critical Slope: 1.025 %
Discharge: 0.687 m ³ /s	Velocity: 1.86 m/s
	Velocity Head: 0.18 m
	Specific Energy: 0.47 m
	Froude Number: 1.431
	Flow Type: Supercritical

Calculation Successful.

Flow Calculation - Emergency Spillway



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Project No.: 5354

Project: 5783 Bloomington Road - Stage 1 Pond 1B

Municipality: Township of Whitchurch-Stouffville

Last Updated: May 16, 2025

IDF

Storm Event					Intensity (mm/hr)	Modification Factor	Intensity (mm/hr)
	A	B	Tc (min)	c			
100 -year	2051.707	6.23	16	0.86	144	1.25	180

100-Year Peak Flows to Proposed Intercepting Swales

	Area (ha)	Runoff Coefficient	Q (m ³ /s)
1	5.02	0.60	1.503
2		0.60	0.000
3		0.60	0.000
4		0.60	0.000
5		0.60	0.000
Total	5.02	0.60	

Sediment Pond Design



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Project No.: 5354

Project: 5783 Bloomington Road - Stage 1 Pond 1B

Municipality: Township of Whitchurch-Stouffville

Last Updated: 2025-05-16

Input		
Total Drainage Area =	5.02	ha
Required Design Parameters		
Permanent Pool Storage =	929	185 m ³ /ha
Active Storage =	929	185 m ³ /ha
Drawdown Time =	48	hrs
Average Outflow =	0.005	m ³ /s
Peak Outflow =	0.008	m ³ /s (est. 1.5x avg)
Sediment Pond Elevations		
High Water Elevation =	318.60	m
Invert Elevation =	318.10	m
Depth =	0.5	m

Calculate D Knowing Q & H	Control Manhole Orifice Plate
Q (m ³ /s) = 0.008	D (mm) = 75
H (m) = 0.50	AREA (m ²) = 0.004
Approximate A (m ²) = 0.0042	COEFF = 0.62
Approximate D (mm) = 73	
A (m ²) = 0.004	GRAVITY = 9.81
D (mm) = 74	K = 1.0

Orifice Calculations				
Total Depth (m)	HEAD (m)	Qp (m ³ /s)	Elevation (m)	
0.000	0.000	0.000	318.10	
0.100	0.063	0.003	318.20	
0.200	0.163	0.005	318.30	
0.300	0.263	0.006	318.40	
0.500	0.463	0.008	318.60	

$$Q_p \text{ (m}^3\text{/s)} = \text{COEF} \cdot \text{AREA} \cdot (2 \cdot \text{GRAVITY} \cdot \text{HEAD} / K)^{0.5}$$

Pond & Orifice Design

Detention Time =	48 hrs
Peak Release Rate =	0.0081 m ³ /s
Invert Elevation of Hole =	318.10 m
Water Surface Elevation =	318.60 m
Hickenbottom Hole Size =	25 mm
Perforated Pipe Diameter =	250 mm
Orifice Discharge Coefficient =	0.62

Note Area of Hickenbottom Holes must be greater than orifice tube reducer area*

Minimum Number of Holes Required =	13
Recommended =	50

A _{standpipe} =	0.049	m ²
A _{holes} =	0.025	m ²

Emergency Spillway



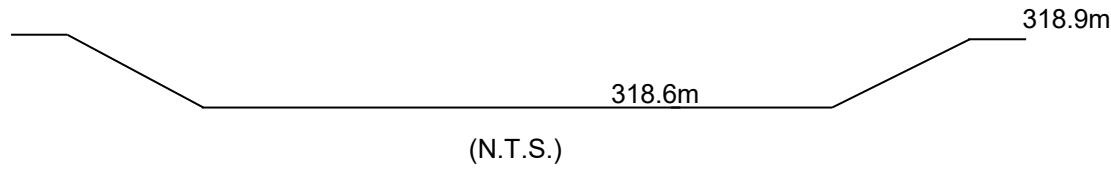
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Project No.: 5354

Project: 5783 Bloomington Road - Stage 1 Pond 1B

Municipality: Township of Whitchurch-Stouffville

Last Updated: May 16, 2025



Weir Parameters

Weir Length (L)	(Longitudinal)	3 m
Crest bottom Length (B)	(Perp. to Flow)	6 m
Crest Elevation		318.60 m
Length of Side Slope		0.1 m
Top of Wier		318.90 m
Side Slope		3.0 :1 (H:V)
Side Slope		33.3%

Weir Calculations ($Q = C_d * b * H^{3/2}$)

Water Elevation	Water Level (H)	H/L	C_d	Q
318.65	0.05	0.017	1.32	0.09
318.70	0.10	0.033	1.46	0.28
318.80	0.20	0.067	1.54	0.870
318.88	0.28	0.094	1.57	1.50
318.90	0.30	0.100	1.57	1.67

Flow over orifice and internal weirs are not counted for Regional Flow modelling

Peak Flow (100yr Uncontrolled) = 1.50 m³/s

Stone Sizing Calculations
ESC Pond Emergency Spillway

Project : 5783 Bloomington Road - Stage 1 Pond 1B
Job No. 5354
Date : May-25

Determine Shear Stress Based on Outflow Velocity

Input:	Proposed Emergency Spillway			
	Bottom Width	=	6.00	m
	Side Slope	=	3.00	mm (H:V)
	Weir Length	=	3.00	m
	Peak Flow	=	1.503	m ³ /s
	Results			
	Flow Depth	=	0.28	m
	Flow Area	=	1.92	m ²
	Wetted Perimeter	=	7.78	m
	Hydraulic Radius, R	=	0.25	m
	Velocity	=	0.78	m/s
Output:	1/R	=	4.04	
	Tractive force, T	=	1.00	kg/m ² (From MTO Design Chart 2.24)

Determine Shear Stress Capacity of Stone Size

Input:	Stone Size, D ₅₀	=	100	mm
Output:	Critical Shear Stress, T _c	=	0.0642 x D50	(MTO, Equation 5.31)
		=	6.42	kg/m ²

Conclusion

O.K. - the critical shear stress capacity of the stone is greater than the tractive force of the flow

Equivalent Slope



Project No.: 5354

Project: 5783 Bloomington Road - Stage 1 Pond 1C

Municipality: Township of Whitchurch-Stouffville

Last Updated: 2025-05-16

Catchment	Number of Divisions of Equal Length	Equal Lengths (m)	Upstream Elevation (mAMSL)	Downstream Elevation (mAMSL)	Slope (m/m)	Slope to the power of -0.5 (m/m)	Sum of Length (m)	Sum of Slope to the power of - 0.5	Watershed Slope, Sw (%)
	1	77.0	327.55	318.80	0.114	3.0	385	35.2	2.0
	2	77.0	318.80	317.65	0.015	8.2			
	3	77.0	317.65	315.85	0.023	6.5			
	4	77.0	315.85	314.85	0.013	8.8			
	5	77.0	314.85	313.85	0.013	8.8			

Notes:

1. The watershed slope is calculated using the Equivalent Slope Method using the Ministry of Transportation (MTO, 1997) Drainage Manual guidelines in Chapter 8 (page 27). The Equivalent Slope Method equation is provided below.

Equivalent Slope Method:

$$S_w = 100 * \left[\frac{n}{\sum (S_n^{-0.5})} \right]^2$$

Where:

S_w is the watershed slope (%);

n is the number of divisions of equal length; and

S_n is the slope of the individual divisions (m/m).

Source: (MTO, 1997)

References:

1. Ministry of Transportation (MTO). 1997. Drainage Management Manual Part 3. Drainage and Hydrology Section. Transportation Engineering Branch. Quality and Standards Division. Government of Ontario.

Runoff Coefficient & Time to Peak



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Project No.: 5354

Project: 5783 Bloomington Road - Stage 1 Pond 1C

Municipality: Township of Whitchurch-Stouffville

Last Updated: May 16, 2025

C = 0.6
TIMP = 57%
XIMP = 57%

Time to Peak Calculation:

Area (ha)	NHYP	Overland Flow					Time to Peak
		S (%)	C	L (m)	T _c (min)	T _c (hr)	T _P (hr)
15.78	1	2.0	0.6	385	14	0.24	0.16

Note:

S = Catchment Slope (%) (See Drawing No. TA - 6A)

L = Catchment Length (m) (see Drawing No. TA - 6A)

T_c = time of concentration (min)

C = Runoff Coefficient (see Drawing No. TA-6A)

Flow Calculation - Swale Sizing



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Project No.: 5354

Project: 5783 Bloomington Road - Stage 1 Pond 1C

Municipality: Township of Whitchurch-Stouffville

Last Updated: May 16, 2025

IDF

Storm Event					Intensity (mm/hr)
	A	B	Tc (min)	C	
5 -year	1015.963	5.255	14	0.826	87

5-Year Peak Flows to Proposed Intercepting Swales

Swale No.	Area (ha)	C	Q (m ³ /s)	*Note 100 year flow from external drainage area included
1	7.00	0.60	1.456	
2	3.00	0.60	7.568	0.447
3		0.60	0.000	7.14
4		0.60	0.000	
5		0.60	0.000	
Total	10.00	0.60		

Worksheet : Trapezoidal Channel - 1C-LEFT

Uniform Flow | Gradually Varied Flow | Messages

Solve For: Normal Depth | Friction Method: Manning Formula

Roughness Coefficient: 0.024	Flow Area: 0.7 m ²
Channel Slope: 2.100 %	Wetted Perimeter: 3.0 m
Normal Depth: 0.4 m	Hydraulic Radius: 0.2 m
Left Side Slope: 3.000 H:V	Top Width: 2.84 m
Right Side Slope: 3.000 H:V	Critical Depth: 0.5 m
Bottom Width: 0.40 m	Critical Slope: 0.929 %
Discharge: 1.456 m ³ /s	Velocity: 2.21 m/s
	Velocity Head: 0.25 m
	Specific Energy: 0.66 m
	Froude Number: 1.466
	Flow Type: Supercritical

Calculation Successful.

Worksheet : Copy of Trapezoidal Channel -1C-RIGHT

Uniform Flow | Gradually Varied Flow | Messages

Solve For: Normal Depth | Friction Method: Manning Formula

Roughness Coefficient: 0.024	Flow Area: 2.9 m ²
Channel Slope: 1.100 %	Wetted Perimeter: 6.2 m
Normal Depth: 0.9 m	Hydraulic Radius: 0.5 m
Left Side Slope: 3.000 H:V	Top Width: 5.94 m
Right Side Slope: 3.000 H:V	Critical Depth: 0.9 m
Bottom Width: 0.80 m	Critical Slope: 0.745 %
Discharge: 7.568 m ³ /s	Velocity: 2.62 m/s
	Velocity Head: 0.35 m
	Specific Energy: 1.21 m
	Froude Number: 1.200
	Flow Type: Supercritical

Calculation Successful.

Flow Calculation - Emergency Flow



Project No.: 5354
Project: 5783 Bloomington Road - Stage 1 Pond 1C
Municipality: Township of Whitchurch-Stouffville
Last Updated: May 16, 2025

IDF

Storm Event					Intensity (mm/hr)	Modification Factor	Intensity (mm/hr)
	A	B	Tc (min)	c			
100-year	2051.707	6.23	14	0.86	151	1.25	189

100-Year Peak Flows to Proposed Intercepting Swales

	Area (ha)	C	Q (m ³ /s)
1	15.78	0.60	12.561
2		0.60	0.000
3		0.60	0.000
4		0.60	0.000
5		0.60	0.000
Total	15.78	0.60	

*Note 100 year flow from external drainage area included
0.447
7.14

Sediment Pond Design



Project No.: 5354
Project: 5783 Bloomington Road - Stage 1 Pond 1C
Municipality: Township of Whitchurch-Stouffville
Last Updated: 2025-05-16

Input		
Total Drainage Area =	15.78	ha
Required Design Parameters		
Permanent Pool Storage =	2919	185 m ³ /ha
	2919	185 m ³ /ha
Drawdown Time =	48	hrs
Average Outflow =	0.017	m ³ /s
Peak Outflow =	0.025	m ³ /s (est. 1.5x avg)
Sediment Pond Elevations		
High Water Elevation =	313.75	m
Invert Elevation =	313.25	m
Depth =	0.5	m

Calculate D Knowing Q & H	Control Manhole Orifice Plate
Q (m ³ /s) = 0.025	D (mm) = 134.0
H (m) = 0.50	AREA (m ²) = 0.014
Approximate A (m ²) = 0.0130	COEFF = 0.62
Approximate D (mm) = 129	
A (m ²) = 0.014	GRAVITY = 9.81
D (mm) = 133	K = 1.0

Orifice Calculations			
Total Depth (m)	HEAD (m)	Qp (m ³ /s)	Elevation (m)
0.000	0.000	0.000	313.25
0.100	0.033	0.007	313.35
0.200	0.133	0.014	313.45
0.300	0.233	0.019	313.55
0.500	0.433	0.025	313.75

$$Q_p \text{ (m}^3\text{/s)} = \text{COEF} * \text{AREA} * (2 * \text{GRAVITY} * \text{HEAD} / \text{K})^{0.5}$$

Pond & Orifice Design		
Detention Time =		48 hrs
Peak Release Rate =		0.0253 m ³ /s
Invert Elevation of Hole =		313.25 m
Water Surface Elevation =		313.75 m
Hickenbottom Hole Size =		25 mm
Perforated Pipe Diameter =		250 mm
Orifice Discharge Coefficient =		0.62
<i>Note* Area of Hickenbottom Holes must be greater than orifice tube reducer area</i>		
Minimum Number of Holes Required =	39	
Recommended =	100	
A _{standpipe} =	0.049	m ²
A _{holes} =	0.049	m ²

Equivalent Slope



Project No.: 5354
Project: 5783 Bloomington Road - Stage 2 Pond 2A
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Catchment	Number of Divisions of Equal Length	Equal Lengths (m)	Upstream Elevation (mAMSL)	Downstream Elevation (mAMSL)	Slope (m/m)	Slope to the power of -0.5 (m/m)	Sum of Length (m)	Sum of Slope to the power of - 0.5	Watershed Slope, Sw (%)
	1	64.6	325.00	322.00	0.046	4.6	323	36.8	1.8
	2	64.6	322.00	320.60	0.022	6.8			
	3	64.6	320.60	319.20	0.022	6.8			
	4	64.6	319.20	318.40	0.012	9.0			
	5	64.6	318.40	317.70	0.011	9.6			

Notes:

1. The watershed slope is calculated using the Equivalent Slope Method using the Ministry of Transportation (MTO, 1997) Drainage Manual guidelines in Chapter 8 (page 27). The Equivalent Slope Method equation is provided below.

Equivalent Slope Method:

$$S_w = 100 * \left[\frac{n}{\sum (S_n^{-0.5})} \right]^2$$

Where:

S_w is the watershed slope (%);
 n is the number of divisions of equal length; and
 S_n is the slope of the individual divisions (m/m).

Source: (MTO, 1997)

References:

1. Ministry of Transportation (MTO). 1997. Drainage Management Manual Part 3. Drainage and Hydrology Section. Transportation Engineering Branch. Quality and Standards Division. Government of Ontario.

Runoff Coefficient & Time to Peak



Project No.: 5354

Project: 5783 Bloomington Road - Stage 2 Pond 2A

Municipality: Township of Whitchurch-Stouffville

Last Updated: May 16, 2025

C = 0.6
TIMP = 57%
XIMP = 57%

Time to Peak Calculation:

Area (ha)	NHYD	Overland Flow					Time to Peak
		S (%)	C	L (m)	T _c (min)	T _c (hr)	T _P (hr)
6.3	1	1.8	0.6	323	14	0.23	0.15

Note:

S = Catchment Slope (%) (See Drawing No. TA - 6A)

L = Catchment Length (m) (see Drawing No. TA - 6A)

T_c = time of concentration (min)

C = Runoff Coefficient (see Drawing No. TA-6A)

Flow Calculation - Swale Sizing



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Project No.: 5354

Project: 5783 Bloomington Road - Stage 2 Pond 2A

Municipality: Township of Whitchurch-Stouffville

Last Updated: May 16, 2025

IDF

Storm Event	A	B	Tc (min)	C	Intensity (mm/hr)
5-year	1015.963	5.255	14	0.826	90

5-Year Peak Flows to Proposed Intercepting Swales + 100 flow from External Drainage Area

Swale No.	Area (ha)	Runoff Coefficient	Q (m ³ /s)
1	6.30	0.60	1.513
2		0.60	0.000
3		0.60	0.000
4		0.60	0.000
5		0.60	0.000
Total	6.30	0.60	

*Note 100 year flow from external drainage area included
0.568

Worksheet : Trapezoidal Channel - 2A

Uniform Flow
Gradually Varied Flow
Messages

Solve For: Normal Depth
Friction Method: Manning Formula

Roughness Coefficient: 0.024	Flow Area: 0.8 m ²
Channel Slope: 1.500 %	Wetted Perimeter: 3.2 m
Normal Depth: 0.4 m	Hydraulic Radius: 0.2 m
Left Side Slope: 3.000 H:V	Top Width: 3.06 m
Right Side Slope: 3.000 H:V	Critical Depth: 0.5 m
Bottom Width: 0.40 m	Critical Slope: 0.924 %
Discharge: 1.513 m ³ /s	Velocity: 1.97 m/s
	Velocity Head: 0.20 m
	Specific Energy: 0.64 m
	Froude Number: 1.255
	Flow Type: Supercritical

i Calculation Successful.

Flow Calculation - Emergency Flow



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Project No.: 5354

Project: 5783 Bloomington Road - Stage 2 Pond 2A

Municipality: Township of Whitchurch-Stouffville

Last Updated: May 16, 2025

IDF

Storm Event					Intensity (mm/hr)	Modification Factor	Intensity (mm/hr)
	A	B	Tc (min)	c			
100-year	2051.707	6.23	14	0.86	158	1.25	197

100-Year Peak Flows to Proposed Intercepting Swales + 100 flow from External Drainage Area

	Area (ha)	Runoff Coefficient	Q (m ³ /s)
1	6.30	0.60	2.636
2		0.60	0.000
3		0.60	0.000
4		0.60	0.000
5		0.60	0.000
Total	6.30	0.60	

*Note 100 year flow from external drainage area included
0.568

Sediment Pond Design



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Project No.: 5354
Project: 5783 Bloomington Road - Stage 2 Pond 2A
Municipality: Township of Whitchurch-Stouffville
Last Updated: 2025-05-16

Input		
Total Drainage Area =	6.30	ha
Required Design Parameters		
Permanent Pool Storage =	1166	185 m ³ /ha
	1166	185 m ³ /ha
Drawdown Time =	48	hrs
Average Outflow =	0.007	m ³ /s
Peak Outflow =	0.010	m ³ /s (est. 1.5x avg)
Sediment Pond Elevations		
High Water Elevation =	323.70	m
Invert Elevation =	323.10	m
Depth =	0.6	m

Calculate D Knowing Q & H	Control Manhole Orifice Plate
Q (m ³ /s) = 0.010	D (mm) = 80
H (m) = 0.60	AREA (m ²) = 0.005
Approximate A (m ²) = 0.0048	COEFF = 0.62
Approximate D (mm) = 78	
A (m ²) = 0.005	GRAVITY = 9.81
D (mm) = 79	K = 1.0

Orifice Calculations				
Total Depth (m)	HEAD (m)	Qp (m ³ /s)	Elevation (m)	
0.000	0.000	0.000	323.10	
0.200	0.160	0.006	323.30	
0.400	0.360	0.008	323.50	
0.500	0.460	0.009	323.60	
0.600	0.560	0.010	323.70	

$$Q_p \text{ (m}^3\text{/s)} = \text{COEF} \times \text{AREA} \times (2 \times \text{GRAVITY} \times \text{HEAD} / K)^{0.5}$$

Pond & Orifice Design

Detention Time = 48 hrs
Peak Release Rate = 0.0101 m³/s
Invert Elevation of Hole = 323.10 m
Water Surface Elevation = 323.70 m
Hickenbottom Hole Size = 25 mm
Perforated Pipe Diameter = 250 mm
Orifice Discharge Coefficient = 0.62

Note Area of Hickenbottom Holes must be greater than orifice tube reducer area*

Minimum Number of Holes Required = 15
Recommended = 75

A_{standpipe} = 0.049 m²
A_{holes} = 0.037 m²

Emergency Spillway



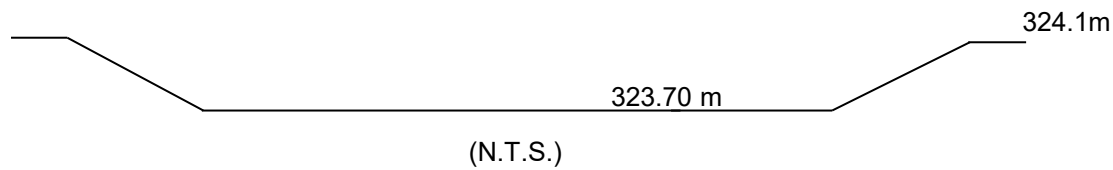
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Project: 5783 Bloomington Road - Stage 2 Pond 2A

Municipality: Township of Whitchurch-Stouffville

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Weir Parameters

Weir Length (L)	(Longitudinal)	3 m
Crest bottom Length (B)	(Perp. to Flow)	5 m
Crest Elevation		323.70 m
Length of Side Slope		0.2 m
Top of Wier		324.20 m
Side Slope		3.0 :1 (H:V)
Side Slope		33.3%

Weir Calculations ($Q = C_d * b * H^{3/2}$)

Water Elevation	Water Level (H)	H/L	C_d	Q
323.75	0.05	0.017	1.32	0.07
324.00	0.30	0.100	1.57	1.41
324.10	0.40	0.133	1.59	2.26
324.14	0.44	0.147	1.60	2.64
324.20	0.50	0.167	1.61	3.26

Flow over orifice and internal weirs are not counted for Regional Flow modelling

Peak Flow (100yr Uncontrolled) = 2.64 m³/s

Stone Sizing Calculations
ESC Pond Emergency Spillway

Project : 5783 Bloomington Road - Stage 2 Pond 2A
Job No. 5354
Date : May-25

Determine Shear Stress Based on Outflow Velocity

Input:	Proposed Emergency Spillway			
	Bottom Width	=	5.00	m
	Side Slope	=	3.00	mm (H:V)
	Weir Length	=	3.00	m
	Peak Flow	=	2.636	m ³ /s
	Results			
	Flow Depth	=	0.44	m
	Flow Area	=	2.78	m ²
	Wetted Perimeter	=	7.78	m
	Hydraulic Radius, R	=	0.36	m
	Velocity	=	0.95	m/s
Output:	1/R	=	2.80	
	Tractive force, T	=	2.00	kg/m ² (From MTO Design Chart 2.24)

Determine Shear Stress Capacity of Stone Size

Input:	Stone Size, D ₅₀	=	100	mm
Output:	Critical Shear Stress, T _c	=	0.0642 x D50	(MTO, Equation 5.31)
		=	6.42	kg/m ²

Conclusion

O.K. - the critical shear stress capacity of the stone is greater than the tractive force of the flow

Equivalent Slope



Project No.: 5354
Project: 5783 Bloomington Road - Stage 2 Pond 3A
Municipality: Township of Whitchurch-Stouffville
Last Updated: 2025-05-16

Catchment	Number of Divisions of Equal Length	Equal Lengths (m)	Upstream Elevation (mAMSL)	Downstream Elevation (mAMSL)	Slope (m/m)	Slope to the power of -0.5 (m/m)	Sum of Length (m)	Sum of Slope to the power of - 0.5	Watershed Slope, Sw (%)
	1	55.2	330.50	329.50	0.018	7.4	276	33.1	2.3
	2	55.2	329.50	328.00	0.027	6.1			
	3	55.2	328.00	326.50	0.027	6.1			
	4	55.2	326.50	325.00	0.027	6.1			
	5	55.2	325.00	324.00	0.018	7.4			

Notes:

1. The watershed slope is calculated using the Equivalent Slope Method using the Ministry of Transportation (MTO, 1997) Drainage Manual guidelines in Chapter 8 (page 27). The Equalivent Slope Method equation is provided below.

Equivalent Slope Method:

$$S_w = 100 * \left[\frac{n}{\sum (S_n^{-0.5})} \right]^2$$

Where:

S_w is the watershed slope (%);
 n is the number of divisions of equal length; and
 S_n is the slope of the individual divisions (m/m).

Source: (MTO, 1997)

References:

1. Ministry of Transportation (MTO). 1997. Drainage Management Manual Part 3. Drainage and Hydrology Section. Transportation Engineering Branch. Quality and Standards Division. Government of Ontario.

Runoff Coefficient & Time to Peak



Project No.: 5354

Project: 5783 Bloomington Road - Stage 2 Pond 3A

Municipality: Township of Whitchurch-Stouffville

Last Updated: May 16, 2025

C = 0.6
TIMP = 57%
XIMP = 57%

Time to Peak Calculation:

Area (ha)	NHYD	Overland Flow					Time to Peak
		S (%)	C	L (m)	T _c (min)	T _c (hr)	T _P (hr)
16.3	1	2.3	0.6	276	10	0.17	0.11

Note:

S = Catchment Slope (%) (See Drawing No. TA - 6A)

L = Catchment Length (m) (see Drawing No. TA - 6A)

T_c = time of concentration (min)

C = Runoff Coefficient (see Drawing No. TA-6A)

Bransby Williams Equations:

*Assumptions: Runoff
Coefficient, C, is greater
than 0.4*

$$t_c = 0.057 * L * S_w^{-0.2} * A^{-0.1}$$

Where:

t_c is the time of
concentration
(minutes);

A is the watershed area
(ha);

L is the watershed
length (m); and

S_w is the watershed
slope (%).

Flow Calculation - Swale Sizing



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Project No.: 5354

Project: 5783 Bloomington Road - Stage 2 Pond 3A

Municipality: Township of Whitchurch-Stouffville

Last Updated: May 16, 2025

IDF

Storm Event					Intensity (mm/hr)
	A	B	Tc (min)	C	
5-year	1015.963	5.255	10	0.826	107

5-Year Peak Flows to Proposed Intercepting Swales

Swale No.	Area (ha)	Runoff Coefficient	Q (m ³ /s)
1	7.00	0.60	1.690
2	3.00	0.60	7.668
3		0.60	0.000
4		0.60	0.000
5		0.60	0.000
Total	10.00	0.60	

*Note 100 year flow from external drainage area included

0.447

7.14

Worksheet : Trapezoidal Channel - 3A_1

Uniform Flow | Gradually Varied Flow | Messages

Solve For: Normal Depth | Friction Method: Manning Formula

Roughness Coefficient: 0.024	Flow Area: 0.9 m ²
Channel Slope: 1.100 %	Wetted Perimeter: 3.5 m
Normal Depth: 0.5 m	Hydraulic Radius: 0.3 m
Left Side Slope: 3.000 H:V	Top Width: 3.38 m
Right Side Slope: 3.000 H:V	Critical Depth: 0.5 m
Bottom Width: 0.40 m	Critical Slope: 0.911 %
Discharge: 1.690 m ³ /s	Velocity: 1.80 m/s
	Velocity Head: 0.17 m
	Specific Energy: 0.66 m
	Froude Number: 1.092
	Flow Type: Supercritical

Calculation Successful.

Worksheet : Trapezoidal Channel - 3A_2

Uniform Flow | Gradually Varied Flow | Messages

Solve For: Normal Depth | Friction Method: Manning Formula

Roughness Coefficient: 0.024	Flow Area: 2.9 m ²
Channel Slope: 1.100 %	Wetted Perimeter: 6.2 m
Normal Depth: 0.9 m	Hydraulic Radius: 0.5 m
Left Side Slope: 3.000 H:V	Top Width: 5.92 m
Right Side Slope: 3.000 H:V	Critical Depth: 1.0 m
Bottom Width: 0.40 m	Critical Slope: 0.746 %
Discharge: 7.668 m ³ /s	Velocity: 2.63 m/s
	Velocity Head: 0.35 m
	Specific Energy: 1.27 m
	Froude Number: 1.200
	Flow Type: Supercritical

Calculation Successful.

Flow Calculation - Emergency Flow



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Project No.: 5354

Project: 5783 Bloomington Road - Stage 2 Pond 3A

Municipality: Township of Whitchurch-Stouffville

Last Updated: May 16, 2025

IDF

Storm Event					Intensity (mm/hr)	Modification Factor	Intensity (mm/hr)
	A	B	Tc (min)	c			
100 year	2051.707	6.23	10	0.86	186	1.25	232

100-Year Peak Flows to Proposed Intercepting Swales

	Area (ha)	Runoff Coefficient	Q (m ³ /s)	*Note 100 year flow from external drainage area included
1	16.30	0.60	13.895	
2		0.60	0.000	
3		0.60	0.000	
4		0.60	0.000	
5		0.60	0.000	
Total	16.30	0.60		

Sediment Pond Design



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Project No.: 5354
Project: 5783 Bloomington Road - Stage 2 Pond 3A
Municipality: Township of Whitchurch-Stouffville
Last Updated: 2025-05-16

Input		
Total Drainage Area =	16.30	ha
Required Design Parameters		
Permanent Pool Storage =	3016	185 m ³ /ha
	3016	185 m ³ /ha
Drawdown Time =	48	hrs
Average Outflow =	0.017	m ³ /s
Peak Outflow =	0.026	m ³ /s (est. 1.5x avg)
Sediment Pond Elevations		
High Water Elevation =	313.75	m
Invert Elevation =	313.25	m
Depth =	0.5	m

Calculate D Knowing Q & H	Control Manhole Orifice Plate
Q (m ³ /s) = 0.026	D (mm) = 135.0
H (m) = 0.50	AREA (m ²) = 0.014
Approximate A (m ²) = 0.0135	COEFF = 0.62
Approximate D (mm) = 131	
A (m ²) = 0.014	GRAVITY = 9.81
D (mm) = 136	K = 1.0

Orifice Calculations				
Total Depth (m)	HEAD (m)	Qp (m ³ /s)	Elevation (m)	
0.000	0.000	0.000	313.25	
0.100	0.033	0.007	313.35	
0.200	0.133	0.014	313.45	
0.300	0.233	0.019	313.55	
0.500	0.433	0.026	313.75	

$$Q_p \text{ (m}^3\text{/s)} = \text{COEF} \times \text{AREA} \times (2 \times \text{GRAVITY} \times \text{HEAD} / K)^{0.5}$$

Pond & Orifice Design

Detention Time = 48 hrs
Peak Release Rate = 0.0262 m³/s
Invert Elevation of Hole = 313.25 m
Water Surface Elevation = 313.75 m
Hickenbottom Hole Size = 25 mm
Perforated Pipe Diameter = 250 mm
Orifice Discharge Coefficient = 0.62

Note Area of Hickenbottom Holes must be greater than orifice tube reducer area*

Minimum Number of Holes Required = 41
Recommended = 100

A_{standpipe} = 0.049 m²
A_{holes} = 0.049 m²

Internal Convince Swale Sizing



Project No.: 5354
Project: 5783 Bloomington Road

IDF

Storm Event	A	B	Tc (min)	c	Intensity (mm/hr)	Modification Factor	Intensity (mm/hr)
100 year	2051.707	6.23	10	0.86	186.742	1.25	233

*Tc=10minutes is used for the internal area peak flow calculation.

100-Year Peak Flows to Proposed Internal convince Swales

Swale No and Type	Side Slope (%)	Slope (%)	Area (Internal) (ha)	Runoff Coefficient (Internal)	Q (Internal) (m³/s)	Q * (External) (m³/s)		Q (Total) (m³/s)	V (m/s)
						From Culvert	From Roadside Ditch		
1 (Triangular)	33	0.4	1.75	0.25	0.284	0.000	0.000	0.28	0.67
2 (Triangular)	33	2	2.00	0.25	0.324	0.106	0.138	0.57	1.45
3a (Trapezoidal)	33	0.9	1.77	0.25	0.287	6.515	0.333	7.14	1.79
3b (Trapezoidal)	33	0.8	9.91	0.25	1.606	0.000	0.000	9.21	1.86
3c (Triangular)	33	2.4	2.00	0.25	0.324	0.078	0.044	0.45	1.46
3d (Trapezoidal)	33	0.9	3.98	0.25	0.645	0.000	0.000	10.30	2.01
3e (Triangular)	33	1.6	2.86	0.25	0.464	0.000	0.000	0.46	1.27

* External flow is from STORMWATER MANAGEMENT MEMORANDUM updated by Schaeffers in April 2025

*External flows from culvert 01 (Region Owned)
*External flows from culvert 03
*Flows from Swale 3a and 3e carry on
*External Flows from culvert 02
*Flows from swale 3b and 3c carry on

Worksheet : Triangular Channel - Swale 1

Uniform Flow | Gradually Varied Flow | Messages

Solve For: Normal Depth Friction Method: Manning Formula

Roughness Coefficient: 0.030

Channel Slope: 0.400 %

Normal Depth: 374.8 mm

Left Side Slope: 33.000 %

Right Side Slope: 33.000 %

Discharge: 284.00 L/s

Flow Area: 0.4 m²

Wetted Perimeter: 2.4 m

Hydraulic Radius: 178.0 mm

Top Width: 2.27 m

Critical Depth: 282.2 mm

Critical Slope: 1.816 %

Velocity: 0.67 m/s

Velocity Head: 0.02 m

Specific Energy: 0.40 m

Froude Number: 0.492

Flow Type: Subcritical

Calculation Successful.

Worksheet : Triangular Channel - Swale 2

Uniform Flow | Gradually Varied Flow | Messages

Solve For: Normal Depth Friction Method: Manning Formula

Roughness Coefficient: 0.030

Channel Slope: 2.000 %

Normal Depth: 359.5 mm

Left Side Slope: 33.000 %

Right Side Slope: 33.000 %

Discharge: 568.00 L/s

Flow Area: 0.4 m²

Wetted Perimeter: 2.3 m

Hydraulic Radius: 170.7 mm

Top Width: 2.18 m

Critical Depth: 372.4 mm

Critical Slope: 1.656 %

Velocity: 1.45 m/s

Velocity Head: 0.11 m

Specific Energy: 0.47 m

Froude Number: 1.093

Flow Type: Supercritical

Calculation Successful.

Worksheet : Trapezoidal Channel - Swale 3a

Uniform Flow | Gradually Varied Flow | Messages

Solve For: Normal Depth Friction Method: Manning Formula

Roughness Coefficient: 0.030

Channel Slope: 0.900 %

Normal Depth: 524.9 mm

Left Side Slope: 33.000 %

Right Side Slope: 33.000 %

Bottom Width: 6.00 m

Discharge: 7,135.00 L/s

Flow Area: 4.0 m²

Wetted Perimeter: 9.3 m

Hydraulic Radius: 426.1 mm

Top Width: 9.18 m

Critical Depth: 481.4 mm

Critical Slope: 1.223 %

Velocity: 1.79 m/s

Velocity Head: 0.16 m

Specific Energy: 0.69 m

Froude Number: 0.868

Flow Type: Subcritical

Calculation Successful.

Worksheet : Trapezoidal Channel - Swale 3b

Uniform Flow | Gradually Varied Flow | Messages

Solve For: Normal Depth Friction Method: Manning Formula

Roughness Coefficient: 0.030

Channel Slope: 0.800 %

Normal Depth: 625.5 mm

Left Side Slope: 33.000 %

Right Side Slope: 33.000 %

Bottom Width: 6.00 m

Discharge: 9,206.00 L/s

Flow Area: 4.9 m²

Wetted Perimeter: 10.0 m

Hydraulic Radius: 494.3 mm

Top Width: 9.79 m

Critical Depth: 562.3 mm

Critical Slope: 1.172 %

Velocity: 1.86 m/s

Velocity Head: 0.18 m

Specific Energy: 0.80 m

Froude Number: 0.838

Flow Type: Subcritical

Calculation Successful.

Worksheet : Triangular Channel - Swale 3c

Uniform Flow | Gradually Varied Flow | Messages

Solve For: Normal Depth Friction Method: Manning Formula

Roughness Coefficient: 0.030

Channel Slope: 2.400 %

Normal Depth: 317.5 mm

Left Side Slope: 33.000 %

Right Side Slope: 33.000 %

Discharge: 447.00 L/s

Flow Area: 0.3 m²

Wetted Perimeter: 2.0 m

Hydraulic Radius: 150.8 mm

Top Width: 1.92 m

Critical Depth: 338.3 mm

Critical Slope: 1.710 %

Velocity: 1.46 m/s

Velocity Head: 0.11 m

Specific Energy: 0.43 m

Froude Number: 1.172

Flow Type: Supercritical

Calculation Successful.

Worksheet : Trapezoidal Channel - 3d

Uniform Flow | Gradually Varied Flow | Messages

Solve For: Normal Depth Friction Method: Manning Formula

Roughness Coefficient: 0.030

Channel Slope: 0.900 %

Normal Depth: 644.3 mm

Left Side Slope: 33.000 %

Right Side Slope: 33.000 %

Bottom Width: 6.00 m

Discharge: 10,298.00 L/s

Flow Area: 5.1 m²

Wetted Perimeter: 10.1 m

Hydraulic Radius: 506.7 mm

Top Width: 9.90 m

Critical Depth: 601.7 mm

Critical Slope: 1.151 %

Velocity: 2.01 m/s

Velocity Head: 0.21 m

Specific Energy: 0.85 m

Froude Number: 0.892

Flow Type: Subcritical

Calculation Successful.

Worksheet : Triangular Channel - Swale 3e

Uniform Flow | Gradually Varied Flow | Messages

Solve For: Normal Depth Friction Method: Manning Formula

Roughness Coefficient: 0.030

Channel Slope: 1.600 %

Normal Depth: 347.2 mm

Left Side Slope: 33.000 %

Right Side Slope: 33.000 %

Discharge: 463.00 L/s

Flow Area: 0.4 m²

Wetted Perimeter: 2.2 m

Hydraulic Radius: 164.8 mm

Top Width: 2.10 m

Critical Depth: 343.2 mm

Critical Slope: 1.702 %

Velocity: 1.27 m/s

Velocity Head: 0.08 m

Specific Energy: 0.43 m

Froude Number: 0.972

Flow Type: Subcritical

Calculation Successful.

Runoff Coefficient & Time to Peak - Pre-development



Project No.: 5354
Project: 5783 Bloomington Road
Municipality: Township of Whitchurch-Stouffville
Last Updated: May 16, 2025

C = 0.25
TIMP = 7%
XIMP = 7%

Time to Peak Calculation:

Swale No and Type	Overland Flow						Time to Peak
	Area (ha)	S (%)	C	L (m)	T _c (min)	T _c (hr)	T _p (hr)
Area going to the SW	21.51	1.51	0.25	566	58	0.96	0.64
Area going to the SE	11.32	1.75	0.25	490	51	0.85	0.57

Note:
S = Catchment Slope (%) (See Drawing No. TA - 6A)
L = Catchment Length (m) (see Drawing No. TA - 6A)
Tc = time of concentration (min)
C = Runoff Coefficient (see Drawing No. TA-6A)

Runoff Coefficient & Time to Peak - Post Development



Project No.: 5354
Project: 5783 Bloomington Road
Municipality: Township of Whitchurch-Stouffville
Last Updated: May 16, 2025

C = 0.25
TIMP = 7%
XIMP = 7%

Time to Peak Calculation:

Swale No and Type	Overland Flow				Time to Peak
	C	L (m)	T _c (min)	T _c (hr)	T _p (hr)
Pathway 1	0.6	792	49	0.82	0.54
Pathway 2	0.6	805	47	0.79	0.53

Pathway 1	A (m2)	Q (m3/s)	V (m/s)	L (m)	S (%)	Tc (min)
Sheet Flow to 3b	9.91	1.606	-	357	1.8	43.13
3b to 3d	-	2.357	1.19	320	0.8	4.48
3d to end	-	3.326	1.39	115	0.9	1.38

Pathway 12	A (m2)	Q (m3/s)	V (m/s)	L (m)	S (%)	Tc (min)
Sheet Flow to 3e	2.86	0.464	-	240	1.4	38.42
3e to 3b	-	0.464	0.68	130	0.3	3.19
3b to 3d	-	2.357	1.19	320	0.8	4.48
3d to end	-	3.326	1.39	115	0.9	1.38

Note:
S = Catchment Slope (%) (See Drawing No. TA - 6A)
L = Catchment Length (m) (see Drawing No. TA - 6A)
Tc = time of concentration (min)
C = Runoff Coefficient (see Drawing No. TA-6A)

Worksheet : Trapezoidal Channel - Swale 3b

Uniform Flow | Gradually Varied Flow | Messages

Solve For: Normal Depth Friction Method: Manning Formula

Roughness Coefficient:	0.030		Flow Area:	2.0	m²
Channel Slope:	0.800	%	Wetted Perimeter:	7.8	m
Normal Depth:	287.9	mm	Hydraulic Radius:	252.5	mm
Left Side Slope:	33.000	%	Top Width:	7.74	m
Right Side Slope:	33.000	%	Critical Depth:	240.3	mm
Bottom Width:	6.00	m	Critical Slope:	1.490	%
Discharge:	2,357.00	L/s	Velocity:	1.19	m/s
			Velocity Head:	0.07	m
			Specific Energy:	0.36	m
			Froude Number:	0.753	
			Flow Type:	Subcritical	

Calculation Successful.

Worksheet : Trapezoidal Channel - 3d

Uniform Flow | Gradually Varied Flow | Messages

Solve For: Normal Depth Friction Method: Manning Formula

Roughness Coefficient:	0.030		Flow Area:	2.4	m²
Channel Slope:	0.900	%	Wetted Perimeter:	8.2	m
Normal Depth:	339.7	mm	Hydraulic Radius:	292.3	mm
Left Side Slope:	33.000	%	Top Width:	8.06	m
Right Side Slope:	33.000	%	Critical Depth:	299.1	mm
Bottom Width:	6.00	m	Critical Slope:	1.398	%
Discharge:	3,326.00	L/s	Velocity:	1.39	m/s
			Velocity Head:	0.10	m
			Specific Energy:	0.44	m
			Froude Number:	0.817	
			Flow Type:	Subcritical	

Calculation Successful.

Worksheet : Triangular Channel - Swale 3e

Uniform Flow | Gradually Varied Flow | Messages

Solve For: Normal Depth Friction Method: Manning Formula

Roughness Coefficient:	0.030		Flow Area:	0.7	m²
Channel Slope:	0.300	%	Wetted Perimeter:	3.0	m
Normal Depth:	475.6	mm	Hydraulic Radius:	225.8	mm
Left Side Slope:	33.000	%	Top Width:	2.88	m
Right Side Slope:	33.000	%	Critical Depth:	343.5	mm
Discharge:	464.00	L/s	Critical Slope:	1.701	%
			Velocity:	0.68	m/s
			Velocity Head:	0.02	m
			Specific Energy:	0.50	m
			Froude Number:	0.443	
			Flow Type:	Subcritical	

Calculation Successful.

Stone Sizing Calculations - Culvert 1

Proposed Outlet

Project : 5783 Bloomington Road

Job No. : 5354

Date : 16-May-25

Actual Shear Stress Based on Outflow Velocity

Input:

Nominal Pipe Diameter	=	750.0	mm
Actual Pipe Diameter	=	762	mm
Slope	=	0.005	m/m
Area	=	0.46	m ²
Hydraulic Radius, R	=	0.19	m
Q100-yr uncontrolled	=	0.11	m ³ /s
Velocity100yrUncontrolled	=	1.32	m/s

Output:

1/R	=	5.25	
Tractive force, T	=	2.21	kg/m ² (From MTO Design Chart 2.24)

Critical Shear Stress Resistance of Stone

Input:

Stone Size, D ₅₀	=	100	mm
-----------------------------	---	-----	----

Output:

Critical Shear Stress Resistance, T _{cb}	=	0.0642 x D50	(MTO, Equation 5.31)
	=	6.42	kg/m ²

Conclusion

O.K. - the critical shear stress capacity of the stone is greater than the tractive force of the flow

Stone Sizing Calculations - Culvert 2

Proposed Outlet

Project : 5783 Bloomington Road

Job No. : 5354

Date : 16-May-25

Actual Shear Stress Based on Outflow Velocity

Input:

Nominal Pipe Diameter	=	750.0	mm
Actual Pipe Diameter	=	762	mm
Slope	=	0.056	m/m
Area	=	0.46	m ²
Hydraulic Radius, R	=	0.19	m
Q100-yr uncontrolled	=	0.08	m ³ /s
Velocity100yrUncontrolled	=	2.81	m/s

Output:

1/R	=	5.25	
Tractive force, T	=	10.02	kg/m ² (From MTO Design Chart 2.24)

Critical Shear Stress Resistance of Stone

Input:

Stone Size, D ₅₀	=	200	mm
-----------------------------	---	-----	----

Output:

Critical Shear Stress Resistance, T _{cb}	=	0.0642 x D50	(MTO, Equation 5.31)
	=	12.84	kg/m ²

Conclusion

O.K. - the critical shear stress capacity of the stone is greater than the tractive force of the flow

Stone Sizing Calculations - Culvert 3

Proposed Outlet

Project : 5783 Bloomington Road

Job No. : 5354

Date : 16-May-25

Actual Shear Stress Based on Outflow Velocity

Input:

Nominal Pipe Diameter	=	900.0	mm
Actual Pipe Diameter	=	914.4	mm
Slope	=	0.016	m/m
Area	=	0.66	m ²
Hydraulic Radius, R	=	0.23	m
Q100-yr uncontrolled	=	6.52	m ³ /s
Velocity100yrUncontrolled	=	2.22	m/s

Output:

1/R	=	4.37	
Tractive force, T	=	5.88	kg/m ² (From MTO Design Chart 2.24)

Critical Shear Stress Resistance of Stone

Input:

Stone Size, D ₅₀	=	100	mm
-----------------------------	---	-----	----

Output:

Critical Shear Stress Resistance, T _{cb}	=	0.0642 x D50	(MTO, Equation 5.31)
	=	6.42	kg/m ²

Conclusion

O.K. - the critical shear stress capacity of the stone is greater than the tractive force of the flow

Scour Pool Sizing Swale 1
5783 Bloomington Road - Township of Whitchurch Stouffville

5354

Date: 2025-05-16

Given:

Swale Width = 2270 mm

Calculation:

Outlet Pipe Dimensions (m)*	Parameters		Scour Pool Dimensions	Scour Pool Dimensions
		MTO** Shallow Basin	Required Min. Dimensions	Provided Dimensions
Span (B) 2.270	Bottom length (m)	3D	1.13	1.20
Diameter (D) 0.375	Bottom width (m)	2B	4.54	4.60
	Basin depth (m)	0.5D	0.19	0.20
	Top length (m)	6D	2.25	2.40
	Top width (m)	2B + 3D	5.67	5.80
	Side Slope	3:1	3:1	3:1

** Refer to MTO Drainage Manual, Chapter D, Section 9.4.1.3, pages D9-22 to D-24 (1985 08 27)

Quarried Stone Average Diameter = 150mm

Stone Sizing Calculations - Swale 1

Proposed Outlet

Project : 5783 Bloomington Road

Job No. : 5354

Date : 16-May-25

Actual Shear Stress Based on Outflow Velocity

Input:

Nominal Swale Width	=	2270.0	mm
Actual Width	=	2306.32	mm
Slope	=	0.004	m/m
Area	=	4.18	m ²
Hydraulic Radius, R	=	0.58	m
Q100-yr uncontrolled	=	0.28	m ³ /s
Velocity100yrUncontrolled	=	0.67	m/s

Output:

1/R	=	1.73	
Tractive force, T	=	0.39	kg/m ² (From MTO Design Chart 2.24)

Critical Shear Stress Resistance of Stone

Input:

Stone Size, D ₅₀	=	100	mm
-----------------------------	---	-----	----

Output:

Critical Shear Stress Resistance, T _{cb}	=	0.0642 x D50	(MTO, Equation 5.31)
	=	6.42	kg/m ²

Conclusion

O.K. - the critical shear stress capacity of the stone is greater than the tractive force of the flow

Scour Pool Sizing Swale 2
5783 Bloomington Road - Township of Whitchurch Stouffville

5354

Date: 2025-05-16

Given:

Swale Width = 2180 mm

Calculation:

Outlet Pipe Dimensions (m)*	Parameters		Scour Pool Dimensions	Scour Pool Dimensions
		MTO** Shallow Basin	Required Min. Dimensions	Provided Dimensions
Span (B) 2.180	Bottom length (m)	3D	1.08	1.20
Diameter (D) 0.360	Bottom width (m)	2B	4.36	4.60
	Basin depth (m)	0.5D	0.18	0.20
	Top length (m)	6D	2.16	2.40
	Top width (m)	2B + 3D	5.44	5.80
	Side Slope	3:1	3:1	3:1

** Refer to MTO Drainage Manual, Chapter D, Section 9.4.1.3, pages D9-22 to D-24 (1985 08 27)

Quarried Stone Average Diameter = 150mm

Stone Sizing Calculations - Swale 2

Proposed Outlet

Project : 5783 Bloomington Road

Job No. : 5354

Date : 16-May-25

Actual Shear Stress Based on Outflow Velocity

Input:

Nominal Swale Width	=	2180.0	mm
Actual Width	=	2214.88	mm
Slope	=	0.02	m/m
Area	=	3.85	m ²
Hydraulic Radius, R	=	0.55	m
Q100-yr uncontrolled	=	0.57	m ³ /s
Velocity100yrUncontrolled	=	1.45	m/s

Output:

1/R	=	1.81	
Tractive force, T	=	1.87	kg/m ² (From MTO Design Chart 2.24)

Critical Shear Stress Resistance of Stone

Input:

Stone Size, D ₅₀	=	100	mm
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Output:

Critical Shear Stress Resistance, T _{cb}	=	0.0642 x D50	(MTO, Equation 5.31)
	=	6.42	kg/m ²

Conclusion

O.K. - the critical shear stress capacity of the stone is greater than the tractive force of the flow

Scour Pool Sizing Swale 3d
5783 Bloomington Road - Township of Whitchurch Stouffville

5354

Date: 2025-05-16

Given:

Swale Width = 6 mm

Calculation:

Outlet Pipe Dimensions (m)*	Parameters		Scour Pool Dimensions	Scour Pool Dimensions
		MTO** Shallow Basin	Required Min. Dimensions	Provided Dimensions
Span (B) 6.000	Bottom length (m)	3D	1.93	2.00
Diameter (D) 0.644	Bottom width (m)	2B	12.00	12.00
	Basin depth (m)	0.5D	0.32	0.40
	Top length (m)	6D	3.87	4.50
	Top width (m)	2B + 3D	13.93	14.50
	Side Slope	3:1	3:1	3:1

** Refer to MTO Drainage Manual, Chapter D, Section 9.4.1.3, pages D9-22 to D-24 (1985 08 27)

Quarried Stone Average Diameter = 150mm

Stone Sizing Calculations - Swale 3d

Proposed Outlet

Project : 5783 Bloomington Road

Job No. : 5354

Date : 16-May-25

Actual Shear Stress Based on Outflow Velocity

Input:

Nominal Swale Width	=	6000.0	mm
Actual Width	=	6096	mm
Slope	=	0.009	m/m
Area	=	29.19	m ²
Hydraulic Radius, R	=	1.52	m
Q100-yr uncontrolled	=	10.30	m ³ /s
Velocity100yrUncontrolled	=	2.01	m/s

Output:

1/R	=	0.66	
Tractive force, T	=	2.56	kg/m ² (From MTO Design Chart 2.24)

Critical Shear Stress Resistance of Stone

Input:

Stone Size, D ₅₀	=	100	mm
-----------------------------	---	-----	----

Output:

Critical Shear Stress Resistance, T _{cb}	=	0.0642 x D50	(MTO, Equation 5.31)
	=	6.42	kg/m ²

Conclusion

O.K. - the critical shear stress capacity of the stone is greater than the tractive force of the flow

OOO	TTTTT	TTTTT	H	H	Y	Y	M	M	OOO	TM
O O	T	T	H	H	Y	Y	MM	MM	O O	
O O	T	T	H	H	Y	Y	M	M	O O	
OOO	T	T	H	H	Y	Y	M	M	OOO	

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

TIME: 01:01:05

USER:

COMMENTS: _____

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*****
** SIMULATION : 100yr Chicago                               **
*****
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```
| CHICAGO STORM | IDF curve parameters: A=1770.000
| Ptotal= 73.74 mm | B= 4.000
|-----| C= 0.820
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33
```

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	5.92	0.83	203.31	1.67	10.60	2.50	5.65
0.17	7.33	1.00	50.96	1.83	8.96	2.67	5.19
0.33	9.77	1.17	25.51	2.00	7.78	2.83	4.81
0.50	15.10	1.33	17.18	2.17	6.90		
0.67	38.21	1.50	13.06	2.33	6.21		

CALIB					
NASHYD	(0001)	Area	(ha)= 21.51	Curve Number	(CN)= 65.0



SCHAEFFERS
CONSULTING ENGINEERS

Visual OTTHYMO™ Schematic
Pre-Development
4Hr Chicago (Municipality), 12Hr AES
(Municipality)

Job #: 2023-5354

Date: May 2025

5783 Bloomington Road

Pre-development

|ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 0.64

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

----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN |' TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr |' hrs mm/hr | hrs mm/hr
0.083 5.92 | 0.833 38.21 | 1.583 13.06 | 2.33 6.90
0.167 5.92 | 0.917 203.30 | 1.667 13.06 | 2.42 6.21
0.250 7.33 | 1.000 203.31 | 1.750 10.60 | 2.50 6.21
0.333 7.33 | 1.083 50.96 | 1.833 10.60 | 2.58 5.65
0.417 9.77 | 1.167 50.96 | 1.917 8.96 | 2.67 5.65
0.500 9.77 | 1.250 25.51 | 2.000 8.96 | 2.75 5.19
0.583 15.10 | 1.333 25.51 | 2.083 7.78 | 2.83 5.19
0.667 15.10 | 1.417 17.18 | 2.167 7.78 | 2.92 4.81
0.750 38.21 | 1.500 17.18 | 2.250 6.90 | 3.00 4.81

Unit Hyd Qpeak (cms)= 1.284

PEAK FLOW (cms)= 0.740 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 21.340
TOTAL RAINFALL (mm)= 73.740
RUNOFF COEFFICIENT = 0.289

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

| CALIB |
| NASHYD (0002) | Area (ha)= 11.32 Curve Number (CN)= 65.0
|ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 0.57

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

----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN |' TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr |' hrs mm/hr | hrs mm/hr
0.083 5.92 | 0.833 38.21 | 1.583 13.06 | 2.33 6.90
0.167 5.92 | 0.917 203.30 | 1.667 13.06 | 2.42 6.21
0.250 7.33 | 1.000 203.31 | 1.750 10.60 | 2.50 6.21
0.333 7.33 | 1.083 50.96 | 1.833 10.60 | 2.58 5.65
0.417 9.77 | 1.167 50.96 | 1.917 8.96 | 2.67 5.65
0.500 9.77 | 1.250 25.51 | 2.000 8.96 | 2.75 5.19
0.583 15.10 | 1.333 25.51 | 2.083 7.78 | 2.83 5.19
0.667 15.10 | 1.417 17.18 | 2.167 7.78 | 2.92 4.81
0.750 38.21 | 1.500 17.18 | 2.250 6.90 | 3.00 4.81

Unit Hyd Qpeak (cms)= 0.759

PEAK FLOW (cms)= 0.423 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 21.340
TOTAL RAINFALL (mm)= 73.740
RUNOFF COEFFICIENT = 0.289

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

| ADD HYD (0003) |

DATE: May 2025

| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 1 (0001): 21.51 0.740 1.75 21.34
+ ID2= 2 (0002): 11.32 0.423 1.67 21.34
===== ID = 3 (0003): 32.83 1.157 1.75 21.34

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

V V I SSSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTTT TTTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\18f807b7-84b8-45fb-87e9-2707f66682c8\sc
Summary filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\18f807b7-84b8-45fb-87e9-2707f66682c8\sc

DATE: 05-16-2025

TIME: 01:01:05

USER:

COMMENTS: _____

** SIMULATION : 10yr Chicago **

| CHICAGO STORM | IDF curve parameters: A=1021.000
| Ptotal= 50.74 mm | B= 3.000
C= 0.787
used in: INTENSITY = A / (t + B)^C
Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME RAIN | TIME RAIN |' TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr |' hrs mm/hr | hrs mm/hr
0.00 4.59 | 0.83 135.63 | 1.67 7.85 | 2.50 4.39
0.17 5.59 | 1.00 33.17 | 1.83 6.73 | 2.67 4.06

5783 Bloomington Road
Pre-development

DATE: May 2025

0.33	7.28		1.17	17.50		2.00	5.91		2.83	3.78
0.50	10.84		1.33	12.21		2.17	5.29			
0.67	25.32		1.50	9.50		2.33	4.79			

TOTAL RAINFALL (mm)= 50.739
RUNOFF COEFFICIENT = 0.201

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

CALIB										
NASHYD (0001)		Area	(ha)=	21.51	Curve Number	(CN)=	65.0			
ID= 1 DT= 5.0 min		Ia	(mm)=	8.00	# of Linear Res.(N)=	3.00				
		U.H. Tp(hrs)=	0.64							

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	4.59	0.833	25.32	1.583	9.50	2.33	5.29
0.167	4.59	0.917	135.63	1.667	9.50	2.42	4.79
0.250	5.59	1.000	135.63	1.750	7.85	2.50	4.79
0.333	5.59	1.083	33.17	1.833	7.85	2.58	4.39
0.417	7.28	1.167	33.17	1.917	6.73	2.67	4.39
0.500	7.28	1.250	17.50	2.000	6.73	2.75	4.06
0.583	10.84	1.333	17.50	2.083	5.91	2.83	4.06
0.667	10.84	1.417	12.21	2.167	5.91	2.92	3.78
0.750	25.32	1.500	12.21	2.250	5.29	3.00	3.78

Unit Hyd Qpeak (cms)= 1.284

PEAK FLOW (cms)= 0.330 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 10.175
TOTAL RAINFALL (mm)= 50.739
RUNOFF COEFFICIENT = 0.201

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

CALIB										
NASHYD (0002)		Area	(ha)=	11.32	Curve Number	(CN)=	65.0			
ID= 1 DT= 5.0 min		Ia	(mm)=	8.00	# of Linear Res.(N)=	3.00				
		U.H. Tp(hrs)=	0.57							

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	4.59	0.833	25.32	1.583	9.50	2.33	5.29
0.167	4.59	0.917	135.63	1.667	9.50	2.42	4.79
0.250	5.59	1.000	135.63	1.750	7.85	2.50	4.79
0.333	5.59	1.083	33.17	1.833	7.85	2.58	4.39
0.417	7.28	1.167	33.17	1.917	6.73	2.67	4.39
0.500	7.28	1.250	17.50	2.000	6.73	2.75	4.06
0.583	10.84	1.333	17.50	2.083	5.91	2.83	4.06
0.667	10.84	1.417	12.21	2.167	5.91	2.92	3.78
0.750	25.32	1.500	12.21	2.250	5.29	3.00	3.78

Unit Hyd Qpeak (cms)= 0.759

PEAK FLOW (cms)= 0.187 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 10.175

ADD HYD (0003)	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	21.51	0.330	1.83	10.18
+ ID2= 2 (0002):	11.32	0.187	1.67	10.18
ID = 3 (0003):	32.83	0.516	1.75	10.18

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

V	V	I	SSSSS	U	U	A	L	(v 6.2.2015)
V	V	I	SS	U	U	A	A	L
V	V	I	SS	U	U	AAAAA	L	
V	V	I	SS	U	U	A	A	L
VV	V	I	SSSSS	UUUUU	A	A	LLLLL	

OOO	TTTTT	TTTTT	H	H	Y	Y	M	M	OOO	TM	
O	O	T	T	H	H	Y	Y	MM	MM	O	O
O	O	T	T	H	H	Y	M	M	O	O	
OOO	T	T	H	H	Y	M	M	OOO			

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\12f57073-dc60-4f2c-b84e-ea4770d88a9e\sc
Summary filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\12f57073-dc60-4f2c-b84e-ea4770d88a9e\sc

DATE: 05-16-2025

TIME: 01:01:05

USER:

COMMENTS: _____

** SIMULATION : 25yr Chicago **

CHICAGO STORM		IDF curve parameters: A=1100.000
Ptotal= 58.14 mm		B= 2.000
		C= 0.776
		used in: INTENSITY = A / (t + B)^C

5783 Bloomington Road
Pre-development

DATE: May 2025

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	5.38	0.83	159.94	1.67	9.00	2.50	5.16
0.17	6.51	1.00	35.45	1.83	7.77	2.67	4.78
0.33	8.38	1.17	19.27	2.00	6.86	2.83	4.46
0.50	12.24	1.33	13.70	2.17	6.16		
0.67	27.34	1.50	10.80	2.33	5.61		

0.583	12.24	1.333	19.27	2.083	6.86	2.83	4.78
0.667	12.24	1.417	13.70	2.167	6.86	2.92	4.46
0.750	27.34	1.500	13.70	2.250	6.16	3.00	4.46

Unit Hyd Qpeak (cms)= 0.759

PEAK FLOW (cms)= 0.250 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 13.448
TOTAL RAINFALL (mm)= 58.136
RUNOFF COEFFICIENT = 0.231

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

CALIB
NASHYD (0001) | Area (ha)= 21.51 Curve Number (CN)= 65.0
ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.64

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

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.38	0.833	27.34	1.583	10.80	2.33	6.16
0.167	5.38	0.917	159.94	1.667	10.80	2.42	5.61
0.250	6.51	1.000	159.94	1.750	9.00	2.50	5.61
0.333	6.51	1.083	35.45	1.833	9.00	2.58	5.16
0.417	8.38	1.167	35.45	1.917	7.77	2.67	5.16
0.500	8.38	1.250	19.27	2.000	7.77	2.75	4.78
0.583	12.24	1.333	19.27	2.083	6.86	2.83	4.78
0.667	12.24	1.417	13.70	2.167	6.86	2.92	4.46
0.750	27.34	1.500	13.70	2.250	6.16	3.00	4.46

Unit Hyd Qpeak (cms)= 1.284

PEAK FLOW (cms)= 0.438 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 13.448
TOTAL RAINFALL (mm)= 58.136
RUNOFF COEFFICIENT = 0.231

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

CALIB
NASHYD (0002) | Area (ha)= 11.32 Curve Number (CN)= 65.0
ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.57

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

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.38	0.833	27.34	1.583	10.80	2.33	6.16
0.167	5.38	0.917	159.94	1.667	10.80	2.42	5.61
0.250	6.51	1.000	159.94	1.750	9.00	2.50	5.61
0.333	6.51	1.083	35.45	1.833	9.00	2.58	5.16
0.417	8.38	1.167	35.45	1.917	7.77	2.67	5.16
0.500	8.38	1.250	19.27	2.000	7.77	2.75	4.78

ADD HYD (0003) |
1 + 2 = 3 |

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	21.51	0.438	1.75	13.45
+ ID2= 2 (0002):	11.32	0.250	1.67	13.45
ID = 3 (0003):	32.83	0.686	1.75	13.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

V V I SSSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUU A A LLLL

OOO TTTTT TTTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\ee88bce2-1f24-406d-8c43-d4bdb8c40aa4\sc
Summary filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\ee88bce2-1f24-406d-8c43-d4bdb8c40aa4\sc

DATE: 05-16-2025

TIME: 01:01:05

USER:

COMMENTS: _____

5783 Bloomington Road
Pre-development

DATE: May 2025

** SIMULATION : 2yr Chicago **

| CHICAGO STORM |
Ptotal= 32.55 mm

IDF curve parameters: A= 647.700
B= 4.000
C= 0.784
used in: INTENSITY = $A / (t + B)^C$

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	3.04	0.83	81.81	1.67	5.25	2.50	2.91
0.17	3.72	1.00	22.50	1.83	4.49	2.67	2.69
0.33	4.86	1.17	11.86	2.00	3.93	2.83	2.50
0.50	7.29	1.33	8.23	2.17	3.51		
0.67	17.17	1.50	6.38	2.33	3.18		

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

Area (ha)= 21.51 Curve Number (CN)= 65.0
Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.64

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

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	3.04	0.833	17.17	1.583	6.38	2.33	3.51
0.167	3.04	0.917	81.81	1.667	6.38	2.42	3.18
0.250	3.72	1.000	81.81	1.750	5.25	2.50	3.18
0.333	3.72	1.083	22.50	1.833	5.25	2.58	2.91
0.417	4.86	1.167	22.50	1.917	4.49	2.67	2.91
0.500	4.86	1.250	11.86	2.000	4.49	2.75	2.69
0.583	7.29	1.333	11.86	2.083	3.93	2.83	2.69
0.667	7.29	1.417	8.23	2.167	3.93	2.92	2.50
0.750	17.17	1.500	8.23	2.250	3.51	3.00	2.50

Unit Hyd Qpeak (cms)= 1.284

PEAK FLOW (cms)= 0.114 (i)
TIME TO PEAK (hrs)= 1.917
RUNOFF VOLUME (mm)= 3.737
TOTAL RAINFALL (mm)= 32.554
RUNOFF COEFFICIENT = 0.115

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

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

Area (ha)= 11.32 Curve Number (CN)= 65.0
Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.57

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

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	3.04	0.833	17.17	1.583	6.38	2.33	3.51
0.167	3.04	0.917	81.81	1.667	6.38	2.42	3.18
0.250	3.72	1.000	81.81	1.750	5.25	2.50	3.18
0.333	3.72	1.083	22.50	1.833	5.25	2.58	2.91
0.417	4.86	1.167	22.50	1.917	4.49	2.67	2.91
0.500	4.86	1.250	11.86	2.000	4.49	2.75	2.69
0.583	7.29	1.333	11.86	2.083	3.93	2.83	2.69
0.667	7.29	1.417	8.23	2.167	3.93	2.92	2.50
0.750	17.17	1.500	8.23	2.250	3.51	3.00	2.50

Unit Hyd Qpeak (cms)= 0.759

PEAK FLOW (cms)= 0.064 (i)
TIME TO PEAK (hrs)= 1.833
RUNOFF VOLUME (mm)= 3.737
TOTAL RAINFALL (mm)= 32.554
RUNOFF COEFFICIENT = 0.115

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

| ADD HYD (0003) |
1 + 2 = 3

	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0001):	21.51	0.114	1.92	3.74
+ ID2= 2 (0002):	11.32	0.064	1.83	3.74
=====				
ID = 3 (0003):	32.83	0.178	1.83	3.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

V V I SSSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUU A A LLLLL

OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\93e61f8-dd4c-4a8e-bf96-ac203474e0df\sc
Summary filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\93e61f8-dd4c-4a8e-bf96-ac203474e0df\sc

DATE: 05-16-2025

TIME: 01:01:05

5783 Bloomington Road
Pre-development

USER:

COMMENTS: _____

DATE: May 2025

```
-----
| CALIB |
| NASHYD ( 0002) | Area (ha)= 11.32 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res. (N)= 3.00
|-----
| U.H. Tp (hrs)= 0.57
```

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

```
*****
** SIMULATION : 50yr Chicago **
*****
```

```
-----
| CHICAGO STORM | IDF curve parameters: A=1488.000
| Ptotal= 68.03 mm | B= 3.000
|-----
| C= 0.803
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33
```

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	5.75	0.83	189.72	1.67	9.99	2.50	5.50
0.17	7.05	1.00	44.29	1.83	8.52	2.67	5.08
0.33	9.24	1.17	22.84	2.00	7.46	2.83	4.72
0.50	13.94	1.33	15.74	2.17	6.65		
0.67	33.54	1.50	12.16	2.33	6.02		

```
-----
| CALIB |
| NASHYD ( 0001) | Area (ha)= 21.51 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res. (N)= 3.00
|-----
| U.H. Tp (hrs)= 0.64
```

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

```
----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
0.083 5.75 | 0.833 33.54 | 1.583 12.16 | 2.33 6.65
0.167 5.75 | 0.917 189.72 | 1.667 12.16 | 2.42 6.02
0.250 7.05 | 1.000 189.72 | 1.750 9.99 | 2.50 6.02
0.333 7.05 | 1.083 44.29 | 1.833 9.99 | 2.58 5.50
0.417 9.24 | 1.167 44.29 | 1.917 8.52 | 2.67 5.50
0.500 9.24 | 1.250 22.84 | 2.000 8.52 | 2.75 5.08
0.583 13.94 | 1.333 22.84 | 2.083 7.46 | 2.83 5.08
0.667 13.94 | 1.417 15.74 | 2.167 7.46 | 2.92 4.72
0.750 33.54 | 1.500 15.74 | 2.250 6.65 | 3.00 4.72
```

Unit Hyd Qpeak (cms)= 1.284

PEAK FLOW (cms)= 0.622 (i)

TIME TO PEAK (hrs)= 1.750

RUNOFF VOLUME (mm)= 18.313

TOTAL RAINFALL (mm)= 68.035

RUNOFF COEFFICIENT = 0.269

(i) 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
0.083 5.75 | 0.833 33.54 | 1.583 12.16 | 2.33 6.65
0.167 5.75 | 0.917 189.72 | 1.667 12.16 | 2.42 6.02
0.250 7.05 | 1.000 189.72 | 1.750 9.99 | 2.50 6.02
0.333 7.05 | 1.083 44.29 | 1.833 9.99 | 2.58 5.50
0.417 9.24 | 1.167 44.29 | 1.917 8.52 | 2.67 5.50
0.500 9.24 | 1.250 22.84 | 2.000 8.52 | 2.75 5.08
0.583 13.94 | 1.333 22.84 | 2.083 7.46 | 2.83 5.08
0.667 13.94 | 1.417 15.74 | 2.167 7.46 | 2.92 4.72
0.750 33.54 | 1.500 15.74 | 2.250 6.65 | 3.00 4.72
```

Unit Hyd Qpeak (cms)= 0.759

PEAK FLOW (cms)= 0.356 (i)

TIME TO PEAK (hrs)= 1.667

RUNOFF VOLUME (mm)= 18.313

TOTAL RAINFALL (mm)= 68.035

RUNOFF COEFFICIENT = 0.269

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

```
-----
| ADD HYD ( 0003) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
| (ha) (cms) (hrs) (mm)
ID1= 1 ( 0001): 21.51 0.622 1.75 18.31
+ ID2= 2 ( 0002): 11.32 0.356 1.67 18.31
=====
ID = 3 ( 0003): 32.83 0.974 1.75 18.31
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
-----
V V I SSSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U A A A A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO
```

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

5783 Bloomington Road
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DATE: May 2025

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\5aa85cbf-a8e0-486a-a548-d6c8b9bdb8db\sc
Summary filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\5aa85cbf-a8e0-486a-a548-d6c8b9bdb8db\sc

PEAK FLOW (cms) = 0.235 (i)
TIME TO PEAK (hrs) = 1.833
RUNOFF VOLUME (mm) = 7.291
TOTAL RAINFALL (mm) = 43.434
RUNOFF COEFFICIENT = 0.168

DATE: 05-16-2025

TIME: 01:01:05

USER:

COMMENTS:

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

| CALIB |
| NASHYD (0002) | Area (ha) = 11.32 Curve Number (CN) = 65.0
| ID= 1 DT= 5.0 min | Ia (mm) = 8.00 # of Linear Res. (N) = 3.00

U.H. Tp (hrs) = 0.57

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

** SIMULATION : 5yr Chicago **

| CHICAGO STORM | IDF curve parameters: A= 929.600
| Ptotal= 43.43 mm | B= 4.000
C= 0.798
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	3.84	0.83	113.16	1.67	6.71	2.50	3.67
0.17	4.71	1.00	30.04	1.83	5.71	2.67	3.38
0.33	6.21	1.17	15.53	2.00	4.99	2.83	3.14
0.50	9.42	1.33	10.65	2.17	4.45		
0.67	22.77	1.50	8.20	2.33	4.02		

| CALIB |
| NASHYD (0001) | Area (ha) = 21.51 Curve Number (CN) = 65.0
| ID= 1 DT= 5.0 min | Ia (mm) = 8.00 # of Linear Res. (N) = 3.00

U.H. Tp (hrs) = 0.64

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

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	3.84	0.833	22.77	1.583	8.20	2.33	4.45
0.167	3.84	0.917	113.16	1.667	8.20	2.42	4.02
0.250	4.71	1.000	113.16	1.750	6.71	2.50	4.02
0.333	4.71	1.083	30.04	1.833	6.71	2.58	3.67
0.417	6.21	1.167	30.04	1.917	5.71	2.67	3.67
0.500	6.21	1.250	15.53	2.000	5.71	2.75	3.38
0.583	9.42	1.333	15.53	2.083	4.99	2.83	3.38
0.667	9.42	1.417	10.65	2.167	4.99	2.92	3.14
0.750	22.77	1.500	10.65	2.250	4.45	3.00	3.14

Unit Hyd Qpeak (cms) = 1.284

Unit Hyd Qpeak (cms) = 0.759

PEAK FLOW (cms) = 0.133 (i)
TIME TO PEAK (hrs) = 1.750
RUNOFF VOLUME (mm) = 7.291
TOTAL RAINFALL (mm) = 43.434
RUNOFF COEFFICIENT = 0.168

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

| ADD HYD (0003) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0001): 21.51 0.235 1.83 7.29
+ ID2= 2 (0002): 11.32 0.133 1.75 7.29
=====

ID = 3 (0003): 32.83 0.366 1.83 7.29

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

=====

V	V	I	SSSSS	U	U	A	L	(v 6.2.2015)		
V	V	I	SS	U	U	A A	L			
V	V	I	SS	U	U	AAAAA	L			
V	V	I	SS	U	U	A A	L			
VV	I	SSSSS	UUUUU	A	A	LLLLL				
OOO	TTTTT	TTTTT	H	H	Y	Y	M	M	OOO	TM
O	O	T	T	H	H	Y Y	MM	MM	O	O
O	O	T	T	H	H	Y	M	M	O	O

5783 Bloomington Road
Pre-development

DATE: May 2025

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\55418ff2-22a3-49b0-bf7a-5f06210a4564\sc
Summary filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\55418ff2-22a3-49b0-bf7a-5f06210a4564\sc

DATE: 05-16-2025 TIME: 01:01:05

USER:

COMMENTS: _____

** SIMULATION : AES_12HR_100yr_PCSWMM **

| READ STORM | Filename: C:\Users\jghobrial\AppData
| | ata\Local\Temp\
| | dee919a8-c033-417b-8a31-d619fb8db545\78a97efa
| Ptotal= 92.24 mm | Comments: AES_12HR_100yr_PCSWMM

TIME	RAIN	TIME	RAIN	'	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	'	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	13.84		6.50	2.77	9.75	0.00
0.25	11.99	3.50	13.84		6.75	2.77	10.00	0.00
0.50	11.99	3.75	13.84		7.00	2.77	10.25	0.00
0.75	11.99	4.00	13.84		7.25	0.92	10.50	0.00
1.00	11.99	4.25	12.91		7.50	0.92	10.75	0.00
1.25	23.98	4.50	12.91		7.75	0.92	11.00	0.00
1.50	23.98	4.75	12.91		8.00	0.92	11.25	0.00
1.75	23.98	5.00	12.91		8.25	0.00	11.50	0.00
2.00	23.98	5.25	7.38		8.50	0.00	11.75	0.00
2.25	18.45	5.50	7.38		8.75	0.00	12.00	0.00
2.50	18.45	5.75	7.38		9.00	0.00		
2.75	18.45	6.00	7.38		9.25	0.00		
3.00	18.45	6.25	2.77		9.50	0.00		

| CALIB |
| NASHYD (0001) | Area (ha)= 21.51 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.64

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	'	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	'	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	18.45		6.250	7.38	9.33	0.00
0.167	0.00	3.250	18.45		6.333	2.77	9.42	0.00
0.250	0.00	3.333	13.84		6.417	2.77	9.50	0.00
0.333	11.99	3.417	13.84		6.500	2.77	9.58	0.00
0.417	11.99	3.500	13.84		6.583	2.77	9.67	0.00
0.500	11.99	3.583	13.84		6.667	2.77	9.75	0.00
0.583	11.99	3.667	13.84		6.750	2.77	9.83	0.00
0.667	11.99	3.750	13.84		6.833	2.77	9.92	0.00
0.750	11.99	3.833	13.84		6.917	2.77	10.00	0.00
0.833	11.99	3.917	13.84		7.000	2.77	10.08	0.00
0.917	11.99	4.000	13.84		7.083	2.77	10.17	0.00
1.000	11.99	4.083	13.84		7.167	2.77	10.25	0.00
1.083	11.99	4.167	13.84		7.250	2.77	10.33	0.00
1.167	11.99	4.250	13.84		7.333	0.92	10.42	0.00
1.250	11.99	4.333	12.91		7.417	0.92	10.50	0.00
1.333	23.98	4.417	12.91		7.500	0.92	10.58	0.00
1.417	23.98	4.500	12.91		7.583	0.92	10.67	0.00
1.500	23.98	4.583	12.91		7.667	0.92	10.75	0.00
1.583	23.98	4.667	12.91		7.750	0.92	10.83	0.00
1.667	23.98	4.750	12.91		7.833	0.92	10.92	0.00
1.750	23.98	4.833	12.91		7.917	0.92	11.00	0.00
1.833	23.98	4.917	12.91		8.000	0.92	11.08	0.00
1.917	23.98	5.000	12.91		8.083	0.92	11.17	0.00
2.000	23.98	5.083	12.91		8.167	0.92	11.25	0.00
2.083	23.98	5.167	12.91		8.250	0.92	11.33	0.00
2.167	23.98	5.250	12.91		8.333	0.00	11.42	0.00
2.250	23.98	5.333	7.38		8.417	0.00	11.50	0.00
2.333	18.45	5.417	7.38		8.500	0.00	11.58	0.00
2.417	18.45	5.500	7.38		8.583	0.00	11.67	0.00
2.500	18.45	5.583	7.38		8.667	0.00	11.75	0.00
2.583	18.45	5.667	7.38		8.750	0.00	11.83	0.00
2.667	18.45	5.750	7.38		8.833	0.00	11.92	0.00
2.750	18.45	5.833	7.38		8.917	0.00	12.00	0.00
2.833	18.45	5.917	7.38		9.000	0.00	12.08	0.00
2.917	18.45	6.000	7.38		9.083	0.00	12.17	0.00
3.000	18.45	6.083	7.38		9.167	0.00	12.25	0.00
3.083	18.45	6.167	7.38		9.250	0.00		

Unit Hyd Qpeak (cms)= 1.284

PEAK FLOW (cms)= 0.416 (i)

TIME TO PEAK (hrs)= 5.333

RUNOFF VOLUME (mm)= 32.108

TOTAL RAINFALL (mm)= 92.240

RUNOFF COEFFICIENT = 0.348

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

| CALIB |
| NASHYD (0002) | Area (ha)= 11.32 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.57

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

TIME	RAIN	TIME	RAIN	'	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	'	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	18.45		6.250	7.38	9.33	0.00
0.167	0.00	3.250	18.45		6.333	2.77	9.42	0.00
0.250	0.00	3.333	13.84		6.417	2.77	9.50	0.00

0.333	11.99	3.417	13.84	6.500	2.77	9.58	0.00
0.417	11.99	3.500	13.84	6.583	2.77	9.67	0.00
0.500	11.99	3.583	13.84	6.667	2.77	9.75	0.00
0.583	11.99	3.667	13.84	6.750	2.77	9.83	0.00
0.667	11.99	3.750	13.84	6.833	2.77	9.92	0.00
0.750	11.99	3.833	13.84	6.917	2.77	10.00	0.00
0.833	11.99	3.917	13.84	7.000	2.77	10.08	0.00
0.917	11.99	4.000	13.84	7.083	2.77	10.17	0.00
1.000	11.99	4.083	13.84	7.167	2.77	10.25	0.00
1.083	11.99	4.167	13.84	7.250	2.77	10.33	0.00
1.167	11.99	4.250	13.84	7.333	0.92	10.42	0.00
1.250	11.99	4.333	12.91	7.417	0.92	10.50	0.00
1.333	23.98	4.417	12.91	7.500	0.92	10.58	0.00
1.417	23.98	4.500	12.91	7.583	0.92	10.67	0.00
1.500	23.98	4.583	12.91	7.667	0.92	10.75	0.00
1.583	23.98	4.667	12.91	7.750	0.92	10.83	0.00
1.667	23.98	4.750	12.91	7.833	0.92	10.92	0.00
1.750	23.98	4.833	12.91	7.917	0.92	11.00	0.00
1.833	23.98	4.917	12.91	8.000	0.92	11.08	0.00
1.917	23.98	5.000	12.91	8.083	0.92	11.17	0.00
2.000	23.98	5.083	12.91	8.167	0.92	11.25	0.00
2.083	23.98	5.167	12.91	8.250	0.92	11.33	0.00
2.167	23.98	5.250	12.91	8.333	0.00	11.42	0.00
2.250	23.98	5.333	7.38	8.417	0.00	11.50	0.00
2.333	18.45	5.417	7.38	8.500	0.00	11.58	0.00
2.417	18.45	5.500	7.38	8.583	0.00	11.67	0.00
2.500	18.45	5.583	7.38	8.667	0.00	11.75	0.00
2.583	18.45	5.667	7.38	8.750	0.00	11.83	0.00
2.667	18.45	5.750	7.38	8.833	0.00	11.92	0.00
2.750	18.45	5.833	7.38	8.917	0.00	12.00	0.00
2.833	18.45	5.917	7.38	9.000	0.00	12.08	0.00
2.917	18.45	6.000	7.38	9.083	0.00	12.17	0.00
3.000	18.45	6.083	7.38	9.167	0.00	12.25	0.00
3.083	18.45	6.167	7.38	9.250	0.00		

Unit Hyd Qpeak (cms)= 0.759

PEAK FLOW (cms)= 0.220 (i)
TIME TO PEAK (hrs)= 5.333
RUNOFF VOLUME (mm)= 32.108
TOTAL RAINFALL (mm)= 92.240
RUNOFF COEFFICIENT = 0.348

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

ADD HYD (0003)					
1 + 2 = 3					

ID1= 1 (0001):	21.51	0.416	5.33	32.11	
+ ID2= 2 (0002):	11.32	0.220	5.33	32.11	
=====					
ID = 3 (0003):	32.83	0.636	5.33	32.11	

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

=====

V V I SSSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

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

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DATE: 05-16-2025

TIME: 01:01:05

USER:

COMMENTS:

** SIMULATION : AES_l2HR_10yr_PCSWMM **

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| | ata\Local\Temp\
| | dee919a8-c033-417b-8a31-d619fb8db545\91aa3dfc
| Ptotal= 62.94 mm | Comments: AES_l2HR_10yr_PCSWMM

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	9.44	6.50	1.89	9.75	0.00
0.25	8.18	3.50	9.44	6.75	1.89	10.00	0.00
0.50	8.18	3.75	9.44	7.00	1.89	10.25	0.00
0.75	8.18	4.00	9.44	7.25	0.63	10.50	0.00
1.00	8.18	4.25	8.81	7.50	0.63	10.75	0.00
1.25	16.36	4.50	8.81	7.75	0.63	11.00	0.00
1.50	16.36	4.75	8.81	8.00	0.63	11.25	0.00
1.75	16.36	5.00	8.81	8.25	0.00	11.50	0.00
2.00	16.36	5.25	5.04	8.50	0.00	11.75	0.00
2.25	12.59	5.50	5.04	8.75	0.00	12.00	0.00
2.50	12.59	5.75	5.04	9.00	0.00		
2.75	12.59	6.00	5.04	9.25	0.00		
3.00	12.59	6.25	1.89	9.50	0.00		

| CALIB |
| NASHYD (0001) | Area (ha)= 21.51 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.64

5783 Bloomington Road
Pre-development

DATE: May 2025

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	12.59	6.250	5.04	9.33	0.00
0.167	0.00	3.250	12.59	6.333	1.89	9.42	0.00
0.250	0.00	3.333	9.44	6.417	1.89	9.50	0.00
0.333	8.18	3.417	9.44	6.500	1.89	9.58	0.00
0.417	8.18	3.500	9.44	6.583	1.89	9.67	0.00
0.500	8.18	3.583	9.44	6.667	1.89	9.75	0.00
0.583	8.18	3.667	9.44	6.750	1.89	9.83	0.00
0.667	8.18	3.750	9.44	6.833	1.89	9.92	0.00
0.750	8.18	3.833	9.44	6.917	1.89	10.00	0.00
0.833	8.18	3.917	9.44	7.000	1.89	10.08	0.00
0.917	8.18	4.000	9.44	7.083	1.89	10.17	0.00
1.000	8.18	4.083	9.44	7.167	1.89	10.25	0.00
1.083	8.18	4.167	9.44	7.250	1.89	10.33	0.00
1.167	8.18	4.250	9.44	7.333	0.63	10.42	0.00
1.250	8.18	4.333	8.81	7.417	0.63	10.50	0.00
1.333	16.36	4.417	8.81	7.500	0.63	10.58	0.00
1.417	16.36	4.500	8.81	7.583	0.63	10.67	0.00
1.500	16.36	4.583	8.81	7.667	0.63	10.75	0.00
1.583	16.36	4.667	8.81	7.750	0.63	10.83	0.00
1.667	16.36	4.750	8.81	7.833	0.63	10.92	0.00
1.750	16.36	4.833	8.81	7.917	0.63	11.00	0.00
1.833	16.36	4.917	8.81	8.000	0.63	11.08	0.00
1.917	16.36	5.000	8.81	8.083	0.63	11.17	0.00
2.000	16.36	5.083	8.81	8.167	0.63	11.25	0.00
2.083	16.36	5.167	8.81	8.250	0.63	11.33	0.00
2.167	16.36	5.250	8.81	8.333	0.00	11.42	0.00
2.250	16.36	5.333	5.04	8.417	0.00	11.50	0.00
2.333	12.59	5.417	5.04	8.500	0.00	11.58	0.00
2.417	12.59	5.500	5.04	8.583	0.00	11.67	0.00
2.500	12.59	5.583	5.04	8.667	0.00	11.75	0.00
2.583	12.59	5.667	5.04	8.750	0.00	11.83	0.00
2.667	12.59	5.750	5.04	8.833	0.00	11.92	0.00
2.750	12.59	5.833	5.04	8.917	0.00	12.00	0.00
2.833	12.59	5.917	5.04	9.000	0.00	12.08	0.00
2.917	12.59	6.000	5.04	9.083	0.00	12.17	0.00
3.000	12.59	6.083	5.04	9.167	0.00	12.25	0.00
3.083	12.59	6.167	5.04	9.250	0.00		

Unit Hyd Qpeak (cms)= 1.284

PEAK FLOW (cms)= 0.216 (i)
TIME TO PEAK (hrs)= 5.333
RUNOFF VOLUME (mm)= 15.744
TOTAL RAINFALL (mm)= 62.940
RUNOFF COEFFICIENT = 0.250

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

CALIB					
NASHYD (0002)	Area	(ha)=	11.32	Curve Number (CN)=	65.0
ID= 1 DT= 5.0 min	Ia	(mm)=	8.00	# of Linear Res.(N)=	3.00
-----	U.H. Tp(hrs)=		0.57		

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN

hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	12.59	6.250	5.04	9.33	0.00
0.167	0.00	3.250	12.59	6.333	1.89	9.42	0.00
0.250	0.00	3.333	9.44	6.417	1.89	9.50	0.00
0.333	8.18	3.417	9.44	6.500	1.89	9.58	0.00
0.417	8.18	3.500	9.44	6.583	1.89	9.67	0.00
0.500	8.18	3.583	9.44	6.667	1.89	9.75	0.00
0.583	8.18	3.667	9.44	6.750	1.89	9.83	0.00
0.667	8.18	3.750	9.44	6.833	1.89	9.92	0.00
0.750	8.18	3.833	9.44	6.917	1.89	10.00	0.00
0.833	8.18	3.917	9.44	7.000	1.89	10.08	0.00
0.917	8.18	4.000	9.44	7.083	1.89	10.17	0.00
1.000	8.18	4.083	9.44	7.167	1.89	10.25	0.00
1.083	8.18	4.167	9.44	7.250	1.89	10.33	0.00
1.167	8.18	4.250	9.44	7.333	0.63	10.42	0.00
1.250	8.18	4.333	8.81	7.417	0.63	10.50	0.00
1.333	16.36	4.417	8.81	7.500	0.63	10.58	0.00
1.417	16.36	4.500	8.81	7.583	0.63	10.67	0.00
1.500	16.36	4.583	8.81	7.667	0.63	10.75	0.00
1.583	16.36	4.667	8.81	7.750	0.63	10.83	0.00
1.667	16.36	4.750	8.81	7.833	0.63	10.92	0.00
1.750	16.36	4.833	8.81	7.917	0.63	11.00	0.00
1.833	16.36	4.917	8.81	8.000	0.63	11.08	0.00
1.917	16.36	5.000	8.81	8.083	0.63	11.17	0.00
2.000	16.36	5.083	8.81	8.167	0.63	11.25	0.00
2.083	16.36	5.167	8.81	8.250	0.63	11.33	0.00
2.167	16.36	5.250	8.81	8.333	0.00	11.42	0.00
2.250	16.36	5.333	5.04	8.417	0.00	11.50	0.00
2.333	12.59	5.417	5.04	8.500	0.00	11.58	0.00
2.417	12.59	5.500	5.04	8.583	0.00	11.67	0.00
2.500	12.59	5.583	5.04	8.667	0.00	11.75	0.00
2.583	12.59	5.667	5.04	8.750	0.00	11.83	0.00
2.667	12.59	5.750	5.04	8.833	0.00	11.92	0.00
2.750	12.59	5.833	5.04	8.917	0.00	12.00	0.00
2.833	12.59	5.917	5.04	9.000	0.00	12.08	0.00
2.917	12.59	6.000	5.04	9.083	0.00	12.17	0.00
3.000	12.59	6.083	5.04	9.167	0.00	12.25	0.00
3.083	12.59	6.167	5.04	9.250	0.00		

Unit Hyd Qpeak (cms)= 0.759

PEAK FLOW (cms)= 0.114 (i)
TIME TO PEAK (hrs)= 5.333
RUNOFF VOLUME (mm)= 15.744
TOTAL RAINFALL (mm)= 62.940
RUNOFF COEFFICIENT = 0.250

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

ADD HYD (0003)				
1 + 2 = 3				
	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0001):	21.51	0.216	5.33	15.74
+ ID2= 2 (0002):	11.32	0.114	5.33	15.74
=====				
ID = 3 (0003):	32.83	0.330	5.33	15.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

5783 Bloomington Road
Pre-development

V V I SS U U A A L
V V I SS U U A A A L
V V I SS U U A A L
VV I SSSS UUUU A A LLLL

OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

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

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TIME: 01:01:05

USER:

COMMENTS: _____

** SIMULATION : AES_12HR_25yr_PCSWMM **

| READ STORM | Filename: C:\Users\jghobrial\AppData
| | ata\Local\Temp\
| | dee919a8-c033-417b-8a31-d619fb8db545\0402f699
| Ptotal= 73.55 mm | Comments: AES_12HR_25yr_PCSWMM

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	11.03	6.50	2.21	9.75	0.00
0.25	9.56	3.50	11.03	6.75	2.21	10.00	0.00
0.50	9.56	3.75	11.03	7.00	2.21	10.25	0.00
0.75	9.56	4.00	11.03	7.25	0.74	10.50	0.00
1.00	9.56	4.25	10.30	7.50	0.74	10.75	0.00
1.25	19.12	4.50	10.30	7.75	0.74	11.00	0.00
1.50	19.12	4.75	10.30	8.00	0.74	11.25	0.00
1.75	19.12	5.00	10.30	8.25	0.00	11.50	0.00
2.00	19.12	5.25	5.88	8.50	0.00	11.75	0.00
2.25	14.71	5.50	5.88	8.75	0.00	12.00	0.00
2.50	14.71	5.75	5.88	9.00	0.00		
2.75	14.71	6.00	5.88	9.25	0.00		
3.00	14.71	6.25	2.21	9.50	0.00		

| CALIB |

| NASHYD (0001) | Area (ha)= 21.51 Curve Number (CN)= 65.0
|ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.64

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

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	14.71	6.250	5.88	9.33	0.00
0.167	0.00	3.250	14.71	6.333	2.21	9.42	0.00
0.250	0.00	3.333	11.03	6.417	2.21	9.50	0.00
0.333	9.56	3.417	11.03	6.500	2.21	9.58	0.00
0.417	9.56	3.500	11.03	6.583	2.21	9.67	0.00
0.500	9.56	3.583	11.03	6.667	2.21	9.75	0.00
0.583	9.56	3.667	11.03	6.750	2.21	9.83	0.00
0.667	9.56	3.750	11.03	6.833	2.21	9.92	0.00
0.750	9.56	3.833	11.03	6.917	2.21	10.00	0.00
0.833	9.56	3.917	11.03	7.000	2.21	10.08	0.00
0.917	9.56	4.000	11.03	7.083	2.21	10.17	0.00
1.000	9.56	4.083	11.03	7.167	2.21	10.25	0.00
1.083	9.56	4.167	11.03	7.250	2.21	10.33	0.00
1.167	9.56	4.250	11.03	7.333	0.74	10.42	0.00
1.250	9.56	4.333	10.30	7.417	0.74	10.50	0.00
1.333	19.12	4.417	10.30	7.500	0.74	10.58	0.00
1.417	19.12	4.500	10.30	7.583	0.74	10.67	0.00
1.500	19.12	4.583	10.30	7.667	0.74	10.75	0.00
1.583	19.12	4.667	10.30	7.750	0.74	10.83	0.00
1.667	19.12	4.750	10.30	7.833	0.74	10.92	0.00
1.750	19.12	4.833	10.30	7.917	0.74	11.00	0.00
1.833	19.12	4.917	10.30	8.000	0.74	11.08	0.00
1.917	19.12	5.000	10.30	8.083	0.74	11.17	0.00
2.000	19.12	5.083	10.30	8.167	0.74	11.25	0.00
2.083	19.12	5.167	10.30	8.250	0.74	11.33	0.00
2.167	19.12	5.250	10.30	8.333	0.00	11.42	0.00
2.250	19.12	5.333	5.88	8.417	0.00	11.50	0.00
2.333	14.71	5.417	5.88	8.500	0.00	11.58	0.00
2.417	14.71	5.500	5.88	8.583	0.00	11.67	0.00
2.500	14.71	5.583	5.88	8.667	0.00	11.75	0.00
2.583	14.71	5.667	5.88	8.750	0.00	11.83	0.00
2.667	14.71	5.750	5.88	8.833	0.00	11.92	0.00
2.750	14.71	5.833	5.88	8.917	0.00	12.00	0.00
2.833	14.71	5.917	5.88	9.000	0.00	12.08	0.00
2.917	14.71	6.000	5.88	9.083	0.00	12.17	0.00
3.000	14.71	6.083	5.88	9.167	0.00	12.25	0.00
3.083	14.71	6.167	5.88	9.250	0.00		

Unit Hyd Qpeak (cms)= 1.284

PEAK FLOW (cms)= 0.284 (i)
TIME TO PEAK (hrs)= 5.333
RUNOFF VOLUME (mm)= 21.237
TOTAL RAINFALL (mm)= 73.550
RUNOFF COEFFICIENT = 0.289

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

| CALIB |
| NASHYD (0002) | Area (ha)= 11.32 Curve Number (CN)= 65.0
|ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.57

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

--- TRANSFORMED HYETOGRAPH ---								
TIME	RAIN	TIME	RAIN	'	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr		hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	14.71	6.250	5.88	9.33	0.00	
0.167	0.00	3.250	14.71	6.333	2.21	9.42	0.00	
0.250	0.00	3.333	11.03	6.417	2.21	9.50	0.00	
0.333	9.56	3.417	11.03	6.500	2.21	9.58	0.00	
0.417	9.56	3.500	11.03	6.583	2.21	9.67	0.00	
0.500	9.56	3.583	11.03	6.667	2.21	9.75	0.00	
0.583	9.56	3.667	11.03	6.750	2.21	9.83	0.00	
0.667	9.56	3.750	11.03	6.833	2.21	9.92	0.00	
0.750	9.56	3.833	11.03	6.917	2.21	10.00	0.00	
0.833	9.56	3.917	11.03	7.000	2.21	10.08	0.00	
0.917	9.56	4.000	11.03	7.083	2.21	10.17	0.00	
1.000	9.56	4.083	11.03	7.167	2.21	10.25	0.00	
1.083	9.56	4.167	11.03	7.250	2.21	10.33	0.00	
1.167	9.56	4.250	11.03	7.333	0.74	10.42	0.00	
1.250	9.56	4.333	10.30	7.417	0.74	10.50	0.00	
1.333	19.12	4.417	10.30	7.500	0.74	10.58	0.00	
1.417	19.12	4.500	10.30	7.583	0.74	10.67	0.00	
1.500	19.12	4.583	10.30	7.667	0.74	10.75	0.00	
1.583	19.12	4.667	10.30	7.750	0.74	10.83	0.00	
1.667	19.12	4.750	10.30	7.833	0.74	10.92	0.00	
1.750	19.12	4.833	10.30	7.917	0.74	11.00	0.00	
1.833	19.12	4.917	10.30	8.000	0.74	11.08	0.00	
1.917	19.12	5.000	10.30	8.083	0.74	11.17	0.00	
2.000	19.12	5.083	10.30	8.167	0.74	11.25	0.00	
2.083	19.12	5.167	10.30	8.250	0.74	11.33	0.00	
2.167	19.12	5.250	10.30	8.333	0.00	11.42	0.00	
2.250	19.12	5.333	5.88	8.417	0.00	11.50	0.00	
2.333	14.71	5.417	5.88	8.500	0.00	11.58	0.00	
2.417	14.71	5.500	5.88	8.583	0.00	11.67	0.00	
2.500	14.71	5.583	5.88	8.667	0.00	11.75	0.00	
2.583	14.71	5.667	5.88	8.750	0.00	11.83	0.00	
2.667	14.71	5.750	5.88	8.833	0.00	11.92	0.00	
2.750	14.71	5.833	5.88	8.917	0.00	12.00	0.00	
2.833	14.71	5.917	5.88	9.000	0.00	12.08	0.00	
2.917	14.71	6.000	5.88	9.083	0.00	12.17	0.00	
3.000	14.71	6.083	5.88	9.167	0.00	12.25	0.00	
3.083	14.71	6.167	5.88	9.250	0.00			

Unit Hyd Q_{peak} (cms) = 0.759

PEAK FLOW	(cms)=	0.151	(i)
TIME TO PEAK	(hrs)=	5.333	
RUNOFF VOLUME	(mm)=	21.237	
TOTAL RAINFALL	(mm)=	73.550	
RUNOFF COEFFICIENT	=	0.289	

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

ADD HYD (0003):				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0001):	21.51	0.284	5.33	21.24
+ ID2= 2 (0002):	11.32	0.151	5.33	21.24
ID = 3 (0003):	32.83	0.435	5.33	21.24

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH

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

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	OOO	TTTTT	TTTTT	H	H	Y	Y	M	M	OOO	TM
O	O	T	T	H	H	Y	Y	MM	MM	O	O
O	O	T	T	H	H	Y	Y	M	M	O	O
	OOO	T	T	H	H	Y	Y	M	M	OOO	

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

```
Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jghobrial\AppData\Local\Civica\VH5\fbddaa27-fb71-4db6-9c16-43e17470752a\f85a4481-f07d-4daa-9550-a8cddacd3162\sc
Summary filename: C:\Users\jghobrial\AppData\Local\Civica\VH5\fbddaa27-fb71-4db6-9c16-43e17470752a\f85a4481-f07d-4daa-9550-a8cddacd3162\sc
```

DATE: 05-16-2025

TIME: 01:01:05

USER:

COMMENTS:

```
*****
** SIMULATION : AES_12HR_2yr_PCSWMM                               **
*****
```

READ STORM	Filename: C:\Users\jghobrial\AppData
	ata\Local\Temp\
	dee919a8-c033-417b-8a31-d619fb8db545\add69d45
Ptotal= 41.65 mm	Comments: AES 12HR 2yr PCSWMM

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	6.25	6.50	1.25	9.75	0.00
0.25	5.41	3.50	6.25	6.75	1.25	10.00	0.00
0.50	5.41	3.75	6.25	7.00	1.25	10.25	0.00
0.75	5.41	4.00	6.25	7.25	0.42	10.50	0.00
1.00	5.41	4.25	5.83	7.50	0.42	10.75	0.00
1.25	10.83	4.50	5.83	7.75	0.42	11.00	0.00
1.50	10.83	4.75	5.83	8.00	0.42	11.25	0.00
1.75	10.83	5.00	5.83	8.25	0.00	11.50	0.00
2.00	10.83	5.25	3.33	8.50	0.00	11.75	0.00

5783 Bloomington Road
Pre-development

DATE: May 2025

2.25	8.33	5.50	3.33	8.75	0.00	12.00	0.00
2.50	8.33	5.75	3.33	9.00	0.00		
2.75	8.33	6.00	3.33	9.25	0.00		
3.00	8.33	6.25	1.25	9.50	0.00		

CALIB							
NASHYD (0001)	Area	(ha)=	21.51	Curve Number	(CN)=	65.0	
ID= 1 DT= 5.0 min	Ia	(mm)=	8.00	# of Linear Res.(N)=	3.00		
	U.H. Tp(hrs)=		0.64				

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	8.33	6.250	3.33	9.33	0.00
0.167	0.00	3.250	8.33	6.333	1.25	9.42	0.00
0.250	0.00	3.333	6.25	6.417	1.25	9.50	0.00
0.333	5.41	3.417	6.25	6.500	1.25	9.58	0.00
0.417	5.41	3.500	6.25	6.583	1.25	9.67	0.00
0.500	5.41	3.583	6.25	6.667	1.25	9.75	0.00
0.583	5.41	3.667	6.25	6.750	1.25	9.83	0.00
0.667	5.41	3.750	6.25	6.833	1.25	9.92	0.00
0.750	5.41	3.833	6.25	6.917	1.25	10.00	0.00
0.833	5.41	3.917	6.25	7.000	1.25	10.08	0.00
0.917	5.41	4.000	6.25	7.083	1.25	10.17	0.00
1.000	5.41	4.083	6.25	7.167	1.25	10.25	0.00
1.083	5.41	4.167	6.25	7.250	1.25	10.33	0.00
1.167	5.41	4.250	6.25	7.333	0.42	10.42	0.00
1.250	5.41	4.333	5.83	7.417	0.42	10.50	0.00
1.333	10.83	4.417	5.83	7.500	0.42	10.58	0.00
1.417	10.83	4.500	5.83	7.583	0.42	10.67	0.00
1.500	10.83	4.583	5.83	7.667	0.42	10.75	0.00
1.583	10.83	4.667	5.83	7.750	0.42	10.83	0.00
1.667	10.83	4.750	5.83	7.833	0.42	10.92	0.00
1.750	10.83	4.833	5.83	7.917	0.42	11.00	0.00
1.833	10.83	4.917	5.83	8.000	0.42	11.08	0.00
1.917	10.83	5.000	5.83	8.083	0.42	11.17	0.00
2.000	10.83	5.083	5.83	8.167	0.42	11.25	0.00
2.083	10.83	5.167	5.83	8.250	0.42	11.33	0.00
2.167	10.83	5.250	5.83	8.333	0.00	11.42	0.00
2.250	10.83	5.333	3.33	8.417	0.00	11.50	0.00
2.333	8.33	5.417	3.33	8.500	0.00	11.58	0.00
2.417	8.33	5.500	3.33	8.583	0.00	11.67	0.00
2.500	8.33	5.583	3.33	8.667	0.00	11.75	0.00
2.583	8.33	5.667	3.33	8.750	0.00	11.83	0.00
2.667	8.33	5.750	3.33	8.833	0.00	11.92	0.00
2.750	8.33	5.833	3.33	8.917	0.00	12.00	0.00
2.833	8.33	5.917	3.33	9.000	0.00	12.08	0.00
2.917	8.33	6.000	3.33	9.083	0.00	12.17	0.00
3.000	8.33	6.083	3.33	9.167	0.00	12.25	0.00
3.083	8.33	6.167	3.33	9.250	0.00		

Unit Hyd Qpeak (cms)= 1.284

PEAK FLOW (cms)= 0.097 (i)
TIME TO PEAK (hrs)= 5.417
RUNOFF VOLUME (mm)= 6.644
TOTAL RAINFALL (mm)= 41.650
RUNOFF COEFFICIENT = 0.160

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

CALIB							
NASHYD (0002)	Area	(ha)=	11.32	Curve Number	(CN)=	65.0	
ID= 1 DT= 5.0 min	Ia	(mm)=	8.00	# of Linear Res.(N)=	3.00		
	U.H. Tp(hrs)=		0.57				

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	8.33	6.250	3.33	9.33	0.00
0.167	0.00	3.250	8.33	6.333	1.25	9.42	0.00
0.250	0.00	3.333	6.25	6.417	1.25	9.50	0.00
0.333	5.41	3.417	6.25	6.500	1.25	9.58	0.00
0.417	5.41	3.500	6.25	6.583	1.25	9.67	0.00
0.500	5.41	3.583	6.25	6.667	1.25	9.75	0.00
0.583	5.41	3.667	6.25	6.750	1.25	9.83	0.00
0.667	5.41	3.750	6.25	6.833	1.25	9.92	0.00
0.750	5.41	3.833	6.25	6.917	1.25	10.00	0.00
0.833	5.41	3.917	6.25	7.000	1.25	10.08	0.00
0.917	5.41	4.000	6.25	7.083	1.25	10.17	0.00
1.000	5.41	4.083	6.25	7.167	1.25	10.25	0.00
1.083	5.41	4.167	6.25	7.250	1.25	10.33	0.00
1.167	5.41	4.250	6.25	7.333	0.42	10.42	0.00
1.250	5.41	4.333	5.83	7.417	0.42	10.50	0.00
1.333	10.83	4.417	5.83	7.500	0.42	10.58	0.00
1.417	10.83	4.500	5.83	7.583	0.42	10.67	0.00
1.500	10.83	4.583	5.83	7.667	0.42	10.75	0.00
1.583	10.83	4.667	5.83	7.750	0.42	10.83	0.00
1.667	10.83	4.750	5.83	7.833	0.42	10.92	0.00
1.750	10.83	4.833	5.83	7.917	0.42	11.00	0.00
1.833	10.83	4.917	5.83	8.000	0.42	11.08	0.00
1.917	10.83	5.000	5.83	8.083	0.42	11.17	0.00
2.000	10.83	5.083	5.83	8.167	0.42	11.25	0.00
2.083	10.83	5.167	5.83	8.250	0.42	11.33	0.00
2.167	10.83	5.250	5.83	8.333	0.00	11.42	0.00
2.250	10.83	5.333	3.33	8.417	0.00	11.50	0.00
2.333	8.33	5.417	3.33	8.500	0.00	11.58	0.00
2.417	8.33	5.500	3.33	8.583	0.00	11.67	0.00
2.500	8.33	5.583	3.33	8.667	0.00	11.75	0.00
2.583	8.33	5.667	3.33	8.750	0.00	11.83	0.00
2.667	8.33	5.750	3.33	8.833	0.00	11.92	0.00
2.750	8.33	5.833	3.33	8.917	0.00	12.00	0.00
2.833	8.33	5.917	3.33	9.000	0.00	12.08	0.00
2.917	8.33	6.000	3.33	9.083	0.00	12.17	0.00
3.000	8.33	6.083	3.33	9.167	0.00	12.25	0.00
3.083	8.33	6.167	3.33	9.250	0.00		

Unit Hyd Qpeak (cms)= 0.759

PEAK FLOW (cms)= 0.052 (i)
TIME TO PEAK (hrs)= 5.333
RUNOFF VOLUME (mm)= 6.644
TOTAL RAINFALL (mm)= 41.650
RUNOFF COEFFICIENT = 0.160

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

ADD HYD (0003)

5783 Bloomington Road

Pre-development

DATE: May 2025

1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
-----	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0001):	21.51	0.097	5.42	6.64
+ ID2= 2 (0002):	11.32	0.052	5.33	6.64
=====				
ID = 3 (0003):	32.83	0.149	5.42	6.64

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

1.25	21.70		4.50	11.69		7.75	0.83		11.00	0.00
1.50	21.70		4.75	11.69		8.00	0.83		11.25	0.00
1.75	21.70		5.00	11.69		8.25	0.00		11.50	0.00
2.00	21.70		5.25	6.68		8.50	0.00		11.75	0.00
2.25	16.70		5.50	6.68		8.75	0.00		12.00	0.00
2.50	16.70		5.75	6.68		9.00	0.00			
2.75	16.70		6.00	6.68		9.25	0.00			
3.00	16.70		6.25	2.50		9.50	0.00			

V	V	I	SSSS	U	U	A	L	(v 6.2.2015)
V	V	I	SS	U	U	A	A	L
V	V	I	SS	U	U	AAAA	L	
V	V	I	SS	U	U	A	A	L
VV		I	SSSS	UUUU	A	A	LLLL	

OOO	TTTT	TTTT	H	H	Y	Y	M	M	OOO	TM	
O	O	T	T	H	H	Y	Y	MM	MM	O	O
O	O	T	T	H	H	Y	M	M	O	O	
OOO	T	T	H	H	Y	M	M	OOO			

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\7b9ea818-5aa9-473d-a42c-7ffa8b858b83\sc
Summary filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\7b9ea818-5aa9-473d-a42c-7ffa8b858b83\sc

DATE: 05-16-2025

TIME: 01:01:05

USER:

COMMENTS: _____

** SIMULATION : AES_12HR_50yr_PCSWMM **

READ STORM	Filename: C:\Users\jghobrial\AppData
	ata\Local\Temp\
	dee919a8-c033-417b-8a31-d619fb8db545\le054a33
Ptotal= 83.47 mm	Comments: AES_12HR_50yr_PCSWMM

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	12.52	6.50	2.50	9.75	0.00
0.25	10.85	3.50	12.52	6.75	2.50	10.00	0.00
0.50	10.85	3.75	12.52	7.00	2.50	10.25	0.00
0.75	10.85	4.00	12.52	7.25	0.83	10.50	0.00
1.00	10.85	4.25	11.69	7.50	0.83	10.75	0.00

CALIB	
NASHYD (0001)	Area (ha)= 21.51
ID= 1 DT= 5.0 min	Ia (mm)= 8.00
U.H. Tp(hrs)= 0.64	Curve Number (CN)= 65.0
	# of Linear Res.(N)= 3.00

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

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	16.70	6.250	6.68	9.33	0.00
0.167	0.00	3.250	16.70	6.333	2.50	9.42	0.00
0.250	0.00	3.333	12.52	6.417	2.50	9.50	0.00
0.333	10.85	3.417	12.52	6.500	2.50	9.58	0.00
0.417	10.85	3.500	12.52	6.583	2.50	9.67	0.00
0.500	10.85	3.583	12.52	6.667	2.50	9.75	0.00
0.583	10.85	3.667	12.52	6.750	2.50	9.83	0.00
0.667	10.85	3.750	12.52	6.833	2.50	9.92	0.00
0.750	10.85	3.833	12.52	6.917	2.50	10.00	0.00
0.833	10.85	3.917	12.52	7.000	2.50	10.08	0.00
0.917	10.85	4.000	12.52	7.083	2.50	10.17	0.00
1.000	10.85	4.083	12.52	7.167	2.50	10.25	0.00
1.083	10.85	4.167	12.52	7.250	2.50	10.33	0.00
1.167	10.85	4.250	12.52	7.333	0.83	10.42	0.00
1.250	10.85	4.333	11.69	7.417	0.83	10.50	0.00
1.333	21.70	4.417	11.69	7.500	0.83	10.58	0.00
1.417	21.70	4.500	11.69	7.583	0.83	10.67	0.00
1.500	21.70	4.583	11.69	7.667	0.83	10.75	0.00
1.583	21.70	4.667	11.69	7.750	0.83	10.83	0.00
1.667	21.70	4.750	11.69	7.833	0.83	10.92	0.00
1.750	21.70	4.833	11.69	7.917	0.83	11.00	0.00
1.833	21.70	4.917	11.69	8.000	0.83	11.08	0.00
1.917	21.70	5.000	11.69	8.083	0.83	11.17	0.00
2.000	21.70	5.083	11.69	8.167	0.83	11.25	0.00
2.083	21.70	5.167	11.69	8.250	0.83	11.33	0.00
2.167	21.70	5.250	11.69	8.333	0.00	11.42	0.00
2.250	21.70	5.333	6.68	8.417	0.00	11.50	0.00
2.333	16.70	5.417	6.68	8.500	0.00	11.58	0.00
2.417	16.70	5.500	6.68	8.583	0.00	11.67	0.00
2.500	16.70	5.583	6.68	8.667	0.00	11.75	0.00
2.583	16.70	5.667	6.68	8.750	0.00	11.83	0.00
2.667	16.70	5.750	6.68	8.833	0.00	11.92	0.00
2.750	16.70	5.833	6.68	8.917	0.00	12.00	0.00
2.833	16.70	5.917	6.68	9.000	0.00	12.08	0.00
2.917	16.70	6.000	6.68	9.083	0.00	12.17	0.00
3.000	16.70	6.083	6.68	9.167	0.00	12.25	0.00
3.083	16.70	6.167	6.68	9.250	0.00		

Unit Hyd Qpeak (cms)= 1.284

PEAK FLOW (cms)= 0.353 (i)

TIME TO PEAK (hrs)= 5.333

RUNOFF VOLUME (mm)= 26.836

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TOTAL RAINFALL (mm)= 83.470
RUNOFF COEFFICIENT = 0.322

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

| CALIB |
| NASHYD (0002) | Area (ha)= 11.32 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.57

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

----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
0.083 0.00 | 3.167 16.70 | 6.250 6.68 | 9.33 0.00
0.167 0.00 | 3.250 16.70 | 6.333 2.50 | 9.42 0.00
0.250 0.00 | 3.333 12.52 | 6.417 2.50 | 9.50 0.00
0.333 10.85 | 3.417 12.52 | 6.500 2.50 | 9.58 0.00
0.417 10.85 | 3.500 12.52 | 6.583 2.50 | 9.67 0.00
0.500 10.85 | 3.583 12.52 | 6.667 2.50 | 9.75 0.00
0.583 10.85 | 3.667 12.52 | 6.750 2.50 | 9.83 0.00
0.667 10.85 | 3.750 12.52 | 6.833 2.50 | 9.92 0.00
0.750 10.85 | 3.833 12.52 | 6.917 2.50 | 10.00 0.00
0.833 10.85 | 3.917 12.52 | 7.000 2.50 | 10.08 0.00
0.917 10.85 | 4.000 12.52 | 7.083 2.50 | 10.17 0.00
1.000 10.85 | 4.083 12.52 | 7.167 2.50 | 10.25 0.00
1.083 10.85 | 4.167 12.52 | 7.250 2.50 | 10.33 0.00
1.167 10.85 | 4.250 12.52 | 7.333 0.83 | 10.42 0.00
1.250 10.85 | 4.333 11.69 | 7.417 0.83 | 10.50 0.00
1.333 21.70 | 4.417 11.69 | 7.500 0.83 | 10.58 0.00
1.417 21.70 | 4.500 11.69 | 7.583 0.83 | 10.67 0.00
1.500 21.70 | 4.583 11.69 | 7.667 0.83 | 10.75 0.00
1.583 21.70 | 4.667 11.69 | 7.750 0.83 | 10.83 0.00
1.667 21.70 | 4.750 11.69 | 7.833 0.83 | 10.92 0.00
1.750 21.70 | 4.833 11.69 | 7.917 0.83 | 11.00 0.00
1.833 21.70 | 4.917 11.69 | 8.000 0.83 | 11.08 0.00
1.917 21.70 | 5.000 11.69 | 8.083 0.83 | 11.17 0.00
2.000 21.70 | 5.083 11.69 | 8.167 0.83 | 11.25 0.00
2.083 21.70 | 5.167 11.69 | 8.250 0.83 | 11.33 0.00
2.167 21.70 | 5.250 11.69 | 8.333 0.00 | 11.42 0.00
2.250 21.70 | 5.333 6.68 | 8.417 0.00 | 11.50 0.00
2.333 16.70 | 5.417 6.68 | 8.500 0.00 | 11.58 0.00
2.417 16.70 | 5.500 6.68 | 8.583 0.00 | 11.67 0.00
2.500 16.70 | 5.583 6.68 | 8.667 0.00 | 11.75 0.00
2.583 16.70 | 5.667 6.68 | 8.750 0.00 | 11.83 0.00
2.667 16.70 | 5.750 6.68 | 8.833 0.00 | 11.92 0.00
2.750 16.70 | 5.833 6.68 | 8.917 0.00 | 12.00 0.00
2.833 16.70 | 5.917 6.68 | 9.000 0.00 | 12.08 0.00
2.917 16.70 | 6.000 6.68 | 9.083 0.00 | 12.17 0.00
3.000 16.70 | 6.083 6.68 | 9.167 0.00 | 12.25 0.00
3.083 16.70 | 6.167 6.68 | 9.250 0.00 |

Unit Hyd Qpeak (cms)= 0.759

PEAK FLOW (cms)= 0.187 (i)
TIME TO PEAK (hrs)= 5.333
RUNOFF VOLUME (mm)= 26.835
TOTAL RAINFALL (mm)= 83.470
RUNOFF COEFFICIENT = 0.321

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

| ADD HYD (0003) |
1 + 2 = 3
ID1= 1 (0001): 21.51 0.353 5.33 26.84
+ ID2= 2 (0002): 11.32 0.187 5.33 26.84

ID = 3 (0003): 32.83 0.540 5.33 26.84

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

V V I SSSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U A A L
V V I SSSSS UUUUU A A LLLLL
OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y M M O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\4792e1bc-3646-439f-be7a-82d2d8c965b0\sc
Summary filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\4792e1bc-3646-439f-be7a-82d2d8c965b0\sc

DATE: 05-16-2025

TIME: 01:01:05

USER:

COMMENTS: _____

** SIMULATION : AES_12HR_5yr_PCSWMM **

| READ STORM | Filename: C:\Users\jghobrial\AppData
| | ata\Local\Temp\
| | dee919a8-c033-417b-8a31-d619fb8db545\9ddca7da
| Ptotal= 54.45 mm | Comments: AES_12HR_5yr_PCSWMM

TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
0.00 0.00 | 3.25 8.17 | 6.50 1.63 | 9.75 0.00

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0.25	7.08	3.50	8.17	6.75	1.63	10.00	0.00
0.50	7.08	3.75	8.17	7.00	1.63	10.25	0.00
0.75	7.08	4.00	8.17	7.25	0.54	10.50	0.00
1.00	7.08	4.25	7.62	7.50	0.54	10.75	0.00
1.25	14.16	4.50	7.62	7.75	0.54	11.00	0.00
1.50	14.16	4.75	7.62	8.00	0.54	11.25	0.00
1.75	14.16	5.00	7.62	8.25	0.00	11.50	0.00
2.00	14.16	5.25	4.36	8.50	0.00	11.75	0.00
2.25	10.89	5.50	4.36	8.75	0.00	12.00	0.00
2.50	10.89	5.75	4.36	9.00	0.00		
2.75	10.89	6.00	4.36	9.25	0.00		
3.00	10.89	6.25	1.63	9.50	0.00		

PEAK FLOW (cms)= 0.165 (i)
TIME TO PEAK (hrs)= 5.333
RUNOFF VOLUME (mm)= 11.776
TOTAL RAINFALL (mm)= 54.450
RUNOFF COEFFICIENT = 0.216

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

| CALIB |
| NASHYD (0002) | Area (ha)= 11.32 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.57

| CALIB |
| NASHYD (0001) | Area (ha)= 21.51 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.64

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

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

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	10.89	6.250	4.36	9.33	0.00
0.167	0.00	3.250	10.89	6.333	1.63	9.42	0.00
0.250	0.00	3.333	8.17	6.417	1.63	9.50	0.00
0.333	7.08	3.417	8.17	6.500	1.63	9.58	0.00
0.417	7.08	3.500	8.17	6.583	1.63	9.67	0.00
0.500	7.08	3.583	8.17	6.667	1.63	9.75	0.00
0.583	7.08	3.667	8.17	6.750	1.63	9.83	0.00
0.667	7.08	3.750	8.17	6.833	1.63	9.92	0.00
0.750	7.08	3.833	8.17	6.917	1.63	10.00	0.00
0.833	7.08	3.917	8.17	7.000	1.63	10.08	0.00
0.917	7.08	4.000	8.17	7.083	1.63	10.17	0.00
1.000	7.08	4.083	8.17	7.167	1.63	10.25	0.00
1.083	7.08	4.167	8.17	7.250	1.63	10.33	0.00
1.167	7.08	4.250	8.17	7.333	0.54	10.42	0.00
1.250	7.08	4.333	7.62	7.417	0.54	10.50	0.00
1.333	14.16	4.417	7.62	7.500	0.54	10.58	0.00
1.417	14.16	4.500	7.62	7.583	0.54	10.67	0.00
1.500	14.16	4.583	7.62	7.667	0.54	10.75	0.00
1.583	14.16	4.667	7.62	7.750	0.54	10.83	0.00
1.667	14.16	4.750	7.62	7.833	0.54	10.92	0.00
1.750	14.16	4.833	7.62	7.917	0.54	11.00	0.00
1.833	14.16	4.917	7.62	8.000	0.54	11.08	0.00
1.917	14.16	5.000	7.62	8.083	0.54	11.17	0.00
2.000	14.16	5.083	7.62	8.167	0.54	11.25	0.00
2.083	14.16	5.167	7.62	8.250	0.54	11.33	0.00
2.167	14.16	5.250	7.62	8.333	0.00	11.42	0.00
2.250	14.16	5.333	4.36	8.417	0.00	11.50	0.00
2.333	10.89	5.417	4.36	8.500	0.00	11.58	0.00
2.417	10.89	5.500	4.36	8.583	0.00	11.67	0.00
2.500	10.89	5.583	4.36	8.667	0.00	11.75	0.00
2.583	10.89	5.667	4.36	8.750	0.00	11.83	0.00
2.667	10.89	5.750	4.36	8.833	0.00	11.92	0.00
2.750	10.89	5.833	4.36	8.917	0.00	12.00	0.00
2.833	10.89	5.917	4.36	9.000	0.00	12.08	0.00
2.917	10.89	6.000	4.36	9.083	0.00	12.17	0.00
3.000	10.89	6.083	4.36	9.167	0.00	12.25	0.00
3.083	10.89	6.167	4.36	9.250	0.00		

Unit Hyd Qpeak (cms)= 1.284

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	10.89	6.250	4.36	9.33	0.00
0.167	0.00	3.250	10.89	6.333	1.63	9.42	0.00
0.250	0.00	3.333	8.17	6.417	1.63	9.50	0.00
0.333	7.08	3.417	8.17	6.500	1.63	9.58	0.00
0.417	7.08	3.500	8.17	6.583	1.63	9.67	0.00
0.500	7.08	3.583	8.17	6.667	1.63	9.75	0.00
0.583	7.08	3.667	8.17	6.750	1.63	9.83	0.00
0.667	7.08	3.750	8.17	6.833	1.63	9.92	0.00
0.750	7.08	3.833	8.17	6.917	1.63	10.00	0.00
0.833	7.08	3.917	8.17	7.000	1.63	10.08	0.00
0.917	7.08	4.000	8.17	7.083	1.63	10.17	0.00
1.000	7.08	4.083	8.17	7.167	1.63	10.25	0.00
1.083	7.08	4.167	8.17	7.250	1.63	10.33	0.00
1.167	7.08	4.250	8.17	7.333	0.54	10.42	0.00
1.250	7.08	4.333	7.62	7.417	0.54	10.50	0.00
1.333	14.16	4.417	7.62	7.500	0.54	10.58	0.00
1.417	14.16	4.500	7.62	7.583	0.54	10.67	0.00
1.500	14.16	4.583	7.62	7.667	0.54	10.75	0.00
1.583	14.16	4.667	7.62	7.750	0.54	10.83	0.00
1.667	14.16	4.750	7.62	7.833	0.54	10.92	0.00
1.750	14.16	4.833	7.62	7.917	0.54	11.00	0.00
1.833	14.16	4.917	7.62	8.000	0.54	11.08	0.00
1.917	14.16	5.000	7.62	8.083	0.54	11.17	0.00
2.000	14.16	5.083	7.62	8.167	0.54	11.25	0.00
2.083	14.16	5.167	7.62	8.250	0.54	11.33	0.00
2.167	14.16	5.250	7.62	8.333	0.00	11.42	0.00
2.250	14.16	5.333	4.36	8.417	0.00	11.50	0.00
2.333	10.89	5.417	4.36	8.500	0.00	11.58	0.00
2.417	10.89	5.500	4.36	8.583	0.00	11.67	0.00
2.500	10.89	5.583	4.36	8.667	0.00	11.75	0.00
2.583	10.89	5.667	4.36	8.750	0.00	11.83	0.00
2.667	10.89	5.750	4.36	8.833	0.00	11.92	0.00
2.750	10.89	5.833	4.36	8.917	0.00	12.00	0.00
2.833	10.89	5.917	4.36	9.000	0.00	12.08	0.00
2.917	10.89	6.000	4.36	9.083	0.00	12.17	0.00
3.000	10.89	6.083	4.36	9.167	0.00	12.25	0.00
3.083	10.89	6.167	4.36	9.250	0.00		

Unit Hyd Qpeak (cms)= 0.759

PEAK FLOW (cms)= 0.088 (i)
TIME TO PEAK (hrs)= 5.333
RUNOFF VOLUME (mm)= 11.776
TOTAL RAINFALL (mm)= 54.450

5783 Bloomington Road
Pre-development

DATE: May 2025

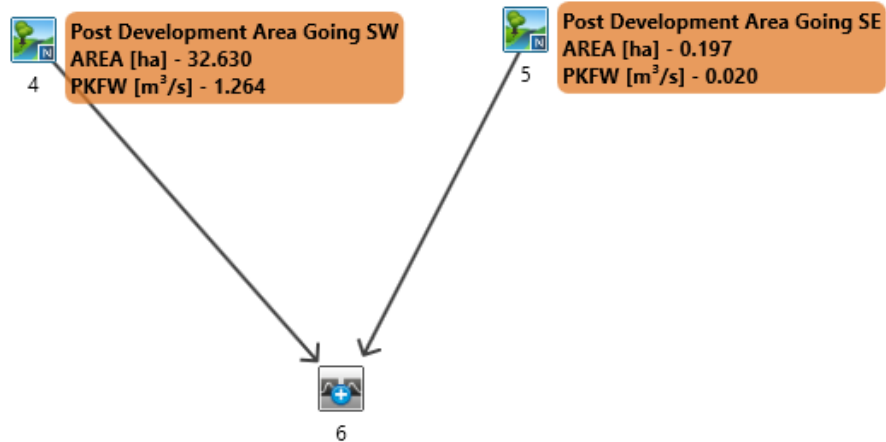
RUNOFF COEFFICIENT = 0.216

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

	ADD	HYD	(	0003	
	1	+	2	=	3

			AREA	QPEAK	TPEAK
			(ha)	(cms)	(hrs)
					R.V.
					(mm)
	ID1=	1	(	0001	:
					21.51
					0.165
					5.33
					11.78
	+	ID2=	2	(	0002
					:
					11.32
					0.088
					5.33
					11.78
=====					
	ID	=	3	(	0003
					:
					32.83
					0.252
					5.33
					11.78

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.



V	V	I	SSSSS	U	U	A	L	(v 6.2.2015)
V	V	I	SS	U	U	A A	L	
V	V	I	SS	U	U	AAAAA	L	
V	V	I	SS	U	U	A	A L	
VV		I	SSSSS	UUUUU	A	A	LLLLL	

	OOO	TTTTT	TTTTT	H	H	Y	Y	M	M	OOO	TM
O	O	T	T	H	H	Y	Y	MM	MM	O	O
O	O	T	T	H	H	Y		M	M	O	O
	OOO	T	T	H	H	Y		M	M	OOO	

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

```

Input   filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voim.dat
Output  filename: C:\Users\jghobriol\AppData\Local\Civica\VH5\fbddaa27-fb71-
4db6-9c16-43e17470752a\3415748b-09ba-43fc-ab4e-1e07b099693e\sc
Summary filename: C:\Users\jghobriol\AppData\Local\Civica\VH5\fbddaa27-fb71-
4db6-9c16-43e17470752a\3415748b-09ba-43fc-ab4e-1e07b099693e\sc

```

DATE: 05-16-2025

TIME: 01:10:14

USER:

COMMENTS:

```
*****
** SIMULATION : 100yr Chicago                               **
*****
```

```
| CHICAGO STORM | IDF curve parameters: A=1770.000
| Ptotal= 73.74 mm | B= 4.000
|-----| C= 0.820
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33
```

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	5.92	0.83	203.31	1.67	10.60	2.50	5.65
0.17	7.33	1.00	50.96	1.83	8.96	2.67	5.19
0.33	9.77	1.17	25.51	2.00	7.78	2.83	4.81
0.50	15.10	1.33	17.18	2.17	6.90		
0.67	38.21	1.50	13.06	2.33	6.21		

CALIB					
NASHYD	(0004)	Area	(ha)= 32.63	Curve Number	(CN)= 65.0



SCHAEFFERS
CONSULTING ENGINEERS

Visual OTTHYMO™ Schematic
Post-Development
4Hr Chicago (Municipality), 12Hr AES
(Municipality)

Job #: 2023-5354

Date: May 2025

5783 Bloomington Road

Pos-development

|ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 0.54

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

----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN |' TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr |' hrs mm/hr | hrs mm/hr
0.083 5.92 | 0.833 38.21 | 1.583 13.06 | 2.33 6.90
0.167 5.92 | 0.917 203.30 | 1.667 13.06 | 2.42 6.21
0.250 7.33 | 1.000 203.31 | 1.750 10.60 | 2.50 6.21
0.333 7.33 | 1.083 50.96 | 1.833 10.60 | 2.58 5.65
0.417 9.77 | 1.167 50.96 | 1.917 8.96 | 2.67 5.65
0.500 9.77 | 1.250 25.51 | 2.000 8.96 | 2.75 5.19
0.583 15.10 | 1.333 25.51 | 2.083 7.78 | 2.83 5.19
0.667 15.10 | 1.417 17.18 | 2.167 7.78 | 2.92 4.81
0.750 38.21 | 1.500 17.18 | 2.250 6.90 | 3.00 4.81

Unit Hyd Qpeak (cms)= 2.308

PEAK FLOW (cms)= 1.264 (i)
TIME TO PEAK (hrs)= 1.583
RUNOFF VOLUME (mm)= 21.340
TOTAL RAINFALL (mm)= 73.740
RUNOFF COEFFICIENT = 0.289

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

| CALIB |
| NASHYD (0005) | Area (ha)= 0.20 Curve Number (CN)= 65.0
|ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 0.11

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

----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN |' TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr |' hrs mm/hr | hrs mm/hr
0.083 5.92 | 0.833 38.21 | 1.583 13.06 | 2.33 6.90
0.167 5.92 | 0.917 203.30 | 1.667 13.06 | 2.42 6.21
0.250 7.33 | 1.000 203.31 | 1.750 10.60 | 2.50 6.21
0.333 7.33 | 1.083 50.96 | 1.833 10.60 | 2.58 5.65
0.417 9.77 | 1.167 50.96 | 1.917 8.96 | 2.67 5.65
0.500 9.77 | 1.250 25.51 | 2.000 8.96 | 2.75 5.19
0.583 15.10 | 1.333 25.51 | 2.083 7.78 | 2.83 5.19
0.667 15.10 | 1.417 17.18 | 2.167 7.78 | 2.92 4.81
0.750 38.21 | 1.500 17.18 | 2.250 6.90 | 3.00 4.81

Unit Hyd Qpeak (cms)= 0.068

PEAK FLOW (cms)= 0.020 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 20.947
TOTAL RAINFALL (mm)= 73.740
RUNOFF COEFFICIENT = 0.284

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

| ADD HYD (0006) |

DATE: May 2025

| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
----- (ha) (cms) (hrs) (mm)
ID1= 1 (0004): 32.63 1.264 1.58 21.34
+ ID2= 2 (0005): 0.20 0.020 1.00 20.95
===== ID = 3 (0006): 32.83 1.268 1.58 21.34

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

V V I SSSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTTT TTTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\517d763-b918-47c1-82e3-b7241def3a31\sc
Summary filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\517d763-b918-47c1-82e3-b7241def3a31\sc

DATE: 05-16-2025

TIME: 01:10:15

USER:

COMMENTS: _____

** SIMULATION : 10yr Chicago **

| CHICAGO STORM | IDF curve parameters: A=1021.000
| Ptotal= 50.74 mm | B= 3.000
C= 0.787
used in: INTENSITY = A / (t + B)^C
Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME RAIN | TIME RAIN |' TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr |' hrs mm/hr | hrs mm/hr
0.00 4.59 | 0.83 135.63 | 1.67 7.85 | 2.50 4.39
0.17 5.59 | 1.00 33.17 | 1.83 6.73 | 2.67 4.06

5783 Bloomington Road
Pos-development

DATE: May 2025

0.33 7.28 | 1.17 17.50 | 2.00 5.91 | 2.83 3.78
0.50 10.84 | 1.33 12.21 | 2.17 5.29 |
0.67 25.32 | 1.50 9.50 | 2.33 4.79 |

TOTAL RAINFALL (mm) = 50.739
RUNOFF COEFFICIENT = 0.197

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

| CALIB |
| NASHYD (0004) | Area (ha) = 32.63 Curve Number (CN) = 65.0
| ID= 1 DT= 5.0 min | Ia (mm) = 8.00 # of Linear Res.(N) = 3.00

U.H. Tp(hrs) = 0.54

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

----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
0.083 4.59 | 0.833 25.32 | 1.583 9.50 | 2.33 5.29
0.167 4.59 | 0.917 135.63 | 1.667 9.50 | 2.42 4.79
0.250 5.59 | 1.000 135.63 | 1.750 7.85 | 2.50 4.79
0.333 5.59 | 1.083 33.17 | 1.833 7.85 | 2.58 4.39
0.417 7.28 | 1.167 33.17 | 1.917 6.73 | 2.67 4.39
0.500 7.28 | 1.250 17.50 | 2.000 6.73 | 2.75 4.06
0.583 10.84 | 1.333 17.50 | 2.083 5.91 | 2.83 4.06
0.667 10.84 | 1.417 12.21 | 2.167 5.91 | 2.92 3.78
0.750 25.32 | 1.500 12.21 | 2.250 5.29 | 3.00 3.78

Unit Hyd Qpeak (cms) = 2.308

PEAK FLOW (cms) = 0.561 (i)
TIME TO PEAK (hrs) = 1.667
RUNOFF VOLUME (mm) = 10.175
TOTAL RAINFALL (mm) = 50.739
RUNOFF COEFFICIENT = 0.201

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

| CALIB |
| NASHYD (0005) | Area (ha) = 0.20 Curve Number (CN) = 65.0
| ID= 1 DT= 5.0 min | Ia (mm) = 8.00 # of Linear Res.(N) = 3.00

U.H. Tp(hrs) = 0.11

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

----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
0.083 4.59 | 0.833 25.32 | 1.583 9.50 | 2.33 5.29
0.167 4.59 | 0.917 135.63 | 1.667 9.50 | 2.42 4.79
0.250 5.59 | 1.000 135.63 | 1.750 7.85 | 2.50 4.79
0.333 5.59 | 1.083 33.17 | 1.833 7.85 | 2.58 4.39
0.417 7.28 | 1.167 33.17 | 1.917 6.73 | 2.67 4.39
0.500 7.28 | 1.250 17.50 | 2.000 6.73 | 2.75 4.06
0.583 10.84 | 1.333 17.50 | 2.083 5.91 | 2.83 4.06
0.667 10.84 | 1.417 12.21 | 2.167 5.91 | 2.92 3.78
0.750 25.32 | 1.500 12.21 | 2.250 5.29 | 3.00 3.78

Unit Hyd Qpeak (cms) = 0.068

PEAK FLOW (cms) = 0.008 (i)
TIME TO PEAK (hrs) = 1.083
RUNOFF VOLUME (mm) = 9.987

| ADD HYD (0006) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)

ID1= 1 (0004): 32.63 0.561 1.67 10.18
+ ID2= 2 (0005): 0.20 0.008 1.08 9.99
=====

ID = 3 (0006): 32.83 0.563 1.67 10.17

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

FINISH
=====

V V I SSSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U A A A A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

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

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\344b42f4-7607-4629-8be3-dacc94474d7f\sc
Summary filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\344b42f4-7607-4629-8be3-dacc94474d7f\sc

DATE: 05-16-2025

TIME: 01:10:14

USER:

COMMENTS: _____

** SIMULATION : 25yr Chicago **

5783 Bloomington Road
Pos-development

DATE: May 2025

CHICAGO STORM
Ptotal= 58.14 mm

IDF curve parameters: A=1100.000
B= 2.000
C= 0.776
used in: INTENSITY = A / (t + B)^C

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	5.38	0.83	159.94	1.67	9.00	2.50	5.16
0.17	6.51	1.00	35.45	1.83	7.77	2.67	4.78
0.33	8.38	1.17	19.27	2.00	6.86	2.83	4.46
0.50	12.24	1.33	13.70	2.17	6.16		
0.67	27.34	1.50	10.80	2.33	5.61		

CALIB
NASHYD (0004)
ID= 1 DT= 5.0 min

Area (ha)= 32.63 Curve Number (CN)= 65.0
Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.54

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

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.38	0.833	27.34	1.583	10.80	2.33	6.16
0.167	5.38	0.917	159.94	1.667	10.80	2.42	5.61
0.250	6.51	1.000	159.94	1.750	9.00	2.50	5.61
0.333	6.51	1.083	35.45	1.833	9.00	2.58	5.16
0.417	8.38	1.167	35.45	1.917	7.77	2.67	5.16
0.500	8.38	1.250	19.27	2.000	7.77	2.75	4.78
0.583	12.24	1.333	19.27	2.083	6.86	2.83	4.78
0.667	12.24	1.417	13.70	2.167	6.86	2.92	4.46
0.750	27.34	1.500	13.70	2.250	6.16	3.00	4.46

Unit Hyd Qpeak (cms)= 2.308

PEAK FLOW (cms)= 0.747 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 13.448
TOTAL RAINFALL (mm)= 58.136
RUNOFF COEFFICIENT = 0.231

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

CALIB
NASHYD (0005)
ID= 1 DT= 5.0 min

Area (ha)= 0.20 Curve Number (CN)= 65.0
Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.11

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

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.38	0.833	27.34	1.583	10.80	2.33	6.16

0.167	5.38	0.917	159.94	1.667	10.80	2.42	5.61
0.250	6.51	1.000	159.94	1.750	9.00	2.50	5.61
0.333	6.51	1.083	35.45	1.833	9.00	2.58	5.16
0.417	8.38	1.167	35.45	1.917	7.77	2.67	5.16
0.500	8.38	1.250	19.27	2.000	7.77	2.75	4.78
0.583	12.24	1.333	19.27	2.083	6.86	2.83	4.78
0.667	12.24	1.417	13.70	2.167	6.86	2.92	4.46
0.750	27.34	1.500	13.70	2.250	6.16	3.00	4.46

Unit Hyd Qpeak (cms)= 0.068

PEAK FLOW (cms)= 0.012 (i)
TIME TO PEAK (hrs)= 1.000
RUNOFF VOLUME (mm)= 13.200
TOTAL RAINFALL (mm)= 58.136
RUNOFF COEFFICIENT = 0.227

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

ADD HYD (0006)
1 + 2 = 3

	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
ID1= 1 (0004):	32.63	0.747	1.67	13.45
+ ID2= 2 (0005):	0.20	0.012	1.00	13.20
ID = 3 (0006):	32.83	0.749	1.67	13.45

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

V V I SSSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL
OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\09ac604c-c867-498b-8f40-319649150f8d\sc
Summary filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\09ac604c-c867-498b-8f40-319649150f8d\sc

DATE: 05-16-2025

TIME: 01:10:14

USER:

5783 Bloomington Road
Pos-development

COMMENTS:

DATE: May 2025

U.H. Tp(hrs)= 0.11

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

** SIMULATION : 2yr Chicago **

CHICAGO STORM | IDF curve parameters: A= 647.700
Ptotal= 32.55 mm | B= 4.000
C= 0.784
used in: INTENSITY = A / (t + B)^C
Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	3.04	0.83	81.81	1.67	5.25	2.50	2.91
0.17	3.72	1.00	22.50	1.83	4.49	2.67	2.69
0.33	4.86	1.17	11.86	2.00	3.93	2.83	2.50
0.50	7.29	1.33	8.23	2.17	3.51		
0.67	17.17	1.50	6.38	2.33	3.18		

CALIB |
NASHYD (0004) | Area (ha)= 32.63 Curve Number (CN)= 65.0
ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
U.H. Tp(hrs)= 0.54

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	3.04	0.833	17.17	1.583	6.38	2.33	3.51
0.167	3.04	0.917	81.81	1.667	6.38	2.42	3.18
0.250	3.72	1.000	81.81	1.750	5.25	2.50	3.18
0.333	3.72	1.083	22.50	1.833	5.25	2.58	2.91
0.417	4.86	1.167	22.50	1.917	4.49	2.67	2.91
0.500	4.86	1.250	11.86	2.000	4.49	2.75	2.69
0.583	7.29	1.333	11.86	2.083	3.93	2.83	2.69
0.667	7.29	1.417	8.23	2.167	3.93	2.92	2.50
0.750	17.17	1.500	8.23	2.250	3.51	3.00	2.50

Unit Hyd Qpeak (cms)= 2.308

PEAK FLOW (cms)= 0.192 (i)
TIME TO PEAK (hrs)= 1.750
RUNOFF VOLUME (mm)= 3.737
TOTAL RAINFALL (mm)= 32.554
RUNOFF COEFFICIENT = 0.115

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

CALIB |
NASHYD (0005) | Area (ha)= 0.20 Curve Number (CN)= 65.0
ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00

---- TRANSFORMED HYETOGRAPH ----

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	3.04	0.833	17.17	1.583	6.38	2.33	3.51
0.167	3.04	0.917	81.81	1.667	6.38	2.42	3.18
0.250	3.72	1.000	81.81	1.750	5.25	2.50	3.18
0.333	3.72	1.083	22.50	1.833	5.25	2.58	2.91
0.417	4.86	1.167	22.50	1.917	4.49	2.67	2.91
0.500	4.86	1.250	11.86	2.000	4.49	2.75	2.69
0.583	7.29	1.333	11.86	2.083	3.93	2.83	2.69
0.667	7.29	1.417	8.23	2.167	3.93	2.92	2.50
0.750	17.17	1.500	8.23	2.250	3.51	3.00	2.50

Unit Hyd Qpeak (cms)= 0.068

PEAK FLOW (cms)= 0.003 (i)
TIME TO PEAK (hrs)= 1.083
RUNOFF VOLUME (mm)= 3.668
TOTAL RAINFALL (mm)= 32.554
RUNOFF COEFFICIENT = 0.113

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

ADD HYD (0006) |
1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0004): 32.63 0.192 1.75 3.74
+ ID2= 2 (0005): 0.20 0.003 1.08 3.67
ID = 3 (0006): 32.83 0.193 1.75 3.74

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

V V I SSSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL
OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\b881e9aa-ee60-4351-82a8-4807356c78f9\sc

5783 Bloomington Road

Pos-development

Summary filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\b881e9aa-ee60-4351-82a8-4807356c78f9\sc

DATE: May 2025

DATE: 05-16-2025

TIME: 01:10:14

USER:

COMMENTS: _____

TOTAL RAINFALL (mm) = 68.035
RUNOFF COEFFICIENT = 0.269

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

| CALIB |
| NASHYD (0005) | Area (ha) = 0.20 Curve Number (CN) = 65.0
| ID= 1 DT= 5.0 min | Ia (mm) = 8.00 # of Linear Res. (N) = 3.00

U.H. Tp (hrs) = 0.11

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

** SIMULATION : 50yr Chicago **

| CHICAGO STORM | IDF curve parameters: A=1488.000
| Ptotal= 68.03 mm | B= 3.000
C= 0.803

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

Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	5.75	0.83	189.72	1.67	9.99	2.50	5.50
0.17	7.05	1.00	44.29	1.83	8.52	2.67	5.08
0.33	9.24	1.17	22.84	2.00	7.46	2.83	4.72
0.50	13.94	1.33	15.74	2.17	6.65		
0.67	33.54	1.50	12.16	2.33	6.02		

| CALIB |
| NASHYD (0004) | Area (ha) = 32.63 Curve Number (CN) = 65.0
| ID= 1 DT= 5.0 min | Ia (mm) = 8.00 # of Linear Res. (N) = 3.00

U.H. Tp (hrs) = 0.54

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

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.75	0.833	33.54	1.583	12.16	2.33	6.65
0.167	5.75	0.917	189.72	1.667	12.16	2.42	6.02
0.250	7.05	1.000	189.72	1.750	9.99	2.50	6.02
0.333	7.05	1.083	44.29	1.833	9.99	2.58	5.50
0.417	9.24	1.167	44.29	1.917	8.52	2.67	5.50
0.500	9.24	1.250	22.84	2.000	8.52	2.75	5.08
0.583	13.94	1.333	22.84	2.083	7.46	2.83	5.08
0.667	13.94	1.417	15.74	2.167	7.46	2.92	4.72
0.750	33.54	1.500	15.74	2.250	6.65	3.00	4.72

Unit Hyd Qpeak (cms) = 2.308

PEAK FLOW (cms) = 1.062 (i)
TIME TO PEAK (hrs) = 1.667
RUNOFF VOLUME (mm) = 18.313

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	5.75	0.833	33.54	1.583	12.16	2.33	6.65
0.167	5.75	0.917	189.72	1.667	12.16	2.42	6.02
0.250	7.05	1.000	189.72	1.750	9.99	2.50	6.02
0.333	7.05	1.083	44.29	1.833	9.99	2.58	5.50
0.417	9.24	1.167	44.29	1.917	8.52	2.67	5.50
0.500	9.24	1.250	22.84	2.000	8.52	2.75	5.08
0.583	13.94	1.333	22.84	2.083	7.46	2.83	5.08
0.667	13.94	1.417	15.74	2.167	7.46	2.92	4.72
0.750	33.54	1.500	15.74	2.250	6.65	3.00	4.72

Unit Hyd Qpeak (cms) = 0.068

PEAK FLOW (cms) = 0.017 (i)
TIME TO PEAK (hrs) = 1.000
RUNOFF VOLUME (mm) = 17.976
TOTAL RAINFALL (mm) = 68.035
RUNOFF COEFFICIENT = 0.264

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

| ADD HYD (0006) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)

ID1= 1 (0004): 32.63 1.062 1.67 18.31
+ ID2= 2 (0005): 0.20 0.017 1.00 17.98
=====

ID = 3 (0006): 32.83 1.065 1.58 18.31

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

=====

V	V	I	SSSSS	U	U	A	L	(v 6.2.2015)
V	V	I	SS	U	U	A A	L	
V	V	I	SS	U	U	AAAAA	L	
V	V	I	SS	U	U	A A	L	
VV		I	SSSSS	UUUUU	A	A	LLLLL	

OOO	TTTTT	TTTTT	H	H	Y	Y	M	M	OOO	TM
O O	T	T	H	H	Y	Y	MM	MM	O O	
O O	T	T	H	H	Y		M	M	O O	
OOO	T	T	H	H	Y		M	M	OOO	

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DATE: May 2025

0.583	9.42		1.333	15.53		2.083	4.99		2.83	3.38
0.667	9.42		1.417	10.65		2.167	4.99		2.92	3.14
0.750	22.77		1.500	10.65		2.250	4.45		3.00	3.14

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\12551916-72a3-40e1-803c-4f08a90a41b5\sc
Summary filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\12551916-72a3-40e1-803c-4f08a90a41b5\sc

Unit Hyd Qpeak (cms)= 2.308

PEAK FLOW (cms)= 0.398 (i)
TIME TO PEAK (hrs)= 1.667
RUNOFF VOLUME (mm)= 7.291
TOTAL RAINFALL (mm)= 43.434
RUNOFF COEFFICIENT = 0.168

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

DATE: 05-16-2025

TIME: 01:10:14

USER:

COMMENTS: _____

| CALIB |
| NASHYD (0005) | Area (ha)= 0.20 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.11

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

** SIMULATION : 5yr Chicago **

----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
0.083 3.84 | 0.833 22.77 | 1.583 8.20 | 2.33 4.45
0.167 3.84 | 0.917 113.16 | 1.667 8.20 | 2.42 4.02
0.250 4.71 | 1.000 113.16 | 1.750 6.71 | 2.50 4.02
0.333 4.71 | 1.083 30.04 | 1.833 6.71 | 2.58 3.67
0.417 6.21 | 1.167 30.04 | 1.917 5.71 | 2.67 3.67
0.500 6.21 | 1.250 15.53 | 2.000 5.71 | 2.75 3.38
0.583 9.42 | 1.333 15.53 | 2.083 4.99 | 2.83 3.38
0.667 9.42 | 1.417 10.65 | 2.167 4.99 | 2.92 3.14
0.750 22.77 | 1.500 10.65 | 2.250 4.45 | 3.00 3.14

| CHICAGO STORM | IDF curve parameters: A= 929.600
| Ptotal= 43.43 mm | B= 4.000
C= 0.798
used in: INTENSITY = A / (t + B)^C
Duration of storm = 3.00 hrs
Storm time step = 10.00 min
Time to peak ratio = 0.33

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	3.84	0.83	113.16	1.67	6.71	2.50	3.67
0.17	4.71	1.00	30.04	1.83	5.71	2.67	3.38
0.33	6.21	1.17	15.53	2.00	4.99	2.83	3.14
0.50	9.42	1.33	10.65	2.17	4.45		
0.67	22.77	1.50	8.20	2.33	4.02		

Unit Hyd Qpeak (cms)= 0.068

PEAK FLOW (cms)= 0.006 (i)
TIME TO PEAK (hrs)= 1.083
RUNOFF VOLUME (mm)= 7.156
TOTAL RAINFALL (mm)= 43.434
RUNOFF COEFFICIENT = 0.165

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

| CALIB |
| NASHYD (0004) | Area (ha)= 32.63 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.54

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

----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
0.083 3.84 | 0.833 22.77 | 1.583 8.20 | 2.33 4.45
0.167 3.84 | 0.917 113.16 | 1.667 8.20 | 2.42 4.02
0.250 4.71 | 1.000 113.16 | 1.750 6.71 | 2.50 4.02
0.333 4.71 | 1.083 30.04 | 1.833 6.71 | 2.58 3.67
0.417 6.21 | 1.167 30.04 | 1.917 5.71 | 2.67 3.67
0.500 6.21 | 1.250 15.53 | 2.000 5.71 | 2.75 3.38

| ADD HYD (0006) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0004): 32.63 0.398 1.67 7.29
+ ID2= 2 (0005): 0.20 0.006 1.08 7.16
=====

ID = 3 (0006): 32.83 0.399 1.67 7.29

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

V V I SSSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U AAAAA L
=====

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DATE: May 2025

V V I SS U U A A L
VV I SSSS UUUU A A LLLL

OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\65f111f8-3ca0-42b0-95de-a6aa47081bc0\sc
Summary filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\65f111f8-3ca0-42b0-95de-a6aa47081bc0\sc

DATE: 05-16-2025

TIME: 01:10:14

USER:

COMMENTS: _____

** SIMULATION : AES_12HR_100yr_PCSWMM **

| READ STORM | Filename: C:\Users\jghobrial\AppData
| | ata\Local\Temp\
| | 9b045d52-515d-445d-b569-27a6e1f3d5a8\78a97efa
| Ptotal= 92.24 mm | Comments: AES_12HR_100yr_PCSWMM

TIME	RAIN	TIME	RAIN	'	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	13.84	6.50	2.77	9.75	0.00	
0.25	11.99	3.50	13.84	6.75	2.77	10.00	0.00	
0.50	11.99	3.75	13.84	7.00	2.77	10.25	0.00	
0.75	11.99	4.00	13.84	7.25	0.92	10.50	0.00	
1.00	11.99	4.25	12.91	7.50	0.92	10.75	0.00	
1.25	23.98	4.50	12.91	7.75	0.92	11.00	0.00	
1.50	23.98	4.75	12.91	8.00	0.92	11.25	0.00	
1.75	23.98	5.00	12.91	8.25	0.00	11.50	0.00	
2.00	23.98	5.25	7.38	8.50	0.00	11.75	0.00	
2.25	18.45	5.50	7.38	8.75	0.00	12.00	0.00	
2.50	18.45	5.75	7.38	9.00	0.00			
2.75	18.45	6.00	7.38	9.25	0.00			
3.00	18.45	6.25	2.77	9.50	0.00			

| CALIB |
| NASHYD (0004) | Area (ha)= 32.63 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00

----- U.H. Tp(hrs)= 0.54

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	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	18.45	6.250	7.38	9.33	0.00	
0.167	0.00	3.250	18.45	6.333	2.77	9.42	0.00	
0.250	0.00	3.333	13.84	6.417	2.77	9.50	0.00	
0.333	11.99	3.417	13.84	6.500	2.77	9.58	0.00	
0.417	11.99	3.500	13.84	6.583	2.77	9.67	0.00	
0.500	11.99	3.583	13.84	6.667	2.77	9.75	0.00	
0.583	11.99	3.667	13.84	6.750	2.77	9.83	0.00	
0.667	11.99	3.750	13.84	6.833	2.77	9.92	0.00	
0.750	11.99	3.833	13.84	6.917	2.77	10.00	0.00	
0.833	11.99	3.917	13.84	7.000	2.77	10.08	0.00	
0.917	11.99	4.000	13.84	7.083	2.77	10.17	0.00	
1.000	11.99	4.083	13.84	7.167	2.77	10.25	0.00	
1.083	11.99	4.167	13.84	7.250	2.77	10.33	0.00	
1.167	11.99	4.250	13.84	7.333	0.92	10.42	0.00	
1.250	11.99	4.333	12.91	7.417	0.92	10.50	0.00	
1.333	23.98	4.417	12.91	7.500	0.92	10.58	0.00	
1.417	23.98	4.500	12.91	7.583	0.92	10.67	0.00	
1.500	23.98	4.583	12.91	7.667	0.92	10.75	0.00	
1.583	23.98	4.667	12.91	7.750	0.92	10.83	0.00	
1.667	23.98	4.750	12.91	7.833	0.92	10.92	0.00	
1.750	23.98	4.833	12.91	7.917	0.92	11.00	0.00	
1.833	23.98	4.917	12.91	8.000	0.92	11.08	0.00	
1.917	23.98	5.000	12.91	8.083	0.92	11.17	0.00	
2.000	23.98	5.083	12.91	8.167	0.92	11.25	0.00	
2.083	23.98	5.167	12.91	8.250	0.92	11.33	0.00	
2.167	23.98	5.250	12.91	8.333	0.00	11.42	0.00	
2.250	23.98	5.333	7.38	8.417	0.00	11.50	0.00	
2.333	18.45	5.417	7.38	8.500	0.00	11.58	0.00	
2.417	18.45	5.500	7.38	8.583	0.00	11.67	0.00	
2.500	18.45	5.583	7.38	8.667	0.00	11.75	0.00	
2.583	18.45	5.667	7.38	8.750	0.00	11.83	0.00	
2.667	18.45	5.750	7.38	8.833	0.00	11.92	0.00	
2.750	18.45	5.833	7.38	8.917	0.00	12.00	0.00	
2.833	18.45	5.917	7.38	9.000	0.00	12.08	0.00	
2.917	18.45	6.000	7.38	9.083	0.00	12.17	0.00	
3.000	18.45	6.083	7.38	9.167	0.00	12.25	0.00	
3.083	18.45	6.167	7.38	9.250	0.00			

Unit Hyd Qpeak (cms)= 2.308

PEAK FLOW (cms)= 0.635 (i)
TIME TO PEAK (hrs)= 5.333
RUNOFF VOLUME (mm)= 32.108
TOTAL RAINFALL (mm)= 92.240
RUNOFF COEFFICIENT = 0.348

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

| CALIB |
| NASHYD (0005) | Area (ha)= 0.20 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 0.11

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	18.45	6.250	7.38	9.33	0.00
0.167	0.00	3.250	18.45	6.333	2.77	9.42	0.00
0.250	0.00	3.333	13.84	6.417	2.77	9.50	0.00
0.333	11.99	3.417	13.84	6.500	2.77	9.58	0.00
0.417	11.99	3.500	13.84	6.583	2.77	9.67	0.00
0.500	11.99	3.583	13.84	6.667	2.77	9.75	0.00
0.583	11.99	3.667	13.84	6.750	2.77	9.83	0.00
0.667	11.99	3.750	13.84	6.833	2.77	9.92	0.00
0.750	11.99	3.833	13.84	6.917	2.77	10.00	0.00
0.833	11.99	3.917	13.84	7.000	2.77	10.08	0.00
0.917	11.99	4.000	13.84	7.083	2.77	10.17	0.00
1.000	11.99	4.083	13.84	7.167	2.77	10.25	0.00
1.083	11.99	4.167	13.84	7.250	2.77	10.33	0.00
1.167	11.99	4.250	13.84	7.333	0.92	10.42	0.00
1.250	11.99	4.333	12.91	7.417	0.92	10.50	0.00
1.333	23.98	4.417	12.91	7.500	0.92	10.58	0.00
1.417	23.98	4.500	12.91	7.583	0.92	10.67	0.00
1.500	23.98	4.583	12.91	7.667	0.92	10.75	0.00
1.583	23.98	4.667	12.91	7.750	0.92	10.83	0.00
1.667	23.98	4.750	12.91	7.833	0.92	10.92	0.00
1.750	23.98	4.833	12.91	7.917	0.92	11.00	0.00
1.833	23.98	4.917	12.91	8.000	0.92	11.08	0.00
1.917	23.98	5.000	12.91	8.083	0.92	11.17	0.00
2.000	23.98	5.083	12.91	8.167	0.92	11.25	0.00
2.083	23.98	5.167	12.91	8.250	0.92	11.33	0.00
2.167	23.98	5.250	12.91	8.333	0.00	11.42	0.00
2.250	23.98	5.333	7.38	8.417	0.00	11.50	0.00
2.333	18.45	5.417	7.38	8.500	0.00	11.58	0.00
2.417	18.45	5.500	7.38	8.583	0.00	11.67	0.00
2.500	18.45	5.583	7.38	8.667	0.00	11.75	0.00
2.583	18.45	5.667	7.38	8.750	0.00	11.83	0.00
2.667	18.45	5.750	7.38	8.833	0.00	11.92	0.00
2.750	18.45	5.833	7.38	8.917	0.00	12.00	0.00
2.833	18.45	5.917	7.38	9.000	0.00	12.08	0.00
2.917	18.45	6.000	7.38	9.083	0.00	12.17	0.00
3.000	18.45	6.083	7.38	9.167	0.00	12.25	0.00
3.083	18.45	6.167	7.38	9.250	0.00		

Unit Hyd Qpeak (cms)= 0.068

PEAK FLOW (cms)= 0.004 (i)
TIME TO PEAK (hrs)= 3.250
RUNOFF VOLUME (mm)= 31.517
TOTAL RAINFALL (mm)= 92.240
RUNOFF COEFFICIENT = 0.342

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

ADD HYD (0006)				
1 + 2 = 3				

ID1= 1 (0004):	AREA (ha)	QPEAK (cms)	TPEAK (hrs)	R.V. (mm)
	32.63	0.635	5.33	32.11
+ ID2= 2 (0005):	0.20	0.004	3.25	31.52
=====				
ID = 3 (0006):	32.83	0.638	5.25	32.10

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

V V I SSSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\db20f91a-cb82-4b78-b6ab-0904d86f33c6\sc
Summary filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\db20f91a-cb82-4b78-b6ab-0904d86f33c6\sc

DATE: 05-16-2025

TIME: 01:10:14

USER:

COMMENTS: _____

** SIMULATION : AES_l2HR_10yr_PCSWMM **

| READ STORM | Filename: C:\Users\jghobrial\AppData
| | ata\Local\Temp\
| | 9b045d52-515d-445d-b569-27a6e1f3d5a8\91aa3dfc
| Ptotal= 62.94 mm | Comments: AES_l2HR_10yr_PCSWMM

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	9.44	6.50	1.89	9.75	0.00
0.25	8.18	3.50	9.44	6.75	1.89	10.00	0.00
0.50	8.18	3.75	9.44	7.00	1.89	10.25	0.00
0.75	8.18	4.00	9.44	7.25	0.63	10.50	0.00
1.00	8.18	4.25	8.81	7.50	0.63	10.75	0.00
1.25	16.36	4.50	8.81	7.75	0.63	11.00	0.00
1.50	16.36	4.75	8.81	8.00	0.63	11.25	0.00
1.75	16.36	5.00	8.81	8.25	0.00	11.50	0.00
2.00	16.36	5.25	5.04	8.50	0.00	11.75	0.00
2.25	12.59	5.50	5.04	8.75	0.00	12.00	0.00
2.50	12.59	5.75	5.04	9.00	0.00		
2.75	12.59	6.00	5.04	9.25	0.00		
3.00	12.59	6.25	1.89	9.50	0.00		

5783 Bloomington Road
Pos-development

DATE: May 2025

| CALIB |
| NASHYD (0004) | Area (ha)= 32.63 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.54

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

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

----- TRANSFORMED HYETOGRAPH -----
TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
0.083 0.00 | 3.167 12.59 | 6.250 5.04 | 9.33 0.00
0.167 0.00 | 3.250 12.59 | 6.333 1.89 | 9.42 0.00
0.250 0.00 | 3.333 9.44 | 6.417 1.89 | 9.50 0.00
0.333 8.18 | 3.417 9.44 | 6.500 1.89 | 9.58 0.00
0.417 8.18 | 3.500 9.44 | 6.583 1.89 | 9.67 0.00
0.500 8.18 | 3.583 9.44 | 6.667 1.89 | 9.75 0.00
0.583 8.18 | 3.667 9.44 | 6.750 1.89 | 9.83 0.00
0.667 8.18 | 3.750 9.44 | 6.833 1.89 | 9.92 0.00
0.750 8.18 | 3.833 9.44 | 6.917 1.89 | 10.00 0.00
0.833 8.18 | 3.917 9.44 | 7.000 1.89 | 10.08 0.00
0.917 8.18 | 4.000 9.44 | 7.083 1.89 | 10.17 0.00
1.000 8.18 | 4.083 9.44 | 7.167 1.89 | 10.25 0.00
1.083 8.18 | 4.167 9.44 | 7.250 1.89 | 10.33 0.00
1.167 8.18 | 4.250 9.44 | 7.333 0.63 | 10.42 0.00
1.250 8.18 | 4.333 8.81 | 7.417 0.63 | 10.50 0.00
1.333 16.36 | 4.417 8.81 | 7.500 0.63 | 10.58 0.00
1.417 16.36 | 4.500 8.81 | 7.583 0.63 | 10.67 0.00
1.500 16.36 | 4.583 8.81 | 7.667 0.63 | 10.75 0.00
1.583 16.36 | 4.667 8.81 | 7.750 0.63 | 10.83 0.00
1.667 16.36 | 4.750 8.81 | 7.833 0.63 | 10.92 0.00
1.750 16.36 | 4.833 8.81 | 7.917 0.63 | 11.00 0.00
1.833 16.36 | 4.917 8.81 | 8.000 0.63 | 11.08 0.00
1.917 16.36 | 5.000 8.81 | 8.083 0.63 | 11.17 0.00
2.000 16.36 | 5.083 8.81 | 8.167 0.63 | 11.25 0.00
2.083 16.36 | 5.167 8.81 | 8.250 0.63 | 11.33 0.00
2.167 16.36 | 5.250 8.81 | 8.333 0.00 | 11.42 0.00
2.250 16.36 | 5.333 5.04 | 8.417 0.00 | 11.50 0.00
2.333 12.59 | 5.417 5.04 | 8.500 0.00 | 11.58 0.00
2.417 12.59 | 5.500 5.04 | 8.583 0.00 | 11.67 0.00
2.500 12.59 | 5.583 5.04 | 8.667 0.00 | 11.75 0.00
2.583 12.59 | 5.667 5.04 | 8.750 0.00 | 11.83 0.00
2.667 12.59 | 5.750 5.04 | 8.833 0.00 | 11.92 0.00
2.750 12.59 | 5.833 5.04 | 8.917 0.00 | 12.00 0.00
2.833 12.59 | 5.917 5.04 | 9.000 0.00 | 12.08 0.00
2.917 12.59 | 6.000 5.04 | 9.083 0.00 | 12.17 0.00
3.000 12.59 | 6.083 5.04 | 9.167 0.00 | 12.25 0.00
3.083 12.59 | 6.167 5.04 | 9.250 0.00 |

Unit Hyd Qpeak (cms)= 2.308

PEAK FLOW (cms)= 0.330 (i)
TIME TO PEAK (hrs)= 5.333
RUNOFF VOLUME (mm)= 15.744
TOTAL RAINFALL (mm)= 62.940
RUNOFF COEFFICIENT = 0.250

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

| CALIB |
| NASHYD (0005) | Area (ha)= 0.20 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.11

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

TIME RAIN | TIME RAIN | TIME RAIN | TIME RAIN
hrs mm/hr | hrs mm/hr | hrs mm/hr | hrs mm/hr
0.083 0.00 | 3.167 12.59 | 6.250 5.04 | 9.33 0.00
0.167 0.00 | 3.250 12.59 | 6.333 1.89 | 9.42 0.00
0.250 0.00 | 3.333 9.44 | 6.417 1.89 | 9.50 0.00
0.333 8.18 | 3.417 9.44 | 6.500 1.89 | 9.58 0.00
0.417 8.18 | 3.500 9.44 | 6.583 1.89 | 9.67 0.00
0.500 8.18 | 3.583 9.44 | 6.667 1.89 | 9.75 0.00
0.583 8.18 | 3.667 9.44 | 6.750 1.89 | 9.83 0.00
0.667 8.18 | 3.750 9.44 | 6.833 1.89 | 9.92 0.00
0.750 8.18 | 3.833 9.44 | 6.917 1.89 | 10.00 0.00
0.833 8.18 | 3.917 9.44 | 7.000 1.89 | 10.08 0.00
0.917 8.18 | 4.000 9.44 | 7.083 1.89 | 10.17 0.00
1.000 8.18 | 4.083 9.44 | 7.167 1.89 | 10.25 0.00
1.083 8.18 | 4.167 9.44 | 7.250 1.89 | 10.33 0.00
1.167 8.18 | 4.250 9.44 | 7.333 0.63 | 10.42 0.00
1.250 8.18 | 4.333 8.81 | 7.417 0.63 | 10.50 0.00
1.333 16.36 | 4.417 8.81 | 7.500 0.63 | 10.58 0.00
1.417 16.36 | 4.500 8.81 | 7.583 0.63 | 10.67 0.00
1.500 16.36 | 4.583 8.81 | 7.667 0.63 | 10.75 0.00
1.583 16.36 | 4.667 8.81 | 7.750 0.63 | 10.83 0.00
1.667 16.36 | 4.750 8.81 | 7.833 0.63 | 10.92 0.00
1.750 16.36 | 4.833 8.81 | 7.917 0.63 | 11.00 0.00
1.833 16.36 | 4.917 8.81 | 8.000 0.63 | 11.08 0.00
1.917 16.36 | 5.000 8.81 | 8.083 0.63 | 11.17 0.00
2.000 16.36 | 5.083 8.81 | 8.167 0.63 | 11.25 0.00
2.083 16.36 | 5.167 8.81 | 8.250 0.63 | 11.33 0.00
2.167 16.36 | 5.250 8.81 | 8.333 0.00 | 11.42 0.00
2.250 16.36 | 5.333 5.04 | 8.417 0.00 | 11.50 0.00
2.333 12.59 | 5.417 5.04 | 8.500 0.00 | 11.58 0.00
2.417 12.59 | 5.500 5.04 | 8.583 0.00 | 11.67 0.00
2.500 12.59 | 5.583 5.04 | 8.667 0.00 | 11.75 0.00
2.583 12.59 | 5.667 5.04 | 8.750 0.00 | 11.83 0.00
2.667 12.59 | 5.750 5.04 | 8.833 0.00 | 11.92 0.00
2.750 12.59 | 5.833 5.04 | 8.917 0.00 | 12.00 0.00
2.833 12.59 | 5.917 5.04 | 9.000 0.00 | 12.08 0.00
2.917 12.59 | 6.000 5.04 | 9.083 0.00 | 12.17 0.00
3.000 12.59 | 6.083 5.04 | 9.167 0.00 | 12.25 0.00
3.083 12.59 | 6.167 5.04 | 9.250 0.00 |

Unit Hyd Qpeak (cms)= 0.068

PEAK FLOW (cms)= 0.002 (i)
TIME TO PEAK (hrs)= 5.250
RUNOFF VOLUME (mm)= 15.454
TOTAL RAINFALL (mm)= 62.940
RUNOFF COEFFICIENT = 0.246

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

| ADD HYD (0006) |
| 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
ID1= 1 (0004): 32.63 0.330 5.33 15.74
+ ID2= 2 (0005): 0.20 0.002 5.25 15.45
===== ID = 3 (0006): 32.83 0.332 5.33 15.74

5783 Bloomington Road
Pos-development

DATE: May 2025

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

3.00 14.71 | 6.25 2.21 | 9.50 0.00 |

=====

V V I SSSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U AAAAA L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

| CALIB |
| NASHYD (0004) | Area (ha)= 32.63 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.54

OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

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

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

Input filename: C:\Program Files (x86)\Visual OTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\18069325-69ef-488e-8477-e808f7b4a71a\sc
Summary filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\18069325-69ef-488e-8477-e808f7b4a71a\sc

DATE: 05-16-2025

TIME: 01:10:14

USER:

COMMENTS: _____

** SIMULATION : AES_12HR_25yr_PCSWMM **

| READ STORM | Filename: C:\Users\jghobrial\AppData
| | ata\Local\Temp\
| | 9b045d52-515d-445d-b569-27a6e1f3d5a8\0402f699
| Ptotal= 73.55 mm | Comments: AES_12HR_25yr_PCSWMM

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	11.03	6.50	2.21	9.75	0.00
0.25	9.56	3.50	11.03	6.75	2.21	10.00	0.00
0.50	9.56	3.75	11.03	7.00	2.21	10.25	0.00
0.75	9.56	4.00	11.03	7.25	0.74	10.50	0.00
1.00	9.56	4.25	10.30	7.50	0.74	10.75	0.00
1.25	19.12	4.50	10.30	7.75	0.74	11.00	0.00
1.50	19.12	4.75	10.30	8.00	0.74	11.25	0.00
1.75	19.12	5.00	10.30	8.25	0.00	11.50	0.00
2.00	19.12	5.25	5.88	8.50	0.00	11.75	0.00
2.25	14.71	5.50	5.88	8.75	0.00	12.00	0.00
2.50	14.71	5.75	5.88	9.00	0.00		
2.75	14.71	6.00	5.88	9.25	0.00		

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	14.71	6.250	5.88	9.33	0.00
0.167	0.00	3.250	14.71	6.333	2.21	9.42	0.00
0.250	0.00	3.333	11.03	6.417	2.21	9.50	0.00
0.333	9.56	3.417	11.03	6.500	2.21	9.58	0.00
0.417	9.56	3.500	11.03	6.583	2.21	9.67	0.00
0.500	9.56	3.583	11.03	6.667	2.21	9.75	0.00
0.583	9.56	3.667	11.03	6.750	2.21	9.83	0.00
0.667	9.56	3.750	11.03	6.833	2.21	9.92	0.00
0.750	9.56	3.833	11.03	6.917	2.21	10.00	0.00
0.833	9.56	3.917	11.03	7.000	2.21	10.08	0.00
0.917	9.56	4.000	11.03	7.083	2.21	10.17	0.00
1.000	9.56	4.083	11.03	7.167	2.21	10.25	0.00
1.083	9.56	4.167	11.03	7.250	2.21	10.33	0.00
1.167	9.56	4.250	11.03	7.333	0.74	10.42	0.00
1.250	9.56	4.333	10.30	7.417	0.74	10.50	0.00
1.333	19.12	4.417	10.30	7.500	0.74	10.58	0.00
1.417	19.12	4.500	10.30	7.583	0.74	10.67	0.00
1.500	19.12	4.583	10.30	7.667	0.74	10.75	0.00
1.583	19.12	4.667	10.30	7.750	0.74	10.83	0.00
1.667	19.12	4.750	10.30	7.833	0.74	10.92	0.00
1.750	19.12	4.833	10.30	7.917	0.74	11.00	0.00
1.833	19.12	4.917	10.30	8.000	0.74	11.08	0.00
1.917	19.12	5.000	10.30	8.083	0.74	11.17	0.00
2.000	19.12	5.083	10.30	8.167	0.74	11.25	0.00
2.083	19.12	5.167	10.30	8.250	0.74	11.33	0.00
2.167	19.12	5.250	10.30	8.333	0.00	11.42	0.00
2.250	19.12	5.333	5.88	8.417	0.00	11.50	0.00
2.333	14.71	5.417	5.88	8.500	0.00	11.58	0.00
2.417	14.71	5.500	5.88	8.583	0.00	11.67	0.00
2.500	14.71	5.583	5.88	8.667	0.00	11.75	0.00
2.583	14.71	5.667	5.88	8.750	0.00	11.83	0.00
2.667	14.71	5.750	5.88	8.833	0.00	11.92	0.00
2.750	14.71	5.833	5.88	8.917	0.00	12.00	0.00
2.833	14.71	5.917	5.88	9.000	0.00	12.08	0.00
2.917	14.71	6.000	5.88	9.083	0.00	12.17	0.00
3.000	14.71	6.083	5.88	9.167	0.00	12.25	0.00
3.083	14.71	6.167	5.88	9.250	0.00		

Unit Hyd Qpeak (cms)= 2.308

PEAK FLOW (cms)= 0.435 (i)
TIME TO PEAK (hrs)= 5.333
RUNOFF VOLUME (mm)= 21.237
TOTAL RAINFALL (mm)= 73.550
RUNOFF COEFFICIENT = 0.289

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

5783 Bloomington Road

Pos-development

| CALIB |
| NASHYD (0005) | Area (ha)= 0.20 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00
----- U.H. Tp(hrs)= 0.11

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

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	14.71	6.250	5.88	9.33	0.00
0.167	0.00	3.250	14.71	6.333	2.21	9.42	0.00
0.250	0.00	3.333	11.03	6.417	2.21	9.50	0.00
0.333	9.56	3.417	11.03	6.500	2.21	9.58	0.00
0.417	9.56	3.500	11.03	6.583	2.21	9.67	0.00
0.500	9.56	3.583	11.03	6.667	2.21	9.75	0.00
0.583	9.56	3.667	11.03	6.750	2.21	9.83	0.00
0.667	9.56	3.750	11.03	6.833	2.21	9.92	0.00
0.750	9.56	3.833	11.03	6.917	2.21	10.00	0.00
0.833	9.56	3.917	11.03	7.000	2.21	10.08	0.00
0.917	9.56	4.000	11.03	7.083	2.21	10.17	0.00
1.000	9.56	4.083	11.03	7.167	2.21	10.25	0.00
1.083	9.56	4.167	11.03	7.250	2.21	10.33	0.00
1.167	9.56	4.250	11.03	7.333	0.74	10.42	0.00
1.250	9.56	4.333	10.30	7.417	0.74	10.50	0.00
1.333	19.12	4.417	10.30	7.500	0.74	10.58	0.00
1.417	19.12	4.500	10.30	7.583	0.74	10.67	0.00
1.500	19.12	4.583	10.30	7.667	0.74	10.75	0.00
1.583	19.12	4.667	10.30	7.750	0.74	10.83	0.00
1.667	19.12	4.750	10.30	7.833	0.74	10.92	0.00
1.750	19.12	4.833	10.30	7.917	0.74	11.00	0.00
1.833	19.12	4.917	10.30	8.000	0.74	11.08	0.00
1.917	19.12	5.000	10.30	8.083	0.74	11.17	0.00
2.000	19.12	5.083	10.30	8.167	0.74	11.25	0.00
2.083	19.12	5.167	10.30	8.250	0.74	11.33	0.00
2.167	19.12	5.250	10.30	8.333	0.00	11.42	0.00
2.250	19.12	5.333	5.88	8.417	0.00	11.50	0.00
2.333	14.71	5.417	5.88	8.500	0.00	11.58	0.00
2.417	14.71	5.500	5.88	8.583	0.00	11.67	0.00
2.500	14.71	5.583	5.88	8.667	0.00	11.75	0.00
2.583	14.71	5.667	5.88	8.750	0.00	11.83	0.00
2.667	14.71	5.750	5.88	8.833	0.00	11.92	0.00
2.750	14.71	5.833	5.88	8.917	0.00	12.00	0.00
2.833	14.71	5.917	5.88	9.000	0.00	12.08	0.00
2.917	14.71	6.000	5.88	9.083	0.00	12.17	0.00
3.000	14.71	6.083	5.88	9.167	0.00	12.25	0.00
3.083	14.71	6.167	5.88	9.250	0.00		

Unit Hyd Qpeak (cms)= 0.068

PEAK FLOW (cms)= 0.003 (i)
TIME TO PEAK (hrs)= 3.250
RUNOFF VOLUME (mm)= 20.845
TOTAL RAINFALL (mm)= 73.550
RUNOFF COEFFICIENT = 0.283

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

| ADD HYD (0006) |
1 + 2 = 3
ID1= 1 (0004): AREA QPEAK TPEAK R.V.
(ha) (cms) (hrs) (mm)
32.63 0.435 5.33 21.24

+ ID2= 2 (0005): 0.20 0.003 3.25 20.85
=====

ID = 3 (0006): 32.83 0.437 5.33 21.23

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

V V I SSSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL

OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO

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

Input filename: C:\Program Files (x86)\Visual OTTHYMO 6.2\VO2\voin.dat
Output filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\948bbb2-3efb-4a9e-826d-5a60bebff21f\sc
Summary filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\948bbb2-3efb-4a9e-826d-5a60bebff21f\sc

DATE: 05-16-2025

TIME: 01:10:14

USER:

COMMENTS:

** SIMULATION : AES_12HR_2yr_PCSWMM **

| READ STORM | Filename: C:\Users\jghobrial\AppData
| | ata\Local\Temp\
| | 9b045d52-515d-445d-b569-27a6e1f3d5a8\add69d45
| Ptotal= 41.65 mm | Comments: AES_12HR_2yr_PCSWMM

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	6.25	6.50	1.25	9.75	0.00
0.25	5.41	3.50	6.25	6.75	1.25	10.00	0.00
0.50	5.41	3.75	6.25	7.00	1.25	10.25	0.00
0.75	5.41	4.00	6.25	7.25	0.42	10.50	0.00
1.00	5.41	4.25	5.83	7.50	0.42	10.75	0.00
1.25	10.83	4.50	5.83	7.75	0.42	11.00	0.00
1.50	10.83	4.75	5.83	8.00	0.42	11.25	0.00
1.75	10.83	5.00	5.83	8.25	0.00	11.50	0.00

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2.00	10.83	5.25	3.33	8.50	0.00	11.75	0.00
2.25	8.33	5.50	3.33	8.75	0.00	12.00	0.00
2.50	8.33	5.75	3.33	9.00	0.00		
2.75	8.33	6.00	3.33	9.25	0.00		
3.00	8.33	6.25	1.25	9.50	0.00		

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

| CALIB |
| NASHYD (0004) | Area (ha)= 32.63 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res. (N)= 3.00

U.H. Tp (hrs)= 0.54

| CALIB |
| NASHYD (0005) | Area (ha)= 0.20 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res. (N)= 3.00

U.H. Tp (hrs)= 0.11

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

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

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	8.33	6.250	3.33	9.33	0.00
0.167	0.00	3.250	8.33	6.333	1.25	9.42	0.00
0.250	0.00	3.333	6.25	6.417	1.25	9.50	0.00
0.333	5.41	3.417	6.25	6.500	1.25	9.58	0.00
0.417	5.41	3.500	6.25	6.583	1.25	9.67	0.00
0.500	5.41	3.583	6.25	6.667	1.25	9.75	0.00
0.583	5.41	3.667	6.25	6.750	1.25	9.83	0.00
0.667	5.41	3.750	6.25	6.833	1.25	9.92	0.00
0.750	5.41	3.833	6.25	6.917	1.25	10.00	0.00
0.833	5.41	3.917	6.25	7.000	1.25	10.08	0.00
0.917	5.41	4.000	6.25	7.083	1.25	10.17	0.00
1.000	5.41	4.083	6.25	7.167	1.25	10.25	0.00
1.083	5.41	4.167	6.25	7.250	1.25	10.33	0.00
1.167	5.41	4.250	6.25	7.333	0.42	10.42	0.00
1.250	5.41	4.333	5.83	7.417	0.42	10.50	0.00
1.333	10.83	4.417	5.83	7.500	0.42	10.58	0.00
1.417	10.83	4.500	5.83	7.583	0.42	10.67	0.00
1.500	10.83	4.583	5.83	7.667	0.42	10.75	0.00
1.583	10.83	4.667	5.83	7.750	0.42	10.83	0.00
1.667	10.83	4.750	5.83	7.833	0.42	10.92	0.00
1.750	10.83	4.833	5.83	7.917	0.42	11.00	0.00
1.833	10.83	4.917	5.83	8.000	0.42	11.08	0.00
1.917	10.83	5.000	5.83	8.083	0.42	11.17	0.00
2.000	10.83	5.083	5.83	8.167	0.42	11.25	0.00
2.083	10.83	5.167	5.83	8.250	0.42	11.33	0.00
2.167	10.83	5.250	5.83	8.333	0.00	11.42	0.00
2.250	10.83	5.333	3.33	8.417	0.00	11.50	0.00
2.333	8.33	5.417	3.33	8.500	0.00	11.58	0.00
2.417	8.33	5.500	3.33	8.583	0.00	11.67	0.00
2.500	8.33	5.583	3.33	8.667	0.00	11.75	0.00
2.583	8.33	5.667	3.33	8.750	0.00	11.83	0.00
2.667	8.33	5.750	3.33	8.833	0.00	11.92	0.00
2.750	8.33	5.833	3.33	8.917	0.00	12.00	0.00
2.833	8.33	5.917	3.33	9.000	0.00	12.08	0.00
2.917	8.33	6.000	3.33	9.083	0.00	12.17	0.00
3.000	8.33	6.083	3.33	9.167	0.00	12.25	0.00
3.083	8.33	6.167	3.33	9.250	0.00		

Unit Hyd Qpeak (cms)= 2.308

PEAK FLOW (cms)= 0.150 (i)
TIME TO PEAK (hrs)= 5.333
RUNOFF VOLUME (mm)= 6.644
TOTAL RAINFALL (mm)= 41.650
RUNOFF COEFFICIENT = 0.160

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

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	8.33	6.250	3.33	9.33	0.00
0.167	0.00	3.250	8.33	6.333	1.25	9.42	0.00
0.250	0.00	3.333	6.25	6.417	1.25	9.50	0.00
0.333	5.41	3.417	6.25	6.500	1.25	9.58	0.00
0.417	5.41	3.500	6.25	6.583	1.25	9.67	0.00
0.500	5.41	3.583	6.25	6.667	1.25	9.75	0.00
0.583	5.41	3.667	6.25	6.750	1.25	9.83	0.00
0.667	5.41	3.750	6.25	6.833	1.25	9.92	0.00
0.750	5.41	3.833	6.25	6.917	1.25	10.00	0.00
0.833	5.41	3.917	6.25	7.000	1.25	10.08	0.00
0.917	5.41	4.000	6.25	7.083	1.25	10.17	0.00
1.000	5.41	4.083	6.25	7.167	1.25	10.25	0.00
1.083	5.41	4.167	6.25	7.250	1.25	10.33	0.00
1.167	5.41	4.250	6.25	7.333	0.42	10.42	0.00
1.250	5.41	4.333	5.83	7.417	0.42	10.50	0.00
1.333	10.83	4.417	5.83	7.500	0.42	10.58	0.00
1.417	10.83	4.500	5.83	7.583	0.42	10.67	0.00
1.500	10.83	4.583	5.83	7.667	0.42	10.75	0.00
1.583	10.83	4.667	5.83	7.750	0.42	10.83	0.00
1.667	10.83	4.750	5.83	7.833	0.42	10.92	0.00
1.750	10.83	4.833	5.83	7.917	0.42	11.00	0.00
1.833	10.83	4.917	5.83	8.000	0.42	11.08	0.00
1.917	10.83	5.000	5.83	8.083	0.42	11.17	0.00
2.000	10.83	5.083	5.83	8.167	0.42	11.25	0.00
2.083	10.83	5.167	5.83	8.250	0.42	11.33	0.00
2.167	10.83	5.250	5.83	8.333	0.00	11.42	0.00
2.250	10.83	5.333	3.33	8.417	0.00	11.50	0.00
2.333	8.33	5.417	3.33	8.500	0.00	11.58	0.00
2.417	8.33	5.500	3.33	8.583	0.00	11.67	0.00
2.500	8.33	5.583	3.33	8.667	0.00	11.75	0.00
2.583	8.33	5.667	3.33	8.750	0.00	11.83	0.00
2.667	8.33	5.750	3.33	8.833	0.00	11.92	0.00
2.750	8.33	5.833	3.33	8.917	0.00	12.00	0.00
2.833	8.33	5.917	3.33	9.000	0.00	12.08	0.00
2.917	8.33	6.000	3.33	9.083	0.00	12.17	0.00
3.000	8.33	6.083	3.33	9.167	0.00	12.25	0.00
3.083	8.33	6.167	3.33	9.250	0.00		

Unit Hyd Qpeak (cms)= 0.068

PEAK FLOW (cms)= 0.001 (i)
TIME TO PEAK (hrs)= 5.250
RUNOFF VOLUME (mm)= 6.520
TOTAL RAINFALL (mm)= 41.650
RUNOFF COEFFICIENT = 0.157

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

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Pos-development

```
| ADD HYD ( 0006) |
| 1 + 2 = 3 |
-----
ID1= 1 ( 0004): 32.63 0.150 5.33 6.64
+ ID2= 2 ( 0005): 0.20 0.001 5.25 6.52
=====
ID = 3 ( 0006): 32.83 0.151 5.33 6.64
```

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

```
V V I SSSSS U U A L (v 6.2.2015)
V V I SS U U A A L
V V I SS U U A A A A L
V V I SS U U A A L
VV I SSSSS UUUUU A A LLLLL
```

```
OOO TTTT TTTT H H Y Y M M OOO TM
O O T T H H Y Y MM MM O O
O O T T H H Y M M O O
OOO T T H H Y M M OOO
```

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

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DATE: 05-16-2025

TIME: 01:10:14

USER:

COMMENTS: _____

```
*****
** SIMULATION : AES_12HR_50yr_PCSWMM **
*****
```

```
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| READ STORM | Filename: C:\Users\jghobrial\AppData
| | ata\Local\Temp\
| | 9b045d52-515d-445d-b569-27a6e1f3d5a8\le054a33
| Ptotal= 83.47 mm | Comments: AES_12HR_50yr_PCSWMM
-----
```

TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.00	0.00	3.25	12.52	6.50	2.50	9.75	0.00
0.25	10.85	3.50	12.52	6.75	2.50	10.00	0.00
0.50	10.85	3.75	12.52	7.00	2.50	10.25	0.00
0.75	10.85	4.00	12.52	7.25	0.83	10.50	0.00

1.00	10.85	4.25	11.69	7.50	0.83	10.75	0.00
1.25	21.70	4.50	11.69	7.75	0.83	11.00	0.00
1.50	21.70	4.75	11.69	8.00	0.83	11.25	0.00
1.75	21.70	5.00	11.69	8.25	0.00	11.50	0.00
2.00	21.70	5.25	6.68	8.50	0.00	11.75	0.00
2.25	16.70	5.50	6.68	8.75	0.00	12.00	0.00
2.50	16.70	5.75	6.68	9.00	0.00		
2.75	16.70	6.00	6.68	9.25	0.00		
3.00	16.70	6.25	2.50	9.50	0.00		

```
-----
| CALIB |
| NASHYD ( 0004) | Area (ha)= 32.63 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res. (N)= 3.00
-----
U.H. Tp (hrs)= 0.54
```

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

---- TRANSFORMED HYETOGRAPH ----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	16.70	6.250	6.68	9.33	0.00
0.167	0.00	3.250	16.70	6.333	2.50	9.42	0.00
0.250	0.00	3.333	12.52	6.417	2.50	9.50	0.00
0.333	10.85	3.417	12.52	6.500	2.50	9.58	0.00
0.417	10.85	3.500	12.52	6.583	2.50	9.67	0.00
0.500	10.85	3.583	12.52	6.667	2.50	9.75	0.00
0.583	10.85	3.667	12.52	6.750	2.50	9.83	0.00
0.667	10.85	3.750	12.52	6.833	2.50	9.92	0.00
0.750	10.85	3.833	12.52	6.917	2.50	10.00	0.00
0.833	10.85	3.917	12.52	7.000	2.50	10.08	0.00
0.917	10.85	4.000	12.52	7.083	2.50	10.17	0.00
1.000	10.85	4.083	12.52	7.167	2.50	10.25	0.00
1.083	10.85	4.167	12.52	7.250	2.50	10.33	0.00
1.167	10.85	4.250	12.52	7.333	0.83	10.42	0.00
1.250	10.85	4.333	11.69	7.417	0.83	10.50	0.00
1.333	21.70	4.417	11.69	7.500	0.83	10.58	0.00
1.417	21.70	4.500	11.69	7.583	0.83	10.67	0.00
1.500	21.70	4.583	11.69	7.667	0.83	10.75	0.00
1.583	21.70	4.667	11.69	7.750	0.83	10.83	0.00
1.667	21.70	4.750	11.69	7.833	0.83	10.92	0.00
1.750	21.70	4.833	11.69	7.917	0.83	11.00	0.00
1.833	21.70	4.917	11.69	8.000	0.83	11.08	0.00
1.917	21.70	5.000	11.69	8.083	0.83	11.17	0.00
2.000	21.70	5.083	11.69	8.167	0.83	11.25	0.00
2.083	21.70	5.167	11.69	8.250	0.83	11.33	0.00
2.167	21.70	5.250	11.69	8.333	0.00	11.42	0.00
2.250	21.70	5.333	6.68	8.417	0.00	11.50	0.00
2.333	16.70	5.417	6.68	8.500	0.00	11.58	0.00
2.417	16.70	5.500	6.68	8.583	0.00	11.67	0.00
2.500	16.70	5.583	6.68	8.667	0.00	11.75	0.00
2.583	16.70	5.667	6.68	8.750	0.00	11.83	0.00
2.667	16.70	5.750	6.68	8.833	0.00	11.92	0.00
2.750	16.70	5.833	6.68	8.917	0.00	12.00	0.00
2.833	16.70	5.917	6.68	9.000	0.00	12.08	0.00
2.917	16.70	6.000	6.68	9.083	0.00	12.17	0.00
3.000	16.70	6.083	6.68	9.167	0.00	12.25	0.00
3.083	16.70	6.167	6.68	9.250	0.00		

Unit Hyd Qpeak (cms)= 2.308

PEAK FLOW (cms)= 0.539 (i)

TIME TO PEAK (hrs)= 5.333

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DATE: May 2025

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RUNOFF VOLUME (mm) = 26.835
 TOTAL RAINFALL (mm) = 83.470
 RUNOFF COEFFICIENT = 0.321

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

 | CALIB |
 | NASHYD (0005) | Area (ha) = 0.20 Curve Number (CN) = 65.0
 | ID= 1 DT= 5.0 min | Ia (mm) = 8.00 # of Linear Res. (N) = 3.00

 U.H. Tp (hrs) = 0.11

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

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

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
0.083	0.00	3.167	16.70	6.250	6.68	9.33	0.00
0.167	0.00	3.250	16.70	6.333	2.50	9.42	0.00
0.250	0.00	3.333	12.52	6.417	2.50	9.50	0.00
0.333	10.85	3.417	12.52	6.500	2.50	9.58	0.00
0.417	10.85	3.500	12.52	6.583	2.50	9.67	0.00
0.500	10.85	3.583	12.52	6.667	2.50	9.75	0.00
0.583	10.85	3.667	12.52	6.750	2.50	9.83	0.00
0.667	10.85	3.750	12.52	6.833	2.50	9.92	0.00
0.750	10.85	3.833	12.52	6.917	2.50	10.00	0.00
0.833	10.85	3.917	12.52	7.000	2.50	10.08	0.00
0.917	10.85	4.000	12.52	7.083	2.50	10.17	0.00
1.000	10.85	4.083	12.52	7.167	2.50	10.25	0.00
1.083	10.85	4.167	12.52	7.250	2.50	10.33	0.00
1.167	10.85	4.250	12.52	7.333	0.83	10.42	0.00
1.250	10.85	4.333	11.69	7.417	0.83	10.50	0.00
1.333	21.70	4.417	11.69	7.500	0.83	10.58	0.00
1.417	21.70	4.500	11.69	7.583	0.83	10.67	0.00
1.500	21.70	4.583	11.69	7.667	0.83	10.75	0.00
1.583	21.70	4.667	11.69	7.750	0.83	10.83	0.00
1.667	21.70	4.750	11.69	7.833	0.83	10.92	0.00
1.750	21.70	4.833	11.69	7.917	0.83	11.00	0.00
1.833	21.70	4.917	11.69	8.000	0.83	11.08	0.00
1.917	21.70	5.000	11.69	8.083	0.83	11.17	0.00
2.000	21.70	5.083	11.69	8.167	0.83	11.25	0.00
2.083	21.70	5.167	11.69	8.250	0.83	11.33	0.00
2.167	21.70	5.250	11.69	8.333	0.00	11.42	0.00
2.250	21.70	5.333	6.68	8.417	0.00	11.50	0.00
2.333	16.70	5.417	6.68	8.500	0.00	11.58	0.00
2.417	16.70	5.500	6.68	8.583	0.00	11.67	0.00
2.500	16.70	5.583	6.68	8.667	0.00	11.75	0.00
2.583	16.70	5.667	6.68	8.750	0.00	11.83	0.00
2.667	16.70	5.750	6.68	8.833	0.00	11.92	0.00
2.750	16.70	5.833	6.68	8.917	0.00	12.00	0.00
2.833	16.70	5.917	6.68	9.000	0.00	12.08	0.00
2.917	16.70	6.000	6.68	9.083	0.00	12.17	0.00
3.000	16.70	6.083	6.68	9.167	0.00	12.25	0.00
3.083	16.70	6.167	6.68	9.250	0.00		

Unit Hyd Qpeak (cms) = 0.068

PEAK FLOW (cms) = 0.004 (i)
 TIME TO PEAK (hrs) = 3.250
 RUNOFF VOLUME (mm) = 26.341
 TOTAL RAINFALL (mm) = 83.470
 RUNOFF COEFFICIENT = 0.316

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

 | ADD HYD (0006) |
 | 1 + 2 = 3 | AREA QPEAK TPEAK R.V.
 (ha) (cms) (hrs) (mm)
 ID1= 1 (0004): 32.63 0.539 5.33 26.84
 + ID2= 2 (0005): 0.20 0.004 3.25 26.34
 =====
 ID = 3 (0006): 32.83 0.542 5.33 26.83

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.

V V I SSSSS U U A L (v 6.2.2015)
 V V I SS U U A A L
 V V I SS U U A A L
 V V I SS U U A A L
 VV I SSSSS UUUU A A LLLL
 OOO TTTT TTTT H H Y Y M M OOO TM
 O O T T H H Y Y MM MM O O
 O O T T H H Y M M O O
 OOO T T H H Y M M OOO

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

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 Summary filename: C:\Users\jghobrial\AppData\Local\Civica\XH5\fbddaa27-fb71-4db6-9c16-43e17470752a\9983c0a7-1cab-475e-bb2f-ba0991393f0a\sc

DATE: 05-16-2025

TIME: 01:10:14

USER:

COMMENTS:

 ** SIMULATION : AES_12HR_5yr_PCSWMM **

 | READ STORM | Filename: C:\Users\jghobrial\AppData
 | | ata\Local\Temp\
 | | 9b045d52-515d-445d-b569-27a6e1f3d5a8\9ddca7da
 | Ptotal= 54.45 mm | Comments: AES_12HR_5yr_PCSWMM

TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr	TIME hrs	RAIN mm/hr
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5783 Bloomington Road
Pos-development

DATE: May 2025

0.00	0.00	3.25	8.17	6.50	1.63	9.75	0.00
0.25	7.08	3.50	8.17	6.75	1.63	10.00	0.00
0.50	7.08	3.75	8.17	7.00	1.63	10.25	0.00
0.75	7.08	4.00	8.17	7.25	0.54	10.50	0.00
1.00	7.08	4.25	7.62	7.50	0.54	10.75	0.00
1.25	14.16	4.50	7.62	7.75	0.54	11.00	0.00
1.50	14.16	4.75	7.62	8.00	0.54	11.25	0.00
1.75	14.16	5.00	7.62	8.25	0.00	11.50	0.00
2.00	14.16	5.25	4.36	8.50	0.00	11.75	0.00
2.25	10.89	5.50	4.36	8.75	0.00	12.00	0.00
2.50	10.89	5.75	4.36	9.00	0.00		
2.75	10.89	6.00	4.36	9.25	0.00		
3.00	10.89	6.25	1.63	9.50	0.00		

Unit Hyd Qpeak (cms)= 2.308

PEAK FLOW (cms)= 0.253 (i)
TIME TO PEAK (hrs)= 5.333
RUNOFF VOLUME (mm)= 11.776
TOTAL RAINFALL (mm)= 54.450
RUNOFF COEFFICIENT = 0.216

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

| CALIB |
| NASHYD (0005) | Area (ha)= 0.20 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.11

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

| CALIB |
| NASHYD (0004) | Area (ha)= 32.63 Curve Number (CN)= 65.0
| ID= 1 DT= 5.0 min | Ia (mm)= 8.00 # of Linear Res.(N)= 3.00

U.H. Tp(hrs)= 0.54

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

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	10.89	6.250	4.36	9.33	0.00
0.167	0.00	3.250	10.89	6.333	1.63	9.42	0.00
0.250	0.00	3.333	8.17	6.417	1.63	9.50	0.00
0.333	7.08	3.417	8.17	6.500	1.63	9.58	0.00
0.417	7.08	3.500	8.17	6.583	1.63	9.67	0.00
0.500	7.08	3.583	8.17	6.667	1.63	9.75	0.00
0.583	7.08	3.667	8.17	6.750	1.63	9.83	0.00
0.667	7.08	3.750	8.17	6.833	1.63	9.92	0.00
0.750	7.08	3.833	8.17	6.917	1.63	10.00	0.00
0.833	7.08	3.917	8.17	7.000	1.63	10.08	0.00
0.917	7.08	4.000	8.17	7.083	1.63	10.17	0.00
1.000	7.08	4.083	8.17	7.167	1.63	10.25	0.00
1.083	7.08	4.167	8.17	7.250	1.63	10.33	0.00
1.167	7.08	4.250	8.17	7.333	0.54	10.42	0.00
1.250	7.08	4.333	7.62	7.417	0.54	10.50	0.00
1.333	14.16	4.417	7.62	7.500	0.54	10.58	0.00
1.417	14.16	4.500	7.62	7.583	0.54	10.67	0.00
1.500	14.16	4.583	7.62	7.667	0.54	10.75	0.00
1.583	14.16	4.667	7.62	7.750	0.54	10.83	0.00
1.667	14.16	4.750	7.62	7.833	0.54	10.92	0.00
1.750	14.16	4.833	7.62	7.917	0.54	10.92	0.00
1.833	14.16	4.917	7.62	8.000	0.54	11.00	0.00
1.917	14.16	5.000	7.62	8.083	0.54	11.08	0.00
2.000	14.16	5.083	7.62	8.167	0.54	11.17	0.00
2.083	14.16	5.167	7.62	8.250	0.54	11.25	0.00
2.167	14.16	5.250	7.62	8.333	0.00	11.33	0.00
2.250	14.16	5.333	4.36	8.417	0.00	11.42	0.00
2.333	10.89	5.417	4.36	8.500	0.00	11.50	0.00
2.417	10.89	5.500	4.36	8.583	0.00	11.58	0.00
2.500	10.89	5.583	4.36	8.667	0.00	11.67	0.00
2.583	10.89	5.667	4.36	8.750	0.00	11.75	0.00
2.667	10.89	5.750	4.36	8.833	0.00	11.83	0.00
2.750	10.89	5.833	4.36	8.917	0.00	11.92	0.00
2.833	10.89	5.917	4.36	9.000	0.00	12.00	0.00
2.917	10.89	6.000	4.36	9.083	0.00	12.08	0.00
3.000	10.89	6.083	4.36	9.167	0.00	12.17	0.00
3.083	10.89	6.167	4.36	9.250	0.00	12.25	0.00

----- TRANSFORMED HYETOGRAPH -----							
TIME	RAIN	TIME	RAIN	TIME	RAIN	TIME	RAIN
hrs	mm/hr	hrs	mm/hr	hrs	mm/hr	hrs	mm/hr
0.083	0.00	3.167	10.89	6.250	4.36	9.33	0.00
0.167	0.00	3.250	10.89	6.333	1.63	9.42	0.00
0.250	0.00	3.333	8.17	6.417	1.63	9.50	0.00
0.333	7.08	3.417	8.17	6.500	1.63	9.58	0.00
0.417	7.08	3.500	8.17	6.583	1.63	9.67	0.00
0.500	7.08	3.583	8.17	6.667	1.63	9.75	0.00
0.583	7.08	3.667	8.17	6.750	1.63	9.83	0.00
0.667	7.08	3.750	8.17	6.833	1.63	9.92	0.00
0.750	7.08	3.833	8.17	6.917	1.63	10.00	0.00
0.833	7.08	3.917	8.17	7.000	1.63	10.08	0.00
0.917	7.08	4.000	8.17	7.083	1.63	10.17	0.00
1.000	7.08	4.083	8.17	7.167	1.63	10.25	0.00
1.083	7.08	4.167	8.17	7.250	1.63	10.33	0.00
1.167	7.08	4.250	8.17	7.333	0.54	10.42	0.00
1.250	7.08	4.333	7.62	7.417	0.54	10.50	0.00
1.333	14.16	4.417	7.62	7.500	0.54	10.58	0.00
1.417	14.16	4.500	7.62	7.583	0.54	10.67	0.00
1.500	14.16	4.583	7.62	7.667	0.54	10.75	0.00
1.583	14.16	4.667	7.62	7.750	0.54	10.83	0.00
1.667	14.16	4.750	7.62	7.833	0.54	10.92	0.00
1.750	14.16	4.833	7.62	7.917	0.54	10.92	0.00
1.833	14.16	4.917	7.62	8.000	0.54	11.00	0.00
1.917	14.16	5.000	7.62	8.083	0.54	11.08	0.00
2.000	14.16	5.083	7.62	8.167	0.54	11.17	0.00
2.083	14.16	5.167	7.62	8.250	0.54	11.25	0.00
2.167	14.16	5.250	7.62	8.333	0.00	11.33	0.00
2.250	14.16	5.333	4.36	8.417	0.00	11.42	0.00
2.333	10.89	5.417	4.36	8.500	0.00	11.50	0.00
2.417	10.89	5.500	4.36	8.583	0.00	11.58	0.00
2.500	10.89	5.583	4.36	8.667	0.00	11.67	0.00
2.583	10.89	5.667	4.36	8.750	0.00	11.75	0.00
2.667	10.89	5.750	4.36	8.833	0.00	11.83	0.00
2.750	10.89	5.833	4.36	8.917	0.00	11.92	0.00
2.833	10.89	5.917	4.36	9.000	0.00	12.00	0.00
2.917	10.89	6.000	4.36	9.083	0.00	12.08	0.00
3.000	10.89	6.083	4.36	9.167	0.00	12.17	0.00
3.083	10.89	6.167	4.36	9.250	0.00	12.25	0.00

Unit Hyd Qpeak (cms)= 0.068

PEAK FLOW (cms)= 0.002 (i)
TIME TO PEAK (hrs)= 5.250
RUNOFF VOLUME (mm)= 11.558

Pos-development

TOTAL RAINFALL (mm) = 54.450
RUNOFF COEFFICIENT = 0.212

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

ADD HYD (0006)				
1 + 2 = 3	AREA	QPEAK	TPEAK	R.V.
-----	(ha)	(cms)	(hrs)	(mm)
ID1= 1 (0004):	32.63	0.253	5.33	11.78
+ ID2= 2 (0005):	0.20	0.002	5.25	11.56
=====				
ID = 3 (0006):	32.83	0.255	5.33	11.77

NOTE: PEAK FLOWS DO NOT INCLUDE BASEFLOWS IF ANY.
