

Project: Post-Developed.gpw

SCS Runoff Post-Developed Area #5

SCS Runoff Offsite Miami University VOA

Basin 5 Inflow

Basin 5 Outflow

Offsite MU Basin

9

10

11

12

13

Reservoir

Reservoir

Combine

Reservoir

Monday, Apr 16, 2012

Hydrograph Return Period Recap Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
).			1-yr	2-yr	3-уг	5-yr	10-yr	25-yr	50-yr	100-yr	- Describion
	SCS Runoff		16.03	25.44		37.65	47.96	63.32	77.13	93.46	Post-Developed Area #1
2	Reservoir	1	0.799	1.238		1.898	2.520	3.483	4.406	5.578	Lake #1 Outlet
3	SCS Runoff		4.614	9.775		17.22	23.78	33.83	43.17	54.70	Post-Developed Area #2
1	SCS Runoff		63.44	93.52		131.67	163.00	208.47	248,74	295.85	Post-Developed Area #3
i	Reservoir	3	0.172	0.279		0.448	0.619	0.908	1.206	2.464	Lake #2 Outlet
3	Combine	4, 5	63.48	93.59		131.78	163.17	208.71	249.07	296.32	Lake #3 Inflow
,	Reservoir	6	1,153	1.474		1.808	2.041	2.339	2.568	8.211	Lake #3 Outlet
3	SCS Runoff		16.74	26.16		38.45	48.83	64.13	77.85	94.05	Post-Developed Area #4
E	Reservoir	8	0.293	0.470		0.729	0.975	1.378	1.852	3.606	Lake #4 Outflow
10	SCS Runoff		32.99	56.13		86.85	113.03	152.35	188.38	231.37	Post-Developed Area #5
11	SCS Runoff		20.89	27.84		36.16	42.76	52.13	60,27	69.69	Offsite Miami University VOA
12	Reservoir	11	4.183	4.903		9.299	15.66	20.40	22.70	24.97	Offsite MU Basin
13	Combine	10, 12	37.00	60.81		93.90	127.27	172.21	210.21	255.41	Basin 5 Inflow
14	Reservoir	13	0.355	0.605		0.985	1.348	1.925	4.553	9.071	Basin 5 Outflow
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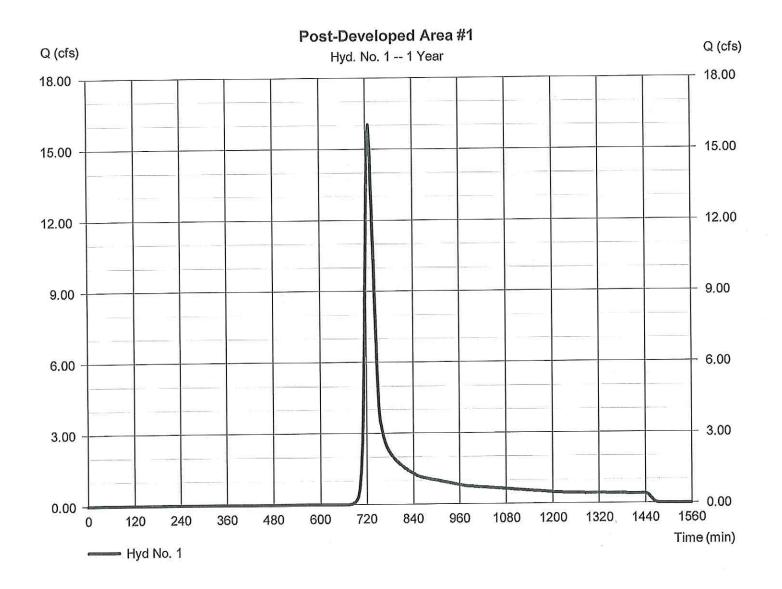
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Monday, Apr 16, 2012

### Hyd. No. 1

Post-Developed Area #1

Peak discharge = 16.03 cfs= SCS Runoff Hydrograph type = 728 min Time to peak Storm frequency = 1 yrs= 60,245 cuftHyd. volume = 2 min Time interval = 77.8Curve number = 24,300 ac Drainage area = 0 ftHydraulic length Basin Slope = 0.0 % $= 20.50 \, \text{min}$ Time of conc. (Tc) = User Tc method = Type II Distribution = 2.33 inTotal precip. = 484 Shape factor = 24 hrs Storm duration



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Monday, Apr 16, 2012

### Hyd. No. 2

Lake #1 Outlet

Hydrograph type Storm frequency = Reservoir = 1 yrs

Peak discharge Time to peak

= 0.799 cfs= 964 min

Time interval

= 2 min

Hyd. volume

= 60,252 cuft

Inflow hyd. No.

= 1 - Post-Developed Area #1

Max. Elevation

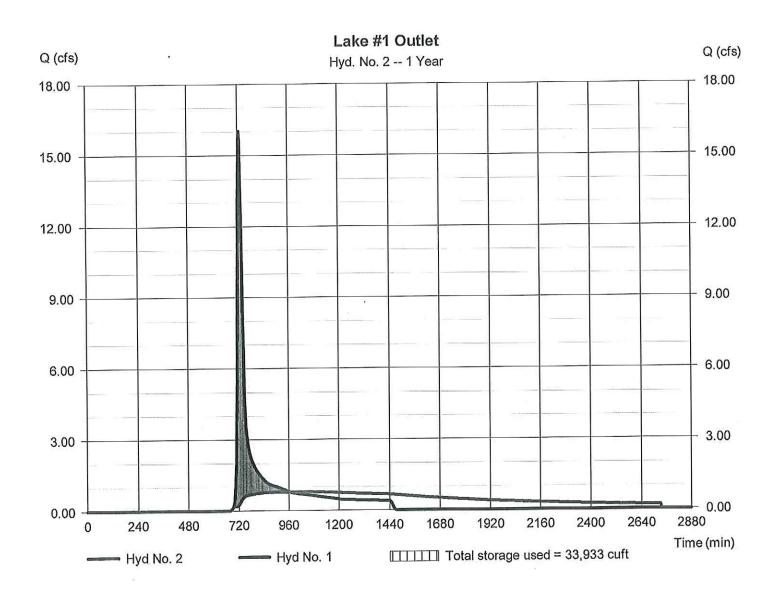
 $= 885.16 \, \mathrm{ft}$ 

Reservoir name

= Lake #1

Max. Storage

= 33,933 cuft



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### Hyd. No. 1

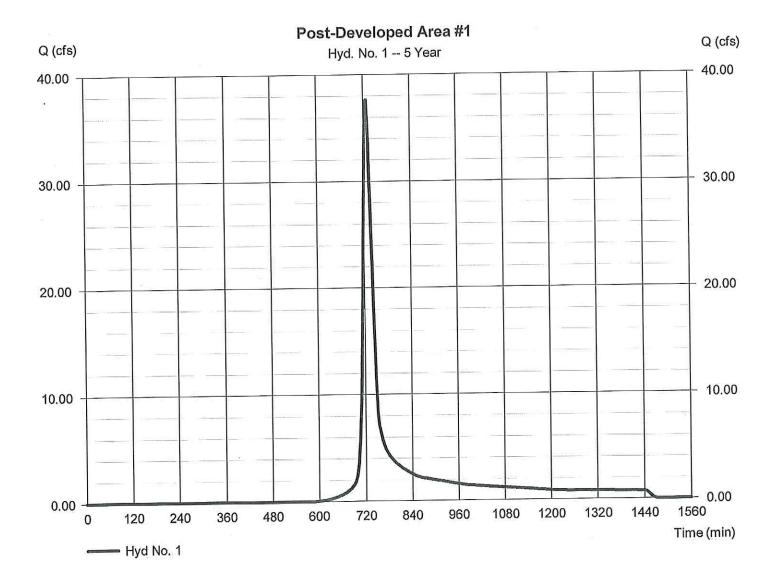
Post-Developed Area #1

= SCS Runoff Hydrograph type = 5 yrsStorm frequency = 2 min Time interval = 24.300 acDrainage area = 0.0 %Basin Slope = User Tc method = 3.49 inTotal precip. = 24 hrs Storm duration

Peak discharge = 37.65 cfs
Time to peak = 728 min
Hyd. volume = 132,548 cuft
Curve number = 77.8
Hydraulic length = 0 ft
Time of conc. (Tc) = 20.50 min
Distribution = Type II

Shape factor

= 484



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Monday, Apr 16, 2012

### Hyd. No. 2

Lake #1 Outlet

Hydrograph type Storm frequency Time interval

Inflow hyd. No.

Reservoir name

= Reservoir = 5 yrs = 2 min

= 2 min = 1 - Post-Developed Area #1 = Lake #1

Hyd. volume #1 Max. Elevation

Peak discharge

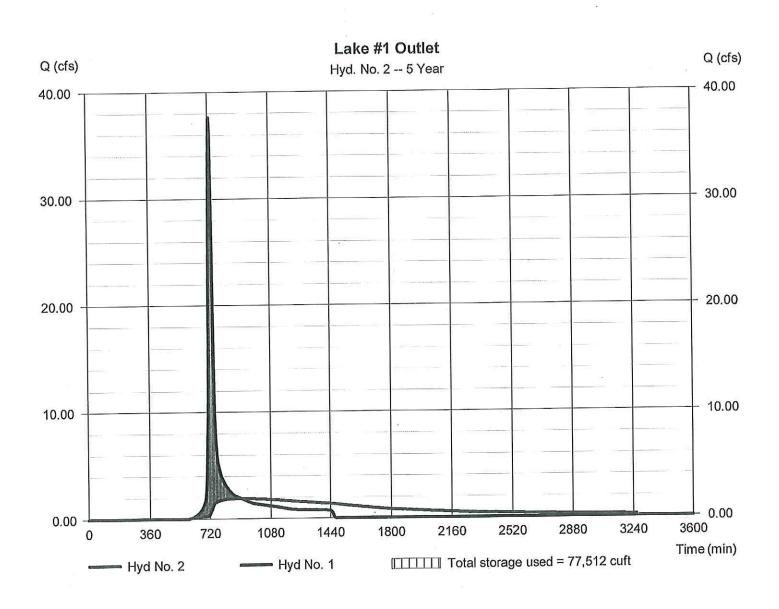
Time to peak

Max. Storage

= 1.898 cfs = 908 min

= 132,557 cuft

= 885.67 ft = 77,512 cuft



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### Hyd. No. 1

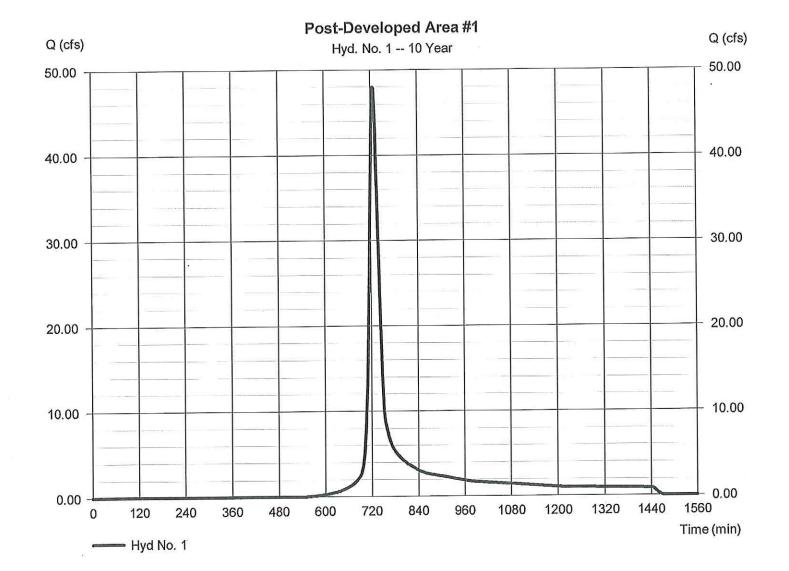
Post-Developed Area #1

= SCS Runoff Hydrograph type Storm frequency = 10 yrs= 2 min Time interval = 24.300 acDrainage area Basin Slope = 0.0 %= User Tc method Total precip. = 3.99 in= 24 hrs Storm duration

Peak discharge = 47.96 cfs
Time to peak = 726 min
Hyd. volume = 167,346 cuft
Curve number = 77.8
Hydraulic length = 0 ft
Time of conc. (Tc) = 20.50 min
Distribution = Type II

= 484

Shape factor



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### Hyd. No. 2

Lake #1 Outlet

Hydrograph type Storm frequency = Reservoir = 10 yrs Peak discharge Time to peak Hyd. volume = 2.520 cfs = 880 min

Time interval Inflow hyd. No.

= 2 min = 1 - Post-Developed Area #1

Max. Elevation

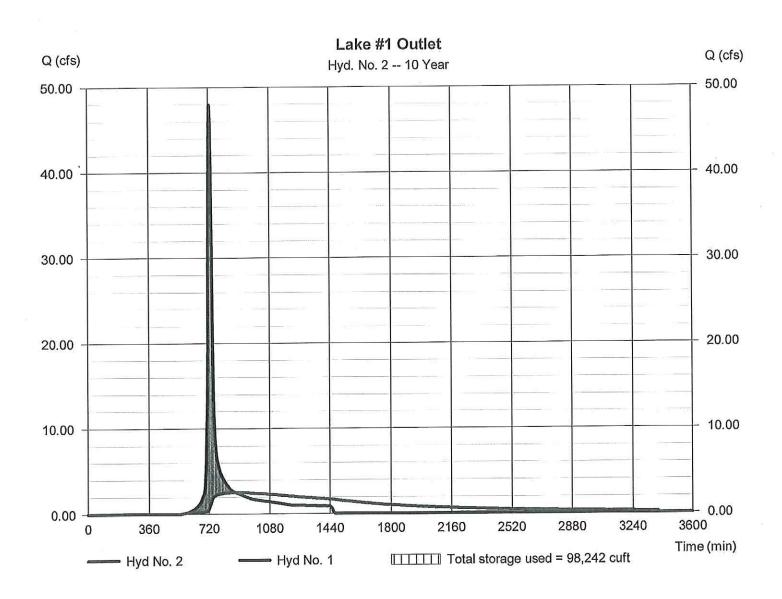
= 167,354 cuft = 885.91 ft

Reservoir name

= Lake #1

Max. Storage

= 98,242 cuft



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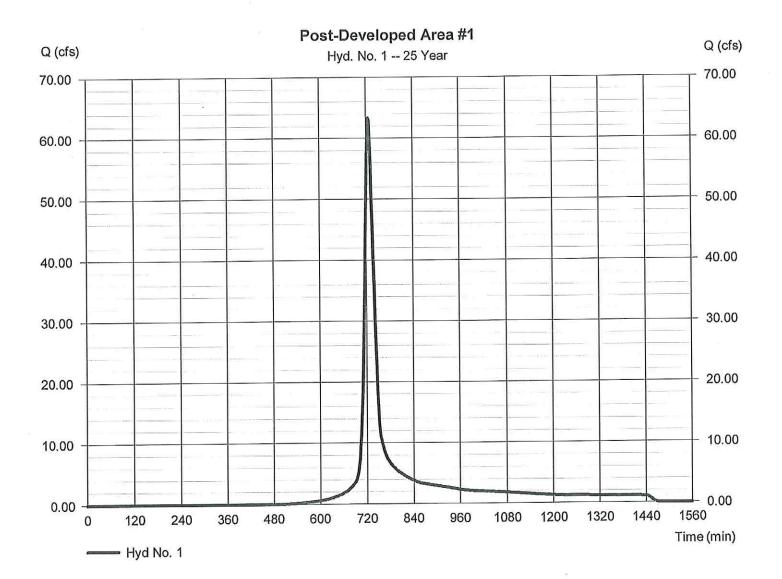
#### Hyd. No. 1

Post-Developed Area #1

= SCS Runoff Hydrograph type = 25 yrs Storm frequency Time interval  $= 2 \min$ = 24.300 ac Drainage area = 0.0 % Basin Slope Tc method = User = 4.70 inTotal precip. Storm duration = 24 hrs

Peak discharge = 63.32 cfs= 726 min Time to peak Hyd. volume = 219,243 cuft = 77.8Curve number Hydraulic length = 0 ftTime of conc. (Tc)  $= 20.50 \, \text{min}$ Distribution = Type II = 484

Shape factor



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#### Hyd. No. 2

Lake #1 Outlet

Hydrograph type Storm frequency Reservoir25 yrs

Peak discharge Time to peak = 3.483 cfs = 856 min

Time interval

= 2 min

Hyd. volume

= 219,246 cuft

Inflow hyd. No.

= 1 - Post-Developed Area #1

Max. Elevation

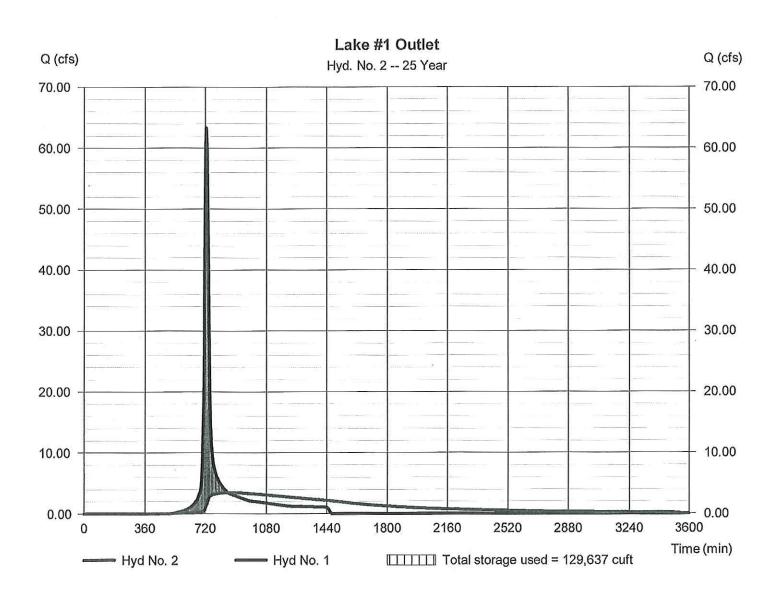
 $= 886.27 \, \text{ft}$ 

Reservoir name

= Lake #1

Max. Storage

= 129,637 cuft



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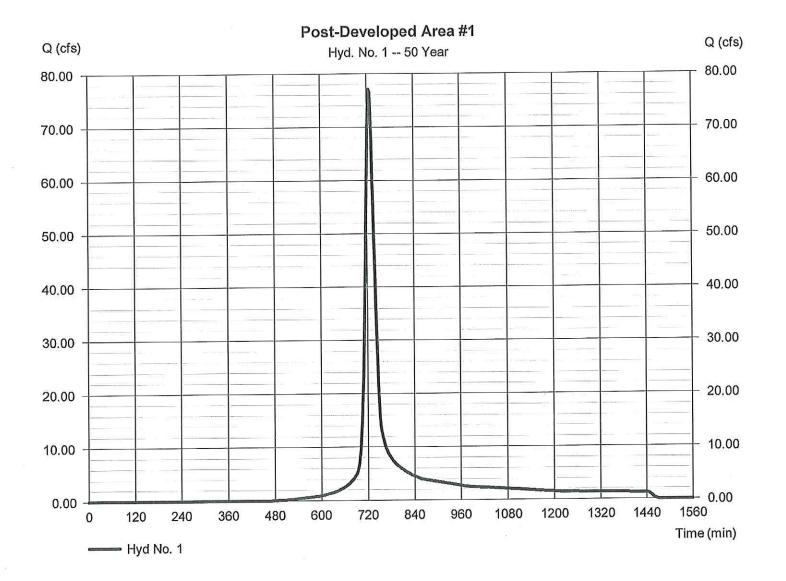
#### Hyd. No. 1

#### Post-Developed Area #1

= SCS Runoff Hydrograph type Storm frequency = 50 yrs= 2 min Time interval = 24.300 acDrainage area = 0.0 %Basin Slope = User Tc method = 5.32 inTotal precip. Storm duration = 24 hrs

Peak discharge = 77.13 cfs
Time to peak = 726 min
Hyd. volume = 266,372 cuft
Curve number = 77.8
Hydraulic length = 0 ft
Time of conc. (Tc) = 20.50 min

Distribution = 20.50 ml = Type II Shape factor = 484



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Monday, Apr 16, 2012

#### Hyd. No. 2

Lake #1 Outlet

Hydrograph type Storm frequency Time interval

Inflow hyd. No.

Reservoir name

= 50 yrs = 2 min

= Reservoir

= 1 - Post-Developed Area #1 = Lake #1

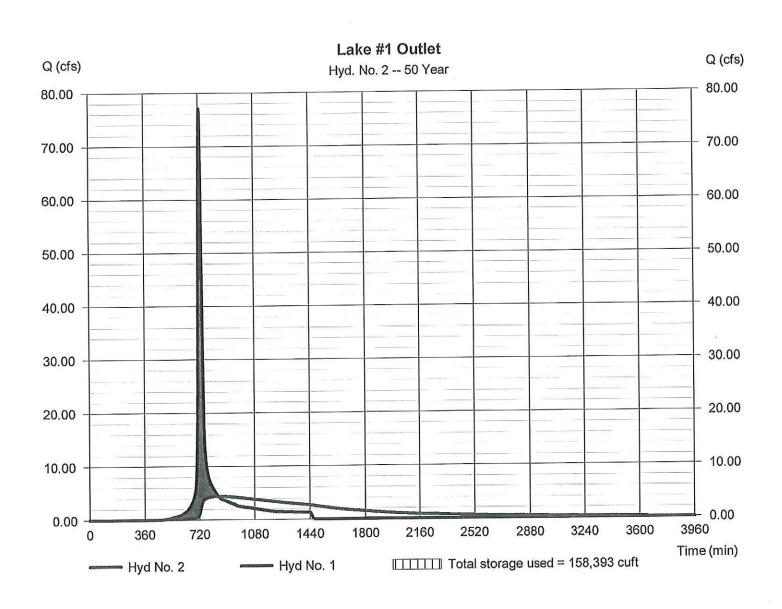
Time to peak Hyd. volume = 844 min = 266,379 cuft

= 4.406 cfs

Max. Elevation Max. Storage

Peak discharge

= 886.59 ft = 158,393 cuft



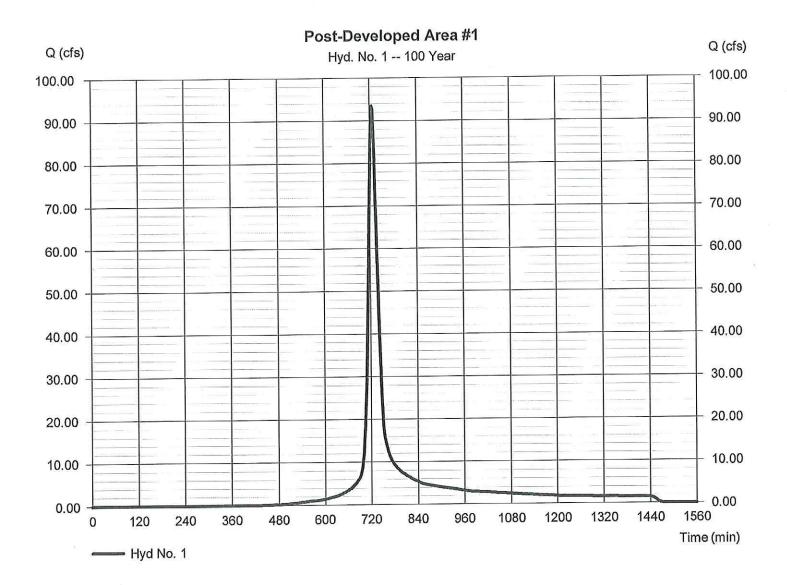
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Monday, Apr 16, 2012

### Hyd. No. 1

Post-Developed Area #1

= 93.46 cfsPeak discharge = SCS Runoff Hydrograph type Time to peak = 726 min Storm frequency = 100 yrsHyd. volume = 322,698 cuft = 2 min Time interval Curve number = 77.8= 24.300 acDrainage area Hydraulic length = 0 ft= 0.0 %Basin Slope Time of conc. (Tc)  $= 20.50 \, \text{min}$ Tc method = User = Type II Distribution Total precip. = 6.04 in= 484 Shape factor Storm duration = 24 hrs



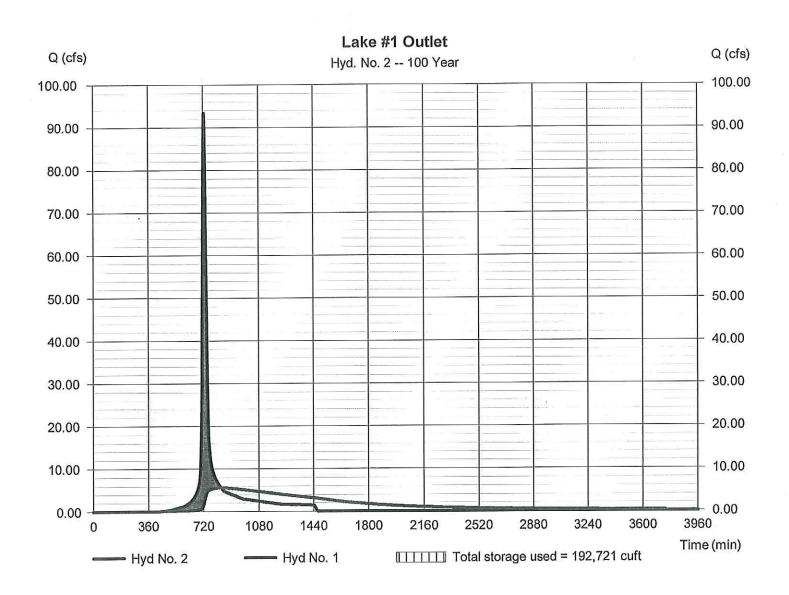
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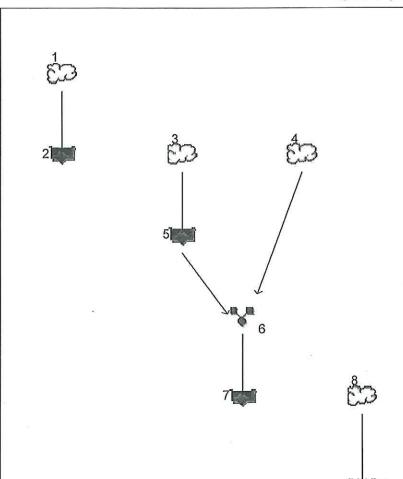
Monday, Apr 16, 2012

#### Hyd. No. 2

Lake #1 Outlet

Peak discharge = 5.578 cfs= Reservoir Hydrograph type = 836 min Time to peak Storm frequency = 100 yrs= 322,702 cuft Time interval Hyd. volume = 2 min  $= 886.97 \, \mathrm{ft}$ Max. Elevation Inflow hyd. No. = 1 - Post-Developed Area #1 = 192,721 cuft Max. Storage Reservoir name = Lake #1

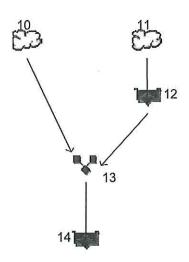




#### Legend

<u>Hyd.</u>	<u>Origin</u>	<u>Description</u>
1	SCS Runoff	Post-Developed Area #1
2	Reservoir	Lake #1 Outlet
3	SCS Runoff	Post-Developed Area #2
4	SCS Runoff	Post-Developed Area #3
5	Reservoir	Lake #2 Outlet
6	Combine	Lake #3 Inflow
7	Reservoir	Lake #3 Outlet
8	SCS Runoff	Post-Developed Area #4
9	Reservoir	Lake #4 Outflow
10	SCS Runoff	Post-Developed Area #5
11	SCS Runoff	Offsite Miami University VOA
12	Reservoir	Offsite MU Basin
13	Combine	Basin 5 Inflow
14	Reservoir	Basin 5 Outflow

Project: Post-Developed.gpw



Monday, Apr 16, 2012

Hydrograph Return Period Recap Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Type			"	nyaranow nyarographs extension to Autoc								
1-yr   2-yr   3-yr   5-yr   10-yr   25-yr   50-yr   100-yr	lyd. Io.	type	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
2       Reservoir       1       0.799       1.238				1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
3       SCS Runoff	1	SCS Runoff		16.03	25.44		37.65	47.96	63.32	77.13	93.46	Post-Developed Area #1
4 SCS Runoff 63.44 93.52 131.67 163.00 208.47 248.74 295.85 Post-Developed Area #3  5 Reservoir 3 0.172 0.279 0.448 0.619 0.908 1.206 2.464 Lake #2 Outlet  6 Combine 4,5 63.48 93.59 131.78 163.17 208.71 249.07 296.32 Lake #3 Inflow  7 Reservoir 6 1.153 1.474 1.808 2.041 2.339 2.568 8.211 Lake #3 Outlet  8 SCS Runoff 16.74 26.16 38.45 48.83 64.13 77.85 94.05 Post-Developed Area #4  9 Reservoir 8 0.293 0.470 0.729 0.975 1.378 1.852 3.606 Lake #4 Outflow  10 SCS Runoff 32.99 56.13 86.85 113.03 152.35 188.38 231.37 Post-Developed Area #5  11 SCS Runoff 20.89 27.84 36.16 42.76 52.13 60.27 69.69 Offsite Miami University VOA  12 Reservoir 11 4.183 4.903 93.90 127.27 172.21 210.21 255.41 Basin 5 Inflow	2	Reservoir	1	0.799	1.238		1.898	2.520	3.483	4.406	5.578	Lake #1 Outlet
5         Reservoir         3         0.172         0.279          0.448         0.619         0.908         1.206         2.464         Lake #2 Outlet           6         Combine         4, 5         63.48         93.59          131.78         163.17         208.71         249.07         296.32         Lake #3 Inflow           7         Reservoir         6         1.153         1.474          1.808         2.041         2.339         2.568         8.211         Lake #3 Outlet           8         SCS Runoff          16.74         26.16          38.45         48.83         64.13         77.85         94.05         Post-Developed Area #4           9         Reservoir         8         0.293         0.470          0.729         0.975         1.378         1.852         3.606         Lake #4 Outflow           10         SCS Runoff          32.99         56.13          86.85         113.03         152.35         188.38         231.37         Post-Developed Area #5           11         SCS Runoff          20.89         27.84          36.16         42.76	3	SCS Runoff	×	4.614	9.775		17.22	23.78	33.83	43.17	54.70	Post-Developed Area #2
6 Combine . 4, 5 63.48 93.59 131.78 163.17 208.71 249.07 296.32 Lake #3 Inflow 7 Reservoir 6 1.153 1.474 1.808 2.041 2.339 2.568 8.211 Lake #3 Outlet 8 SCS Runoff 16.74 26.16 38.45 48.83 64.13 77.85 94.05 Post-Developed Area #4 9 Reservoir 8 0.293 0.470 0.729 0.975 1.378 1.852 3.606 Lake #4 Outflow 10 SCS Runoff 32.99 56.13 86.85 113.03 152.35 188.38 231.37 Post-Developed Area #5 11 SCS Runoff 20.89 27.84 36.16 42.76 52.13 60.27 69.69 Offsite Miami University VOA 12 Reservoir 11 4.183 4.903 9.299 15.66 20.40 22.70 24.97 Offsite MU Basin 13 Combine 10, 12 37.00 60.81 93.90 127.27 172.21 210.21 255.41 Basin 5 Inflow	4	SCS Runoff		63.44	93.52	******	131.67	163.00	208.47	248.74	295.85	Post-Developed Area #3
7 Reservoir 6 1.153 1.474 1.808 2.041 2.339 2.568 8.211 Lake #3 Outlet 8 SCS Runoff 16.74 26.16 38.45 48.83 64.13 77.85 94.05 Post-Developed Area #4 9 Reservoir 8 0.293 0.470 0.729 0.975 1.378 1.852 3.606 Lake #4 Outflow 10 SCS Runoff 32.99 56.13 86.85 113.03 152.35 188.38 231.37 Post-Developed Area #5 11 SCS Runoff 20.89 27.84 36.16 42.76 52.13 60.27 69.69 Offsite Miami University VOA 12 Reservoir 11 4.183 4.903 9.299 15.66 20.40 22.70 24.97 Offsite MU Basin 13 Combine 10, 12 37.00 60.81 93.90 127.27 172.21 210.21 255.41 Basin 5 Inflow	5	Reservoir	3	0.172	0.279		0.448	0.619	0.908	1.206	2.464	Lake #2 Outlet
8       SCS Runoff	6	Combine .	4, 5	63.48	93.59		131.78	163.17	208.71	249.07	296.32	Lake #3 Inflow
9 Reservoir 8 0.293 0.470 0.729 0.975 1.378 1.852 3.606 Lake #4 Outflow 10 SCS Runoff 32.99 56.13 86.85 113.03 152.35 188.38 231.37 Post-Developed Area #5 11 SCS Runoff 20.89 27.84 36.16 42.76 52.13 60.27 69.69 Offsite Miami University VOA 12 Reservoir 11 4.183 4.903 9.299 15.66 20.40 22.70 24.97 Offsite MU Basin 13 Combine 10, 12 37.00 60.81 93.90 127.27 172.21 210.21 255.41 Basin 5 Inflow	7	Reservoir	6	1.153	1.474		1.808	2.041	2.339	2.568	8.211	Lake #3 Outlet
10 SCS Runoff 32.99 56.13 86.85 113.03 152.35 188.38 231.37 Post-Developed Area #5 11 SCS Runoff 20.89 27.84 36.16 42.76 52.13 60.27 69.69 Offsite Miami University VOA 12 Reservoir 11 4.183 4.903 9.299 15.66 20.40 22.70 24.97 Offsite MU Basin 13 Combine 10, 12 37.00 60.81 93.90 127.27 172.21 210.21 255.41 Basin 5 Inflow	8	SCS Runoff		16.74	26.16		38.45	48.83	64.13	77.85	94.05	Post-Developed Area #4
11 SCS Runoff 20.89 27.84 36.16 42.76 52.13 60.27 69.69 Offsite Miami University VOA  12 Reservoir 11 4.183 4.903 9.299 15.66 20.40 22.70 24.97 Offsite MU Basin  13 Combine 10, 12 37.00 60.81 93.90 127.27 172.21 210.21 255.41 Basin 5 Inflow	9	Reservoir	8	0.293	0.470		0.729	0.975	1.378	1.852	3.606	Lake #4 Outflow
12 Reservoir 11 4.183 4.903 9.299 15.66 20.40 22.70 24.97 Offsite MU Basin 13 Combine 10, 12 37.00 60.81 93.90 127.27 172.21 210.21 255.41 Basin 5 Inflow	10	SCS Runoff		32.99	56,13		86.85	113.03	152.35	188.38	231.37	Post-Developed Area #5
13 Combine 10, 12 37.00 60.81 93.90 127.27 172.21 210.21 255.41 Basin 5 Inflow	11	SCS Runoff		20.89	27.84		36.16	42.76	52.13	60.27	69.69	Offsite Miami University VOA
	12	Reservoir	11	4.183	4.903		9.299	15.66	20.40	22.70	24.97	Offsite MU Basin
14 Reservoir 13 0.355 0.605 0.985 1.348 1.925 4.553 9.071 Basin 5 Outflow	13	Combine	10, 12	37.00	60.81		93.90	127.27	172.21	210.21	255.41	Basin 5 Inflow
	14	Reservoir	13	0.355	0.605		0.985	1.348	1.925	4.553	9.071	Basin 5 Outflow
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Tuesday, May 15, 2012

### Hyd. No. 3

Post-Developed Area #2

= SCS Runoff Hydrograph type Storm frequency = 1 yrsTime interval = 2 min Drainage area = 17.600 acBasin Slope = 0.0 %Tc method = User Total precip. = 2.33 in= 24 hrs Storm duration

Peak discharge = 4.614 cfs
Time to peak = 12.13 hrs
Hyd. volume = 21,332 cuft
Curve number = 68.6
Hydraulic length = 0 ft
Time of conc. (Tc) = 18.00 min
Distribution = Type II

= 484

Shape factor



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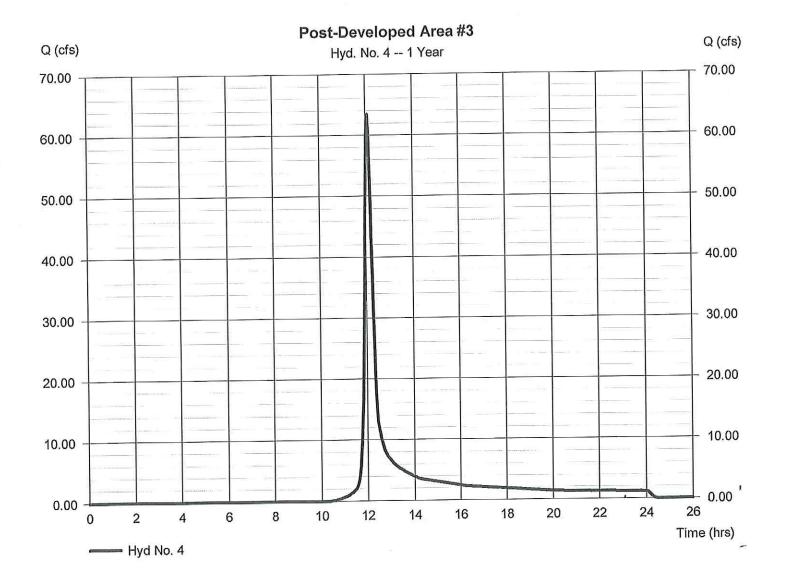
Tuesday, May 15, 2012

### Hyd. No. 4

Post-Developed Area #3

= SCS Runoff Hydrograph type Storm frequency = 1 yrsTime interval = 2 min = 63.500 acDrainage area = 0.0 %Basin Slope Tc method = User = 2.33 inTotal precip. Storm duration = 24 hrs

= 63.44 cfsPeak discharge  $= 12.10 \, hrs$ Time to peak = 204,171 cuftHyd. volume = 82.2Curve number = 0 ftHydraulic length Time of conc. (Tc)  $= 17.10 \, \text{min}$ = Type II Distribution Shape factor = 484



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#### Hyd. No. 5

Lake #2 Outlet

Hydrograph type Storm frequency Time interval = Reservoir = 1 yrs Peak discharge Time to peak Hyd. volume = 0.172 cfs = 24.10 hrs

Inflow hyd. No.

= 2 min= 3 - Post-Developed Area #2

Max. Elevation

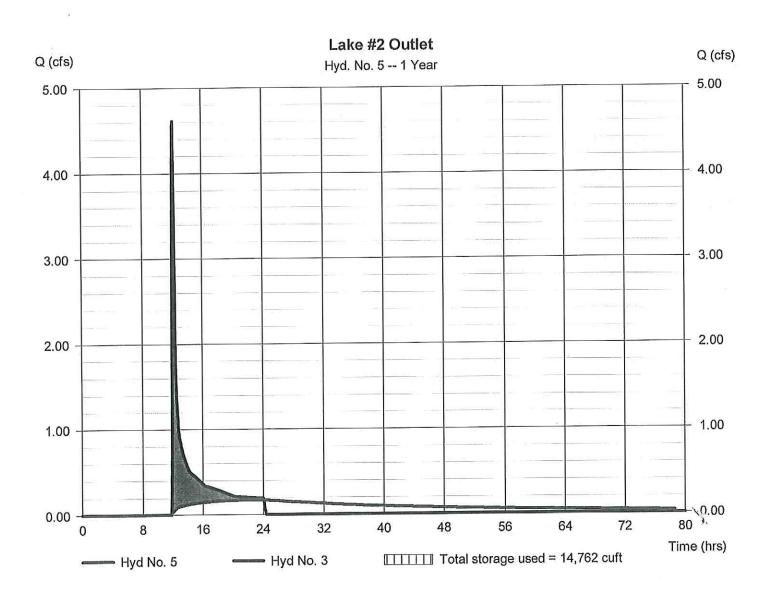
= 21,332 cuft = 888.01 ft

Reservoir name

= Lake #2

Max. Storage

= 14,762 cuft



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### Hyd. No. 6

Lake #3 Inflow

Hydrograph type Storm frequency Time interval

Inflow hyds.

= Combine

= 1 yrs = 2 min = 4, 5 Peak discharge

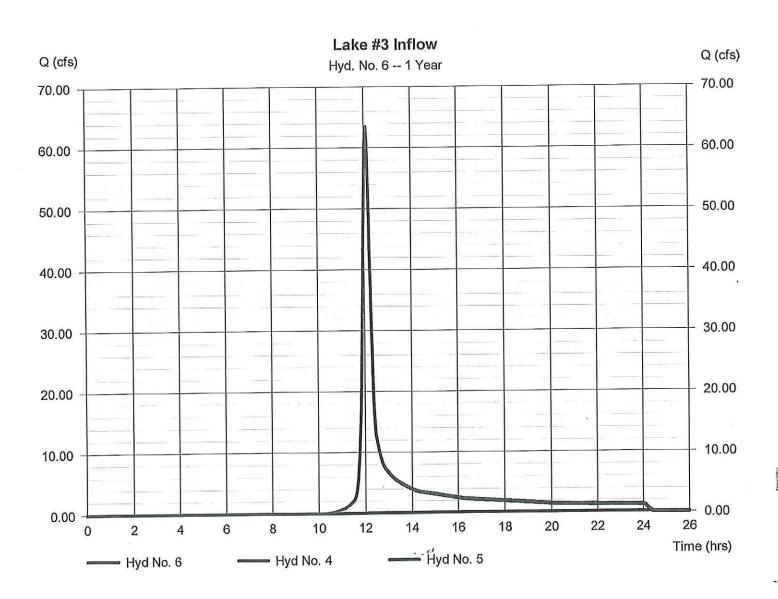
= 63.48 cfs = 12.10 hrs

Time to peak Hyd. volume

= 225,503 cuft

Contrib. drain. area

= 63.500 ac



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### Hyd. No. 7

Lake #3 Outlet

Hydrograph type Storm frequency Time interval

Inflow hyd. No.

Reservoir name

= 1 yrs = 2 min

= Reservoir

= 6 - Lake #3 Inflow

= Lake #3

Peak discharge

Time to peak Hyd. volume

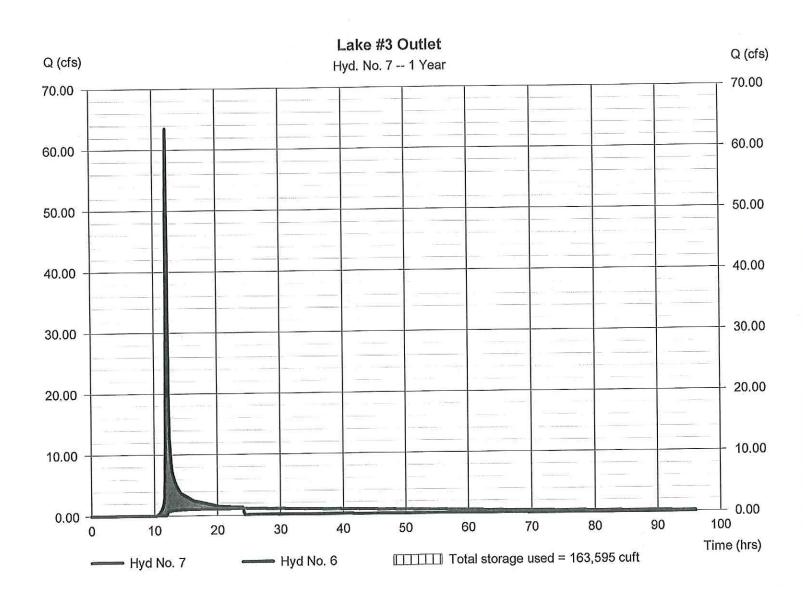
Max. Elevation
Max. Storage

= 882.78 ft = 163,595 cuft

= 1.153 cfs

 $= 24.13 \, hrs$ 

= 196,675 cuft



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### Hyd. No. 3

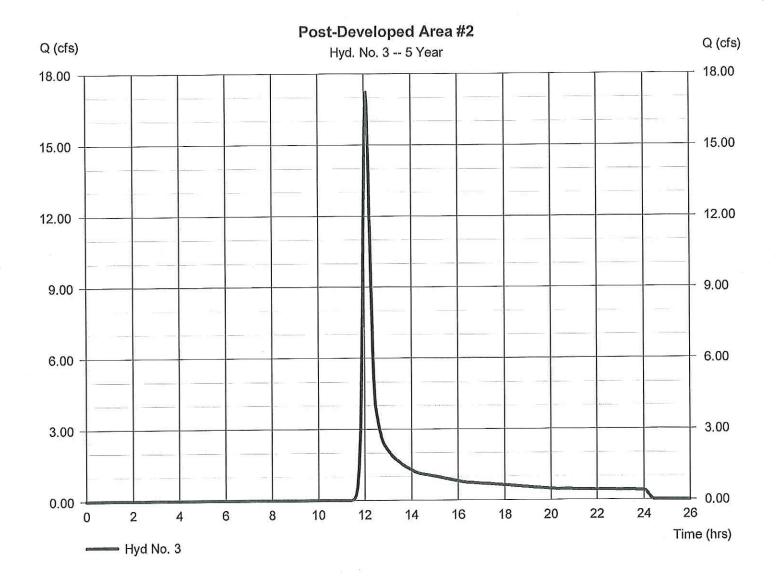
Post-Developed Area #2

= SCS Runoff Hydrograph type Storm frequency = 5 yrsTime interval = 2 min = 17.600 acDrainage area Basin Slope = 0.0 %Tc method = User = 3.49 inTotal precip. Storm duration = 24 hrs

Peak discharge = 17.22 cfs
Time to peak = 12.10 hrs
Hyd. volume = 59,211 cuft
Curve number = 68.6
Hydraulic length = 0 ft
Time of conc. (Tc) = 18.00 min
Distribution = Type II

= 484

Shape factor



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#### Hyd. No. 4

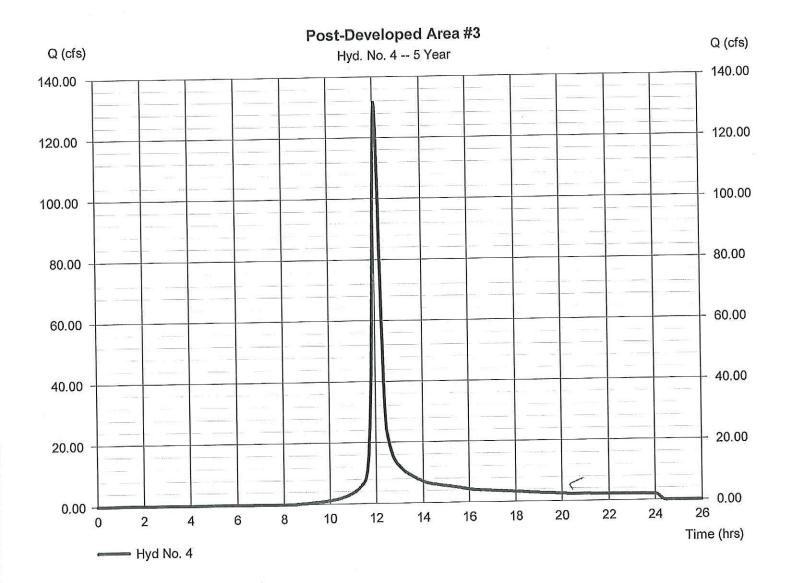
Post-Developed Area #3

= SCS Runoff Hydrograph type Storm frequency = 5 yrs= 2 min Time interval = 63.500 ac Drainage area = 0.0 %Basin Slope = User Tc method = 3.49 inTotal precip. = 24 hrs Storm duration

Peak discharge = 131.67 cfs
Time to peak = 12.07 hrs
Hyd. volume = 412,457 cuft
Curve number = 82.2
Hydraulic length = 0 ft
Time of conc. (Tc) = 17.10 min
Distribution = Type II

= 484

Shape factor



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Tuesday, May 15, 2012

#### Hyd. No. 5

Lake #2 Outlet

Hydrograph type Storm frequency = Reservoir = 5 yrs Peak discharge Time to peak = 0.448 cfs = 21.07 hrs

Time interval

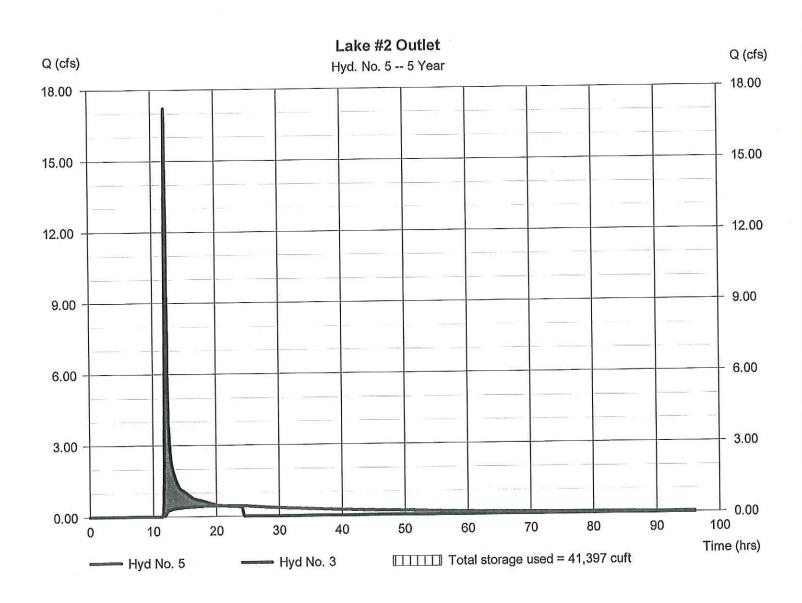
= 2 min

Hyd. volume

= 58,169 cuft = 888.29 ft

Inflow hyd. No. Reservoir name = 3 - Post-Developed Area #2 = Lake #2 Max. Elevation Max. Storage

= 41,397 cuft



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Tuesday, May 15, 2012

### Hyd. No. 6

Lake #3 Inflow

Hydrograph type Storm frequency Time interval

Inflow hyds.

= Combine

= 5 yrs = 2 min = 4, 5 Peak discharge

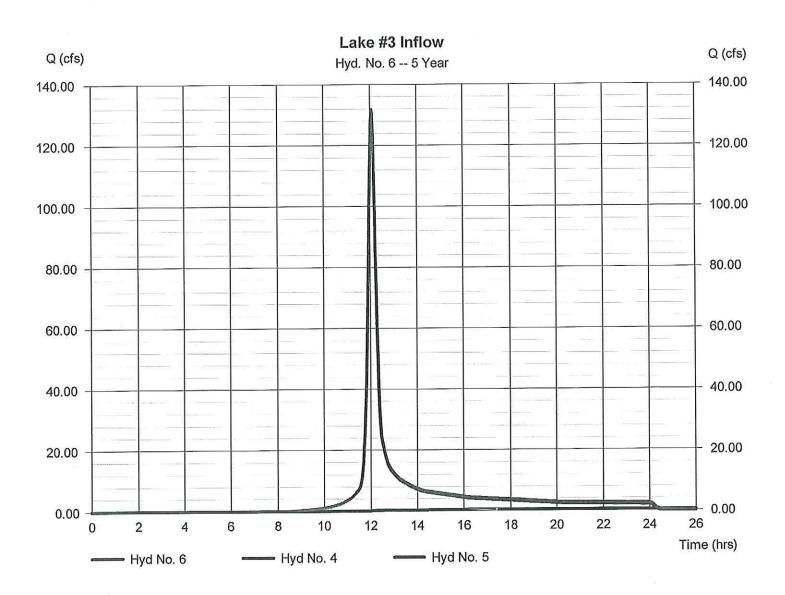
= 131.78 cfs

Time to peak Hyd. volume

= 12.07 hrs = 470,627 cuft

Contrib. drain. area

= 63.500 ac



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Tuesday, May 15, 2012

### Hyd. No. 7

Lake #3 Outlet

Hydrograph type Storm frequency = Reservoir = 5 yrs Peak discharge Time to peak Hyd. volume = 1.808 cfs = 24.17 hrs

Time interval Inflow hyd. No.

= 2 min = 6 - Lake #3 Inflow

Max. Elevation

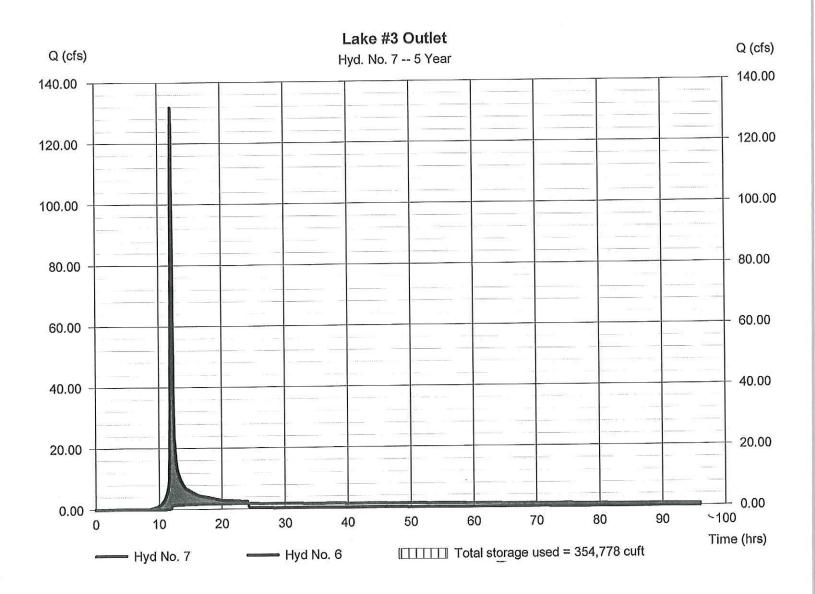
= 395,887 cuft = 883.93 ft

Reservoir name

= Lake #3

Max. Storage

= 354,778 cuft



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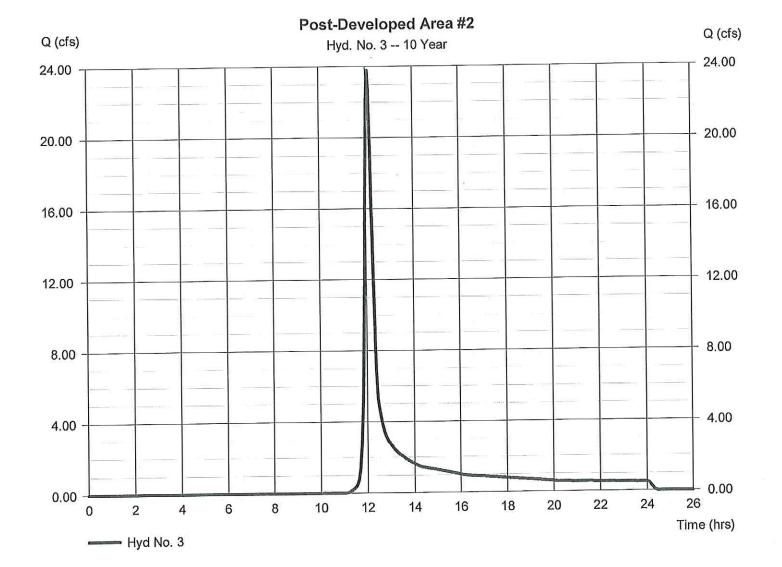
### Hyd. No. 3

#### Post-Developed Area #2

Hydrograph type = SCS Runoff Storm frequency = 10 yrs $= 2 \min$ Time interval = 17.600 ac Drainage area = 0.0 %Basin Slope Tc method = User = 3.99 inTotal precip. Storm duration = 24 hrs

= 23.78 cfsPeak discharge = 12.10 hrsTime to peak = 78,925 cuft Hyd. volume Curve number = 68.6Hydraulic length = 0 ftTime of conc. (Tc) = 18.00 min = Type II Distribution = 484

Shape factor



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Tuesday, May 15, 2012

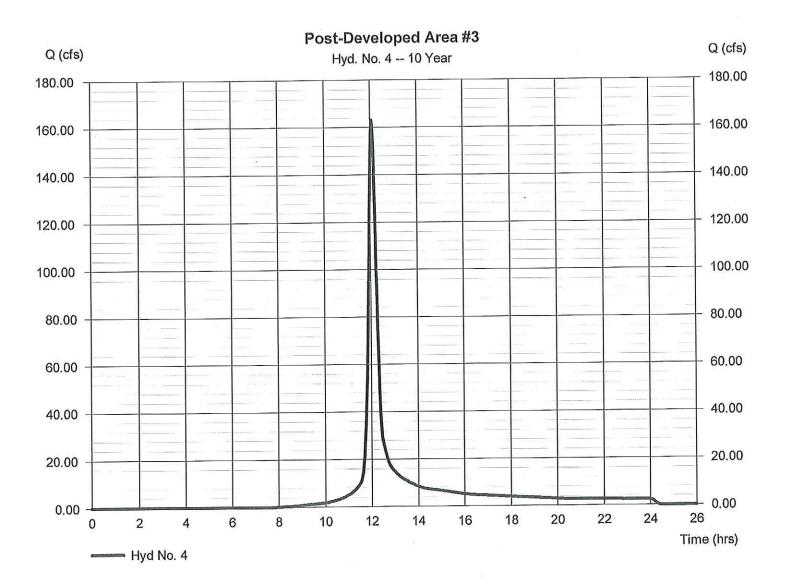
#### Hyd. No. 4

#### Post-Developed Area #3

= SCS Runoff Hydrograph type = 10 yrs Storm frequency Time interval = 2 min = 63.500 ac Drainage area = 0.0 %Basin Slope Tc method = User = 3.99 inTotal precip. Storm duration = 24 hrs

Peak discharge = 163.00 cfs
Time to peak = 12.07 hrs
Hyd. volume = 509,625 cuft
Curve number = 82.2

Hydraulic length = 0 ft
Time of conc. (Tc) = 17.10 min
Distribution = Type II
Shape factor = 484



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Tuesday, May 15, 2012

#### Hyd. No. 5

Lake #2 Outlet

Time interval

Inflow hyd. No.

Reservoir name

Hydrograph type Storm frequency = Reservoir

= 10 yrs

= 2 min= 3 - Post-Developed Area #2

= Lake #2

Peak discharge

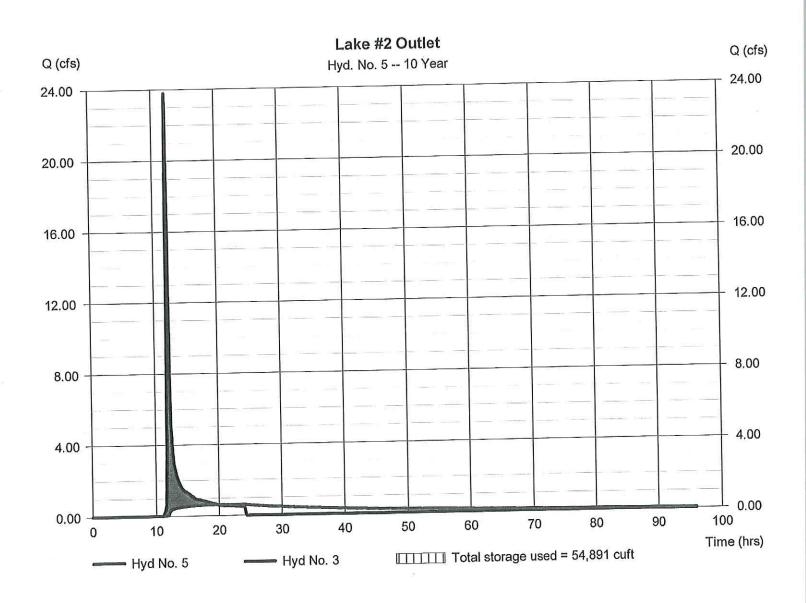
Time to peak Hyd. volume Max. Elevation

Max. Storage

= 0.619 cfs = 19.80 hrs

= 76,883 cuft = 888.43 ft

= 54,891 cuft



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Tuesday, May 15, 2012

### Hyd. No. 6

Lake #3 Inflow

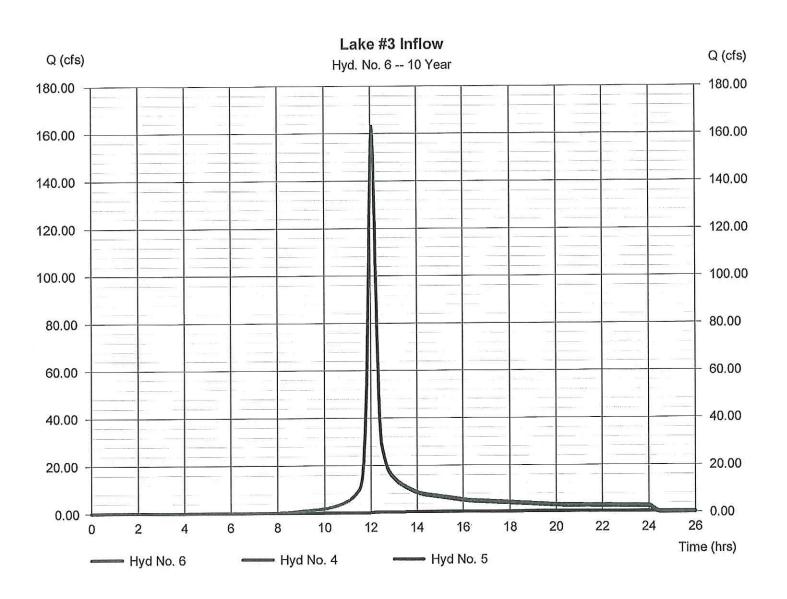
Hydrograph type Storm frequency Time interval

Inflow hyds.

= Combine = 10 yrs

= 10 yrs = 2 min = 4, 5 Peak discharge Time to peak = 163.17 cfs = 12.07 hrs

Hyd. volume Contrib. drain. area = 586,509 cuft = 63.500 ac



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Tuesday, May 15, 2012

### Hyd. No. 7

Lake #3 Outlet

Hydrograph type Storm frequency Time interval

= Reservoir = 10 yrs

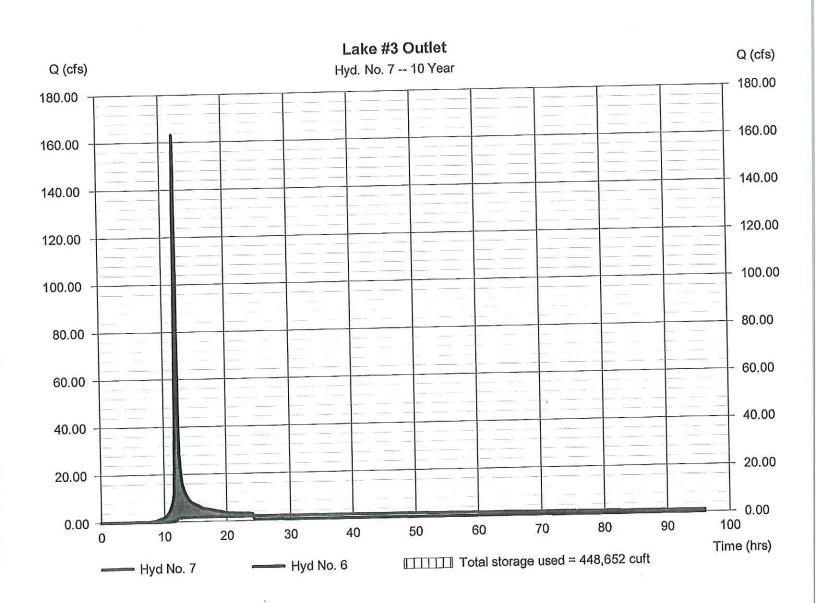
 $= 2 \min$ = 6 - Lake #3 Inflow

Inflow hyd. No. = Lake #3 Reservoir name

Peak discharge Time to peak

= 2.041 cfs $= 24.20 \, hrs$ = 473,606 cuft Hyd. volume

= 884.46 ft Max. Elevation = 448,652 cuft Max. Storage



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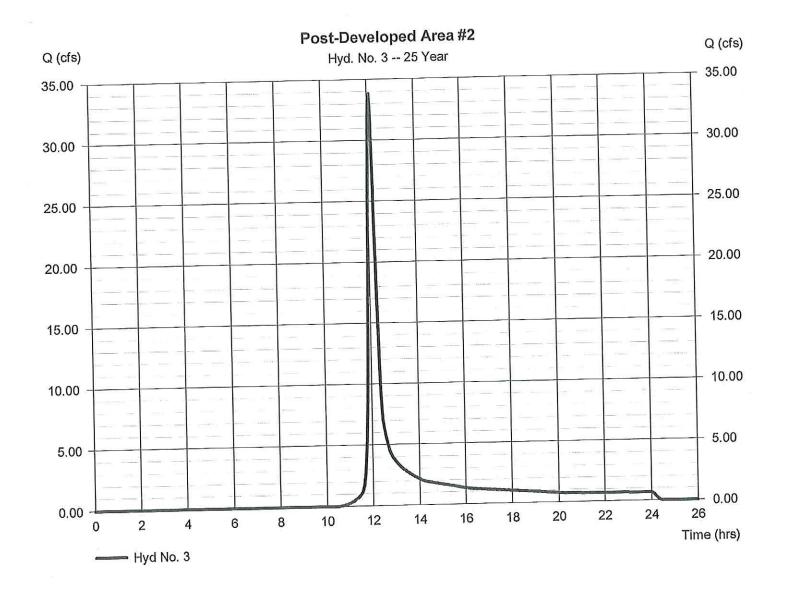
Tuesday, May 15, 2012

### Hyd. No. 3

Post-Developed Area #2

= SCS Runoff Hydrograph type = 25 yrs Storm frequency = 2 min Time interval = 17.600 ac Drainage area = 0.0 %Basin Slope = User Tc method = 4.70 inTotal precip. = 24 hrs Storm duration

= 33.83 cfsPeak discharge = 12.10 hrs Time to peak = 109,433 cuft Hyd. volume Curve number = 68.6= 0 ftHydraulic length Time of conc. (Tc)  $= 18.00 \, \text{min}$ = Type II Distribution = 484 Shape factor



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Tuesday, May 15, 2012

#### Hyd. No. 4

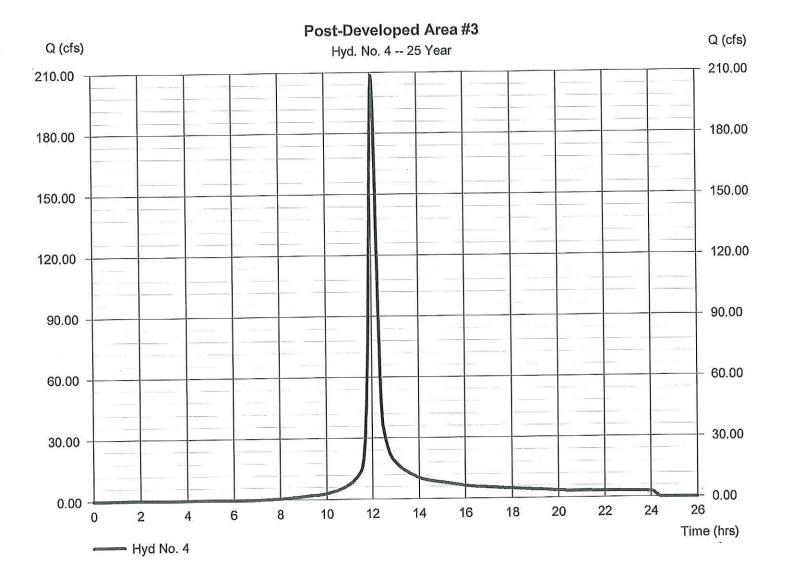
Post-Developed Area #3

= SCS Runoff Hydrograph type = 25 yrs Storm frequency = 2 min Time interval = 63.500 ac Drainage area = 0.0 %Basin Slope Tc method = User = 4.70 inTotal precip. Storm duration = 24 hrs

Peak discharge = 208.47 cfs
Time to peak = 12.07 hrs
Hyd. volume = 652,434 cuft
Curve number = 82.2
Hydraulic length = 0 ft
Time of conc. (Tc) = 17.10 min
Distribution = Type II

Shape factor

= 484



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Tuesday, May 15, 2012

#### Hvd. No. 5

Lake #2 Outlet

Hydrograph type Storm frequency Time interval

= Reservoir = 25 yrs

= 2 min

= 3 - Post-Developed Area #2

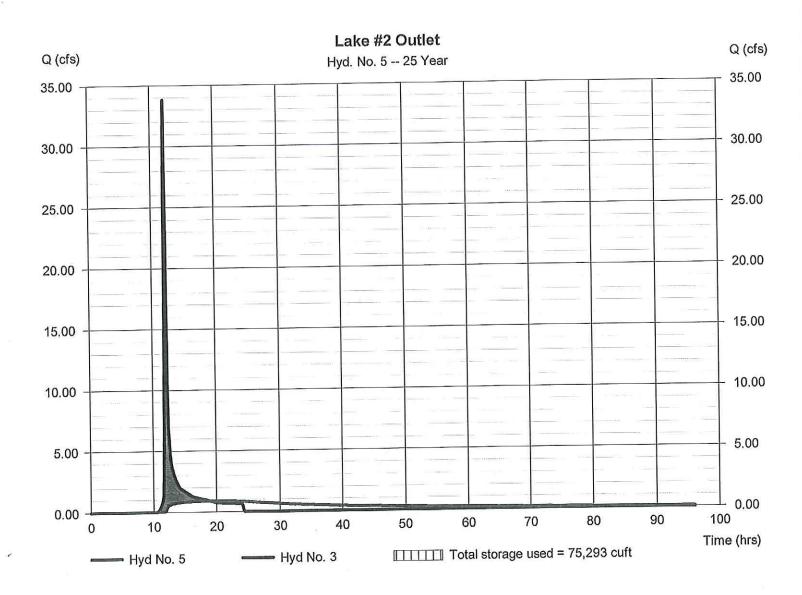
Inflow hyd. No. = Lake #2 Reservoir name

Peak discharge

= 0.908 cfsTime to peak = 19.00 hrs Hyd. volume = 106,120 cuft Max. Elevation

Max. Storage

 $= 888.64 \, \text{ft}$ = 75,293 cuft



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Tuesday, May 15, 2012

### Hyd. No. 6

Lake #3 Inflow

Hydrograph type Storm frequency Time interval

Inflow hyds.

= Combine

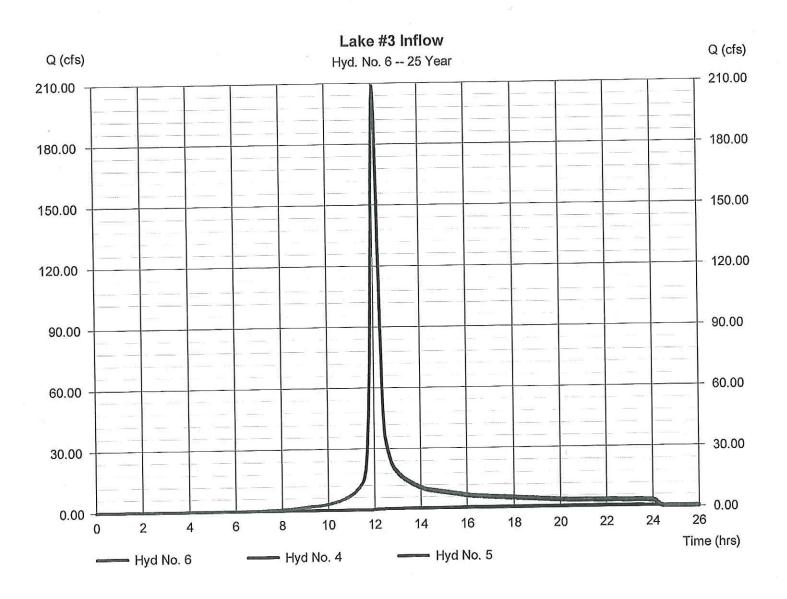
= 25 yrs = 2 min = 4, 5 Peak discharge Time to peak = 208.71 cfs = 12.07 hrs

Hyd. volume

= 758,555 cuft

Contrib. drain. area

= 63.500 ac



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Tuesday, May 15, 2012

### Hyd. No. 7

Lake #3 Outlet

Hydrograph type

Storm frequency Time interval

Inflow hyd. No. Reservoir name = Reservoir

= 25 yrs = 2 min

= 6 - Lake #3 Inflow

= Lake #3

Peak discharge

Time to peak Hyd. volume

Max. Elevation

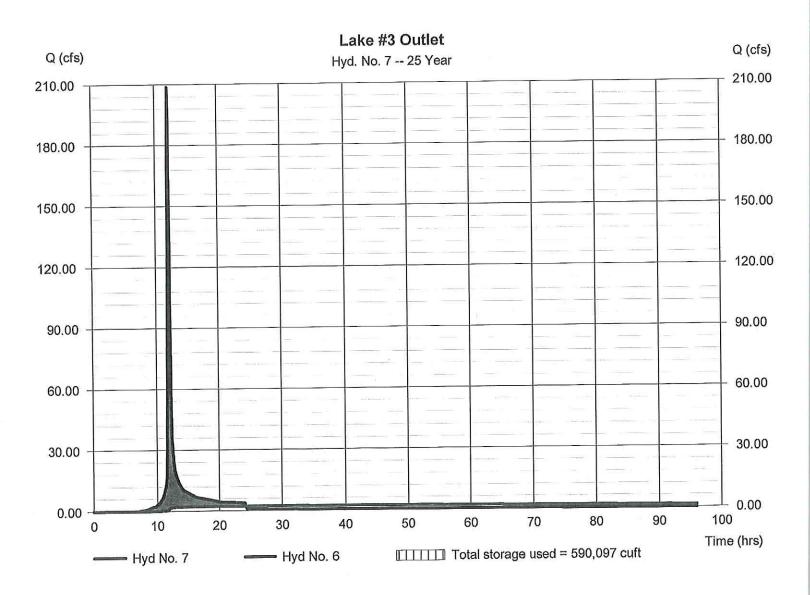
Max. Storage

= 2.339 cfs

= 24.23 hrs = 573,366 cuft

 $= 885.23 \, \text{ft}$ 

= 590,097 cuft



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Tuesday, May 15, 2012

### Hyd. No. 3

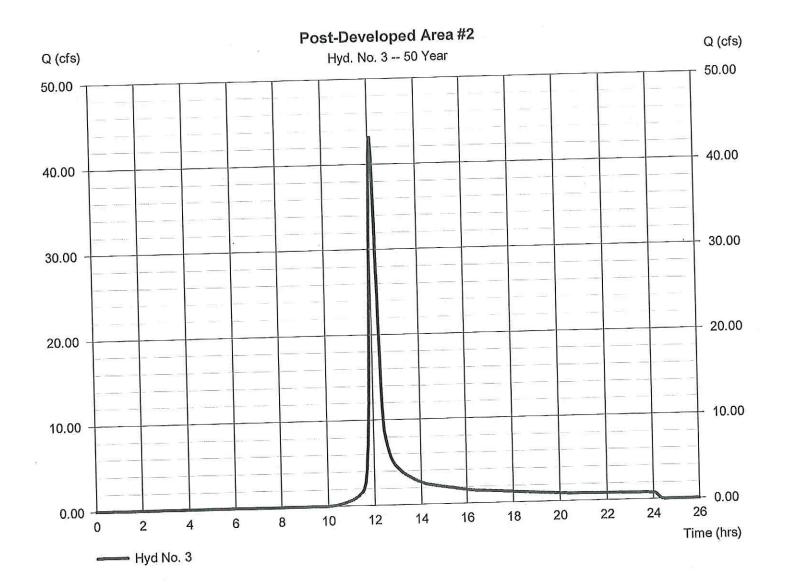
### Post-Developed Area #2

= SCS Runoff Hydrograph type Storm frequency = 50 yrs $= 2 \min$ Time interval = 17.600 ac Drainage area = 0.0 %Basin Slope = User Tc method = 5.32 inTotal precip. = 24 hrs Storm duration

Peak discharge = 43.17 cfs
Time to peak = 12.07 hrs
Hyd. volume = 137,993 cuft
Curve number = 68.6
Hydraulic length = 0 ft
Time of conc. (Tc) = 18.00 min
Distribution = Type II

Shape factor

= 484



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Tuesday, May 15, 2012

### Hyd. No. 4

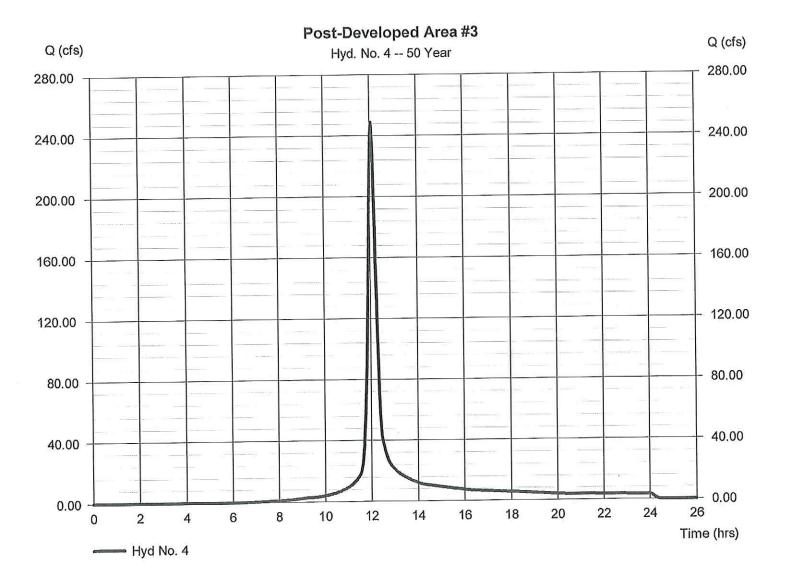
Post-Developed Area #3

= SCS Runoff Hydrograph type = 50 yrsStorm frequency Time interval = 2 min = 63.500 acDrainage area = 0.0 %Basin Slope = User Tc method = 5.32 inTotal precip. = 24 hrs Storm duration

Peak discharge = 248.74 cfs
Time to peak = 12.07 hrs
Hyd. volume = 780,575 cuft
Curve number = 82.2
Hydraulic length = 0 ft
Time of conc. (Tc) = 17.10 min
Distribution = Type II

= 484

Shape factor



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Tuesday, May 15, 2012

### Hyd. No. 5

Lake #2 Outlet

Hydrograph type Storm frequency

Time interval Inflow hyd. No.

Reservoir name

= Reservoir = 50 yrs

= 2 min = 3 - Post-Developed Area #2

= Lake #2

Peak discharge

Time to peak Hyd. volume

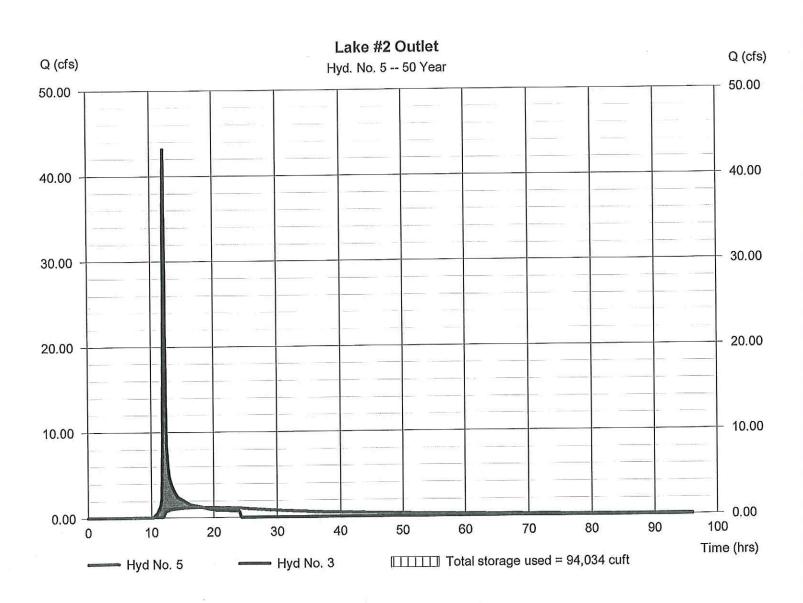
Max. Elevation

Max. Storage

= 1.206 cfs= 18.27 hrs

= 133,701 cuft

= 888.84 ft = 94,034 cuft



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Tuesday, May 15, 2012

### Hyd. No. 6

Lake #3 Inflow

Hydrograph type Storm frequency Time interval

Inflow hyds.

= Combine = 50 yrs

= 2 min

= 4, 5

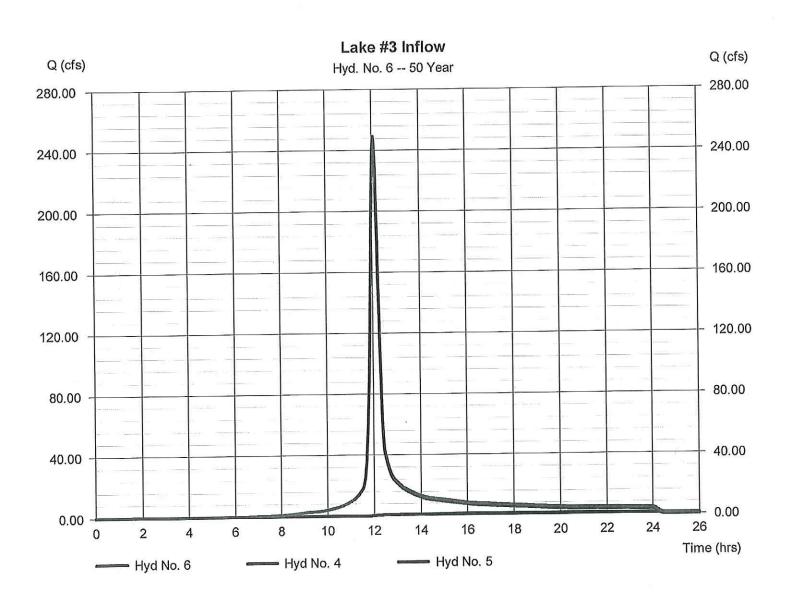
Peak discharge Time to peak Hyd. volume

= 249.07 cfs $= 12.07 \, hrs$ 

= 914,276 cuft

Contrib. drain. area

= 63.500 ac



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Tuesday, May 15, 2012

### Hyd. No. 7

Lake #3 Outlet

Hydrograph type Storm frequency Time interval

Inflow hyd. No.

Reservoir name

= 50 yrs= 2 min

= Reservoir

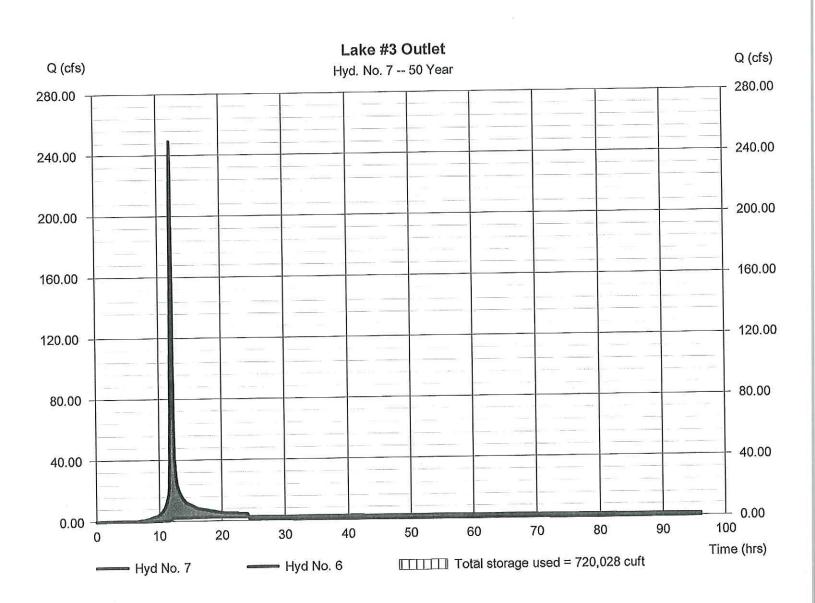
= 6 - Lake #3 Inflow = Lake #3

Peak discharge

= 2.568 cfs $= 24.23 \, hrs$ Time to peak Hyd. volume = 651,649 cuft

Max. Elevation  $= 885.89 \, \mathrm{ft}$ Max. Storage

= 720,028 cuft



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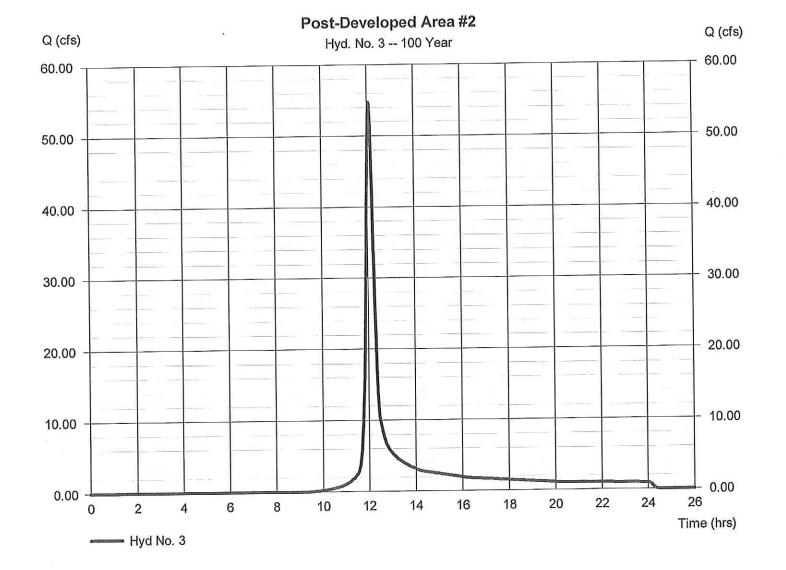
Tuesday, May 15, 2012

### Hyd. No. 3

Post-Developed Area #2

= SCS Runoff Hydrograph type = 100 yrsStorm frequency = 2 min Time interval = 17.600 ac Drainage area = 0.0 %Basin Slope = User Tc method = 6.04 inTotal precip. = 24 hrs Storm duration

= 54.70 cfsPeak discharge  $= 12.07 \, hrs$ Time to peak Hyd. volume = 172,933 cuft Curve number = 68.6= 0 ftHydraulic length Time of conc. (Tc)  $= 18.00 \, \text{min}$ = Type II Distribution Shape factor = 484



Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

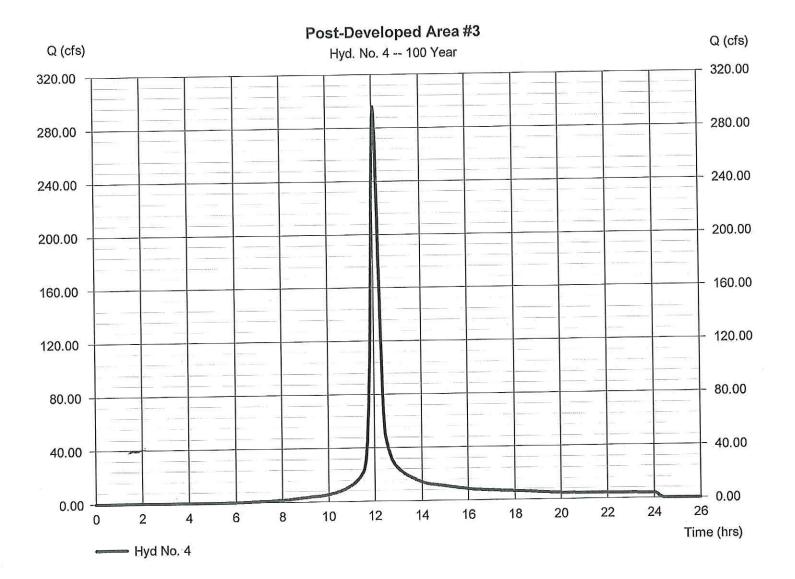
Tuesday, May 15, 2012

### Hyd. No. 4

Post-Developed Area #3

= SCS Runoff Hydrograph type = 100 yrsStorm frequency = 2 min Time interval = 63.500 acDrainage area = 0.0 %Basin Slope = User Tc method = 6.04 inTotal precip. = 24 hrs Storm duration

= 295.85 cfs Peak discharge  $= 12.07 \, hrs$ Time to peak = 932,341 cuft Hyd. volume Curve number = 82.2= 0 ftHydraulic length Time of conc. (Tc) = 17.10 min = Type II Distribution = 484 Shape factor



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Tuesday, May 15, 2012

### Hyd. No. 5

Lake #2 Outlet

Hydrograph type Storm frequency Time interval

Inflow hyd. No.

Reservoir name

= Reservoir

= 100 yrs  $= 2 \min$ 

= 3 - Post-Developed Area #2 = Lake #2

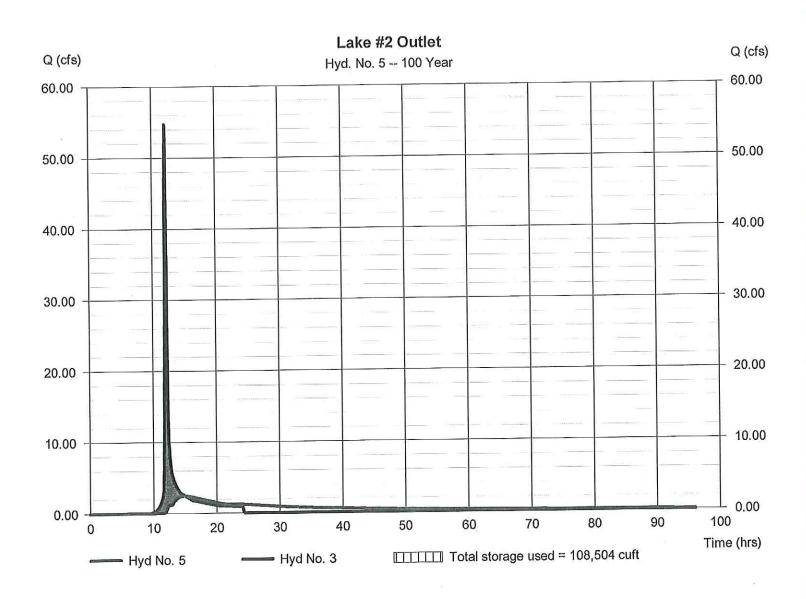
Peak discharge Time to peak

= 2.464 cfs= 15.00 hrs

Hyd. volume = 168,183 cuft Max. Elevation = 888.99 ft

Max. Storage

= 108,504 cuft



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Tuesday, May 15, 2012

### Hyd. No. 6

Lake #3 Inflow

Hydrograph type Storm frequency Time interval

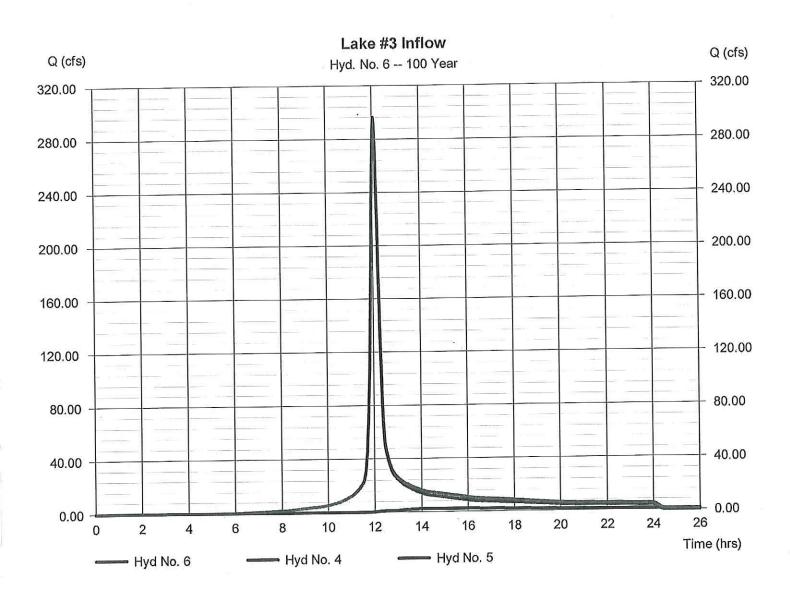
Inflow hyds.

= Combine = 100 yrs

= 2 min = 4, 5 Peak discharge Time to peak = 296.32 cfs = 12.07 hrs = 1,100,524 cuft

Hyd. volume Contrib. drain. area

= 63.500 ac



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Tuesday, May 15, 2012

### Hyd. No. 7

Lake #3 Outlet

Hydrograph type Storm frequency Time interval

Inflow hyd. No.

= Reservoir = 100 vrs

= 100 yrs = 2 min

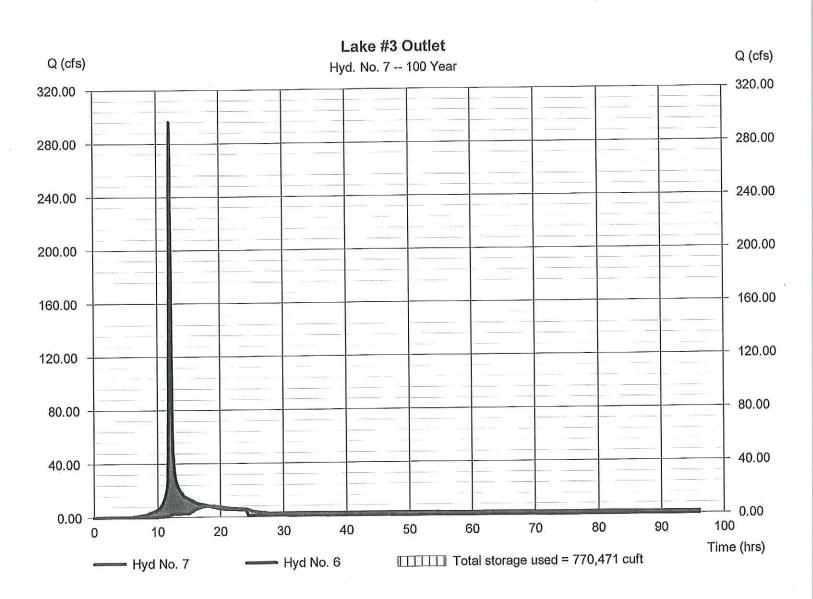
= 6 - Lake #3 Inflow

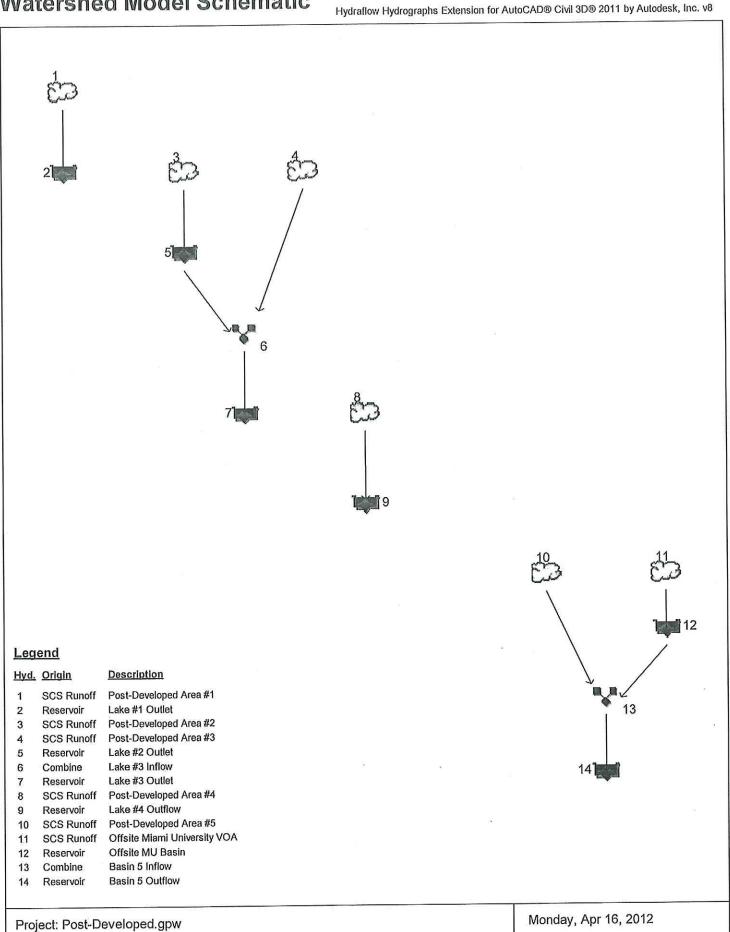
Reservoir name = Lake #3

Peak discharge Time to peak = 8.211 cfs = 18.23 hrs

Hyd. volume = 822,128 cuft
Max. Elevation = 886.14 ft

Max. Storage = 770,471 cuft





Hydrograph Return Period Recap Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

lyd. Io,	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	2000//8/07/
	SCS Runoff		16.03	25.44		37.65	47.96	63.32	77.13	93.46	Post-Developed Area #1
	Reservoir	1	0.799	1.238		1.898	2.520	3,483	4.406	5.578	Lake #1 Outlet
	SCS Runoff		4.614	9.775		17.22	23.78	33.83	43.17	54.70	Post-Developed Area #2
	SCS Runoff		63.44	93.52		131.67	163.00	208.47	248.74	295.85	Post-Developed Area #3
	Reservoir	3	0.172	0.279		0.448	0.619	0.908	1.206	2.464	Lake #2 Outlet
	Combine	4, 5	63.48	93.59		131.78	163,17	208.71	249.07	296.32	Lake #3 Inflow
	Reservoir	6	1.153	1.474		1.808	2.041	2.339	2.568	8.211	Lake #3 Outlet
	SCS Runoff		16.74	26.16		38.45	48.83	64.13	77.85	94.05	Post-Developed Area #4
	Reservoir	8	0.293	0.470		0.729	0.975	1.378	1.852	3.606	Lake #4 Outflow
0	SCS Runoff	******	32.99	56.13		86.85	113.03	152.35	188.38	231.37	Post-Developed Area #5
1	SCS Runoff		20.89	27.84		36.16	42.76	52.13	60.27	69.69	Offsite Miami University VOA
12	Reservoir	11	4.183	4.903		9.299	15.66	20.40	22.70	24.97	Offsite MU Basin
3	Combine	10, 12	37.00	60.81		93.90	127.27	172.21	210.21	255.41	Basin 5 Inflow
4	Reservoir	13	0.355	0.605		0.985	1.348	1.925	4.553	9.071	Basin 5 Outflow
											,

Proj. file: Post-Developed 120511.gpw

Tuesday, May 15, 2012

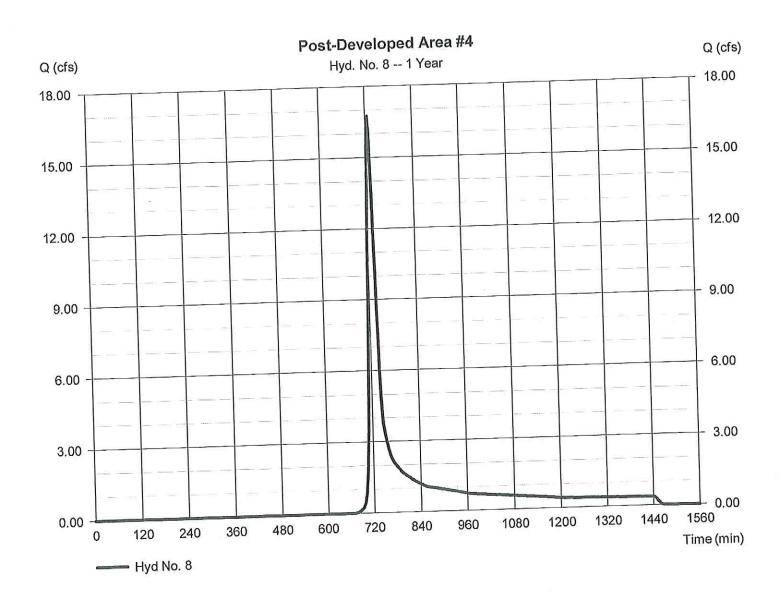
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Monday, Apr 16, 2012

### Hyd. No. 8

Post-Developed Area #4

= 16.74 cfsPeak discharge = SCS Runoff Hydrograph type Time to peak  $= 726 \, \text{min}$ = 1 yrsStorm frequency = 56,008 cuft Hyd. volume = 2 minTime interval = 78.3Curve number = 22.250 acDrainage area = 0 ftHydraulic length = 0.0 %Basin Slope  $= 18.70 \, \text{min}$ Time of conc. (Tc) = User Tc method = Type II Distribution = 2.33 inTotal precip. = 484 Shape factor = 24 hrs Storm duration



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Monday, Apr 16, 2012

### Hyd. No. 9

Lake #4 Outflow

Hydrograph type Storm frequency Time interval

Inflow hyd. No.

Reservoir name

= Reservoir = 1 yrs

= Lake #4

= 2 min

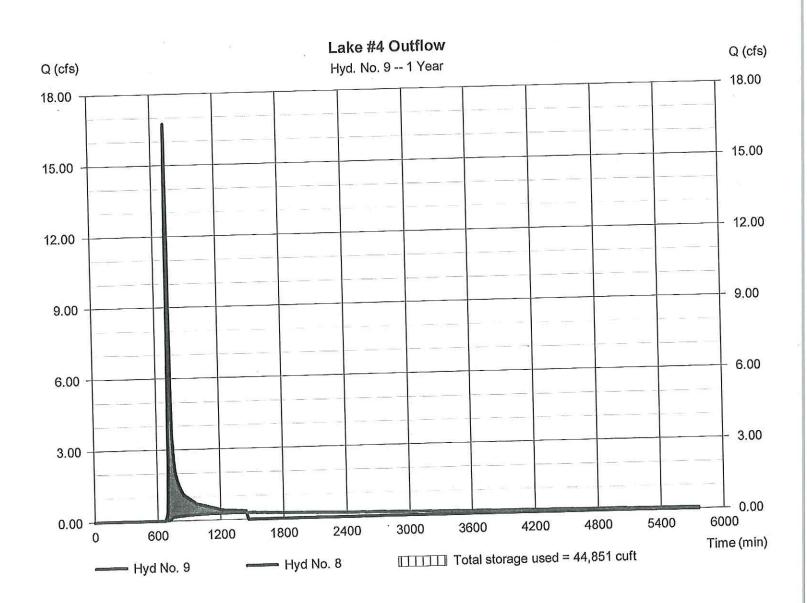
= 8 - Post-Developed Area #4

Peak discharge

= 0.293 cfs $= 1448 \, \text{min}$ 

Time to peak = 46,780 cuftHyd. volume = 890.03 ftMax. Elevation

= 44,851 cuftMax. Storage



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Monday, Apr 16, 2012

### Hyd. No. 8

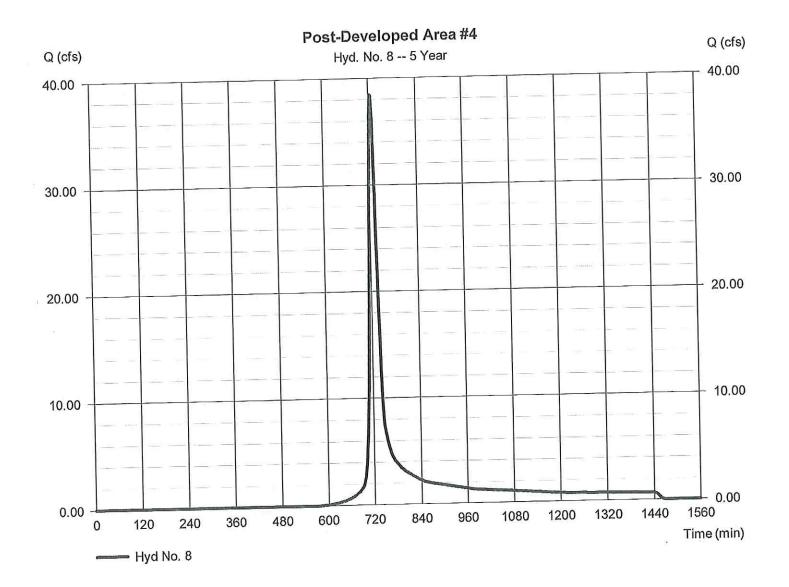
Post-Developed Area #4

= SCS Runoff Hydrograph type Storm frequency = 5 yrs= 2 min Time interval = 22.250 acDrainage area = 0.0 %Basin Slope = User Tc method = 3.49 inTotal precip. = 24 hrs Storm duration

Peak discharge = 38.45 cfs
Time to peak = 724 min
Hyd. volume = 121,969 cuft
Curve number = 78.3
Hydraulic length = 0 ft
Time of conc. (Tc) = 18.70 min
Distribution = Type II

Shape factor

= 484



Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Monday, Apr 16, 2012

### Hyd. No. 9

Lake #4 Outflow

Hydrograph type Storm frequency Time interval

= Reservoir = 5 yrs

= 2 min

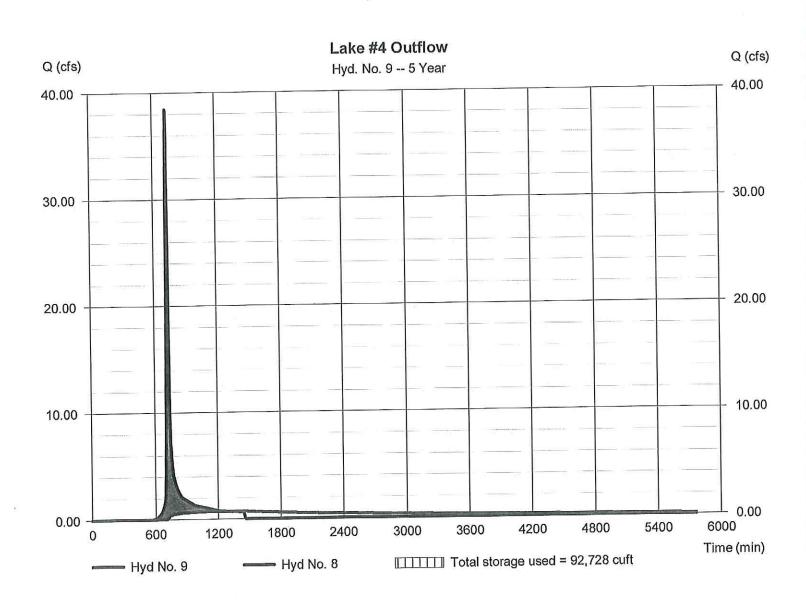
= 8 - Post-Developed Area #4 = Lake #4

Inflow hyd. No. Reservoir name Peak discharge

= 0.729 cfs= 1294 min Time to peak = 104,661 cuft Hyd. volume

Max. Elevation Max. Storage

 $= 890.48 \, \text{ft}$ = 92,728 cuft



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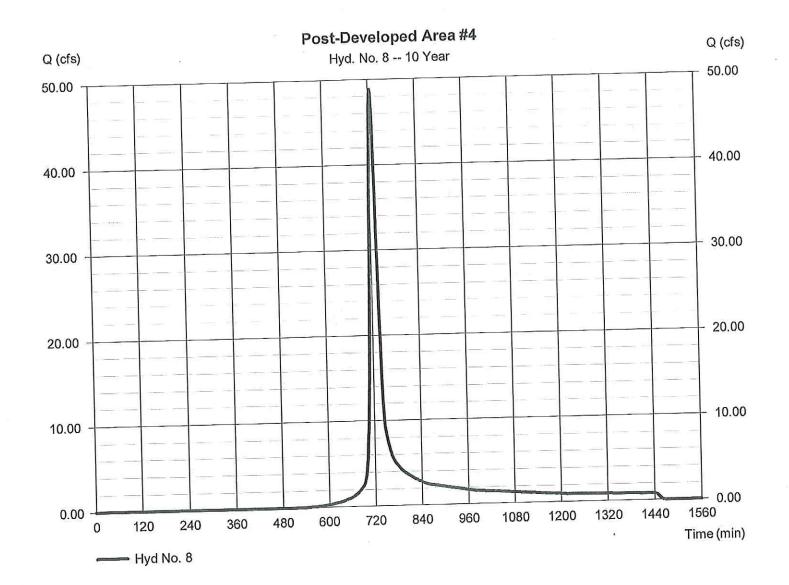
Monday, Apr 16, 2012

### Hyd. No. 8

Post-Developed Area #4

= SCS Runoff Hydrograph type = 10 yrs Storm frequency = 2 min Time interval = 22.250 acDrainage area = 0.0 %Basin Slope = User Tc method = 3.99 inTotal precip. = 24 hrs Storm duration

= 48.83 cfsPeak discharge = 724 min Time to peak = 153,597 cuft Hyd. volume = 78.3Curve number = 0 ftHydraulic length  $= 18.70 \, \text{min}$ Time of conc. (Tc) = Type II Distribution = 484 Shape factor



Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Monday, Apr 16, 2012

### Hyd. No. 9

Lake #4 Outflow

Hydrograph type Storm frequency Time interval

= Reservoir = 10 yrs

= 2 min = 8 - Post-Developed Area #4 Peak discharge Time to peak Hyd. volume Max. Elevation

= 0.975 cfs= 1194 min = 133,478 cuft

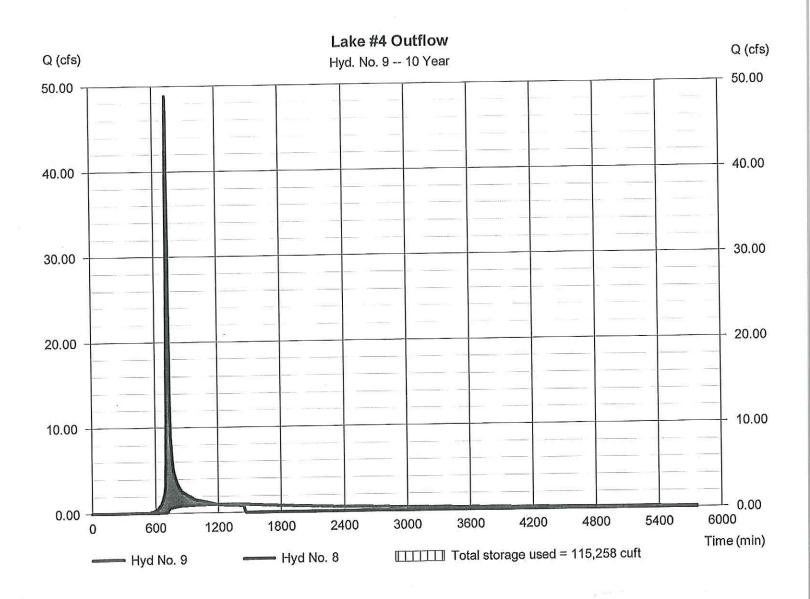
 $= 890.69 \, \text{ft}$ 

Inflow hyd. No. Reservoir name

= Lake #4

Max. Storage

= 115,258 cuft



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Monday, Apr 16, 2012

### Hyd. No. 8

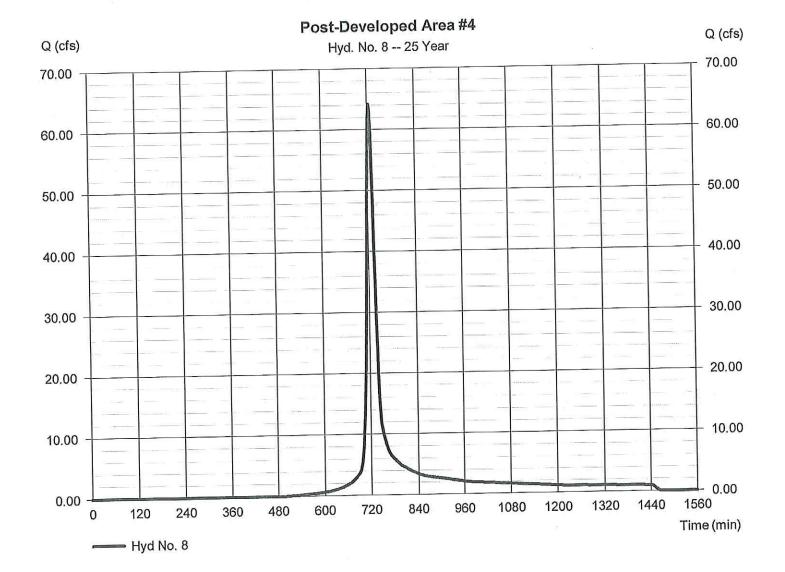
### Post-Developed Area #4

= SCS Runoff Hydrograph type = 25 yrsStorm frequency = 2 min Time interval = 22.250 acDrainage area = 0.0 %Basin Slope = User Tc method = 4.70 inTotal precip. = 24 hrs Storm duration

Peak discharge = 64.13 cfs
Time to peak = 724 min
Hyd. volume = 200,684 cuft
Curve number = 78.3
Hydraulic length = 0 ft
Time of conc. (Tc) = 18.70 min
Distribution = Type II

Shape factor

= 484



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Monday, Apr 16, 2012

### Hyd. No. 9

Lake #4 Outflow

Hydrograph type Storm frequency Time interval

= Reservoir = 25 yrs

= 2 min

= 8 - Post-Developed Area #4

Peak discharge Time to peak Hyd. volume

= 1.378 cfs= 1146 min

= 177,117 cuft Max. Elevation

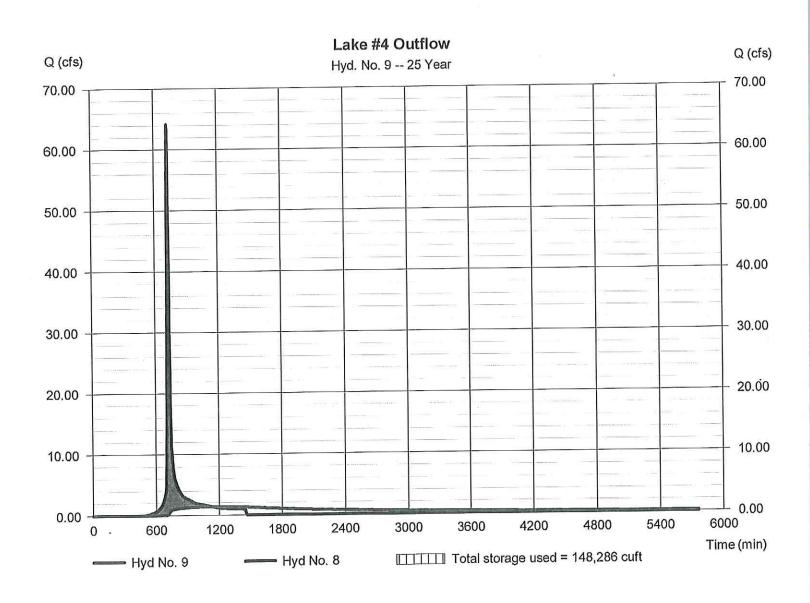
 $= 891.00 \, \text{ft}$ 

Inflow hyd. No. Reservoir name

= Lake #4

Max. Storage

= 148,286 cuft



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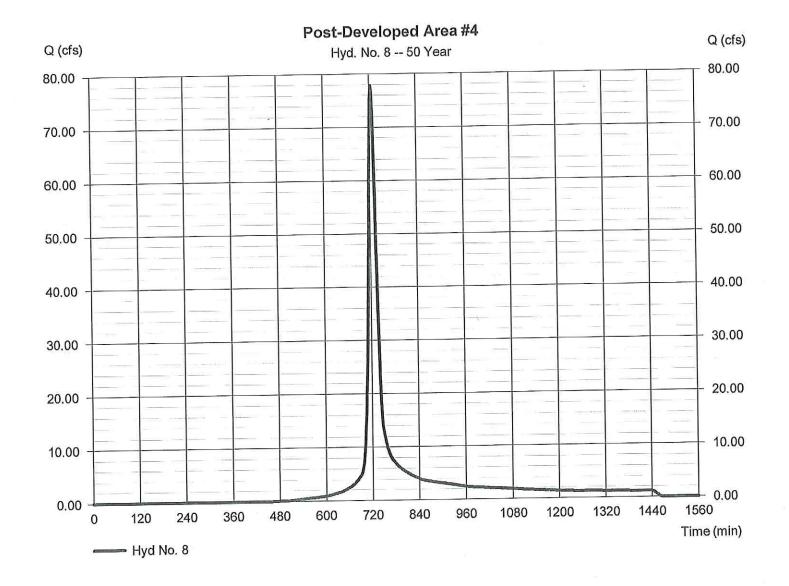
Monday, Apr 16, 2012

### Hyd. No. 8

Post-Developed Area #4

= SCS Runoff Hydrograph type = 50 yrsStorm frequency  $= 2 \min$ Time interval = 22.250 acDrainage area = 0.0 %Basin Slope = User Tc method = 5.32 inTotal precip. = 24 hrs Storm duration

= 77.85 cfsPeak discharge Time to peak  $= 724 \, \text{min}$ Hyd. volume = 243,382 cuft Curve number = 78.3Hydraulic length = 0 ft= 18.70 min Time of conc. (Tc) = Type II Distribution = 484 Shape factor



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### Hyd. No. 9

Lake #4 Outflow

Hydrograph type Storm frequency Time interval

Inflow hyd. No.

Reservoir name

= Reservoir = 50 yrs

= 2 min

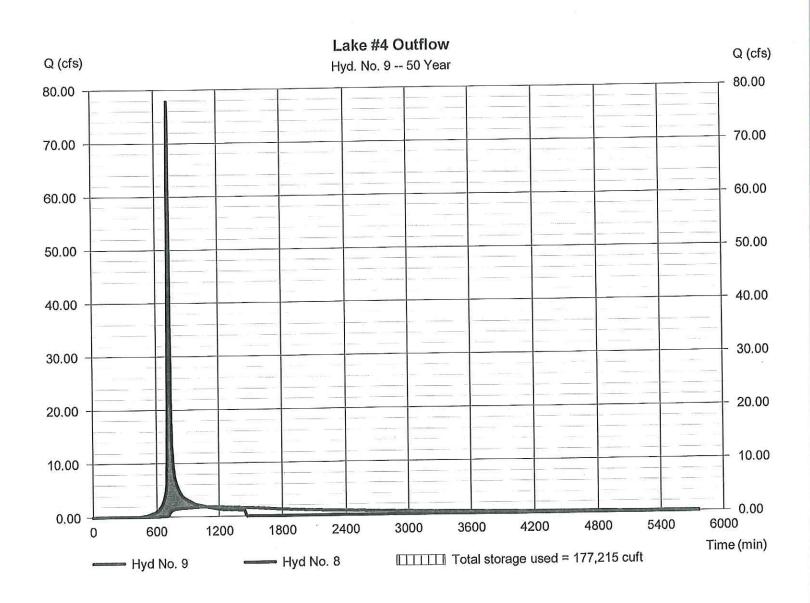
= 8 - Post-Developed Area #4

= Lake #4

Peak discharge

= 1.852 cfsTime to peak = 1086 min Hyd. volume = 217,301 cuft $= 891.26 \, \mathrm{ft}$ 

Max. Elevation Max. Storage = 177,215 cuft



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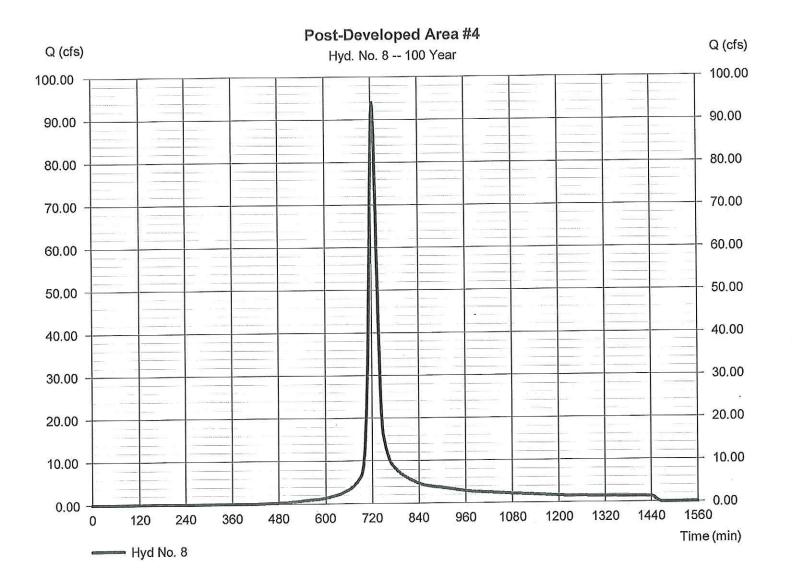
### Hyd. No. 8

Post-Developed Area #4

= SCS Runoff Hydrograph type Storm frequency = 100 yrs= 2 min Time interval = 22.250 ac Drainage area = 0.0 %Basin Slope = User Tc method = 6.04 inTotal precip. = 24 hrs Storm duration

Peak discharge = 94.05 cfs
Time to peak = 724 min
Hyd. volume = 294,358 cuft
Curve number = 78.3
Hydraulic length = 0 ft

Time of conc. (Tc) = 18.70 min
Distribution = Type II
Shape factor = 484



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Monday, Apr 16, 2012

### Hyd. No. 9

Lake #4 Outflow

Hydrograph type Storm frequency Time interval

Inflow hyd. No.

Reservoir name

= Reservoir = 100 yrs $= 2 \min$ 

= 8 - Post-Developed Area #4

= Lake #4

Peak discharge

= 3.606 cfs= 904 min Time to peak Hyd. volume = 267,424 cuft

Max. Elevation Max. Storage

= 891.45 ft = 199,116 cuft

