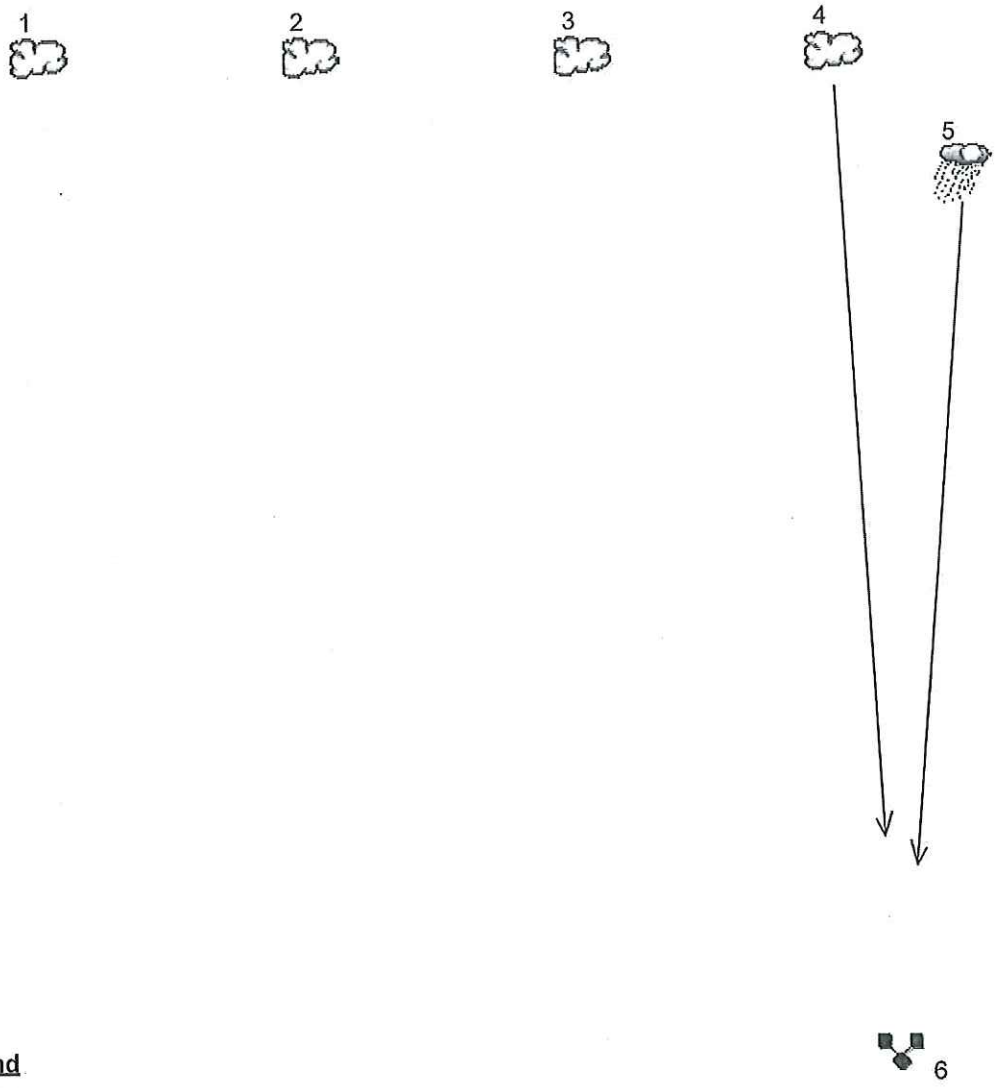
Watershed Model Schematic

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



Legend

Hyd.	Origin	Description
1	SCS Runoff	Pre-Developed Area #1 - Analysis Point #1
2	SCS Runoff	Pre-Developed Area #2 - Analysis Point #2
3	SCS Runoff	Pre-Developed Area #3 - Analysis Point #3
4	SCS Runoff	Pre-Developed Area #4 - Analysis Point #4
5	Manual	Offsite Miami University 50yr
6	Combine	Analysis Point #4 Allowable

Project: Allowable.gpw	Monday, Apr 16, 2012

Hydrograph Return Period Recap

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

Hyd. No.	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	
1	SCS Runoff	------	5.576	-------	-------	-------	33.39	48.59	62.80	80.12	Pre-Developed Area #1 - Analysis Poi
2	SCS Runoff	------	2.622	-------	-------	-------	37.24	61.30	85.37	115.56	Pre-Developed Area #2 - Analysis Poi
3	SCS Runoff	------	1.366	-------	-------	-------	17.86	28.93	39.73	53.21	Pre-Developed Area #3 - Analysis Poi
4	SCS Runoff	------	1.868	-------	-------	-------	26.01	41.88	57.14	76.13	Pre-Developed Area #4 - Analysis Poi
5	Manual	------	22.70	-------	-------	-------	0.000	0.000	0.000	0.000	Offsite Miami University 50yr
6	Combine	4, 5	24.38	-------	-------	-------	26.01	41.88	57.14	76.13	Analysis Point #4 Allowable

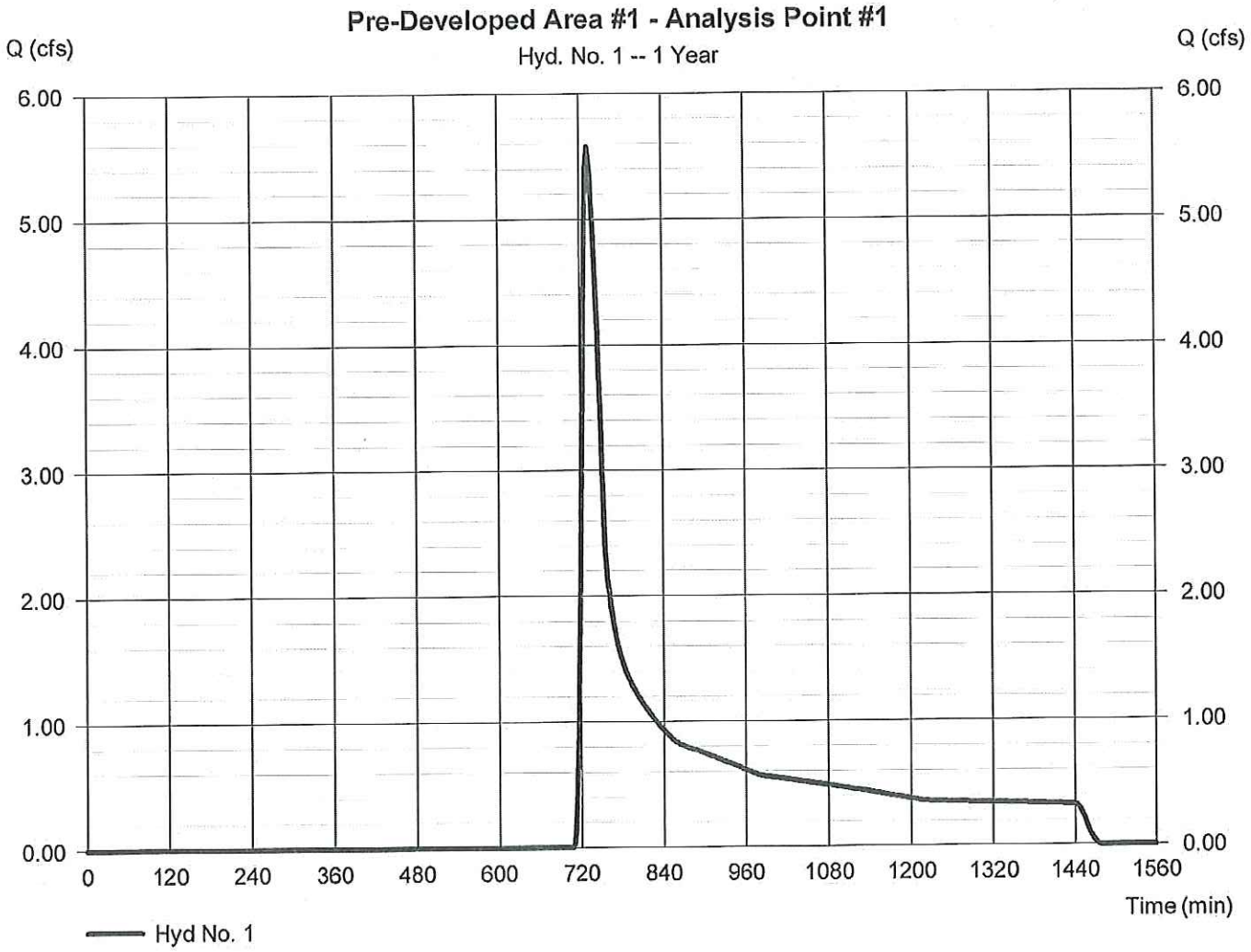
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Monday, Apr 16, 2012

Hyd. No. 1

Pre-Developed Area #1 - Analysis Point #1

Hydrograph type	= SCS Runoff	Peak discharge	= 5.576 cfs
Storm frequency	= 1 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 34,194 cuft
Drainage area	= 32.570 ac	Curve number	= 67.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 25.20 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



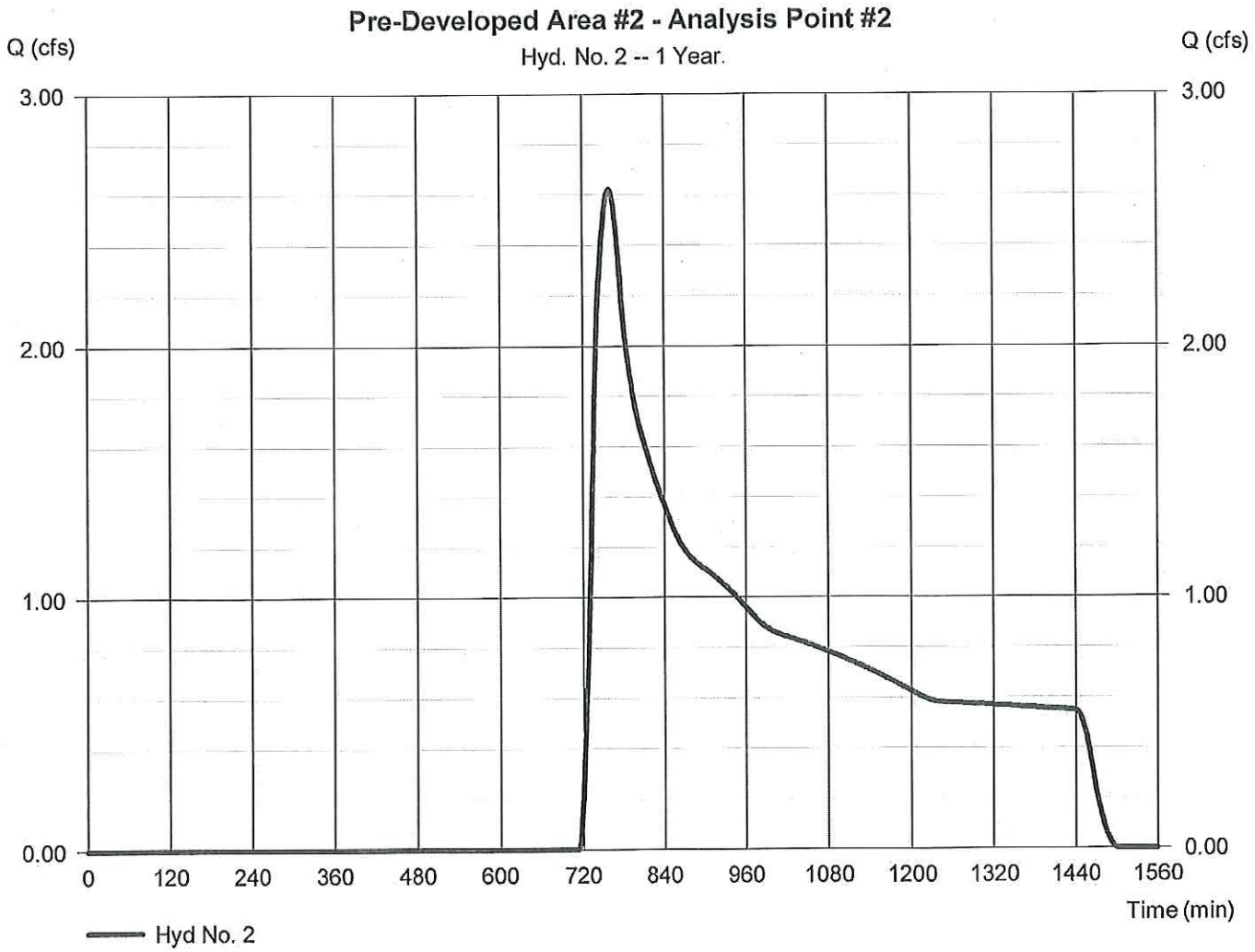
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Monday, Apr 16, 2012

Hyd. No. 2

Pre-Developed Area #2 - Analysis Point #2

Hydrograph type	= SCS Runoff	Peak discharge	= 2.622 cfs
Storm frequency	= 1 yrs	Time to peak	= 760 min
Time interval	= 2 min	Hyd. volume	= 41,581 cuft
Drainage area	= 83.620 ac	Curve number	= 60.4
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 37.10 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

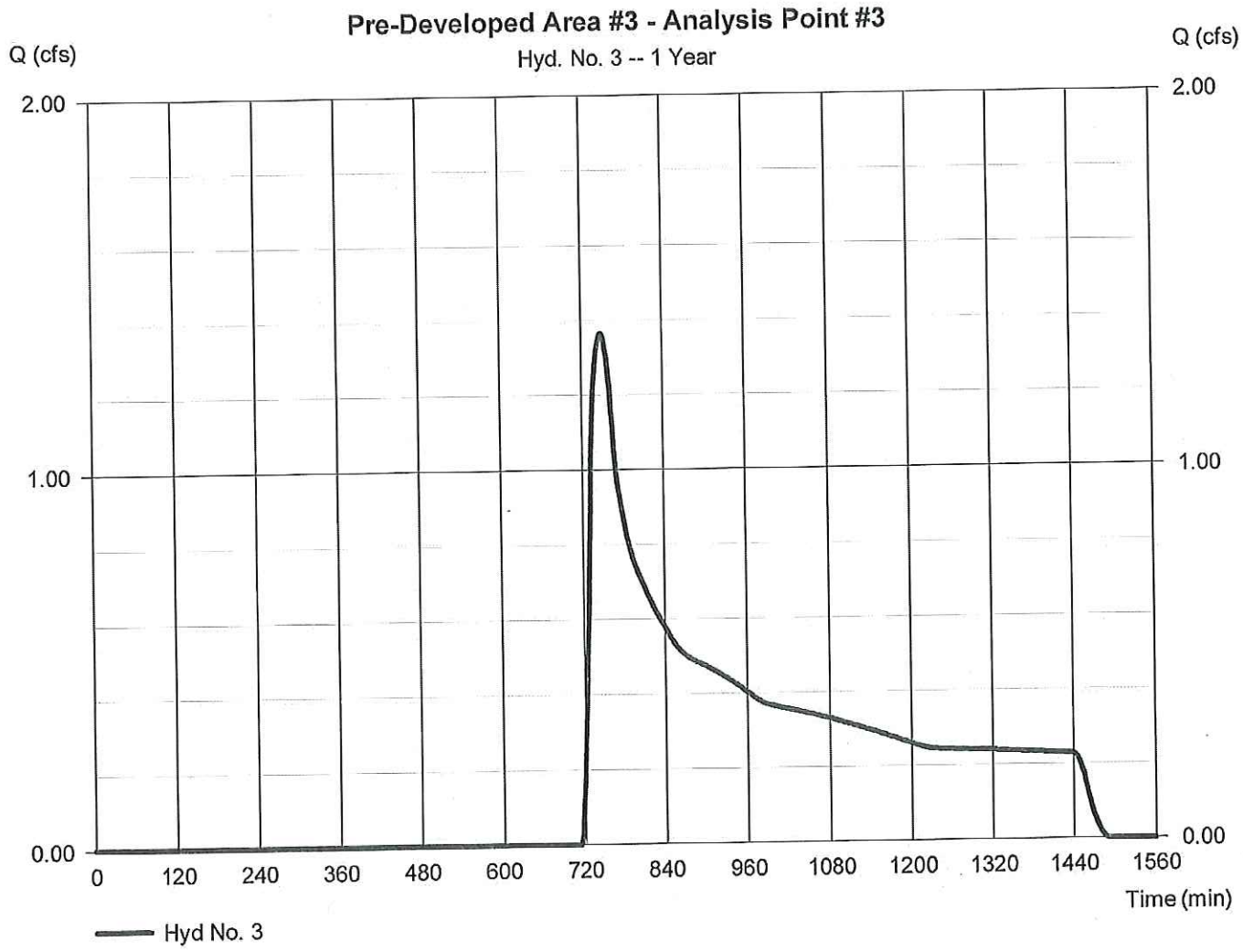
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Monday, Apr 16, 2012

Hyd. No. 3

Pre-Developed Area #3 - Analysis Point #3

Hydrograph type	= SCS Runoff	Peak discharge	= 1.366 cfs
Storm frequency	= 1 yrs	Time to peak	= 750 min
Time interval	= 2 min	Hyd. volume	= 18,211 cuft
Drainage area	= 32.220 ac	Curve number	= 61.3
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 31.30 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

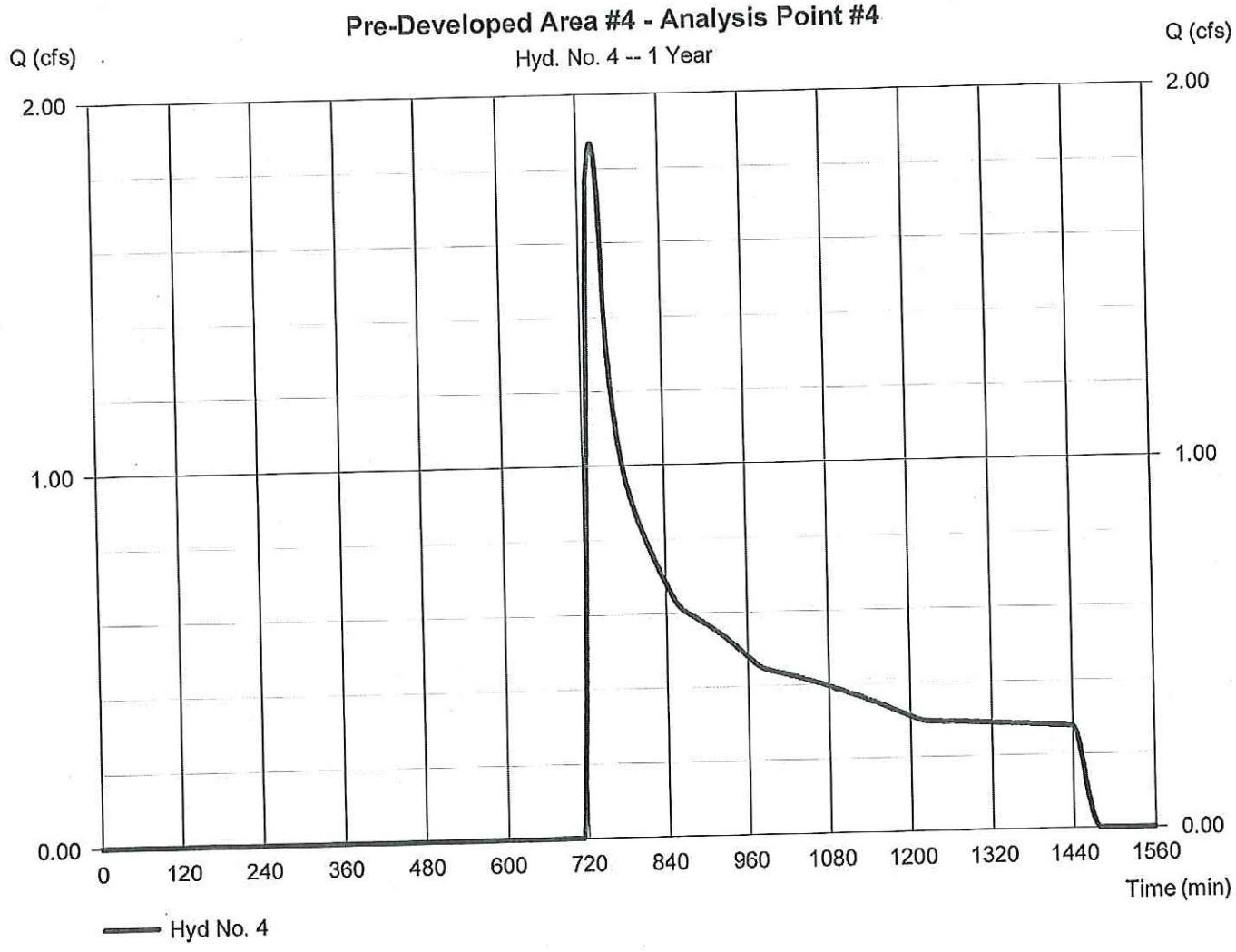
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Monday, Apr 16, 2012

Hyd. No. 4

Pre-Developed Area #4 - Analysis Point #4

Hydrograph type	= SCS Runoff	Peak discharge	= 1.868 cfs
Storm frequency	= 1 yrs	Time to peak	= 742 min
Time interval	= 2 min	Hyd. volume	= 22,165 cuft
Drainage area	= 39.810 ac	Curve number	= 61.4
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 26.40 min
Total precip.	= 2.33 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



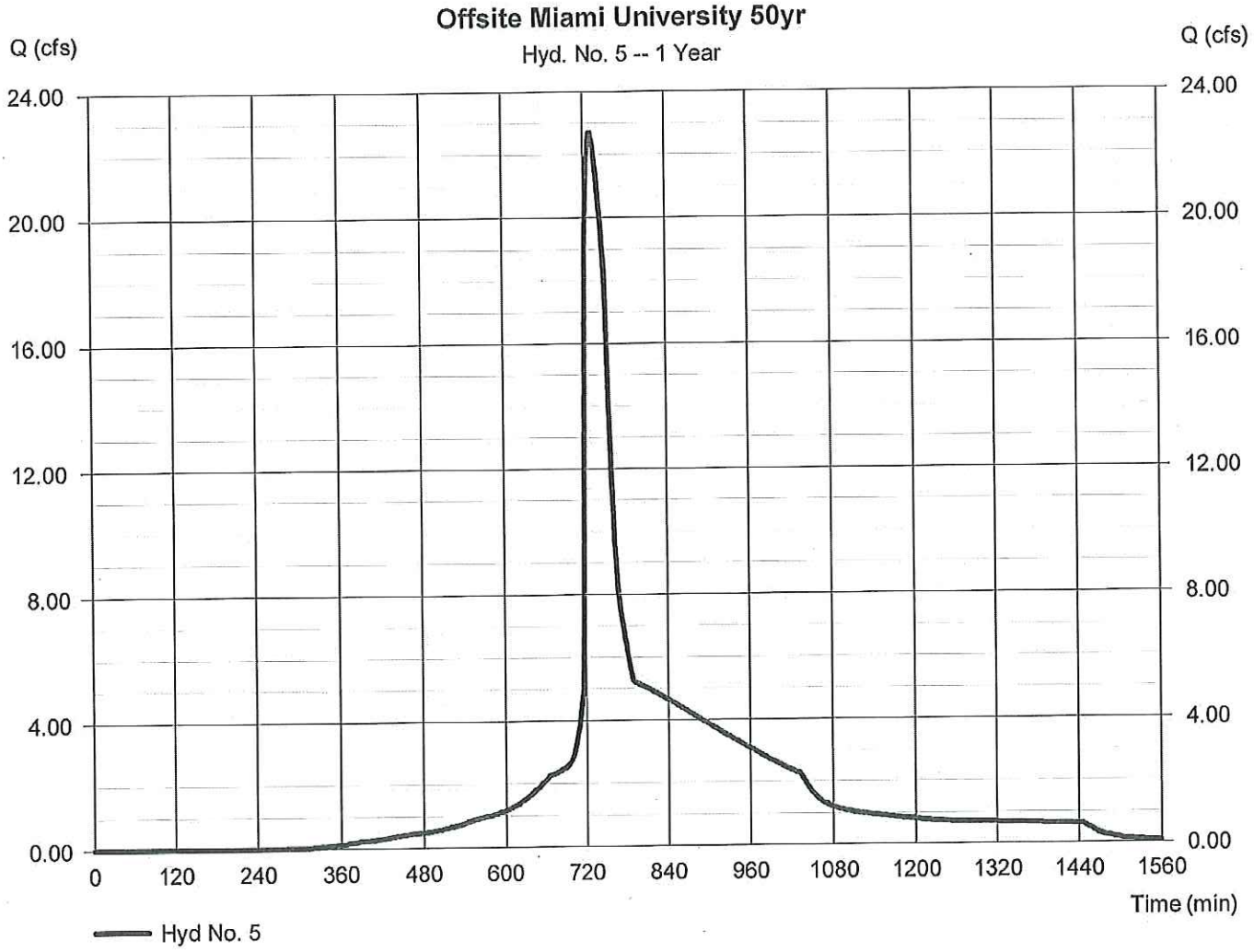
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Monday, Apr 16, 2012

Hyd. No. 5

Offsite Miami University 50yr

Hydrograph type	= Manual	Peak discharge	= 22.70 cfs
Storm frequency	= 1 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 163,737 cuft



Hydrograph Report

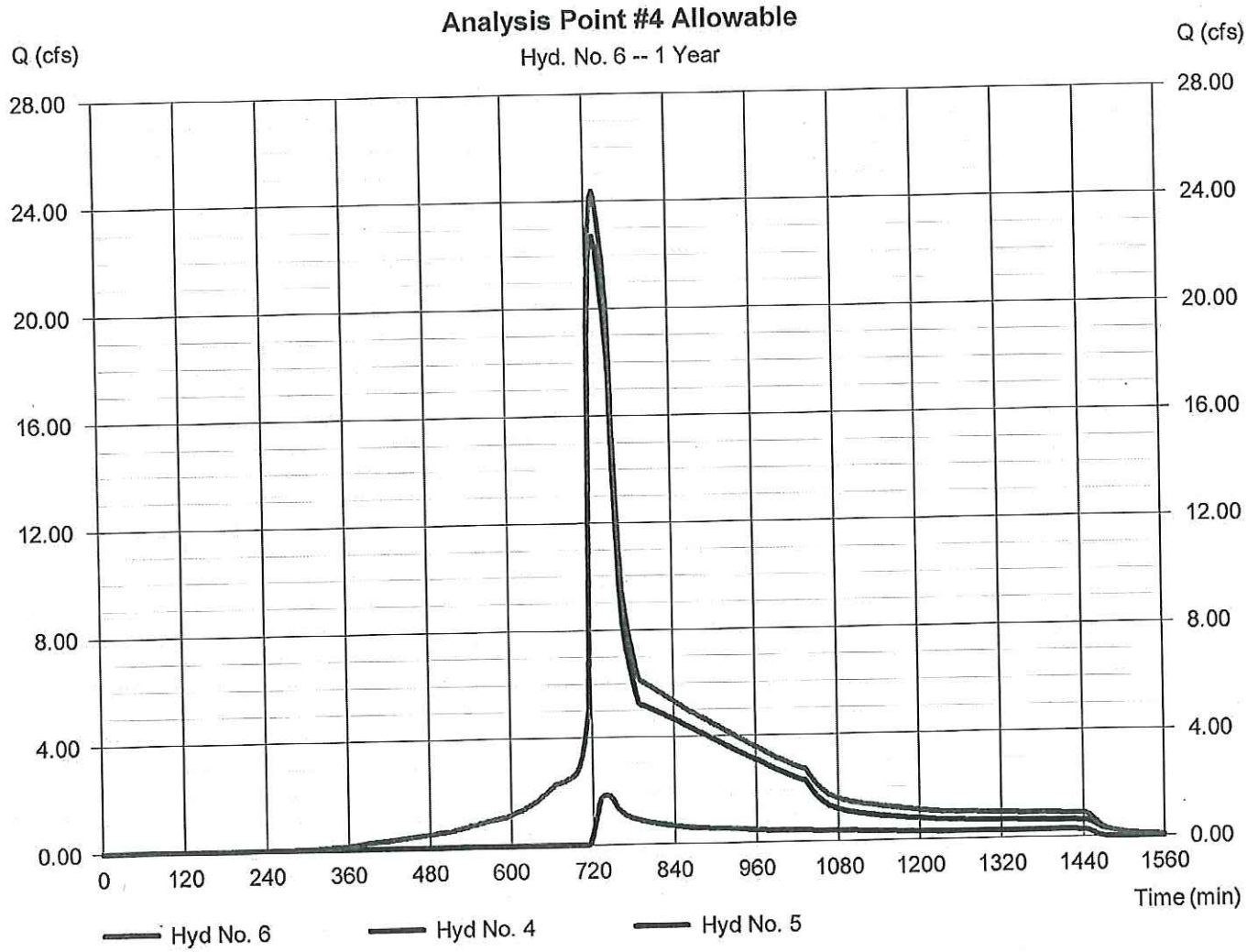
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Monday, Apr 16, 2012

Hyd. No. 6

Analysis Point #4 Allowable

Hydrograph type	= Combine	Peak discharge	= 24.38 cfs
Storm frequency	= 1 yrs	Time to peak	= 732 min
Time interval	= 2 min	Hyd. volume	= 185,901 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 39.810 ac



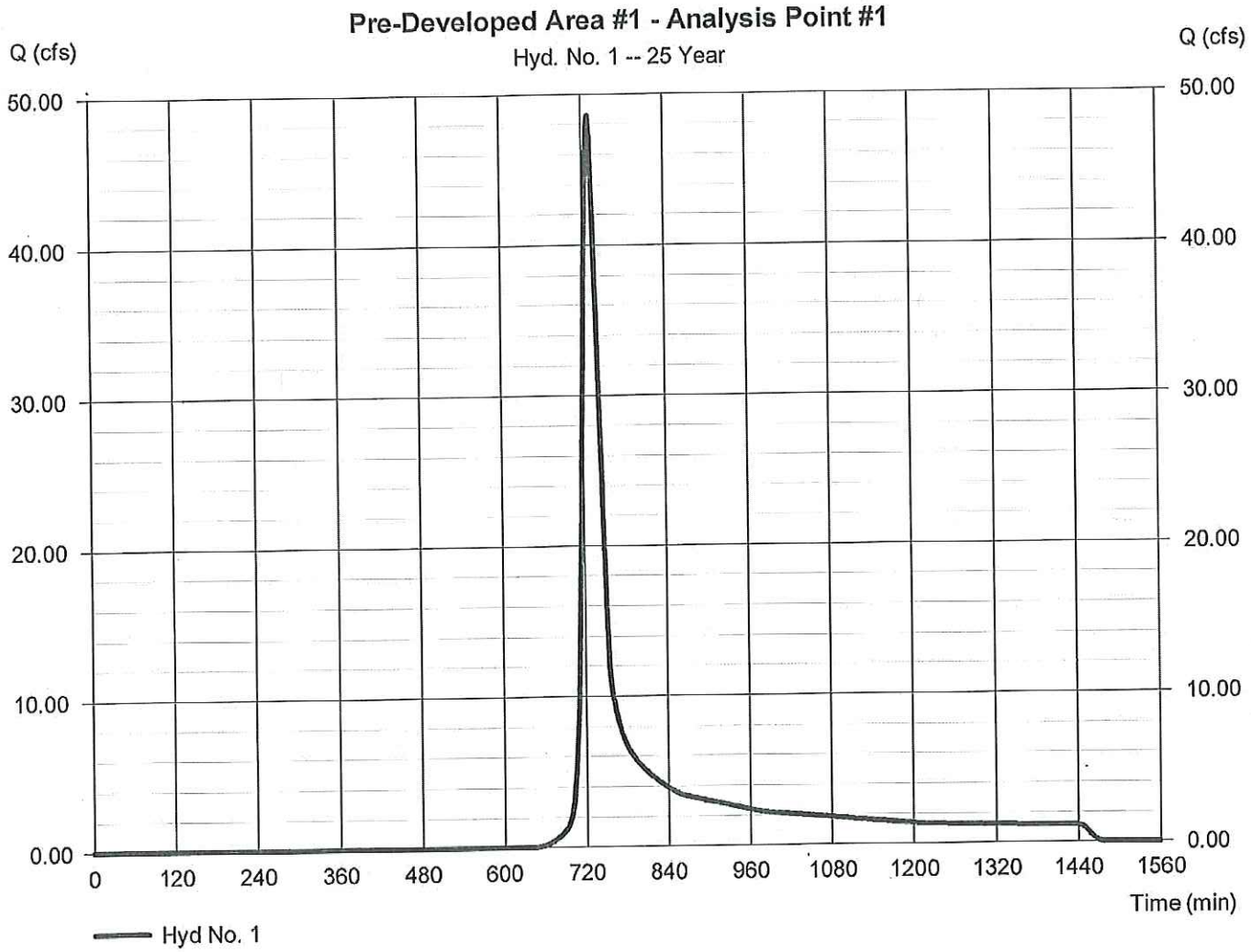
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Monday, Apr 16, 2012

Hyd. No. 1

Pre-Developed Area #1 - Analysis Point #1

Hydrograph type	= SCS Runoff	Peak discharge	= 48.59 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 187,552 cuft
Drainage area	= 32.570 ac	Curve number	= 67.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 25.20 min
Total precip.	= 4.70 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



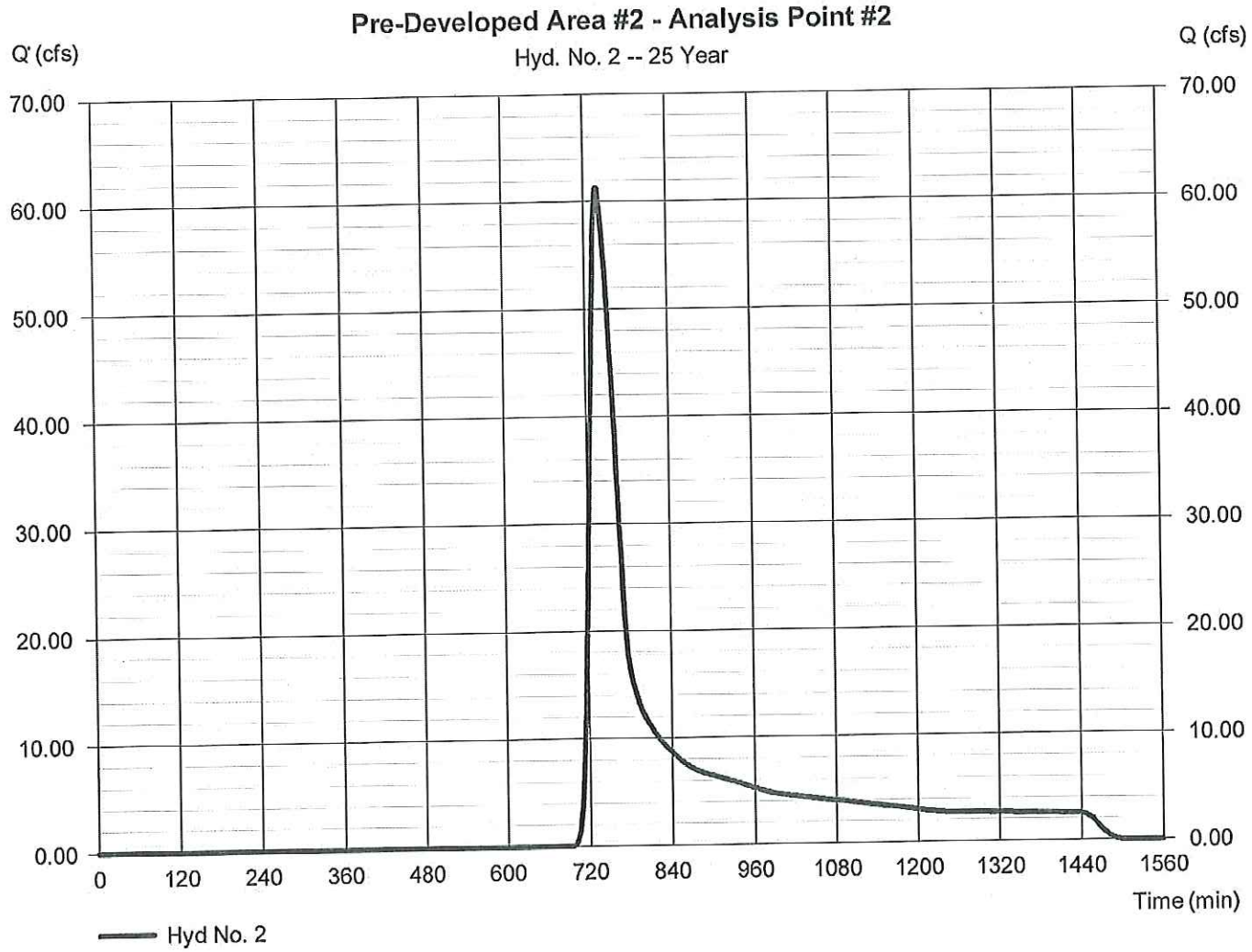
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Monday, Apr 16, 2012

Hyd. No. 2

Pre-Developed Area #2 - Analysis Point #2

Hydrograph type	= SCS Runoff	Peak discharge	= 61.30 cfs
Storm frequency	= 25 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 350,500 cuft
Drainage area	= 83.620 ac	Curve number	= 60.4
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 37.10 min
Total precip.	= 4.70 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



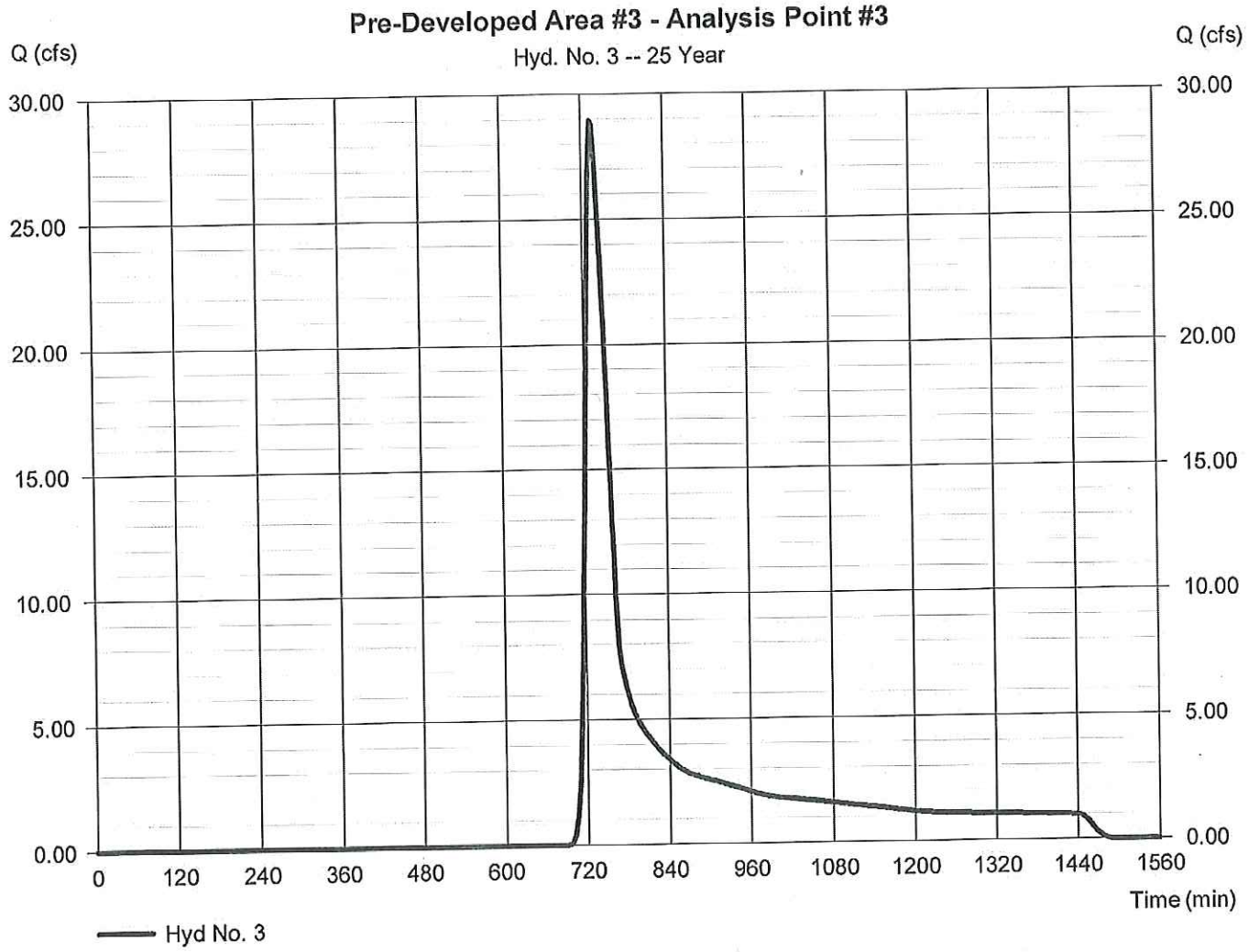
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Monday, Apr 16, 2012

Hyd. No. 3

Pre-Developed Area #3 - Analysis Point #3

Hydrograph type	= SCS Runoff	Peak discharge	= 28.93 cfs
Storm frequency	= 25 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 143,498 cuft
Drainage area	= 32.220 ac	Curve number	= 61.3
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 31.30 min
Total precip.	= 4.70 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



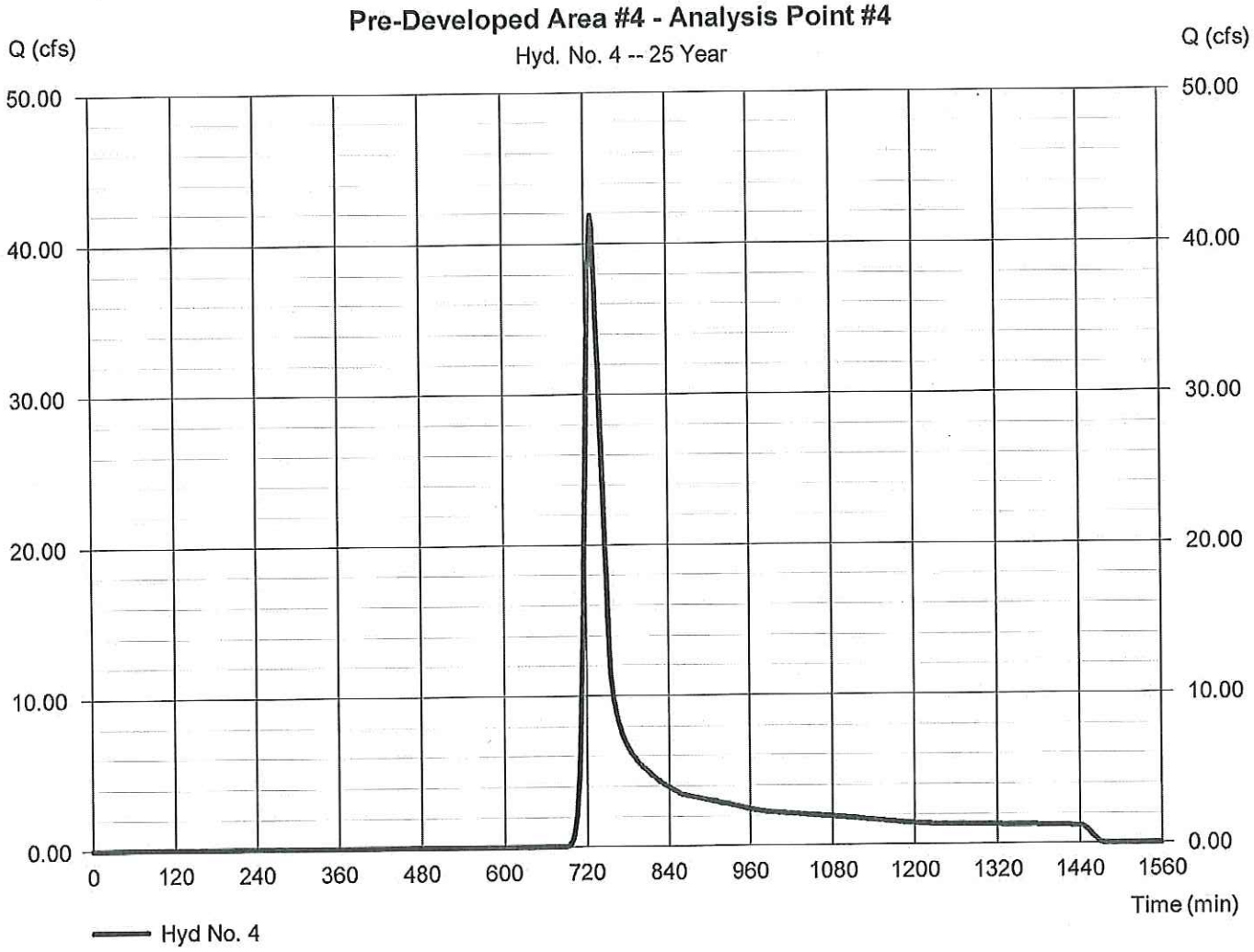
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Monday, Apr 16, 2012

Hyd. No. 4

Pre-Developed Area #4 - Analysis Point #4

Hydrograph type	= SCS Runoff	Peak discharge	= 41.88 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 173,288 cuft
Drainage area	= 39.810 ac	Curve number	= 61.4
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 26.40 min
Total precip.	= 4.70 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



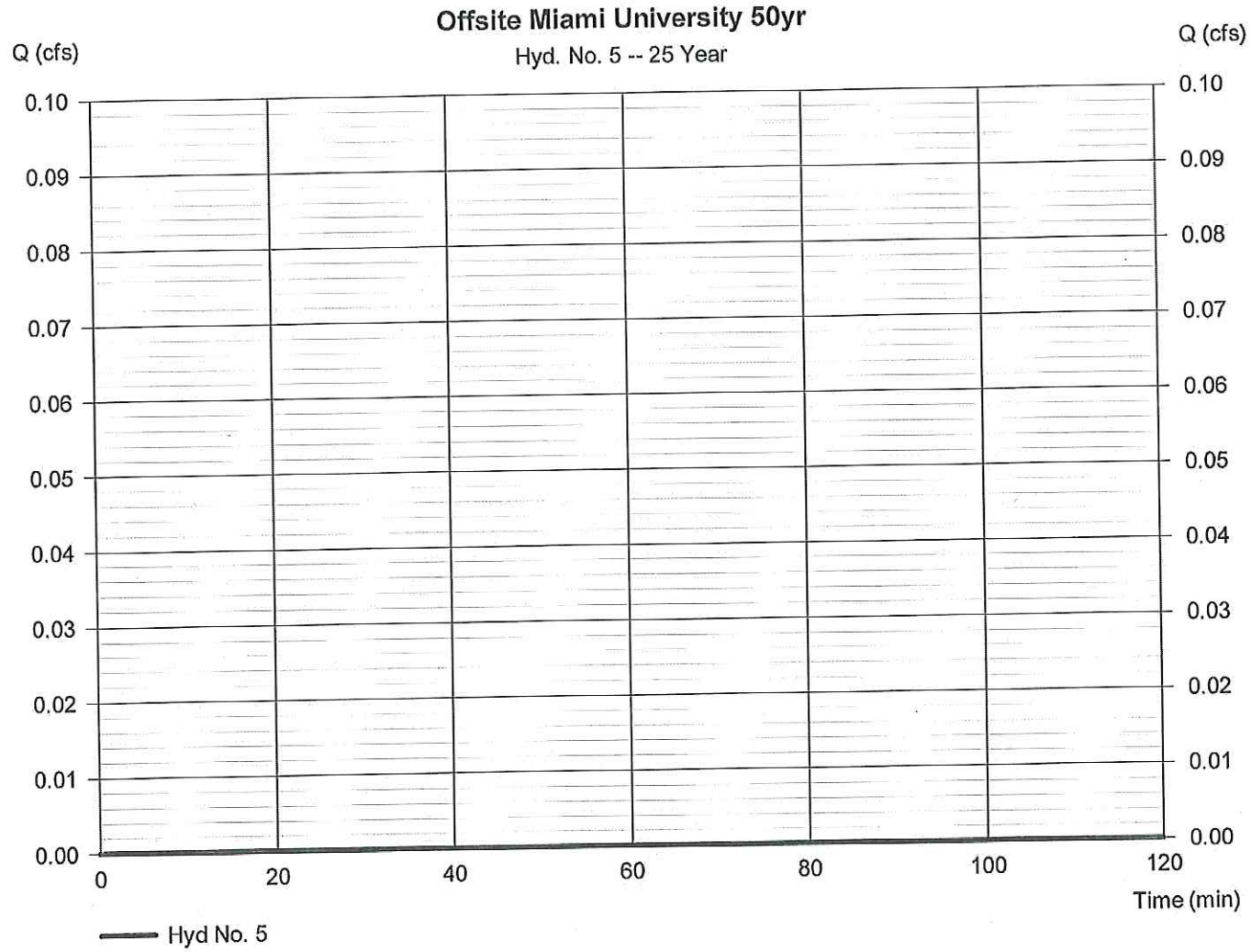
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Monday, Apr 16, 2012

Hyd. No. 5

Offsite Miami University 50yr

Hydrograph type	= Manual	Peak discharge	= 0.000 cfs
Storm frequency	= 25 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft



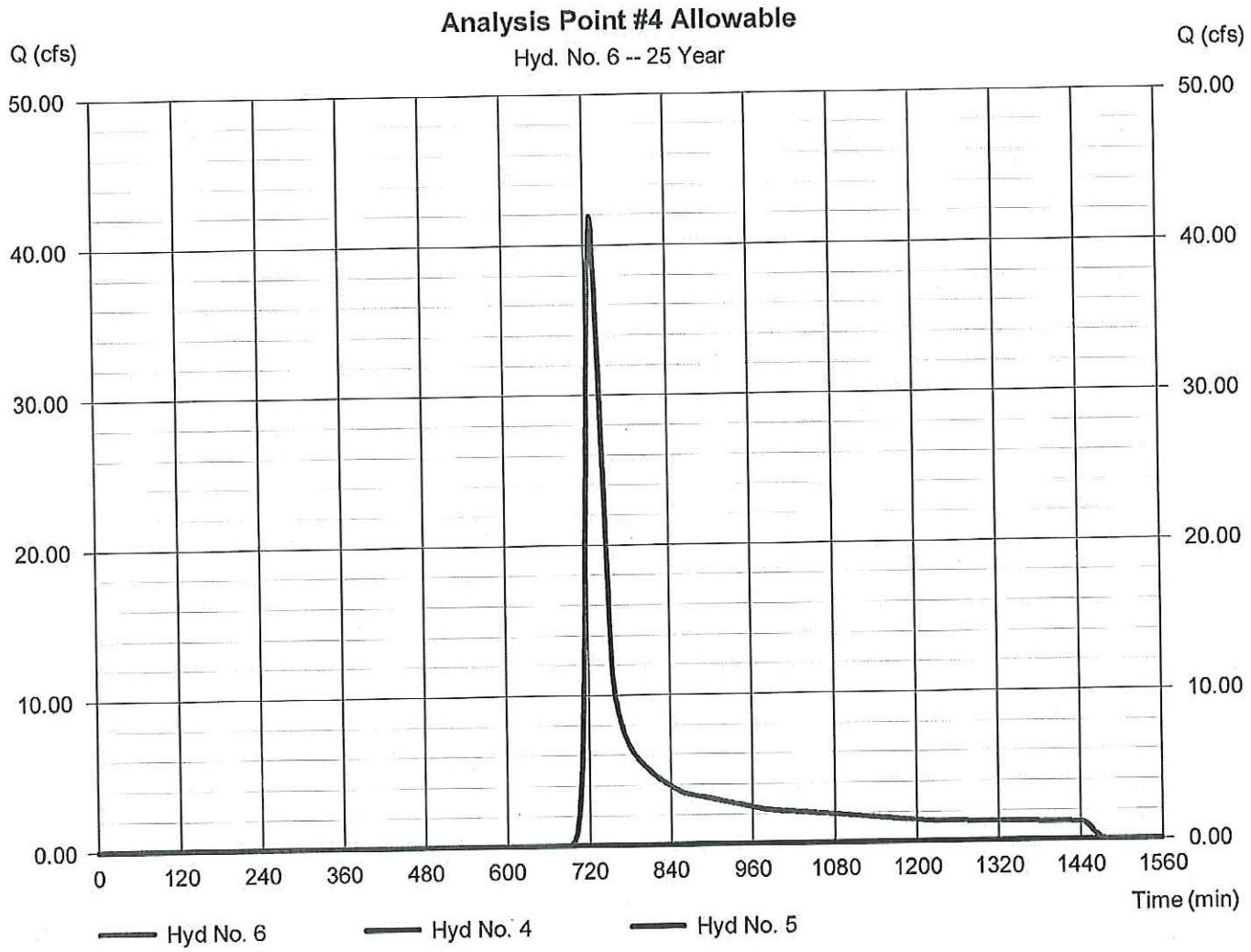
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Monday, Apr 16, 2012

Hyd. No. 6

Analysis Point #4 Allowable

Hydrograph type	= Combine	Peak discharge	= 41.88 cfs
Storm frequency	= 25 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 173,288 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 39.810 ac



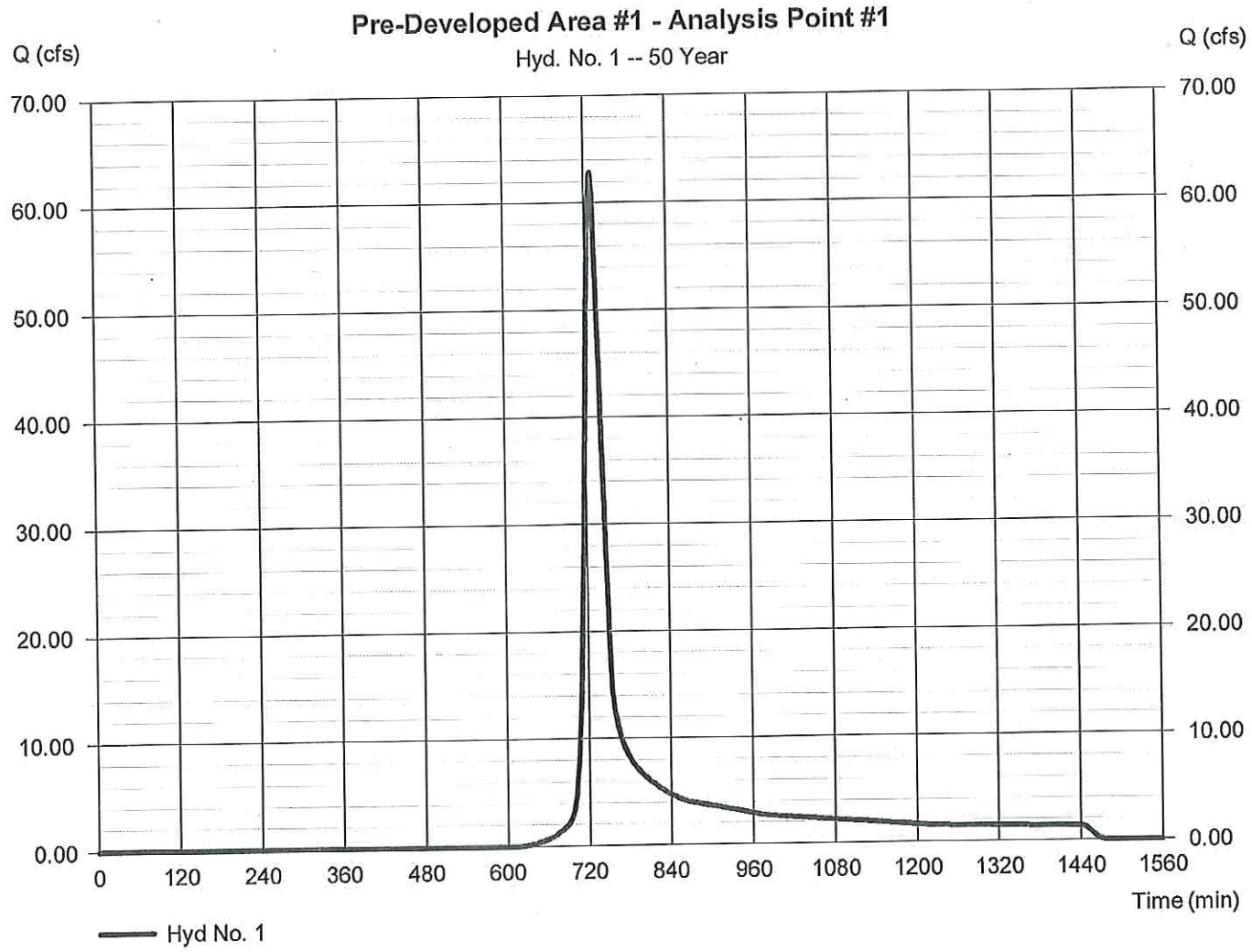
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Monday, Apr 16, 2012

Hyd. No. 1

Pre-Developed Area #1 - Analysis Point #1

Hydrograph type	= SCS Runoff	Peak discharge	= 62.80 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 238,052 cuft
Drainage area	= 32.570 ac	Curve number	= 67.2
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 25.20 min
Total precip.	= 5.32 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



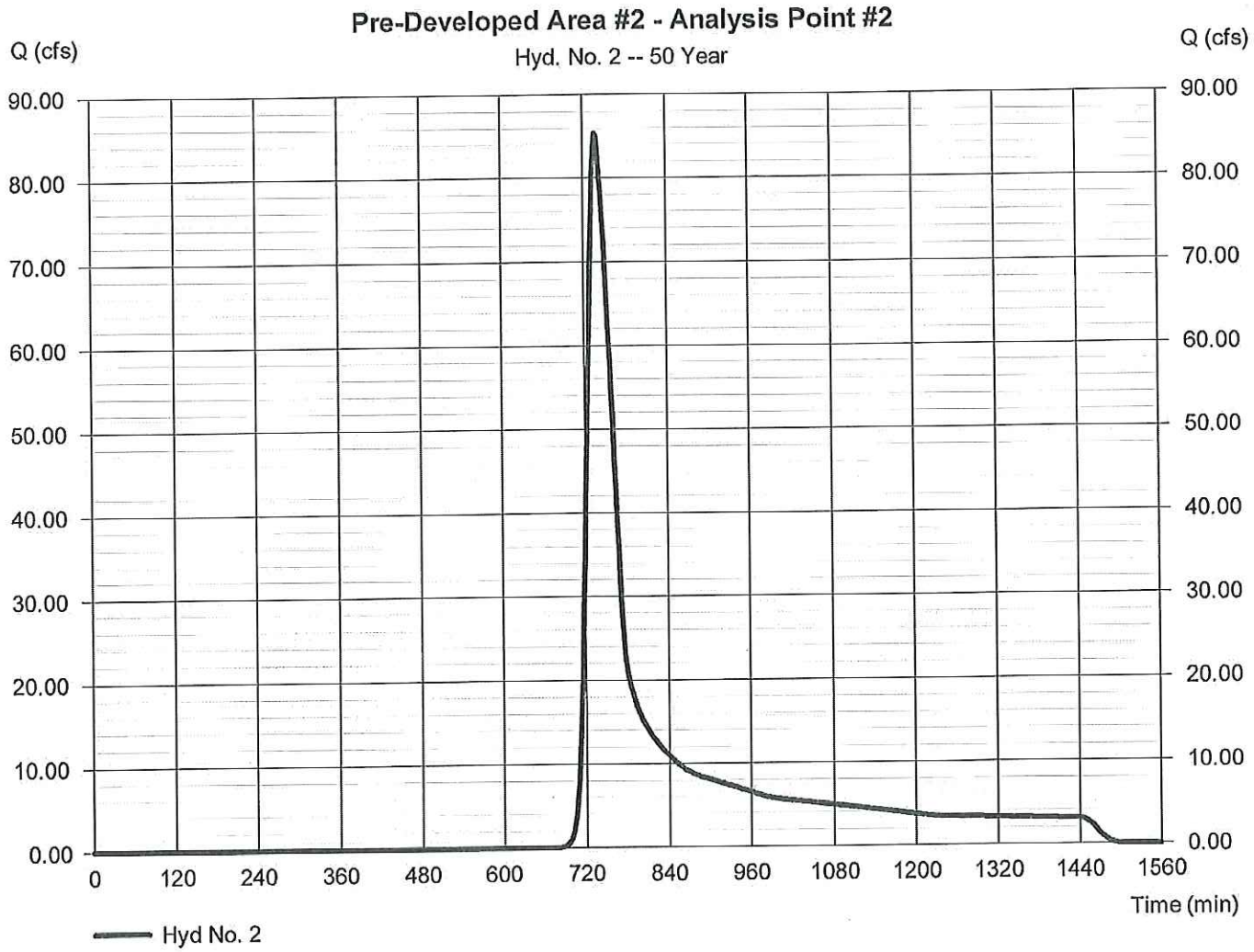
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Monday, Apr 16, 2012

Hyd. No. 2

Pre-Developed Area #2 - Analysis Point #2

Hydrograph type	= SCS Runoff	Peak discharge	= 85.37 cfs
Storm frequency	= 50 yrs	Time to peak	= 738 min
Time interval	= 2 min	Hyd. volume	= 461,701 cuft
Drainage area	= 83.620 ac	Curve number	= 60.4
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 37.10 min
Total precip.	= 5.32 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



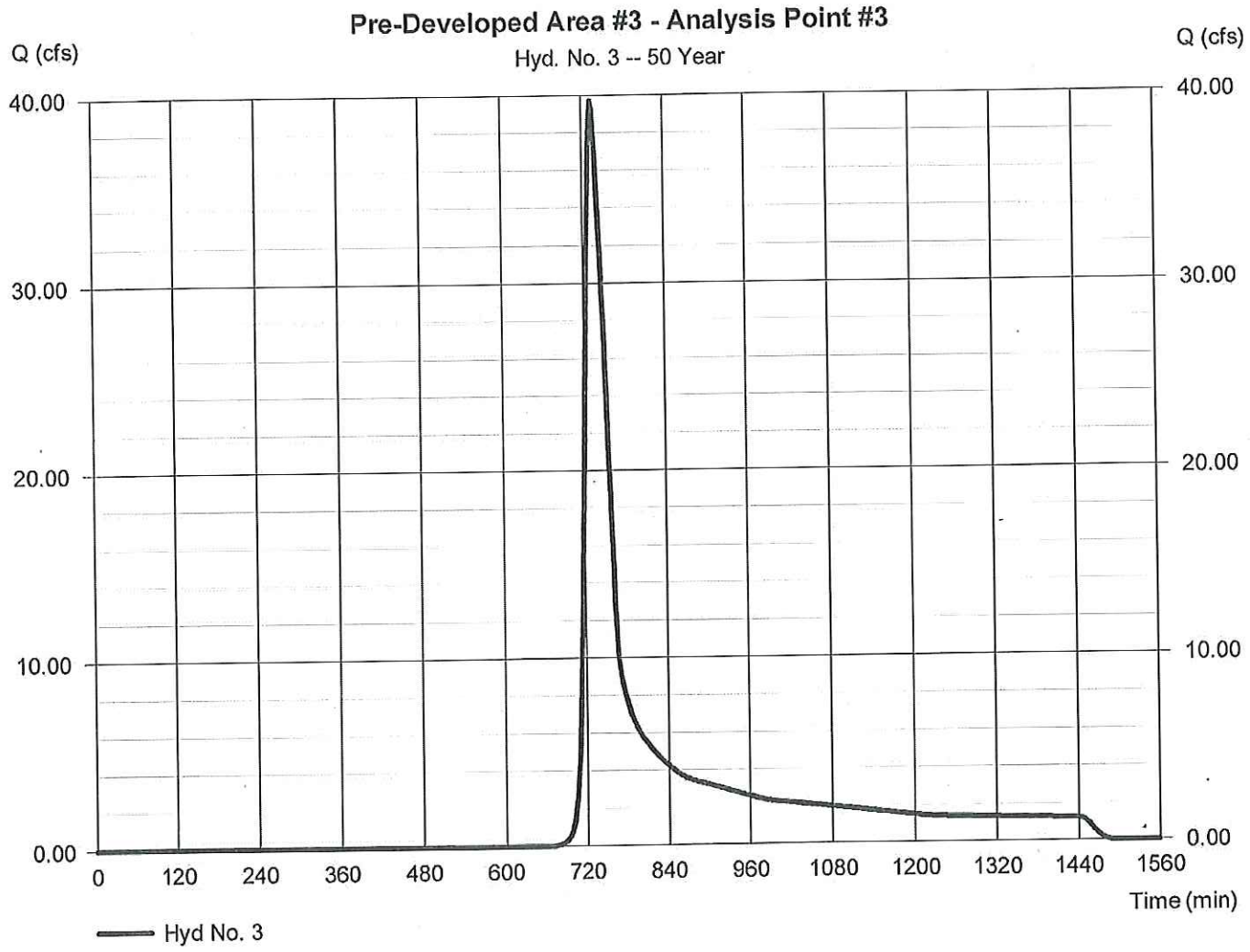
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Monday, Apr 16, 2012

Hyd. No. 3

Pre-Developed Area #3 - Analysis Point #3

Hydrograph type	= SCS Runoff	Peak discharge	= 39.73 cfs
Storm frequency	= 50 yrs	Time to peak	= 734 min
Time interval	= 2 min	Hyd. volume	= 187,980 cuft
Drainage area	= 32.220 ac	Curve number	= 61.3
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 31.30 min
Total precip.	= 5.32 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



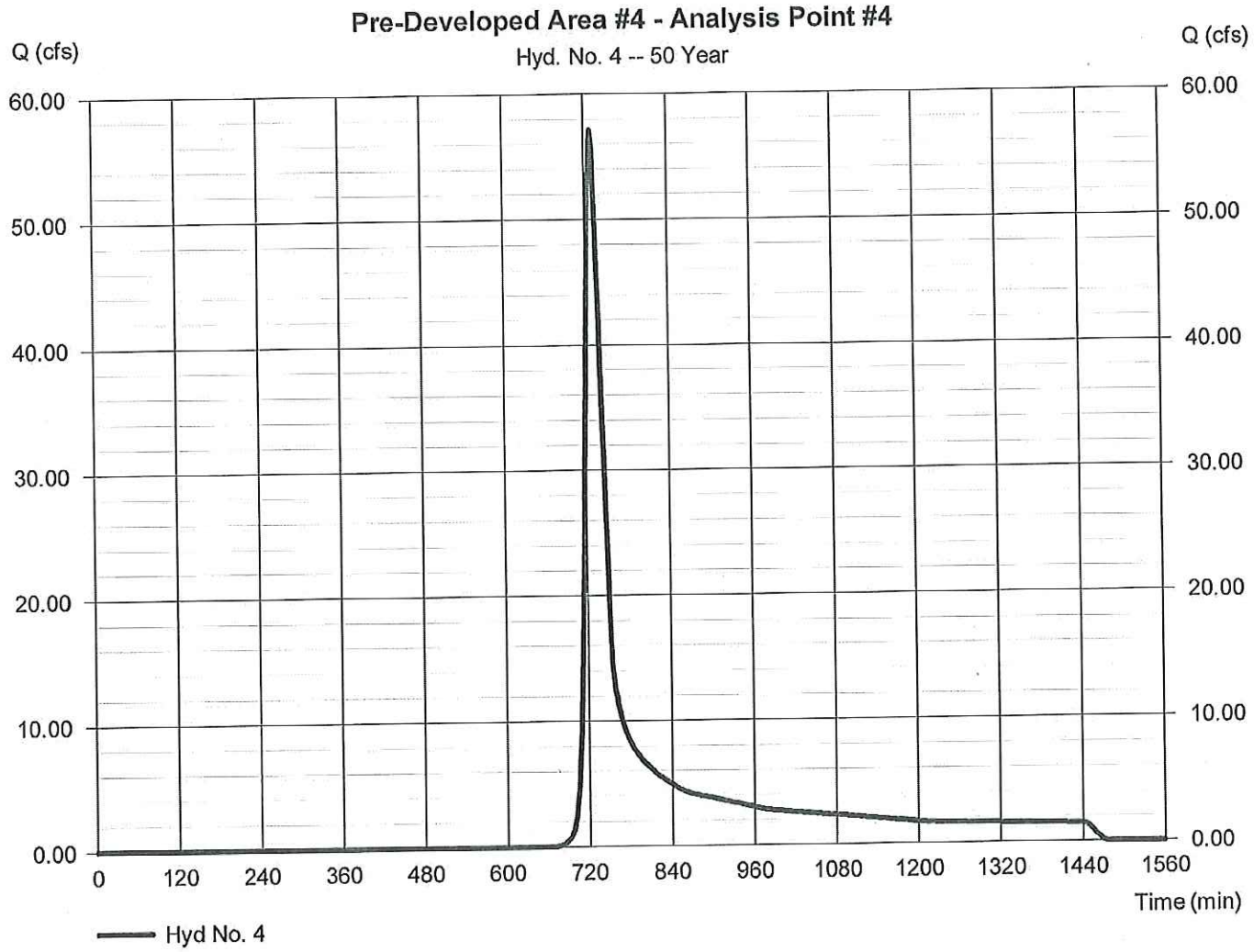
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Monday, Apr 16, 2012

Hyd. No. 4

Pre-Developed Area #4 - Analysis Point #4

Hydrograph type	= SCS Runoff	Peak discharge	= 57.14 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 226,866 cuft
Drainage area	= 39.810 ac	Curve number	= 61.4
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 26.40 min
Total precip.	= 5.32 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



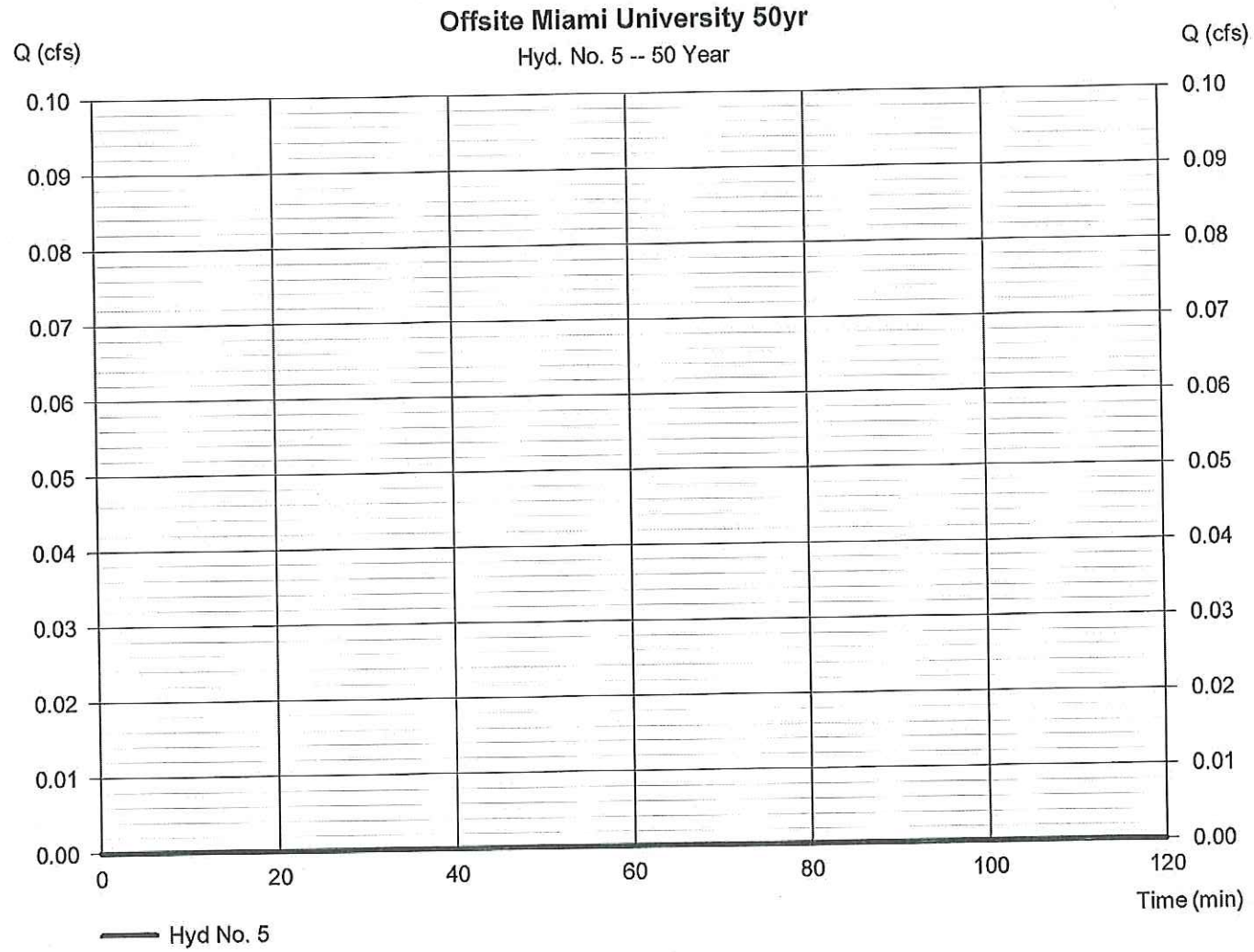
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Monday, Apr 16, 2012

Hyd. No. 5

Offsite Miami University 50yr

Hydrograph type	= Manual	Peak discharge	= 0.000 cfs
Storm frequency	= 50 yrs	Time to peak	= n/a
Time interval	= 2 min	Hyd. volume	= 0 cuft



Hydrograph Report

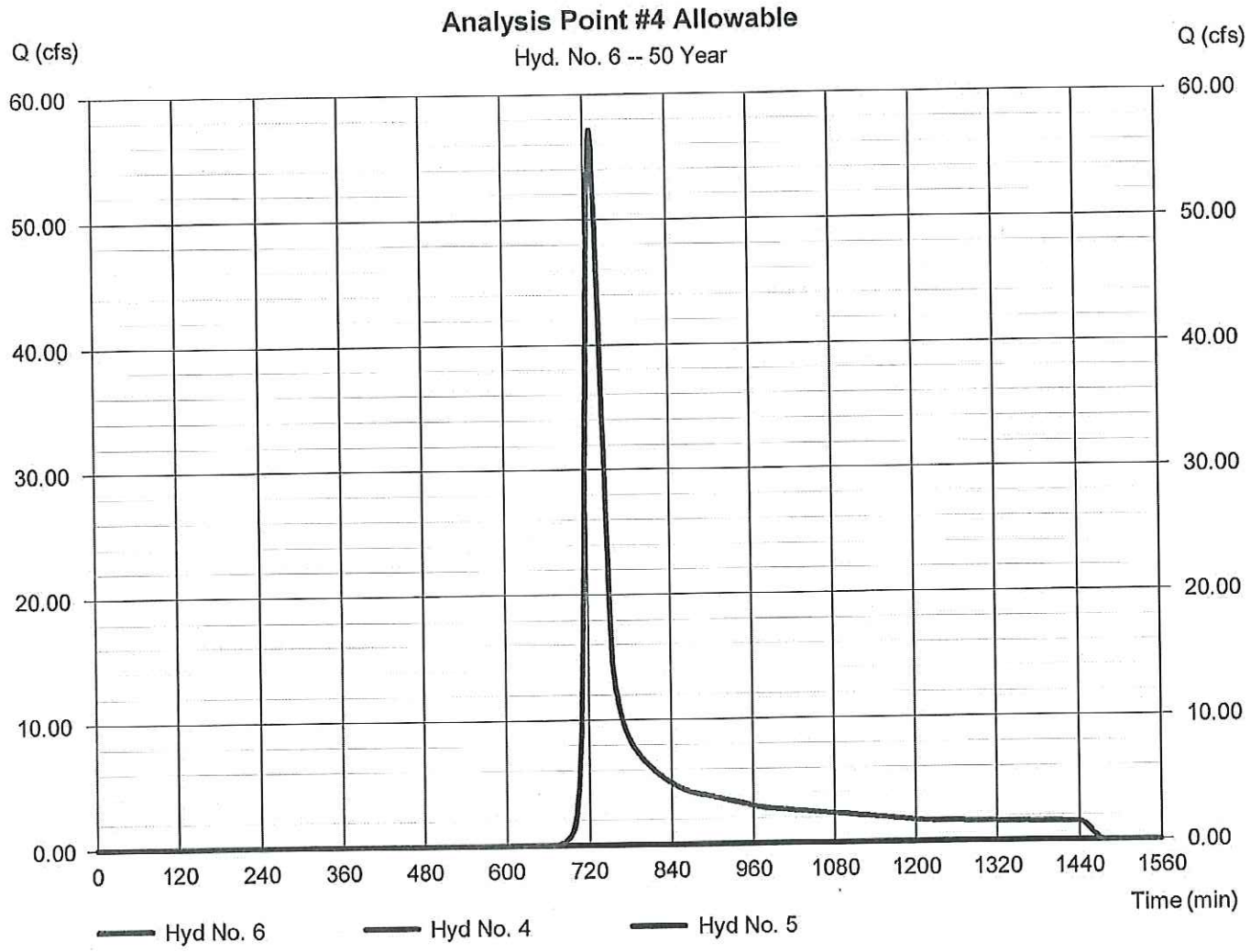
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8

Monday, Apr 16, 2012

Hyd. No. 6

Analysis Point #4 Allowable

Hydrograph type	= Combine	Peak discharge	= 57.14 cfs
Storm frequency	= 50 yrs	Time to peak	= 730 min
Time interval	= 2 min	Hyd. volume	= 226,866 cuft
Inflow hyds.	= 4, 5	Contrib. drain. area	= 39.810 ac



Project: Voice of America Park

Drainage Area Description:

Post-Developed Area #1, Onsite tributary Lake #1 and analyis point #1

Job #: 07M056.006
Initials: GJK
Date: 4/4/2012

Drainage Area: 24.30 Acres

Soil Types:
25 % Type B
75 % Type C

Land Use:

Open Space	75 %
Lake	10 %
Impervious	15 %

Composite Runoff Curve Number:

Ground Cover	Soil Type	CN	Soil Type %	Land Use %	
Open Space	B	61	25	75	11.44
Lake	B	100	25	10	2.50
Impervious	B	98	25	15	3.68
Open Space	C	74	75	75	41.63
Lake	C	100	75	10	7.50
Impervious	C	98	75	15	11.03

Composite CN = **77.8**

Time of Concentration:

			Tc
Sheet Flow:			
Length = 100	Slope(ft/ft) = 0.0200	Manning's, n = 0.17	0.19 hr
Shallow Concentrated Flow:			
Length = 370	Slope(ft/ft) = 0.0150	Velocity (fps) = 2	0.05 hr
Channel Flow:			
Length = 1070		Velocity (fps) = 3	0.10 hr
Pipe Flow:			
Length =		Velocity (fps) =	hr
		Tc =	**0.34 hr**
			20.5 min

Project: Voice of America Park

Drainage Area Description:

Post-Developed Area #2, Onsite tributary to Lake #2, then Lake #3 and analyis point #2

Job #: 07M056.006
Initials: GJK
Date: 4/4/2012

Drainage Area: 17.60 Acres

Soil Types:
100 % Type B
0 % Type C

Land Use:

Open Space	75 %
Lake	10 %
Impervious	15 %

Composite Runoff Curve Number:

Ground Cover	Soil Type	CN	Soil Type %	Land Use %	
Open Space	B	61	100	75	45.75
Lake	B	100	100	10	10.00
Impervious	B	98	100	15	14.70
Open Space	C	74	0	75	0.00
Lake	C	100	0	10	0.00
Impervious	C	98	0	15	0.00

Composite CN = 70.5

Time of Concentration:

			Tc
Sheet Flow:			
Length = 100	Slope(ft/ft) = 0.0150	Manning's, n = 0.17	0.21 hr
Shallow Concentrated Flow:			
Length = 620	Slope(ft/ft) = 0.0150	Velocity (fps) = 2	0.09 hr
Channel Flow:			
Length =		Velocity (fps) =	0.00 hr
Pipe Flow:			
Length =		Velocity (fps) =	hr
		Tc =	**0.30 hr**
			18.0 min

Project: Voice of America Park

Drainage Area Description:

Post-Developed Area #3, Onsite tributary to Lake #3 and analyis point #2

Job #: 07M056.006
Initials: GJK
Date: 4/4/2012

Drainage Area: 63.50 Acres

Soil Types:
30 % Type B
70 % Type C

Land Use:

Open Space	42 %	26.67 acres
Lake	8 %	5.08 acres
Impervious	20 %	12.7 acres
Synthetic Turf Fields	30 %	19.05 (9 Fields Total)

Composite Runoff Curve Number:

Ground Cover	Soil Type	CN	Soil Type %	Land Use %	
Open Space	B	61	30	42	7.69
Lake	B	100	30	8	2.40
Impervious	B	98	30	20	5.88
Synthetic Turf Fields	B	90	30	30	8.10
Open Space	C	74	70	42	21.76
Lake	C	100	70	8	5.60
Impervious	C	98	70	20	13.72
Synthetic Turf Fields	C	90	70	30	18.90

Composite CN = **65.1**

Time of Concentration:

			Tc
Sheet Flow:			
Length = 100	Slope(ft/ft) = 0.0200	Manning's, n = 0.17	0.19 hr
Shallow Concentrated Flow:			
Length = 300	Slope(ft/ft) = 0.0150	Velocity (fps) = 2	0.04 hr
Channel Flow:			
Length =		Velocity (fps) =	0.00 hr
Pipe Flow:			
Length = 930		Velocity (fps) = 5	0.05 hr
		Tc =	**0.28 hr**
			17.1 min

(61 × 26.67) + (100 × 5.08) + (98 × 12.7) + (90 × 19.05) / 63.5 = 72.3

1626.87 + 508 = 1714.5

1714.5 / 63.5 = 27.0

Project: Voice of America Park

Drainage Area Description:

Post-Developed Area #4, Onsite tributary to Lake #4 and analyis point #3

Job #: 07M056.006
Initials: GJK
Date: 4/4/2012

Drainage Area: 22.25 Acres

Soil Types:
70 % Type B
30 % Type C

Land Use:

Open Space	60 %
Lake	10 %
Impervious	30 %

Composite Runoff Curve Number:

Ground Cover	Soil Type	CN	Soil Type %	Land Use %	
Open Space	B	61	70	60	25.62
Lake	B	100	70	10	7.00
Impervious	B	98	70	30	20.58
Open Space	C	74	30	60	13.32
Lake	C	100	30	10	3.00
Impervious	C	98	30	30	8.82

Composite CN = **78.3**

Time of Concentration:

			Tc
Sheet Flow:			
Length = 100	Slope(ft/ft) = 0.0150	Manning's, n = 0.17	0.21 hr
Shallow Concentrated Flow:			
Length = 450	Slope(ft/ft) = 0.0150	Velocity (fps) = 2	0.06 hr
Channel Flow:			
Length = 320		Velocity (fps) = 2.5	0.04 hr
Pipe Flow:			
Length = 130		Velocity (fps) = 5	0.01 hr
		Tc =	**0.31 hr**
			18.7 min

Project: Voice of America Park

Drainage Area Description:

Post-Developed Area #5, Onsite tributary to Lake #5 analyis point #3

Job #: 07M056.006
Initials: GJK
Date: 4/4/2012

Drainage Area: 67.30 Acres

Soil Types:
35 % Type B
65 % Type C

Land Use:

Open Space	82 %
Lake	13 %
Impervious	5 %

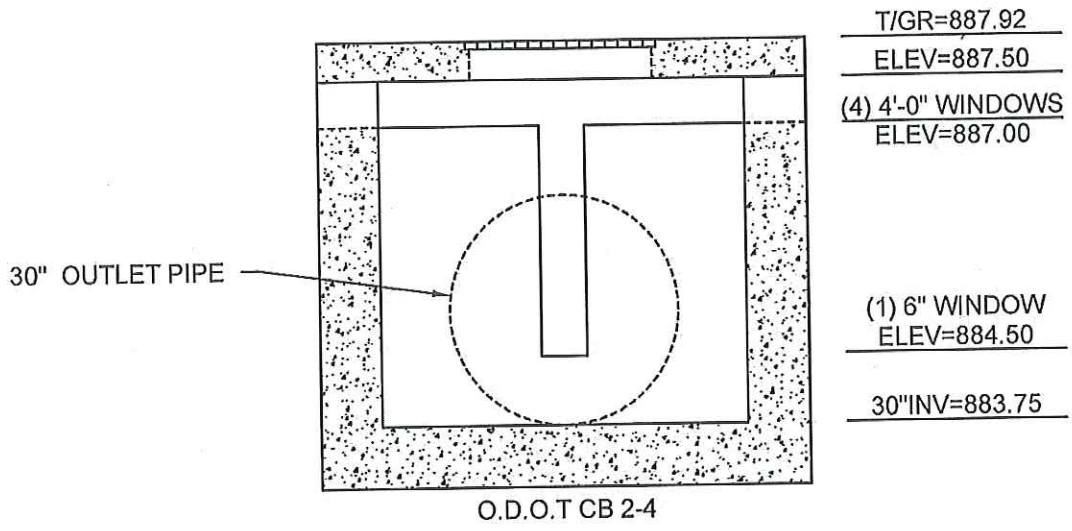
Composite Runoff Curve Number:

Ground Cover	Soil Type	CN	Soil Type %	Land Use %	
Open Space	B	61	35	82	17.51
Lake	B	100	35	13	4.55
Impervious	B	98	35	5	1.72
Open Space	C	74	65	82	39.44
Lake	C	100	65	13	8.45
Impervious	C	98	65	5	3.19

Composite CN = **74.8**

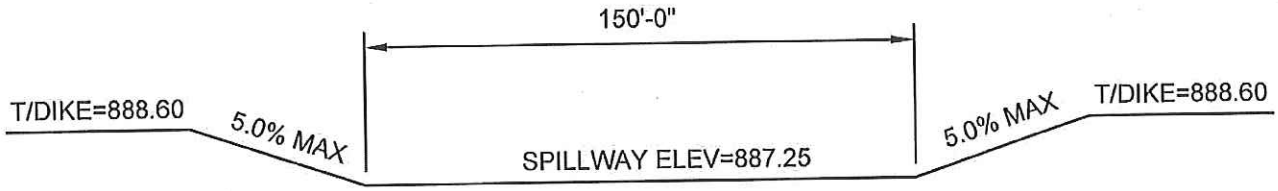
Time of Concentration:

			Tc
Sheet Flow:			
Length = 100	Slope(ft/ft) = 0.0150	Manning's, n = 0.17	0.21 hr
Shallow Concentrated Flow:			
Length = 950	Slope(ft/ft) = 0.0120	Velocity (fps) = 1.8	0.15 hr
Channel Flow:			
Length = 100		Velocity (fps) = 2.5	0.01 hr
		Tc =	**0.37 hr**
			22.3 min



LAKE #1 OUTLET STRUCTURE SIDE VIEW DETAIL

N.T.S.



LAKE #1 EMERGENCY SPILLWAY DETAIL

N.T.S.

Drawing:	07M056-006 CD
Scale	07M056.006
Drawn by:	GJK
Checked By:	
Issue Date:	04-04-12

VOICE OF AMERICA PARK ATHLETIC COMPLEX

SECTION 12, TOWN 3, RANGE 2,
WEST CHESTER TOWNSHIP,
BUTLER COUNTY, OHIO

FUTURE LAKE #1 OUTLET DETAILS

bayer becker
6900 Tylersville Road, Suite A
Mason, OH 45040 - 513.336.6600

Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Monday, Apr 16, 2012

Pond No. 1 - Lake #1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 884.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	884.50	00	0	0
0.24	884.74	01	0	0
0.25	884.75	81,066	271	271
0.50	885.00	82,336	20,423	20,694
1.50	886.00	87,471	84,882	105,577
2.50	887.00	92,703	90,065	195,642

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 30.00	0.00	0.00	0.00
Span (in)	= 30.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 883.75	0.00	0.00	0.00
Length (ft)	= 47.00	0.00	0.00	0.00
Slope (%)	= 0.30	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.50	15.50	0.00	0.00
Crest El. (ft)	= 884.50	887.00	0.00	0.00
Weir Coeff.	= 3.00	3.00	3.33	3.33
Weir Type	= Rect	Rect	---	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	884.50	0.00	---	---	---	0.00	0.00	---	---	---	---	0.000
0.02	0	884.52	2.53 oc	---	---	---	0.01	0.00	---	---	---	---	0.006
0.05	0	884.55	2.53 oc	---	---	---	0.02	0.00	---	---	---	---	0.016
0.07	0	884.57	2.53 oc	---	---	---	0.03	0.00	---	---	---	---	0.029
0.10	0	884.60	2.53 oc	---	---	---	0.04	0.00	---	---	---	---	0.045
0.12	0	884.62	2.53 oc	---	---	---	0.06	0.00	---	---	---	---	0.062
0.14	0	884.64	2.53 oc	---	---	---	0.08	0.00	---	---	---	---	0.082
0.17	0	884.67	2.53 oc	---	---	---	0.10	0.00	---	---	---	---	0.103
0.19	0	884.69	2.53 oc	---	---	---	0.13	0.00	---	---	---	---	0.126
0.22	0	884.72	2.53 oc	---	---	---	0.15	0.00	---	---	---	---	0.150
0.24	0	884.74	2.53 oc	---	---	---	0.18	0.00	---	---	---	---	0.176
0.24	27	884.74	2.53 oc	---	---	---	0.18	0.00	---	---	---	---	0.177
0.24	54	884.74	2.53 oc	---	---	---	0.18	0.00	---	---	---	---	0.178
0.24	82	884.74	2.53 oc	---	---	---	0.18	0.00	---	---	---	---	0.180
0.24	109	884.74	2.53 oc	---	---	---	0.18	0.00	---	---	---	---	0.181
0.24	136	884.74	2.53 oc	---	---	---	0.18	0.00	---	---	---	---	0.182
0.25	163	884.75	2.53 oc	---	---	---	0.18	0.00	---	---	---	---	0.183
0.25	190	884.75	2.53 oc	---	---	---	0.18	0.00	---	---	---	---	0.184
0.25	217	884.75	2.53 oc	---	---	---	0.19	0.00	---	---	---	---	0.185
0.25	244	884.75	2.53 oc	---	---	---	0.19	0.00	---	---	---	---	0.186
0.25	271	884.75	2.53 oc	---	---	---	0.19	0.00	---	---	---	---	0.188
0.28	2,314	884.78	2.53 oc	---	---	---	0.22	0.00	---	---	---	---	0.216
0.30	4,356	884.80	2.53 oc	---	---	---	0.25	0.00	---	---	---	---	0.246
0.32	6,398	884.83	2.53 oc	---	---	---	0.28	0.00	---	---	---	---	0.278
0.35	8,441	884.85	2.53 oc	---	---	---	0.31	0.00	---	---	---	---	0.311
0.38	10,483	884.88	2.53 oc	---	---	---	0.34	0.00	---	---	---	---	0.345
0.40	12,525	884.90	2.53 oc	---	---	---	0.38	0.00	---	---	---	---	0.380
0.43	14,568	884.93	2.53 oc	---	---	---	0.42	0.00	---	---	---	---	0.416
0.45	16,610	884.95	2.53 oc	---	---	---	0.45	0.00	---	---	---	---	0.453
0.48	18,652	884.98	2.53 oc	---	---	---	0.49	0.00	---	---	---	---	0.491
0.50	20,694	885.00	2.53 oc	---	---	---	0.53	0.00	---	---	---	---	0.530
0.60	29,183	885.10	2.53 oc	---	---	---	0.70	0.00	---	---	---	---	0.697
0.70	37,671	885.20	2.53 oc	---	---	---	0.88	0.00	---	---	---	---	0.879
0.80	46,159	885.30	2.53 oc	---	---	---	1.07	0.00	---	---	---	---	1.073
0.90	54,647	885.40	2.53 oc	---	---	---	1.28	0.00	---	---	---	---	1.281
1.00	63,136	885.50	2.53 oc	---	---	---	1.50	0.00	---	---	---	---	1.500
1.10	71,624	885.60	2.53 oc	---	---	---	1.73	0.00	---	---	---	---	1.730

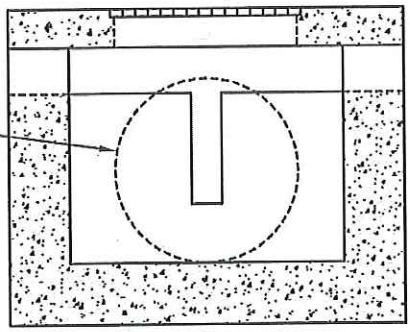
Continues on next page...

Lake #1

Stage / Storage / Discharge Table

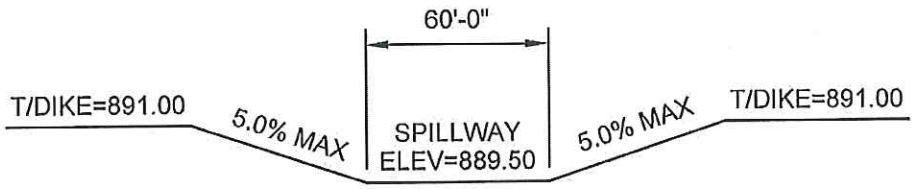
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.20	80,112	885.70	2.53 oc	---	---	---	1.97	0.00	---	---	---	---	1.971
1.30	88,600	885.80	2.53 oc	---	---	---	2.22	0.00	---	---	---	---	2.223
1.40	97,088	885.90	2.53 oc	---	---	---	2.48	0.00	---	---	---	---	2.484
1.50	105,577	886.00	2.82 oc	---	---	---	2.75 s	0.00	---	---	---	---	2.751
1.60	114,583	886.10	3.12 oc	---	---	---	3.02 s	0.00	---	---	---	---	3.019
1.70	123,590	886.20	3.32 oc	---	---	---	3.30 s	0.00	---	---	---	---	3.297
1.80	132,596	886.30	3.64 oc	---	---	---	3.57 s	0.00	---	---	---	---	3.574
1.90	141,603	886.40	3.86 oc	---	---	---	3.86 s	0.00	---	---	---	---	3.860
2.00	150,609	886.50	4.19 oc	---	---	---	4.15 s	0.00	---	---	---	---	4.153
2.10	159,616	886.60	4.53 oc	---	---	---	4.45 s	0.00	---	---	---	---	4.446
2.20	168,622	886.70	4.75 oc	---	---	---	4.75 s	0.00	---	---	---	---	4.753
2.30	177,629	886.80	5.09 oc	---	---	---	5.06 s	0.00	---	---	---	---	5.058
2.40	186,635	886.90	5.44 oc	---	---	---	5.37 s	0.00	---	---	---	---	5.366
2.50	195,642	887.00	5.78 oc	---	---	---	5.68 s	0.00	---	---	---	---	5.680

...End



LAKE #2 OUTLET STRUCTURE SIDE VIEW DETAIL

N.T.S.



LAKE #2 EMERGENCY SPILLWAY DETAIL

N.T.S.

Drawing:	07M056-006 CD
Scale	07M056.006
Drawn by:	GJK
Checked By:	
Issue Date:	04-04-12

VOICE OF AMERICA PARK ATHLETIC COMPLEX

SECTION 12, TOWN 3, RANGE 2,
WEST CHESTER TOWNSHIP,
BUTLER COUNTY, OHIO

LAKE #2 OUTLET DETAILS

bayer becker
6900 Tylersville Road, Suite A
Mason, OH 45040 - 513.336.6600

Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Monday, Apr 16, 2012

Pond No. 2 - Lake #2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 887.70 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	887.70	00	0	0
0.09	887.79	01	0	0
0.10	887.80	55,863	187	187
0.30	888.00	80,959	13,604	13,791
1.30	889.00	110,891	95,524	109,315
2.30	890.00	133,307	121,915	231,230

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	0.00	0.00	0.00
Span (in)	= 24.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 887.06	0.00	0.00	0.00
Length (ft)	= 178.00	0.00	0.00	0.00
Slope (%)	= 0.30	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.33	11.67	0.00	0.00
Crest El. (ft)	= 887.70	888.90	0.00	0.00
Weir Coeff.	= 3.00	3.00	3.33	3.33
Weir Type	= Rect	Rect	---	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under Inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	887.70	0.00	---	---	---	0.00	0.00	---	---	---	---	0.000
0.01	0	887.71	2.34 oc	---	---	---	0.00	0.00	---	---	---	---	0.001
0.02	0	887.72	2.34 oc	---	---	---	0.00	0.00	---	---	---	---	0.002
0.03	0	887.73	2.34 oc	---	---	---	0.00	0.00	---	---	---	---	0.004
0.04	0	887.74	2.34 oc	---	---	---	0.01	0.00	---	---	---	---	0.007
0.04	0	887.74	2.34 oc	---	---	---	0.01	0.00	---	---	---	---	0.009
0.05	0	887.75	2.34 oc	---	---	---	0.01	0.00	---	---	---	---	0.012
0.06	0	887.76	2.34 oc	---	---	---	0.02	0.00	---	---	---	---	0.016
0.07	0	887.77	2.34 oc	---	---	---	0.02	0.00	---	---	---	---	0.019
0.08	0	887.78	2.34 oc	---	---	---	0.02	0.00	---	---	---	---	0.023
0.09	0	887.79	2.34 oc	---	---	---	0.03	0.00	---	---	---	---	0.027
0.09	19	887.79	2.34 oc	---	---	---	0.03	0.00	---	---	---	---	0.027
0.09	37	887.79	2.34 oc	---	---	---	0.03	0.00	---	---	---	---	0.028
0.09	56	887.79	2.34 oc	---	---	---	0.03	0.00	---	---	---	---	0.028
0.09	75	887.79	2.34 oc	---	---	---	0.03	0.00	---	---	---	---	0.028
0.09	94	887.79	2.34 oc	---	---	---	0.03	0.00	---	---	---	---	0.029
0.10	112	887.80	2.34 oc	---	---	---	0.03	0.00	---	---	---	---	0.029
0.10	131	887.80	2.34 oc	---	---	---	0.03	0.00	---	---	---	---	0.030
0.10	150	887.80	2.34 oc	---	---	---	0.03	0.00	---	---	---	---	0.030
0.10	168	887.80	2.34 oc	---	---	---	0.03	0.00	---	---	---	---	0.031
0.10	187	887.80	2.34 oc	---	---	---	0.03	0.00	---	---	---	---	0.031
0.12	1,548	887.82	2.34 oc	---	---	---	0.04	0.00	---	---	---	---	0.041
0.14	2,908	887.84	2.34 oc	---	---	---	0.05	0.00	---	---	---	---	0.052
0.16	4,268	887.86	2.34 oc	---	---	---	0.06	0.00	---	---	---	---	0.063
0.18	5,629	887.88	2.34 oc	---	---	---	0.08	0.00	---	---	---	---	0.076
0.20	6,989	887.90	2.34 oc	---	---	---	0.09	0.00	---	---	---	---	0.089
0.22	8,350	887.92	2.34 oc	---	---	---	0.10	0.00	---	---	---	---	0.102
0.24	9,710	887.94	2.34 oc	---	---	---	0.12	0.00	---	---	---	---	0.116
0.26	11,071	887.96	2.34 oc	---	---	---	0.13	0.00	---	---	---	---	0.131
0.28	12,431	887.98	2.34 oc	---	---	---	0.15	0.00	---	---	---	---	0.147
0.30	13,791	888.00	2.34 oc	---	---	---	0.16	0.00	---	---	---	---	0.163
0.40	23,344	888.10	2.34 oc	---	---	---	0.25	0.00	---	---	---	---	0.250
0.50	32,896	888.20	2.34 oc	---	---	---	0.35	0.00	---	---	---	---	0.350
0.60	42,449	888.30	2.34 oc	---	---	---	0.46	0.00	---	---	---	---	0.460
0.70	52,001	888.40	2.34 oc	---	---	---	0.58	0.00	---	---	---	---	0.580
0.80	61,553	888.50	2.34 oc	---	---	---	0.71	0.00	---	---	---	---	0.708
0.90	71,106	888.60	2.34 oc	---	---	---	0.85	0.00	---	---	---	---	0.845

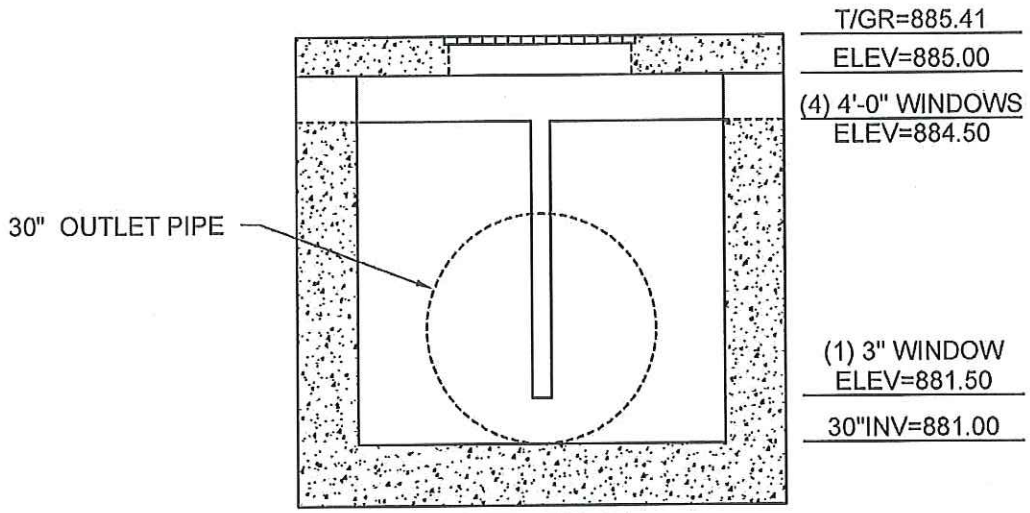
Continues on next page...

Lake #2

Stage / Storage / Discharge Table

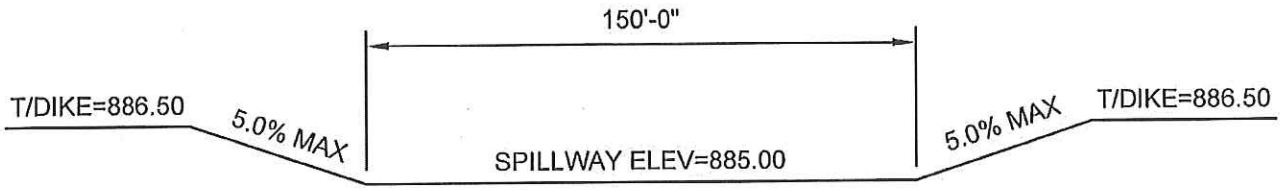
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.00	80,658	888.70	2.34 oc	---	---	---	0.99	0.00	---	---	---	---	0.990
1.10	90,211	888.80	2.34 oc	---	---	---	1.14	0.00	---	---	---	---	1.142
1.20	99,763	888.90	2.34 oc	---	---	---	1.30	0.00	---	---	---	---	1.301
1.30	109,315	889.00	2.63 oc	---	---	---	1.46 s	1.11	---	---	---	---	2.571
1.40	121,507	889.10	4.79 oc	---	---	---	1.56 s	3.13	---	---	---	---	4.690
1.50	133,698	889.20	7.33 oc	---	---	---	1.57 s	5.75	---	---	---	---	7.320
1.60	145,890	889.30	9.91 oc	---	---	---	1.26 s	8.65 s	---	---	---	---	9.910
1.70	158,081	889.40	10.79 oc	---	---	---	1.11 s	9.68 s	---	---	---	---	10.79
1.80	170,273	889.50	11.91 oc	---	---	---	1.06 s	10.85 s	---	---	---	---	11.91
1.90	182,464	889.60	12.83 oc	---	---	---	1.03 s	11.81 s	---	---	---	---	12.83
2.00	194,656	889.70	13.64 oc	---	---	---	1.00 s	12.63 s	---	---	---	---	13.63
2.10	206,847	889.80	14.36 oc	---	---	---	0.98 s	13.38 s	---	---	---	---	14.35
2.20	219,039	889.90	15.02 oc	---	---	---	0.96 s	14.05 s	---	---	---	---	15.01
2.30	231,230	890.00	15.63 oc	---	---	---	0.95 s	14.68 s	---	---	---	---	15.63

...End



LAKE #3 OUTLET STRUCTURE SIDE VIEW DETAIL

N.T.S.



LAKE #3 EMERGENCY SPILLWAY DETAIL

N.T.S.

Drawing:	07M056-006 CD
Scale	07M056.006
Drawn by:	GJK
Checked By:	
Issue Date:	04-04-12

VOICE OF AMERICA PARK ATHLETIC COMPLEX

SECTION 12, TOWN 3, RANGE 2,
WEST CHESTER TOWNSHIP,
BUTLER COUNTY, OHIO

LAKE #3 OUTLET DETAILS

bayer becker
6900 Tylersville Road, Suite A
Mason, OH 45040 - 513.336.6600

Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Monday, Apr 16, 2012

Pond No. 3 - Lake #3

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 881.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	881.50	00	0	0
0.24	881.74	01	0	0
0.25	881.75	143,125	479	479
0.50	882.00	146,679	36,221	36,700
1.50	883.00	156,045	151,323	188,023
2.50	884.00	165,367	160,667	348,690
3.50	885.00	174,740	170,015	518,705
4.50	886.00	196,672	185,579	704,284

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 30.00	0.00	0.00	0.00
Span (in)	= 30.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 881.00	0.00	0.00	0.00
Length (ft)	= 190.00	0.00	0.00	0.00
Slope (%)	= 0.30	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.25	11.75	0.00	0.00
Crest El. (ft)	= 881.50	884.50	0.00	0.00
Weir Coeff.	= 3.00	3.00	3.33	3.33
Weir Type	= Rect	Rect	---	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	881.50	0.00	---	---	---	0.00	0.00	---	---	---	---	0.000
0.02	0	881.52	1.76 ic	---	---	---	0.00	0.00	---	---	---	---	0.003
0.05	0	881.55	1.76 ic	---	---	---	0.01	0.00	---	---	---	---	0.008
0.07	0	881.57	1.76 ic	---	---	---	0.01	0.00	---	---	---	---	0.014
0.10	0	881.60	1.76 ic	---	---	---	0.02	0.00	---	---	---	---	0.022
0.12	0	881.62	1.76 ic	---	---	---	0.03	0.00	---	---	---	---	0.031
0.14	0	881.64	1.76 ic	---	---	---	0.04	0.00	---	---	---	---	0.041
0.17	0	881.67	1.76 ic	---	---	---	0.05	0.00	---	---	---	---	0.052
0.19	0	881.69	1.76 ic	---	---	---	0.06	0.00	---	---	---	---	0.063
0.22	0	881.72	1.76 ic	---	---	---	0.08	0.00	---	---	---	---	0.075
0.24	0	881.74	1.76 ic	---	---	---	0.09	0.00	---	---	---	---	0.088
0.24	48	881.74	1.76 ic	---	---	---	0.09	0.00	---	---	---	---	0.089
0.24	96	881.74	1.76 ic	---	---	---	0.09	0.00	---	---	---	---	0.089
0.24	144	881.74	1.76 ic	---	---	---	0.09	0.00	---	---	---	---	0.090
0.24	192	881.74	1.76 ic	---	---	---	0.09	0.00	---	---	---	---	0.090
0.24	239	881.74	1.76 ic	---	---	---	0.09	0.00	---	---	---	---	0.091
0.25	287	881.75	1.76 ic	---	---	---	0.09	0.00	---	---	---	---	0.091
0.25	335	881.75	1.76 ic	---	---	---	0.09	0.00	---	---	---	---	0.092
0.25	383	881.75	1.76 ic	---	---	---	0.09	0.00	---	---	---	---	0.093
0.25	431	881.75	1.76 ic	---	---	---	0.09	0.00	---	---	---	---	0.093
0.25	479	881.75	1.76 ic	---	---	---	0.09	0.00	---	---	---	---	0.094
0.28	4,101	881.78	1.76 ic	---	---	---	0.11	0.00	---	---	---	---	0.108
0.30	7,723	881.80	1.76 ic	---	---	---	0.12	0.00	---	---	---	---	0.123
0.32	11,345	881.83	1.76 ic	---	---	---	0.14	0.00	---	---	---	---	0.139
0.35	14,967	881.85	1.76 ic	---	---	---	0.16	0.00	---	---	---	---	0.155
0.38	18,589	881.88	1.76 ic	---	---	---	0.17	0.00	---	---	---	---	0.172
0.40	22,211	881.90	1.76 ic	---	---	---	0.19	0.00	---	---	---	---	0.190
0.43	25,834	881.93	1.76 ic	---	---	---	0.21	0.00	---	---	---	---	0.208
0.45	29,456	881.95	1.76 ic	---	---	---	0.23	0.00	---	---	---	---	0.227
0.48	33,078	881.98	1.76 ic	---	---	---	0.25	0.00	---	---	---	---	0.246
0.50	36,700	882.00	1.76 ic	---	---	---	0.27	0.00	---	---	---	---	0.265
0.60	51,832	882.10	1.76 ic	---	---	---	0.35	0.00	---	---	---	---	0.349
0.70	66,964	882.20	1.76 ic	---	---	---	0.44	0.00	---	---	---	---	0.439
0.80	82,097	882.30	1.76 ic	---	---	---	0.54	0.00	---	---	---	---	0.537
0.90	97,229	882.40	1.76 ic	---	---	---	0.64	0.00	---	---	---	---	0.640

Continues on next page...

Lake #3

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.00	112,361	882.50	1.76 ic	---	---	---	0.75	0.00	---	---	---	---	0.750
1.10	127,494	882.60	1.76 ic	---	---	---	0.87	0.00	---	---	---	---	0.865
1.20	142,626	882.70	1.76 ic	---	---	---	0.99	0.00	---	---	---	---	0.986
1.30	157,758	882.80	1.76 ic	---	---	---	1.11	0.00	---	---	---	---	1.111
1.40	172,890	882.90	1.76 ic	---	---	---	1.24	0.00	---	---	---	---	1.242
1.50	188,023	883.00	1.76 ic	---	---	---	1.38	0.00	---	---	---	---	1.378
1.60	204,089	883.10	1.76 ic	---	---	---	1.52	0.00	---	---	---	---	1.518
1.70	220,156	883.20	1.76 ic	---	---	---	1.66	0.00	---	---	---	---	1.662
1.80	236,223	883.30	1.86 ic	---	---	---	1.81 s	0.00	---	---	---	---	1.811
1.90	252,290	883.40	1.97 ic	---	---	---	1.96 s	0.00	---	---	---	---	1.962
2.00	268,356	883.50	2.12 ic	---	---	---	2.12 s	0.00	---	---	---	---	2.117
2.10	284,423	883.60	2.33 ic	---	---	---	2.28 s	0.00	---	---	---	---	2.276
2.20	300,490	883.70	2.46 ic	---	---	---	2.44 s	0.00	---	---	---	---	2.438
2.30	316,557	883.80	2.60 ic	---	---	---	2.60 s	0.00	---	---	---	---	2.604
2.40	332,623	883.90	2.87 ic	---	---	---	2.77 s	0.00	---	---	---	---	2.772
2.50	348,690	884.00	3.02 ic	---	---	---	2.95 s	0.00	---	---	---	---	2.945
2.60	365,691	884.10	3.17 ic	---	---	---	3.12 s	0.00	---	---	---	---	3.122
2.70	382,693	884.20	3.32 oc	---	---	---	3.30 s	0.00	---	---	---	---	3.301
2.80	399,694	884.30	3.61 oc	---	---	---	3.48 s	0.00	---	---	---	---	3.481
2.90	416,696	884.40	3.77 oc	---	---	---	3.67 s	0.00	---	---	---	---	3.667
3.00	433,697	884.50	3.92 oc	---	---	---	3.86 s	0.00	---	---	---	---	3.856
3.10	450,699	884.60	5.26 oc	---	---	---	4.01 s	1.11	---	---	---	---	5.127
3.20	467,700	884.70	7.29 oc	---	---	---	4.14 s	3.15	---	---	---	---	7.292
3.30	484,702	884.80	10.20 oc	---	---	---	4.23 s	5.79	---	---	---	---	10.01
3.40	501,703	884.90	13.21 oc	---	---	---	4.27 s	8.91	---	---	---	---	13.18
3.50	518,705	885.00	16.62 oc	---	---	---	4.16 s	12.46	---	---	---	---	16.62
3.60	537,263	885.10	20.28 oc	---	---	---	3.90 s	16.38	---	---	---	---	20.28
3.70	555,821	885.20	24.35 oc	---	---	---	3.71 s	20.65	---	---	---	---	24.35
3.80	574,379	885.30	28.19 oc	---	---	---	3.34 s	24.85 s	---	---	---	---	28.19
3.90	592,937	885.40	30.27 oc	---	---	---	3.14 s	27.13 s	---	---	---	---	30.27
4.00	611,495	885.50	31.84 oc	---	---	---	3.00 s	28.85 s	---	---	---	---	31.84
4.10	630,053	885.60	33.15 oc	---	---	---	2.87 s	30.28 s	---	---	---	---	33.15
4.20	648,611	885.70	34.28 oc	---	---	---	2.77 s	31.51 s	---	---	---	---	34.28
4.30	667,168	885.80	35.29 oc	---	---	---	2.67 s	32.61 s	---	---	---	---	35.29
4.40	685,726	885.90	36.20 oc	---	---	---	2.59 s	33.61 s	---	---	---	---	36.20
4.50	704,284	886.00	37.06 oc	---	---	---	2.52 s	34.53 s	---	---	---	---	37.05

...End

LAKE #4 OUTLET STRUCTURE DETAIL

N.T.S.

LAKE #4 EMERGENCY SPILLWAY DETAIL

N.T.S.

Drawing:	07M056-006 CD
Scale	07M056.006
Drawn by:	GJK
Checked By:	
Issue Date:	04-04-12

VOICE OF AMERICA PARK ATHLETIC COMPLEX

SECTION 12, TOWN 3, RANGE 2,
WEST CHESTER TOWNSHIP,
BUTLER COUNTY, OHIO

LAKE #4 OUTLET DETAILS

bayer becker
6900 Tylersville Road, Suite A
Mason, OH 45040 - 513.336.6600

Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2011 by Autodesk, Inc. v8 — Monday, Apr 16, 2012

Pond No. 4 - Lake #4

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 889.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	889.50	00	0	0
0.09	889.59	01	0	0
0.10	889.60	101,215	337	337
0.50	890.00	103,743	40,989	41,326
1.50	891.00	110,129	106,909	148,235
2.50	892.00	116,611	113,343	261,578
3.50	893.00	123,187	119,872	381,450
4.00	893.50	126,512	62,417	443,867

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.25	5.75	0.00	0.00
Crest El. (ft)	= 889.50	891.25	0.00	0.00
Weir Coeff.	= 3.00	3.00	3.33	3.33
Weir Type	= Rect	Rect	---	---
Multi-Stage	= No	No	No	No

Exfil.(In/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	889.50	---	---	---	---	0.00	0.00	---	---	---	---	0.000
0.01	0	889.51	---	---	---	---	0.00	0.00	---	---	---	---	0.001
0.02	0	889.52	---	---	---	---	0.00	0.00	---	---	---	---	0.002
0.03	0	889.53	---	---	---	---	0.00	0.00	---	---	---	---	0.003
0.04	0	889.54	---	---	---	---	0.01	0.00	---	---	---	---	0.005
0.05	0	889.55	---	---	---	---	0.01	0.00	---	---	---	---	0.007
0.05	0	889.55	---	---	---	---	0.01	0.00	---	---	---	---	0.009
0.06	0	889.56	---	---	---	---	0.01	0.00	---	---	---	---	0.012
0.07	0	889.57	---	---	---	---	0.01	0.00	---	---	---	---	0.015
0.08	0	889.58	---	---	---	---	0.02	0.00	---	---	---	---	0.017
0.09	0	889.59	---	---	---	---	0.02	0.00	---	---	---	---	0.020
0.09	34	889.59	---	---	---	---	0.02	0.00	---	---	---	---	0.021
0.09	67	889.59	---	---	---	---	0.02	0.00	---	---	---	---	0.021
0.09	101	889.59	---	---	---	---	0.02	0.00	---	---	---	---	0.021
0.09	135	889.59	---	---	---	---	0.02	0.00	---	---	---	---	0.022
0.10	168	889.59	---	---	---	---	0.02	0.00	---	---	---	---	0.022
0.10	202	889.60	---	---	---	---	0.02	0.00	---	---	---	---	0.022
0.10	236	889.60	---	---	---	---	0.02	0.00	---	---	---	---	0.023
0.10	269	889.60	---	---	---	---	0.02	0.00	---	---	---	---	0.023
0.10	303	889.60	---	---	---	---	0.02	0.00	---	---	---	---	0.023
0.10	337	889.60	---	---	---	---	0.02	0.00	---	---	---	---	0.024
0.14	4,436	889.64	---	---	---	---	0.04	0.00	---	---	---	---	0.039
0.18	8,535	889.68	---	---	---	---	0.06	0.00	---	---	---	---	0.057
0.22	12,633	889.72	---	---	---	---	0.08	0.00	---	---	---	---	0.077
0.26	16,732	889.76	---	---	---	---	0.10	0.00	---	---	---	---	0.099
0.30	20,831	889.80	---	---	---	---	0.12	0.00	---	---	---	---	0.123
0.34	24,930	889.84	---	---	---	---	0.15	0.00	---	---	---	---	0.149
0.38	29,029	889.88	---	---	---	---	0.18	0.00	---	---	---	---	0.176
0.42	33,128	889.92	---	---	---	---	0.20	0.00	---	---	---	---	0.204
0.46	37,227	889.96	---	---	---	---	0.23	0.00	---	---	---	---	0.234
0.50	41,326	890.00	---	---	---	---	0.27	0.00	---	---	---	---	0.265
0.60	52,017	890.10	---	---	---	---	0.35	0.00	---	---	---	---	0.349
0.70	62,708	890.20	---	---	---	---	0.44	0.00	---	---	---	---	0.439
0.80	73,398	890.30	---	---	---	---	0.54	0.00	---	---	---	---	0.537
0.90	84,089	890.40	---	---	---	---	0.64	0.00	---	---	---	---	0.640

Continues on next page...

Lake #4

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.00	94,780	890.50	---	---	---	---	0.75	0.00	---	---	---	---	0.750
1.10	105,471	890.60	---	---	---	---	0.87	0.00	---	---	---	---	0.865
1.20	116,162	890.70	---	---	---	---	0.99	0.00	---	---	---	---	0.986
1.30	126,853	890.80	---	---	---	---	1.11	0.00	---	---	---	---	1.111
1.40	137,544	890.90	---	---	---	---	1.24	0.00	---	---	---	---	1.242
1.50	148,235	891.00	---	---	---	---	1.38	0.00	---	---	---	---	1.378
1.60	159,569	891.10	---	---	---	---	1.52	0.00	---	---	---	---	1.518
1.70	170,904	891.20	---	---	---	---	1.66	0.00	---	---	---	---	1.662
1.80	182,238	891.30	---	---	---	---	1.81	0.19	---	---	---	---	2.004
1.90	193,572	891.40	---	---	---	---	1.96	1.00	---	---	---	---	2.965
2.00	204,907	891.50	---	---	---	---	2.12	2.15	---	---	---	---	4.276
2.10	216,241	891.60	---	---	---	---	2.28	3.57	---	---	---	---	5.852
2.20	227,575	891.70	---	---	---	---	2.45	5.20	---	---	---	---	7.651
2.30	238,910	891.80	---	---	---	---	2.62	7.03	---	---	---	---	9.648
2.40	250,244	891.90	---	---	---	---	2.79	9.04	---	---	---	---	11.82
2.50	261,578	892.00	---	---	---	---	2.96	11.20	---	---	---	---	14.17
2.60	273,566	892.10	---	---	---	---	3.14	13.52	---	---	---	---	16.66
2.70	285,553	892.20	---	---	---	---	3.33	15.97	---	---	---	---	19.30
2.80	297,540	892.30	---	---	---	---	3.51	18.56	---	---	---	---	22.07
2.90	309,527	892.40	---	---	---	---	3.70	21.27	---	---	---	---	24.97
3.00	321,514	892.50	---	---	---	---	3.90	24.10	---	---	---	---	28.00
3.10	333,501	892.60	---	---	---	---	4.09	27.05	---	---	---	---	31.15
3.20	345,489	892.70	---	---	---	---	4.29	30.11	---	---	---	---	34.41
3.30	357,476	892.80	---	---	---	---	4.50	33.28	---	---	---	---	37.78
3.40	369,463	892.90	---	---	---	---	4.70	36.55	---	---	---	---	41.25
3.50	381,450	893.00	---	---	---	---	4.91	39.93	---	---	---	---	44.85
3.55	387,692	893.05	---	---	---	---	5.02	41.66	---	---	---	---	46.67
3.60	393,934	893.10	---	---	---	---	5.12	43.40	---	---	---	---	48.53
3.65	400,175	893.15	---	---	---	---	5.23	45.18	---	---	---	---	50.41
3.70	406,417	893.20	---	---	---	---	5.34	46.97	---	---	---	---	52.31
3.75	412,659	893.25	---	---	---	---	5.45	48.79	---	---	---	---	54.23
3.80	418,900	893.30	---	---	---	---	5.56	50.63	---	---	---	---	56.18
3.85	425,142	893.35	---	---	---	---	5.67	52.49	---	---	---	---	58.16
3.90	431,384	893.40	---	---	---	---	5.78	54.38	---	---	---	---	60.15
3.95	437,625	893.45	---	---	---	---	5.89	56.28	---	---	---	---	62.17
4.00	443,867	893.50	---	---	---	---	6.00	58.22	---	---	---	---	64.22

...End

LAKE #5 OUTLET STRUCTURE DETAIL

N.T.S.

LAKE #5 EMERGENCY SPILLWAY DETAIL

N.T.S.

Drawing:	07M056-006 CD
Scale	07M056.006
Drawn by:	GJK
Checked By:	
Issue Date:	04-04-12

VOICE OF AMERICA PARK ATHLETIC COMPLEX

SECTION 12, TOWN 3, RANGE 2,
WEST CHESTER TOWNSHIP,
BUTLER COUNTY, OHIO

LAKE #5 OUTLET DETAILS

bayer becker
6900 Tylersville Road, Suite A
Mason, OH 45040 - 513.336.6600

Pond Report

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

Monday, Apr 16, 2012

Pond No. 5 - Lake #5

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 887.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	887.50	00	0	0
0.07	887.57	01	0	0
0.08	887.58	322,667	1,078	1,078
0.50	888.00	326,812	136,370	137,449
1.50	889.00	338,236	332,474	469,923
2.50	890.00	351,020	344,574	814,497
3.50	891.00	356,916	353,929	1,168,426
4.50	892.00	367,142	361,980	1,530,406

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.25	9.67	0.00	0.00
Crest El. (ft)	= 887.50	889.40	0.00	0.00
Weir Coeff.	= 3.00	3.00	3.33	3.33
Weir Type	= Rect	Rect	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	887.50	---	---	---	---	0.00	0.00	---	---	---	---	0.000
0.01	0	887.51	---	---	---	---	0.00	0.00	---	---	---	---	0.000
0.01	0	887.51	---	---	---	---	0.00	0.00	---	---	---	---	0.001
0.02	0	887.52	---	---	---	---	0.00	0.00	---	---	---	---	0.002
0.03	0	887.53	---	---	---	---	0.00	0.00	---	---	---	---	0.004
0.04	0	887.54	---	---	---	---	0.00	0.00	---	---	---	---	0.005
0.04	0	887.54	---	---	---	---	0.01	0.00	---	---	---	---	0.006
0.05	0	887.55	---	---	---	---	0.01	0.00	---	---	---	---	0.008
0.06	0	887.56	---	---	---	---	0.01	0.00	---	---	---	---	0.010
0.06	0	887.56	---	---	---	---	0.01	0.00	---	---	---	---	0.012
0.07	0	887.57	---	---	---	---	0.01	0.00	---	---	---	---	0.014
0.07	108	887.57	---	---	---	---	0.01	0.00	---	---	---	---	0.014
0.07	216	887.57	---	---	---	---	0.01	0.00	---	---	---	---	0.014
0.07	324	887.57	---	---	---	---	0.01	0.00	---	---	---	---	0.015
0.07	431	887.57	---	---	---	---	0.02	0.00	---	---	---	---	0.015
0.08	539	887.57	---	---	---	---	0.02	0.00	---	---	---	---	0.015
0.08	647	887.58	---	---	---	---	0.02	0.00	---	---	---	---	0.016
0.08	755	887.58	---	---	---	---	0.02	0.00	---	---	---	---	0.016
0.08	863	887.58	---	---	---	---	0.02	0.00	---	---	---	---	0.016
0.08	971	887.58	---	---	---	---	0.02	0.00	---	---	---	---	0.017
0.08	1,078	887.58	---	---	---	---	0.02	0.00	---	---	---	---	0.017
0.12	14,715	887.62	---	---	---	---	0.03	0.00	---	---	---	---	0.032
0.16	28,353	887.66	---	---	---	---	0.05	0.00	---	---	---	---	0.050
0.21	41,990	887.71	---	---	---	---	0.07	0.00	---	---	---	---	0.070
0.25	55,627	887.75	---	---	---	---	0.09	0.00	---	---	---	---	0.093
0.29	69,264	887.79	---	---	---	---	0.12	0.00	---	---	---	---	0.117
0.33	82,901	887.83	---	---	---	---	0.14	0.00	---	---	---	---	0.143
0.37	96,538	887.87	---	---	---	---	0.17	0.00	---	---	---	---	0.172
0.42	110,175	887.92	---	---	---	---	0.20	0.00	---	---	---	---	0.201
0.46	123,812	887.96	---	---	---	---	0.23	0.00	---	---	---	---	0.232
0.50	137,449	888.00	---	---	---	---	0.27	0.00	---	---	---	---	0.265
0.60	170,696	888.10	---	---	---	---	0.35	0.00	---	---	---	---	0.349
0.70	203,944	888.20	---	---	---	---	0.44	0.00	---	---	---	---	0.439
0.80	237,191	888.30	---	---	---	---	0.54	0.00	---	---	---	---	0.537
0.90	270,439	888.40	---	---	---	---	0.64	0.00	---	---	---	---	0.640

Continues on next page...

Lake #5

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.00	303,686	888.50	---	---	---	---	0.75	0.00	---	---	---	---	0.750
1.10	336,934	888.60	---	---	---	---	0.87	0.00	---	---	---	---	0.865
1.20	370,181	888.70	---	---	---	---	0.99	0.00	---	---	---	---	0.986
1.30	403,428	888.80	---	---	---	---	1.11	0.00	---	---	---	---	1.111
1.40	436,676	888.90	---	---	---	---	1.24	0.00	---	---	---	---	1.242
1.50	469,923	889.00	---	---	---	---	1.38	0.00	---	---	---	---	1.378
1.60	504,381	889.10	---	---	---	---	1.52	0.00	---	---	---	---	1.518
1.70	538,838	889.20	---	---	---	---	1.66	0.00	---	---	---	---	1.662
1.80	573,295	889.30	---	---	---	---	1.81	0.00	---	---	---	---	1.811
1.90	607,753	889.40	---	---	---	---	1.96	0.00	---	---	---	---	1.964
2.00	642,210	889.50	---	---	---	---	2.12	0.92	---	---	---	---	3.036
2.10	676,668	889.60	---	---	---	---	2.28	2.59	---	---	---	---	4.874
2.20	711,125	889.70	---	---	---	---	2.45	4.76	---	---	---	---	7.209
2.30	745,582	889.80	---	---	---	---	2.62	7.33	---	---	---	---	9.949
2.40	780,040	889.90	---	---	---	---	2.79	10.25	---	---	---	---	13.04
2.50	814,497	890.00	---	---	---	---	2.96	13.48	---	---	---	---	16.45
2.60	849,890	890.10	---	---	---	---	3.14	16.99	---	---	---	---	20.13
2.70	885,283	890.20	---	---	---	---	3.33	20.76	---	---	---	---	24.08
2.80	920,676	890.30	---	---	---	---	3.51	24.77	---	---	---	---	28.28
2.90	956,069	890.40	---	---	---	---	3.70	29.00	---	---	---	---	32.71
3.00	991,462	890.50	---	---	---	---	3.90	33.46	---	---	---	---	37.36
3.10	1,026,854	890.60	---	---	---	---	4.09	38.13	---	---	---	---	42.22
3.20	1,062,247	890.70	---	---	---	---	4.29	42.99	---	---	---	---	47.28
3.30	1,097,640	890.80	---	---	---	---	4.50	48.04	---	---	---	---	52.54
3.40	1,133,033	890.90	---	---	---	---	4.70	53.28	---	---	---	---	57.98
3.50	1,168,426	891.00	---	---	---	---	4.91	58.71	---	---	---	---	63.62
3.60	1,204,624	891.10	---	---	---	---	5.12	64.30	---	---	---	---	69.42
3.70	1,240,822	891.20	---	---	---	---	5.34	70.05	---	---	---	---	75.39
3.80	1,277,020	891.30	---	---	---	---	5.56	75.97	---	---	---	---	81.53
3.90	1,313,218	891.40	---	---	---	---	5.78	82.05	---	---	---	---	87.82
4.00	1,349,416	891.50	---	---	---	---	6.00	88.27	---	---	---	---	94.27
4.10	1,385,614	891.60	---	---	---	---	6.23	94.65	---	---	---	---	100.88
4.20	1,421,813	891.70	---	---	---	---	6.46	101.18	---	---	---	---	107.63
4.30	1,458,011	891.80	---	---	---	---	6.69	107.85	---	---	---	---	114.53
4.40	1,494,209	891.90	---	---	---	---	6.92	114.66	---	---	---	---	121.58
4.50	1,530,406	892.00	---	---	---	---	7.16	121.62	---	---	---	---	128.78

...End

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Water Quality Volume

Project:	Voice of America Park	Designed By:	GJK	Date:	4/16/12
Job No.:	07M056.006	Checked By:		Date:	
Basin ID:	WQ Basin (Lake #1)	Revised By:		Date:	

Required Water Quality Volume

$WQ_v = P\ C\ A/12$

Site Drainage Area (A) = 24.30 acres (To Basin)

Rainfall Depth (P) = 0.75 in.

Runoff Coefficient (C) = 0.2

WQ_v = 0.304 acre-ft.

Sediment Storage Allowance = -25 %

Sediment Storage Allowance = -0.08 Ac-ft

Total WQ_v = 0.228 Ac-ft

= 9,924 cu.ft.

Water Quality Release Rate

Q_{wqv} = Total WQ_v/RT

Required Retention Time (RT) = 24 hours

Provided Retention Time (PT) = 44.21 hours

Q_{wqv} = 0.115 cfs

Water Quality Outlet Orifice

Contour Areas

	Elevation ft	Area ft^2	Volume ft^3	Cum. Vol. ft^3	Elevation at V	Storage at Elev
Basin Inv. =	884.50	79,803	0.00	0.00		
Contour 1 =	885.00	88,336	42034.75	42034.75	884.62	9923.51
Contour 2 =	886.00	87,471	87903.50	129938.25		
Contour 3 =	887.00	92,703	90087.00	220025.25		

$Q = C\ L\ H^{3/2}$

C_d = 3.00

L = 6.00 In

H = 1.44 In

Q = 0.062 cfs

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Water Quality Volume

Project:	Voice of America Park	Designed By:	GJK	Date:	4/16/12
Job No.:	07M056.006	Checked By:		Date:	
Basin ID:	WQ Basin (Lake #2)	Revised By:		Date:	

Required Water Quality Volume

$WQ_v = P\ C\ A/12$

Site Drainage Area (A) = 16.70 acres (To Basin)

Rainfall Depth (P) = 0.75 in.

Runoff Coefficient (C) = 0.2

WQ_v = 0.209 acre-ft.

Sediment Storage Allowance = -25 %

Sediment Storage Allowance = -0.05 Ac-ft

Total WQ_v = 0.157 Ac-ft

= 6,820 cu.ft.

Water Quality Release Rate

Q_{wqv} = Total WQ_v/RT

Required Retention Time (RT) = 24 hours

Provided Retention Time (PT) = 79.88 hours

Q_{wqv} = 0.079 cfs

Water Quality Outlet Orifice

Contour Areas

	Elevation ft	Area ft^2	Volume ft^3	Cum. Vol. ft^3	Elevation at V	Storage at Elev
Basin Inv. =	887.70	54,989	0.00	0.00		
Contour 1 =	888.00	80,959	20392.20	20392.20	887.80	6819.86
Contour 2 =	889.00	110,891	95925.00	116317.20		

$Q = C\ L\ H^{3/2}$

C_d = 3.00

L = 3.00 In

H = 1.20 In

Q = 0.024 cfs

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Water Quality Volume

Project:	Voice of America Park	Designed By:	GJK	Date:	4/4/12
Job No.:	07M056.006	Checked By:		Date:	
Basin ID:	WQ Basin (Lake #3)	Revised By:		Date:	

Required Water Quality Volume

$WQ_v = P\ C\ A/12$

Site Drainage Area (A) = 63.60 acres (To Basin)

Rainfall Depth (P) = 0.75 in.

Runoff Coefficient (C) = 0.2

WQ_v = 0.795 acre-ft.

Sediment Storage Allowance = -25 %

Sediment Storage Allowance = -0.20 Ac-ft

Total WQ_v = 0.596 Ac-ft

= 25,973 cu.ft.

Water Quality Release Rate

Q_{wqv} = Total WQ_v/RT

Required Retention Time (RT) = 24 hours

Provided Retention Time (PT) = 92.35 hours

Q_{wqv} = 0.301 cfs

Water Quality Outlet Orifice

Contour Areas

	Elevation ft	Area ft^2	Volume ft^3	Cum. Vol. ft^3	Elevation at V	Storage at Elev
Basin Inv. =	881.50	141,031	0.00	0.00		
Contour 1 =	882.00	146,679	71927.50	71927.50	881.68	25972.65
Contour 2 =	883.00	156,045	151362.00	223289.50		
Contour 3 =	884.00	165,367	160706.00	383995.50		
Contour 4 =	885.00	174,740	170053.50	554049.00		
Contour 5 =	886.00	196,672	185706.00	739755.00		

$Q = C\ L\ H^{3/2}$

C_d = 3.00

L = 2.50 In

H = 3.00 In

Q = 0.078 cfs

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Water Quality Volume

Project: Voice of America Park
Job No.: 07M056.006
Basin ID: WQ Basin (Lake #4)

Designed By: GJK Date: 4/16/12
Checked By: Date:
Revised By: Date:

Required Water Quality Volume

$WQ_v = P\ C\ A/12$

Site Drainage Area (A) = 22.00 acres (To Basin)

Rainfall Depth (P) = 0.75 in.

Runoff Coefficient (C) = 0.2

WQ_v = 0.275 acre-ft.

Sediment Storage Allowance = -25 %
Sediment Storage Allowance = -0.07 Ac-ft

Total WQ_v = 0.206 Ac-ft
= 8,984 cu.ft.

Water Quality Release Rate

Q_{wqv} = Total WQ_v/RT

Required Retention Time (RT) = 24 hours

Provided Retention Time (PT) = 138.32 hours

Q_{wqv} = 0.104 cfs

Water Quality Outlet Orifice

Contour Areas

	Elevation ft	Area ft^2	Volume ft^3	Cum. Vol. ft^3	Elevation at V	Storage at Elev
Basin Inv. =	889.50	100,586	0.00	0.00		
Contour 1 =	890.00	103,743	51082.25	51082.25	889.59	8984.25
Contour 2 =	891.00	110,129	106936.00	158018.25		
Contour 3 =	892.00	116,611	113370.00	271388.25		
Contour 4 =	893.00	123,187	119899.00	391287.25		

$Q = C\ L\ H^{3/2}$

C_d = 3.00
L = 3.00 In
H = 1.00 In
Q = 0.018 cfs

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Water Quality Volume

Project:	Voice of America Park	Designed By:	GJK	Date:	4/16/12
Job No.:	07M056.006	Checked By:		Date:	
Basin ID:	WQ Basin (Lake #5)	Revised By:		Date:	

Required Water Quality Volume

$WQ_v = P\ C\ A/12$

Site Drainage Area (A) = 67.30 acres (To Basin)

Rainfall Depth (P) = 0.75 in.

Runoff Coefficient (C) = 0.2

WQ_v = 0.841 acre-ft.

Sediment Storage Allowance = -25 %

Sediment Storage Allowance = -0.21 Ac-ft

Total WQ_v = 0.631 Ac-ft

= 27,484 cu.ft.

Water Quality Release Rate

Q_{wqv} = Total WQ_v/RT

Required Retention Time (RT) 24 hours

Provided Retention Time (PT) 317.35 hours

Q_{wqv} = 0.318 cfs

Water Quality Outlet Orifice

Contour Areas

	Elevation ft	Area ft^2	Volume ft^3	Cum. Vol. ft^3	Elevation at V	Storage at Elev
Basin Inv. =	887.50	321,879	0.00	0.00		
Contour 1 =	888.00	326,812	162172.75	162172.75	887.58	27483.64
Contour 2 =	889.00	338,236	332524.00	494696.75		
Contour 3 =	890.00	351,020	344628.00	839324.75		
Contour 4 =	891.00	356,916	353968.00	1193292.75		

$Q = C\ L\ H^{3/2}$

C_d = 3.00

L = 4.00 In

H = 1.00 In

Q = 0.024 cfs