

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph description
1	Rational	15.61	1	15	14,051	-----	-----	-----	North Basin (2)
2	Reservoir	6.661	1	24	14,047	1	1287.51	8,632	North Detention
Sapulpa North Basin.gpw					Return Period: 5 Year			Tuesday, Jul 21, 2009	

Hydrograph Report

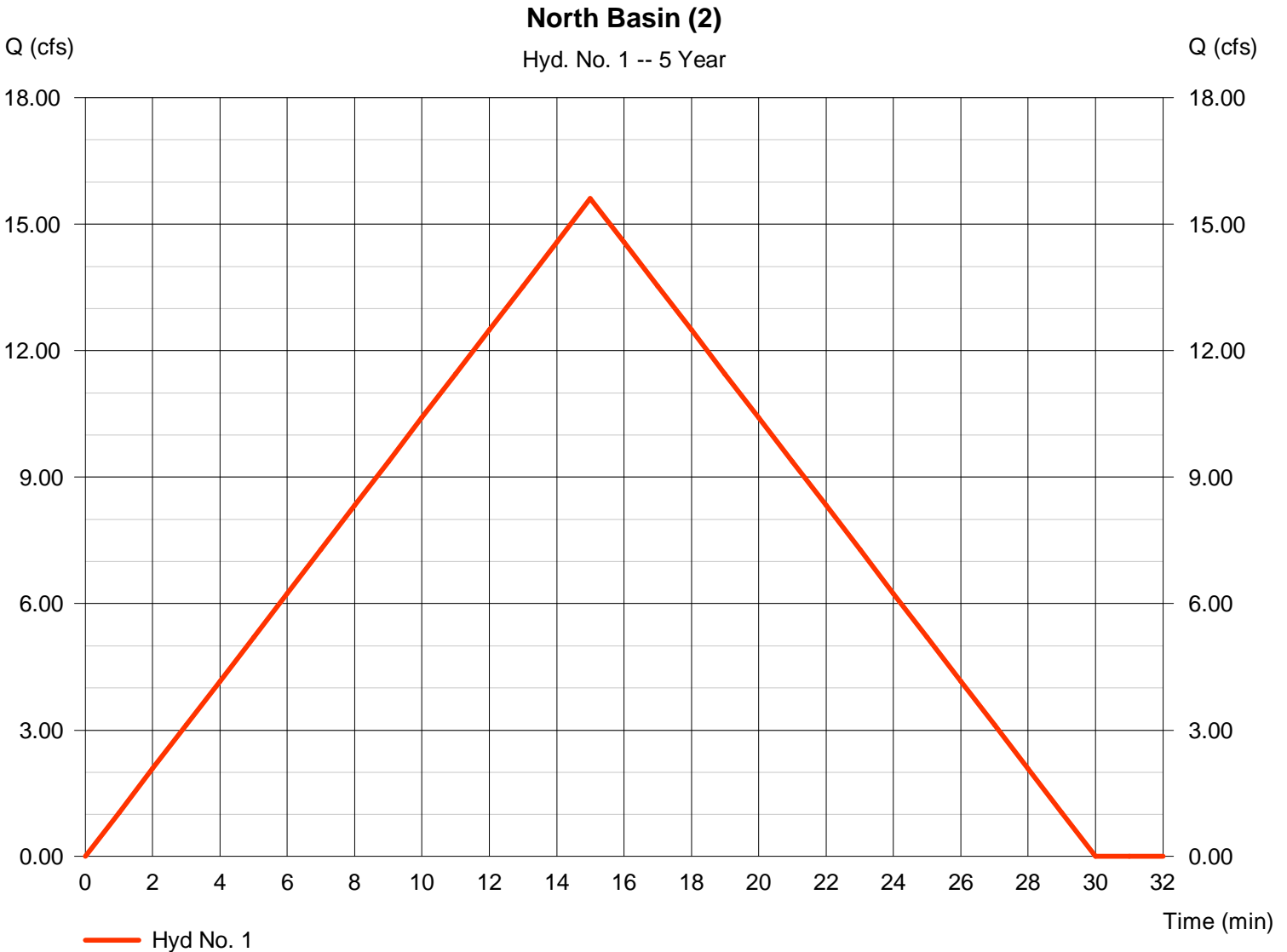
Hyd. No. 1

North Basin (2)

Hydrograph type = Rational
Storm frequency = 5 yrs
Time interval = 1 min
Drainage area = 5.280 ac
Intensity = 4.549 in/hr
IDF Curve = wichita.IDF

Peak discharge = 15.61 cfs
Time to peak = 15 min
Hyd. volume = 14,051 cuft
Runoff coeff. = 0.65*
Tc by TR55 = 15.60 min
Asc/Rec limb fact = 1/1

* Composite (Area/C) = + (4.580 x 0.69) + (0.700 x 0.40) / 5.280



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

Hyd. No. 1

North Basin (2)

<u>Description</u>	<u>A</u>		<u>B</u>		<u>C</u>		<u>Totals</u>	
Sheet Flow								
Manning's n-value	= 0.035		0.011		0.011			
Flow length (ft)	= 100.0		0.0		0.0			
Two-year 24-hr precip. (in)	= 3.50		0.00		0.00			
Land slope (%)	= 0.26		0.00		0.00			
Travel Time (min)	= 6.61	+	0.00	+	0.00	=	6.61	
Shallow Concentrated Flow								
Flow length (ft)	= 600.00		0.00		0.00			
Watercourse slope (%)	= 0.30		0.00		0.00			
Surface description	= Paved		Paved		Paved			
Average velocity (ft/s)	= 1.11		0.00		0.00			
Travel Time (min)	= 8.98	+	0.00	+	0.00	=	8.98	
Channel Flow								
X sectional flow area (sqft)	= 0.00		0.00		0.00			
Wetted perimeter (ft)	= 0.00		0.00		0.00			
Channel slope (%)	= 0.00		0.00		0.00			
Manning's n-value	= 0.015		0.015		0.015			
Velocity (ft/s)	= 0.00		0.00		0.00			
Flow length (ft)	= 0.0		0.0		0.0			
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00	
Total Travel Time, Tc							=	15.60 min

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

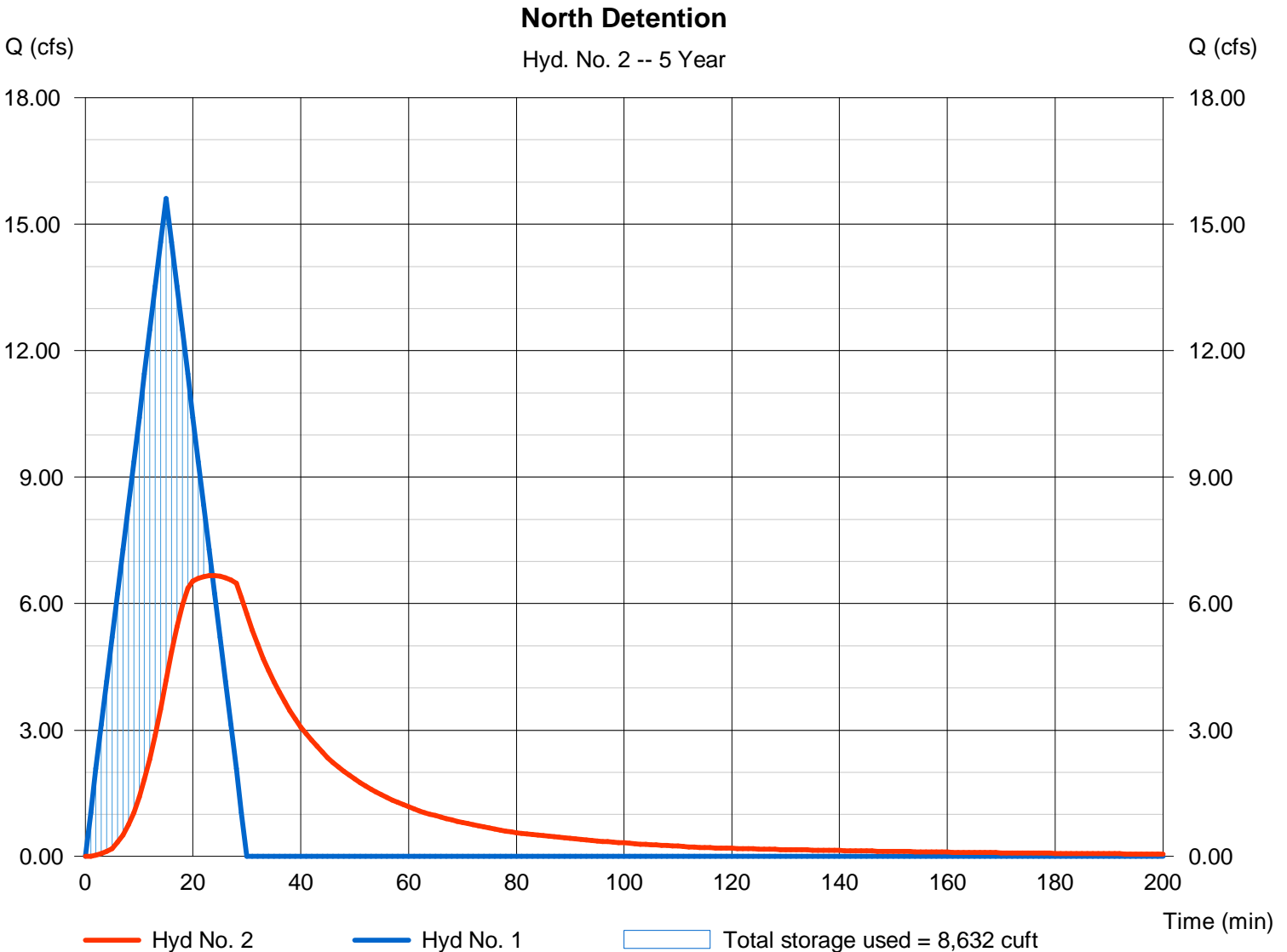
Tuesday, Jul 21, 2009

Hyd. No. 2

North Detention

Hydrograph type	= Reservoir	Peak discharge	= 6.661 cfs
Storm frequency	= 5 yrs	Time to peak	= 24 min
Time interval	= 1 min	Hyd. volume	= 14,047 cuft
Inflow hyd. No.	= 1 - North Basin (2)	Max. Elevation	= 1287.51 ft
Reservoir name	= North Detention Area	Max. Storage	= 8,632 cuft

Storage Indication method used.



Pond No. 1 - North Detention Area

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 1286.75 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	1286.75	10,000	0	0
0.75	1287.50	11,500	8,055	8,055
1.25	1288.00	89,100	22,099	30,155
2.25	1289.00	199,000	140,405	170,560

Culvert / Orifice Structures

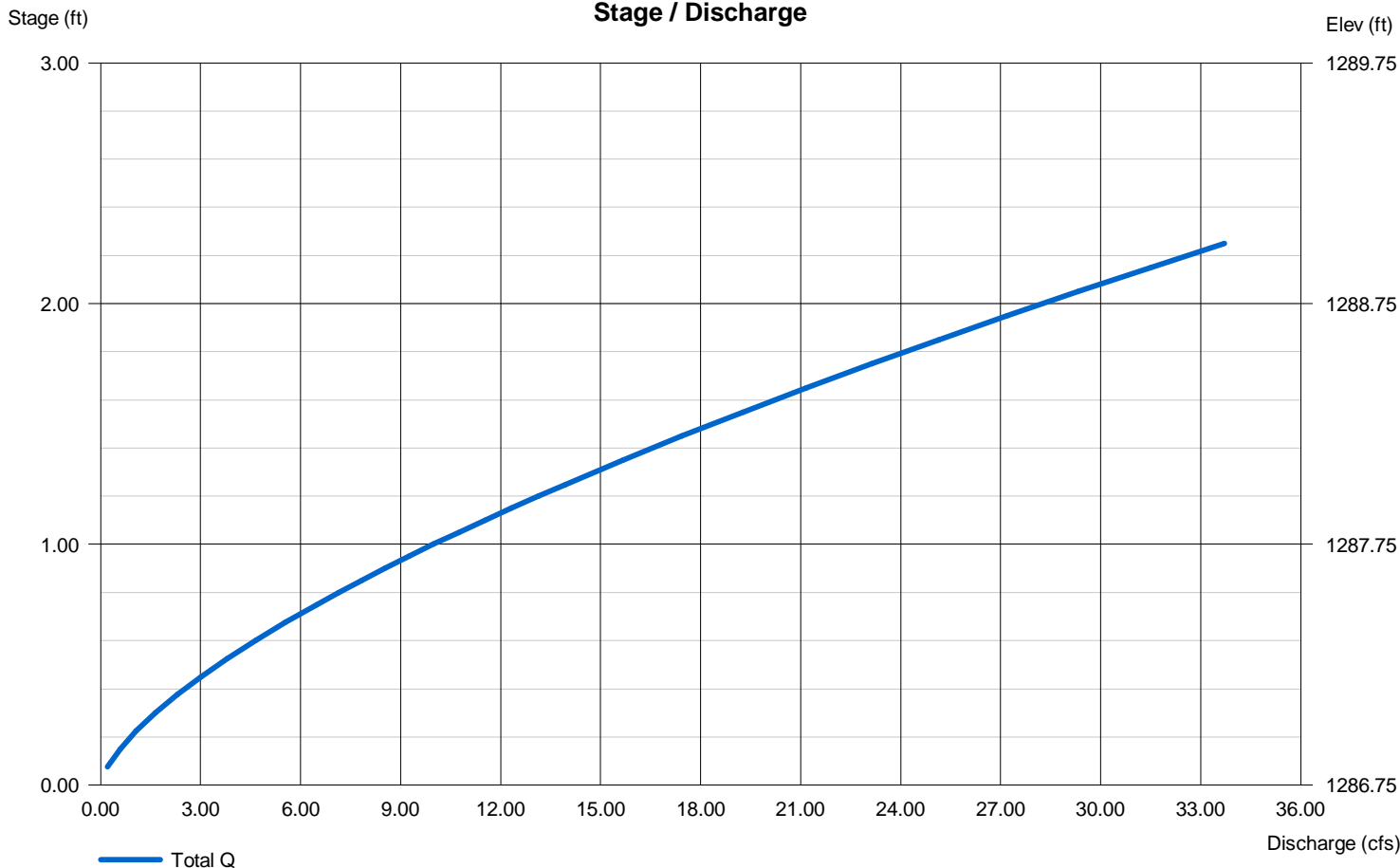
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	Inactive	Inactive	Inactive	Inactive
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage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

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 3.00	Inactive	Inactive	Inactive
Crest El. (ft)	= 1286.75	1287.50	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	Rect	---	---
Multi-Stage	= No	No	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 / Discharge



Hydraflow Rainfall Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc. v6.066

Tuesday, Jul 21, 2009

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	-----
2	76.3137	14.3000	0.8844	-----
3	0.0000	0.0000	0.0000	-----
5	52.6224	11.2000	0.7497	-----
10	55.1841	11.1000	0.7229	-----
25	60.7012	11.1000	0.7068	-----
50	66.9222	11.3000	0.7004	-----
100	62.2794	10.1000	0.6624	-----

File name: wichita.IDF

$$\text{Intensity} = B / (T_c + D)^E$$

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5.57	4.54	3.85	3.35	2.97	2.67	2.43	2.23	2.06	1.92	1.80	1.69
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.52	5.33	4.55	3.99	3.57	3.24	2.97	2.75	2.57	2.41	2.27	2.15
10	7.40	6.09	5.22	4.60	4.13	3.76	3.46	3.21	3.00	2.82	2.67	2.53
25	8.51	7.03	6.05	5.35	4.81	4.39	4.05	3.76	3.52	3.32	3.14	2.98
50	9.47	7.86	6.78	6.00	5.41	4.94	4.56	4.24	3.98	3.75	3.55	3.37
100	10.31	8.53	7.37	6.53	5.90	5.40	5.00	4.66	4.37	4.13	3.92	3.73

Tc = time in minutes. Values may exceed 60.

Precip. file name: wich_24hr.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	3.50	0.00	4.50	5.30	6.10	6.80	7.90
SCS 6-Hr	0.00	1.80	0.00	0.00	2.60	0.00	0.00	4.00
Huff-1st	0.00	1.55	0.00	2.75	4.00	5.38	6.50	8.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	1.75	0.00	2.80	3.90	5.25	6.00	7.10