

Starbucks

Lot 3

Franklin Gateway Development

Section II

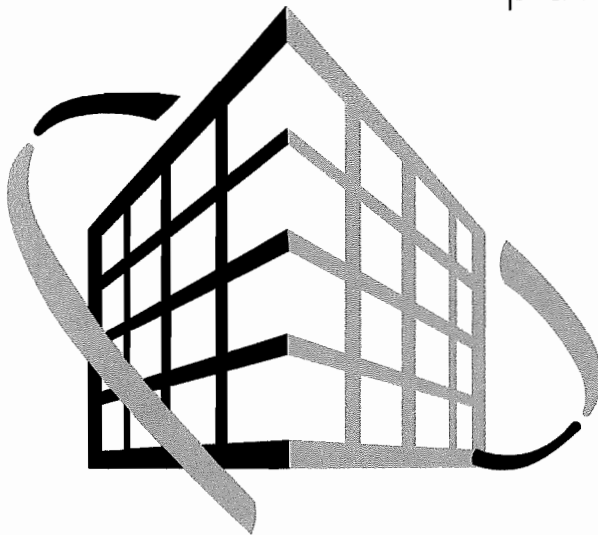
Franklin, Indiana

Drainage Report

Prepared:

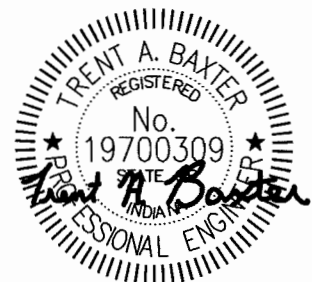
January 21, 2019

Prepared by:



**VERSATILE
CONSTRUCTION
GROUP, LLC.**

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CERTIFIED BY:

**Drainage Report
Starbucks
Lot 3
Franklin Gateway Development
Section II
Franklin, Indiana
Johnson County**

Introduction

The proposed site is located on the north side of State Road 44 and is Lot 3 of the Franklin Gateway Development Section II (previously Lot 5 in drainage report). The site contains 0.912 acres. The proposed project includes construction of a 2,255 s.f. building, and approximately 24,965 s.f. of concrete sidewalk, drives, pads, and asphalt paving. The north and south private drives along with the associated drainage was designed by others. This report will analyze the proposed peak flows from the proposed site, provide analysis for the proposed storm water conveyance system, and design the required stormwater detention and water quality for the proposed Starbucks. The report will follow the guidelines established in the City of Franklin, Indiana Subdivision Control Ordinance Section 6.19, and Franklin Gateway Development Secondary Plat Drainage Report Section II, prepared by Independent Land Surveying and dated November 20, 2018. Hereafter this report will be referred to as the Master Plan.

A Summary of peak flows calculated in this report are included in Appendix A.

Existing Site

The existing site was a retail store. All buildings have been or will be removed. There is some remaining asphalt/concrete paving which will also be removed. The existing site peak flows were analyzed in the Master Plan.

The soil located on site are predominately Crosby silt loam, Brookston silty loam, and Miami silt loam. Soils are classified as Group B. A Soils Map and description are included in Appendix B of this report.

Existing Peak Flows

Peak flows for the existing site were calculated in the Master Plan. The allowable release rates from the Master Plan are as follows:

10-year developed rate = 0.47 c.f.s.

100-year developed rate = 0.98 c.f.s.

Proposed Site

The proposed site contains seven (7) drainage basins. Proposed Basin 1 through proposed Basin 4 drain into the proposed stormwater conveyance system, into the proposed underground detention system, and discharges into Structure 803 (Str. 803 designed by others). Proposed Basin 5 drains to directly to Str. 803. Proposed Basin 6 includes the north private drive (by others) and a sheet drained grass area, both of which directly drain to Structure 804 (Str. 804 designed by others). Proposed Basin 7 is sheet drained grass area which will drain to the east to the undeveloped property. Proposed Basin 8 includes the south private drive (by others), part of the entrance drive, and a sheet drained grass area, all of which directly drain to Structure 801 (Str. 801 designed by others). A copy of the Proposed Basin Map and with area descriptions are included in Appendix C of this report.

Proposed Peak Flows and Stormwater Detention

Using the 2018 Hydraflow Hydrograph Program, the proposed peak flows and detention requirements were calculated using the SCS method with Huff distributions. The runoff was analyzed for the 2, 10, and 100 year return storm events and for the 1, 2, 3, 6, 12, and 24 hour storm duration. The “time of concentration” for each basin was assumed at 5 minutes. The runoff “CN” factors used in the calculations are as follows:

98 For all roof, asphalt, and concrete areas.

74 For all grass areas

The allowable release rates from the Master Plan are as follows:

10-year developed rate = 0.47 c.f.s.

100-year developed rate = 0.98 c.f.s.

The 1 hour storm duration provided the highest peak flows.

The 2 hour storm duration provided the highest 100-year storage volume

The 3 hour storm duration provided the highest 2-year and 10-year storage volume

The proposed peak flows discharging from each basin are included in the Summary of this report (Appendix A).

The program results are included in Appendix D of this report.

Rainfall data and Stormtech SC-310 chamber stage vs. storage is provided in Appendix G of this report.

Detention Control

Stormwater detention will be provided by 100 Stormtech SC-310 chambers. Stormwater detention control will be provided by a 4'x 6' concrete manhole. The concrete manhole will contain a weir wall. A 2-inch diameter hole will be provided at the bottom of the weir wall (739.67) and a 6-inch diameter hole at elevation 740.90 (2-year elevation) to serve as outlet control. An emergency overflow weir will be provided in the weir wall at the 100-year storage volume elevation (741.87) to pass 1.25 times the peak flow from 100-year storm (4.2825 c.f.s.). 742.32 elevation is the maximum height needed over the weir.

Results of the routing through the detention pond are provided in Appendix D of this report.

Water Quality

Water quality will be provided by:

1. Isolator rows (woven geotextile fabric) installed at the inlet to each underground chamber.
2. One (1) foot of stone placed below the underground chambers drained by a 4" perforated underdrain wrapped in a geotextile sock.
3. A 2-inch diameter outlet (minimum size allowed) to retain the peak runoff from a 1.25 inch, 24-hour rainfall event.

Water Quality Calculations are provided in Appendix E of this report.

Storm Sewer Sizing

Using the 2018 Hydraflow Storm Sewer Program, the proposed storm sewers were sized to accommodate the peak run-off from a 10-yr. storm event without the hydraulic grade line exceeding the any inlet casting. The Outfall Pipe was sized to handle 1.25 times the peak 100 yr. storm (4.2825 c.f.s.) without the upstream hydraulic grade line exceeding the weir wall elevation (741.87).

Storm Sewer Sizing Calculations are provided in Appendix F of this report.

Conclusion

Required release rates:

10-year developed rate = 0.47 c.f.s.

100-year developed rate = 0.98 c.f.s.

Actual release rates:

10-year developed rate = 0.252 c.f.s.

100-year developed rate = 0.955 c.f.s.

With the reduction of peak runoff from the entire site from the existing and allowed, the proposed project will not adversely affect the surrounding properties or any existing storm sewer system.

Appendix A

Summary Table Of Calculations

Summary Table

Allowable Peak Flows from Detention		
	10 Year Storm	100 Year storm
	(c.f.s.)	(c.f.s.)
Basin 1-4 after Detention	0.47	0.98

Proposed Peak Flows (1-Hour Storm)

	2 Year Storm	10 Year storm	100 Year storm
	(c.f.s.)	(c.f.s.)	(c.f.s.)
Basin 1	0.137	0.277	0.621
Basin2	0.080	0.153	0.323
Basin 3	0.396	0.672	1.228
Basin 4	0.368	0.679	1.341
Total before Detention	0.928	1.719	3.426
Total after Detention	0.108 (740.81)	0.227 (741.26)	0.935 (741.84)
Basin 5	0.003	0.012	0.038
Basin 6	0.053	0.120	0.280
Basin 7	0.015	0.052	0.163
Basin 8	0.251	0.463	0.914

Max storage elevation in parenthesis

Proposed Peak Flows (2-Hour Storm)

	2 Year Storm	10 Year storm	100 Year storm
	(c.f.s.)	(c.f.s.)	(c.f.s.)
Basin 1	0.106	0.215	0.525
Basin2	0.064	0.128	0.264
Basin 3	0.320	0.526	0.930
Basin 4	0.307	0.558	1.085
Total before Detention	0.774	1.412	2.762
Total after Detention	0.113 (740.90)	0.247 (741.33)	0.955 (741.87)
Basin 5	0.0030	0.0110	0.0310
Basin 6	0.0450	0.0900	0.2300
Basin 7	0.0160	0.0470	0.1290
Basin 8	0.2090	0.3810	0.7390

Max storage elevation in parenthesis

Summary Table

Proposed Peak Flows (3-Hour Storm)

	2 Year Storm	10 Year storm	100 Year storm
	(c.f.s.)	(c.f.s.)	(c.f.s.)
Basin 1	0.085	0.190	0.437
Basin2	0.056	0.107	0.217
Basin 3	0.262	0.416	0.712
Basin 4	0.258	0.462	0.874
Total before Detention	0.649	1.168	2.239
Total after Detention	0.113 (740.90)	0.252 (741.35)	0.906 (741.79)
Basin 5	0.003	0.009	0.025
Basin 6	0.037	0.077	0.195
Basin 7	0.015	0.041	0.103
Basin 8	0.176	0.315	0.596

Proposed Peak Flows (6-Hour Storm)

	2 Year Storm	10 Year storm	100 Year storm
	(c.f.s.)	(c.f.s.)	(c.f.s.)
Basin 1	0.067	0.141	0.299
Basin2	0.041	0.074	0.139
Basin 3	0.165	0.255	0.426
Basin 4	0.179	0.303	0.544
Total before Detention	0.453	0.772	1.408
Total after Detention	0.111 (740.87)	0.0.235 (741.29)	0.726 (741.61)
Basin 5	0.0030	0.0070	0.0190
Basin 6	0.0250	0.0600	0.1400
Basin 7	0.0130	0.0290	0.0800
Basin 8	0.1220	0.2070	0.3710

Max storage elevation in parenthesis

Proposed Peak Flows (12-Hour Storm)

	2 Year Storm	10 Year storm	100 Year storm
	(c.f.s.)	(c.f.s.)	(c.f.s.)
Basin 1	0.048	0.082	0.150
Basin2	0.023	0.037	0.064
Basin 3	0.074	0.109	0.178
Basin 4	0.092	0.143	0.239
Total before Detention	0.237	0.371	0.631
Total after Detention	0.110 (740.85)	0.224 (741.25)	0.591 (741.52)
Basin 5	0.003	0.007	0.014
Basin 6	0.023	0.039	0.075
Basin 7	0.013	0.028	0.059
Basin 8	0.063	0.097	0.163

Max storage elevation in parenthesis

Summary Table

Proposed Peak Flows (24-Hour Storm)			
	2 Year Storm	10 Year storm	100 Year storm
	(c.f.s.)	(c.f.s.)	(c.f.s)
Basin 1	0.036	0.058	0.099
Basin2	0.016	0.025	0.041
Basin 3	0.047	0.069	0.112
Basin 4	0.062	0.092	0.152
Total before Detention	0.161	0.244	0.404
Total after Detention	0.102 (740.70)	0.164 (741.09)	0.403 (741.44)
Basin 5	0.003	0.005	0.011
Basin 6	0.018	0.029	0.051
Basin 7	0.012	0.023	0.045
Basin 8	0.042	0.063	0.104

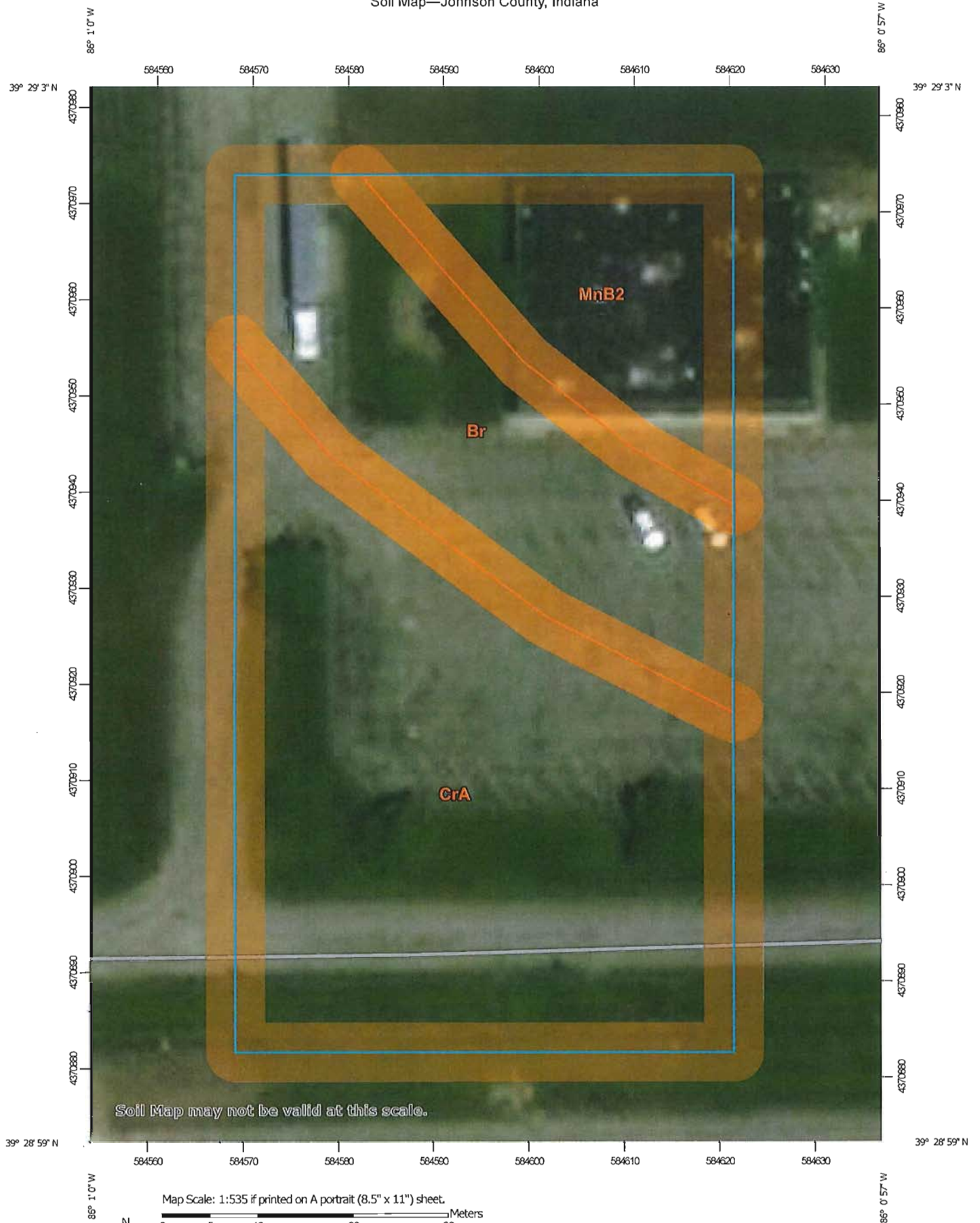
Max storage elevation in parenthesis

Max Chart Values are in **BOLD**

Appendix B


Soils Map and Description

Soil Map—Johnson County, Indiana





MAP LEGEND


Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Johnson County, Indiana

Survey Area Data: Version 26, Sep 7, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 24, 2014—Mar 20, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Br	Brookston silty clay loam, 0 to 2 percent slopes	0.3	27.6%
CrA	Crosby silt loam, fine-loamy subsoil, 0 to 2 percent slopes	0.7	56.2%
MnB2	Miami silt loam, 2 to 6 percent slopes, eroded	0.2	16.2%
Totals for Area of Interest		1.2	100.0%

Appendix C

Proposed Basin Map And Area Description

Basin 6

Basin 7

Basin 4

Basin 1

PROPOSED
STARBUCKS
2,255 Sq.Ft.
Fin. Fl. 745.50

Basin 3

Basin 2

Basin 5

Basin 8

E. KING ST. (S.R. 44)

Proposed Drainage Basin Map

Proposed Basin Areas

Basin Number	Onsite (s.f.)			Total Acres			Total Basin Acreage
	Roof	Pvmt/Con	Grass	Roof	Pvmt/Con	Grass	
Basin 1	2255	1721	2692	0.052	0.040	0.062	0.153
Basin 2	0	1927	626	0.000	0.044	0.014	0.059
Basin 3	0	6406	407	0.000	0.147	0.009	0.156
Basin 4	0	7857	1746	0.000	0.180	0.040	0.220
Total to storage	2255	17911	5471	0.052	0.411	0.126	0.589
Basin 5	0	0	864	0.000	0.000	0.020	0.020
Basin 6	0	1470	1856	0.000	0.034	0.043	0.076
Basin7	0	73	3289	0.000	0.002	0.076	0.077
Basin 8	0	5511	1039	0.000	0.127	0.024	0.150
Total Site							0.912

Basin 1 drains to Str. c

Basin 2 drains to Str. d

Basin 3 drains to Str. b

Basin 4 drains to Str. a

Basin 5 drains to Str. 803 (design by others)

Basin 6 drains to Str. 804 (design by others)

Basin 7 drains off site to east undeveloped property (design by others)

Basin 8 drains to Str. 801 (design by others)

Appendix D

Proposed Peak Flows Calculations

Hydraflow Table of Contents

1 hr storm.gpw

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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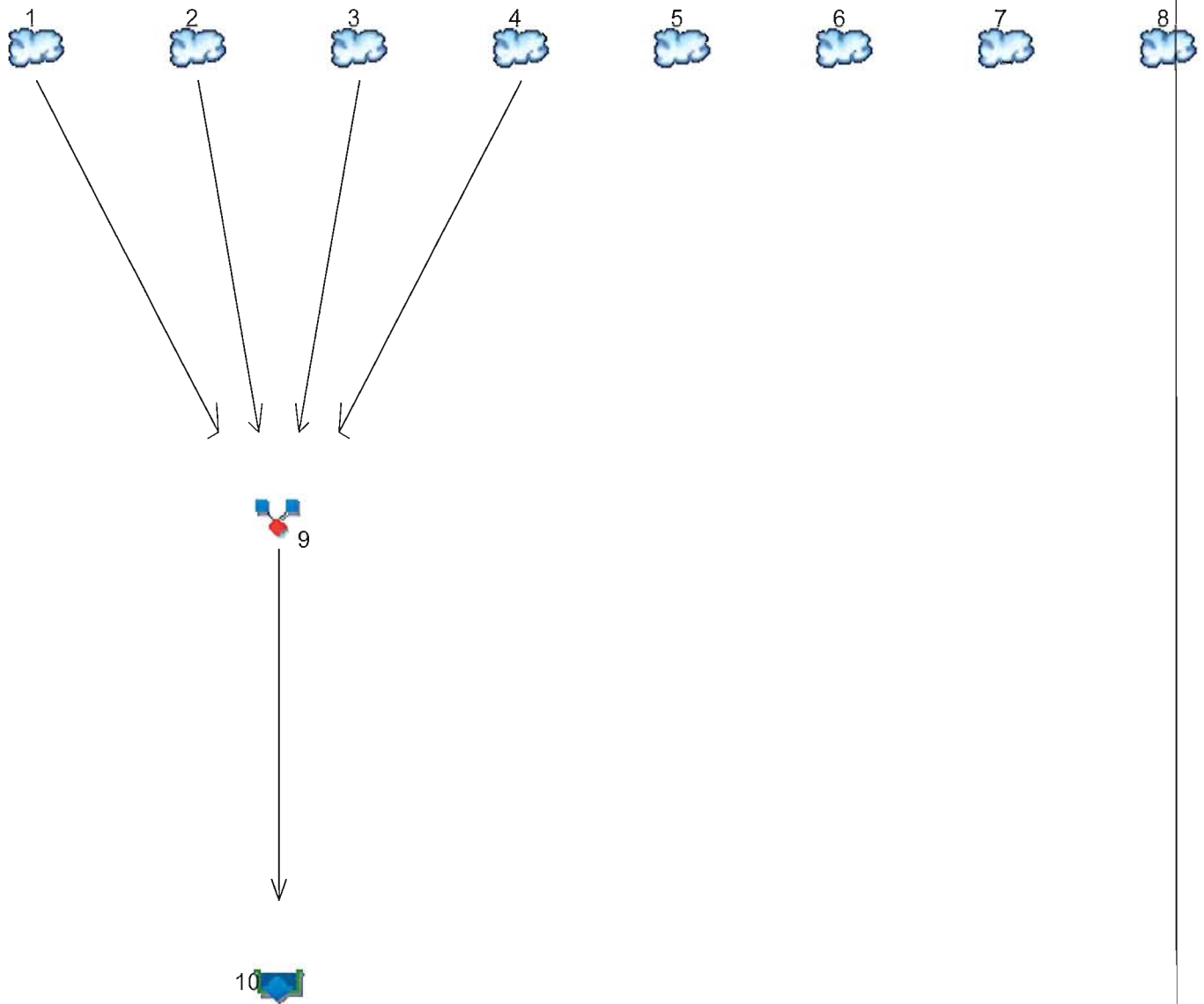
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Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020



Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	-----	-----	0.137	-----	-----	0.277	-----	-----	0.621	Basin 1
2	SCS Runoff	-----	-----	0.080	-----	-----	0.153	-----	-----	0.323	Basin 2
3	SCS Runoff	-----	-----	0.396	-----	-----	0.672	-----	-----	1.228	Basin 3
4	SCS Runoff	-----	-----	0.368	-----	-----	0.679	-----	-----	1.341	Basin 4
5	SCS Runoff	-----	-----	0.003	-----	-----	0.012	-----	-----	0.038	Basin 5
6	SCS Runoff	-----	-----	0.053	-----	-----	0.120	-----	-----	0.280	Basin 6
7	SCS Runoff	-----	-----	0.015	-----	-----	0.052	-----	-----	0.163	Basin 7
8	SCS Runoff	-----	-----	0.251	-----	-----	0.463	-----	-----	0.914	Basin 8
9	Combine	1, 2, 3,	-----	0.928	-----	-----	1.719	-----	-----	3.426	Total to storage
10	Reservoir	4, 9	-----	0.108	-----	-----	0.227	-----	-----	0.935	Pond routing
Proj. file: 1 hr storm.gpw										Thursday, 01 / 24 / 2019	

Hydrograph Summary Report

Hydratflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	0.137	2	16	250	-----	-----	-----	Basin 1
2	SCS Runoff	0.080	2	14	141	-----	-----	-----	Basin 2
3	SCS Runoff	0.396	2	10	576	-----	-----	-----	Basin 3
4	SCS Runoff	0.368	2	12	614	-----	-----	-----	Basin 4
5	SCS Runoff	0.003	2	28	7	-----	-----	-----	Basin 5
6	SCS Runoff	0.053	2	18	101	-----	-----	-----	Basin 6
7	SCS Runoff	0.015	2	28	33	-----	-----	-----	Basin 7
8	SCS Runoff	0.251	2	12	419	-----	-----	-----	Basin 8
9	Combine	0.928	2	12	1,581	1, 2, 3, 4,	-----	-----	Total to storage
10	Reservoir	0.108	2	64	1,558	9	740.81	1,259	Pond routing
1 hr storm.gpw					Return Period: 2 Year			Thursday, 01 / 24 / 2019	

Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

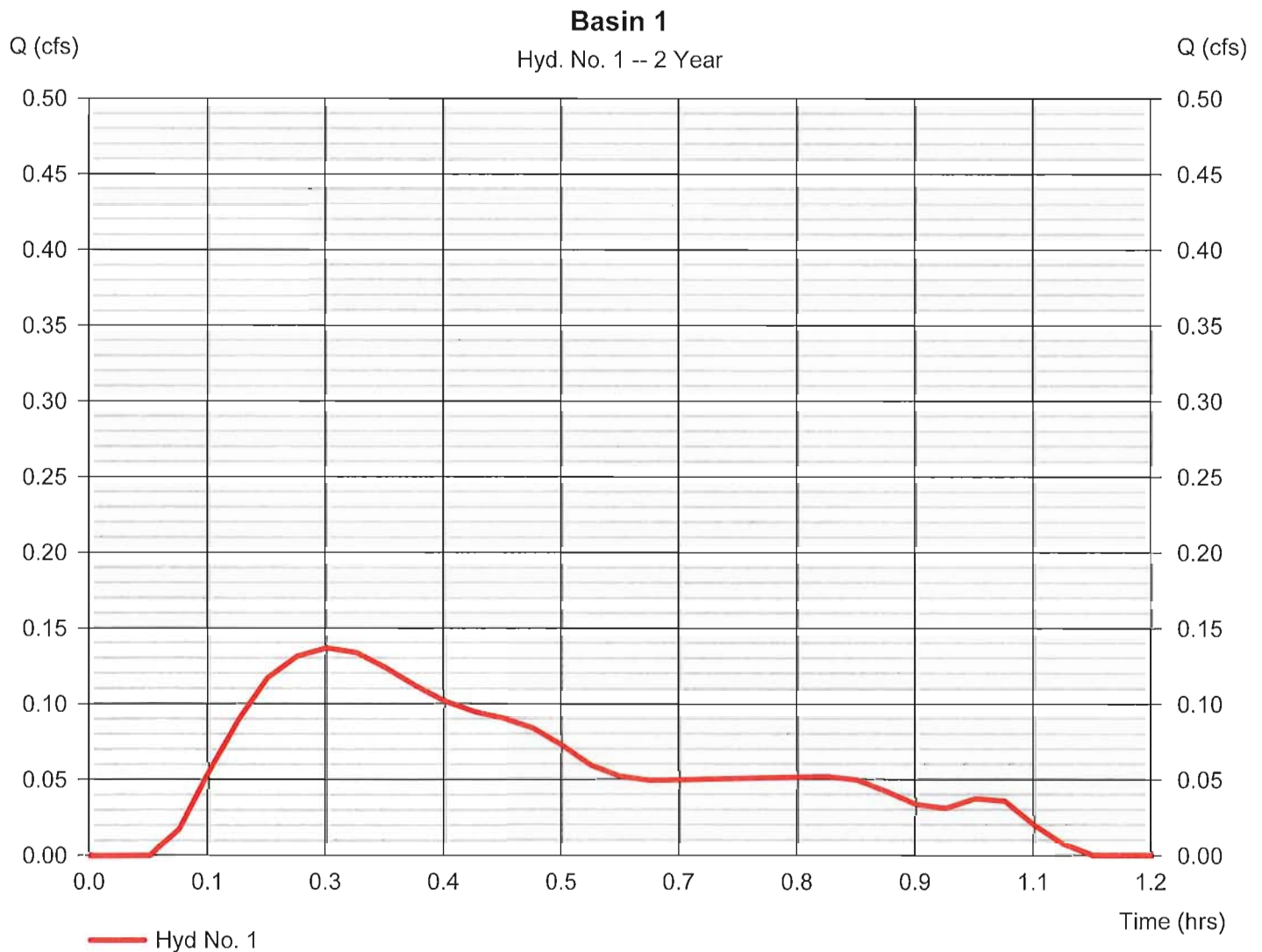
Thursday, 01 / 24 / 2019

Hyd. No. 1

Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.137 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.27 hrs
Time interval	= 2 min	Hyd. volume	= 250 cuft
Drainage area	= 0.150 ac	Curve number	= 88*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.37 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.092 \times 98) + (0.062 \times 74)] / 0.150$



Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

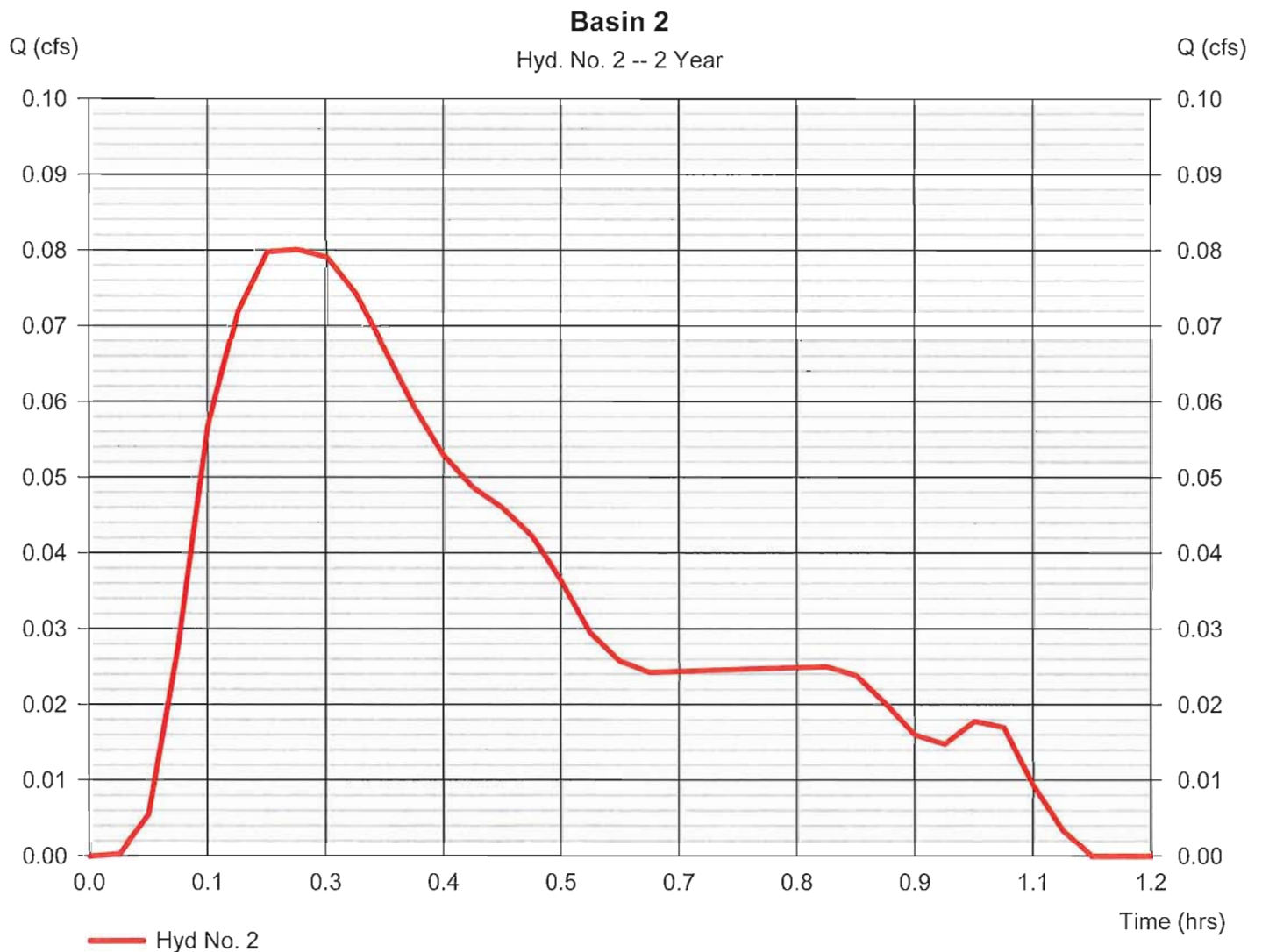
Thursday, 01 / 24 / 2019

Hyd. No. 2

Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.080 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.23 hrs
Time interval	= 2 min	Hyd. volume	= 141 cuft
Drainage area	= 0.060 ac	Curve number	= 92*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.37 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.044 \times 98) + (0.014 \times 74)] / 0.060$



Hydrograph Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

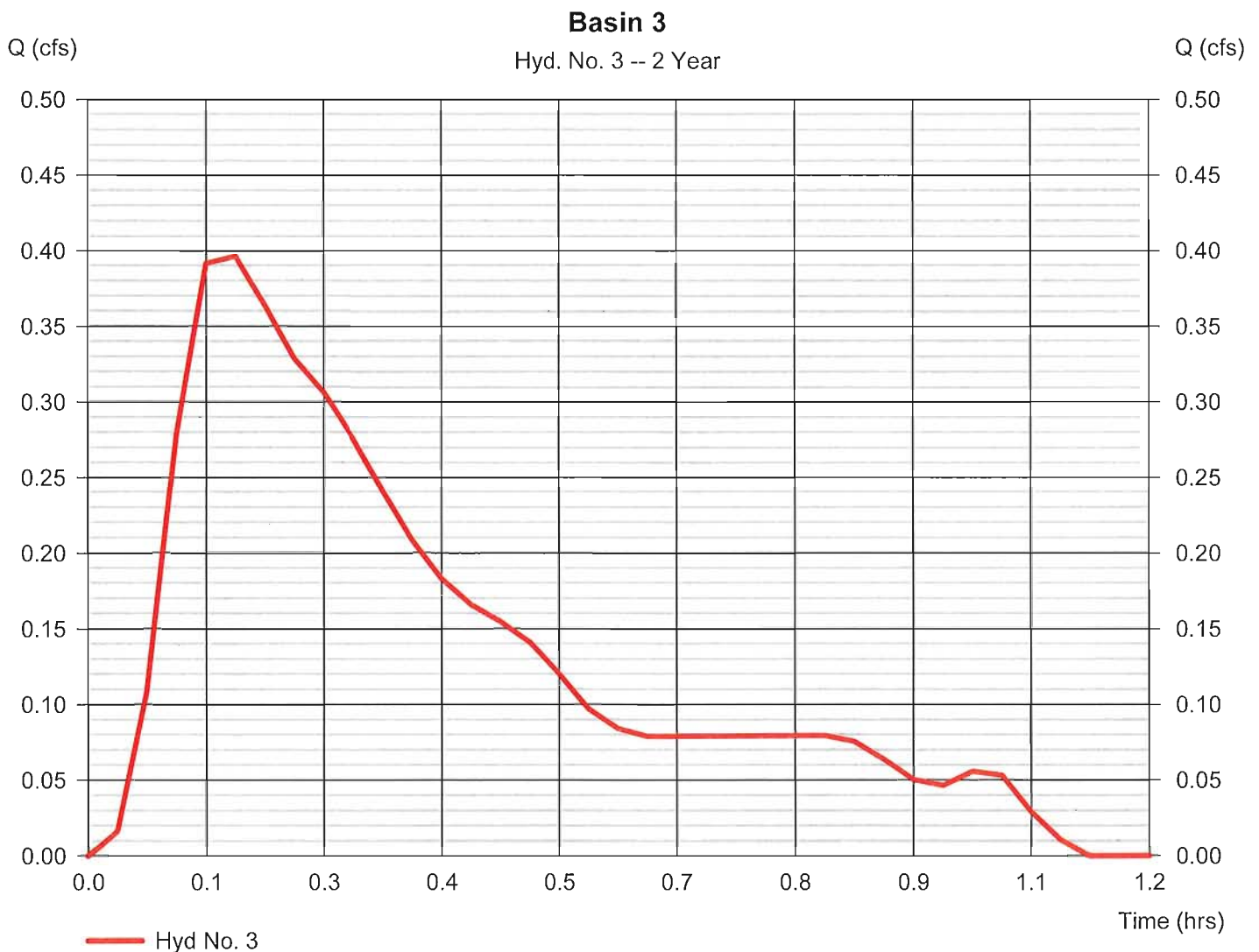
Thursday, 01 / 24 / 2019

Hyd. No. 3

Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 0.396 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.17 hrs
Time interval	= 2 min	Hyd. volume	= 576 cuft
Drainage area	= 0.160 ac	Curve number	= 97*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.37 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.147 \times 98) + (0.009 \times 74)] / 0.160$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

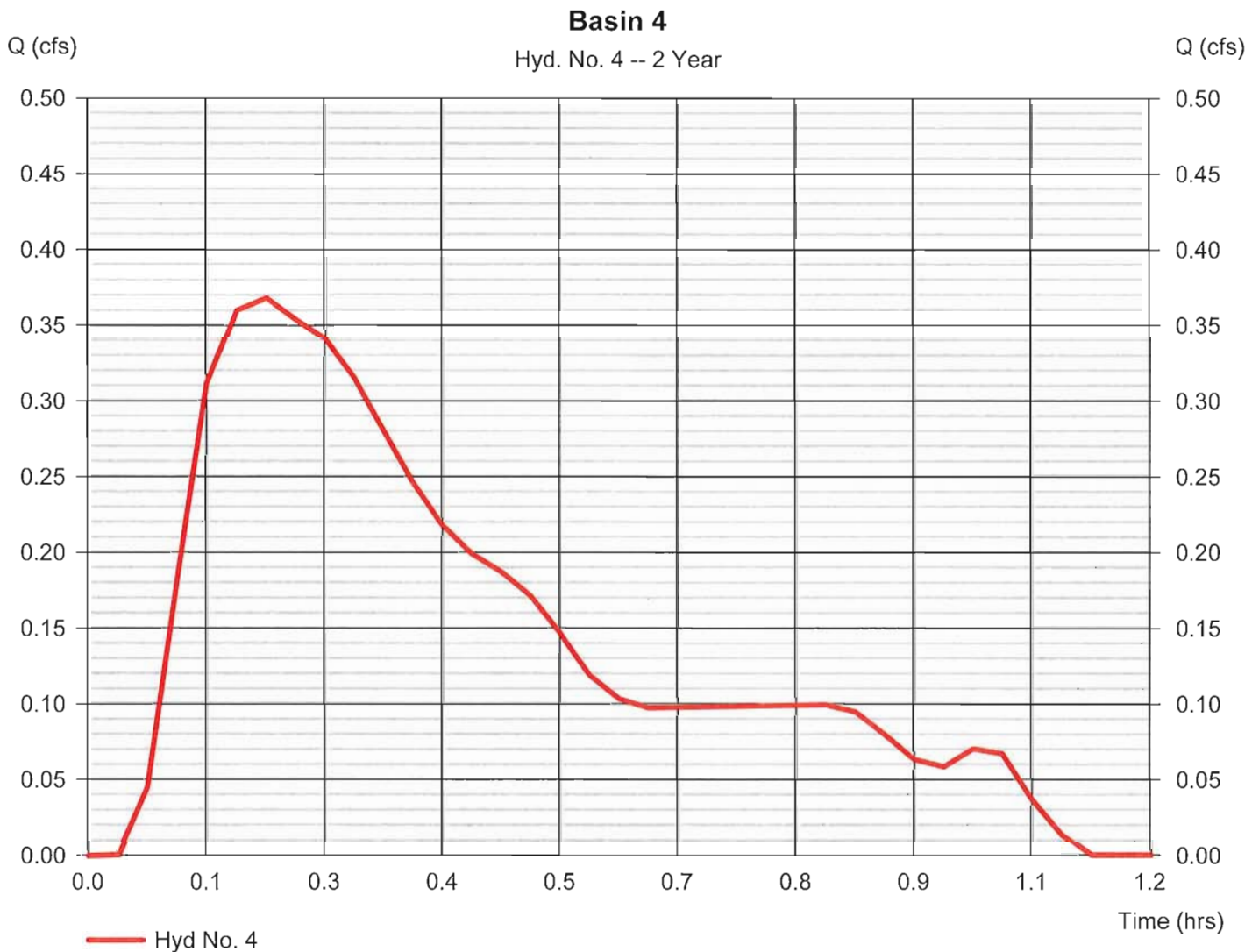
Thursday, 01 / 24 / 2019

Hyd. No. 4

Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 0.368 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.20 hrs
Time interval	= 2 min	Hyd. volume	= 614 cuft
Drainage area	= 0.220 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.37 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.180 \times 98) + (0.040 \times 74)] / 0.220$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

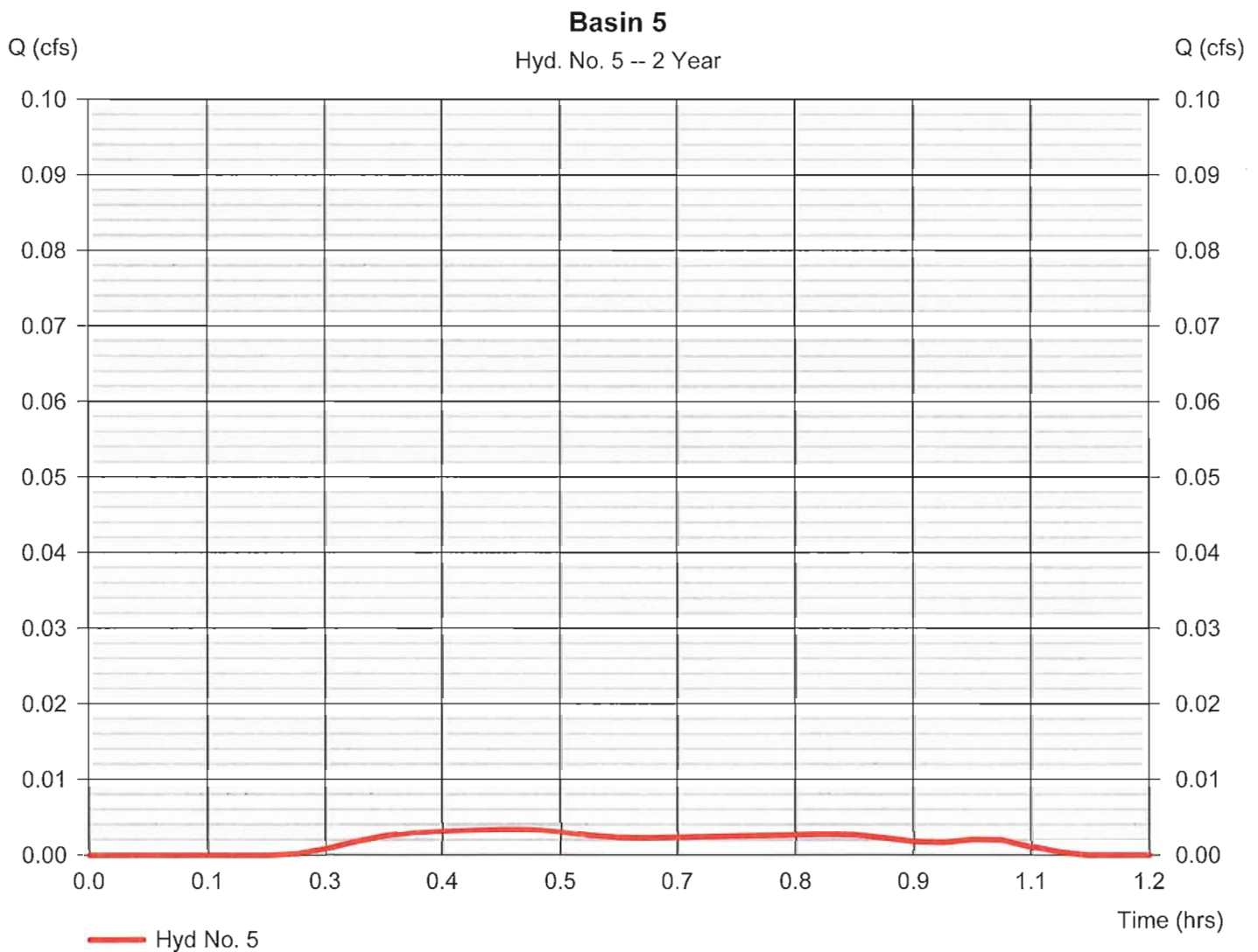
Thursday, 01 / 24 / 2019

Hyd. No. 5

Basin 5

Hydrograph type	= SCS Runoff	Peak discharge	= 0.003 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.47 hrs
Time interval	= 2 min	Hyd. volume	= 7 cuft
Drainage area	= 0.020 ac	Curve number	= 74*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.37 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.020 \times 74)] / 0.020$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

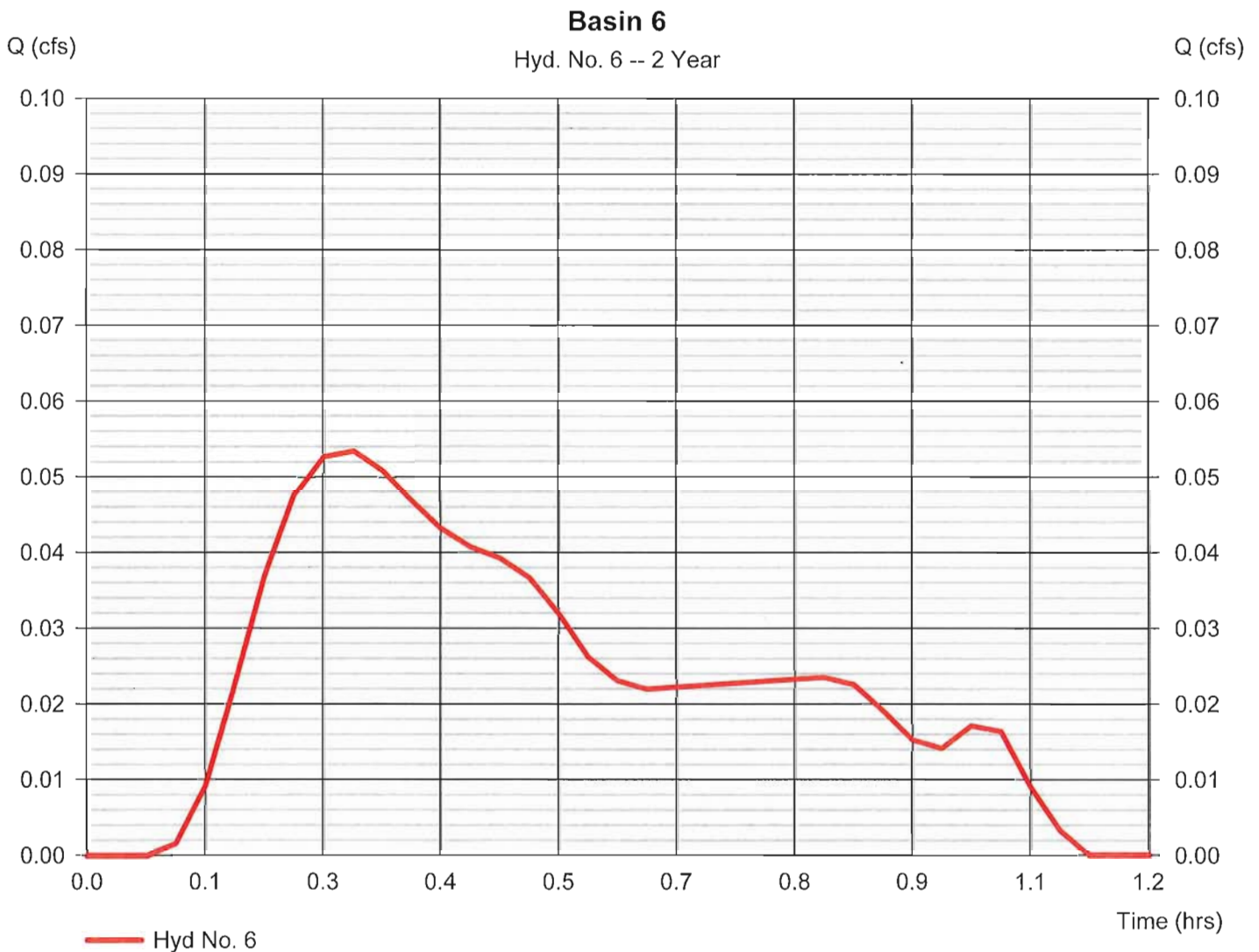
Thursday, 01 / 24 / 2019

Hyd. No. 6

Basin 6

Hydrograph type	= SCS Runoff	Peak discharge	= 0.053 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.30 hrs
Time interval	= 2 min	Hyd. volume	= 101 cuft
Drainage area	= 0.080 ac	Curve number	= 85*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.37 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.034 \times 98) + (0.043 \times 74)] / 0.080$



Hydrograph Report

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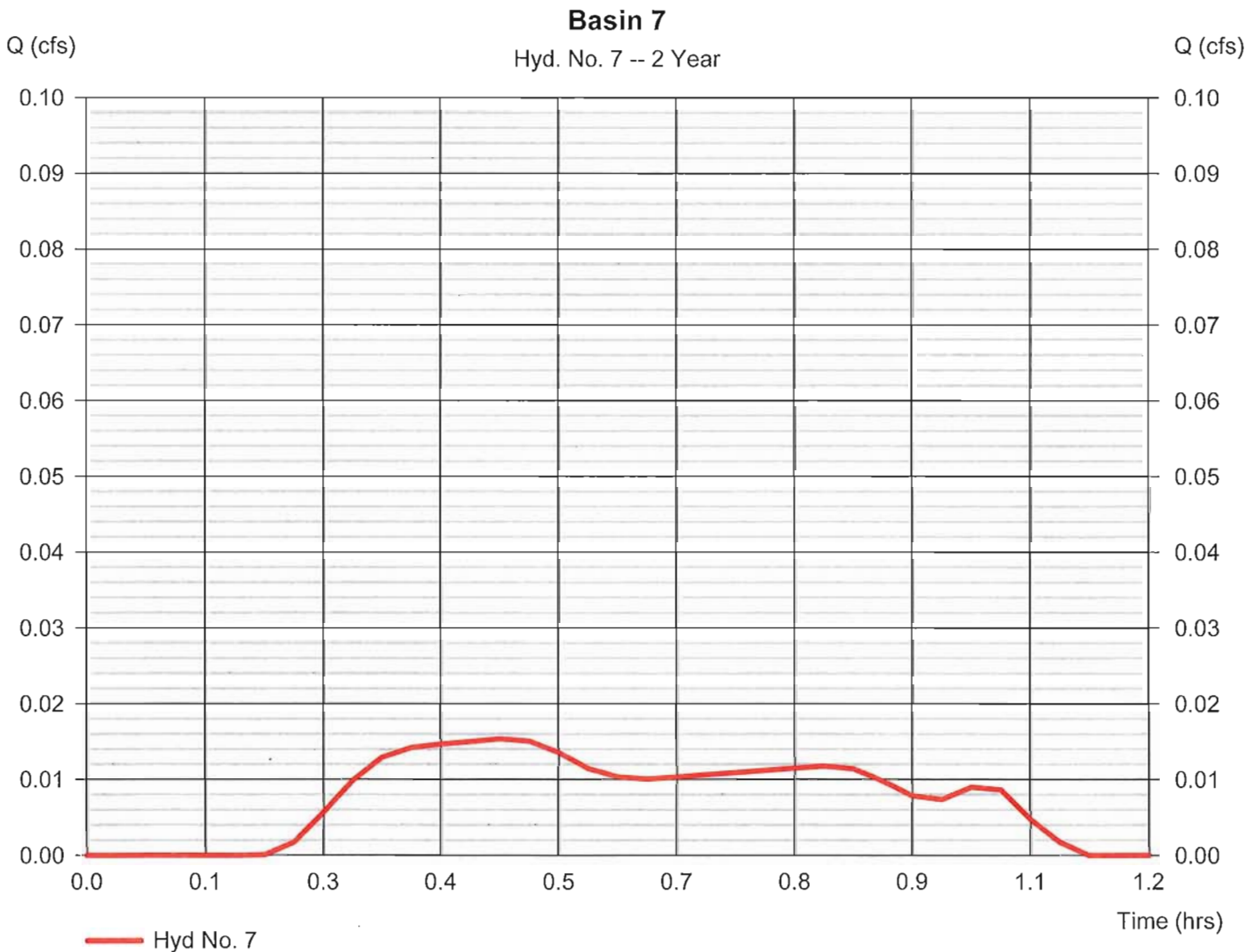
Thursday, 01 / 24 / 2019

Hyd. No. 7

Basin 7

Hydrograph type	= SCS Runoff	Peak discharge	= 0.015 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.47 hrs
Time interval	= 2 min	Hyd. volume	= 33 cuft
Drainage area	= 0.080 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.37 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.002 \times 98) + (0.076 \times 74)] / 0.080$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

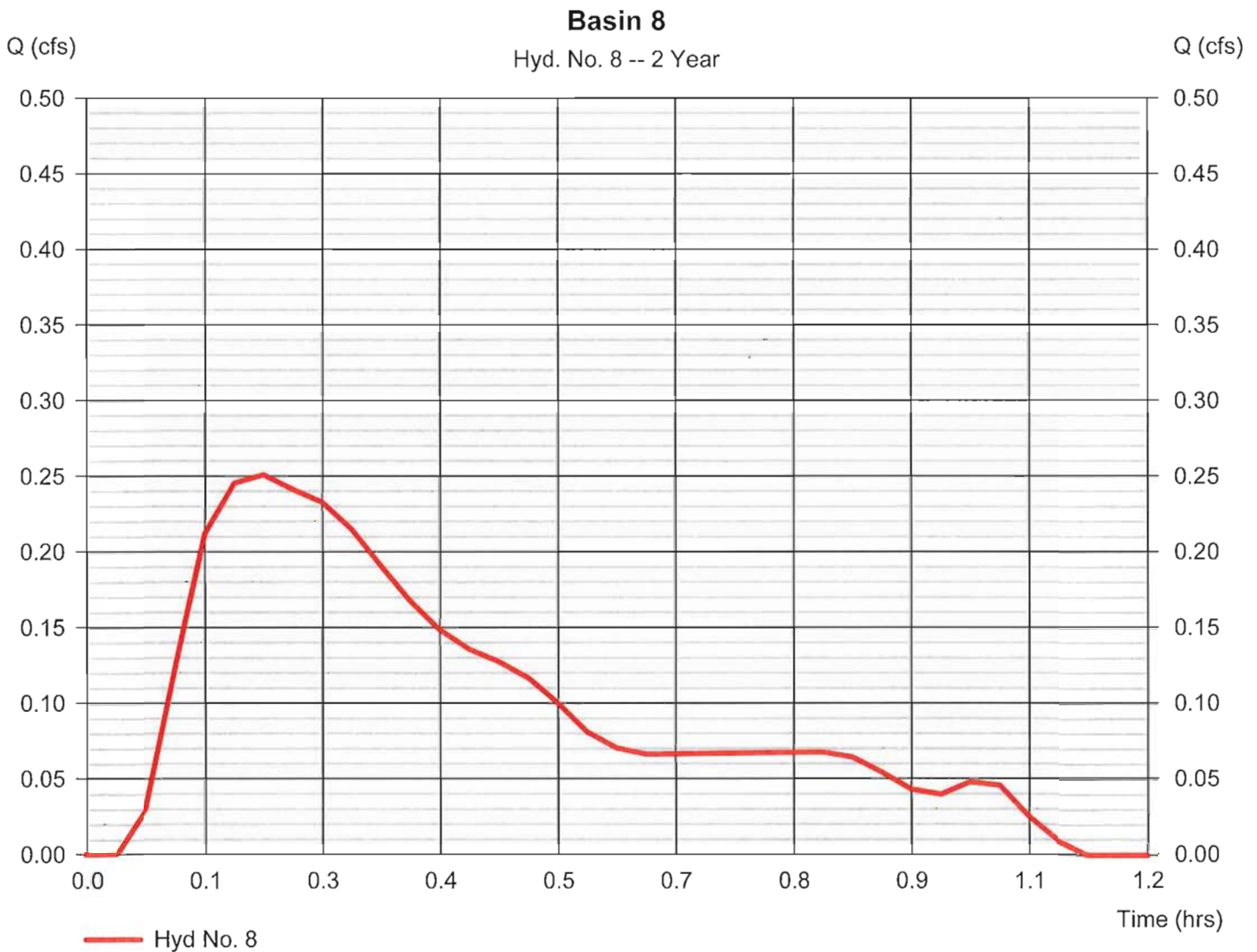
Thursday, 01 / 24 / 2019

Hyd. No. 8

Basin 8

Hydrograph type	= SCS Runoff	Peak discharge	= 0.251 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.20 hrs
Time interval	= 2 min	Hyd. volume	= 419 cuft
Drainage area	= 0.150 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.37 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.127 \times 98) + (0.024 \times 74)] / 0.150$



Hydrograph Report

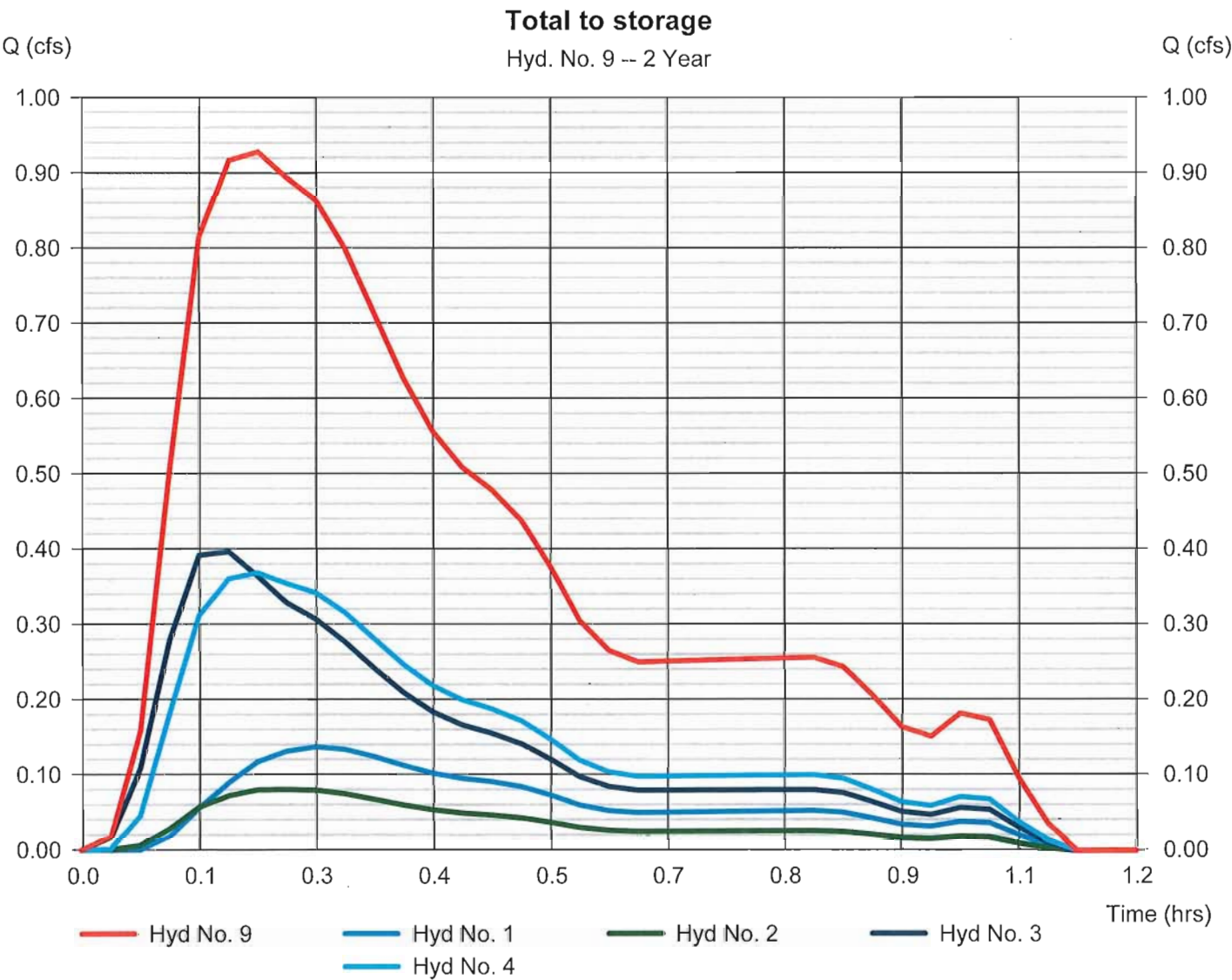
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 24 / 2019

Hyd. No. 9

Total to storage

Hydrograph type	= Combine	Peak discharge	= 0.928 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.20 hrs
Time interval	= 2 min	Hyd. volume	= 1,581 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 0.590 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

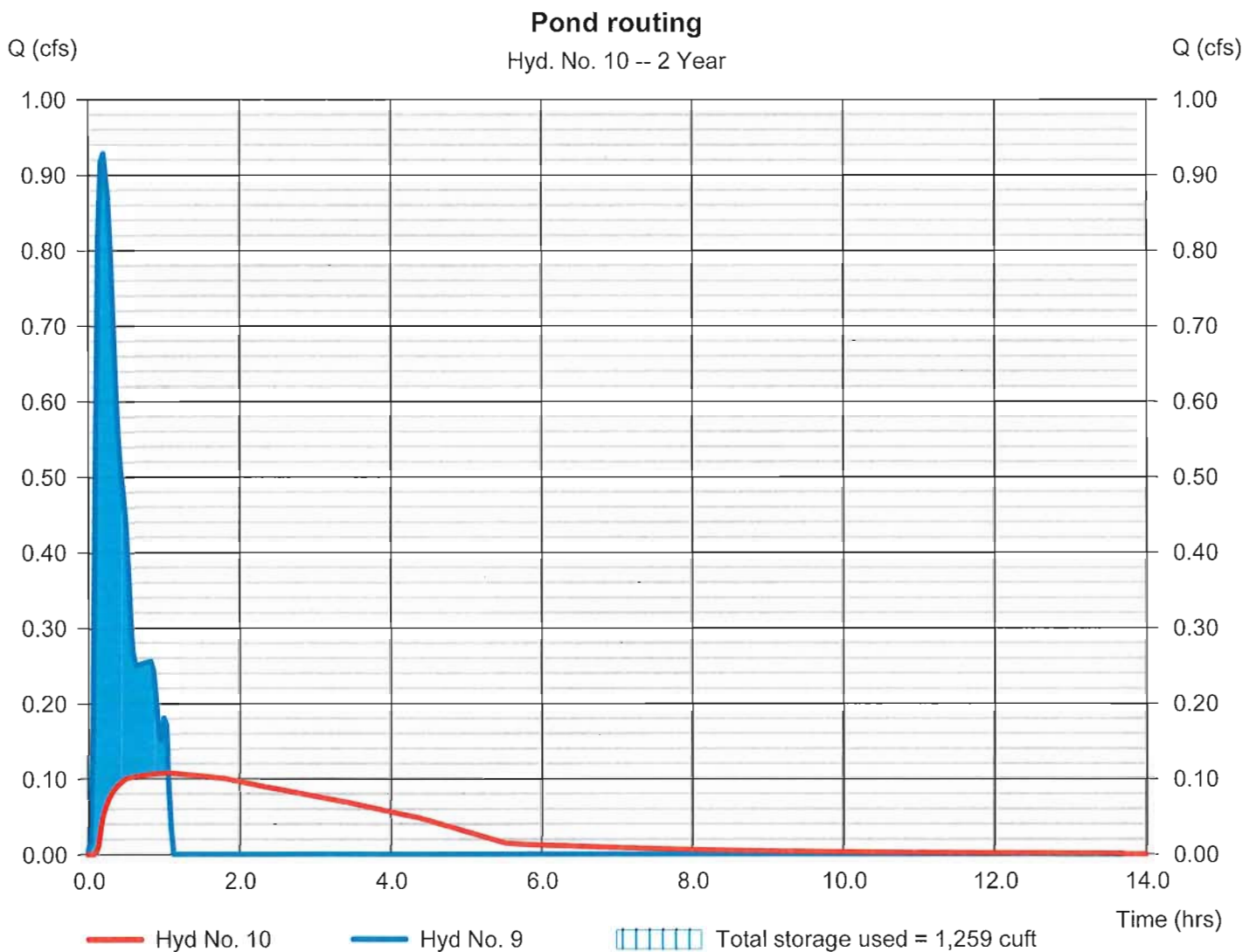
Thursday, 01 / 24 / 2019

Hyd. No. 10

Pond routing

Hydrograph type	= Reservoir	Peak discharge	= 0.108 cfs
Storm frequency	= 2 yrs	Time to peak	= 1.07 hrs
Time interval	= 2 min	Hyd. volume	= 1,558 cuft
Inflow hyd. No.	= 9 - Total to storage	Max. Elevation	= 740.81 ft
Reservoir name	= Underground Pond 1	Max. Storage	= 1,259 cuft

Storage Indication method used.



Pond Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 24 / 2019

Pond No. 1 - Underground Pond 1

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	739.67	n/a	0	0
0.17	739.84	n/a	165	165
0.33	740.00	n/a	165	330
0.51	740.18	n/a	165	495
0.67	740.34	n/a	165	660
0.83	740.50	n/a	165	825
1.00	740.67	n/a	165	990
1.17	740.84	n/a	335	1,326
1.33	741.00	n/a	326	1,652
1.50	741.17	n/a	314	1,967
1.67	741.34	n/a	300	2,267
1.83	741.50	n/a	281	2,548
2.00	741.67	n/a	257	2,805
2.17	741.84	n/a	214	3,019
2.33	742.00	n/a	178	3,196
2.50	742.17	n/a	165	3,362
2.67	742.34	n/a	165	3,527
2.83	742.50	n/a	165	3,692
3.00	742.67	n/a	165	3,857

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 2.00	6.00	0.00	0.00
Span (in)	= 2.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 739.67	740.90	0.00	0.00
Length (ft)	= 1.00	1.00	0.00	0.00
Slope (%)	= 1.00	1.00	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	0.00	0.00	0.00
Crest El. (ft)	= 741.87	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 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	739.67	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.02	17	739.69	0.00 oc	0.00	---	---	0.00	---	---	---	---	---	0.001
0.03	33	739.70	0.00 oc	0.00	---	---	0.00	---	---	---	---	---	0.002
0.05	50	739.72	0.00 oc	0.00	---	---	0.00	---	---	---	---	---	0.003
0.07	66	739.74	0.00 oc	0.00	---	---	0.00	---	---	---	---	---	0.005
0.09	83	739.76	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.007
0.10	99	739.77	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.008
0.12	116	739.79	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.010
0.14	132	739.81	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.012
0.15	149	739.82	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.013
0.17	165	739.84	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.015
0.19	182	739.86	0.02 oc	0.00	---	---	0.00	---	---	---	---	---	0.022
0.20	198	739.87	0.03 oc	0.00	---	---	0.00	---	---	---	---	---	0.027
0.22	215	739.89	0.03 oc	0.00	---	---	0.00	---	---	---	---	---	0.032
0.23	231	739.90	0.04 oc	0.00	---	---	0.00	---	---	---	---	---	0.036
0.25	248	739.92	0.04 oc	0.00	---	---	0.00	---	---	---	---	---	0.039
0.27	264	739.94	0.04 oc	0.00	---	---	0.00	---	---	---	---	---	0.043
0.28	281	739.95	0.05 oc	0.00	---	---	0.00	---	---	---	---	---	0.046
0.30	297	739.97	0.05 oc	0.00	---	---	0.00	---	---	---	---	---	0.049
0.31	314	739.98	0.05 ic	0.00	---	---	0.00	---	---	---	---	---	0.050
0.33	330	740.00	0.05 ic	0.00	---	---	0.00	---	---	---	---	---	0.052
0.35	347	740.02	0.05 ic	0.00	---	---	0.00	---	---	---	---	---	0.054
0.37	363	740.04	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.056

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Underground Pond 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
0.38	380	740.05	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.058
0.40	396	740.07	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.059
0.42	413	740.09	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.061
0.44	429	740.11	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.063
0.46	446	740.13	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.064
0.47	462	740.14	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.066
0.49	479	740.16	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.067
0.51	495	740.18	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.069
0.53	512	740.20	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.070
0.54	528	740.21	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.071
0.56	545	740.23	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.072
0.57	561	740.24	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.074
0.59	578	740.26	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.075
0.61	594	740.28	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.076
0.62	611	740.29	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.077
0.64	627	740.31	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.078
0.65	644	740.32	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.079
0.67	660	740.34	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.080
0.69	677	740.36	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.082
0.70	693	740.37	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.083
0.72	710	740.39	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.084
0.73	726	740.40	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.085
0.75	743	740.42	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.086
0.77	759	740.44	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.087
0.78	776	740.45	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.088
0.80	792	740.47	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.089
0.81	809	740.48	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.090
0.83	825	740.50	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.091
0.85	842	740.52	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.092
0.86	858	740.53	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.093
0.88	875	740.55	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.094
0.90	891	740.57	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.095
0.92	908	740.59	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.096
0.93	924	740.60	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.097
0.95	941	740.62	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.098
0.97	957	740.64	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.099
0.98	974	740.65	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.100
1.00	990	740.67	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.101
1.02	1,024	740.69	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.101
1.03	1,057	740.70	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.102
1.05	1,091	740.72	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.103
1.07	1,125	740.74	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.104
1.09	1,158	740.76	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.105
1.10	1,192	740.77	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.106
1.12	1,225	740.79	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.107
1.14	1,259	740.81	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.108
1.15	1,292	740.82	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.109
1.17	1,326	740.84	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.109
1.19	1,358	740.86	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.110
1.20	1,391	740.87	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.111
1.22	1,424	740.89	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.112
1.23	1,456	740.90	0.11 ic	0.00 oc	---	---	0.00	---	---	---	---	---	0.113
1.25	1,489	740.92	0.11 ic	0.00 oc	---	---	0.00	---	---	---	---	---	0.115
1.27	1,522	740.94	0.11 ic	0.00 oc	---	---	0.00	---	---	---	---	---	0.118
1.28	1,554	740.95	0.11 ic	0.01 oc	---	---	0.00	---	---	---	---	---	0.121
1.30	1,587	740.97	0.12 ic	0.01 oc	---	---	0.00	---	---	---	---	---	0.125
1.31	1,620	740.98	0.12 ic	0.01 oc	---	---	0.00	---	---	---	---	---	0.130
1.33	1,652	741.00	0.12 ic	0.02 oc	---	---	0.00	---	---	---	---	---	0.135
1.35	1,684	741.02	0.12 ic	0.02 oc	---	---	0.00	---	---	---	---	---	0.140
1.36	1,715	741.03	0.12 ic	0.03 oc	---	---	0.00	---	---	---	---	---	0.145
1.38	1,747	741.05	0.12 ic	0.03 oc	---	---	0.00	---	---	---	---	---	0.151
1.40	1,778	741.07	0.12 ic	0.04 oc	---	---	0.00	---	---	---	---	---	0.157
1.41	1,809	741.09	0.12 ic	0.04 oc	---	---	0.00	---	---	---	---	---	0.163
1.43	1,841	741.10	0.12 ic	0.05 oc	---	---	0.00	---	---	---	---	---	0.169
1.45	1,872	741.12	0.12 ic	0.05 oc	---	---	0.00	---	---	---	---	---	0.176
1.47	1,904	741.14	0.12 ic	0.06 oc	---	---	0.00	---	---	---	---	---	0.182
1.48	1,935	741.15	0.12 ic	0.06 oc	---	---	0.00	---	---	---	---	---	0.188
1.50	1,967	741.17	0.13 ic	0.07 oc	---	---	0.00	---	---	---	---	---	0.194
1.52	1,997	741.19	0.13 ic	0.07 oc	---	---	0.00	---	---	---	---	---	0.201
1.53	2,027	741.20	0.13 ic	0.08 oc	---	---	0.00	---	---	---	---	---	0.207

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Underground Pond 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
1.55	2,057	741.22	0.13 ic	0.09 oc	---	---	0.00	---	---	---	---	---	0.213
1.57	2,087	741.24	0.13 ic	0.09 oc	---	---	0.00	---	---	---	---	---	0.219
1.59	2,117	741.26	0.13 ic	0.10 oc	---	---	0.00	---	---	---	---	---	0.225
1.60	2,147	741.27	0.13 ic	0.10 oc	---	---	0.00	---	---	---	---	---	0.230
1.62	2,177	741.29	0.13 ic	0.11 oc	---	---	0.00	---	---	---	---	---	0.236
1.64	2,207	741.31	0.13 ic	0.11 oc	---	---	0.00	---	---	---	---	---	0.241
1.65	2,237	741.32	0.13 ic	0.11 oc	---	---	0.00	---	---	---	---	---	0.246
1.67	2,267	741.34	0.13 ic	0.12 oc	---	---	0.00	---	---	---	---	---	0.250
1.69	2,295	741.36	0.13 ic	0.12 oc	---	---	0.00	---	---	---	---	---	0.254
1.70	2,323	741.37	0.13 ic	0.12 oc	---	---	0.00	---	---	---	---	---	0.257
1.72	2,351	741.39	0.13 ic	0.13 oc	---	---	0.00	---	---	---	---	---	0.259
1.73	2,379	741.40	0.13 ic	0.15 oc	---	---	0.00	---	---	---	---	---	0.283
1.75	2,407	741.42	0.14 ic	0.22 oc	---	---	0.00	---	---	---	---	---	0.353
1.77	2,436	741.44	0.14 ic	0.27 oc	---	---	0.00	---	---	---	---	---	0.405
1.78	2,464	741.45	0.14 ic	0.31 oc	---	---	0.00	---	---	---	---	---	0.449
1.80	2,492	741.47	0.14 ic	0.35 oc	---	---	0.00	---	---	---	---	---	0.488
1.81	2,520	741.48	0.14 ic	0.38 oc	---	---	0.00	---	---	---	---	---	0.522
1.83	2,548	741.50	0.14 ic	0.42 oc	---	---	0.00	---	---	---	---	---	0.555
1.85	2,574	741.52	0.14 ic	0.45 oc	---	---	0.00	---	---	---	---	---	0.586
1.86	2,599	741.53	0.14 ic	0.48 oc	---	---	0.00	---	---	---	---	---	0.616
1.88	2,625	741.55	0.14 ic	0.50 oc	---	---	0.00	---	---	---	---	---	0.644
1.90	2,651	741.57	0.14 ic	0.53 oc	---	---	0.00	---	---	---	---	---	0.671
1.91	2,676	741.59	0.14 ic	0.55 oc	---	---	0.00	---	---	---	---	---	0.696
1.93	2,702	741.60	0.14 ic	0.58 oc	---	---	0.00	---	---	---	---	---	0.721
1.95	2,728	741.62	0.14 ic	0.60 oc	---	---	0.00	---	---	---	---	---	0.744
1.97	2,754	741.64	0.14 ic	0.62 oc	---	---	0.00	---	---	---	---	---	0.766
1.98	2,779	741.65	0.14 ic	0.64 oc	---	---	0.00	---	---	---	---	---	0.788
2.00	2,805	741.67	0.15 ic	0.66 oc	---	---	0.00	---	---	---	---	---	0.809
2.02	2,826	741.69	0.15 ic	0.68 oc	---	---	0.00	---	---	---	---	---	0.830
2.03	2,848	741.70	0.15 ic	0.70 oc	---	---	0.00	---	---	---	---	---	0.849
2.05	2,869	741.72	0.15 ic	0.71 ic	---	---	0.00	---	---	---	---	---	0.862
2.07	2,890	741.74	0.15 ic	0.72 ic	---	---	0.00	---	---	---	---	---	0.873
2.09	2,912	741.76	0.15 ic	0.74 ic	---	---	0.00	---	---	---	---	---	0.884
2.10	2,933	741.77	0.15 ic	0.75 ic	---	---	0.00	---	---	---	---	---	0.895
2.12	2,954	741.79	0.15 ic	0.76 ic	---	---	0.00	---	---	---	---	---	0.906
2.14	2,976	741.81	0.15 ic	0.77 ic	---	---	0.00	---	---	---	---	---	0.916
2.15	2,997	741.82	0.15 ic	0.78 ic	---	---	0.00	---	---	---	---	---	0.927
2.17	3,019	741.84	0.15 ic	0.79 ic	---	---	0.00	---	---	---	---	---	0.937
2.19	3,036	741.86	0.15 ic	0.79 ic	---	---	0.00	---	---	---	---	---	0.947
2.20	3,054	741.87	0.15 ic	0.80 ic	---	---	0.00	---	---	---	---	---	0.957
2.22	3,072	741.89	0.15 ic	0.81 ic	---	---	0.02	---	---	---	---	---	0.990
2.23	3,090	741.90	0.15 ic	0.82 ic	---	---	0.06	---	---	---	---	---	1.037
2.25	3,108	741.92	0.15 ic	0.83 ic	---	---	0.11	---	---	---	---	---	1.096
2.27	3,125	741.94	0.16 ic	0.84 ic	---	---	0.17	---	---	---	---	---	1.163
2.28	3,143	741.95	0.16 ic	0.85 ic	---	---	0.23	---	---	---	---	---	1.237
2.30	3,161	741.97	0.16 ic	0.85 ic	---	---	0.31	---	---	---	---	---	1.318
2.31	3,179	741.98	0.16 ic	0.86 ic	---	---	0.38	---	---	---	---	---	1.404
2.33	3,196	742.00	0.16 ic	0.87 ic	---	---	0.47	---	---	---	---	---	1.497
2.35	3,213	742.02	0.16 ic	0.88 ic	---	---	0.56	---	---	---	---	---	1.601
2.36	3,229	742.03	0.16 ic	0.89 ic	---	---	0.66	---	---	---	---	---	1.712
2.38	3,246	742.05	0.16 ic	0.90 ic	---	---	0.77	---	---	---	---	---	1.826
2.40	3,262	742.07	0.16 ic	0.91 ic	---	---	0.88	---	---	---	---	---	1.947
2.41	3,279	742.09	0.16 ic	0.91 ic	---	---	1.00	---	---	---	---	---	2.071
2.43	3,295	742.10	0.16 ic	0.92 ic	---	---	1.12	---	---	---	---	---	2.201
2.45	3,312	742.12	0.16 ic	0.93 ic	---	---	1.24	---	---	---	---	---	2.335
2.47	3,329	742.14	0.16 ic	0.94 ic	---	---	1.37	---	---	---	---	---	2.473
2.48	3,345	742.15	0.16 ic	0.95 ic	---	---	1.51	---	---	---	---	---	2.616
2.50	3,362	742.17	0.16 ic	0.95 ic	---	---	1.64	---	---	---	---	---	2.759
2.52	3,378	742.19	0.16 ic	0.96 ic	---	---	1.78	---	---	---	---	---	2.910
2.53	3,395	742.20	0.16 ic	0.97 ic	---	---	1.93	---	---	---	---	---	3.063
2.55	3,411	742.22	0.16 ic	0.98 ic	---	---	2.08	---	---	---	---	---	3.222
2.57	3,428	742.24	0.17 ic	0.99 ic	---	---	2.23	---	---	---	---	---	3.383
2.59	3,444	742.26	0.17 ic	0.99 ic	---	---	2.39	---	---	---	---	---	3.548
2.60	3,461	742.27	0.17 ic	1.00 ic	---	---	2.55	---	---	---	---	---	3.716
2.62	3,477	742.29	0.17 ic	1.01 ic	---	---	2.71	---	---	---	---	---	3.888
2.64	3,494	742.31	0.17 ic	1.02 ic	---	---	2.88	---	---	---	---	---	4.062
2.65	3,510	742.32	0.17 ic	1.02 ic	---	---	3.05	---	---	---	---	---	4.240
2.67	3,527	742.34	0.17 ic	1.03 ic	---	---	3.22	---	---	---	---	---	4.419
2.69	3,543	742.36	0.17 ic	1.04 ic	---	---	3.38	---	---	---	---	---	4.592
2.70	3,560	742.37	0.17 ic	1.04 ic	---	---	3.55	---	---	---	---	---	4.768

Continues on next page...

Underground Pond 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
2.72	3,576	742.39	0.17 ic	1.05 ic	---	---	3.72	---	---	---	---	---	4.947
2.73	3,593	742.40	0.17 ic	1.06 ic	---	---	3.90	---	---	---	---	---	5.128
2.75	3,609	742.42	0.17 ic	1.07 ic	---	---	4.07	---	---	---	---	---	5.311
2.77	3,626	742.44	0.17 ic	1.07 ic	---	---	4.25	---	---	---	---	---	5.498
2.78	3,642	742.45	0.17 ic	1.08 ic	---	---	4.44	---	---	---	---	---	5.687
2.80	3,659	742.47	0.17 ic	1.09 ic	---	---	4.62	---	---	---	---	---	5.878
2.81	3,675	742.48	0.17 ic	1.09 ic	---	---	4.81	---	---	---	---	---	6.070
2.83	3,692	742.50	0.17 ic	1.10 ic	---	---	5.00	---	---	---	---	---	6.268
2.85	3,708	742.52	0.17 ic	1.11 ic	---	---	5.20	---	---	---	---	---	6.479
2.86	3,725	742.53	0.18 ic	1.11 ic	---	---	5.41	---	---	---	---	---	6.694
2.88	3,741	742.55	0.18 ic	1.12 ic	---	---	5.62	---	---	---	---	---	6.910
2.90	3,758	742.57	0.18 ic	1.13 ic	---	---	5.83	---	---	---	---	---	7.129
2.91	3,774	742.59	0.18 ic	1.13 ic	---	---	6.04	---	---	---	---	---	7.350
2.93	3,791	742.60	0.18 ic	1.14 ic	---	---	6.26	---	---	---	---	---	7.575
2.95	3,807	742.62	0.18 ic	1.15 ic	---	---	6.48	---	---	---	---	---	7.802
2.97	3,824	742.64	0.18 ic	1.15 ic	---	---	6.70	---	---	---	---	---	8.031
2.98	3,840	742.65	0.18 ic	1.16 ic	---	---	6.93	---	---	---	---	---	8.264
3.00	3,857	742.67	0.18 ic	1.17 ic	---	---	7.15	---	---	---	---	---	8.493

...End

Hydrograph Summary Report

Hydratflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	0.277	2	14	493	-----	-----	-----	Basin 1
2	SCS Runoff	0.153	2	12	253	-----	-----	-----	Basin 2
3	SCS Runoff	0.672	2	8	910	-----	-----	-----	Basin 3
4	SCS Runoff	0.679	2	10	1,045	-----	-----	-----	Basin 4
5	SCS Runoff	0.012	2	20	24	-----	-----	-----	Basin 5
6	SCS Runoff	0.120	2	16	216	-----	-----	-----	Basin 6
7	SCS Runoff	0.052	2	18	104	-----	-----	-----	Basin 7
8	SCS Runoff	0.463	2	10	713	-----	-----	-----	Basin 8
9	Combine	1.719	2	10	2,701	1, 2, 3, 4, 9	-----	-----	Total to storage
10	Reservoir	0.227	2	62	2,677		741.26	2,128	Pond routing
1 hr storm.gpw					Return Period: 10 Year			Thursday, 01 / 24 / 2019	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

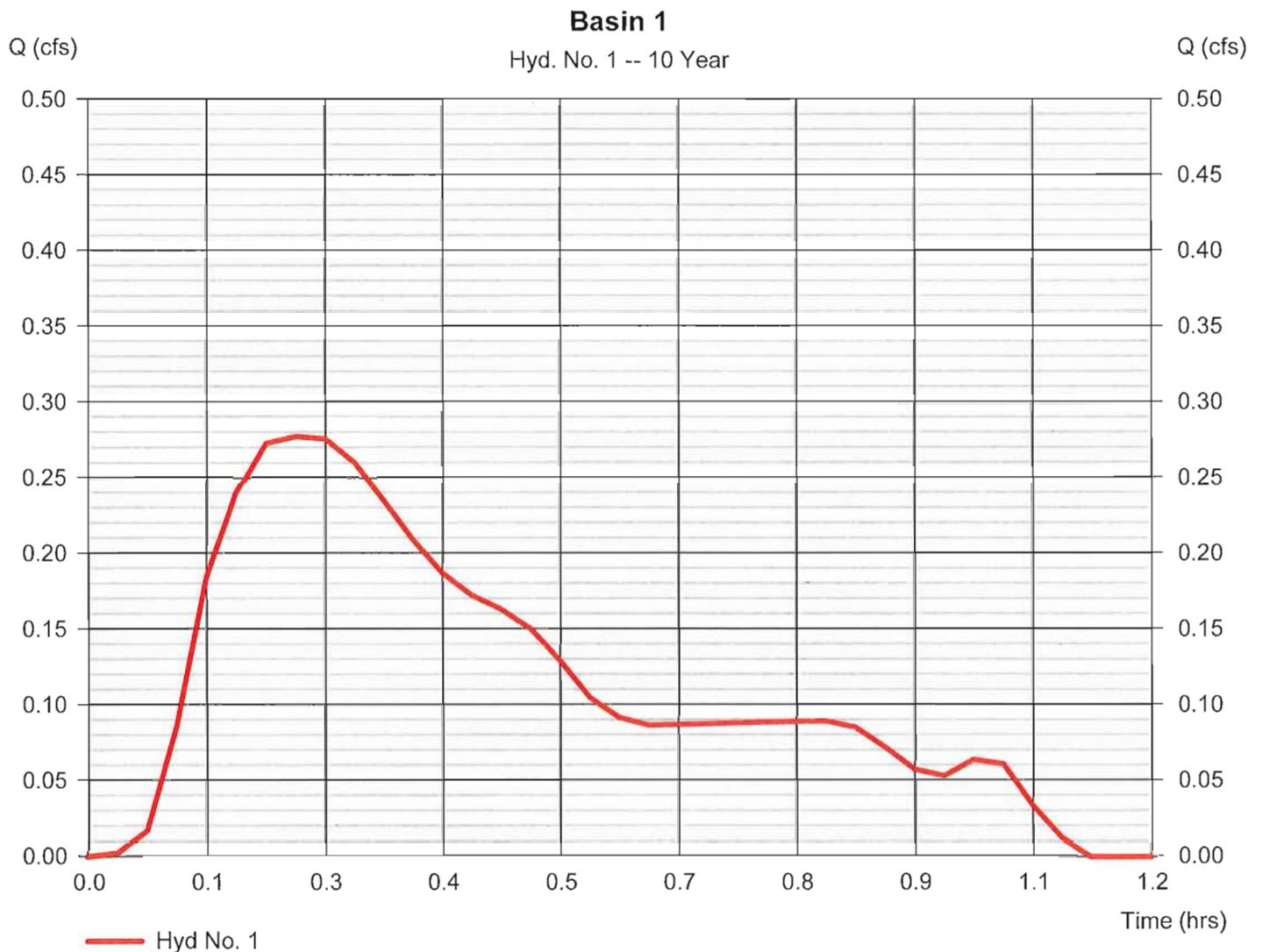
Thursday, 01 / 24 / 2019

Hyd. No. 1

Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.277 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.23 hrs
Time interval	= 2 min	Hyd. volume	= 493 cuft
Drainage area	= 0.150 ac	Curve number	= 88*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.00 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.092 \times 98) + (0.062 \times 74)] / 0.150$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

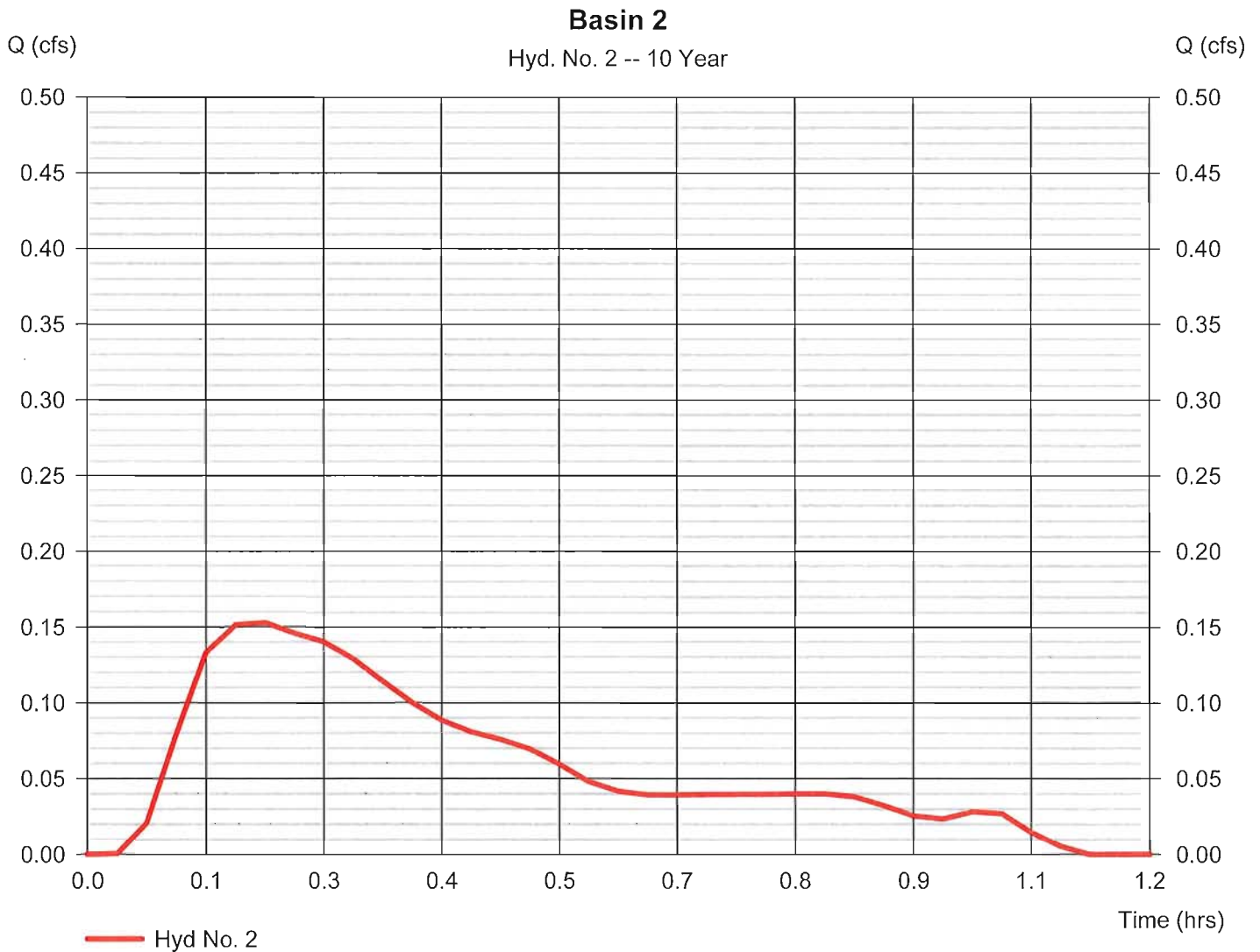
Thursday, 01 / 24 / 2019

Hyd. No. 2

Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.153 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.20 hrs
Time interval	= 2 min	Hyd. volume	= 253 cuft
Drainage area	= 0.060 ac	Curve number	= 92*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.00 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.044 \times 98) + (0.014 \times 74)] / 0.060$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

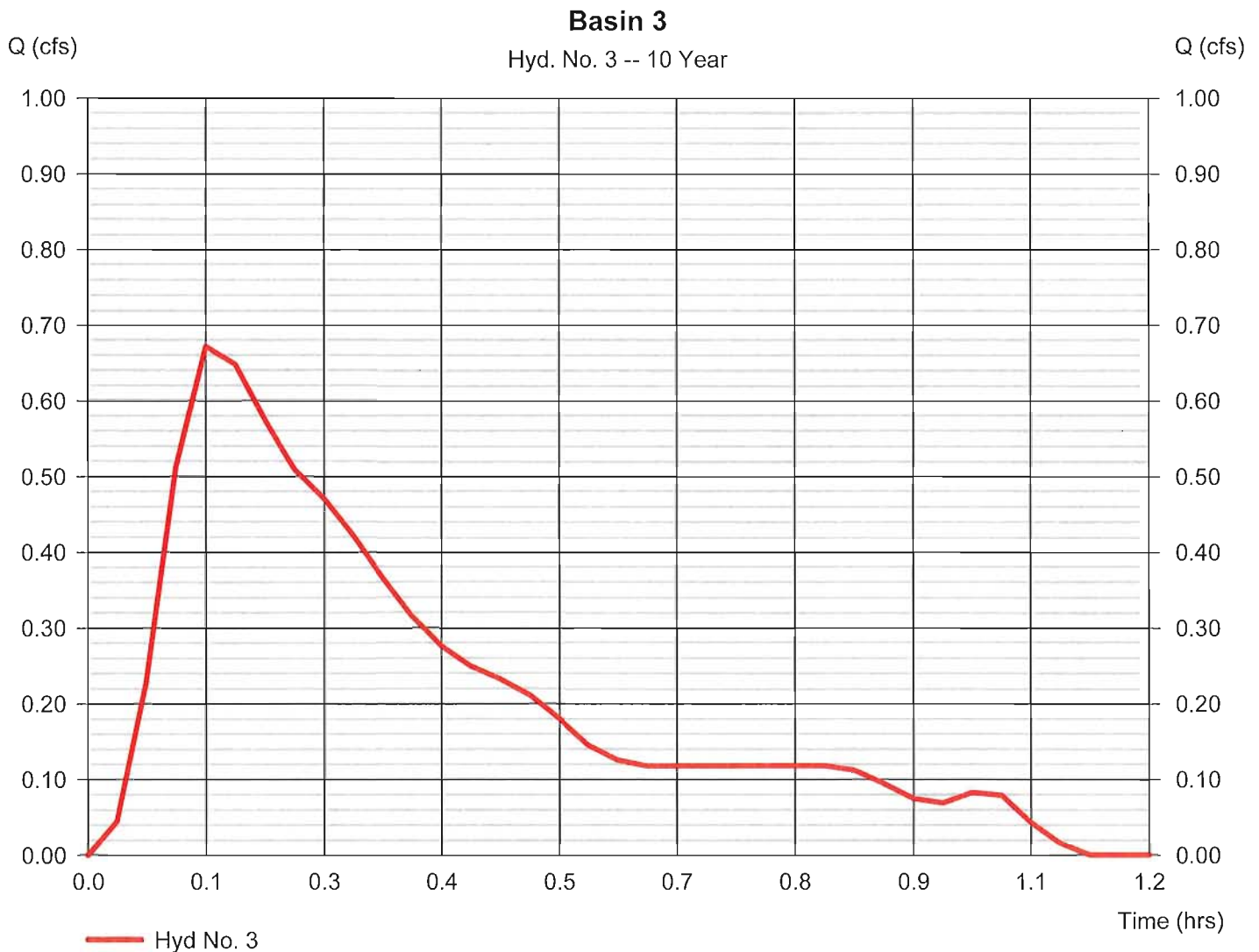
Thursday, 01 / 24 / 2019

Hyd. No. 3

Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 0.672 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.13 hrs
Time interval	= 2 min	Hyd. volume	= 910 cuft
Drainage area	= 0.160 ac	Curve number	= 97*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.00 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.147 \times 98) + (0.009 \times 74)] / 0.160$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

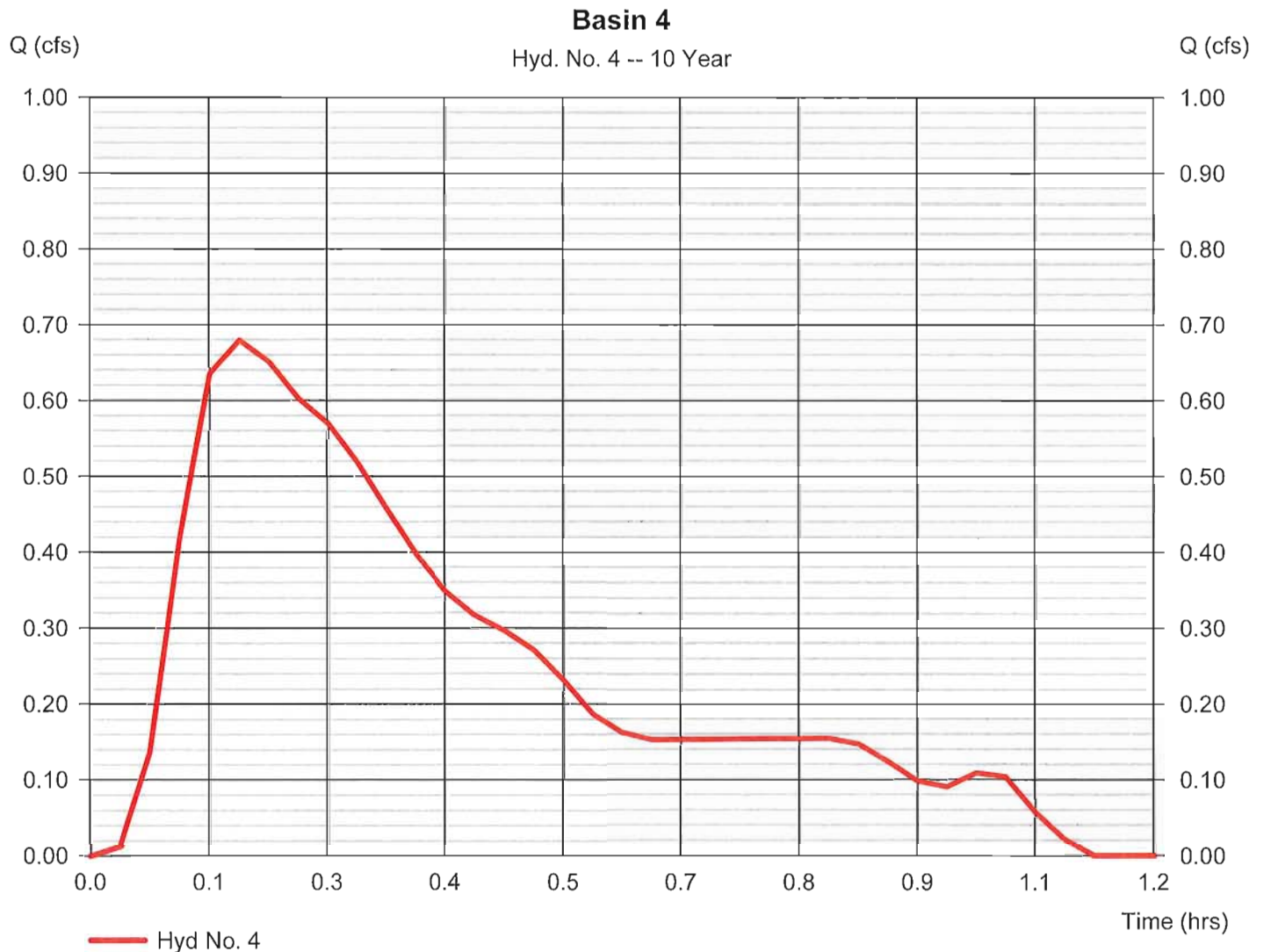
Thursday, 01 / 24 / 2019

Hyd. No. 4

Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 0.679 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.17 hrs
Time interval	= 2 min	Hyd. volume	= 1,045 cuft
Drainage area	= 0.220 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.00 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.180 \times 98) + (0.040 \times 74)] / 0.220$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

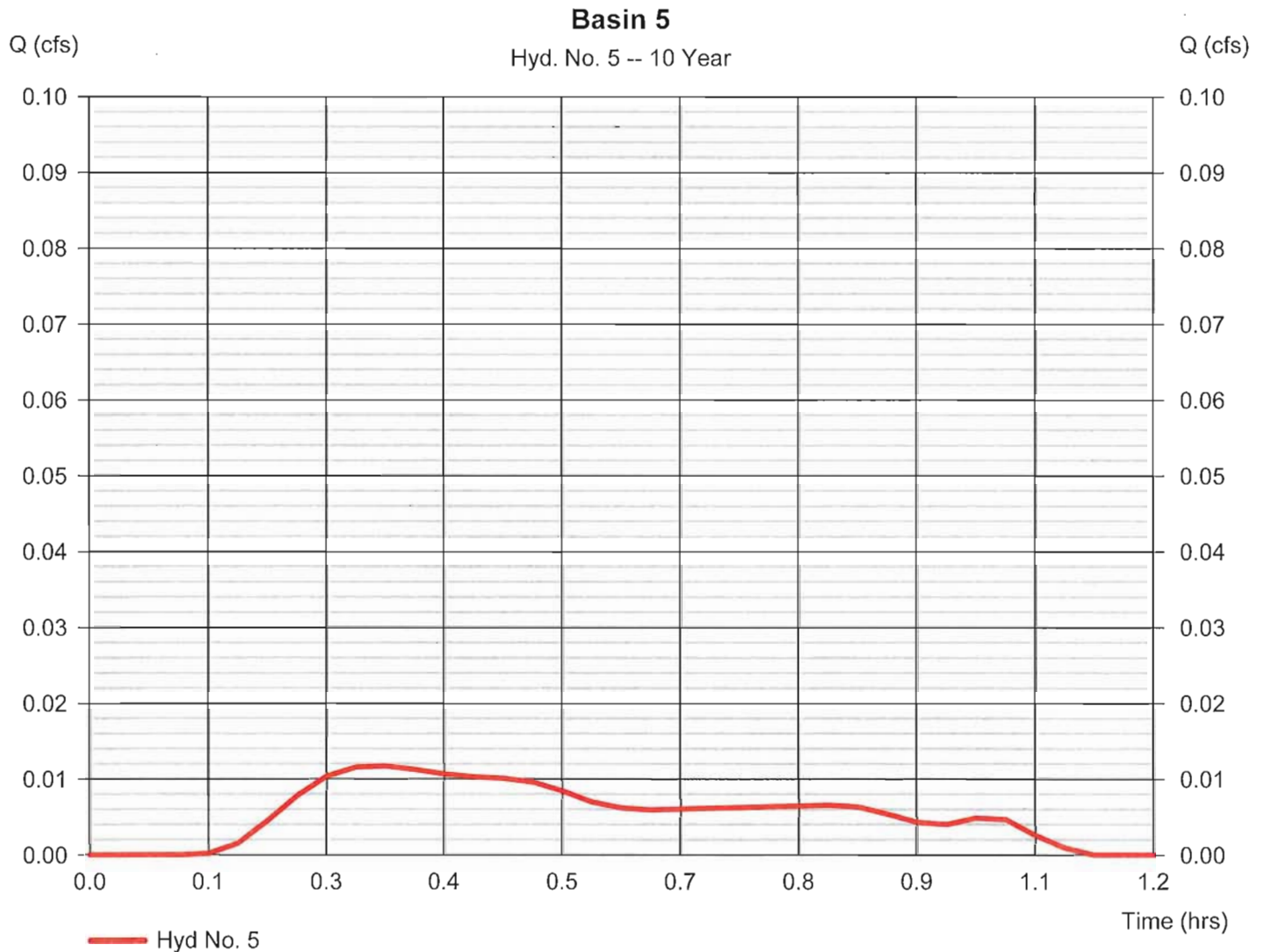
Thursday, 01 / 24 / 2019

Hyd. No. 5

Basin 5

Hydrograph type	= SCS Runoff	Peak discharge	= 0.012 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.33 hrs
Time interval	= 2 min	Hyd. volume	= 24 cuft
Drainage area	= 0.020 ac	Curve number	= 74*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.00 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.020 \times 74)] / 0.020$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

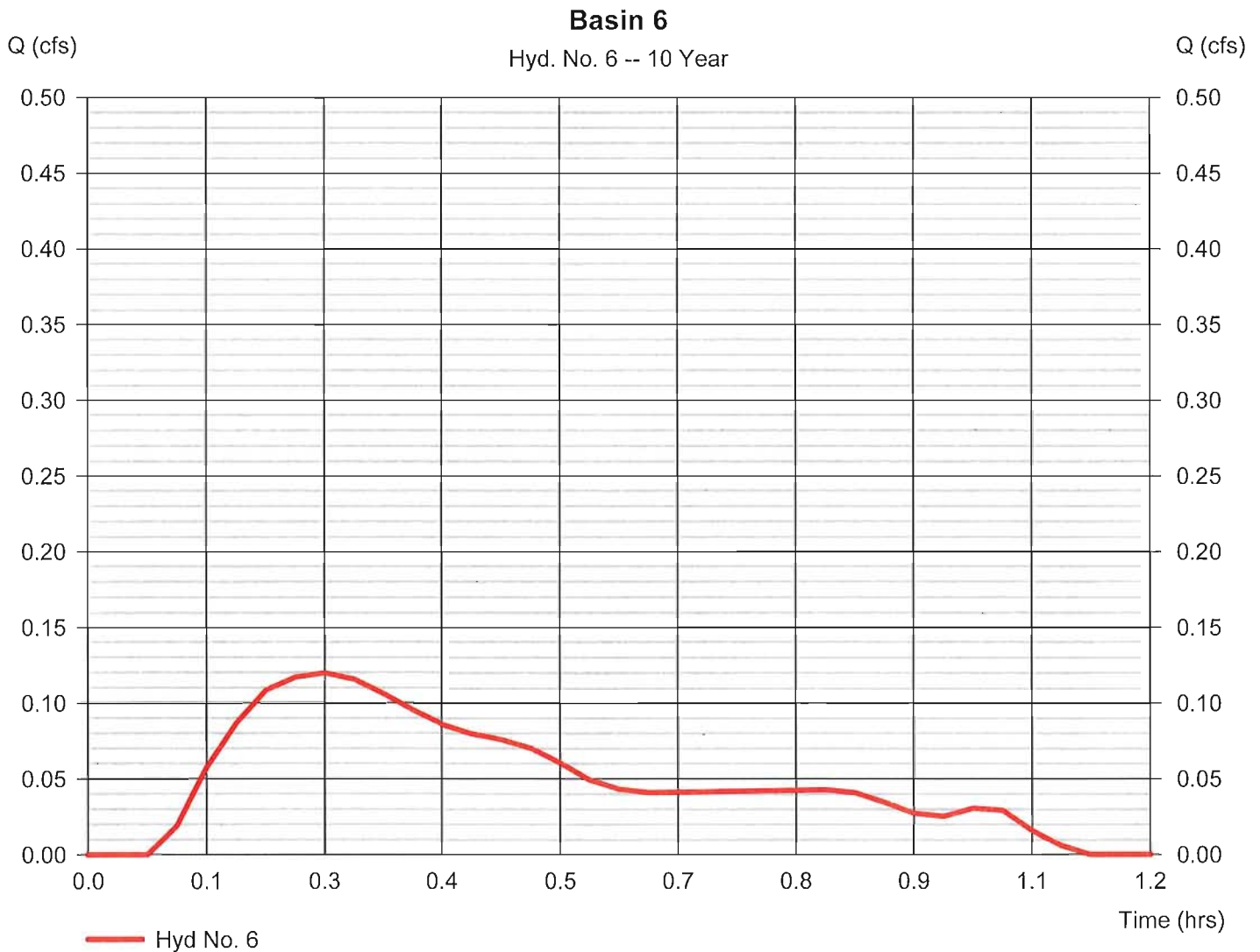
Thursday, 01 / 24 / 2019

Hyd. No. 6

Basin 6

Hydrograph type	= SCS Runoff	Peak discharge	= 0.120 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.27 hrs
Time interval	= 2 min	Hyd. volume	= 216 cuft
Drainage area	= 0.080 ac	Curve number	= 85*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.00 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.034 \times 98) + (0.043 \times 74)] / 0.080$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

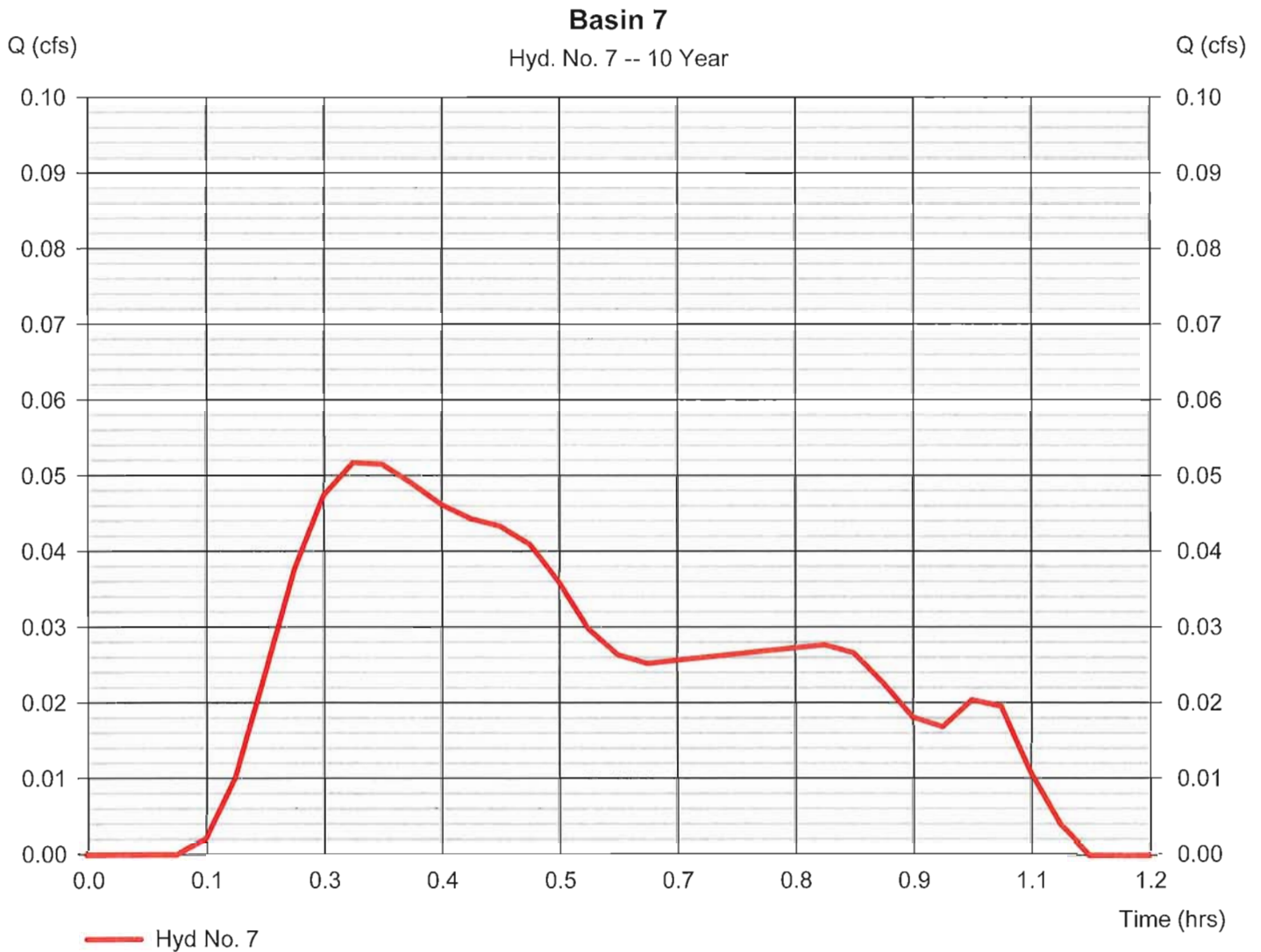
Thursday, 01 / 24 / 2019

Hyd. No. 7

Basin 7

Hydrograph type	= SCS Runoff	Peak discharge	= 0.052 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.30 hrs
Time interval	= 2 min	Hyd. volume	= 104 cuft
Drainage area	= 0.080 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.00 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.002 \times 98) + (0.076 \times 74)] / 0.080$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

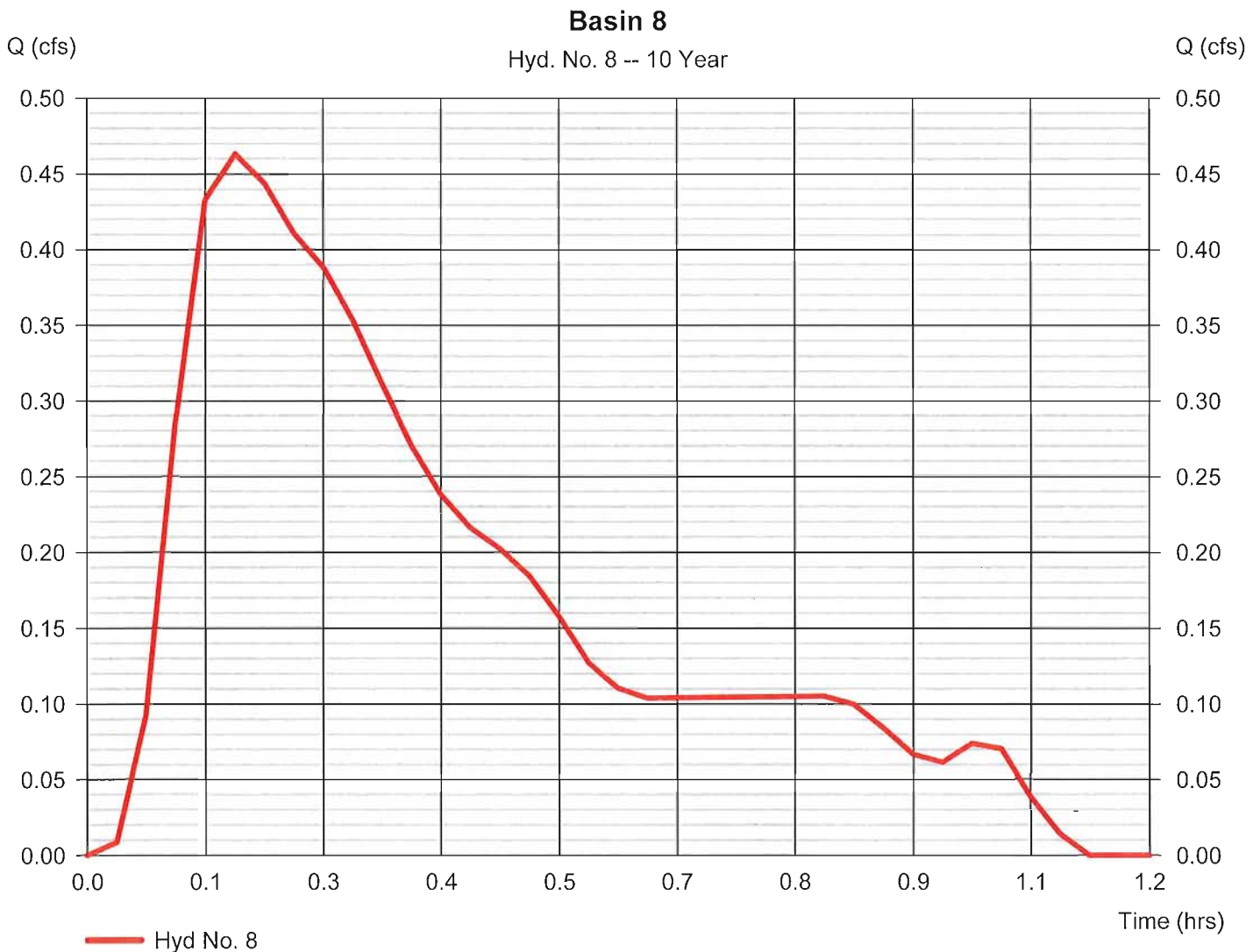
Thursday, 01 / 24 / 2019

Hyd. No. 8

Basin 8

Hydrograph type	= SCS Runoff	Peak discharge	= 0.463 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.17 hrs
Time interval	= 2 min	Hyd. volume	= 713 cuft
Drainage area	= 0.150 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.00 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.127 \times 98) + (0.024 \times 74)] / 0.150$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

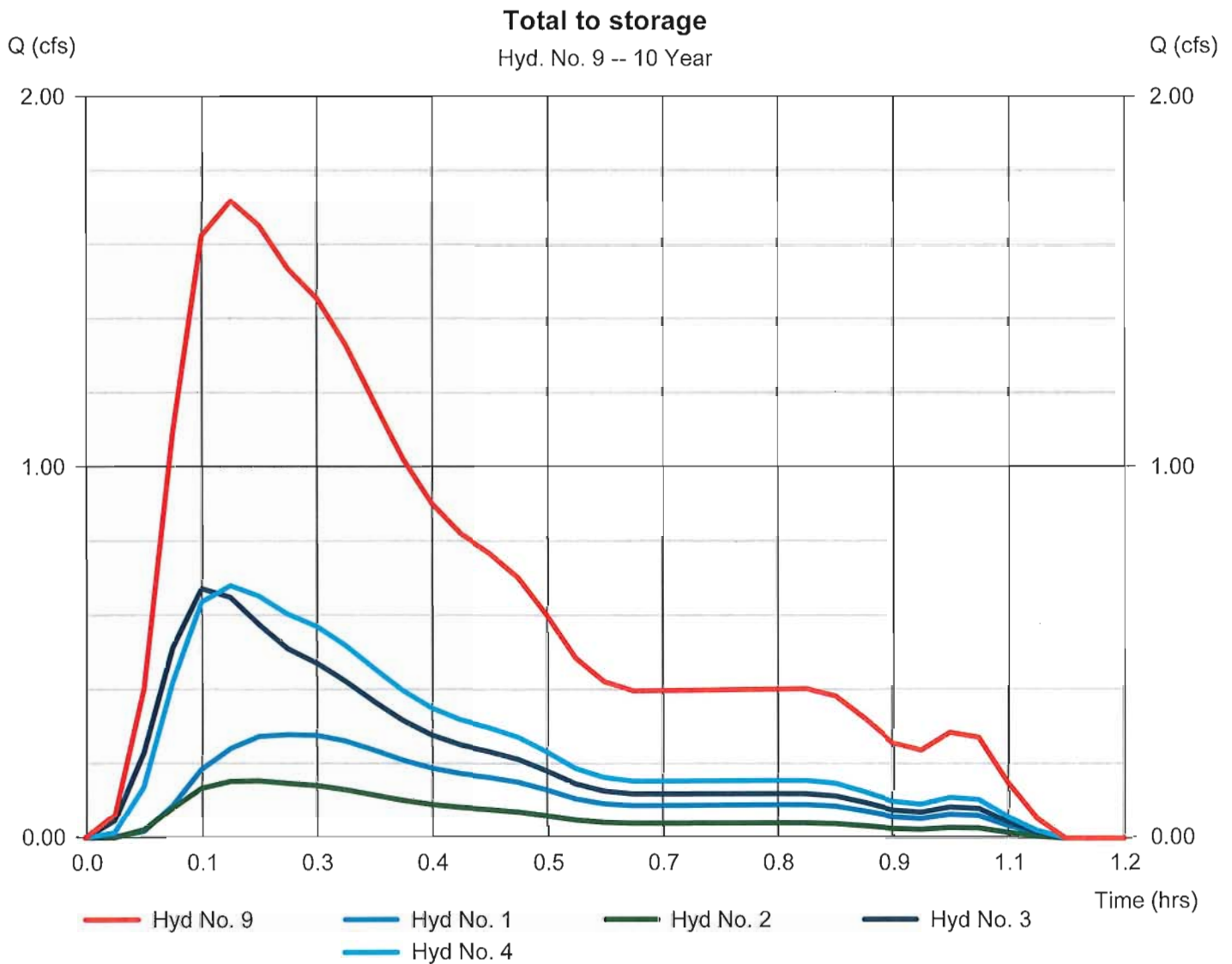
Thursday, 01 / 24 / 2019

Hyd. No. 9

Total to storage

Hydrograph type = Combine
Storm frequency = 10 yrs
Time interval = 2 min
Inflow hyds. = 1, 2, 3, 4

Peak discharge = 1.719 cfs
Time to peak = 0.17 hrs
Hyd. volume = 2,701 cuft
Contrib. drain. area = 0.590 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

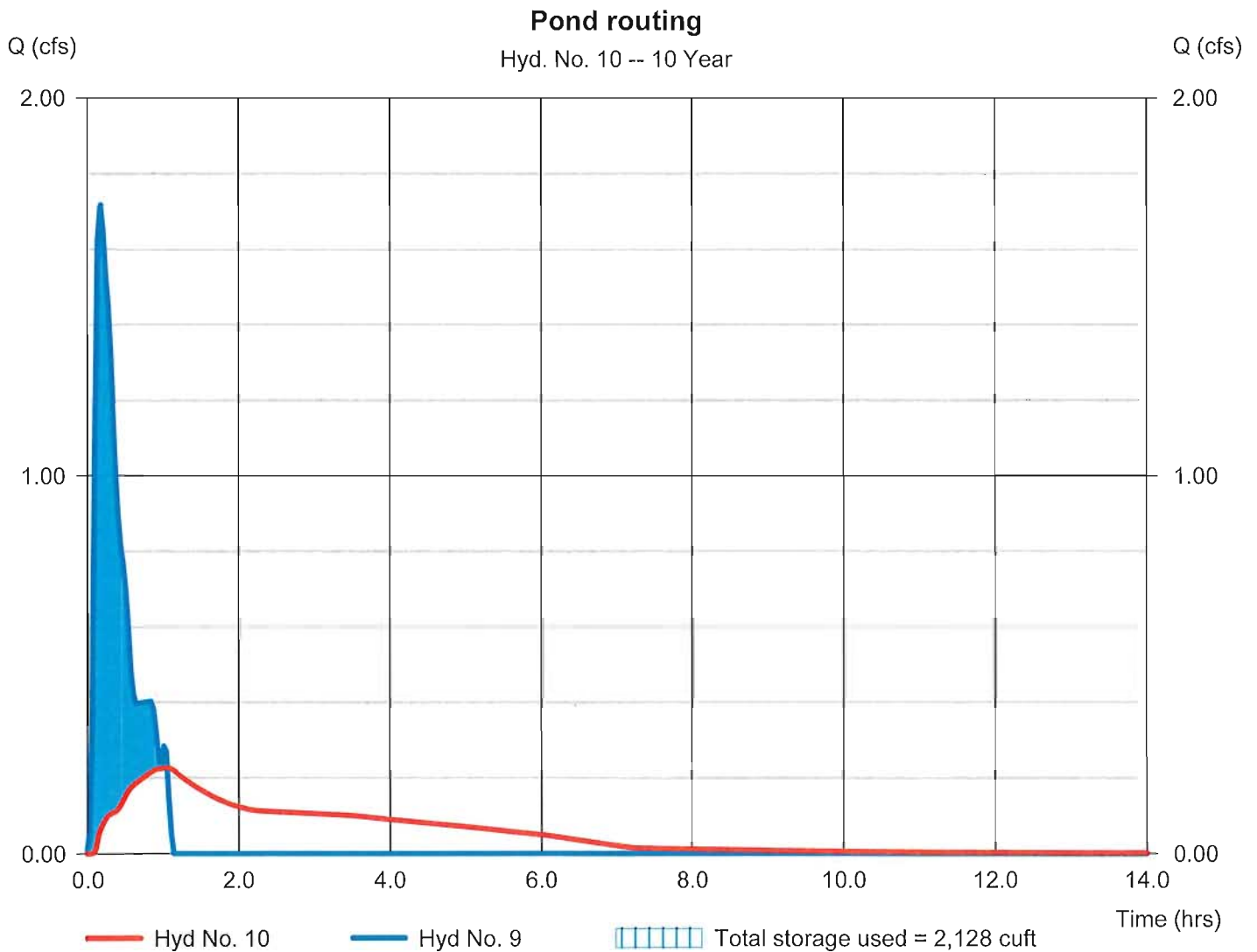
Thursday, 01 / 24 / 2019

Hyd. No. 10

Pond routing

Hydrograph type	= Reservoir	Peak discharge	= 0.227 cfs
Storm frequency	= 10 yrs	Time to peak	= 1.03 hrs
Time interval	= 2 min	Hyd. volume	= 2,677 cuft
Inflow hyd. No.	= 9 - Total to storage	Max. Elevation	= 741.26 ft
Reservoir name	= Underground Pond 1	Max. Storage	= 2,128 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	0.621	2	12	1,024	-----	-----	-----	Basin 1
2	SCS Runoff	0.323	2	10	482	-----	-----	-----	Basin 2
3	SCS Runoff	1.228	2	8	1,561	-----	-----	-----	Basin 3
4	SCS Runoff	1.341	2	8	1,912	-----	-----	-----	Basin 4
5	SCS Runoff	0.038	2	16	71	-----	-----	-----	Basin 5
6	SCS Runoff	0.280	2	12	481	-----	-----	-----	Basin 6
7	SCS Runoff	0.163	2	16	300	-----	-----	-----	Basin 7
8	SCS Runoff	0.914	2	8	1,304	-----	-----	-----	Basin 8
9	Combine	3.426	2	8	4,979	1, 2, 3, 4, 9	-----	-----	Total to storage
10	Reservoir	0.935	2	32	4,955		741.84	3,015	Pond routing
1 hr storm.gpw					Return Period: 100 Year			Thursday, 01 / 24 / 2019	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

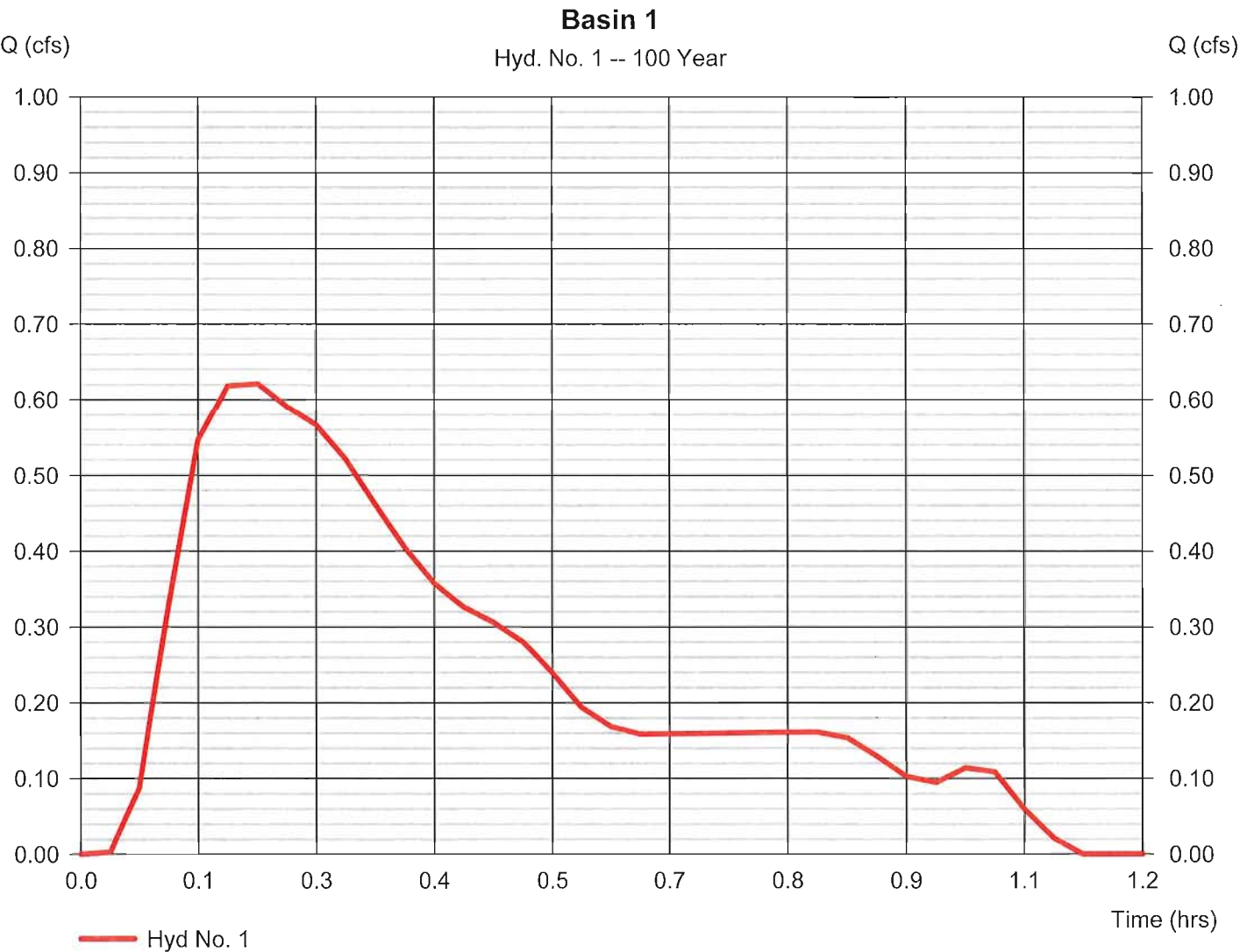
Thursday, 01 / 24 / 2019

Hyd. No. 1

Basin 1

Hydrograph type	=	SCS Runoff	Peak discharge	=	0.621 cfs
Storm frequency	=	100 yrs	Time to peak	=	0.20 hrs
Time interval	=	2 min	Hyd. volume	=	1,024 cuft
Drainage area	=	0.150 ac	Curve number	=	88*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.21 in	Distribution	=	Huff-1st
Storm duration	=	1.00 hrs	Shape factor	=	484

* Composite (Area/CN) = [(0.092 x 98) + (0.062 x 74)] / 0.150



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

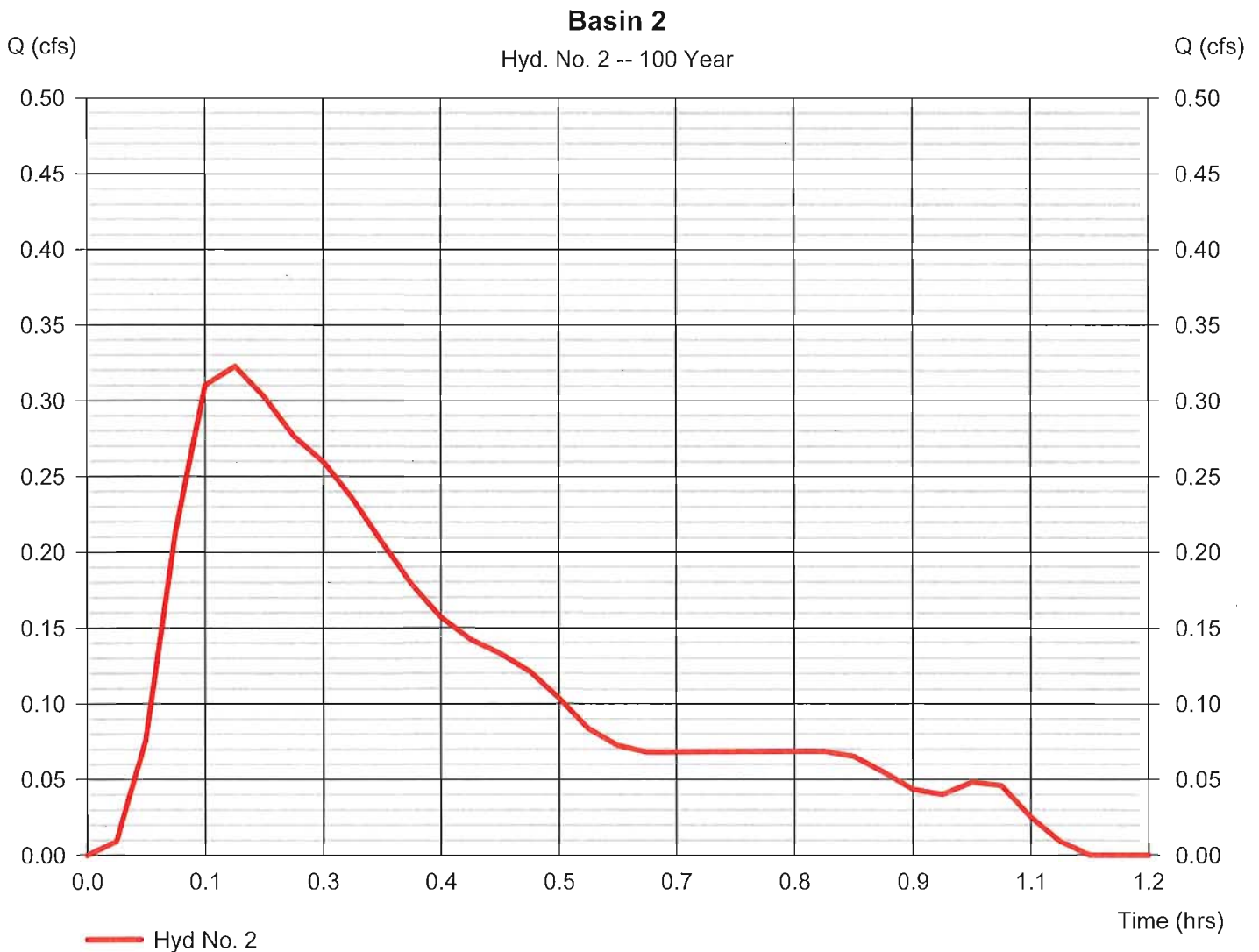
Thursday, 01 / 24 / 2019

Hyd. No. 2

Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.323 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.17 hrs
Time interval	= 2 min	Hyd. volume	= 482 cuft
Drainage area	= 0.060 ac	Curve number	= 92*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.21 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.044 \times 98) + (0.014 \times 74)] / 0.060$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

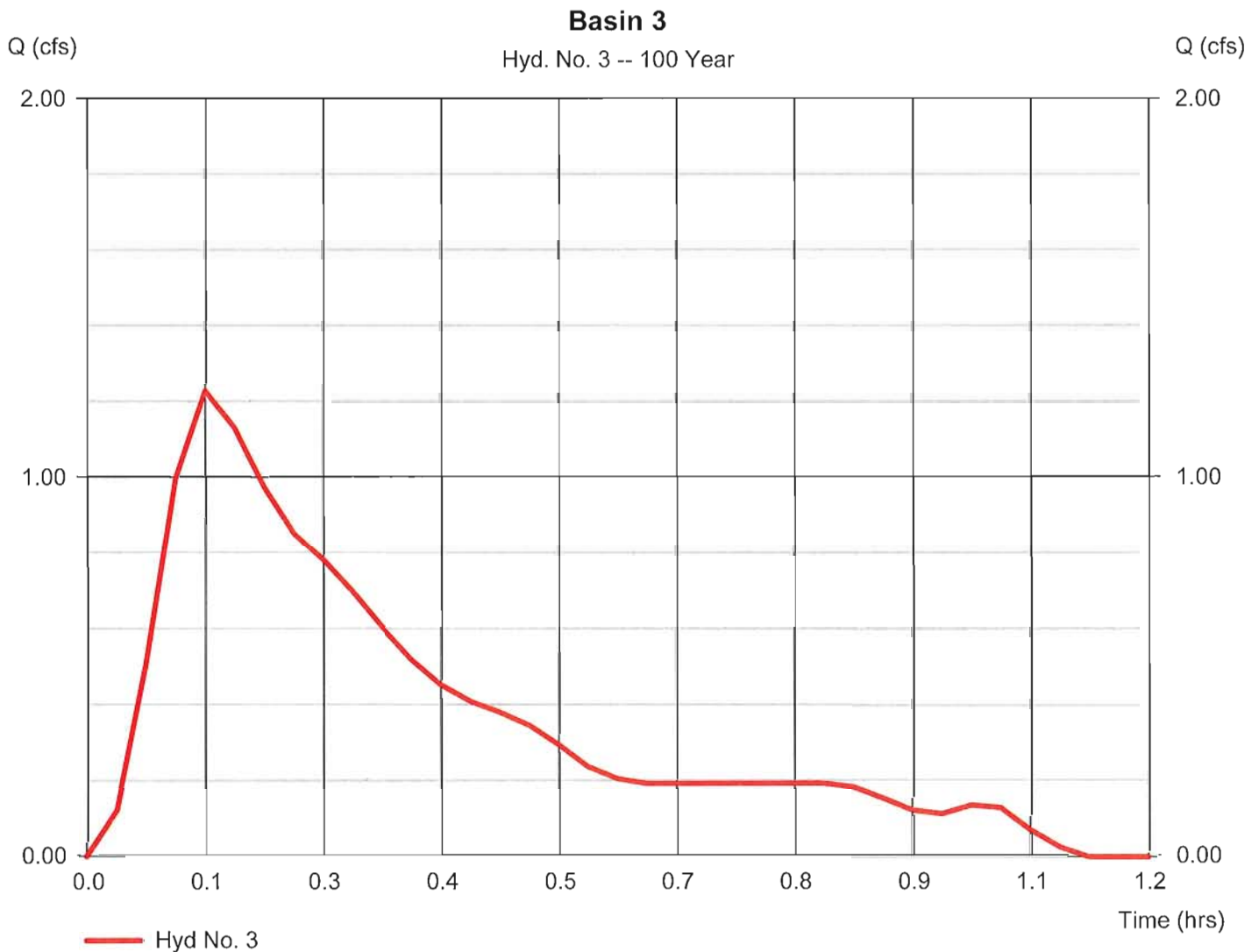
Thursday, 01 / 24 / 2019

Hyd. No. 3

Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 1.228 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.13 hrs
Time interval	= 2 min	Hyd. volume	= 1,561 cuft
Drainage area	= 0.160 ac	Curve number	= 97*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.21 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.147 \times 98) + (0.009 \times 74)] / 0.160$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

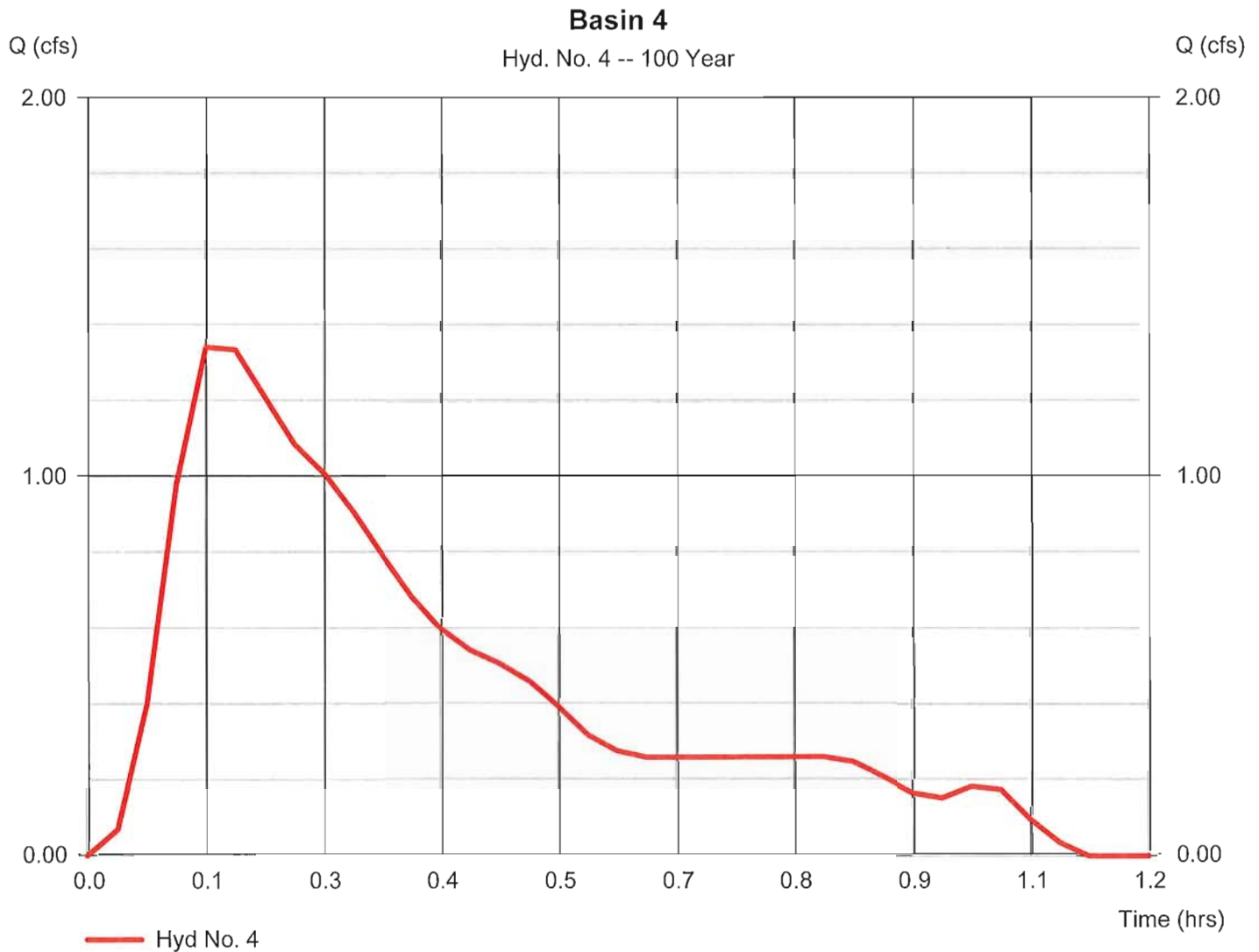
Thursday, 01 / 24 / 2019

Hyd. No. 4

Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 1.341 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.13 hrs
Time interval	= 2 min	Hyd. volume	= 1,912 cuft
Drainage area	= 0.220 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.21 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.180 \times 98) + (0.040 \times 74)] / 0.220$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

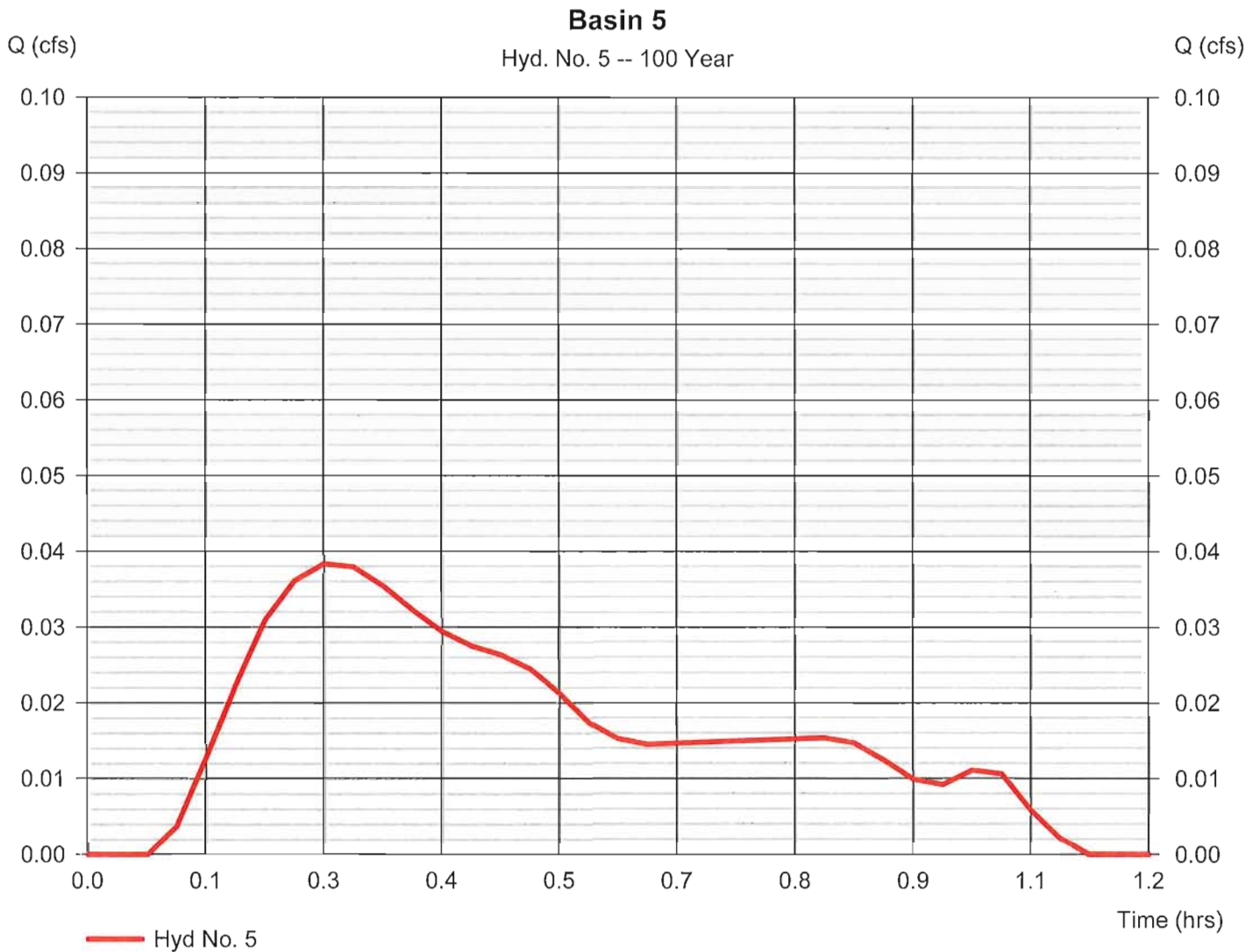
Thursday, 01 / 24 / 2019

Hyd. No. 5

Basin 5

Hydrograph type	= SCS Runoff	Peak discharge	= 0.038 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.27 hrs
Time interval	= 2 min	Hyd. volume	= 71 cuft
Drainage area	= 0.020 ac	Curve number	= 74*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.21 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.020 \times 74)] / 0.020$



Hydrograph Report

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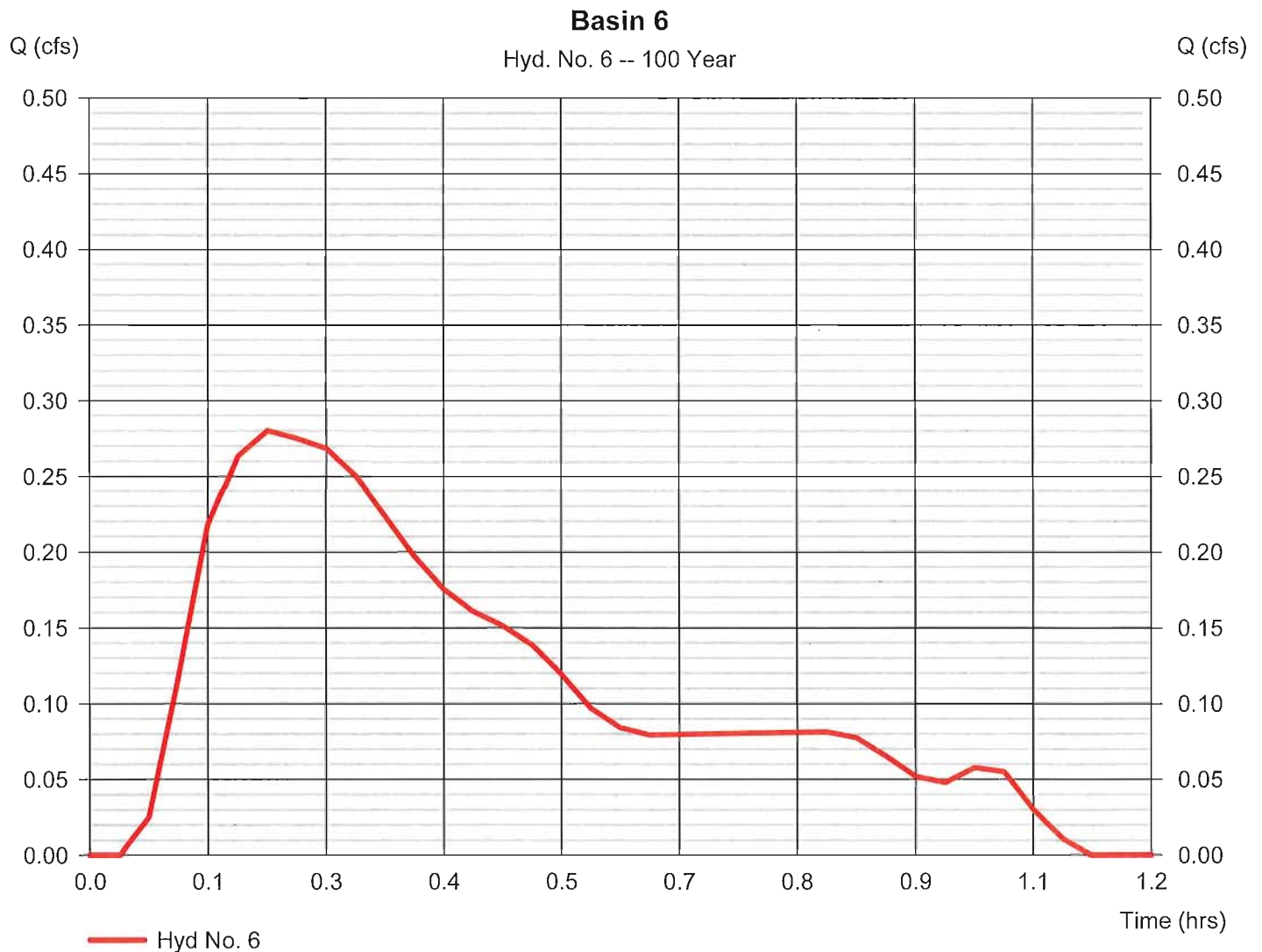
Thursday, 01 / 24 / 2019

Hyd. No. 6

Basin 6

Hydrograph type	= SCS Runoff	Peak discharge	= 0.280 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.20 hrs
Time interval	= 2 min	Hyd. volume	= 481 cuft
Drainage area	= 0.080 ac	Curve number	= 85*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.21 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.034 \times 98) + (0.043 \times 74)] / 0.080$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

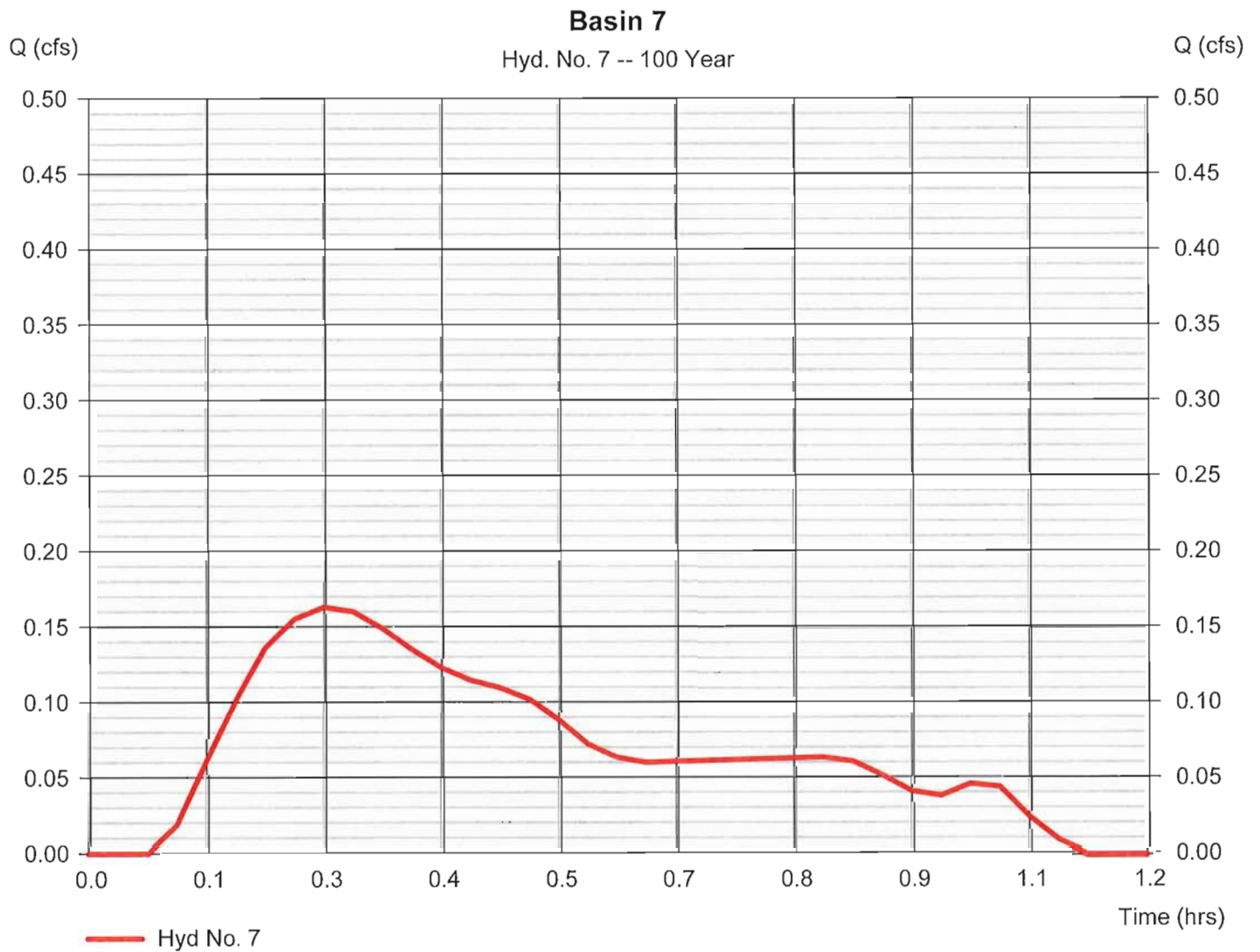
Thursday, 01 / 24 / 2019

Hyd. No. 7

Basin 7

Hydrograph type	= SCS Runoff	Peak discharge	= 0.163 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.27 hrs
Time interval	= 2 min	Hyd. volume	= 300 cuft
Drainage area	= 0.080 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.21 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.002 \times 98) + (0.076 \times 74)] / 0.080$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

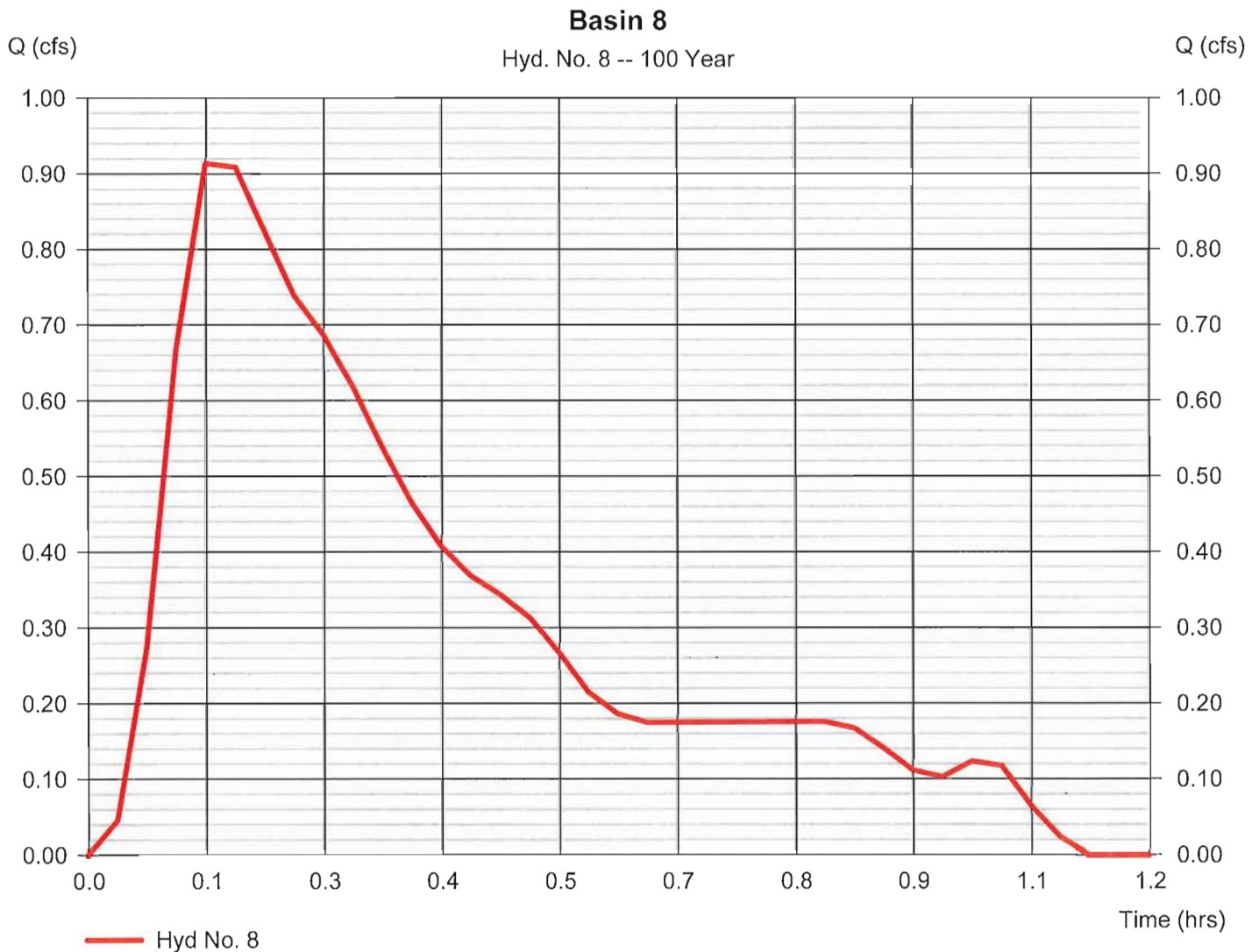
Thursday, 01 / 24 / 2019

Hyd. No. 8

Basin 8

Hydrograph type	= SCS Runoff	Peak discharge	= 0.914 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.13 hrs
Time interval	= 2 min	Hyd. volume	= 1,304 cuft
Drainage area	= 0.150 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.21 in	Distribution	= Huff-1st
Storm duration	= 1.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.127 \times 98) + (0.024 \times 74)] / 0.150$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

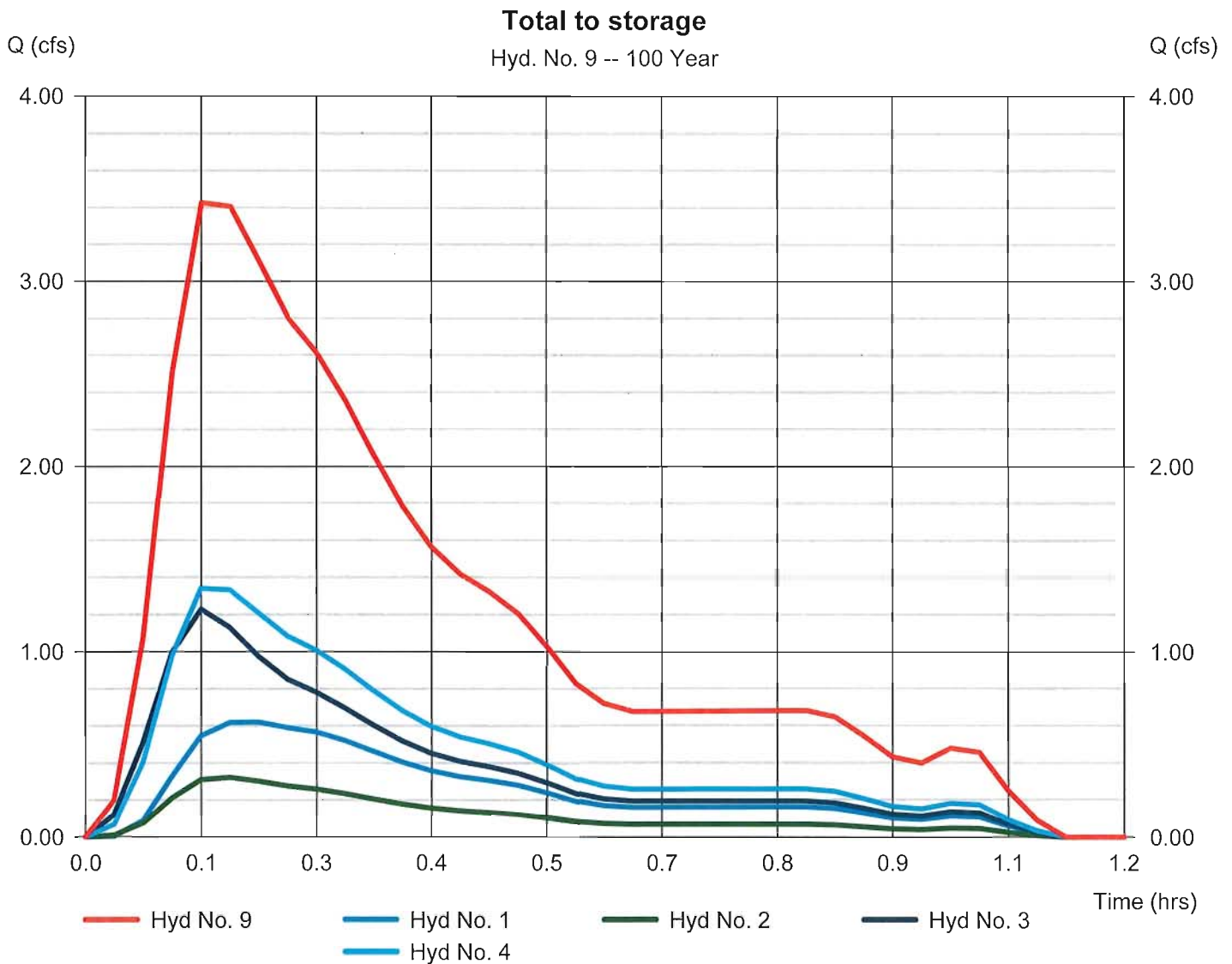
Thursday, 01 / 24 / 2019

Hyd. No. 9

Total to storage

Hydrograph type = Combine
 Storm frequency = 100 yrs
 Time interval = 2 min
 Inflow hyds. = 1, 2, 3, 4

Peak discharge = 3.426 cfs
 Time to peak = 0.13 hrs
 Hyd. volume = 4,979 cuft
 Contrib. drain. area = 0.590 ac



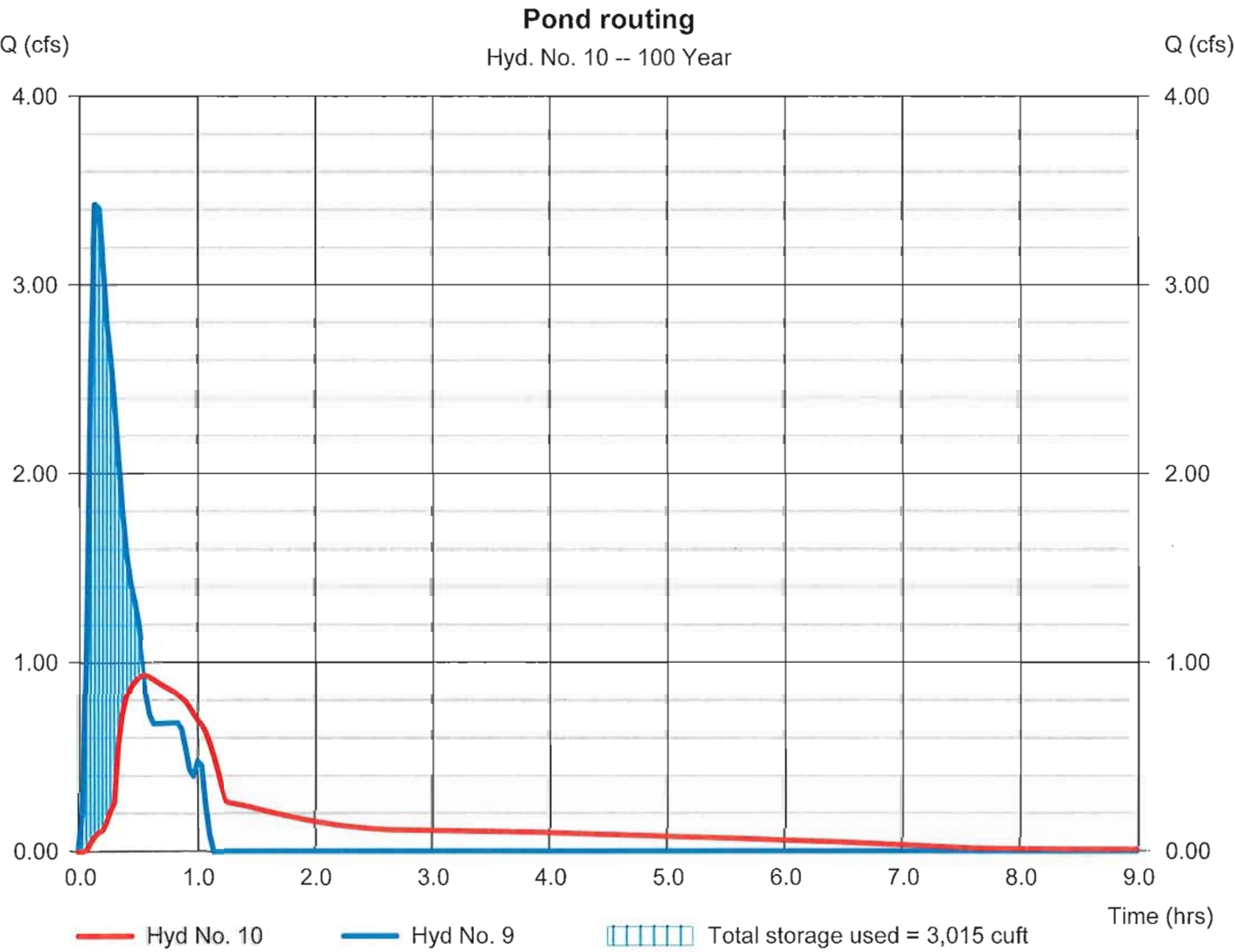
Hydrograph Report

Hyd. No. 10

Pond routing

Hydrograph type	= Reservoir	Peak discharge	= 0.935 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.53 hrs
Time interval	= 2 min	Hyd. volume	= 4,955 cuft
Inflow hyd. No.	= 9 - Total to storage	Max. Elevation	= 741.84 ft
Reservoir name	= Underground Pond 1	Max. Storage	= 3,015 cuft

Storage Indication method used.



Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	46.8066	9.7000	0.8733	-----
2	59.5280	10.4000	0.8832	-----
3	0.0000	0.0000	0.0000	-----
5	54.7227	9.1000	0.8128	-----
10	54.6685	8.4000	0.7806	-----
25	53.3784	7.5000	0.7364	-----
50	50.1986	6.5000	0.6964	-----
100	47.1992	5.6000	0.6579	-----

File name: Franklin,Indiana.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	4.48	3.47	2.85	2.42	2.11	1.88	1.70	1.55	1.42	1.32	1.23	1.15
2	5.32	4.15	3.42	2.92	2.55	2.27	2.05	1.87	1.72	1.59	1.48	1.39
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	6.37	4.98	4.12	3.53	3.11	2.78	2.52	2.31	2.14	1.99	1.86	1.75
10	7.21	5.63	4.67	4.01	3.53	3.17	2.88	2.65	2.45	2.29	2.14	2.02
25	8.31	6.49	5.39	4.65	4.11	3.70	3.37	3.11	2.89	2.70	2.54	2.40
50	9.16	7.13	5.93	5.12	4.54	4.10	3.75	3.46	3.23	3.02	2.85	2.70
100	9.99	7.74	6.45	5.59	4.97	4.50	4.13	3.82	3.57	3.36	3.17	3.01

Tc = time in minutes. Values may exceed 60.

Precip. file name: G:\pcp files\Franklin, Indiana\huff 1st 1-hour.pcp

[illegible]

Hydraflow Table of Contents

2 hr storm.gpw

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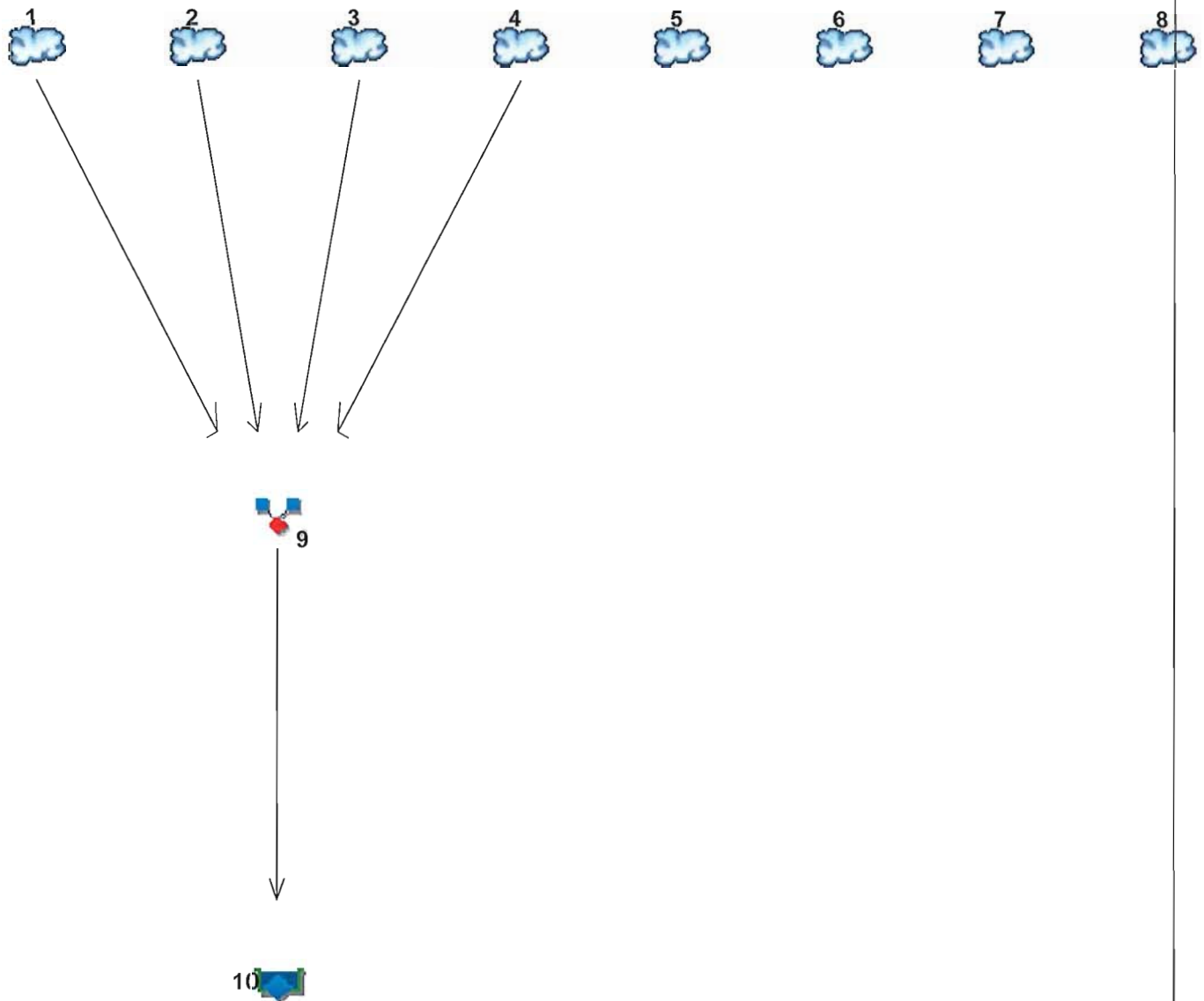
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Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020



Hydrograph Return Period Recap

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	-----	-----	0.106	-----	-----	0.215	-----	-----	0.525	Basin 1
2	SCS Runoff	-----	-----	0.064	-----	-----	0.128	-----	-----	0.264	Basin 2
3	SCS Runoff	-----	-----	0.320	-----	-----	0.526	-----	-----	0.930	Basin 3
4	SCS Runoff	-----	-----	0.307	-----	-----	0.558	-----	-----	1.085	Basin 4
5	SCS Runoff	-----	-----	0.003	-----	-----	0.011	-----	-----	0.031	Basin 5
6	SCS Runoff	-----	-----	0.045	-----	-----	0.090	-----	-----	0.230	Basin 6
7	SCS Runoff	-----	-----	0.016	-----	-----	0.047	-----	-----	0.129	Basin 7
8	SCS Runoff	-----	-----	0.209	-----	-----	0.381	-----	-----	0.739	Basin 8
9	Combine	1, 2, 3,	-----	0.774	-----	-----	1.412	-----	-----	2.762	Total to storage
10	Reservoir	4, 9	-----	0.113	-----	-----	0.247	-----	-----	0.956	Pond routing
<div> <div>Proj. file: 2 hr storm.gpw</div> <div>Thursday, 01 / 24 / 2019</div> </div>											

Hydrograph Summary Report

Hydratlow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	0.106	2	30	369	-----	-----	-----	Basin 1
2	SCS Runoff	0.064	2	14	197	-----	-----	-----	Basin 2
3	SCS Runoff	0.320	2	12	745	-----	-----	-----	Basin 3
4	SCS Runoff	0.307	2	14	830	-----	-----	-----	Basin 4
5	SCS Runoff	0.003	2	42	15	-----	-----	-----	Basin 5
6	SCS Runoff	0.045	2	30	157	-----	-----	-----	Basin 6
7	SCS Runoff	0.016	2	36	65	-----	-----	-----	Basin 7
8	SCS Runoff	0.209	2	14	566	-----	-----	-----	Basin 8
9	Combine	0.774	2	14	2,140	1, 2, 3, 4, 9	-----	-----	Total to storage
10	Reservoir	0.113	2	106	2,117		740.90	1,455	Pond routing
2 hr storm.gpw					Return Period: 2 Year			Thursday, 01 / 24 / 2019	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

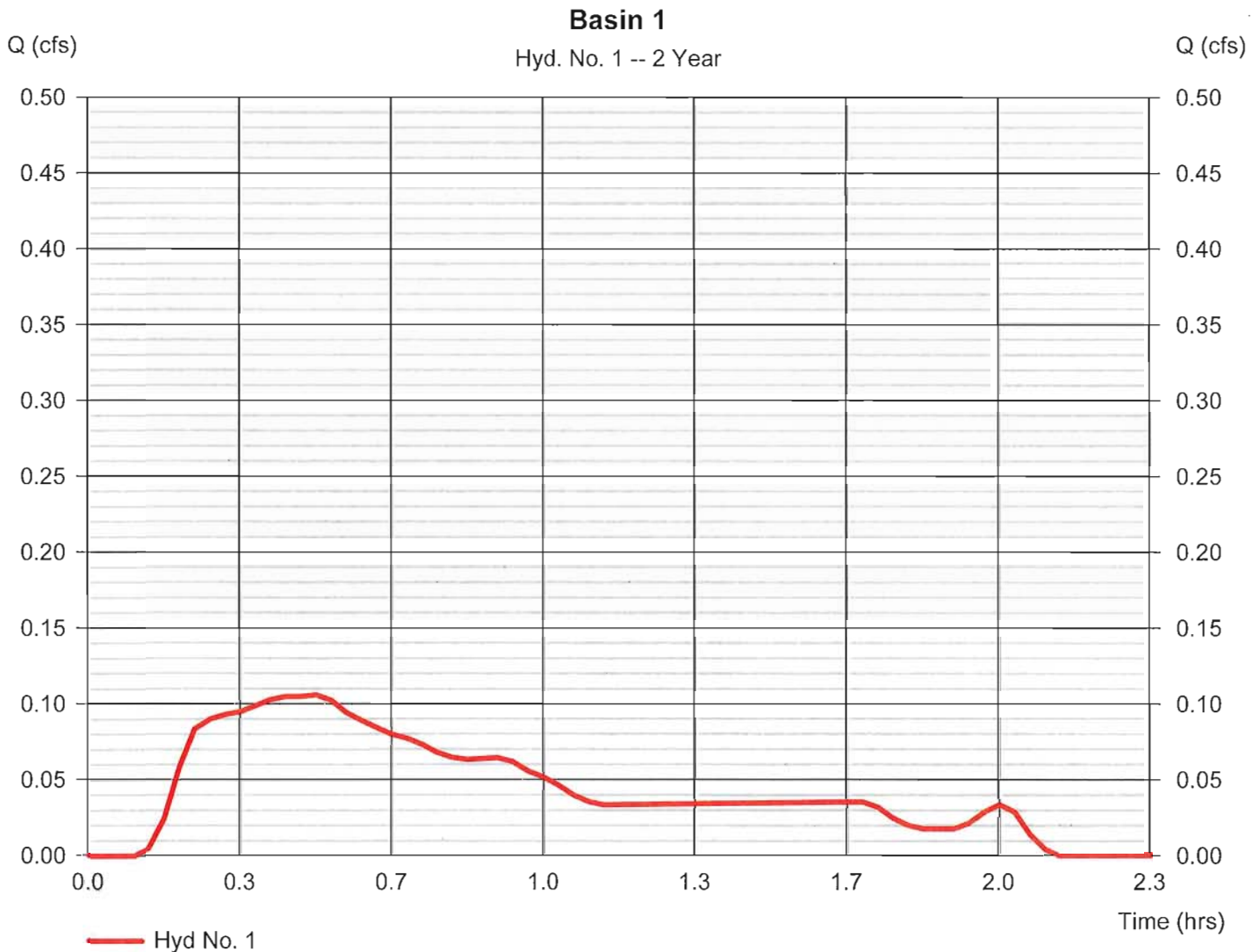
Thursday, 01 / 24 / 2019

Hyd. No. 1

Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.106 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.50 hrs
Time interval	= 2 min	Hyd. volume	= 369 cuft
Drainage area	= 0.150 ac	Curve number	= 88*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.69 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.092 \times 98) + (0.062 \times 74)] / 0.150$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

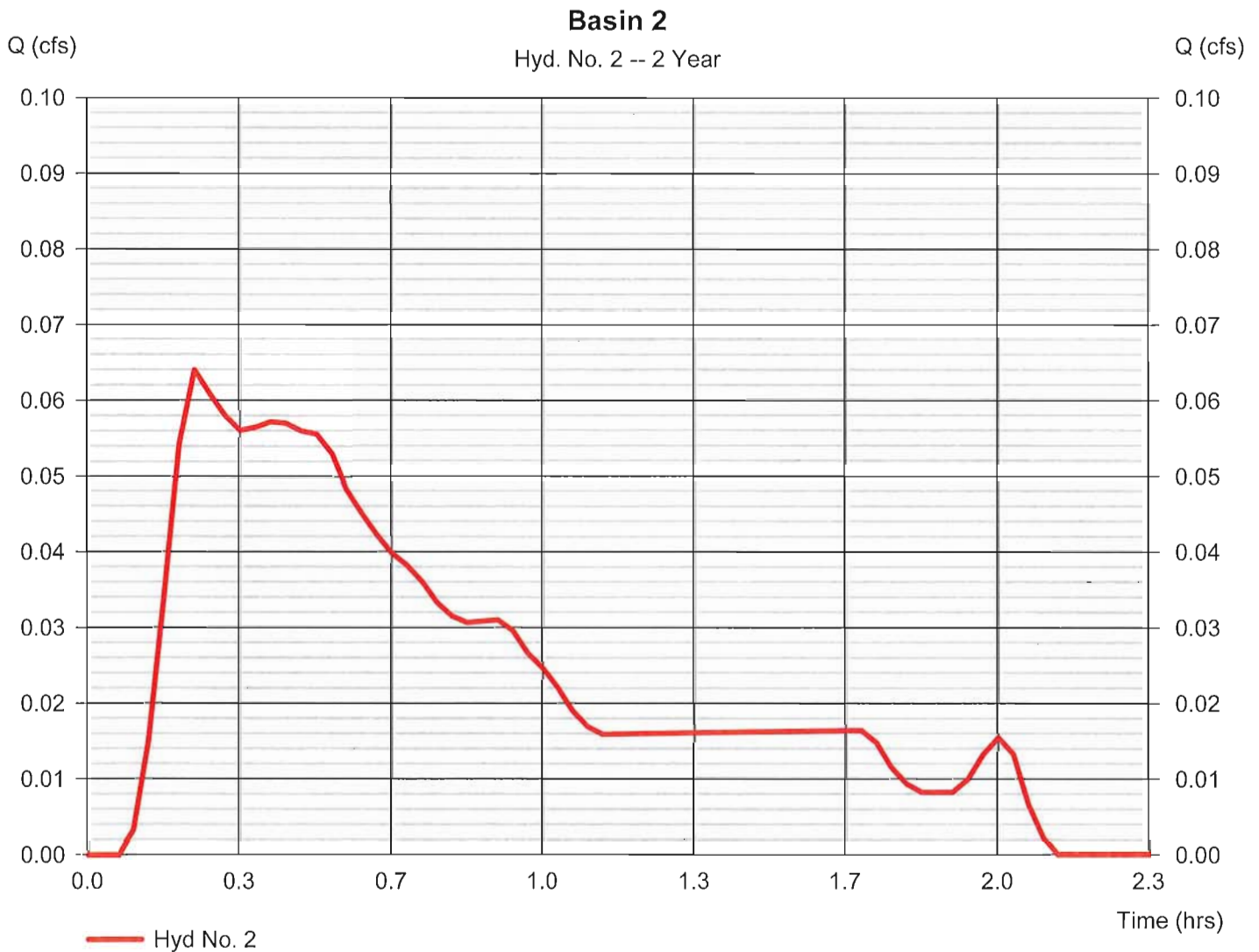
Thursday, 01 / 24 / 2019

Hyd. No. 2

Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.064 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.23 hrs
Time interval	= 2 min	Hyd. volume	= 197 cuft
Drainage area	= 0.060 ac	Curve number	= 92*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.69 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.044 \times 98) + (0.014 \times 74)] / 0.060$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

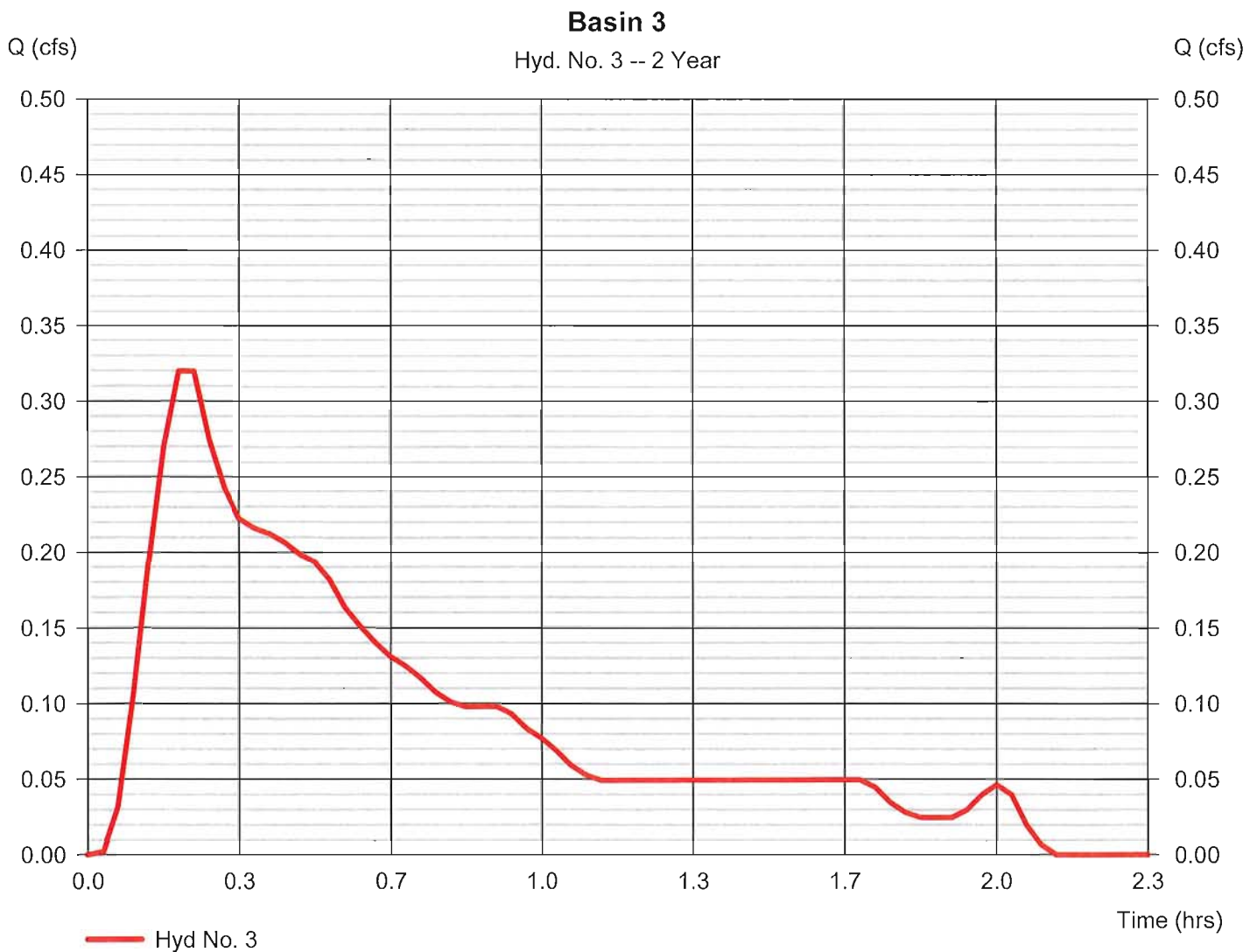
Thursday, 01 / 24 / 2019

Hyd. No. 3

Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 0.320 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.20 hrs
Time interval	= 2 min	Hyd. volume	= 745 cuft
Drainage area	= 0.160 ac	Curve number	= 97*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.69 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.147 \times 98) + (0.009 \times 74)] / 0.160$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

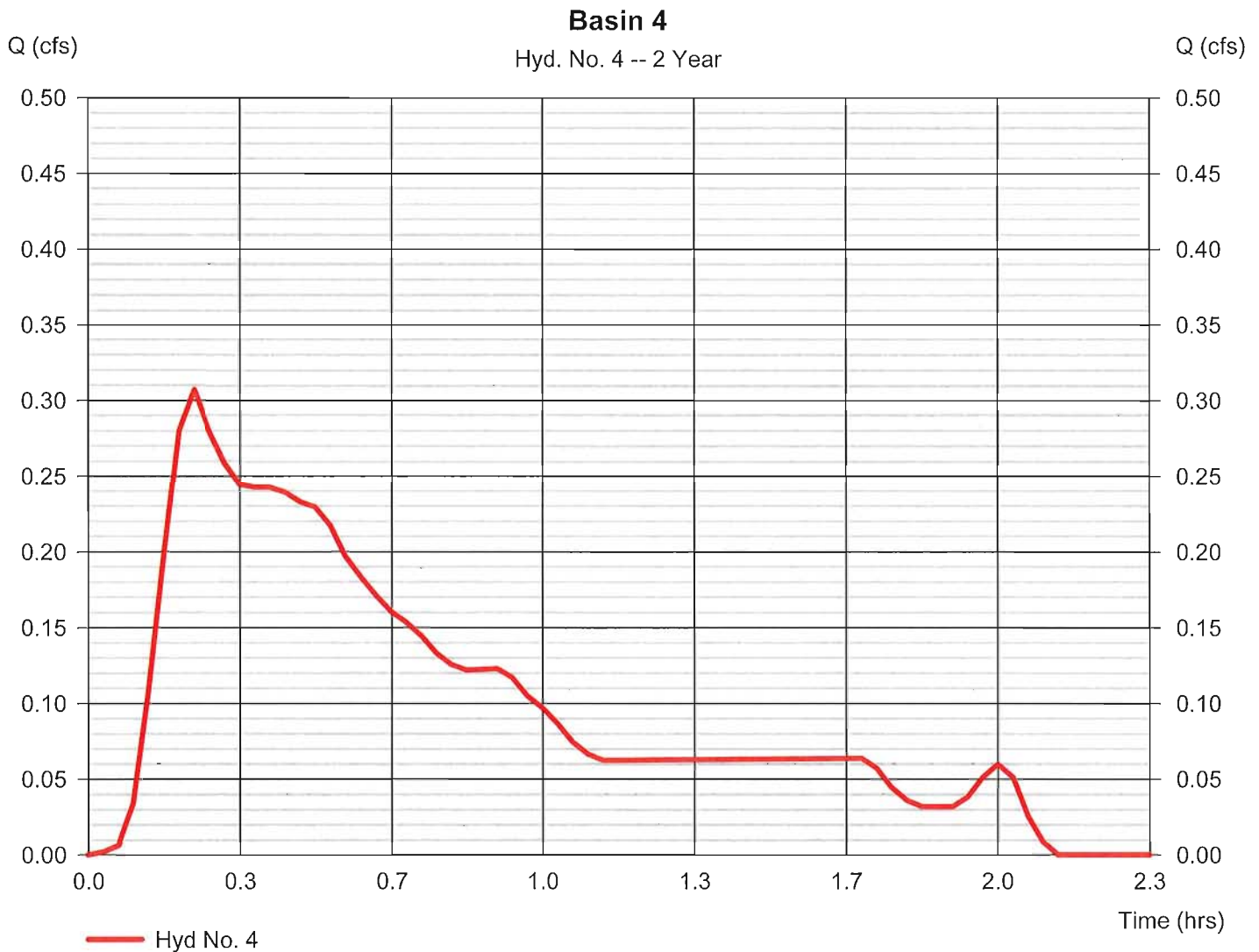
Thursday, 01 / 24 / 2019

Hyd. No. 4

Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 0.307 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.23 hrs
Time interval	= 2 min	Hyd. volume	= 830 cuft
Drainage area	= 0.220 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.69 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.180 \times 98) + (0.040 \times 74)] / 0.220$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

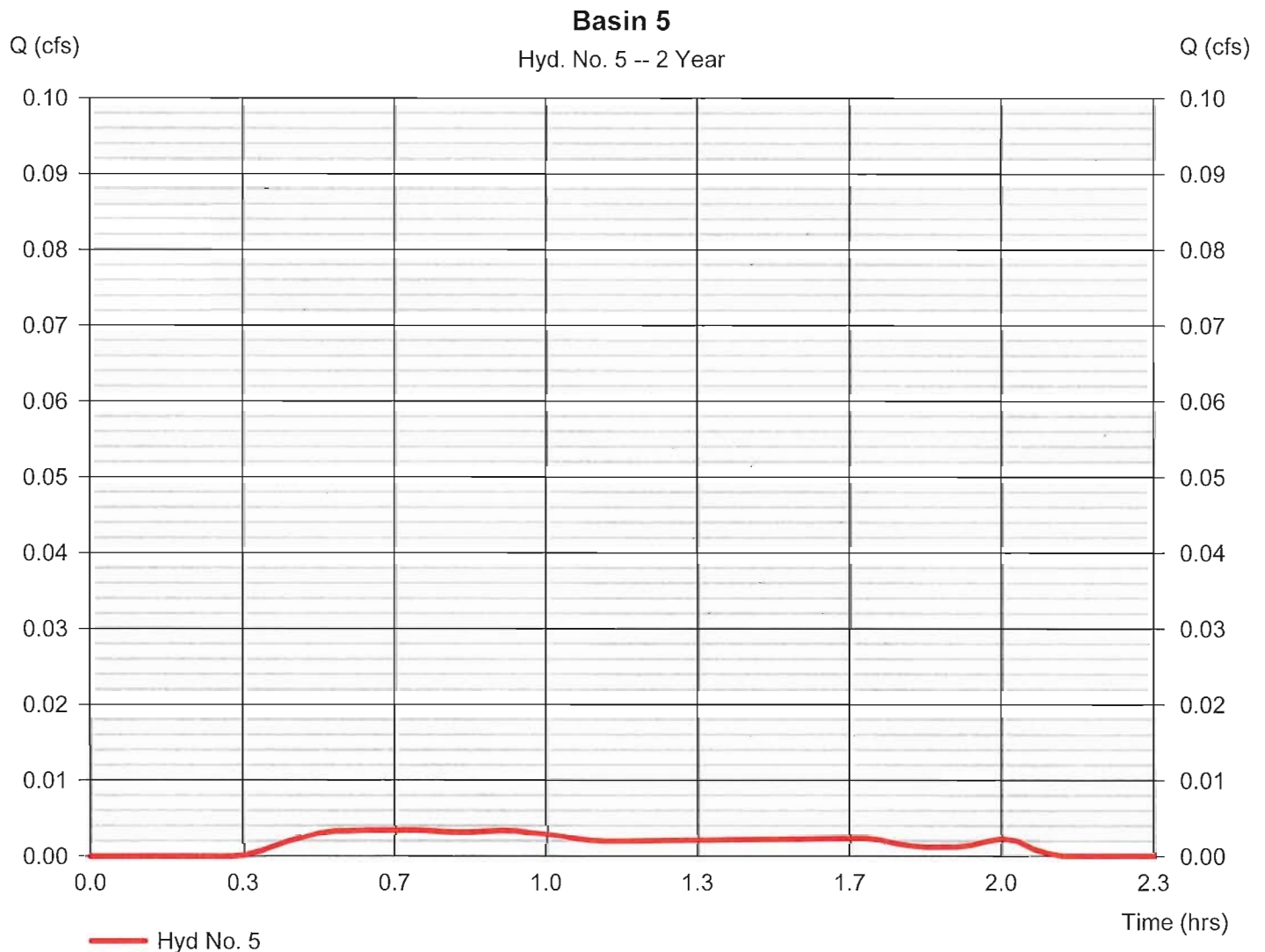
Thursday, 01 / 24 / 2019

Hyd. No. 5

Basin 5

Hydrograph type	= SCS Runoff	Peak discharge	= 0.003 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.70 hrs
Time interval	= 2 min	Hyd. volume	= 15 cuft
Drainage area	= 0.020 ac	Curve number	= 74*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.69 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.020 \times 74)] / 0.020$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

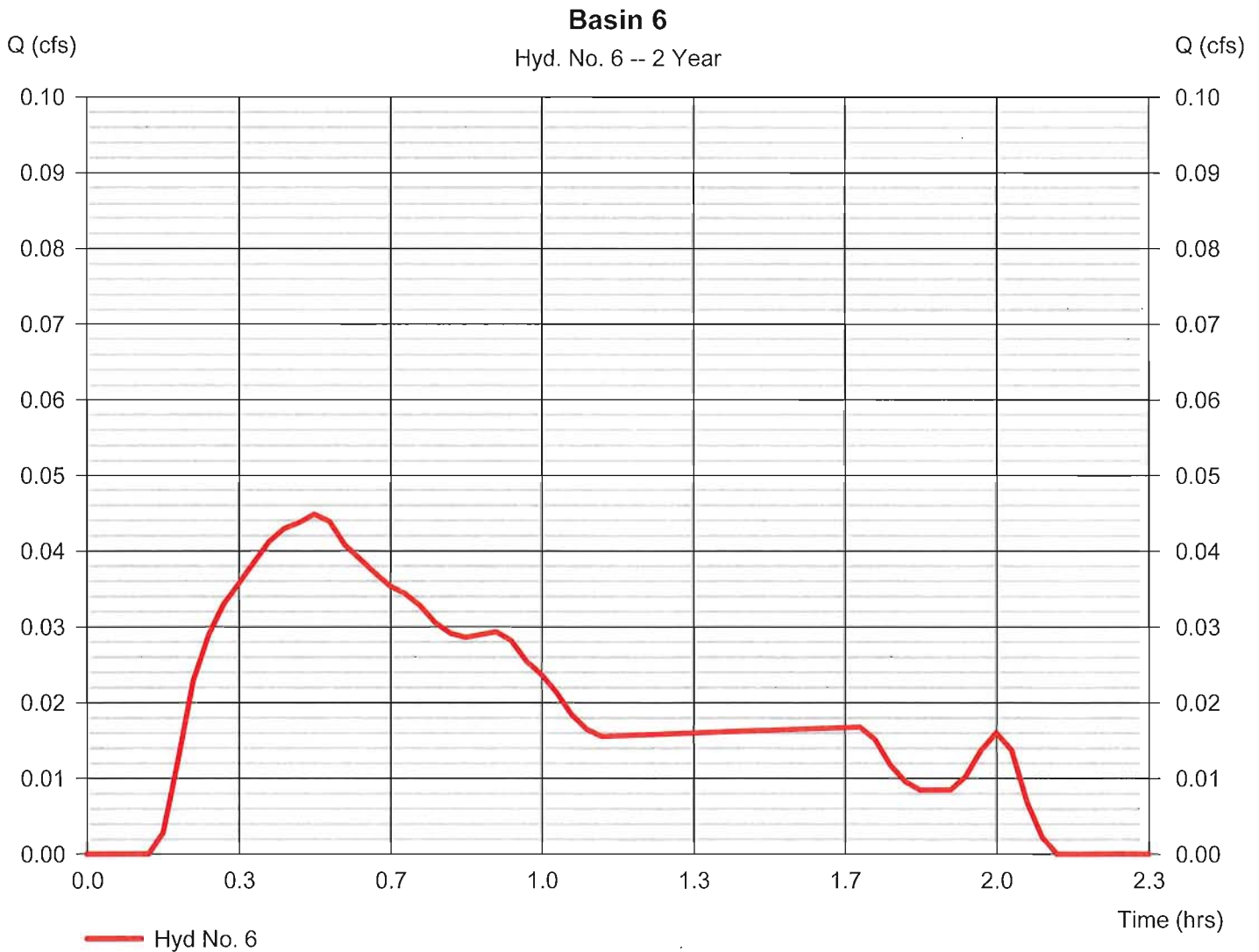
Thursday, 01 / 24 / 2019

Hyd. No. 6

Basin 6

Hydrograph type	= SCS Runoff	Peak discharge	= 0.045 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.50 hrs
Time interval	= 2 min	Hyd. volume	= 157 cuft
Drainage area	= 0.080 ac	Curve number	= 85*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.69 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.034 \times 98) + (0.043 \times 74)] / 0.080$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

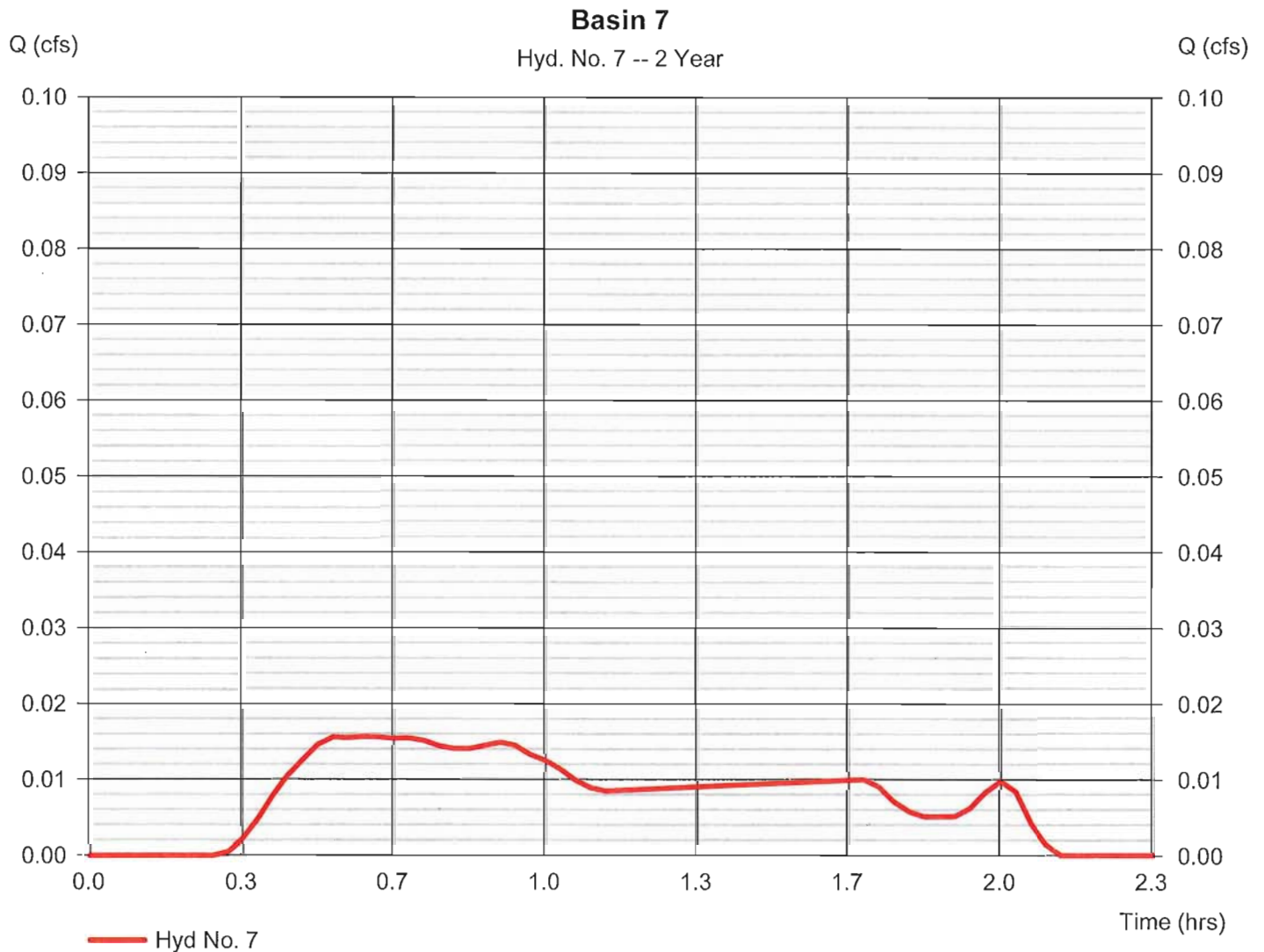
Thursday, 01 / 24 / 2019

Hyd. No. 7

Basin 7

Hydrograph type	= SCS Runoff	Peak discharge	= 0.016 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.60 hrs
Time interval	= 2 min	Hyd. volume	= 65 cuft
Drainage area	= 0.080 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.69 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.002 \times 98) + (0.076 \times 74)] / 0.080$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

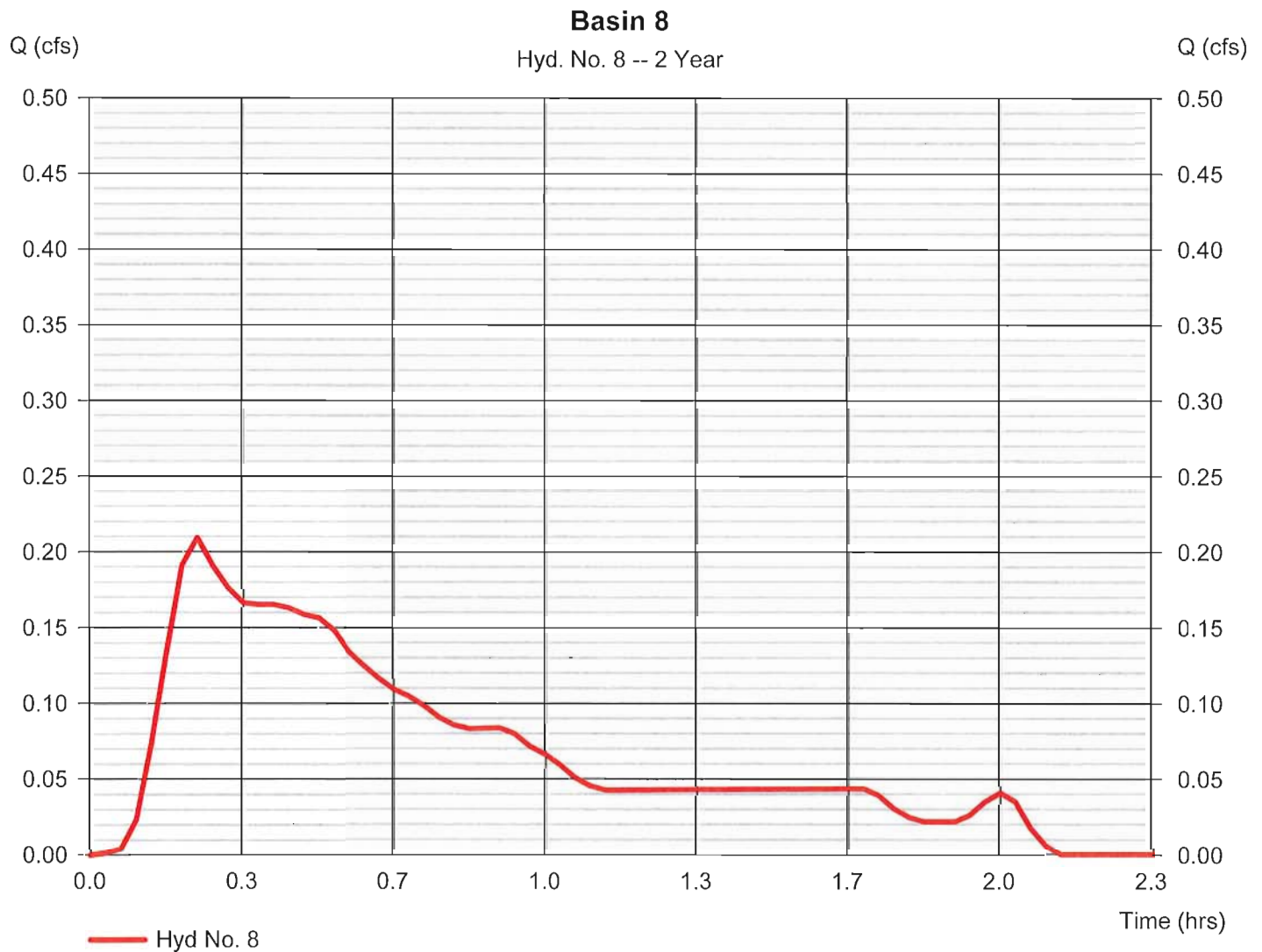
Thursday, 01 / 24 / 2019

Hyd. No. 8

Basin 8

Hydrograph type	= SCS Runoff	Peak discharge	= 0.209 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.23 hrs
Time interval	= 2 min	Hyd. volume	= 566 cuft
Drainage area	= 0.150 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.69 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.127 \times 98) + (0.024 \times 74)] / 0.150$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

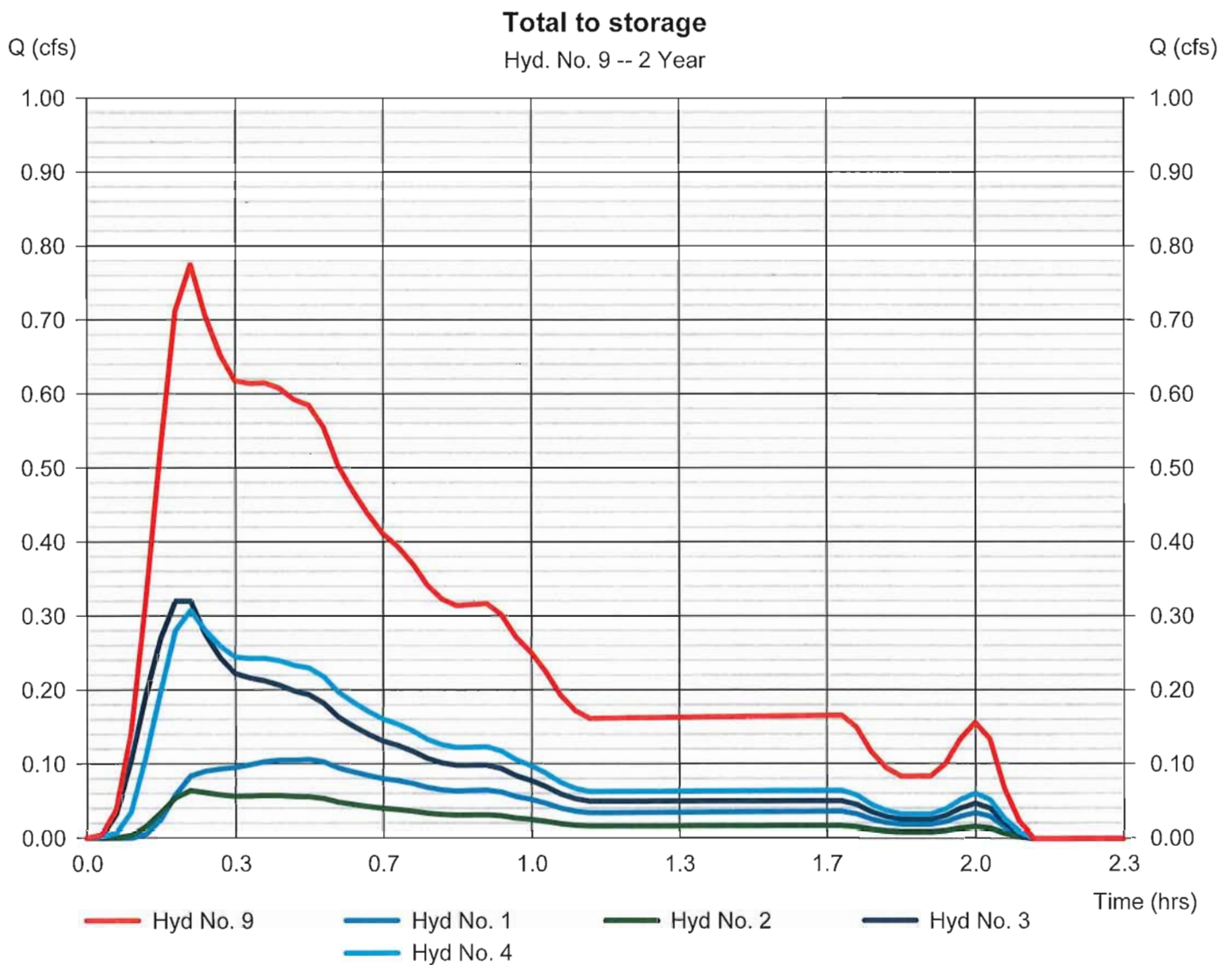
Thursday, 01 / 24 / 2019

Hyd. No. 9

Total to storage

Hydrograph type = Combine
 Storm frequency = 2 yrs
 Time interval = 2 min
 Inflow hyds. = 1, 2, 3, 4

Peak discharge = 0.774 cfs
 Time to peak = 0.23 hrs
 Hyd. volume = 2,140 cuft
 Contrib. drain. area = 0.590 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

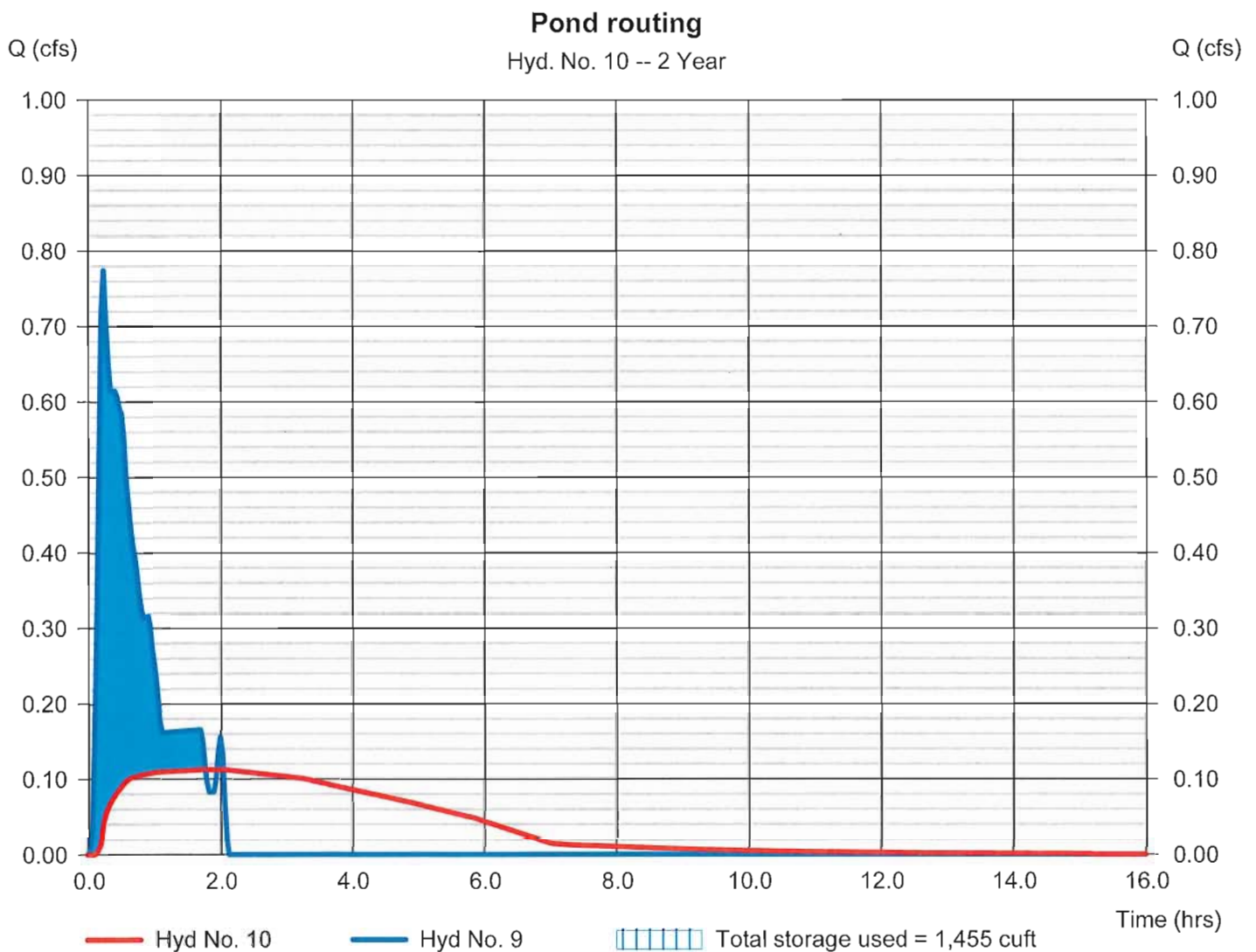
Thursday, 01 / 24 / 2019

Hyd. No. 10

Pond routing

Hydrograph type	= Reservoir	Peak discharge	= 0.113 cfs
Storm frequency	= 2 yrs	Time to peak	= 1.77 hrs
Time interval	= 2 min	Hyd. volume	= 2,117 cuft
Inflow hyd. No.	= 9 - Total to storage	Max. Elevation	= 740.90 ft
Reservoir name	= Underground Pond 1	Max. Storage	= 1,455 cuft

Storage Indication method used.



Pond Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 24 / 2019

Pond No. 1 - Underground Pond 1

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	739.67	n/a	0	0
0.17	739.84	n/a	165	165
0.33	740.00	n/a	165	330
0.51	740.18	n/a	165	495
0.67	740.34	n/a	165	660
0.83	740.50	n/a	165	825
1.00	740.67	n/a	165	990
1.17	740.84	n/a	335	1,326
1.33	741.00	n/a	326	1,652
1.50	741.17	n/a	314	1,967
1.67	741.34	n/a	300	2,267
1.83	741.50	n/a	281	2,548
2.00	741.67	n/a	257	2,805
2.17	741.84	n/a	214	3,019
2.33	742.00	n/a	178	3,196
2.50	742.17	n/a	165	3,362
2.67	742.34	n/a	165	3,527
2.83	742.50	n/a	165	3,692
3.00	742.67	n/a	165	3,857

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 2.00	6.00	0.00	0.00
Span (in)	= 2.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 739.67	740.90	0.00	0.00
Length (ft)	= 1.00	1.00	0.00	0.00
Slope (%)	= 1.00	1.00	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	0.00	0.00	0.00
Crest El. (ft)	= 741.87	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 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	739.67	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.02	17	739.69	0.00 oc	0.00	---	---	0.00	---	---	---	---	---	0.001
0.03	33	739.70	0.00 oc	0.00	---	---	0.00	---	---	---	---	---	0.002
0.05	50	739.72	0.00 oc	0.00	---	---	0.00	---	---	---	---	---	0.003
0.07	66	739.74	0.00 oc	0.00	---	---	0.00	---	---	---	---	---	0.005
0.09	83	739.76	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.007
0.10	99	739.77	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.008
0.12	116	739.79	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.010
0.14	132	739.81	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.012
0.15	149	739.82	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.013
0.17	165	739.84	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.015
0.19	182	739.86	0.02 oc	0.00	---	---	0.00	---	---	---	---	---	0.022
0.20	198	739.87	0.03 oc	0.00	---	---	0.00	---	---	---	---	---	0.027
0.22	215	739.89	0.03 oc	0.00	---	---	0.00	---	---	---	---	---	0.032
0.23	231	739.90	0.04 oc	0.00	---	---	0.00	---	---	---	---	---	0.036
0.25	248	739.92	0.04 oc	0.00	---	---	0.00	---	---	---	---	---	0.039
0.27	264	739.94	0.04 oc	0.00	---	---	0.00	---	---	---	---	---	0.043
0.28	281	739.95	0.05 oc	0.00	---	---	0.00	---	---	---	---	---	0.046
0.30	297	739.97	0.05 oc	0.00	---	---	0.00	---	---	---	---	---	0.049
0.31	314	739.98	0.05 ic	0.00	---	---	0.00	---	---	---	---	---	0.050
0.33	330	740.00	0.05 ic	0.00	---	---	0.00	---	---	---	---	---	0.052
0.35	347	740.02	0.05 ic	0.00	---	---	0.00	---	---	---	---	---	0.054
0.37	363	740.04	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.056

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Underground Pond 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
0.38	380	740.05	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.058
0.40	396	740.07	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.059
0.42	413	740.09	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.061
0.44	429	740.11	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.063
0.46	446	740.13	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.064
0.47	462	740.14	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.066
0.49	479	740.16	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.067
0.51	495	740.18	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.069
0.53	512	740.20	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.070
0.54	528	740.21	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.071
0.56	545	740.23	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.072
0.57	561	740.24	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.074
0.59	578	740.26	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.075
0.61	594	740.28	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.076
0.62	611	740.29	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.077
0.64	627	740.31	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.078
0.65	644	740.32	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.079
0.67	660	740.34	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.080
0.69	677	740.36	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.082
0.70	693	740.37	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.083
0.72	710	740.39	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.084
0.73	726	740.40	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.085
0.75	743	740.42	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.086
0.77	759	740.44	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.087
0.78	776	740.45	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.088
0.80	792	740.47	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.089
0.81	809	740.48	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.090
0.83	825	740.50	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.091
0.85	842	740.52	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.092
0.86	858	740.53	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.093
0.88	875	740.55	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.094
0.90	891	740.57	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.095
0.92	908	740.59	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.096
0.93	924	740.60	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.097
0.95	941	740.62	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.098
0.97	957	740.64	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.099
0.98	974	740.65	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.100
1.00	990	740.67	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.101
1.02	1,024	740.69	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.101
1.03	1,057	740.70	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.102
1.05	1,091	740.72	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.103
1.07	1,125	740.74	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.104
1.09	1,158	740.76	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.105
1.10	1,192	740.77	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.106
1.12	1,225	740.79	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.107
1.14	1,259	740.81	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.108
1.15	1,292	740.82	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.109
1.17	1,326	740.84	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.109
1.19	1,358	740.86	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.110
1.20	1,391	740.87	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.111
1.22	1,424	740.89	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.112
1.23	1,456	740.90	0.11 ic	0.00 oc	---	---	0.00	---	---	---	---	---	0.113
1.25	1,489	740.92	0.11 ic	0.00 oc	---	---	0.00	---	---	---	---	---	0.115
1.27	1,522	740.94	0.11 ic	0.00 oc	---	---	0.00	---	---	---	---	---	0.118
1.28	1,554	740.95	0.11 ic	0.01 oc	---	---	0.00	---	---	---	---	---	0.121
1.30	1,587	740.97	0.12 ic	0.01 oc	---	---	0.00	---	---	---	---	---	0.125
1.31	1,620	740.98	0.12 ic	0.01 oc	---	---	0.00	---	---	---	---	---	0.130
1.33	1,652	741.00	0.12 ic	0.02 oc	---	---	0.00	---	---	---	---	---	0.135
1.35	1,684	741.02	0.12 ic	0.02 oc	---	---	0.00	---	---	---	---	---	0.140
1.36	1,715	741.03	0.12 ic	0.03 oc	---	---	0.00	---	---	---	---	---	0.145
1.38	1,747	741.05	0.12 ic	0.03 oc	---	---	0.00	---	---	---	---	---	0.151
1.40	1,778	741.07	0.12 ic	0.04 oc	---	---	0.00	---	---	---	---	---	0.157
1.41	1,809	741.09	0.12 ic	0.04 oc	---	---	0.00	---	---	---	---	---	0.163
1.43	1,841	741.10	0.12 ic	0.05 oc	---	---	0.00	---	---	---	---	---	0.169
1.45	1,872	741.12	0.12 ic	0.05 oc	---	---	0.00	---	---	---	---	---	0.176
1.47	1,904	741.14	0.12 ic	0.06 oc	---	---	0.00	---	---	---	---	---	0.182
1.48	1,935	741.15	0.12 ic	0.06 oc	---	---	0.00	---	---	---	---	---	0.188
1.50	1,967	741.17	0.13 ic	0.07 oc	---	---	0.00	---	---	---	---	---	0.194
1.52	1,997	741.19	0.13 ic	0.07 oc	---	---	0.00	---	---	---	---	---	0.201
1.53	2,027	741.20	0.13 ic	0.08 oc	---	---	0.00	---	---	---	---	---	0.207

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Underground Pond 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
1.55	2,057	741.22	0.13 ic	0.09 oc	---	---	0.00	---	---	---	---	---	0.213
1.57	2,087	741.24	0.13 ic	0.09 oc	---	---	0.00	---	---	---	---	---	0.219
1.59	2,117	741.26	0.13 ic	0.10 oc	---	---	0.00	---	---	---	---	---	0.225
1.60	2,147	741.27	0.13 ic	0.10 oc	---	---	0.00	---	---	---	---	---	0.230
1.62	2,177	741.29	0.13 ic	0.11 oc	---	---	0.00	---	---	---	---	---	0.236
1.64	2,207	741.31	0.13 ic	0.11 oc	---	---	0.00	---	---	---	---	---	0.241
1.65	2,237	741.32	0.13 ic	0.11 oc	---	---	0.00	---	---	---	---	---	0.246
1.67	2,267	741.34	0.13 ic	0.12 oc	---	---	0.00	---	---	---	---	---	0.250
1.69	2,295	741.36	0.13 ic	0.12 oc	---	---	0.00	---	---	---	---	---	0.254
1.70	2,323	741.37	0.13 ic	0.12 oc	---	---	0.00	---	---	---	---	---	0.257
1.72	2,351	741.39	0.13 ic	0.13 oc	---	---	0.00	---	---	---	---	---	0.259
1.73	2,379	741.40	0.13 ic	0.15 oc	---	---	0.00	---	---	---	---	---	0.283
1.75	2,407	741.42	0.14 ic	0.22 oc	---	---	0.00	---	---	---	---	---	0.353
1.77	2,436	741.44	0.14 ic	0.27 oc	---	---	0.00	---	---	---	---	---	0.405
1.78	2,464	741.45	0.14 ic	0.31 oc	---	---	0.00	---	---	---	---	---	0.449
1.80	2,492	741.47	0.14 ic	0.35 oc	---	---	0.00	---	---	---	---	---	0.488
1.81	2,520	741.48	0.14 ic	0.38 oc	---	---	0.00	---	---	---	---	---	0.522
1.83	2,548	741.50	0.14 ic	0.42 oc	---	---	0.00	---	---	---	---	---	0.555
1.85	2,574	741.52	0.14 ic	0.45 oc	---	---	0.00	---	---	---	---	---	0.586
1.86	2,599	741.53	0.14 ic	0.48 oc	---	---	0.00	---	---	---	---	---	0.616
1.88	2,625	741.55	0.14 ic	0.50 oc	---	---	0.00	---	---	---	---	---	0.644
1.90	2,651	741.57	0.14 ic	0.53 oc	---	---	0.00	---	---	---	---	---	0.671
1.91	2,676	741.59	0.14 ic	0.55 oc	---	---	0.00	---	---	---	---	---	0.696
1.93	2,702	741.60	0.14 ic	0.58 oc	---	---	0.00	---	---	---	---	---	0.721
1.95	2,728	741.62	0.14 ic	0.60 oc	---	---	0.00	---	---	---	---	---	0.744
1.97	2,754	741.64	0.14 ic	0.62 oc	---	---	0.00	---	---	---	---	---	0.766
1.98	2,779	741.65	0.14 ic	0.64 oc	---	---	0.00	---	---	---	---	---	0.788
2.00	2,805	741.67	0.15 ic	0.66 oc	---	---	0.00	---	---	---	---	---	0.809
2.02	2,826	741.69	0.15 ic	0.68 oc	---	---	0.00	---	---	---	---	---	0.830
2.03	2,848	741.70	0.15 ic	0.70 oc	---	---	0.00	---	---	---	---	---	0.849
2.05	2,869	741.72	0.15 ic	0.71 ic	---	---	0.00	---	---	---	---	---	0.862
2.07	2,890	741.74	0.15 ic	0.72 ic	---	---	0.00	---	---	---	---	---	0.873
2.09	2,912	741.76	0.15 ic	0.74 ic	---	---	0.00	---	---	---	---	---	0.884
2.10	2,933	741.77	0.15 ic	0.75 ic	---	---	0.00	---	---	---	---	---	0.895
2.12	2,954	741.79	0.15 ic	0.76 ic	---	---	0.00	---	---	---	---	---	0.906
2.14	2,976	741.81	0.15 ic	0.77 ic	---	---	0.00	---	---	---	---	---	0.916
2.15	2,997	741.82	0.15 ic	0.78 ic	---	---	0.00	---	---	---	---	---	0.927
2.17	3,019	741.84	0.15 ic	0.79 ic	---	---	0.00	---	---	---	---	---	0.937
2.19	3,036	741.86	0.15 ic	0.79 ic	---	---	0.00	---	---	---	---	---	0.947
2.20	3,054	741.87	0.15 ic	0.80 ic	---	---	0.00	---	---	---	---	---	0.957
2.22	3,072	741.89	0.15 ic	0.81 ic	---	---	0.02	---	---	---	---	---	0.990
2.23	3,090	741.90	0.15 ic	0.82 ic	---	---	0.06	---	---	---	---	---	1.037
2.25	3,108	741.92	0.15 ic	0.83 ic	---	---	0.11	---	---	---	---	---	1.096
2.27	3,125	741.94	0.16 ic	0.84 ic	---	---	0.17	---	---	---	---	---	1.163
2.28	3,143	741.95	0.16 ic	0.85 ic	---	---	0.23	---	---	---	---	---	1.237
2.30	3,161	741.97	0.16 ic	0.85 ic	---	---	0.31	---	---	---	---	---	1.318
2.31	3,179	741.98	0.16 ic	0.86 ic	---	---	0.38	---	---	---	---	---	1.404
2.33	3,196	742.00	0.16 ic	0.87 ic	---	---	0.47	---	---	---	---	---	1.497
2.35	3,213	742.02	0.16 ic	0.88 ic	---	---	0.56	---	---	---	---	---	1.601
2.36	3,229	742.03	0.16 ic	0.89 ic	---	---	0.66	---	---	---	---	---	1.712
2.38	3,246	742.05	0.16 ic	0.90 ic	---	---	0.77	---	---	---	---	---	1.826
2.40	3,262	742.07	0.16 ic	0.91 ic	---	---	0.88	---	---	---	---	---	1.947
2.41	3,279	742.09	0.16 ic	0.91 ic	---	---	1.00	---	---	---	---	---	2.071
2.43	3,295	742.10	0.16 ic	0.92 ic	---	---	1.12	---	---	---	---	---	2.201
2.45	3,312	742.12	0.16 ic	0.93 ic	---	---	1.24	---	---	---	---	---	2.335
2.47	3,329	742.14	0.16 ic	0.94 ic	---	---	1.37	---	---	---	---	---	2.473
2.48	3,345	742.15	0.16 ic	0.95 ic	---	---	1.51	---	---	---	---	---	2.616
2.50	3,362	742.17	0.16 ic	0.95 ic	---	---	1.64	---	---	---	---	---	2.759
2.52	3,378	742.19	0.16 ic	0.96 ic	---	---	1.78	---	---	---	---	---	2.910
2.53	3,395	742.20	0.16 ic	0.97 ic	---	---	1.93	---	---	---	---	---	3.063
2.55	3,411	742.22	0.16 ic	0.98 ic	---	---	2.08	---	---	---	---	---	3.222
2.57	3,428	742.24	0.17 ic	0.99 ic	---	---	2.23	---	---	---	---	---	3.383
2.59	3,444	742.26	0.17 ic	0.99 ic	---	---	2.39	---	---	---	---	---	3.548
2.60	3,461	742.27	0.17 ic	1.00 ic	---	---	2.55	---	---	---	---	---	3.716
2.62	3,477	742.29	0.17 ic	1.01 ic	---	---	2.71	---	---	---	---	---	3.888
2.64	3,494	742.31	0.17 ic	1.02 ic	---	---	2.88	---	---	---	---	---	4.062
2.65	3,510	742.32	0.17 ic	1.02 ic	---	---	3.05	---	---	---	---	---	4.240
2.67	3,527	742.34	0.17 ic	1.03 ic	---	---	3.22	---	---	---	---	---	4.419
2.69	3,543	742.36	0.17 ic	1.04 ic	---	---	3.38	---	---	---	---	---	4.592
2.70	3,560	742.37	0.17 ic	1.04 ic	---	---	3.55	---	---	---	---	---	4.768

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Underground Pond 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
2.72	3,576	742.39	0.17 ic	1.05 ic	---	---	3.72	---	---	---	---	---	4.947
2.73	3,593	742.40	0.17 ic	1.06 ic	---	---	3.90	---	---	---	---	---	5.128
2.75	3,609	742.42	0.17 ic	1.07 ic	---	---	4.07	---	---	---	---	---	5.311
2.77	3,626	742.44	0.17 ic	1.07 ic	---	---	4.25	---	---	---	---	---	5.498
2.78	3,642	742.45	0.17 ic	1.08 ic	---	---	4.44	---	---	---	---	---	5.687
2.80	3,659	742.47	0.17 ic	1.09 ic	---	---	4.62	---	---	---	---	---	5.878
2.81	3,675	742.48	0.17 ic	1.09 ic	---	---	4.81	---	---	---	---	---	6.070
2.83	3,692	742.50	0.17 ic	1.10 ic	---	---	5.00	---	---	---	---	---	6.268
2.85	3,708	742.52	0.17 ic	1.11 ic	---	---	5.20	---	---	---	---	---	6.479
2.86	3,725	742.53	0.18 ic	1.11 ic	---	---	5.41	---	---	---	---	---	6.694
2.88	3,741	742.55	0.18 ic	1.12 ic	---	---	5.62	---	---	---	---	---	6.910
2.90	3,758	742.57	0.18 ic	1.13 ic	---	---	5.83	---	---	---	---	---	7.129
2.91	3,774	742.59	0.18 ic	1.13 ic	---	---	6.04	---	---	---	---	---	7.350
2.93	3,791	742.60	0.18 ic	1.14 ic	---	---	6.26	---	---	---	---	---	7.575
2.95	3,807	742.62	0.18 ic	1.15 ic	---	---	6.48	---	---	---	---	---	7.802
2.97	3,824	742.64	0.18 ic	1.15 ic	---	---	6.70	---	---	---	---	---	8.031
2.98	3,840	742.65	0.18 ic	1.16 ic	---	---	6.93	---	---	---	---	---	8.264
3.00	3,857	742.67	0.18 ic	1.17 ic	---	---	7.15	---	---	---	---	---	8.493

...End

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	0.215	2	14	688	-----	-----	-----	Basin 1
2	SCS Runoff	0.128	2	14	338	-----	-----	-----	Basin 2
3	SCS Runoff	0.526	2	12	1,157	-----	-----	-----	Basin 3
4	SCS Runoff	0.558	2	14	1,371	-----	-----	-----	Basin 4
5	SCS Runoff	0.011	2	32	40	-----	-----	-----	Basin 5
6	SCS Runoff	0.090	2	26	312	-----	-----	-----	Basin 6
7	SCS Runoff	0.047	2	30	171	-----	-----	-----	Basin 7
8	SCS Runoff	0.381	2	14	935	-----	-----	-----	Basin 8
9	Combine	1.412	2	14	3,553	1, 2, 3, 4, 9	-----	-----	Total to storage
10	Reservoir	0.247	2	102	3,530		741.33	2,248	Pond routing
2 hr storm.gpw					Return Period: 10 Year			Thursday, 01 / 24 / 2019	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

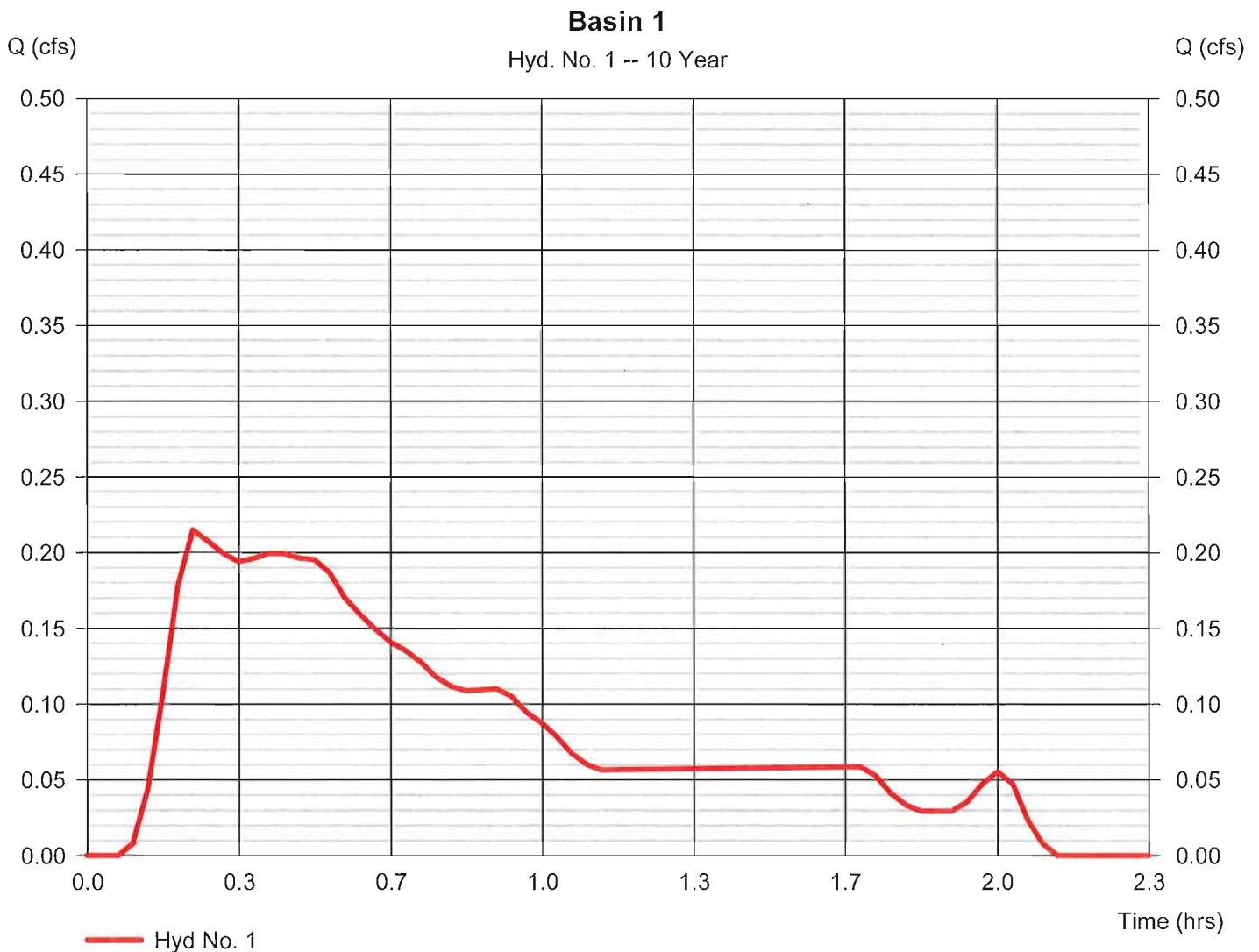
Thursday, 01 / 24 / 2019

Hyd. No. 1

Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.215 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.23 hrs
Time interval	= 2 min	Hyd. volume	= 688 cuft
Drainage area	= 0.150 ac	Curve number	= 88*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.46 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.092 \times 98) + (0.062 \times 74)] / 0.150$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

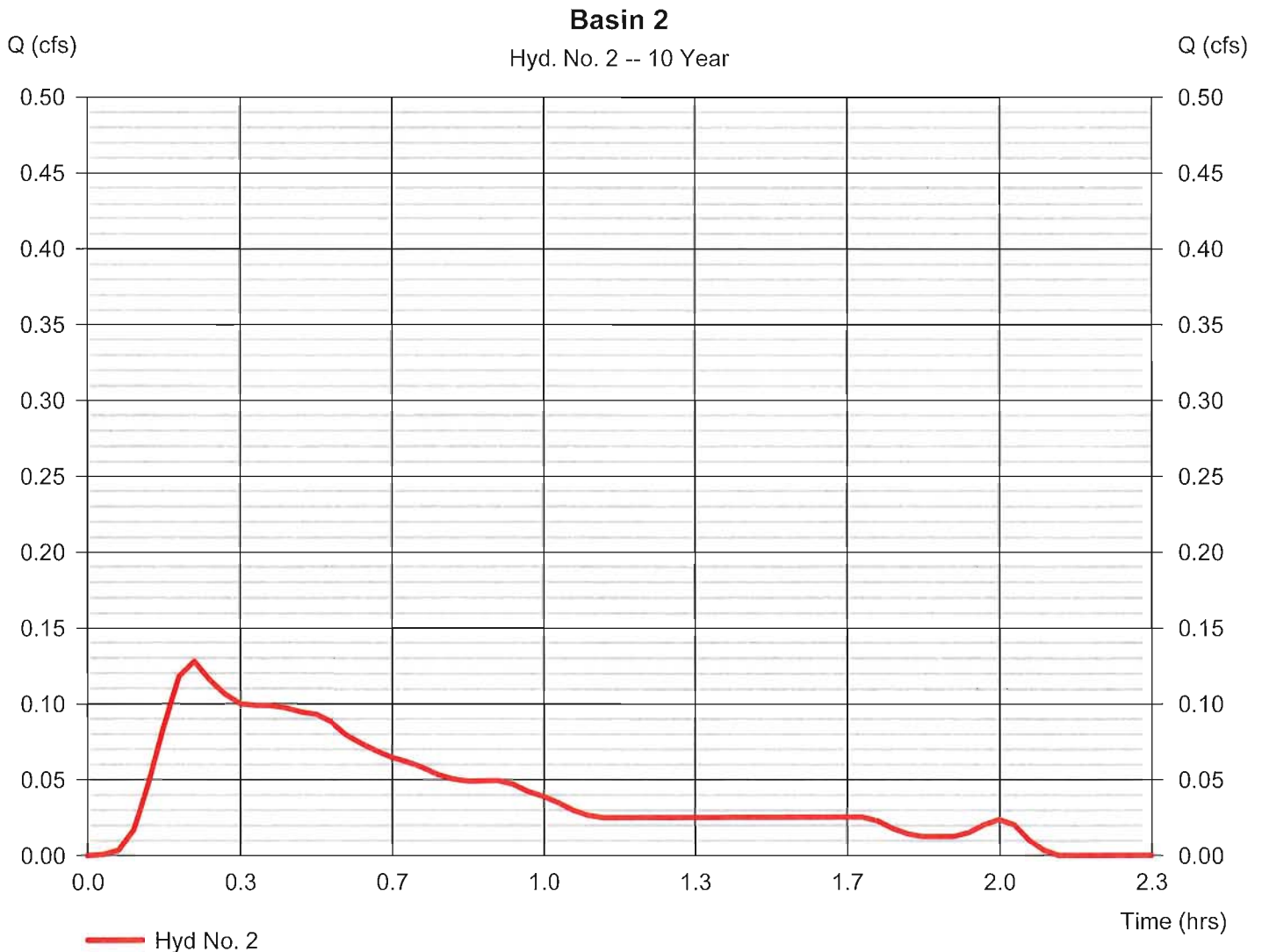
Thursday, 01 / 24 / 2019

Hyd. No. 2

Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.128 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.23 hrs
Time interval	= 2 min	Hyd. volume	= 338 cuft
Drainage area	= 0.060 ac	Curve number	= 92*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.46 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.044 \times 98) + (0.014 \times 74)] / 0.060$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

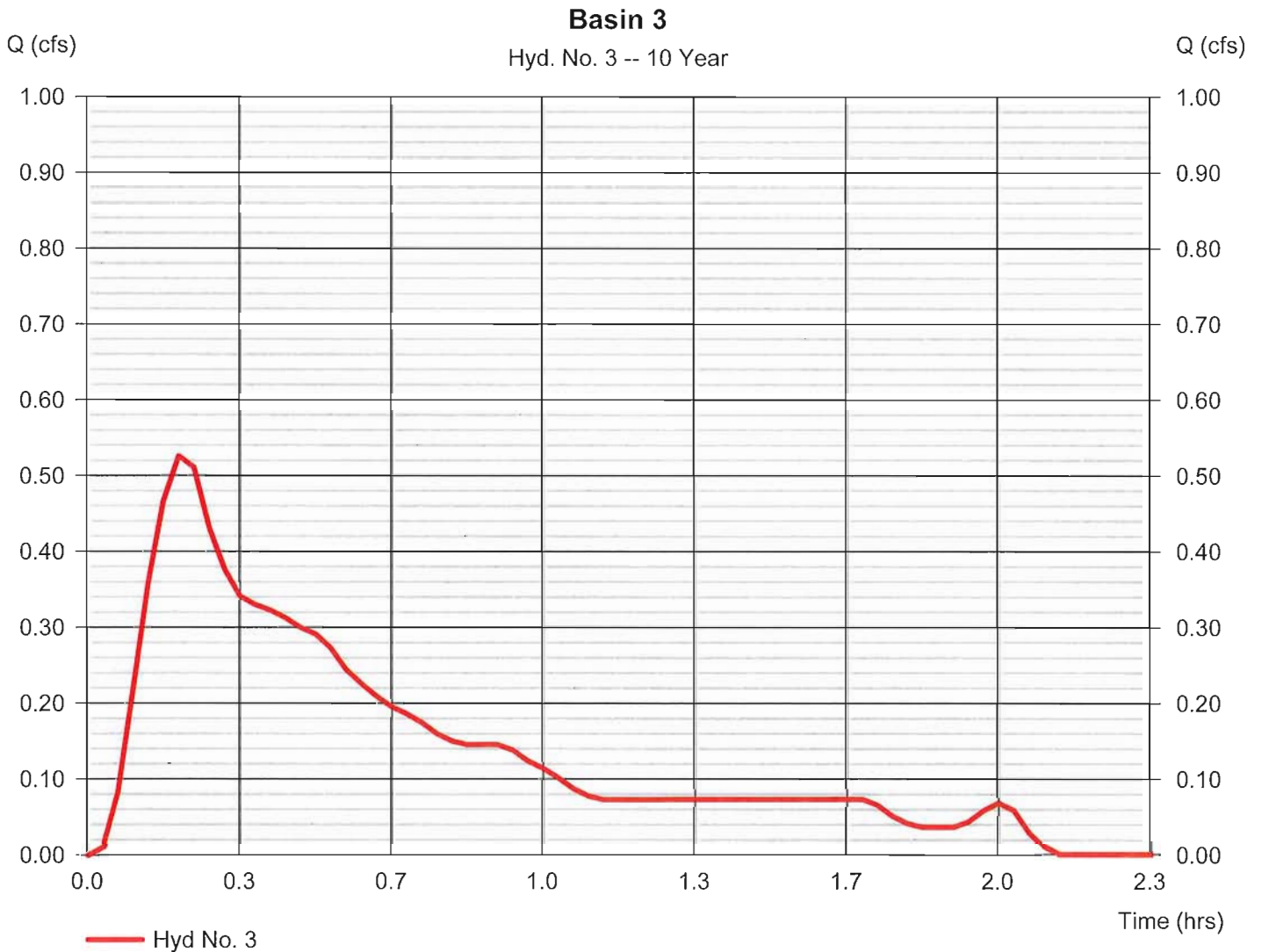
Thursday, 01 / 24 / 2019

Hyd. No. 3

Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 0.526 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.20 hrs
Time interval	= 2 min	Hyd. volume	= 1,157 cuft
Drainage area	= 0.160 ac	Curve number	= 97*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.46 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.147 \times 98) + (0.009 \times 74)] / 0.160$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

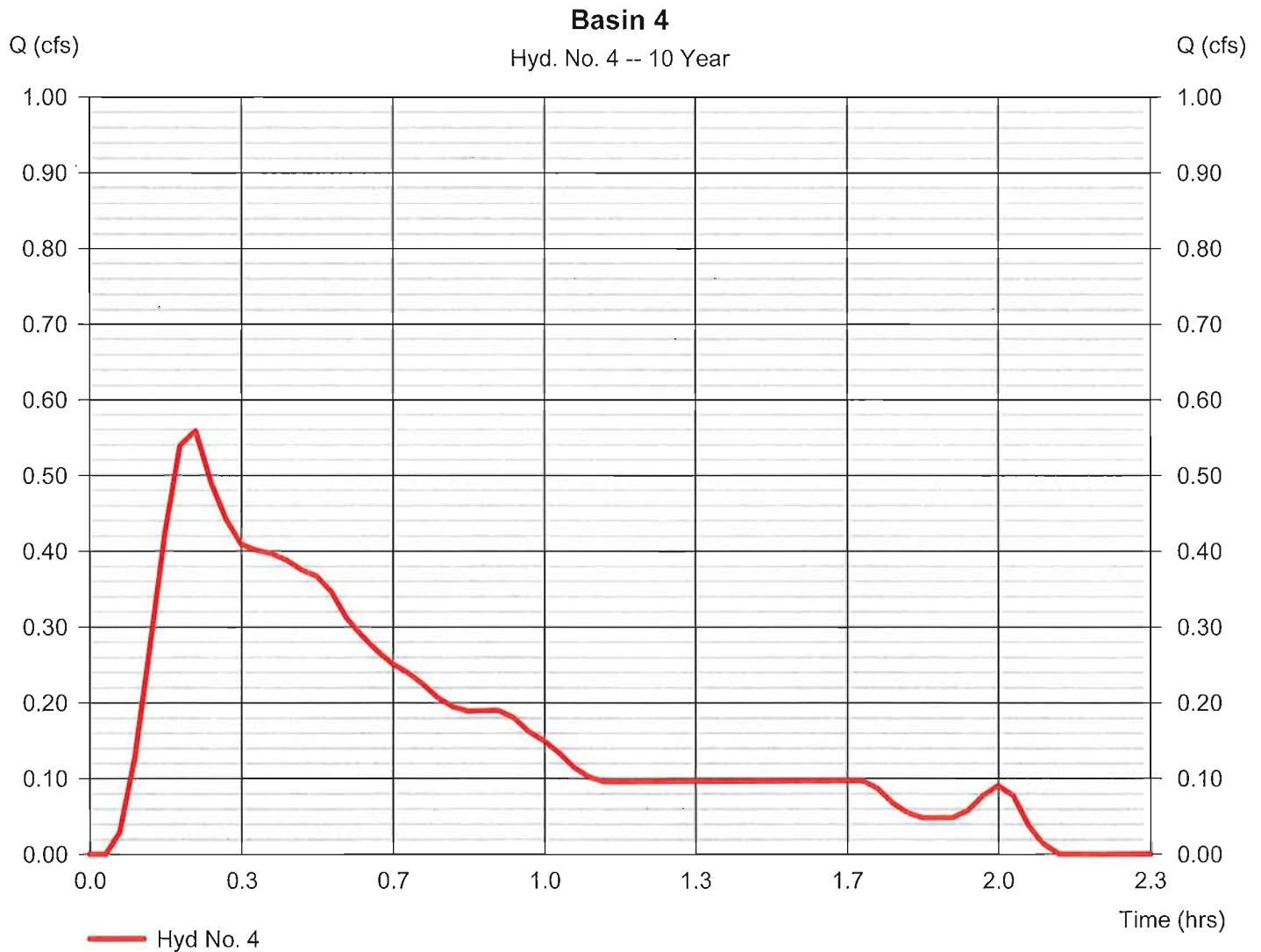
Thursday, 01 / 24 / 2019

Hyd. No. 4

Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 0.558 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.23 hrs
Time interval	= 2 min	Hyd. volume	= 1,371 cuft
Drainage area	= 0.220 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.46 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.180 \times 98) + (0.040 \times 74)] / 0.220$



Hydrograph Report

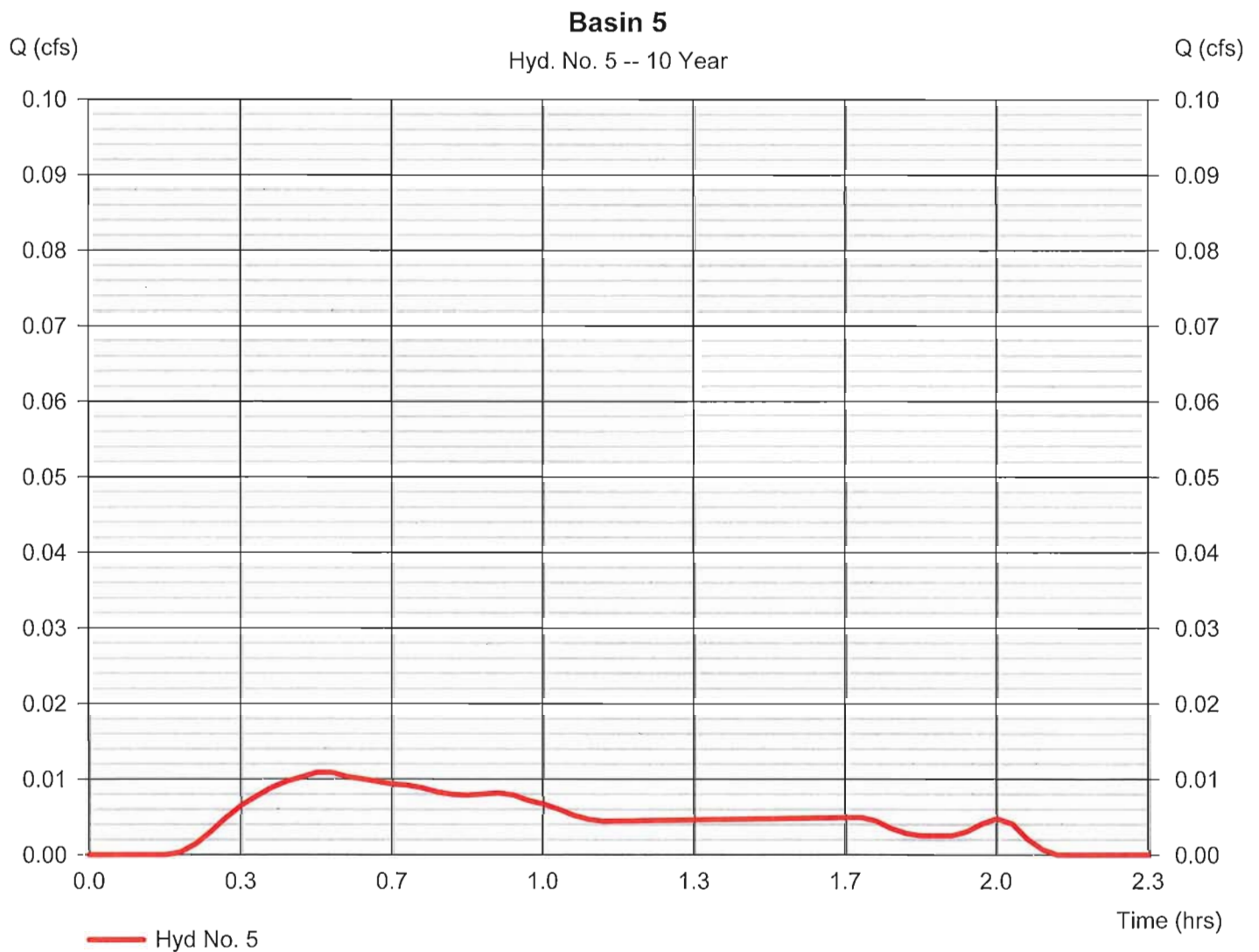
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 24 / 2019

Hyd. No. 5

Basin 5

Hydrograph type	= SCS Runoff	Peak discharge	= 0.011 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.53 hrs
Time interval	= 2 min	Hyd. volume	= 40 cuft
Drainage area	= 0.020 ac	Curve number	= 74*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.46 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.020 \times 74)] / 0.020$ 

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

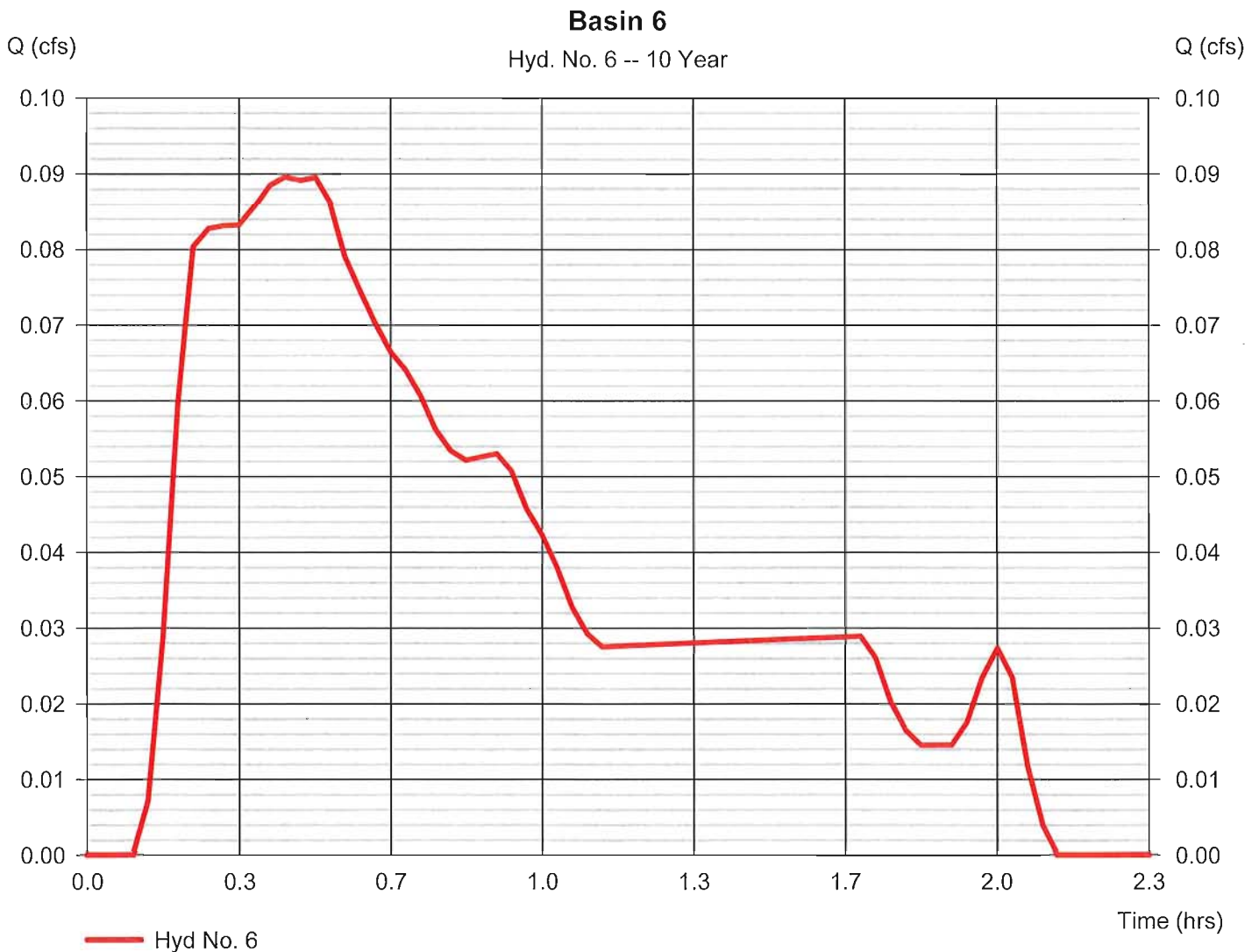
Thursday, 01 / 24 / 2019

Hyd. No. 6

Basin 6

Hydrograph type	= SCS Runoff	Peak discharge	= 0.090 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.43 hrs
Time interval	= 2 min	Hyd. volume	= 312 cuft
Drainage area	= 0.080 ac	Curve number	= 85*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.46 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.034 \times 98) + (0.043 \times 74)] / 0.080$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

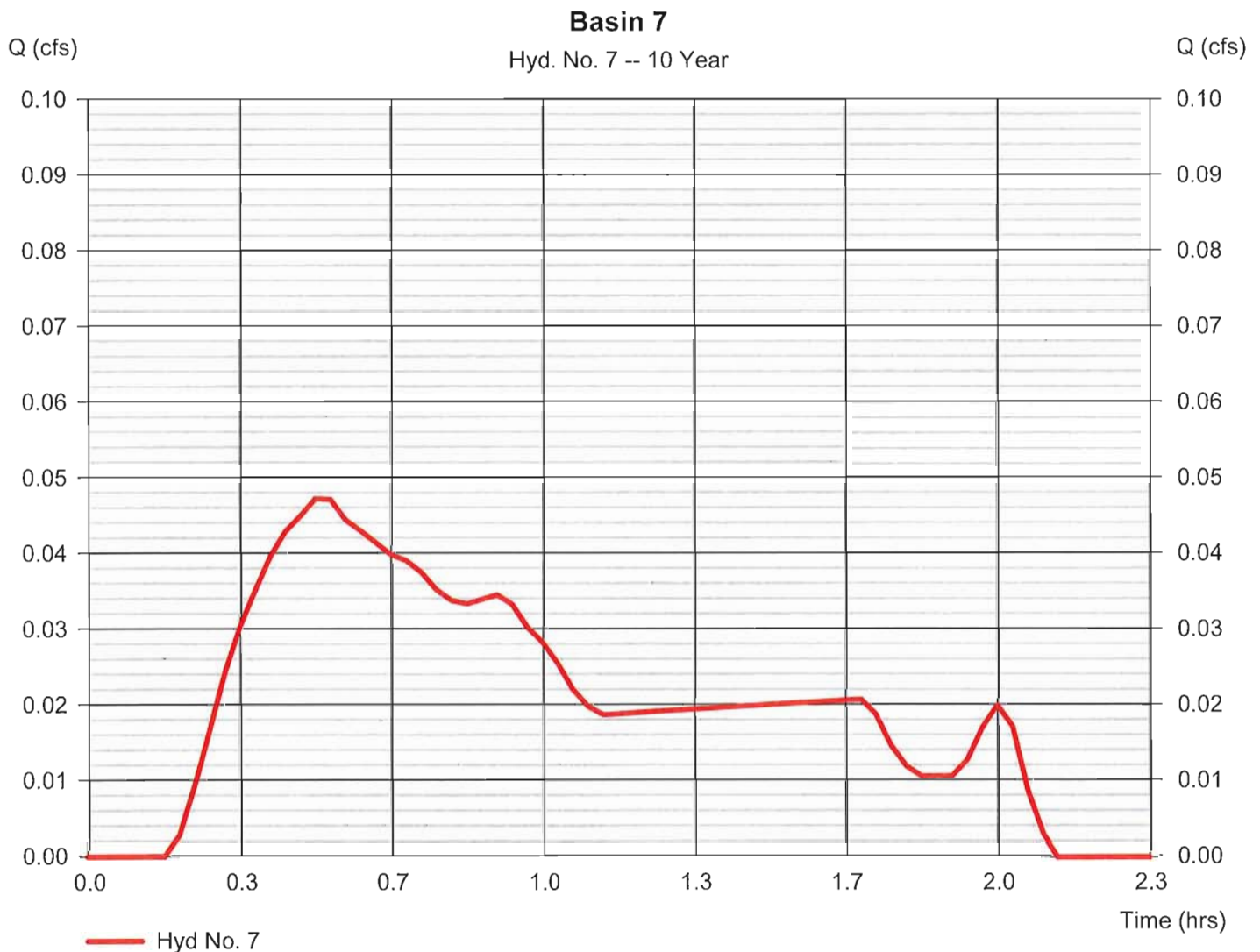
Thursday, 01 / 24 / 2019

Hyd. No. 7

Basin 7

Hydrograph type	= SCS Runoff	Peak discharge	= 0.047 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.50 hrs
Time interval	= 2 min	Hyd. volume	= 171 cuft
Drainage area	= 0.080 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.46 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.002 \times 98) + (0.076 \times 74)] / 0.080$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

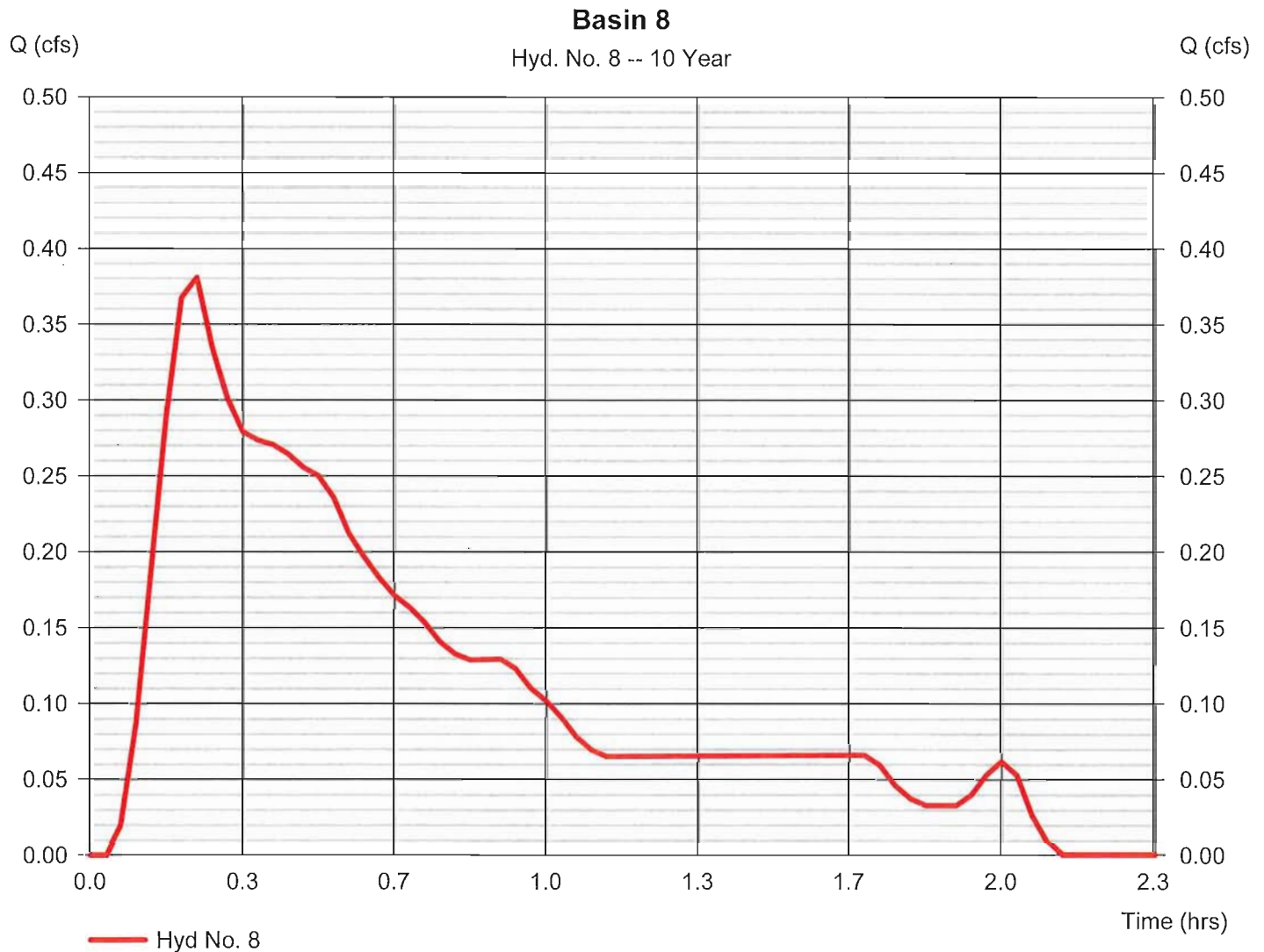
Thursday, 01 / 24 / 2019

Hyd. No. 8

Basin 8

Hydrograph type	= SCS Runoff	Peak discharge	= 0.381 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.23 hrs
Time interval	= 2 min	Hyd. volume	= 935 cuft
Drainage area	= 0.150 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.46 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.127 \times 98) + (0.024 \times 74)] / 0.150$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

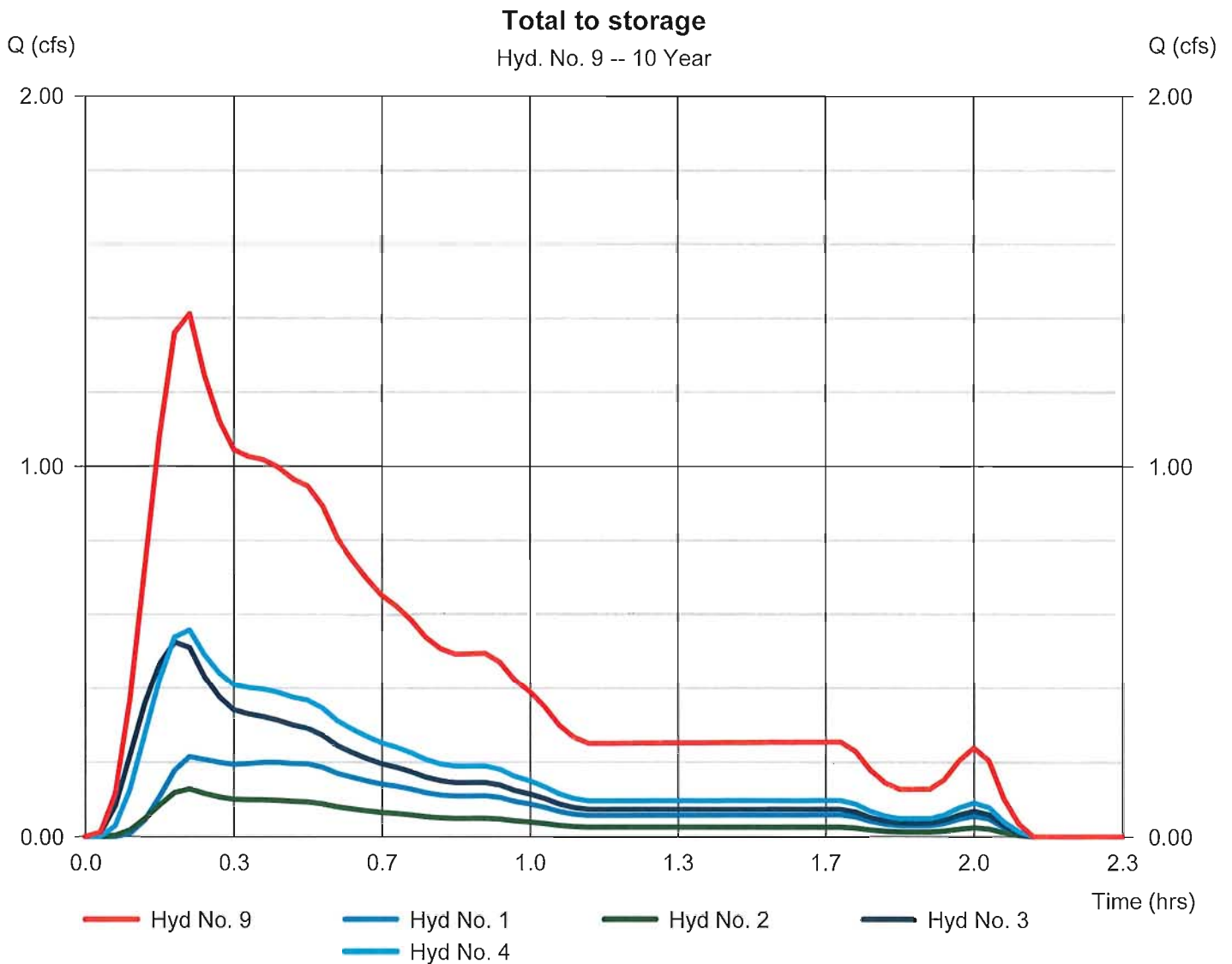
Thursday, 01 / 24 / 2019

Hyd. No. 9

Total to storage

Hydrograph type = Combine
 Storm frequency = 10 yrs
 Time interval = 2 min
 Inflow hyds. = 1, 2, 3, 4

Peak discharge = 1.412 cfs
 Time to peak = 0.23 hrs
 Hyd. volume = 3,553 cuft
 Contrib. drain. area = 0.590 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

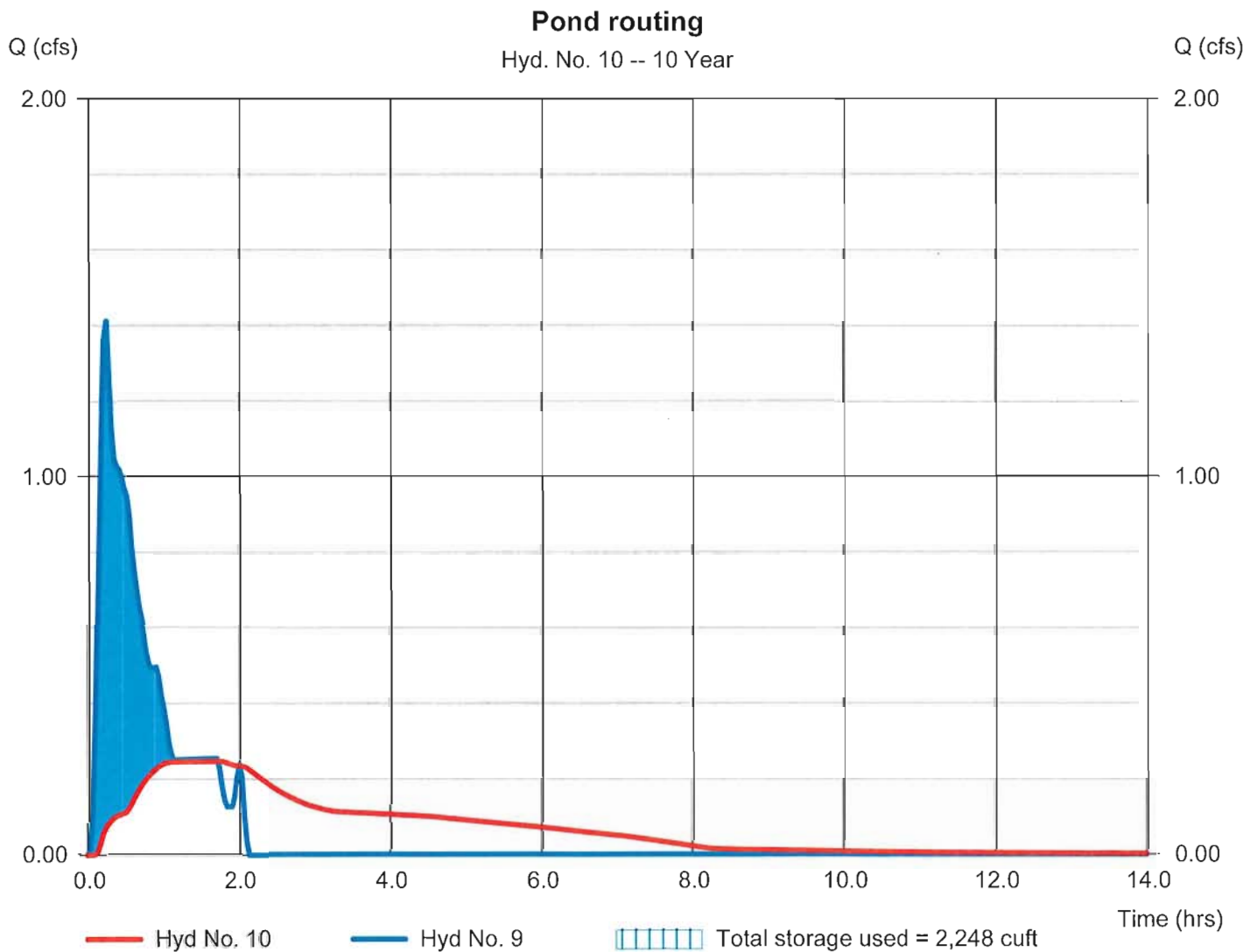
Thursday, 01 / 24 / 2019

Hyd. No. 10

Pond routing

Hydrograph type	= Reservoir	Peak discharge	= 0.247 cfs
Storm frequency	= 10 yrs	Time to peak	= 1.70 hrs
Time interval	= 2 min	Hyd. volume	= 3,530 cuft
Inflow hyd. No.	= 9 - Total to storage	Max. Elevation	= 741.33 ft
Reservoir name	= Underground Pond 1	Max. Storage	= 2,248 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	0.525	2	14	1,379	-----	-----	-----	Basin 1
2	SCS Runoff	0.264	2	14	631	-----	-----	-----	Basin 2
3	SCS Runoff	0.930	2	12	1,972	-----	-----	-----	Basin 3
4	SCS Runoff	1.085	2	12	2,467	-----	-----	-----	Basin 4
5	SCS Runoff	0.031	2	30	107	-----	-----	-----	Basin 5
6	SCS Runoff	0.230	2	14	661	-----	-----	-----	Basin 6
7	SCS Runoff	0.129	2	30	448	-----	-----	-----	Basin 7
8	SCS Runoff	0.739	2	12	1,682	-----	-----	-----	Basin 8
9	Combine	2.762	2	12	6,448	1, 2, 3, 4, 9	-----	-----	Total to storage
10	Reservoir	0.956	2	46	6,425		741.87	3,052	Pond routing
2 hr storm.gpw					Return Period: 100 Year			Thursday, 01 / 24 / 2019	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

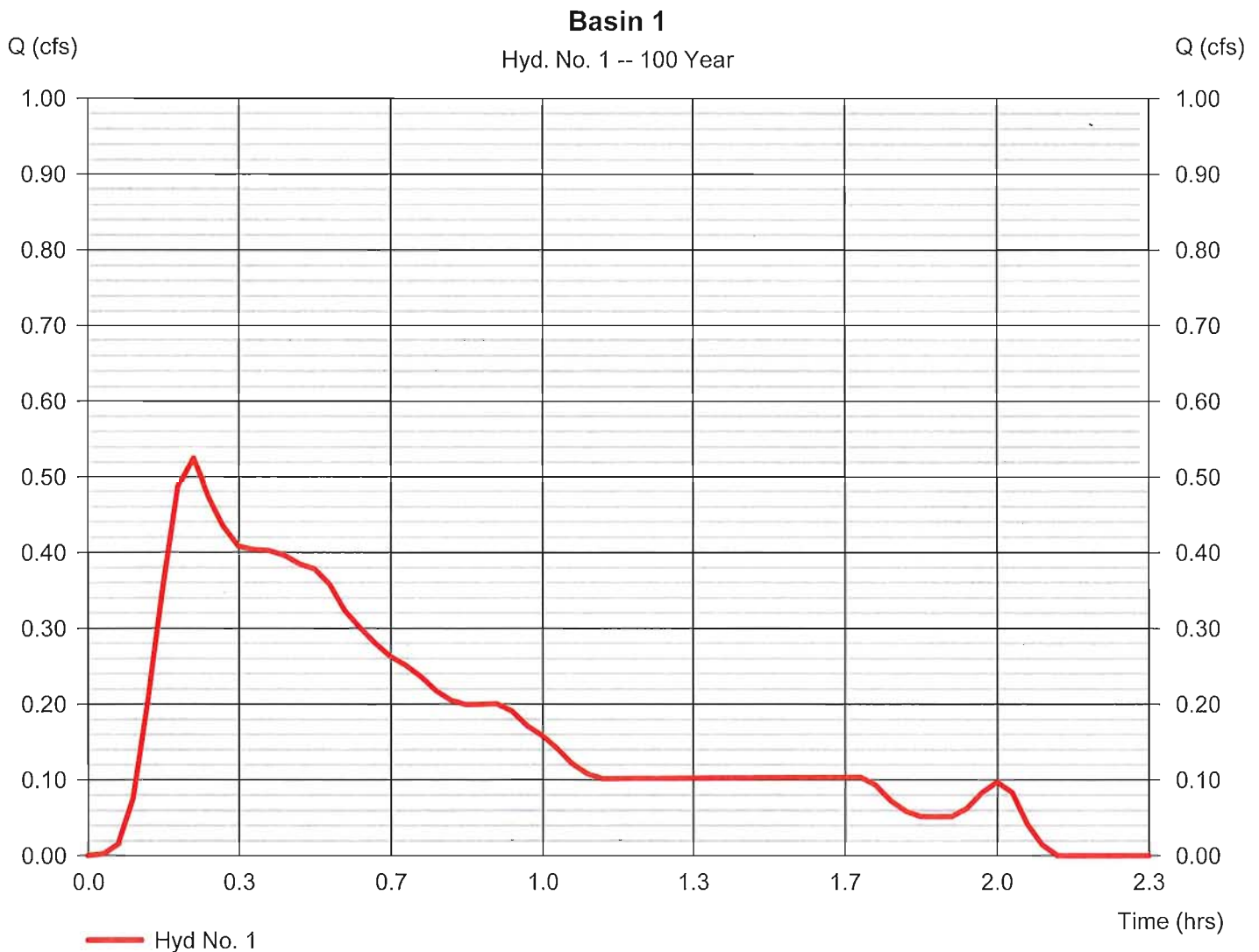
Thursday, 01 / 24 / 2019

Hyd. No. 1

Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.525 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.23 hrs
Time interval	= 2 min	Hyd. volume	= 1,379 cuft
Drainage area	= 0.150 ac	Curve number	= 88*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.97 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.092 \times 98) + (0.062 \times 74)] / 0.150$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

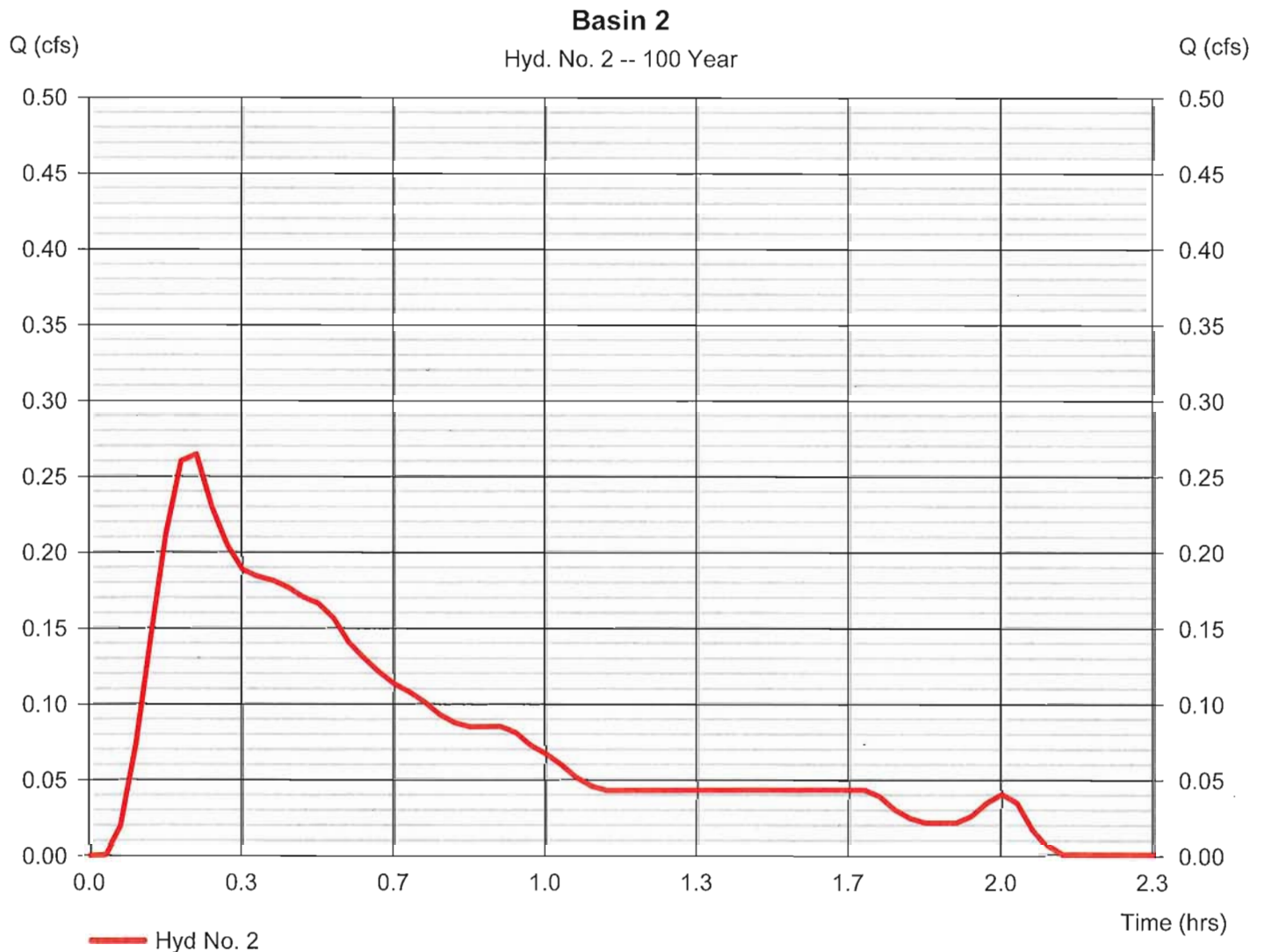
Thursday, 01 / 24 / 2019

Hyd. No. 2

Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.264 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.23 hrs
Time interval	= 2 min	Hyd. volume	= 631 cuft
Drainage area	= 0.060 ac	Curve number	= 92*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.97 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.044 \times 98) + (0.014 \times 74)] / 0.060$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

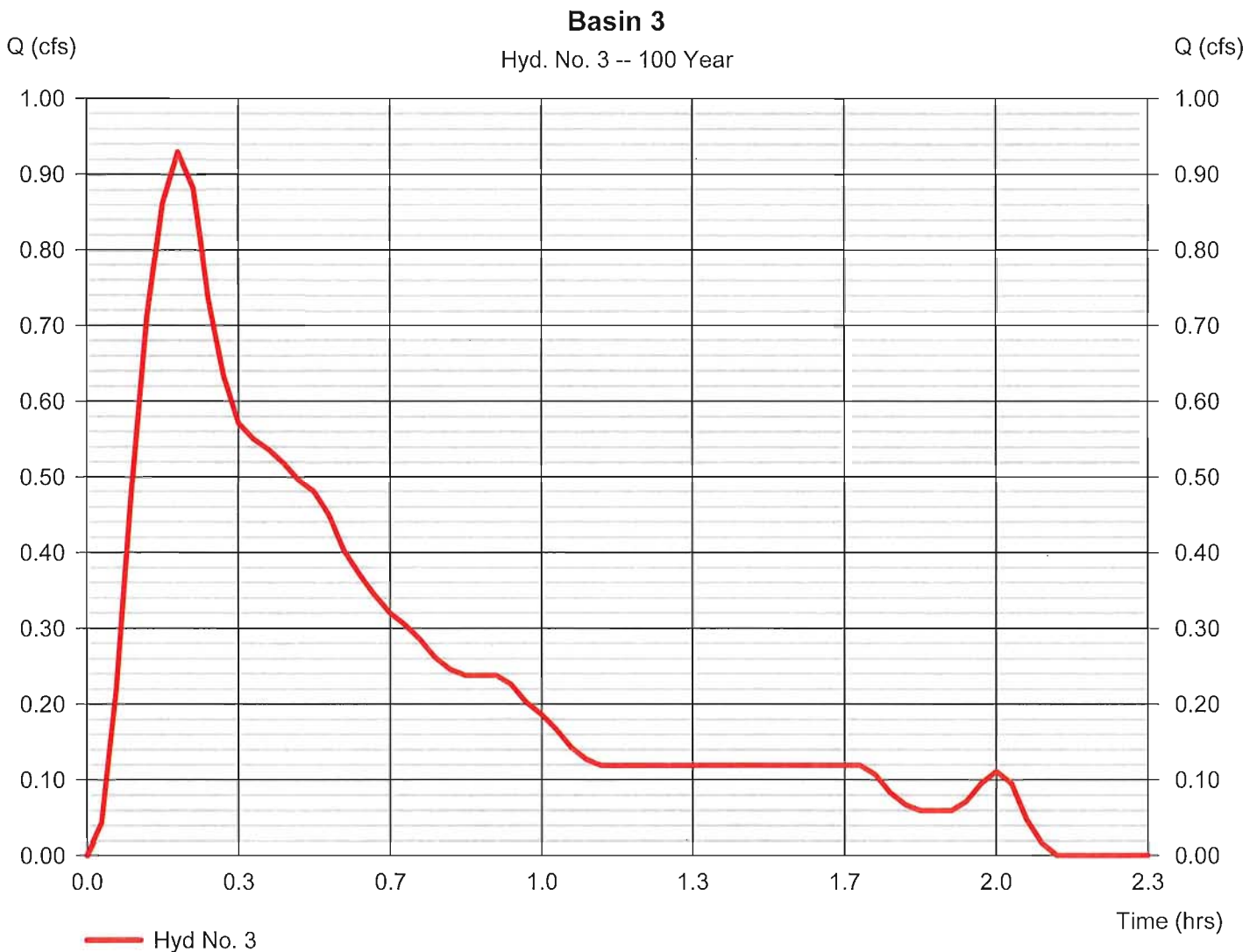
Thursday, 01 / 24 / 2019

Hyd. No. 3

Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 0.930 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.20 hrs
Time interval	= 2 min	Hyd. volume	= 1,972 cuft
Drainage area	= 0.160 ac	Curve number	= 97*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.97 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.147 \times 98) + (0.009 \times 74)] / 0.160$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

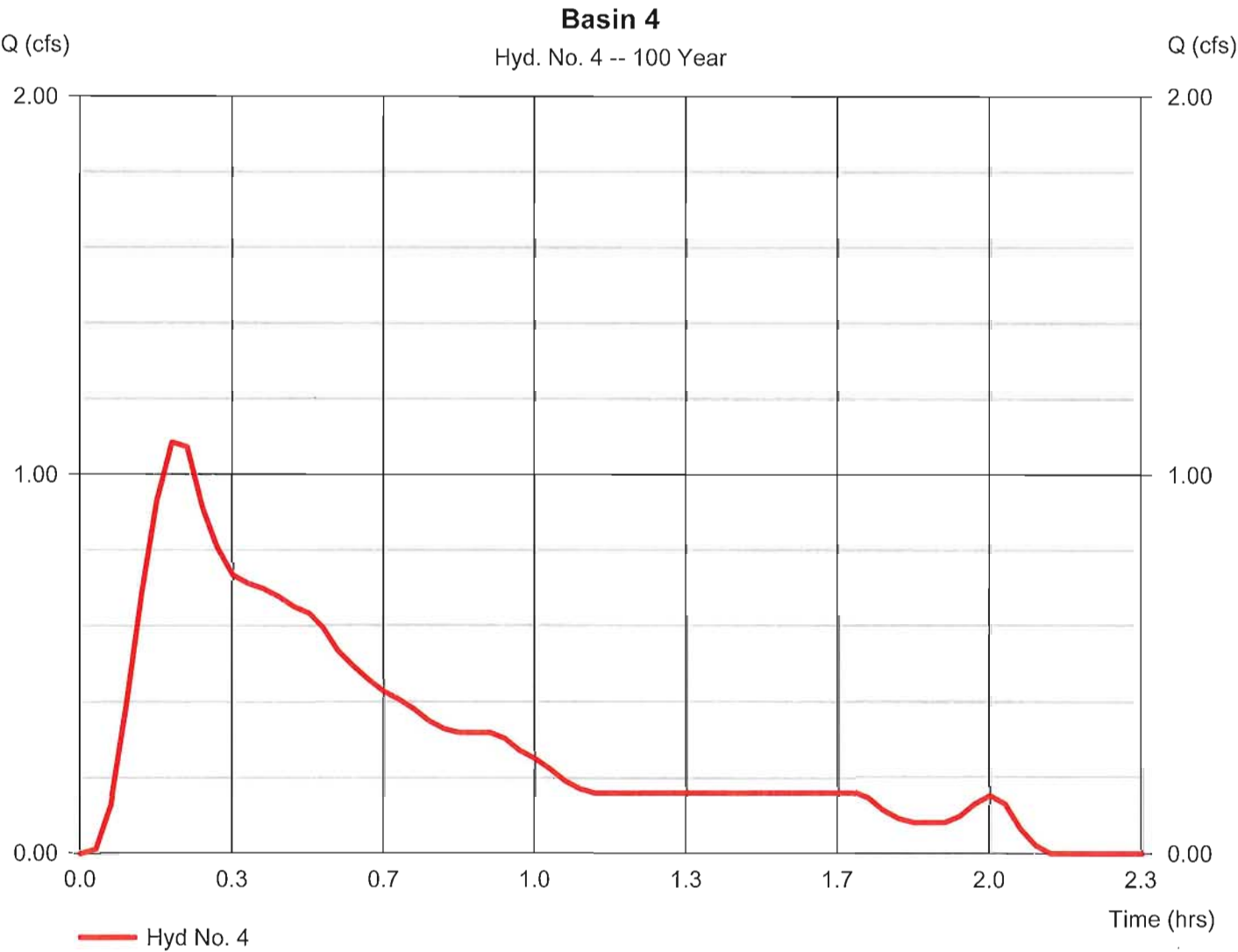
Thursday, 01 / 24 / 2019

Hyd. No. 4

Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 1.085 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.20 hrs
Time interval	= 2 min	Hyd. volume	= 2,467 cuft
Drainage area	= 0.220 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.97 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.180 x 98) + (0.040 x 74)] / 0.220



Hydrograph Report

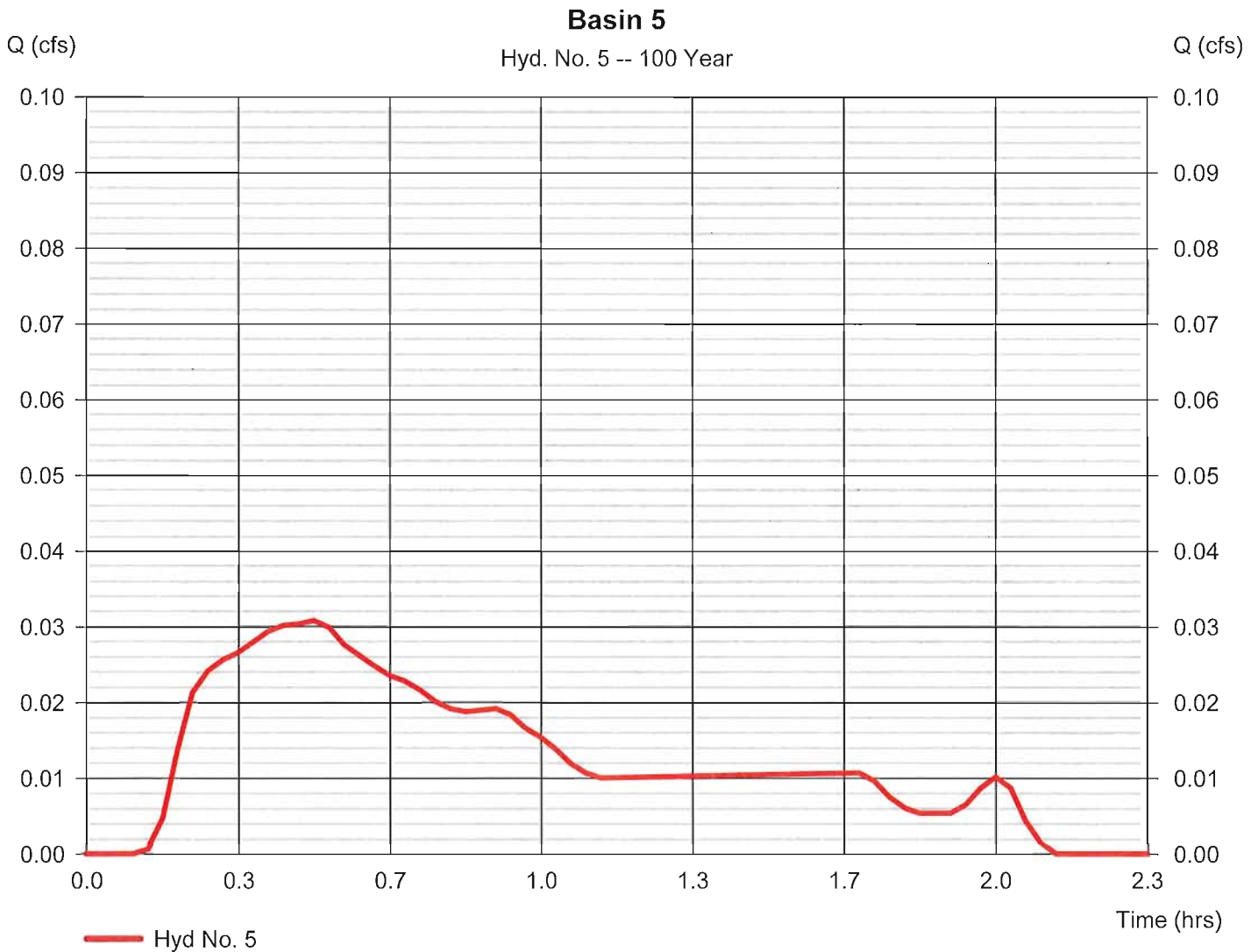
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 24 / 2019

Hyd. No. 5

Basin 5

Hydrograph type	= SCS Runoff	Peak discharge	= 0.031 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.50 hrs
Time interval	= 2 min	Hyd. volume	= 107 cuft
Drainage area	= 0.020 ac	Curve number	= 74*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.97 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.020 \times 74)] / 0.020$ 

Hydrograph Report

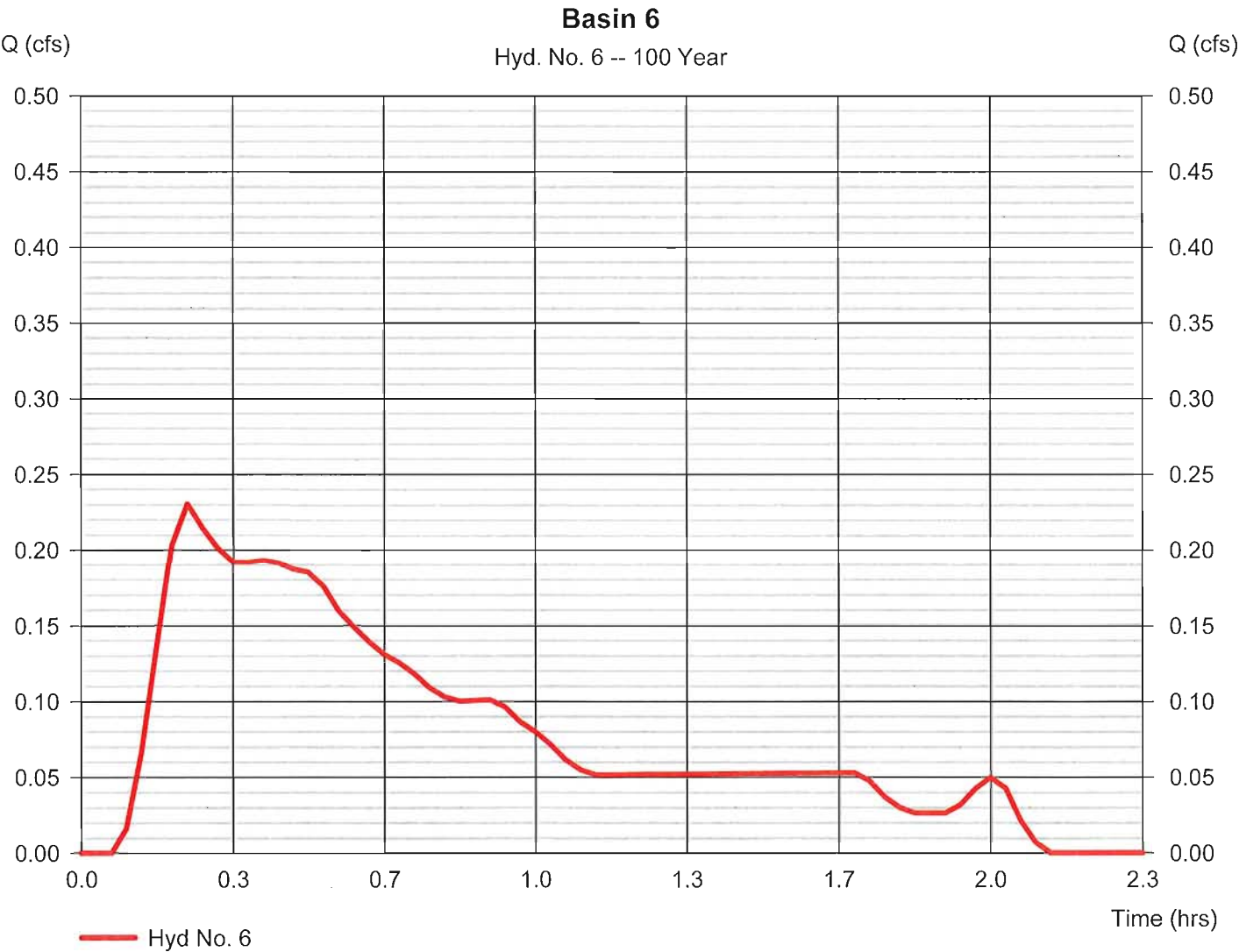
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020 Thursday, 01 / 24 / 2019

Hyd. No. 6

Basin 6

Hydrograph type	= SCS Runoff	Peak discharge	= 0.230 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.23 hrs
Time interval	= 2 min	Hyd. volume	= 661 cuft
Drainage area	= 0.080 ac	Curve number	= 85*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.97 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.034 x 98) + (0.043 x 74)] / 0.080



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

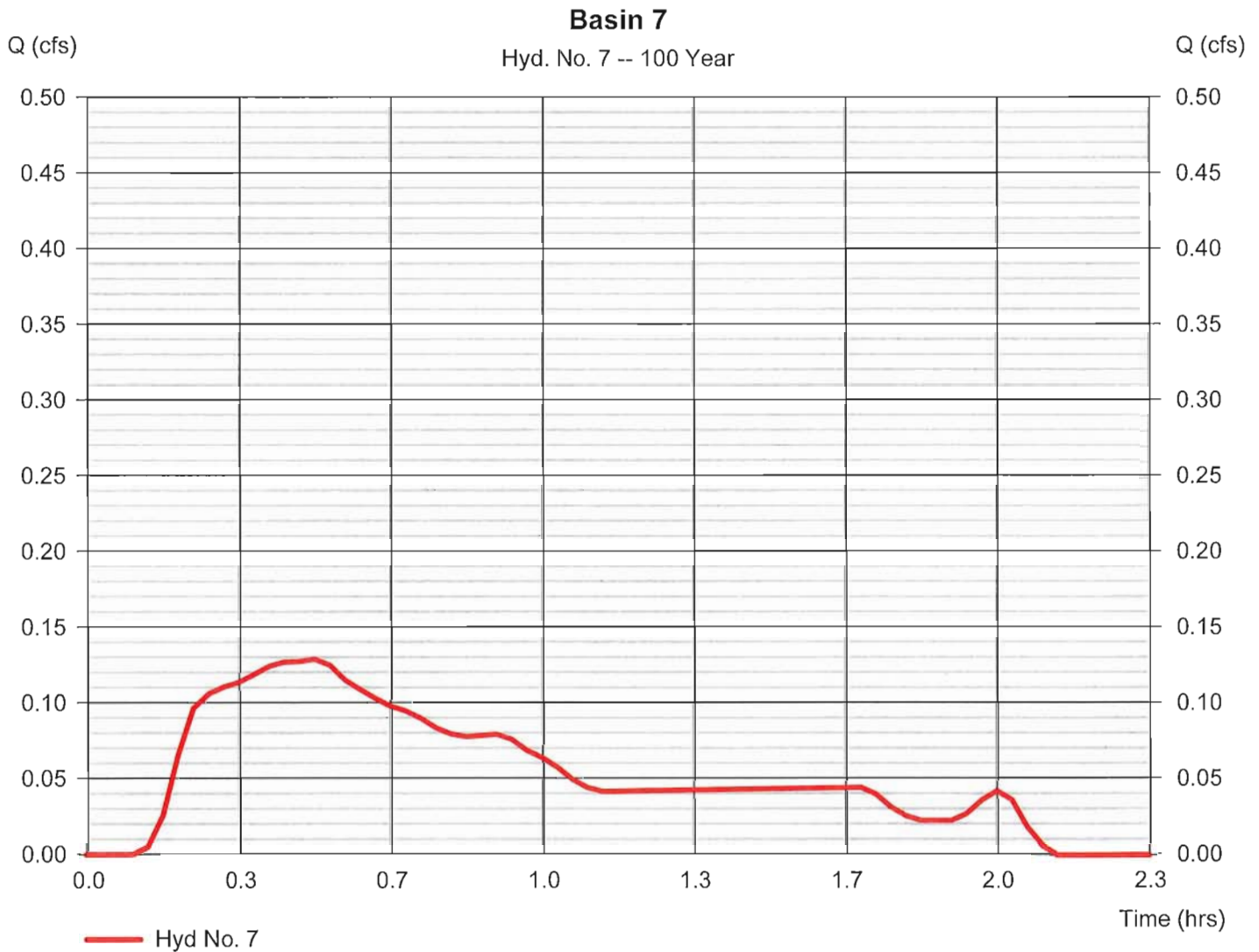
Thursday, 01 / 24 / 2019

Hyd. No. 7

Basin 7

Hydrograph type	= SCS Runoff	Peak discharge	= 0.129 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.50 hrs
Time interval	= 2 min	Hyd. volume	= 448 cuft
Drainage area	= 0.080 ac	Curve number	= 75*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.97 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.002 \times 98) + (0.076 \times 74)] / 0.080$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

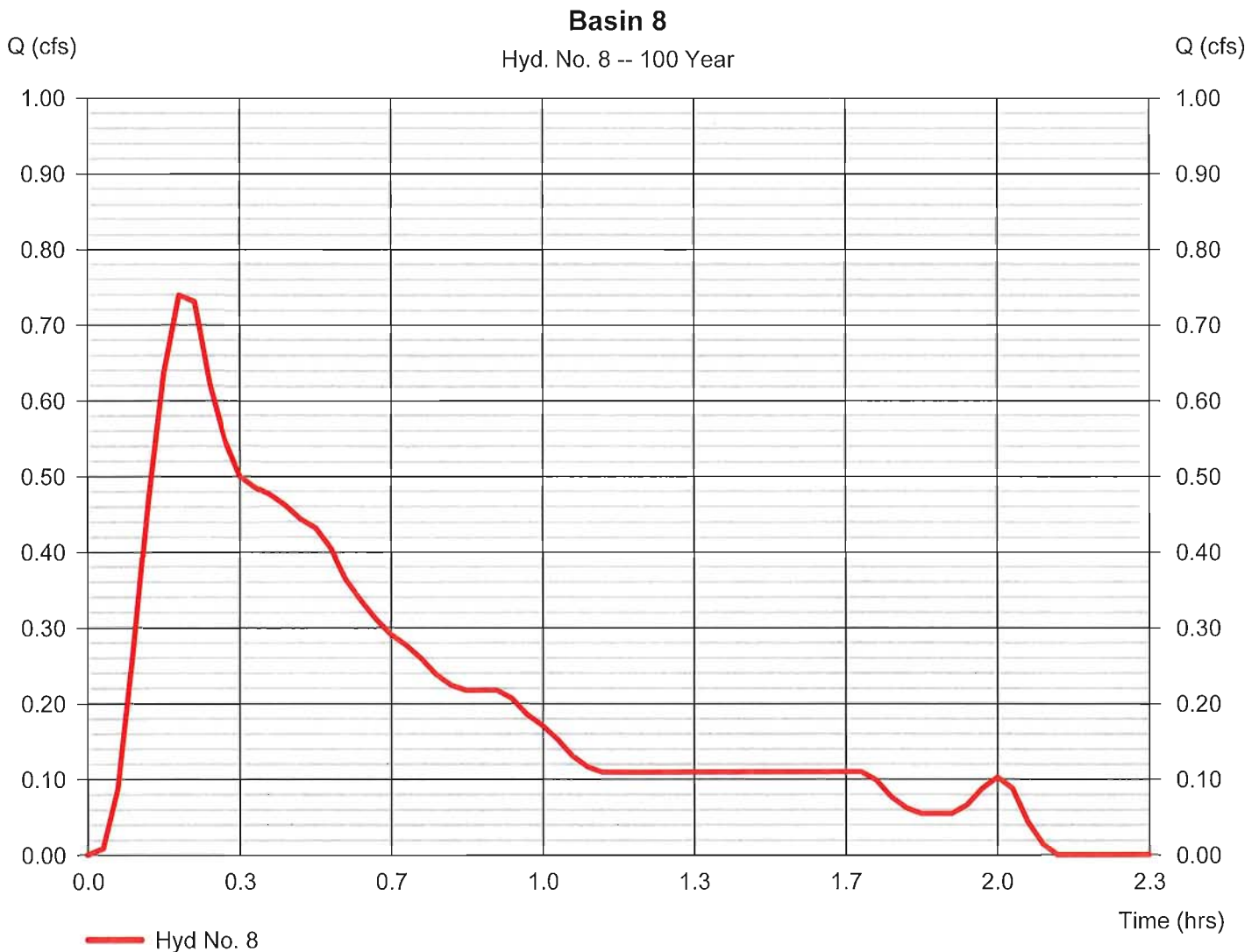
Thursday, 01 / 24 / 2019

Hyd. No. 8

Basin 8

Hydrograph type	= SCS Runoff	Peak discharge	= 0.739 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.20 hrs
Time interval	= 2 min	Hyd. volume	= 1,682 cuft
Drainage area	= 0.150 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.97 in	Distribution	= Huff-1st
Storm duration	= 2.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.127 \times 98) + (0.024 \times 74)] / 0.150$



Hydrograph Report

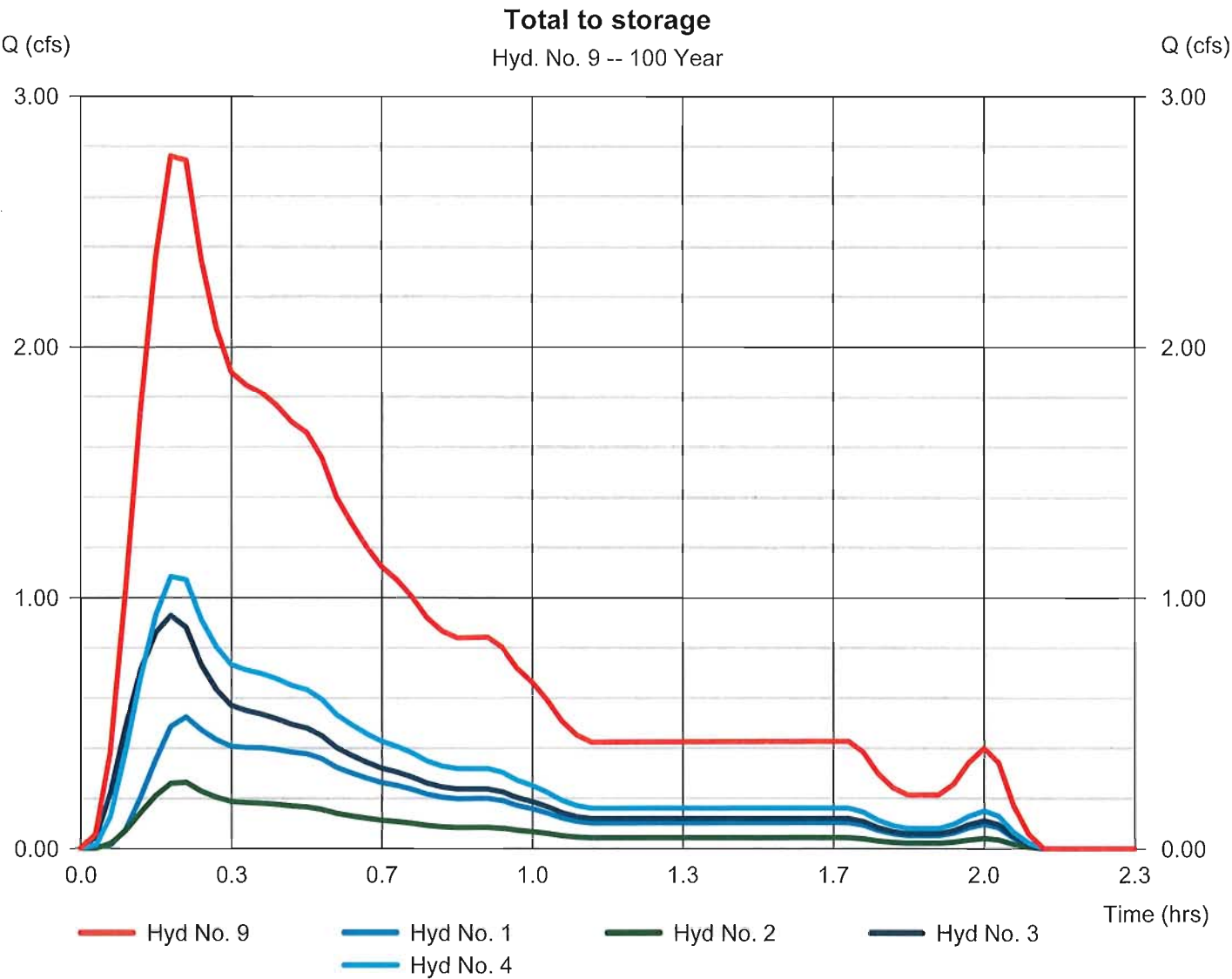
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 24 / 2019

Hyd. No. 9

Total to storage

Hydrograph type	= Combine	Peak discharge	= 2.762 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.20 hrs
Time interval	= 2 min	Hyd. volume	= 6,448 cuft
Inflow hyds.	= 1, 2, 3, 4	Contrib. drain. area	= 0.590 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

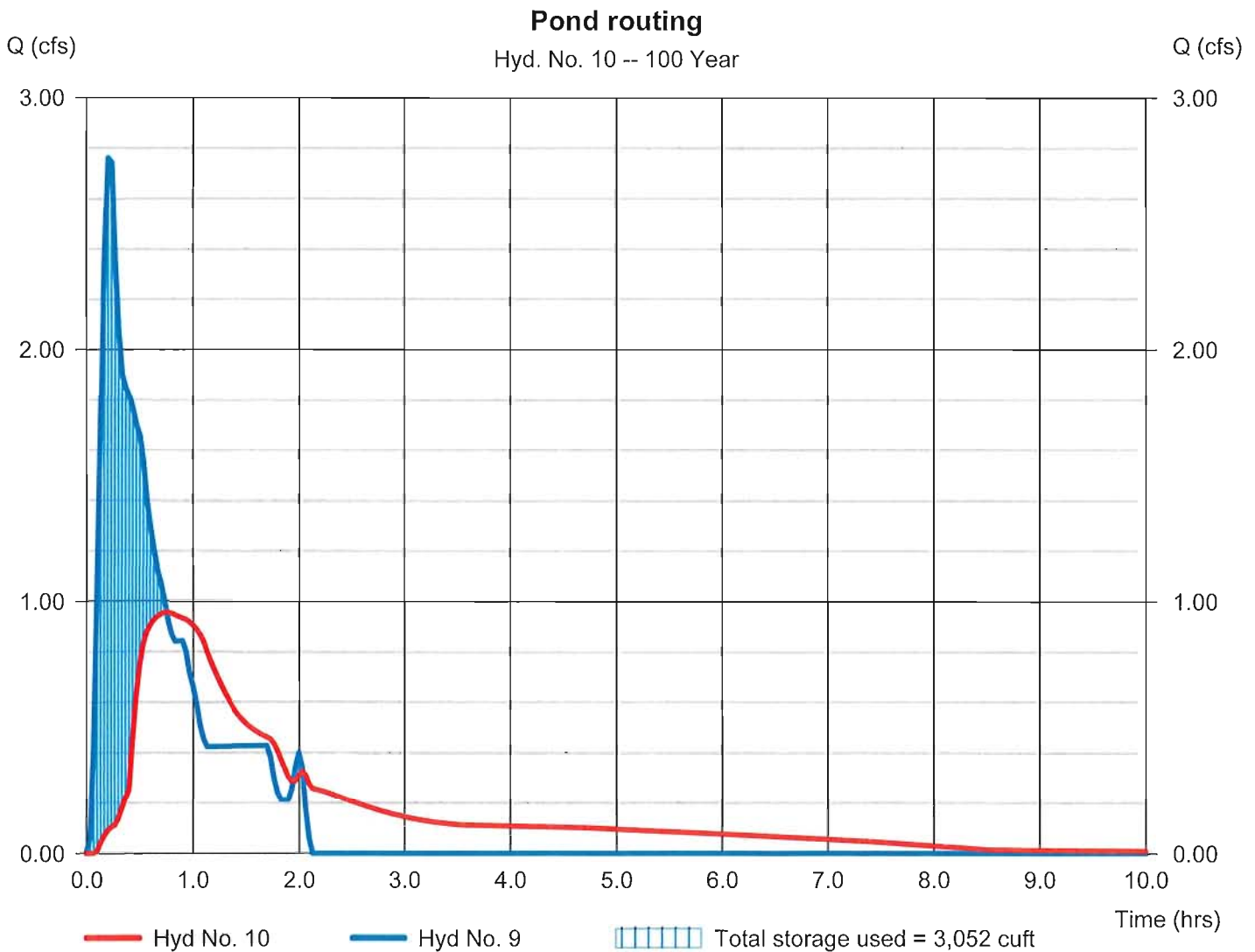
Thursday, 01 / 24 / 2019

Hyd. No. 10

Pond routing

Hydrograph type	= Reservoir	Peak discharge	= 0.956 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.77 hrs
Time interval	= 2 min	Hyd. volume	= 6,425 cuft
Inflow hyd. No.	= 9 - Total to storage	Max. Elevation	= 741.87 ft
Reservoir name	= Underground Pond 1	Max. Storage	= 3,052 cuft

Storage Indication method used.



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2 - Year

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10 - Year

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100 - Year

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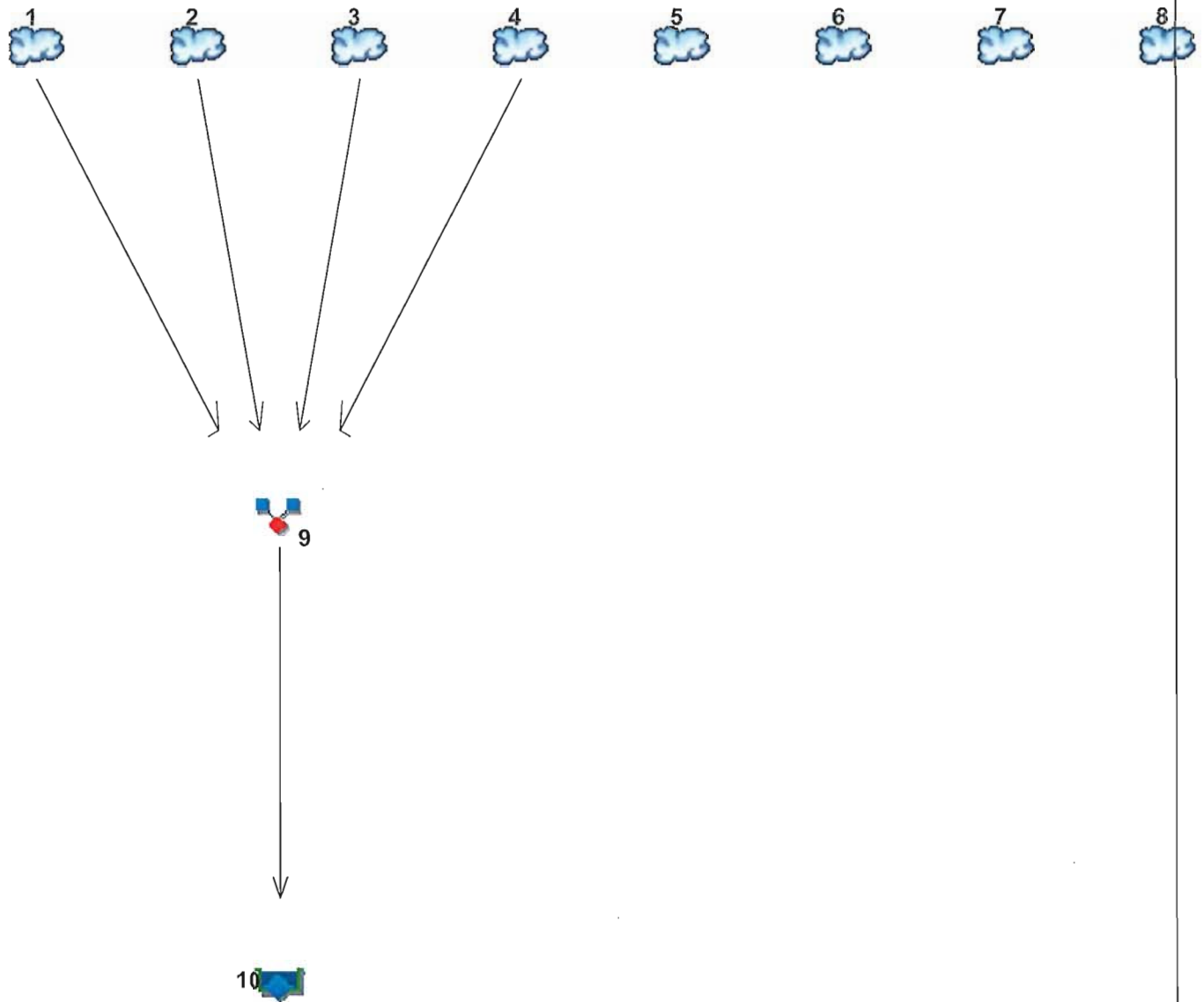
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Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020



Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	-----	-----	0.085	-----	-----	0.190	-----	-----	0.437	Basin 1
2	SCS Runoff	-----	-----	0.056	-----	-----	0.107	-----	-----	0.217	Basin 2
3	SCS Runoff	-----	-----	0.262	-----	-----	0.416	-----	-----	0.712	Basin 3
4	SCS Runoff	-----	-----	0.258	-----	-----	0.462	-----	-----	0.874	Basin 4
5	SCS Runoff	-----	-----	0.003	-----	-----	0.009	-----	-----	0.025	Basin 5
6	SCS Runoff	-----	-----	0.037	-----	-----	0.077	-----	-----	0.195	Basin 6
7	SCS Runoff	-----	-----	0.015	-----	-----	0.041	-----	-----	0.103	Basin 7
8	SCS Runoff	-----	-----	0.176	-----	-----	0.315	-----	-----	0.596	Basin 8
9	Combine	1, 2, 3,	-----	0.649	-----	-----	1.168	-----	-----	2.239	Total to storage
10	Reservoir	4, 9	-----	0.113	-----	-----	0.252	-----	-----	0.906	Pond routing
<div> <div>Proj. file: 3 hr storm.gpw</div> <div>Thursday, 01 / 24 / 2019</div> </div>											

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	0.085	2	38	440	-----	-----	-----	Basin 1
2	SCS Runoff	0.056	2	20	229	-----	-----	-----	Basin 2
3	SCS Runoff	0.262	2	18	841	-----	-----	-----	Basin 3
4	SCS Runoff	0.258	2	18	955	-----	-----	-----	Basin 4
5	SCS Runoff	0.003	2	46	20	-----	-----	-----	Basin 5
6	SCS Runoff	0.037	2	46	191	-----	-----	-----	Basin 6
7	SCS Runoff	0.015	2	46	87	-----	-----	-----	Basin 7
8	SCS Runoff	0.176	2	18	651	-----	-----	-----	Basin 8
9	Combine	0.649	2	18	2,464	1, 2, 3, 4, 9	-----	-----	Total to storage
10	Reservoir	0.113	2	154	2,440		740.90	1,458	Pond routing
3 hr storm.gpw					Return Period: 2 Year			Thursday, 01 / 24 / 2019	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

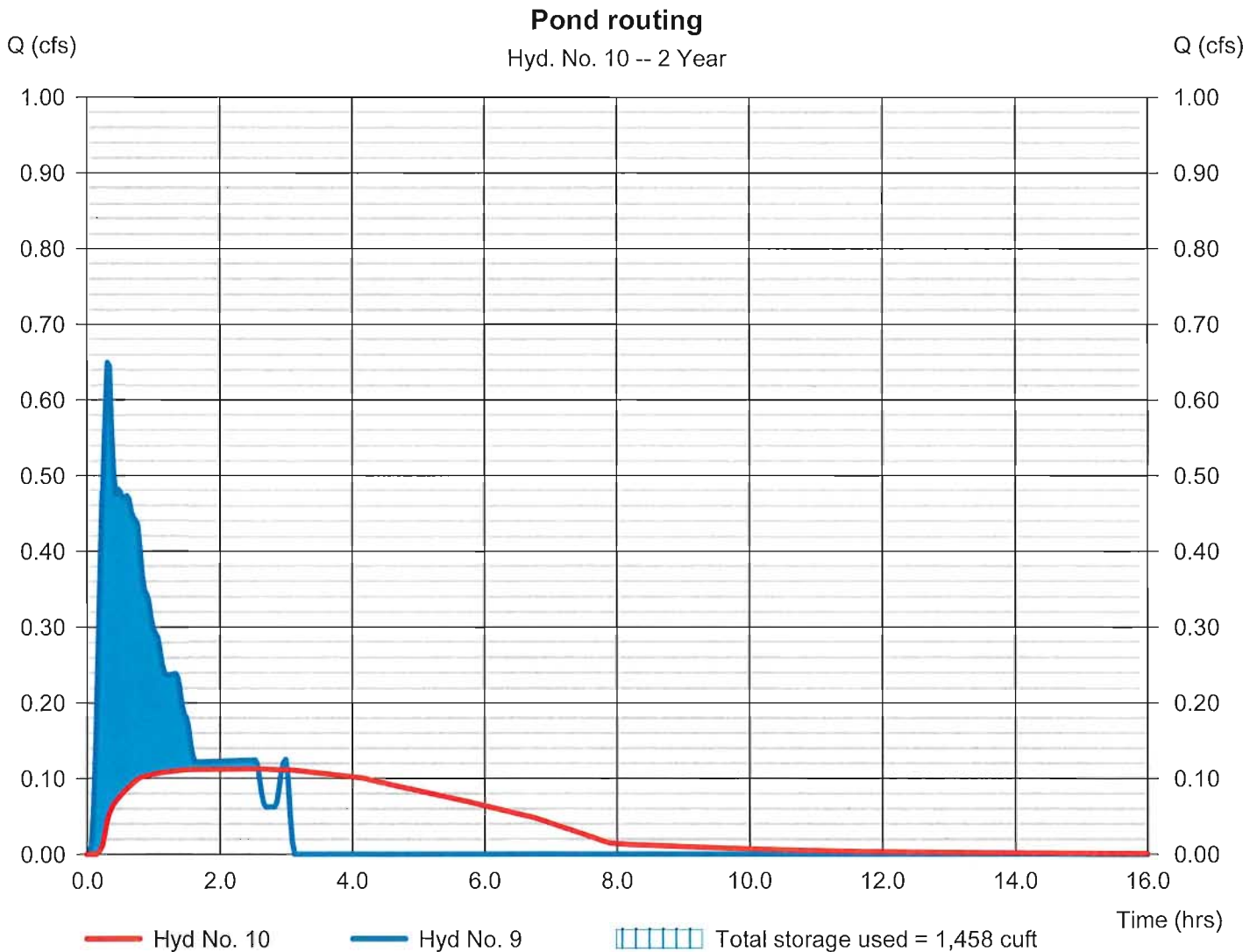
Thursday, 01 / 24 / 2019

Hyd. No. 10

Pond routing

Hydrograph type	= Reservoir	Peak discharge	= 0.113 cfs
Storm frequency	= 2 yrs	Time to peak	= 2.57 hrs
Time interval	= 2 min	Hyd. volume	= 2,440 cuft
Inflow hyd. No.	= 9 - Total to storage	Max. Elevation	= 740.90 ft
Reservoir name	= Underground Pond 1	Max. Storage	= 1,458 cuft

Storage Indication method used.



Pond Report

5

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 24 / 2019

Pond No. 1 - Underground Pond 1

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	739.67	n/a	0	0
0.17	739.84	n/a	165	165
0.33	740.00	n/a	165	330
0.51	740.18	n/a	165	495
0.67	740.34	n/a	165	660
0.83	740.50	n/a	165	825
1.00	740.67	n/a	165	990
1.17	740.84	n/a	335	1,326
1.33	741.00	n/a	326	1,652
1.50	741.17	n/a	314	1,967
1.67	741.34	n/a	300	2,267
1.83	741.50	n/a	281	2,548
2.00	741.67	n/a	257	2,805
2.17	741.84	n/a	214	3,019
2.33	742.00	n/a	178	3,196
2.50	742.17	n/a	165	3,362
2.67	742.34	n/a	165	3,527
2.83	742.50	n/a	165	3,692
3.00	742.67	n/a	165	3,857

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 2.00	6.00	0.00	0.00
Span (in)	= 2.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 739.67	740.90	0.00	0.00
Length (ft)	= 1.00	1.00	0.00	0.00
Slope (%)	= 1.00	1.00	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	0.00	0.00	0.00
Crest El. (ft)	= 741.87	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 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	739.67	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.02	17	739.69	0.00 oc	0.00	---	---	0.00	---	---	---	---	---	0.001
0.03	33	739.70	0.00 oc	0.00	---	---	0.00	---	---	---	---	---	0.002
0.05	50	739.72	0.00 oc	0.00	---	---	0.00	---	---	---	---	---	0.003
0.07	66	739.74	0.00 oc	0.00	---	---	0.00	---	---	---	---	---	0.005
0.09	83	739.76	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.007
0.10	99	739.77	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.008
0.12	116	739.79	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.010
0.14	132	739.81	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.012
0.15	149	739.82	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.013
0.17	165	739.84	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.015
0.19	182	739.86	0.02 oc	0.00	---	---	0.00	---	---	---	---	---	0.022
0.20	198	739.87	0.03 oc	0.00	---	---	0.00	---	---	---	---	---	0.027
0.22	215	739.89	0.03 oc	0.00	---	---	0.00	---	---	---	---	---	0.032
0.23	231	739.90	0.04 oc	0.00	---	---	0.00	---	---	---	---	---	0.036
0.25	248	739.92	0.04 oc	0.00	---	---	0.00	---	---	---	---	---	0.039
0.27	264	739.94	0.04 oc	0.00	---	---	0.00	---	---	---	---	---	0.043
0.28	281	739.95	0.05 oc	0.00	---	---	0.00	---	---	---	---	---	0.046
0.30	297	739.97	0.05 oc	0.00	---	---	0.00	---	---	---	---	---	0.049
0.31	314	739.98	0.05 ic	0.00	---	---	0.00	---	---	---	---	---	0.050
0.33	330	740.00	0.05 ic	0.00	---	---	0.00	---	---	---	---	---	0.052
0.35	347	740.02	0.05 ic	0.00	---	---	0.00	---	---	---	---	---	0.054
0.37	363	740.04	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.056

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Underground Pond 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
0.38	380	740.05	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.058
0.40	396	740.07	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.059
0.42	413	740.09	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.061
0.44	429	740.11	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.063
0.46	446	740.13	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.064
0.47	462	740.14	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.066
0.49	479	740.16	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.067
0.51	495	740.18	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.069
0.53	512	740.20	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.070
0.54	528	740.21	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.071
0.56	545	740.23	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.072
0.57	561	740.24	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.074
0.59	578	740.26	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.075
0.61	594	740.28	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.076
0.62	611	740.29	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.077
0.64	627	740.31	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.078
0.65	644	740.32	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.079
0.67	660	740.34	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.080
0.69	677	740.36	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.082
0.70	693	740.37	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.083
0.72	710	740.39	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.084
0.73	726	740.40	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.085
0.75	743	740.42	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.086
0.77	759	740.44	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.087
0.78	776	740.45	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.088
0.80	792	740.47	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.089
0.81	809	740.48	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.090
0.83	825	740.50	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.091
0.85	842	740.52	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.092
0.86	858	740.53	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.093
0.88	875	740.55	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.094
0.90	891	740.57	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.095
0.92	908	740.59	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.096
0.93	924	740.60	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.097
0.95	941	740.62	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.098
0.97	957	740.64	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.099
0.98	974	740.65	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.100
1.00	990	740.67	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.101
1.02	1,024	740.69	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.101
1.03	1,057	740.70	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.102
1.05	1,091	740.72	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.103
1.07	1,125	740.74	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.104
1.09	1,158	740.76	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.105
1.10	1,192	740.77	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.106
1.12	1,225	740.79	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.107
1.14	1,259	740.81	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.108
1.15	1,292	740.82	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.109
1.17	1,326	740.84	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.109
1.19	1,358	740.86	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.110
1.20	1,391	740.87	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.111
1.22	1,424	740.89	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.112
1.23	1,456	740.90	0.11 ic	0.00 oc	---	---	0.00	---	---	---	---	---	0.113
1.25	1,489	740.92	0.11 ic	0.00 oc	---	---	0.00	---	---	---	---	---	0.115
1.27	1,522	740.94	0.11 ic	0.00 oc	---	---	0.00	---	---	---	---	---	0.118
1.28	1,554	740.95	0.11 ic	0.01 oc	---	---	0.00	---	---	---	---	---	0.121
1.30	1,587	740.97	0.12 ic	0.01 oc	---	---	0.00	---	---	---	---	---	0.125
1.31	1,620	740.98	0.12 ic	0.01 oc	---	---	0.00	---	---	---	---	---	0.130
1.33	1,652	741.00	0.12 ic	0.02 oc	---	---	0.00	---	---	---	---	---	0.135
1.35	1,684	741.02	0.12 ic	0.02 oc	---	---	0.00	---	---	---	---	---	0.140
1.36	1,715	741.03	0.12 ic	0.03 oc	---	---	0.00	---	---	---	---	---	0.145
1.38	1,747	741.05	0.12 ic	0.03 oc	---	---	0.00	---	---	---	---	---	0.151
1.40	1,778	741.07	0.12 ic	0.04 oc	---	---	0.00	---	---	---	---	---	0.157
1.41	1,809	741.09	0.12 ic	0.04 oc	---	---	0.00	---	---	---	---	---	0.163
1.43	1,841	741.10	0.12 ic	0.05 oc	---	---	0.00	---	---	---	---	---	0.169
1.45	1,872	741.12	0.12 ic	0.05 oc	---	---	0.00	---	---	---	---	---	0.176
1.47	1,904	741.14	0.12 ic	0.06 oc	---	---	0.00	---	---	---	---	---	0.182
1.48	1,935	741.15	0.12 ic	0.06 oc	---	---	0.00	---	---	---	---	---	0.188
1.50	1,967	741.17	0.13 ic	0.07 oc	---	---	0.00	---	---	---	---	---	0.194
1.52	1,997	741.19	0.13 ic	0.07 oc	---	---	0.00	---	---	---	---	---	0.201
1.53	2,027	741.20	0.13 ic	0.08 oc	---	---	0.00	---	---	---	---	---	0.207

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Underground Pond 1

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Civ A cfs	Civ B cfs	Civ C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
1.55	2,057	741.22	0.13 ic	0.09 oc	---	---	0.00	---	---	---	---	---	0.213
1.57	2,087	741.24	0.13 ic	0.09 oc	---	---	0.00	---	---	---	---	---	0.219
1.59	2,117	741.26	0.13 ic	0.10 oc	---	---	0.00	---	---	---	---	---	0.225
1.60	2,147	741.27	0.13 ic	0.10 oc	---	---	0.00	---	---	---	---	---	0.230
1.62	2,177	741.29	0.13 ic	0.11 oc	---	---	0.00	---	---	---	---	---	0.236
1.64	2,207	741.31	0.13 ic	0.11 oc	---	---	0.00	---	---	---	---	---	0.241
1.65	2,237	741.32	0.13 ic	0.11 oc	---	---	0.00	---	---	---	---	---	0.246
1.67	2,267	741.34	0.13 ic	0.12 oc	---	---	0.00	---	---	---	---	---	0.250
1.69	2,295	741.36	0.13 ic	0.12 oc	---	---	0.00	---	---	---	---	---	0.254
1.70	2,323	741.37	0.13 ic	0.12 oc	---	---	0.00	---	---	---	---	---	0.257
1.72	2,351	741.39	0.13 ic	0.13 oc	---	---	0.00	---	---	---	---	---	0.259
1.73	2,379	741.40	0.13 ic	0.15 oc	---	---	0.00	---	---	---	---	---	0.283
1.75	2,407	741.42	0.14 ic	0.22 oc	---	---	0.00	---	---	---	---	---	0.353
1.77	2,436	741.44	0.14 ic	0.27 oc	---	---	0.00	---	---	---	---	---	0.405
1.78	2,464	741.45	0.14 ic	0.31 oc	---	---	0.00	---	---	---	---	---	0.449
1.80	2,492	741.47	0.14 ic	0.35 oc	---	---	0.00	---	---	---	---	---	0.488
1.81	2,520	741.48	0.14 ic	0.38 oc	---	---	0.00	---	---	---	---	---	0.522
1.83	2,548	741.50	0.14 ic	0.42 oc	---	---	0.00	---	---	---	---	---	0.555
1.85	2,574	741.52	0.14 ic	0.45 oc	---	---	0.00	---	---	---	---	---	0.586
1.86	2,599	741.53	0.14 ic	0.48 oc	---	---	0.00	---	---	---	---	---	0.616
1.88	2,625	741.55	0.14 ic	0.50 oc	---	---	0.00	---	---	---	---	---	0.644
1.90	2,651	741.57	0.14 ic	0.53 oc	---	---	0.00	---	---	---	---	---	0.671
1.91	2,676	741.59	0.14 ic	0.55 oc	---	---	0.00	---	---	---	---	---	0.696
1.93	2,702	741.60	0.14 ic	0.58 oc	---	---	0.00	---	---	---	---	---	0.721
1.95	2,728	741.62	0.14 ic	0.60 oc	---	---	0.00	---	---	---	---	---	0.744
1.97	2,754	741.64	0.14 ic	0.62 oc	---	---	0.00	---	---	---	---	---	0.766
1.98	2,779	741.65	0.14 ic	0.64 oc	---	---	0.00	---	---	---	---	---	0.788
2.00	2,805	741.67	0.15 ic	0.66 oc	---	---	0.00	---	---	---	---	---	0.809
2.02	2,826	741.69	0.15 ic	0.68 oc	---	---	0.00	---	---	---	---	---	0.830
2.03	2,848	741.70	0.15 ic	0.70 oc	---	---	0.00	---	---	---	---	---	0.849
2.05	2,869	741.72	0.15 ic	0.71 ic	---	---	0.00	---	---	---	---	---	0.862
2.07	2,890	741.74	0.15 ic	0.72 ic	---	---	0.00	---	---	---	---	---	0.873
2.09	2,912	741.76	0.15 ic	0.74 ic	---	---	0.00	---	---	---	---	---	0.884
2.10	2,933	741.77	0.15 ic	0.75 ic	---	---	0.00	---	---	---	---	---	0.895
2.12	2,954	741.79	0.15 ic	0.76 ic	---	---	0.00	---	---	---	---	---	0.906
2.14	2,976	741.81	0.15 ic	0.77 ic	---	---	0.00	---	---	---	---	---	0.916
2.15	2,997	741.82	0.15 ic	0.78 ic	---	---	0.00	---	---	---	---	---	0.927
2.17	3,019	741.84	0.15 ic	0.79 ic	---	---	0.00	---	---	---	---	---	0.937
2.19	3,036	741.86	0.15 ic	0.79 ic	---	---	0.00	---	---	---	---	---	0.947
2.20	3,054	741.87	0.15 ic	0.80 ic	---	---	0.00	---	---	---	---	---	0.957
2.22	3,072	741.89	0.15 ic	0.81 ic	---	---	0.02	---	---	---	---	---	0.990
2.23	3,090	741.90	0.15 ic	0.82 ic	---	---	0.06	---	---	---	---	---	1.037
2.25	3,108	741.92	0.15 ic	0.83 ic	---	---	0.11	---	---	---	---	---	1.096
2.27	3,125	741.94	0.16 ic	0.84 ic	---	---	0.17	---	---	---	---	---	1.163
2.28	3,143	741.95	0.16 ic	0.85 ic	---	---	0.23	---	---	---	---	---	1.237
2.30	3,161	741.97	0.16 ic	0.85 ic	---	---	0.31	---	---	---	---	---	1.318
2.31	3,179	741.98	0.16 ic	0.86 ic	---	---	0.38	---	---	---	---	---	1.404
2.33	3,196	742.00	0.16 ic	0.87 ic	---	---	0.47	---	---	---	---	---	1.497
2.35	3,213	742.02	0.16 ic	0.88 ic	---	---	0.56	---	---	---	---	---	1.601
2.36	3,229	742.03	0.16 ic	0.89 ic	---	---	0.66	---	---	---	---	---	1.712
2.38	3,246	742.05	0.16 ic	0.90 ic	---	---	0.77	---	---	---	---	---	1.826
2.40	3,262	742.07	0.16 ic	0.91 ic	---	---	0.88	---	---	---	---	---	1.947
2.41	3,279	742.09	0.16 ic	0.91 ic	---	---	1.00	---	---	---	---	---	2.071
2.43	3,295	742.10	0.16 ic	0.92 ic	---	---	1.12	---	---	---	---	---	2.201
2.45	3,312	742.12	0.16 ic	0.93 ic	---	---	1.24	---	---	---	---	---	2.335
2.47	3,329	742.14	0.16 ic	0.94 ic	---	---	1.37	---	---	---	---	---	2.473
2.48	3,345	742.15	0.16 ic	0.95 ic	---	---	1.51	---	---	---	---	---	2.616
2.50	3,362	742.17	0.16 ic	0.95 ic	---	---	1.64	---	---	---	---	---	2.759
2.52	3,378	742.19	0.16 ic	0.96 ic	---	---	1.78	---	---	---	---	---	2.910
2.53	3,395	742.20	0.16 ic	0.97 ic	---	---	1.93	---	---	---	---	---	3.063
2.55	3,411	742.22	0.16 ic	0.98 ic	---	---	2.08	---	---	---	---	---	3.222
2.57	3,428	742.24	0.17 ic	0.99 ic	---	---	2.23	---	---	---	---	---	3.383
2.59	3,444	742.26	0.17 ic	0.99 ic	---	---	2.39	---	---	---	---	---	3.548
2.60	3,461	742.27	0.17 ic	1.00 ic	---	---	2.55	---	---	---	---	---	3.716
2.62	3,477	742.29	0.17 ic	1.01 ic	---	---	2.71	---	---	---	---	---	3.888
2.64	3,494	742.31	0.17 ic	1.02 ic	---	---	2.88	---	---	---	---	---	4.062
2.65	3,510	742.32	0.17 ic	1.02 ic	---	---	3.05	---	---	---	---	---	4.240
2.67	3,527	742.34	0.17 ic	1.03 ic	---	---	3.22	---	---	---	---	---	4.419
2.69	3,543	742.36	0.17 ic	1.04 ic	---	---	3.38	---	---	---	---	---	4.592
2.70	3,560	742.37	0.17 ic	1.04 ic	---	---	3.55	---	---	---	---	---	4.768

Continues on next page...

Underground Pond 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
2.72	3,576	742.39	0.17 ic	1.05 ic	---	---	3.72	---	---	---	---	---	4.947
2.73	3,593	742.40	0.17 ic	1.06 ic	---	---	3.90	---	---	---	---	---	5.128
2.75	3,609	742.42	0.17 ic	1.07 ic	---	---	4.07	---	---	---	---	---	5.311
2.77	3,626	742.44	0.17 ic	1.07 ic	---	---	4.25	---	---	---	---	---	5.498
2.78	3,642	742.45	0.17 ic	1.08 ic	---	---	4.44	---	---	---	---	---	5.687
2.80	3,659	742.47	0.17 ic	1.09 ic	---	---	4.62	---	---	---	---	---	5.878
2.81	3,675	742.48	0.17 ic	1.09 ic	---	---	4.81	---	---	---	---	---	6.070
2.83	3,692	742.50	0.17 ic	1.10 ic	---	---	5.00	---	---	---	---	---	6.268
2.85	3,708	742.52	0.17 ic	1.11 ic	---	---	5.20	---	---	---	---	---	6.479
2.86	3,725	742.53	0.18 ic	1.11 ic	---	---	5.41	---	---	---	---	---	6.694
2.88	3,741	742.55	0.18 ic	1.12 ic	---	---	5.62	---	---	---	---	---	6.910
2.90	3,758	742.57	0.18 ic	1.13 ic	---	---	5.83	---	---	---	---	---	7.129
2.91	3,774	742.59	0.18 ic	1.13 ic	---	---	6.04	---	---	---	---	---	7.350
2.93	3,791	742.60	0.18 ic	1.14 ic	---	---	6.26	---	---	---	---	---	7.575
2.95	3,807	742.62	0.18 ic	1.15 ic	---	---	6.48	---	---	---	---	---	7.802
2.97	3,824	742.64	0.18 ic	1.15 ic	---	---	6.70	---	---	---	---	---	8.031
2.98	3,840	742.65	0.18 ic	1.16 ic	---	---	6.93	---	---	---	---	---	8.264
3.00	3,857	742.67	0.18 ic	1.17 ic	---	---	7.15	---	---	---	---	---	8.493

...End

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	0.190	2	20	802	-----	-----	-----	Basin 1
2	SCS Runoff	0.107	2	18	387	-----	-----	-----	Basin 2
3	SCS Runoff	0.416	2	18	1,297	-----	-----	-----	Basin 3
4	SCS Runoff	0.462	2	18	1,557	-----	-----	-----	Basin 4
5	SCS Runoff	0.009	2	46	50	-----	-----	-----	Basin 5
6	SCS Runoff	0.077	2	20	369	-----	-----	-----	Basin 6
7	SCS Runoff	0.041	2	46	213	-----	-----	-----	Basin 7
8	SCS Runoff	0.315	2	18	1,062	-----	-----	-----	Basin 8
9	Combine	1.168	2	18	4,043	1, 2, 3, 4, 9	-----	-----	Total to storage
10	Reservoir	0.252	2	92	4,020		741.35	2,286	Pond routing
3 hr storm.gpw					Return Period: 10 Year			Thursday, 01 / 24 / 2019	

Hydrograph Report

10

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

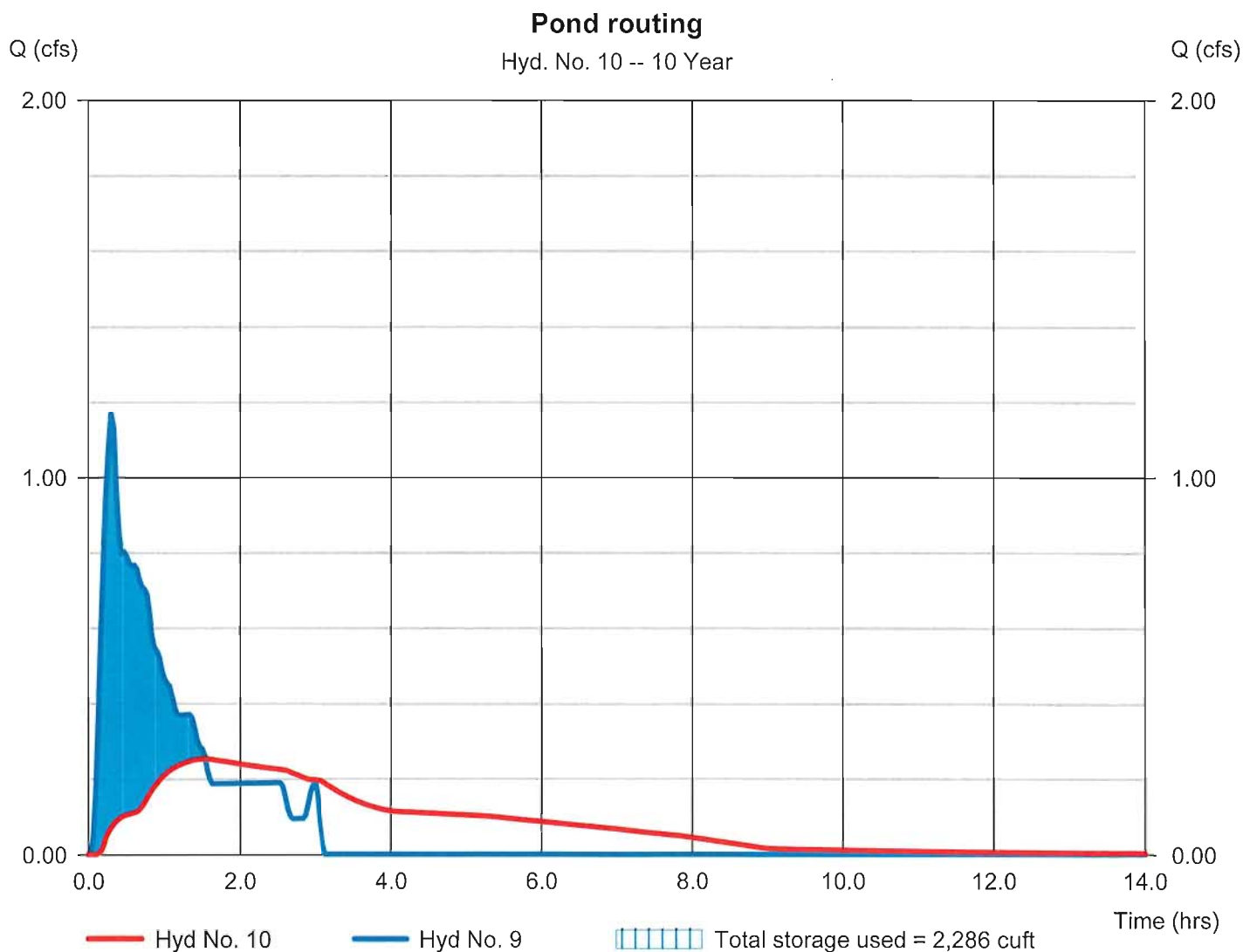
Thursday, 01 / 24 / 2019

Hyd. No. 10

Pond routing

Hydrograph type	= Reservoir	Peak discharge	= 0.252 cfs
Storm frequency	= 10 yrs	Time to peak	= 1.53 hrs
Time interval	= 2 min	Hyd. volume	= 4,020 cuft
Inflow hyd. No.	= 9 - Total to storage	Max. Elevation	= 741.35 ft
Reservoir name	= Underground Pond 1	Max. Storage	= 2,286 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydrailow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	0.437	2	18	1,573	-----	-----	-----	Basin 1
2	SCS Runoff	0.217	2	18	712	-----	-----	-----	Basin 2
3	SCS Runoff	0.712	2	18	2,194	-----	-----	-----	Basin 3
4	SCS Runoff	0.874	2	18	2,768	-----	-----	-----	Basin 4
5	SCS Runoff	0.025	2	38	128	-----	-----	-----	Basin 5
6	SCS Runoff	0.195	2	20	762	-----	-----	-----	Basin 6
7	SCS Runoff	0.103	2	38	533	-----	-----	-----	Basin 7
8	SCS Runoff	0.596	2	18	1,887	-----	-----	-----	Basin 8
9	Combine	2.239	2	18	7,247	1, 2, 3, 4, 9	-----	-----	Total to storage
10	Reservoir	0.906	2	56	7,224		741.79	2,955	Pond routing
3 hr storm.gpw					Return Period: 100 Year			Thursday, 01 / 24 / 2019	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

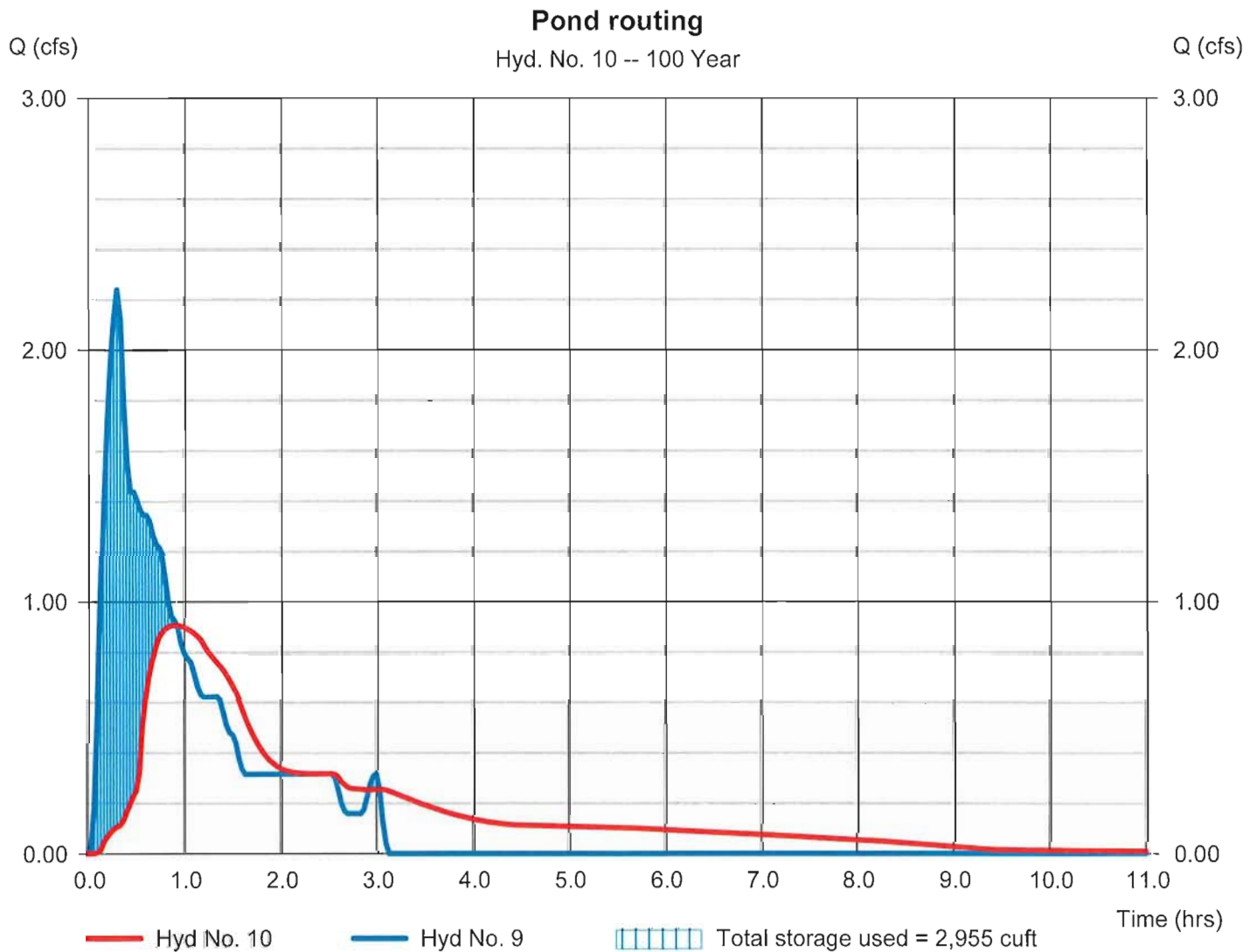
Thursday, 01 / 24 / 2019

Hyd. No. 10

Pond routing

Hydrograph type	= Reservoir	Peak discharge	= 0.906 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.93 hrs
Time interval	= 2 min	Hyd. volume	= 7,224 cuft
Inflow hyd. No.	= 9 - Total to storage	Max. Elevation	= 741.79 ft
Reservoir name	= Underground Pond 1	Max. Storage	= 2,955 cuft

Storage Indication method used.



Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	46.8066	9.7000	0.8733	-----
2	59.5280	10.4000	0.8832	-----
3	0.0000	0.0000	0.0000	-----
5	54.7227	9.1000	0.8128	-----
10	54.6685	8.4000	0.7806	-----
25	53.3784	7.5000	0.7364	-----
50	50.1986	6.5000	0.6964	-----
100	47.1992	5.6000	0.6579	-----

File name: Franklin.Indiana.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	4.48	3.47	2.85	2.42	2.11	1.88	1.70	1.55	1.42	1.32	1.23	1.15
2	5.32	4.15	3.42	2.92	2.55	2.27	2.05	1.87	1.72	1.59	1.48	1.39
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	6.37	4.98	4.12	3.53	3.11	2.78	2.52	2.31	2.14	1.99	1.86	1.75
10	7.21	5.63	4.67	4.01	3.53	3.17	2.88	2.65	2.45	2.29	2.14	2.02
25	8.31	6.49	5.39	4.65	4.11	3.70	3.37	3.11	2.89	2.70	2.54	2.40
50	9.16	7.13	5.93	5.12	4.54	4.10	3.75	3.46	3.23	3.02	2.85	2.70
100	9.99	7.74	6.45	5.59	4.97	4.50	4.13	3.82	3.57	3.36	3.17	3.01

Tc = time in minutes. Values may exceed 60.

Precip. file name: G:\pcp files\Franklin, Indiana\huff 1st 3-hour.pcp

[illegible]

Watershed Model Schematic.....

1

Hydrograph Return Period Recap.....

2

2 - Year

Summary Report.....

3

10 - Year

Summary Report.....

4

100 - Year

Summary Report.....

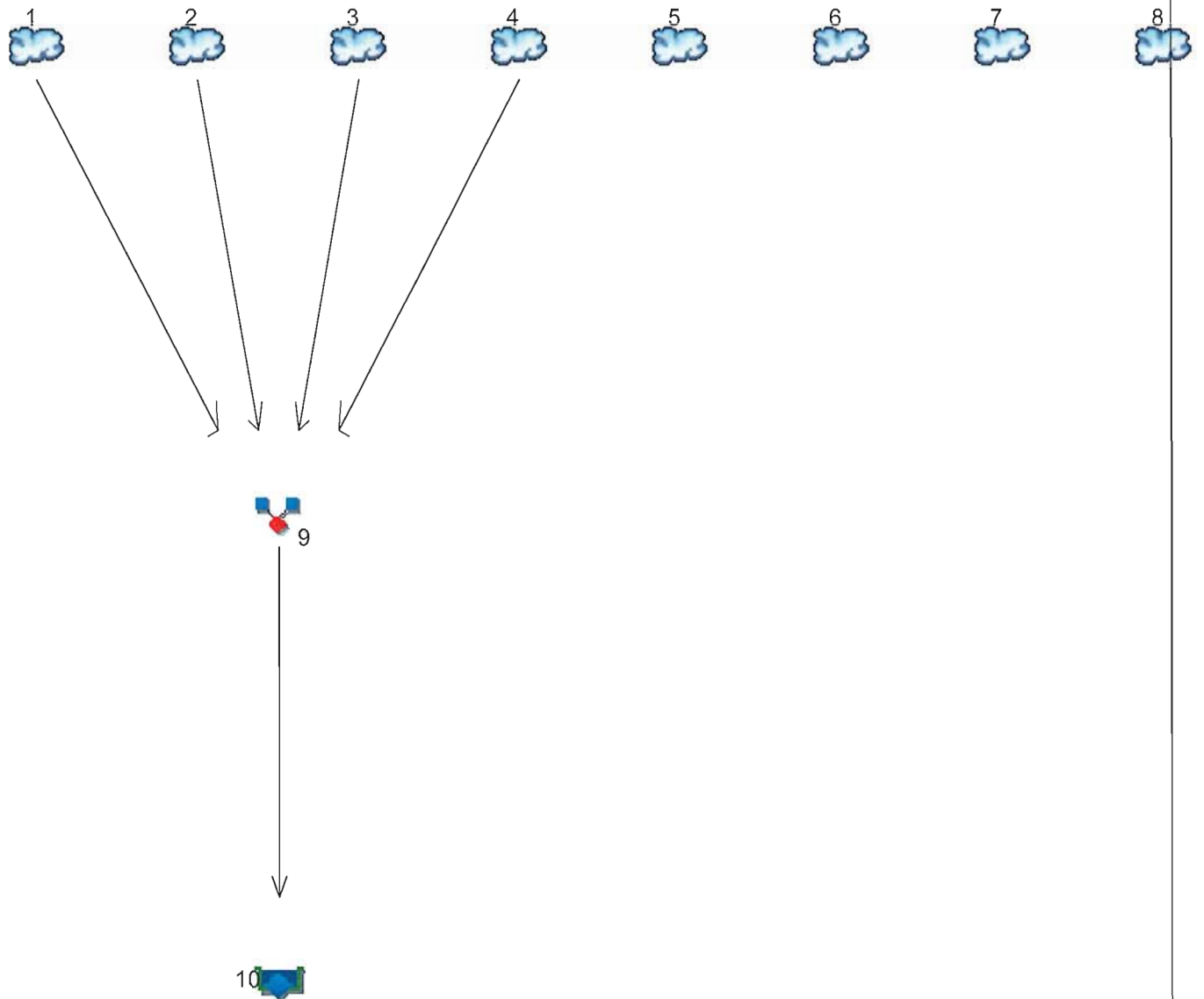
5

IDF Report.....

6

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020



Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	0.067	2	36	572	-----	-----	-----	Basin 1
2	SCS Runoff	0.041	2	36	288	-----	-----	-----	Basin 2
3	SCS Runoff	0.165	2	36	1,011	-----	-----	-----	Basin 3
4	SCS Runoff	0.179	2	36	1,179	-----	-----	-----	Basin 4
5	SCS Runoff	0.003	2	90	30	-----	-----	-----	Basin 5
6	SCS Runoff	0.025	2	90	255	-----	-----	-----	Basin 6
7	SCS Runoff	0.013	2	90	130	-----	-----	-----	Basin 7
8	SCS Runoff	0.122	2	36	804	-----	-----	-----	Basin 8
9	Combine	0.453	2	36	3,050	1, 2, 3, 4, 9	-----	-----	Total to storage
10	Reservoir	0.111	2	170	3,026		740.87	1,396	Pond routing
6 hr storm.gpw					Return Period: 2 Year			Thursday, 01 / 24 / 2019	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	0.141	2	36	1,015	-----	-----	-----	Basin 1
2	SCS Runoff	0.074	2	36	478	-----	-----	-----	Basin 2
3	SCS Runoff	0.255	2	36	1,550	-----	-----	-----	Basin 3
4	SCS Runoff	0.303	2	36	1,897	-----	-----	-----	Basin 4
5	SCS Runoff	0.007	2	90	70	-----	-----	-----	Basin 5
6	SCS Runoff	0.060	2	36	476	-----	-----	-----	Basin 6
7	SCS Runoff	0.029	2	90	296	-----	-----	-----	Basin 7
8	SCS Runoff	0.207	2	36	1,293	-----	-----	-----	Basin 8
9	Combine	0.772	2	36	4,940	1, 2, 3, 4, 9	-----	-----	Total to storage
10	Reservoir	0.235	2	130	4,916		741.29	2,171	Pond routing
6 hr storm.gpw					Return Period: 10 Year			Thursday, 01 / 24 / 2019	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	0.299	2	36	1,936	-----	-----	-----	Basin 1
2	SCS Runoff	0.139	2	36	861	-----	-----	-----	Basin 2
3	SCS Runoff	0.426	2	36	2,601	-----	-----	-----	Basin 3
4	SCS Runoff	0.544	2	36	3,321	-----	-----	-----	Basin 4
5	SCS Runoff	0.019	2	36	168	-----	-----	-----	Basin 5
6	SCS Runoff	0.140	2	36	950	-----	-----	-----	Basin 6
7	SCS Runoff	0.080	2	36	696	-----	-----	-----	Basin 7
8	SCS Runoff	0.371	2	36	2,265	-----	-----	-----	Basin 8
9	Combine	1.408	2	36	8,719	1, 2, 3, 4, 9	-----	-----	Total to storage
10	Reservoir	0.726	2	80	8,696		741.61	2,708	Pond routing
6 hr storm.gpw					Return Period: 100 Year			Thursday, 01 / 24 / 2019	

Watershed Model Schematic..... 1

Hydrograph Return Period Recap..... 2

2 - Year

Summary Report..... 3

10 - Year

Summary Report..... 4

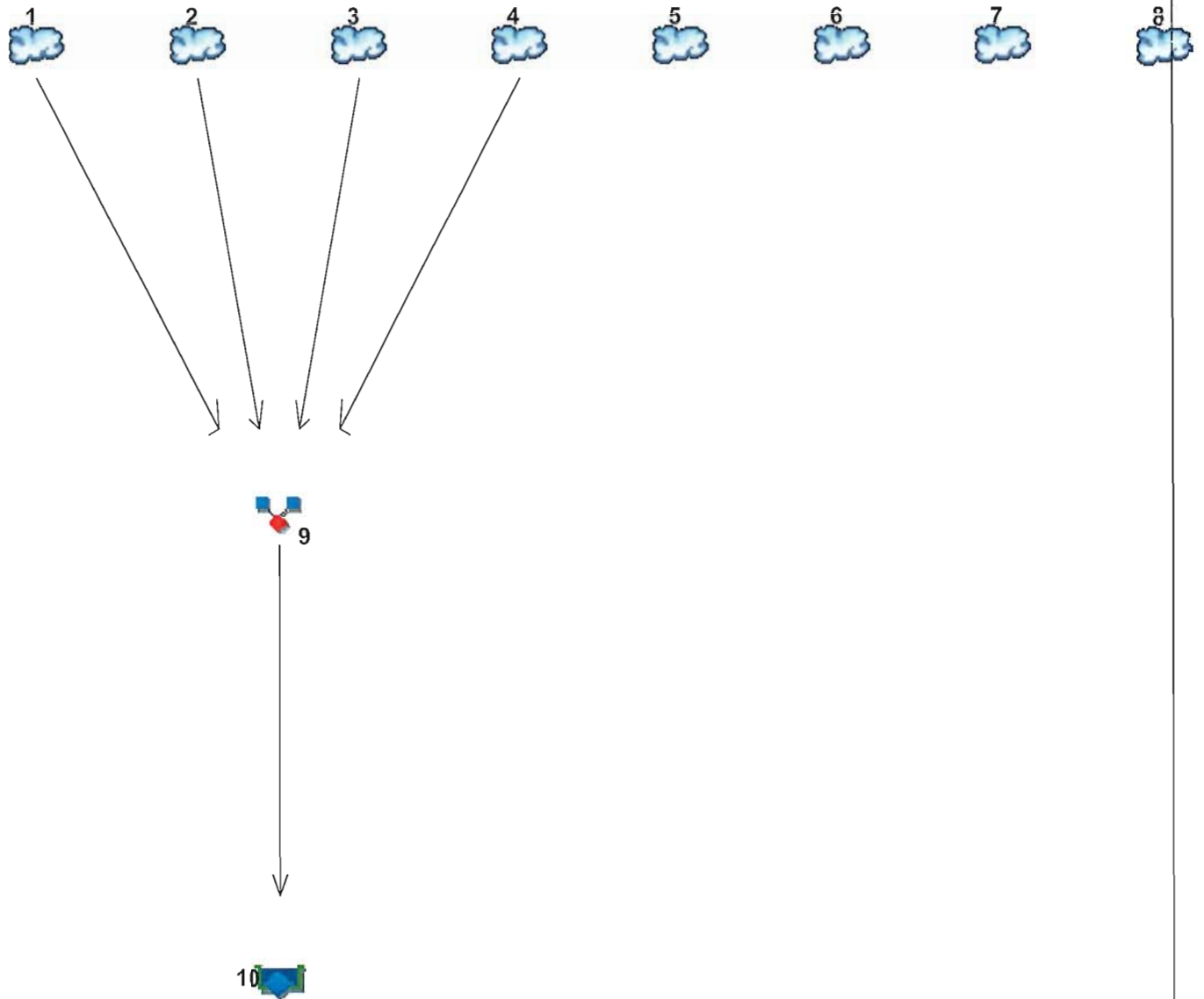
100 - Year

Summary Report..... 5

IDF Report..... 6

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020



Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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Hydrograph Summary Report

Hydrallow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	0.048	2	324	723	-----	-----	-----	Basin 1
2	SCS Runoff	0.023	2	288	353	-----	-----	-----	Basin 2
3	SCS Runoff	0.074	2	288	1,200	-----	-----	-----	Basin 3
4	SCS Runoff	0.092	2	288	1,428	-----	-----	-----	Basin 4
5	SCS Runoff	0.003	2	324	43	-----	-----	-----	Basin 5
6	SCS Runoff	0.023	2	324	330	-----	-----	-----	Basin 6
7	SCS Runoff	0.013	2	324	184	-----	-----	-----	Basin 7
8	SCS Runoff	0.063	2	288	974	-----	-----	-----	Basin 8
9	Combine	0.237	2	288	3,704	1, 2, 3, 4, 9	-----	-----	Total to storage
10	Reservoir	0.110	2	402	3,680		740.85	1,349	Pond routing
12 hr storm.gpw					Return Period: 2 Year			Thursday, 01 / 24 / 2019	

Hydrograph Summary Report

Hydroflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	0.082	2	288	1,252	-----	-----	-----	Basin 1
2	SCS Runoff	0.037	2	288	578	-----	-----	-----	Basin 2
3	SCS Runoff	0.109	2	288	1,826	-----	-----	-----	Basin 3
4	SCS Runoff	0.143	2	288	2,269	-----	-----	-----	Basin 4
5	SCS Runoff	0.007	2	324	94	-----	-----	-----	Basin 5
6	SCS Runoff	0.039	2	288	597	-----	-----	-----	Basin 6
7	SCS Runoff	0.028	2	324	393	-----	-----	-----	Basin 7
8	SCS Runoff	0.097	2	288	1,547	-----	-----	-----	Basin 8
9	Combine	0.371	2	288	5,924	1, 2, 3, 4, 9	-----	-----	Total to storage
10	Reservoir	0.224	2	364	5,900		741.25	2,114	Pond routing
12 hr storm.gpw					Return Period: 10 Year			Thursday, 01 / 24 / 2019	

Hydrograph Summary Report

Hydrailow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	0.150	2	288	2,337	-----	-----	-----	Basin 1
2	SCS Runoff	0.064	2	288	1,025	-----	-----	-----	Basin 2
3	SCS Runoff	0.178	2	288	3,046	-----	-----	-----	Basin 3
4	SCS Runoff	0.239	2	288	3,928	-----	-----	-----	Basin 4
5	SCS Runoff	0.014	2	324	214	-----	-----	-----	Basin 5
6	SCS Runoff	0.075	2	288	1,159	-----	-----	-----	Basin 6
7	SCS Runoff	0.059	2	324	882	-----	-----	-----	Basin 7
8	SCS Runoff	0.163	2	288	2,678	-----	-----	-----	Basin 8
9	Combine	0.631	2	288	10,336	1, 2, 3, 4, 9	-----	-----	Total to storage
10	Reservoir	0.591	2	294	10,313		741.52	2,578	Pond routing
12 hr storm.gpw					Return Period: 100 Year			Thursday, 01 / 24 / 2019	

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	46.8066	9.7000	0.8733	-----
2	59.5280	10.4000	0.8832	-----
3	0.0000	0.0000	0.0000	-----
5	54.7227	9.1000	0.8128	-----
10	54.6685	8.4000	0.7806	-----
25	53.3784	7.5000	0.7364	-----
50	50.1986	6.5000	0.6964	-----
100	47.1992	5.6000	0.6579	-----

File name: Franklin,Indiana.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	4.48	3.47	2.85	2.42	2.11	1.88	1.70	1.55	1.42	1.32	1.23	1.15
2	5.32	4.15	3.42	2.92	2.55	2.27	2.05	1.87	1.72	1.59	1.48	1.39
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	6.37	4.98	4.12	3.53	3.11	2.78	2.52	2.31	2.14	1.99	1.86	1.75
10	7.21	5.63	4.67	4.01	3.53	3.17	2.88	2.65	2.45	2.29	2.14	2.02
25	8.31	6.49	5.39	4.65	4.11	3.70	3.37	3.11	2.89	2.70	2.54	2.40
50	9.16	7.13	5.93	5.12	4.54	4.10	3.75	3.46	3.23	3.02	2.85	2.70
100	9.99	7.74	6.45	5.59	4.97	4.50	4.13	3.82	3.57	3.36	3.17	3.01

Tc = time in minutes. Values may exceed 60.

Precip. file name: G:\pcp files\Franklin, Indiana\huff 2st 12-hour.pcp

[illegible]

Watershed Model Schematic..... 1

Hydrograph Return Period Recap..... 2

2 - Year

Summary Report..... 3

10 - Year

Summary Report..... 4

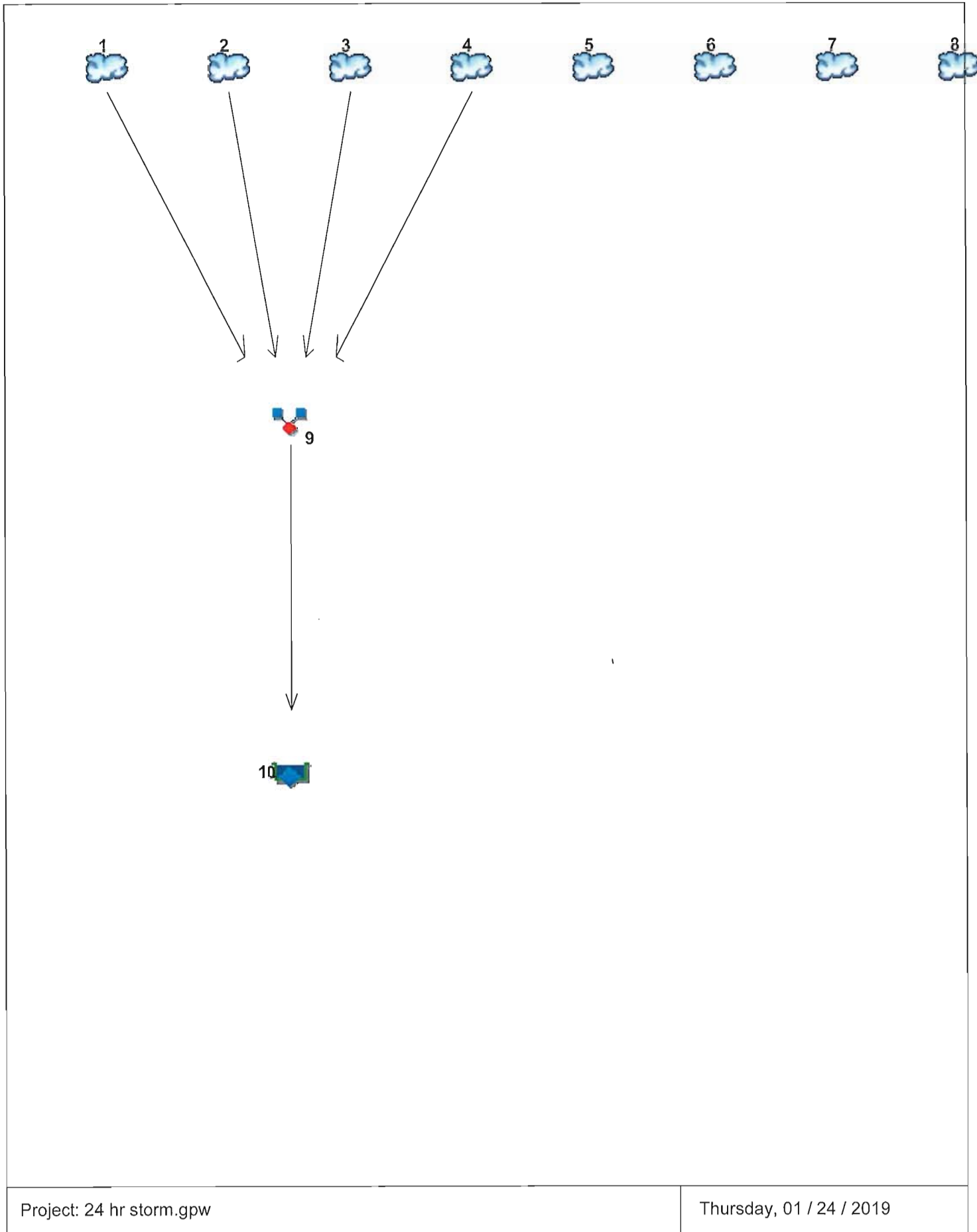
100 - Year

Summary Report..... 5

IDF Report..... 6

Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020



Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	-----	-----	0.036	-----	-----	0.058	-----	-----	0.099	Basin 1
2	SCS Runoff	-----	-----	0.016	-----	-----	0.025	-----	-----	0.041	Basin 2
3	SCS Runoff	-----	-----	0.047	-----	-----	0.069	-----	-----	0.112	Basin 3
4	SCS Runoff	-----	-----	0.062	-----	-----	0.092	-----	-----	0.152	Basin 4
5	SCS Runoff	-----	-----	0.003	-----	-----	0.005	-----	-----	0.011	Basin 5
6	SCS Runoff	-----	-----	0.018	-----	-----	0.029	-----	-----	0.051	Basin 6
7	SCS Runoff	-----	-----	0.012	-----	-----	0.023	-----	-----	0.045	Basin 7
8	SCS Runoff	-----	-----	0.042	-----	-----	0.063	-----	-----	0.104	Basin 8
9	Combine	1, 2, 3,	-----	0.161	-----	-----	0.244	-----	-----	0.404	Total to storage
10	Reservoir	4, 9	-----	0.102	-----	-----	0.164	-----	-----	0.403	Pond routing
Proj. file: 24 hr storm.gpw										Thursday, 01 / 24 / 2019	

Hydrograph Summary Report

Hydrflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	0.036	2	936	892	-----	-----	-----	Basin 1
2	SCS Runoff	0.016	2	936	426	-----	-----	-----	Basin 2
3	SCS Runoff	0.047	2	936	1,404	-----	-----	-----	Basin 3
4	SCS Runoff	0.062	2	936	1,702	-----	-----	-----	Basin 4
5	SCS Runoff	0.003	2	936	58	-----	-----	-----	Basin 5
6	SCS Runoff	0.018	2	936	414	-----	-----	-----	Basin 6
7	SCS Runoff	0.012	2	936	247	-----	-----	-----	Basin 7
8	SCS Runoff	0.042	2	936	1,160	-----	-----	-----	Basin 8
9	Combine	0.161	2	936	4,424	1, 2, 3, 4, 9	-----	-----	Total to storage
10	Reservoir	0.102	2	1010	4,400		740.70	1,044	Pond routing
24 hr storm.gpw					Return Period: 2 Year			Thursday, 01 / 24 / 2019	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	0.058	2	936	1,512	-----	-----	-----	Basin 1
2	SCS Runoff	0.025	2	936	686	-----	-----	-----	Basin 2
3	SCS Runoff	0.069	2	936	2,124	-----	-----	-----	Basin 3
4	SCS Runoff	0.092	2	936	2,673	-----	-----	-----	Basin 4
5	SCS Runoff	0.005	2	936	121	-----	-----	-----	Basin 5
6	SCS Runoff	0.029	2	936	730	-----	-----	-----	Basin 6
7	SCS Runoff	0.023	2	936	505	-----	-----	-----	Basin 7
8	SCS Runoff	0.063	2	936	1,822	-----	-----	-----	Basin 8
9	Combine	0.244	2	936	6,994	1, 2, 3, 4, 9	-----	-----	Total to storage
10	Reservoir	0.164	2	1010	6,971		741.09	1,816	Pond routing
24 hr storm.gpw					Return Period: 10 Year			Thursday, 01 / 24 / 2019	

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	0.099	2	936	2,776	-----	-----	-----	Basin 1
2	SCS Runoff	0.041	2	936	1,204	-----	-----	-----	Basin 2
3	SCS Runoff	0.112	2	936	3,530	-----	-----	-----	Basin 3
4	SCS Runoff	0.152	2	936	4,589	-----	-----	-----	Basin 4
5	SCS Runoff	0.011	2	936	266	-----	-----	-----	Basin 5
6	SCS Runoff	0.051	2	936	1,388	-----	-----	-----	Basin 6
7	SCS Runoff	0.045	2	936	1,091	-----	-----	-----	Basin 7
8	SCS Runoff	0.104	2	936	3,129	-----	-----	-----	Basin 8
9	Combine	0.404	2	936	12,099	1, 2, 3, 4, 9	-----	-----	Total to storage
10	Reservoir	0.403	2	936	12,075		741.44	2,435	Pond routing
24 hr storm.gpw					Return Period: 100 Year			Thursday, 01 / 24 / 2019	

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	46.8066	9.7000	0.8733	-----
2	59.5280	10.4000	0.8832	-----
3	0.0000	0.0000	0.0000	-----
5	54.7227	9.1000	0.8128	-----
10	54.6685	8.4000	0.7806	-----
25	53.3784	7.5000	0.7364	-----
50	50.1986	6.5000	0.6964	-----
100	47.1992	5.6000	0.6579	-----

File name: Franklin,Indiana.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	4.48	3.47	2.85	2.42	2.11	1.88	1.70	1.55	1.42	1.32	1.23	1.15
2	5.32	4.15	3.42	2.92	2.55	2.27	2.05	1.87	1.72	1.59	1.48	1.39
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	6.37	4.98	4.12	3.53	3.11	2.78	2.52	2.31	2.14	1.99	1.86	1.75
10	7.21	5.63	4.67	4.01	3.53	3.17	2.88	2.65	2.45	2.29	2.14	2.02
25	8.31	6.49	5.39	4.65	4.11	3.70	3.37	3.11	2.89	2.70	2.54	2.40
50	9.16	7.13	5.93	5.12	4.54	4.10	3.75	3.46	3.23	3.02	2.85	2.70
100	9.99	7.74	6.45	5.59	4.97	4.50	4.13	3.82	3.57	3.36	3.17	3.01

Tc = time in minutes. Values may exceed 60.

Precip. file name: G:\pcp files\Franklin, Indiana\huff 3rd 24-hour.pcp

[illegible]

Appendix E

Water Quality Calculations

Watershed Model Schematic..... 1

Hydrograph Return Period Recap..... 2

10 - Year

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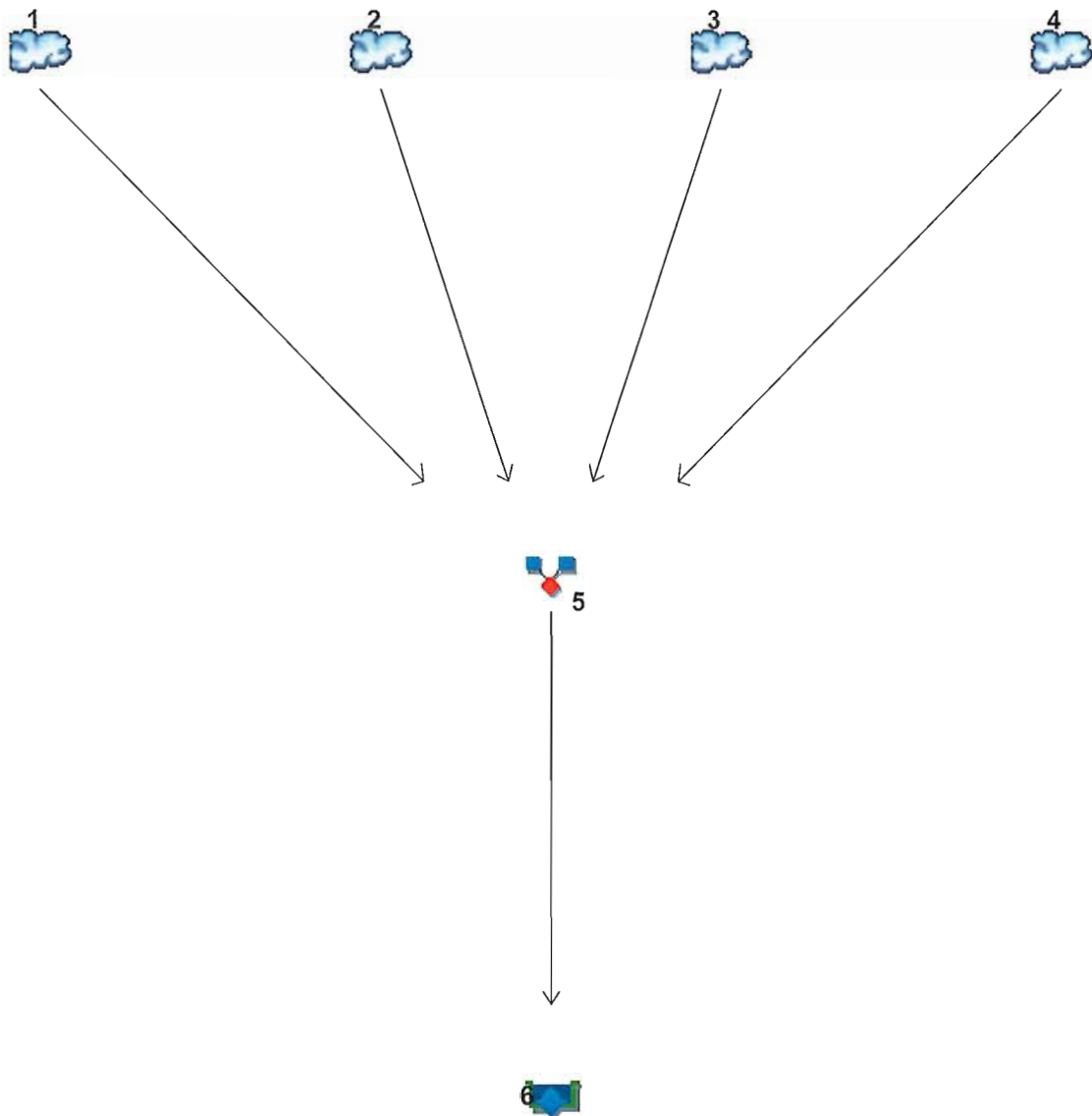
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Watershed Model Schematic

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

[illegible]

Hydrograph Summary Report

Hydratlow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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	SCS Runoff	0.010	2	936	208	-----	-----	-----	Basin 1
2	SCS Runoff	0.005	2	936	122	-----	-----	-----	Basin 2
3	SCS Runoff	0.019	2	936	513	-----	-----	-----	Basin 3
4	SCS Runoff	0.022	2	936	536	-----	-----	-----	Basin 4
5	Combine	0.056	2	936	1,379	1, 2, 3, 4	-----	-----	Total to storage
6	Reservoir	0.047	2	940	1,355	5	739.96	287	Pond routing
water quality.gpw					Return Period: 10 Year			Thursday, 01 / 24 / 2019	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

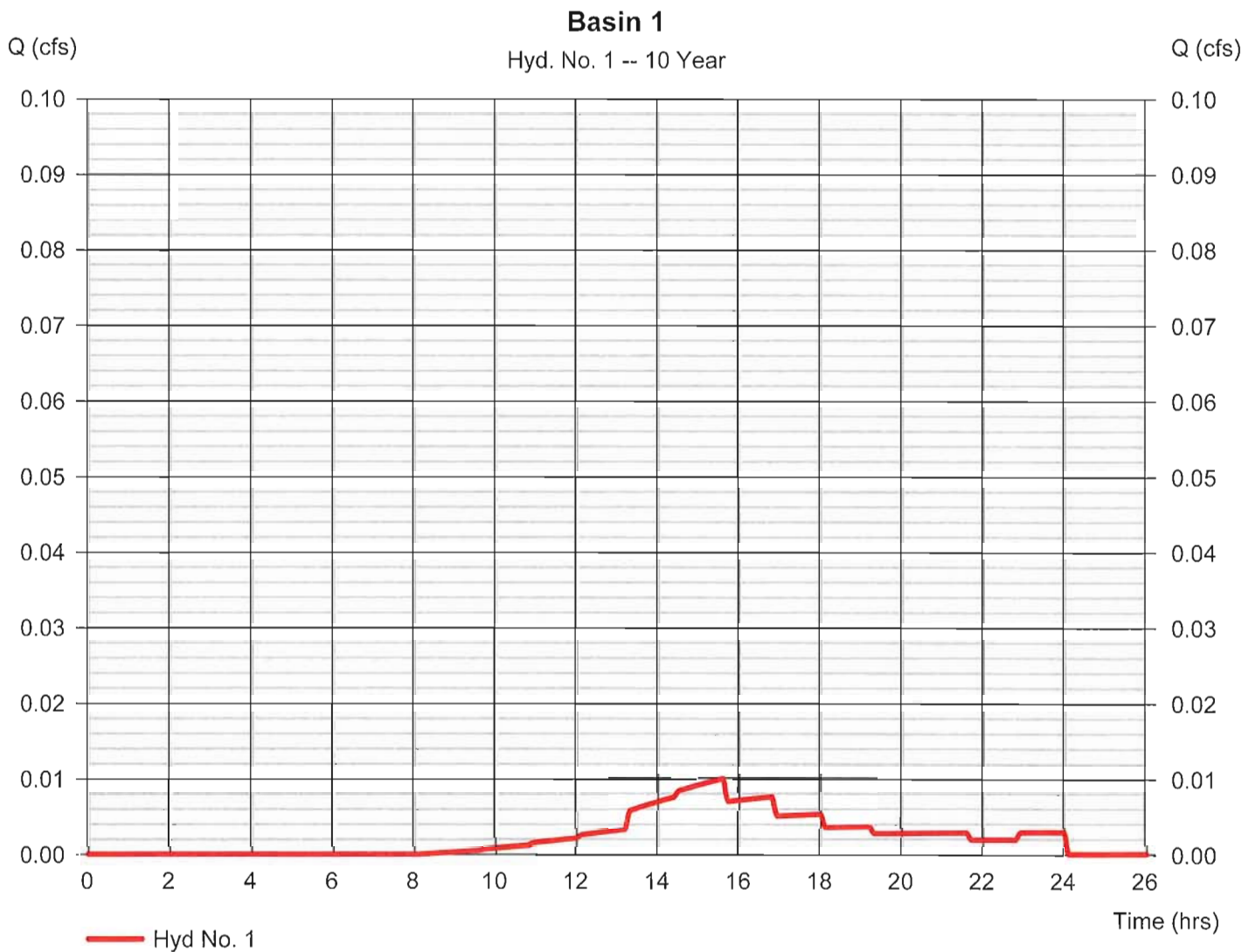
Thursday, 01 / 24 / 2019

Hyd. No. 1

Basin 1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.010 cfs
Storm frequency	= 10 yrs	Time to peak	= 15.60 hrs
Time interval	= 2 min	Hyd. volume	= 208 cuft
Drainage area	= 0.150 ac	Curve number	= 88*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.25 in	Distribution	= Huff-3rd
Storm duration	= 24.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.092 \times 98) + (0.062 \times 74)] / 0.150$



Precipitation Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

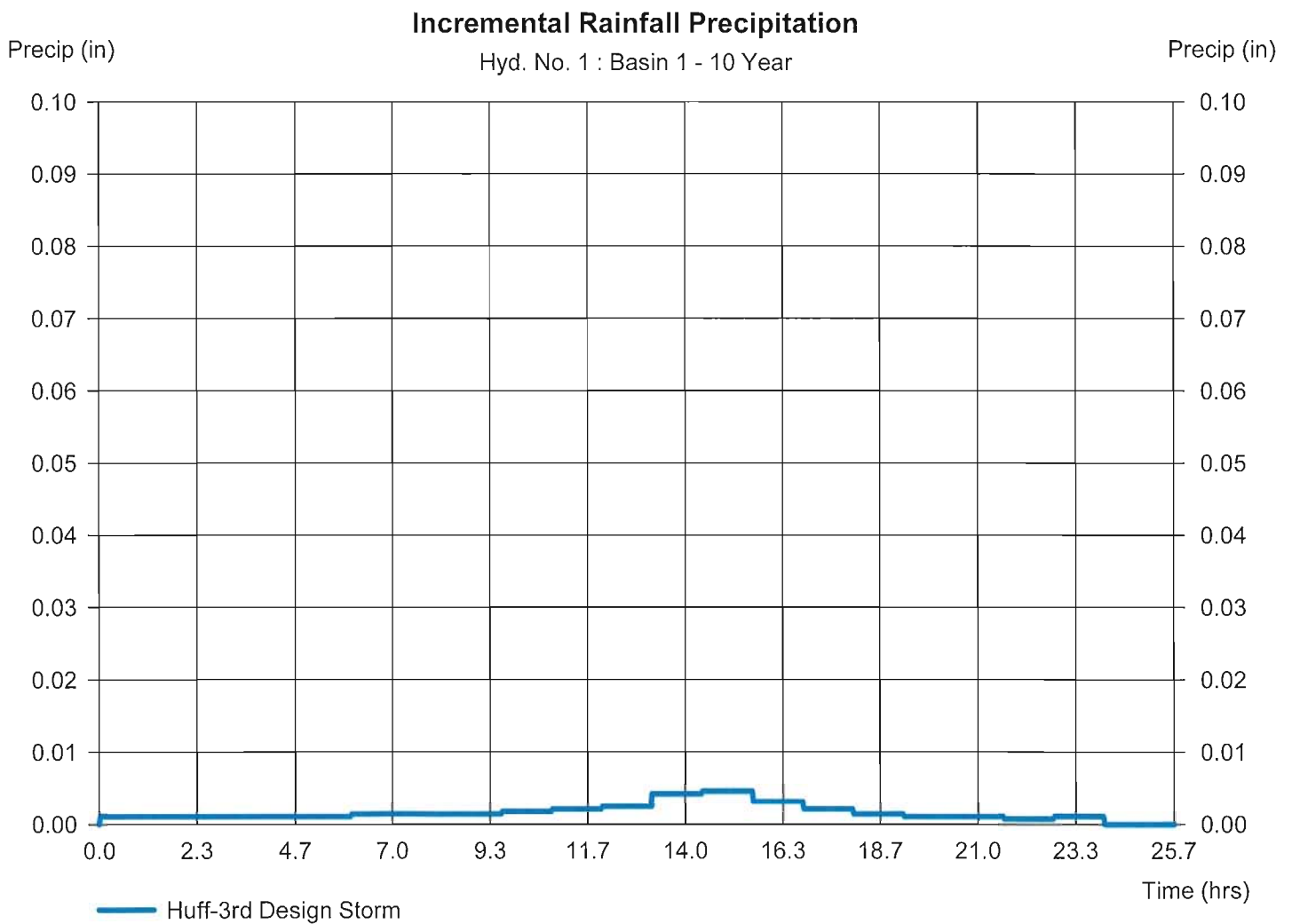
Thursday, 01 / 24 / 2019

Hyd. No. 1

Basin 1

Storm Frequency = 10 yrs
 Total precip. = 1.2500 in
 Storm duration = 24.00 hrs

Time interval = 2 min
 Distribution = Huff-3rd



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

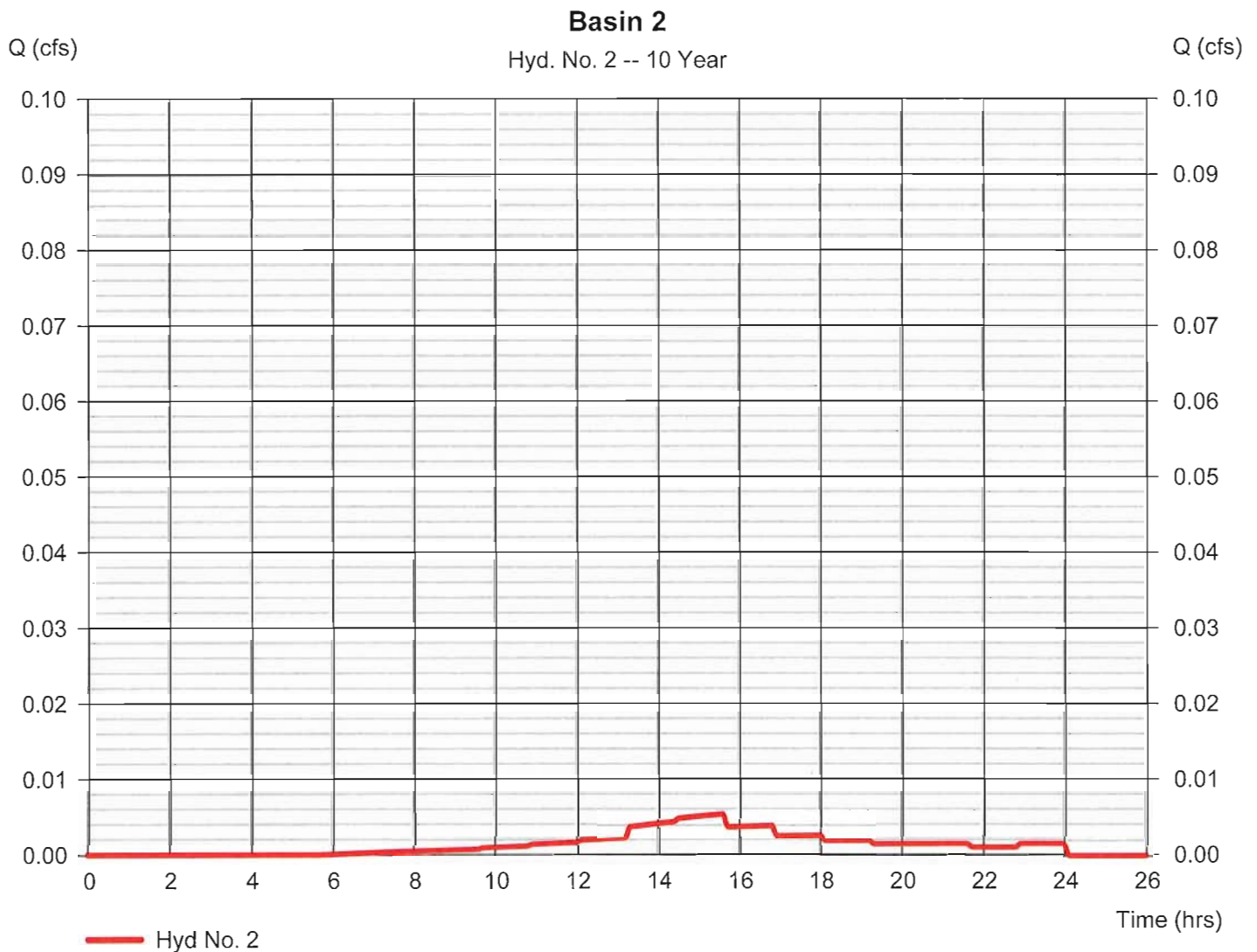
Thursday, 01 / 24 / 2019

Hyd. No. 2

Basin 2

Hydrograph type	= SCS Runoff	Peak discharge	= 0.005 cfs
Storm frequency	= 10 yrs	Time to peak	= 15.60 hrs
Time interval	= 2 min	Hyd. volume	= 122 cuft
Drainage area	= 0.060 ac	Curve number	= 92*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.25 in	Distribution	= Huff-3rd
Storm duration	= 24.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.044 \times 98) + (0.014 \times 74)] / 0.060$



Precipitation Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

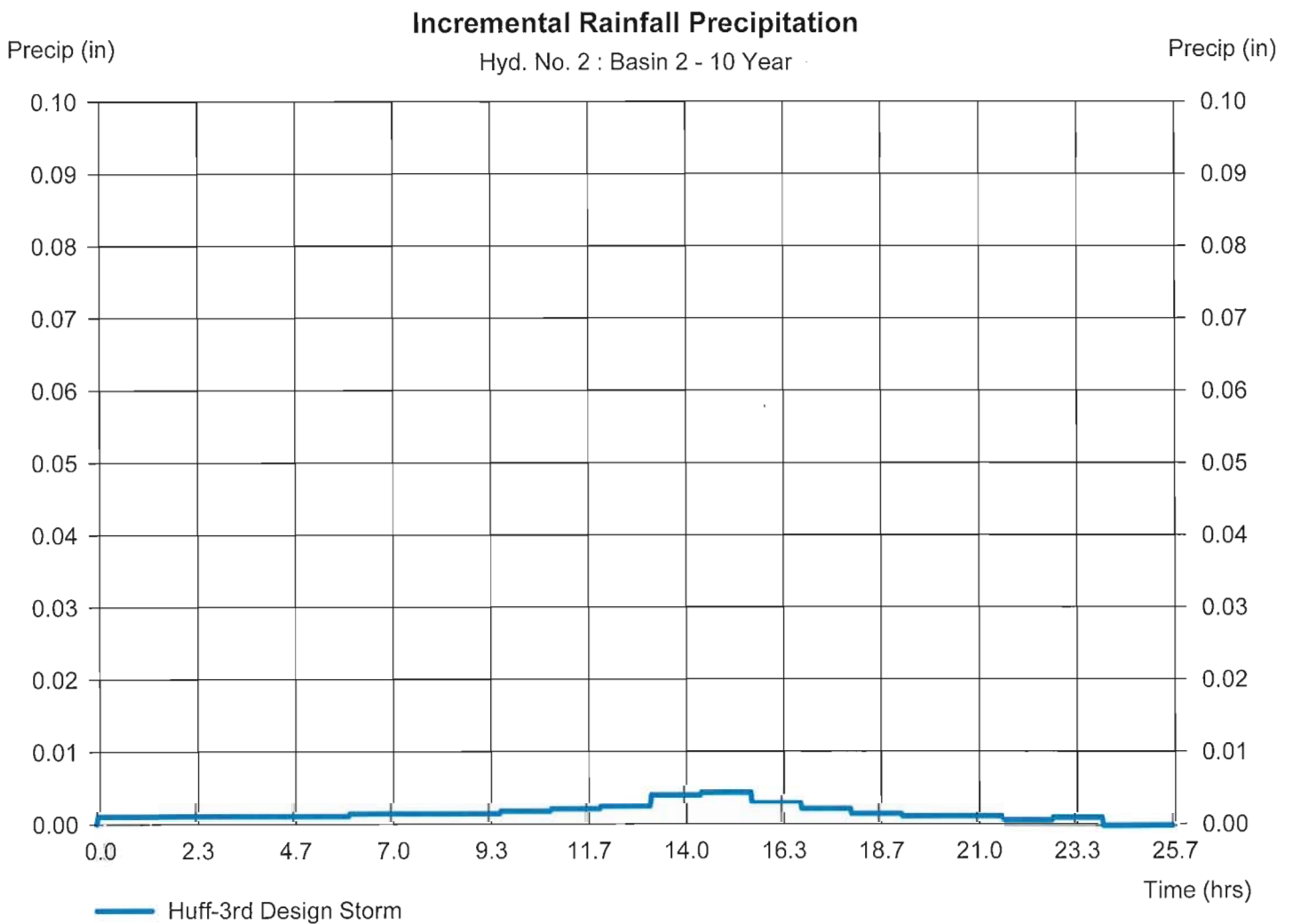
Thursday, 01 / 24 / 2019

Hyd. No. 2

Basin 2

Storm Frequency = 10 yrs
Total precip. = 1.2500 in
Storm duration = 24.00 hrs

Time interval = 2 min
Distribution = Huff-3rd



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

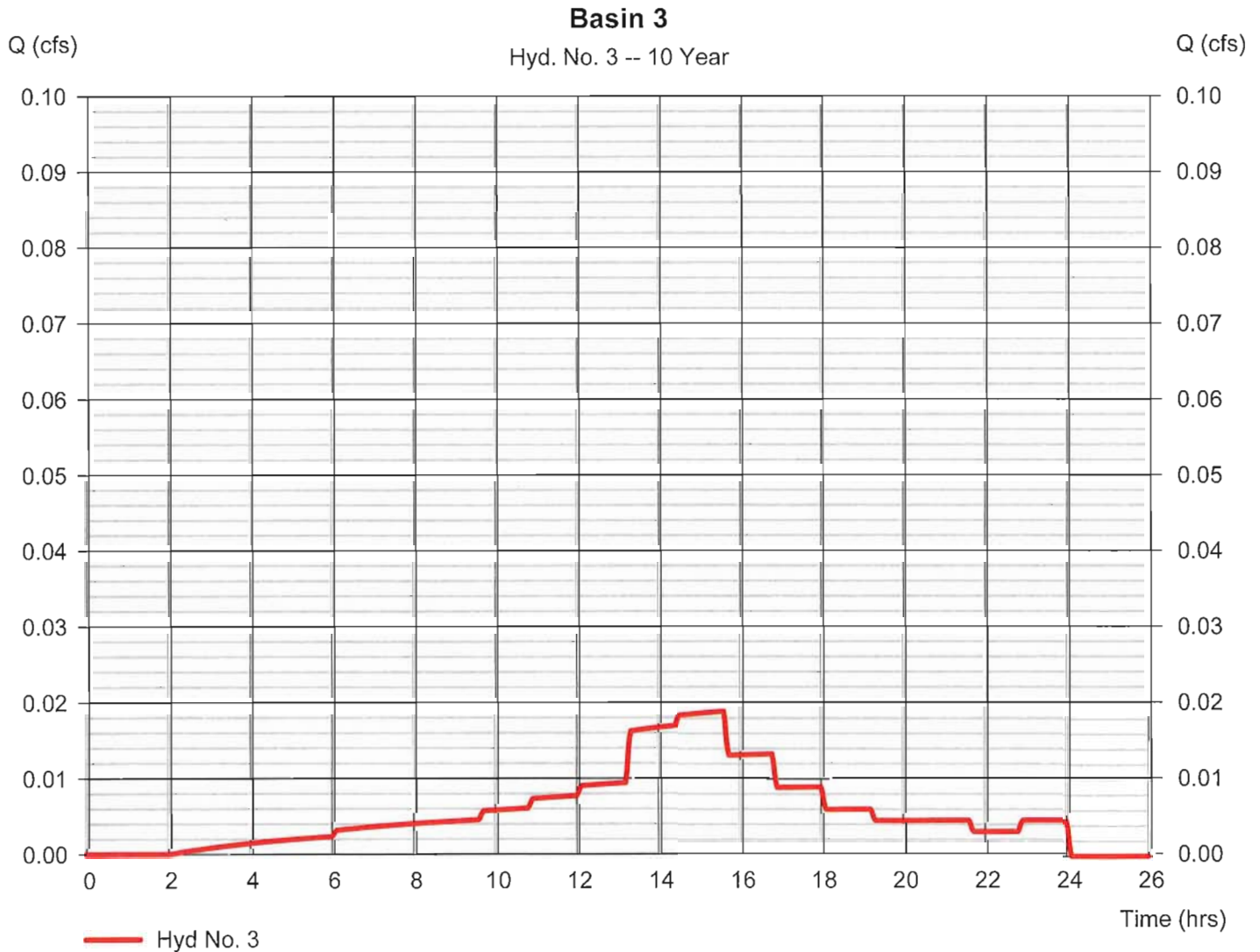
Thursday, 01 / 24 / 2019

Hyd. No. 3

Basin 3

Hydrograph type	= SCS Runoff	Peak discharge	= 0.019 cfs
Storm frequency	= 10 yrs	Time to peak	= 15.60 hrs
Time interval	= 2 min	Hyd. volume	= 513 cuft
Drainage area	= 0.160 ac	Curve number	= 97*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.25 in	Distribution	= Huff-3rd
Storm duration	= 24.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.147 \times 98) + (0.009 \times 74)] / 0.160$



Precipitation Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

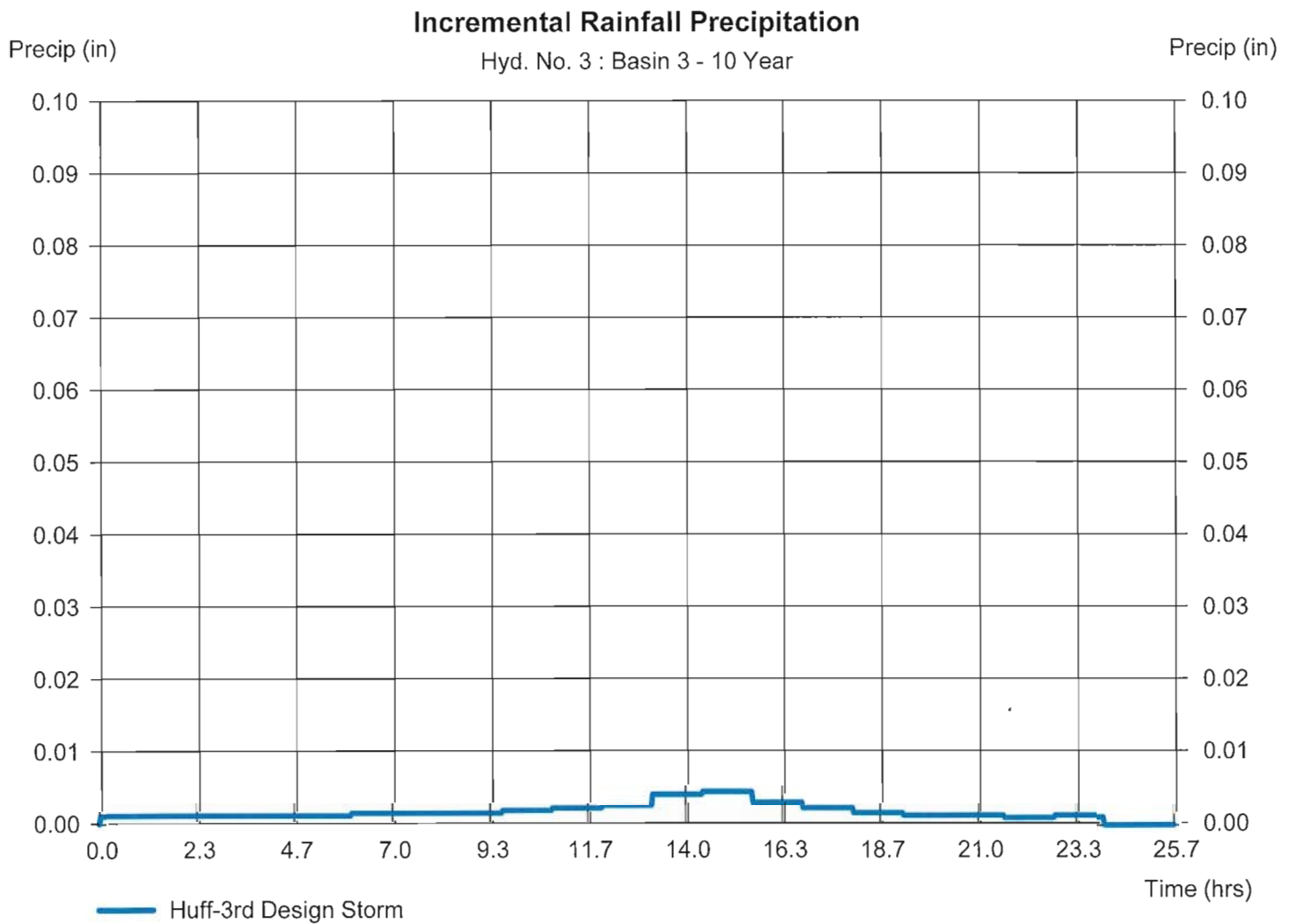
Thursday, 01 / 24 / 2019

Hyd. No. 3

Basin 3

Storm Frequency = 10 yrs
 Total precip. = 1.2500 in
 Storm duration = 24.00 hrs

Time interval = 2 min
 Distribution = Huff-3rd



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

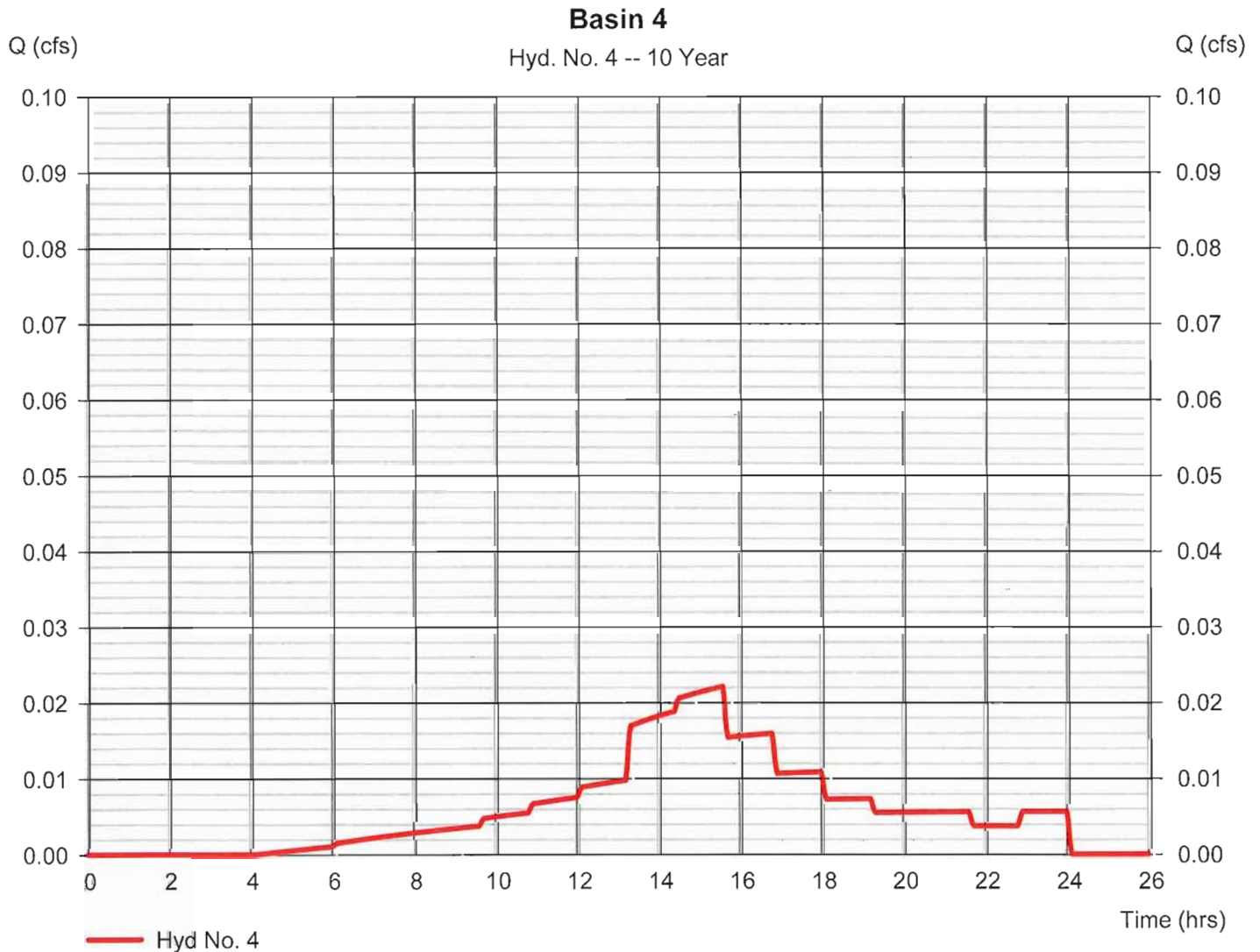
Thursday, 01 / 24 / 2019

Hyd. No. 4

Basin 4

Hydrograph type	= SCS Runoff	Peak discharge	= 0.022 cfs
Storm frequency	= 10 yrs	Time to peak	= 15.60 hrs
Time interval	= 2 min	Hyd. volume	= 536 cuft
Drainage area	= 0.220 ac	Curve number	= 94*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 1.25 in	Distribution	= Huff-3rd
Storm duration	= 24.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.180 \times 98) + (0.040 \times 74)] / 0.220$



Precipitation Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 24 / 2019

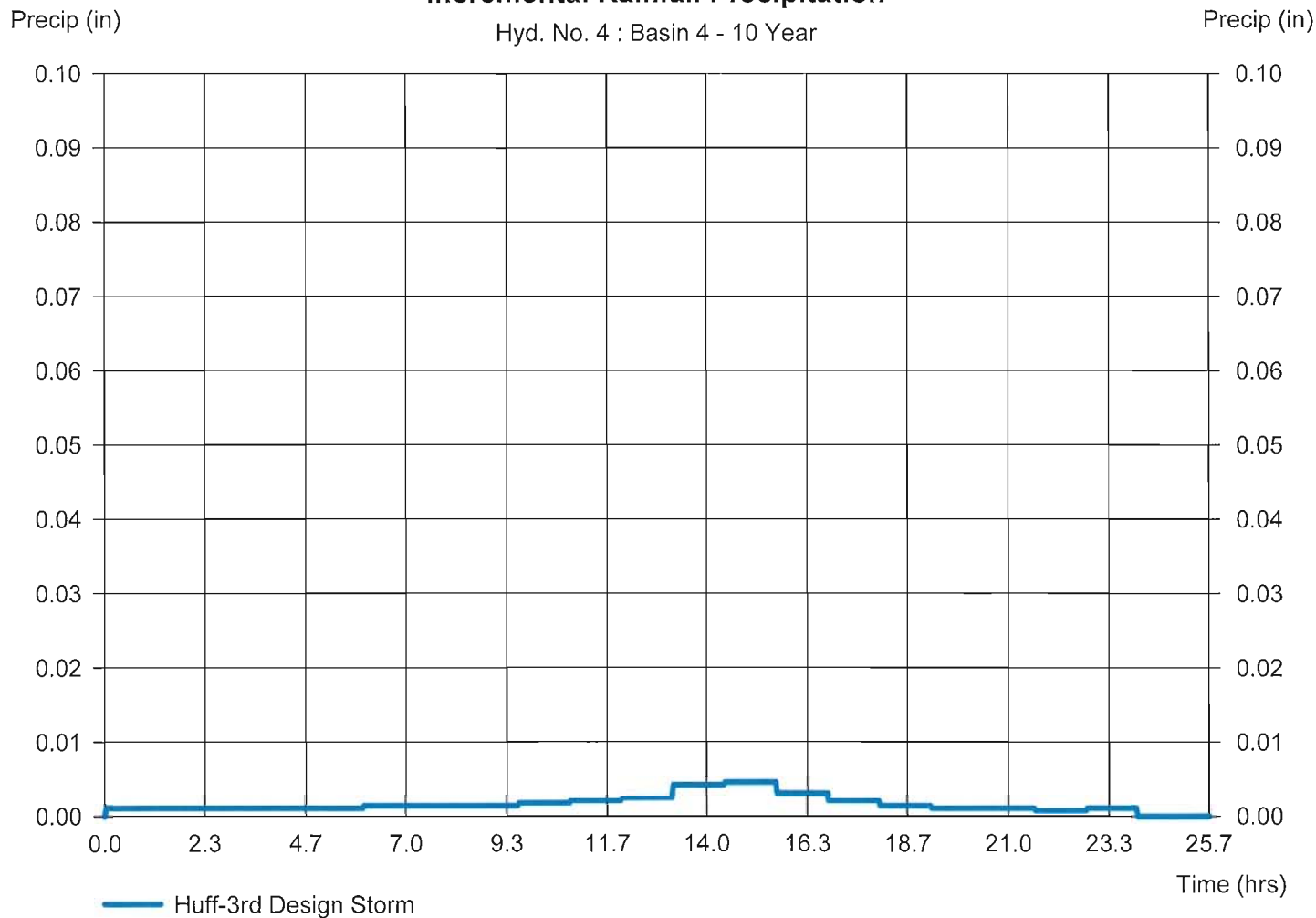
Hyd. No. 4

Basin 4

Storm Frequency = 10 yrs
 Total precip. = 1.2500 in
 Storm duration = 24.00 hrs

Time interval = 2 min
 Distribution = Huff-3rd

Incremental Rainfall Precipitation



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

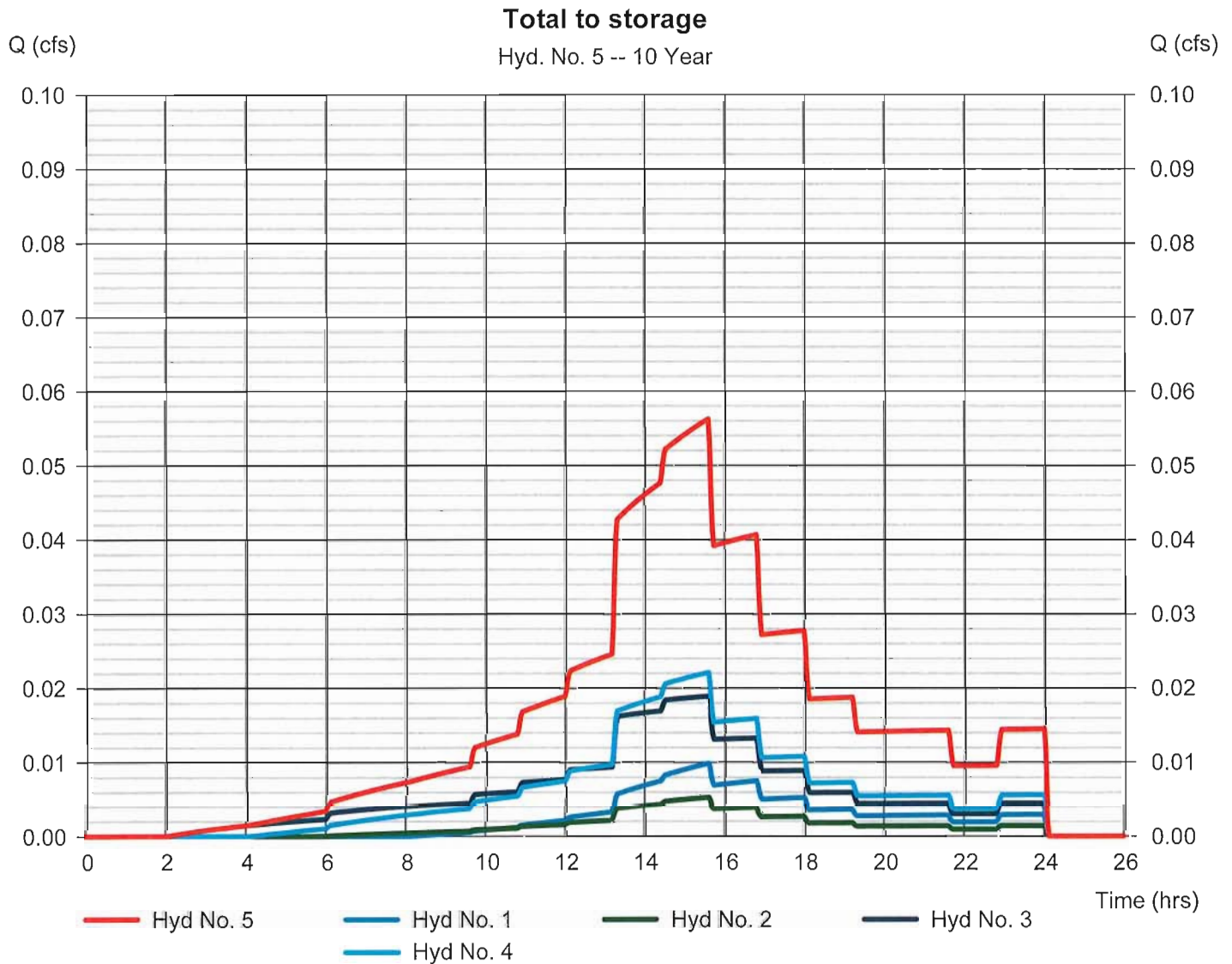
Thursday, 01 / 24 / 2019

Hyd. No. 5

Total to storage

Hydrograph type = Combine
 Storm frequency = 10 yrs
 Time interval = 2 min
 Inflow hyds. = 1, 2, 3, 4

Peak discharge = 0.056 cfs
 Time to peak = 15.60 hrs
 Hyd. volume = 1,379 cuft
 Contrib. drain. area = 0.590 ac



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

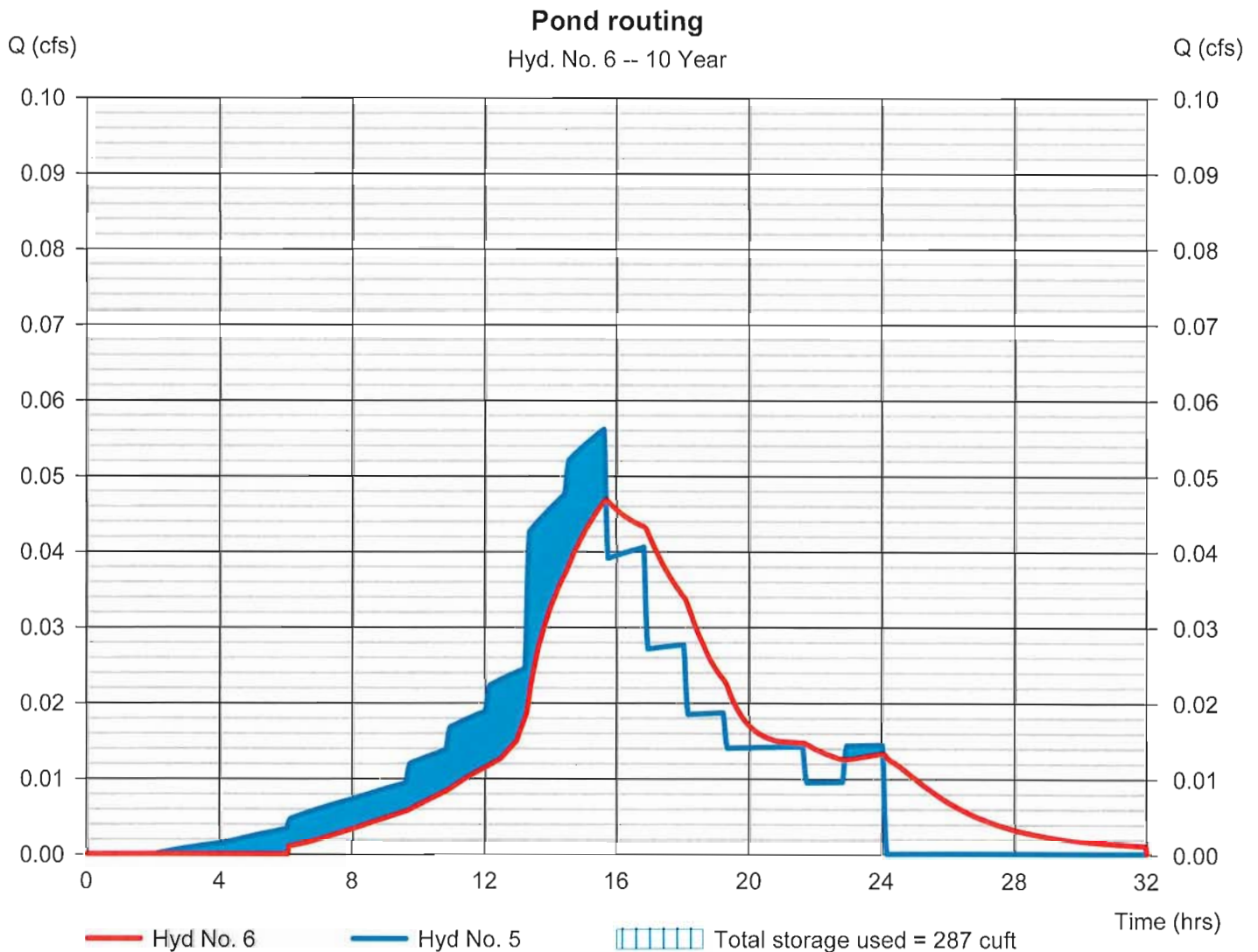
Thursday, 01 / 24 / 2019

Hyd. No. 6

Pond routing

Hydrograph type	= Reservoir	Peak discharge	= 0.047 cfs
Storm frequency	= 10 yrs	Time to peak	= 15.67 hrs
Time interval	= 2 min	Hyd. volume	= 1,355 cuft
Inflow hyd. No.	= 5 - Total to storage	Max. Elevation	= 739.96 ft
Reservoir name	= Underground Pond 1	Max. Storage	= 287 cuft

Storage Indication method used.



Pond Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 24 / 2019

Pond No. 1 - Underground Pond 1

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	739.67	n/a	0	0
0.17	739.84	n/a	165	165
0.33	740.00	n/a	165	330
0.51	740.18	n/a	165	495
0.67	740.34	n/a	165	660
0.83	740.50	n/a	165	825
1.00	740.67	n/a	165	990
1.17	740.84	n/a	335	1,326
1.33	741.00	n/a	326	1,652
1.50	741.17	n/a	314	1,967
1.67	741.34	n/a	300	2,267
1.83	741.50	n/a	281	2,548
2.00	741.67	n/a	257	2,805
2.17	741.84	n/a	214	3,019
2.33	742.00	n/a	178	3,196
2.50	742.17	n/a	165	3,362
2.67	742.34	n/a	165	3,527
2.83	742.50	n/a	165	3,692
3.00	742.67	n/a	165	3,857

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 2.00	6.00	0.00	0.00
Span (in)	= 2.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 739.67	740.90	0.00	0.00
Length (ft)	= 1.00	1.00	0.00	0.00
Slope (%)	= 1.00	1.00	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	0.00	0.00	0.00
Crest El. (ft)	= 741.87	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 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	739.67	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.02	17	739.69	0.00 oc	0.00	---	---	0.00	---	---	---	---	---	0.001
0.03	33	739.70	0.00 oc	0.00	---	---	0.00	---	---	---	---	---	0.002
0.05	50	739.72	0.00 oc	0.00	---	---	0.00	---	---	---	---	---	0.003
0.07	66	739.74	0.00 oc	0.00	---	---	0.00	---	---	---	---	---	0.005
0.09	83	739.76	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.007
0.10	99	739.77	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.008
0.12	116	739.79	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.010
0.14	132	739.81	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.012
0.15	149	739.82	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.013
0.17	165	739.84	0.01 oc	0.00	---	---	0.00	---	---	---	---	---	0.015
0.19	182	739.86	0.02 oc	0.00	---	---	0.00	---	---	---	---	---	0.022
0.20	198	739.87	0.03 oc	0.00	---	---	0.00	---	---	---	---	---	0.027
0.22	215	739.89	0.03 oc	0.00	---	---	0.00	---	---	---	---	---	0.032
0.23	231	739.90	0.04 oc	0.00	---	---	0.00	---	---	---	---	---	0.036
0.25	248	739.92	0.04 oc	0.00	---	---	0.00	---	---	---	---	---	0.039
0.27	264	739.94	0.04 oc	0.00	---	---	0.00	---	---	---	---	---	0.043
0.28	281	739.95	0.05 oc	0.00	---	---	0.00	---	---	---	---	---	0.046
0.30	297	739.97	0.05 oc	0.00	---	---	0.00	---	---	---	---	---	0.049
0.31	314	739.98	0.05 ic	0.00	---	---	0.00	---	---	---	---	---	0.050
0.33	330	740.00	0.05 ic	0.00	---	---	0.00	---	---	---	---	---	0.052
0.35	347	740.02	0.05 ic	0.00	---	---	0.00	---	---	---	---	---	0.054
0.37	363	740.04	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.056

Continues on next page...

Underground Pond 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
0.38	380	740.05	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.058
0.40	396	740.07	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.059
0.42	413	740.09	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.061
0.44	429	740.11	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.063
0.46	446	740.13	0.06 ic	0.00	---	---	0.00	---	---	---	---	---	0.064
0.47	462	740.14	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.066
0.49	479	740.16	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.067
0.51	495	740.18	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.069
0.53	512	740.20	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.070
0.54	528	740.21	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.071
0.56	545	740.23	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.072
0.57	561	740.24	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.074
0.59	578	740.26	0.07 ic	0.00	---	---	0.00	---	---	---	---	---	0.075
0.61	594	740.28	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.076
0.62	611	740.29	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.077
0.64	627	740.31	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.078
0.65	644	740.32	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.079
0.67	660	740.34	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.080
0.69	677	740.36	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.082
0.70	693	740.37	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.083
0.72	710	740.39	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.084
0.73	726	740.40	0.08 ic	0.00	---	---	0.00	---	---	---	---	---	0.085
0.75	743	740.42	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.086
0.77	759	740.44	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.087
0.78	776	740.45	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.088
0.80	792	740.47	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.089
0.81	809	740.48	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.090
0.83	825	740.50	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.091
0.85	842	740.52	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.092
0.86	858	740.53	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.093
0.88	875	740.55	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.094
0.90	891	740.57	0.09 ic	0.00	---	---	0.00	---	---	---	---	---	0.095
0.92	908	740.59	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.096
0.93	924	740.60	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.097
0.95	941	740.62	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.098
0.97	957	740.64	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.099
0.98	974	740.65	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.100
1.00	990	740.67	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.101
1.02	1,024	740.69	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.101
1.03	1,057	740.70	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.102
1.05	1,091	740.72	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.103
1.07	1,125	740.74	0.10 ic	0.00	---	---	0.00	---	---	---	---	---	0.104
1.09	1,158	740.76	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.105
1.10	1,192	740.77	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.106
1.12	1,225	740.79	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.107
1.14	1,259	740.81	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.108
1.15	1,292	740.82	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.109
1.17	1,326	740.84	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.109
1.19	1,358	740.86	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.110
1.20	1,391	740.87	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.111
1.22	1,424	740.89	0.11 ic	0.00	---	---	0.00	---	---	---	---	---	0.112
1.23	1,456	740.90	0.11 ic	0.00 oc	---	---	0.00	---	---	---	---	---	0.113
1.25	1,489	740.92	0.11 ic	0.00 oc	---	---	0.00	---	---	---	---	---	0.115
1.27	1,522	740.94	0.11 ic	0.00 oc	---	---	0.00	---	---	---	---	---	0.118
1.28	1,554	740.95	0.11 ic	0.01 oc	---	---	0.00	---	---	---	---	---	0.121
1.30	1,587	740.97	0.12 ic	0.01 oc	---	---	0.00	---	---	---	---	---	0.125
1.31	1,620	740.98	0.12 ic	0.01 oc	---	---	0.00	---	---	---	---	---	0.130
1.33	1,652	741.00	0.12 ic	0.02 oc	---	---	0.00	---	---	---	---	---	0.135
1.35	1,684	741.02	0.12 ic	0.02 oc	---	---	0.00	---	---	---	---	---	0.140
1.36	1,715	741.03	0.12 ic	0.03 oc	---	---	0.00	---	---	---	---	---	0.145
1.38	1,747	741.05	0.12 ic	0.03 oc	---	---	0.00	---	---	---	---	---	0.151
1.40	1,778	741.07	0.12 ic	0.04 oc	---	---	0.00	---	---	---	---	---	0.157
1.41	1,809	741.09	0.12 ic	0.04 oc	---	---	0.00	---	---	---	---	---	0.163
1.43	1,841	741.10	0.12 ic	0.05 oc	---	---	0.00	---	---	---	---	---	0.169
1.45	1,872	741.12	0.12 ic	0.05 oc	---	---	0.00	---	---	---	---	---	0.176
1.47	1,904	741.14	0.12 ic	0.06 oc	---	---	0.00	---	---	---	---	---	0.182
1.48	1,935	741.15	0.12 ic	0.06 oc	---	---	0.00	---	---	---	---	---	0.188
1.50	1,967	741.17	0.13 ic	0.07 oc	---	---	0.00	---	---	---	---	---	0.194
1.52	1,997	741.19	0.13 ic	0.07 oc	---	---	0.00	---	---	---	---	---	0.201
1.53	2,027	741.20	0.13 ic	0.08 oc	---	---	0.00	---	---	---	---	---	0.207

Continues on next page...

Underground Pond 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
1.55	2,057	741.22	0.13 ic	0.09 oc	---	---	0.00	---	---	---	---	---	0.213
1.57	2,087	741.24	0.13 ic	0.09 oc	---	---	0.00	---	---	---	---	---	0.219
1.59	2,117	741.26	0.13 ic	0.10 oc	---	---	0.00	---	---	---	---	---	0.225
1.60	2,147	741.27	0.13 ic	0.10 oc	---	---	0.00	---	---	---	---	---	0.230
1.62	2,177	741.29	0.13 ic	0.11 oc	---	---	0.00	---	---	---	---	---	0.236
1.64	2,207	741.31	0.13 ic	0.11 oc	---	---	0.00	---	---	---	---	---	0.241
1.65	2,237	741.32	0.13 ic	0.11 oc	---	---	0.00	---	---	---	---	---	0.246
1.67	2,267	741.34	0.13 ic	0.12 oc	---	---	0.00	---	---	---	---	---	0.250
1.69	2,295	741.36	0.13 ic	0.12 oc	---	---	0.00	---	---	---	---	---	0.254
1.70	2,323	741.37	0.13 ic	0.12 oc	---	---	0.00	---	---	---	---	---	0.257
1.72	2,351	741.39	0.13 ic	0.13 oc	---	---	0.00	---	---	---	---	---	0.259
1.73	2,379	741.40	0.13 ic	0.15 oc	---	---	0.00	---	---	---	---	---	0.283
1.75	2,407	741.42	0.14 ic	0.22 oc	---	---	0.00	---	---	---	---	---	0.353
1.77	2,436	741.44	0.14 ic	0.27 oc	---	---	0.00	---	---	---	---	---	0.405
1.78	2,464	741.45	0.14 ic	0.31 oc	---	---	0.00	---	---	---	---	---	0.449
1.80	2,492	741.47	0.14 ic	0.35 oc	---	---	0.00	---	---	---	---	---	0.488
1.81	2,520	741.48	0.14 ic	0.38 oc	---	---	0.00	---	---	---	---	---	0.522
1.83	2,548	741.50	0.14 ic	0.42 oc	---	---	0.00	---	---	---	---	---	0.555
1.85	2,574	741.52	0.14 ic	0.45 oc	---	---	0.00	---	---	---	---	---	0.586
1.86	2,599	741.53	0.14 ic	0.48 oc	---	---	0.00	---	---	---	---	---	0.616
1.88	2,625	741.55	0.14 ic	0.50 oc	---	---	0.00	---	---	---	---	---	0.644
1.90	2,651	741.57	0.14 ic	0.53 oc	---	---	0.00	---	---	---	---	---	0.671
1.91	2,676	741.59	0.14 ic	0.55 oc	---	---	0.00	---	---	---	---	---	0.696
1.93	2,702	741.60	0.14 ic	0.58 oc	---	---	0.00	---	---	---	---	---	0.721
1.95	2,728	741.62	0.14 ic	0.60 oc	---	---	0.00	---	---	---	---	---	0.744
1.97	2,754	741.64	0.14 ic	0.62 oc	---	---	0.00	---	---	---	---	---	0.766
1.98	2,779	741.65	0.14 ic	0.64 oc	---	---	0.00	---	---	---	---	---	0.788
2.00	2,805	741.67	0.15 ic	0.66 oc	---	---	0.00	---	---	---	---	---	0.809
2.02	2,826	741.69	0.15 ic	0.68 oc	---	---	0.00	---	---	---	---	---	0.830
2.03	2,848	741.70	0.15 ic	0.70 oc	---	---	0.00	---	---	---	---	---	0.849
2.05	2,869	741.72	0.15 ic	0.71 ic	---	---	0.00	---	---	---	---	---	0.862
2.07	2,890	741.74	0.15 ic	0.72 ic	---	---	0.00	---	---	---	---	---	0.873
2.09	2,912	741.76	0.15 ic	0.74 ic	---	---	0.00	---	---	---	---	---	0.884
2.10	2,933	741.77	0.15 ic	0.75 ic	---	---	0.00	---	---	---	---	---	0.895
2.12	2,954	741.79	0.15 ic	0.76 ic	---	---	0.00	---	---	---	---	---	0.906
2.14	2,976	741.81	0.15 ic	0.77 ic	---	---	0.00	---	---	---	---	---	0.916
2.15	2,997	741.82	0.15 ic	0.78 ic	---	---	0.00	---	---	---	---	---	0.927
2.17	3,019	741.84	0.15 ic	0.79 ic	---	---	0.00	---	---	---	---	---	0.937
2.19	3,036	741.86	0.15 ic	0.79 ic	---	---	0.00	---	---	---	---	---	0.947
2.20	3,054	741.87	0.15 ic	0.80 ic	---	---	0.00	---	---	---	---	---	0.957
2.22	3,072	741.89	0.15 ic	0.81 ic	---	---	0.02	---	---	---	---	---	0.990
2.23	3,090	741.90	0.15 ic	0.82 ic	---	---	0.06	---	---	---	---	---	1.037
2.25	3,108	741.92	0.15 ic	0.83 ic	---	---	0.11	---	---	---	---	---	1.096
2.27	3,125	741.94	0.16 ic	0.84 ic	---	---	0.17	---	---	---	---	---	1.163
2.28	3,143	741.95	0.16 ic	0.85 ic	---	---	0.23	---	---	---	---	---	1.237
2.30	3,161	741.97	0.16 ic	0.85 ic	---	---	0.31	---	---	---	---	---	1.318
2.31	3,179	741.98	0.16 ic	0.86 ic	---	---	0.38	---	---	---	---	---	1.404
2.33	3,196	742.00	0.16 ic	0.87 ic	---	---	0.47	---	---	---	---	---	1.497
2.35	3,213	742.02	0.16 ic	0.88 ic	---	---	0.56	---	---	---	---	---	1.601
2.36	3,229	742.03	0.16 ic	0.89 ic	---	---	0.66	---	---	---	---	---	1.712
2.38	3,246	742.05	0.16 ic	0.90 ic	---	---	0.77	---	---	---	---	---	1.826
2.40	3,262	742.07	0.16 ic	0.91 ic	---	---	0.88	---	---	---	---	---	1.947
2.41	3,279	742.09	0.16 ic	0.91 ic	---	---	1.00	---	---	---	---	---	2.071
2.43	3,295	742.10	0.16 ic	0.92 ic	---	---	1.12	---	---	---	---	---	2.201
2.45	3,312	742.12	0.16 ic	0.93 ic	---	---	1.24	---	---	---	---	---	2.335
2.47	3,329	742.14	0.16 ic	0.94 ic	---	---	1.37	---	---	---	---	---	2.473
2.48	3,345	742.15	0.16 ic	0.95 ic	---	---	1.51	---	---	---	---	---	2.616
2.50	3,362	742.17	0.16 ic	0.95 ic	---	---	1.64	---	---	---	---	---	2.759
2.52	3,378	742.19	0.16 ic	0.96 ic	---	---	1.78	---	---	---	---	---	2.910
2.53	3,395	742.20	0.16 ic	0.97 ic	---	---	1.93	---	---	---	---	---	3.063
2.55	3,411	742.22	0.16 ic	0.98 ic	---	---	2.08	---	---	---	---	---	3.222
2.57	3,428	742.24	0.17 ic	0.99 ic	---	---	2.23	---	---	---	---	---	3.383
2.59	3,444	742.26	0.17 ic	0.99 ic	---	---	2.39	---	---	---	---	---	3.548
2.60	3,461	742.27	0.17 ic	1.00 ic	---	---	2.55	---	---	---	---	---	3.716
2.62	3,477	742.29	0.17 ic	1.01 ic	---	---	2.71	---	---	---	---	---	3.888
2.64	3,494	742.31	0.17 ic	1.02 ic	---	---	2.88	---	---	---	---	---	4.062
2.65	3,510	742.32	0.17 ic	1.02 ic	---	---	3.05	---	---	---	---	---	4.240
2.67	3,527	742.34	0.17 ic	1.03 ic	---	---	3.22	---	---	---	---	---	4.419
2.69	3,543	742.36	0.17 ic	1.04 ic	---	---	3.38	---	---	---	---	---	4.592
2.70	3,560	742.37	0.17 ic	1.04 ic	---	---	3.55	---	---	---	---	---	4.768

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Underground Pond 1

Stage / Storage / Discharge Table

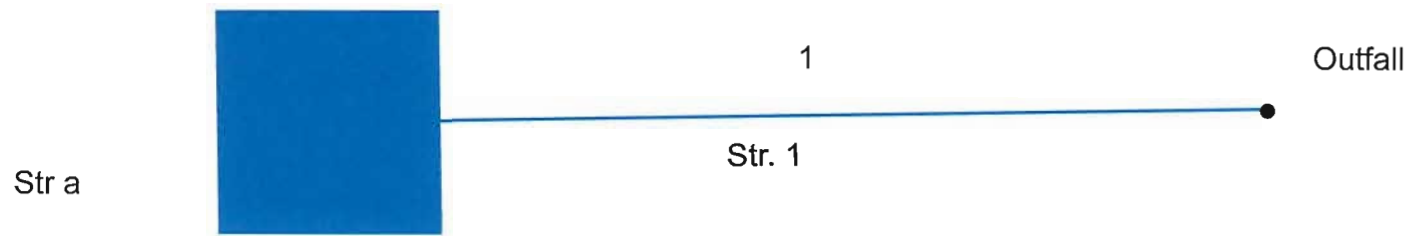
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
2.72	3,576	742.39	0.17 ic	1.05 ic	---	---	3.72	---	---	---	---	---	4.947
2.73	3,593	742.40	0.17 ic	1.06 ic	---	---	3.90	---	---	---	---	---	5.128
2.75	3,609	742.42	0.17 ic	1.07 ic	---	---	4.07	---	---	---	---	---	5.311
2.77	3,626	742.44	0.17 ic	1.07 ic	---	---	4.25	---	---	---	---	---	5.498
2.78	3,642	742.45	0.17 ic	1.08 ic	---	---	4.44	---	---	---	---	---	5.687
2.80	3,659	742.47	0.17 ic	1.09 ic	---	---	4.62	---	---	---	---	---	5.878
2.81	3,675	742.48	0.17 ic	1.09 ic	---	---	4.81	---	---	---	---	---	6.070
2.83	3,692	742.50	0.17 ic	1.10 ic	---	---	5.00	---	---	---	---	---	6.268
2.85	3,708	742.52	0.17 ic	1.11 ic	---	---	5.20	---	---	---	---	---	6.479
2.86	3,725	742.53	0.18 ic	1.11 ic	---	---	5.41	---	---	---	---	---	6.694
2.88	3,741	742.55	0.18 ic	1.12 ic	---	---	5.62	---	---	---	---	---	6.910
2.90	3,758	742.57	0.18 ic	1.13 ic	---	---	5.83	---	---	---	---	---	7.129
2.91	3,774	742.59	0.18 ic	1.13 ic	---	---	6.04	---	---	---	---	---	7.350
2.93	3,791	742.60	0.18 ic	1.14 ic	---	---	6.26	---	---	---	---	---	7.575
2.95	3,807	742.62	0.18 ic	1.15 ic	---	---	6.48	---	---	---	---	---	7.802
2.97	3,824	742.64	0.18 ic	1.15 ic	---	---	6.70	---	---	---	---	---	8.031
2.98	3,840	742.65	0.18 ic	1.16 ic	---	---	6.93	---	---	---	---	---	8.264
3.00	3,857	742.67	0.18 ic	1.17 ic	---	---	7.15	---	---	---	---	---	8.493

...End

Appendix F

Storm Sewer Sizing Calculations

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD



Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Str. 1	1.16	12	Cir	8.438	740.75	741.25	5.925	741.20	741.70	n/a	741.93 i	End	Grate
Project File: Str 1.stm									Number of lines: 1			Run Date: 1/25/2019		
NOTES: Return period = 10 Yrs. ; i - Inlet control.														

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End8	438	0.22	0.22	0.73	0.16	0.16	5.0	5.0	7.2	1.16	8.67	8.36	12	5.93	740.75	741.25	741.20	741.70	744.00	744.00	Str. 1
Project File: Str 1.stm																Number of lines: 1		Run Date: 1/25/2019				
NOTES:Intensity = 54.67 / (Inlet time + 8.40) ^ 0.78; Return period =Yrs. 10 ; c = cir e = ellip b = box																						

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	Str a	1.16	0.00	1.16	0.00	Grate	0.0	0.00	0.60	2.00	2.00	Sag	2.00	0.050	0.020	0.000	0.21	7.52	0.46	7.52	3.0	Off
Project File: Str 1.stm												Number of lines: 1					Run Date: 1/25/2019					
NOTES: Inlet N-Values = 0.016; Intensity = 54.67 / (Inlet time + 8.40) ^ 0.78; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.																						

FL-DOT Report

Line No	To Line	Type of struc	n - Value	Len (ft)	Drainage Area			Time of conc (min)	Time of Flow in sect (min)	Inten (I) (in/hr)	Total CA	Add Q Total Flow Q (cfs)	Inlet elev (ft)	Elev of HGL			Rise	HGL	ADD		Date: 1/25/2019		
					C1 = 0.9 C2 = 0.85 C3 = 0.2									Elev of Crown			Span	Pipe	Full Flow	Frequency: 10 yrs			
														Elev of Invert						Proj: Str 1.stm			
					Up (ft)	Down (ft)	Fall (ft)							Size (in)	Slope (%)	Vel (ft/s)	Cap (cfs)	Line description					
1	End	Grate	0.013	8.438	0.00 0.18 0.04	0.00 0.18 0.04	0.00 0.15 0.01	5.00	0.04	7.21	0.16	0.00 1.16	744.00	741.70 742.25 741.25	741.20 741.75 740.75	0.50 0.50	12 12 Cir	5.96 5.93	3.36 11.04	1.16 8.67	Str. 1		
NOTES: Intensity = 54.67 / (Inlet time + 8.40) ^ 0.78 (in/hr)																						Project File: Str 1.stm	

NOTES: Intensity = 54.67 / (Inlet time + 8.40) ^ 0.78 (in/hr)

Project File: Str 1.stm

Hydraulic Grade Line Computations

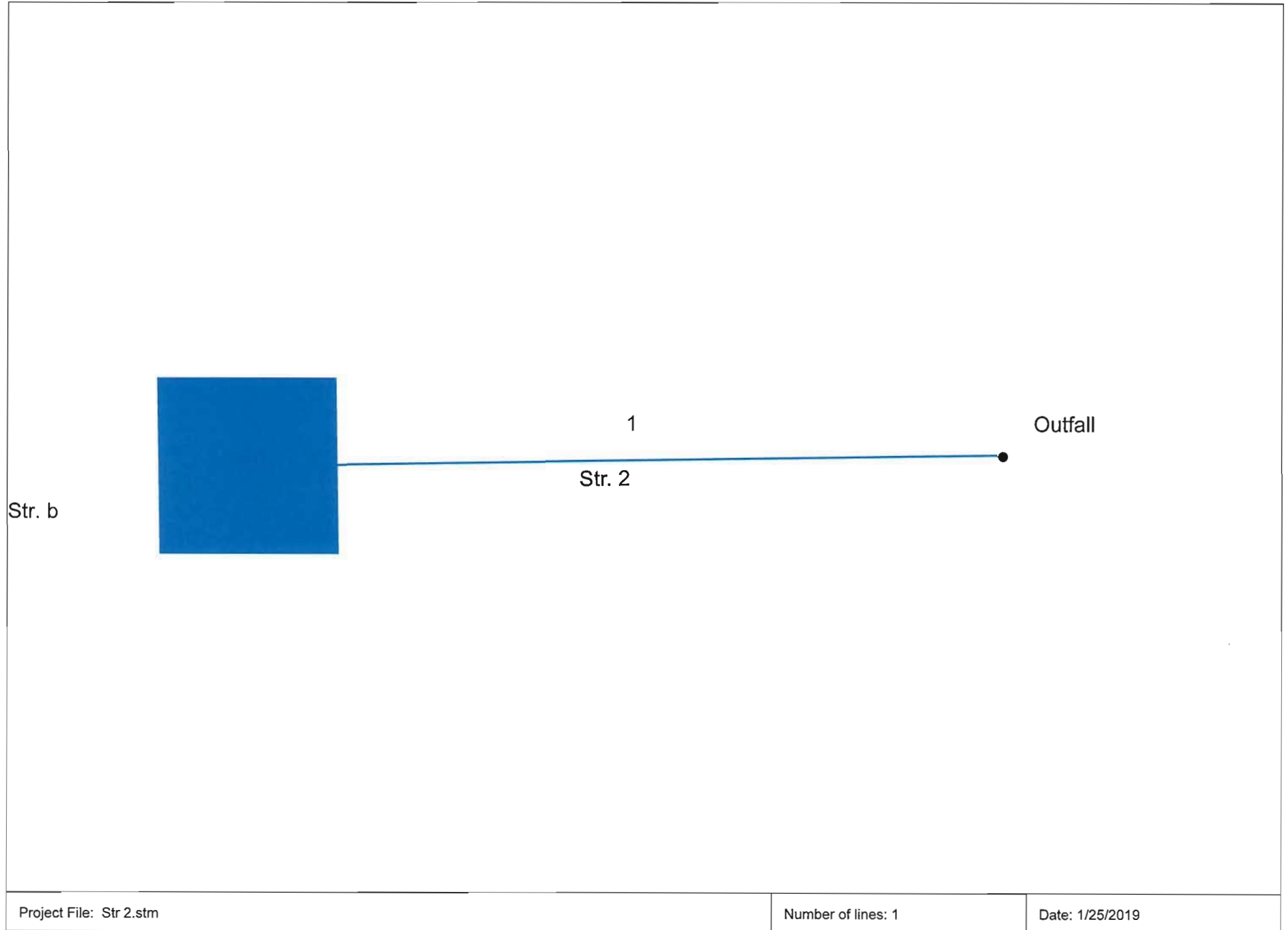
Line (1)	Size (in) (2)	Q (cfs) (3)	Downstream								Len (ft) (12)	Upstream								Check		JL coeff (K) (23)	Minor loss (ft) (24)
			Invert elev (ft) (4)	HGL elev (ft) (5)	Depth (ft) (6)	Area (sqft) (7)	Vel (ft/s) (8)	Vel head (ft) (9)	EGL elev (ft) (10)	Sf (%) (11)		Invert elev (ft) (13)	HGL elev (ft) (14)	Depth (ft) (15)	Area (sqft) (16)	Vel (ft/s) (17)	Vel head (ft) (18)	EGL elev (ft) (19)	Sf (%) (20)	Ave Sf (%) (21)	Enrgy loss (ft) (22)		
1	12	1.16	740.75	741.20	0.45	0.34	3.38	0.17	741.37	n/a	8.438	741.25	741.70	0.45**	0.35	3.35	0.17	741.88i	n/a	n/a	n/a	1.00	n/a
Project File: Str 1.stm														Number of lines: 1				Run Date: 1/25/2019					
Notes: ; ** Critical depth. ; c = cir e = ellip b = box																							

General Procedure:

Hydraflow computes the HGL using the Bernoulli energy equation. Manning's equation is used to determine energy losses due to pipe friction. In a standard step, iterative procedure, Hydraflow assumes upstream HGLs until the energy equation balances. If the energy equation cannot balance, supercritical flow exists and critical depth is temporarily assumed at the upstream end. A supercritical flow Profile is then computed using the same procedure in a downstream direction using momentum principles. The computed HGL is checked against inlet control.

- Col. 1 The line number being computed. Calculations begin at Line 1 and proceed upstream.
- Col. 2 The line size. In the case of non-circular pipes, the line rise is printed above the span.
- Col. 3 Total flow rate in the line.
- Col. 4 The elevation of the downstream invert.
- Col. 5 Elevation of the hydraulic grade line at the downstream end. This is computed as the upstream HGL + Minor loss of this line's downs
- Col. 6 The downstream depth of flow inside the pipe (HGL - Invert elevation) but not greater than the line size.
- Col. 7 Cross-sectional area of the flow at the downstream end.
- Col. 8 The velocity of the flow at the downstream end, (Col. 3 / Col. 7).
- Col. 9 Velocity head (Velocity squared / $2g$).
- Col. 10 The elevation of the energy grade line at the downstream end, HGL + Velocity head, (Col. 5 + Col. 9).
- Col. 11 The friction slope at the downstream end (the S or Slope term in Manning's equation).
- Col. 12 The line length.
- Col. 13 The elevation of the upstream invert.
- Col. 14 Elevation of the hydraulic grade line at the upstream end.
- Col. 15 The upstream depth of flow inside the pipe (HGL - Invert elevation) but not greater than the line size.
- Col. 16 Cross-sectional area of the flow at the upstream end.
- Col. 17 The velocity of the flow at the upstream end, (Col. 3 / Col. 16).
- Col. 18 Velocity head (Velocity squared / $2g$).
- Col. 19 The elevation of the energy grade line at the upstream end, HGL + Velocity head, (Col. 14 + Col. 18) .
- Col. 20 The friction slope at the upstream end (the S or Slope term in Manning's equation).
- Col. 21 The average of the downstream and upstream friction slopes.
- Col. 22 Energy loss. Average $Sf/100 \times \text{Line Length}$ (Col. 21/100 x Col. 12). Equals (EGL upstream - EGL downstream) +/- tolerance.
- Col. 23 The junction loss coefficient (K).
- Col. 24 Minor loss. (Col. 23 x Col. 18). Is added to upstream HGL and used as the starting HGL for the next upstream line(s).

Hydraflow Storm Sewers Extension for Autodesk® AutoCAD



Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Str. 2	0.93	12	Cir	8.454	740.75	741.25	5.914	741.16	741.66	n/a	741.85 i	End	Grate
Project File: Str 2.stm									Number of lines: 1			Run Date: 1/25/2019		
NOTES: Return period = 10 Yrs. ; i - Inlet control.														

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr (min)	Total (min)	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End8	454	0.16	0.16	0.81	0.13	0.13	5.0	5.0	7.2	0.93	8.66	3.11	12	5.91	740.75	741.25	741.16	741.66	744.00	744.00	Str. 2
Project File: Str 2.stm																Number of lines: 1		Run Date: 1/25/2019				
NOTES:Intensity = 54.67 / (Inlet time + 8.40) ^ 0.78; Return period =Yrs. 10 ; c = cir e = ellip b = box																						

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	Str. b	0.93	0.00	0.93	0.00	Grate	0.0	0.00	0.60	2.00	2.00	Sag	2.00	0.050	0.020	0.000	0.19	6.45	0.44	6.45	3.0	Off

Project File: Str 2.stm

Number of lines: 1

Run Date: 1/25/2019

NOTES: Inlet N-Values = 0.016; Intensity = 54.67 / (Inlet time + 8.40) ^ 0.78; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

FL-DOT Report

Line No	To Line	Type of struc	n - Value	Len (ft)	Drainage Area			Time of conc (min)	Time of Flow in sect (min)	Inten (I) (in/hr)	Total CA	Add Q	Inlet elev (ft)	Elev of HGL			Rise	HGL	ADD		Date: 1/25/2019	
					C1 = 0.9 C2 = 0.85 C3 = 0.2							Total Flow		Elev of Crown			Span	Pipe	Full Flow	Frequency: 10 yrs		
														Elev of Invert						Proj: Str 2.stm		
					Up	Down	Fall					Size		Slope	Vel	Cap	Line description					
(ft)	(ft)	(ft)	(in)	(%)	(ft/s)	(cfs)																
1	End	Grate	0.013	8.454	0.00 0.15 0.01	0.00 0.15 0.01	0.00 0.12 0.00	5.00	0.05	7.21	0.13	0.00 0.93	744.00	741.66 742.25 741.25	741.16 741.75 740.75	0.50 0.50	12 12 Cir	5.86 5.91	3.11 11.03	0.93 8.66	Str. 2	

NOTES: Intensity = 54.67 / (Inlet time + 8.40) ^ 0.78 (in/hr)

Project File: Str 2.stm

NOTES: Intensity = 54.67 / (Inlet time + 8.40) ^ 0.78 (in/hr)

Project File: Str 2.stm

Hydraulic Grade Line Computations

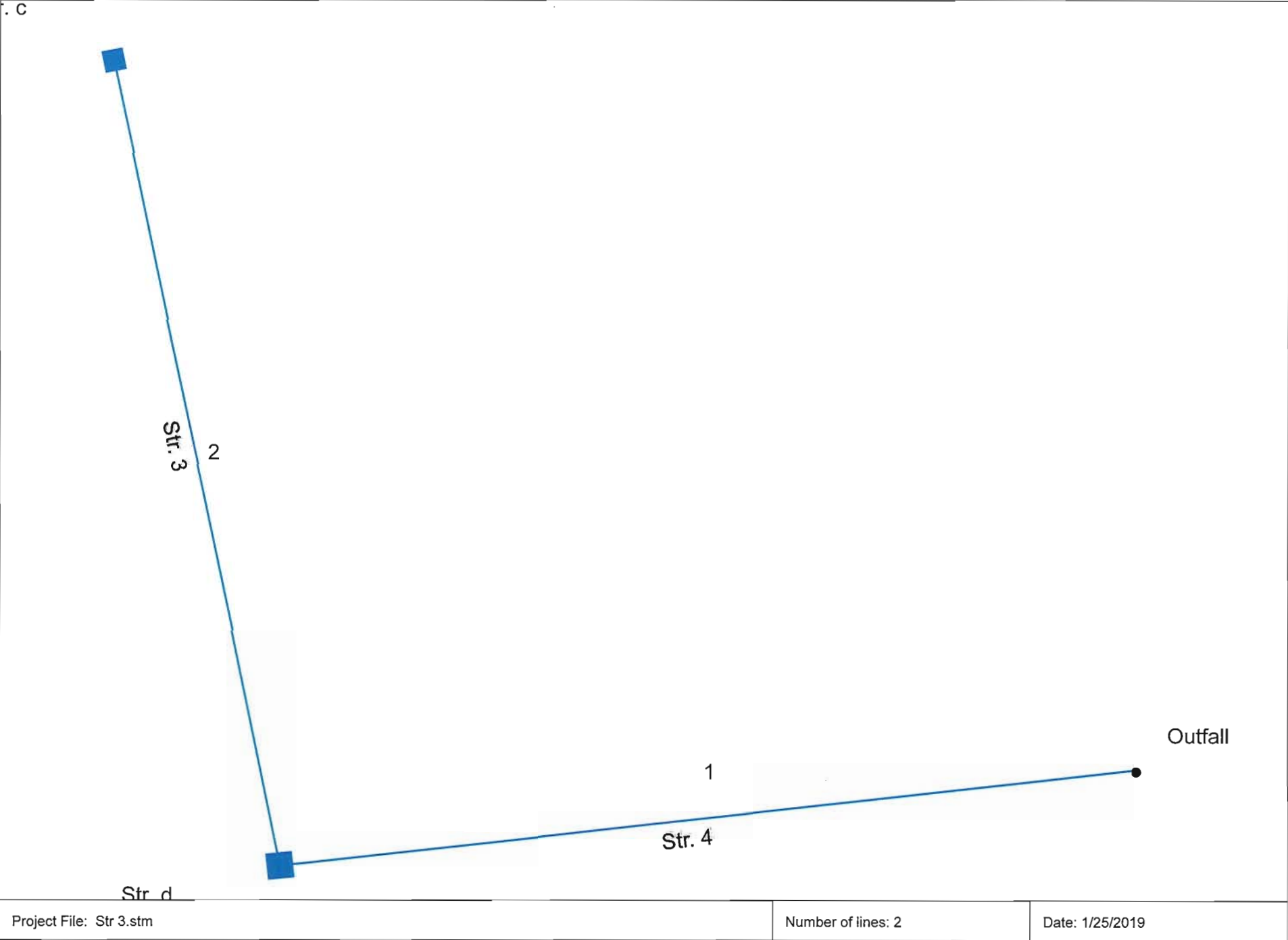
Line (1)	Size (in) (2)	Q (cfs) (3)	Downstream								Len (ft) (12)	Upstream								Check		JL coeff (K) (23)	Minor loss (ft) (24)
			Invert elev (ft) (4)	HGL elev (ft) (5)	Depth (ft) (6)	Area (sqft) (7)	Vel (ft/s) (8)	Vel head (ft) (9)	EGL elev (ft) (10)	Sf (%) (11)		Invert elev (ft) (13)	HGL elev (ft) (14)	Depth (ft) (15)	Area (sqft) (16)	Vel (ft/s) (17)	Vel head (ft) (18)	EGL elev (ft) (19)	Sf (%) (20)	Ave Sf (%) (21)	Enrgy loss (ft) (22)		
1	12	0.93	740.75	741.16	0.41	0.30	3.08	0.15	741.31	n/a	8.454	741.254	741.66 j	0.41**	0.30	3.13	0.15	741.81i	n/a	n/a	n/a	1.00	n/a
Project File: Str 2.stm														Number of lines: 1				Run Date: 1/25/2019					
Notes: ; ** Critical depth.; j-Line contains hyd. jump ; c = cir e = ellip b = box																							

General Procedure:

Hydraflow computes the HGL using the Bernoulli energy equation. Manning's equation is used to determine energy losses due to pipe friction. In a standard step, iterative procedure, Hydraflow assumes upstream HGLs until the energy equation balances. If the energy equation cannot balance, supercritical flow exists and critical depth is temporarily assumed at the upstream end. A supercritical flow Profile is then computed using the same procedure in a downstream direction using momentum principles. The computed HGL is checked against inlet control.

- Col. 1 The line number being computed. Calculations begin at Line 1 and proceed upstream.
- Col. 2 The line size. In the case of non-circular pipes, the line rise is printed above the span.
- Col. 3 Total flow rate in the line.
- Col. 4 The elevation of the downstream invert.
- Col. 5 Elevation of the hydraulic grade line at the downstream end. This is computed as the upstream HGL + Minor loss of this line's downs
- Col. 6 The downstream depth of flow inside the pipe (HGL - Invert elevation) but not greater than the line size.
- Col. 7 Cross-sectional area of the flow at the downstream end.
- Col. 8 The velocity of the flow at the downstream end, (Col. 3 / Col. 7).
- Col. 9 Velocity head (Velocity squared / 2g).
- Col. 10 The elevation of the energy grade line at the downstream end, HGL + Velocity head, (Col. 5 + Col. 9).
- Col. 11 The friction slope at the downstream end (the S or Slope term in Manning's equation).
- Col. 12 The line length.
- Col. 13 The elevation of the upstream invert.
- Col. 14 Elevation of the hydraulic grade line at the upstream end.
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- Col. 16 Cross-sectional area of the flow at the upstream end.
- Col. 17 The velocity of the flow at the upstream end, (Col. 3 / Col. 16).
- Col. 18 Velocity head (Velocity squared / 2g).
- Col. 19 The elevation of the energy grade line at the upstream end, HGL + Velocity head, (Col. 14 + Col. 18) .
- Col. 20 The friction slope at the upstream end (the S or Slope term in Manning's equation).
- Col. 21 The average of the downstream and upstream friction slopes.
- Col. 22 Energy loss. Average $Sf/100 \times \text{Line Length}$ (Col. 21/100 x Col. 12). Equals (EGL upstream - EGL downstream) +/- tolerance.
- Col. 23 The junction loss coefficient (K).
- Col. 24 Minor loss. (Col. 23 x Col. 18). Is added to upstream HGL and used as the starting HGL for the next upstream line(s).

Hydraflow Storm Sewers Extension for Autodesk® AutoC



Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Str. 4	0.91	12	Cir	81.854	740.75	741.00	0.305	741.15	741.55	0.10	741.65	End	Curb-Horiz
2	Str. 3	0.66	12	Cir	78.836	741.00	741.25	0.317	741.65	741.71	0.05	741.77	1	Curb-Horiz

Storm Sewer Tabulation

Station		Len (ft)	Drng Area		Rnoff coeff (C)	Area x C		Tc		Rain (l) (in/hr)	Total flow (cfs)	Cap full (cfs)	Vel (ft/s)	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line		Incr (ac)	Total (ac)		Incr	Total	Inlet (min)	Syst (min)					Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	81.854	0.06	0.21	0.69	0.04	0.13	5.0	5.9	6.9	0.91	1.97	2.59	12	0.31	740.75	741.00	741.15	741.55	744.00	744.10	Str. 4
2	1 78	836	0.15	0.15	0.61	0.09	0.09	5.0	5.0	7.2	0.66	2.01	1.54	12	0.32	741.00	741.25	741.65	741.71	744.10	744.25	Str. 3
Project File: Str 3.stm																Number of lines: 2		Run Date: 1/25/2019				
NOTES: Intensity = 54.67 / (Inlet time + 8.40) ^ 0.78; Return period = Yrs. 10 ; c = cir e = ellip b = box																						

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1	Str. d	0.30	0.00	0.30	0.00	Curb	4.0	2.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.000	0.14	4.06	0.39	4.06	3.0	Off
2	Str. c	0.66	0.00	0.66	0.00	Curb	4.0	2.00	0.00	0.00	0.00	Sag	2.00	0.050	0.020	0.000	0.20	6.89	0.45	6.89	3.0	Off

Project File: Str 3.stm

Number of lines: 2

Run Date: 1/25/2019

NOTES: Inlet N-Values = 0.016; Intensity = 54.67 / (Inlet time + 8.40) ^ 0.78; Return period = 10 Yrs. ; * Indicates Known Q added. All curb inlets are Horiz throat.

Page 1

Storm Sewers v12.00

Hydraulic Grade Line Computations

Line (1)	Size (in) (2)	Q (cfs) (3)	Downstream								Len (ft) (12)	Upstream								Check		JL coeff (K) (23)	Minor loss (ft) (24)
			Invert elev (ft) (4)	HGL elev (ft) (5)	Depth (ft) (6)	Area (sqft) (7)	Vel (ft/s) (8)	Vel head (ft) (9)	EGL elev (ft) (10)	Sf (%) (11)		Invert elev (ft) (13)	HGL elev (ft) (14)	Depth (ft) (15)	Area (sqft) (16)	Vel (ft/s) (17)	Vel head (ft) (18)	EGL elev (ft) (19)	Sf (%) (20)	Ave Sf (%) (21)	Enrgy loss (ft) (22)		
1	12	0.91	740.75	741.15	0.40	0.29	3.11	0.15	741.30	0.578	81.854	741.007	741.55	0.55	0.44	2.07	0.07	741.62	0.192	0.385	0.315	1.50	0.10
2	12	0.66	741.00	741.65	0.65	0.54	1.22	0.02	741.67	0.060	78.836	741.257	741.71	0.46	0.36	1.86	0.05	741.77	0.179	0.120	0.094	1.00	0.05

Project File: Str 3.stm

Number of lines: 2

Run Date: 1/25/2019

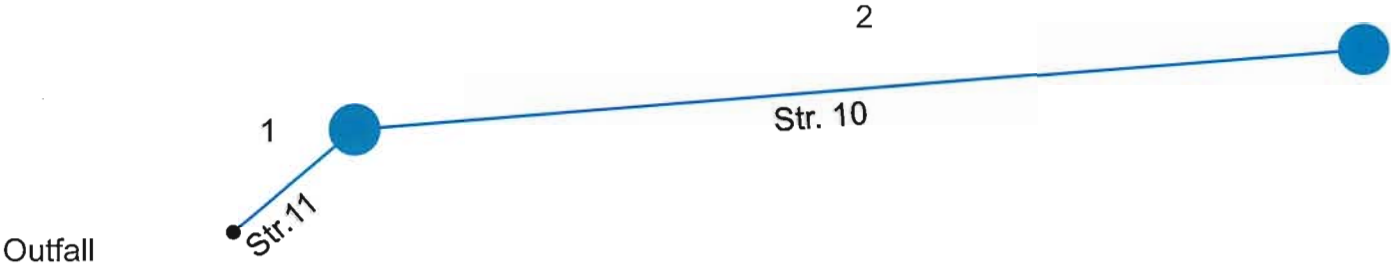
; c = cir e = ellip b = box

General Procedure:

Hydraflow computes the HGL using the Bernoulli energy equation. Manning's equation is used to determine energy losses due to pipe friction. In a standard step, iterative procedure, Hydraflow assumes upstream HGLs until the energy equation balances. If the energy equation cannot balance, supercritical flow exists and critical depth is temporarily assumed at the upstream end. A supercritical flow Profile is then computed using the same procedure in a downstream direction using momentum principles. The computed HGL is checked against inlet control.

- Col. 1 The line number being computed. Calculations begin at Line 1 and proceed upstream.
- Col. 2 The line size. In the case of non-circular pipes, the line rise is printed above the span.
- Col. 3 Total flow rate in the line.
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- Col. 5 Elevation of the hydraulic grade line at the downstream end. This is computed as the upstream HGL + Minor loss of this line's downs
- Col. 6 The downstream depth of flow inside the pipe (HGL - Invert elevation) but not greater than the line size.
- Col. 7 Cross-sectional area of the flow at the downstream end.
- Col. 8 The velocity of the flow at the downstream end, (Col. 3 / Col. 7).
- Col. 9 Velocity head (Velocity squared / 2g).
- Col. 10 The elevation of the energy grade line at the downstream end, HGL + Velocity head, (Col. 5 + Col. 9).
- Col. 11 The friction slope at the downstream end (the S or Slope term in Manning's equation).
- Col. 12 The line length.
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Hydraflow Storm Sewers Extension for Autodesk® AutoC



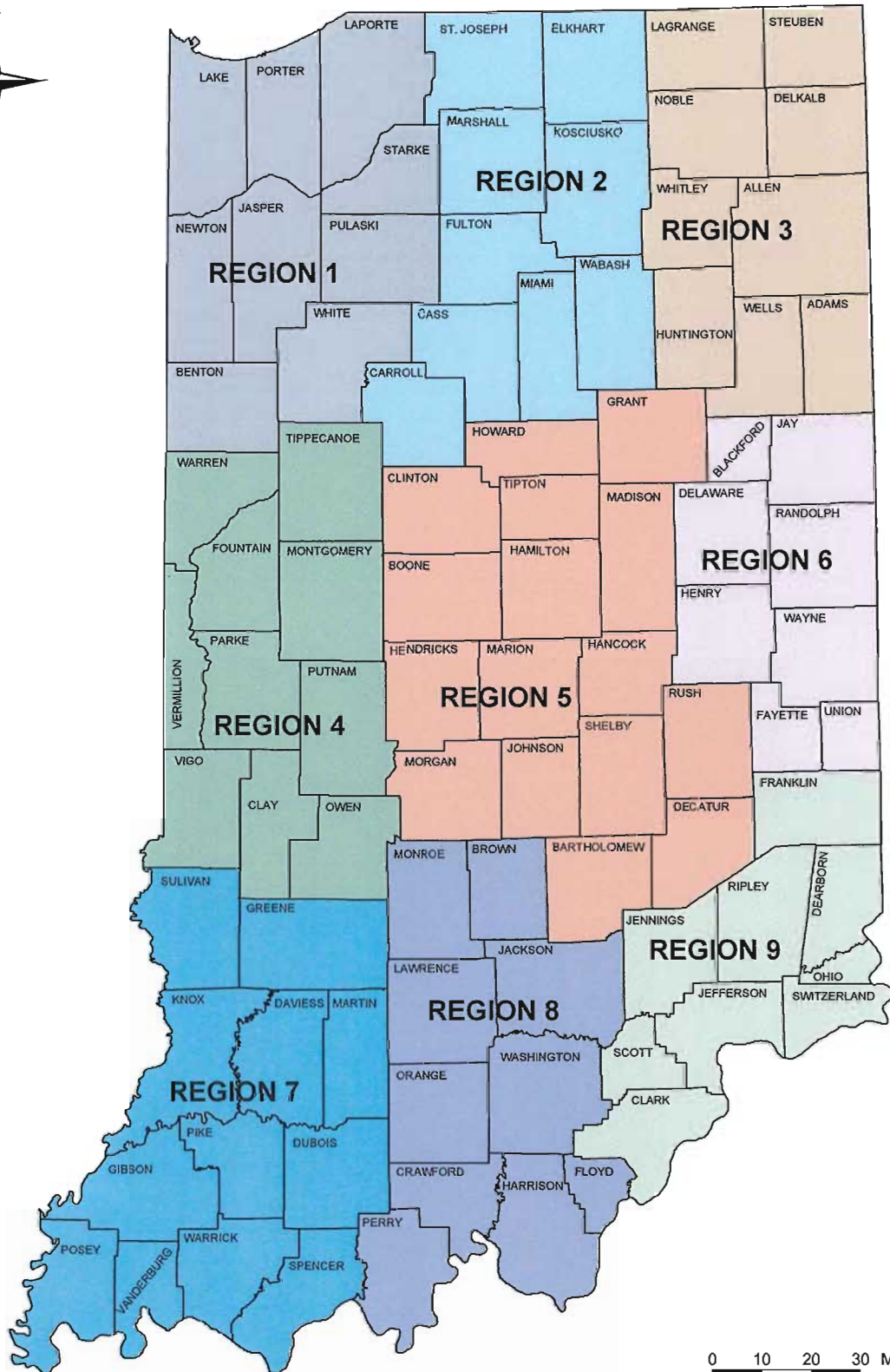
Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Str.11	6.21	24	Cir	13.277	739.60	739.61	0.075	740.48	740.65	n/a	740.71 i	End	Manhole
2	Str. 10	6.05	24	Cir	83.747	739.61	739.67	0.072	741.25	741.31	0.07	741.38	1	Manhole
Project File: outfall Storm.stm									Number of lines: 2			Run Date: 1/25/2019		
NOTES: Return period = 10 Yrs. ; i - Inlet control.														

Appendix G

Rainfall Data and
SC-310 chambers
Stage vs. Storage Table

HUFF CLIMATIC REGIONS FOR INDIANA



RAINFALL FREQUENCY ATLAS OF THE MIDWEST -- BULLETIN 71

Sectional Mean Frequency Distributions for Storm Periods of 5 Minutes to 10 Days and Recurrence Intervals of 2 Months to 100 Years in Indiana

Rainfall (inches) for given recurrence interval

<u>Section</u>	<u>Duration</u>	<u>2-Month</u>	<u>3-Month</u>	<u>4-Month</u>	<u>6-Month</u>	<u>9-Month</u>	<u>1-year</u>	<u>2-year</u>	<u>5-year</u>	<u>10-year</u>	<u>25-year</u>	<u>50-year</u>	<u>100-year</u>
5	10-day	2.13	2.56	2.95	3.47	3.99	4.34	5.06	6.07	6.96	8.36	9.57	10.86
5	5-day	1.73	2.07	2.34	2.71	3.12	3.39	3.97	4.86	5.66	6.91	8.07	9.44
5	72-hr	1.52	1.79	2.02	2.34	2.70	2.93	3.45	4.27	5.04	6.15	7.17	8.31
5	48-hr	1.42	1.66	1.85	2.14	2.47	2.68	3.18	3.94	4.63	5.65	6.56	7.55
5	24-hr	1.35	1.57	1.72	1.99	2.26	2.46	2.92	3.64	4.25	5.16	5.95	6.84
5	18-hr	1.27	1.48	1.62	1.87	2.13	2.31	2.74	3.42	3.99	4.85	5.59	6.43
5	12-hr	1.18	1.37	1.50	1.73	1.97	2.14	2.54	3.17	3.70	4.49	5.18	5.95
5	6-hr	1.02	1.18	1.29	1.50	1.70	1.85	2.19	2.73	3.19	3.87	4.46	5.13
5	3-hr	0.86	1.00	1.10	1.27	1.44	1.57	1.87	2.33	2.72	3.30	3.81	4.38
5	2-hr	0.79	0.92	1.00	1.16	1.32	1.43	1.69	2.11	2.46	2.99	3.45	3.97
5	1-hr	0.64	0.74	0.81	0.94	1.07	1.16	1.37	1.71	2.00	2.43	2.80	3.21
5	30-min	0.50	0.58	0.64	0.74	0.84	0.91	1.08	1.35	1.57	1.91	2.20	2.53
5	15-min	0.36	0.42	0.46	0.53	0.61	0.66	0.79	0.98	1.15	1.39	1.61	1.85
5	10-min	0.29	0.33	0.36	0.42	0.48	0.52	0.61	0.76	0.89	1.08	1.25	1.44
5	5-min	0.17	0.19	0.21	0.24	0.28	0.30	0.35	0.44	0.51	0.62	0.71	0.82
6	10-day	2.13	2.57	2.96	3.48	4.00	4.35	5.00	6.00	6.82	8.30	9.55	11.05
6	5-day	1.62	1.93	2.19	2.54	2.92	3.17	3.75	4.68	5.50	6.90	8.20	9.68
6	72-hr	1.45	1.70	1.92	2.22	2.56	2.78	3.30	4.15	4.98	6.06	7.25	8.55
6	48-hr	1.36	1.59	1.77	2.06	2.36	2.57	3.01	3.73	4.40	5.54	6.55	7.70
6	24-hr	1.26	1.47	1.61	1.86	2.21	2.30	2.76	3.37	3.89	4.65	5.29	6.05
6	18-hr	1.19	1.38	1.51	1.75	1.99	2.16	2.59	3.17	3.66	4.37	4.97	5.69
6	12-hr	1.10	1.28	1.40	1.62	1.84	2.00	2.40	2.93	3.38	4.05	4.60	5.26
6	6-hr	0.95	1.10	1.20	1.39	1.58	1.72	2.07	2.53	2.92	3.49	3.97	4.54
6	3-hr	0.81	0.94	1.03	1.19	1.35	1.47	1.77	2.16	2.49	2.98	3.39	3.87
6	2-hr	0.73	0.85	0.93	1.08	1.22	1.33	1.60	1.95	2.26	2.70	3.07	3.51
6	1-hr	0.59	0.69	0.76	0.87	0.99	1.08	1.30	1.58	1.83	2.19	2.49	2.84
6	30-min	0.47	0.54	0.60	0.69	0.78	0.85	1.02	1.25	1.44	1.72	1.96	2.24
6	15-min	0.34	0.40	0.43	0.50	0.57	0.62	0.75	0.91	1.05	1.26	1.43	1.63
6	10-min	0.26	0.31	0.34	0.39	0.44	0.48	0.58	0.71	0.82	0.98	1.11	1.27
6	5-min	0.15	0.18	0.20	0.23	0.26	0.28	0.33	0.40	0.47	0.56	0.63	0.73

NOAA Atlas 14, Volume 2, Version 3 FRANKLIN

Station ID: 12-3095

Location name: Franklin, Indiana, USA*

Latitude: 39.5167°, Longitude: -86.0667°

Elevation:

Elevation (station metadata): 771 ft**

* source: ESRI Maps

** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

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PF tabular

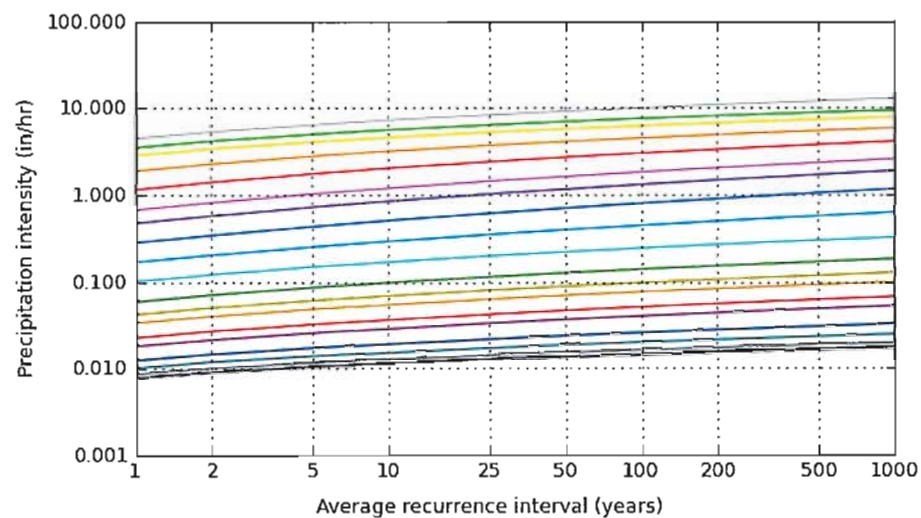
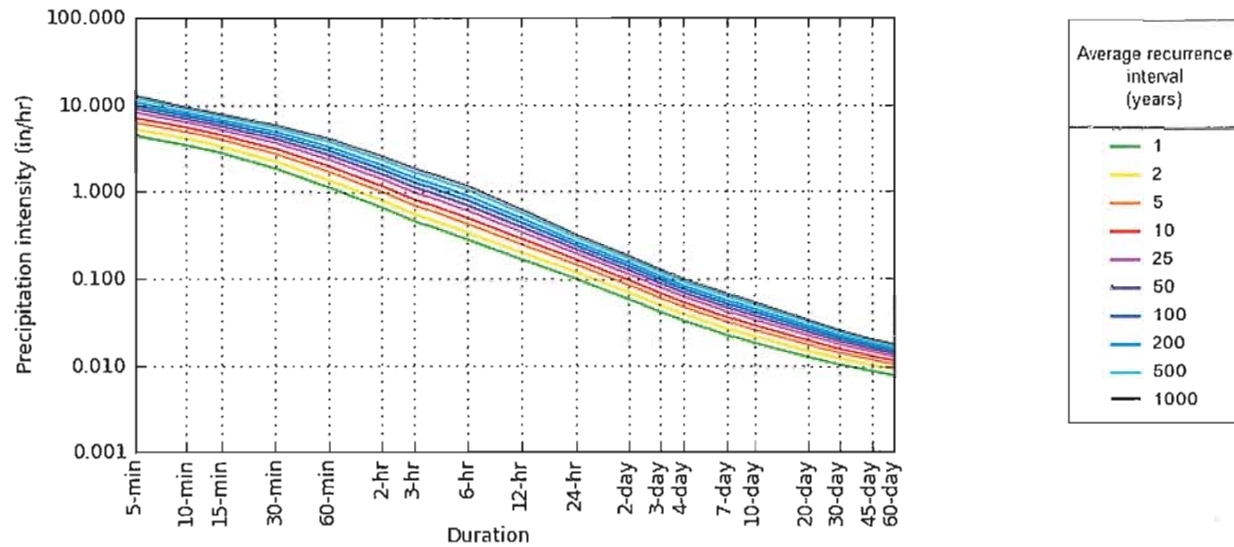
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	4.48 (4.00-5.06)	5.33 (4.75-6.02)	6.38 (5.66-7.21)	7.22 (6.40-8.15)	8.32 (7.31-9.38)	9.17 (7.99-10.4)	10.00 (8.64-11.3)	10.9 (9.30-12.4)	12.0 (10.1-13.8)	12.9 (10.7-14.9)
10-min	3.48 (3.10-3.94)	4.16 (3.71-4.70)	4.96 (4.40-5.60)	5.57 (4.93-6.28)	6.35 (5.59-7.18)	6.95 (6.06-7.86)	7.52 (6.50-8.54)	8.12 (6.95-9.25)	8.86 (7.45-10.2)	9.40 (7.79-10.9)
15-min	2.84 (2.54-3.22)	3.39 (3.02-3.83)	4.06 (3.61-4.59)	4.57 (4.04-5.16)	5.24 (4.60-5.91)	5.73 (5.00-6.49)	6.23 (5.38-7.07)	6.73 (5.76-7.67)	7.37 (6.20-8.45)	7.83 (6.50-9.05)
30-min	1.88 (1.68-2.13)	2.27 (2.02-2.56)	2.78 (2.47-3.14)	3.17 (2.81-3.58)	3.70 (3.25-4.17)	4.10 (3.57-4.64)	4.50 (3.89-5.10)	4.91 (4.20-5.60)	5.46 (4.59-6.26)	5.87 (4.87-6.78)
60-min	1.15 (1.02-1.30)	1.39 (1.24-1.57)	1.75 (1.55-1.97)	2.02 (1.79-2.28)	2.40 (2.11-2.71)	2.70 (2.35-3.05)	3.01 (2.60-3.41)	3.33 (2.85-3.80)	3.77 (3.17-4.33)	4.12 (3.42-4.76)
2-hr	0.671 (0.599-0.761)	0.812 (0.724-0.922)	1.02 (0.908-1.16)	1.19 (1.05-1.34)	1.43 (1.25-1.61)	1.62 (1.41-1.83)	1.82 (1.57-2.06)	2.04 (1.73-2.31)	2.34 (1.95-2.67)	2.59 (2.11-2.97)
3-hr	0.474 (0.423-0.538)	0.573 (0.510-0.650)	0.722 (0.642-0.820)	0.843 (0.746-0.954)	1.01 (0.888-1.15)	1.16 (1.00-1.31)	1.31 (1.12-1.48)	1.47 (1.24-1.67)	1.70 (1.40-1.95)	1.89 (1.53-2.18)
6-hr	0.283 (0.252-0.324)	0.342 (0.304-0.392)	0.432 (0.383-0.493)	0.506 (0.446-0.575)	0.611 (0.533-0.695)	0.700 (0.604-0.794)	0.795 (0.677-0.902)	0.897 (0.751-1.02)	1.04 (0.854-1.19)	1.17 (0.933-1.34)
12-hr	0.169 (0.151-0.191)	0.203 (0.182-0.229)	0.252 (0.225-0.285)	0.293 (0.260-0.330)	0.349 (0.308-0.392)	0.396 (0.346-0.444)	0.445 (0.384-0.500)	0.496 (0.422-0.559)	0.569 (0.475-0.646)	0.628 (0.515-0.717)
24-hr	0.101 (0.093-0.110)	0.121 (0.112-0.132)	0.149 (0.137-0.162)	0.170 (0.156-0.185)	0.199 (0.182-0.217)	0.222 (0.202-0.242)	0.245 (0.222-0.268)	0.268 (0.242-0.294)	0.300 (0.268-0.330)	0.325 (0.288-0.364)
2-day	0.059 (0.055-0.064)	0.071 (0.066-0.077)	0.087 (0.080-0.094)	0.099 (0.091-0.107)	0.115 (0.105-0.124)	0.128 (0.116-0.138)	0.140 (0.128-0.152)	0.153 (0.139-0.167)	0.171 (0.153-0.187)	0.184 (0.164-0.202)
3-day	0.042 (0.039-0.046)	0.051 (0.047-0.054)	0.061 (0.057-0.066)	0.070 (0.065-0.075)	0.081 (0.075-0.087)	0.090 (0.083-0.096)	0.098 (0.090-0.106)	0.107 (0.098-0.116)	0.119 (0.108-0.129)	0.129 (0.116-0.139)
4-day	0.034 (0.032-0.036)	0.040 (0.038-0.043)	0.049 (0.046-0.052)	0.055 (0.052-0.059)	0.064 (0.060-0.068)	0.071 (0.066-0.075)	0.078 (0.072-0.083)	0.084 (0.078-0.090)	0.094 (0.086-0.100)	0.101 (0.092-0.108)
7-day	0.023 (0.021-0.025)	0.027 (0.025-0.029)	0.033 (0.031-0.035)	0.037 (0.035-0.040)	0.043 (0.040-0.046)	0.048 (0.044-0.051)	0.052 (0.048-0.056)	0.057 (0.052-0.061)	0.063 (0.058-0.068)	0.068 (0.062-0.073)
10-day	0.018 (0.017-0.020)	0.022 (0.020-0.023)	0.026 (0.024-0.028)	0.029 (0.028-0.031)	0.034 (0.032-0.036)	0.038 (0.035-0.040)	0.041 (0.038-0.044)	0.045 (0.042-0.048)	0.050 (0.046-0.053)	0.054 (0.049-0.057)
20-day	0.013 (0.012-0.013)	0.015 (0.014-0.016)	0.018 (0.016-0.019)	0.020 (0.018-0.021)	0.022 (0.021-0.024)	0.024 (0.023-0.026)	0.027 (0.025-0.028)	0.029 (0.027-0.030)	0.031 (0.029-0.033)	0.033 (0.031-0.036)
30-day	0.010 (0.010-0.011)	0.012 (0.011-0.013)	0.014 (0.013-0.015)	0.016 (0.015-0.017)	0.018 (0.017-0.019)	0.019 (0.018-0.020)	0.021 (0.019-0.022)	0.022 (0.021-0.023)	0.024 (0.022-0.026)	0.025 (0.024-0.027)
45-day	0.009 (0.008-0.009)	0.010 (0.010-0.011)	0.012 (0.011-0.013)	0.013 (0.012-0.014)	0.015 (0.014-0.015)	0.016 (0.015-0.017)	0.017 (0.016-0.018)	0.018 (0.017-0.019)	0.019 (0.018-0.020)	0.020 (0.019-0.021)
60-day	0.008 (0.007-0.008)	0.009 (0.009-0.010)	0.010 (0.010-0.011)	0.012 (0.011-0.012)	0.013 (0.012-0.014)	0.014 (0.013-0.015)	0.015 (0.014-0.016)	0.016 (0.015-0.017)	0.017 (0.016-0.018)	0.018 (0.016-0.019)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

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PF graphical

PDS-based intensity-duration-frequency (IDF) curves
Latitude: 39.5167°, Longitude: -86.0667°



NOAA Atlas 14, Volume 2, Version 3

Created (GMT): Thu Jan 17 12:52:22 2019

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Maps & aerals

Small scale terrain



Large scale terrain



Large scale map





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1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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Project: Starbucks Franklin, Indiana



Chamber Model -

SC-310

Units -

Imperial

[Click Here for Metric](#)

100

Number of chambers -

100

Voids in the stone (porosity) -

40

%

Base of STONE Elevation -

739.67

ft

Amount of Stone Above Chambers -

6

in

Amount of Stone Below Chambers -

12

in

Area of system -

2476

sf

☒ Include Perimeter Stone in Calculations

Min. Area - 2372 sf min. area

StormTech SC-310 Cumu

Height of System (inches)	Incremental Single Chamber (cubic feet)	Incremental Total Chamber (cubic feet)	Incremental Stone (cubic feet)	Incremental Ch & St (cubic feet)	Cumulative Chamber (cubic feet)	Elevation (feet)
34	0.00	0.00	82.53	82.53	3691.74	742.50
33	0.00	0.00	82.53	82.53	3609.21	742.42
32	0.00	0.00	82.53	82.53	3526.67	742.34
31	0.00	0.00	82.53	82.53	3444.14	742.25
30	0.00	0.00	82.53	82.53	3361.61	742.17
29	0.00	0.00	82.53	82.53	3279.07	742.09
28	0.06	5.88	80.18	86.06	3196.54	742.00
27	0.15	15.47	76.34	91.82	3110.48	741.92
26	0.27	26.59	71.90	98.49	3018.66	741.84
25	0.54	54.48	60.74	115.22	2920.18	741.75
24	0.70	70.40	54.37	124.78	2804.96	741.67
23	0.82	82.45	49.55	132.01	2680.18	741.59
22	0.92	92.46	45.55	138.01	2548.18	741.50
21	1.01	101.50	41.93	143.43	2410.17	741.42
20	1.09	109.46	38.75	148.21	2266.74	741.34
19	1.15	115.43	36.36	151.79	2118.53	741.25
18	1.21	121.49	33.94	155.43	1966.74	741.17
17	1.27	127.49	31.54	159.03	1811.31	741.09
16	1.32	132.46	29.55	162.01	1652.28	741.00
15	1.36	136.50	27.93	164.43	1490.28	740.92
14	1.40	140.50	26.33	166.83	1325.84	740.84
13	1.43	143.46	25.15	168.61	1159.01	740.75
12	0.00	0.00	82.53	82.53	990.40	740.67
11	0.00	0.00	82.53	82.53	907.87	740.59
10	0.00	0.00	82.53	82.53	825.33	740.50
9	0.00	0.00	82.53	82.53	742.80	740.42
8	0.00	0.00	82.53	82.53	660.27	740.34
7	0.00	0.00	82.53	82.53	577.73	740.25
6	0.00	0.00	82.53	82.53	495.20	740.17
5	0.00	0.00	82.53	82.53	412.67	740.09
4	0.00	0.00	82.53	82.53	330.13	740.00
3	0.00	0.00	82.53	82.53	247.60	739.92
2	0.00	0.00	82.53	82.53	165.07	739.84
1	0.00	0.00	82.53	82.53	82.53	739.75