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**RECEIVED**  
**4.27.2021**  
East Hampton  
Land Use Office

**STORM WATER ANALYSIS**  
**LONG HILL ESTATES**  
**April 23, 2021**

The existing property is 20.29 acres in size and located on the south side of Long Hill Road just west of West High Street (State Route 66) in East Hampton, Connecticut. The site is undeveloped and the ground cover is primarily forested. The topography slopes generally from south to north with a drainage divide approximately in the center of the property.

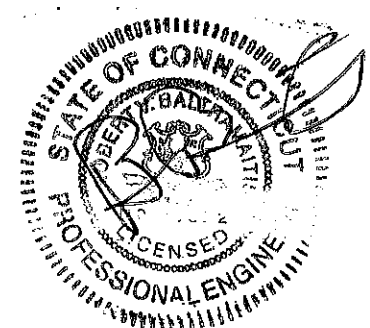
The proposed development will consist of eight (8) single family residential homes on new lots of varying sizes. Lot sizes range from approximately 60,000 SF to 125,000 SF. The shape and size of the proposed lots is a function of providing code compliant domestic wells, protective radii, primary sub-surface sewage disposal systems and future reserve areas.

Hydraflow Hydrographs® (HH) software was used to generate computer models of the pre- and post-development scenarios. HH utilizes the methodologies set forth in the Technical Release No. 55 (TR-55) and Technical Release No. 20 (TR-20) computer model, originally developed by the Soil Conservation Service (SCS) now called the Natural Resources Conservation Service (NRCS). The HH software predicts runoff rates based upon several factors including land use, hydrologic soil type, vegetative cover, watershed area, time of concentration rainfall data and the attenuation effects due to ponds and structures.

Presently, under *pre-development conditions*, approximately half of the site drains northeasterly to a wetland system that traverses through the northeast corner of the site and drains to an existing culvert under Long Hill Road (Analysis Point A). The remaining portion of the site drains north westerly to a roadside swale (Analysis Point B) or simply drains overland across the west border (Analysis Point C).

Under *post-development conditions*, the existing drainage areas will be altered but the size of the areas draining to each analysis point will be similar. Based on existing land coverage in the sub watersheds and the underlying soils, as identified in the Soil Survey of New London County, Connecticut, runoff curve numbers (CN) were developed for each drainage area for existing and post-development conditions. The following runoff coefficients were used based on the hydrologic classification of area soils which are of hydrologic class 'C' with some class 'B' to the south:

<u>Land Cover</u>	<u>CN</u>
Roofs	98
Pavements	98
Grass	74
Woods (C)	70
Woods (B)	55



Drainage areas for pre- and post-development scenarios were developed and are shown on Plan Sheet DA-1 entitled “Pre and Post Drainage Area Plan” contained in the plan set.

The times-of-concentration (Tc) were determined for both the pre- and post-development conditions using the SCS Lag Method given parameters of the watershed affecting overland flow, gutter flow, channel flow and pipe flow, where applicable; a minimum time-of-concentration (Tc) of 5 minutes is utilized. Hydrographs were developed using SCS TR-55 methodology to ascertain flow rates and volumes, utilizing NOAA 14 published rainfall values. The associated 24-hour rainfall totals utilized are 3.34”, 5.13”, 6.25” and 7.97” for the 2-, 10-, 25- and 100-year storms, respectively.

The following table summarizes each drainage area:

Watershed	Area (Acres)	Tc (min)	Weighted CN	Description
ex-POI-A	10.3	19	69	Existing runoff east to culvert
ex-POI-B	3.1	13	70	Existing runoff west to roadside
ex-POI-C	6.9	13	67	Existing runoff west overland
PR-DA-1	1.2	6	73	Post Dev runoff east to culvert
PR-DA-2	0.9	7	77	Post Dev runoff east to culvert
PR-DA-6	1.0	14	72	Post Dev runoff east to culvert
PR-DA-7	4.4	21	67	Post Dev runoff east to culvert
PR-DA-8a	3.6	13	71	Post Dev runoff east to culvert
PR-DA-8b	0.1	5	74	Post Dev runoff east to culvert
PR-DA-3	1.4	10	72	Post Dev runoff west to road side
PR-DA-4	1.8	10	72	Post Dev runoff west to road side
PR-DA-9a	0.1	9	73	Post Dev runoff west to road side
PR-DA-5	3.1	14	68	Post Dev runoff west overland
PR-DA-10a	0.2	5	70	Post Dev runoff west overland
PR-DA-10b	2.5	15	64	Post Dev runoff west overland

Not surprisingly, the developed site is anticipated to increase the peak runoff rates and volumes from the site. To mitigate this impact, sub-surface storm water infiltration systems are proposed to accommodate rooftop water from EACH of the proposed dwellings. Each system is designed to fully accommodate the anticipated volume for a 100-year, 24-hour storm. Each system will consist of approximately 60 feet of (18”x30”) infiltration chambers on a crushed stone bed.

While this first mitigation significantly reduces the post-development impact, we still expect an increase in peak runoff rates and volumes associated with the paved driveways and creation of lawns and other areas. To mitigate this impact, the site will be developed with a series of raingardens/ bioretention areas constructed as mild depressions in the topography. These storm water management areas are designed to hold enough volume of post development runoff to meet or reduce the pre-development volume. The following table summarizes the volume holding capacity of the raingardens:

<b>Raingarden</b>	<b>Serves</b>	<b>Volume</b>	<b>Drains To</b>
SWM 1	Lot 7	2,069	Runoff east to culvert
SWM 2	Lot 5	758	Runoff east to culvert
SWM 3	Lot 4	3,743	Runoff west to road side
SWM 4	Lot 1	5,374	Runoff west to road side
SWM 5	Lot 2	2,488	Runoff west overland
SWM 6	Lot 6	7,548	Runoff east to culvert
SWM 7	Lot 6	4,526	Runoff east to culvert

The following table summarizes the existing and post-development runoff rates and volumes. The table also depicts the volume that will be captured by the raingardens

<b>Watershed</b>	<b>Existing</b>		<b>Proposed</b>		<b>Difference (cu. ft.)</b>	<b>Storage Available (cu. ft.)</b>
	<b>Rate (cfs)</b>	<b>Volume (cu. ft.)</b>	<b>Rate (cfs)</b>	<b>Volume (cu. ft.)</b>		
East to culvert	36.6	163,697	40.29	178,345	+ 14,648	14,901
West to roadside	13.1	49,166	14.9	54,346	+ 5,180	9,117
West overland	26.8	101,000	20.2	82,327	- 18,673	2,488

As summarized above, the mitigation measures including the rooftop infiltrators and the proposed raingarden/ bioretention areas, will fully mitigate the storm water impacts of development. As such, the perpetual maintenance of these amenities should be required by future property owners as a deed covenant.

## Long Hill SWM Summary

### **SWM-1 Rain Garden/Bio**

1.5' deep. – Top berm 292.75, Bottom 291.00 (ALLOWS FOR 3" FREE BOARD)

Volume= Elev 292.50=1,508 s.f, Elev 291.50=1,015 s.f., Elev 290.50 = 600 s.f. equals 2,069 CF of volume

### **SWM-2 Rain Garden/Bio**

1.00' deep. – Top berm 296.25, Bottom 295.00

Volume= Elev 296.00 = 936 s.f., Elev 295 = 581 s.f. equals 758 CF of volume

### **SWM-3 Rain Garden/Bio**

2.00' deep. – Top berm 293.25, Bottom 291.00

Volume= Elev 293.0 = 2,733 s.f., Elev 292 = 1,807, Elev 291.0 = 1,140 s.f. equals 3,743 CF of volume

### **SWM-4 Rain Garden/Bio**

2.00' deep. – Top berm 283.25, Bottom 281.00

Volume= Elev 283=3,443 s.f., Elev 282 = 2,668 s.f., Elev 281 = 1,970 s.f. equals 5,374 CF of volume

### **SWM-5 Rain Garden/Bio**

2.00' deep. – Top berm 316.25, Bottom 314.00

Volume= Elev 316=2,381 s.f., Elev 315 = 1,612 s.f., Elev 314 = 984 s.f. equals 2,488 CF of volume

### **SWM-6 Rain Garden/Bio**

2.00' deep. – Top berm 346.25, Bottom 344.00

Volume= Elev 344.00=4,698 s.f., Elev 343.00 = 3,760 s.f., Elev 342.00 = 2,878 equals 7,548 CF of volume

### **SWM-7 Rain Garden/Bio**

2.00' deep. – Top berm 342.25, Bottom 340.00

Volume= Elev 342.00=3,148 s.f., Elev 341.00 = 2,296 s.f., Elev 340 = 1,510 equals 4,526 CF of volume

## SUMMARY

### **Watershed 1 to the wetlands**

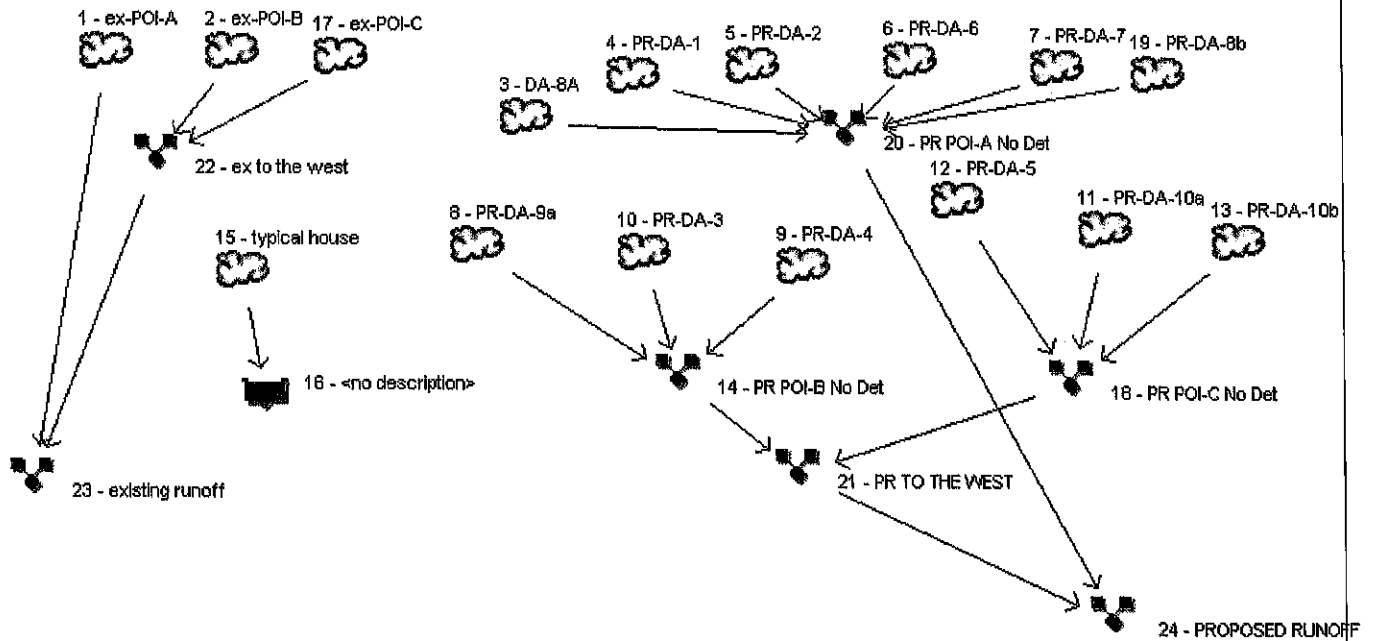
SWM-1, SWM-2, SWM-6, SWM-7 = 2,069 + 758 + 7,548 + 4,526 = 14,901 s.f. Total

### **Watershed 2 to the West**

SWM-3, SWM-4, SWM-5 = 3,743 + 5,374 + 2,488 = 11,605 s.f. Total

# Watershed Model Schematic

Hydraflow Hydrographs by Intellisolve v9.02



## Legend

Hyd.	Origin	Description
1	SCS Runoff	ex-POI-A
2	SCS Runoff	ex-POI-B
3	SCS Runoff	DA-8A
4	SCS Runoff	PR-DA-1
5	SCS Runoff	PR-DA-2
6	SCS Runoff	PR-DA-6
7	SCS Runoff	PR-DA-7
8	SCS Runoff	PR-DA-9a
9	SCS Runoff	PR-DA-4
10	SCS Runoff	PR-DA-3
11	SCS Runoff	PR-DA-10a
12	SCS Runoff	PR-DA-5
13	SCS Runoff	PR-DA-10b
14	Combine	PR POI-B No Det
15	SCS Runoff	typical house
16	Reservoir	<no description>
17	SCS Runoff	ex-POI-C
18	Combine	PR POI-C No Det
19	SCS Runoff	PR-DA-8b
20	Combine	PR POI-A No Det
21	Combine	PR TO THE WEST
22	Combine	ex to the west
23	Combine	existing runoff
24	Combine	PROPOSED RUNOFF

# Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.02

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	7.026	1	733	32,542	---	-----	-----	ex-POI-A
2	SCS Runoff	2.438	1	730	10,089	---	-----	-----	ex-POI-B
3	SCS Runoff	2.892	1	731	12,415	---	-----	-----	DA-8A
4	SCS Runoff	1.450	1	725	4,701	---	-----	-----	PR-DA-1
5	SCS Runoff	1.205	1	726	3,949	---	-----	-----	PR-DA-2
6	SCS Runoff	0.785	1	731	3,325	---	-----	-----	PR-DA-6
7	SCS Runoff	2.302	1	739	12,256	---	-----	-----	PR-DA-7
8	SCS Runoff	0.140	1	727	507	---	-----	-----	PR-DA-9a
9	SCS Runoff	1.664	1	729	6,467	---	-----	-----	PR-DA-4
10	SCS Runoff	1.257	1	729	4,888	---	-----	-----	PR-DA-3
11	SCS Runoff	0.212	1	725	716	---	-----	-----	PR-DA-10a
12	SCS Runoff	1.949	1	732	8,791	---	-----	-----	PR-DA-5
13	SCS Runoff	1.053	1	735	5,520	---	-----	-----	PR-DA-10b
14	Combine	3.058	1	729	11,862	8, 9, 10,	-----	-----	PR POI-B No Det
15	SCS Runoff	0.111	1	724	384	---	-----	-----	typical house
16	Reservoir	0.000	1	679	0	15	100.17	66.6	<no description>
17	SCS Runoff	4.281	1	731	18,781	---	-----	-----	ex-POI-C
18	Combine	3.102	1	733	15,027	11, 12, 13,	-----	-----	PR POI-C No Det
19	SCS Runoff	0.136	1	724	410	---	-----	-----	PR-DA-8b
20	Combine	7.500	1	730	37,057	3, 4, 5, 6, 7, 19	-----	-----	PR POI-A No Det
21	Combine	6.018	1	730	26,889	14, 18,	-----	-----	PR TO THE WEST
22	Combine	6.710	1	731	28,870	2, 17,	-----	-----	ex to the west
23	Combine	12.79	1	733	61,010	1, 22	-----	-----	existing runoff
24	Combine	13.52	1	730	63,945	20, 21,	-----	-----	PROPOSED RUNOFF
drainage model.gpw					Return Period: 2 Year			Sunday, Apr 25, 2021	

# Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.02

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	26.46	1	732	110,129	---	----	-----	ex-POI-A
2	SCS Runoff	8.815	1	729	33,286	---	----	-----	ex-POI-B
3	SCS Runoff	10.08	1	730	39,967	---	----	-----	DA-8A
4	SCS Runoff	4.688	1	725	14,441	---	----	-----	PR-DA-1
5	SCS Runoff	3.454	1	726	11,126	---	----	-----	PR-DA-2
6	SCS Runoff	2.640	1	730	10,451	---	----	-----	PR-DA-6
7	SCS Runoff	9.435	1	736	43,765	---	----	-----	PR-DA-7
8	SCS Runoff	0.454	1	727	1,556	---	----	-----	PR-DA-9a
9	SCS Runoff	5.592	1	728	20,329	---	----	-----	PR-DA-4
10	SCS Runoff	4.227	1	728	15,365	---	----	-----	PR-DA-3
11	SCS Runoff	0.765	1	725	2,362	---	----	-----	PR-DA-10a
12	SCS Runoff	7.652	1	731	30,545	---	----	-----	PR-DA-5
13	SCS Runoff	5.087	1	732	21,552	---	----	-----	PR-DA-10b
14	Combine	10.27	1	728	37,250	8, 9, 10,	----	-----	PR POI-B No Det
15	SCS Runoff	0.209	1	724	743	---	----	-----	typical house
16	Reservoir	0.000	1	601	0	15	100.85	186	<no description>
17	SCS Runoff	17.62	1	729	67,068	---	----	-----	ex-POI-C
18	Combine	13.17	1	731	54,459	11, 12, 13,	----	-----	PR POI-C No Det
19	SCS Runoff	0.426	1	723	1,233	---	----	-----	PR-DA-8b
20	Combine	27.16	1	729	120,982	3, 4, 5, 6, 7, 19	----	-----	PR POI-A No Det
21	Combine	23.12	1	729	91,709	14, 18,	----	-----	PR TO THE WEST
22	Combine	26.43	1	729	100,353	2, 17,	----	-----	ex to the west
23	Combine	49.40	1	731	209,123	1, 22	----	-----	existing runoff
24	Combine	50.27	1	729	212,692	20, 21,	----	-----	PROPOSED RUNOFF
drainage model.gpw					Return Period: 10 Year			Sunday, Apr 25, 2021	

# Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.02

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	32.93	1	732	136,449	---	----	-----	ex-POI-A
2	SCS Runoff	10.93	1	729	41,096	---	----	-----	ex-POI-B
3	SCS Runoff	12.44	1	730	49,178	---	----	-----	DA-8A
4	SCS Runoff	5.726	1	725	17,652	---	----	-----	PR-DA-1
5	SCS Runoff	4.154	1	726	13,432	---	----	-----	PR-DA-2
6	SCS Runoff	3.245	1	730	12,816	---	----	-----	PR-DA-6
7	SCS Runoff	11.87	1	735	54,620	---	----	-----	PR-DA-7
8	SCS Runoff	0.556	1	727	1,902	---	----	-----	PR-DA-9a
9	SCS Runoff	6.868	1	728	24,931	---	----	-----	PR-DA-4
10	SCS Runoff	5.191	1	728	18,843	---	----	-----	PR-DA-3
11	SCS Runoff	0.947	1	725	2,917	---	----	-----	PR-DA-10a
12	SCS Runoff	9.576	1	730	37,981	---	----	-----	PR-DA-5
13	SCS Runoff	6.502	1	732	27,215	---	----	-----	PR-DA-10b
14	Combine	12.61	1	728	45,676	8, 9, 10,	----	-----	PR POI-B No Det
15	SCS Runoff	0.238	1	724	849	---	----	-----	typical house
16	Reservoir	0.000	1	673	0	15	101.09	224	<no description>
17	SCS Runoff	22.16	1	729	83,703	---	----	-----	ex-POI-C
18	Combine	16.61	1	731	68,112	11, 12, 13,	----	-----	PR POI-C No Det
19	SCS Runoff	0.519	1	723	1,502	---	----	-----	PR-DA-8b
20	Combine	33.65	1	729	149,200	3, 4, 5, 6, 7, 19	----	-----	PR POI-A No Det
21	Combine	28.85	1	729	113,788	14, 18,	----	-----	PR TO THE WEST
22	Combine	33.08	1	729	124,800	2, 17,	----	-----	ex to the west
23	Combine	61.70	1	731	259,565	1, 22	----	-----	existing runoff
24	Combine	62.50	1	729	262,988	20, 21,	----	-----	PROPOSED RUNOFF
drainage model.gpw					Return Period: 25 Year			Sunday, Apr 25, 2021	



# Hydrograph Summary Report

Hydraflow Hydrographs by Intelisolve v9.02

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	39.58	1	731	163,697	---	----	----	ex-POI-A
2	SCS Runoff	13.08	1	729	49,166	---	----	----	ex-POI-B
3	SCS Runoff	14.86	1	730	58,675	---	----	----	DA-8A
4	SCS Runoff	6.780	1	725	20,950	---	----	----	PR-DA-1
5	SCS Runoff	4.861	1	725	15,784	---	----	----	PR-DA-2
6	SCS Runoff	3.860	1	730	15,251	---	----	----	PR-DA-6
7	SCS Runoff	14.39	1	735	65,906	---	----	----	PR-DA-7
8	SCS Runoff	0.658	1	727	2,257	---	----	----	PR-DA-9a
9	SCS Runoff	8.168	1	728	29,666	---	----	----	PR-DA-4
10	SCS Runoff	6.173	1	728	22,422	---	----	----	PR-DA-3
11	SCS Runoff	1.132	1	725	3,489	---	----	----	PR-DA-10a
12	SCS Runoff	11.56	1	730	45,695	---	----	----	PR-DA-5
13	SCS Runoff	7.971	1	732	33,143	---	----	----	PR-DA-10b
14	Combine	14.99	1	728	54,346	8, 9, 10,	----	----	PR POI-B No Det
15	SCS Runoff	0.267	1	724	955	---	----	----	typical house
16	Reservoir	0.000	1	669	0	15	101.37	262	<no description>
17	SCS Runoff	26.84	1	729	100,999	---	----	----	ex-POI-C
18	Combine	20.16	1	731	82,327	11, 12, 13,	----	----	PR POI-C No Det
19	SCS Runoff	0.613	1	723	1,778	---	----	----	PR-DA-8b
20	Combine	40.29	1	729	178,345	3, 4, 5, 6, 7, 19	----	----	PR POI-A No Det
21	Combine	34.74	1	729	136,674	14, 18,	----	----	PR TO THE WEST
22	Combine	39.92	1	729	150,165	2, 17,	----	----	ex to the west
23	Combine	74.34	1	731	311,841	1, 22	----	----	existing runoff
24	Combine	75.03	1	729	315,018	20, 21,	----	----	PROPOSED RUNOFF
drainage model.gpw					Return Period: 100 Year			Sunday, Apr 25, 2021	

# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

Sunday, Apr 25, 2021

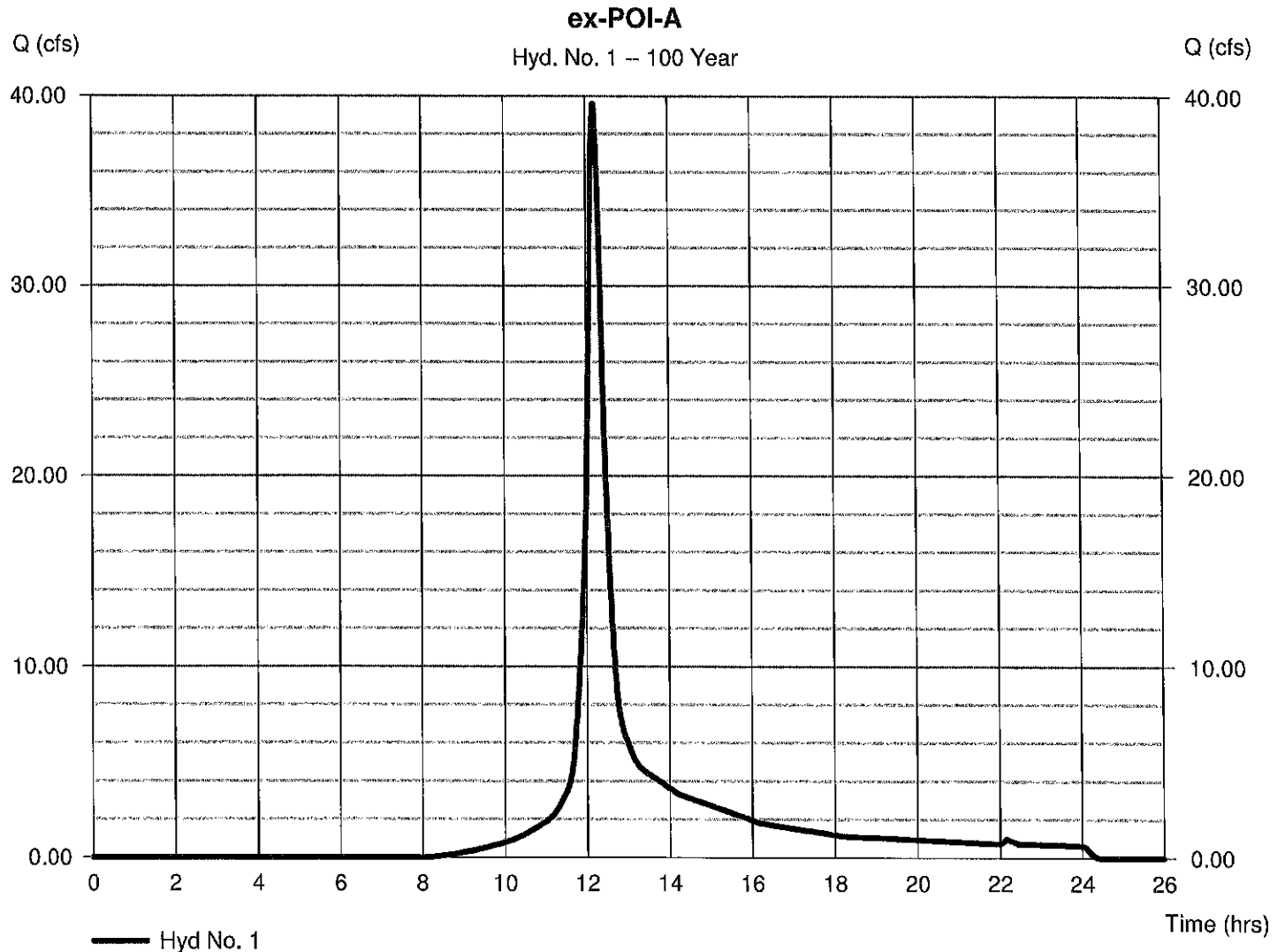
## Hyd. No. 1

ex-POI-A

Hydrograph type = SCS Runoff  
Storm frequency = 100 yrs  
Time interval = 1 min  
Drainage area = 10.300 ac  
Basin Slope = 10.0 %  
Tc method = LAG  
Total precip. = 7.97 in  
Storm duration = 24 hrs

Peak discharge = 39.58 cfs  
Time to peak = 12.18 hrs  
Hyd. volume = 163,697 cuft  
Curve number = 69\*  
Hydraulic length = 1276 ft  
Time of conc. (Tc) = 16.77 min  
Distribution = Type III  
Shape factor = 484

\* Composite (Area/CN) =  $[(1.000 \times 55) + (9.300 \times 70)] / 10.300$



# Hydrograph Report

Hydraflow Hydrographs by Intellisolve v9.02

Sunday, Apr 25, 2021

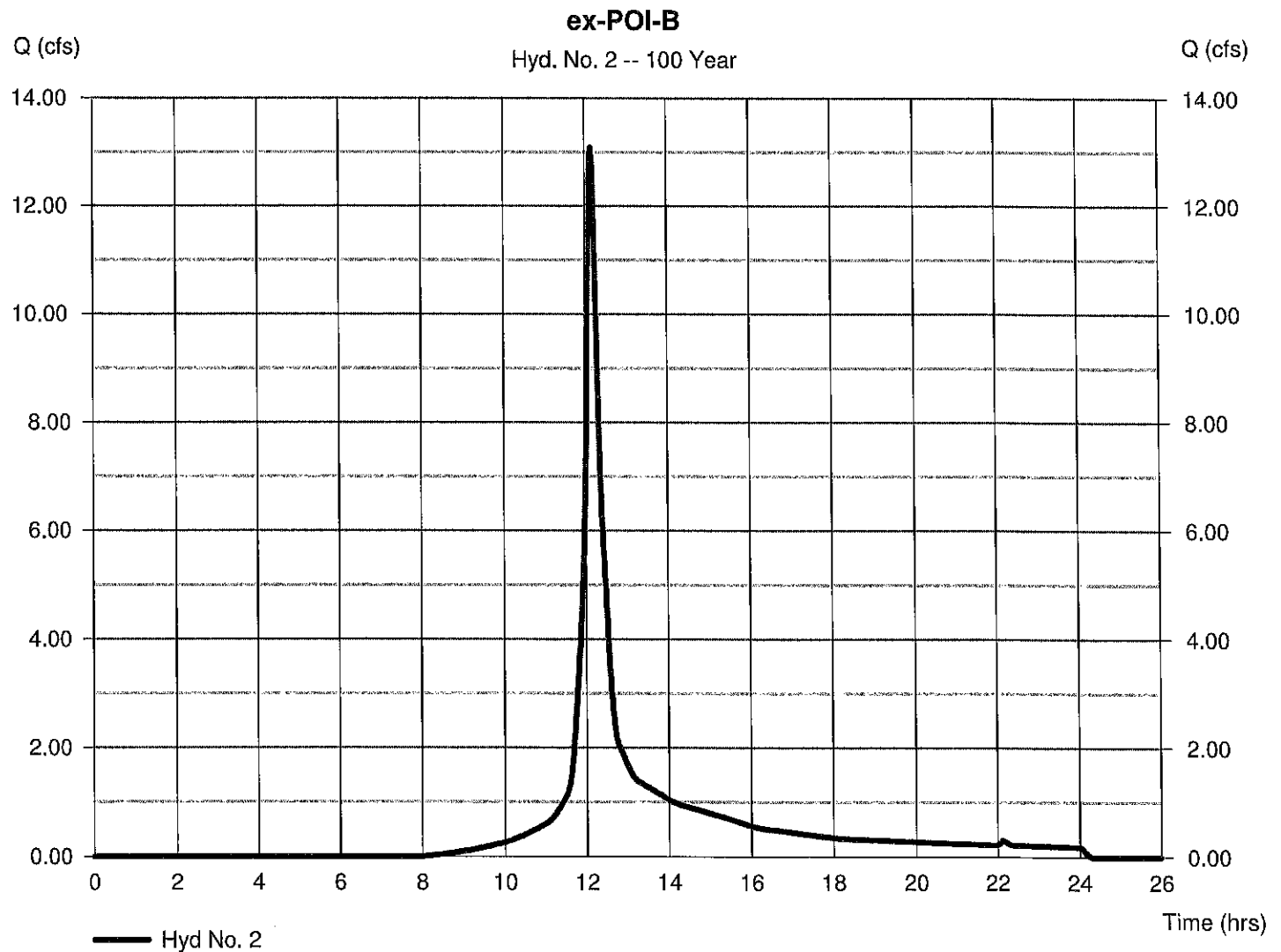
## Hyd. No. 2

ex-POI-B

Hydrograph type = SCS Runoff  
Storm frequency = 100 yrs  
Time interval = 1 min  
Drainage area = 3.100 ac  
Basin Slope = 9.9 %  
Tc method = LAG  
Total precip. = 7.97 in  
Storm duration = 24 hrs

Peak discharge = 13.08 cfs  
Time to peak = 12.15 hrs  
Hyd. volume = 49,166 cuft  
Curve number = 70\*  
Hydraulic length = 990 ft  
Time of conc. (Tc) = 13.40 min  
Distribution = Type III  
Shape factor = 484

\* Composite (Area/CN) =  $[(0.060 \times 55) + (3.040 \times 70)] / 3.100$



# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

Sunday, Apr 25, 2021

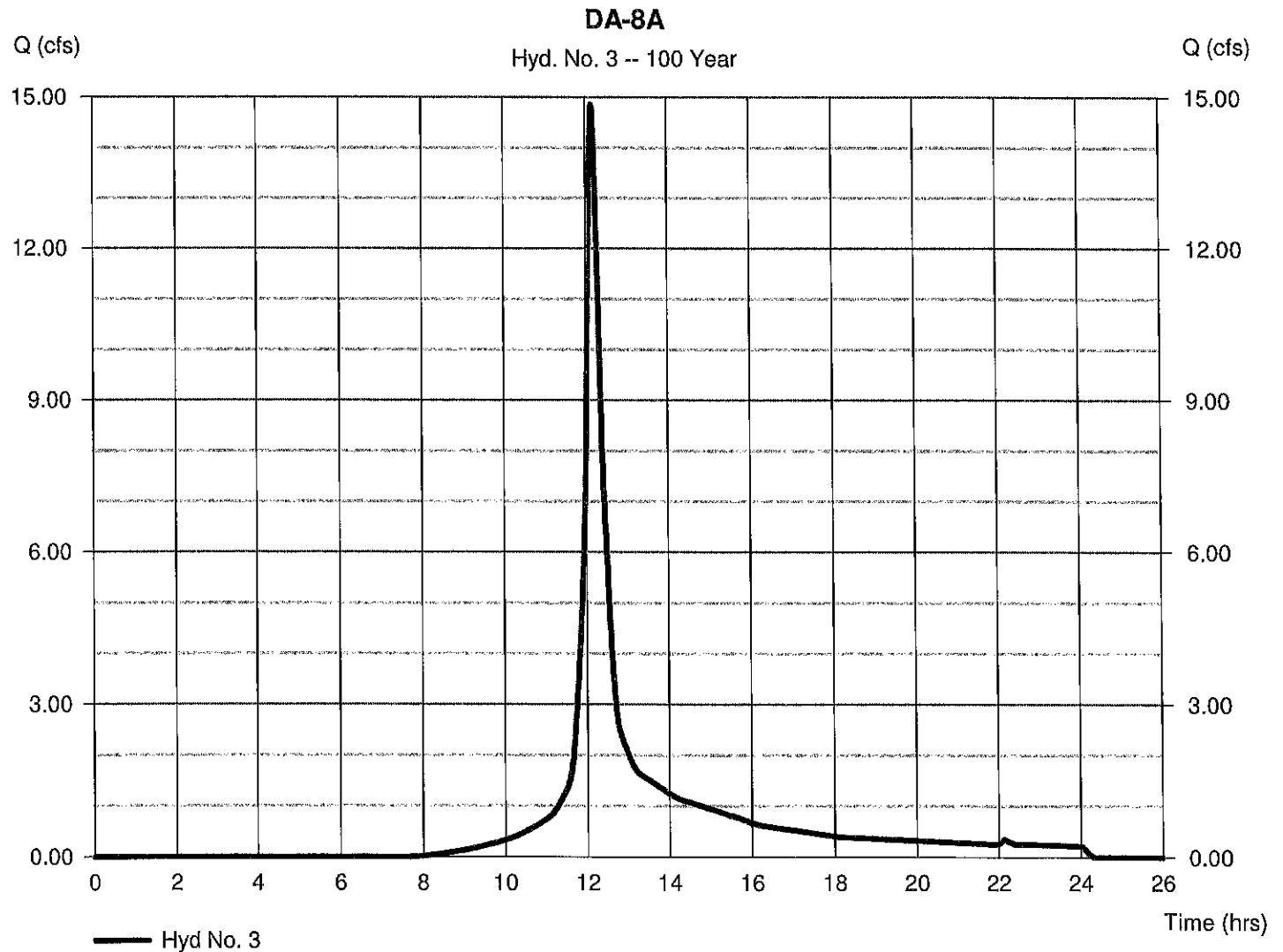
## Hyd. No. 3

DA-8A

Hydrograph type = SCS Runoff  
Storm frequency = 100 yrs  
Time interval = 1 min  
Drainage area = 3.550 ac  
Basin Slope = 8.9 %  
Tc method = LAG  
Total precip. = 7.97 in  
Storm duration = 24 hrs

Peak discharge = 14.86 cfs  
Time to peak = 12.17 hrs  
Hyd. volume = 58,675 cuft  
Curve number = 71\*  
Hydraulic length = 970 ft  
Time of conc. (Tc) = 13.53 min  
Distribution = Type III  
Shape factor = 484

\* Composite (Area/CN) = [(0.450 x 74) + (3.040 x 70) + (0.060 x 98)] / 3.550



# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

Sunday, Apr 25, 2021

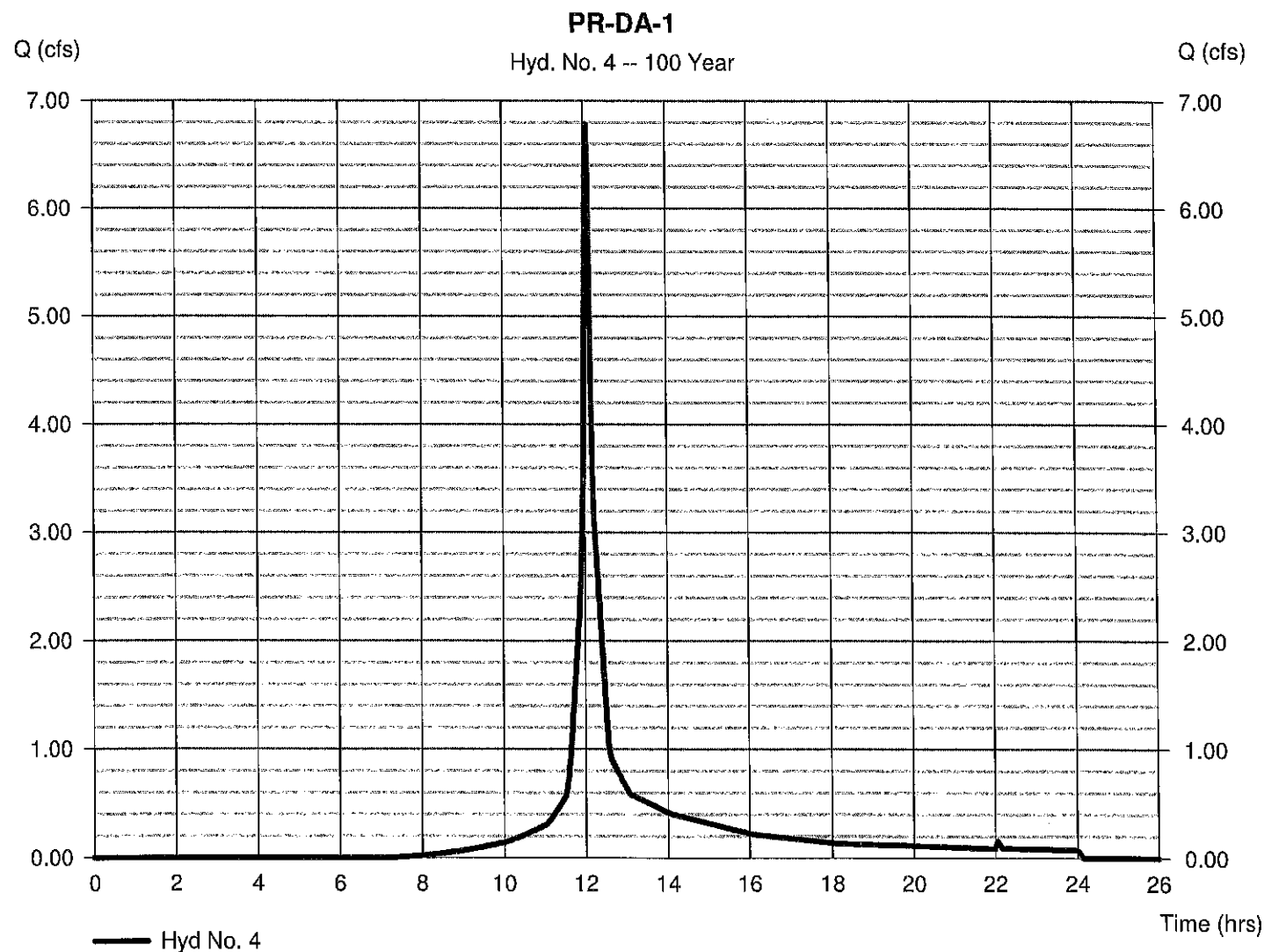
## Hyd. No. 4

PR-DA-1

Hydrograph type = SCS Runoff  
 Storm frequency = 100 yrs  
 Time interval = 1 min  
 Drainage area = 1.170 ac  
 Basin Slope = 11.9 %  
 Tc method = LAG  
 Total precip. = 7.97 in  
 Storm duration = 24 hrs

Peak discharge = 6.780 cfs  
 Time to peak = 12.08 hrs  
 Hyd. volume = 20,950 cuft  
 Curve number = 73\*  
 Hydraulic length = 470 ft  
 Time of conc. (Tc) = 6.20 min  
 Distribution = Type III  
 Shape factor = 484

\* Composite (Area/CN) = [(0.430 x 74) + (0.660 x 70) + (0.080 x 98)] / 1.170



# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

Sunday, Apr 25, 2021

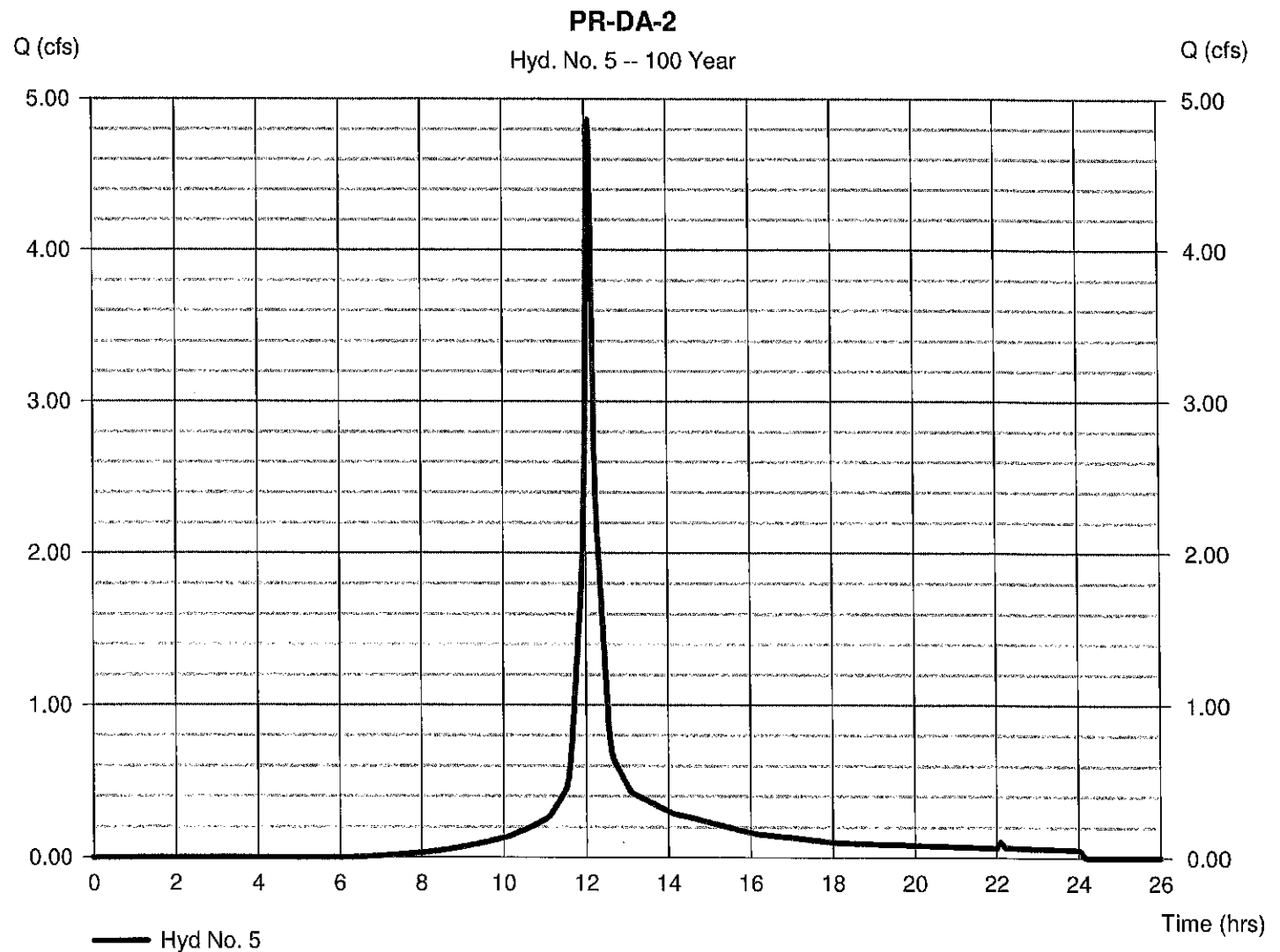
## Hyd. No. 5

PR-DA-2

Hydrograph type = SCS Runoff  
Storm frequency = 100 yrs  
Time interval = 1 min  
Drainage area = 0.850 ac  
Basin Slope = 10.0 %  
Tc method = LAG  
Total precip. = 7.97 in  
Storm duration = 24 hrs

Peak discharge = 4.861 cfs  
Time to peak = 12.08 hrs  
Hyd. volume = 15,784 cuft  
Curve number = 77\*  
Hydraulic length = 595 ft  
Time of conc. (Tc) = 7.28 min  
Distribution = Type III  
Shape factor = 484

\* Composite (Area/CN) =  $[(0.390 \times 74) + (0.150 \times 98) + (0.310 \times 70)] / 0.850$



# Hydrograph Report

Hydraflow Hydrographs by Intellisolve v9.02

Sunday, Apr 25, 2021

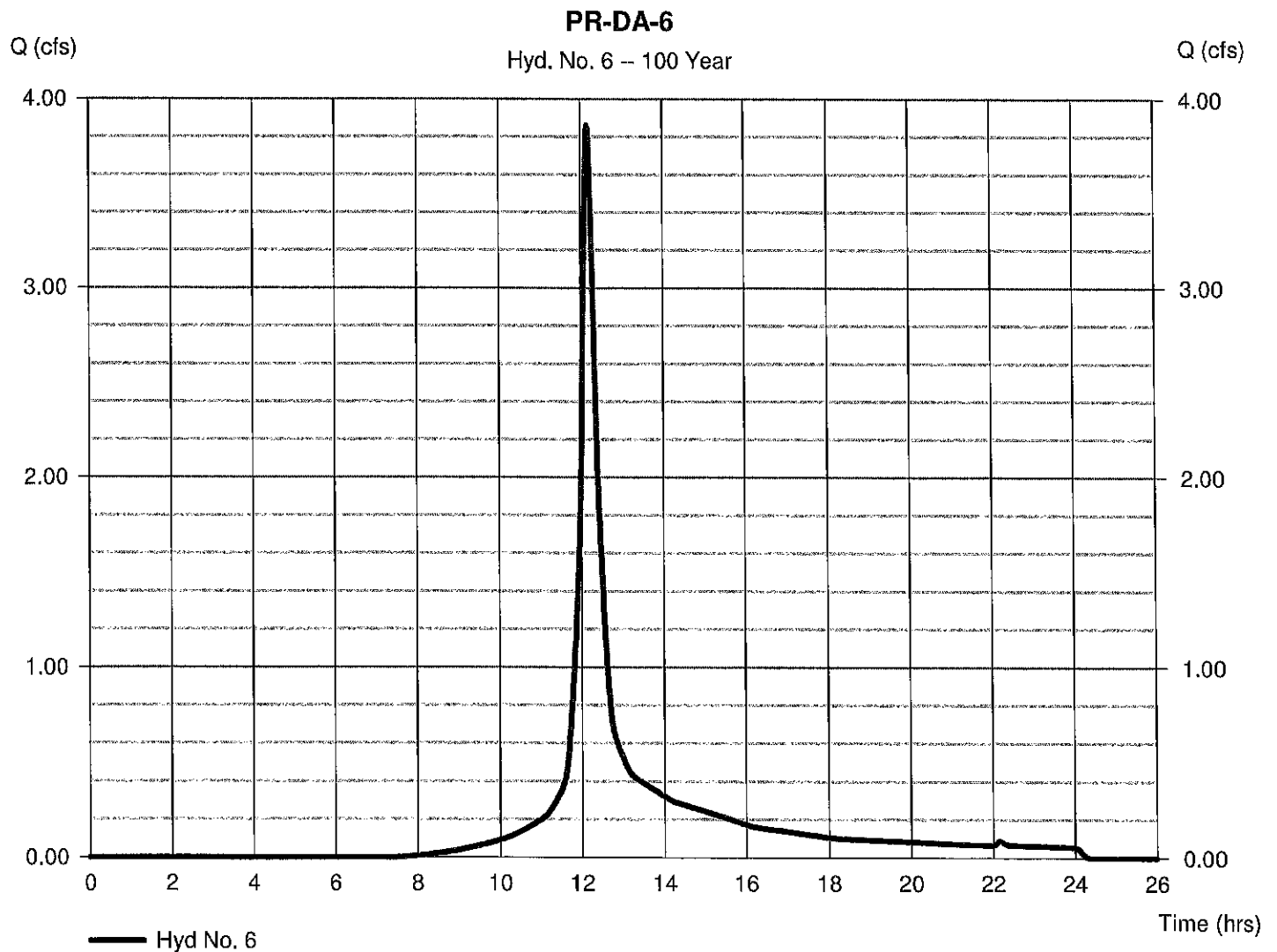
## Hyd. No. 6

PR-DA-6

Hydrograph type = SCS Runoff  
Storm frequency = 100 yrs  
Time interval = 1 min  
Drainage area = 0.900 ac  
Basin Slope = 9.9 %  
Tc method = LAG  
Total precip. = 7.97 in  
Storm duration = 24 hrs

Peak discharge = 3.860 cfs  
Time to peak = 12.17 hrs  
Hyd. volume = 15,251 cuft  
Curve number = 72\*  
Hydraulic length = 1164 ft  
Time of conc. (Tc) = 14.44 min  
Distribution = Type III  
Shape factor = 484

\* Composite (Area/CN) =  $[(0.230 \times 70) + (0.400 \times 74) + (0.100 \times 98) + (0.170 \times 55)] / 0.900$



# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

Sunday, Apr 25, 2021

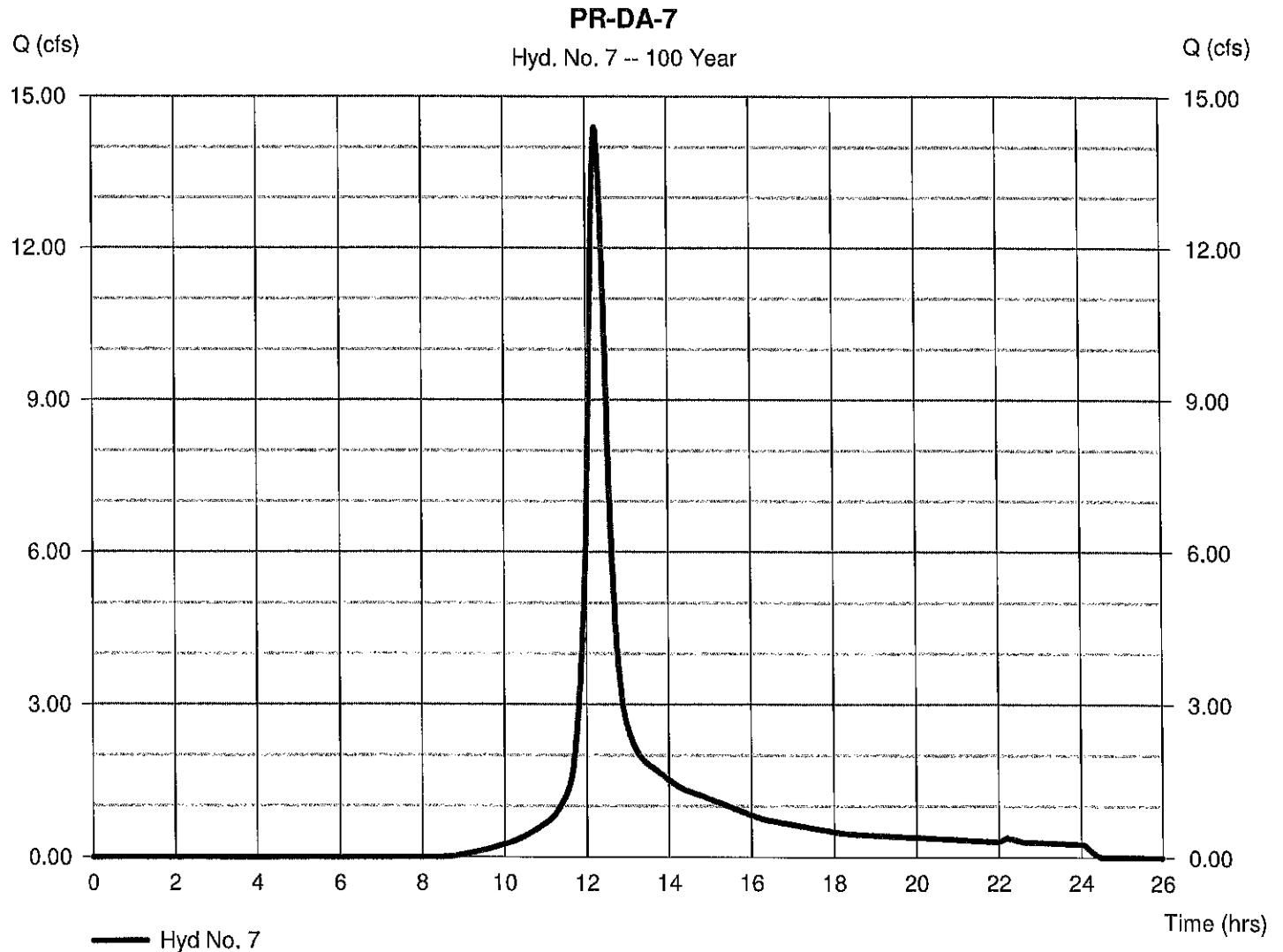
## Hyd. No. 7

PR-DA-7

Hydrograph type = SCS Runoff  
Storm frequency = 100 yrs  
Time interval = 1 min  
Drainage area = 4.390 ac  
Basin Slope = 7.5 %  
Tc method = LAG  
Total precip. = 7.97 in  
Storm duration = 24 hrs

Peak discharge = 14.39 cfs  
Time to peak = 12.25 hrs  
Hyd. volume = 65,906 cuft  
Curve number = 67\*  
Hydraulic length = 1367 ft  
Time of conc. (Tc) = 21.58 min  
Distribution = Type III  
Shape factor = 484

\* Composite (Area/CN) =  $[(0.270 \times 74) + (0.030 \times 98) + (3.090 \times 70) + (1.000 \times 55)] / 4.390$





# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

Sunday, Apr 25, 2021

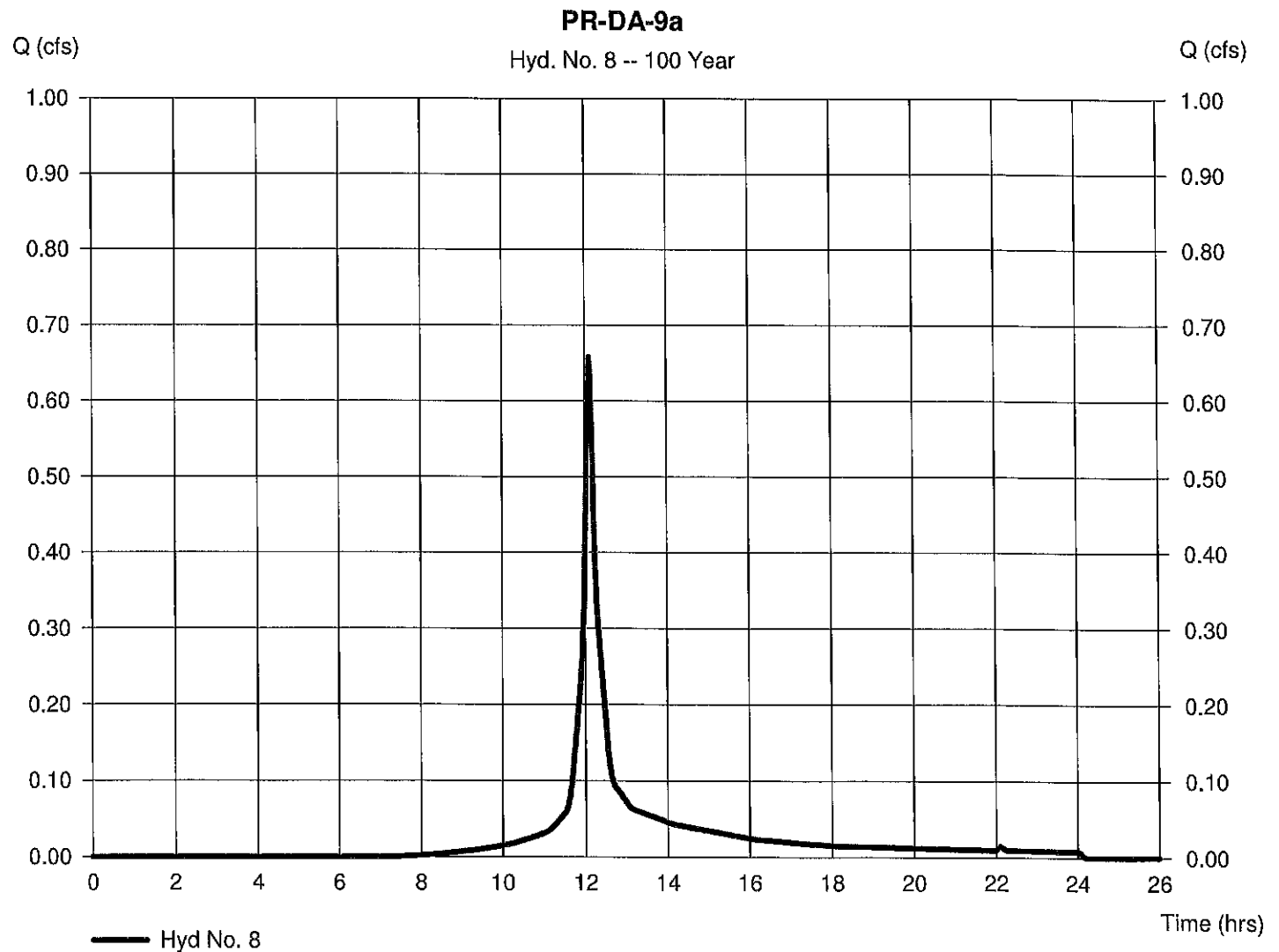
## Hyd. No. 8

PR-DA-9a

Hydrograph type = SCS Runoff  
Storm frequency = 100 yrs  
Time interval = 1 min  
Drainage area = 0.130 ac  
Basin Slope = 9.3 %  
Tc method = LAG  
Total precip. = 7.97 in  
Storm duration = 24 hrs

Peak discharge = 0.658 cfs  
Time to peak = 12.12 hrs  
Hyd. volume = 2,257 cuft  
Curve number = 73\*  
Hydraulic length = 624 ft  
Time of conc. (Tc) = 8.80 min  
Distribution = Type III  
Shape factor = 484

\* Composite (Area/CN) = [(0.090 x 70) + (0.010 x 98) + (0.030 x 74)] / 0.130



# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

Sunday, Apr 25, 2021

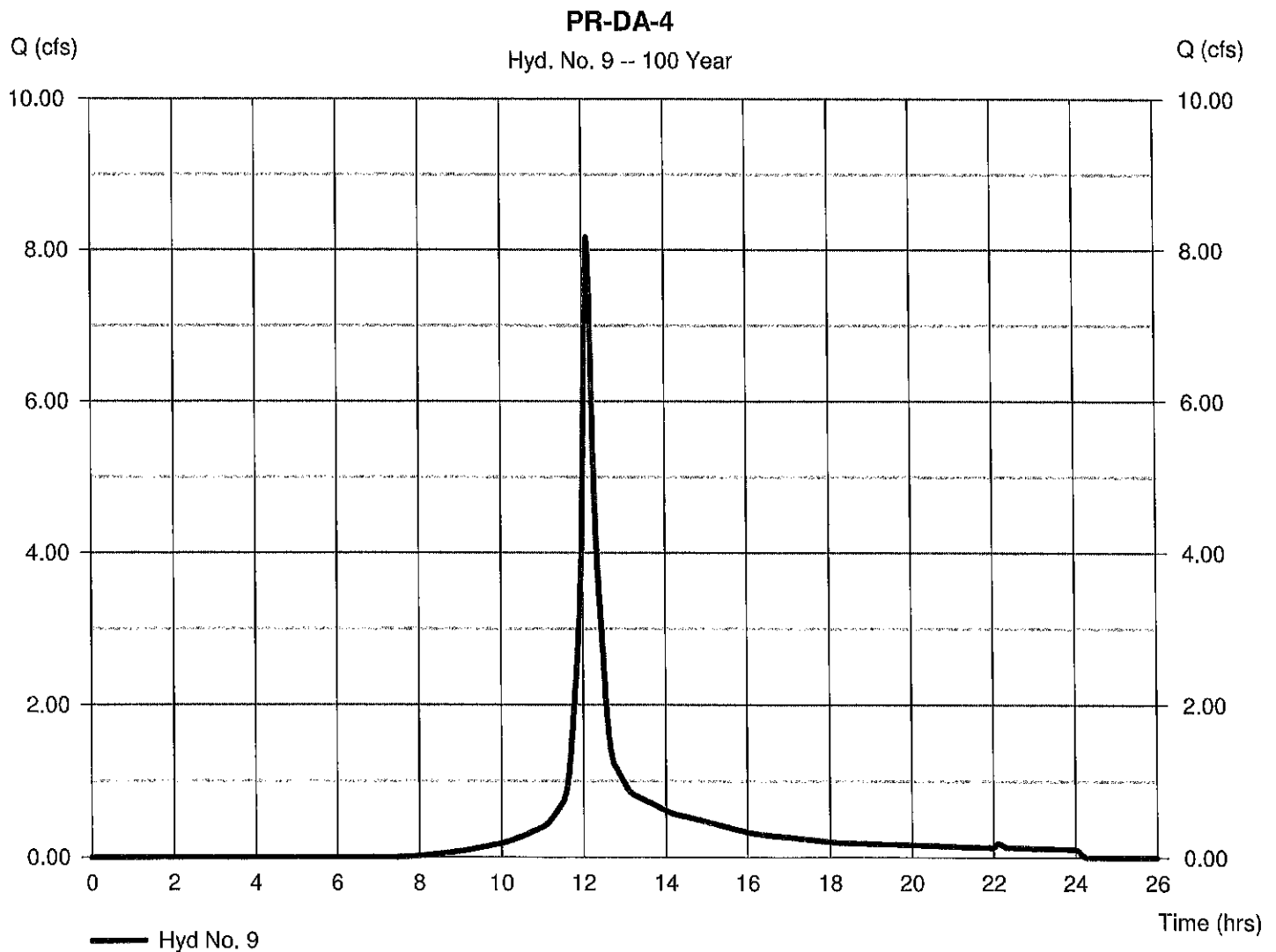
## Hyd. No. 9

PR-DA-4

Hydrograph type = SCS Runoff  
Storm frequency = 100 yrs  
Time interval = 1 min  
Drainage area = 1.720 ac  
Basin Slope = 10.0 %  
Tc method = LAG  
Total precip. = 7.97 in  
Storm duration = 24 hrs

Peak discharge = 8.168 cfs  
Time to peak = 12.13 hrs  
Hyd. volume = 29,666 cuft  
Curve number = 72\*  
Hydraulic length = 760 ft  
Time of conc. (Tc) = 10.21 min  
Distribution = Type III  
Shape factor = 484

\* Composite (Area/CN) =  $[(1.150 \times 70) + (0.070 \times 98) + (0.500 \times 74)] / 1.720$



# Hydrograph Report

Hydraflow Hydrographs by Intellisolve v9.02

Sunday, Apr 25, 2021

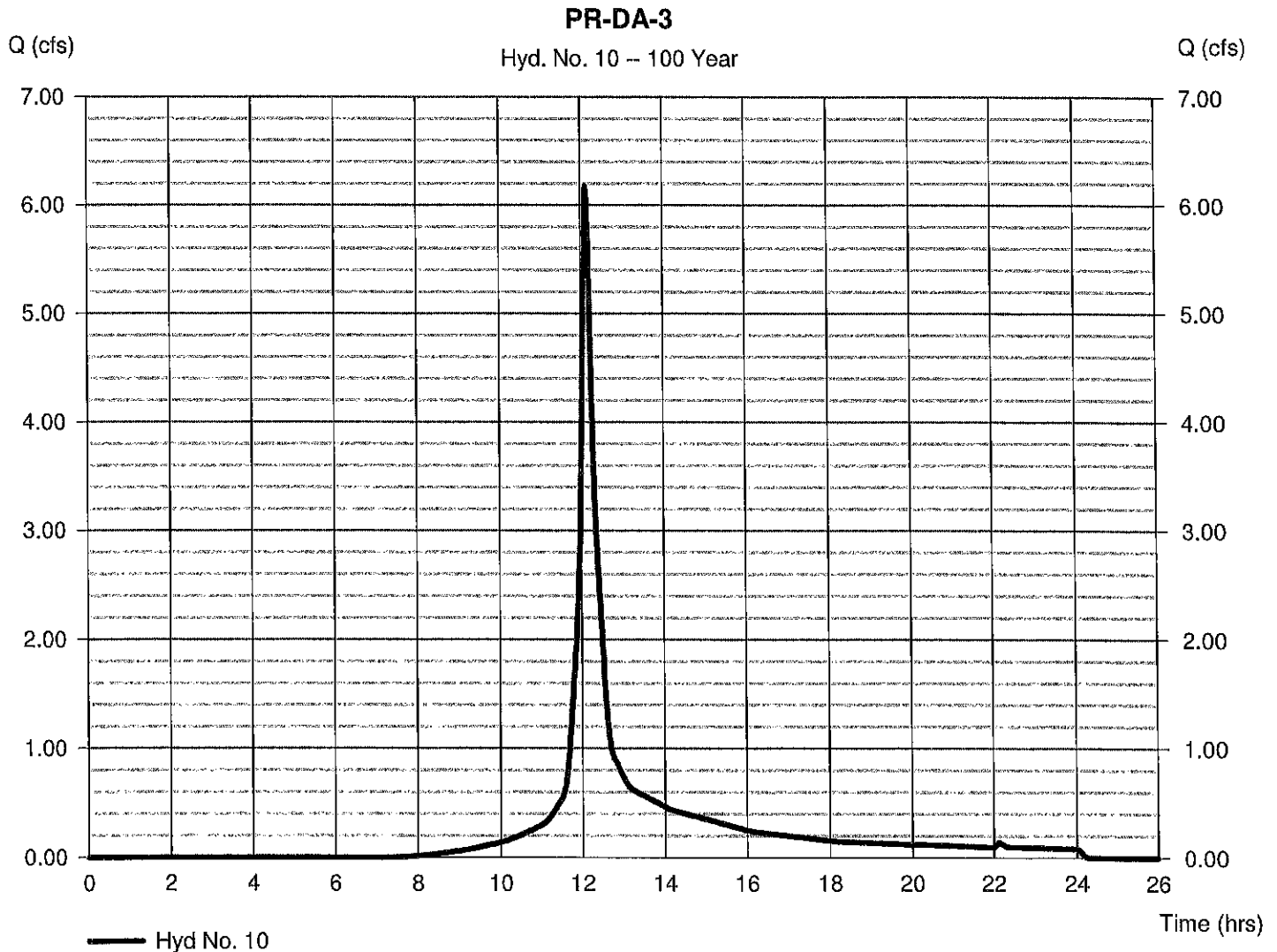
## Hyd. No. 10

PR-DA-3

Hydrograph type = SCS Runoff  
 Storm frequency = 100 yrs  
 Time interval = 1 min  
 Drainage area = 1.300 ac  
 Basin Slope = 9.7 %  
 Tc method = LAG  
 Total precip. = 7.97 in  
 Storm duration = 24 hrs

Peak discharge = 6.173 cfs  
 Time to peak = 12.13 hrs  
 Hyd. volume = 22,422 cuft  
 Curve number = 72\*  
 Hydraulic length = 760 ft  
 Time of conc. (Tc) = 10.37 min  
 Distribution = Type III  
 Shape factor = 484

\* Composite (Area/CN) = [(0.850 x 70) + (0.050 x 98) + (0.400 x 74)] / 1.300



# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

Sunday, Apr 25, 2021

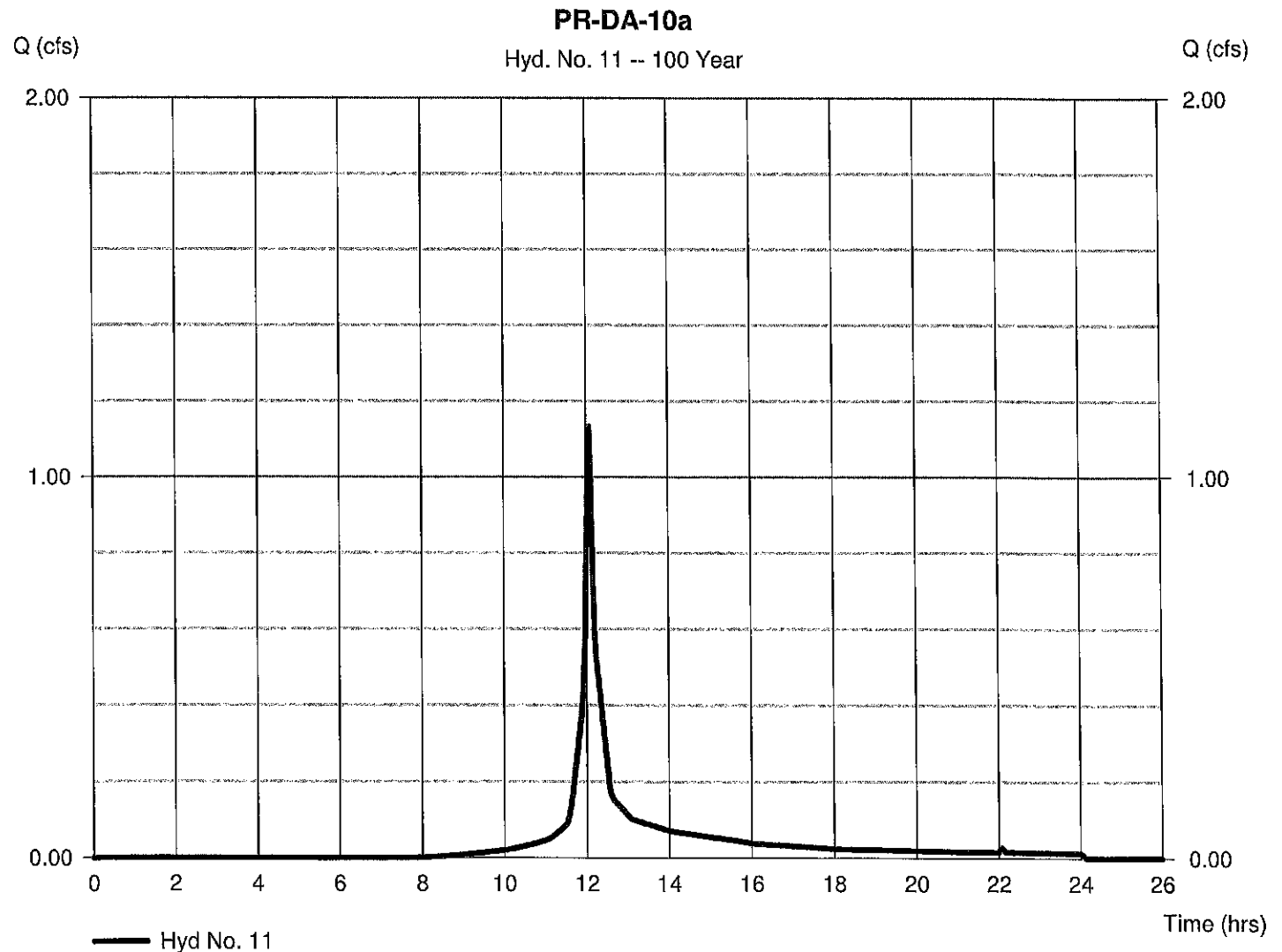
## Hyd. No. 11

PR-DA-10a

Hydrograph type = SCS Runoff  
Storm frequency = 100 yrs  
Time interval = 1 min  
Drainage area = 0.210 ac  
Basin Slope = 11.1 %  
Tc method = USER  
Total precip. = 7.97 in  
Storm duration = 24 hrs

Peak discharge = 1.132 cfs  
Time to peak = 12.08 hrs  
Hyd. volume = 3,489 cuft  
Curve number = 70\*  
Hydraulic length = 325 ft  
Time of conc. (Tc) = 5.00 min  
Distribution = Type III  
Shape factor = 484

\* Composite (Area/CN) = + (0.210 x 70) / 0.210



# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

Sunday, Apr 25, 2021

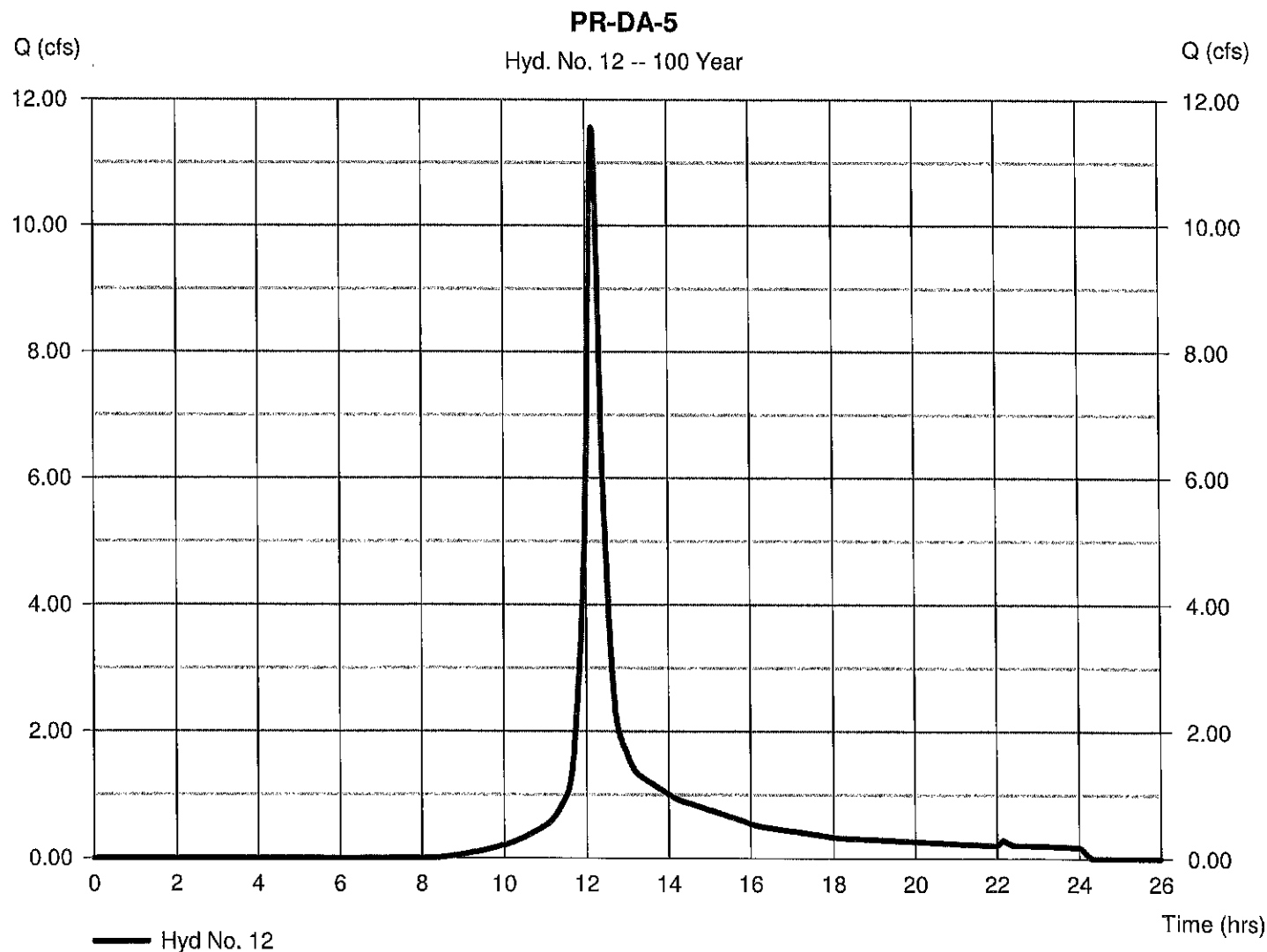
## Hyd. No. 12

PR-DA-5

Hydrograph type = SCS Runoff  
Storm frequency = 100 yrs  
Time interval = 1 min  
Drainage area = 2.990 ac  
Basin Slope = 8.7 %  
Tc method = LAG  
Total precip. = 7.97 in  
Storm duration = 24 hrs

Peak discharge = 11.56 cfs  
Time to peak = 12.17 hrs  
Hyd. volume = 45,695 cuft  
Curve number = 68\*  
Hydraulic length = 900 ft  
Time of conc. (Tc) = 13.97 min  
Distribution = Type III  
Shape factor = 484

\* Composite (Area/CN) =  $[(0.510 \times 74) + (0.120 \times 98) + (1.660 \times 70) + (0.700 \times 55)] / 2.990$



# Hydrograph Report

Hydraflow Hydrographs by Intellisolve v9.02

Sunday, Apr 25, 2021

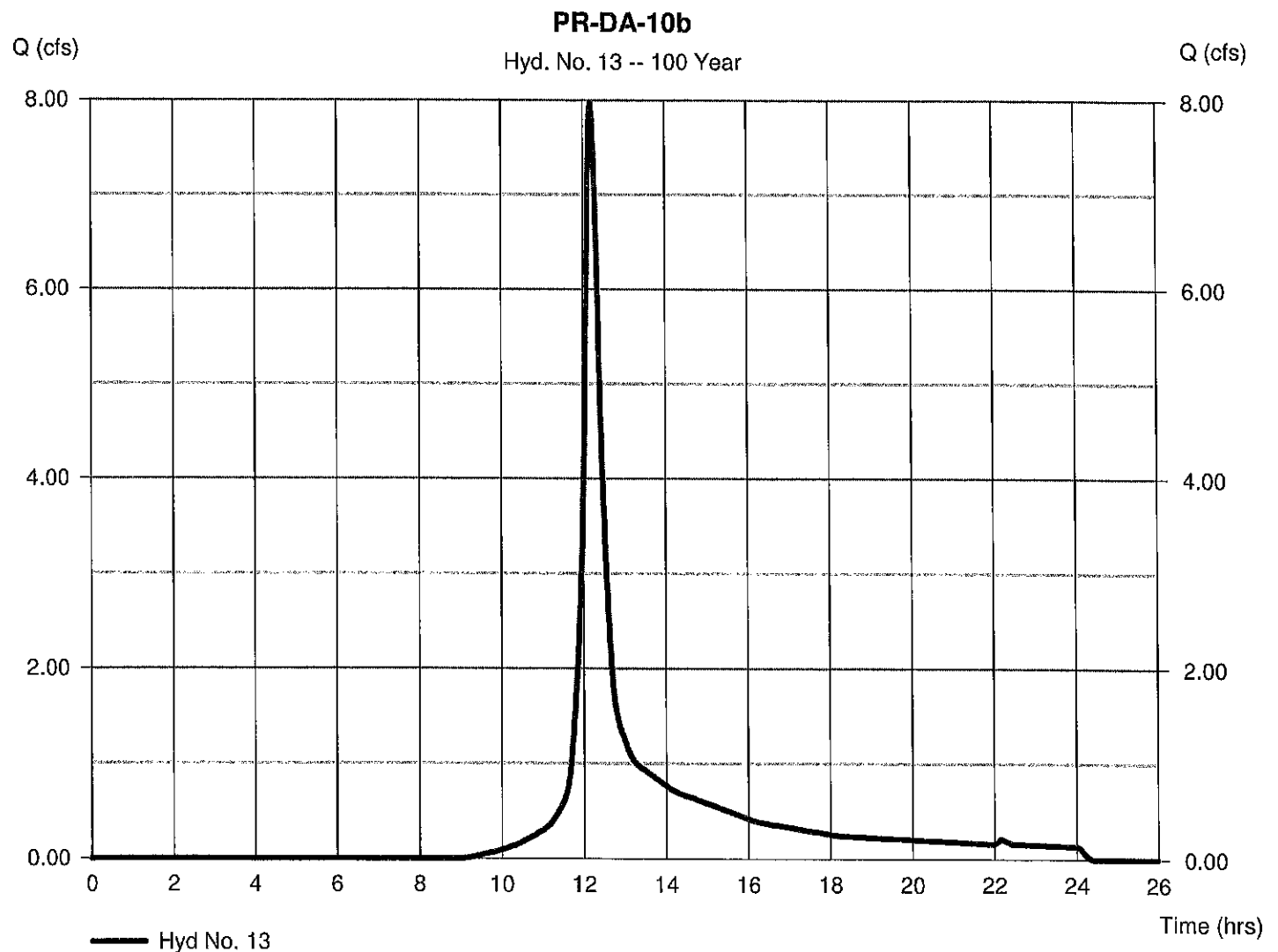
## Hyd. No. 13

PR-DA-10b

Hydrograph type = SCS Runoff  
Storm frequency = 100 yrs  
Time interval = 1 min  
Drainage area = 2.400 ac  
Basin Slope = 10.3 %  
Tc method = LAG  
Total precip. = 7.97 in  
Storm duration = 24 hrs

Peak discharge = 7.971 cfs  
Time to peak = 12.20 hrs  
Hyd. volume = 33,143 cuft  
Curve number = 64\*  
Hydraulic length = 988 ft  
Time of conc. (Tc) = 15.36 min  
Distribution = Type III  
Shape factor = 484

\* Composite (Area/CN) =  $[(0.980 \times 55) + (1.420 \times 70)] / 2.400$



# Hydrograph Report

Hydraflow Hydrographs by Intellisolve v9.02

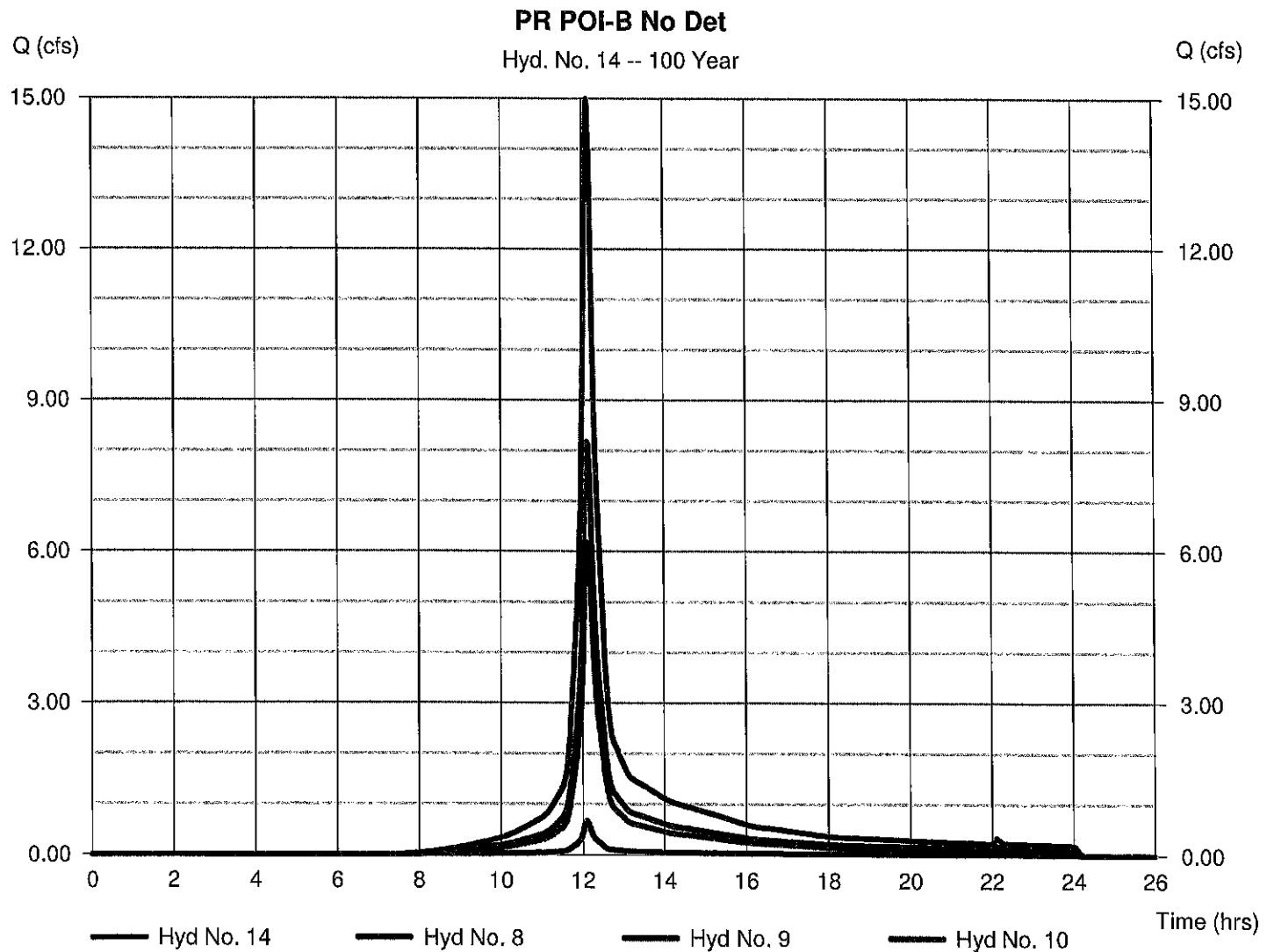
Sunday, Apr 25, 2021

## Hyd. No. 14

PR POI-B No Det

Hydrograph type = Combine  
Storm frequency = 100 yrs  
Time interval = 1 min  
Inflow hyds. = 8, 9, 10

Peak discharge = 14.99 cfs  
Time to peak = 12.13 hrs  
Hyd. volume = 54,346 cuft  
Contrib. drain. area = 3.150 ac



# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

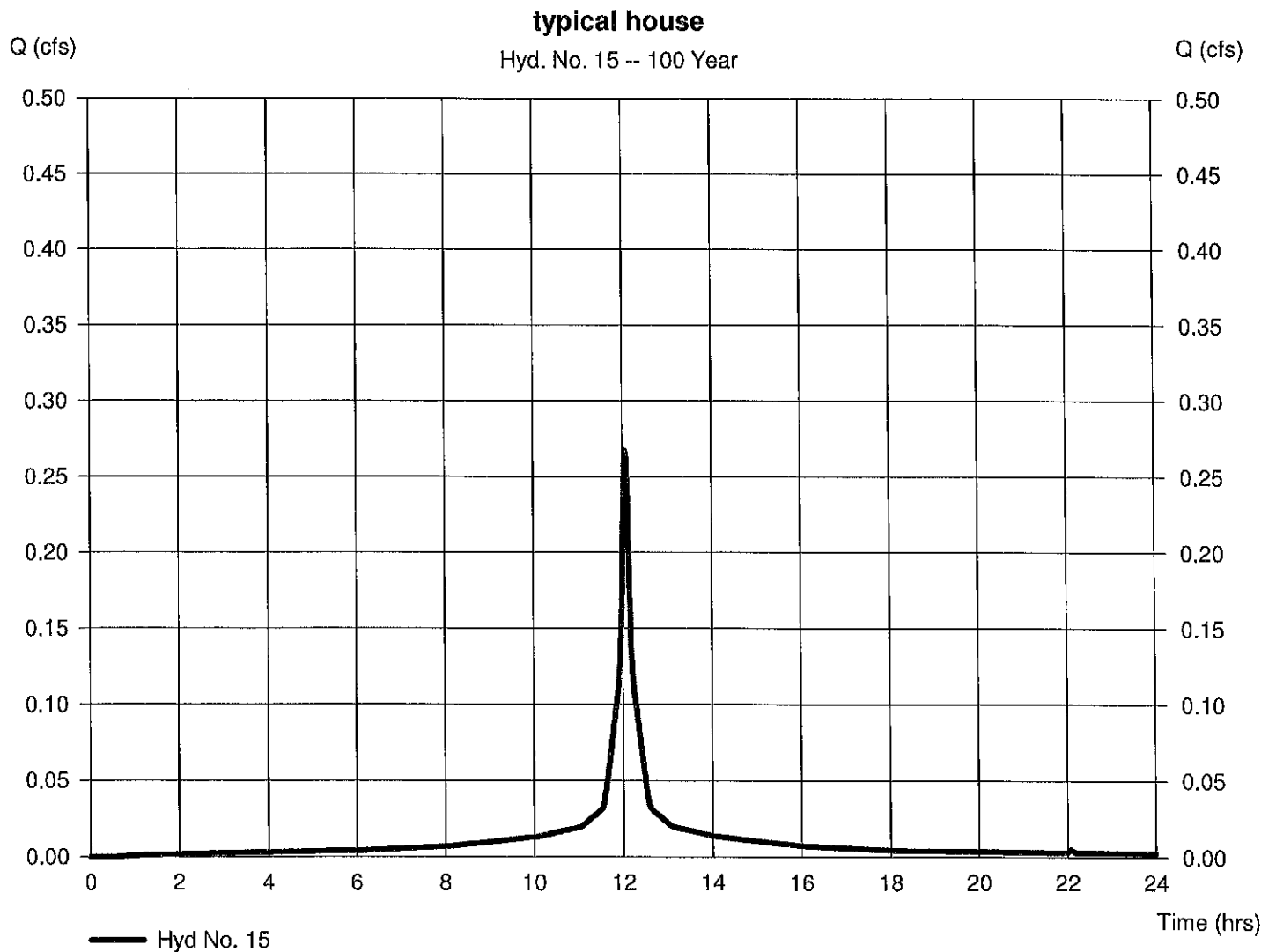
Sunday, Apr 25, 2021

## Hyd. No. 15

typical house

Hydrograph type = SCS Runoff  
Storm frequency = 100 yrs  
Time interval = 1 min  
Drainage area = 0.033 ac  
Basin Slope = 0.0 %  
Tc method = USER  
Total precip. = 7.97 in  
Storm duration = 24 hrs

Peak discharge = 0.267 cfs  
Time to peak = 12.07 hrs  
Hyd. volume = 955 cuft  
Curve number = 98  
Hydraulic length = 0 ft  
Time of conc. (Tc) = 5.00 min  
Distribution = Type III  
Shape factor = 484





# Hydrograph Report

Hydraflow Hydrographs by Intellisolve v9.02

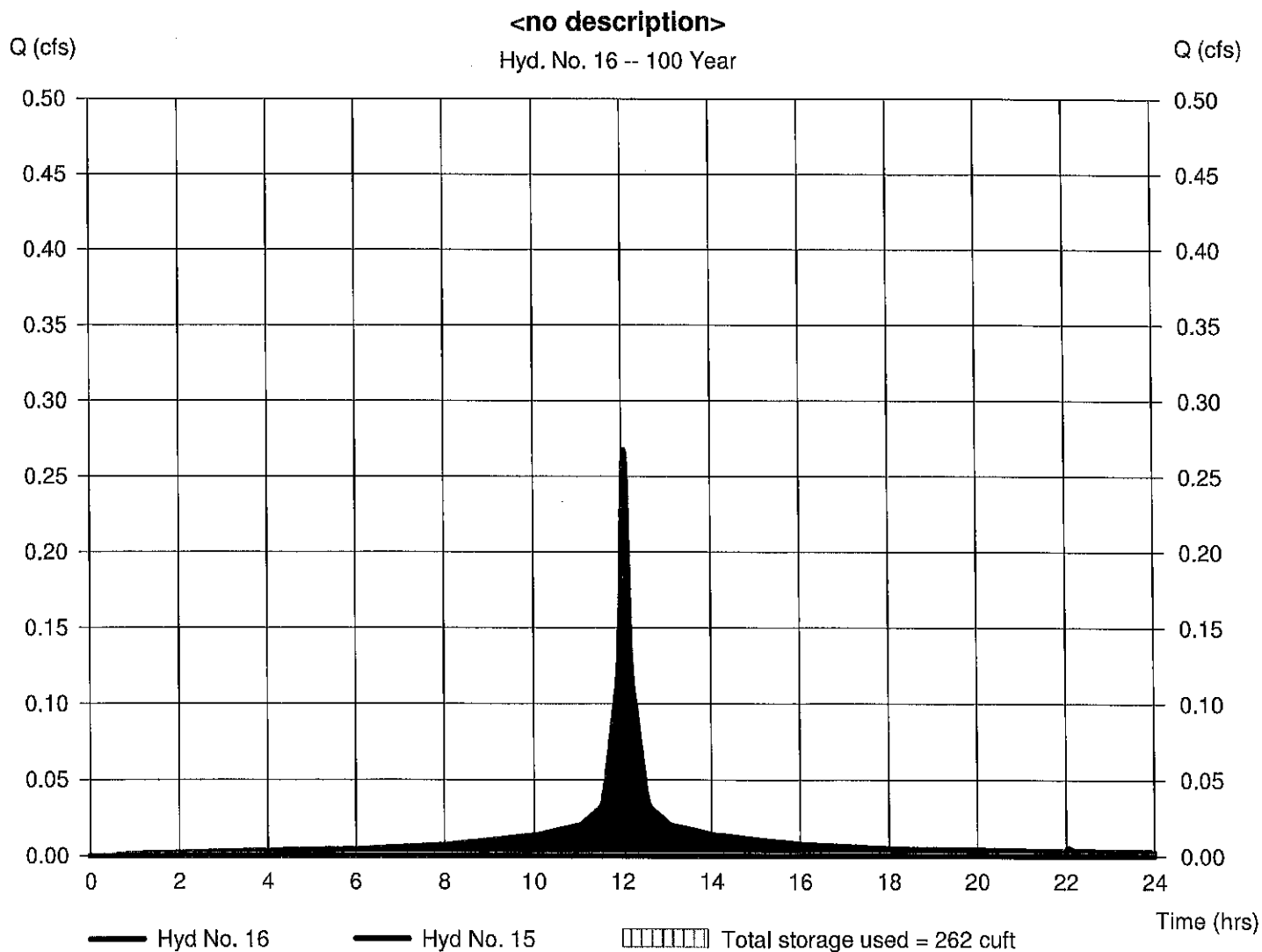
Sunday, Apr 25, 2021

## Hyd. No. 16

<no description>

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 100 yrs	Time to peak	= 11.15 hrs
Time interval	= 1 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 15 - typical house	Max. Elevation	= 101.37 ft
Reservoir name	= dwelling roof system	Max. Storage	= 262 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



# Pond Report

Hydraflow Hydrographs by Intellisolve v9.02

Sunday, Apr 25, 2021

## Pond No. 2 - dwelling roof system

### Pond Data

UG Chambers - Invert elev. = 100.00 ft, Rise x Span = 1.50 x 3.00 ft, Barrel Len = 55.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No  
 Encasement - Invert elev. = 99.50 ft, Width = 4.00 ft, Height = 2.00 ft, Voids = 33.00%

### Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	99.50	n/a	0	0
0.20	99.70	n/a	15	15
0.40	99.90	n/a	15	29
0.60	100.10	n/a	26	55
0.80	100.30	n/a	36	91
1.00	100.50	n/a	36	127
1.20	100.70	n/a	35	162
1.40	100.90	n/a	33	195
1.60	101.10	n/a	31	226
1.80	101.30	n/a	28	254
2.00	101.50	n/a	22	275

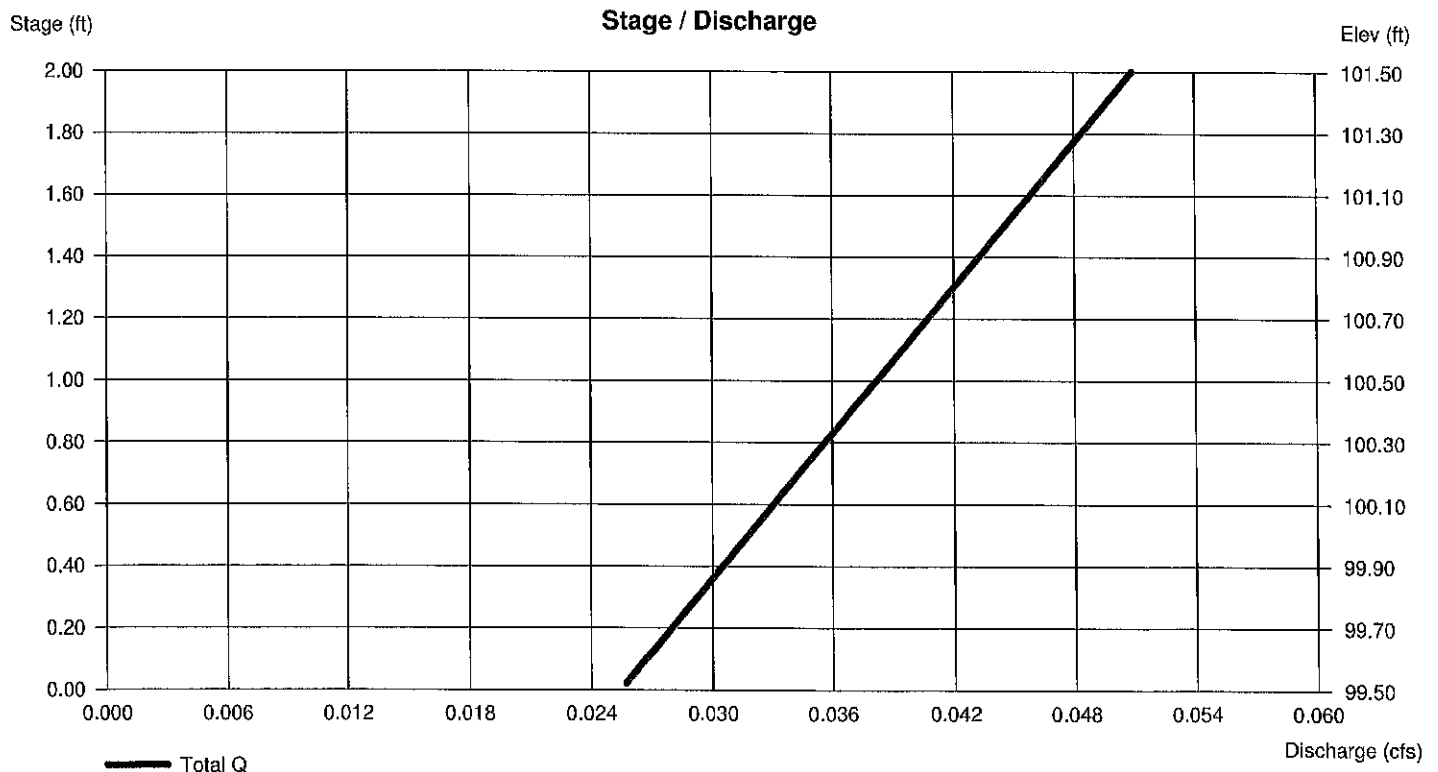
### Culvert / Orifice Structures

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

### Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 5.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet and outlet control. Weir risers are checked for orifice conditions.



# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

Sunday, Apr 25, 2021

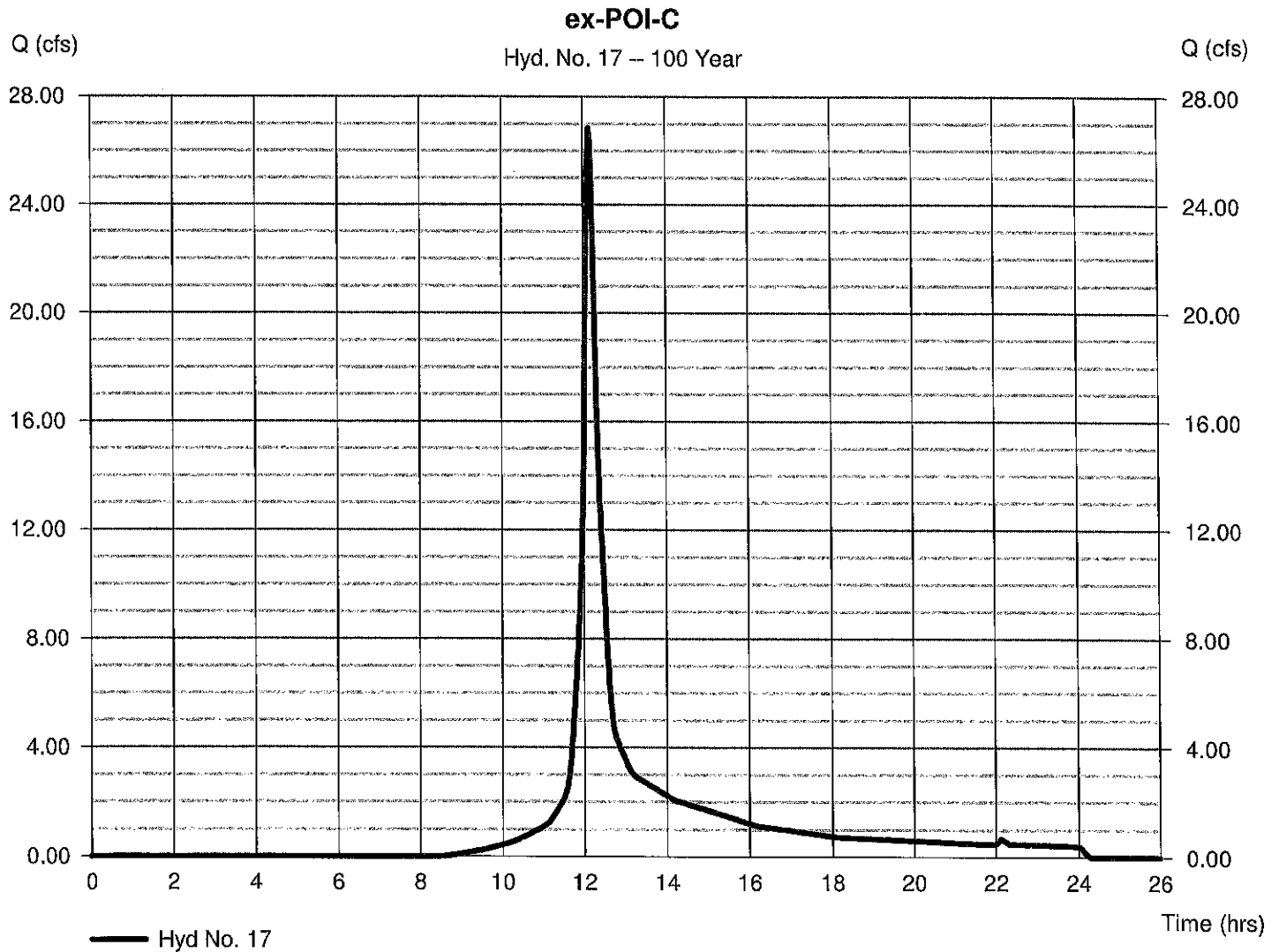
## Hyd. No. 17

ex-POI-C

Hydrograph type = SCS Runoff  
 Storm frequency = 100 yrs  
 Time interval = 1 min  
 Drainage area = 6.900 ac  
 Basin Slope = 9.2 %  
 Tc method = LAG  
 Total precip. = 7.97 in  
 Storm duration = 24 hrs

Peak discharge = 26.84 cfs  
 Time to peak = 12.15 hrs  
 Hyd. volume = 100,999 cuft  
 Curve number = 67\*  
 Hydraulic length = 795 ft  
 Time of conc. (Tc) = 12.63 min  
 Distribution = Type III  
 Shape factor = 484

\* Composite (Area/CN) =  $[(1.600 \times 55) + (5.300 \times 70)] / 6.900$



# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

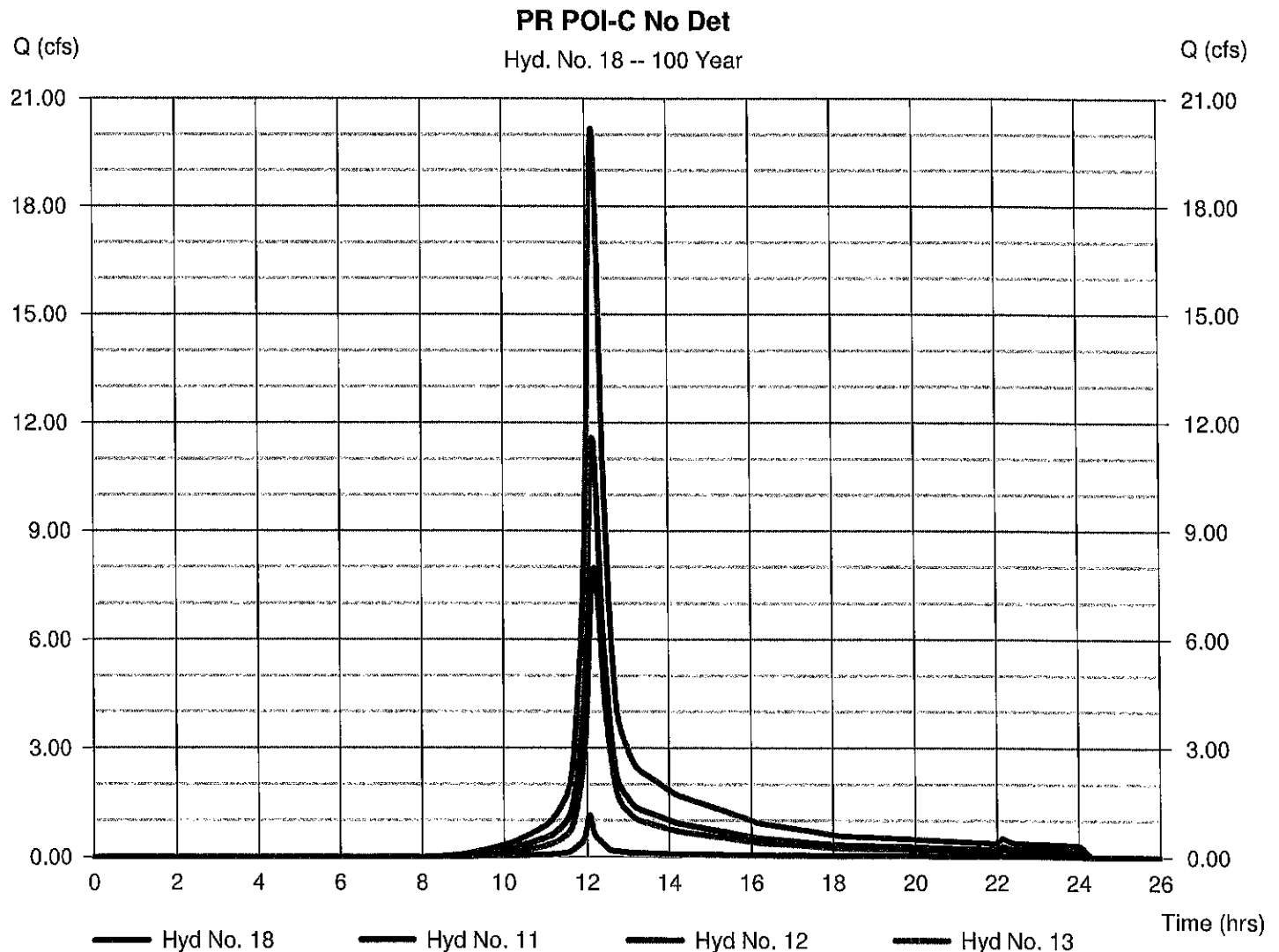
Sunday, Apr 25, 2021

## Hyd. No. 18

PR POI-C No Det

Hydrograph type = Combine  
Storm frequency = 100 yrs  
Time interval = 1 min  
Inflow hyds. = 11, 12, 13

Peak discharge = 20.16 cfs  
Time to peak = 12.18 hrs  
Hyd. volume = 82,327 cuft  
Contrib. drain. area = 5.600 ac



# Hydrograph Report

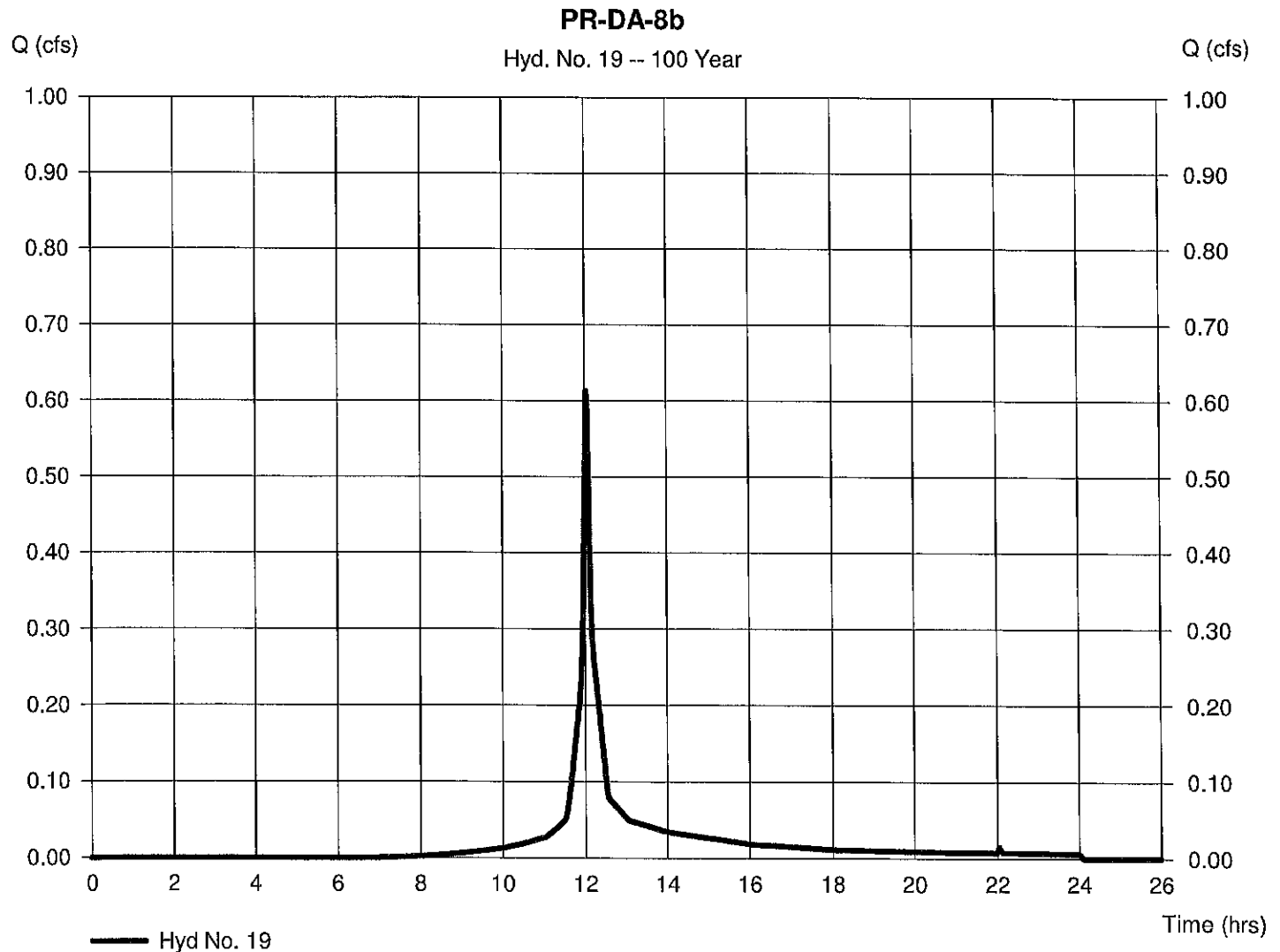
## Hyd. No. 19

PR-DA-8b

Hydrograph type = SCS Runoff  
Storm frequency = 100 yrs  
Time interval = 1 min  
Drainage area = 0.100 ac  
Basin Slope = 13.0 %  
Tc method = LAG  
Total precip. = 7.97 in  
Storm duration = 24 hrs

Peak discharge = 0.613 cfs  
Time to peak = 12.05 hrs  
Hyd. volume = 1,778 cuft  
Curve number = 74\*  
Hydraulic length = 230 ft  
Time of conc. (Tc) = 3.26 min  
Distribution = Type III  
Shape factor = 484

\* Composite (Area/CN) = [(0.010 x 98) + (0.020 x 74) + (0.070 x 70)] / 0.100



# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

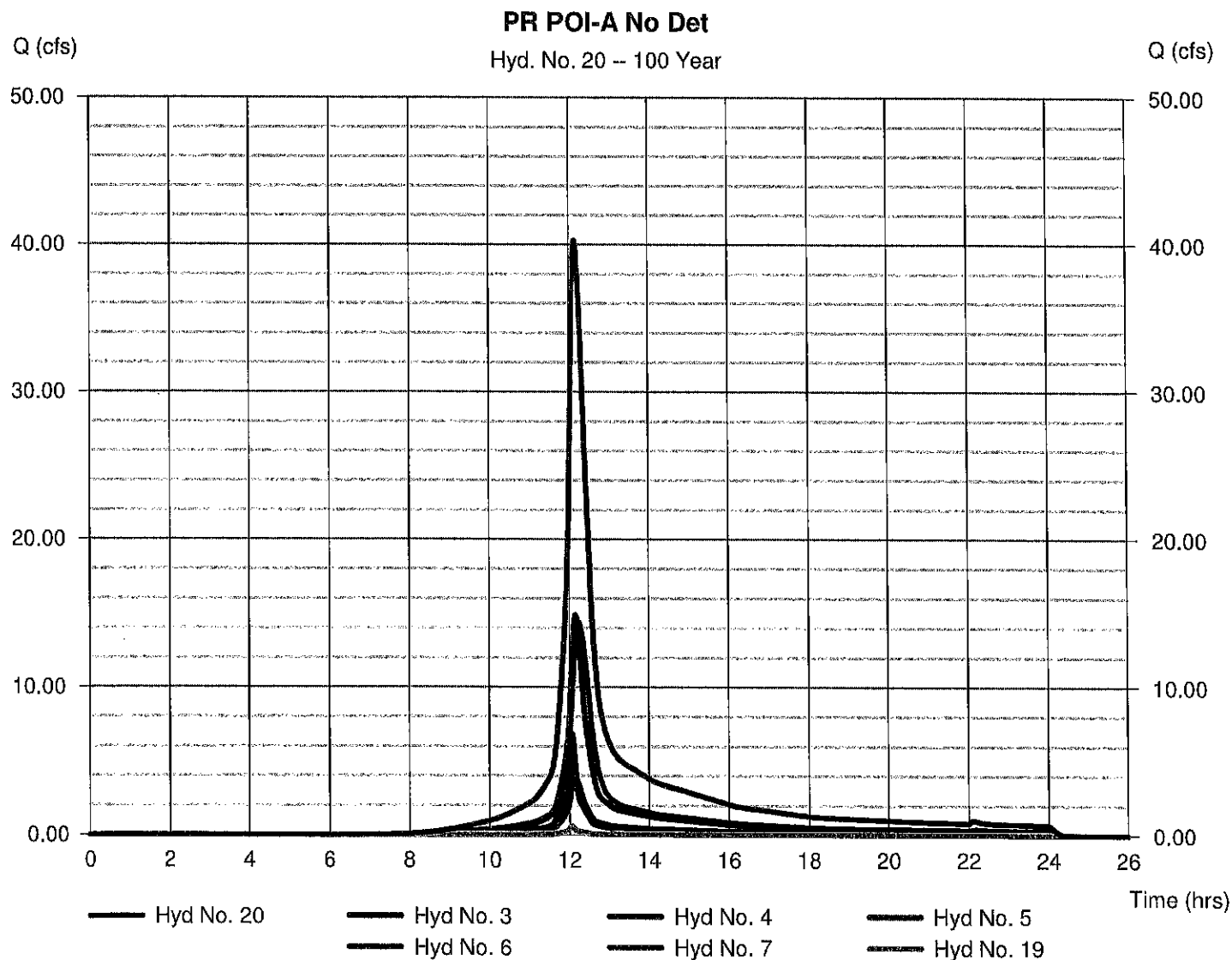
Sunday, Apr 25, 2021

## Hyd. No. 20

PR POI-A No Det

Hydrograph type = Combine  
Storm frequency = 100 yrs  
Time interval = 1 min  
Inflow hyds. = 3, 4, 5, 6, 7, 19

Peak discharge = 40.29 cfs  
Time to peak = 12.15 hrs  
Hyd. volume = 178,345 cuft  
Contrib. drain. area = 10.960 ac



# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

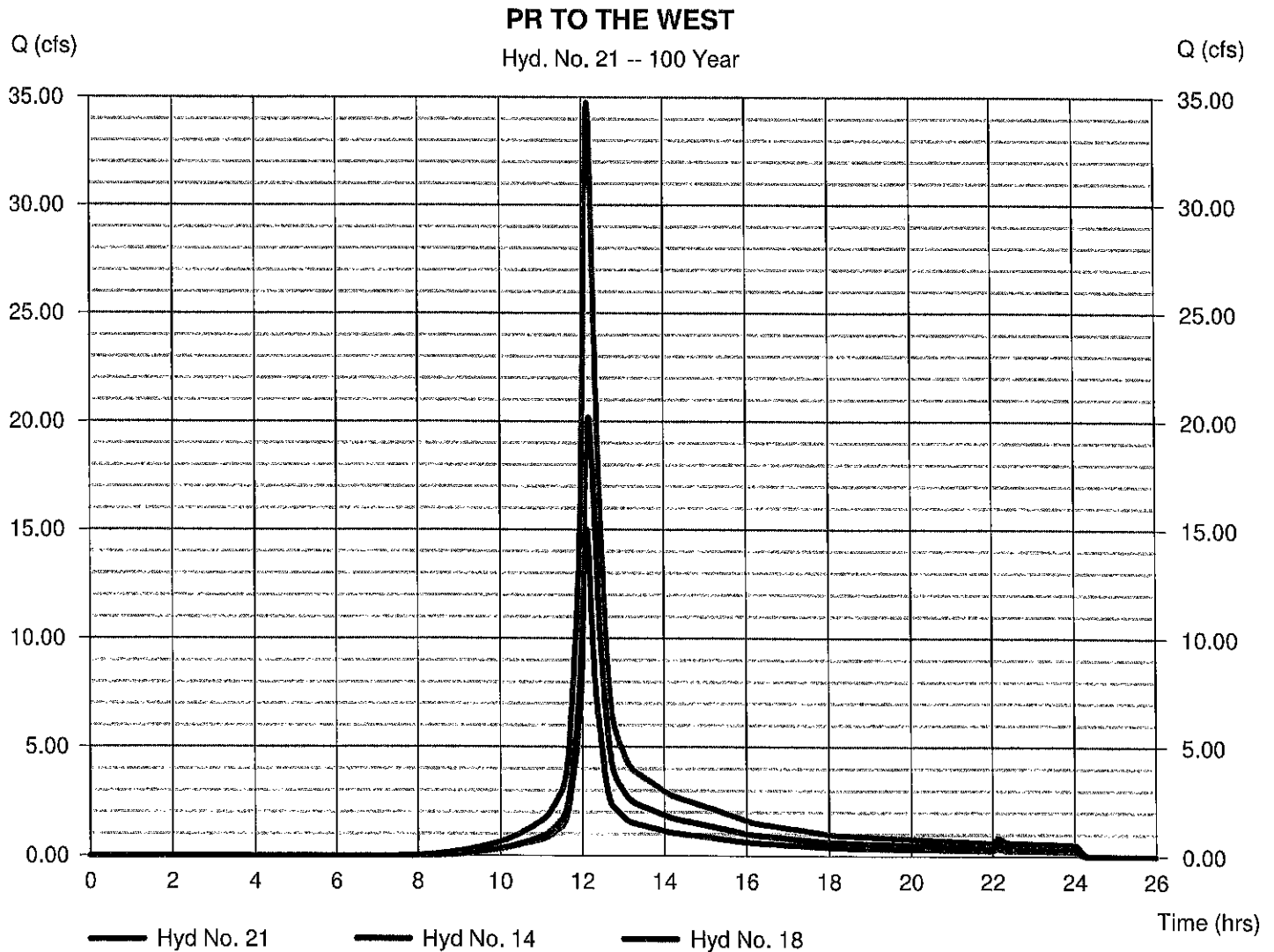
Sunday, Apr 25, 2021

## Hyd. No. 21

PR TO THE WEST

Hydrograph type = Combine  
 Storm frequency = 100 yrs  
 Time interval = 1 min  
 Inflow hyds. = 14, 18

Peak discharge = 34.74 cfs  
 Time to peak = 12.15 hrs  
 Hyd. volume = 136,674 cuft  
 Contrib. drain. area = 0.000 ac



# Hydrograph Report

Hydraflow Hydrographs by Intellsolve v9.02

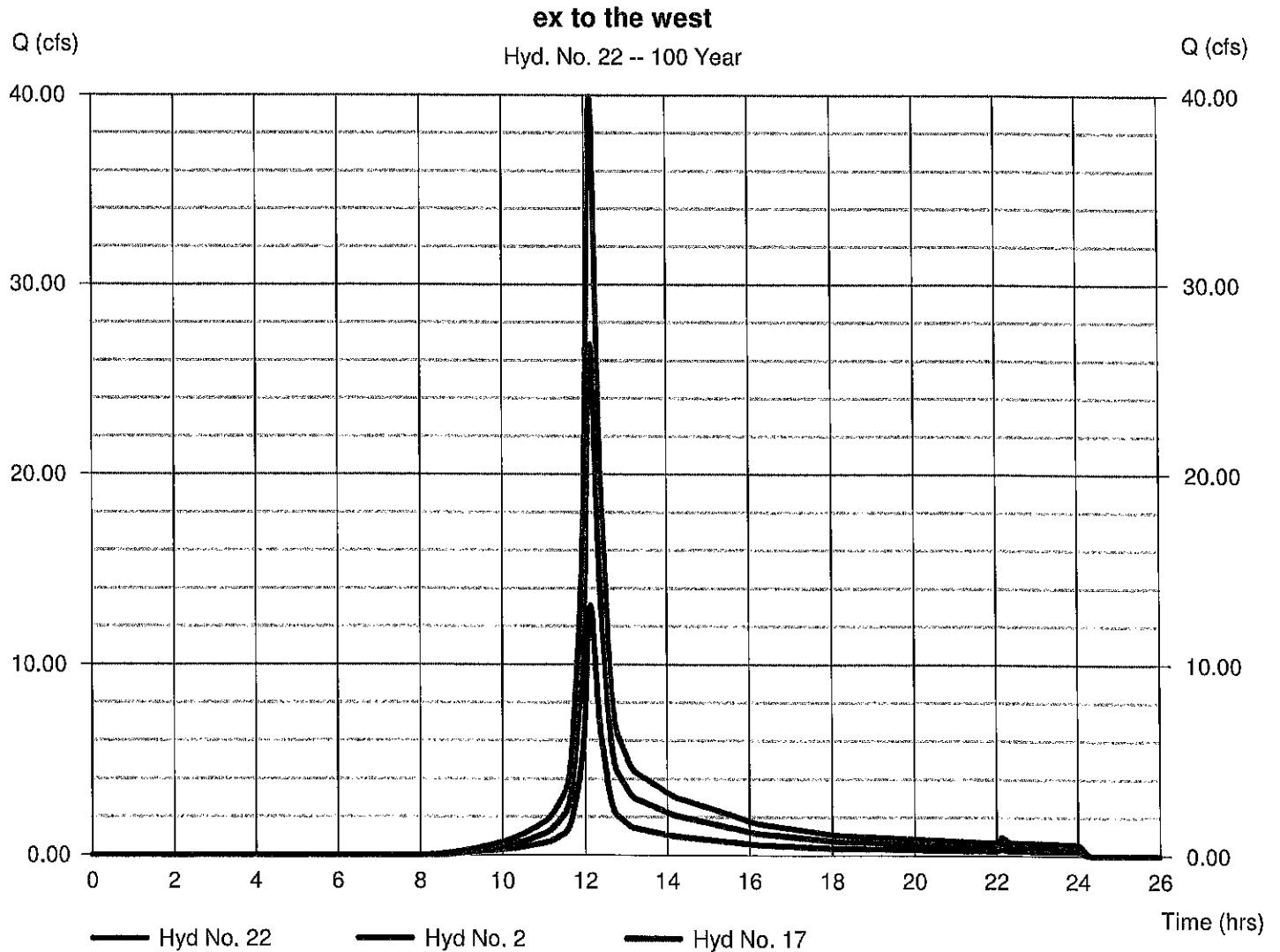
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## Hyd. No. 22

ex to the west

Hydrograph type = Combine  
Storm frequency = 100 yrs  
Time interval = 1 min  
Inflow hyds. = 2, 17

Peak discharge = 39.92 cfs  
Time to peak = 12.15 hrs  
Hyd. volume = 150,165 cuft  
Contrib. drain. area = 10.000 ac





# Hydrograph Report

Hydraflow Hydrographs by Intellisolve v9.02

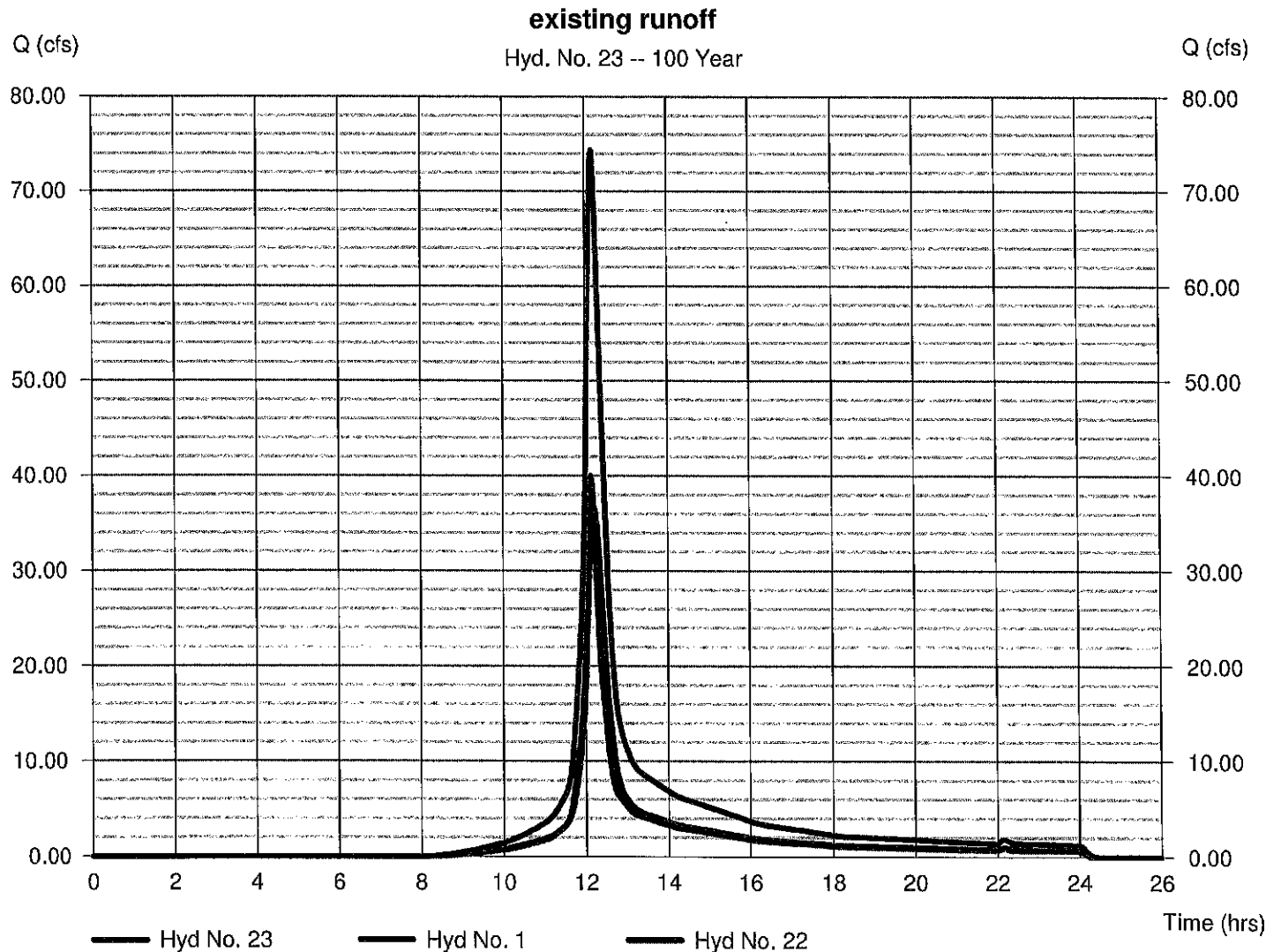
Sunday, Apr 25, 2021

## Hyd. No. 23

existing runoff

Hydrograph type = Combine  
 Storm frequency = 100 yrs  
 Time interval = 1 min  
 Inflow hyds. = 1, 22

Peak discharge = 74.34 cfs  
 Time to peak = 12.18 hrs  
 Hyd. volume = 311,841 cuft  
 Contrib. drain. area = 10.300 ac



# Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.02

Sunday, Apr 25, 2021

## Hyd. No. 24

### PROPOSED RUNOFF

Hydrograph type = Combine  
 Storm frequency = 100 yrs  
 Time interval = 1 min  
 Inflow hyds. = 20, 21

Peak discharge = 75.03 cfs  
 Time to peak = 12.15 hrs  
 Hyd. volume = 315,018 cuft  
 Contrib. drain. area = 0.000 ac

