



Yerkes Associates, Inc.

Consulting Engineers / Landscape Architects / Surveyors

MEMORANDUM

Date: September 15, 2009

TO: Al Giannantonio
Bill Hook

FROM: Christopher P. Martincic, P.E.

SUBJECT: Hershey's Mill Dam
Inundation Study with revised data

Gentlemen,

I have revised my calculations for the Hershey's Mill Dam spillway routing. I used the following assumptions in my calculations:

1. The bottom of the pond is sloped at 8:1.
2. The banks of the pond are sloped at 4:1.
3. When the dam is full the bottom elevation of the storage capacity equals the water surface elevation.
4. Base flow equals 1.3 cfs.
5. Utilized SCS method as calculated by Hydraflow Hydrographs 2007.
6. Utilized Curve Number of 67.2, as determined through existing ground cover.
7. Used average Time of Concentration of 75.4 minutes. Average taken from DEP's and EB Walsh's calculations of 73.8 minutes and 77 minutes, respectively.
8. Utilized 3.2 inches and 7.1 inches of rainfall for the 2-yr and 100-yr storm events respectively. These amounts are in accordance with Table 1 of DEP's Erosion and Sediment Pollution Control Program Manual (Chapter 102).

My results are summarized as follows:

- A. During the 100-yr storm event the condition of the pond, that is if it is full or emptied, has no measurable impact on the elevation of the water overtopping the dam. Likewise the actual depth of the pond, whether four (4) feet or two (2) feet has no measurable impact.
- B. My calculations show that during the 100-yr storm event the dam will be overtopped by approximately 1.72 feet of water. This correlates to an elevation of 450.72.

I have attached the relevant data sheets and calculations to this memo.

Thank you,



Chris Martincic

Hydrograph Summary Report

Hydraflow Hydrographs by Intellsolve v9.1

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	1915.65	2	760	14,931,550	—	—	—	Drainage Area
2	SCS Runoff	1.302	2	716	2,630	—	—	—	Base Flow
3	Combine	1915.74	2	760	14,934,180	1, 2	—	—	Combined flow
4	Reservoir	1911.21	2	762	14,615,380	3	450.72	732,906	Drained (4)
5	Reservoir	1911.21	2	762	14,758,760	3	450.72	589,521	Drained (2)
6	Reservoir	1911.20	2	762	15,357,960	3	450.72	404,019	Full
7	Reservoir	1910.80	2	762	15,358,010	3	449.87	308,443	<no description>

Hydrograph Summary Report

Hydraflow Hydrographs by Intellsolve v9.1

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	321.47	2	764	3,091,502	---	---	---	Drainage Area
2	SCS Runoff	0.268	2	718	555	---	---	---	Base Flow
3	Combine	321.49	2	764	3,092,057	1, 2	---	---	Combined flow
4	Reservoir	301.55	2	780	2,773,268	3	449.25	570,158	Drained (4')
5	Reservoir	311.98	2	774	2,916,650	3	449.26	428,640	Drained (2')
6	Reservoir	317.53	2	770	3,532,284	3	449.27	244,605	Full
7	Reservoir	319.96	2	766	3,532,285	3	448.30	142,700	<no description>

Hydrograph Return Period Recap

Hydraflow Hydrographs by Intellsolve v9.1

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	—	—	321.47	—	—	—	—	—	1915.65	Drainage Area
2	SCS Runoff	—	—	0.268	—	—	—	—	—	1.302	Base Flow
3	Combine	1, 2	—	321.49	—	—	—	—	—	1915.74	Combined flow
4	Reservoir	3	—	301.55	—	—	—	—	—	1911.21	Drained (4')
5	Reservoir	3	—	311.98	—	—	—	—	—	1911.21	Drained (2')
6	Reservoir	3	—	317.53	—	—	—	—	—	1911.20	Full
7	Reservoir	3	—	319.96	—	—	—	—	—	1910.80	<no description>

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1

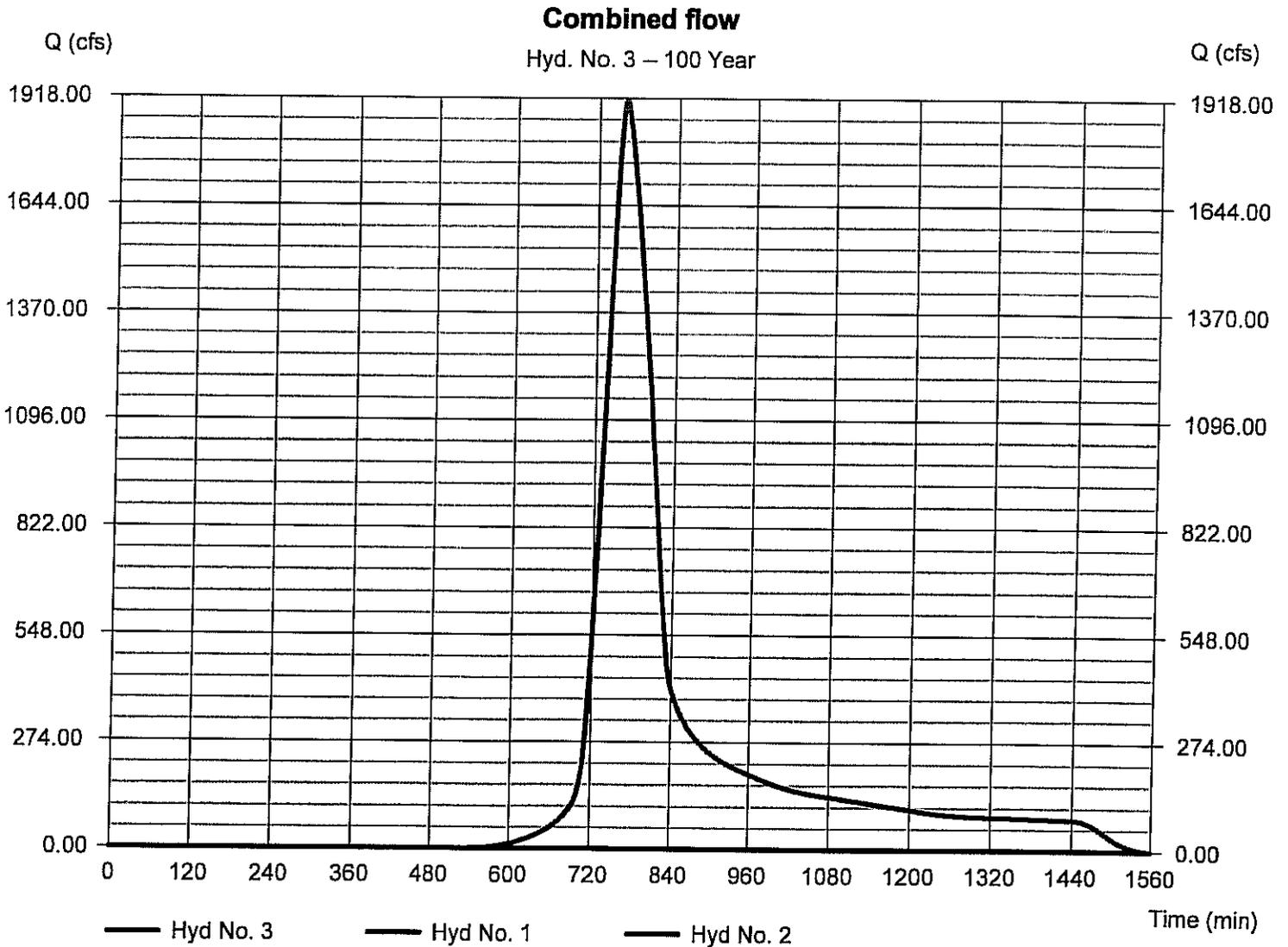
Tuesday, Sep 15, 2009

Hyd. No. 3

Combined flow

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

Peak discharge = 1915.74 cfs
Time to peak = 760 min
Hyd. volume = 14,934,180 cuft
Contrib. drain. area = 1199.220 ac



Hydrograph Report

Hydraflow Hydrographs by Intellisolve v9.1

Tuesday, Sep 15, 2009

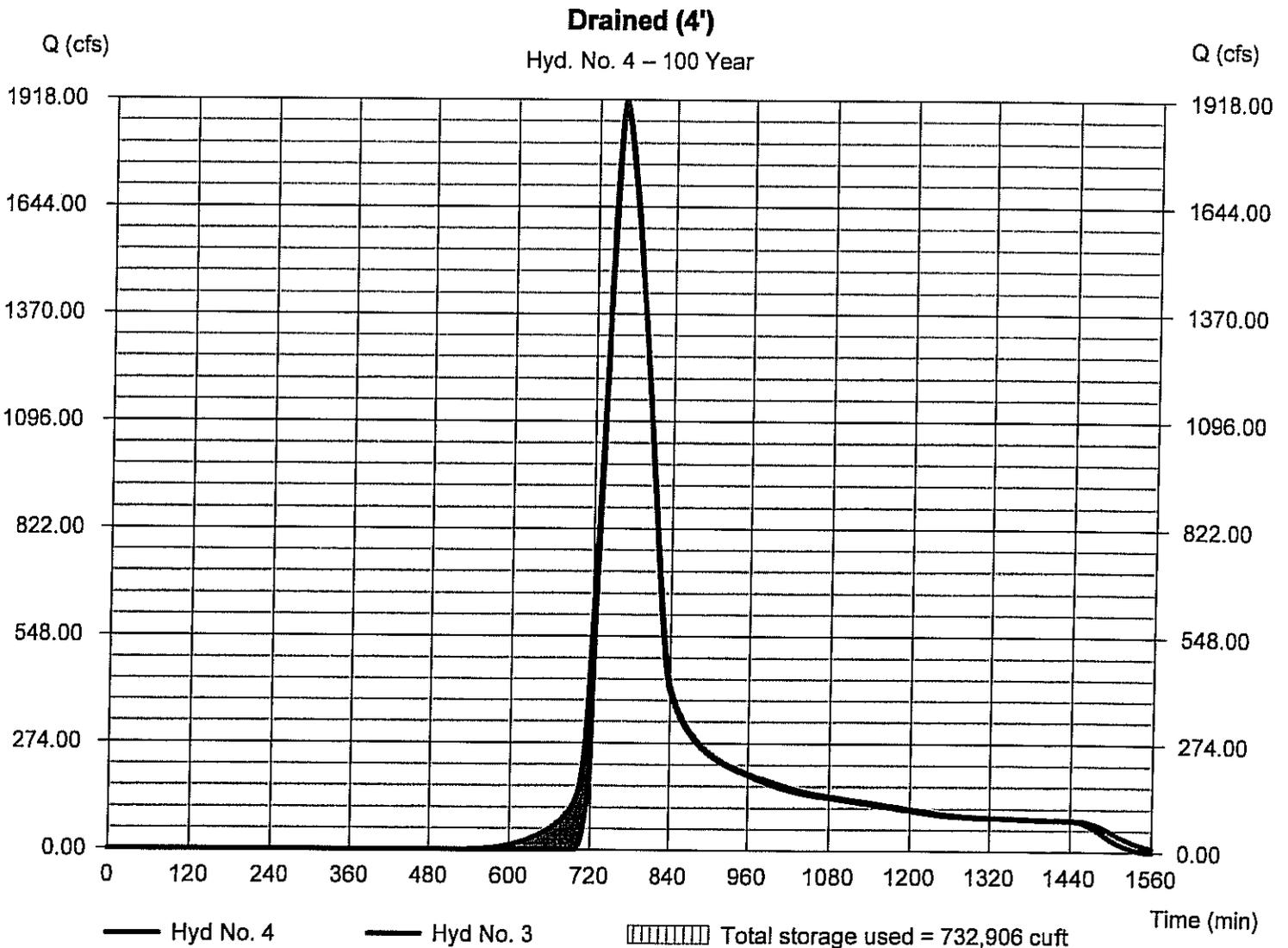
Hyd. No. 4

Drained (4')

Hydrograph type = Reservoir
Storm frequency = 100 yrs
Time interval = 2 min
Inflow hyd. No. = 3 - Combined flow
Reservoir name = Hershey's Mill Dam (4')-drained

Peak discharge = 1911.21 cfs
Time to peak = 762 min
Hyd. volume = 14,615,380 cuft
Max. Elevation = 450.72 ft
Max. Storage = 732,906 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs by Intellsolve v9.1

Tuesday, Sep 15, 2009

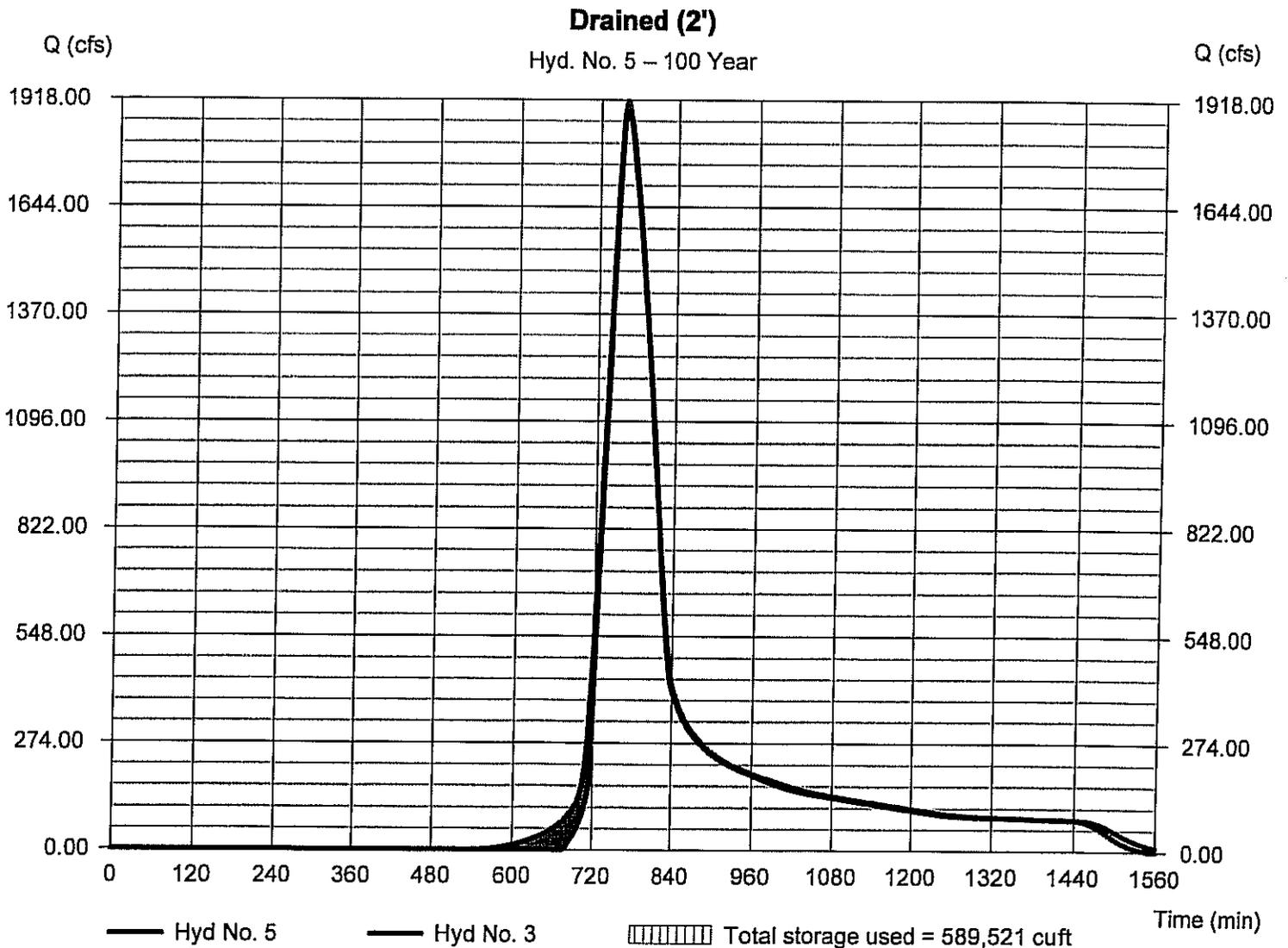
Hyd. No. 5

Drained (2')

Hydrograph type = Reservoir
Storm frequency = 100 yrs
Time interval = 2 min
Inflow hyd. No. = 3 - Combined flow
Reservoir name = Hershey's Mill Dam (2') - drained

Peak discharge = 1911.21 cfs
Time to peak = 762 min
Hyd. volume = 14,758,760 cuft
Max. Elevation = 450.72 ft
Max. Storage = 589,521 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1

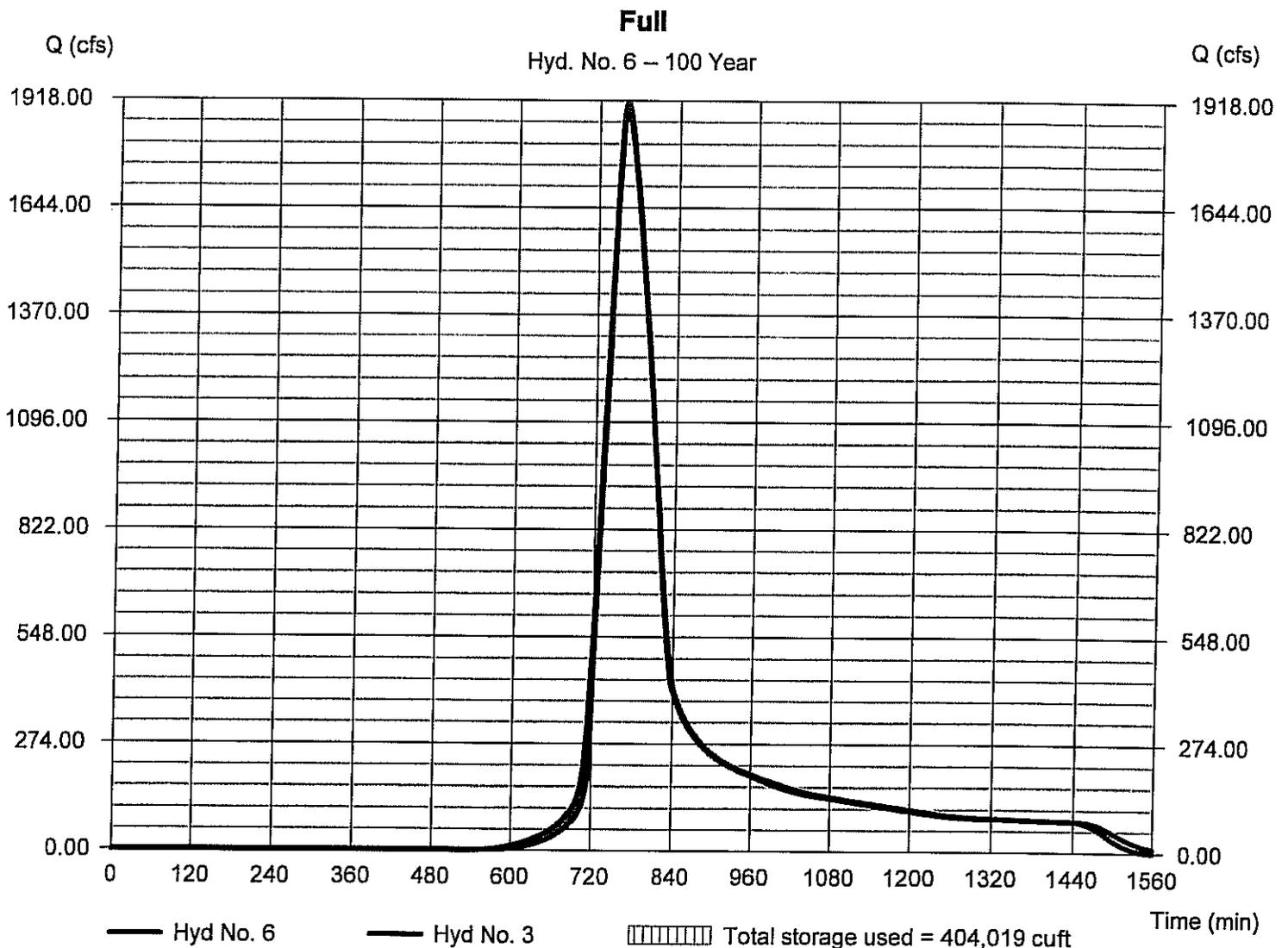
Tuesday, Sep 15, 2009

Hyd. No. 6

Full

Hydrograph type	= Reservoir	Peak discharge	= 1911.20 cfs
Storm frequency	= 100 yrs	Time to peak	= 762 min
Time interval	= 2 min	Hyd. volume	= 15,357,960 cuft
Inflow hyd. No.	= 3 - Combined flow	Max. Elevation	= 450.72 ft
Reservoir name	= Hershey's Mill Dam - full	Max. Storage	= 404,019 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs by Intellsolve v9.1

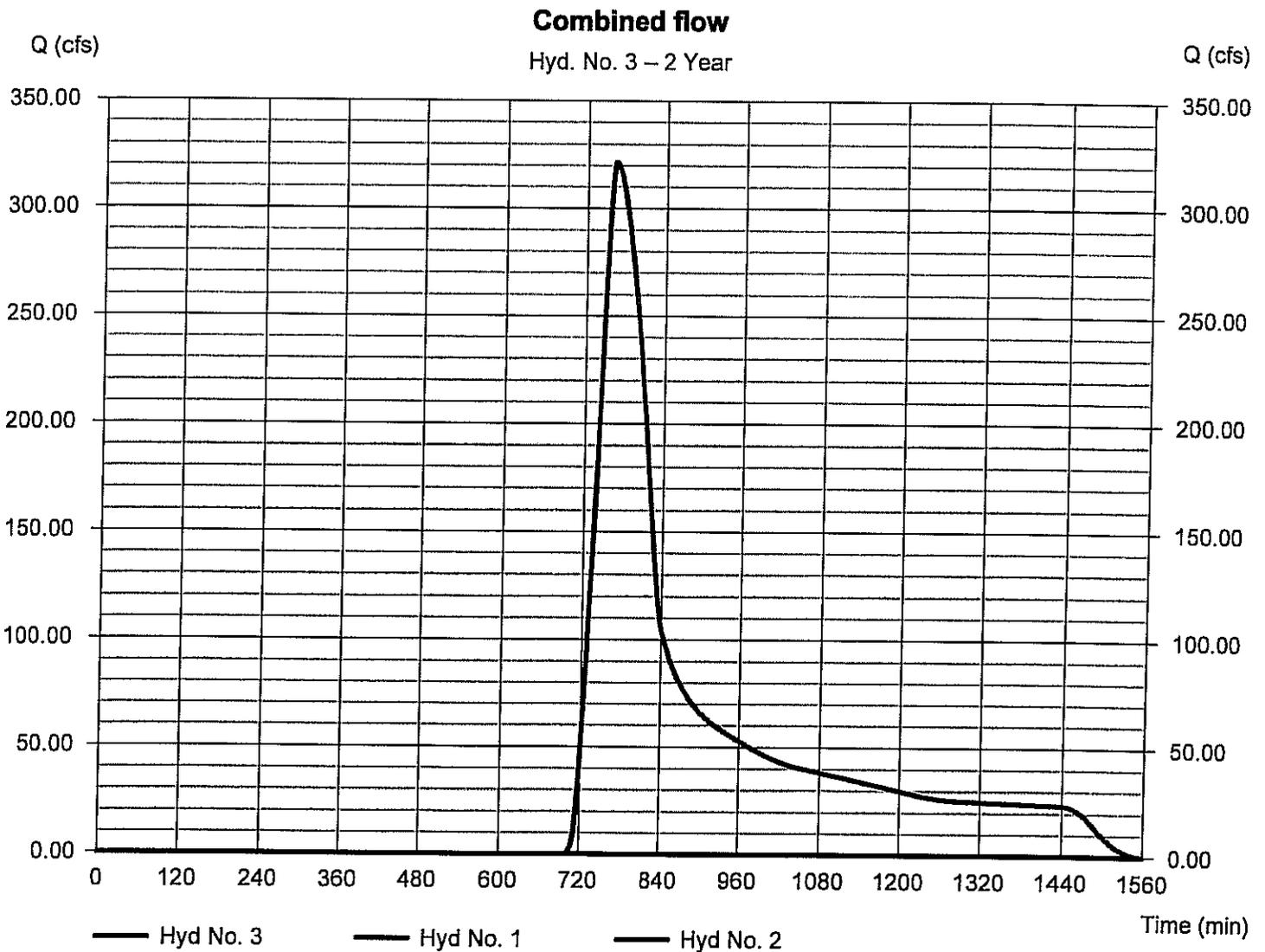
Tuesday, Sep 15, 2009

Hyd. No. 3

Combined flow

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

Peak discharge = 321.49 cfs
Time to peak = 764 min
Hyd. volume = 3,092,057 cuft
Contrib. drain. area = 1199.220 ac



Hydrograph Report

Hydraflow Hydrographs by Intellisolve v9.1

Tuesday, Sep 15, 2009

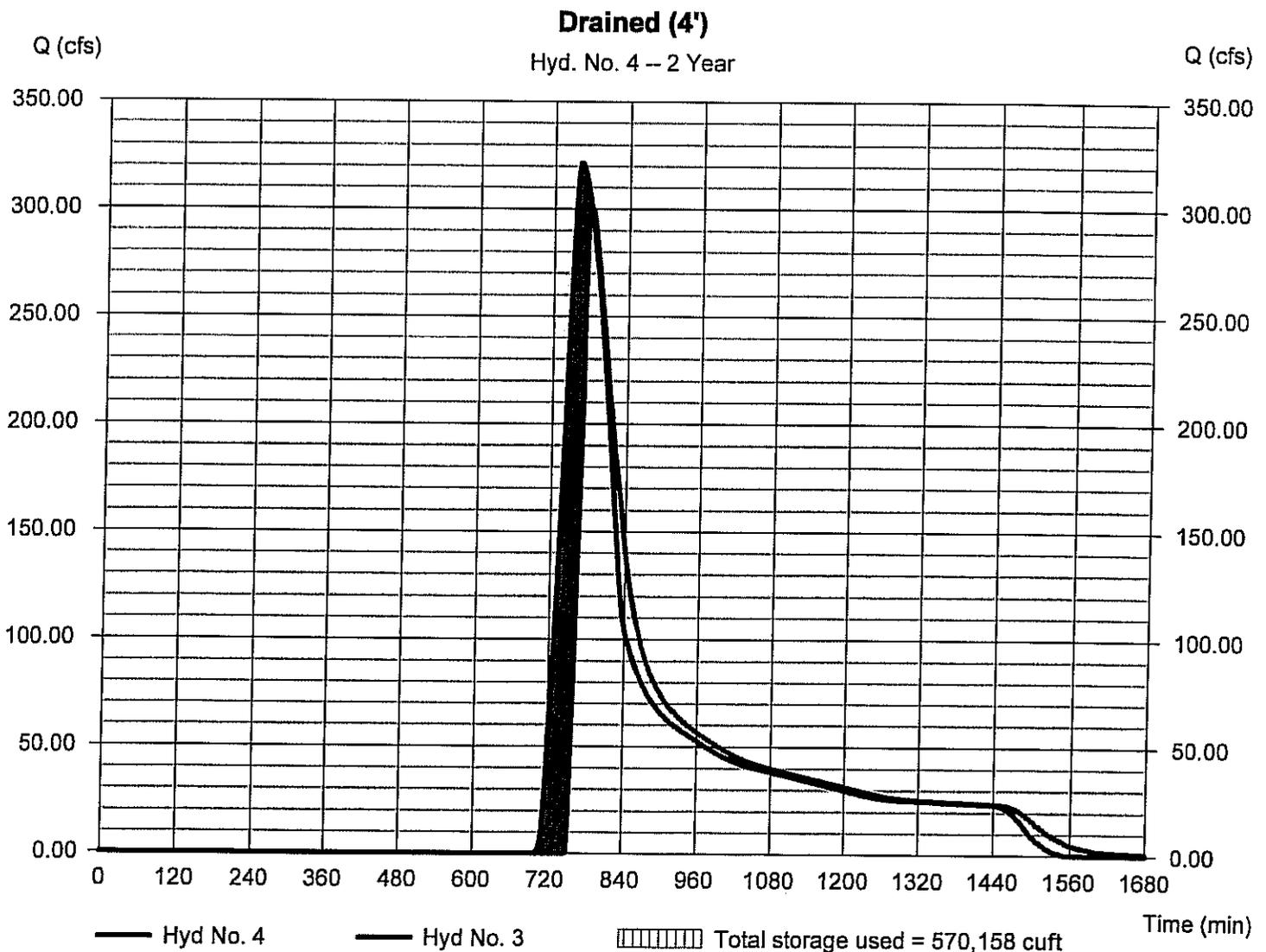
Hyd. No. 4

Drained (4')

Hydrograph type = Reservoir
Storm frequency = 2 yrs
Time interval = 2 min
Inflow hyd. No. = 3 - Combined flow
Reservoir name = Hershey's Mill Dam (4')-drained

Peak discharge = 301.55 cfs
Time to peak = 780 min
Hyd. volume = 2,773,268 cuft
Max. Elevation = 449.25 ft
Max. Storage = 570,158 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.1

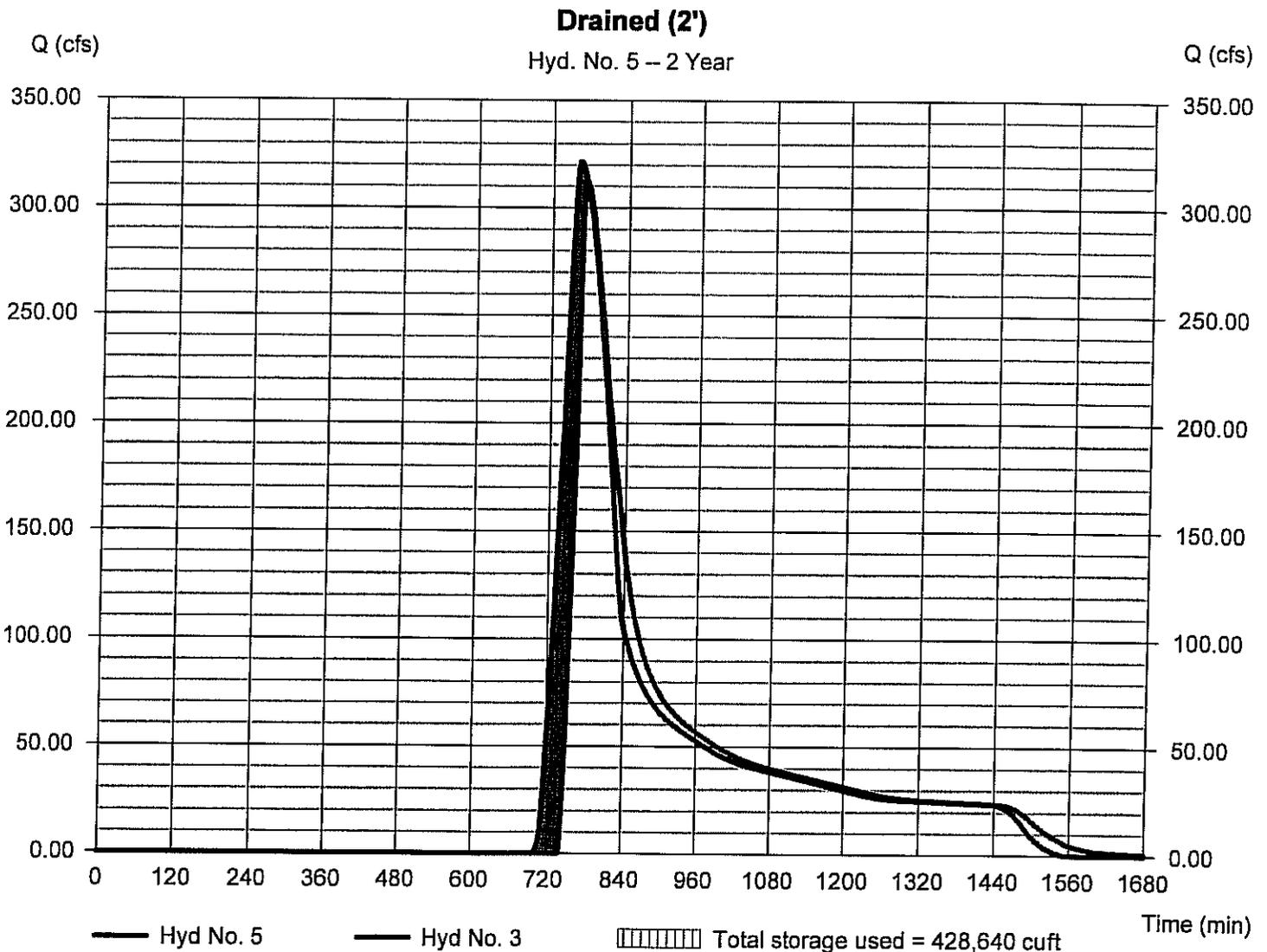
Tuesday, Sep 15, 2009

Hyd. No. 5

Drained (2')

Hydrograph type	= Reservoir	Peak discharge	= 311.98 cfs
Storm frequency	= 2 yrs	Time to peak	= 774 min
Time interval	= 2 min	Hyd. volume	= 2,916,650 cuft
Inflow hyd. No.	= 3 - Combined flow	Max. Elevation	= 449.26 ft
Reservoir name	= Hershey's Mill Dam (2') - drained	Max. Storage	= 428,640 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs by Intellsolve v9.1

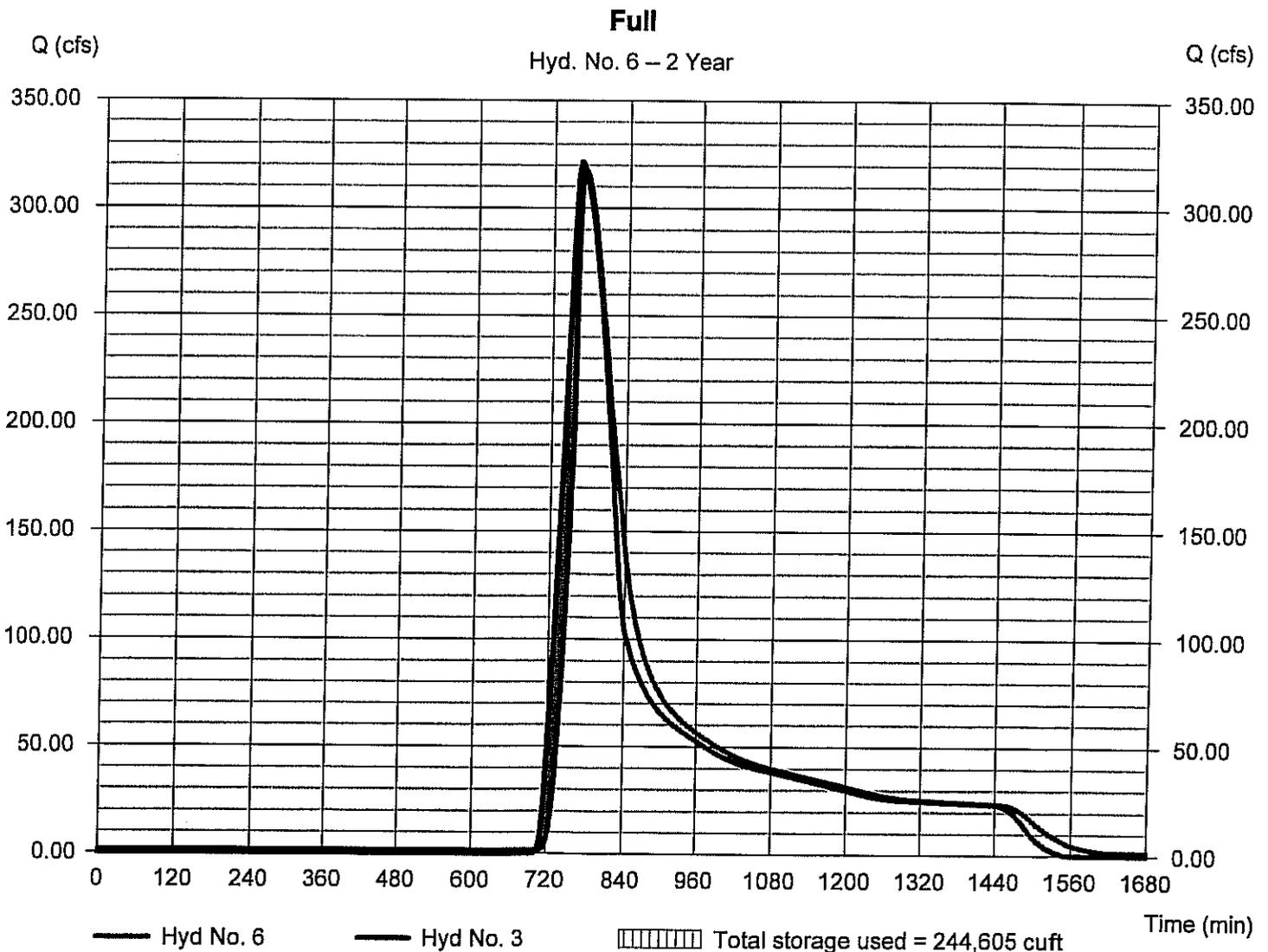
Tuesday, Sep 15, 2009

Hyd. No. 6

Full

Hydrograph type	= Reservoir	Peak discharge	= 317.53 cfs
Storm frequency	= 2 yrs	Time to peak	= 770 min
Time interval	= 2 min	Hyd. volume	= 3,532,284 cuft
Inflow hyd. No.	= 3 - Combined flow	Max. Elevation	= 449.27 ft
Reservoir name	= Hershey's Mill Dam - full	Max. Storage	= 244,605 cuft

Storage Indication method used.



Weighted Average S.C.S. Curve Numbers & Rational C Coefficients:

Subarea: Predevelopment

Description	CN	Area	Influence
1 Impervious	89	6,235,627.50	554,970,847.50
2 1/2 Acre Lots	70	14,364,357.00	1,005,504,990.00
3 Woods	55	8,461,523.60	465,383,798.00
4 Meadow	65	23,166,326.39	1,505,811,215.35
Total		52,227,834.49	3,531,670,850.85
		Ave. CN=	67.62

Acres 1,198.99