

Stormwater Calculations

**Laugle Industrial Park
City of Franklin
Johnson County**

**Submitted:
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By:



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Section 1: Stormwater Calculations Summary

Introduction

This report shall identify the existing and proposed drainage aspects associated with the proposed Laugle Industrial Park development. The proposed development contains ± 36 acres of land located at the northeast corner of Graham Road and Earlywood Drive in the City of Franklin (see Exhibit 1: Location Map). The overall ± 36 acres shall be platted into one ± 11 acre lot and a future ± 23 acre block for future development.

Pre-Development Conditions

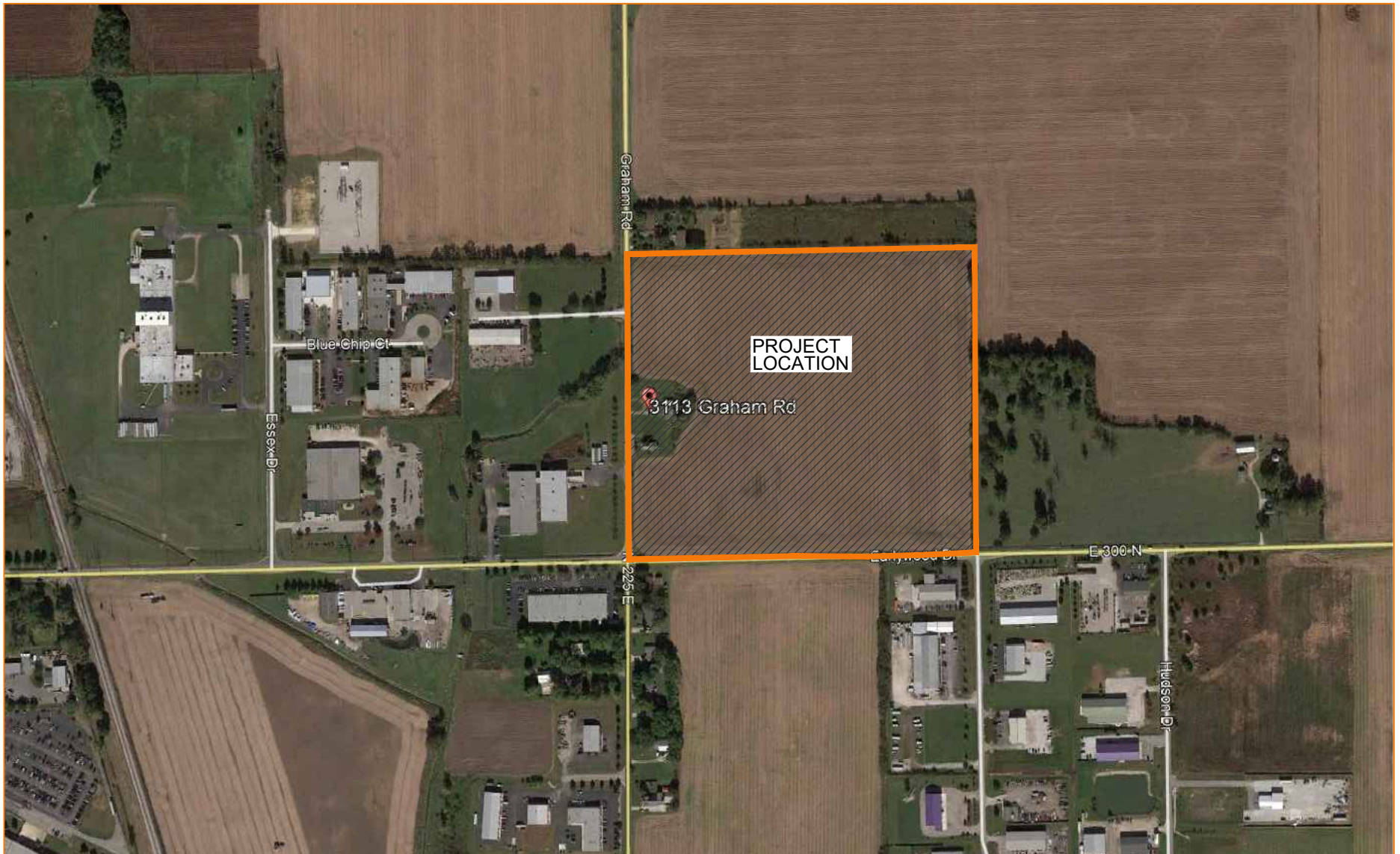
The project site is situated on ± 33.5 acres that currently is made up of cultivated fields. The current topography creates 2 onsite watersheds. A ± 22 acre onsite basin conveys runoff to the southeast and drains through a 15" CMP culvert under Earlywood Drive (C.R. 300 N.) The remaining ± 11.5 acre onsite watershed conveys drainage westerly towards Graham Road and to Canary Creek. A 20.39 acre offsite watershed conveys runoff through the project site and to the aforementioned culvert (see Exhibit 2: Pre-Development Watershed Map). The existing culvert conveys drainage under Earlywood Drive, and discharges into an existing swale, where it follows existing drainage patterns.

The project site lies outside any mapped floodways and/or floodplains per Community Panel 18081C0143D of the Flood Insurance Rate Map of Johnson County, dated August 2, 2007.

Post-Development Conditions

The proposed project includes the creation of one lot and one block for future industrial development. A private roadway, along with public utilities and drainage facilities shall be constructed to serve the development. A dry detention basin and mechanical water treatment unit shall be designed and constructed by the developer to provide the required storm water quantity and quality treatment (see Exhibit 3: Post-Development Watershed Map). A 14" by 23" elliptical pipe shall be installed under Earlywood Drive in order to convey the drainage from the proposed development. The existing 15" CMP culvert shall be extended and utilized for drainage of the Earlywood Drive right-of-way. Onsite storm structures and storm sewers have been identified on the primary plat; however, full design calculations shall be provided during the construction plan and secondary plat submittals. Development of Block A shall require additional detention facilities and storm sewer infrastructure for the conveyance of runoff from the future area(s).

EXHIBIT 1: LOCATION MAP



Section 2: Hydrologic Modeling Calculations

Hydrologic modeling calculations were generated to determine allowable release rates from the watershed areas. All drainage calculations were completed using Hydraflow modeling software. The SCS Triangular method utilizing SCS II rainfall distribution was used to calculate the onsite and offsite hydrographs. The TR-55 Method was used to calculate times of concentration. Curve numbers were computed based on the applicable land use and the percentage by area of each hydrologic soil type obtained from the Johnson County Soils Survey.

Soil Hydrologic Group Percentage Calculations

Table 1 Soil Hydrologic Group Percentage Calculations Onsite Basin		
Soil Type	Hydrologic Group – B (acres)	Hydrologic Group – C (acres)
Miami Silt Loam, MnB2	--	1.520
Miami Silt Loam, MnC2	--	0.358
Brookston Silty Clay Loam, Br	9.231	--
Crosby-Miami Silt Loam, CsB2	--	0.581
Crosby Silt Loam, CrA	--	10.661
Totals	9.23	13.12
Percentages of Hydrologic Groups	41.30%	58.70%

Table 2 Soil Hydrologic Group Percentage Calculations Offsite Basin		
Soil Type	Hydrologic Group – B (acres)	Hydrologic Group – C (acres)
Miami Silt Loam, MnB2	--	1.386
Miami Silt Loam, MnC2	--	0.326
Brookston Silty Clay Loam, Br	8.421	--
Crosby-Miami Silt Loam, CsB2	--	0.530
Crosby Silt Loam, CrA	--	9.726
Totals	8.42	11.97
Percentages of Hydrologic Groups	41.30%	58.70%

Pre-Development Conditions

Land Use Description	Runoff Curve No. For Hydrologic Group – B		Runoff Curve No. For Hydrologic Group – C		Q
	Percentage Used*	41.30%	Percentage Used*	58.70%	
Pasture (Good Condition)	61		74		69

Land Use Description	Runoff Curve No. For Hydrologic Group – B		Runoff Curve No. For Hydrologic Group – C		Average Runoff Curve Number
	<i>Percentage Used*</i>	41.30%	<i>Percentage Used*</i>	58.70%	
Pasture (Good Condition)	61		74		69

The City of Franklin requires that the 10-year and 100-year post-development rain events shall be limited to the pre-developed 2-year and 10-year rain events, respectively. As mentioned previously, the future developments within Block A shall design and construct individual detention facilities to meet the City's requirements. This drainage analysis analyzed the predeveloped 2-year and 10-year storm events to determine the amount of runoff that shall be conveyed to the proposed culvert under Earlywood Drive. Only the 24 hour storm was calculated, as it is customary that the peak runoff is generated during the 24 hour event using the SCS II rainfall distribution.

The following tables summarize the peak runoff rates (cfs) resulting from hydrologic modeling for each basin. See Appendix A for pre-development unit and computed flood hydrograph reports.

Table 5 Pre-Development Hydrograph Peak Runoff Rate Summary Onsite Basin	
Return Period (years)	Storm Duration
	24 Hours
2	8.93
10	29.76

Table 6 Pre-Development Hydrograph Peak Runoff Rate Summary Offsite Basin	
Return Period (years)	Storm Duration
	24 Hours
2	6.32
10	21.33

Post-Development Conditions

The post-developed unit hydrograph assumes full development of all proposed industrial areas within Lot #1. A storm sewer network shall collect the proposed runoff and convey it through a mechanical treatment unit for water quality treatment, while a dry detention facility shall be employed to treat the captured runoff for water quantity purposes. The following table summarizes the peak runoff rate (cfs) resulting from hydrologic modeling for the proposed Lot #1 basin. See Appendix B for post-development unit and computed flood hydrograph reports.

Table 7 Post-Development Hydrograph Peak Runoff Rate Summary Onsite Basin	
Return Period (years)	Storm Duration
	24 Hours
10	33.82
100	59.46

An analysis of the proposed watershed, combined with the existing offsite watershed, is needed to determine a total runoff to the proposed detention facility. The following table combines the proposed runoff from Lot #1 and the offsite area.

Table 8 Post-Developed Lot #1 & Offsite Hydrograph Peak Runoff Rate Summary	
Return Period (years)	Storm Duration
	24 Hours
10	46.84
100	90.09

The existing downstream swale, along the south side of Earlywood Drive, shall be the restrictive basis for this project site. A hydraulic analysis of the swale has been provided within this section to verify that the proposed development does not overburden the swale. Per the analysis, the max conveyance is 20.15 cfs.

Channel Report

<Name>

Triangular

Side Slopes (z:1) = 5.52, 4.79
Total Depth (ft) = 1.00

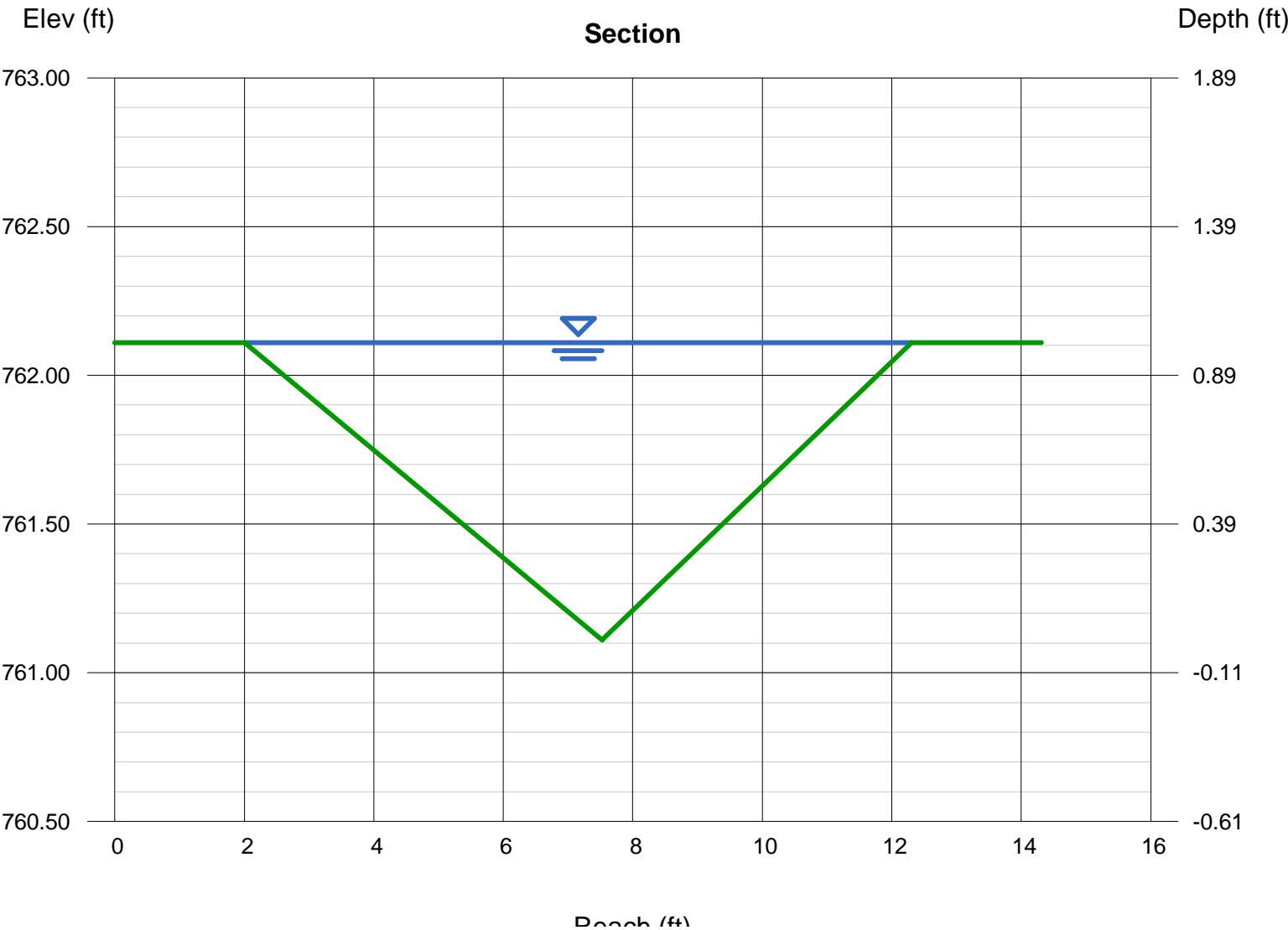
Invert Elev (ft) = 761.11
Slope (%) = 1.61
N-Value = 0.030

Calculations

Compute by: Q vs Depth
No. Increments = 10

Highlighted

Depth (ft) = 1.00
Q (cfs) = 20.15
Area (sqft) = 5.16
Velocity (ft/s) = 3.91
Wetted Perim (ft) = 10.50
Crit Depth, Yc (ft) = 0.99
Top Width (ft) = 10.31
EGL (ft) = 1.24



Section 3: Detention Calculations

Stormwater detention is addressed by releasing the critical 10 year post-development peak runoff at the critical 2 year pre-development peak runoff rate and releasing the critical 100 year post-development peak runoff at the critical 10 year pre-development peak runoff rate. However, as presented previously, the downstream receiving channel shall be the restriction for the hydraulic analysis. The detention facility shall provide water quantity treatment for the onsite & offsite basin. See Appendix A & B for pre and post-developed hydrograph reports, respectively. See Appendix C for the proposed pond data.

Allowable Discharge Rate (see Section 2: Hydrologic Modeling Calculations, Hydrologic Modeling Runoff Summary)

- Allowable overall 10-year discharge rate = 8.93 cfs (Onsite Ex. Basin, 2yr-2hr event)
- Allowable overall 100-year discharge rate = 20.15 cfs (Downstream Channel)

Table 9	
Post-Developed & Offsite Hydrograph Peak Routed Runoff Rate Summary	
Return Period (years)	Storm Duration
	24 Hours
10	5.51
100	7.01

Peak 10 Year Post-Development Discharge Rate = **5.51 cfs** < 8.93 cfs (allowable)
Peak Water Surface Elev. = **764.43** < 766.60 (top of bank)

Peak 100 Year Post-Development Discharge Rate = **7.01 cfs** < 20.15 cfs (allowable)
Peak Water Surface Elev. = **765.60** = 766.60 (top of bank)

All post-development storms are discharged at flow rates less than their respective allowable discharge rates. All post-development storms produce a peak water surface elevation below the maximum detention basin elevation.

Appendix A: Pre-Developed Conditions

■	Onsite Time of Concentration	A-1
■	Offsite Time of Concentration	A-2
■	Onsite Basin: 2 yr. – 24 hr. Flood Hydrograph	A-3
■	Onsite Basin: 10 yr. – 24 hr. Flood Hydrograph.....	A-4
■	Onsite Basin: 100 yr. – 24 hr. Flood Hydrograph	A-5
■	Offsite Basin: 2 yr. – 24 hr. Flood Hydrograph	A-6
■	Offsite Basin: 10 yr. – 24 hr. Flood Hydrograph.....	A-7
■	Offsite Basin: 100 yr. – 24 hr. Flood Hydrograph	A-8

TIME OF CONCENTRATION or TRAVEL TIME WORKSHEET

Project: Laugle Industrial Park

Designer: DJM

Date: 4/8/2020

Scenario/Structure: Existing Onsite Watershed TC

Sheet Flow

1. Surface Description	cult. Field		pvm		pvm
2. Manning's Roughness Coeff., (n)	0.035		0.011		0.011
3. Flow Length, (L) **total L<= 100 ft	100.00 ft.		0.00 ft.		0.00 ft.
4. Two-yr 24-hr Rainfall, (P2)	2.64 in.		2.64 in.		2.64 in.
5. Land Slope, (s)	0.0053 ft./ft.		0.0210 ft./ft.		0.0366 ft./ft.
6. Travel Time, (Tt) (Tt = [0.007(nL)^0.8]/[P2^0.5*s^0.4])	0.095 hr	+	0.000 hr	+	0.000 hr

Shallow Concentrated Flow

7. Surface Description (paved or unpaved)	paved		unpaved		unpaved
8. Flow Length, (L)	0.00 ft.		1145.62 ft.		0.00 ft.
9. Watercourse Slope, (s)	0.0239 ft./ft.		0.0053 ft./ft.		0.0060 ft./ft.
10. Average Velocity, (V) (Vp = 20.3282(s)^0.5) (Vup = 16.1345(s)^0.5)	2.494 ft./s		1.175 ft./s		1.250 ft./s
11. Travel Time, (Tt) (Tt = L/3600V)	0.000 hr	+	0.271 hr	+	0.000 hr

Watershed or
Subarea Tc or Tt =

0.366 hr

or

21.98 min

Channel Flow

12. Cross Sectional Flow Area, (a)	9.00 ft.^2		132.12 ft.^2		174.24 ft.^2
13. Wetted Perimeter, Pw	8.54 ft.		30.71 ft.		43.74 ft.
14. Hydraulic Radius, (r) (r = a/Pw)	1.054 ft.		4.302 ft.		3.984 ft.
15. Channel Slope, (s)	0.0100 ft./ft.		0.0121 ft./ft.		0.0084 ft./ft.
16. Manning's Roughness Coeff., (n)	0.170		0.027		0.027
17. Velocity, (V) (V = [1.49*r^0.67*s^0.5]/n)	0.908 ft./s		16.136 ft./s		12.769 ft./s
18. Flow Length, (L)	0.00 ft.		0.00 ft.		0.00 ft.
19. Travel Time, (Tt) (Tt = L/3600V)	0.000 hr	+	0.000 hr	+	0.000 hr

TIME OF CONCENTRATION or TRAVEL TIME WORKSHEET

Project: Laugle Industrial Park

Designer: DJM

Date: 4/8/2020

Scenario/Structure: Offsite Watershed

Sheet Flow

1. Surface Description	cult. Field	pvm	pvm
2. Manning's Roughness Coeff., (n)	0.035	0.011	0.011
3. Flow Length, (L) **total L<= 100 ft	100.00 ft.	0.00 ft.	0.00 ft.
4. Two-yr 24-hr Rainfall, (P2)	2.64 in.	2.64 in.	2.64 in.
5. Land Slope, (s)	0.0092 ft./ft.	0.0210 ft./ft.	0.0366 ft./ft.
6. Travel Time, (Tt) (Tt = [0.007(nL)^0.8]/[P2^0.5*s^0.4])	0.077 hr	+	0.000 hr

Shallow Concentrated Flow

7. Surface Description (paved or unpaved)	paved	unpaved	unpaved
8. Flow Length, (L)	0.00 ft.	2690.89 ft.	0.00 ft.
9. Watercourse Slope, (s)	0.0239 ft./ft.	0.0092 ft./ft.	0.0060 ft./ft.
10. Average Velocity, (V) (Vp = 20.3282(s)^0.5) (Vup = 16.1345(s)^0.5)	2.494 ft./s	1.548 ft./s	1.250 ft./s
11. Travel Time, (Tt) (Tt = L/3600V)	0.000 hr	+	0.483 hr

Watershed or
Subarea Tc or Tt =

0.560 hr

or

33.57 min

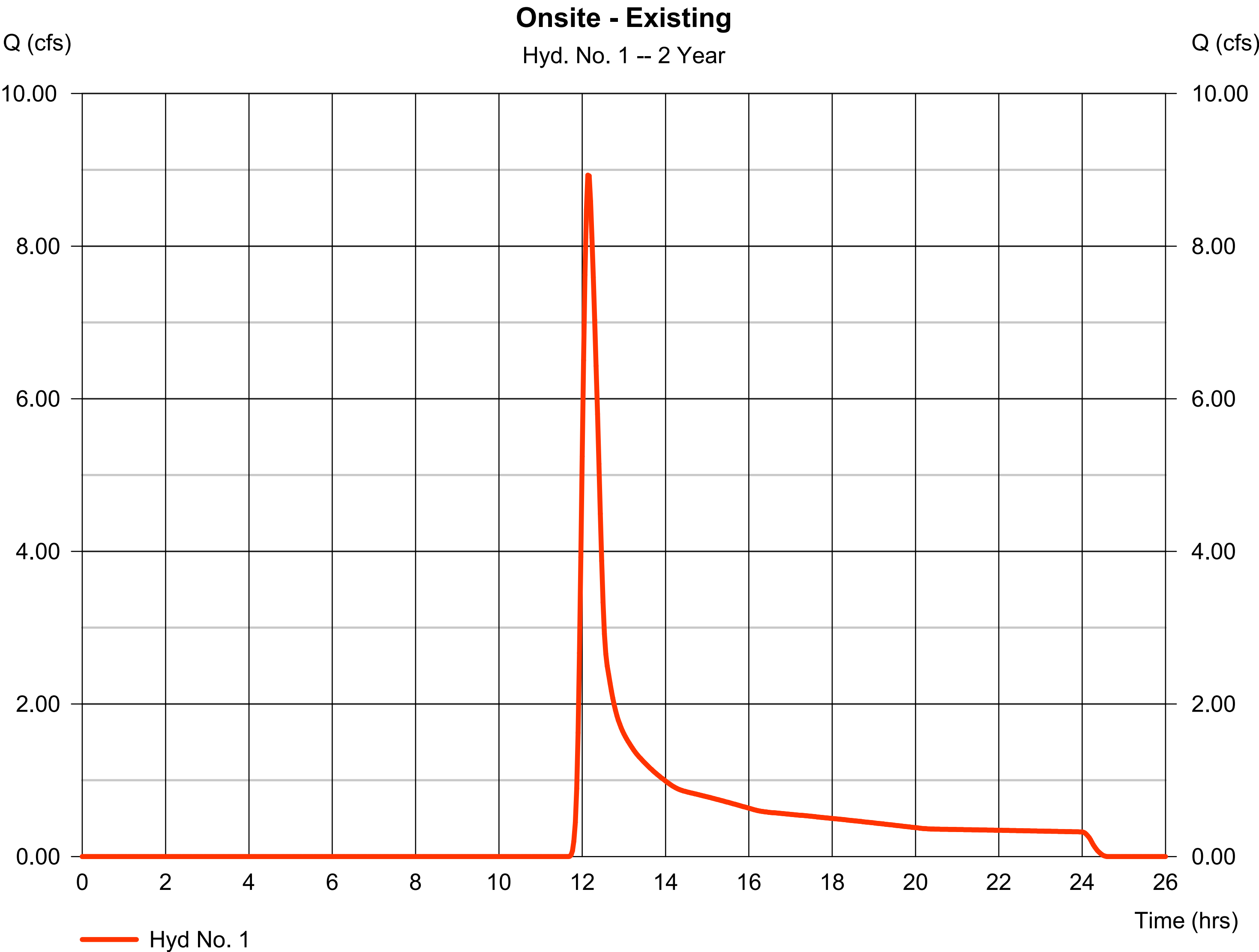
Channel Flow

12. Cross Sectional Flow Area, (a)	9.00 ft.^2	132.12 ft.^2	174.24 ft.^2
13. Wetted Perimeter, Pw	8.54 ft.	30.71 ft.	43.74 ft.
14. Hydraulic Radius, (r) (r = a/Pw)	1.054 ft.	4.302 ft.	3.984 ft.
15. Channel Slope, (s)	0.0100 ft./ft.	0.0121 ft./ft.	0.0084 ft./ft.
16. Manning's Roughness Coeff., (n)	0.170	0.027	0.027
17. Velocity, (V) (V = [1.49*r^0.67*s^0.5]/n)	0.908 ft./s	16.136 ft./s	12.769 ft./s
18. Flow Length, (L)	0.00 ft.	0.00 ft.	0.00 ft.
19. Travel Time, (Tt) (Tt = L/3600V)	0.000 hr	+	0.000 hr

Hyd. No. 1

Onsite - Existing

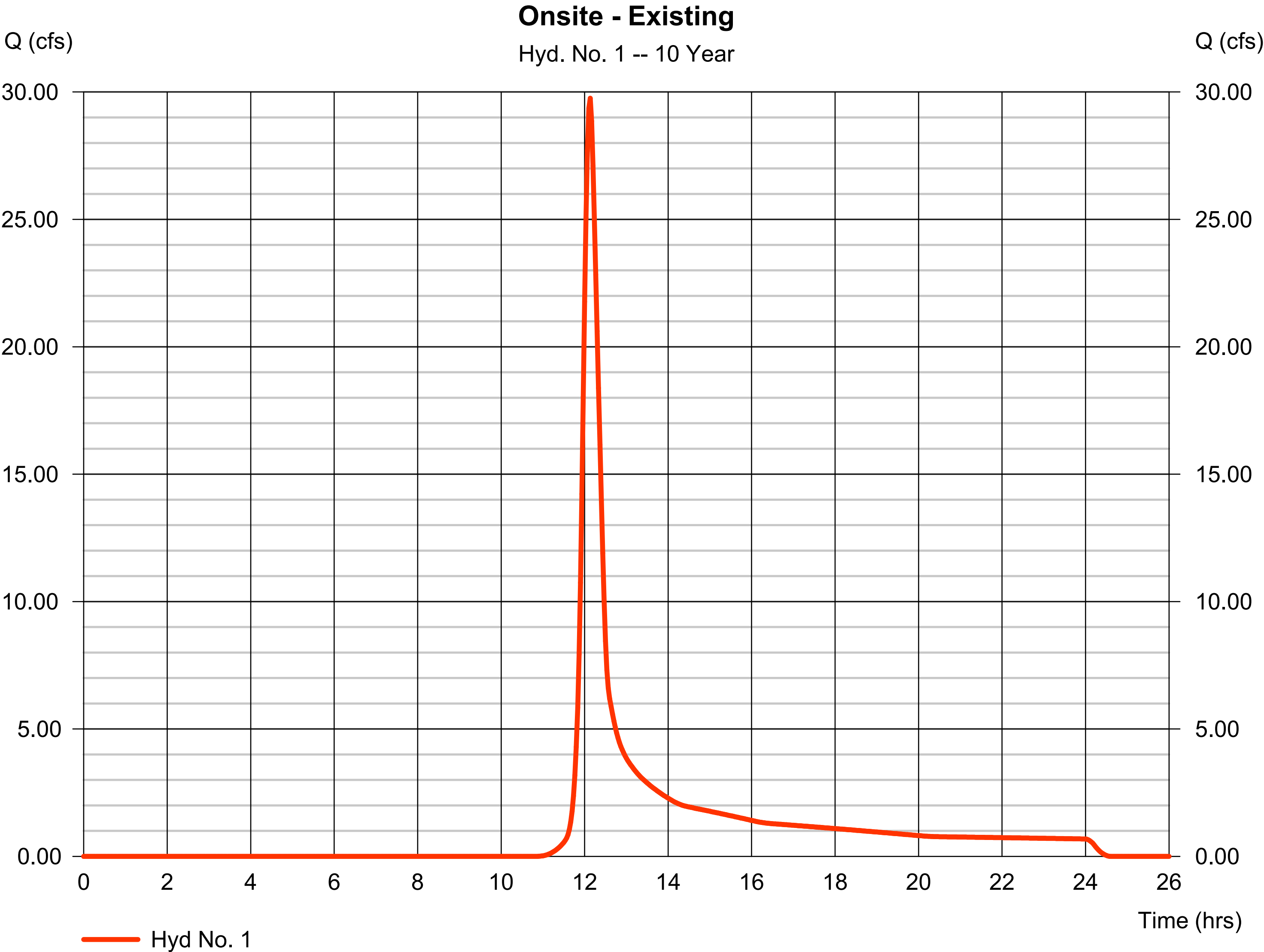
Hydrograph type	= SCS Runoff	Peak discharge	= 8.929 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 40,169 cuft
Drainage area	= 22.350 ac	Curve number	= 69
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 22.00 min
Total precip.	= 2.64 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hyd. No. 1

Onsite - Existing

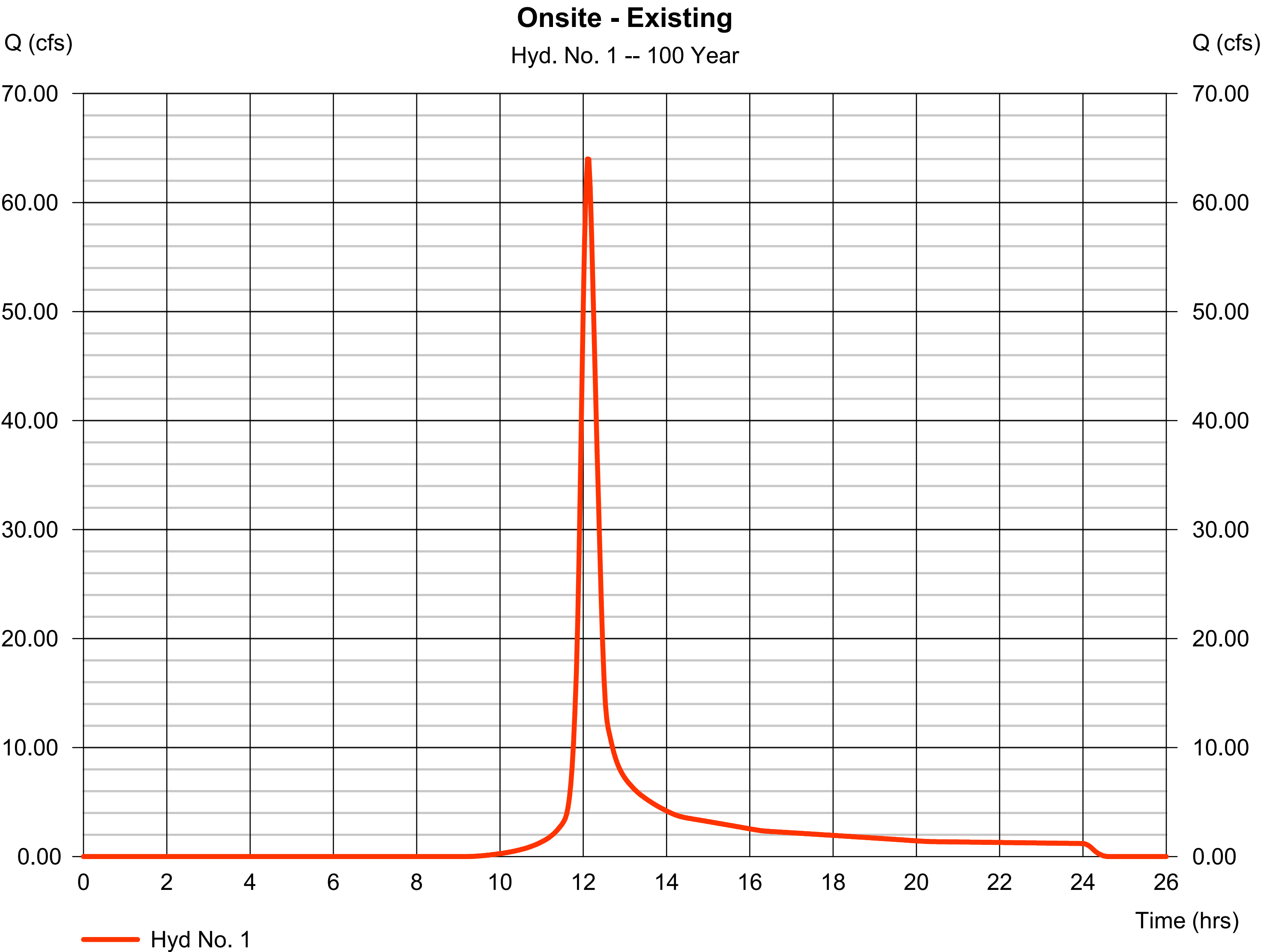
Hydrograph type	= SCS Runoff	Peak discharge	= 29.76 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.13 hrs
Time interval	= 2 min	Hyd. volume	= 108,916 cuft
Drainage area	= 22.350 ac	Curve number	= 69
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 22.00 min
Total precip.	= 4.08 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hyd. No. 1

Onsite - Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	63.99 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.10 hrs
Time interval	=	2 min	Hyd. volume	=	224,002 cuft
Drainage area	=	22.350 ac	Curve number	=	69
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	22.00 min
Total precip.	=	6.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

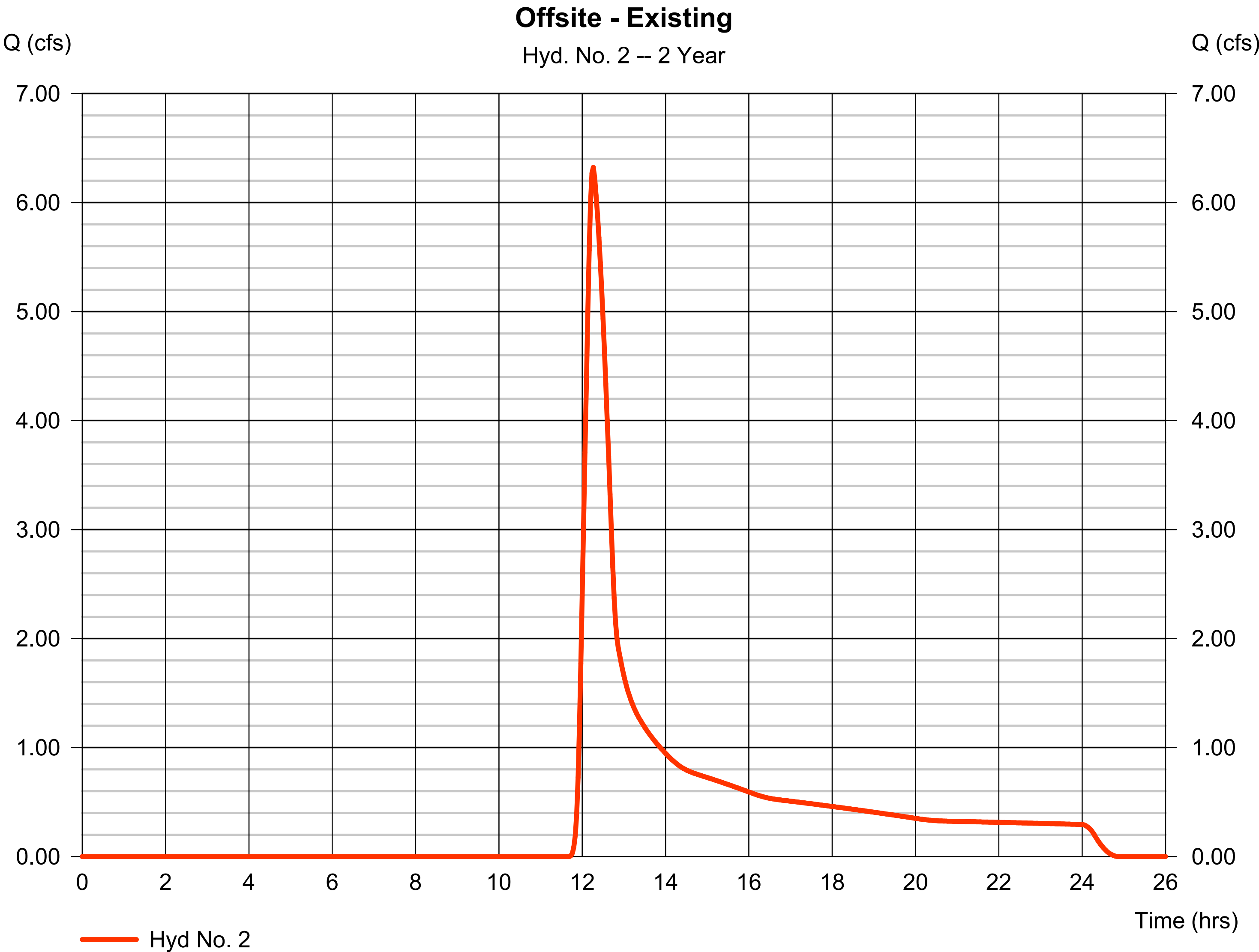


Hydrograph Report

Hyd. No. 2

Offsite - Existing

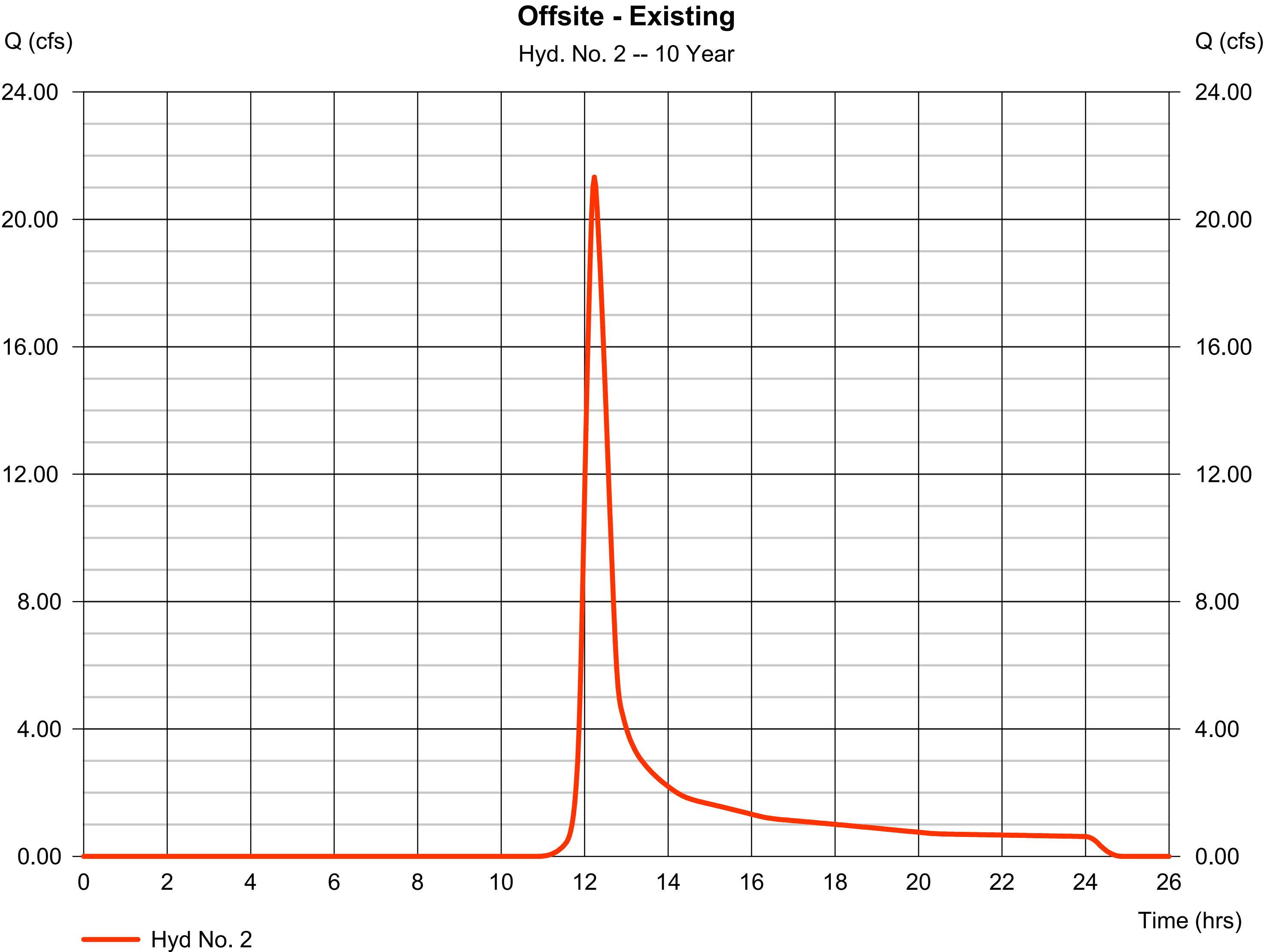
Hydrograph type	=	SCS Runoff	Peak discharge	=	6.323 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.27 hrs
Time interval	=	2 min	Hyd. volume	=	36,452 cuft
Drainage area	=	20.389 ac	Curve number	=	69
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.57 min
Total precip.	=	2.64 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hyd. No. 2

Offsite - Existing

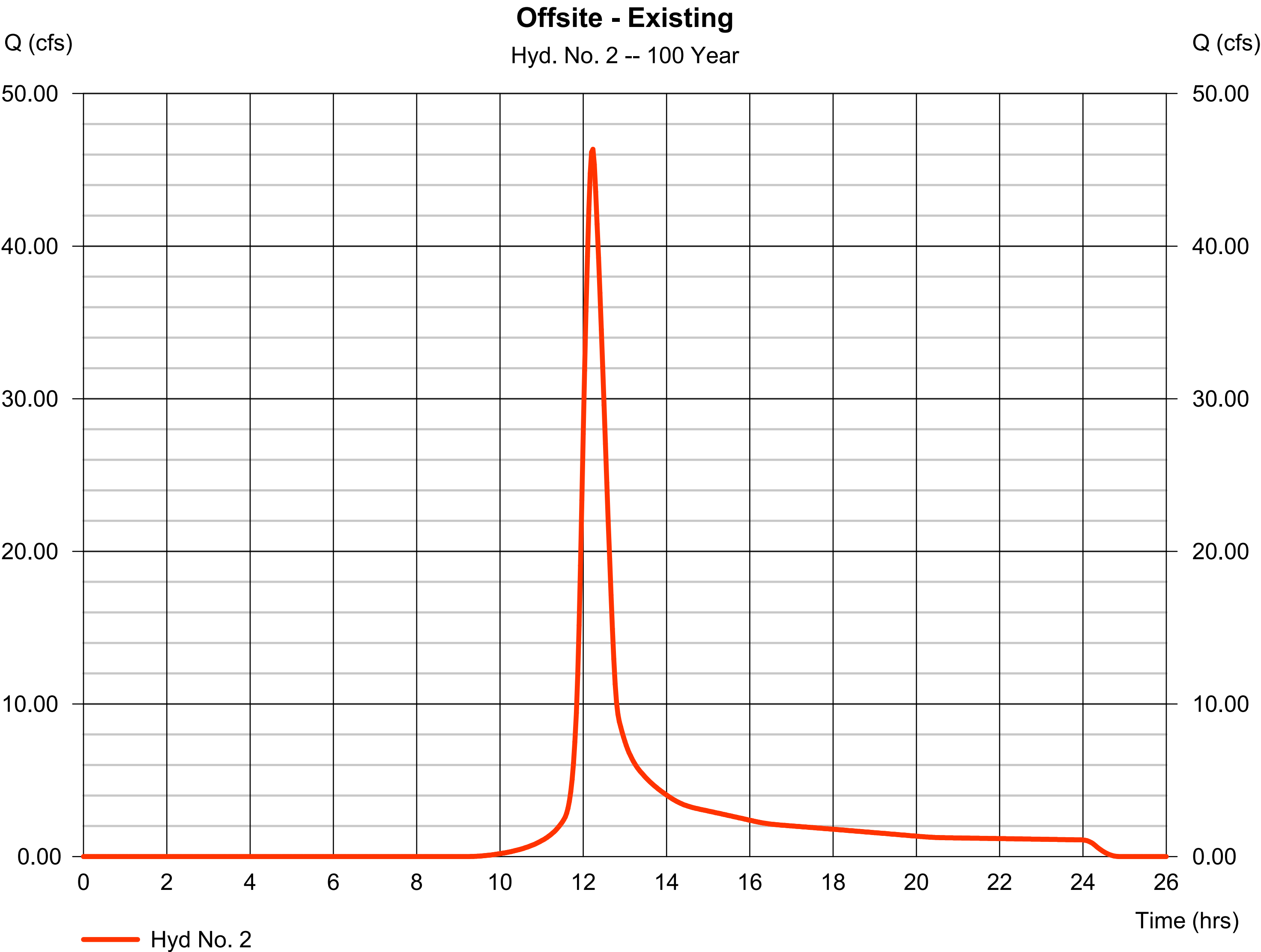
Hydrograph type	=	SCS Runoff	Peak discharge	=	21.33 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	98,838 cuft
Drainage area	=	20.389 ac	Curve number	=	69
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.57 min
Total precip.	=	4.08 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Hyd. No. 2

Offsite - Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	46.35 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.23 hrs
Time interval	=	2 min	Hyd. volume	=	203,276 cuft
Drainage area	=	20.389 ac	Curve number	=	69
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	33.57 min
Total precip.	=	6.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



Appendix B: Post-Developed Conditions

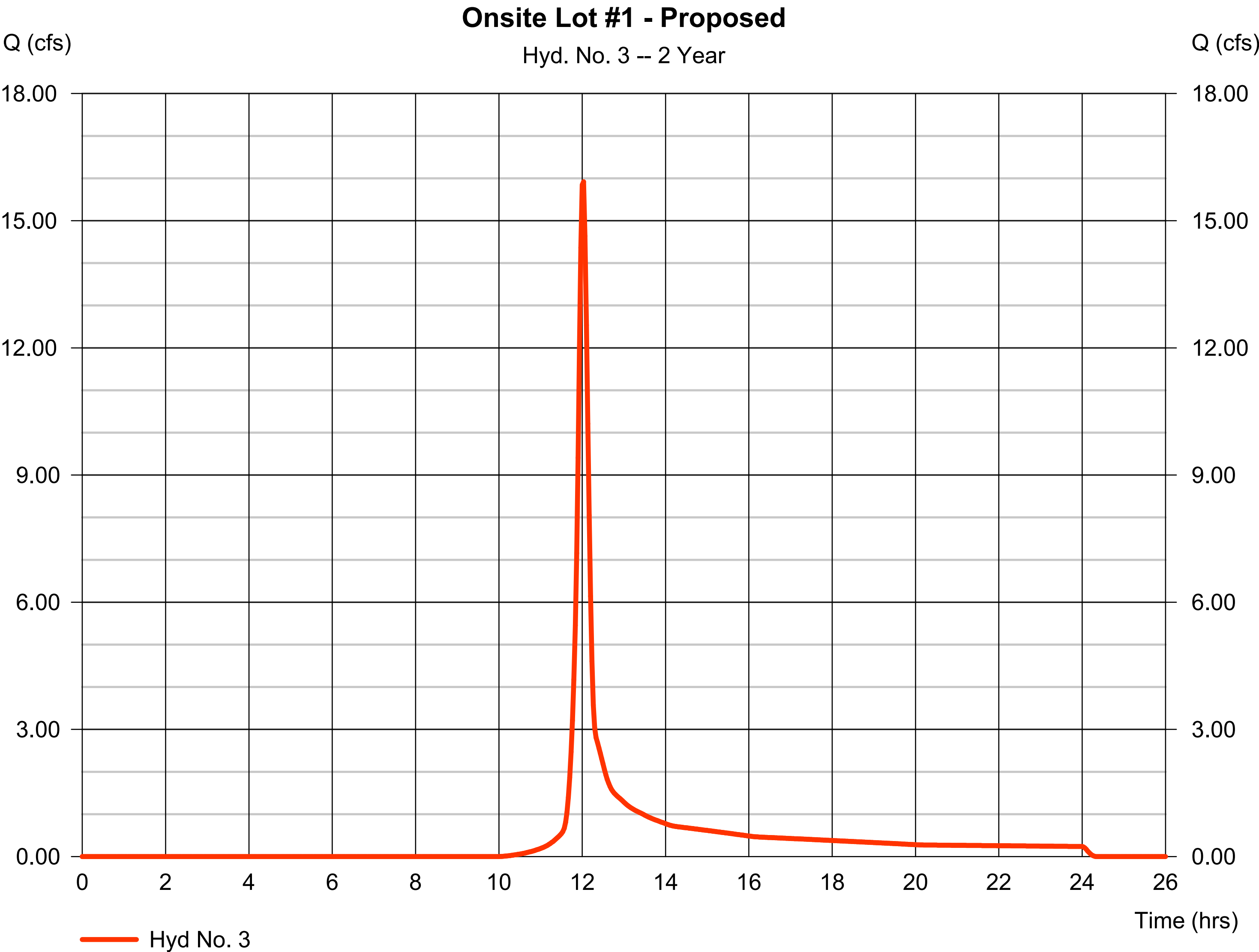
■	Onsite Basin: 2 yr. – 24 hr. Flood Hydrograph	B-1
■	Onsite Basin: 10 yr. – 24 hr. Flood Hydrograph.....	B-2
■	Onsite Basin: 100 yr. – 24 hr. Flood Hydrograph	B-3
■	Combined Basin: 2 yr. – 24 hr. Flood Hydrograph.....	B-4
■	Combined Basin: 10 yr. – 24 hr. Flood Hydrograph.....	B-5
■	Combined Basin: 100 yr. – 24 hr. Flood Hydrograph.....	B-6

Hyd. No. 3

Onsite Lot #1 - Proposed

Hydrograph type	=	SCS Runoff	Peak discharge	=	15.92 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	41,794 cuft
Drainage area	=	10.700 ac	Curve number	=	81*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	2.64 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(4.476 x 98) + (6.229 x 69)] / 10.700

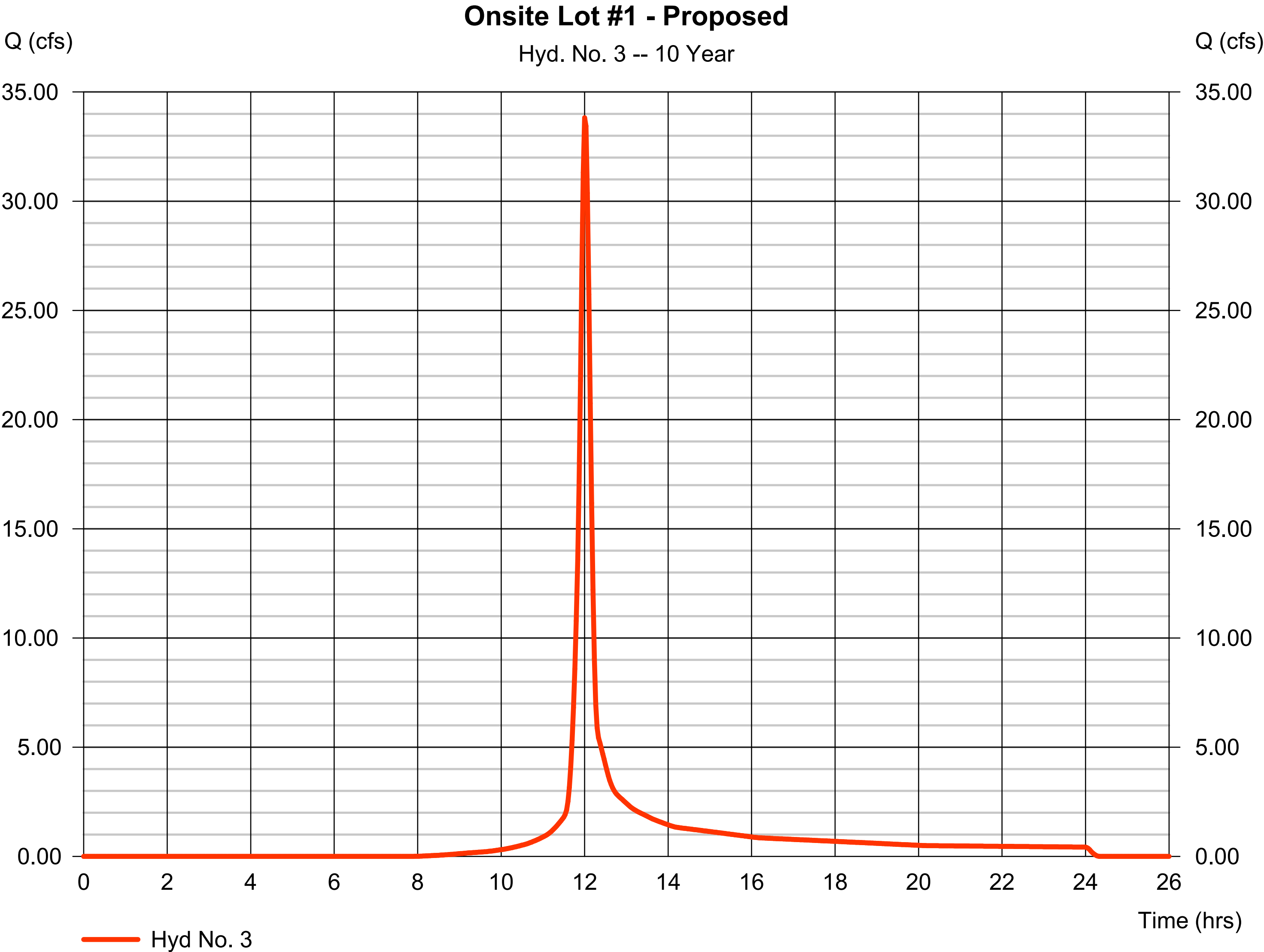


Hyd. No. 3

Onsite Lot #1 - Proposed

Hydrograph type	=	SCS Runoff	Peak discharge	=	33.82 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	87,676 cuft
Drainage area	=	10.700 ac	Curve number	=	81*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	4.08 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(4.476 x 98) + (6.229 x 69)] / 10.700



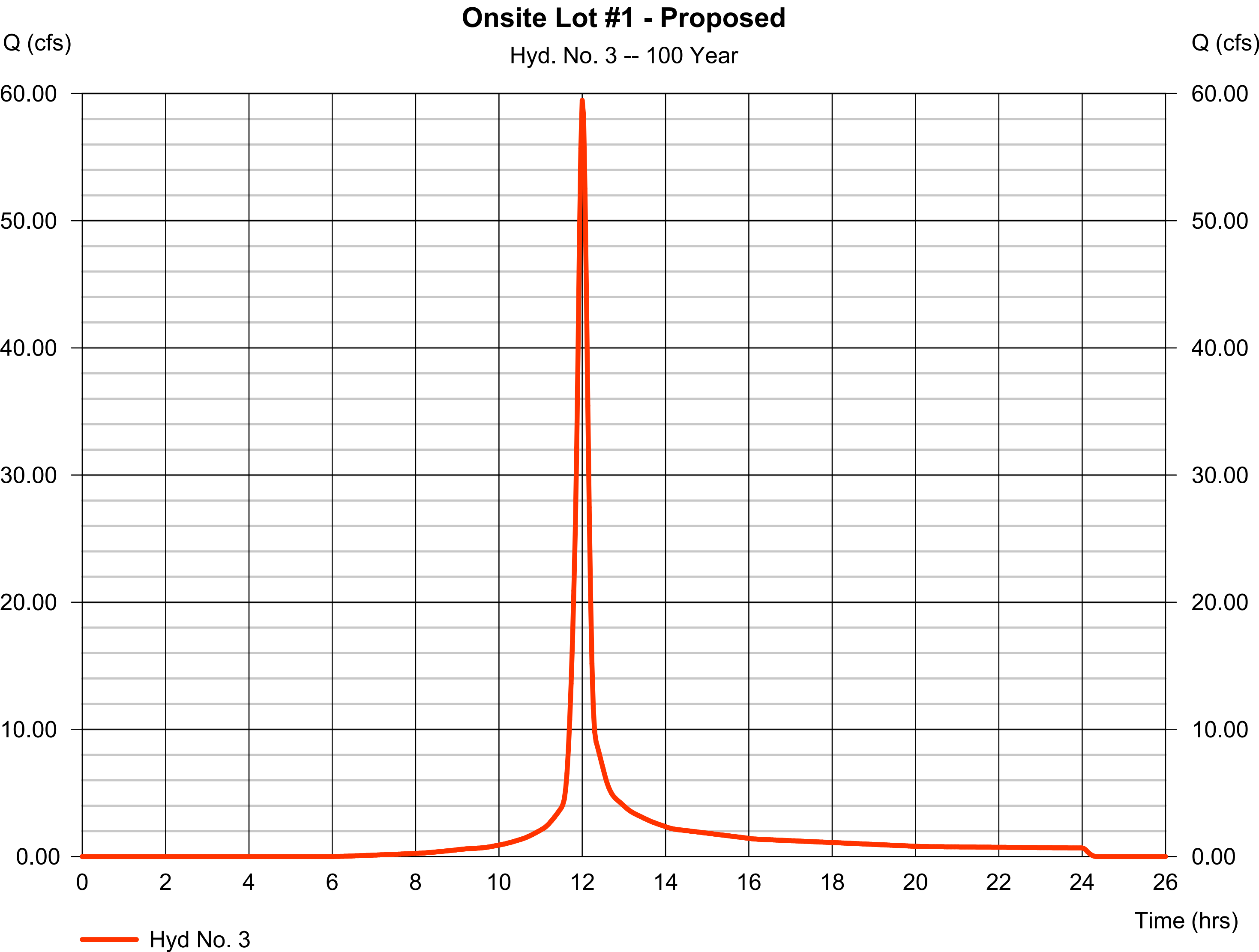
Hydrograph Report

Hyd. No. 3

Onsite Lot #1 - Proposed

Hydrograph type	=	SCS Runoff	Peak discharge	=	59.46 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	155,562 cuft
Drainage area	=	10.700 ac	Curve number	=	81*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	10.00 min
Total precip.	=	6.00 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(4.476 x 98) + (6.229 x 69)] / 10.700

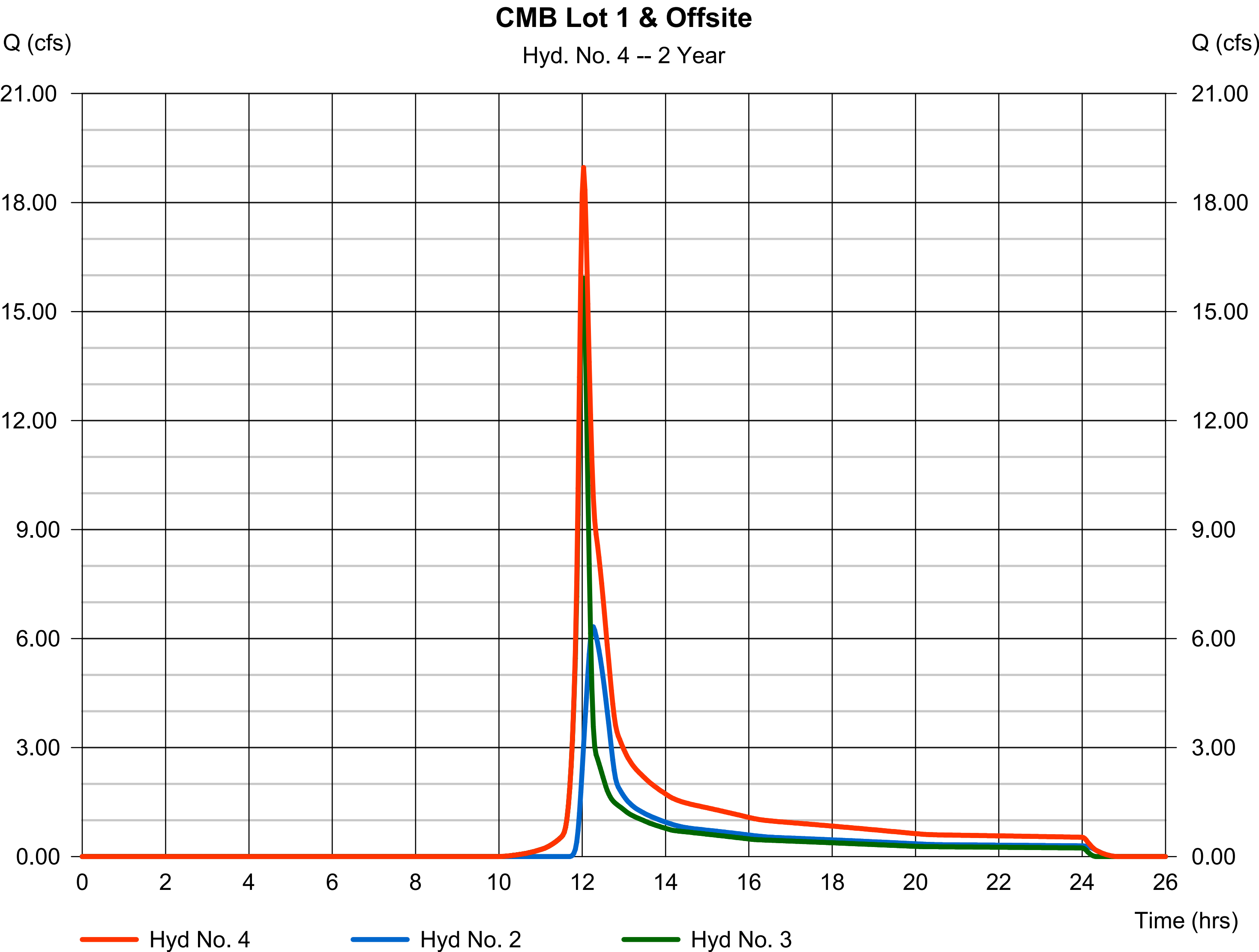


Hydrograph Report

Hyd. No. 4

CMB Lot 1 & Offsite

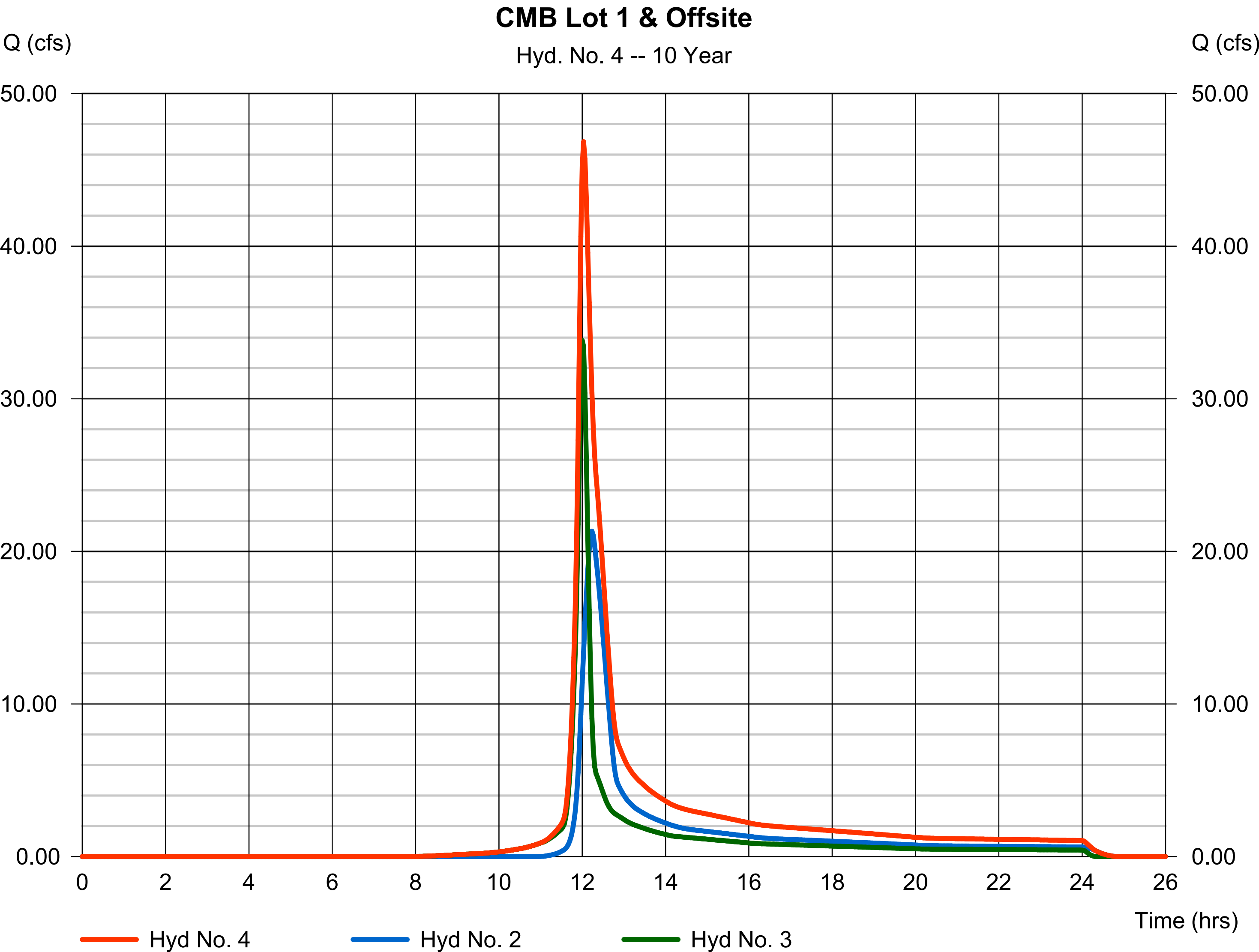
Hydrograph type	= Combine	Peak discharge	= 18.97 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 78,246 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 31.090 ac



Hyd. No. 4

CMB Lot 1 & Offsite

Hydrograph type	= Combine	Peak discharge	= 46.84 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 186,514 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 31.090 ac

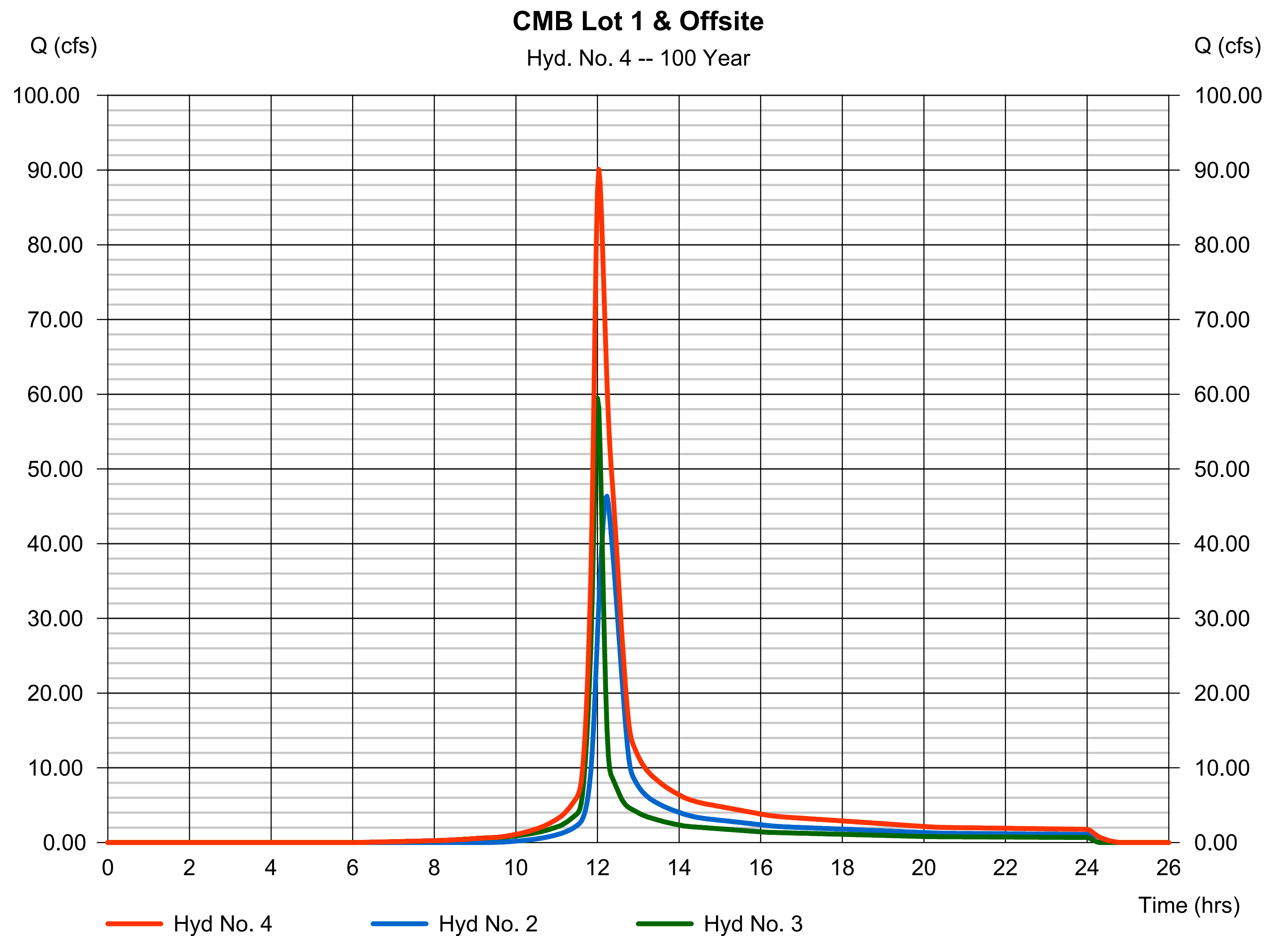


Hydrograph Report

Hyd. No. 4

CMB Lot 1 & Offsite

Hydrograph type	= Combine	Peak discharge	= 90.09 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 358,839 cuft
Inflow hyds.	= 2, 3	Contrib. drain. area	= 31.090 ac



Appendix C: Detention Calculations

■	Reservoir Report.....	C-1
■	Combined Basin: 2 yr. – 24 hr. Routed Flood Hydrograph	C-2
■	Combined Basin: 10 yr. – 24 hr. Routed Flood Hydrograph.....	C-3
■	Combined Basin: 100 yr. – 24 hr. Routed Flood Hydrograph	C-4

Pond No. 1 - Dry Basin

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 761.60 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	761.60	00	0	0
0.40	762.00	2,201	293	293
1.40	763.00	23,348	10,904	11,198
2.40	764.00	59,652	40,102	51,299
3.40	765.00	96,606	77,384	128,684
4.40	766.00	109,796	103,123	231,807

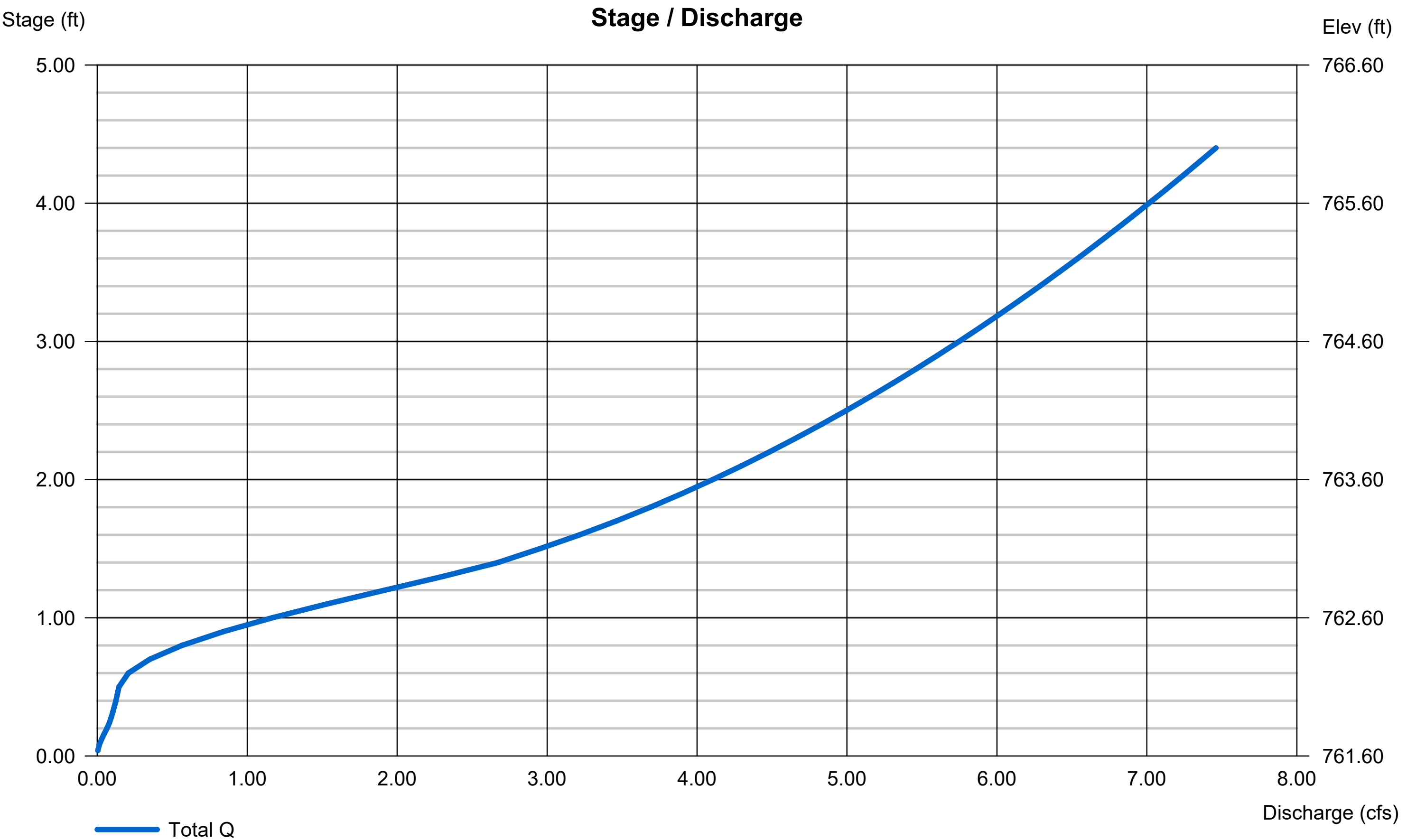
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	3.00	12.00	0.00
Span (in)	= 18.00	3.00	12.00	0.00
No. Barrels	= 0	1	1	0
Invert El. (ft)	= 761.60	761.60	762.10	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)	= 764.60	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	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).



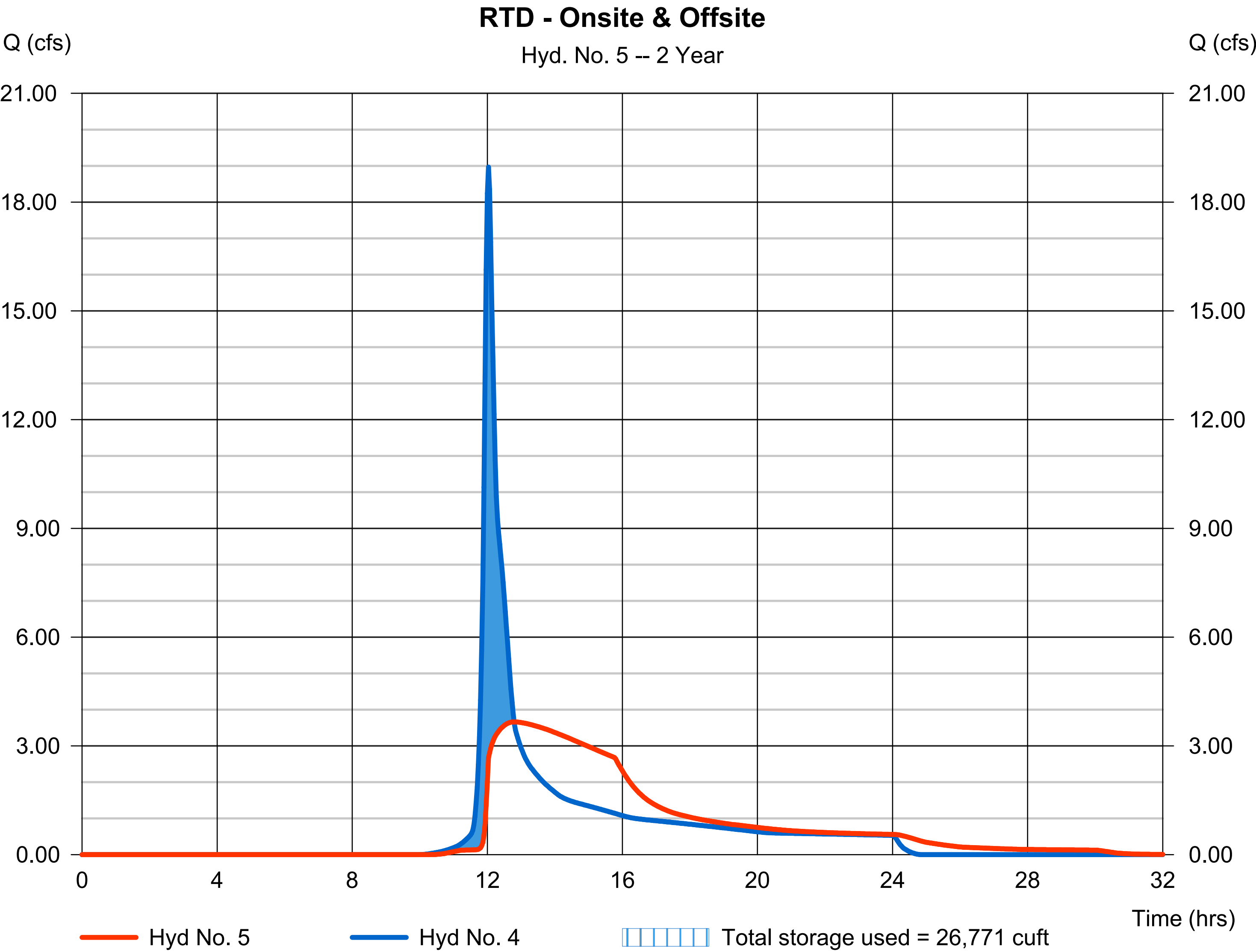
Hydrograph Report

Hyd. No. 5

RTD - Onsite & Offsite

Hydrograph type	= Reservoir	Peak discharge	= 3.661 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.80 hrs
Time interval	= 2 min	Hyd. volume	= 78,237 cuft
Inflow hyd. No.	= 4 - CMB Lot 1 & Offsite	Max. Elevation	= 763.39 ft
Reservoir name	= Dry Basin	Max. Storage	= 26,771 cuft

Storage Indication method used.

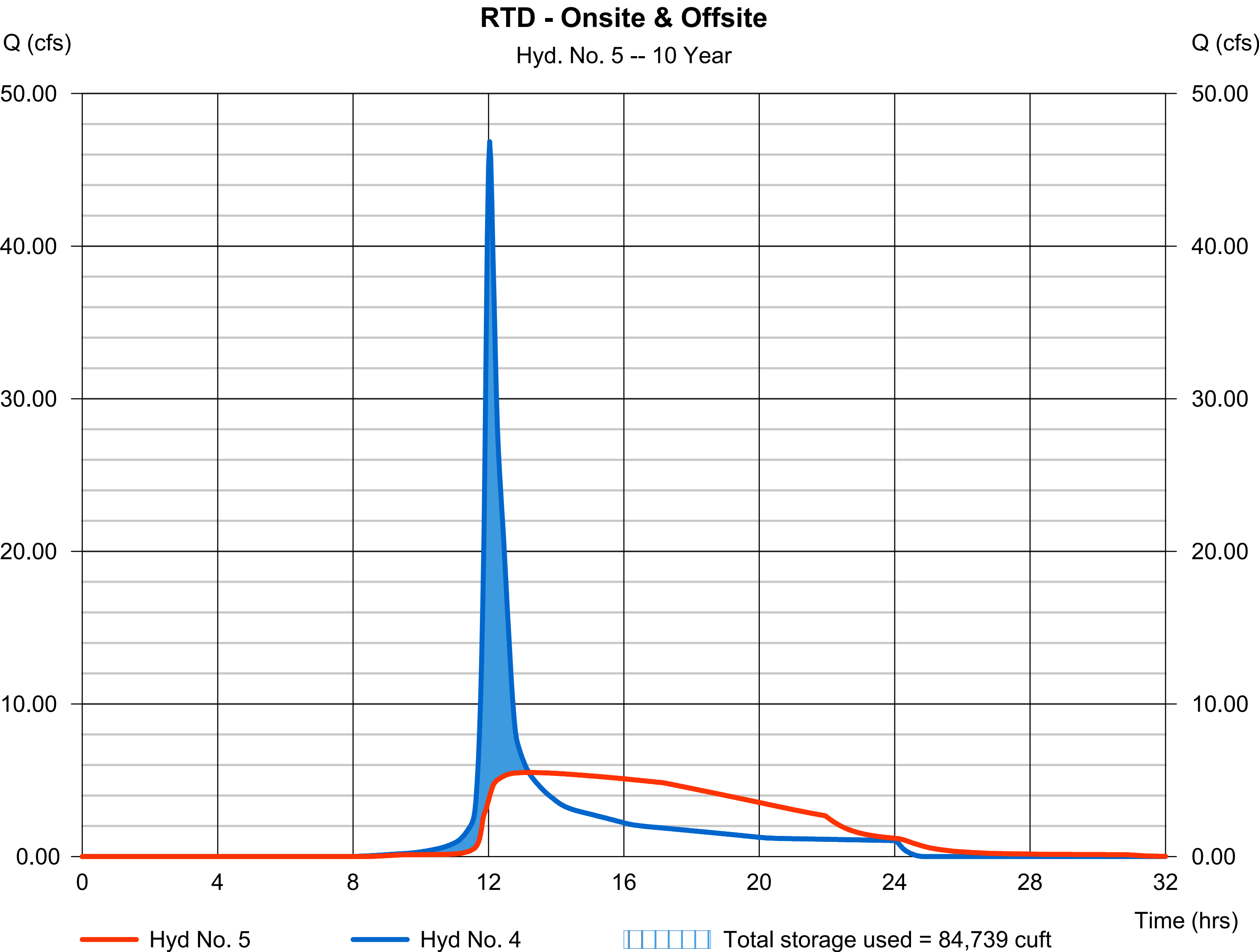


Hyd. No. 5

RTD - Onsite & Offsite

Hydrograph type	= Reservoir	Peak discharge	= 5.506 cfs
Storm frequency	= 10 yrs	Time to peak	= 13.20 hrs
Time interval	= 2 min	Hyd. volume	= 186,506 cuft
Inflow hyd. No.	= 4 - CMB Lot 1 & Offsite	Max. Elevation	= 764.43 ft
Reservoir name	= Dry Basin	Max. Storage	= 84,739 cuft

Storage Indication method used.



Hydrograph Report

Hyd. No. 5

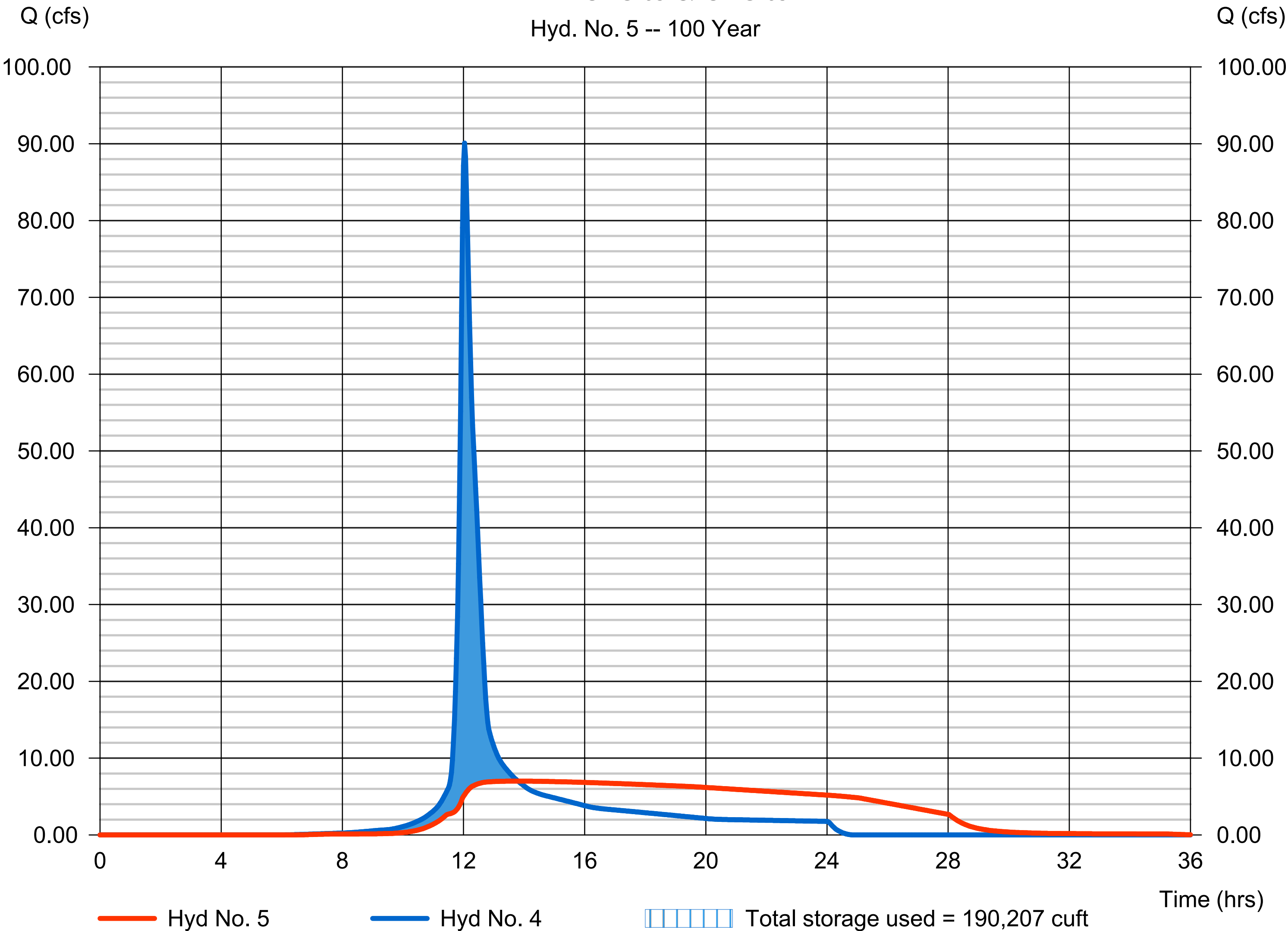
RTD - Onsite & Offsite

Hydrograph type	= Reservoir	Peak discharge	= 7.010 cfs
Storm frequency	= 100 yrs	Time to peak	= 13.80 hrs
Time interval	= 2 min	Hyd. volume	= 358,830 cuft
Inflow hyd. No.	= 4 - CMB Lot 1 & Offsite	Max. Elevation	= 765.60 ft
Reservoir name	= Dry Basin	Max. Storage	= 190,207 cuft

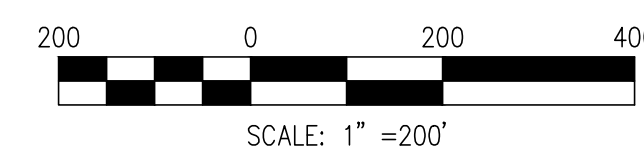
Storage Indication method used.

RTD - Onsite & Offsite

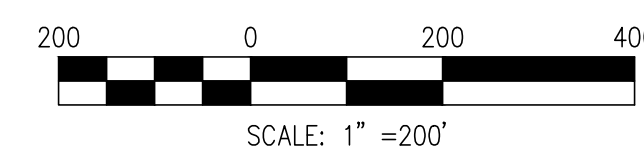
Hyd. No. 5 -- 100 Year



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