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MARINDA HEIGHTS SUBDIVISION

FAIRFAX, CA

HYDROLOGY STUDY
AND
DRAINAGE CALCULATIONS

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1. INTRODUCTION

PURPOSE

The purpose of this analysis is to determine the peak flow rates for all of the site's drainage before and after development for the 100-year storm event. In addition, the report is intended to provide recommendations for the stormwater detention necessary to reduce the post-construction rate of flow to below the rate of the existing conditions.

SITE CONDITIONS

The proposed Marinda Heights Subdivision covers an area of 100.504 acres in an undeveloped region in the Town of Fairfax. The existing property's area primarily consists of steep terrains and lies on the southern edge of unincorporated Fairfax and the Northwest corner of town of San Anselmo. The proposed improvements lie within the property and will develop a small portion of the area in order to create a new housing development. The proposed development will be accessible from Marinda Drive which is located off Sir Francis Drake Blvd. and Ridgeway Avenue off Taylor Drive in Fairfax, CA.

PROPOSED PROJECT

The proposed project consists of a subdivision of the property that will divide the land into 10 lots and one parcel offered for dedication. Nine of these lots are approximately 10 acres, one lot will be 1.362 acres, and the remainder of the property will feature a parcel dedicated for roadway access, trails, and utilities. Marinda Drive will be extended with driveways to provide access to nine (9) of the lots and Ridgeway Avenue will be extended to the property to provide access to the tenth (10^{th}) lot on the eastern side of the property. The proposed area to be improved with impervious surfaces consists of less than four acres or 4% of the total site. There are several large areas surrounding the proposed building sites which are to remain undeveloped with their existing drainage paths to remain undisturbed by the proposed development.

The runoff from impervious surfaces within each of the proposed lots are to be collected and treated as part of the Stormwater Control Measures.

2. STORMWATER CONTROL MEASURES

The Town of Fairfax requires the subdivision project be subject to the requirements of the Phase II Stormwater National Pollutant Discharge Elimination System (NPDES) Permit for small MS4s, Provision E.12, "Post-Construction Stormwater Management Program" issued by the California State Water Resources Control Board. As a regulated project, runoff from impervious surfaces must be directed towards bioretention areas. The improvement areas of the site are divided into Drainage Management Areas (DMAs).

PERMEABLE JOINT PAVERS

The Marinda Heights Subdivision features permeable joint pavers on each of proposed homes' driveways. The primary benefit of the pavers are that they allow runoff to drain back into the ground and don't require excess stormwater treatment. Beneath the paver system is a base layer of open-graded aggregate that can collect and detain stormwater. This permeable joint paver system minimizes the amount of detention needed due to the fact it has a much lower runoff coefficient than a typical asphalt or concrete driveway. The permeable joint paver system was given a runoff coefficient of 0.4 due its high porosity of the paver system and high percentage of voids in its underlying base layer.

GREEN ROOFS

The proposed project dedicates numerous green roofs areas to be implemented on conventional roofs for each home. The green roofs provide numerous benefits to the project including: visual aesthetic, stormwater treatment, and stormwater detention. Although the green roofs designs have not been finalized, it is likely that they will consists of square models as shown below.

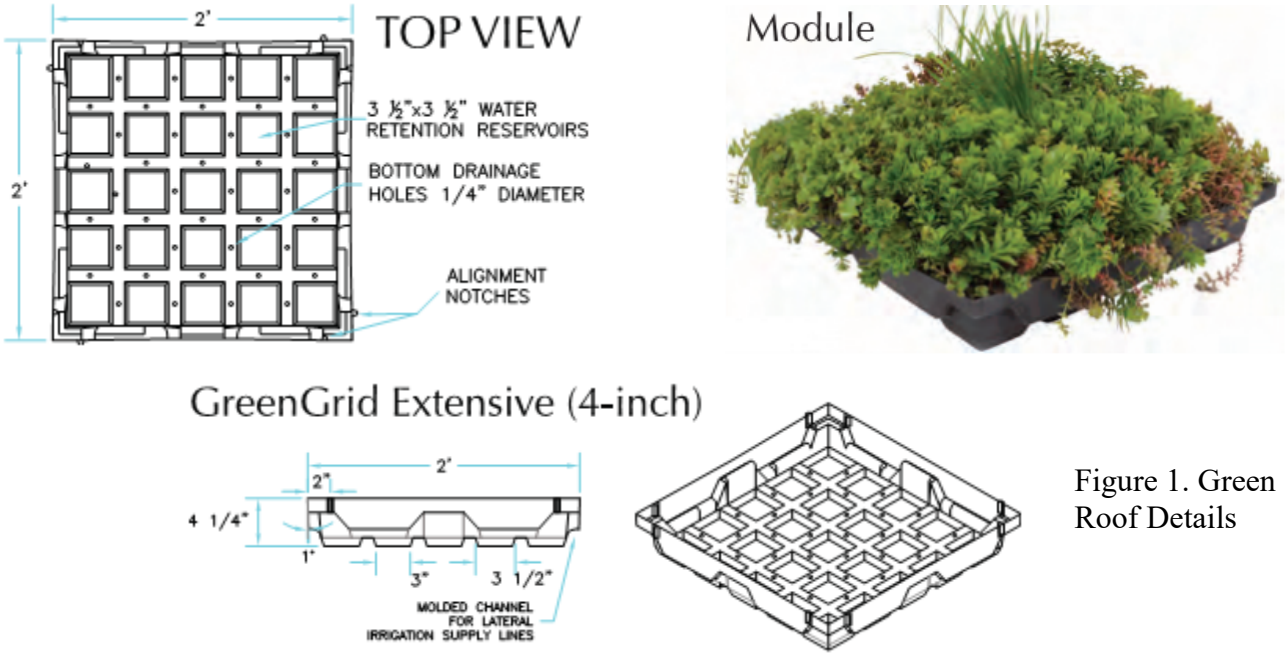


Figure 1. Green Roof Details

BIORETENTION AREAS

The bioretention areas required for Post-Construction Stormwater Management consist of the following sections.

- Built flat and level. See Figure 2.
- 18 inches of sand/compost mix
- 12 inches of Class 2 permeable,
- Caltrans specification 68-2.02F(3) (schematic)

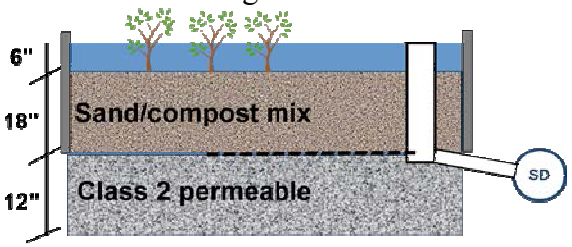


Figure 2. Bioretention Cross-Section

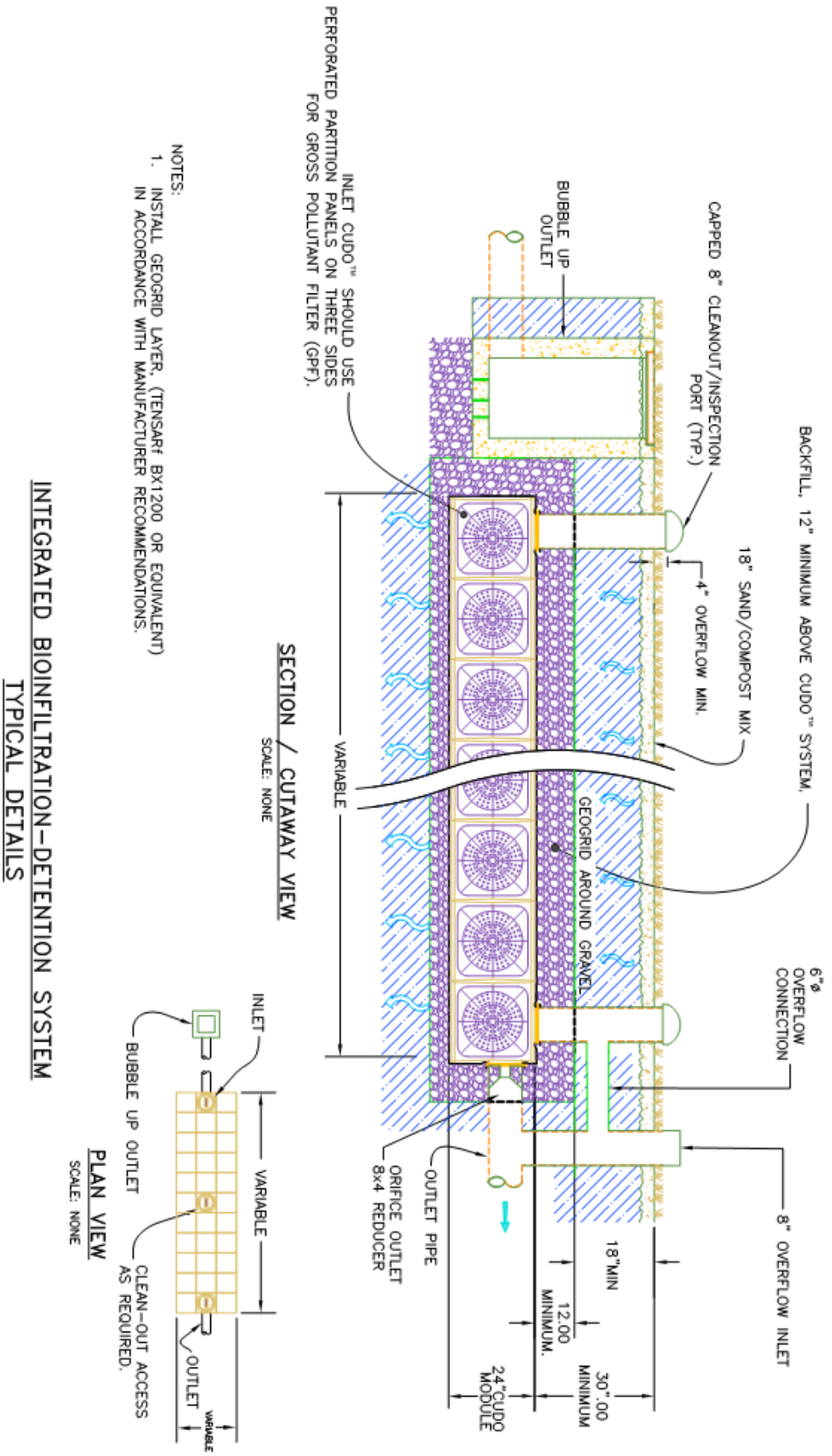
The bioretention areas will treat stormwater runoff within the sand/compost and permeable drain rock layers. The treated stormwater will then percolate down from the bioretention areas into the detention chambers. This system will be referred to as an Integrated Bioinfiltration-Detention System In the event of a small storm, the captured runoff will infiltrate the soil media and chambers and remain there until it either evaporates exfiltrates out of the system's surrounding soils. In more severe storms such as the 100-year storm, stormwater may fully saturate the system causing ponding to occur. The proposed Integrated Bioinfiltration-Detention System will feature overflow pipes that will allow ponded stormwater to flow out of the system and discharged back to the existing drainage paths.

DETENTION STRUCTURES

The bioretention areas onsite are currently intended to be integrated with Kristar's CUDO Stormwater Detention Structures to increase the water storage capabilities of the bioretention areas. The CUDO structures can be used to create a water storage system comprised of 24" x 24" x 24" cubes made of polypropylene plastic that can be installed as a single level sytem that are connected to form rows. A detailed section of the Integrated Bioinfiltration-Detention System can be found on page 5.

Figure 3. CUDO Detention Structure

The detention structure offers a 95% water storage capacity and offers an additiontal volume beneath our proposed bioretention areas to temporarily detain water prior to allowing it to be discharged back to the existing natural site. Runoff will enter the detention structures through an inlet structure allowing water to fill the interconnected cubes. Runoff will outflow from the system through a 4" orifice or through a 6" overflow pipe that will allow water to exit the system provided the orifice becomes clogged.


INTEGRATED BIOINFILTRATION-DETENTION SYSTEM
TYPICAL DETAILS
SCALE: NONE
NOTES:
1. INSTALL GEOGRID LAYER, (TENSAR® BX1200 OR EQUIVALENT) IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.
INLET CUDO™ SHOULD USE PERFORATED PARTITION PANELS ON THREE SIDES FOR GROSS POLLUTANT FILTER (GPF).
BUBBLE UP OUTLET
CAPPED 8" CLEANOUT/INSPECTION PORT (TYP.)
4" OVERFLOW MIN.
18" SAND/COMPOST MIX
BACKFILL, 12" MINIMUM ABOVE CUDO™ SYSTEM.
6"ø OVERFLOW CONNECTION
8" OVERFLOW INLET
GEOGRID AROUND GRAVEL
VARIABLE
ORIFICE OUTLET 8x4 REDUCER
OUTLET PIPE
18"MIN
12.00 MINIMUM.
30".00 MINIMUM
24"CUDO MODULE
SECTION / CUTAWAY VIEW
SCALE: NONE
INLET
BUBBLE UP OUTLET
VARIABLE
CLEAN-OUT ACCESS AS REQUIRED.
OUTLET
VARIABLE
PLAN VIEW
SCALE: NONE

3. METHODS OF HYDROLOGY

The existing watersheds of the property were mapped to determine their catchment areas and corresponding outlets to calculate the current rate of runoff leaving the site (See Attachment 1: Existing Watershed Map). The proposed improvements such as buildings and roads were then overlayed on this existing watershed map to analyze the effects of the improvements on the watershed. Next, drainage improvements were selected and placed to maintain the current drainage patterns of the existing conditions. Portions of towns of Fairfax and San Anselmo downstream are already subject to flooding during wet seasons, therefore the selected drainage improvements were sized to decrease the rate of runoff leaving the site.

The majority of the project's improvements occur in the upper regions of the watersheds. The proposed drainage systems were designed to reduce the flow rate of the improvements in the upper reaches of the site and to allow the lower reaches to remain unaffected.

The development's drainage design were created to imitate the natural drainage paths and ensure runoff from the proposed improvements exits the site in the same manner. However, the improvements altered the upper reaches of the drainage paths, so new subsheds were created in the drainage design to ensure runoff reaches its shed's respective outlet. The new subsheds' areas were calculated by determining the proposed drainage areas flowing into drainage inlets and catch basins in the development. The total area draining to the proposed storm drainage system is approximately 6.901 acres. The runoff collected from each subshed will be routed to the Integrated Bioinfilitration-Detention Systems unless treatment and/or detention is unfeasible where improvements meet the edge of the property limits. In such a case, excess detention is provided in other locations to offset the increase of runoff in these area. The collected stormwater runoff from the upper reaches of the watersheds are to be treated, temporarily detained and returned to their natural drainage outlet in order to decrease the peak rate of runoff leaving the project's site.

EXISTING RUNOFF COEFFICIENT

Runoff Coefficients were calculated for each shed area using the Methodology from the Highway Design Manual Figure 819.2A and the totals of pervious and impervious areas.

The runoff coefficient for the existing hillside site is calculated as follows:

Existing Runoff Coefficient	
Relief – Steep, Average Slopes Above 30%	use 0.35
Soil Infiltration – Normal, Well Drained	use 0.07
Vegetal Cover – Excellent	use 0.05
Surface Storage – Negligible	use 0.10
	Total 0.57

RUNOFF PRODUCING CHARACTERISTICS OF WATERSHEDS SHOWING FACTORS FOR EACH CHARACTERISTIC FOR VARIOUS WATERSHED TYPES FROM SOIL CONSERVATION SERVICE - U.S.D.A.

	EXTREME	HIGH	NORMAL	LOW
RELIEF	.28-.35 STEEP, RUGGED TERRAIN WITH AVERAGE SLOPES ABOVE 30%	.20-.28 HILLY, WITH AVERAGE SLOPES OF 10 TO 20%	.14-.20 ROLLING, WITH AVERAGE SLOPES OF 5 TO 10%	* .08-.14 RELATIVELY FLATLAND, WITH AVERAGE SLOPES OF 0 TO 5%
SOIL INFILTRATION	.12-.16 NO EFFECTIVE SOIL COVER, EITHER ROCK OR THIN SOIL MANTLE OF NEGLIGIBLE INFILTRATION CAPACITY	* .08-.12 SLOW TO TAKE UP WATER, CLAY OR SHALLOW LOAM SOILS OF LOW INFILTRATION CAPACITY IMPERFECTLY OR POORLY DRAINED	.06-.08 NORMAL; WELL DRAINED LIGHT OR MEDIUM TEXTURED SOILS, SANDY LOAMS SILT AND SILT LOAMS	.04-.06 HIGH; DEEP SAND OR OTHER SOIL THAT TAKES UP WATER READILY VERY LIGHT WE DRAINED SOILS
VEGETAL COVER	.12-.16 NO EFFECTIVE PLANT COVER, BARE OR VERY SPARSE COVER	* .08-.12 POOR TO FAIR; CLEAN CULTIVATION CROPS, OR POOR NATURAL COVER, LESS THAN 20% OF DRAINAGE AREA OVER GOOD COVER	.06-.08 FAIR TO GOOD; ABOUT 50% OF AREA IN GOOD GRASSLAND OR WOODLAND, NOT MORE THAN 50% OF AREA IN CULTIVATED CROPS	.04-.06 GOOD TO EXCELLENT; ABOUT 90% OF DRAINAGE AREA IN GOOD GRASS LAND, WOODLAND OR EQUIVALENT COVER
SURFACE	.10-.12 NEGLIGIBLE; SURFACE DEPRESSIONS FEW AND SHALLOW; DRAINAGEWAYS STEEP AND SMALL, NO MARSHES	.08-.10 LOW; WELL DEFINED SYSTEM OF SMALL DRAINAGEWAYS; NO PONDS OR MARSHES	* .06-.08 NORMAL; CONSIDERABLE SURFACE DEPRESSION STORAGE; LAKES AND PONDS AND MARSHES	.04-.06 HIGH; SURFACE STORAGE, HIGH DRAINAGE SYSTEM NOT SHARPLY DEFINED; LARGE FLOOD PLAIN STORAGE OR LARGE NUMBER OF PONDS OR MARSHES

GREEN ROOF RUNOFF COEFFICIENT

The retention capacity of the green roof is governed by the planting media thickness. With a four (4) inch green roof thickness, much of the runoff will be retained within the planting media and reservoir for the smaller storms (such as the 2-year). As storms become more intense and of longer duration, the green roof section will eventually become fully saturated. At full saturation, the green roof is no longer detaining additional storm water and a drop into the green roof section must equal a drop out.

Carter and Jackson in their widely cited paper titled “Vegetated roofs for stormwater management at multiple spatial scales” (published in *Landscape and Urban Planning*, Volume 80, Issues 1–2, 28 March 2007, Pages 84-94) modelled five (5) design storms across a number of watersheds and determined the percentage runoff reduction if the

existing rooftops within a watershed were replaced with green roofs. Their study was based on a soil mix spread to a depth of three (3) inches with a 100-year-24 hour rain event depth of 7.68 inches. For total imperious area densities similar to the house sites they determined a 4.7% runoff reduction between existing roofs and green roofs for the 100-year storm event.

The reduction percentage was factored for the project conditions in Fairfax as follows:

$$4.7\% = \frac{4"\ media\ depth\ proposed}{3"\ media\ depth\ in\ study} + \frac{7.68"\ 100-yr\ depth\ in\ study}{10.4"\ 100-yr\ depth\ in\ Fairfax}$$

$$Percent\ \text{Re}duction = 4.6\%$$

$$Runoff\ Coefficient\ for\ conventional\ roof = 0.9$$

$$Runoff\ Coefficient\ for\ green\ roof = 0.9\ x\ (1-0.046) = 0.86$$

The results indicate that the green roof provides very little runoff attenuation for the 100-year storm event. Additional stormwater detention will need to be implemented in addition to the green roofs for the home sites.

PROPOSED RUNOFF COEFFICIENTS

The proposed development features four different types of surfaces with their own respective runoff coefficients. The four types of surfaces include: Impervious Surfaces ($C_I = 0.9$), Natural Hillside Areas or Landscape Areas ($C_L = 0.57$), Green Roof Area ($C_G = 0.86$) & Permeable Paver Areas ($C_P = 0.4$). These values were used to calculate a composite runoff coefficient for each of the subsheds to determine their peak flow rate.

The following calculation was used to calculate composite runoff coefficient:

[(Impervious Area) x (C_I) + (Landscape Area) x (C_L) + (Green Roof Area) x (C_G) + (Permeable Paver Area) x (C_P)] / (Total Area)

See Appendix A for the Composite Runoff Coefficient Table.

Note: Some landscaped areas in close proximity to the proposed building envelopes will be used for lawn space or will improve upon the exisiting natural landscape. These areas will utilize a runoff coefficient of 0.4 to demonstrate the increased permeability.

TIME OF CONCENTRATION

A minimum of seven minutes was used for all existing and proposed hydrograph modeling.

RUNOFF INTENSITY

Intensity duration frequency curves where developed for the Town of Fairfax based on the National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Point Precipitation Frequency Estimates. The NOAA estimate for the 100-year, 24-hour storm is 10.4 inches of rain in the Town of Fairfax.

4. RESULTS

PEAK RUNOFF REDUCTIONS

The 100-yr peak flow was calculated in *Hydraflow Storm Sewers* using the Rational Method and yielded the following results for the areas of the site to be improved:

SHED A				
SUBSHED	EXISTING PEAK RUNOFF (CFS)	PROPOSED PEAK RUNOFF (CFS)	PROPOSED PEAK RUNOFF W/ DETENTION (CFS)	FLOW REDUCTION FROM EXISTING (CFS)
A2	1.251	1.307	1.184	-0.067
A3	2.975	3.592	2.581	-0.394
TOTAL	4.226	4.899	3.765	-0.461

SHED B				
SUBSHED	EXISTING PEAK RUNOFF (CFS)	PROPOSED PEAK RUNOFF (CFS)	PROPOSED PEAK RUNOFF W/ DETENTION (CFS)	FLOW REDUCTION FROM EXISTING (CFS)
B1	0.25	0.391	0.232	-0.018
B3	1.723	2.265	1.566	-0.157
B4	0.667	1.026	0.597	-0.07
TOTAL	2.64	3.682	2.395	-0.245

SHED C				
SUBSHED	EXISTING PEAK RUNOFF (CFS)	PROPOSED PEAK RUNOFF (CFS)	PROPOSED PEAK RUNOFF W/ DETENTION (CFS)	FLOW REDUCTION FROM EXISTING (CFS)
C1	2.668	3.390	2.428	-0.240
C2	6.45	8.542	6.176	-0.274
C3	1.168	1.531	1.072	-0.096
TOTAL	10.064	13.135	9.456	-0.608

SHED D				
SUBSHED	EXISTING PEAK RUNOFF (CFS)	PROPOSED PEAK RUNOFF (CFS)	PROPOSED PEAK RUNOFF W/ DETENTION (CFS)	FLOW REDUCTION FROM EXISTING (CFS)
D1	0.807	1.05	0.683	-0.124
D3	0.472	0.519	0.389	-0.083
D4	0.417	0.498	0.363	-0.054
TOTAL	1.696	2.067	1.435	-0.261

5. SUMMARY

Among the four (4) sheds A, B, C & D the total reduction is 1.575 CFS. The project will create no negative stormwater impacts downstream due to the Integrated Bioinfiltration-Detention System utilized.

SOURCES:

Carter, Timothy & Jackson, C. (2007). Vegetated roofs for stormwater management at multiple spatial scales. Landscape and Urban Planning. 80. 84-94. 10.1016/j.landurbplan.2006.06.005.

SUBSHED A2 COMPOSITE RUNOFF COEFFICIENT TABLE											
A2 SUBSHEDS	TOTAL AREA (SF)	TOTAL AREA (ACRES)	IMPERVIOUS AREA (SF)	RUNOFF COEFFICIENT	LANDSCAPE AREA (SF)	RUNOFF COEFFICIENT	GREEN ROOF (SF)	RUNOFF COEFFICIENT	PERMEABLE PAVER (SF)	RUNOFF COEFFICIENT	COMPOSITE RUNOFF COEFFICIENT
A2A	5113	0.12	153.3	0.9	4959.7	0.57		0.86		0.4	0.58
A2B	1742.7	0.04	84.3	0.9	1658.4	0.57		0.86		0.4	0.59
A2C	8453.1	0.19	1181.9	0.9	2217.2	0.57		0.86	5054	0.4	0.51
A2A-C	**15308.8**	**0.35**	**1419.50**	**0.9**	**8835.30**	**0.57**	**0.00**	**0.86**	**5054.00**	**0.4**	**0.54**
A2D	920.9	0.02	920.9	0.9		0.57		0.86		0.4	0.90
A2E	3468.9	0.08	1976.4	0.9	1492.5	0.57		0.86		0.4	0.76
A2D-E	**4389.8**	**0.1**	**2897.3**	**0.9**	**1492.5**	**0.57**	**0**	**0.86**	**0**	**0.4**	**0.79**

SUBSHED A3 COMPOSITE RUNOFF COEFFICIENT TABLE											
A3 SUBSHEDS	TOTAL AREA (SF)	TOTAL AREA (ACRES)	IMPERVIOUS AREA (SF)	RUNOFF COEFFICIENT	LANDSCAPE AREA (SF)	RUNOFF COEFFICIENT	GREEN ROOF (SF)	RUNOFF COEFFICIENT	PERMEABLE PAVER (SF)	RUNOFF COEFFICIENT	COMPOSITE RUNOFF COEFFICIENT
A3A	8117	0.19	915.4	0.9	7201.6	0.57		0.86		0.4	0.61
A3B	21971.7	0.50	8901.2	0.9	12325.3	0.57		0.86	745.2	0.4	0.70
A3C	1027.3	0.02		0.9	1027.3	0.57		0.86		0.4	0.57
A3B-C	**22999**	**0.53**	**8901.2**	**0.9**	**13352.6**	**0.57**	**0**	**0.86**	**745.2**	**0.4**	**0.69**
A3D	4586.8	0.11	4295.2	0.9	291.6	0.57		0.86		0.4	0.88
A3E	4603.2	0.11		0.9	4603.2	0.57		0.86		0.4	0.57
A3D-E	**9190**	**0.21**	**4295.2**	**0.9**	**4894.8**	**0.57**	**0**	**0.86**	**0**	**0.4**	**0.72**
A3F	4815.2	0.11	2811.9	0.9	2003.3	0.57		0.86		0.4	0.76
A3G	1094.3	0.03	162.1	0.9	932.2	0.57		0.86		0.4	0.62
A3F-G	**5909.5**	**0.14**	**2974**	**0.9**	**2935.5**	**0.57**	**0**	**0.86**	**0**	**0.4**	**0.74**

SUBSHED B1 COMPOSITE RUNOFF COEFFICIENT TABLE											
B1A SUBSHED	TOTAL AREA (SF)	TOTAL AREA (ACRES)	IMPERVIOUS AREA (SF)	RUNOFF COEFFICIENT	LANDSCAPE AREA (SF)	RUNOFF COEFFICIENT	GREEN ROOF (SF)	RUNOFF COEFFICIENT	PERMEABLE PAVER (SF)	RUNOFF COEFFICIENT	COMPOSITE RUNOFF COEFFICIENT
B1A	3735.5	0.09	2414	0.9		0.57	1321.5	0.86		0.4	0.89

SUBSHED B3 COMPOSITE RUNOFF COEFFICIENT TABLE											
B3 SUBSHEDS	TOTAL AREA (SF)	TOTAL AREA (ACRES)	IMPERVIOUS AREA (SF)	RUNOFF COEFFICIENT	LANDSCAPE AREA (SF)	RUNOFF COEFFICIENT	GREEN ROOF (SF)	RUNOFF COEFFICIENT	PERMEABLE PAVER (SF)	RUNOFF COEFFICIENT	COMPOSITE RUNOFF COEFFICIENT
B3A	3451.7	0.08	2855.3	0.9	60	0.57		0.86	536.4	0.4	0.82
B3B	4335.8	0.10	2470.1	0.9	1259.2	0.57		0.86	606.5	0.4	0.73
B3C	8704.6	0.20	2547.4	0.9	1739.6	0.57	2178.3	0.86	2239.3	0.4	0.70
B3D	5708	0.13	4599.8	0.9	417.1	0.57	691.1	0.86		0.4	0.87
B3E	1761	0.04	1305.1	0.9	455.9	0.57		0.86		0.4	0.81
B3F	2893.3	0.07		0.9	2893.3	0.57		0.86		0.4	0.57
B3E-F	**4654.3**	**0.11**	**1305.1**	**0.9**	**3349.2**	**0.57**	**0**	**0.86**	**0**	**0.4**	**0.66**

SUBSHED B4 COMPOSITE RUNOFF COEFFICIENT TABLE											
B4 SUBSHEDS	TOTAL AREA (SF)	TOTAL AREA (ACRES)	IMPERVIOUS AREA (SF)	RUNOFF COEFFICIENT	LANDSCAPE AREA (SF)	RUNOFF COEFFICIENT	GREEN ROOF (SF)	RUNOFF COEFFICIENT	PERMEABLE PAVER (SF)	RUNOFF COEFFICIENT	COMPOSITE RUNOFF COEFFICIENT
B4A	4294.4	0.10	3647.6	0.9	646.8	0.57		0.86		0.4	0.85
B4B	1904.4	0.04	783.9	0.9		0.57	1120.5	0.86		0.4	0.88
B4C	4373.2	0.10	4373.2	0.9		0.57		0.86		0.4	0.90

SUBSHED C1 COMPOSITE RUNOFF COEFFICIENT TABLE											
C1 SUBSHEDS	TOTAL AREA (SF)	TOTAL AREA (ACRES)	IMPERVIOUS AREA (SF)	RUNOFF COEFFICIENT	LANDSCAPE AREA (SF)	RUNOFF COEFFICIENT	GREEN ROOF (SF)	RUNOFF COEFFICIENT	PERMEABLE PAVER (SF)	RUNOFF COEFFICIENT	COMPOSITE RUNOFF COEFFICIENT
PA	6930.5	0.16	2007.2	0.9	4923.5	0.57		0.86		0.4	0.67
L9A	5918	0.14	0	0.9	3773.5	0.57	1068.8	0.86	1075.7	0.4	0.59
L9B	3960.4	0.09	2691.6	0.9	961.6	0.57	307.2	0.86		0.4	0.82
L9C	4033.8	0.09	2849.6	0.9	495.8	0.57	688.4	0.86		0.4	0.85
L8A	8854.1	0.20	3850.2	0.9	4813.3	0.57	122.9	0.86	67.7	0.4	0.72
L8B	3547.7	0.08	813.4	0.9	394.4	0.57	2339.9	0.86		0.4	0.84
L7A	6305.2	0.14	943.4	0.9	3138.3	0.57	2223.5	0.86		0.4	0.72
L7B	2555	0.06	2555	0.9		0.57		0.86		0.4	0.90

SUBSHED C2 COMPOSITE RUNOFF COEFFICIENT TABLE											
C2 SUBSHEDS	TOTAL AREA (SF)	TOTAL AREA (ACRES)	IMPERVIOUS AREA (SF)	RUNOFF COEFFICIENT	LANDSCAPE AREA (SF)	RUNOFF COEFFICIENT	GREEN ROOF (SF)	RUNOFF COEFFICIENT	PERMEABLE PAVER (SF)	RUNOFF COEFFICIENT	COMPOSITE RUNOFF COEFFICIENT
C2A	5648.6	0.13	2029.5	0.9	3619.1	0.57		0.86		0.4	0.69
C2B	17716.8	0.41	4228.2	0.9	13488.6	0.57		0.86		0.4	0.65
C2C	15851.8	0.36	4714.9	0.9	10315.7	0.57		0.86	821.2	0.4	0.66
C2D	11756	0.27	3606.5	0.9	8150.5	0.57		0.86		0.4	0.67
C2E	10982.6	0.25	7750.4	0.9		0.57		0.86	3232.2	0.4	0.75
C2F	14696.5	0.34	4970.4	0.9	7750.6	0.57		0.86	1975.5	0.4	0.66
C2G	13283.9	0.30	4485.2	0.9	8798.7	0.57		0.86		0.4	0.68
L7C	3531.7	0.08		0.9		0.57	2453	0.86	1079.8	0.4	0.72
C2H	7126.2	0.16	5871.2	0.9		0.57	1255	0.86		0.4	0.89
C2I	1062.6	0.02	470.6	0.9		0.57	592	0.86		0.4	0.88

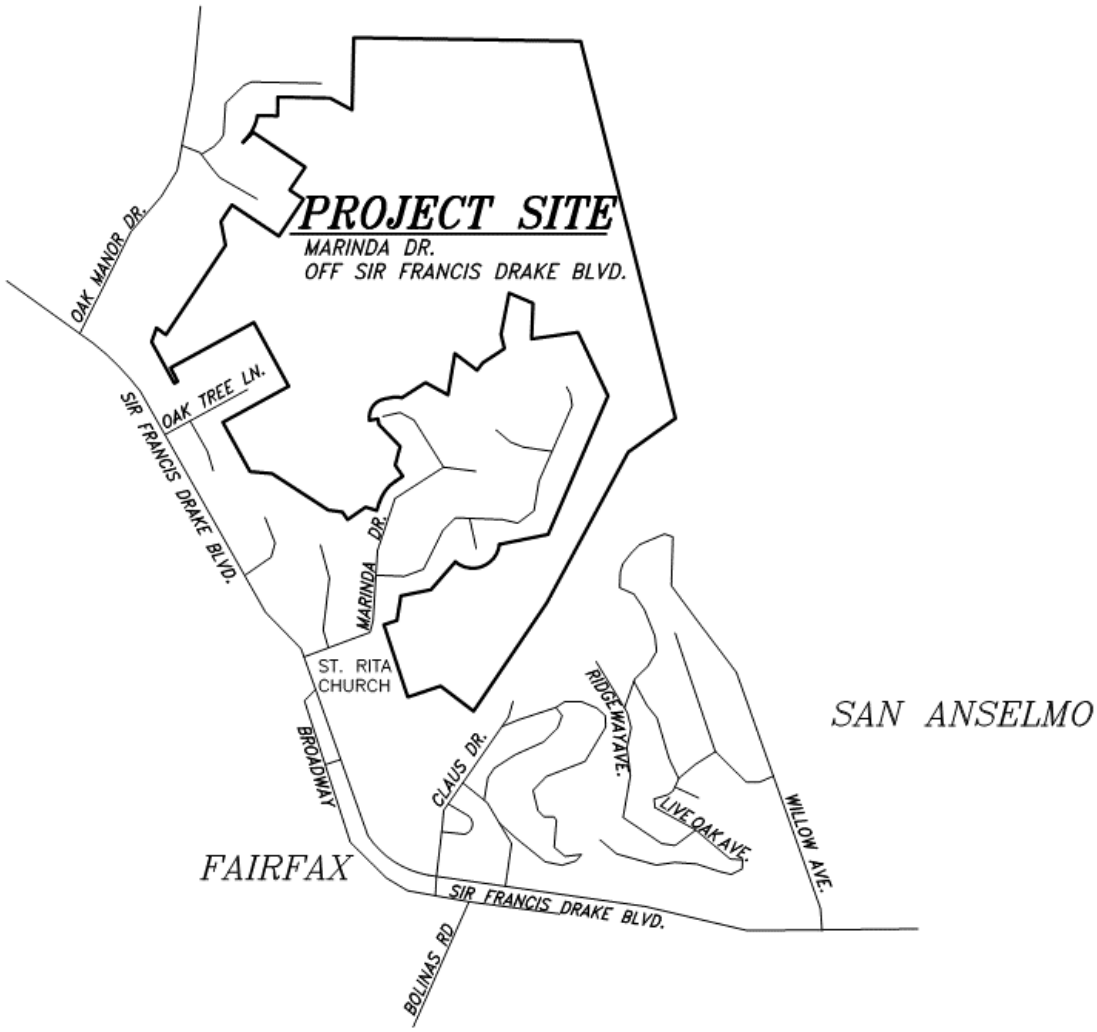
SUBSHED C3 COMPOSITE RUNOFF COEFFICIENT TABLE											
C3 SUBSHEDS	TOTAL AREA (SF)	TOTAL AREA (ACRES)	IMPERVIOUS AREA (SF)	RUNOFF COEFFICIENT	LANDSCAPE AREA (SF)	RUNOFF COEFFICIENT	GREEN ROOF (SF)	RUNOFF COEFFICIENT	PERMEABLE PAVER (SF)	RUNOFF COEFFICIENT	COMPOSITE RUNOFF COEFFICIENT
C3A	1842	0.04	1709.7	0.9	132.3	0.4		0.86		0.4	0.86
C3B	2356.4	0.05	2356.4	0.9	0	0.4		0.86	0	0.4	0.90
C3C	3088	0.07	343	0.9		0.4	0	0.86	2745	0.4	0.46
C3D	4441.1	0.10	3141.9	0.9	130	0.4	1169.2	0.86	0	0.4	0.87
C3C-D	**7529.1**	**0.17**	**3484.9**	**0.9**	**130**	**0.4**	**1169.2**	**0.86**	**2745**	**0.4**	**0.70**
C3E	1857.4	0.04	101.5	0.9	425.5	0.4		0.86	1330.4	0.4	0.43
C3F	2923	0.07	586.9	0.9	1008.1	0.4		0.86	1328	0.4	0.50
C3G	4123.4	0.09	2124.7	0.9		0.4	1998.7	0.86		0.4	0.88
C3E-G	**7046.4**	**0.16**	**2711.6**	**0.9**	**1008.1**	**0.4**	**1998.7**	**0.86**	**1328**	**0.4**	**0.72**

SUBSHED D1 COMPOSITE RUNOFF COEFFICIENT TABLE											
D1 SUBSHEDS	TOTAL AREA (SF)	TOTAL AREA (ACRES)	IMPERVIOUS AREA (SF)	RUNOFF COEFFICIENT	LANDSCAPE AREA (SF)	RUNOFF COEFFICIENT	GREEN ROOF (SF)	RUNOFF COEFFICIENT	PERMEABLE PAVER (SF)	RUNOFF COEFFICIENT	COMPOSITE RUNOFF COEFFICIENT
D1A	7517.3	0.17	3465.6	0.9	387.9	0.57		0.86	3663.8	0.4	0.64
D1B	3177.2	0.07	2853.7	0.9	0	0.57	323.5	0.86	0	0.4	0.90
D1C	2276	0.05	2076	0.9	200	0.57	0	0.86		0.4	0.87

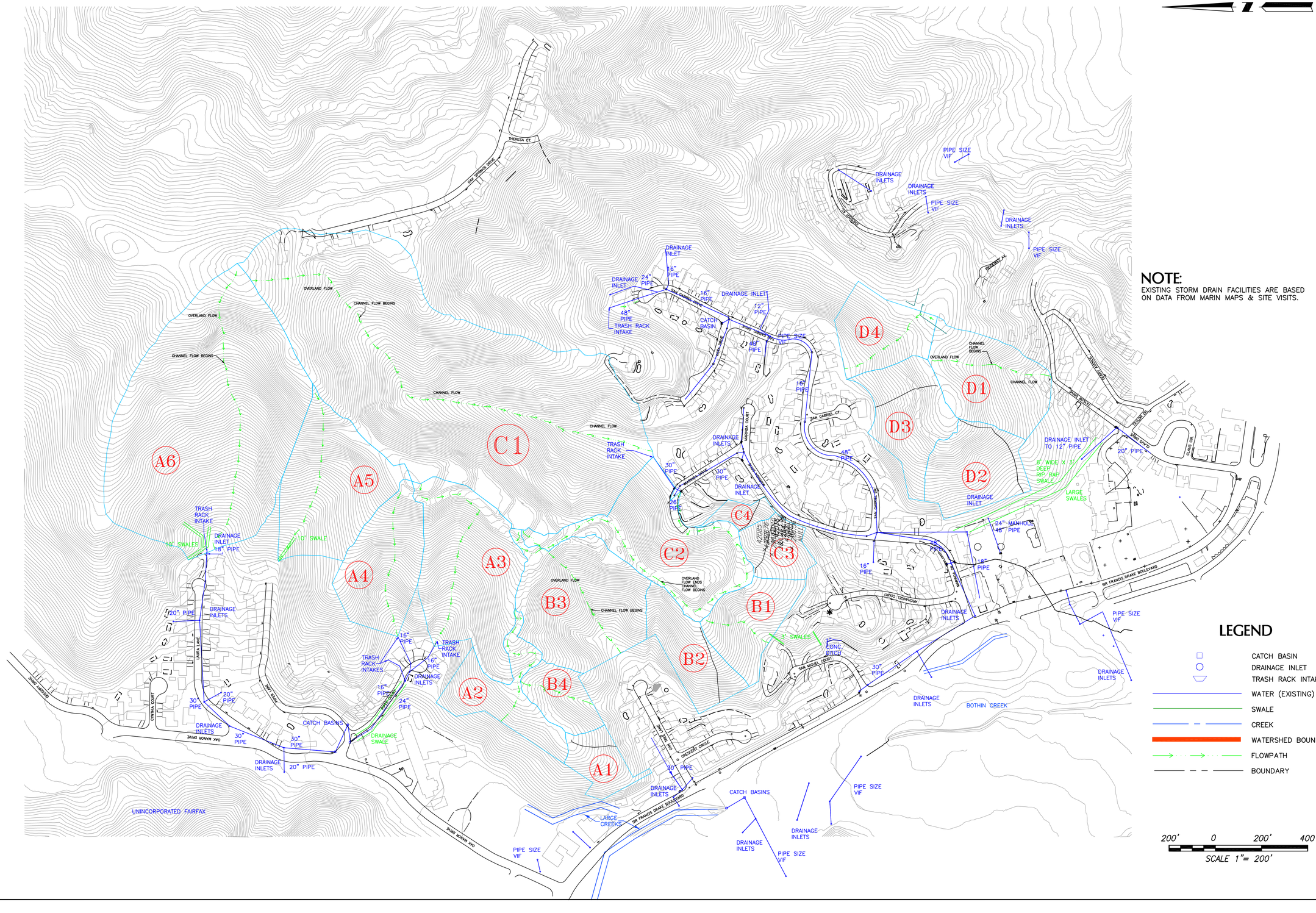
SUBSHED D3 COMPOSITE RUNOFF COEFFICIENT TABLE											
D3 SUBSHEDS	TOTAL AREA (SF)	TOTAL AREA (ACRES)	IMPERVIOUS AREA (SF)	RUNOFF COEFFICIENT	LANDSCAPE AREA (SF)	RUNOFF COEFFICIENT	GREEN ROOF (SF)	RUNOFF COEFFICIENT	PERMEABLE PAVER (SF)	RUNOFF COEFFICIENT	COMPOSITE RUNOFF COEFFICIENT
D3A	3723.3	0.09	0	0.9	2152.1	0.4	0	0.86	1571.2	0.4	0.40
D3B	3445.3	0.08	1906	0.9	0	0.57	1539.3	0.86	0	0.4	0.88

SUBSHED D4 COMPOSITE RUNOFF COEFFICIENT TABLE											
D4 SUBSHEDS	TOTAL AREA (SF)	TOTAL AREA (ACRES)	IMPERVIOUS AREA (SF)	RUNOFF COEFFICIENT	LANDSCAPE AREA (SF)	RUNOFF COEFFICIENT	GREEN ROOF (SF)	RUNOFF COEFFICIENT	PERMEABLE PAVER (SF)	RUNOFF COEFFICIENT	COMPOSITE RUNOFF COEFFICIENT
D4A	6536.2	0.15	2106.3	0.9	4429.9	0.57	0	0.86	0	0.4	0.68

ATTACHMENT 1: VICINITY MAP



VICINITY MAP
NOT TO SCALE



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PHONE (415) 897-2800
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NO.	DATE	REVISION	APP.
1			
2			
3			
4			

EXISTING WATERSHED MAP
MARINDA HEIGHTS SUBDIVISION

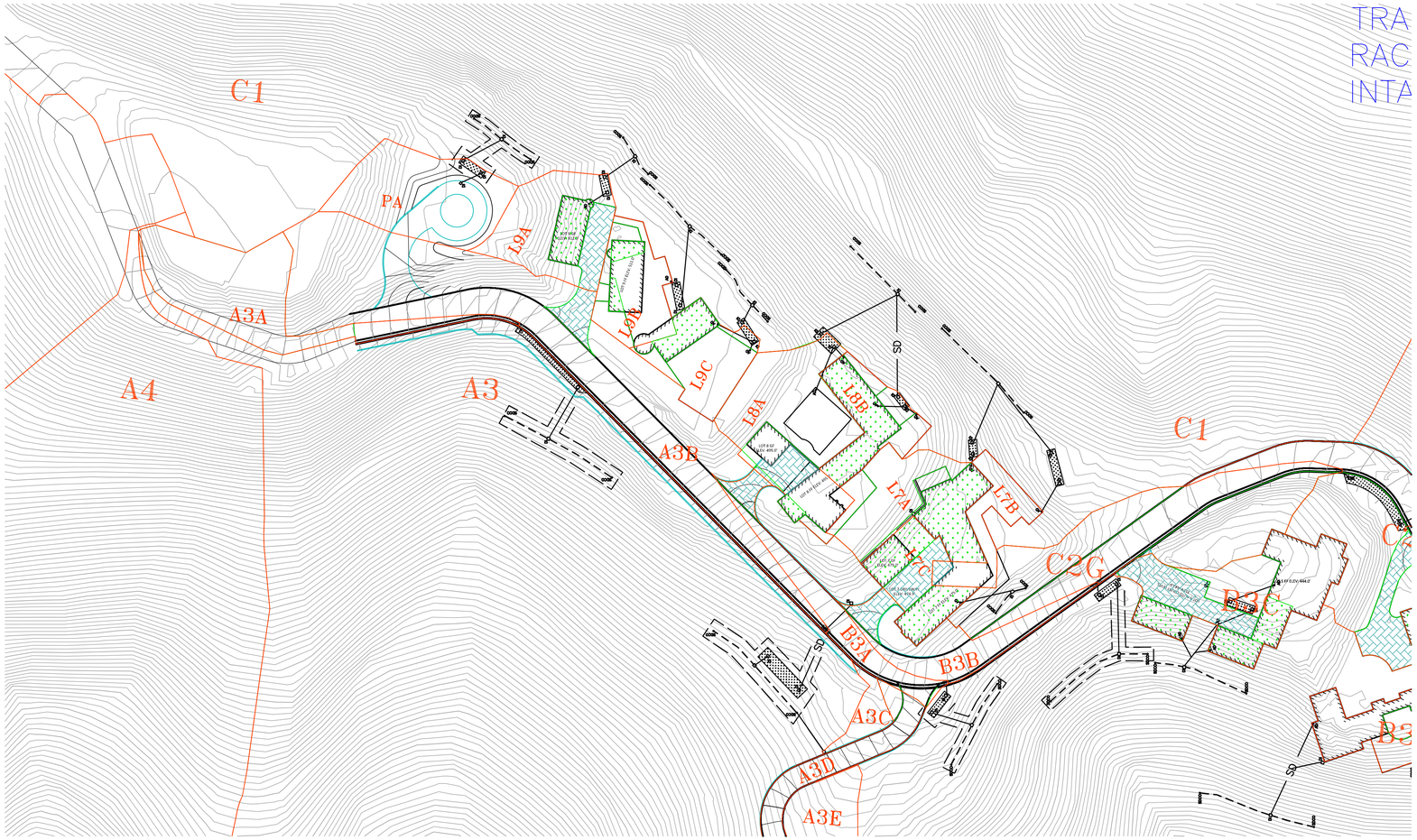
APN: 001-150-12, 001-171-51, 001-251-31, 001-160-09

FAIRFAX CALIFORNIA

Scale: 1" = 200'
Drawn by: HJS
Designed by: HJS
Checked by: LEO
Date: SEPTEMBER 2017

SHEET
C1
OF 1

15-163



A3 & C1 SUBSHEDS

SCALE: 1" = 50'

LEGEND

- CATCH BASIN
- DRAINAGE INLET
- GREEN ROOF
- PERMEABLE PAVERS
- WATERSHED BOUNDARY

50' 0 50' 100'

SCALE: 1"= 50'

NO.	DATE	REVISION	APP.
1			
2			
3			
4			

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PROPOSED WATERSHED MAP
MARINDA HEIGHTS SUBDIVISION

APN: 001-150-12, 001-171-51, 001-251-31, 001-160-09

FAIRFAX CALIFORNIA

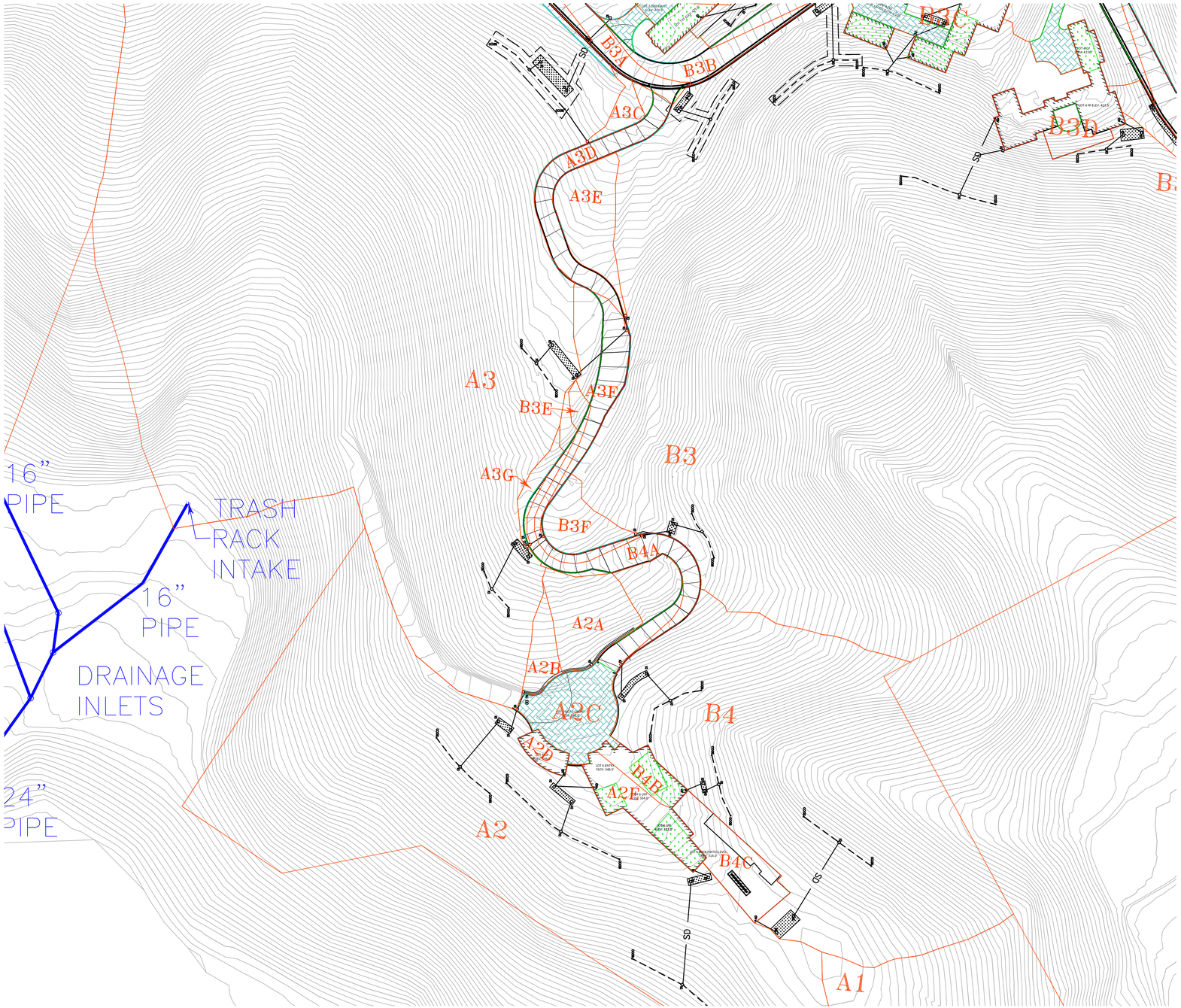
Scale:	1" = 50'
Drawn by:	HJS
Designed by:	HJS
Checked by:	LEO
Date:	SEPTEMBER 2017

SHEET

C1

OF 4

15-163



A2, A3, B3 & B4 SUBSHEDS

SCALE: 1" = 50'

NO.	DATE	REVISION	APP.
1			
2			
3			
4			

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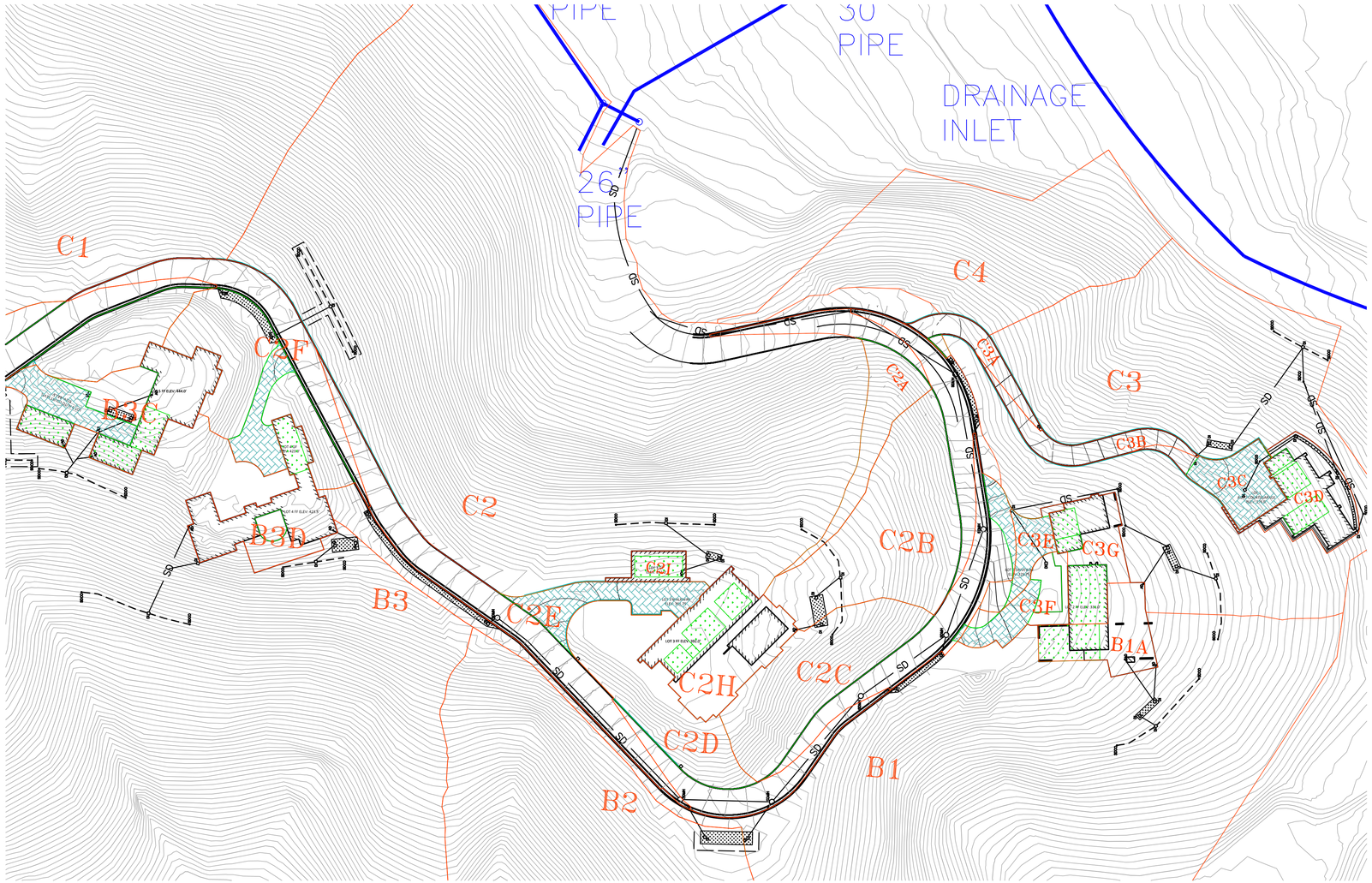
PROPOSED WATERSHED MAP
MARINDA HEIGHTS SUBDIVISION
APN: 001-150-12, 001-171-51, 001-251-31, 001-160-09
FAIRFAX CALIFORNIA

Scale:	1" = 50'
Drawn by:	HJS
Designed by:	HJS
Checked by:	LEO
Date:	SEPTEMBER 2017

SHEET
C2
OF 4

15-163



LEGEND

- CATCH BASIN
- DRAINAGE INLET
- GREEN ROOF
- PERMEABLE PAVERS
- WATERSHED BOUNDARY

B (1,2&3) & C (2,3&4) SUBSHEDS

SCALE: 1" = 50'

50' 0 50' 100'

SCALE: 1"= 50'

NO.	DATE	REVISION	APP.
1			
2			
3			
4			

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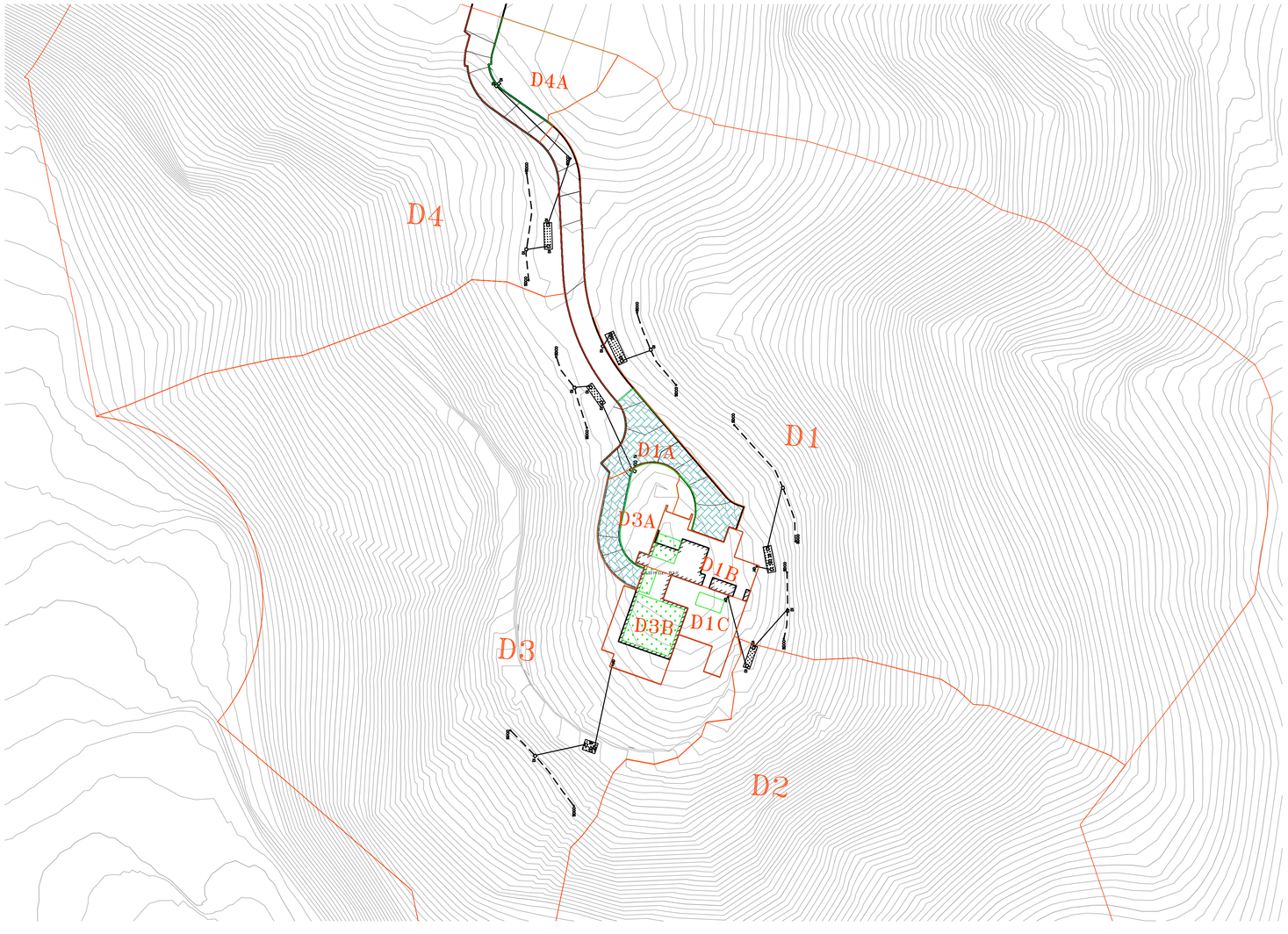
PROPOSED WATERSHED MAP
MARINDA HEIGHTS SUBDIVISION
FAIRFAX CALIFORNIA
APN: 001-150-12, 001-171-51, 001-251-31, 001-160-09

Scale:	1" = 50'
Drawn by:	HJS
Designed by:	HJS
Checked by:	LEO
Date:	SEPTEMBER 2017

SHEET
C3
OF 4

15-163



SHED D SUBSHEDS

SCALE: 1" = 50'

LEGEND

- CATCH BASIN
- DRAINAGE INLET
- GREEN ROOF
- PERMEABLE PAVERS
- WATERSHED BOUNDARY

50' 0 50' 100'

SCALE: 1"= 50'

NO.	DATE	REVISION	APP.
1			
2			
3			
4			

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7200 REDWOOD BLVD. SUITE 305, NOVATO, CA 94945
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PROPOSED WATERSHED MAP
MARINDA HEIGHTS SUBDIVISION

APN: 001-150-12, 001-171-51, 001-251-31, 001-160-09

FAIRFAX CALIFORNIA

Scale:	1" = 50'
Drawn by:	HJS
Designed by:	HJS
Checked by:	LEO
Date:	SEPTEMBER 2017

SHEET

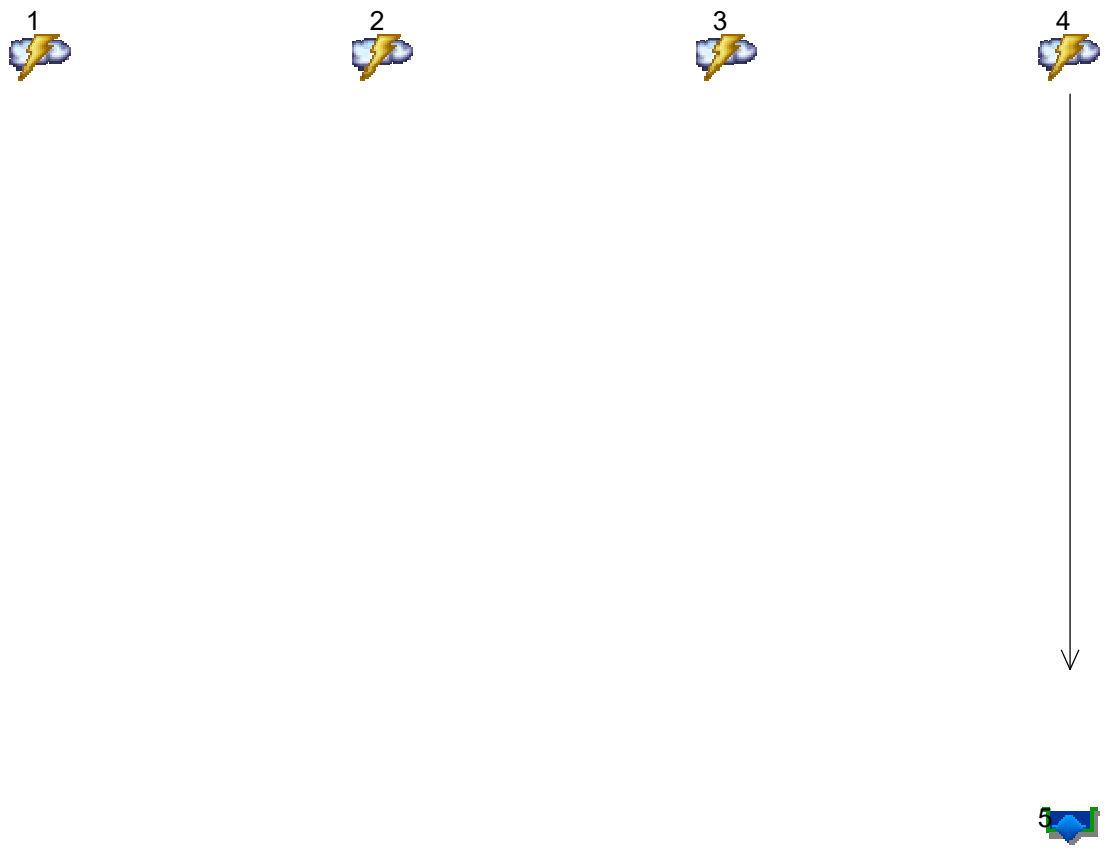
C4

OF 4

15-163

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514



Legend

Hyd.	Origin	Description
1	Rational	A2A-C (EXISTING)
2	Rational	A2A-C
3	Rational	A2D-E (EXISTING)
4	Rational	A2D-E
5	Reservoir	A2D-E DETENTION

Hydraflow Table of Contents

A2 SUBSHEDS.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

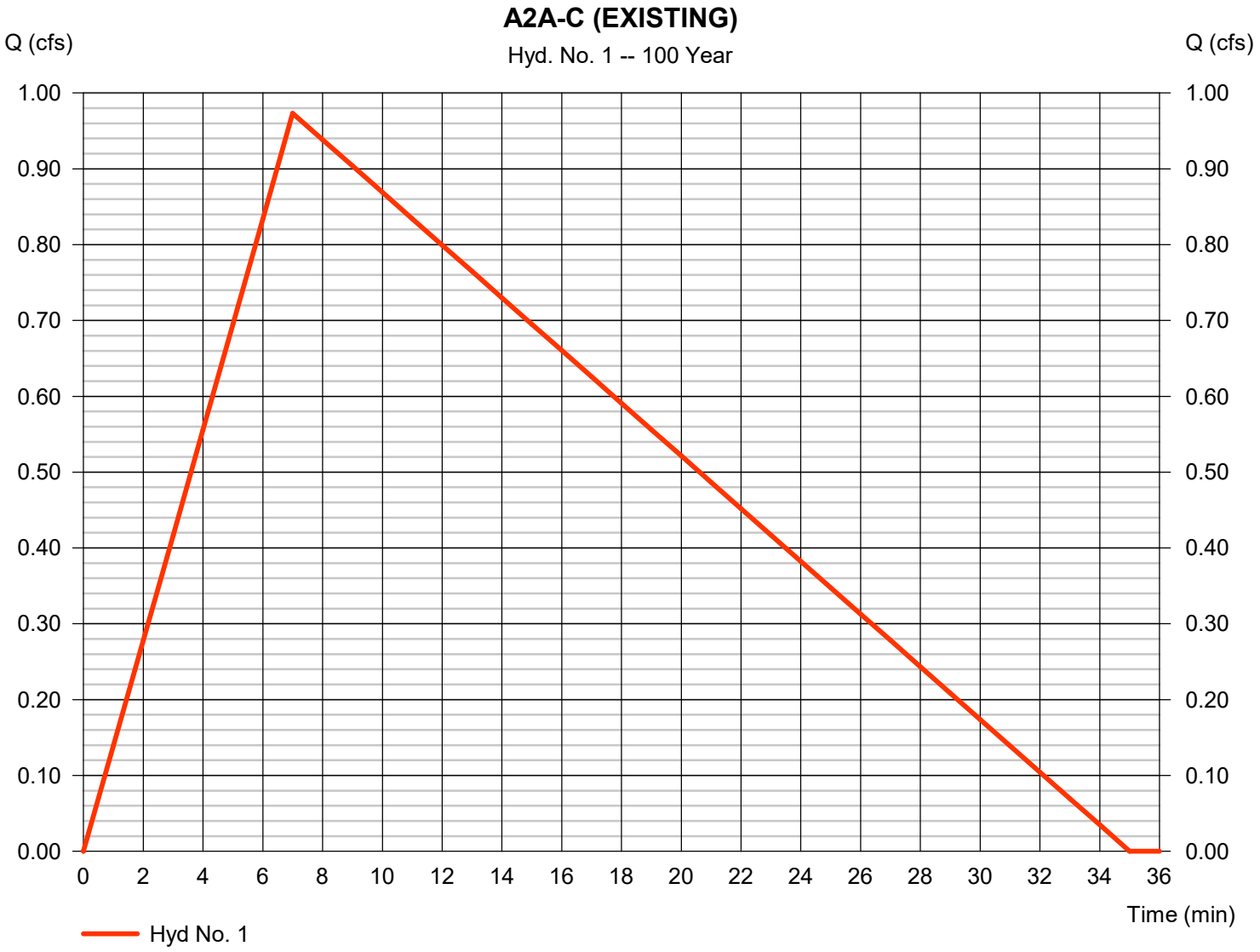
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	0.973	1	7	1,022	------	------	------	A2A-C (EXISTING)
2	Rational	0.922	1	7	968	------	------	------	A2A-C
3	Rational	0.278	1	7	292	------	------	------	A2D-E (EXISTING)
4	Rational	0.385	1	7	405	------	------	------	A2D-E
5	Reservoir	0.262	1	16	361	4	100.81	131	A2D-E DETENTION

Hydrograph Report

Hyd. No. 1

A2A-C (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.973 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	1,022 cuft
Drainage area	=	0.350 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

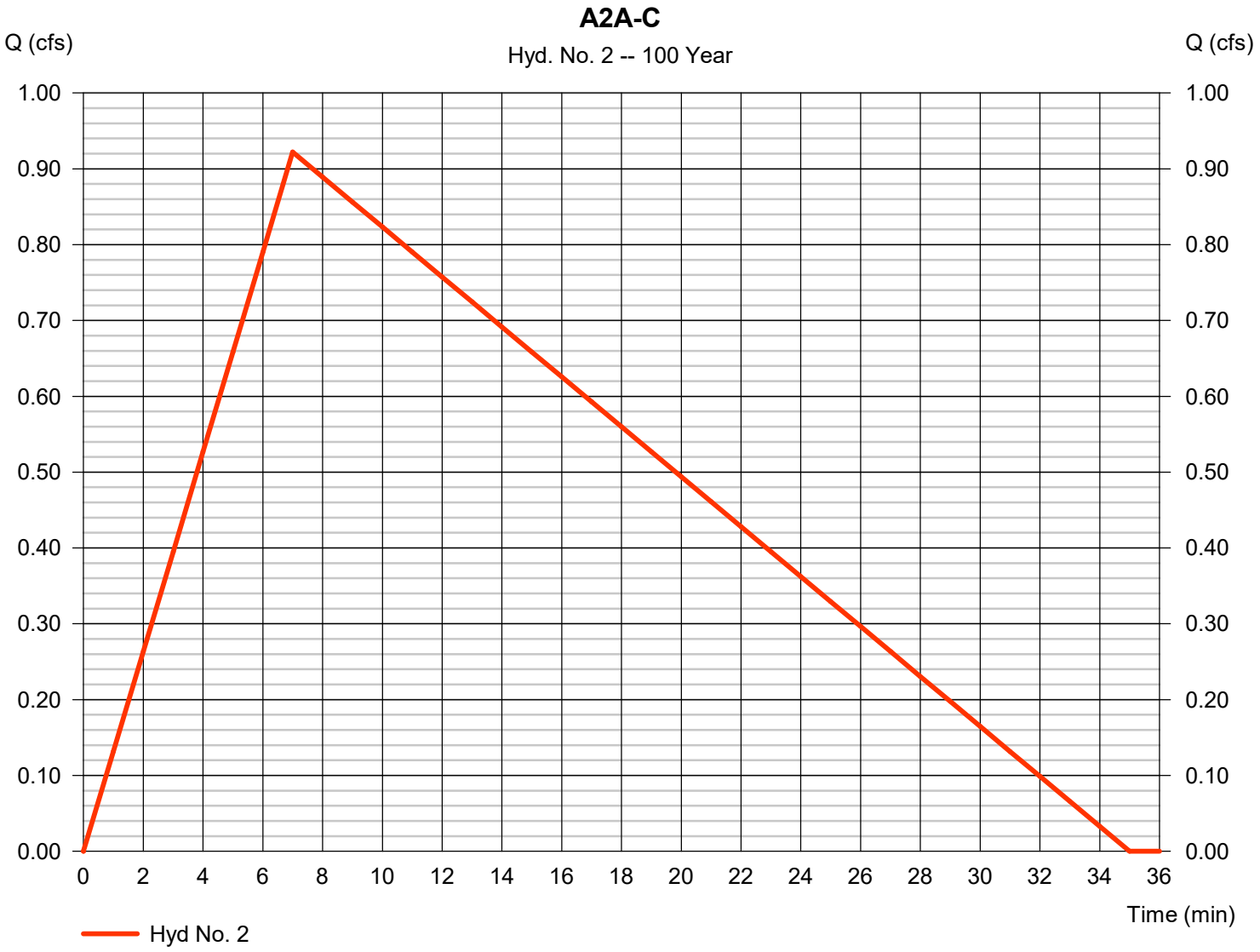


Hydrograph Report

Hyd. No. 2

A2A-C

Hydrograph type	=	Rational	Peak discharge	=	0.922 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	968 cuft
Drainage area	=	0.350 ac	Runoff coeff.	=	0.54
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



Hydrograph Report

Hyd. No. 3

A2D-E (EXISTING)

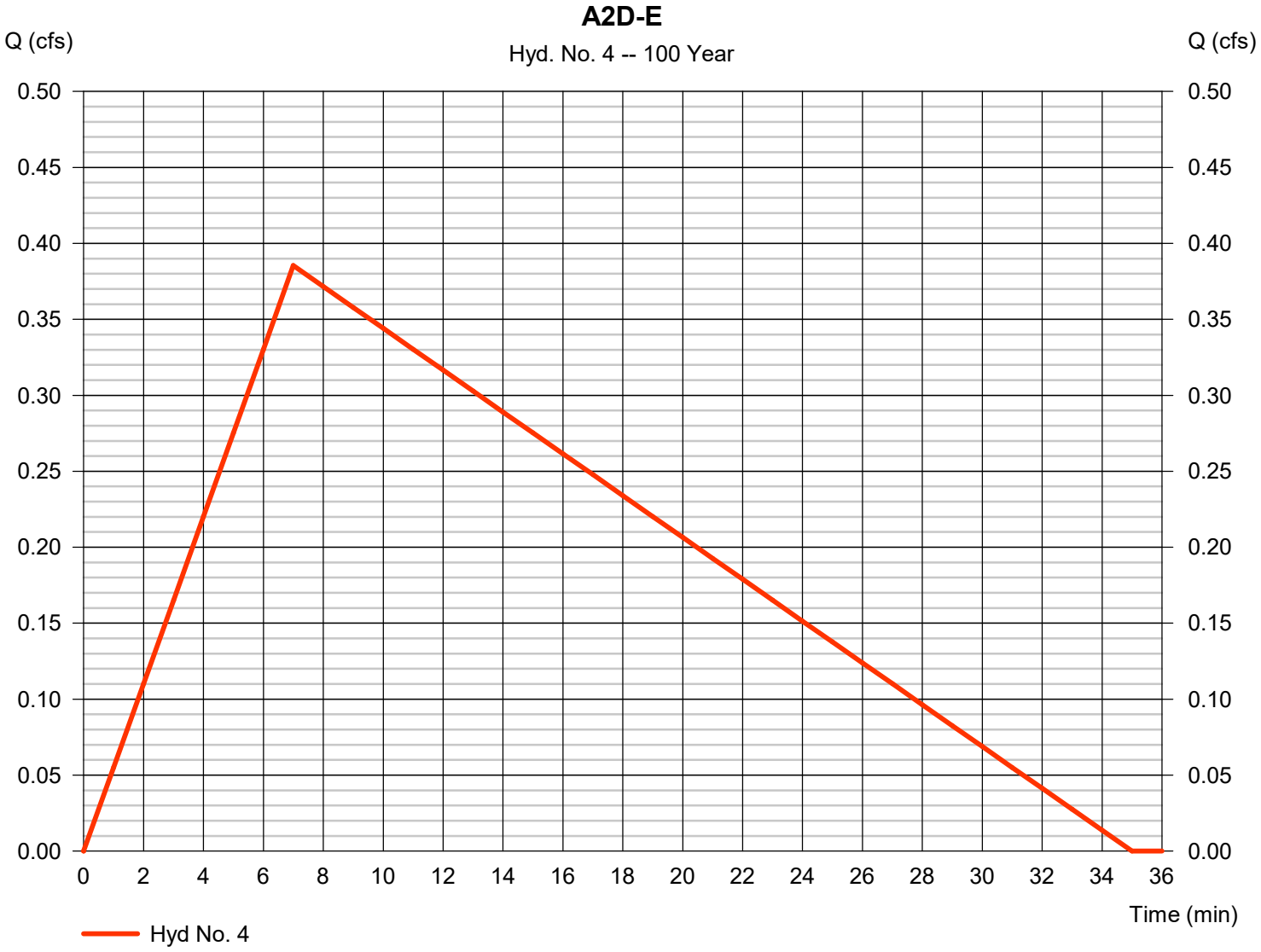
Hydrograph type	= Rational	Peak discharge	= 0.278 cfs
Storm frequency	= 100 yrs	Time to peak	= 7 min
Time interval	= 1 min	Hyd. volume	= 292 cuft
Drainage area	= 0.100 ac	Runoff coeff.	= 0.57
Intensity	= 4.878 in/hr	Tc by User	= 7.00 min
IDF Curve	= Fairfax.idf	Asc/Rec limb fact	= 1/4

Hydrograph Report

Hyd. No. 4

A2D-E

Hydrograph type	=	Rational	Peak discharge	=	0.385 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	405 cuft
Drainage area	=	0.100 ac	Runoff coeff.	=	0.79
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



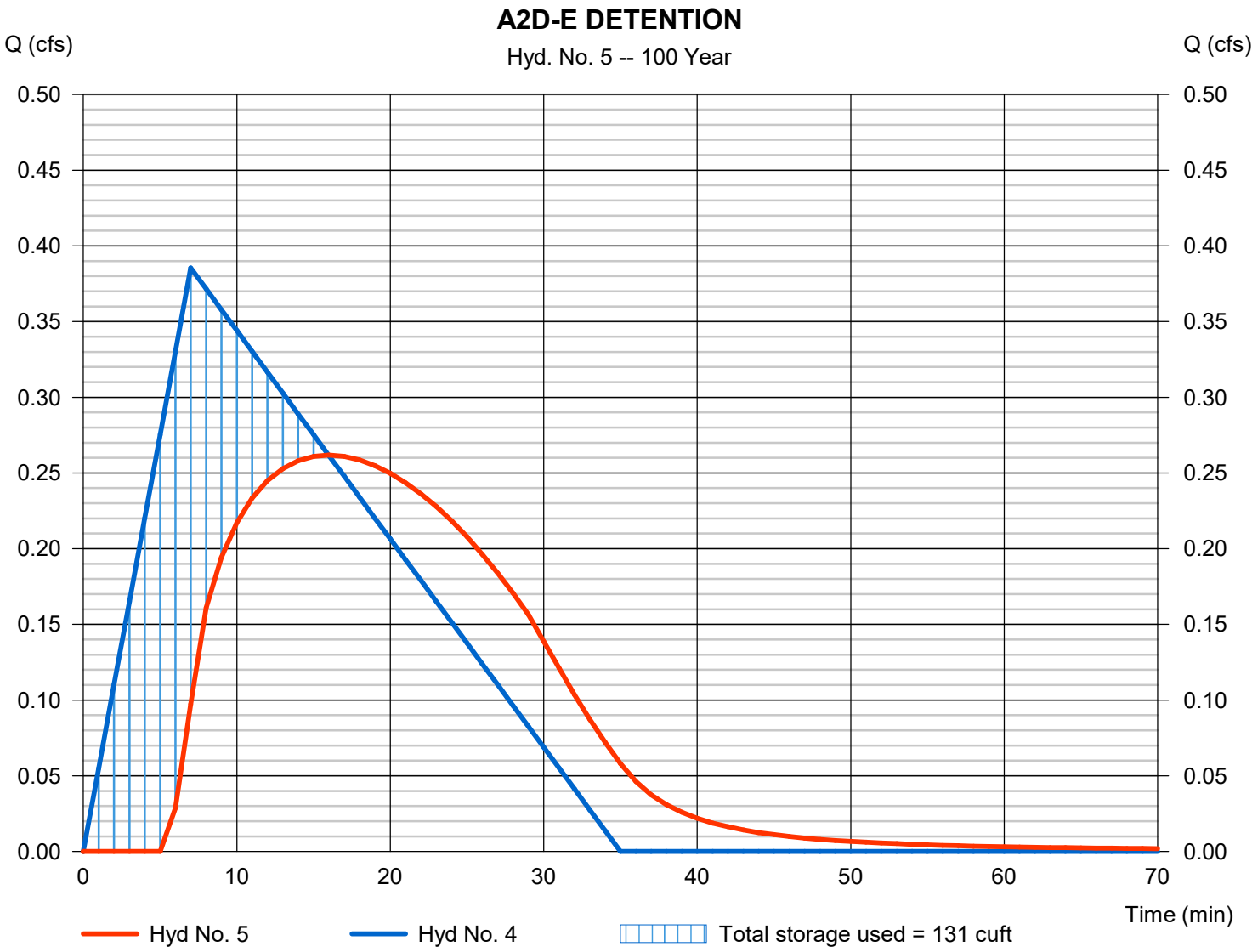
Hydrograph Report

Hyd. No. 5

A2D-E DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.262 cfs
Storm frequency	=	100 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	361 cuft
Inflow hyd. No.	=	4 - A2D-E	Max. Elevation	=	100.81 ft
Reservoir name	=	BIO A2D-E	Max. Storage	=	131 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - BIO A2D-E

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 5.70 ft, Barrel Len = 28.50 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	31	31
0.38	100.38	n/a	31	62
0.57	100.57	n/a	31	93
0.76	100.76	n/a	31	123
0.95	100.95	n/a	31	154
1.14	101.14	n/a	31	185
1.33	101.33	n/a	31	216
1.52	101.52	n/a	31	247
1.71	101.71	n/a	31	278
1.90	101.90	n/a	31	309

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	6.00	0.00	0.00
Span (in)	= 4.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.25	102.50	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) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

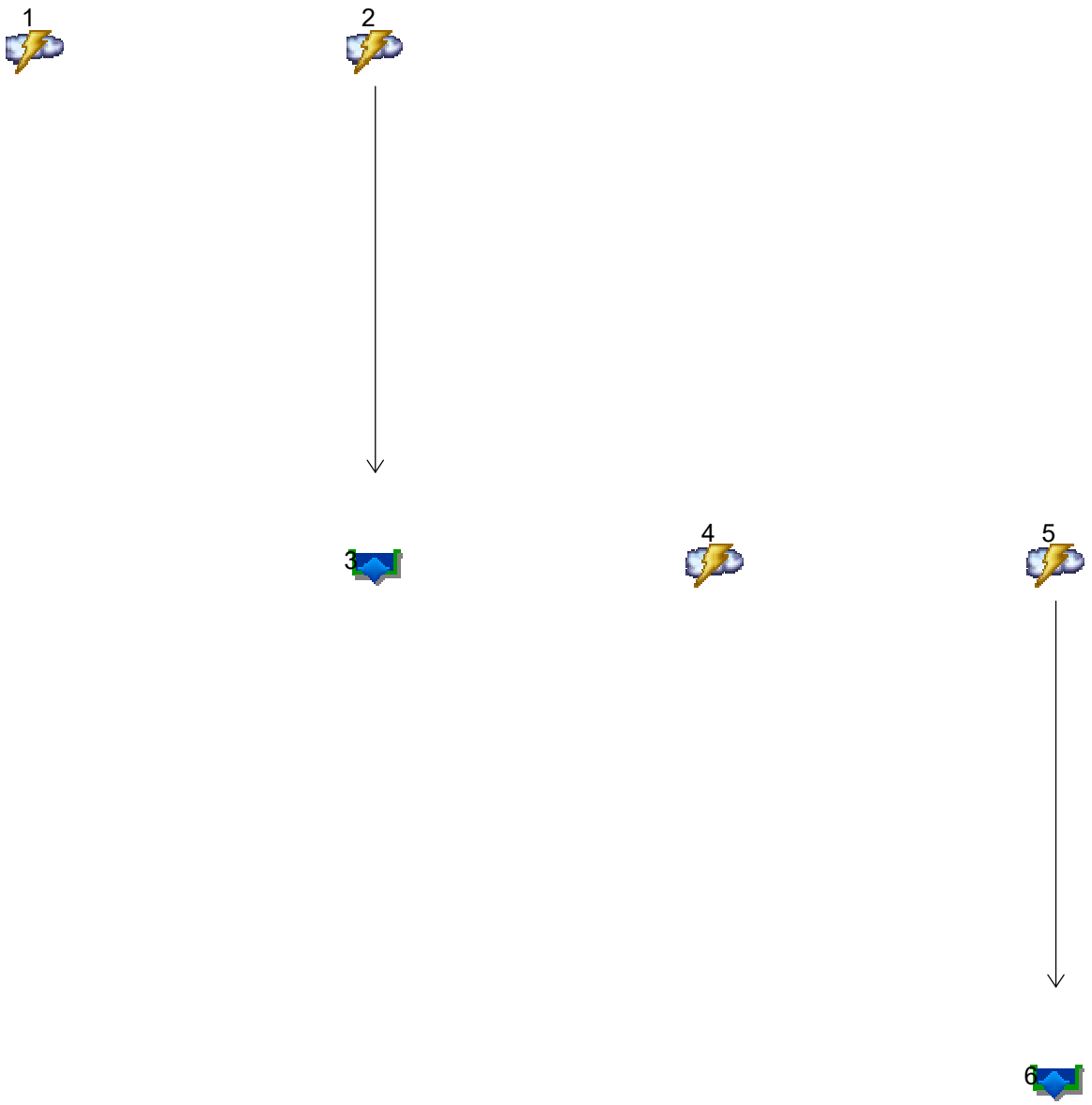
Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

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	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	31	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	62	100.38	0.04 ic	0.00	---	---	---	---	---	---	---	---	0.039
0.57	93	100.57	0.17 ic	0.00	---	---	---	---	---	---	---	---	0.166
0.76	123	100.76	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.246
0.95	154	100.95	0.31 ic	0.00	---	---	---	---	---	---	---	---	0.307
1.14	185	101.14	0.36 ic	0.00	---	---	---	---	---	---	---	---	0.357
1.33	216	101.33	0.40 ic	0.00	---	---	---	---	---	---	---	---	0.402
1.52	247	101.52	0.44 ic	0.00	---	---	---	---	---	---	---	---	0.441
1.71	278	101.71	0.48 ic	0.00	---	---	---	---	---	---	---	---	0.478
1.90	309	101.90	0.51 ic	0.00	---	---	---	---	---	---	---	---	0.512

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514



Legend

Hyd.	Origin	Description
1	Rational	A3A (EXISTING)
2	Rational	A3A
3	Reservoir	A3A DETENTION
4	Rational	A3B-C (EXISTING)
5	Rational	A3B-C
6	Reservoir	A3B-C DETENTION

Hydraflow Table of Contents

A3 SUBSHEDS (A-C).gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	0.528	1	7	555	------	------	------	A3A (EXISTING)
2	Rational	0.565	1	7	594	------	------	------	A3A
3	Reservoir	0.390	1	16	560	2	101.28	162	A3A DETENTION
4	Rational	1.474	1	7	1,547	------	------	------	A3B-C (EXISTING)
5	Rational	1.784	1	7	1,873	------	------	------	A3B-C
6	Reservoir	1.409	1	13	1,863	5	102.09	368	A3B-C DETENTION

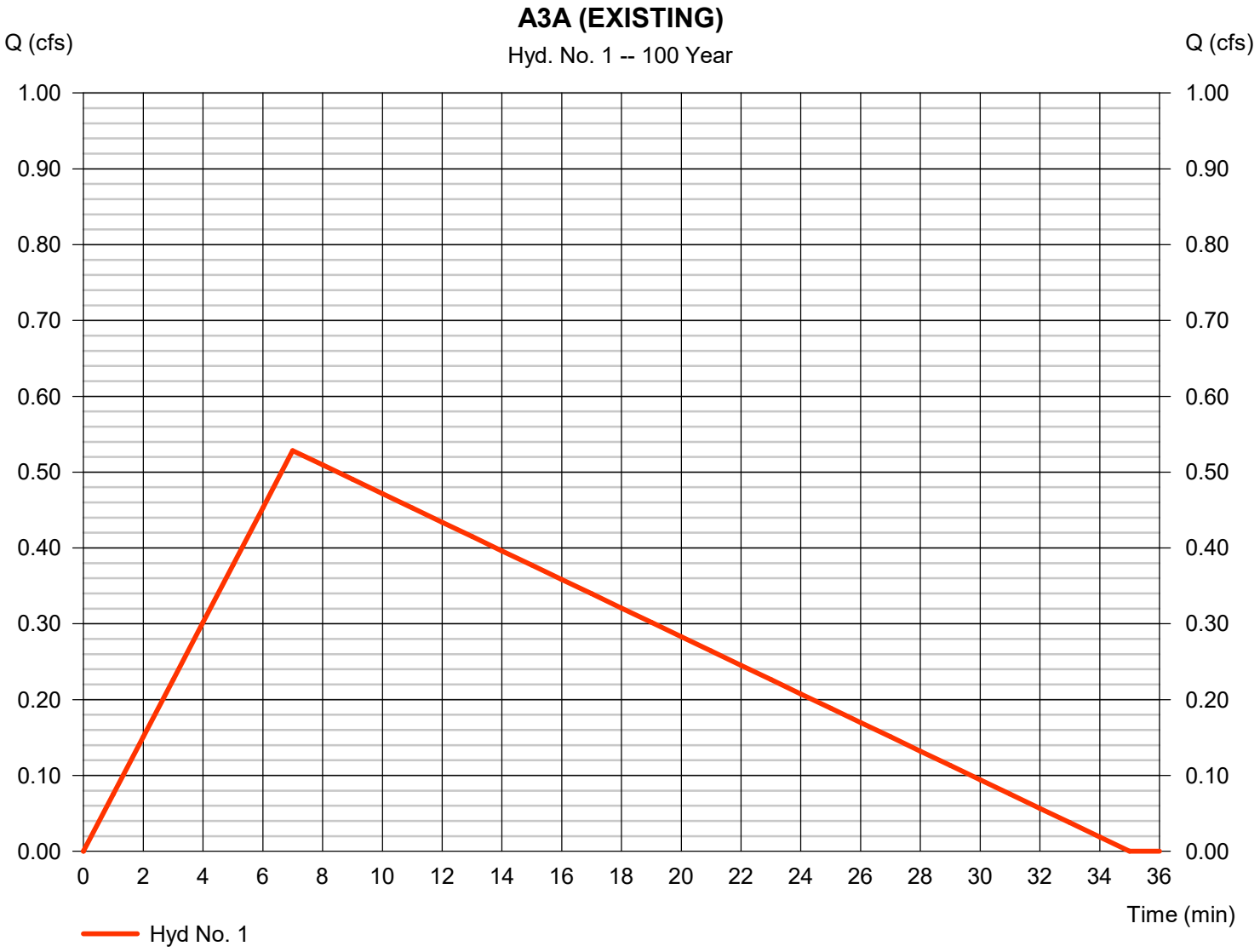
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hyd. No. 1

A3A (EXISTING)

Hydrograph type	= Rational	Peak discharge	= 0.528 cfs
Storm frequency	= 100 yrs	Time to peak	= 7 min
Time interval	= 1 min	Hyd. volume	= 555 cuft
Drainage area	= 0.190 ac	Runoff coeff.	= 0.57
Intensity	= 4.878 in/hr	Tc by User	= 7.00 min
IDF Curve	= Fairfax.idf	Asc/Rec limb fact	= 1/4

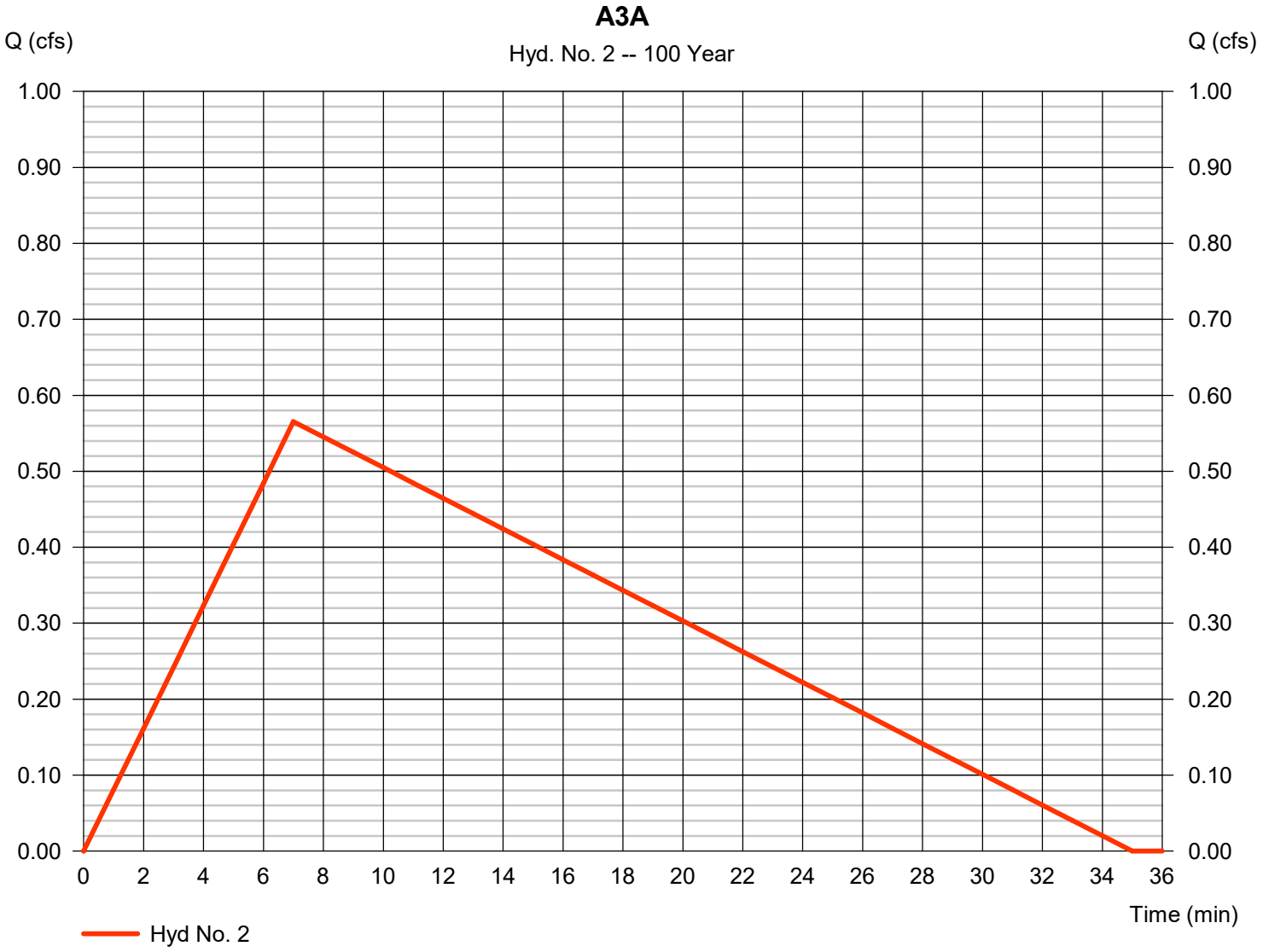


Hydrograph Report

Hyd. No. 2

A3A

Hydrograph type	=	Rational	Peak discharge	=	0.565 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	594 cuft
Drainage area	=	0.190 ac	Runoff coeff.	=	0.61
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



Hydrograph Report

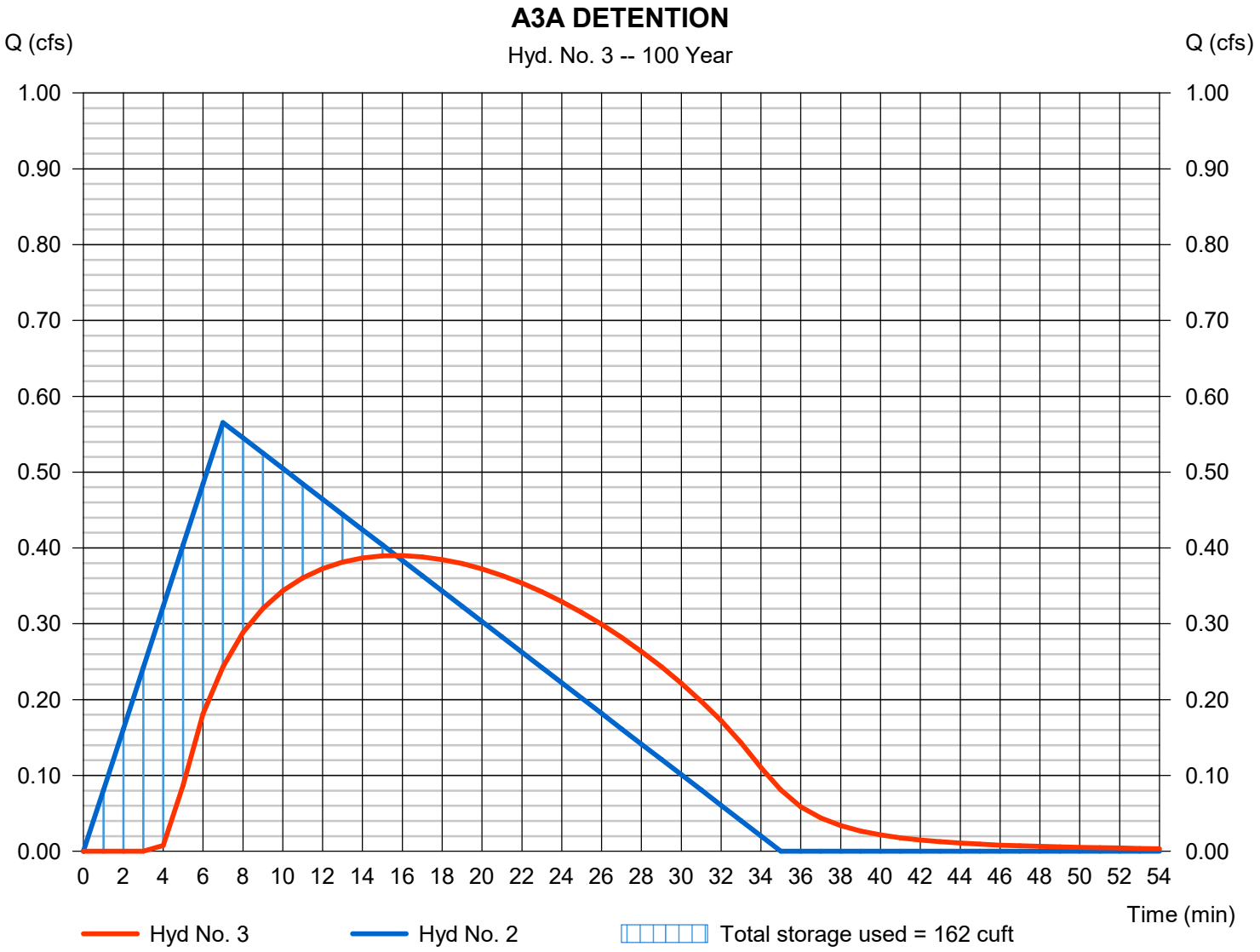
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hyd. No. 3

A3A DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.390 cfs
Storm frequency	=	100 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	560 cuft
Inflow hyd. No.	=	2 - A3A	Max. Elevation	=	101.28 ft
Reservoir name	=	BIO A3A	Max. Storage	=	162 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BIO A3A

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 1.90 ft, Barrel Len = 66.50 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	24	24
0.38	100.38	n/a	24	48
0.57	100.57	n/a	24	72
0.76	100.76	n/a	24	96
0.95	100.95	n/a	24	120
1.14	101.14	n/a	24	144
1.33	101.33	n/a	24	168
1.52	101.52	n/a	24	192
1.71	101.71	n/a	24	216
1.90	101.90	n/a	24	240

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	6.00	0.00	0.00
Span (in)	= 4.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.25	102.50	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) = 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

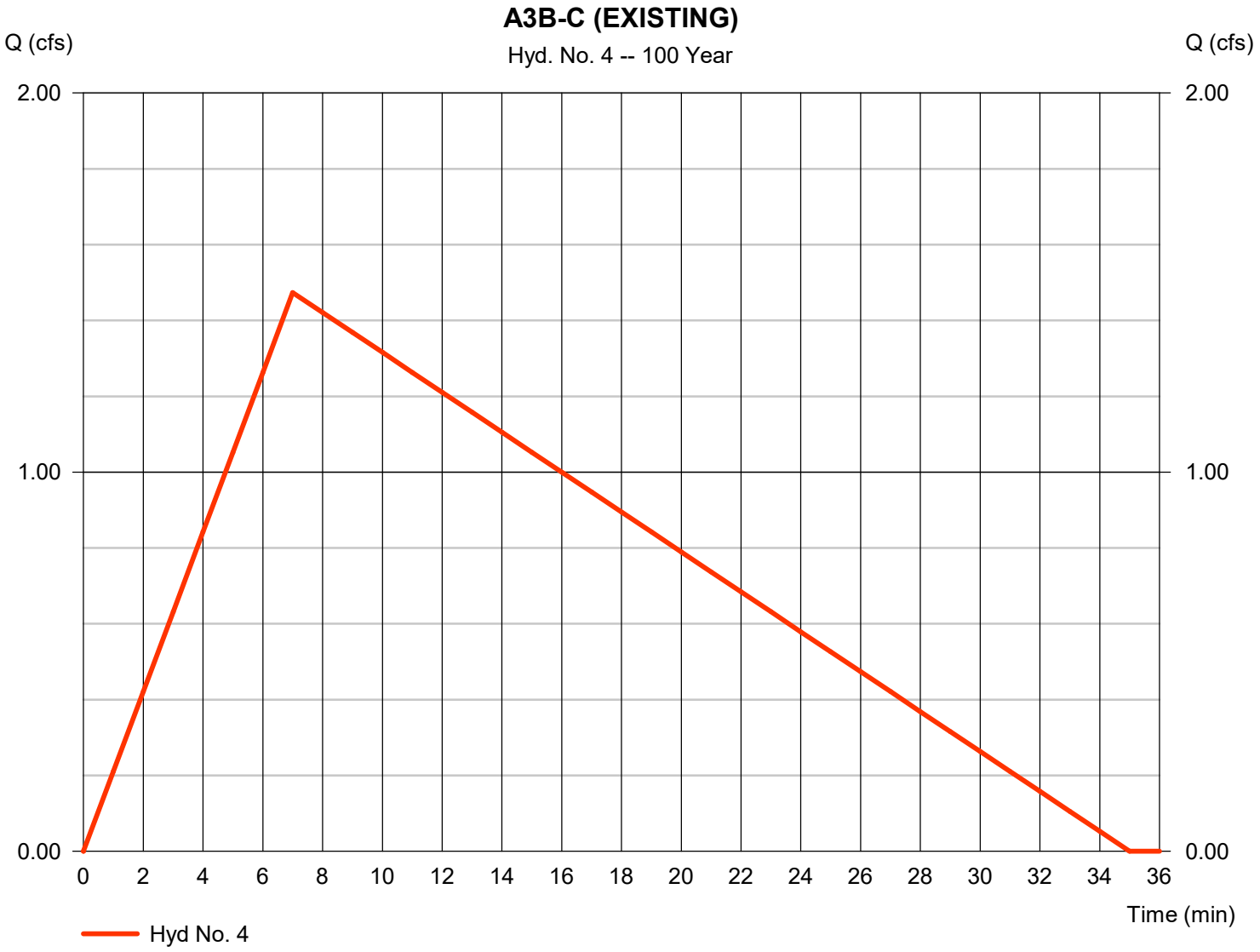
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	24	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	48	100.38	0.04 ic	0.00	---	---	---	---	---	---	---	---	0.039
0.57	72	100.57	0.17 ic	0.00	---	---	---	---	---	---	---	---	0.166
0.76	96	100.76	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.246
0.95	120	100.95	0.31 ic	0.00	---	---	---	---	---	---	---	---	0.307
1.14	144	101.14	0.36 ic	0.00	---	---	---	---	---	---	---	---	0.357
1.33	168	101.33	0.40 ic	0.00	---	---	---	---	---	---	---	---	0.402
1.52	192	101.52	0.44 ic	0.00	---	---	---	---	---	---	---	---	0.441
1.71	216	101.71	0.48 ic	0.00	---	---	---	---	---	---	---	---	0.478
1.90	240	101.90	0.51 ic	0.00	---	---	---	---	---	---	---	---	0.512

Hydrograph Report

Hyd. No. 4

A3B-C (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	1.474 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	1,547 cuft
Drainage area	=	0.530 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

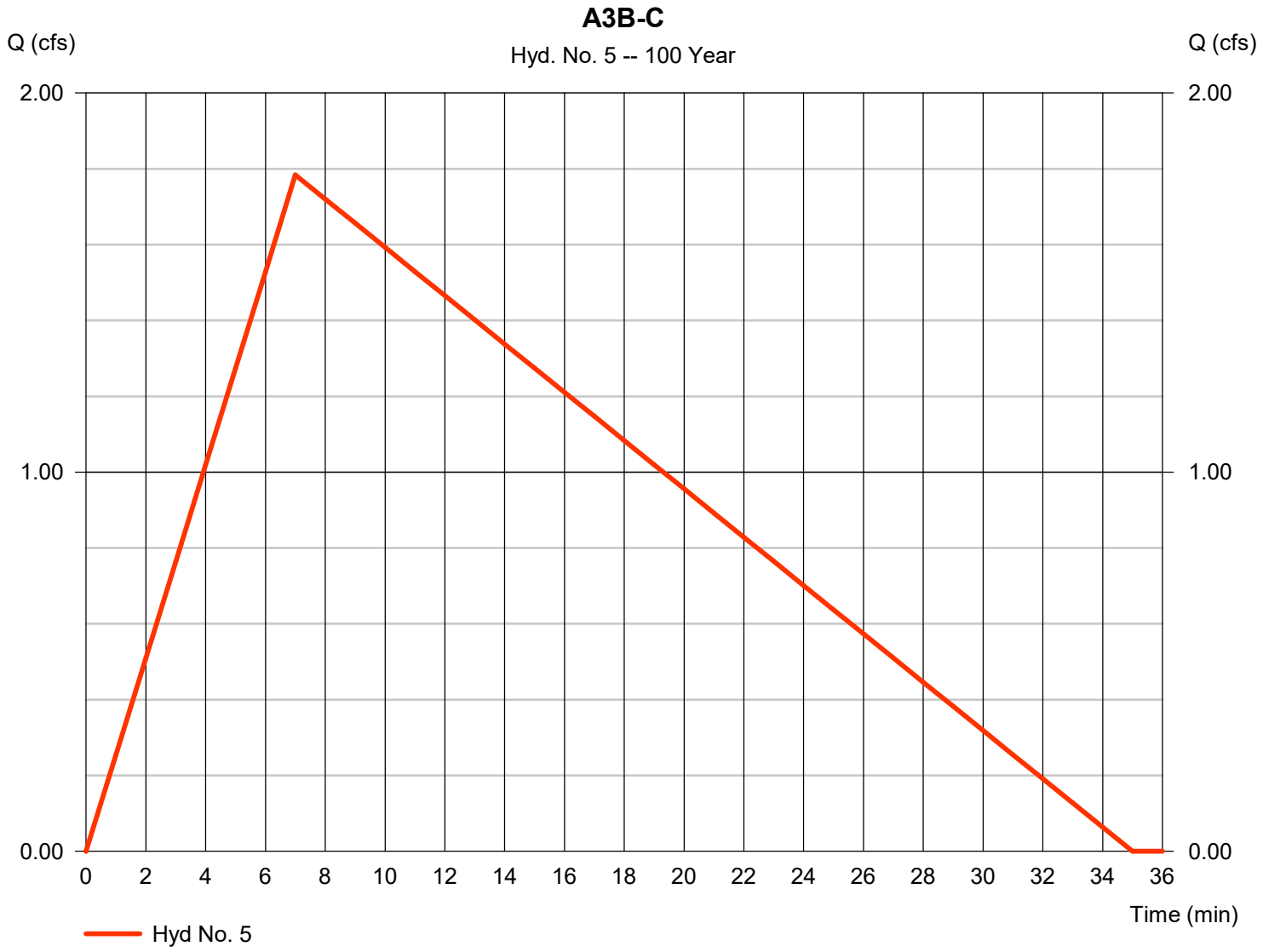


Hydrograph Report

Hyd. No. 5

A3B-C

Hydrograph type	=	Rational	Peak discharge	=	1.784 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	1,873 cuft
Drainage area	=	0.530 ac	Runoff coeff.	=	0.69
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



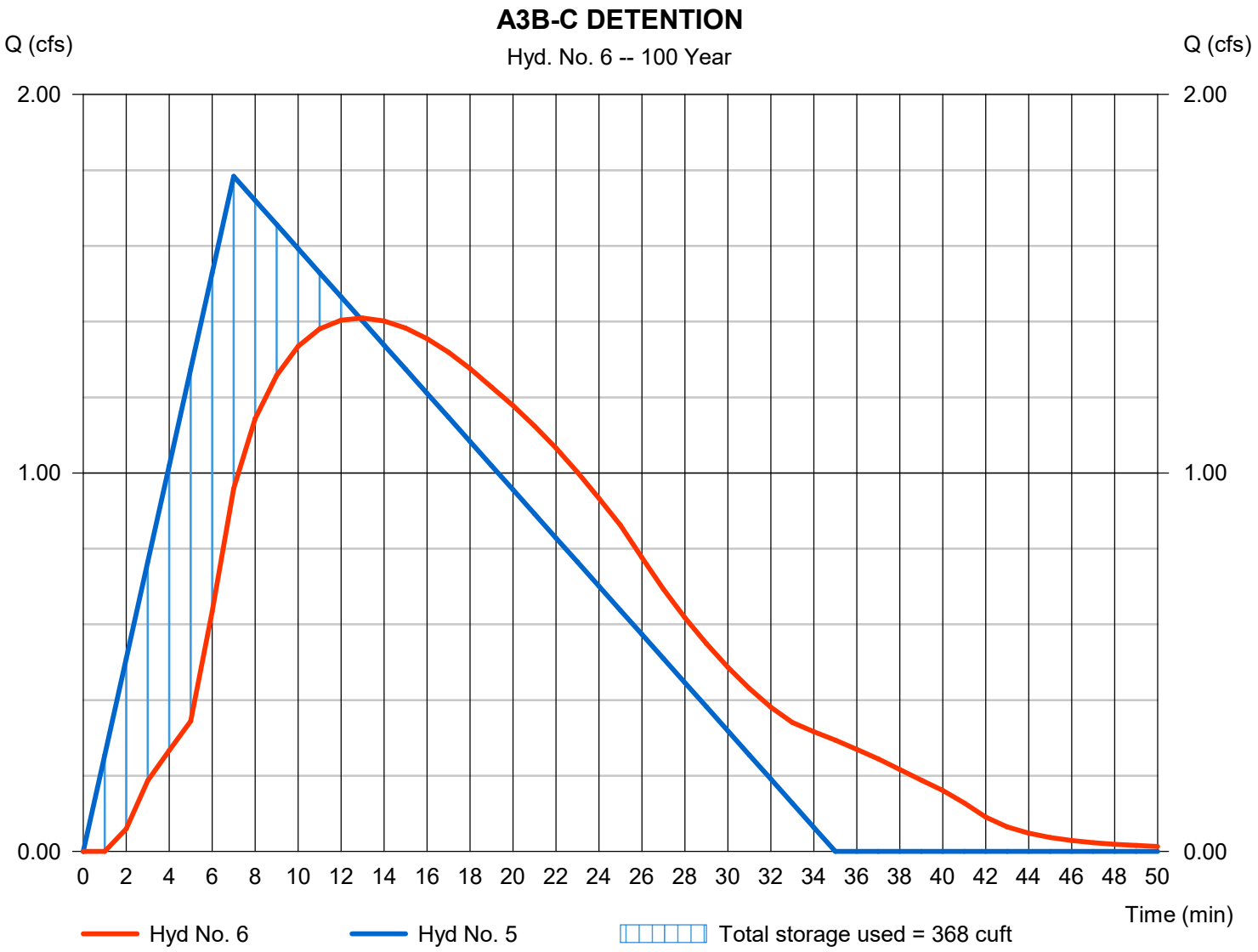
Hydrograph Report

Hyd. No. 6

A3B-C DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	1.409 cfs
Storm frequency	=	100 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	1,863 cuft
Inflow hyd. No.	=	5 - A3B-C	Max. Elevation	=	102.09 ft
Reservoir name	=	BIO A3B-C	Max. Storage	=	368 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - BIO A3B-C

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 5.70 ft, Barrel Len = 38.00 ft, No. Barrels = 1, Slope = 1.90%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.26	100.26	n/a	9	9
0.52	100.52	n/a	33	43
0.79	100.79	n/a	50	92
1.05	101.05	n/a	57	149
1.31	101.31	n/a	57	206
1.57	101.57	n/a	57	263
1.84	101.84	n/a	57	319
2.10	102.10	n/a	50	369
2.36	102.36	n/a	33	402
2.62	102.62	n/a	9	412

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	6.00	0.00	0.00
Span (in)	= 4.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.25	101.00	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) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

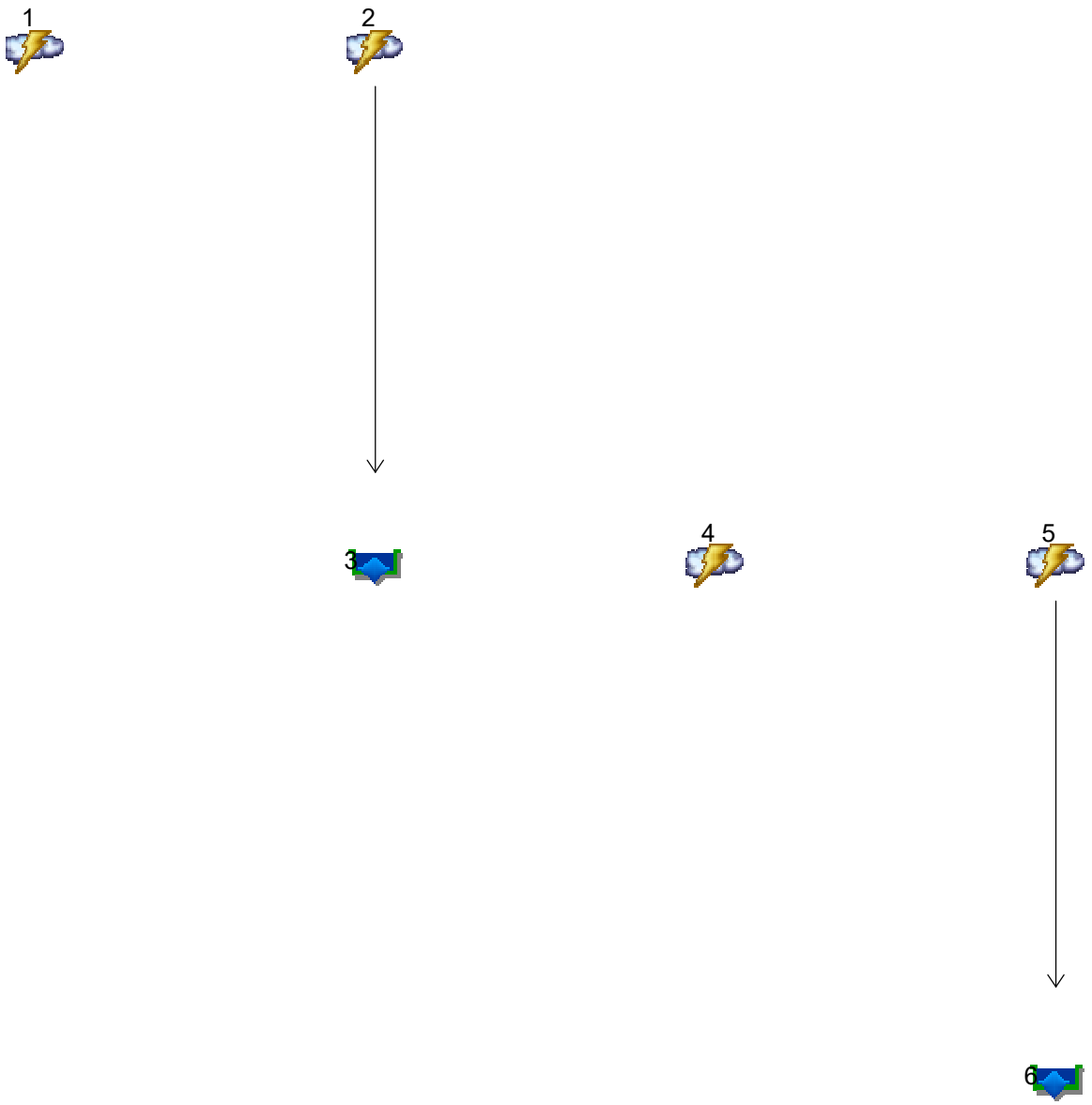
Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

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	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.26	9	100.26	0.00 ic	0.00	---	---	---	---	---	---	---	---	0.000
0.52	43	100.52	0.14 ic	0.00	---	---	---	---	---	---	---	---	0.137
0.79	92	100.79	0.26 ic	0.00	---	---	---	---	---	---	---	---	0.256
1.05	149	101.05	0.33 ic	0.01 ic	---	---	---	---	---	---	---	---	0.341
1.31	206	101.31	0.40 ic	0.24 ic	---	---	---	---	---	---	---	---	0.641
1.57	263	101.57	0.45 ic	0.54 ic	---	---	---	---	---	---	---	---	0.989
1.84	319	101.84	0.50 ic	0.72 ic	---	---	---	---	---	---	---	---	1.224
2.10	369	102.10	0.54 ic	0.87 ic	---	---	---	---	---	---	---	---	1.415
2.36	402	102.36	0.59 ic	1.00 ic	---	---	---	---	---	---	---	---	1.581
2.62	412	102.62	0.62 ic	1.11 ic	---	---	---	---	---	---	---	---	1.731

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514



Legend

Hyd.	Origin	Description
1	Rational	A3D-E (EXISTING)
2	Rational	A3D-E
3	Reservoir	A3D-E DETENTION
4	Rational	A3 F-G (EXISTING)
5	Rational	A3 F-G
6	Reservoir	A3F-G DETENTION

Hydraflow Table of Contents

A3 SUBSHEDS (D-G).gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

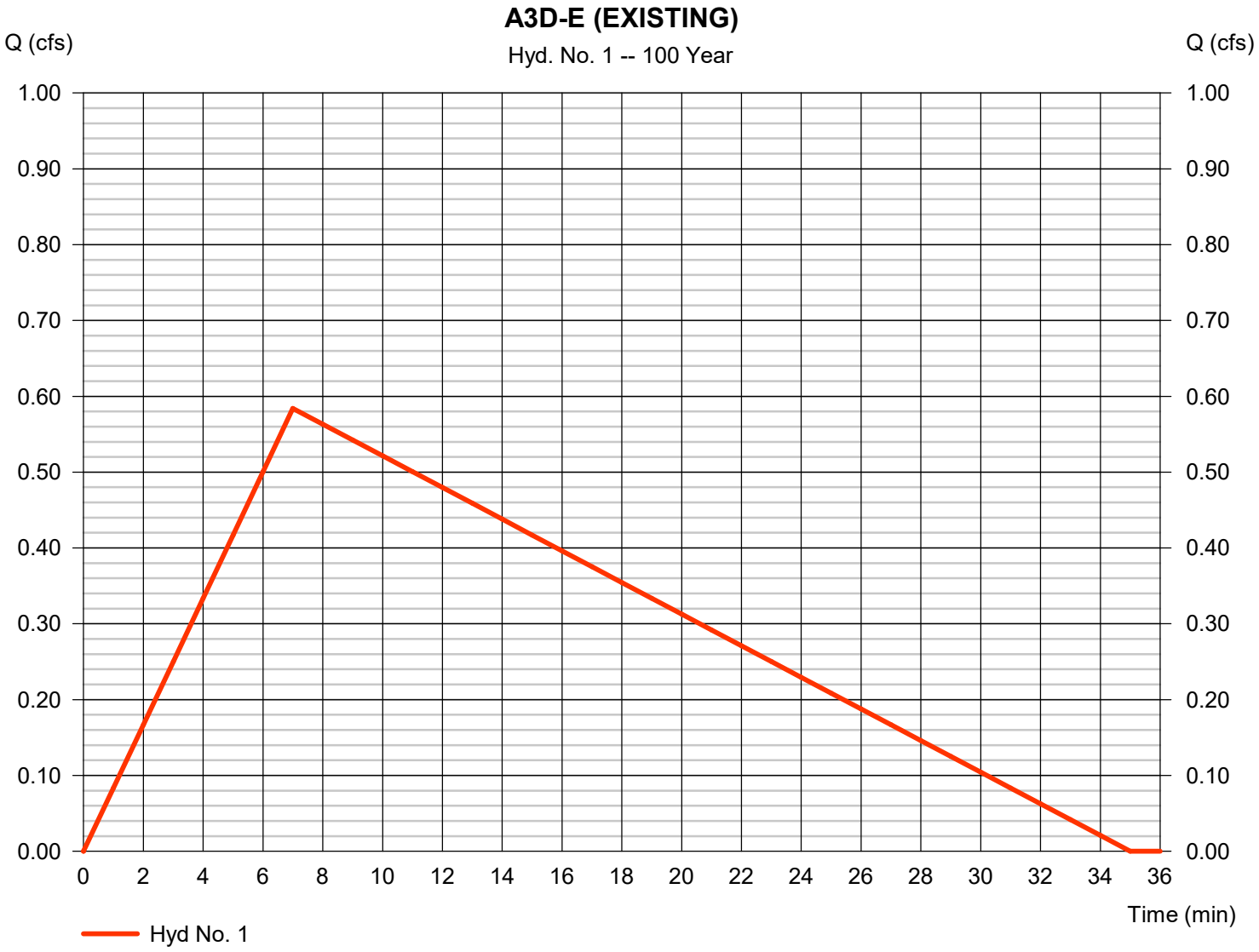
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	0.584	1	7	613	------	------	------	A3D-E (EXISTING)
2	Rational	0.738	1	7	774	------	------	------	A3D-E
3	Reservoir	0.414	1	19	716	2	101.39	301	A3D-E DETENTION
4	Rational	0.389	1	7	409	------	------	------	A3 F-G (EXISTING)
5	Rational	0.505	1	7	531	------	------	------	A3 F-G
6	Reservoir	0.368	1	15	502	5	101.19	128	A3F-G DETENTION

Hydrograph Report

Hyd. No. 1

A3D-E (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.584 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	613 cuft
Drainage area	=	0.210 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

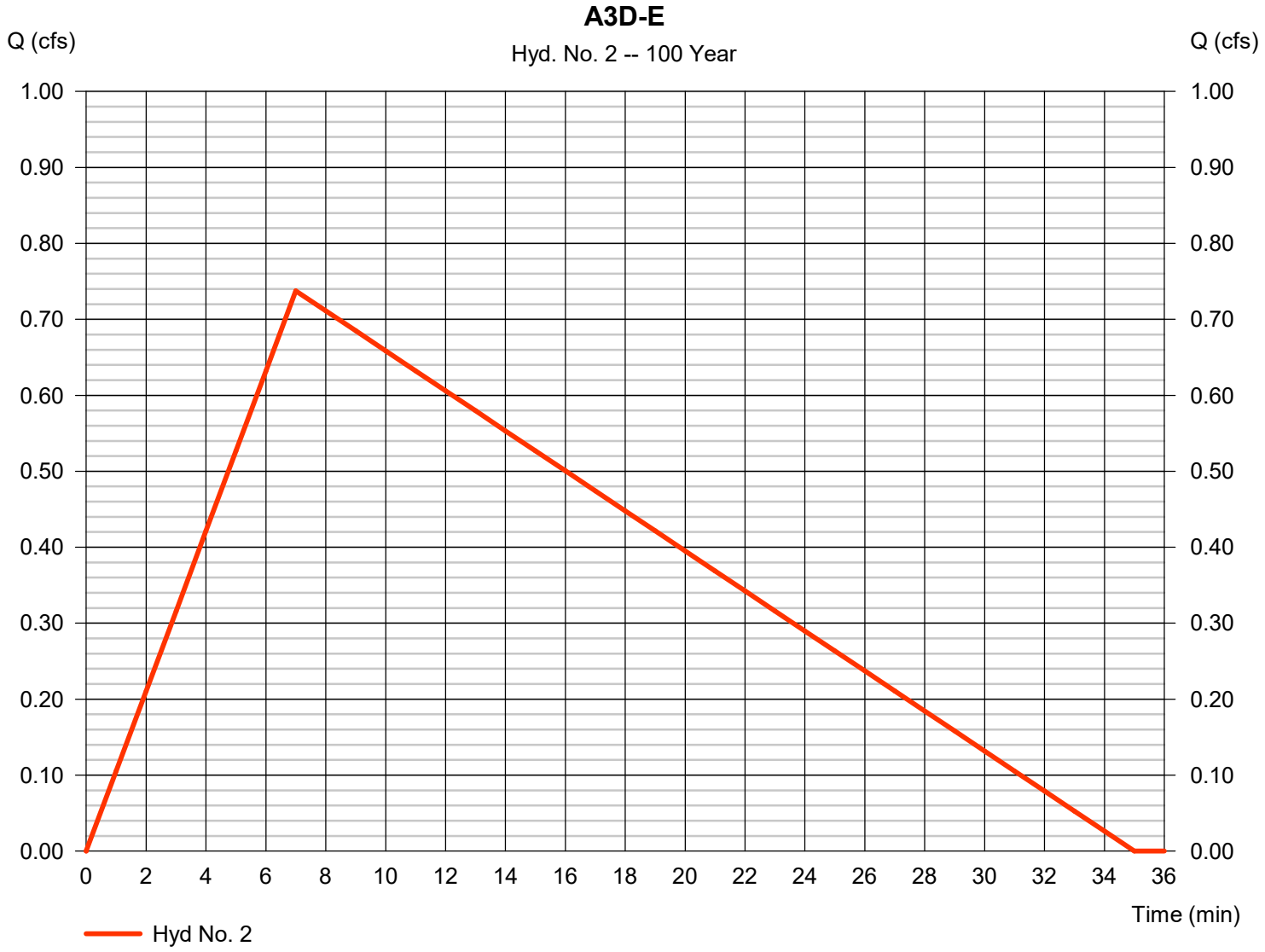


Hydrograph Report

Hyd. No. 2

A3D-E

Hydrograph type	=	Rational	Peak discharge	=	0.738 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	774 cuft
Drainage area	=	0.210 ac	Runoff coeff.	=	0.72
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



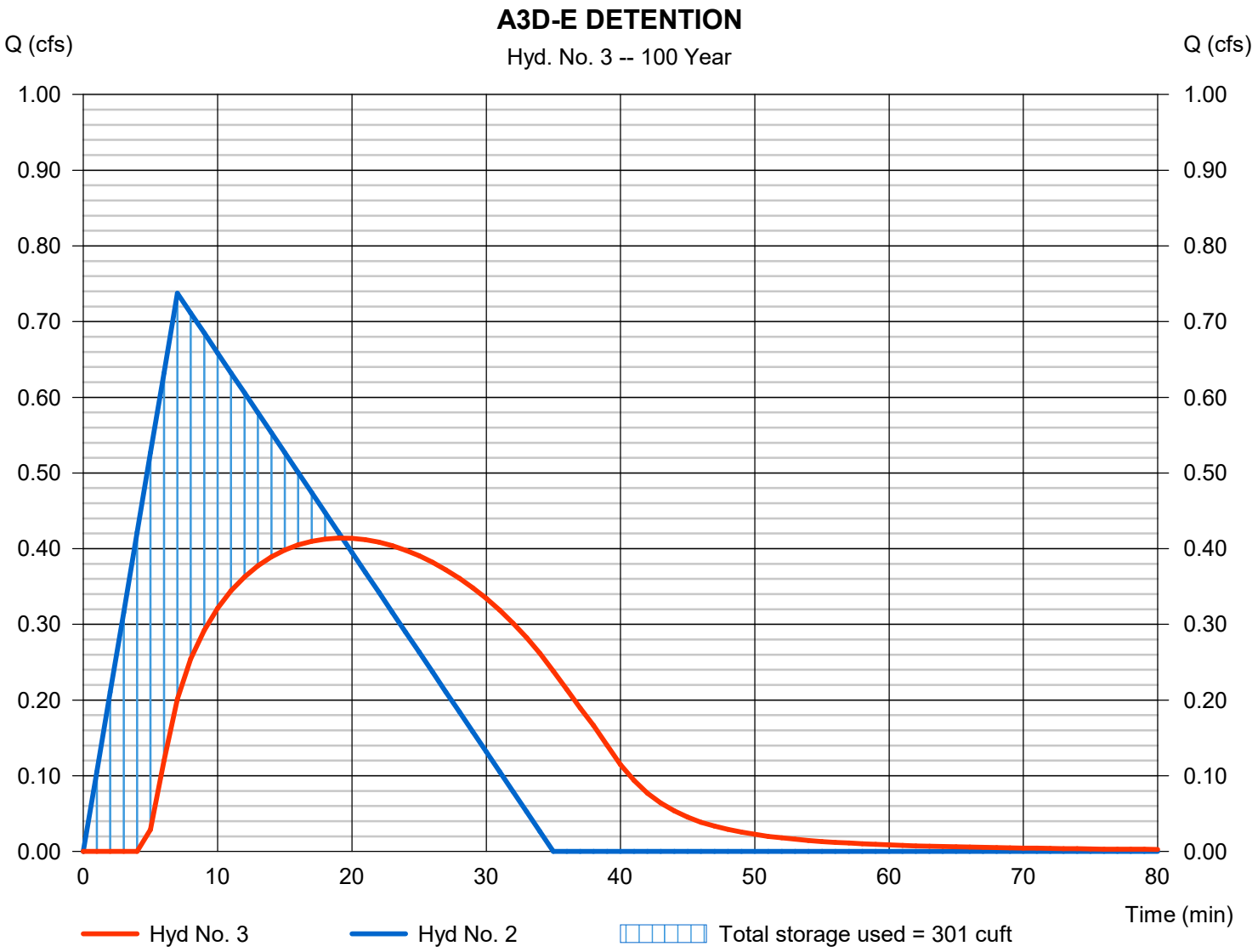
Hydrograph Report

Hyd. No. 3

A3D-E DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.414 cfs
Storm frequency	=	100 yrs	Time to peak	=	19 min
Time interval	=	1 min	Hyd. volume	=	716 cuft
Inflow hyd. No.	=	2 - A3D-E	Max. Elevation	=	101.39 ft
Reservoir name	=	BIO A3D-E	Max. Storage	=	301 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BIO A3D-E

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 5.70 ft, Barrel Len = 38.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	41	41
0.38	100.38	n/a	41	82
0.57	100.57	n/a	41	123
0.76	100.76	n/a	41	165
0.95	100.95	n/a	41	206
1.14	101.14	n/a	41	247
1.33	101.33	n/a	41	288
1.52	101.52	n/a	41	329
1.71	101.71	n/a	41	370
1.90	101.90	n/a	41	412

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	0.00	0.00	0.00
Span (in)	= 4.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 100.25	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) = 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

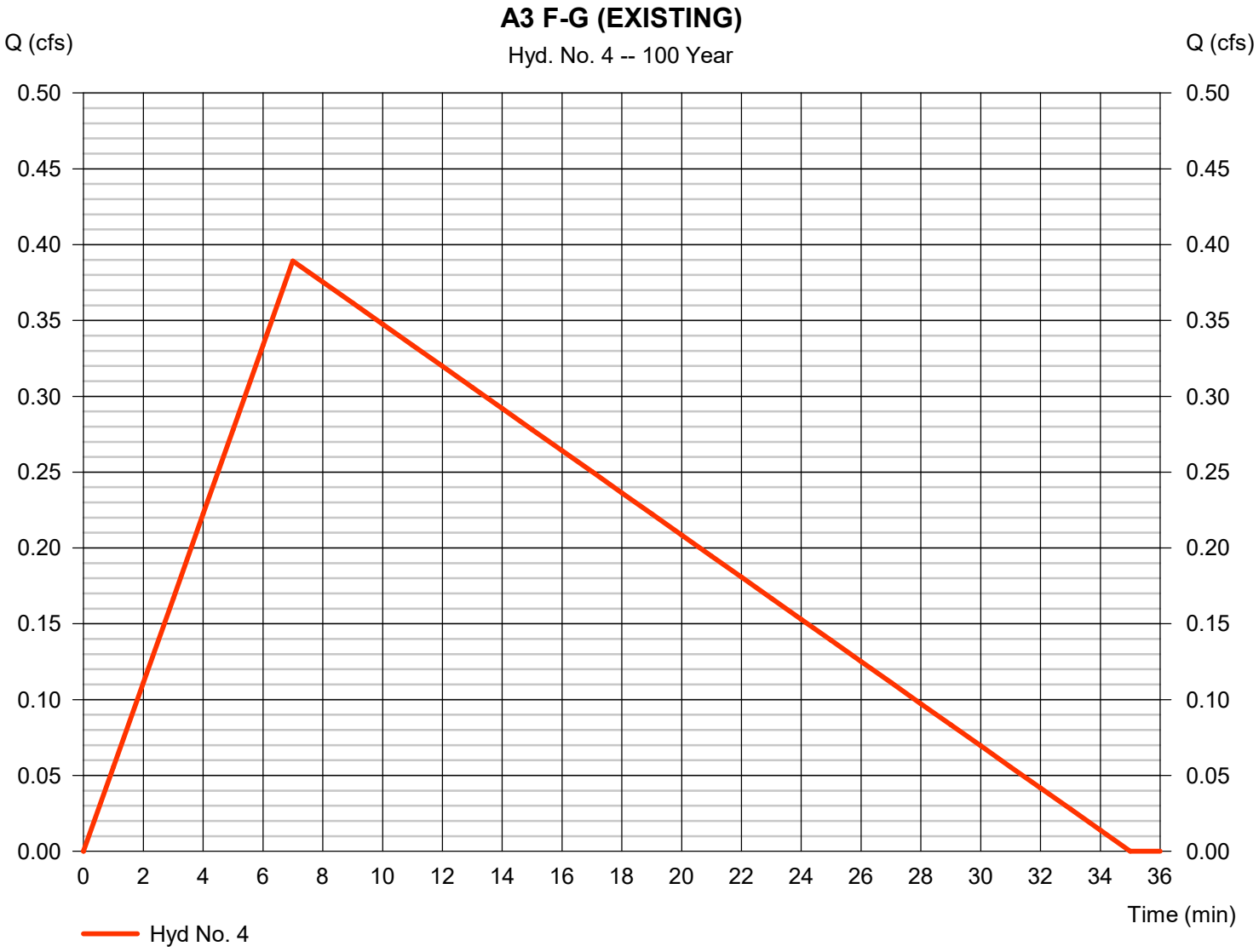
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	---	---	---	---	---	---	---	---	---	0.000
0.19	41	100.19	0.00	---	---	---	---	---	---	---	---	---	0.000
0.38	82	100.38	0.04 ic	---	---	---	---	---	---	---	---	---	0.039
0.57	123	100.57	0.17 ic	---	---	---	---	---	---	---	---	---	0.166
0.76	165	100.76	0.25 ic	---	---	---	---	---	---	---	---	---	0.246
0.95	206	100.95	0.31 ic	---	---	---	---	---	---	---	---	---	0.307
1.14	247	101.14	0.36 ic	---	---	---	---	---	---	---	---	---	0.357
1.33	288	101.33	0.40 ic	---	---	---	---	---	---	---	---	---	0.402
1.52	329	101.52	0.44 ic	---	---	---	---	---	---	---	---	---	0.441
1.71	370	101.71	0.48 ic	---	---	---	---	---	---	---	---	---	0.478
1.90	412	101.90	0.51 ic	---	---	---	---	---	---	---	---	---	0.512

Hydrograph Report

Hyd. No. 4

A3 F-G (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.389 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	409 cuft
Drainage area	=	0.140 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

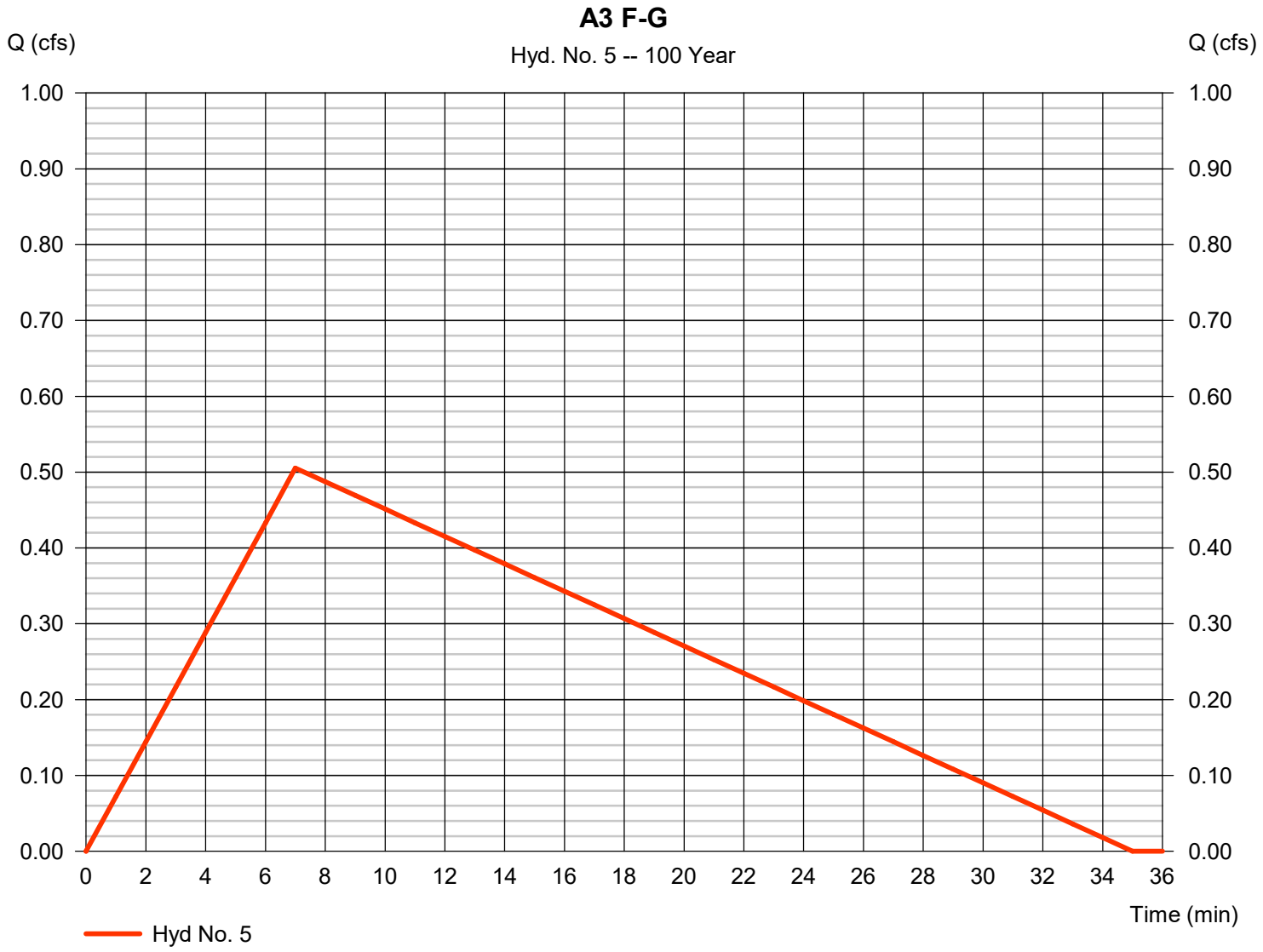


Hydrograph Report

Hyd. No. 5

A3 F-G

Hydrograph type	=	Rational	Peak discharge	=	0.505 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	531 cuft
Drainage area	=	0.140 ac	Runoff coeff.	=	0.74
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



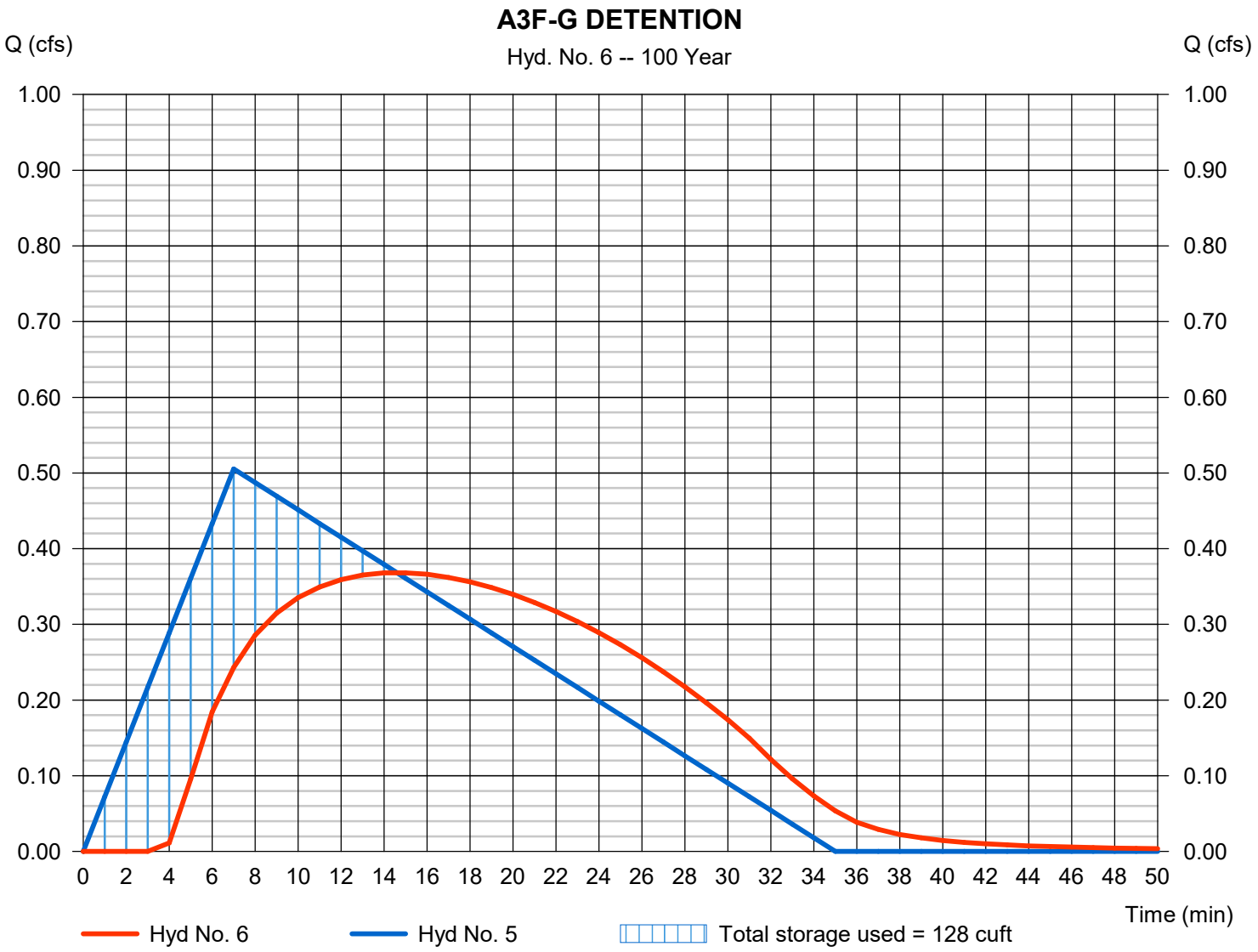
Hydrograph Report

Hyd. No. 6

A3F-G DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.368 cfs
Storm frequency	=	100 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	502 cuft
Inflow hyd. No.	=	5 - A3 F-G	Max. Elevation	=	101.19 ft
Reservoir name	=	BIO A3F-G	Max. Storage	=	128 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - BIO A3F-G

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 5.70 ft, Barrel Len = 19.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	21	21
0.38	100.38	n/a	21	41
0.57	100.57	n/a	21	62
0.76	100.76	n/a	21	82
0.95	100.95	n/a	21	103
1.14	101.14	n/a	21	123
1.33	101.33	n/a	21	144
1.52	101.52	n/a	21	165
1.71	101.71	n/a	21	185
1.90	101.90	n/a	21	206

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	0.00	0.00	0.00
Span (in)	= 4.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 100.25	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) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

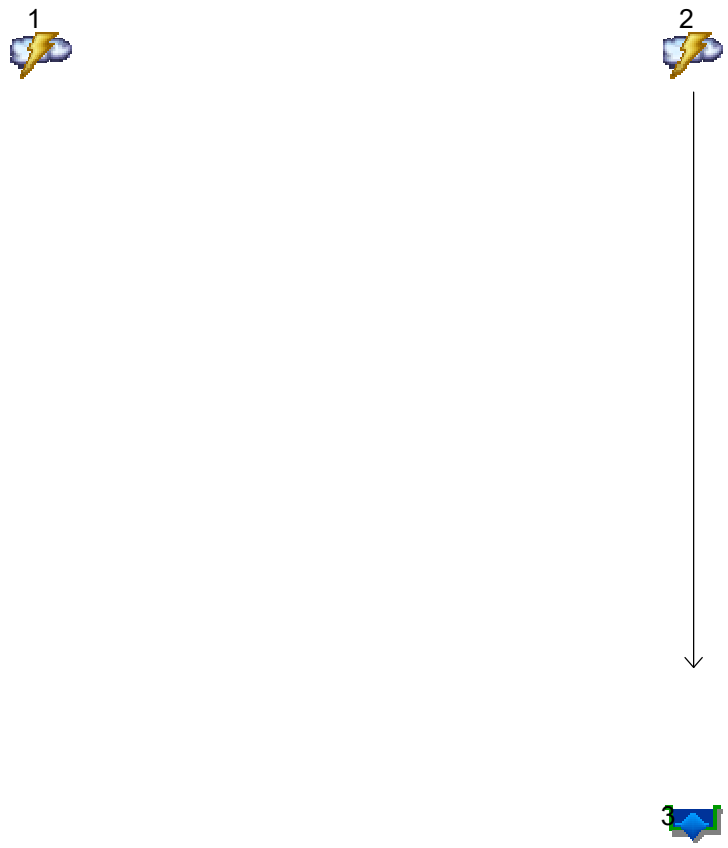
Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

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	100.00	0.00	---	---	---	---	---	---	---	---	---	0.000
0.19	21	100.19	0.00	---	---	---	---	---	---	---	---	---	0.000
0.38	41	100.38	0.04 ic	---	---	---	---	---	---	---	---	---	0.039
0.57	62	100.57	0.17 ic	---	---	---	---	---	---	---	---	---	0.166
0.76	82	100.76	0.25 ic	---	---	---	---	---	---	---	---	---	0.246
0.95	103	100.95	0.31 ic	---	---	---	---	---	---	---	---	---	0.307
1.14	123	101.14	0.36 ic	---	---	---	---	---	---	---	---	---	0.357
1.33	144	101.33	0.40 ic	---	---	---	---	---	---	---	---	---	0.402
1.52	165	101.52	0.44 ic	---	---	---	---	---	---	---	---	---	0.441
1.71	185	101.71	0.48 ic	---	---	---	---	---	---	---	---	---	0.478
1.90	206	101.90	0.51 ic	---	---	---	---	---	---	---	---	---	0.512

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514



Legend

Hyd.	Origin	Description
1	Rational	B1A (EXISTING)
2	Rational	B1A
3	Reservoir	B1A DETENTION

Hydraflow Table of Contents

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	0.250	1	7	263	------	------	------	B1A (EXISTING)
2	Rational	0.391	1	7	410	------	------	------	B1A
3	Reservoir	0.232	1	18	380	2	101.35	146	B1A DETENTION

Hydrograph Report

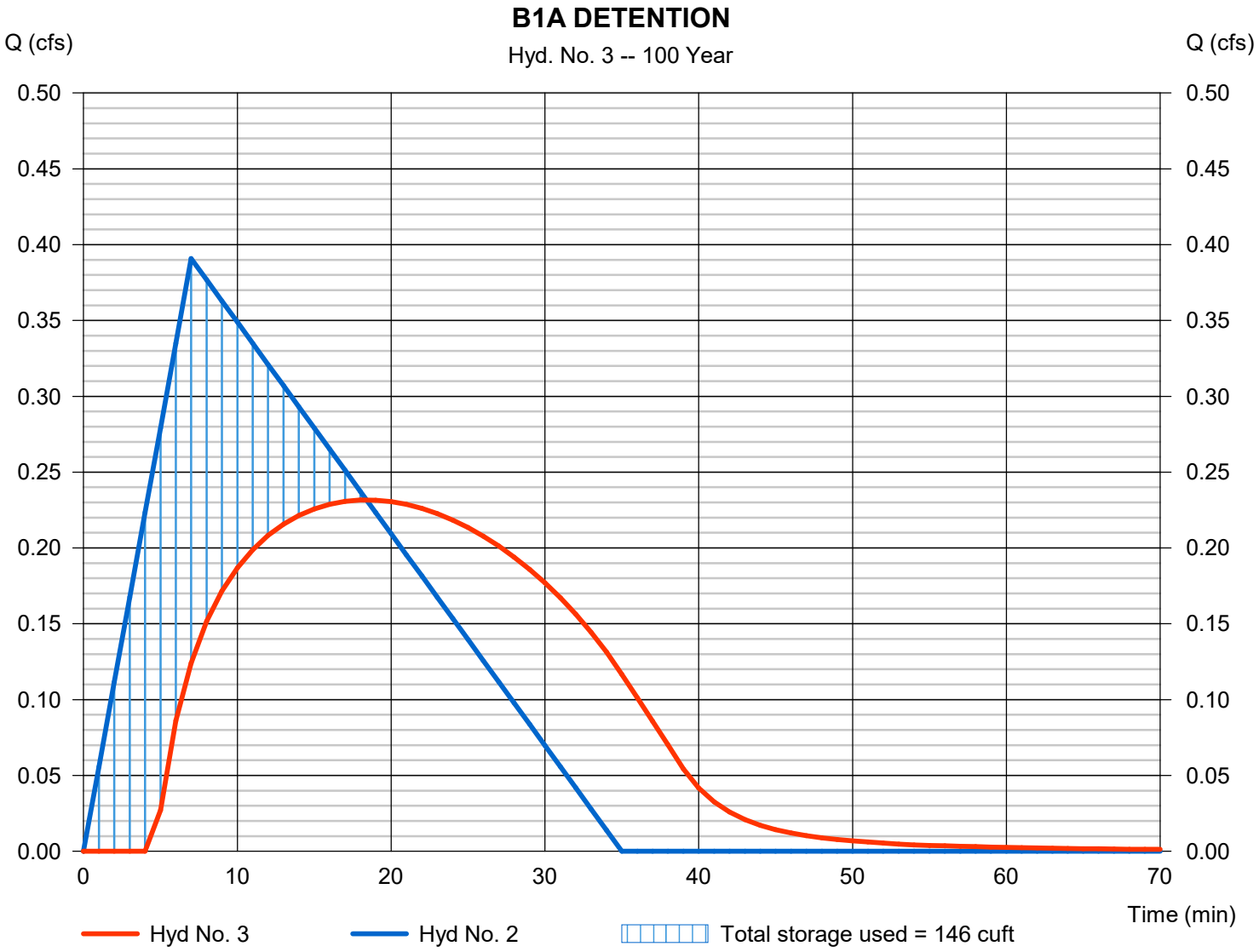
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hyd. No. 3

B1A DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.232 cfs
Storm frequency	=	100 yrs	Time to peak	=	18 min
Time interval	=	1 min	Hyd. volume	=	380 cuft
Inflow hyd. No.	=	2 - B1A	Max. Elevation	=	101.35 ft
Reservoir name	=	BIO B1A	Max. Storage	=	146 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BIO B1A

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 5.70 ft, Barrel Len = 19.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	21	21
0.38	100.38	n/a	21	41
0.57	100.57	n/a	21	62
0.76	100.76	n/a	21	82
0.95	100.95	n/a	21	103
1.14	101.14	n/a	21	123
1.33	101.33	n/a	21	144
1.52	101.52	n/a	21	165
1.71	101.71	n/a	21	185
1.90	101.90	n/a	21	206

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 3.00	6.00	0.00	0.00
Span (in)	= 3.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.26	102.50	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) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

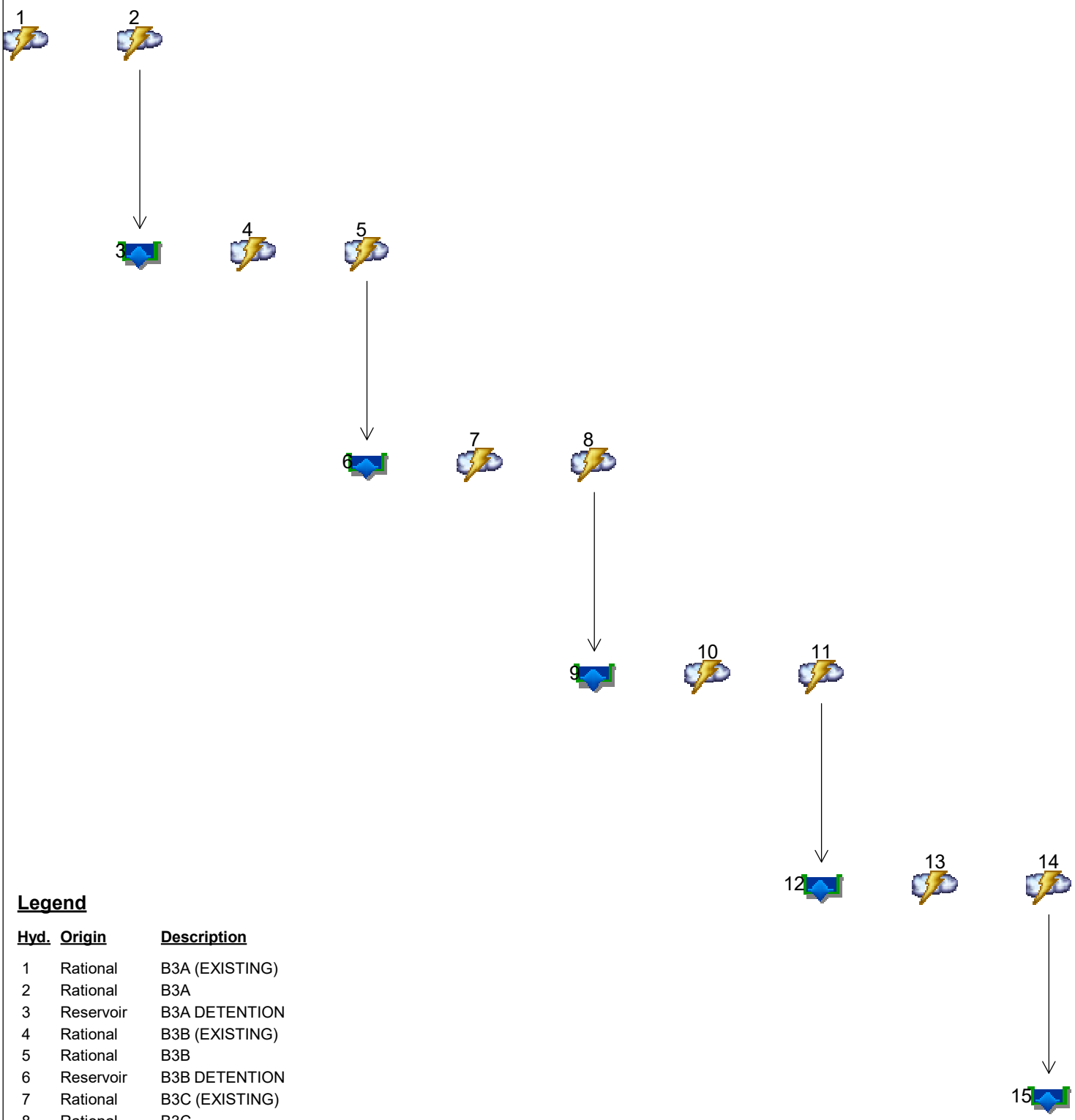
Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

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	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	21	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	41	100.38	0.03 ic	0.00	---	---	---	---	---	---	---	---	0.028
0.57	62	100.57	0.10 ic	0.00	---	---	---	---	---	---	---	---	0.102
0.76	82	100.76	0.14 ic	0.00	---	---	---	---	---	---	---	---	0.145
0.95	103	100.95	0.18 ic	0.00	---	---	---	---	---	---	---	---	0.178
1.14	123	101.14	0.21 ic	0.00	---	---	---	---	---	---	---	---	0.205
1.33	144	101.33	0.23 ic	0.00	---	---	---	---	---	---	---	---	0.230
1.52	165	101.52	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.252
1.71	185	101.71	0.27 ic	0.00	---	---	---	---	---	---	---	---	0.272
1.90	206	101.90	0.29 ic	0.00	---	---	---	---	---	---	---	---	0.291

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514



Legend

Hyd.	Origin	Description
1	Rational	B3A (EXISTING)
2	Rational	B3A
3	Reservoir	B3A DETENTION
4	Rational	B3B (EXISTING)
5	Rational	B3B
6	Reservoir	B3B DETENTION
7	Rational	B3C (EXISTING)
8	Rational	B3C
9	Reservoir	B3C DETENTION
10	Rational	B3D (EXISTING)
11	Rational	B3D
12	Reservoir	B3D DETENTION
13	Rational	B3E-F (EXISTING)
14	Rational	B3E-F
15	Reservoir	B3E-F DETENTION

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

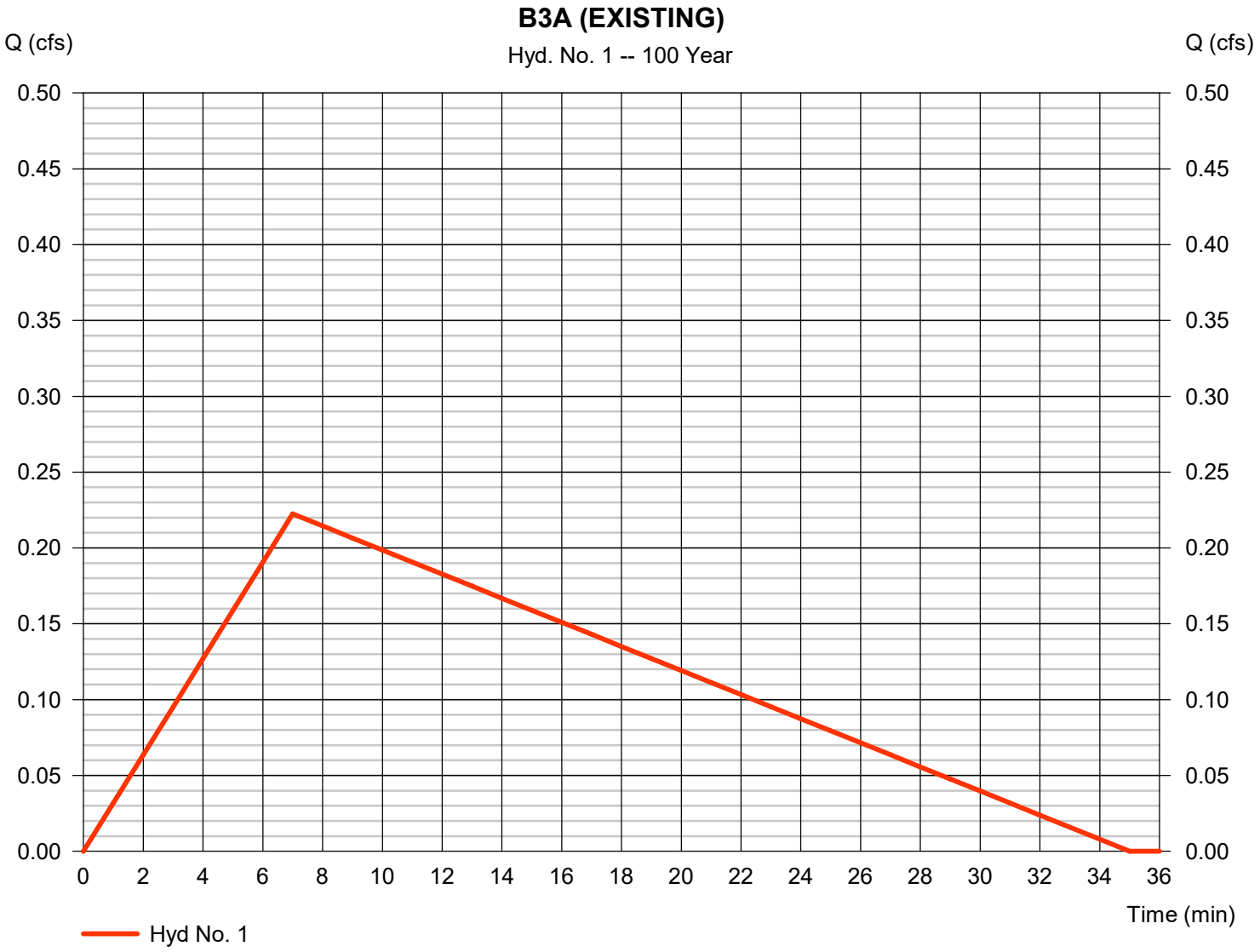
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	0.222	1	7	234	------	------	------	B3A (EXISTING)
2	Rational	0.320	1	7	336	------	------	------	B3A
3	Reservoir	0.215	1	16	315	2	101.21	95.8	B3A DETENTION
4	Rational	0.278	1	7	292	------	------	------	B3B (EXISTING)
5	Rational	0.356	1	7	374	------	------	------	B3B
6	Reservoir	0.241	1	16	354	5	101.41	102	B3B DETENTION
7	Rational	0.556	1	7	584	------	------	------	B3C (EXISTING)
8	Rational	0.683	1	7	717	------	------	------	B3C
9	Reservoir	0.473	1	16	688	8	101.69	182	B3C DETENTION
10	Rational	0.361	1	7	380	------	------	------	B3D (EXISTING)
11	Rational	0.552	1	7	579	------	------	------	B3D
12	Reservoir	0.360	1	17	537	11	101.15	183	B3D DETENTION
13	Rational	0.306	1	7	321	------	------	------	B3E-F (EXISTING)
14	Rational	0.354	1	7	372	------	------	------	B3E-F
15	Reservoir	0.277	1	13	362	14	101.75	63.1	B3E-F DETENTION

Hydrograph Report

Hyd. No. 1

B3A (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.222 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	234 cuft
Drainage area	=	0.080 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



Hydraflow Table of Contents

B3 SUBSHEDS.gpw

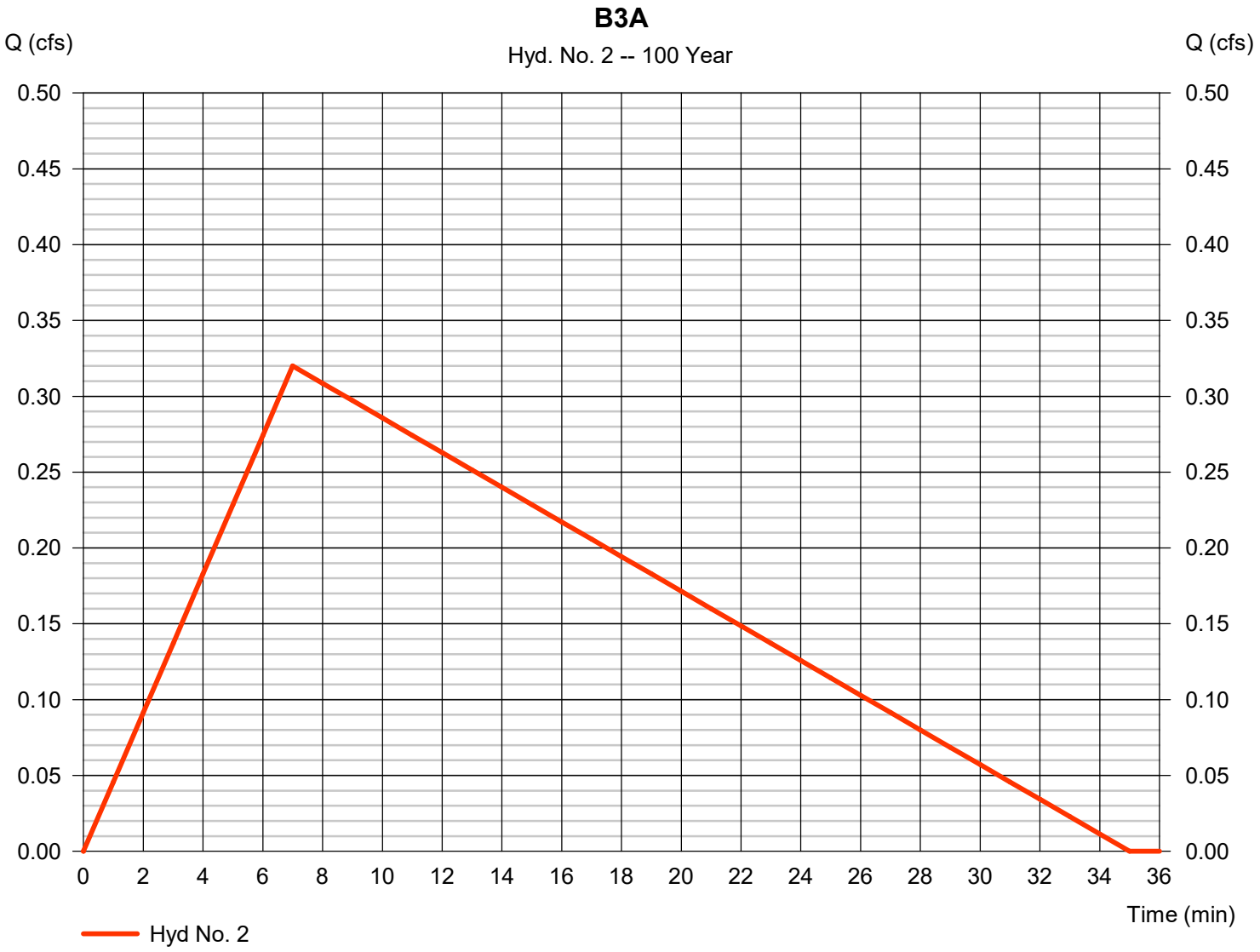
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hydrograph Report

Hyd. No. 2

B3A

Hydrograph type	= Rational	Peak discharge	= 0.320 cfs
Storm frequency	= 100 yrs	Time to peak	= 7 min
Time interval	= 1 min	Hyd. volume	= 336 cuft
Drainage area	= 0.080 ac	Runoff coeff.	= 0.82
Intensity	= 4.878 in/hr	Tc by User	= 7.00 min
IDF Curve	= Fairfax.idf	Asc/Rec limb fact	= 1/4



Hydrograph Report

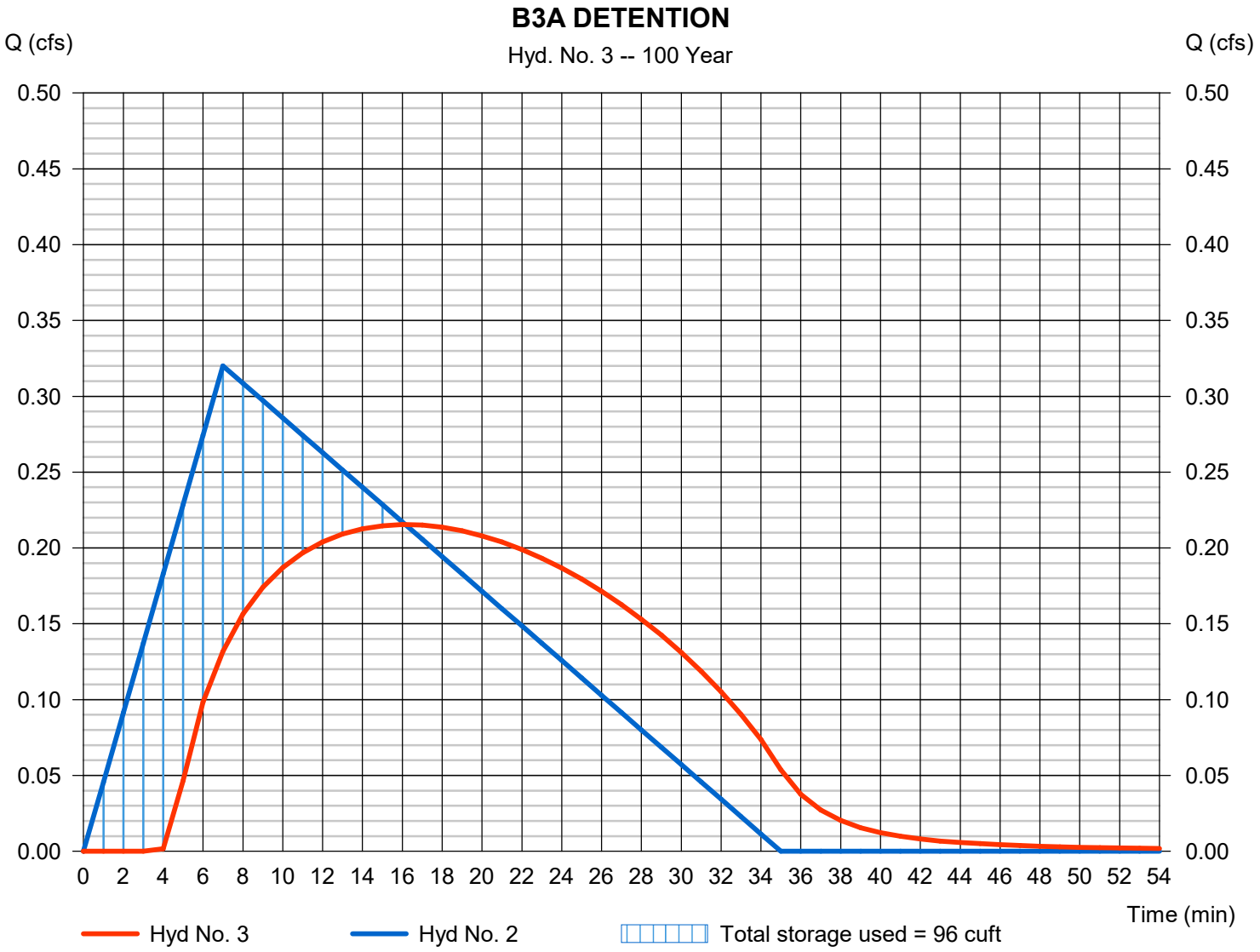
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hyd. No. 3

B3A DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.215 cfs
Storm frequency	=	100 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	315 cuft
Inflow hyd. No.	=	2 - B3A	Max. Elevation	=	101.21 ft
Reservoir name	=	BIO B3A	Max. Storage	=	96 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BIO B3A

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 3.80 ft, Barrel Len = 20.90 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	15	15
0.38	100.38	n/a	15	30
0.57	100.57	n/a	15	45
0.76	100.76	n/a	15	60
0.95	100.95	n/a	15	75
1.14	101.14	n/a	15	91
1.33	101.33	n/a	15	106
1.52	101.52	n/a	15	121
1.71	101.71	n/a	15	136
1.90	101.90	n/a	15	151

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 3.00	6.00	0.00	0.00
Span (in)	= 3.00	6.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 100.25	102.50	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) = 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

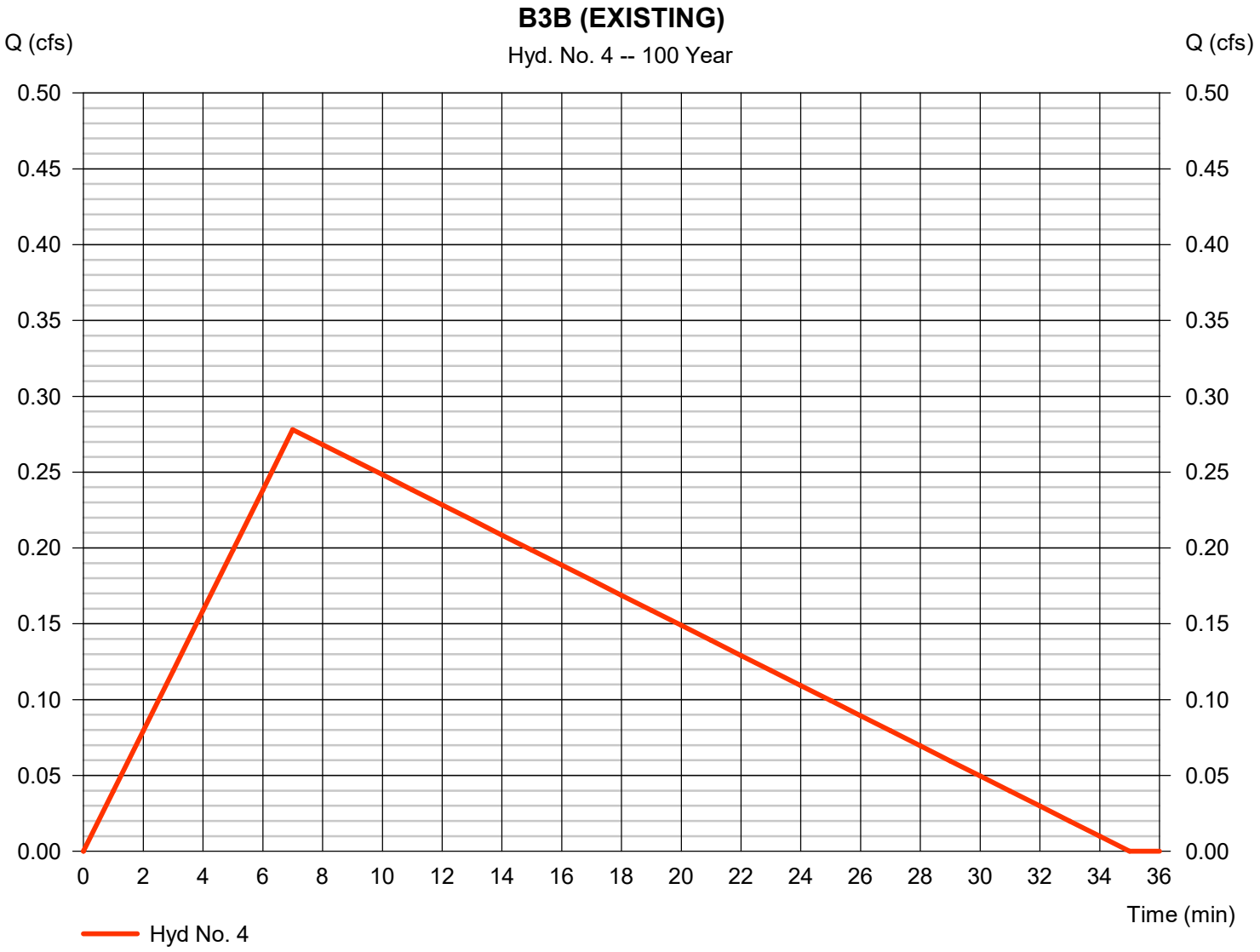
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	15	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	30	100.38	0.03 ic	0.00	---	---	---	---	---	---	---	---	0.032
0.57	45	100.57	0.10 ic	0.00	---	---	---	---	---	---	---	---	0.104
0.76	60	100.76	0.15 ic	0.00	---	---	---	---	---	---	---	---	0.147
0.95	75	100.95	0.18 ic	0.00	---	---	---	---	---	---	---	---	0.179
1.14	91	101.14	0.21 ic	0.00	---	---	---	---	---	---	---	---	0.207
1.33	106	101.33	0.23 ic	0.00	---	---	---	---	---	---	---	---	0.231
1.52	121	101.52	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.253
1.71	136	101.71	0.27 ic	0.00	---	---	---	---	---	---	---	---	0.273
1.90	151	101.90	0.29 ic	0.00	---	---	---	---	---	---	---	---	0.292

Hydrograph Report

Hyd. No. 4

B3B (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.278 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	292 cuft
Drainage area	=	0.100 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

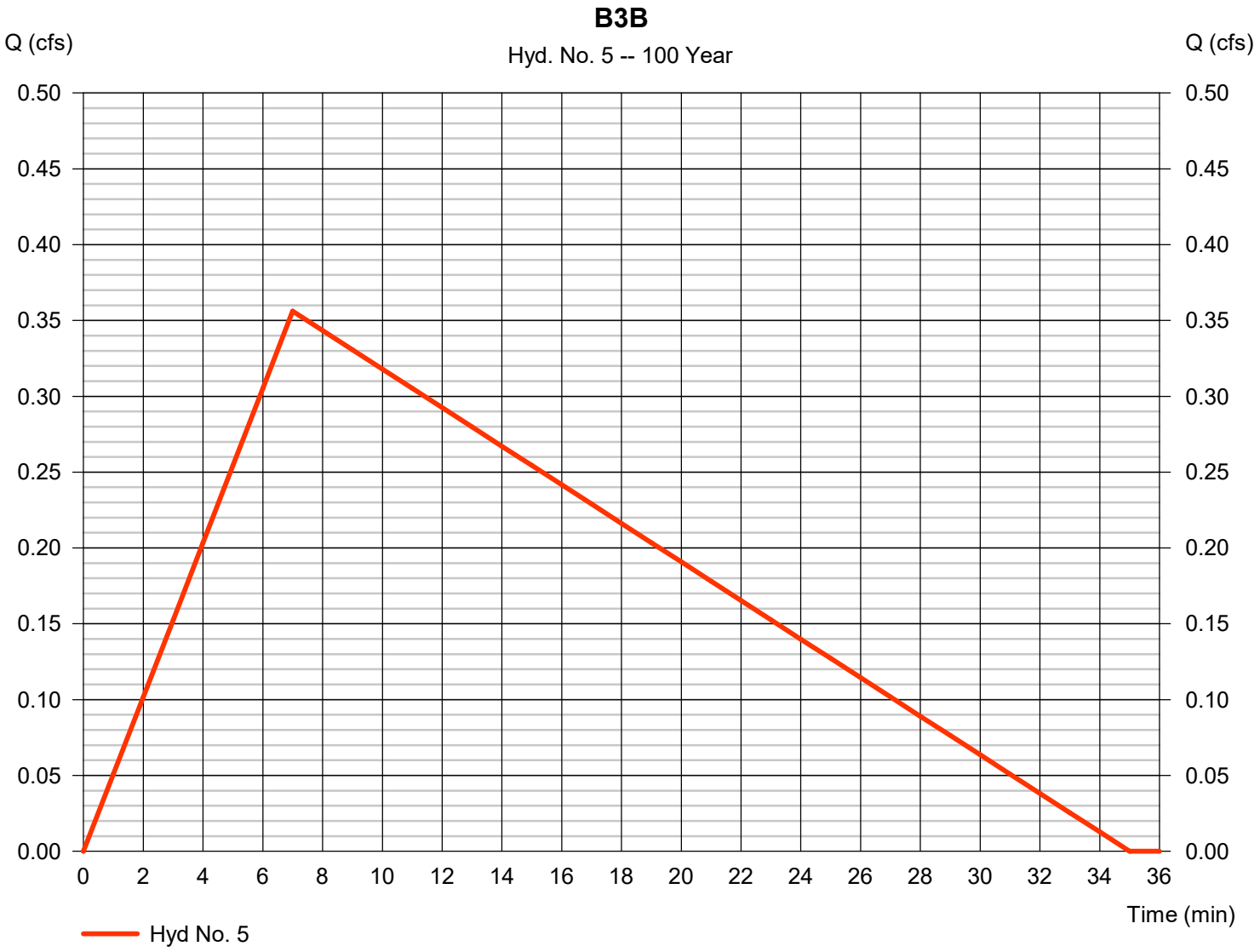


Hydrograph Report

Hyd. No. 5

B3B

Hydrograph type	=	Rational	Peak discharge	=	0.356 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	374 cuft
Drainage area	=	0.100 ac	Runoff coeff.	=	0.73
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



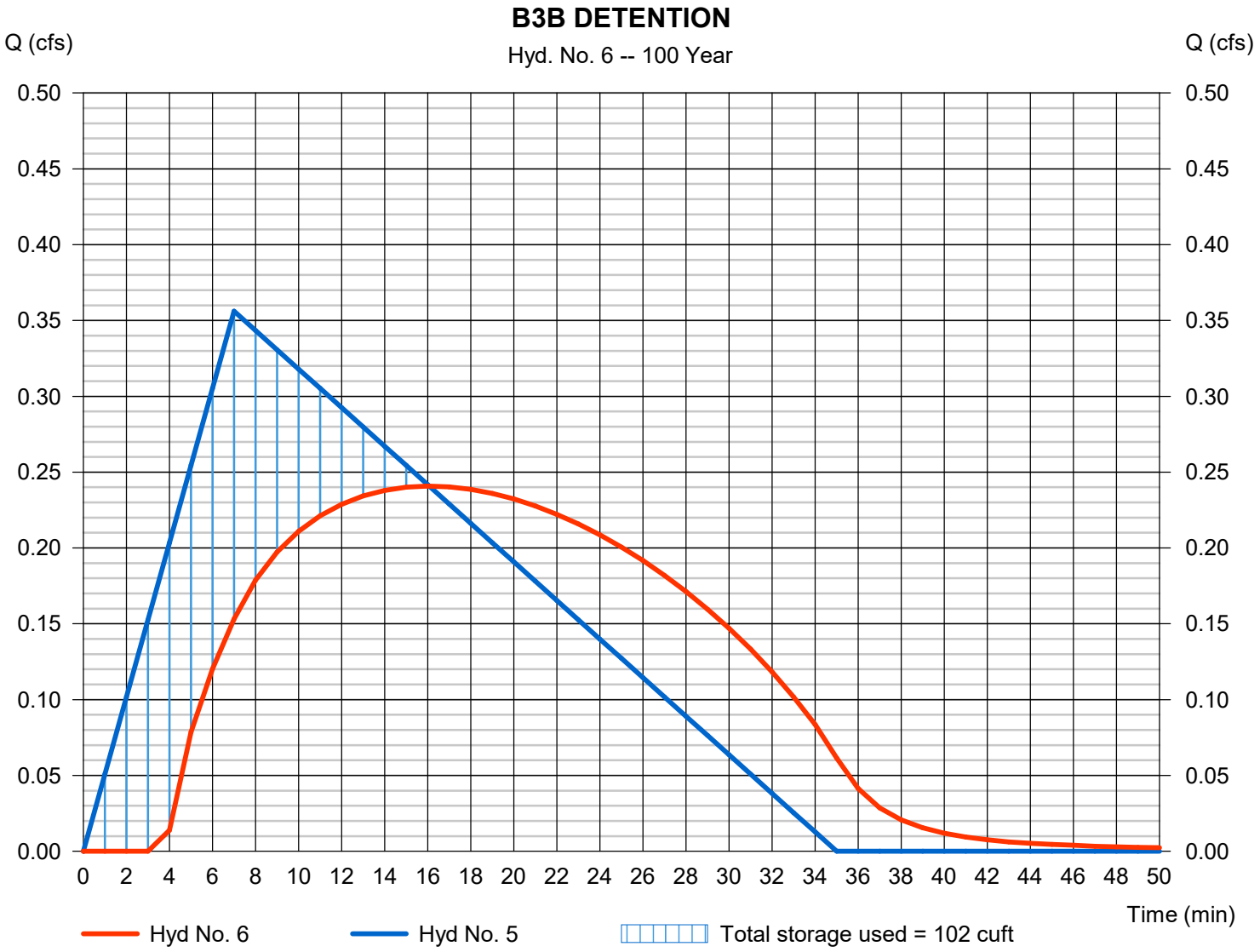
Hydrograph Report

Hyd. No. 6

B3B DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.241 cfs
Storm frequency	=	100 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	354 cuft
Inflow hyd. No.	=	5 - B3B	Max. Elevation	=	101.41 ft
Reservoir name	=	BIO B3B	Max. Storage	=	102 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - BIO B3B

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 3.80 ft, Barrel Len = 19.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	14	14
0.38	100.38	n/a	14	27
0.57	100.57	n/a	14	41
0.76	100.76	n/a	14	55
0.95	100.95	n/a	14	69
1.14	101.14	n/a	14	82
1.33	101.33	n/a	14	96
1.52	101.52	n/a	14	110
1.71	101.71	n/a	14	123
1.90	101.90	n/a	14	137

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 3.00	6.00	0.00	0.00
Span (in)	= 3.00	6.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 100.25	102.50	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) = 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

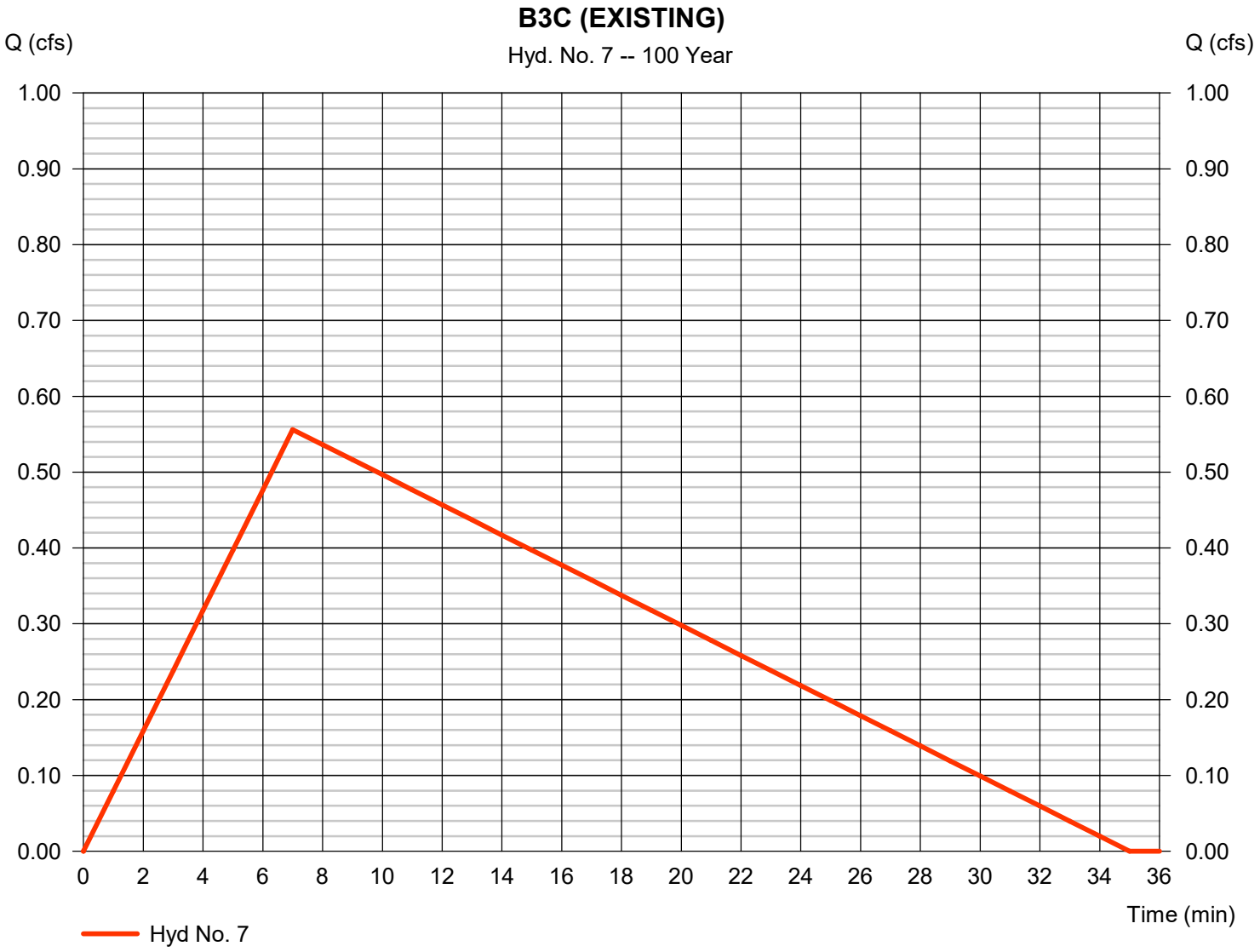
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	14	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	27	100.38	0.03 ic	0.00	---	---	---	---	---	---	---	---	0.032
0.57	41	100.57	0.10 ic	0.00	---	---	---	---	---	---	---	---	0.104
0.76	55	100.76	0.15 ic	0.00	---	---	---	---	---	---	---	---	0.147
0.95	69	100.95	0.18 ic	0.00	---	---	---	---	---	---	---	---	0.179
1.14	82	101.14	0.21 ic	0.00	---	---	---	---	---	---	---	---	0.207
1.33	96	101.33	0.23 ic	0.00	---	---	---	---	---	---	---	---	0.231
1.52	110	101.52	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.253
1.71	123	101.71	0.27 ic	0.00	---	---	---	---	---	---	---	---	0.273
1.90	137	101.90	0.29 ic	0.00	---	---	---	---	---	---	---	---	0.292

Hydrograph Report

Hyd. No. 7

B3C (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.556 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	584 cuft
Drainage area	=	0.200 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

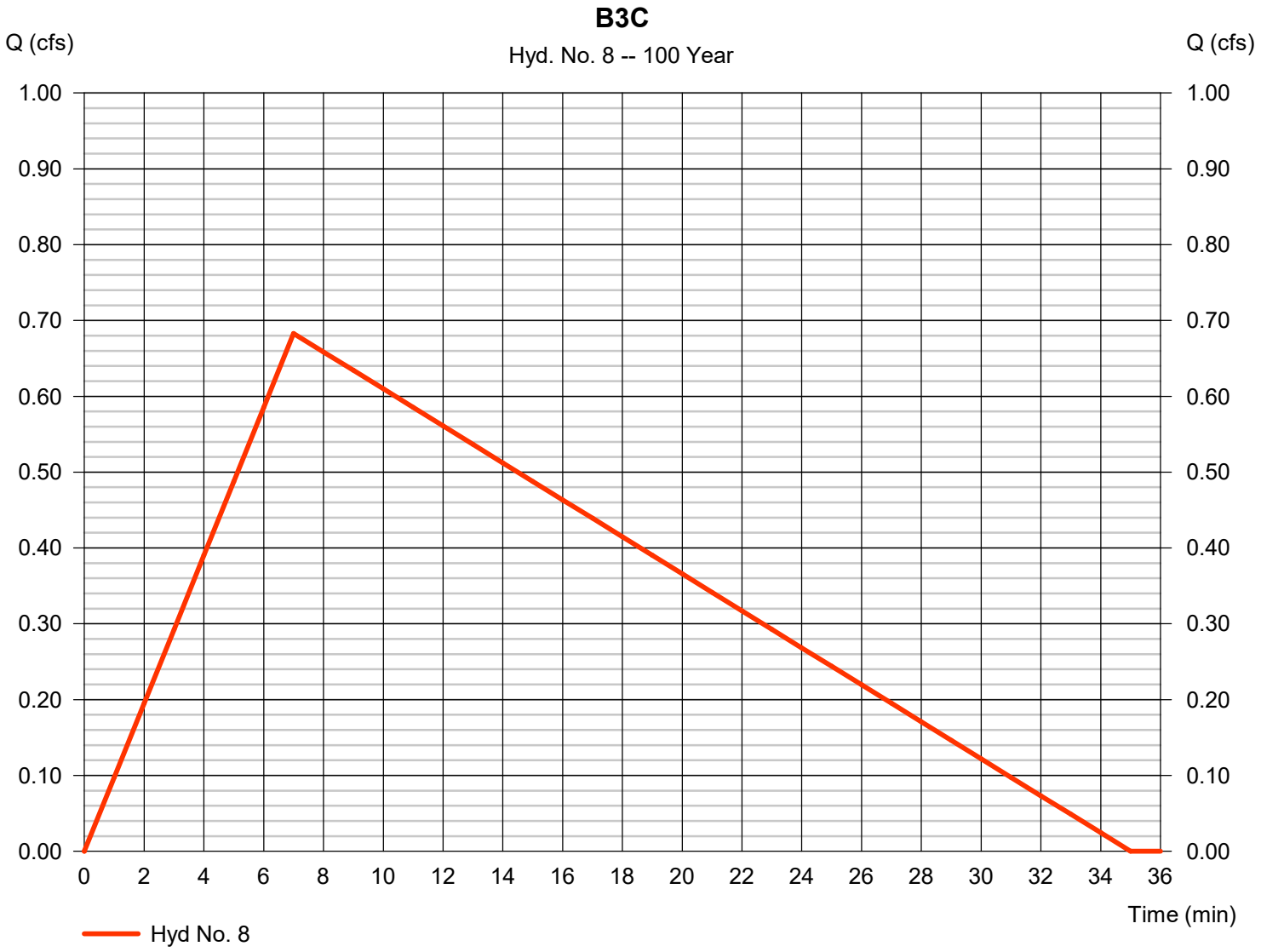


Hydrograph Report

Hyd. No. 8

B3C

Hydrograph type	=	Rational	Peak discharge	=	0.683 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	717 cuft
Drainage area	=	0.200 ac	Runoff coeff.	=	0.7
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



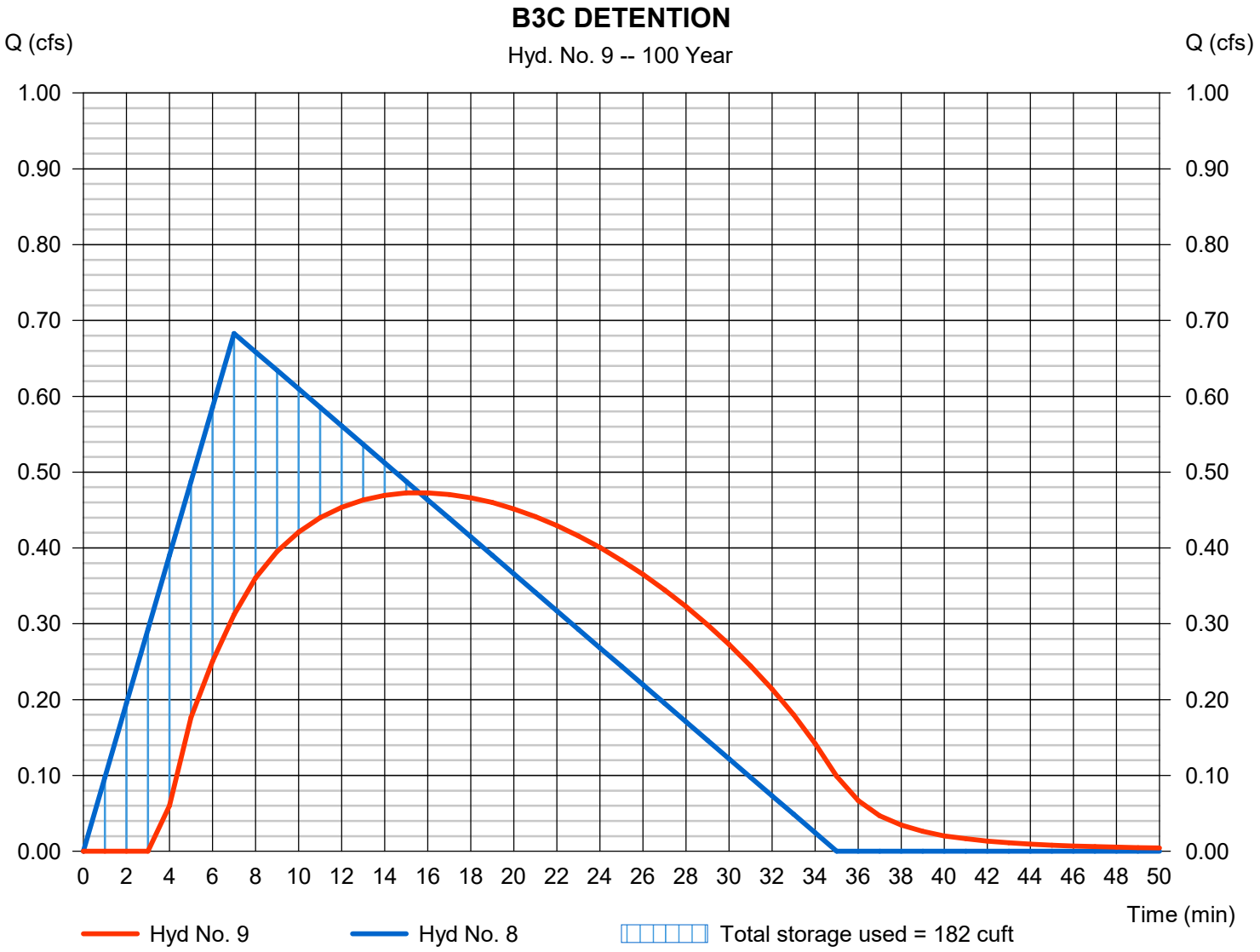
Hydrograph Report

Hyd. No. 9

B3C DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.473 cfs
Storm frequency	=	100 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	688 cuft
Inflow hyd. No.	=	8 - B3C	Max. Elevation	=	101.69 ft
Reservoir name	=	BIO B3C	Max. Storage	=	182 cuft

Storage Indication method used.



Pond Report

Pond No. 3 - BIO B3C

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 5.70 ft, Barrel Len = 19.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	21	21
0.38	100.38	n/a	21	41
0.57	100.57	n/a	21	62
0.76	100.76	n/a	21	82
0.95	100.95	n/a	21	103
1.14	101.14	n/a	21	123
1.33	101.33	n/a	21	144
1.52	101.52	n/a	21	165
1.71	101.71	n/a	21	185
1.90	101.90	n/a	21	206

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	0.00	0.00	0.00
Span (in)	= 4.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 100.25	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) = 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

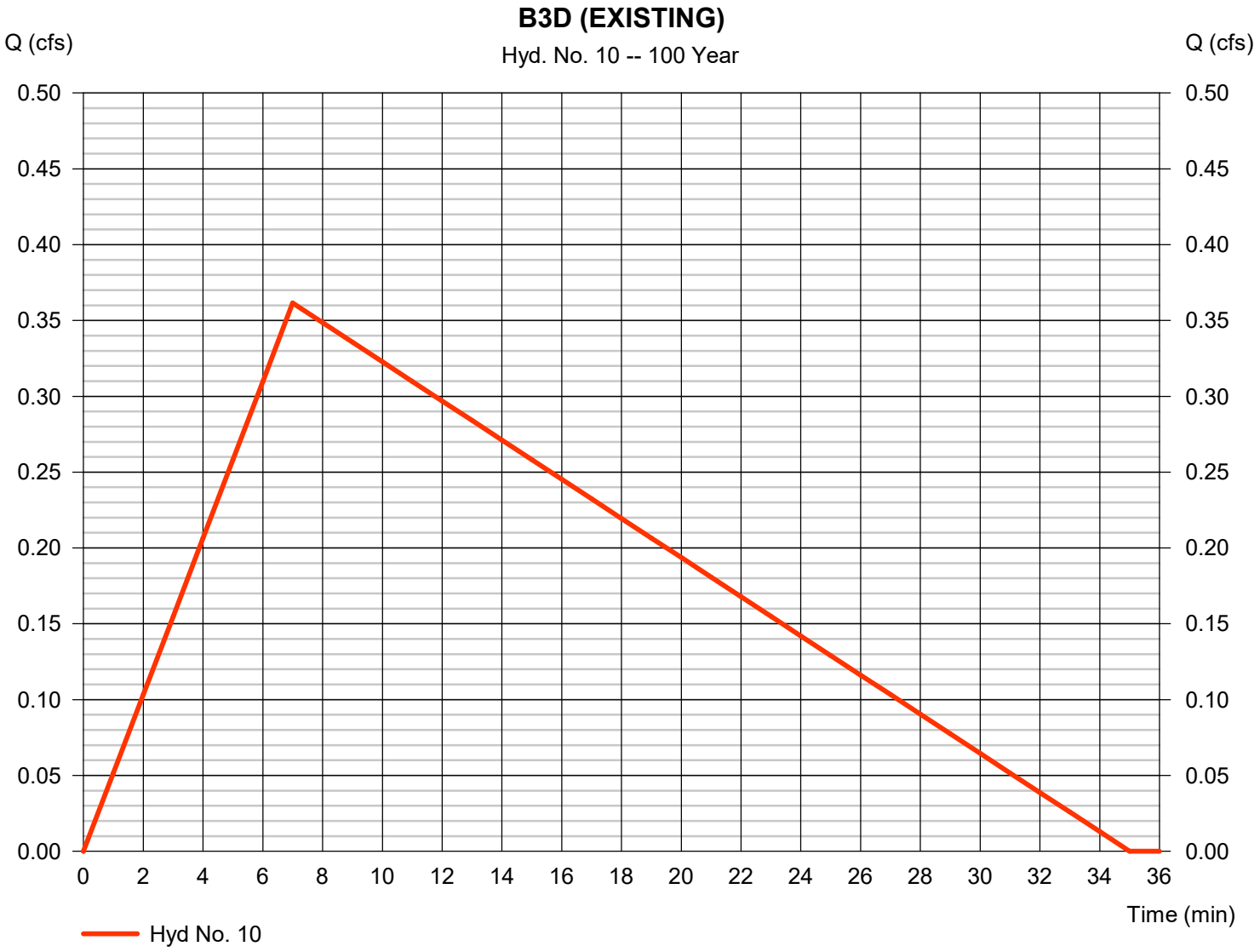
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	---	---	---	---	---	---	---	---	---	0.000
0.19	21	100.19	0.00	---	---	---	---	---	---	---	---	---	0.000
0.38	41	100.38	0.04 ic	---	---	---	---	---	---	---	---	---	0.039
0.57	62	100.57	0.17 ic	---	---	---	---	---	---	---	---	---	0.166
0.76	82	100.76	0.25 ic	---	---	---	---	---	---	---	---	---	0.246
0.95	103	100.95	0.31 ic	---	---	---	---	---	---	---	---	---	0.307
1.14	123	101.14	0.36 ic	---	---	---	---	---	---	---	---	---	0.357
1.33	144	101.33	0.40 ic	---	---	---	---	---	---	---	---	---	0.402
1.52	165	101.52	0.44 ic	---	---	---	---	---	---	---	---	---	0.441
1.71	185	101.71	0.48 ic	---	---	---	---	---	---	---	---	---	0.478
1.90	206	101.90	0.51 ic	---	---	---	---	---	---	---	---	---	0.512

Hydrograph Report

Hyd. No. 10

B3D (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.361 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	380 cuft
Drainage area	=	0.130 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

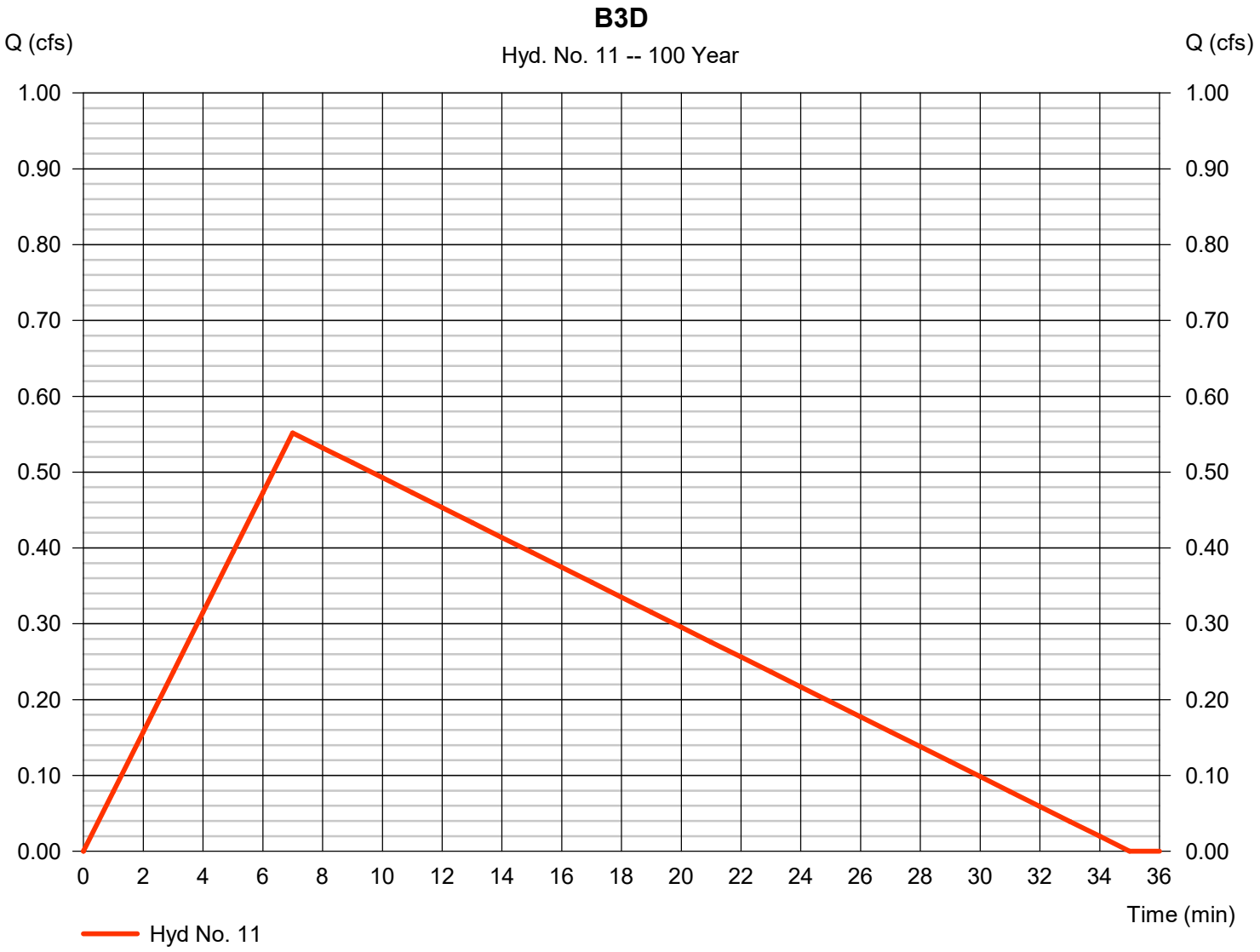


Hydrograph Report

Hyd. No. 11

B3D

Hydrograph type	=	Rational	Peak discharge	=	0.552 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	579 cuft
Drainage area	=	0.130 ac	Runoff coeff.	=	0.87
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



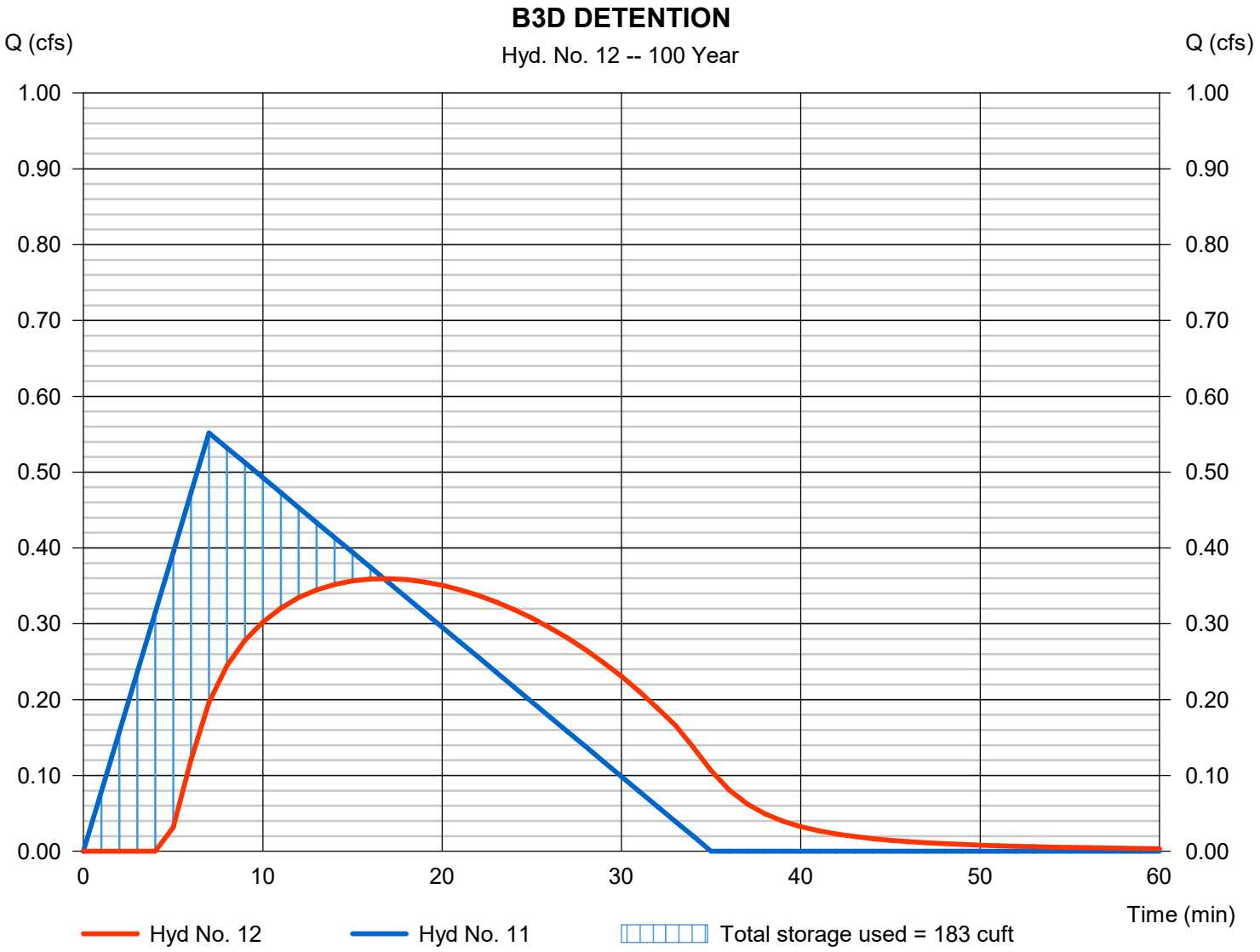
Hydrograph Report

Hyd. No. 12

B3D DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.360 cfs
Storm frequency	=	100 yrs	Time to peak	=	17 min
Time interval	=	1 min	Hyd. volume	=	537 cuft
Inflow hyd. No.	=	11 - B3D	Max. Elevation	=	101.15 ft
Reservoir name	=	BIO B3D	Max. Storage	=	183 cuft

Storage Indication method used.



Pond Report

Pond No. 4 - BIO B3D

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 7.60 ft, Barrel Len = 20.90 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	30	30
0.38	100.38	n/a	30	60
0.57	100.57	n/a	30	91
0.76	100.76	n/a	30	121
0.95	100.95	n/a	30	151
1.14	101.14	n/a	30	181
1.33	101.33	n/a	30	211
1.52	101.52	n/a	30	241
1.71	101.71	n/a	30	272
1.90	101.90	n/a	30	302

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	6.00	0.00	0.00
Span (in)	= 4.00	6.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 100.25	102.50	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) = 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

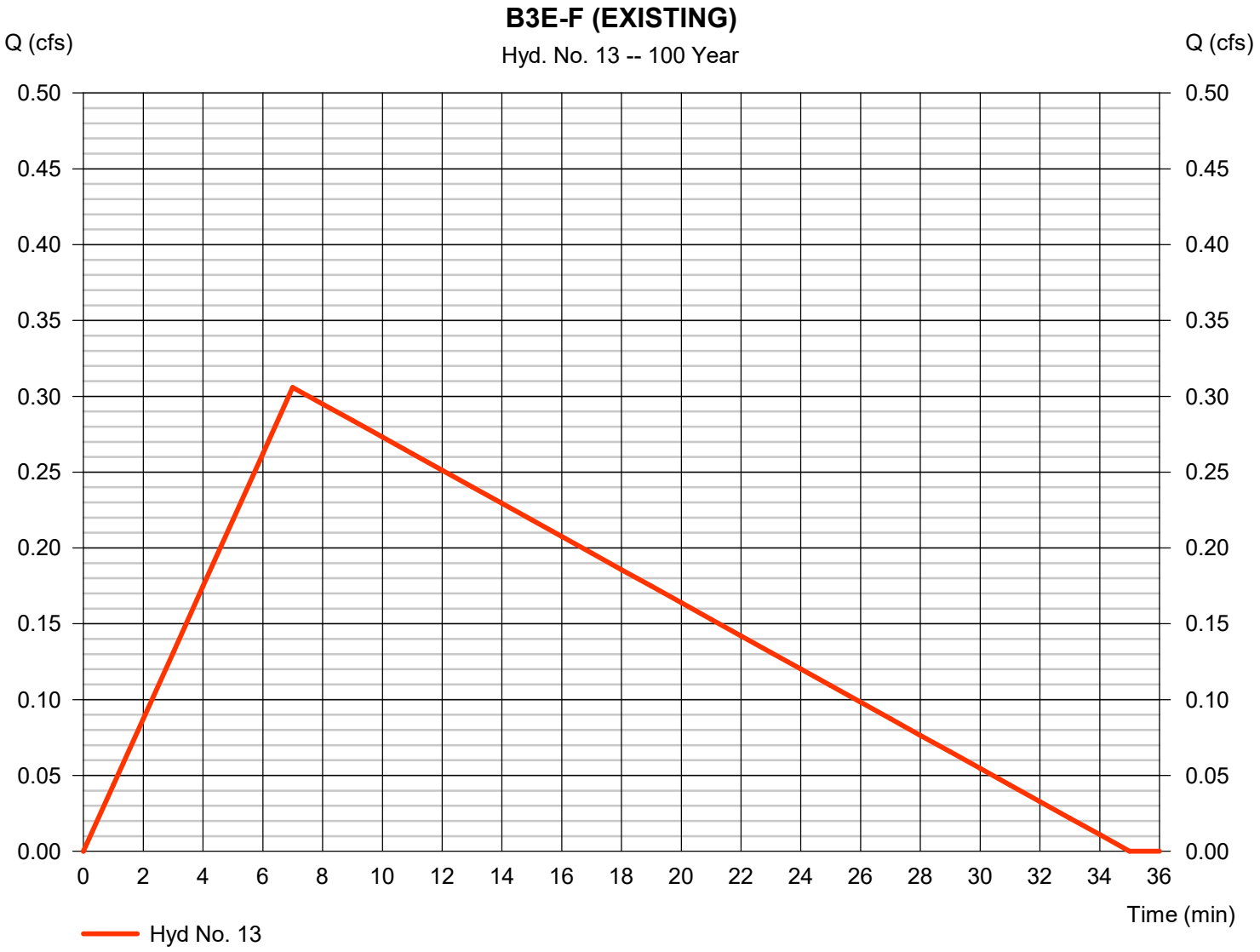
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	30	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	60	100.38	0.04 ic	0.00	---	---	---	---	---	---	---	---	0.039
0.57	91	100.57	0.17 ic	0.00	---	---	---	---	---	---	---	---	0.166
0.76	121	100.76	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.246
0.95	151	100.95	0.31 ic	0.00	---	---	---	---	---	---	---	---	0.307
1.14	181	101.14	0.36 ic	0.00	---	---	---	---	---	---	---	---	0.357
1.33	211	101.33	0.40 ic	0.00	---	---	---	---	---	---	---	---	0.402
1.52	241	101.52	0.44 ic	0.00	---	---	---	---	---	---	---	---	0.441
1.71	272	101.71	0.48 ic	0.00	---	---	---	---	---	---	---	---	0.478
1.90	302	101.90	0.51 ic	0.00	---	---	---	---	---	---	---	---	0.512

Hydrograph Report

Hyd. No. 13

B3E-F (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.306 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	321 cuft
Drainage area	=	0.110 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

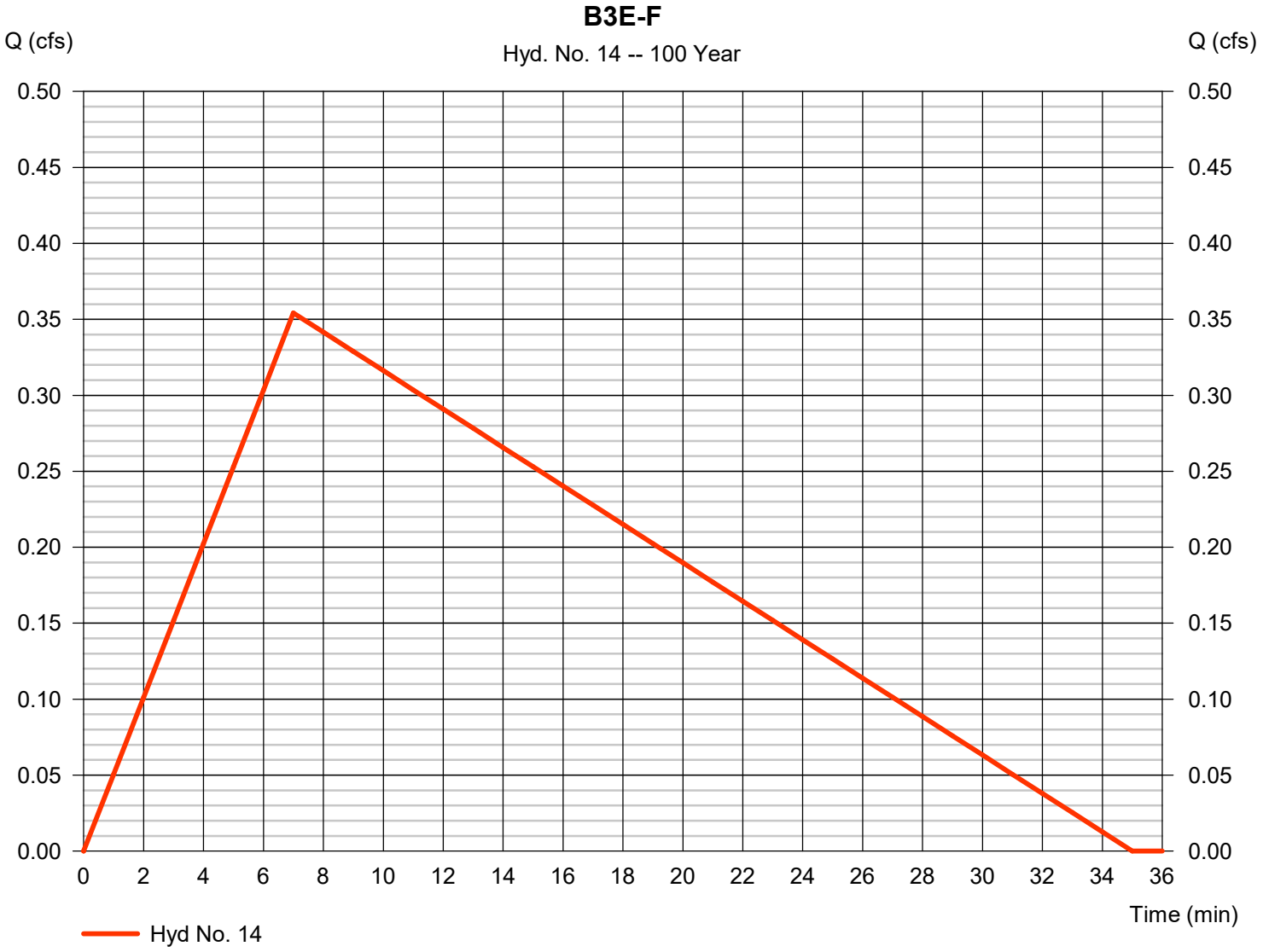


Hydrograph Report

Hyd. No. 14

B3E-F

Hydrograph type	=	Rational	Peak discharge	=	0.354 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	372 cuft
Drainage area	=	0.110 ac	Runoff coeff.	=	0.66
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



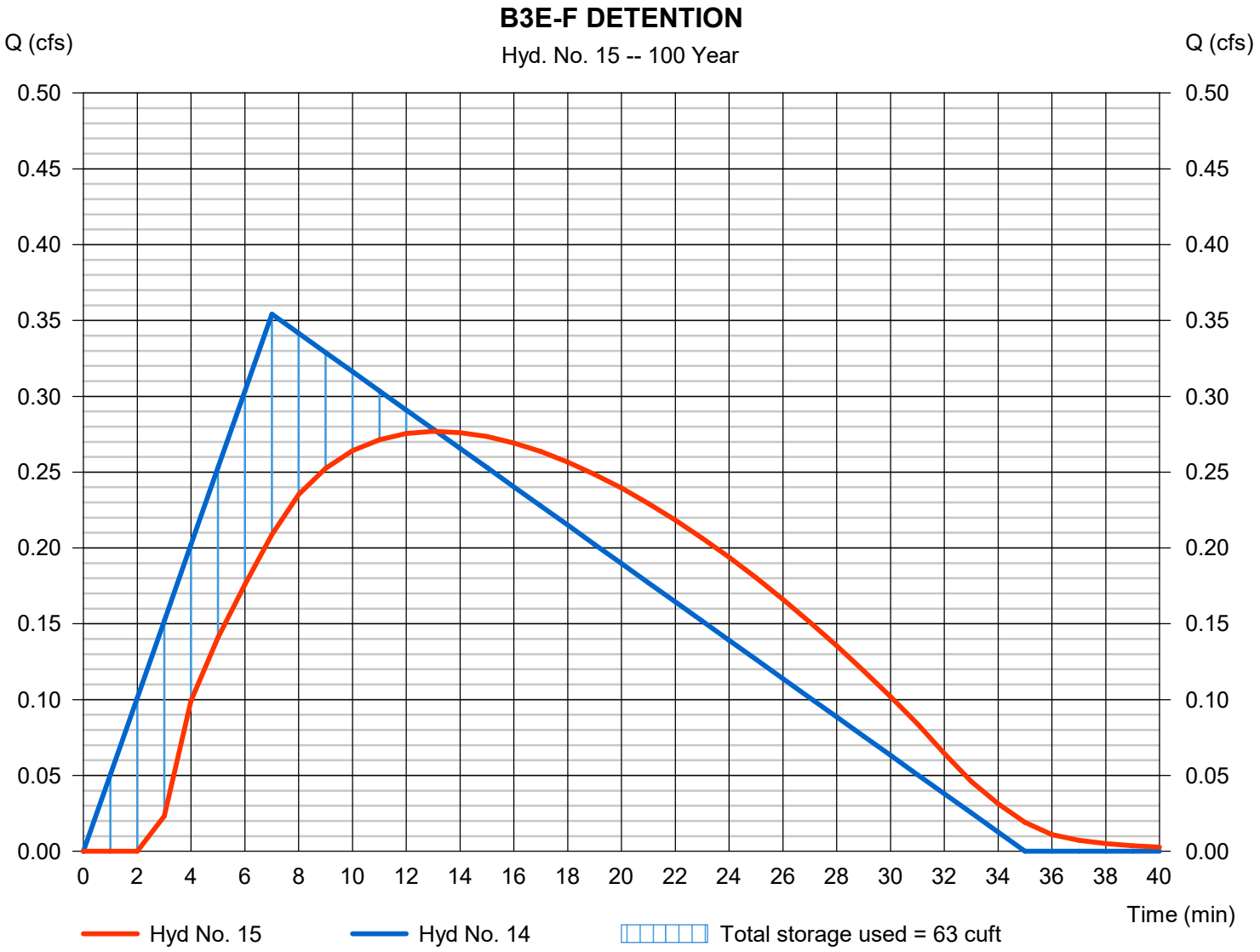
Hydrograph Report

Hyd. No. 15

B3E-F DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.277 cfs
Storm frequency	=	100 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	362 cuft
Inflow hyd. No.	=	14 - B3E-F	Max. Elevation	=	101.75 ft
Reservoir name	=	BIO B3E-F	Max. Storage	=	63 cuft

Storage Indication method used.



Pond No. 5 - BIO B3E-F

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 3.80 ft, Barrel Len = 9.50 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	7	7
0.38	100.38	n/a	7	14
0.57	100.57	n/a	7	21
0.76	100.76	n/a	7	27
0.95	100.95	n/a	7	34
1.14	101.14	n/a	7	41
1.33	101.33	n/a	7	48
1.52	101.52	n/a	7	55
1.71	101.71	n/a	7	62
1.90	101.90	n/a	7	69

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 3.00	6.00	0.00	0.00
Span (in)	= 3.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.25	102.50	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) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

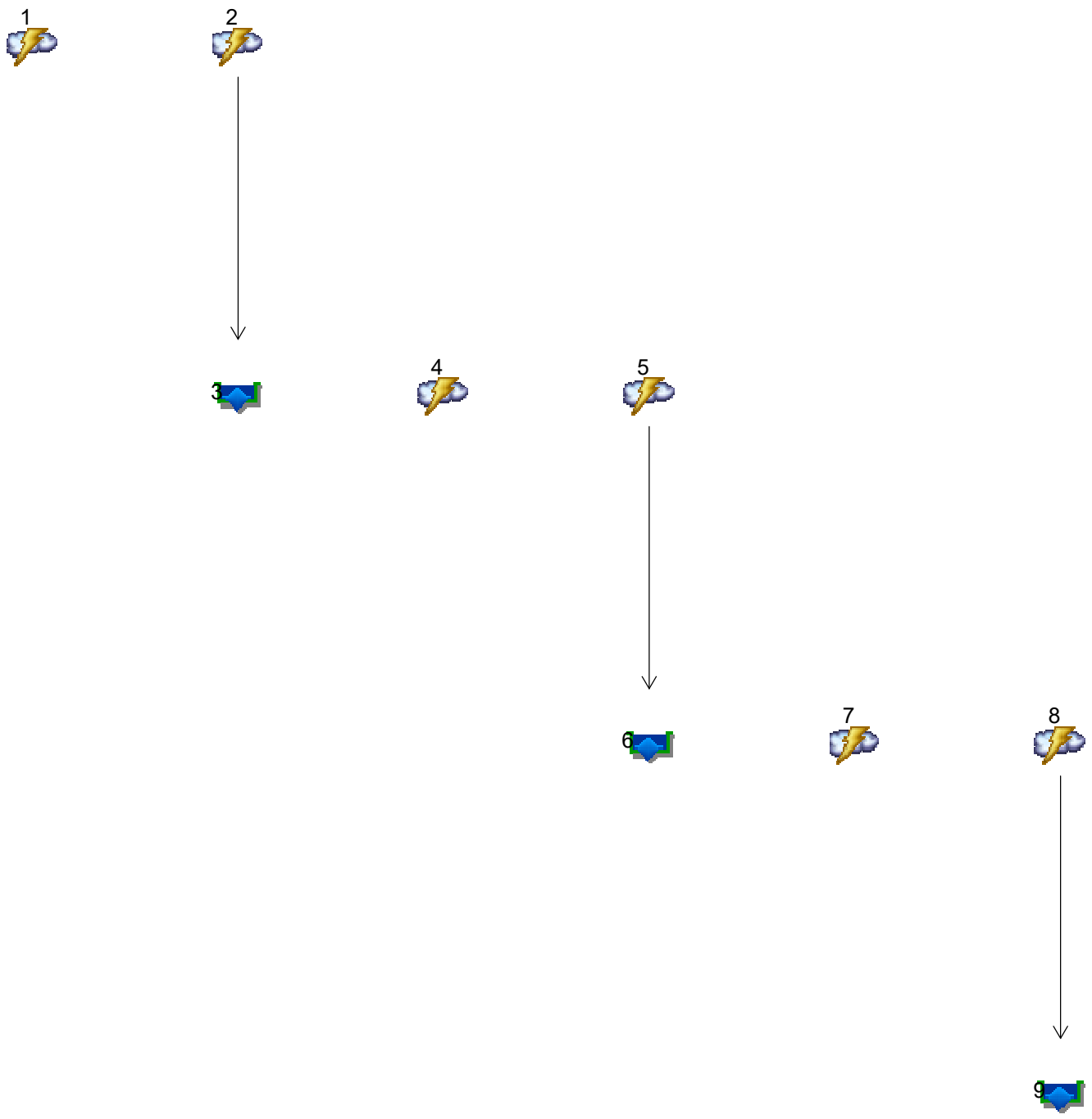
Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

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	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	7	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	14	100.38	0.03 ic	0.00	---	---	---	---	---	---	---	---	0.032
0.57	21	100.57	0.10 ic	0.00	---	---	---	---	---	---	---	---	0.104
0.76	27	100.76	0.15 ic	0.00	---	---	---	---	---	---	---	---	0.147
0.95	34	100.95	0.18 ic	0.00	---	---	---	---	---	---	---	---	0.179
1.14	41	101.14	0.21 ic	0.00	---	---	---	---	---	---	---	---	0.207
1.33	48	101.33	0.23 ic	0.00	---	---	---	---	---	---	---	---	0.231
1.52	55	101.52	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.253
1.71	62	101.71	0.27 ic	0.00	---	---	---	---	---	---	---	---	0.273
1.90	69	101.90	0.29 ic	0.00	---	---	---	---	---	---	---	---	0.292

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514



Legend

Hyd.	Origin	Description
1	Rational	B4A (EXISTING)
2	Rational	B4A
3	Reservoir	B4A DETENTION
4	Rational	B4B (EXISTING)
5	Rational	B4B
6	Reservoir	B4B DETENTION
7	Rational	B4C (EXISTING)
8	Rational	B4C
9	Reservoir	B4C DETENTION

Hydraflow Table of Contents

B4 SUBSHEDS.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

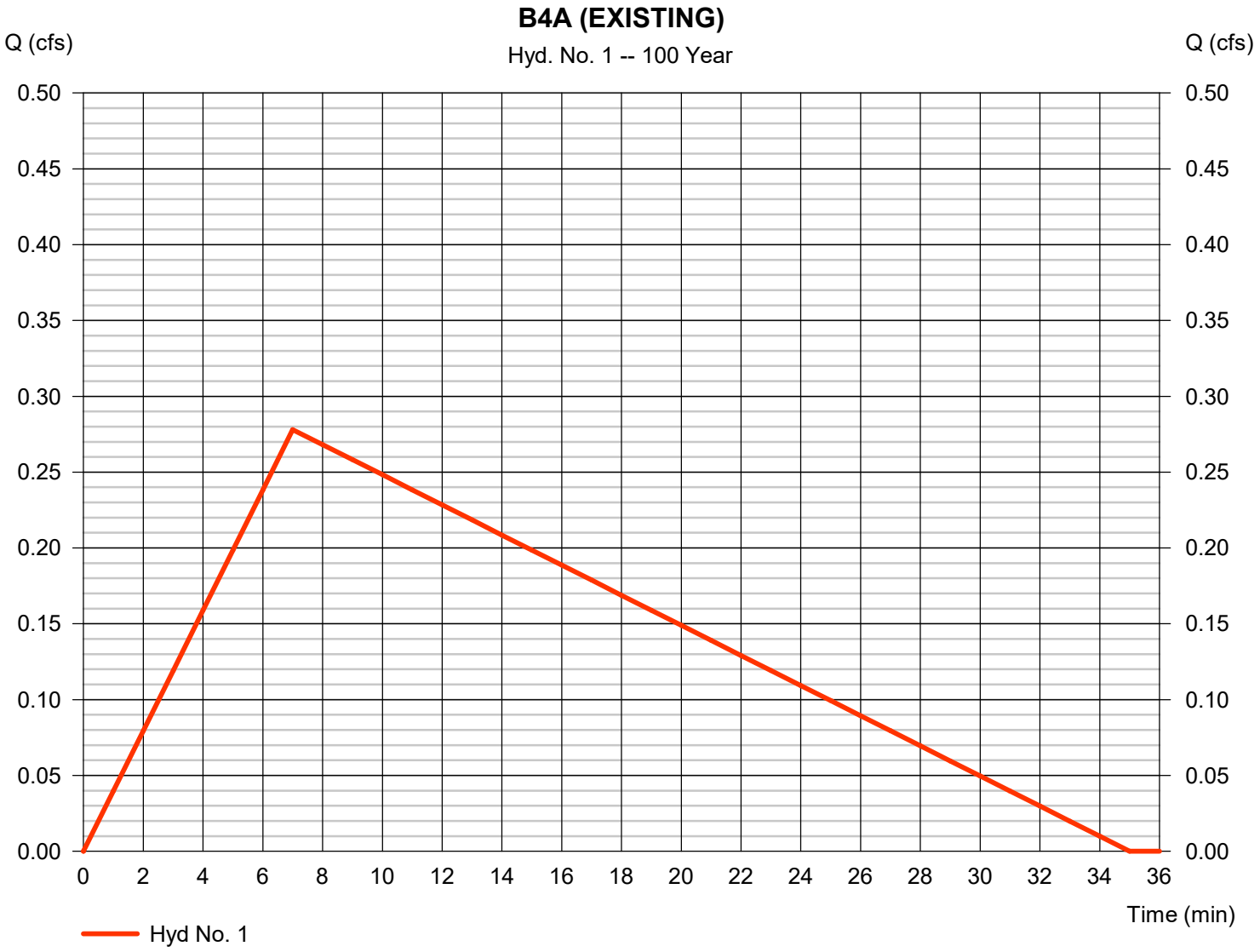
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	0.278	1	7	292	------	------	------	B4A (EXISTING)
2	Rational	0.415	1	7	435	------	------	------	B4A
3	Reservoir	0.229	1	20	400	2	101.32	171	B4A DETENTION
4	Rational	0.111	1	7	117	------	------	------	B4B (EXISTING)
5	Rational	0.172	1	7	180	------	------	------	B4B
6	Reservoir	0.105	1	18	125	5	101.52	82.1	B4B DETENTION
7	Rational	0.278	1	7	292	------	------	------	B4C (EXISTING)
8	Rational	0.439	1	7	461	------	------	------	B4C
9	Reservoir	0.263	1	18	364	8	101.06	199	B4C DETENTION

Hydrograph Report

Hyd. No. 1

B4A (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.278 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	292 cuft
Drainage area	=	0.100 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

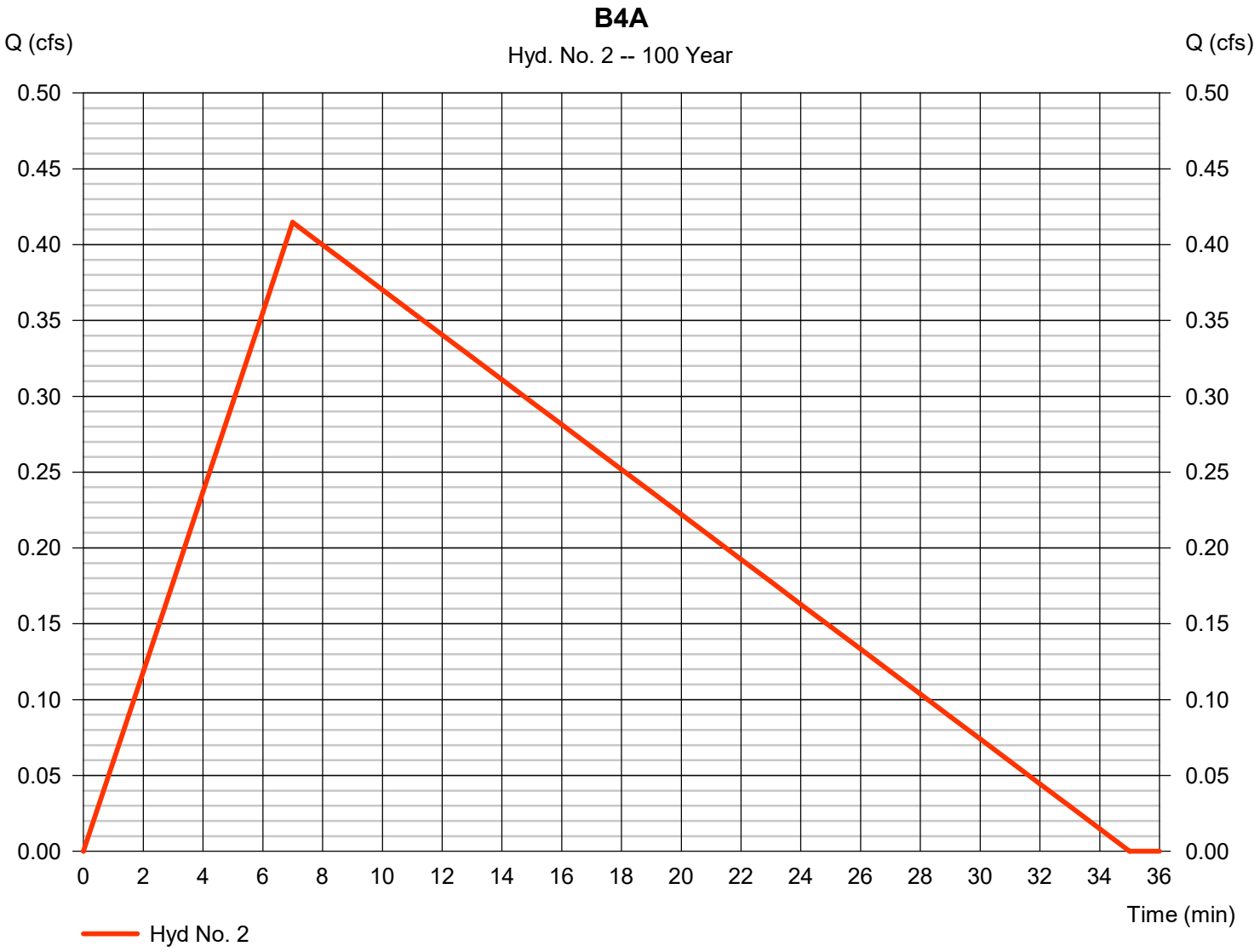


Hydrograph Report

Hyd. No. 2

B4A

Hydrograph type	= Rational	Peak discharge	= 0.415 cfs
Storm frequency	= 100 yrs	Time to peak	= 7 min
Time interval	= 1 min	Hyd. volume	= 435 cuft
Drainage area	= 0.100 ac	Runoff coeff.	= 0.85
Intensity	= 4.878 in/hr	Tc by User	= 7.00 min
IDF Curve	= Fairfax.idf	Asc/Rec limb fact	= 1/4



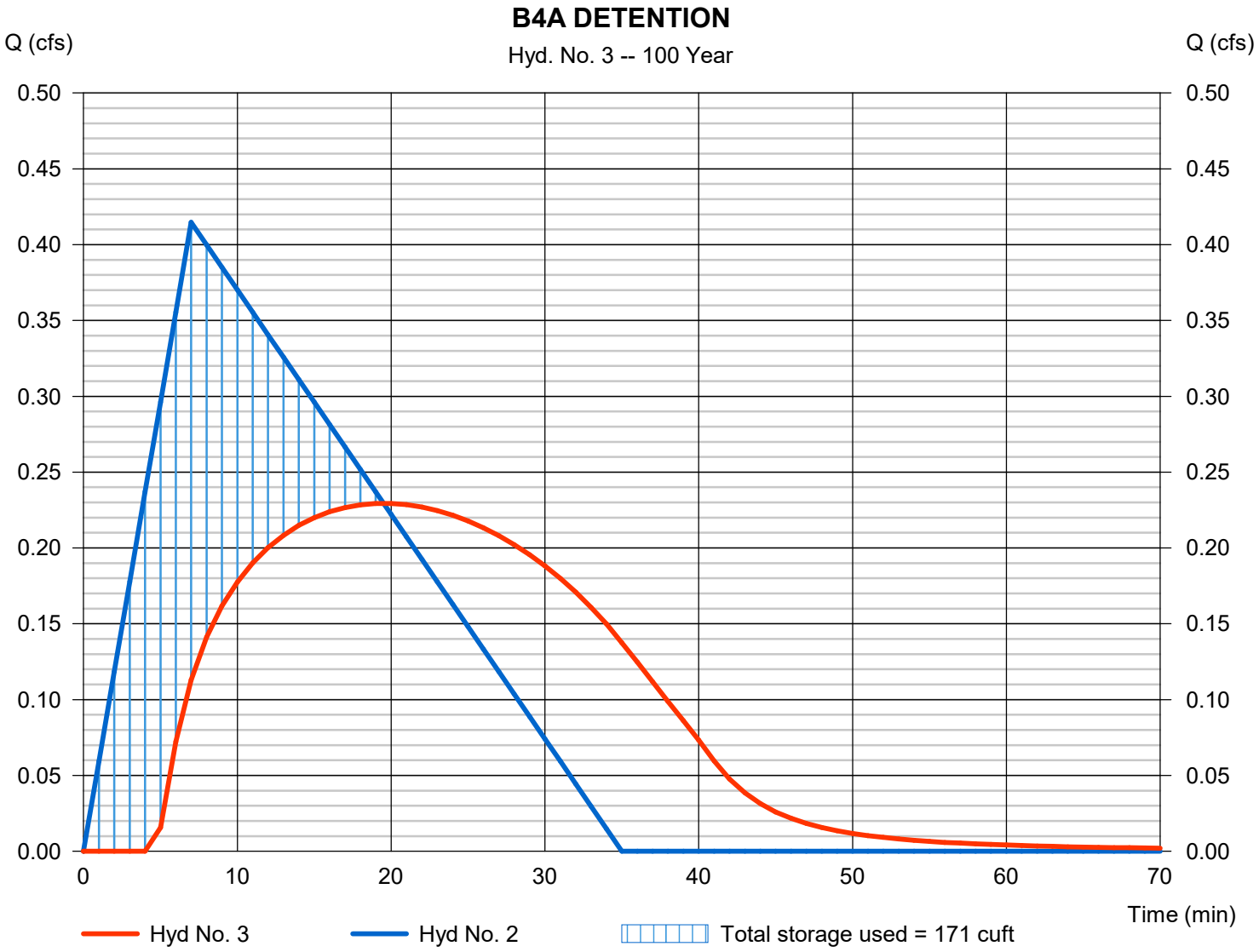
Hydrograph Report

Hyd. No. 3

B4A DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.229 cfs
Storm frequency	=	100 yrs	Time to peak	=	20 min
Time interval	=	1 min	Hyd. volume	=	400 cuft
Inflow hyd. No.	=	2 - B4A	Max. Elevation	=	101.32 ft
Reservoir name	=	BIO B4A	Max. Storage	=	171 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BIO B4A

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 3.80 ft, Barrel Len = 34.20 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	25	25
0.38	100.38	n/a	25	49
0.57	100.57	n/a	25	74
0.76	100.76	n/a	25	99
0.95	100.95	n/a	25	123
1.14	101.14	n/a	25	148
1.33	101.33	n/a	25	173
1.52	101.52	n/a	25	198
1.71	101.71	n/a	25	222
1.90	101.90	n/a	25	247

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 3.00	6.00	0.00	0.00
Span (in)	= 3.00	6.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 100.25	102.50	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) = 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

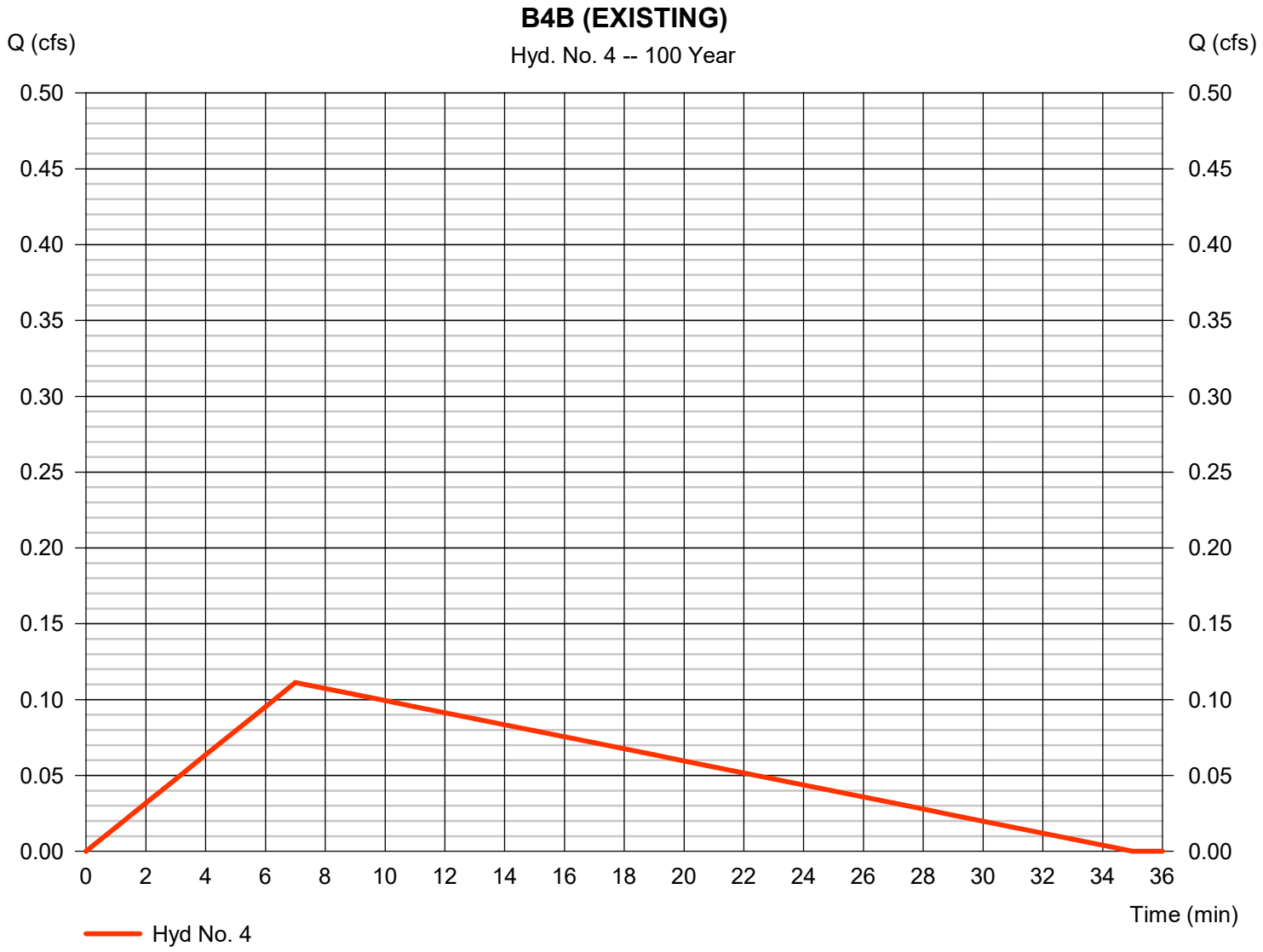
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	25	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	49	100.38	0.03 ic	0.00	---	---	---	---	---	---	---	---	0.032
0.57	74	100.57	0.10 ic	0.00	---	---	---	---	---	---	---	---	0.104
0.76	99	100.76	0.15 ic	0.00	---	---	---	---	---	---	---	---	0.147
0.95	123	100.95	0.18 ic	0.00	---	---	---	---	---	---	---	---	0.179
1.14	148	101.14	0.21 ic	0.00	---	---	---	---	---	---	---	---	0.207
1.33	173	101.33	0.23 ic	0.00	---	---	---	---	---	---	---	---	0.231
1.52	198	101.52	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.253
1.71	222	101.71	0.27 ic	0.00	---	---	---	---	---	---	---	---	0.273
1.90	247	101.90	0.29 ic	0.00	---	---	---	---	---	---	---	---	0.292

Hydrograph Report

Hyd. No. 4

B4B (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.111 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	117 cuft
Drainage area	=	0.040 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

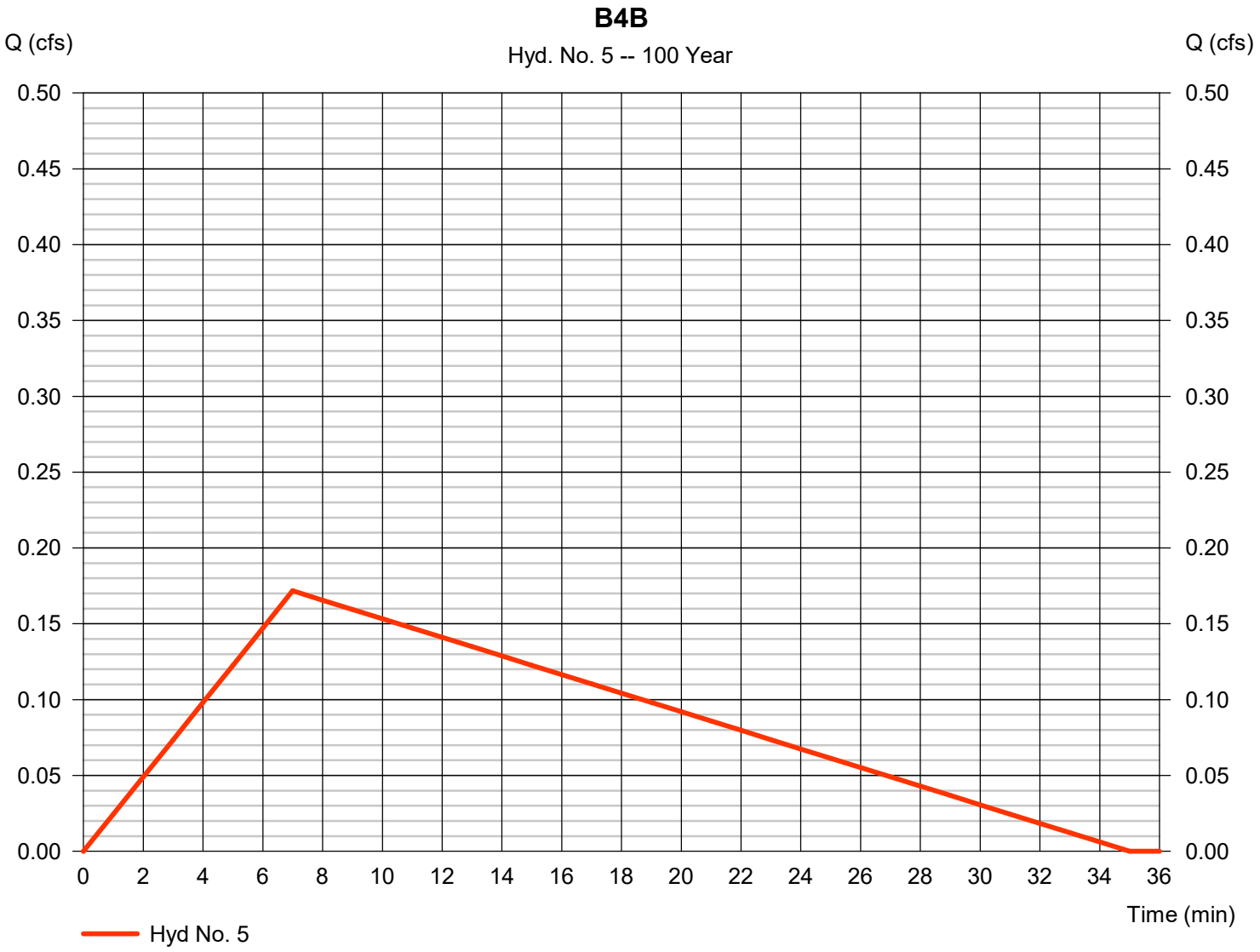


Hydrograph Report

Hyd. No. 5

B4B

Hydrograph type	=	Rational	Peak discharge	=	0.172 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	180 cuft
Drainage area	=	0.040 ac	Runoff coeff.	=	0.88
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



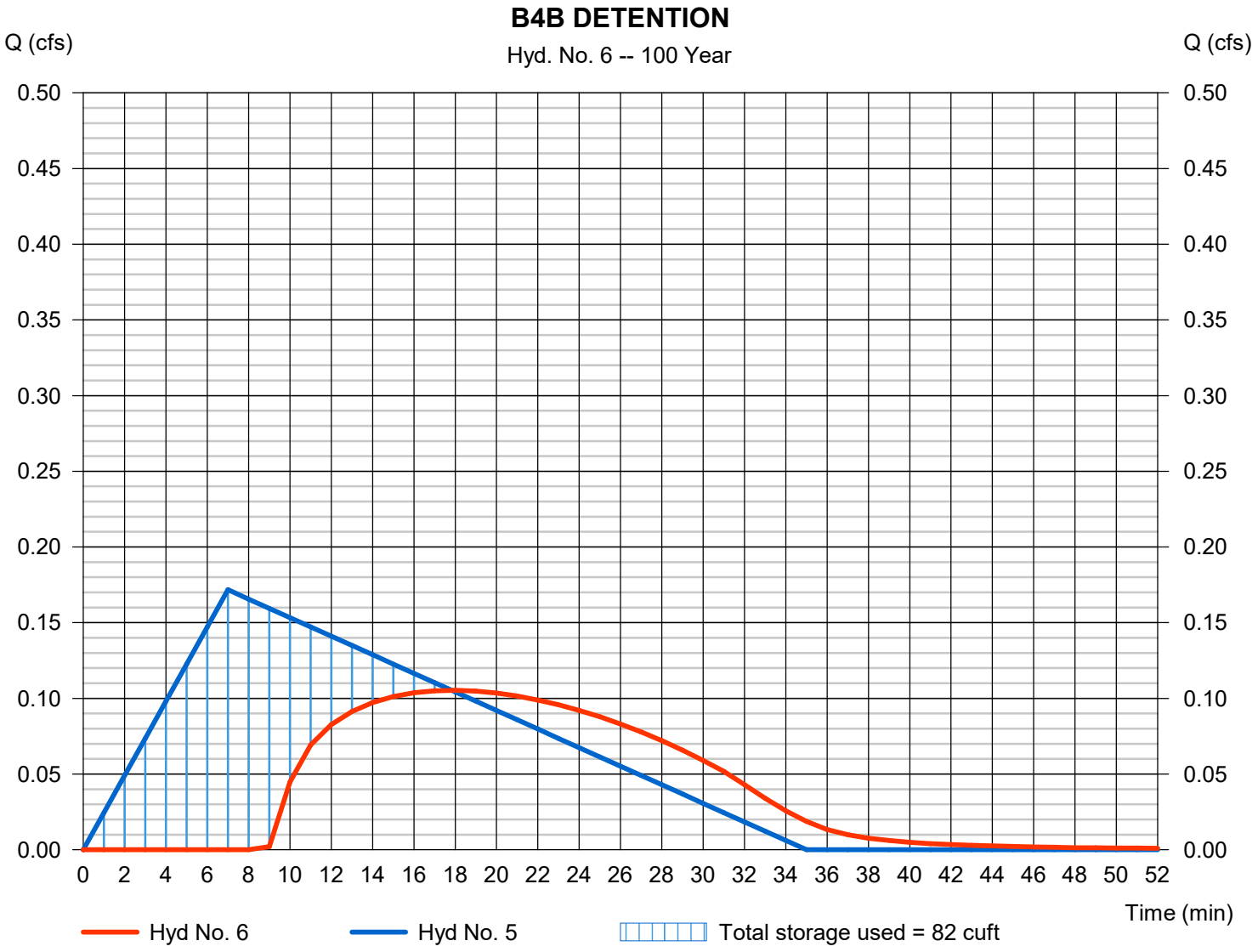
Hydrograph Report

Hyd. No. 6

B4B DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.105 cfs
Storm frequency	=	100 yrs	Time to peak	=	18 min
Time interval	=	1 min	Hyd. volume	=	125 cuft
Inflow hyd. No.	=	5 - B4B	Max. Elevation	=	101.52 ft
Reservoir name	=	BIO B4B	Max. Storage	=	82 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - BIO B4B

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 5.70 ft, Barrel Len = 9.50 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	10	10
0.38	100.38	n/a	10	21
0.57	100.57	n/a	10	31
0.76	100.76	n/a	10	41
0.95	100.95	n/a	10	51
1.14	101.14	n/a	10	62
1.33	101.33	n/a	10	72
1.52	101.52	n/a	10	82
1.71	101.71	n/a	10	93
1.90	101.90	n/a	10	103

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 2.50	6.00	0.00	0.00
Span (in)	= 2.50	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 101.00	102.50	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) = 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

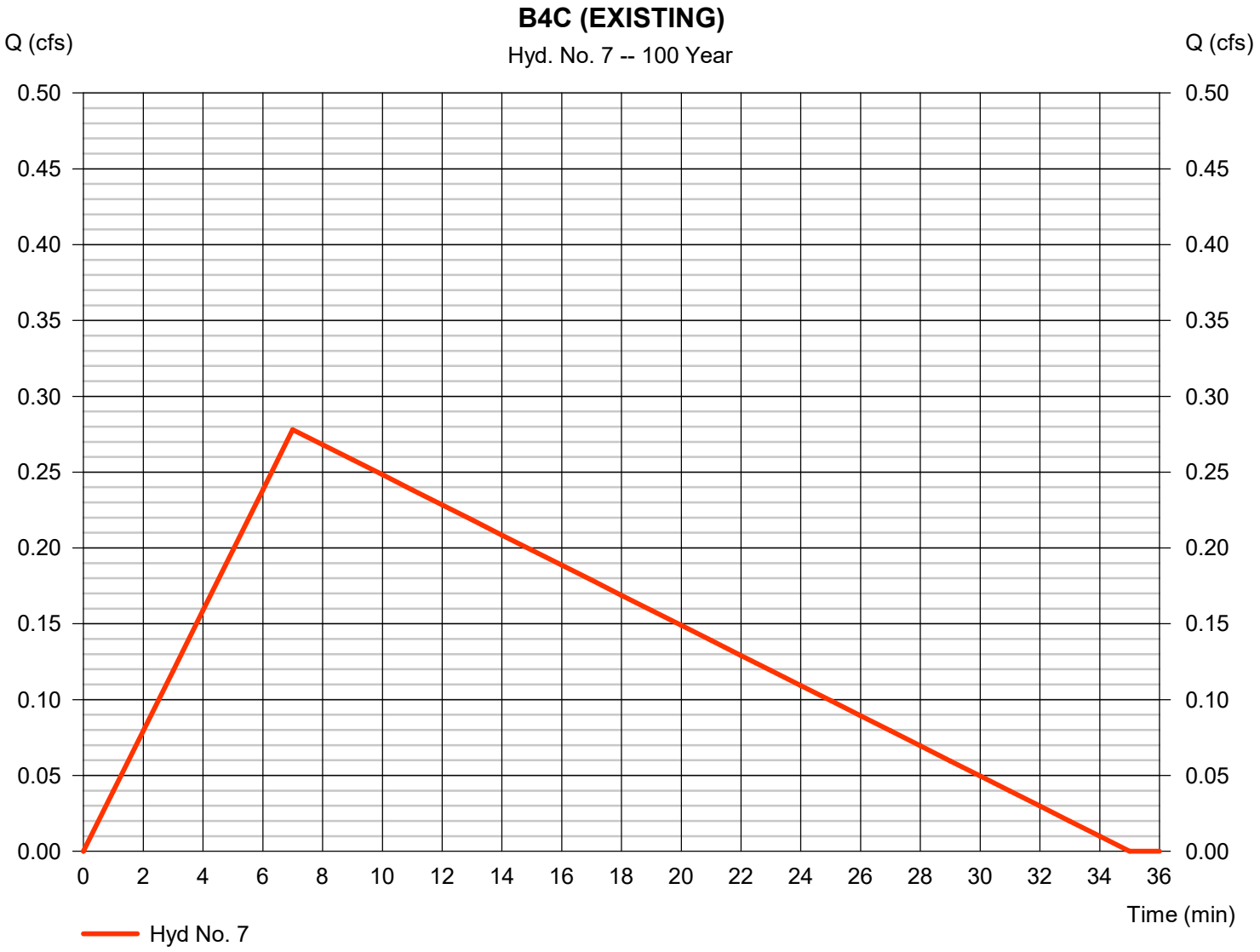
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	10	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	21	100.38	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.57	31	100.57	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.76	41	100.76	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.95	51	100.95	0.00	0.00	---	---	---	---	---	---	---	---	0.000
1.14	62	101.14	0.03 ic	0.00	---	---	---	---	---	---	---	---	0.031
1.33	72	101.33	0.08 ic	0.00	---	---	---	---	---	---	---	---	0.078
1.52	82	101.52	0.11 ic	0.00	---	---	---	---	---	---	---	---	0.106
1.71	93	101.71	0.13 ic	0.00	---	---	---	---	---	---	---	---	0.128
1.90	103	101.90	0.15 ic	0.00	---	---	---	---	---	---	---	---	0.146

Hydrograph Report

Hyd. No. 7

B4C (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.278 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	292 cuft
Drainage area	=	0.100 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

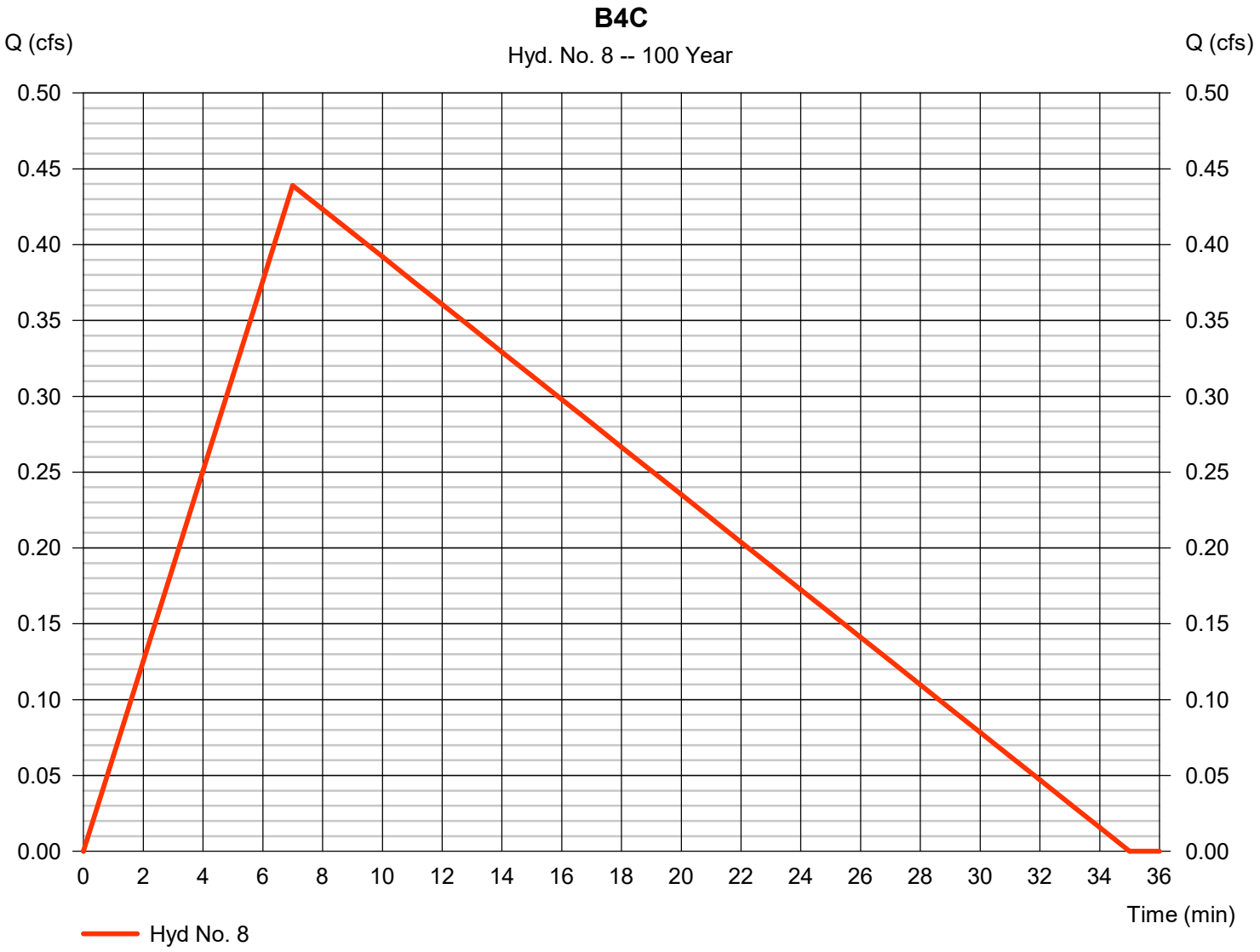


Hydrograph Report

Hyd. No. 8

B4C

Hydrograph type	= Rational	Peak discharge	= 0.439 cfs
Storm frequency	= 100 yrs	Time to peak	= 7 min
Time interval	= 1 min	Hyd. volume	= 461 cuft
Drainage area	= 0.100 ac	Runoff coeff.	= 0.9
Intensity	= 4.878 in/hr	Tc by User	= 7.00 min
IDF Curve	= Fairfax.idf	Asc/Rec limb fact	= 1/4



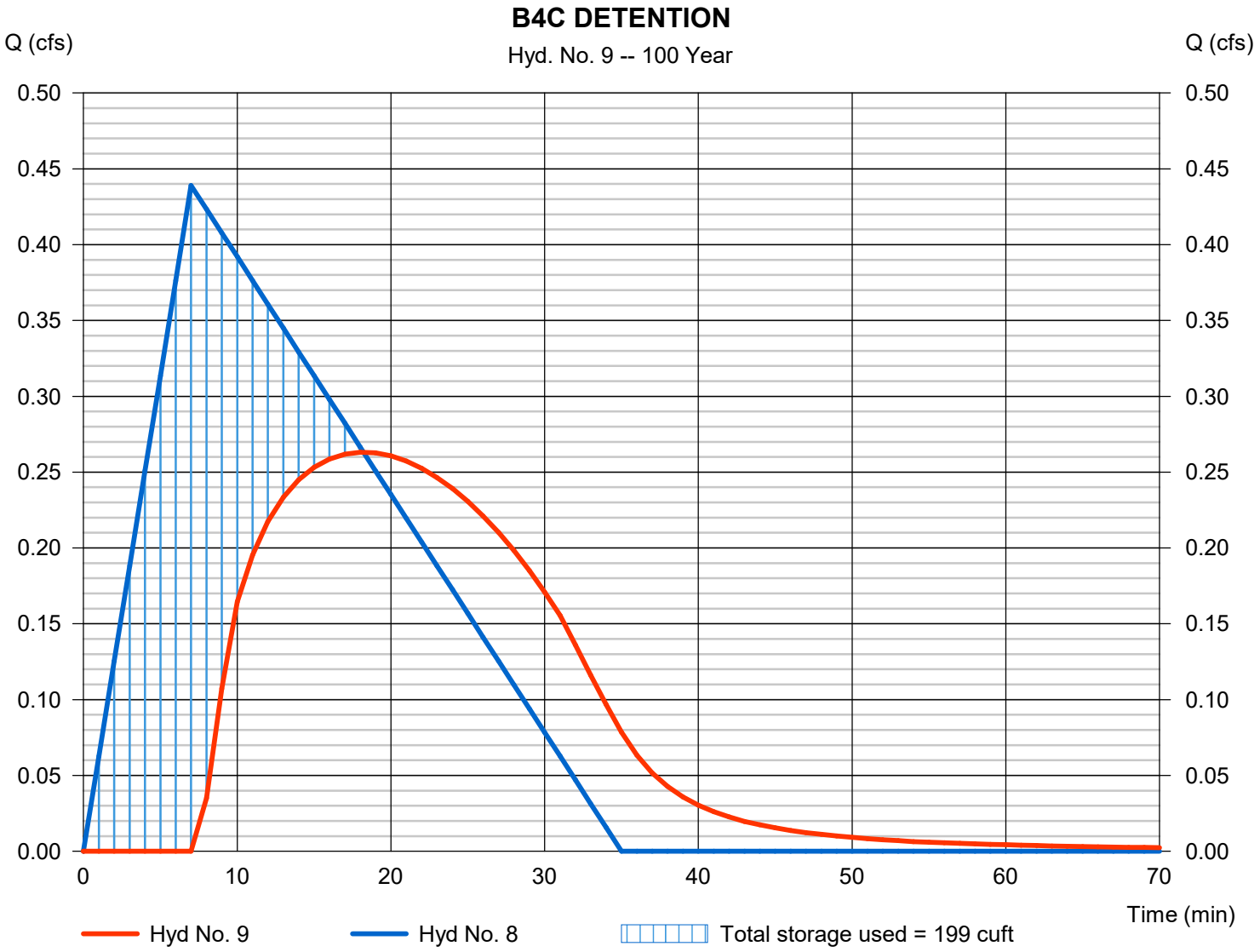
Hydrograph Report

Hyd. No. 9

B4C DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.263 cfs
Storm frequency	=	100 yrs	Time to peak	=	18 min
Time interval	=	1 min	Hyd. volume	=	364 cuft
Inflow hyd. No.	=	8 - B4C	Max. Elevation	=	101.06 ft
Reservoir name	=	BIO B4C	Max. Storage	=	199 cuft

Storage Indication method used.



Pond Report

Pond No. 3 - BIO B4C

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 7.60 ft, Barrel Len = 24.70 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	36	36
0.38	100.38	n/a	36	71
0.57	100.57	n/a	36	107
0.76	100.76	n/a	36	143
0.95	100.95	n/a	36	178
1.14	101.14	n/a	36	214
1.33	101.33	n/a	36	250
1.52	101.52	n/a	36	285
1.71	101.71	n/a	36	321
1.90	101.90	n/a	36	357

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	0.00	0.00	0.00
Span (in)	= 4.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 100.50	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) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

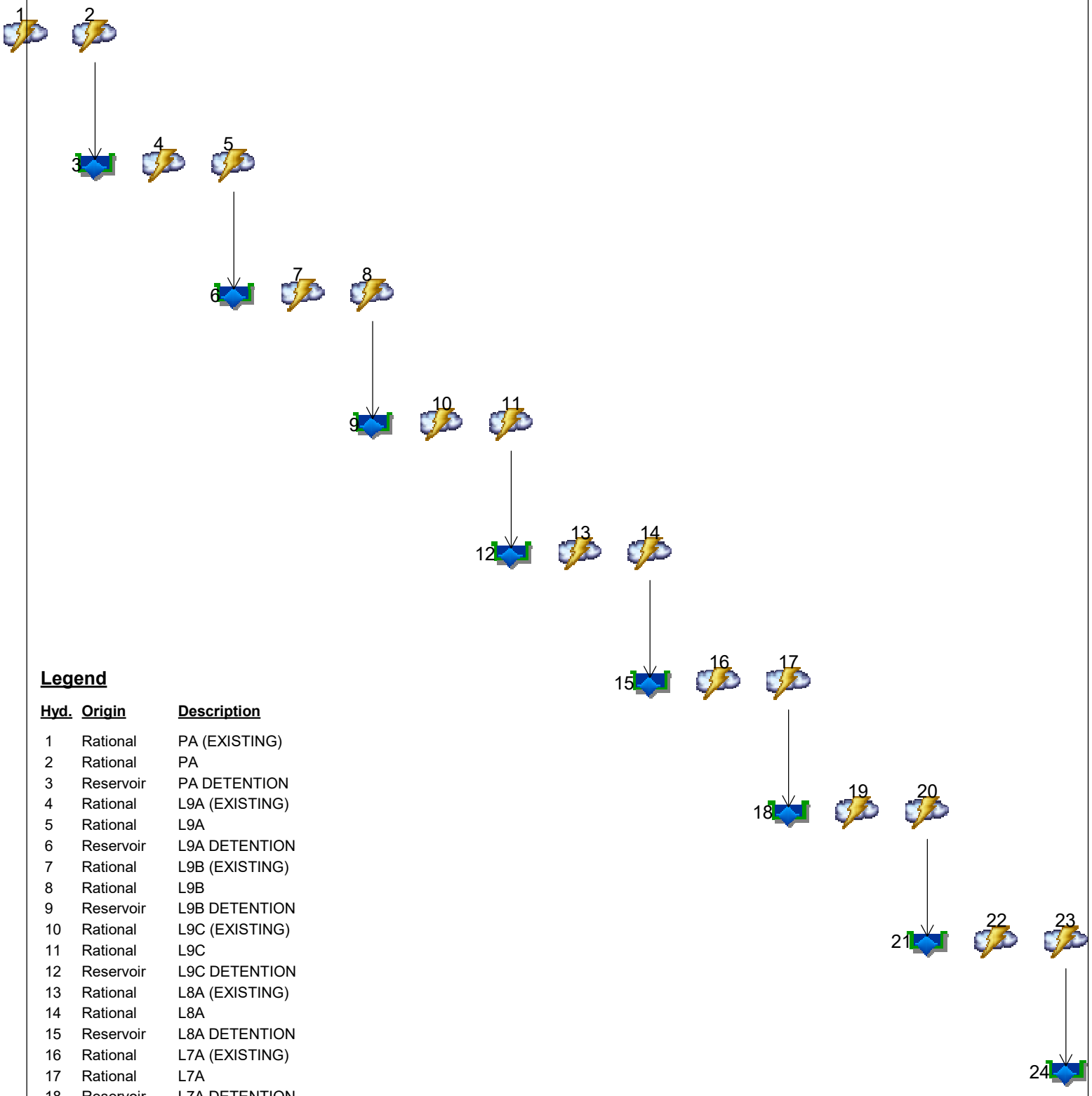
Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

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	100.00	0.00	---	---	---	---	---	---	---	---	---	0.000
0.19	36	100.19	0.00	---	---	---	---	---	---	---	---	---	0.000
0.38	71	100.38	0.00	---	---	---	---	---	---	---	---	---	0.000
0.57	107	100.57	0.01 ic	---	---	---	---	---	---	---	---	---	0.012
0.76	143	100.76	0.13 ic	---	---	---	---	---	---	---	---	---	0.127
0.95	178	100.95	0.22 ic	---	---	---	---	---	---	---	---	---	0.224
1.14	214	101.14	0.29 ic	---	---	---	---	---	---	---	---	---	0.289
1.33	250	101.33	0.34 ic	---	---	---	---	---	---	---	---	---	0.342
1.52	285	101.52	0.39 ic	---	---	---	---	---	---	---	---	---	0.388
1.71	321	101.71	0.43 ic	---	---	---	---	---	---	---	---	---	0.429
1.90	357	101.90	0.47 ic	---	---	---	---	---	---	---	---	---	0.467

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514



Legend

Hyd.	Origin	Description
1	Rational	PA (EXISTING)
2	Rational	PA
3	Reservoir	PA DETENTION
4	Rational	L9A (EXISTING)
5	Rational	L9A
6	Reservoir	L9A DETENTION
7	Rational	L9B (EXISTING)
8	Rational	L9B
9	Reservoir	L9B DETENTION
10	Rational	L9C (EXISTING)
11	Rational	L9C
12	Reservoir	L9C DETENTION
13	Rational	L8A (EXISTING)
14	Rational	L8A
15	Reservoir	L8A DETENTION
16	Rational	L7A (EXISTING)
17	Rational	L7A
18	Reservoir	L7A DETENTION
19	Rational	L7B (EXISTING)
20	Rational	L7B
21	Reservoir	L7B DETENTION
22	Rational	L8B (EXISTING)
23	Rational	L8B
24	Reservoir	L8B DETENTION

Hydraflow Table of Contents

C1 SUBSHEDS.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	0.445	1	7	467	------	------	------	PA (EXISTING)
2	Rational	0.523	1	7	549	------	------	------	PA
3	Reservoir	0.411	1	13	530	2	101.38	99.3	PA DETENTION
4	Rational	0.389	1	7	409	------	------	------	L9A (EXISTING)
5	Rational	0.403	1	7	423	------	------	------	L9A
6	Reservoir	0.339	1	11	408	5	101.07	61.8	L9A DETENTION
7	Rational	0.250	1	7	263	------	------	------	L9B (EXISTING)
8	Rational	0.360	1	7	378	------	------	------	L9B
9	Reservoir	0.238	1	17	341	8	101.64	118	L9B DETENTION
10	Rational	0.250	1	7	263	------	------	------	L9C (EXISTING)
11	Rational	0.373	1	7	392	------	------	------	L9C
12	Reservoir	0.249	1	16	369	11	101.54	111	L9C DETENTION
13	Rational	0.556	1	7	584	------	------	------	L8A (EXISTING)
14	Rational	0.702	1	7	738	------	------	------	L8A
15	Reservoir	0.435	1	18	694	14	101.49	242	L8A DETENTION
16	Rational	0.389	1	7	409	------	------	------	L7A (EXISTING)
17	Rational	0.492	1	7	516	------	------	------	L7A
18	Reservoir	0.387	1	13	496	17	101.26	95.9	L7A DETENTION
19	Rational	0.167	1	7	175	------	------	------	L7B (EXISTING)
20	Rational	0.263	1	7	277	------	------	------	L7B
21	Reservoir	0.149	1	19	236	20	100.77	117	L7B DETENTION
22	Rational	0.222	1	7	234	------	------	------	L8B (EXISTING)
23	Rational	0.328	1	7	344	------	------	------	L8B
24	Reservoir	0.220	1	16	294	23	101.75	113	L8B DETENTION

Hydrograph Report

Hyd. No. 1

PA (EXISTING)

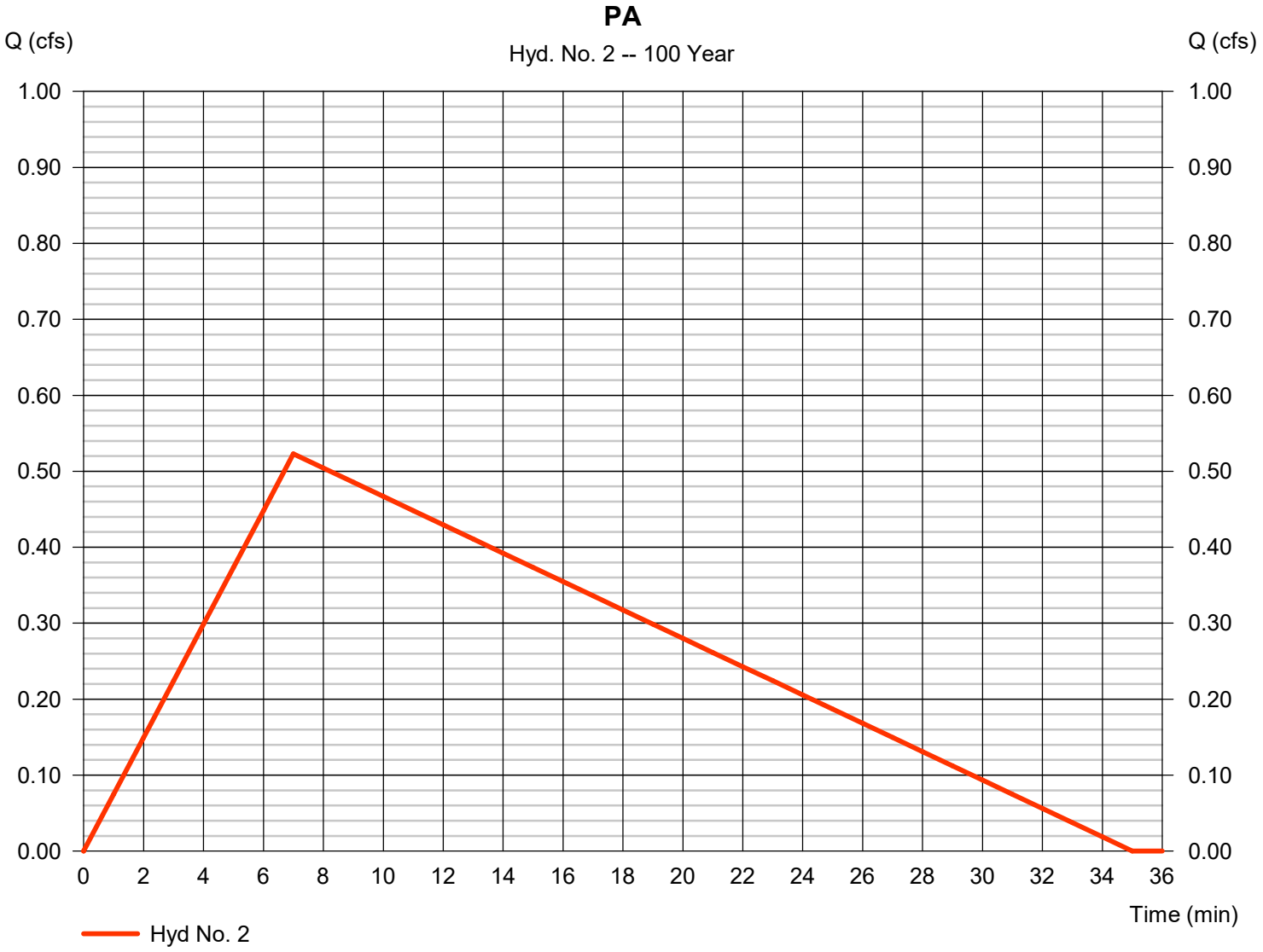
Hydrograph type	=	Rational	Peak discharge	=	0.445 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	467 cuft
Drainage area	=	0.160 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

Hydrograph Report

Hyd. No. 2

PA

Hydrograph type	=	Rational	Peak discharge	=	0.523 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	549 cuft
Drainage area	=	0.160 ac	Runoff coeff.	=	0.67
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



Hydrograph Report

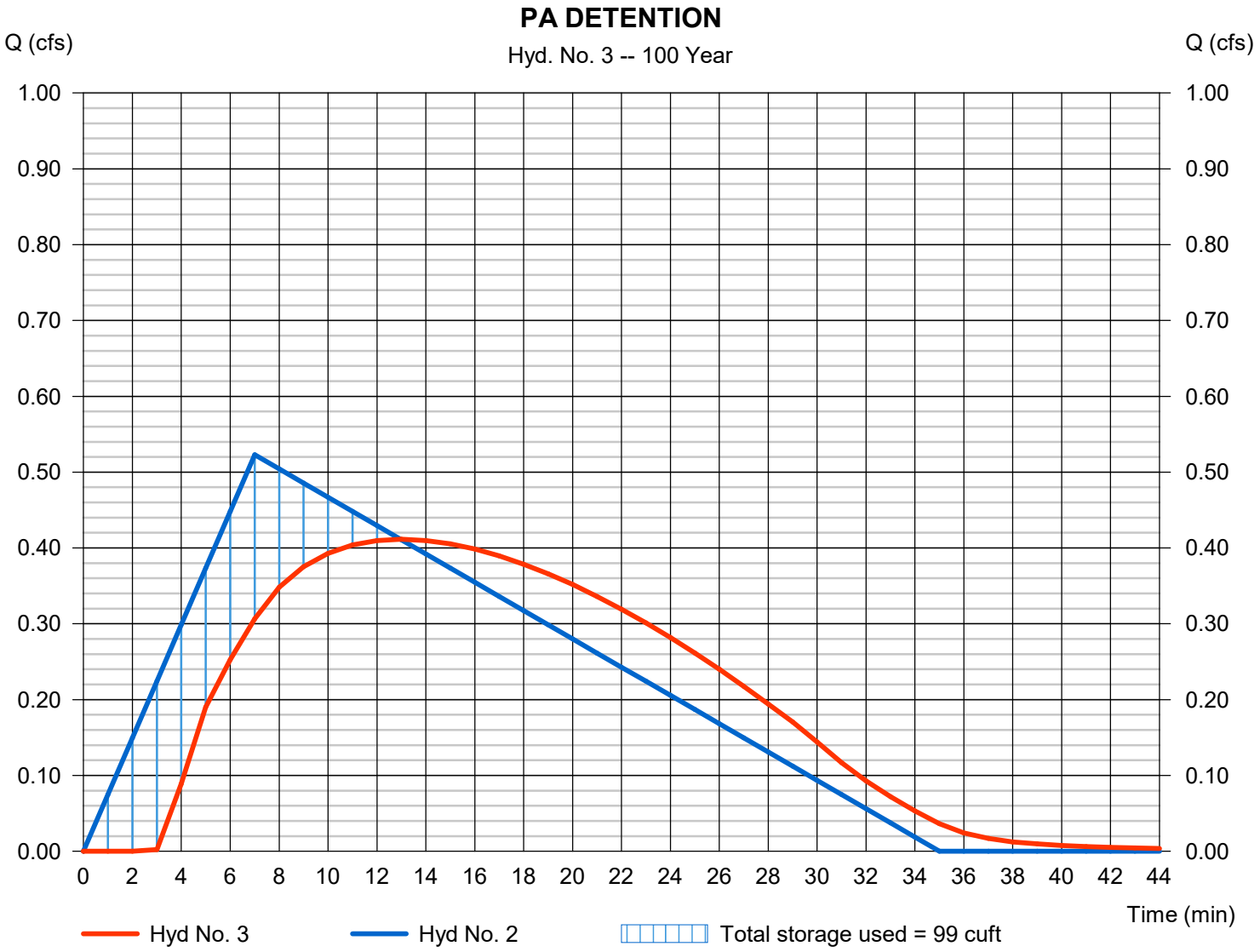
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hyd. No. 3

PA DETENTION

Hydrograph type	= Reservoir	Peak discharge	= 0.411 cfs
Storm frequency	= 100 yrs	Time to peak	= 13 min
Time interval	= 1 min	Hyd. volume	= 530 cuft
Inflow hyd. No.	= 2 - PA	Max. Elevation	= 101.38 ft
Reservoir name	= BIO PA	Max. Storage	= 99 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BIO PA

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 3.80 ft, Barrel Len = 19.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	14	14
0.38	100.38	n/a	14	27
0.57	100.57	n/a	14	41
0.76	100.76	n/a	14	55
0.95	100.95	n/a	14	69
1.14	101.14	n/a	14	82
1.33	101.33	n/a	14	96
1.52	101.52	n/a	14	110
1.71	101.71	n/a	14	123
1.90	101.90	n/a	14	137

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	0.00	0.00	0.00
Span (in)	= 4.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 100.25	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) = 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

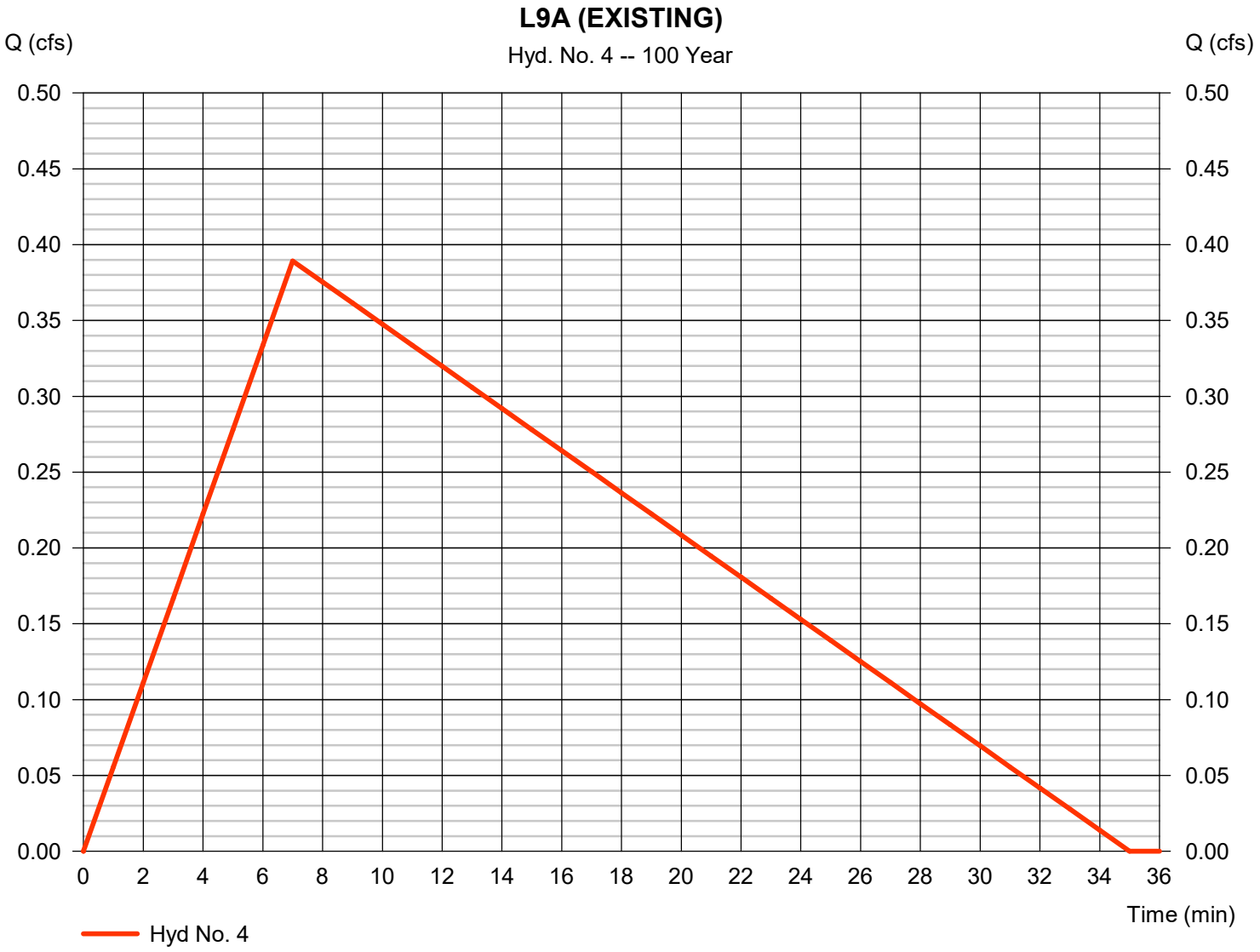
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	---	---	---	---	---	---	---	---	---	0.000
0.19	14	100.19	0.00	---	---	---	---	---	---	---	---	---	0.000
0.38	27	100.38	0.04 ic	---	---	---	---	---	---	---	---	---	0.039
0.57	41	100.57	0.17 ic	---	---	---	---	---	---	---	---	---	0.166
0.76	55	100.76	0.25 ic	---	---	---	---	---	---	---	---	---	0.246
0.95	69	100.95	0.31 ic	---	---	---	---	---	---	---	---	---	0.307
1.14	82	101.14	0.36 ic	---	---	---	---	---	---	---	---	---	0.357
1.33	96	101.33	0.40 ic	---	---	---	---	---	---	---	---	---	0.402
1.52	110	101.52	0.44 ic	---	---	---	---	---	---	---	---	---	0.441
1.71	123	101.71	0.48 ic	---	---	---	---	---	---	---	---	---	0.478
1.90	137	101.90	0.51 ic	---	---	---	---	---	---	---	---	---	0.512

Hydrograph Report

Hyd. No. 4

L9A (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.389 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	409 cuft
Drainage area	=	0.140 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

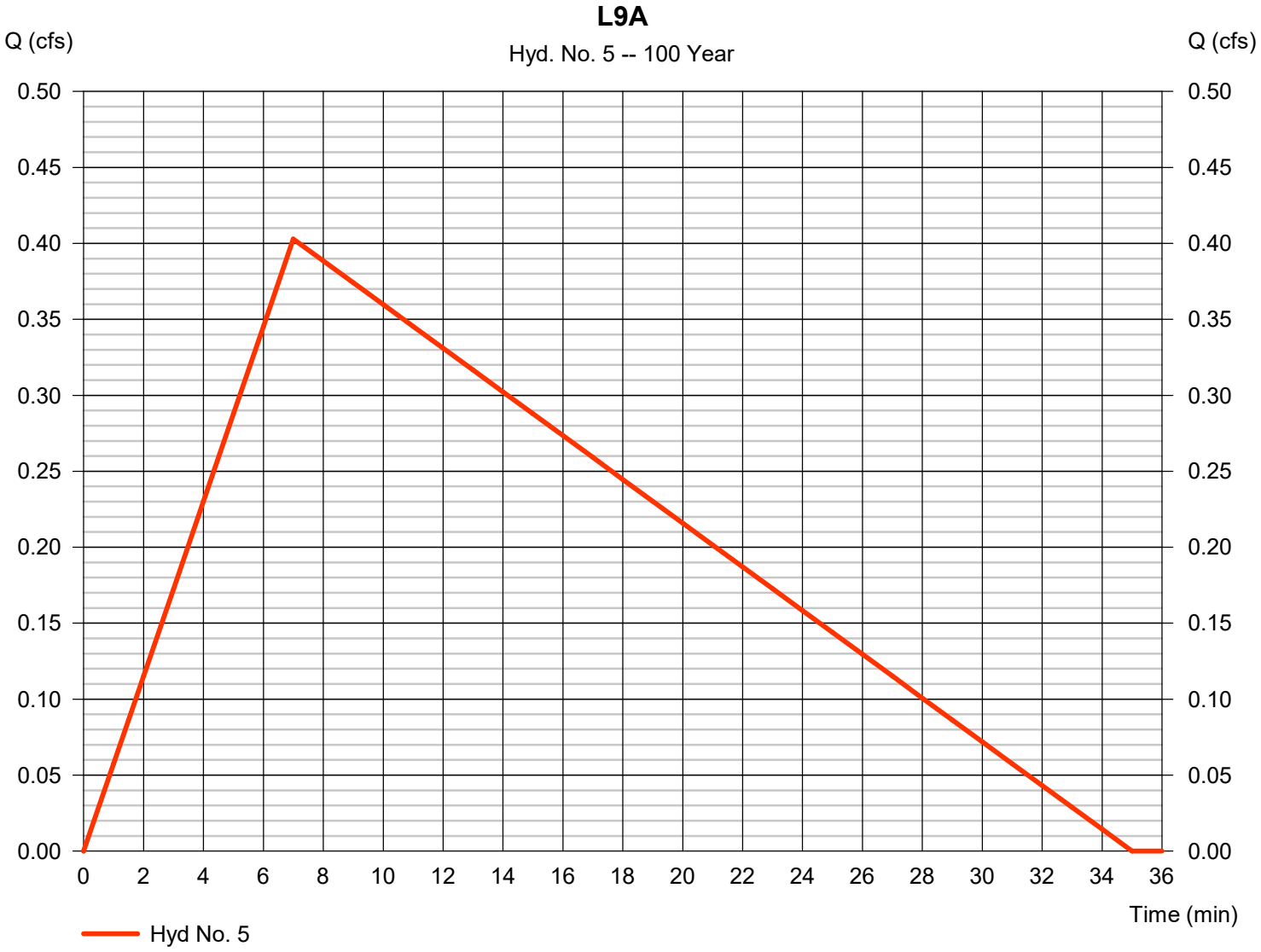


Hydrograph Report

Hyd. No. 5

L9A

Hydrograph type	=	Rational	Peak discharge	=	0.403 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	423 cuft
Drainage area	=	0.140 ac	Runoff coeff.	=	0.59
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



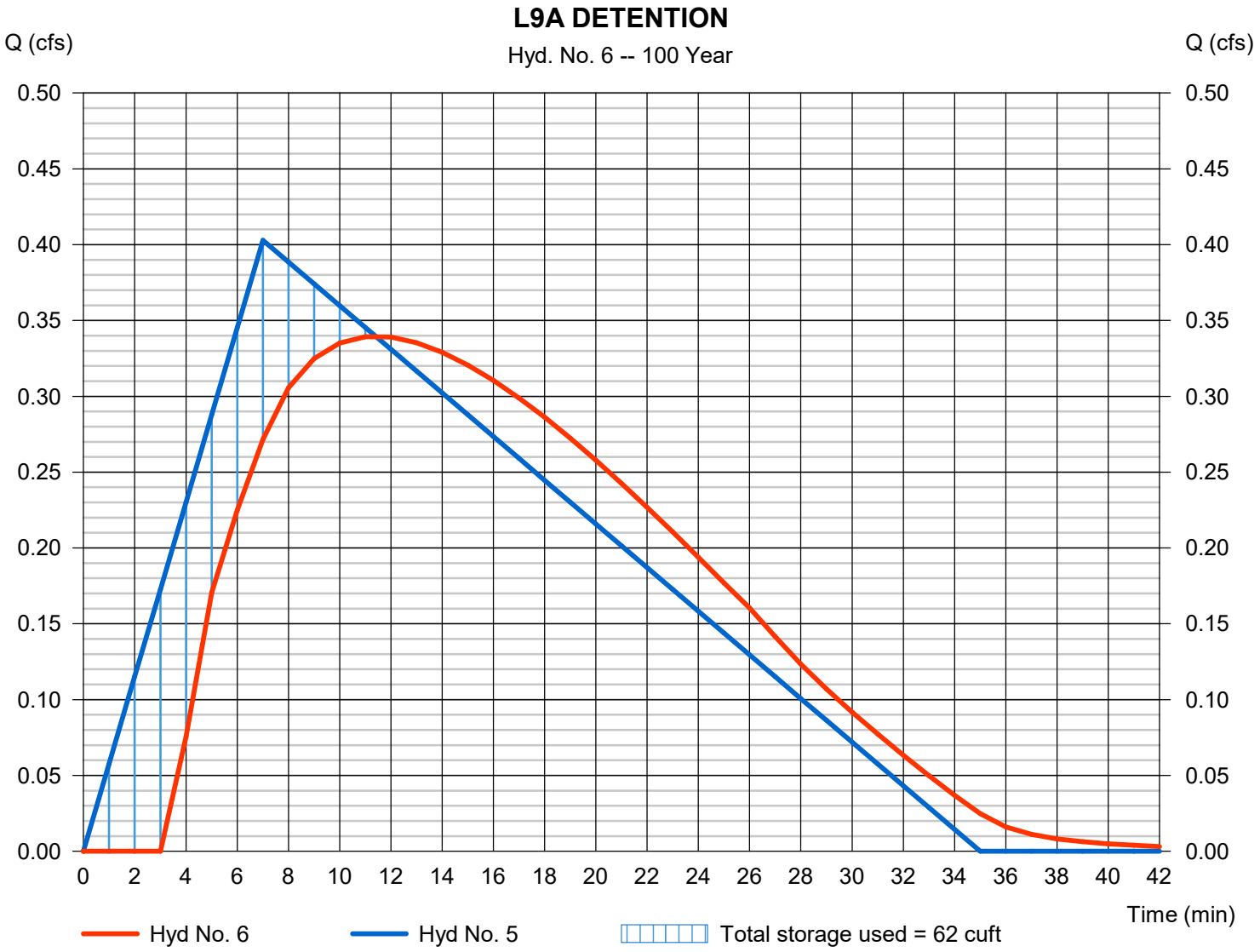
Hydrograph Report

Hyd. No. 6

L9A DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.339 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	408 cuft
Inflow hyd. No.	=	5 - L9A	Max. Elevation	=	101.07 ft
Reservoir name	=	BIO L9A	Max. Storage	=	62 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - BIO L9A

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 3.80 ft, Barrel Len = 15.20 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	11	11
0.38	100.38	n/a	11	22
0.57	100.57	n/a	11	33
0.76	100.76	n/a	11	44
0.95	100.95	n/a	11	55
1.14	101.14	n/a	11	66
1.33	101.33	n/a	11	77
1.52	101.52	n/a	11	88
1.71	101.71	n/a	11	99
1.90	101.90	n/a	11	110

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	0.00	0.00	0.00
Span (in)	= 4.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 100.25	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) = 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

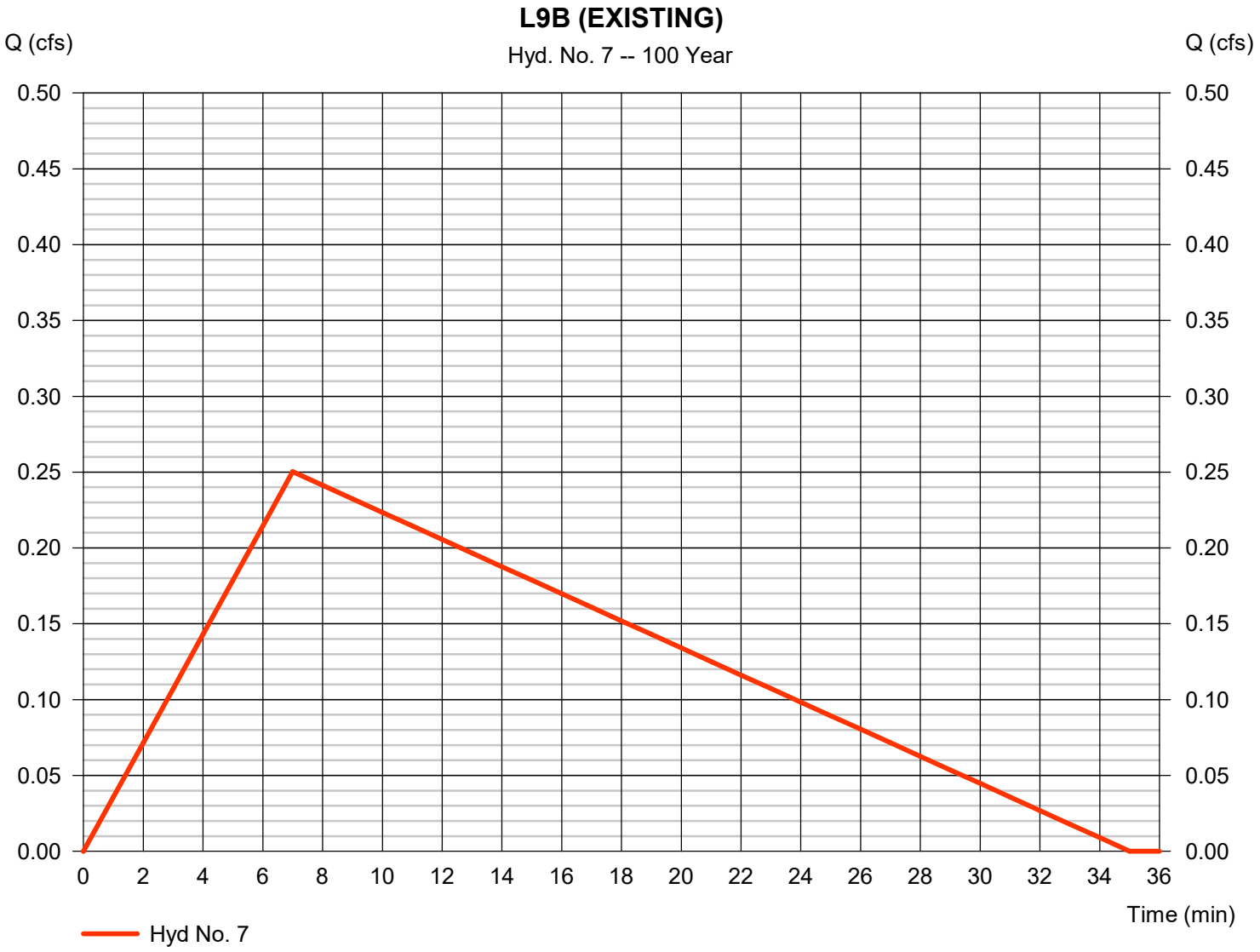
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	---	---	---	---	---	---	---	---	---	0.000
0.19	11	100.19	0.00	---	---	---	---	---	---	---	---	---	0.000
0.38	22	100.38	0.04 ic	---	---	---	---	---	---	---	---	---	0.039
0.57	33	100.57	0.17 ic	---	---	---	---	---	---	---	---	---	0.166
0.76	44	100.76	0.25 ic	---	---	---	---	---	---	---	---	---	0.246
0.95	55	100.95	0.31 ic	---	---	---	---	---	---	---	---	---	0.307
1.14	66	101.14	0.36 ic	---	---	---	---	---	---	---	---	---	0.357
1.33	77	101.33	0.40 ic	---	---	---	---	---	---	---	---	---	0.402
1.52	88	101.52	0.44 ic	---	---	---	---	---	---	---	---	---	0.441
1.71	99	101.71	0.48 ic	---	---	---	---	---	---	---	---	---	0.478
1.90	110	101.90	0.51 ic	---	---	---	---	---	---	---	---	---	0.512

Hydrograph Report

Hyd. No. 7

L9B (EXISTING)

Hydrograph type	= Rational	Peak discharge	= 0.250 cfs
Storm frequency	= 100 yrs	Time to peak	= 7 min
Time interval	= 1 min	Hyd. volume	= 263 cuft
Drainage area	= 0.090 ac	Runoff coeff.	= 0.57
Intensity	= 4.878 in/hr	Tc by User	= 7.00 min
IDF Curve	= Fairfax.idf	Asc/Rec limb fact	= 1/4

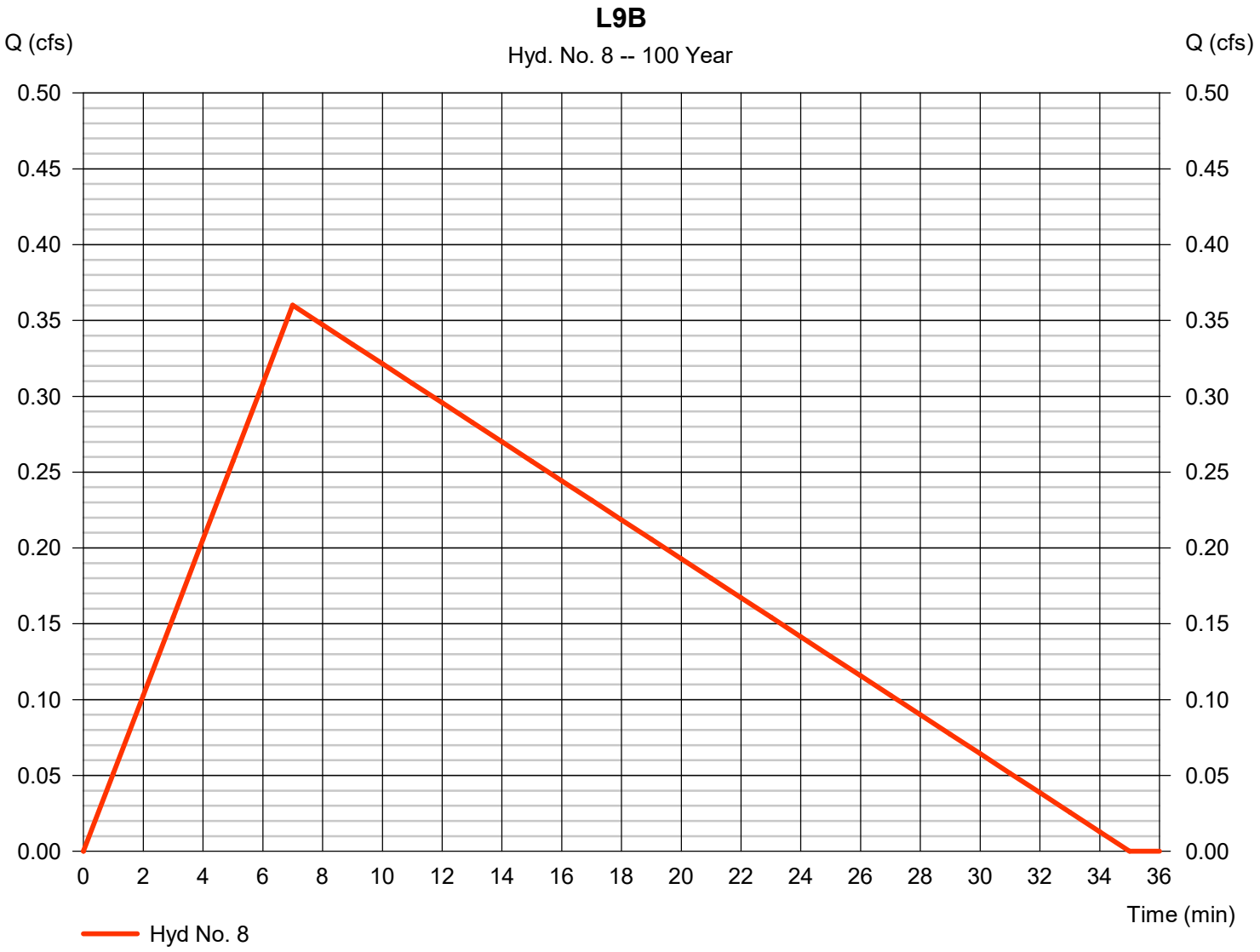


Hydrograph Report

Hyd. No. 8

L9B

Hydrograph type	=	Rational	Peak discharge	=	0.360 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	378 cuft
Drainage area	=	0.090 ac	Runoff coeff.	=	0.82
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



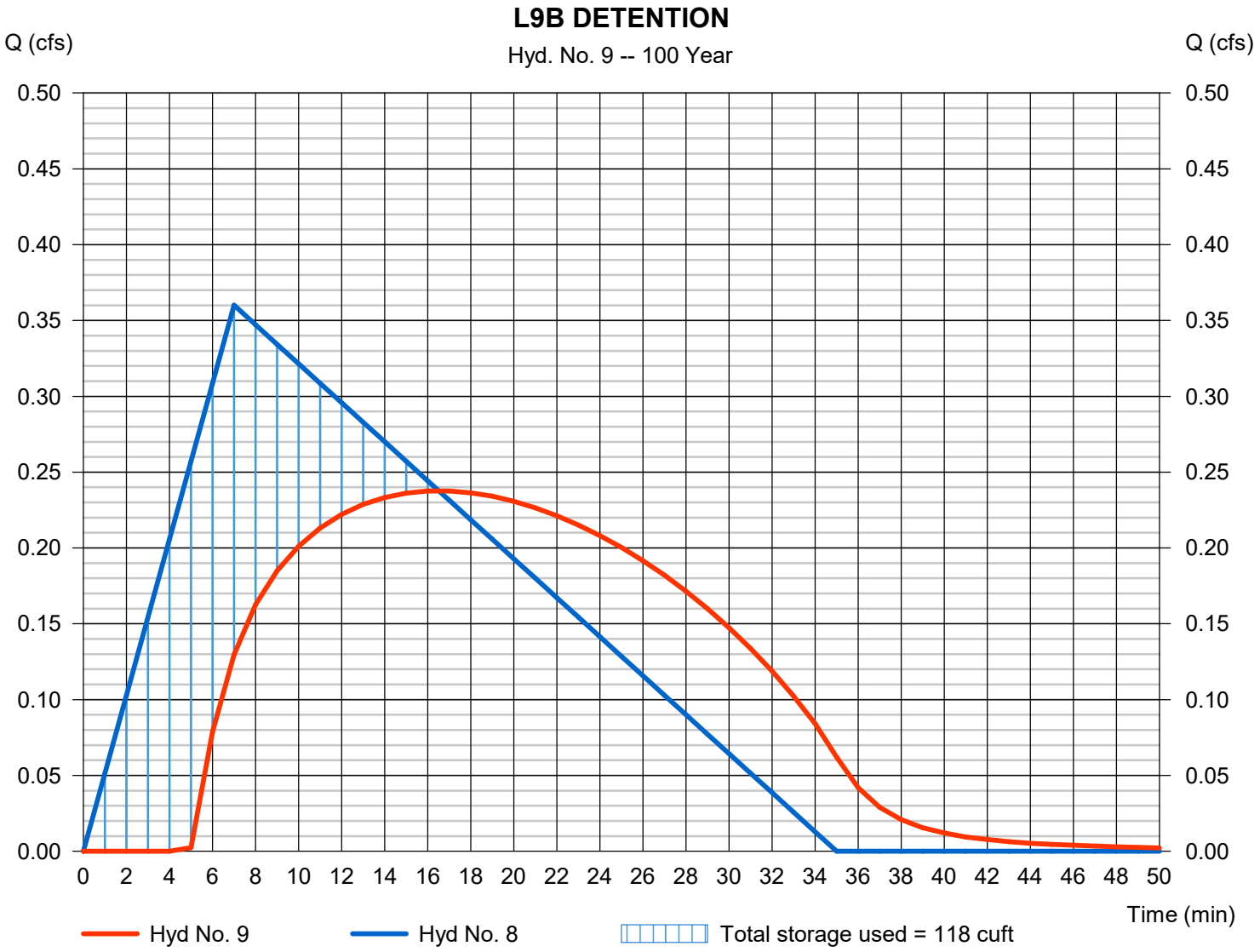
Hydrograph Report

Hyd. No. 9

L9B DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.238 cfs
Storm frequency	=	100 yrs	Time to peak	=	17 min
Time interval	=	1 min	Hyd. volume	=	341 cuft
Inflow hyd. No.	=	8 - L9B	Max. Elevation	=	101.64 ft
Reservoir name	=	BIO L9B	Max. Storage	=	118 cuft

Storage Indication method used.



Pond Report

Pond No. 3 - BIO L9B

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 3.80 ft, Barrel Len = 19.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	14	14
0.38	100.38	n/a	14	27
0.57	100.57	n/a	14	41
0.76	100.76	n/a	14	55
0.95	100.95	n/a	14	69
1.14	101.14	n/a	14	82
1.33	101.33	n/a	14	96
1.52	101.52	n/a	14	110
1.71	101.71	n/a	14	123
1.90	101.90	n/a	14	137

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 3.00	6.00	0.00	0.00
Span (in)	= 3.00	6.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 100.50	102.50	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) = 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

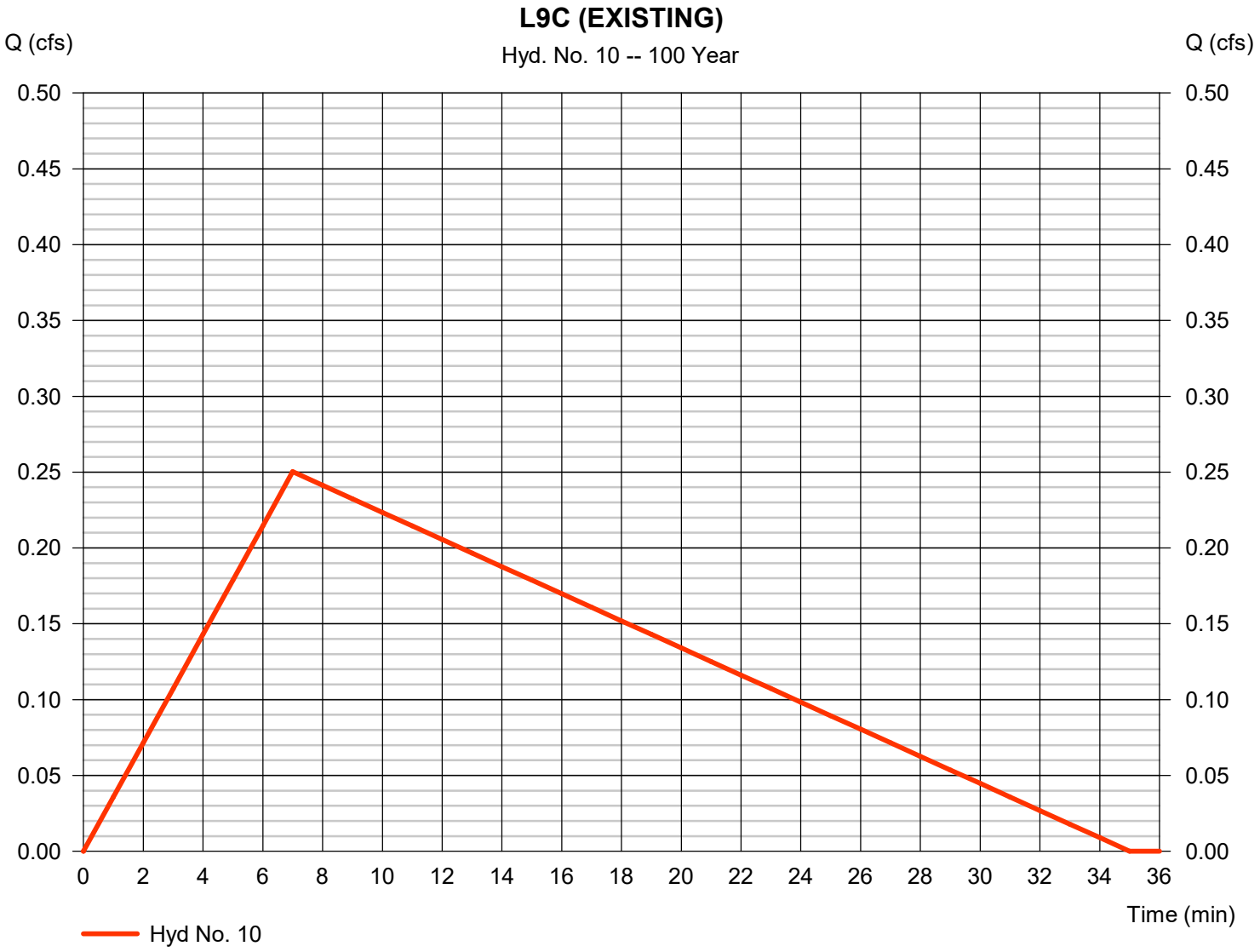
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	14	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	27	100.38	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.57	41	100.57	0.01 ic	0.00	---	---	---	---	---	---	---	---	0.010
0.76	55	100.76	0.09 ic	0.00	---	---	---	---	---	---	---	---	0.087
0.95	69	100.95	0.13 ic	0.00	---	---	---	---	---	---	---	---	0.135
1.14	82	101.14	0.17 ic	0.00	---	---	---	---	---	---	---	---	0.170
1.33	96	101.33	0.20 ic	0.00	---	---	---	---	---	---	---	---	0.198
1.52	110	101.52	0.22 ic	0.00	---	---	---	---	---	---	---	---	0.224
1.71	123	101.71	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.246
1.90	137	101.90	0.27 ic	0.00	---	---	---	---	---	---	---	---	0.267

Hydrograph Report

Hyd. No. 10

L9C (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.250 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	263 cuft
Drainage area	=	0.090 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

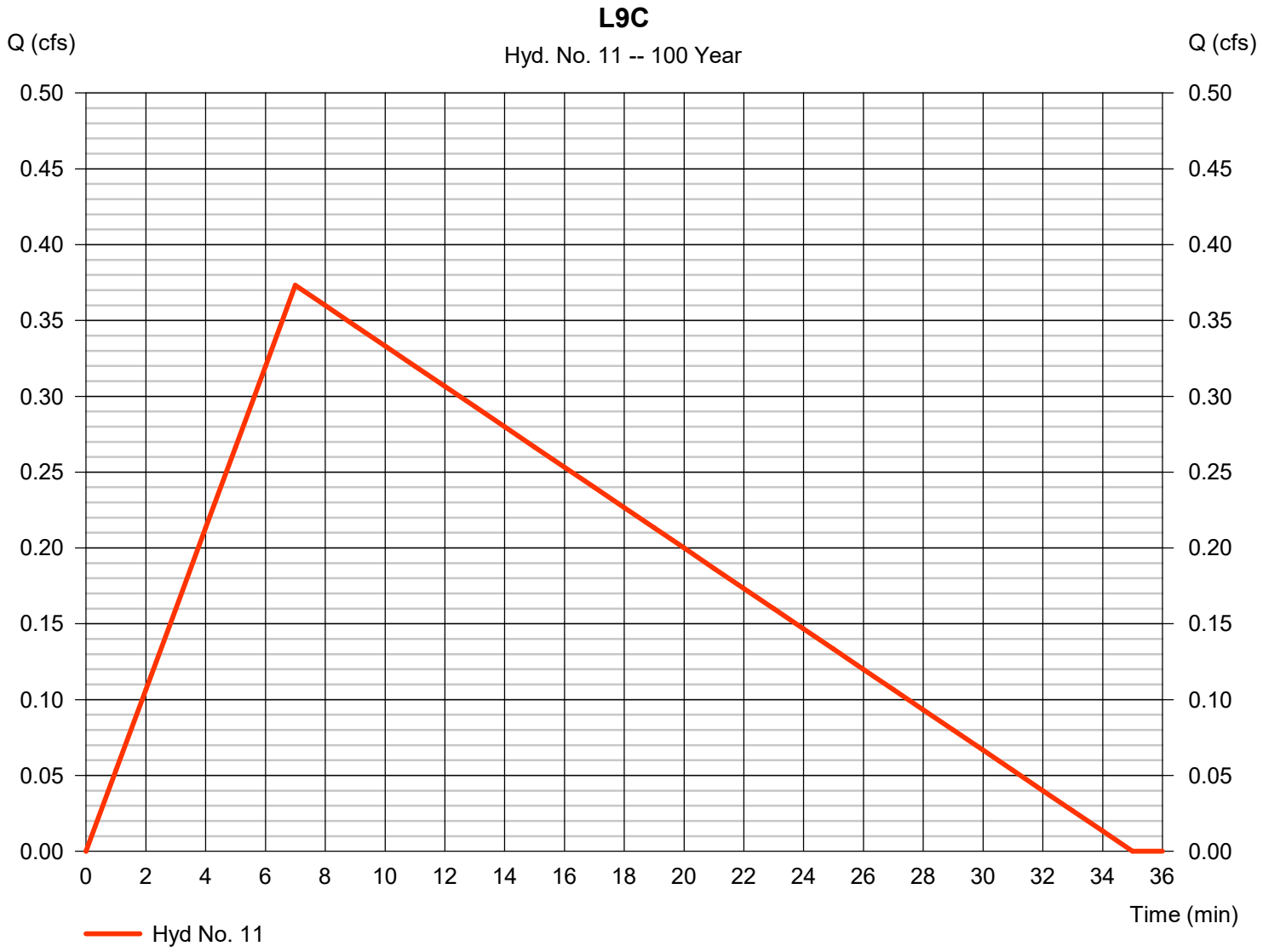


Hydrograph Report

Hyd. No. 11

L9C

Hydrograph type	=	Rational	Peak discharge	=	0.373 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	392 cuft
Drainage area	=	0.090 ac	Runoff coeff.	=	0.85
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



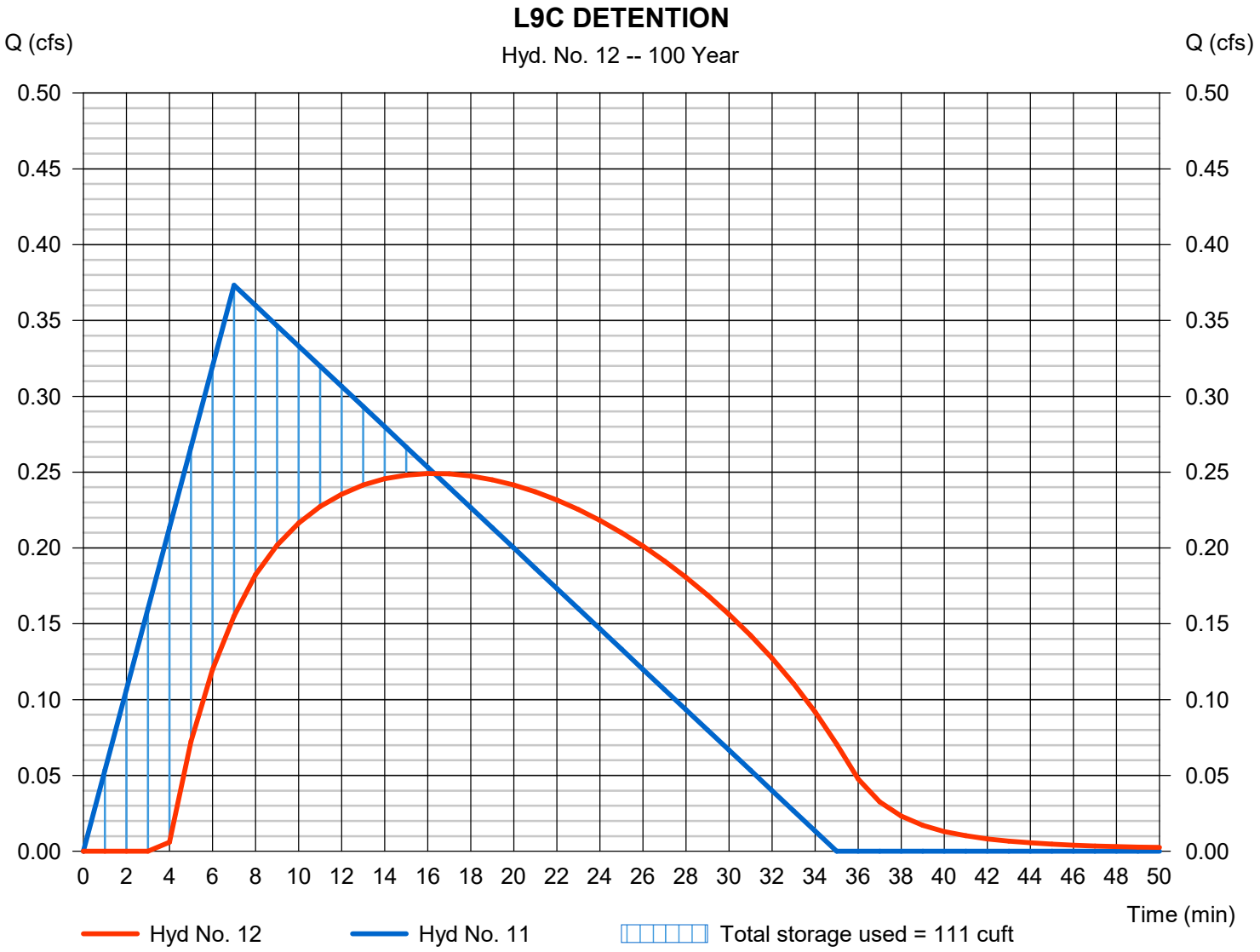
Hydrograph Report

Hyd. No. 12

L9C DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.249 cfs
Storm frequency	=	100 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	369 cuft
Inflow hyd. No.	=	11 - L9C	Max. Elevation	=	101.54 ft
Reservoir name	=	BIO L9C	Max. Storage	=	111 cuft

Storage Indication method used.



Pond Report

Pond No. 4 - BIO L9C

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 3.80 ft, Barrel Len = 19.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	14	14
0.38	100.38	n/a	14	27
0.57	100.57	n/a	14	41
0.76	100.76	n/a	14	55
0.95	100.95	n/a	14	69
1.14	101.14	n/a	14	82
1.33	101.33	n/a	14	96
1.52	101.52	n/a	14	110
1.71	101.71	n/a	14	123
1.90	101.90	n/a	14	137

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 3.00	6.00	0.00	0.00
Span (in)	= 3.00	6.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 100.30	102.50	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) = 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

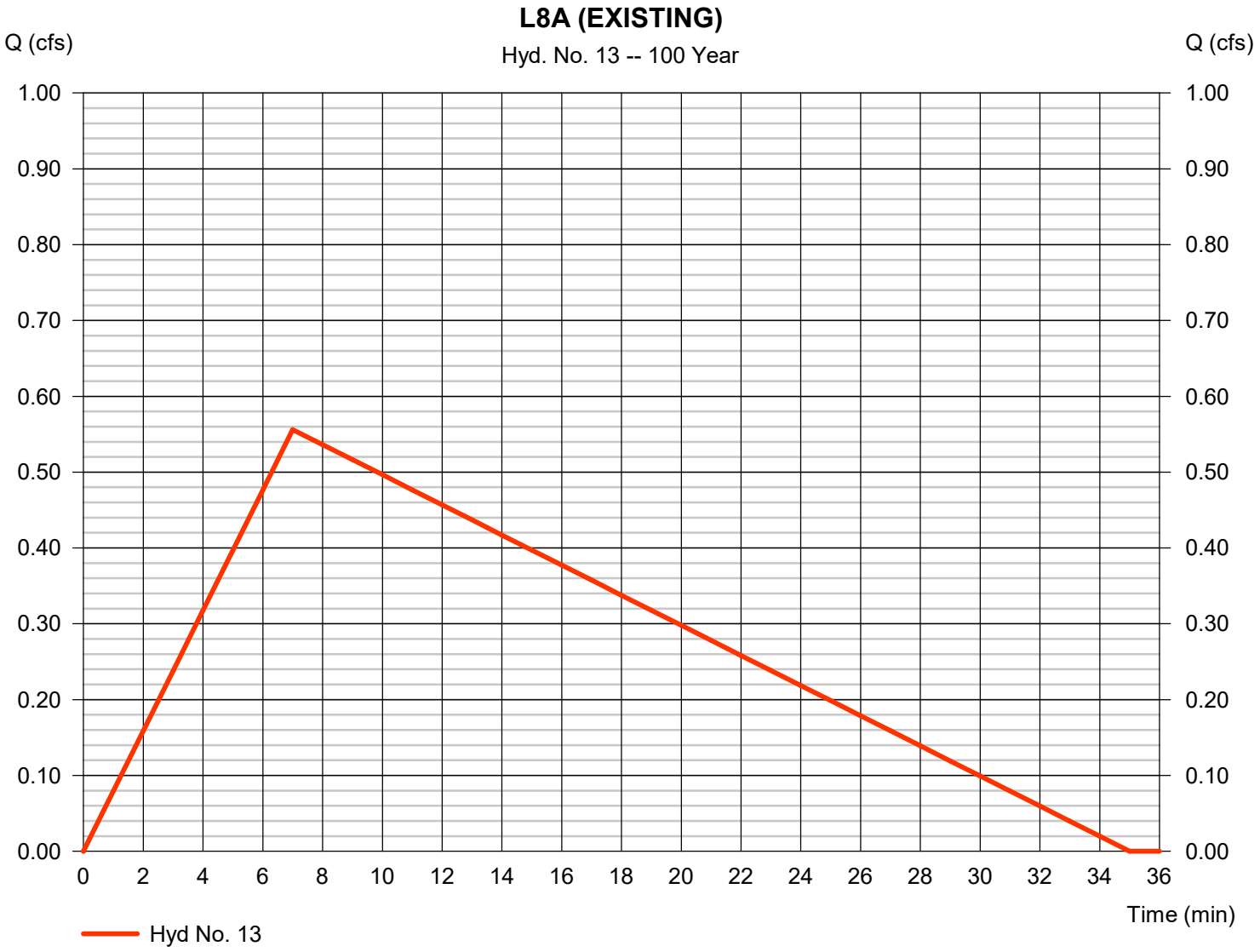
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	14	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	27	100.38	0.01 ic	0.00	---	---	---	---	---	---	---	---	0.013
0.57	41	100.57	0.09 ic	0.00	---	---	---	---	---	---	---	---	0.090
0.76	55	100.76	0.14 ic	0.00	---	---	---	---	---	---	---	---	0.137
0.95	69	100.95	0.17 ic	0.00	---	---	---	---	---	---	---	---	0.171
1.14	82	101.14	0.20 ic	0.00	---	---	---	---	---	---	---	---	0.200
1.33	96	101.33	0.22 ic	0.00	---	---	---	---	---	---	---	---	0.225
1.52	110	101.52	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.247
1.71	123	101.71	0.27 ic	0.00	---	---	---	---	---	---	---	---	0.268
1.90	137	101.90	0.29 ic	0.00	---	---	---	---	---	---	---	---	0.287

Hydrograph Report

Hyd. No. 13

L8A (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.556 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	584 cuft
Drainage area	=	0.200 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

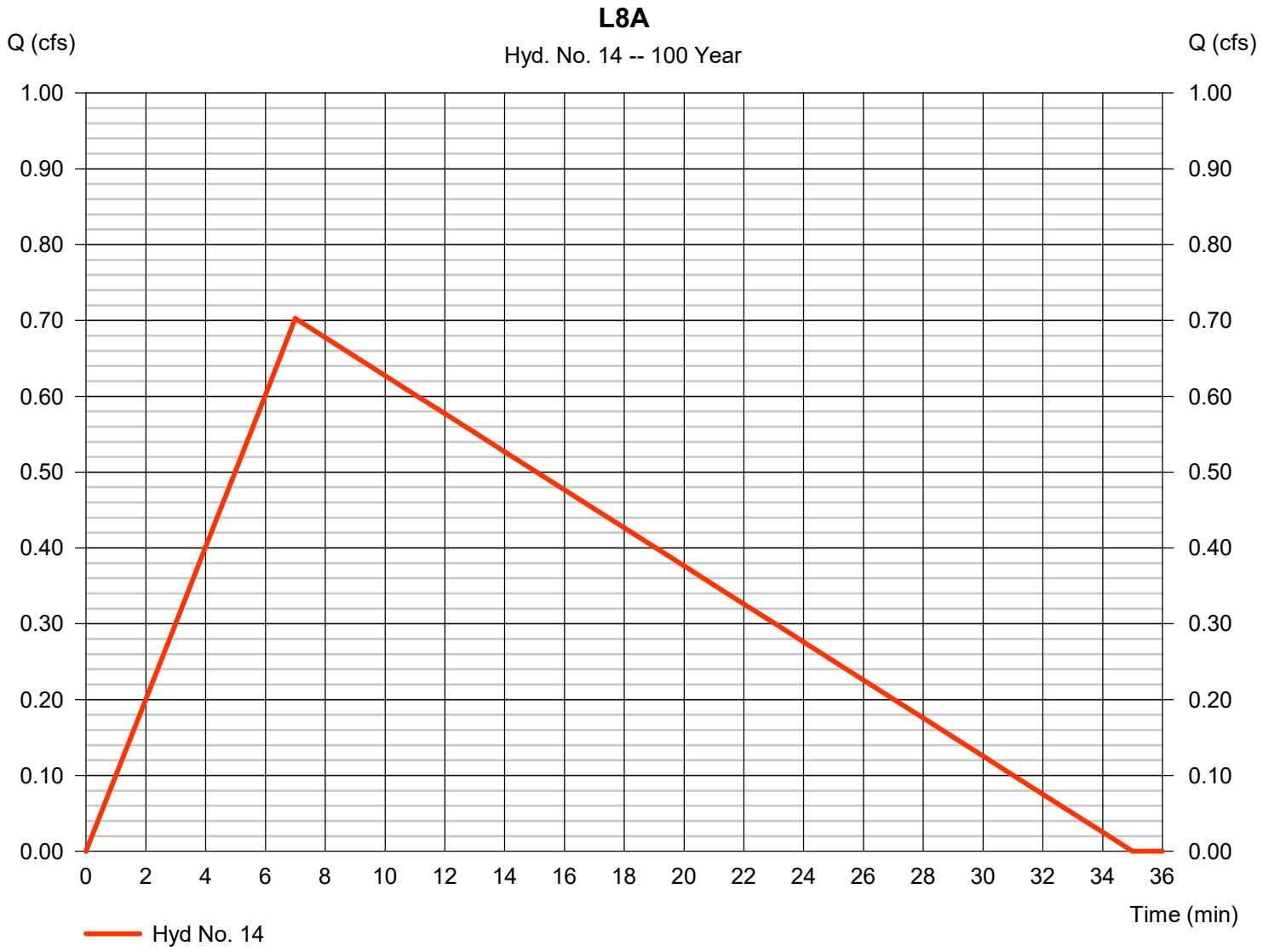


Hydrograph Report

Hyd. No. 14

L8A

Hydrograph type	=	Rational	Peak discharge	=	0.702 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	738 cuft
Drainage area	=	0.200 ac	Runoff coeff.	=	0.72
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



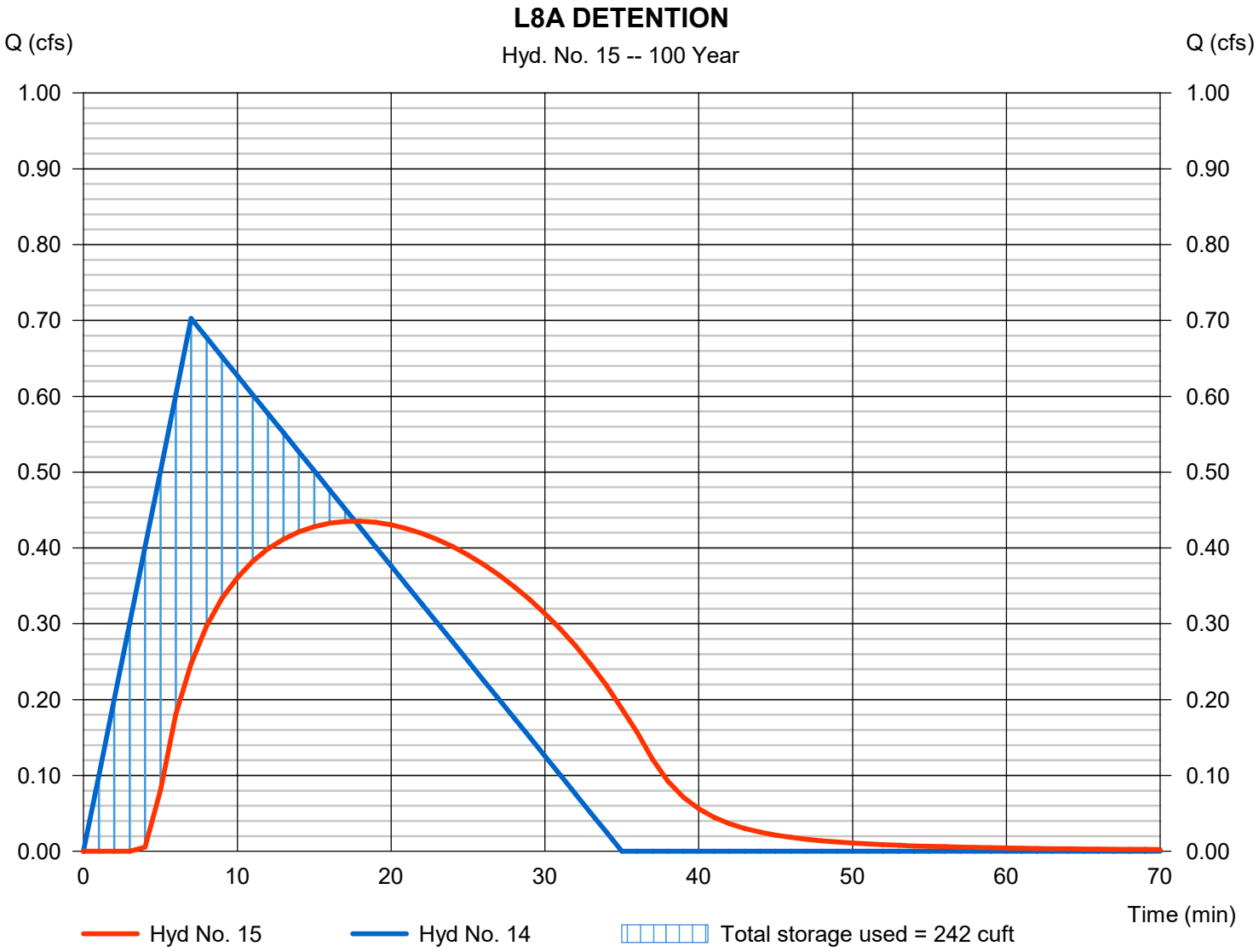
Hydrograph Report

Hyd. No. 15

L8A DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.435 cfs
Storm frequency	=	100 yrs	Time to peak	=	18 min
Time interval	=	1 min	Hyd. volume	=	694 cuft
Inflow hyd. No.	=	14 - L8A	Max. Elevation	=	101.49 ft
Reservoir name	=	BIO L8A	Max. Storage	=	242 cuft

Storage Indication method used.



Pond Report

Pond No. 5 - BIO L8A

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 9.50 ft, Barrel Len = 17.10 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	31	31
0.38	100.38	n/a	31	62
0.57	100.57	n/a	31	93
0.76	100.76	n/a	31	123
0.95	100.95	n/a	31	154
1.14	101.14	n/a	31	185
1.33	101.33	n/a	31	216
1.52	101.52	n/a	31	247
1.71	101.71	n/a	31	278
1.90	101.90	n/a	31	309

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 5.00	6.00	0.00	0.00
Span (in)	= 5.00	6.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 100.25	102.50	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) = 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

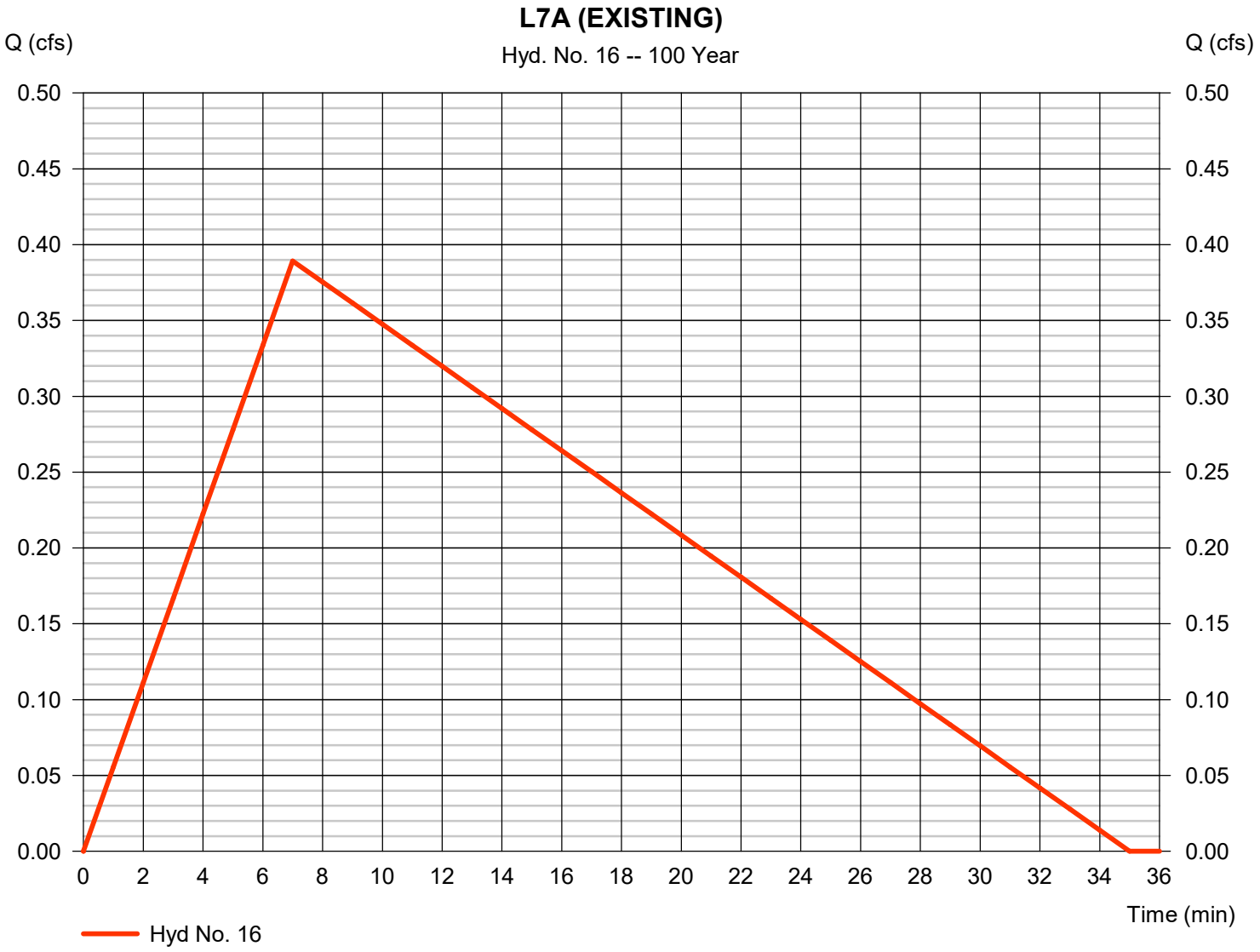
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	31	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	62	100.38	0.04 ic	0.00	---	---	---	---	---	---	---	---	0.045
0.57	93	100.57	0.22 ic	0.00	---	---	---	---	---	---	---	---	0.217
0.76	123	100.76	0.36 ic	0.00	---	---	---	---	---	---	---	---	0.361
0.95	154	100.95	0.46 ic	0.00	---	---	---	---	---	---	---	---	0.460
1.14	185	101.14	0.54 ic	0.00	---	---	---	---	---	---	---	---	0.542
1.33	216	101.33	0.61 ic	0.00	---	---	---	---	---	---	---	---	0.613
1.52	247	101.52	0.68 ic	0.00	---	---	---	---	---	---	---	---	0.676
1.71	278	101.71	0.73 ic	0.00	---	---	---	---	---	---	---	---	0.734
1.90	309	101.90	0.79 ic	0.00	---	---	---	---	---	---	---	---	0.788

Hydrograph Report

Hyd. No. 16

L7A (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.389 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	409 cuft
Drainage area	=	0.140 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

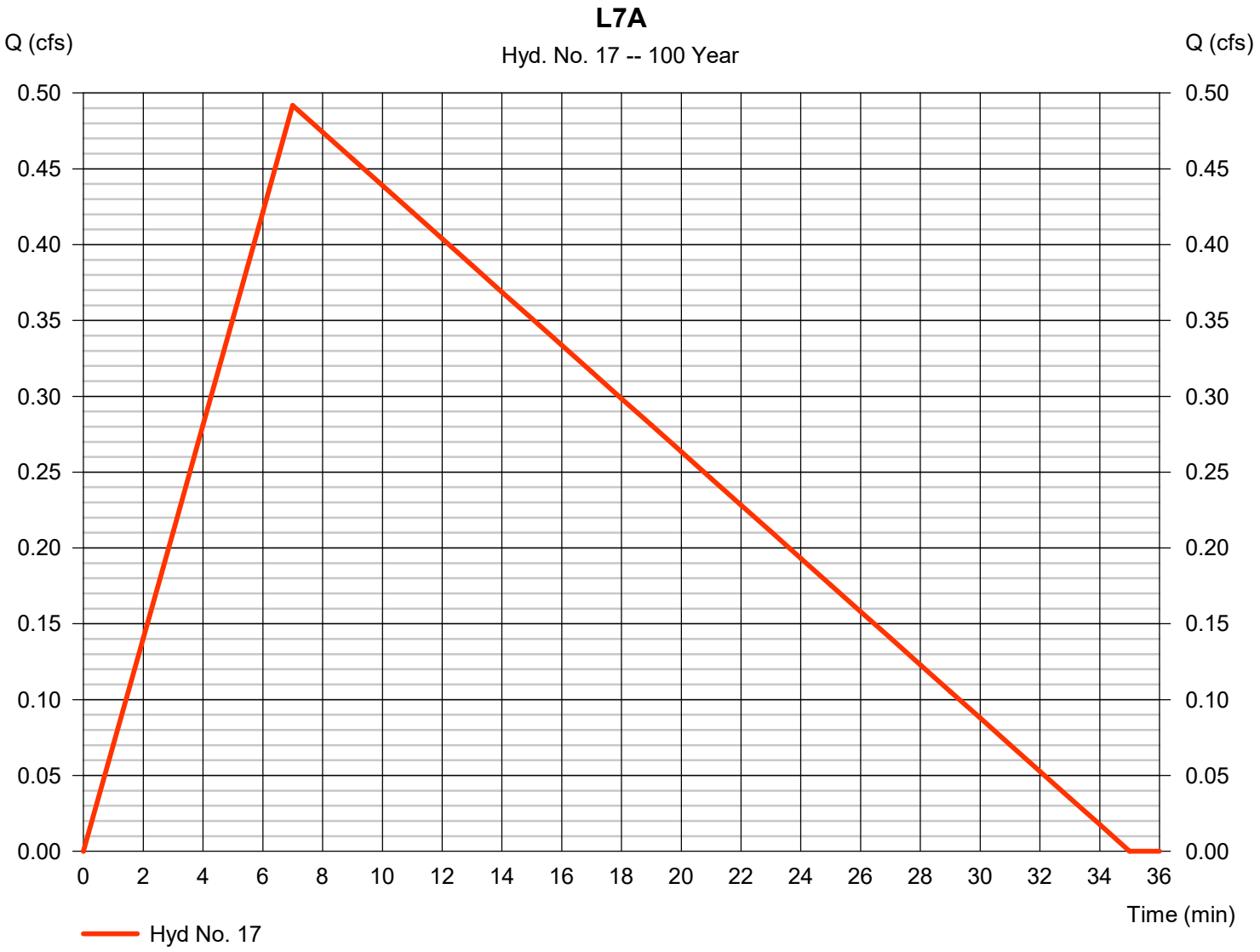


Hydrograph Report

Hyd. No. 17

L7A

Hydrograph type	=	Rational	Peak discharge	=	0.492 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	516 cuft
Drainage area	=	0.140 ac	Runoff coeff.	=	0.72
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



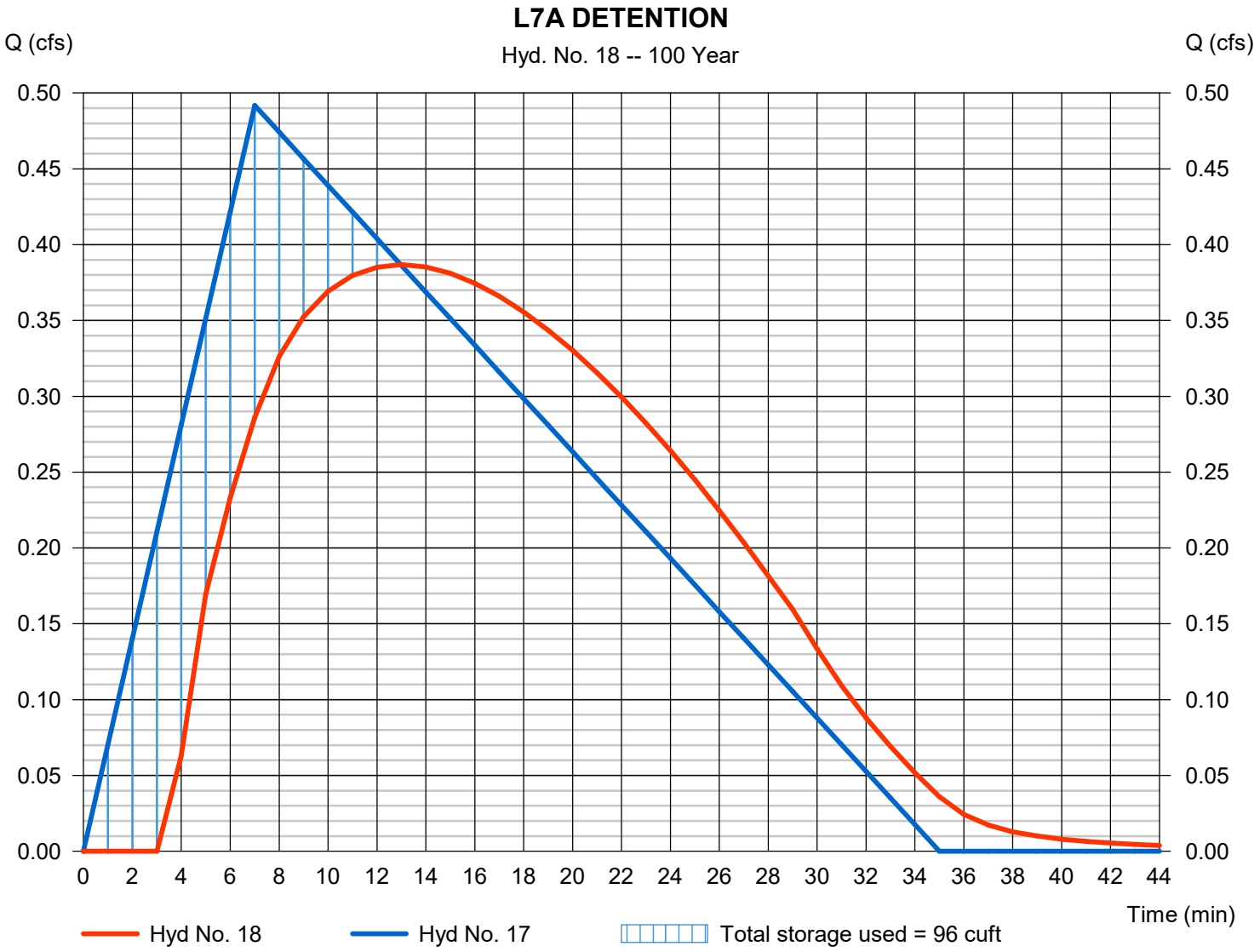
Hydrograph Report

Hyd. No. 18

L7A DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.387 cfs
Storm frequency	=	100 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	496 cuft
Inflow hyd. No.	=	17 - L7A	Max. Elevation	=	101.26 ft
Reservoir name	=	BIO L7A	Max. Storage	=	96 cuft

Storage Indication method used.



Pond Report

Pond No. 7 - BIO L7A

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 5.70 ft, Barrel Len = 13.30 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	14	14
0.38	100.38	n/a	14	29
0.57	100.57	n/a	14	43
0.76	100.76	n/a	14	58
0.95	100.95	n/a	14	72
1.14	101.14	n/a	14	86
1.33	101.33	n/a	14	101
1.52	101.52	n/a	14	115
1.71	101.71	n/a	14	130
1.90	101.90	n/a	14	144

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	6.00	0.00	0.00
Span (in)	= 4.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.25	102.50	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) = 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

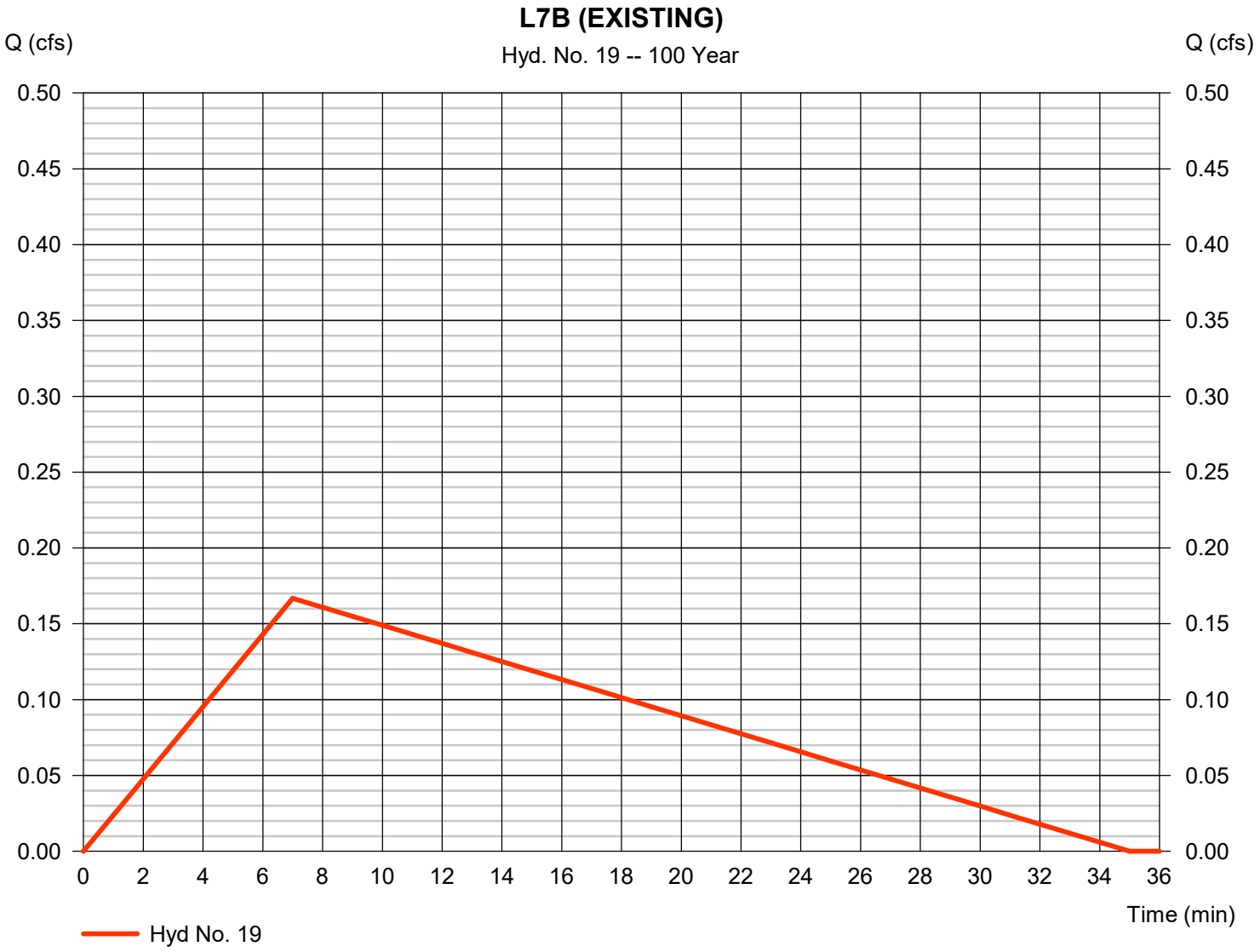
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	14	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	29	100.38	0.04 ic	0.00	---	---	---	---	---	---	---	---	0.039
0.57	43	100.57	0.17 ic	0.00	---	---	---	---	---	---	---	---	0.166
0.76	58	100.76	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.246
0.95	72	100.95	0.31 ic	0.00	---	---	---	---	---	---	---	---	0.307
1.14	86	101.14	0.36 ic	0.00	---	---	---	---	---	---	---	---	0.357
1.33	101	101.33	0.40 ic	0.00	---	---	---	---	---	---	---	---	0.402
1.52	115	101.52	0.44 ic	0.00	---	---	---	---	---	---	---	---	0.441
1.71	130	101.71	0.48 ic	0.00	---	---	---	---	---	---	---	---	0.478
1.90	144	101.90	0.51 ic	0.00	---	---	---	---	---	---	---	---	0.512

Hydrograph Report

Hyd. No. 19

L7B (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.167 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	175 cuft
Drainage area	=	0.060 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

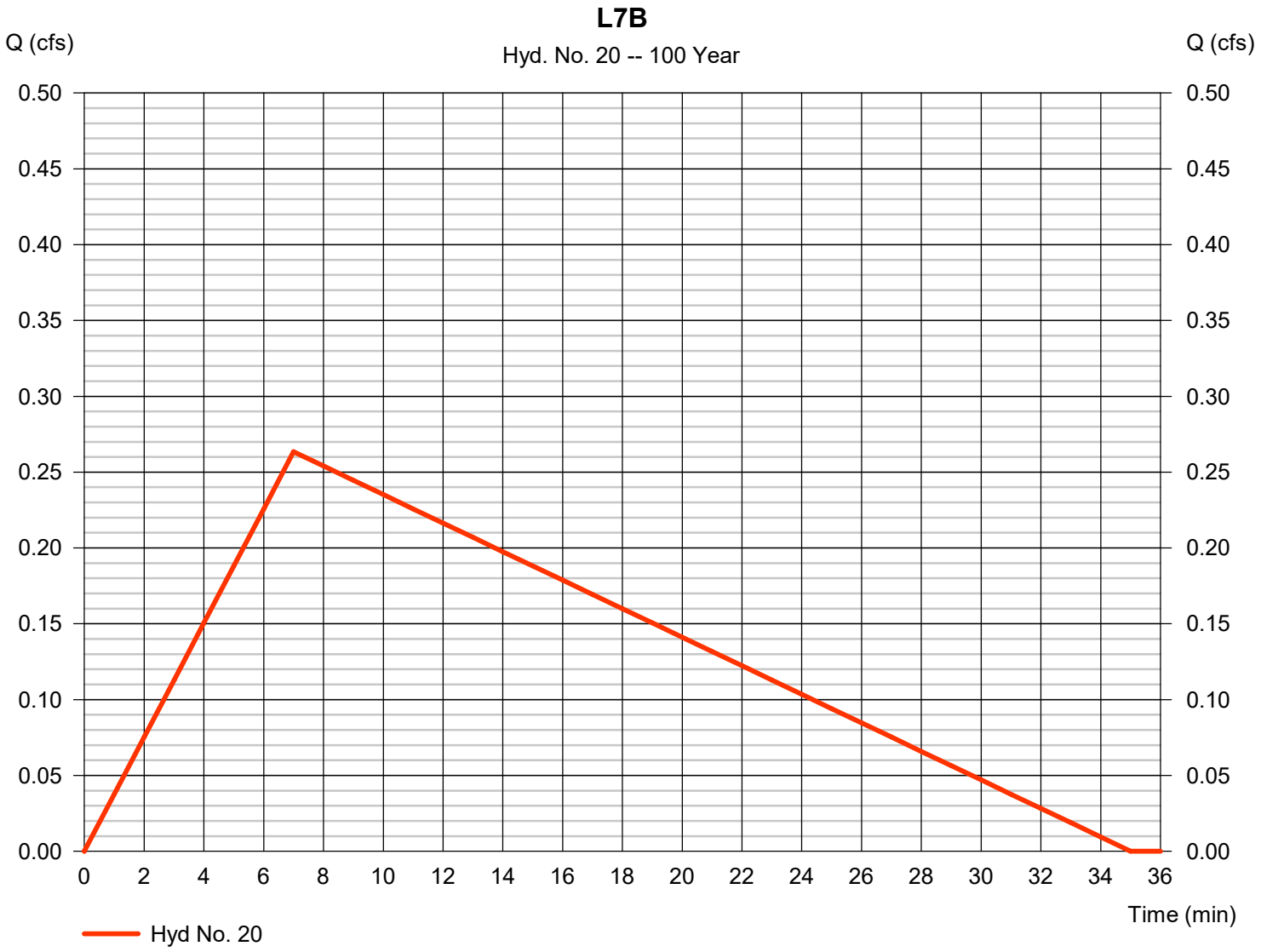


Hydrograph Report

Hyd. No. 20

L7B

Hydrograph type	=	Rational	Peak discharge	=	0.263 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	277 cuft
Drainage area	=	0.060 ac	Runoff coeff.	=	0.9
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



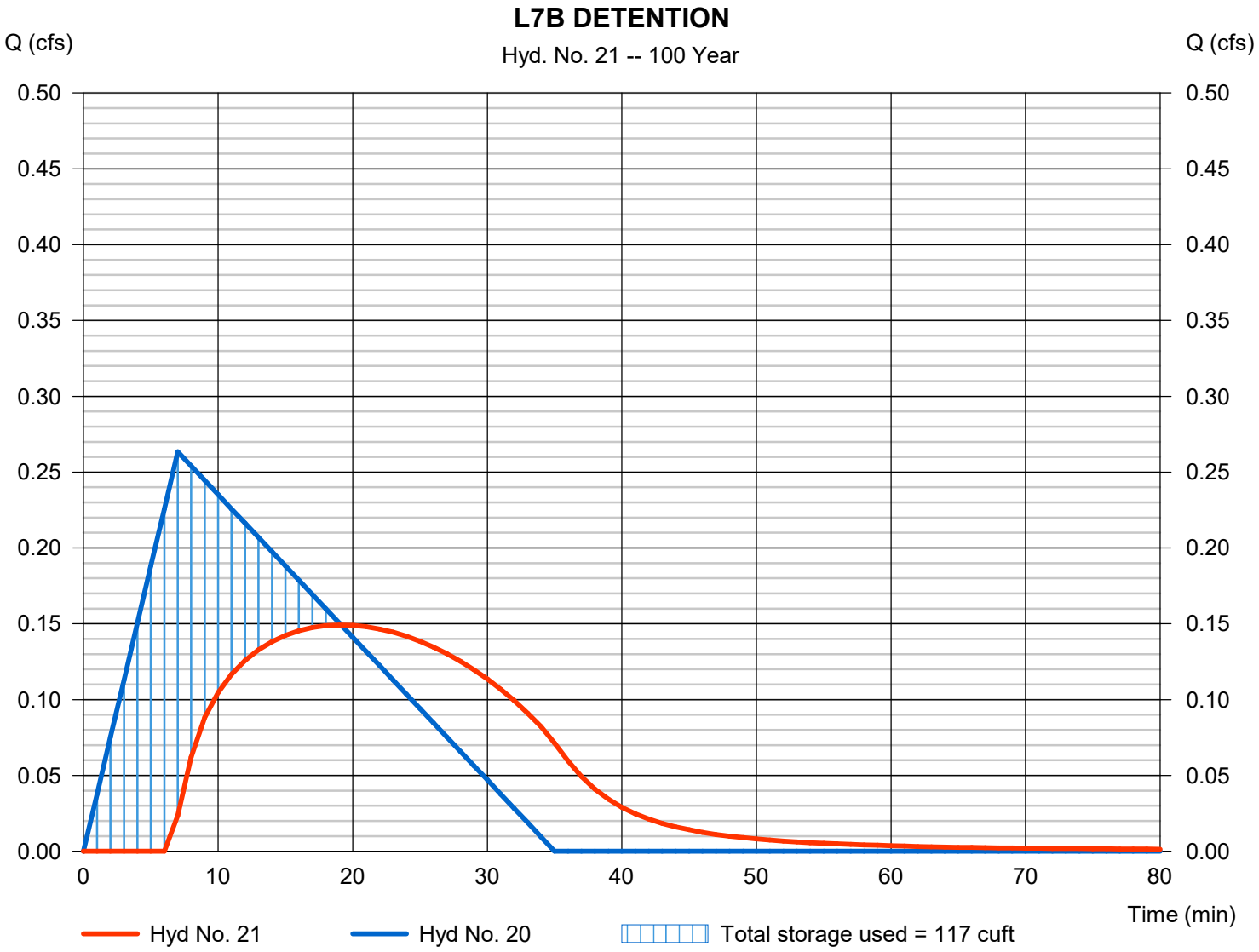
Hydrograph Report

Hyd. No. 21

L7B DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.149 cfs
Storm frequency	=	100 yrs	Time to peak	=	19 min
Time interval	=	1 min	Hyd. volume	=	236 cuft
Inflow hyd. No.	=	20 - L7B	Max. Elevation	=	100.77 ft
Reservoir name	=	BIO L7B	Max. Storage	=	117 cuft

Storage Indication method used.



Pond Report

Pond No. 8 - BIO L7B

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 5.70 ft, Barrel Len = 26.60 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	29	29
0.38	100.38	n/a	29	58
0.57	100.57	n/a	29	86
0.76	100.76	n/a	29	115
0.95	100.95	n/a	29	144
1.14	101.14	n/a	29	173
1.33	101.33	n/a	29	202
1.52	101.52	n/a	29	231
1.71	101.71	n/a	29	259
1.90	101.90	n/a	29	288

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 3.00	6.00	0.00	0.00
Span (in)	= 3.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.25	102.50	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) = 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

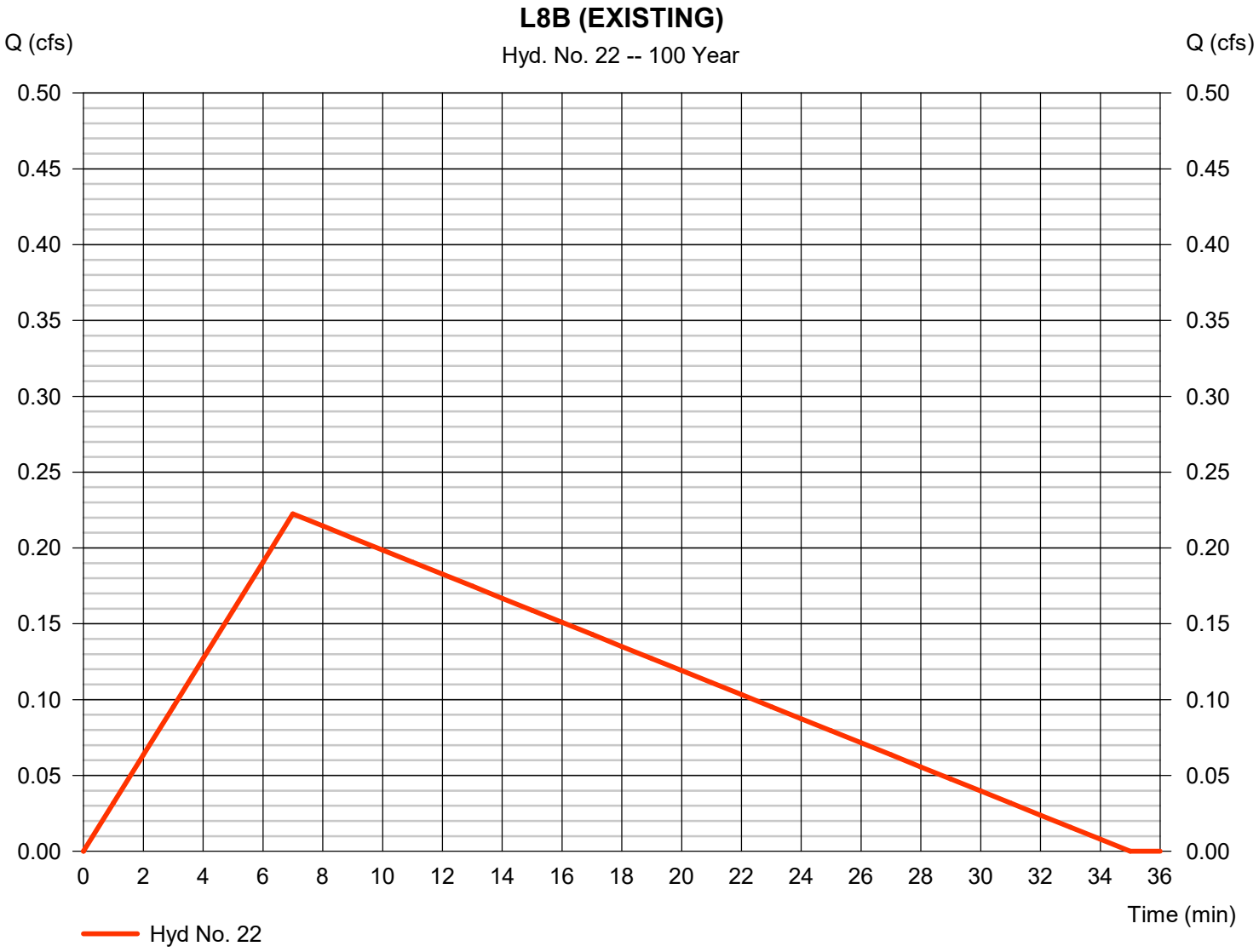
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	29	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	58	100.38	0.03 ic	0.00	---	---	---	---	---	---	---	---	0.032
0.57	86	100.57	0.10 ic	0.00	---	---	---	---	---	---	---	---	0.104
0.76	115	100.76	0.15 ic	0.00	---	---	---	---	---	---	---	---	0.147
0.95	144	100.95	0.18 ic	0.00	---	---	---	---	---	---	---	---	0.179
1.14	173	101.14	0.21 ic	0.00	---	---	---	---	---	---	---	---	0.207
1.33	202	101.33	0.23 ic	0.00	---	---	---	---	---	---	---	---	0.231
1.52	231	101.52	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.253
1.71	259	101.71	0.27 ic	0.00	---	---	---	---	---	---	---	---	0.273
1.90	288	101.90	0.29 ic	0.00	---	---	---	---	---	---	---	---	0.292

Hydrograph Report

Hyd. No. 22

L8B (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.222 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	234 cuft
Drainage area	=	0.080 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

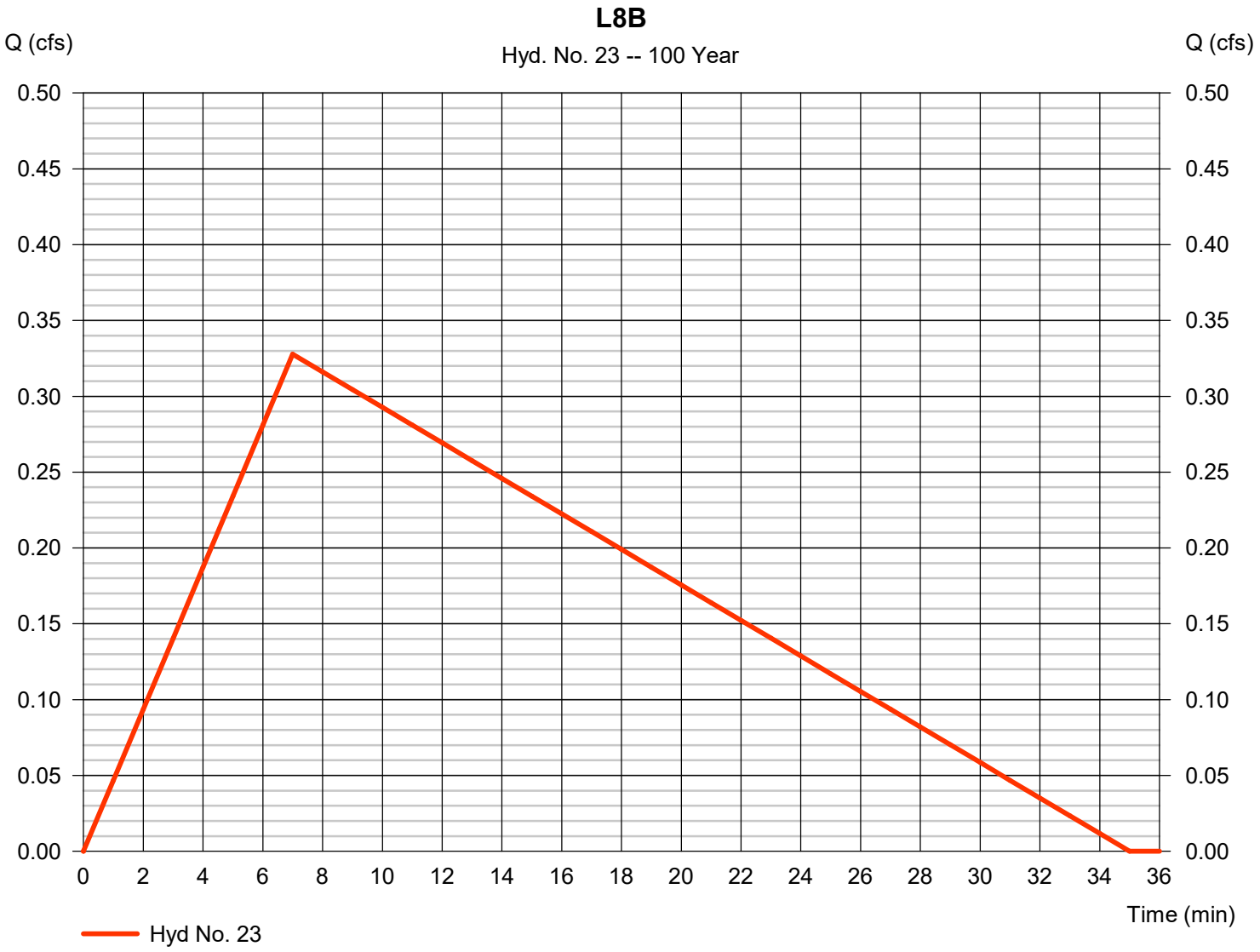


Hydrograph Report

Hyd. No. 23

L8B

Hydrograph type	=	Rational	Peak discharge	=	0.328 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	344 cuft
Drainage area	=	0.080 ac	Runoff coeff.	=	0.84
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



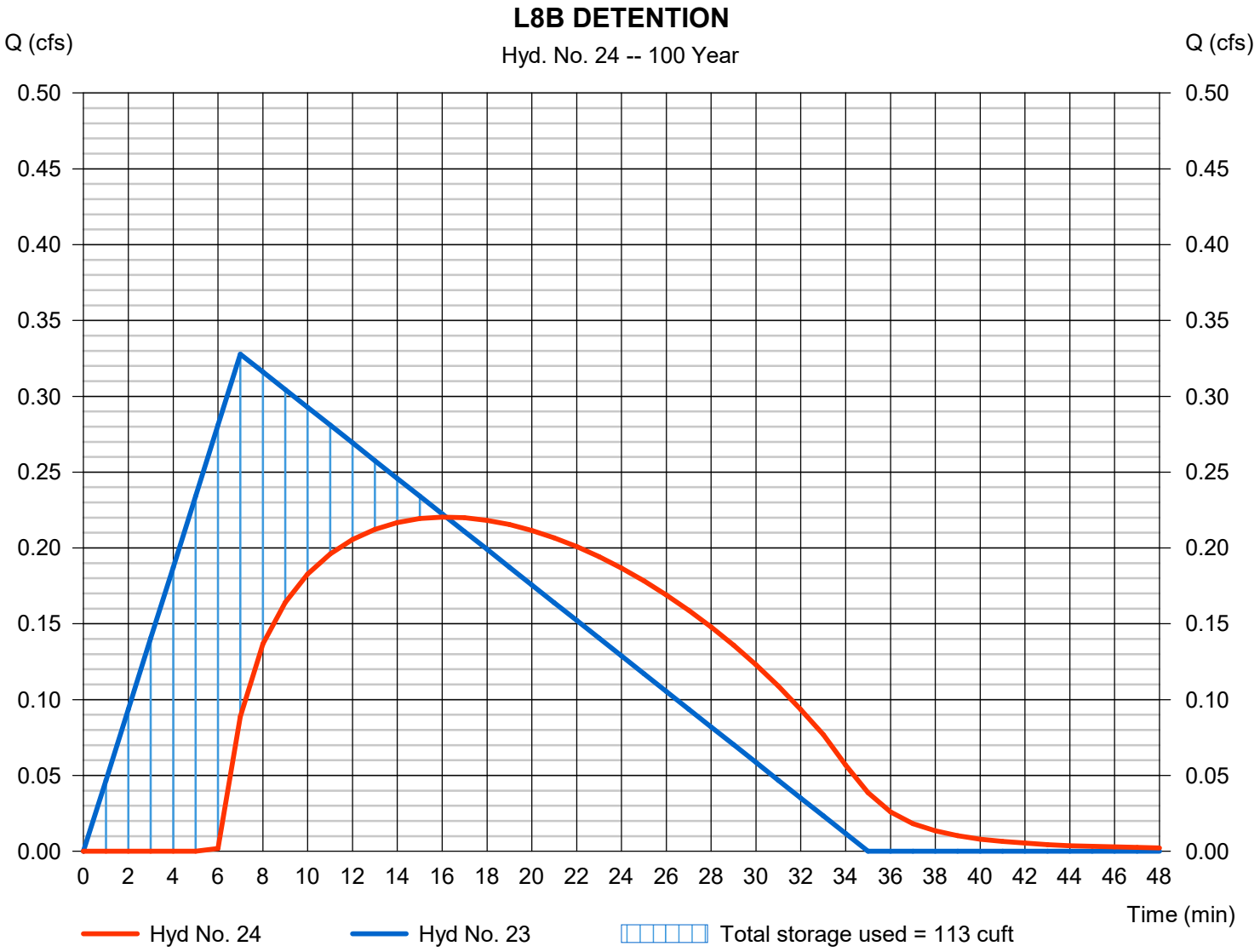
Hydrograph Report

Hyd. No. 24

L8B DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.220 cfs
Storm frequency	=	100 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	294 cuft
Inflow hyd. No.	=	23 - L8B	Max. Elevation	=	101.75 ft
Reservoir name	=	BIO L8B	Max. Storage	=	113 cuft

Storage Indication method used.



Pond Report

Pond No. 6 - BIO L8B

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.80 x 5.70 ft, Barrel Len = 11.40 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.18	100.18	n/a	12	12
0.36	100.36	n/a	12	23
0.54	100.54	n/a	12	35
0.72	100.72	n/a	12	47
0.90	100.90	n/a	12	58
1.08	101.08	n/a	12	70
1.26	101.26	n/a	12	82
1.44	101.44	n/a	12	94
1.62	101.62	n/a	12	105
1.80	101.80	n/a	12	117

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 3.00	6.00	0.00	0.00
Span (in)	= 3.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.75	102.50	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) = 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	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.18	12	100.18	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.36	23	100.36	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.54	35	100.54	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.72	47	100.72	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.90	58	100.90	0.04 ic	0.00	---	---	---	---	---	---	---	---	0.041
1.08	70	101.08	0.11 ic	0.00	---	---	---	---	---	---	---	---	0.107
1.26	82	101.26	0.15 ic	0.00	---	---	---	---	---	---	---	---	0.147
1.44	94	101.44	0.18 ic	0.00	---	---	---	---	---	---	---	---	0.178
1.62	105	101.62	0.20 ic	0.00	---	---	---	---	---	---	---	---	0.204
1.80	117	101.80	0.23 ic	0.00	---	---	---	---	---	---	---	---	0.227

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

Legend

Hyd.	Origin	Description
1	Rational	C2A (EXISTING)
2	Rational	C2A
3	Rational	C2B (EXISTING)
4	Rational	C2B

Hydraflow Table of Contents

C2 SUBSHEDS (A-B) - Copy.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

Wednesday, 09 / 6 / 2017

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

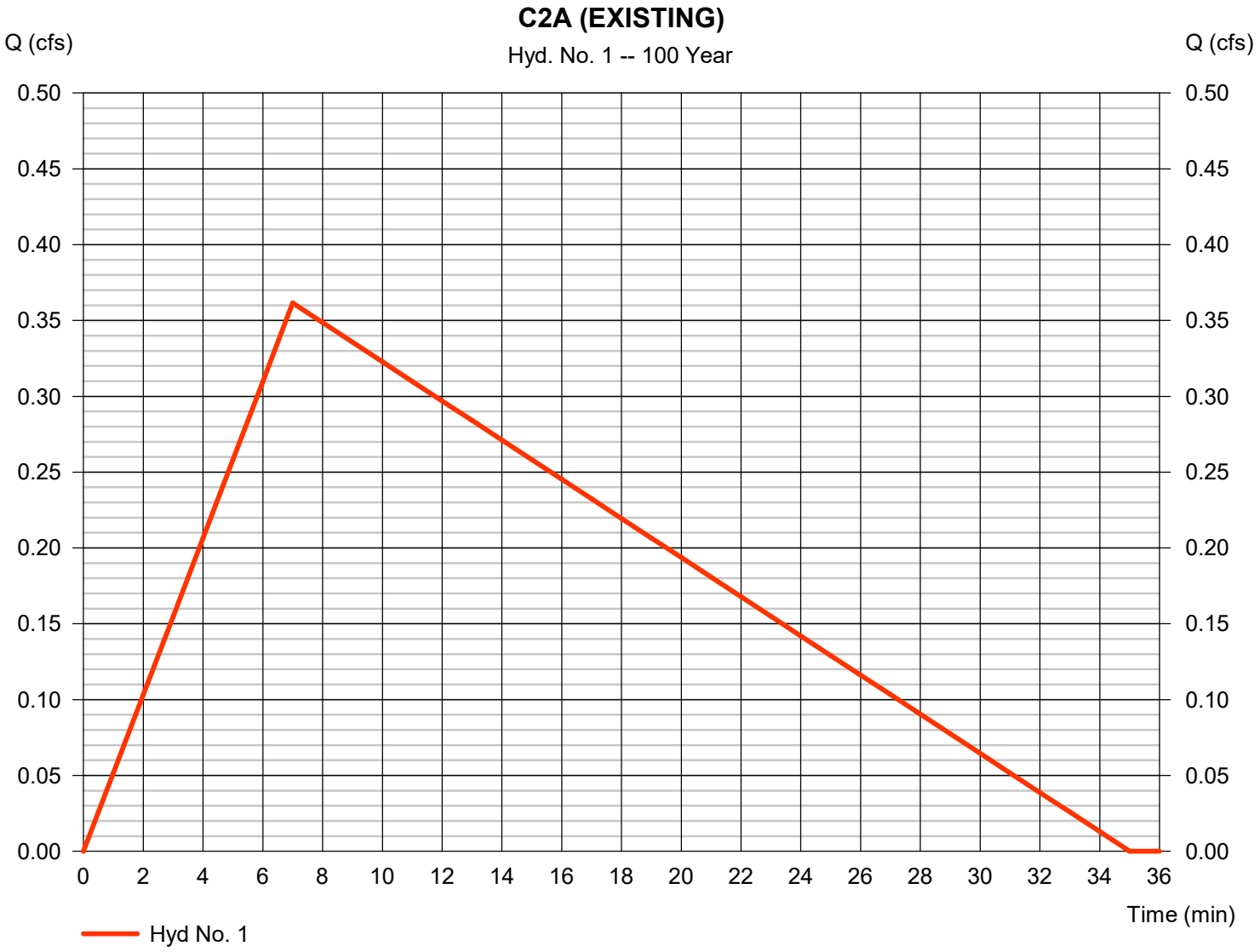
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	0.361	1	7	380	------	------	------	C2A (EXISTING)
2	Rational	0.438	1	7	459	------	------	------	C2A
3	Rational	1.140	1	7	1,197	------	------	------	C2B (EXISTING)
4	Rational	1.300	1	7	1,365	------	------	------	C2B

Hydrograph Report

Hyd. No. 1

C2A (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.361 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	380 cuft
Drainage area	=	0.130 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

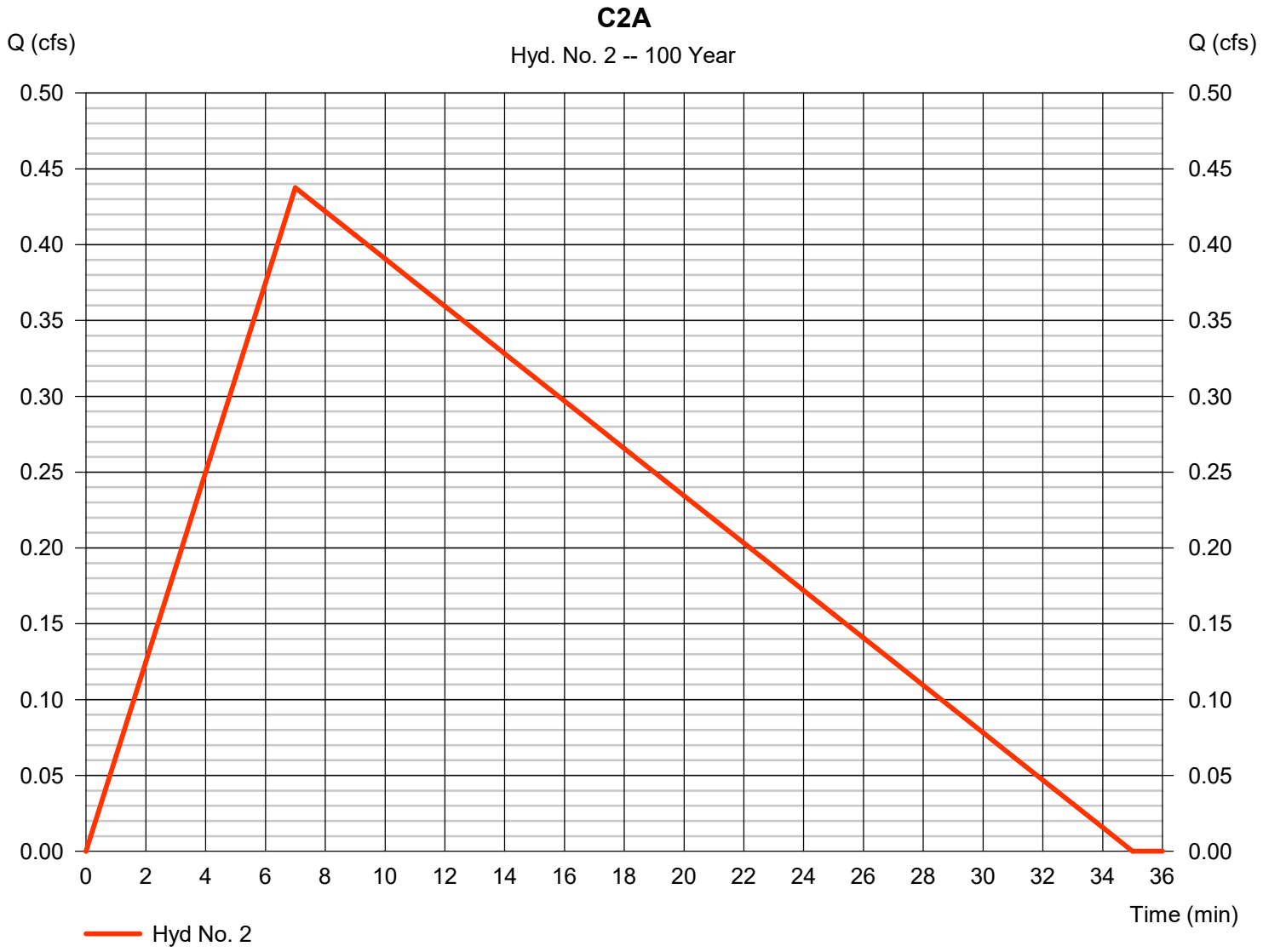


Hydrograph Report

Hyd. No. 2

C2A

Hydrograph type	=	Rational	Peak discharge	=	0.438 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	459 cuft
Drainage area	=	0.130 ac	Runoff coeff.	=	0.69
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

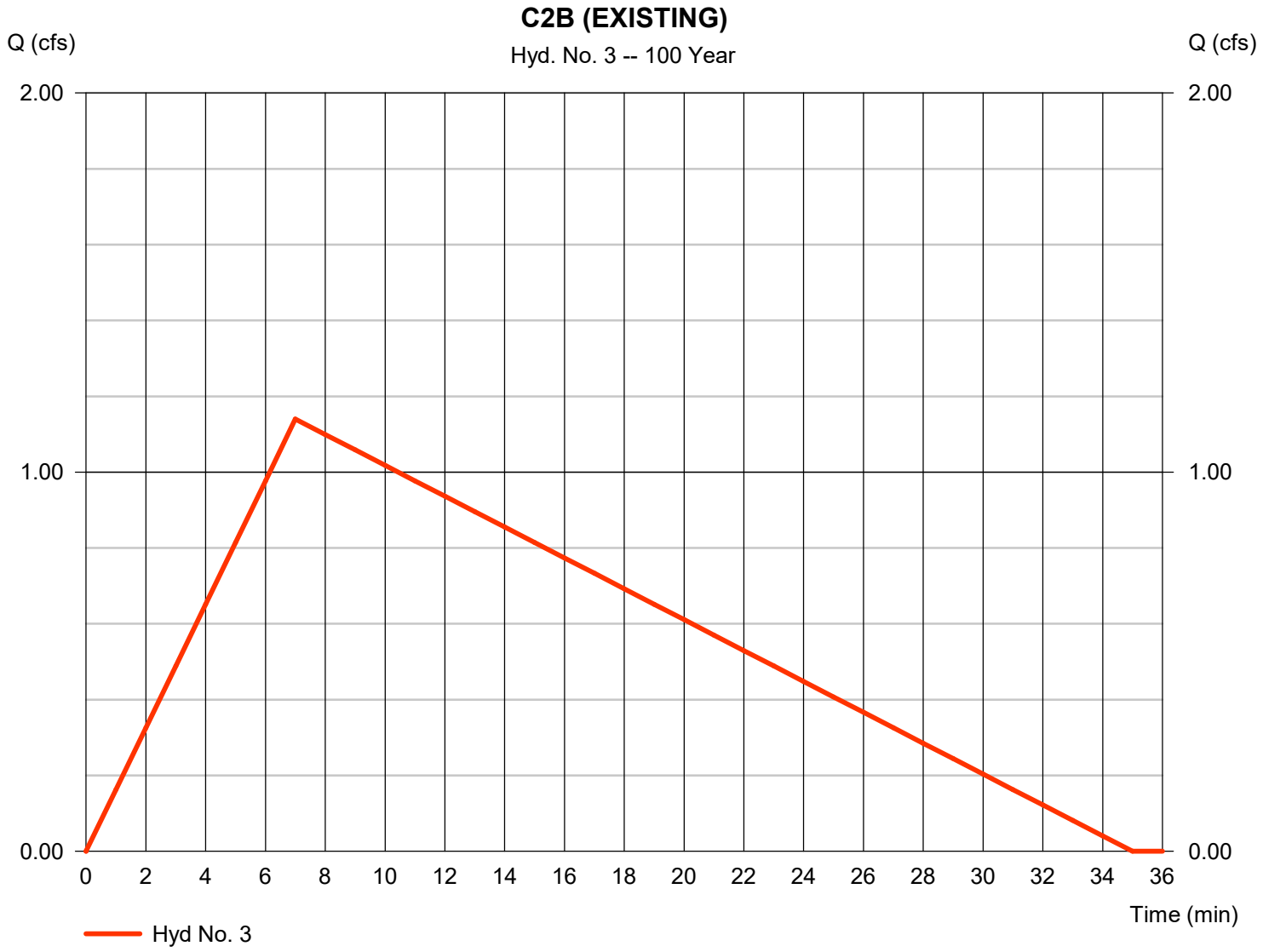


Hydrograph Report

Hyd. No. 3

C2B (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	1.140 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	1,197 cuft
Drainage area	=	0.410 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

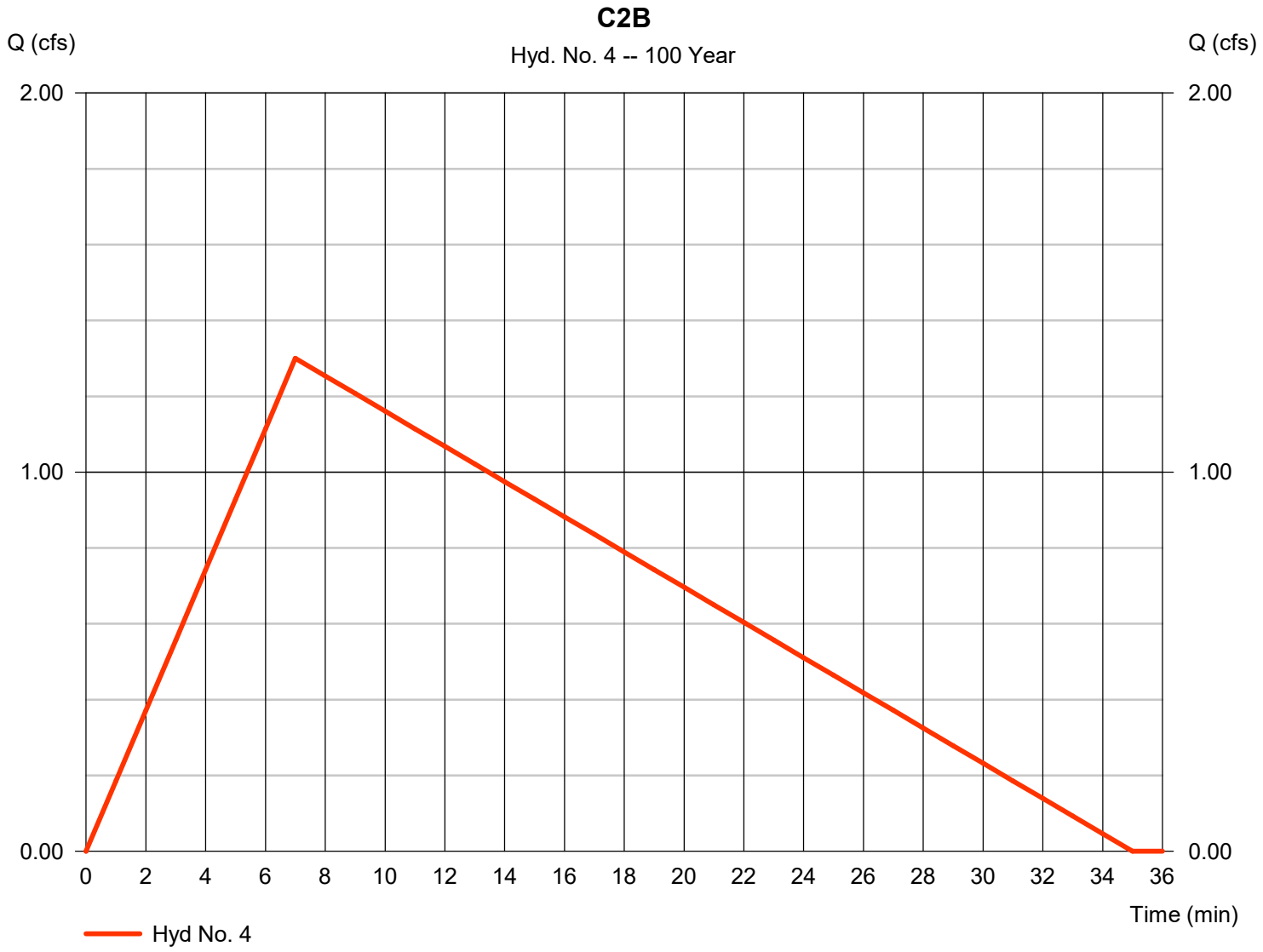


Hydrograph Report

Hyd. No. 4

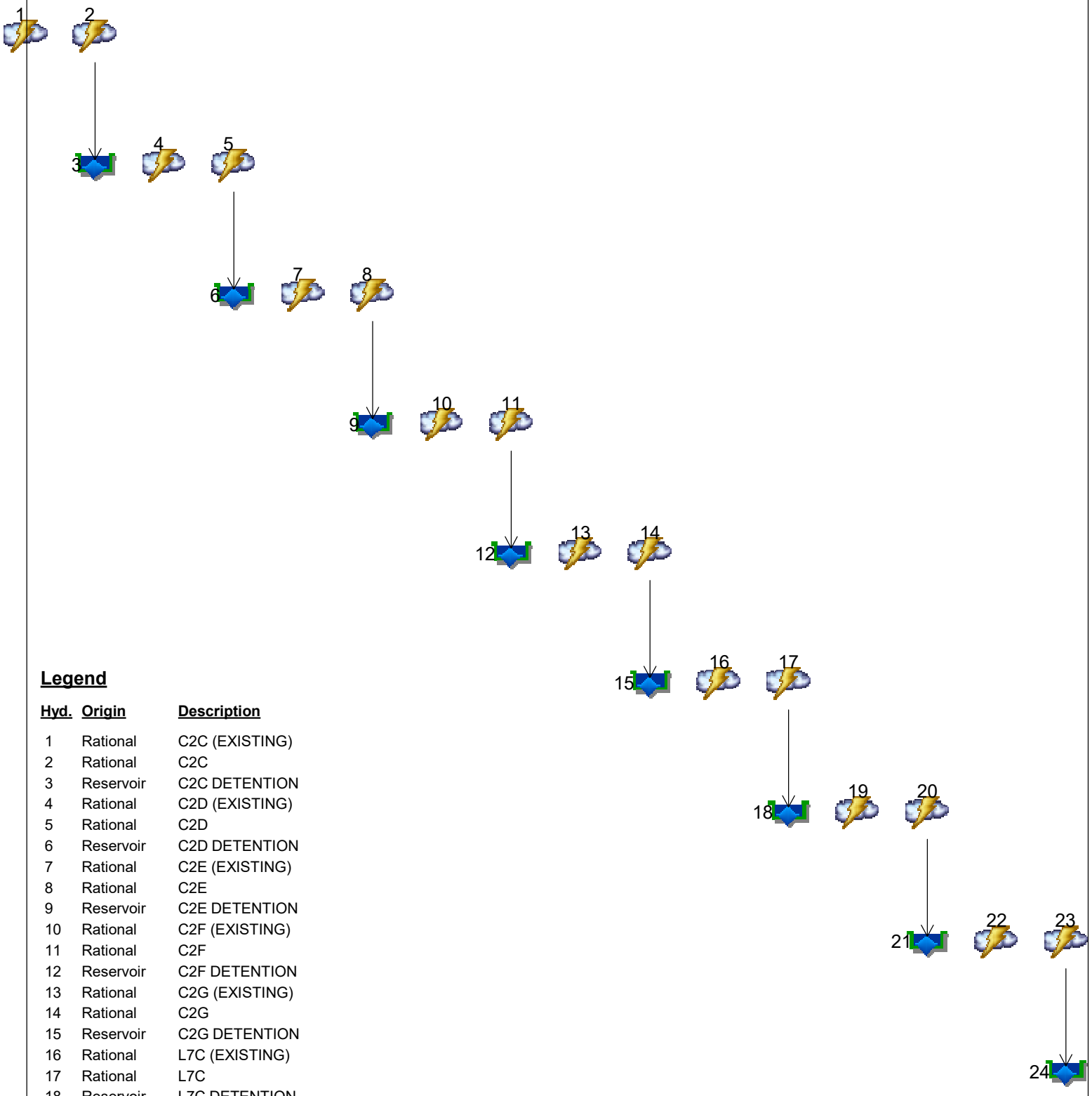
C2B

Hydrograph type	=	Rational	Peak discharge	=	1.300 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	1,365 cuft
Drainage area	=	0.410 ac	Runoff coeff.	=	0.65
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514



Legend

Hyd.	Origin	Description
1	Rational	C2C (EXISTING)
2	Rational	C2C
3	Reservoir	C2C DETENTION
4	Rational	C2D (EXISTING)
5	Rational	C2D
6	Reservoir	C2D DETENTION
7	Rational	C2E (EXISTING)
8	Rational	C2E
9	Reservoir	C2E DETENTION
10	Rational	C2F (EXISTING)
11	Rational	C2F
12	Reservoir	C2F DETENTION
13	Rational	C2G (EXISTING)
14	Rational	C2G
15	Reservoir	C2G DETENTION
16	Rational	L7C (EXISTING)
17	Rational	L7C
18	Reservoir	L7C DETENTION
19	Rational	C2H (EXISTING)
20	Rational	C2H
21	Reservoir	C2H DETENTION
22	Rational	C2I (EXISTING)
23	Rational	C2I
24	Reservoir	C2I DETENTION

Hydraflow Table of Contents

C2 SUBSHEDS.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	1.001	1	7	1,051	------	------	------	C2C (EXISTING)
2	Rational	1.159	1	7	1,217	------	------	------	C2C
3	Reservoir	0.966	1	13	1,266	2	103.32	311	C2C DETENTION
4	Rational	0.751	1	7	788	------	------	------	C2D (EXISTING)
5	Rational	0.883	1	7	927	------	------	------	C2D
6	Reservoir	0.601	1	16	901	5	102.46	231	C2D DETENTION
7	Rational	0.695	1	7	730	------	------	------	C2E (EXISTING)
8	Rational	0.915	1	7	960	------	------	------	C2E
9	Reservoir	0.507	1	19	908	8	101.87	365	C2E DETENTION
10	Rational	0.945	1	7	993	------	------	------	C2F (EXISTING)
11	Rational	1.095	1	7	1,149	------	------	------	C2F
12	Reservoir	0.940	1	11	1,111	11	101.53	220	C2F DETENTION
13	Rational	0.834	1	7	876	------	------	------	C2G (EXISTING)
14	Rational	0.995	1	7	1,045	------	------	------	C2G
15	Reservoir	0.757	1	14	985	14	101.39	310	C2G DETENTION
16	Rational	0.222	1	7	234	------	------	------	L7C (EXISTING)
17	Rational	0.281	1	7	295	------	------	------	L7C
18	Reservoir	0.217	1	13	265	17	100.68	76.4	L7C DETENTION
19	Rational	0.445	1	7	467	------	------	------	C2H (EXISTING)
20	Rational	0.695	1	7	729	------	------	------	C2H
21	Reservoir	0.395	1	19	671	20	101.30	282	C2H DETENTION
22	Rational	0.056	1	7	58	------	------	------	C2I (EXISTING)
23	Rational	0.086	1	7	90	------	------	------	C2I
24	Reservoir	0.055	1	17	51	23	100.88	47.7	C2I DETENTION

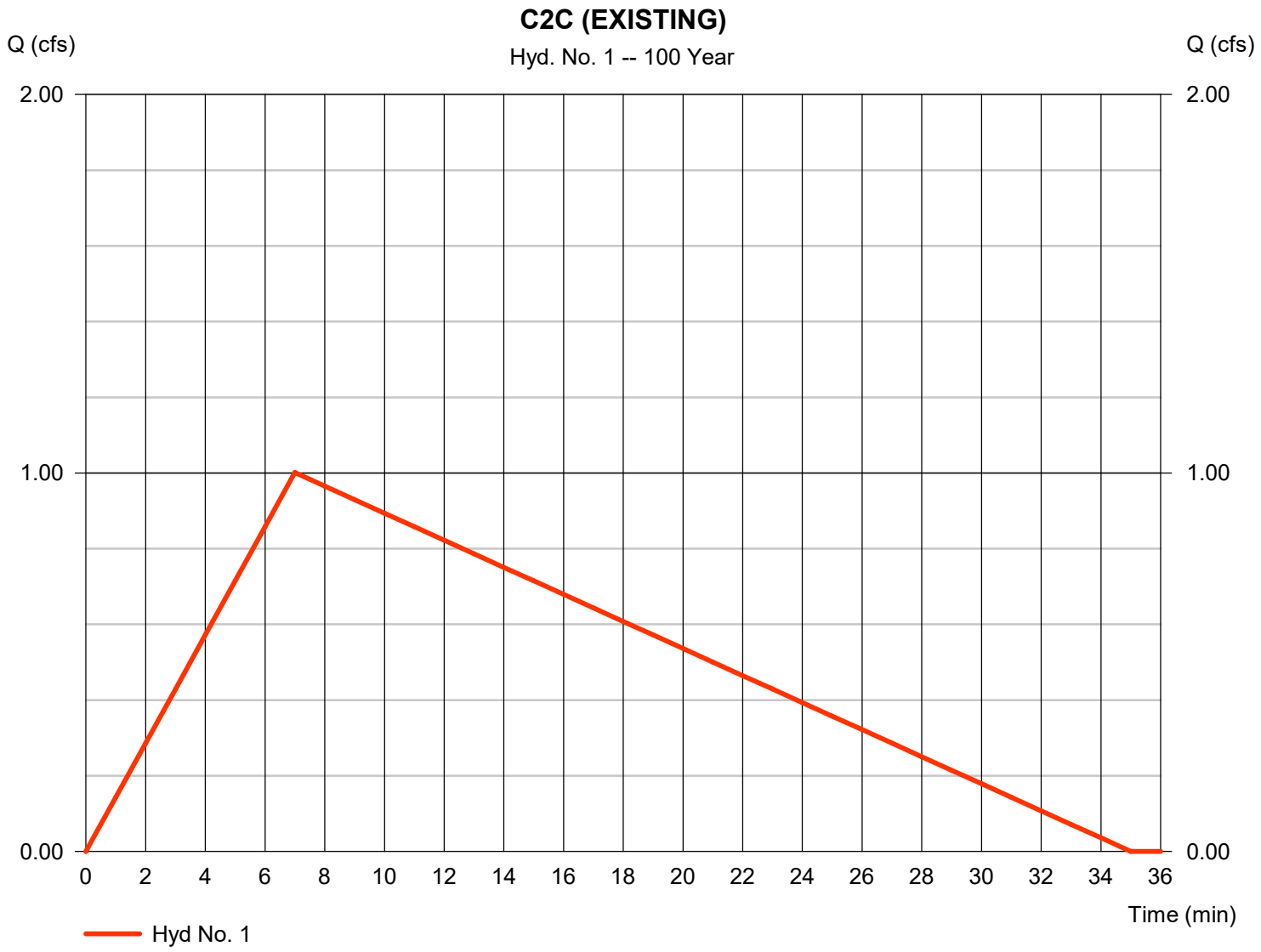
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hyd. No. 1

C2C (EXISTING)

Hydrograph type	= Rational	Peak discharge	= 1.001 cfs
Storm frequency	= 100 yrs	Time to peak	= 7 min
Time interval	= 1 min	Hyd. volume	= 1,051 cuft
Drainage area	= 0.360 ac	Runoff coeff.	= 0.57
Intensity	= 4.878 in/hr	Tc by User	= 7.00 min
IDF Curve	= Fairfax.idf	Asc/Rec limb fact	= 1/4

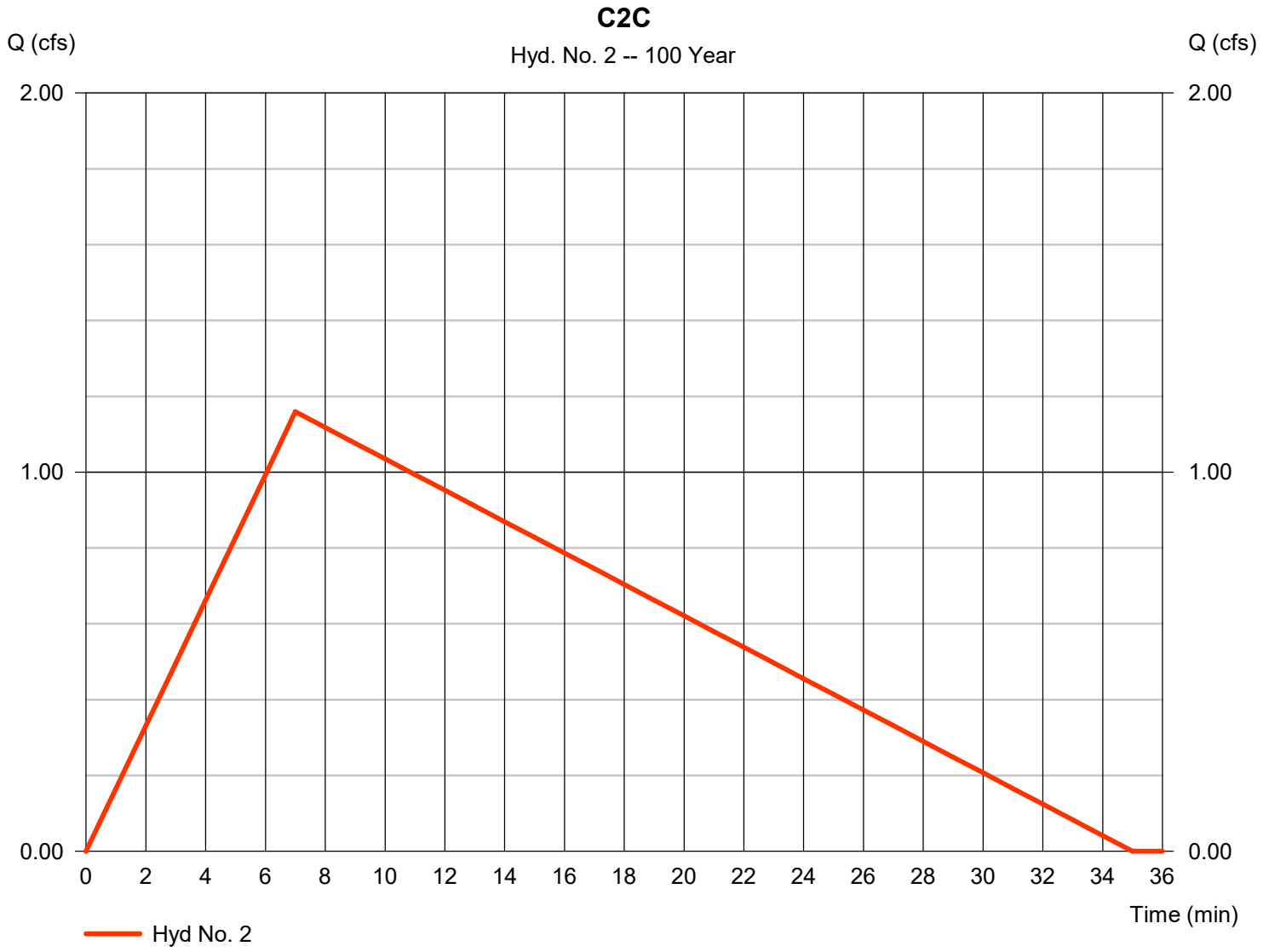


Hydrograph Report

Hyd. No. 2

C2C

Hydrograph type	=	Rational	Peak discharge	=	1.159 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	1,217 cuft
Drainage area	=	0.360 ac	Runoff coeff.	=	0.66
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



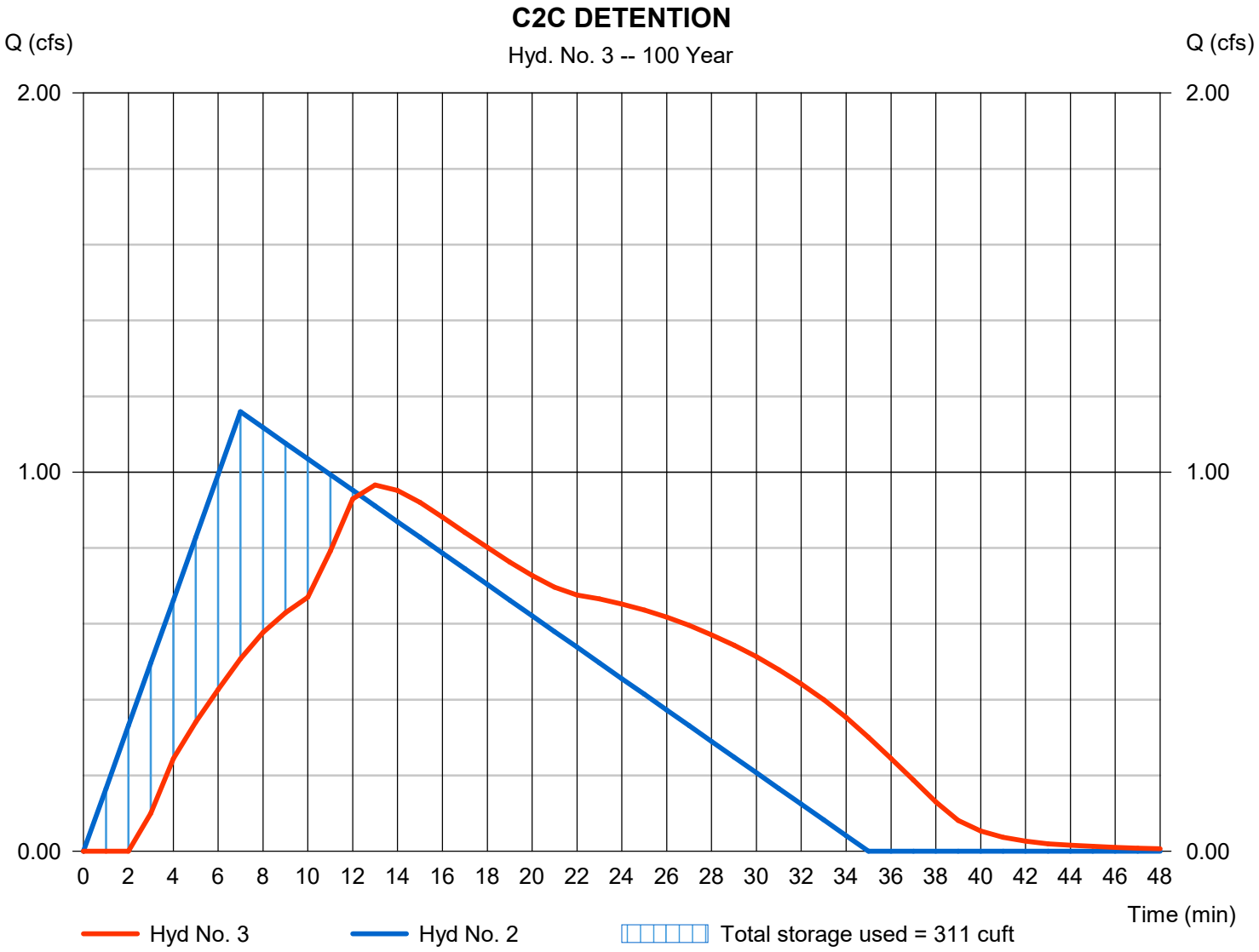
Hydrograph Report

Hyd. No. 3

C2C DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.966 cfs
Storm frequency	=	100 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	1,266 cuft
Inflow hyd. No.	=	2 - C2C	Max. Elevation	=	103.32 ft
Reservoir name	=	BIO C2C	Max. Storage	=	311 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BIO C2C

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 3.80 x 3.80 ft, Barrel Len = 24.70 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.38	100.38	n/a	36	36
0.76	100.76	n/a	36	71
1.14	101.14	n/a	36	107
1.52	101.52	n/a	36	143
1.90	101.90	n/a	36	178
2.28	102.28	n/a	36	214
2.66	102.66	n/a	36	250
3.04	103.04	n/a	36	285
3.42	103.42	n/a	36	321
3.80	103.80	n/a	36	357

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	6.00	0.00	0.00
Span (in)	= 4.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.25	103.00	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) = 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

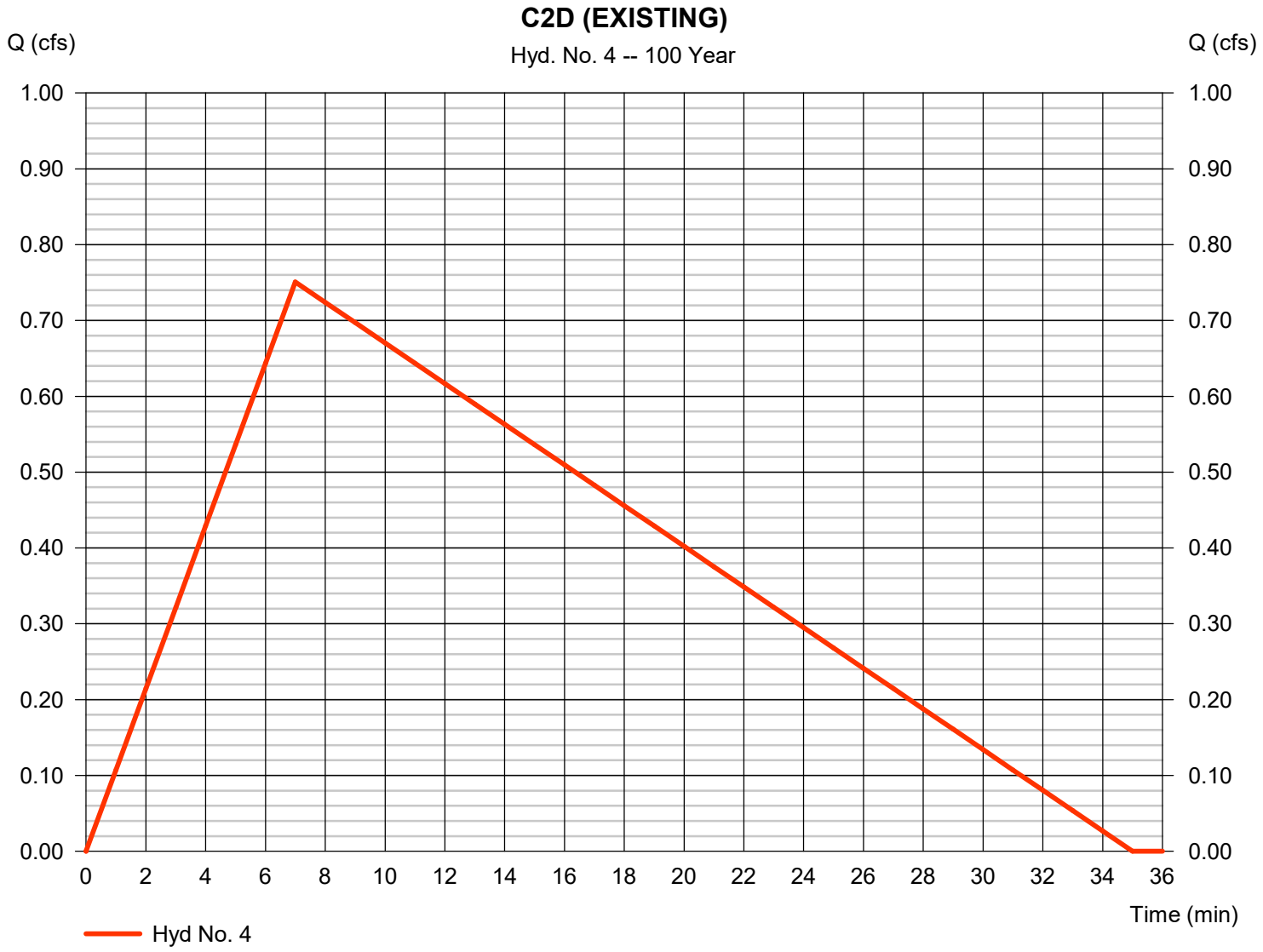
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	36	100.38	0.04 ic	0.00	---	---	---	---	---	---	---	---	0.039
0.76	71	100.76	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.246
1.14	107	101.14	0.36 ic	0.00	---	---	---	---	---	---	---	---	0.357
1.52	143	101.52	0.44 ic	0.00	---	---	---	---	---	---	---	---	0.441
1.90	178	101.90	0.51 ic	0.00	---	---	---	---	---	---	---	---	0.512
2.28	214	102.28	0.57 ic	0.00	---	---	---	---	---	---	---	---	0.573
2.66	250	102.66	0.63 ic	0.00	---	---	---	---	---	---	---	---	0.629
3.04	285	103.04	0.68 ic	0.01 ic	---	---	---	---	---	---	---	---	0.686
3.42	321	103.42	0.73 ic	0.39 ic	---	---	---	---	---	---	---	---	1.117
3.80	357	103.80	0.77 ic	0.70 ic	---	---	---	---	---	---	---	---	1.474

Hydrograph Report

Hyd. No. 4

C2D (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.751 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	788 cuft
Drainage area	=	0.270 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



Hydrograph Report

Hyd. No. 5

C2D

Hydrograph type	=	Rational	Peak discharge	=	0.883 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	927 cuft
Drainage area	=	0.270 ac	Runoff coeff.	=	0.67
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

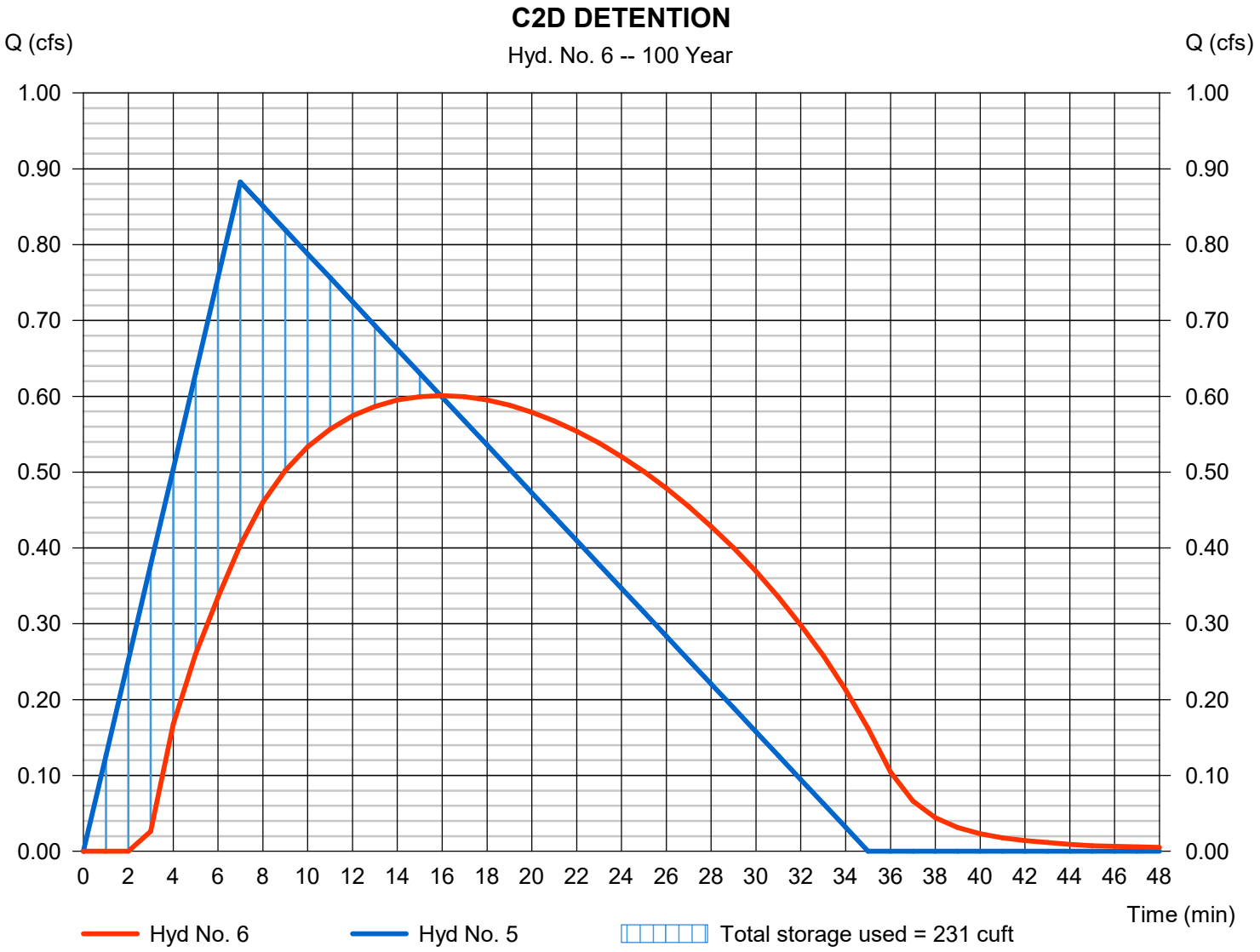
Hydrograph Report

Hyd. No. 6

C2D DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.601 cfs
Storm frequency	=	100 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	901 cuft
Inflow hyd. No.	=	5 - C2D	Max. Elevation	=	102.46 ft
Reservoir name	=	BIO C2C	Max. Storage	=	231 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BIO C2C

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 3.80 x 3.80 ft, Barrel Len = 24.70 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.38	100.38	n/a	36	36
0.76	100.76	n/a	36	71
1.14	101.14	n/a	36	107
1.52	101.52	n/a	36	143
1.90	101.90	n/a	36	178
2.28	102.28	n/a	36	214
2.66	102.66	n/a	36	250
3.04	103.04	n/a	36	285
3.42	103.42	n/a	36	321
3.80	103.80	n/a	36	357

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	6.00	0.00	0.00
Span (in)	= 4.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.25	103.00	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) = 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

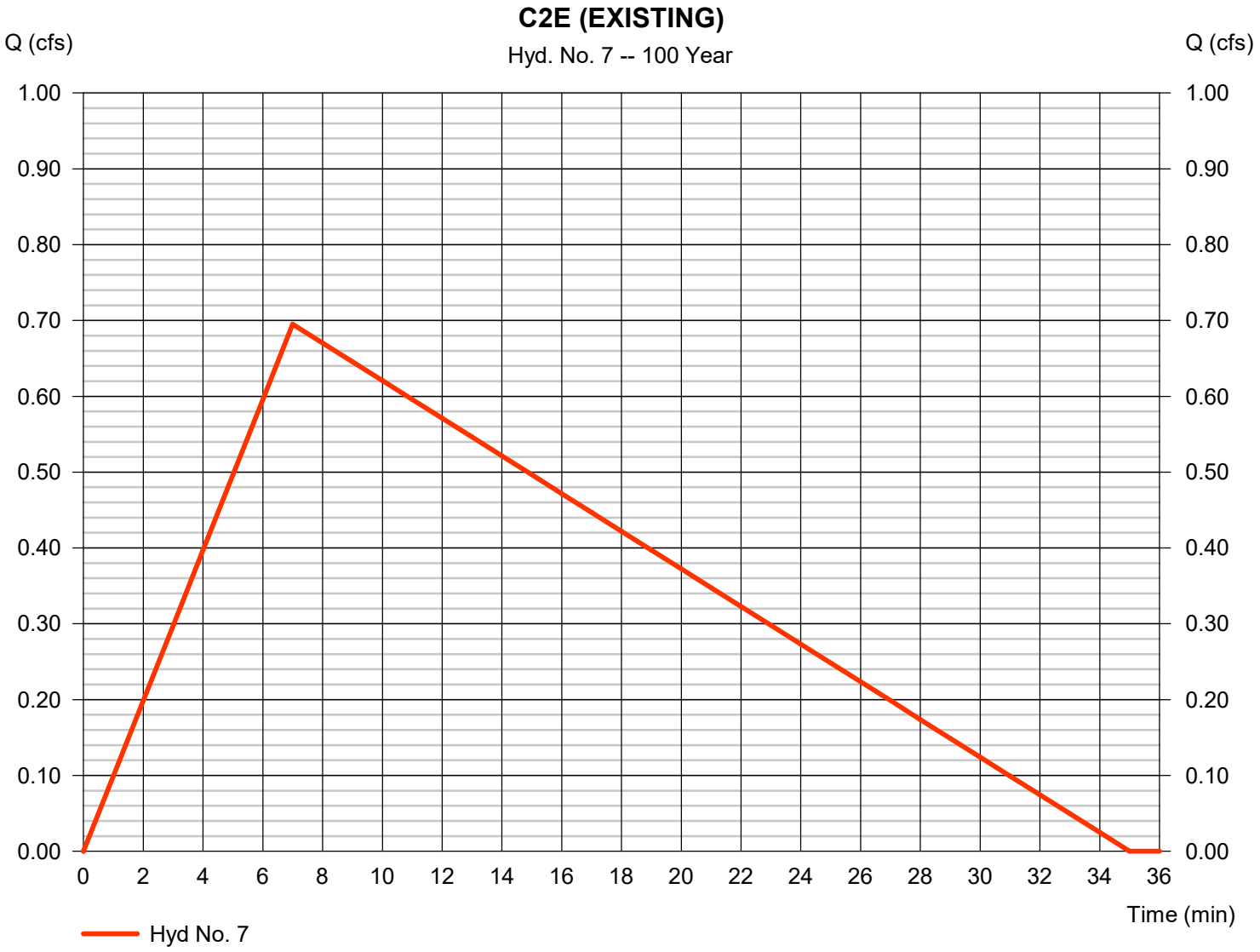
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	36	100.38	0.04 ic	0.00	---	---	---	---	---	---	---	---	0.039
0.76	71	100.76	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.246
1.14	107	101.14	0.36 ic	0.00	---	---	---	---	---	---	---	---	0.357
1.52	143	101.52	0.44 ic	0.00	---	---	---	---	---	---	---	---	0.441
1.90	178	101.90	0.51 ic	0.00	---	---	---	---	---	---	---	---	0.512
2.28	214	102.28	0.57 ic	0.00	---	---	---	---	---	---	---	---	0.573
2.66	250	102.66	0.63 ic	0.00	---	---	---	---	---	---	---	---	0.629
3.04	285	103.04	0.68 ic	0.01 ic	---	---	---	---	---	---	---	---	0.686
3.42	321	103.42	0.73 ic	0.39 ic	---	---	---	---	---	---	---	---	1.117
3.80	357	103.80	0.77 ic	0.70 ic	---	---	---	---	---	---	---	---	1.474

Hydrograph Report

Hyd. No. 7

C2E (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.695 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	730 cuft
Drainage area	=	0.250 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

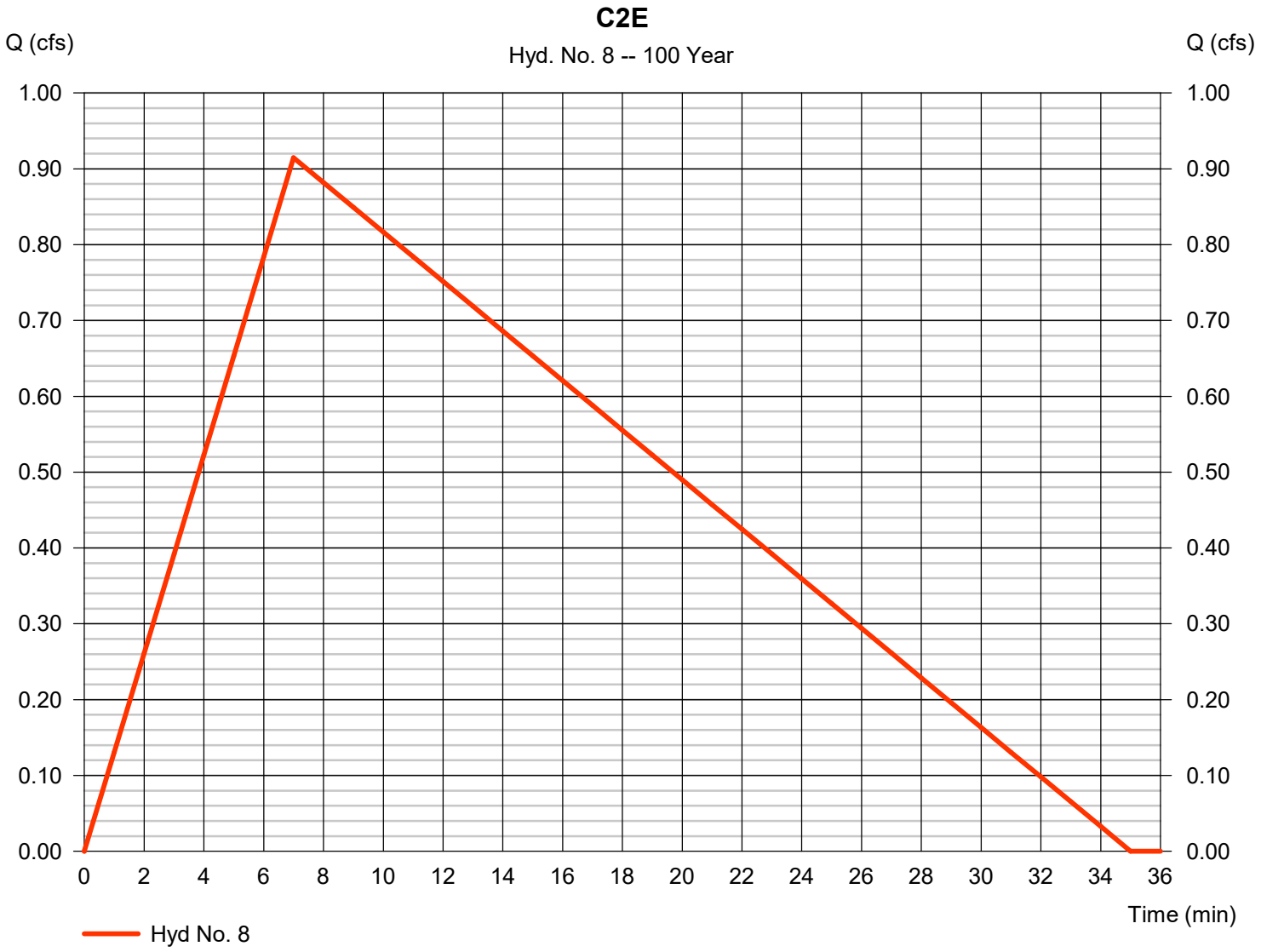


Hydrograph Report

Hyd. No. 8

C2E

Hydrograph type	=	Rational	Peak discharge	=	0.915 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	960 cuft
Drainage area	=	0.250 ac	Runoff coeff.	=	0.75
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



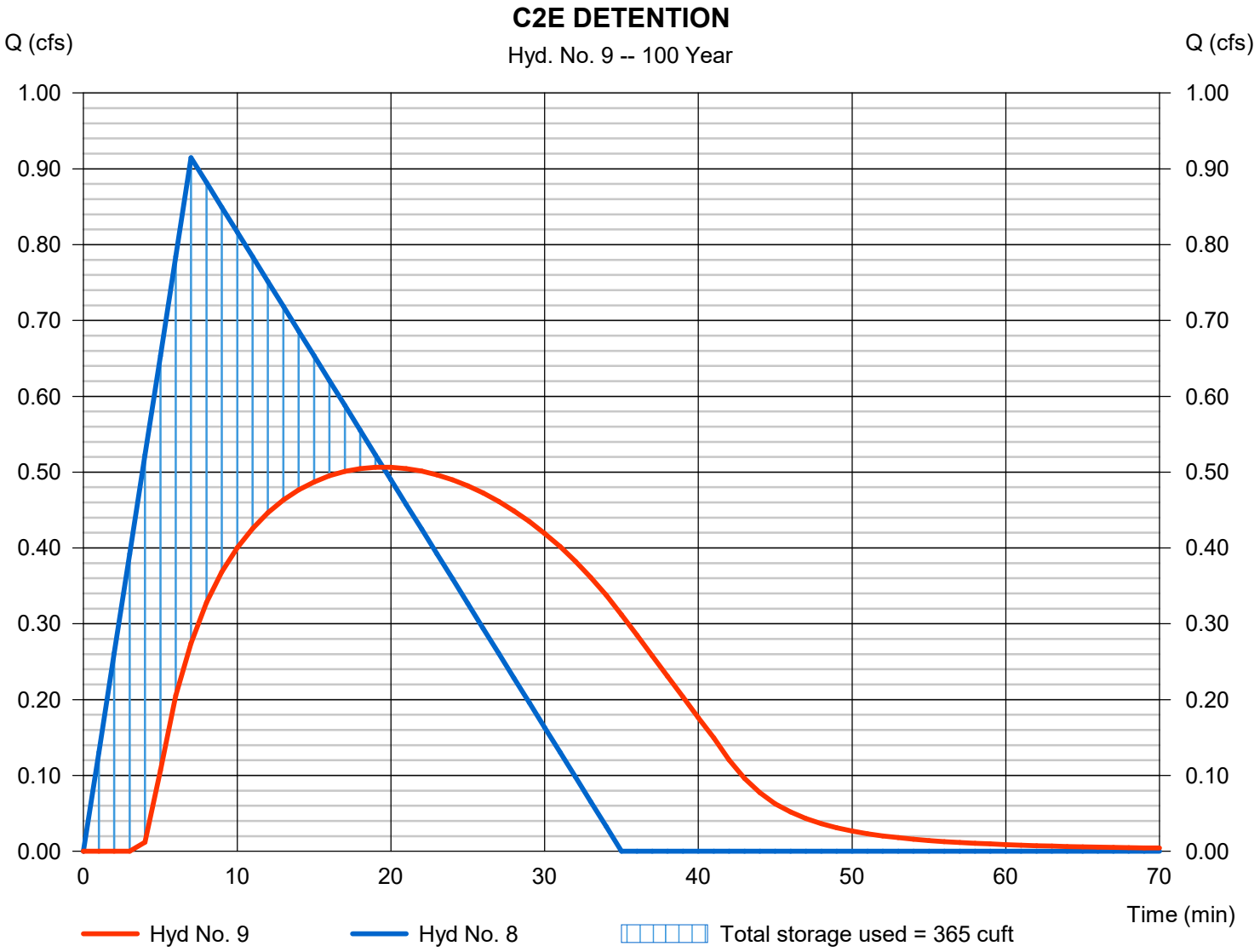
Hydrograph Report

Hyd. No. 9

C2E DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.507 cfs
Storm frequency	=	100 yrs	Time to peak	=	19 min
Time interval	=	1 min	Hyd. volume	=	908 cuft
Inflow hyd. No.	=	8 - C2E	Max. Elevation	=	101.87 ft
Reservoir name	=	BIO C2E	Max. Storage	=	365 cuft

Storage Indication method used.



Pond Report

Pond No. 3 - BIO C2E

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 5.70 ft, Barrel Len = 34.20 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	37	37
0.38	100.38	n/a	37	74
0.57	100.57	n/a	37	111
0.76	100.76	n/a	37	148
0.95	100.95	n/a	37	185
1.14	101.14	n/a	37	222
1.33	101.33	n/a	37	259
1.52	101.52	n/a	37	296
1.71	101.71	n/a	37	333
1.90	101.90	n/a	37	370

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	6.00	0.00	0.00
Span (in)	= 4.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.25	102.50	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) = 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	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	37	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	74	100.38	0.04 ic	0.00	---	---	---	---	---	---	---	---	0.039
0.57	111	100.57	0.17 ic	0.00	---	---	---	---	---	---	---	---	0.166
0.76	148	100.76	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.246
0.95	185	100.95	0.31 ic	0.00	---	---	---	---	---	---	---	---	0.307
1.14	222	101.14	0.36 ic	0.00	---	---	---	---	---	---	---	---	0.357
1.33	259	101.33	0.40 ic	0.00	---	---	---	---	---	---	---	---	0.402
1.52	296	101.52	0.44 ic	0.00	---	---	---	---	---	---	---	---	0.441
1.71	333	101.71	0.48 ic	0.00	---	---	---	---	---	---	---	---	0.478
1.90	370	101.90	0.51 ic	0.00	---	---	---	---	---	---	---	---	0.512

Hydrograph Report

Hyd. No. 10

C2F (EXISTING)

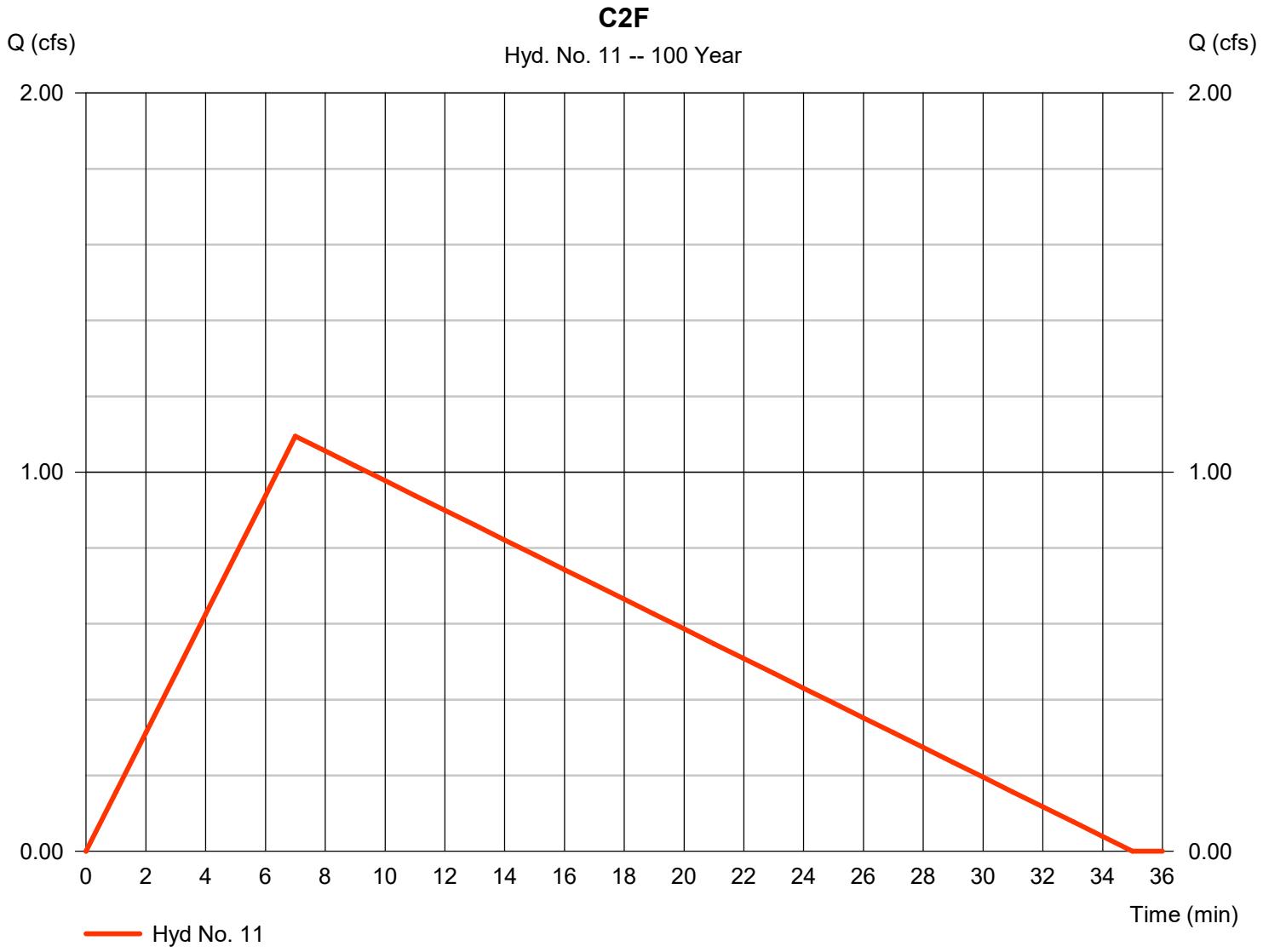
Hydrograph type	=	Rational	Peak discharge	=	0.945 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	993 cuft
Drainage area	=	0.340 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

Hydrograph Report

Hyd. No. 11

C2F

Hydrograph type	=	Rational	Peak discharge	=	1.095 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	1,149 cuft
Drainage area	=	0.340 ac	Runoff coeff.	=	0.66
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



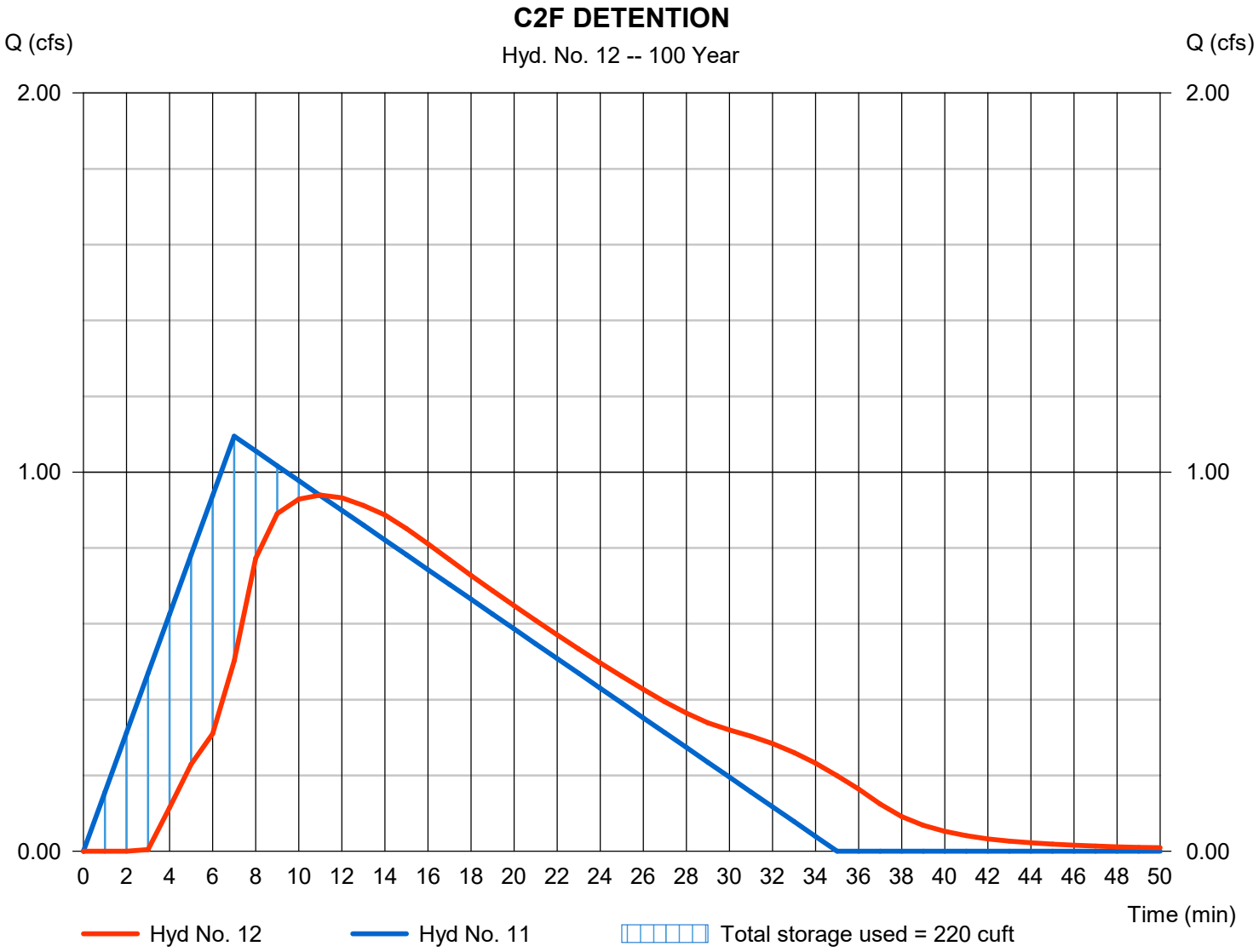
Hydrograph Report

Hyd. No. 12

C2F DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.940 cfs
Storm frequency	=	100 yrs	Time to peak	=	11 min
Time interval	=	1 min	Hyd. volume	=	1,111 cuft
Inflow hyd. No.	=	11 - C2F	Max. Elevation	=	101.53 ft
Reservoir name	=	BIO C2F	Max. Storage	=	220 cuft

Storage Indication method used.



Pond Report

Pond No. 4 - BIO C2F

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 1.90 ft, Barrel Len = 76.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	27	27
0.38	100.38	n/a	27	55
0.57	100.57	n/a	27	82
0.76	100.76	n/a	27	110
0.95	100.95	n/a	27	137
1.14	101.14	n/a	27	165
1.33	101.33	n/a	27	192
1.52	101.52	n/a	27	220
1.71	101.71	n/a	27	247
1.90	101.90	n/a	27	274

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	6.00	0.00	0.00
Span (in)	= 4.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.25	101.00	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) = 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

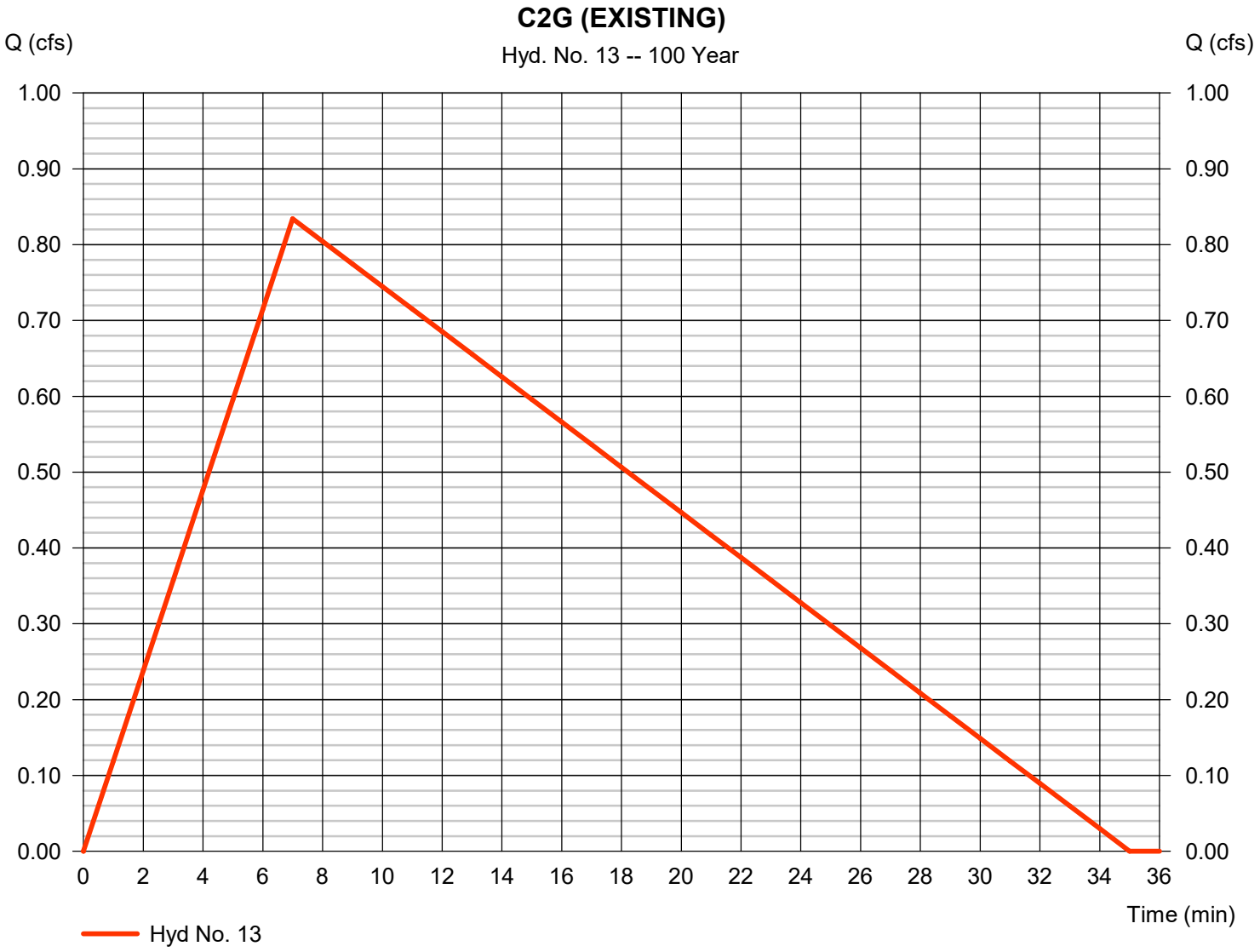
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	27	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	55	100.38	0.04 ic	0.00	---	---	---	---	---	---	---	---	0.039
0.57	82	100.57	0.17 ic	0.00	---	---	---	---	---	---	---	---	0.166
0.76	110	100.76	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.246
0.95	137	100.95	0.31 ic	0.00	---	---	---	---	---	---	---	---	0.307
1.14	165	101.14	0.36 ic	0.06 ic	---	---	---	---	---	---	---	---	0.415
1.33	192	101.33	0.40 ic	0.27 ic	---	---	---	---	---	---	---	---	0.671
1.52	220	101.52	0.44 ic	0.49 ic	---	---	---	---	---	---	---	---	0.933
1.71	247	101.71	0.48 ic	0.64 ic	---	---	---	---	---	---	---	---	1.119
1.90	274	101.90	0.51 ic	0.76 ic	---	---	---	---	---	---	---	---	1.274

Hydrograph Report

Hyd. No. 13

C2G (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.834 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	876 cuft
Drainage area	=	0.300 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



Hydrograph Report

Hyd. No. 14

C2G

Hydrograph type	=	Rational	Peak discharge	=	0.995 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	1,045 cuft
Drainage area	=	0.300 ac	Runoff coeff.	=	0.68
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

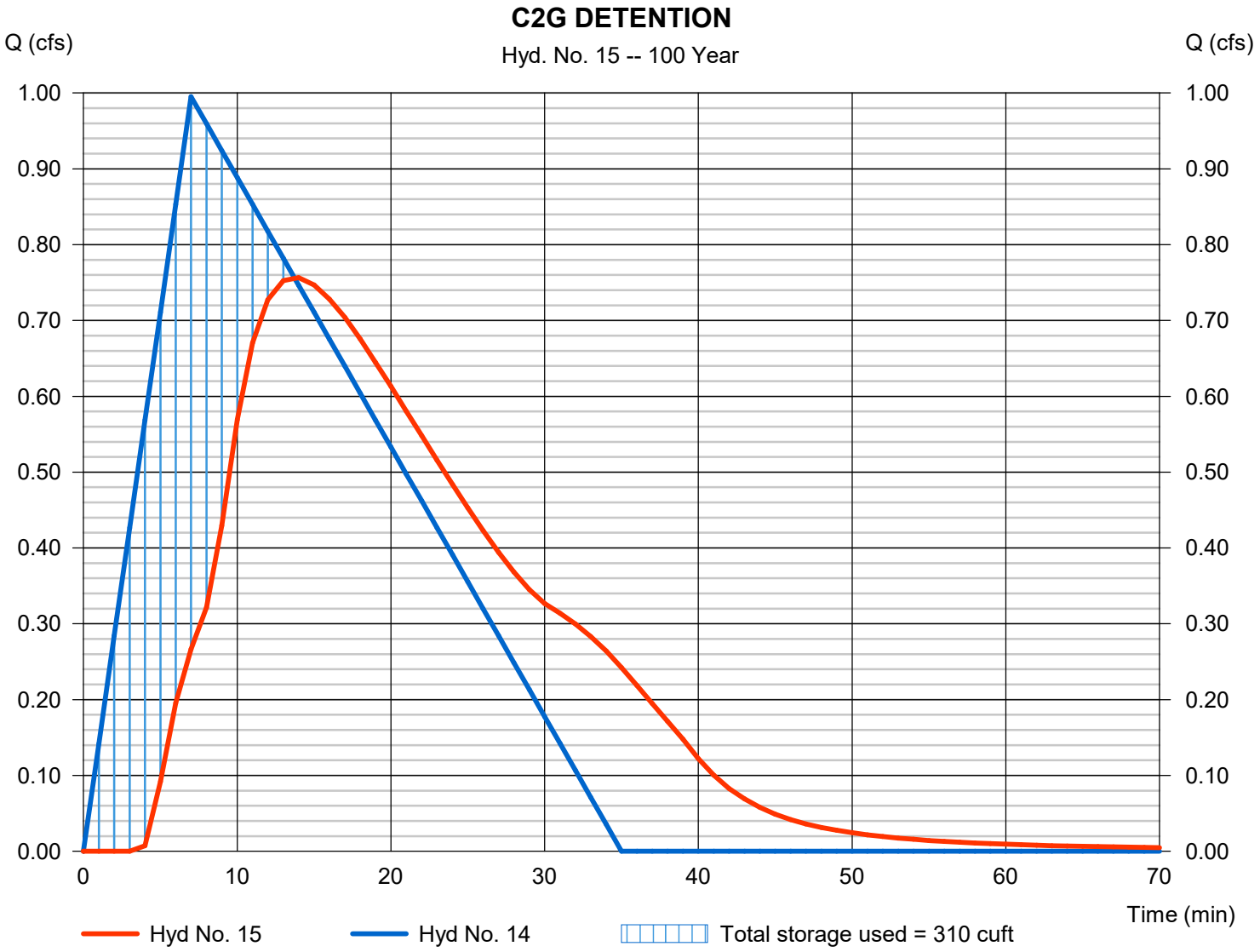
Hydrograph Report

Hyd. No. 15

C2G DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.757 cfs
Storm frequency	=	100 yrs	Time to peak	=	14 min
Time interval	=	1 min	Hyd. volume	=	985 cuft
Inflow hyd. No.	=	14 - C2G	Max. Elevation	=	101.39 ft
Reservoir name	=	BIO C2G	Max. Storage	=	310 cuft

Storage Indication method used.



Pond No. 5 - BIO C2G

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 3.80 ft, Barrel Len = 58.90 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	43	43
0.38	100.38	n/a	43	85
0.57	100.57	n/a	43	128
0.76	100.76	n/a	43	170
0.95	100.95	n/a	43	213
1.14	101.14	n/a	43	255
1.33	101.33	n/a	43	298
1.52	101.52	n/a	43	340
1.71	101.71	n/a	43	383
1.90	101.90	n/a	43	425

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	6.00	0.00	0.00
Span (in)	= 4.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.25	101.00	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) = 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	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	43	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	85	100.38	0.04 ic	0.00	---	---	---	---	---	---	---	---	0.039
0.57	128	100.57	0.17 ic	0.00	---	---	---	---	---	---	---	---	0.166
0.76	170	100.76	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.246
0.95	213	100.95	0.31 ic	0.00	---	---	---	---	---	---	---	---	0.307
1.14	255	101.14	0.36 ic	0.06 ic	---	---	---	---	---	---	---	---	0.415
1.33	298	101.33	0.40 ic	0.27 ic	---	---	---	---	---	---	---	---	0.671
1.52	340	101.52	0.44 ic	0.49 ic	---	---	---	---	---	---	---	---	0.933
1.71	383	101.71	0.48 ic	0.64 ic	---	---	---	---	---	---	---	---	1.119
1.90	425	101.90	0.51 ic	0.76 ic	---	---	---	---	---	---	---	---	1.274

Hydrograph Report

Hyd. No. 16

L7C (EXISTING)

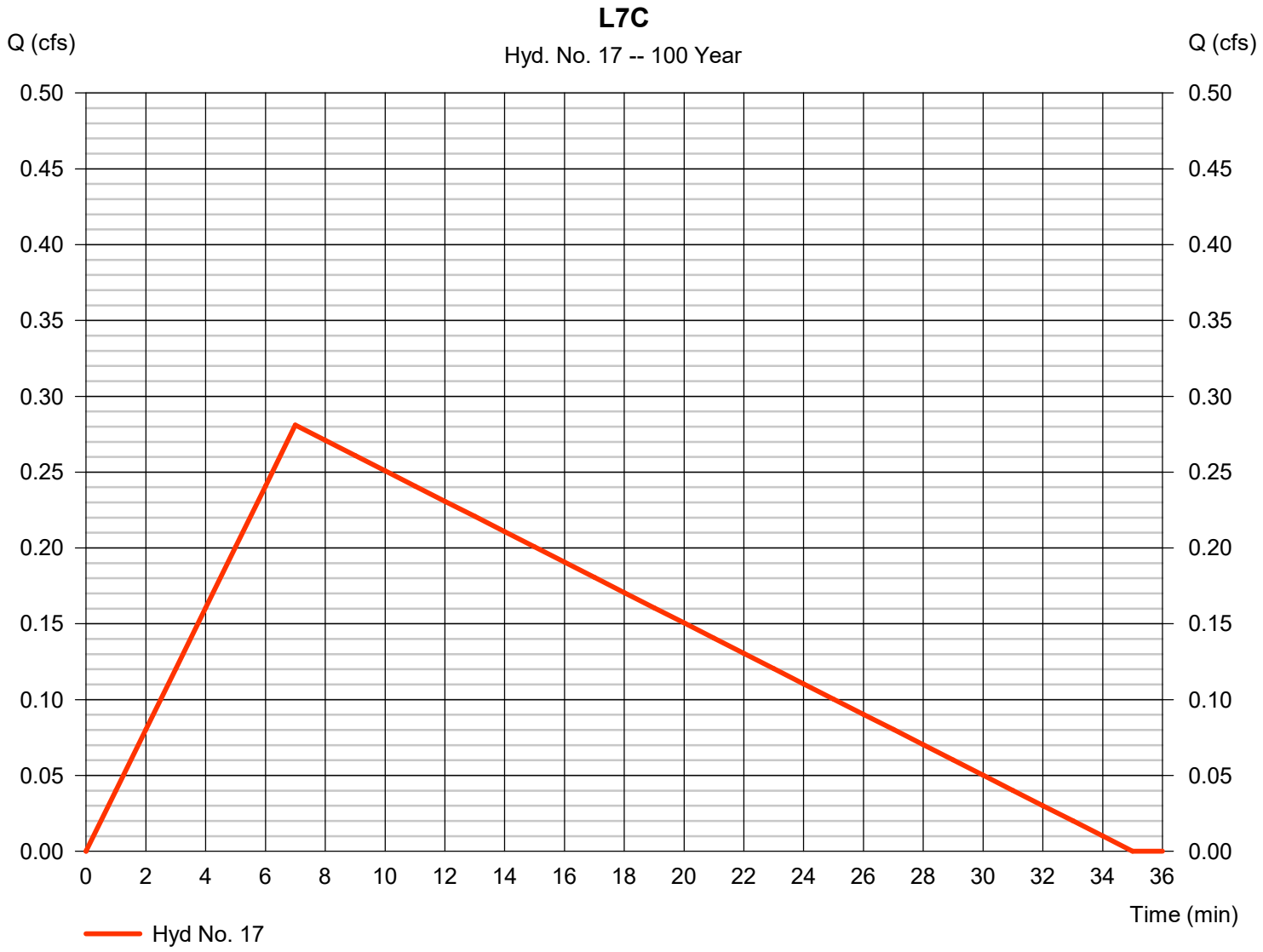
Hydrograph type	=	Rational	Peak discharge	=	0.222 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	234 cuft
Drainage area	=	0.080 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

Hydrograph Report

Hyd. No. 17

L7C

Hydrograph type	=	Rational	Peak discharge	=	0.281 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	295 cuft
Drainage area	=	0.080 ac	Runoff coeff.	=	0.72
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



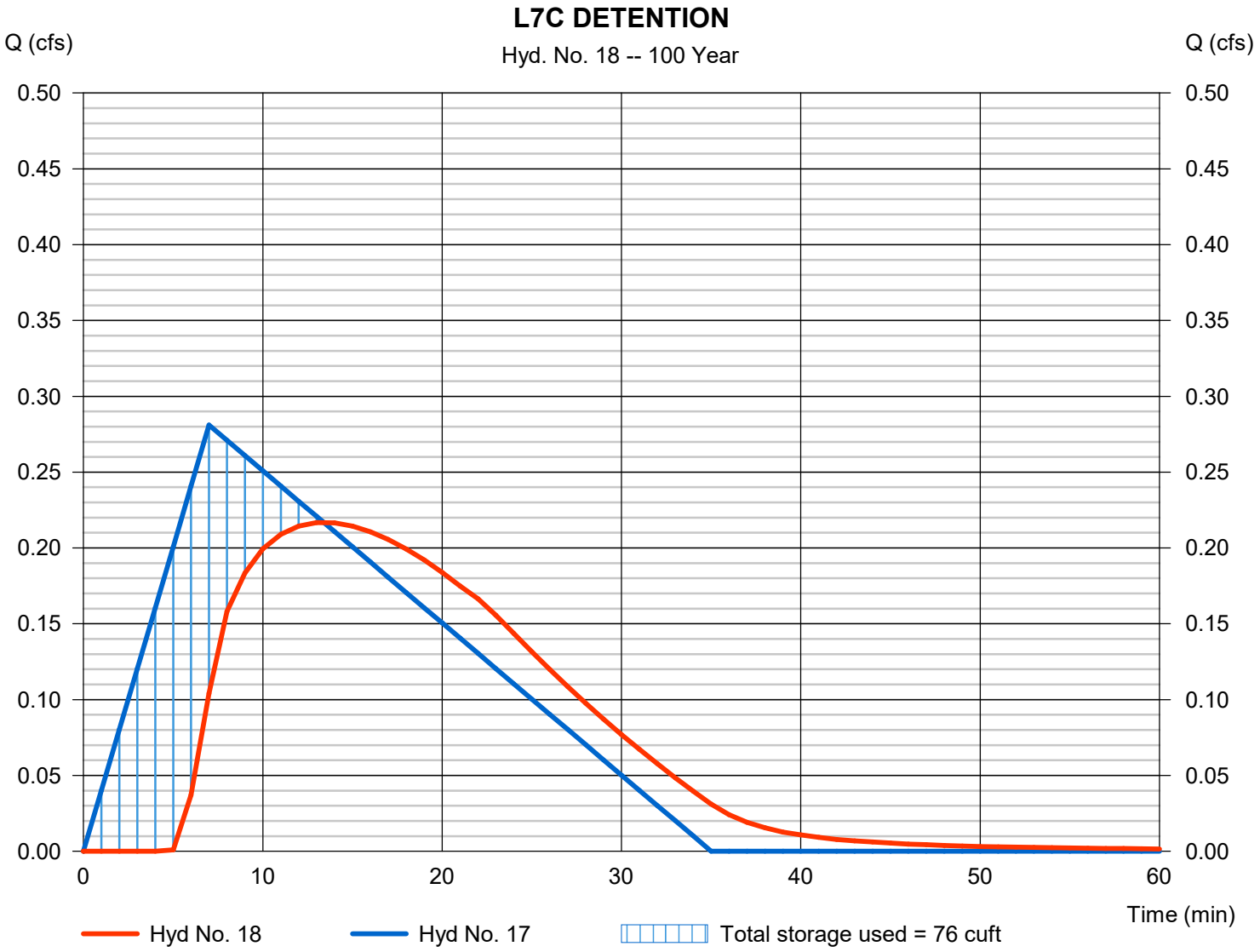
Hydrograph Report

Hyd. No. 18

L7C DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.217 cfs
Storm frequency	=	100 yrs	Time to peak	=	13 min
Time interval	=	1 min	Hyd. volume	=	265 cuft
Inflow hyd. No.	=	17 - L7C	Max. Elevation	=	100.68 ft
Reservoir name	=	BIO L7C	Max. Storage	=	76 cuft

Storage Indication method used.



Pond Report

Pond No. 6 - BIO L7C

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 1.90 ft, Barrel Len = 58.90 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	21	21
0.38	100.38	n/a	21	43
0.57	100.57	n/a	21	64
0.76	100.76	n/a	21	85
0.95	100.95	n/a	21	106
1.14	101.14	n/a	21	128
1.33	101.33	n/a	21	149
1.52	101.52	n/a	21	170
1.71	101.71	n/a	21	191
1.90	101.90	n/a	21	213

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	6.00	0.00	0.00
Span (in)	= 4.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.25	102.50	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) = 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

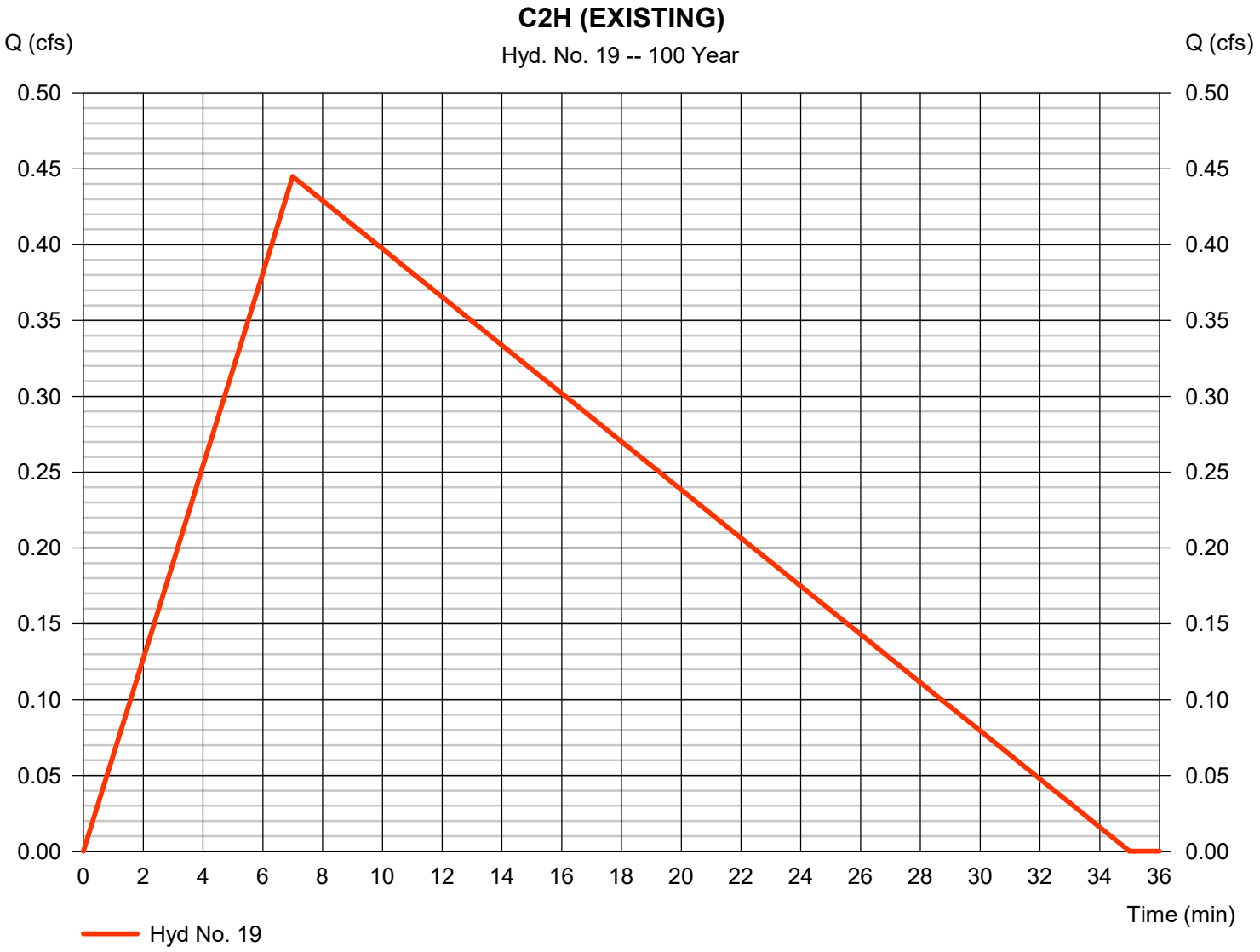
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	21	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	43	100.38	0.04 ic	0.00	---	---	---	---	---	---	---	---	0.039
0.57	64	100.57	0.17 ic	0.00	---	---	---	---	---	---	---	---	0.166
0.76	85	100.76	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.246
0.95	106	100.95	0.31 ic	0.00	---	---	---	---	---	---	---	---	0.307
1.14	128	101.14	0.36 ic	0.00	---	---	---	---	---	---	---	---	0.357
1.33	149	101.33	0.40 ic	0.00	---	---	---	---	---	---	---	---	0.402
1.52	170	101.52	0.44 ic	0.00	---	---	---	---	---	---	---	---	0.441
1.71	191	101.71	0.48 ic	0.00	---	---	---	---	---	---	---	---	0.478
1.90	213	101.90	0.51 ic	0.00	---	---	---	---	---	---	---	---	0.512

Hydrograph Report

Hyd. No. 19

C2H (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.445 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	467 cuft
Drainage area	=	0.160 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

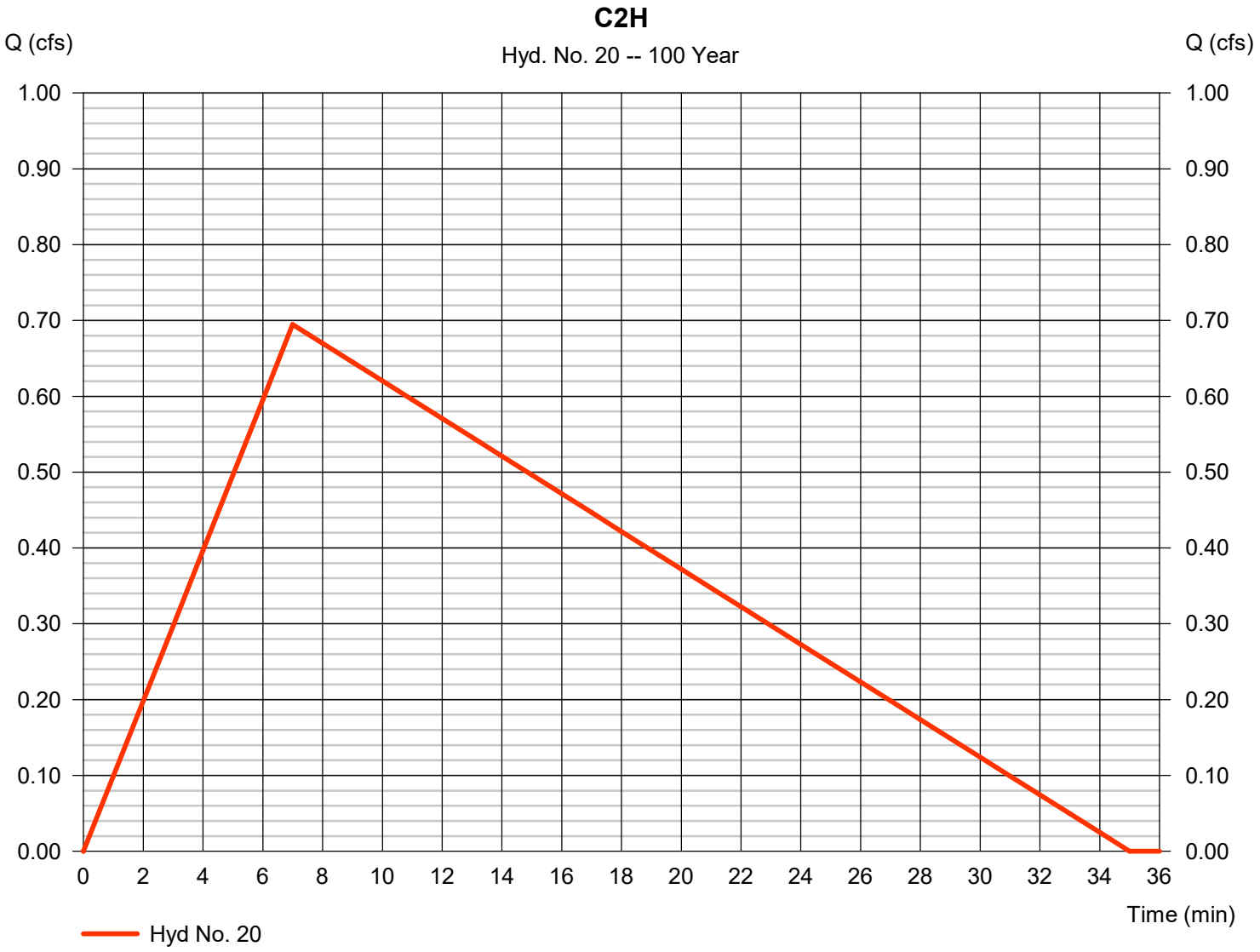


Hydrograph Report

Hyd. No. 20

C2H

Hydrograph type	=	Rational	Peak discharge	=	0.695 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	729 cuft
Drainage area	=	0.160 ac	Runoff coeff.	=	0.89
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



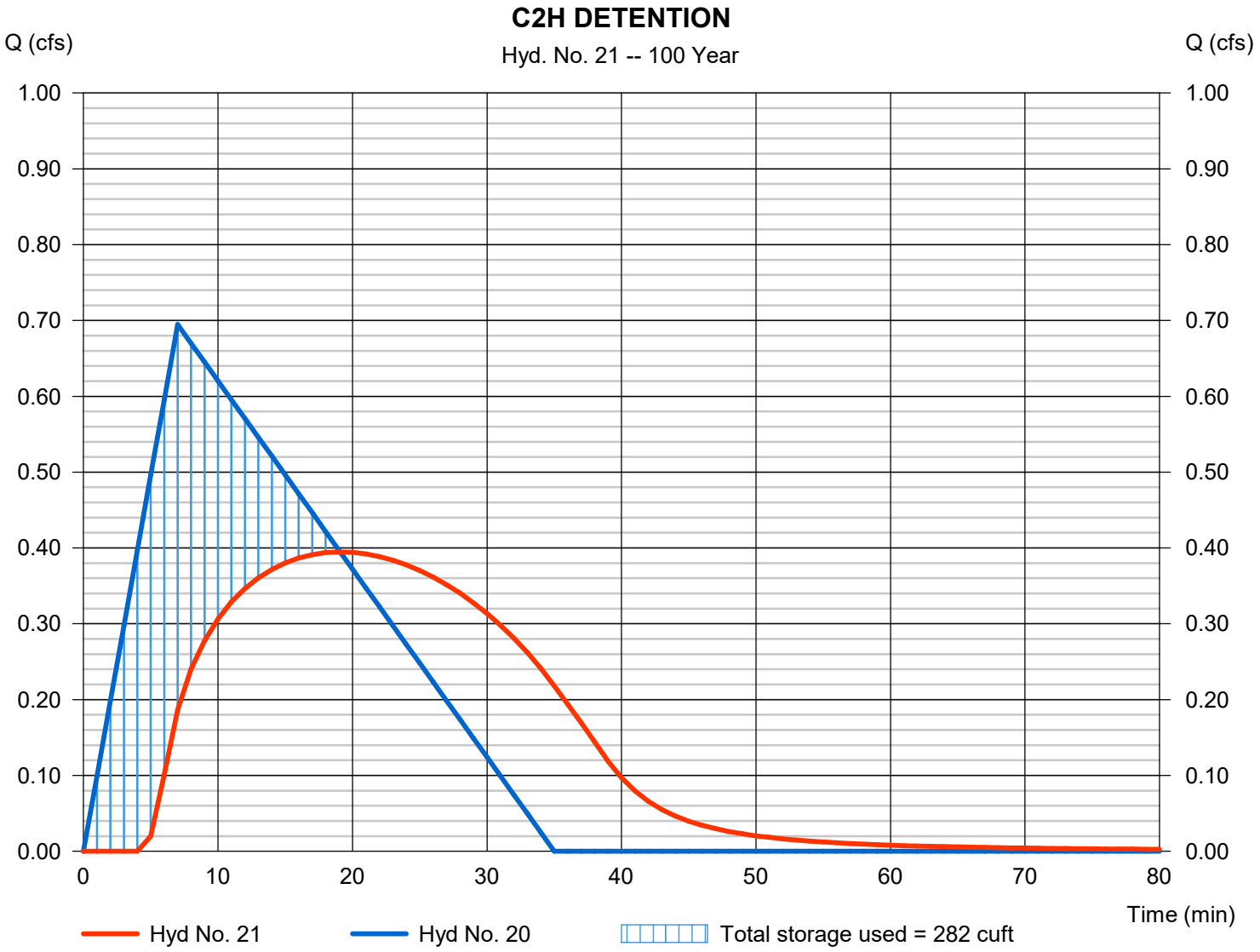
Hydrograph Report

Hyd. No. 21

C2H DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.395 cfs
Storm frequency	=	100 yrs	Time to peak	=	19 min
Time interval	=	1 min	Hyd. volume	=	671 cuft
Inflow hyd. No.	=	20 - C2H	Max. Elevation	=	101.30 ft
Reservoir name	=	BIO C2H	Max. Storage	=	282 cuft

Storage Indication method used.



Pond Report

Pond No. 7 - BIO C2H

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 9.50 ft, Barrel Len = 22.80 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	41	41
0.38	100.38	n/a	41	82
0.57	100.57	n/a	41	123
0.76	100.76	n/a	41	165
0.95	100.95	n/a	41	206
1.14	101.14	n/a	41	247
1.33	101.33	n/a	41	288
1.52	101.52	n/a	41	329
1.71	101.71	n/a	41	370
1.90	101.90	n/a	41	412

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	6.00	0.00	0.00
Span (in)	= 4.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.25	102.50	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) = 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	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	41	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	82	100.38	0.04 ic	0.00	---	---	---	---	---	---	---	---	0.039
0.57	123	100.57	0.17 ic	0.00	---	---	---	---	---	---	---	---	0.166
0.76	165	100.76	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.246
0.95	206	100.95	0.31 ic	0.00	---	---	---	---	---	---	---	---	0.307
1.14	247	101.14	0.36 ic	0.00	---	---	---	---	---	---	---	---	0.357
1.33	288	101.33	0.40 ic	0.00	---	---	---	---	---	---	---	---	0.402
1.52	329	101.52	0.44 ic	0.00	---	---	---	---	---	---	---	---	0.441
1.71	370	101.71	0.48 ic	0.00	---	---	---	---	---	---	---	---	0.478
1.90	412	101.90	0.51 ic	0.00	---	---	---	---	---	---	---	---	0.512

Hydrograph Report

Hyd. No. 22

C2I (EXISTING)

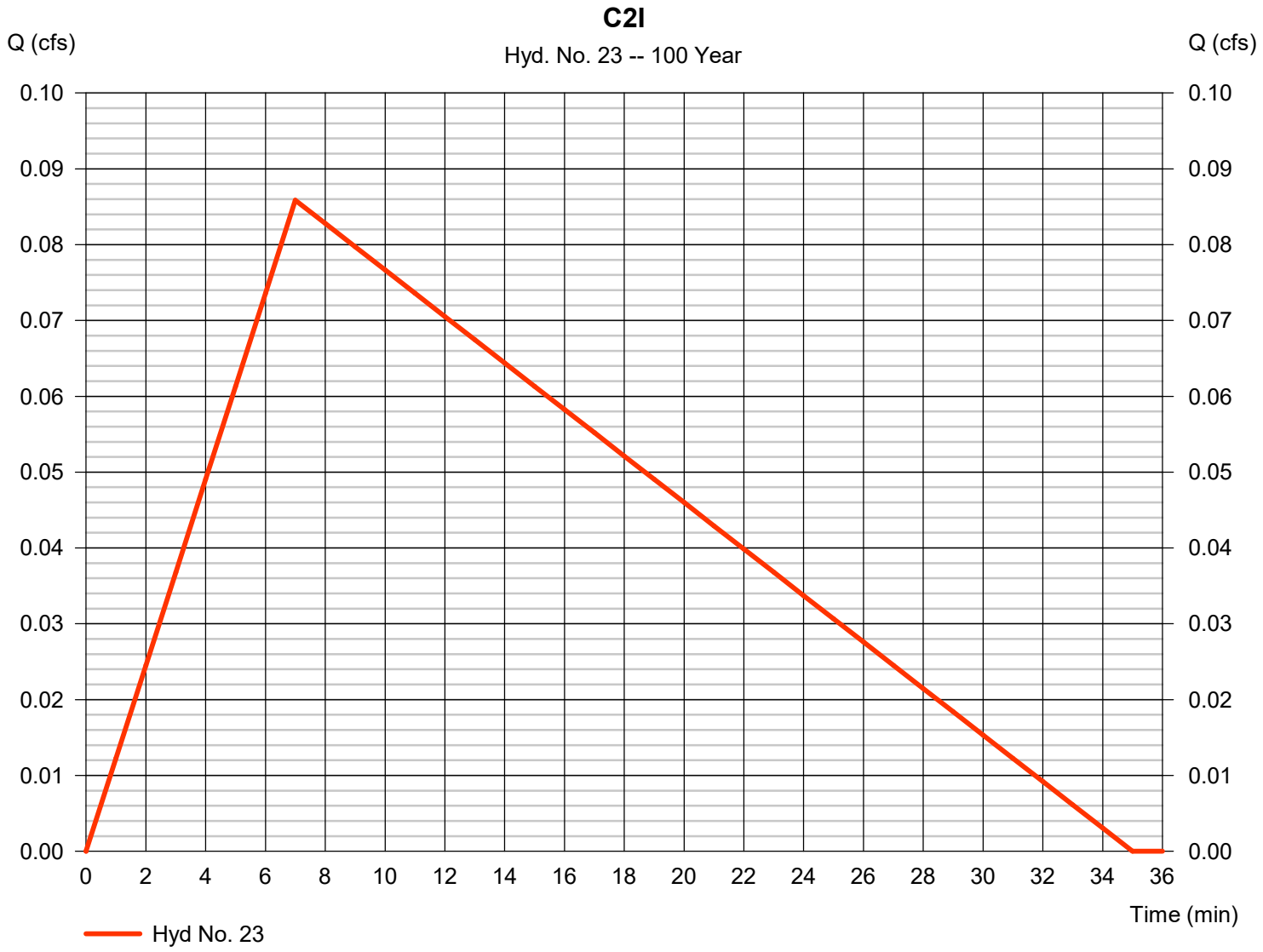
Hydrograph type	=	Rational	Peak discharge	=	0.056 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	58 cuft
Drainage area	=	0.020 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

Hydrograph Report

Hyd. No. 23

C2I

Hydrograph type	=	Rational	Peak discharge	=	0.086 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	90 cuft
Drainage area	=	0.020 ac	Runoff coeff.	=	0.88
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



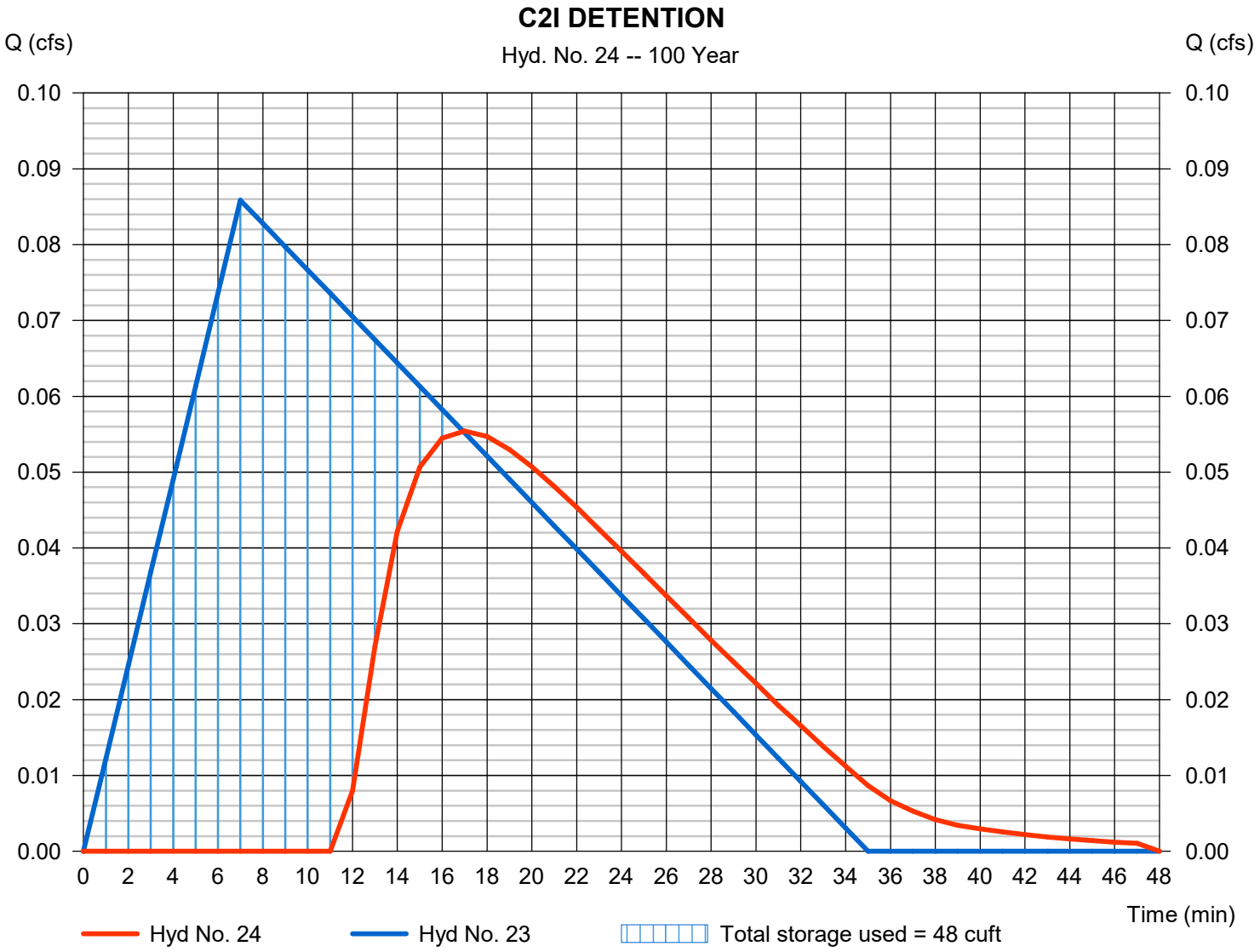
Hydrograph Report

Hyd. No. 24

C2I DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.055 cfs
Storm frequency	=	100 yrs	Time to peak	=	17 min
Time interval	=	1 min	Hyd. volume	=	51 cuft
Inflow hyd. No.	=	23 - C2I	Max. Elevation	=	100.88 ft
Reservoir name	=	BIO C2I	Max. Storage	=	48 cuft

Storage Indication method used.



Pond Report

Pond No. 8 - BIO C2I

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 5.70 ft, Barrel Len = 9.50 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	10	10
0.38	100.38	n/a	10	21
0.57	100.57	n/a	10	31
0.76	100.76	n/a	10	41
0.95	100.95	n/a	10	51
1.14	101.14	n/a	10	62
1.33	101.33	n/a	10	72
1.52	101.52	n/a	10	82
1.71	101.71	n/a	10	93
1.90	101.90	n/a	10	103

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 3.00	6.00	0.00	0.00
Span (in)	= 3.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.70	102.50	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) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

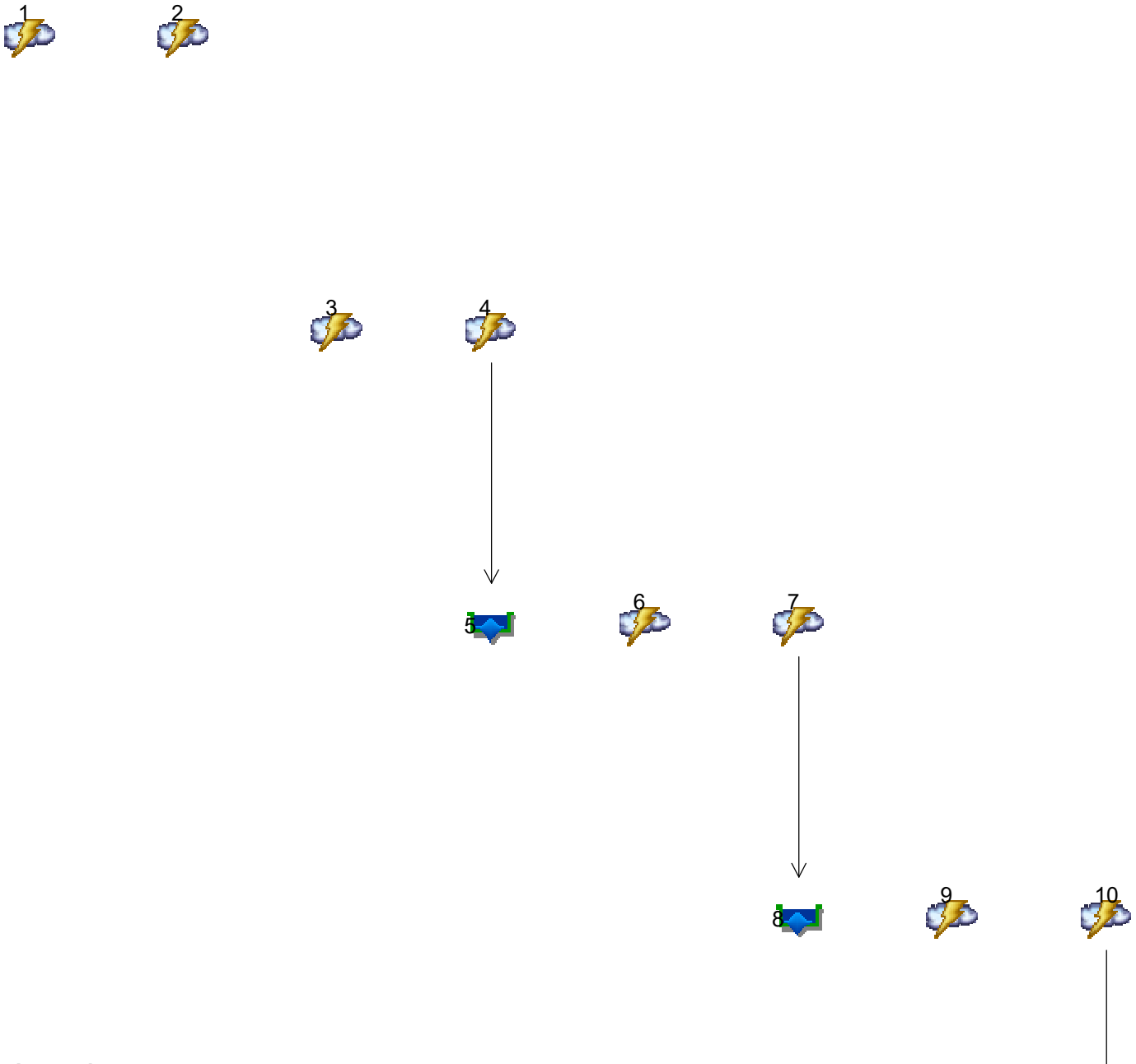
Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

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	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	10	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	21	100.38	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.57	31	100.57	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.76	41	100.76	0.01 ic	0.00	---	---	---	---	---	---	---	---	0.008
0.95	51	100.95	0.08 ic	0.00	---	---	---	---	---	---	---	---	0.084
1.14	62	101.14	0.13 ic	0.00	---	---	---	---	---	---	---	---	0.133
1.33	72	101.33	0.17 ic	0.00	---	---	---	---	---	---	---	---	0.168
1.52	82	101.52	0.20 ic	0.00	---	---	---	---	---	---	---	---	0.197
1.71	93	101.71	0.22 ic	0.00	---	---	---	---	---	---	---	---	0.222
1.90	103	101.90	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.245

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514



Legend

Hyd.	Origin	Description
1	Rational	C3A (EXISTING)
2	Rational	C3A
3	Rational	C3B (EXISTING)
4	Rational	C3B
5	Reservoir	C3B DETENTION
6	Rational	C3C-D (EXISTING)
7	Rational	C3C-D
8	Reservoir	C3C-D DETENTION
9	Rational	C3E-G (EXISTING)
10	Rational	C3E-G
11	Reservoir	C2E-G DETENTION

Hydraflow Table of Contents

C3 SUBSHEDS.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

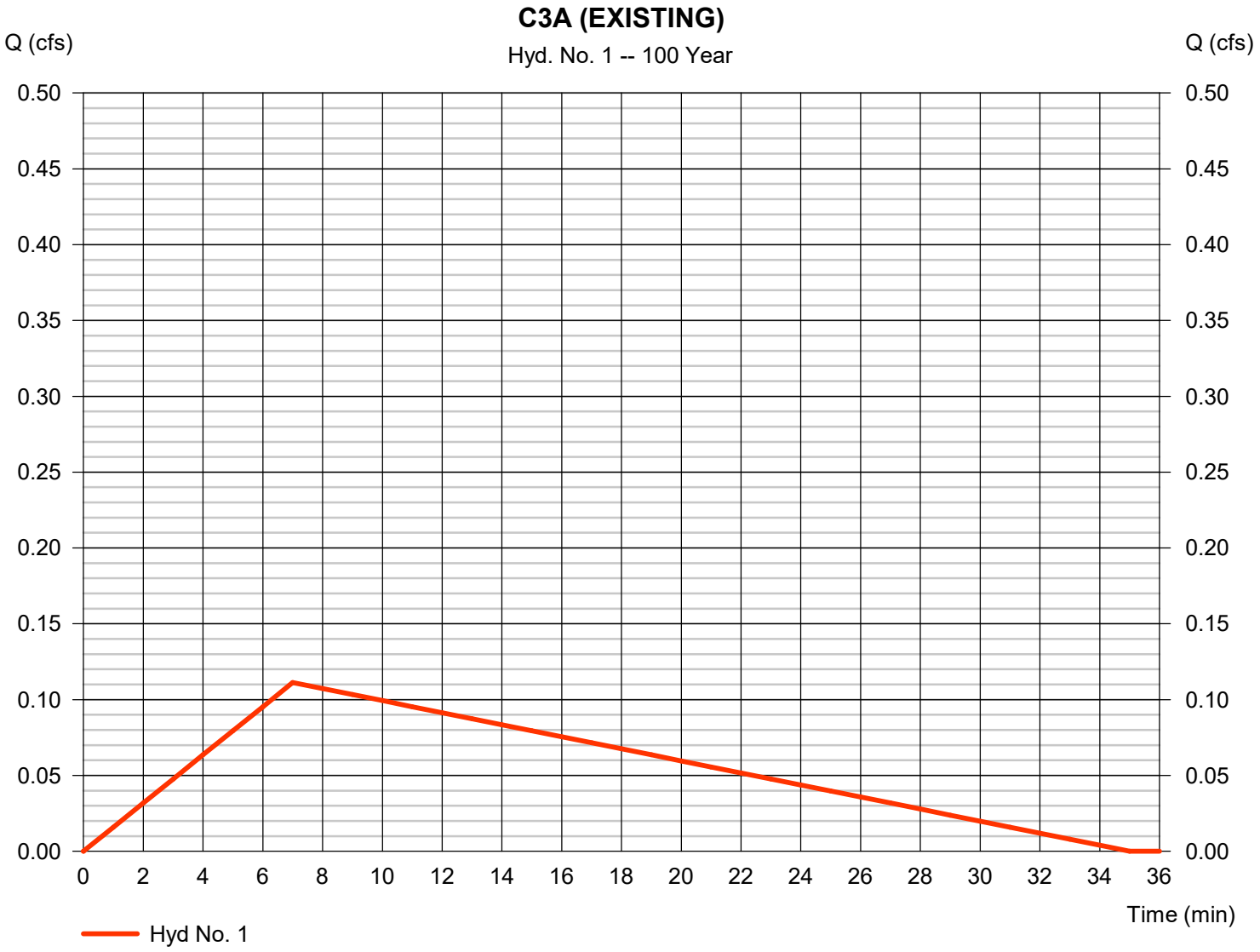
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	0.111	1	7	117	------	------	------	C3A (EXISTING)
2	Rational	0.168	1	7	176	------	------	------	C3A
3	Rational	0.139	1	7	146	------	------	------	C3B (EXISTING)
4	Rational	0.220	1	7	231	------	------	------	C3B
5	Reservoir	0.132	1	18	193	4	101.25	90.3	C3B DETENTION
6	Rational	0.473	1	7	496	------	------	------	C3C-D (EXISTING)
7	Rational	0.581	1	7	610	------	------	------	C3C-D
8	Reservoir	0.401	1	16	570	7	101.13	203	C3C-D DETENTION
9	Rational	0.445	1	7	467	------	------	------	C3E-G (EXISTING)
10	Rational	0.562	1	7	590	------	------	------	C3E-G
11	Reservoir	0.403	1	15	561	10	101.34	145	C2E-G DETENTION

Hydrograph Report

Hyd. No. 1

C3A (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.111 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	117 cuft
Drainage area	=	0.040 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

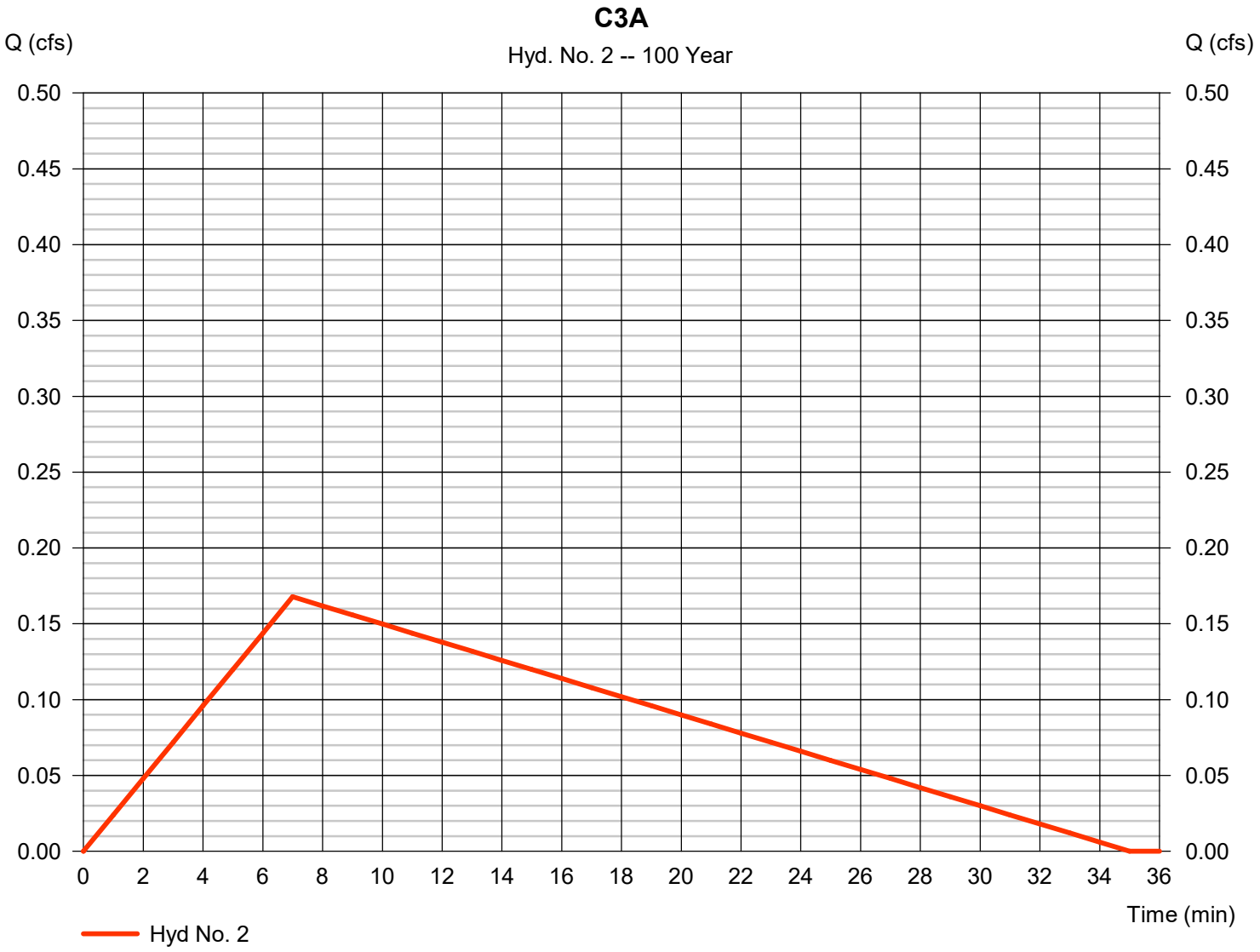


Hydrograph Report

Hyd. No. 2

C3A

Hydrograph type	=	Rational	Peak discharge	=	0.168 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	176 cuft
Drainage area	=	0.040 ac	Runoff coeff.	=	0.86
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

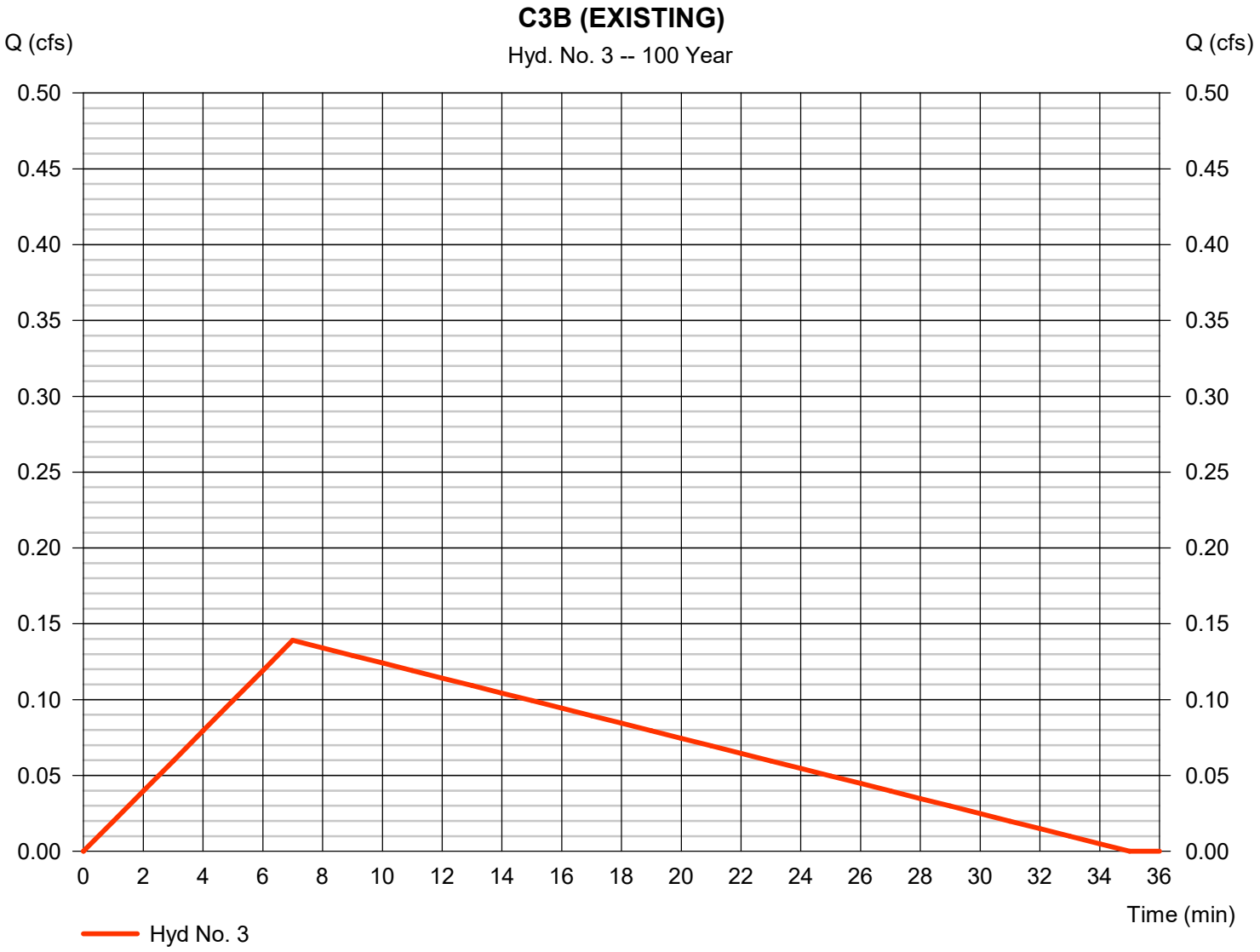


Hydrograph Report

Hyd. No. 3

C3B (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.139 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	146 cuft
Drainage area	=	0.050 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

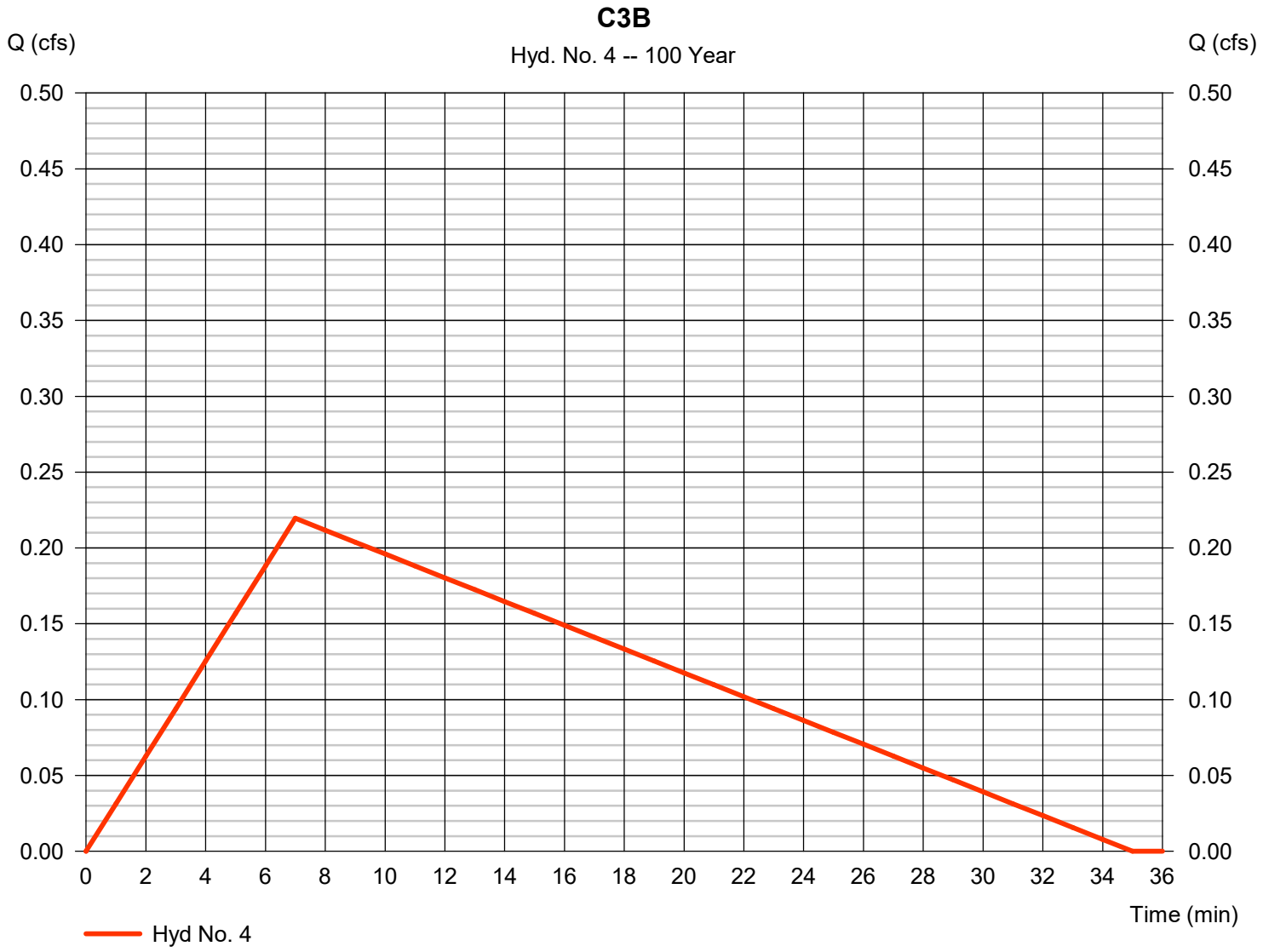


Hydrograph Report

Hyd. No. 4

C3B

Hydrograph type	=	Rational	Peak discharge	=	0.220 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	231 cuft
Drainage area	=	0.050 ac	Runoff coeff.	=	0.9
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



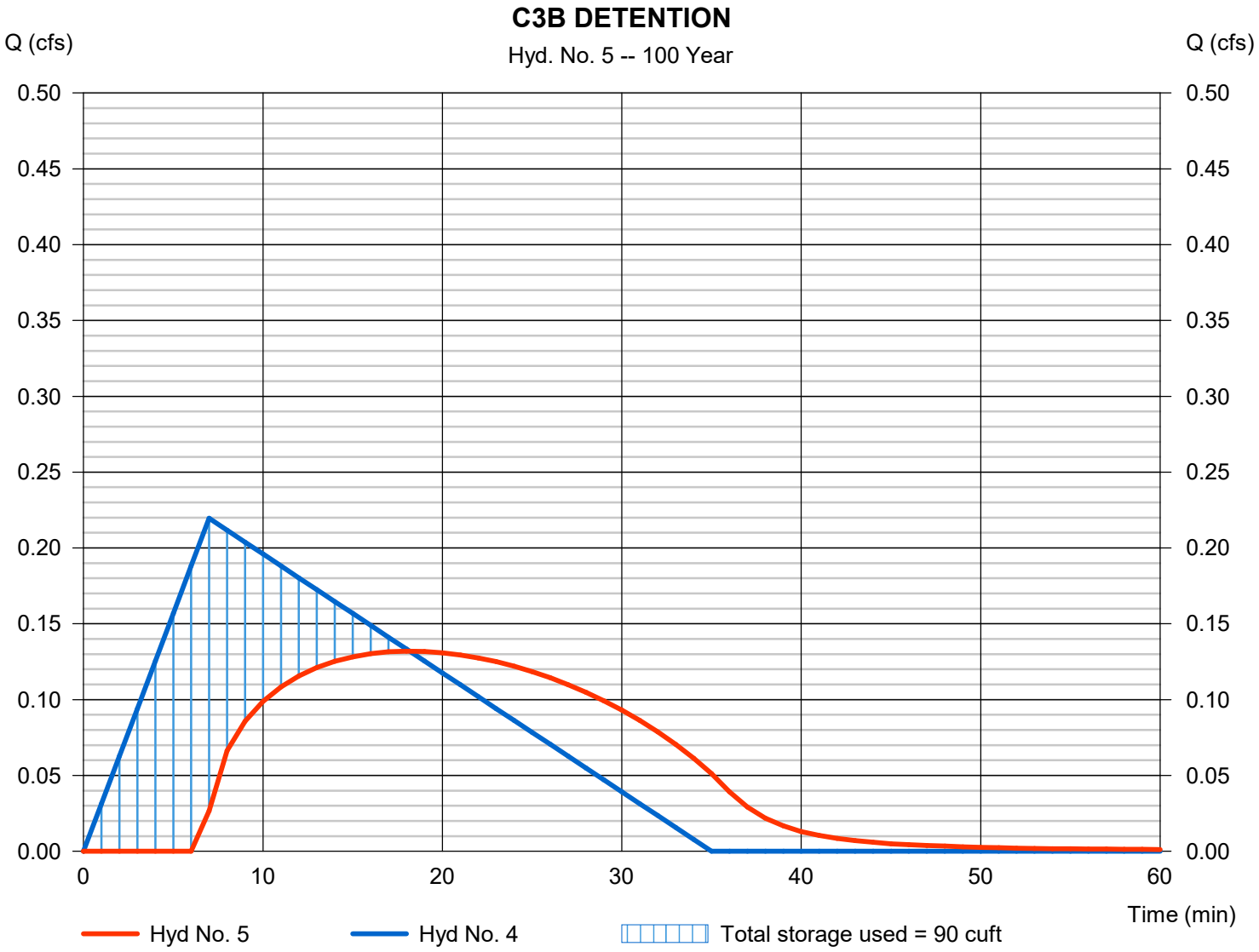
Hydrograph Report

Hyd. No. 5

C3B DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.132 cfs
Storm frequency	=	100 yrs	Time to peak	=	18 min
Time interval	=	1 min	Hyd. volume	=	193 cuft
Inflow hyd. No.	=	4 - C3B	Max. Elevation	=	101.25 ft
Reservoir name	=	BIO C3B	Max. Storage	=	90 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - BIO C3B

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 3.80 ft, Barrel Len = 19.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	14	14
0.38	100.38	n/a	14	27
0.57	100.57	n/a	14	41
0.76	100.76	n/a	14	55
0.95	100.95	n/a	14	69
1.14	101.14	n/a	14	82
1.33	101.33	n/a	14	96
1.52	101.52	n/a	14	110
1.71	101.71	n/a	14	123
1.90	101.90	n/a	14	137

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 2.50	6.00	0.00	0.00
Span (in)	= 2.50	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.50	102.50	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) = 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

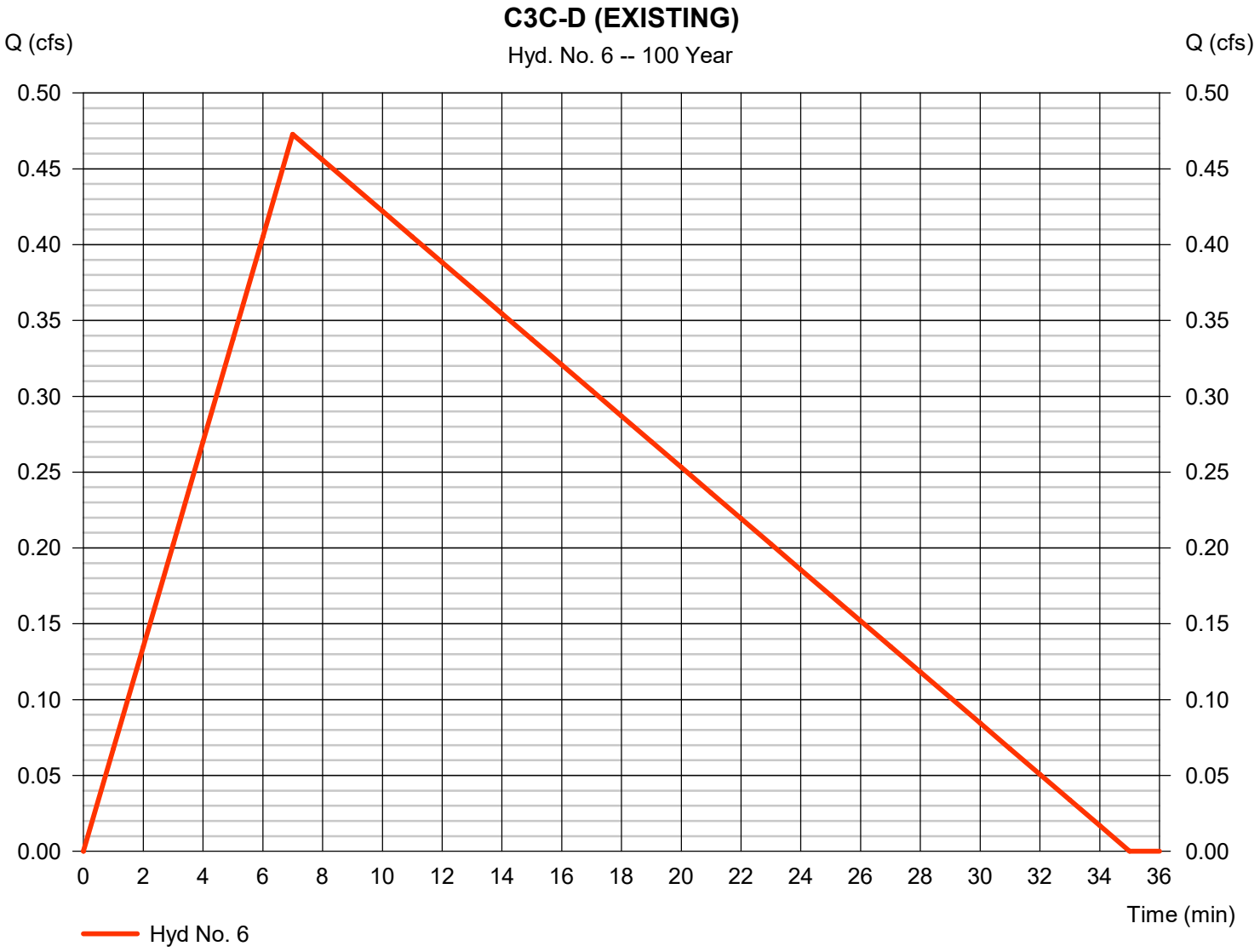
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	14	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	27	100.38	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.57	41	100.57	0.01 ic	0.00	---	---	---	---	---	---	---	---	0.009
0.76	55	100.76	0.06 ic	0.00	---	---	---	---	---	---	---	---	0.065
0.95	69	100.95	0.10 ic	0.00	---	---	---	---	---	---	---	---	0.097
1.14	82	101.14	0.12 ic	0.00	---	---	---	---	---	---	---	---	0.120
1.33	96	101.33	0.14 ic	0.00	---	---	---	---	---	---	---	---	0.140
1.52	110	101.52	0.16 ic	0.00	---	---	---	---	---	---	---	---	0.157
1.71	123	101.71	0.17 ic	0.00	---	---	---	---	---	---	---	---	0.173
1.90	137	101.90	0.19 ic	0.00	---	---	---	---	---	---	---	---	0.187

Hydrograph Report

Hyd. No. 6

C3C-D (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.473 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	496 cuft
Drainage area	=	0.170 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

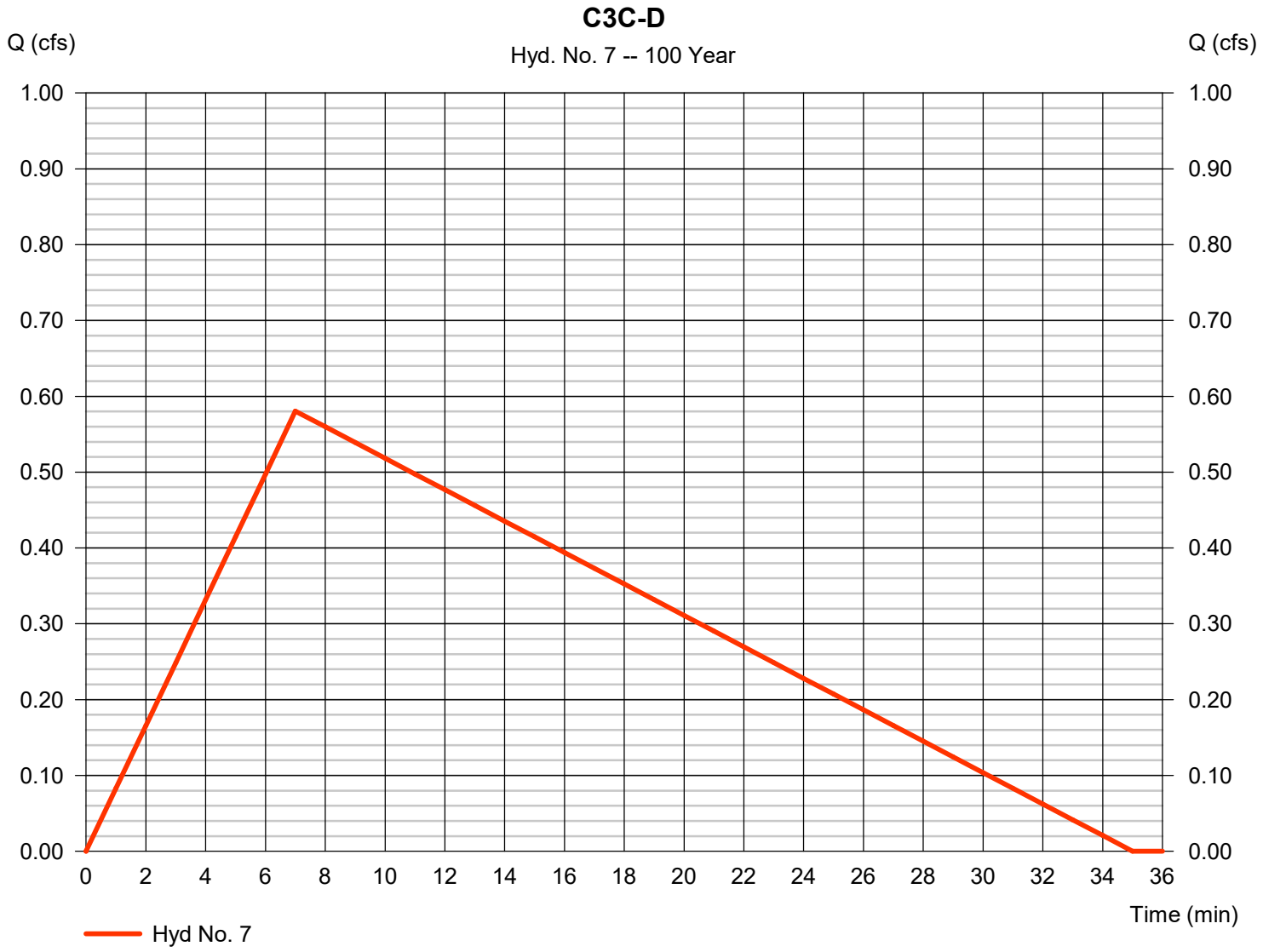


Hydrograph Report

Hyd. No. 7

C3C-D

Hydrograph type	=	Rational	Peak discharge	=	0.581 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	610 cuft
Drainage area	=	0.170 ac	Runoff coeff.	=	0.7
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



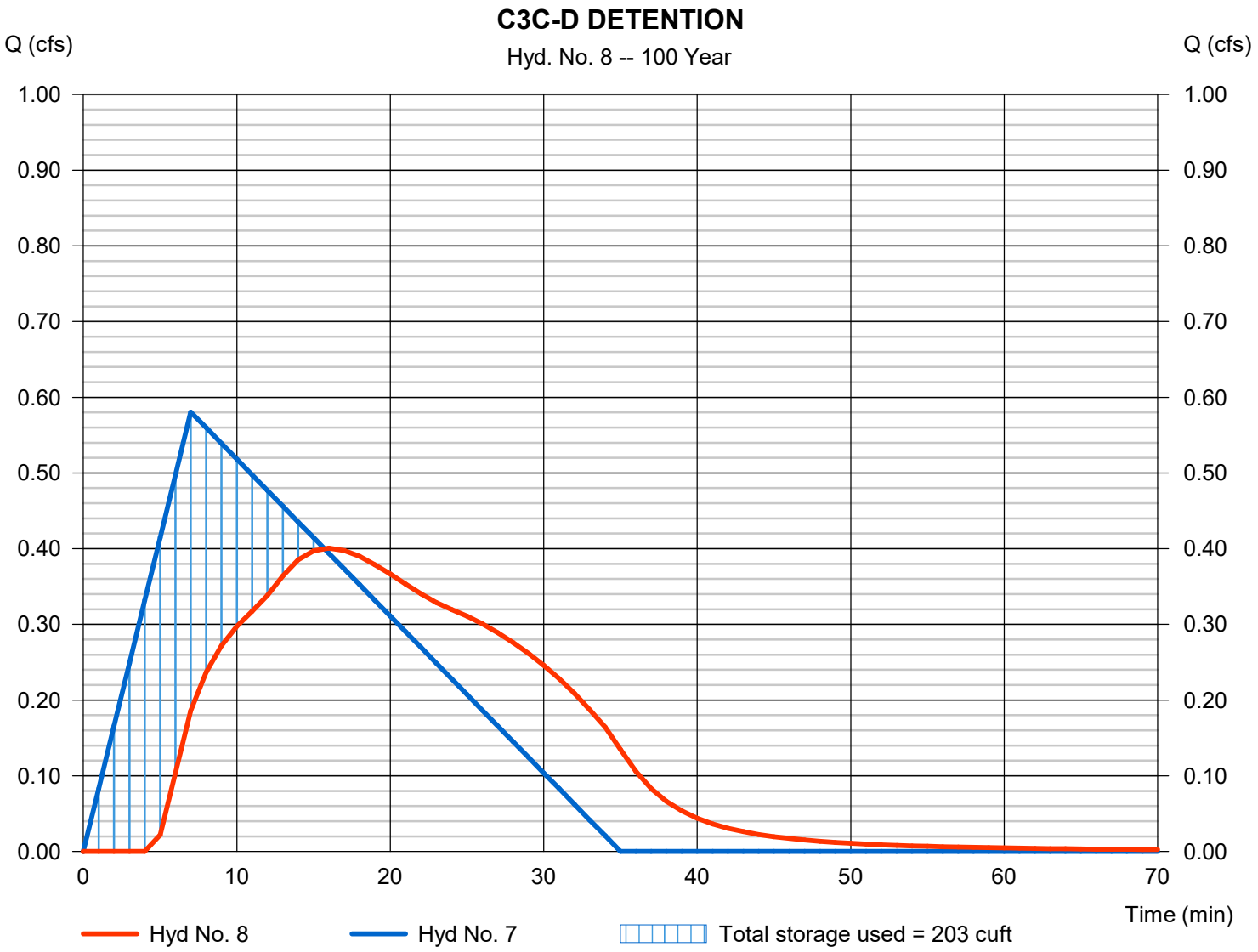
Hydrograph Report

Hyd. No. 8

C3C-D DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.401 cfs
Storm frequency	=	100 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	570 cuft
Inflow hyd. No.	=	7 - C3C-D	Max. Elevation	=	101.13 ft
Reservoir name	=	BIO C3C-D	Max. Storage	=	203 cuft

Storage Indication method used.



Pond Report

Pond No. 3 - BIO C3C-D

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 1.90 ft, Barrel Len = 95.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	34	34
0.38	100.38	n/a	34	69
0.57	100.57	n/a	34	103
0.76	100.76	n/a	34	137
0.95	100.95	n/a	34	172
1.14	101.14	n/a	34	206
1.33	101.33	n/a	34	240
1.52	101.52	n/a	34	274
1.71	101.71	n/a	34	309
1.90	101.90	n/a	34	343

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	6.00	0.00	0.00
Span (in)	= 4.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.25	101.00	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) = 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

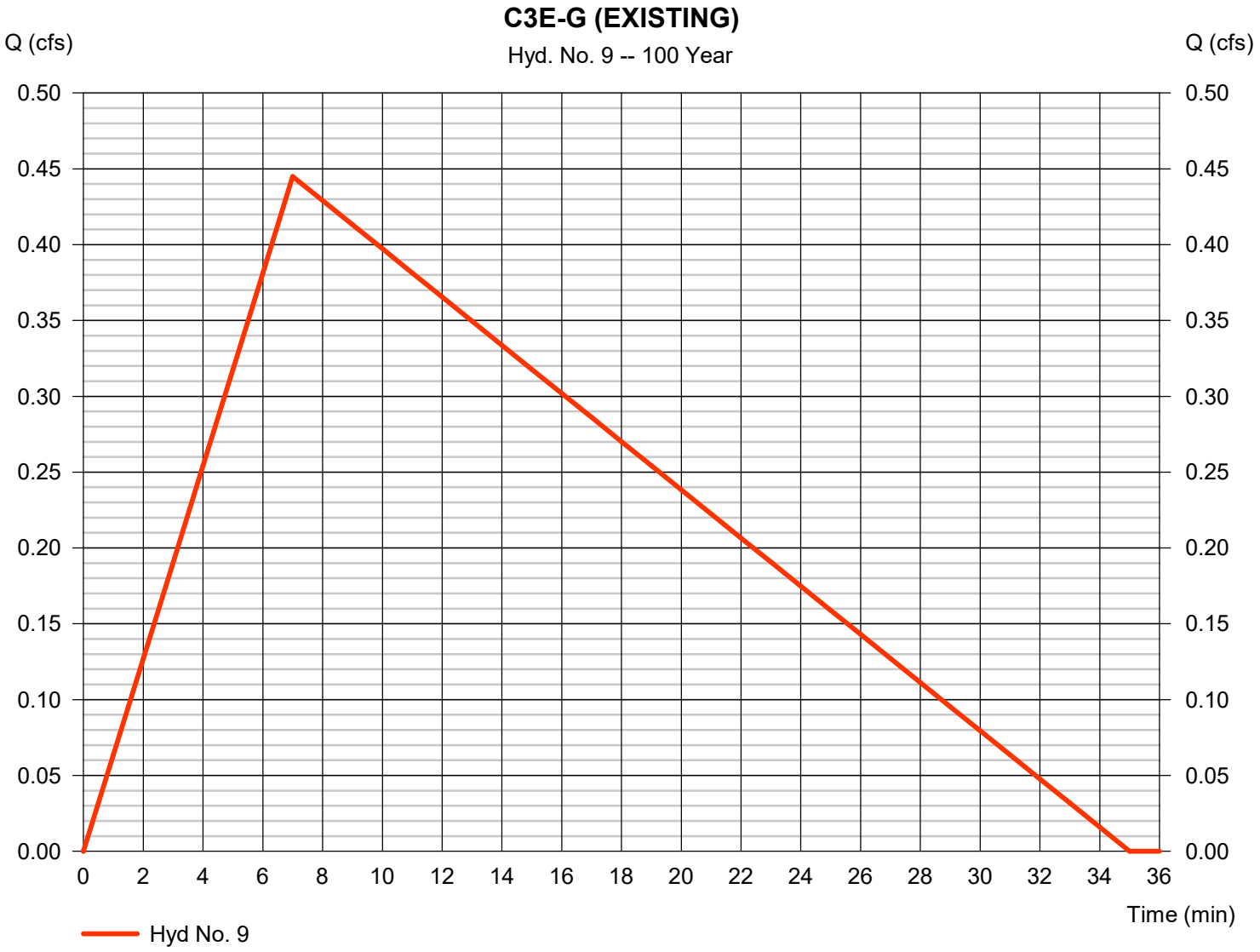
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	34	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	69	100.38	0.04 ic	0.00	---	---	---	---	---	---	---	---	0.039
0.57	103	100.57	0.17 ic	0.00	---	---	---	---	---	---	---	---	0.166
0.76	137	100.76	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.246
0.95	172	100.95	0.31 ic	0.00	---	---	---	---	---	---	---	---	0.307
1.14	206	101.14	0.36 ic	0.06 ic	---	---	---	---	---	---	---	---	0.415
1.33	240	101.33	0.40 ic	0.27 ic	---	---	---	---	---	---	---	---	0.671
1.52	274	101.52	0.44 ic	0.49 ic	---	---	---	---	---	---	---	---	0.933
1.71	309	101.71	0.48 ic	0.64 ic	---	---	---	---	---	---	---	---	1.119
1.90	343	101.90	0.51 ic	0.76 ic	---	---	---	---	---	---	---	---	1.274

Hydrograph Report

Hyd. No. 9

C3E-G (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.445 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	467 cuft
Drainage area	=	0.160 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

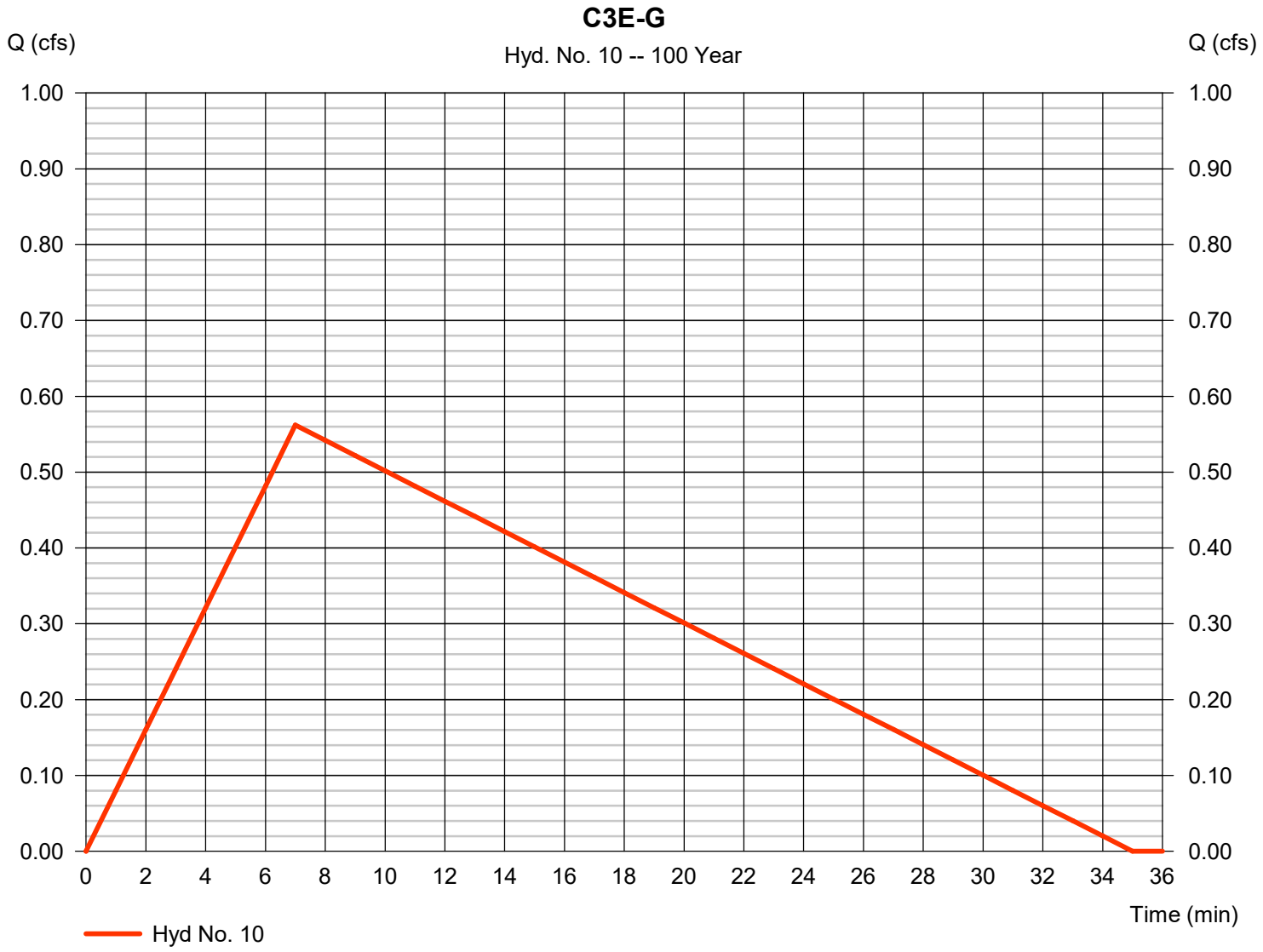


Hydrograph Report

Hyd. No. 10

C3E-G

Hydrograph type	=	Rational	Peak discharge	=	0.562 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	590 cuft
Drainage area	=	0.160 ac	Runoff coeff.	=	0.72
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



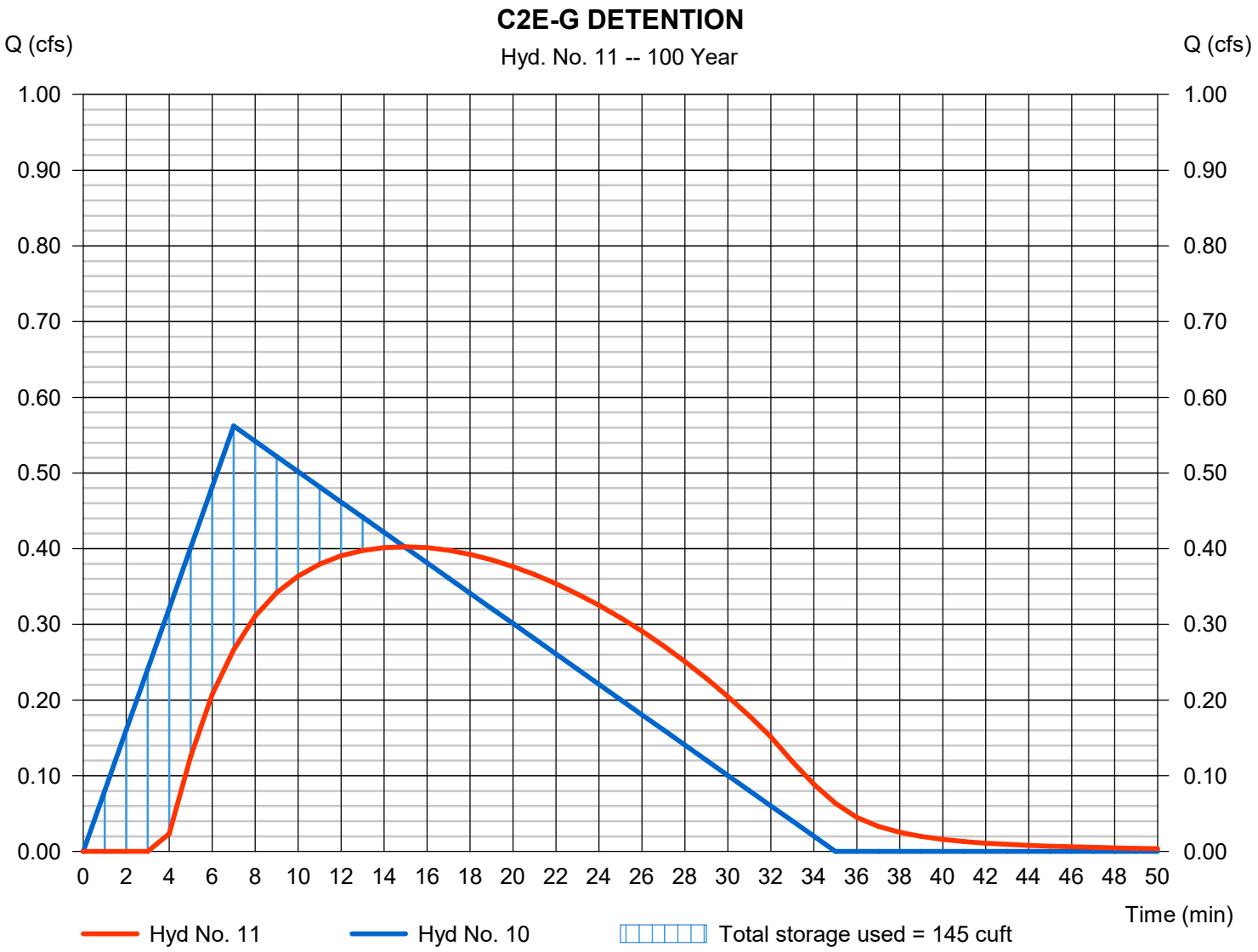
Hydrograph Report

Hyd. No. 11

C2E-G DETENTION

Hydrograph type	= Reservoir	Peak discharge	= 0.403 cfs
Storm frequency	= 100 yrs	Time to peak	= 15 min
Time interval	= 1 min	Hyd. volume	= 561 cuft
Inflow hyd. No.	= 10 - C3E-G	Max. Elevation	= 101.34 ft
Reservoir name	= BIO C3E-G	Max. Storage	= 145 cuft

Storage Indication method used.



Pond Report

Pond No. 4 - BIO C3E-G

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 5.70 ft, Barrel Len = 19.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	21	21
0.38	100.38	n/a	21	41
0.57	100.57	n/a	21	62
0.76	100.76	n/a	21	82
0.95	100.95	n/a	21	103
1.14	101.14	n/a	21	123
1.33	101.33	n/a	21	144
1.52	101.52	n/a	21	165
1.71	101.71	n/a	21	185
1.90	101.90	n/a	21	206

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	6.00	0.00	0.00
Span (in)	= 4.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.25	102.50	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) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

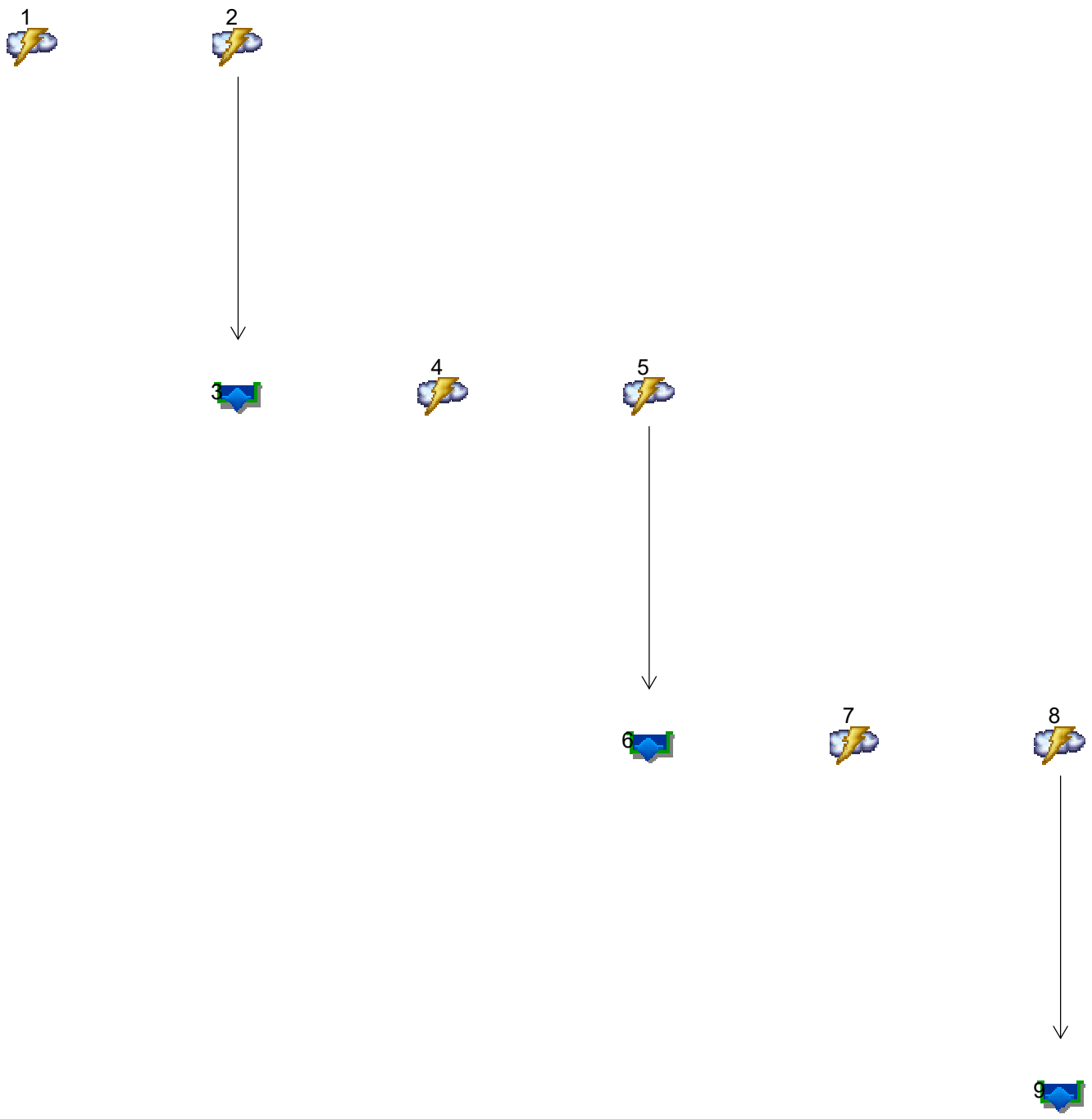
Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

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	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	21	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	41	100.38	0.04 ic	0.00	---	---	---	---	---	---	---	---	0.039
0.57	62	100.57	0.17 ic	0.00	---	---	---	---	---	---	---	---	0.166
0.76	82	100.76	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.246
0.95	103	100.95	0.31 ic	0.00	---	---	---	---	---	---	---	---	0.307
1.14	123	101.14	0.36 ic	0.00	---	---	---	---	---	---	---	---	0.357
1.33	144	101.33	0.40 ic	0.00	---	---	---	---	---	---	---	---	0.402
1.52	165	101.52	0.44 ic	0.00	---	---	---	---	---	---	---	---	0.441
1.71	185	101.71	0.48 ic	0.00	---	---	---	---	---	---	---	---	0.478
1.90	206	101.90	0.51 ic	0.00	---	---	---	---	---	---	---	---	0.512

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514



Legend

Hyd.	Origin	Description
1	Rational	D1A (EXISTING)
2	Rational	D1A
3	Reservoir	D1A DETENTION
4	Rational	D1B (EXISTING)
5	Rational	D1B
6	Reservoir	D1B DETENTION
7	Rational	D1C (EXISTING)
8	Rational	D1C
9	Reservoir	D1C DETENTION

Hydraflow Table of Contents

D1 SUBSHEDS.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

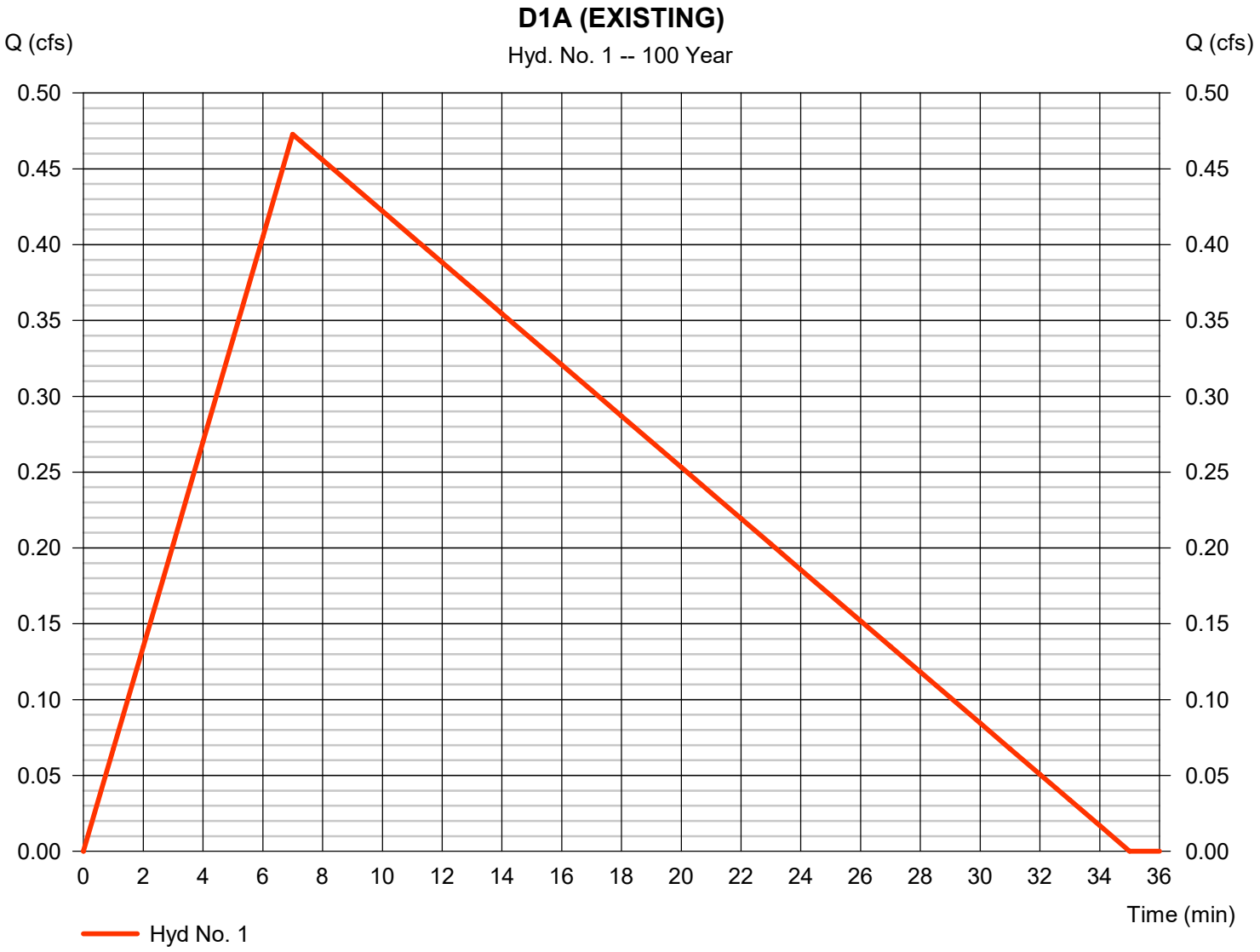
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	0.473	1	7	496	------	------	------	D1A (EXISTING)
2	Rational	0.531	1	7	557	------	------	------	D1A
3	Reservoir	0.359	1	16	519	2	101.15	163	D1A DETENTION
4	Rational	0.195	1	7	204	------	------	------	D1B (EXISTING)
5	Rational	0.307	1	7	323	------	------	------	D1B
6	Reservoir	0.190	1	18	293	5	101.02	112	D1B DETENTION
7	Rational	0.139	1	7	146	------	------	------	D1C (EXISTING)
8	Rational	0.212	1	7	223	------	------	------	D1C
9	Reservoir	0.134	1	17	172	8	100.95	92.1	D1C DETENTION

Hydrograph Report

Hyd. No. 1

D1A (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.473 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	496 cuft
Drainage area	=	0.170 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

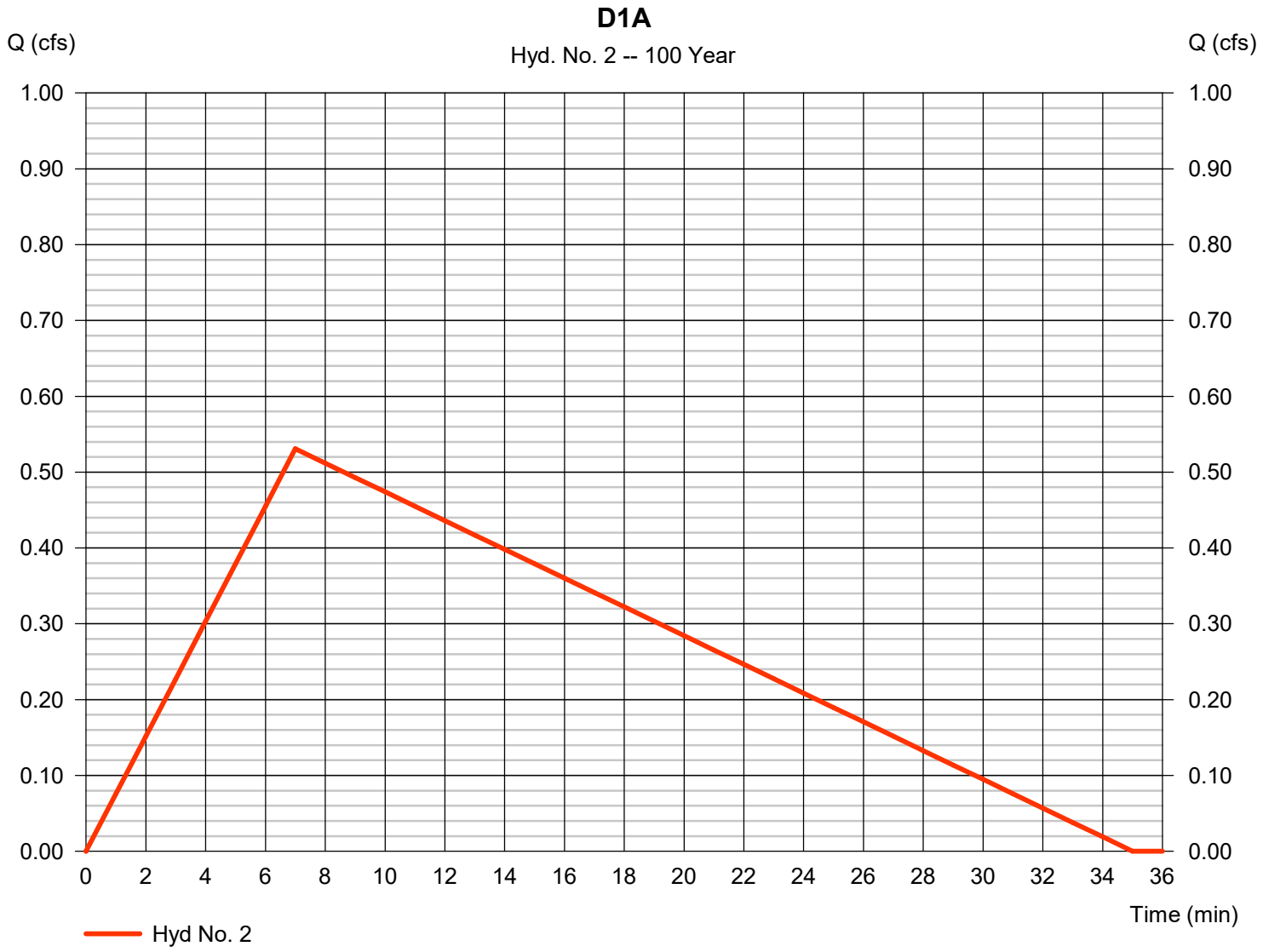


Hydrograph Report

Hyd. No. 2

D1A

Hydrograph type	=	Rational	Peak discharge	=	0.531 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	557 cuft
Drainage area	=	0.170 ac	Runoff coeff.	=	0.64
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



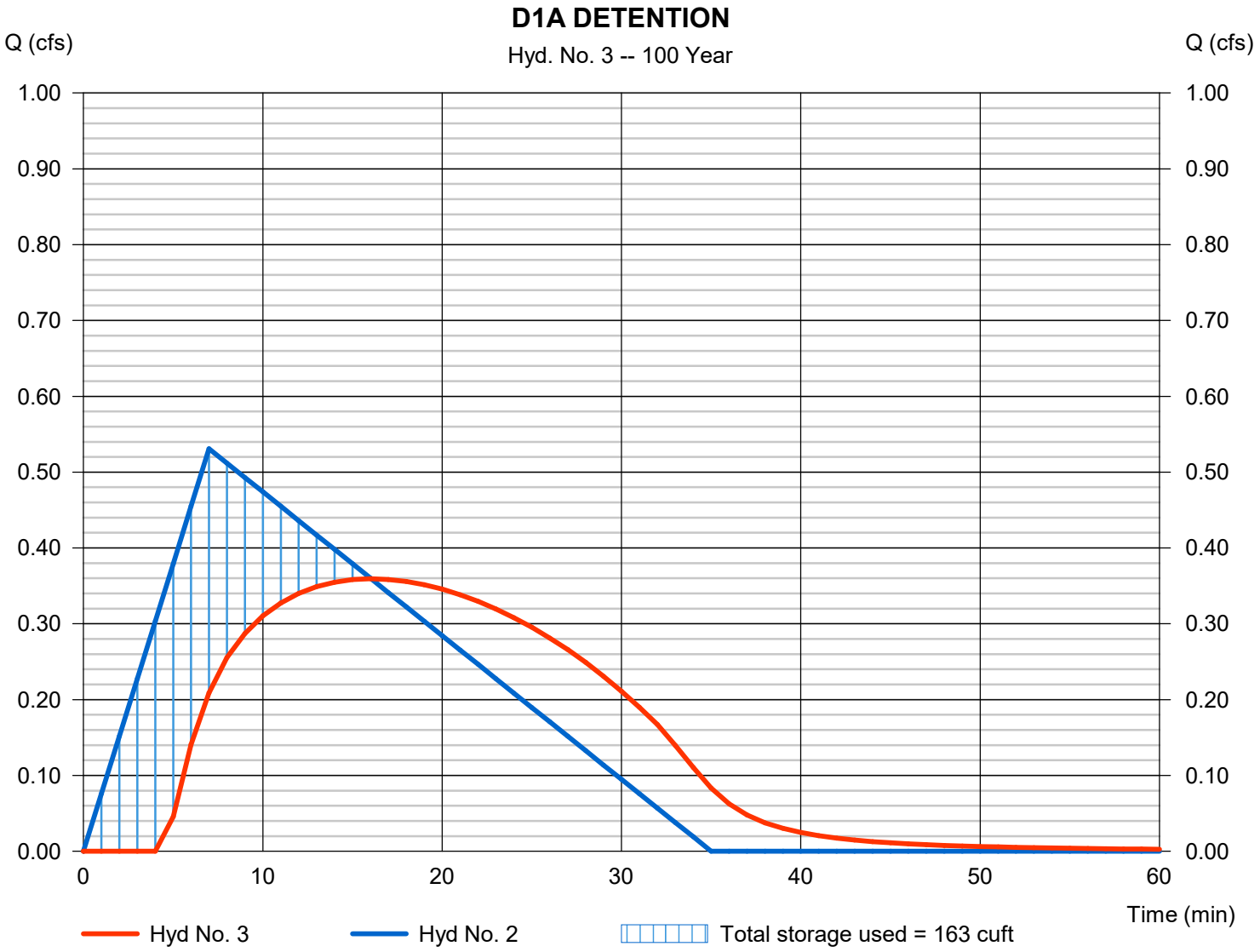
Hydrograph Report

Hyd. No. 3

D1A DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.359 cfs
Storm frequency	=	100 yrs	Time to peak	=	16 min
Time interval	=	1 min	Hyd. volume	=	519 cuft
Inflow hyd. No.	=	2 - D1A	Max. Elevation	=	101.15 ft
Reservoir name	=	BIO D1A	Max. Storage	=	163 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BIO D1A

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 5.80 ft, Barrel Len = 24.40 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	27	27
0.38	100.38	n/a	27	54
0.57	100.57	n/a	27	81
0.76	100.76	n/a	27	108
0.95	100.95	n/a	27	134
1.14	101.14	n/a	27	161
1.33	101.33	n/a	27	188
1.52	101.52	n/a	27	215
1.71	101.71	n/a	27	242
1.90	101.90	n/a	27	269

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	6.00	0.00	0.00
Span (in)	= 4.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.25	102.50	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) = 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	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	27	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	54	100.38	0.04 ic	0.00	---	---	---	---	---	---	---	---	0.039
0.57	81	100.57	0.17 ic	0.00	---	---	---	---	---	---	---	---	0.166
0.76	108	100.76	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.246
0.95	134	100.95	0.31 ic	0.00	---	---	---	---	---	---	---	---	0.307
1.14	161	101.14	0.36 ic	0.00	---	---	---	---	---	---	---	---	0.357
1.33	188	101.33	0.40 ic	0.00	---	---	---	---	---	---	---	---	0.402
1.52	215	101.52	0.44 ic	0.00	---	---	---	---	---	---	---	---	0.441
1.71	242	101.71	0.48 ic	0.00	---	---	---	---	---	---	---	---	0.478
1.90	269	101.90	0.51 ic	0.00	---	---	---	---	---	---	---	---	0.512

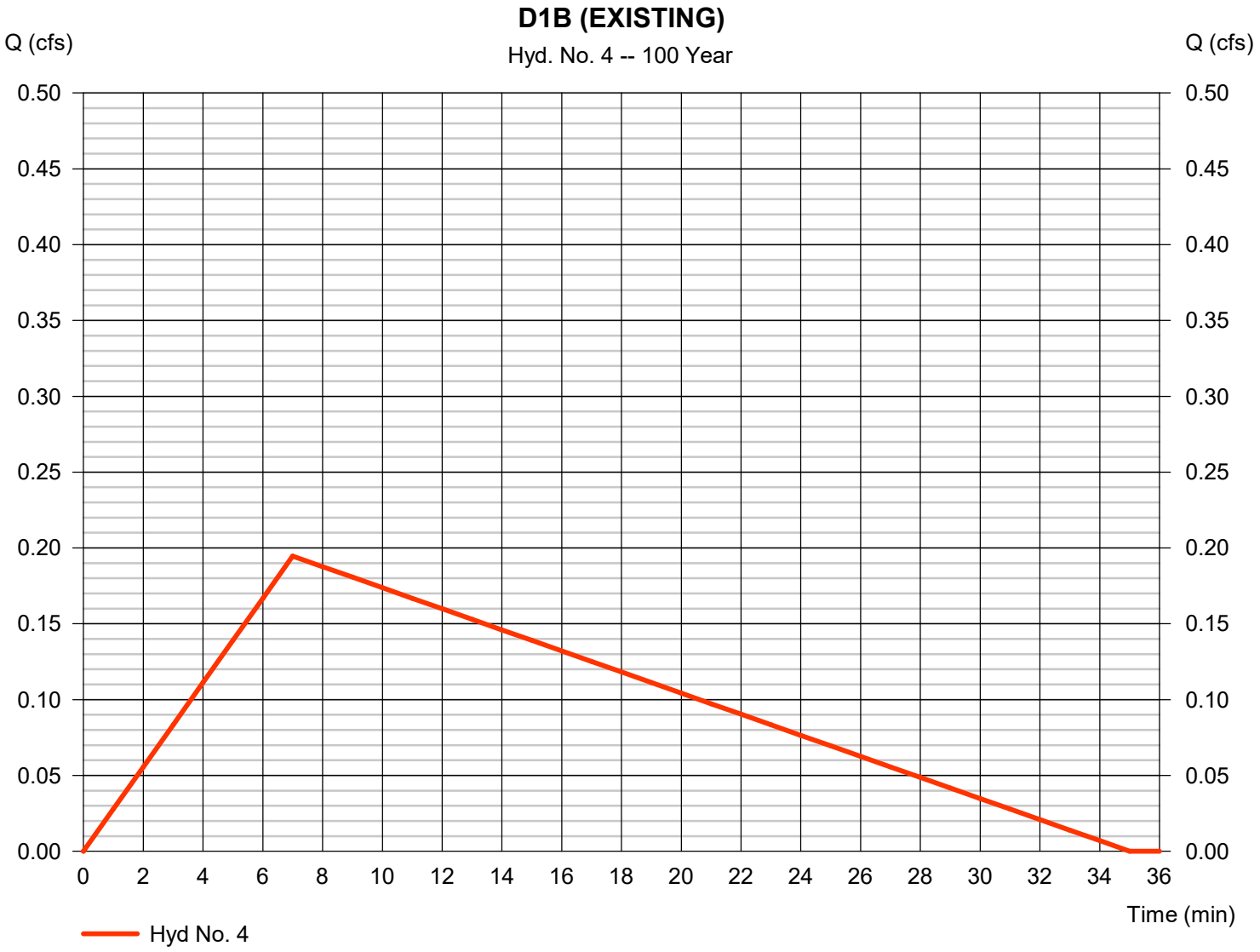
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hyd. No. 4

D1B (EXISTING)

Hydrograph type	= Rational	Peak discharge	= 0.195 cfs
Storm frequency	= 100 yrs	Time to peak	= 7 min
Time interval	= 1 min	Hyd. volume	= 204 cuft
Drainage area	= 0.070 ac	Runoff coeff.	= 0.57
Intensity	= 4.878 in/hr	Tc by User	= 7.00 min
IDF Curve	= Fairfax.idf	Asc/Rec limb fact	= 1/4



Hydrograph Report

Hyd. No. 5

D1B

Hydrograph type	= Rational	Peak discharge	= 0.307 cfs
Storm frequency	= 100 yrs	Time to peak	= 7 min
Time interval	= 1 min	Hyd. volume	= 323 cuft
Drainage area	= 0.070 ac	Runoff coeff.	= 0.9
Intensity	= 4.878 in/hr	Tc by User	= 7.00 min
IDF Curve	= Fairfax.idf	Asc/Rec limb fact	= 1/4

Hydrograph Report

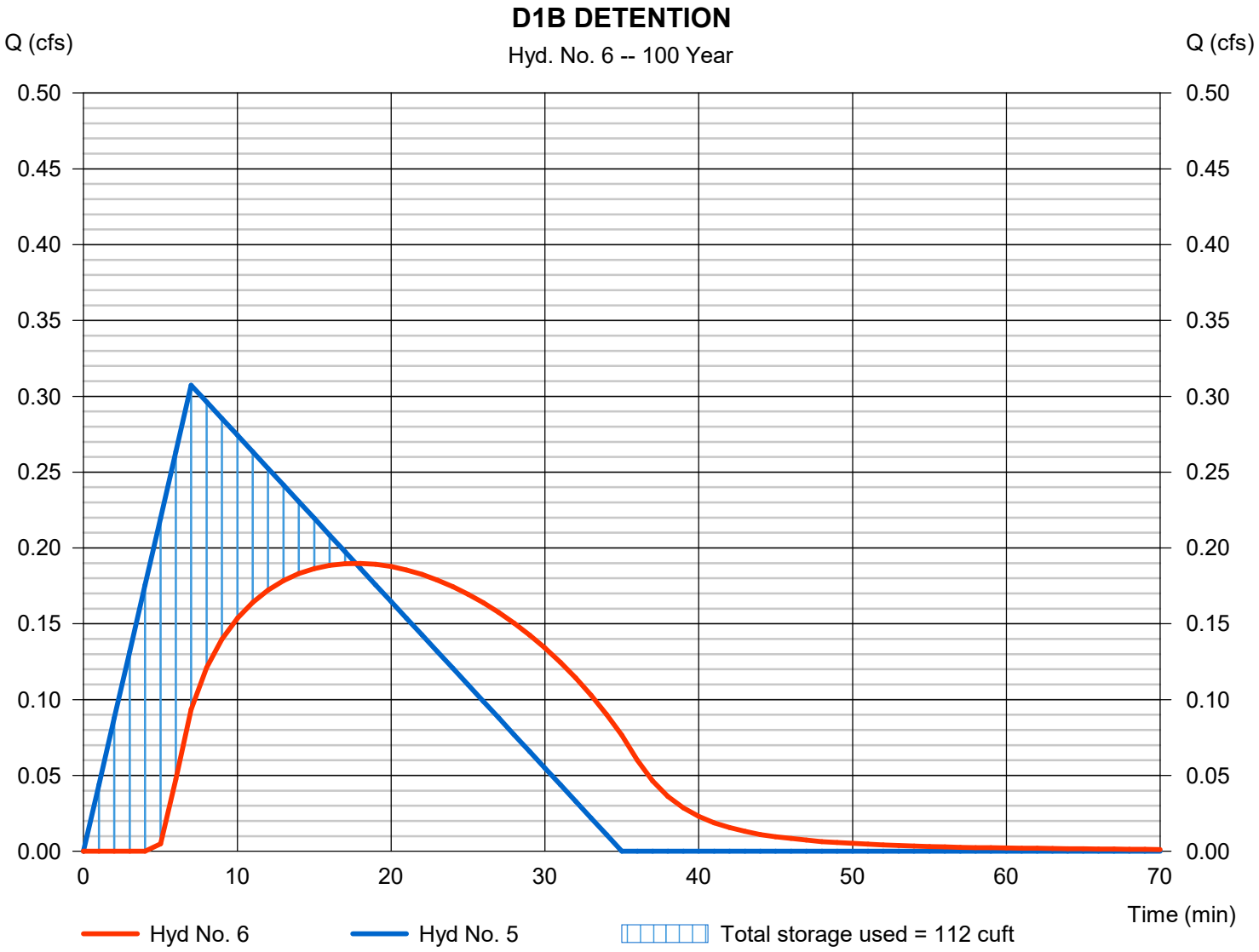
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hyd. No. 6

D1B DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.190 cfs
Storm frequency	=	100 yrs	Time to peak	=	18 min
Time interval	=	1 min	Hyd. volume	=	293 cuft
Inflow hyd. No.	=	5 - D1B	Max. Elevation	=	101.02 ft
Reservoir name	=	BIO D1B	Max. Storage	=	112 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - BIO D1B

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 5.80 ft, Barrel Len = 19.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	21	21
0.38	100.38	n/a	21	42
0.57	100.57	n/a	21	63
0.76	100.76	n/a	21	84
0.95	100.95	n/a	21	105
1.14	101.14	n/a	21	126
1.33	101.33	n/a	21	147
1.52	101.52	n/a	21	168
1.71	101.71	n/a	21	188
1.90	101.90	n/a	21	209

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 3.00	6.00	0.00	0.00
Span (in)	= 3.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.25	102.50	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) = 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

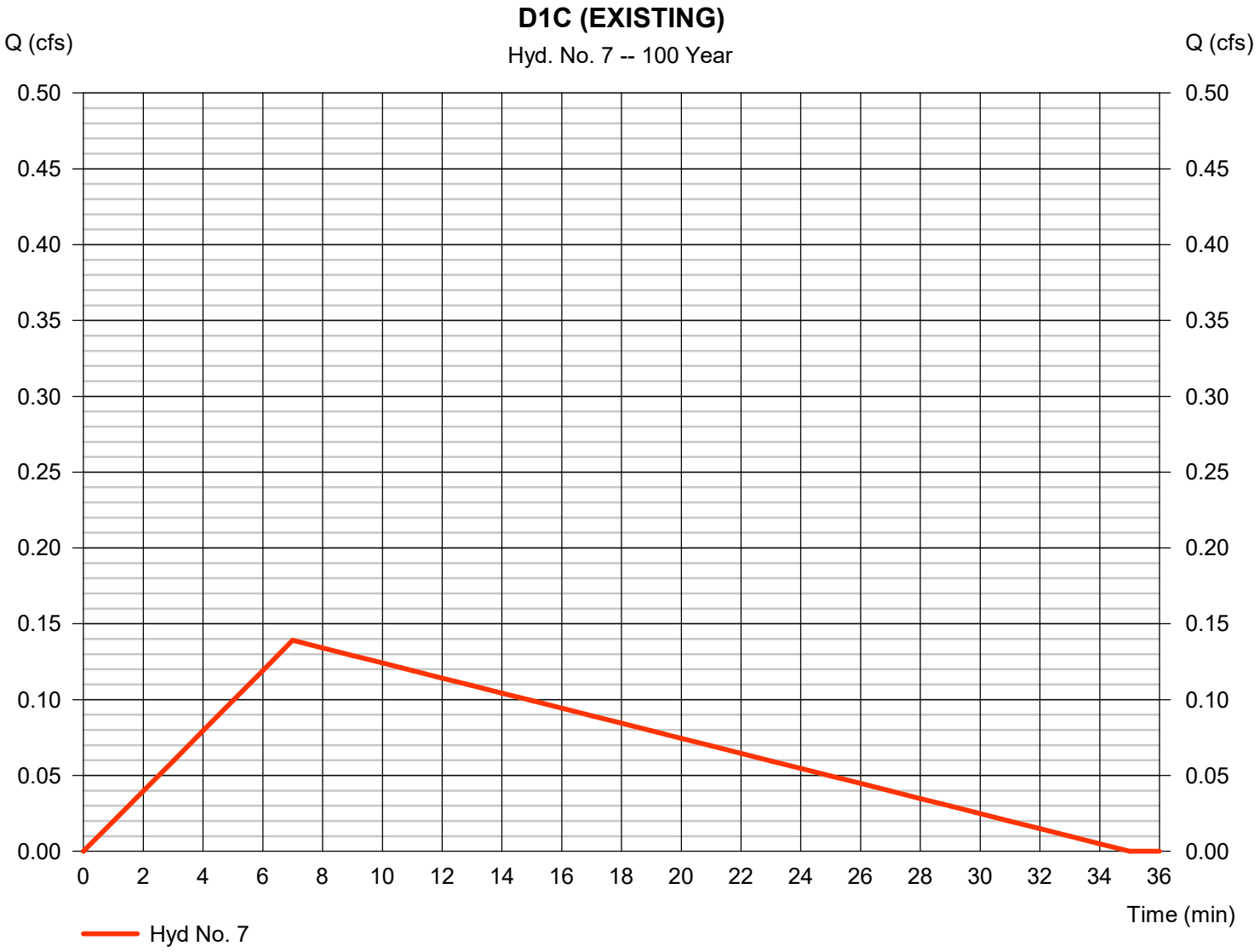
Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	21	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	42	100.38	0.03 ic	0.00	---	---	---	---	---	---	---	---	0.032
0.57	63	100.57	0.10 ic	0.00	---	---	---	---	---	---	---	---	0.104
0.76	84	100.76	0.15 ic	0.00	---	---	---	---	---	---	---	---	0.147
0.95	105	100.95	0.18 ic	0.00	---	---	---	---	---	---	---	---	0.179
1.14	126	101.14	0.21 ic	0.00	---	---	---	---	---	---	---	---	0.207
1.33	147	101.33	0.23 ic	0.00	---	---	---	---	---	---	---	---	0.231
1.52	168	101.52	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.253
1.71	188	101.71	0.27 ic	0.00	---	---	---	---	---	---	---	---	0.273
1.90	209	101.90	0.29 ic	0.00	---	---	---	---	---	---	---	---	0.292

Hydrograph Report

Hyd. No. 7

D1C (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.139 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	146 cuft
Drainage area	=	0.050 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

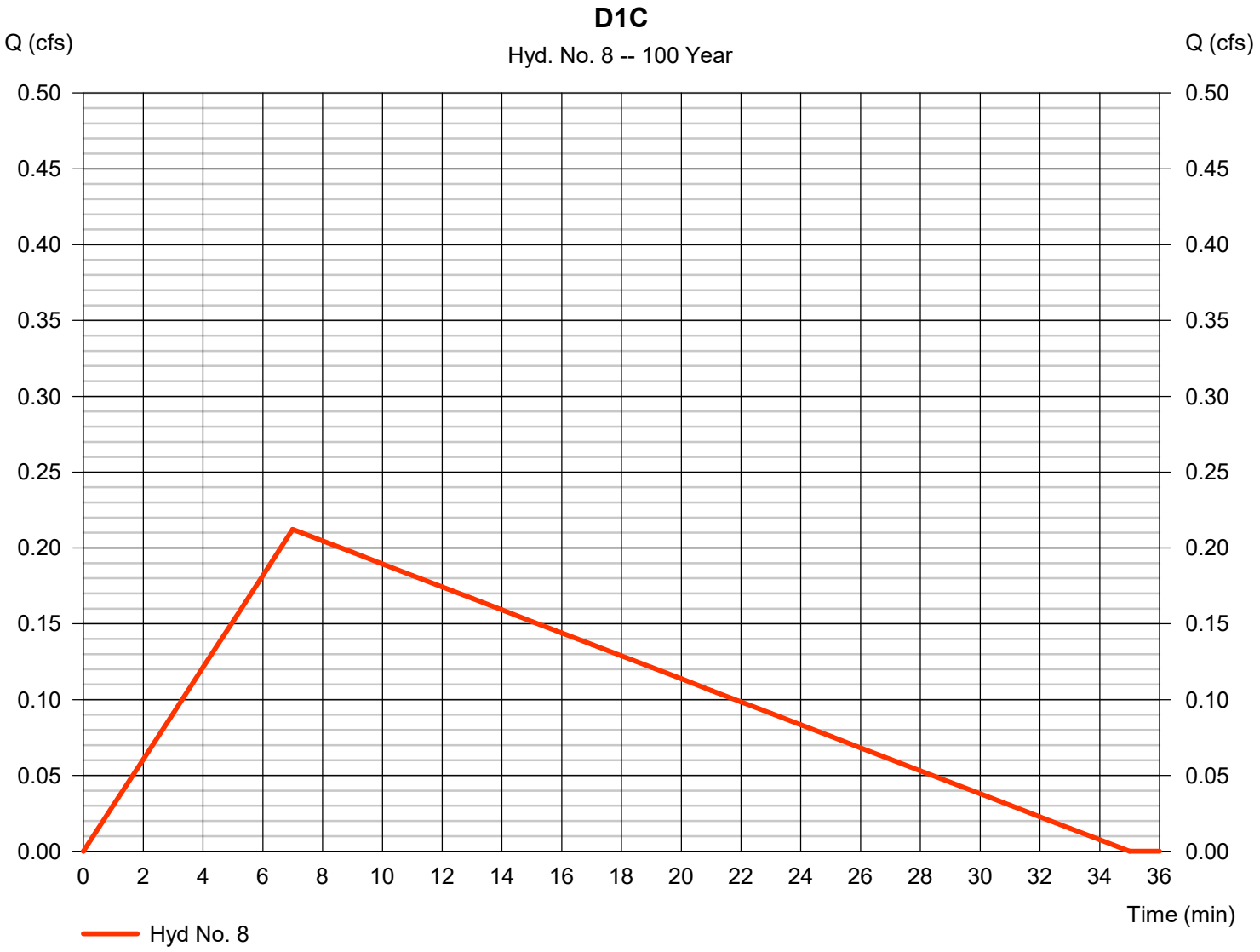


Hydrograph Report

Hyd. No. 8

D1C

Hydrograph type	=	Rational	Peak discharge	=	0.212 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	223 cuft
Drainage area	=	0.050 ac	Runoff coeff.	=	0.87
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



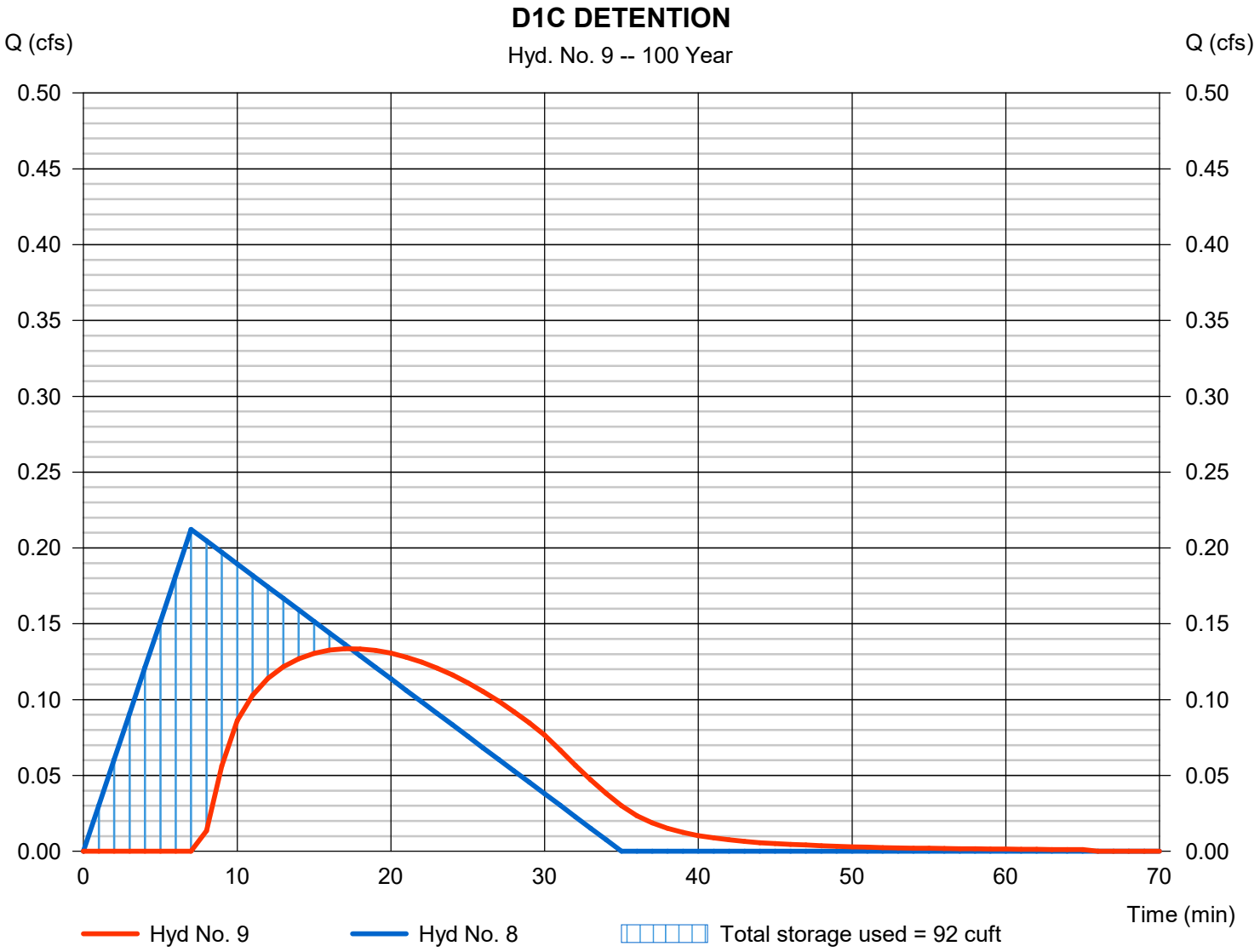
Hydrograph Report

Hyd. No. 9

D1C DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.134 cfs
Storm frequency	=	100 yrs	Time to peak	=	17 min
Time interval	=	1 min	Hyd. volume	=	172 cuft
Inflow hyd. No.	=	8 - D1C	Max. Elevation	=	100.95 ft
Reservoir name	=	BIO D1C	Max. Storage	=	92 cuft

Storage Indication method used.



Pond Report

Pond No. 3 - BIO D1C

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 5.70 ft, Barrel Len = 17.10 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	19	19
0.38	100.38	n/a	19	37
0.57	100.57	n/a	19	56
0.76	100.76	n/a	19	74
0.95	100.95	n/a	19	93
1.14	101.14	n/a	19	111
1.33	101.33	n/a	19	130
1.52	101.52	n/a	19	148
1.71	101.71	n/a	19	167
1.90	101.90	n/a	19	185

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 3.00	6.00	0.00	0.00
Span (in)	= 3.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.50	102.50	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) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

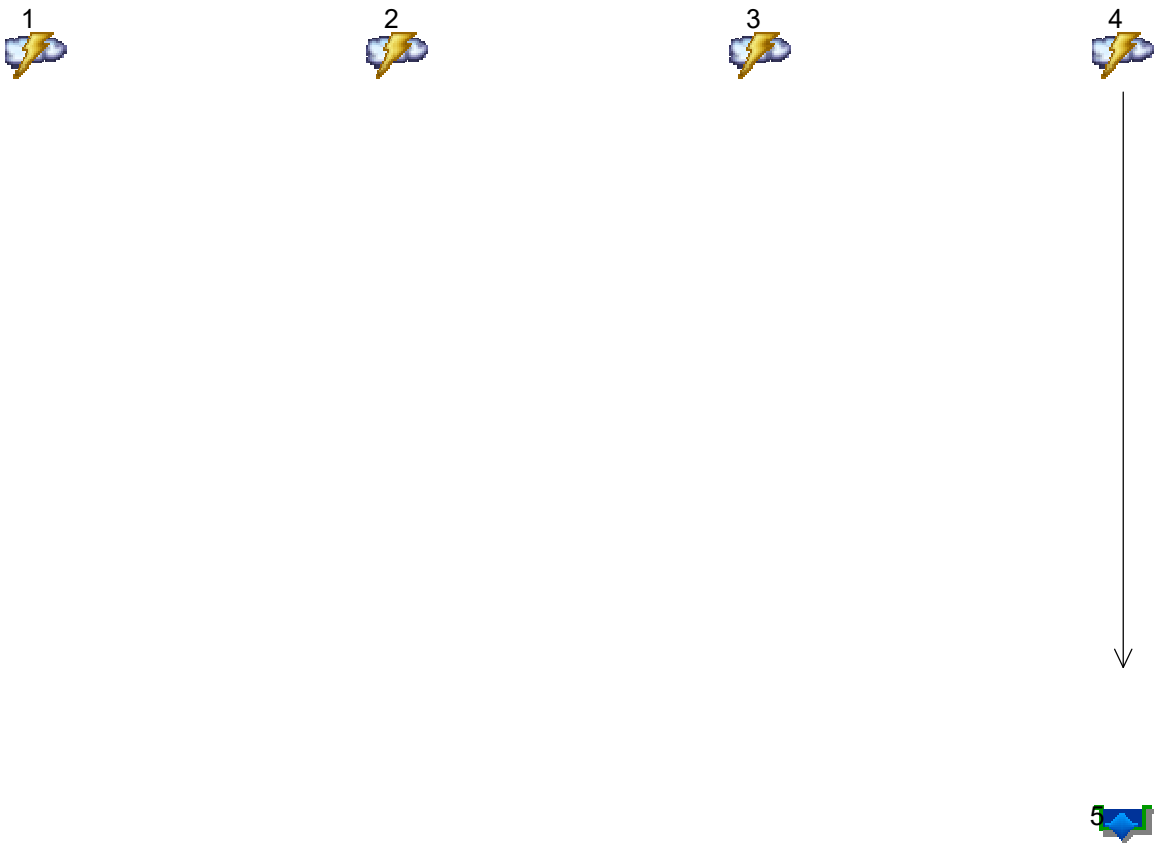
Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

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	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	19	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	37	100.38	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.57	56	100.57	0.01 ic	0.00	---	---	---	---	---	---	---	---	0.010
0.76	74	100.76	0.09 ic	0.00	---	---	---	---	---	---	---	---	0.087
0.95	93	100.95	0.13 ic	0.00	---	---	---	---	---	---	---	---	0.135
1.14	111	101.14	0.17 ic	0.00	---	---	---	---	---	---	---	---	0.170
1.33	130	101.33	0.20 ic	0.00	---	---	---	---	---	---	---	---	0.198
1.52	148	101.52	0.22 ic	0.00	---	---	---	---	---	---	---	---	0.224
1.71	167	101.71	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.246
1.90	185	101.90	0.27 ic	0.00	---	---	---	---	---	---	---	---	0.267

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514



Legend

Hyd.	Origin	Description
1	Rational	D3A (EXISTING)
2	Rational	D3A
3	Rational	D3B (EXISTING)
4	Rational	D3B
5	Reservoir	D3B DETENTION

Hydraflow Table of Contents

D3 SUBSHEDS.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	0.250	1	7	263	------	------	------	D3A (EXISTING)
2	Rational	0.176	1	7	184	------	------	------	D3A
3	Rational	0.222	1	7	234	------	------	------	D3B (EXISTING)
4	Rational	0.343	1	7	361	------	------	------	D3B
5	Reservoir	0.213	1	18	333	4	101.19	120	D3B DETENTION

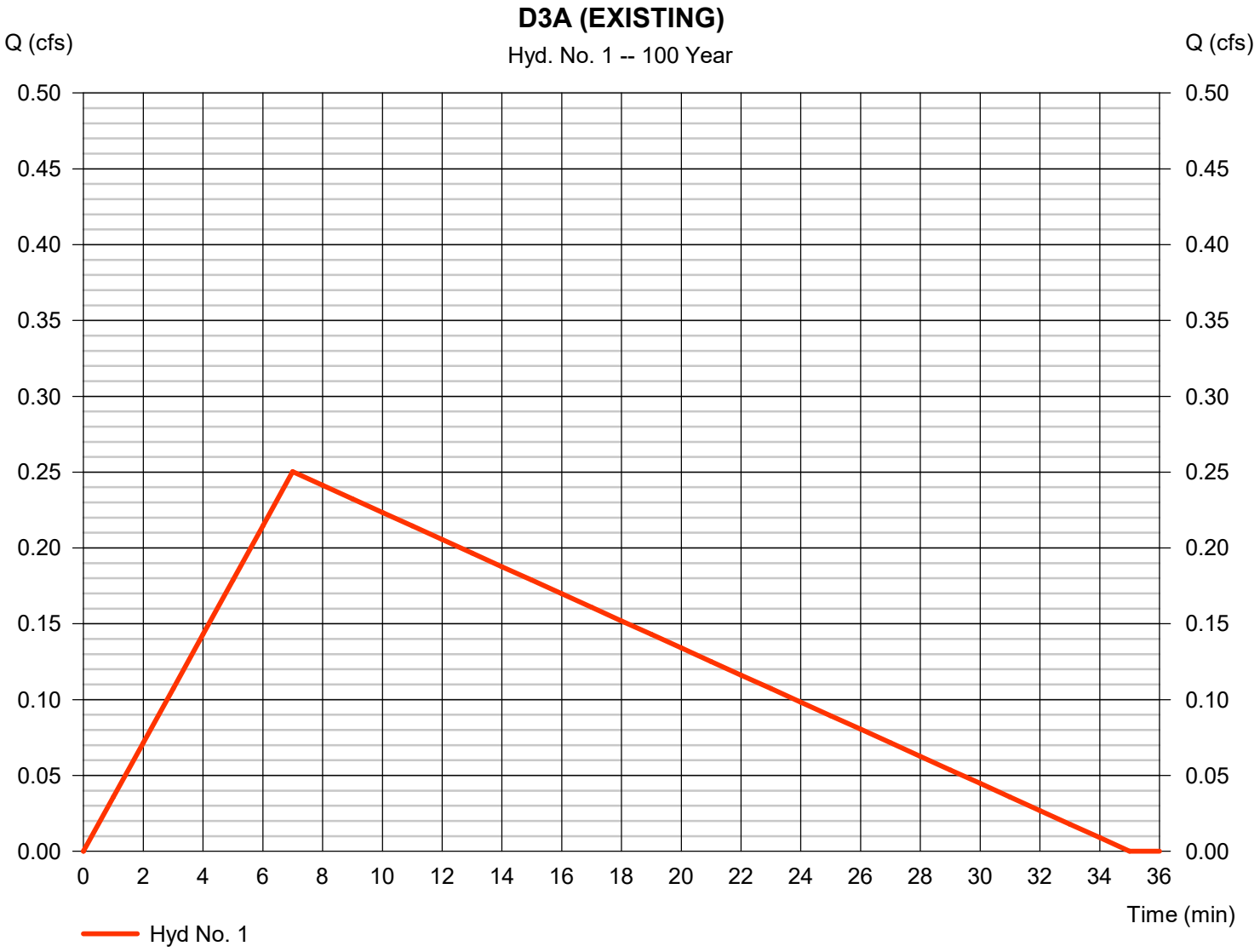
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hyd. No. 1

D3A (EXISTING)

Hydrograph type	= Rational	Peak discharge	= 0.250 cfs
Storm frequency	= 100 yrs	Time to peak	= 7 min
Time interval	= 1 min	Hyd. volume	= 263 cuft
Drainage area	= 0.090 ac	Runoff coeff.	= 0.57
Intensity	= 4.878 in/hr	Tc by User	= 7.00 min
IDF Curve	= Fairfax.idf	Asc/Rec limb fact	= 1/4

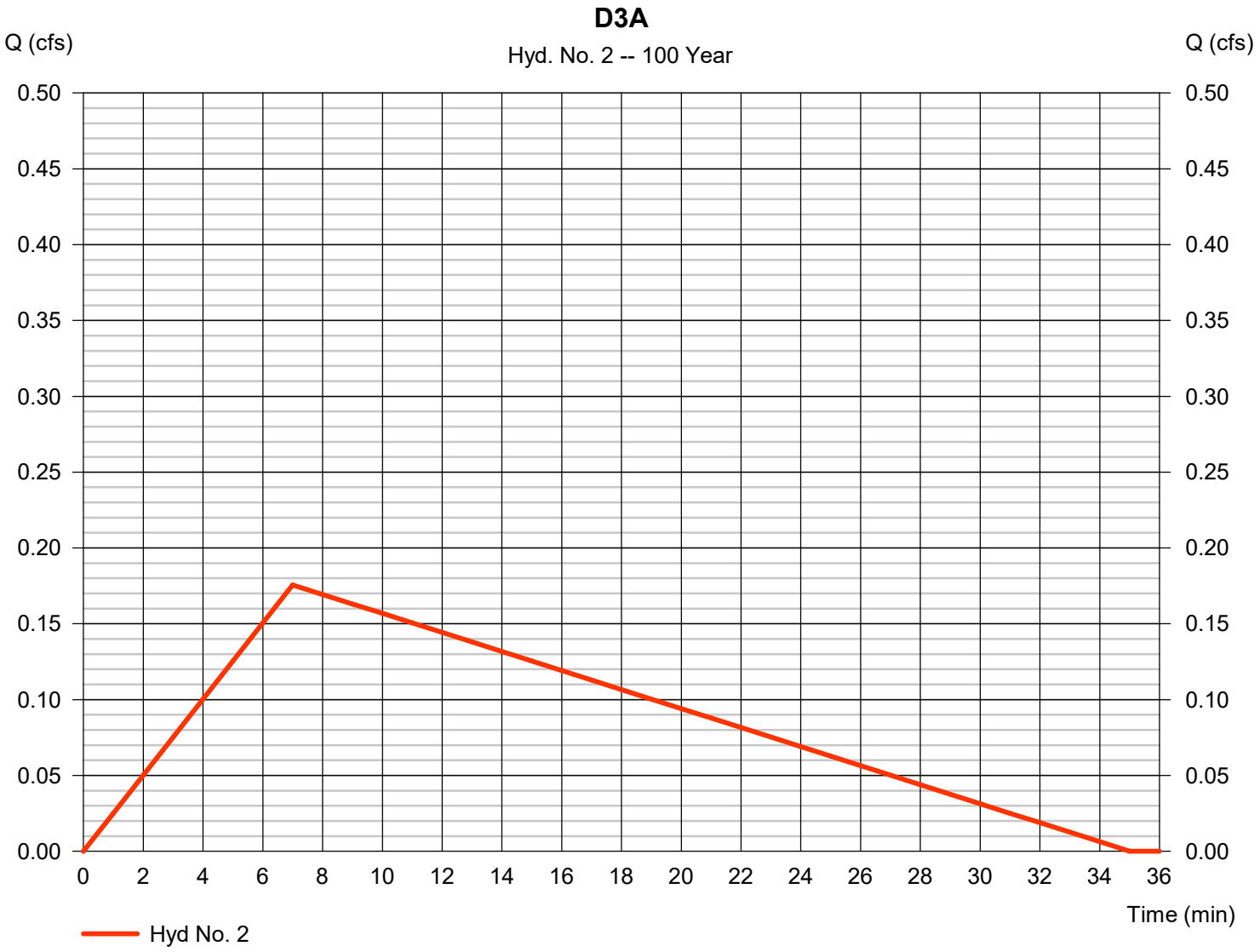


Hydrograph Report

Hyd. No. 2

D3A

Hydrograph type	= Rational	Peak discharge	= 0.176 cfs
Storm frequency	= 100 yrs	Time to peak	= 7 min
Time interval	= 1 min	Hyd. volume	= 184 cuft
Drainage area	= 0.090 ac	Runoff coeff.	= 0.4
Intensity	= 4.878 in/hr	Tc by User	= 7.00 min
IDF Curve	= Fairfax.idf	Asc/Rec limb fact	= 1/4

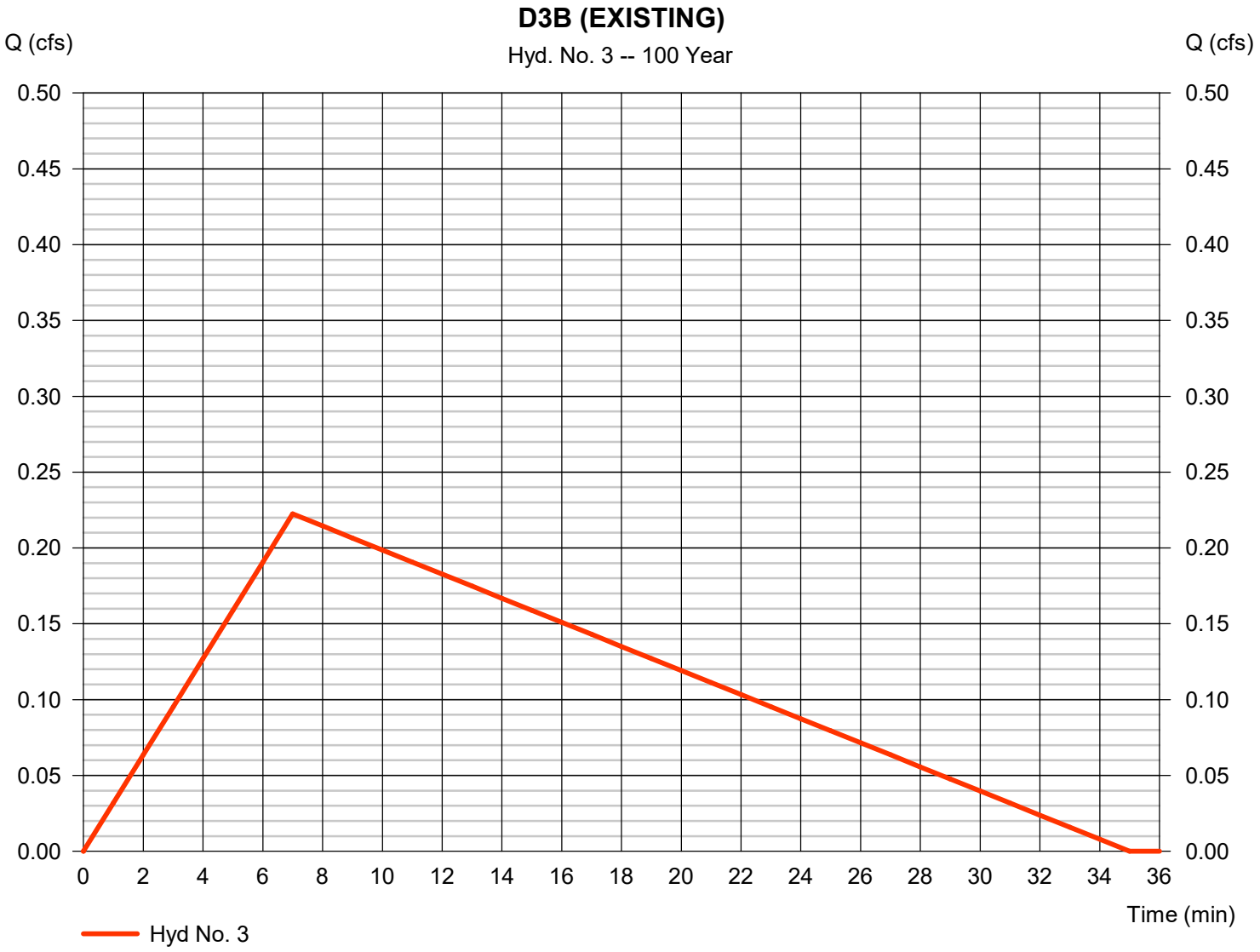


Hydrograph Report

Hyd. No. 3

D3B (EXISTING)

Hydrograph type	=	Rational	Peak discharge	=	0.222 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	234 cuft
Drainage area	=	0.080 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



Hydrograph Report

Hyd. No. 4

D3B

Hydrograph type	=	Rational	Peak discharge	=	0.343 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	361 cuft
Drainage area	=	0.080 ac	Runoff coeff.	=	0.88
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

Hydrograph Report

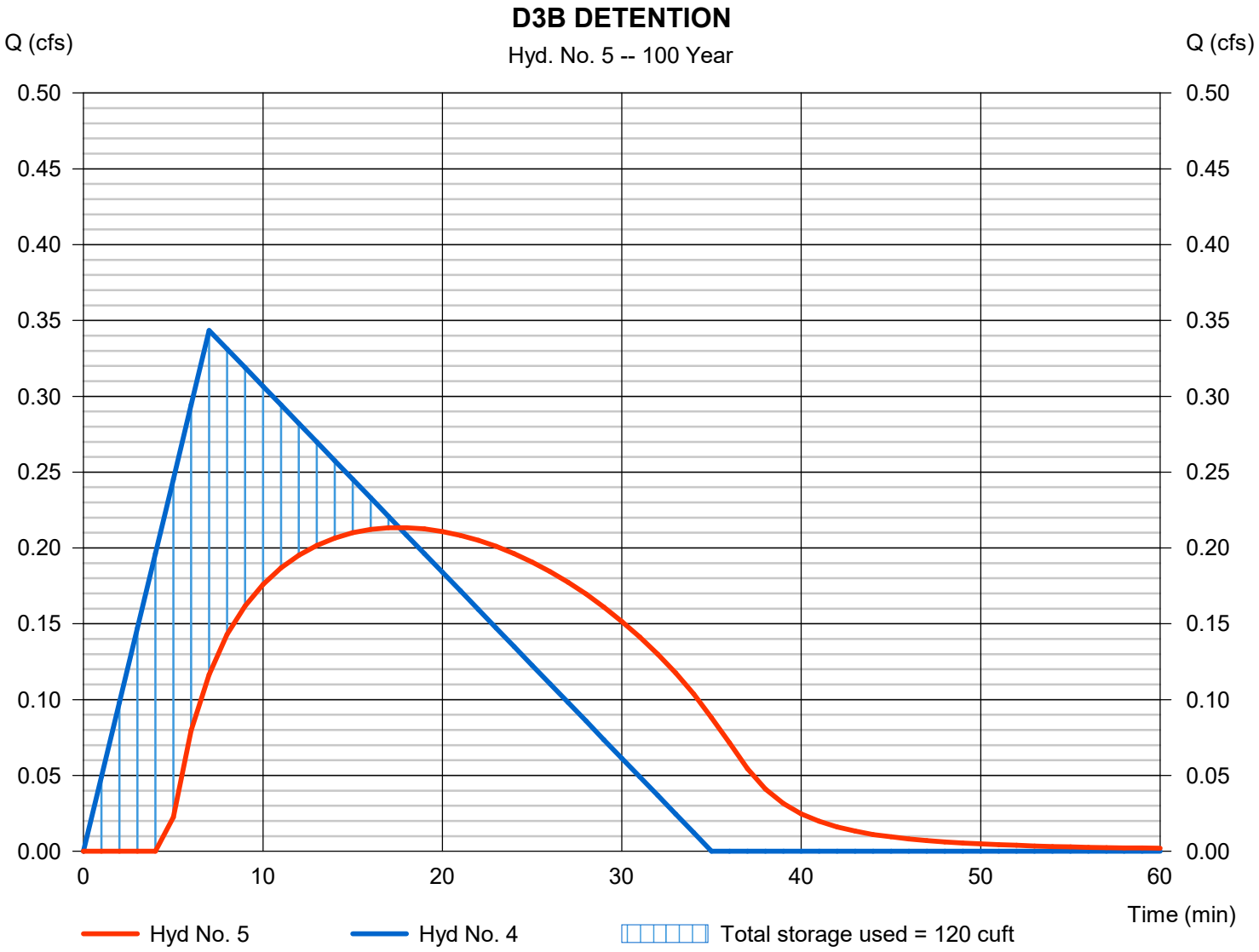
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hyd. No. 5

D3B DETENTION

Hydrograph type	= Reservoir	Peak discharge	= 0.213 cfs
Storm frequency	= 100 yrs	Time to peak	= 18 min
Time interval	= 1 min	Hyd. volume	= 333 cuft
Inflow hyd. No.	= 4 - D3B	Max. Elevation	= 101.19 ft
Reservoir name	= BIO D3B	Max. Storage	= 120 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BIO D3B

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 7.60 ft, Barrel Len = 13.30 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	19	19
0.38	100.38	n/a	19	38
0.57	100.57	n/a	19	58
0.76	100.76	n/a	19	77
0.95	100.95	n/a	19	96
1.14	101.14	n/a	19	115
1.33	101.33	n/a	19	134
1.52	101.52	n/a	19	154
1.71	101.71	n/a	19	173
1.90	101.90	n/a	19	192

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 3.00	6.00	0.00	0.00
Span (in)	= 3.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.25	102.50	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) = 0.000 (by Wet area)

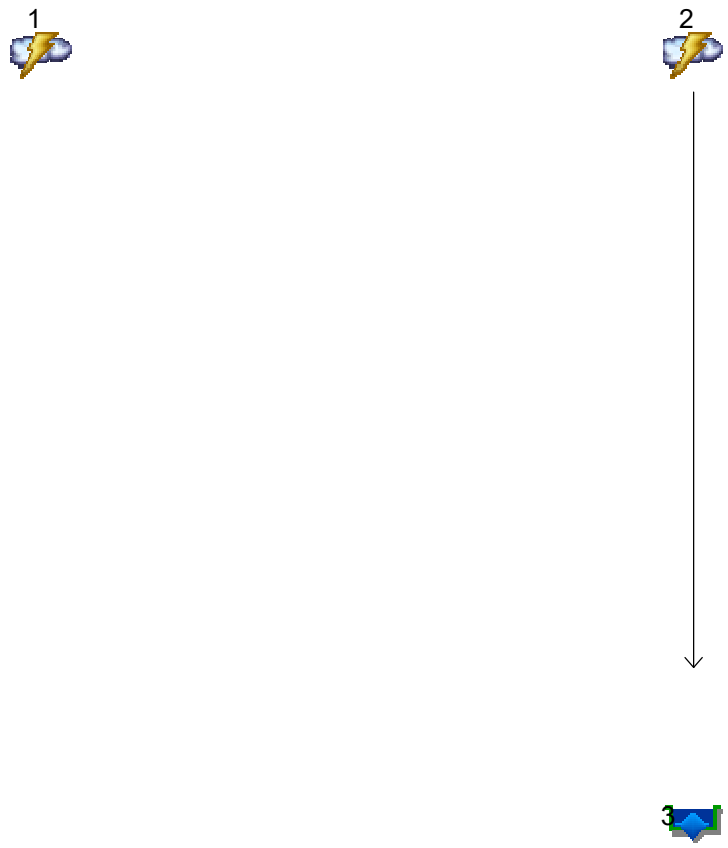
TW Elev. (ft) = 0.00

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	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	19	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	38	100.38	0.03 ic	0.00	---	---	---	---	---	---	---	---	0.032
0.57	58	100.57	0.10 ic	0.00	---	---	---	---	---	---	---	---	0.104
0.76	77	100.76	0.15 ic	0.00	---	---	---	---	---	---	---	---	0.147
0.95	96	100.95	0.18 ic	0.00	---	---	---	---	---	---	---	---	0.179
1.14	115	101.14	0.21 ic	0.00	---	---	---	---	---	---	---	---	0.207
1.33	134	101.33	0.23 ic	0.00	---	---	---	---	---	---	---	---	0.231
1.52	154	101.52	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.253
1.71	173	101.71	0.27 ic	0.00	---	---	---	---	---	---	---	---	0.273
1.90	192	101.90	0.29 ic	0.00	---	---	---	---	---	---	---	---	0.292

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	Rational	D4 (EXISTING)
2	Rational	D4A
3	Reservoir	D4A DETENTION

Hydraflow Table of Contents

D4 SUBSHED.gpw

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514 Wednesday, 09 / 6 / 2017

Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v10.514

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	0.417	1	7	438	------	------	------	D4 (EXISTING)
2	Rational	0.498	1	7	522	------	------	------	D4A
3	Reservoir	0.363	1	15	493	2	101.17	126	D4A DETENTION

Hydrograph Report

Hyd. No. 1

D4 (EXISTING)

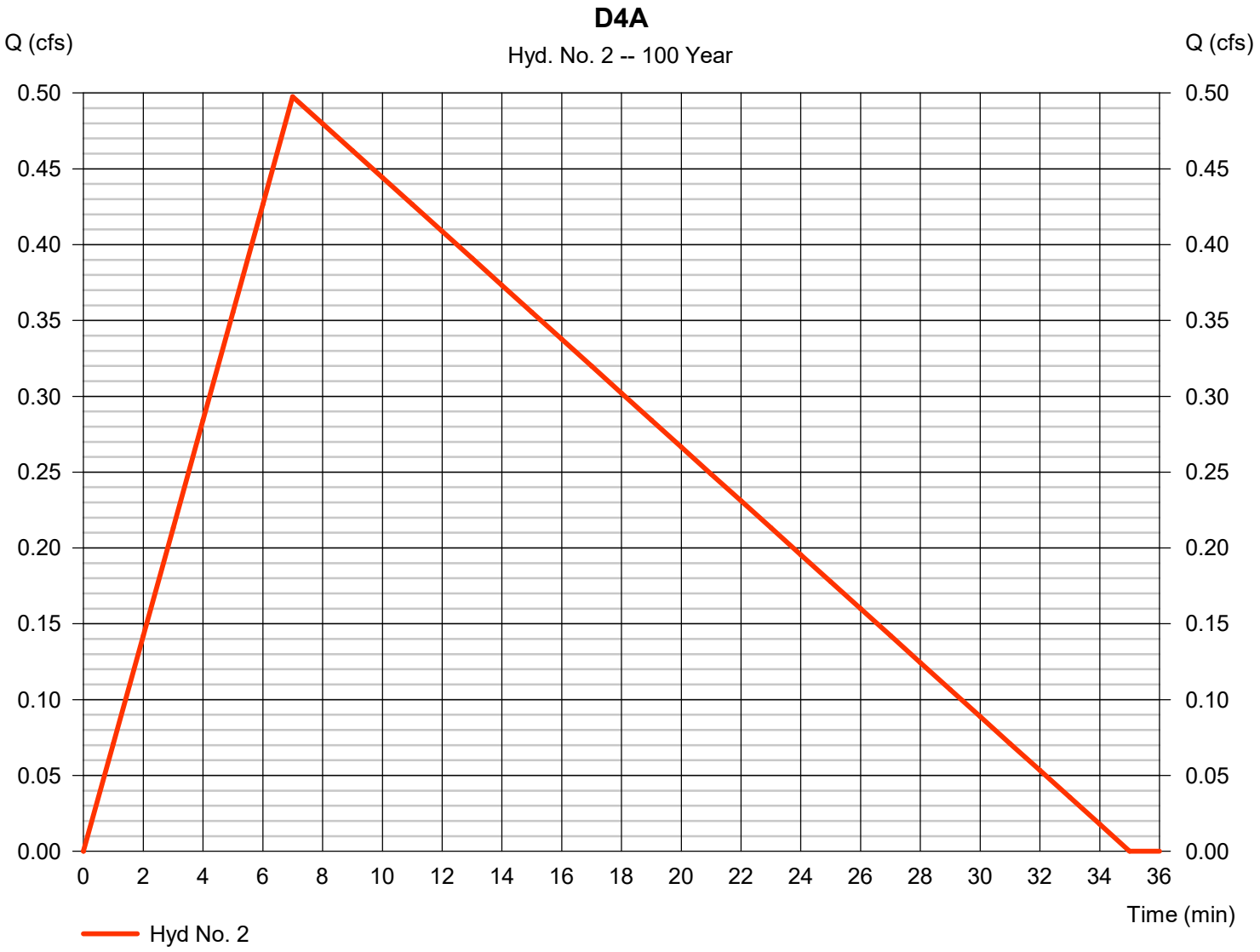
Hydrograph type	=	Rational	Peak discharge	=	0.417 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	438 cuft
Drainage area	=	0.150 ac	Runoff coeff.	=	0.57
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4

Hydrograph Report

Hyd. No. 2

D4A

Hydrograph type	=	Rational	Peak discharge	=	0.498 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	522 cuft
Drainage area	=	0.150 ac	Runoff coeff.	=	0.68
Intensity	=	4.878 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Fairfax.idf	Asc/Rec limb fact	=	1/4



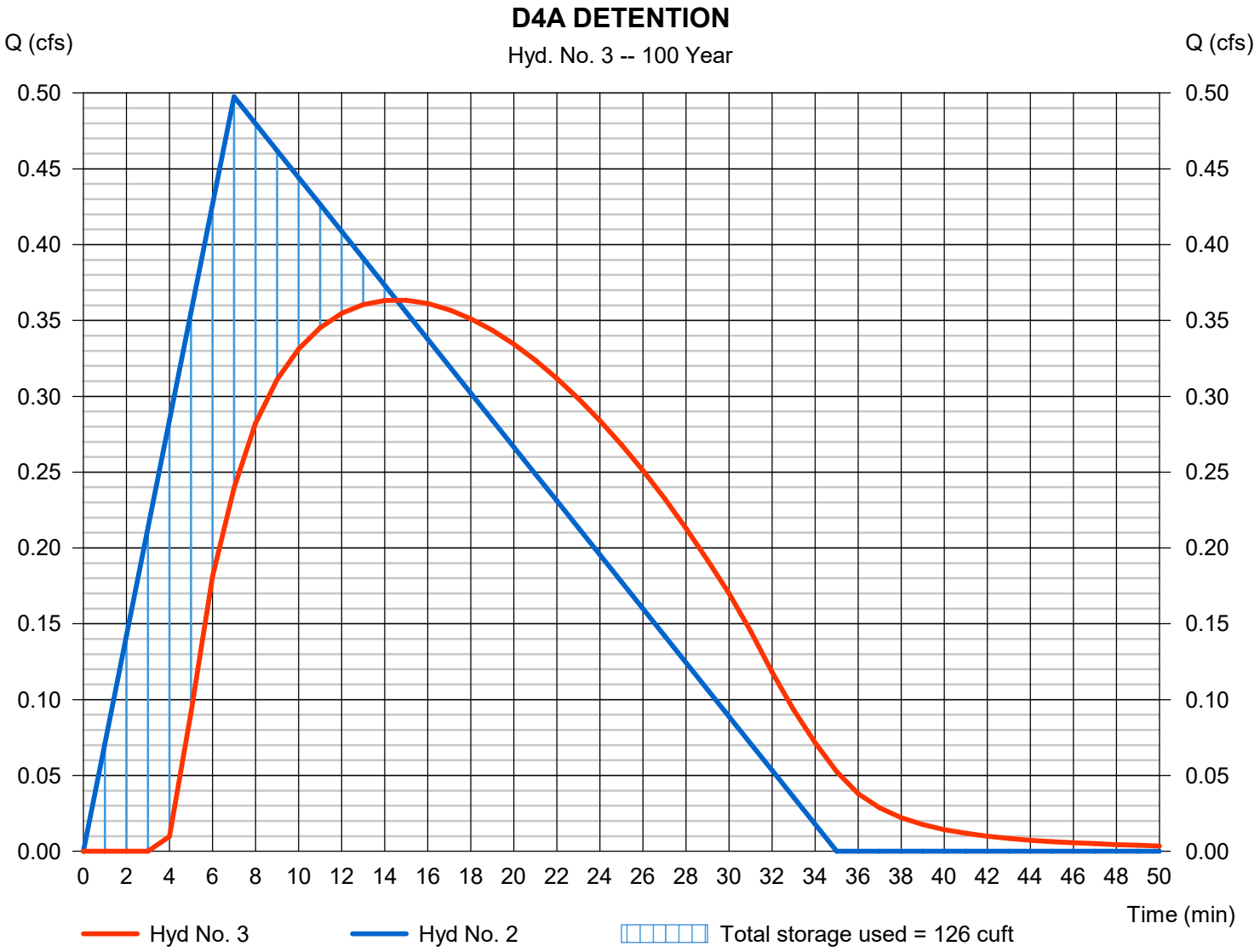
Hydrograph Report

Hyd. No. 3

D4A DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.363 cfs
Storm frequency	=	100 yrs	Time to peak	=	15 min
Time interval	=	1 min	Hyd. volume	=	493 cuft
Inflow hyd. No.	=	2 - D4A	Max. Elevation	=	101.17 ft
Reservoir name	=	BIO D4A	Max. Storage	=	126 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BIO D4A

Pond Data

UG Chambers -Invert elev. = 100.00 ft, Rise x Span = 1.90 x 5.70 ft, Barrel Len = 19.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	n/a	0	0
0.19	100.19	n/a	21	21
0.38	100.38	n/a	21	41
0.57	100.57	n/a	21	62
0.76	100.76	n/a	21	82
0.95	100.95	n/a	21	103
1.14	101.14	n/a	21	123
1.33	101.33	n/a	21	144
1.52	101.52	n/a	21	165
1.71	101.71	n/a	21	185
1.90	101.90	n/a	21	206

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 4.00	6.00	0.00	0.00
Span (in)	= 4.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 100.25	102.50	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) = 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	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.19	21	100.19	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.38	41	100.38	0.04 ic	0.00	---	---	---	---	---	---	---	---	0.039
0.57	62	100.57	0.17 ic	0.00	---	---	---	---	---	---	---	---	0.166
0.76	82	100.76	0.25 ic	0.00	---	---	---	---	---	---	---	---	0.246
0.95	103	100.95	0.31 ic	0.00	---	---	---	---	---	---	---	---	0.307
1.14	123	101.14	0.36 ic	0.00	---	---	---	---	---	---	---	---	0.357
1.33	144	101.33	0.40 ic	0.00	---	---	---	---	---	---	---	---	0.402
1.52	165	101.52	0.44 ic	0.00	---	---	---	---	---	---	---	---	0.441
1.71	185	101.71	0.48 ic	0.00	---	---	---	---	---	---	---	---	0.478
1.90	206	101.90	0.51 ic	0.00	---	---	---	---	---	---	---	---	0.512