Storm Drainage Computations
Davis Re-Subdivision
Re-Subdivision Plan
591 Pleasant Valley Road
South Windsor, Connecticut

Prepared by:

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1. Introduction

Cesar, LLC is proposing to develop a 2.681acre parcel of land located at 591 Pleasant Valley Road in South Windsor, Connecticut. The proposed work will disturb approximately 74,440 SF± (1.71 acre) of the parcel. The proposed development will include construction of three new single-family (existing home to be razed) with an associated paved driveways, subsurface utilities, and landscaping. Refer to the site plan drawings, entitled – "Davis Resubdivision ~ Residential Resubdivision / Special Exception ~591 Pleasant Valley Road, South Windsor, Connecticut, prepared by Design Professionals, Inc, dated May 13, 2018", as amended, for information regarding the proposed property development.

2. Pre vs Post Development Comparisons

The surficial characteristics of the site can primarily be classified as woodland and grass areas that are common for residential properties. The entire site drains south to north across the parcel to the existing storm water catchment system in Pleasant Valley Road.

To establish a hydrologic comparison between pre- and post-development conditions, an evaluation was performed to quantify the increase in stormwater volume for the parcel during a 10-year storm event. The Rational method as outlined in the ConnDOT Drainage Manual, was followed in predicting the peak rates of runoff and volumes. Hydraflow Hydrographs (version 2020) computer modeling software was used as application. Refer to **Appendix A** for the pre-developed conditions watershed computations.

3. Post Development Site Conditions

The three new homes proposed by Cesar, LLC will slightly increase the impervious coverage on the parcel. To control the increase in stormwater volume due to increased impervious coverage, one rain garden on Lot 3 is proposed. The raingarden was sized to provide a total storage volume equal to the projected increase in stormwater volume for all three lots during a the 10-year storm. Our analysis demonstrated an increase of about 524 cft across the parcel for this storm event. The proposed rain garden on lot 3 was sized to provide at minimum 713 cft of storage. All proposed drainage watershed analysis computations can be found in **Appendix A**. Stage storage reports for the raingarden are also included in **Appendix B**.

4. Analysis of Results

Hydraulic conditions related to storm drainage were evaluated for both proposed and existing conditions using Hydraflow Hydrographs (version 2018) computer modeling software to determine peak discharge rates of runoff leaving the developed site. Based on modeling from existing conditions, one discharge location was identified as a point of interest for assessing downstream effects. The following table contains the data generated from the Hydraflow software:

TABLE 1

Peak Volume of Stormwater Discharge

		Runoff Volume		
Watershed Area	Storm Event (Year)	Pre-developed Condition (ft^3)	Post-developed Condition (ft^3)	Net Change Rate of Runoff (ft^3)
DP#1 – To Pleasant Valley Road	10	2,852	3,376	+524

As indicated by the analysis results, the stormwater runoff volume for the entire parcel is expected to increase because of the proposed development. Comparing the projected increase in stormwater volume for each lot indicated that Lot 3 was the main contributor to the increased stormwater volume. Due to the location of the existing house and gravel drive within the boundaries of Lots 1 & 2, the proposed development caused a small change in impervious coverage when comparing the existing condition to the proposed for these lots. Hydraflow results indicated a projected increase in stormwater volume for Lot 1 of 19 cft and a reduction in volume for Lot 2 of 23 cft. Since The reduction in volume on Lot 2 is greater than the projected increase in volume for lot 1, no raingarden is proposed on either lot. The rain garden proposed on Lot 3 will store the overall stormwater volume increase. Existing and Proposed Hydrographs for each Lot are included in **Appendix A** of this report.

5. Conclusion

It is our opinion that the proposed stormwater management design as presented herein and on the accompanying site plans, will not pose any significant detrimental impacts to the environment surrounding the site.

APPENDIX A
Watershed Computations
(Pre & Post-Development Conditions)

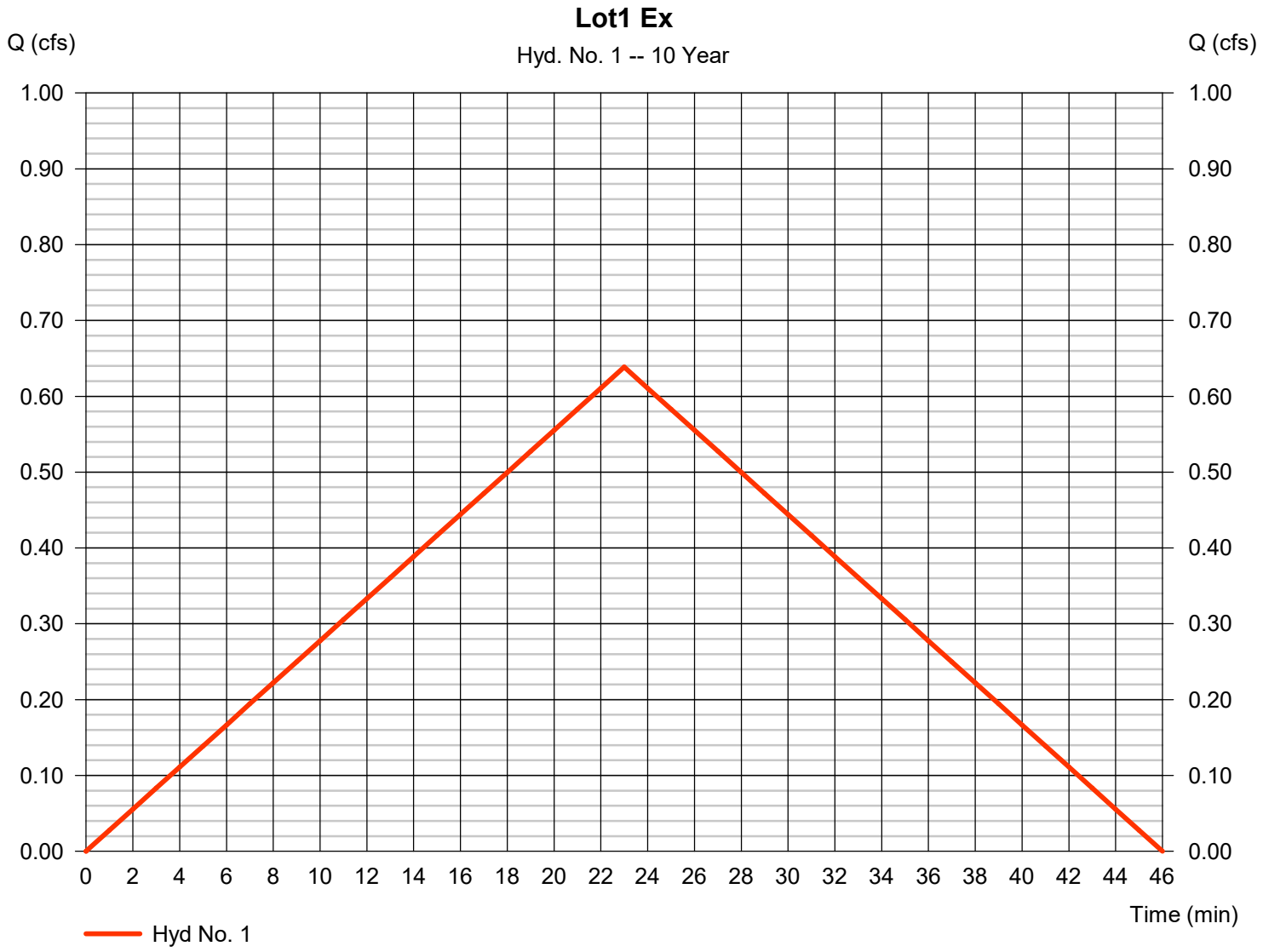
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Friday, 03 / 26 / 2021

Hyd. No. 1

Lot1 Ex

Hydrograph type	=	Rational	Peak discharge	=	0.638 cfs
Storm frequency	=	10 yrs	Time to peak	=	23 min
Time interval	=	1 min	Hyd. volume	=	881 cuft
Drainage area	=	0.545 ac	Runoff coeff.	=	0.354
Intensity	=	3.307 in/hr	Tc by TR55	=	23.00 min
IDF Curve	=	SampleFHA.idf	Asc/Rec limb fact	=	1/1



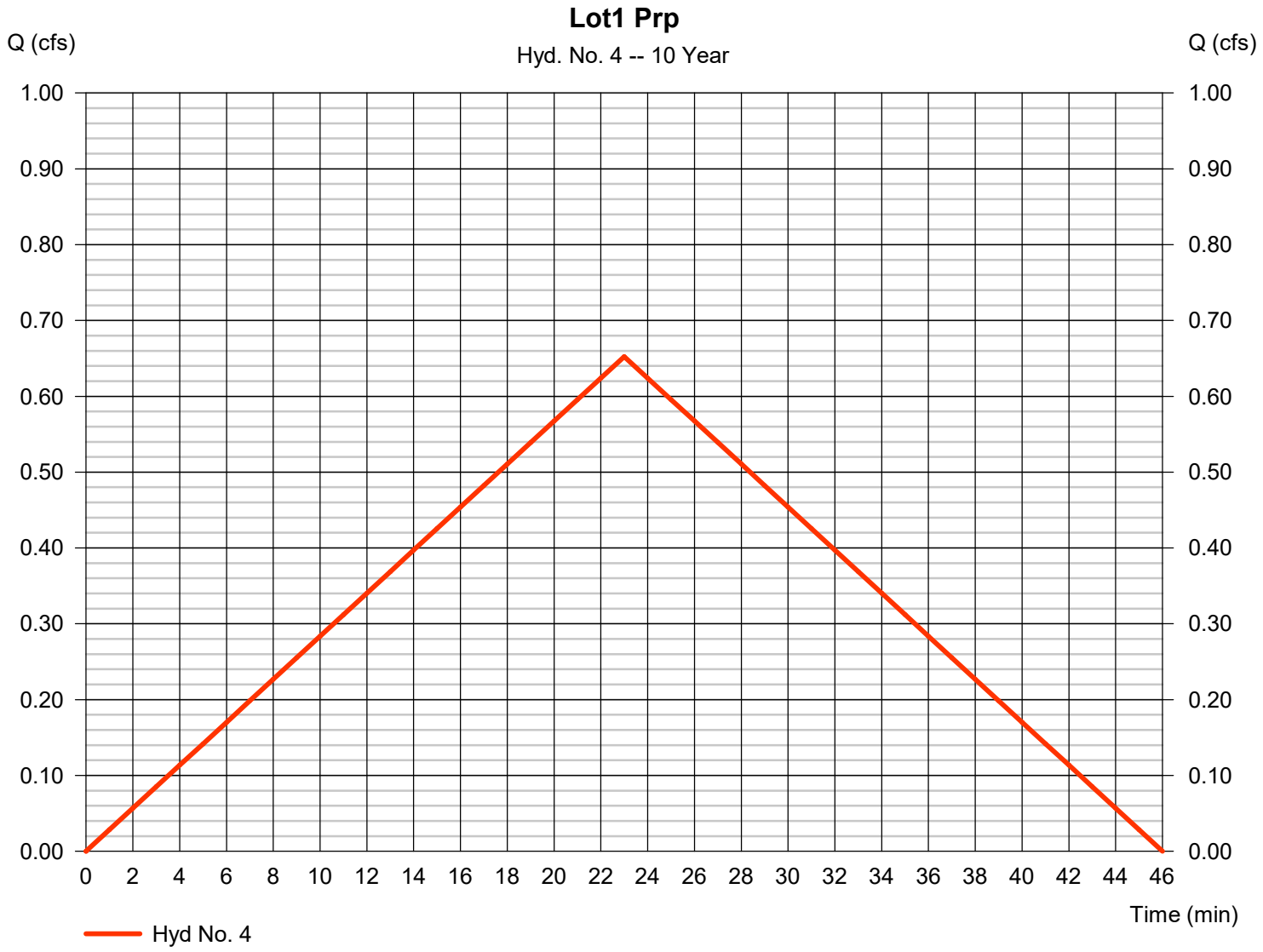
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Friday, 03 / 26 / 2021

Hyd. No. 4

Lot1 Prp

Hydrograph type	=	Rational	Peak discharge	=	0.652 cfs
Storm frequency	=	10 yrs	Time to peak	=	23 min
Time interval	=	1 min	Hyd. volume	=	900 cuft
Drainage area	=	0.545 ac	Runoff coeff.	=	0.362
Intensity	=	3.307 in/hr	Tc by TR55	=	23.00 min
IDF Curve	=	SampleFHA.idf	Asc/Rec limb fact	=	1/1



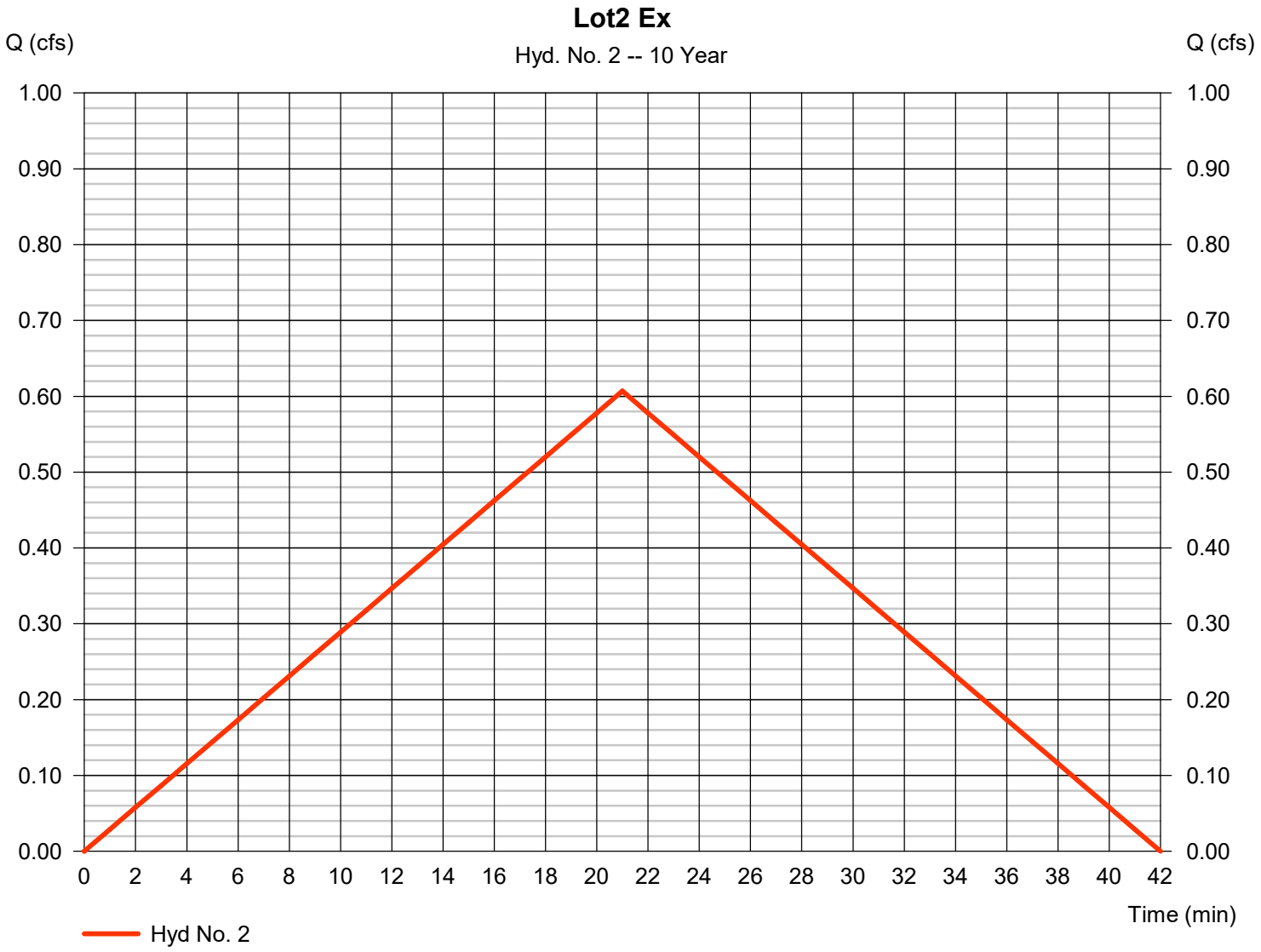
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Friday, 03 / 26 / 2021

Hyd. No. 2

Lot2 Ex

Hydrograph type	=	Rational	Peak discharge	=	0.607 cfs
Storm frequency	=	10 yrs	Time to peak	=	21 min
Time interval	=	1 min	Hyd. volume	=	765 cuft
Drainage area	=	0.510 ac	Runoff coeff.	=	0.34
Intensity	=	3.500 in/hr	Tc by TR55	=	21.00 min
IDF Curve	=	SampleFHA.idf	Asc/Rec limb fact	=	1/1



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Friday, 03 / 26 / 2021

Hyd. No. 5

Lot2 Prp

Hydrograph type	=	Rational	Peak discharge	=	0.589 cfs
Storm frequency	=	10 yrs	Time to peak	=	21 min
Time interval	=	1 min	Hyd. volume	=	742 cuft
Drainage area	=	0.510 ac	Runoff coeff.	=	0.33
Intensity	=	3.500 in/hr	Tc by TR55	=	21.00 min
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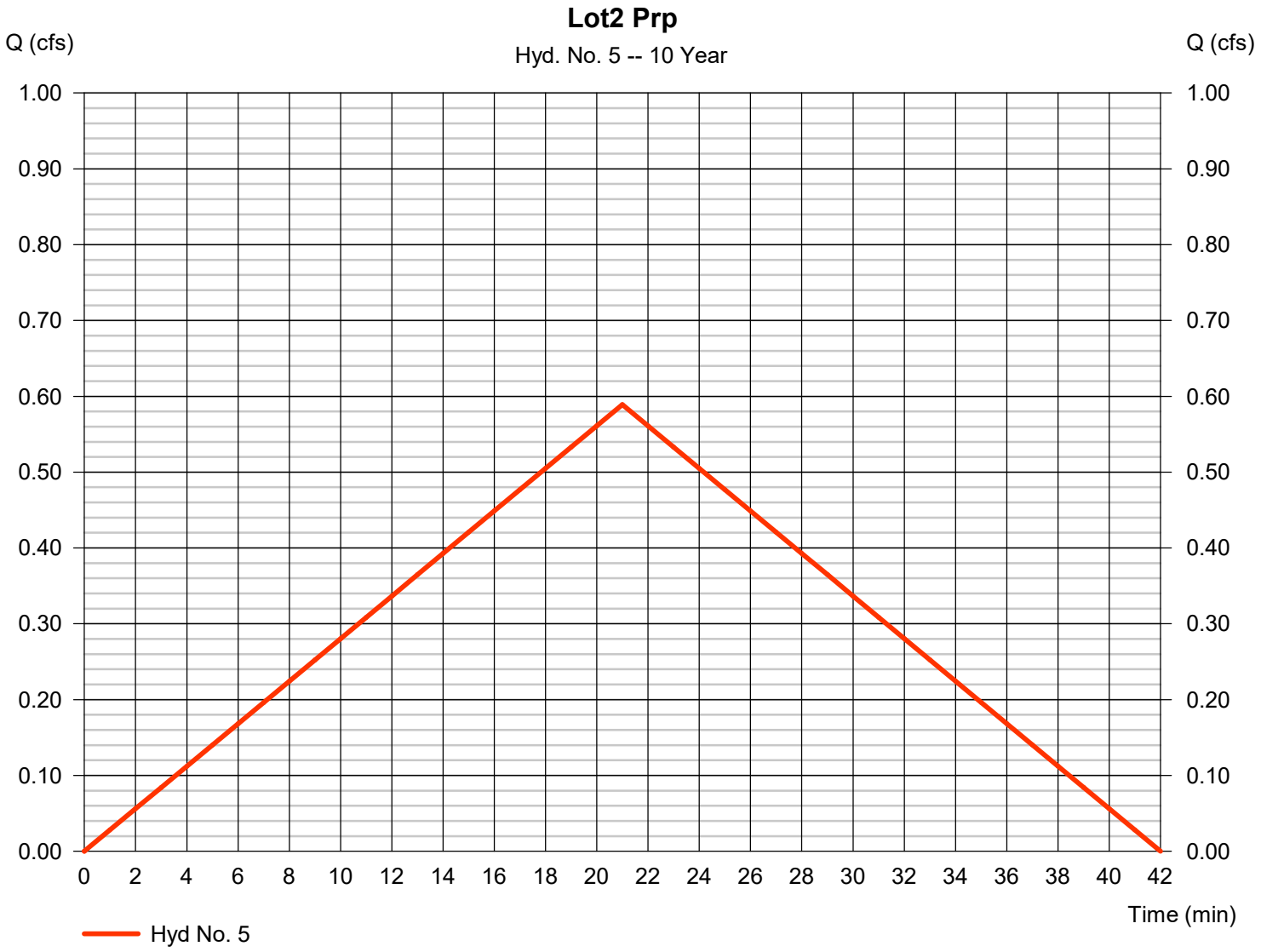


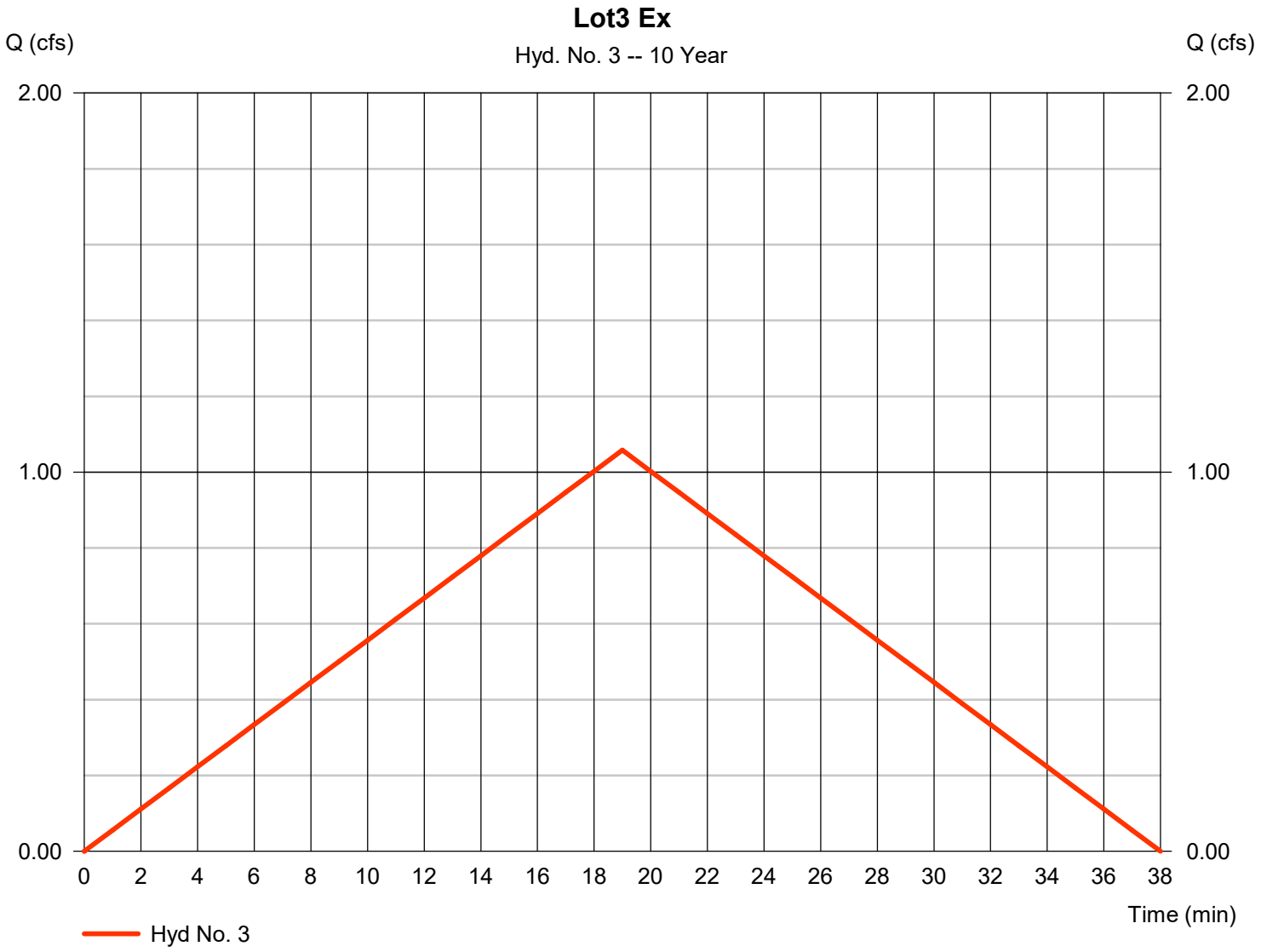
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Friday, 03 / 26 / 2021

Hyd. No. 3

Lot3 Ex

Hydrograph type	= Rational	Peak discharge	= 1.058 cfs
Storm frequency	= 10 yrs	Time to peak	= 19 min
Time interval	= 1 min	Hyd. volume	= 1,206 cuft
Drainage area	= 1.624 ac	Runoff coeff.	= 0.175
Intensity	= 3.722 in/hr	Tc by TR55	= 19.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



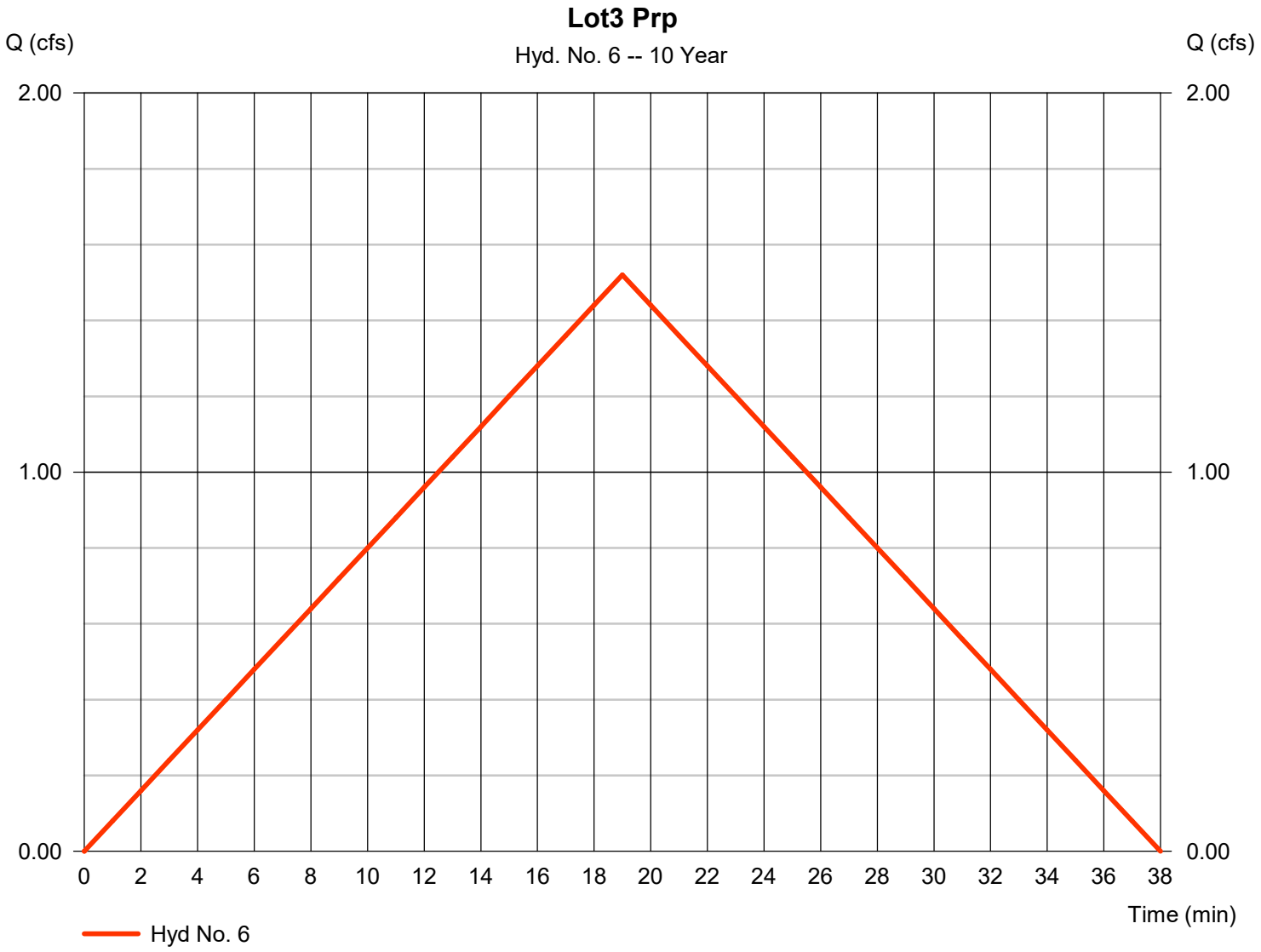
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Friday, 03 / 26 / 2021

Hyd. No. 6

Lot3 Prp

Hydrograph type	=	Rational	Peak discharge	=	1.520 cfs
Storm frequency	=	10 yrs	Time to peak	=	19 min
Time interval	=	1 min	Hyd. volume	=	1,733 cuft
Drainage area	=	1.621 ac	Runoff coeff.	=	0.252
Intensity	=	3.722 in/hr	Tc by TR55	=	19.00 min
IDF Curve	=	SampleFHA.idf	Asc/Rec limb fact	=	1/1



APPENDIX B
Watershed Computations
(Pond Reports)

Pond Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020 Monday, 04 / 5 / 2021

Pond No. 1 - Lot 3 Rain Garden

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 63.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	63.00	146	0	0
1.00	64.00	349	240	240
2.00	65.00	609	473	713

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	0.00	0.00	0.00
Span (in)	= 0.00	0.00	0.00	0.00
No. Barrels	= 0	0	0	0
Invert El. (ft)	= 0.00	0.00	0.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .000	.000	.000	n/a
Orifice Coeff.	= 0.00	0.00	0.00	0.00
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.	= 0.00	0.00	0.00	0.00
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	63.00	---	---	---	---	---	---	---	---	---	---	0.000
1.00	240	64.00	---	---	---	---	---	---	---	---	---	---	0.000
2.00	713	65.00	---	---	---	---	---	---	---	---	---	---	0.000