

July 30, 2026

Mithila Chakraborty, Ph.D.

Connecticut Department of Housing

505 Hudson Street

Hartford, CT 06106

Re: Lot 1 (22 Oakwood Drive), Beacon Falls, Connecticut

Dear Dr. Chakraborty:

I have reviewed the Department of Health comment letter and would like to respond by providing the missing information that they are requesting. This project has received specific approval from the local health dept. for phase 1, and the test hole data has been approved for the other phases. A Stormwater pollution control plan has also been prepared for the Stormwater general permit for construction activities per the DEEP requirements.

The Connecticut Department of Public Health (DPH) Comments

DPH recommends the Applicant consider alternatives that:

1. Reduce the amount of land converted from forest, such as through fewer and/or larger building lots with mandatory forest buffers separating each lot;
- R. The development is a compact or cluster development of 94 single-family homes on 135 acres, with a development impervious area of only 13.89 acres or 10.3%. All the proposed houses are located on Lot 1, which is 59.46 acres, and the remaining Lot 2 will have 76.35 acres, of which 40.27 acres are being deeded as public space. The project, as proposed, is a much less impactful alternative to the original proposal of 295 townhouses and single-family units known as Chatfield Farms II (see Chapfield-II.pdf), which had a proposed impervious area of 25.2 acres or 18.6%.**
2. Minimize impervious cover and septic density, and;
- R. Impervious area has been minimized with the current proposal by clustering the units in the northern portion of the property. The septic systems are small individual systems located near each unit throughout the developed area, versus a large community system consolidating all the flow in one location.**
3. Avoid developing the most hydrologically sensitive portions of the Site.



- R. The property is located at the divide of two watersheds. The majority of the proposed development is located on the northern watershed, which discharges to a wetlands area along the Beacon Heights landfill and then on to a tributary of the Hackanum Brook. A Smaller portion of the development discharges south towards a wetland area, which then flows into a tributary of Hopp Brook. The project avoids developing near wetland areas and limits its disturbance to the northern portion of the property, and preserves the sensitive wetlands areas and watersheds to the south. The project includes best management practices, including a storm water treatment train that includes deep sump catch basins, 4- hydrodynamic separators, 2 wet bottom retention ponds, and 2 level spreaders to promote groundwater recharge and water quality from the proposed site. Please see attached Engineering report as Appendix A**
- 4.. DPH recommends that any environmental review conducted should at a minimum:
- R. See attached Phase 1 environmental review. See Appendix B**
- 5 DPH recommends that the Applicant develop an Erosion and Sedimentation Control (ESC) plan consistent with the Connecticut Guidelines for Soil Erosion & Sediment Control Guidelines All ESC measures should be developed in consultation with the municipal inland wetlands commission, installed prior to disturbance, maintained throughout construction, kept in place until disturbed areas are fully stabilized, and inspected regularly and after significant precipitation events, with immediate corrective action where deficiencies are observed.
- R. The Project has an approved (by local town Inland Wetlands & storm water commissions) and State Compliant ESC Plan as part of the plan set, and a pollution control plan with ESC measures issued to the DEEP with our General Permit Application Form for the Discharge of Stormwater from Construction Activities is included in Appendix C .**
6. Stable vegetative cover should be installed over disturbed areas as soon as practicable. All grading and drainage features should preserve or enhance the Site's pollutant attenuation and infiltration capacity and avoid creating concentrated, erosive discharges toward or within the Watershed. Any dewatering associated with construction activities should be controlled, filtered, and discharged in a manner that prevents erosion and avoids direct discharge to sensitive drainage pathways.
- R. Will comply, the project is phased to reduce the amount of disturbed areas to a minimum, phase 1 is the creation of the storm water ponds and 16 house, which will be constructed one or two at a time, and will not disturb the remainder of the site until the current phase of houses is complete and the area is stabilized with vegetation. All storm water and dewatering will be filtered and treated as per the project drawing set and the pollution control plan. Stormwater is directed to water treatment units and retention ponds and the any dewatering will be directed to dewatering filters and then to the storm water control system.**



7. The stormwater system should be designed, constructed and maintained to direct runoff northwest and away from the Watershed boundary and in consistency with the Connecticut Stormwater Manual⁴. Pre-construction stormwater analysis should assess the long-term efficacy of the proposed stormwater infrastructure and controls, including the two detention ponds, and evaluate how those controls will function during phased construction and prior to full buildout.

R The Majority of the site is constructed and directs water to the north west watershed, only a small portion of the development is within the south eastern water shed, (as shown in the figure below) both water sheds have a treatment train and storm water controls to insure good water quality and promote filtration and infiltration of the storm water. The southerly water shed has a dedicated 40.27 acre open space buffer and wetland areas before leaving the site to the south east. Also refer to Appendix B the Phase 1 Environmental report section 3.2 &3.3.





8. DPH recommends that the Applicant develop an Operations and Maintenance (O&M) Plan for all stormwater and source water protection infrastructure at the Site, including detention ponds, pretreatment, conveyance, drainage and discharge components, and emergency overflow areas.
- R. Attached in appendix D is the Storm water Maintenance Plan**
9. DPH recommends that the Applicant prepare and implement a Spill Prevention, Control, and Countermeasure (SPCC) Plan for both construction and operation of the Proposed Project.
- R. Attached in Appendix E is the Spill Prevention plan.**
10. Coordination with RWA and the NVHD is essential before, during, and after construction. The Applicant should provide each with points of contact, a copy of final site plans, and reasonable access for observation during construction and phasing transitions. Following completion of the Project, RWA should be granted reasonable access to monitor and inspect the Site to ensure protection of this public water supply resource.
- R. Will comply, RWA and NVHD will have full access to the site and materials upon request. Approval for Phase 1 Septic systems has been received from NVHD, (see Appendix F) and coordination will continue throughout the building permit and construction process.**

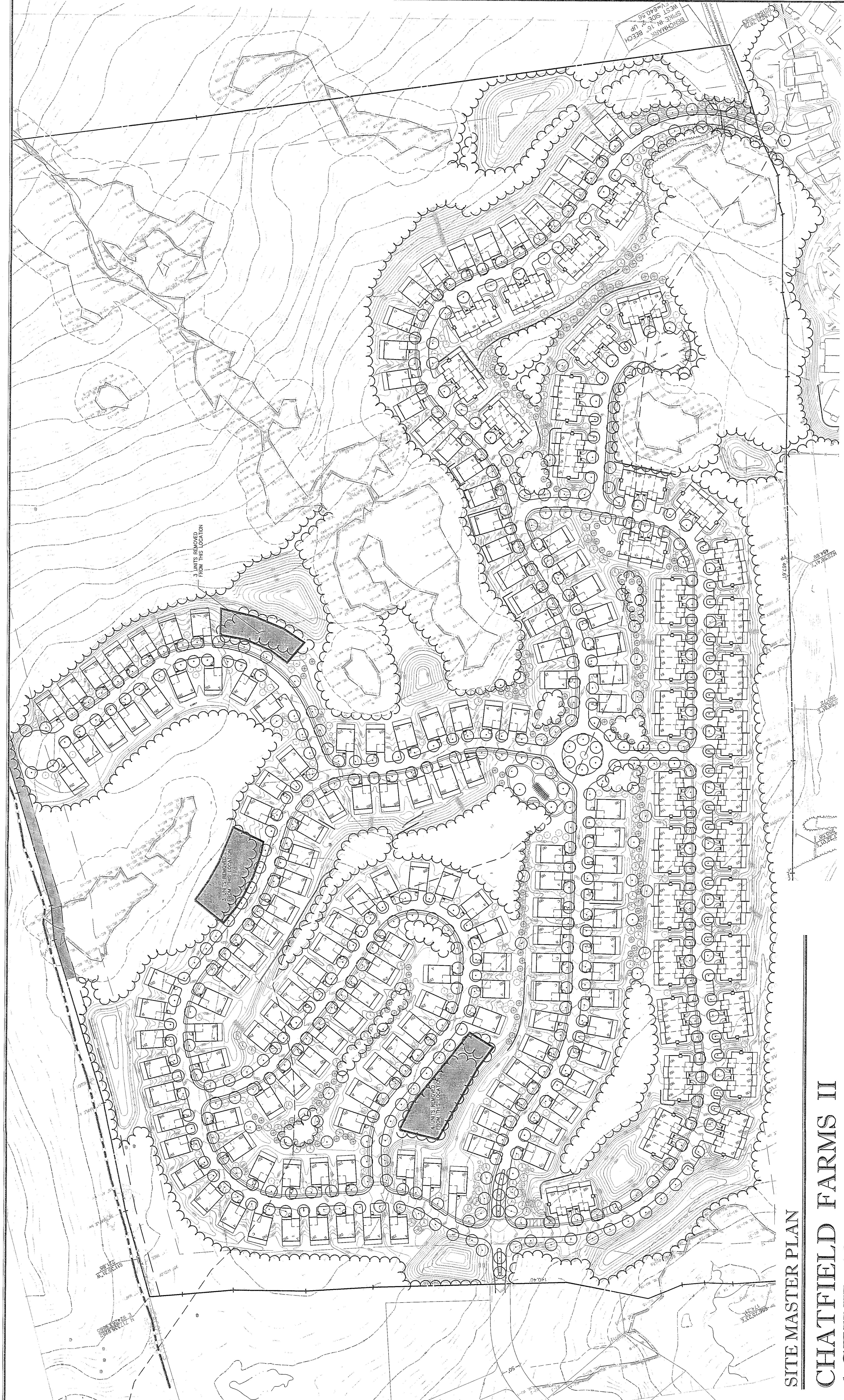
Should you require any additional information, please do not hesitate to contact our office.

Sincerely,


Manuel J. Silva
Project Manager



Previous Proposed Site Plans Chapfield II



SITE MASTER PLAN

CHATFIELD FARMS II
ACTIVE ADULT COMMUNITY

MILLER ROAD & BEAR HILL ROAD
BEACON FALLS, CONNECTICUT MAY 12, 2008

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BEACON FALLS, CONNECTICUT

2. INFORMATION REGARDING THE LOCATION OF EXISTING UTILITIES HAS BEEN BASED UPON AVAILABLE INFORMATION AND MAY BE INCOMPLETE, AND WHERE SHOWN SHOULD BE CONSIDERED APPROXIMATE. THE LOCATION OF ALL EXISTING UTILITIES SHOULD BE CONFIRMED PRIOR TO BEGINNING CONSTRUCTION. CALL "CALL BEFORE YOU DIG" AT 1-800-922-4445. THE LOCATION OF ALL UTILITIES SHALL BE SHOWN ON THE PLANS FOR THE RESOLUTION.

3. MALLON & MCKENSON, INC. ACCEPTS NO RESPONSIBILITY FOR THE ACCURACY OF MAPS AND DATA WHICH HAVE BEEN SUPPLIED BY OTHERS.

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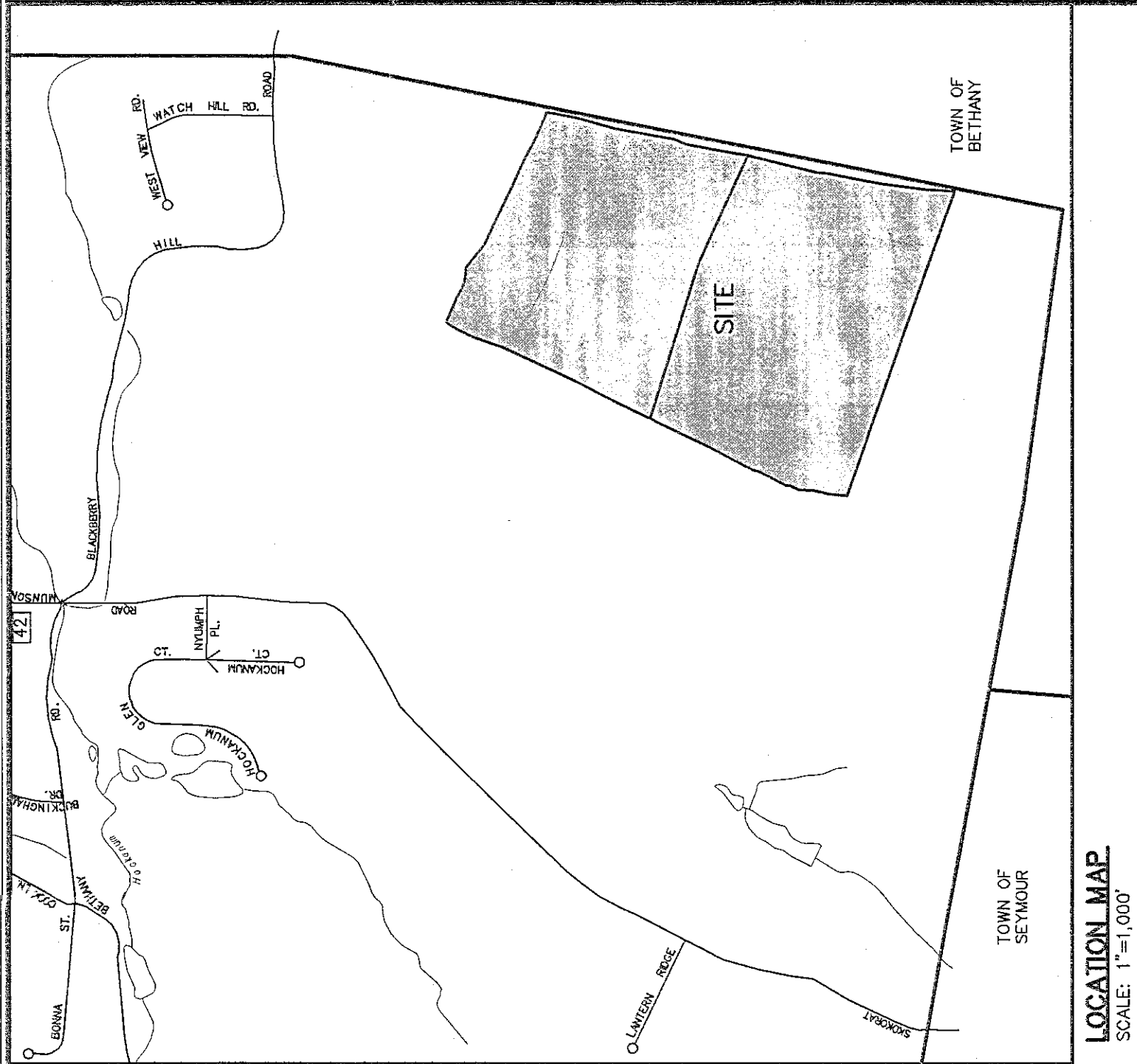
AREA:	±135 ACRES
ZONE:	R1
PROPOSED USE:	ACTIVE ADULT PLANNED RESIDENTIAL DEVELOPMENT

ZONING DATA		REQUIRED/ALLOWED	PROPOSED
OPEN SPACE		>15% (20.4 AC.)	40.9% (55.5 AC.)
MAX. STRUCTURE COVERAGE		20% (27.1 AC.)	10.3% (13.9 AC.)
MAX. IMPERVIOUS COVERAGE		25% (33.9 AC.)	18.6% (25.2 AC.)
MIN. BUILDING SEPARATION		20'	>20'
SETRBACK FROM INTERIOR ROADS		100'	>20'
ADJACENT PROPERTY SETBACK		100'	100'

OPEN SPACE	REQUIRED/ALLOWED
MAX. STRUCTURE COVERAGE	>15% (20.4 AC.)
MAX. IMPERVIOUS COVERAGE	20% (27.1 AC.)
MAX. IMPERVIOUS COVERAGE	25% (33.9 AC.)
MAX. BUILDING HEIGHT	35'
MIN. BUILDING SEPARATION	20'
SETBACK FROM INTERIOR ROADS	>20'
ADJACENT PROPERTY SETBACK	100'

1	TITLE SHEET
EX1-EX2	EXISTING CONDITIONS MAP
4	MASTER SITE PLAN
L1-L8	SITE PLAN - LAYOUT AND LANDSCAPING
G1-G8	SITE PLAN - GRADING AND UTILITIES
EC1-EC8	SOIL EROSION AND SEDIMENT CONTROL
1 OF 1	CONSTRUCTION SEQUENCE PHASING PLAN
P1-P12	ROADWAY PLAN AND PROFILE SHEETS
D1-D9	SITE DETAIL SHEETS

PLANS PREPARED FOR LOCAL REGULATORY APPROVAL ONLY



LOCATION MAP
SCALE 1"=1000'

LEGEND

PROPOSED		EXISTING
STREET LINE PROPERTY LINE CONTOUR SPOT GRADE WETLANDS TREE LINE TREE STONE WALL SANITARY SEWER W/ MANHOLE STORM DRAIN W/ CATCH BASIN DOMESTIC WATER IRON PIPE MONUMENT CONSTRUCTION ENTRANCE PAD RETAINING WALL SEDIMENT FILTER FENCE TEMPORARY DIVERSION BERM	70 x70.5	70 x70.5

OWNER:
AURORA ROSA, A SINGLE WOMAN
27 BELINSKY CIRCLE
OXFORD, CT 06478

APPLICANT: AURORA ROSA ET AL
27 BELINSKY CIRCLE
OXFORD, CT 06478

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2288-09
PROJECT NO.



Appendix A

SITE ENGINEERING DESIGN REPORT

SITE ENGINEERING DESIGN REPORT

Hopp Brook Estates
Proposed Residential Development
Oakwood drive
Beacon Falls, Connecticut
Job No. 2215

Prepared For:
Hopp Brook Developers

Prepared By:



Manuel J. Silva
Project Manager

April 01, 2019
Revised 2-09-21
Revised 01-02-25
Revised 02-12-25

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Appendix A	Storm Water Hydrographs
Appendix B	Inlet report (Gutter flow analysis for catch basin on site)
Appendix C	Drainage Statement
Appendix D	HGL storm sewer calculation 100-year storm
Appendix E	Level Spreader Calculations
Appendix F	Drainage Area Maps, Existing & Proposed Conditions

INTRODUCTION:

Hopp Brook Developers is proposing the construction of 109 new residential detached dwellings to be located on the two parcels totaling 135 acres at the end of Oakwood Drive. The majority of the proposed dwellings will have a total floor area of approximately 2,830 square feet, distributed over two (2) stories. This new construction is proposed within a previously proposed residential development known as "Chatfield II".

Currently, the property is made up of 2 parcels. The entire site in general is a wooded area with little under story with some wetland areas.

The storm water runoff from the site flows in two directions easterly to a large wetland area that flows southerly and forms an unnamed tributary to Hopp Brook and Northerly towards a wetland west of Oakwood Drive.

This site has an existing accessway to Oakwood Drive. One driveway is proposed for this development accessing Oakwood Drive in Beacon Falls. Upon completion of the development, parking will be provided for 393 cars, 188 of these spaces will be garage spaces located in the houses 2 car garages.

EXISTING STORMWATER RUNOFF

For analysis purposes, the site has been examined as having two drainage areas. These two drainage areas will be referred to as DA-S (East & Southern drainage area flowing to the large wetland to the east), and DA-N (West and Northern drainage area flowing to Wetland near Oakwood Drive).

The storm water runoff from the site flows in two directions southeasterly to a large wetland area that flows southerly and forms an unnamed tributary to Hopp Brook and northwesterly.

Based on the above, it is apparent that there is two points of interest associated with the existing drainage pattern, the point immediately prior to the southeasterly portion of the property to a large wetland area, where the site drains to the unnamed tributary to the Hopp Brook, and the point immediately prior to the Northwesterly portion of the property. Peak rates of storm water runoff, for 5, 10, 25, 50 and 100 year storm events, have been calculated for this point of interest. The rates are depicted on Table 1. The supporting calculations are included as Appendix A.

These existing flows will later be compared to post development flows as a means of assessing the potential flow impact on surrounding infrastructures.

TABLE 1
Existing Flows (CFS)

Existing Runoff from Northwestern watershed area to be developed				
<u>DA-N</u>				
5-year	10-year	25-year	50-year	100-year
25.69	36.52	52.33	64.57	78.23
Existing Runoff from Southeastern watershed area to be developed				
<u>DA-S</u>				
5-year	10-year	25-year	50-year	100-year
15.46	21.98	31.48	38.85	47.06

PROPOSED STORM WATER DRAINAGE

The plans are designed to minimize potential impacts to adjacent properties and the existing storm water infrastructure.

Without storm water quality measures, proposed development of this site will increase the Weighted Runoff Coefficient (WRC) and decrease the Time of Concentration (T_c), resulting in an increase in the peak rate of storm water runoff. However, the construction of, two (2) Storm Water Management Areas (SWMA) actually result in a reduction of post-development rate of runoff relative to predevelopment conditions.

Design details for these systems are presented on Sheet SP-2 (part of the overall Project Documents). The system will drain the roofs, sidewalks, grassy areas, Club house, pool area, and parking lot associated with the 94 single-family homes development. The roofs and parking lots will be the major elements of the total impervious area on the site. (calculations included as Appendix A, Gutter flow analysis included as Appendix B) The roof, grassy areas, sidewalks and driveways will contribute to the runoff totals seen in table 2.

The northwesterly SWMA (Pond 1) has a total storage volume of approximately 96,503 c. f. and the maximum water depth has been calculated to be 10 feet. This SWMA will reduce the post development peak rate of runoff by 2.47 cfs for the one hundred year storm. The southwesterly SWMA (Pond 2) has a total storage volume of approximately 133,331 c. f. and the maximum water depth has been calculated to be 6 feet. This SWMA will reduce the post development peak rate of runoff by 37.48 cfs for the one hundred year storm. As indicated in the following summary and attached computations, the proposed development will reduce the peak rate of runoff to less than the pre-developed condition for both the Northwesterly and Southeasterly water sheds on site.

The development as proposed will not have an adverse impact on the surrounding wetlands or watercourses.

Table 2, (below) represents the combined effect of these flow patterns on the existing infrastructures. Flows from the proposed systems will produce peak flows that are less than the existing peak flows from the two watersheds on the site.

TABLE 2

Proposed Flows (CFS) for new condition				
Proposed Runoff from Northwestern watershed area to be developed				
		<u>DA-n</u>		
5-year	10-year	25-year	50-year	100-year
24.47	33.88	44.76	58.88	75.76

Percent reduction of runoff from the site

5 year	10 year	25 year	50year	100year
5%	7.2%	14%	8.8%	3%

Proposed Runoff from Southeastern watershed area to be developed

		<u>DA-E</u>		
5-year	10-year	25-year	50-year	100-year
4.933	5.963	7.21	8.01	9.58

Percent reduction of runoff from the site

5 year	10 year	25 year	50year	100year
68%	72%	77%	79%	79%

SANITARY SEWER

Sanitary Sewer discharge will be through a proposed 8-inch PVC sanitary sewer line to a proposed septic system for each phase of the project. Each phase will have a system that can accommodate 16- 3 bedroom houses.

Using the technical standards of the Connecticut Public Health Code, the estimated sewage flow is 150 gallons per day per bedroom. This development will have no more than 48 bedrooms per phase or a total of 327:

16 units have 3 bedrooms per Phase/system and a total 109 units for all phases

$16 \times 3 = 48$; $109 \times 3 = 327$ total bedrooms

$48 \times 150 = 7,200$ gallons per day average flow max per phase

$327 \times 150 = 49,050$ gallons per day average total for all phases

Average Daily Flow = 5 gpm per phase; =34.06 all phases

$$\begin{aligned}\text{Peak flow estimate} &= \frac{5 \times 5 (\text{peaking factor})}{34 \times 5 (\text{peaking factor})} = \frac{25}{170} \\ &= 25 \text{ gpm Peak or } 0.055 \text{ cfs} \\ &= 170 \text{ gpm Peak or } 0.37 \text{ cfs}\end{aligned}$$

Other Utilities

All proposed utilities to the site will be through underground utility connections. Electrical service will be from existing aboveground electric utility line in proposed streets. Water service will be from an existing water main in the proposed streets.

APPENDIX A
STAGE HYDROGRAPHS

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5 - Year

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10 - Year

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25 - Year

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50 - Year

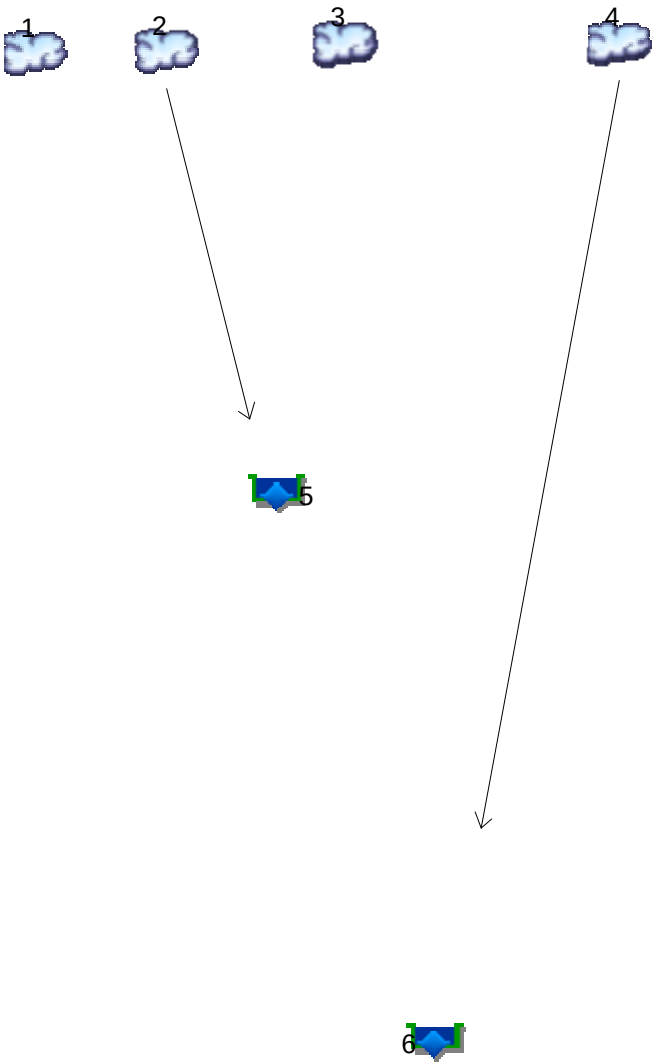
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Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020



Legend

Hyd.	Origin	Description
1	SCS Runoff	ex da-1
2	SCS Runoff	proposed da-1
3	SCS Runoff	DA-2 Existing
4	SCS Runoff	Proposed DA-2
5	Reservoir	pond 1 control
6	Reservoir	pond 2 control

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Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

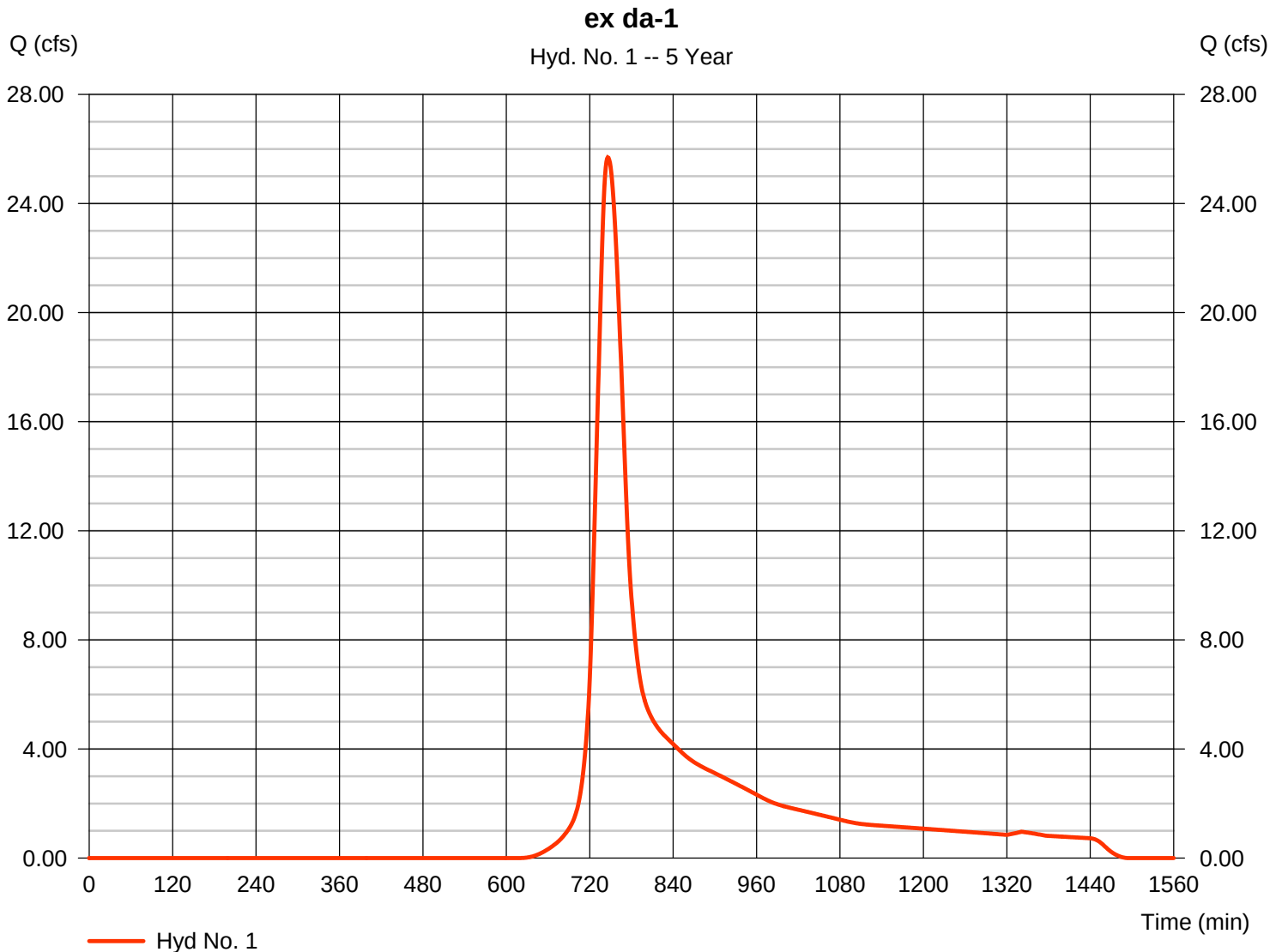
Thursday, 01 / 7 / 2021

Hyd. No. 1

ex da-1

Hydrograph type = SCS Runoff
 Storm frequency = 5 yrs
 Time interval = 1 min
 Drainage area = 24.700 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 4.71 in
 Storm duration = 24 hrs

Peak discharge = 25.69 cfs
 Time to peak = 746 min
 Hyd. volume = 150,276 cuft
 Curve number = 68
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 34.90 min
 Distribution = Type III
 Shape factor = 484



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No. 1

ex da-1

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.400	0.011	0.011	
Flow length (ft)	= 300.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.62	0.00	0.00	
Land slope (%)	= 6.00	0.00	0.00	
Travel Time (min)	= 31.33	+	0.00	+
			0.00	= 31.33
Shallow Concentrated Flow				
Flow length (ft)	= 837.00	0.00	0.00	
Watercourse slope (%)	= 6.00	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=3.95	0.00	0.00	
Travel Time (min)	= 3.53	+	0.00	+
			0.00	= 3.53
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00	0.00	0.00	
Flow length (ft)	({0})0.0	0.0	0.0	
Travel Time (min)	= 0.00	+	0.00	+
			0.00	= 0.00
Total Travel Time, Tc				34.90 min

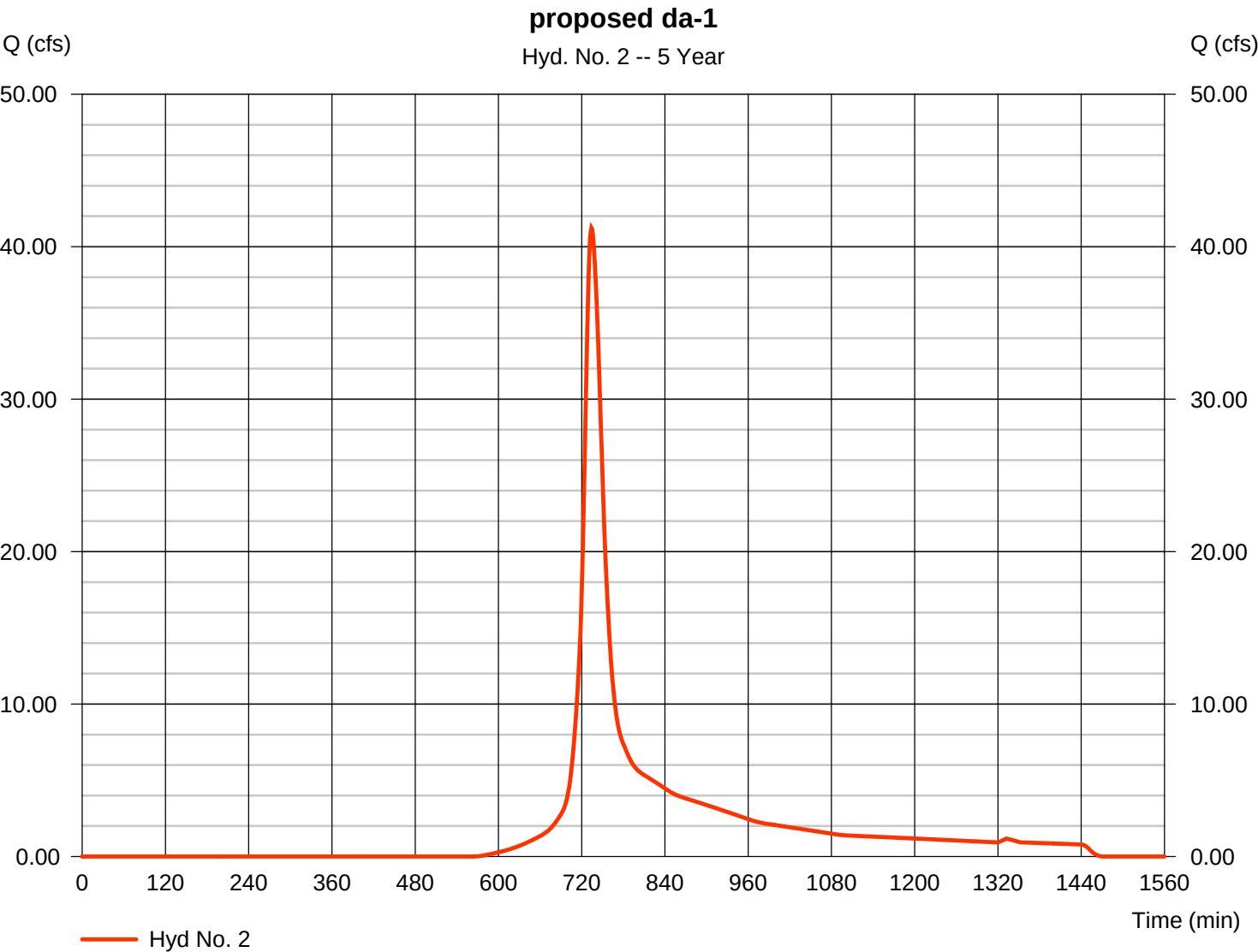
Hydrograph Report

Hyd. No. 2

proposed da-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	41.24 cfs
Storm frequency	=	5 yrs	Time to peak	=	734 min
Time interval	=	1 min	Hyd. volume	=	184,294 cuft
Drainage area	=	24.700 ac	Curve number	=	73*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	19.30 min
Total precip.	=	4.71 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(16.650 x 61) + (8.050 x 98)] / 24.700



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No. 2

proposed da-1

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>			
Sheet Flow							
Manning's n-value	= 0.011	0.150	0.011				
Flow length (ft)	= 300.0	300.0	0.0				
Two-year 24-hr precip. (in)	= 3.62	3.62	0.00				
Land slope (%)	= 5.00	5.00	0.00				
Travel Time (min)	= 1.90	+	15.38	+	0.00	=	17.28
Shallow Concentrated Flow							
Flow length (ft)	= 0.00	0.00	0.00				
Watercourse slope (%)	= 0.00	0.00	0.00				
Surface description	= Paved	Paved	Paved				
Average velocity (ft/s)	=0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Channel Flow							
X sectional flow area (sqft)	= 1.76	0.00	0.00				
Wetted perimeter (ft)	= 4.71	0.00	0.00				
Channel slope (%)	= 0.50	0.00	0.00				
Manning's n-value	= 0.011	0.015	0.015				
Velocity (ft/s)	=4.95	0.00	0.00				
Flow length (ft)	(0)600.0	0.0	0.0				
Travel Time (min)	= 2.02	+	0.00	+	0.00	=	2.02
Total Travel Time, Tc					19.30 min		

Hydrograph Report

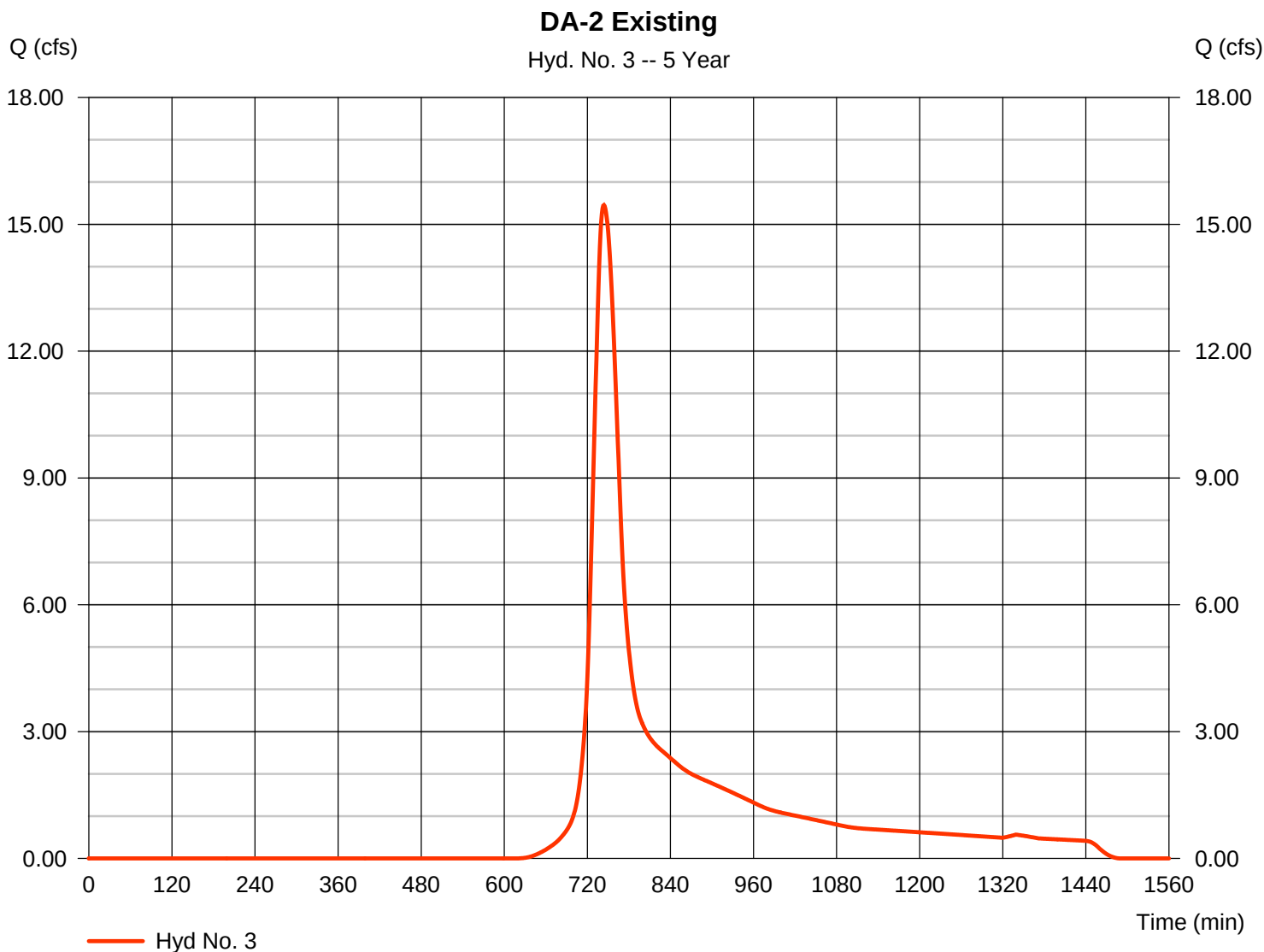
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

Hyd. No. 3

DA-2 Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 15.46 cfs
Storm frequency	= 5 yrs	Time to peak	= 744 min
Time interval	= 1 min	Hyd. volume	= 86,533 cuft
Drainage area	= 14.130 ac	Curve number	= 68
Basin Slope	= 6.0 %	Hydraulic length	= 300 ft
Tc method	= TR55	Time of conc. (Tc)	= 32.00 min
Total precip.	= 4.71 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No. 3

DA-2 Existing

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.400	0.011	0.011	
Flow length (ft)	= 300.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.62	0.00	0.00	
Land slope (%)	= 6.00	0.00	0.00	
Travel Time (min)	= 31.33	+ 0.00	+ 0.00	= 31.33
Shallow Concentrated Flow				
Flow length (ft)	= 250.00	0.00	0.00	
Watercourse slope (%)	= 13.00	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=5.82	0.00	0.00	
Travel Time (min)	= 0.72	+ 0.00	+ 0.00	= 0.72
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00	0.00	0.00	
Flow length (ft)	({0})0.0	0.0	0.0	
Travel Time (min)	= 0.00	+ 0.00	+ 0.00	= 0.00
Total Travel Time, Tc				32.00 min

Hydrograph Report

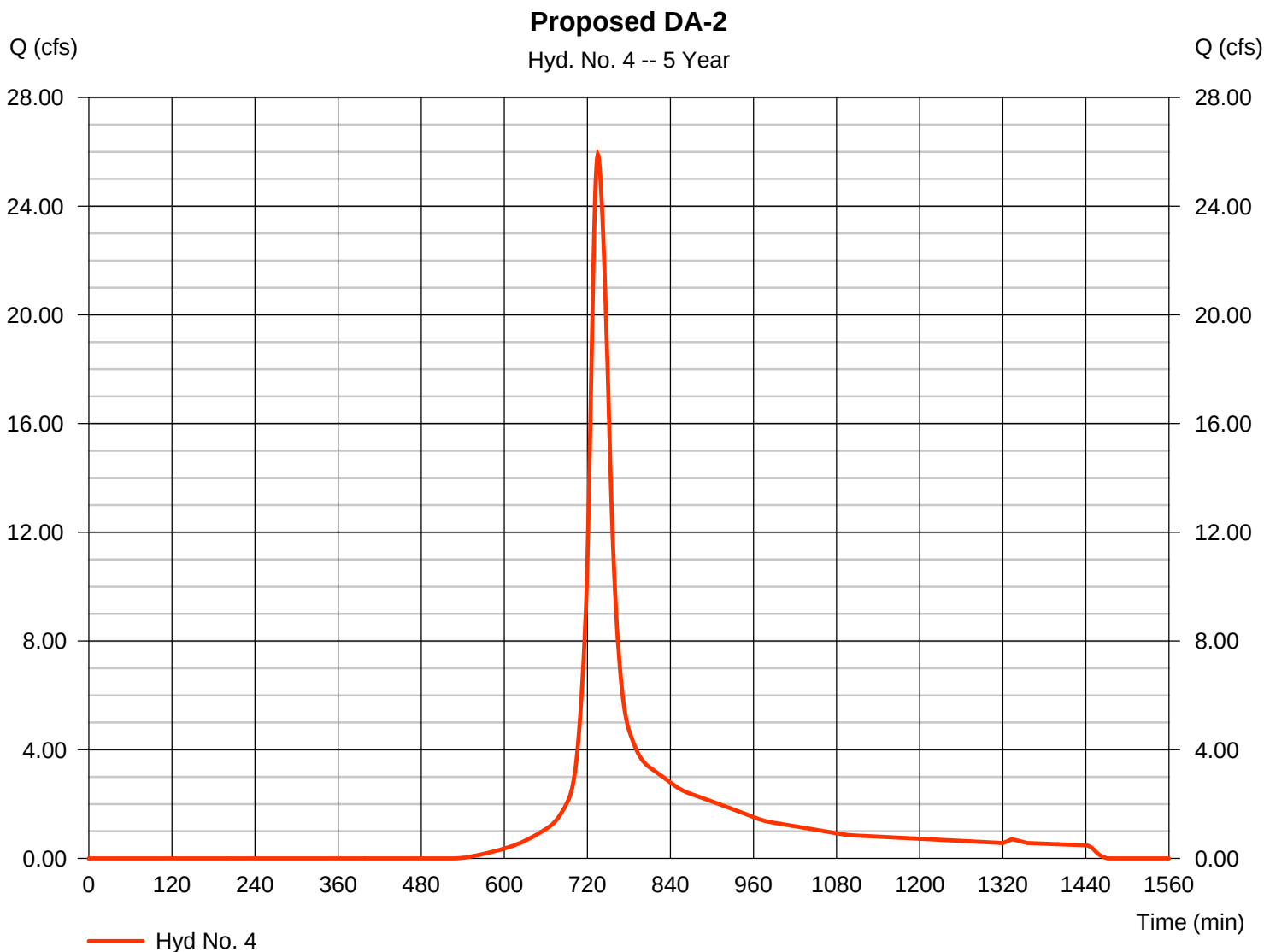
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

Hyd. No. 4

Proposed DA-2

Hydrograph type	= SCS Runoff	Peak discharge	= 25.91 cfs
Storm frequency	= 5 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 119,034 cuft
Drainage area	= 14.130 ac	Curve number	= 76*
Basin Slope	= 6.0 %	Hydraulic length	= 300 ft
Tc method	= TR55	Time of conc. (Tc)	= 21.60 min
Total precip.	= 4.71 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(5.839 \times 98) + (8.290 \times 61)] / 14.130$ 

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No. 4

Proposed DA-2

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>			
Sheet Flow							
Manning's n-value	= 0.011	0.150	0.011				
Flow length (ft)	= 300.0	300.0	0.0				
Two-year 24-hr precip. (in)	= 3.62	3.62	0.00				
Land slope (%)	= 5.00	5.00	0.00				
Travel Time (min)	= 1.90	+	15.38	+	0.00	=	17.28
Shallow Concentrated Flow							
Flow length (ft)	= 0.00	0.00	0.00				
Watercourse slope (%)	= 0.00	0.00	0.00				
Surface description	= Paved	Paved	Paved				
Average velocity (ft/s)	=0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Channel Flow							
X sectional flow area (sqft)	= 1.76	0.00	0.00				
Wetted perimeter (ft)	= 4.71	0.00	0.00				
Channel slope (%)	= 0.50	0.00	0.00				
Manning's n-value	= 0.011	0.015	0.015				
Velocity (ft/s)	=4.95	0.00	0.00				
Flow length (ft)	((0})1287.0	0.0	0.0				
Travel Time (min)	= 4.33	+	0.00	+	0.00	=	4.33
Total Travel Time, Tc				21.60 min			

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

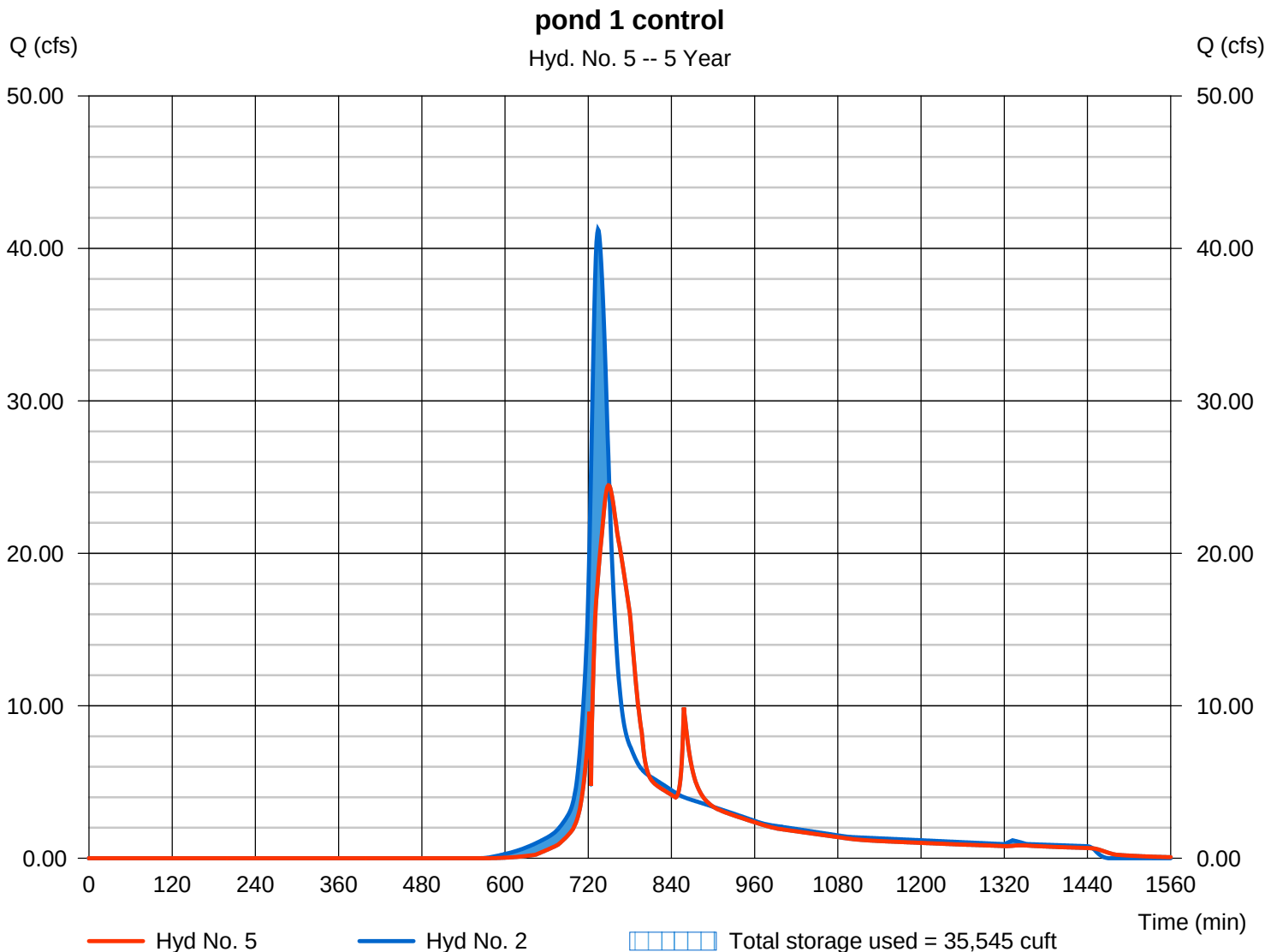
Thursday, 01 / 7 / 2021

Hyd. No. 5

pond 1 control

Hydrograph type	= Reservoir	Peak discharge	= 24.47 cfs
Storm frequency	= 5 yrs	Time to peak	= 749 min
Time interval	= 1 min	Hyd. volume	= 166,029 cuft
Inflow hyd. No.	= 2 - proposed da-1	Max. Elevation	= 654.67 ft
Reservoir name	= pond 1	Max. Storage	= 35,545 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond No. 1 - pond 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 650.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	650.00	5,918	0	0
2.00	652.00	7,279	13,172	13,172
4.00	654.00	8,754	16,009	29,181
6.00	656.00	10,344	19,074	48,255
8.00	658.00	12,048	22,368	70,623
10.00	660.00	13,856	25,880	96,503

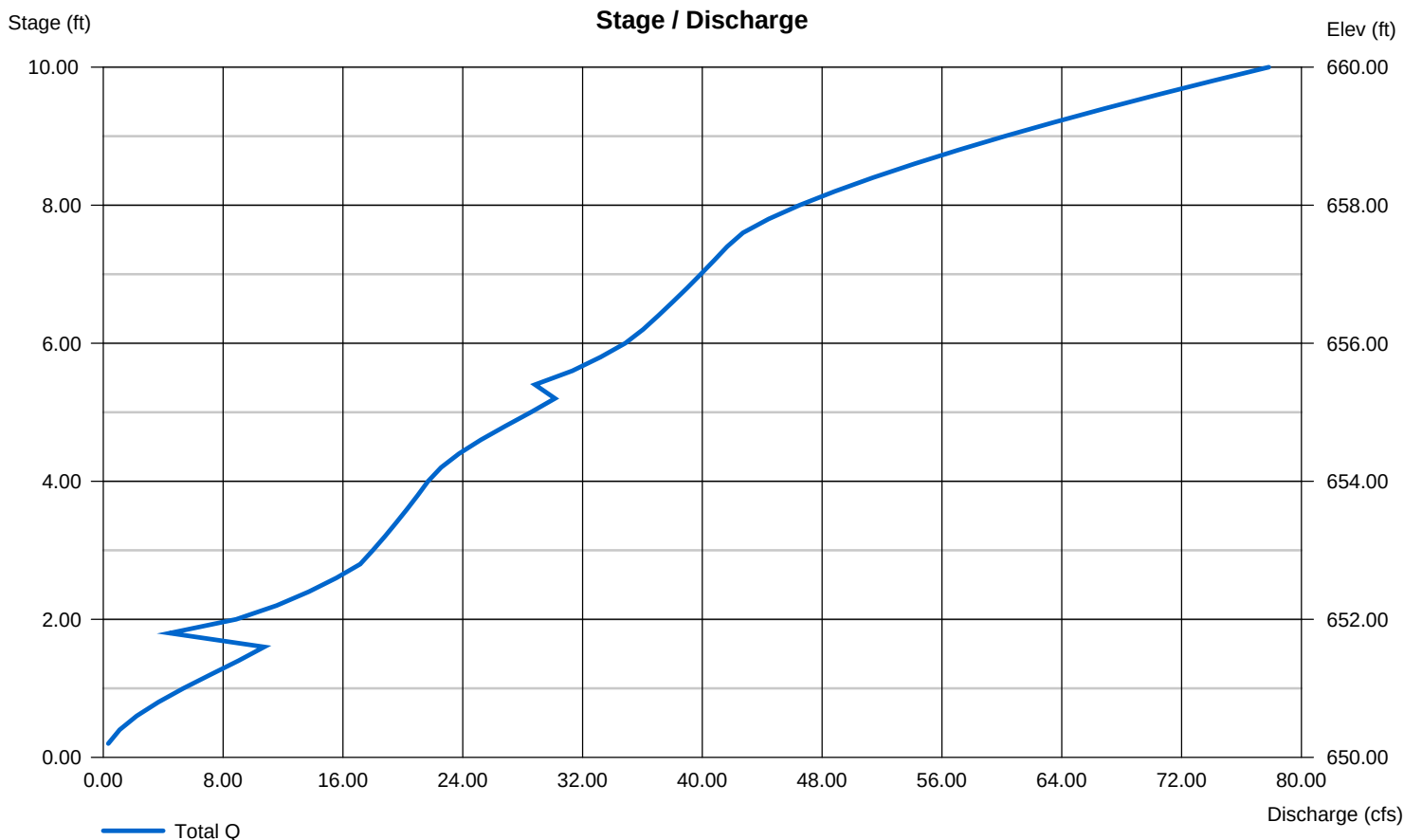
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	21.00	15.50	0.00
Span (in)	= 0.00	21.00	15.50	0.00
No. Barrels	= 0	1	1	0
Invert El. (ft)	= 0.00	650.00	654.00	0.00
Length (ft)	= 0.00	0.50	0.50	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	2.00	0.00	0.00
Crest El. (ft)	= 0.00	657.50	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	Rect	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 6.000 (by Contour)			
TW Elev. (ft)	= 0.00			

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



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

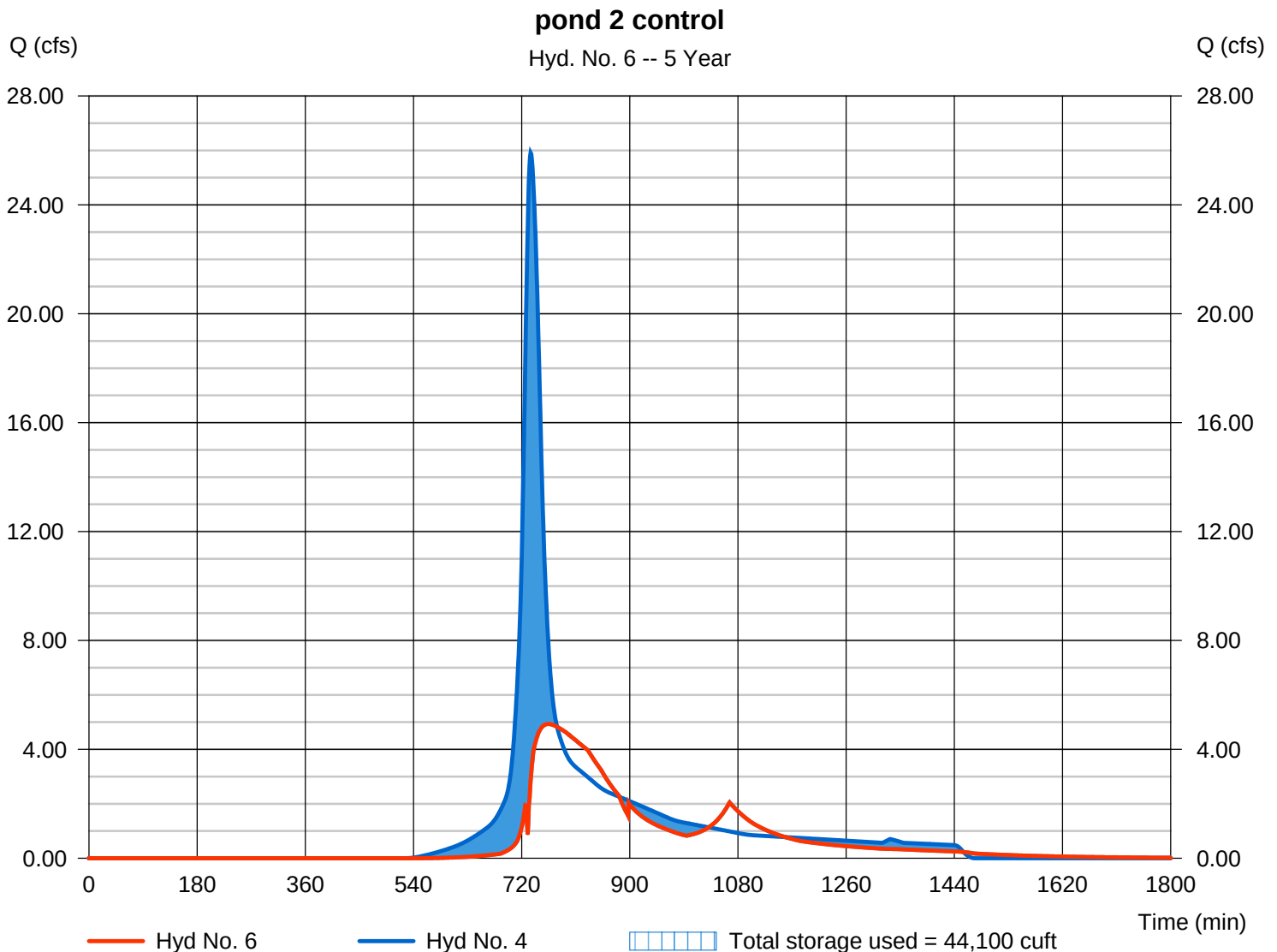
Thursday, 01 / 7 / 2021

Hyd. No. 6

pond 2 control

Hydrograph type	= Reservoir	Peak discharge	= 4.933 cfs
Storm frequency	= 5 yrs	Time to peak	= 764 min
Time interval	= 1 min	Hyd. volume	= 68,776 cuft
Inflow hyd. No.	= 4 - Proposed DA-2	Max. Elevation	= 692.20 ft
Reservoir name	= pond 2	Max. Storage	= 44,100 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

13

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

Pond No. 2 - pond 2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 690.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	690.00	18,677	0	0
2.00	692.00	20,975	39,626	39,626
4.00	694.00	23,406	44,354	83,980
6.00	696.00	25,972	49,351	133,331

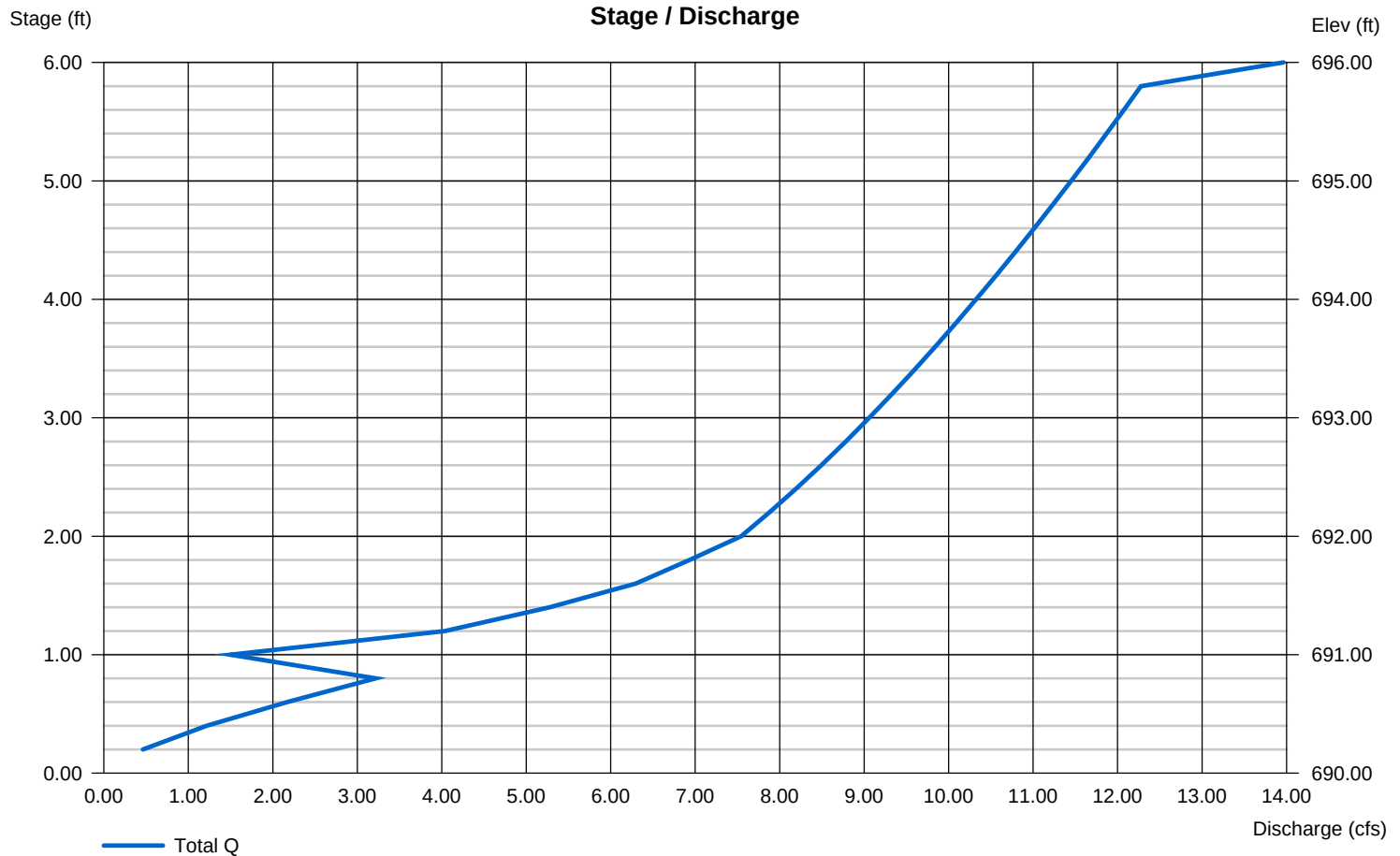
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	12.00	0.00	0.00
Span (in)	= 0.00	12.00	0.00	0.00
No. Barrels	= 0	1	0	0
Invert El. (ft)	= 0.00	690.00	0.00	0.00
Length (ft)	= 0.00	0.50	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	5.00	0.00	0.00
Crest El. (ft)	= 0.00	695.80	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	Rect	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 6.000 (by Contour)			
TW Elev. (ft)	= 0.00			

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



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

Hyd. No. 1

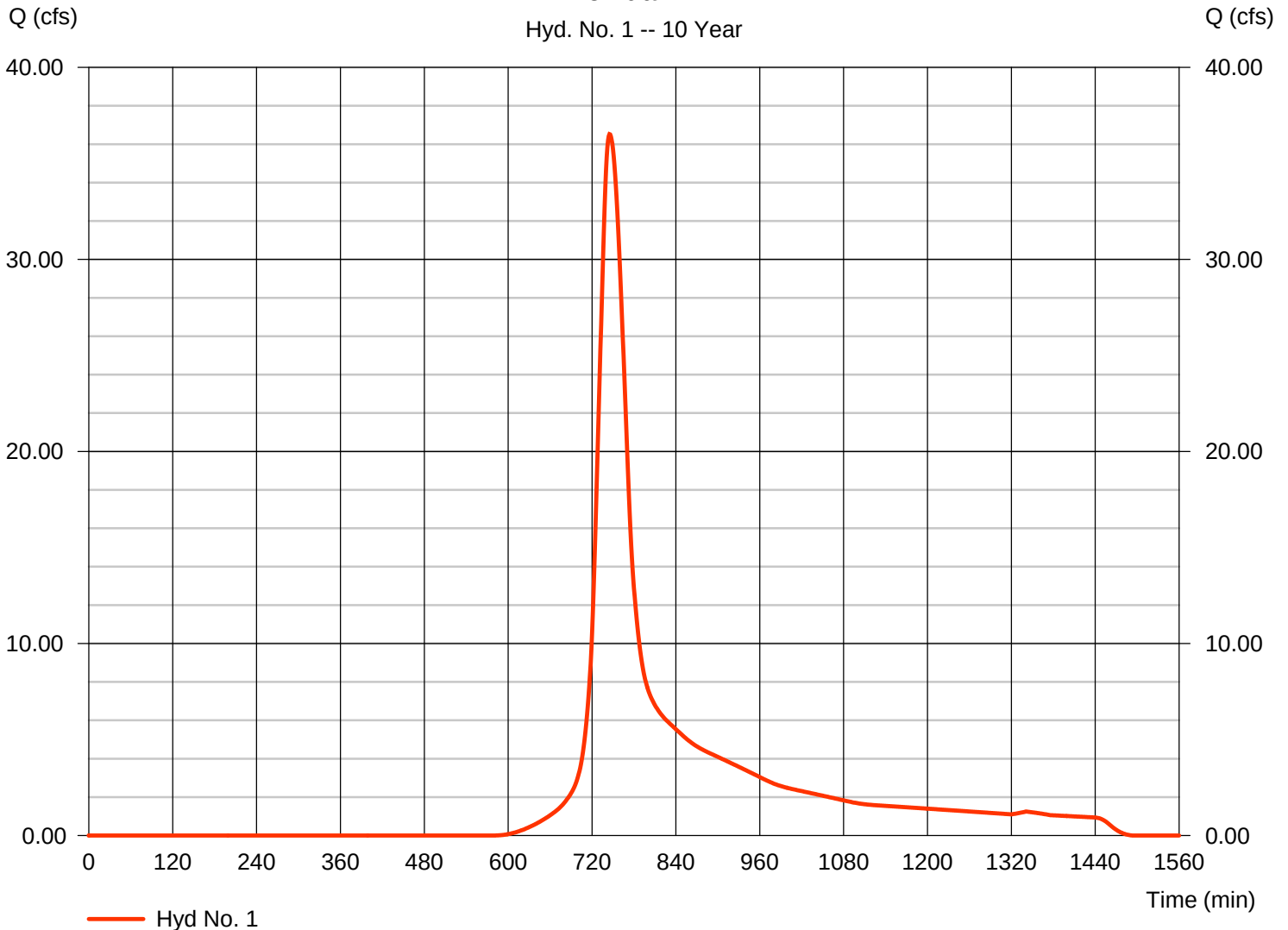
ex da-1

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 24.700 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 5.62 in
 Storm duration = 24 hrs

Peak discharge = 36.52 cfs
 Time to peak = 745 min
 Hyd. volume = 209,149 cuft
 Curve number = 68
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 34.90 min
 Distribution = Type III
 Shape factor = 484

ex da-1

Hyd. No. 1 -- 10 Year



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

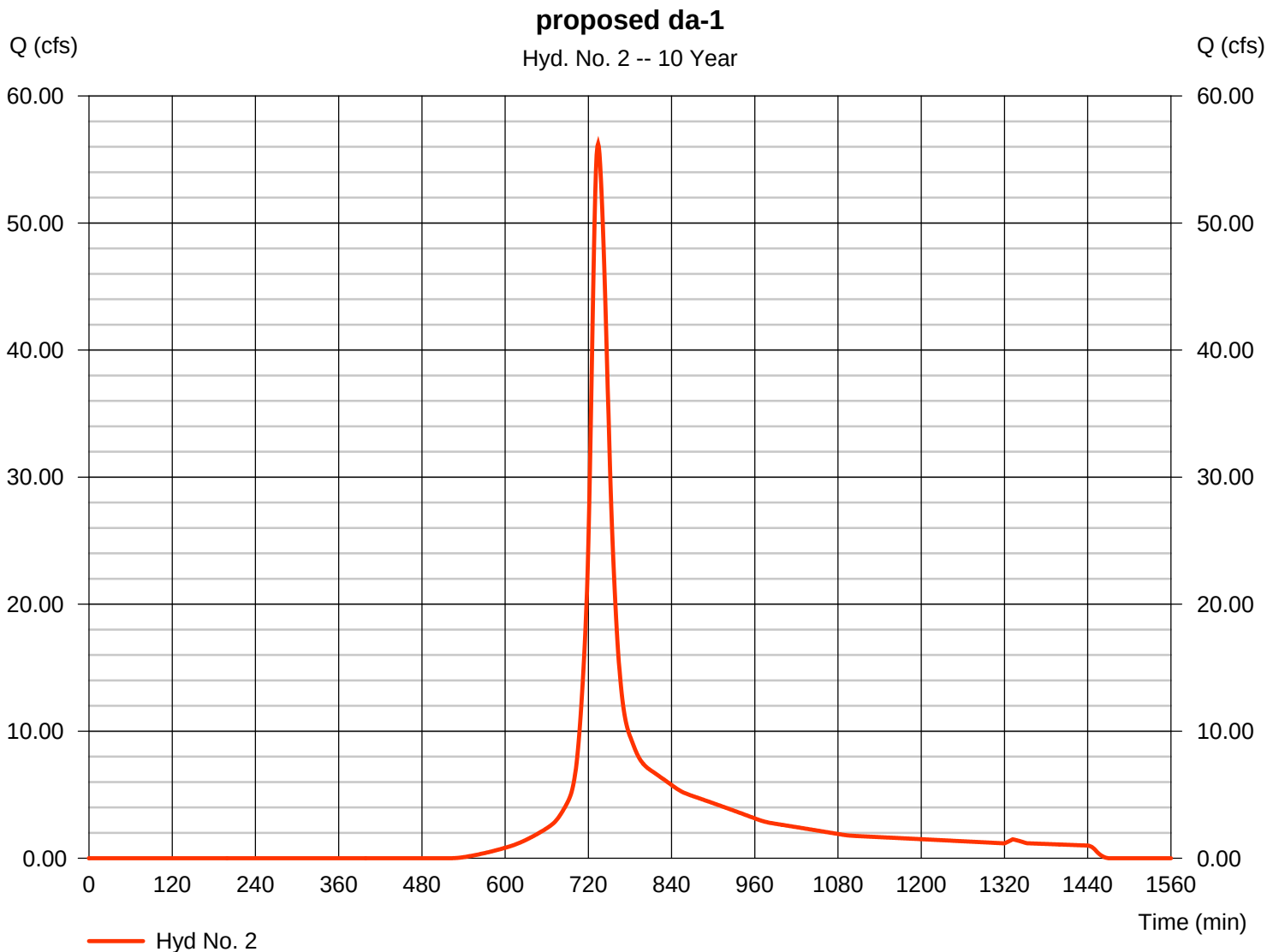
Hyd. No. 2

proposed da-1

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 24.700 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 5.62 in
 Storm duration = 24 hrs

Peak discharge = 56.24 cfs
 Time to peak = 734 min
 Hyd. volume = 248,920 cuft
 Curve number = 73*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 19.30 min
 Distribution = Type III
 Shape factor = 484

* Composite (Area/CN) = $[(16.650 \times 61) + (8.050 \times 98)] / 24.700$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

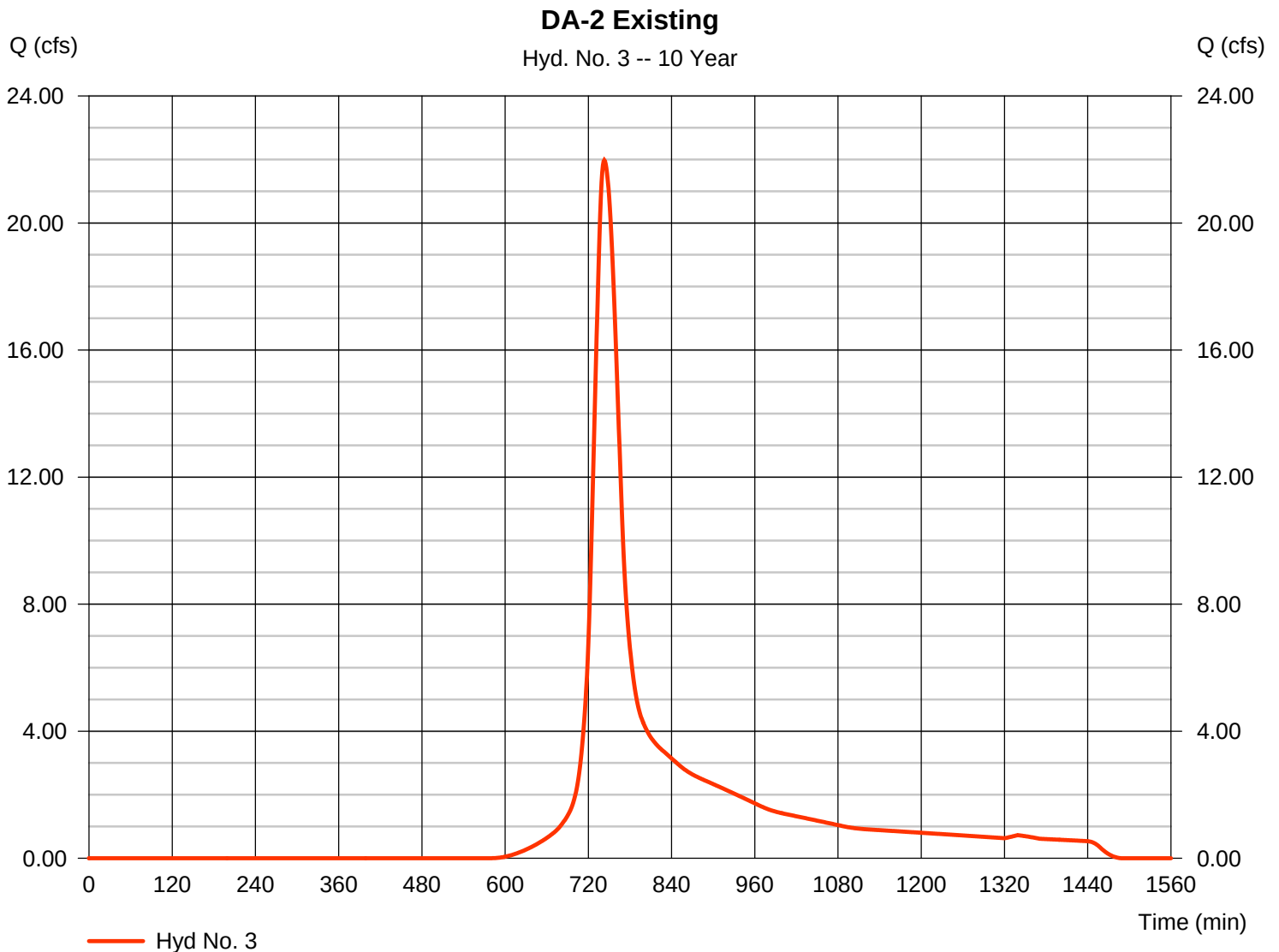
Thursday, 01 / 7 / 2021

Hyd. No. 3

DA-2 Existing

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 14.130 ac
 Basin Slope = 6.0 %
 Tc method = TR55
 Total precip. = 5.62 in
 Storm duration = 24 hrs

Peak discharge = 21.98 cfs
 Time to peak = 743 min
 Hyd. volume = 120,434 cuft
 Curve number = 68
 Hydraulic length = 300 ft
 Time of conc. (Tc) = 32.00 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

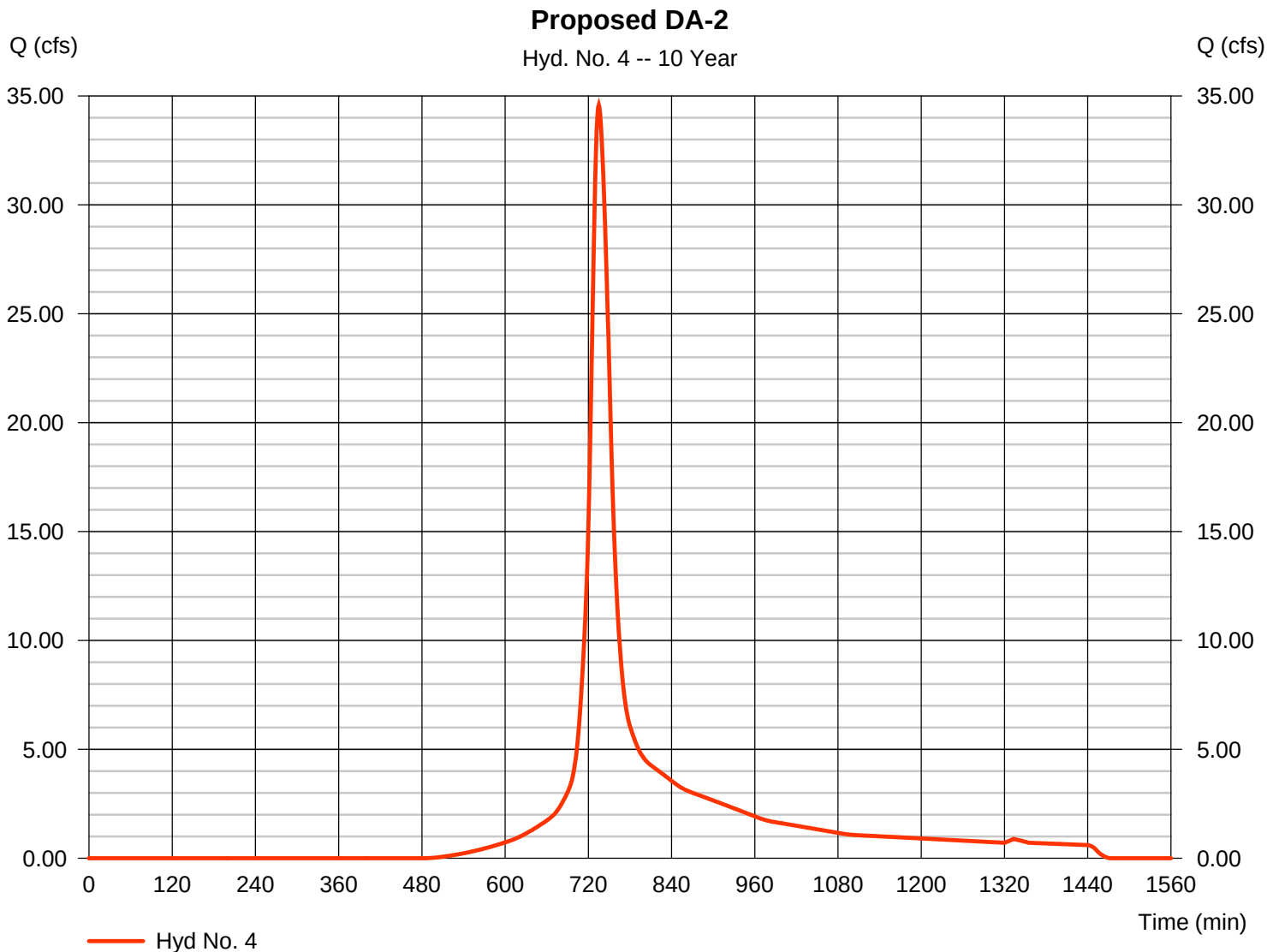
Hyd. No. 4

Proposed DA-2

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 14.130 ac
 Basin Slope = 6.0 %
 Tc method = TR55
 Total precip. = 5.62 in
 Storm duration = 24 hrs

Peak discharge = 34.59 cfs
 Time to peak = 735 min
 Hyd. volume = 158,187 cuft
 Curve number = 76*
 Hydraulic length = 300 ft
 Time of conc. (Tc) = 21.60 min
 Distribution = Type III
 Shape factor = 484

* Composite (Area/CN) = $[(5.839 \times 98) + (8.290 \times 61)] / 14.130$



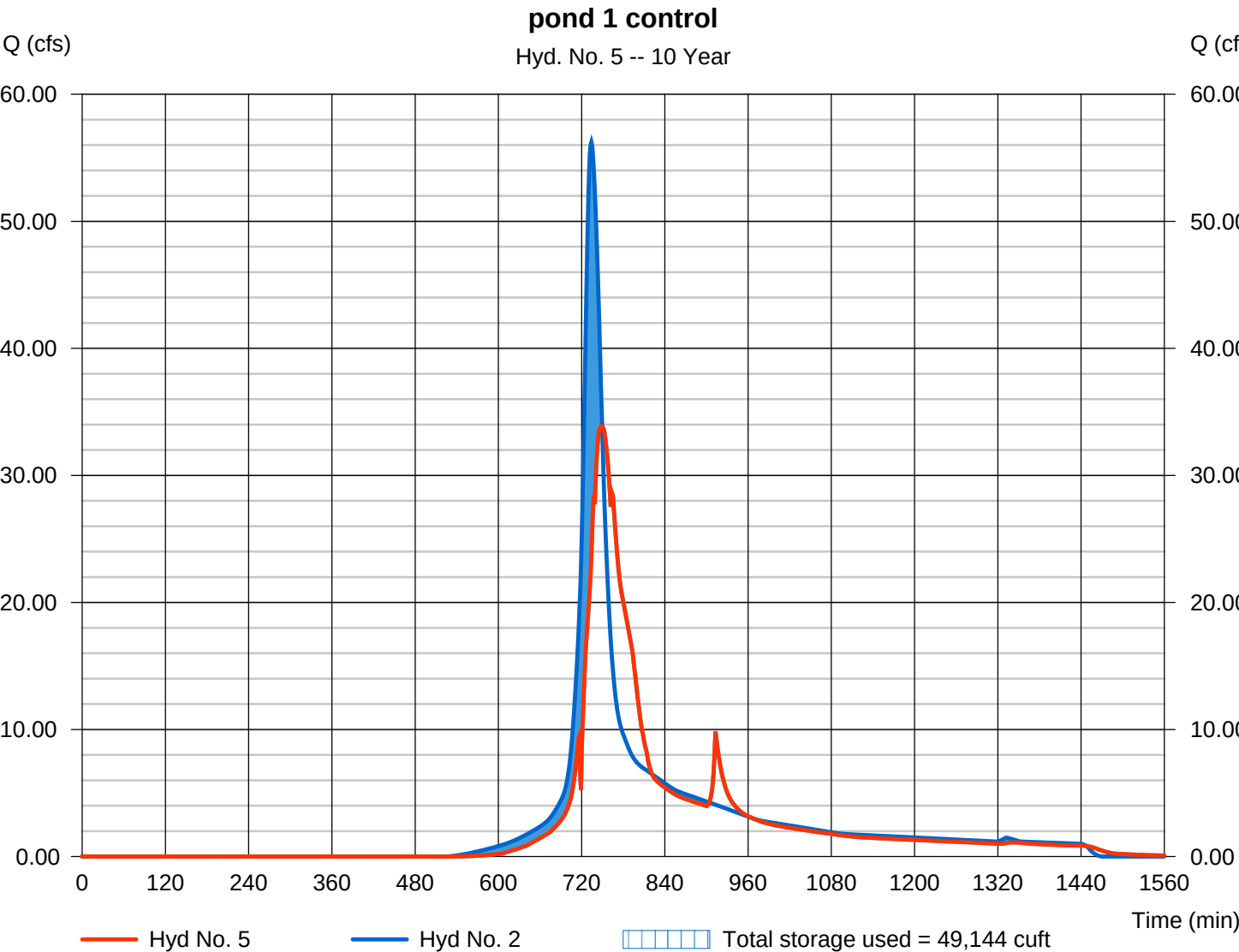
Hydrograph Report

Hyd. No. 5

pond 1 control

Hydrograph type	= Reservoir	Peak discharge	= 33.88 cfs
Storm frequency	= 10 yrs	Time to peak	= 749 min
Time interval	= 1 min	Hyd. volume	= 227,113 cuft
Inflow hyd. No.	= 2 - proposed da-1	Max. Elevation	= 656.08 ft
Reservoir name	= pond 1	Max. Storage	= 49,144 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

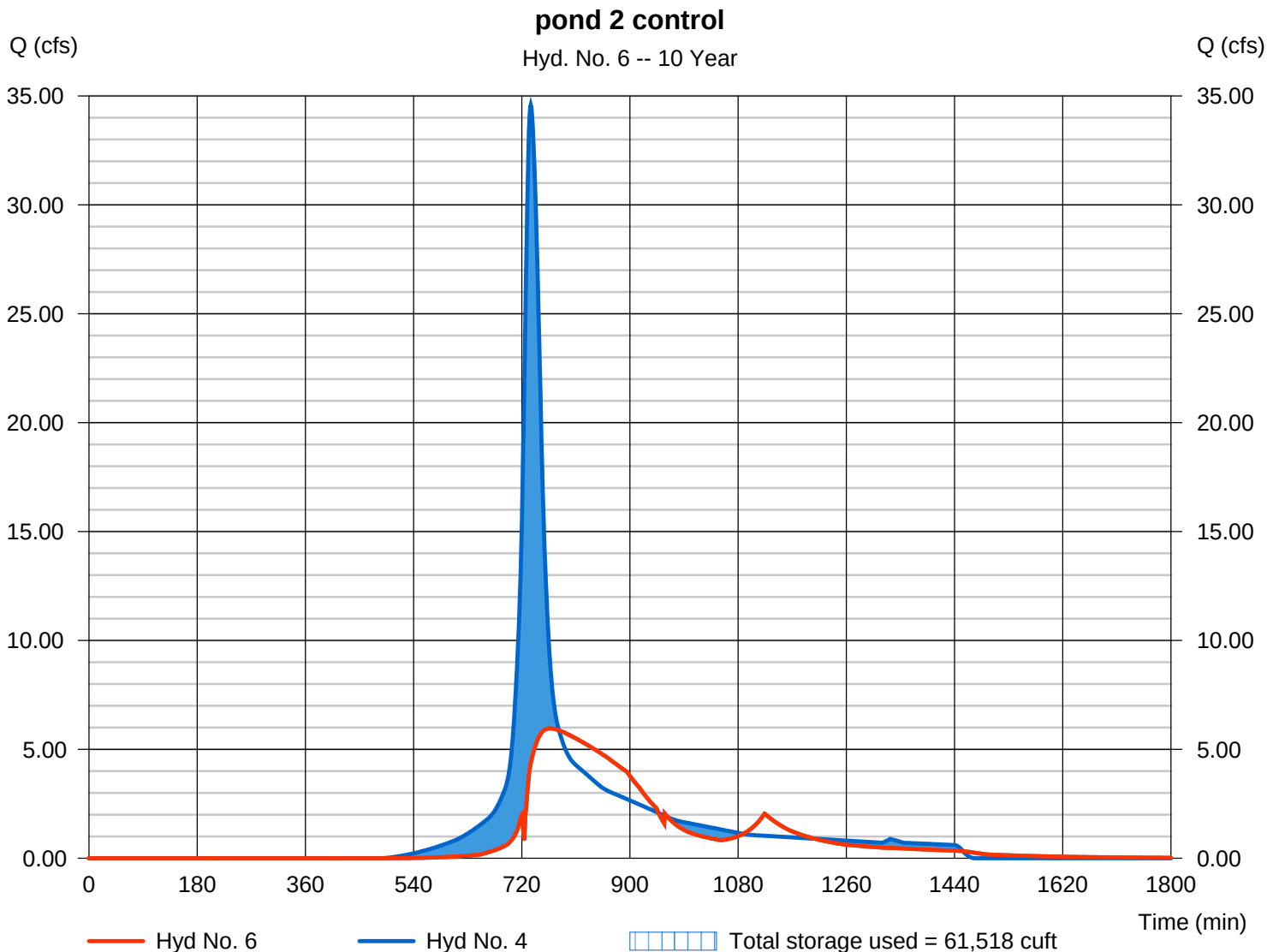
Thursday, 01 / 7 / 2021

Hyd. No. 6

pond 2 control

Hydrograph type	= Reservoir	Peak discharge	= 5.963 cfs
Storm frequency	= 10 yrs	Time to peak	= 767 min
Time interval	= 1 min	Hyd. volume	= 94,639 cuft
Inflow hyd. No.	= 4 - Proposed DA-2	Max. Elevation	= 692.99 ft
Reservoir name	= pond 2	Max. Storage	= 61,518 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

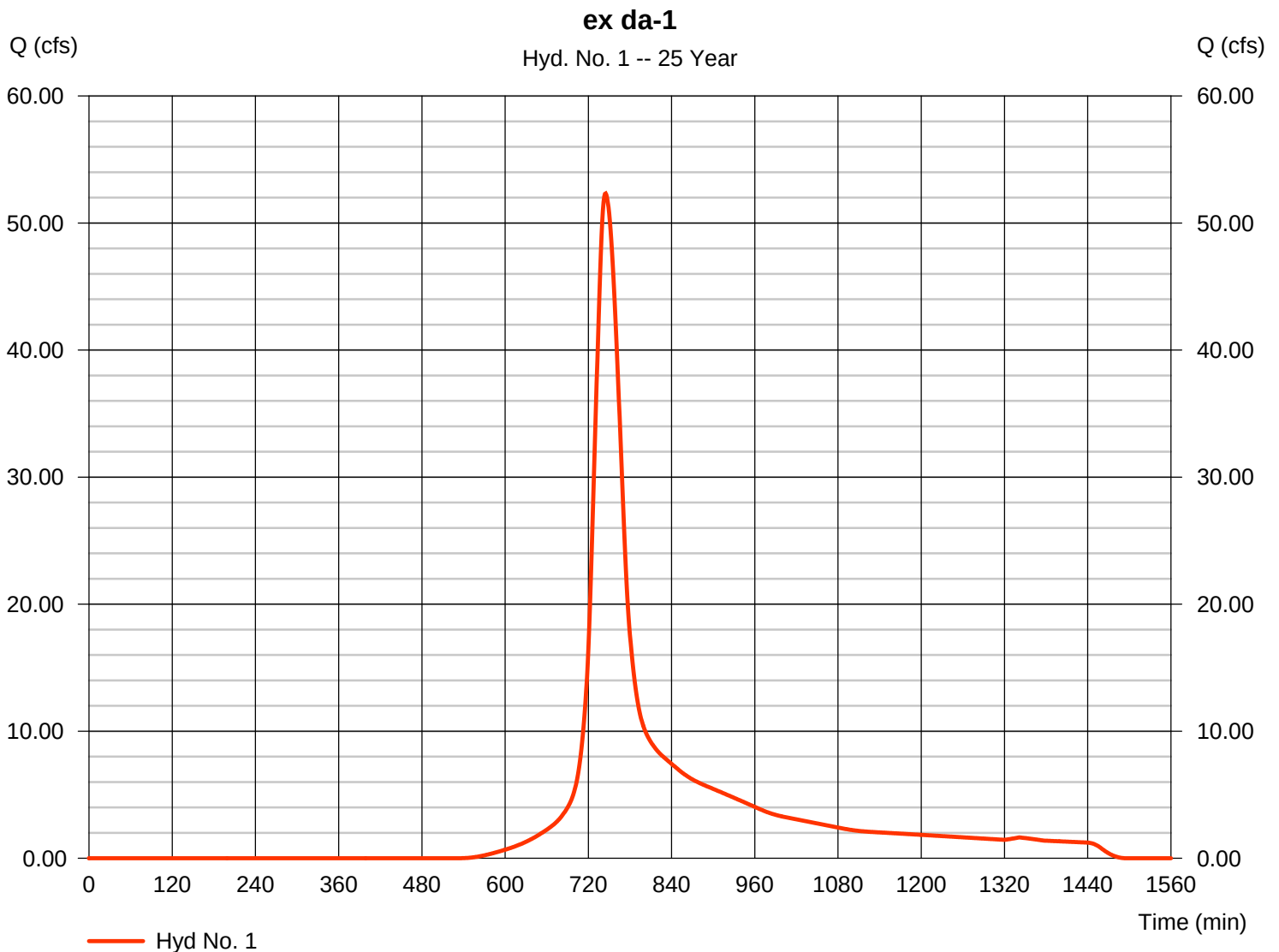
Thursday, 01 / 7 / 2021

Hyd. No. 1

ex da-1

Hydrograph type = SCS Runoff
 Storm frequency = 25 yrs
 Time interval = 1 min
 Drainage area = 24.700 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 6.86 in
 Storm duration = 24 hrs

Peak discharge = 52.33 cfs
 Time to peak = 745 min
 Hyd. volume = 295,636 cuft
 Curve number = 68
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 34.90 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

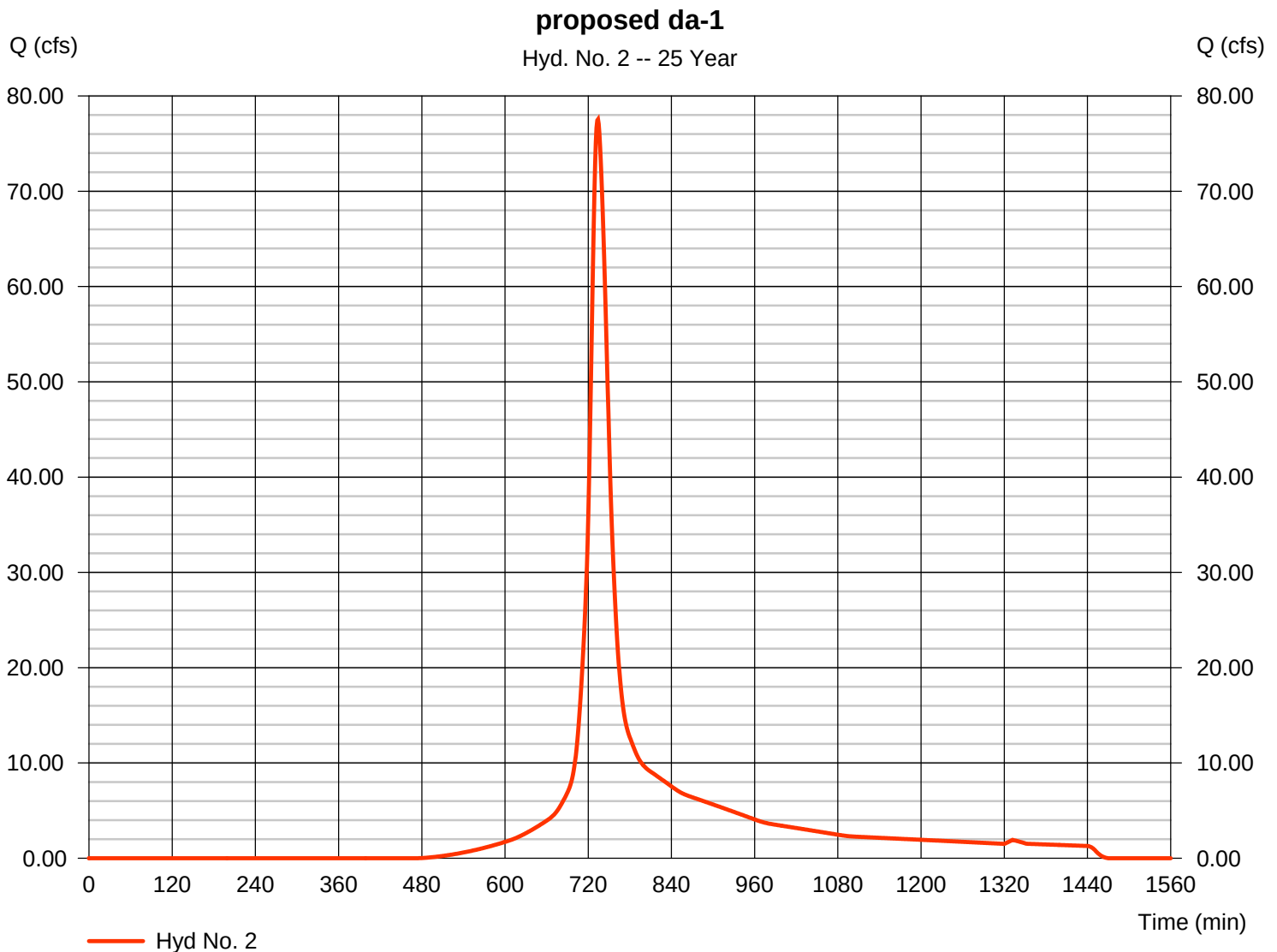
Hyd. No. 2

proposed da-1

Hydrograph type = SCS Runoff
 Storm frequency = 25 yrs
 Time interval = 1 min
 Drainage area = 24.700 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 6.86 in
 Storm duration = 24 hrs

Peak discharge = 77.54 cfs
 Time to peak = 734 min
 Hyd. volume = 342,044 cuft
 Curve number = 73*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 19.30 min
 Distribution = Type III
 Shape factor = 484

* Composite (Area/CN) = $[(16.650 \times 61) + (8.050 \times 98)] / 24.700$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

Hyd. No. 3

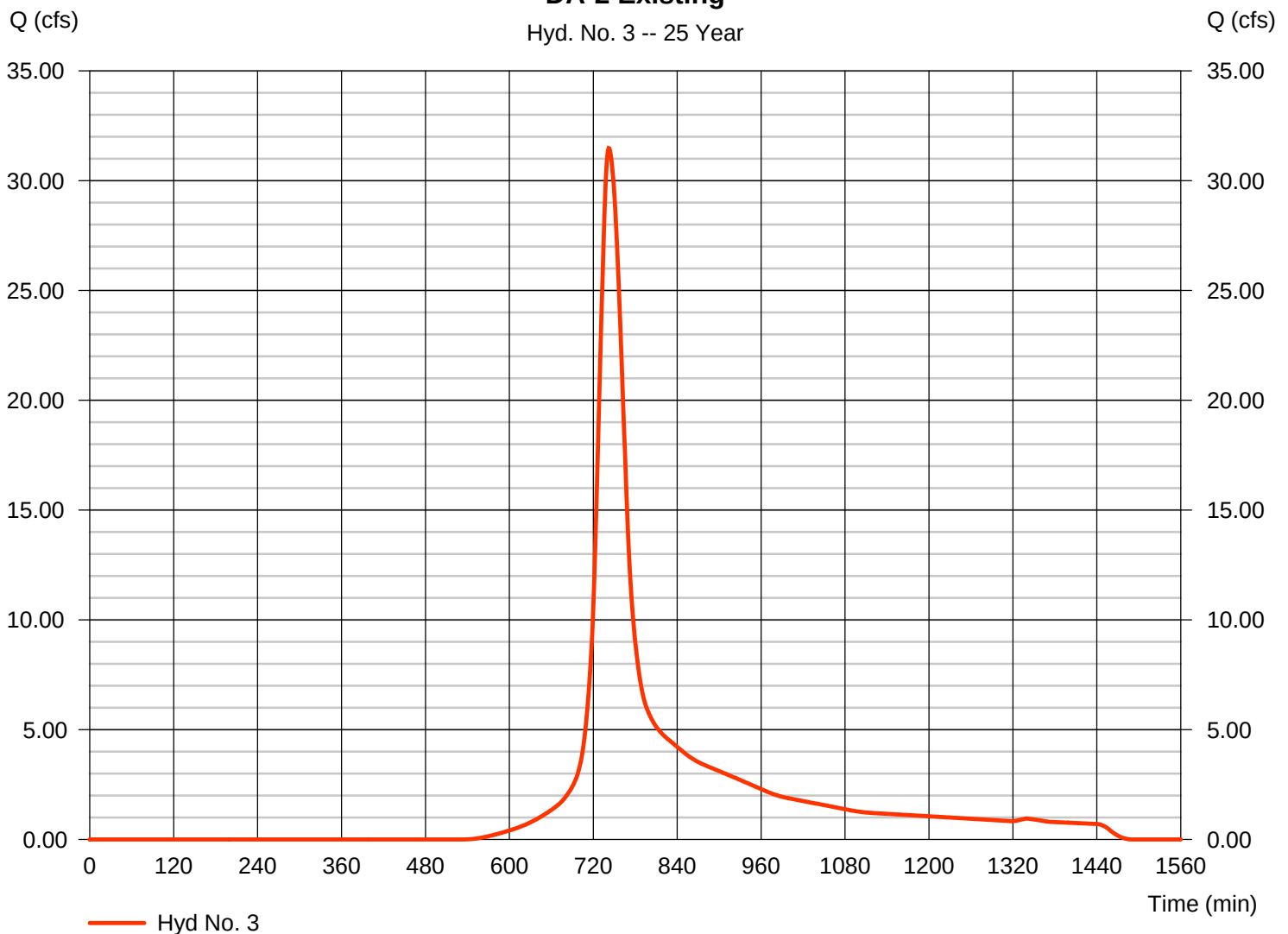
DA-2 Existing

Hydrograph type = SCS Runoff
 Storm frequency = 25 yrs
 Time interval = 1 min
 Drainage area = 14.130 ac
 Basin Slope = 6.0 %
 Tc method = TR55
 Total precip. = 6.86 in
 Storm duration = 24 hrs

Peak discharge = 31.48 cfs
 Time to peak = 742 min
 Hyd. volume = 170,236 cuft
 Curve number = 68
 Hydraulic length = 300 ft
 Time of conc. (Tc) = 32.00 min
 Distribution = Type III
 Shape factor = 484

DA-2 Existing

Hyd. No. 3 -- 25 Year



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

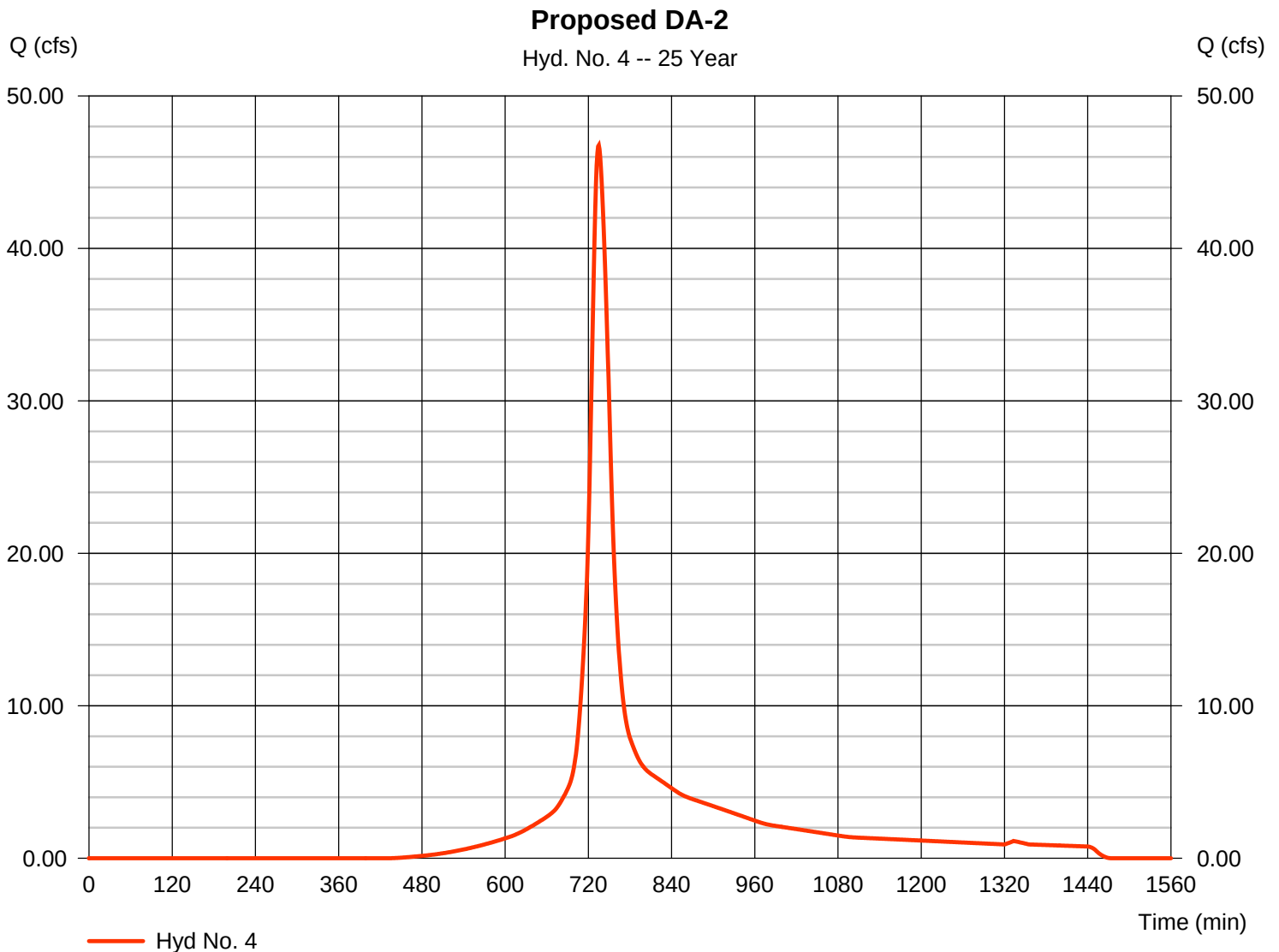
Hyd. No. 4

Proposed DA-2

Hydrograph type = SCS Runoff
 Storm frequency = 25 yrs
 Time interval = 1 min
 Drainage area = 14.130 ac
 Basin Slope = 6.0 %
 Tc method = TR55
 Total precip. = 6.86 in
 Storm duration = 24 hrs

Peak discharge = 46.76 cfs
 Time to peak = 735 min
 Hyd. volume = 214,026 cuft
 Curve number = 76*
 Hydraulic length = 300 ft
 Time of conc. (Tc) = 21.60 min
 Distribution = Type III
 Shape factor = 484

* Composite (Area/CN) = $[(5.839 \times 98) + (8.290 \times 61)] / 14.130$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

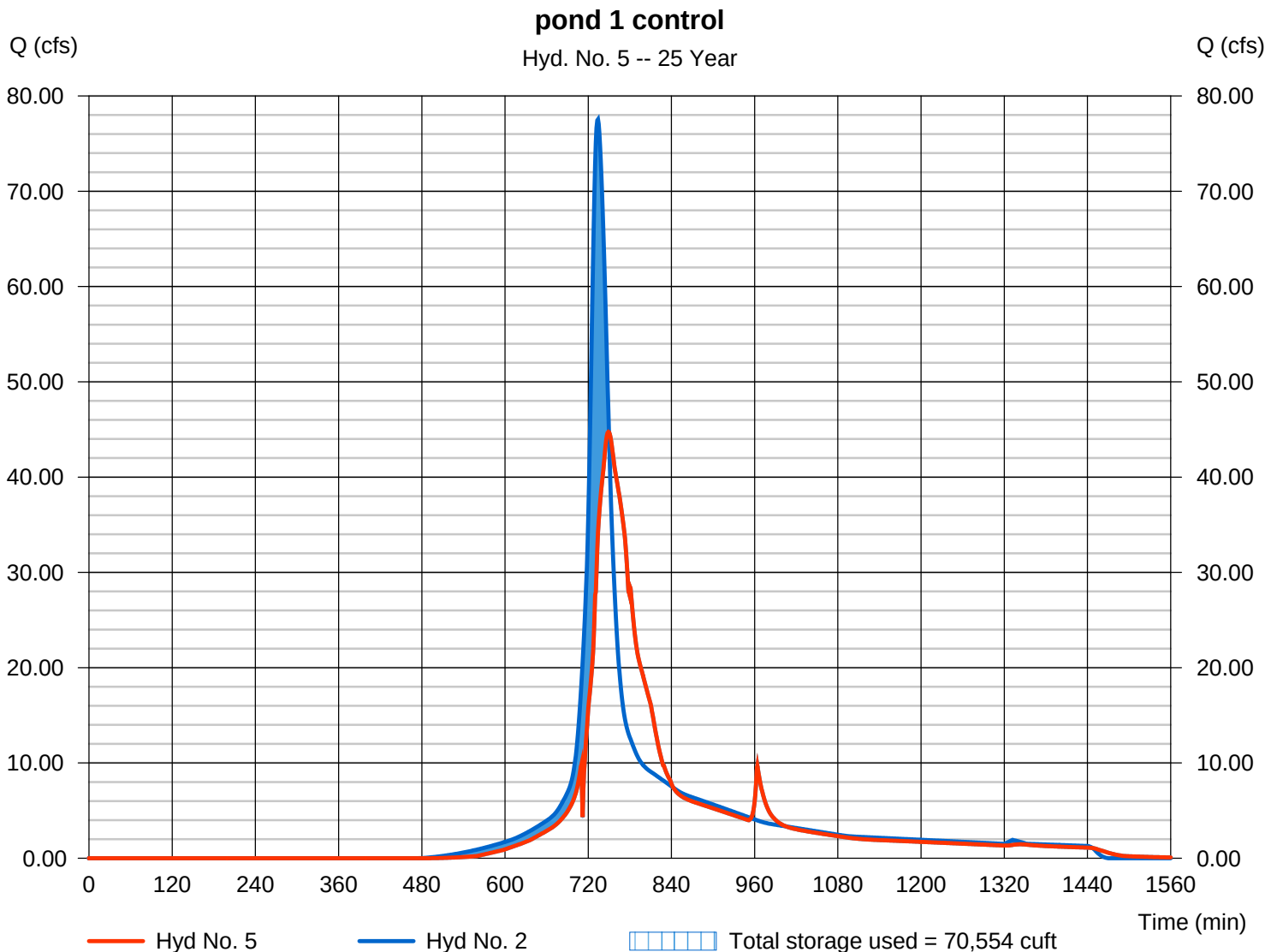
Thursday, 01 / 7 / 2021

Hyd. No. 5

pond 1 control

Hydrograph type	= Reservoir	Peak discharge	= 44.76 cfs
Storm frequency	= 25 yrs	Time to peak	= 749 min
Time interval	= 1 min	Hyd. volume	= 315,550 cuft
Inflow hyd. No.	= 2 - proposed da-1	Max. Elevation	= 658.00 ft
Reservoir name	= pond 1	Max. Storage	= 70,554 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

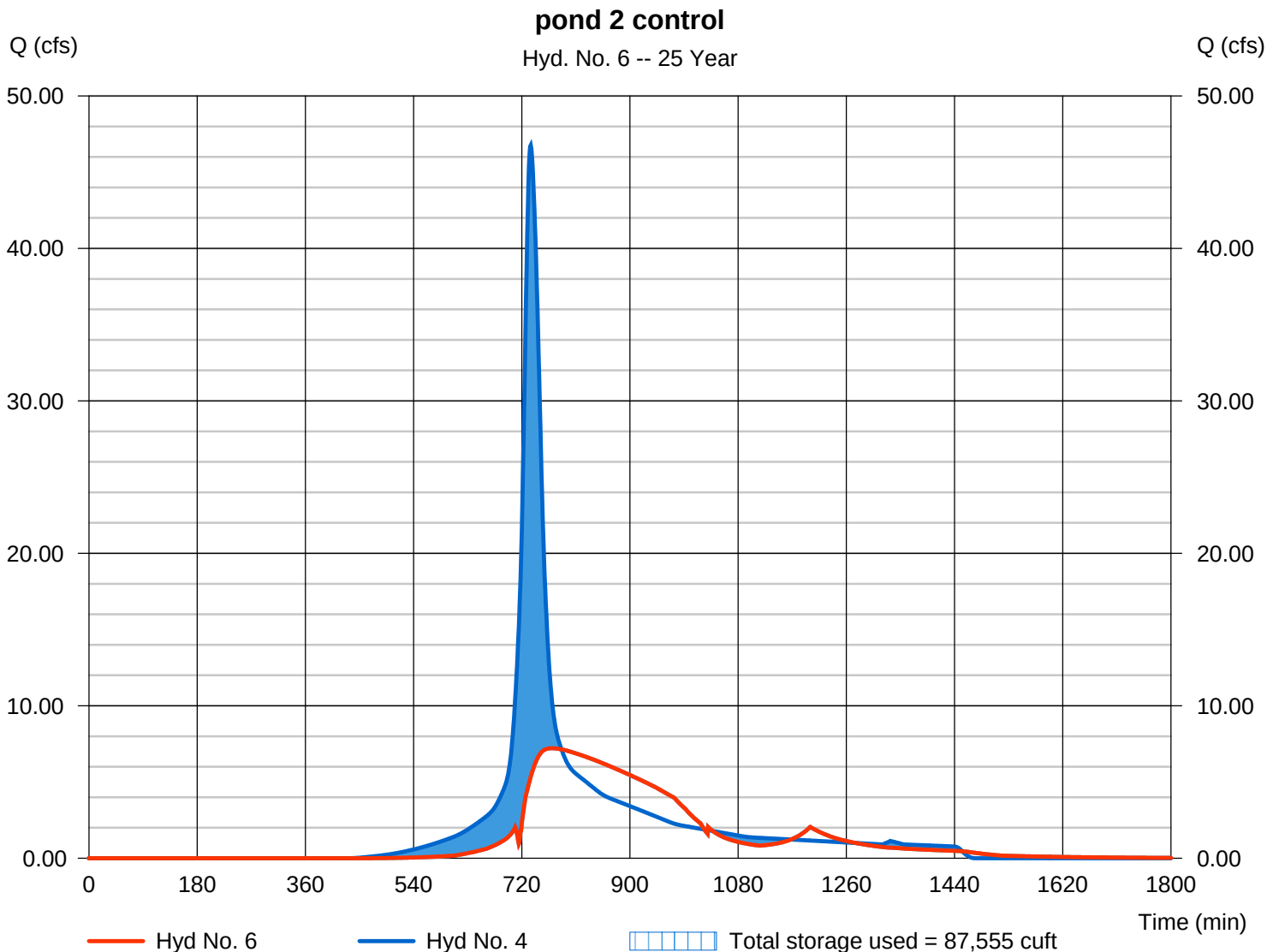
Thursday, 01 / 7 / 2021

Hyd. No. 6

pond 2 control

Hydrograph type	= Reservoir	Peak discharge	= 7.218 cfs
Storm frequency	= 25 yrs	Time to peak	= 770 min
Time interval	= 1 min	Hyd. volume	= 133,365 cuft
Inflow hyd. No.	= 4 - Proposed DA-2	Max. Elevation	= 694.15 ft
Reservoir name	= pond 2	Max. Storage	= 87,555 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

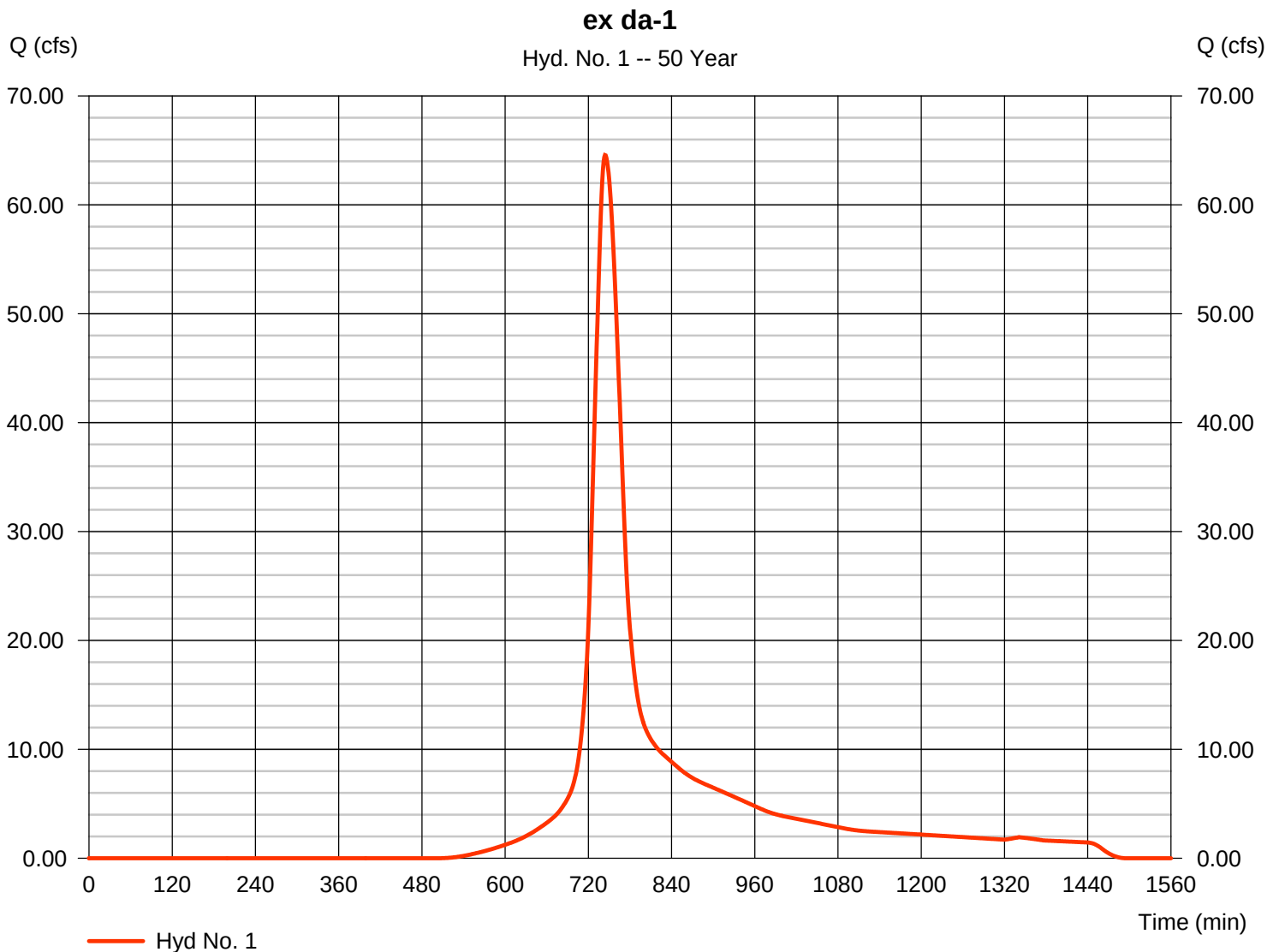
Thursday, 01 / 7 / 2021

Hyd. No. 1

ex da-1

Hydrograph type = SCS Runoff
 Storm frequency = 50 yrs
 Time interval = 1 min
 Drainage area = 24.700 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 7.78 in
 Storm duration = 24 hrs

Peak discharge = 64.57 cfs
 Time to peak = 744 min
 Hyd. volume = 363,231 cuft
 Curve number = 68
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 34.90 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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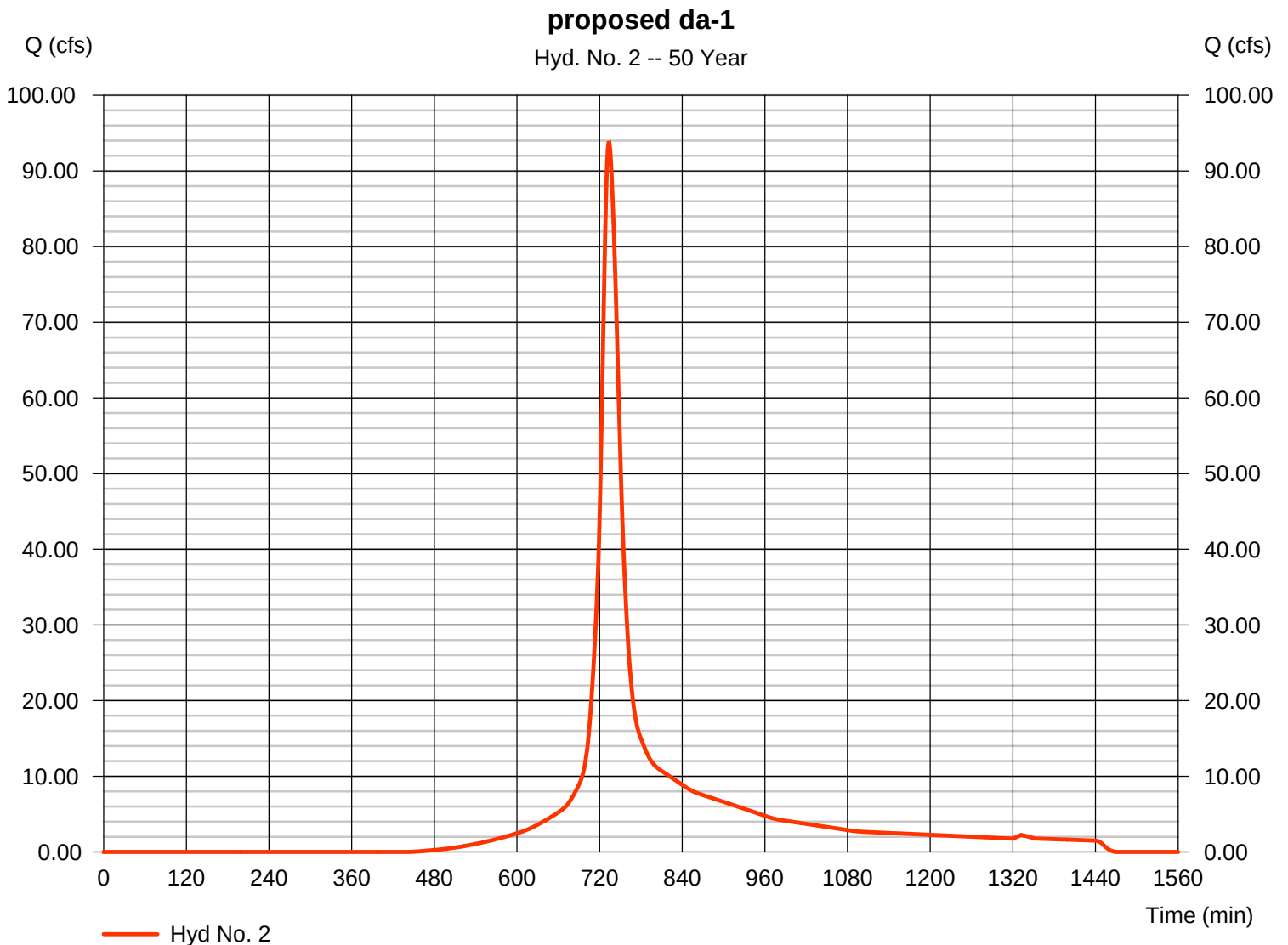
Hyd. No. 2

proposed da-1

Hydrograph type = SCS Runoff
 Storm frequency = 50 yrs
 Time interval = 1 min
 Drainage area = 24.700 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 7.78 in
 Storm duration = 24 hrs

Peak discharge = 93.73 cfs
 Time to peak = 734 min
 Hyd. volume = 413,831 cuft
 Curve number = 73*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 19.30 min
 Distribution = Type III
 Shape factor = 484

* Composite (Area/CN) = $[(16.650 \times 61) + (8.050 \times 98)] / 24.700$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

Hyd. No. 3

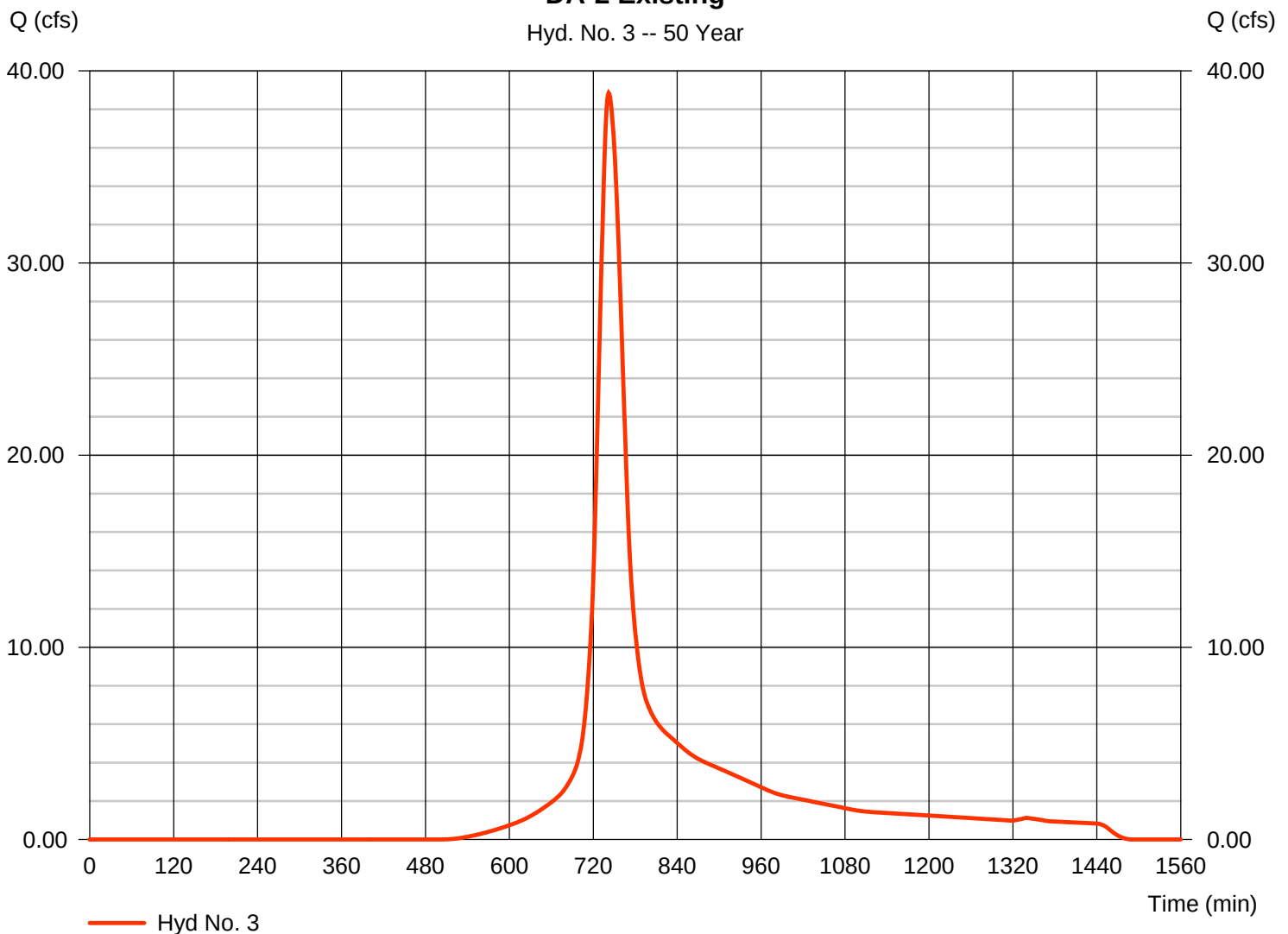
DA-2 Existing

Hydrograph type = SCS Runoff
 Storm frequency = 50 yrs
 Time interval = 1 min
 Drainage area = 14.130 ac
 Basin Slope = 6.0 %
 Tc method = TR55
 Total precip. = 7.78 in
 Storm duration = 24 hrs

Peak discharge = 38.85 cfs
 Time to peak = 742 min
 Hyd. volume = 209,159 cuft
 Curve number = 68
 Hydraulic length = 300 ft
 Time of conc. (Tc) = 32.00 min
 Distribution = Type III
 Shape factor = 484

DA-2 Existing

Hyd. No. 3 -- 50 Year



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

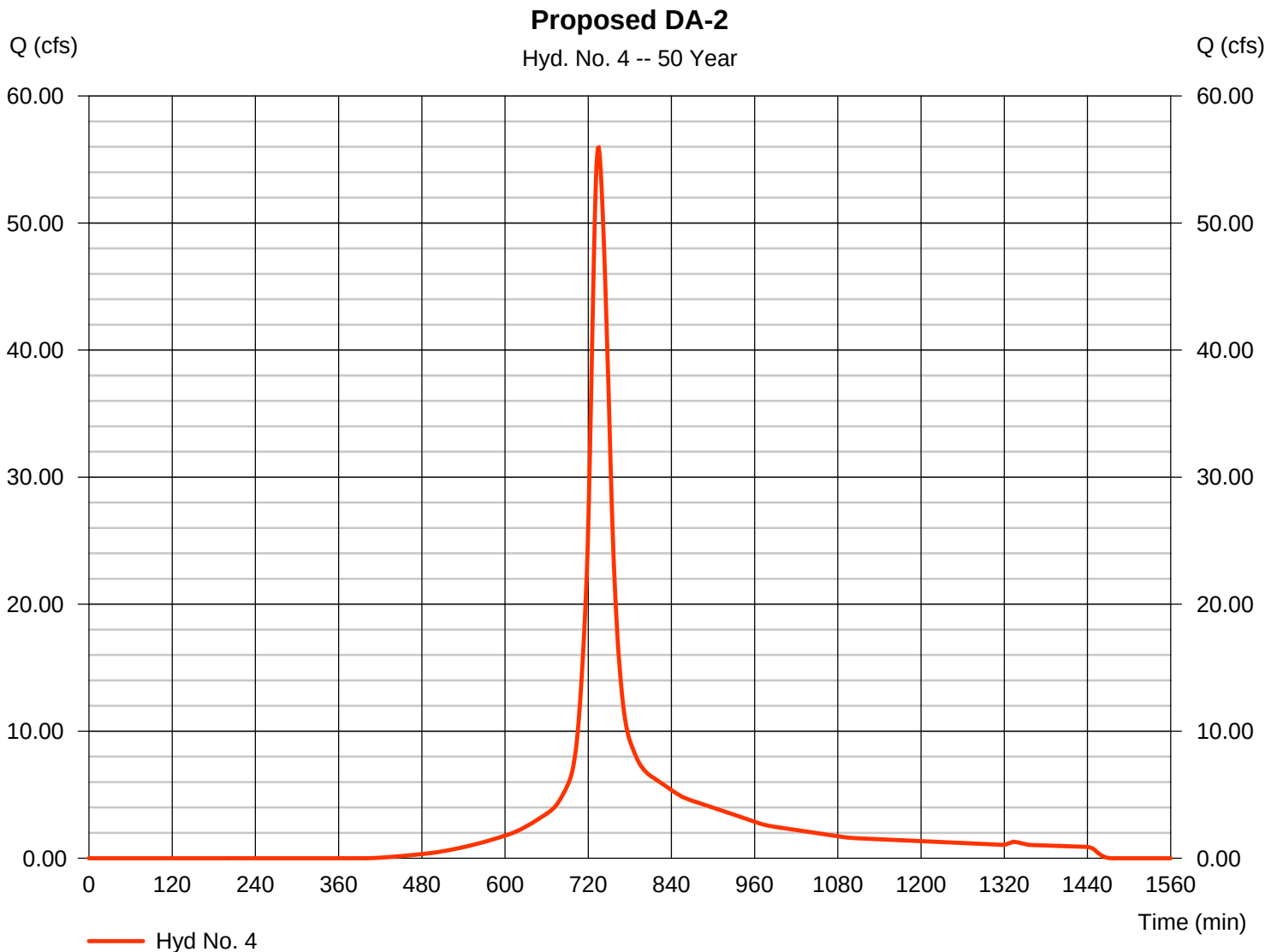
Hyd. No. 4

Proposed DA-2

Hydrograph type = SCS Runoff
 Storm frequency = 50 yrs
 Time interval = 1 min
 Drainage area = 14.130 ac
 Basin Slope = 6.0 %
 Tc method = TR55
 Total precip. = 7.78 in
 Storm duration = 24 hrs

Peak discharge = 55.94 cfs
 Time to peak = 735 min
 Hyd. volume = 256,757 cuft
 Curve number = 76*
 Hydraulic length = 300 ft
 Time of conc. (Tc) = 21.60 min
 Distribution = Type III
 Shape factor = 484

* Composite (Area/CN) = $[(5.839 \times 98) + (8.290 \times 61)] / 14.130$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

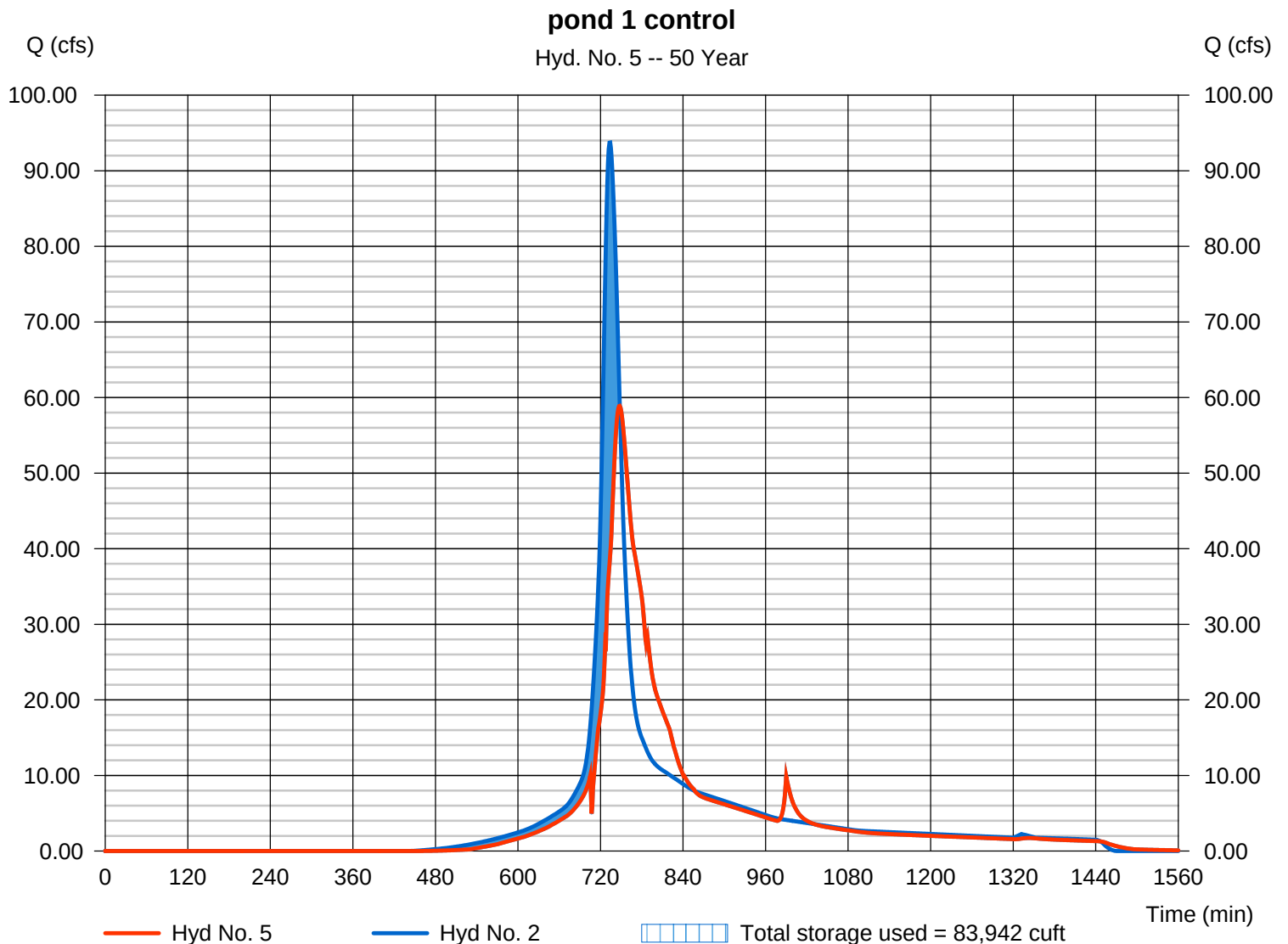
Hyd. No. 5

pond 1 control

Hydrograph type = Reservoir
 Storm frequency = 50 yrs
 Time interval = 1 min
 Inflow hyd. No. = 2 - proposed da-1
 Reservoir name = pond 1

Peak discharge = 58.88 cfs
 Time to peak = 748 min
 Hyd. volume = 384,191 cuft
 Max. Elevation = 659.03 ft
 Max. Storage = 83,942 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

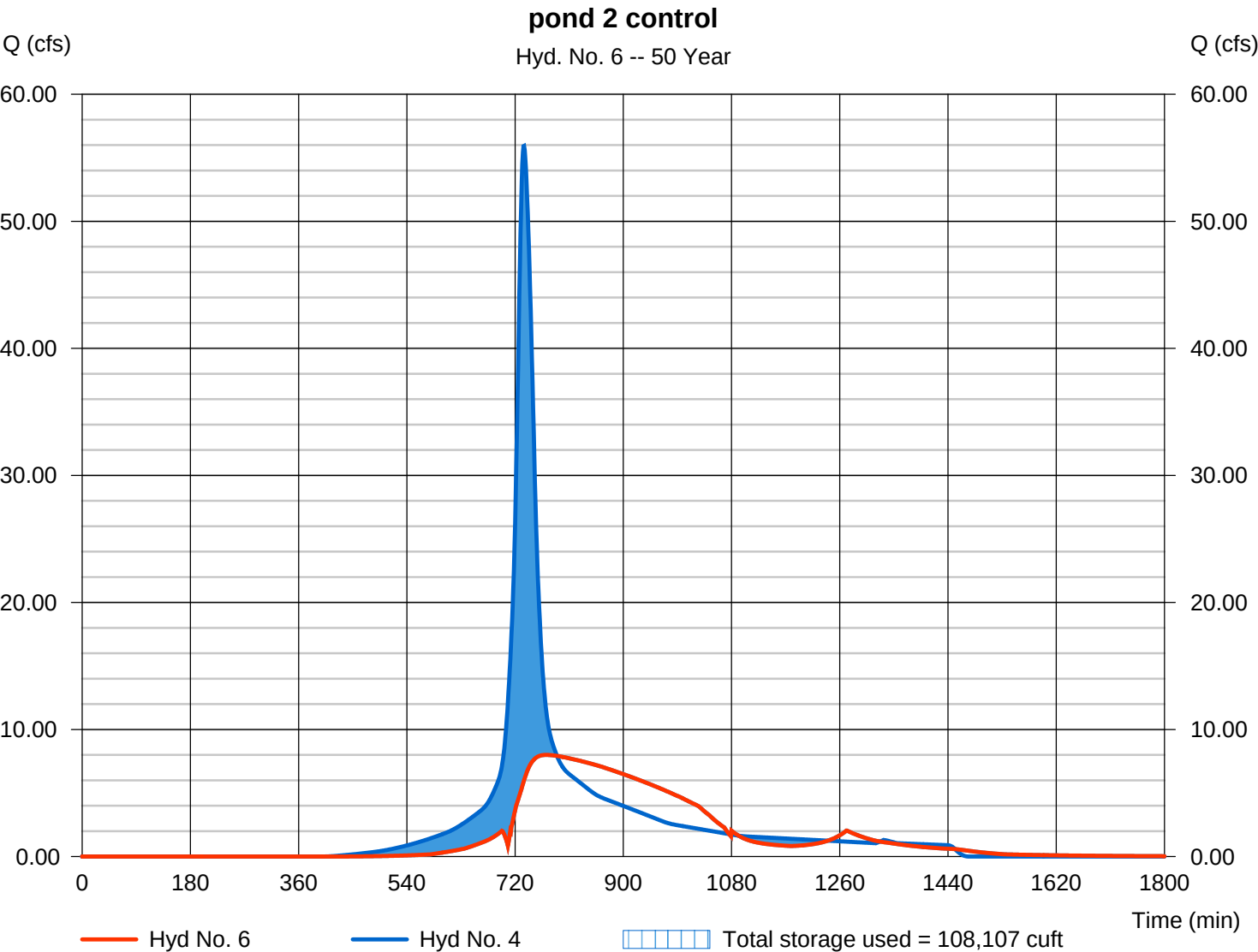
Thursday, 01 / 7 / 2021

Hyd. No. 6

pond 2 control

Hydrograph type	= Reservoir	Peak discharge	= 8.001 cfs
Storm frequency	= 50 yrs	Time to peak	= 772 min
Time interval	= 1 min	Hyd. volume	= 163,766 cuft
Inflow hyd. No.	= 4 - Proposed DA-2	Max. Elevation	= 694.98 ft
Reservoir name	= pond 2	Max. Storage	= 108,107 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

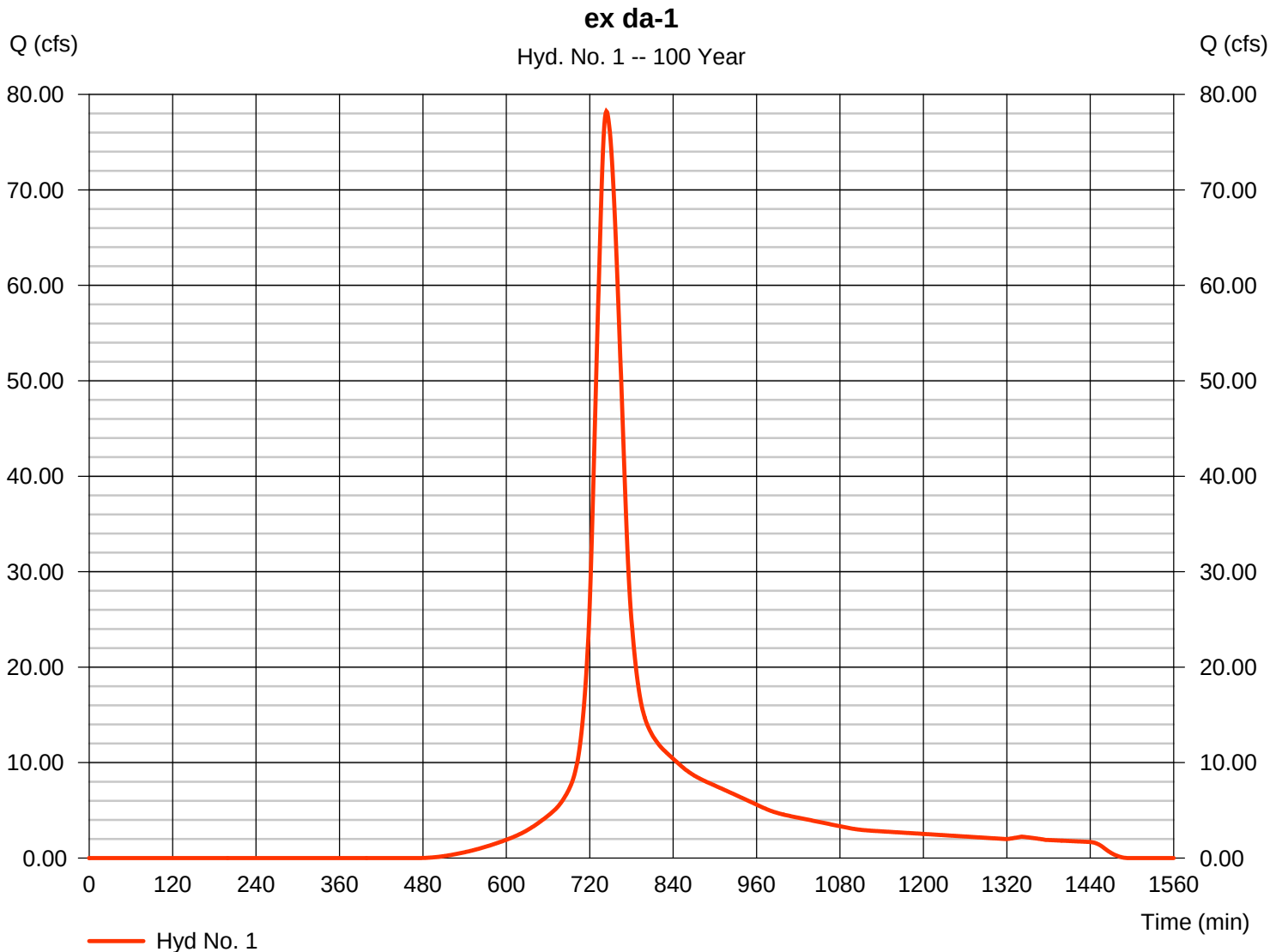
Thursday, 01 / 7 / 2021

Hyd. No. 1

ex da-1

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 24.700 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 8.78 in
 Storm duration = 24 hrs

Peak discharge = 78.23 cfs
 Time to peak = 744 min
 Hyd. volume = 439,182 cuft
 Curve number = 68
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 34.90 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

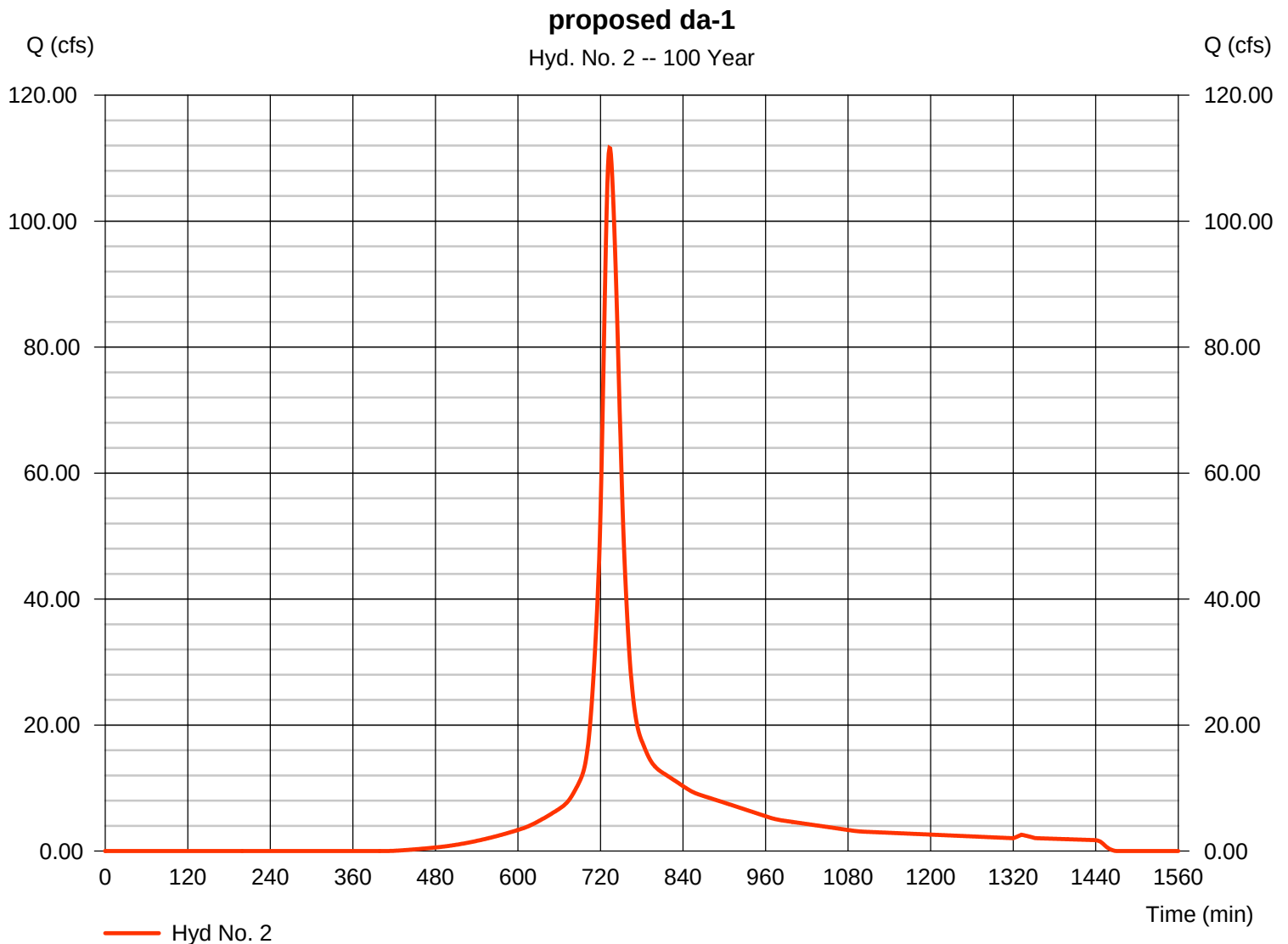
Hyd. No. 2

proposed da-1

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 24.700 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 8.78 in
 Storm duration = 24 hrs

Peak discharge = 111.62 cfs
 Time to peak = 733 min
 Hyd. volume = 493,762 cuft
 Curve number = 73*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 19.30 min
 Distribution = Type III
 Shape factor = 484

* Composite (Area/CN) = $[(16.650 \times 61) + (8.050 \times 98)] / 24.700$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

Hyd. No. 3

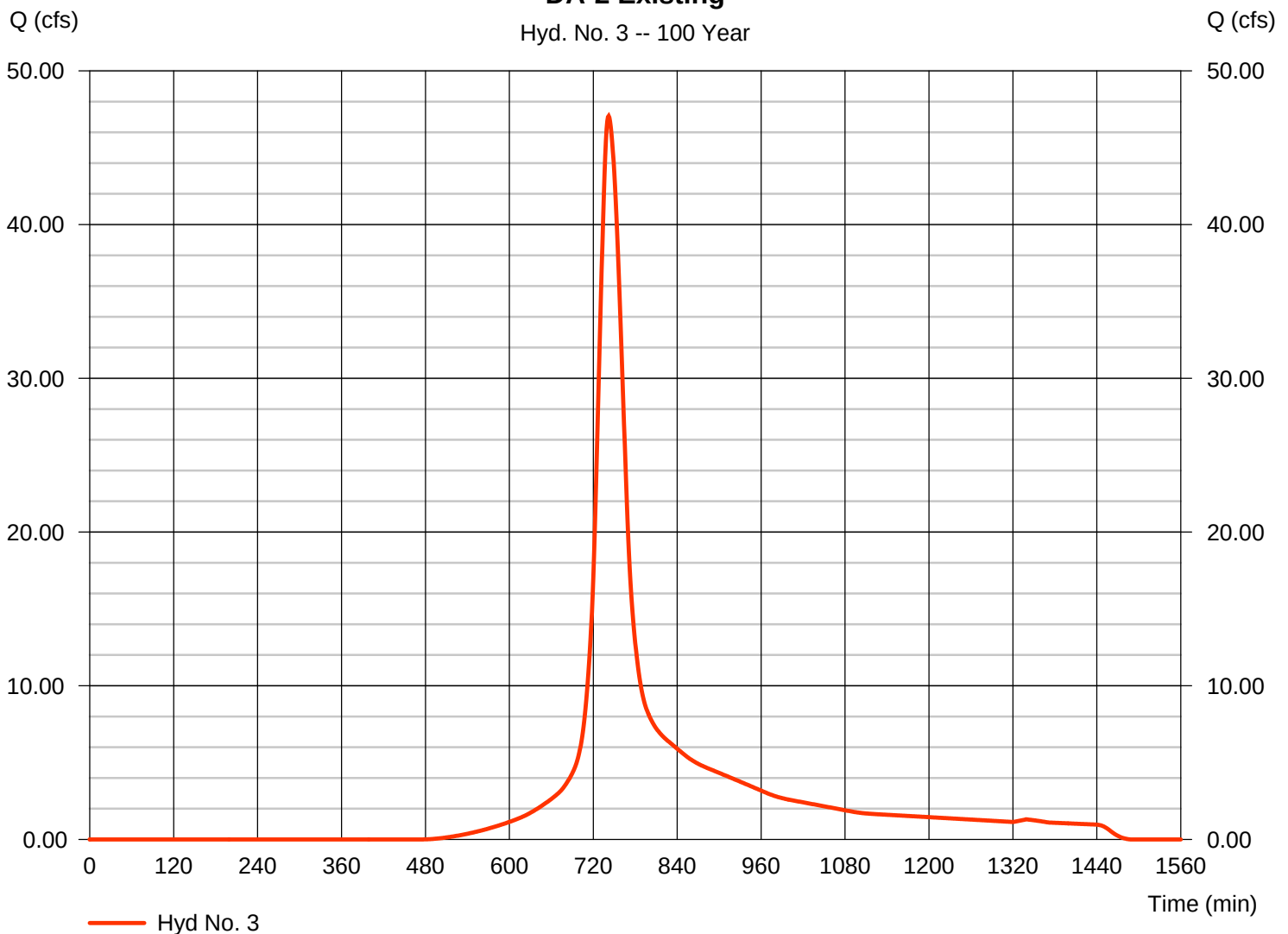
DA-2 Existing

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 14.130 ac
 Basin Slope = 6.0 %
 Tc method = TR55
 Total precip. = 8.78 in
 Storm duration = 24 hrs

Peak discharge = 47.06 cfs
 Time to peak = 742 min
 Hyd. volume = 252,894 cuft
 Curve number = 68
 Hydraulic length = 300 ft
 Time of conc. (Tc) = 32.00 min
 Distribution = Type III
 Shape factor = 484

DA-2 Existing

Hyd. No. 3 -- 100 Year



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

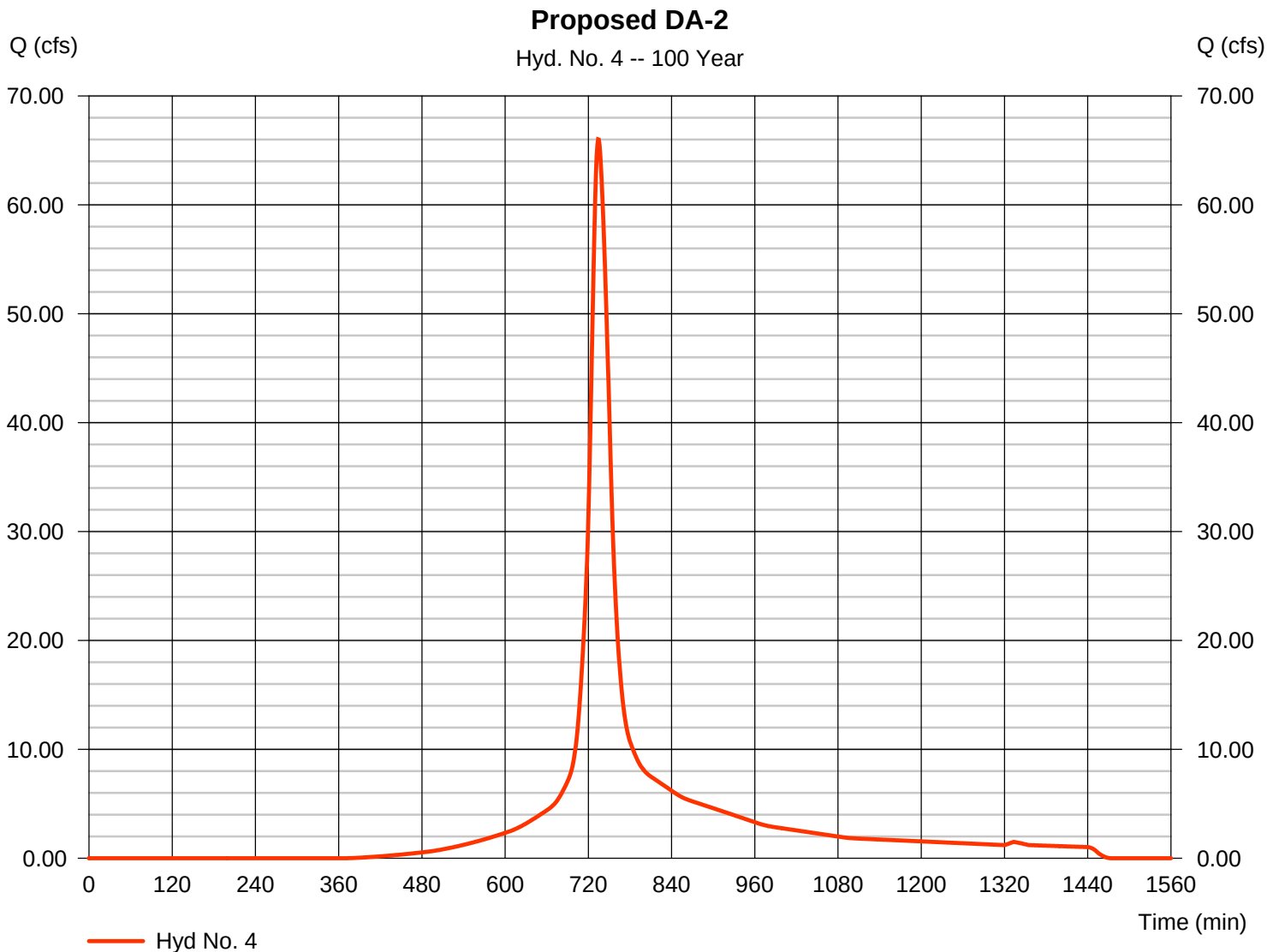
Hyd. No. 4

Proposed DA-2

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 14.130 ac
 Basin Slope = 6.0 %
 Tc method = TR55
 Total precip. = 8.78 in
 Storm duration = 24 hrs

Peak discharge = 66.01 cfs
 Time to peak = 734 min
 Hyd. volume = 304,110 cuft
 Curve number = 76*
 Hydraulic length = 300 ft
 Time of conc. (Tc) = 21.60 min
 Distribution = Type III
 Shape factor = 484

* Composite (Area/CN) = $[(5.839 \times 98) + (8.290 \times 61)] / 14.130$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

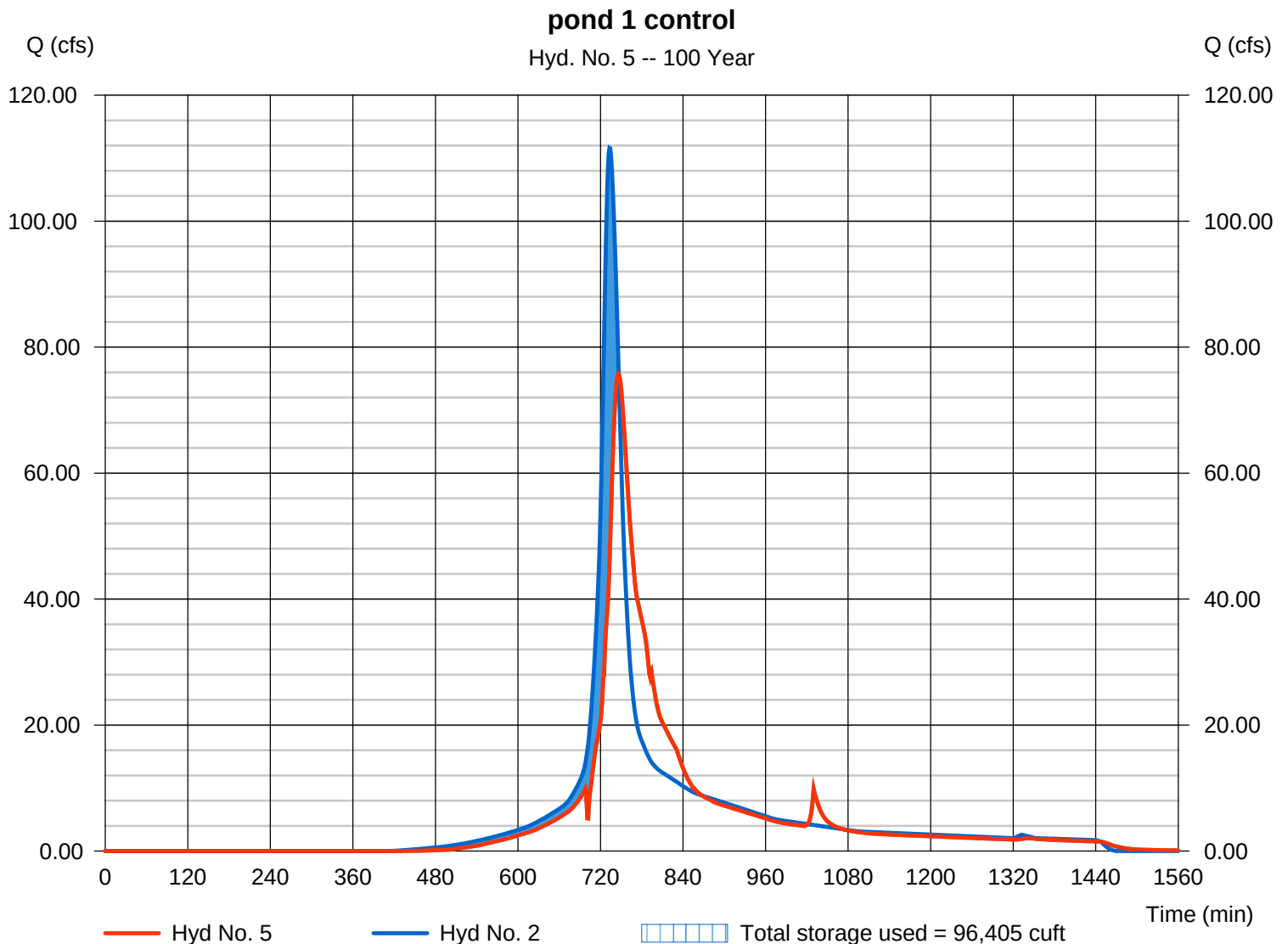
Thursday, 01 / 7 / 2021

Hyd. No. 5

pond 1 control

Hydrograph type	= Reservoir	Peak discharge	= 75.76 cfs
Storm frequency	= 100 yrs	Time to peak	= 746 min
Time interval	= 1 min	Hyd. volume	= 460,913 cuft
Inflow hyd. No.	= 2 - proposed da-1	Max. Elevation	= 659.99 ft
Reservoir name	= pond 1	Max. Storage	= 96,405 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

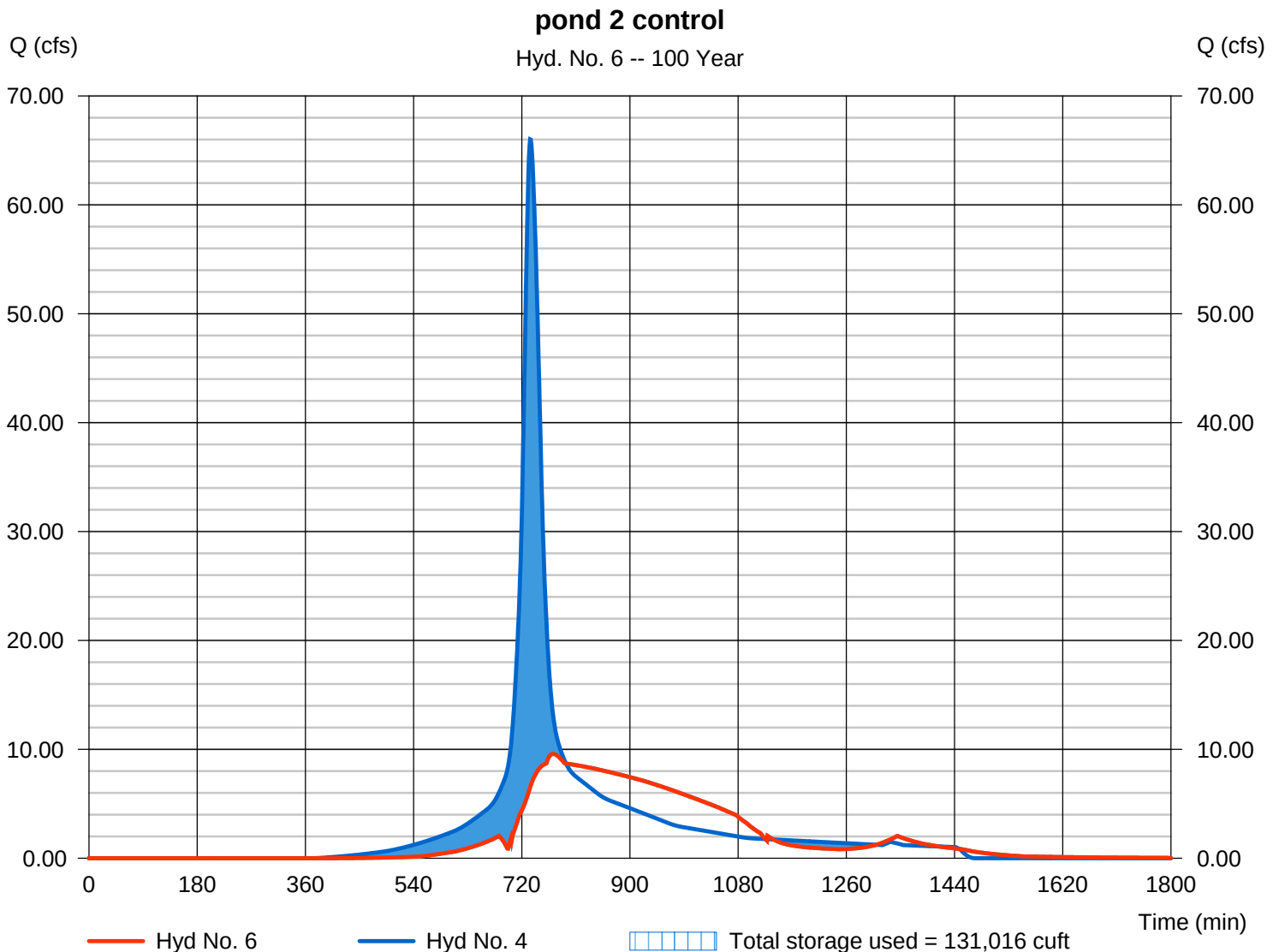
Hyd. No. 6

pond 2 control

Hydrograph type = Reservoir
 Storm frequency = 100 yrs
 Time interval = 1 min
 Inflow hyd. No. = 4 - Proposed DA-2
 Reservoir name = pond 2

Peak discharge = 9.582 cfs
 Time to peak = 772 min
 Hyd. volume = 198,054 cuft
 Max. Elevation = 695.91 ft
 Max. Storage = 131,016 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	-----
2	37.7795	9.5000	0.8133	-----
3	0.0000	0.0000	0.0000	-----
5	99.3592	15.3000	0.9554	-----
10	69.0361	11.6000	0.8412	-----
25	182.6736	18.0000	1.0144	-----
50	118.5118	13.6000	0.8977	-----
100	133.2439	13.2000	0.8997	-----

File name: Newhaven.idf

$$\text{Intensity} = B / (T_c + D)^E$$

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	4.29	3.37	2.80	2.41	2.12	1.90	1.72	1.58	1.46	1.36	1.28	1.20
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	5.60	4.54	3.82	3.30	2.91	2.60	2.35	2.15	1.98	1.83	1.71	1.60
10	6.50	5.21	4.37	3.78	3.34	3.00	2.73	2.50	2.32	2.16	2.02	1.90
25	7.59	6.22	5.26	4.56	4.02	3.60	3.26	2.97	2.73	2.53	2.35	2.20
50	8.59	6.94	5.84	5.05	4.46	4.00	3.63	3.32	3.07	2.85	2.66	2.50
100	9.79	7.87	6.60	5.70	5.03	4.50	4.08	3.73	3.44	3.20	2.98	2.80

Tc = time in minutes. Values may exceed 60.

Precip. file name: H:\LIBRARY\DEPT\SITE\hydraflow\beacon falls-noaa-ct.pcp

[illegible]

Appendix B
Inlet report (Gutter flow analysis for catch basin on site)

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter								Inlet			Byp Line No	
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)				
1	Structure - (6)	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	5.00	0.020	0.020	0.011	0.00	0.00	0.00	0.00	0.00	0.0	Off	
2	Structure - (5)	0.07	0.00	0.07	0.00	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.04	1.76	0.04	1.76	0.04	1.76	0.0	3
3	Structure - (4)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	4
4	Structure - (3)	0.45	0.15	0.48	0.11	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.08	3.85	0.08	3.85	0.08	3.85	0.0	Off
5	Structure - (54)	0.45	0.15	0.48	0.11	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.08	3.85	0.08	3.85	0.08	3.85	0.0	Off
6	Structure - (55)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	5
7	Structure - (56)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	6
8	Structure - (57)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	17
9	Structure - (2)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	Off
10	Structure - (15)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	Off
11	Structure - (16)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	10
12	Structure - (17)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	9
13	Structure - (1)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	Off
14	Structure - (12)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	Off
15	Structure - (13)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	14
16	Structure - (14)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	13
17	Structure - (59)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	4
18	Structure - (58)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	5
19	Structure - (91)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	Off
20	Structure - (92)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	Off
21	Structure - (121)	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	5.00	0.020	0.020	0.011	0.00	0.00	0.00	0.00	0.00	0.0	Off	
22	Structure - (120)	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	5.00	0.020	0.020	0.011	0.00	0.00	0.00	0.00	0.00	0.0	Off	
23	Structure - (74)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	Off
Project File: storm 5-15-19.stm															Number of lines: 89							Run Date: 2/9/2021		
NOTES: Inlet N-Values = 0.016; Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period = 25 Yrs. ; * Indicates Known Q added. All curb inlets are throat.																								

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet			Grate Inlet				Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
24	Structure - (64)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	Off
25	Structure - (65)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	24
26	Structure - (66)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	25
27	Structure - (67)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	26
28	Structure - (68)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	27
29	Structure - (69)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	40
30	Structure - (93)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	Off
31	Structure - (94)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	30
32	Structure - (95)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	Off
33	Structure - (96)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	32
34	Structure - (97)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	33
35	Structure - (98)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	34
36	Structure - (99)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	35
37	Structure - (100)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	36
38	Structure - (101)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	39
39	Structure - (112)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	41
40	Structure - (70)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	42
41	Structure - (111)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	44
42	Structure - (72)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	43
43	Structure - (73)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	23
44	Structure - (110)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	45
45	Structure - (109)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	49
46	Structure - (102)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	20

Project File: storm 5-15-19.stm

Number of lines: 89

Run Date: 2/9/2021

NOTES: Inlet N-Values = 0.016; Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period = 25 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet				Gutter								Inlet				Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)			
47	Structure - (103)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	46	
48	Structure - (104)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	51	
49	Structure - (108)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	Off	
50	Structure - (107)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	52	
51	Structure - (105)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	19	
52	Structure - (106)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	Off	
53	Structure - (42)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	Off	
54	Structure - (119)	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	5.00	0.020	0.020	0.011	0.00	0.00	0.00	0.00	0.00	0.0	Off		
55	Structure - (43)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	53	
56	Structure - (44)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	55	
57	Structure - (45)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	56	
58	Structure - (46)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	57	
59	Structure - (47)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	58	
60	Structure - (53)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	61	
61	Structure - (52)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	65	
62	Structure - (114)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	Off	
63	Structure - (115)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	62	
64	Structure - (116)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	66	
65	Structure - (51)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	67	
66	Structure - (117)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	Off	
67	Structure - (50)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	68	
68	Structure - (48)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	69	
69	Structure - (49)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	Off	

Project File: storm 5-15-19.stm

Number of lines: 89

Run Date: 2/9/2021

NOTES: Inlet N-Values = 0.016; Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period = 25 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter								Inlet			Byp Line No	
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)				
70	Structure - (19)	0.45	0.18	0.50	0.13	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.08	3.90	0.08	3.90	0.08	3.90	0.0	Off
71	Structure - (27)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	70
72	Structure - (28)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	89
73	Structure - (29)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	Off
74	Structure - (30)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	71
75	Structure - (31)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	74
76	Structure - (32)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	75
77	Structure - (33)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	88
78	Structure - (35)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	72
79	Structure - (36)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	73
80	Structure - (20)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	70
81	Structure - (21)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	87
82	Structure - (22)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	81
83	Structure - (23)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	82
84	Structure - (24)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	86
85	Structure - (34)	0.45	0.01	0.39	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.50	0.07	3.50	0.07	3.50	0.0	Off
86	Structure - (26)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	80
87	Structure - (25)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	Off
88		0.45	0.06	0.50	0.01	Comb	4.0	3.00	0.00	3.00	2.00	0.020	2.00	0.050	0.020	0.013	0.13	3.41	0.13	3.41	0.13	3.41	0.0	85
89		0.07	0.09	0.16	0.00	Comb	4.0	3.00	0.00	3.00	2.00	0.020	2.00	0.050	0.020	0.013	0.08	1.68	0.08	1.68	0.08	1.68	0.0	87
Project File: storm 5-15-19.stm															Number of lines: 89							Run Date: 2/9/2021		
NOTES: Inlet N-Values = 0.016; Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period = 25 Yrs. ; * Indicates Known Q added. All curb inlets are throat.																								

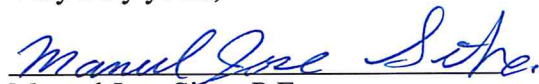
APPENDIX C
Drainage Statement

Drainage Design Statement

The Proposed drainage system for the Hopp Brook Estates development at the end of Oakwood Drive has been designed to conform to the town of Beacon falls Engineering Standards. These standards prevent the increase of storm water discharge to the surrounding areas for the 100-year storm event. The storm water conveyance system (piping) is designed for the 100-year storm event, and the gutter flow analysis is based on the 10-year storm event. The development as proposed will not have an adverse impact on the surrounding wetlands or watercourses.

Should you have questions concerning the above, please contact Manny Silva.

Very truly yours,

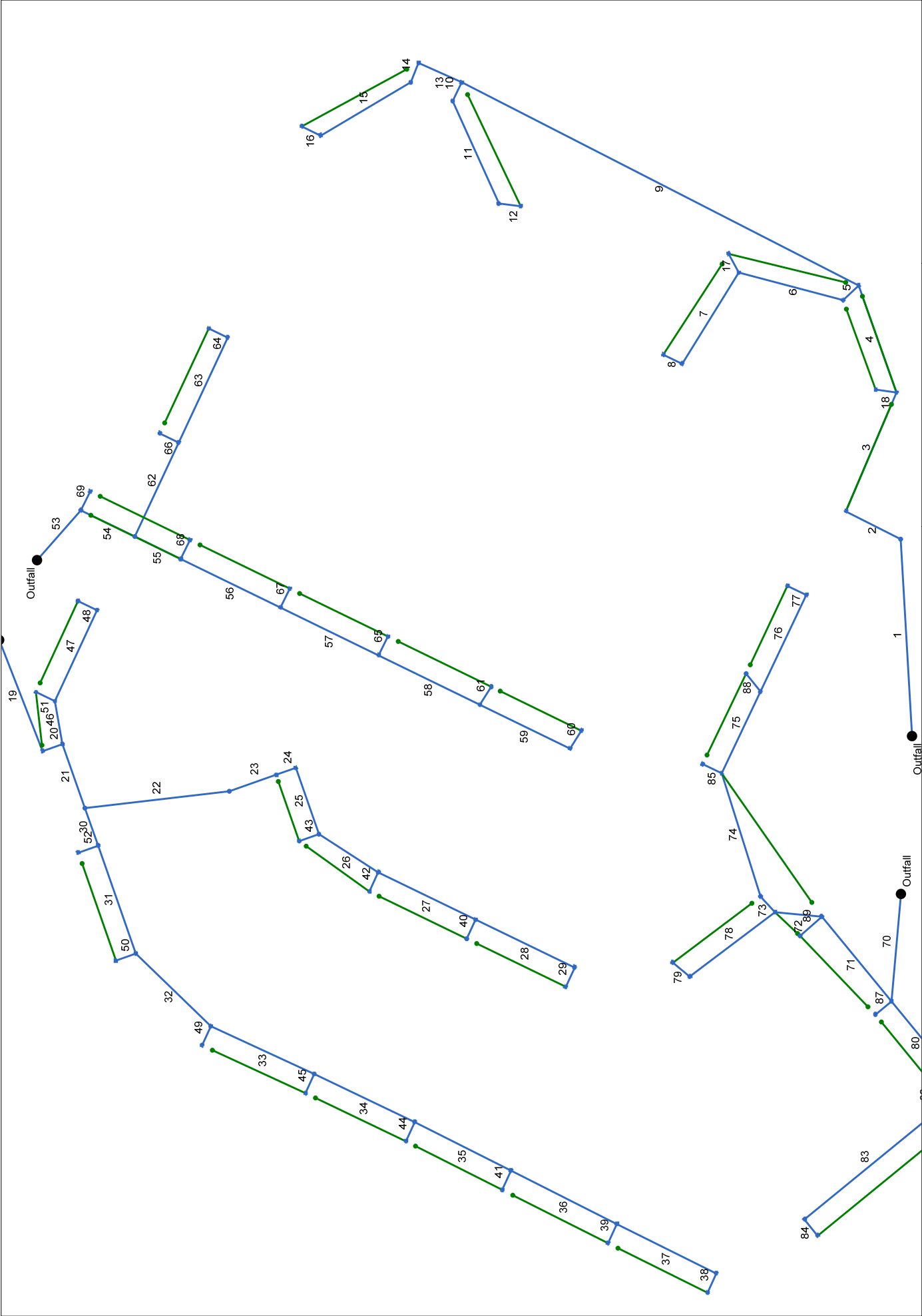


Manuel Jose Silva, P.E.

Project Engineer

APPENDIX D

HGL storm sewer calculation 100-year storm



Project File: storm 5-15-19.stm		Number of lines: 89	Date: 5/30/2019
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Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Pipe - (6)	5.47	24	Cir	264.215	688.00	689.40	0.530	688.85	690.22	n/a	690.22 j	End	Manhole
2	Pipe - (5)	5.54	24	Cir	82.503	689.40	690.81	1.709	690.22	691.64	n/a	691.64	1	Combination
3	Pipe - (4)	5.64	24	Cir	173.387	689.81	690.66	0.490	691.64	691.50	n/a	691.50	2	Combination
4	Pipe - (3)	5.07	24	Cir	151.974	690.66	691.40	0.487	691.50	692.19	n/a	692.19 j	3	Combination
5	Pipe - (111)	2.12	18	Cir	28.586	691.40	691.86	1.609	692.19	692.41	n/a	692.41 j	4	Combination
6	Pipe - (46)	1.80	18	Cir	145.347	691.86	694.69	1.947	692.41	695.19	n/a	695.19 j	5	Combination
7	Pipe - (47)	1.02	18	Cir	144.154	694.79	703.44	6.001	695.19	703.82	n/a	703.82 j	6	Combination
8	Pipe - (48)	0.53	15	Cir	28.330	703.54	704.11	2.012	703.82	704.39	n/a	704.39	7	Combination
9	Pipe - (2)	3.53	24	Cir	599.685	691.40	694.38	0.497	692.19	695.04	n/a	695.04 j	4	Combination
10	Pipe - (112)	1.39	15	Cir	28.000	694.38	694.75	1.321	695.04	695.22	n/a	695.22 j	9	Combination
11	Pipe - (12)	1.02	15	Cir	150.725	694.75	699.64	3.244	695.22	700.04	n/a	700.04 j	10	Combination
12	Pipe - (13)	0.53	15	Cir	29.502	699.74	700.33	2.000	700.04	700.61	n/a	700.61 j	11	Combination
13	Pipe - (1)	1.85	24	Cir	63.713	694.38	694.67	0.455	695.04	695.14	n/a	695.14 j	9	Combination
14	Pipe - (113)	1.40	15	Cir	27.920	694.67	694.81	0.501	695.14	695.28	0.17	695.28	13	Combination
15	Pipe - (8)	1.02	15	Cir	140.819	694.81	699.30	3.188	695.28	699.70	n/a	699.70 j	14	Combination
16	Pipe - (9)	0.53	15	Cir	28.330	699.40	699.68	0.988	699.70	699.96	n/a	699.96 j	15	Combination
17	Pipe - (50)	0.53	15	Cir	28.307	696.10	696.38	0.989	696.33	696.66	n/a	696.66	6	Combination
18	Pipe - (49)	0.53	15	Cir	28.283	693.95	694.23	0.990	694.18	694.51	n/a	694.51	3	Combination
19	Pipe - (77)	11.72	24	Cir	159.998	650.00	654.76	2.978	651.25	655.99	n/a	655.99 j	End	Combination
20	Pipe - (78)	11.38	24	Cir	28.331	654.86	655.15	1.000	655.99	656.36	n/a	656.36	19	Combination
21	Pipe - (108)	9.60	18	Cir	90.949	655.15	656.13	1.078	656.36	657.33	n/a	657.33 j	20	Manhole
22	Pipe - (105)	3.99	18	Cir	195.574	656.23	671.89	8.007	657.33	672.65	n/a	672.65 j	21	Manhole
23	Pipe - (104)	4.03	18	Cir	66.624	673.99	677.77	5.668	674.38	678.54	0.15	678.54	22	Combination
24	Pipe - (106)	3.64	18	Cir	28.335	677.77	678.60	2.927	678.54	679.33	n/a	679.33 j	23	Combination

Project File: storm 5-15-19.stm	Number of lines: 89	Run Date: 5/30/2019
NOTES: Return period = 100 Yrs. ; j - Line contains hyd. jump.		

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	Pipe - (54)	3.30	18	Cir	94.156	678.60	679.62	1.083	679.33	680.31	n/a	680.31 j	24	Combination
26	Pipe - (55)	2.54	18	Cir	94.621	679.72	680.67	1.004	680.31	681.27	n/a	681.27	25	Combination
27	Pipe - (56)	1.79	18	Cir	145.593	680.77	689.50	5.996	681.27	690.00	n/a	690.00	26	Combination
28	Pipe - (57)	1.02	18	Cir	148.146	689.60	699.97	7.000	690.00	700.35	n/a	700.35 j	27	Combination
29	Pipe - (58)	0.53	15	Cir	28.331	700.07	700.64	2.012	700.35	700.92	n/a	700.92	28	Combination
30	Pipe - (107)	5.94	18	Cir	53.393	656.83	657.37	1.000	657.60	658.31	n/a	658.91	21	Combination
31	Pipe - (80)	5.28	18	Cir	153.073	656.79	659.85	1.999	658.91	660.73	n/a	660.73 j	30	Combination
32	Pipe - (81)	4.61	18	Cir	140.325	659.95	665.57	4.000	660.73	666.39	n/a	666.39	31	Combination
33	Pipe - (82)	3.93	18	Cir	153.082	665.67	670.26	2.998	666.39	671.02	n/a	671.02	32	Combination
34	Pipe - (83)	3.24	18	Cir	149.845	670.36	676.35	3.997	671.02	677.03	n/a	677.03	33	Combination
35	Pipe - (84)	2.52	18	Cir	144.966	676.45	686.60	7.002	677.03	687.20	n/a	687.20	34	Combination
36	Pipe - (85)	1.79	18	Cir	159.427	686.70	694.67	4.999	687.20	695.17	0.28	695.17	35	Combination
37	Pipe - (86)	1.02	18	Cir	149.376	694.77	699.25	2.999	695.17	699.63	n/a	699.63 j	36	Combination
38	Pipe - (87)	0.53	15	Cir	28.331	699.35	699.64	1.024	699.63	699.92	n/a	699.92	37	Combination
39	Pipe - (98)	0.53	15	Cir	28.331	695.34	695.63	1.024	695.57	695.91	n/a	695.91	36	Combination
40	Pipe - (59)	0.53	15	Cir	28.335	690.66	691.23	2.012	690.86	691.51	n/a	691.51	27	Combination
41	Pipe - (97)	0.53	15	Cir	28.331	687.33	688.18	3.000	687.51	688.46	n/a	688.46	35	Combination
42	Pipe - (60)	0.53	15	Cir	28.335	683.10	683.38	0.988	683.33	683.66	n/a	683.66	26	Combination
43	Pipe - (61)	0.53	15	Cir	28.335	680.02	680.30	0.988	680.31	680.58	n/a	680.58 j	25	Combination
44	Pipe - (96)	0.53	15	Cir	28.331	676.90	678.04	4.024	677.07	678.32	n/a	678.32	34	Combination
45	Pipe - (95)	0.53	15	Cir	28.331	671.60	671.89	1.024	671.83	672.17	n/a	672.17	33	Combination
46	Pipe - (88)	1.81	18	Cir	58.462	656.49	657.08	1.009	656.89	657.59	0.23	657.59	20	Combination
47	Pipe - (89)	1.02	18	Cir	134.322	657.18	666.58	6.998	657.59	666.96	n/a	666.96 j	46	Combination
48	Pipe - (90)	0.53	15	Cir	28.330	666.68	667.53	3.000	666.96	667.81	n/a	667.81	47	Combination

Project File: storm 5-15-19.stm	Number of lines: 89	Run Date: 5/30/2019
NOTES: Return period = 100 Yrs. ; j - Line contains hyd. jump.		

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
49	Pipe - (94)	0.53	15	Cir	28.331	666.39	666.95	2.000	666.58	667.24	n/a	667.24	32	Combination
50	Pipe - (93)	0.53	15	Cir	28.331	661.29	661.57	0.988	661.52	661.85	n/a	661.85	31	Combination
51	Pipe - (91)	0.53	15	Cir	28.330	658.73	659.30	2.012	658.93	659.58	n/a	659.58	46	Combination
52	Pipe - (92)	0.53	15	Cir	28.331	657.36	657.64	1.000	658.31	657.93	n/a	657.93	30	Combination
53	Pipe - (34)	5.32	24	Cir	89.000	650.00	671.06	23.663	650.29	671.87	n/a	672.35	End	Combination
54	Pipe - (35)	4.71	24	Cir	80.634	671.06	674.58	4.365	671.87	675.34	n/a	675.34 j	53	Manhole
55	Pipe - (35) (1)	3.42	24	Cir	68.613	674.58	677.80	4.693	675.34	678.45	n/a	678.45 j	54	Combination
56	Pipe - (36)	2.86	24	Cir	149.256	677.90	682.38	3.002	678.45	682.97	n/a	682.97	55	Combination
57	Pipe - (37)	2.27	24	Cir	146.742	682.48	686.88	2.998	682.97	687.40	n/a	687.40	56	Combination
58	Pipe - (38)	1.67	24	Cir	151.418	686.98	693.04	4.002	687.40	693.49	n/a	693.49	57	Combination
59	Pipe - (39)	1.02	24	Cir	134.937	693.14	698.54	4.002	693.49	698.89	0.18	698.89	58	Combination
60	Pipe - (45)	0.53	15	Cir	28.473	699.01	699.58	2.002	699.21	699.86	n/a	699.86	59	Combination
61	Pipe - (44)	0.53	15	Cir	28.473	694.31	695.16	2.985	694.49	695.44	n/a	695.44	58	Combination
62	Pipe - (99)	1.76	18	Cir	139.082	674.78	682.70	5.695	675.34	683.20	n/a	683.20 j	54	Combination
63	Pipe - (100)	1.01	18	Cir	155.291	684.09	693.41	6.002	684.29	693.78	n/a	693.78	62	Combination
64	Pipe - (101)	0.53	18	Cir	28.330	693.51	693.79	0.988	693.78	694.06	n/a	694.06 j	63	Combination
65	Pipe - (43)	0.53	15	Cir	28.331	689.32	689.60	0.988	689.55	689.88	n/a	689.88	57	Combination
66	Pipe - (102)	0.53	18	Cir	28.330	683.64	684.49	3.000	683.81	684.76	n/a	684.76	62	Combination
67	Pipe - (42)	0.53	15	Cir	28.331	683.49	684.06	2.012	683.69	684.34	n/a	684.34	56	Combination
68	Pipe - (40)	0.53	15	Cir	28.331	678.73	679.02	1.024	678.96	679.30	n/a	679.30	55	Combination
69	Pipe - (41)	0.53	15	Cir	28.331	670.45	670.73	1.000	672.35*	672.35*	0.00	672.35	53	Combination
70	Pipe - (14)	7.64	18	Cir	144.488	690.00	692.28	1.578	691.06	693.35	0.85	693.35	End	Combination
71	Pipe - (22)	4.51	15	Cir	147.158	692.28	693.75	0.999	693.35	694.61	n/a	694.61 j	70	Combination
72	Pipe - (23)	4.33	15	Cir	63.362	693.85	694.48	0.994	694.61	695.32	0.41	695.32	71	Combination

Project File: storm 5-15-19.stm	Number of lines: 89	Run Date: 5/30/2019
NOTES: Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.		

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
73	Pipe - (24)	3.05	15	Cir	28.495	694.58	694.87	1.000	695.32	695.57	n/a	695.57 j	72	Combination
74	Pipe - (25)	2.70	15	Cir	173.431	694.97	696.70	0.998	695.57	697.36	0.31	697.36	73	Combination
75	Pipe - (26)	1.87	15	Cir	121.264	696.80	698.01	0.998	697.36	698.55	n/a	698.55 j	74	Combination
76	Pipe - (27)	1.02	15	Cir	143.319	698.11	703.85	4.005	698.55	704.25	n/a	704.25 j	75	Combination
77	Pipe - (28)	0.53	15	Cir	28.330	703.95	704.23	0.988	704.25	704.51	n/a	704.51 j	76	Combination
78	Pipe - (30)	1.02	15	Cir	143.569	697.50	703.25	4.005	697.73	703.65	0.21	703.65	72	Combination
79	Pipe - (31)	0.53	15	Cir	29.172	703.35	703.64	0.994	703.65	703.92	n/a	703.92 j	78	Combination
80	Pipe - (15)	2.62	18	Cir	125.659	693.90	696.41	1.997	694.31	697.02	n/a	697.02	70	Combination
81	Pipe - (16)	2.21	18	Cir	28.199	696.51	696.80	1.028	697.02	697.36	0.24	697.36	80	Combination
82	Pipe - (17)	1.79	15	Cir	37.275	696.90	698.01	2.978	697.36	698.54	n/a	698.54	81	Combination
83	Pipe - (18)	1.02	15	Cir	221.992	698.11	702.55	2.000	698.54	702.95	n/a	702.95 j	82	Combination
84	Pipe - (19)	0.53	15	Cir	28.331	702.65	702.94	1.024	702.95	703.22	n/a	703.22 j	83	Combination
85	Pipe - (29)	0.53	15	Cir	28.330	700.78	701.63	3.000	700.96	701.91	n/a	701.91	74	Combination
86	Pipe - (21)	0.53	15	Cir	28.199	699.35	699.64	1.029	699.58	699.92	n/a	699.92	82	Combination
87	Pipe - (20)	0.53	15	Cir	28.000	695.36	695.64	1.007	695.59	695.93	n/a	695.93	70	Combination
88		0.53	15	Cir	30.776	700.22	701.14	2.989	700.40	701.42	n/a	701.42	75	Combination
89		0.09	15	Cir	39.000	697.33	697.72	1.000	697.43	697.83	n/a	697.83	71	Combination
Project File: storm 5-15-19.stm														Run Date: 5/30/2019
NOTES: Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.														

Hydraulic Grade Line Computations

Line	Size	Q (cfs) (3)	Downstream						Len (ft) (12)	Upstream						Check		JL coeff (K) (23)	Minor loss (ft) (24)				
			Invert elev (ft) (4)	HGL elev (ft) (5)	Depth (ft) (6)	Area (sqft) (7)	Vel (ft/s) (8)	Vel head (ft) (9)		EGL elev (ft) (10)	Sf (%) (11)	Invert elev (ft) (13)	HGL elev (ft) (14)	Depth (ft) (15)	Area (sqft) (16)	Vel (ft/s) (17)	Vel head (ft) (18)			EGL elev (ft) (19)	Sf (%) (20)	Ave Sf (%) (21)	Enrgy loss (ft) (22)
1	24	5.47	688.00	688.85	0.85	1.22	4.30	0.31	689.16	0.000	264.215	689.40	690.22 j	0.82**	1.22	4.48	0.31	690.54	0.000	0.000	n/a	0.89	n/a
2	24	5.54	689.40	690.22	0.82	1.22	4.53	0.31	690.54	0.000	82.503	690.81	691.64	0.83**	1.23	4.50	0.31	691.95	0.000	0.000	n/a	1.50	n/a
3	24	5.64	689.81	691.64	1.83	1.25	1.87	0.32	691.96	0.000	173.387	690.66	691.50	0.84**	1.25	4.52	0.32	691.81	0.000	0.000	n/a	1.50	n/a
4	24	5.07	690.66	691.50	0.84	1.16	4.06	0.30	691.79	0.000	151.974	691.40	692.19 j	0.79**	1.16	4.37	0.30	692.49	0.000	0.000	n/a	1.65	0.49
5	18	2.12	691.40	692.19	0.79	0.59	2.24	0.20	692.40	0.000	28.586	691.86	692.41 j	0.55**	0.59	3.62	0.20	692.61	0.000	0.000	n/a	1.31	0.27
6	18	1.80	691.86	692.41	0.55	0.52	3.07	0.18	692.59	0.000	145.347	694.69	695.19 j	0.50**	0.52	3.45	0.18	695.38	0.000	0.000	n/a	1.73	0.32
7	18	1.02	694.79	695.19	0.40	0.35	2.66	0.13	695.33	0.000	144.154	703.44	703.82 j	0.38**	0.35	2.94	0.13	703.95	0.000	0.000	n/a	1.49	n/a
8	15	0.53	703.54	703.82	0.28	0.20	2.63	0.10	703.92	0.000	28.330	704.11	704.39	0.28**	0.21	2.54	0.10	704.49	0.000	0.000	n/a	1.00	n/a
9	24	3.53	691.40	692.19	0.79	0.90	3.04	0.24	692.43	0.000	599.685	694.38	695.04 j	0.66**	0.90	3.93	0.24	695.28	0.000	0.000	n/a	1.69	n/a
10	15	1.39	694.38	695.04	0.66	0.42	2.13	0.17	695.21	0.000	28.000	694.75	695.22 j	0.47**	0.42	3.34	0.17	695.39	0.000	0.000	n/a	1.21	n/a
11	15	1.02	694.75	695.22	0.47	0.33	2.45	0.14	695.36	0.000	150.725	699.64	700.04 j	0.40**	0.33	3.05	0.14	700.18	0.000	0.000	n/a	1.32	0.19
12	15	0.53	699.74	700.04	0.30	0.21	2.38	0.10	700.14	0.000	29.502	700.33	700.61 j	0.28**	0.21	2.54	0.10	700.71	0.000	0.000	n/a	1.00	n/a
13	24	1.85	694.38	695.04	0.66	0.56	2.06	0.17	695.20	0.000	63.713	694.67	695.14 j	0.47**	0.56	3.28	0.17	695.31	0.000	0.000	n/a	1.50	0.25
14	15	1.40	694.67	695.14	0.47	0.42	3.32	0.17	695.32	0.000	27.920	694.81	695.28	0.47**	0.42	3.34	0.17	695.45	0.000	0.000	n/a	1.00	0.17
15	15	1.02	694.81	695.28	0.47	0.34	2.44	0.14	695.42	0.000	140.819	699.30	699.70 j	0.40**	0.34	3.05	0.14	699.84	0.000	0.000	n/a	1.29	0.19
16	15	0.53	699.40	699.70	0.30	0.21	2.38	0.10	699.80	0.000	28.330	699.68	699.96 j	0.28**	0.21	2.54	0.10	700.06	0.000	0.000	n/a	1.00	n/a
17	15	0.53	696.10	696.33	0.23*	0.16	3.34	0.10	696.43	0.000	28.307	696.38	696.66	0.28**	0.21	2.54	0.10	696.76	0.000	0.000	n/a	1.00	n/a
18	15	0.53	693.95	694.18	0.23*	0.16	3.34	0.10	694.28	0.000	28.283	694.23	694.51	0.28**	0.21	2.54	0.10	694.61	0.000	0.000	n/a	1.00	n/a
19	24	11.72	650.00	651.25	1.25	2.02	5.67	0.52	651.77	0.000	159.998	654.76	655.99 j	1.23**	2.02	5.79	0.52	656.51	0.000	0.000	n/a	1.50	0.78
20	24	11.38	654.86	655.99	1.13	1.83	6.23	0.51	656.50	0.000	28.331	655.15	656.36	1.21**	1.99	5.73	0.51	656.87	0.000	0.000	n/a	2.23	n/a
21	18	9.60	655.15	656.36	1.21	1.51	6.29	0.63	656.99	0.000	90.949	656.13	657.35 j	1.20**	1.51	6.36	0.63	657.95	0.000	0.000	n/a	0.98	n/a
Project File: storm 5-15-19.stm												Number of lines: 89						Run Date: 5/30/2019					
Notes: * depth assumed.; ** Critical depth.; j-Line contains hyd. jump. ; c = cir e = ellip b = box																							

Hydraulic Grade Line Computations

Line	Size (in) (2) (1)	Q (cfs) (3)	Downstream								Len (ft) (12)	Upstream								Check		JL coeff (K) (23)	Minor loss (ft) (24)
			Invert elev (ft) (4)	HGL elev (ft) (5)	Depth (ft) (6)	Area (sqft) (7)	Vel (ft/s) (8)	Vel head (ft) (9)	EGL elev (ft) (10)	Sf (%) (11)		Invert elev (ft) (13)	HGL elev (ft) (14)	Depth (ft) (15)	Area (sqft) (16)	Vel (ft/s) (17)	Vel head (ft) (18)	EGL elev (ft) (19)	Sf (%) (20)	Ave Sf (%) (21)	Enrgy loss (ft) (22)		
22	18	3.99	656.23	657.33	1.10	0.90	2.88	0.30	657.63	0.000	195.574	671.89	672.65 j	0.76**	0.90	4.41	0.30	672.96	0.000	0.000	n/a	0.26	n/a
23	18	4.03	673.99	674.38	0.39*	0.37	10.99	0.30	674.69	0.000	66.624	677.77	678.54	0.77**	0.91	4.43	0.30	678.84	0.000	0.000	n/a	0.50	0.15
24	18	3.64	677.77	678.54	0.77	0.85	4.01	0.28	678.82	0.000	28.335	678.60	679.33 j	0.73**	0.85	4.28	0.28	679.61	0.000	0.000	n/a	1.50	0.43
25	18	3.30	678.60	679.33	0.73	0.80	3.88	0.27	679.60	0.000	94.156	679.62	680.31 j	0.69**	0.80	4.15	0.27	680.58	0.000	0.000	n/a	1.50	0.40
26	18	2.54	679.72	680.31	0.59	0.65	3.92	0.23	680.54	0.000	94.621	680.67	681.27	0.60**	0.66	3.82	0.23	681.50	0.000	0.000	n/a	1.49	n/a
27	18	1.79	680.77	681.27	0.50	0.52	3.45	0.18	681.46	0.000	145.593	689.50	690.00	0.50**	0.52	3.45	0.18	690.19	0.000	0.000	n/a	1.50	n/a
28	18	1.02	689.60	690.00	0.40	0.35	2.67	0.13	690.14	0.000	148.146	699.97	700.35 j	0.38**	0.35	2.94	0.13	700.48	0.000	0.000	n/a	1.50	n/a
29	15	0.53	700.07	700.35	0.28	0.20	2.63	0.10	700.45	0.000	28.331	700.64	700.92	0.28**	0.21	2.54	0.10	701.02	0.000	0.000	n/a	1.00	n/a
30	18	5.94	656.83	657.60	0.77*	0.91	6.50	0.40	658.01	0.000	53.393	657.37	658.31	0.94**	1.17	5.09	0.40	658.71	0.000	0.000	n/a	1.50	n/a
31	18	5.28	656.79	658.91	1.50	1.08	2.99	0.14	659.05	0.216	153.073	659.85	660.73 j	0.88**	1.08	4.87	0.37	661.10	0.504	0.360	n/a	1.50	0.55
32	18	4.61	659.95	660.73	0.78	0.93	4.95	0.33	661.07	0.000	140.323	665.57	666.39	0.82**	0.99	4.64	0.33	666.72	0.000	0.000	n/a	1.43	n/a
33	18	3.93	665.67	666.39	0.72	0.84	4.69	0.30	666.69	0.000	153.082	670.26	671.02	0.76**	0.90	4.39	0.30	671.32	0.000	0.000	n/a	1.50	n/a
34	18	3.24	670.36	671.02	0.66	0.75	4.34	0.26	671.28	0.000	149.843	676.35	677.03	0.68**	0.79	4.12	0.26	677.30	0.000	0.000	n/a	1.50	n/a
35	18	2.52	676.45	677.03	0.58	0.64	3.96	0.23	677.26	0.000	144.966	686.60	687.20	0.60**	0.66	3.81	0.23	687.43	0.000	0.000	n/a	1.50	n/a
36	18	1.79	686.70	687.20	0.50	0.52	3.47	0.18	687.39	0.000	159.427	694.67	695.17	0.50**	0.52	3.44	0.18	695.36	0.000	0.000	n/a	1.50	0.28
37	18	1.02	694.77	695.17	0.40	0.35	2.67	0.13	695.31	0.000	149.376	699.25	699.63 j	0.38**	0.35	2.94	0.13	699.76	0.000	0.000	n/a	1.50	n/a
38	15	0.53	699.35	699.63	0.28	0.20	2.63	0.10	699.73	0.000	28.331	699.64	699.92	0.28**	0.21	2.54	0.10	700.02	0.000	0.000	n/a	1.00	n/a
39	15	0.53	695.34	695.57	0.23*	0.16	3.39	0.10	695.67	0.000	28.331	695.63	695.91	0.28**	0.21	2.54	0.10	696.01	0.000	0.000	n/a	1.00	n/a
40	15	0.53	690.66	690.86	0.20*	0.12	4.29	0.10	690.96	0.000	28.335	691.23	691.51	0.28**	0.21	2.54	0.10	691.61	0.000	0.000	n/a	1.00	n/a
41	15	0.53	687.33	687.51	0.18*	0.11	4.94	0.10	687.61	0.000	28.331	688.18	688.46	0.28**	0.21	2.54	0.10	688.56	0.000	0.000	n/a	1.00	n/a
42	15	0.53	683.10	683.33	0.23*	0.16	3.34	0.10	683.43	0.000	28.335	683.38	683.66	0.28**	0.21	2.54	0.10	683.76	0.000	0.000	n/a	1.00	n/a
Project File: storm 5-15-19.stm										Number of lines: 89									Run Date: 5/30/2019				
Notes: * depth assumed.; ** Critical depth.; j-Line contains hyd. jump. ; c = cir e = ellip b = box																							

Hydraulic Grade Line Computations

Line	Size	Q (cfs) (3)	Downstream								Len (ft) (12)	Upstream								Check		JL coeff (K) (23)	Minor loss (ft) (24)	
			Invert elev (ft) (4)	HGL elev (ft) (5)	Depth (ft) (6)	Area (sqft) (7)	Vel (ft/s) (8)	Vel head (ft) (9)	EGL elev (ft) (10)	Sf (%) (11)		Invert elev (ft) (13)	HGL elev (ft) (14)	Depth (ft) (15)	Area (sqft) (16)	Vel (ft/s) (17)	Vel head (ft) (18)	EGL elev (ft) (19)	Sf (%) (20)	Ave Sf (%) (21)	Enrgy loss (ft) (22)			
43	15	0.53	680.02	680.31	0.29	0.21	2.44	0.10	680.41	0.000	28.335	680.30	680.58 j	0.28**	0.21	2.54	0.10	680.68	0.000	0.000	n/a	1.00	n/a	
44	15	0.53	676.90	677.07	0.17*	0.10	5.48	0.10	677.17	0.000	28.331	678.04	678.32	0.28**	0.21	2.54	0.10	678.42	0.000	0.000	n/a	1.00	n/a	
45	15	0.53	671.60	671.83	0.23*	0.16	3.39	0.10	671.93	0.000	28.331	671.89	672.17	0.28**	0.21	2.54	0.10	672.27	0.000	0.000	n/a	1.00	n/a	
46	18	1.81	656.49	656.89	0.40*	0.38	4.73	0.19	657.08	0.000	58.462	657.08	657.59	0.51**	0.53	3.45	0.19	657.77	0.000	0.000	n/a	1.26	0.23	
47	18	1.02	657.18	657.59	0.41	0.35	2.64	0.13	657.72	0.000	134.322	666.58	666.96 j	0.38**	0.35	2.94	0.13	667.09	0.000	0.000	n/a	1.50	n/a	
48	15	0.53	666.68	666.96	0.28	0.20	2.63	0.10	667.06	0.000	28.330	667.53	667.81	0.28**	0.21	2.54	0.10	667.91	0.000	0.000	n/a	1.00	n/a	
49	15	0.53	666.39	666.58	0.20*	0.12	4.29	0.10	666.68	0.000	28.331	666.95	667.24	0.28**	0.21	2.54	0.10	667.34	0.000	0.000	n/a	1.00	n/a	
50	15	0.53	661.29	661.52	0.23*	0.16	3.34	0.10	661.62	0.000	28.331	661.57	661.85	0.28**	0.21	2.54	0.10	661.95	0.000	0.000	n/a	1.00	n/a	
51	15	0.53	658.73	658.93	0.20*	0.12	4.29	0.10	659.03	0.000	28.330	659.30	659.58	0.28**	0.21	2.54	0.10	659.68	0.000	0.000	n/a	1.00	n/a	
52	15	0.53	657.36	658.31	0.95	0.21	0.53	0.10	658.41	0.000	28.331	657.64	657.93	0.28**	0.21	2.54	0.10	658.03	0.000	0.000	n/a	1.00	n/a	
53	24	5.32	650.00	650.29	0.29*	0.28	19.09	0.31	650.59	0.000	89.000	671.06	671.87	0.81**	1.20	4.44	0.31	672.18	0.000	0.000	n/a	1.56	n/a	
54	24	4.71	671.06	671.87	0.81	1.10	3.93	0.28	672.16	0.000	80.634	674.58	675.34 j	0.76**	1.10	4.28	0.28	675.63	0.000	0.000	n/a	1.00	0.28	
55	24	3.42	674.58	675.34	0.76	0.88	3.10	0.24	675.58	0.000	68.613	677.80	678.45 j	0.65**	0.88	3.89	0.24	678.68	0.000	0.000	n/a	1.50	0.35	
56	24	2.86	677.90	678.45	0.55	0.70	4.11	0.21	678.66	0.000	149.256	682.38	682.97	0.59**	0.77	3.70	0.21	683.18	0.000	0.000	n/a	1.50	n/a	
57	24	2.27	682.48	682.97	0.49	0.60	3.82	0.19	683.16	0.000	146.742	686.88	687.40	0.52**	0.65	3.47	0.19	687.59	0.000	0.000	n/a	1.50	n/a	
58	24	1.67	686.98	687.40	0.42	0.49	3.44	0.16	687.56	0.000	151.418	693.04	693.49	0.45**	0.52	3.18	0.16	693.64	0.000	0.000	n/a	1.49	n/a	
59	24	1.02	693.14	693.49	0.35	0.36	2.80	0.12	693.61	0.000	134.937	698.54	698.89	0.35**	0.37	2.79	0.12	699.01	0.000	0.000	n/a	1.49	0.18	
60	15	0.53	699.01	699.21	0.20*	0.12	4.29	0.10	699.31	0.000	28.473	699.58	699.86	0.28**	0.21	2.54	0.10	699.96	0.000	0.000	n/a	1.00	n/a	
61	15	0.53	694.31	694.49	0.18*	0.11	4.93	0.10	694.59	0.000	28.473	695.16	695.44	0.28**	0.21	2.54	0.10	695.54	0.000	0.000	n/a	1.00	n/a	
62	18	1.76	674.78	675.34	0.56	0.51	2.90	0.18	675.53	0.000	139.082	682.70	683.20 j	0.50**	0.51	3.42	0.18	683.38	0.000	0.000	n/a	1.50	n/a	
63	18	1.01	684.09	684.29	0.20*	0.14	7.44	0.13	684.42	0.000	155.291	693.41	693.78	0.37**	0.34	2.92	0.13	693.92	0.000	0.000	n/a	1.50	n/a	
Project File: storm 5-15-19.stm												Number of lines: 89								Run Date: 5/30/2019				
Notes: * depth assumed.; ** Critical depth.; j-Line contains hyd. jump. ; c = cir e = ellip b = box																								

Hydraulic Grade Line Computations

Line	Size	Q (cfs) (3)	Downstream								Len (ft) (12)	Upstream								Check		JL coeff (K) (23)	Minor loss (ft) (24)			
			Invert elev (ft) (4)	HGL elev (ft) (5)	Depth (ft) (6)	Area (sqft) (7)	Vel (ft/s) (8)	Vel head (ft) (9)	EGL elev (ft) (10)	Sf (%) (11)		HGL elev (ft) (14)	Depth (ft) (15)	Area (sqft) (16)	Vel (ft/s) (17)	Vel head (ft) (18)	EGL elev (ft) (19)	Sf (%) (20)	Ave Sf (%) (21)	Enrgy loss (ft) (22)						
	(1) (in) (2)																									
85	15	0.53	700.78	700.96	0.18*	0.11	4.94	0.10	701.06	0.000	28.330	701.63	701.91	0.28**	0.21	2.54	0.10	702.01	0.000	0.000	n/a	1.00	n/a			n/a
86	15	0.53	699.35	699.58	0.23*	0.16	3.39	0.10	699.68	0.000	28.199	699.64	699.92	0.28**	0.21	2.54	0.10	700.02	0.000	0.000	n/a	1.00	n/a			n/a
87	15	0.53	695.36	695.59	0.23*	0.16	3.36	0.10	695.69	0.000	28.000	695.64	695.93	0.28**	0.21	2.54	0.10	696.03	0.000	0.000	n/a	1.00	n/a			n/a
88	15	0.53	700.22	700.40	0.18*	0.11	4.93	0.10	700.50	0.000	30.776	701.14	701.42	0.28**	0.21	2.54	0.10	701.52	0.000	0.000	n/a	1.00	n/a			n/a
89	15	0.09	697.33	697.43	0.10*	0.05	1.96	0.04	697.47	0.000	39.000	697.72	697.83	0.11**	0.06	1.58	0.04	697.87	0.000	0.000	n/a	1.00	n/a			n/a
Project File: storm 5-15-19.stm												Number of lines: 89								Run Date: 5/30/2019						
Notes: * depth assumed.; ** Critical depth.; j-Line contains hyd. jump. ; c = cir e = ellip b = box																										

Hydraflow HGL Computation Procedure

General Procedure:

Hydraflow computes the HGL using the Bernoulli energy equation. Manning's equation is used to determine energy losses due to pipe friction. In a standard step, iterative procedure, Hydraflow assumes upstream HGLs until the energy equation balances. If the energy equation cannot balance, supercritical flow exists and critical depth is temporarily assumed at the upstream end. A supercritical flow Profile is then computed using the same procedure in a downstream direction using momentum principles.

- Col. 1 The line number being computed. Calculations begin at Line 1 and proceed upstream.
- Col. 2 The line size. In the case of non-circular pipes, the line rise is printed above the span.
- Col. 3 Total flow rate in the line.
- Col. 4 The elevation of the downstream invert.
- Col. 5 Elevation of the hydraulic grade line at the downstream end. This is computed as the upstream HGL + Minor loss of this line's downstream line.
- Col. 6 The downstream depth of flow inside the pipe ($HGL - \text{Invert elevation}$) but not greater than the line size.
- Col. 7 Cross-sectional area of the flow at the downstream end.
- Col. 8 The velocity of the flow at the downstream end, (Col. 3 / Col. 7).
- Col. 9 Velocity head ($\text{Velocity squared} / 2g$).
- Col. 10 The elevation of the energy grade line at the downstream end, $HGL + \text{Velocity head}$, (Col. 5 + Col. 9).
- Col. 11 The friction slope at the downstream end (the S or Slope term in Manning's equation).
- Col. 12 The line length.
- Col. 13 The elevation of the upstream invert.
- Col. 14 Elevation of the hydraulic grade line at the upstream end.
- Col. 15 The upstream depth of flow inside the pipe ($HGL - \text{Invert elevation}$) but not greater than the line size.
- Col. 16 Cross-sectional area of the flow at the upstream end.
- Col. 17 The velocity of the flow at the upstream end, (Col. 3 / Col. 16).
- Col. 18 Velocity head ($\text{Velocity squared} / 2g$).
- Col. 19 The elevation of the energy grade line at the upstream end, $HGL + \text{Velocity head}$, (Col. 14 + Col. 18) .
- Col. 20 The friction slope at the upstream end (the S or Slope term in Manning's equation).
- Col. 21 The average of the downstream and upstream friction slopes.
- Col. 22 Energy loss. $\text{Average Sf}/100 \times \text{Line Length}$ (Col. 21/100 x Col. 12). Equals ($\text{EGL upstream} - \text{EGL downstream}$) +/- tolerance.
- Col. 23 The junction loss coefficient (K).
- Col. 24 Minor loss. (Col. 23 x Col. 18). Is added to upstream HGL and used as the starting HGL for the next upstream line(s).

APPENDIX E

North POND 1

SUBSURFACE LEVEL SPREADER CALCULATION

$$L \text{ (length of level spreader pipe)} = Q / QL$$

$$QL \text{ (perforation flow rate)} = Cd * A * (2 * g * H)^{0.5}$$

$$Cd = \text{Coefficient of discharge (typically 0.60)}$$

$$A = \text{Cross sectional area of one perforation (ft}^2\text{)} = 0.00136$$

$$g = 32.2 \text{ ft/sec}^2$$

$$H = \text{head, average height of water above perforation (ft)} = 1.11$$

24-inch pipe with 24-0.5-in holes per linear foot

$$QL = 0.591$$

$$H = 0.418 \text{ feet}$$

$$Q = 75.76 \text{ cfs}$$

$$L = 75.76 \text{ cfs} / (0.591 \text{ cfs/ft})$$

$$= 128 \text{ L.F.}$$

128 L.F. LEVEL SPREADER PROPOSED

South POND 2

SUBSURFACE LEVEL SPREADER CALCULATION

$$L \text{ (length of level spreader pipe)} = Q / QL$$

$$QL \text{ (perforation flow rate)} = Cd * A * (2 * g * H)^{0.5}$$

$$Cd = \text{Coefficient of discharge (typically 0.60)}$$

$$A = \text{Cross sectional area of one perforation (ft}^2\text{)} = 0.00136$$

$$g = 32.2 \text{ ft/sec}^2$$

$$H = \text{head, average height of water above perforation (ft)} = 1.11$$

24-inch pipe with 24-0.5-in holes per linear foot

$$QL = 0.591$$

$$H = 0.418 \text{ feet}$$

$$Q = 9.582 \text{ cfs}$$

$$L = 9.582 \text{ cfs} / (0.591 \text{ cfs/ft})$$

$$= 16.23 \text{ L.F.}$$

18 L.F. LEVEL SPREADER PROPOSED

Hydro graph Run 25-yr storm 12 hour duration

Hydrograph Return Period Recap..... 1

25 - Year

Hydrograph Reports..... 2

Hydrograph No. 1, SCS Runoff, ex da-1..... 2

TR-55 Tc Worksheet..... 3

Hydrograph No. 2, SCS Runoff, proposed da-1..... 4

TR-55 Tc Worksheet..... 5

Hydrograph No. 3, SCS Runoff, DA-2 Existing..... 6

TR-55 Tc Worksheet..... 7

Hydrograph No. 4, SCS Runoff, Proposed DA-2..... 8

TR-55 Tc Worksheet..... 9

Hydrograph No. 5, Reservoir, pond 1 control..... 10

Pond Report - pond 1..... 11

Hydrograph No. 6, Reservoir, pond 2 control..... 12

Pond Report - pond 2..... 13

IDF Report..... 14

Hydrograph Return Period Recap

Hydroflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	-----	-----	-----	-----	-----	-----	83.30	-----	-----	ex da-1
2	SCS Runoff	-----	-----	-----	-----	-----	-----	114.11	-----	-----	proposed da-1
3	SCS Runoff	-----	-----	-----	-----	-----	-----	50.78	-----	-----	DA-2 Existing
4	SCS Runoff	-----	-----	-----	-----	-----	-----	62.92	-----	-----	Proposed DA-2
5	Reservoir	2	-----	-----	-----	-----	-----	68.30	-----	-----	pond 1 control
6	Reservoir	4	-----	-----	-----	-----	-----	7.564	-----	-----	pond 2 control
Proj. file: drainage 12-hours.gpw										Thursday, 01 / 7 / 2021	

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

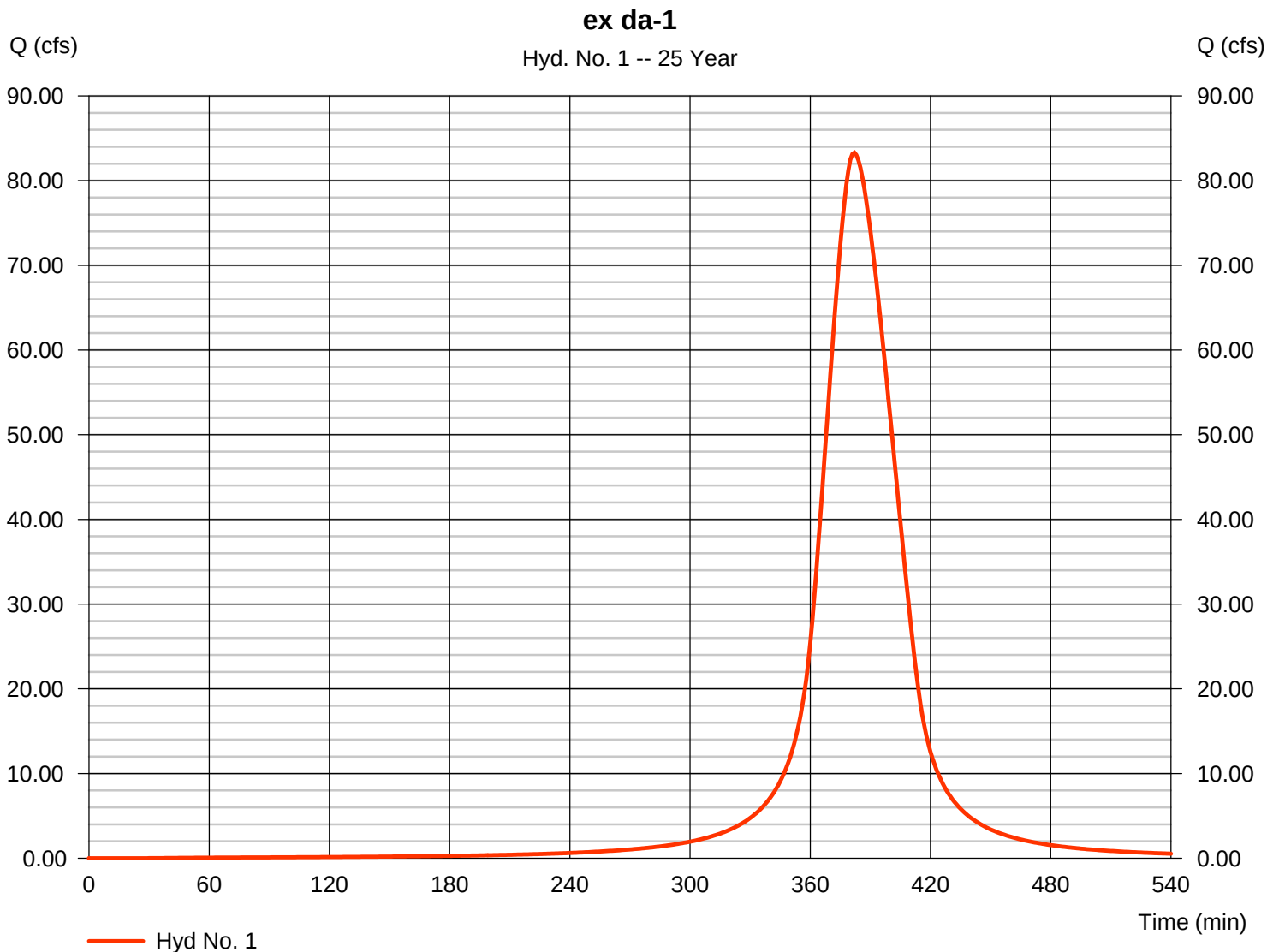
Thursday, 01 / 7 / 2021

Hyd. No. 1

ex da-1

Hydrograph type = SCS Runoff
 Storm frequency = 25 yrs
 Time interval = 1 min
 Drainage area = 24.700 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 2.70 in
 Storm duration = 12.00 hrs

Peak discharge = 83.30 cfs
 Time to peak = 382 min
 Hyd. volume = 242,069 cuft
 Curve number = 68
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 34.90 min
 Distribution = Synthetic
 Shape factor = 484



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No. 1

ex da-1

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.400	0.011	0.011	
Flow length (ft)	= 300.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.62	0.00	0.00	
Land slope (%)	= 6.00	0.00	0.00	
Travel Time (min)	= 31.33	+	0.00	+
			0.00	= 31.33
Shallow Concentrated Flow				
Flow length (ft)	= 837.00	0.00	0.00	
Watercourse slope (%)	= 6.00	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=3.95	0.00	0.00	
Travel Time (min)	= 3.53	+	0.00	+
			0.00	= 3.53
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00	0.00	0.00	
Flow length (ft)	(0)0.0	0.0	0.0	
Travel Time (min)	= 0.00	+	0.00	+
			0.00	= 0.00
Total Travel Time, Tc				34.90 min

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

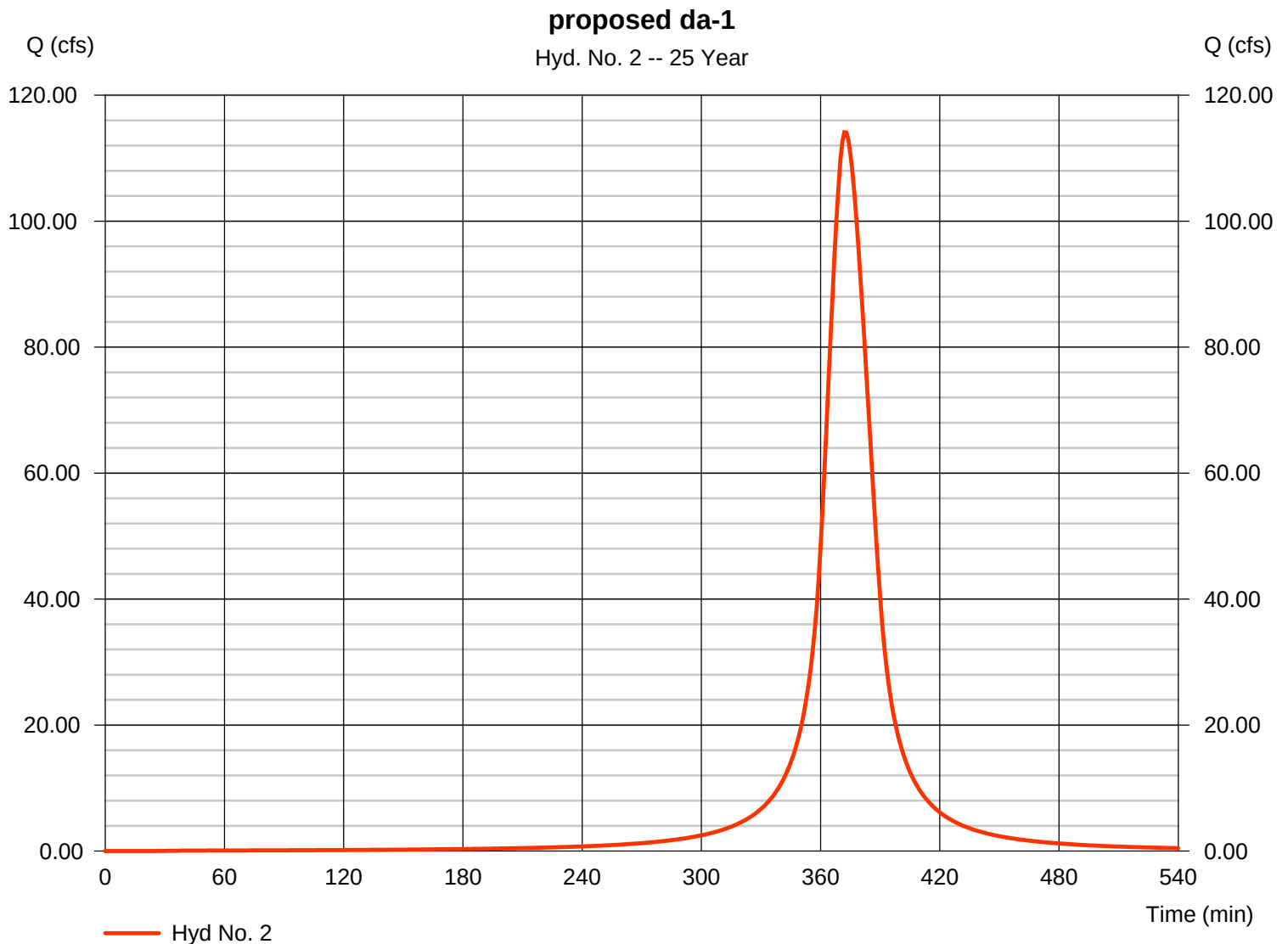
Hyd. No. 2

proposed da-1

Hydrograph type = SCS Runoff
 Storm frequency = 25 yrs
 Time interval = 1 min
 Drainage area = 24.700 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 2.70 in
 Storm duration = 12.00 hrs

Peak discharge = 114.11 cfs
 Time to peak = 372 min
 Hyd. volume = 242,069 cuft
 Curve number = 73*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 19.30 min
 Distribution = Synthetic
 Shape factor = 484

* Composite (Area/CN) = $[(16.650 \times 61) + (8.050 \times 98)] / 24.700$



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No. 2

proposed da-1

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>			
Sheet Flow							
Manning's n-value	= 0.011	0.150	0.011				
Flow length (ft)	= 300.0	300.0	0.0				
Two-year 24-hr precip. (in)	= 3.62	3.62	0.00				
Land slope (%)	= 5.00	5.00	0.00				
Travel Time (min)	= 1.90	+	15.38	+	0.00	=	17.28
Shallow Concentrated Flow							
Flow length (ft)	= 0.00	0.00	0.00				
Watercourse slope (%)	= 0.00	0.00	0.00				
Surface description	= Paved	Paved	Paved				
Average velocity (ft/s)	=0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Channel Flow							
X sectional flow area (sqft)	= 1.76	0.00	0.00				
Wetted perimeter (ft)	= 4.71	0.00	0.00				
Channel slope (%)	= 0.50	0.00	0.00				
Manning's n-value	= 0.011	0.015	0.015				
Velocity (ft/s)	=4.95	0.00	0.00				
Flow length (ft)	(0)600.0	0.0	0.0				
Travel Time (min)	= 2.02	+	0.00	+	0.00	=	2.02
Total Travel Time, Tc				19.30 min			

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

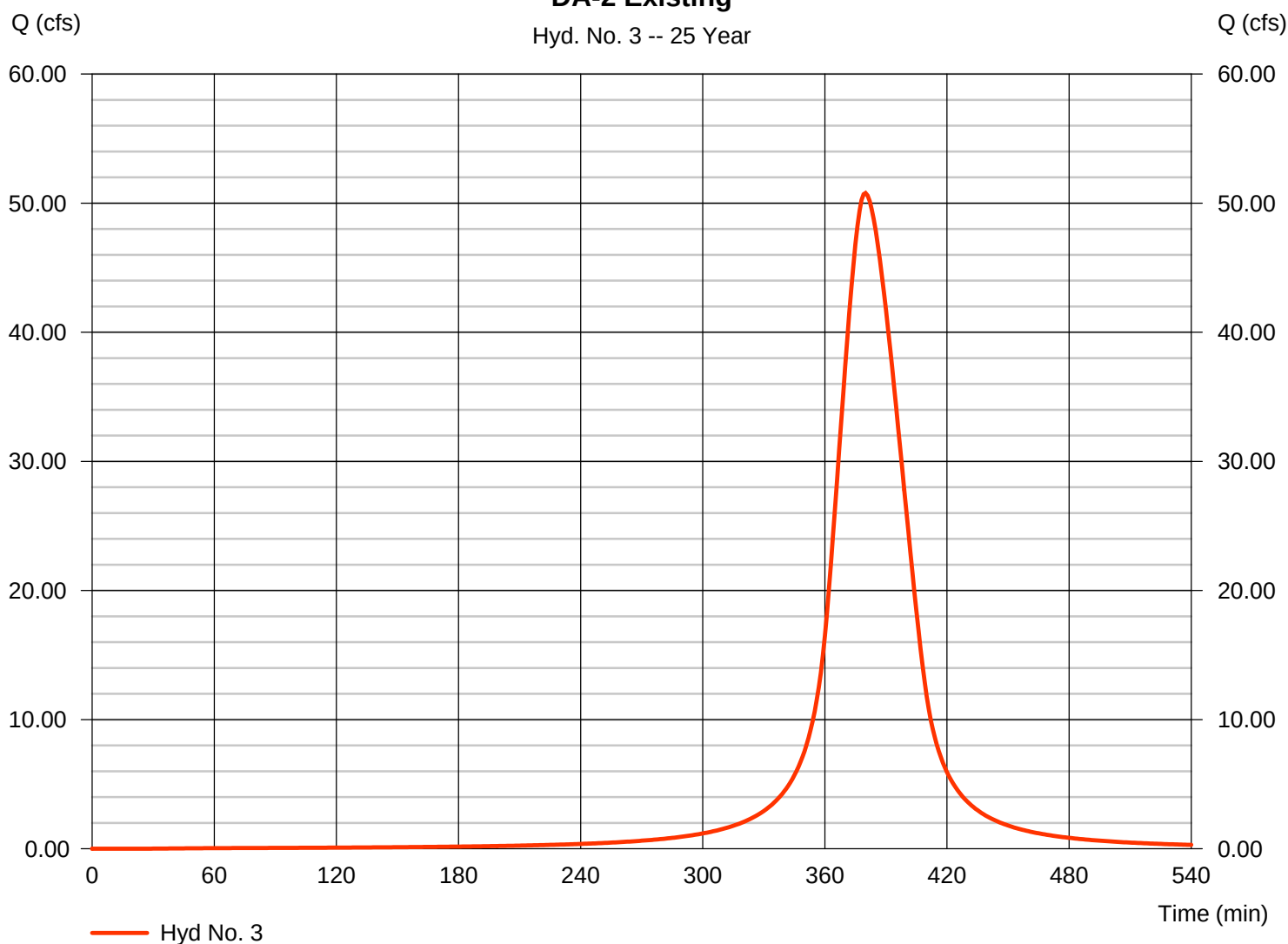
Hyd. No. 3

DA-2 Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 50.78 cfs
Storm frequency	= 25 yrs	Time to peak	= 380 min
Time interval	= 1 min	Hyd. volume	= 139,390 cuft
Drainage area	= 14.130 ac	Curve number	= 68
Basin Slope	= 6.0 %	Hydraulic length	= 300 ft
Tc method	= TR55	Time of conc. (Tc)	= 32.00 min
Total precip.	= 2.70 in	Distribution	= Synthetic
Storm duration	= 12.00 hrs	Shape factor	= 484

DA-2 Existing

Hyd. No. 3 -- 25 Year



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No. 3

DA-2 Existing

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.400	0.011	0.011	
Flow length (ft)	= 300.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.62	0.00	0.00	
Land slope (%)	= 6.00	0.00	0.00	
Travel Time (min)	= 31.33	+ 0.00	+ 0.00	= 31.33
Shallow Concentrated Flow				
Flow length (ft)	= 250.00	0.00	0.00	
Watercourse slope (%)	= 13.00	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=5.82	0.00	0.00	
Travel Time (min)	= 0.72	+ 0.00	+ 0.00	= 0.72
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00	0.00	0.00	
Flow length (ft)	({0})0.0	0.0	0.0	
Travel Time (min)	= 0.00	+ 0.00	+ 0.00	= 0.00
Total Travel Time, Tc				32.00 min

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

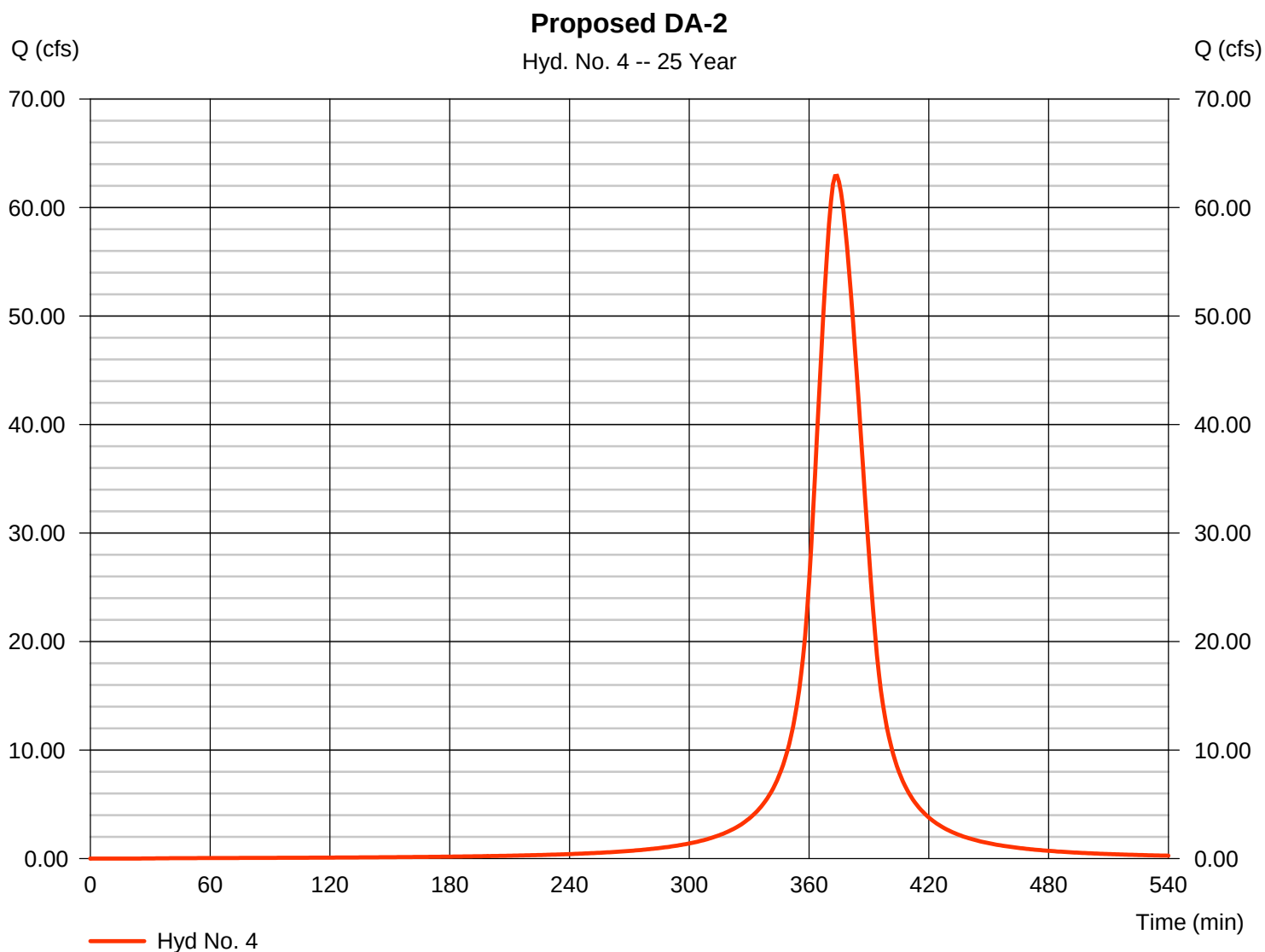
Thursday, 01 / 7 / 2021

Hyd. No. 4

Proposed DA-2

Hydrograph type	= SCS Runoff	Peak discharge	= 62.92 cfs
Storm frequency	= 25 yrs	Time to peak	= 374 min
Time interval	= 1 min	Hyd. volume	= 139,811 cuft
Drainage area	= 14.130 ac	Curve number	= 76*
Basin Slope	= 6.0 %	Hydraulic length	= 300 ft
Tc method	= TR55	Time of conc. (Tc)	= 21.60 min
Total precip.	= 2.70 in	Distribution	= Synthetic
Storm duration	= 12.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(5.839 \times 98) + (8.290 \times 61)] / 14.130$



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No. 4

Proposed DA-2

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>			
Sheet Flow							
Manning's n-value	= 0.011	0.150	0.011				
Flow length (ft)	= 300.0	300.0	0.0				
Two-year 24-hr precip. (in)	= 3.62	3.62	0.00				
Land slope (%)	= 5.00	5.00	0.00				
Travel Time (min)	= 1.90	+	15.38	+	0.00	=	17.28
Shallow Concentrated Flow							
Flow length (ft)	= 0.00	0.00	0.00				
Watercourse slope (%)	= 0.00	0.00	0.00				
Surface description	= Paved	Paved	Paved				
Average velocity (ft/s)	=0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Channel Flow							
X sectional flow area (sqft)	= 1.76	0.00	0.00				
Wetted perimeter (ft)	= 4.71	0.00	0.00				
Channel slope (%)	= 0.50	0.00	0.00				
Manning's n-value	= 0.011	0.015	0.015				
Velocity (ft/s)	=4.95	0.00	0.00				
Flow length (ft)	(0)1287.0	0.0	0.0				
Travel Time (min)	= 4.33	+	0.00	+	0.00	=	4.33
Total Travel Time, Tc					21.60 min		

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

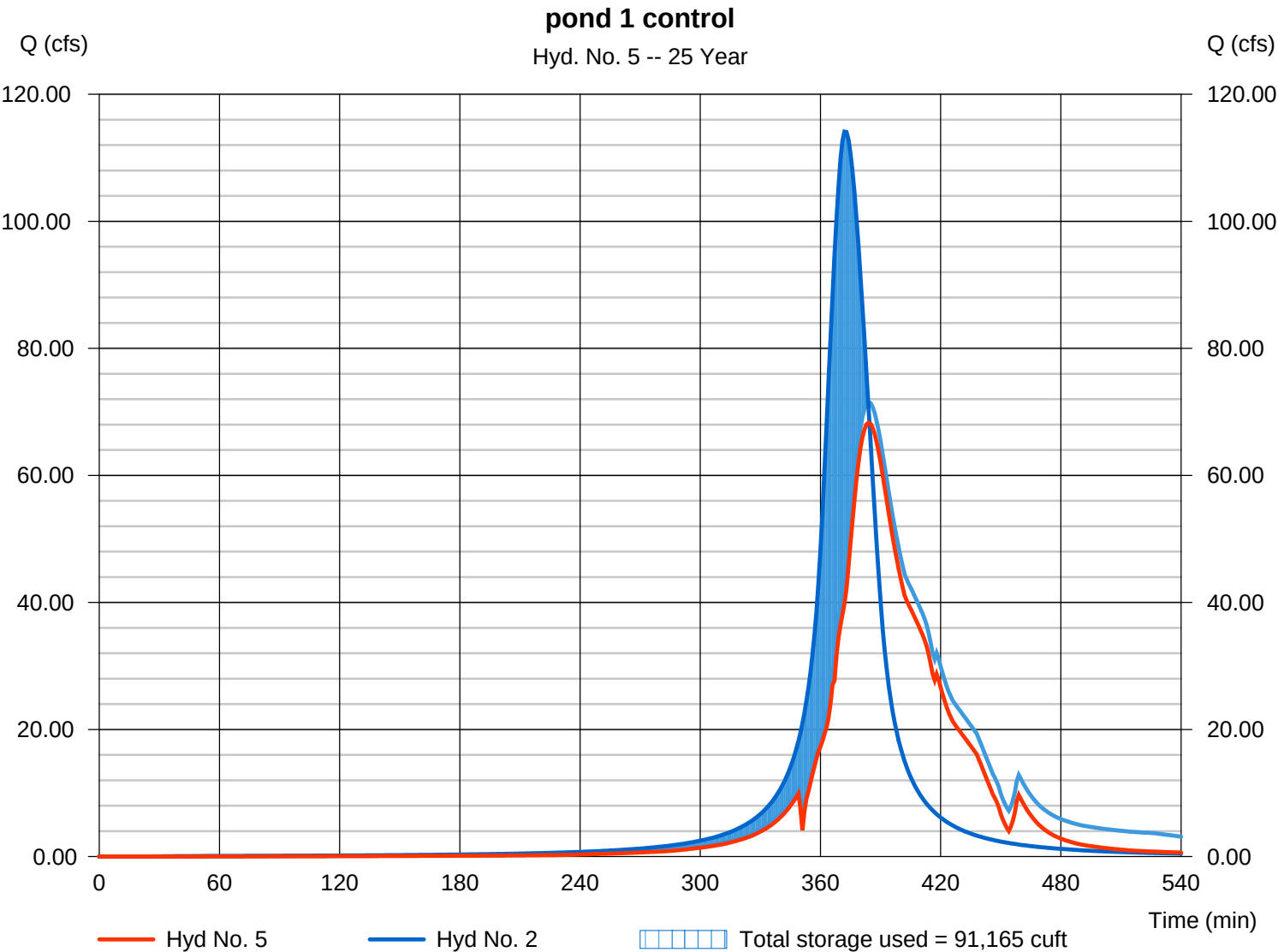
Thursday, 01 / 7 / 2021

Hyd. No. 5

pond 1 control

Hydrograph type	= Reservoir	Peak discharge	= 68.30 cfs
Storm frequency	= 25 yrs	Time to peak	= 384 min
Time interval	= 1 min	Hyd. volume	= 228,429 cuft
Inflow hyd. No.	= 2 - proposed da-1	Max. Elevation	= 659.59 ft
Reservoir name	= pond 1	Max. Storage	= 91,165 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond No. 1 - pond 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 650.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	650.00	5,918	0	0
2.00	652.00	7,279	13,172	13,172
4.00	654.00	8,754	16,009	29,181
6.00	656.00	10,344	19,074	48,255
8.00	658.00	12,048	22,368	70,623
10.00	660.00	13,856	25,880	96,503

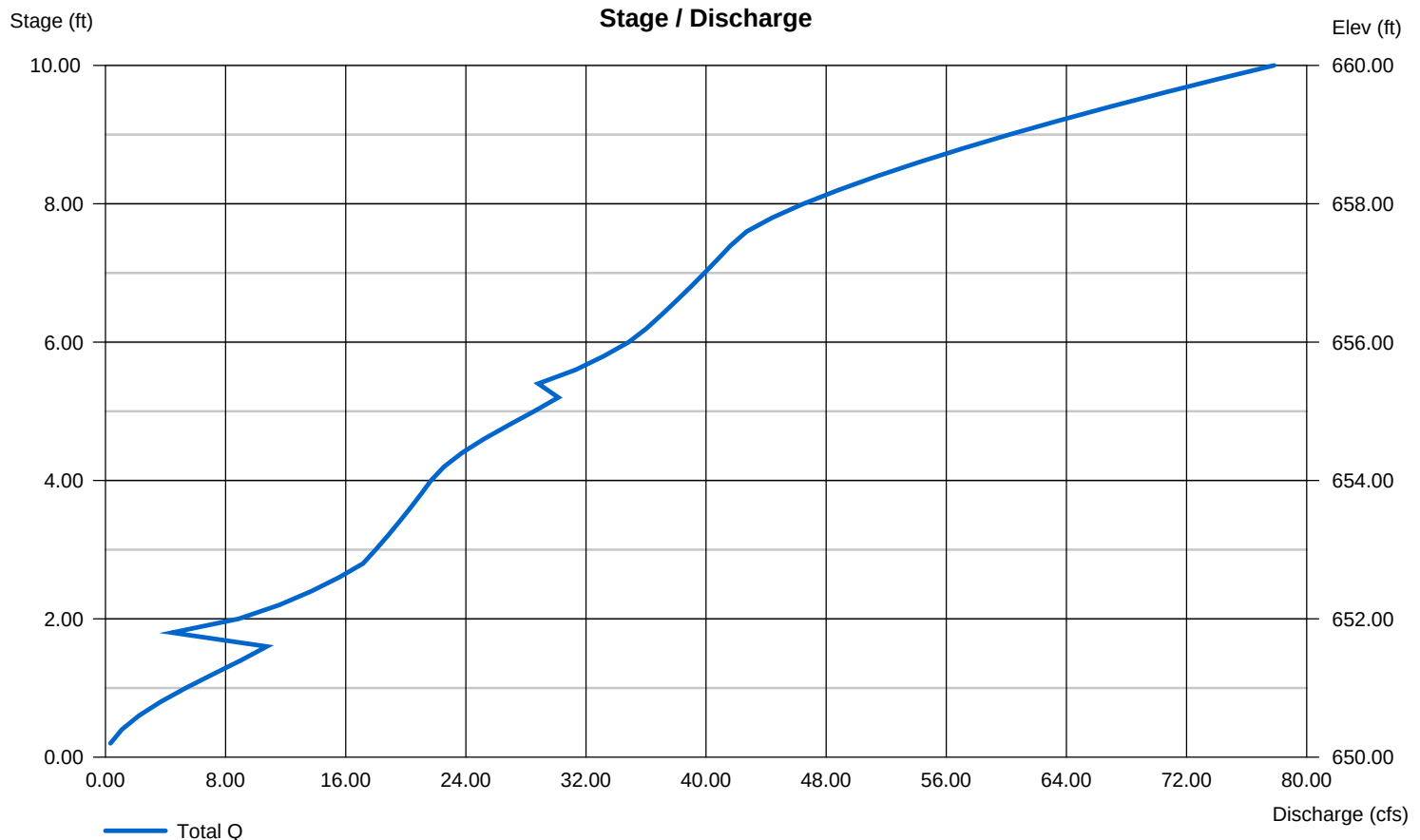
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	21.00	15.50	0.00
Span (in)	= 0.00	21.00	15.50	0.00
No. Barrels	= 0	1	1	0
Invert El. (ft)	= 0.00	650.00	654.00	0.00
Length (ft)	= 0.00	0.50	0.50	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	2.00	0.00	0.00
Crest El. (ft)	= 0.00	657.50	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	Rect	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 6.000 (by Contour)			
TW Elev. (ft)	= 0.00			

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



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

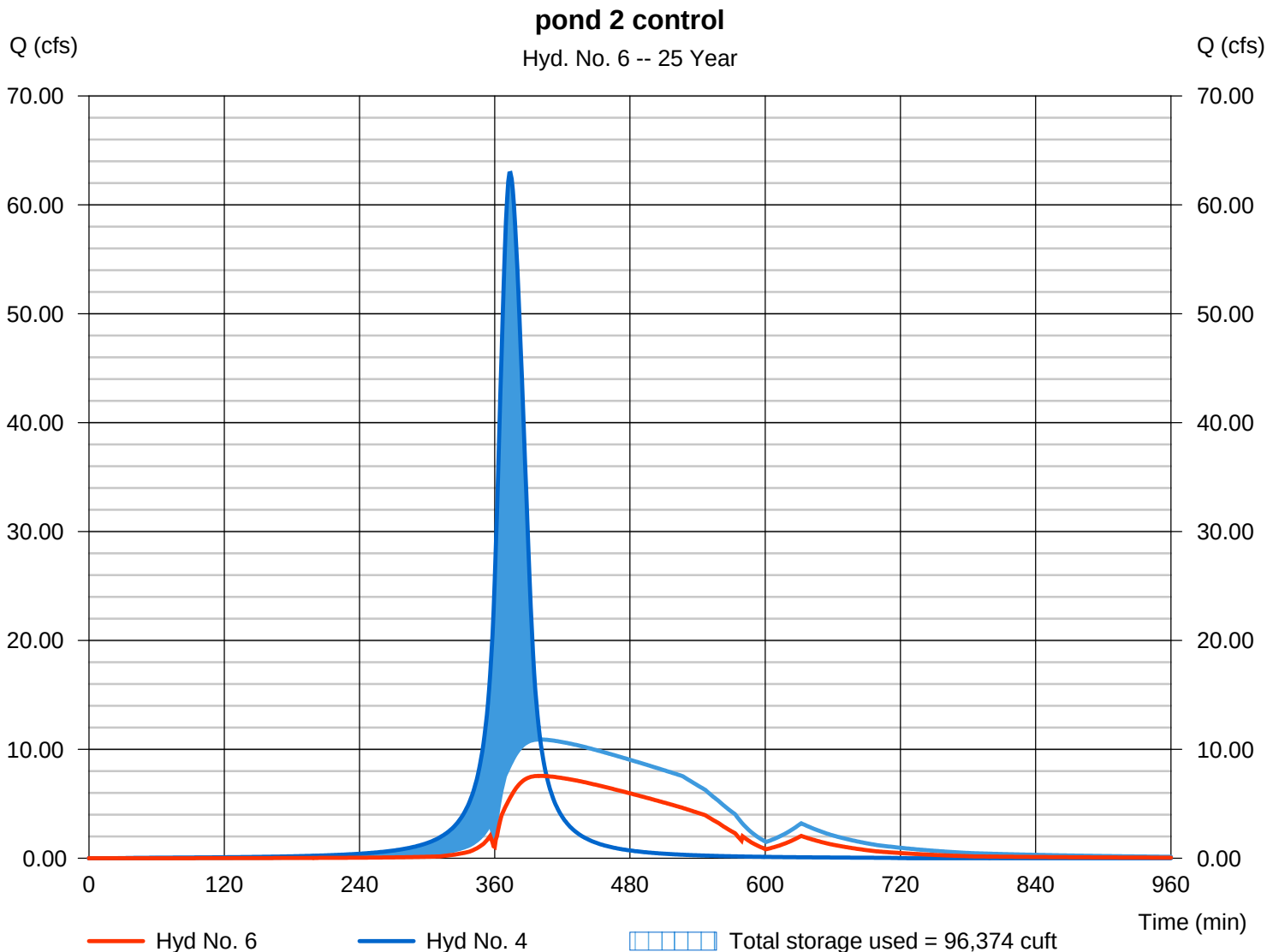
Thursday, 01 / 7 / 2021

Hyd. No. 6

pond 2 control

Hydrograph type	= Reservoir	Peak discharge	= 7.564 cfs
Storm frequency	= 25 yrs	Time to peak	= 400 min
Time interval	= 1 min	Hyd. volume	= 88,331 cuft
Inflow hyd. No.	= 4 - Proposed DA-2	Max. Elevation	= 694.50 ft
Reservoir name	= pond 2	Max. Storage	= 96,374 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

13

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

Pond No. 2 - pond 2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 690.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	690.00	18,677	0	0
2.00	692.00	20,975	39,626	39,626
4.00	694.00	23,406	44,354	83,980
6.00	696.00	25,972	49,351	133,331

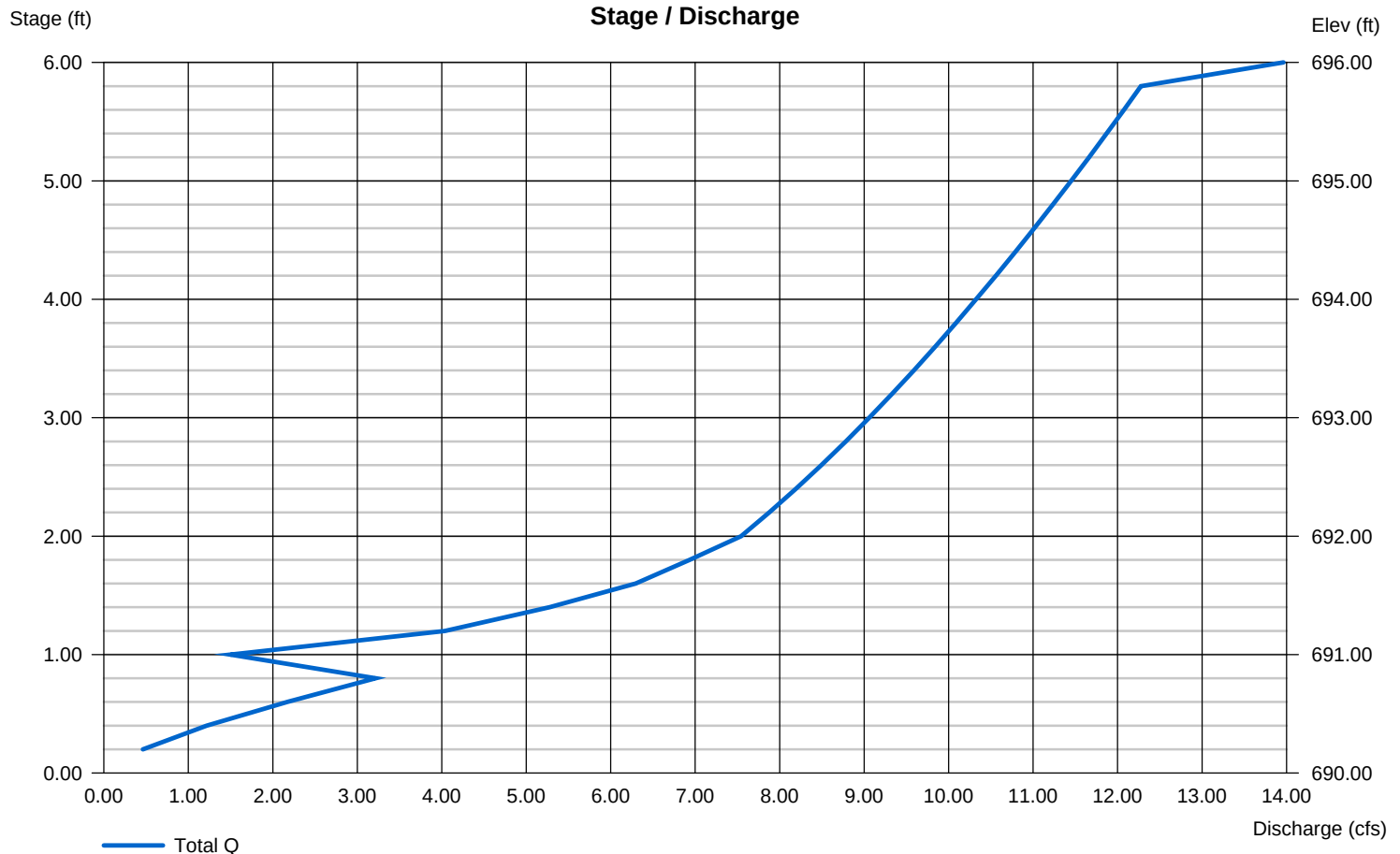
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	12.00	0.00	0.00
Span (in)	= 0.00	12.00	0.00	0.00
No. Barrels	= 0	1	0	0
Invert El. (ft)	= 0.00	690.00	0.00	0.00
Length (ft)	= 0.00	0.50	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

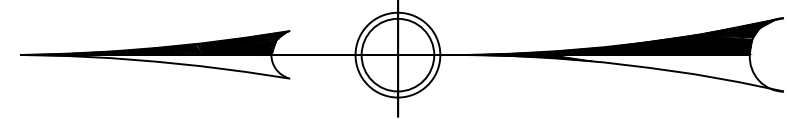
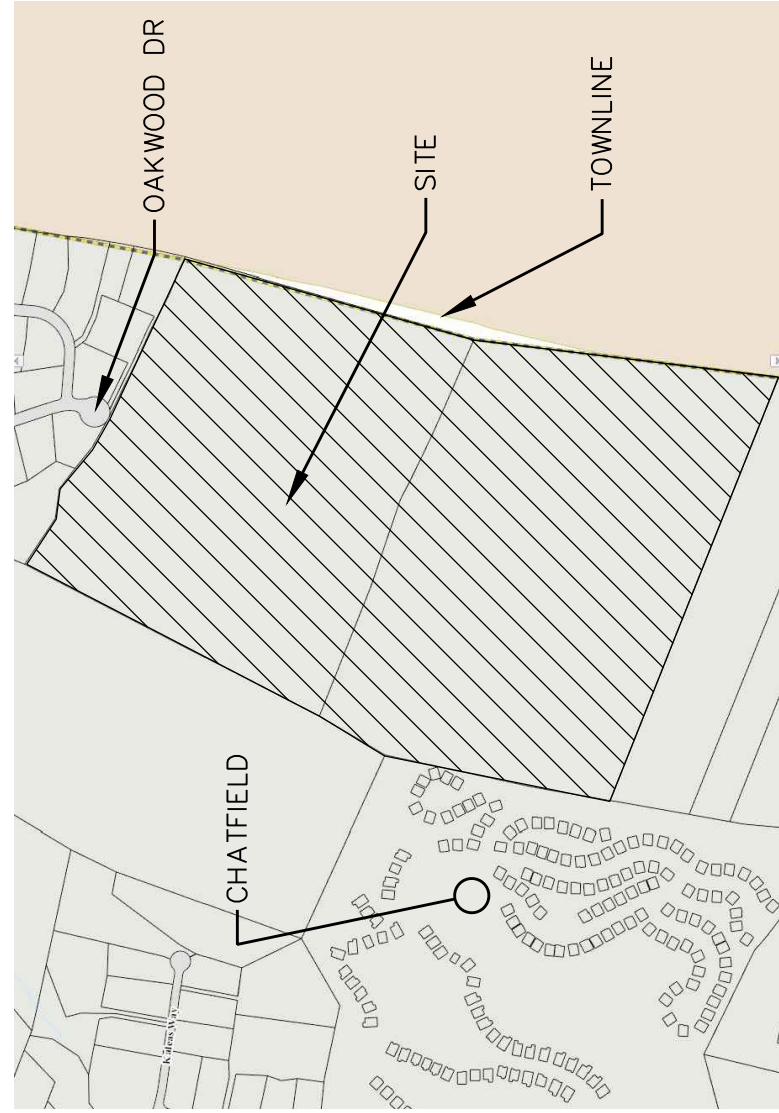
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	5.00	0.00	0.00
Crest El. (ft)	= 0.00	695.80	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	Rect	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 6.000 (by Contour)			
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).



APPENDIX F
Drainage Area Maps



ROSE
TISO
& CO. LLC.
ARCHITECTS • SURVEYORS • ENGINEERS

WWW.ROSETISO.COM
35 BRENTWOOD AVENUE, FAIRFIELD, CT 06825
TEL: (203) 610-6262 • FAX: (203) 610-6404

REVISIONS		
NO.	BY	DATE DESCRIPTION
1.	MJS	8-08-19 WETLANDS SUBMISSION
2.	MJS	10-04-19 ENGINEERING COMMENTS
3.	SFS	3-17-20 ZONE CHANGE APPLICATION
4.	MJS	01-07-21 WETLANDS SUBMISSION
5.	MJS	01-27-21 WETLANDS COMMENTS
6.	MJS	03-18-21 WETLANDS COMMENTS
7.	MJS	03-31-21 WETLANDS COMMENTS
8.	MJS	08-05-21 STAFF COMMENTS
9.	MJS	11-23-23 STAFF COMMENTS
10.	MJS	6-21-24 STAFF COMMENTS
11.	MJS	9-27-24 STAFF COMMENTS
12.	MJS	10-24-24 ENGINEERING COMMENTS
13.	MJS	12-13-24 LOT LINES ADDED

PROJECT TITLE

HOPP BROOK ESTATES
FINAL SITE PLANS

OAKWOOD LANE
BEACON FALLS, CT.

Prepared For:
HOPP BROOK DEVELOPERS LLC

SHEET TITLE

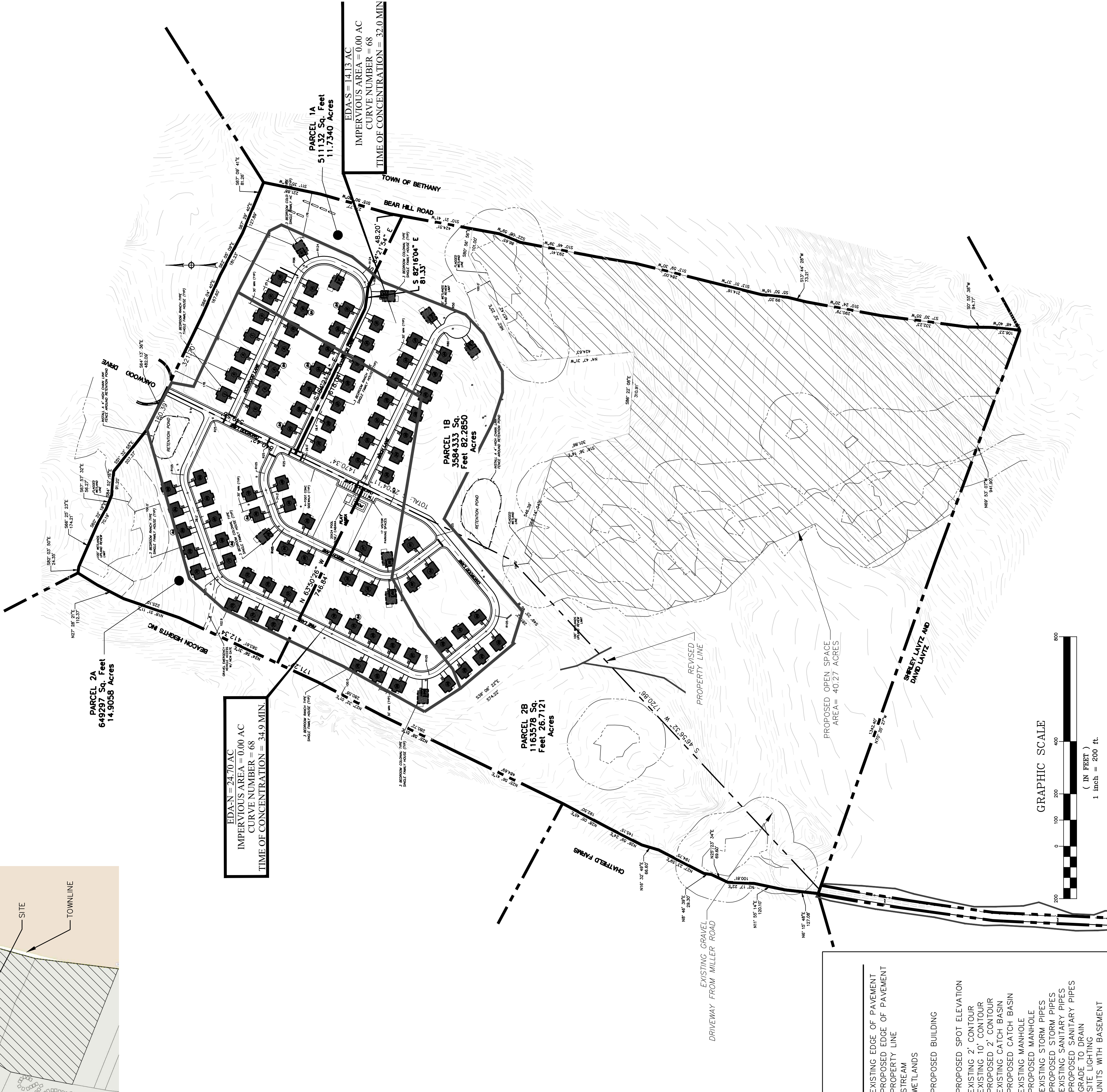
EXISTING DRAINAGE
AREA MAP

DESIGNED BY: MJS	SCALE: 1"=200'
DRAWN BY: MJS	DATE: 2-23-18
CHECKED BY: MJS	PROJECT NUMBER: 2215
CAD FILE: 2215	

SEAL

SHEET NUMBER

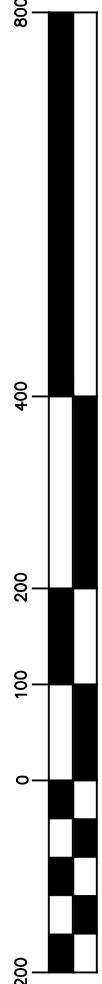
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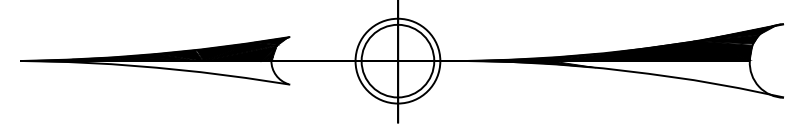
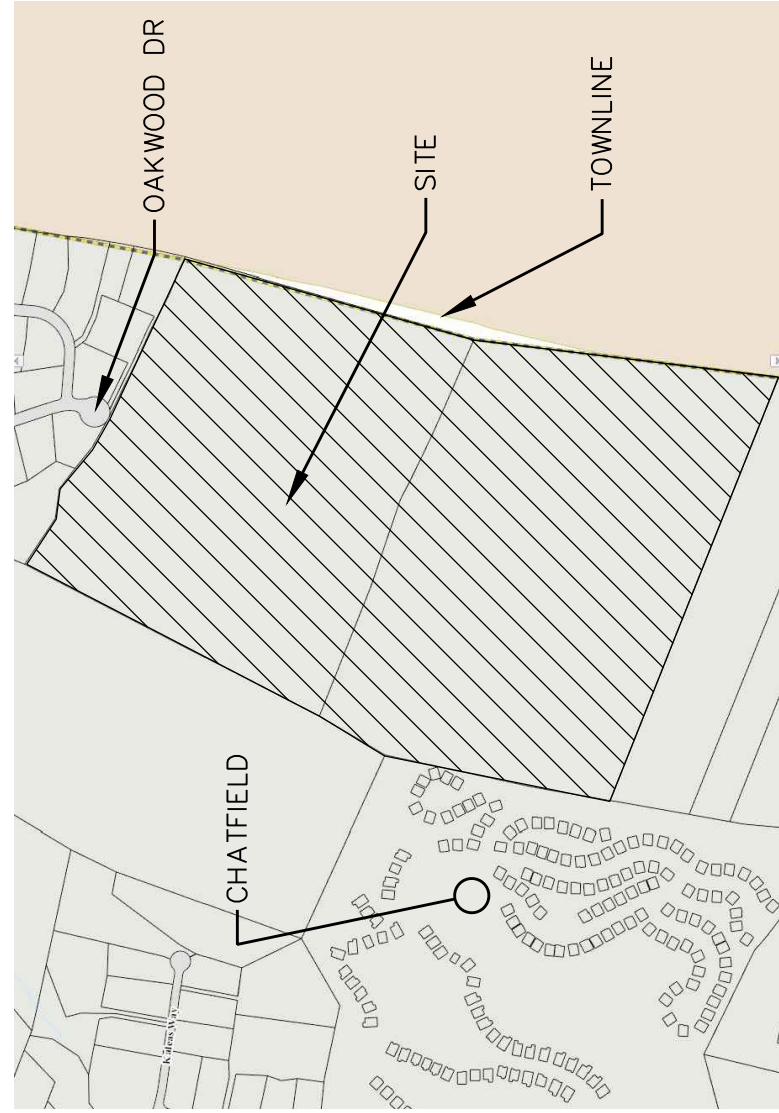
LEGEND

- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF PAVEMENT
- PROPERTY LINE
- STREAM
- WETLANDS
- PROPOSED BUILDING
- PROPOSED SPOT ELEVATION
- EXISTING 2' CONTOUR
- EXISTING 10' CONTOUR
- PROPOSED 2' CONTOUR
- EXISTING CATCH BASIN
- PROPOSED CATCH BASIN
- EXISTING MANHOLE
- PROPOSED MANHOLE
- EXISTING STORM PIPES
- PROPOSED STORM PIPES
- EXISTING SANITARY PIPES
- PROPOSED SANITARY PIPES
- GRADE TO DRAIN
- SITE LIGHTING
- UNITS WITH BASEMENT

GRAPHIC SCALE



(IN FEET)
1 inch = 200 ft.



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OAKWOOD LANE
BEACON FALLS, CT.

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SHEET TITLE

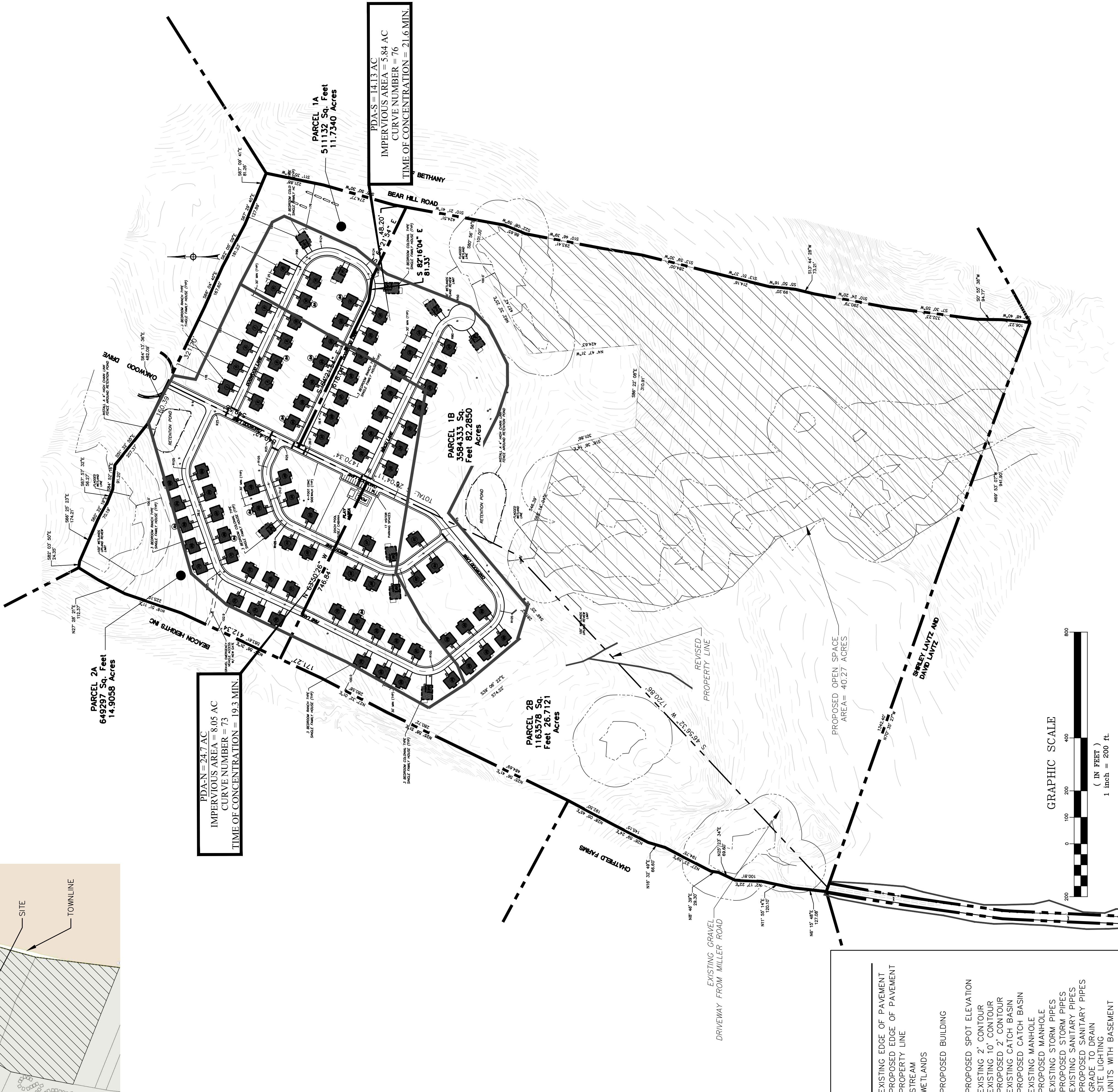
PROPOSED DRAINAGE
AREA MAP

DESIGNED BY: MJS	SCALE: 1"=200'
DRAWN BY: MJS	DATE: 2-23-18
CHECKED BY: MJS	PROJECT NUMBER: 2215
CAD FILE: 2215	

SEAL

SHEET NUMBER

DA-PR



LEGEND

- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF PAVEMENT
- PROPERTY LINE
- STREAM
- WETLANDS
- PROPOSED BUILDING
- PROPOSED SPOT ELEVATION
- EXISTING 2' CONTOUR
- EXISTING 10' CONTOUR
- PROPOSED 2' CONTOUR
- EXISTING CATCH BASIN
- PROPOSED CATCH BASIN
- EXISTING MANHOLE
- PROPOSED MANHOLE
- EXISTING STORM PIPES
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- PROPOSED SANITARY PIPES
- GRADE TO DRAIN
- SITE LIGHTING
- UNITS WITH BASEMENT

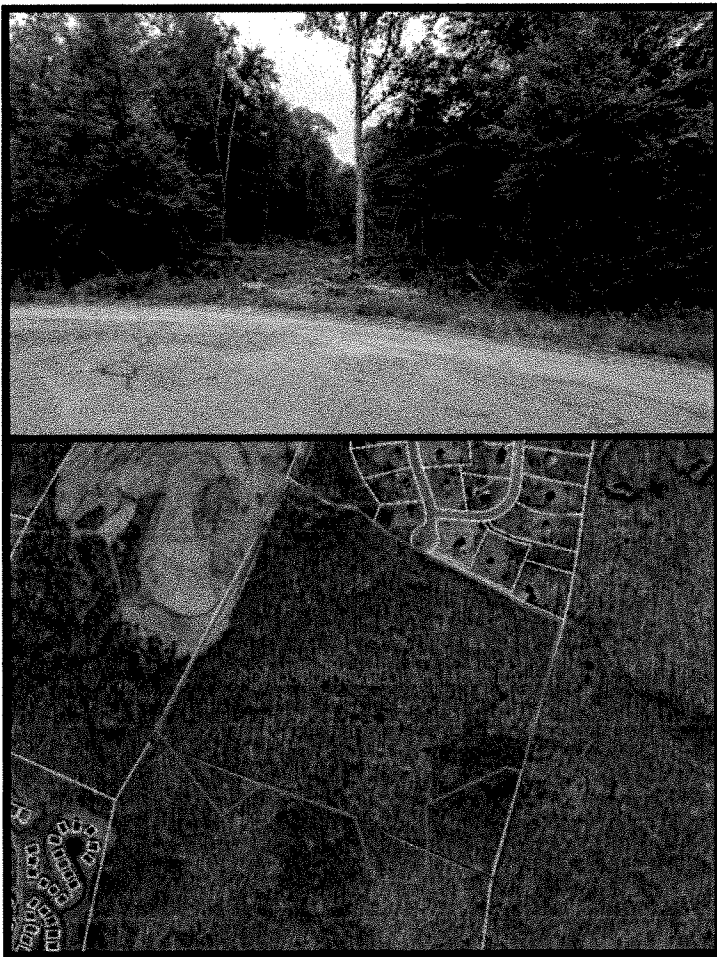


Appendix B

Phase 1 Environmental Report

PHASE I: ENVIRONMENTAL SITE ASSESSMENT

**“Hopp Brook Estates”
MBL #: 12-2-27
Beacon Falls, CT 06403**



Prepared For:

ION Bank
C/O Ms. Tiffany Hartmann
Sr. Loan Administrator
87 Church Street
Naugatuck, CT 06770

Prepared By:

Diversified Environmental Services, Inc.
93 Industrial Drive
Southington, CT 06489

DES Project: 2026-5d
June 2026



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APPENDICES

Appendix A - Subject Property and Aerial Photographs, Historical Topographic Maps
Appendix B - Municipal/State Documentation
Appendix C - Regulatory Database Report

1 INTRODUCTION

1.1 SCOPE OF WORK AND PURPOSE

Ms. Tiffany Hartmann, of Ion Bank, retained Diversified Environmental Services, Inc. (DES) to perform a Phase I Environmental Site Assessment (ESA) of the property known as “Hopp Brook Estates” located in Beacon Falls, Connecticut. The parcel is known by the Town of Beacon Falls as MBL ID # 12-2-27 and consists of approximately 55-acres of vacant/wooded, undeveloped land. The parcel is located in a residential (R1) zoned area and is located off the south side of the Oakwood Drive cul-de-sac within the Town of Beacon Falls and hereafter referred to as the “Subject Property”.

The scope of services provided by DES for this assessment included a Subject Property inspection and a review of the following, when applicable:

- Town of Beacon Falls land records,
- Town of Beacon Falls Fire Department files,
- Town of Beacon Falls Planning, Zoning and Building Department files,
- Naugatuck Valley Health District files,
- Sanborn Fire Insurance Maps, City Directories & Aerial Photographs

DES also reviewed an electronic database search produced by Environmental Record Search, LLC (ERS), which provides an overview of the environmental databases specified in ASTM Standard E1527-21 – Standard Practice for Environmental Site Assessments: Phase I Environmental Assessment Process.

The services provided for this report did not include items that are considered outside the scope of an ASTM Phase I ESA; including sampling or laboratory analytical testing, indoor air quality, radon, lead-based paint, drinking water analysis, asbestos-containing materials (ACM), or emerging contaminants (including per- and polyfluoroalkyl substances - PFAs). Regulatory compliance, health and safety, and industrial hygiene are also considered out of scope.

The Phase I ESA is an evaluation of the current and historical operations/activities conducted at the Subject Property. During this non-intrusive investigation, recognized environmental conditions (RECs), at which a release to the environment (soil and/or groundwater) may have occurred, are identified. These RECs include, but are not limited to, areas at the Subject Property where hazardous waste and/or petroleum products have been used, stored, handled, spilled, and/or released to the environment.

1.2 SUBJECT PROPERTY SUMMARY

The Subject Property location is illustrated on Figure 1, on the appropriate United States Geological Survey (USGS) 7.5-minute Naugatuck, Connecticut Quadrangle topographic map. Specifically, the Subject Property is located off the south side of the Oakwood Drive cul-de-sac and east of the former Beacon Heights Landfill (currently inactive) within the Town of Beacon Falls.

The *Town of Beacon Falls Zoning Map* indicates the Subject Property is situated within a residential (R1 – single-family) zoned area. Land occupants and uses within the immediate vicinity consist of residential properties along Oakwood Drive and Timber Ridge Lane, north of the Subject Property, and Chatfield Farms (55+ community), further southwest of the Subject Property. The Beacon Heights Landfill, which is inactive and has undergone remediation and was capped, is located west of the Subject Property.

The Subject Property consists of one (1) parcel, totaling approximately 55-acres of undeveloped and wooded land. Some clearing (removal of trees) has occurred in the proposed roadway area to allow access to conduct percolation (“perc”) tests for planned septic systems. The Subject Property is illustrated on Figure 2. The plan is based on mapping provided by the Town of Beacon Falls GIS system, observations made at the time of the Subject Property inspection, and the most recent proposed development plans obtained at the Beacon Falls Town Hall. Photographs depicting current Subject Property conditions are included in **Appendix A**. The following Subject Property development data was described in the Beacon Falls Town records.

MBL # 12-2-27

Beacon Falls, CT 06403

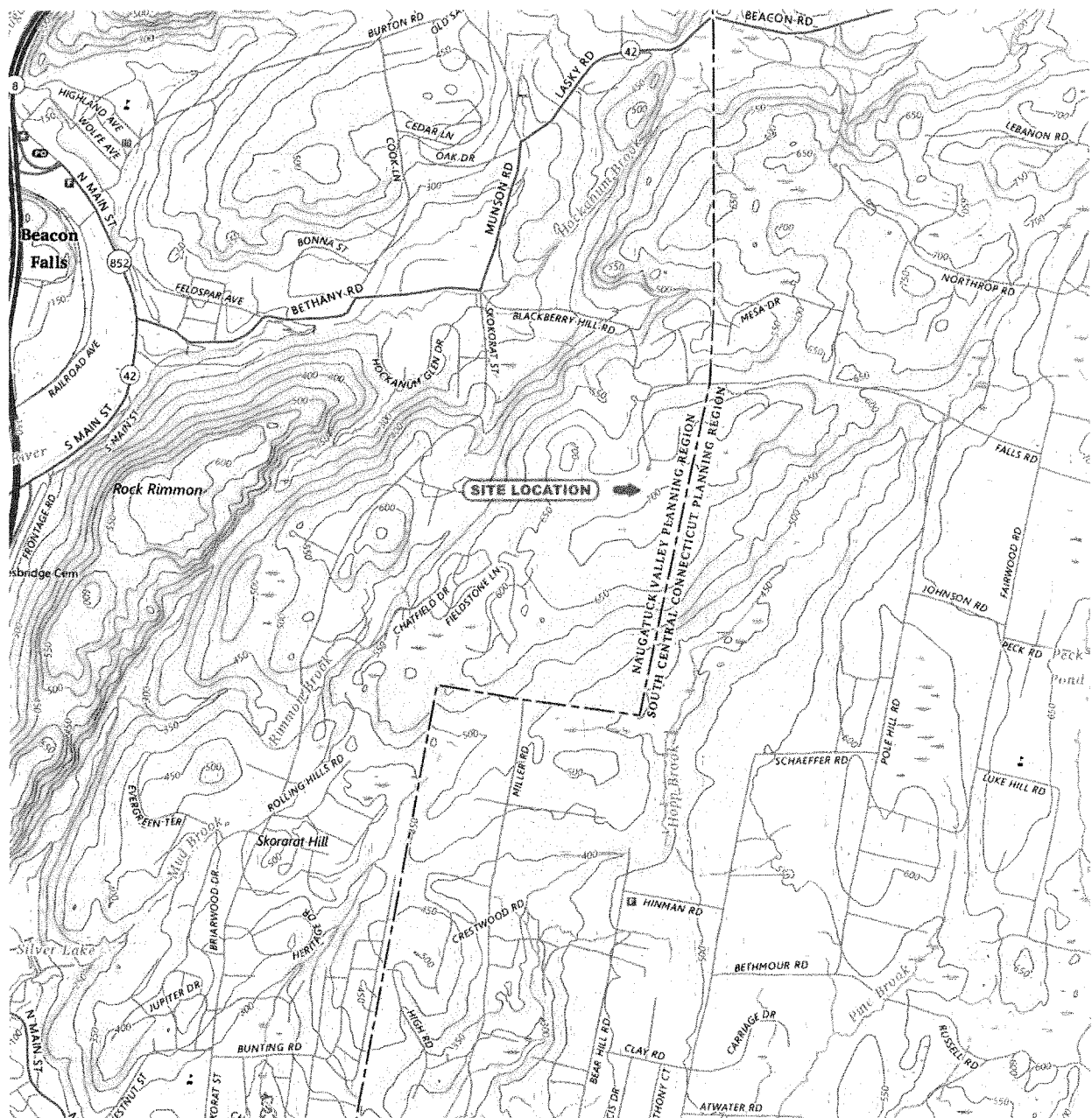
Property owner:	Hopp Brook Developers LLC
Parcel address:	“Hopp Brook Estates” MBL # 12-2-27
Area:	~55-acres
Current development:	Vacant, Wooded, Undeveloped – Partial Clearing for Perc Tests

A complete description of the Subject Property and surrounding areas is provided in section 4.

1.3 PERSONNEL

This Phase I ESA was approved by Jeffrey D. Gworek, Project Manager for DES. The property contact for this effort was Mr. Louis Salemme, of Hopp Brook Developers, LLC (owner/member). The Subject Property inspection was conducted by DES personnel on June 18, 2026.

Figure 1: Subject Property Location Map
Hopp Brook Estates
Beacon Falls, CT



Project Number: 2026-5d

Date: June 2026

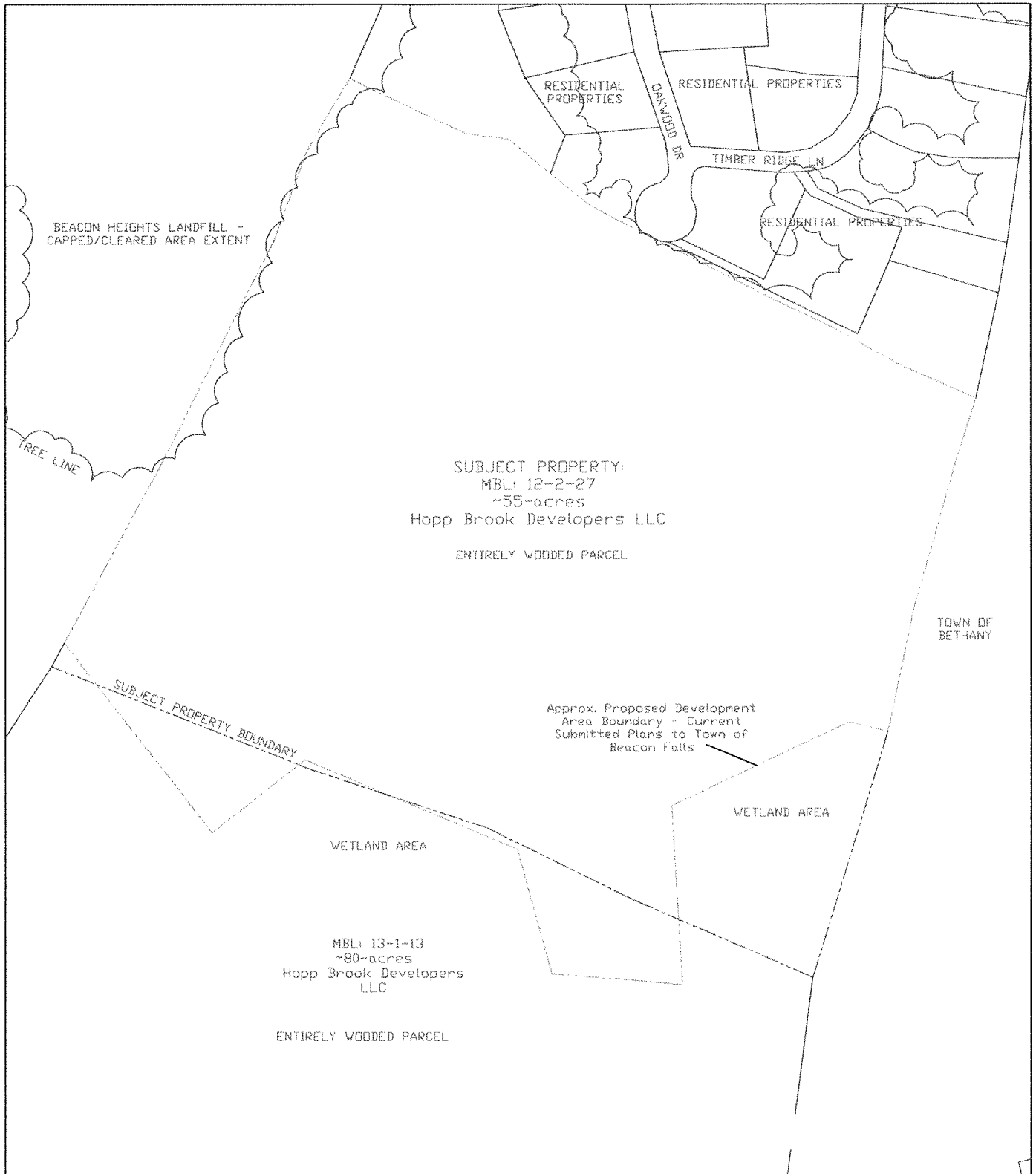
Compiled By: JDG



Diversified Environmental Services, Inc.

93 Industrial Drive

Southington, Connecticut 06489



 93 Industrial Drive Southington, CT 06489 (860) 621-3630 OFFICE	Drawing Name:	Sheet No.:
	FIGURE 2: SUBJECT PROPERTY LAYOUT MAP	1 of 1
	Project Address:	Project No.:
	"Hopp Brook Estates" MBL#: 12-2-27 Beacon Falls, CT 06524	2026 - 5d
CONFIDENTIALITY: THIS DRAWING AND ALL INFORMATION CONTAINED HEREIN SHALL NOT BE USED IN WHOLE OR PART WITHOUT THE FULL KNOWLEDGE AND WRITTEN CONSENT OF DIVERSIFIED ENVIRONMENTAL SERVICES, INC.		Date: 6-18-2026
		Scale: NTS

2 SUBJECT PROPERTY HISTORY

DES examined the land records available from the Beacon Falls Town Hall to determine past and present owners and to determine former uses of the Subject Property. In addition, DES reviewed available aerial photographs, Sanborn Fire Insurance Maps (when available), historic topographic mapping, and historic City Directories maintained by the University of Connecticut Map and Geographic Information Center (MAGIC), the Connecticut State Library, and/or information provided from Environmental Records Search, LLC (ERS).

2.1 LAND RECORDS REVIEW

The following information pertaining to the transfer of the Subject Property was revealed in the Tax Assessor's field cards and/or Property Records available via the Beacon Falls Town Hall. A list of the current and previous property owners identified in the land records are listed below:

"Hopp Brook Estates"
MBL # 12-2-27
Beacon Falls, CT

Record of Ownership	Date	Book	Page	Notes
Hopp Brook Developers LLC	10/20/2015	212	822	Auction – Warranty Deed
Point Center Financial	9/9/2013	203	572	Foreclosure
RKP Properties LLC	6/4/2007	172	701	Warranty Deed
Bruce Dapkins, Dale Dapkins, & G. Giering	10/3/1997	103	896	Cert. of Devise
Gladys V. Dapkins	12/22/1992	85	924	Court of Probate
Gladys V. Dapkins & Joseph P. Dapkins	7/8/1974	37	298	Warranty Deed
Fairlee Realty, Inc.	7/17/1973	33	563	-
George E. Howard & Olive M. Howard	8/14/1958	27	35	-

2.2 AERIAL PHOTOGRAPHS REVIEW

DES reviewed aerial photographs of the Subject Property and surrounding area from the UConn MAGIC and Town of Beacon Falls GIS system for select years from 1934 through 2023. Aerial photographs were reviewed for the following years: 1934, 1951, 1970, 1986, 1990, 1995, 2004, 2008, 2012, 2016, 2019 and 2023. Copies of the aerial photographs reviewed are included in **Appendix A**.

- The aerial photographs from 1934 through 2023 depict the Subject Property as entirely wooded and undeveloped. Two (2) apparent wet areas are observed on the 1934 aerial photograph on the southern/central portion and the southeastern portion of the Subject Property. The wet areas are not observed on subsequent aerials until the 1995 and 2004 aerial photographs. The former "Betkoski's Dump" to the west of the Subject Area is observed with a small (~6-acre) portion of the parcel cleared. The adjoining parcels to the north, east, and south are wooded and undeveloped in the 1934 aerial photograph.

- The immediate surrounding area remains similar and unchanged in the 1951 aerial photograph. Additional clearing is observed on the 1970 aerial photograph at the former “Betkoski’s Dump” parcel, to the west of the Subject Property, which was around the time it became Beacon Heights Landfill.
- Some additional clearing (possible remediation activities) are observed on the Beacon Heights Landfill property in the 1986 aerial photograph. Additional residential development along Blackberry Hill Road is also observed. The remediation of Beacon Heights Landfill continues through the 1995 aerial photograph and is completed (capped landfill) by the 2004 aerial photograph. Residential development (clearing & road construction) is observed off the north side of Blackberry Hill Road in the 1990 and 1995 aerial photographs.
- The residential development of Oakwood Drive (roadway construction) is observed to the north of the Subject Property in the 2008 aerial photograph along with the Timber Ridge Lane residential development in the 2016 aerial photograph. The Chatfield Farms (55+ residential community) development is also observed further southwest of the Subject Property beginning in the 2008 aerial and continuing through the 2023 aerial photograph.

2.3 HISTORICAL TOPOGRAPHIC MAP REVIEW

Topographic (Topo) Maps may provide historical features/characteristics and past development at a property and the surrounding area dating back to the late 1800s. Topo maps were reviewed for the following years: 1892, 1908, 1921, 1936, 1947, 1956, 1964, 1974, and 1988. A copy of the pertinent Historical Topographic Maps reviewed are included in **Appendix A**.

- The 1892, 1908, 1921, and 1936 Topo Maps depict limited low-resolution detail for the Subject Property and surrounding area. The Subject Property appears wooded and undeveloped through all the reviewed Topo Maps.
- The 1947, 1956, and 1964 Topo Maps depict the limited area of the former “Betkoski’s Dump” landfill to the west of the Subject Property.
- The 1974 and 1988 Topo Maps depict the expanded Beacon Heights Landfill area to the west of the Subject Property and “gravel pits” off the north side of Blackberry Hill Road.

2.4 SANBORN FIRE INSURANCE MAP REVIEW

When available, Sanborn Fire Insurance Maps (Sanborn Maps) provide historical records of land use in many urban areas of the United States from the late 1860s through the mid-1900s. Sanborn Map coverage was not available for the Subject Property area.

2.5 TOWN DEPARTMENTS

DES reviewed available files at the Beacon Falls Town Hall on June 18, 2026, as well as documents and records available electronically from the Town of Beacon Falls. No information related to environmental conditions at the Subject Property were available for review. DES reviewed the “Hopp Brook Estates Final Site Plans – Phase Plan”, prepared by Rose-Tiso & Co, LLC., at the Land Use Department in the Beacon Falls Town Hall. According to the plan, the first phase is to clear and construct the roadways and two (2) retention pond areas, followed by six (6) phases of house construction areas for a total of ninety-four (94) houses.

DES also reviewed several Planning & Zoning minutes from related meetings and a May, 23, 2023 Docket (#HHD-CV22-6152301-S) from the Superior Court of Hartford related to the project. These documents provided an overview of securing proper town approval for development and the reviewed documents did not address any outstanding environmental issues. A 2023 EPA 5-Year Review report, completed for the inactive/former Beacon Heights Landfill, to the west of the Subject Property, was also reviewed and is summarized in **Section 5.3** of this report. A copy of some of the reviewed documents are included in **Appendix B**.

2.6 PHASE I QUESTIONNAIRES – SUBJECT PROPERTY INFORMATION

Mr. Louis Salemme (owner/member) completed the User and Owner Questionnaires as his company, Hopp Brook Developers, LLC, owns the Subject Property and is working with Ion Bank to secure funding. Mr. Salemme stated he had no knowledge of any environmental concerns at the Subject Property and it is undeveloped and wooded. Municipal water is available to the Subject Property area and the ninety-four (94) planned houses will be connected to septic systems. Mr. Salemme had no knowledge of any environmental liens or violations, chemical storage, spills/releases, or environmental cleanups at the Subject Property. A copy of the completed questionnaires are included in **Appendix B**.

2.7 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

There were no previous environmental reports or investigations provided to DES for review.

2.8 CITY DIRECTORIES

When appropriate, DES personnel review available City Directories for the Subject Property and the immediate surrounding area. The Subject Property has never been developed and is wooded. Oakwood Drive and Timber Ridge Lane, to the north of the Subject Property, were residentially developed with single family homes from 2008 through 2021. The Beacon Heights Landfill, to the west of the Subject Property, is a Superfund Hazardous Waste site and reportedly received municipal and industrial wastes from the 1920s to 1979. The landfill underwent remediation and was capped in the 1990s with 5-year reviews completed by the EPA (most current review in 2023).

2.9 SUMMARY OF HISTORIC SUBJECT PROPERTY USAGE

The Subject Property is currently wooded and undeveloped and has been since at least 1934 (aerial photograph – earliest available photo). Recent tree clearing along proposed roadways has been completed to allow for “perc” testing for planned septic systems.

The surrounding area to the north of the Subject Property (Oakwood Drive and Timber Ridge Lane) was also historically wooded and undeveloped until around 2008 when construction of Oakwood Drive, followed by the construction of Timber Ridge Lane and the subsequent residential development through 2021. The area to the east and south has also been historically (and remains) wooded and undeveloped. The inactive Beacon Heights Landfill is located west of the Subject Property and is a Superfund Hazardous Waste site which reportedly received municipal and industrial wastes from the 1920s to 1979. A small portion (~6-acres) of the site operated as “Betkoski’s Dump” from the 1920s until 1970. In 1970, new owners (Beacon Heights, Inc.) expanded the landfill area to approximately 34-acres and placed wastes directly onto bedrock and covered them with soil. Open burning and waste disposal directly onto bedrock was discontinued around 1973 and the landfill was closed in 1979. The landfill is currently capped and municipal water supply was extended to neighboring residential developments as part of the site cleanup in 1989. The EPA performed a final inspection of the site in 1998 and determined all remedial action activities were completed.

3 GEOLOGY, HYDROGEOLOGY, AND WATER QUALITY

3.1 GEOLOGIC SETTING

The Geographic Information Systems (GIS) Bedrock Map of Connecticut, provided by Connecticut Environmental Conditions Online (CT ECO), identifies bedrock beneath the Subject Property as Golden Hill Schist (Ogh), which is described as generally well-layered schist of gray to silvery color. The CT ECO GIS Surficial Materials Map of Connecticut shows the surficial geology at the Subject Property consists of Till.

3.2 GROUNDWATER QUALITY AND ESTIMATED GROUNDWATER FLOW DIRECTION

Groundwater at the Subject Property, according to the CT ECO GIS Groundwater Quality Map of Connecticut, consists of two (2) classifications. The western/central portion has been assigned a classification of "GA-Impaired", indicating that the groundwater quality goal and designated use is Class "GA or GAA", however there may be known or potential impairment sources. The eastern portion of the Subject Property has been assigned a classification of "GAA", indicating that the groundwater quality is of natural quality or suitable for drinking and within the area of influence of private and potential public water supply wells.

The movement and direction of groundwater flow is influenced by many factors, including but not limited to the aquifer's hydraulic characteristics, surface and bedrock topography, the presence of surface water bodies, and the influence of pumping wells. Preliminary estimates of groundwater flow direction usually consider surface topography and the presence of nearby surface water bodies. Based upon DES' observations of the Subject Property and surrounding region, DES has inferred groundwater flow to be in a northwesterly direction, but may vary as surface topography undulates on the southeastern portion of Subject Property. Reviewed groundwater contour maps for the former Beacon Heights Landfill indicate overburden groundwater flows in northwesterly direction.

3.3 SURFACE WATER AND LOCAL WATER SUPPLIES

The nearest named waterbody is Hopp Brook, which is located approximately 0.22-miles off the eastern boundary of the Subject Property. Hopp Brook was given a surface water quality classification of "AA", indicating that the surface water currently meets all quality standards and is suitable for drinking water supply, recreational use, fish and wildlife habitat, industrial and agricultural water supply and other legitimate uses including navigation. Class "AA" waters are designated as outstanding natural resources.

Based on the Atlas of The Public Water Supply Sources & Drainage Basins of Connecticut, there are no known public drinking water supplies located within one (1) mile of the Subject Property. According to Town of Beacon Falls information, municipal water is available along Oakwood Drive. A water supply well

receptor survey, which identifies private water supply wells and wells registered with the CT Department of Public Health (CT DPH), is considered a non-ASTM scope task.

3.4 RADON

The United States Environmental Protection Agency (US EPA) Action Radon Information was provided by ERS for the State of Connecticut. The Subject Property is located in a Zone 1 designated by the EPA, with predicted average indoor radon screening levels >4.0 picocuries per liter (pCi/L), which is above the US EPA Action Level of 4.0 pCi/L. Information obtained from the CDC for New Haven County, for the most recent year (2019), indicated an annual mean pre-mitigation radon level of 4.7 pCi/L in the tested buildings.

3.5 SENSITIVE ECOLOGICAL AREAS & FLOOD ZONE

According to CT ECO GIS mapping, the Subject Property is not located within a Natural Diversity Database Area or an area considered an important wildlife habitat (Critical Habitat). The Subject Property is also not located within an Aquifer Protection Area, as defined and delineated by the CTDEEP. The Subject Property is located within a "Zone X" (no shading), or an area of a minimal flooding designated by the Federal Emergency Management Agency (FEMA). A copy of the applicable mapping is included in **Appendix B**.

4 SUBJECT PROPERTY RECONNAISSANCE

DES personnel conducted a walk-through inspection of the Subject Property on June 18, 2026. The weather during the property reconnaissance was overcast, foggy, and 68 degrees F. Observations and information revealed during the record reviews performed under the scope of this ESA are described below. In addition, observed environmental conditions and the presence of hazardous substances and/or petroleum products are discussed herein (if present). Photographs of the Subject Property on the day of the walk-through inspection are included in **Appendix A**.

4.1 PRESENT USE

The Subject Property consists of one (1) vacant, wooded, and undeveloped parcel totaling approximately 55-acres of land in a residential (R1) zone. Some clearing of trees along the proposed roadways has been completed to allow “perc” testing for septic systems of the planned residential development.

4.2 INTERIOR INSPECTION

The Subject Property is vacant, wooded, and undeveloped. There are no structures on the property.

4.3 PROPERTY GROUNDS INSPECTION

The Subject Property is located and accessed off the south side of the Oakwood Drive cul-de-sac. The Subject Property is entirely wooded, except for the clearing of trees along the proposed roadway areas. The parcel generally slopes down from an elevated area on the southeast/central portion towards a lower area at approximately 620’ above mean sea level (msl) on the northwestern corner. A relative high point (~715’ msl) is located on the southeast/central portion with gentler sloping down to the southern and eastern boundaries at around 680’ msl.

4.4 UNDERGROUND/ABOVEGROUND STORAGE TANKS

The Subject Property is vacant, wooded, and undeveloped. DES did not observe any evidence of aboveground or underground storage tanks (ASTs/USTs) at the Subject Property.

4.5 SOLID WASTE

No solid waste was observed at the Subject Property during the walk-through.

4.6 STAINED SOIL/PAVEMENT, STRESSED VEGETATION

DES personnel did not observe the presence of stained soil or obvious evidence of stressed vegetation on the observed areas of the Subject Property.

4.7 ASBESTOS/LEAD

There are no structures located on the Subject Property. The sampling and testing of suspect materials, if present, would be considered outside the scope of this Phase I ESA.

4.8 OTHER OBSERVATIONS

No other significant observations were made during the Subject Property inspection.

4.9 OBSERVATIONS OF NEIGHBORING PROPERTIES

DES briefly observed the neighboring properties from the boundary limits of the Subject Property.

North: Oakwood Drive & Timber Ridge Lane / Residential Properties

South: Undeveloped & Wooded Properties

East: Undeveloped & Wooded Properties

West: Former Beacon Heights Landfill (Inactive)

5 REGULATORY AGENCY REVIEW

As part of the Phase I ESA, DES personnel reviewed an environmental database report, generated for the Subject Property, by Environmental Records Search, LLC (ERS). A copy of the ERS report is included in **Appendix C**.

5.1 CT DEEP REVIEWED DOCUMENTATION

No documentation or information related to the Subject Property was available to review in the electronic files maintained by the Connecticut Department of Energy and Environmental Protection (CT DEEP).

5.2 LOCAL LEACHATE AND WASTEWATER DISCHARGE SOURCES

Leachate and Wastewater Discharge Source Map information was reviewed for the Subject Property and surrounding area and provided in the ERS report. The report lists the locations of discharges to the water or soil in the state that are either under review or are regulated by the CT DEEP.

The Subject Property was not listed on the map. No leachate and wastewater discharge sites (LWDS) were identified within a 0.25-mile radius of the Subject Property.

5.3 DATABASE SEARCH

DES reviewed an electronic environmental database report from ERS in accordance with ASTM E 1527-21 search criteria. The following table summarizes the results of the ERS report. The ERS Radius Map Report is provided in **Appendix C**.

Database	ASTM/Standard Search Radius	Sites Plotted Within Search Radius
Federal National Priority List (NPL)	1.0 mile	1
Federal CERCLIS List	0.5 mile	2
Federal SEMS-ARCHIVE (NFRAP) List	0.5 mile	0
Federal RCRA CORRACTS	1.0 mile	0
Federal RCRA Generators	0.25 mile	0
Federal Brownfields sites	0.5 mile	0
Emergency Response Notification System (ERNS) list	0.0625 miles	0
CT DEEP - CPCS	0.25 mile	0
CT DEEP - Historical Hazardous Waste Site	0.5 mile	0
CT DEEP - Historical SDAD	0.5 mile	0
CT DEEP SPILLS - 1990+	0.0625 miles	0
CT DEEP Landfills/Transfer Stations	0.5 mile	0
CT DEEP Registered USTs	0.25 mile	0
CT DEEP LUSTs	0.5 mile	0
CT DEEP Voluntary Cleanup Programs	0.5 mile	0
CT DEEP Brownfields	0.5 mile	0

Specific database findings are subsequently discussed. The Subject Property ("Hopp Brook Estates") was not listed in the ERS report. The un-mappable occurrences (electronic database listings without specific addresses/locations) identified by the electronic database search were reviewed and determined to not be associated with the Subject Property based on provided data and/or address information.

The presence of a site in the ERS database report does not necessarily mean that the property constitutes an environmental threat to the Subject Property. One (1) site was identified within 1-mile of the Subject Property by ERS. A summary of the listing located within the immediate surrounding area of the Subject Property is provided below. Further information can be found in the ERS report attached in **Appendix C**.

- **"Beacon Heights Landfill / Betkoskis Dump" – Map ID 1, 2, 3**

The landfill, located adjacent and west of the Subject Property, was listed in the NPL-US, Controls-US, ROD-US, SEMS-Active-US, and ELUR-CT databases. Based on reviewed documentation, including the "Seventh (7th) 5-Year Review Report for Beacon Heights Landfill Superfund Site" completed by the US EPA in 2023, a small part of the site operated as "Betkoski's Dump" from the 1920s until 1970. Approximately 6-acres of active dumping and open burning of municipal refuse and industrial waste was conducted during that time period. In 1970, new owners (Beacon Heights, Inc.) expanded the landfill area to approximately 34-acres and placed wastes directly onto bedrock and covered them with soil. In 1973, open burning and waste disposal directly onto bedrock was discontinued and the landfill was closed in 1979. The landfill is currently capped and municipal water supply was extended to neighboring residential developments as part of the site cleanup in 1989 due to various VOCs identified in nearby residential drinking water wells in 1985. The EPA performed a final inspection of the site in 1998 and determined all remedial action activities were completed. Groundwater contour maps (from ongoing overburden and bedrock monitoring) indicate groundwater flow in a northwesterly direction and away from the Subject Property. A copy of the EPA 5-Year Review Report is included in **Appendix B**.

The reviewed listing does not appear to be a potential significant environmental concern due to the groundwater flow direction and/or relative elevation to the Subject Property. The landfill was remediated and capped in accordance with EPA/CTDEEP requirements and is monitored on a five (5) year basis.

6 APPLICABLE CONNECTICUT REGULATIONS

The Connecticut Property Transfer Program (PTP) has sunset on March 1, 2026 with Public Act 25-6 Section 2 changing the definition of “Transfer of Establishment” to transactions that occur on or before March 1, 2026. Form filings are not required for transactions after that date and properties that are already in the PTP will remain in the program until verification unless they choose to transition to the Release-Based Cleanup (RBC) Program.

6.1 RELEASE-BASED CLEANUP PROGRAM

Following the sunset of the PTP on March 1, 2026, the Connecticut Department of Energy and Environmental Protection (CTDEEP) has transitioned to the Release-Based Cleanup Regulations (RBCRs). The new regulations cover Existing Releases (historical): which are newly discovered after the regulations go into effect, Significant Existing Releases (SERs): which are historical releases that pose an imminent risk to human health or the environment, and Emergent Reportable Releases: which are new releases (spills).

The RBCRs require that releases (new or historic) be cleaned up to the same cleanup criteria and follow the same regulations defining the investigation and cleanup process. Under these new regulations, any investigation will be driven by business decisions when a property transaction occurs. The owner of the property and/or potential purchaser should complete their due diligence to investigate the property using the multi-phased approach which is outlined in the Release Characterization Guidance document released by the CTDEEP on December 15, 2025. The multi-phased approach begins with the Phase I which evaluates the current and historical uses of the Subject Property and identifies Areas of Concern (AOCs) at which a release to the environment may have occurred.

7 CONCLUSIONS

At the request of Ms. Tiffany Hartmann, of Ion Bank, DES conducted a Phase I Environmental Site Assessment (ESA) for the property known as “Hopp Brook Estates” in Beacon Falls, Connecticut. DES based its methodology for this Phase I ESA on protocols for site assessment in accordance with ASTM Standards and the Connecticut Department of Energy and Environmental Protection (CT DEEP) Release Characterization Guidance document.

7.1 SUBJECT PROPERTY DETAILS AND FINDINGS

- The Subject Property consists of one (1) parcel, known by the Town of Beacon Falls as MBL ID # 12-2-27 and consists of approximately 55-acres of vacant/wooded and undeveloped land in a residential (R1) zoned area.
- Some clearing of trees along the planned roadways of the proposed 94-unit residential development has recently been completed to allow for “perc” testing access as the units will be connected to septic systems. The entirety of the Subject Property, outside the cleared roadway access areas, is heavily wooded with areas of thick low-lying vegetation.
- The Beacon Heights Landfill (inactive) abuts the Subject Property to the west and is an EPA Superfund site. According to reviewed documentation, a small portion of the site operated as “Betkoski’s Dump” from the 1920s until 1970 when approximately 6-acres of active dumping and open burning of municipal refuse and industrial waste was conducted. In 1970, new owners expanded the landfill area to approximately 34 acres and placed wastes directly onto bedrock and covered them with soil. In 1973, open burning and waste disposal directly onto bedrock was discontinued and the landfill was closed in 1979. The landfill is currently capped and municipal water supply was extended to neighboring residential developments as part of the site cleanup. The EPA performed a final inspection of the site in 1998 and determined all remedial action activities were completed. Reviewed groundwater contour maps indicate both overburden and bedrock groundwater flow in a northwesterly direction, away from the Subject Property.
- The Subject Property is not located within a Natural Diversity Database Area, Critical Habitat, or within an Aquifer Protection Area (delineated by CTDEEP). The Subject Property is located within a “Zone X” (no shading), or an area of a minimal flooding designated by FEMA.

7.2 RECOGNIZED ENVIRONMENTAL CONDITIONS

A Recognized Environmental Condition (REC) is defined as: *“(1) the presence of hazardous substances or petroleum products in, on, or at the subject property due to a release to the environment; (2) the likely presence of hazardous substances or petroleum products in, on or at the subject property due to a release or likely release to the environment; or (3) the presence of hazardous substances or petroleum products*

in, on or at the subject property under conditions that pose a material threat of a future release to the environment.”

Also listed below, if applicable, are Historical RECs (HREC) where *“a previous release of hazardous substances or petroleum products affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority or authorities and meeting unrestricted use criteria established by the applicable regulatory authority or authorities, without subjecting the property to any controls”* and Controlled RECs (CREC) where a *“a recognized environmental condition affecting the subject property that has been addressed to the satisfaction of the applicable regulatory authority with hazardous substances or petroleum products allowed to remain in place subject to implementation of controls”*.

Based on the information reviewed as part of this Phase I, DES did not identify any RECs at the Subject Property.

7.3 AREAS OF CONCERN (AOCs)

The CT Department of Energy and Environmental Protection (CTDEEP) Release Characterization Guidance (RCG) document defines an AOC as a “Location or area at a site where hazardous waste and/or hazardous substances (including petroleum products) have been or may have been used, stored, treated, handled, disposed, spilled, and/or released to the environment.”

Based on the information reviewed as part of this Phase I, DES did not identify any AOCs at the Subject Property.

7.4 DATA GAPS

No significant data gaps were identified that affected the ability of DES to identify recognized environmental conditions at the Subject Property.

7.5 LIMITING CONDITIONS

DES did not walk the entirety of the heavily wooded parcel, but observed the Subject Property from the accessible cleared areas. No other limiting conditions were encountered during the completion of this Phase I ESA.

8 LIMITATIONS AND RELIANCE

Diversified Environmental Services, Inc. (DES) warrants that all work performed on this project conforms to the written scope of work. DES further warrants that all professional services were performed in accordance with the professional standards current at the time the work was completed, including but not limited to the form and content recommended for a Phase I Environmental Site Assessment as described in the CT DEEP "Release Based Guidance" Document (dated December 15, 2025) and the American Society of Testing Materials (ASTM) Phase I standard.

Observations were made of the Subject Property and any structures present, as documented in this report. Where access to portions of the Subject Property or structures was unavailable or limited (e.g., locked doors, fenced areas), DES renders no opinion regarding the presence or absence of potential contamination by hazardous substances, wastes, petroleum products, or related materials.

Preparation of this report relied on information obtained from local municipal and CT DEEP files, other resource documents, and personnel interviews. DES is not responsible for the accuracy or completeness of such files, documents, or verbally transmitted information.

This report has been prepared by DES for the exclusive use of its client. It shall remain confidential and shall not be disclosed to any other parties without the prior written consent of both the client and DES. The conclusions and opinions expressed in this report are based solely on the information available at the time of the assessment and should not be interpreted as a guarantee or assurance of the environmental condition or integrity of the Subject Property.

The author of this Report, Diversified Environmental Services, Inc. of Southington, Connecticut, hereby states that any opinions contained herein shall not be construed as a warranty or representation that the Subject Property is free of pollution, contamination, or hazardous substances; that it complies with all applicable federal, state, or local regulatory or statutory requirements; or that it is fit for any particular purpose. Unless otherwise expressly stated in this Report, no investigation was conducted regarding the compliance history of present or past owners or operators of the Subject Property with applicable laws and regulations.

The conclusions presented in this Report are based on the limited services described herein and are subject to the time and budgetary constraints agreed upon with the client. Any person or entity considering the use, acquisition, financing, or any other activity involving the Subject Property is solely responsible for determining the adequacy and suitability of the property for its intended purposes and must not rely upon any representation or statement made by Diversified Environmental Services, Inc.

DES performed this assessment in a professional manner consistent with the degree of skill and care ordinarily exercised by reputable and competent environmental consultants under similar circumstances. DES shall not be responsible for any conditions or consequences arising from relevant facts that were concealed, withheld, or not fully disclosed during the evaluation.

8.1 USER

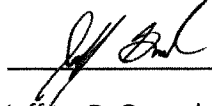
This report was prepared for the sole and exclusive use of Ms. Tiffany Hartmann and Ion Bank (the User) and is subject to and issued in connection with the proposal agreement and the provisions thereof. It is the responsibility of the User of this report to provide certain information to the Environmental Professional, including reporting any environmental liens or activity and use limitations, which are recorded against the Subject Property. The User is also required to provide the Environmental Professional with any specialized knowledge or experience that is material to RECs at the Subject Property, the relationship of the purchase price of the property to the fair market value of the Subject Property; and any commonly known or reasonably ascertainable information within the local community about the Subject Property, that is material to RECs at the Subject Property.

8.2 RELIANCE

It is agreed that this Phase I Environmental Site Assessment report is written solely for the use of Ms. Tiffany Hartmann and Ion Bank. A copy of this Phase I Environmental Assessment report will be provided in its entirety to Ms. Hartmann and thereby entitled to rely thereon. No other party shall have any right to rely on this Phase I Environmental Site Assessment report without prior written consent from Diversified Environmental Services, Inc.

9 SIGNATURES OF AUTHORS

This report was prepared and reviewed by the undersigned. Requests for information on the content of this document should be directed to DES in Southington, CT.



Jeffrey D. Gworek
Project Manager



Appendix C
STORMWATER POLLUTION PREVENTION &
CONTROL PLAN

STORMWATER POLLUTION PREVENTION & CONTROL PLAN

For The Proposed:
Hopp Brook Estates

Located At:
22 Oakwood Drive
Beacon Falls, Connecticut
Job # 2215

Prepared On:
June 1, 2026

Prepared For:
Hopp Brook Developers LLC

Prepared By:




Manuel J. Silva
Project Manager

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Appendix B

Site Inspection Checklist

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Stormwater Monitoring Report

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1.0 Introduction

This Stormwater Pollution Control Plan (SWPCP) has been prepared in support of the Connecticut Department of Energy and Environmental Protection *General Permit for Stormwater and Dewatering Wastewaters from Construction Activities* (CTDEEP General Permit) for the proposed Hopp Brook Estates Phase 1. The project site is located at 22 Oak Wood Lane in Beacon Falls, Connecticut. The site is currently undeveloped with a large wooded area on a 56.27-acre parcel, of which 7.5 acres are to be disturbed for the construction of Phase 1 and the 2 retention ponds.

The SWPCP is prepared pursuant to the requirements of Section 5(b) of the CTDEEP General Permit issued August 21, 2013. This General Permit was issued by the CTDEEP pursuant to Section 22a-430b of the Connecticut General Statutes, as amended by Public Act 91-263. See Appendix A for a complete copy of the CTDEEP General Permit. A location map showing the general boundaries of the construction activity is attached as Figure 1.

The project proposes to construct 15 single family houses, 2 storm water retention ponds. Along with supporting roads and utilities.

2.0 SITE DESCRIPTION (SECTION 5(B)(1)(b)(ii) OF GENERAL PERMIT)

2.1 Construction Activity (Section 5(b)(1)(B)(ii) of General Permit)

Hopp Brook Developers, LLC is proposing the construction of a phase 1 (15 houses) of a 6-phase single-family development located on 22 Oakwood Drive, in Beacon Falls. Proposed Phase development includes The project proposes to construct 15 single family houses, 2 storm water retention ponds. Along with supporting roads and utilities.

Currently, the property is comprised of a single 56.27-acre parcel. The existing site is an undeveloped wooded area. The existing soil condition consists of silty sand with gravel, cobbles and boulders. Woodbridge fine sandy loam has been found existing in much of the site.

Overall, the site slopes from the center to the northwest, draining to a wetlands area located near the end of Oakwood Drive, and from the center to the south to an existing wetland off the property to the south. The maximum elevation is approximately 708 feet. The minimum elevation is approximately 686 feet.

2.2 Area of Site and Area of Disturbance (Section 5(b)(1)(B)(ii) of General Permit)

The total area of the project site is approximately 17.69 acres. The area of site disturbance during the construction phase and demolition phase totals approximately 7.5 acres.

2.3 Proposed Stormwater Runoff (Section 5(b)(1)(B)(ii) of General Permit)

The plans are designed to minimize potential impacts to adjacent properties and the existing storm water infrastructure.

Without storm water quality measures, proposed development of this site will increase the Weighted Runoff Coefficient (WRC) and decrease the Time of Concentration (Tc), resulting in an increase in the peak rate of storm water runoff. However, the construction of, two (2) Storm Water Management Areas (SWMA) actually result in a reduction of post-development rate of runoff relative to predevelopment conditions.

Design details for these systems are presented on Sheet SP-2 (part of the overall Project Documents). The system will drain the roofs, sidewalks, grassy areas, Club house, and parking lot associated with the 94 single-family homes development. The roofs and parking lots will be the major elements of the total impervious area on the site. (calculations included as Appendix A, Gutter flow analysis included as Appendix B) The roof, grassy areas, sidewalks and driveways will contribute to the runoff totals seen in table 2.

The northwesterly SWMA (Pond 1) has a total storage volume of approximately 96,503 c. f. and the maximum water depth has been calculated to be 10 feet. This SWMA will reduce the post development peak rate of runoff by 2.47 cfs for the one hundred year storm. The southwesterly SWMA (Pond 2) has a total storage volume of approximately 133,331 c. f. and the maximum water depth has been calculated to be 6 feet. This SWMA will reduce the post development peak rate of runoff by 37.48 cfs for the one hundred year storm. As indicated in the following summary and attached computations, the proposed development will reduce the peak rate of runoff to less than the pre-developed condition for both the Northwesterly and Southeasterly water sheds on site.

The development as proposed will not have an adverse impact on the surrounding wetlands or watercourses.

2.4 Receiving Waters (Section 5(b)(1)(B)(ii) of General Permit)

The proposed drainage system's control structures throughout the site where a metered discharge will enter the adjacent wetlands areas.

(Section 5(b)(1)(B)(ii) of General Permit)

Approximately 1.01 acres of wetlands exist along the north westr limit of the site.

3.0 CONSTRUCTION SEQUENCING (SECTION 5(b)(1)(B)(iii) OF GENERAL PERMIT)

3.1 Phase I Sequence and Estimated Timetable of Major Activities

1. Construction begins – August 2027
2. Contact Town of Beacon falls Inland Wetland Agent, Zoning Official and Building Inspector at least forty-eight (48) hours prior to commencement of any demolition, construction or regulated activity on this project.
3. Clearing limits shall be physically marked in the field and approved by the Town of Beacon Falls, Zoning Official and Building Inspector prior to the start of work on the site. Install tree protection and perimeter silt fence.
4. Install stabilized construction entrance/exit.
5. Silt fence to be installed around the site along the limit of disturbance as specified (clear only those areas necessary to install silt fence).
6. Prepare temporary parking and storage areas.
7. Halt all activities and contact the engineer of record to perform inspection and certification of best management practices (BMP's).
8. General contractor shall schedule and conduct the stormwater pre-construction meeting with the engineer, agencies and ground-disturbing contractor before proceeding with construction.
9. Construct and stabilized sediment basin(s) and sediment trap(s) with appropriate outfalls structures (clear only those areas necessary to install basins and traps).
10. Demolish existing structures as per approved Demo plan.
11. The site will be cleared and grubbed.
12. Excavate all stumps located in the structural area and remove to a disposal site or stockpile area to be chipped. No stumps are to be buried within 100' of wetland or 100' from a watercourse. Stumps are to be disposed of in accordance with current state law.
13. Begin grading the site.
14. Start construction of building pad and structures.

3.2 Phase II Sequence and Estimated Timetable of Major Activities

1. Temporarily seed, throughout construction, denuded areas that will be inactive for 14 days or more.
2. Install utilities, underdrains, storm sewers, curbs, and gutters.
3. Install rip rap around outlet structures as each outlet structure is installed.
4. Install inlet protection at all storm sewer structures as each inlet structure is installed.
5. Permanently stabilize areas to be vegetated as they are brought to final grade.
6. Prepare for site paving.

7. Pave site.
8. Install appropriate inlet protection devices for paved areas as work progresses.
9. Complete grading and installation of permanent stabilization over all areas including out lots.
10. Construct construction driveway entrance.
11. Backfill temporary sediment traps.
12. Install water quality control devices and associated drainage pipes.
13. Construct sidewalk.
14. Obtain concurrence with the construction manager that the site has been fully stabilized.
15. Remove all remaining temporary erosion and sediment control devices.
16. Stabilize any areas disturbed by the removal of BMP's
17. Ask the Construction Manager to contact the engineer to complete the engineer's on-site inspection and report.
18. Continue daily inspection reports until the final daily inspection report is signed by the construction manager and submitted.

4.0 CONTROL MEASURES (SECTION 5(b)(1)(B)(iv) OF GENERAL PERMIT)

The stabilization practices, structural practices and maintenance procedures are described on the Grading & Drainage Plan, the Soil Erosion & Sediment Control Plans and the Soil Erosion & Sediment Control Notes & Details. The locations of these control measures will be designed and constructed in accordance with the *Guidelines for Soil Erosion and Sediment Control* published by the Connecticut Council on Soil and Water Conservation.

4.1 Sediment removal controls

Soil Erosion and Sediment Control measures will be installed to mitigate runoff from the site associated with construction. These measures include temporary diversion swales, stone check dams, temporary sediment traps, silt fence with hay-bale protection, inlet protection and construction entrance. Details can be found in the Erosion Control Plan, see Sheet SP-7.

5.0 RUNOFF REDUCTION AND LOW IMPACT DEVELOPMENT INFORMATION (SECTION 5(b)(1)(B)(v) OF GENERAL PERMIT)

The proposed Phase 1 development results in an increase in impervious area of approximately 1.72 acres when compared to existing conditions. The project includes the construction of 2 retention ponds and the installation of Stormceptor water quality control units up-gradient of the Ponds. The Ponds and water quality control units serve to treat the water quality volume from associated contributing drainage areas

These measures will result in an enhancement to the stormwater discharge from the site. Details of these measures can be found on the included plans and Engineering Report. Narratives regarding the purpose and implementation of runoff reduction practices and calculations for proposed ground cover and water quality volumes on site can also be found in the Engineering Report, included in Appendix F of this SWPCP.

6.0 INSPECTION (SECTION 5(b)(1)(B)(vi) OF GENERAL PERMIT)

6.1 Inspection by Qualified Personnel

All construction activities submitting a registration for this general permit shall be inspected initially for Plan implementation and then weekly for routine inspections. Inspectors from the CT-DEEP and the appropriate District may inspect the site for compliance with this general permit at any time construction activities are ongoing and upon completion of construction activities to verify the final stabilization of the site and/or the installation of post-construction stormwater management measures pursuant to Section 6(a) of the general permit.

6.1.1 Plan Implementation Inspections

Within the first 30 days following commencement of the construction activity on the site, the permittee shall contact: (1) the appropriate District; or (2) a qualified soil erosion and sediment control professional or a qualified professional engineer to inspect the site. The site shall be inspected at least once and no more than three times during the first 90 days to confirm compliance with the general permit and proper initial implementation of all controls measures designated in the Plan for the site for the initial phase of construction. For sites not inspected by District personnel, the inspector shall be someone who:

- a. is not an employee, as defined by the Internal Revenue Service in the Internal Revenue code of 1986, of the registrant, and
- b. has not engaged in any activities associated with the preparation, planning, designing or engineering of such plan for soil erosion and sediment control or plan for engineered stormwater management systems on behalf of such registrant, and
- c. is not under the same employ as any person who engaged in any activities associated with the preparation, planning, designing or engineering of such plans and specifications for soil erosion and sediment control or plans and specifications for engineered stormwater management systems on behalf of such registrant, and
- d. has no ownership interest of any kind in the project for which the registration is being submitted.

The permittee may use, if they wish, the same person(s) that provided the Plan Review Certification.

6.1.2 Routine Inspections

The permittee shall routinely inspect the site for compliance with the general permit and the Plan for the site until a Notice of Termination has been submitted. Inspection procedures for these routine inspections shall be addressed and implemented in the following manner. The permittee shall maintain a rain gauge on-site to document rainfall amounts. At least once a week and within 24 hours of the end of a storm that generates a discharge, a qualified inspector (provided by the permittee). As defined in the “Definitions” section (Section 2) of the general permit, shall inspect, at a minimum, the following: disturbed areas of the construction activity that have not been finally stabilized; all erosion and sedimentation control measures; all structural control measures; soil stockpile areas; washout areas and locations where vehicles enter or exit the site. These areas shall be inspected for evidence of, or the potential for, pollutants entering the drainage system and impacts to the receiving waters. Locations where vehicles enter or exit the site shall also be inspected for evidence of off-site sediment tracking. For storms that end on a weekend, holiday or other time after which normal working hours will not commence within 24 hours, an inspection is required within 24 hours only for storms that equal or exceed 0.1 inches. For storms of less than 0.1 inches, an inspection shall occur immediately upon the start of the subsequent normal working hours. Where sites have been temporarily or finally stabilized, such inspection shall be conducted at least once every month for three months.

The qualified inspector(s) shall evaluate the effectiveness of erosion and sediment controls, structural controls, stabilization practices, and any other controls implemented to prevent pollution and determine if it is necessary to install, maintain, or repair such controls and/or practices to improve the quality of stormwater discharges.

6.1.3 Inspection Report

A report shall be prepared and retained as part of the Plan. This report shall summarize: the scope of the inspection; name(s) and qualifications of personnel making the inspection; the date(s) of the inspection; weather conditions including precipitation information; major observations relating to erosion and sediment controls and the implementation of the Plan; a description of the stormwater discharges from the site; and any water quality monitoring performed during the inspection. The report shall be signed by the permittee or his/her authorized representative in accordance with the “Certification of Documents” section of the general permit. A copy(s) of the Weekly Construction Inspection Report is located in Appendix B.

The report shall include a statement that, in the judgment of the qualified inspector(s) conducting the site inspection, the site is either in compliance or out of compliance with the terms and conditions of the Plan and permit. If the site inspection indicates that the site is out of compliance, the inspection report shall include a summary of the remedial actions

required to bring the site back into compliance. Non-engineered corrective actions (as identified in the Guidelines) shall be implemented on site within 24 hours and incorporated into a revised Plan within three calendar days of the date of inspection unless another schedule is specified in the Guidelines. Engineered corrective actions (as identified in the Guidelines) shall be implemented on site within seven days and incorporated into a revised Plan within ten days of the date of inspection, unless another schedule is specified in the Guidelines or is approved by the commissioner. During the period in which any corrective actions are being developed and have not yet been fully implemented, interim measures shall be implemented to minimize the potential for the discharge of pollutants from the site.

7.0 MONITORING (SECTION 5(b)(1)(B)(vii) and 5(c) OF GENERAL PERMIT

7.1 Turbidity Monitoring Requirements

7.1.1 Monitoring Frequency

Sampling shall be conducted at least once every month, when there is a discharge of stormwater from the site while construction activity is ongoing, until final stabilization of the drainage area associated with each outfall is achieved. Sampling is only required during normal working hours. If sampling is discontinued due to the end of normal working hours, sampling shall resume the following morning or the morning of the next working day following a weekend or holiday, as long as the discharge continues. Sampling may be temporarily suspended any time conditions exist that may reasonably pose a threat to the safety of the person taking the sample. Such conditions may include high winds, lightning, impinging wave or tidal activity, intense rainfall or other hazardous condition. Once the unsafe condition is no longer present, sampling shall resume. If there is no stormwater discharge during a month, sampling is not required.

7.1.2 Sample Collection

All samples shall be collected from discharges resulting from a storm event that occurs at least 24 hours after any previous storm event generating a stormwater discharge. Any sample containing snow or ice melt must be identified on the Stormwater Monitoring Report Form, a copy(s) is included in Appendix E. Sampling of snow or ice melt in the absence of a storm event is not a valid sample. Samples shall be grab samples taken at least three separate times during a storm event and shall be representative of the flow and characteristics of the discharge(s). Samples may be taken manually or by an in-situ turbidity probe or other automatic sampling device equipped to take individual turbidity readings (i.e. not composite). The first sample shall be taken within the first hour of stormwater discharge from the site. In cases where samples are collected manually and the discharge begins outside of normal working hours, the first sample shall be taken at the start of normal working hours.

7.1.3 Sampling Locations

Sampling is required of all point source discharges of stormwater from disturbed areas. Where there are two or more discharge points that discharge substantially identical runoff, based on similarities of the exposed soils, slope, and type of stormwater controls used, a sample may be taken from just one of the discharge points. In such case, the permittee shall report that the results also apply to the substantially identical discharge point(s). No more than 5 substantially identical outfalls may be identified for one representative discharge. If such project is planned to continue for more than one year, the permittee shall rotate twice per year the location where samples are taken so that a different discharge point is sampled every six months. The Plan must identify each outfall authorized by this permit and describe the rationale for any substantially identical outfall determinations. All sampling point(s) shall be identified in the Plan and be clearly marked in the field with a flag, stake, or other visible marker.

Sampling and analysis shall be prescribed by 40 CFR Part 136.

7.1.4 Turbidity Values

The stormwater discharge turbidity value for each sampling point shall be determined by taking the average of the turbidity values of all samples taken at that sampling point during a given storm.

7.2 Stormwater Monitoring Reports

Within 30 days following the end of each month, the permittee shall enter the stormwater sampling result(s) on the Stormwater Monitoring Report (SMR) form (available at www.ct.gov/deep/stormwater) and submit it in accordance with the NetDMR provisions in subsection 7.2.1, below, or, if the permittee has opted out of NetDMR, to the following address:

Bureau of Materials Management and Compliance Assurance
Water Permitting and Enforcement Division (Attn: DMR Processing)
Connecticut Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

If there was no discharge during any given monitoring period, the permittee shall submit the form as required with the words “no discharge” entered in place of the monitoring results.

If the permittee monitors any discharge more frequently than required by the CTDEEP General Permit, the results of this monitoring shall be included in additional SMRs for the month in which the samples were collected.

If sampling protocols are modified due to the limitations of normal working hours or unsafe conditions, a description of and reason for the modifications shall be included with the SMR.

If the permittee samples a discharge that is representative of two or more substantially identical discharge points, the permittee shall include the names or locations of the other discharge points.

7.3 NetDMR Reporting Requirements

Prior to 180 days after the issuance of the CTDEEP General Permit, the Permittee may either submit monitoring data and other reports to the Department in hard copy form or electronically using NetDMR, a web-based tool that allows Permittees to electronically submit stormwater monitoring reports through a secure internet connection. Unless otherwise approved in writing by the commissioner, no later than 180 days after the issuance of the General Permit the Permittee shall begin reporting electronically using NetDMR. Specific requirements regarding subscription to NetDMR and submittal of data and reports in hard copy form and for submittal using NetDMR are described in Section 5(c)(2)(F) of the CTDEEP General Permit.

7.3.1 Reporting and Record Keeping Requirements

For a period of at least five years from the date that construction is complete, the permittee shall retain copies of the Plan and all reports required by this general permit, and records of all data used to complete the registration for this general permit, unless the commissioner specified another time period in writing. Inspection records must be retained as part of the Plan for a period of five years after the date of inspection.

The permittee shall retain an updated copy of the Plan required by this general permit at the construction site from the date construction is initiated at the site until the date construction at the site is completed.

8.0 CONTRACTORS (SECTION 5(b)(1)(B)(viii) OF GENERAL PERMIT)

Contained in Appendix D is a copy of the certification statement required for all contractors and subcontractors that will perform action on this site.

8.1 Certification Statement

Copies of the certification statement have been included in Appendix C which is required for all contractors and subcontractors that will perform action on this site. This certification shall be signed by each contractor and subcontractor identified in the Plan and will include the name and title of the person providing the signature, the name, address and telephone number of the contracting firm; the address of the site; and the date of the certification.

8.2 Subdivisions

The project site is one contiguous property and therefore this requirement is not applicable.

9.0 IMPAIRED WATERS (SECTION 5(b)(1)(B)(ix) OF GENERAL PERMIT)

Construction activities from this project do not discharge into impaired waters.

10.0 STORMWATER CONTROL MEASURES (SECTION 5(b)(2) OF GENERAL PERMIT)

10.1 Erosion and Sediment Controls (Section 5(b)(2)(A) of General Permit)

The stabilization practices, structural practices and maintenance procedures are described on the Grading & Utility Plan (Sp-3, Sp-4), and Erosion Control Plan (Sp-5, Sp-6). The location of these controls is shown on the above referenced plans. All erosion and sediment

control measures are designed and will be constructed in accordance with the *Guidelines for Soil Erosion and Sediment Control* published by the Connecticut Council on Soil and Water Conservation.

10.1.1 Soil Stabilization and Protection

The soil erosion and sediment control measures that will be proposed as part of this project include geotextile silt fences, temporary sediment traps, stone check dams, temporary diversion swales, construction entrances, dust control measures, riprap stabilization, and inlet protection for existing and proposed drainage features.

10.1.2 Structural Measures

Structural practices included in the Soil Erosion & Sedimentation Control Plans that are intended to divert flows away from exposed soils, store flows and limit runoff and discharge of pollutants from the site include but are not limited to: earth berms, diversion ditches and sediment traps. The temporary sediment traps will be excavated to detain sediment-laden runoff from contributing drainage areas located within the project's limits of disturbance. The sediment traps are proposed in the low-lying areas of each contributing drainage area and have been sized to provide a minimum storage volume of 134 cubic yards per acre of drainage area per *2023 Connecticut Guidelines for Soil Erosion and Sediment Control* and shall be maintained until final stabilization of the contributing area. For additional detail regarding structural practices refer to the Soil Erosion & Sedimentation Control Plans (2.31 and 2.32) and the Soil Erosion & Sedimentation Control Notes & Details (2.41, 2.42, and 2.43).

10.1.3 Maintenance

The contractor shall be responsible for the proper construction and stabilization, and maintenance of all temporary erosion and sediment control measures and related items, and shall also be responsible for the proper construction and stabilization of all pertinent erosion and sedimentation control measures and related items.

The contractor shall also issue a report summarizing the scope of his inspection, time, personnel used, observations and action taken for each inspection. These reports shall be retained as part of the erosion and sedimentation control plan.

The silt fence shall be inspected once every seven calendar days or after every storm event producing 0.1 inches of rainfall or greater. Any necessary repairs shall be made immediately. Accumulated sediments shall be removed as required to keep the fence functional. Deposits shall be removed when accumulations reach one-half the above ground height of the fence. Undercutting or erosion of the toe anchor shall be replaced immediately with rock filters.

The stabilized construction entrances shall be inspected at the end of each workday. The thickness shall be constantly maintained to the specified thickness by adding additional rock. A stockpile of rock material shall be maintained on-site for this purpose. At the end of each workday, any sediment deposited on the public roadways shall be removed and returned to the construction site. Washing of the roadway with water shall not be permitted.

Inlet filters shall be inspected once a week or after every storm event, whichever comes first. Any necessary repairs shall be made immediately. Accumulated sediments shall be removed as required to keep the filter functional.

11.0 DEWATERING WASTEWATERS (SECTION 5(b)(2)(B) OF GENERAL PERMIT)

According to the Geotechnical Report done by Coastal Materials Testing Lab, and Terracon Nationwide in August of 2024. The logs of these wells, numbered , are attached (see Appendix G for full report) and the locations noted on the test pit location plan. That investigation reported silty sand with gravel, cobbles, and boulders. Bedrock (Gneiss / Schist) has been found at approximately 9-10 feet below existing grade elevations in much of the site.

Groundwater was observed in the one test pits at elevation 170 near the proposed Texas Roadhouse near the stream and seems to be water pitched in the ledge. Therefore, little of no dewatering is anticipated.

12.0 POST CONSTRUCTION STORMWATER MANAGEMENT (SECTION 5(B)(2)(C) OF GENERAL PERMIT)

12.1 Runoff Reduction and Low Impact Development Practices

A proposed stormwater conveyance system, consisting of a series of pipes and catch basins, will collect the majority of the runoff from the proposed impervious areas. These areas include the proposed roof, driveways and parking fields.

Methods for runoff reduction and low impact development on site include drainage swales and catch basins with minimum two-foot sumps. These measures will result in an enhancement to the stormwater discharge from the site.

12.2 Suspended Solids and Floatables Removal

In an effort to improve the quality of the stormwater discharged from the site, the project will include Stormceptor water quality units, hooded catch basins with two-foot sumps,

and vegetated drainage swales. These stormwater quality measures are intended to provide removal of suspended solids before runoff reaches Long Island Sound.

13.0 OTHER CONTROLS (SECTION 5(b)(2)(D) OF GENERAL PERMIT)

13.1 Waste Disposal

Best management practices shall be implemented to minimize the discharge of litter, debris, building materials, hardened concrete waste, or similar materials to waters of the State. These include periodic inspections by the contractor and removal of all debris within 24 hours of inspection.

13.2 Washout Areas

Washout of applicators, containers, vehicles and equipment for concrete, paint and other materials shall be conducted in a designated washout area. There shall be no surface discharge of washout wastewaters from this area. Such washout shall be conducted: (1) outside of any buffers and at least 50 feet from any stream, wetland or other sensitive resource; or (2) in an entirely self-contained washout system. The permittee shall clearly flag off and designate areas to be used for washing and conduct such activities only in these areas. The permittee shall direct all wash water into a container or pit designed such that no overflows can occur during rainfall or after snowmelt.

In addition, dumping of liquid wastes in storm sewers is prohibited. The permittee shall move and dispose of hardened concrete waste consistent with practices developed for the "Waste Disposal" section (subparagraph 13.1 above). At least once per week, the permittee must inspect any containers or pits used for washout to ensure structural integrity, adequate holding capacity, and to check for leaks or overflows. If there are signs of leaks, holes or overflows in the containers or pits that could lead to a discharge, the permittee shall repair them prior to further use. For concrete washout areas, the permittee shall remove hardened concrete waste whenever the hardened concrete has accumulated to a height of half of the container or pit or as necessary to avoid overflows.

13.3 Vehicle Tracking

Off-site vehicle tracking of sediments and the generation of dust shall be minimized. Wet dust suppression shall be used, in accordance with section 22a-174-18(b) of the Connecticut General Statutes, for any construction activity that causes airborne particulates. The volume of water sprayed for controlling dust shall be minimized so as to prevent the runoff of water. No discharge of dust control water shall contain or cause visible oil sheen, floating solids, visible discoloration, or foaming in the receiving stream.

13.4 Post-Construction

All post-construction stormwater structures shall be cleaned of construction sediment and any remaining silt fence shall be removed upon stabilization of the site.

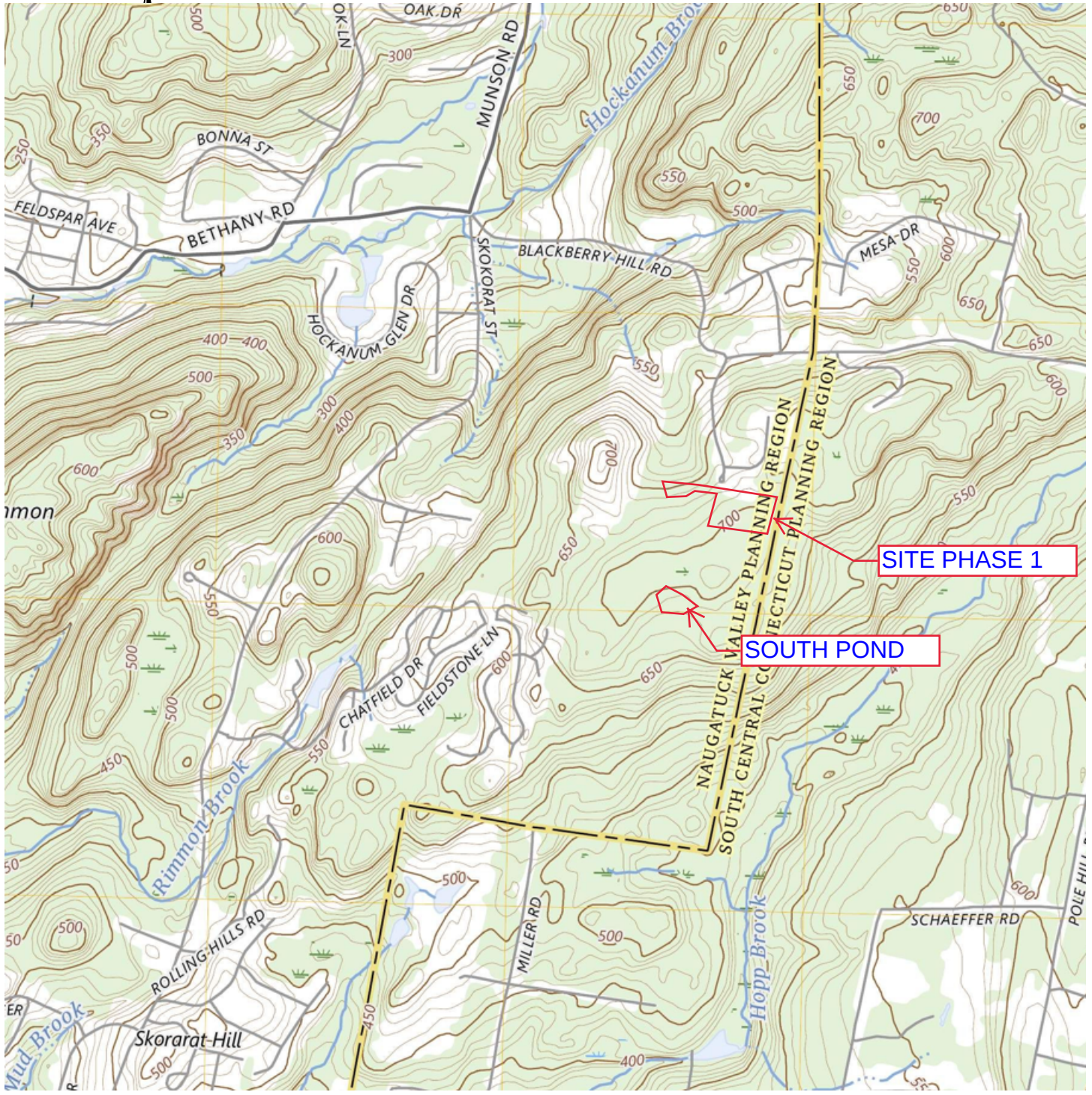
All chemical and petroleum product containers stored on the site (excluding those contained within vehicles and equipment) shall be provided with impermeable containment which will hold at least 110% of the volume of the largest container, or 10% of the total volume of all containers in the area, whichever is larger, without overflow from the containment area. All chemicals and their containers shall be stored under a roofed area except for those chemicals stored in containers of 100 gallon capacity or more, in which case a roof is not required. Double-walled tanks satisfy this requirement.

14.0 NOTICE OF TERMINATION FORM

At the conclusion of Site construction and within *30 days of the last Site inspection* of construction activities and cleaning out of all stormwater control structures, a Notice of Termination Form (see Appendix H) shall be completed and submitted to the CTDEEP. A copy of the receipt of the Notice of Termination Form or other correspondence associated to/or from CT DEEP shall be placed in the Appendix E of the Stormwater Pollution Control Plan Notebook.

LIST OF FIGURES

Site Location Map (Figure 1)
Natural Diversity Data Base Map (Figure 2)



ROSE
•TISO
& CO. LLC.
ARCHITECTS • SURVEYORS • ENGINEERS

WWW.ROSETISO.COM
38 BIRCHWOOD AVENUE, SUITE 3, FAIRFIELD, CT 06824
TEL: (203) 610-6262 • FAX: (203) 610-6404

HOPP BROOK ESTATES
PHASE 1
22 OAKWOOD DRIVE
BEACON FALLS CT

DRAWN BY: SFS
CHECKED BY: MJS
CAD FILE:
DESIGN BY: SFS
SCALE: 1"=2,000'
DATE: 05-22-25

FIGURE:

1

Natural Diversity Data Base Areas

BEACON FALLS, CT
December 2025

-  State and Federal Listed Species
-  Critical Habitat
-  Town Boundary

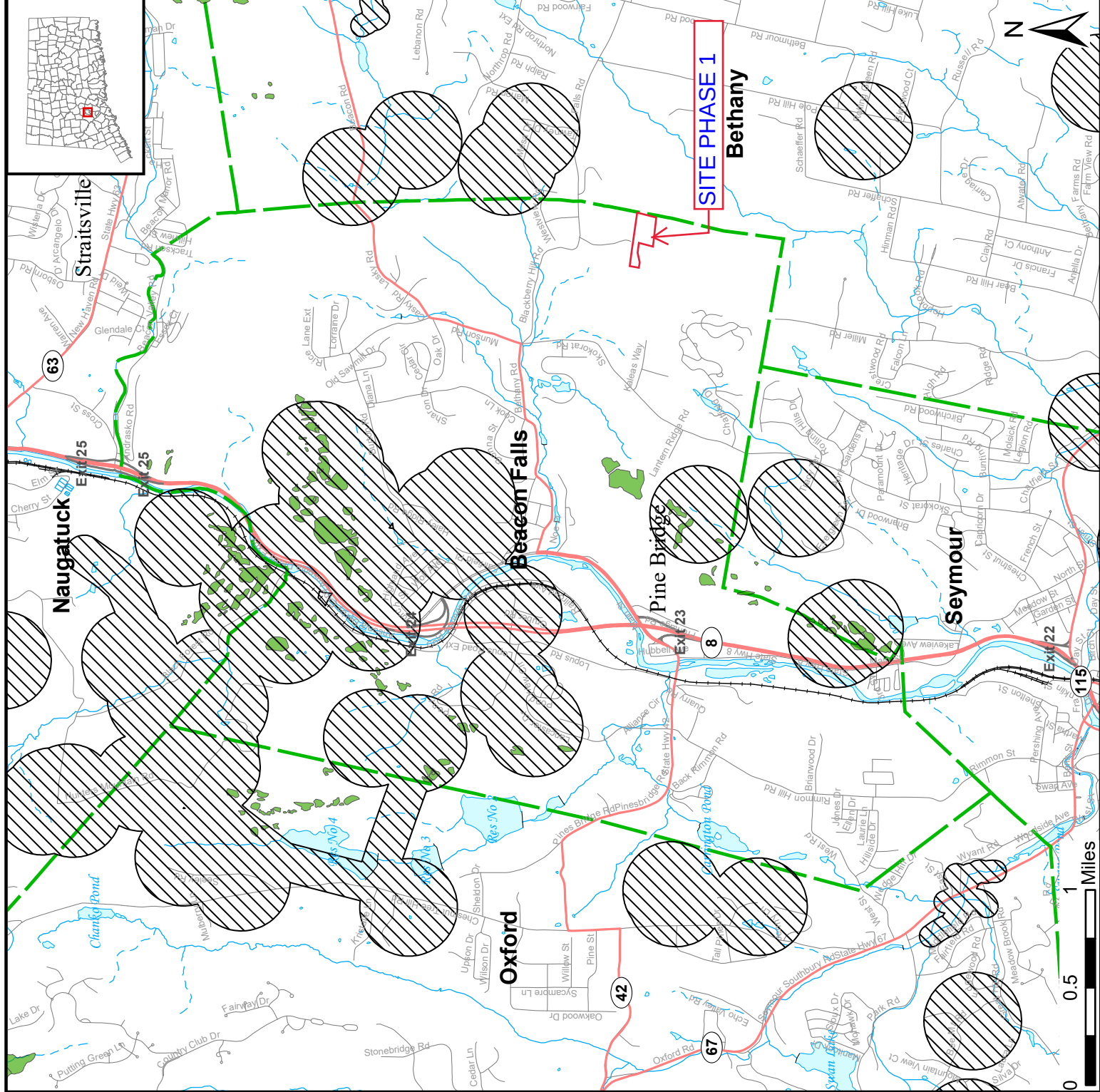
NOTE: This map shows known locations of State and Federal Listed Species and Critical Habitats. Information on listed species is collected and compiled by the Natural Diversity Data Base (NDDB) from a variety of data sources. Exact locations of species have been buffered to produce the generalized locations.

This map is intended for use as a preliminary screening tool for conducting a Natural Diversity Data Base Review Request. To use the map, locate the project boundaries and any additional affected areas. If the project is within a hatched area there may be a potential conflict with a listed species. For more information, use DEEP ezFile <https://efilings.deep.ct.gov/DEEPPortal/> to submit a Request for Natural Diversity Data Base State Listed Species Review or Site Assessment. More detailed instructions are provided along with the request form on our website.

<https://portal.ct.gov/deep-nddbrequest>

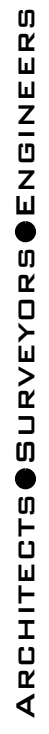
Use the CTECO Interactive Map Viewers at <http://cteco.uconn.edu> to more precisely search for and locate a site and to view aerial imagery with NDDB Areas.

QUESTIONS: Department of Energy and Environmental Protection (DEEP)
79 Elm St, Hartford, CT 06106
email: deep.nddbrequest@ct.gov
Phone: (860) 424-3011



LIST OF DRAWINGS

Site Layout Plan (SP-0,SP-1 thru Sp-1d)
Grading & Utility Plan (SP-2, thru Sp-2d)
Erosion Control Plan (SP-3 thru ,Sp-3d & SP-7)



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35 BRENTWOOD AVENUE, FAIRFIELD, CT 06825
TEL: (203) 610-6262 • FAX: (203) 610-6404

REVISIONS	
20.	WETLANDS/RECOMMENDATION DATE: 03-08-21
19.	STAFF COMMENTS DATE: 08-05-21
18.	STAFF COMMENTS DATE: 01-23-23
17.	STAFF COMMENTS DATE: 06-21-24
16.	STAFF COMMENTS DATE: 09-27-24
15.	ENGINEERING COMMENTS DATE: 10-24-24
14.	LOT LINES ADDED DATE: 12-13-24
13.	ENGINEERING COMMENTS DATE: 02-12-25
12.	ROAD EXPANSION, OFFICE & ROAD VARIATIONS DATE: 06-04-25
11.	PERVIOUS LOT / PHASE LINES RESIZED DATE: 07-19-25
10.	WATER TOWER REMOVED DATE: 08-15-25
9.	ISSUED TO HEALTH DEPT FOR PH1 PERMITS DATE: 11-18-25
8.	ALL PROPOSED SEPTIC LOCATION ADDED DATE: 05-06-26
7.	HEALTH DEPARTMENT COMMENTS DATE: 05-06-26

PROJECT TITLE

HOPP BROOK ESTATES FINAL SITE PLANS

**OAKWOOD LANE
BEACON FALLS, CT.**

Prepared For:

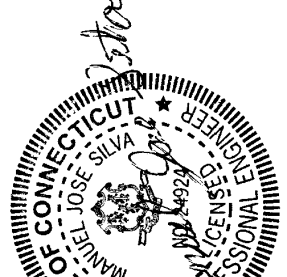
HOPP BROOK DEVELOPERS LLC

37111 133HS

OVERALL PROPERTY MAP

DESIGNED BY: MJS	SCALE: 1"=200'
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CHECKED BY: MJS	PROJECT NUMBER: 2215
CAD FILE: 2215	

SEAL



Old



REVISIONS		
NO.	DATE	DESCRIPTION
8.	MJS 08-05-21	STAFF COMMENTS
9.	MJS 11-23-23	STAFF COMMENTS
10.	MJS 6-21-24	STAFF COMMENTS
11.	MJS 9-27-24	STAFF COMMENTS
12.	MJS 10-24-24	ENGINEERING COMMENTS
13.	MJS 12-13-24	LOT LINES ADDED
14.	MJS 02-12-25	ENGINEERING COMMENTS
15.	MJS 06-04-25	ROAD ESPALANDE, OFFICE & ROAD NAMES
16.	MJS 06-19-25	PERVIOUS LOT/ PHASE LINES RESTORED
17.	MJS 07-15-25	WATER TOWER REMOVED
18.	MJS 11-18-25	ISSUED TO HEALTH DEPT FOR PH1 PERMIT
19.	MJS 02-10-26	ALL PROPOSED SEPTIC LOCATION ADDED
20.	MJS 05-06-26	HEALTH DEPARTMENT COMMENTS

HOPP BROOK ESTATES
FINAL SITE PLANS

OAKWOOD LANE
BEACON FALLS, CT.

Prepared For:

HOPP BROOK DEVELOPERS LLC

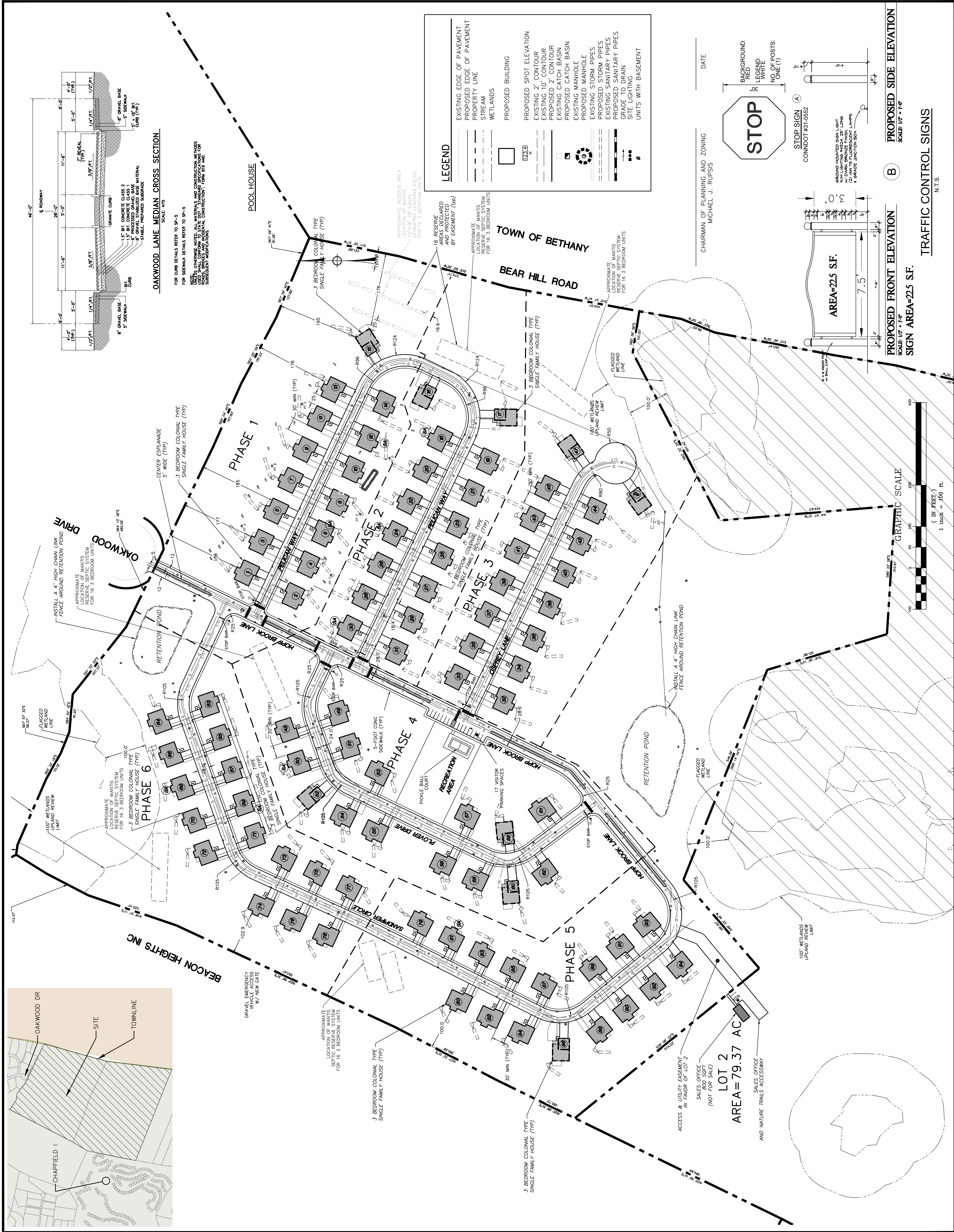
PHASE PLAN

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CHECKED BY: MJS	PROJECT NUMBER: 2215
CAD FILE: 2215	

SEAL

SHEET NUMBER

SP-1



REVISIONS		
NO.	DATE	DESCRIPTION
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10.	MJS 6-21-24	STAFF COMMENTS
11.	MJS 9-27-24	STAFF COMMENTS
12.	MJS 10-24-24	ENGINEERING COMMENTS
13.	MJS 12-13-24	LOT LINES ADDED
14.	MJS 02-12-25	ENGINEERING COMMENTS
15.	MJS 06-04-25	ROAD ESPLANADE, OFFICE & ROAD NAMES
16.	MJS 06-19-25	REMOVING LOT / PHASE LINES RESTORED
17.	MJS 07-15-25	WATER TOWER REMOVED
18.	MJS 11-18-25	ISSUED TO HEALTH DEPT FOR PH1 PERMIT
19.	MJS 02-10-26	ALL PROPOSED SEPTIC LOCATION ADDED
20.	MJS 05-06-26	HEALTH DEPARTMENT COMMENTS

PROJECT TITLE

HOPP BROOK ESTATES
FINAL SITE PLANS

OAKWOOD LANE
BEACON FALLS, CT.

Prepared For:
HOPP BROOK DEVELOPERS LLC

SHEET TITLE

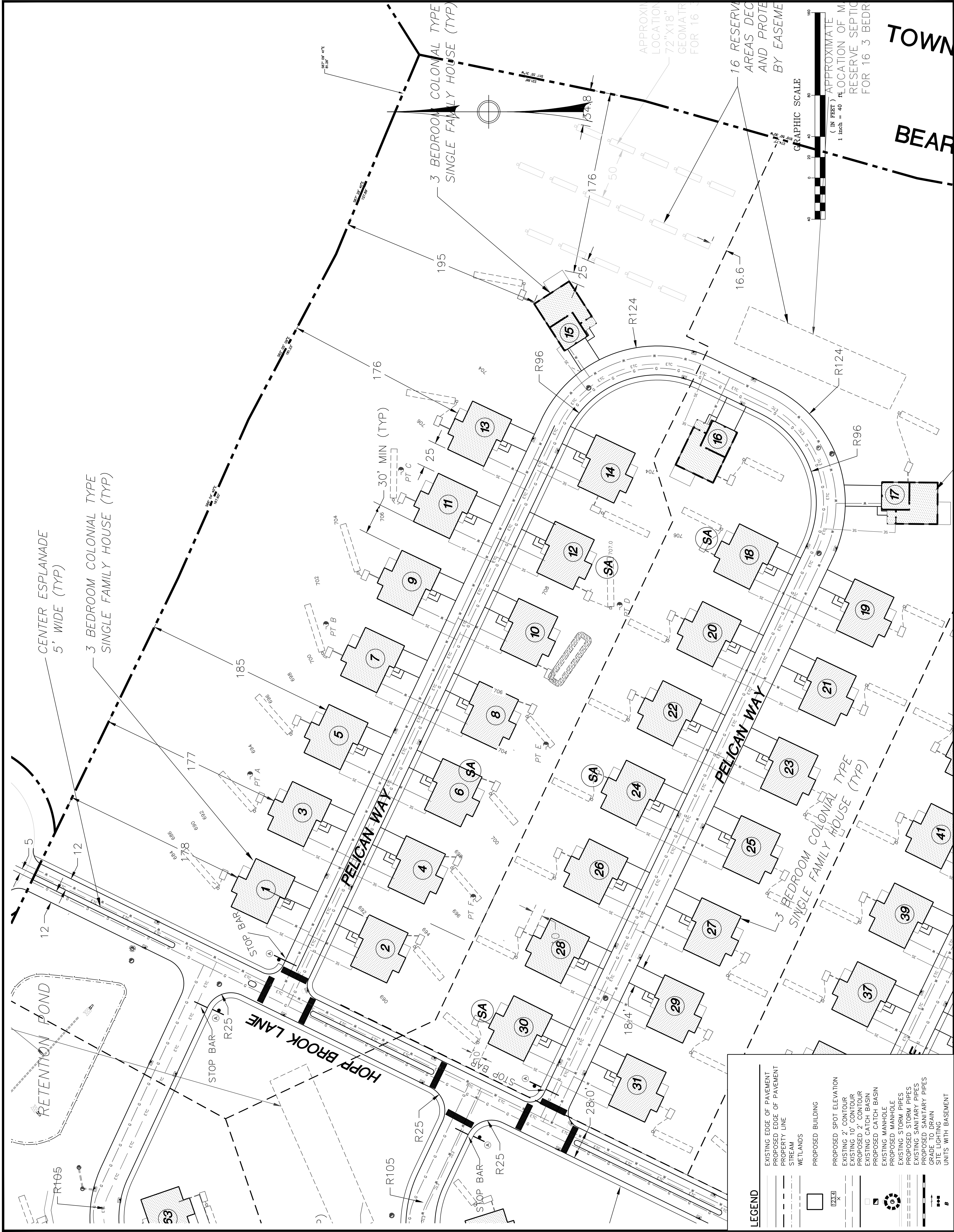
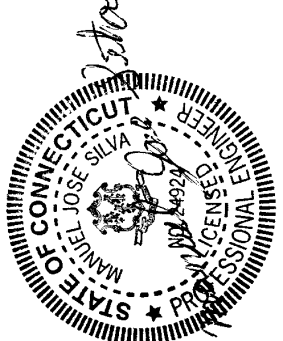
SITE PLAN

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SEAL

SHEET NUMBER

SP-1A



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20	03-21-11

PROJECT TITLE

HOPP BROOK ESTATES
FINAL SITE PLANS

OAKWOOD LANE
BEACON FALLS, CT.

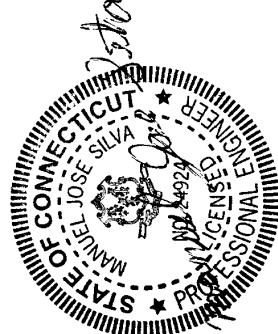
Prepared For:
HOPP BROOK DEVELOPERS LLC

SHEET TITLE

GRADING & UTILITY PLAN

DESIGNED BY: MJS	SCALE: 1"=100'
DRAWN BY: MJS	DATE: 2-23-18
CHECKED BY: MJS	PROJECT NUMBER: 2215
CAD FILE: 2215	

SEAL



SHEET NUMBER

SP-2





PROJECT TITLE

HOPP BROOK ESTATES
FINAL SITE PLANS

OAKWOOD LANE
BEACON FALLS, CT.

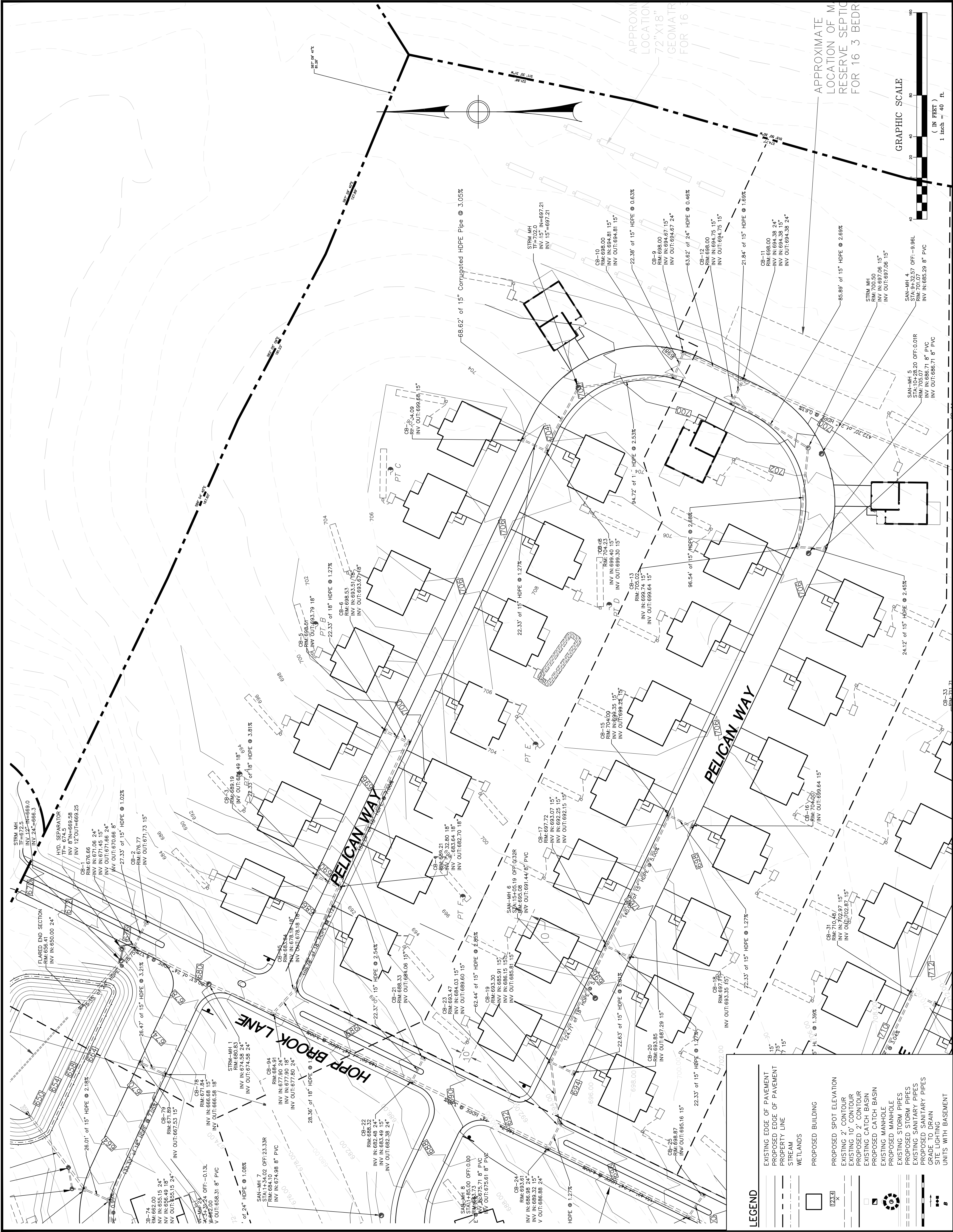
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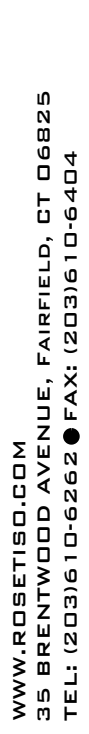
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SEAL

SP-2a

SHEET NUMBER





REVIEWS	
702	WETLANDS DOCUMENTATION
8	STAFF COMMENTS
9	STAFF COMMENTS
10	STAFF COMMENTS
11	STAFF COMMENTS
12	ENGINEERING COMMENTS
13	LOT LINES ADDED
14	ENGINEERING COMMENTS
15	ROAD EXPOSURE, OFFICE & ROAD VIEWS
16	PERVIOUS LOT / PHASE LINES RESTORED
17	WATER TOWER REMOVED
18	ISSUED TO HEALTH DEPT FOR PH1 PERM
19	ALL PROPOSED SEPTIC LOCATION ADDED
20	HEALTH DEPARTMENT COMMENTS

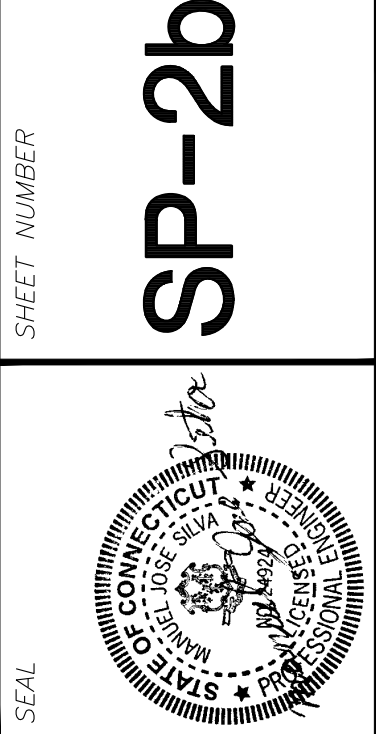
HOPP BROOK ESTATES FINAL SITE PLANS

OAKWOOD LANE
BEACON FALLS, CT.

Prepared For:
HOPP BROOK DEVELOPERS LLC

GRADING & UTILITY PLAN

DESIGNED BY: MJS	SCALE: 1"=40'
DRAWN BY: MJS	DATE: 2-23-18
CHECKED BY: MJS	PROJECT NUMBER: 2215
CAD FILE: 2215	





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REVIEWS	
10.	WIS 03-08-E-21 WETLANDS DOCUMENTATION
8.	WIS 08-05-E-21 STAFF COMMENTS
9.	WIS 11-23-23 STAFF COMMENTS
10.	WIS 6-27-24 STAFF COMMENTS
11.	WIS 9-27-24 STAFF COMMENTS
12.	WIS 10-24-24 ENGINEERING COMMENTS
13.	WIS 12-13-24 LOT LINES ADDED
14.	WIS 02-12-25 ENGINEERING COMMENTS
15.	WIS 06-04-25 ROAD EXPANSION, OTFEE & ROAD NAMES
16.	WIS 08-19-25 PERVIOUS LOT PHASE LINES RESTORED
17.	WIS 07-15-25 WATER TOWER REMOVED
18.	WIS 11-18-25 ISSUED TO HEALTH DEPT FOR PHI PERMIT
19.	WIS 02-10-26 ALL PROPOSED SEPTIC LOCATIONS ADDED
20.	WIS 05-06-26 HEALTH DEPARTMENT COMMENTS

PROJECT TITLE

HOPP BROOK ESTATES FINAL SITE PLANS

**OAKWOOD LANE
BEACON FALLS, CT**

Prepared For:

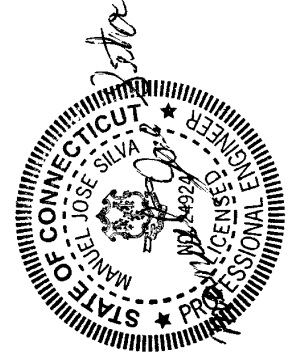
HOPP BROOK DEVELOPERS LLC

SHEET TITLE 3711 133HS

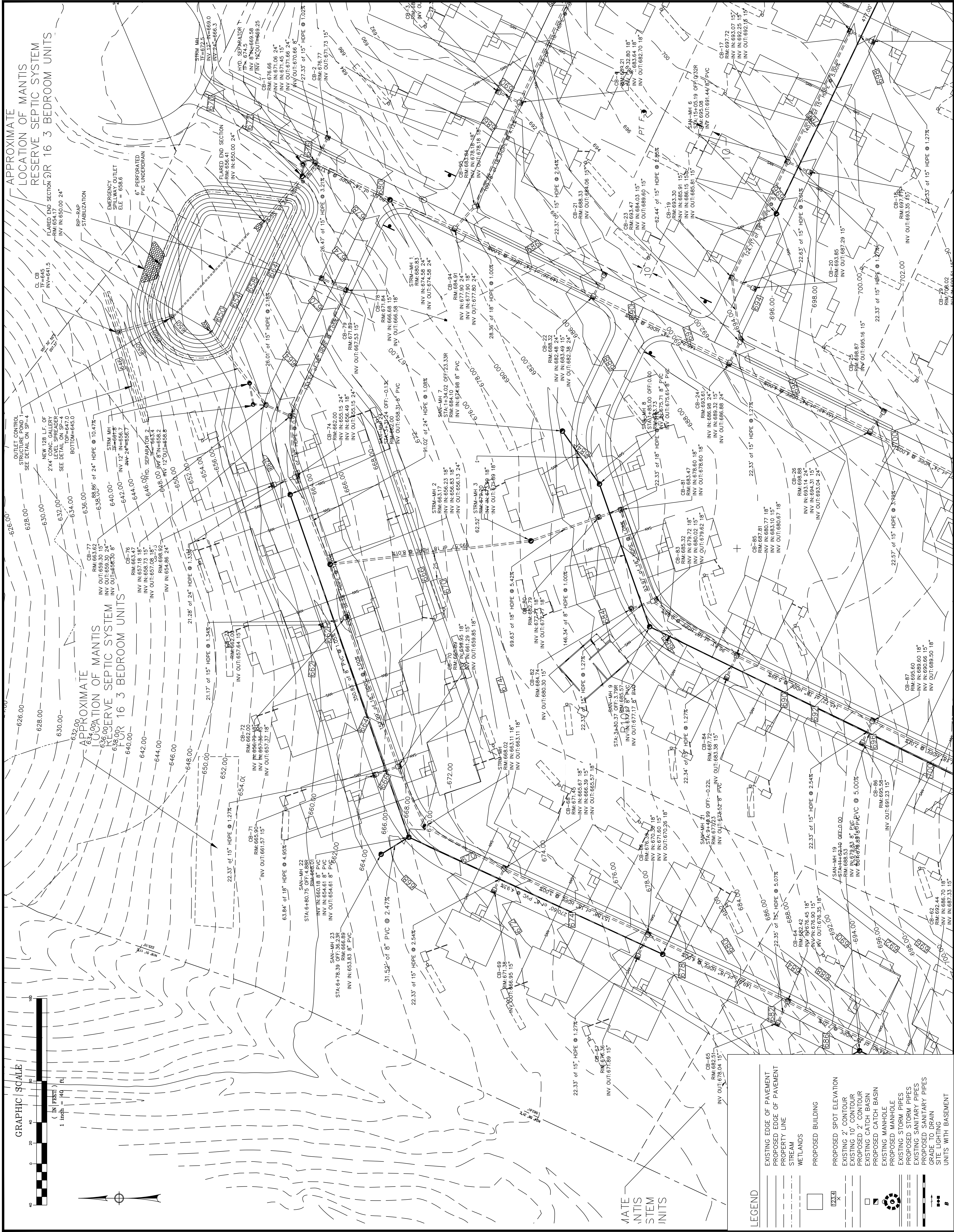
GRADING & UTILITY PLAN

DESIGNED BY: MJS	SCALE: 1"=40'
DRAWN BY: MJS	DATE: 2-23-18
CHECKED BY: MJS	PROJECT NUMBER: 2215
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SFAI SHEET NUMBER



SP-20





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REVIEWS	
7/20/18	0.5-0.8E-21 NETLANDS ENGINEERING
8/1/18	MUS 08-05-21 STAFF COMMENTS
9/1/18	MUS 11-23-23 STAFF COMMENTS
10/1/18	MUS 6-21-24 STAFF COMMENTS
11/1/18	MUS 9-27-24 STAFF COMMENTS
12/1/18	MUS 10-24-24 ENGINEERING COMMENTS
1/2/19	MUS 12-13-24 LOD LINES ADDED
1/14/19	MUS 02-12-25 ENGINEERING COMMENTS
1/15/19	MUS 06-04-25 ROAD RESURFACE, OFFICE & ROAD NAMES
1/16/19	MUS 08-19-25 PERIODIC LOT PHASE LINES RESTORED
1/17/19	MUS 07-19-25 WATER TOWER REMOVED
1/18/19	MUS 11-18-25 ISSUED TO HEALTH DEPT FOR PH1 PERMIT
1/19/19	MUS 02-10-26 ALL PROPOSED SEPTIC LOCATIONS ADDED
2/1/19	MUS 05-08-26 HEALTH DEPARTMENT COMMENTS

HOPP BROOK ESTATES FINAL SITE PLANS

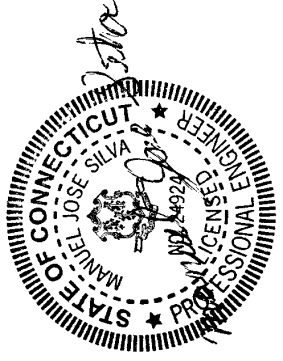
OAKWOOD LANE
BEACON FALLS, CT.

Prepared For:

HOPP BROOK DEVELOPERS LLC

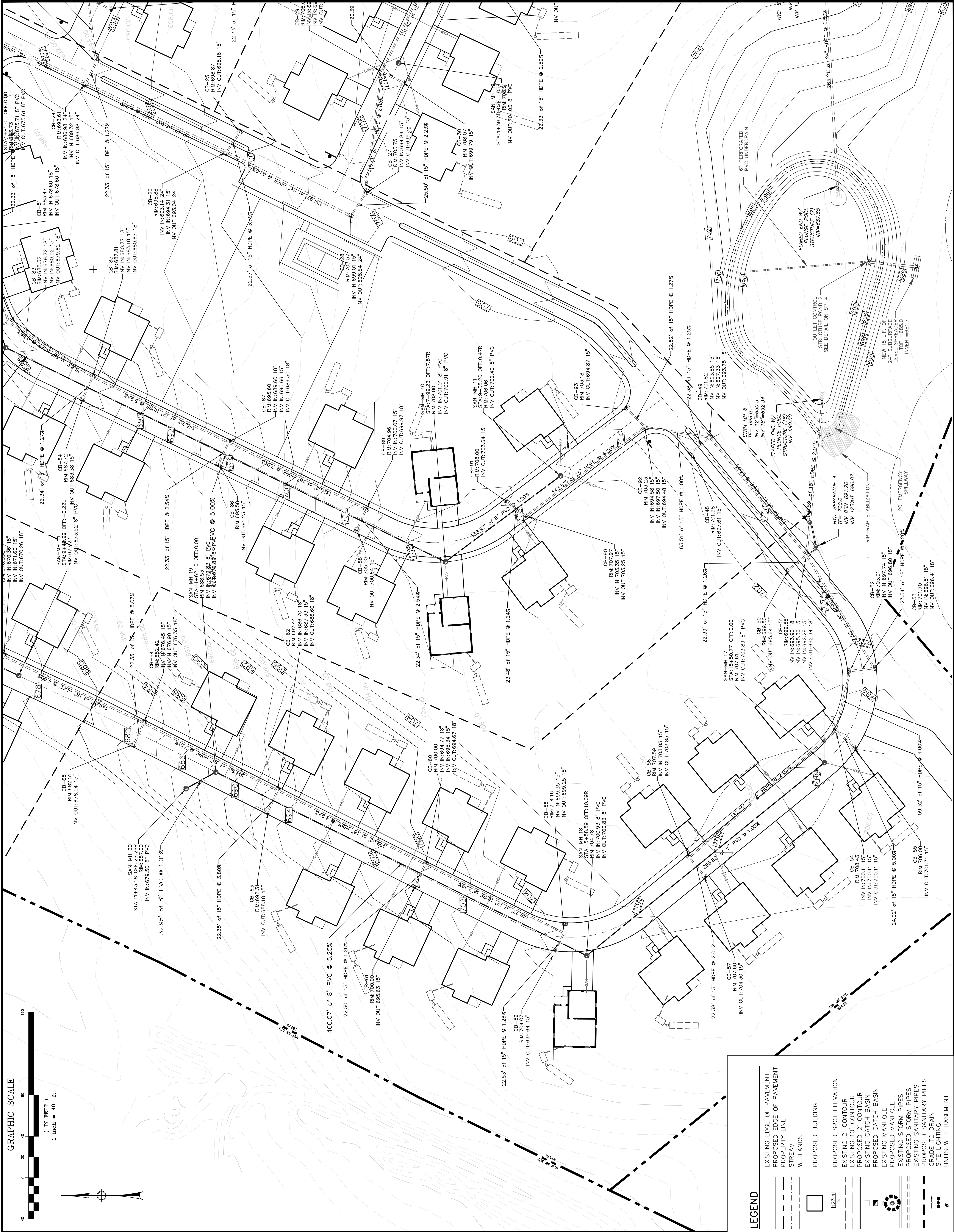
GRADING & UTILITY PLAN

DESIGNED BY: MJS	SCALE: 1"=40'
DRAWN BY: MJS	DATE: 2-23-18
CHECKED BY: MJS	PROJECT NUMBER: 2215
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SEAL SHEET NUMBER

SP-2d



REVISIONS	
NO. DRS	DATE
8.	M/S 08-05-21
9.	M/S 11-23-23
10.	M/S 6-21-24
11.	M/S 9-27-24
12.	M/S 10-24-24
13.	M/S 12-13-24
14.	M/S 02-12-25
15.	M/S 06-04-25
16.	M/S 06-19-25
17.	M/S 07-15-25
18.	M/S 11-18-25
19.	M/S 02-10-26
20.	M/S 05-06-26
WETLANDS DEMONSTRATION	
STAFF COMMENTS	
STAFF COMMENTS	
STAFF COMMENTS	
STAFF COMMENTS	
ENGINEERING COMMENTS	
LOT LINES ADDED	
ENGINEERING COMMENTS	
ROAD ESPALANDE, OFFICE & ROAD NAMES	
PERVIOUS LOT / PHASE LINES RESTORED	
WATER TOWER REMOVED	
ISSUED TO HEALTH DEPT FOR PH1 PERMIT	
ALL PROPOSED SEPTIC LOCATION ADDED	
HEALTH DEPARTMENT COMMENTS	

PROJECT TITLE

HOPP BROOK ESTATES
FINAL SITE PLANS

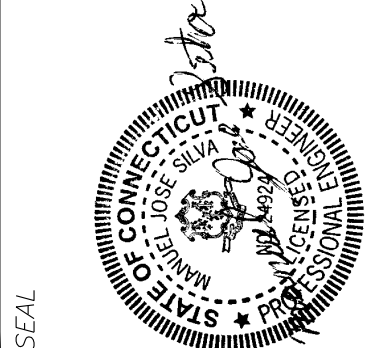
OAKWOOD LANE
BEACON FALLS, CT.

Prepared For:
HOPP BROOK DEVELOPERS LLC

SHEET TITLE
SOIL EROSION
CONTROL PLAN

DESIGNED BY: MJS	SCALE: 1"=40'
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CAD FILE: 2215	

SEAL



SHEET NUMBER
SP-3a



LEGEND

- PROPERTY LINES
- FILTER FABRIC FENCE
- FILTER FABRIC FENCE BACKED WITH HAY BALES
- PROPOSED LIGHTING
- PROPOSED CATCH BASIN
- PROPOSED MANHOLE
- EXISTING CATCH BASIN
- EXISTING MANHOLE
- ANTI-TRACKING APRON
- SILT SACK @ CATCH BASINS
- SILT SACK @ MANHOLES
- HAYBALE CHECKDAM

REVISIONS	
NO.	DATE
1	03-21
2	03-21
3	03-21
4	03-21
5	03-21
6	03-21
7	03-21
8	03-21
9	03-21
10	03-21
11	03-21
12	03-21
13	03-21
14	03-21
15	03-21
16	03-21
17	03-21
18	03-21
19	03-21
20	03-21

PROJECT TITLE

HOPP BROOK ESTATES
FINAL SITE PLANS

OAKWOOD LANE
BEACON FALLS, CT.

Prepared For:

HOPP BROOK DEVELOPERS LLC

SHEET TITLE

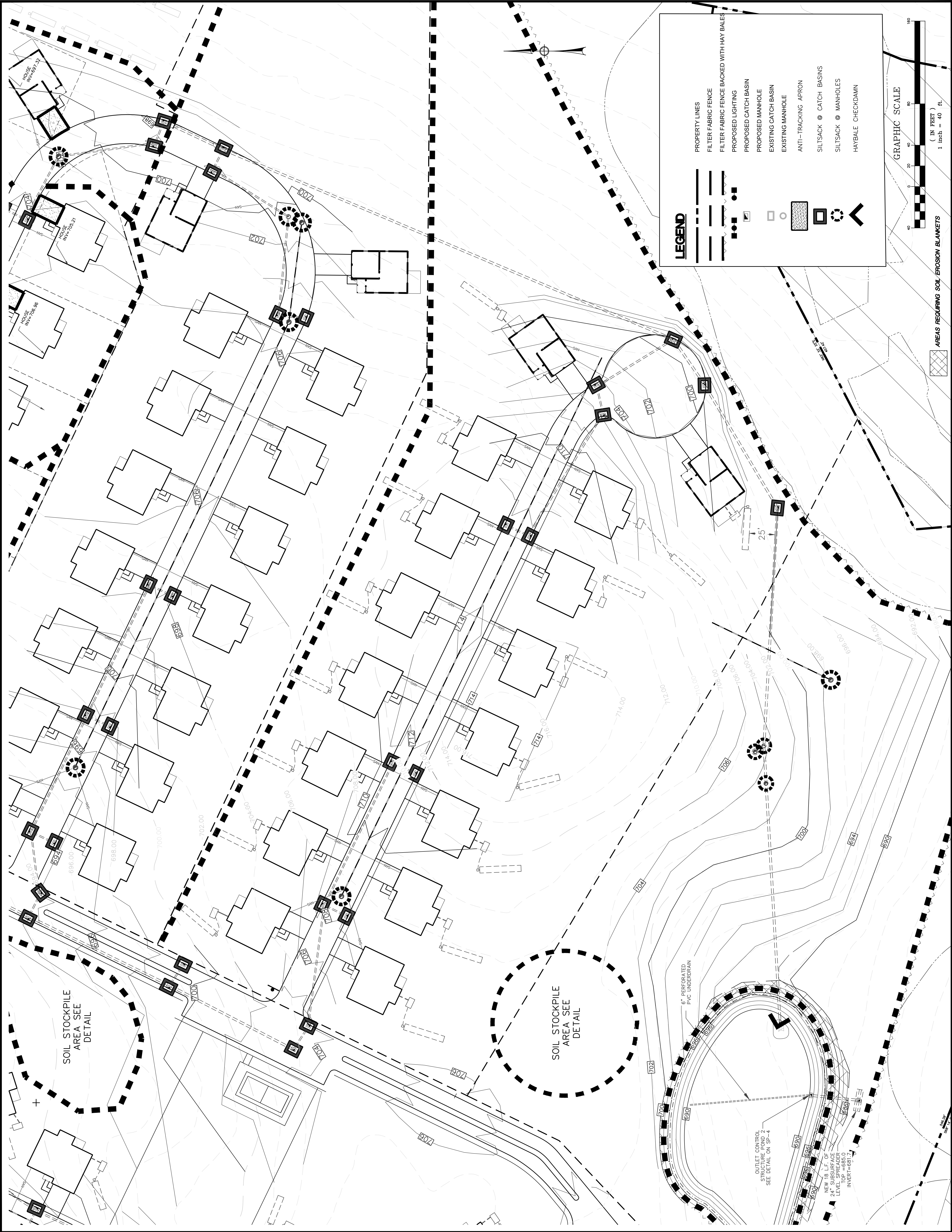
SOIL EROSION
CONTROL PLAN

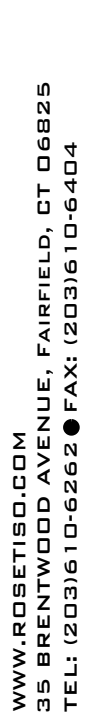
DESIGNED BY: MJS	SCALE: 1"=40'
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CAD FILE: 2215	

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SHEET NUMBER

SP-3b





PROJECT TITLE

**HOPP BROOK ESTATES
FINAL SITE PLANS**

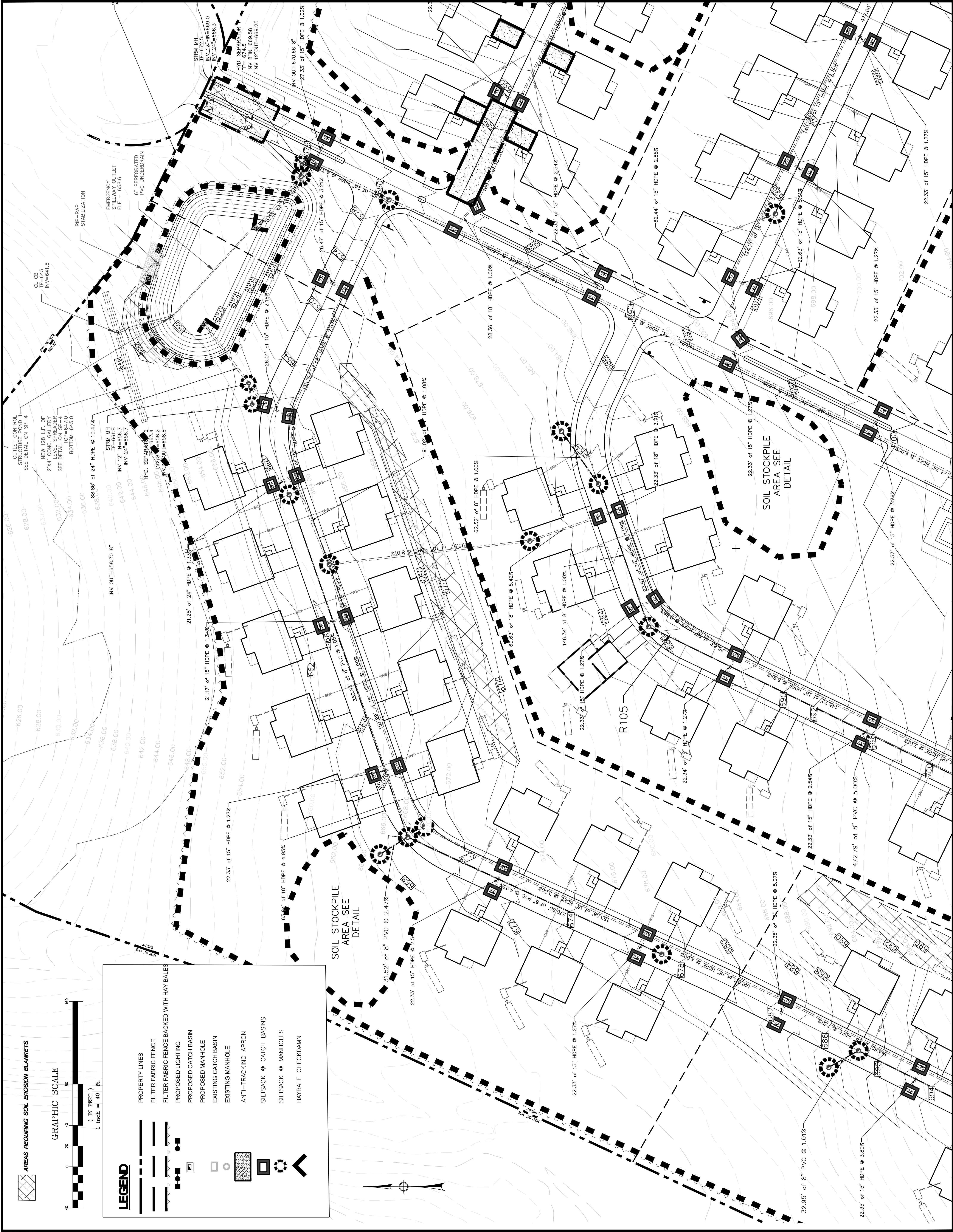
**OAKWOOD LANE
BEACON FALLS, CT.**

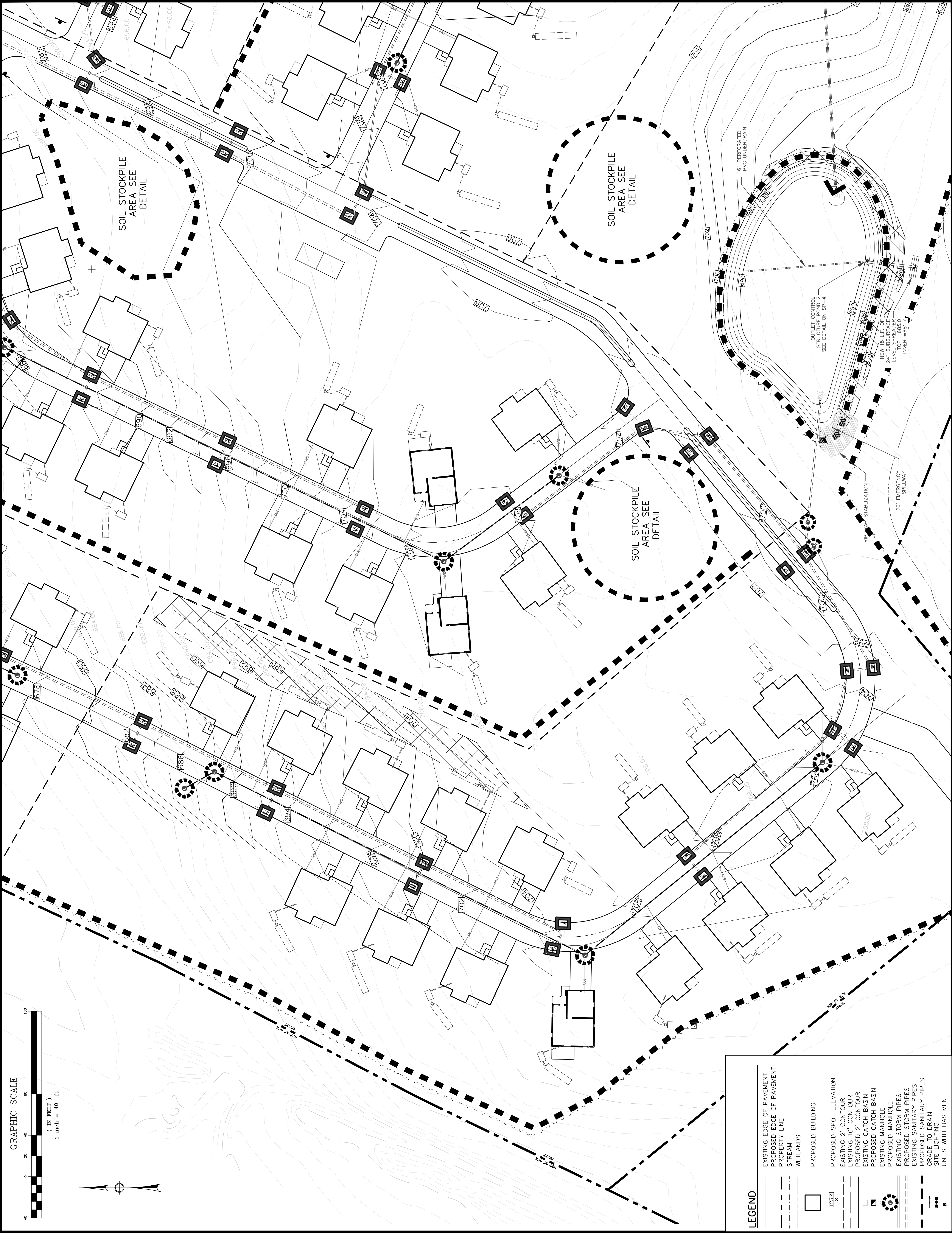
Prepared For:

HOPP BROOK DEVELOPERS LLC

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SEAL		SHEET NUMBER
		SP-3C





R

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REVISIONS	
NO. / DATE	DESCRIPTION
8. / MJS 08-05-21	STAFF COMMENTS
9. / MJS 11-23-23	STAFF COMMENTS
10. / MJS 6-21-24	STAFF COMMENTS
11. / MJS 9-27-24	STAFF COMMENTS
12. / MJS 10-24-24	ENGINEERING COMMENTS
13. / MJS 12-13-24	LOT LINES ADDED
14. / MJS 02-12-25	ENGINEERING COMMENTS
15. / MJS 06-04-25	ROAD ESPALMAGE, OFFICE & ROAD NAMES
16. / MJS 06-19-25	PERVIOUS LOT / PHASE LINES RESTORED
17. / MJS 07-15-25	WATER TOWER REMOVED
18. / MJS 11-18-25	ISSUED TO HEALTH DEPT FOR PH1 PERMIT
19. / MJS 02-10-26	ALL PROPOSED SEPTIC LOCATION ADDED
20. / MJS 05-06-26	HEALTH DEPARTMENT COMMENTS

PROJECT TITLE

HOPP BROOK ESTATES
FINAL SITE PLANS

OAKWOOD LANE
BEACON FALLS, CT.

Prepared For:
HOPP BROOK DEVELOPERS LLC

SHEET TITLE

SOIL EROSION
CONTROL PLAN

DESIGNED BY: MJS	SCALE: 1"=40'
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CAD FILE: 2215	

SEAL

SHEET NUMBER
SP-3d

PHASING CONSTRUCTION SEQUENCE:

- PHASE 0
1. INSTALL SOIL EROSION CONTROLS IN THE AREA OF THE PROPOSED RETENTION PONDS INCLUDING ANTI-TRACING PAD AT THE SITE ENTRANCE.
 2. CLEAR AND GRUB RETENTION POND AREAS. INSTALL UTILITY CONTROL STRUCTURES, INLETS, LEVELSPREADERS AND SOIL STABILIZING MATS AS REQUIRED.
 3. CONSTRUCT PIPE RUNS FROM BOTH PONDS TO THE PHASE 1 AREA.

PHASE 1

1. INSTALL PHASE 1 SOIL EROSION CONTROLS.
2. RROUGH GRADE ROADWAYS AND CONSTRUCT STORM DRAINAGE, AND ALL OTHER UTILITIES.
3. CLEAR AND GRUB INDIVIDUAL HOUSE AREAS AS NEEDED.
4. CONSTRUCT INDIVIDUAL HOUSE PER SEPTIC DRAWINGS
5. CONSTRUCT INDIVIDUAL SEPTIC SYSTEMS PER SEPTIC DRAWINGS
6. LOAM AND SEED ALL PERVIOUS SURFACES
7. REMOVE SOIL EROSION CONTROL EXCEPT FOR PERIMETER REINFORCED SILT FENCE.
8. CLEAN UP

PHASE 2

1. INSTALL PHASE 2 SOIL EROSION CONTROLS.
2. RROUGH GRADE ROADWAYS AND CONSTRUCT STORM DRAINAGE, AND ALL OTHER UTILITIES.
3. CLEAR AND GRUB INDIVIDUAL HOUSE AREAS AS NEEDED.
4. CONSTRUCT INDIVIDUAL HOUSE PER SEPTIC DRAWINGS
5. CONSTRUCT INDIVIDUAL SEPTIC SYSTEMS WITH IN PHASE 3
6. LOAM AND SEED ALL PERVIOUS SURFACES
7. REMOVE SOIL EROSION CONTROL EXCEPT FOR PERIMETER REINFORCED SILT FENCE.
8. CLEAN UP

PHASE 3

1. INSTALL PHASE 3 SOIL EROSION CONTROLS.
2. RROUGH GRADE ROADWAYS AND CONSTRUCT STORM DRAINAGE, AND ALL OTHER UTILITIES.
3. CLEAR AND GRUB INDIVIDUAL HOUSE AREAS AS NEEDED.
4. CONSTRUCT INDIVIDUAL HOUSES WITH IN PHASE 3
5. CONSTRUCT INDIVIDUAL SEPTIC SYSTEMS PER SEPTIC DRAWINGS
6. LOAM AND SEED ALL PERVIOUS SURFACES
7. REMOVE SOIL EROSION CONTROL EXCEPT FOR PERIMETER REINFORCED SILT FENCE.
8. CLEAN UP

PHASE 4

1. INSTALL PHASE 4 SOIL EROSION CONTROLS.
2. RROUGH GRADE ROADWAYS AND CONSTRUCT STORM DRAINAGE, AND ALL OTHER UTILITIES.
3. CLEAR AND GRUB PHASE 4 ROADWAY AREA.
4. INSTALL FIRST COURSE OF PAVEMENT
5. CONSTRUCT INDIVIDUAL HOUSES WITH IN PHASE 4
6. CONSTRUCT INDIVIDUAL SEPTIC SYSTEMS PER SEPTIC DRAWINGS
7. LOAM AND SEED ALL PERVIOUS SURFACES
8. PAVE ROAD WITH FINAL COURSE
9. REMOVE SOIL EROSION CONTROL EXCEPT FOR PERIMETER REINFORCED SILT FENCE.
10. CLEAN UP

PHASE 5

1. INSTALL PHASE 5 SOIL EROSION CONTROLS.
2. RROUGH GRADE ROADWAYS AND CONSTRUCT STORM DRAINAGE, AND ALL OTHER UTILITIES.
3. CLEAR AND GRUB PHASE 5 ROADWAY AREA.
4. INSTALL FIRST COURSE OF PAVEMENT
5. CONSTRUCT INDIVIDUAL HOUSES WITH IN PHASE 5
6. CONSTRUCT INDIVIDUAL SEPTIC SYSTEMS PER SEPTIC DRAWINGS
7. LOAM AND SEED ALL PERVIOUS SURFACES
8. PAVE ROAD WITH FINAL COURSE
9. REMOVE SOIL EROSION CONTROL EXCEPT FOR PERIMETER REINFORCED SILT FENCE.
10. CLEAN UP

PHASE 6

1. INSTALL PHASE 6 SOIL EROSION CONTROLS.
2. RROUGH GRADE ROADWAYS AND CONSTRUCT STORM DRAINAGE, AND ALL OTHER UTILITIES.
3. CLEAR AND GRUB PHASE 6 ROADWAY AREA.
4. INSTALL FIRST COURSE OF PAVEMENT
5. CONSTRUCT INDIVIDUAL HOUSES WITH IN PHASE 6
6. CONSTRUCT INDIVIDUAL SEPTIC SYSTEMS PER SEPTIC DRAWINGS
7. LOAM AND SEED ALL PERVIOUS SURFACES
8. PAVE ROAD WITH FINAL COURSE
9. REMOVE SOIL EROSION CONTROL EXCEPT FOR PERIMETER REINFORCED SILT FENCE.
10. CLEAN UP

PHASE 7

1. INSTALL PHASE 7 SOIL EROSION CONTROLS.
2. RROUGH GRADE ROADWAYS AND CONSTRUCT STORM DRAINAGE, AND ALL OTHER UTILITIES.
3. CLEAR AND GRUB PHASE 7 ROADWAY AREA.
4. INSTALL FIRST COURSE OF PAVEMENT
5. CONSTRUCT INDIVIDUAL HOUSES WITH IN PHASE 7
6. CONSTRUCT INDIVIDUAL SEPTIC SYSTEMS PER SEPTIC DRAWINGS
7. LOAM AND SEED ALL PERVIOUS SURFACES
8. PAVE ROAD WITH FINAL COURSE
9. REMOVE SOIL EROSION CONTROL INCLUDING ALL PERIMETER REINFORCED SILT FENCE.
10. CLEAN UP

4. IMPROVEMENTS:
Hopp Brook Developers is proposing the construction of a 109 single family homes, located on an ten and five acre tract in Hopp Brook, Connecticut. Currently the property is comprised of a two parcels totaling 135 acres. Parcel 1 is 109.5 acres and Parcel 2 is 25.5 acres. The property is currently zoned R-1 (Residential Single-Family, 15.97 acres) Also proposed are two retention ponds a northerly one being 95,500 cubic feet and the other southerly being 133,300 cubic feet in size.

The Post Construction runoff coefficient for the site is estimated at 73 to pond 1 & 76 to pond 2

B. DESIGN CRITERIA:

1. Erosion and sedimentation control measures have been located with consideration given to slopes, wetlands, and watercourses, and in accordance with the Connecticut 2002 Guidelines for Soil Erosion and Sediment Control, of the Connecticut Council of Soil and Water Conservation, Latest Edition.
2. Temporary sediment traps/basins are located throughout the project site where initial earth disturbance and ground shaping will be performed. These sediment basins have been sized in accordance with the "2002 Guidelines for Soil and Sediment Control". All sediment traps/basins shall provide a minimum of 134 cubic yards of water storage per acre drained and shall be maintained until final stabilization of the contributing area.

C. INSTALLATION AND/OR APPLICATION PROCEDURES:

1. Erosion and sedimentation control devices and stormwater management facilities shall be constructed in accordance with the project plans and specifications.
2. **D. OPERATION, MAINTENANCE PROGRAM INSPECTIONS:**
Prior to any construction, a pre construction conference is to be held among the Design Engineer, the Owners, the Contractor, the Town Engineer, the Wetlands Enforcement Officer, and the Zoning Enforcement Officer to review the erosion and sedimentation control measures to be taken.
2. All revisions after approval has been granted shall be forwarded to the appropriate commissions and the Town Engineer.
3. The Town zoning & wetlands departments shall receive written notification seventy two hours before the start of any construction.
4. All erosion control measures associated with the construction are to be installed and maintained in accordance with the schedule and requirements. Additional control measures shall be installed during the construction period as necessary and required.

5. All soil erosion and sediment control measures must be installed before any construction activities.
6. Filter fabric / silt fence will be installed along the toe of all critical cut and fill slopes.
7. Sediment removed from control measures must be disposed of at a location approved by the design engineer that will not cause additional sedimentation to the surrounding area.
8. Qualified personnel (provided by the Permittee) shall inspect disturbed areas of the construction activity that have not been finally stabilized, structure control measures, and locations where vehicles enter or exit the site at least once every seven (7) calendar days within 24 hours of the end of a storm that is 0.1 inches or greater. Where sites have been temporarily or finally stabilized, such inspection shall be conducted at least once every month for three (3) months.

Disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters. Locations where vehicles enter or exit the site shall be inspected for evidence of off-site sediment tracking.

Based on the results of this inspection, this description of potential sources and pollution prevention measures identified in the plan shall be revised as appropriate or as soon as practicable after such inspection. Such modifications shall provide for timely implementation of any changes to the site plan. The plan shall be revised and the site contents updated in accordance with the findings of the inspection. The plan shall be revised and the site contents updated in accordance with sound engineering practices, the Guidelines and Subsections (4) and (6) (c) i) 3) of the Storm Water General Permit.

A report summarizing the scope of the inspection, named(s) and qualifications of personnel making the inspection, and the results of the inspection, major observations relating to the implementation of the plan for at least three (3) years after the date of inspection. The report shall be signed by the Permittee, or his authorizing representative.

E. BEST MANAGEMENT PRACTICES:
The contractor shall be responsible for compliance with the requirements of the general sequence of grading and construction activities, application of soil erosion and sediment control measures, and final stabilization of site as indicated on the plans.

2. Relocating of equipment or machinery within twenty-five (25) feet of any wetland or watercourse shall be allowed only by direction of the Engineer. Relocating locations and procedures to be submitted for Commission approval after site contractor has been approved.
3. No construction shall proceed until a written proposal of methods to prevent debris, paint, spent blasted materials or other materials from entering the wetland or watercourse has been submitted by the contractor to the Engineer and has been approved by the Engineer, and such methods have been approved by the Engineer. The contractor shall be responsible for the implementation of such methods in an environmentally safe manner, in accordance with all applicable Federal and State laws and regulations. The Engineer may order the contractor to cease such activity temporarily if, in the judgment of the Engineer, wind or storm conditions threaten to cause the deposit of materials into a waterway.

4. No materials resulting from construction activities shall be placed in or contribute to the degradation of an adjacent wetland or watercourse. Disposal of any material shall be in accordance with Connecticut General Statutes including, but not limited to, Sections 22A-207 through 22A-209 with Connecticut General Statutes including, but not limited to, Sections 22A-207 through 22A-209.

5. Fencing of streams with equipment shall be prohibited, except where approved by the Engineer. Equipment shall be maintained in good working order. Where frequent equipment travel on stream banks and banks are exposed, erosion control measures shall be installed to prevent erosion. If erosion control measures are not installed, significant grade change will occur and no significant environmental impact will result. Approval will be required for any haul road or temporary structure placed in wetlands or watercourses.
6. A construction sequencing plan and a water handling plan, including a contingency plan for flood control, shall be submitted to the Engineer for review and approval. The sequencing plan shall include commencement of any construction in a waterway. Water shall be kept deep enough in the channel to allow for the passage of fish and for the continuous flow of the watercourse as required by the Engineer.

7. When dewatering is necessary, pumps shall only discharge directly into the wetlands or watercourse. Prior to dewatering the contractor must submit to the Engineer a written proposal for specific methods and devices to be used, and obtain the Engineer's approval of such method and devices to be used for dewatering activities including, but not limited to, pumping the water into a temporary sedimentation trap, providing surge protection at the inlet and outlet of pumps or treating the water. The contractor shall be responsible for the implementation of such methods. The Engineer determines that the pump operating methods to minimize and retain the suspended solids in the water, such time as means of controlling turbidity is submitted by the contractor and approved by the Engineer and implemented by the contractor.
8. Work within and adjacent to watercourses shall be conducted during periods of low flow, whenever possible. The contractor shall be responsible for the implementation of such methods and devices to be used to create stable flow conditions. Threaten to cause excessive erosion, siltation or turbidity. The contractor shall make every effort to secure the work site before predicted major storms. A major storm shall be defined as a storm predicted by the NOAA Weather Service with warnings of flooding, severe thunderstorms, or similarly severe weather conditions or effects.

9. All temporary fill shall be stabilized during use to prevent erosion and suitably contained to prevent sediment or other particulate matter from entering a wetland or watercourse. All areas affected by temporary fill must be restored to their original contours or is directed by the Engineer, and revegetated. The area extent of temporary fill or excavation shall be defined to that area necessary to perform the work, as approved by the Engineer.

10. Dumping of oil, chemicals, or other deleterious materials on the ground is forbidden. The contractor shall provide a means of catching, retaining and properly disposing of drained oil, removed oil filters, or other deleterious material. All spills of such materials shall be reported immediately by the contractor to the DEP.

11. Application of Herbicides or Pesticides must be done by a Connecticut licensed applicator. The contractor shall submit to the Engineer the proposed application schedule and must receive the Engineer's approval of the proposed applicator before such application is carried out.

12. During spawning seasons, discharges and construction activities in spawning area of the State waters shall be restricted so as not to disturb or inhibit aquatic species which are indigenous to the waters.

F. SOIL STABILIZATION MEASURES:

1. All topsoil not to be used for final grading/handscaped areas shall be removed from the site within 14 days of completion of construction. Topsoil that is not used for final grading/handscaped areas shall be stored/stockpiled in accordance with applicable State and Local laws.
2. All areas within 500 feet of an inhabited dwelling shall be wetted as necessary to provide dust control.
3. Stabilization of all slopes greater than 3:1 shall include hydroseeding of the seed/fertilizer with erosion control matting to be installed as soon as feasible as grading progresses.
4. Sediment disposal areas and topsoil stockpiles not scheduled for construction activities within thirty (30) days shall be stabilized as follows:

- A. Ground limestone at a rate of 135 lbs. per 1,000 s.f.
- B. Fertilizer at a rate of 14 lbs. per 1,000 s.f. using a 10-20-10 analysis or an equivalent.
- C. Annual dry grass seeding applied at a rate of not less than 1 lb. per 1,000 s.f.
- D. Mutch of newly seeded areas with 50 lbs. of salt hay or small grain straw per 1,000 s.f.

5. All disturbed areas are to be provided with at least 4" of topsoil before final seeding.
6. Permanent vegetation is to be seeded or sodded on all exposed areas within ten (10) days after final grading. Mowing is necessary for seed protection and establishment. Lime and fertilizer before permanent seeding.

7. Permanent vegetation:
 - A. Materials specifications for lawn areas:
 - (i) Sod: Minimum of 4" topsoil
 - (ii) Limestone: 135 lbs. per 1,000 s.f.
 - (iii) Fertilizer: 14 lbs. per 1,000 s.f. using a 10-20-10 analysis or an equivalent.
 - (iv) Seed:

Permanent Vegetation — Lawn

Proportion by Weight	Common Name	Grass	Pure s.d.	Seed s.d.
45%	Kentucky Bluegrass	80	85	0.50
45%	Creeping Red Fescue	65	98	0.50
10%	Perennial Ryegrass	90	98	0.50

Permanent Vegetation — Detention Pond, Embankments, Out Slopes, etc. more than 25' from Unit

- A. Seed Mixture:

Creeping Red Fescue (Pennlawn, Watergreen)	Lbs/1,000 s.f.
20	45
2	05
- B. Tail Fescue (Kentucky 31) or Smooth Bromegrass (Saratoga, Lincoln)
- C. Liquid mulch binders must be used to anchor salt hay, hay or straw mulches.
- D. Application should be heavier at edges where wind catches the mulch in valleys
- E. All created banks. Remainder of area should be uniform in appearance.
- F. Fill material shall be free from debris, petroleum or combustible material and frozen or wet earth.
- G. Construction areas shall be periodically sprayed with water until the surface is wet to control the generation of dust.
- H. Seed preparation:
 - (i) Topsoil should be a minimum of four inches deep (compacted) before seeding.
 - (ii) have topsoil tested for pH, add lime as necessary to achieve pH of 6.5. Apply fertilizer at a rate of 300 pounds per acre or seven pounds per 4,000 s.f. using 10-20-10 or equivalent in dry form.
 - (iii) Topsoil should be 4" deep. If topsoil is less than 4" deep, add topsoil to a depth of 4" and then seed.
 - (iv) Work line and fertilizer into soil as neatly as practical to a depth of four inches with a disc, springtooth harrow or other suitable equipment. The final harrowing or discing operation should be on the general contour. Continue all day or silty soil and coarse sands should be raked to firm the seed bed whenever feasible.
 - (v) Debris, such as wire, cable, tree roots, places of concrete, blocks, lumps or other unsuitable material
 - (vi) seed bed just before seeding. If traffic has left soil compact, the area must be relined and firmed as above.

G. RESPONSIBLE PARTIES:

HOPP BROOK DEVELOPERS, LLC
475 WHITNEY AVE, NEW HAVEN CT 06511
Tel. (203) 562-3111

is assigned the responsibility for implementing the control measures of this plan. This responsibility includes the installation and maintenance of control measures, informing all parties engaged on the project of the requirements and objectives of this plan, and notifying the Planning and Zoning Commission of the transfer of responsibility, and for conveying a copy of this plan if title to the property is transferred.

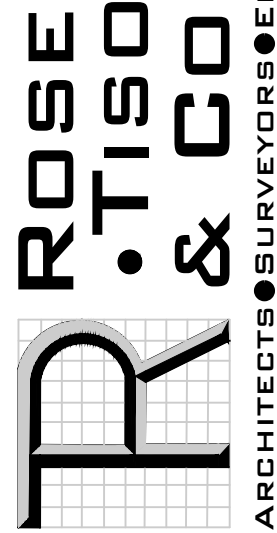
TEMPORARY SEDIMENT TRAP

CONSTRUCTION NOTES:

1. Clear, grub and strip any vegetation and root mat from any proposed embankment and outlet area
2. Remove stones and rocks whose diameter is greater than 3 inches and other debris
3. Excavate wet storage and construct the embankment and/or outlet as needed to obtain the necessary storage requirements.
4. Use only fill material for the embankment that is free from excessive organics, debris, large rocks (over 6 inches) or other unsuitable materials.
5. Compact the embankment in 9-inch layers by traversing with equipment while it is being constructed
6. Stabilize the earth embankment using any of the following measures: Temporary Seeding, Permanent Seeding, or Stone Slope Protection immediately after installation.

MAINTENANCE NOTES:
1. Inspect the temporary sediment trap at least once a week and within 24 hours of the end of a storm with a rainfall amount of 0.5 inch or greater.
2. Check the outlet to ensure that it is structurally sound and has not been damaged by erosion or construction equipment.
3. The height of the stone outlet should be maintained at least 1 foot below the crest of the embankment.
4. Also check for sediment accumulation and filtration performance

5. When sediments have accumulated to one half the minimum required volume of the wet storage, dewater the trap as needed, remove sediments and restore the trap to its original dimensions. Dispose of the sediment removed from the basin in a suitable area and in such a manner that it will not erode and cause sedimentation problems.
6. The temporary sediment trap may be removed after the contributing drainage area is stabilized



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PROJECT TITLE

HOPP BROOK ESTATES FINAL SITE PLANS

OAKWOOD LANE
BEACON FALLS, CT.

Prepared For:

HOPP BROOK DEVELOPERS LLC

SHEET TITLE

DETAILS

DESIGNED BY: MJS	SCALE: 1"=100'
DRAWN BY: MJS	DATE: 2-23-18
CHECKED BY: MJS	PROJECT NUMBER: 2215
CAD FILE: 2215	

SHEET NUMBER

SP-7

APPENDIX A

**NO CAM APPROVAL REQUIRED SITE IS OUTSIDE
THE CAM AREA**

Coastal Area Site Plan Application
Coastal Area Management Correspondence with
DEEP Coastal Site Plan Review Approval

APPENDIX B

Site Inspection Checklist

Crown Point II
22 Oakwood Drive
Beacon Falls, Connecticut
Stormwater Pollution Control Plan
Weekly Construction Site Inspection checklist and Report for Temporary and Final Stabilized Areas

Date of Weekly Inspection: _____

Project/Construction Manager Name, Signature and Qualifications: _____

Areas/Items Inspected	Checked (Y/N)	Comments/Notes	Corrective Actions Taken (Explain)
1. All Disturbed/Unstabilized Soil Areas			
2. Soil Erosion and Sediment Control Measures (e.g., silt fences, haybales, inlet protection, etc.)			
3. Construction Entrances			
4. Material/Vehicle/Machinery/Equipment Storage Areas			
5. Catch Basins/Water Quality Units			
6. Sediment Traps/Detention Basins			
7. Soil Stockpile Areas			
8. Stormwater Discharge Points (e.g. riprap pads)			
9. Debris			
10. Waste Receptacles			
11. Litter			
12. On-site and Nearby Wetlands and Watercourses			
13. Other Relevant Areas or Items			

APPENDIX C

Stormwater Monitoring Report



**Connecticut Department of
Energy & Environmental Protection**
Bureau of Materials Management & Compliance Assurance
Water Permitting & Enforcement Division

**General Permit for the Discharge of Stormwater and Dewatering Wastewaters from
Construction Activities, issued 8/21/13, effective 10/1/13**
Stormwater Monitoring Report

SITE INFORMATION

Permittee:	_____
Mailing Address:	_____
Business Phone:	_____ ext.: _____ Fax: _____
Contact Person:	_____ Title: _____
Site Name:	_____
Site Address:	_____
Receiving Water (name, basin):	_____
Stormwater Permit No.	<u>GSN</u> _____

SAMPLING INFORMATION (Submit a separate form for each outfall)

Outfall Designation:	_____	Date/Time Collected:	_____
Outfall Location(s) (lat/lon or map link):	_____		
Person Collecting Sample:	_____		
Storm Magnitude (inches):	_____	Storm Duration (hours):	_____
Size of Disturbed Area at any time:	_____		

MONITORING RESULTS

Sample #	Parameter	Method	Results (units)	Laboratory (if applicable)
1	Turbidity			
2	Turbidity			
3	Turbidity			
4	Turbidity			

(provide an attachment if more than 4 samples were taken for this outfall)

Avg =

STATEMENT OF ACKNOWLEDGMENT

I certify that the data reported on this document were prepared under my direction or supervision in accordance with the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. The information submitted is, to the best of my knowledge and belief, true, accurate and complete.

Authorized Official: _____
Signature: _____ Date: _____

Please send completed form to:

DEPARTMENT OF ENERGY & ENVIRONMENTAL PROTECTION
BUREAU OF MATERIALS MANAGEMENT AND COMPLIANCE ASSURANCE
79 ELM STREET
HARTFORD, CT 06106-5127
ATTN: NEAL WILLIAMS

APPENDIX D

Contractor Certificate

Contractor Certification Statement

The following certification must be signed by each contractor and subcontractor where appropriate.

"I hereby certify that I am a contractor licensed in the State of Connecticut. I am making this certification in connection with a registration under such general permit, submitted by:

Name of Contractor / Subcontractor

for an activity located at:

Address of Project or Activity

"I certify under penalty of the law that I have read and understand the terms and conditions of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. I understand that as a contractor or subcontractor at the site, I am authorized by this general permit, and must comply with the terms and conditions of this general permit, including, but not limited to, the requirements of the Stormwater Pollution Control Plan prepared for the site."

Signature of Contractor / Subcontractor

Date

Name of Contractor / Subcontractor

Title

Name of Contracting Firm		
Mailing Address		City/Town
State	Zip Code	Business Phone

APPENDIX E

Notice of Termination



General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

Notice of Termination Form

Please complete and submit this form in accordance with the general permit (DEP-PED-GP-015) in order to ensure the proper handling of your termination. Print or type unless otherwise noted.

Note: Ensure that for commercial and industrial facilities, registrations under the *General Permit for the Discharge of Stormwater Associated with Industrial Activity* (DEP-PED-GP-014) or the *General Permit for the Discharge of Stormwater from Commercial Activities* (DEP-PED-GP-004) have been filed where applicable. For questions about the applicability of these general permits, please call the Department at 860-424-3018.

Part I: Registrant Information

1. Permit number: **GSN**
2. Fill in the name of the registrant(s) as indicated on the registration certificate:
Registrant:
3. Site Address:
City/Town: _____ State: _____ Zip Code: _____
4. Date all storm drainage structures were cleaned of construction sediment:
Date of Completion of Construction: _____
Date of Last Inspection (must be at least three months after final stabilization pursuant to Section 6(b)(6)(D) of the general permit): _____
5. Check the post-construction activities at the site (check all that apply):
☐ Industrial ☐ Residential ☐ Commercial ☐ Capped Landfill
☐ Other (describe): _____

Part II: Certification

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute."

Signature of Permittee

Date

Name of Permittee (print or type)

Title (if applicable)

Note: Please submit this Notice of Termination Form to:

STORMWATER PERMIT COORDINATOR
BUREAU OF WATER MANAGEMENT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

APPENDIX F

Engineering Report

For Phase 1-6

SITE ENGINEERING DESIGN REPORT

Hopp Brook Estates
Proposed Residential Development
Oakwood drive
Beacon Falls, Connecticut
Job No. 2215

Prepared For:
Hopp Brook Developers

Prepared By:



Manuel J. Silva
Project Manager

April 01, 2019
Revised 2-09-21
Revised 01-02-25
Revised 02-12-25

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Proposed Storm Water Drainage	3
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Table 2	4
Appendix A	Storm Water Hydrographs
Appendix B	Inlet report (Gutter flow analysis for catch basin on site)
Appendix C	Drainage Statement
Appendix D	HGL storm sewer calculation 100-year storm
Appendix E	Level Spreader Calculations
Appendix F	Drainage Area Maps, Existing & Proposed Conditions

INTRODUCTION:

Hopp Brook Developers is proposing the construction of 109 new residential detached dwellings to be located on the two parcels totaling 135 acres at the end of Oakwood Drive. The majority of the proposed dwellings will have a total floor area of approximately 2,830 square feet, distributed over two (2) stories. This new construction is proposed within a previously proposed residential development known as "Chatfield II".

Currently, the property is made up of 2 parcels. The entire site in general is a wooded area with little under story with some wetland areas.

The storm water runoff from the site flows in two directions easterly to a large wetland area that flows southerly and forms an unnamed tributary to Hopp Brook and Northerly towards a wetland west of Oakwood Drive.

This site has an existing accessway to Oakwood Drive. One driveway is proposed for this development accessing Oakwood Drive in Beacon Falls. Upon completion of the development, parking will be provided for 393 cars, 188 of these spaces will be garage spaces located in the houses 2 car garages.

EXISTING STORMWATER RUNOFF

For analysis purposes, the site has been examined as having two drainage areas. These two drainage areas will be referred to as DA-S (East & Southern drainage area flowing to the large wetland to the east), and DA-N (West and Northern drainage area flowing to Wetland near Oakwood Drive).

The storm water runoff from the site flows in two directions southeasterly to a large wetland area that flows southerly and forms an unnamed tributary to Hopp Brook and northwesterly.

Based on the above, it is apparent that there is two points of interest associated with the existing drainage pattern, the point immediately prior to the southeasterly portion of the property to a large wetland area, where the site drains to the unnamed tributary to the Hopp Brook, and the point immediately prior to the Northwesterly portion of the property. Peak rates of storm water runoff, for 5, 10, 25, 50 and 100 year storm events, have been calculated for this point of interest. The rates are depicted on Table 1. The supporting calculations are included as Appendix A.

These existing flows will later be compared to post development flows as a means of assessing the potential flow impact on surrounding infrastructures.

TABLE 1
Existing Flows (CFS)

Existing Runoff from Northwestern watershed area to be developed				
<u>DA-N</u>				
5-year	10-year	25-year	50-year	100-year
25.69	36.52	52.33	64.57	78.23
Existing Runoff from Southeastern watershed area to be developed				
<u>DA-S</u>				
5-year	10-year	25-year	50-year	100-year
15.46	21.98	31.48	38.85	47.06

PROPOSED STORM WATER DRAINAGE

The plans are designed to minimize potential impacts to adjacent properties and the existing storm water infrastructure.

Without storm water quality measures, proposed development of this site will increase the Weighted Runoff Coefficient (WRC) and decrease the Time of Concentration (T_c), resulting in an increase in the peak rate of storm water runoff. However, the construction of, two (2) Storm Water Management Areas (SWMA) actually result in a reduction of post-development rate of runoff relative to predevelopment conditions.

Design details for these systems are presented on Sheet SP-2 (part of the overall Project Documents). The system will drain the roofs, sidewalks, grassy areas, Club house, pool area, and parking lot associated with the 94 single-family homes development. The roofs and parking lots will be the major elements of the total impervious area on the site. (calculations included as Appendix A, Gutter flow analysis included as Appendix B) The roof, grassy areas, sidewalks and driveways will contribute to the runoff totals seen in table 2.

The northwesterly SWMA (Pond 1) has a total storage volume of approximately 96,503 c. f. and the maximum water depth has been calculated to be 10 feet. This SWMA will reduce the post development peak rate of runoff by 2.47 cfs for the one hundred year storm. The southwesterly SWMA (Pond 2) has a total storage volume of approximately 133,331 c. f. and the maximum water depth has been calculated to be 6 feet. This SWMA will reduce the post development peak rate of runoff by 37.48 cfs for the one hundred year storm. As indicated in the following summary and attached computations, the proposed development will reduce the peak rate of runoff to less than the pre-developed condition for both the Northwesterly and Southeasterly water sheds on site.

The development as proposed will not have an adverse impact on the surrounding wetlands or watercourses.

Table 2, (below) represents the combined effect of these flow patterns on the existing infrastructures. Flows from the proposed systems will produce peak flows that are less than the existing peak flows from the two watersheds on the site.

TABLE 2

Proposed Flows (CFS) for new condition				
Proposed Runoff from Northwestern watershed area to be developed				
		<u>DA-n</u>		
5-year	10-year	25-year	50-year	100-year
24.47	33.88	44.76	58.88	75.76

Percent reduction of runoff from the site

5 year	10 year	25 year	50year	100year
5%	7.2%	14%	8.8%	3%

Proposed Runoff from Southeastern watershed area to be developed

		<u>DA-E</u>		
5-year	10-year	25-year	50-year	100-year
4.933	5.963	7.21	8.01	9.58

Percent reduction of runoff from the site

5 year	10 year	25 year	50year	100year
68%	72%	77%	79%	79%

SANITARY SEWER

Sanitary Sewer discharge will be through a proposed 8-inch PVC sanitary sewer line to a proposed septic system for each phase of the project. Each phase will have a system that can accommodate 16- 3 bedroom houses.

Using the technical standards of the Connecticut Public Health Code, the estimated sewage flow is 150 gallons per day per bedroom. This development will have no more than 48 bedrooms per phase or a total of 327:

16 units have 3 bedrooms per Phase/system and a total 109 units for all phases

$16 \times 3 = 48$; $109 \times 3 = 327$ total bedrooms

$48 \times 150 = 7,200$ gallons per day average flow max per phase

$327 \times 150 = 49,050$ gallons per day average total for all phases

Average Daily Flow = 5 gpm per phase; =34.06 all phases

$$\begin{aligned} \text{Peak flow estimate} &= \frac{5 \times 5 (\text{peaking factor})}{34 \times 5 (\text{peaking factor})} = \frac{25}{170} \end{aligned}$$

$$= 25 \text{ gpm Peak or } 0.055 \text{ cfs}$$

$$= 170 \text{ gpm Peak or } 0.37 \text{ cfs}$$

Other Utilities

All proposed utilities to the site will be through underground utility connections. Electrical service will be from existing aboveground electric utility line in proposed streets. Water service will be from an existing water main in the proposed streets.

APPENDIX A
STAGE HYDROGRAPHS

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5 - Year

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10 - Year

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25 - Year

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50 - Year

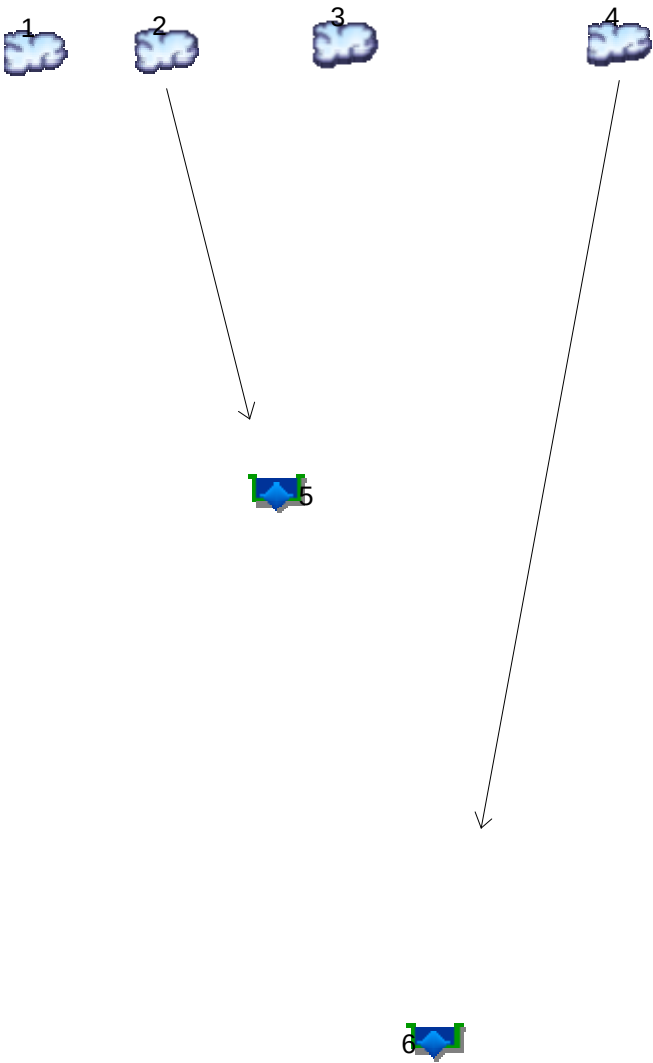
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Watershed Model Schematic

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020



Legend

Hyd.	Origin	Description
1	SCS Runoff	ex da-1
2	SCS Runoff	proposed da-1
3	SCS Runoff	DA-2 Existing
4	SCS Runoff	Proposed DA-2
5	Reservoir	pond 1 control
6	Reservoir	pond 2 control

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Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

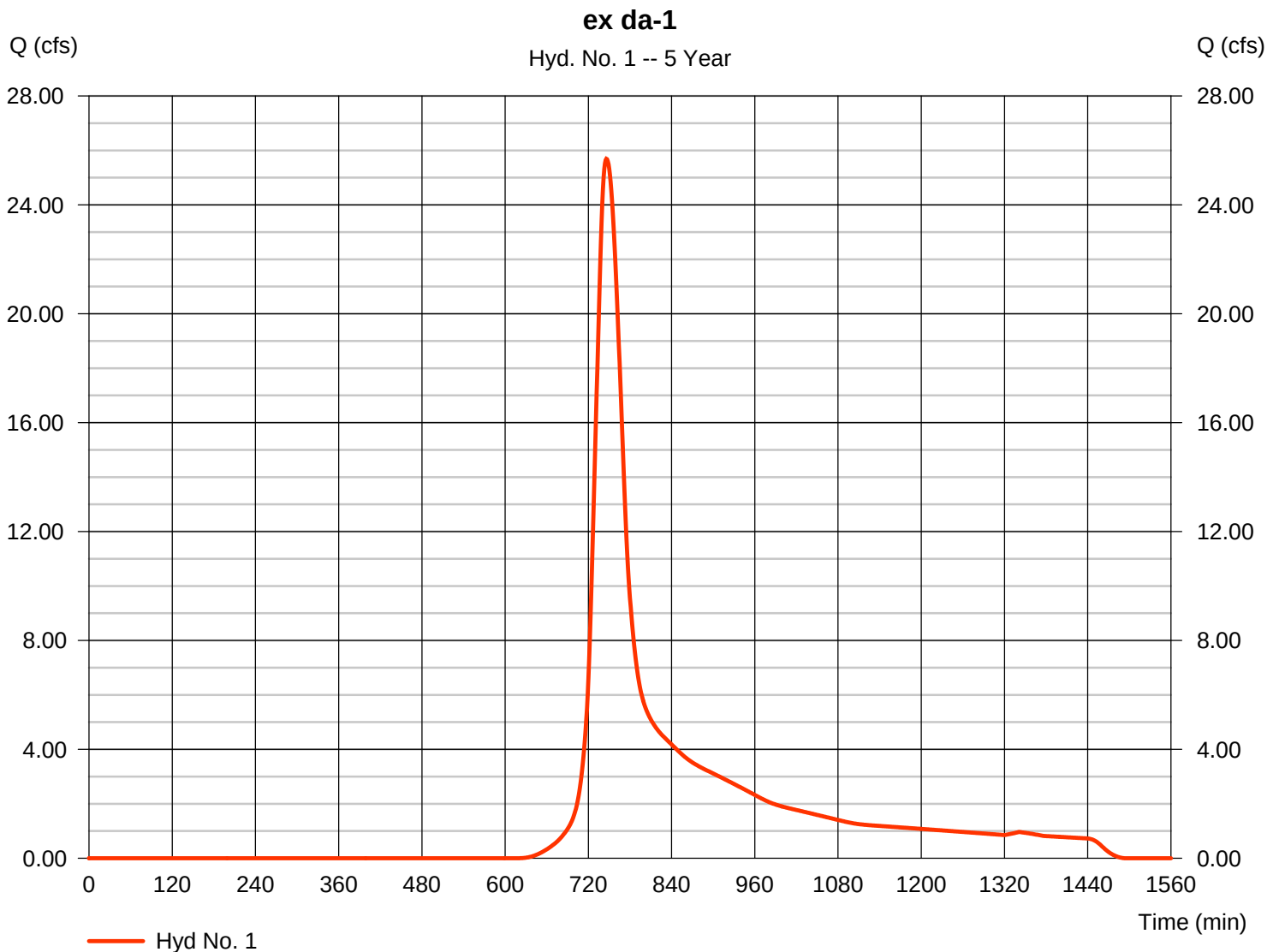
Thursday, 01 / 7 / 2021

Hyd. No. 1

ex da-1

Hydrograph type = SCS Runoff
 Storm frequency = 5 yrs
 Time interval = 1 min
 Drainage area = 24.700 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 4.71 in
 Storm duration = 24 hrs

Peak discharge = 25.69 cfs
 Time to peak = 746 min
 Hyd. volume = 150,276 cuft
 Curve number = 68
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 34.90 min
 Distribution = Type III
 Shape factor = 484



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No. 1

ex da-1

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.400	0.011	0.011	
Flow length (ft)	= 300.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.62	0.00	0.00	
Land slope (%)	= 6.00	0.00	0.00	
Travel Time (min)	= 31.33	+	0.00	+
			0.00	= 31.33
Shallow Concentrated Flow				
Flow length (ft)	= 837.00	0.00	0.00	
Watercourse slope (%)	= 6.00	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=3.95	0.00	0.00	
Travel Time (min)	= 3.53	+	0.00	+
			0.00	= 3.53
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00	0.00	0.00	
Flow length (ft)	(0)0.0	0.0	0.0	
Travel Time (min)	= 0.00	+	0.00	+
			0.00	= 0.00
Total Travel Time, Tc				34.90 min

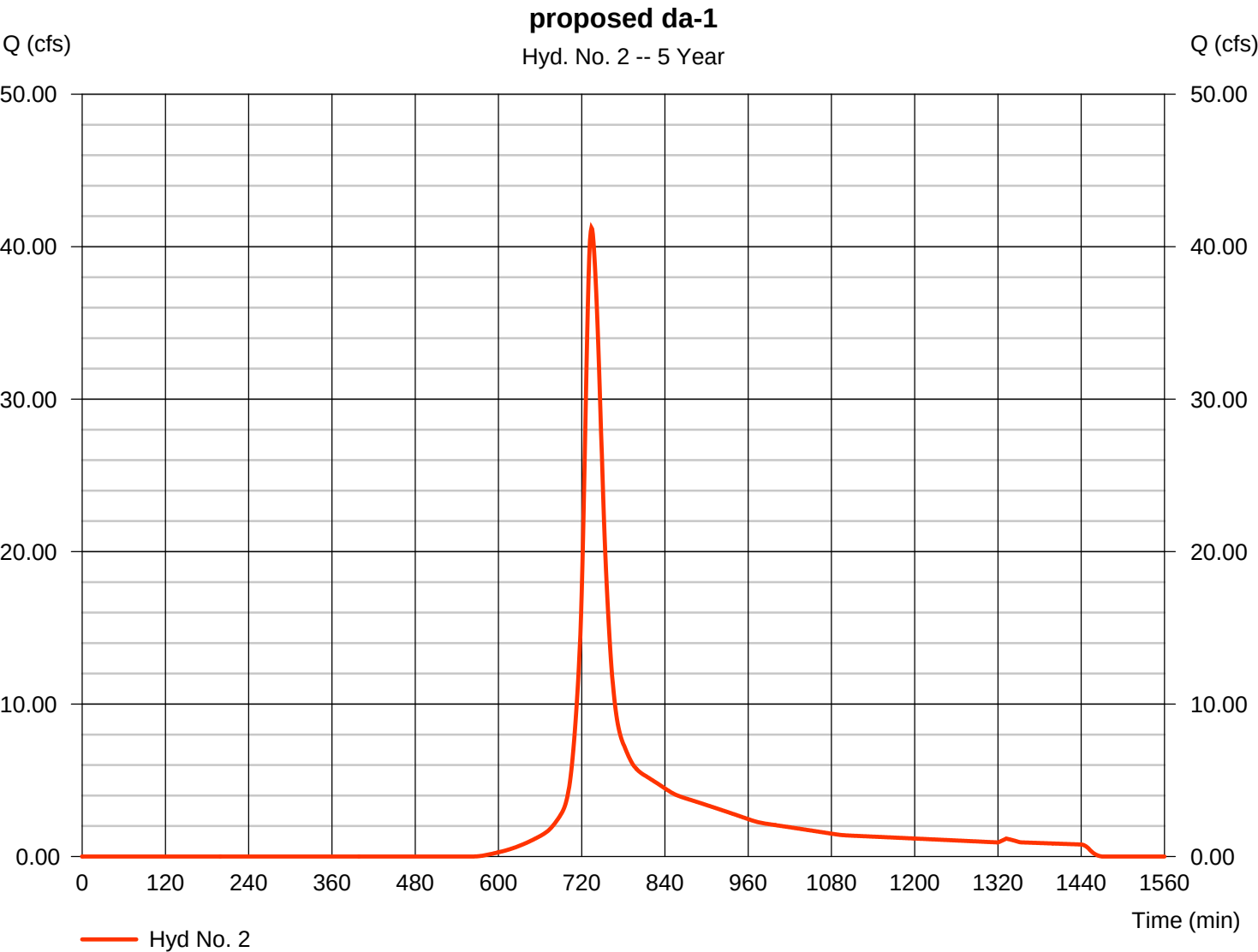
Hydrograph Report

Hyd. No. 2

proposed da-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	41.24 cfs
Storm frequency	=	5 yrs	Time to peak	=	734 min
Time interval	=	1 min	Hyd. volume	=	184,294 cuft
Drainage area	=	24.700 ac	Curve number	=	73*
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	19.30 min
Total precip.	=	4.71 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

* Composite (Area/CN) = [(16.650 x 61) + (8.050 x 98)] / 24.700



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No. 2

proposed da-1

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>			
Sheet Flow							
Manning's n-value	= 0.011	0.150	0.011				
Flow length (ft)	= 300.0	300.0	0.0				
Two-year 24-hr precip. (in)	= 3.62	3.62	0.00				
Land slope (%)	= 5.00	5.00	0.00				
Travel Time (min)	= 1.90	+	15.38	+	0.00	=	17.28
Shallow Concentrated Flow							
Flow length (ft)	= 0.00	0.00	0.00				
Watercourse slope (%)	= 0.00	0.00	0.00				
Surface description	= Paved	Paved	Paved				
Average velocity (ft/s)	=0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Channel Flow							
X sectional flow area (sqft)	= 1.76	0.00	0.00				
Wetted perimeter (ft)	= 4.71	0.00	0.00				
Channel slope (%)	= 0.50	0.00	0.00				
Manning's n-value	= 0.011	0.015	0.015				
Velocity (ft/s)	=4.95	0.00	0.00				
Flow length (ft)	600.0	0.0	0.0				
Travel Time (min)	= 2.02	+	0.00	+	0.00	=	2.02
Total Travel Time, Tc					19.30 min		

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

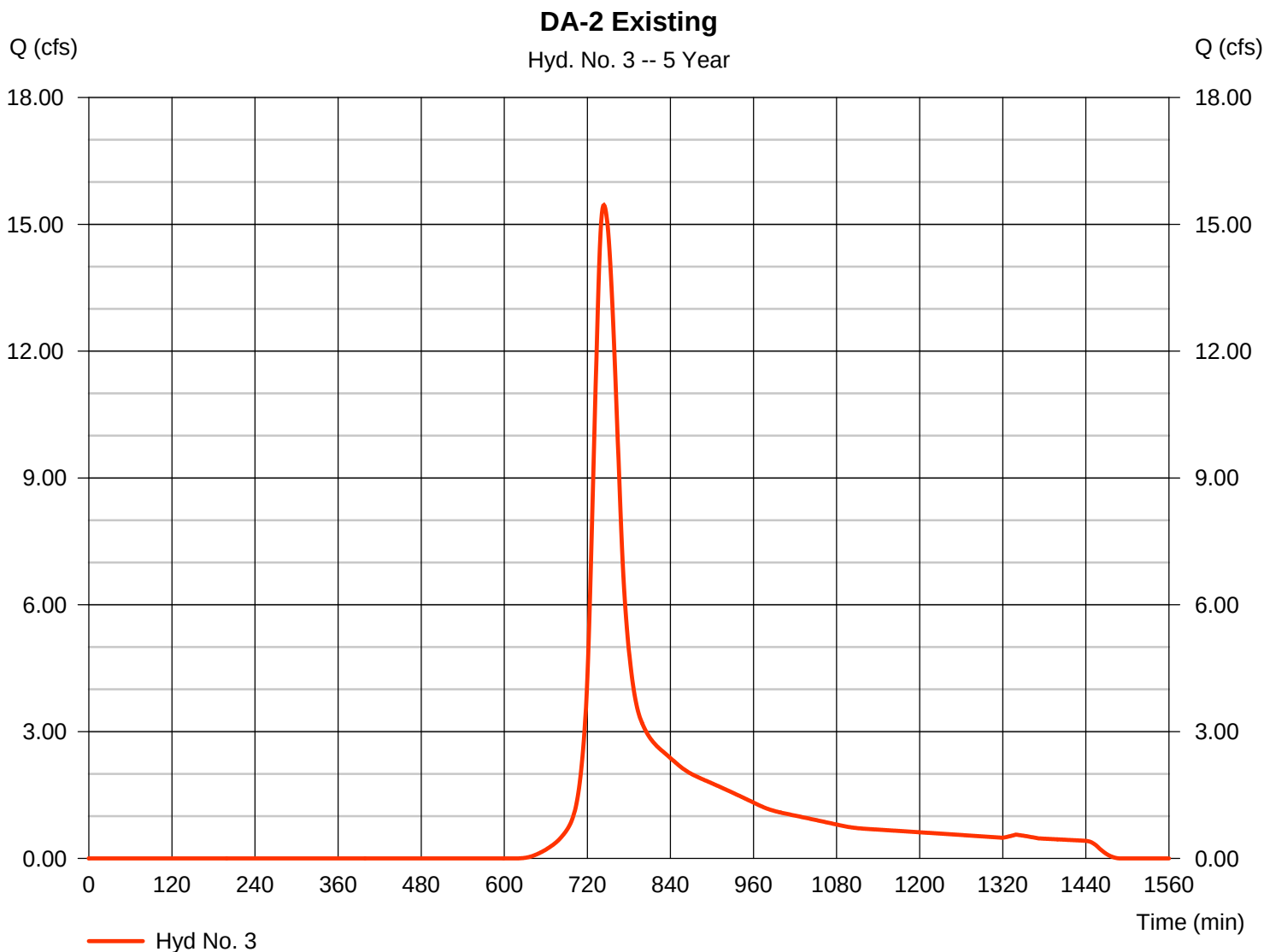
Thursday, 01 / 7 / 2021

Hyd. No. 3

DA-2 Existing

Hydrograph type = SCS Runoff
 Storm frequency = 5 yrs
 Time interval = 1 min
 Drainage area = 14.130 ac
 Basin Slope = 6.0 %
 Tc method = TR55
 Total precip. = 4.71 in
 Storm duration = 24 hrs

Peak discharge = 15.46 cfs
 Time to peak = 744 min
 Hyd. volume = 86,533 cuft
 Curve number = 68
 Hydraulic length = 300 ft
 Time of conc. (Tc) = 32.00 min
 Distribution = Type III
 Shape factor = 484



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No. 3

DA-2 Existing

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.400	0.011	0.011	
Flow length (ft)	= 300.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.62	0.00	0.00	
Land slope (%)	= 6.00	0.00	0.00	
Travel Time (min)	= 31.33	+ 0.00	+ 0.00	= 31.33
Shallow Concentrated Flow				
Flow length (ft)	= 250.00	0.00	0.00	
Watercourse slope (%)	= 13.00	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=5.82	0.00	0.00	
Travel Time (min)	= 0.72	+ 0.00	+ 0.00	= 0.72
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00	0.00	0.00	
Flow length (ft)	({0})0.0	0.0	0.0	
Travel Time (min)	= 0.00	+ 0.00	+ 0.00	= 0.00
Total Travel Time, Tc				32.00 min

Hydrograph Report

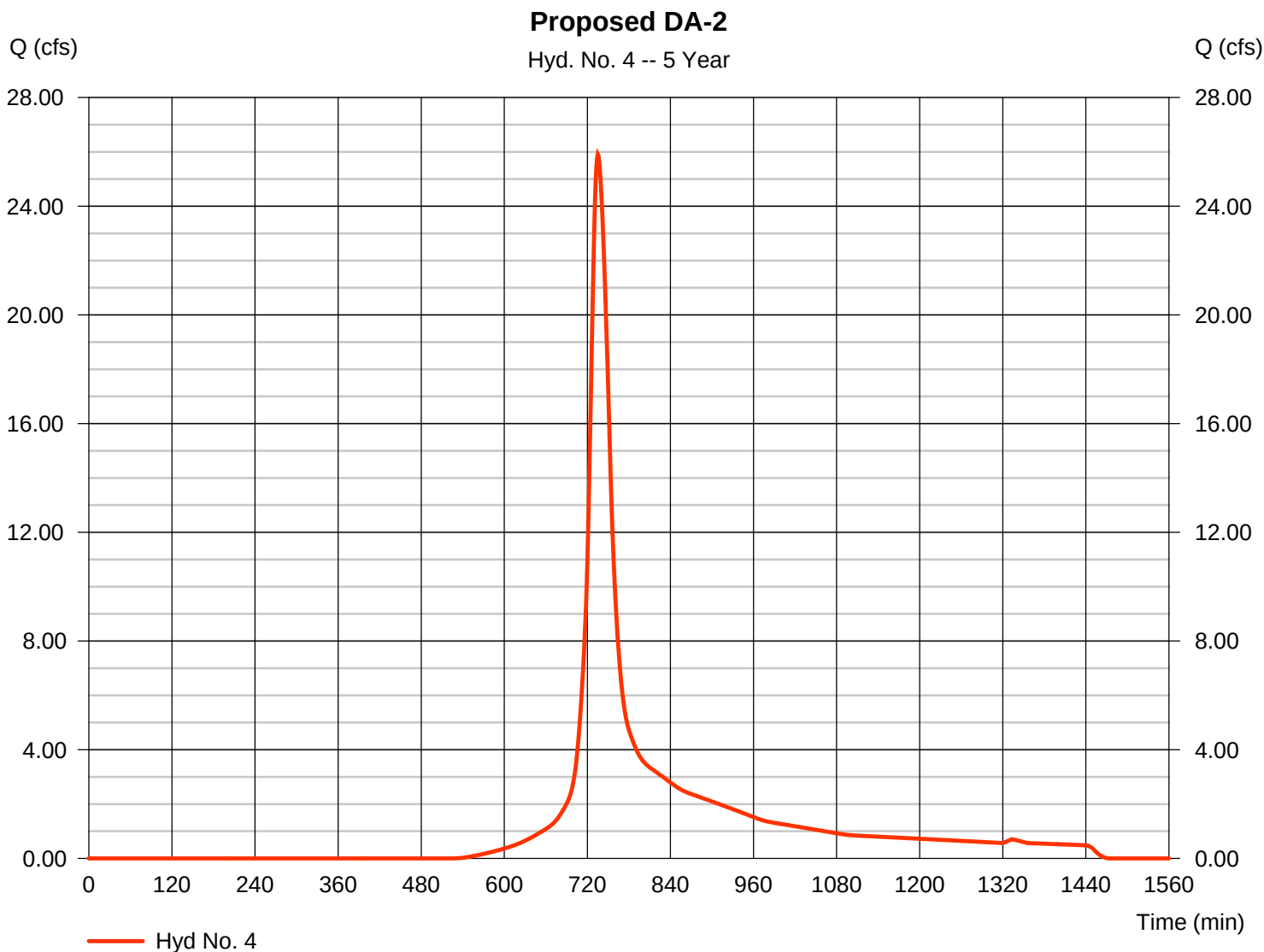
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

Hyd. No. 4

Proposed DA-2

Hydrograph type	= SCS Runoff	Peak discharge	= 25.91 cfs
Storm frequency	= 5 yrs	Time to peak	= 735 min
Time interval	= 1 min	Hyd. volume	= 119,034 cuft
Drainage area	= 14.130 ac	Curve number	= 76*
Basin Slope	= 6.0 %	Hydraulic length	= 300 ft
Tc method	= TR55	Time of conc. (Tc)	= 21.60 min
Total precip.	= 4.71 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(5.839 \times 98) + (8.290 \times 61)] / 14.130$ 

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No. 4

Proposed DA-2

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>			
Sheet Flow							
Manning's n-value	= 0.011	0.150	0.011				
Flow length (ft)	= 300.0	300.0	0.0				
Two-year 24-hr precip. (in)	= 3.62	3.62	0.00				
Land slope (%)	= 5.00	5.00	0.00				
Travel Time (min)	= 1.90	+	15.38	+	0.00	=	17.28
Shallow Concentrated Flow							
Flow length (ft)	= 0.00	0.00	0.00				
Watercourse slope (%)	= 0.00	0.00	0.00				
Surface description	= Paved	Paved	Paved				
Average velocity (ft/s)	=0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Channel Flow							
X sectional flow area (sqft)	= 1.76	0.00	0.00				
Wetted perimeter (ft)	= 4.71	0.00	0.00				
Channel slope (%)	= 0.50	0.00	0.00				
Manning's n-value	= 0.011	0.015	0.015				
Velocity (ft/s)	=4.95	0.00	0.00				
Flow length (ft)	(0)1287.0	0.0	0.0				
Travel Time (min)	= 4.33	+	0.00	+	0.00	=	4.33
Total Travel Time, Tc					21.60 min		

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

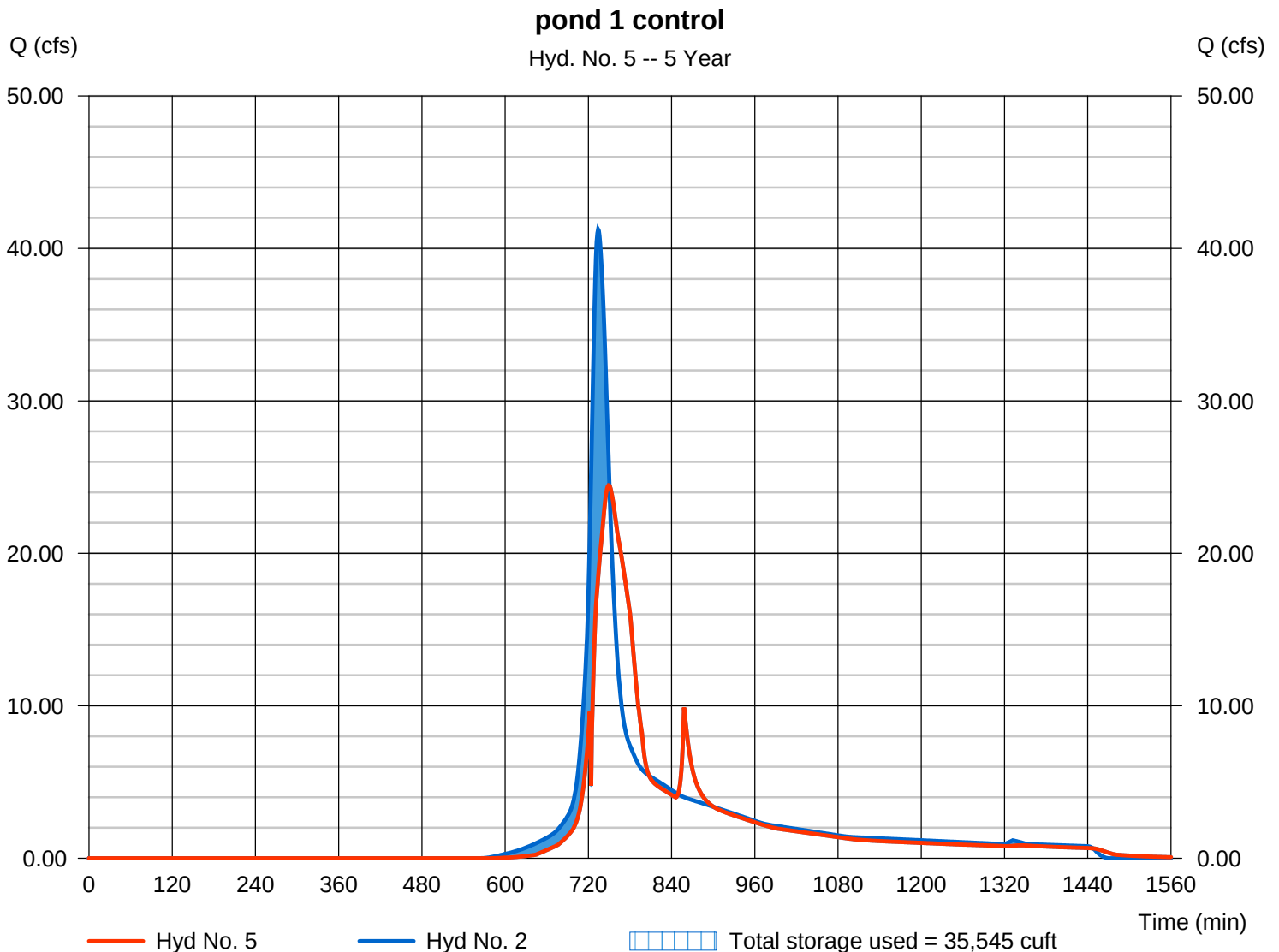
Thursday, 01 / 7 / 2021

Hyd. No. 5

pond 1 control

Hydrograph type	= Reservoir	Peak discharge	= 24.47 cfs
Storm frequency	= 5 yrs	Time to peak	= 749 min
Time interval	= 1 min	Hyd. volume	= 166,029 cuft
Inflow hyd. No.	= 2 - proposed da-1	Max. Elevation	= 654.67 ft
Reservoir name	= pond 1	Max. Storage	= 35,545 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

Pond No. 1 - pond 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 650.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	650.00	5,918	0	0
2.00	652.00	7,279	13,172	13,172
4.00	654.00	8,754	16,009	29,181
6.00	656.00	10,344	19,074	48,255
8.00	658.00	12,048	22,368	70,623
10.00	660.00	13,856	25,880	96,503

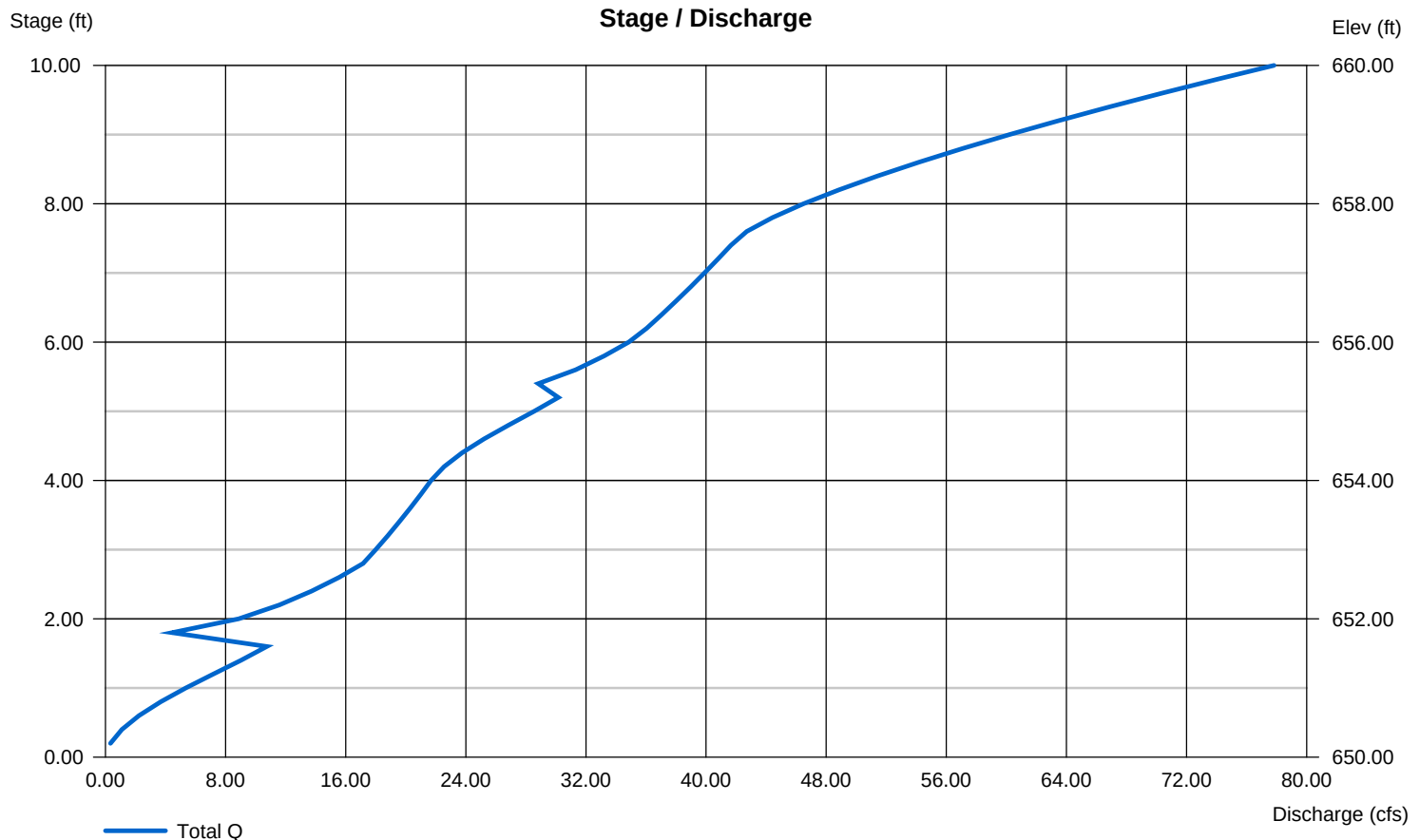
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	21.00	15.50	0.00
Span (in)	= 0.00	21.00	15.50	0.00
No. Barrels	= 0	1	1	0
Invert El. (ft)	= 0.00	650.00	654.00	0.00
Length (ft)	= 0.00	0.50	0.50	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	2.00	0.00	0.00
Crest El. (ft)	= 0.00	657.50	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	Rect	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 6.000 (by Contour)			
TW Elev. (ft)	= 0.00			

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



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

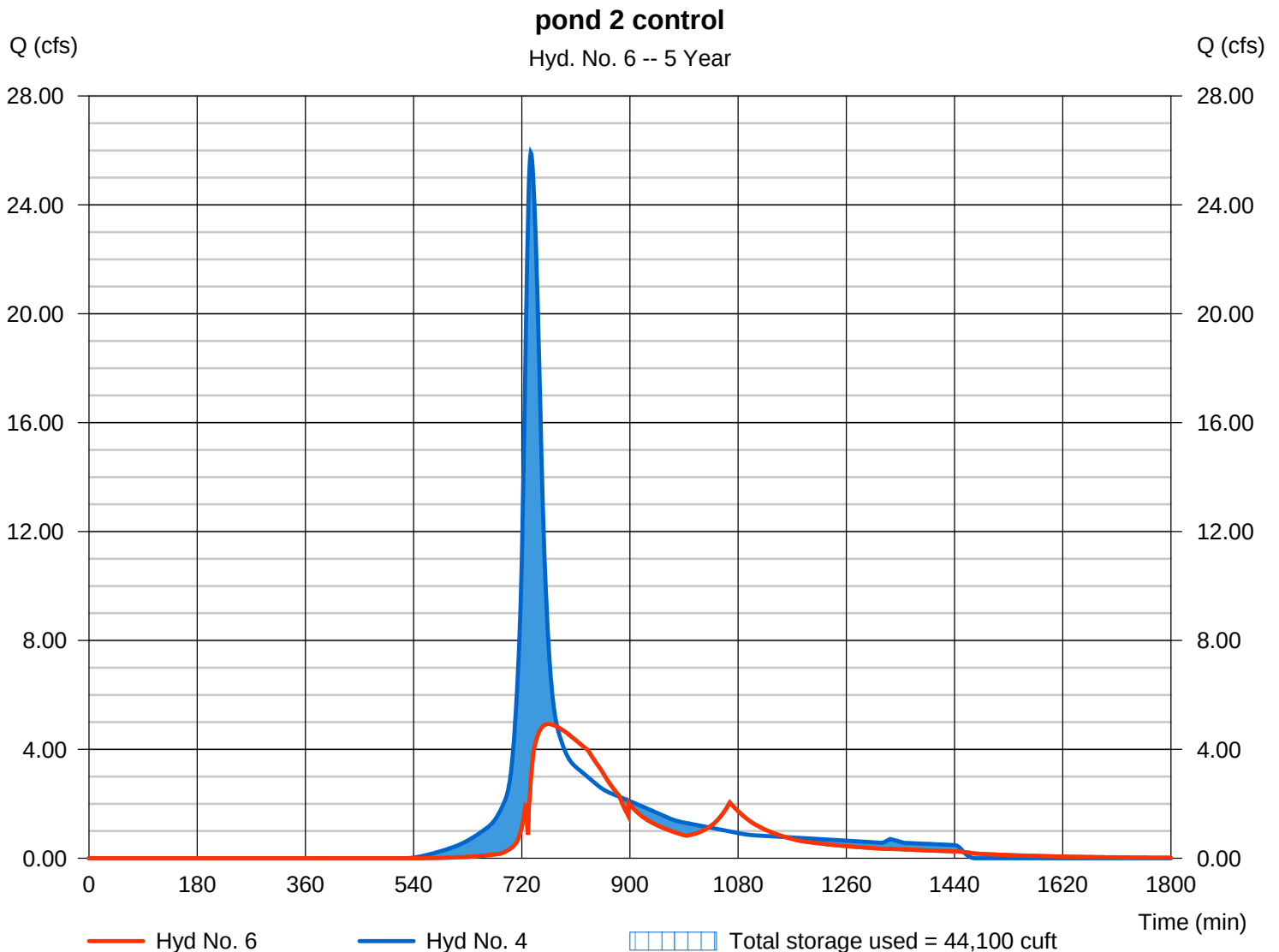
Thursday, 01 / 7 / 2021

Hyd. No. 6

pond 2 control

Hydrograph type	= Reservoir	Peak discharge	= 4.933 cfs
Storm frequency	= 5 yrs	Time to peak	= 764 min
Time interval	= 1 min	Hyd. volume	= 68,776 cuft
Inflow hyd. No.	= 4 - Proposed DA-2	Max. Elevation	= 692.20 ft
Reservoir name	= pond 2	Max. Storage	= 44,100 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

Pond No. 2 - pond 2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 690.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	690.00	18,677	0	0
2.00	692.00	20,975	39,626	39,626
4.00	694.00	23,406	44,354	83,980
6.00	696.00	25,972	49,351	133,331

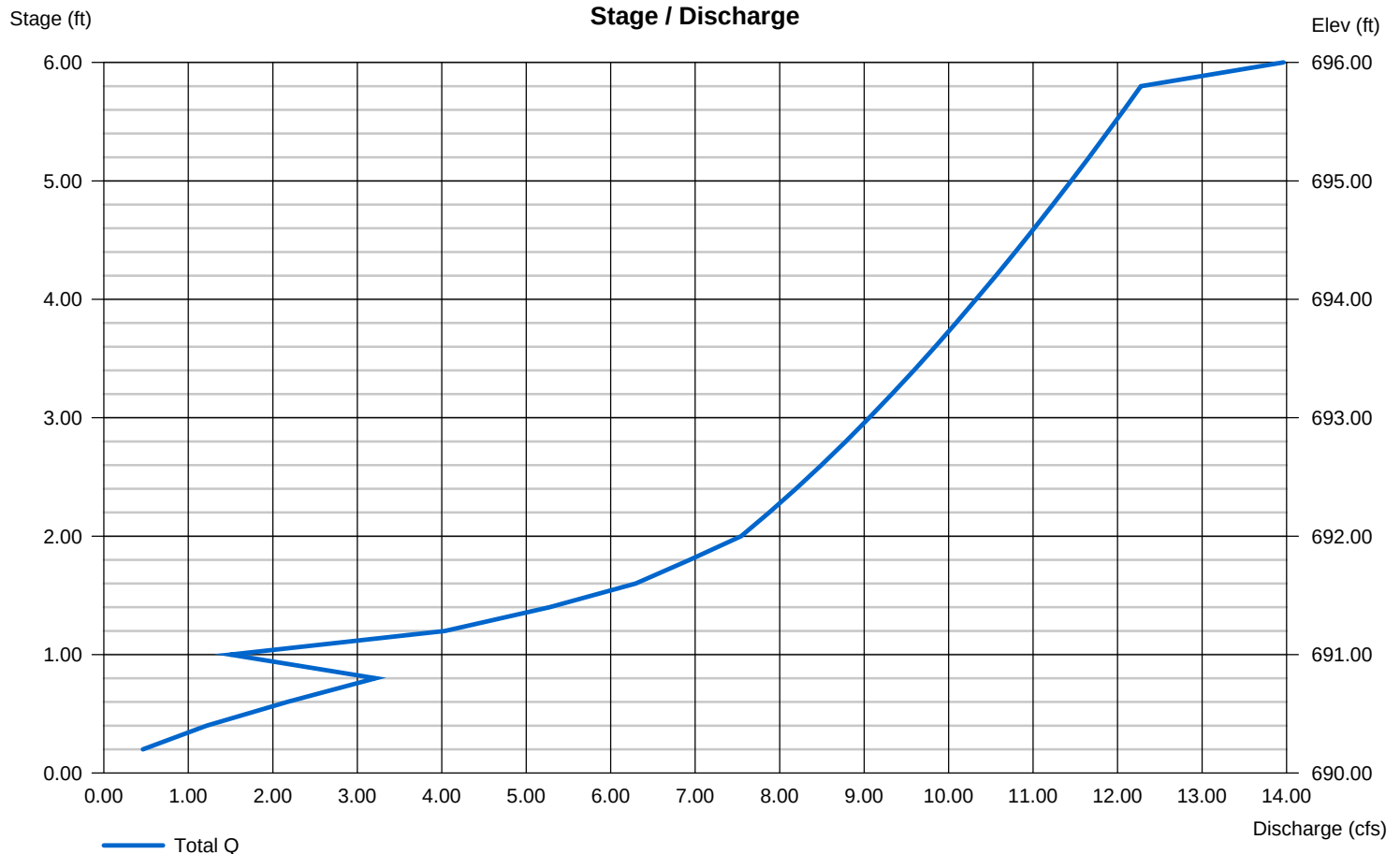
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	12.00	0.00	0.00
Span (in)	= 0.00	12.00	0.00	0.00
No. Barrels	= 0	1	0	0
Invert El. (ft)	= 0.00	690.00	0.00	0.00
Length (ft)	= 0.00	0.50	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	5.00	0.00	0.00
Crest El. (ft)	= 0.00	695.80	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	Rect	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 6.000 (by Contour)			
TW Elev. (ft)	= 0.00			

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



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

Hyd. No. 1

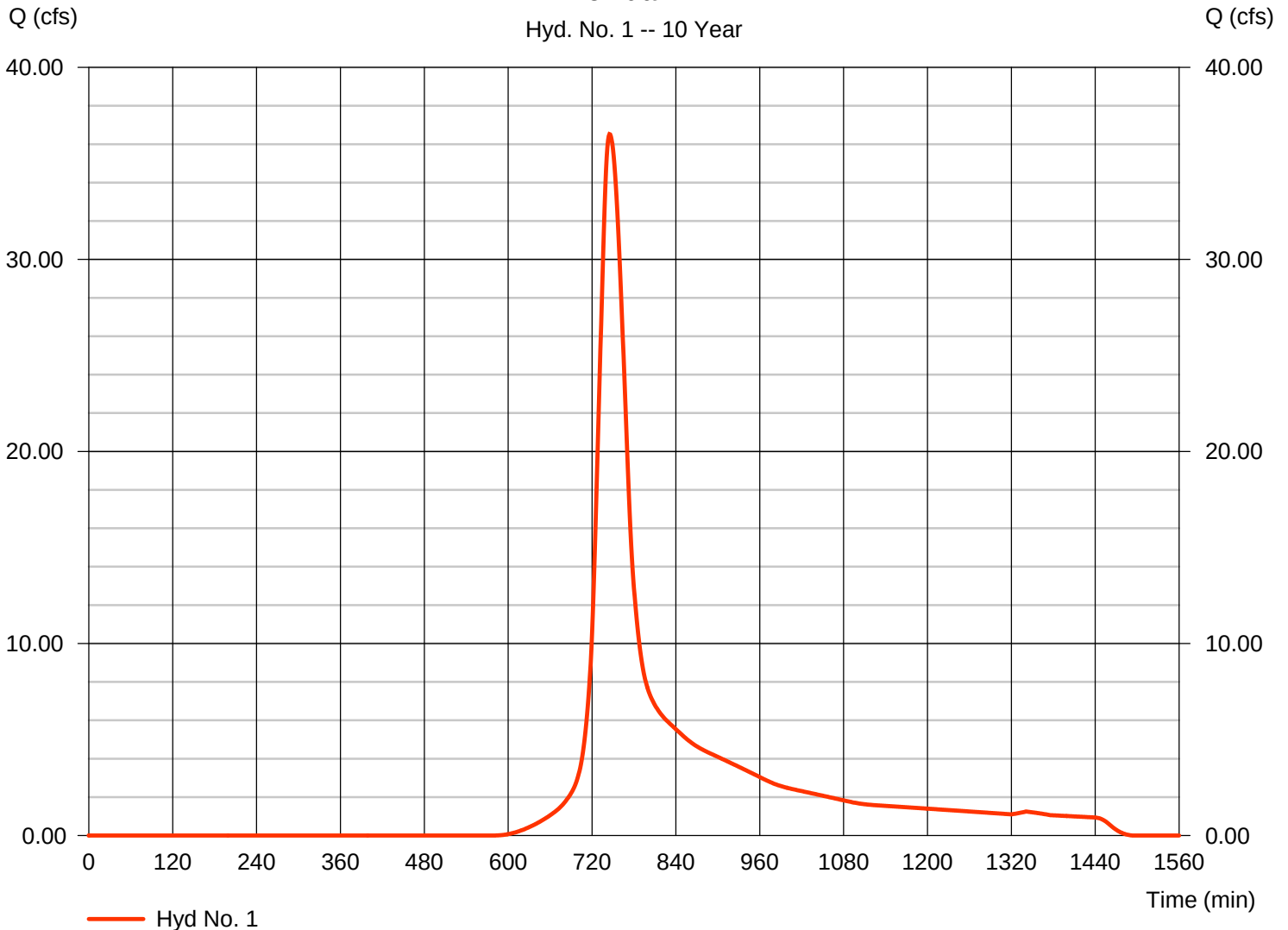
ex da-1

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 24.700 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 5.62 in
 Storm duration = 24 hrs

Peak discharge = 36.52 cfs
 Time to peak = 745 min
 Hyd. volume = 209,149 cuft
 Curve number = 68
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 34.90 min
 Distribution = Type III
 Shape factor = 484

ex da-1

Hyd. No. 1 -- 10 Year



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

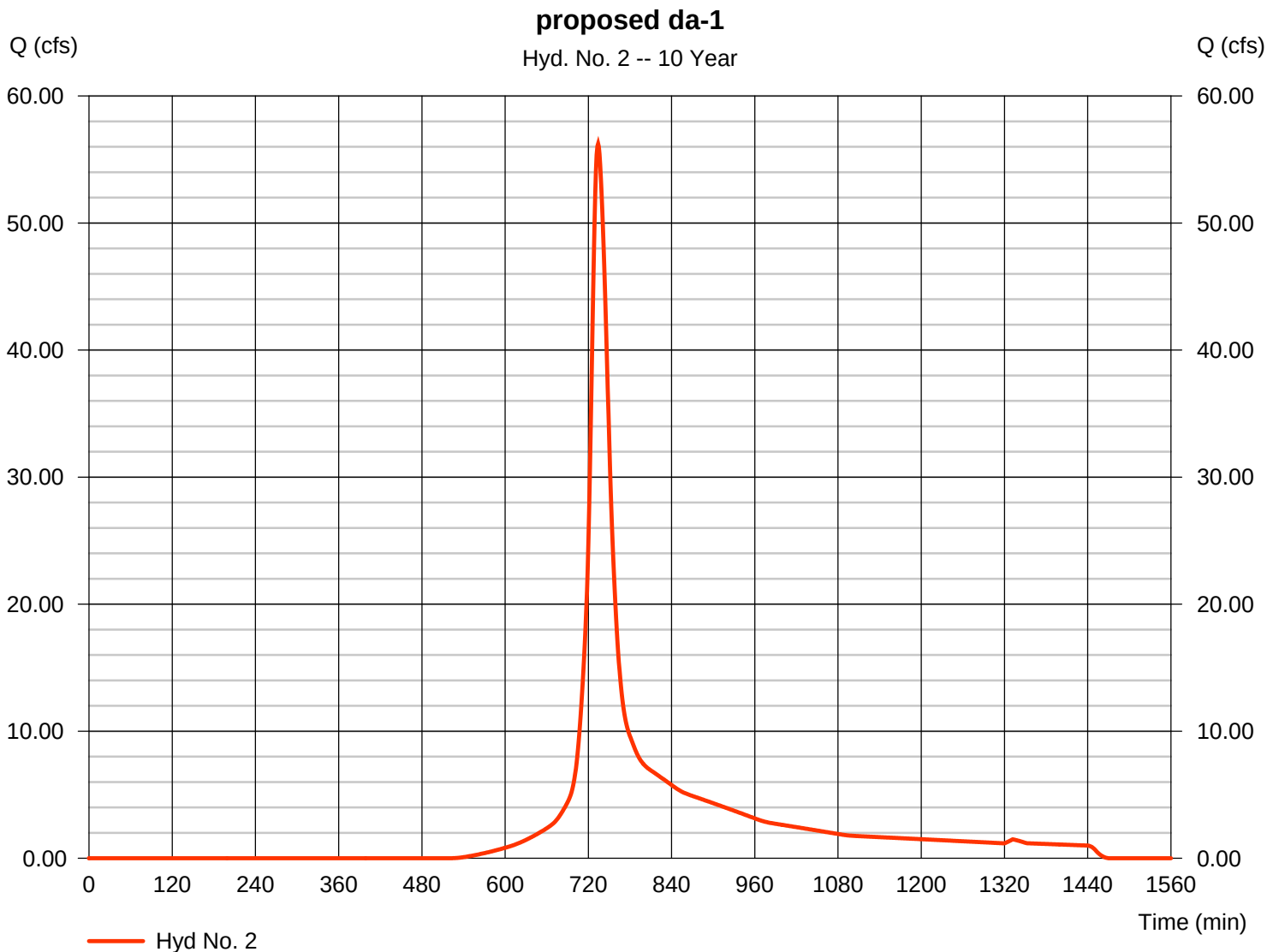
Hyd. No. 2

proposed da-1

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 24.700 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 5.62 in
 Storm duration = 24 hrs

Peak discharge = 56.24 cfs
 Time to peak = 734 min
 Hyd. volume = 248,920 cuft
 Curve number = 73*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 19.30 min
 Distribution = Type III
 Shape factor = 484

* Composite (Area/CN) = $[(16.650 \times 61) + (8.050 \times 98)] / 24.700$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

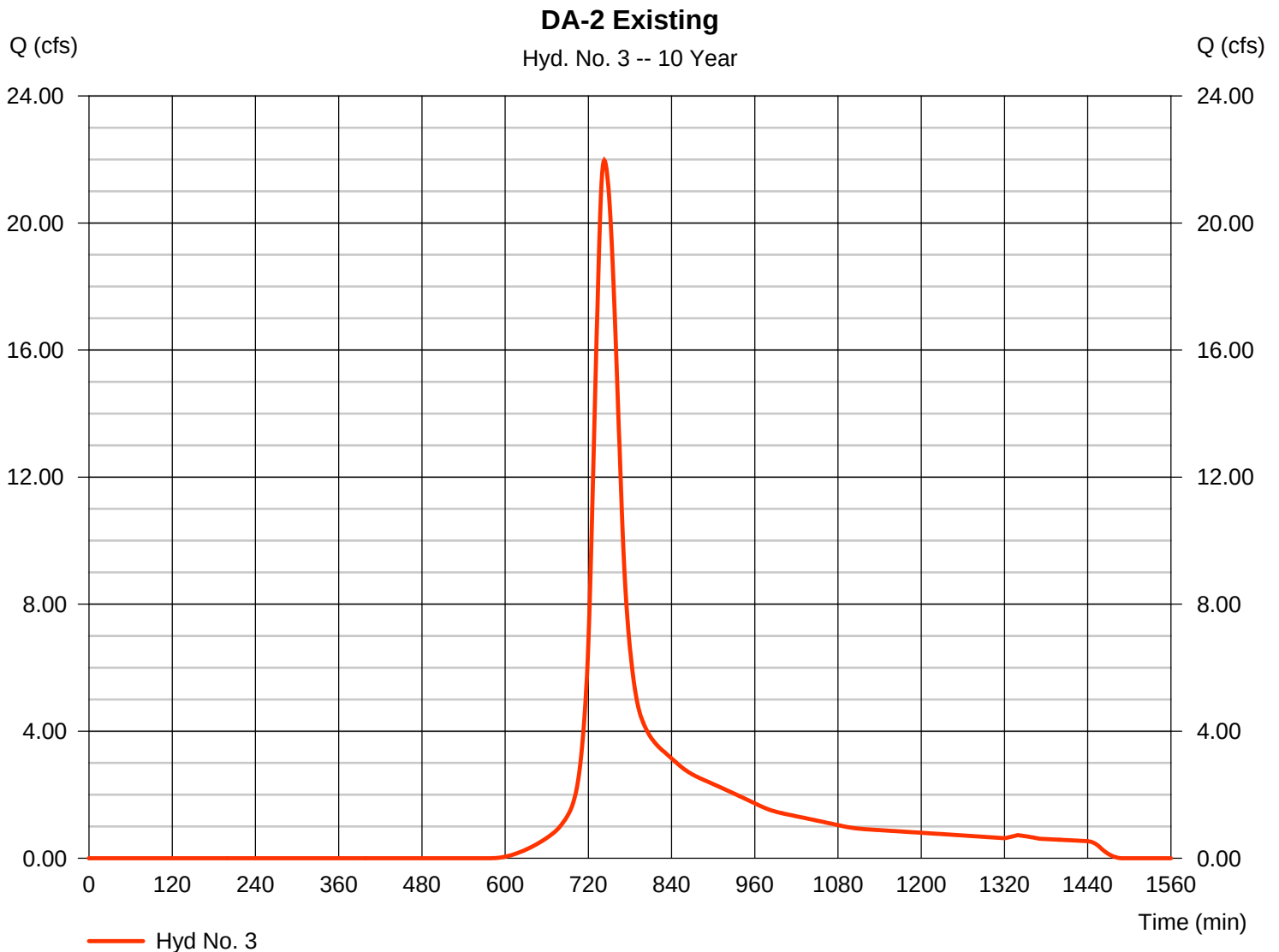
Thursday, 01 / 7 / 2021

Hyd. No. 3

DA-2 Existing

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 14.130 ac
 Basin Slope = 6.0 %
 Tc method = TR55
 Total precip. = 5.62 in
 Storm duration = 24 hrs

Peak discharge = 21.98 cfs
 Time to peak = 743 min
 Hyd. volume = 120,434 cuft
 Curve number = 68
 Hydraulic length = 300 ft
 Time of conc. (Tc) = 32.00 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

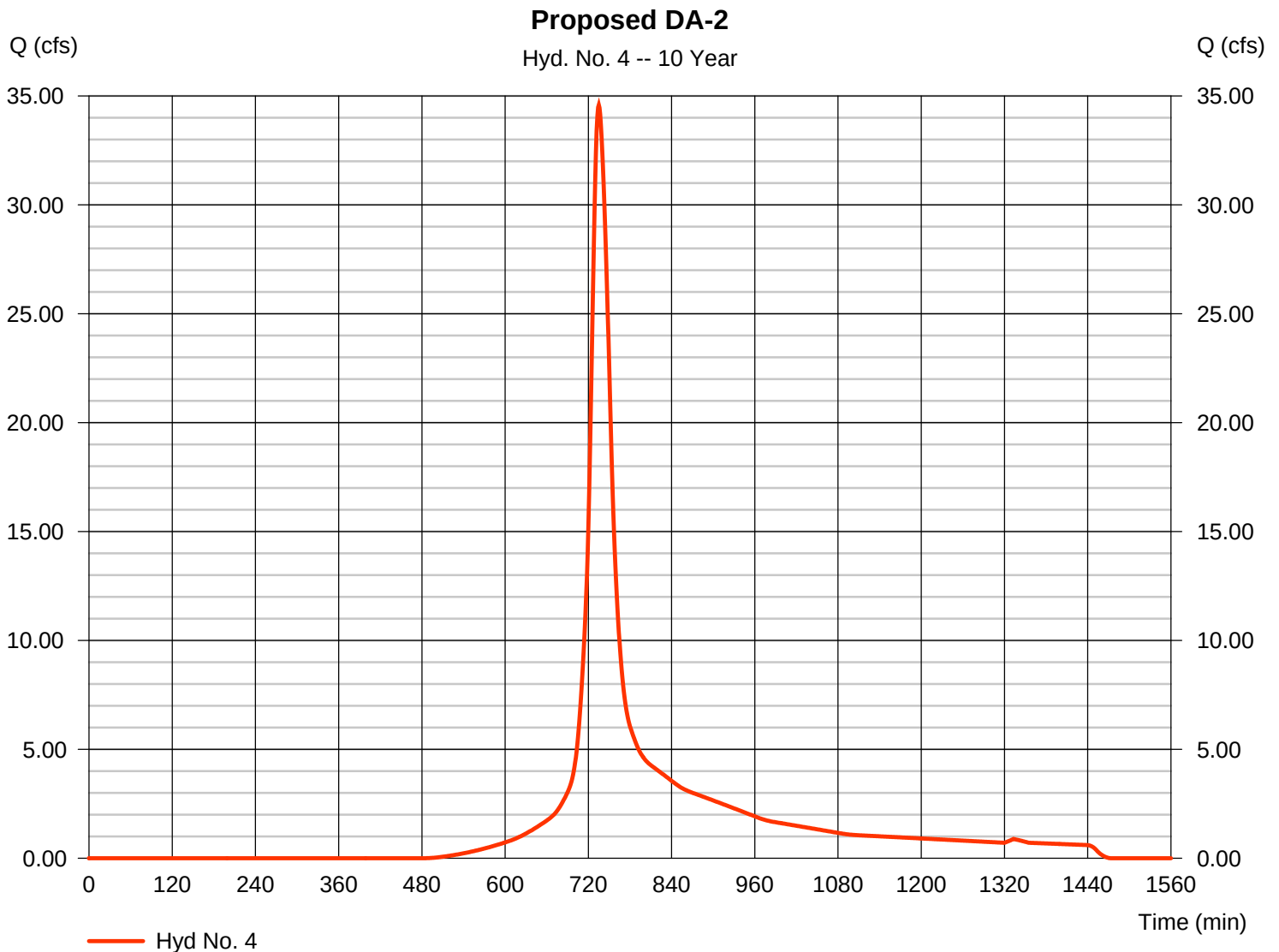
Hyd. No. 4

Proposed DA-2

Hydrograph type = SCS Runoff
 Storm frequency = 10 yrs
 Time interval = 1 min
 Drainage area = 14.130 ac
 Basin Slope = 6.0 %
 Tc method = TR55
 Total precip. = 5.62 in
 Storm duration = 24 hrs

Peak discharge = 34.59 cfs
 Time to peak = 735 min
 Hyd. volume = 158,187 cuft
 Curve number = 76*
 Hydraulic length = 300 ft
 Time of conc. (Tc) = 21.60 min
 Distribution = Type III
 Shape factor = 484

* Composite (Area/CN) = $[(5.839 \times 98) + (8.290 \times 61)] / 14.130$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

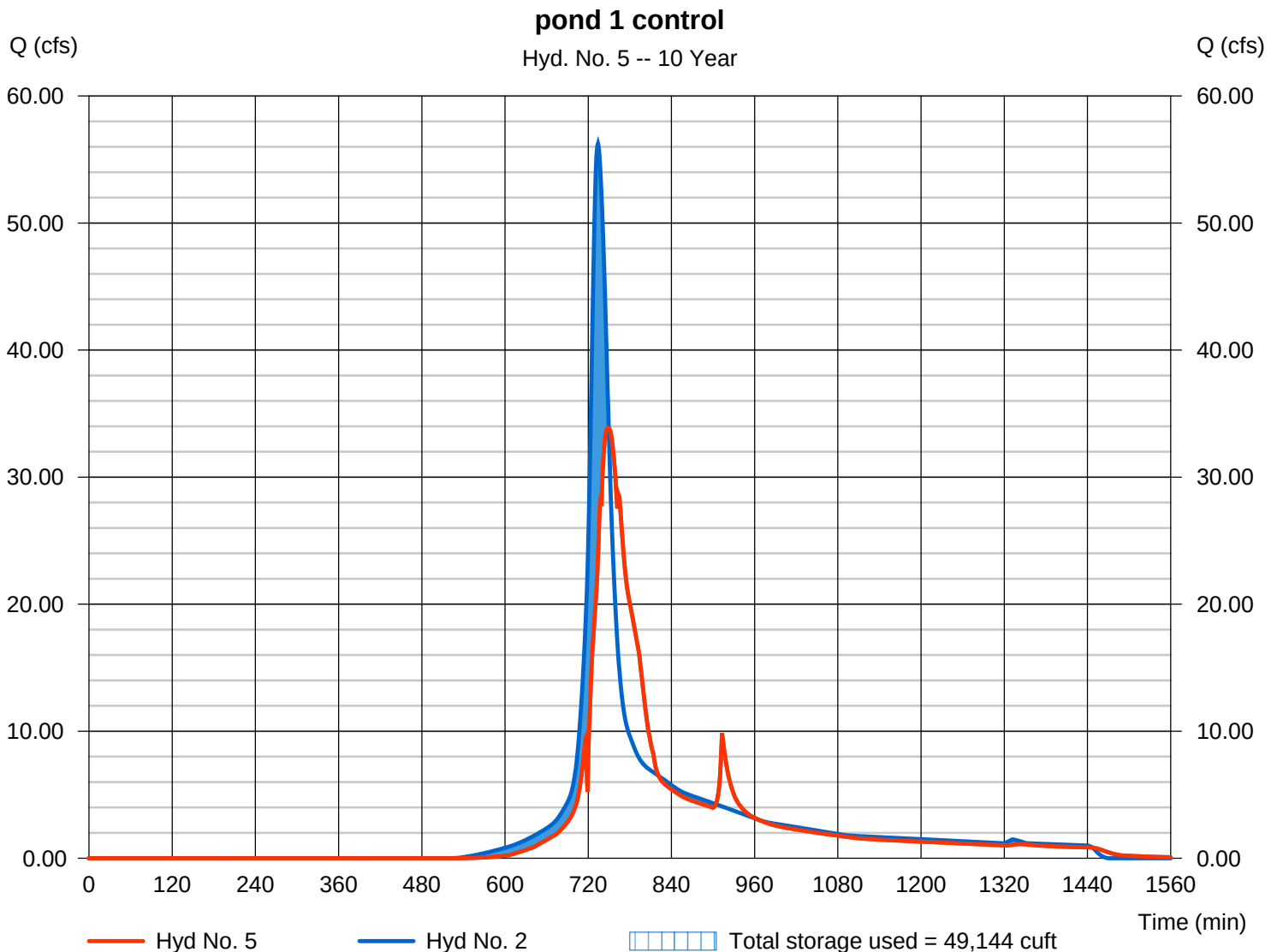
Thursday, 01 / 7 / 2021

Hyd. No. 5

pond 1 control

Hydrograph type	= Reservoir	Peak discharge	= 33.88 cfs
Storm frequency	= 10 yrs	Time to peak	= 749 min
Time interval	= 1 min	Hyd. volume	= 227,113 cuft
Inflow hyd. No.	= 2 - proposed da-1	Max. Elevation	= 656.08 ft
Reservoir name	= pond 1	Max. Storage	= 49,144 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

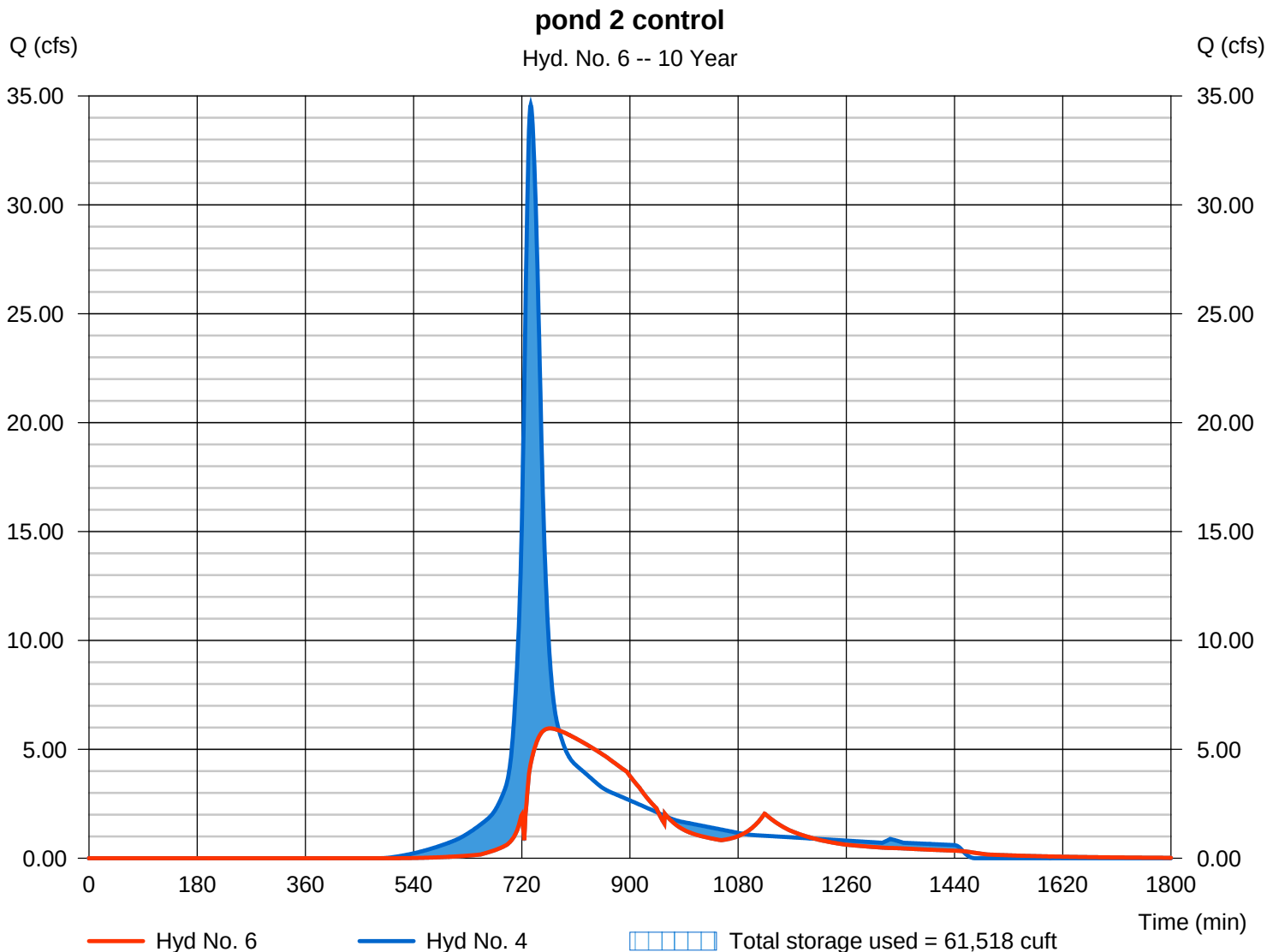
Thursday, 01 / 7 / 2021

Hyd. No. 6

pond 2 control

Hydrograph type	= Reservoir	Peak discharge	= 5.963 cfs
Storm frequency	= 10 yrs	Time to peak	= 767 min
Time interval	= 1 min	Hyd. volume	= 94,639 cuft
Inflow hyd. No.	= 4 - Proposed DA-2	Max. Elevation	= 692.99 ft
Reservoir name	= pond 2	Max. Storage	= 61,518 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

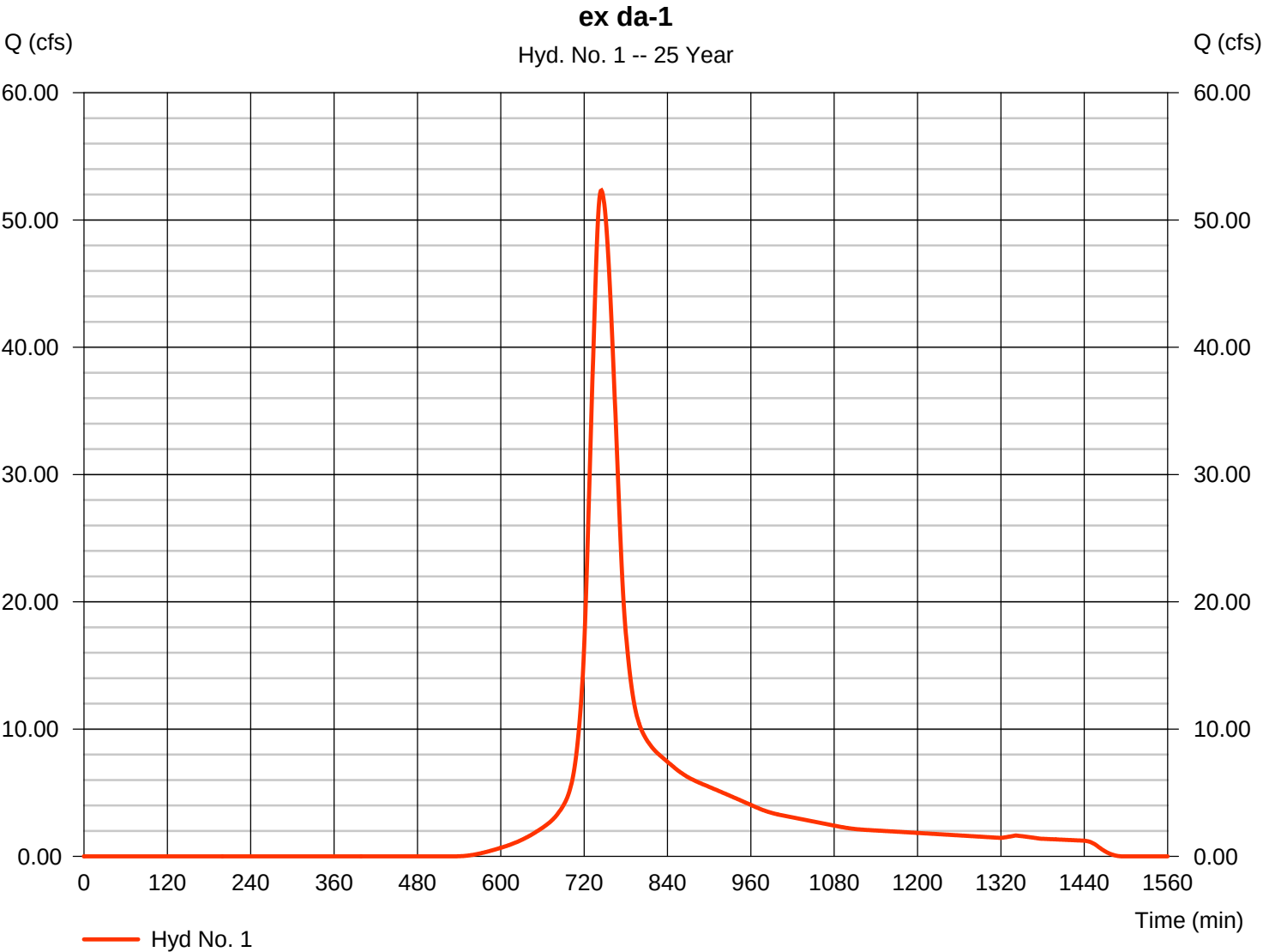
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

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Hyd. No. 1

ex da-1

Hydrograph type	=	SCS Runoff	Peak discharge	=	52.33 cfs
Storm frequency	=	25 yrs	Time to peak	=	745 min
Time interval	=	1 min	Hyd. volume	=	295,636 cuft
Drainage area	=	24.700 ac	Curve number	=	68
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	34.90 min
Total precip.	=	6.86 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

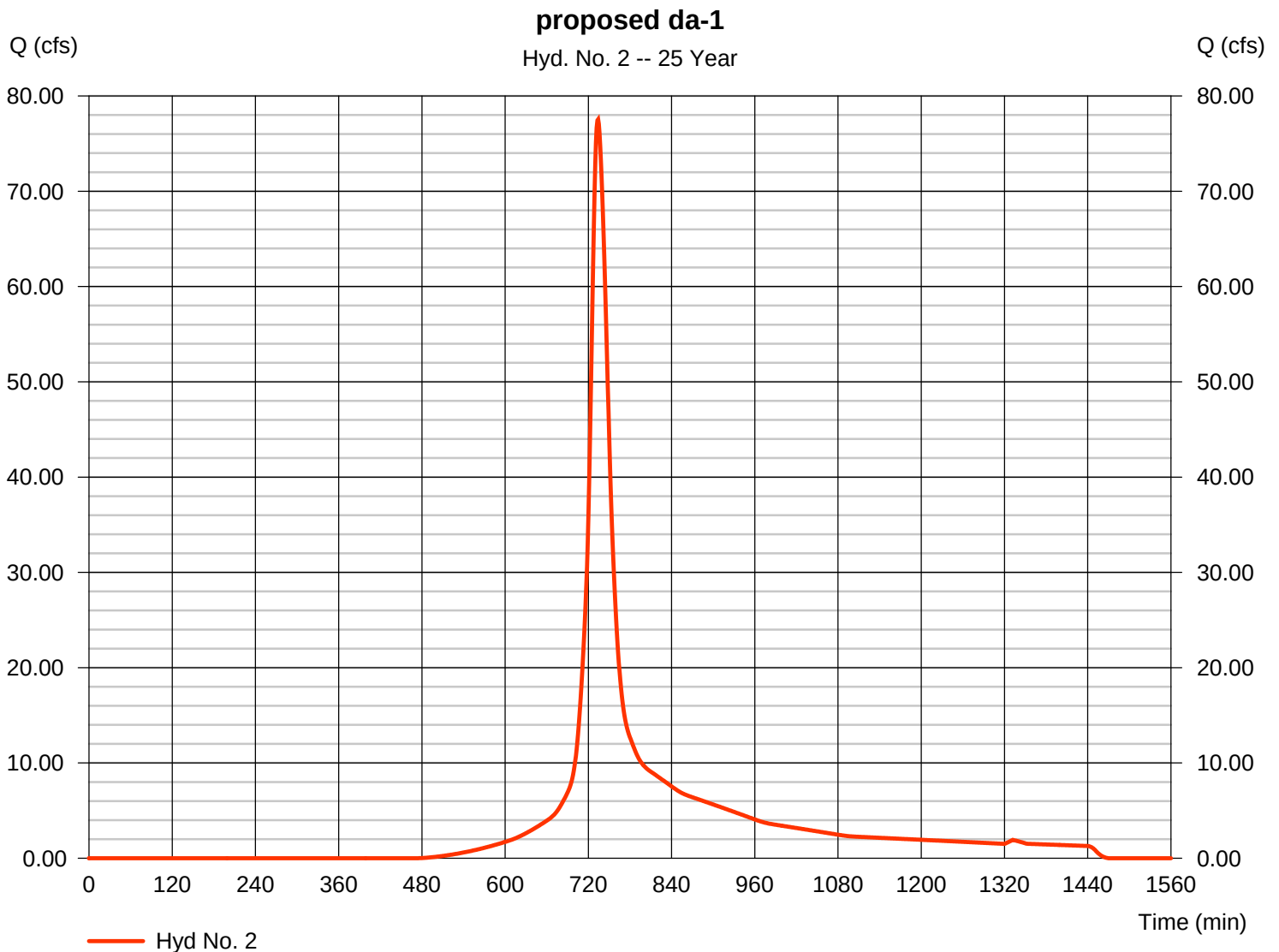
Hyd. No. 2

proposed da-1

Hydrograph type = SCS Runoff
 Storm frequency = 25 yrs
 Time interval = 1 min
 Drainage area = 24.700 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 6.86 in
 Storm duration = 24 hrs

Peak discharge = 77.54 cfs
 Time to peak = 734 min
 Hyd. volume = 342,044 cuft
 Curve number = 73*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 19.30 min
 Distribution = Type III
 Shape factor = 484

* Composite (Area/CN) = $[(16.650 \times 61) + (8.050 \times 98)] / 24.700$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

Hyd. No. 3

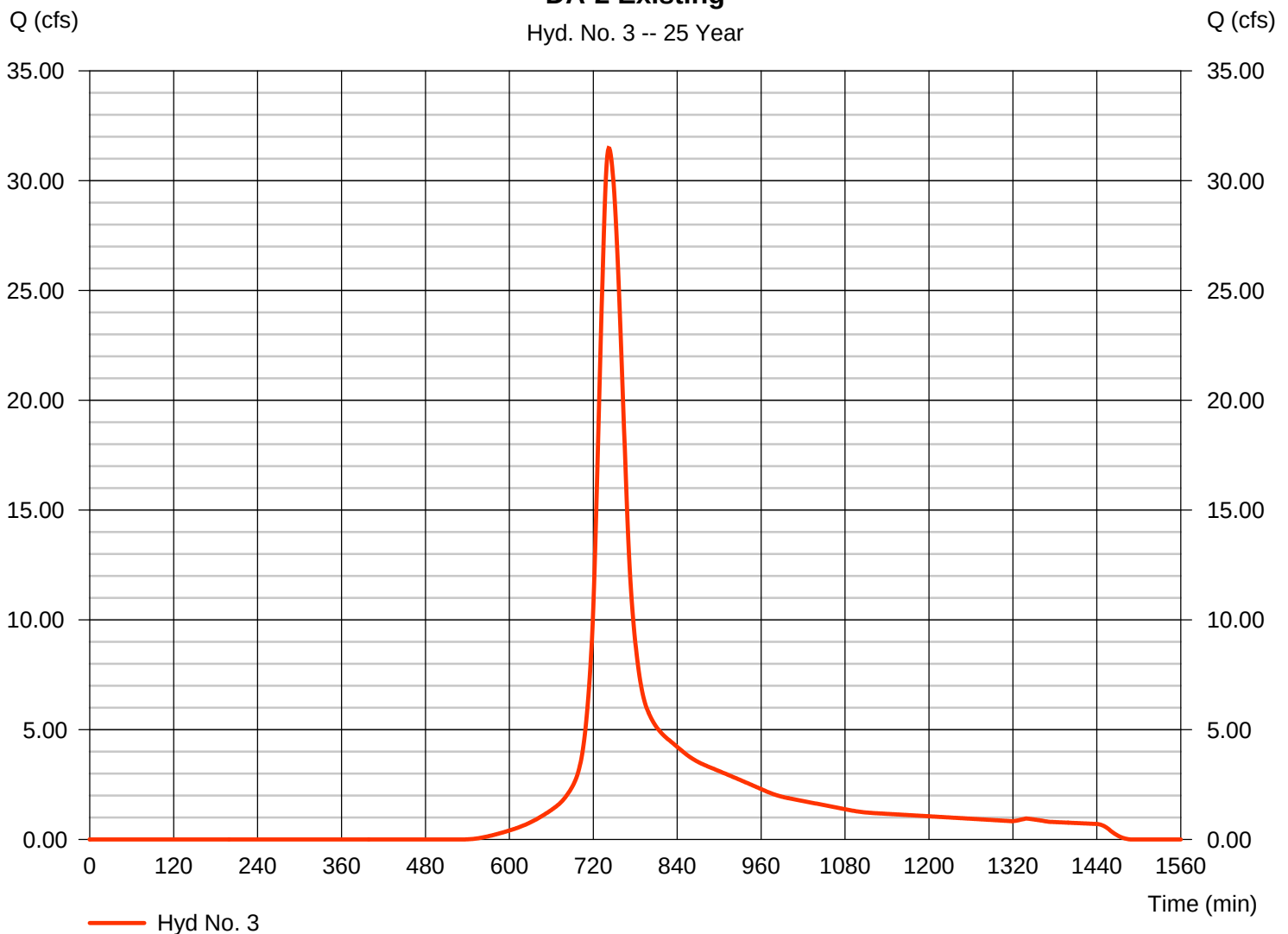
DA-2 Existing

Hydrograph type = SCS Runoff
 Storm frequency = 25 yrs
 Time interval = 1 min
 Drainage area = 14.130 ac
 Basin Slope = 6.0 %
 Tc method = TR55
 Total precip. = 6.86 in
 Storm duration = 24 hrs

Peak discharge = 31.48 cfs
 Time to peak = 742 min
 Hyd. volume = 170,236 cuft
 Curve number = 68
 Hydraulic length = 300 ft
 Time of conc. (Tc) = 32.00 min
 Distribution = Type III
 Shape factor = 484

DA-2 Existing

Hyd. No. 3 -- 25 Year



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

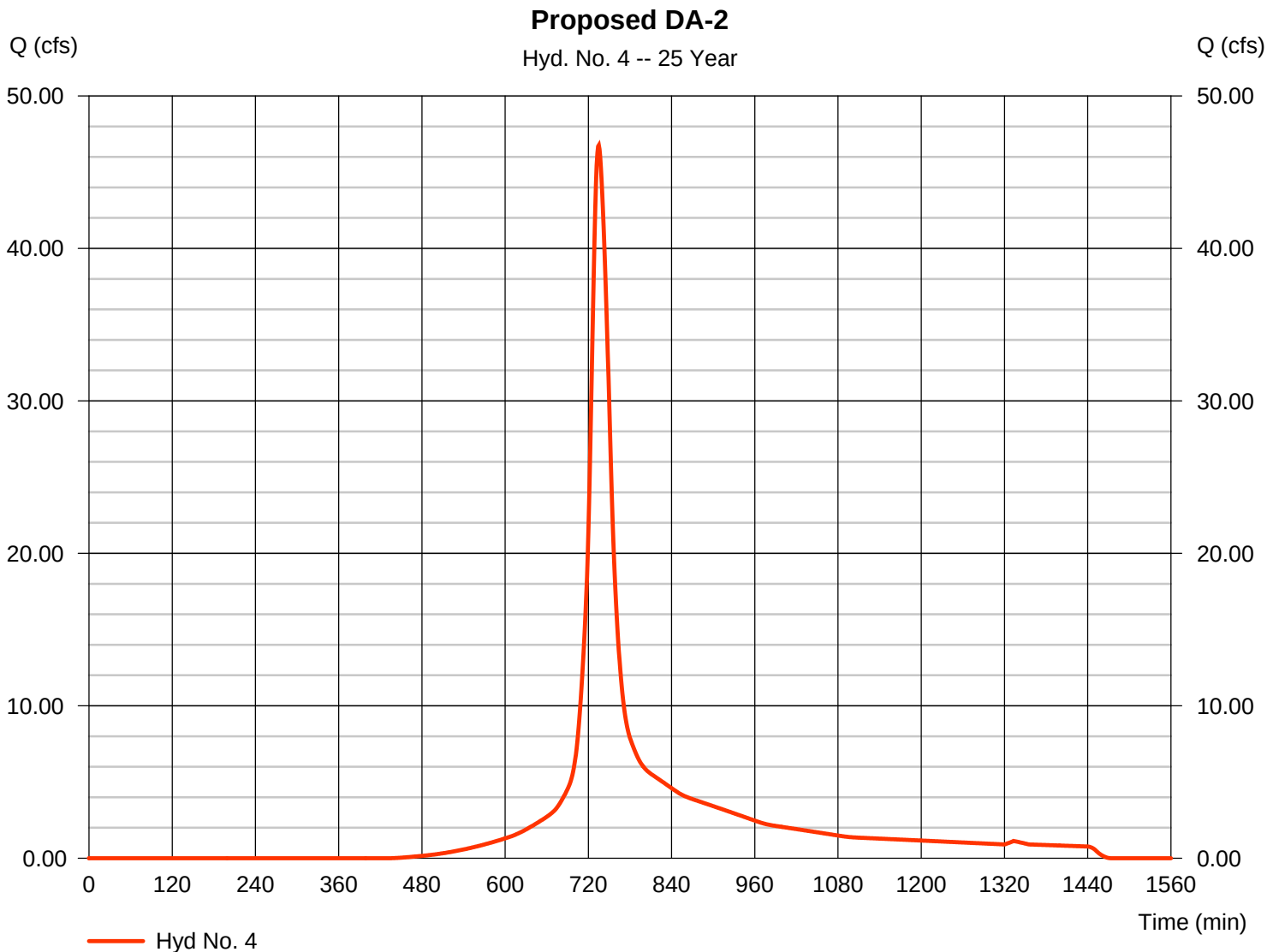
Hyd. No. 4

Proposed DA-2

Hydrograph type = SCS Runoff
 Storm frequency = 25 yrs
 Time interval = 1 min
 Drainage area = 14.130 ac
 Basin Slope = 6.0 %
 Tc method = TR55
 Total precip. = 6.86 in
 Storm duration = 24 hrs

Peak discharge = 46.76 cfs
 Time to peak = 735 min
 Hyd. volume = 214,026 cuft
 Curve number = 76*
 Hydraulic length = 300 ft
 Time of conc. (Tc) = 21.60 min
 Distribution = Type III
 Shape factor = 484

* Composite (Area/CN) = $[(5.839 \times 98) + (8.290 \times 61)] / 14.130$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

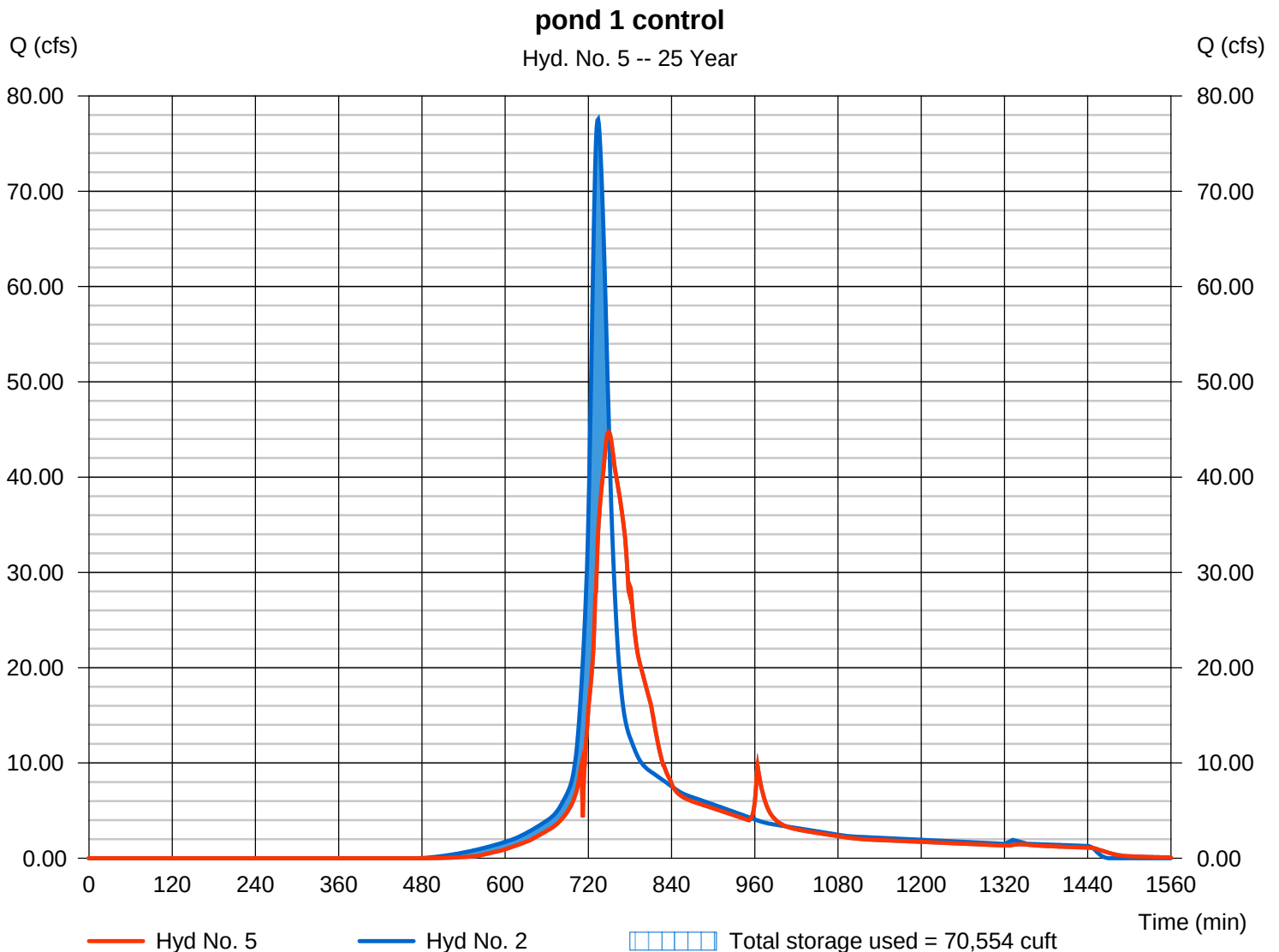
Hyd. No. 5

pond 1 control

Hydrograph type = Reservoir
 Storm frequency = 25 yrs
 Time interval = 1 min
 Inflow hyd. No. = 2 - proposed da-1
 Reservoir name = pond 1

Peak discharge = 44.76 cfs
 Time to peak = 749 min
 Hyd. volume = 315,550 cuft
 Max. Elevation = 658.00 ft
 Max. Storage = 70,554 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

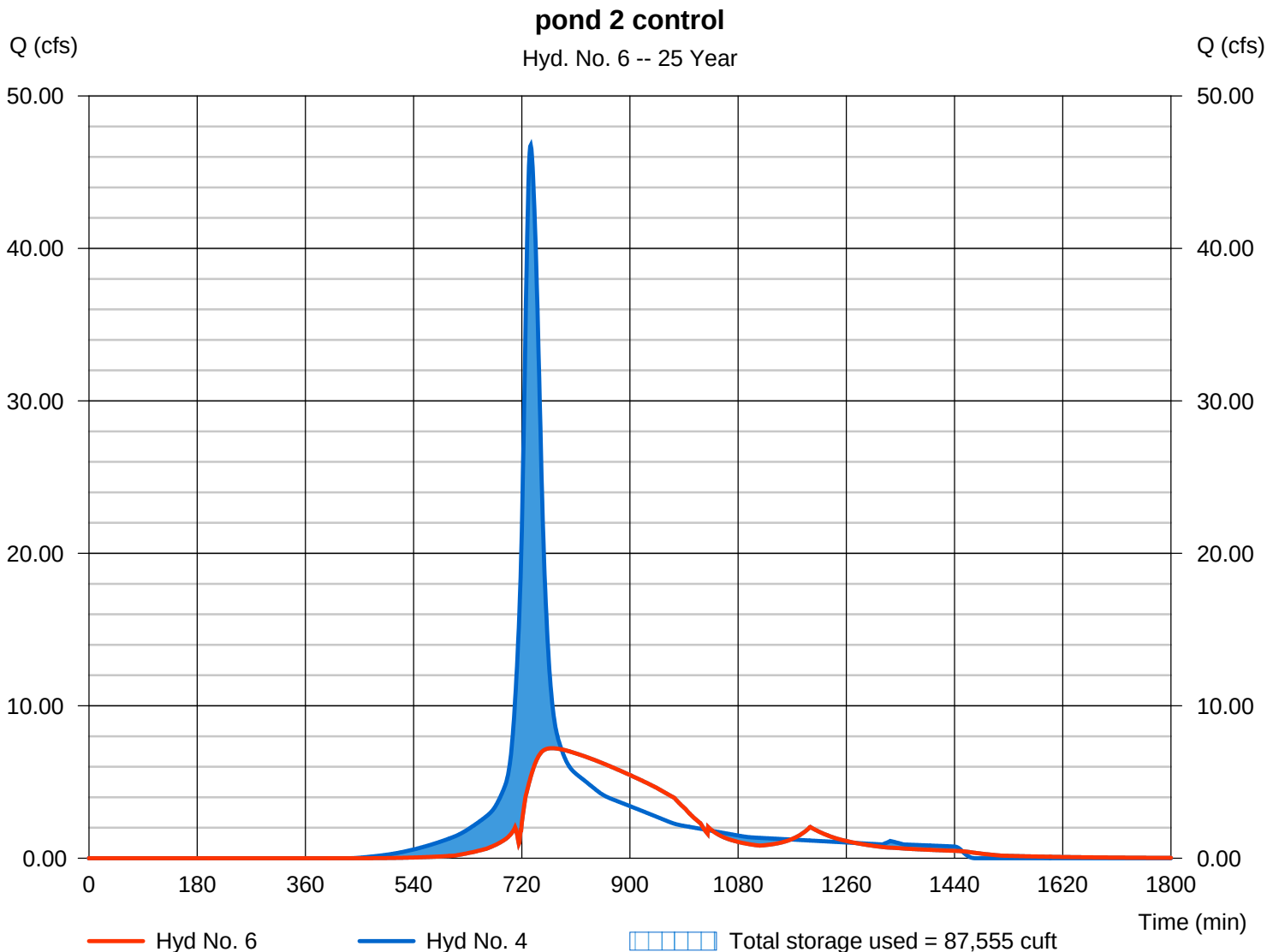
Thursday, 01 / 7 / 2021

Hyd. No. 6

pond 2 control

Hydrograph type	= Reservoir	Peak discharge	= 7.218 cfs
Storm frequency	= 25 yrs	Time to peak	= 770 min
Time interval	= 1 min	Hyd. volume	= 133,365 cuft
Inflow hyd. No.	= 4 - Proposed DA-2	Max. Elevation	= 694.15 ft
Reservoir name	= pond 2	Max. Storage	= 87,555 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

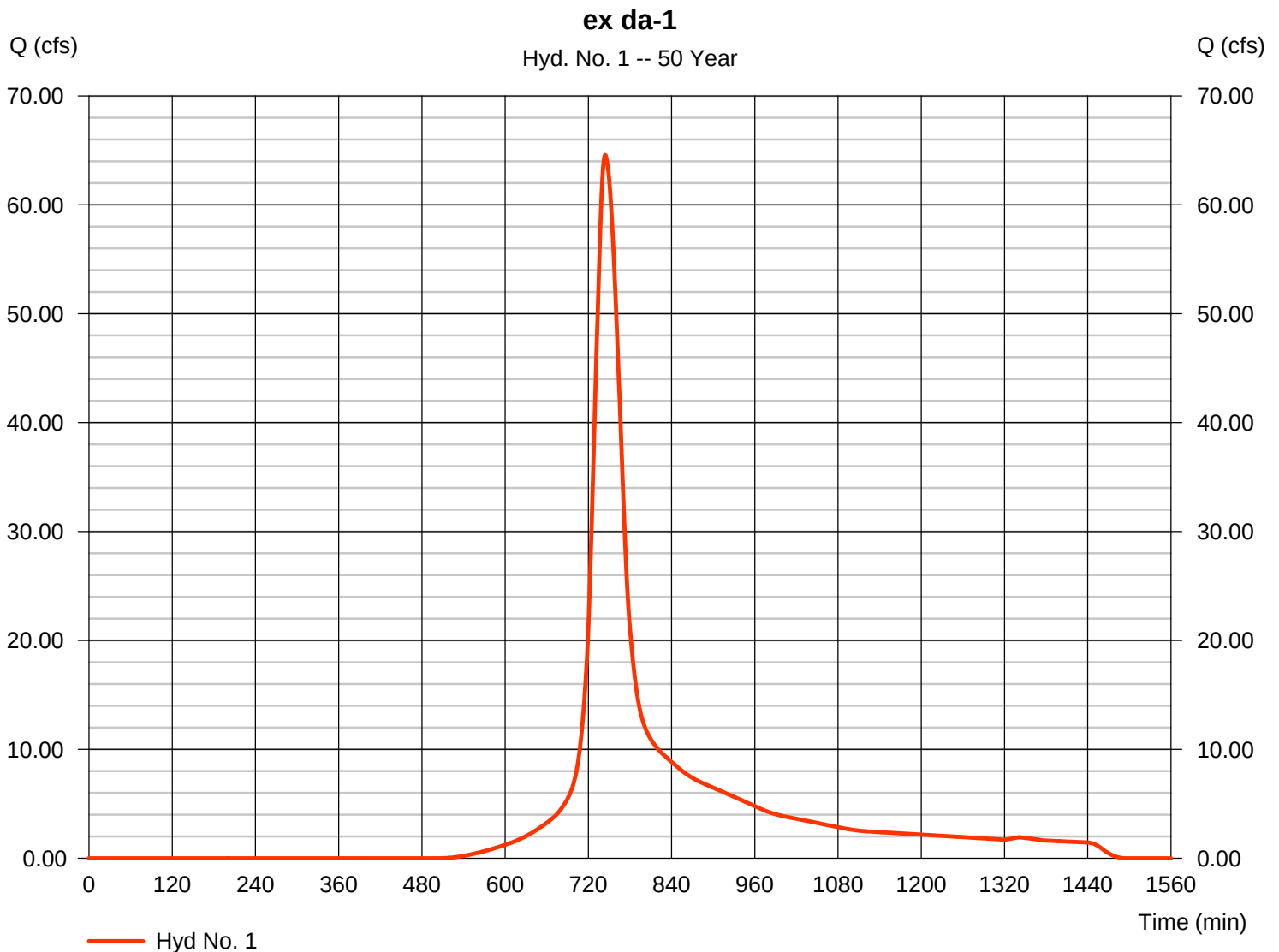
Thursday, 01 / 7 / 2021

Hyd. No. 1

ex da-1

Hydrograph type = SCS Runoff
 Storm frequency = 50 yrs
 Time interval = 1 min
 Drainage area = 24.700 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 7.78 in
 Storm duration = 24 hrs

Peak discharge = 64.57 cfs
 Time to peak = 744 min
 Hyd. volume = 363,231 cuft
 Curve number = 68
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 34.90 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

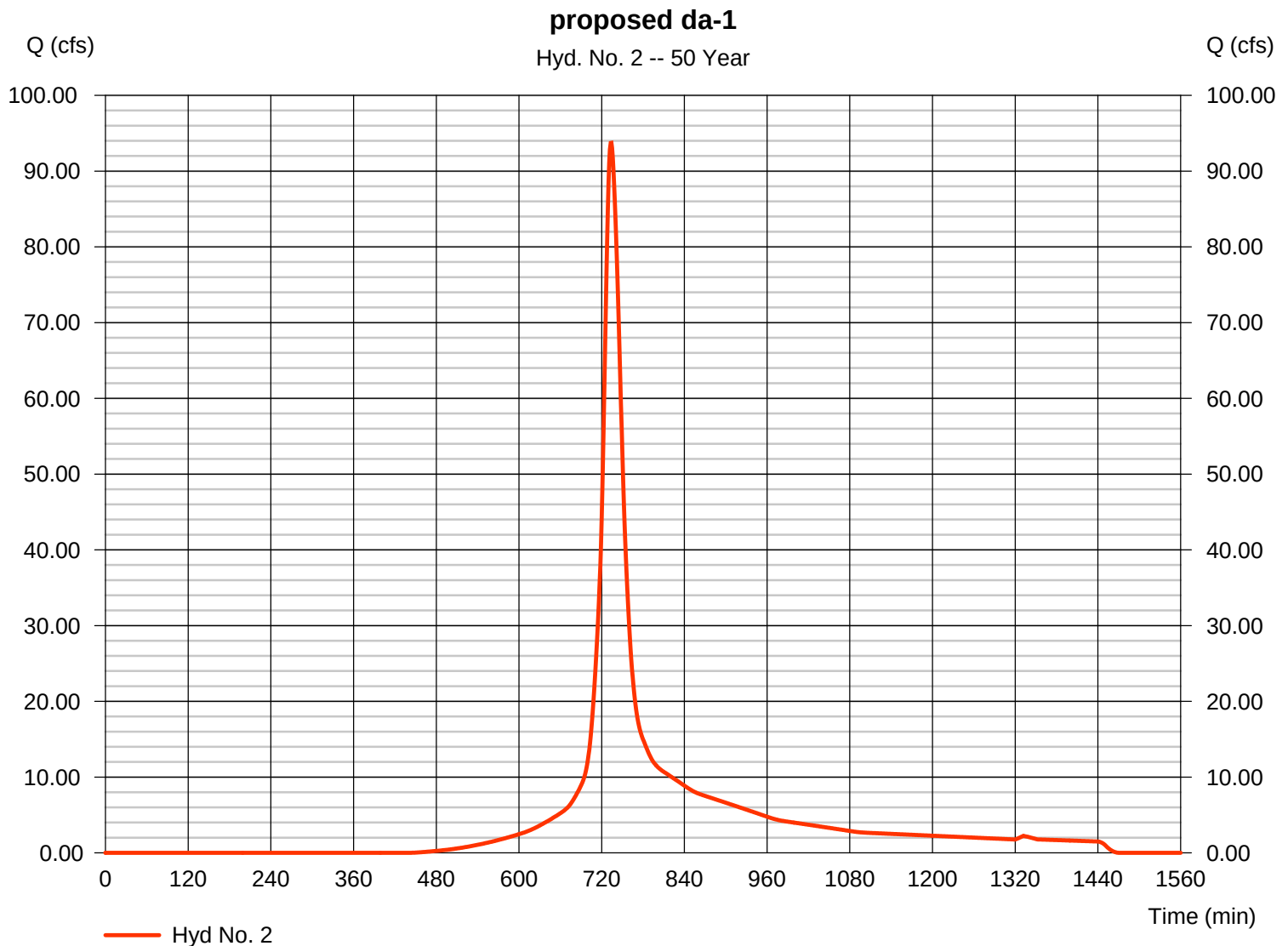
Hyd. No. 2

proposed da-1

Hydrograph type = SCS Runoff
 Storm frequency = 50 yrs
 Time interval = 1 min
 Drainage area = 24.700 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 7.78 in
 Storm duration = 24 hrs

Peak discharge = 93.73 cfs
 Time to peak = 734 min
 Hyd. volume = 413,831 cuft
 Curve number = 73*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 19.30 min
 Distribution = Type III
 Shape factor = 484

* Composite (Area/CN) = $[(16.650 \times 61) + (8.050 \times 98)] / 24.700$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

Hyd. No. 3

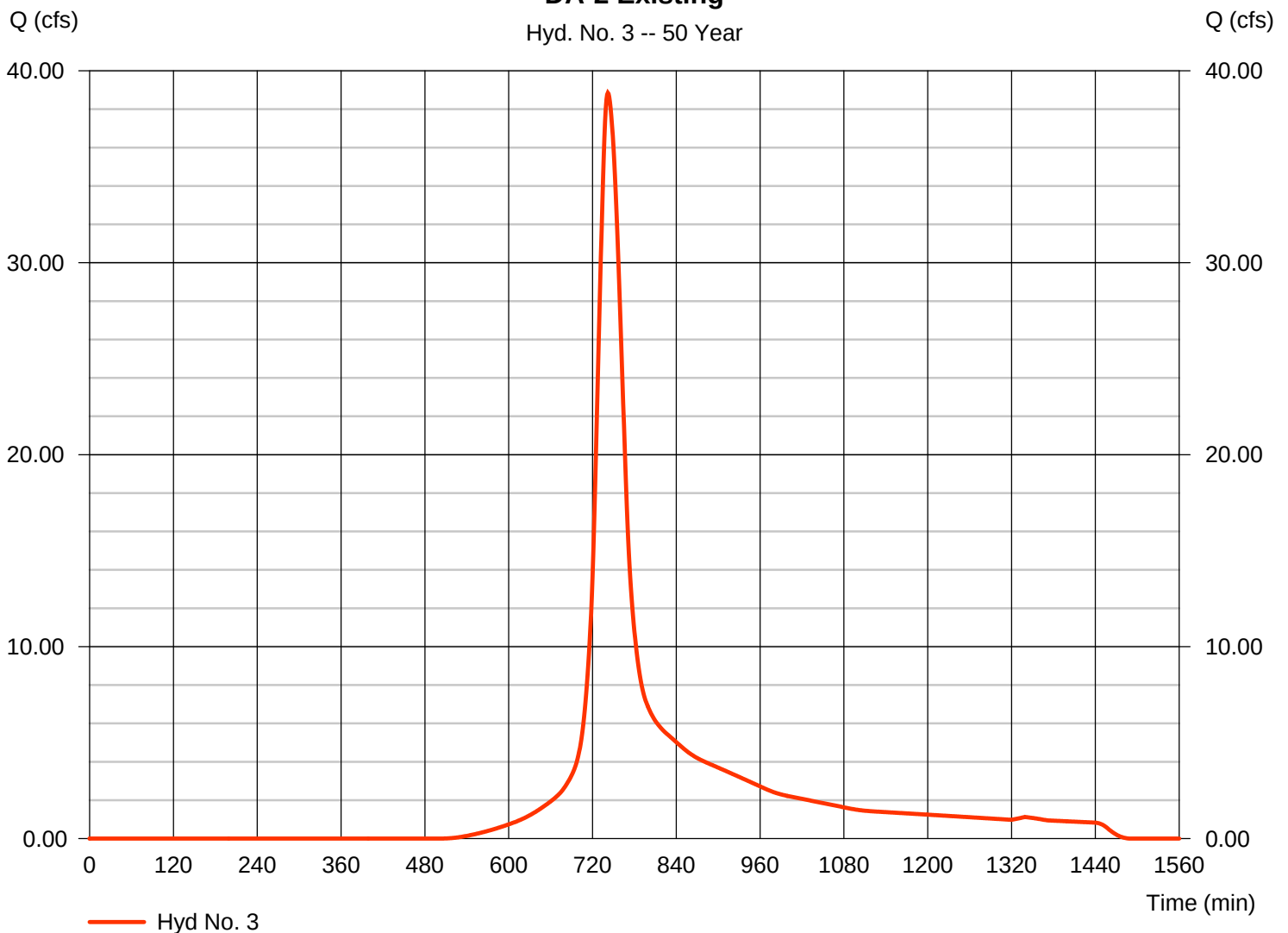
DA-2 Existing

Hydrograph type = SCS Runoff
 Storm frequency = 50 yrs
 Time interval = 1 min
 Drainage area = 14.130 ac
 Basin Slope = 6.0 %
 Tc method = TR55
 Total precip. = 7.78 in
 Storm duration = 24 hrs

Peak discharge = 38.85 cfs
 Time to peak = 742 min
 Hyd. volume = 209,159 cuft
 Curve number = 68
 Hydraulic length = 300 ft
 Time of conc. (Tc) = 32.00 min
 Distribution = Type III
 Shape factor = 484

DA-2 Existing

Hyd. No. 3 -- 50 Year



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

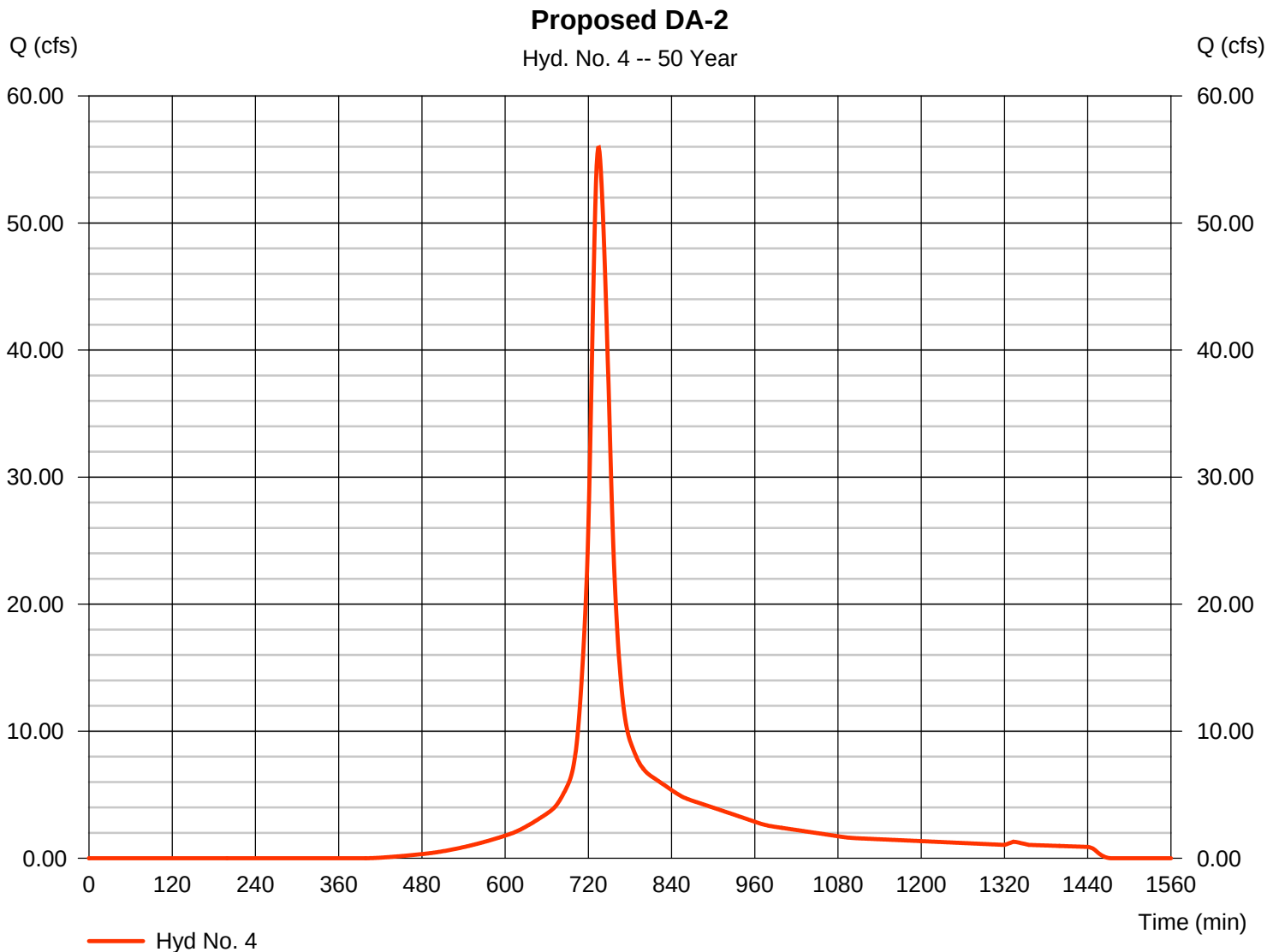
Hyd. No. 4

Proposed DA-2

Hydrograph type = SCS Runoff
 Storm frequency = 50 yrs
 Time interval = 1 min
 Drainage area = 14.130 ac
 Basin Slope = 6.0 %
 Tc method = TR55
 Total precip. = 7.78 in
 Storm duration = 24 hrs

Peak discharge = 55.94 cfs
 Time to peak = 735 min
 Hyd. volume = 256,757 cuft
 Curve number = 76*
 Hydraulic length = 300 ft
 Time of conc. (Tc) = 21.60 min
 Distribution = Type III
 Shape factor = 484

* Composite (Area/CN) = $[(5.839 \times 98) + (8.290 \times 61)] / 14.130$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

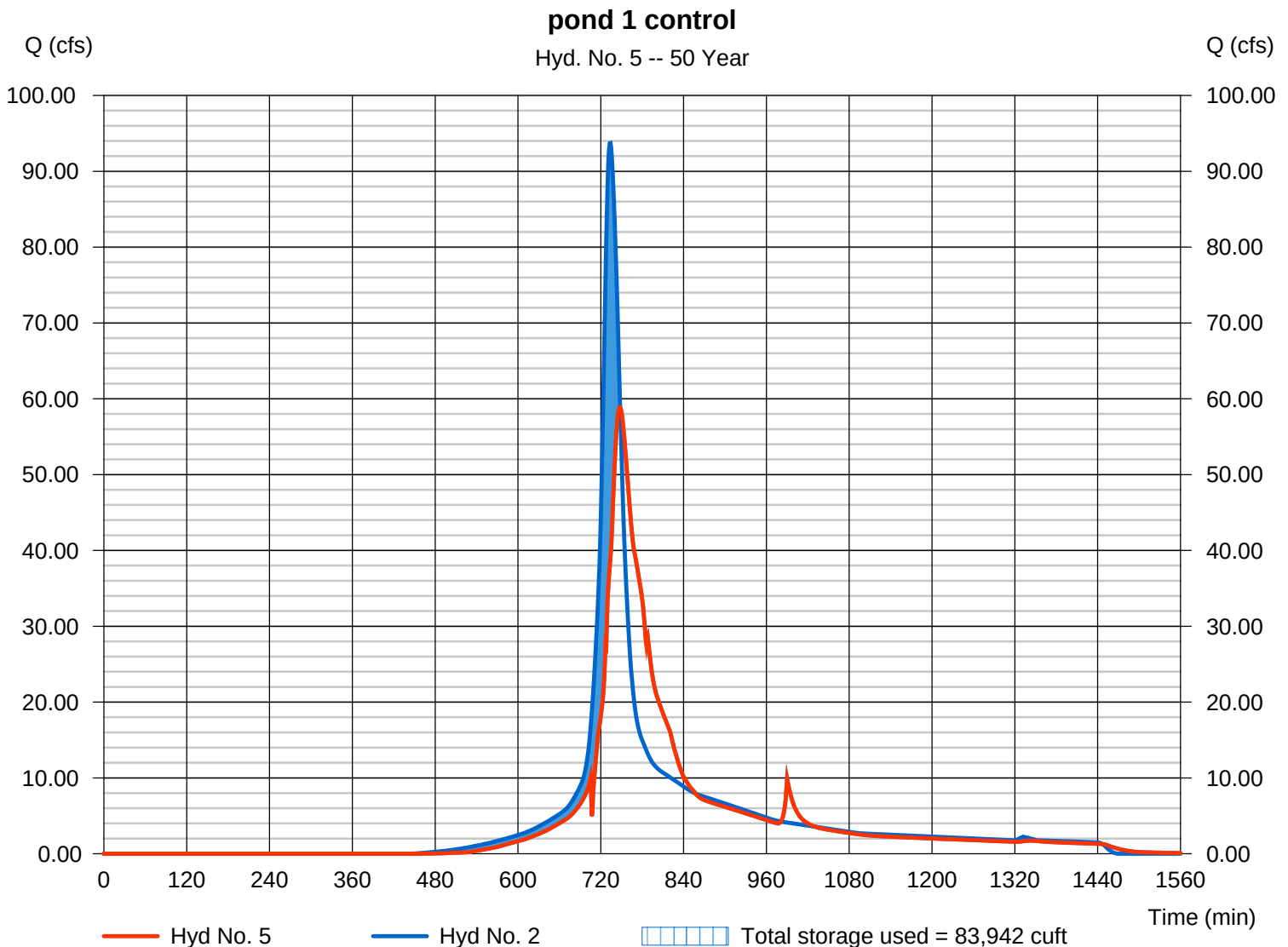
Thursday, 01 / 7 / 2021

Hyd. No. 5

pond 1 control

Hydrograph type	= Reservoir	Peak discharge	= 58.88 cfs
Storm frequency	= 50 yrs	Time to peak	= 748 min
Time interval	= 1 min	Hyd. volume	= 384,191 cuft
Inflow hyd. No.	= 2 - proposed da-1	Max. Elevation	= 659.03 ft
Reservoir name	= pond 1	Max. Storage	= 83,942 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

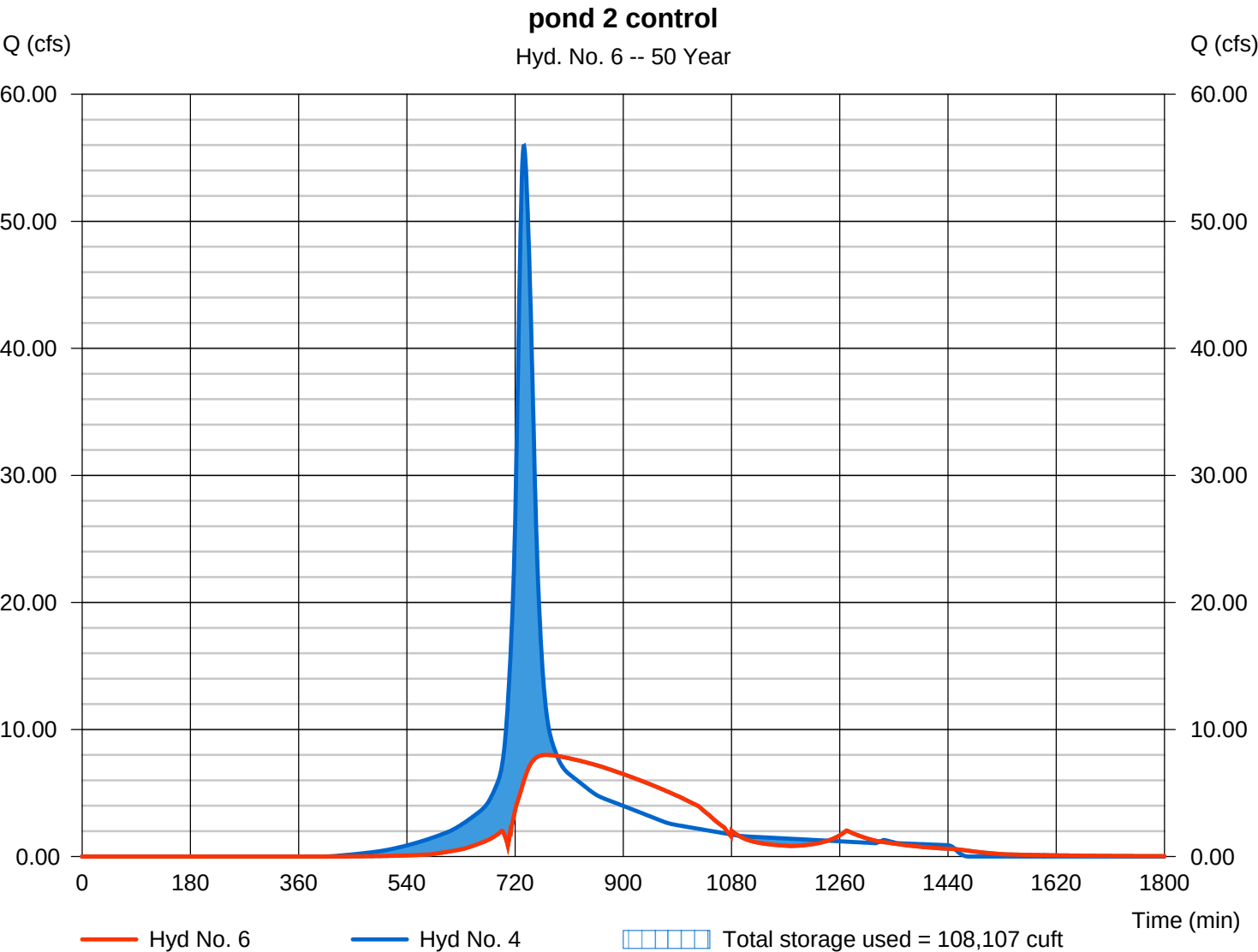
Thursday, 01 / 7 / 2021

Hyd. No. 6

pond 2 control

Hydrograph type	= Reservoir	Peak discharge	= 8.001 cfs
Storm frequency	= 50 yrs	Time to peak	= 772 min
Time interval	= 1 min	Hyd. volume	= 163,766 cuft
Inflow hyd. No.	= 4 - Proposed DA-2	Max. Elevation	= 694.98 ft
Reservoir name	= pond 2	Max. Storage	= 108,107 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

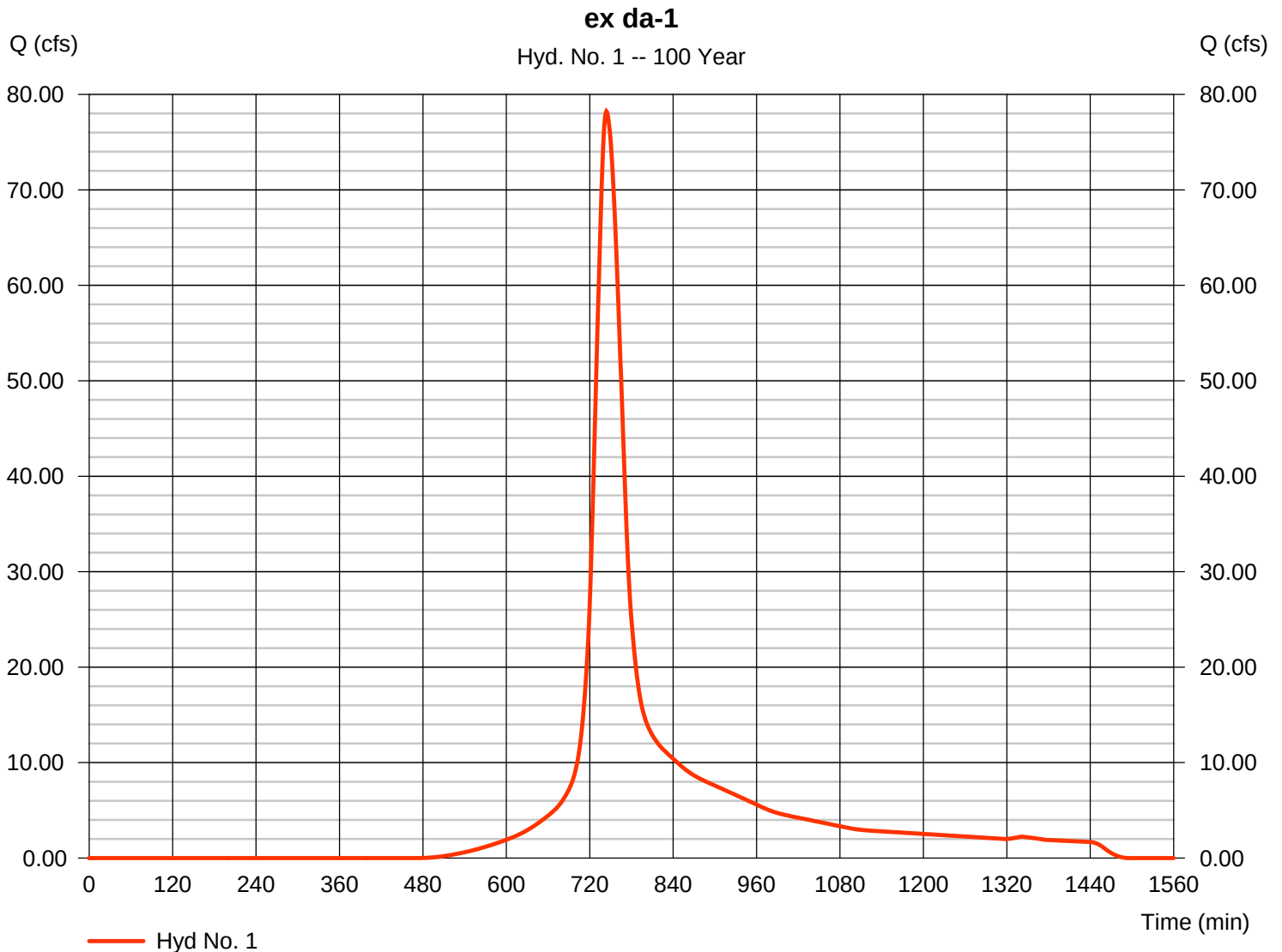
Thursday, 01 / 7 / 2021

Hyd. No. 1

ex da-1

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 24.700 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 8.78 in
 Storm duration = 24 hrs

Peak discharge = 78.23 cfs
 Time to peak = 744 min
 Hyd. volume = 439,182 cuft
 Curve number = 68
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 34.90 min
 Distribution = Type III
 Shape factor = 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

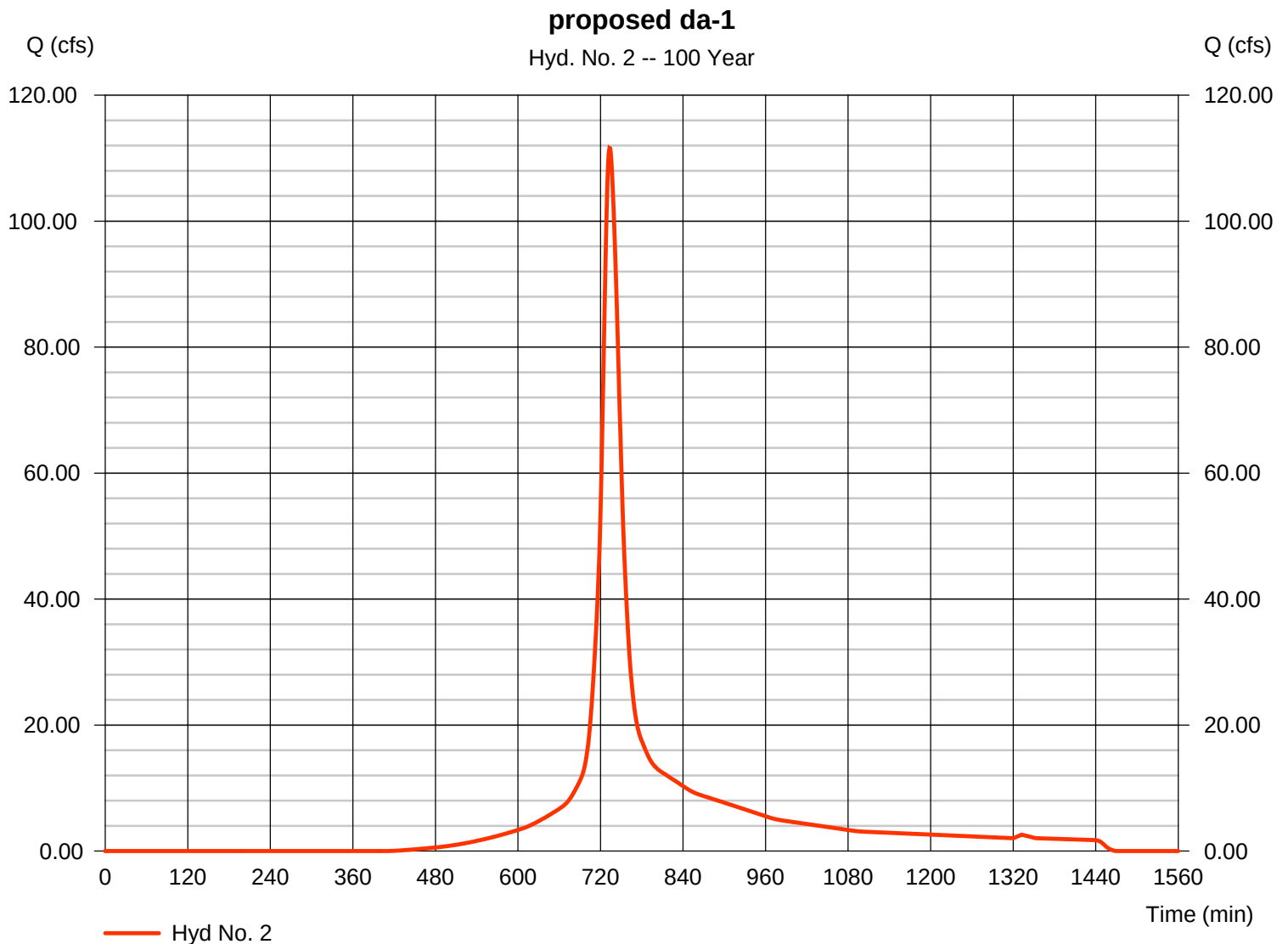
Hyd. No. 2

proposed da-1

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 24.700 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 8.78 in
 Storm duration = 24 hrs

Peak discharge = 111.62 cfs
 Time to peak = 733 min
 Hyd. volume = 493,762 cuft
 Curve number = 73*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 19.30 min
 Distribution = Type III
 Shape factor = 484

* Composite (Area/CN) = $[(16.650 \times 61) + (8.050 \times 98)] / 24.700$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

Hyd. No. 3

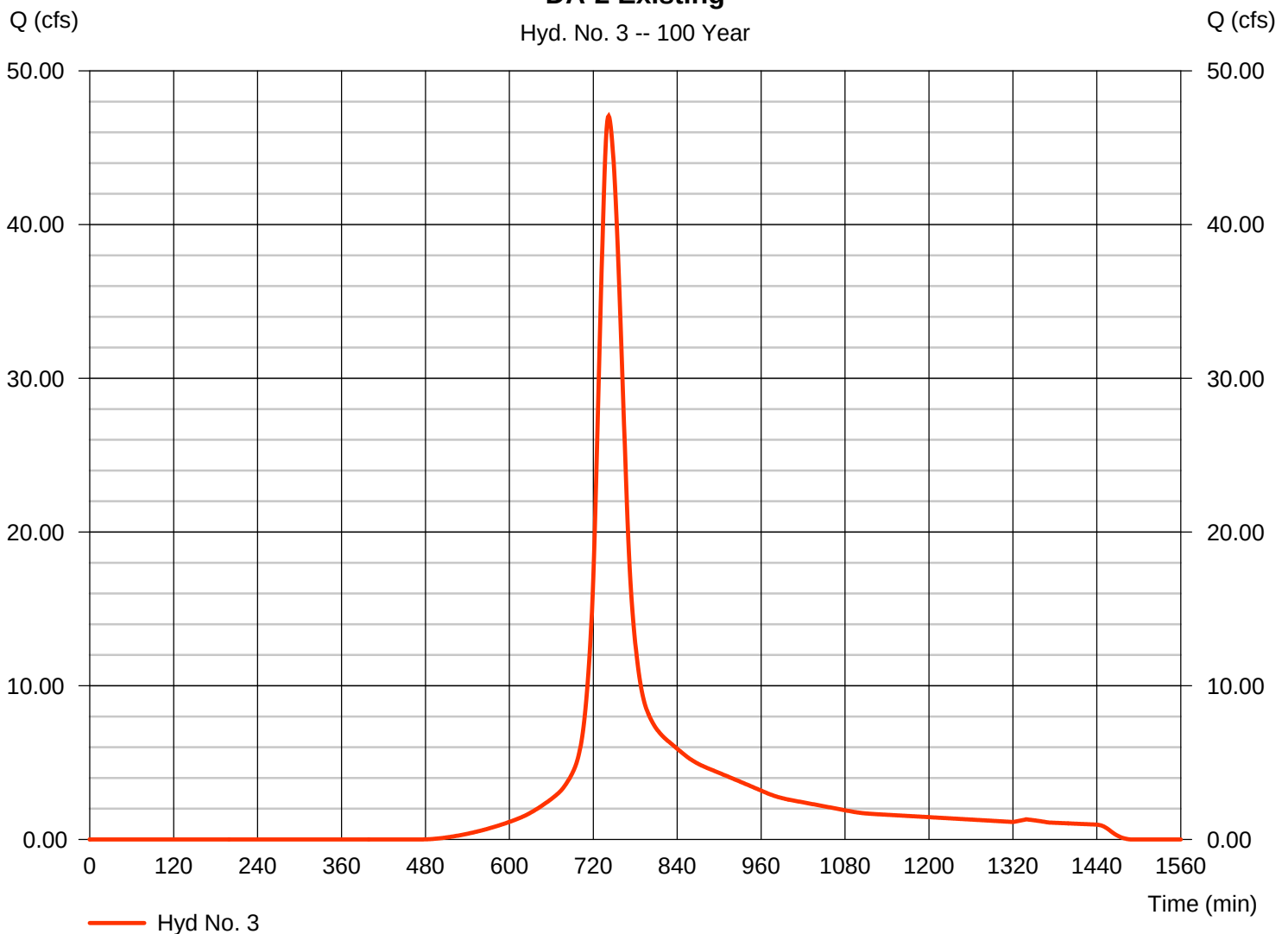
DA-2 Existing

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 14.130 ac
 Basin Slope = 6.0 %
 Tc method = TR55
 Total precip. = 8.78 in
 Storm duration = 24 hrs

Peak discharge = 47.06 cfs
 Time to peak = 742 min
 Hyd. volume = 252,894 cuft
 Curve number = 68
 Hydraulic length = 300 ft
 Time of conc. (Tc) = 32.00 min
 Distribution = Type III
 Shape factor = 484

DA-2 Existing

Hyd. No. 3 -- 100 Year



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

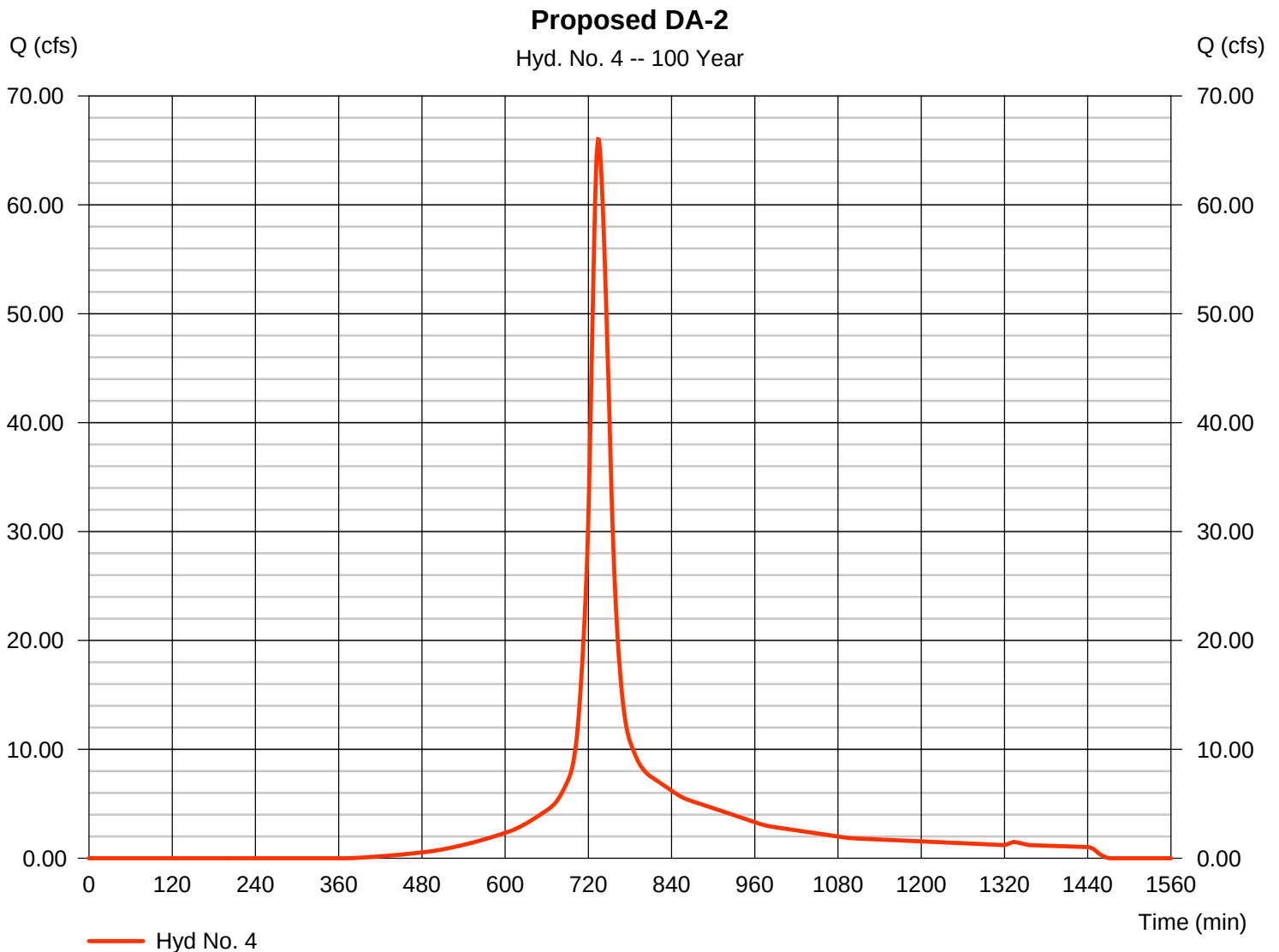
Hyd. No. 4

Proposed DA-2

Hydrograph type = SCS Runoff
 Storm frequency = 100 yrs
 Time interval = 1 min
 Drainage area = 14.130 ac
 Basin Slope = 6.0 %
 Tc method = TR55
 Total precip. = 8.78 in
 Storm duration = 24 hrs

Peak discharge = 66.01 cfs
 Time to peak = 734 min
 Hyd. volume = 304,110 cuft
 Curve number = 76*
 Hydraulic length = 300 ft
 Time of conc. (Tc) = 21.60 min
 Distribution = Type III
 Shape factor = 484

* Composite (Area/CN) = $[(5.839 \times 98) + (8.290 \times 61)] / 14.130$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

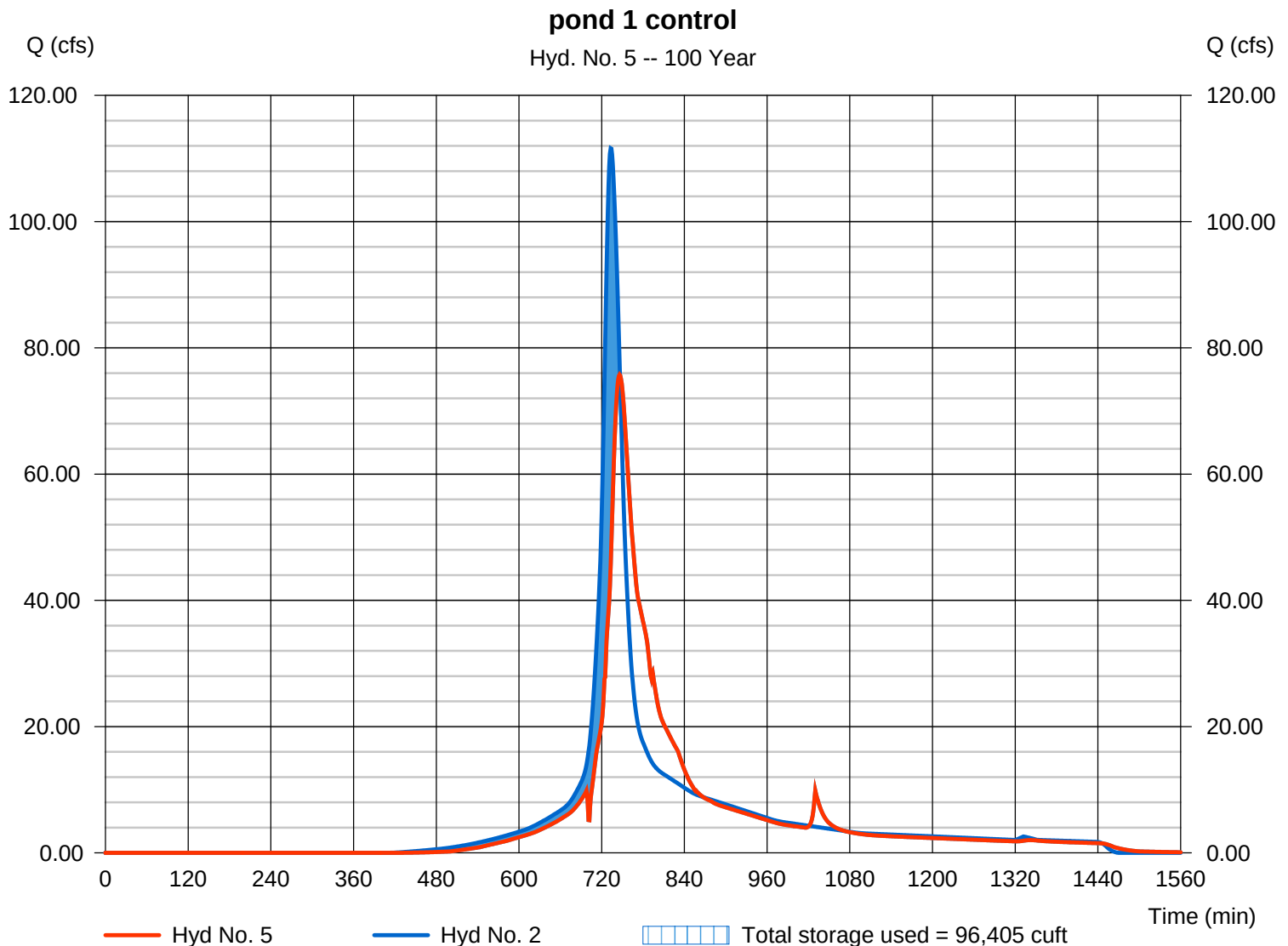
Thursday, 01 / 7 / 2021

Hyd. No. 5

pond 1 control

Hydrograph type	= Reservoir	Peak discharge	= 75.76 cfs
Storm frequency	= 100 yrs	Time to peak	= 746 min
Time interval	= 1 min	Hyd. volume	= 460,913 cuft
Inflow hyd. No.	= 2 - proposed da-1	Max. Elevation	= 659.99 ft
Reservoir name	= pond 1	Max. Storage	= 96,405 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

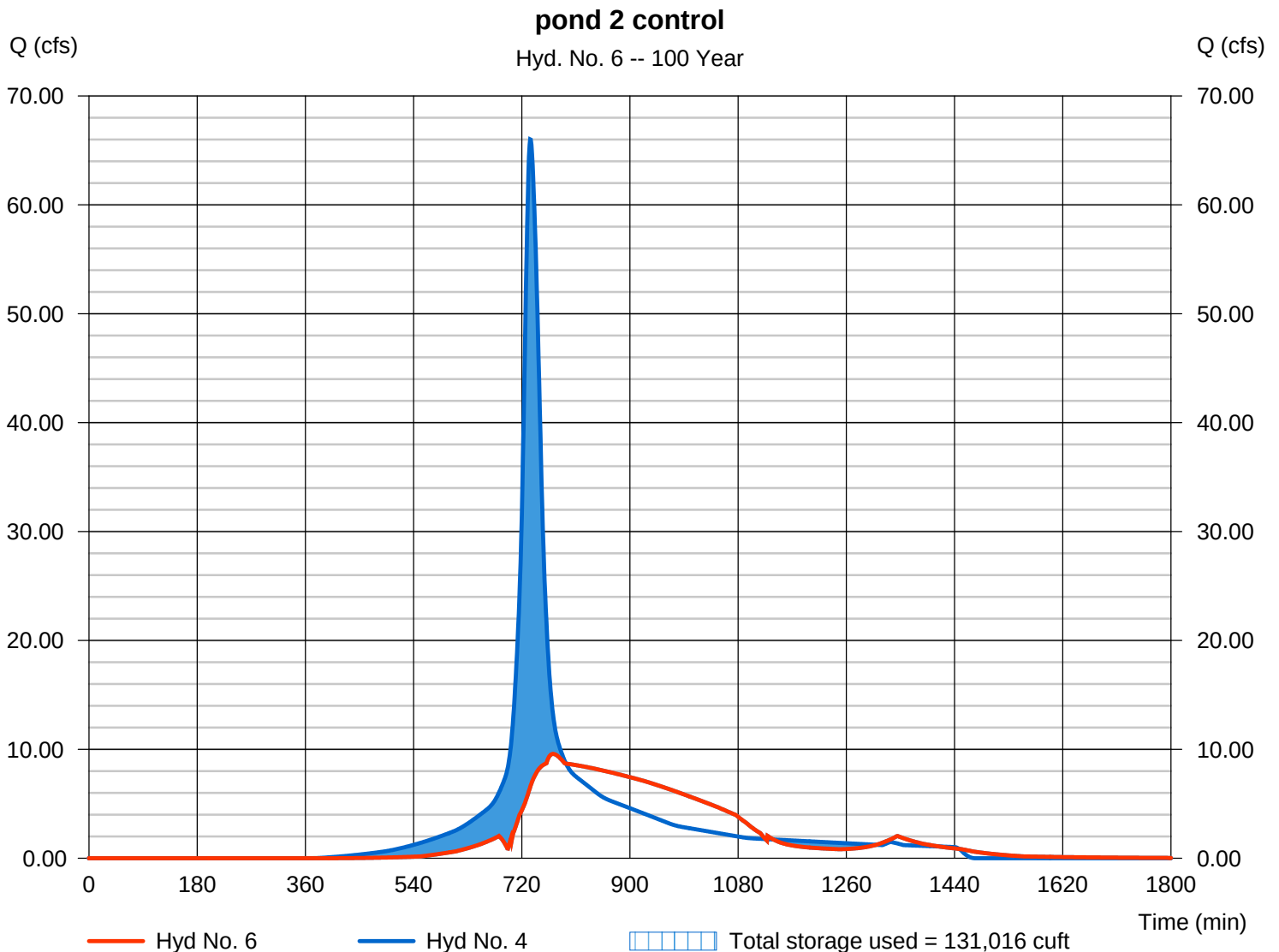
Hyd. No. 6

pond 2 control

Hydrograph type = Reservoir
 Storm frequency = 100 yrs
 Time interval = 1 min
 Inflow hyd. No. = 4 - Proposed DA-2
 Reservoir name = pond 2

Peak discharge = 9.582 cfs
 Time to peak = 772 min
 Hyd. volume = 198,054 cuft
 Max. Elevation = 695.91 ft
 Max. Storage = 131,016 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	-----
2	37.7795	9.5000	0.8133	-----
3	0.0000	0.0000	0.0000	-----
5	99.3592	15.3000	0.9554	-----
10	69.0361	11.6000	0.8412	-----
25	182.6736	18.0000	1.0144	-----
50	118.5118	13.6000	0.8977	-----
100	133.2439	13.2000	0.8997	-----

File name: Newhaven.idf

$$\text{Intensity} = B / (Tc + D)^E$$

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	4.29	3.37	2.80	2.41	2.12	1.90	1.72	1.58	1.46	1.36	1.28	1.20
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	5.60	4.54	3.82	3.30	2.91	2.60	2.35	2.15	1.98	1.83	1.71	1.60
10	6.50	5.21	4.37	3.78	3.34	3.00	2.73	2.50	2.32	2.16	2.02	1.90
25	7.59	6.22	5.26	4.56	4.02	3.60	3.26	2.97	2.73	2.53	2.35	2.20
50	8.59	6.94	5.84	5.05	4.46	4.00	3.63	3.32	3.07	2.85	2.66	2.50
100	9.79	7.87	6.60	5.70	5.03	4.50	4.08	3.73	3.44	3.20	2.98	2.80

Tc = time in minutes. Values may exceed 60.

Precip. file name: H:\LIBRARY\DEPT\SITE\hydraflow\beacon falls-noaa-ct.pcp

[illegible]

Appendix B
Inlet report (Gutter flow analysis for catch basin on site)

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet			Grate Inlet			Gutter								Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)				
1	Structure - (6)	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	5.00	0.020	0.020	0.011	0.00	0.00	0.00	0.00	0.00	0.0	Off	
2	Structure - (5)	0.07	0.00	0.07	0.00	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.04	1.76	0.04	1.76	0.04	1.76	0.0	3
3	Structure - (4)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	4
4	Structure - (3)	0.45	0.15	0.48	0.11	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.08	3.85	0.08	3.85	0.08	3.85	0.0	Off
5	Structure - (54)	0.45	0.15	0.48	0.11	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.08	3.85	0.08	3.85	0.08	3.85	0.0	Off
6	Structure - (55)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	5
7	Structure - (56)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	6
8	Structure - (57)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	17
9	Structure - (2)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	Off
10	Structure - (15)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	Off
11	Structure - (16)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	10
12	Structure - (17)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	9
13	Structure - (1)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	Off
14	Structure - (12)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	Off
15	Structure - (13)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	14
16	Structure - (14)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	13
17	Structure - (59)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	4
18	Structure - (58)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	5
19	Structure - (91)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	Off
20	Structure - (92)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	Off
21	Structure - (121)	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	5.00	0.020	0.020	0.011	0.00	0.00	0.00	0.00	0.00	0.0	Off	
22	Structure - (120)	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	5.00	0.020	0.020	0.011	0.00	0.00	0.00	0.00	0.00	0.0	Off	
23	Structure - (74)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	Off
Project File: storm 5-15-19.stm															Number of lines: 89							Run Date: 2/9/2021		
NOTES: Inlet N-Values = 0.016; Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period = 25 Yrs. ; * Indicates Known Q added. All curb inlets are throat.																								

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter								Inlet			Byp Line No	
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)				
24	Structure - (64)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	Off
25	Structure - (65)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	24
26	Structure - (66)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	25
27	Structure - (67)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	26
28	Structure - (68)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	27
29	Structure - (69)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	40
30	Structure - (93)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	Off
31	Structure - (94)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	30
32	Structure - (95)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	Off
33	Structure - (96)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	32
34	Structure - (97)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	33
35	Structure - (98)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	34
36	Structure - (99)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	35
37	Structure - (100)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	36
38	Structure - (101)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	39
39	Structure - (112)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	41
40	Structure - (70)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	42
41	Structure - (111)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	44
42	Structure - (72)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	43
43	Structure - (73)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	23
44	Structure - (110)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	45
45	Structure - (109)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	49
46	Structure - (102)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	20
Project File: storm 5-15-19.stm															Number of lines: 89					Run Date: 2/9/2021				
NOTES: Inlet N-Values = 0.016; Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period = 25 Yrs. ; * Indicates Known Q added. All curb inlets are throat.																								

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet				Gutter								Inlet				Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)		
47	Structure - (103)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	46	
48	Structure - (104)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	51	
49	Structure - (108)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	Off	
50	Structure - (107)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	52	
51	Structure - (105)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	19	
52	Structure - (106)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	Off	
53	Structure - (42)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	Off	
54	Structure - (119)	0.00	0.00	0.00	0.00	MH	0.0	0.00	0.00	0.00	0.00	Sag	5.00	0.020	0.020	0.011	0.00	0.00	0.00	0.00	0.00	0.0	Off		
55	Structure - (43)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	53	
56	Structure - (44)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	55	
57	Structure - (45)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	56	
58	Structure - (46)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	57	
59	Structure - (47)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	58	
60	Structure - (53)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	61	
61	Structure - (52)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	65	
62	Structure - (114)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	Off	
63	Structure - (115)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	62	
64	Structure - (116)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.07	3.45	0.0	66	
65	Structure - (51)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	67	
66	Structure - (117)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.07	3.60	0.0	Off	
67	Structure - (50)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	68	
68	Structure - (48)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	69	
69	Structure - (49)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.07	3.70	0.0	Off	

Project File: storm 5-15-19.stm

Number of lines: 89

Run Date: 2/9/2021

NOTES: Inlet N-Values = 0.016; Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period = 25 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter								Inlet				Byp Line No	
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)					
70	Structure - (19)	0.45	0.18	0.50	0.13	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.08	3.90	0.08	3.90	0.0	0.0	Off		
71	Structure - (27)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.0	0.0	70		
72	Structure - (28)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.0	0.0	89		
73	Structure - (29)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.0	0.0	Off		
74	Structure - (30)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.0	0.0	71		
75	Structure - (31)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.0	0.0	74		
76	Structure - (32)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.0	0.0	75		
77	Structure - (33)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.0	0.0	88		
78	Structure - (35)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.0	0.0	72		
79	Structure - (36)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.0	0.0	73		
80	Structure - (20)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.0	0.0	70		
81	Structure - (21)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.0	0.0	87		
82	Structure - (22)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.0	0.0	81		
83	Structure - (23)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.0	0.0	82		
84	Structure - (24)	0.45	0.00	0.38	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.45	0.07	3.45	0.0	0.0	86		
85	Structure - (34)	0.45	0.01	0.39	0.06	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.50	0.07	3.50	0.0	0.0	Off		
86	Structure - (26)	0.45	0.06	0.42	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.60	0.07	3.60	0.0	0.0	80		
87	Structure - (25)	0.45	0.09	0.44	0.09	Comb	4.0	3.00	0.00	3.00	2.00	0.050	5.00	0.020	0.020	0.011	0.07	3.70	0.07	3.70	0.0	0.0	Off		
88		0.45	0.06	0.50	0.01	Comb	4.0	3.00	0.00	3.00	2.00	0.020	2.00	0.050	0.020	0.013	0.13	3.41	0.13	3.41	0.0	0.0	85		
89		0.07	0.09	0.16	0.00	Comb	4.0	3.00	0.00	3.00	2.00	0.020	2.00	0.050	0.020	0.013	0.08	1.68	0.08	1.68	0.0	0.0	87		
Project File: storm 5-15-19.stm														Number of lines: 89							Run Date: 2/9/2021				
NOTES: Inlet N-Values = 0.016; Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period = 25 Yrs. ; * Indicates Known Q added. All curb inlets are throat.																									

APPENDIX C
Drainage Statement

Drainage Design Statement

The Proposed drainage system for the Hopp Brook Estates development at the end of Oakwood Drive has been designed to conform to the town of Beacon falls Engineering Standards. These standards prevent the increase of storm water discharge to the surrounding areas for the 100-year storm event. The storm water conveyance system (piping) is designed for the 100-year storm event, and the gutter flow analysis is based on the 10-year storm event. The development as proposed will not have an adverse impact on the surrounding wetlands or watercourses.

Should you have questions concerning the above, please contact Manny Silva.

Very truly yours,

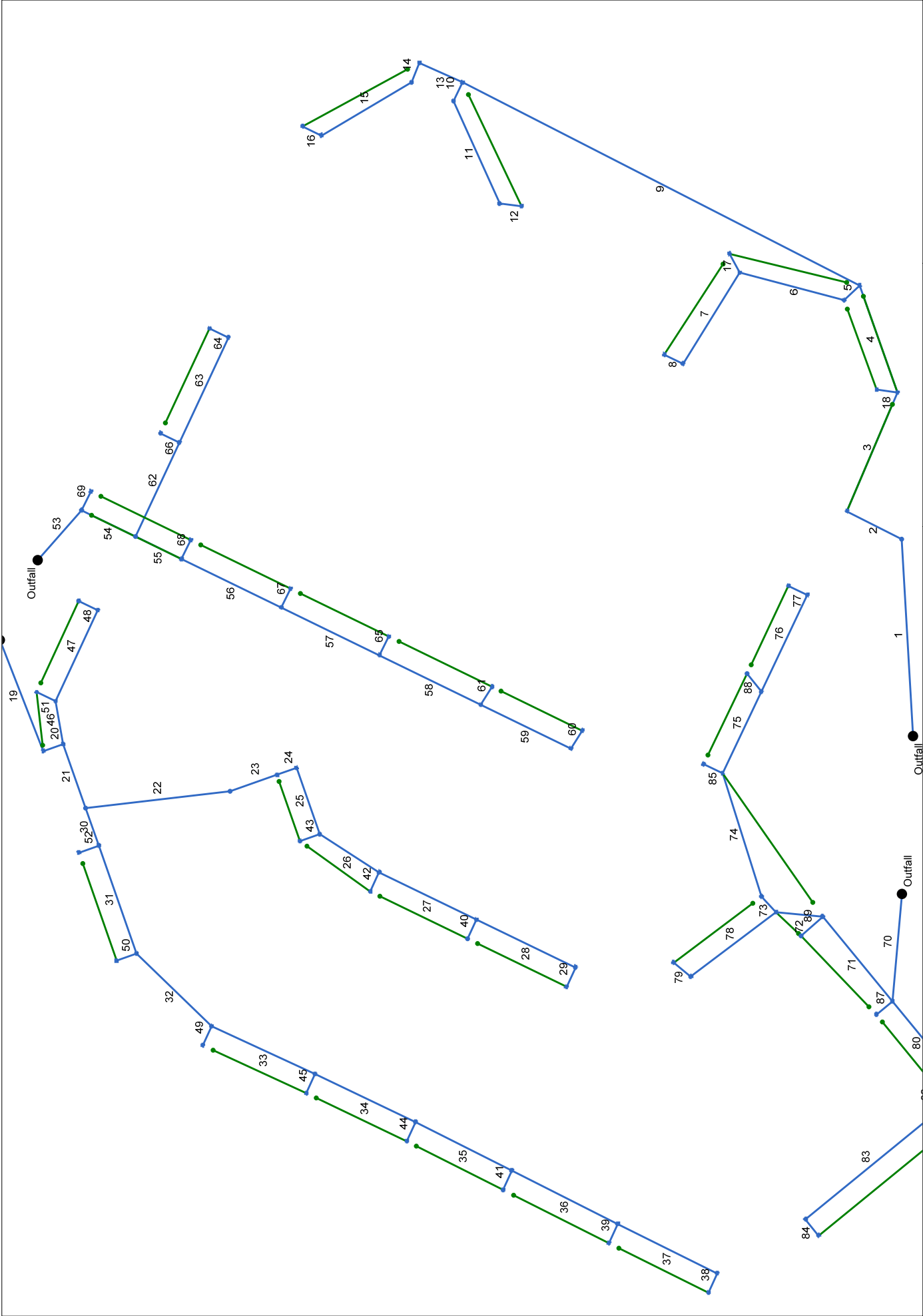


Manuel Jose Silva, P.E.

Project Engineer

APPENDIX D

HGL storm sewer calculation 100-year storm



Project File: storm 5-15-19.stm		Number of lines: 89	Date: 5/30/2019
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Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
1	Pipe - (6)	5.47	24	Cir	264.215	688.00	689.40	0.530	688.85	690.22	n/a	690.22 j	End	Manhole
2	Pipe - (5)	5.54	24	Cir	82.503	689.40	690.81	1.709	690.22	691.64	n/a	691.64	1	Combination
3	Pipe - (4)	5.64	24	Cir	173.387	689.81	690.66	0.490	691.64	691.50	n/a	691.50	2	Combination
4	Pipe - (3)	5.07	24	Cir	151.974	690.66	691.40	0.487	691.50	692.19	n/a	692.19 j	3	Combination
5	Pipe - (111)	2.12	18	Cir	28.586	691.40	691.86	1.609	692.19	692.41	n/a	692.41 j	4	Combination
6	Pipe - (46)	1.80	18	Cir	145.347	691.86	694.69	1.947	692.41	695.19	n/a	695.19 j	5	Combination
7	Pipe - (47)	1.02	18	Cir	144.154	694.79	703.44	6.001	695.19	703.82	n/a	703.82 j	6	Combination
8	Pipe - (48)	0.53	15	Cir	28.330	703.54	704.11	2.012	703.82	704.39	n/a	704.39	7	Combination
9	Pipe - (2)	3.53	24	Cir	599.685	691.40	694.38	0.497	692.19	695.04	n/a	695.04 j	4	Combination
10	Pipe - (112)	1.39	15	Cir	28.000	694.38	694.75	1.321	695.04	695.22	n/a	695.22 j	9	Combination
11	Pipe - (12)	1.02	15	Cir	150.725	694.75	699.64	3.244	695.22	700.04	n/a	700.04 j	10	Combination
12	Pipe - (13)	0.53	15	Cir	29.502	699.74	700.33	2.000	700.04	700.61	n/a	700.61 j	11	Combination
13	Pipe - (1)	1.85	24	Cir	63.713	694.38	694.67	0.455	695.04	695.14	n/a	695.14 j	9	Combination
14	Pipe - (113)	1.40	15	Cir	27.920	694.67	694.81	0.501	695.14	695.28	0.17	695.28	13	Combination
15	Pipe - (8)	1.02	15	Cir	140.819	694.81	699.30	3.188	695.28	699.70	n/a	699.70 j	14	Combination
16	Pipe - (9)	0.53	15	Cir	28.330	699.40	699.68	0.988	699.70	699.96	n/a	699.96 j	15	Combination
17	Pipe - (50)	0.53	15	Cir	28.307	696.10	696.38	0.989	696.33	696.66	n/a	696.66	6	Combination
18	Pipe - (49)	0.53	15	Cir	28.283	693.95	694.23	0.990	694.18	694.51	n/a	694.51	3	Combination
19	Pipe - (77)	11.72	24	Cir	159.998	650.00	654.76	2.978	651.25	655.99	n/a	655.99 j	End	Combination
20	Pipe - (78)	11.38	24	Cir	28.331	654.86	655.15	1.000	655.99	656.36	n/a	656.36	19	Combination
21	Pipe - (108)	9.60	18	Cir	90.949	655.15	656.13	1.078	656.36	657.33	n/a	657.33 j	20	Manhole
22	Pipe - (105)	3.99	18	Cir	195.574	656.23	671.89	8.007	657.33	672.65	n/a	672.65 j	21	Manhole
23	Pipe - (104)	4.03	18	Cir	66.624	673.99	677.77	5.668	674.38	678.54	0.15	678.54	22	Combination
24	Pipe - (106)	3.64	18	Cir	28.335	677.77	678.60	2.927	678.54	679.33	n/a	679.33 j	23	Combination

Project File: storm 5-15-19.stm

Number of lines: 89

Run Date: 5/30/2019

NOTES: Return period = 100 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
25	Pipe - (54)	3.30	18	Cir	94.156	678.60	679.62	1.083	679.33	680.31	n/a	680.31 j	24	Combination
26	Pipe - (55)	2.54	18	Cir	94.621	679.72	680.67	1.004	680.31	681.27	n/a	681.27	25	Combination
27	Pipe - (56)	1.79	18	Cir	145.593	680.77	689.50	5.996	681.27	690.00	n/a	690.00	26	Combination
28	Pipe - (57)	1.02	18	Cir	148.146	689.60	699.97	7.000	690.00	700.35	n/a	700.35 j	27	Combination
29	Pipe - (58)	0.53	15	Cir	28.331	700.07	700.64	2.012	700.35	700.92	n/a	700.92	28	Combination
30	Pipe - (107)	5.94	18	Cir	53.393	656.83	657.37	1.000	657.60	658.31	n/a	658.91	21	Combination
31	Pipe - (80)	5.28	18	Cir	153.073	656.79	659.85	1.999	658.91	660.73	n/a	660.73 j	30	Combination
32	Pipe - (81)	4.61	18	Cir	140.325	659.95	665.57	4.000	660.73	666.39	n/a	666.39	31	Combination
33	Pipe - (82)	3.93	18	Cir	153.082	665.67	670.26	2.998	666.39	671.02	n/a	671.02	32	Combination
34	Pipe - (83)	3.24	18	Cir	149.845	670.36	676.35	3.997	671.02	677.03	n/a	677.03	33	Combination
35	Pipe - (84)	2.52	18	Cir	144.966	676.45	686.60	7.002	677.03	687.20	n/a	687.20	34	Combination
36	Pipe - (85)	1.79	18	Cir	159.427	686.70	694.67	4.999	687.20	695.17	0.28	695.17	35	Combination
37	Pipe - (86)	1.02	18	Cir	149.376	694.77	699.25	2.999	695.17	699.63	n/a	699.63 j	36	Combination
38	Pipe - (87)	0.53	15	Cir	28.331	699.35	699.64	1.024	699.63	699.92	n/a	699.92	37	Combination
39	Pipe - (98)	0.53	15	Cir	28.331	695.34	695.63	1.024	695.57	695.91	n/a	695.91	36	Combination
40	Pipe - (59)	0.53	15	Cir	28.335	690.66	691.23	2.012	690.86	691.51	n/a	691.51	27	Combination
41	Pipe - (97)	0.53	15	Cir	28.331	687.33	688.18	3.000	687.51	688.46	n/a	688.46	35	Combination
42	Pipe - (60)	0.53	15	Cir	28.335	683.10	683.38	0.988	683.33	683.66	n/a	683.66	26	Combination
43	Pipe - (61)	0.53	15	Cir	28.335	680.02	680.30	0.988	680.31	680.58	n/a	680.58 j	25	Combination
44	Pipe - (96)	0.53	15	Cir	28.331	676.90	678.04	4.024	677.07	678.32	n/a	678.32	34	Combination
45	Pipe - (95)	0.53	15	Cir	28.331	671.60	671.89	1.024	671.83	672.17	n/a	672.17	33	Combination
46	Pipe - (88)	1.81	18	Cir	58.462	656.49	657.08	1.009	656.89	657.59	0.23	657.59	20	Combination
47	Pipe - (89)	1.02	18	Cir	134.322	657.18	666.58	6.998	657.59	666.96	n/a	666.96 j	46	Combination
48	Pipe - (90)	0.53	15	Cir	28.330	666.68	667.53	3.000	666.96	667.81	n/a	667.81	47	Combination

Project File: storm 5-15-19.stm	Number of lines: 89	Run Date: 5/30/2019
NOTES: Return period = 100 Yrs. ; j - Line contains hyd. jump.		

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
49	Pipe - (94)	0.53	15	Cir	28.331	666.39	666.95	2.000	666.58	667.24	n/a	667.24	32	Combination
50	Pipe - (93)	0.53	15	Cir	28.331	661.29	661.57	0.988	661.52	661.85	n/a	661.85	31	Combination
51	Pipe - (91)	0.53	15	Cir	28.330	658.73	659.30	2.012	658.93	659.58	n/a	659.58	46	Combination
52	Pipe - (92)	0.53	15	Cir	28.331	657.36	657.64	1.000	658.31	657.93	n/a	657.93	30	Combination
53	Pipe - (34)	5.32	24	Cir	89.000	650.00	671.06	23.663	650.29	671.87	n/a	672.35	End	Combination
54	Pipe - (35)	4.71	24	Cir	80.634	671.06	674.58	4.365	671.87	675.34	n/a	675.34 j	53	Manhole
55	Pipe - (35) (1)	3.42	24	Cir	68.613	674.58	677.80	4.693	675.34	678.45	n/a	678.45 j	54	Combination
56	Pipe - (36)	2.86	24	Cir	149.256	677.90	682.38	3.002	678.45	682.97	n/a	682.97	55	Combination
57	Pipe - (37)	2.27	24	Cir	146.742	682.48	686.88	2.998	682.97	687.40	n/a	687.40	56	Combination
58	Pipe - (38)	1.67	24	Cir	151.418	686.98	693.04	4.002	687.40	693.49	n/a	693.49	57	Combination
59	Pipe - (39)	1.02	24	Cir	134.937	693.14	698.54	4.002	693.49	698.89	0.18	698.89	58	Combination
60	Pipe - (45)	0.53	15	Cir	28.473	699.01	699.58	2.002	699.21	699.86	n/a	699.86	59	Combination
61	Pipe - (44)	0.53	15	Cir	28.473	694.31	695.16	2.985	694.49	695.44	n/a	695.44	58	Combination
62	Pipe - (99)	1.76	18	Cir	139.082	674.78	682.70	5.695	675.34	683.20	n/a	683.20 j	54	Combination
63	Pipe - (100)	1.01	18	Cir	155.291	684.09	693.41	6.002	684.29	693.78	n/a	693.78	62	Combination
64	Pipe - (101)	0.53	18	Cir	28.330	693.51	693.79	0.988	693.78	694.06	n/a	694.06 j	63	Combination
65	Pipe - (43)	0.53	15	Cir	28.331	689.32	689.60	0.988	689.55	689.88	n/a	689.88	57	Combination
66	Pipe - (102)	0.53	18	Cir	28.330	683.64	684.49	3.000	683.81	684.76	n/a	684.76	62	Combination
67	Pipe - (42)	0.53	15	Cir	28.331	683.49	684.06	2.012	683.69	684.34	n/a	684.34	56	Combination
68	Pipe - (40)	0.53	15	Cir	28.331	678.73	679.02	1.024	678.96	679.30	n/a	679.30	55	Combination
69	Pipe - (41)	0.53	15	Cir	28.331	670.45	670.73	1.000	672.35*	672.35*	0.00	672.35	53	Combination
70	Pipe - (14)	7.64	18	Cir	144.488	690.00	692.28	1.578	691.06	693.35	0.85	693.35	End	Combination
71	Pipe - (22)	4.51	15	Cir	147.158	692.28	693.75	0.999	693.35	694.61	n/a	694.61 j	70	Combination
72	Pipe - (23)	4.33	15	Cir	63.362	693.85	694.48	0.994	694.61	695.32	0.41	695.32	71	Combination

Project File: storm 5-15-19.stm	Number of lines: 89	Run Date: 5/30/2019
NOTES: Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.		

Storm Sewer Summary Report

Line No.	Line ID	Flow rate (cfs)	Line Size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line Slope (%)	HGL Down (ft)	HGL Up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns Line No.	Junction Type
73	Pipe - (24)	3.05	15	Cir	28.495	694.58	694.87	1.000	695.32	695.57	n/a	695.57 j	72	Combination
74	Pipe - (25)	2.70	15	Cir	173.431	694.97	696.70	0.998	695.57	697.36	0.31	697.36	73	Combination
75	Pipe - (26)	1.87	15	Cir	121.264	696.80	698.01	0.998	697.36	698.55	n/a	698.55 j	74	Combination
76	Pipe - (27)	1.02	15	Cir	143.319	698.11	703.85	4.005	698.55	704.25	n/a	704.25 j	75	Combination
77	Pipe - (28)	0.53	15	Cir	28.330	703.95	704.23	0.988	704.25	704.51	n/a	704.51 j	76	Combination
78	Pipe - (30)	1.02	15	Cir	143.569	697.50	703.25	4.005	697.73	703.65	0.21	703.65	72	Combination
79	Pipe - (31)	0.53	15	Cir	29.172	703.35	703.64	0.994	703.65	703.92	n/a	703.92 j	78	Combination
80	Pipe - (15)	2.62	18	Cir	125.659	693.90	696.41	1.997	694.31	697.02	n/a	697.02	70	Combination
81	Pipe - (16)	2.21	18	Cir	28.199	696.51	696.80	1.028	697.02	697.36	0.24	697.36	80	Combination
82	Pipe - (17)	1.79	15	Cir	37.275	696.90	698.01	2.978	697.36	698.54	n/a	698.54	81	Combination
83	Pipe - (18)	1.02	15	Cir	221.992	698.11	702.55	2.000	698.54	702.95	n/a	702.95 j	82	Combination
84	Pipe - (19)	0.53	15	Cir	28.331	702.65	702.94	1.024	702.95	703.22	n/a	703.22 j	83	Combination
85	Pipe - (29)	0.53	15	Cir	28.330	700.78	701.63	3.000	700.96	701.91	n/a	701.91	74	Combination
86	Pipe - (21)	0.53	15	Cir	28.199	699.35	699.64	1.029	699.58	699.92	n/a	699.92	82	Combination
87	Pipe - (20)	0.53	15	Cir	28.000	695.36	695.64	1.007	695.59	695.93	n/a	695.93	70	Combination
88		0.53	15	Cir	30.776	700.22	701.14	2.989	700.40	701.42	n/a	701.42	75	Combination
89		0.09	15	Cir	39.000	697.33	697.72	1.000	697.43	697.83	n/a	697.83	71	Combination
Project File: storm 5-15-19.stm									Number of lines: 89			Run Date: 5/30/2019		
NOTES: Return period = 100 Yrs. ; *Surcharged (HGL above crown). ; j - Line contains hyd. jump.														

Hydraulic Grade Line Computations

Line	Size	Q (cfs) (3)	Downstream						Len (ft) (12)	Upstream						Check		JL coeff (K) (23)	Minor loss (ft) (24)				
			Invert elev (ft) (4)	HGL elev (ft) (5)	Depth (ft) (6)	Area (sqft) (7)	Vel (ft/s) (8)	Vel head (ft) (9)		EGL elev (ft) (10)	Sf (%) (11)	Invert elev (ft) (13)	HGL elev (ft) (14)	Depth (ft) (15)	Area (sqft) (16)	Vel (ft/s) (17)	Vel head (ft) (18)			EGL elev (ft) (19)	Sf (%) (20)	Ave Sf (%) (21)	Enrgy loss (ft) (22)
1	24	5.47	688.00	688.85	0.85	1.22	4.30	0.31	689.16	0.000	264.215	689.40	690.22 j	0.82**	1.22	4.48	0.31	690.54	0.000	0.000	n/a	0.89	n/a
2	24	5.54	689.40	690.22	0.82	1.22	4.53	0.31	690.54	0.000	82.503	690.81	691.64	0.83**	1.23	4.50	0.31	691.95	0.000	0.000	n/a	1.50	n/a
3	24	5.64	689.81	691.64	1.83	1.25	1.87	0.32	691.96	0.000	173.387	690.66	691.50	0.84**	1.25	4.52	0.32	691.81	0.000	0.000	n/a	1.50	n/a
4	24	5.07	690.66	691.50	0.84	1.16	4.06	0.30	691.79	0.000	151.974	691.40	692.19 j	0.79**	1.16	4.37	0.30	692.49	0.000	0.000	n/a	1.65	0.49
5	18	2.12	691.40	692.19	0.79	0.59	2.24	0.20	692.40	0.000	28.586	691.86	692.41 j	0.55**	0.59	3.62	0.20	692.61	0.000	0.000	n/a	1.31	0.27
6	18	1.80	691.86	692.41	0.55	0.52	3.07	0.18	692.59	0.000	145.347	694.69	695.19 j	0.50**	0.52	3.45	0.18	695.38	0.000	0.000	n/a	1.73	0.32
7	18	1.02	694.79	695.19	0.40	0.35	2.66	0.13	695.33	0.000	144.154	703.44	703.82 j	0.38**	0.35	2.94	0.13	703.95	0.000	0.000	n/a	1.49	n/a
8	15	0.53	703.54	703.82	0.28	0.20	2.63	0.10	703.92	0.000	28.330	704.11	704.39	0.28**	0.21	2.54	0.10	704.49	0.000	0.000	n/a	1.00	n/a
9	24	3.53	691.40	692.19	0.79	0.90	3.04	0.24	692.43	0.000	599.685	694.38	695.04 j	0.66**	0.90	3.93	0.24	695.28	0.000	0.000	n/a	1.69	n/a
10	15	1.39	694.38	695.04	0.66	0.42	2.13	0.17	695.21	0.000	28.000	694.75	695.22 j	0.47**	0.42	3.34	0.17	695.39	0.000	0.000	n/a	1.21	n/a
11	15	1.02	694.75	695.22	0.47	0.33	2.45	0.14	695.36	0.000	150.725	699.64	700.04 j	0.40**	0.33	3.05	0.14	700.18	0.000	0.000	n/a	1.32	0.19
12	15	0.53	699.74	700.04	0.30	0.21	2.38	0.10	700.14	0.000	29.502	700.33	700.61 j	0.28**	0.21	2.54	0.10	700.71	0.000	0.000	n/a	1.00	n/a
13	24	1.85	694.38	695.04	0.66	0.56	2.06	0.17	695.20	0.000	63.713	694.67	695.14 j	0.47**	0.56	3.28	0.17	695.31	0.000	0.000	n/a	1.50	0.25
14	15	1.40	694.67	695.14	0.47	0.42	3.32	0.17	695.32	0.000	27.920	694.81	695.28	0.47**	0.42	3.34	0.17	695.45	0.000	0.000	n/a	1.00	0.17
15	15	1.02	694.81	695.28	0.47	0.34	2.44	0.14	695.42	0.000	140.819	699.30	699.70 j	0.40**	0.34	3.05	0.14	699.84	0.000	0.000	n/a	1.29	0.19
16	15	0.53	699.40	699.70	0.30	0.21	2.38	0.10	699.80	0.000	28.330	699.68	699.96 j	0.28**	0.21	2.54	0.10	700.06	0.000	0.000	n/a	1.00	n/a
17	15	0.53	696.10	696.33	0.23*	0.16	3.34	0.10	696.43	0.000	28.307	696.38	696.66	0.28**	0.21	2.54	0.10	696.76	0.000	0.000	n/a	1.00	n/a
18	15	0.53	693.95	694.18	0.23*	0.16	3.34	0.10	694.28	0.000	28.283	694.23	694.51	0.28**	0.21	2.54	0.10	694.61	0.000	0.000	n/a	1.00	n/a
19	24	11.72	650.00	651.25	1.25	2.02	5.67	0.52	651.77	0.000	159.998	654.76	655.99 j	1.23**	2.02	5.79	0.52	656.51	0.000	0.000	n/a	1.50	0.78
20	24	11.38	654.86	655.99	1.13	1.83	6.23	0.51	656.50	0.000	28.331	655.15	656.36	1.21**	1.99	5.73	0.51	656.87	0.000	0.000	n/a	2.23	n/a
21	18	9.60	655.15	656.36	1.21	1.51	6.29	0.63	656.99	0.000	90.949	656.13	657.35 j	1.20**	1.51	6.36	0.63	657.95	0.000	0.000	n/a	0.98	n/a
Project File: storm 5-15-19.stm												Number of lines: 89						Run Date: 5/30/2019					
Notes: * depth assumed.; ** Critical depth.; j-Line contains hyd. jump. ; c = cir e = ellip b = box																							

Hydraulic Grade Line Computations

Line	Size	Q (cfs) (3)	Downstream								Len (ft) (12)	Upstream								Check		JL coeff (K) (23)	Minor loss (ft) (24)	
			Invert elev (ft) (4)	HGL elev (ft) (5)	Depth (ft) (6)	Area (sqft) (7)	Vel (ft/s) (8)	Vel head (ft) (9)	EGL elev (ft) (10)	Sf (%) (11)		Invert elev (ft) (13)	HGL elev (ft) (14)	Depth (ft) (15)	Area (sqft) (16)	Vel (ft/s) (17)	Vel head (ft) (18)	EGL elev (ft) (19)	Sf (%) (20)	Ave Sf (%) (21)	Enrgy loss (ft) (22)			
43	15	0.53	680.02	680.31	0.29	0.21	2.44	0.10	680.41	0.000	28.335	680.30	680.58 j	0.28**	0.21	2.54	0.10	680.68	0.000	0.000	n/a	1.00	n/a	
44	15	0.53	676.90	677.07	0.17*	0.10	5.48	0.10	677.17	0.000	28.331	678.04	678.32	0.28**	0.21	2.54	0.10	678.42	0.000	0.000	n/a	1.00	n/a	
45	15	0.53	671.60	671.83	0.23*	0.16	3.39	0.10	671.93	0.000	28.331	671.89	672.17	0.28**	0.21	2.54	0.10	672.27	0.000	0.000	n/a	1.00	n/a	
46	18	1.81	656.49	656.89	0.40*	0.38	4.73	0.19	657.08	0.000	58.462	657.08	657.59	0.51**	0.53	3.45	0.19	657.77	0.000	0.000	n/a	1.26	0.23	
47	18	1.02	657.18	657.59	0.41	0.35	2.64	0.13	657.72	0.000	134.322	666.58	666.96 j	0.38**	0.35	2.94	0.13	667.09	0.000	0.000	n/a	1.50	n/a	
48	15	0.53	666.68	666.96	0.28	0.20	2.63	0.10	667.06	0.000	28.330	667.53	667.81	0.28**	0.21	2.54	0.10	667.91	0.000	0.000	n/a	1.00	n/a	
49	15	0.53	666.39	666.58	0.20*	0.12	4.29	0.10	666.68	0.000	28.331	666.95	667.24	0.28**	0.21	2.54	0.10	667.34	0.000	0.000	n/a	1.00	n/a	
50	15	0.53	661.29	661.52	0.23*	0.16	3.34	0.10	661.62	0.000	28.331	661.57	661.85	0.28**	0.21	2.54	0.10	661.95	0.000	0.000	n/a	1.00	n/a	
51	15	0.53	658.73	658.93	0.20*	0.12	4.29	0.10	659.03	0.000	28.330	659.30	659.58	0.28**	0.21	2.54	0.10	659.68	0.000	0.000	n/a	1.00	n/a	
52	15	0.53	657.36	658.31	0.95	0.21	0.53	0.10	658.41	0.000	28.331	657.64	657.93	0.28**	0.21	2.54	0.10	658.03	0.000	0.000	n/a	1.00	n/a	
53	24	5.32	650.00	650.29	0.29*	0.28	19.09	0.31	650.59	0.000	89.000	671.06	671.87	0.81**	1.20	4.44	0.31	672.18	0.000	0.000	n/a	1.56	n/a	
54	24	4.71	671.06	671.87	0.81	1.10	3.93	0.28	672.16	0.000	80.634	674.58	675.34 j	0.76**	1.10	4.28	0.28	675.63	0.000	0.000	n/a	1.00	0.28	
55	24	3.42	674.58	675.34	0.76	0.88	3.10	0.24	675.58	0.000	68.613	677.80	678.45 j	0.65**	0.88	3.89	0.24	678.68	0.000	0.000	n/a	1.50	0.35	
56	24	2.86	677.90	678.45	0.55	0.70	4.11	0.21	678.66	0.000	149.256	682.38	682.97	0.59**	0.77	3.70	0.21	683.18	0.000	0.000	n/a	1.50	n/a	
57	24	2.27	682.48	682.97	0.49	0.60	3.82	0.19	683.16	0.000	146.742	686.88	687.40	0.52**	0.65	3.47	0.19	687.59	0.000	0.000	n/a	1.50	n/a	
58	24	1.67	686.98	687.40	0.42	0.49	3.44	0.16	687.56	0.000	151.418	693.04	693.49	0.45**	0.52	3.18	0.16	693.64	0.000	0.000	n/a	1.49	n/a	
59	24	1.02	693.14	693.49	0.35	0.36	2.80	0.12	693.61	0.000	134.937	698.54	698.89	0.35**	0.37	2.79	0.12	699.01	0.000	0.000	n/a	1.49	0.18	
60	15	0.53	699.01	699.21	0.20*	0.12	4.29	0.10	699.31	0.000	28.473	699.58	699.86	0.28**	0.21	2.54	0.10	699.96	0.000	0.000	n/a	1.00	n/a	
61	15	0.53	694.31	694.49	0.18*	0.11	4.93	0.10	694.59	0.000	28.473	695.16	695.44	0.28**	0.21	2.54	0.10	695.54	0.000	0.000	n/a	1.00	n/a	
62	18	1.76	674.78	675.34	0.56	0.51	2.90	0.18	675.53	0.000	139.082	682.70	683.20 j	0.50**	0.51	3.42	0.18	683.38	0.000	0.000	n/a	1.50	n/a	
63	18	1.01	684.09	684.29	0.20*	0.14	7.44	0.13	684.42	0.000	155.291	693.41	693.78	0.37**	0.34	2.92	0.13	693.92	0.000	0.000	n/a	1.50	n/a	
Project File: storm 5-15-19.stm												Number of lines: 89								Run Date: 5/30/2019				
Notes: * depth assumed.; ** Critical depth.; j-Line contains hyd. jump. ; c = cir e = ellip b = box																								

Hydraulic Grade Line Computations

Line	Size	Q (cfs) (3)	Downstream								Len (ft) (12)	Upstream								Check		JL coeff (K) (23)	Minor loss (ft) (24)	
			Invert elev (ft) (4)	HGL elev (ft) (5)	Depth (ft) (6)	Area (sqft) (7)	Vel (ft/s) (8)	Vel head (ft) (9)	EGL elev (ft) (10)	Sf (%) (11)		Invert elev (ft) (13)	HGL elev (ft) (14)	Depth (ft) (15)	Area (sqft) (16)	Vel (ft/s) (17)	Vel head (ft) (18)	EGL elev (ft) (19)	Sf (%) (20)	Ave Sf (%) (21)	Energy loss (ft) (22)			
	(1)	(2)																						
64	18	0.53	693.51	693.78	0.27	0.22	2.41	0.09	693.88	0.000	28.330	693.79	694.06 j	0.27**	0.22	2.46	0.09	694.15	0.000	0.000	n/a	1.00	n/a	
65	15	0.53	689.32	689.55	0.23*	0.16	3.34	0.10	689.65	0.000	28.331	689.60	689.88	0.28**	0.21	2.54	0.10	689.98	0.000	0.000	n/a	1.00	n/a	
66	18	0.53	683.64	683.81	0.17*	0.11	4.82	0.09	683.91	0.000	28.330	684.49	684.76	0.27**	0.22	2.46	0.09	684.86	0.000	0.000	n/a	1.00	n/a	
67	15	0.53	683.49	683.69	0.20*	0.12	4.29	0.10	683.79	0.000	28.331	684.06	684.34	0.28**	0.21	2.54	0.10	684.44	0.000	0.000	n/a	1.00	n/a	
68	15	0.53	678.73	678.96	0.23*	0.16	3.39	0.10	679.06	0.000	28.331	679.02	679.30	0.28**	0.21	2.54	0.10	679.40	0.000	0.000	n/a	1.00	n/a	
69	15	0.53	670.45	672.35	1.25	1.23	0.43	0.00	672.35	0.006	28.331	670.73	672.35	1.25	1.23	0.43	0.00	672.35	0.006	0.006	0.002	1.00	0.00	
70	18	7.64	690.00	691.06	1.06	1.33	5.72	0.50	691.56	0.000	144.488	692.28	693.35	1.07**	1.35	5.67	0.50	693.85	0.000	0.000	n/a	1.70	0.85	
71	15	4.51	692.28	693.35	1.07	0.90	4.04	0.39	693.74	0.000	147.158	693.75	694.61 j	0.86**	0.90	5.01	0.39	695.00	0.000	0.000	n/a	1.50	0.59	
72	15	4.33	693.85	694.61	0.76	0.78	5.54	0.38	694.99	0.000	63.362	694.48	695.32	0.84**	0.88	4.92	0.38	695.70	0.000	0.000	n/a	1.08	0.41	
73	15	3.05	694.58	695.32	0.74	0.71	4.02	0.29	695.61	0.000	28.495	694.87	695.57 j	0.70**	0.71	4.30	0.29	695.86	0.000	0.000	n/a	0.72	n/a	
74	15	2.70	694.97	695.57	0.60	0.58	4.65	0.26	695.83	0.000	173.431	696.70	697.36	0.66**	0.66	4.12	0.26	697.62	0.000	0.000	n/a	1.16	0.31	
75	15	1.87	696.80	697.36	0.56	0.51	3.52	0.21	697.57	0.000	121.264	698.01	698.55 j	0.54**	0.51	3.65	0.21	698.76	0.000	0.000	n/a	1.38	n/a	
76	15	1.02	698.11	698.55	0.44	0.34	2.62	0.14	698.70	0.000	143.319	703.85	704.25 j	0.40**	0.34	3.05	0.14	704.39	0.000	0.000	n/a	1.50	0.22	
77	15	0.53	703.95	704.25	0.30	0.21	2.38	0.10	704.35	0.000	28.330	704.23	704.51 j	0.28**	0.21	2.54	0.10	704.61	0.000	0.000	n/a	1.00	n/a	
78	15	1.02	697.50	697.73	0.23*	0.15	6.64	0.14	697.87	0.000	143.569	703.25	703.65	0.40**	0.34	3.05	0.14	703.79	0.000	0.000	n/a	1.46	0.21	
79	15	0.53	703.35	703.65	0.30	0.21	2.38	0.10	703.75	0.000	29.172	703.64	703.92 j	0.28**	0.21	2.54	0.10	704.02	0.000	0.000	n/a	1.00	n/a	
80	18	2.62	693.90	694.31	0.41*	0.39	6.70	0.23	694.54	0.000	125.659	696.41	697.02	0.61**	0.68	3.86	0.23	697.26	0.000	0.000	n/a	1.50	n/a	
81	18	2.21	696.51	697.02	0.51	0.53	4.13	0.21	697.23	0.000	28.199	696.80	697.36	0.56**	0.60	3.66	0.21	697.57	0.000	0.000	n/a	1.13	0.24	
82	15	1.79	696.90	697.36	0.46	0.41	4.34	0.20	697.56	0.000	37.275	698.01	698.54	0.53**	0.50	3.60	0.20	698.74	0.000	0.000	n/a	1.68	n/a	
83	15	1.02	698.11	698.54	0.43	0.34	2.73	0.14	698.69	0.000	221.992	702.55	702.95 j	0.40**	0.34	3.05	0.14	703.09	0.000	0.000	n/a	1.50	0.22	
84	15	0.53	702.65	702.95	0.30	0.21	2.38	0.10	703.05	0.000	28.331	702.94	703.22 j	0.28**	0.21	2.54	0.10	703.32	0.000	0.000	n/a	1.00	n/a	
Project File: storm 5-15-19.stm												Number of lines: 89								Run Date: 5/30/2019				
Notes: * depth assumed.; ** Critical depth.; j-Line contains hyd. jump. ; c = cir e = ellip b = box																								

Hydraulic Grade Line Computations

Line	Size	Q (cfs) (3)	Downstream								Len (ft) (12)	Upstream								Check		JL coeff (K) (23)	Minor loss (ft) (24)	
			Invert elev (ft) (4)	HGL elev (ft) (5)	Depth (ft) (6)	Area (sqft) (7)	Vel (ft/s) (8)	Vel head (ft) (9)	EGL elev (ft) (10)	Sf (%) (11)		HGL elev (ft) (14)	Depth (ft) (15)	Area (sqft) (16)	Vel (ft/s) (17)	Vel head (ft) (18)	EGL elev (ft) (19)	Sf (%) (20)	Ave Sf (%) (21)	Enrgy loss (ft) (22)				
(1)	(in) (2)																							
85	15	0.53	700.78	700.96	0.18*	0.11	4.94	0.10	701.06	0.000	28.330	701.63	701.91	0.28**	0.21	2.54	0.10	702.01	0.000	0.000	n/a	1.00	n/a	
86	15	0.53	699.35	699.58	0.23*	0.16	3.39	0.10	699.68	0.000	28.199	699.64	699.92	0.28**	0.21	2.54	0.10	700.02	0.000	0.000	n/a	1.00	n/a	
87	15	0.53	695.36	695.59	0.23*	0.16	3.36	0.10	695.69	0.000	28.000	695.64	695.93	0.28**	0.21	2.54	0.10	696.03	0.000	0.000	n/a	1.00	n/a	
88	15	0.53	700.22	700.40	0.18*	0.11	4.93	0.10	700.50	0.000	30.776	701.14	701.42	0.28**	0.21	2.54	0.10	701.52	0.000	0.000	n/a	1.00	n/a	
89	15	0.09	697.33	697.43	0.10*	0.05	1.96	0.04	697.47	0.000	39.000	697.72	697.83	0.11**	0.06	1.58	0.04	697.87	0.000	0.000	n/a	1.00	n/a	
Project File: storm 5-15-19.stm												Number of lines: 89								Run Date: 5/30/2019				
Notes: * depth assumed.; ** Critical depth.; j-Line contains hyd. jump. ; c = cir e = ellip b = box																								

Hydraflow HGL Computation Procedure

General Procedure:

Hydraflow computes the HGL using the Bernoulli energy equation. Manning's equation is used to determine energy losses due to pipe friction. In a standard step, iterative procedure, Hydraflow assumes upstream HGLs until the energy equation balances. If the energy equation cannot balance, supercritical flow exists and critical depth is temporarily assumed at the upstream end. A supercritical flow Profile is then computed using the same procedure in a downstream direction using momentum principles.

Col. 1 The line number being computed. Calculations begin at Line 1 and proceed upstream.

Col. 2 The line size. In the case of non-circular pipes, the line rise is printed above the span.

Col. 3 Total flow rate in the line.

Col. 4 The elevation of the downstream invert.

Col. 5 Elevation of the hydraulic grade line at the downstream end. This is computed as the upstream HGL + Minor loss of this line's downstream line.

Col. 6 The downstream depth of flow inside the pipe (HGL - Invert elevation) but not greater than the line size.

Col. 7 Cross-sectional area of the flow at the downstream end.

Col. 8 The velocity of the flow at the downstream end, (Col. 3 / Col. 7).

Col. 9 Velocity head (Velocity squared / 2g).

Col. 10 The elevation of the energy grade line at the downstream end, HGL + Velocity head, (Col. 5 + Col. 9).

Col. 11 The friction slope at the downstream end (the S or Slope term in Manning's equation).

Col. 12 The line length.

Col. 13 The elevation of the upstream invert.

Col. 14 Elevation of the hydraulic grade line at the upstream end.

Col. 15 The upstream depth of flow inside the pipe (HGL - Invert elevation) but not greater than the line size.

Col. 16 Cross-sectional area of the flow at the upstream end.

Col. 17 The velocity of the flow at the upstream end, (Col. 3 / Col. 16).

Col. 18 Velocity head (Velocity squared / 2g).

Col. 19 The elevation of the energy grade line at the upstream end, HGL + Velocity head, (Col. 14 + Col. 18) .

Col. 20 The friction slope at the upstream end (the S or Slope term in Manning's equation).

Col. 21 The average of the downstream and upstream friction slopes.

Col. 22 Energy loss. Average $Sf/100 \times \text{Line Length}$ (Col. 21/100 x Col. 12). Equals (EGL upstream - EGL downstream) +/- tolerance.

Col. 23 The junction loss coefficient (K).

Col. 24 Minor loss. (Col. 23 x Col. 18). Is added to upstream HGL and used as the starting HGL for the next upstream line(s).

APPENDIX E

North POND 1

SUBSURFACE LEVEL SPREADER CALCULATION

$$L \text{ (length of level spreader pipe)} = Q / QL$$

$$QL \text{ (perforation flow rate)} = Cd * A * (2 * g * H)^{0.5}$$

$$Cd = \text{Coefficient of discharge (typically 0.60)}$$

$$A = \text{Cross sectional area of one perforation (ft}^2\text{)} = 0.00136$$

$$g = 32.2 \text{ ft/sec}^2$$

$$H = \text{head, average height of water above perforation (ft)} = 1.11$$

24-inch pipe with 24-0.5-in holes per linear foot

$$QL = 0.591$$

$$H = 0.418 \text{ feet}$$

$$Q = 75.76 \text{ cfs}$$

$$L = 75.76 \text{ cfs} / (0.591 \text{ cfs/ft})$$

$$= 128 \text{ L.F.}$$

128 L.F. LEVEL SPREADER PROPOSED

South POND 2

SUBSURFACE LEVEL SPREADER CALCULATION

$$L \text{ (length of level spreader pipe)} = Q / QL$$

$$QL \text{ (perforation flow rate)} = Cd * A * (2 * g * H)^{0.5}$$

$$Cd = \text{Coefficient of discharge (typically 0.60)}$$

$$A = \text{Cross sectional area of one perforation (ft}^2\text{)} = 0.00136$$

$$g = 32.2 \text{ ft/sec}^2$$

$$H = \text{head, average height of water above perforation (ft)} = 1.11$$

24-inch pipe with 24-0.5-in holes per linear foot

$$QL = 0.591$$

$$H = 0.418 \text{ feet}$$

$$Q = 9.582 \text{ cfs}$$

$$L = 9.582 \text{ cfs} / (0.591 \text{ cfs/ft})$$

$$= 16.23 \text{ L.F.}$$

18 L.F. LEVEL SPREADER PROPOSED

Hydro graph Run 25-yr storm 12 hour duration

Hydrograph Return Period Recap..... 1

25 - Year

Hydrograph Reports..... 2

 Hydrograph No. 1, SCS Runoff, ex da-1..... 2

 TR-55 Tc Worksheet..... 3

 Hydrograph No. 2, SCS Runoff, proposed da-1..... 4

 TR-55 Tc Worksheet..... 5

 Hydrograph No. 3, SCS Runoff, DA-2 Existing..... 6

 TR-55 Tc Worksheet..... 7

 Hydrograph No. 4, SCS Runoff, Proposed DA-2..... 8

 TR-55 Tc Worksheet..... 9

 Hydrograph No. 5, Reservoir, pond 1 control..... 10

 Pond Report - pond 1..... 11

 Hydrograph No. 6, Reservoir, pond 2 control..... 12

 Pond Report - pond 2..... 13

IDF Report..... 14

Hydrograph Return Period Recap

Hydroflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	SCS Runoff	-----	-----	-----	-----	-----	-----	83.30	-----	-----	ex da-1
2	SCS Runoff	-----	-----	-----	-----	-----	-----	114.11	-----	-----	proposed da-1
3	SCS Runoff	-----	-----	-----	-----	-----	-----	50.78	-----	-----	DA-2 Existing
4	SCS Runoff	-----	-----	-----	-----	-----	-----	62.92	-----	-----	Proposed DA-2
5	Reservoir	2	-----	-----	-----	-----	-----	68.30	-----	-----	pond 1 control
6	Reservoir	4	-----	-----	-----	-----	-----	7.564	-----	-----	pond 2 control
Proj. file: drainage 12-hours.gpw										Thursday, 01 / 7 / 2021	

Hydrograph Report

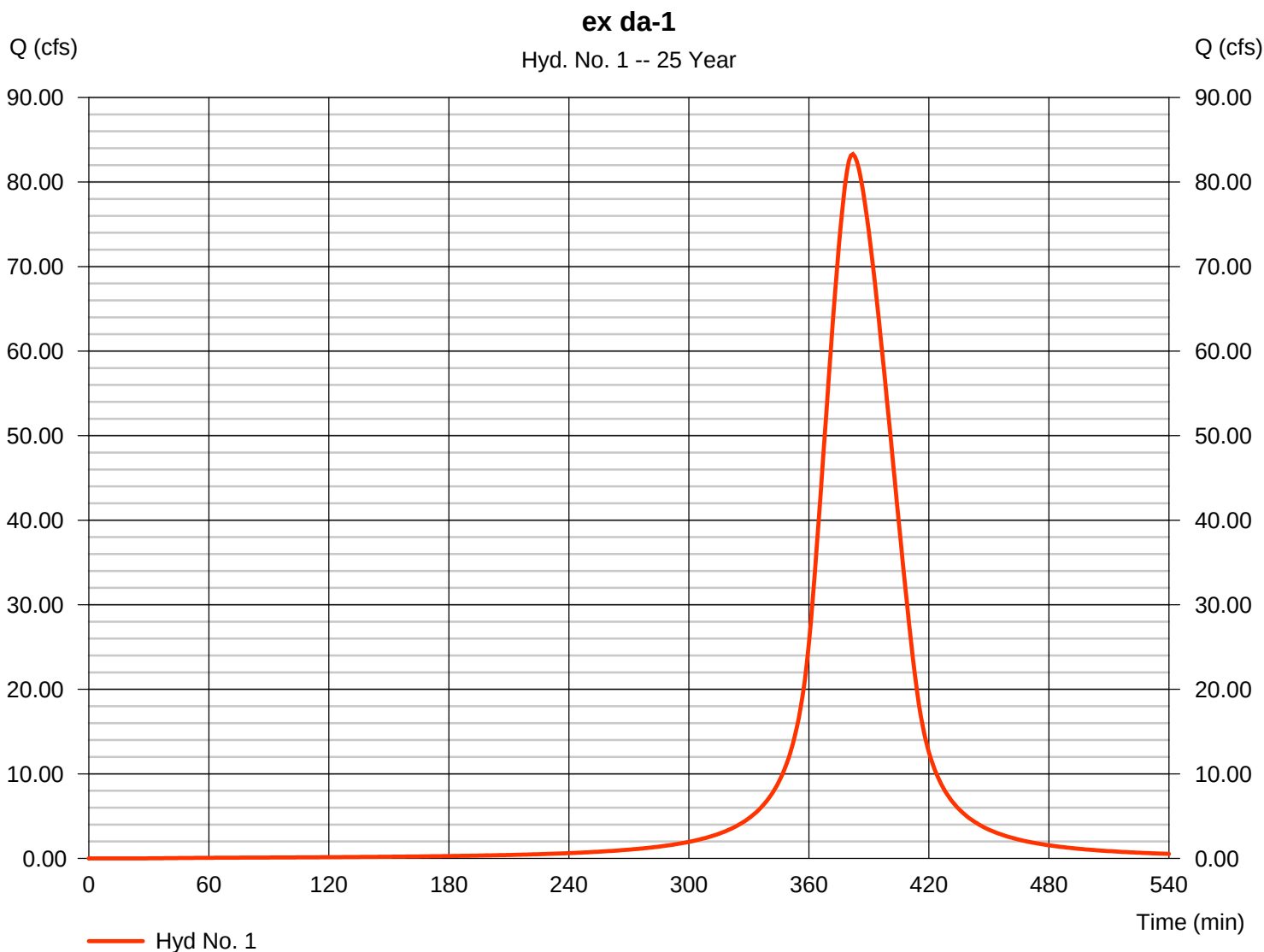
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

Hyd. No. 1

ex da-1

Hydrograph type	= SCS Runoff	Peak discharge	= 83.30 cfs
Storm frequency	= 25 yrs	Time to peak	= 382 min
Time interval	= 1 min	Hyd. volume	= 242,069 cuft
Drainage area	= 24.700 ac	Curve number	= 68
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 34.90 min
Total precip.	= 2.70 in	Distribution	= Synthetic
Storm duration	= 12.00 hrs	Shape factor	= 484



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No. 1

ex da-1

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.400	0.011	0.011	
Flow length (ft)	= 300.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.62	0.00	0.00	
Land slope (%)	= 6.00	0.00	0.00	
Travel Time (min)	= 31.33	+	0.00	+
			0.00	= 31.33
Shallow Concentrated Flow				
Flow length (ft)	= 837.00	0.00	0.00	
Watercourse slope (%)	= 6.00	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=3.95	0.00	0.00	
Travel Time (min)	= 3.53	+	0.00	+
			0.00	= 3.53
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00	0.00	0.00	
Flow length (ft)	({0})0.0	0.0	0.0	
Travel Time (min)	= 0.00	+	0.00	+
			0.00	= 0.00
Total Travel Time, Tc				34.90 min

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

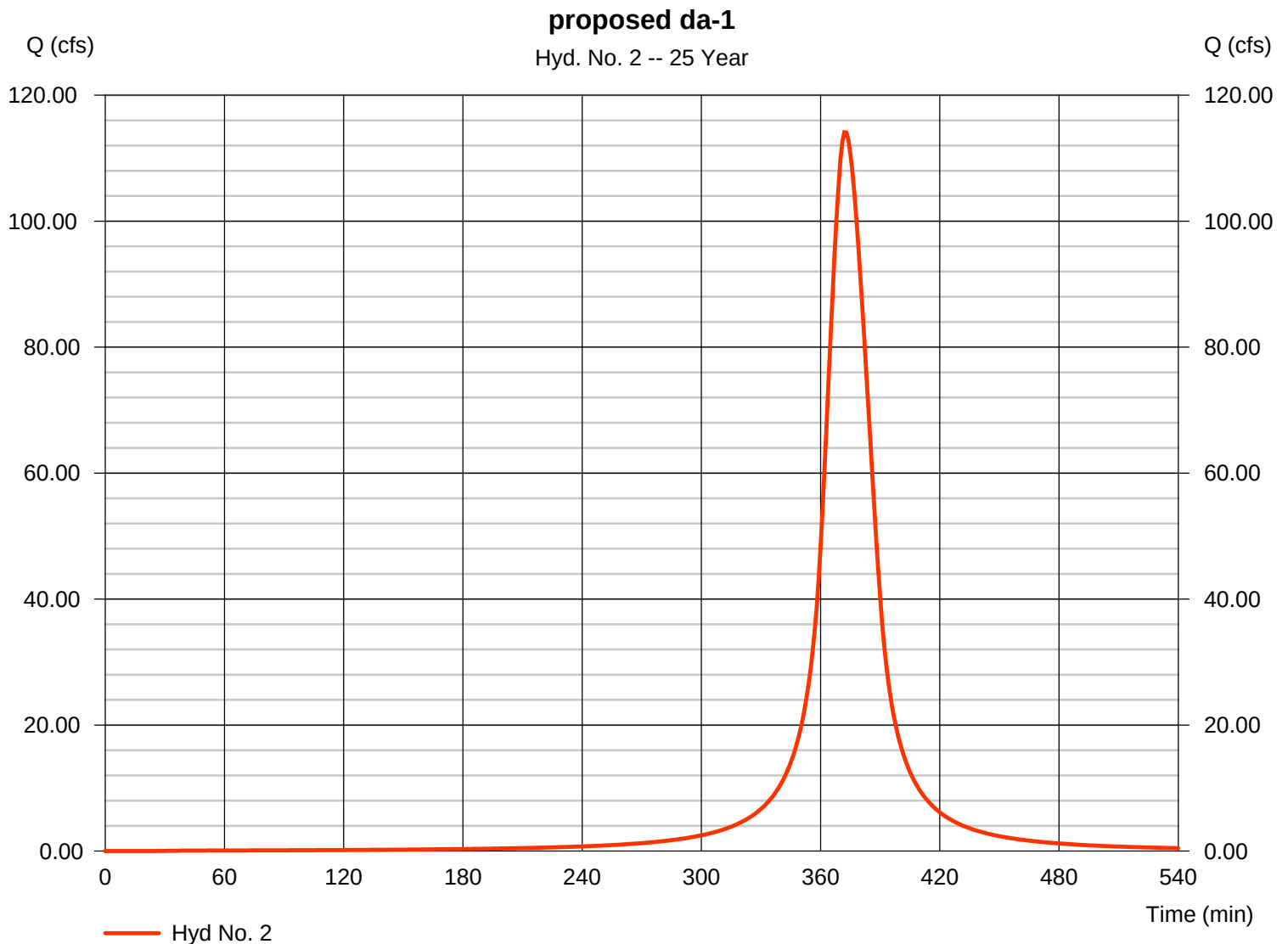
Hyd. No. 2

proposed da-1

Hydrograph type = SCS Runoff
 Storm frequency = 25 yrs
 Time interval = 1 min
 Drainage area = 24.700 ac
 Basin Slope = 0.0 %
 Tc method = TR55
 Total precip. = 2.70 in
 Storm duration = 12.00 hrs

Peak discharge = 114.11 cfs
 Time to peak = 372 min
 Hyd. volume = 242,069 cuft
 Curve number = 73*
 Hydraulic length = 0 ft
 Time of conc. (Tc) = 19.30 min
 Distribution = Synthetic
 Shape factor = 484

* Composite (Area/CN) = $[(16.650 \times 61) + (8.050 \times 98)] / 24.700$



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No. 2

proposed da-1

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>			
Sheet Flow							
Manning's n-value	= 0.011	0.150	0.011				
Flow length (ft)	= 300.0	300.0	0.0				
Two-year 24-hr precip. (in)	= 3.62	3.62	0.00				
Land slope (%)	= 5.00	5.00	0.00				
Travel Time (min)	= 1.90	+	15.38	+	0.00	=	17.28
Shallow Concentrated Flow							
Flow length (ft)	= 0.00	0.00	0.00				
Watercourse slope (%)	= 0.00	0.00	0.00				
Surface description	= Paved	Paved	Paved				
Average velocity (ft/s)	=0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Channel Flow							
X sectional flow area (sqft)	= 1.76	0.00	0.00				
Wetted perimeter (ft)	= 4.71	0.00	0.00				
Channel slope (%)	= 0.50	0.00	0.00				
Manning's n-value	= 0.011	0.015	0.015				
Velocity (ft/s)	=4.95	0.00	0.00				
Flow length (ft)	((0})600.0	0.0	0.0				
Travel Time (min)	= 2.02	+	0.00	+	0.00	=	2.02
Total Travel Time, Tc					19.30 min		

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

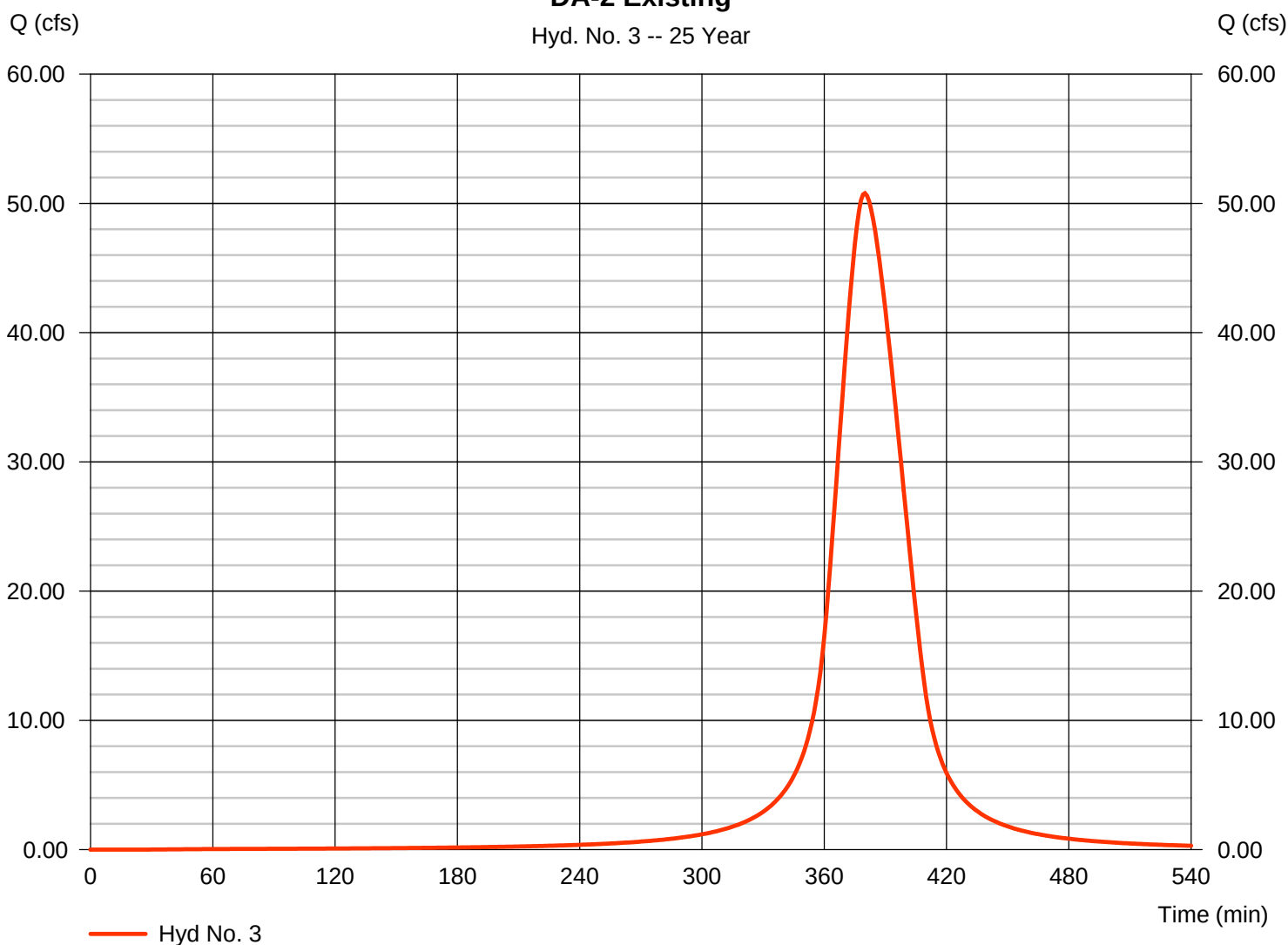
Hyd. No. 3

DA-2 Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 50.78 cfs
Storm frequency	= 25 yrs	Time to peak	= 380 min
Time interval	= 1 min	Hyd. volume	= 139,390 cuft
Drainage area	= 14.130 ac	Curve number	= 68
Basin Slope	= 6.0 %	Hydraulic length	= 300 ft
Tc method	= TR55	Time of conc. (Tc)	= 32.00 min
Total precip.	= 2.70 in	Distribution	= Synthetic
Storm duration	= 12.00 hrs	Shape factor	= 484

DA-2 Existing

Hyd. No. 3 -- 25 Year



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No. 3

DA-2 Existing

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.400	0.011	0.011	
Flow length (ft)	= 300.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 3.62	0.00	0.00	
Land slope (%)	= 6.00	0.00	0.00	
Travel Time (min)	= 31.33	+ 0.00	+ 0.00	= 31.33
Shallow Concentrated Flow				
Flow length (ft)	= 250.00	0.00	0.00	
Watercourse slope (%)	= 13.00	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=5.82	0.00	0.00	
Travel Time (min)	= 0.72	+ 0.00	+ 0.00	= 0.72
Channel Flow				
X sectional flow area (sqft)	= 0.00	0.00	0.00	
Wetted perimeter (ft)	= 0.00	0.00	0.00	
Channel slope (%)	= 0.00	0.00	0.00	
Manning's n-value	= 0.015	0.015	0.015	
Velocity (ft/s)	=0.00	0.00	0.00	
Flow length (ft)	({0})0.0	0.0	0.0	
Travel Time (min)	= 0.00	+ 0.00	+ 0.00	= 0.00
Total Travel Time, Tc				32.00 min

Hydrograph Report

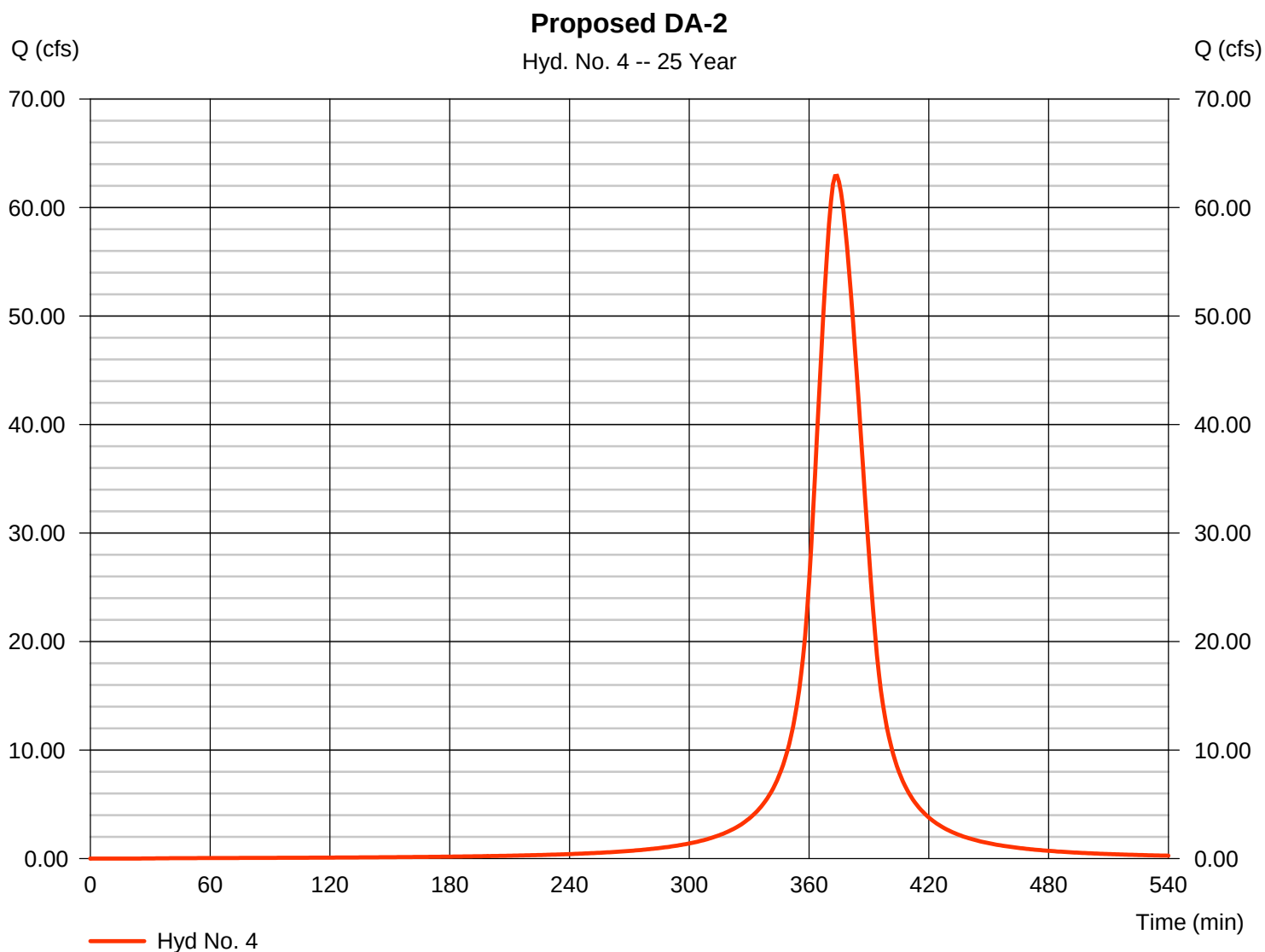
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

Hyd. No. 4

Proposed DA-2

Hydrograph type	= SCS Runoff	Peak discharge	= 62.92 cfs
Storm frequency	= 25 yrs	Time to peak	= 374 min
Time interval	= 1 min	Hyd. volume	= 139,811 cuft
Drainage area	= 14.130 ac	Curve number	= 76*
Basin Slope	= 6.0 %	Hydraulic length	= 300 ft
Tc method	= TR55	Time of conc. (Tc)	= 21.60 min
Total precip.	= 2.70 in	Distribution	= Synthetic
Storm duration	= 12.00 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(5.839 \times 98) + (8.290 \times 61)] / 14.130$ 

TR55 Tc Worksheet

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Hyd. No. 4

Proposed DA-2

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>			
Sheet Flow							
Manning's n-value	= 0.011	0.150	0.011				
Flow length (ft)	= 300.0	300.0	0.0				
Two-year 24-hr precip. (in)	= 3.62	3.62	0.00				
Land slope (%)	= 5.00	5.00	0.00				
Travel Time (min)	= 1.90	+	15.38	+	0.00	=	17.28
Shallow Concentrated Flow							
Flow length (ft)	= 0.00	0.00	0.00				
Watercourse slope (%)	= 0.00	0.00	0.00				
Surface description	= Paved	Paved	Paved				
Average velocity (ft/s)	=0.00	0.00	0.00				
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Channel Flow							
X sectional flow area (sqft)	= 1.76	0.00	0.00				
Wetted perimeter (ft)	= 4.71	0.00	0.00				
Channel slope (%)	= 0.50	0.00	0.00				
Manning's n-value	= 0.011	0.015	0.015				
Velocity (ft/s)	=4.95	0.00	0.00				
Flow length (ft)	((0})1287.0	0.0	0.0				
Travel Time (min)	= 4.33	+	0.00	+	0.00	=	4.33
Total Travel Time, Tc					21.60 min		

Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

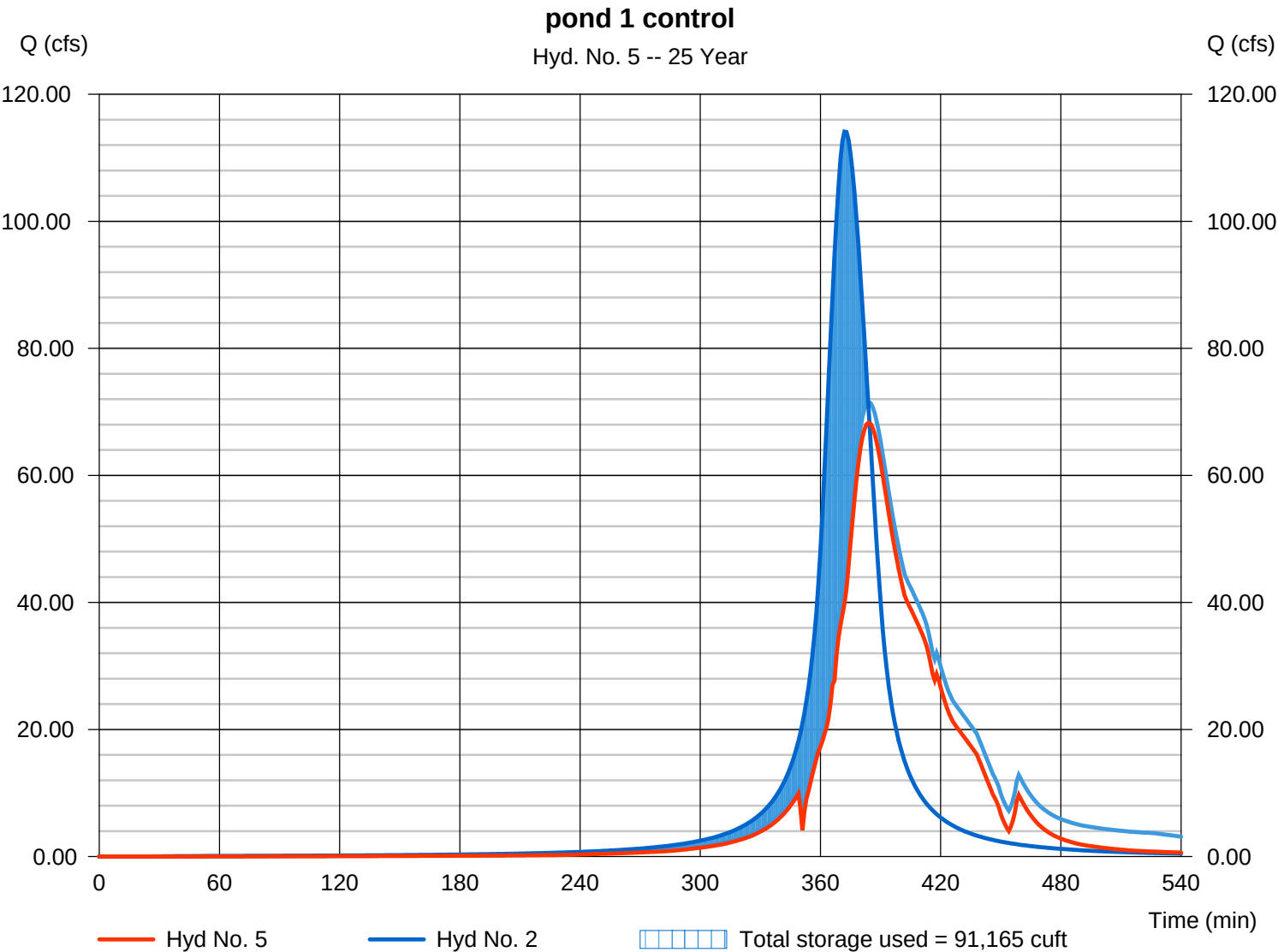
Thursday, 01 / 7 / 2021

Hyd. No. 5

pond 1 control

Hydrograph type	= Reservoir	Peak discharge	= 68.30 cfs
Storm frequency	= 25 yrs	Time to peak	= 384 min
Time interval	= 1 min	Hyd. volume	= 228,429 cuft
Inflow hyd. No.	= 2 - proposed da-1	Max. Elevation	= 659.59 ft
Reservoir name	= pond 1	Max. Storage	= 91,165 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond No. 1 - pond 1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 650.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	650.00	5,918	0	0
2.00	652.00	7,279	13,172	13,172
4.00	654.00	8,754	16,009	29,181
6.00	656.00	10,344	19,074	48,255
8.00	658.00	12,048	22,368	70,623
10.00	660.00	13,856	25,880	96,503

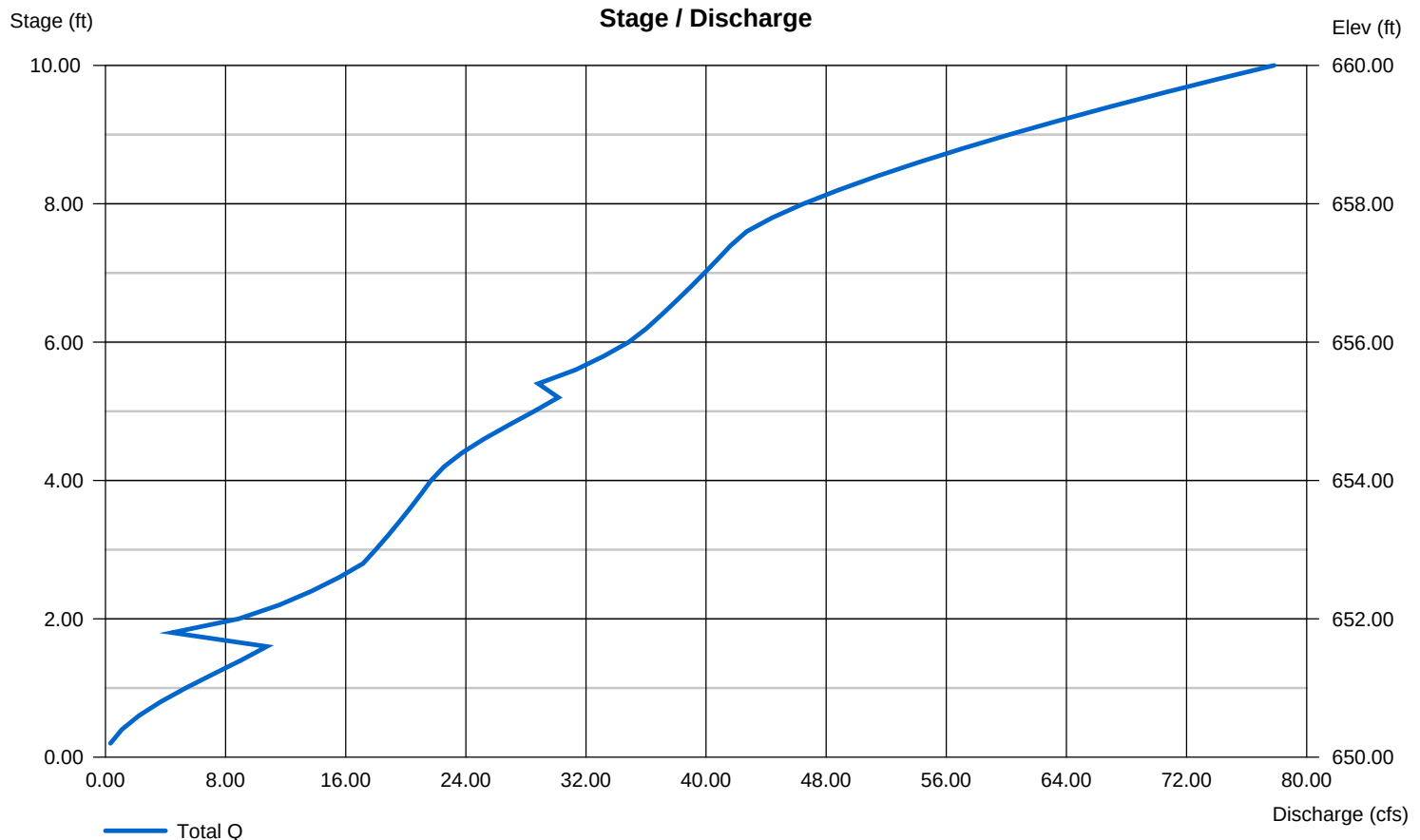
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	21.00	15.50	0.00
Span (in)	= 0.00	21.00	15.50	0.00
No. Barrels	= 0	1	1	0
Invert El. (ft)	= 0.00	650.00	654.00	0.00
Length (ft)	= 0.00	0.50	0.50	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	2.00	0.00	0.00
Crest El. (ft)	= 0.00	657.50	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	Rect	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 6.000 (by Contour)			
TW Elev. (ft)	= 0.00			

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



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

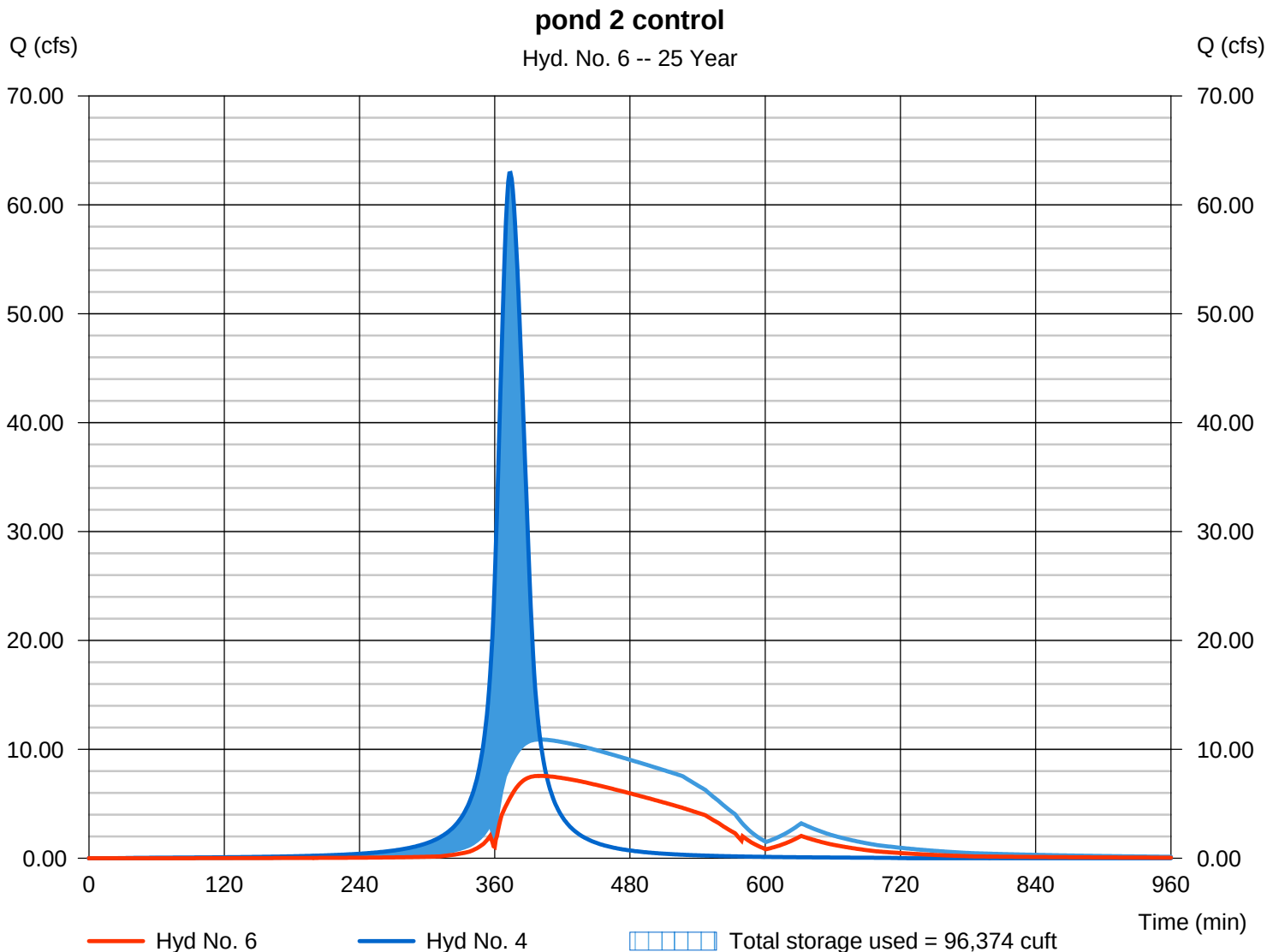
Thursday, 01 / 7 / 2021

Hyd. No. 6

pond 2 control

Hydrograph type	= Reservoir	Peak discharge	= 7.564 cfs
Storm frequency	= 25 yrs	Time to peak	= 400 min
Time interval	= 1 min	Hyd. volume	= 88,331 cuft
Inflow hyd. No.	= 4 - Proposed DA-2	Max. Elevation	= 694.50 ft
Reservoir name	= pond 2	Max. Storage	= 96,374 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

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Hydraflow Hydrographs Extension for Autodesk® Civil 3D® 2019 by Autodesk, Inc. v2020

Thursday, 01 / 7 / 2021

Pond No. 2 - pond 2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Beginning Elevation = 690.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	690.00	18,677	0	0
2.00	692.00	20,975	39,626	39,626
4.00	694.00	23,406	44,354	83,980
6.00	696.00	25,972	49,351	133,331

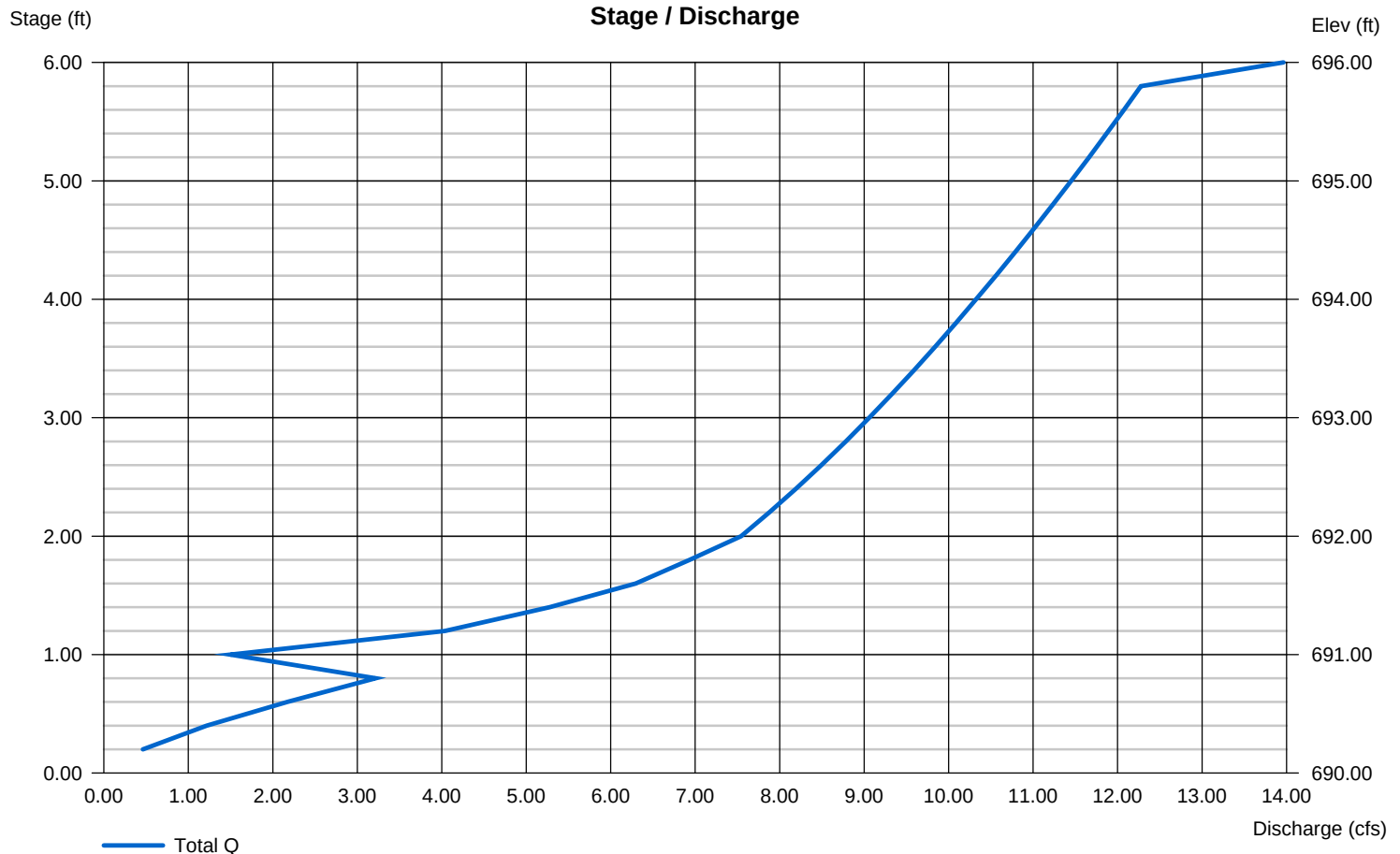
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 0.00	12.00	0.00	0.00
Span (in)	= 0.00	12.00	0.00	0.00
No. Barrels	= 0	1	0	0
Invert El. (ft)	= 0.00	690.00	0.00	0.00
Length (ft)	= 0.00	0.50	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

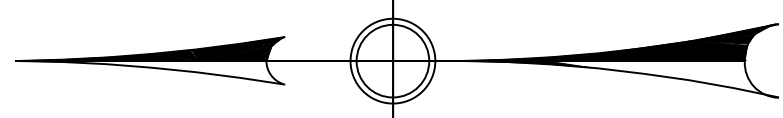
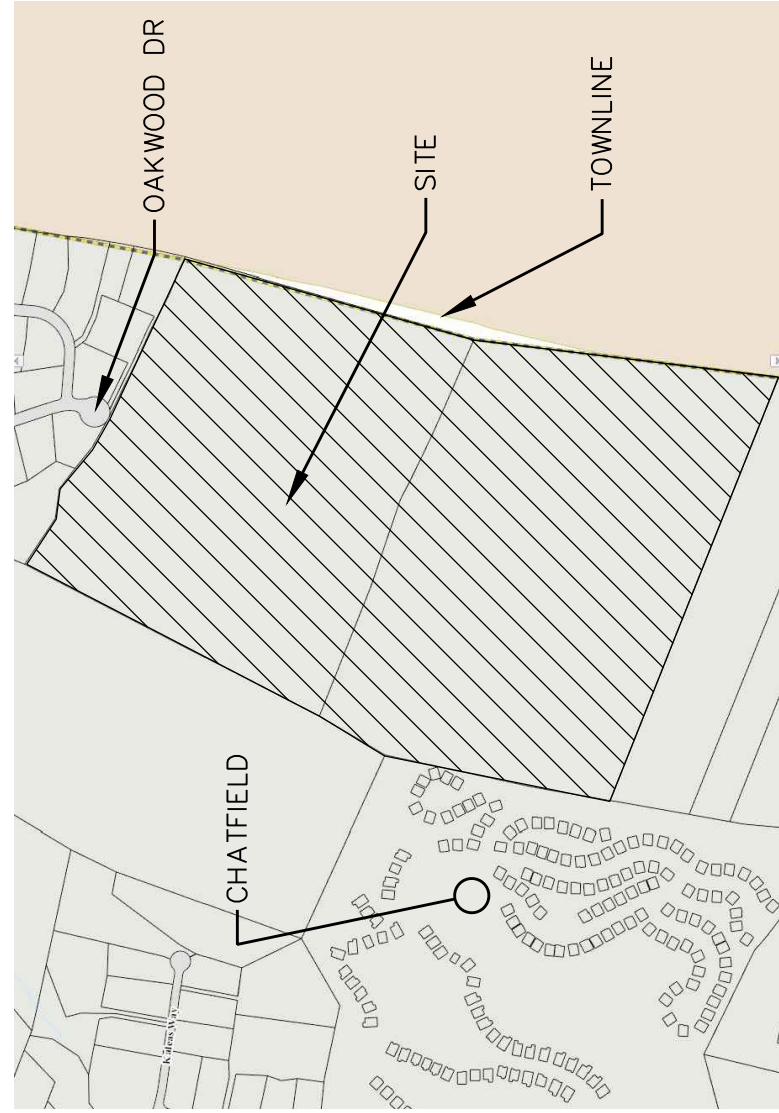
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	5.00	0.00	0.00
Crest El. (ft)	= 0.00	695.80	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	Rect	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 6.000 (by Contour)			
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).



APPENDIX F
Drainage Area Maps



ROSE
TISO
& CO. LLC.
ARCHITECTS • SURVEYORS • ENGINEERS

WWW.ROSETISO.COM
35 BRENTWOOD AVENUE, FAIRFIELD, CT 06825
TEL: (203) 610-6262 • FAX: (203) 610-6404

REVISIONS		
NO.	BY	DATE DESCRIPTION
1.	MJS	8-08-19 WETLANDS SUBMISSION
2.	MJS	10-04-19 ENGINEERING COMMENTS
3.	SFS	3-17-20 ZONE CHANGE APPLICATION
4.	MJS	01-07-21 WETLANDS SUBMISSION
5.	MJS	01-27-21 WETLANDS COMMENTS
6.	MJS	03-18-21 WETLANDS COMMENTS
7.	MJS	03-31-21 WETLANDS COMMENTS
8.	MJS	08-05-21 STAFF COMMENTS
9.	MJS	11-23-23 STAFF COMMENTS
10.	MJS	6-21-24 STAFF COMMENTS
11.	MJS	9-27-24 STAFF COMMENTS
12.	MJS	10-24-24 ENGINEERING COMMENTS
13.	MJS	12-13-24 LOT LINES ADDED

PROJECT TITLE

HOPP BROOK ESTATES
FINAL SITE PLANS

OAKWOOD LANE
BEACON FALLS, CT.

Prepared For:
HOPP BROOK DEVELOPERS LLC

SHEET TITLE

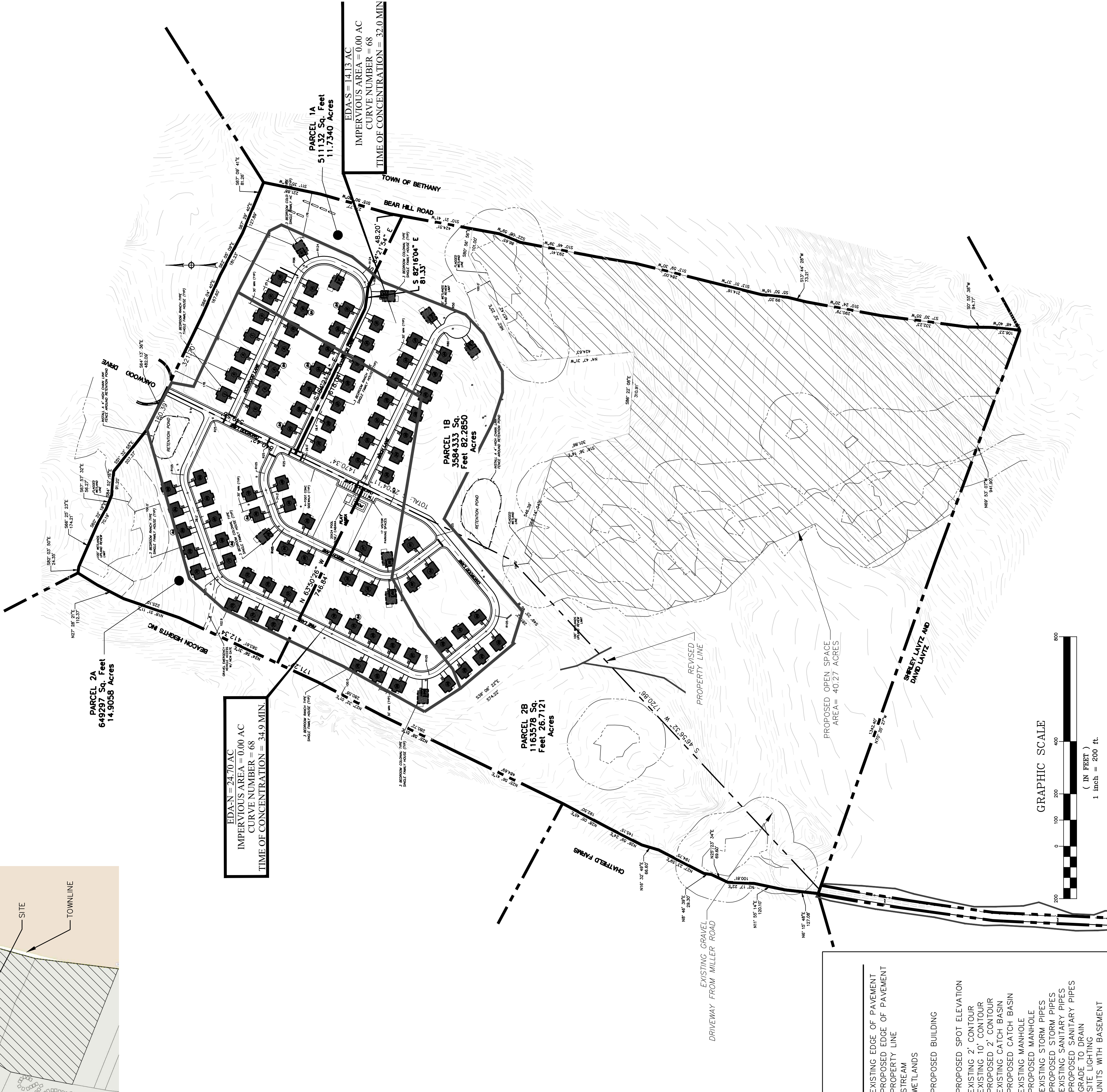
EXISTING DRAINAGE
AREA MAP

DESIGNED BY: MJS	SCALE: 1"=200'
DRAWN BY: MJS	DATE: 2-23-18
CHECKED BY: MJS	PROJECT NUMBER: 2215
CAD FILE: 2215	

SEAL

SHEET NUMBER

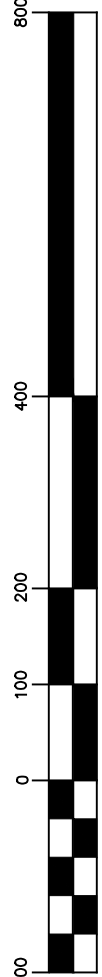
DA-EX



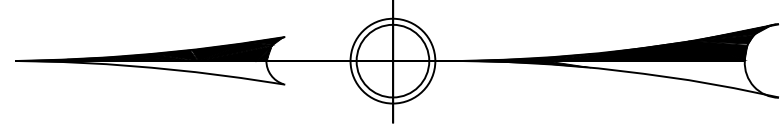
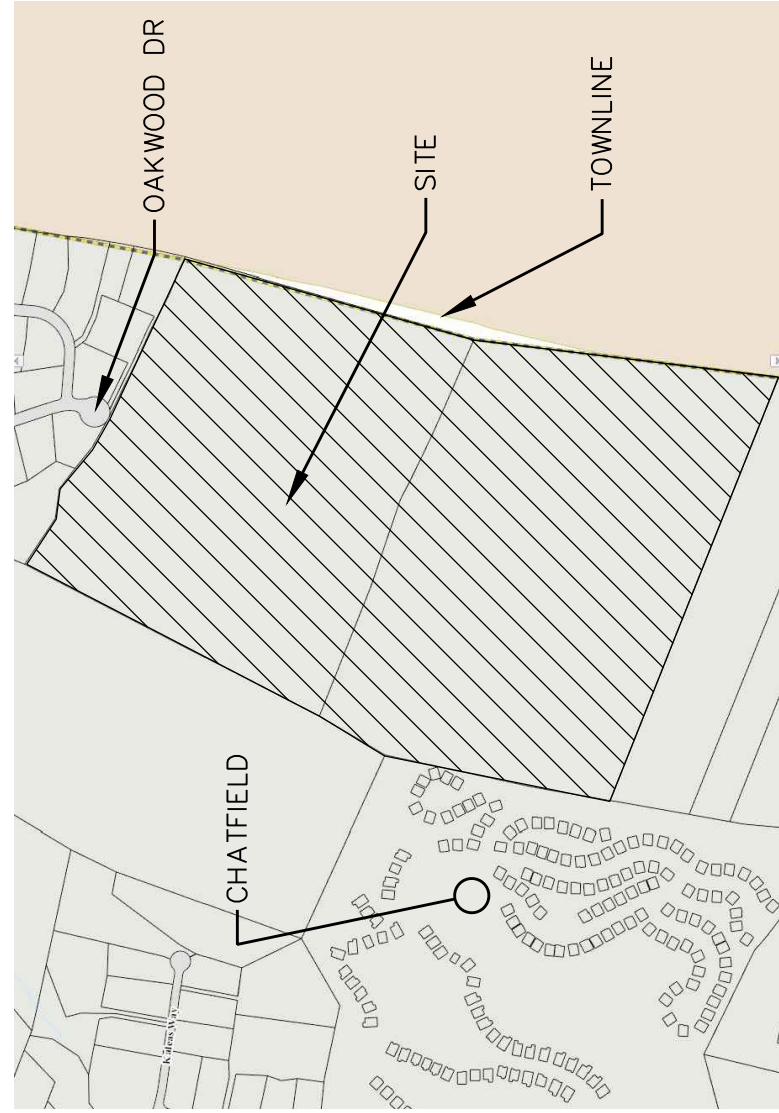
LEGEND

- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF PAVEMENT
- PROPERTY LINE
- STREAM
- WETLANDS
- PROPOSED BUILDING
- PROPOSED SPOT ELEVATION
- EXISTING 2' CONTOUR
- EXISTING 10' CONTOUR
- PROPOSED 2' CONTOUR
- EXISTING CATCH BASIN
- PROPOSED CATCH BASIN
- EXISTING MANHOLE
- PROPOSED MANHOLE
- EXISTING STORM PIPES
- PROPOSED STORM PIPES
- EXISTING SANITARY PIPES
- PROPOSED SANITARY PIPES
- GRADE TO DRAIN
- SITE LIGHTING
- UNITS WITH BASEMENT

GRAPHIC SCALE



(IN FEET)
1 inch = 200 ft.



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SHEET TITLE

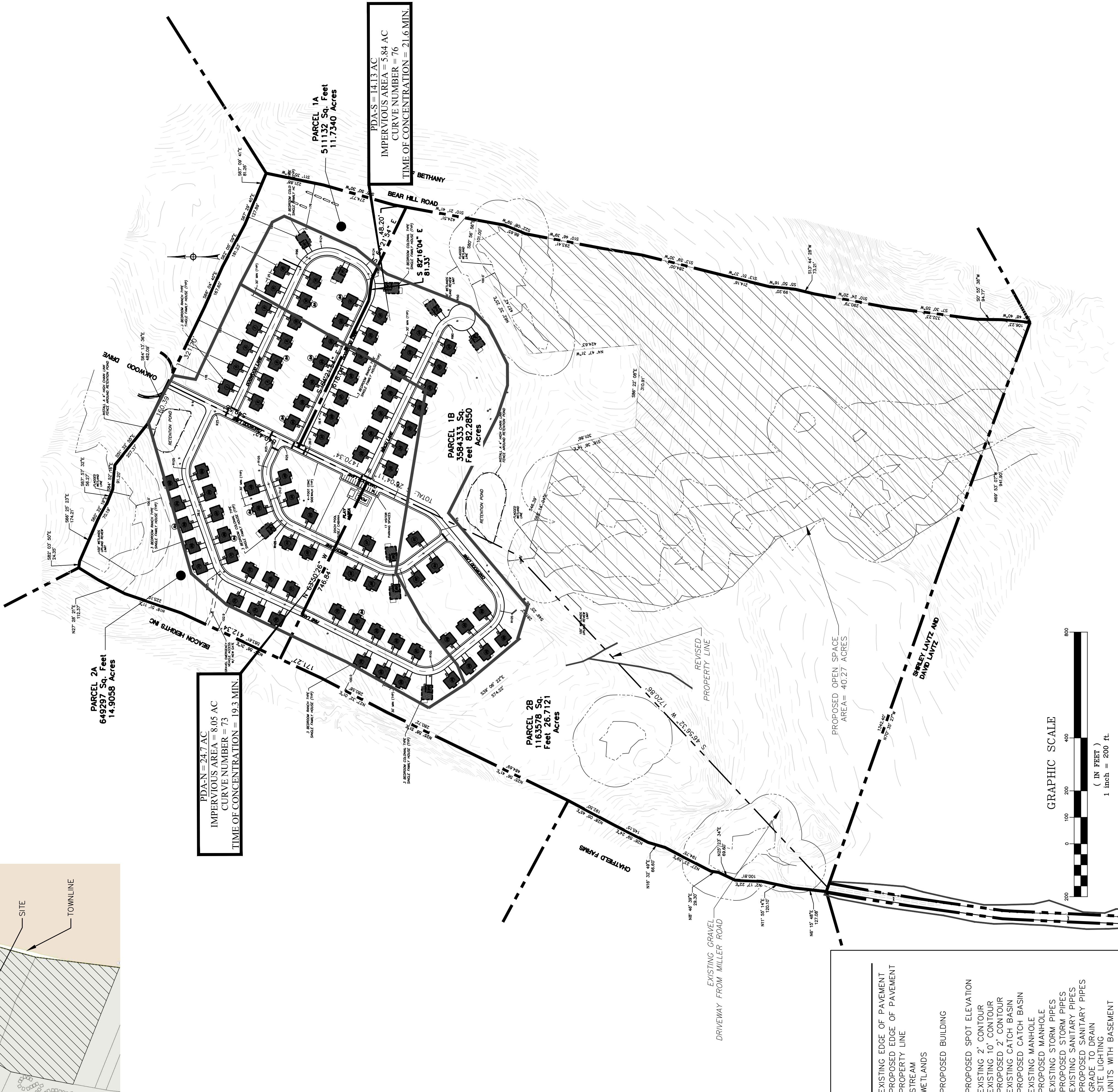
PROPOSED DRAINAGE
AREA MAP

DESIGNED BY: MJS	SCALE: 1"=200'
DRAWN BY: MJS	DATE: 2-23-18
CHECKED BY: MJS	PROJECT NUMBER: 2215
CAD FILE: 2215	

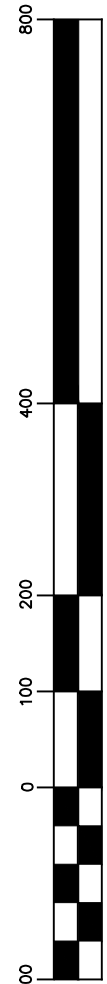
SEAL

SHEET NUMBER

DA-PR



GRAPHIC SCALE



(IN FEET)
1 inch = 200 ft.

LEGEND

- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF PAVEMENT
- PROPERTY LINE
- STREAM
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- PROPOSED STORM PIPES
- EXISTING SANITARY PIPES
- PROPOSED SANITARY PIPES
- GRADE TO DRAIN
- SITE LIGHTING
- UNITS WITH BASEMENT



Appendix D

Storm Water Detention System Inspection & Maintenance Plan



Storm Water Detention System Inspection & Maintenance Plan
For 22 Oakwood Drive, Beacon falls , CT
Owner: Hopp Brook Estates

The stormwater collection and retention system at 22 Oakwood Drive, Beacon Falls, CT, Connecticut. The inspection and Maintenance Plan filed on the town records is as follows:

Catch Basin Inspection and Maintenance Plan:

1. Basins are to be inspected every 6 months, and sump vacuumed if the sediment depth is greater than 18 inches.
2. Oil accumulation is typically much less than sediment. However, removal of oil and sediment during the same service is recommended.
3. Remove floatables first and then remove the remaining volume.

Retention Pond Inspection and Maintenance Plan:

1. Ponds shall be inspected every 12 months and vacuumed if the sediment depth is greater than 12 inches.

Hydrodynamic Separator Inspection and Maintenance Plan:

1. The property owner is responsible for the operations and maintenance of all proposed stormwater infrastructure
2. Units are to be inspected every 6 months and sump vacuumed if sediment depth is greater than 18 inches
3. Oil accumulation is typically much less than sediment; however, removal of oil and sediment during the same service is recommended.
4. Remove floatables first, and then remove the remaining volume. A logbook recording compliance with the above maintenance schedule shall be held on-site and made available for review by Town officials.

Manuel Jose Silva, P.E.
Project Engineer
msilva@rosetiso.com



Appendix E

Spill Control and Prevention Plan

June 30, 2026

Spill Control and Prevention Plan

Location: 22 Oakwood Drive, Beacon falls CT

Facility Type: residential

Adjacent Features: Inland wetlands

I. Introduction

The purpose of this Spill Control and Prevention Plan is to establish guidelines and procedures to *prevent, control, and mitigate the impact of spills at the proposed warehouse facility located at 22 Oakwood Drive, Beacon Falls, CT*. Given the proximity to inland wetlands, it is crucial to implement measures that safeguard the environment and prevent contamination of nearby water bodies.

II. Site Description and Assessment

1. Site Layout:

- Reference Site plans By Rose Tiso and Company with sensitive areas, including inland wetlands .
- Establish designated spill response zones.

2. Drainage Systems:

- Implement a stormwater management plan to manage runoff and avoid adverse impacts to sensitive areas.
- Ensure that stormwater drains oil/water separators (water Quality separators) are installed and maintained per the management plan.



III. Spill Prevention Measures

1. Storage and Handling:

- Store hazardous materials in designated areas with secondary containment.
- Use appropriate storage containers with proper labeling.
- Minimize the quantity of stored hazardous materials.

2. Training and Awareness:

- Conduct regular training sessions for employees on spill prevention and response procedures.
- Display clear signage indicating spill response procedures and emergency contacts.

3. Equipment Maintenance:

- Regularly inspect and maintain equipment to prevent leaks or spills.
- Establish a preventive maintenance schedule.

IV. Spill Response Plan

1. Immediate Actions:

- Employees discovering a spill should immediately notify the designated spill response team.
- Evacuate the affected area and prevent unauthorized access.

2. Containment:

- Utilize spill containment kits to limit the spread of the spill.
- Deploy absorbent materials to contain and absorb spilled substances.

3. Notification:

- Notify appropriate regulatory agencies, 1-866-DEP-SPIL (1-866-337-7745) including local environmental authorities 203 874-6321 or 911.
- Report the incident to emergency services and relevant stakeholders.



V. Spill Cleanup and Decontamination Plan

1. Cleanup Procedures:

- Use appropriate cleanup materials and techniques for the spilled substance.
- Dispose of contaminated materials in accordance with local regulations.

2. Decontamination:

- Decontaminate affected surfaces and equipment thoroughly after a spill.
- Monitor water quality in nearby water bodies for potential contamination.

3. Documentation:

- Maintain detailed records of spill incidents, response actions, and cleanup efforts.
- Conduct post-incident evaluations to identify areas for improvement.

VI. Conclusion

This Spill Control and Prevention Plan is designed to mitigate the risks of spills at the proposed residential development and protect the nearby inland wetlands . Regular training, proper storage practices, and a well-defined spill response plan are essential components of the overall environmental management strategy for the site.



Appendix F

Naugatuck Valley Health Approval Phase 1



Naugatuck Valley Health District

98 Bank Street Seymour, CT 06483

T: 203-881-3255 F: 203-881-3259 W: www.nvhd.org

Ansonia Beacon Falls Derby Naugatuck Seymour Shelton

Public Health
Prevent. Promote. Protect.

May 12, 2026

Manny Silva
Rose Tiso & Co.
35 Brentwood Ave #3
Fairfield, CT 06825

Re: Hopp Brook Estates, Phase 1
Proposed 15 Single-Family Homes
Oakwood Lane, Beacon Falls, CT 06401

Dear Manny Silva,

The Naugatuck Valley Health District received plans for the phase 1 parcel containing 15 single-family homes located at Oakwood Lane, Beacon Falls, CT 06401. The proposed design flow of the parcel is 6,750 gallons per day. These plans have been reviewed and approved.

Please be advised that pursuant to Naugatuck Valley Health District's regulations and protocol, the referenced phase 1 parcel is approved with the following provisions:

- All 15 single-family homes will be serviced by a public water supply.
- A permit to construct will be required for each individual subsurface sewage disposal system prior to the time of installation.

If you should have any additional questions on the above subject matter, please call this office.

Sincerely,

John Mucha, MPH, RS
Head Sanitarian

CC: Joe Salemme



Healthy people in a healthy Naugatuck Valley