Regional Planning Commission
Kingston Springs, Tennessee

9 November, 2023
Meeting Packet

Kingston Springs Regional Planning Commission
Meeting Agenda
9 November, 2023

Submittal Deadline Date: 13 October, 2023

The meeting was called to order by _____at _____pm.

1. **Roll Call of Voting Members:**

Keith Allgood	_____
Tony Thompson	_____
Tony Gross	_____
Mike Hargis	_____
Lauren Hill	_____
Mike Patenaude	_____
Craig Kitch	_____
Marie Spafford	_____
Bob Stohler	_____

2. **Non-Voting Staff:**

Sharon Armstrong, Planner	_____
Peter Chimera, P.E.	_____ (Attends at Request of Planning Commission)

3. **Ex Officio Attendance:**

John Lawless, City Manager	_____
Attorney	_____ (Attends at request of Planning Commission)

4. **Declaration of Quorum by Chairperson.**

5. **Motion to approve 12 October, 2023, Planning Commission meeting minutes.**

6. **Motion to approve 9 November, 2023, Planning Commission meeting agenda.**

7. **Community Input**

Public Comments shall be:

a. limited to three (3) minutes for all regular agenda items and items removed from the Agenda and an overall time limit for all comments on an agenda item to ten (10) minutes unless extended by vote of a majority of the Planning Commission

b. The Chairman shall limit comments to the Agenda items, to relevant comments and shall restrict comments that are disruptive in nature.

8. Declaration of Conflict(s)

In the event that any member shall have a personal interest of any kind in a matter then before the Kingston Springs Municipal-Regional Planning Commission, she/he shall disclose his/her interest. Conflict of Interest is defined in the Kingston Springs Municipal Code Title 1, Chapter 4, Section 1-402 through Section 1-404.

9. Old Business

A. Ellersly PUD – W. Kingston Springs Rd – Stop Work Order, Development Meeting, Next Steps, Revised Grading and Site Plan

B. The Golf Club of DBI, South Harpeth Rd. – Inspections, Soil and Erosion Reports

C. The Golf Club of TN, 1000 Golf Club Dr. –
- **a. Off Season Improvements Plan Revised Submission – Engineering Comments**
- **b. Maintenance Facility Revision – Late Submission of Comments 3 November 2023, Revisions**
- **c. Road improvements to South Harpeth Rd. From the GCTN Maintenance Facility to CC Rd.**

10. New Business

A. Concept Review – John Tarver
- **a. Map 96 Parcels 51.00 & 51.01 Zoned C-2 Highway Service District**
- **b. 121 Single Family Structures, No Commercial Development Proposed**

B. PC Training – New Legislation Affecting Planning Commission - Q&A, PC Member Certification of Training

11. Other (For Discussion Only).

a. None

12. Motion to Adjourn.

The meeting was adjourned by _____ at _____pm

_____	_____
Mike Patenaude	**Jamie Dupré**
Planning Commission Chair	**City Recorder**

Kingston Springs Regional Planning Commission
Meeting Minutes
12 October, 2023

Submittal Deadline Date: 15 September, 2023

The meeting was called to order by Mike Patenaude at 7:00 pm.

1. **Roll Call of Voting Members:**

Keith Allgood	Absent
Tony Thompson	Present
Tony Gross	Present
Mike Hargis	Present
Lauren Hill	Present
Mike Patenaude	Present
Craig Kitch	Present
Marie Spafford	Absent
Bob Stohler	Present

2. **Non-Voting Staff:**

Sharon Armstrong, Planner	Present
Peter Chimera, P.E.	Present

3. **Ex Officio Attendance:**

John Lawless, City Manager	Present
Tim Potter, Attorney	Absent (Attends at request of Planning Commission)

4. **Declaration of Quorum by Chairperson.**
   Chairman Patenaude declared a quorum.

5. **Motion to approve 10 August, 2023, Planning Commission meeting minutes.**
   Motion to approve the August 10, 2023, Planning Commission meeting minutes made by Lauren Hill, with a second by Tony Gross. Motion passed.

6. **Motion to approve 12 October, 2023, Planning Commission meeting agenda.**
   Item 10.A. New Business moved to front of agenda ahead of Old Business. Motion to approve the October 12, 2023, Planning Agenda as amended made by Tony Thompson, with a second by Tony Gross. Motion passed.

7. Community Input

Public Comments shall be:
a. Limited to three (3) minutes for all regular agenda items and items removed from the agenda and an overall time limit for all comments on an agenda item to ten (10) minutes unless extended by vote of a majority of the Planning Commission
b. The Chairman shall limit comments to the agenda items, to relevant comments and shall restrict comments that are disruptive in nature.

John Tarver – 119 Luyben Hills. Introduction of potential plan, 121 single family homes for rent on one lot.

Bill Rogers – 1660 South Harpeth Road. Concerns on road condition of South Harpeth from city limits to CC Road.

8. Declaration of Conflict(s)

In the event that any member shall have a personal interest of any kind in a matter then before the Kingston Springs Municipal-Regional Planning Commission, she/he shall disclose his/her interest. Conflict of Interest is defined in the Kingston Springs Municipal Code Title 1, Chapter 4, Section 1-402 through Section 1-404.

9. Old Business

A. **Ellersly PUD – W. Kingston Springs Rd – Stop Work Order, Development**
City Planner provided a general update. A stop work was issued. During the grading process, damage was done to SSCUD infrastructure and town sewer infrastructure. Detention pond was being installed over water lines. Meeting was held with developer, property owner, and SSCUD to discuss what happened and plan for moving forward. SSCUD gave direction to developer to address issue. Engineer Peter Chimera declared that he is also engineer for SSCUD. Repairs done by SSCUD and paid for by owner. Engineer waiting on updated plans showing the detention pond in another location. Suggestion was that the town require owner to inspect sewer lines when project is complete to assure all needed repairs have been made. Planner noted there is a lot near this location that is being developed. Planner informed developer that he will need to scope sewer line. Planner said when plans are revised it will come back to the planning commission for review and approval.

B. Town of Kingston Springs Plat – Acquisition of a portion of Map 91N, Grp D, Parcel 39.00 and replat of Map 91, Parcel 99
Board of Commissioners approved rezoning – seeking plat approval. Motion to approve rezoning of Town of Kingston Springs Plat – Acquisition of a portion of Map 91N, Grp D, Parcel 39.00 and replat of Map 91, Parcel 99 made by Craig Kitch, with a second by Tony Gross. Motion passed.

C. Roy McPherson, The Willows Development 129 E. Kingston Springs Rd. – Stop Work Order, Notice of Violation, Revised Civil Plans, Performance Bond, GeoTech Report

City Planner Armstrong provided update. Mr. McPherson asked for renewal of grading plan. Planner conducted inspection and found issues – debris on site that was unacceptable, work done outside of established grading plan. Since that inspection Mr. McPherson has revised plan, including the expanded area where the initial area was exceeded. First, PC will need to consider the area outside of initial grading plan; second, fill in that area without Geotech reports. Mr. McPherson has hired new Geotech engineers and has supplied an updated plan set including bore locations. The third thing to consider is the performance bond. McPherson has secured a bond in the amount of $481,640.25. It covers the lift station, sewer tanks, the roads, every single element of the development.

1. Expansion of grading permit to include area outside of original plan with additional fill. Boring will take place whether expanded or not, but if expanded boring will take place in expanded area. Tony Gross says project has been going on so long and project has up to now been disrespectful to the Town of Kingston Springs. Planner states she has a recommendation that if the Planning Commission approves this project to continue, then a civil engineer needs to be on the site to monitor and report every two weeks. Cost for this engineer will be a pass through to Mr. McPherson. Planner stated that if the expansion of the grading permit is approved or if it is denied, either way, any inappropriate fill will need to be removed. Engineer recommended approving expansion, if the bore holes come back clean. Any bore samples that come back unsatisfactory will require the fill to be removed anyway. Planner reiterated the need for a monitor on the site. Motion to expand grading plan with the requirement of a site monitor involved when any fill is brought onto the site made by Mike Hargis, second by Lauren Hill. Discussion was held on amount of inspection required. Engineer recommended that fill could be dumped, but could not be graded until inspected. Motion amended to site inspection frequency at the direction of city staff with pass through of costs incurred to developer. All voted in favor of motion, with Bob Stohler voting no.
2. Approve staff recommendation for bore holes on this project. Engineer would like to review plan set. Motion to approve recommendation for bole holes on the project on condition of engineer approval of bore hole locations selected made by Craig Kitch, with a second by Lauren Hill. All approved. Motion passed.
3. Performance bond has been reviewed and is satisfactory for $481,640.25. Motion to accept performance bond made by Mike Hargis, with a second by Craig Kitch. All voted in favor. Motion passed.

D. <u>The Golf Club of DBI, South Harpeth Rd. – Inspections, Soil and Erosion Reports</u>

No complaints of soil on roadway.

E. <u>The Golf Club of TN, 1000 Golf Club Dr. – Off Season Improvements Plan Revised Submission</u>

Off Season Improvements. Motion to defer to next meeting until criteria can be approved by town engineer made by Craig Kitch, with a second by Tony Thompson. Discussion was held. Gross said he would be okay with approval conditionally. Mike Hargis was okay as well. Engineer said timing of project would not be impacted

either way. Gross and Hargis indicated they were okay with motion on the floor. Vote was held with all approve. Motion passed.

Staff relayed concerns with 2 driveway connections at the maintenance building, office complex, locations on South Harpeth Rd. The Planner relayed the project engineer indicated he would be submitting a revised plan to improve the construction entrance for the DBI project for a permanent connection to South Harpeth Rd. resulting in 3 connections to the road in a short distance. Planner indicated the Golf Club of TN remove one of the two connections to South Harpeth Dr. to reduce the impact to the road surface, improve safety near the hairpin turn, and to reduce the number of connections to the road to one. Engineering and Planning comments sent to the applicant.

Maintenance building. Applicant consented to defer as additional information is needed for applicant to review and respond to engineering comments. Motion to defer decision on maintenance building made by Tony Gross, with a second by Craig Kitch. All in favor and motion approved.

F. Punjabi Dhaba Project – Stop Work Order, Stormwater Issues, Meeting, Owner Complaint, Project Update

The Planner provided the history of the project and the reasoning behind the stop work order. Planner indicated the developer has responded to deficiencies in the project and the project is moving forward. This item was informational only and no action was taken.

10. New Business

A. Final Plat, Hill Subdivision, 1 Lot, 1447 CC Rd, Map 90 Parcel 77.01

Item moved to earlier in agenda – property is in Cheatham County, but not in Kingston Springs, but falls within our urban growth boundary. County zoning rules apply. Motion to approve Final Plat, Hill Subdivision, 1 Lot, 1447 CC Rd, Map 90, Parcel 77.01 made by Mike Hargis with a second by Craig Kitch. All in favor, motion passed.

B. PC Training – New Legislation Affecting Planning Commission

Planner requested Planning Commission read legislative summaries provided and she would be asking questions of the commission over the next two meetings as part of their annual training.

Chair Patenaude requested that for future, the Planning Commission receive training on permitting process, more specifically when a permit is required and why permits are required.

11. Other (For Discussion Only).

a. None

12. <u>Motion to Adjourn.</u>

Motion to adjourn made by Craig Kitch, with a second by Lauren Hill. Meeting adjourned at 8:30 p.m.

Mike Patenaude	**Jamie Dupré**
Planning Commission Chair	**City Recorder**

November 2, 2023

Mr. John Lawless
City Manager
Town of Kingston Springs
PO Box 256
Kingston Springs, TN 37082

Re: Ellersly Subdivision
Phase 1 Pond Revision - Resubmittal

Dear Mr. Lawless,

On behalf of the owner/developer, we are respectfully resubmitting herewith a requested revision to the detention pond within Phase 1. As you are aware, we are requesting this field revision in order to avoid existing utilities, particularly the existing water line.

As you will see in our calculations we are still achieving the design intent of our original approvals and calculations. Please review at your earliest convenience and let me know if you need anything else for this review. The comments have been addressed as follows:

1. Show pipe calculations for pipe under road to 25-year storm
   Pipe calculations have been added herewith for the existing pipe under W Kingston Spring Road.

2. Revise contours to match detail.
   Contours have been revised to better reflect the ditch details.

3. How does overflow get into ditch?
   Contours have been revised to better allow for overflow drainage to the ditch.

4. Excavate all electrical/sewer crossings for city inspection
   Note has been added. See sheet C1.01.

5. After construction, contractor to televise all sewer infrastructure(mains, manholes, clean-outs, and laterals), and repair any defects, and provide survey grade as-builts of the sewer system in CAD or GIS format.
   Note has been added, see sheet C1.01.

6. Provide a summary table summarizing the pre-and post development peak flows for each event.
   A summary table has been added to drainage report.

7. Provide pipe and ditch calculations for all proposed conveyances.
   Storm pipe and ditch calculations have been provided. See the calcs in the drainage report.

8. Include stormwater narrative in stormwater report, describing assumptions, calculations, BMPs.
   Narrative has been provided including assumptions, procedures, and calculations.

9. Additional information requested, may warrant additional comments. Understood.

If you need any additional information, please do not hesitate to let me know.

Respectfully Submitted
CSDG

Ryan Lovelace, P.E.
Principal

Cc: Ron Merville, Developer
Sharon Armstrong, City Planner

CSDG No. 19-012-01

DRAINAGE REPORT

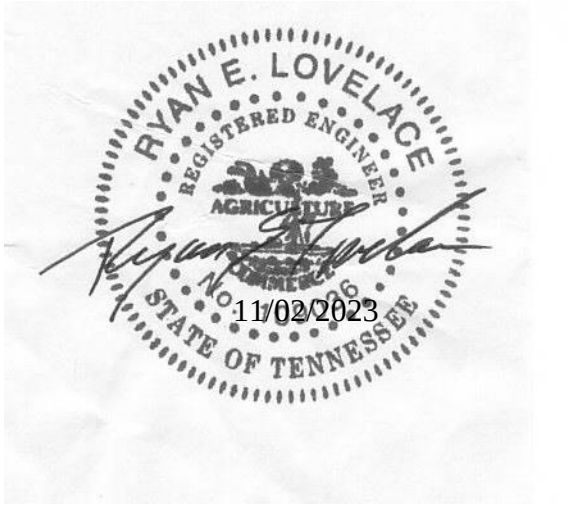
For

Ellersly Subdivision

0 Ellersly Way

Kingston Springs, Cheatham County, TN

November 2nd, 2023



Prepared by:

CSDG
Planning | Engineering
Landscape Architecture
2305 Kline Avenue, Suite 300
Nashville, TN 37211 | 615.248.9999

Contact: Ryan Lovelace, PE

Project No. 19-012-01

PROJECT DESCRIPTION

Ellersly Subdivision is a residential development proposing a total of 35 single family units in Phase 1, which the remainder of Phase 1 includes 7 single family units. The project is located off West Kingston Springs Road in Kingston Springs, TN. The remainder of Phase 1 is approximately 3.1 ± acres and the total land disturbance will be approximately 3.1± acres. The construction documents propose 7 single family lots and supporting infrastructure for the remainder of Phase 1.

EXISTING SITE CONDITIONS

The site is currently comprised of undeveloped grasslands and woods adjacent to the existing portion of Phase 1 of Ellersly Subdivision. The existing slopes on site range from 2-20%.

The site has 1 drainage basin, Basin A. Basin A drains to the existing ditch on the east side of the existing Ellersly lots towards an existing CPP pipe that drains under West Kingston Springs Road.

The flow for the entire site has been studied and Pre and Post flows for all basins have been analyzed. Drainage basins for pre and post flows have been calculated using the Metro Stormwater Management Manual Table 2-5 Curve Numbers for Urban Areas, and each basins CN areas can be found on their respective drainage maps. Time of concentration calculations Manning's n-value assumptions have been used from Soil Conservation Service TR-55, which is included in this drainage report. Pre development flows were found by using SCS Unit Hydrograph Method and TR-55 method.

PROPOSED DEVELOPMENT

This site proposes 7 single family lots and infrastructure that covers the majority of the site. In the proposed conditions, no historic drainage patterns will be changed. All storm pipes and grass lined ditches have been designed to handle a 25 yr frequency storm. These pipe networks are comprised of a series of RCP pipes that direct water to the proposed ditches to bypass drainage around the site. All pipes contain capacity for proposed flows and HGL's are below top of casting. Calculations or the storm pipes were analyzed using Storm Sewers Software. All inlets are designed with a maximum of 8' spread. All grass lined swales have been designed to handle the 25-yr frequency storm. The detention pond is designed to decrease flow from the 2 yr through 100 yr storm events.

The following table shows the design calculations that reduce the flows of 2 yr – 100 yr storm

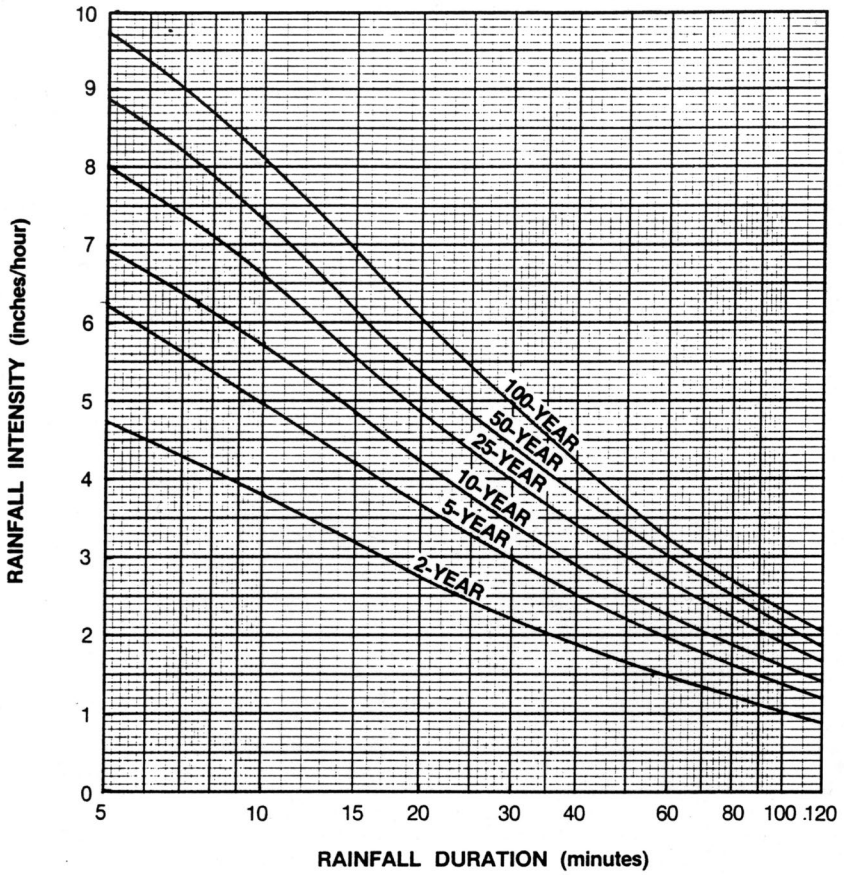
events to the pre and post basins.

Basin	2 Yr (CFS)	5 Yr (CFS)	10 Yr (CFS)	25 Yr (CFS)	50 Yr (CFS)	100 yr (CFS)
Pre Basin A	5.508	11.58	16.07	22.19	29.96	31.89
Post Basin A	5.474	10.02	13.63	18.05	21.16	25.30

The downstream structure has been analyzed for the proposed conditions based on minimum design requirements (0.5% slope). This is the existing 24'' CMP storm pipe under North Kingston Springs Road. The flows in the pipe do not contain the 25 yr storm & the water elevation overtops the road at the 10-yr storm.

SEDIMENT TRAPS/BASINS

The proposed sediment basin and other various BMPs were designed to remove sediment prior to it leaving the site. The sediment basin has been designed to handle the 5-yr storm without overtopping the emergency spillway.



Reference: Frederick et al. (1977) and Data from Nashville Airport, 1949 to 1985, Climatic Data Center, NOAA.

RAINFALL VOLUME (inches)										
	5 Min	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	12 Hr	24 Hr
2-Year	0.40	0.64	0.80	1.11	1.51	1.75	1.96	2.31	2.73	3.39
5-Year	0.52	0.83	1.05	1.50	1.97	2.39	2.71	3.30	3.83	4.50
10-Year	0.58	0.95	1.21	1.73	2.27	2.82	3.21	3.96	4.57	5.23
25-Year	0.67	1.10	1.38	2.00	2.66	3.36	3.84	4.79	5.49	6.16
50-Year	0.74	1.22	1.52	2.23	2.94	3.76	4.30	5.41	6.18	6.85
100-Year	0.81	1.35	1.72	2.50	3.21	4.16	4.77	6.02	6.86	7.53

RAINFALL INTENSITY (inches/hour)										
	5 Min	10 Min	15 Min	30 Min	1 Hr	2 Hr	3 Hr	6 Hr	12 Hr	24 Hr
2-Year	4.75	3.81	3.20	2.22	1.51	0.88	0.65	0.39	0.23	0.14
5-Year	6.25	4.99	4.20	3.00	1.97	1.20	0.90	0.55	0.32	0.19
10-Year	6.97	5.71	4.84	3.46	2.27	1.41	1.07	0.66	0.38	0.22
25-Year	8.00	6.60	5.50	4.00	2.66	1.68	1.28	0.80	0.46	0.26
50-Year	8.90	7.35	6.08	4.45	2.94	1.88	1.43	0.90	0.52	0.29
100-Year	9.72	8.08	6.88	4.99	3.21	2.08	1.59	1.00	0.57	0.31

Figure 2-1
Intensity-Duration-Frequency Curves and Depth-Duration Data

Table 2-5
RUNOFF CURVE NUMBERS FOR URBAN AREAS[a]

Cover Description		Curve Numbers for Hydrologic Soil Group			
Cover Type and Hydrologic Condition	Average Percent Impervious Area[b]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawn, parks, golf courses, cemeteries, etc.)[c]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
¼ acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
½ acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing Urban Areas					
Newly graded areas (previous areas only, no vegetation)[d]		77	86	91	94
Idle lands (CNs are determined using cover types similar to those in Table 2-6)					

Manning's n-Values

Pipes	Manning's n
Reinforced concrete	0.013
Vitrified clay pipe	0.013
Smooth welded pipe	0.011
Corrugated metal pipe	0.023
Polyvinyl chloride (PVC)	0.010
Natural Channels	
Gravel beds, Straight	0.025
Gravel beds, large boulders	0.040
Earth, straight, some grass	0.026
Earth, winding, no vegetation	0.030
Earth, winding	0.050
Overland Flow	
Smooth surfaces (concrete, asphalt, bare soil)	0.011
Fallow (no residue)	0.05
Cultivated soils, residue <=20%	0.06
Cultivated soils, residue >20%	0.17
Short grass	0.15
Dense grass	0.24
Bermuda grass	0.41
Light underbrush woods	0.40
Dense underbrush woods	0.80

Source: Soil Conservation Service TR-55

DRAINAGE MAPS

CSDG
Planning | Engineering
Landscape Architecture

ELLERSLY
PRE DRAINAGE MAP
PN:19-012-0 | D:10.06.2023

N

0 50 100
SCALE: 1"=100'

CSDG
Planning | Engineering
Landscape Architecture

ELLERSLY
POST DRAINAGE MAP

PN: 19-012-0 | D: 10.06.2023

N

0 50 100
SCALE: 1"=100'

PRE/POST FLOWS

Hydrograph Return Period Recap

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

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	------	-------	5.508	-------	11.58	16.07	22.19	26.96	31.89	Pre Basin A
3	SCS Runoff	------	-------	5.168	-------	8.596	11.02	14.23	16.65	19.06	Post Basin A To Bypass Ditch
6	SCS Runoff	------	-------	3.034	-------	6.380	8.853	12.22	14.85	17.56	Post Basin A to Detention Pond
7	Reservoir	6	-------	1.421	-------	3.673	4.872	7.783	12.65	16.72	Basin A Routed
9	Combine	3, 7,	-------	5.474	-------	10.02	13.63	18.05	21.16	25.30	Final Post Basin A

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

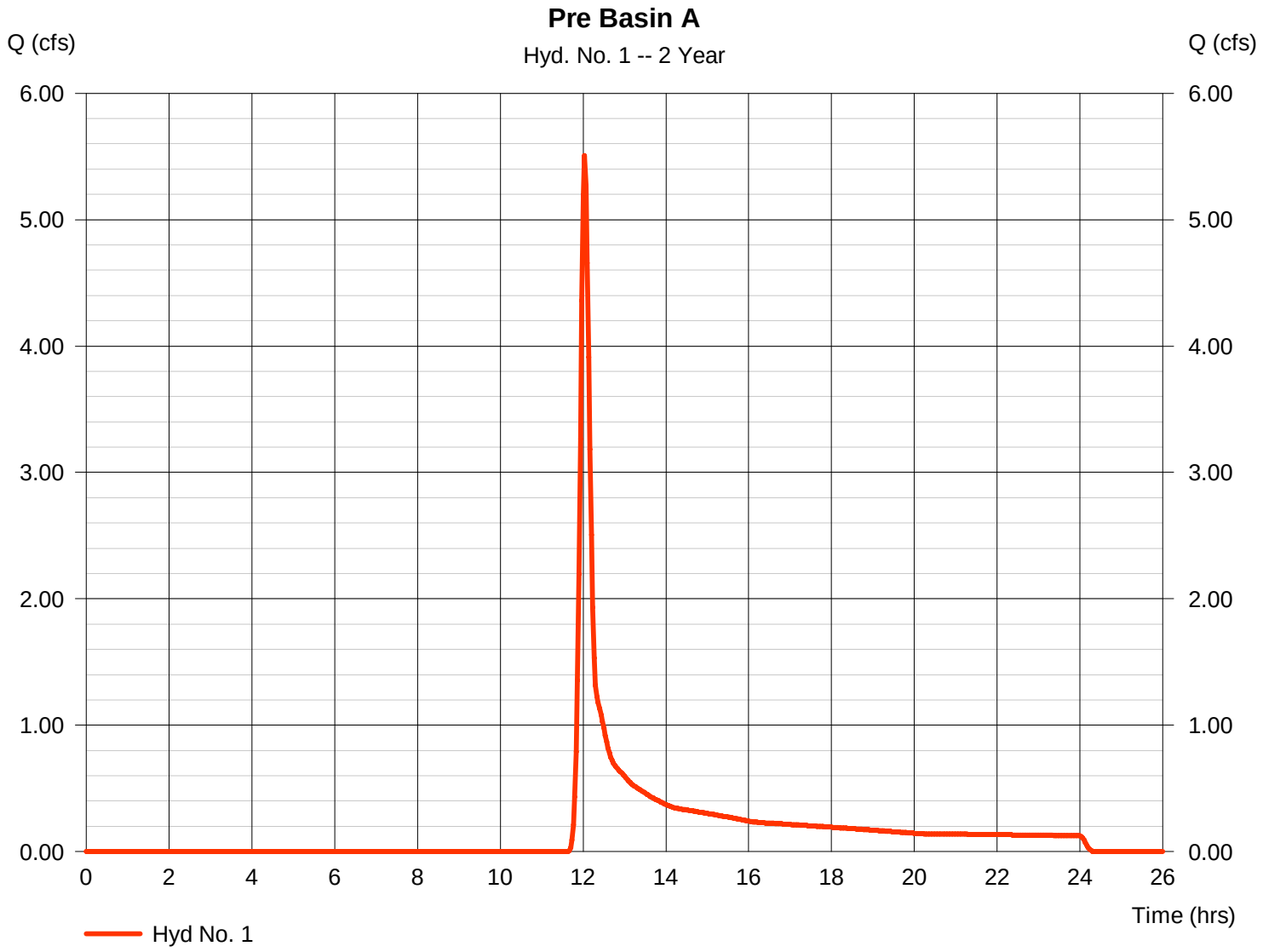
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	5.508	2	722	16,392	------	------	------	Pre Basin A
3	SCS Runoff	5.168	2	718	10,335	------	------	------	Post Basin A To Bypass Ditch
6	SCS Runoff	3.034	2	722	9,028	------	------	------	Post Basin A to Detention Pond
7	Reservoir	1.421	2	732	9,027	6	584.96	1,865	Basin A Routed
9	Combine	5.474	2	718	19,362	3, 7,	------	------	Final Post Basin A

Hydrograph Report

Hyd. No. 1

Pre Basin A

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.508 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	16,392 cuft
Drainage area	=	6.300 ac	Curve number	=	65
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	13.10 min
Total precip.	=	3.39 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

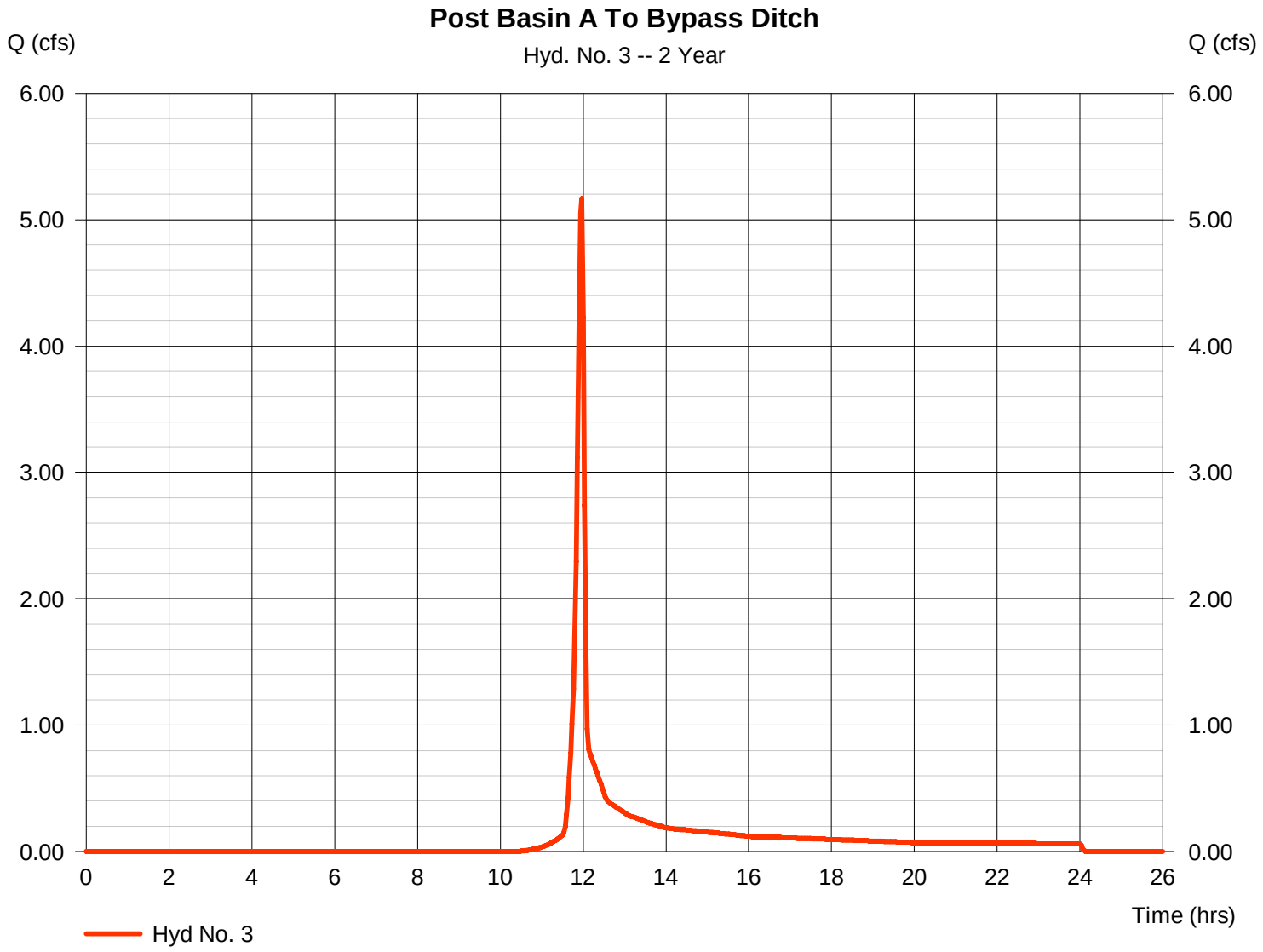


Hydrograph Report

Hyd. No. 3

Post Basin A To Bypass Ditch

Hydrograph type	=	SCS Runoff	Peak discharge	=	5.168 cfs
Storm frequency	=	2 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	10,335 cuft
Drainage area	=	2.480 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	3.39 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

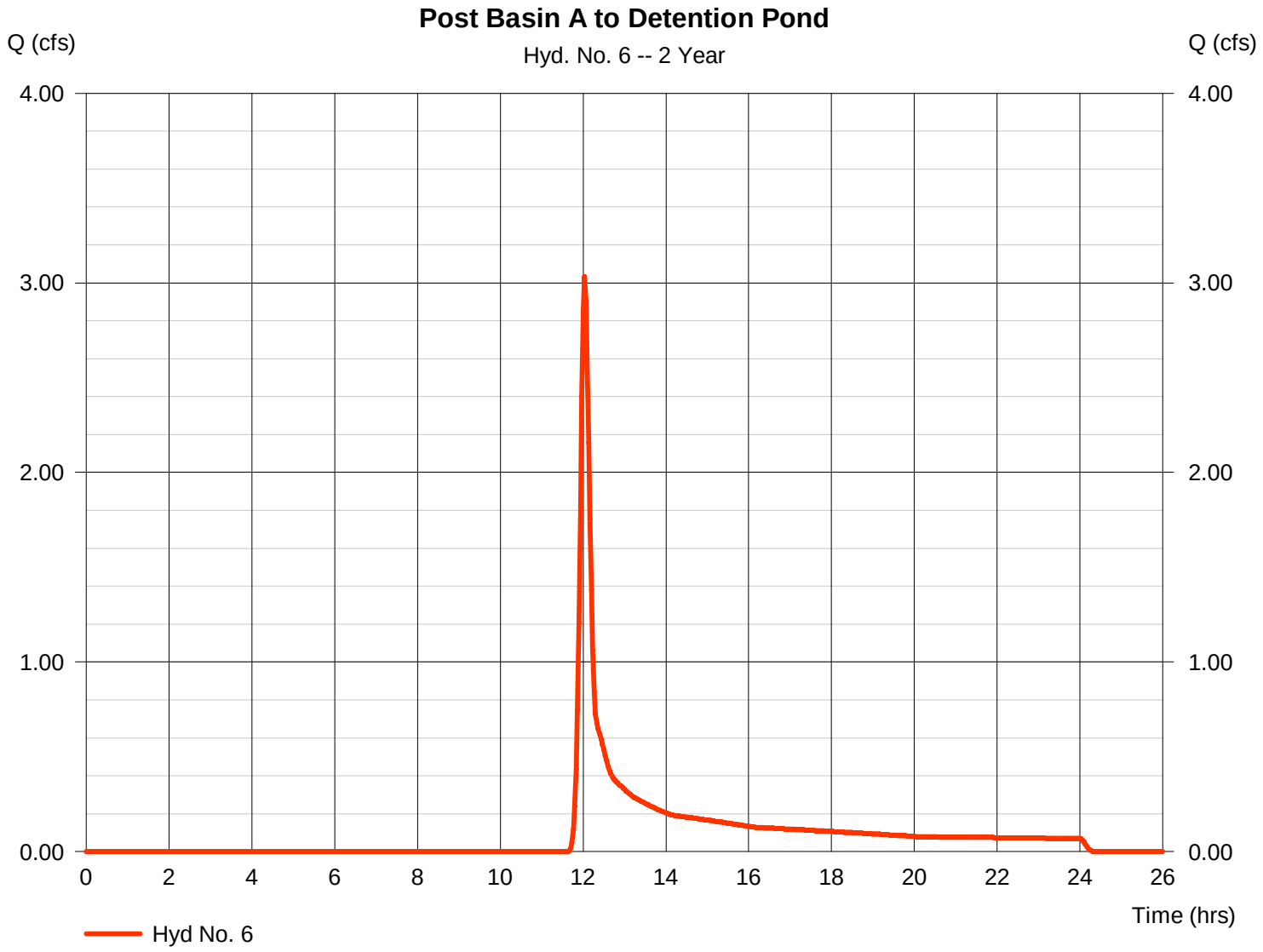


Hydrograph Report

Hyd. No. 6

Post Basin A to Detention Pond

Hydrograph type	= SCS Runoff	Peak discharge	= 3.034 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 9,028 cuft
Drainage area	= 3.470 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.30 min
Total precip.	= 3.39 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

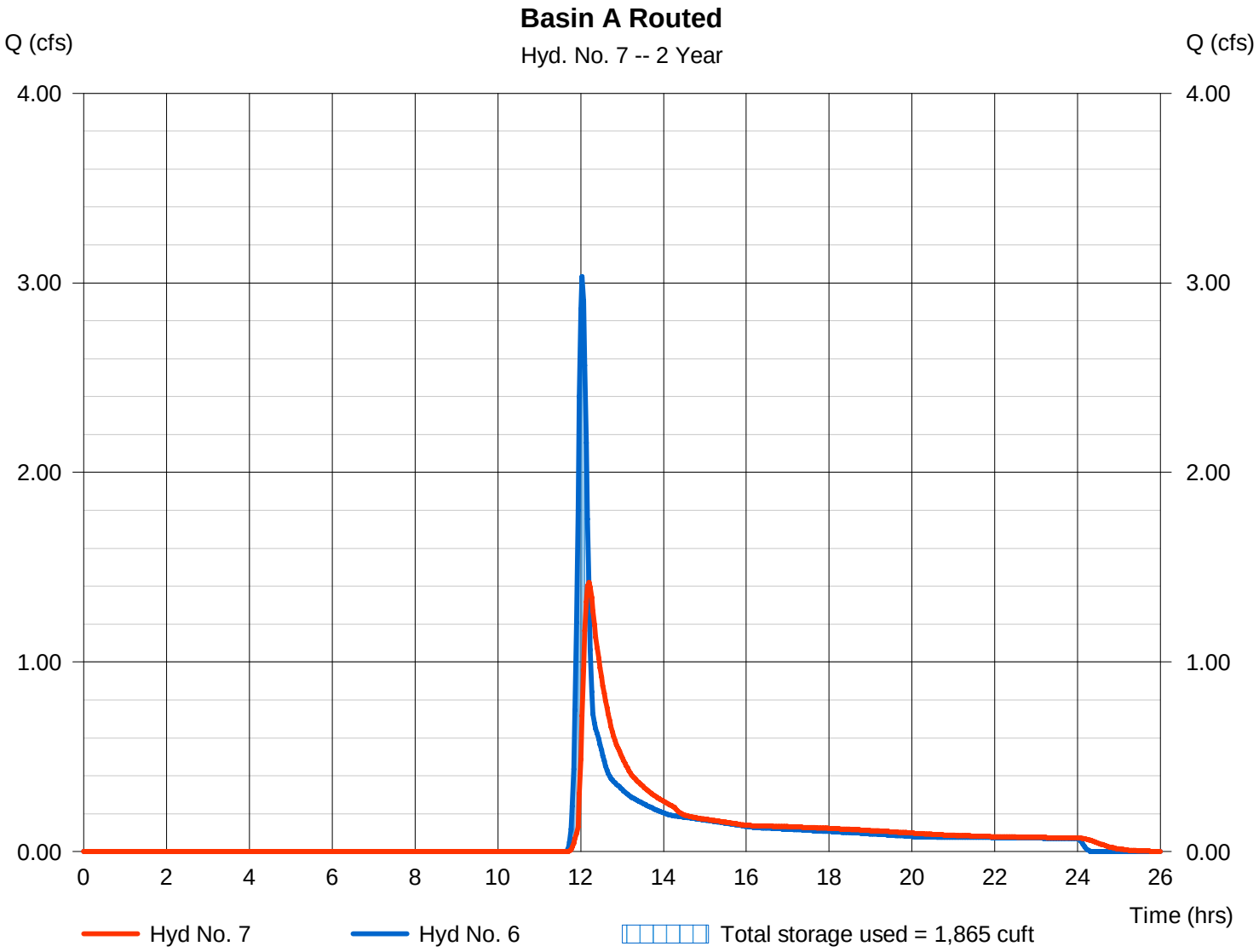
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Tuesday, 10 / 17 / 2023

Hyd. No. 7

Basin A Routed

Hydrograph type	=	Reservoir	Peak discharge	=	1.421 cfs
Storm frequency	=	2 yrs	Time to peak	=	12.20 hrs
Time interval	=	2 min	Hyd. volume	=	9,027 cuft
Inflow hyd. No.	=	6 - Post Basin A to Detention Pond	Max. Elevation	=	584.96 ft
Reservoir name	=	Detention Pond	Max. Storage	=	1,865 cuft

Storage Indication method used.



Pond Report

Pond No. 3 - Detention Pond

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 582.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	582.00	00	0	0
2.00	584.00	773	515	515
4.00	586.00	2,151	2,809	3,324
6.00	588.00	4,130	6,174	9,498

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	2.00	0.00	0.00
Span (in)	= 24.00	2.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 581.90	582.00	0.00	0.00
Length (ft)	= 132.00	0.00	0.00	0.00
Slope (%)	= 10.00	0.10	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	Yes	No	No

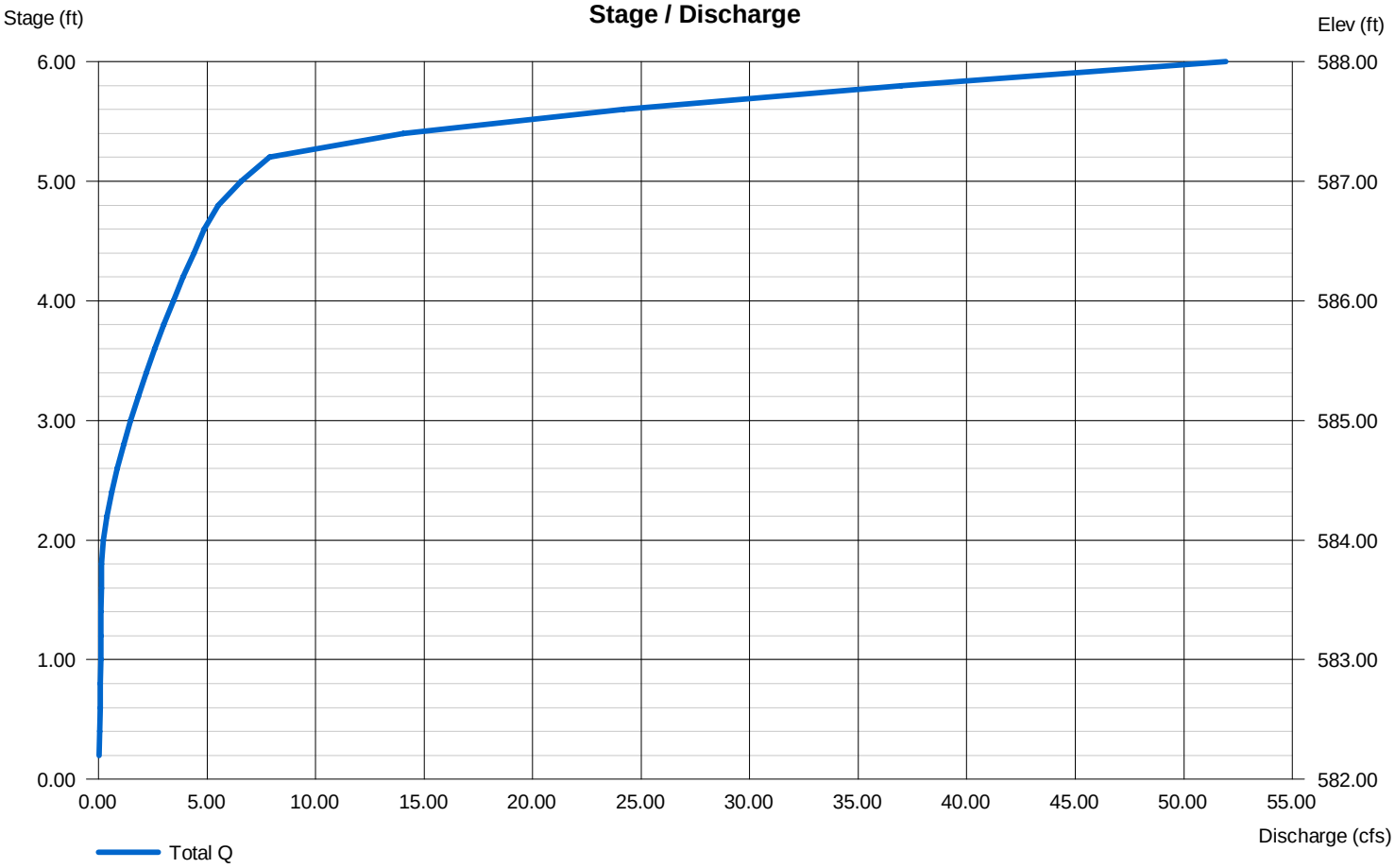
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 14.50	1.20	0.30	20.00
Crest El. (ft)	= 588.60	586.70	583.80	587.20
Weir Coeff.	= 3.33	3.33	3.33	2.60
Weir Type	= 1	Rect	Rect	Broad
Multi-Stage	= Yes	Yes	Yes	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

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

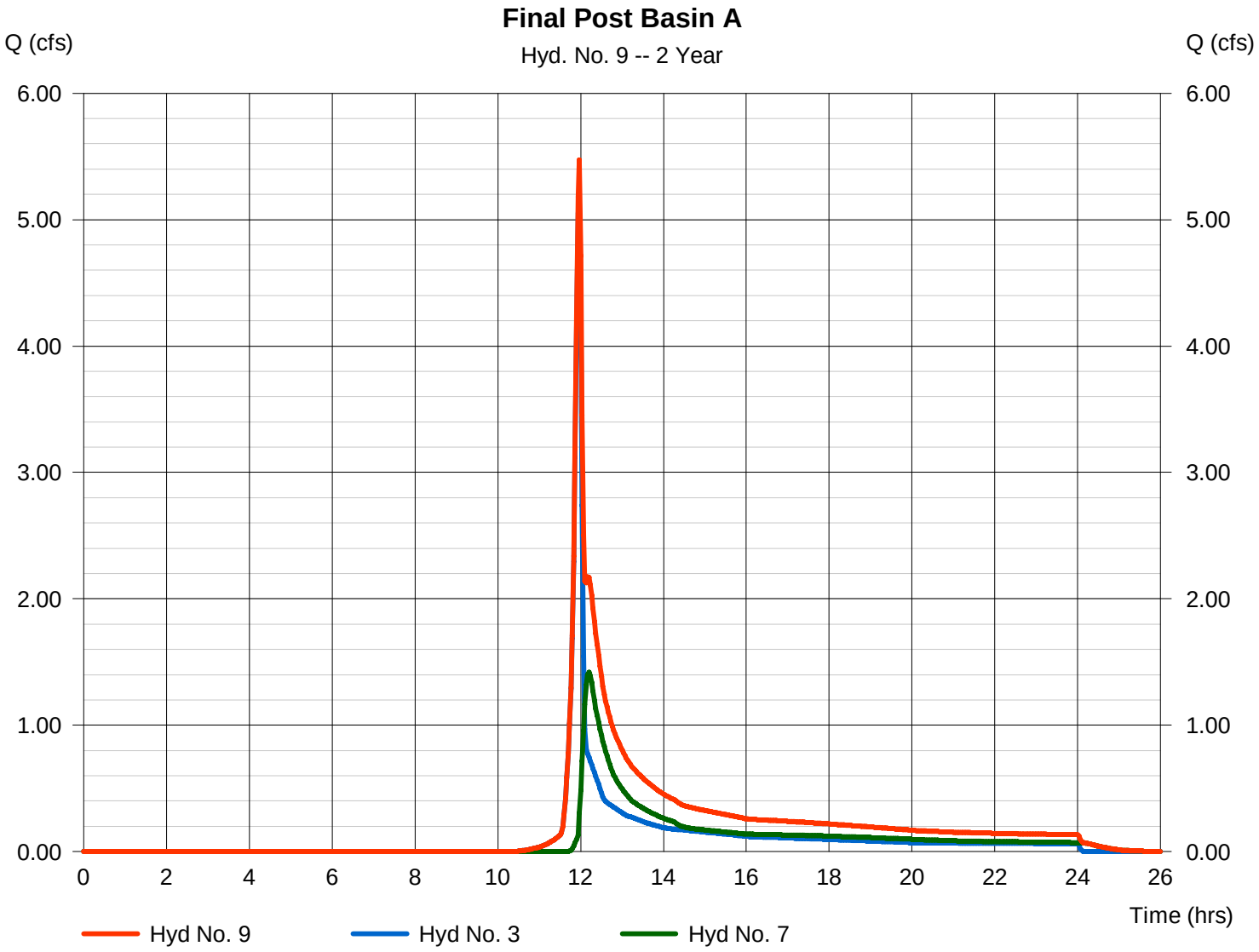


Hydrograph Report

Hyd. No. 9

Final Post Basin A

Hydrograph type	= Combine	Peak discharge	= 5.474 cfs
Storm frequency	= 2 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 19,362 cuft
Inflow hyds.	= 3, 7	Contrib. drain. area	= 2.480 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

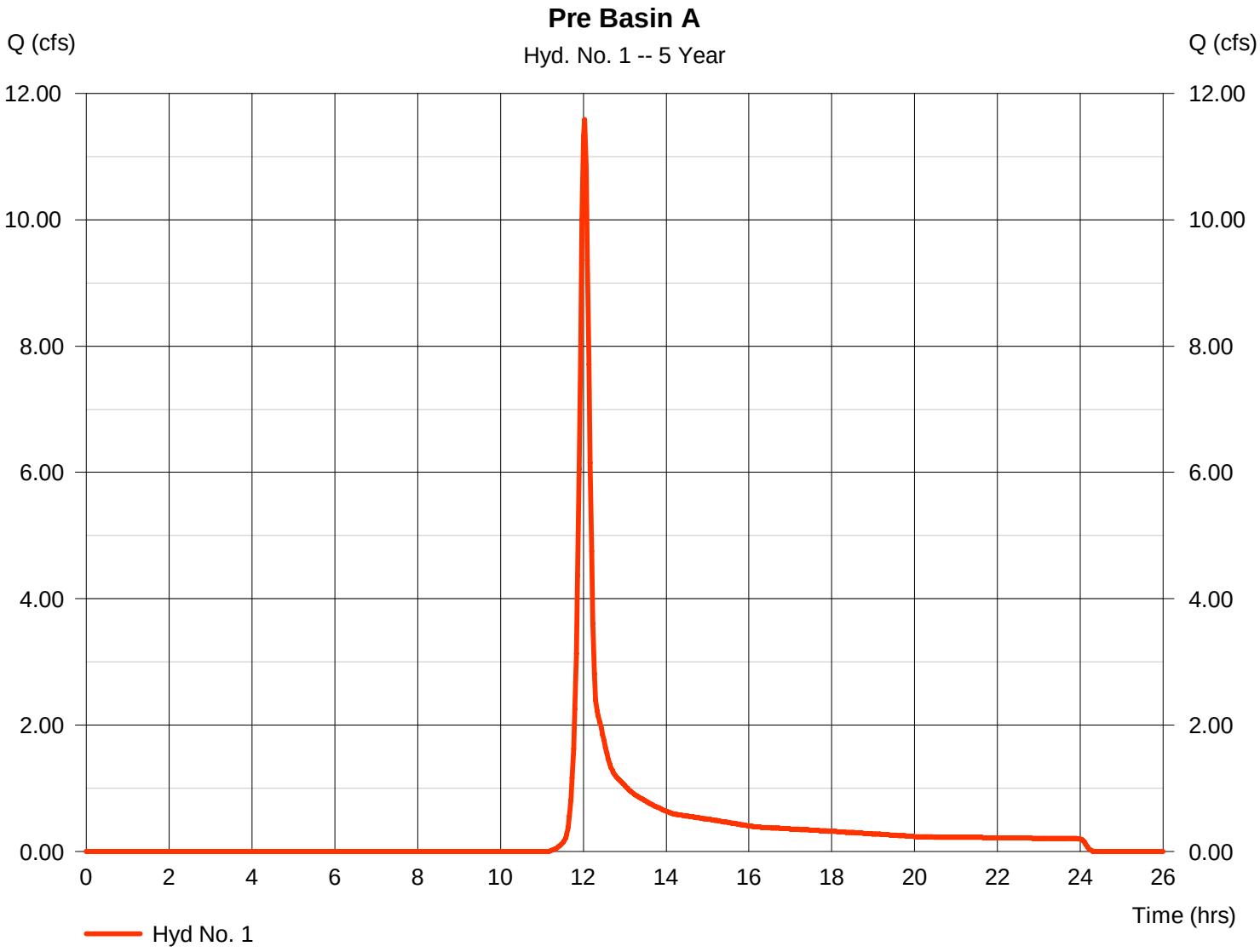
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	11.58	2	722	31,375	------	------	------	Pre Basin A
3	SCS Runoff	8.596	2	718	17,305	------	------	------	Post Basin A To Bypass Ditch
6	SCS Runoff	6.380	2	722	17,281	------	------	------	Post Basin A to Detention Pond
7	Reservoir	3.673	2	730	17,280	6	586.10	3,623	Basin A Routed
9	Combine	10.02	2	718	34,584	3, 7,	------	------	Final Post Basin A

Hydrograph Report

Hyd. No. 1

Pre Basin A

Hydrograph type	= SCS Runoff	Peak discharge	= 11.58 cfs
Storm frequency	= 5 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 31,375 cuft
Drainage area	= 6.300 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 13.10 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

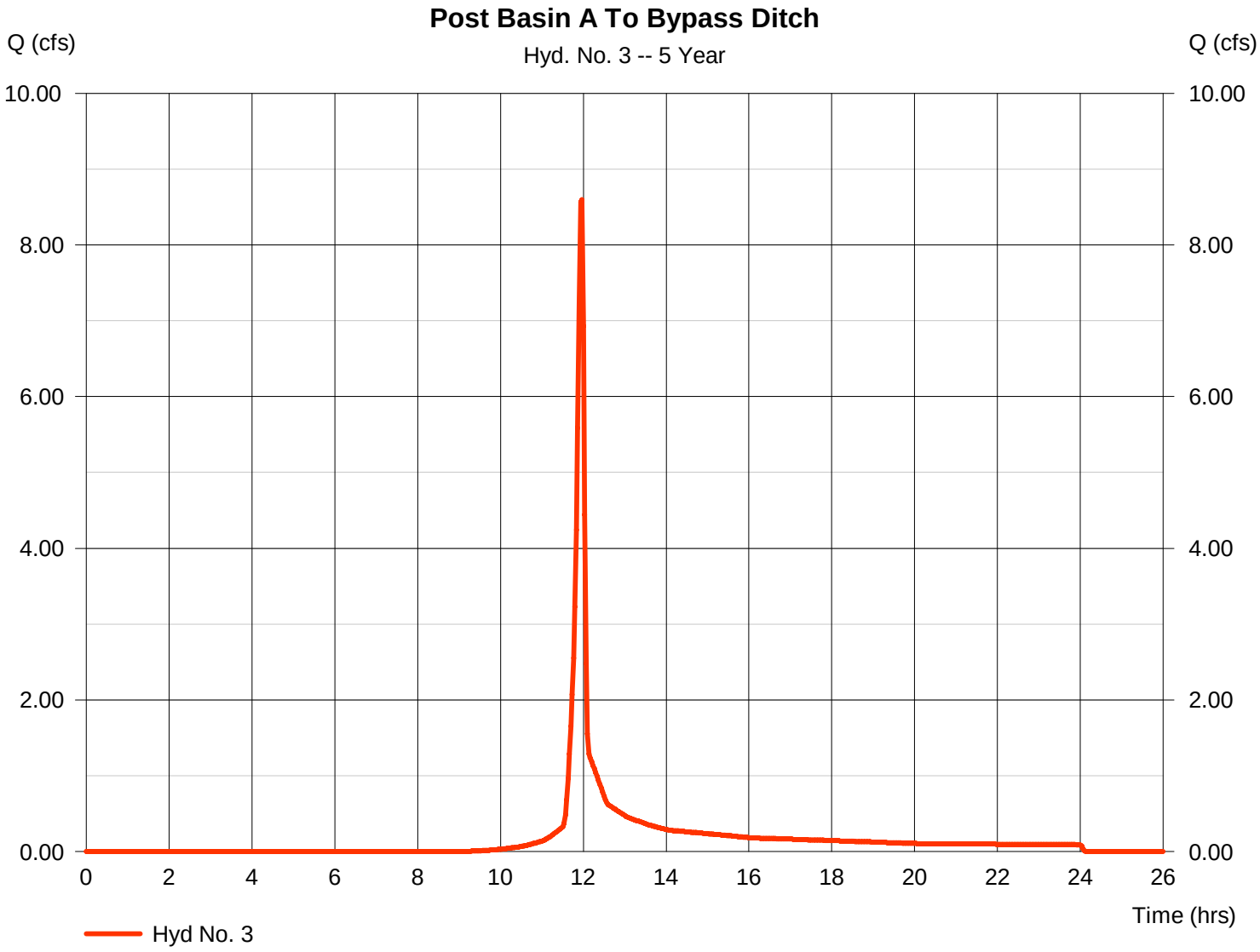


Hydrograph Report

Hyd. No. 3

Post Basin A To Bypass Ditch

Hydrograph type	= SCS Runoff	Peak discharge	= 8.596 cfs
Storm frequency	= 5 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 17,305 cuft
Drainage area	= 2.480 ac	Curve number	= 75
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 4.50 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

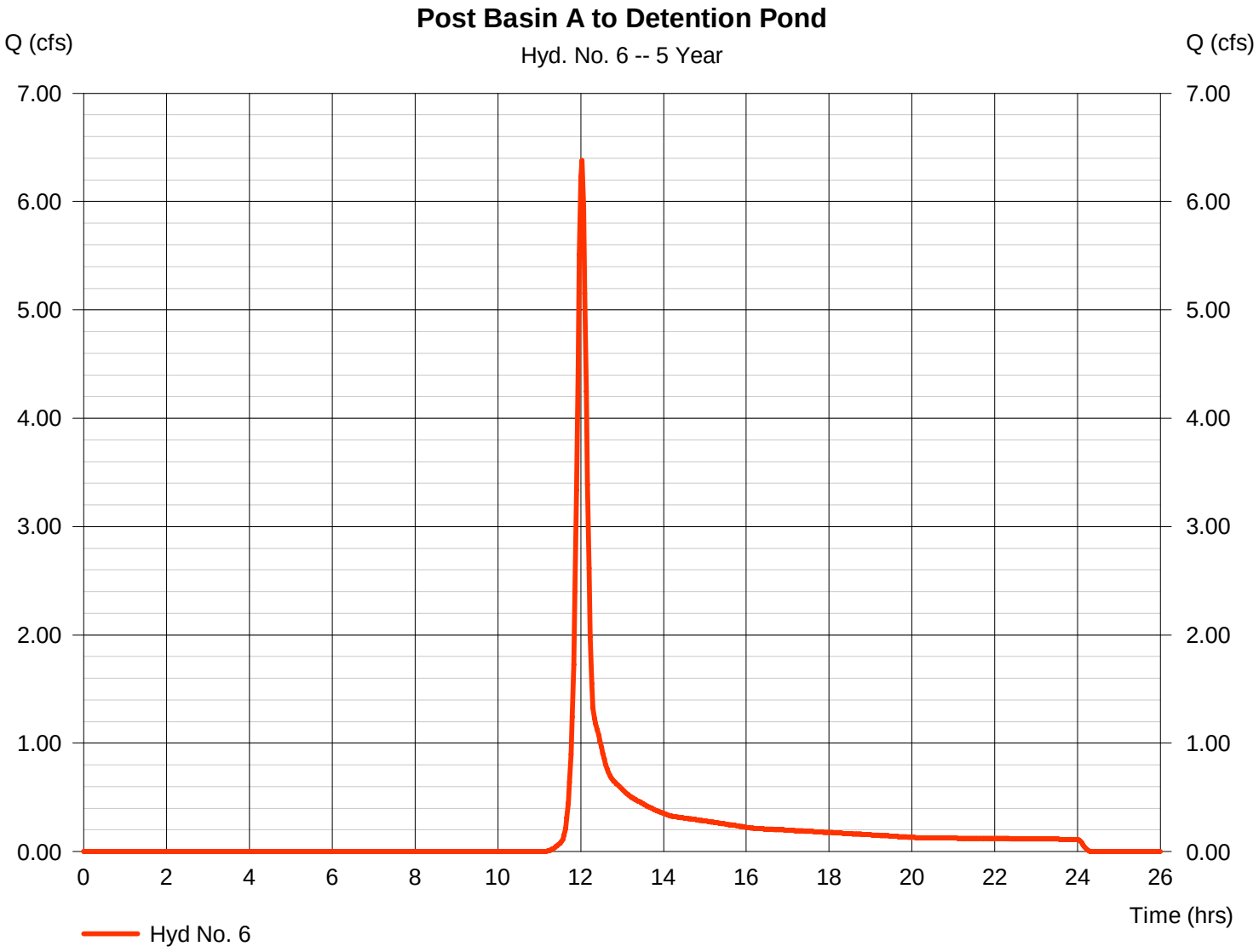


Hydrograph Report

Hyd. No. 6

Post Basin A to Detention Pond

Hydrograph type	=	SCS Runoff	Peak discharge	=	6.380 cfs
Storm frequency	=	5 yrs	Time to peak	=	12.03 hrs
Time interval	=	2 min	Hyd. volume	=	17,281 cuft
Drainage area	=	3.470 ac	Curve number	=	65
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	12.30 min
Total precip.	=	4.50 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



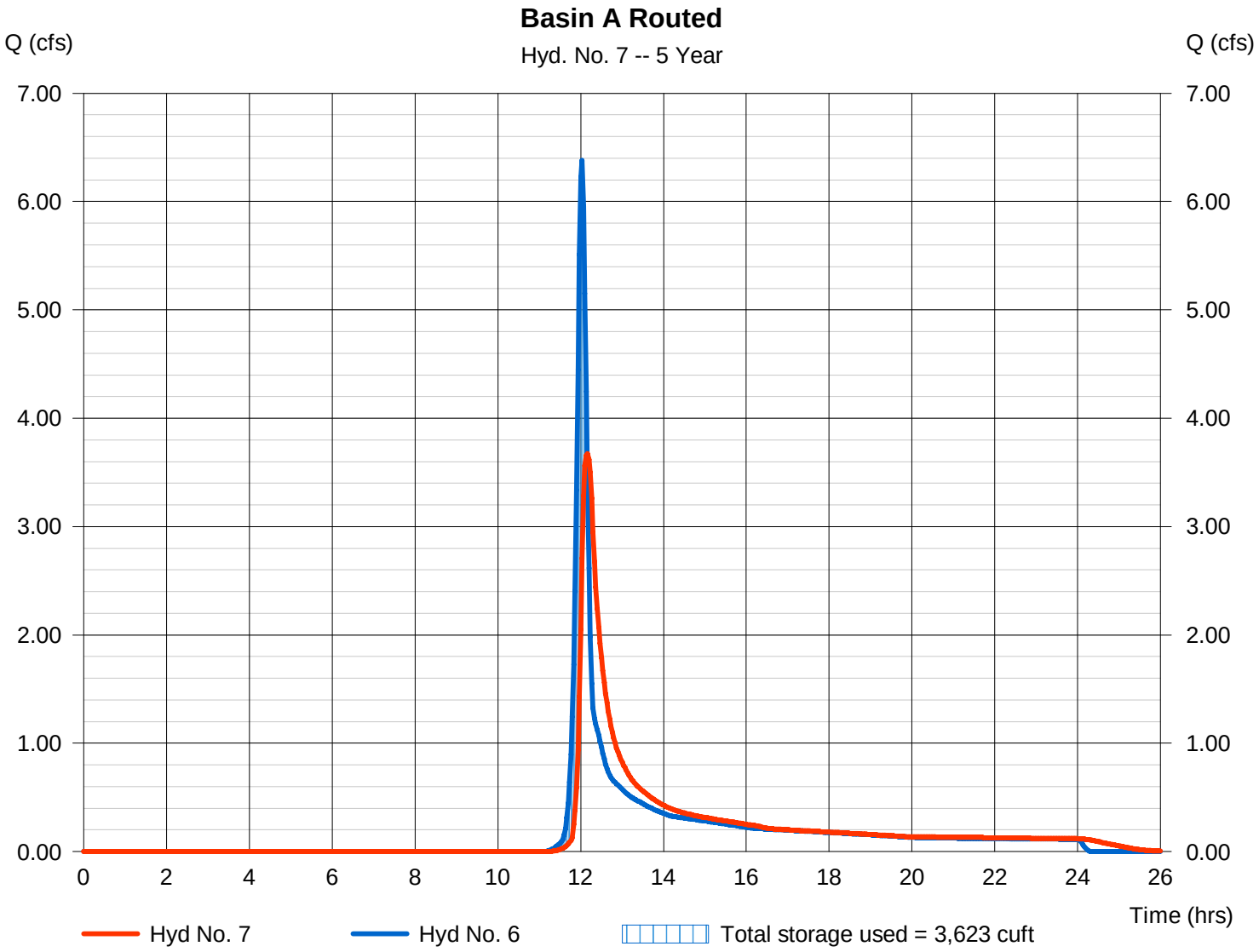
Hydrograph Report

Hyd. No. 7

Basin A Routed

Hydrograph type	=	Reservoir	Peak discharge	=	3.673 cfs
Storm frequency	=	5 yrs	Time to peak	=	12.17 hrs
Time interval	=	2 min	Hyd. volume	=	17,280 cuft
Inflow hyd. No.	=	6 - Post Basin A to Detention Pond	Max. Elevation	=	586.10 ft
Reservoir name	=	Detention Pond	Max. Storage	=	3,623 cuft

Storage Indication method used.

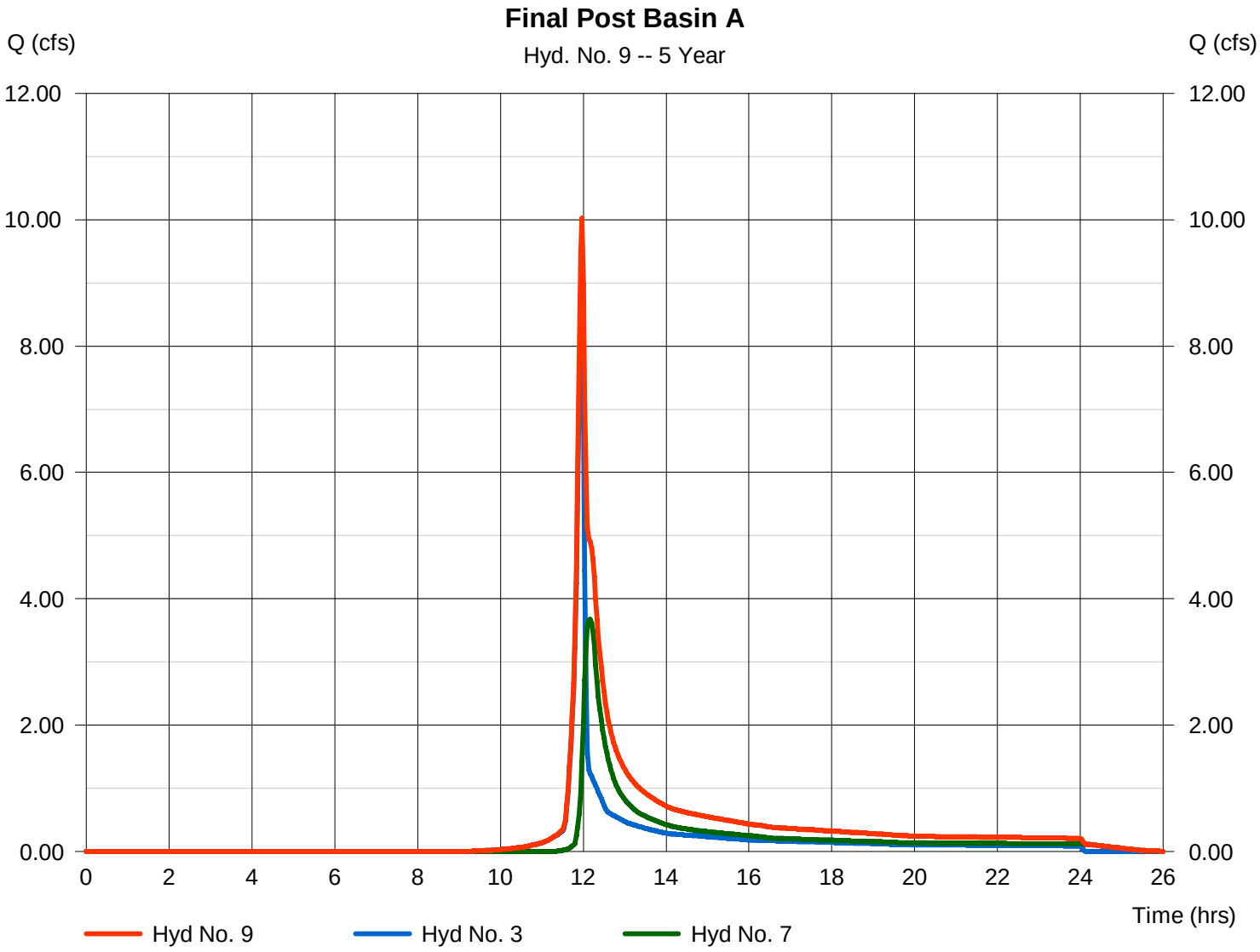


Hydrograph Report

Hyd. No. 9

Final Post Basin A

Hydrograph type	= Combine	Peak discharge	= 10.02 cfs
Storm frequency	= 5 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 34,584 cuft
Inflow hyds.	= 3, 7	Contrib. drain. area	= 2.480 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

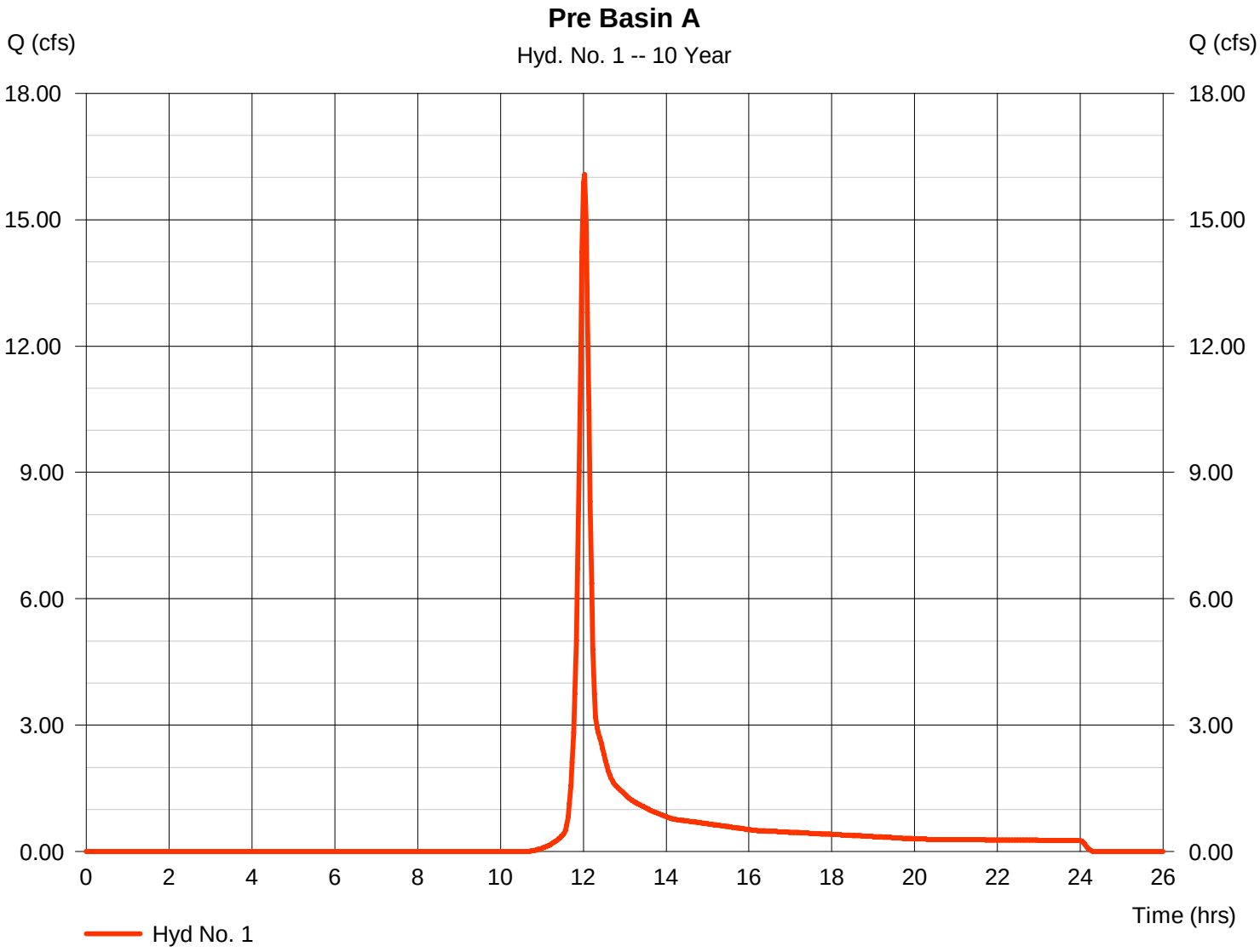
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	16.07	2	722	42,649	------	------	------	Pre Basin A
3	SCS Runoff	11.02	2	716	22,256	------	------	------	Post Basin A To Bypass Ditch
6	SCS Runoff	8.853	2	722	23,491	------	------	------	Post Basin A to Detention Pond
7	Reservoir	4.872	2	730	23,489	6	586.60	5,162	Basin A Routed
9	Combine	13.63	2	718	45,745	3, 7,	------	------	Final Post Basin A

Hydrograph Report

Hyd. No. 1

Pre Basin A

Hydrograph type	= SCS Runoff	Peak discharge	= 16.07 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 42,649 cuft
Drainage area	= 6.300 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 13.10 min
Total precip.	= 5.23 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

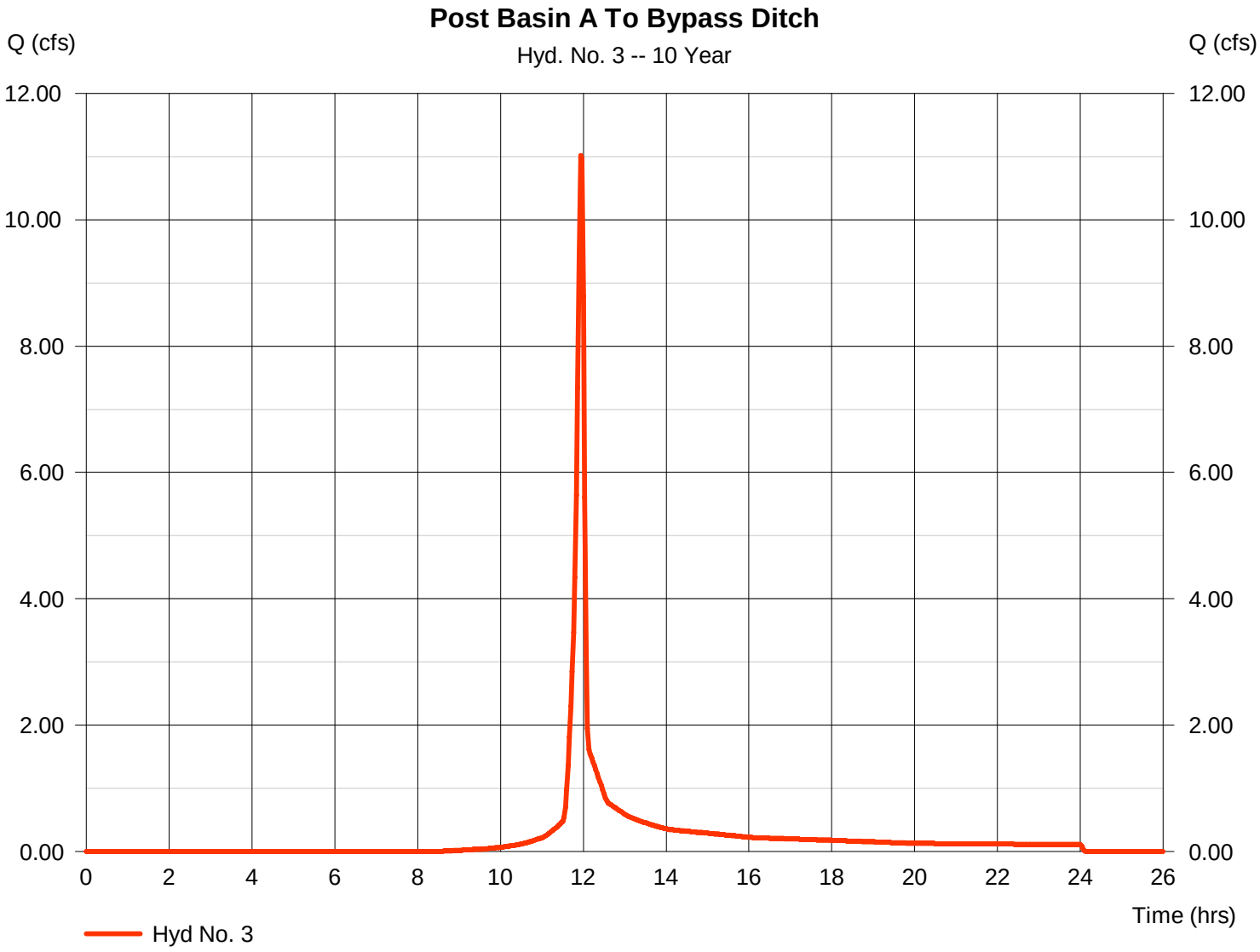


Hydrograph Report

Hyd. No. 3

Post Basin A To Bypass Ditch

Hydrograph type	=	SCS Runoff	Peak discharge	=	11.02 cfs
Storm frequency	=	10 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	22,256 cuft
Drainage area	=	2.480 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	5.23 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

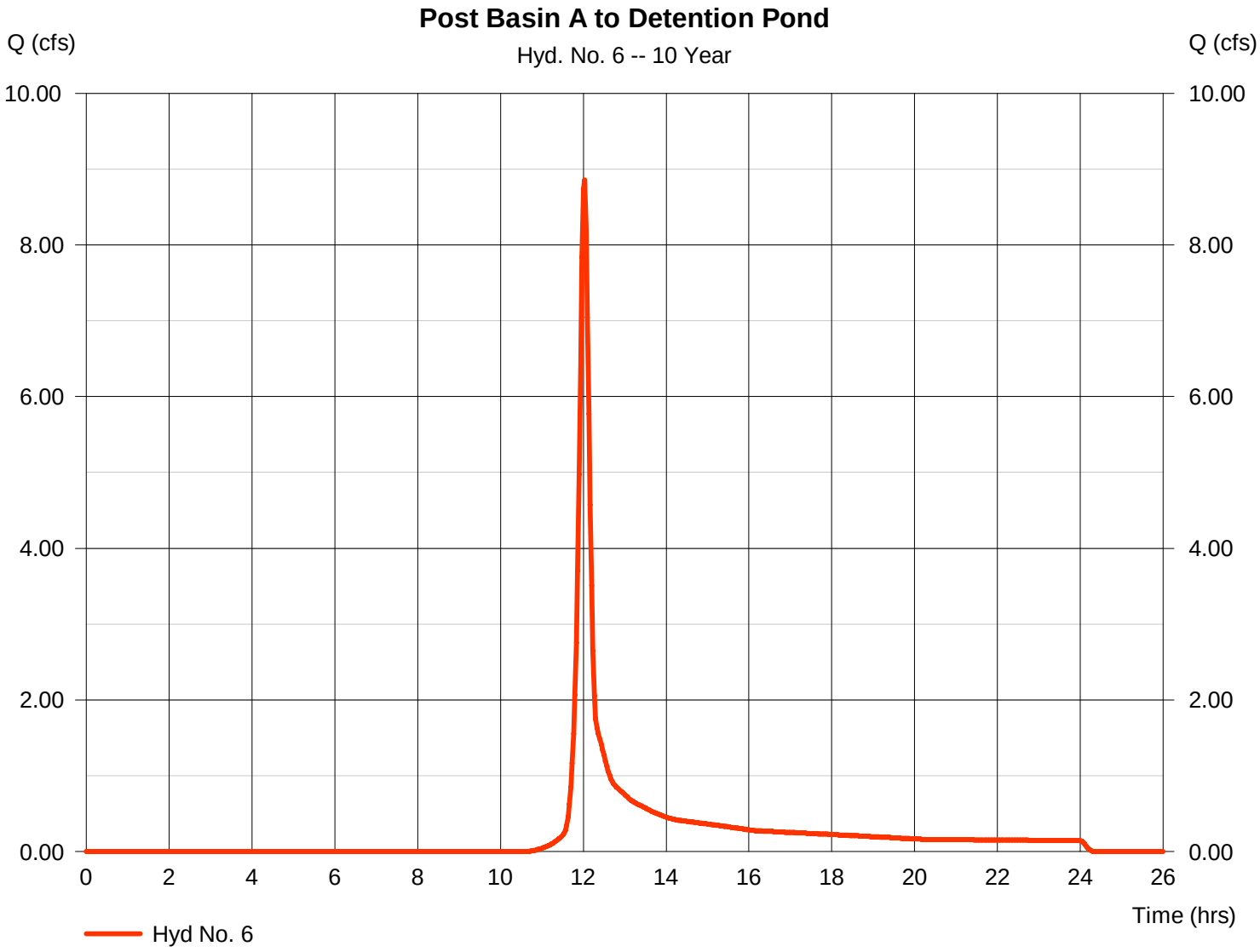


Hydrograph Report

Hyd. No. 6

Post Basin A to Detention Pond

Hydrograph type	= SCS Runoff	Peak discharge	= 8.853 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 23,491 cuft
Drainage area	= 3.470 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.30 min
Total precip.	= 5.23 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

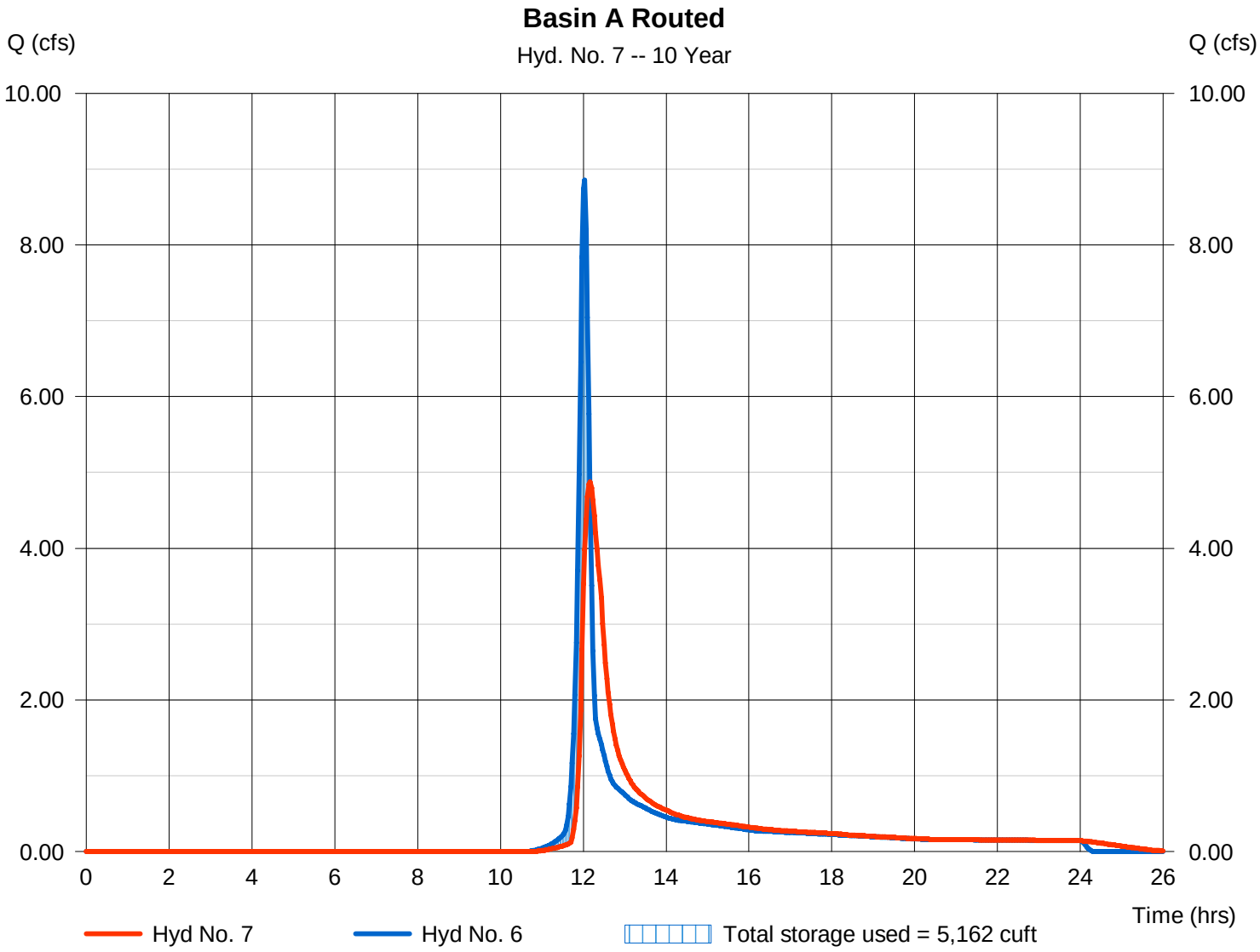
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Tuesday, 10 / 17 / 2023

Hyd. No. 7

Basin A Routed

Hydrograph type	=	Reservoir	Peak discharge	=	4.872 cfs
Storm frequency	=	10 yrs	Time to peak	=	12.17 hrs
Time interval	=	2 min	Hyd. volume	=	23,489 cuft
Inflow hyd. No.	=	6 - Post Basin A to Detention Pond	Max. Elevation	=	586.60 ft
Reservoir name	=	Detention Pond	Max. Storage	=	5,162 cuft

Storage Indication method used.

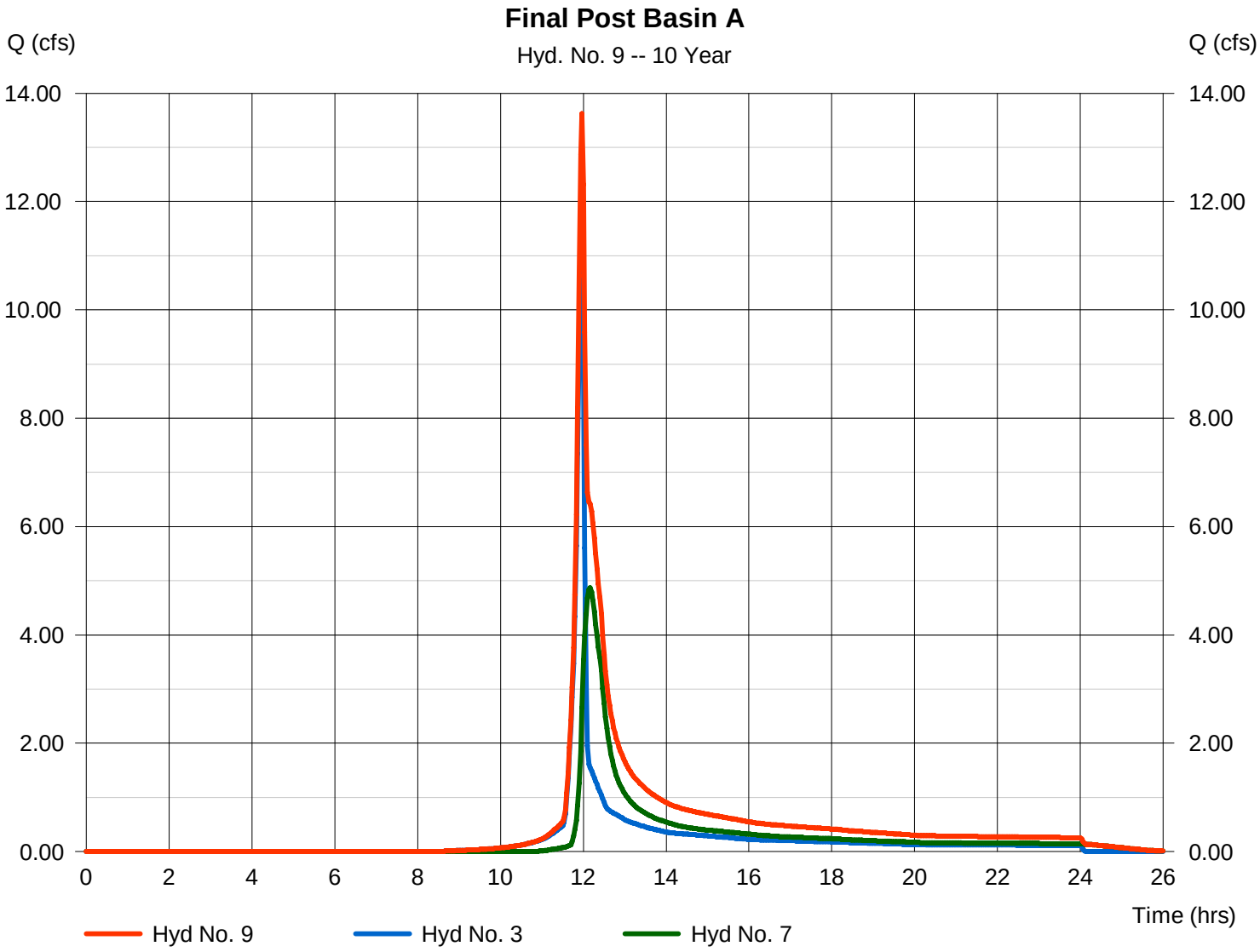


Hydrograph Report

Hyd. No. 9

Final Post Basin A

Hydrograph type	= Combine	Peak discharge	= 13.63 cfs
Storm frequency	= 10 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 45,745 cuft
Inflow hyds.	= 3, 7	Contrib. drain. area	= 2.480 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

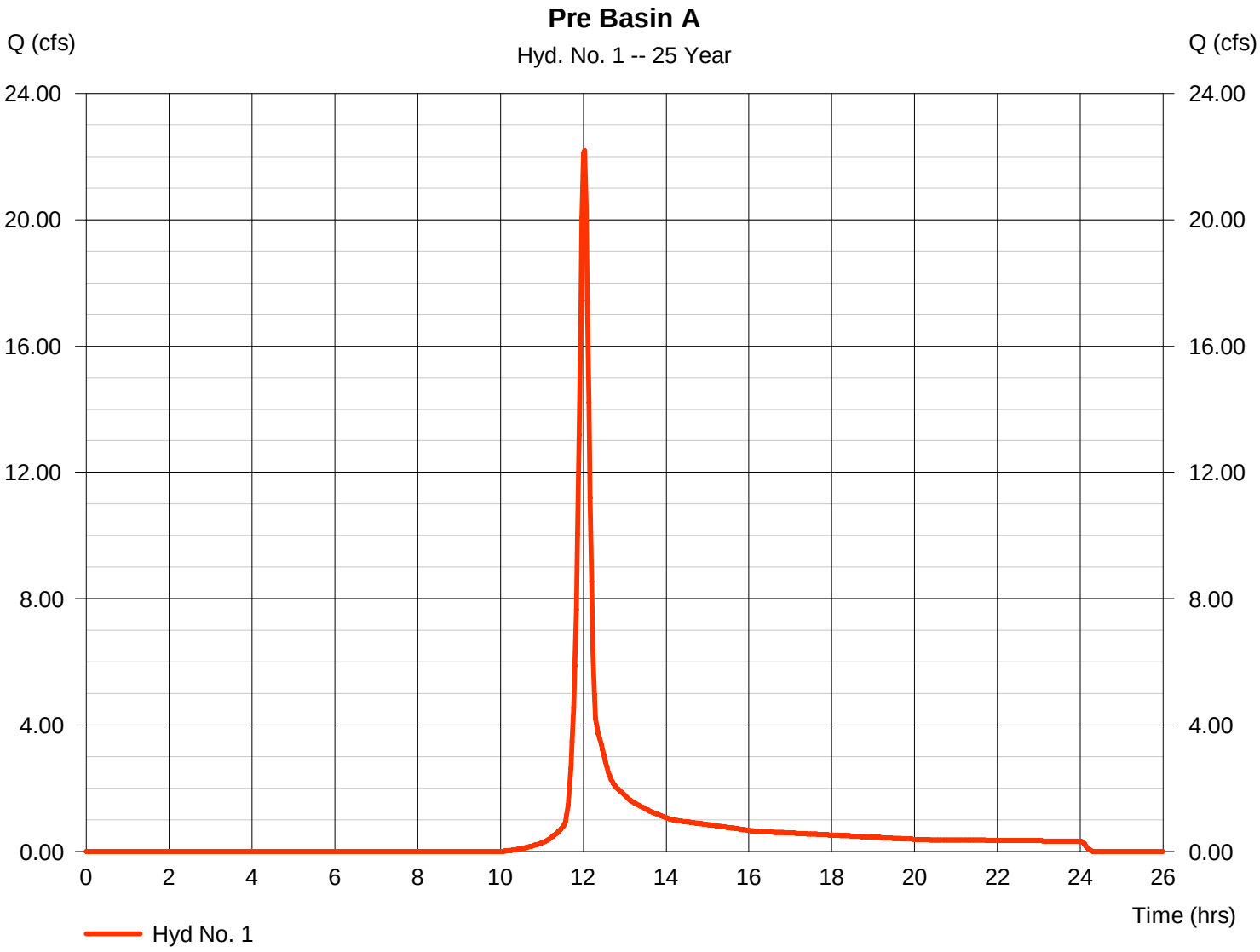
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	22.19	2	722	58,212	------	------	------	Pre Basin A
3	SCS Runoff	14.23	2	716	28,854	------	------	------	Post Basin A To Bypass Ditch
6	SCS Runoff	12.22	2	722	32,063	------	------	------	Post Basin A to Detention Pond
7	Reservoir	7.783	2	728	32,061	6	587.18	6,979	Basin A Routed
9	Combine	18.05	2	718	60,915	3, 7,	------	------	Final Post Basin A

Hydrograph Report

Hyd. No. 1

Pre Basin A

Hydrograph type	= SCS Runoff	Peak discharge	= 22.19 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 58,212 cuft
Drainage area	= 6.300 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 13.10 min
Total precip.	= 6.16 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

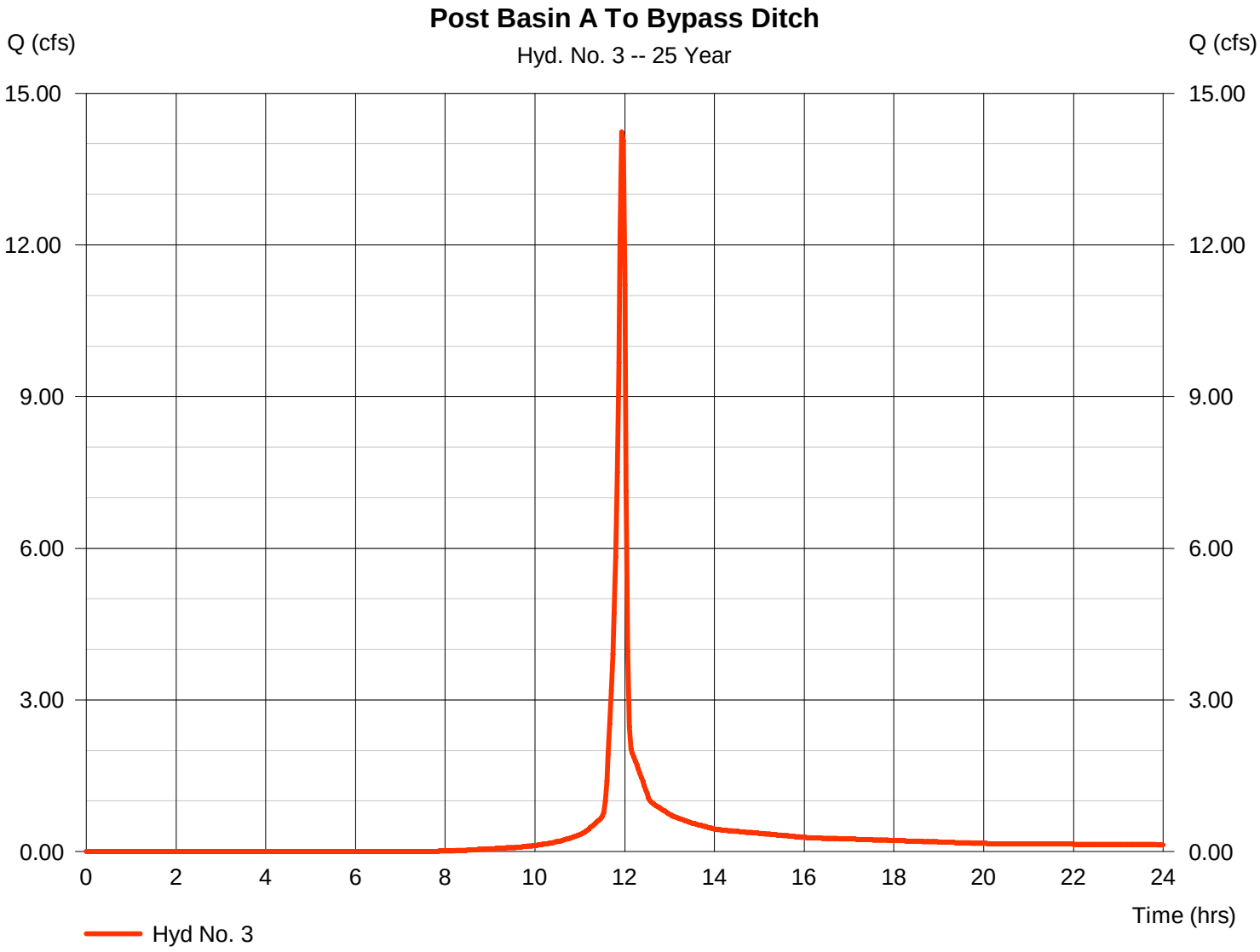


Hydrograph Report

Hyd. No. 3

Post Basin A To Bypass Ditch

Hydrograph type	=	SCS Runoff	Peak discharge	=	14.23 cfs
Storm frequency	=	25 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	28,854 cuft
Drainage area	=	2.480 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	6.16 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

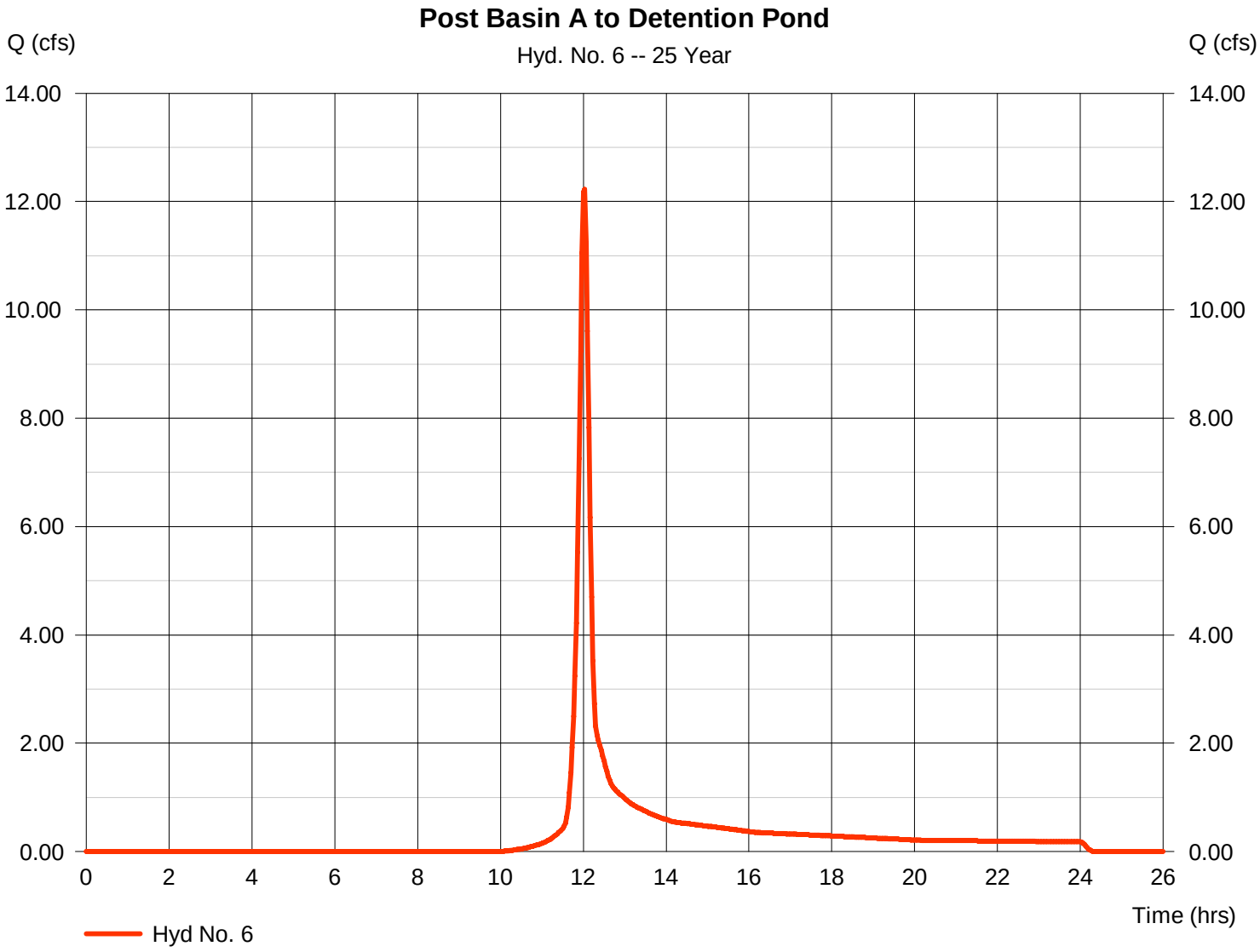


Hydrograph Report

Hyd. No. 6

Post Basin A to Detention Pond

Hydrograph type	= SCS Runoff	Peak discharge	= 12.22 cfs
Storm frequency	= 25 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 32,063 cuft
Drainage area	= 3.470 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.30 min
Total precip.	= 6.16 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



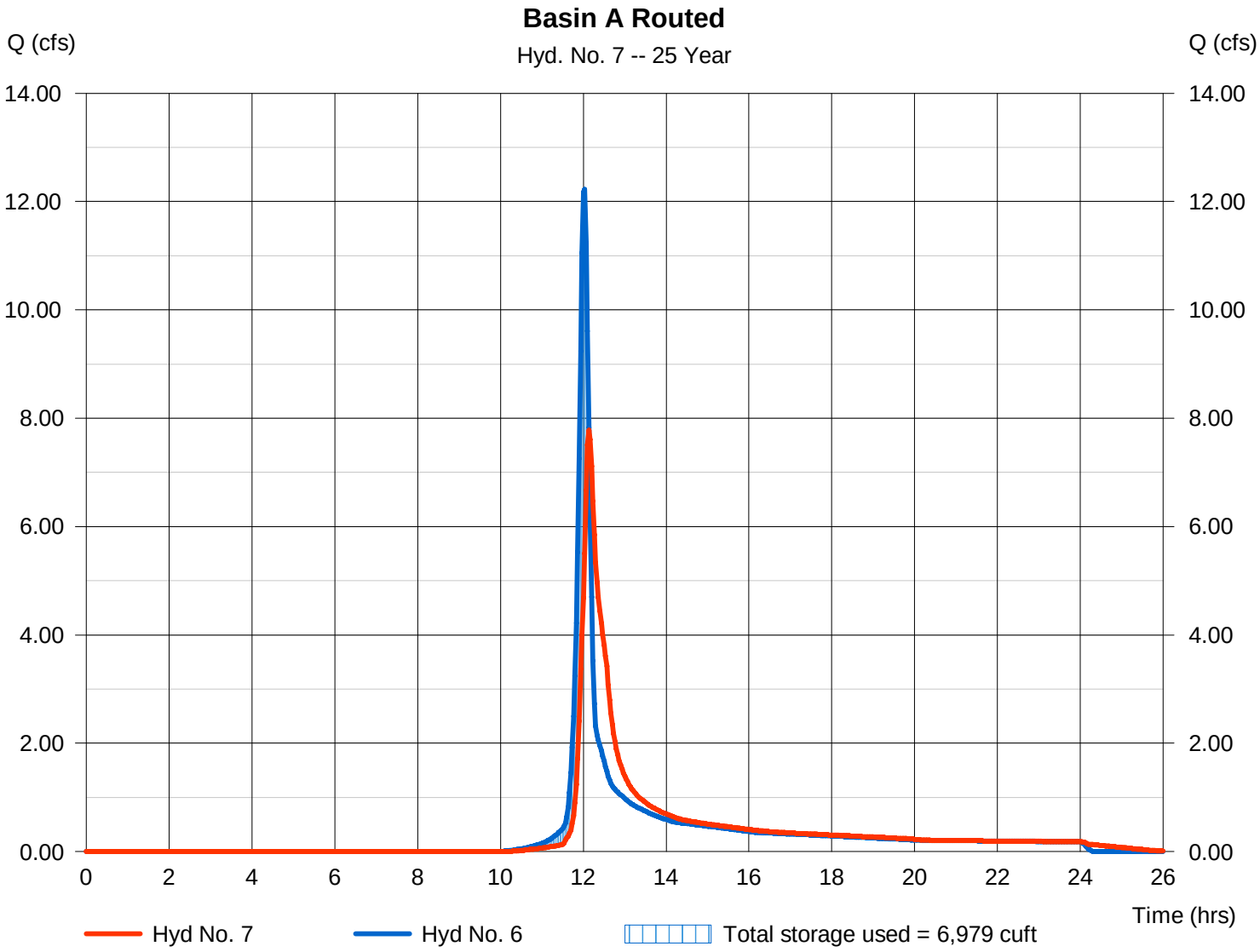
Hydrograph Report

Hyd. No. 7

Basin A Routed

Hydrograph type	=	Reservoir	Peak discharge	=	7.783 cfs
Storm frequency	=	25 yrs	Time to peak	=	12.13 hrs
Time interval	=	2 min	Hyd. volume	=	32,061 cuft
Inflow hyd. No.	=	6 - Post Basin A to Detention Pond	Max. Elevation	=	587.18 ft
Reservoir name	=	Detention Pond	Max. Storage	=	6,979 cuft

Storage Indication method used.

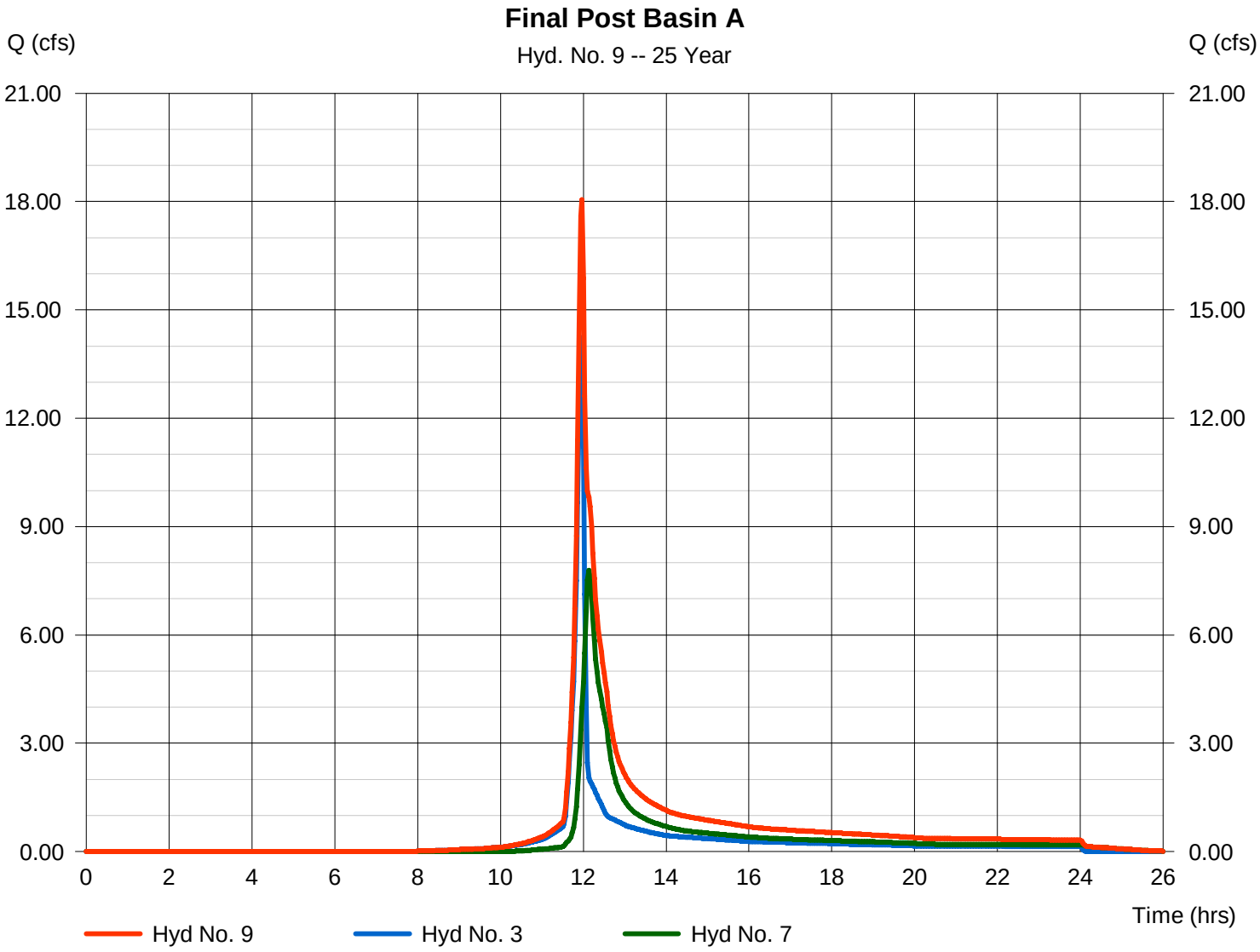


Hydrograph Report

Hyd. No. 9

Final Post Basin A

Hydrograph type	= Combine	Peak discharge	= 18.05 cfs
Storm frequency	= 25 yrs	Time to peak	= 11.97 hrs
Time interval	= 2 min	Hyd. volume	= 60,915 cuft
Inflow hyds.	= 3, 7	Contrib. drain. area	= 2.480 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

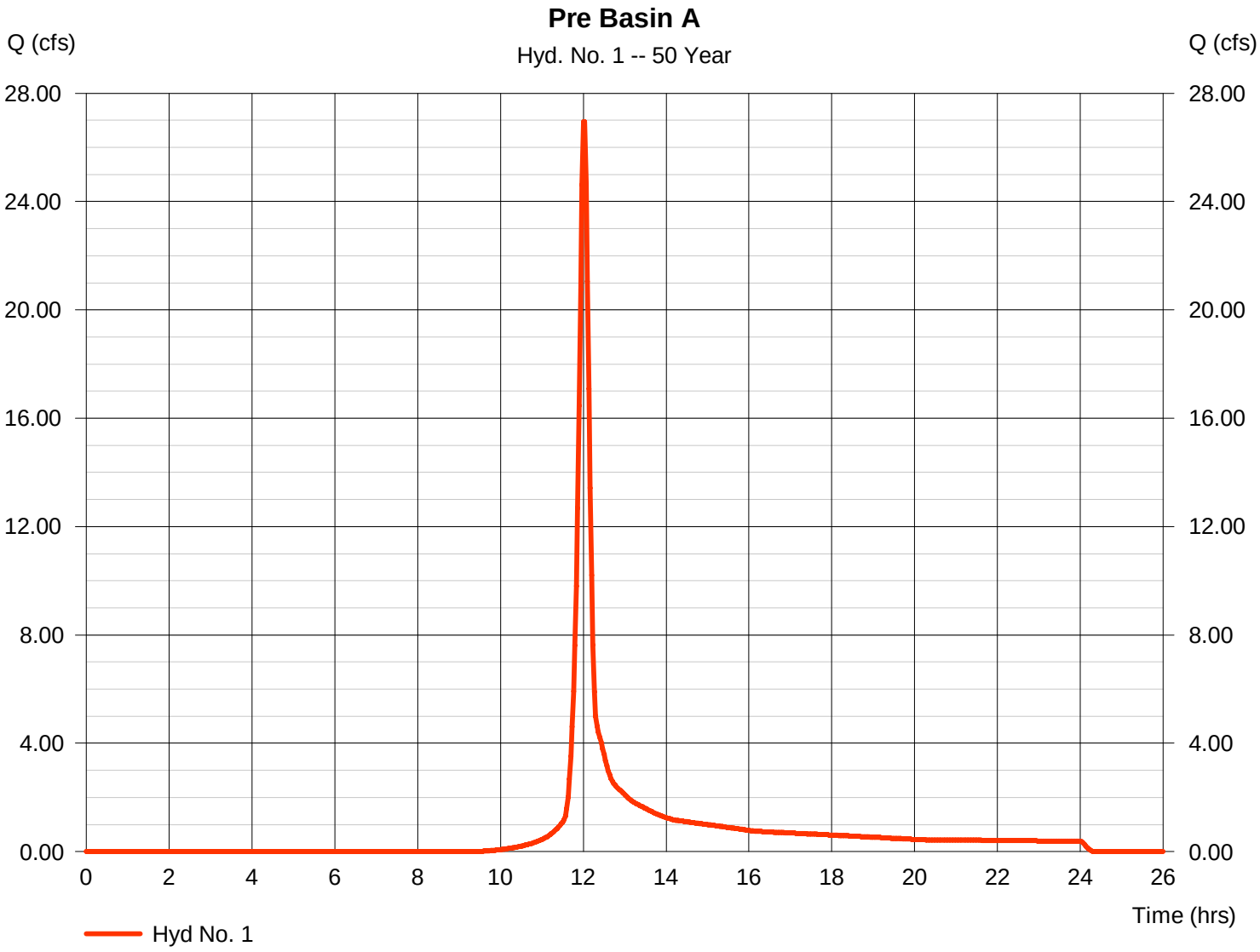
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	26.96	2	720	70,445	------	------	------	Pre Basin A
3	SCS Runoff	16.65	2	716	33,907	------	------	------	Post Basin A To Bypass Ditch
6	SCS Runoff	14.85	2	720	38,801	------	------	------	Post Basin A to Detention Pond
7	Reservoir	12.65	2	724	38,799	6	587.35	7,506	Basin A Routed
9	Combine	21.16	2	718	72,706	3, 7,	------	------	Final Post Basin A

Hydrograph Report

Hyd. No. 1

Pre Basin A

Hydrograph type	= SCS Runoff	Peak discharge	= 26.96 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 70,445 cuft
Drainage area	= 6.300 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 13.10 min
Total precip.	= 6.85 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

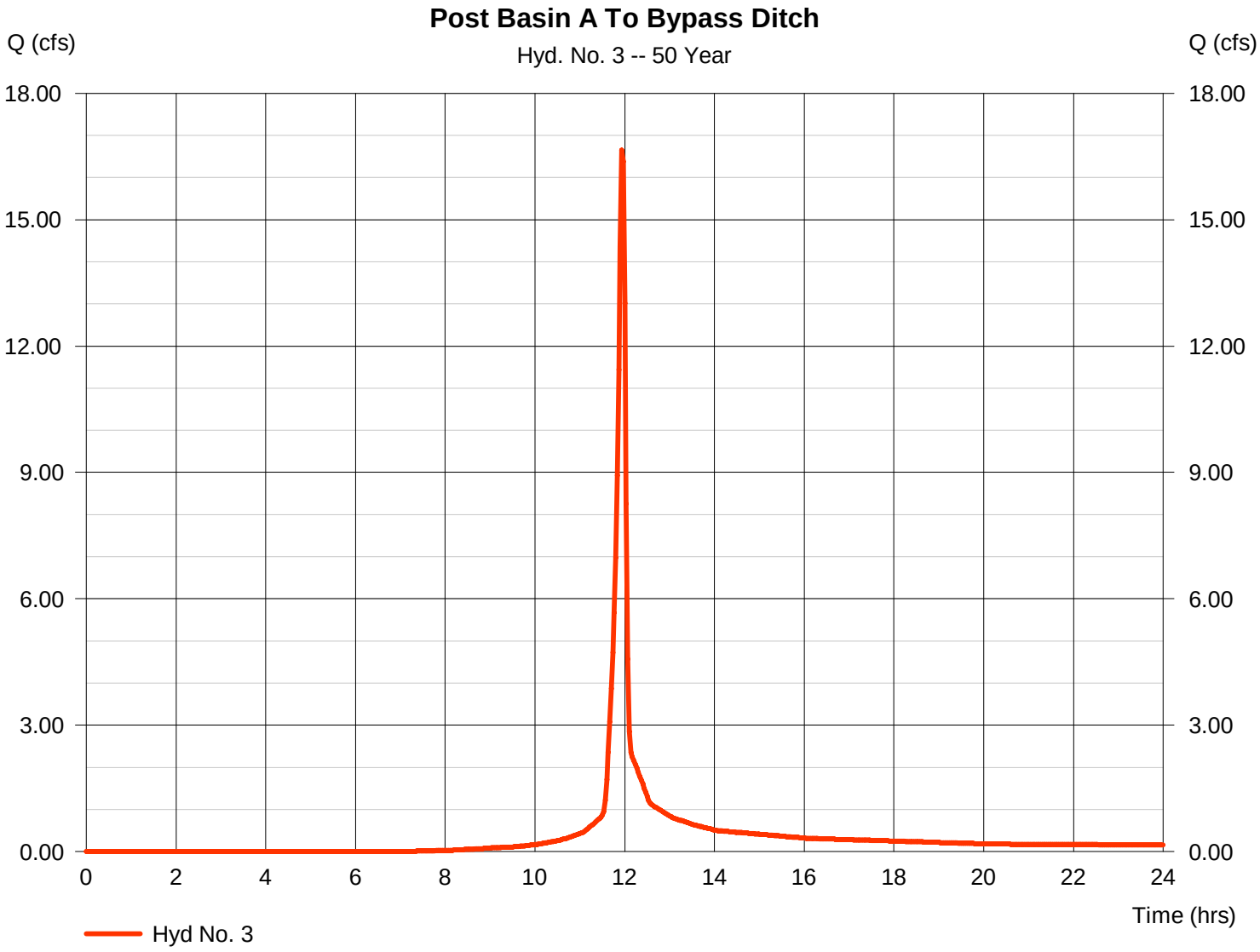


Hydrograph Report

Hyd. No. 3

Post Basin A To Bypass Ditch

Hydrograph type	=	SCS Runoff	Peak discharge	=	16.65 cfs
Storm frequency	=	50 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	33,907 cuft
Drainage area	=	2.480 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	6.85 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

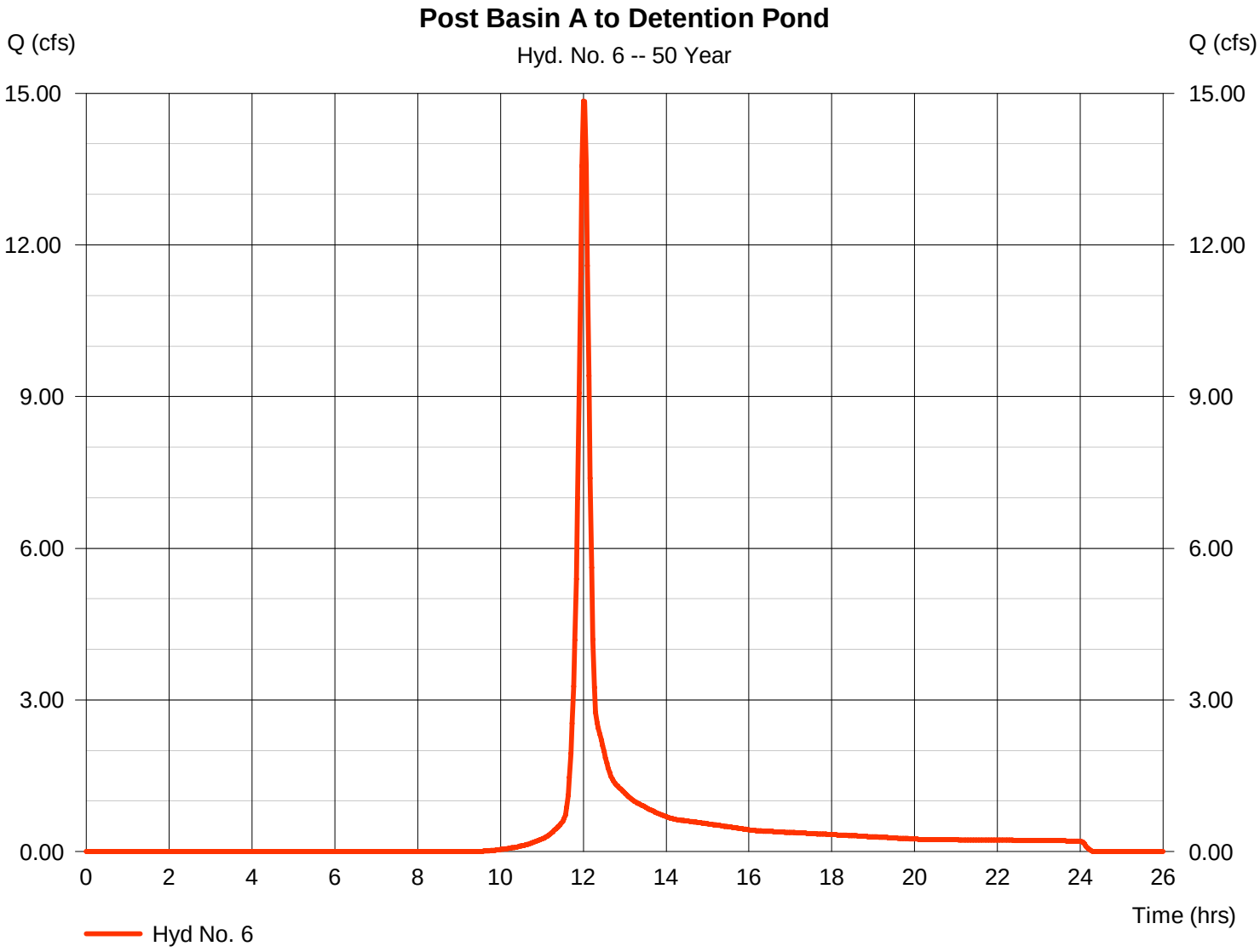


Hydrograph Report

Hyd. No. 6

Post Basin A to Detention Pond

Hydrograph type	= SCS Runoff	Peak discharge	= 14.85 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 38,801 cuft
Drainage area	= 3.470 ac	Curve number	= 65
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 12.30 min
Total precip.	= 6.85 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



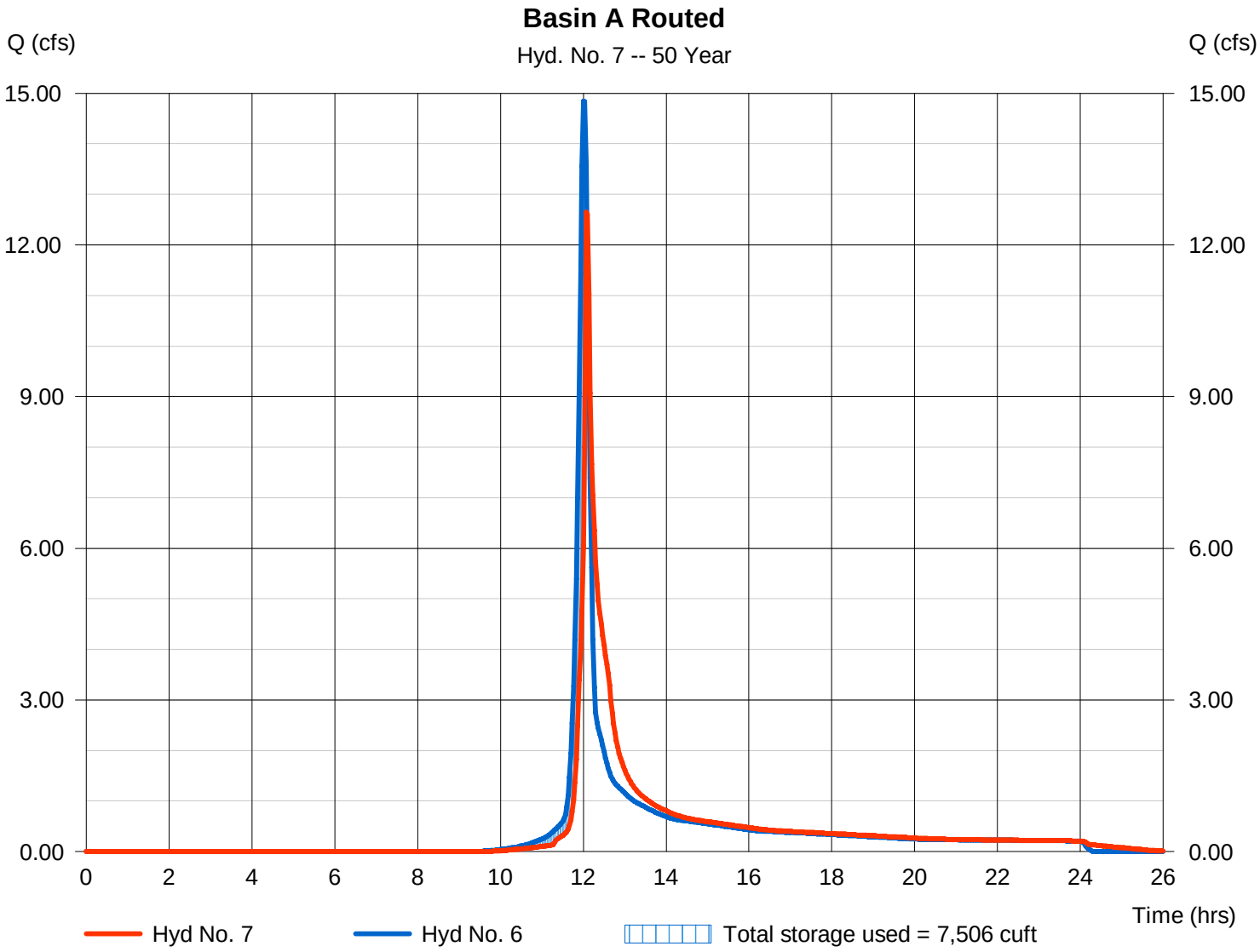
Hydrograph Report

Hyd. No. 7

Basin A Routed

Hydrograph type	=	Reservoir	Peak discharge	=	12.65 cfs
Storm frequency	=	50 yrs	Time to peak	=	12.07 hrs
Time interval	=	2 min	Hyd. volume	=	38,799 cuft
Inflow hyd. No.	=	6 - Post Basin A to Detention Pond	Max. Elevation	=	587.35 ft
Reservoir name	=	Detention Pond	Max. Storage	=	7,506 cuft

Storage Indication method used.

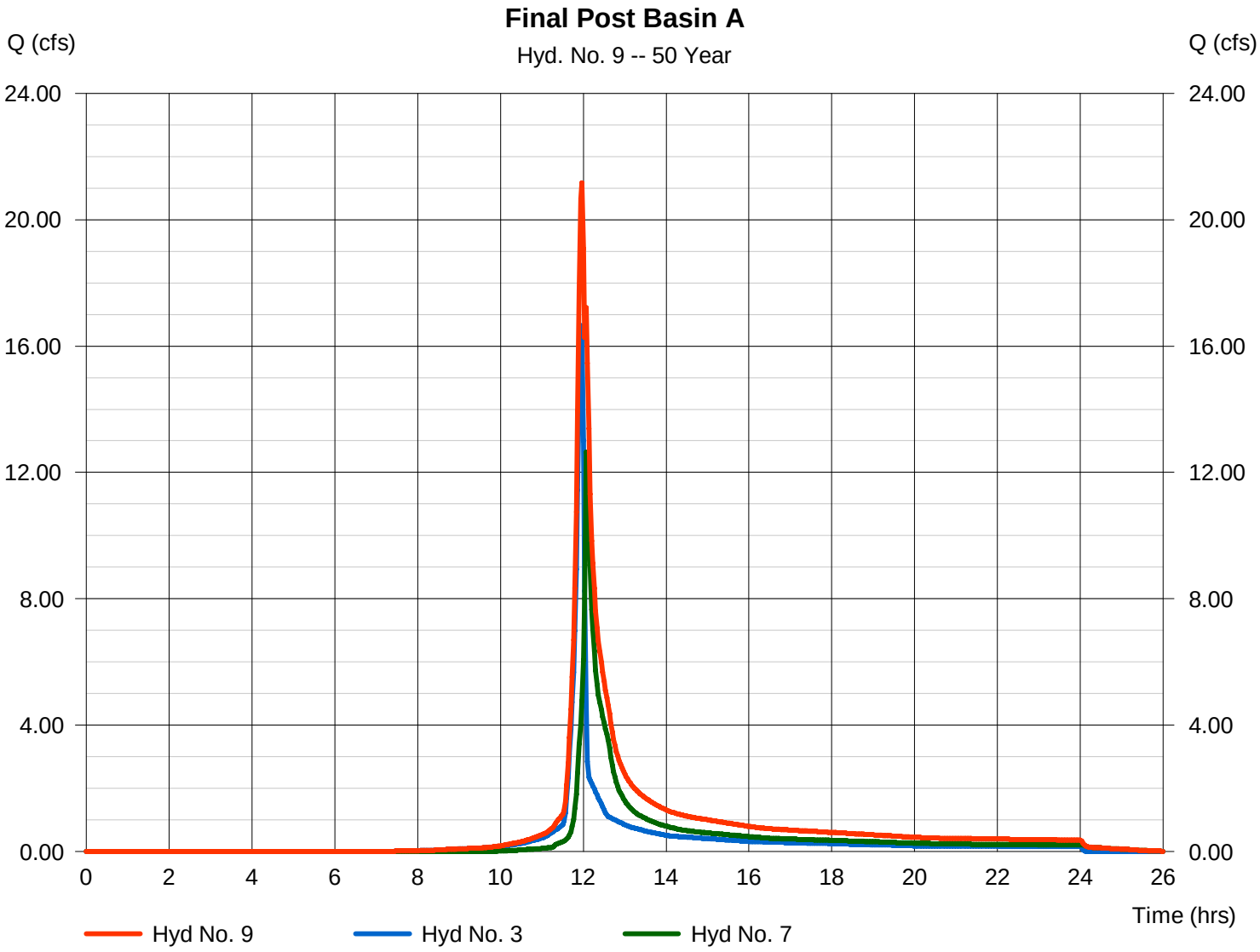


Hydrograph Report

Hyd. No. 9

Final Post Basin A

Hydrograph type	=	Combine	Peak discharge	=	21.16 cfs
Storm frequency	=	50 yrs	Time to peak	=	11.97 hrs
Time interval	=	2 min	Hyd. volume	=	72,706 cuft
Inflow hyds.	=	3, 7	Contrib. drain. area	=	2.480 ac



Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022

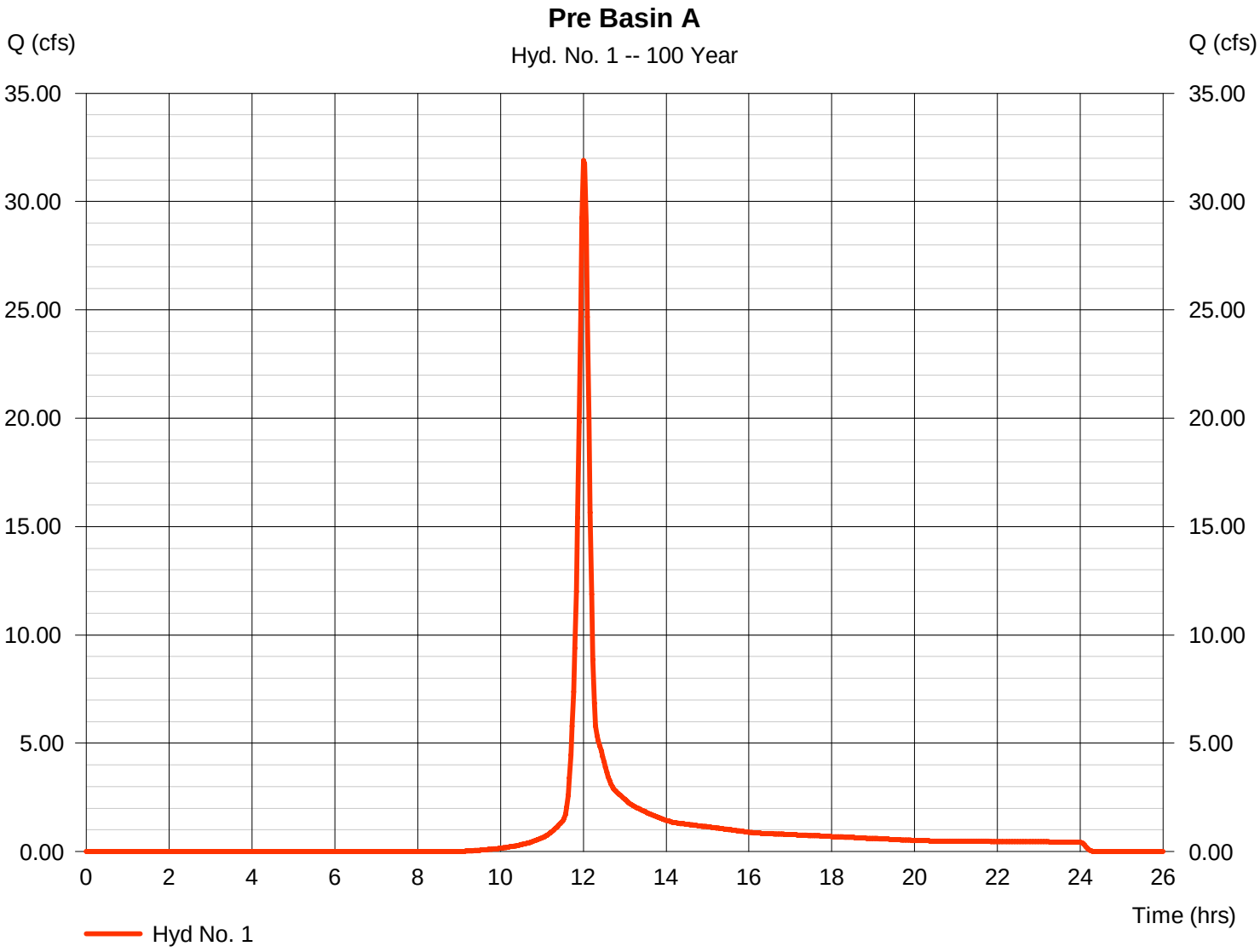
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	SCS Runoff	31.89	2	720	82,962	------	------	------	Pre Basin A
3	SCS Runoff	19.06	2	716	38,989	------	------	------	Post Basin A To Bypass Ditch
6	SCS Runoff	17.56	2	720	45,695	------	------	------	Post Basin A to Detention Pond
7	Reservoir	16.72	2	724	45,693	6	587.45	7,809	Basin A Routed
9	Combine	25.30	2	722	84,682	3, 7,	------	------	Final Post Basin A

Hydrograph Report

Hyd. No. 1

Pre Basin A

Hydrograph type	=	SCS Runoff	Peak discharge	=	31.89 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	82,962 cuft
Drainage area	=	6.300 ac	Curve number	=	65
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	13.10 min
Total precip.	=	7.53 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

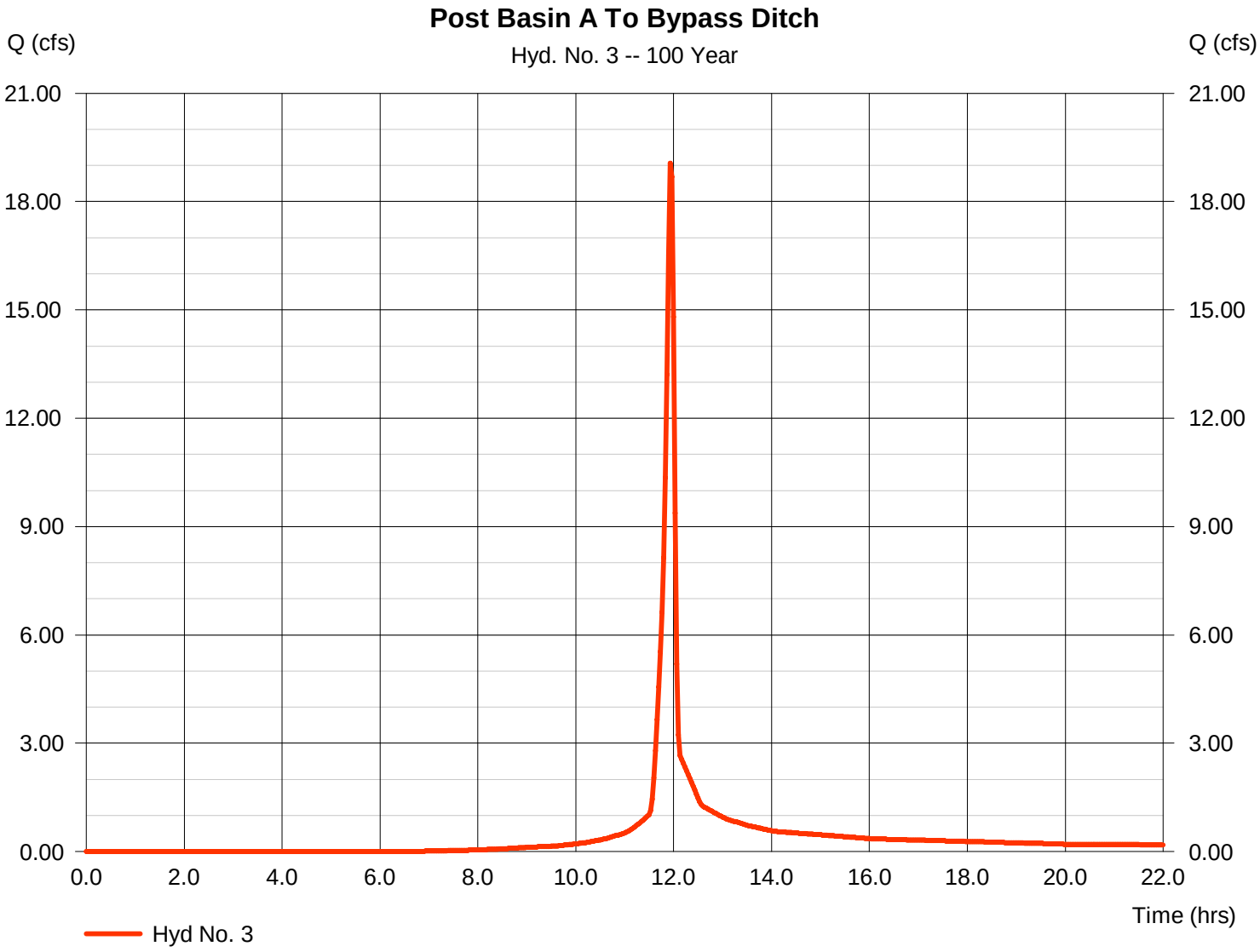


Hydrograph Report

Hyd. No. 3

Post Basin A To Bypass Ditch

Hydrograph type	=	SCS Runoff	Peak discharge	=	19.06 cfs
Storm frequency	=	100 yrs	Time to peak	=	11.93 hrs
Time interval	=	2 min	Hyd. volume	=	38,989 cuft
Drainage area	=	2.480 ac	Curve number	=	75
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	User	Time of conc. (Tc)	=	5.00 min
Total precip.	=	7.53 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484

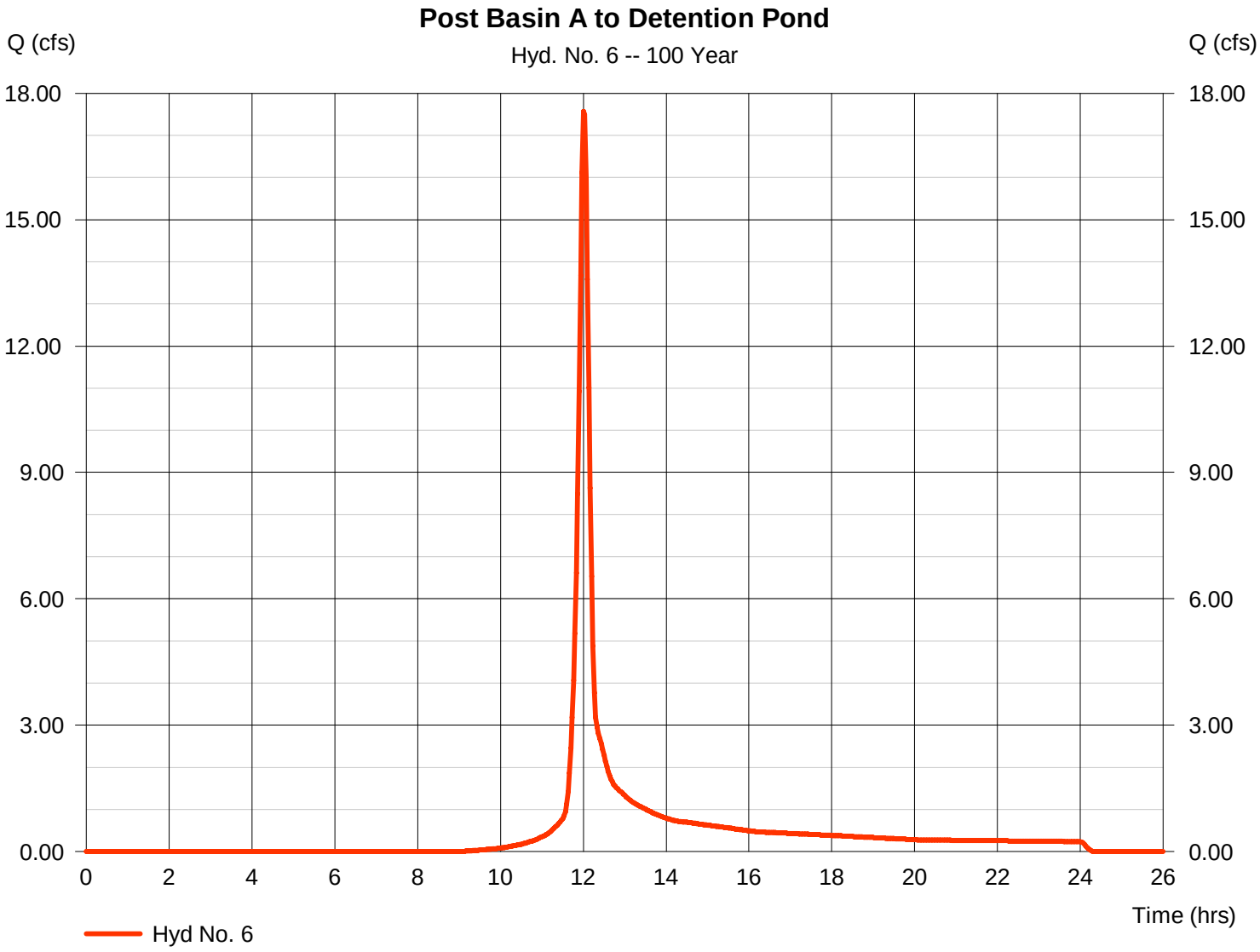


Hydrograph Report

Hyd. No. 6

Post Basin A to Detention Pond

Hydrograph type	=	SCS Runoff	Peak discharge	=	17.56 cfs
Storm frequency	=	100 yrs	Time to peak	=	12.00 hrs
Time interval	=	2 min	Hyd. volume	=	45,695 cuft
Drainage area	=	3.470 ac	Curve number	=	65
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	TR55	Time of conc. (Tc)	=	12.30 min
Total precip.	=	7.53 in	Distribution	=	Type II
Storm duration	=	24 hrs	Shape factor	=	484



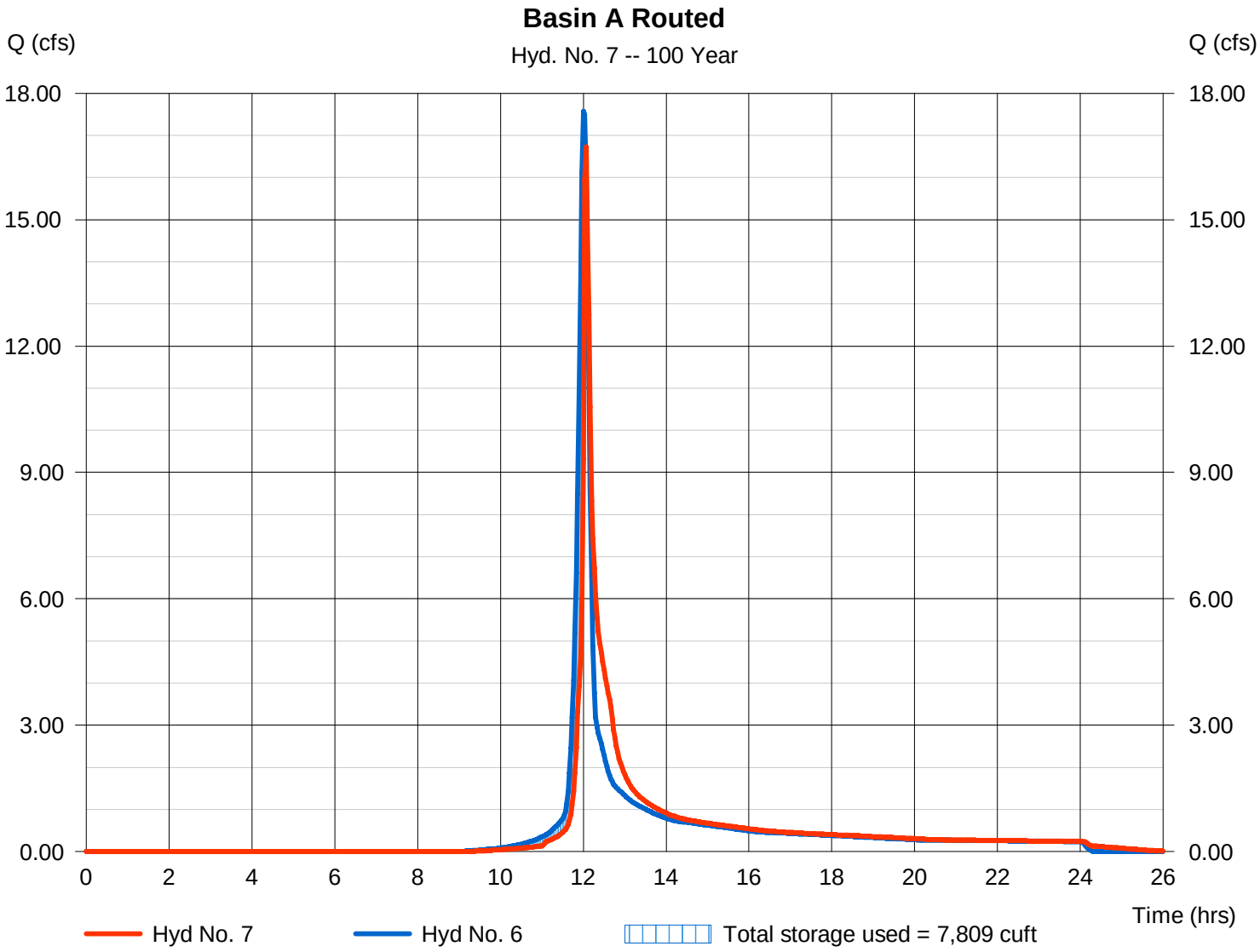
Hydrograph Report

Hyd. No. 7

Basin A Routed

Hydrograph type	= Reservoir	Peak discharge	= 16.72 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 45,693 cuft
Inflow hyd. No.	= 6 - Post Basin A to Detention Pond	Max. Elevation	= 587.45 ft
Reservoir name	= Detention Pond	Max. Storage	= 7,809 cuft

Storage Indication method used.

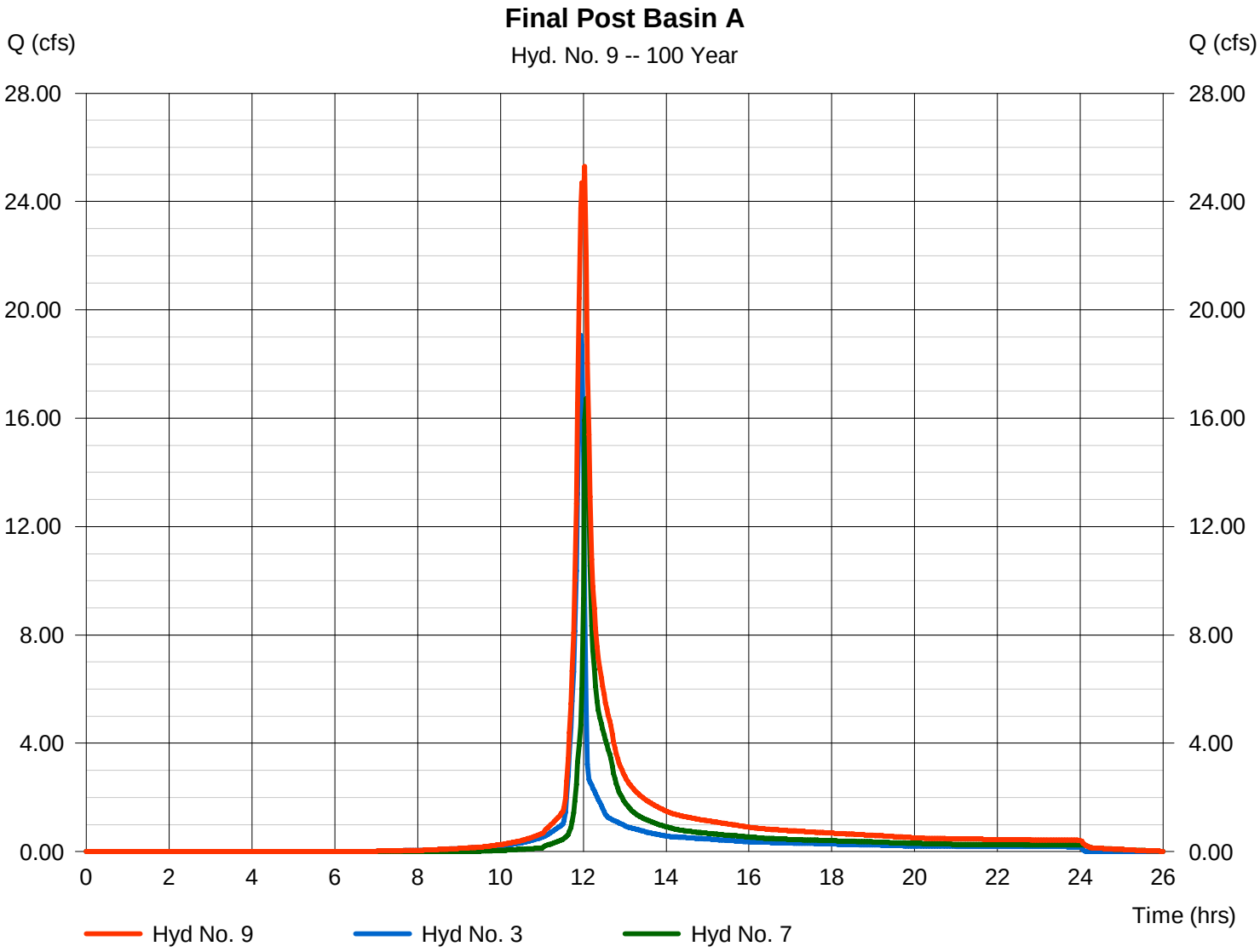


Hydrograph Report

Hyd. No. 9

Final Post Basin A

Hydrograph type	= Combine	Peak discharge	= 25.30 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 84,682 cuft
Inflow hyds.	= 3, 7	Contrib. drain. area	= 2.480 ac



STORMWATER PIPES

CSDG PROJECT #: 19-012-01

CSDG
Planning | Engineering
Landscape Architecture

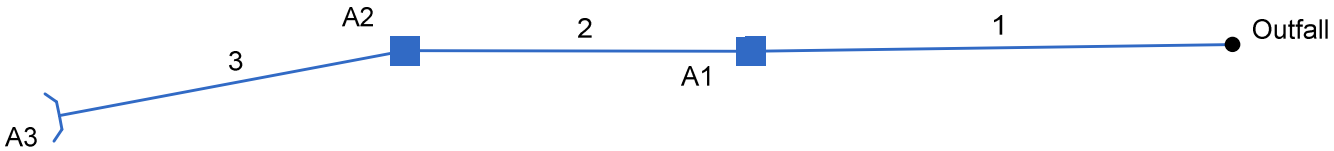
ELLERSLY
STORM DRAINAGE MAP

PN:19-012-0 | D:11.1.2023

N

0 30 60
SCALE: 1"=30'

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: Line A.stm	Number of lines: 3	Date: 11/1/2023

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data								Line ID
	Dnstr Line No.	Line Length (ft)	Defl angle (deg)	Junc Type	Known Q (cfs)	Drng Area (ac)	Runoff Coeff (C)	Inlet Time (min)	Invert El Dn (ft)	Line Slope (%)	Invert El Up (ft)	Line Size (in)	Line Shape	N Value (n)	J-Loss Coeff (K)	Inlet/ Rim El (ft)	
1	End	67.000	179.178	Comb	0.00	0.15	0.85	5.0	556.00	17.91	568.00	18	Cir	0.013	0.50	571.50	A1-A0
2	1	48.000	0.926	Comb	0.00	0.26	0.80	5.0	568.10	0.63	568.40	18	Cir	0.013	0.50	571.50	A2-A1
3	2	49.000	-10.735	Hdwl	0.00	0.68	0.70	5.0	568.50	9.18	573.00	18	Cir	0.013	1.00	576.50	A3-A2

Project File: Line A.stm | Number of lines: 3 | Date: 11/1/2023

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1	A1	Combination	571.50	Rect	4.00	4.00	18	Cir	568.00	18	Cir	568.10
2	A2	Combination	571.50	Rect	4.00	4.00	18	Cir	568.40	18	Cir	568.50
3	A3	OpenHeadwall	576.50	n/a	n/a	n/a	18	Cir	573.00			

Project File: Line A.stm | Number of Structures: 3 | Run Date: 11/1/2023

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	A1-A0	6.54	18	Cir	67.000	556.00	568.00	17.910	556.39	568.99	n/a	568.99	End	Combination
2	A2-A1	5.56	18	Cir	48.000	568.10	568.40	0.625	569.00	569.31	0.19	569.31	1	Combination
3	A3-A2	3.93	18	Cir	49.000	568.50	573.00	9.184	569.31	573.76	n/a	573.76 j	2	OpenHeadwall

Project File: Line A.stm | Number of lines: 3 | Run Date: 11/1/2023

NOTES: Return period = 25 Yrs. ; j - Line contains hyd. jump.

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	67.000	0.15	1.09	0.85	0.13	0.81	5.0	5.6	8.1	6.54	44.44	11.64	18	17.91	556.00	568.00	556.39	568.99	559.51	571.50	A1-A0
2	1	48.000	0.26	0.94	0.80	0.21	0.68	5.0	5.4	8.1	5.56	8.30	5.00	18	0.63	568.10	568.40	569.00	569.31	571.50	571.50	A2-A1
3	2	49.000	0.68	0.68	0.70	0.48	0.48	5.0	5.0	8.2	3.93	31.82	4.21	18	9.18	568.50	573.00	569.31	573.76	571.50	576.50	A3-A2

Project File: Line A.stm

Number of lines: 3

Run Date: 11/1/2023

NOTES:Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82; Return period =Yrs. 25 ; c = cir e = ellip b = box

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)	Depr (in)	
1	A1	1.05	0.00	1.05	0.00	Comb	6.0	2.50	0.00	2.50	1.80	0.100	2.00	0.083	0.083	0.013	0.15	1.81	0.17	0.00	2.0	Off
2	A2	1.72	0.00	1.68	0.04	Comb	6.0	2.50	0.00	2.50	1.80	0.100	2.00	0.083	0.083	0.013	0.18	2.18	0.21	0.53	2.0	Off
3	A3	3.93	0.00	3.93	0.00	Hdwl	0.0	0.00	0.00	0.00	0.00	Sag	0.00	0.000	0.000	0.013	0.00	0.00	0.00	0.00	0.0	Off

Project File: Line A.stm

Number of lines: 3

Run Date: 11/1/2023

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.

FL-DOT Report

Line No	To Line	Type of struc	n - Value	Len	Drainage Area			Time of conc	Time of Flow in sect	Inten (I)	Total CA	Add Q	Inlet elev	Elev of HGL			Rise	HGL	ADD		Date: 11/1/2023
					C1 = 0.2 C2 = 0.5 C3 = 0.9							Total Flow		Elev of Crown			Span	Pipe	Full Flow		Frequency: 25 yrs
														Elev of Invert							Proj: Line A.stm
					Increment (ac)	Sub-Total (ac)	Sum CA					Q		Up	Down	Fall	Size	Slope	Vel	Cap	
				(ft)				(min)	(min)	(in/hr)		(cfs)	(ft)	(ft)	(ft)	(ft)	(in)	(%)	(ft/s)	(cfs)	Line description
1	End	Comb	0.013	67.000	0.00	0.00	0.00	5.62	0.30	8.06	0.81	0.00	571.50	568.99	556.39	12.60	18	18.80	11.64	6.54	A1-A0
					0.00	0.00	0.00					6.54		569.50	557.50		18	17.91	25.15	44.44	
					0.00	0.00	0.00							568.00	556.00	12.00	Cir				
2	1	Comb	0.013	48.000	0.00	0.00	0.00	5.37	0.25	8.13	0.68	0.00	571.50	569.31	569.00	0.31	18	0.65	5.00	5.56	A2-A1
					0.00	0.00	0.00					5.56		569.90	569.60		18	0.63	4.70	8.30	
					0.00	0.00	0.00							568.40	568.10	0.30	Cir				
3	2	Hdwl	0.013	49.000	0.00	0.00	0.00	5.00	0.37	8.25	0.48	0.00	576.50	573.76	569.31	4.45	18	9.08	4.21	3.93	A3-A2
					0.00	0.00	0.00					3.93		574.50	570.00		18	9.18	18.01	31.82	
					0.00	0.00	0.00							573.00	568.50	4.50	Cir				

NOTES: Intensity = 102.61 / (Inlet time + 16.50) ^ 0.82 (in/hr) ; Time of flow in section is based on full flow.

Project File: Line A.stm

Storm Sewer Inlet Time Tabulation

Line No.	Line ID	Tc Method	Sheet Flow					Shallow Concentrated Flow					Channel Flow							Total Travel Time (min)
			n-Value	flow Length (ft)	2-yr 24h P (in)	Land Slope (%)	Travel Time (min)	flow Length (ft)	Water Slope (%)	Surf Descr	Ave Vel (ft/s)	Travel Time (min)	X-sec Area (sqft)	Wetted Perim (ft)	Chan Slope (%)	n-Value	Vel	flow Length (ft)	Travel Time (min)	
1	A1-A0	User																		5.00
2	A2-A1	User																		5.00
3	A3-A2	User																		5.00

Project File: Line A.stm | Min. Tc used for intensity calculations = 5 min | Number of lines: 3 | Date: 11/1/2023

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
(1)	(in) (2)	(cfs) (3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(ft) (12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(K) (23)	(ft) (24)
1	18	6.54	556.00	556.39	0.39	0.36	17.98	0.44	556.82	0.000	67.000	568.00	568.99	0.99**	1.23	5.30	0.44	569.42	0.000	0.000	n/a	0.50	n/a
2	18	5.56	568.10	569.00	0.90*	1.11	5.03	0.38	569.38	0.000	48.000	568.40	569.31	0.91**	1.12	4.97	0.38	569.69	0.000	0.000	n/a	0.50	0.19
3	18	3.93	568.50	569.31	0.81	0.89	4.04	0.30	569.61	0.000	49.000	573.00	573.76 j	0.76**	0.89	4.39	0.30	574.06	0.000	0.000	n/a	1.00	0.30

Project File: Line A.stm | Number of lines: 3 | Run Date: 11/1/2023

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 x 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).

DOWNSTREAM DRAINAGE

CSDG
Planning | Engineering
Landscape Architecture

ELLERSLY
OFFSITE STORM PIPE

PN:19-012-0 | D:10.06.2023

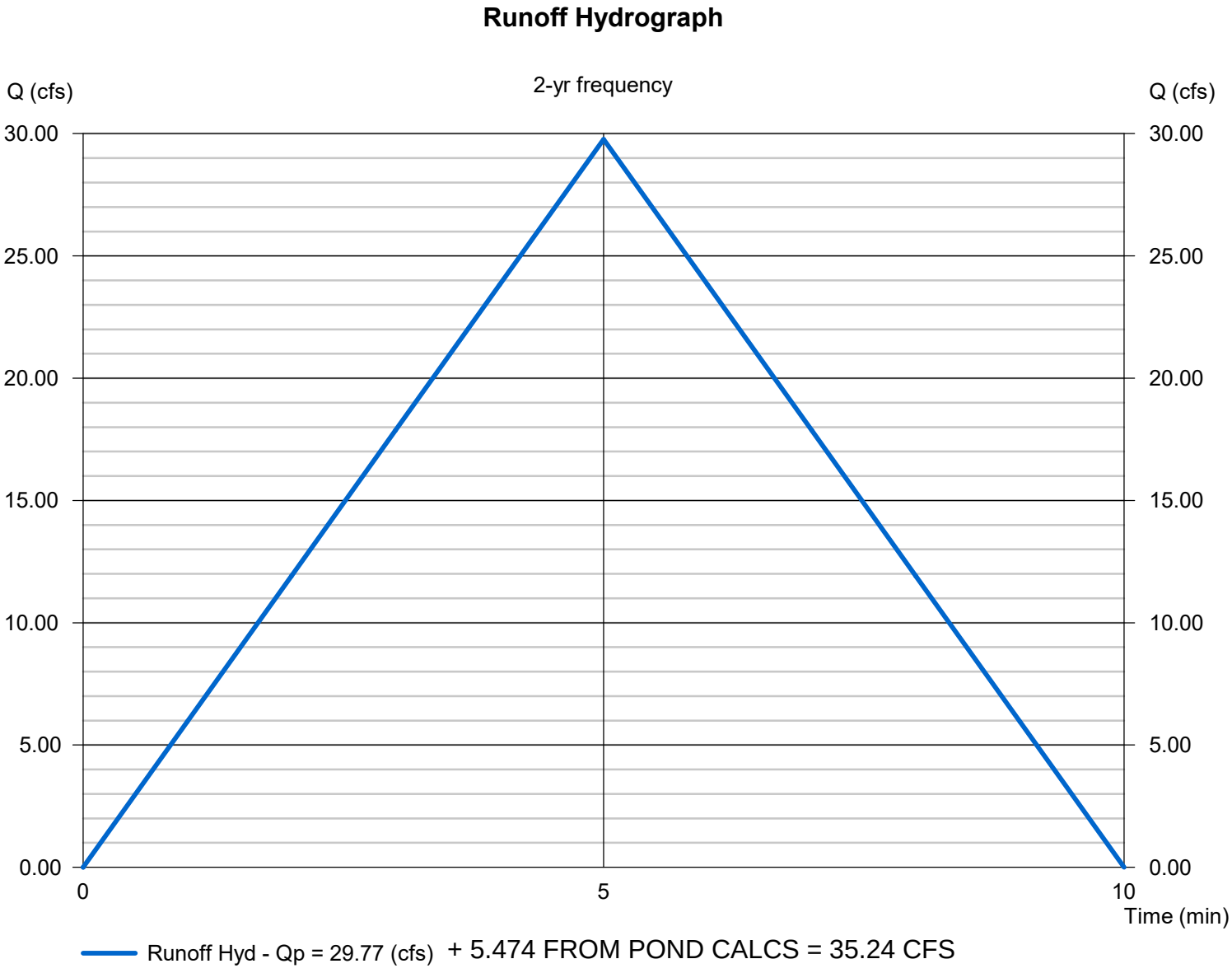
Hydrology Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Nov 2 2023

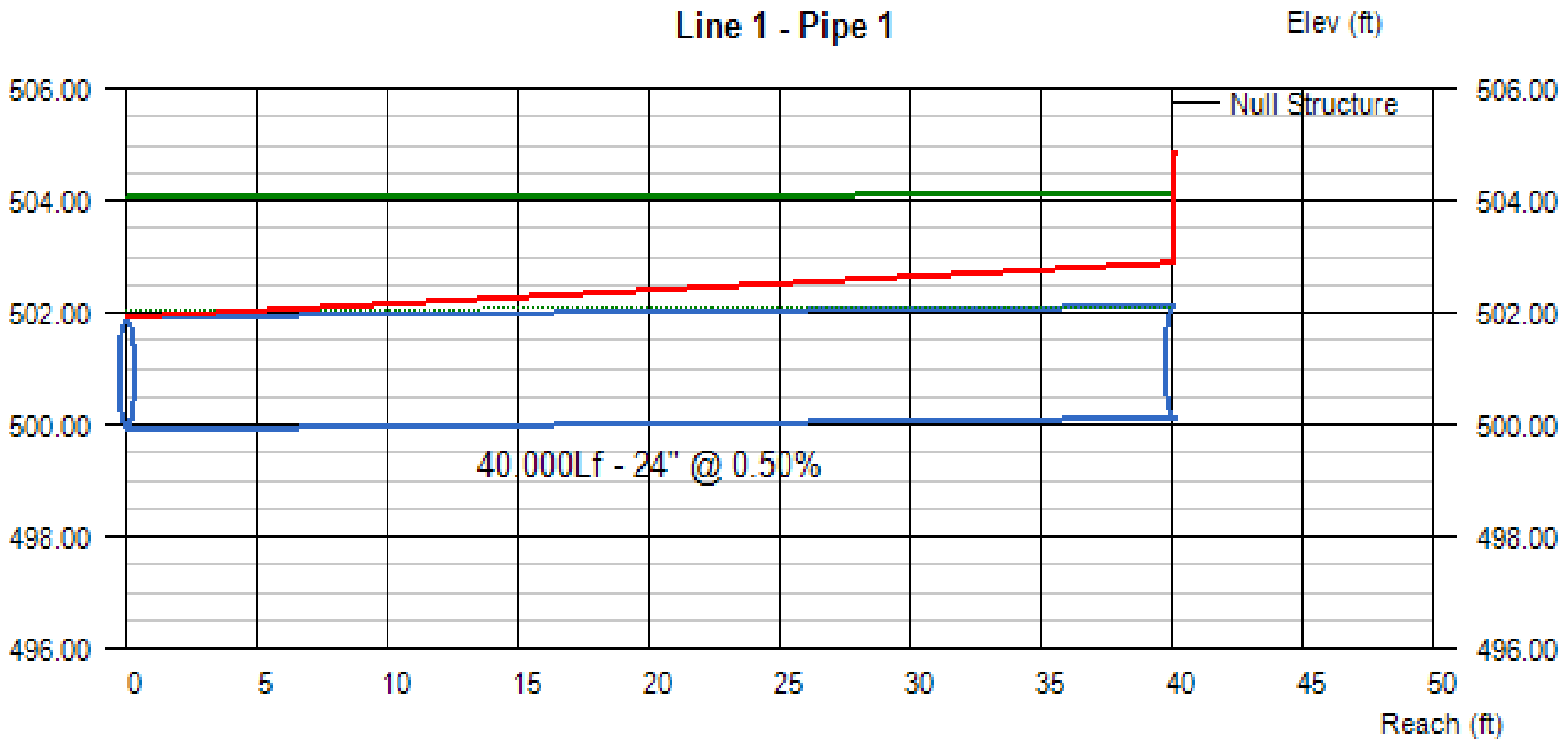
TO OFFSITE STORM - 2 YR

Hydrograph type	= Rational	Peak discharge (cfs)	= 29.77
Storm frequency (yrs)	= 2	Time interval (min)	= 1
Drainage area (ac)	= 8.970	Runoff coeff. (C)	= 0.7
Rainfall Inten (in/hr)	= 4.741	Tc by User (min)	= 5
IDF Curve	= nashville.IDF	Rec limb factor	= 1.00

Hydrograph Volume = 8,931 (cuft); 0.205 (acft)



Line Profile (Line 1) - Pipe 1



Line #	Q	Invert Elevation		Depth of Flow			Hydraulic Grade Line			Velocity		Cover	
	(cfs)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Hw (ft)	Dn (ft)	Up (ft)	Jnct (ft)	Dn (ft/s)	Up (ft/s)	Dn (ft)	Up (ft)
1	35.24	499.92	500.12	2.00	2.00	4.73	501.92	502.89	504.85	11.22	11.22	2.13	2.00

Project File: | No. Lines: 1 | Run Date: 11/2/2023

Hydrology Report

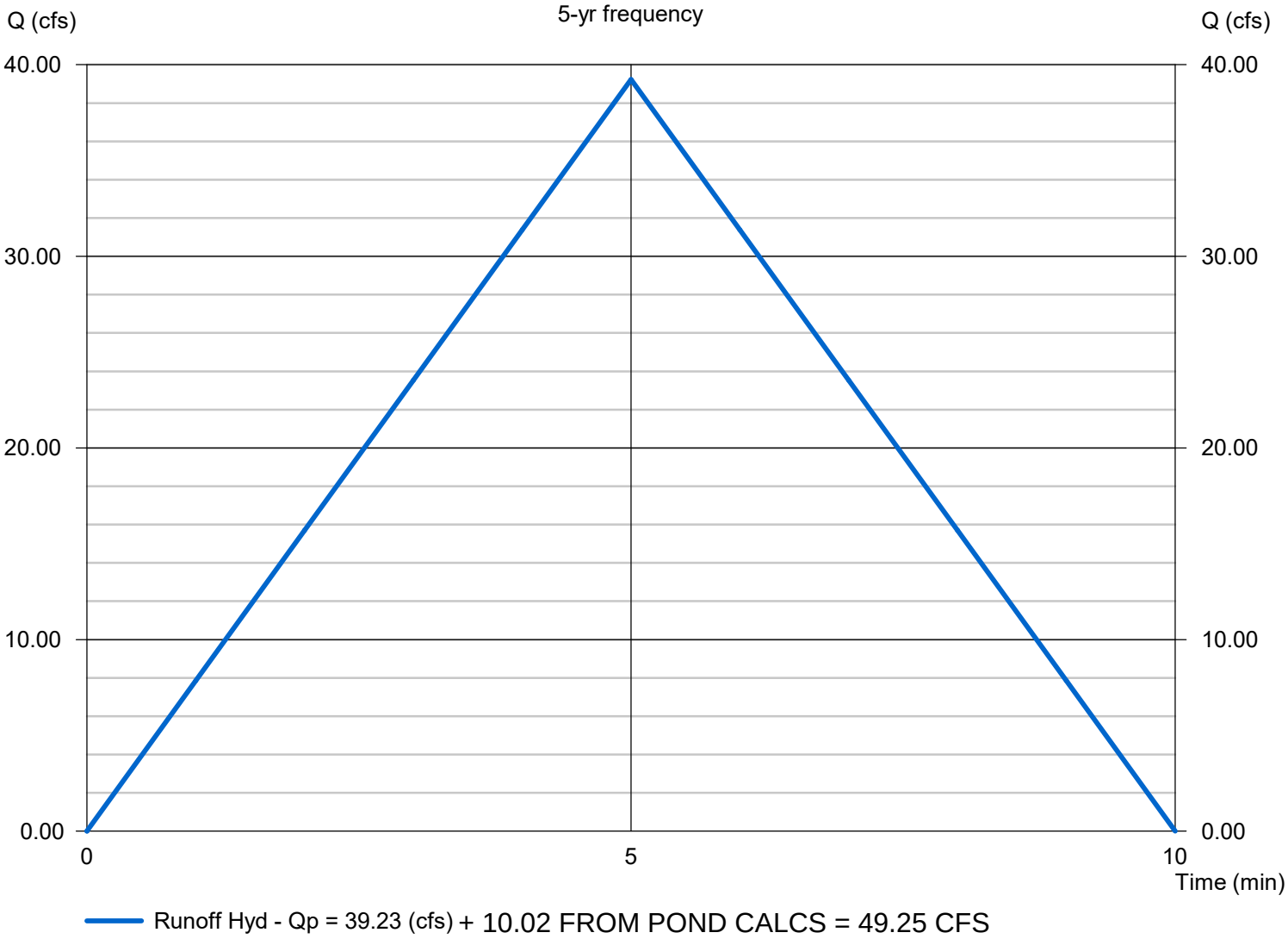
Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Nov 2 2023

TO OFFSITE STORM - 5 YR

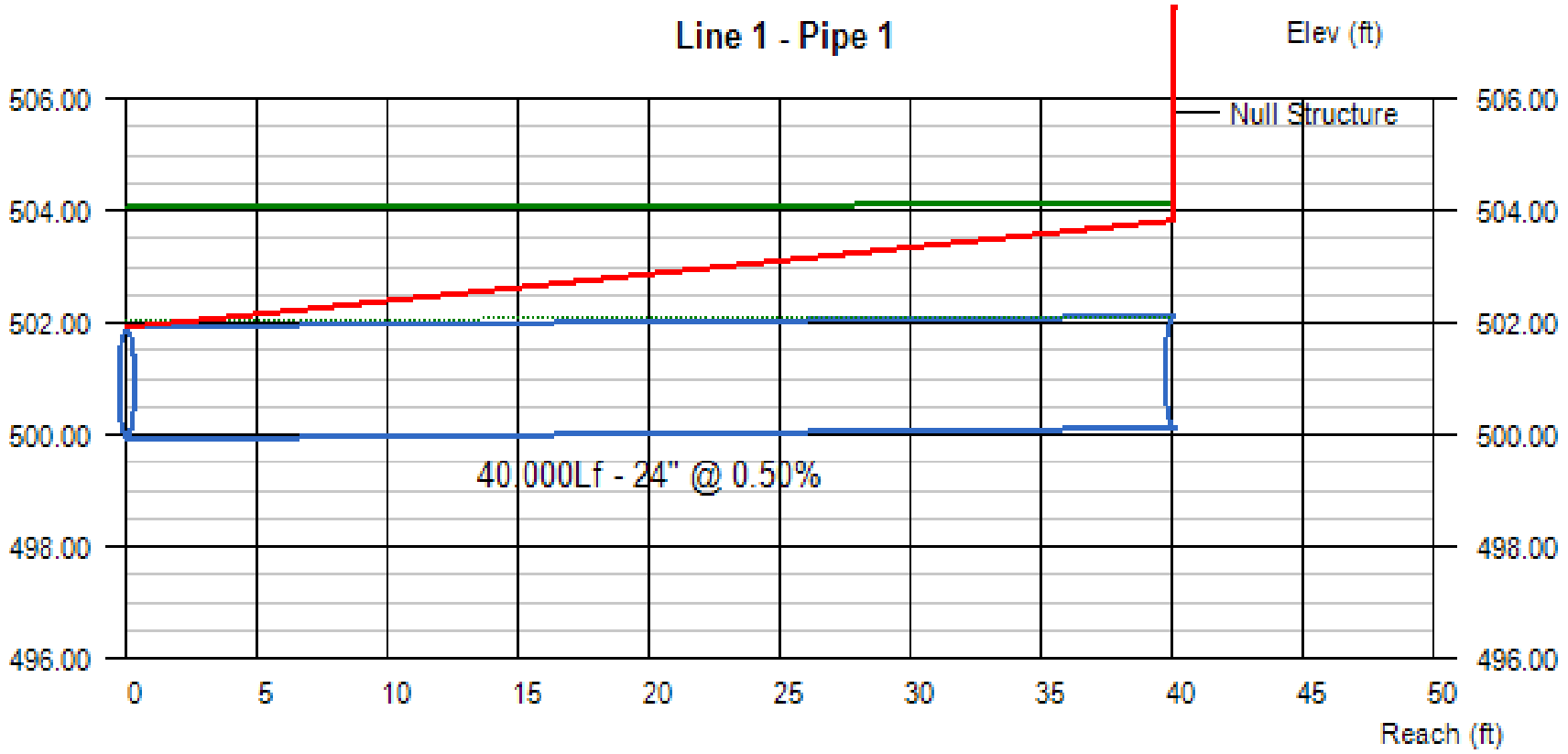
Hydrograph type	= Rational	Peak discharge (cfs)	= 39.23
Storm frequency (yrs)	= 5	Time interval (min)	= 1
Drainage area (ac)	= 8.970	Runoff coeff. (C)	= 0.7
Rainfall Inten (in/hr)	= 6.249	Tc by User (min)	= 5
IDF Curve	= nashville.IDF	Rec limb factor	= 1.00

Hydrograph Volume = 11,770 (cuft); 0.270 (acft)

Runoff Hydrograph



Line Profile (Line 1) - Pipe 1



Line #	Q	Invert Elevation		Depth of Flow			Hydraulic Grade Line			Velocity		Cover	
	(cfs)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Hw (ft)	Dn (ft)	Up (ft)	Jnct (ft)	Dn (ft/s)	Up (ft/s)	Dn (ft)	Up (ft)
1	49.25	499.92	500.12	2.00	2.00	7.52	501.92	503.82	507.64	15.68	15.68	2.13	2.00

Project File: | No. Lines: 1 | Run Date: 11/2/2023

Hydrology Report

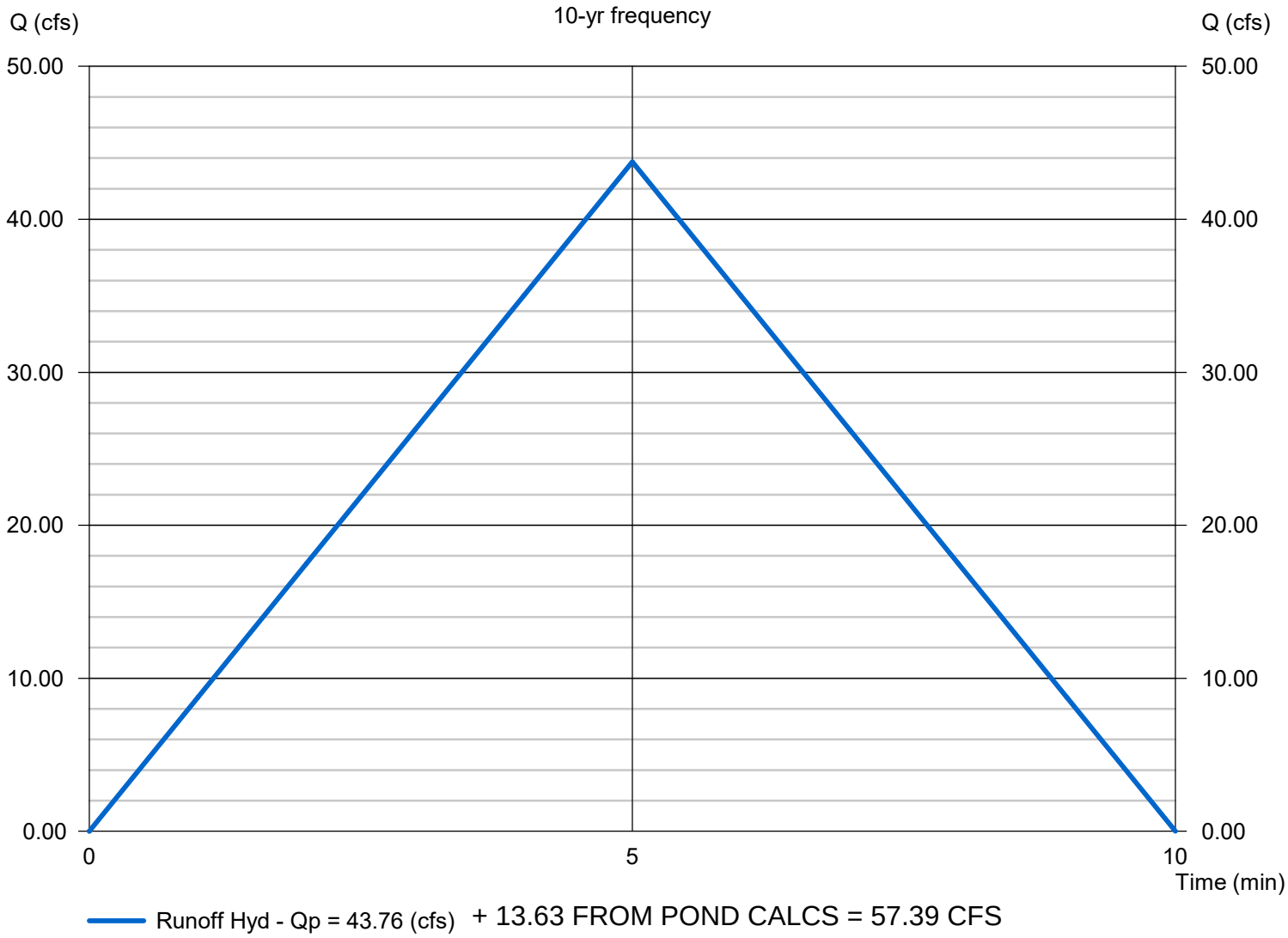
Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Nov 2 2023

TO OFFSITE STORM - 10 YR

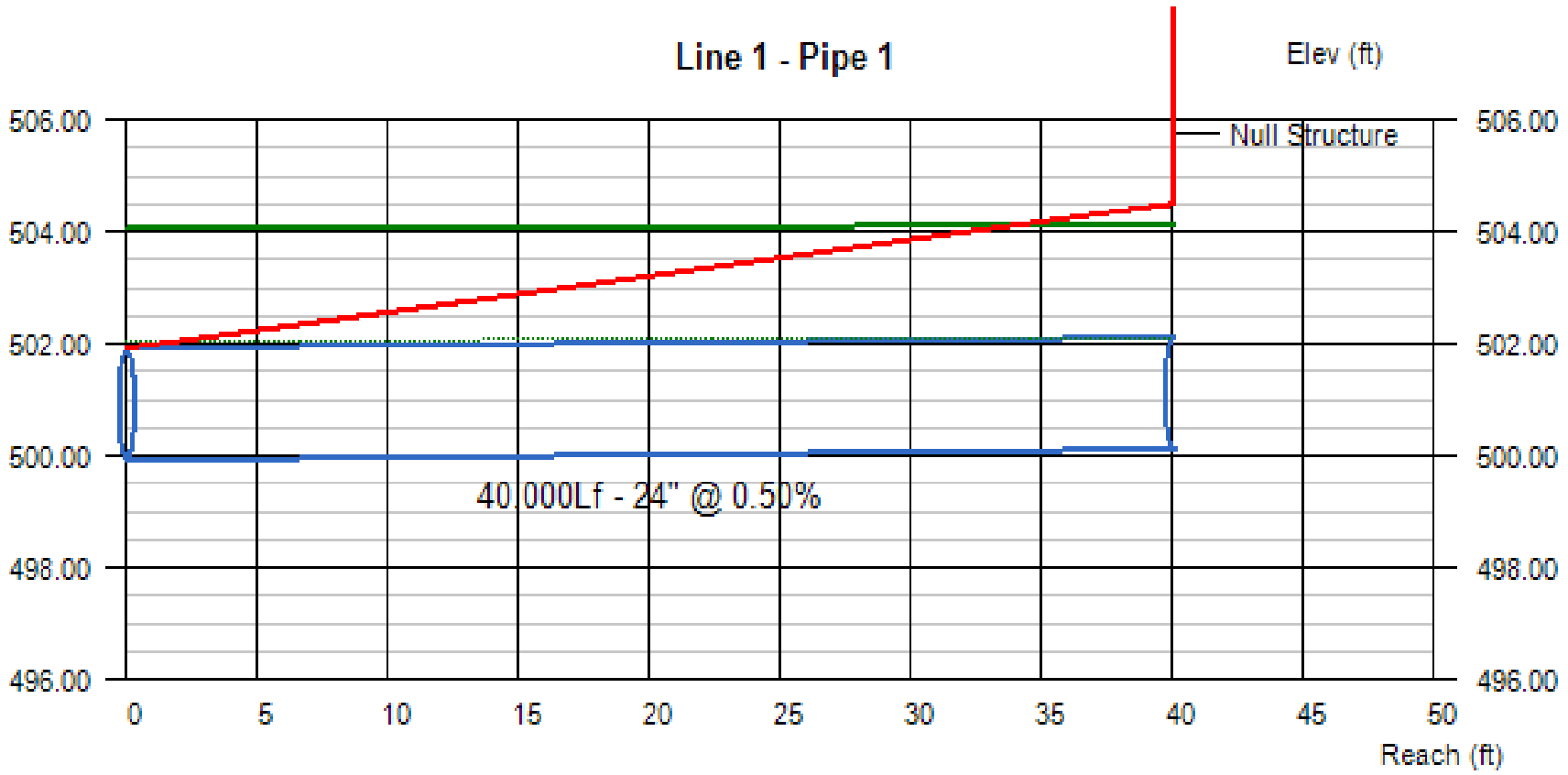
Hydrograph type	= Rational	Peak discharge (cfs)	= 43.76
Storm frequency (yrs)	= 10	Time interval (min)	= 1
Drainage area (ac)	= 8.970	Runoff coeff. (C)	= 0.7
Rainfall Inten (in/hr)	= 6.969	Tc by User (min)	= 5
IDF Curve	= nashville.IDF	Rec limb factor	= 1.00

Hydrograph Volume = 13,128 (cuft); 0.301 (acft)

Runoff Hydrograph



Line Profile (Line 1) - Pipe 1



Line #	Q	Invert Elevation		Depth of Flow			Hydraulic Grade Line			Velocity		Cover	
	(cfs)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Hw (ft)	Dn (ft)	Up (ft)	Jnct (ft)	Dn (ft/s)	Up (ft/s)	Dn (ft)	Up (ft)
1	57.39	499.92	500.12	2.00	2.00	9.57	501.92	504.50	509.69	18.27	18.27	2.13	2.00

Project File: | No. Lines: 1 | Run Date: 11/2/2023

Hydrology Report

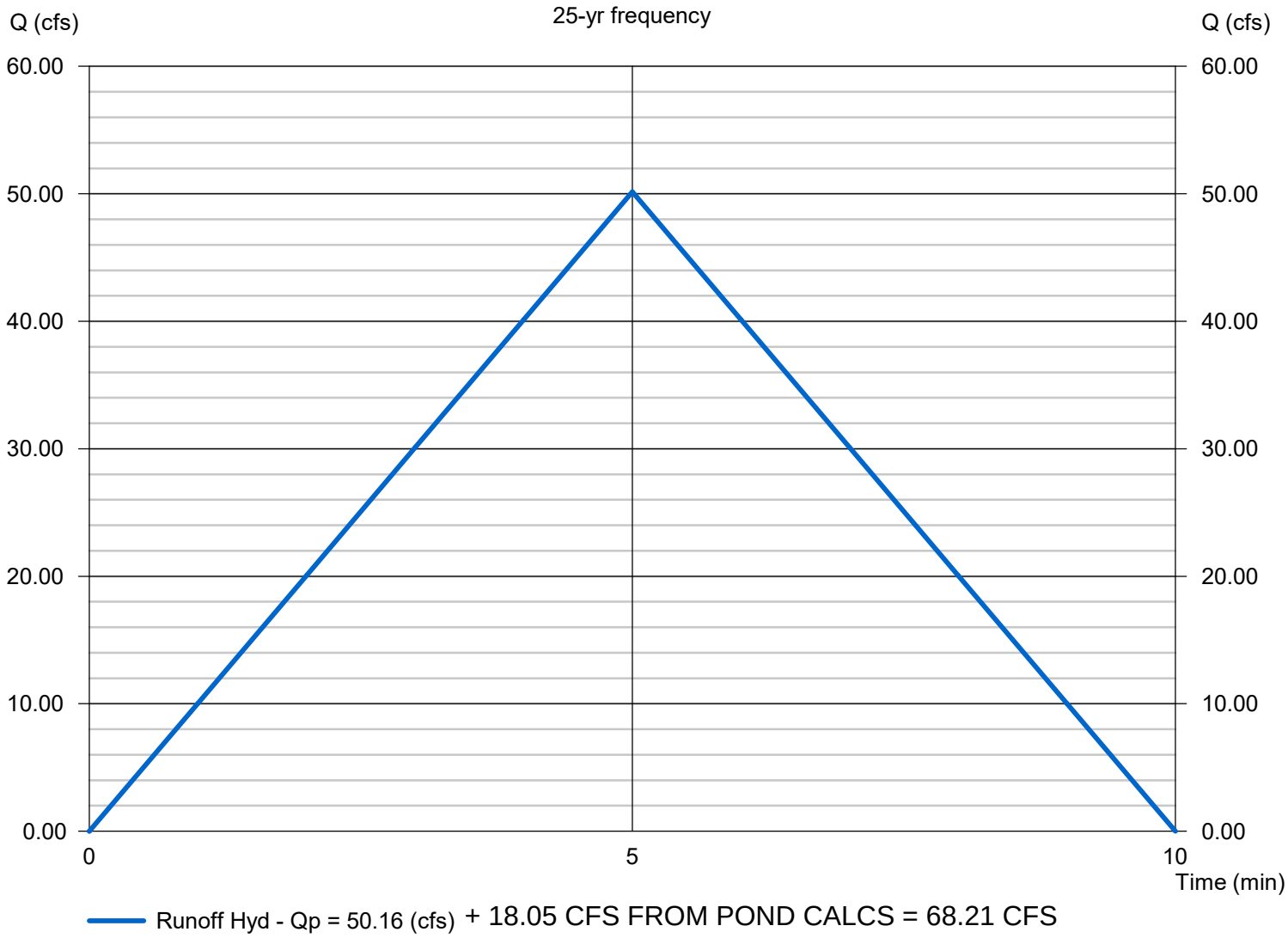
Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Nov 2 2023

TO OFFSITE STORM - 25 YR

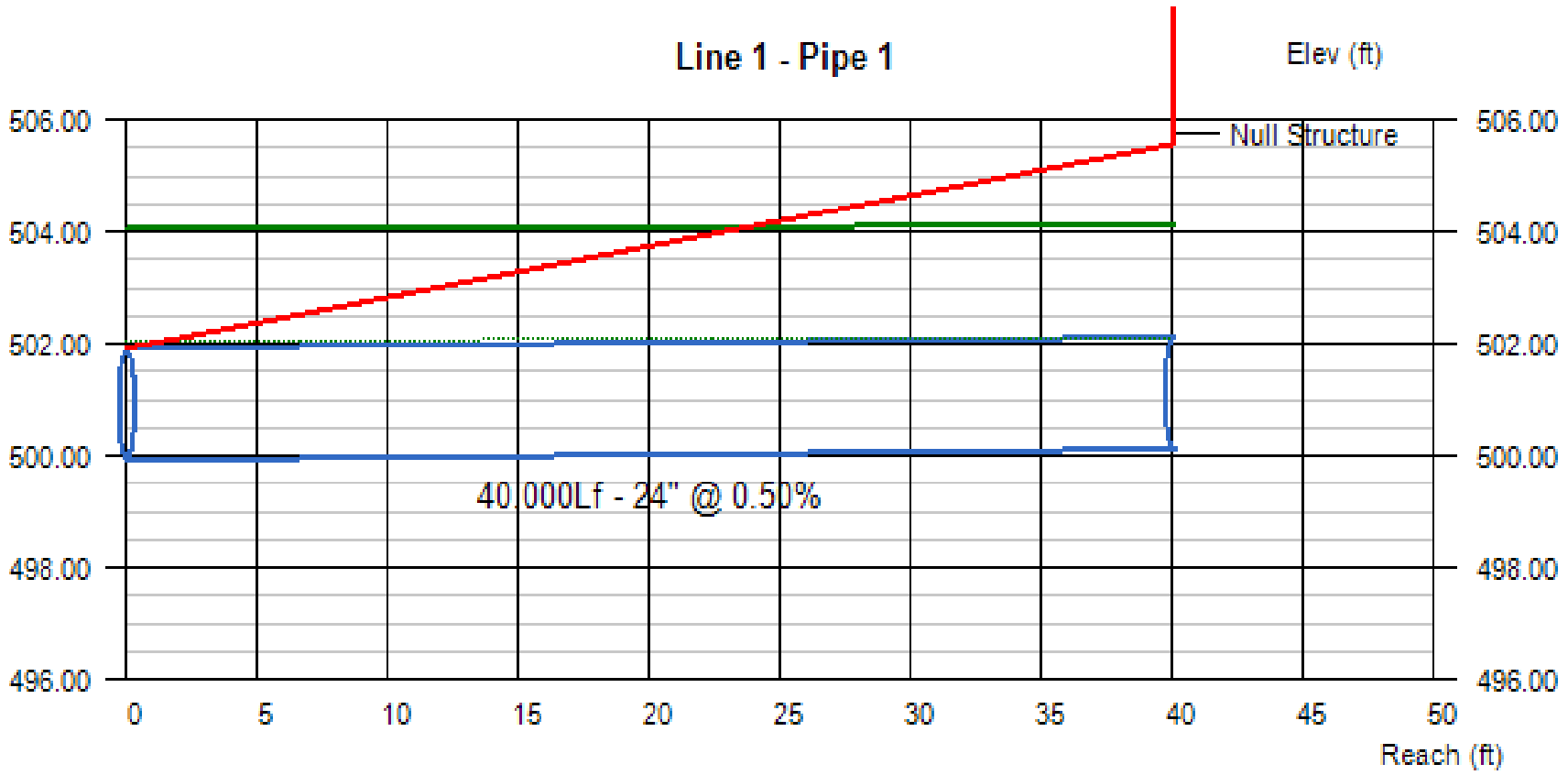
Hydrograph type	= Rational	Peak discharge (cfs)	= 50.16
Storm frequency (yrs)	= 25	Time interval (min)	= 1
Drainage area (ac)	= 8.970	Runoff coeff. (C)	= 0.7
Rainfall Inten (in/hr)	= 7.988	Tc by User (min)	= 5
IDF Curve	= nashville.IDF	Rec limb factor	= 1.00

Hydrograph Volume = 15,048 (cuft); 0.345 (acft)

Runoff Hydrograph



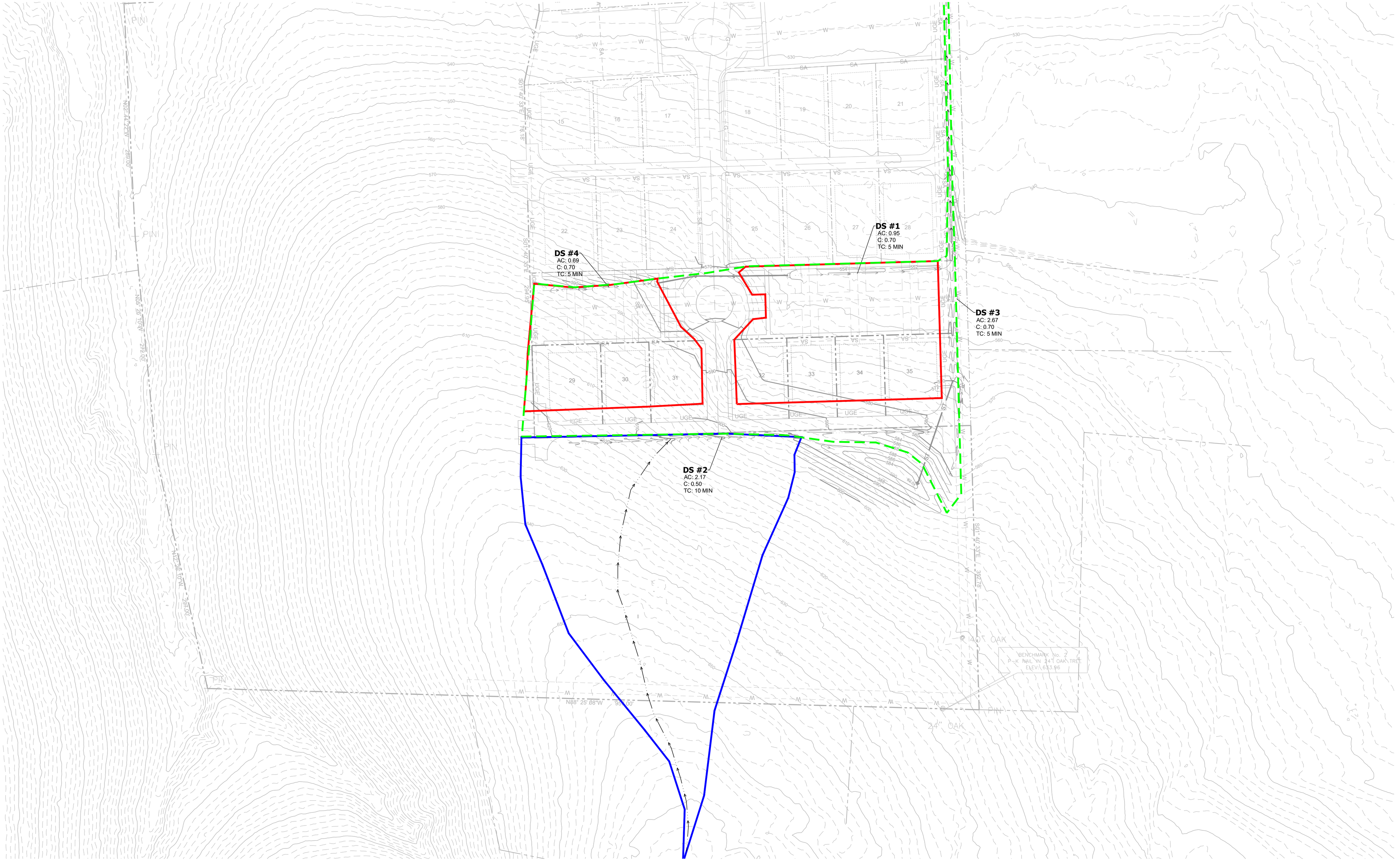
Line Profile (Line 1) - Pipe 1



Line #	Q	Invert Elevation		Depth of Flow			Hydraulic Grade Line			Velocity		Cover	
	(cfs)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Hw (ft)	Dn (ft)	Up (ft)	Jnct (ft)	Dn (ft/s)	Up (ft/s)	Dn (ft)	Up (ft)
1	68.21	499.92	500.12	2.00	2.00	12.77	501.92	505.56	512.89	21.72	21.71	2.13	2.00

Project File: | No. Lines: 1 | Run Date: 11/2/2023

DITCHES



CSDG
Planning | Engineering
Landscape Architecture

ELLERSLY
DRAINAGE SWALE AREA MAP

PN:19-012-0 | D:10.06.2023

N

0 50 100
SCALE: 1"=100'

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Nov 1 2023

DS #1

Trapezoidal

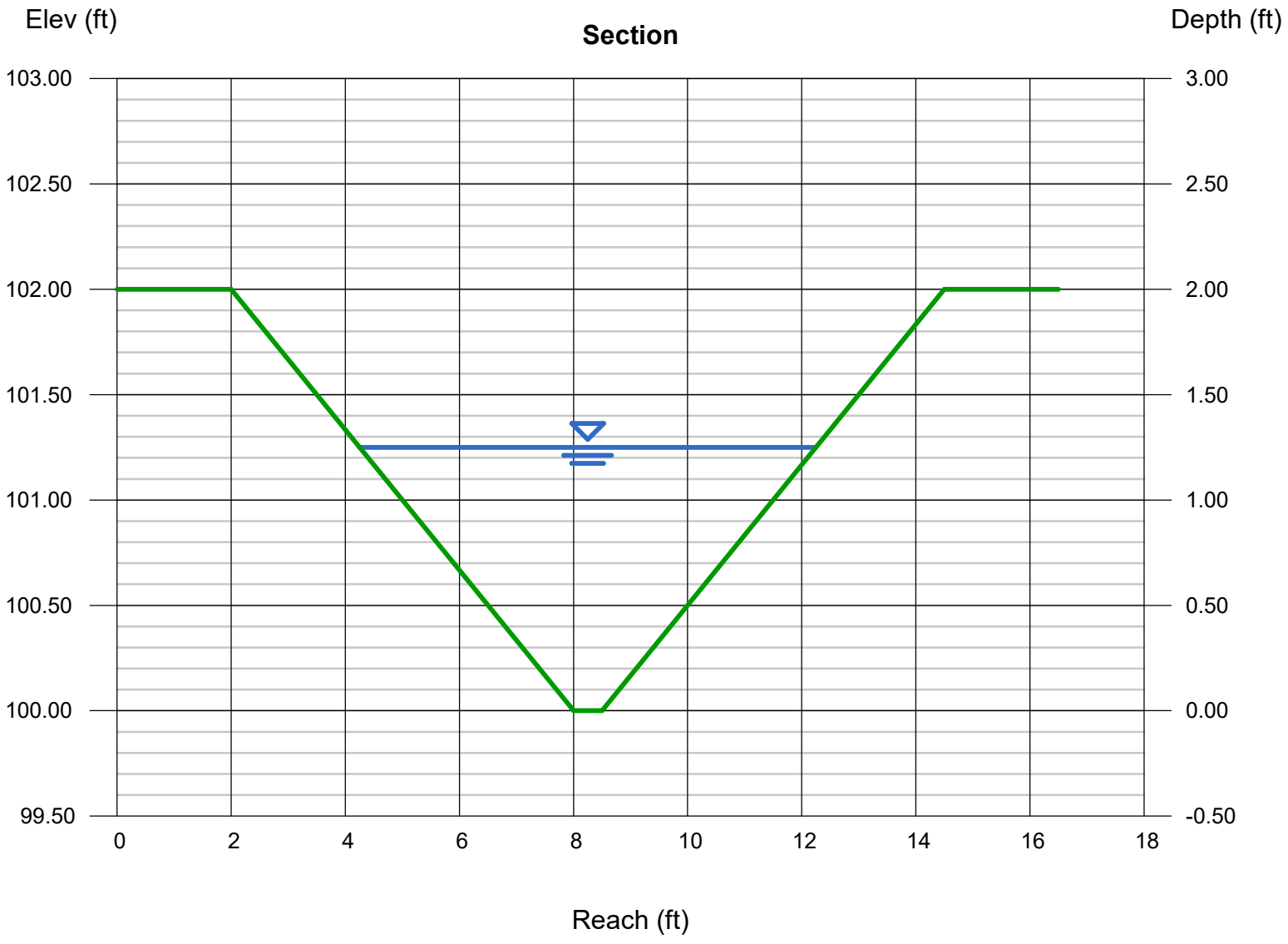
Bottom Width (ft)	= 0.50
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 100.00
Slope (%)	= 3.00
N-Value	= 0.240

Calculations

Compute by:	Known Q
Known Q (cfs)	= 4.19

Highlighted

Depth (ft)	= 1.25
Q (cfs)	= 4.190
Area (sqft)	= 5.31
Velocity (ft/s)	= 0.79
Wetted Perim (ft)	= 8.41
Crit Depth, Yc (ft)	= 0.58
Top Width (ft)	= 8.00
EGL (ft)	= 1.26



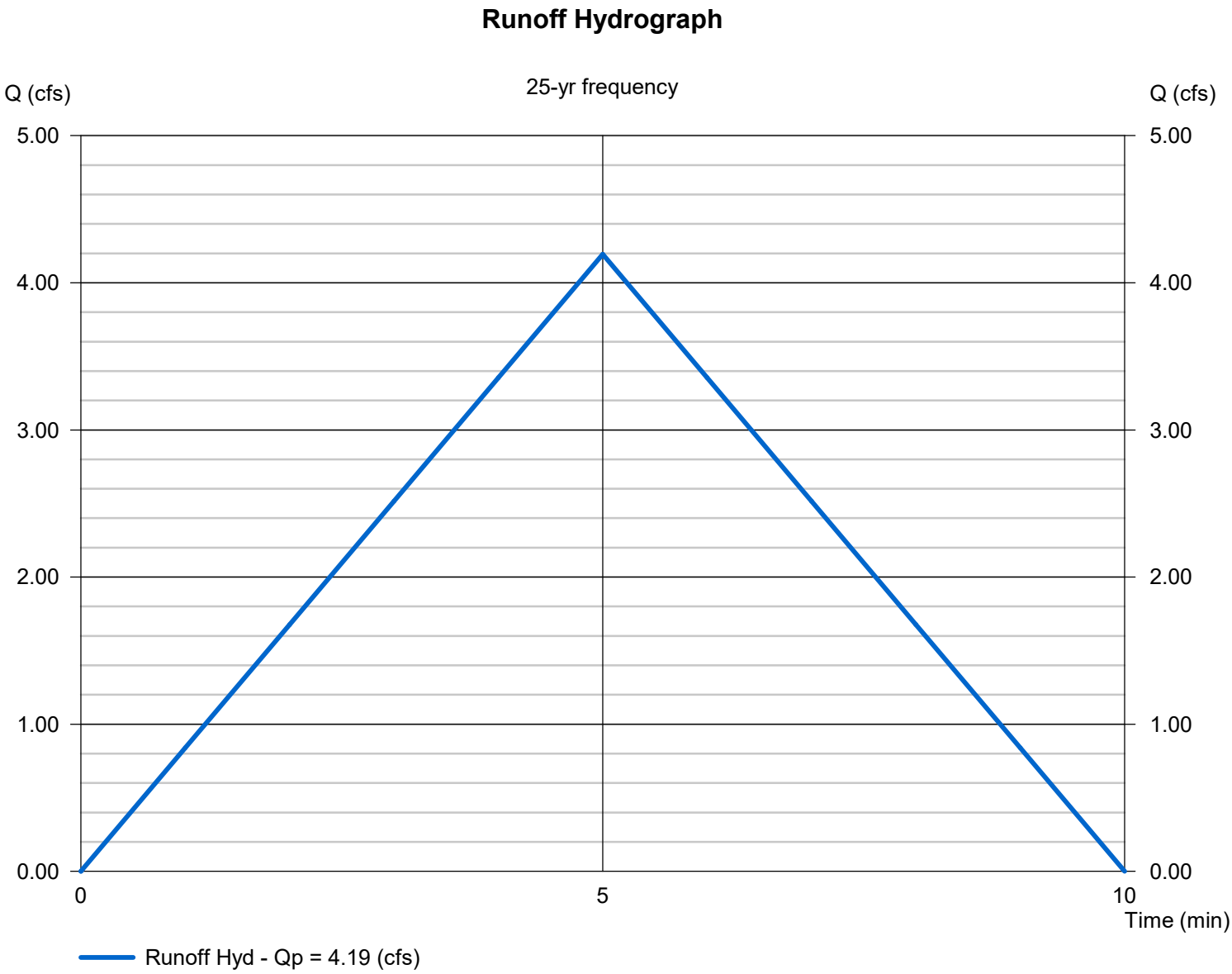
Hydrology Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Nov 1 2023

DS #1

Hydrograph type	= Rational	Peak discharge (cfs)	= 4.194
Storm frequency (yrs)	= 25	Time interval (min)	= 1
Drainage area (ac)	= 0.750	Runoff coeff. (C)	= 0.7
Rainfall Inten (in/hr)	= 7.988	Tc by User (min)	= 5
IDF Curve	= nashville.IDF	Rec limb factor	= 1.00

Hydrograph Volume = 1,258 (cuft); 0.029 (acft)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Nov 1 2023

DS #2

Trapezoidal

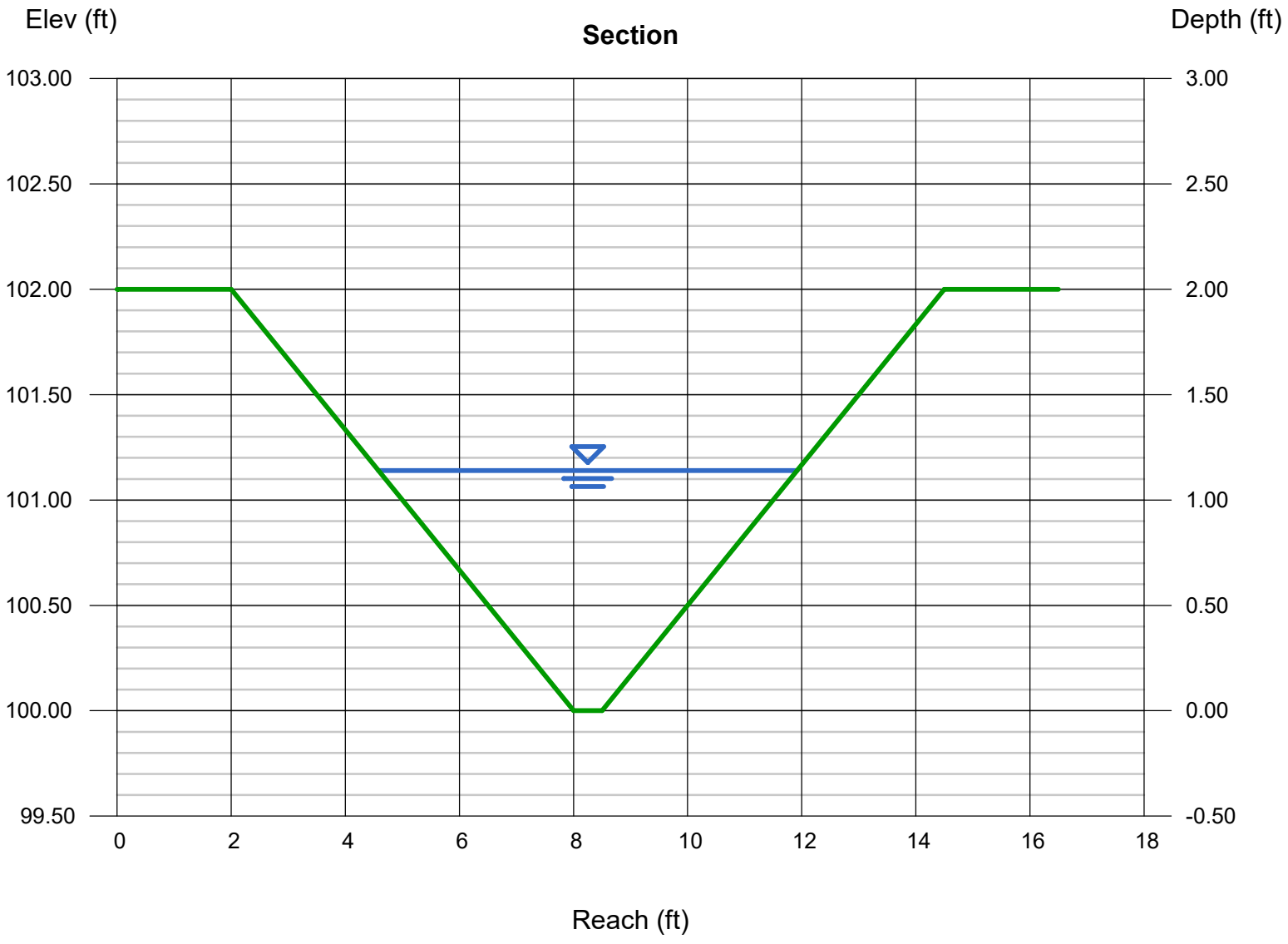
Bottom Width (ft)	= 0.50
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 100.00
Slope (%)	= 11.00
N-Value	= 0.240

Calculations

Compute by:	Known Q
Known Q (cfs)	= 6.25

Highlighted

Depth (ft)	= 1.14
Q (cfs)	= 6.250
Area (sqft)	= 4.47
Velocity (ft/s)	= 1.40
Wetted Perim (ft)	= 7.71
Crit Depth, Yc (ft)	= 0.70
Top Width (ft)	= 7.34
EGL (ft)	= 1.17



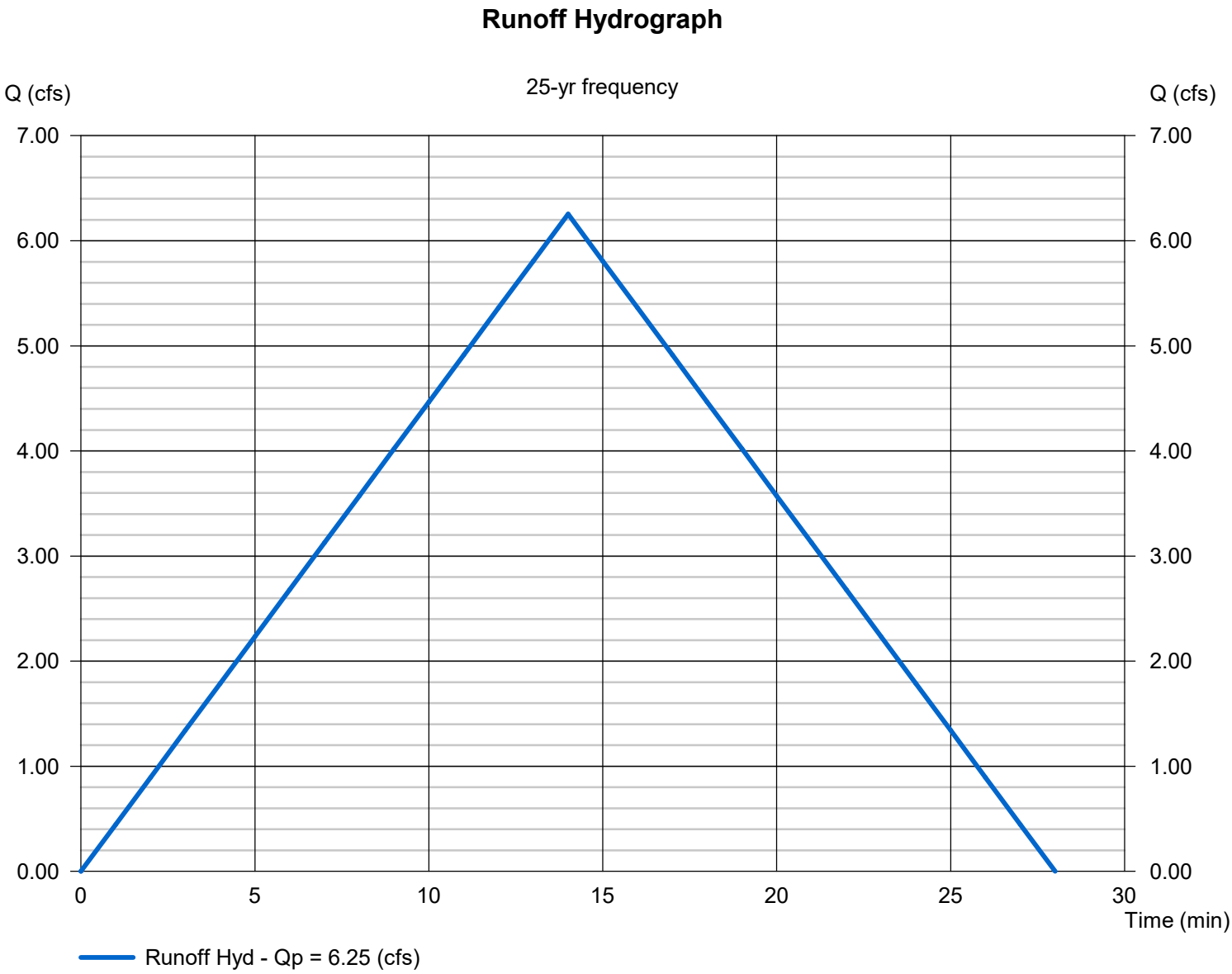
Hydrology Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Nov 1 2023

DS #2

Hydrograph type	= Rational	Peak discharge (cfs)	= 6.253
Storm frequency (yrs)	= 25	Time interval (min)	= 1
Drainage area (ac)	= 2.170	Runoff coeff. (C)	= 0.5
Rainfall Inten (in/hr)	= 5.763	Tc by TR55 (min)	= 14
IDF Curve	= nashville.IDF	Rec limb factor	= 1.00

Hydrograph Volume = 5,253 (cuft); 0.121 (acft)



TR55 Tc Worksheet

Rational

DS #2

Description		A		B		C		Totals
Sheet Flow								
Manning's n-value	=	0.240		0.011		0.011		
Flow length (ft)	=	150.0		0.0		0.0		
Two-year 24-hr precip. ((in))	=	2.20		0.00		0.00		
Land slope (%)	=	8.60		0.00		0.00		
Travel Time (min)	**=**	**13.28**	**+**	**0.00**	**+**	**0.00**	**=**	**13.28**
Shallow Concentrated Flow								
Flow length (ft)	=	395.00		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)	**=**	**1.13**	**+**	**0.00**	**+**	**0.00**	**=**	**1.13**
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		
Travel Time (min)	**=**	**0**	**+**	**0**	**+**	**0**	**=**	**0.00**

Total Travel Time, Tc ..... 14.00 min

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Nov 1 2023

DS #3

Trapezoidal

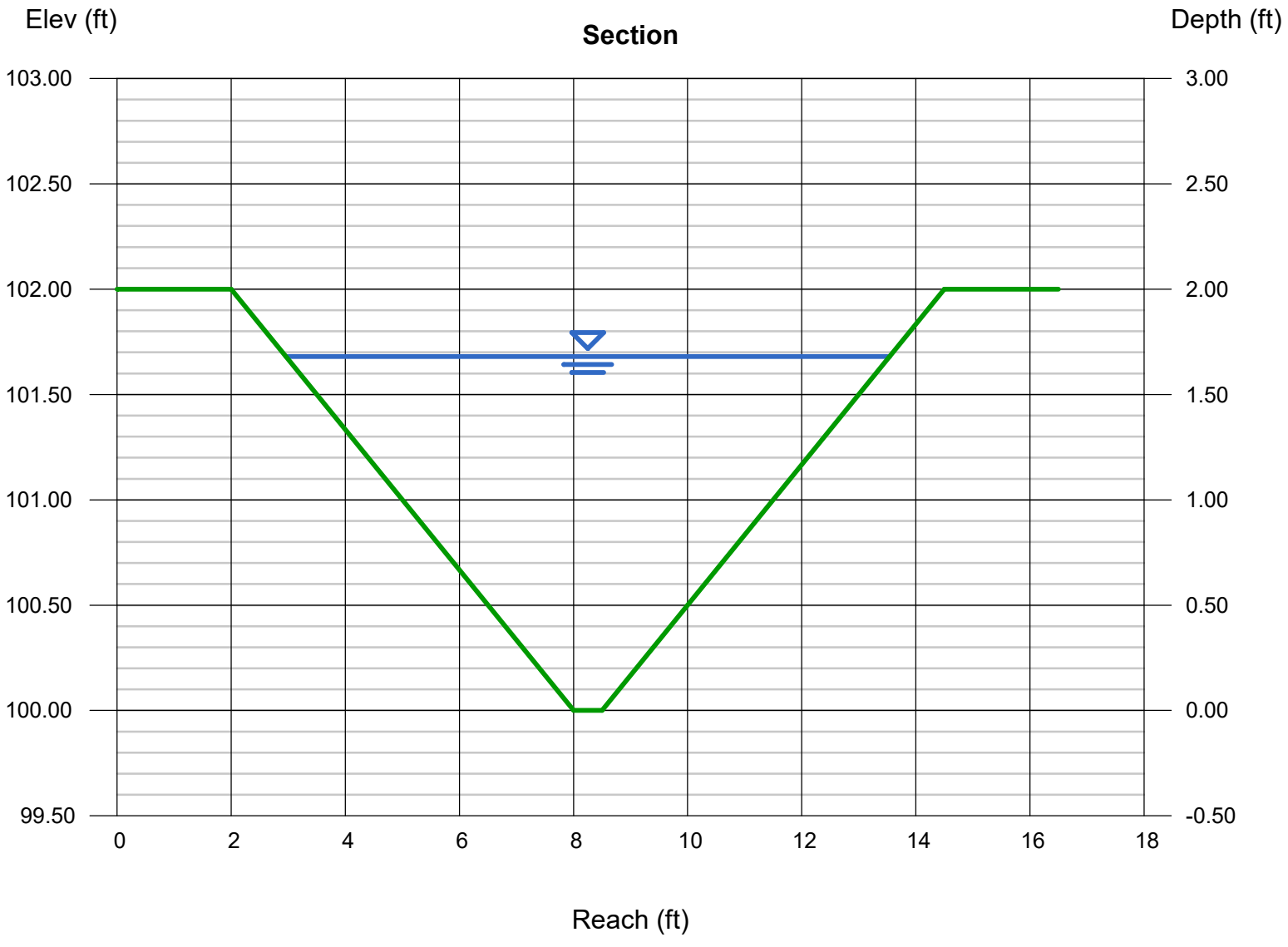
Bottom Width (ft)	= 0.50
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 100.00
Slope (%)	= 10.00
N-Value	= 0.240

Calculations

Compute by:	Known Q
Known Q (cfs)	= 16.00

Highlighted

Depth (ft)	= 1.68
Q (cfs)	= 16.00
Area (sqft)	= 9.31
Velocity (ft/s)	= 1.72
Wetted Perim (ft)	= 11.13
Crit Depth, Yc (ft)	= 1.05
Top Width (ft)	= 10.58
EGL (ft)	= 1.73



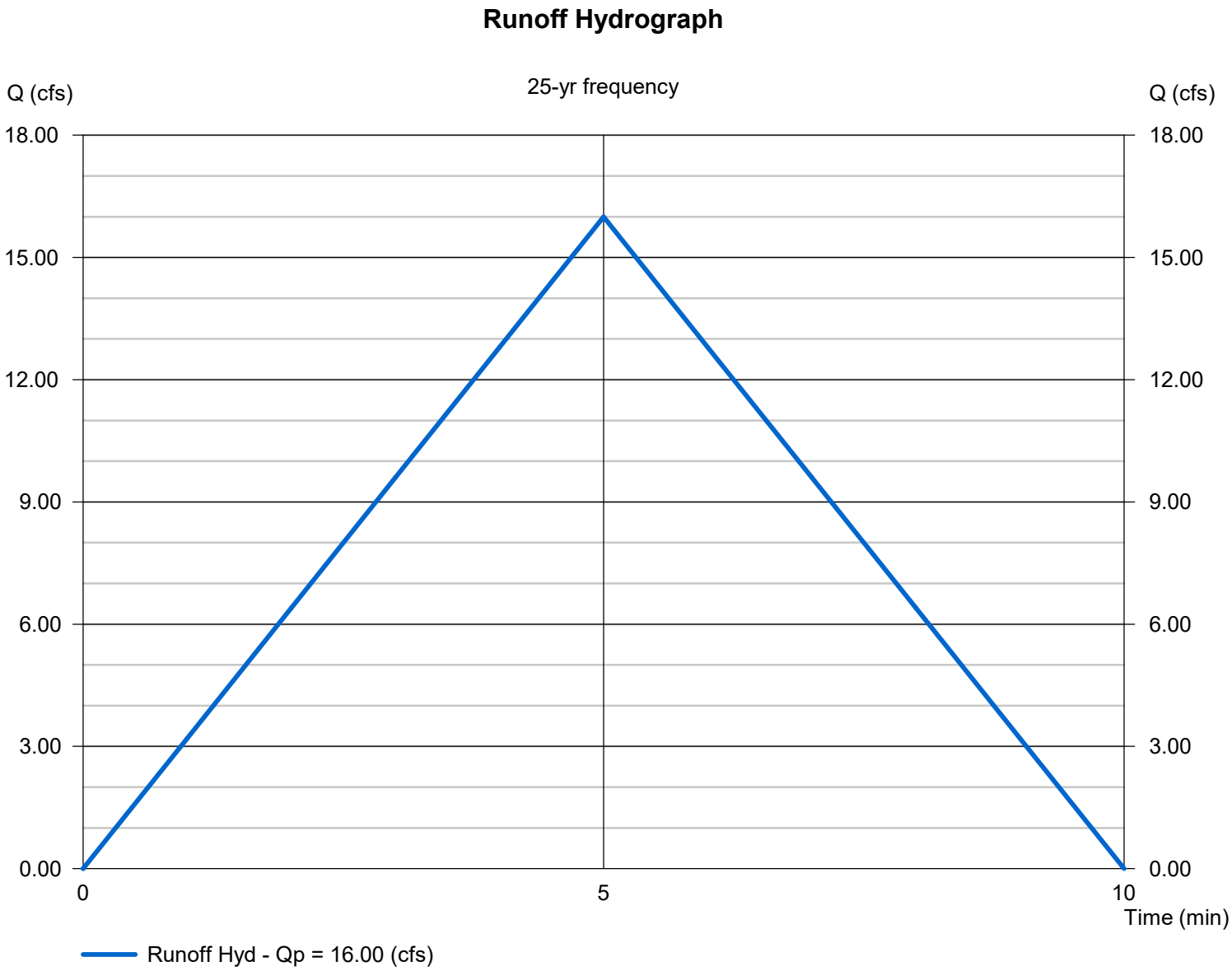
Hydrology Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Nov 1 2023

DS #3

Hydrograph type	= Rational	Peak discharge (cfs)	= 16.00
Storm frequency (yrs)	= 25	Time interval (min)	= 1
Drainage area (ac)	= 2.670	Runoff coeff. (C)	= 0.75
Rainfall Inten (in/hr)	= 7.988	Tc by User (min)	= 5
IDF Curve	= nashville.IDF	Rec limb factor	= 1.00

Hydrograph Volume = 4,799 (cuft); 0.110 (acft)



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Nov 1 2023

DS #4

Trapezoidal

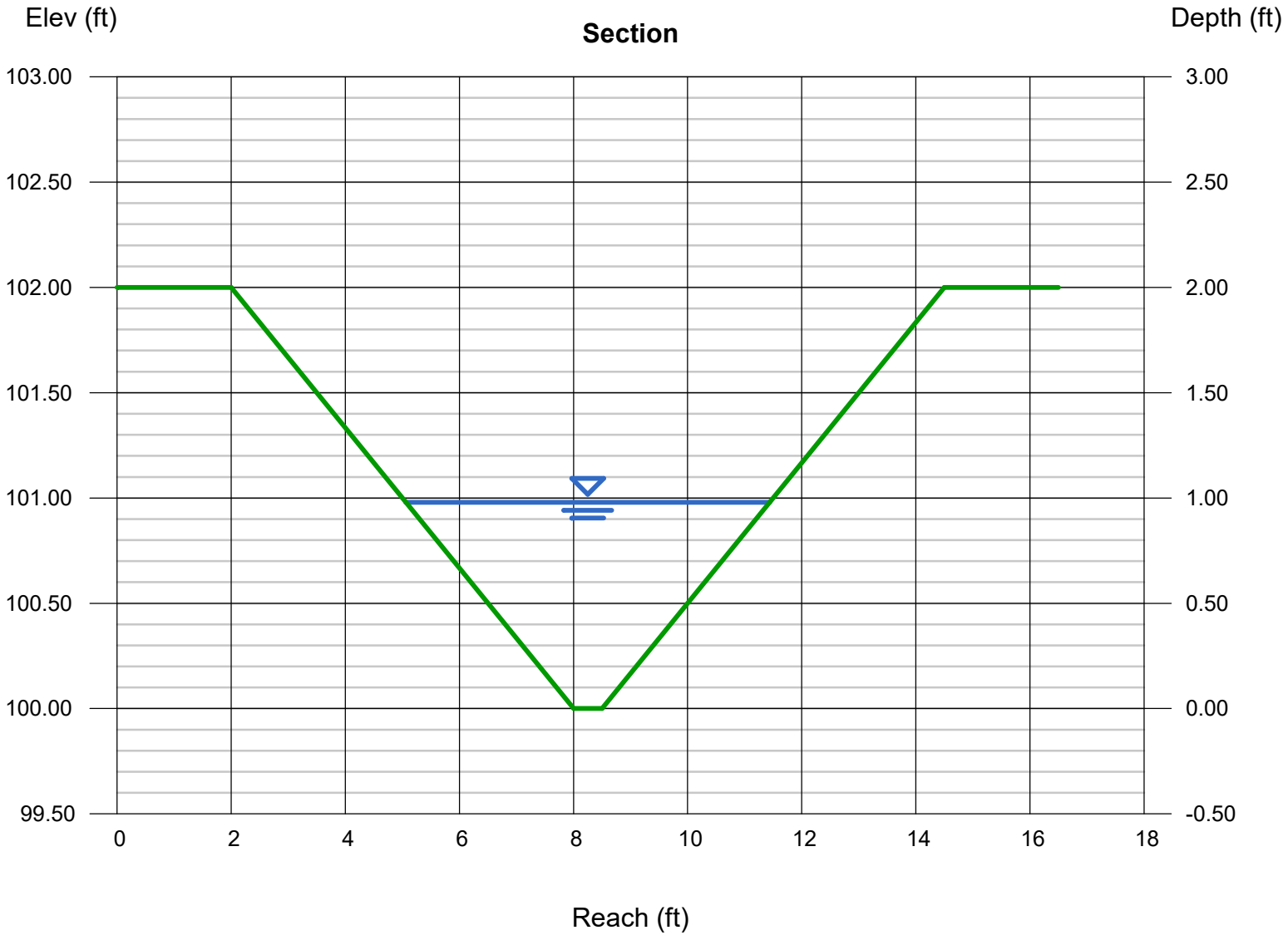
Bottom Width (ft)	= 0.50
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 100.00
Slope (%)	= 9.00
N-Value	= 0.240

Calculations

Compute by:	Known Q
Known Q (cfs)	= 3.91

Highlighted

Depth (ft)	= 0.98
Q (cfs)	= 3.910
Area (sqft)	= 3.37
Velocity (ft/s)	= 1.16
Wetted Perim (ft)	= 6.70
Crit Depth, Yc (ft)	= 0.57
Top Width (ft)	= 6.38
EGL (ft)	= 1.00



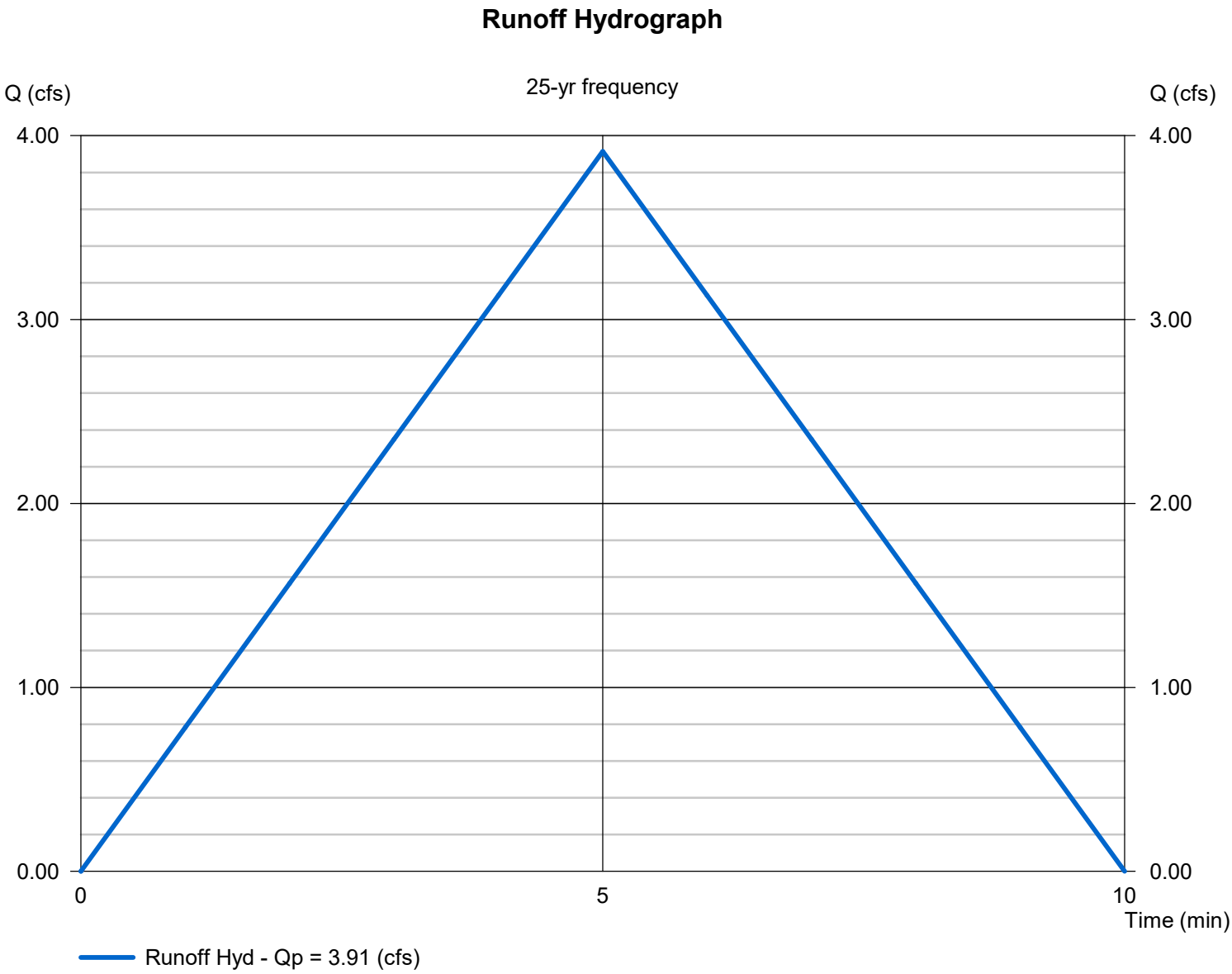
Hydrology Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Nov 1 2023

DS #4

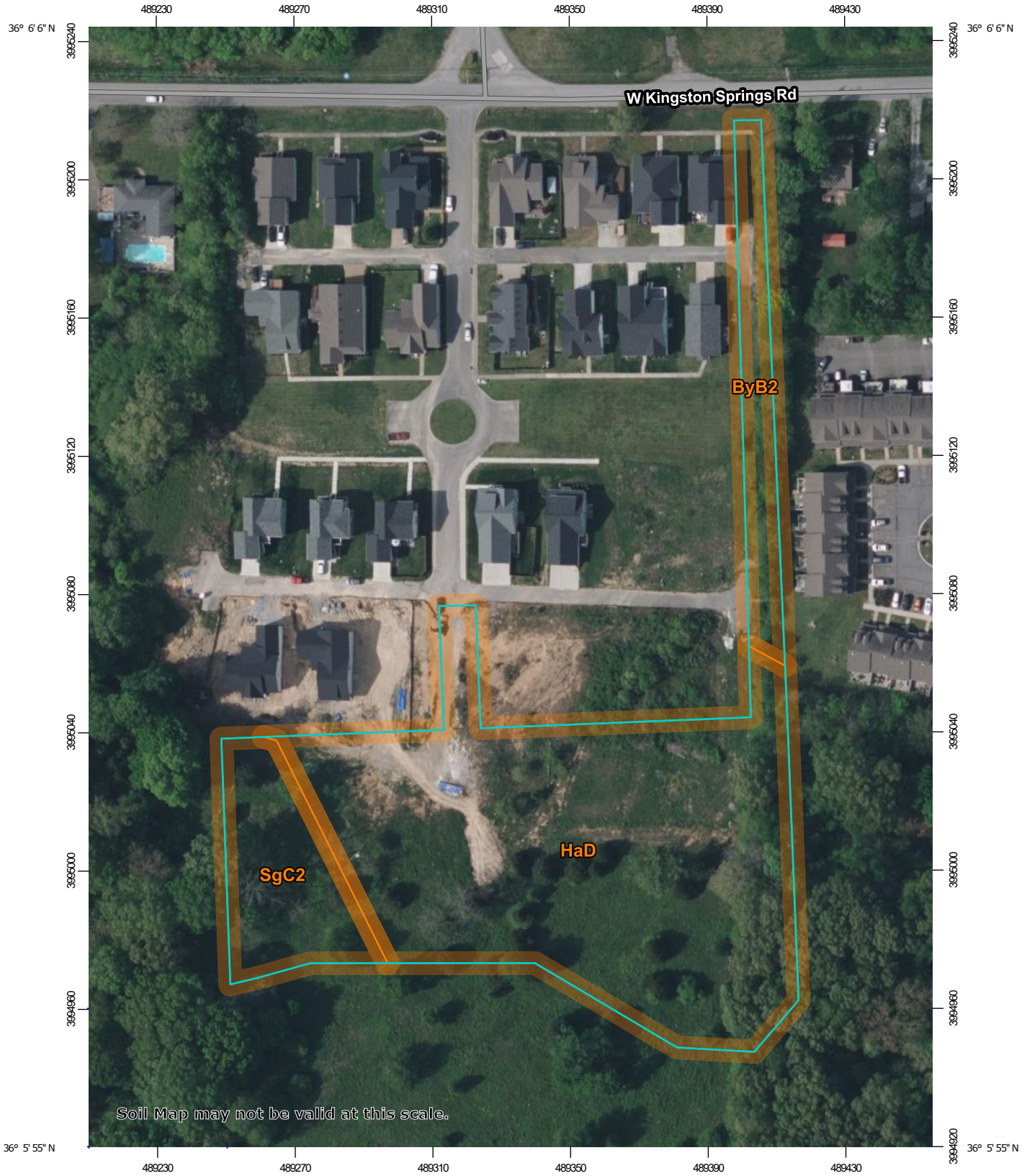
Hydrograph type	= Rational	Peak discharge (cfs)	= 3.914
Storm frequency (yrs)	= 25	Time interval (min)	= 1
Drainage area (ac)	= 0.700	Runoff coeff. (C)	= 0.7
Rainfall Inten (in/hr)	= 7.988	Tc by User (min)	= 5
IDF Curve	= nashville.IDF	Rec limb factor	= 1.00

Hydrograph Volume = 1,174 (cuft); 0.027 (acft)



SOILS

Soil Map—Cheatham County, Tennessee



Map Scale: 1:1,580 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 20 40 80 120

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cheatham County, Tennessee
Survey Area Data: Version 17, Sep 12, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 21, 2021—May 1, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

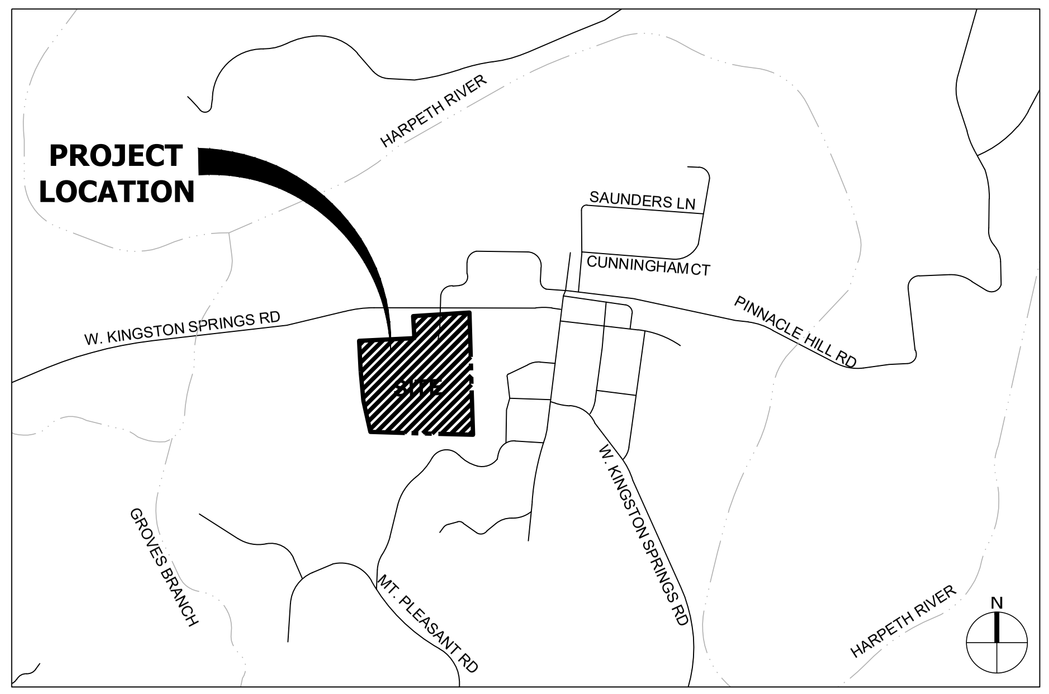
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ByB2	Byler silt loam, 2 to 5 percent slopes, eroded	0.3	9.6%
HaD	Hawthorne gravelly silt loam, 12 to 20 percent slopes	2.8	76.1%
SgC2	Sengtown gravelly silt loam, 5 to 12 percent slopes	0.5	14.3%
Totals for Area of Interest		**3.6**	**100.0%**

PLANNED UNIT DEVELOPMENT

ELLERSLY SUBDIVISION

PHASE 1
EROSION CONTROL & GRADING PLAN

ELLERSLY WAY
KINGSTON SPRINGS, TN 37082
MAP 096B PARCEL 003



VICINITY MAP
1" = 1000'

SHEET INDEX

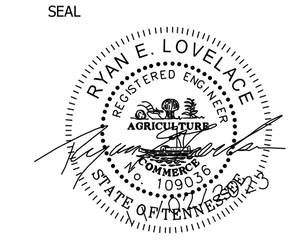
	COVER SHEET
C1.00	SWPPP STAGE 1
C1.01	SWPPP STAGE 2
C1.02	SWPPP STAGE 3 & GRADING PLAN

CSDG
Planning | Engineering
Landscape Architecture

ENGINEER
CSDG
2305 KLINE AVE, STE 300
NASHVILLE, TN 37211
PH:(615) 248-9999
CONTACT:RYAN LOVELACE, P.E.
E-MAIL:RYANL@CSDGTN.COM

OWNER | DEVELOPER
ENERGY FIT SOLUTIONS, INC.
8 WESTLAKE DRIVE
NASHVILLE, TN 37205

SEAL



Tennessee811
Know what's below.
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ISSUE SET:

ISSUE DATE: JANUARY 2022

REVISION SCHEDULE:

No.	Description	Date
1	INITIAL SUBMITTAL	12/01/21
2	PC COMMENTS	01/25/22
3	STAFF COMMENTS	03/25/22
4	STAFF COMMENTS	04/22/22
5	STAFF COMMENTS	04/26/22
6	POND REVISION	10/11/23
7	REVISION RESUBMITTAL	11/02/23

REVISION: | DRAWN: AEM | CHECKED: REL

PROJECT NO.: 19-012-01

N.O.C. Certification

1. The project associated with these submitted plans is covered under Tennessee Construction General Permit. TN. TNR144975. The total disturbed area is: ±3.1 AC.

Signature — 03/25/2022 Date

Circle one: Developer (Project Engineer) Other _____

Erosion Control Specialist Note

I, RYAN E. LOVELACE, PE, Certified Erosion Control Specialist have reviewed the plan for sufficient on-site temporary erosion and sediment control provisions.

Signature — 03/25/2022 Date

NOTES:
1. CONSTRUCTION ENTRANCE AND CONCRETE WASHOUT TO BE ADJUSTED AS NECESSARY BY CONTRACTOR
2. LIMITS OF DISTURBANCE TO BE MARKED WITH ORANGE CONSTRUCTION FENCING OR MATERIAL OF EQUAL VISIBILITY

CONCRETE WASHDOWN NOTE:

CONTRACTOR SHALL PROVIDE AN AREA FOR CONCRETE WASH DOWN AND EQUIPMENT FUELING. CONTRACTOR TO COORDINATE EXACT LOCATION DURING PRE-CONSTRUCTION MEETING.

TOTAL DISTURBED AREA 3.1 AC.

SWPPP LEGEND

CD	CHECK DAM
CE	CONSTRUCTION ENTRANCE
DS	DRAINAGE SWALE
ST	SEDIMENT TRAP
SF	SILT FENCE
WB	WIRE BACKED SILT FENCE

WEST KINGSTON SPRINGS ROAD

GAS LINE

CROSS DRAIN

SITE OUTFALL #1
N: 645523.22
E: 1638304.50

INV: 513.75
CB 24" CPP
INV: 516.05
SQ. MH.
INV: 516.55
FL: 513.20

BENCMARK No. 1
P-K NAIL IN TEL. POLE
ELEV. 517.09

MARVIN CROUCH (1)
217-877

WENDELL CROUCH (2)
227-205

S02° 11' 04"E 34.67'
S11° 32' 05"W 90.15'
N87° 14' 30"E 514.00'

BAKER MAP 96
PARCEL (4) 283-119

N02° 42' 27"W 588.00'

FINCH
MAP 96
PARCEL (5) 96-42

N85° 25' 08"W 957.00'

(19)
225-402

(10)
179-658

WINSTEAD
(10.01)
259-368
200-313

PACK (11)
208-880
189-130

24" OAK

BENCHMARK No. 2
P-K NAIL IN 24" OAK TREE
ELEV. 513.96

EXISTING PHASE 1

FUTURE PHASE 2 & 3

CE

DOUBLE ROW WIRE-BACKED SILT FENCE

REMAINING PHASE 1

ST

LIMITS OF DISTURBANCE

DOUBLE ROW WIRE-BACKED SILT FENCE

NOTE:
SEDIMENT TRAP SHALL BE THE SIZE AND SHAPE OF THE PERMANENT POND AS SHOWN ON SHEET C1.01. SEE SEQUENCE NOTE ON C1.01 FOR DETAILS

FUTURE PHASE 2 & 3

NOTES:
1. EROSION CONTROL SHOWN HEREON IS REQUIRED FOR CONSTRUCTION OF LOTS 29-35.
2. INSTALL APPROPRIATE J-HOOKS IN THE SILT FENCE

N

SCALE: 1"=60'

MAP 96-B, PARCEL 003.00

PROJECT BENCHMARK:
DESCRIPTION: PK NAIL IN TEL. POLE
N: --
E: --
ELEVATION: 517.09

Tennessee 811
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Planning | Engineering
Landscape Architecture
2305 Kline Ave, Ste 300
Nashville, TN 37211
615.248.9999
csdgtn.com

SEAL

RYAN E. LOVELACE
REGISTERED ENGINEER
AGRICULTURE
NUMBER
109056
STATE OF TENNESSEE
12/07/2023

ELLERSLY SUBDIVISION PHASE 1

0 ELLERSLY WAY,
KINGSTON SPRINGS,
CHEATHAM COUNTY,
TENNESSEE

ISSUE SET:

ISSUE DATE: JANUARY 2022

REVISION SCHEDULE:

No.	Description	Date
1	INITIAL SUBMITTAL	12/01/21
2	PC COMMENTS	01/25/22
3	STAFF COMMENTS	03/28/22
4	STAFF COMMENTS	04/22/22
5	STAFF COMMENTS	04/26/22
6	POND REVISION	10/11/23
8	REVISION RESUBMITTAL	11/02/23

REVISION: | DRAWN: ESW | CHECKED: REL

SWPPP STAGE 1
PHASE 1

C1.00

PROJECT NO.: 19-012-01

Nov 02, 2023 - 8:28am T:\CAD\D\2019\19-012-01\CAD\Civil\SWPPP-Phase 1\19-012-01 - C1.00 -SWPPP Phase 1.dwg

N.O.C. Certification

1. The project associated with these submitted plans is covered under Tennessee Construction General Permit. TN. TNR 144975. The total disturbed area is: ±3.1 AC.

Signature — 03/25/2022 Date

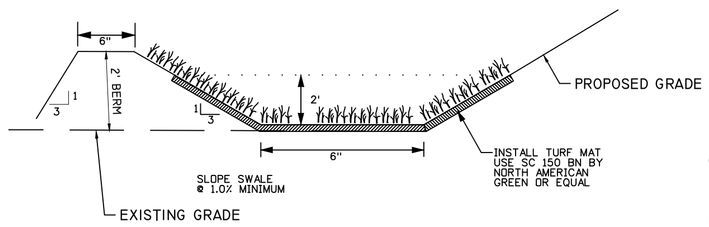
Circle one: Developer (Project Engineer) Other _____

Erosion Control Specialist Note

I, RYAN E. LOVELACE, PE, Certified Erosion Control Specialist have reviewed the plan for sufficient on-site temporary erosion and sediment control provisions.

Signature — 03/25/2022 Date

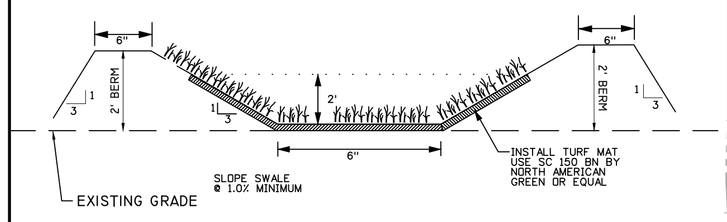
NOTES:
1. CONSTRUCTION ENTRANCE AND CONCRETE WASHOUT TO BE ADJUSTED AS NECESSARY BY CONTRACTOR
2. LIMITS OF DISTURBANCE TO BE MARKED WITH ORANGE CONSTRUCTION FENCING OR MATERIAL OF EQUAL VISIBILITY
3. EXCAVATE ALL ELECTRICAL/SEWER CROSSINGS FOR CITY INSPECTION
4. AFTER CONSTRUCTION, CONTRACTOR TO TELEVISE ALL SEWER INFRASTRUCTURE AND REPAIR ANY DEFECTS, AND PROVIDE SURVEY GRADE AS-BUILTS IN CAD OR GIS FORMAT.



PERMANENT DIVERSION SWALE 1, 2, & 4

N.T.S.

NOTE: THE INTENT OF THIS DIVERSION SWALE IS TO INSTALL A 2-FT HIGH BERM ON ONE SIDE OF THE FLOWLINE WITHOUT ANY CUT.



PERMANENT DIVERSION SWALE 3

N.T.S.

NOTE: THE INTENT OF THIS DIVERSION SWALE IS TO INSTALL A 2-FT HIGH BERM ON BOTH SIDES OF THE FLOWLINE WITHOUT ANY CUT.

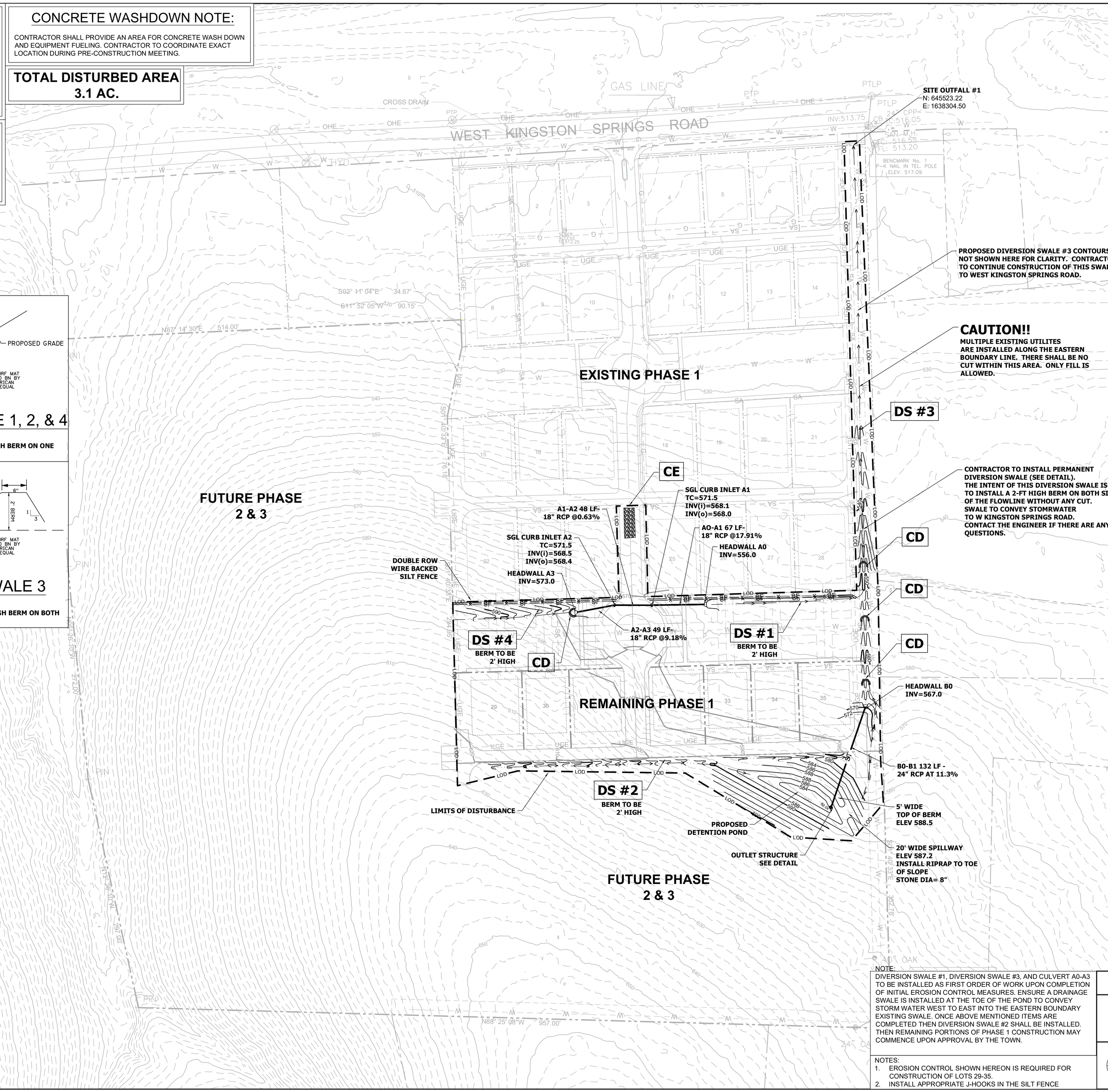
CONCRETE WASHDOWN NOTE:

CONTRACTOR SHALL PROVIDE AN AREA FOR CONCRETE WASH DOWN AND EQUIPMENT FUELING. CONTRACTOR TO COORDINATE EXACT LOCATION DURING PRE-CONSTRUCTION MEETING.

TOTAL DISTURBED AREA 3.1 AC.

SWPPP LEGEND

CD	CHECK DAM
CE	CONSTRUCTION ENTRANCE
DS	DRAINAGE SWALE
ST	SEDIMENT TRAP
SF	SILT FENCE
WB	WIRE BACKED SILT FENCE



NOTE:
DIVERSION SWALE #1, DIVERSION SWALE #3, AND CULVERT A0-A3 TO BE INSTALLED AS FIRST ORDER OF WORK UPON COMPLETION OF INITIAL EROSION CONTROL MEASURES. ENSURE A DRAINAGE SWALE IS INSTALLED AT THE TOE OF THE POND TO CONVEY STORM WATER WEST TO EAST INTO THE EASTERN BOUNDARY EXISTING SWALE. ONCE ABOVE MENTIONED ITEMS ARE COMPLETED THEN DIVERSION SWALE #2 SHALL BE INSTALLED. THEN REMAINING PORTIONS OF PHASE 1 CONSTRUCTION MAY COMMENCE UPON APPROVAL BY THE TOWN.

NOTES:
1. EROSION CONTROL SHOWN HEREON IS REQUIRED FOR CONSTRUCTION OF LOTS 29-35.
2. INSTALL APPROPRIATE J-HOOKS IN THE SILT FENCE

MAP 96-B, PARCEL 003.00

PROJECT BENCHMARK:
DESCRIPTION: PK NAIL IN TEL. POLE
N: --
E: --
ELEVATION: 517.09

N

0 60 120
SCALE: 1"=60'

Tennessee 811 Know what's below. Call before you dig.

CSDG
Planning | Engineering
Landscape Architecture
2305 Kline Ave, Ste 300
Nashville, TN 37211
615.248.9999
csdgtn.com

SEAL

RYAN E. LOVELACE REGISTERED ENGINEER AGRICULTURE OWNER'S No. 109056 STATE OF TENNESSEE 10/17/2023

ELLERSLY SUBDIVISION PHASE 1

0 ELLERSLY WAY,
KINGSTON SPRINGS,
CHEATHAM COUNTY,
TENNESSEE

ISSUE SET:

ISSUE DATE: JANUARY 2022

REVISION SCHEDULE:

No.	Description	Date
1	INITIAL SUBMITTAL	12/01/21
2	PC COMMENTS	01/25/22
3	STAFF COMMENTS	03/28/22
4	STAFF COMMENTS	04/22/22
5	STAFF COMMENTS	04/26/22
6	POND REVISION	10/11/23
6	REVISION RESUBMITTAL	11/02/23

REVISION: | DRAWN: ESW | CHECKED: REL

SWPPP STAGE 2
PHASE 1

C1.01

PROJECT NO.: 19-012-01

Nov 02, 2023 - 8:28am T:\CADD\2019\19-012-01\CAD\Civil\SWPPP-Phase 1\19-012-01 - C1.01 -SWPPP Phase 2.dwg

Stormwater Pollution Prevention Plan Notes:

1. The contractor is responsible for making sure that a copy of the SWPPP is retained on-site at or near the construction entrance. If a construction trailer in not available, the contractor shall provide a waterproof enclosure near the construction entrance to place the SWPPP. In addition to the SWPPP, the contractor shall make certain that the following information must also be posted at the construction site (in a construction trailer or in the waterproof enclosure):
   a) A copy of the notice of coverage (NOC) with the NPDES permit tracking number for the construction project number
   b) name, company name, email address, telephone number and address of the project site owner or a local contact person
   c) a brief description of the project
   d) the location of the SWPPP if an on-site location for storing the plan is not available.

2. The owner of this project site will provide erosion control measures as shown on this SWPPP. Once the owner sells this property, the new property owner will be required to obtain coverage under this permit from the governing federal, state and local agencies and the new property owner shall assume operational control and responsibility for the portion of the site that he/she purchases.

3. Prior to the commencement of any clearing or grubbing, the contractor shall erect "construction fencing", tree protection fencing, caution tape, etc. along the limits of disturbance to protect trees, stream bank buffers, etc. that are not to be disturbed.

4. Prior to any type of construction activity, the contractor shall install the stone based construction exit, the silt fence and the sediment traps/basins when indicated on the SWPPP. Additional erosion control measures such as rock check dams, diversion swales, temporary creek crossings, temporary mulching of disturbed areas, final seed and straw application and general erosion control maintenance shall be provided as construction progresses and these measures become necessary. The contractor shall be responsible for implementing all of the erosion control measures.

5. All erosion control measures shall be installed and maintained in accordance with the manufacture's specifications and recommendations. It is the purpose of all control measures to slow runoff so that rill and gully formation is prevented. The contractor shall inspect the control measures periodically and replace and/or modify the controls for relevant site situations.

6. Where the application of temporary or permanent grass seed is specified as part of the SWPPP, the contractor shall use an appropriate grass seed mixture for the time of year that the seed is sown. Use fescue during the spring and summer months and a mixture of fescue and winter rye during the fall and winter months. Sow at a rate of 6 lbs. per 1000 sq.ft. of area. Provide adequate amounts of water to establish a healthy stand of grass.

7. If sediment escapes the construction site, it is the contractor's responsibility to remove the sediment that has escaped the site. The contractor shall obtain the permission of the landowner where the sediment has accumulated before removal can begin. If sediment enters a stream, the contractor must also gain the written permission of the State before remediation/restoration can begin.

8. The contractor shall remove sediment from sediment traps, silt fences, sedimentation ponds, and other sediment controls as necessary and must be removed when capacity has been reduced by 50%.

9. Litter, construction debris and construction chemicals exposed to storm water shall be picked up and removed from the site to prevent them from becoming a pollutant source for storm water discharges. After use, materials used for erosion prevention and sediment control should be removed from the site.

10. There are no other construction activities or industrial activities associated with this project site that are covered under a separate permit.

11. There are streams on or near this project site, therefore additional permits associated with these features are required.

12. All earth stockpiles, whether on the project site or off-site shall include erosion control measures to prevent the material from be washed from the site by storm water runoff.

13. Clearing and grubbing must be held to the minimum necessary for grading and equipment operation.

14. Erosion prevention and sediment control measures must be in place and functional before earth moving operations begin and must be constructed and maintained throughout the construction period. Temporary measures may be removed at the beginning of the workday, but must be replaced at the end of the workday.

15. The contractor shall maintain a rain gauge and daily rainfall records at the site.

16. The contractor shall initiate stabilization measures in portions of the site where construction activities have temporarily or permanently ceased. Temporary or permanent soil stabilization at the construction site must be completed no later than 14 days after the construction activity on that portion of the site has temporarily or permanently ceased.

17. The contractor shall construct temporary diversion swales to divert off-site runoff from crossing the disturbed areas. These diversion swales, when necessary, shall be field located to avoid existing trees wherever possible.

18. No work shall be allowed in or around streams or wetlands without the proper permits. Prior to the commencement of any construction activities in these areas, the contractor shall obtain a copy of the permits from the property owner, which allows this work. He shall not begin work without obtaining a copy of these permits or stiff fines from the federal and state agencies may be levied.

19. Muddy water to be pumped from excavation and work areas must be held in settling basins or filtered prior to its discharge into surface waters. Water must be discharged through a pipe, well-grassed or lined channel or other equivalent means so the discharge does not cause erosion and sedimentation. Discharged water must not cause an objectionable color contrast with the receiving stream.

20. After construction is complete, all disturbed areas, which are not covered with impermeable surface (i.e. asphalt, concrete, buildings, etc.), shall be covered with topsoil (4-inch thick minimum), grass seed and straw. The contractor shall maintain the seed and straw until a solid, healthy stand of permanent grass covers the disturbed areas.

21. Silt fence shall be used along the lower edge of disturbed areas that have sheet flow runoff. Where runoff is concentrated (such as swales and ditches), bumpus fences or rock check dams shall be used to slow the velocity and allow settling of sediment.

22. All construction and waste material shall be collected and removed from the site on a periodic basis. All construction and waste material shall be located outside of any existing or proposed drainage ways and shall be covered and protected from the rain until they are removed from the site. Any liquid materials or chemicals stored on-site shall be located away from any existing or proposed drainage ways and a berm of sufficient height to contain the entire volume of the liquid shall be constructed to completely encompass and impound the stored materials to prevent a spill from flowing off of the site.

23. All soil, plants, trees and other vegetation in protected streams and wetlands and along the banks of same are protected by State law and therefore are prohibited from being removed. The contractor shall ensure that these areas remain undisturbed during construction. Contractor shall erect construction barriers or take other means necessary to insure that the areas remain protected.

24. The contractor shall employee a person to inspect the erosion control measures as required by the State and local agencies. The inspector must have successfully completed the "Fundamentals of Erosion Prevention and Sediment Control" course provided by the State. A copy of the certification or training record for inspector certification should be kept on site.

25. Inspections described in the Tennessee General Permit shall be performed at least twice every calendar week and shall be performed at least 72 hours apart. Inspect all erosion control measures, disturbed areas, storage of material areas, outfall points, construction access points, etc.

26. Any inadequate control measures or control measures in disrepair shall be replaced or modified or repaired as necessary before the next rain event if possible, but in no case more than 7 days after the need is identified. The contractor shall provide additional erosion control measures where necessary to insure adequate control so that no silt exits the project site.

27. Inspections shall be documented and include: the scope of the inspection, name and title of personnel making the inspection, the date of the inspection, major observations relating to the implementation of the storm water pollution prevention plan (including the location of discharges of sediment or other pollutants from the site and of any control device that failed to operate as designed or proved inadequate for a particular location), and actions taken in accordance with the General Permit. Inspections documentation will be maintained on site and made available upon request. Inspection reports must be submitted to the State (TDEC) within 10 days of the request. Use the inspection report form provided in Appendix C of the General Permit and complete on a weekly basis.

28. Sediment removed from sediment control structures is to be placed at a site that has been permitted by local and state agencies. The contractor is responsible for obtaining the site to "waste" the sediment material. The sediment shall be treated in a manner so that the area around the disposal site will not be contaminated or damaged by the sediment in the storm water run-off. Cost of this treatment is to be included in the price for the earthwork.

29. The contractor shall seed and straw all disturbed areas as soon as possible after final grading is completed, unless otherwise indicated. The contractor shall take whatever means necessary to establish permanent soil stabilization. Any areas that do not include construction activity for more than 14 days shall be temporarily covered with straw to help prevent erosion.

30. Remove sediment from all drainage structures, pipes and swales before acceptance by the developer or the local governing agency.

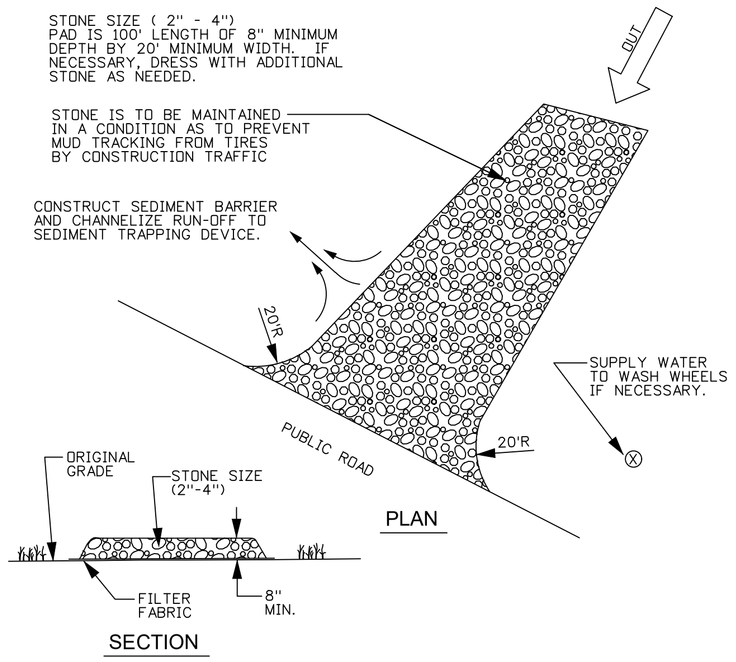
31. Remove the temporary erosion and water pollution control devices only when in the opinion of the owner's representative, they are no longer needed.

32. During the period between the end of the construction and the establishment of the permanent vegetation, erosion control measures shall remain in place and maintained. Once permanent vegetation is established and approved, then the erosion control measures may be removed.

33. This SWPPP is developed in accordance with the Tennessee General NPDES Permit (TNR100000) for storm water discharges associated with construction activity (TNCGP), and is prepared using sound engineering practices. Civil Site Design Group P.L.L.C. personnel involved with the development of this plan have completed the design of vegetative and structural measures for erosion and sediment control course available from the State of Tennessee.

34. Contractor to provide an area for concrete wash down and equipment fueling in accordance with Metro CP-10 and CP-13, respectively. Contractor to coordinate exact location with NPDES department during preconstruction meeting. Control of other site wastes such as discarded building materials, chemicals, litter, and sanitary wastes that may cause adverse impacts to water quality is also required by the Grading Permittee.

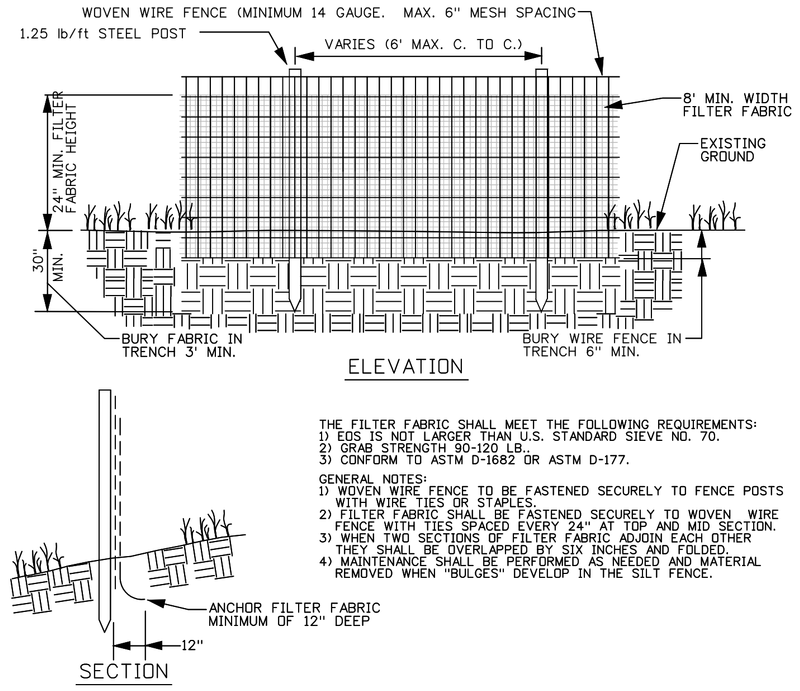
35. All slopes 3:1 or greater to be stabilized within 7 days of inactivity.



TEMPORARY CONSTRUCTION ENTRANCE

N.T.S. TCP-03

CE

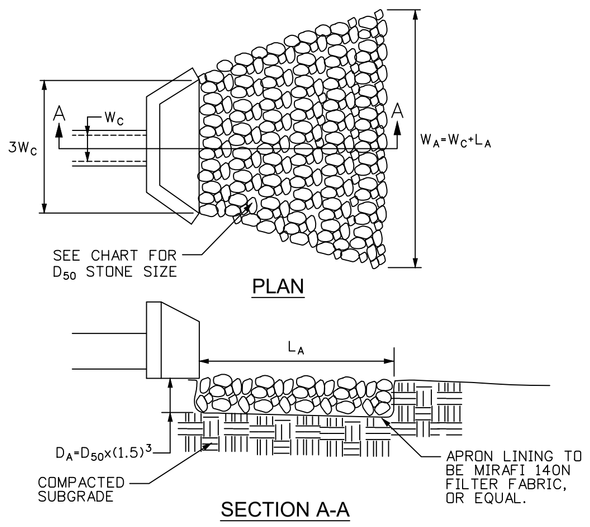


WIRE BACKED SILT FENCE

N.T.S.

SF

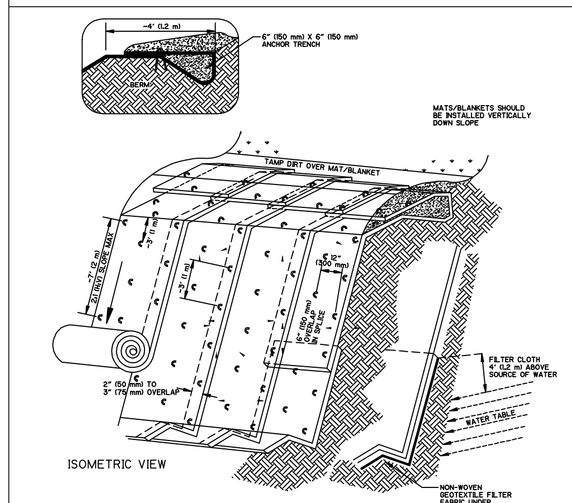
W_C, Culvert Diameter (inches)	D_{50}, Rock Size (inches)	L_A, Apron Length (feet)	W_A, Downstream Width (feet)	D_A, thickness (inches)	Rock Qty. (tons)
12	6	12	13	18	15
18	9	16	18	24	20
21	9	18	20	24	35
24	9	20	22	24	60
30	9	22	24	24	75
36	12	24	27	30	120
42	18	26	30	36	180
48	18	28	32	36	215



RIPRAP AT HEADWALL

N.T.S. TCP-20(Volume 4 Nashville Storm Management Manual)

RR



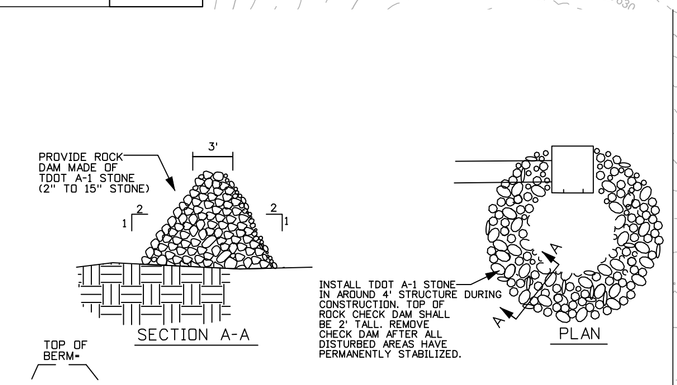
NOTES:
1. SLOPE SURFACE SHALL BE FREE OF ROCKS, SOD, CLODS, STICKS AND GRASS. MATS/BLANKETS SHALL HAVE GOOD SOIL CONTACT.
2. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.

EROSION CONTROL MATTING

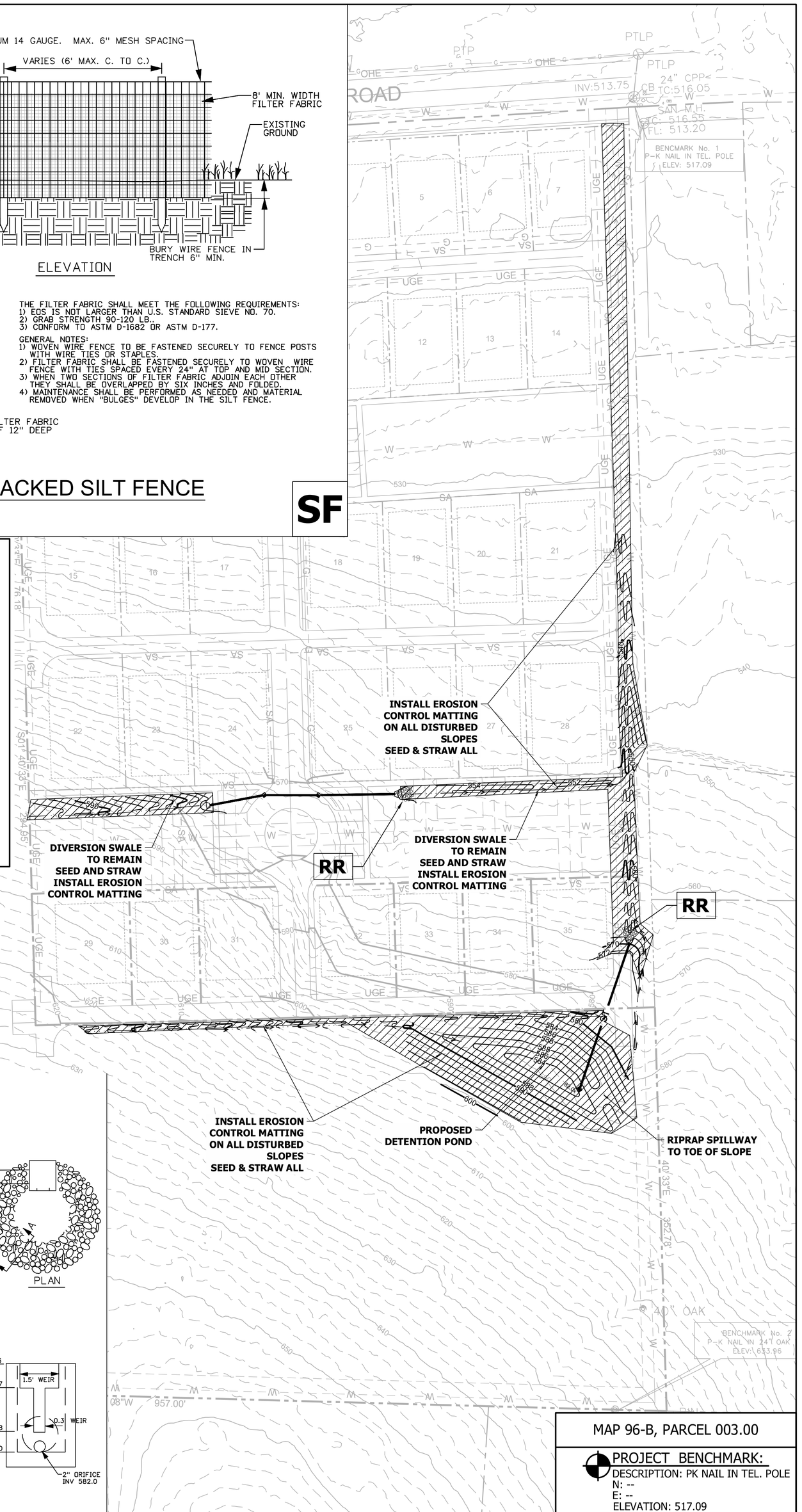
N.T.S.

SWPPP LEGEND

- **CD** CHECK DAM
- **CE** CONSTRUCTION ENTRANCE
- **DS** DRAINAGE SWALE
- **ST** SEDIMENT TRAP
- **SF** SILT FENCE
- **WB** WIRE BACKED SILT FENCE
- **RR** RIPRAP PAD



DETENTION POND OUTLET STRUCTURE



MAP 96-B, PARCEL 003.00

PROJECT BENCHMARK:
DESCRIPTION: PK NAIL IN TEL. POLE
N: --
E: --
ELEVATION: 517.09

N

0 60 120
SCALE: 1"=60'

CSDG
Planning | Engineering
Landscape Architecture
2305 Kline Ave, Ste 300
Nashville, TN 37211
615.248.9999
csdgtn.com

SEAL

RYAN E. LOVELACE
REGISTERED ENGINEER
AGRICULTURE
NUMBER
109056
STATE OF TENNESSEE
12/01/2021

ELLERSLY SUBDIVISION PHASE 1

0 ELLERSLY WAY,
KINGSTON SPRINGS,
CHEATHAM COUNTY,
TENNESEE

ISSUE SET:

ISSUE DATE: JANUARY 2022

REVISION SCHEDULE:

No.	Description	Date
1	INITIAL SUBMITTAL	12/01/21
2	PC COMMENTS	01/20/22
3	STAFF COMMENTS	03/28/22
4	STAFF COMMENTS	04/22/22
5	STAFF COMMENTS	04/26/22
6	POND REVISION	10/11/23
6	REVISION RESUBMITTAL	11/02/23

REVISION: | DRAWN: ESW | CHECKED: REL

SWPPP STAGE 3
PHASE 1 & GRADING
PLAN

C1.02

PROJECT NO.: 19-012-01

Nov 02, 2023 - 8:28am T:\CADD\2019\19-012-01\CAD\Civil\SWPPP-Phase 1\19-012-01 - C1.02 -Notes and Details.dwg

Re: Golf Club Responses

City Planner <cityplanner@kingstonsprings-tn.gov>
Fri 11/3/2023 1:35 PM

To:Jeff Hooper <jhooper@bcacivil.com>
Cc:Chimera, Peter <pchimera@cecinc.com>;John Lawless <jlawless@kingstonsprings-tn.gov>;Mike Patenaude <patenaude54@bellsouth.net>

Jeff,

I am forwarding your responses to the City Engineer with this email and will discuss your responses with him and respond. Please provide your availability to discuss next week prior to the Planning Commission meeting.

Please provide a copy of the easement agreement with Mrs. Dorris permitting the driveway construction granting permission to construct the driveway and a portion of the parking lot for the maintenance facility site.

Comments:

1. Please provide the distance between proposed driveways and the length of each parcel along South Harpeth Rd.
2. While the previous Maintenance Site drawings were approved and a permit was issued the changes to building footprints, road connections, and construction on a parcel owned by Mrs. Dorris constitute changes to the Site Plan and requires Planning Commission review and approval.
3. The construction of 2 driveways on a local access road with a speed limit of 30 mph with a proposal to add another entrance in favor of DBI create a safety issue for existing residents and three points of access to South Harpeth Rd. for heavy equipment, semi-trucks, dump trucks, and passenger vehicles causing damage to the road surface that is maintained at the expense of all existing taxpayers. I have requested that you remove the second driveway at the maintenance facility location and reiterated to you that the construction entrance now used for the DBI project cannot remain open.
4. A Performance Bond and road improvements may be required for the project.

Sincerely,
Sharon Armstrong

From: Jeff Hooper <jhooper@bcacivil.com>
Sent: Friday, November 3, 2023 12:07 PM
To: City Planner <cityplanner@kingstonsprings-tn.gov>
Subject: Golf Club Responses

Sharon-

Per our conversation this morning, please find attached our responses to comments for your Planning Commission package.

Thank you,

Jeff Hooper, P.E.
Barge Civil Associates, LLC

BCA
BARGE CIVIL
ASSOCIATES

MEMORANDUM

To: Mrs. Sharon Armstrong, Town Planner

From: Jeff Hooper, P.E.

Date: November 3, 2023

Job No.: 2653-10

Re: Golf Club of DBI
Off Season and Maintenance Facility Revision Packages

Please find below our responses to planning and engineering comments for the subject projects received on October 4th and October 12th respectively.

- Please list Maintenance Facility Expansion under proposed structures.
  - Response: We interpret this comment to be directed to Sheet C0.1, Master Plan. The updated Master Plan was approved in June, permits have been issued, and construction has commenced on the maintenance facility, therefore we listed it as existing.

- All disturbed soil must be stored more than 100 ft. from South Harpeth Road.
  - Response: Noted.

- EPSC weekly inspections reports must be provided to the Town of Kingston Springs within 3 days of inspections and/ or reports.
  - Response: Noted.

- 811 Notification must be present on all pages for utility location.
  - Response: Noted.

- Fire Hydrant replacement required.
  - Response: Keynote 10 on Sheet C4.0 identifies the location of the new fire hydrant, see detail A inset in that sheet.

- All parking spaces within the Town of Kingston Springs must be 10 ft x 20 ft.
  - Response: Noted.

- Sheet C3.0 – The second entrance/exit must be removed from the plan set:
  - Response: It is our desire to construct two access points for the maintenance facility, one as a dedicated entrance, and the other as a dedicated exit. We believe doing so provides improved traffic flow on South Harpeth Road when compared with a single entrance. Additionally, we believe the proposed improvements will improve drivers' sight distances.

- No structures including the retaining walls are permitted in the regulatory flood zone.
  - Response: The portion of retaining wall was approved at the March 10, 2022, planning commission meeting and the subsequent grading permit issued.

- Reduce the size of the connecting light duty road pavement to 12 feet.
  - Response: The service path width of 20 feet is desired for two-way maintenance traffic.

- A performance Bond for Soil, Erosion, Stormwater containment and roadway surface for all city roads must be provided.
  - Response: Noted.

- A utility and grading plan must be provided.
  - Response: Sheets 2.0 and 4.0 were part of the plan set which are the grading plan and utility plan, respectively.

- All buildings entered or occupied by humans must be sprinkled.
  - Response: Noted, we have been coordinating sprinklers with the Town's fire officials.

- This application is deemed incomplete because hydrologic calculations were not included (section 4.2.3.5). Please provide a stormwater report detailing any and all stormwater quantity, quality, and conveyance measures used.
  - Response: We are happy to provide hydrologic calculations as requested, however it was our understanding that this information is required during the grading permitting process not the PC entitlement process. Section 4.2.2 of the Towns Stormwater Management Regulations states: "*Each application for a grading permit or a building permit…*"

- This report should show no increase in the release rate for the 2-year through 10-year events and should show that stormwater systems are capable of handling the 100-year event (6.8.1).
  - Response: Noted.

- A stormwater maintenance agreement is also required for the development (6.8.4)
  - Response: Noted.

- Additional comments may pe provided once a stormwater report is received.
  - Response: Noted.

Off Season Package Comments:

- Please explain the routing of stormwater once it leaves the end wall labeled S1.
    - Response: Upon exiting structure S1, the conveyance of water is overland flow to Brush Creek. S1 discharges at the point where it does to keep from grading within the floodplain.

- Please provide stormwater narrative for the area downstream of S15. It appears that this system has no discharge.
    - Response: The connection to the existing golf course drainage system at structure S10 which is conveyed to Brush Creek through a closed conduit system.

Turf Maintenance Facility Comments:

- Fill is shown in the floodplain limits. If limits are to be modified by the CLOMR/LOMAR, proposed floodplain lines need to be shown on all sheets.
    - Response: Cuts and fills are being proposed in the floodplain. The CLOMR obtained by the Golf Club has taken the design into consideration. The turf maintenance facility scope is controlled by the backwater of Harpeth River or elevation 512.2. We can indicate that governing elevation for both the pre and post conditions.

- A TDEC NOC and SWPPP are required for this project. Please note the NOC Permit Number on the plan and delete the notation that the permit is not required.
    - Response: The project is covered under permit number TNR245825. The notation a permit is not required is in error and will be corrected.

Our team will be in attendance at the Planning Commission Meeting on November 9, 2023, to answer any questions regarding the above statements however it may serve well to have a conversation regarding these prior to the meeting if open to doing so.

Concept Review Application

Kingston Springs, TN Planning Department

Phone: 615-952-2110 Fax: 615-952-2397

Applicant Name: John Mark Tarver Jr. Date: 10/10/23

Applicant Phone: (865) 617-6932 Applicant Email: john@tarverproperties.com

Project Address: 119 Luyben Hills Rd, Kingston Springs, TN 37082

If Applicant differs from Property Owner please complete below information

Property Owner Name: Larry Law Jr, Lisa Law Garrison, Treesa Law

Property Owner Phone: (615) 294-9556 Property Owner Email: pamfrancis84@me.com

Association of Applicant to Property Owner: Buyer

Applicant Signature: _____ Date: 10/10/23

TO BE COMPLETED BY REVIEWER

Property Map Number: _____ Property Parcel Number: _____

Property Zoning: _____ Property Flood Zoning: _____

TYPE OF PROJECT TO BE REVIEWED (check all that apply):

- [x] NEW
- [ ] ADDITION
- [ ] REMODEL
- [ ] REPAIR

- [x] Residential Construction
- [x] Commercial Construction
- [ ] Accessory Structure
- [x] Grading/Excavating
- [x] Driveway
- [ ] Demolition
- [ ] Deck
- [x] Signage
- [ ] Roofing
- [ ] Pool (above and below ground)

Description of Project: 121 single family units for rent with commerical lots on West Kingston Springs Rd


Exhibit A
W KINGSTON SPRINGS ROAD
COMMERCIAL
COMMERCIAL
3,756 L.F. 2-3" FORCE MAIN
LOVRENHILLS ROAD
WELCH ROAD
22.17 ACRES
INTERSTATE 40