HAVEN HILL ACRES

STORM WATER DRAINAGE AND DETENTION REPORT

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Appendices

Introduction

Thouvenot, Wade & Moerchen, Inc. has prepared this Storm Water Drainage and Detention Report on behalf of the representatives of the proposed Haven Hill Acres and is being provided in support of the Planned Use submittal. The purpose of this report is to establish the design parameters and document analysis results for the proposed drainage system and Various detention ponds.

Location

The proposed Haven Hill Acres Development is on parcels 13-1-21-29-12-201-006.002 and 13-1-12-19-12-201-006 in Collinsville, Illinois. The property is currently 18.54 acres zoned R3 Residential. The site is bordered to the east and west by subdivisions zoned R-3. Summit Ridge and Sydney Creek subdivisions border the east. The northern property line is bordered by Reese Drive. The southwest property line is bordered by Carroll Wood Hill Condominiums, and the northwest property line is bordered by Sean's Park subdivision. Greenview Acres subdivision is zoned R-3 and is located to the south of the site. A majority of the site is wooded.

Design Methodology

The design criteria utilized for all analysis follows the requirements as outlined in the City of Collinsville Code of Ordinances and the IDOT Drainage Manual. The Rational Method was used to determine the pre-developed and post-developed runoff rates. Runoff coefficients were calculated as a weighted average of varying ground cover, with coefficients used from City of Collinsville Code of Ordinances. Rainfall intensities were derived from the Illinois State Water Survey Bulletin 75 adjusted for the St. Louis Urban Effect.

To address water quality, a barracuda unit from ADS has been incorporated to treat the first inch of runoff generated by the added impervious area prior to discharge into the detention pond. In addition, a concrete-paved ditch has been provided from inlet to outlet within the dry-bottom detention pond to satisfy city requirements.

All storm water detention analyses herein have been completed in accordance with the analysis parameters as set forth by these rules and regulations in order to accommodate the 5-, 10-, 25-, 50-, and 100-year storm events. The program *Hydraflow* Hydrographs was used to run the pre- and post- developed conditions and size the detention ponds.

All storm systems were analyzed using the Rational Method with a general provision being made to accommodate the storm water flow rates that may be anticipated during a 25-year storm event with overland flow provisions being made for a larger storm event. The program *Storm*CAD was utilized to aid in the design of the storm sewers.

RipRap has been sized to accommodate the 25-year storm event leaving culverts. RipRap should be placed at a 3:1 slope for pipes/overflows leaving the detention pond.

Rainfall Intensity (in/hr) for Southwest Illinois							
		Return Period (Years)					
		2	5	10	25	50	100
Duration of Storm (Hr)	1	1.99	2.46	2.85	3.4	3.864	4.30
	2	2.46	3.04	3.52	4.2	4.761	5.31
	3	2.71	3.36	3.88	4.63	5.256	5.85
	6	3.19	3.93	4.54	5.44	6.164	6.87
	12	3.69	4.57	5.27	6.3	7.142	7.97
	18	3.99	4.93	5.69	6.81	7.717	8.60
	24	4.24	5.24	6.06	7.25	8.211	9.15
	48	4.92	6.08	7.02	8.34	9.373	10.44
	72	5.45	6.69	7.72	9.15	10.22	11.34
	120	6.11	7.49	8.59	10.1	11.28	12.47
	240	7.76	9.41	10.70	12.4	13.74	15.07
from ISWS Bulletin 75 adjusted for St. Louis Urban Effect							

Existing Conditions

Currently the site consists of an undeveloped field, mostly wooded. The existing site consists of three (3) drainage areas. Existing Drainage Area #1 drains to the East while Existing Drainage Areas #2 and #3 drain to the West.

Existing Drainage Area 1 makes up a large majority of the site, 15.69 acres with a composite runoff coefficient of 0.20. This area includes a wooded area. The runoff from this drainage area flows from west to east into Sydney Creek.

Existing Drainage Area #1				
COVER	COEFFICIENT	AREA (SF)	AREA (AC)	COMPOSITE C
Agricultural, pastured or wooded areas	0.20	683,456	15.69	0.20
Overall:			**15.69**	**0.20**

Existing Drainage Area 2 is located in the western portion of the site and consists of 2.86-acres with a composite runoff coefficient of 0.20. The area includes an agricultural field. The runoff from this drainage area flows from southeast to a ditch at the western property line.

Existing Drainage Area #2				
COVER	COEFFICIENT	AREA (SF)	AREA (AC)	COMPOSITE C
Agricultural, pastured or wooded areas	0.20	124,582	2.86	0.20
Overall:			**2.86**	**0.20**

Existing Drainage Area 3 is located in the southwestern corner of the site and consists of 0.13-acres with a composite runoff coefficient of 0.20. The area includes an agricultural field. The runoff from this drainage area flows from east to west to an existing ditch along the western property line.

Existing Drainage Area #3				
COVER	COEFFICIENT	AREA (SF)	AREA (AC)	COMPOSITE C
Agricultural, pastured or wooded areas	0.20	5,663	0.13	0.20
Overall:			**0.13**	**0.20**

Refer to **Appendix E** for runoff calculations for the existing drainage areas. Refer to **Appendix A** for the delineation of the existing drainage areas. Located below is a summary of runoff flows for existing drainages areas.

Existing Drainage Summary												
Drainage Area	Area (acres)	C	5-Year		10-Year		25-Year		50-Year		100-Year	
			Tc (min.)	Q (cfs)	Tc (min.)	Q (cfs)	Tc (min.)	Q (cfs)	Tc (min.)	Q (cfs)	Tc (min.)	Q (cfs)
1	**15.69**	**0.20**	**8**	**20.47**	**8**	**23.47**	**7**	**29.61**	**7**	**33.51**	**7**	**37.44**
2	**2.86**	**0.20**	**8**	**3.73**	**8**	**4.28**	**7**	**5.40**	**7**	**6.11**	**7**	**6.83**
3	**0.13**	**0.20**	**8**	**0.17**	**7**	**0.20**	**7**	**0.25**	**6**	**0.29**	**6**	**0.33**

Proposed Conditions

The proposed Haven Hill Acres will consist of roadways, sidewalks, utilities, three multi-family buildings made up of 60 units, and one (1) detention pond. Storm sewer will be utilized to collect runoff during storm events and convey the flows to the proposed detention pond. The proposed conditions will consist of three (3) distinct discharge points from the site. Drainage Area 1 will require volume reduction measures and water quality treatment as a result of the increase in impervious surfaces. Refer to **Appendix I** for water quality calculations and specifications. After water has been treated, it will enter the detention pond that has been designed to limit runoff.

Proposed Drainage Area 1A (Detained) is located in the western/middle portion of the site and consists of 5.46-acres with a composite runoff coefficient of 0.50. Two of the housing units, the parking lot, and a portion of green space that will drain to the pond. The runoff from this drainage area is captured throughout the site by storm sewer and drains into the detention pond which is located in the middle of the site.

PROPOSED DRAINAGE AREA #1A (DETAINED)				
COVER	COEFFICIENT	AREA (SF)	AREA (AC)	COMPOSITE C
Bike Trail	0.90	3,049	0.07	0.90
Buildings	0.90	33,977	0.78	0.90
Pavement	0.90	55,757	1.28	0.90
Concrete Sidewalk/ Patio	0.90	8,276	0.19	0.90
Lawn/Wooded	0.90	136,778	3.14	0.20
Overall:			**5.46**	**0.50**

Proposed Drainage Area 1B (Undetained) is located in the eastern portion of the site and consists of 12.98 acres with a composite runoff coefficient of 0.22. This area includes a portion of the bike trail, and wooded areas. A minor portion of the drainage area will be conveyed through a proposed culvert situated beneath the planned bike trail. The delineation of this contributing area is provided in **Appendix A**. The culvert has been designed to accommodate the 50-year storm event and further evaluated under the 100-year storm event using *Flow Master*. Detailed results of this analysis are presented in **Appendix F**. The runoff from this drainage area flows to Sydney Creek.

PROPOSED DRAINAGE AREA #1B (UNDETAINED)				
COVER	COEFFICIENT	AREA (SF)	AREA (AC)	COMPOSITE C
Bike Trail	0.90	6,098	0.14	0.90
Concrete Patio	0.90	436	0.01	0.90
Building	0.90	8,276	0.19	0.90
Roadway	0.90	1,307	0.03	0.90
Lawn/Wooded	0.20	549,727	12.62	0.20
Overall:			**12.98**	**0.22**

Proposed Drainage Area 2 (Undetained) is located in the middle of the western property line and consists of 0.14-acres with a composite runoff coefficient of 0.21. This area includes grass and a small portion of impervious surface. The runoff from this drainage area sheet flows to the west into an existing ditch.

PROPOSED DRAINAGE AREA #2 (UNDETAINED)				
COVER	COEFFICIENT	AREA (SF)	AREA (AC)	COMPOSITE C
Lawn/Wooded	0.20	6,098	0.14	0.20
Concrete Patio	0.90	436	0.01	0.90
Overall:			**0.14**	**0.21**

Proposed Drainage Area 3 is located in the southwest corner of the site and consists of 0.13-acres and a composite runoff coefficient of 0.20. This area includes a grassy/wooded area. The runoff from this drainage area flows offsite to the west.

PROPOSED DRAINAGE AREA #3 (UNDETAINED)				
COVER	COEFFICIENT	AREA (SF)	AREA (AC)	COMPOSITE C
Lawn/Wooded	0.20	5,663	0.13	0.20
Overall:			**0.13**	**0.20**

Refer to **Appendix E** for runoff calculations for the proposed drainage areas. Refer to **Appendix A** for the delineation of the proposed drainage areas. Located below is a summary of runoff flows for proposed drainage areas.

Proposed Drainage Summary												
Drainage Area	Area (acres)	C	5-Year		10-Year		25-Year		50-Year		100-Year	
			Tc (min.)	Q (cfs)	Tc (min.)	Q (cfs)	Tc (min.)	Q (cfs)	Tc (min.)	Q (cfs)	Tc (min.)	Q (cfs)
1A (DETAINED)	5.46	0.50	8	17.80	8	20.42	8	24.56	7	29.15	7	32.58
1B (UNDETAINED)	12.98	0.22	8	18.62	8	21.35	8	25.69	7	30.49	7	34.07
2 (UNDETAINED)	0.14	0.21	5	0.22	5	0.26	5	0.31	5	0.35	5	0.39
3 (UNDETAINED)	0.13	0.20	8	0.17	7	0.20	7	0.25	6	0.29	6	0.33

Additionally, a ditch analysis was completed leading to the crossroad culvert and along the swale leading to the detention pond. The software *FlowMaster* was used to determine the water depth in the 15-year, 20 min storm. Results for the ditch analysis' can be found in **Appendix F**.

Detention Analysis

Due to the post-development flows exceeding the pre-development runoff conditions, detention will be required for the site. On site storm water detention will be accomplished by the one (1) detention pond. Runoff will be conveyed to these ponds by way of overland flow and storm sewer utilized throughout the development.

Detention Pond 1A

To accomplish a reduction in runoff, a detention pond has been designed in the middle of the site and will collect stormwater from the Proposed Drainage Area 1A. The detention pond will be constructed with a 2-stage outlet control structure. The outlet control structure will contain a 6" diameter HDPE pipe connecting to a 5'x5' area inlet. The area inlet will have three (3) throats at 4' wide each with elevations at 507.00. A 12" diameter HDPE pipe will discharge from the three-sided detention structure to an existing ditch that flows to the east and into Sydney Creek. A pond summary can be found below.

Proposed Detention Pond 1A Outflow				
Storm Event	$Q_{(in)}$ (cfs)	$Q_{(out)}$ (cfs)	Volume (cf)	High Water Elevation
5-Year	17.80	4.40	12,482	507.16
10-Year	20.42	7.66	13,126	507.27
25-Year	24.56	10.81	14,091	507.45
50-Year	29.15	11.02	14,884	507.60
100-Year	32.58	11.24	16,422	507.88
*Area 1A flows into the pond				

Various conditions on the pond outlet have been analyzed to include a low-flow block condition and the analysis of the emergency overflow weir. To simulate the low-flow block, the 6" outlet structure has been turned off in the *Hydraflow* pond, leaving the three (4) four-foot-wide openings on the area inlet and the 12" HDPE pipe to drain the pond.

A 15' wide emergency overflow weir has been designed in case the entire outlet structure becomes blocked. For this simulation, all outflow structures have been turned off leaving the emergency overflow as the primary outlet structure. The top of the pond has been placed over 1' above this highwater elevation to ensure proposed site conditions remain under existing, even in emergency circumstances. The flows from both scenarios are provided in **Appendix E.5** with summary table below.

Proposed Detention Pond 1A - Alternate Outflow Conditions		
	Low-Flow Block	Emergency Overflow
	100-Year	100-Year
High Water Elevation	507.97	508.81
Storage Volume (cf)	16,899	22,381
Pond Outflow (cfs)	11.30	6.90

Drainage Area 1 Total Conditions

To find the total proposed flows for Drainage Area #1, a combined Hydrograph was set up to calculate the flows from Detention Pond 1A, and the flows from the undetained Area 1B.

Drainage Area 1 Total Conditions						
	Drainage Conditions	5-Year	10-Year	25-Year	50-Year	100-Year
1	Existing	20.47	23.47	29.61	33.51	37.44
1A	Detention Outflow	4.40	7.66	10.81	11.02	11.24
1B	Undetained	18.62	21.35	25.69	30.49	34.07
1	Total Proposed	19.84	22.63	27.05	31.88	35.52

Comparison of Existing versus Proposed Conditions

Comparing the overall combined runoff numbers from the pre-development (Existing Conditions) and the runoff numbers from the post-development (Proposed Conditions), calculations show that the amount of runoff is slightly reduced for all of the drainage areas. In the table shown below, the peak runoff numbers from existing conditions are compared to the proposed conditions.

Drainage Area Differentials						
		5-YR	10-YR	25-YR	50-YR	100-YR
Drainage Area 1	Existing (cfs)	20.47	23.47	29.61	33.51	37.44
	Proposed (cfs)	19.84	22.63	27.05	31.88	35.52
	Differential (cfs)	-0.63	-0.84	-2.56	-1.63	-1.92
	% Reduction	3.08%	3.58%	8.65%	4.86%	5.13%
Drainage Area 2	Existing (cfs)	3.73	4.28	5.40	6.11	6.83
	Proposed (cfs)	0.22	0.26	0.31	0.35	0.39
	Differential (cfs)	-3.51	-4.02	-5.09	-5.76	-6.44
	% Reduction	94.10%	93.93%	94.26%	94.27%	94.29%
Drainage Area 3	Existing (cfs)	0.17	0.20	0.25	0.29	0.33
	Proposed (cfs)	0.17	0.20	0.25	0.29	0.33
	Differential (cfs)	0.00	0.00	0.00	0.00	0.00
	% Reduction	0.00%	0.00%	0.00%	0.00%	0.00%

Storm Sewer Analysis

The proposed storm sewer system for Haven Hill Acres was analyzed and designed to accommodate the 25-year storm. Precipitation events larger in magnitude will cause the local system flooding and will rely on overland flow conveyance which is typical practice in urban areas. All storm sewer system modeling was completed using the Bentley StormCAD Select Series 4 software program by Bentley System Inc. Detailed reports are included in **Appendix D.**

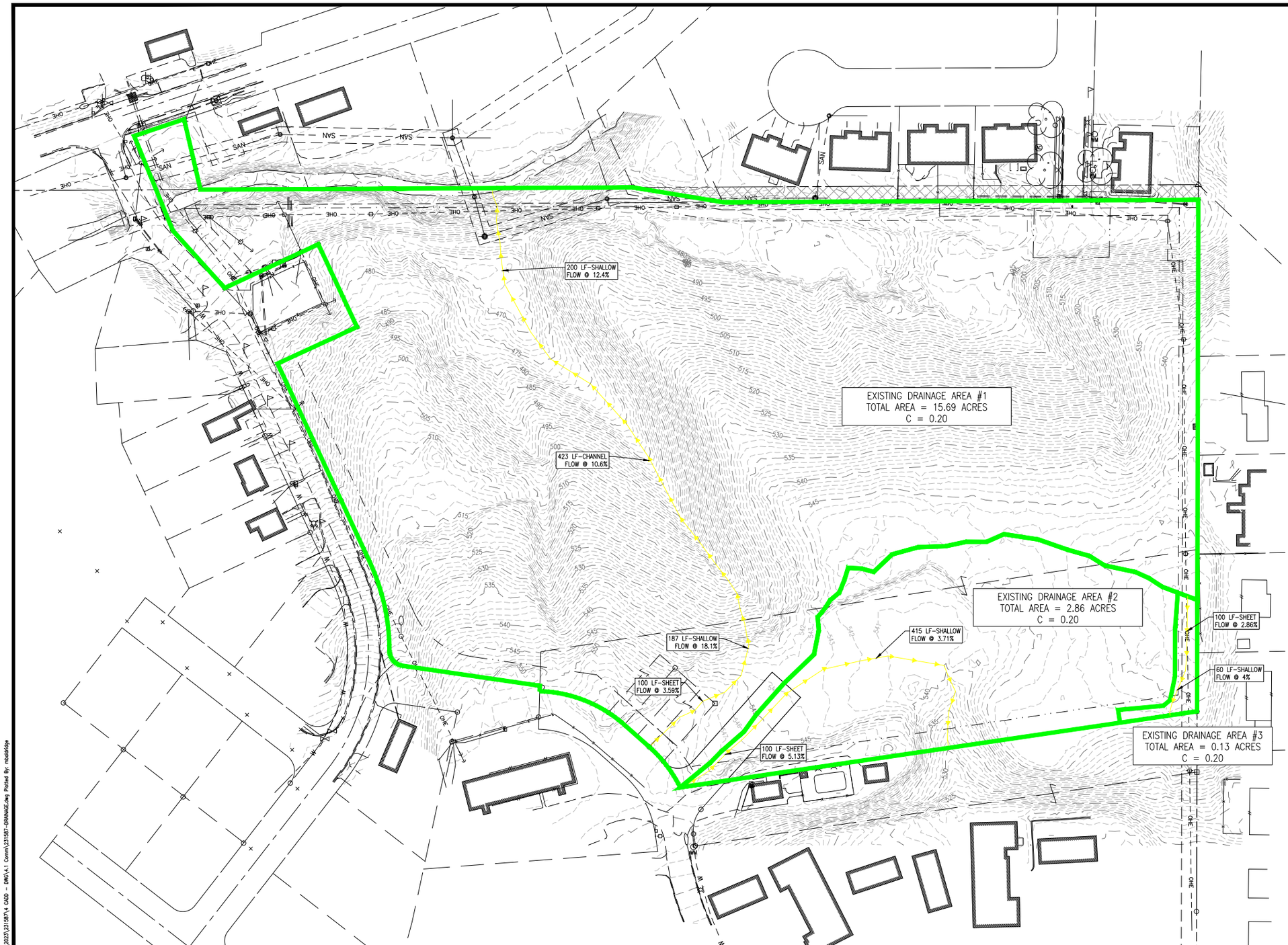
The onsite storm sewer system utilizes HPDE pipe throughout the site. Storm sewers will collect surface runoff from the buildings, grass areas, and roadways and convey the runoff to the various discharge points. A time of concentration of five (5) minutes has been used for all proposed inlets.

Various storm sewer inlets will be located around the site to include open throat inlets along the roadway and grated pavement inlets in the parking lot. Area inlets will be utilized in non-paved areas as well. All inlets and storm sewers are in conformance with the City of Collinsville and the Illinois Department of Transportation (IDOT) design requirements.

The storm sewer outlet design considers the effects of the 100-year high water elevations developed within the proposed detention pond. The 100-year elevations were placed on the proposed outfalls to account for the effects of this condition.

RR-4 rip-rap will be utilized at the outfall of the storm sewer to reduce erosion. The rip-rap length will be in conformance with the IDOT Drainage Manual. The rock size will be in conformance with the Natural Resources Conservation Service Code 910, found in the Illinois Urban Manual.

Appendix A: Drainage Area Maps



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231587

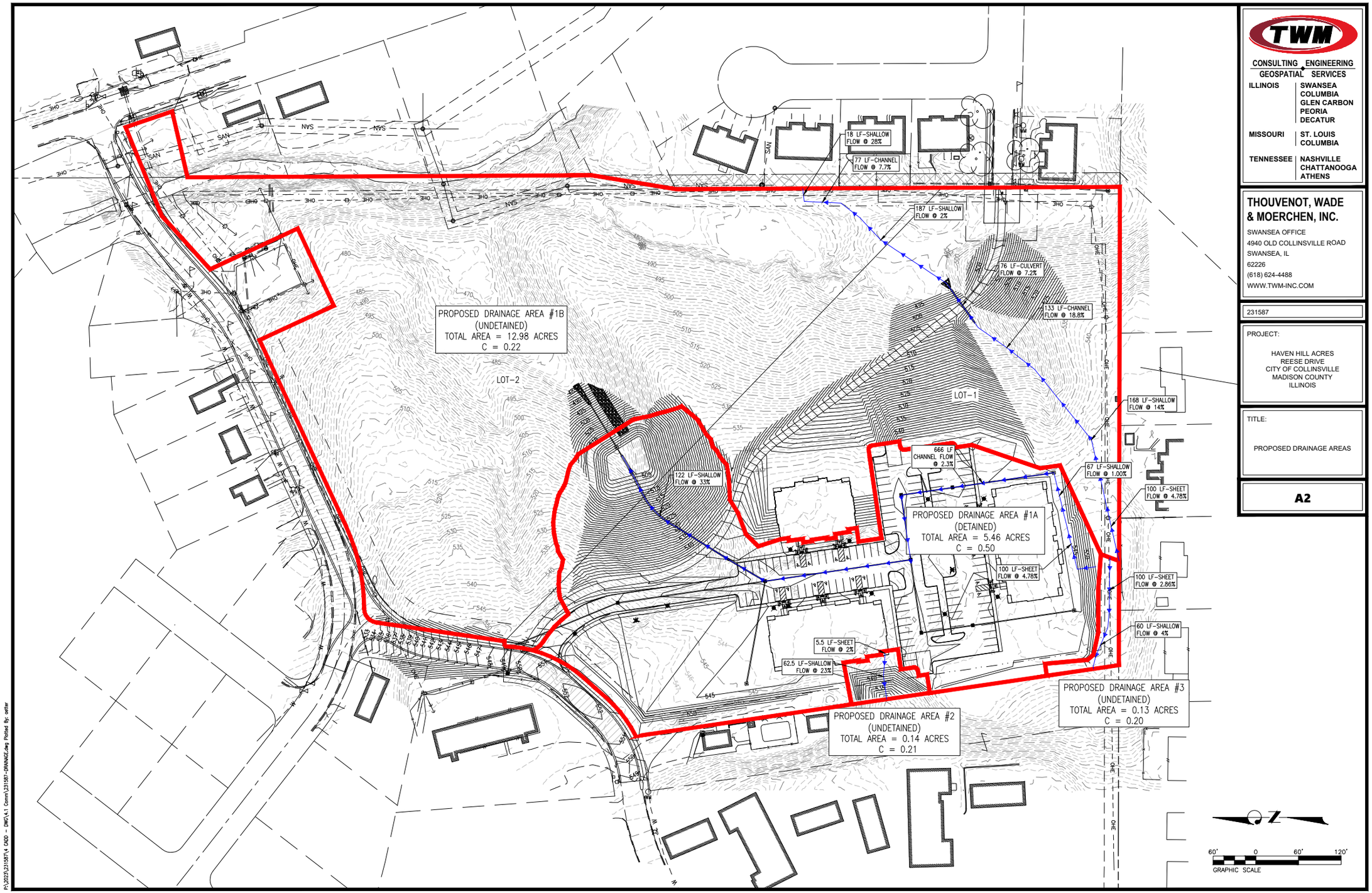
PROJECT:

HAVEN HILL ACRES
REESE DRIVE
CITY OF COLLINSVILLE
MADISON COUNTY
ILLINOIS

TITLE:

EXISTING DRAINAGE AREAS

A1



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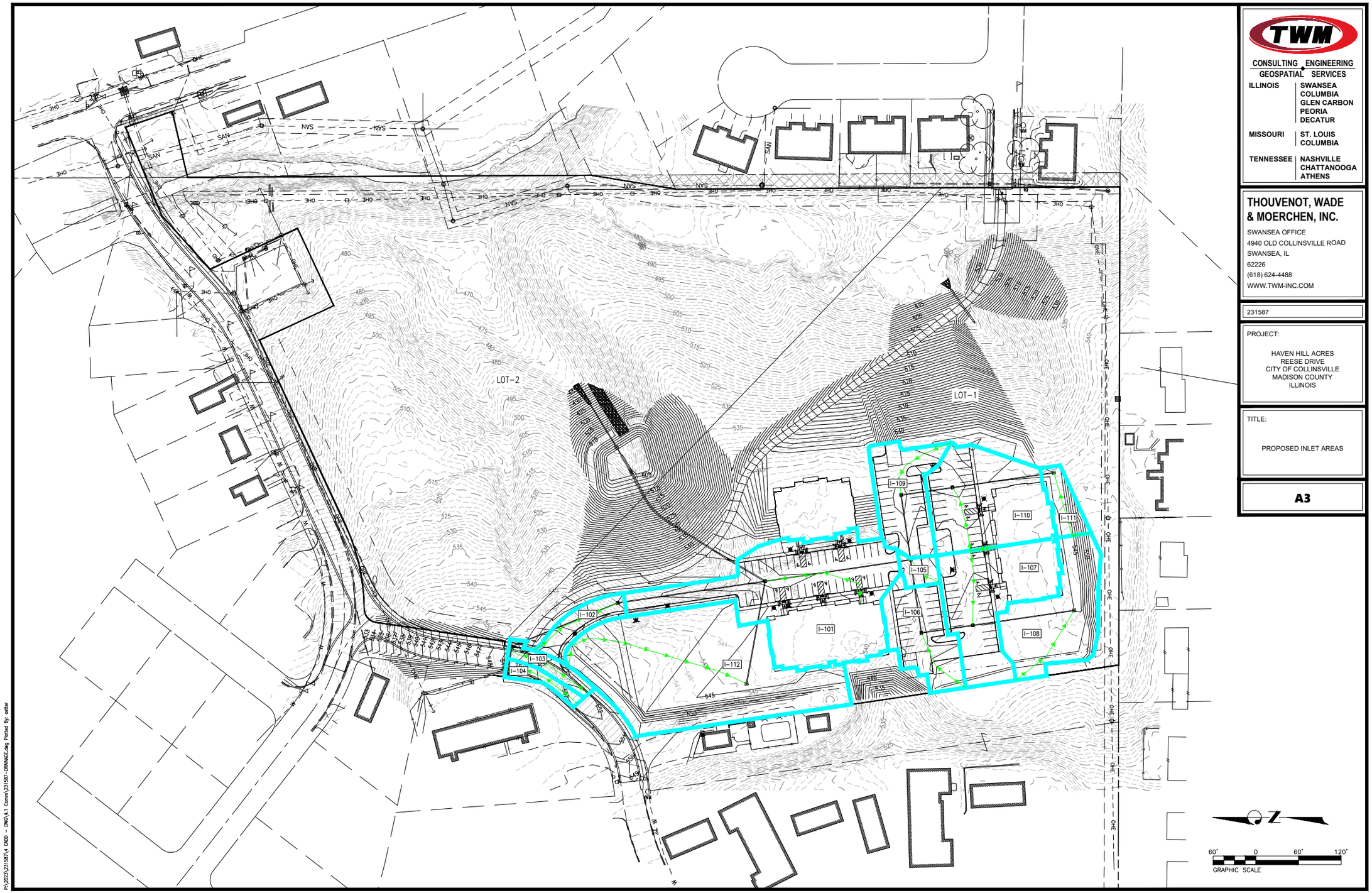
HAVEN HILL ACRES
REESE DRIVE
CITY OF COLLINSVILLE
MADISON COUNTY
ILLINOIS

TITLE:

PROPOSED DRAINAGE AREAS

A2



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ILLINOIS

TITLE:

PROPOSED INLET AREAS

A3

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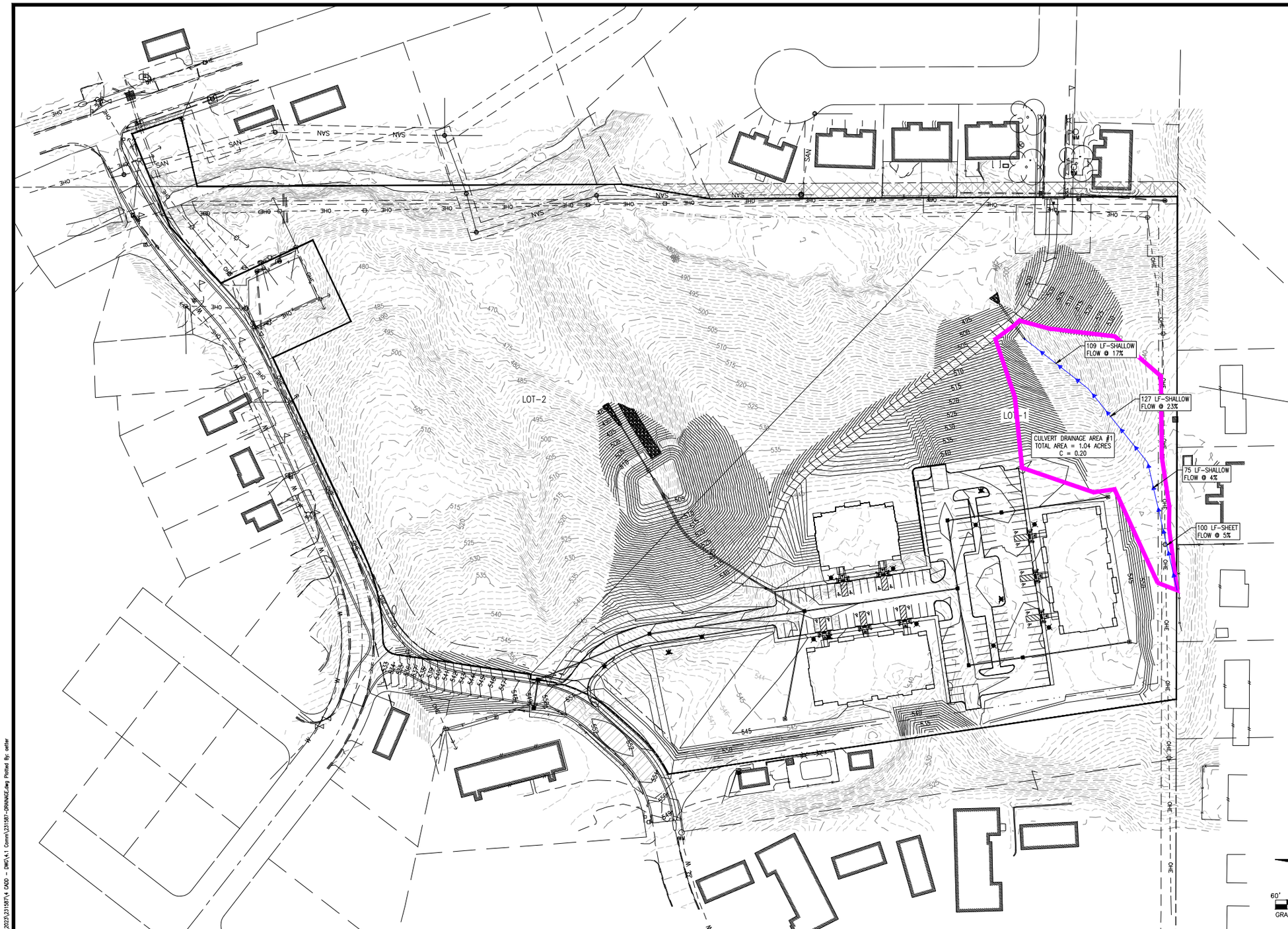

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TITLE:

PROPOSED CULVERT AREA

A4

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Appendix B: IDOT Time of Concentration Worksheets

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Existing Drainage Area #1

DESIGN STORM EVENT

5 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Wooded	0.20	15.686
Total On-Site Area		15.686
Composite On-Site Runoff Coefficient	0.20	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	15.69	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.20	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Wooded	100	0.2	7.01	0.0359		7
						7

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	187	0.18	6.86		0.5
Unpaved	200	0.12	5.68		0.5
					1

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
Wooded Channel	423	0.03	2888.000	396.000	0.106	60.76		0.1
								0.1

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	8

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Existing Drainage Area #1

DESIGN STORM EVENT

10 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Wooded	0.20	15.686
Total On-Site Area		15.686
Composite On-Site Runoff Coefficient	0.20	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	15.69	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.20	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Wooded	100	0.2	8.07	0.0359		7
						7

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	187	0.18	6.86		0.5
Unpaved	200	0.12	5.68		0.5
					1

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
Wooded Channel	423	0.03	2888.000	396.000	0.106	60.76		0.1
								0.1

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	8

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Existing Drainage Area #1

DESIGN STORM EVENT

25 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Wooded	0.20	15.686
Total On-Site Area		15.686
Composite On-Site Runoff Coefficient	0.20	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	15.69	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.20	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Wooded	100	0.2	9.94	0.0359		6
						6

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	187	0.18	6.86		0.5
Unpaved	200	0.12	5.68		0.5
					1

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
Wooded Channel	423	0.03	2888.000	396.000	0.106	60.76		0.1
								0.1

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	7

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Existing Drainage Area #1

DESIGN STORM EVENT

50 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Wooded	0.20	15.686
Total On-Site Area		15.686
Composite On-Site Runoff Coefficient	0.20	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	15.69	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.20	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Wooded	100	0.2	11.26	0.0359		6
						6

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	187	0.18	6.86		0.5
Unpaved	200	0.12	5.68		0.5
					1

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
Wooded Channel	423	0.03	2888.000	396.000	0.106	60.76		0.1
								0.1

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	7

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Existing Drainage Area #1

DESIGN STORM EVENT

100 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Wooded	0.20	15.686
Total On-Site Area		15.686
Composite On-Site Runoff Coefficient	0.20	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	15.69	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.20	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Wooded	100	0.2	12.56	0.0359		6
						6

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	187	0.18	6.86		0.5
Unpaved	200	0.12	5.68		0.5
					1

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
Wooded Channel	423	0.03	2888.000	396.000	0.106	60.76		0.1
								0.1

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	7

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/21/2025

DESCRIPTION OF DRAINAGE AREA

Existing Drainage Area #2

DESIGN STORM EVENT

5 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Wooded	0.20	2.863
Total On-Site Area		2.863
Composite On-Site Runoff Coefficient	0.20	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	2.86	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.20	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Wooded	100	0.2	7.20	0.0513		6
						6

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	415	0.04	3.11		2.2
					2.2

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
								0

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	8

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/21/2025

DESCRIPTION OF DRAINAGE AREA

Existing Drainage Area #2

DESIGN STORM EVENT

10 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Wooded	0.20	2.863
Total On-Site Area		2.863
Composite On-Site Runoff Coefficient	0.20	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	2.86	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.20	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Wooded	100	0.2	8.28	0.0513		6
						6

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	415	0.04	3.11		2.2
					2.2

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
								0

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	8

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/21/2025

DESCRIPTION OF DRAINAGE AREA

Existing Drainage Area #2

DESIGN STORM EVENT

25 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Wooded	0.20	2.863
Total On-Site Area		2.863
Composite On-Site Runoff Coefficient	0.20	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	2.86	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.20	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Wooded	100	0.2	10.21	0.0513		5
						5

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	415	0.04	3.11		2.2
					2.2

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
								0

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	7

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/21/2025

DESCRIPTION OF DRAINAGE AREA

Existing Drainage Area #2

DESIGN STORM EVENT

50 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Wooded	0.20	2.863
Total On-Site Area		2.863
Composite On-Site Runoff Coefficient	0.20	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	2.86	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.20	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Wooded	100	0.2	11.56	0.0513		5
						5

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	415	0.04	3.11		2.2
					2.2

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
								0

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	7

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/21/2025

DESCRIPTION OF DRAINAGE AREA

Existing Drainage Area #2

DESIGN STORM EVENT

100 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Wooded	0.20	2.863
Total On-Site Area		2.863
Composite On-Site Runoff Coefficient	0.20	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	2.86	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.20	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Wooded	100	0.2	12.90	0.0513		5
						5

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	415	0.04	3.11		2.2
					2.2

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
								0

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	7

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/21/2025

DESCRIPTION OF DRAINAGE AREA

Existing Drainage Area #3

DESIGN STORM EVENT: 5 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Wooded	0.20	0.131
Total On-Site Area		0.131
Composite On-Site Runoff Coefficient	0.20	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	0.13	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.20	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Lawn	100	0.2	7.01	0.0286		8
						8

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	60.6	0.04	3.23		0.3
					0.3

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
								0

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN): 8

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/21/2025

DESCRIPTION OF DRAINAGE AREA

Existing Drainage Area #3

DESIGN STORM EVENT

10 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Wooded	0.20	0.131
Total On-Site Area		0.131
Composite On-Site Runoff Coefficient	0.20	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	0.13	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.20	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Lawn	100	0.2	8.07	0.0286		7
						7

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	60.6	0.04	3.23		0.3
					0.3

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
								0

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	7

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/21/2025

DESCRIPTION OF DRAINAGE AREA

Existing Drainage Area #3

DESIGN STORM EVENT

25 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Wooded	0.20	0.131
Total On-Site Area		0.131
Composite On-Site Runoff Coefficient	0.20	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	0.13	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.20	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Lawn	100	0.2	9.66	0.0286		7
						7

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	60.6	0.04	3.23		0.3
					0.3

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
								0

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	7

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/21/2025

DESCRIPTION OF DRAINAGE AREA

Existing Drainage Area #3

DESIGN STORM EVENT

50 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Wooded	0.20	0.131
Total On-Site Area		0.131
Composite On-Site Runoff Coefficient	0.20	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	0.13	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.20	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Lawn	100	0.2	11.26	0.0286		6
						6

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	60.6	0.04	3.23		0.3
					0.3

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
								0

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	6

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/21/2025

DESCRIPTION OF DRAINAGE AREA

Existing Drainage Area #3

DESIGN STORM EVENT

100 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Wooded	0.20	0.131
Total On-Site Area		0.131
Composite On-Site Runoff Coefficient	0.20	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	0.13	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.20	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Lawn	100	0.2	12.56	0.0286		6
						6

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	60.6	0.04	3.23		0.3
					0.3

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
								0

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	6

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Proposed Drainage Area #1A (Detained)

DESIGN STORM EVENT

5 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Bike Trail	0.90	0.067
Buildings	0.90	0.781
Pavement	0.90	1.277
Concrete Sidewalk/Patio	0.90	0.187
Lawn/Wooded	0.20	3.144
Total On-Site Area		5.456
Composite On-Site Runoff Coefficient	0.50	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	5.46	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.50	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Lawn	100	0.2	7.40	0.0875		5
						5

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	67	0.01	1.63		0.7
Paved	122	0.33	11.68		1.2
					1.9

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
18" RCP	666	0.013	1.767	4.712	0.023	9.03		1.2
								1.2

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	8

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Proposed Drainage Area #1A (Detained)

DESIGN STORM EVENT

10 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Bike Trail	0.90	0.067
Buildings	0.90	0.781
Pavement	0.90	1.277
Concrete Sidewalk/Patio	0.90	0.187
Lawn/Wooded	0.20	3.144
Total On-Site Area		5.456
Composite On-Site Runoff Coefficient	0.50	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	5.46	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.50	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Lawn	100	0.2	8.49	0.0875		5
						5

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	67	0.01	1.63		0.7
Paved	122	0.33	11.68		1.2
					1.9

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
18" RCP	666	0.013	1.767	4.712	0.023	9.03		1.2
								1.2

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	8

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Proposed Drainage Area #1A (Detained)

DESIGN STORM EVENT

25 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Bike Trail	0.90	0.067
Buildings	0.90	0.781
Pavement	0.90	1.277
Concrete Sidewalk/Patio	0.90	0.187
Lawn/Wooded	0.20	3.144
Total On-Site Area		5.456
Composite On-Site Runoff Coefficient	0.50	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	5.46	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.50	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Lawn	100	0.2	10.21	0.0875		5
						5

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	67	0.01	1.63		0.7
Paved	122	0.33	11.68		1.2
					1.9

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
18" RCP	666	0.013	1.767	4.712	0.023	9.03		1.2
								1.2

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	8

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Proposed Drainage Area #1A (Detained)

DESIGN STORM EVENT

50 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Bike Trail	0.90	0.067
Buildings	0.90	0.781
Pavement	0.90	1.277
Concrete Sidewalk/Patio	0.90	0.187
Lawn/Wooded	0.20	3.144
Total On-Site Area		5.456
Composite On-Site Runoff Coefficient	0.50	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	5.46	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.50	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Lawn	100	0.2	11.87	0.0875		4
						4

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	67	0.01	1.63		0.7
Paved	122	0.33	11.68		1.2
					1.9

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
18" RCP	666	0.013	1.767	4.712	0.023	9.03		1.2
								1.2

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	7

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Proposed Drainage Area #1A (Detained)

DESIGN STORM EVENT

100 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Bike Trail	0.90	0.067
Buildings	0.90	0.781
Pavement	0.90	1.277
Concrete Sidewalk/Patio	0.90	0.187
Lawn/Wooded	0.20	3.144
Total On-Site Area		5.456
Composite On-Site Runoff Coefficient	0.50	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	5.46	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.50	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Lawn	100	0.2	13.25	0.0875		4
						4

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	67	0.01	1.63		0.7
Paved	122	0.33	11.68		1.2
					1.9

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
18" RCP	666	0.013	1.767	4.712	0.023	9.03		1.2
								1.2

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	7

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Proposed Drainage Area #1B (Undetained)

DESIGN STORM EVENT

5 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Bike Trail	0.90	0.142
Concrete Patio	0.90	0.006
Building	0.90	0.192
Roadway	0.90	0.026
Lawn/Wooded	0.20	12.615
Total On-Site Area		12.980
Composite On-Site Runoff Coefficient	0.22	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	12.98	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.22	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Lawn	100	0.2	7.20	0.0478		6
						6

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	168	0.14	6.13		0.5
Unpaved	187	0.02	2.36		0.5
Unpaved	18	0.28	8.50		0
					1

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
Wooded Channel	133	0.3	8600.000	485.000	0.188	14.60		0.2
Culvert	77	0.013	0.785	3.140	0.072	12.18		0.1
Wooded Channel	52	0.3	1036.000	136.000	0.077	5.32		0.2
								0.5

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN) 8

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Proposed Drainage Area #1B (Undetained)

DESIGN STORM EVENT

10 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Bike Trail	0.90	0.142
Concrete Patio	0.90	0.006
Building	0.90	0.192
Roadway	0.90	0.026
Lawn/Wooded	0.20	12.615
Total On-Site Area		12.980
Composite On-Site Runoff Coefficient	0.22	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	12.98	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.22	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Lawn	100	0.2	8.28	0.0478		6
						6

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	168	0.14	6.13		0.5
Unpaved	187	0.02	2.36		0.5
Unpaved	18	0.28	8.50		0
					1

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
Wooded Channel	133	0.3	8600.000	485.000	0.188	14.60		0.2
Culvert	77	0.013	0.785	3.140	0.072	12.18		0.1
Wooded Channel	52	0.3	1036.000	136.000	0.077	5.32		0.2
								0.5

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN) 8

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Proposed Drainage Area #1B (Undetained)

DESIGN STORM EVENT

25 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Bike Trail	0.90	0.142
Concrete Patio	0.90	0.006
Building	0.90	0.192
Roadway	0.90	0.026
Lawn/Wooded	0.20	12.615
Total On-Site Area		12.980
Composite On-Site Runoff Coefficient	0.22	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	12.98	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.22	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Lawn	100	0.2	9.94	0.0478		6
						6

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	168	0.14	6.13		0.5
Unpaved	187	0.02	2.36		0.5
Unpaved	18	0.28	8.50		0
					1

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
Wooded Channel	133	0.3	8600.000	485.000	0.188	14.60		0.2
Culvert	77	0.013	0.785	3.140	0.072	12.18		0.1
Wooded Channel	52	0.3	1036.000	136.000	0.077	5.32		0.2
								0.5

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN) 8

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Proposed Drainage Area #1B (Undetained)

DESIGN STORM EVENT

50 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Bike Trail	0.90	0.142
Concrete Patio	0.90	0.006
Building	0.90	0.192
Roadway	0.90	0.026
Lawn/Wooded	0.20	12.615
Total On-Site Area		12.980
Composite On-Site Runoff Coefficient	0.22	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	12.98	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.22	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Lawn	100	0.2	11.56	0.0478		5
						5

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	168	0.14	6.13		0.5
Unpaved	187	0.02	2.36		0.5
Unpaved	18	0.28	8.50		0
					1

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
Wooded Channel	133	0.3	8600.000	485.000	0.188	14.60		0.2
Culvert	77	0.013	0.785	3.140	0.072	12.18		0.1
Wooded Channel	52	0.3	1036.000	136.000	0.077	5.32		0.2
								0.5

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN) 7

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Proposed Drainage Area #1B (Undetained)

DESIGN STORM EVENT

100 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Bike Trail	0.90	0.142
Concrete Patio	0.90	0.006
Building	0.90	0.192
Roadway	0.90	0.026
Lawn/Wooded	0.20	12.615
Total On-Site Area		12.980
Composite On-Site Runoff Coefficient	0.22	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	12.98	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.22	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Lawn	100	0.2	12.90	0.0478		5
						5

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	168	0.14	6.13		0.5
Unpaved	187	0.02	2.36		0.5
Unpaved	18	0.28	8.50		0
					1

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
Wooded Channel	133	0.3	8600.000	485.000	0.188	14.60		0.2
Culvert	77	0.013	0.785	3.140	0.072	12.18		0.1
Wooded Channel	52	0.3	1036.000	136.000	0.077	5.32		0.2
								0.5

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN) 7

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Proposed Drainage Area #2 (Undetained)

DESIGN STORM EVENT

5 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Lawn/Wooded	0.20	0.138
Concrete Patio	0.90	0.001
Total On-Site Area		0.139
Composite On-Site Runoff Coefficient	0.21	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	0.14	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.21	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Wooded	5.5	0.2	7.59	0.02		1
						1

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	62.5	0.23	7.77		0.1
					0.1

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
								0

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	5

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Proposed Drainage Area #2 (Undetained)

DESIGN STORM EVENT

10 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Lawn/Wooded	0.20	0.138
Concrete Patio	0.90	0.001
Total On-Site Area		0.139
Composite On-Site Runoff Coefficient	0.21	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	0.14	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.21	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Wooded	5.5	0.2	8.69	0.02		1
						1

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	62.5	0.23	7.77		0.1
					0.1

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
								0

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	5

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Proposed Drainage Area #2 (Undetained)

DESIGN STORM EVENT

25 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Lawn/Wooded	0.20	0.138
Concrete Patio	0.90	0.001
Total On-Site Area		0.139
Composite On-Site Runoff Coefficient	0.21	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	0.14	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.21	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Wooded	5.5	0.2	10.49	0.02		1
						1

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	62.5	0.23	7.77		0.1
					0.1

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
								0

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	5

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Proposed Drainage Area #2 (Undetained)

DESIGN STORM EVENT

50 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Lawn/Wooded	0.20	0.138
Concrete Patio	0.90	0.001
Total On-Site Area		0.139
Composite On-Site Runoff Coefficient	0.21	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	0.14	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.21	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Wooded	5.5	0.2	11.87	0.02		1
						1

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	62.5	0.23	7.77		0.1
					0.1

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
								0

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	5

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Proposed Drainage Area #2 (Undetained)

DESIGN STORM EVENT

100 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Lawn/Wooded	0.20	0.138
Concrete Patio	0.90	0.001
Total On-Site Area		0.139
Composite On-Site Runoff Coefficient	0.21	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	0.14	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.21	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Wooded	5.5	0.2	13.25	0.02		1
						1

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	62.5	0.23	7.77		0.1
					0.1

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
								0

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	5

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Proposed Drainage Area #3 (Undetained)

DESIGN STORM EVENT

5 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Lawn/Wooded	0.20	0.131
Total On-Site Area		0.131
Composite On-Site Runoff Coefficient	0.20	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	0.13	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.20	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Lawn	100	0.2	6.82	0.0286		8
						8

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	60.6	0.04	3.23		0.3
					0.3

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
								0

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	8

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Proposed Drainage Area #3 (Undetained)

DESIGN STORM EVENT

10 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Lawn/Wooded	0.20	0.131
Total On-Site Area		0.131
Composite On-Site Runoff Coefficient	0.20	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	0.13	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.20	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Lawn	100	0.2	8.07	0.0286		7
						7

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	60.6	0.04	3.23		0.3
					0.3

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
								0

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	7

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Proposed Drainage Area #3 (Undetained)

DESIGN STORM EVENT

25 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Lawn/Wooded	0.20	0.131
Total On-Site Area		0.131
Composite On-Site Runoff Coefficient	0.20	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	0.13	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.20	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Lawn	100	0.2	9.94	0.0286		7
						7

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	60.6	0.04	3.23		0.3
					0.3

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
								0

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	7

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Proposed Drainage Area #3 (Undetained)

DESIGN STORM EVENT

50 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Lawn/Wooded	0.20	0.131
Total On-Site Area		0.131
Composite On-Site Runoff Coefficient	0.20	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	0.13	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.20	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Lawn	100	0.2	11.26	0.0286		6
						6

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	60.6	0.04	3.23		0.3
					0.3

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
								0

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	6

IDOT RATIONAL METHOD DRAINAGE ANALYSIS

Project Name:	Haven Hill Acres
Project Number:	231587
Engineer:	MGB
Date of Analysis:	11/20/2025

DESCRIPTION OF DRAINAGE AREA

Proposed Drainage Area #3 (Undetained)

DESIGN STORM EVENT

100 Year

TRIBUTARY LAND USAGE AND IDOT RUNOFF COEFFICIENTS

Tributary Land Usage (On-Site)	Runoff Coefficients	Drainage Area (acres)
Lawn/Wooded	0.20	0.131
Total On-Site Area		0.131
Composite On-Site Runoff Coefficient	0.20	

Tributary Land Usage (Off-Site)	Runoff Coefficients	Drainage Area (acres)
Total Off-Site Area		0.000
Composite Off-Site Runoff Coefficient	0.00	

TOTAL TRIBUTARY DRAINAGE AREA (ON-SITE & OFF-SITE)	0.13	acres
TOTAL COMPOSITE RUNOFF C (ON-SITE & OFF-SITE)	0.20	C

TIME OF CONCENTRATION CALCULATIONS

Overland Flow (by Kinematic Wave Equation - Section 4-102 IDOT Drainage Manual)

Description of Flow Surface	Length (ft) Max.=100'	Manning's Coefficient	Rainfall Intensity (in/hr)	Slope (ft/ft)		Overland Time (min)
Lawn	100	0.2	12.56	0.0286		6
						6

Shallow Concentrated Flow

Paved/ Unpaved?	Length (ft)	Slope (ft/ft)	Velocity (ft/s)		Time (min)
Unpaved	60.6	0.04	3.23		0.3
					0.3

Gutter Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Slope (ft/ft)	Longitudinal Slope (ft/ft)	Width of Flow Spread (ft)	Q_{flow} (cfs)	Flow Area (sf)	Velocity (ft/s)	Time (min)
									0

Channel Flow

Description of Channel Surface	Length (ft)	Manning's Coefficient	Cross Sectional Area (sf)	Wetted Perimeter	Longitudinal Slope (ft/ft)	Velocity (ft/s)		Time (min)
								0

Other Flow Times

Description	Time (min)		Time (min)
			0

TOTAL TIME OF CONCENTRATION (MIN)	6

Appendix C: Inlet Area Calculations

C_{pvmt} =	0.90
C_{bldg} =	0.90
C_{lawn} =	0.20

Inlet	A_{total} (sf)	A_{pvmt} (sf)	A_{bldg} (sf)	A_{lawn} (sf)
I-101	39592	21454	12837	5301
I-102	4652	4235	0	417
I-103	3128	2934	0	194
I-104	2172	1789	0	383
I-105	2171	1330	0	841
I-106	12155	8033	0	4122
I-107	21089	9802	6419	4868
I-108	17577	188.5	0	17388.5
I-109	12164	9635	0	2529
I-110	21535	8937	6419	6179
I-111	3823	60.5	0	3762.5
I-112	46776	188.5	0	46587.5

Inlet	A (ac.)	C_{comp}	$t_{c,\ 25\text{-}yr}$ (min)
I-101	0.909	0.806	5
I-102	0.107	0.837	5
I-103	0.072	0.857	5
I-104	0.050	0.777	5
I-105	0.050	0.629	5
I-106	0.279	0.663	5
I-107	0.484	0.738	5
I-108	0.404	0.208	5
I-109	0.279	0.754	5
I-110	0.494	0.699	5
I-111	0.088	0.211	5
I-112	1.074	0.203	5

Appendix D: StormCAD Storm Sewer Analysis Results

FlexTable: Catch Basin Table

Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Inlet Type	Capture Efficiency (Calculated) (%)	Flow (Captured) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)
I-101	543.61	543.61	535.00	Full Capture	100.0	7.94	538.04	538.04
I-104	549.99	549.99	545.24	Full Capture	100.0	0.42	545.51	545.51
I-102	546.98	546.98	542.88	Full Capture	100.0	1.01	543.49	543.49
I-112	544.00	544.00	540.00	Full Capture	100.0	2.33	540.65	540.65
I-105	544.70	544.70	536.75	Full Capture	100.0	0.34	541.08	541.08
I-106	543.05	543.05	538.75	Full Capture	100.0	2.01	542.16	542.16
I-107	544.18	544.18	539.50	Full Capture	100.0	3.87	542.54	542.54
I-108	544.34	544.34	540.78	Full Capture	100.0	0.91	542.63	542.63
I-109	542.75	542.75	538.35	Full Capture	100.0	2.29	542.75	542.75
I-110	543.06	543.06	539.50	Full Capture	100.0	3.73	543.06	543.06
I-111	544.00	544.00	541.50	Full Capture	100.0	0.21	543.06	543.06
I-103	549.58	549.58	544.81	Full Capture	100.0	0.67	545.25	545.25

FlexTable: Catchment Table

Label	Outflow Element	Area (User Defined) (acres)	Runoff Coefficient (Rational)	Time of Concentration (min)	Flow (Total Out) (cfs)
CM-104	I-104	0.050	0.780	5.000	0.42
CM-102	I-102	0.110	0.840	5.000	1.01
CM-112	I-112	1.070	0.200	5.000	2.33
CM-101	I-101	0.900	0.810	5.000	7.94
CM-106	I-106	0.280	0.660	5.000	2.01
CM-105	I-105	0.050	0.630	5.000	0.34
CM-109	I-109	0.280	0.750	5.000	2.29
CM-107	I-107	0.480	0.740	5.000	3.87
CM-110	I-110	0.700	0.490	5.000	3.73
CM-108	I-108	0.400	0.210	5.000	0.91
CM-111	I-111	0.090	0.210	5.000	0.21
CM-103	I-103	0.072	0.860	5.000	0.67

FlexTable: Conduit Table

Start Node	Stop Node	Flow (cfs)	Invert (Start) (ft)	Invert (Stop) (ft)
I-102	I-101	2.04	542.88	535.25
I-112	I-101	2.33	540.00	535.25
I-107	I-106	4.41	539.50	538.85
I-106	I-105	6.19	538.75	536.85
I-105	I-101	9.90	536.75	535.00
I-108	I-107	0.91	540.78	539.60
I-111	I-110	0.21	541.50	539.60
I-110	I-109	2.95	539.50	538.45
I-109	I-105	4.64	538.35	536.85
I-104	I-103	0.42	545.24	544.91
I-103	I-102	1.09	544.81	542.98
I-101	S3 BARRACUDA	18.92	535.00	532.51
S3 BARRACUDA	O-100	18.91	532.51	529.00

Length (Scaled) (ft)	Slope (Calculated) (%)	Diameter (in)	Velocity (ft/s)	Headloss (ft)	Capacity (Design) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Flow / Capacity (Design) (%)
209.6	3.640	12.0	7.57	5.45	7.24	543.49	538.04	28.1
146.5	3.243	12.0	7.52	2.61	6.84	540.65	538.04	34.1
73.0	0.890	15.0	3.60	0.38	6.50	542.54	542.16	67.9
104.0	1.827	15.0	5.04	1.07	9.31	542.16	541.08	66.5
207.0	0.845	18.0	5.60	3.04	10.29	541.08	538.04	96.2
144.2	0.818	12.0	1.16	0.10	3.43	542.63	542.54	26.6
144.2	1.318	12.0	0.26	0.00	4.36	543.06	543.06	4.7
73.0	1.438	12.0	3.76	0.84	4.55	543.59	542.75	64.9
91.9	1.632	12.0	5.90	2.59	4.85	543.67	541.08	95.6
38.0	0.868	12.0	2.90	0.26	3.54	545.51	545.25	12.0
161.2	1.135	12.0	4.17	1.76	4.05	545.25	543.49	26.9
60.0	4.151	18.0	10.71	3.14	22.81	538.04	534.90	83.0
84.6	4.148	18.0	13.67	4.42	22.80	534.90	530.48	82.9

FlexTable: Manhole Table

Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Flow (Total Out) (cfs)	Depth (Out) (ft)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)
S3 BARRACUDA	544.00	544.00	532.51	18.91	2.39	534.90	534.90

FlexTable: Outfall Table

ID	Label	Elevation (Invert) (ft)	Elevation (User Defined Tailwater) (ft)	Hydraulic Grade (ft)	Flow (Total Out) (cfs)
80	O-100	529.00		530.48	18.90

Appendix E.1: 5-Year Hydraflow Hydrographs Calculations

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

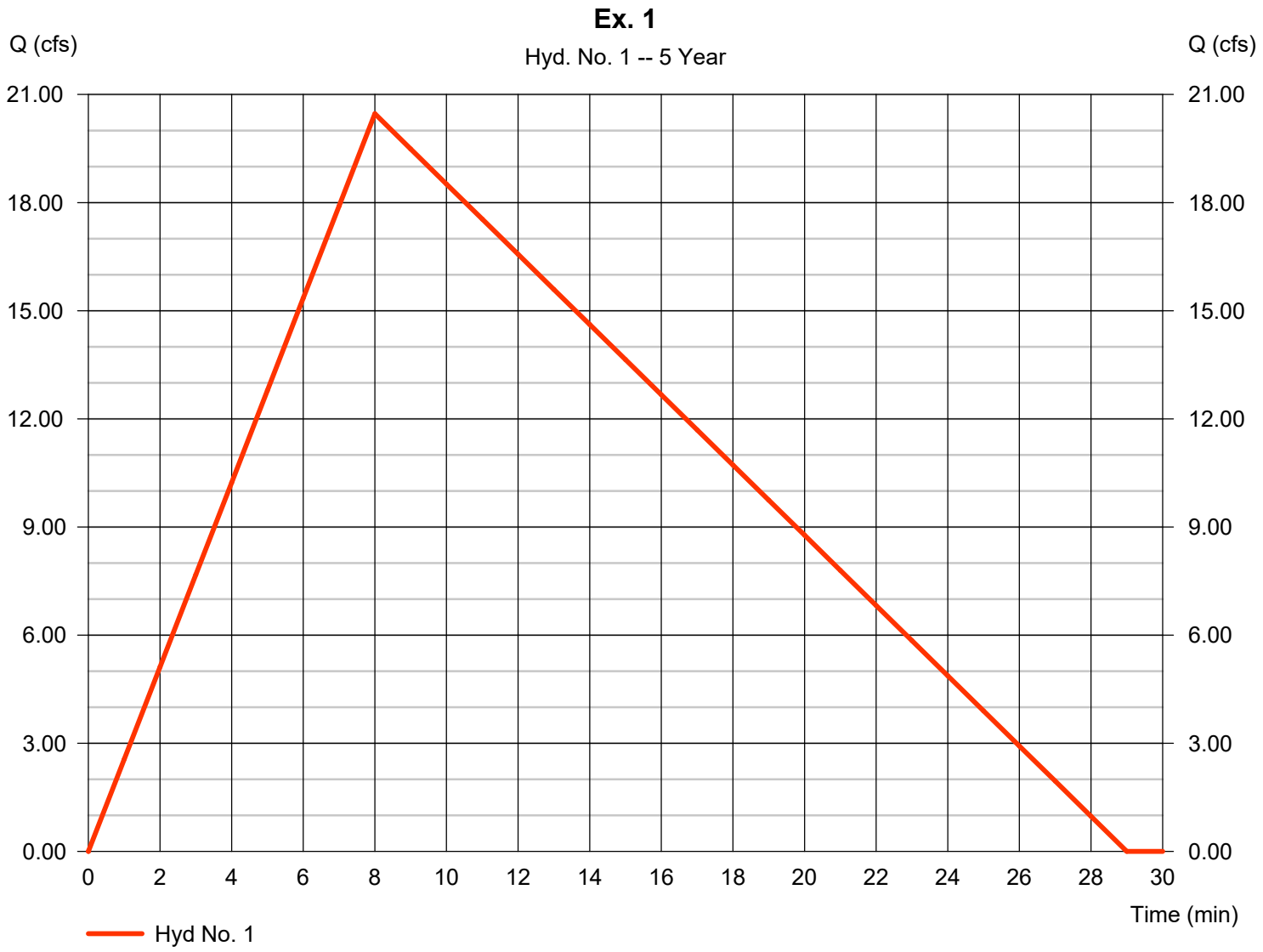
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	20.47	1	8	18,026	------	------	------	Ex. 1
2	Rational	3.730	1	8	3,286	------	------	------	Ex. 2
3	Rational	0.170	1	8	149	------	------	------	Ex. 3
5	Rational	17.80	1	8	15,682	------	------	------	Prop. 1A (Detained)
6	Rational	18.62	1	8	16,403	------	------	------	Prop. 1B
7	Rational	0.223	1	5	123	------	------	------	Prop. 2
8	Rational	0.170	1	8	149	------	------	------	Prop. 3
10	Reservoir	4.395	1	24	15,486	5	507.16	12,482	1A through Pond
11	Combine	19.84	1	8	31,688	6, 10	------	------	Prop. 1 Combined

Hydrograph Report

Hyd. No. 1

Ex. 1

Hydrograph type	=	Rational	Peak discharge	=	20.47 cfs
Storm frequency	=	5 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	18,026 cuft
Drainage area	=	15.690 ac	Runoff coeff.	=	0.2
Intensity	=	6.522 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67



Hydrograph Report

Hyd. No. 2

Ex. 2

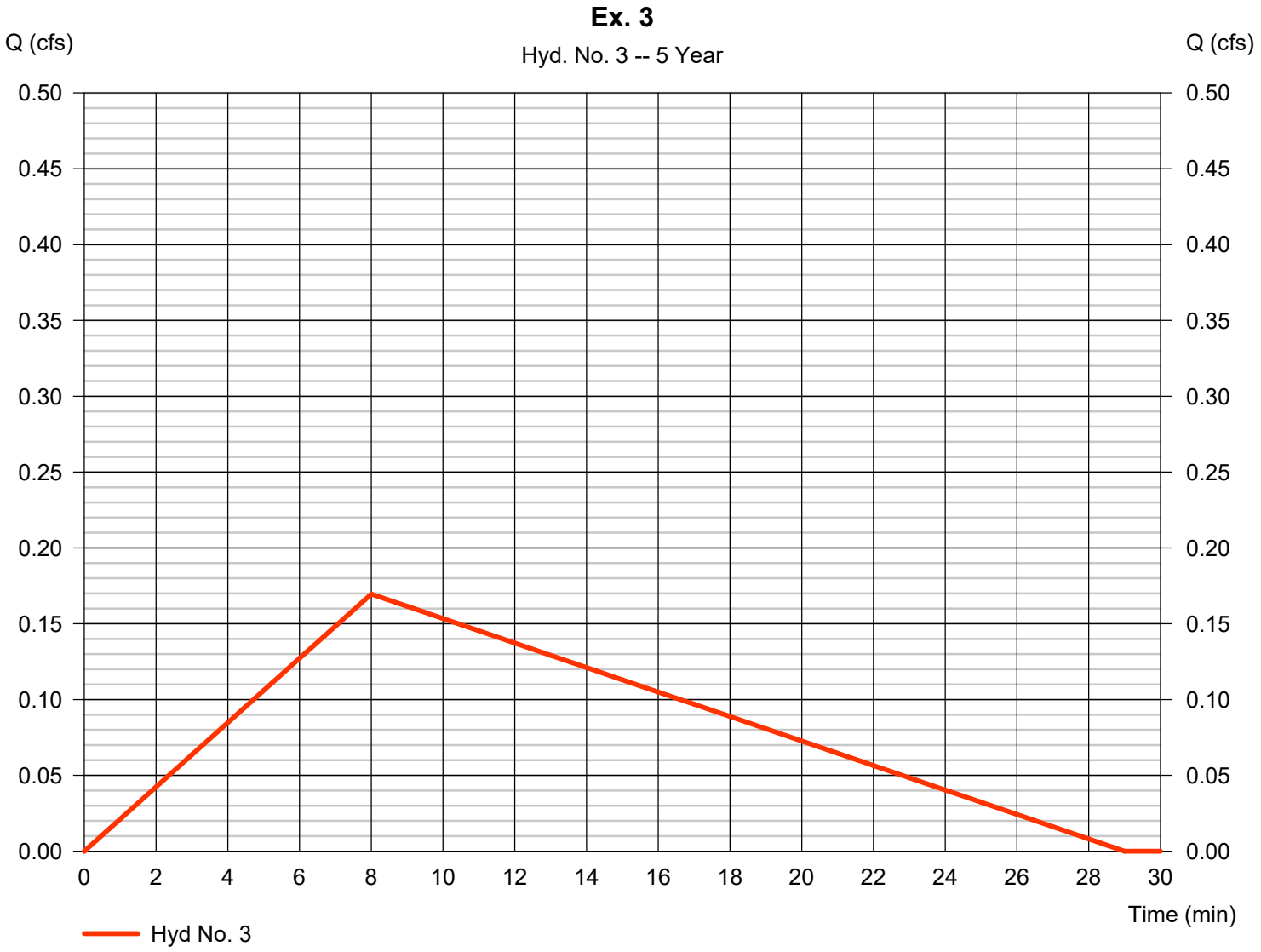
Hydrograph type	=	Rational	Peak discharge	=	3.730 cfs
Storm frequency	=	5 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	3,286 cuft
Drainage area	=	2.860 ac	Runoff coeff.	=	0.2
Intensity	=	6.522 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

Hydrograph Report

Hyd. No. 3

Ex. 3

Hydrograph type	=	Rational	Peak discharge	=	0.170 cfs
Storm frequency	=	5 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	149 cuft
Drainage area	=	0.130 ac	Runoff coeff.	=	0.2
Intensity	=	6.522 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

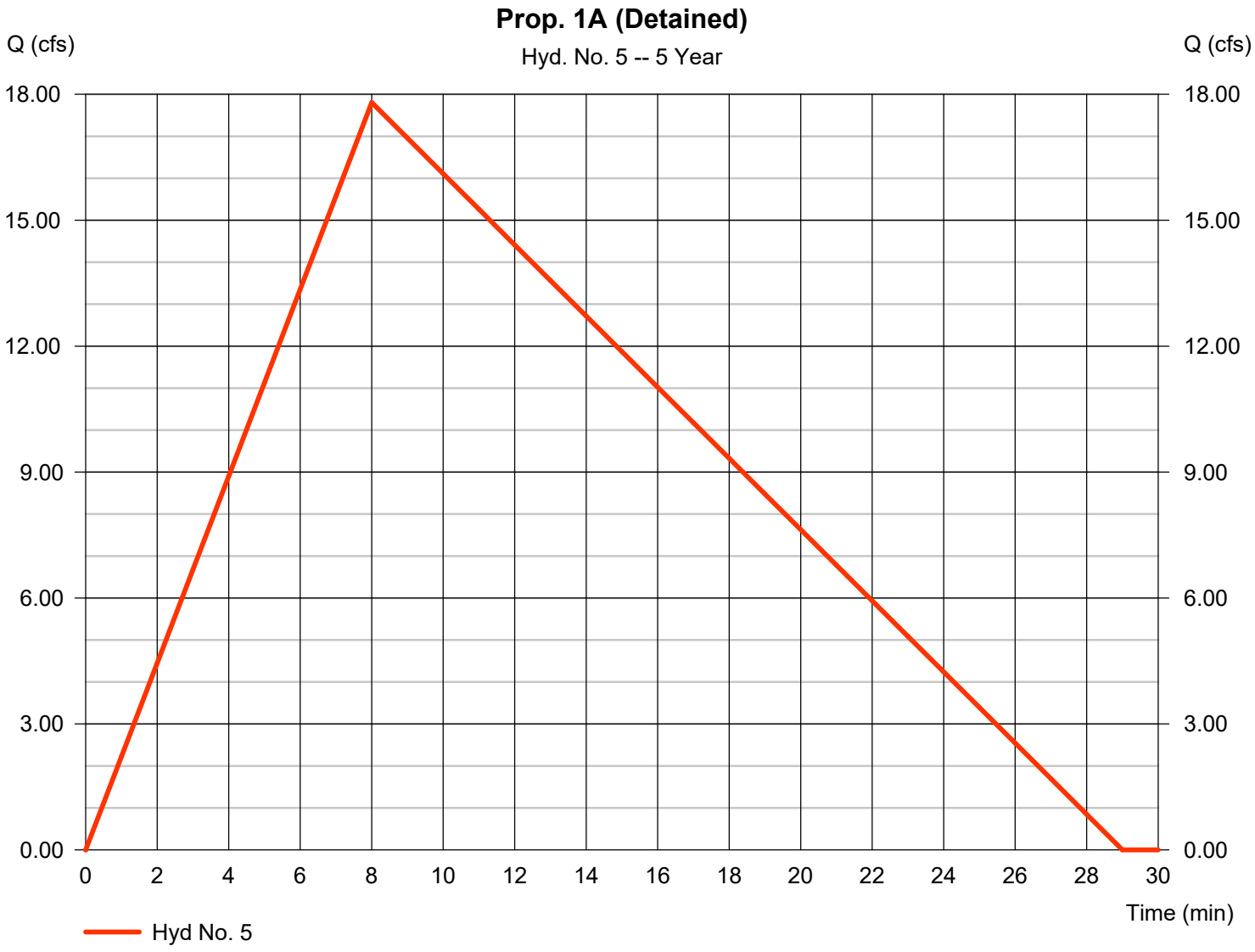


Hydrograph Report

Hyd. No. 5

Prop. 1A (Detained)

Hydrograph type	=	Rational	Peak discharge	=	17.80 cfs
Storm frequency	=	5 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	15,682 cuft
Drainage area	=	5.460 ac	Runoff coeff.	=	0.5
Intensity	=	6.522 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

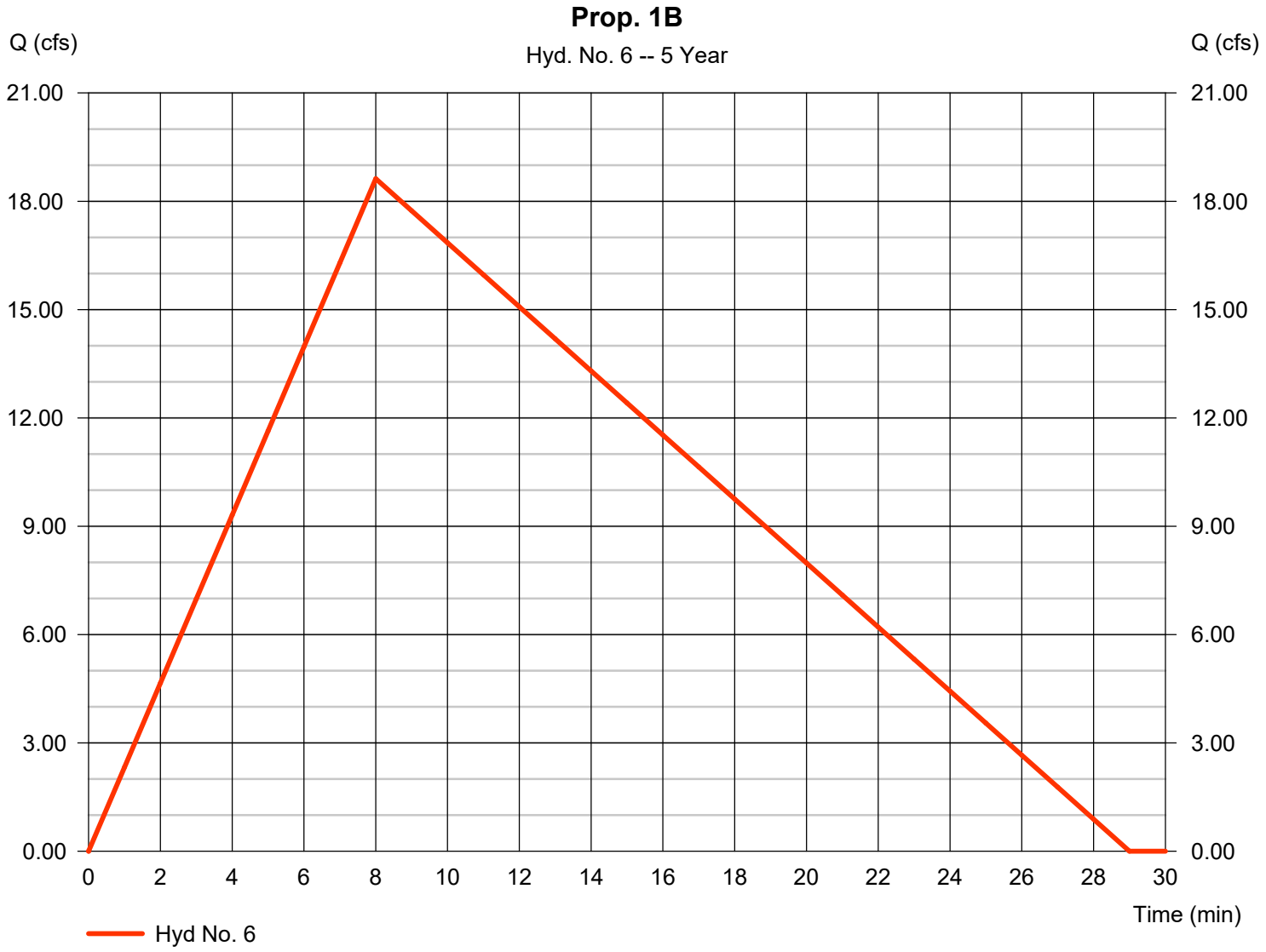


Hydrograph Report

Hyd. No. 6

Prop. 1B

Hydrograph type	=	Rational	Peak discharge	=	18.62 cfs
Storm frequency	=	5 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	16,403 cuft
Drainage area	=	12.980 ac	Runoff coeff.	=	0.22
Intensity	=	6.522 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

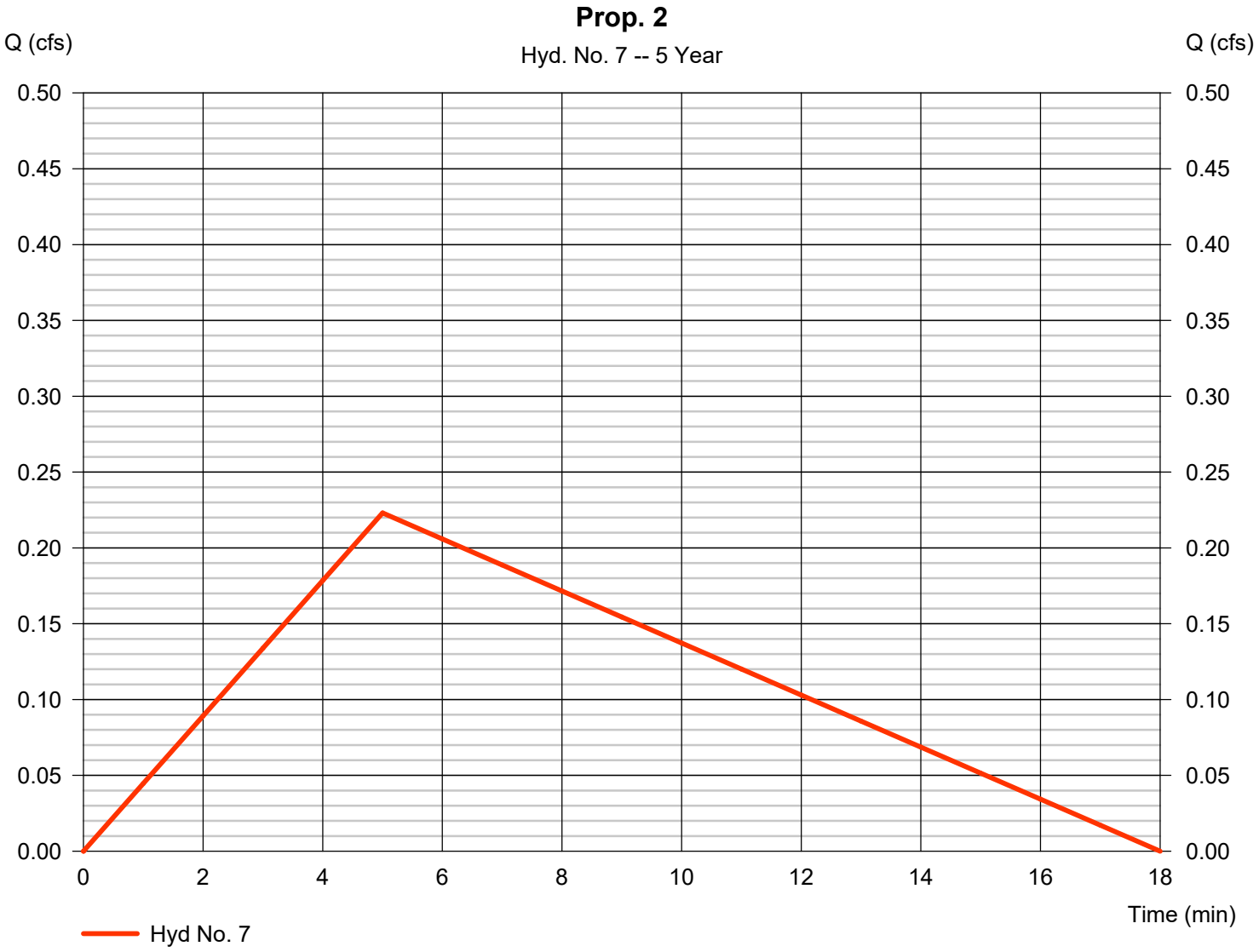


Hydrograph Report

Hyd. No. 7

Prop. 2

Hydrograph type	=	Rational	Peak discharge	=	0.223 cfs
Storm frequency	=	5 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	123 cuft
Drainage area	=	0.140 ac	Runoff coeff.	=	0.21
Intensity	=	7.588 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

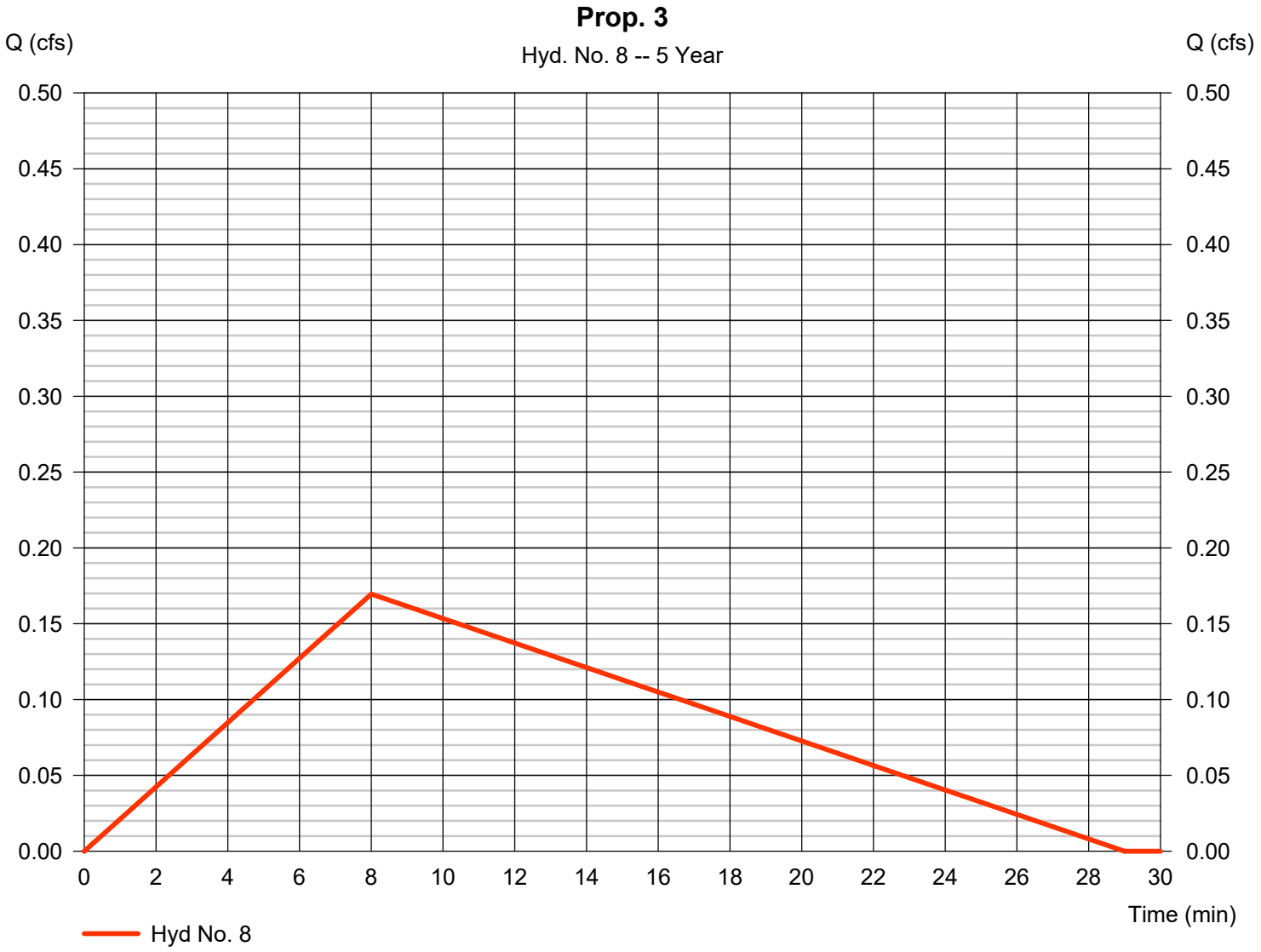


Hydrograph Report

Hyd. No. 8

Prop. 3

Hydrograph type	=	Rational	Peak discharge	=	0.170 cfs
Storm frequency	=	5 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	149 cuft
Drainage area	=	0.130 ac	Runoff coeff.	=	0.2
Intensity	=	6.522 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67



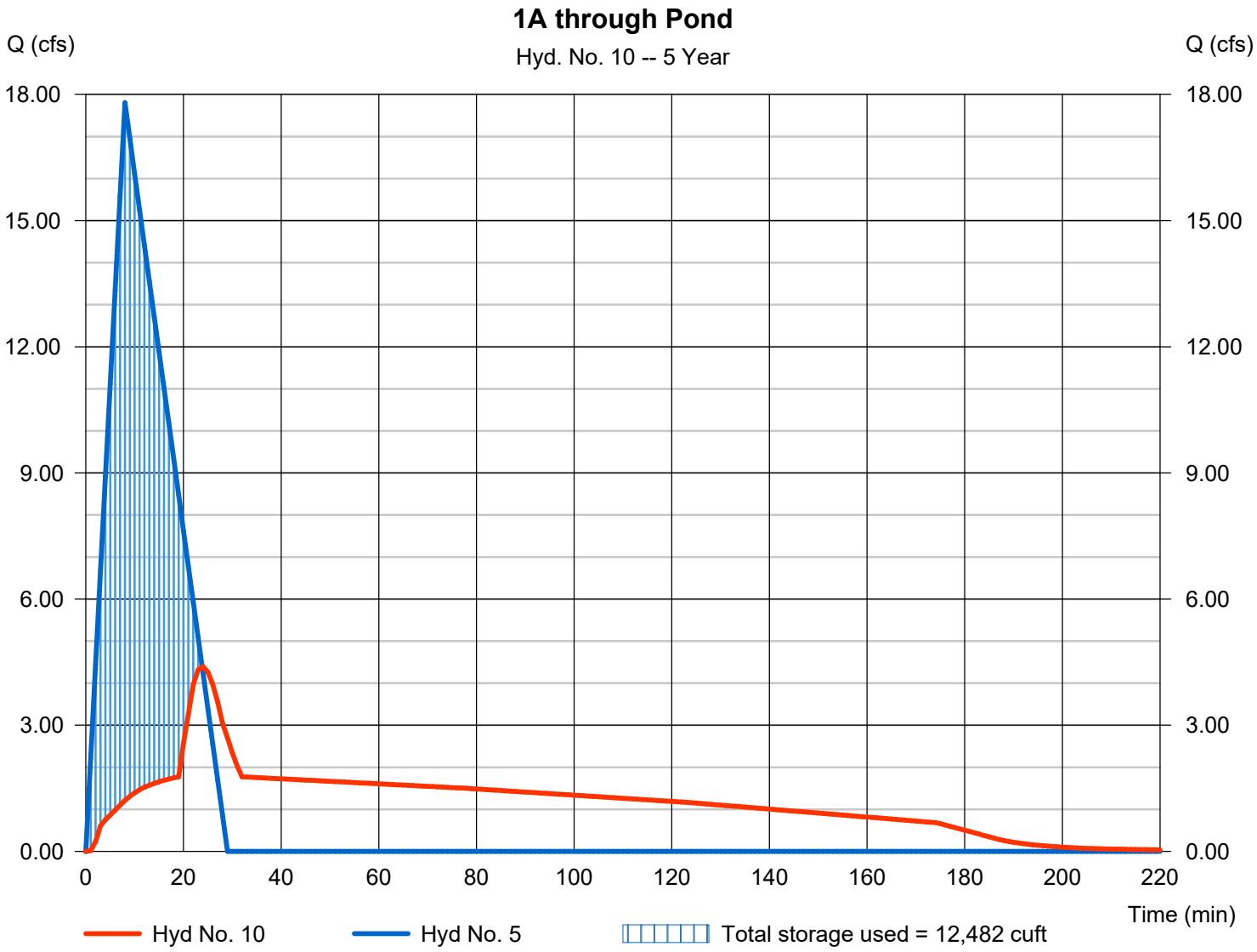
Hydrograph Report

Hyd. No. 10

1A through Pond

Hydrograph type	=	Reservoir	Peak discharge	=	4.395 cfs
Storm frequency	=	5 yrs	Time to peak	=	24 min
Time interval	=	1 min	Hyd. volume	=	15,486 cuft
Inflow hyd. No.	=	5 - Prop. 1A (Detained)	Max. Elevation	=	507.16 ft
Reservoir name	=	Pond 1A	Max. Storage	=	12,482 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Pond 1A

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 503.23 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	503.23	05	0	0
0.77	504.00	2,466	663	663
1.77	505.00	3,217	2,833	3,496
2.77	506.00	4,052	3,626	7,122
3.77	507.00	4,969	4,502	11,624
4.77	508.00	5,970	5,461	17,085
5.77	509.00	7,055	6,504	23,590
6.77	510.00	8,224	7,631	31,221

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	6.00	0.00	0.00
Span (in)	= 12.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 498.50	503.23	0.00	0.00
Length (ft)	= 69.00	11.00	0.00	0.00
Slope (%)	= 6.55	2.02	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

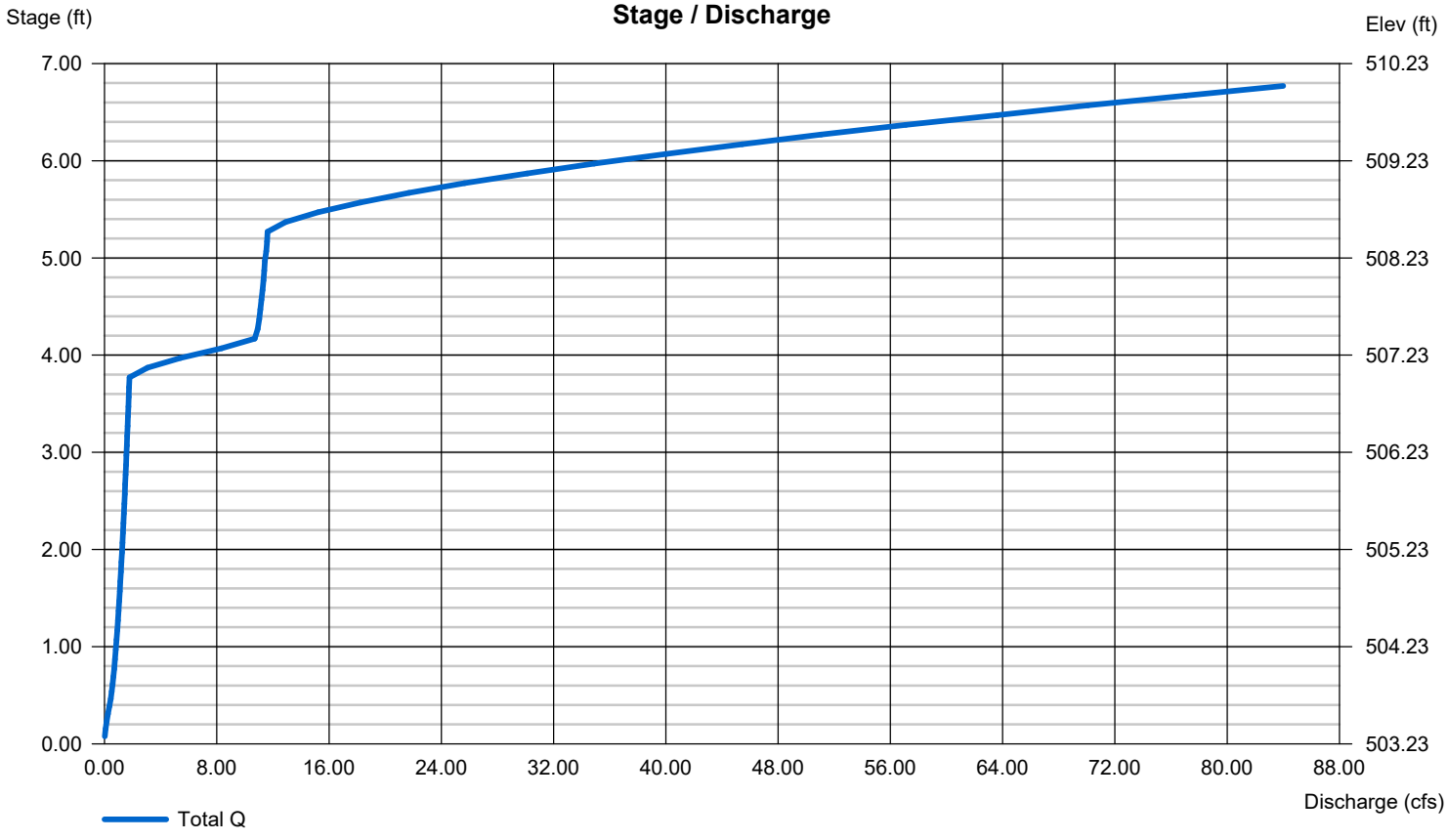
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	15.00	0.00	0.00
Crest El. (ft)	= 507.00	508.50	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= Rect	Broad	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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

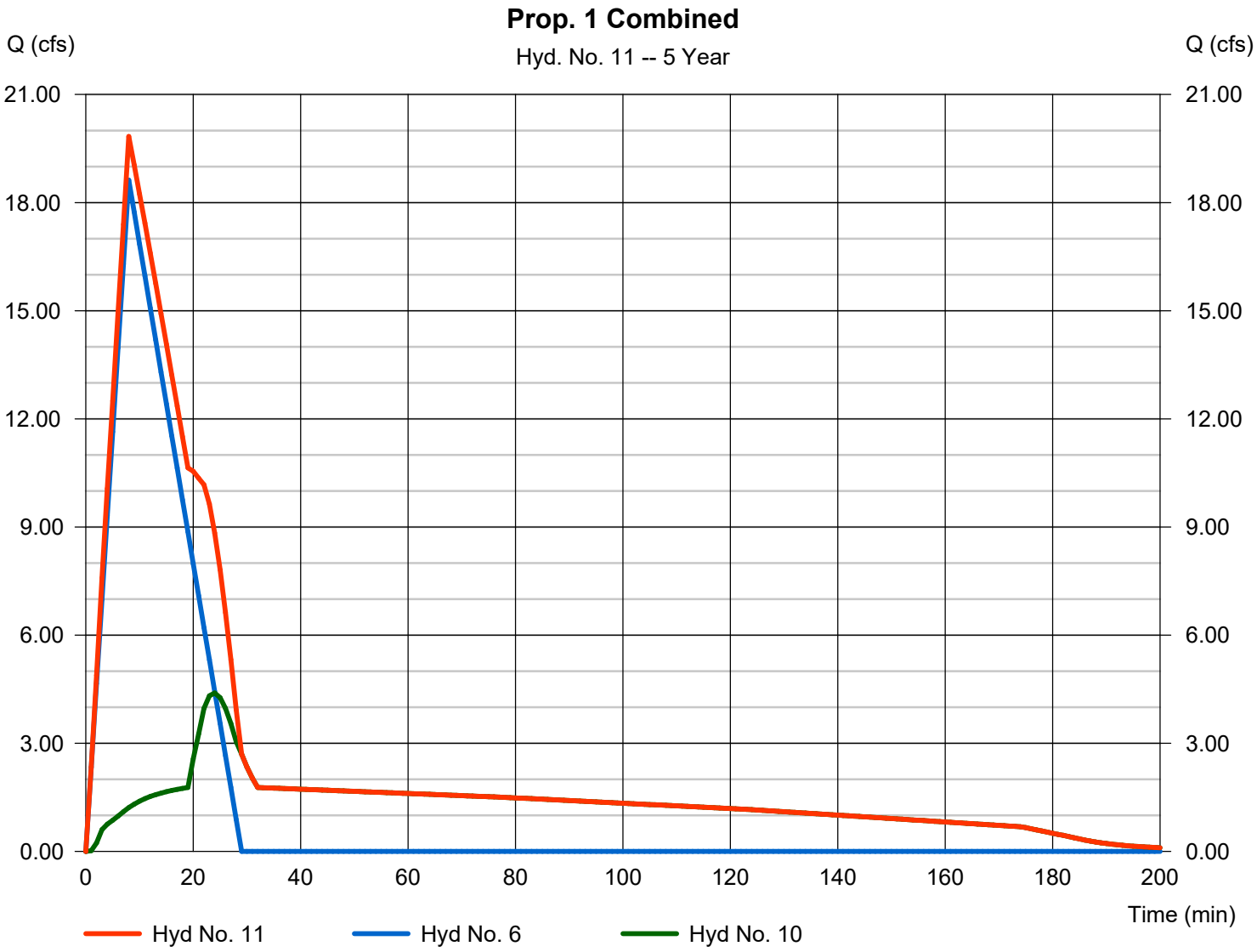


Hydrograph Report

Hyd. No. 11

Prop. 1 Combined

Hydrograph type	=	Combine	Peak discharge	=	19.84 cfs
Storm frequency	=	5 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	31,688 cuft
Inflow hyds.	=	6, 10	Contrib. drain. area	=	12.980 ac



Appendix E.2: 10-Year Hydraflow Hydrographs Calculations

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

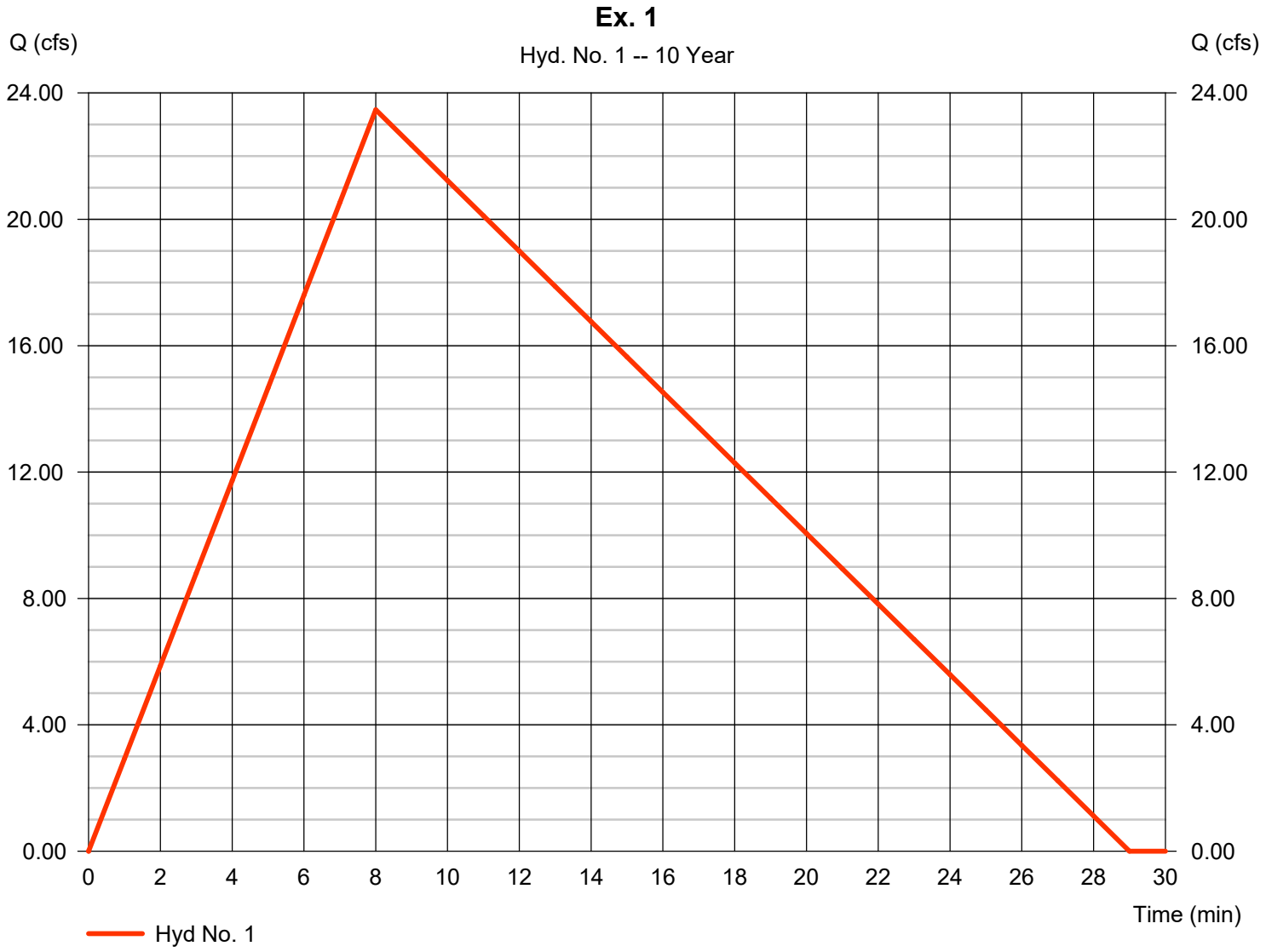
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	23.47	1	8	20,669	------	------	------	Ex. 1
2	Rational	4.282	1	8	3,772	------	------	------	Ex. 2
3	Rational	0.204	1	7	157	------	------	------	Ex. 3
5	Rational	20.42	1	8	17,982	------	------	------	Prop. 1A (Detained)
6	Rational	21.35	1	8	18,809	------	------	------	Prop. 1B
7	Rational	0.255	1	5	141	------	------	------	Prop. 2
8	Rational	0.204	1	7	157	------	------	------	Prop. 3
10	Reservoir	7.660	1	21	17,758	5	507.27	13,126	1A through Pond
11	Combine	22.63	1	8	36,336	6, 10	------	------	Prop. 1 Combined

Hydrograph Report

Hyd. No. 1

Ex. 1

Hydrograph type	=	Rational	Peak discharge	=	23.47 cfs
Storm frequency	=	10 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	20,669 cuft
Drainage area	=	15.690 ac	Runoff coeff.	=	0.2
Intensity	=	7.478 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67



Hydrograph Report

Hyd. No. 2

Ex. 2

Hydrograph type	=	Rational	Peak discharge	=	4.282 cfs
Storm frequency	=	10 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	3,772 cuft
Drainage area	=	2.863 ac	Runoff coeff.	=	0.2
Intensity	=	7.478 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

Hydrograph Report

Hyd. No. 3

Ex. 3

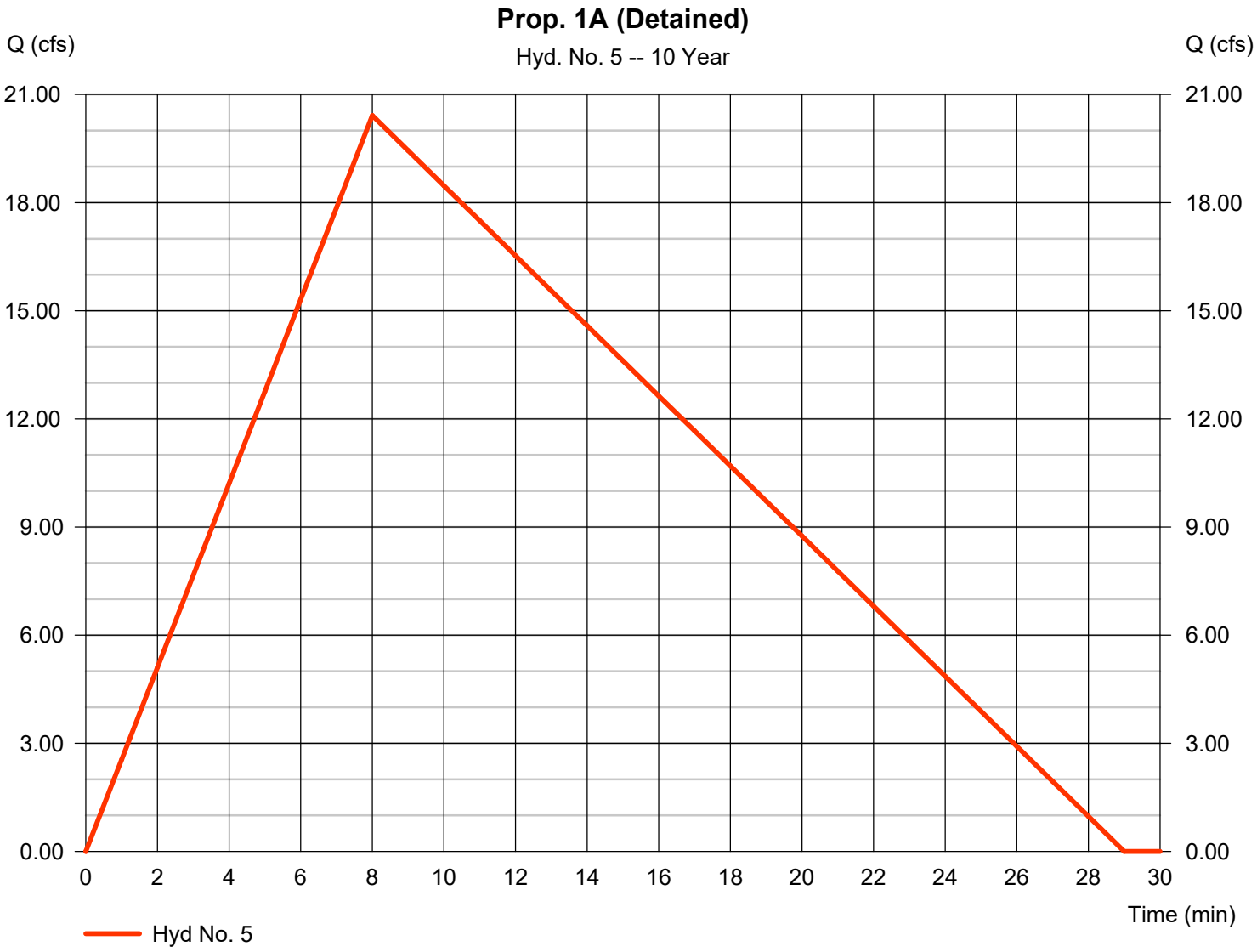
Hydrograph type	=	Rational	Peak discharge	=	0.204 cfs
Storm frequency	=	10 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	157 cuft
Drainage area	=	0.130 ac	Runoff coeff.	=	0.2
Intensity	=	7.838 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

Hydrograph Report

Hyd. No. 5

Prop. 1A (Detained)

Hydrograph type	=	Rational	Peak discharge	=	20.42 cfs
Storm frequency	=	10 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	17,982 cuft
Drainage area	=	5.460 ac	Runoff coeff.	=	0.5
Intensity	=	7.478 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67



Hydrograph Report

Hyd. No. 6

Prop. 1B

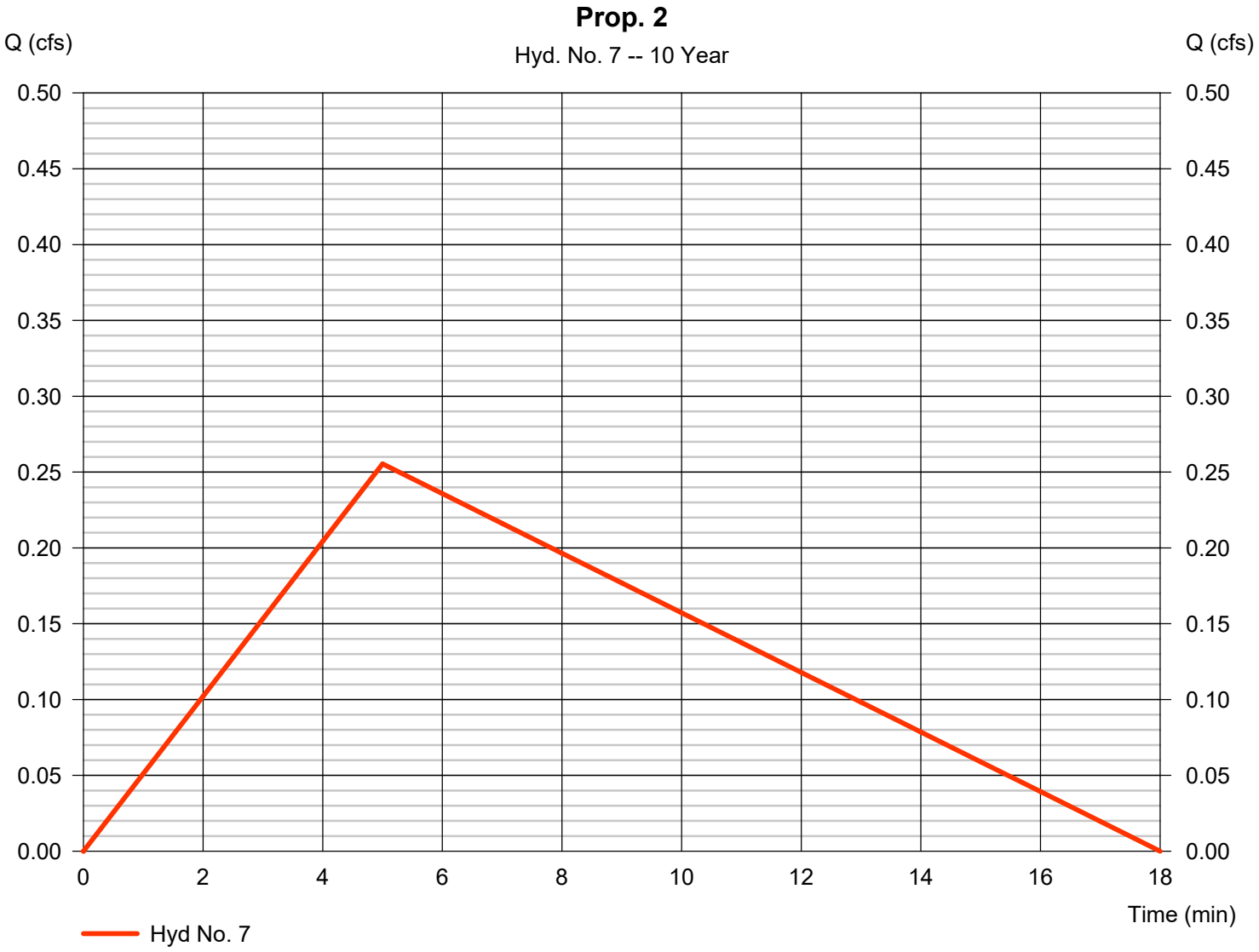
Hydrograph type	=	Rational	Peak discharge	=	21.35 cfs
Storm frequency	=	10 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	18,809 cuft
Drainage area	=	12.980 ac	Runoff coeff.	=	0.22
Intensity	=	7.478 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

Hydrograph Report

Hyd. No. 7

Prop. 2

Hydrograph type	=	Rational	Peak discharge	=	0.255 cfs
Storm frequency	=	10 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	141 cuft
Drainage area	=	0.140 ac	Runoff coeff.	=	0.21
Intensity	=	8.688 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

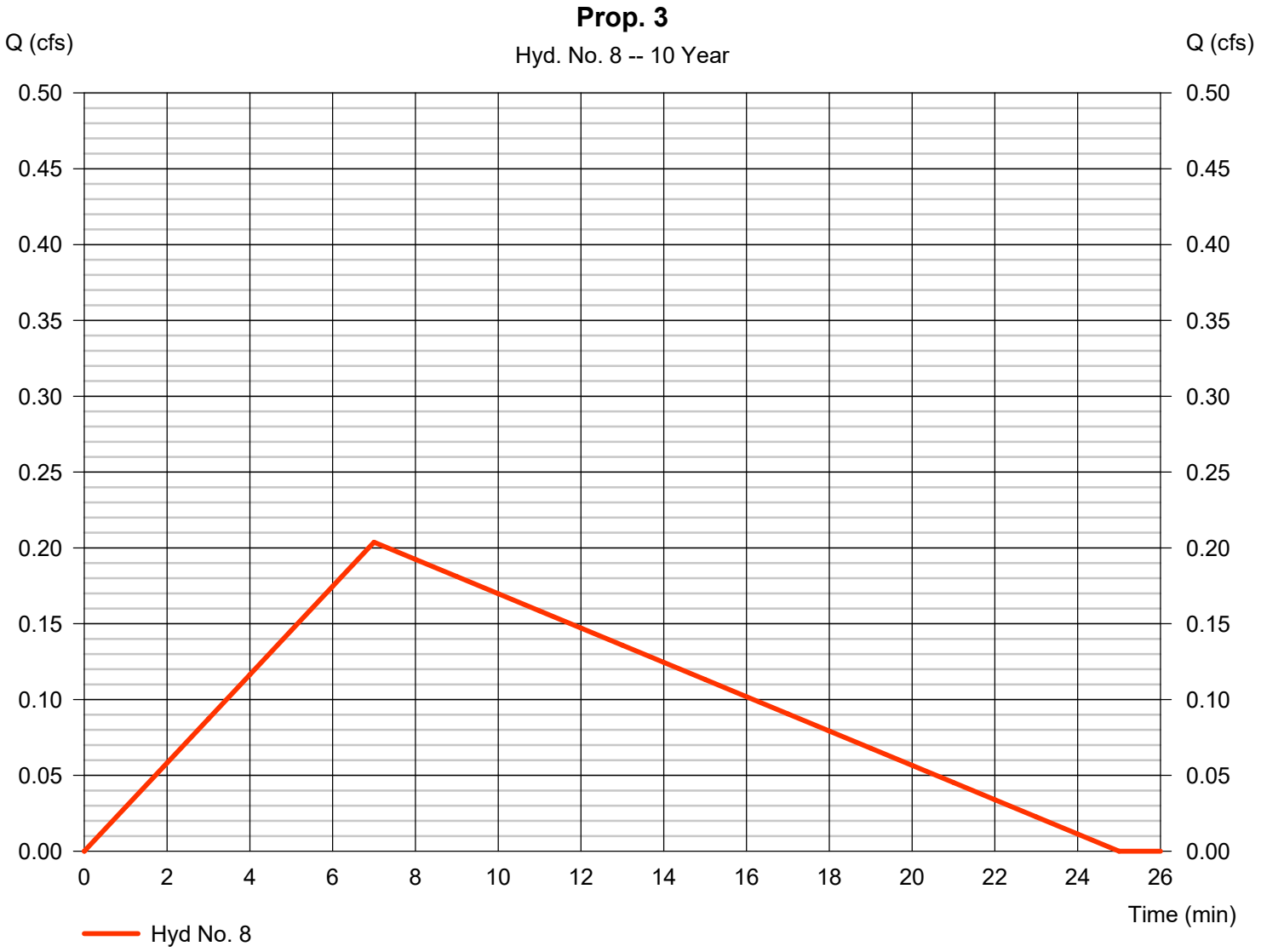


Hydrograph Report

Hyd. No. 8

Prop. 3

Hydrograph type	=	Rational	Peak discharge	=	0.204 cfs
Storm frequency	=	10 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	157 cuft
Drainage area	=	0.130 ac	Runoff coeff.	=	0.2
Intensity	=	7.838 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67



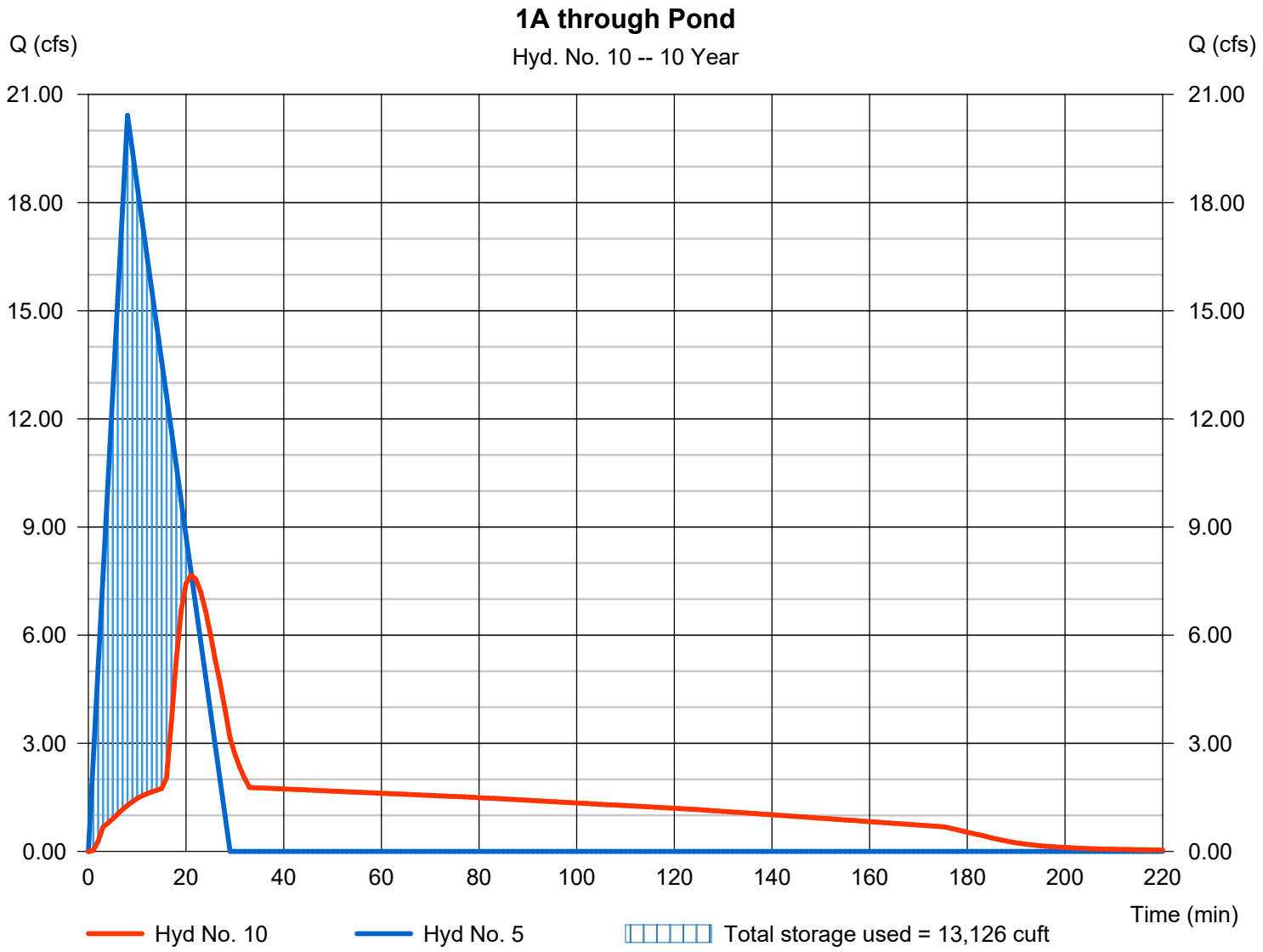
Hydrograph Report

Hyd. No. 10

1A through Pond

Hydrograph type	=	Reservoir	Peak discharge	=	7.660 cfs
Storm frequency	=	10 yrs	Time to peak	=	21 min
Time interval	=	1 min	Hyd. volume	=	17,758 cuft
Inflow hyd. No.	=	5 - Prop. 1A (Detained)	Max. Elevation	=	507.27 ft
Reservoir name	=	Pond 1A	Max. Storage	=	13,126 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Pond 1A

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 503.23 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	503.23	05	0	0
0.77	504.00	2,466	663	663
1.77	505.00	3,217	2,833	3,496
2.77	506.00	4,052	3,626	7,122
3.77	507.00	4,969	4,502	11,624
4.77	508.00	5,970	5,461	17,085
5.77	509.00	7,055	6,504	23,590
6.77	510.00	8,224	7,631	31,221

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	6.00	0.00	0.00
Span (in)	= 12.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 498.50	503.23	0.00	0.00
Length (ft)	= 69.00	11.00	0.00	0.00
Slope (%)	= 6.55	2.02	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

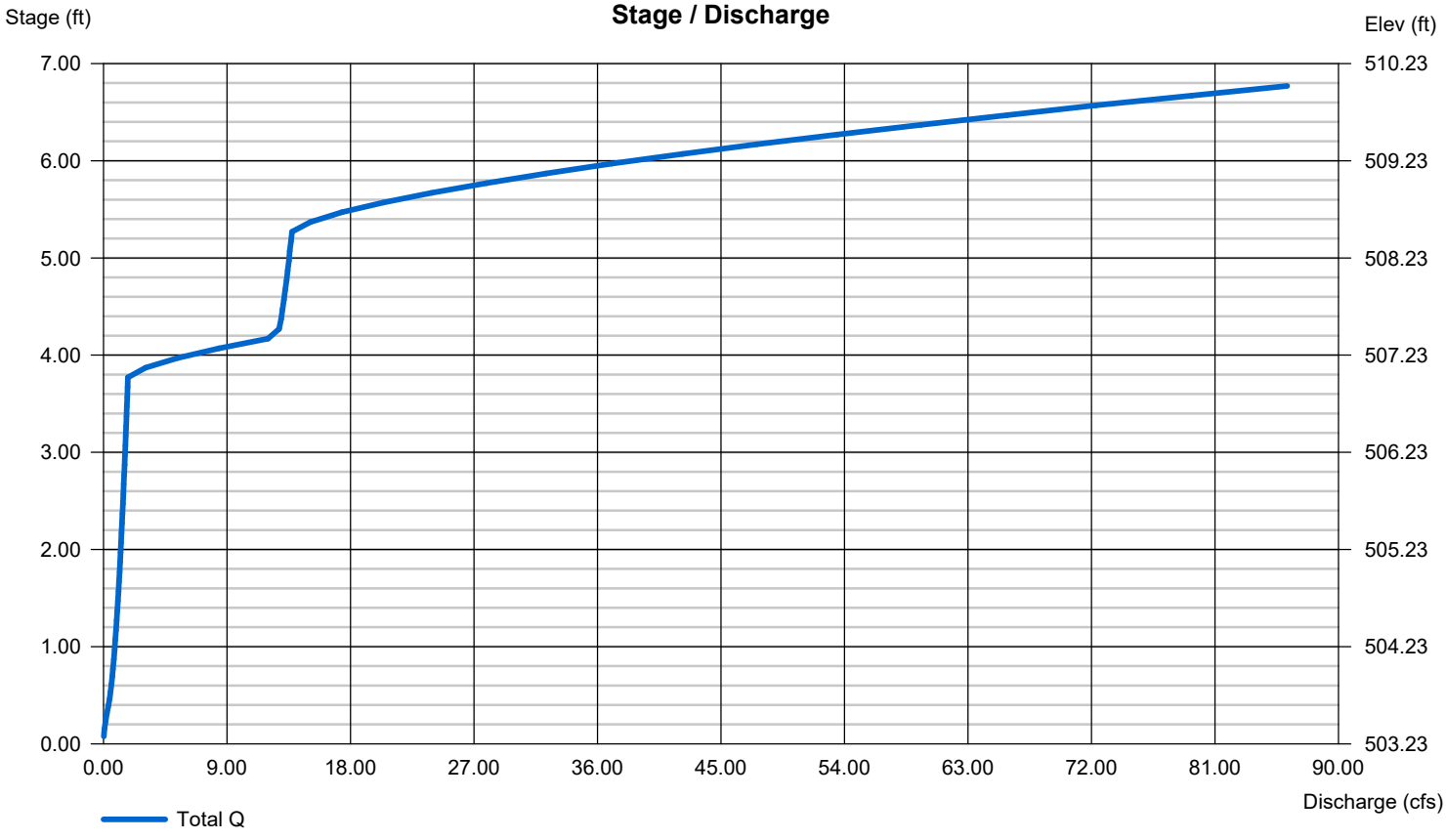
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	15.00	0.00	0.00
Crest El. (ft)	= 507.00	508.50	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= Rect	Broad	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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

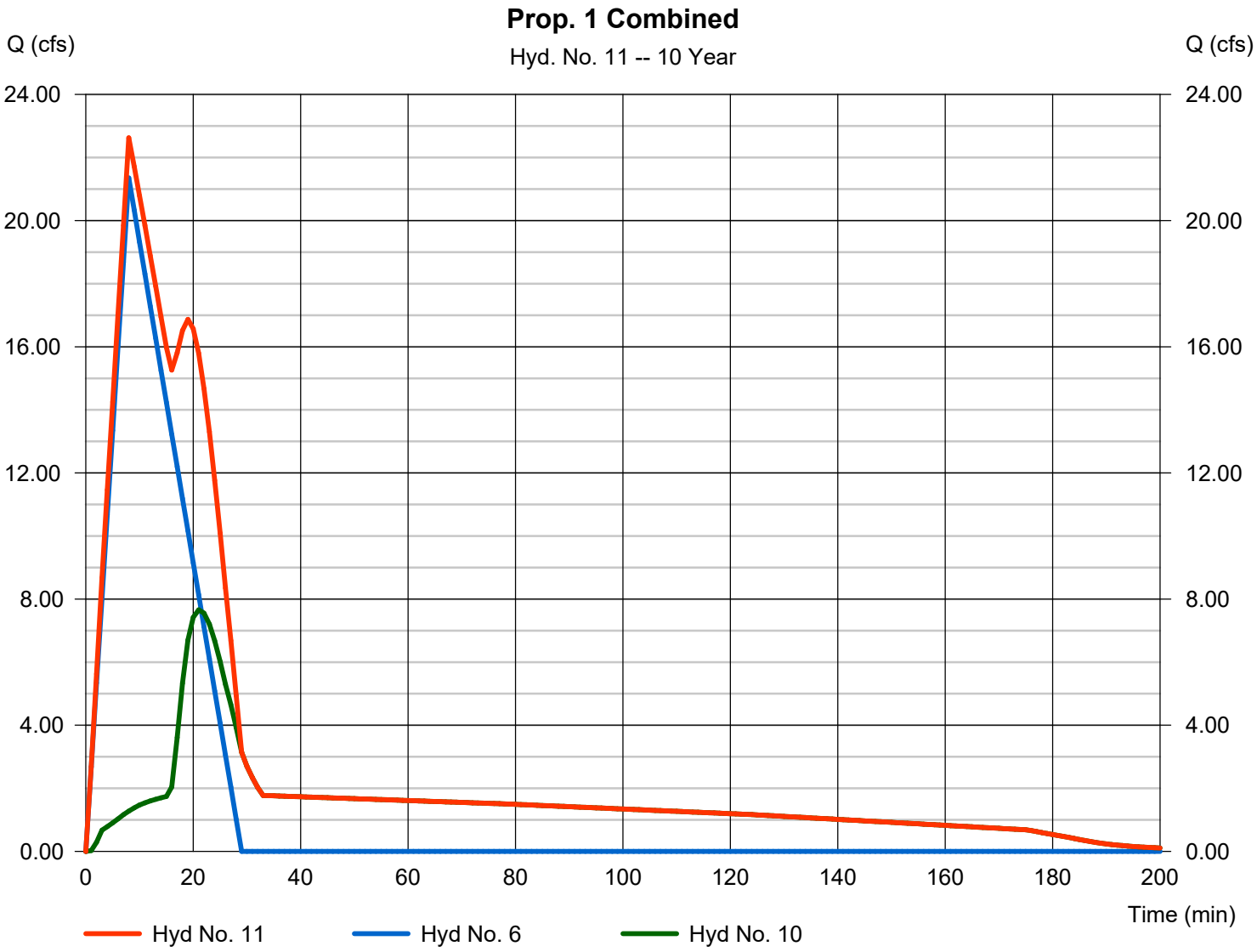


Hydrograph Report

Hyd. No. 11

Prop. 1 Combined

Hydrograph type	=	Combine	Peak discharge	=	22.63 cfs
Storm frequency	=	10 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	36,336 cuft
Inflow hyds.	=	6, 10	Contrib. drain. area	=	12.980 ac



Appendix E.3: 25-Year Hydraflow Hydrographs Calculations

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

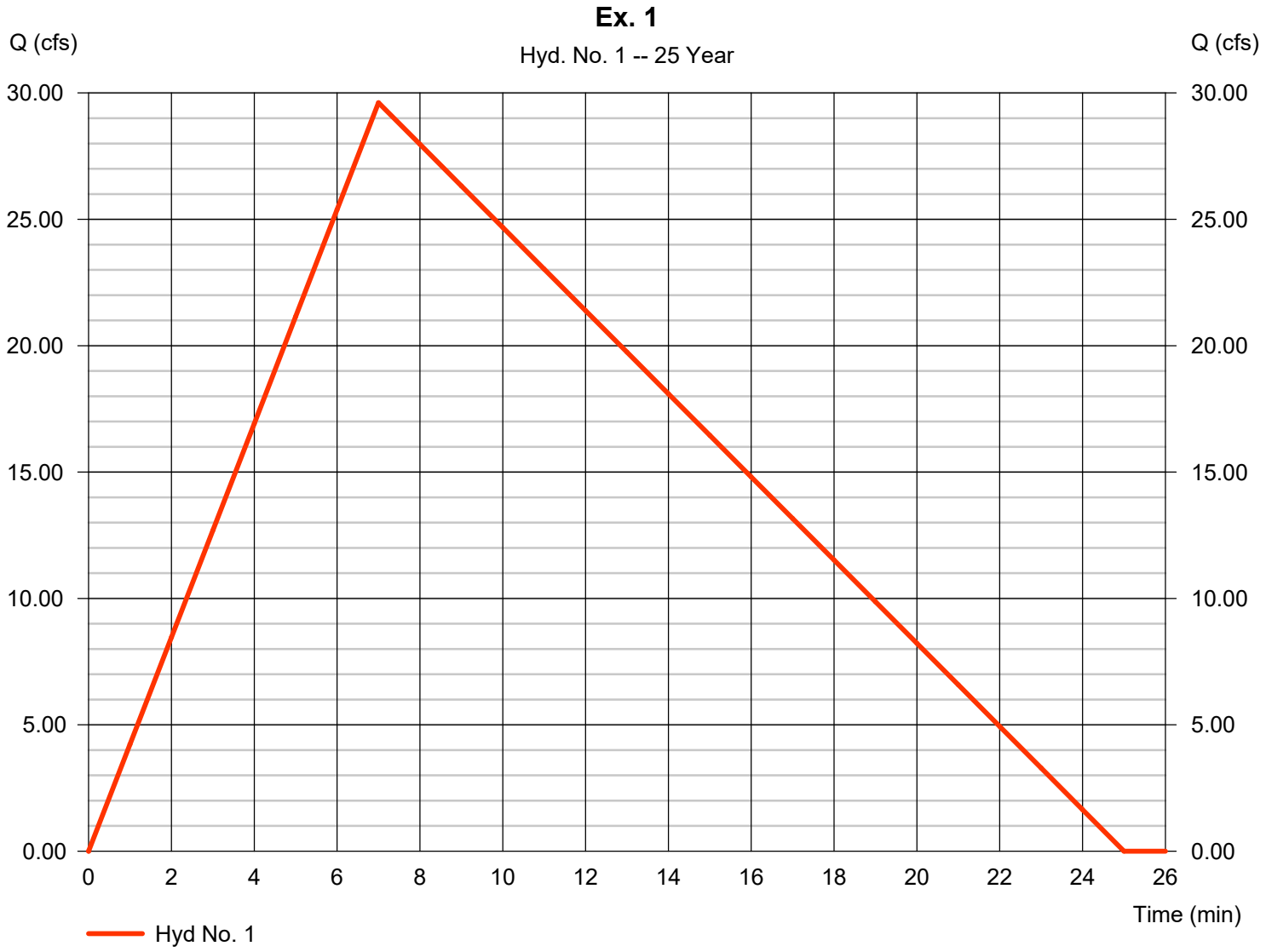
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	29.61	1	7	22,823	------	------	------	Ex. 1
2	Rational	5.404	1	7	4,165	------	------	------	Ex. 2
3	Rational	0.247	1	7	191	------	------	------	Ex. 3
5	Rational	24.56	1	8	21,633	------	------	------	Prop. 1A (Detained)
6	Rational	25.69	1	8	22,628	------	------	------	Prop. 1B
7	Rational	0.308	1	5	170	------	------	------	Prop. 2
8	Rational	0.245	1	7	189	------	------	------	Prop. 3
10	Reservoir	10.81	1	20	21,364	5	507.45	14,091	1A through Pond
11	Combine	27.05	1	8	43,714	6, 10	------	------	Prop. 1 Combined

Hydrograph Report

Hyd. No. 1

Ex. 1

Hydrograph type	=	Rational	Peak discharge	=	29.61 cfs
Storm frequency	=	25 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	22,823 cuft
Drainage area	=	15.690 ac	Runoff coeff.	=	0.2
Intensity	=	9.437 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67



Hydrograph Report

Hyd. No. 2

Ex. 2

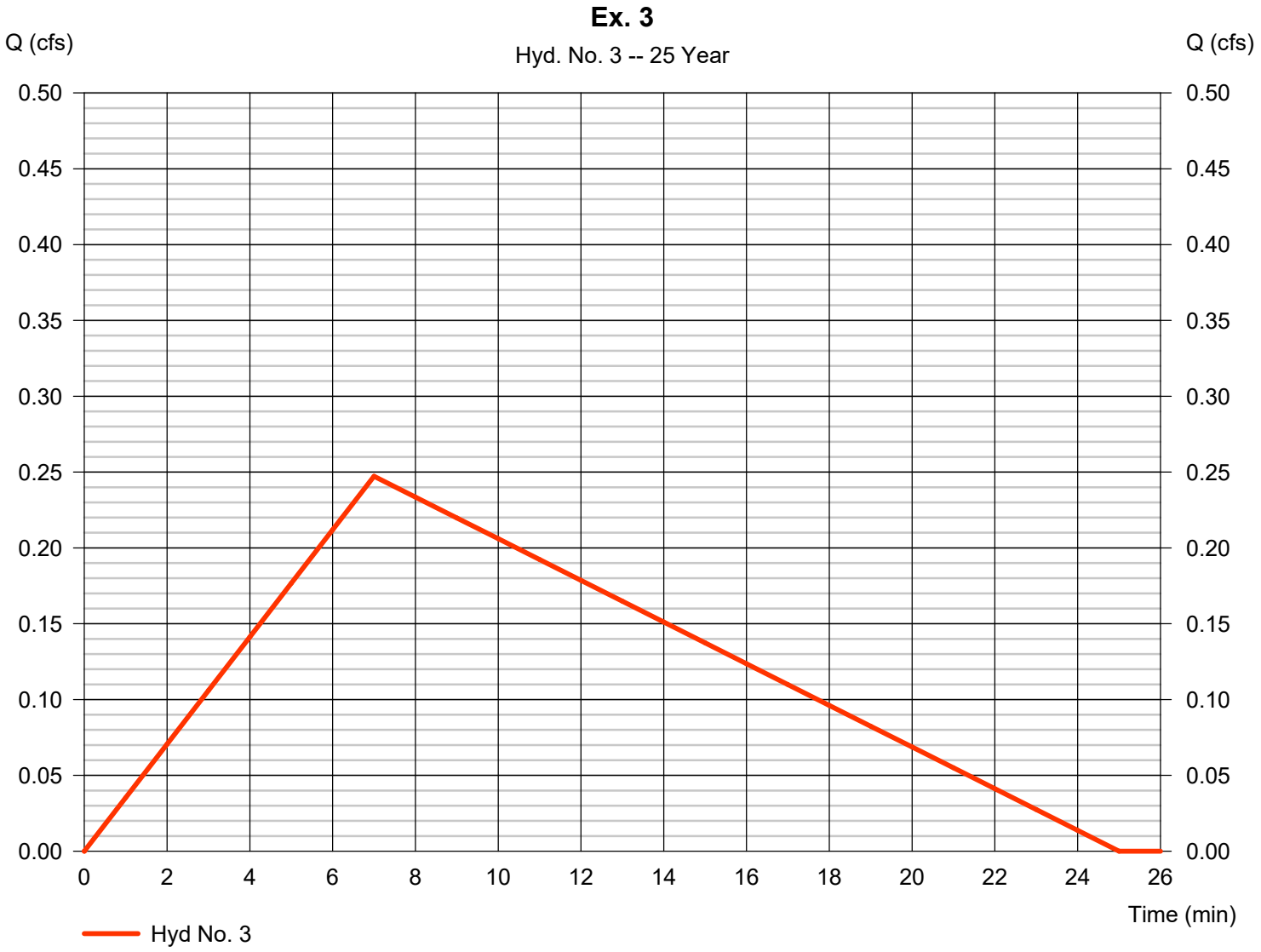
Hydrograph type	=	Rational	Peak discharge	=	5.404 cfs
Storm frequency	=	25 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	4,165 cuft
Drainage area	=	2.863 ac	Runoff coeff.	=	0.2
Intensity	=	9.437 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

Hydrograph Report

Hyd. No. 3

Ex. 3

Hydrograph type	=	Rational	Peak discharge	=	0.247 cfs
Storm frequency	=	25 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	191 cuft
Drainage area	=	0.131 ac	Runoff coeff.	=	0.2
Intensity	=	9.437 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

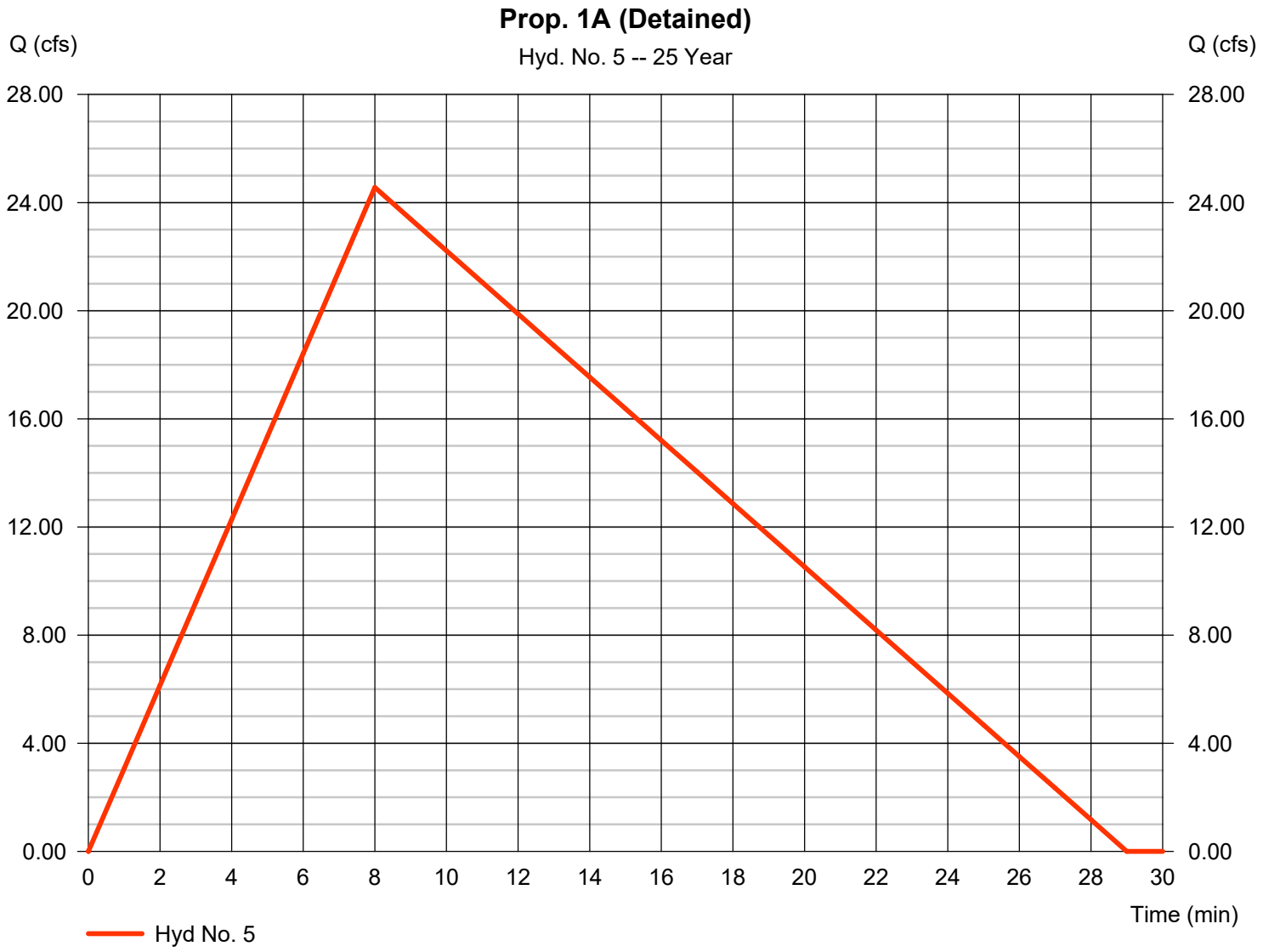


Hydrograph Report

Hyd. No. 5

Prop. 1A (Detained)

Hydrograph type	=	Rational	Peak discharge	=	24.56 cfs
Storm frequency	=	25 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	21,633 cuft
Drainage area	=	5.460 ac	Runoff coeff.	=	0.5
Intensity	=	8.996 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

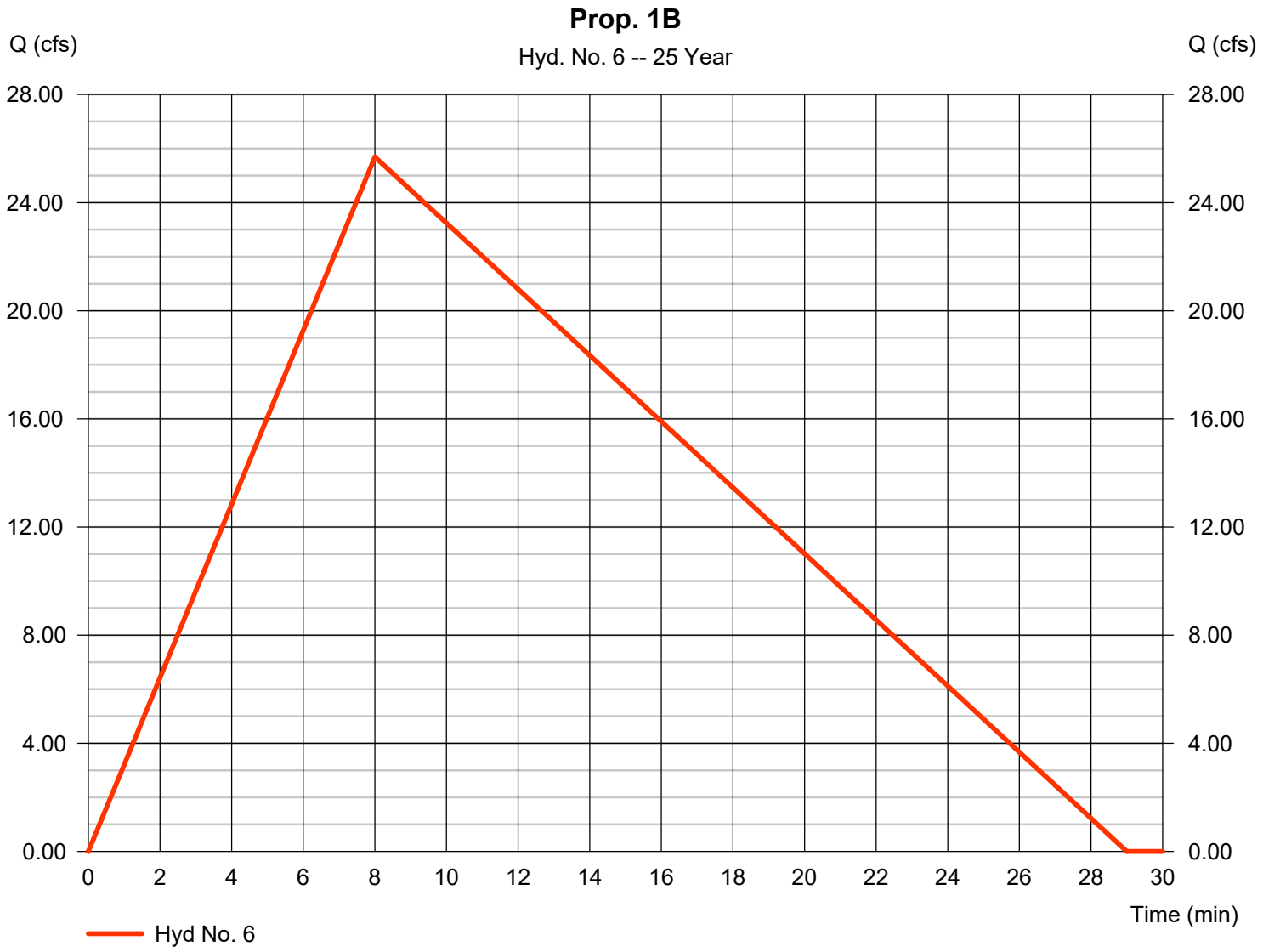


Hydrograph Report

Hyd. No. 6

Prop. 1B

Hydrograph type	=	Rational	Peak discharge	=	25.69 cfs
Storm frequency	=	25 yrs	Time to peak	=	8 min
Time interval	=	1 min	Hyd. volume	=	22,628 cuft
Drainage area	=	12.980 ac	Runoff coeff.	=	0.22
Intensity	=	8.996 in/hr	Tc by User	=	8.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

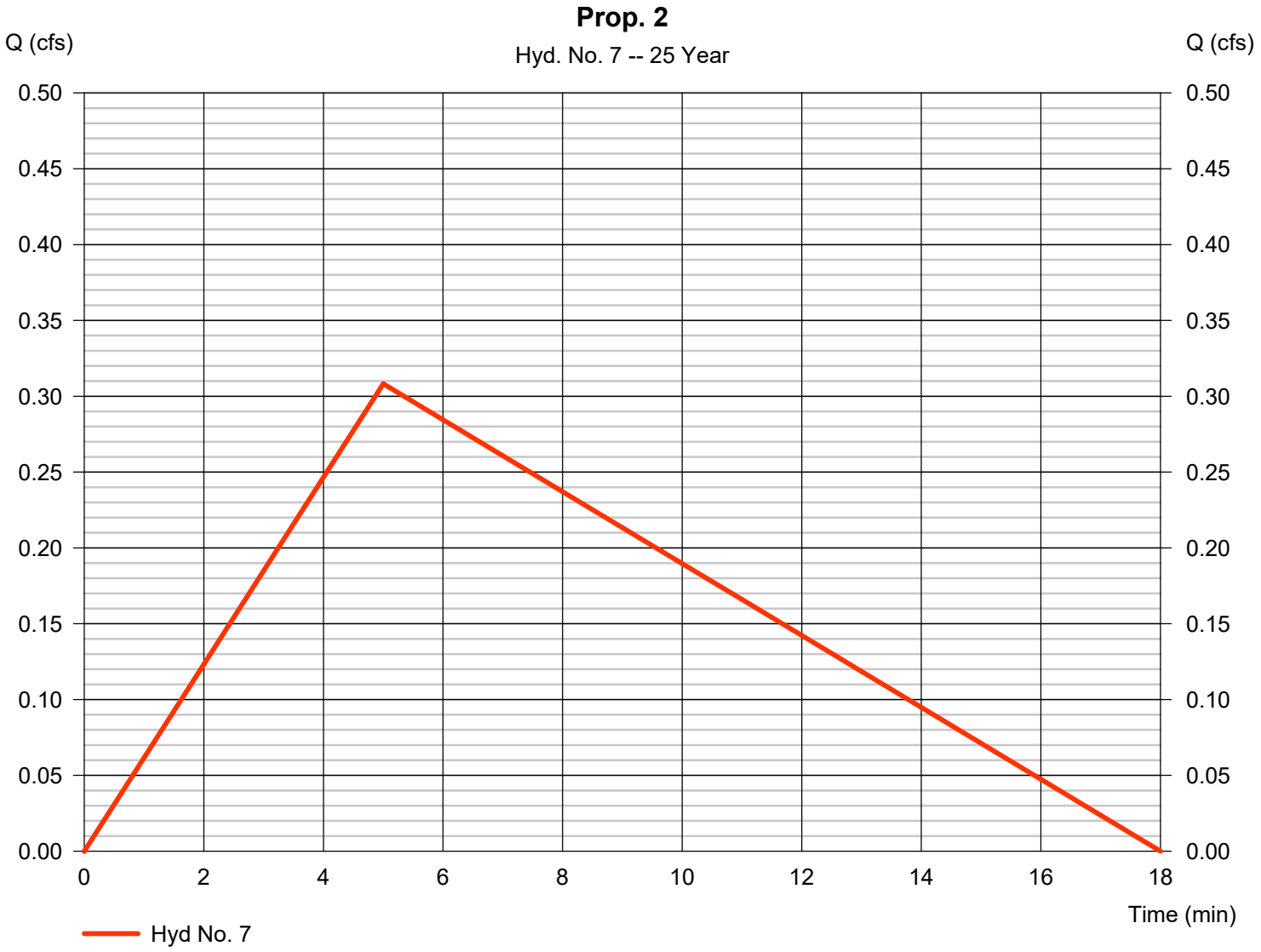


Hydrograph Report

Hyd. No. 7

Prop. 2

Hydrograph type	=	Rational	Peak discharge	=	0.308 cfs
Storm frequency	=	25 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	170 cuft
Drainage area	=	0.140 ac	Runoff coeff.	=	0.21
Intensity	=	10.484 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

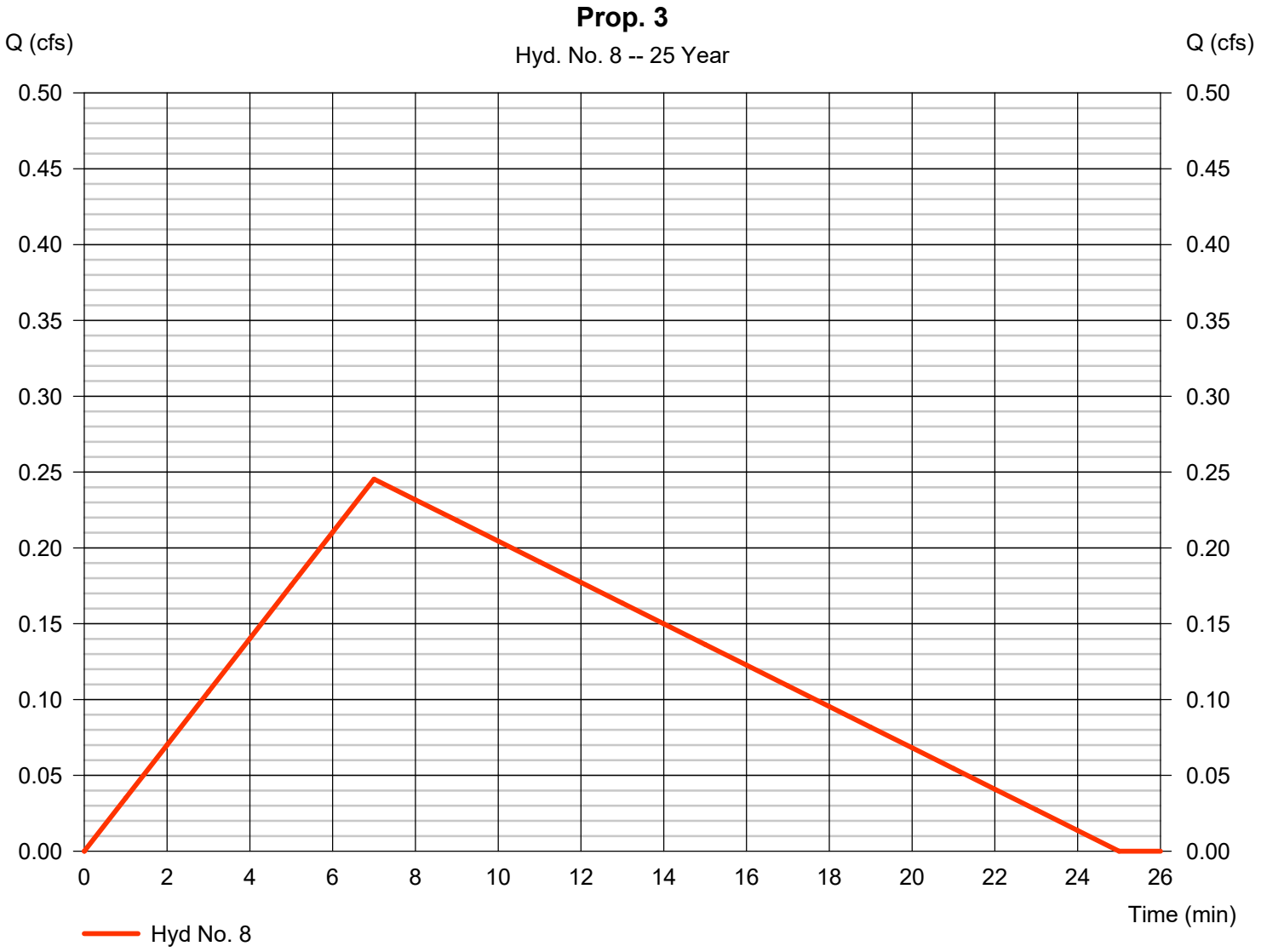


Hydrograph Report

Hyd. No. 8

Prop. 3

Hydrograph type	=	Rational	Peak discharge	=	0.245 cfs
Storm frequency	=	25 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	189 cuft
Drainage area	=	0.130 ac	Runoff coeff.	=	0.2
Intensity	=	9.437 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67



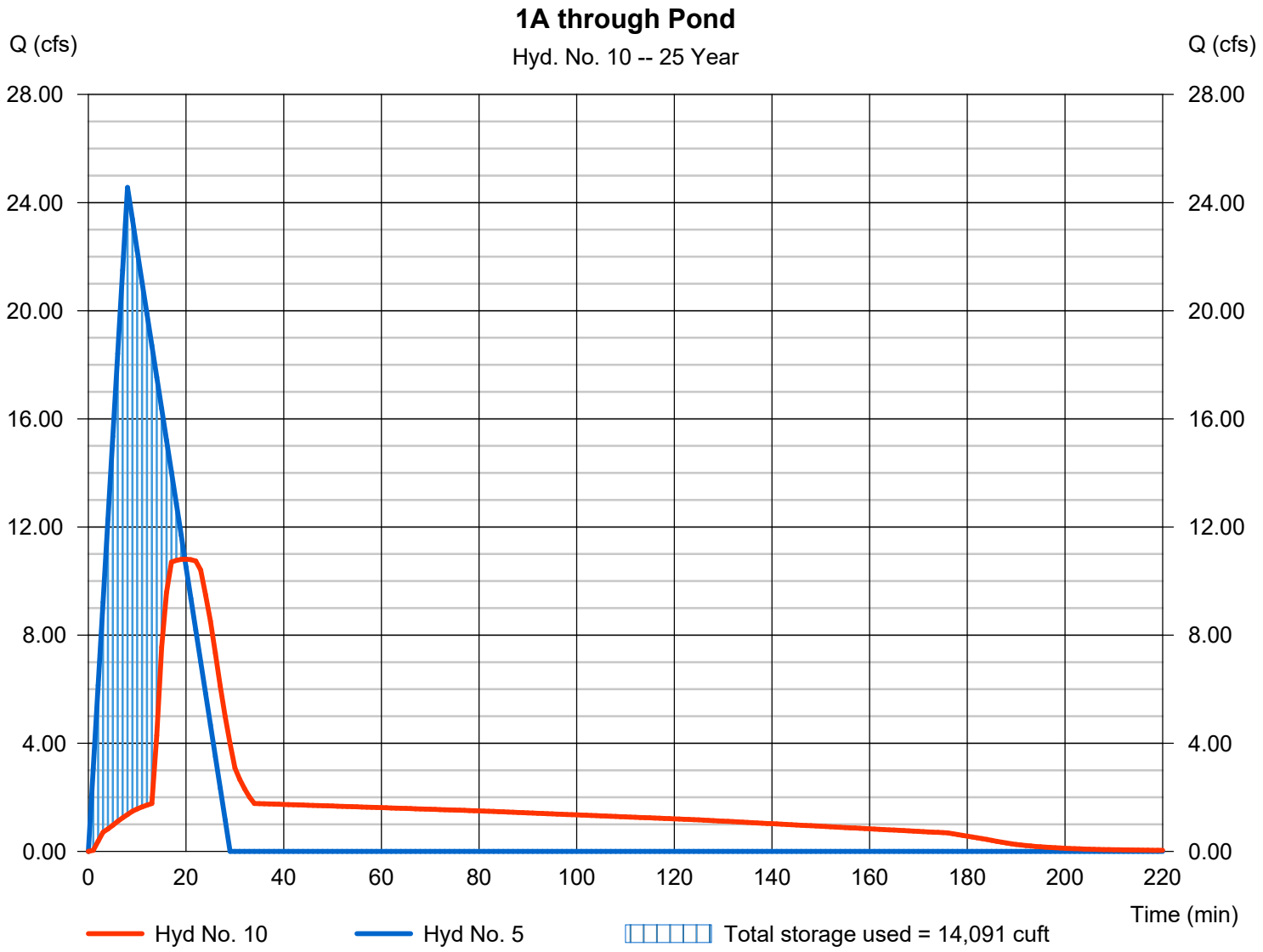
Hydrograph Report

Hyd. No. 10

1A through Pond

Hydrograph type	=	Reservoir	Peak discharge	=	10.81 cfs
Storm frequency	=	25 yrs	Time to peak	=	20 min
Time interval	=	1 min	Hyd. volume	=	21,364 cuft
Inflow hyd. No.	=	5 - Prop. 1A (Detained)	Max. Elevation	=	507.45 ft
Reservoir name	=	Pond 1A	Max. Storage	=	14,091 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Pond 1A

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 503.23 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	503.23	05	0	0
0.77	504.00	2,466	663	663
1.77	505.00	3,217	2,833	3,496
2.77	506.00	4,052	3,626	7,122
3.77	507.00	4,969	4,502	11,624
4.77	508.00	5,970	5,461	17,085
5.77	509.00	7,055	6,504	23,590
6.77	510.00	8,224	7,631	31,221

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	6.00	0.00	0.00
Span (in)	= 12.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 498.50	503.23	0.00	0.00
Length (ft)	= 69.00	11.00	0.00	0.00
Slope (%)	= 6.55	2.02	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

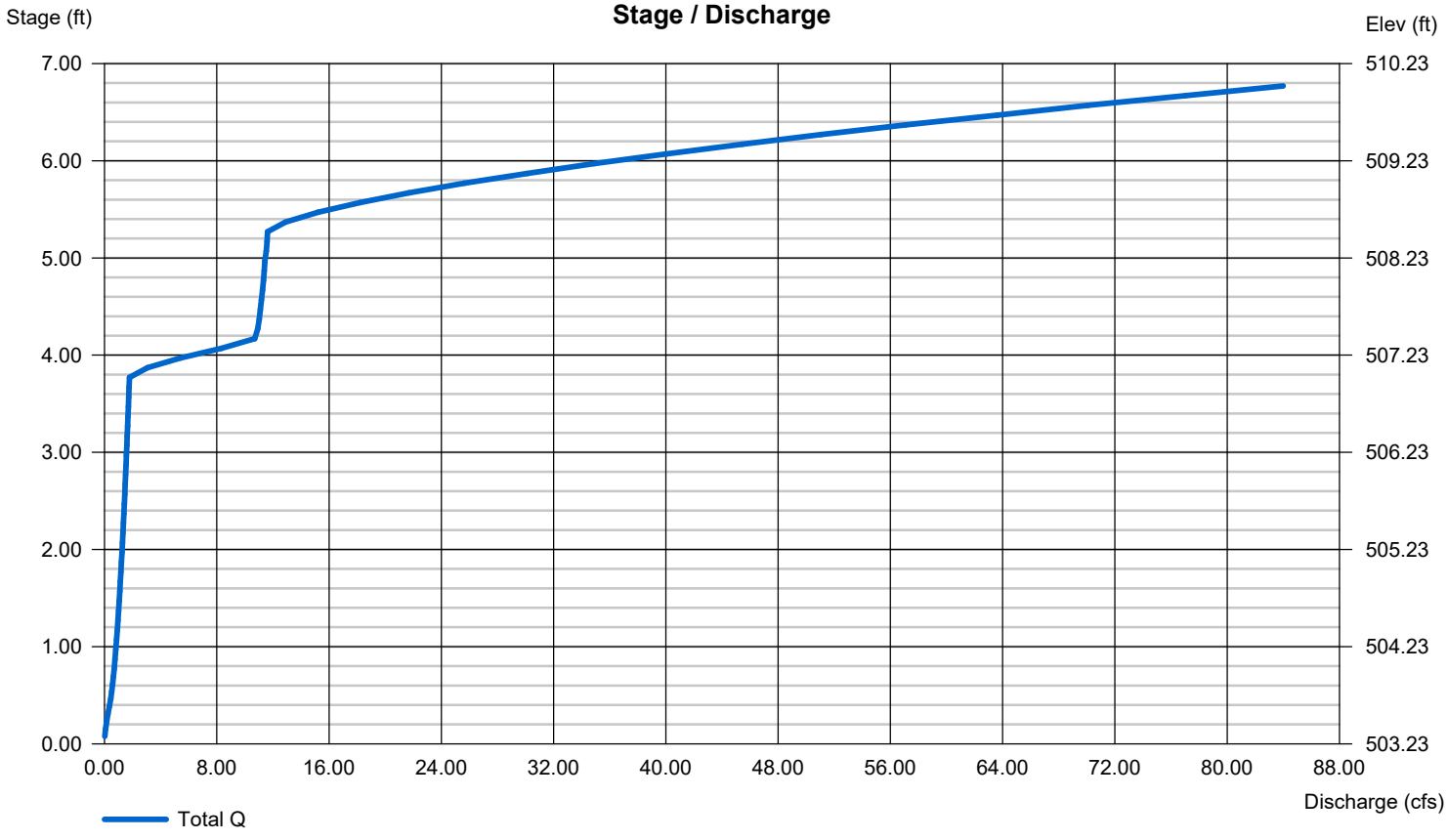
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	15.00	0.00	0.00
Crest El. (ft)	= 507.00	508.50	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= Rect	Broad	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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

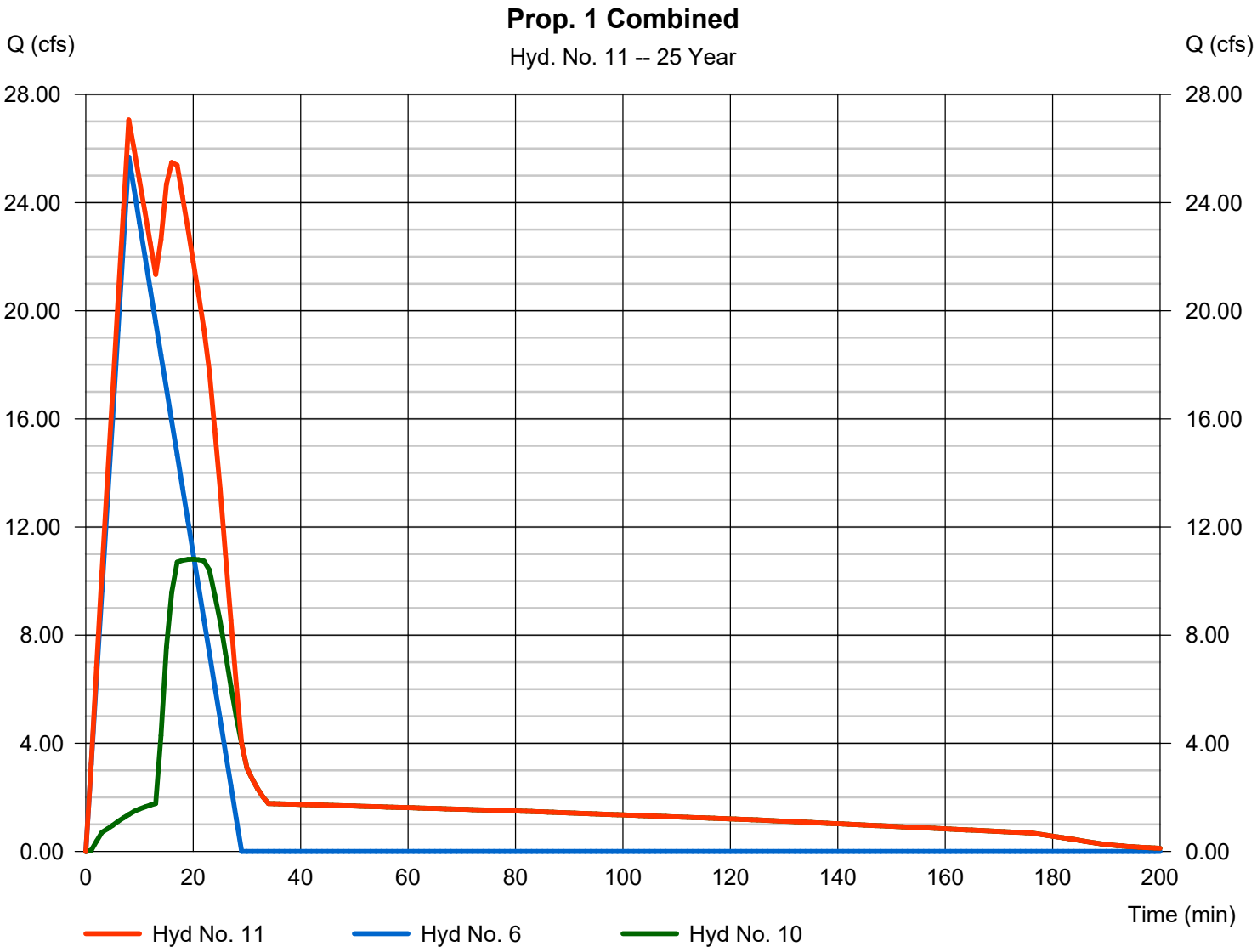


Hydrograph Report

Hyd. No. 11

Prop. 1 Combined

Hydrograph type	= Combine	Peak discharge	= 27.05 cfs
Storm frequency	= 25 yrs	Time to peak	= 8 min
Time interval	= 1 min	Hyd. volume	= 43,714 cuft
Inflow hyds.	= 6, 10	Contrib. drain. area	= 12.980 ac



Appendix E.4: 50-Year Hydraflow Hydrographs Calculations

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

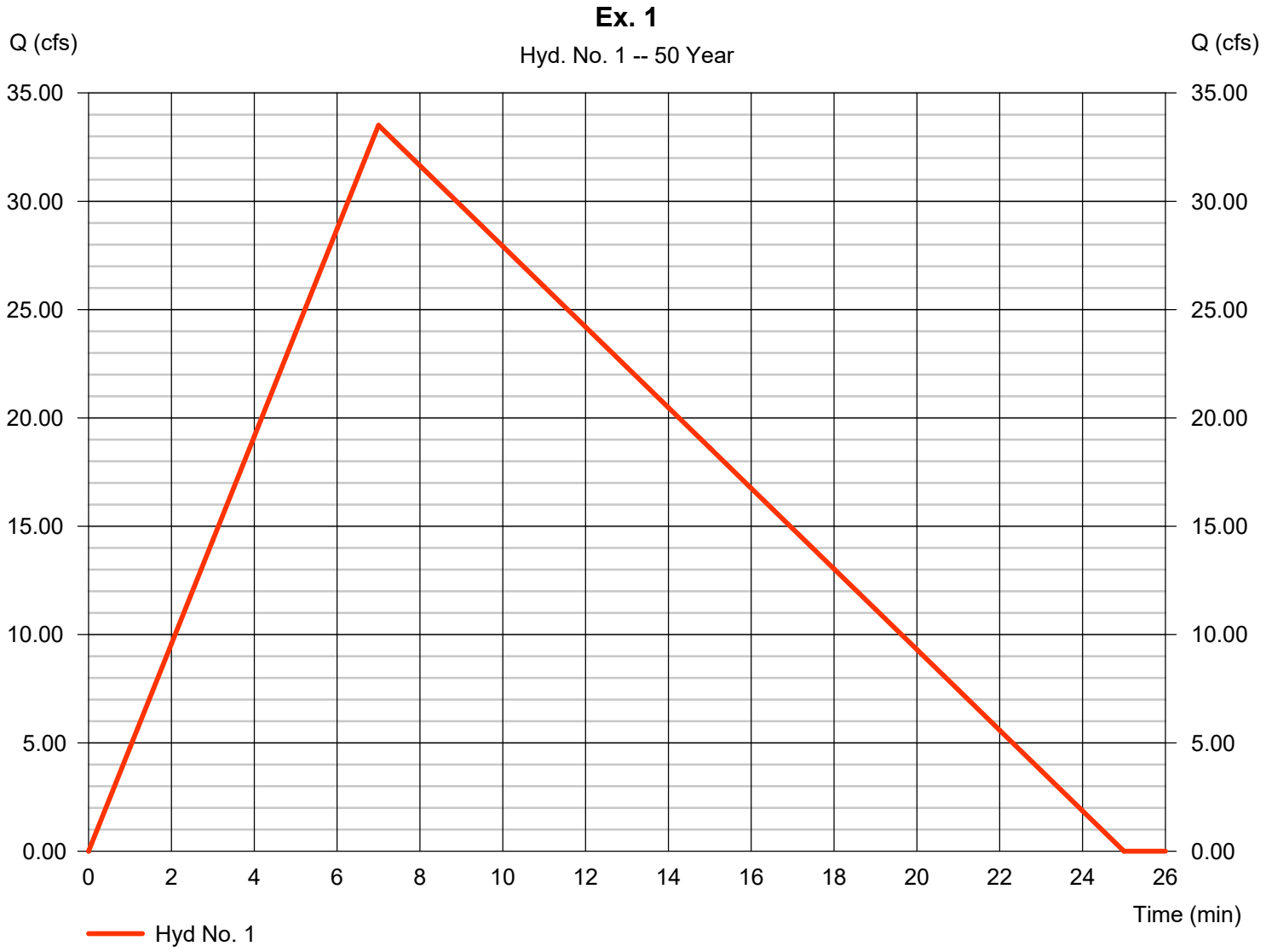
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	33.51	1	7	25,825	------	------	------	Ex. 1
2	Rational	6.114	1	7	4,712	------	------	------	Ex. 2
3	Rational	0.294	1	6	194	------	------	------	Ex. 3
5	Rational	29.15	1	7	22,467	------	------	------	Prop. 1A (Detained)
6	Rational	30.49	1	7	23,501	------	------	------	Prop. 1B
7	Rational	0.349	1	5	192	------	------	------	Prop. 2
8	Rational	0.292	1	6	193	------	------	------	Prop. 3
10	Reservoir	11.02	1	18	21,860	5	507.60	14,884	1A through Pond
11	Combine	31.88	1	7	44,730	6, 10	------	------	Prop. 1 Combined
13	Rational	2.337	1	6	1,544	------	------	------	Cross Road Culvert

Hydrograph Report

Hyd. No. 1

Ex. 1

Hydrograph type	=	Rational	Peak discharge	=	33.51 cfs
Storm frequency	=	50 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	25,825 cuft
Drainage area	=	15.690 ac	Runoff coeff.	=	0.2
Intensity	=	10.678 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

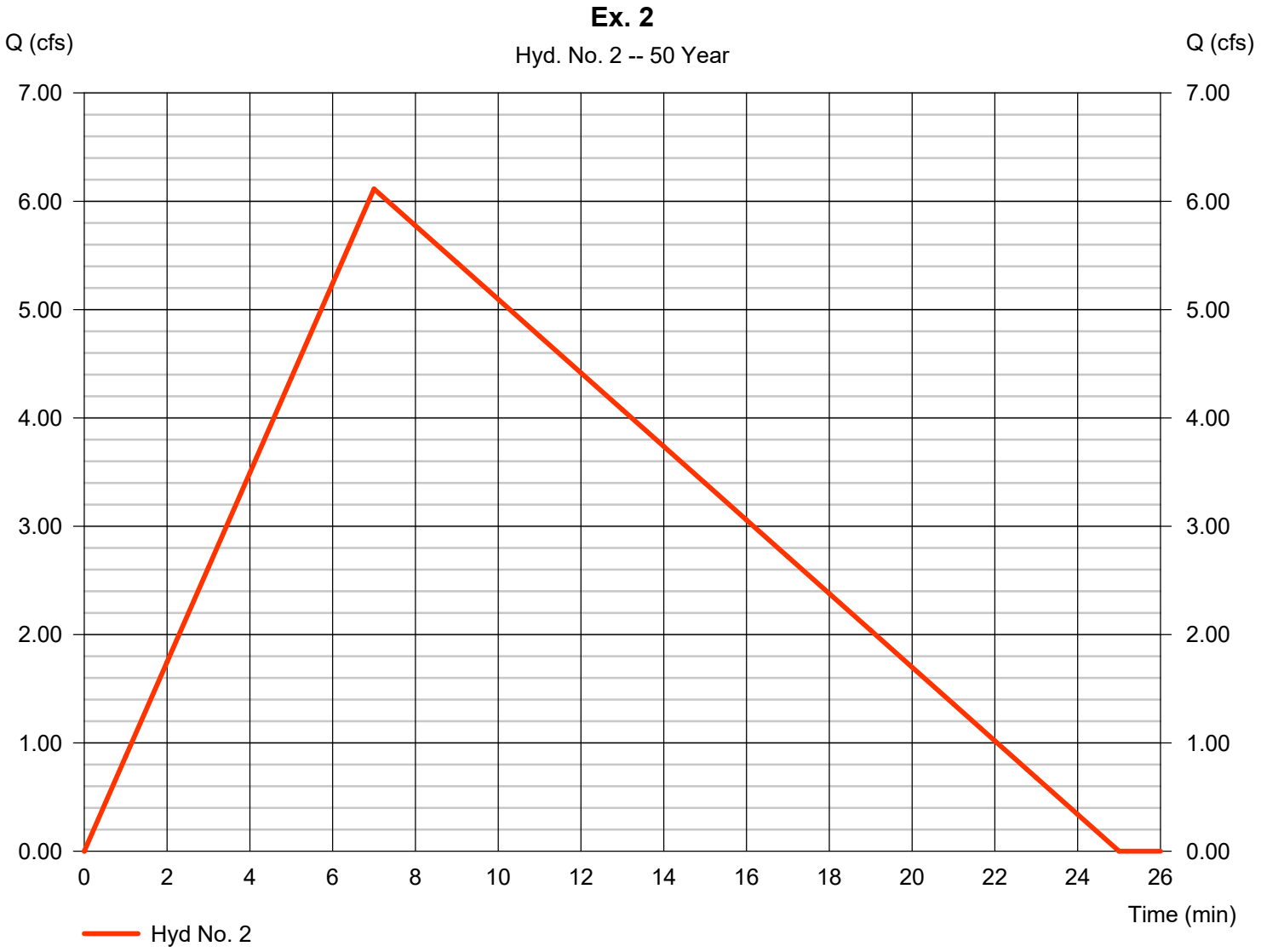


Hydrograph Report

Hyd. No. 2

Ex. 2

Hydrograph type	=	Rational	Peak discharge	=	6.114 cfs
Storm frequency	=	50 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	4,712 cuft
Drainage area	=	2.863 ac	Runoff coeff.	=	0.2
Intensity	=	10.678 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

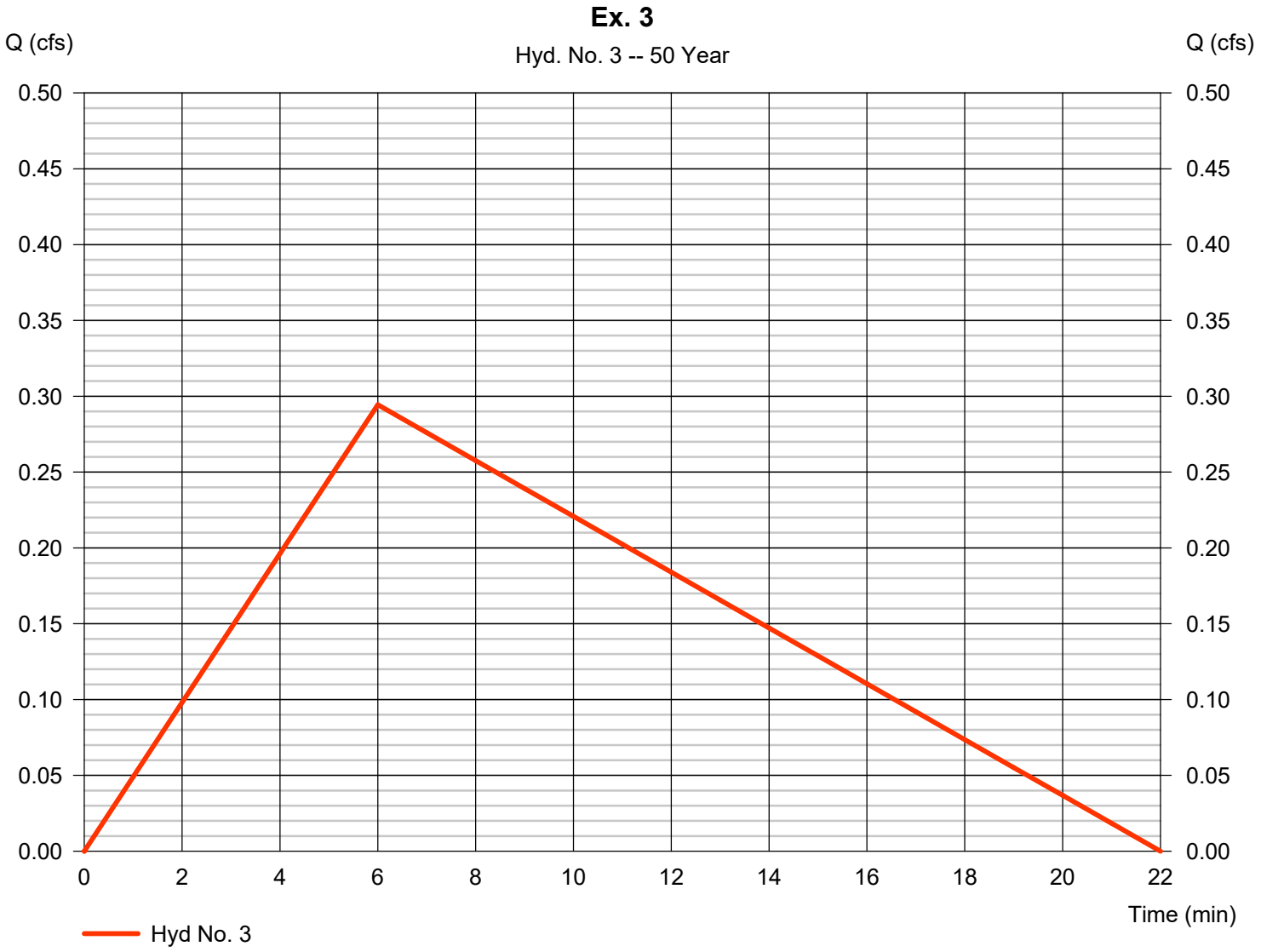


Hydrograph Report

Hyd. No. 3

Ex. 3

Hydrograph type	=	Rational	Peak discharge	=	0.294 cfs
Storm frequency	=	50 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	194 cuft
Drainage area	=	0.131 ac	Runoff coeff.	=	0.2
Intensity	=	11.236 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

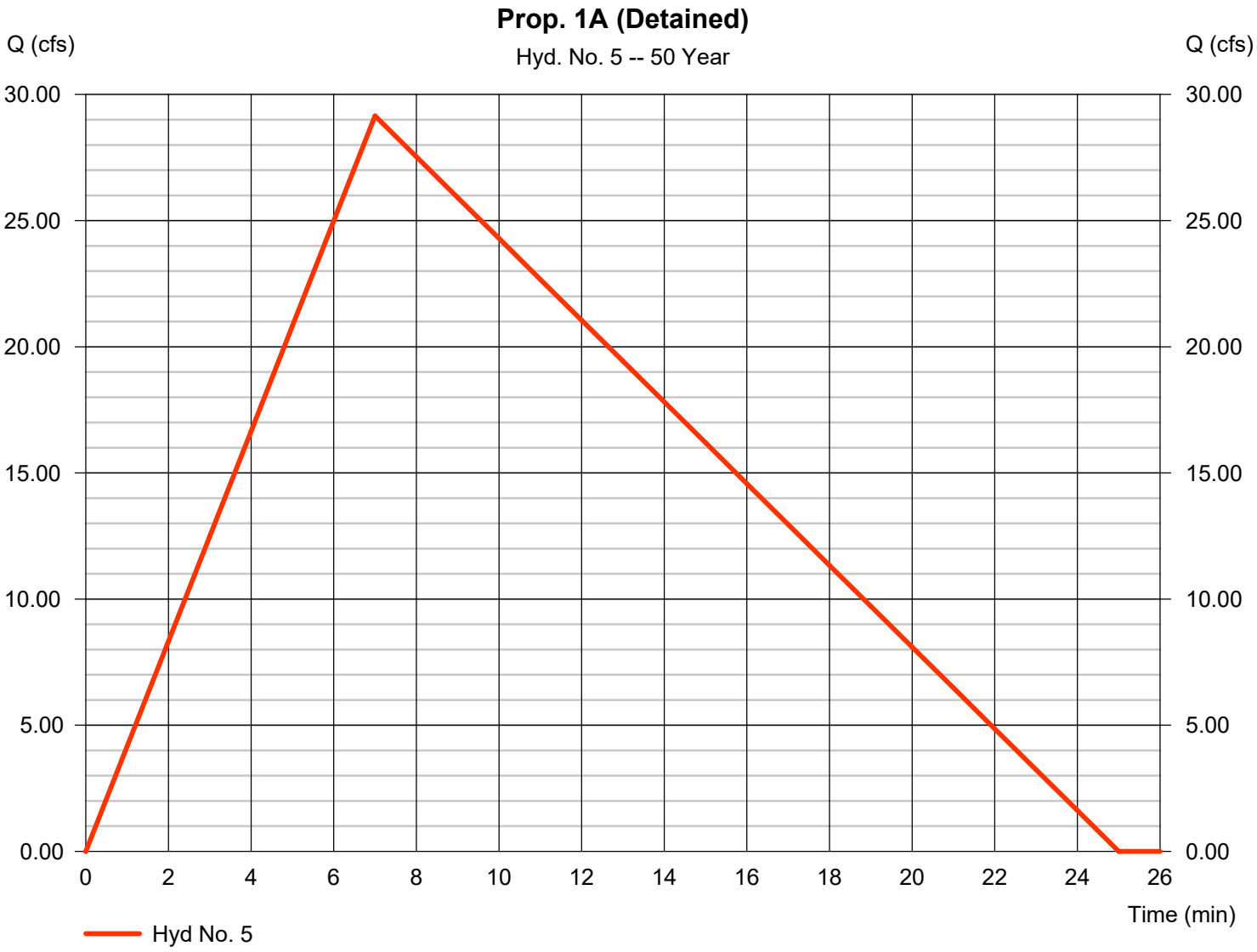


Hydrograph Report

Hyd. No. 5

Prop. 1A (Detained)

Hydrograph type	=	Rational	Peak discharge	=	29.15 cfs
Storm frequency	=	50 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	22,467 cuft
Drainage area	=	5.460 ac	Runoff coeff.	=	0.5
Intensity	=	10.678 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

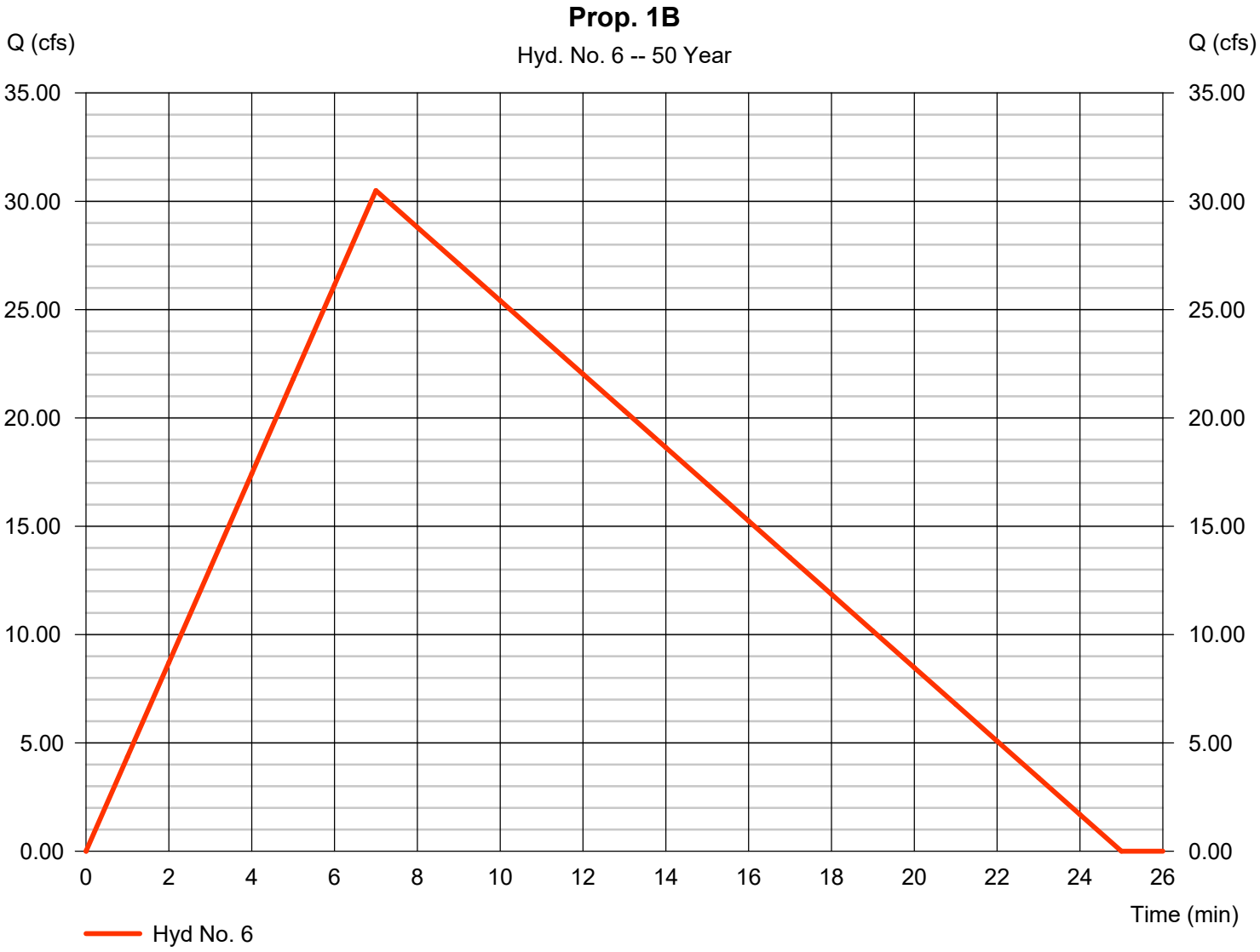


Hydrograph Report

Hyd. No. 6

Prop. 1B

Hydrograph type	=	Rational	Peak discharge	=	30.49 cfs
Storm frequency	=	50 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	23,501 cuft
Drainage area	=	12.980 ac	Runoff coeff.	=	0.22
Intensity	=	10.678 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

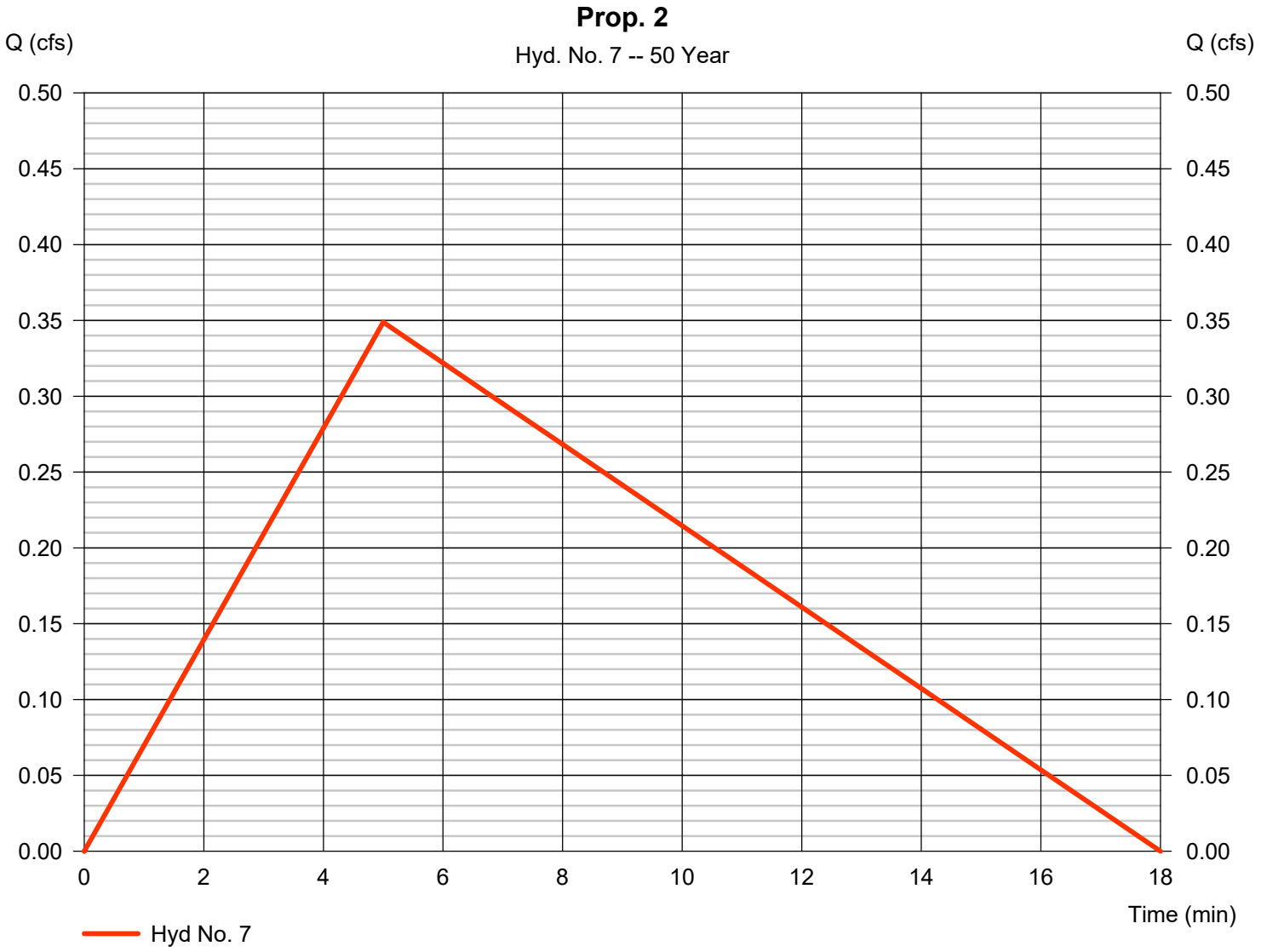


Hydrograph Report

Hyd. No. 7

Prop. 2

Hydrograph type	=	Rational	Peak discharge	=	0.349 cfs
Storm frequency	=	50 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	192 cuft
Drainage area	=	0.140 ac	Runoff coeff.	=	0.21
Intensity	=	11.864 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

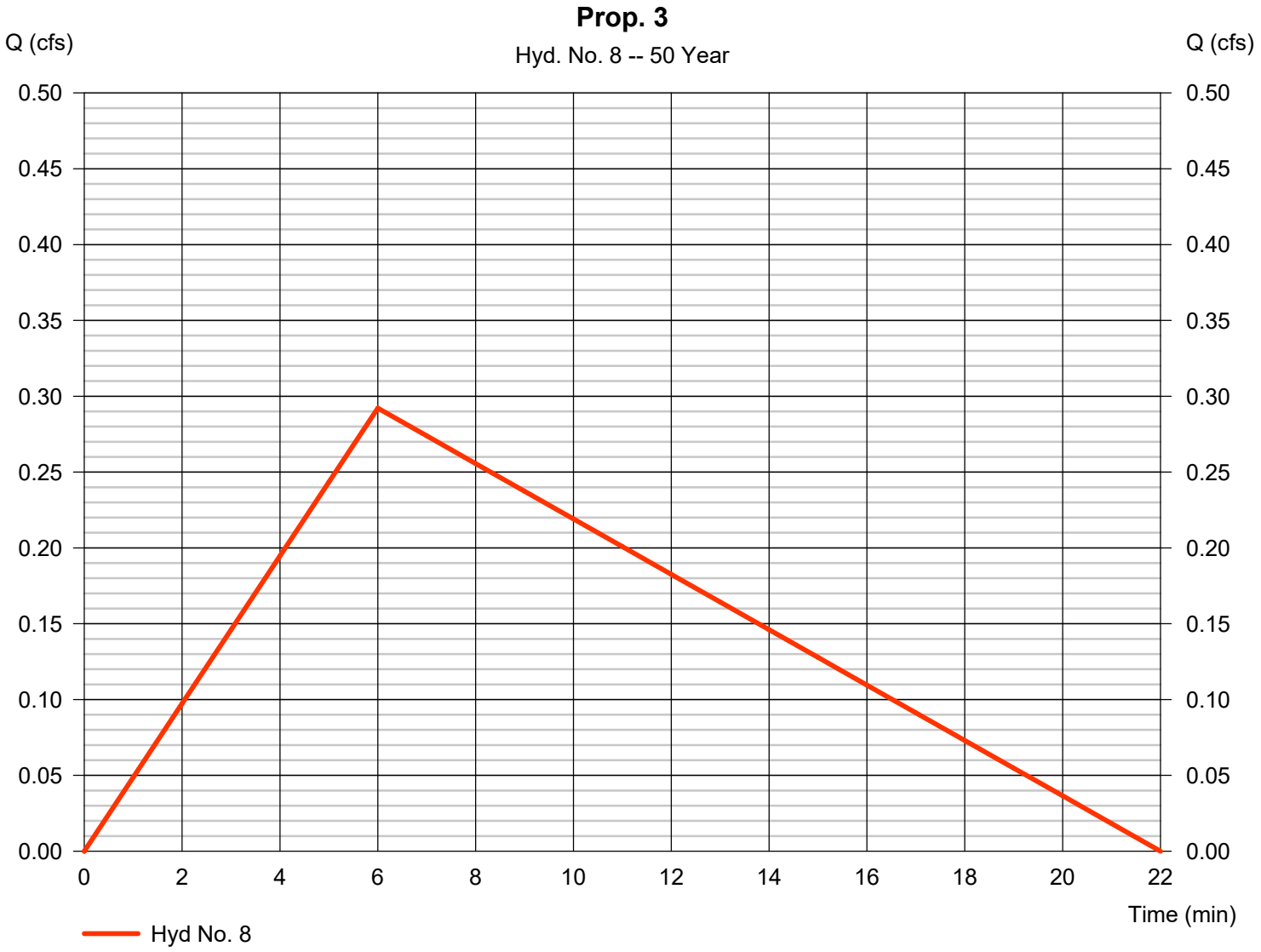


Hydrograph Report

Hyd. No. 8

Prop. 3

Hydrograph type	=	Rational	Peak discharge	=	0.292 cfs
Storm frequency	=	50 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	193 cuft
Drainage area	=	0.130 ac	Runoff coeff.	=	0.2
Intensity	=	11.236 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67



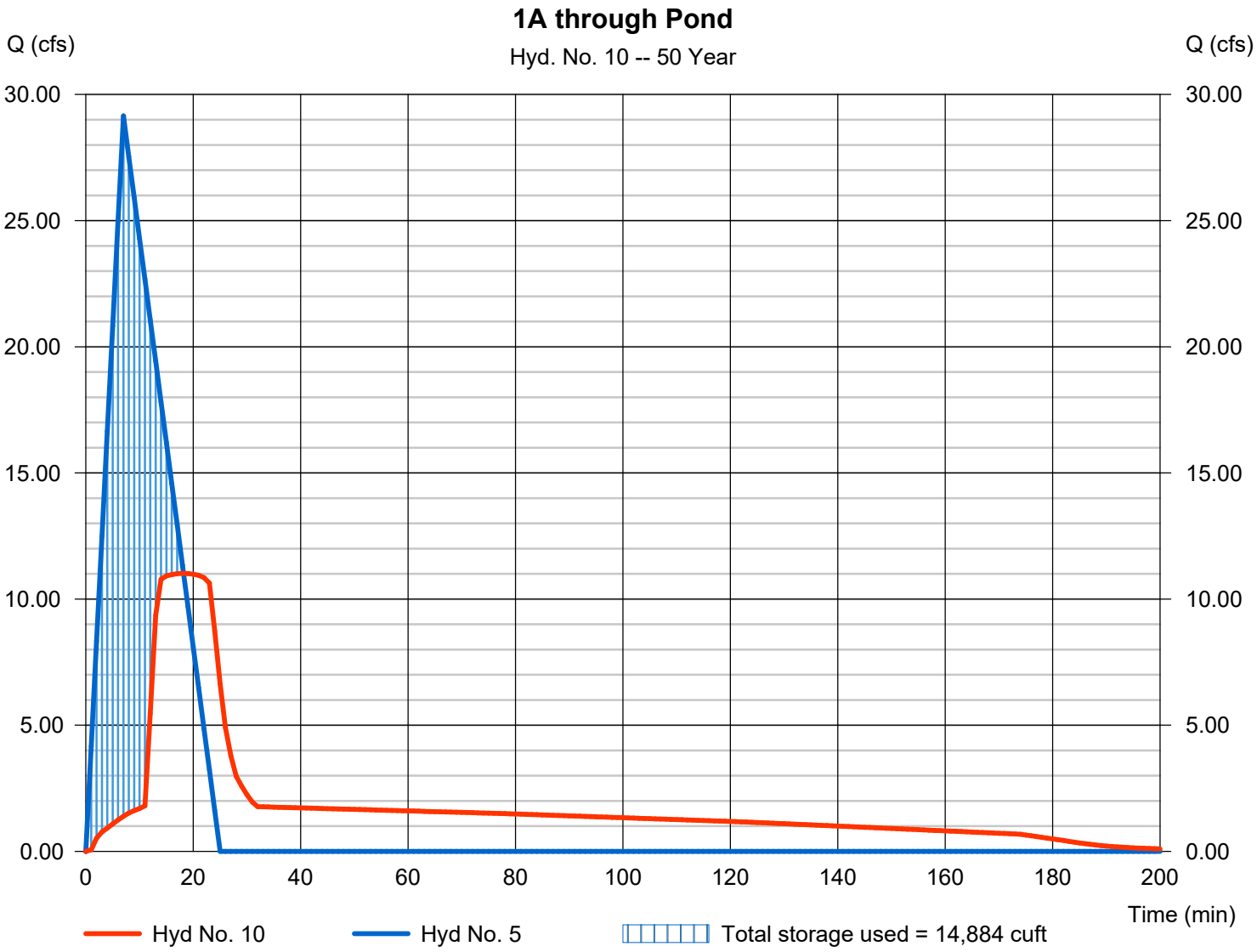
Hydrograph Report

Hyd. No. 10

1A through Pond

Hydrograph type	=	Reservoir	Peak discharge	=	11.02 cfs
Storm frequency	=	50 yrs	Time to peak	=	18 min
Time interval	=	1 min	Hyd. volume	=	21,860 cuft
Inflow hyd. No.	=	5 - Prop. 1A (Detained)	Max. Elevation	=	507.60 ft
Reservoir name	=	Pond 1A	Max. Storage	=	14,884 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Pond 1A

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 503.23 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	503.23	05	0	0
0.77	504.00	2,466	663	663
1.77	505.00	3,217	2,833	3,496
2.77	506.00	4,052	3,626	7,122
3.77	507.00	4,969	4,502	11,624
4.77	508.00	5,970	5,461	17,085
5.77	509.00	7,055	6,504	23,590
6.77	510.00	8,224	7,631	31,221

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	6.00	0.00	0.00
Span (in)	= 12.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 498.50	503.23	0.00	0.00
Length (ft)	= 69.00	11.00	0.00	0.00
Slope (%)	= 6.55	2.02	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

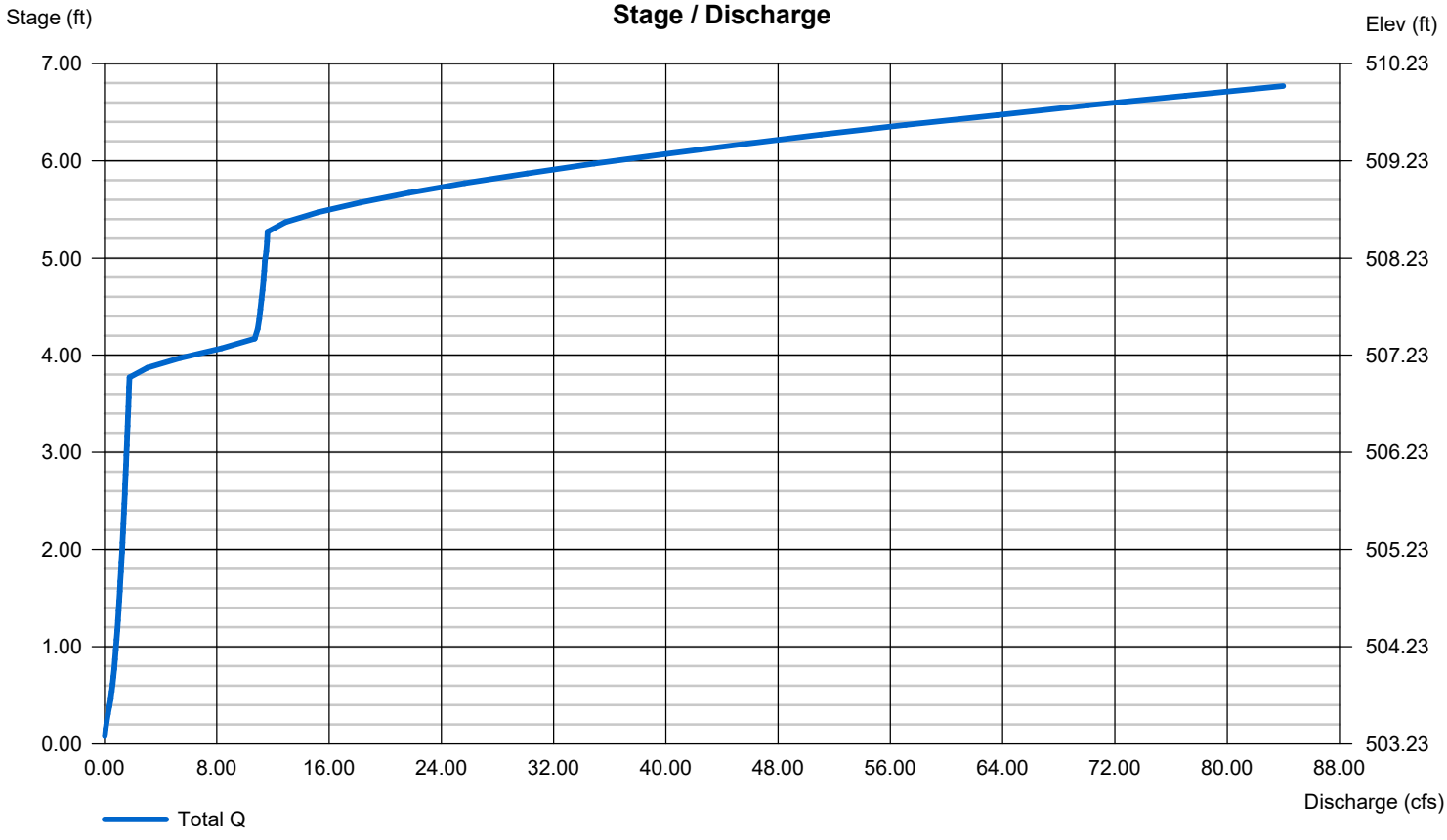
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	15.00	0.00	0.00
Crest El. (ft)	= 507.00	508.50	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= Rect	Broad	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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

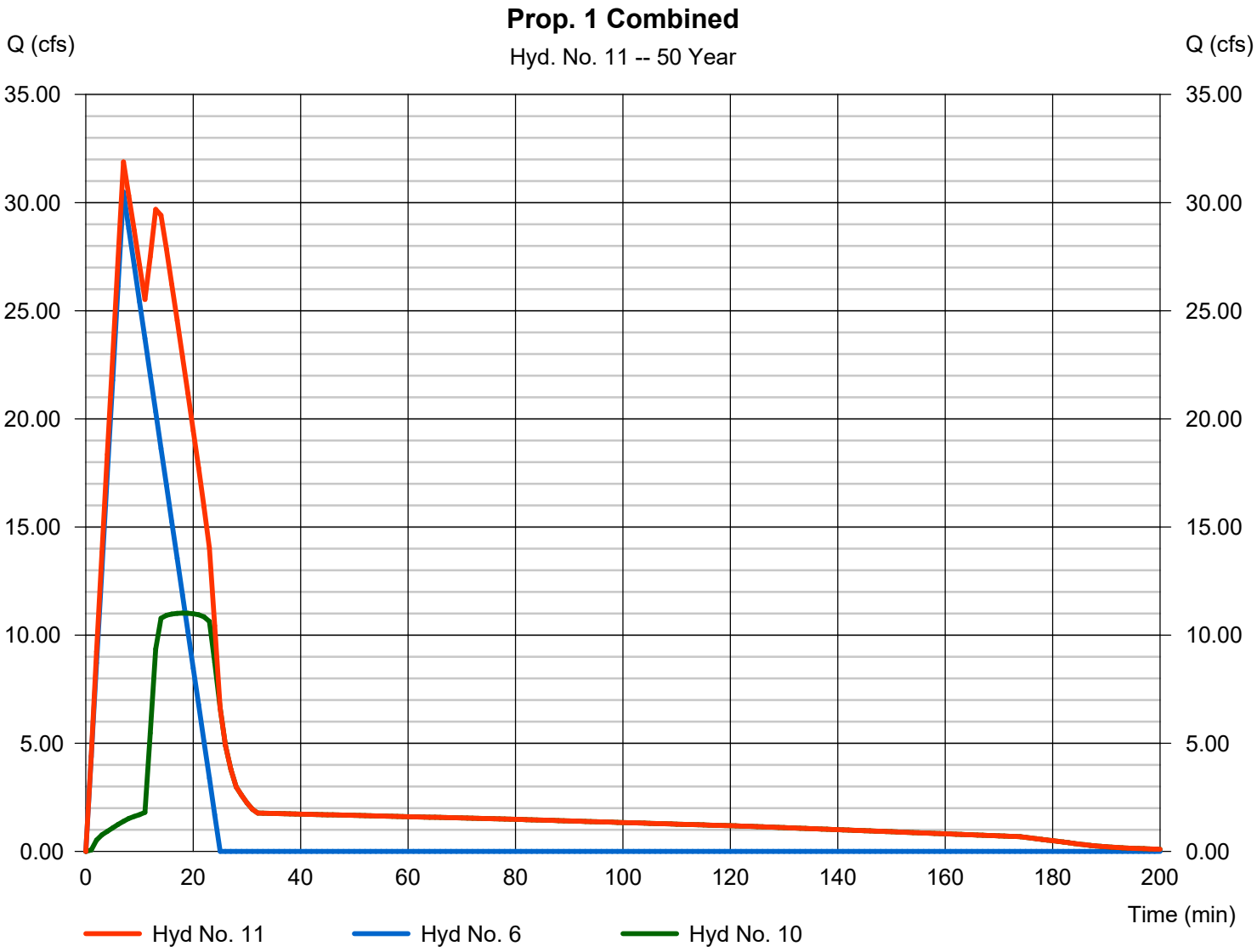


Hydrograph Report

Hyd. No. 11

Prop. 1 Combined

Hydrograph type	=	Combine	Peak discharge	=	31.88 cfs
Storm frequency	=	50 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	44,730 cuft
Inflow hyds.	=	6, 10	Contrib. drain. area	=	12.980 ac

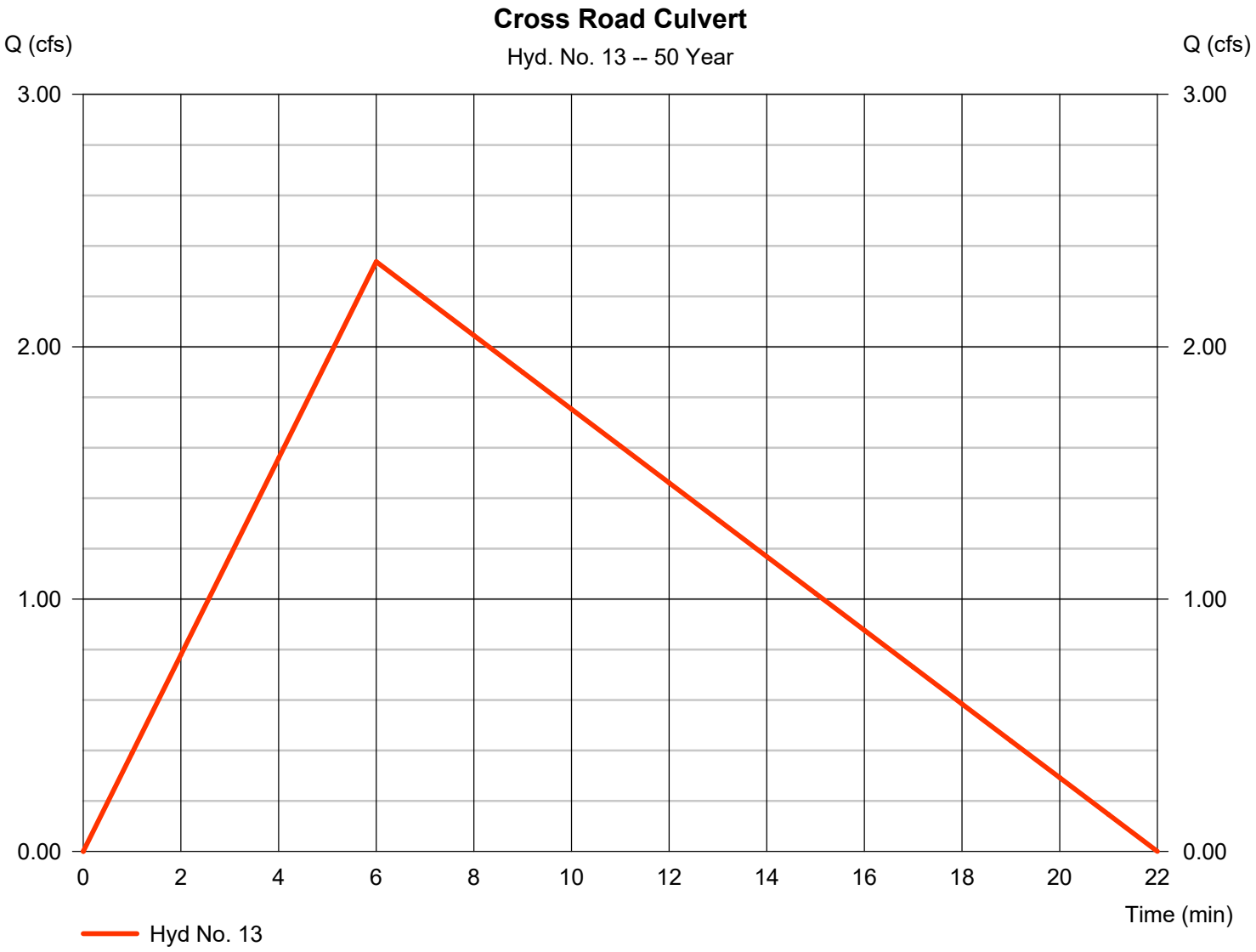


Hydrograph Report

Hyd. No. 13

Cross Road Culvert

Hydrograph type	=	Rational	Peak discharge	=	2.337 cfs
Storm frequency	=	50 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	1,544 cuft
Drainage area	=	1.040 ac	Runoff coeff.	=	0.2
Intensity	=	11.236 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67



Appendix E.5: 100-Year Hydraflow Hydrographs Calculations

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2024

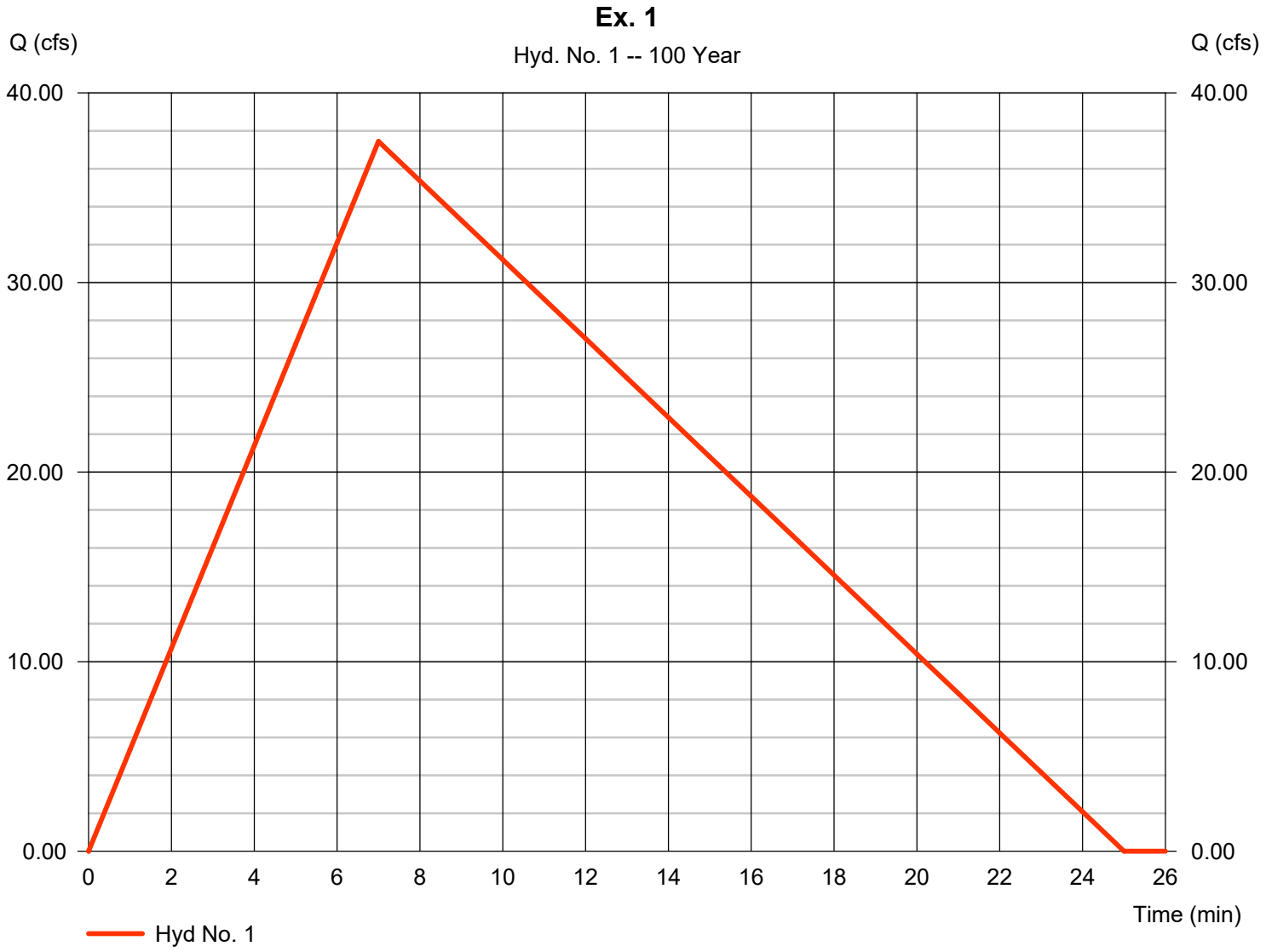
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Rational	37.44	1	7	28,858	------	------	------	Ex. 1
2	Rational	6.832	1	7	5,266	------	------	------	Ex. 2
3	Rational	0.329	1	6	217	------	------	------	Ex. 3
5	Rational	32.58	1	7	25,106	------	------	------	Prop. 1A (Detained)
6	Rational	34.07	1	7	26,261	------	------	------	Prop. 1B
7	Rational	0.389	1	5	214	------	------	------	Prop. 2
8	Rational	0.326	1	6	216	------	------	------	Prop. 3
10	Reservoir	11.24	1	19	24,428	5	507.88	16,422	1A through Pond
11	Combine	35.52	1	7	49,983	6, 10	------	------	Prop. 1 Combined
13	Reservoir	11.30	1	19	12,807	5	507.97	16,899	Low Flow Blocked
14	Reservoir	6.902	1	21	4,093	5	508.81	22,381	Overflow Weir
16	Rational	2.610	1	6	1,724	------	------	------	Cross Road Culvert

Hydrograph Report

Hyd. No. 1

Ex. 1

Hydrograph type	=	Rational	Peak discharge	=	37.44 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	28,858 cuft
Drainage area	=	15.690 ac	Runoff coeff.	=	0.2
Intensity	=	11.932 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

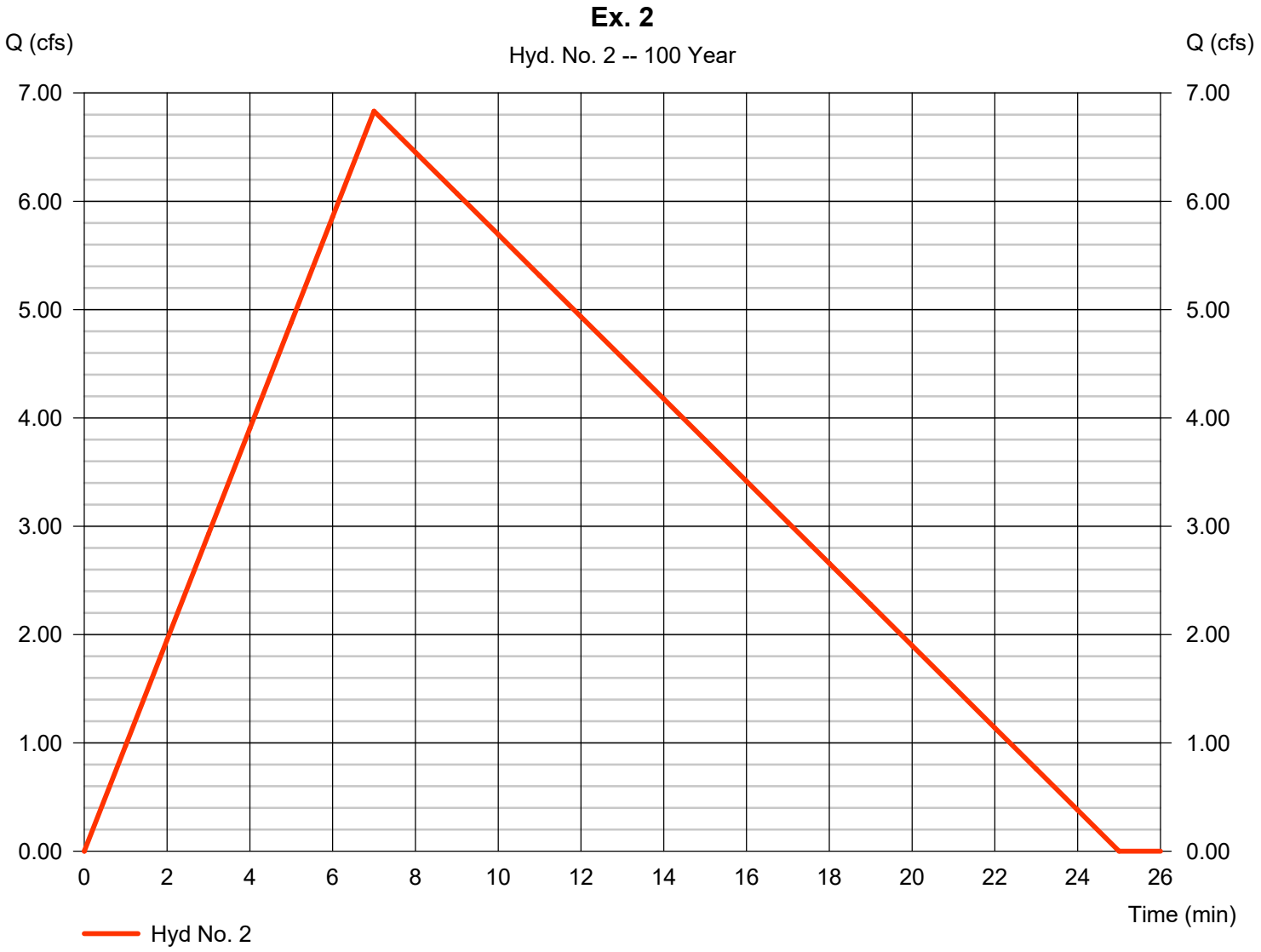


Hydrograph Report

Hyd. No. 2

Ex. 2

Hydrograph type	=	Rational	Peak discharge	=	6.832 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	5,266 cuft
Drainage area	=	2.863 ac	Runoff coeff.	=	0.2
Intensity	=	11.932 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

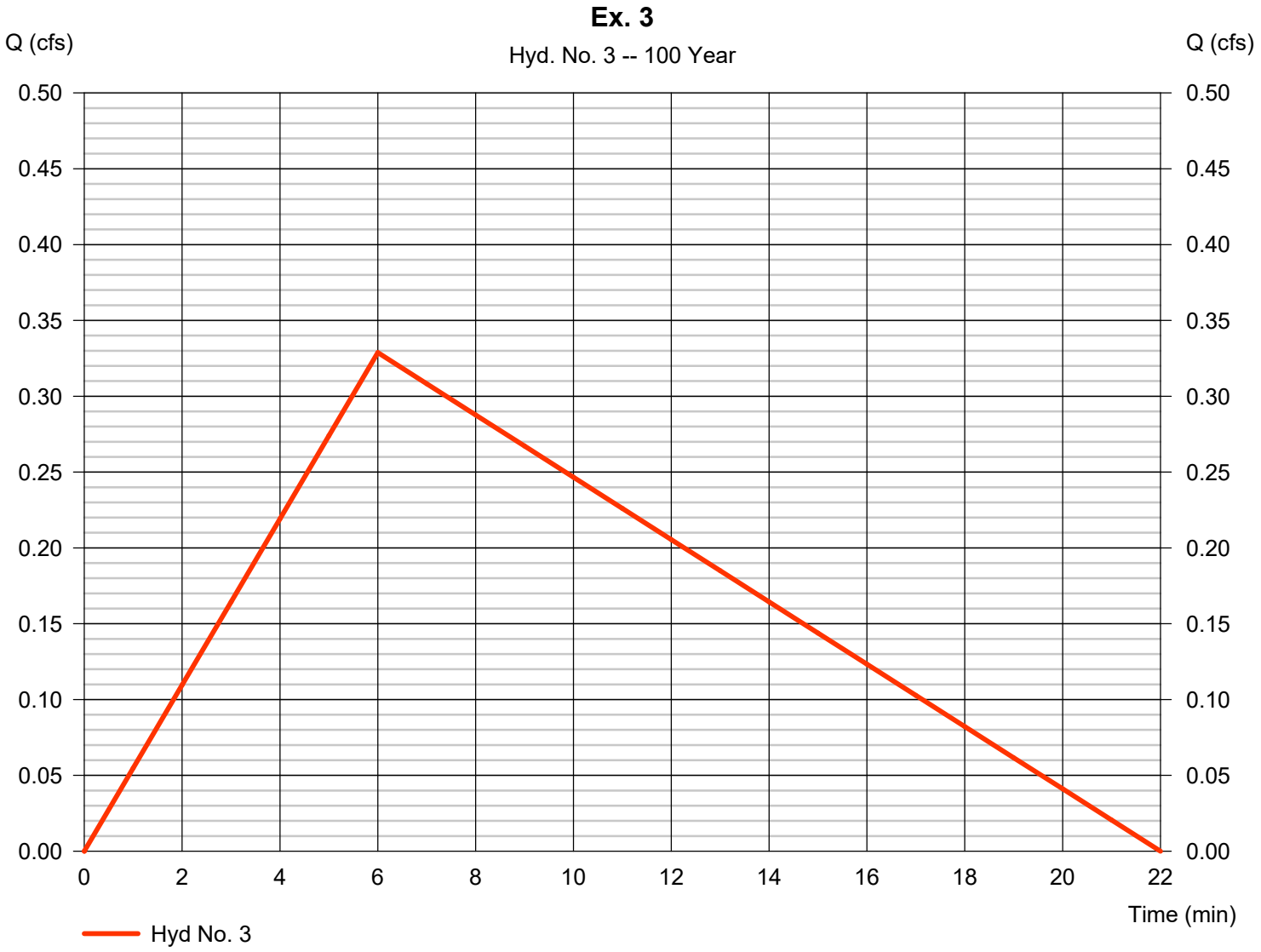


Hydrograph Report

Hyd. No. 3

Ex. 3

Hydrograph type	=	Rational	Peak discharge	=	0.329 cfs
Storm frequency	=	100 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	217 cuft
Drainage area	=	0.131 ac	Runoff coeff.	=	0.2
Intensity	=	12.550 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

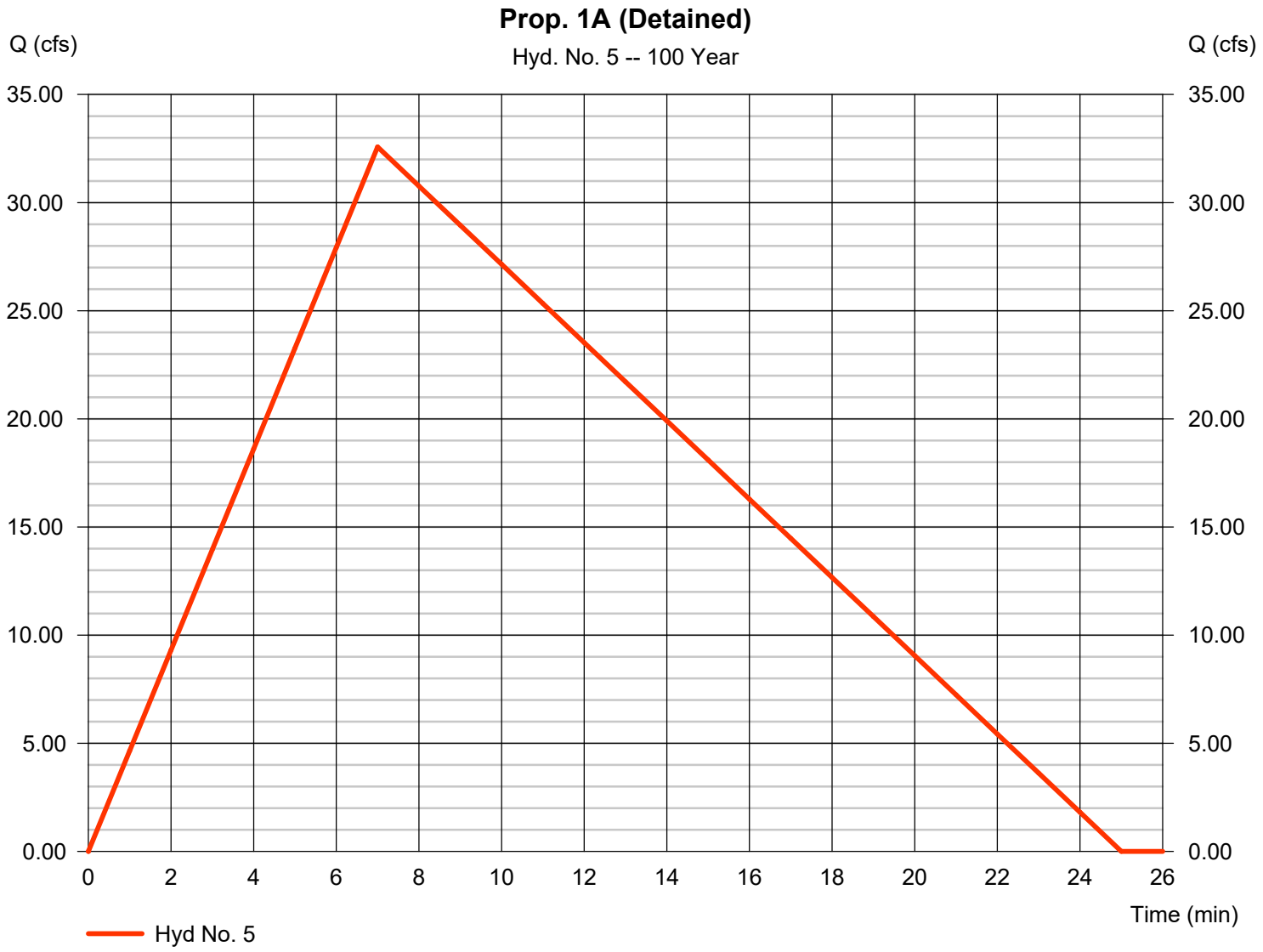


Hydrograph Report

Hyd. No. 5

Prop. 1A (Detained)

Hydrograph type	=	Rational	Peak discharge	=	32.58 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	25,106 cuft
Drainage area	=	5.460 ac	Runoff coeff.	=	0.5
Intensity	=	11.932 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

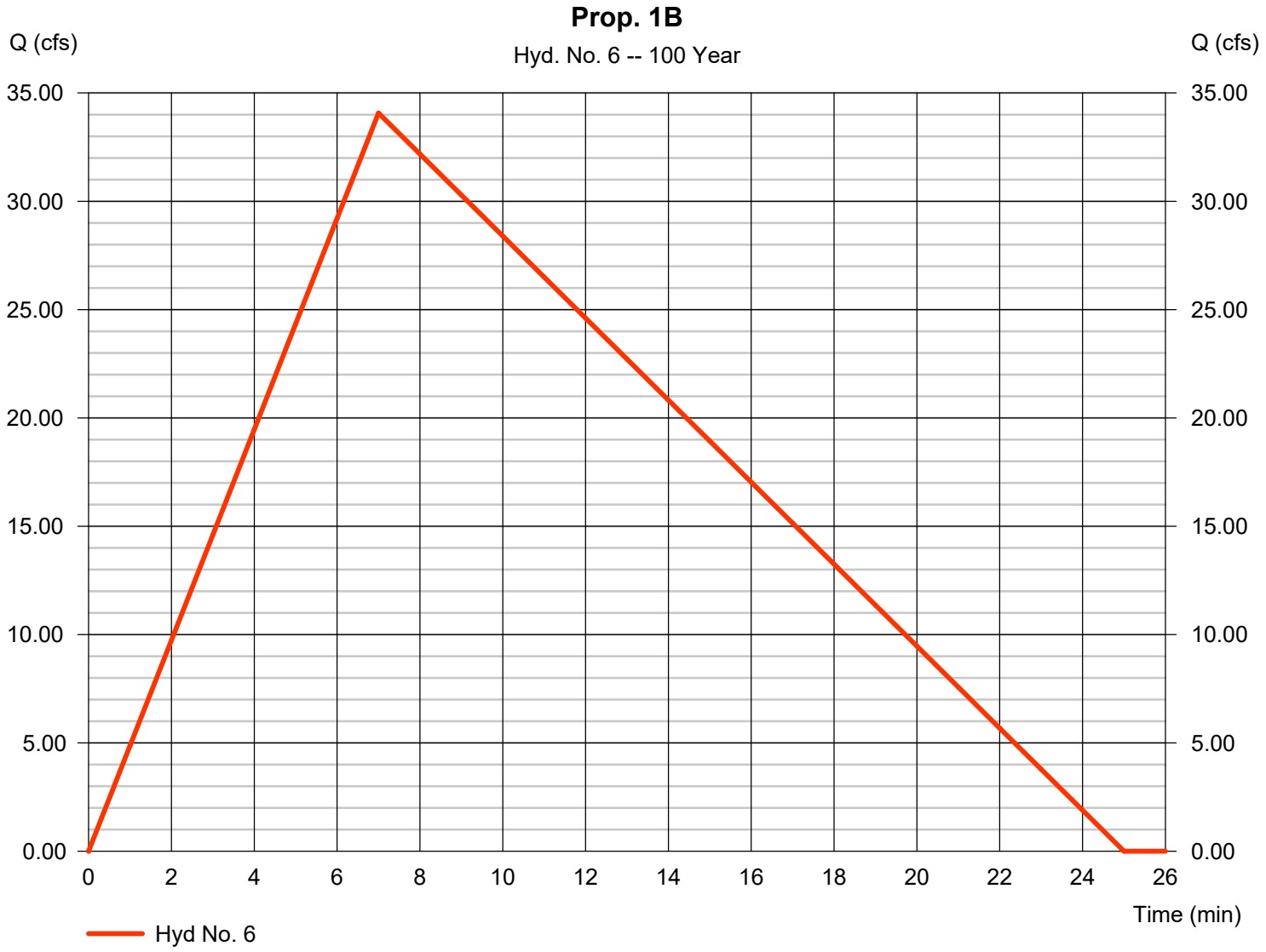


Hydrograph Report

Hyd. No. 6

Prop. 1B

Hydrograph type	=	Rational	Peak discharge	=	34.07 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	26,261 cuft
Drainage area	=	12.980 ac	Runoff coeff.	=	0.22
Intensity	=	11.932 in/hr	Tc by User	=	7.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

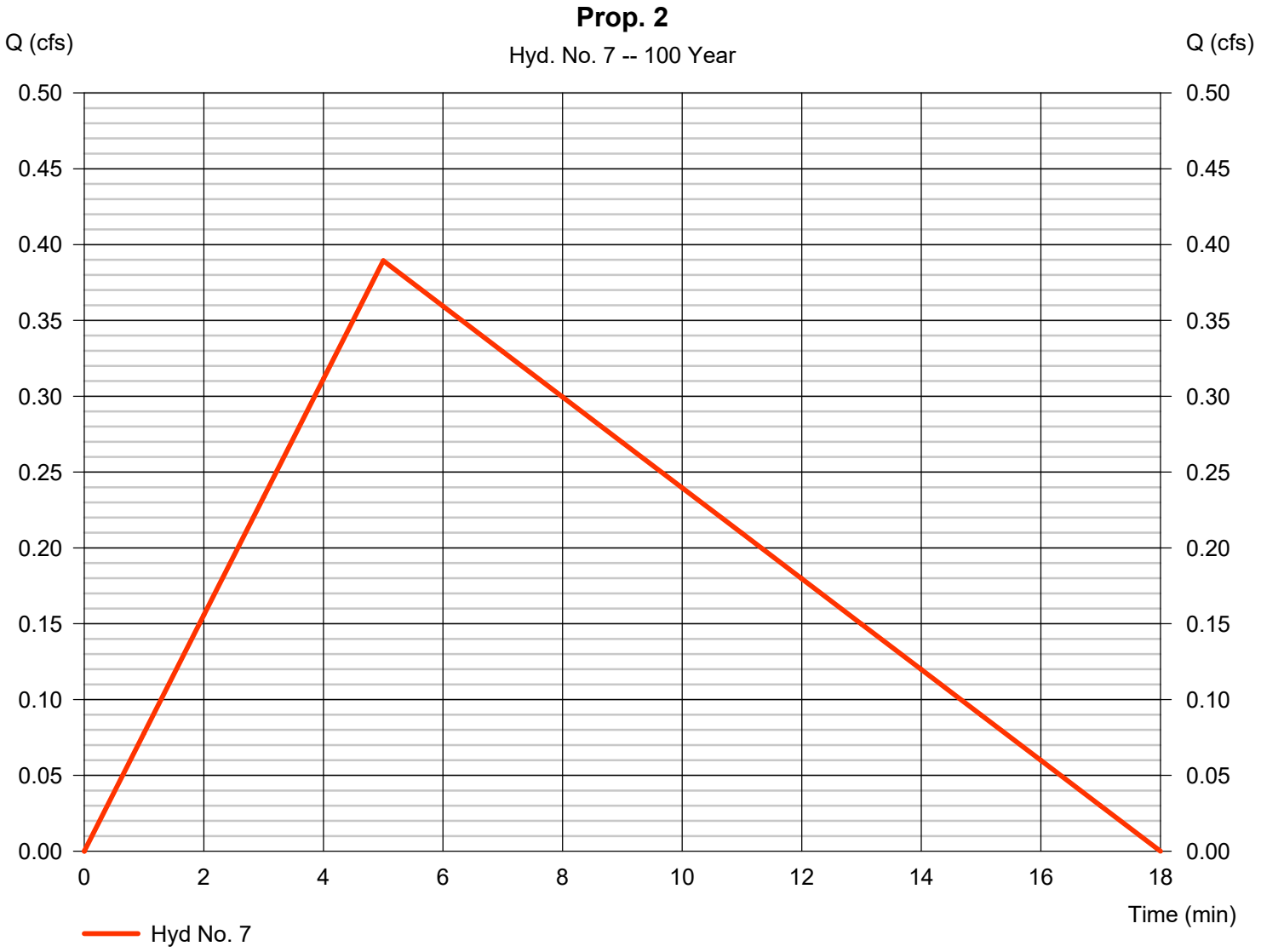


Hydrograph Report

Hyd. No. 7

Prop. 2

Hydrograph type	=	Rational	Peak discharge	=	0.389 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	214 cuft
Drainage area	=	0.140 ac	Runoff coeff.	=	0.21
Intensity	=	13.243 in/hr	Tc by User	=	5.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67

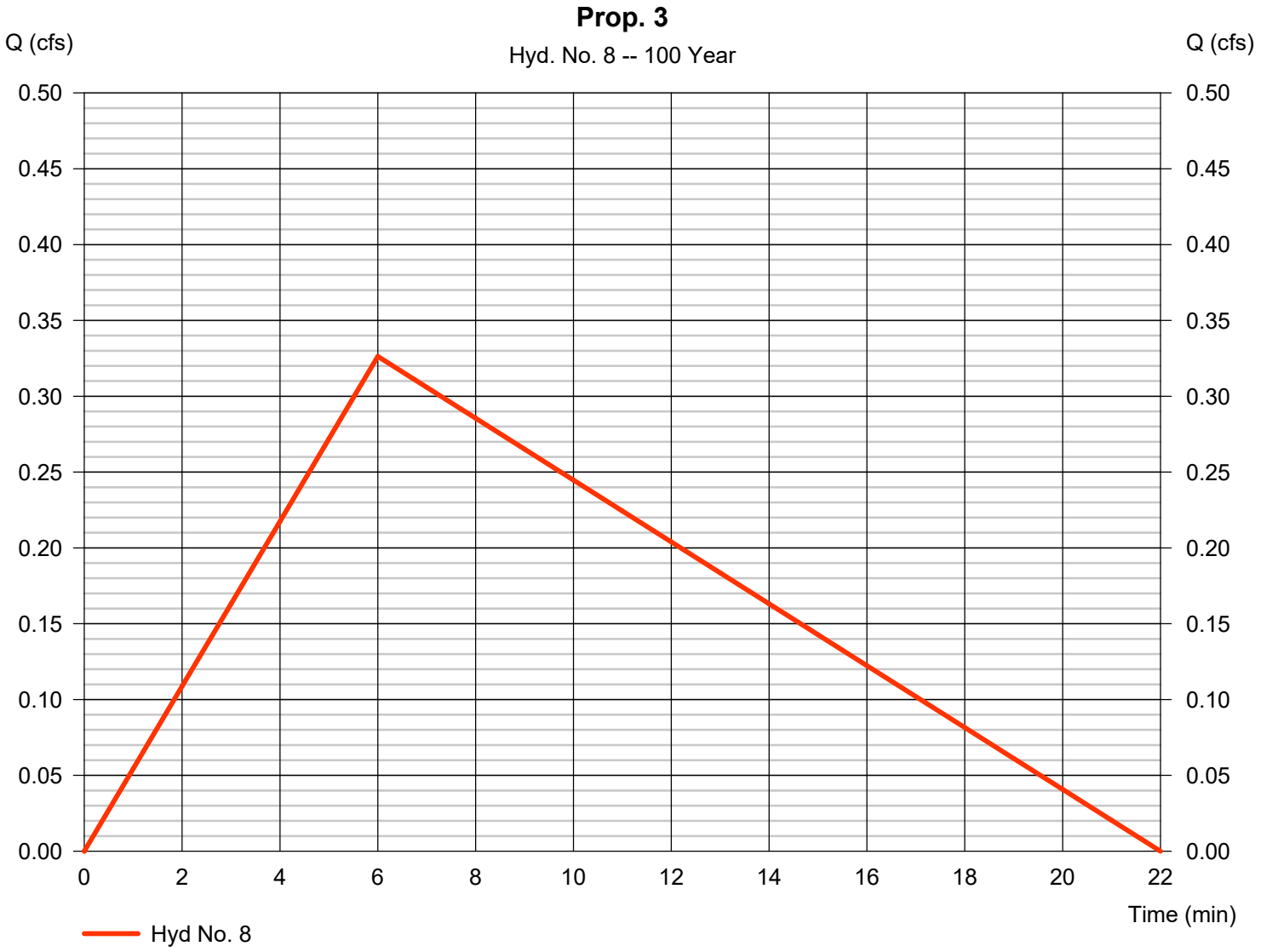


Hydrograph Report

Hyd. No. 8

Prop. 3

Hydrograph type	=	Rational	Peak discharge	=	0.326 cfs
Storm frequency	=	100 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	216 cuft
Drainage area	=	0.130 ac	Runoff coeff.	=	0.2
Intensity	=	12.550 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67



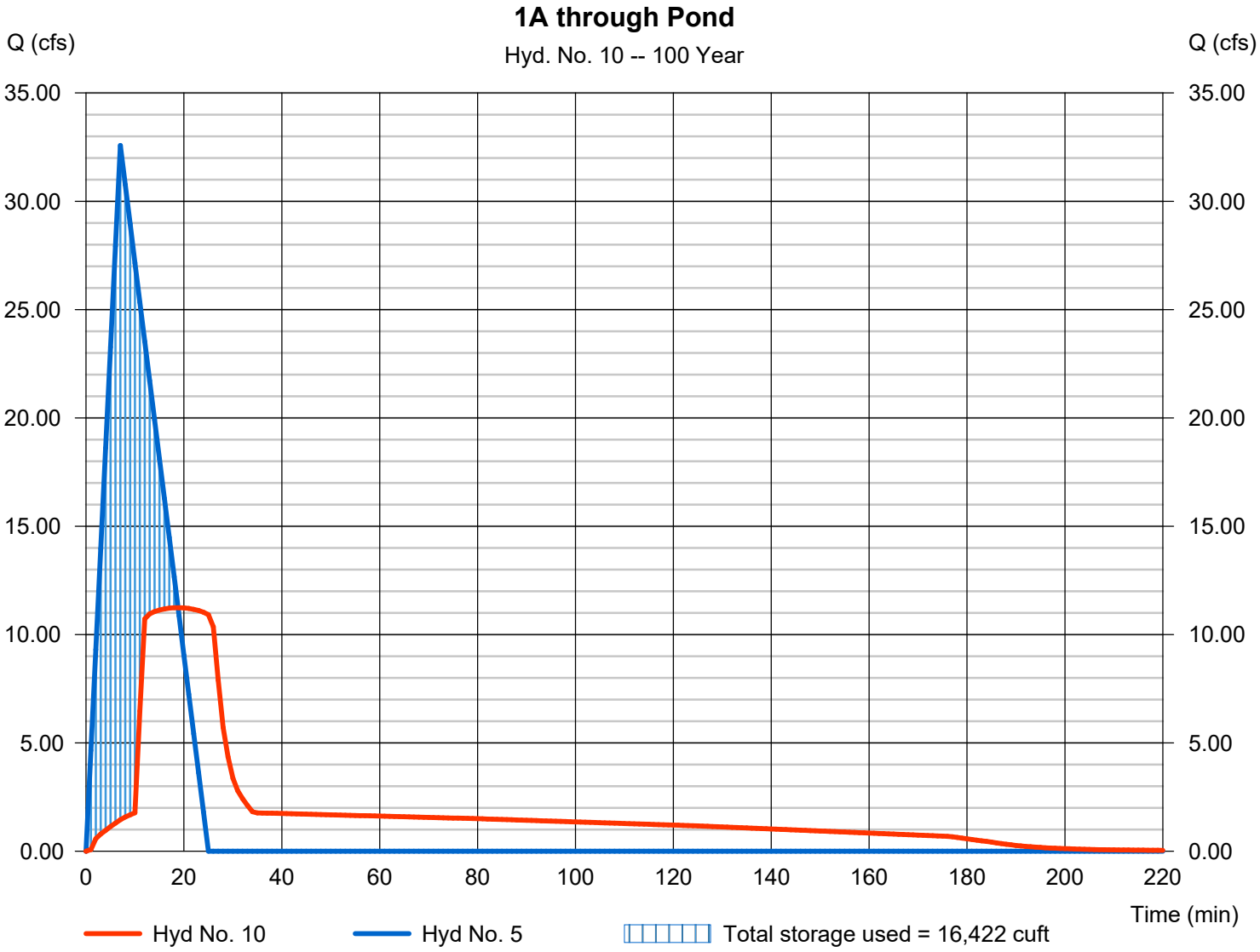
Hydrograph Report

Hyd. No. 10

1A through Pond

Hydrograph type	=	Reservoir	Peak discharge	=	11.24 cfs
Storm frequency	=	100 yrs	Time to peak	=	19 min
Time interval	=	1 min	Hyd. volume	=	24,428 cuft
Inflow hyd. No.	=	5 - Prop. 1A (Detained)	Max. Elevation	=	507.88 ft
Reservoir name	=	Pond 1A	Max. Storage	=	16,422 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Pond 1A

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 503.23 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	503.23	05	0	0
0.77	504.00	2,466	663	663
1.77	505.00	3,217	2,833	3,496
2.77	506.00	4,052	3,626	7,122
3.77	507.00	4,969	4,502	11,624
4.77	508.00	5,970	5,461	17,085
5.77	509.00	7,055	6,504	23,590
6.77	510.00	8,224	7,631	31,221

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	6.00	0.00	0.00
Span (in)	= 12.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 498.50	503.23	0.00	0.00
Length (ft)	= 69.00	11.00	0.00	0.00
Slope (%)	= 6.55	2.02	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

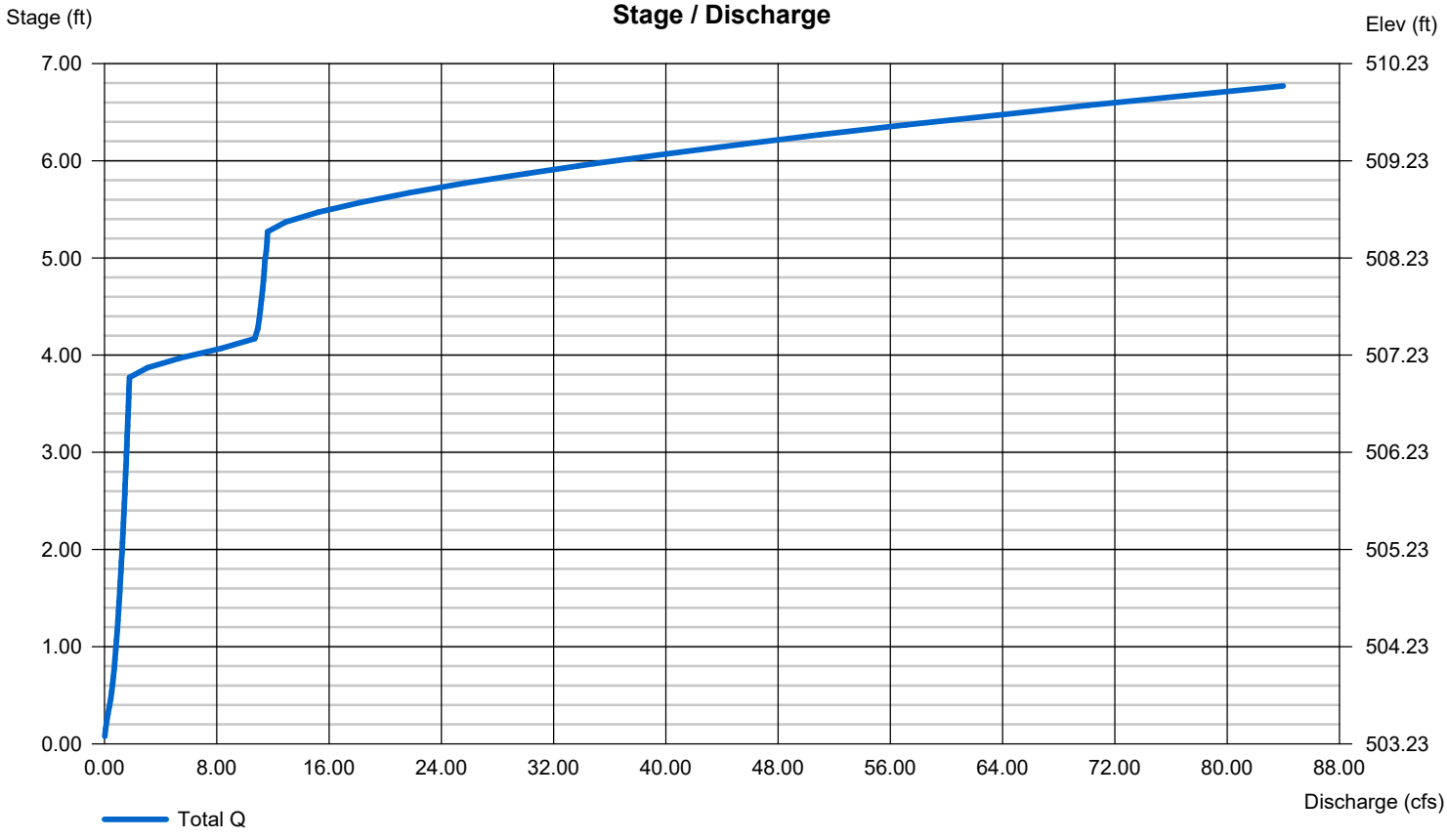
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	15.00	0.00	0.00
Crest El. (ft)	= 507.00	508.50	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= Rect	Broad	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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

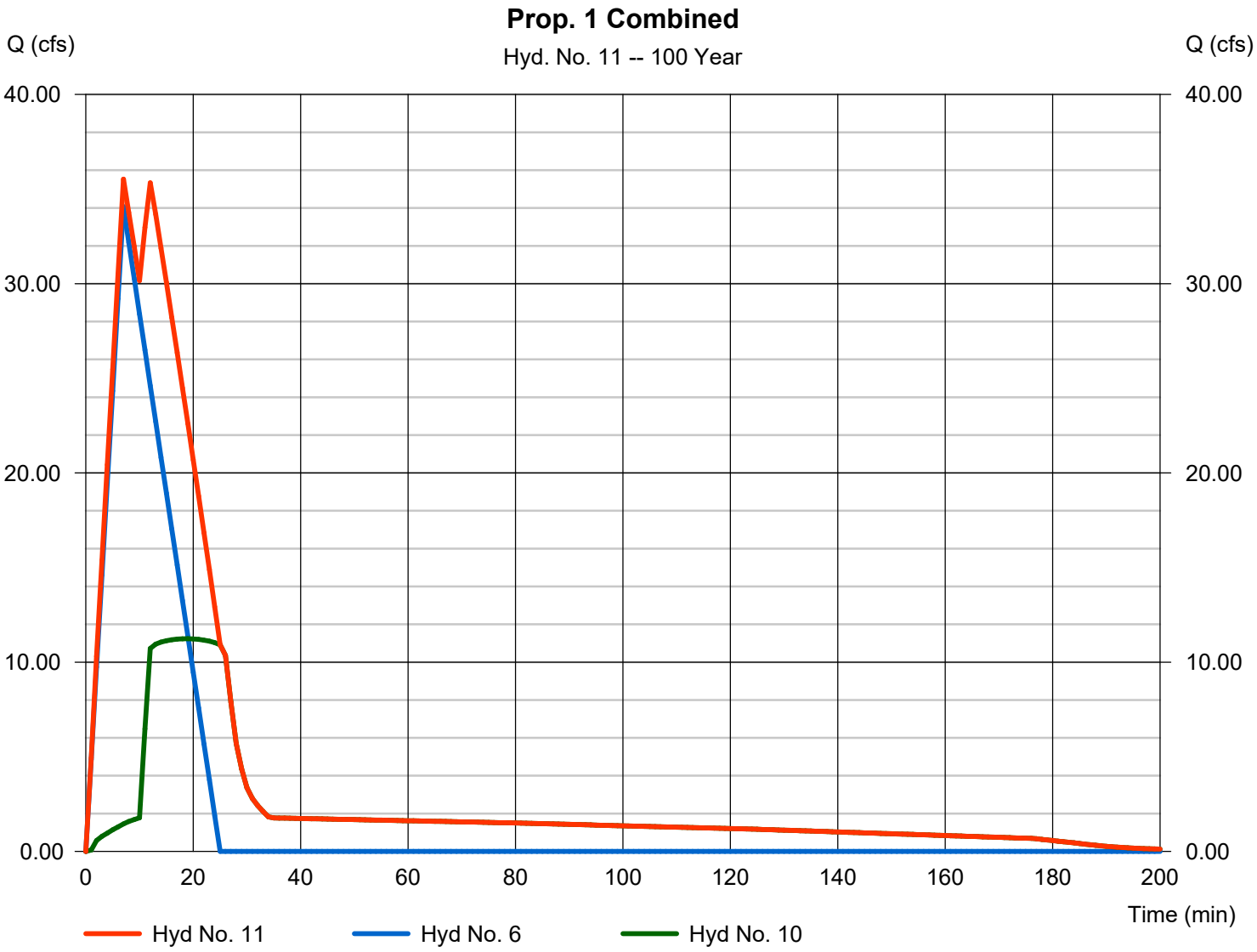


Hydrograph Report

Hyd. No. 11

Prop. 1 Combined

Hydrograph type	=	Combine	Peak discharge	=	35.52 cfs
Storm frequency	=	100 yrs	Time to peak	=	7 min
Time interval	=	1 min	Hyd. volume	=	49,983 cuft
Inflow hyds.	=	6, 10	Contrib. drain. area	=	12.980 ac



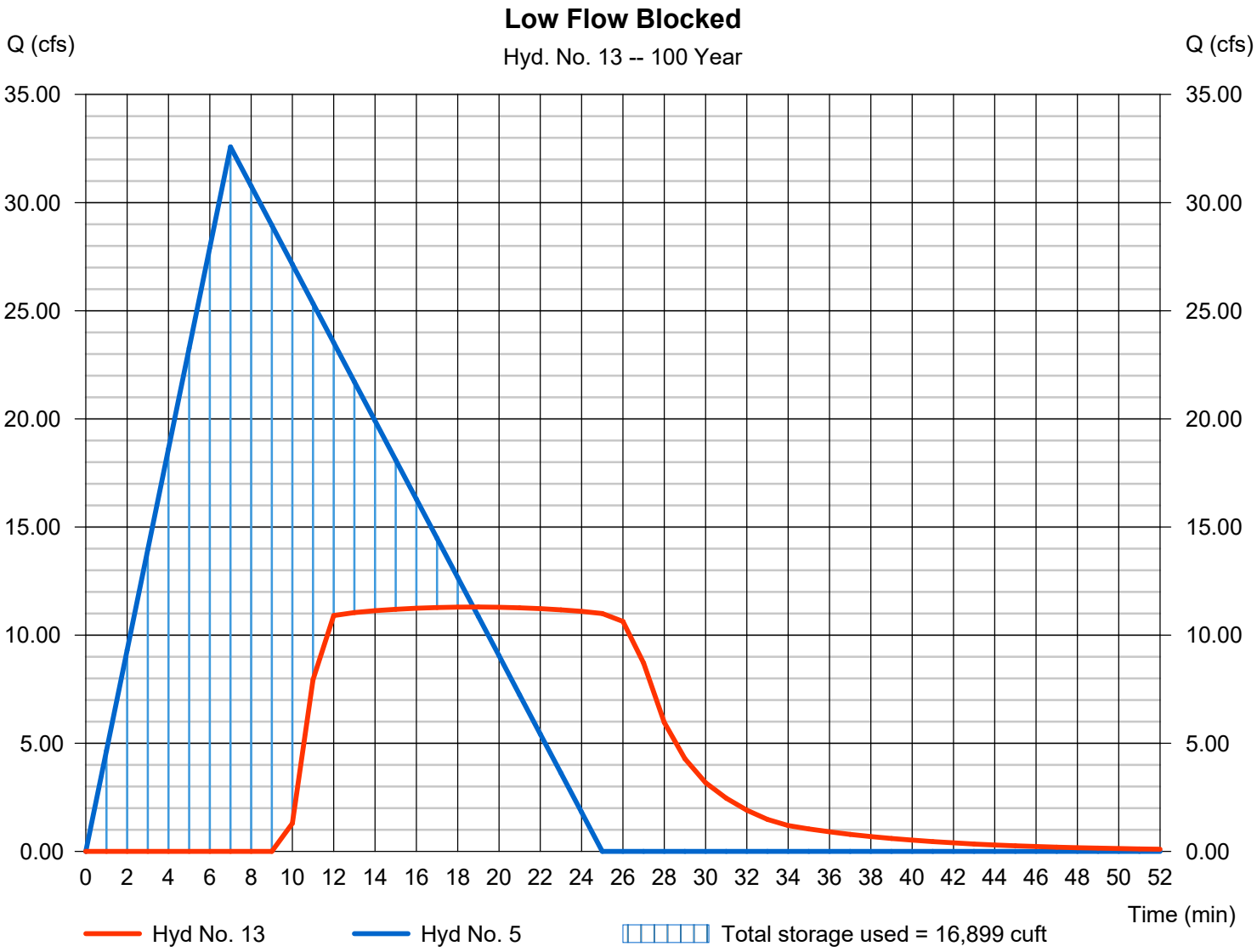
Hydrograph Report

Hyd. No. 13

Low Flow Blocked

Hydrograph type	=	Reservoir	Peak discharge	=	11.30 cfs
Storm frequency	=	100 yrs	Time to peak	=	19 min
Time interval	=	1 min	Hyd. volume	=	12,807 cuft
Inflow hyd. No.	=	5 - Prop. 1A (Detained)	Max. Elevation	=	507.97 ft
Reservoir name	=	Low Flow Blocked	Max. Storage	=	16,899 cuft

Storage Indication method used.



Pond Report

Pond No. 3 - Low Flow Blocked

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 503.23 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	503.23	05	0	0
0.77	504.00	2,466	663	663
1.77	505.00	3,217	2,833	3,496
2.77	506.00	4,052	3,626	7,122
3.77	507.00	4,969	4,502	11,624
4.77	508.00	5,970	5,461	17,085
5.77	509.00	7,055	6,504	23,590
6.77	510.00	8,224	7,631	31,221

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	Inactive	0.00	0.00
Span (in)	= 12.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 498.50	503.23	0.00	0.00
Length (ft)	= 69.00	11.00	0.00	0.00
Slope (%)	= 6.55	2.02	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

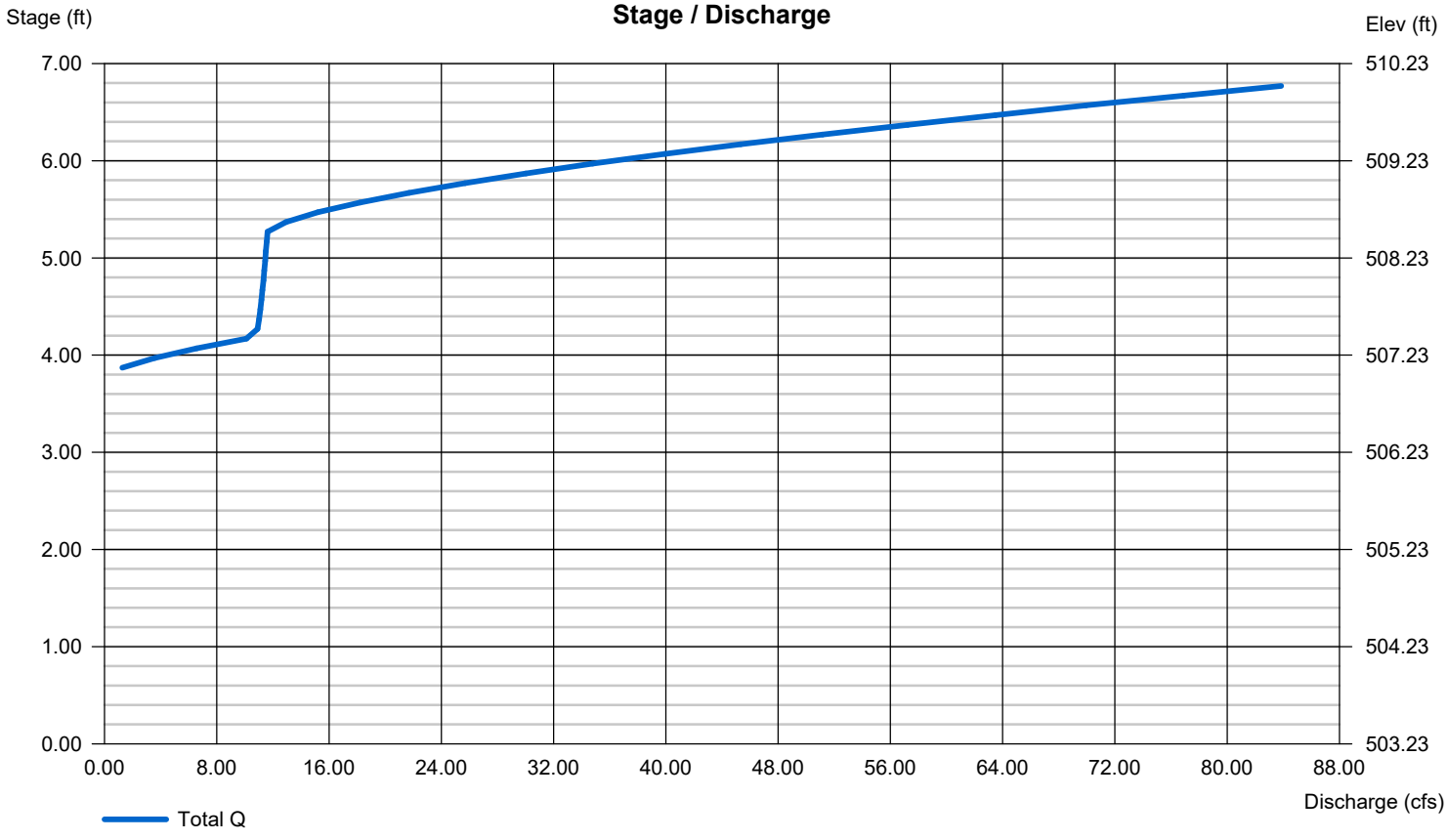
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	15.00	0.00	0.00
Crest El. (ft)	= 507.00	508.50	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= Rect	Broad	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 0.00

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



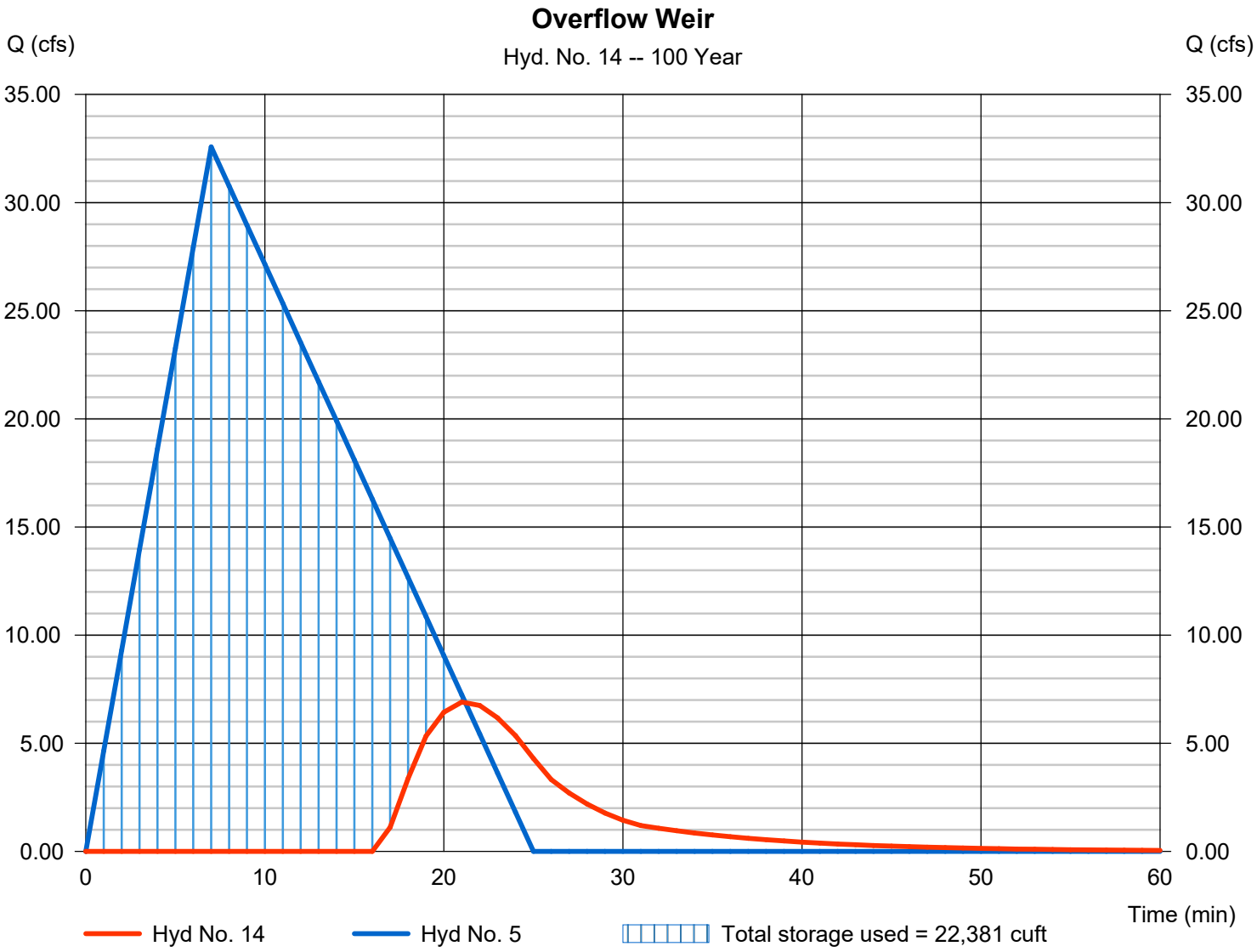
Hydrograph Report

Hyd. No. 14

Overflow Weir

Hydrograph type	=	Reservoir	Peak discharge	=	6.902 cfs
Storm frequency	=	100 yrs	Time to peak	=	21 min
Time interval	=	1 min	Hyd. volume	=	4,093 cuft
Inflow hyd. No.	=	5 - Prop. 1A (Detained)	Max. Elevation	=	508.81 ft
Reservoir name	=	Overflow Weir	Max. Storage	=	22,381 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - Overflow Weir

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 503.23 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	503.23	05	0	0
0.77	504.00	2,466	663	663
1.77	505.00	3,217	2,833	3,496
2.77	506.00	4,052	3,626	7,122
3.77	507.00	4,969	4,502	11,624
4.77	508.00	5,970	5,461	17,085
5.77	509.00	7,055	6,504	23,590
6.77	510.00	8,224	7,631	31,221

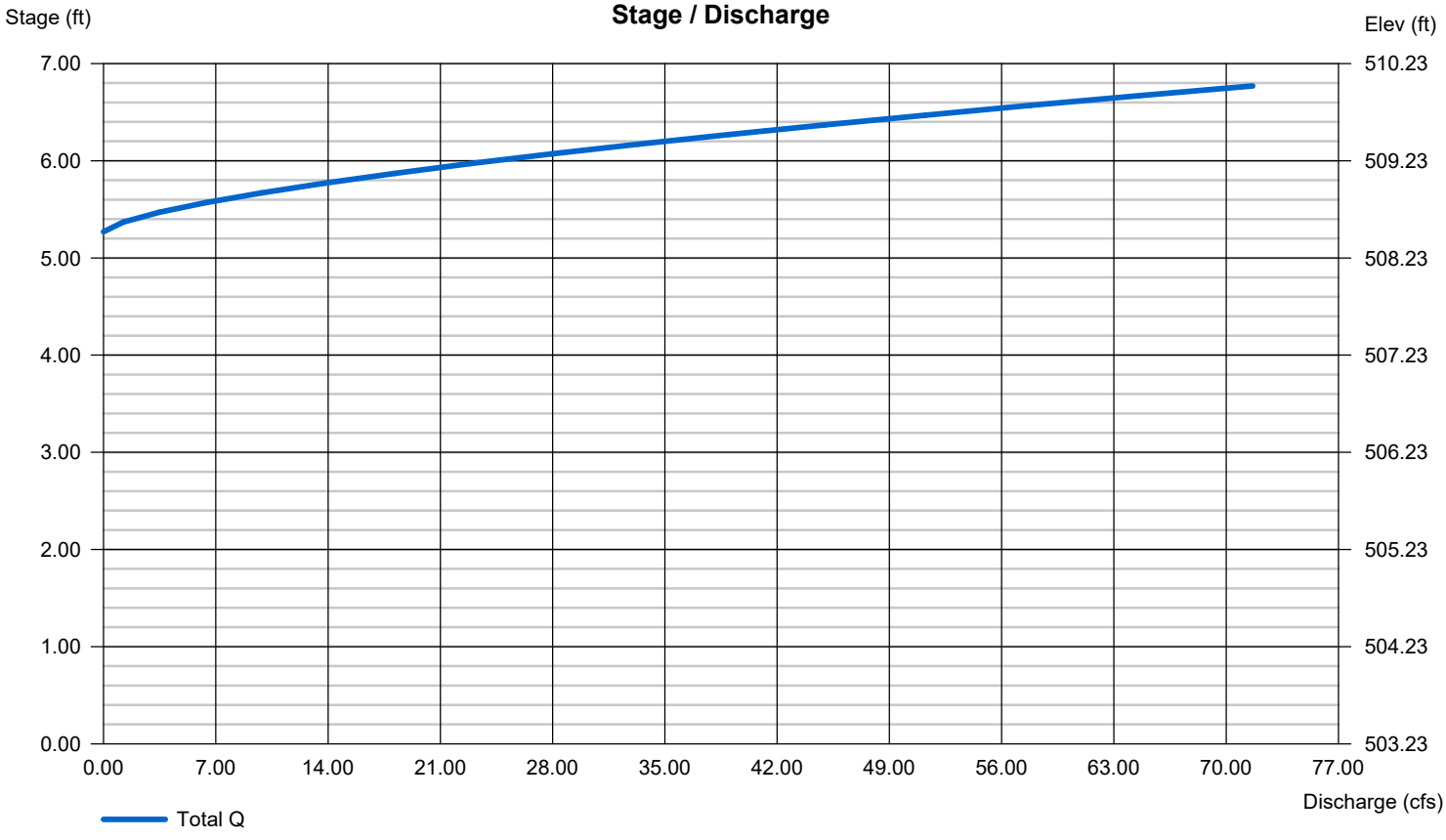
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	Inactive	Inactive	0.00	0.00
Span (in)	= 12.00	6.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 498.50	503.23	0.00	0.00
Length (ft)	= 69.00	11.00	0.00	0.00
Slope (%)	= 6.55	2.02	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)	Inactive	15.00	0.00	0.00
Crest El. (ft)	= 507.00	508.50	0.00	0.00
Weir Coeff.	= 3.33	2.60	3.33	3.33
Weir Type	= Rect	Broad	---	---
Multi-Stage	= Yes	No	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

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

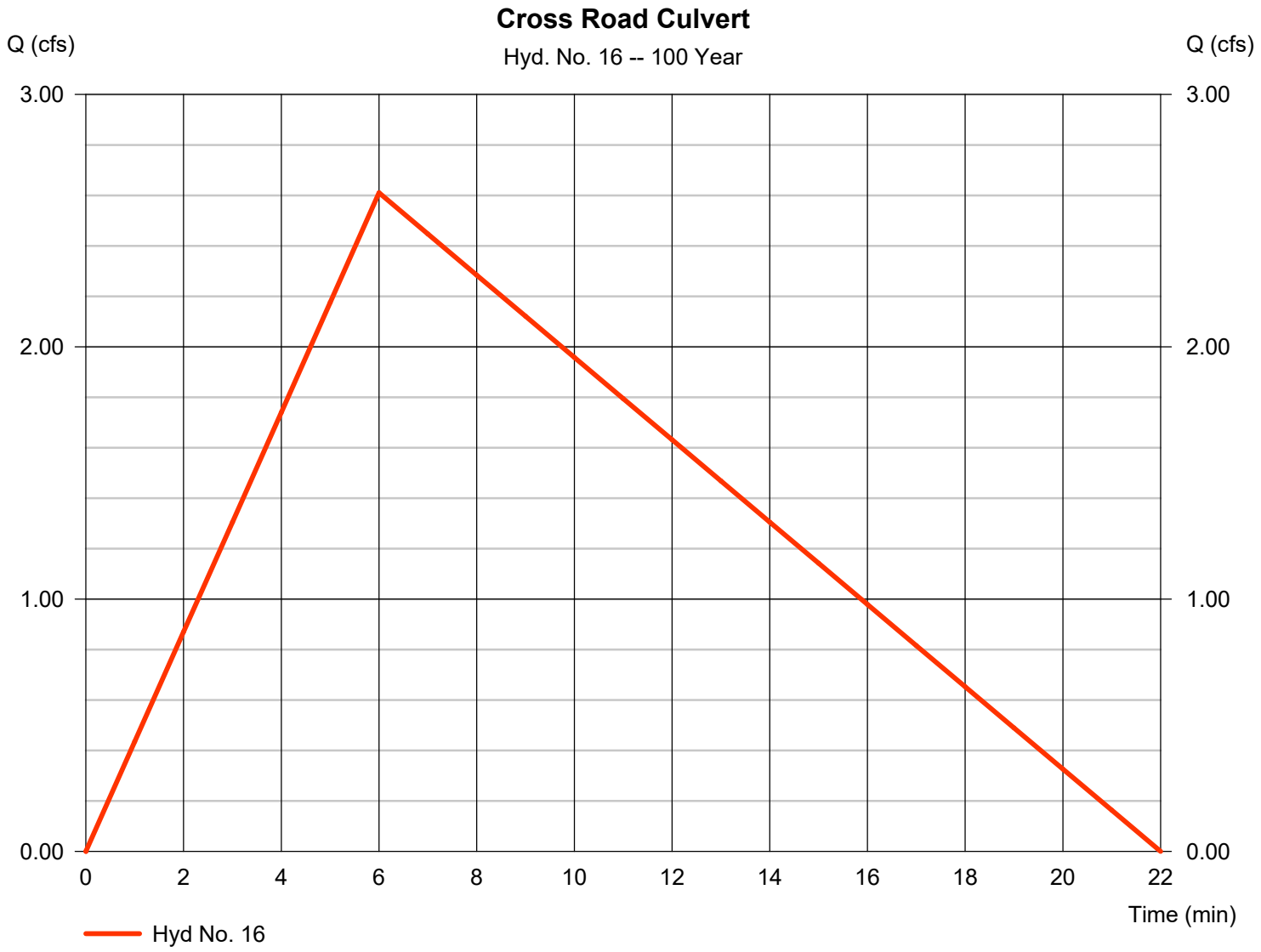


Hydrograph Report

Hyd. No. 16

Cross Road Culvert

Hydrograph type	=	Rational	Peak discharge	=	2.610 cfs
Storm frequency	=	100 yrs	Time to peak	=	6 min
Time interval	=	1 min	Hyd. volume	=	1,724 cuft
Drainage area	=	1.040 ac	Runoff coeff.	=	0.2
Intensity	=	12.550 in/hr	Tc by User	=	6.00 min
IDF Curve	=	Bulletin75-Madison County.idf	Asc/Rec limb fact	=	1/2.67



Appendix F: Hydraflow Express Culvert Analysis

Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Nov 24 2025

Cross Road Culvert 50-YR

Invert Elev Dn (ft)	=	495.00
Pipe Length (ft)	=	54.00
Slope (%)	=	3.50
Invert Elev Up (ft)	=	496.89
Rise (in)	=	15.0
Shape	=	Circular
Span (in)	=	15.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Square edge w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

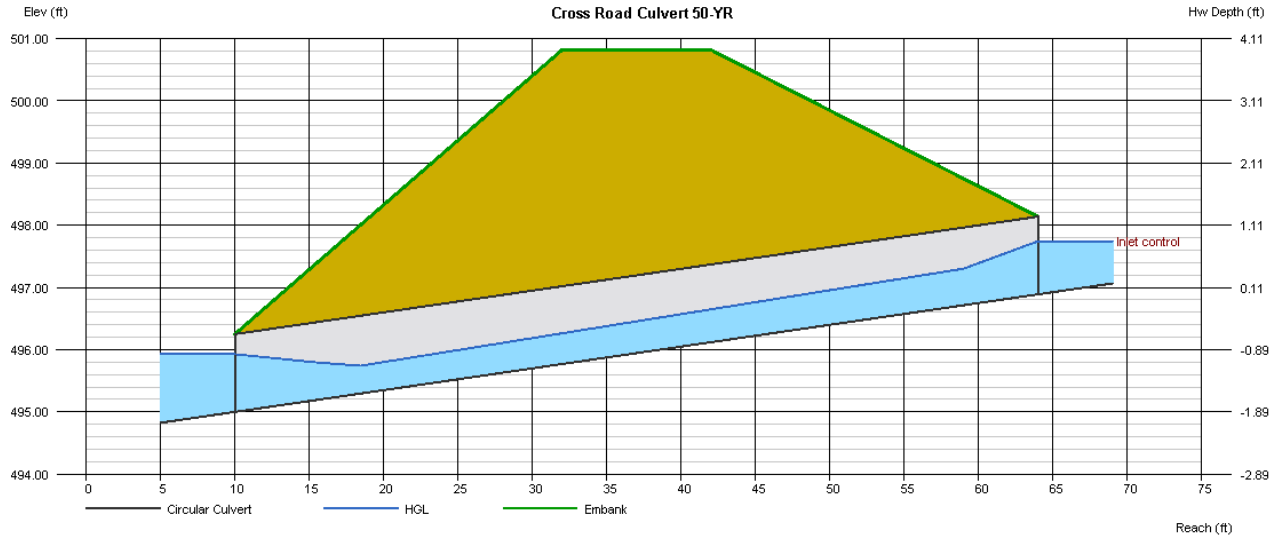
Top Elevation (ft)	=	500.82
Top Width (ft)	=	10.00
Crest Width (ft)	=	12.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	2.33
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	2.30
Qpipe (cfs)	=	2.30
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	2.35
Veloc Up (ft/s)	=	3.90
HGL Dn (ft)	=	495.93
HGL Up (ft)	=	497.50
Hw Elev (ft)	=	497.75
Hw/D (ft)	=	0.68
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Monday, Nov 24 2025

Cross Road Culvert 100-YR

Invert Elev Dn (ft)	=	495.00
Pipe Length (ft)	=	54.00
Slope (%)	=	3.50
Invert Elev Up (ft)	=	496.89
Rise (in)	=	15.0
Shape	=	Circular
Span (in)	=	15.0
No. Barrels	=	1
n-Value	=	0.012
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Square edge w/headwall (C)
Coeff. K,M,c,Y,k	=	0.0098, 2, 0.0398, 0.67, 0.5

Embankment

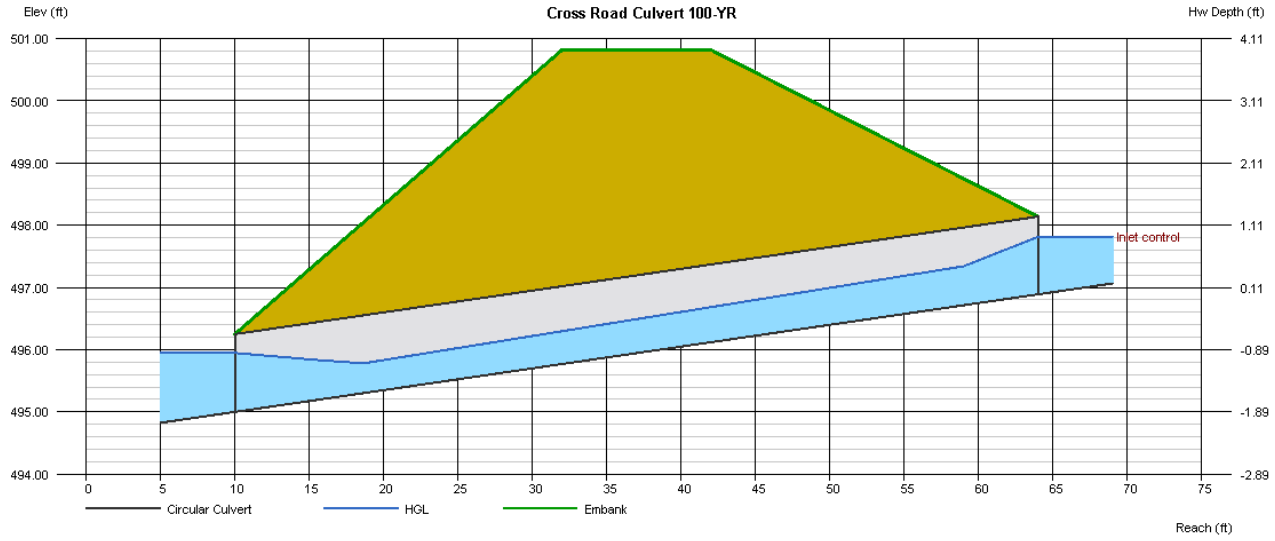
Top Elevation (ft)	=	500.82
Top Width (ft)	=	10.00
Crest Width (ft)	=	12.00

Calculations

Qmin (cfs)	=	0.00
Qmax (cfs)	=	2.61
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	2.60
Qpipe (cfs)	=	2.60
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	2.60
Veloc Up (ft/s)	=	4.07
HGL Dn (ft)	=	495.95
HGL Up (ft)	=	497.54
Hw Elev (ft)	=	497.81
Hw/D (ft)	=	0.74
Flow Regime	=	Inlet Control



Appendix G: Flow Master Ditch Analysis

Worksheet for Cross Road Culvert

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.210 ft/ft
Left Side Slope	7.000 H:V
Right Side Slope	3.000 H:V
Bottom Width	2.00 ft
Discharge	0.91 cfs

Results	
Normal Depth	1.1 in
Flow Area	0.2 ft²
Wetted Perimeter	2.9 ft
Hydraulic Radius	0.9 in
Top Width	2.91 ft
Critical Depth	1.9 in
Critical Slope	0.027 ft/ft
Velocity	4.08 ft/s
Velocity Head	0.26 ft
Specific Energy	0.35 ft
Froude Number	2.599
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	1.1 in
Critical Depth	1.9 in
Channel Slope	0.210 ft/ft
Critical Slope	0.027 ft/ft

Worksheet for O-100

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.300 ft/ft
Left Side Slope	3.000 H:V
Right Side Slope	3.000 H:V
Discharge	17.00 cfs

Results	
Normal Depth	5.9 in
Flow Area	0.7 ft²
Wetted Perimeter	3.1 ft
Hydraulic Radius	2.8 in
Top Width	2.94 ft
Critical Depth	13.8 in
Critical Slope	0.003 ft/ft
Velocity	23.65 ft/s
Velocity Head	8.69 ft
Specific Energy	9.18 ft
Froude Number	8.429
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	5.9 in
Critical Depth	13.8 in
Channel Slope	0.300 ft/ft
Critical Slope	0.003 ft/ft

Appendix H: RipRap Design

SOIL CONSERVATION SERVICE (SCS) ROCK OUTLET PROTECTION

Project: Haven Hill Acres
Project Number: 231587
Engineer: AGE
Date of Analysis: November 24, 2025

Description of Outlet:

Outlet #: 1
Cross Road Culvert

Outlet Conditions:

Receiving Channel Description (Flat Ground/Deep Channel):	Flat ground	(from Cross-Sections)
Channel Width (ft. - Leave Blank if Flat Ground):	0.0	(from Cross-Sections)
Channel Side Slopes - Left Side (H:V - Leave Blank if Flat Ground):	0.0	:1 (from Cross-Sections)
Channel Side Slopes - Right Side (H:V - Leave Blank if Flat Ground):	0.0	:1 (from Cross-Sections)
Height of Riprap above Pipe Crown (in.):	0.00	
Discharge Pipe Size (in.):	15.00	(from StormCAD)
Discharge Pipe Velocity (ft/s):	2.06	(from StormCAD)
Discharging Pipe Exit Flow Depth (Under Half Full/Over Half Full):	UNDER HALF FULL	(from StormCAD)

Minimum Rock Size (Table 2):

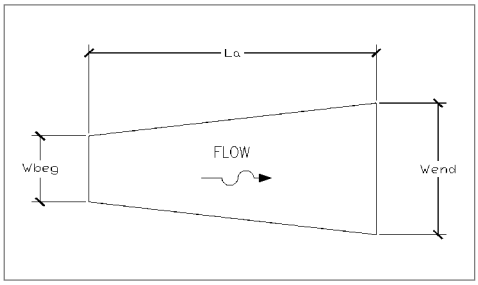
Discharge Pipe Velocity Used For Riprap Determination (ft/s): 5

	Minimum Tailwater					
	5 ft/s		5 ft/s		10 ft/s	
Culvert Size (in.)	Rock Size	LA (ft.)	Rock Size (for 10 ft/s)	LA (ft.)	Rock Size	LA (ft.)
12.00	RR-3	10		10	RR-3	12
15.00			RR-3	12.00		
18.00	RR-3	14		14	RR-4	16

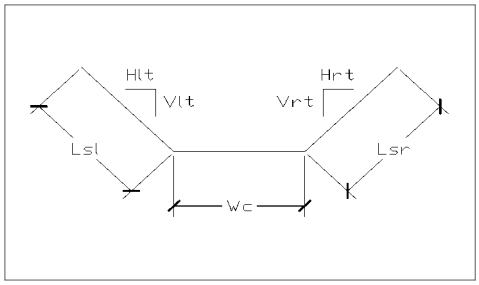
Is LA > 3*Discharge Pipe Velocity? YES! (Section 6-302 IDOT Drainage Manual)

Area of Riprap:

Flat Ground (Plan View):



Deep Channel (Section View):



LA =	12.00	ft.
	3.66	m
WBEG =	3.75	ft.
	1.14	m
WEND =	13.25	ft.
	4.04	m
AREARIPRAP =	102.00	ft.2
	9.48	m2

LA =		ft.
		m
WC =		ft.
		m
LSL =		ft.
		m
LSR =		ft.
		m
AREARIPRAP =		ft.2
		m2

Design Results:

USE 16-INCH THICK RR-4 RIPRAP OVER
6-INCH THICK BEDDING & MARATI 500X OR GREATER FILTER FABRIC
TO THE DIMENSIONS INDICATED ABOVE IN ACCORDANCE WITH THE APPROPRIATE STANDARD SPECIFICATION FOR ROAD AND BRIDGE CONSTRUCTION.

Appendix I: Water Quality Calculations and Specifications

PRODUCT SPECIFICATIONS

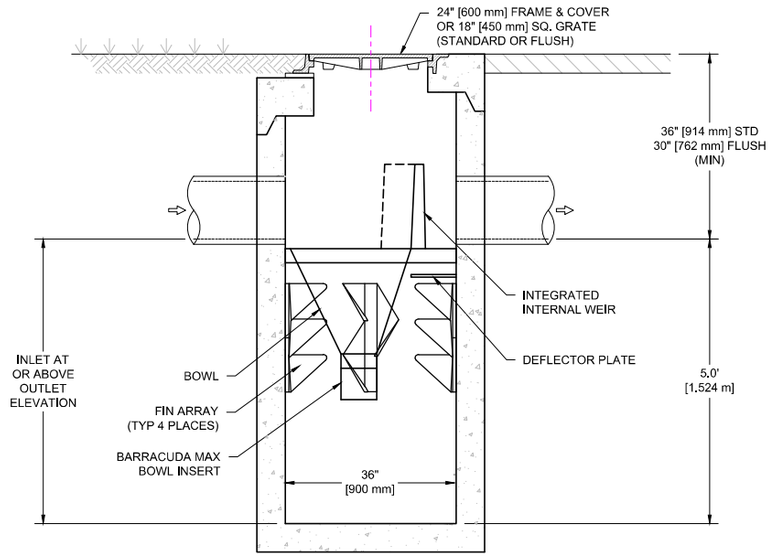
- THE STORMWATER TREATMENT UNIT SHALL BE AN INLINE UNIT CAPABLE OF CONVEYING 100% OF THE DESIGN PEAK FLOW. IF PEAK FLOW RATES EXCEED MAXIMUM HYDRAULIC RATE, THE UNIT SHALL BE INSTALLED OFFLINE.
- THE BARRACUDA UNIT SHALL BE DESIGNED TO REMOVE AT LEAST 80% OF THE SUSPENDED SOLIDS ON AN ANNUAL AGGREGATE REMOVAL BASIS. SAID REMOVAL SHALL BE BASED ON FULL-SCALE THIRD PARTY TESTING USING OK-110 MEDIA GRADATION OR EQUIVALENT AND 300 mg/L INFLUENT CONCENTRATION. SAID FULL SCALE TESTING SHALL HAVE INCLUDED SEDIMENT CAPTURE BASED ON ACTUAL TOTAL MASS COLLECTED BY THE STORMWATER TREATMENT UNIT.

  -OR -

  THE BARRACUDA UNIT SHALL BE DESIGNED TO REMOVE AT LEAST 50% OF TSS USING A MEDIA MIX WITH d_{50}=75 MICRON AND 200 MG/L INFLUENT CONCENTRATION.

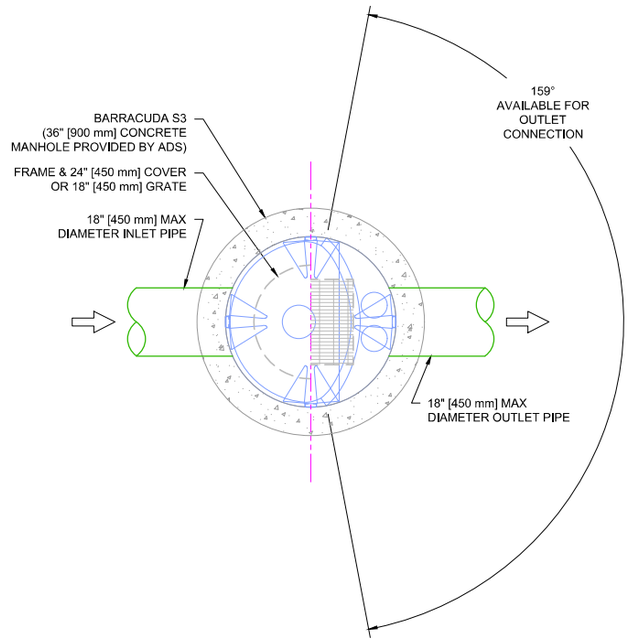
  -OR -

  THE BARRACUDA UNIT SHALL BE DESIGNED TO REMOVE AT LEAST 50% OF TSS PER PREVIOUS 2013 NJDEP/NJCAT HDS PROTOCOL.



SECTION VIEW A-A
NOT TO SCALE

BARRACUDA MAX S3		
	CFS	L/s
NJDEP (50% Removal)	0.85	24.1
OK-110 (80% Removal)	0.86	24.1



PLAN VIEW
NOT TO SCALE

NOTES:

- ENGINEER / CONTRACTOR TO CONFIRM PIPE MATERIALS AND APPLICABLE ADAPTERS
- CONTRACTOR IS RESPONSIBLE FOR MATERIAL AND LABOR TO BRING CASTINGS TO FINISHED GRADE
- CONTRACTOR TO MEASURE HEIGHT OF STRUCTURE TO ENSURE THAT DEPTH OF EXCAVATION IS CORRECT.
- UNIT SHALL CONFORM TO HS20-44 LOAD RATINGS.

BARRACUDA MAX S3
CONCRETE MANHOLE
STANDARD DETAIL

DATE: 09/06/24 | DRAWN: JLM | CHECKED: SMW

DRAWING #: 531-310

DATE	DRWN	CHKD	DESCRIPTION
04/01/25	JLM	AT	STD/FLUSH LID

Barracuda Max
Stormwater Separator

4640 TRUEMAN BLVD
HILLIARD, OH 43026

TWM ENGINEERING GEOSPATIAL SERVICES twm-inc.com	Project: Haven Hills Location: Collinsville, IL Client: JRG Holdings, LLC	Project No.: Date: Initials: Page No.:

Haven Hill Acres Water Quality Calcs (first 1")

$WQv = [(P)(Rv)(A)] / 12$

$WQv = [(1")(0.95)(4.28)] / 12$

$WQv = [4.07] / 12$

$WQv = \underline{0.34 \text{ cfs}}$

$Rv = 0.05 + 0.009(I)$

$Rv = 0.05 + 0.009(100\%)$

$Rv = 0.05 + 0.9$

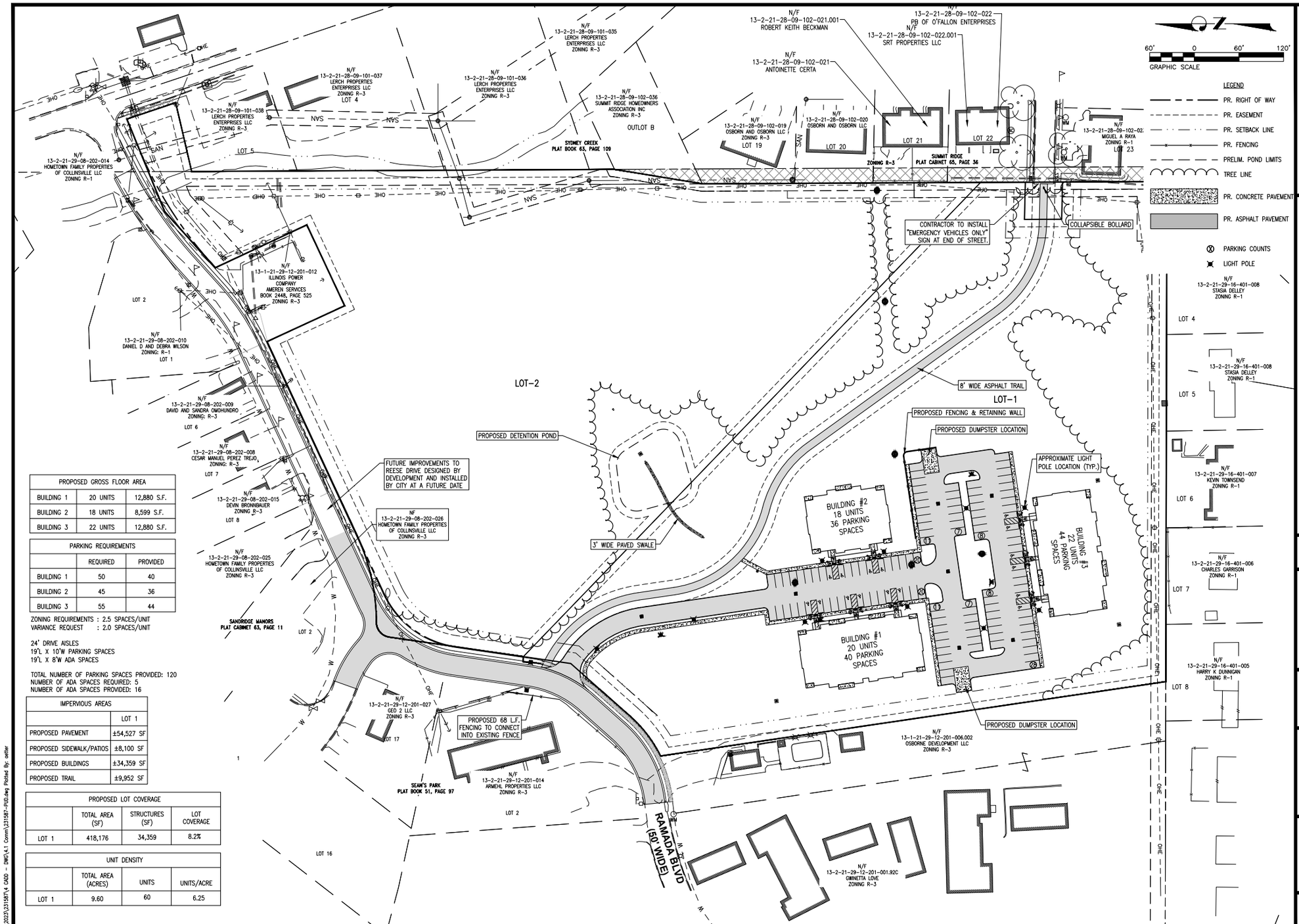
$Rv = 0.95$

→ S3 Barracuda Max Model* (36" dia) = 0.86cfs

$0.34 \leq 0.86$ ✓

* with OK-100 (80% removal)

Appendix J: Relevant Construction Sheets



PROPOSED GROSS FLOOR AREA		
BUILDING 1	20 UNITS	12,880 S.F.
BUILDING 2	18 UNITS	8,599 S.F.
BUILDING 3	22 UNITS	12,880 S.F.

PARKING REQUIREMENTS		
	REQUIRED	PROVIDED
BUILDING 1	50	40
BUILDING 2	45	36
BUILDING 3	55	44

ZONING REQUIREMENTS : 2.5 SPACES/UNIT
VARIANCE REQUEST : 2.0 SPACES/UNIT

24' DRIVE AISLES
19'L X 10'W PARKING SPACES
19'L X 8'W ADA SPACES

TOTAL NUMBER OF PARKING SPACES PROVIDED: 120
NUMBER OF ADA SPACES REQUIRED: 5
NUMBER OF ADA SPACES PROVIDED: 16

IMPERVIOUS AREAS	
	LOT 1
PROPOSED PAVEMENT	±54,527 SF
PROPOSED SIDEWALK/PATIOS	±8,100 SF
PROPOSED BUILDINGS	±34,359 SF
PROPOSED TRAIL	±9,952 SF

PROPOSED LOT COVERAGE			
	TOTAL AREA (SF)	STRUCTURES (SF)	LOT COVERAGE
LOT 1	418,176	34,359	8.2%

UNIT DENSITY			
	TOTAL AREA (ACRES)	UNITS	UNITS/ACRE
LOT 1	9.60	60	6.25

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TENNESSEE	NASHVILLE CHATTANOOGA ATHENS

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IL. PROF. STR. ENGR. CORP.	81-005202
IL. PROF. LAND SURV. CORP.	048-000029
KS. PROF. ENGR. FACILITY	E-3256
MO. PROF. ENGR. CORP.	001528
MO. LAND SURVEYING CORP.	000346
TN. PROF. ENGR. FIRM	8974

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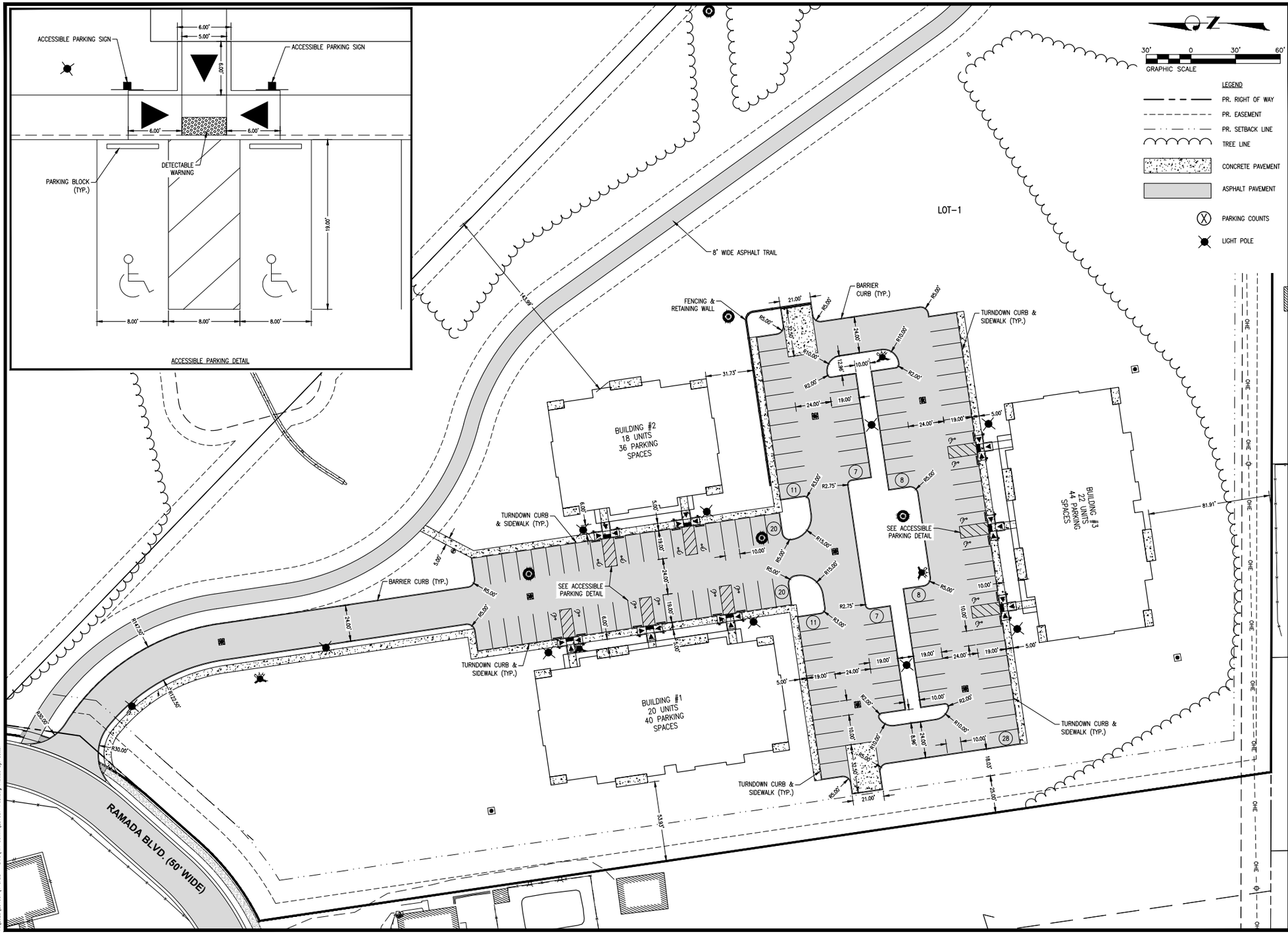
REV.	DATE	DESCRIPTION
1		
2		
3		
4		

DRAWN BY:	LEM
DESIGNED BY:	BYF
CHECKED BY:	NTS
APPROVED BY:	MJM
PROJECT NO:	D01231587

PROJECT:
HAVEN HILL ACRES
REESE DRIVE
CITY OF COLLINSVILLE
MADISON COUNTY
ILLINOIS

TITLE:
SITE PLAN

C-4



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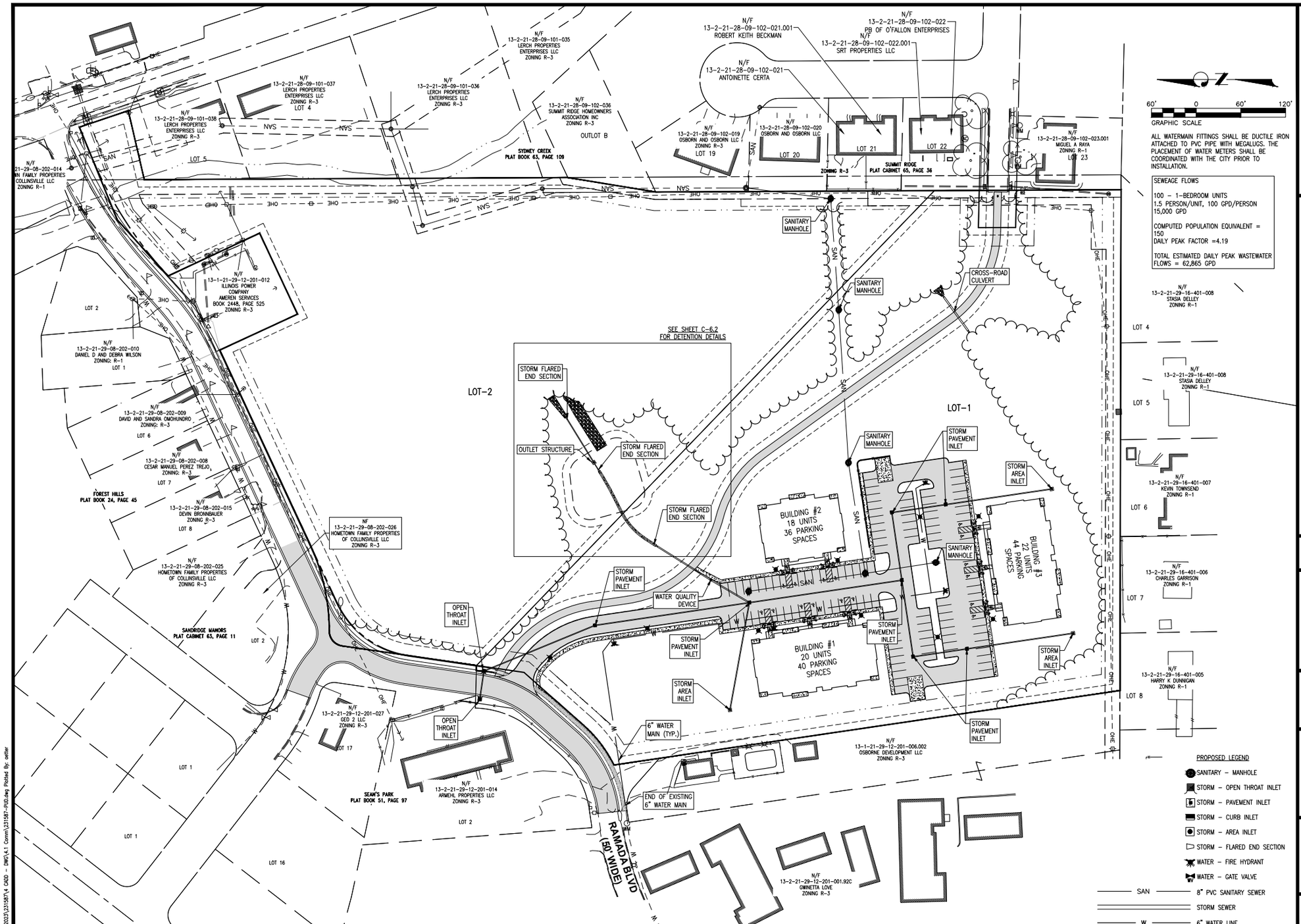
CITY OF COLLINSVILLE
MADISON COUNTY
ILLINOIS

TITLE:

SITE PLAN - LOT 1

C-4.1



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PROJECT NO:	D01231587

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HAVEN HILL ACRES
REESE DRIVE
CITY OF COLLINSVILLE
MADISON COUNTY
ILLINOIS

TITLE:
UTILITY PLAN

C-6

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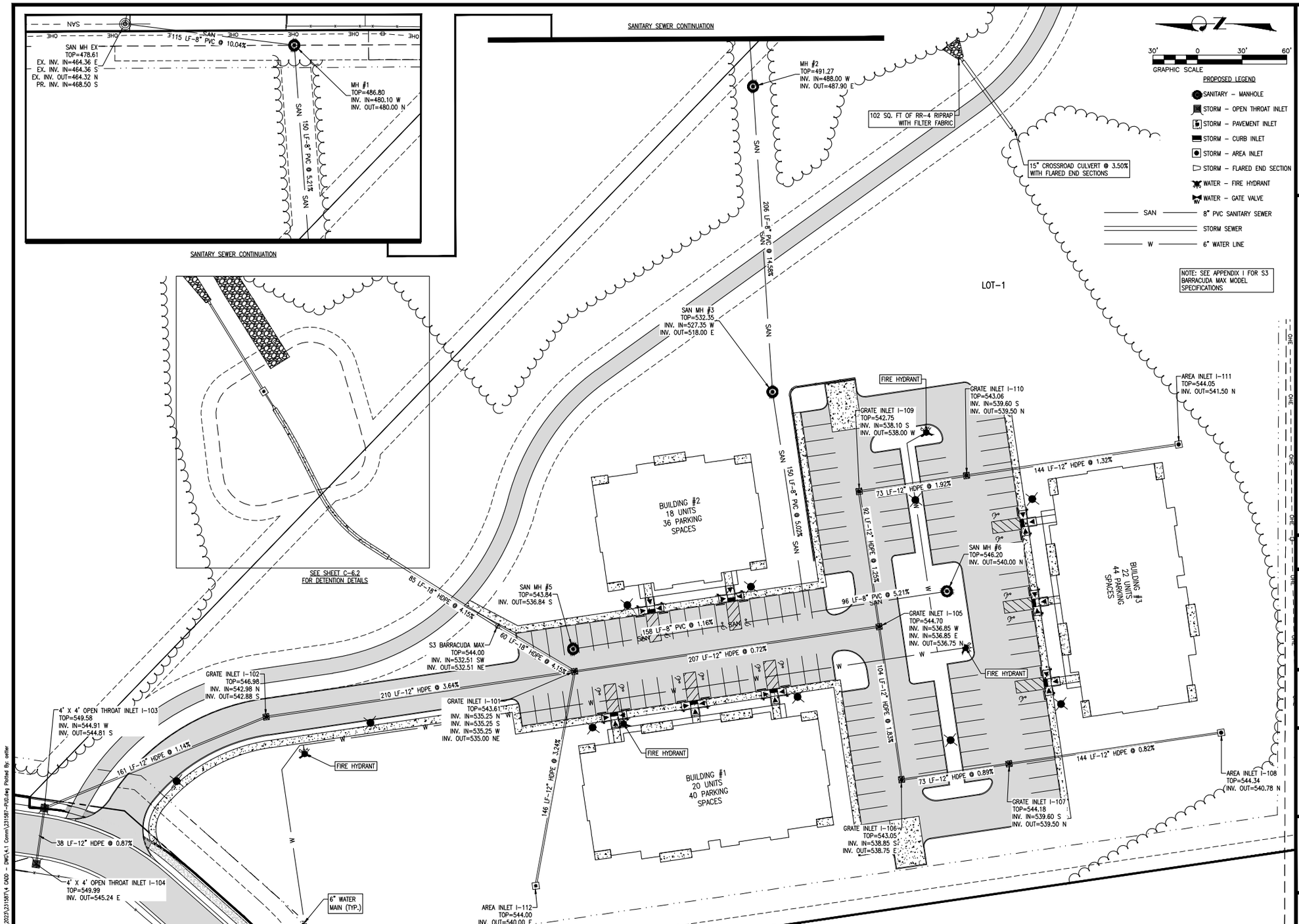

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PROJECT NO:	D01231587

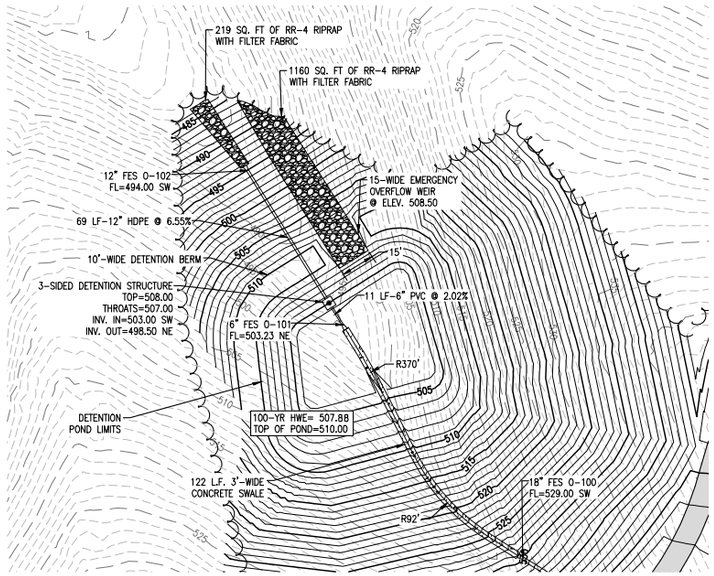
PROJECT:

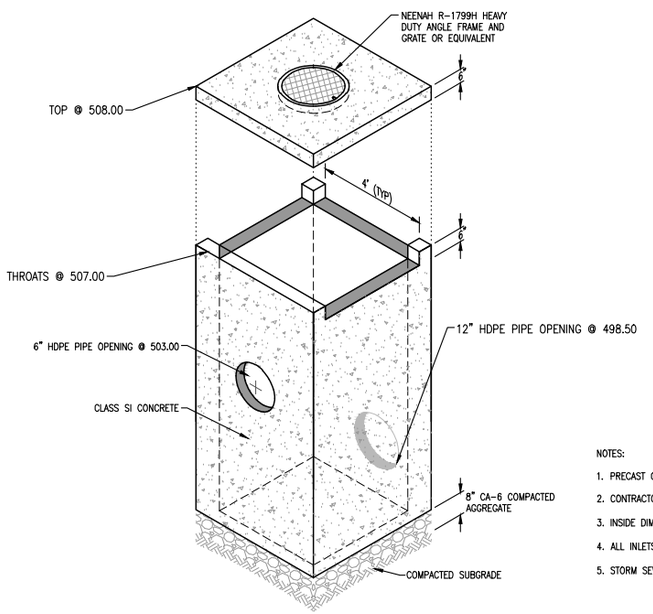
HAVEN HILL ACRES
REESE DRIVE
CITY OF COLLINSVILLE
MADISON COUNTY
ILLINOIS

TITLE:

UTILITY PLAN - LOT 1

C-6.1

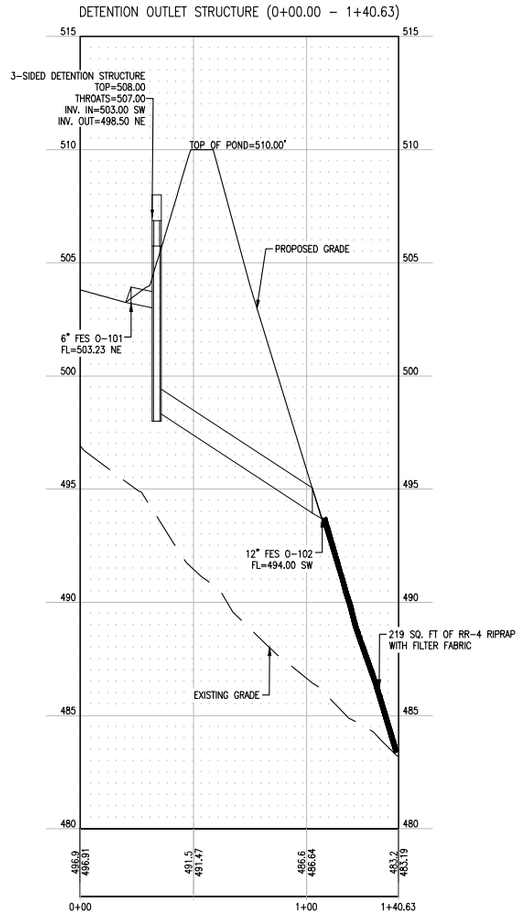


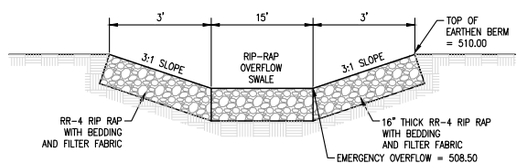


NOTES:

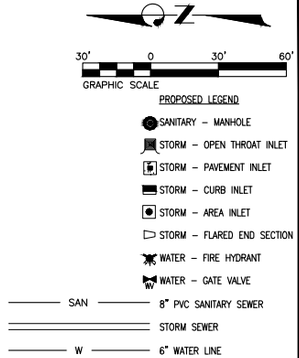
1. PRECAST OPEN THROAT INLETS SHALL CONFORM TO ASTM C-478
2. CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR ALL STORM SEWER STRUCTURES
3. INSIDE DIMENSION OF DETENTION STRUCTURE SHALL BE 4' X 4'.
4. ALL INLETS SHALL HAVE A MINIMUM OF 6" BETWEEN OUTSIDE OF PIPE AND ADJACENT WALL OF STRUCTURE.
5. STORM SEWER PIPE TO BE SEALED WITH NON-SHRINK GROUT AT PIPE/INLET INTERFACE.

DETENTION OUTFALL STRUCTURE





EMERGENCY OVERFLOW SPILLWAY



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MO. LAND SURVEYING CORP.	000346
TN. PROF. ENGR. FIRM	8974

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PROJECT:

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REESE DRIVE
CITY OF COLLINSVILLE
MADISON COUNTY
ILLINOIS

TITLE:

STORM WATER DETENTION DETAILS

C-6.2

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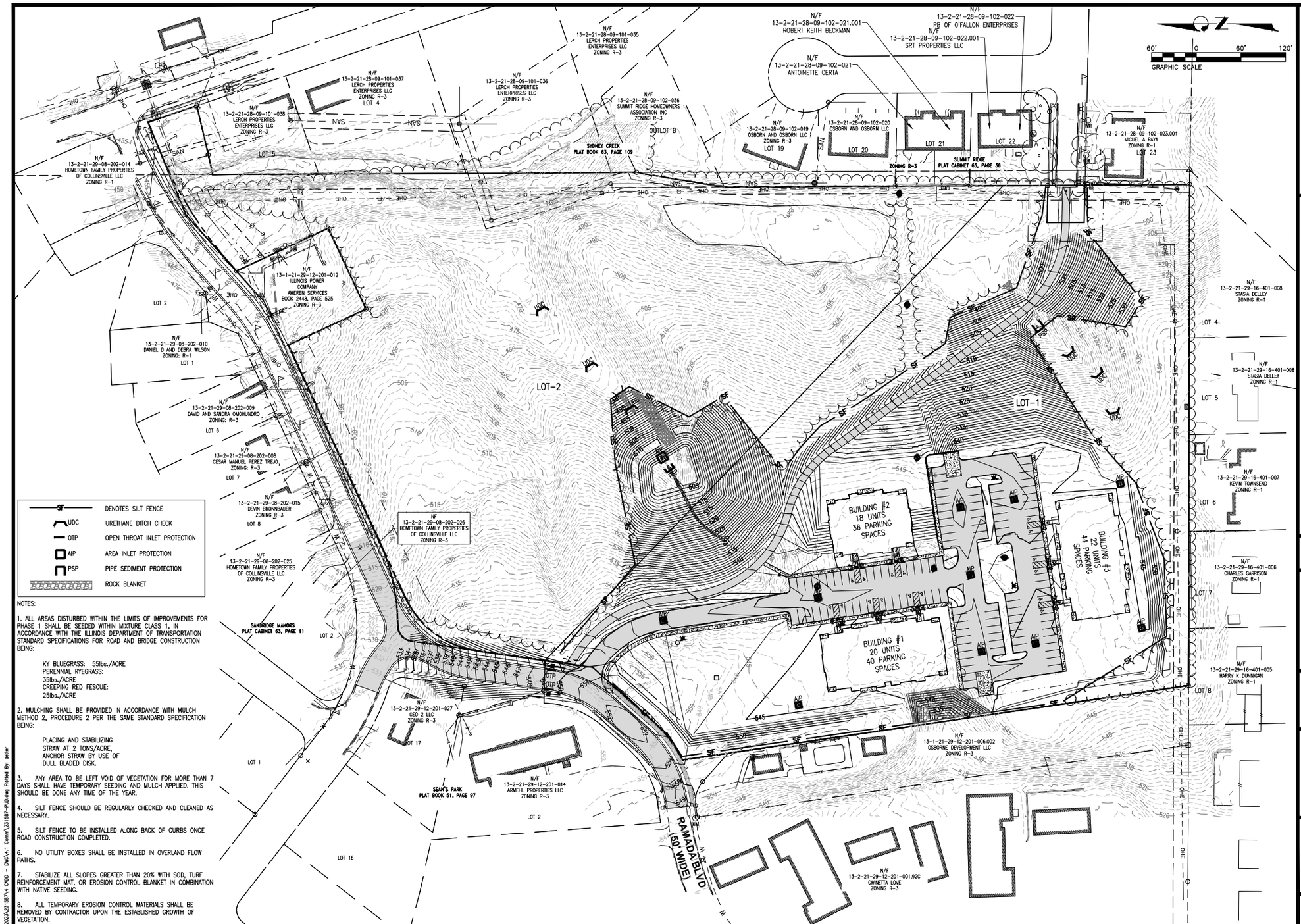

NOTES:

1. ALL AREAS DISTURBED WITHIN THE LIMITS OF IMPROVEMENTS FOR PHASE 1 SHALL BE SEEDED WITHIN MIXTURE CLASS 1, IN ACCORDANCE WITH THE ILLINOIS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION BEING:

   KY BLUEGRASS: 55lbs./ACRE
   PERENNIAL RYEGRASS: 35lbs./ACRE
   CREEPING RED FESCUE: 25lbs./ACRE

2. MULCHING SHALL BE PROVIDED IN ACCORDANCE WITH MULCH METHOD 2, PROCEDURE 2 PER THE SAME STANDARD SPECIFICATION BEING:

   PLACING AND STABILIZING STRAW AT 2 TONS/ACRE, ANCHOR STRAW BY USE OF DULL BLADED DISK.

3. ANY AREA TO BE LEFT VOID OF VEGETATION FOR MORE THAN 7 DAYS SHALL HAVE TEMPORARY SEEDING AND MULCH APPLIED. THIS SHOULD BE DONE ANY TIME OF THE YEAR.

4. SILT FENCE SHOULD BE REGULARLY CHECKED AND CLEANED AS NECESSARY.

5. SILT FENCE TO BE INSTALLED ALONG BACK OF CURBS ONCE ROAD CONSTRUCTION COMPLETED.

6. NO UTILITY BOXES SHALL BE INSTALLED IN OVERLAND FLOW PATHS.

7. STABILIZE ALL SLOPES GREATER THAN 20% WITH SOD, TURF REINFORCEMENT MAT, OR EROSION CONTROL BLANKET IN COMBINATION WITH NATIVE SEEDING.

8. ALL TEMPORARY EROSION CONTROL MATERIALS SHALL BE REMOVED BY CONTRACTOR UPON THE ESTABLISHED GROWTH OF VEGETATION.

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MO. PROF. ENGR. CORP.	001528
MO. LAND SURVEYING CORP.	000346
TN. PROF. ENGR. FIRM	8974

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SIGNATURE:
DATE SIGNED:
LICENSE EXPIRATION:

ISSUED FOR PLANNING & ZONING
DATE OF ISSUANCE: 12/01/25

REV.	DATE	DESCRIPTION
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DRAWN BY:	LEM
DESIGNED BY:	BYF
CHECKED BY:	NTS
APPROVED BY:	MJM
PROJECT NO:	D01231587

PROJECT:
HAVEN HILL ACRES
REESE DRIVE
CITY OF COLLINSVILLE
MADISON COUNTY
ILLINOIS

TITLE:
GRADING AND EROSION CONTROL PLAN

C-7

NOTES:

1. ALL AREAS DISTURBED WITHIN THE LIMITS OF IMPROVEMENTS FOR PHASE 1 SHALL BE SEEDED WITHIN MIXTURE CLASS 1, IN ACCORDANCE WITH THE ILLINOIS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION BEING:

KY BLUEGRASS: 55lbs./ACRE
PERENNIAL RYEGRASS: 35lbs./ACRE
CREEPING RED FESCUE: 25lbs./ACRE

2. MULCHING SHALL BE PROVIDED IN ACCORDANCE WITH MULCH METHOD 2, PROCEDURE 2 PER THE SAME STANDARD SPECIFICATION BEING:

PLACING AND STABILIZING
STRAW AT 2 TONS/ACRE,
ANCHOR STRAW BY USE OF
DULL BLADED DISK.

3. ANY AREA TO BE LEFT VOID OF VEGETATION FOR MORE THAN 7 DAYS SHALL HAVE TEMPORARY SEEDING AND MULCH APPLIED. THIS SHOULD BE DONE ANY TIME OF THE YEAR.

4. SILT FENCE SHOULD BE REGULARLY CHECKED AND CLEANED AS NECESSARY.

5. SILT FENCE TO BE INSTALLED ALONG BACK OF CURBS ONCE ROAD CONSTRUCTION COMPLETED.

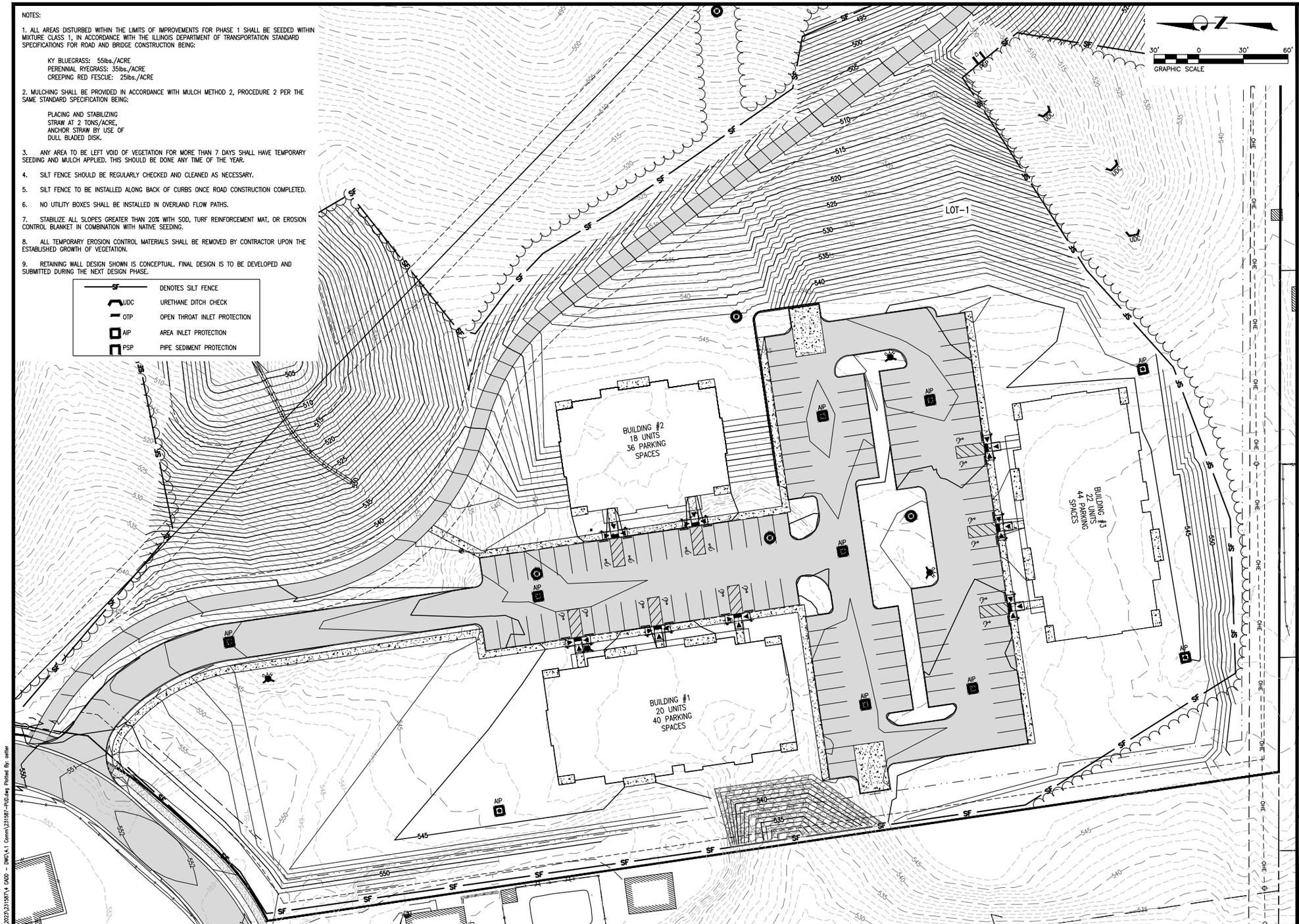
6. NO UTILITY BOXES SHALL BE INSTALLED IN OVERLAND FLOW PATHS.

7. STABILIZE ALL SLOPES GREATER THAN 20% WITH SOD, TURF REINFORCEMENT MAT, OR EROSION CONTROL BLANKET IN COMBINATION WITH NATIVE SEEDING.

8. ALL TEMPORARY EROSION CONTROL MATERIALS SHALL BE REMOVED BY CONTRACTOR UPON THE ESTABLISHED GROWTH OF VEGETATION.

9. RETAINING WALL DESIGN SHOWN IS CONCEPTUAL. FINAL DESIGN IS TO BE DEVELOPED AND SUBMITTED DURING THE NEXT DESIGN PHASE.

SF	DENOTES SILT FENCE
UDC	URETHANE DITCH CHECK
OTP	OPEN THROAT INLET PROTECTION
AIP	AREA INLET PROTECTION
PSP	PIPE SEDIMENT PROTECTION



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TWM
CONSULTING ENGINEERING
GEOSPATIAL SERVICES

ILLINOIS	SWANSEA COLUMBIA GLEN CARBON PEORIA DECATUR
MISSOURI	ST. CHARLES ST. LOUIS COLUMBIA
TENNESSEE	NASHVILLE CHATTANOOGA ATHENS

THOUVENOT, WADE & MOERCHEN, INC.
SWANSEA OFFICE
4940 OLD COLLINSVILLE ROAD
SWANSEA, ILLINOIS
62226
(618) 624-4488
WWW.TWM-INC.COM

PROF. LICENSE	NUMBER
IL. PROF. DESIGN FIRM	184-001220
IL. PROF. ENGR. CORP.	62-035370
IL. PROF. STR. ENGR. CORP.	81-005202
IL. PROF. LAND SURV. CORP.	048-000029
KS. PROF. ENGR. FACILITY	E-3256
MO. PROF. ENGR. CORP.	001528
MO. LAND SURVEYING CORP.	000346
TN. PROF. ENGR. FIRM	8974

SEAL

SIGNATURE:
DATE SIGNED:
LICENSE EXPIRATION:

ISSUED FOR PLANNING & ZONING
DATE OF ISSUANCE: 12/01/25

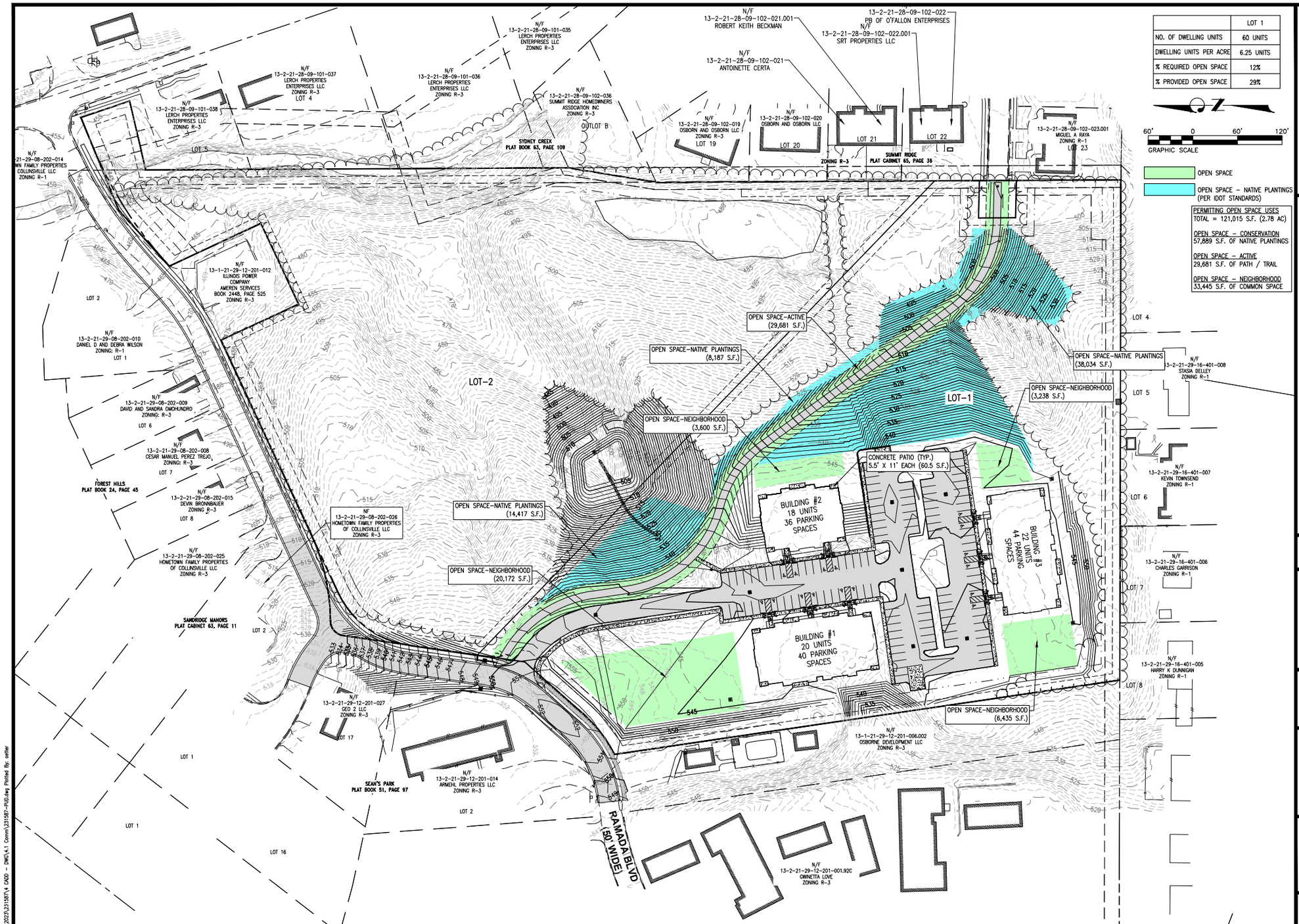
REV.	DATE	DESCRIPTION
△		
△		
△		
△		

DRAWN BY:	LEM
DESIGNED BY:	BYF
CHECKED BY:	NTS
APPROVED BY:	MJM
PROJECT NO:	D01231587

PROJECT:
HAVEN HILL ACRES
REESE DRIVE
CITY OF COLLINSVILLE
MADISON COUNTY
ILLINOIS

TITLE:
GRADING AND EROSION CONTROL PLAN - LOT 1

C-7.1



	LOT 1
NO. OF DWELLING UNITS	60 UNITS
DWELLING UNITS PER ACRE	6.25 UNITS
% REQUIRED OPEN SPACE	12%
% PROVIDED OPEN SPACE	29%

PERMITTING OPEN SPACE USES
TOTAL = 121,015 S.F. (2.78 AC)

OPEN SPACE – CONSERVATION
57,889 S.F. OF NATIVE PLANTINGS

OPEN SPACE – ACTIVE
29,681 S.F. OF PATH / TRAIL

OPEN SPACE – NEIGHBORHOOD
33,445 S.F. OF COMMON SPACE

CONSULTING ENGINEERING
GEOSPATIAL SERVICES

ILLINOIS: SWANSEA, COLUMBIA, GLEN CARBON, PEORIA, DECATUR
MISSOURI: ST. CHARLES, ST. LOUIS, COLUMBIA
TENNESSEE: NASHVILLE, CHATTANOOGA, ATHENS

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ISSUED FOR PLANNING & ZONING
DATE OF ISSUANCE: 12/01/25

REV.	DATE	DESCRIPTION
1		
2		
3		
4		

DRAWN BY:	LEM
DESIGNED BY:	BYF
CHECKED BY:	NTS
APPROVED BY:	MJM
PROJECT NO:	D01231587

PROJECT:
HAVEN HILL ACRES
REESE DRIVE
CITY OF COLLINSVILLE
MADISON COUNTY
ILLINOIS

TITLE:
OPEN SPACE PLAN

C-8

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