

**STREUVER FIDELCO CAPPELLI, LLC
YONKERS DOWNTOWN DEVELOPMENT – PHASE 1**

DRAFT ENVIRONMENTAL IMPACT STATEMENT

For:

PALISADES POINT

Prepared by:

PAULUS, SOKOLOWSKI & SARTOR

STORMWATER MANAGEMENT

1. Methodology

The proposed development of the site will involve the disturbance of more than 1-acre of land, therefore, the Phase II Stormwater regulations of the New York State Department of Environmental Conservation (NYSDEC) require that a State Pollutant Discharge Elimination System (SPDES) permit be obtained. Conformance with the guidelines of the SPDES permit requires that stormwater management practices be designed in accordance with the NYSDEC “Stormwater Management Design Manual” which require water quantity as well as water quality mitigation.

The primary objective of the Stormwater Management Plan is to improve water quality through capture and treatment of 90% of the annual stormwater runoff volume caused by increases in the impervious area of the site. To achieve this objective, a new stormwater collection system is proposed. The collection system will utilize inlets and piping to collect runoff and convey stormwater to water quality treatment units that will discharge treated stormwater into the Hudson River. Stormwater Quantity mitigation (i.e. detention) is not required since all stormwater runoff will be discharged directly into the Hudson River (designated as a 4th order stream or larger by NYSDEC).

The assessment of stormwater runoff has been based upon the Soil Conservation Service Method as described in Technical Release No. 55 (TR-55), “Urban Hydrology for Small Watersheds”. Theoretical storms are modeled with the 24 Hour SCS Unit Dimensionless Hydrograph utilizing a Type III rainfall distribution and recurrence intervals of 2, 10, 25

and 100 years, shown on Table 1-1. Hydrograph generations and routings were accomplished via Intelisolve’s Hydraflow 2005 Program. The program is tailored to model the SCS Method for hydrograph generations and to perform iterative solutions of the continuity equation (outflow=inflow +/- storage) with the intermediate values of the routing curve obtained through linear interpolation.

Table 1-1 Rainfall Volumes of Design Storms (per Westchester County Best Management Practices for Stormwater Management)				
Event (year)	2	10	25	100
Rainfall (in)	3.3	5.0	5.7	7.2

Storm sewers hydraulics have been based upon surface runoff generated by the 10 year storm event according to the General Permit for Construction Activities by NYSDEC for runoff conveyance systems in the closed storm drain system, and the Manning’s Equation as defined in the “Handbook of Hydraulics” by Brater and King, sixth edition. The corresponding Manning’s “n” value for HDPE pipe utilized in the design is 0.015.

2. Existing Site Conditions and Pre-Development Runoff Analysis

The existing project site is partially developed with a 1.70 -acre asphalt parking lot and asphalt access road. The remaining 3.89-acres of the site are currently vacant. The vacant areas of the property consist of natural vegetation along the shoreline and bare disturbed areas within the interior of the property that include stockpiles of building debris. The adjacent existing 0.65-acre sculpture park has been included in the drainage study area. The total study area including the park is 6.24-acres.

Existing drainage infrastructure on the project site is limited to two (2) catchbasins in the asphalt parking area, which convey stormwater through piping to a headwall structure along the shoreline of the Hudson River.

The topography of the site is flat with elevations ranging from 12 in the northeast to 8 in the southwest and divides the site into 2 drainage sub-areas. Hydrological soil classifications within the project site are predominantly Uf and Uc with the soil group designation of “C” based on Westchester County Soil Survey data. The majority of the site drains to the Hudson River (EX DA-A) and the balance of the site drains to the south east corner of the site onto the adjacent properties (EX DA-B). The pre-development drainage tributary areas including sub-watershed limits and flow paths are indicated on **Figure 1**.

The results of the 2, 10, 25 and 100-year routed hydrographs for pre development can be found in **Appendix A** and are summarized below in Table 2-1.

Table 2-1 - Existing Hydrologic Parameters & Flow							
Watershed	Drainage Area (Ac)	SCS Curve Number	Tc (Min.)	2-YR. (CFS)	10-YR. (CFS)	25-YR. (CFS)	100-YR. (CFS)
EX DA - A	5.18	87	30.4	6.98	12.30	14.5	19.20
EX DA – B	1.07	85	107.3	.65	1.19	1.41	1.90

3. Proposed Site Development & Post-Development Runoff Analysis

The proposed development will introduce two (2) new buildings each with an attached multi-story parking structure, new roadways, parking areas and associated walkways. The existing asphalt parking area and roadway will be removed. Impervious coverage will increase to 4.27-acres while pervious coverage will decrease to 1.40-acres.

A new storm drainage system is proposed to collect runoff from the entire project site including building roofs, parking decks, access roadways, other paved surfaces and landscaped areas. The proposed system will include catchbasins, piping, headwalls and water quality treatment units. All of the stormwater collected will be piped to discharge to the Hudson River via three (3) headwall structures (1 existing and 2 new). The proposed plan divides the site into three (3) drainage sub-areas. Area PR DA-A (north end of site) will discharge at the existing headwall. While Area PR DA-B (central) and PR DA-C (south) will each discharge to new headwall structures. The post-development drainage tributary areas including sub-watershed limits and flow paths are indicated on **Figure 2**.

The results of the 2, 10, 25 and 100-year routed hydrographs for post development can be found in **Appendix B** and are summarized below. Water Quality Volume and Water Quality Flow calculations for each respective drainage area are included in **Appendix C**.

Table 3-1 - Proposed Hydrologic Parameters & Flow							
Watershed	Drainage Area (Ac)	SCS Curve Number	Tc (Min.)	2-YR. (CFS)	10-YR. (CFS)	25-YR. (CFS)	100-YR. (CFS)
PR DA - A	0.77	98	10	1.79	2.73	3.11	3.94
PR DA - B	2.53	88	19.7	3.99	6.89	8.08	10.64
PR DA - C	2.36	94	11.8	5.07	8.04	9.25	11.82

4. Soil Erosion and Sediment Control

The construction of the proposed development will require the excavation and grading of soils on site. The area of disturbance will include the majority of the site as well as the existing adjacent sculpture park.

During construction of the proposed development, temporary and permanent soil erosion and sediment control measures shall be implemented, to minimize impacts to the surrounding land areas and water bodies.

Soil erosion would be controlled by:

- Keeping disturbed areas to a minimum and providing temporary seeding and mulching if construction operations cease for more than 7 days;
- Keeping topsoil stockpiles less than 35 feet high and keeping the side slopes of these stockpiles at or less than 2:1;
- Constructing a crushed stone tracking pad at the points of egress and ingress for construction vehicles of each phase; and
- Placing stone rip-rap at the outlets of storm drainage pipe networks.

Sedimentation would be controlled by:

- Installing silt fence barriers along the base of slopes and around the perimeter of topsoil stockpiles;
- Placing inlet filters over the grate of each stormwater inlet or catch basin as it is constructed to prevent sedimentation within the storm sewer system;
- Cleaning inlet filters and the upstream sides of all silt fencing after

- each erosion producing storm;
- Use of temporary sediment basins;
- Use of temporary division swales.

Soil erosion and sediment control shall be ensured during the construction period through a program of daily observation and maintenance with particular emphasis on inspection and repair following rain storms. All graded areas shall be permanently seeded and landscaped to minimize erosion. All control measures shall be carried out in accordance with NYSDEC Guidelines for Urban Erosion and Sediment Control.

The project has been designed to minimize any potential adverse impacts to surface waters.

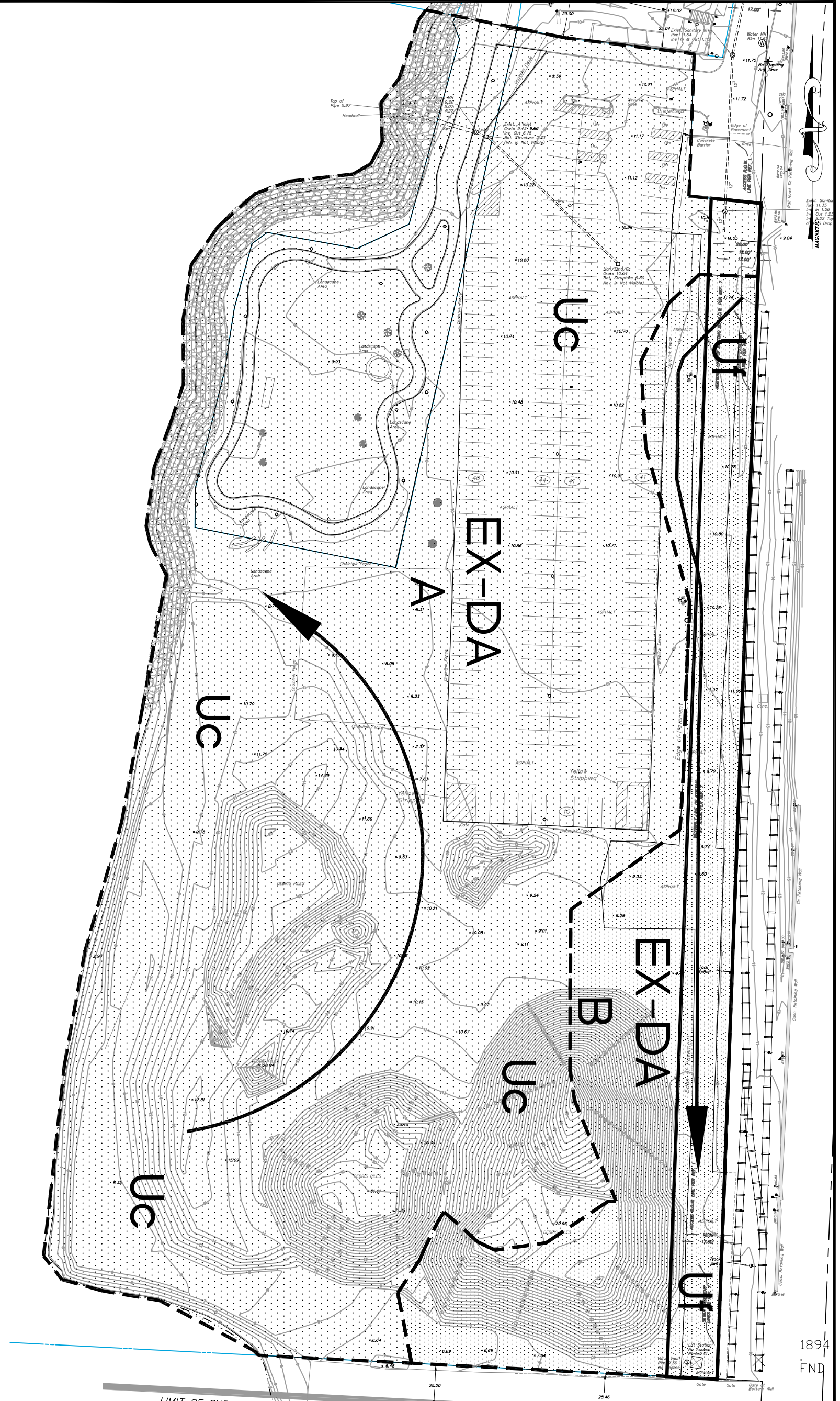
5. Conclusion

The basic design criteria of proposed stormwater facilities, which are (A) to select feasible Storm Water Management, (B) to maximize pre-treatment and minimize collective impervious area, and (C) to limit any adverse hydrological and environmental impacts, have been applied to practices of this project.

As presented within this report, the runoff of stormwater in the post development condition is substantially improved in terms of quality and quantity control. The introduction of water quality treatment as well as managed landscaped areas as compared to pre development condition will have a positive effect on water quality and quantity control.

APPENDIX A

PRE-DEVELOPMENT DRAINAGE CALCULATIONS



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Water Shed	Area		Impervious Area			Pervious Area		
	SF	AC	SF	AC	CN	SF	AC	CN
EX - DA - A	225,677	5.18	89,510	2.05	98	136,167	3.13	79
EX - DA - B	46672	1.07	15,655	0.36	98	31,017	0.71	79
Total	272,349	6.25	105,165	2.41	-	167,184	3.84	-

<p>PAULUS SOKOLOWSKI and SARTOR CONSULTING ENGINEERS</p> <p>470 NEPPERHAN AVENUE SUITE 220 YONKERS, NEW YORK 10701 PHONE: (914) 509-8600 FAX: (914) 470-1679</p>		<p>PROJECT TITLE</p> <p>PALISADES POINT</p>	<p>SHEET TITLE</p> <p>PRE DEVELOPMENT DRAINAGE PLAN</p>	<p>DATE 10/18/06</p> <p>SCALE 1" = 60'</p> <p>DRN. BY DJS</p> <p>CHK. BY ALG</p>	<p>PROJ. NO. 03113.006</p> <p>FIGURE 1</p>
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TR55 Tc Worksheet

Hyd. No. 1

EX. D.A. - A

<u>Description</u>	<u>A</u>		<u>B</u>		<u>C</u>		<u>Totals</u>	
Sheet Flow								
Manning's n-value	= 0.011		0.011		0.011			
Flow length (ft)	= 35.0		265.0		0.0			
Two-year 24-hr precip. (in)	= 3.30		3.30		0.00			
Land slope (%)	= 0.12		0.02		0.00			
Travel Time (min)	= 1.57	+	16.16	+	0.00	=	17.73	
Shallow Concentrated Flow								
Flow length (ft)	= 202.00		0.00		0.00			
Watercourse slope (%)	= 0.03		0.00		0.00			
Surface description	= Unpaved		Paved		Paved			
Average velocity (ft/s)	= 0.27		0.00		0.00			
Travel Time (min)	= 12.65	+	0.00	+	0.00	=	12.65	
Channel Flow								
X sectional flow area (sqft)	= 0.00		0.00		0.00			
Wetted perimeter (ft)	= 0.00		0.00		0.00			
Channel slope (%)	= 0.00		0.00		0.00			
Manning's n-value	= 0.015		0.015		0.015			
Velocity (ft/s)	= 0.00		0.00		0.00			
Flow length (ft)	= 0.0		0.0		0.0			
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00	
Total Travel Time, Tc							=	30.38 min

TR55 Tc Worksheet

Hyd. No. 2

EX. D.A. - B

<u>Description</u>	<u>A</u>		<u>B</u>		<u>C</u>		<u>Totals</u>
Sheet Flow							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 32.0		268.0		0.0		
Two-year 24-hr precip. (in)	= 3.30		3.30		0.00		
Land slope (%)	= 0.03		0.00		0.00		
Travel Time (min)	= 2.53	+	40.05	+	0.00	=	42.58
Shallow Concentrated Flow							
Flow length (ft)	= 353.00		0.00		0.00		
Watercourse slope (%)	= 0.00		0.00		0.00		
Surface description	= Paved		Paved		Paved		
Average velocity (ft/s)	= 0.09		0.00		0.00		
Travel Time (min)	= 64.72	+	0.00	+	0.00	=	64.72
Channel Flow							
X sectional flow area (sqft)	= 0.00		0.00		0.00		
Wetted perimeter (ft)	= 0.00		0.00		0.00		
Channel slope (%)	= 0.00		0.00		0.00		
Manning's n-value	= 0.015		0.015		0.015		
Velocity (ft/s)	= 0.00		0.00		0.00		
Flow length (ft)	= 0.0		0.0		0.0		
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00
Total Travel Time, Tc							107.30 min

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	6.98	5	740	38,851	---	-----	-----	EX. D.A. - A
2	SCS Runoff	0.65	5	790	7,228	---	-----	-----	EX. D.A. - B
03113006-c-Pre-Development Model.gpw								Return Period: 2 Year	Thursday, Oct 19 2006, 11:15 AM

Hydrograph Plot

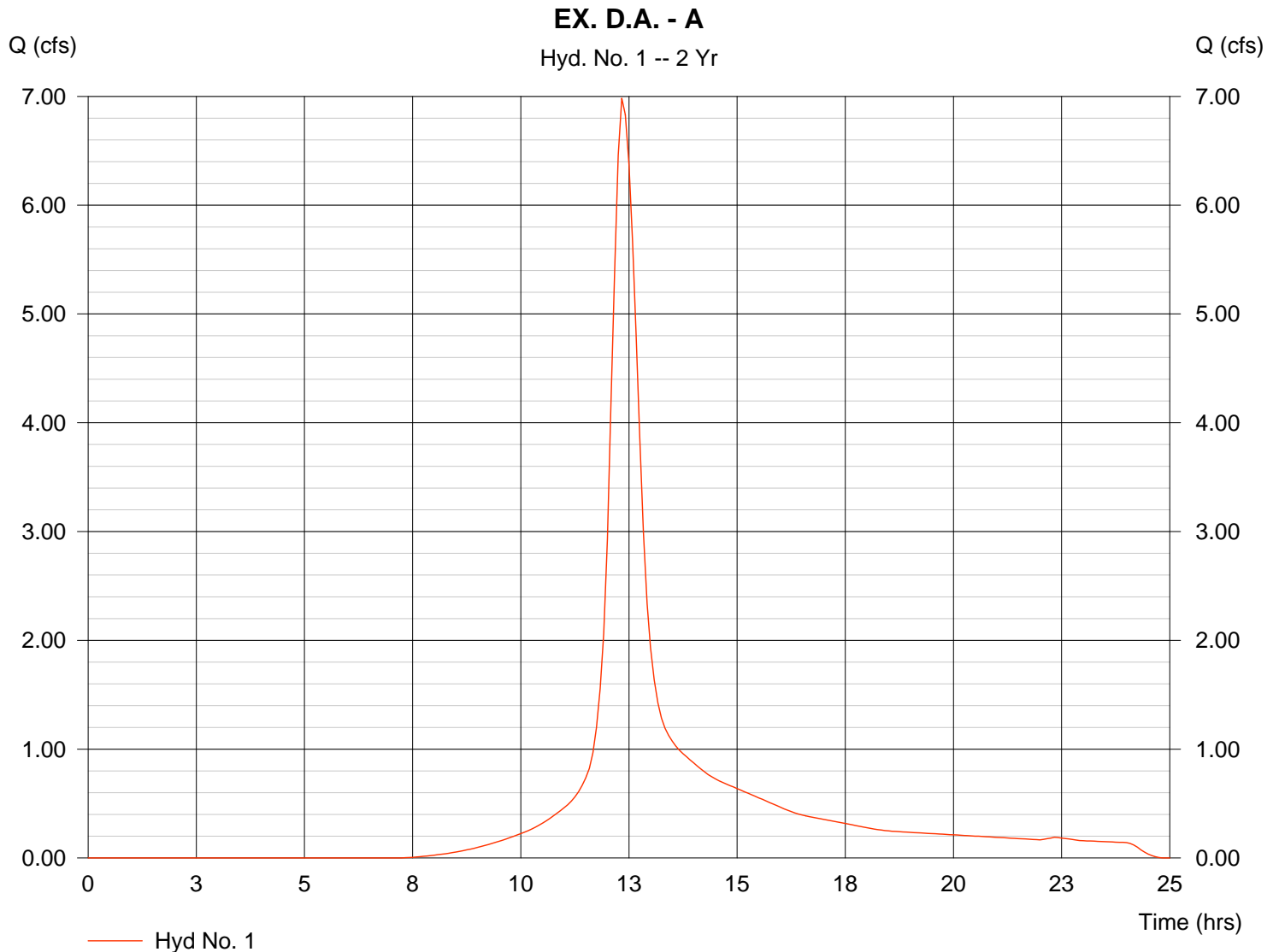
Hyd. No. 1

EX. D.A. - A

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Drainage area = 5.18 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 3.30 in
Storm duration = 24 hrs

Peak discharge = 6.98 cfs
Time interval = 5 min
Curve number = 87
Hydraulic length = 0 ft
Time of conc. (Tc) = 30.38468 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 38,851 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	12.30	5	740	69,173	---	-----	-----	EX. D.A. - A
2	SCS Runoff	1.19	5	790	13,208	---	-----	-----	EX. D.A. - B
03113006-c-Pre-Development Model.gpw							Return Period: 10 Year		Thursday, Oct 19 2006, 11:15 AM

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Thursday, Oct 19 2006, 11:16 AM

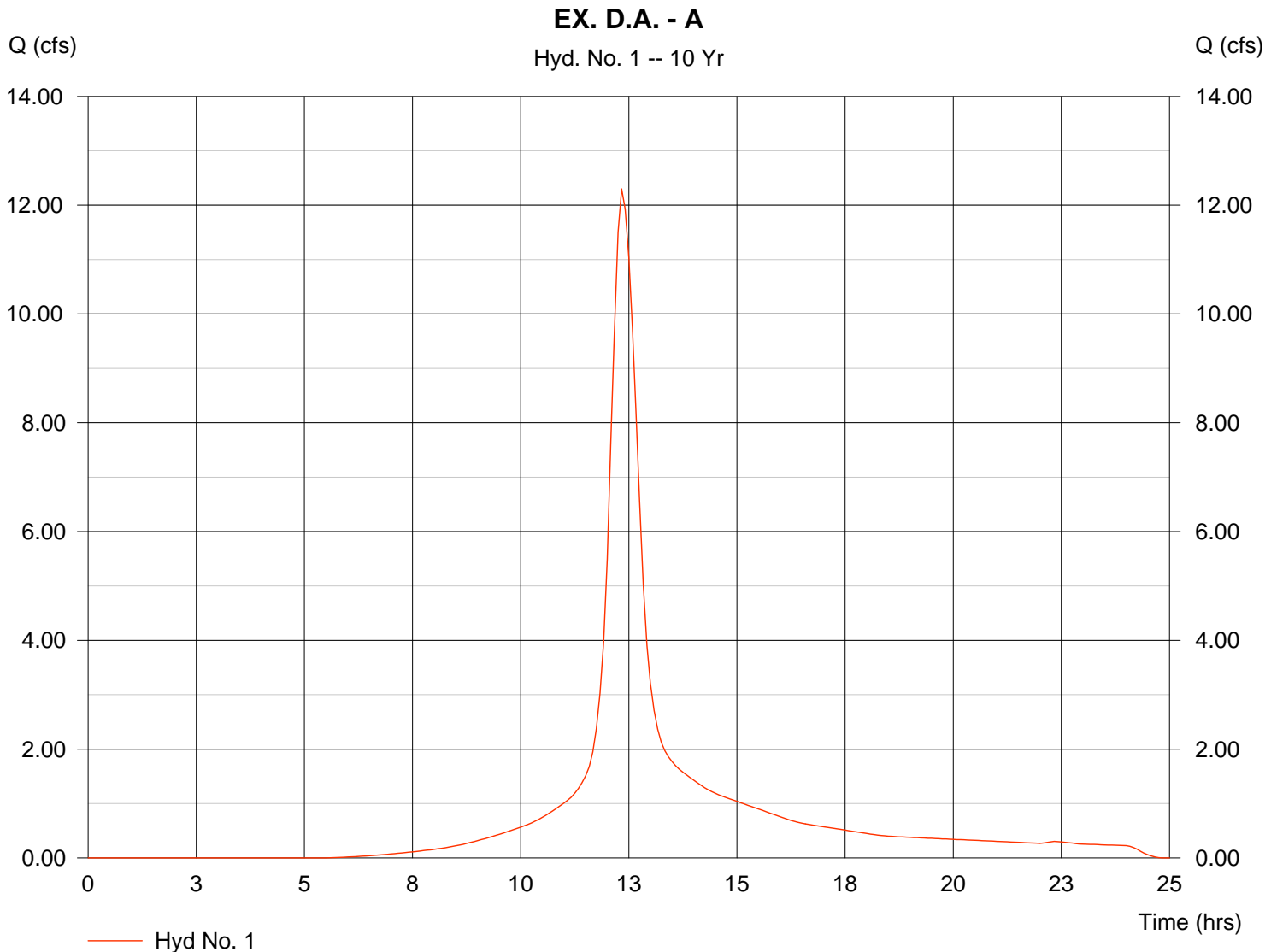
Hyd. No. 1

EX. D.A. - A

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Drainage area = 5.18 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 5.00 in
Storm duration = 24 hrs

Peak discharge = 12.30 cfs
Time interval = 5 min
Curve number = 87
Hydraulic length = 0 ft
Time of conc. (Tc) = 30.38468 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 69,173 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	14.50	5	740	82,038	---	-----	-----	EX. D.A. - A
2	SCS Runoff	1.41	5	790	15,765	---	-----	-----	EX. D.A. - B
03113006-c-Pre-Development Model.gpw								Return Period: 25 Year	Thursday, Oct 19 2006, 11:16 AM

Hydrograph Plot

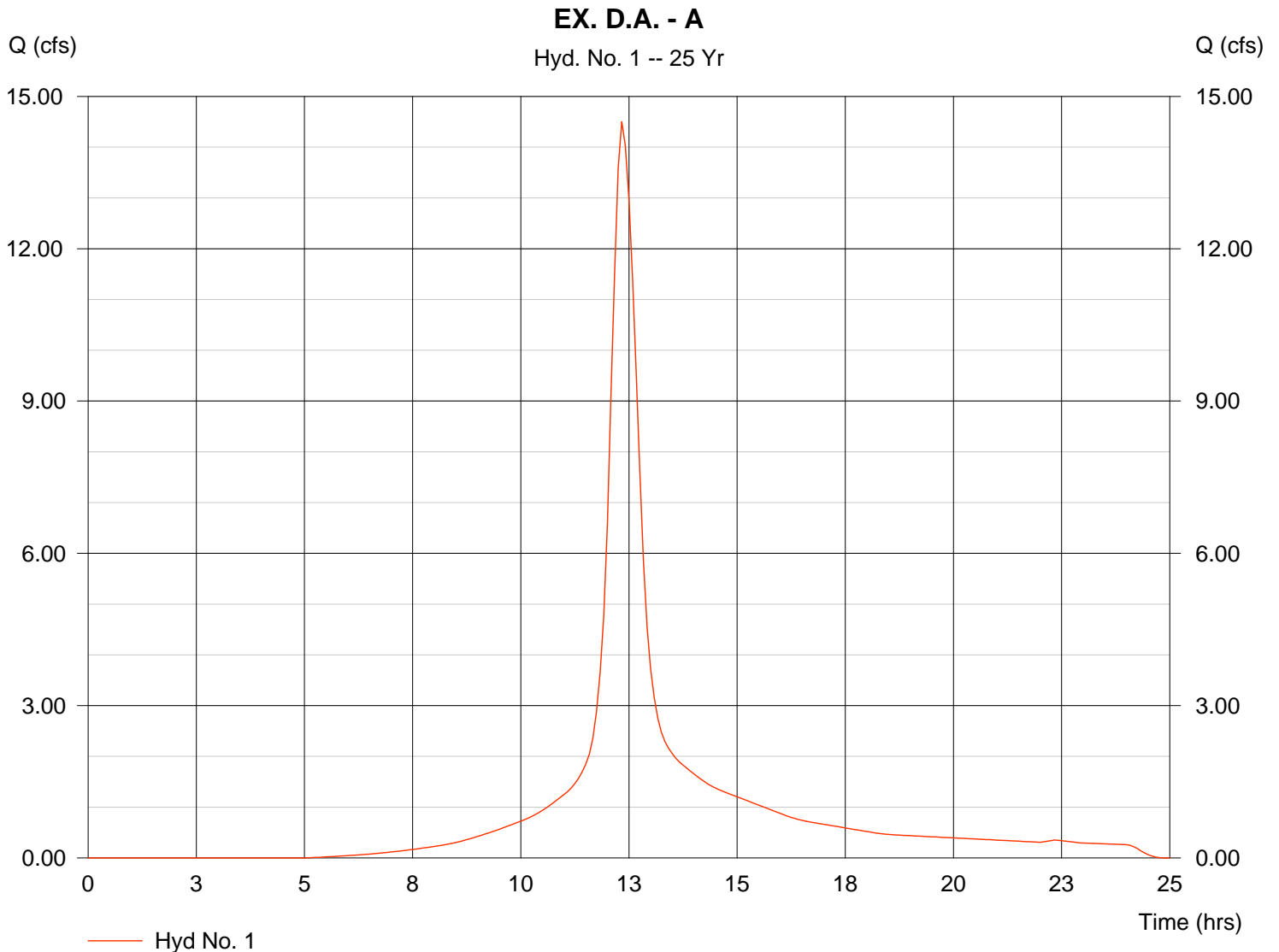
Hyd. No. 1

EX. D.A. - A

Hydrograph type = SCS Runoff
Storm frequency = 25 yrs
Drainage area = 5.18 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 5.70 in
Storm duration = 24 hrs

Peak discharge = 14.50 cfs
Time interval = 5 min
Curve number = 87
Hydraulic length = 0 ft
Time of conc. (Tc) = 30.38468 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 82,038 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	19.20	5	740	110,002	---	-----	-----	EX. D.A. - A
2	SCS Runoff	1.90	5	785	21,348	---	-----	-----	EX. D.A. - B
03113006-c-Pre-Development Model.gpw								Return Period: 100 Year	Thursday, Oct 19 2006, 11:16 AM

Hydrograph Plot

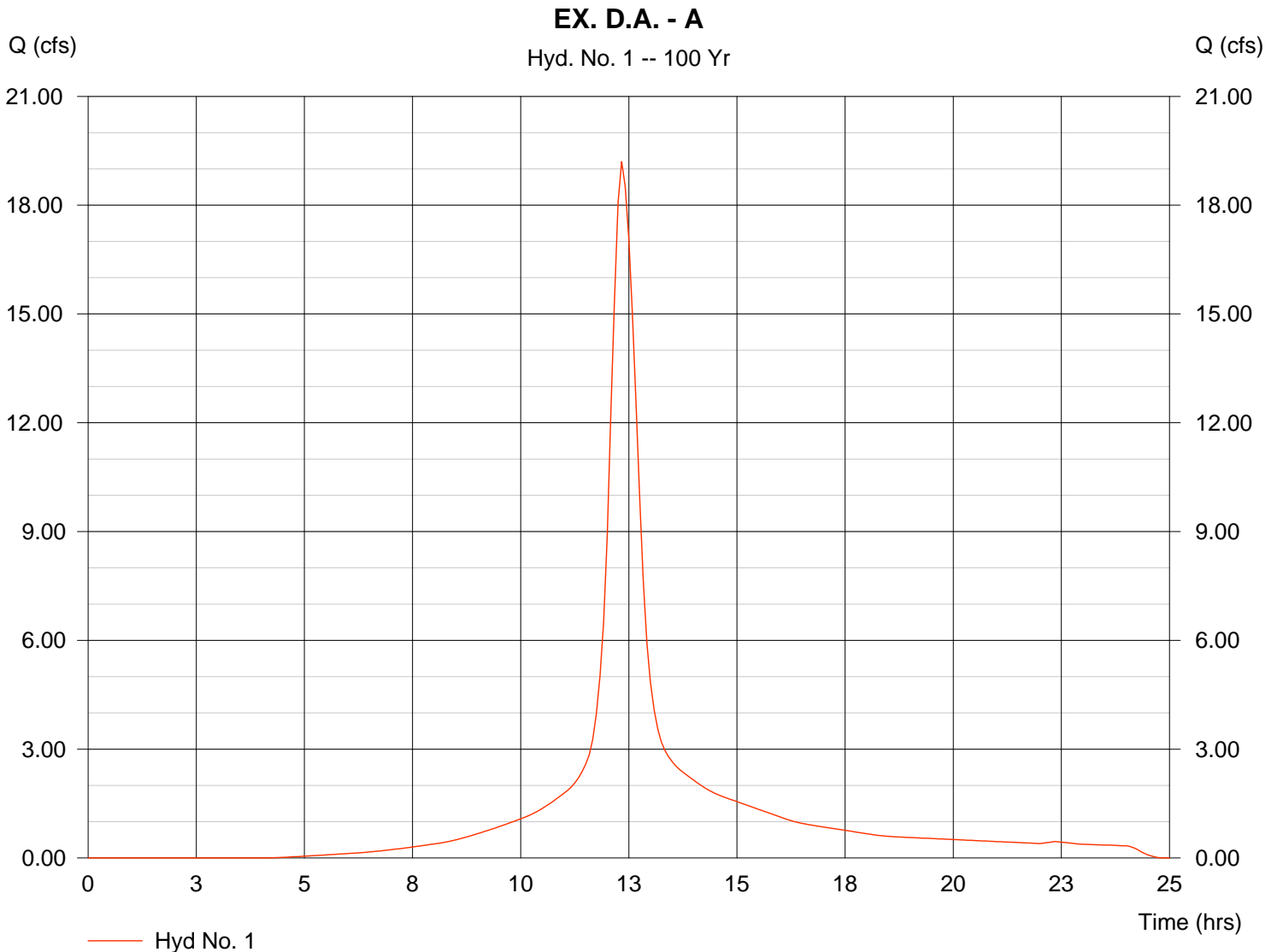
Hyd. No. 1

EX. D.A. - A

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Drainage area = 5.18 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 7.20 in
Storm duration = 24 hrs

Peak discharge = 19.20 cfs
Time interval = 5 min
Curve number = 87
Hydraulic length = 0 ft
Time of conc. (Tc) = 30.38468 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 110,002 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	6.98	5	740	38,851	---	-----	-----	EX. D.A. - A
2	SCS Runoff	0.65	5	790	7,228	---	-----	-----	EX. D.A. - B
03113006-c-Pre-Development Model.gpw								Return Period: 2 Year	Thursday, Oct 19 2006, 11:19 AM

Hydrograph Plot

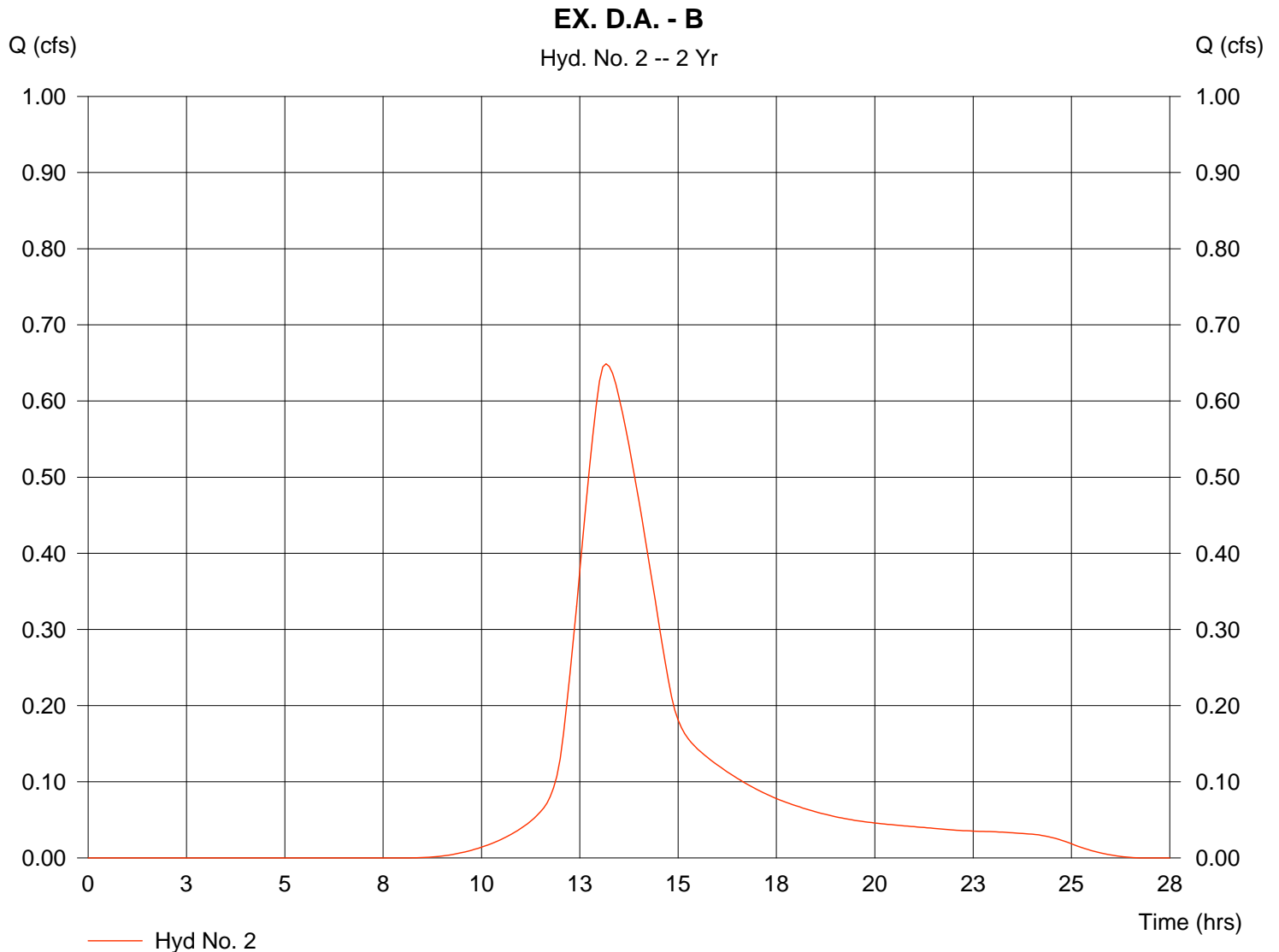
Hyd. No. 2

EX. D.A. - B

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Drainage area = 1.07 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 3.30 in
Storm duration = 24 hrs

Peak discharge = 0.65 cfs
Time interval = 5 min
Curve number = 85
Hydraulic length = 0 ft
Time of conc. (Tc) = 107.3 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 7,228 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	12.30	5	740	69,173	---	-----	-----	EX. D.A. - A
2	SCS Runoff	1.19	5	790	13,208	---	-----	-----	EX. D.A. - B
03113006-c-Pre-Development Model.gpw								Return Period: 10 Year	Thursday, Oct 19 2006, 11:20 AM

Hydrograph Plot

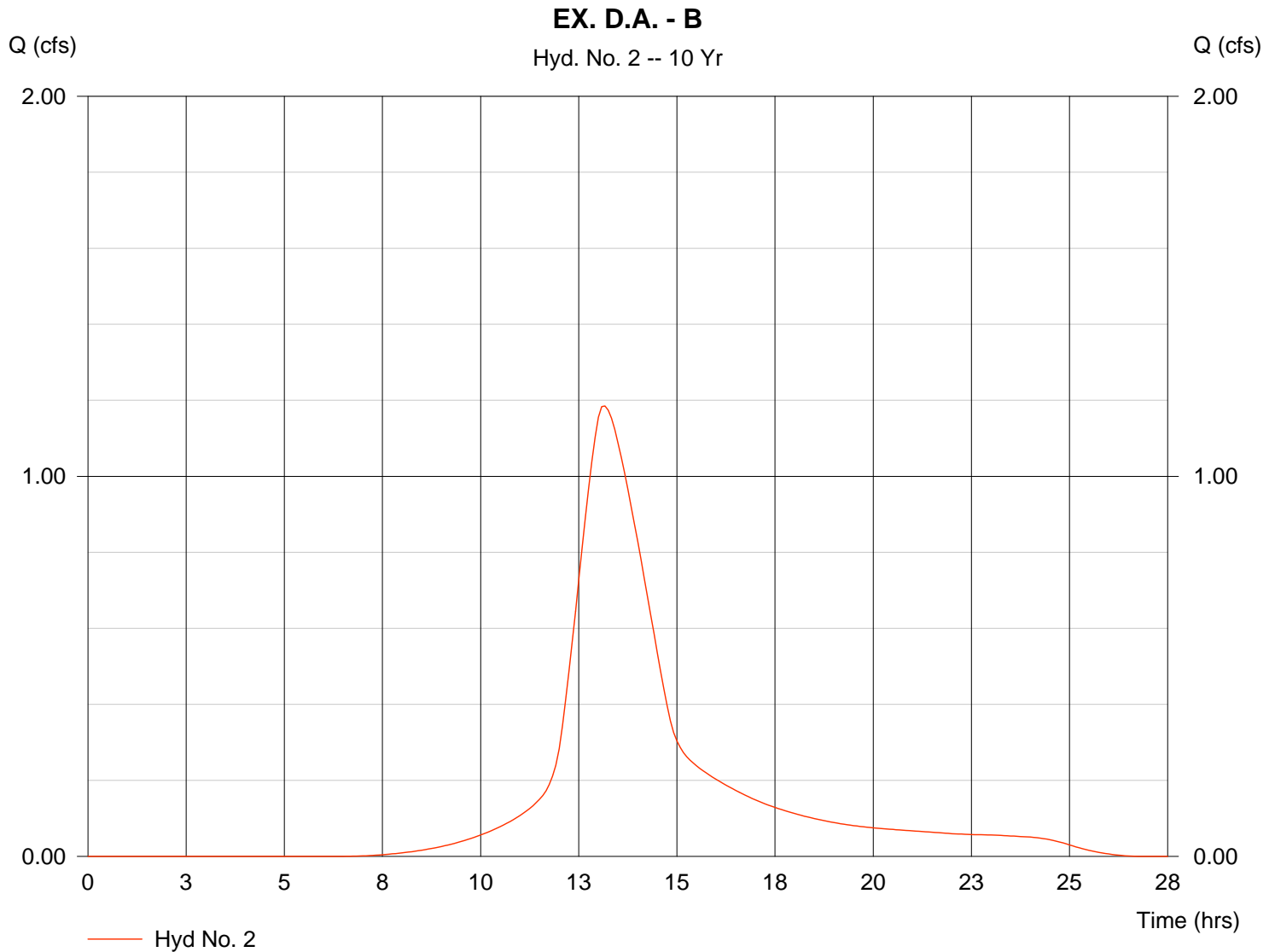
Hyd. No. 2

EX. D.A. - B

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Drainage area = 1.07 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 5.00 in
Storm duration = 24 hrs

Peak discharge = 1.19 cfs
Time interval = 5 min
Curve number = 85
Hydraulic length = 0 ft
Time of conc. (Tc) = 107.3 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 13,208 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	14.50	5	740	82,038	---	-----	-----	EX. D.A. - A
2	SCS Runoff	1.41	5	790	15,765	---	-----	-----	EX. D.A. - B
03113006-c-Pre-Development Model.gpw								Return Period: 25 Year	Thursday, Oct 19 2006, 11:20 AM

Hydrograph Plot

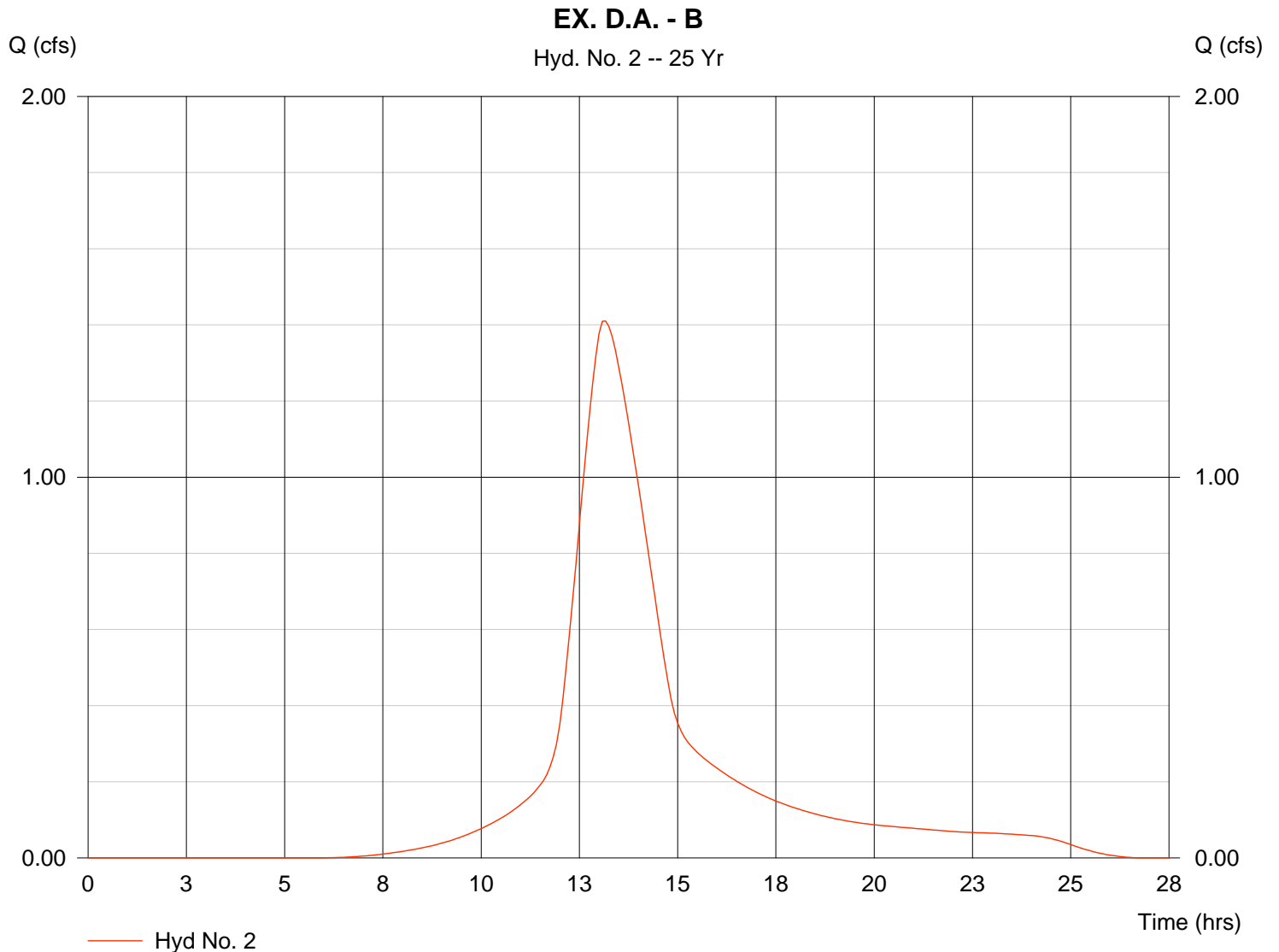
Hyd. No. 2

EX. D.A. - B

Hydrograph type = SCS Runoff
Storm frequency = 25 yrs
Drainage area = 1.07 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 5.70 in
Storm duration = 24 hrs

Peak discharge = 1.41 cfs
Time interval = 5 min
Curve number = 85
Hydraulic length = 0 ft
Time of conc. (Tc) = 107.3 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 15,765 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	19.20	5	740	110,002	---	-----	-----	EX. D.A. - A
2	SCS Runoff	1.90	5	785	21,348	---	-----	-----	EX. D.A. - B
03113006-c-Pre-Development Model.gpw								Return Period: 100 Year	Thursday, Oct 19 2006, 11:20 AM

Hydrograph Plot

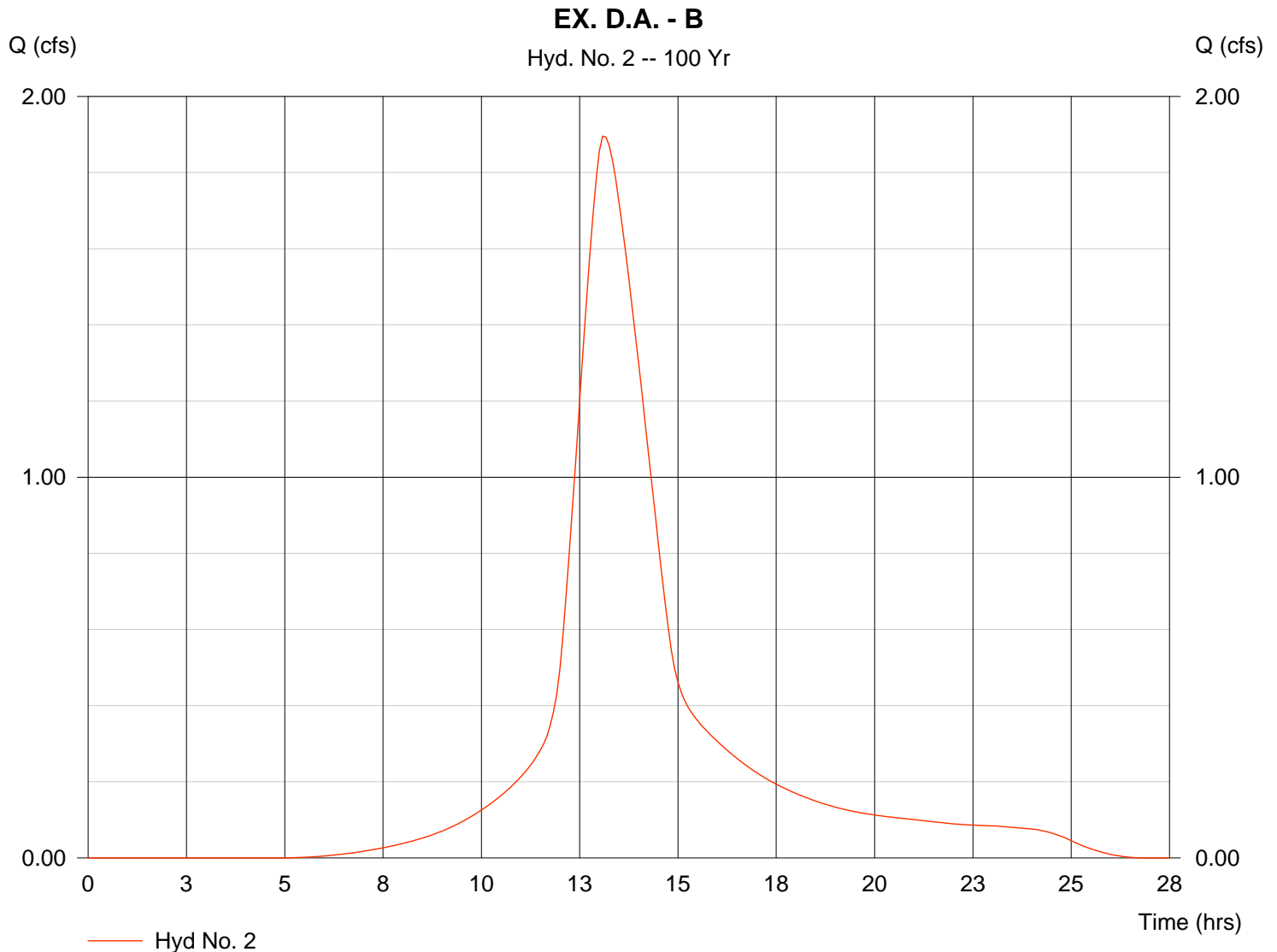
Hyd. No. 2

EX. D.A. - B

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Drainage area = 1.07 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 7.20 in
Storm duration = 24 hrs

Peak discharge = 1.90 cfs
Time interval = 5 min
Curve number = 85
Hydraulic length = 0 ft
Time of conc. (Tc) = 107.3 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 21,348 cuft



APPENDIX B

POST-DEVELOPMENT DRAINAGE CALCULATIONS

TR55 Tc Worksheet

Hyd. No. 2

PROP D.A. - B

<u>Description</u>	<u>A</u>		<u>B</u>		<u>C</u>		<u>Totals</u>	
Sheet Flow								
Manning's n-value	= 0.011		0.011		0.011			
Flow length (ft)	= 21.0		0.0		0.0			
Two-year 24-hr precip. (in)	= 3.30		0.00		0.00			
Land slope (%)	= 0.01		0.00		0.00			
Travel Time (min)	= 2.85	+	0.00	+	0.00	=	2.85	
Shallow Concentrated Flow								
Flow length (ft)	= 0.00		0.00		0.00			
Watercourse slope (%)	= 0.00		0.00		0.00			
Surface description	= Paved		Paved		Paved			
Average velocity (ft/s)	= 0.00		0.00		0.00			
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00	
Channel Flow								
X sectional flow area (sqft)	= 1.77		0.00		0.00			
Wetted perimeter (ft)	= 4.71		0.00		0.00			
Channel slope (%)	= 0.01		0.00		0.00			
Manning's n-value	= 0.011		0.015		0.015			
Velocity (ft/s)	= 0.70		0.00		0.00			
Flow length (ft)	= 711.0		0.0		0.0			
Travel Time (min)	= 16.85	+	0.00	+	0.00	=	16.85	
Total Travel Time, Tc							=	19.70 min

TR55 Tc Worksheet

Hyd. No. 3

PROP D.A. - C

<u>Description</u>	<u>A</u>		<u>B</u>		<u>C</u>		<u>Totals</u>	
Sheet Flow								
Manning's n-value	= 0.011		0.011		0.011			
Flow length (ft)	= 28.0		0.0		0.0			
Two-year 24-hr precip. (in)	= 3.30		0.00		0.00			
Land slope (%)	= 0.03		0.00		0.00			
Travel Time (min)	= 2.31	+	0.00	+	0.00	=	2.31	
Shallow Concentrated Flow								
Flow length (ft)	= 0.00		0.00		0.00			
Watercourse slope (%)	= 0.00		0.00		0.00			
Surface description	= Paved		Paved		Paved			
Average velocity (ft/s)	= 0.00		0.00		0.00			
Travel Time (min)	= 0.00	+	0.00	+	0.00	=	0.00	
Channel Flow								
X sectional flow area (sqft)	= 1.77		0.00		0.00			
Wetted perimeter (ft)	= 4.71		0.00		0.00			
Channel slope (%)	= 0.01		0.00		0.00			
Manning's n-value	= 0.011		0.015		0.015			
Velocity (ft/s)	= 0.70		0.00		0.00			
Flow length (ft)	= 402.0		0.0		0.0			
Travel Time (min)	= 9.53	+	0.00	+	0.00	=	9.53	
Total Travel Time, Tc							=	11.84 min

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description	
1	SCS Runoff	1.79	5	730	8,037	----	-----	-----	PROP D.A. - A	
2	SCS Runoff	3.99	5	735	19,168	----	-----	-----	PROP D.A. - B	
3	SCS Runoff	5.07	5	730	21,211	----	-----	-----	PROP D.A. - C	
03113006-c-Post-Development Model.gpr							Return Period: 2 Year		Thursday, Oct 19 2006, 11:26 AM	

Hydrograph Plot

Hyd. No. 1

PROP D.A. - A

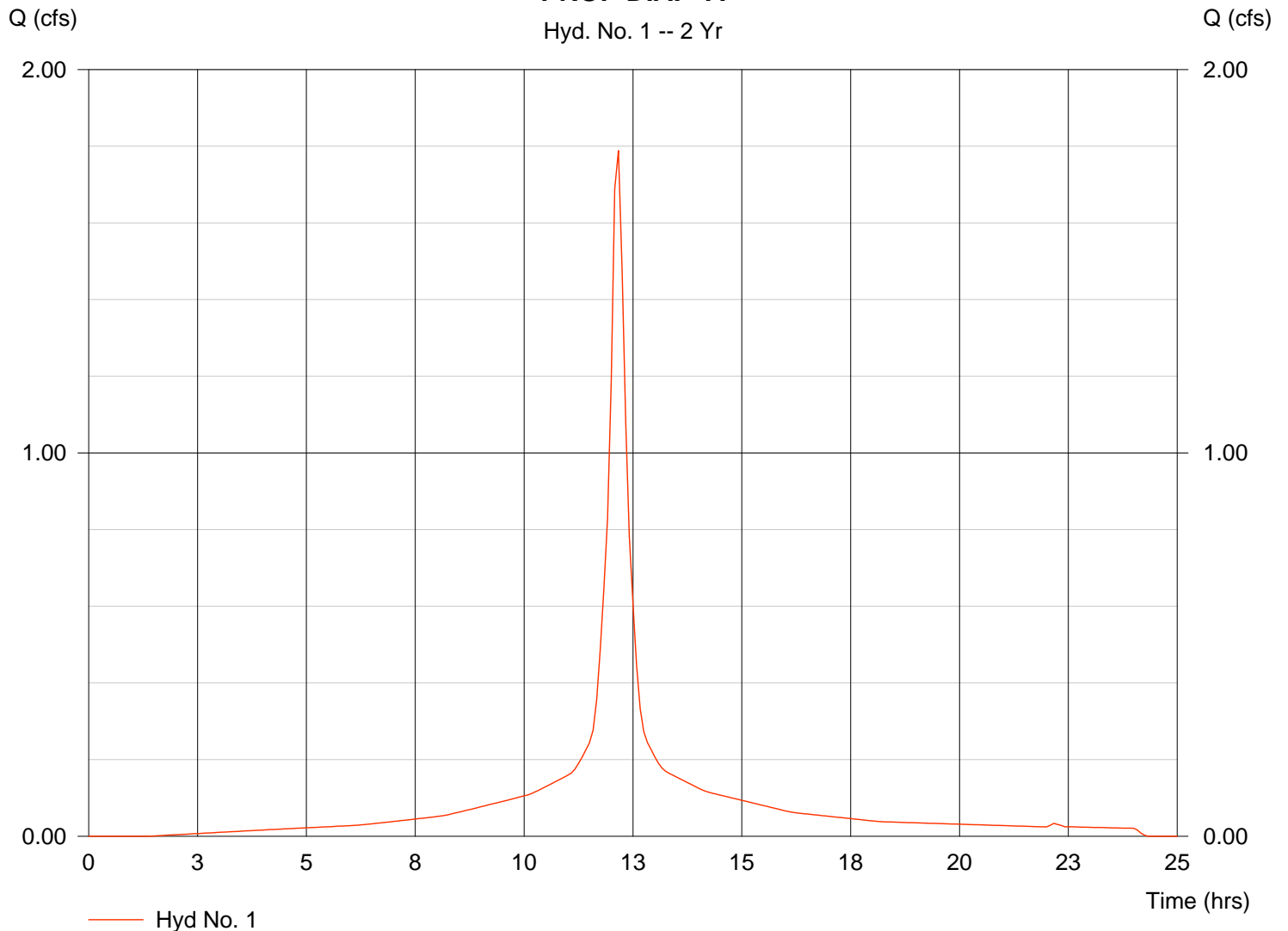
Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Drainage area = 0.77 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 3.30 in
Storm duration = 24 hrs

Peak discharge = 1.79 cfs
Time interval = 5 min
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 10 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 8,037 cuft

PROP D.A. - A

Hyd. No. 1 -- 2 Yr



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	2.73	5	730	12,481	----	-----	-----	PROP D.A. - A
2	SCS Runoff	6.89	5	735	33,695	----	-----	-----	PROP D.A. - B
3	SCS Runoff	8.04	5	730	34,599	----	-----	-----	PROP D.A. - C
03113006-c-Post-Development Model.gpr						Return Period: 10 Year		Thursday, Oct 19 2006, 11:27 AM	

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Thursday, Oct 19 2006, 11:27 AM

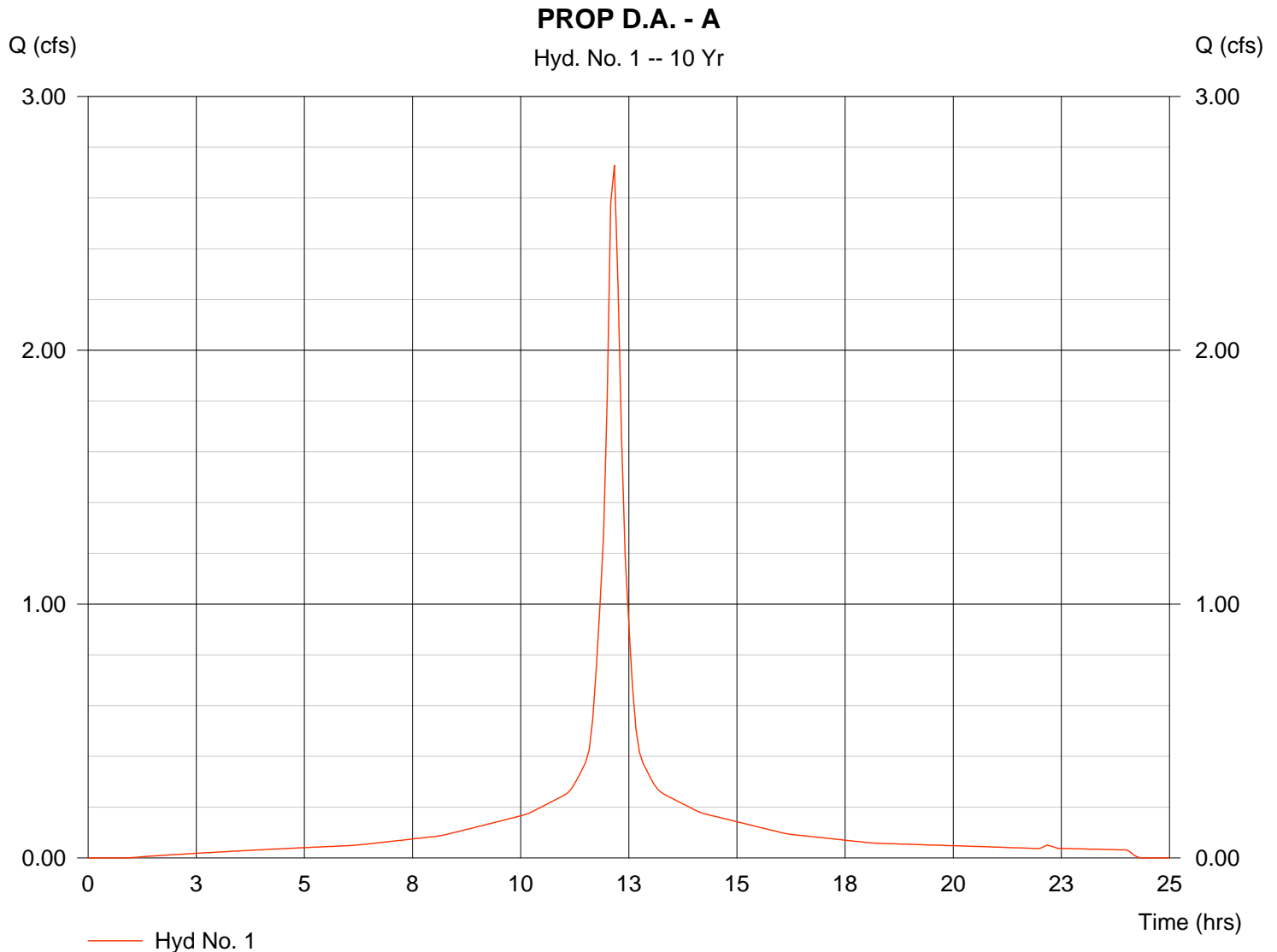
Hyd. No. 1

PROP D.A. - A

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Drainage area = 0.77 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.00 in
Storm duration = 24 hrs

Peak discharge = 2.73 cfs
Time interval = 5 min
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 10 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 12,481 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	3.11	5	730	14,313	----	-----	-----	PROP D.A. - A
2	SCS Runoff	8.08	5	735	39,835	----	-----	-----	PROP D.A. - B
3	SCS Runoff	9.25	5	730	40,154	----	-----	-----	PROP D.A. - C
03113006-c-Post-Development Model.gpr						Return Period: 25 Year		Thursday, Oct 19 2006, 11:27 AM	

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Thursday, Oct 19 2006, 11:27 AM

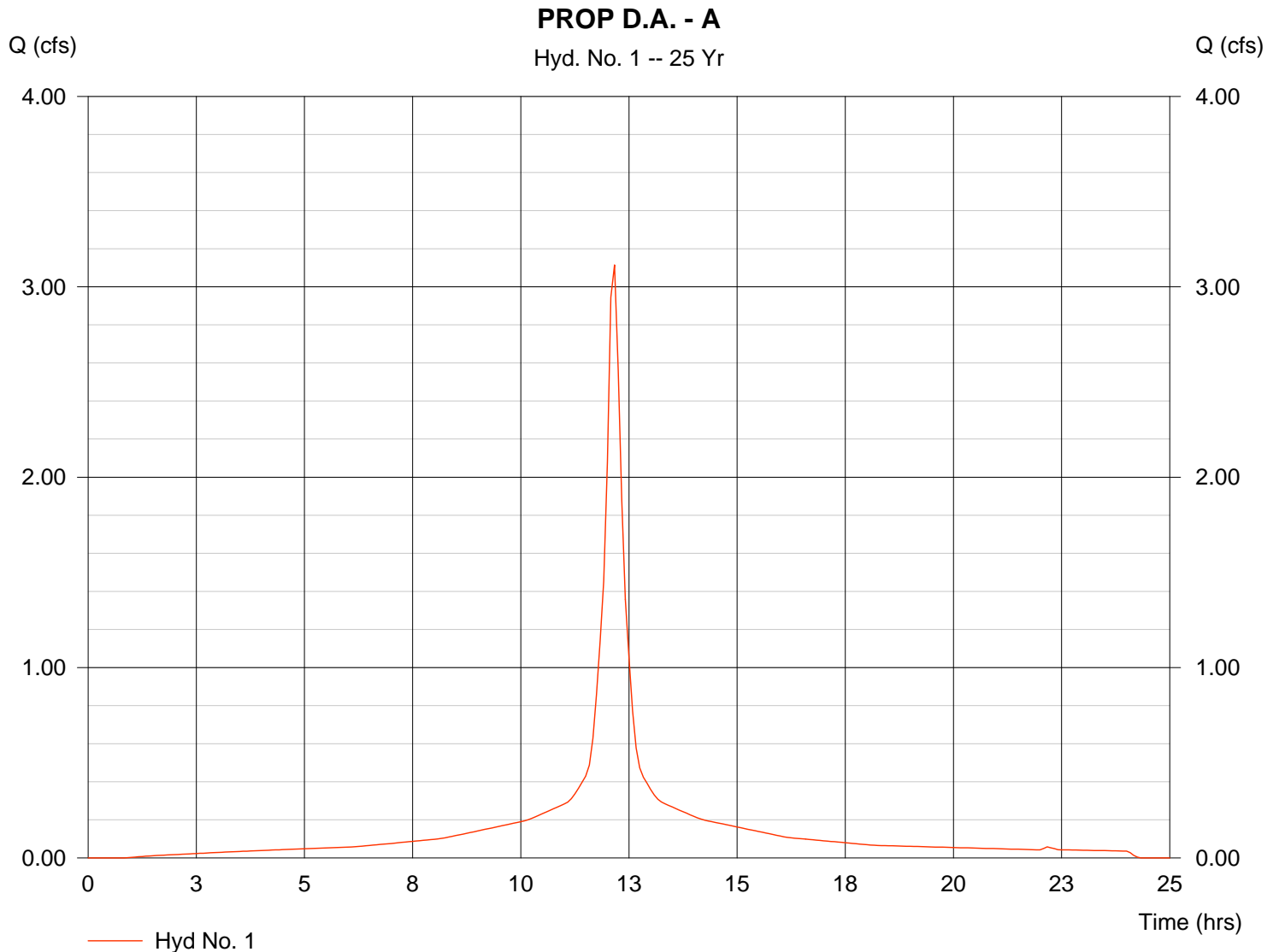
Hyd. No. 1

PROP D.A. - A

Hydrograph type = SCS Runoff
Storm frequency = 25 yrs
Drainage area = 0.77 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.70 in
Storm duration = 24 hrs

Peak discharge = 3.11 cfs
Time interval = 5 min
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 10 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 14,313 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	3.94	5	730	18,240	----	-----	-----	PROP D.A. - A
2	SCS Runoff	10.64	5	735	53,156	----	-----	-----	PROP D.A. - B
3	SCS Runoff	11.82	5	730	52,099	----	-----	-----	PROP D.A. - C
03113006-c-Post-Development Model.gpr						Return Period: 100 Year		Thursday, Oct 19 2006, 11:27 AM	

Hydrograph Plot

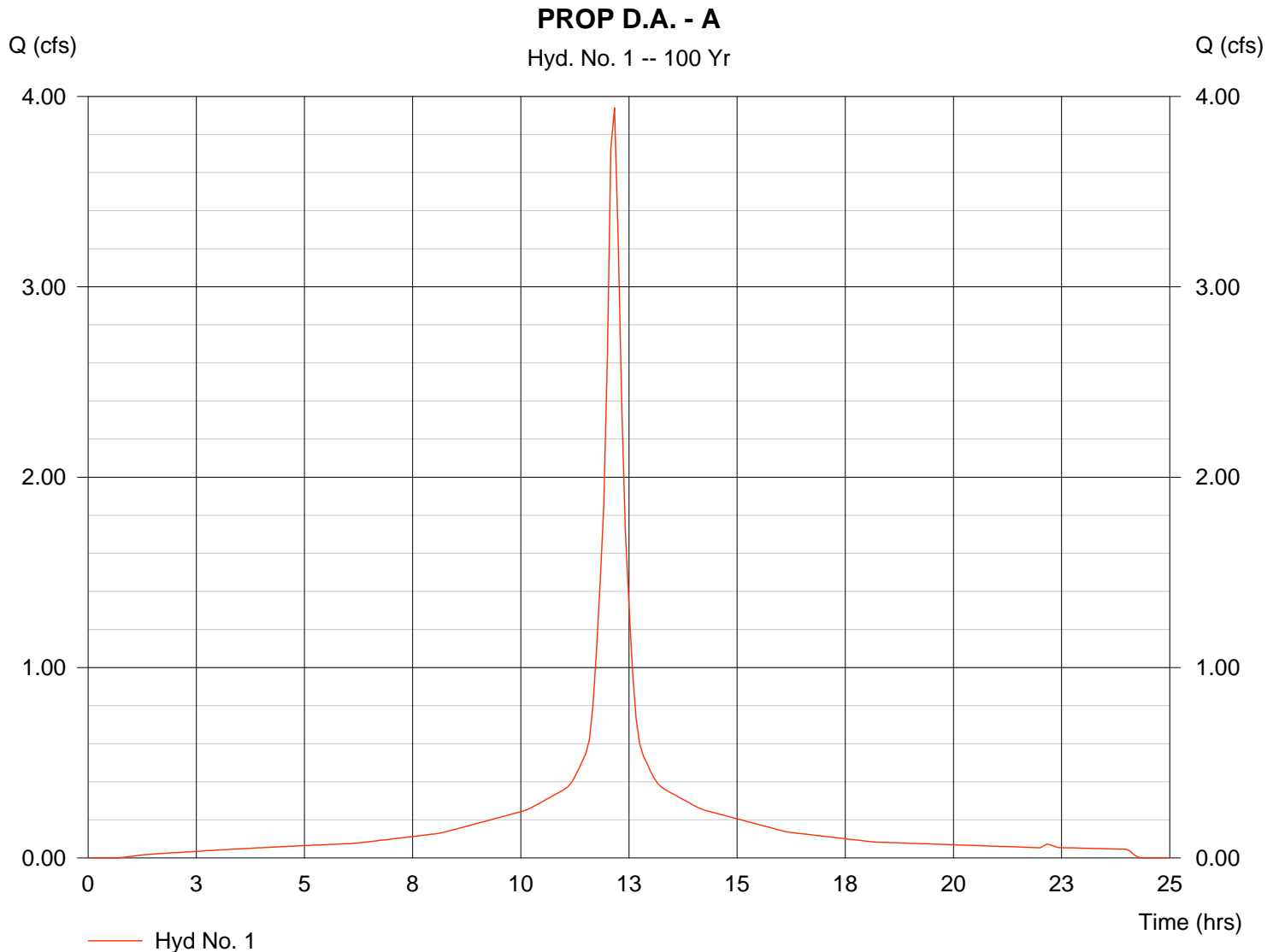
Hyd. No. 1

PROP D.A. - A

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Drainage area = 0.77 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 7.20 in
Storm duration = 24 hrs

Peak discharge = 3.94 cfs
Time interval = 5 min
Curve number = 98
Hydraulic length = 0 ft
Time of conc. (Tc) = 10 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 18,240 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	1.79	5	730	8,037	----	-----	-----	PROP D.A. - A
2	SCS Runoff	3.99	5	735	19,168	----	-----	-----	PROP D.A. - B
3	SCS Runoff	5.07	5	730	21,211	----	-----	-----	PROP D.A. - C
03113006-c-Post-Development Model.gpr							Return Period: 2 Year		Thursday, Oct 19 2006, 11:31 AM

Hydrograph Plot

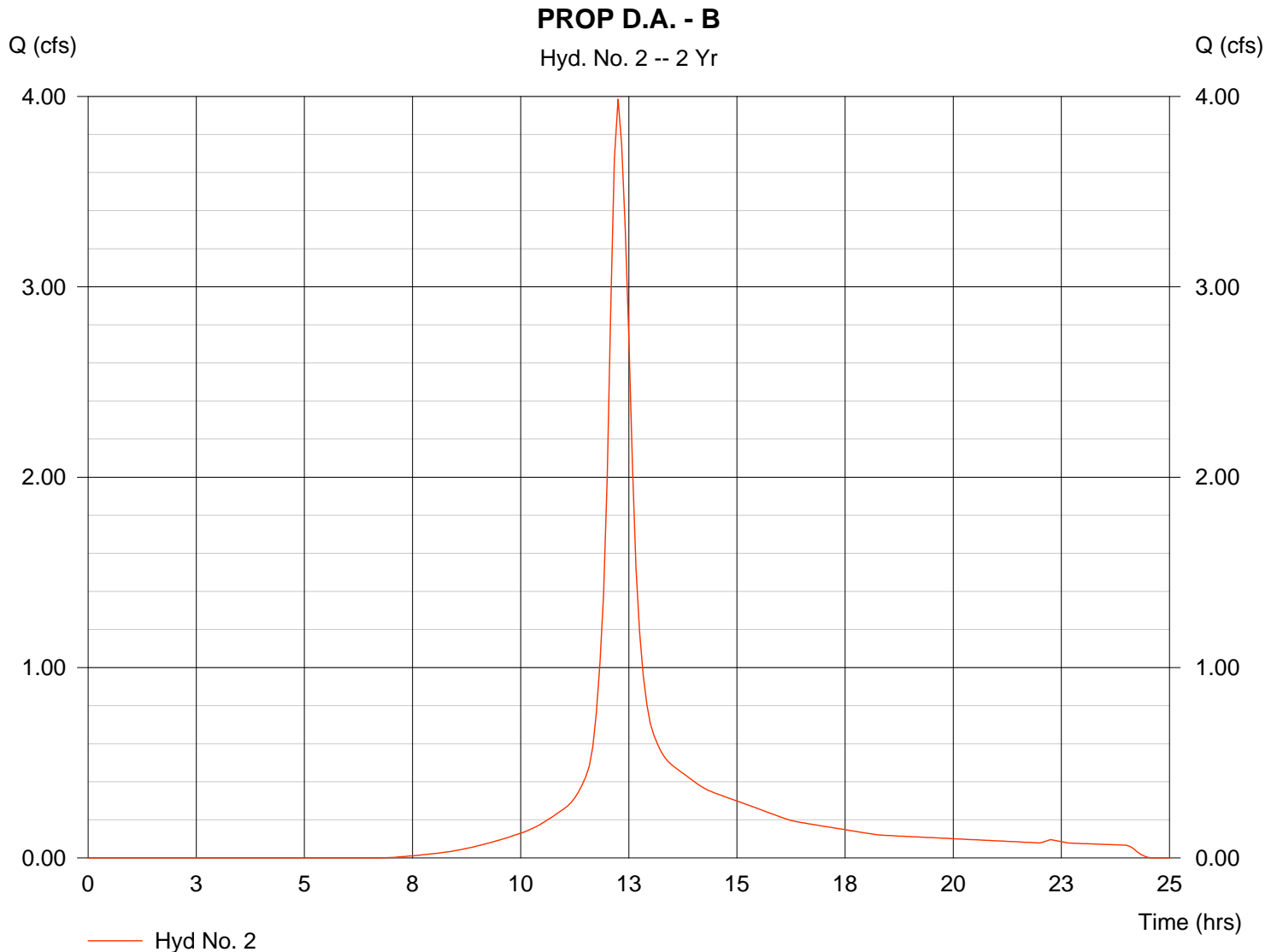
Hyd. No. 2

PROP D.A. - B

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Drainage area = 2.53 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 3.30 in
Storm duration = 24 hrs

Peak discharge = 3.99 cfs
Time interval = 5 min
Curve number = 88
Hydraulic length = 0 ft
Time of conc. (Tc) = 19.70439 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 19,168 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	2.73	5	730	12,481	---	-----	-----	PROP D.A. - A
2	SCS Runoff	6.89	5	735	33,695	---	-----	-----	PROP D.A. - B
3	SCS Runoff	8.04	5	730	34,599	---	-----	-----	PROP D.A. - C
03113006-c-Post-Development Model.gpr						Return Period: 10 Year		Thursday, Oct 19 2006, 11:31 AM	

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Thursday, Oct 19 2006, 11:31 AM

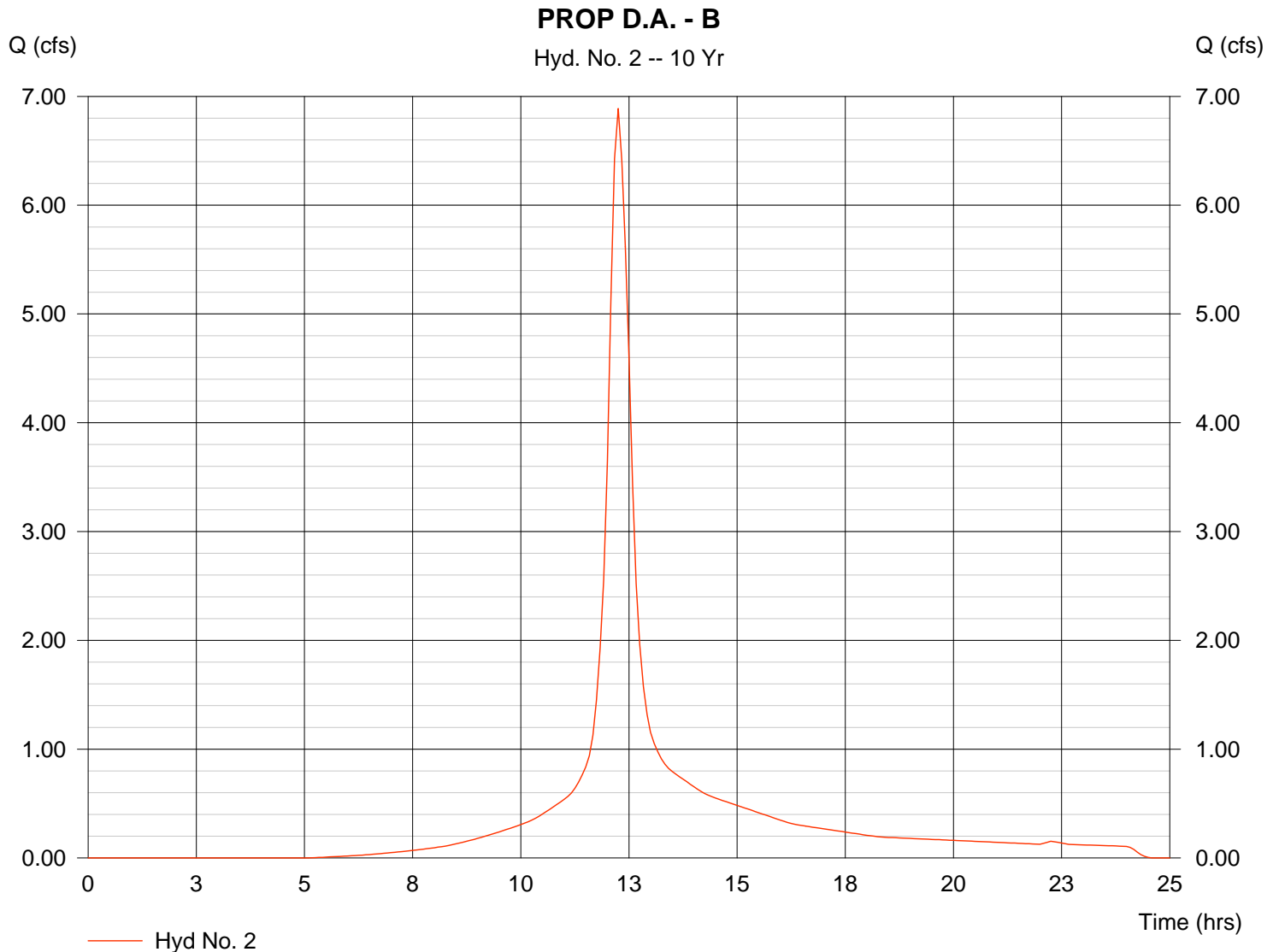
Hyd. No. 2

PROP D.A. - B

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Drainage area = 2.53 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 5.00 in
Storm duration = 24 hrs

Peak discharge = 6.89 cfs
Time interval = 5 min
Curve number = 88
Hydraulic length = 0 ft
Time of conc. (Tc) = 19.70439 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 33,695 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	3.11	5	730	14,313	----	-----	-----	PROP D.A. - A
2	SCS Runoff	8.08	5	735	39,835	----	-----	-----	PROP D.A. - B
3	SCS Runoff	9.25	5	730	40,154	----	-----	-----	PROP D.A. - C
03113006-c-Post-Development Model.gpr						Return Period: 25 Year		Thursday, Oct 19 2006, 11:31 AM	

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Thursday, Oct 19 2006, 11:31 AM

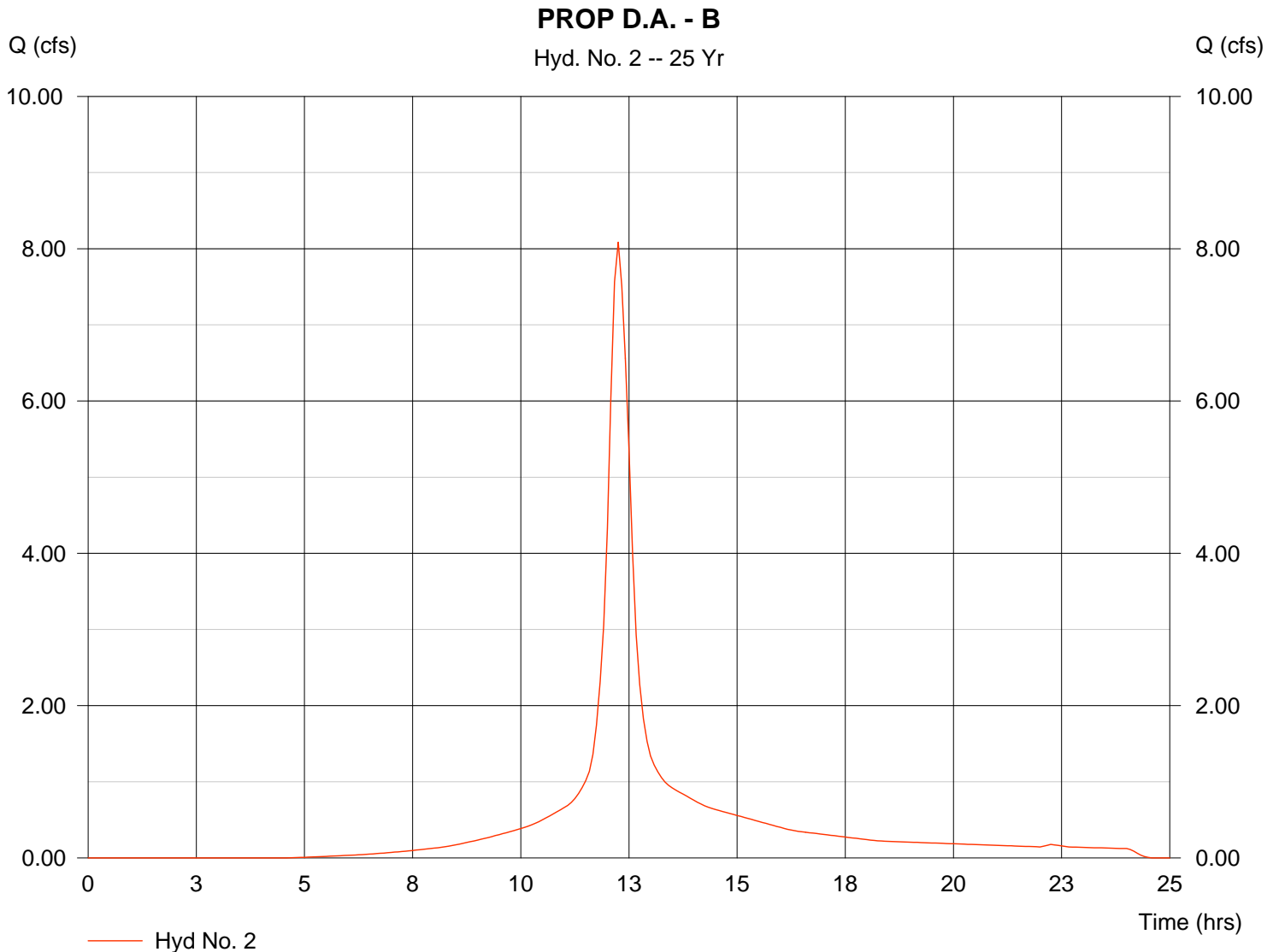
Hyd. No. 2

PROP D.A. - B

Hydrograph type = SCS Runoff
Storm frequency = 25 yrs
Drainage area = 2.53 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 5.70 in
Storm duration = 24 hrs

Peak discharge = 8.08 cfs
Time interval = 5 min
Curve number = 88
Hydraulic length = 0 ft
Time of conc. (Tc) = 19.70439 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 39,835 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	3.94	5	730	18,240	----	-----	-----	PROP D.A. - A
2	SCS Runoff	10.64	5	735	53,156	----	-----	-----	PROP D.A. - B
3	SCS Runoff	11.82	5	730	52,099	----	-----	-----	PROP D.A. - C
03113006-c-Post-Development Model.gpr						Return Period: 100 Year		Thursday, Oct 19 2006, 11:31 AM	

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Thursday, Oct 19 2006, 11:31 AM

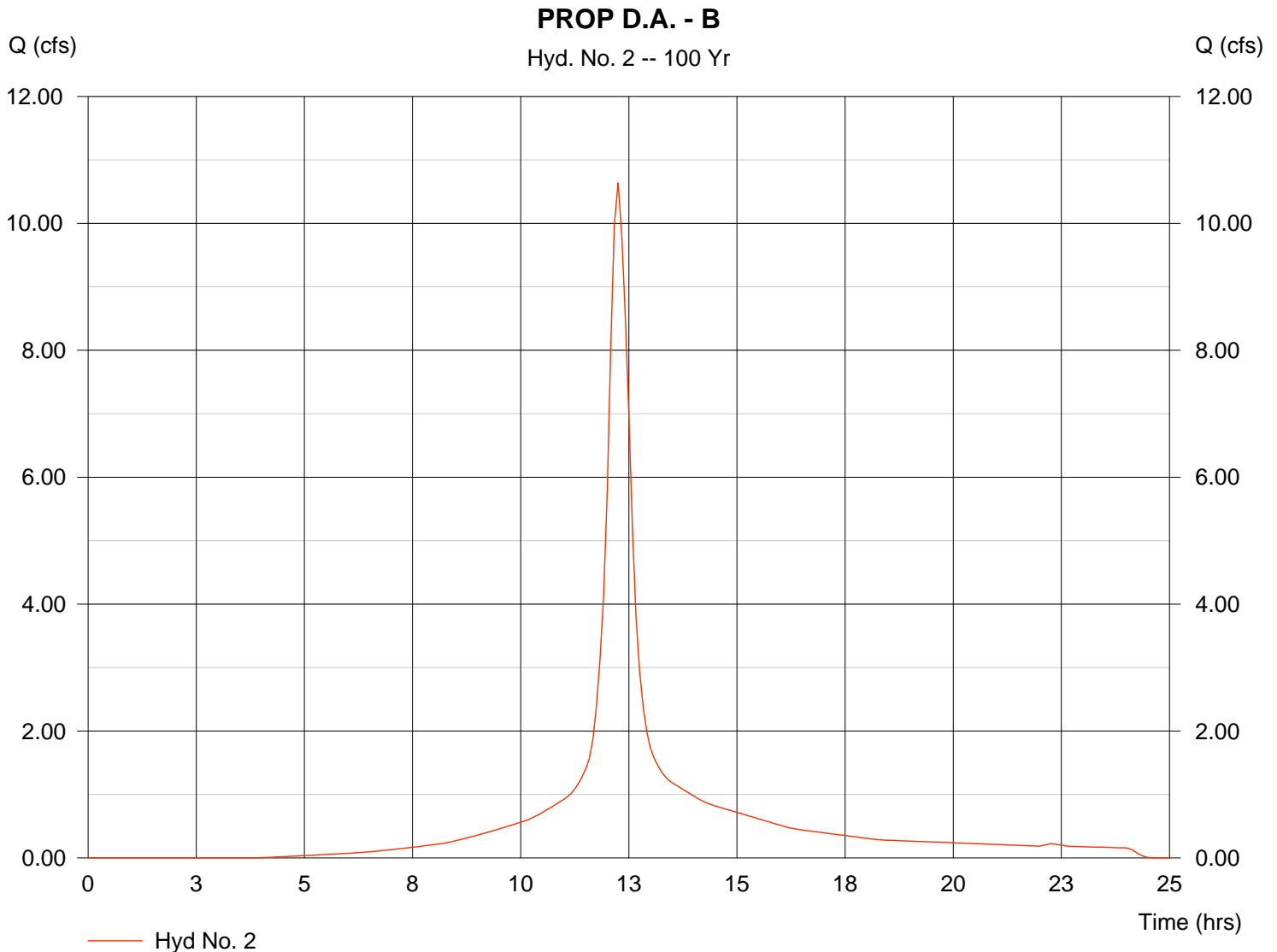
Hyd. No. 2

PROP D.A. - B

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Drainage area = 2.53 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 7.20 in
Storm duration = 24 hrs

Peak discharge = 10.64 cfs
Time interval = 5 min
Curve number = 88
Hydraulic length = 0 ft
Time of conc. (Tc) = 19.70439 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 53,156 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	1.79	5	730	8,037	----	-----	-----	PROP D.A. - A
2	SCS Runoff	3.99	5	735	19,168	----	-----	-----	PROP D.A. - B
3	SCS Runoff	5.07	5	730	21,211	----	-----	-----	PROP D.A. - C
03113006-c-Post-Development Model.gpr							Return Period: 2 Year		Thursday, Oct 19 2006, 11:35 AM

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Thursday, Oct 19 2006, 11:36 AM

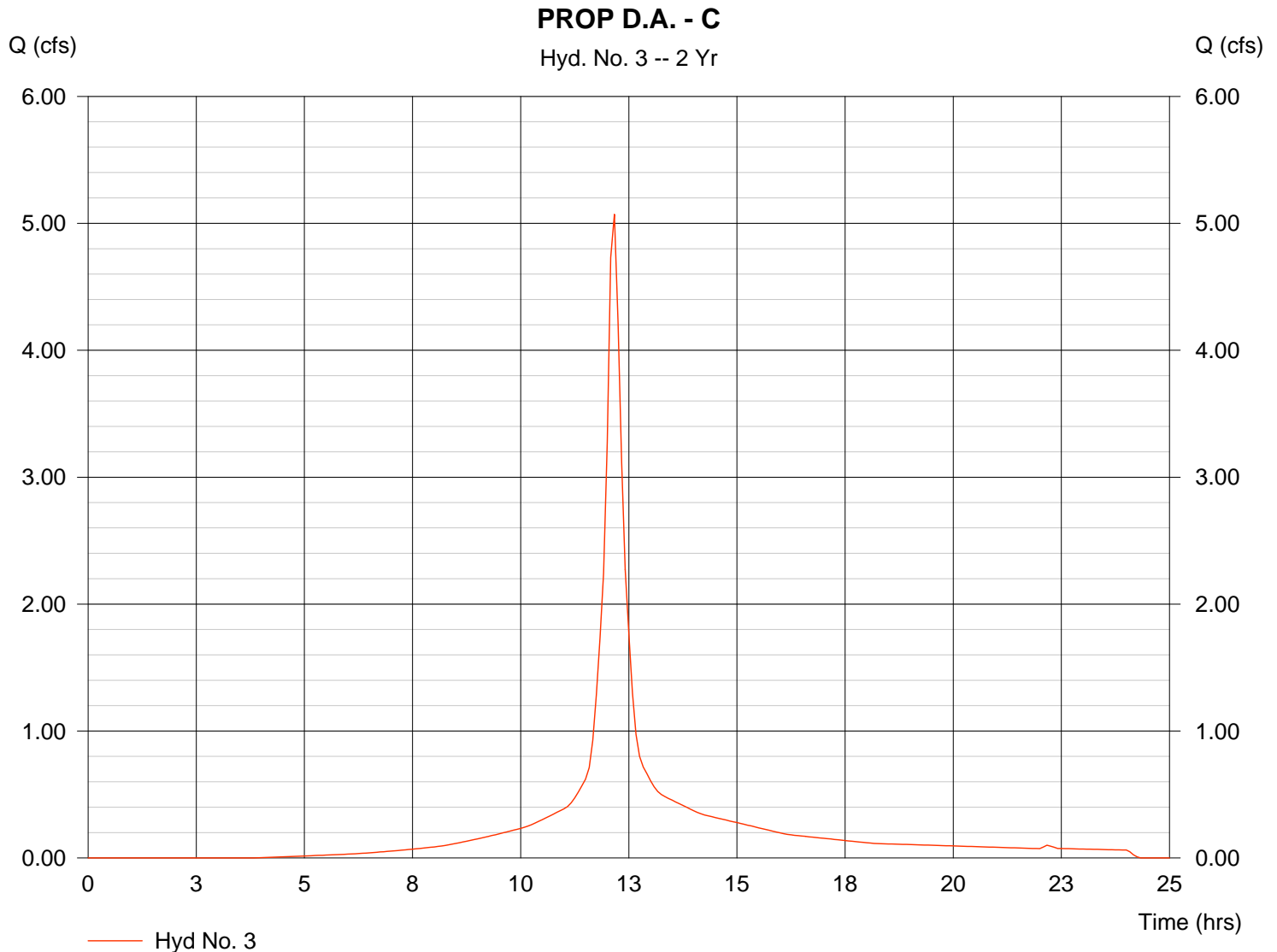
Hyd. No. 3

PROP D.A. - C

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Drainage area = 2.36 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 3.30 in
Storm duration = 24 hrs

Peak discharge = 5.07 cfs
Time interval = 5 min
Curve number = 94
Hydraulic length = 0 ft
Time of conc. (Tc) = 11.84133 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 21,211 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	2.73	5	730	12,481	----	-----	-----	PROP D.A. - A
2	SCS Runoff	6.89	5	735	33,695	----	-----	-----	PROP D.A. - B
3	SCS Runoff	8.04	5	730	34,599	----	-----	-----	PROP D.A. - C
03113006-c-Post-Development Model.gpr						Return Period: 10 Year		Thursday, Oct 19 2006, 11:36 AM	

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Thursday, Oct 19 2006, 11:36 AM

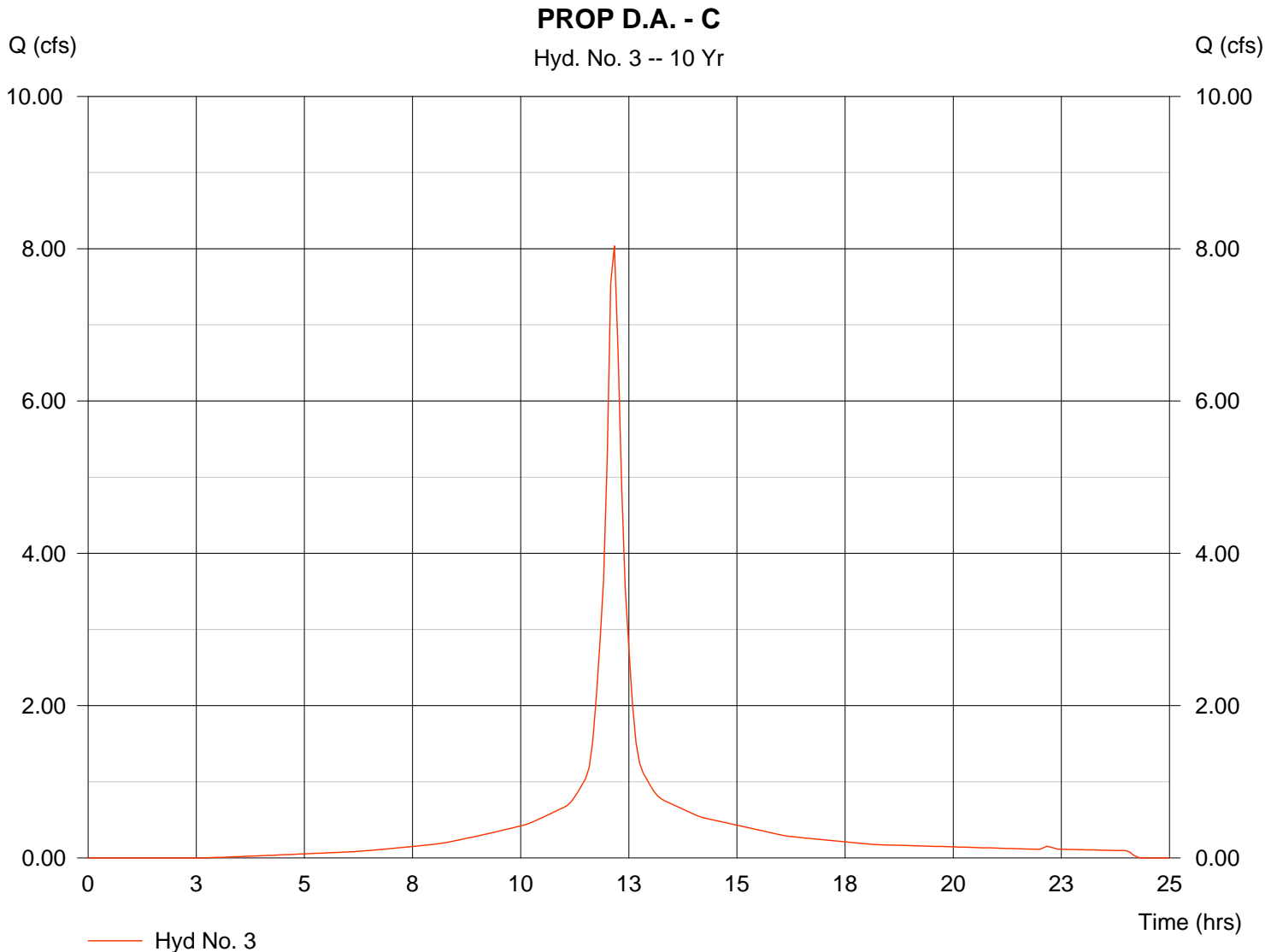
Hyd. No. 3

PROP D.A. - C

Hydrograph type = SCS Runoff
Storm frequency = 10 yrs
Drainage area = 2.36 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 5.00 in
Storm duration = 24 hrs

Peak discharge = 8.04 cfs
Time interval = 5 min
Curve number = 94
Hydraulic length = 0 ft
Time of conc. (Tc) = 11.84133 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 34,599 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	3.11	5	730	14,313	----	-----	-----	PROP D.A. - A
2	SCS Runoff	8.08	5	735	39,835	----	-----	-----	PROP D.A. - B
3	SCS Runoff	9.25	5	730	40,154	----	-----	-----	PROP D.A. - C
03113006-c-Post-Development Model.gpr						Return Period: 25 Year		Thursday, Oct 19 2006, 11:36 AM	

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Thursday, Oct 19 2006, 11:36 AM

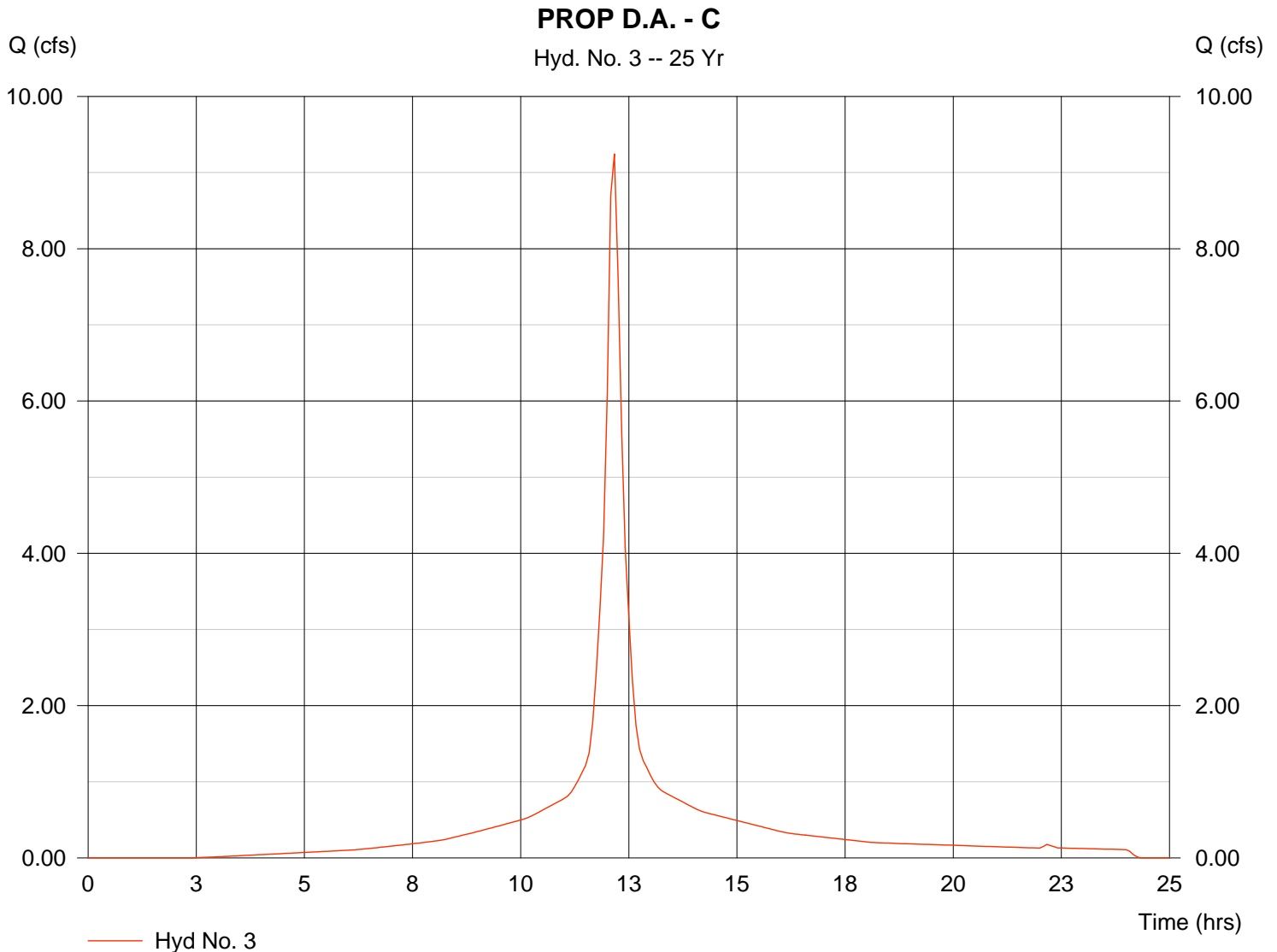
Hyd. No. 3

PROP D.A. - C

Hydrograph type = SCS Runoff
Storm frequency = 25 yrs
Drainage area = 2.36 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 5.70 in
Storm duration = 24 hrs

Peak discharge = 9.25 cfs
Time interval = 5 min
Curve number = 94
Hydraulic length = 0 ft
Time of conc. (Tc) = 11.84133 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 40,154 cuft



Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	3.94	5	730	18,240	----	-----	-----	PROP D.A. - A
2	SCS Runoff	10.64	5	735	53,156	----	-----	-----	PROP D.A. - B
3	SCS Runoff	11.82	5	730	52,099	----	-----	-----	PROP D.A. - C
03113006-c-Post-Development Model.gpr						Return Period: 100 Year		Thursday, Oct 19 2006, 11:36 AM	

Hydrograph Plot

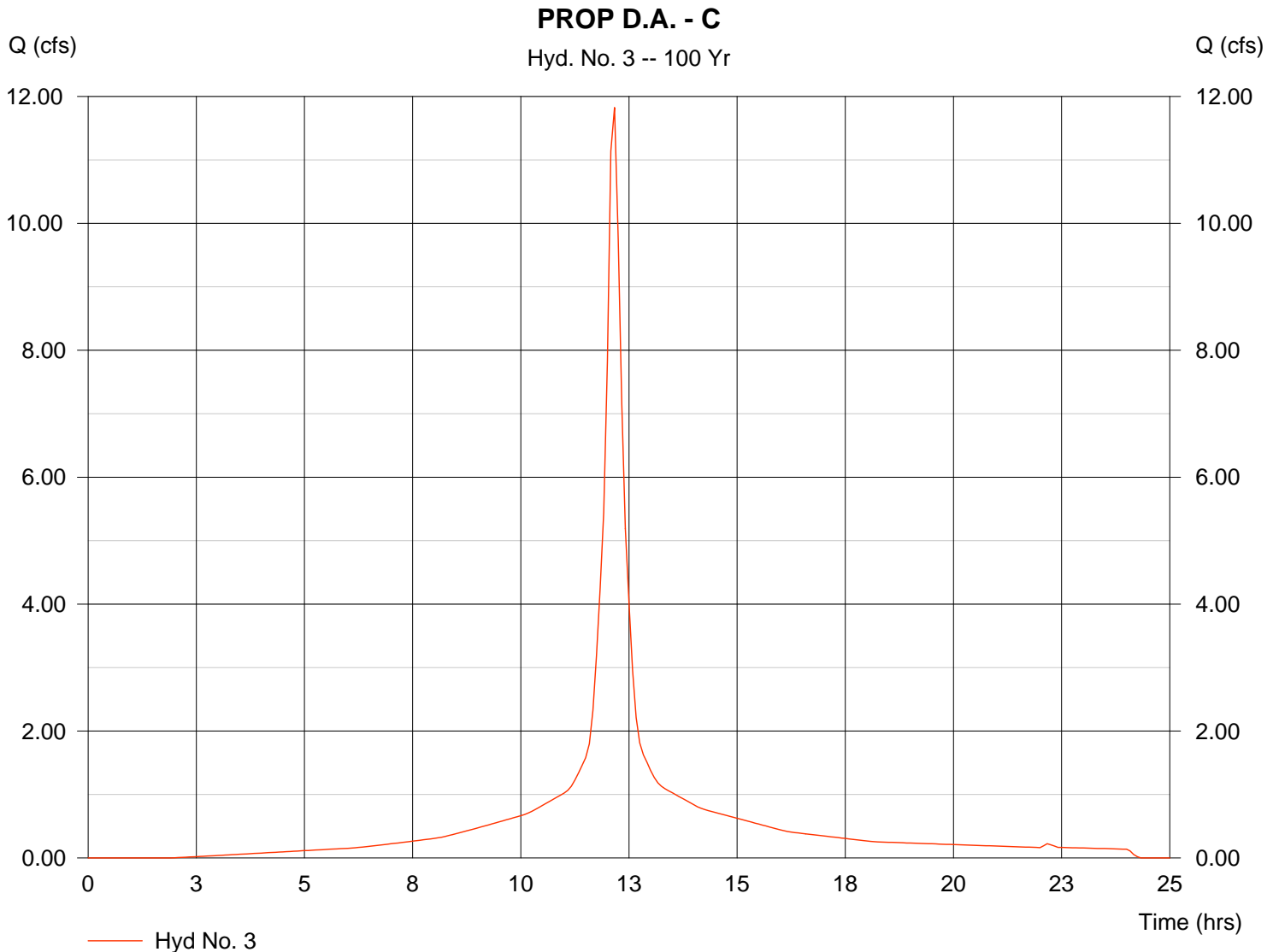
Hyd. No. 3

PROP D.A. - C

Hydrograph type = SCS Runoff
Storm frequency = 100 yrs
Drainage area = 2.36 ac
Basin Slope = 0.0 %
Tc method = TR55
Total precip. = 7.20 in
Storm duration = 24 hrs

Peak discharge = 11.82 cfs
Time interval = 5 min
Curve number = 94
Hydraulic length = 0 ft
Time of conc. (Tc) = 11.84133 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 52,099 cuft



APPENDIX C

WATER QUALITY CALCULATIONS