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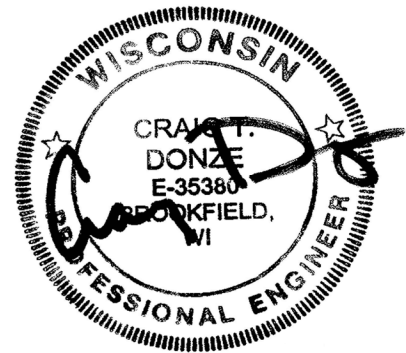
Project:

Weld-All
2001 S. Prairie Ave.

City of Waukesha, WI

Stormwater Narrative

Preparer:



Project Number: **569-19**

Last Revised:

May 14, 2019

Drainage Background

One Source Consulting has been contracted to provide site civil engineering related services for a proposed building and parking lot expansion on the south side of the Weld-All building at 2001 S. Prairie Avenue, Waukesha.

The site is located at the southern most end of Prairie Avenue within part of the Section 15, T6N, R19E in the City of Waukesha and tributary to the Fox River (Illinois) basin. The “South” study area as defined in the 2009 stormwater calculation summary prepared by Jahnke & Jahnke Associates is approximately 5.64 acres and includes the proposed building additional and parking lot expansion. The total property is 16.1 acres.

Planning Goals

The stormwater planning goals for this land division is to:

- Show that runoff resulting from an increase in impervious surface does not exceed the pre-development release rates for the 1, 2, 10 & 100-yr storm events.
- Show that the wet detention pond reduces the total suspended solids load by 80% in an average annual basis.

Design Summary

To accomplish the above goals, the runoff from the south drainage basin is controlled by a wet detention pond constructed in 1997 with an outlet control structure.

Rainfall Depth

The following design storm rainfall depths are based on NOAA Atlas 14 for the study area:

Rainfall Depths

24-Hour Design Storm	1-year	2-year	10-year	100-year
Rainfall Depth	2.38 inches	2.69 inches	3.36 inches	6.17 inches

Soils Information

The USDA NRCS website, Web Soil Survey, was used to determine the soil units and hydrologic soil groups for the site.

Soil Types Present

Map Symbol	Map Unit Name	HSG
CeD2	Casco Loam, 12 to 20% slopes, eroded	B
FoC2	Fox Loam, 6 to 12% slopes, eroded	C
FsA	Fox Silt Loam, 0 to 2% slopes	B
HtB	Houghton Muck, 0 to 2% slopes	A/D

Infiltration

Based on the soil types present on the site, it is exempt from the City of Franklin and WDNR infiltration requirements, based upon the clay content of the in-situ soils and shallow groundwater indicators identified at the soil boring locations.

Peak Discharge Rates

The hydrologic analysis was completed using the AutoCAD Civil 3D 2018 Hydraflow module. Pre- and Post-development conditions were modeled using the TR-55 Urban Hydrology for Small Watersheds methodology using a 5-minute minimum time of concentration. The following table summarize the results of the analysis.

Comparison of Pre- and Post-Development Flows				
	1-year	2-year	10-year	100-year
South Discharge (cfs)	Pre-development Flows			
	1.39	2.11	5.51	14.63
	Post-Development Flows			
	0.21	0.23	0.30	0.41

Water Quality

The study area utilizes a wet detention pond to achieve post-construction storm water quality goal of 80% removal of the Total Suspended Solids (TSS) based on no controls in accordance with the DNR requirements for suspended solids removal. The water quality modeling results for the site are as follows:

Table 4: Water Quality Modeling Results

Site	No Controls (lbs)	With Controls (lbs)	% Reduction
Post-development South Discharge	329	0	100

WELD-ALL

PRE-DEVELOPED CONDITIONS



**One Source
Consulting**

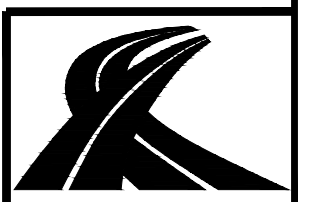
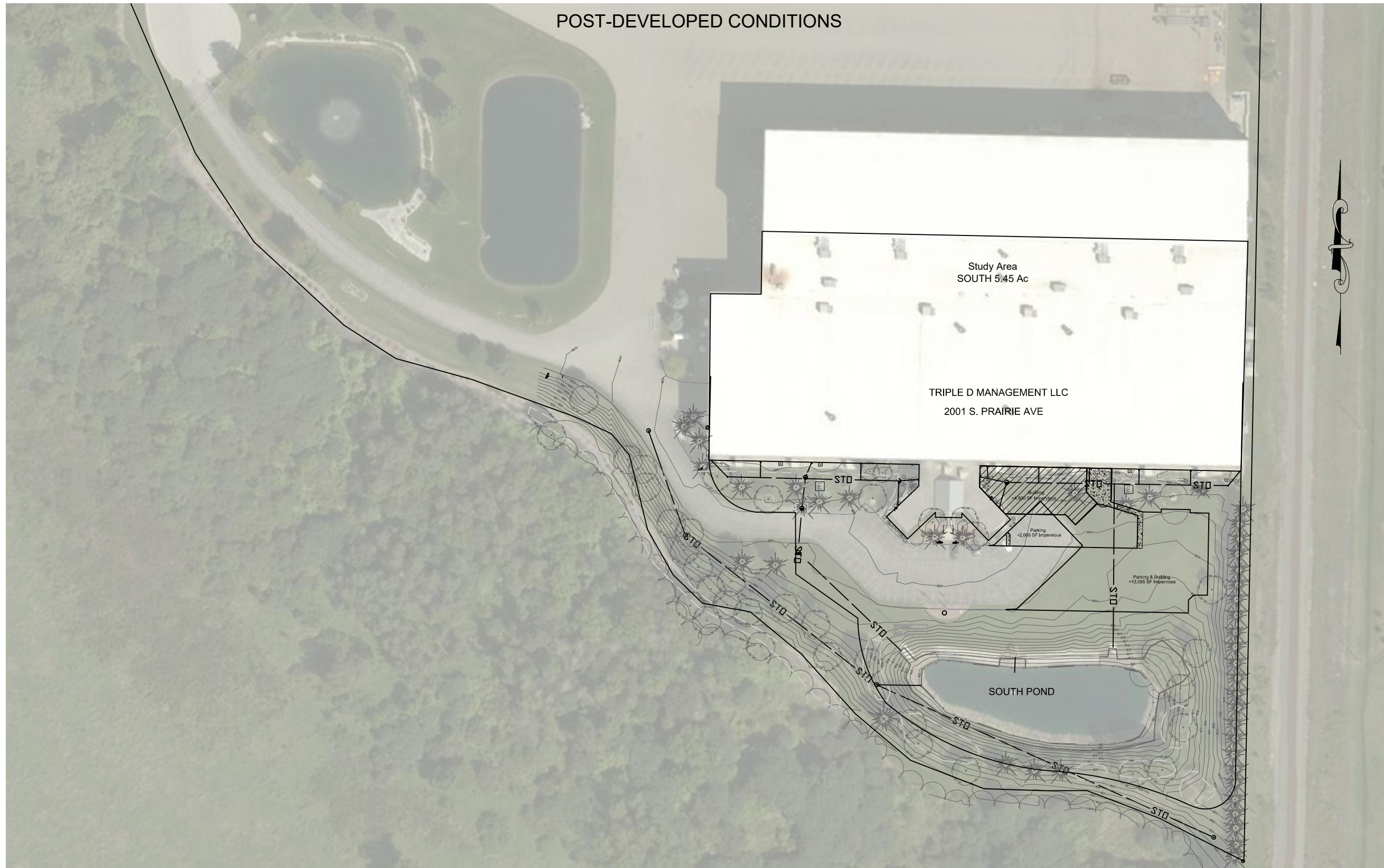
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Brookfield, WI 53045
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Drawing Scale:

1"=100'

WELD-ALL

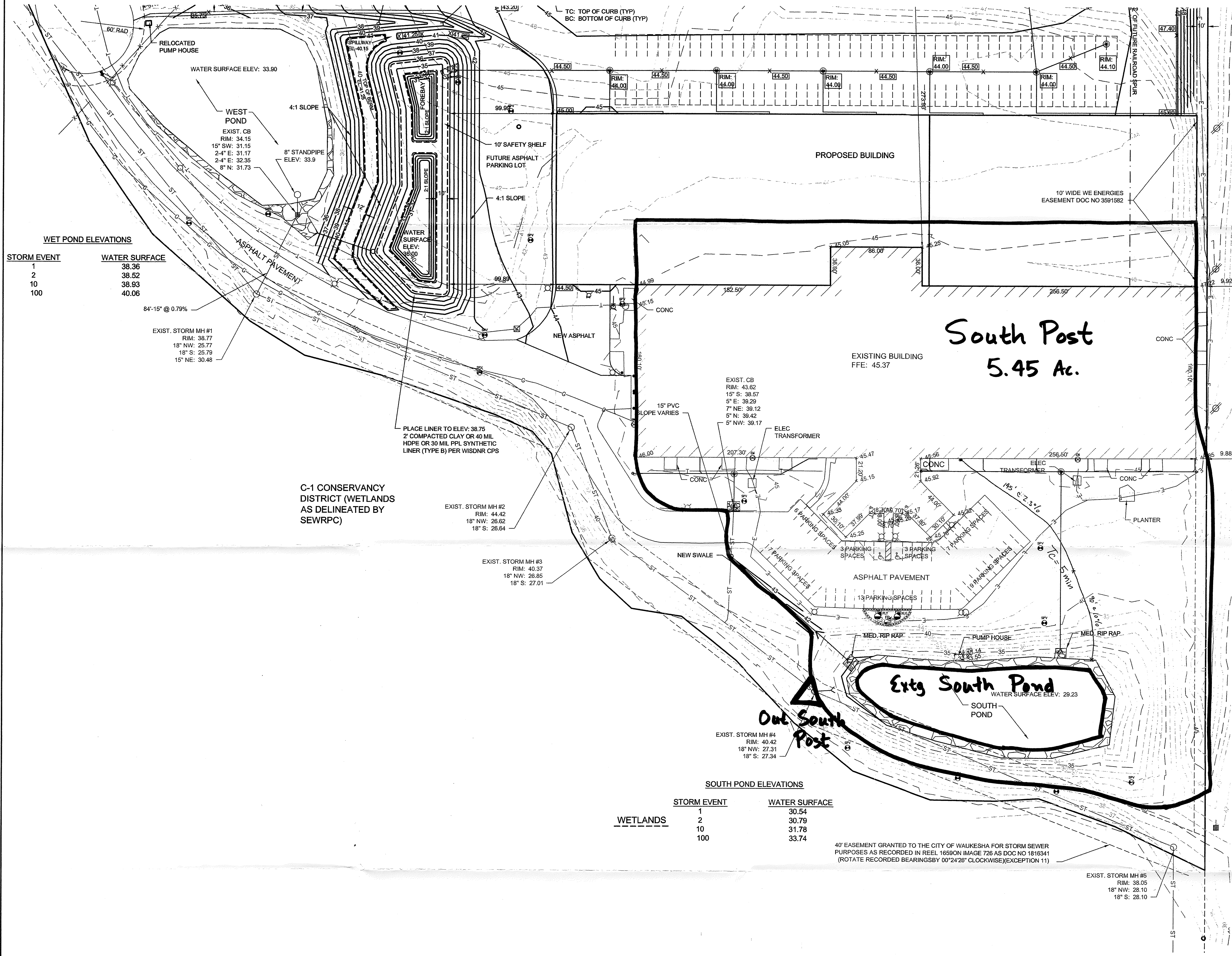
POST-DEVELOPED CONDITIONS



One Source Consulting

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Brookfield, WI 53045
(262) 781-9005

Drawing Scale:
1"=100'



WET POND ELEVATIONS

STORM EVENT	WATER SURFACE
1	38.36
2	38.52
10	38.93
100	40.06

C-1 CONSERVANCY DISTRICT (WETLANDS AS DELINEATED BY SEWRPC)

SOUTH POND ELEVATIONS

WETLANDS	STORM EVENT	WATER SURFACE
	1	30.54
	2	30.79
	10	31.78
	100	33.74

- LEGEND**
- EXISTING SECTION MONUMENT
 - EXISTING IRON PIPE FOUND
 - EXISTING LIGHT POLE
 - EXISTING HYDRANT
 - EXISTING WATER VALVE UNDERGROUND
 - EXISTING SANITARY MANHOLE
 - EXISTING GAS METER
 - EXISTING CABLE TV PEDESTAL
 - EXISTING HOUSE VALVE
 - EXISTING POWER POLE
 - EXISTING ELECTRIC PEDESTAL
 - EXISTING MAILBOX
 - EXISTING SIGN
 - EXISTING TELEPHONE PEDESTAL
 - EXISTING CATCH BASIN ROUND
 - EXISTING WOOD POST
 - EXISTING WOOD POST
 - EXISTING FLOODLIGHT
 - EXISTING FLAGPOLE
 - EXISTING ELECTRIC METER
 - EXISTING TELEGRAPH POLE
 - EXISTING BOLLARD
 - EXISTING DECIDUOUS TREE
 - EXISTING CONIFEROUS TREE
 - EXISTING UNDERGROUND GAS MAIN
 - EXISTING UNDERGROUND ELECTRIC
 - EXISTING UNDERGROUND TELEPHONE
 - EXISTING FENCE LINE
 - EXISTING RETAINING WALL
 - EXISTING FINISH FLOOR ELEVATION

ALL ELEVATIONS ARE AT CITY OF WAUKESHA DATUM (ADD 780.56 TO CONVERT TO USGS DATUM)

REFERENCE BENCHMARKS:
 ELEV: 40.43 "OPEN" HYD E. SIDE PRAIRIE AT S. ENTRANCE.
 ELEV: 44.12 "OPEN" HYD E. SIDE PRAIRIE AT SIEMANS MAIN ENTRANCE

40' EASEMENT GRANTED TO THE CITY OF WAUKESHA FOR STORM SEWER PURPOSES AS RECORDED IN REEL 16580N IMAGE 726 AS DOC NO 1816341 (ROTATE RECORDED BEARINGS BY 00°24'26" CLOCKWISE)(EXCEPTION 11)

Post DEVELOPED (South)

REVISED: SEPTEMBER 30, 2008

PROPOSED GRADING PLAN
 RE: WELDALL
 PART OF NW & SW 1/4 SECTION 15, T6N, R19E
 CITY OF WAUKESHA, WAUKESHA COUNTY, WI.

JAHNKE & JAHNKE ASSOCIATES INC.
 PLANNERS & PROFESSIONAL ENGINEERS
 711 W. MORELAND BLVD. - WAUKESHA, WI 53188
 TEL. No. (262) 542-5797 FAX (262) 542-7698

SCALE: 1" = 40' DATE: JUNE 26, 2008
 DRAWN BY: N.S. CHECKED BY: M.B. FILE NO.: WAUKESHA 793
 BOOK NO.: WAUKESHA 174 JOB: S4743 SHEET 6 OF 9

FILE NAME: S:\PROJECTS\S4743\DWG\S4743.dwg

Data Summary Sheet for Stormwater Management Plan

Project Name: Weld-All Project Size: 19.2 Acres Project type: Industrial No. of Lots: N/A
 Number of Runoff Discharge Points: 1 Watershed (ultimate discharge): Fox River (Illinois)
 Watershed Area (including off-site runoff traveling through project area): 5.45 acres
 Public Land Survey Location: Section 15, T6N R19E (City of Waukesha)

Summary Data Elements	Subwatershed 1		Subwatershed 2		Subwatershed 3		
	Pre-develop	Post-develop	Pre-develop	Post-develop	Pre-develop	Post-develop (Detained)	Post-develop (Undetained)
Watershed (ultimate discharge)	Fox River (Illinois)						
Watershed Areas (see attached map)	5.45 Ac	5.45 Ac					
Average Watershed Slopes	2-4%	2-4%					
Land Uses (see attached map)	5.45 Ac Open 0.00 Ac Imp	2.76 Ac Parking 0.39 Ac Roof 1.97 Open Space 0.33 Ac Water					
Composite Runoff Curve Number	69	87					
Conveyance Systems Types	Overland Flow	Overland Flow					
Summary of Average Conveyance System Data	300' @ 2.3% Sheet 280' @ 2.9% Shallow	100' @ 0.8% Sheet 275' @ 0.8% Shallow					
Time of Concentration (Tc) (see attached map & worksheets)	5 min	5 min					
Runoff volume: 25% of 2-yr 24-hr storm, post-developed	N/A	6,823 cf					
Runoff volume: first half-inch	N/A	118,701 cf					
Peak Flow: 1-year/24 hour	1.39 cfs	10.32 cfs					
Peak Flow: 2-yr./24 hour	2.11 cfs	12.46 cfs					
Peak Flow: 10-yr./24 hour	5.51 cfs	20.40 cfs					
Peak Flow: 100-yr./24 hour	14.63 cfs	37.60 cfs					

Runoff CN: Impervious: 98; Open Space – Good: 61

Weld-All South Basin Design

Data Summary Sheet

Design Element	Design Data
Site assessment data: (see attached maps)	
Contributing drainage area to basin (subwatershed A)	5.45 acres
Distance to nearest private well (including off-site wells)	>100'
Distance to municipal well (including off-site wells)	>1200'
Wellhead protection area involved?	No
Ground slope at site of proposed basin	1 - 4%
Any buried or overhead utilities in the area?	Yes, Electric & Irrigation
Proposed outfall conveyance system/discharge (w/ distances)	City Storm
Any downstream roads or other structures? (describe)	Yes, Driveway
Floodplain, shoreland or wetlands?	Wetland 60' South
Soil investigation data (see attached map & soil logs):	
Number of soil investigations completed	5 in 2008
Do elevations of test holes extend 3 ft. below proposed bottom?	Yes
Average soil texture at pond bottom elevation (USDA)	Sandy Loam
Design infiltration rate at basin bottom and method of analysis	Exempt
Measured infiltration rate following construction	n/a
Distance from pond bottom to bedrock	>5'
Distance from pond bottom to seasonal water table	0 to 4 feet
General basin design data (see attached detailed drawings):	
Basin bottom area	n/a
Effective infiltration area	n/a
1% of development area	2,374 sf
Basin bottom elevation	799.25
Top of berm elevation (after settling) and width	821.8; 12' wide
Basin storage below outlet	83,080 cf
25% of 2-yr 24-hr post development runoff volume	n/a
Time to completely infiltrate stored water	n/a
Sediment forebay size & depth	0.08 ac at 5' depth
Additional design features	Oversized for aesthetics

Design Basin Inflow, Outflow & Storage Data <i>(NOAA Atlas 14 Rainfall Depths & MSE III Rainfall Distribution)</i>					
Design Storm	Inflow Peak Rate	Maximum Outflow Rate	Max. Water Elevation	Storage Volume at Max. Elev.	Outflow Control Structures*
1-yr./24 hr.	10.32 cfs	0.21 cfs	811.60	16,576 cf	#1,2
2-yr./24 hr.	12.46 cfs	0.23 cfs	811.83	20,481 cf	#1,2
10-yr./24 hr.	20.40 cfs	0.30 cfs	812.69	35,794 cf	#1,2
100-yr./24 hr.	37.60 cfs	0.41 cfs	814.44	71,542 cf	#1,2

* The controlling elements are summarized below (See attached detail drawing of outlet structure):

#1 = (2) 2 inch diameter orifice – flow line elev. @ 810.55

#2 = 18 inch diameter outlet pipe – flow line elev. @ 806.80

#3 = 10 foot wide earthen/grass emergency overflow spillway – flow line elev. @ 818.0

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

1 - Southeast_2008 Pre



2 - Southeast_2008 Post



3 - To SE Pond_2008



4 - Southeast_2019 Addition



5 - To SE Pond_2019



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	SCS Runoff	1.388	3	747	7,267	-----	-----	-----	Southeast_2008 Pre	
2	SCS Runoff	9.272	3	729	20,099	-----	-----	-----	Southeast_2008 Post	
3	Reservoir	0.193	3	912	20,002	2	811.48	14,588	To SE Pond_2008	
4	SCS Runoff	10.32	3	729	22,468	-----	-----	-----	Southeast_2019 Addition	
5	Reservoir	0.206	3	909	22,370	4	811.60	16,576	To SE Pond_2019	
Weld-All_South.gpw					Return Period: 1 Year			Thursday, 05 / 9 / 2019		

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

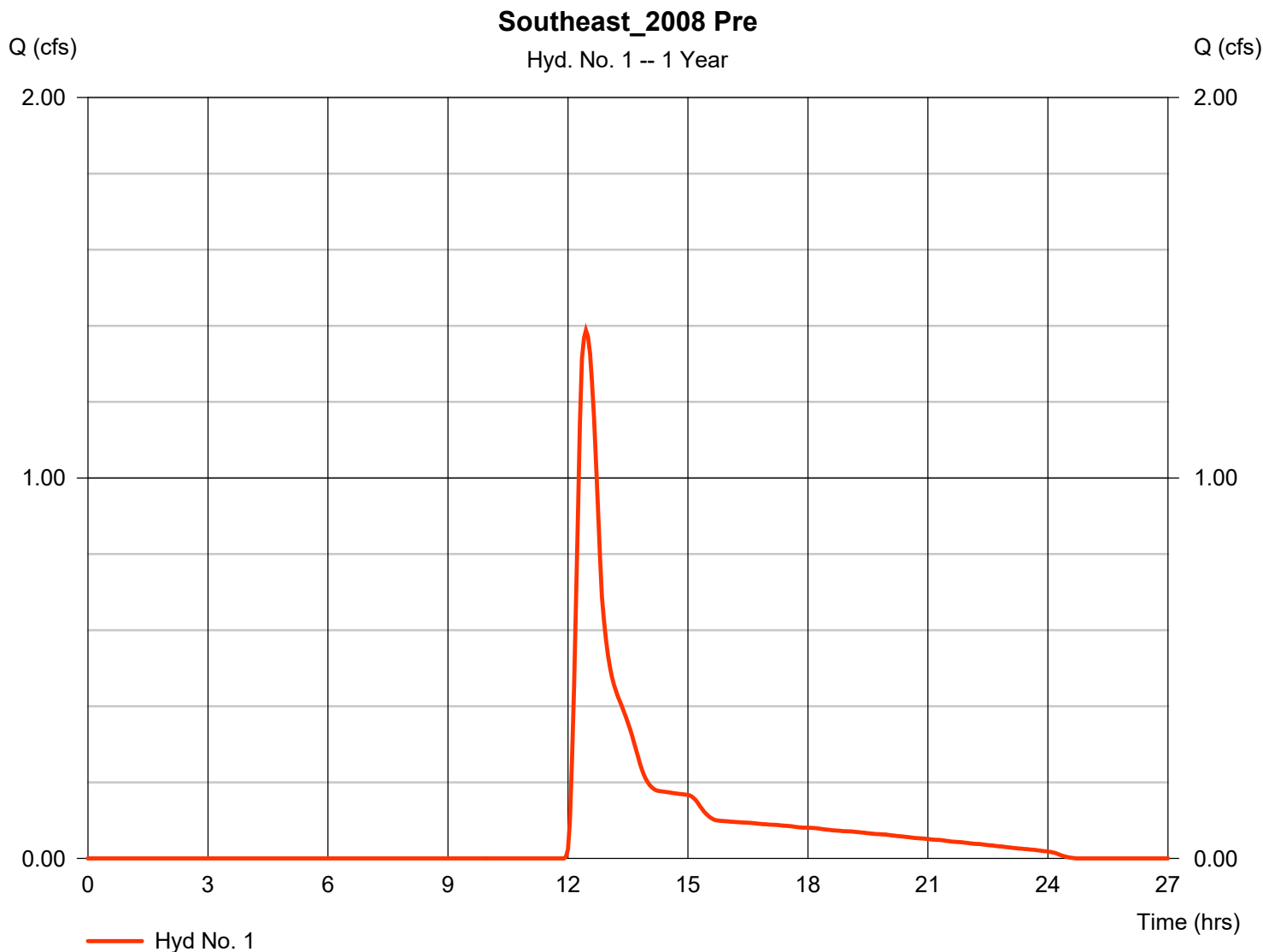
Thursday, 05 / 9 / 2019

Hyd. No. 1

Southeast_2008 Pre

Hydrograph type	= SCS Runoff	Peak discharge	= 1.388 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.45 hrs
Time interval	= 3 min	Hyd. volume	= 7,267 cuft
Drainage area	= 5.450 ac	Curve number	= 69*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 25.90 min
Total precip.	= 2.38 in	Distribution	= Custom
Storm duration	= S:\Design Resources\Hydraflow\Map Factors	Shape factor	= 484

* Composite (Area/CN) = [(5.450 x 69)] / 5.450



TR55 Tc Worksheet

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Hyd. No. 1

Southeast_2008 Pre

<u>Description</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Totals</u>
Sheet Flow				
Manning's n-value	= 0.150	0.011	0.011	
Flow length (ft)	= 300.0	0.0	0.0	
Two-year 24-hr precip. (in)	= 2.69	0.00	0.00	
Land slope (%)	= 2.33	0.00	0.00	
Travel Time (min)	= 24.21	+ 0.00	+ 0.00	= 24.21
Shallow Concentrated Flow				
Flow length (ft)	= 280.00	0.00	0.00	
Watercourse slope (%)	= 2.86	0.00	0.00	
Surface description	= Unpaved	Paved	Paved	
Average velocity (ft/s)	=2.73	0.00	0.00	
Travel Time (min)	= 1.71	+ 0.00	+ 0.00	= 1.71
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				25.90 min

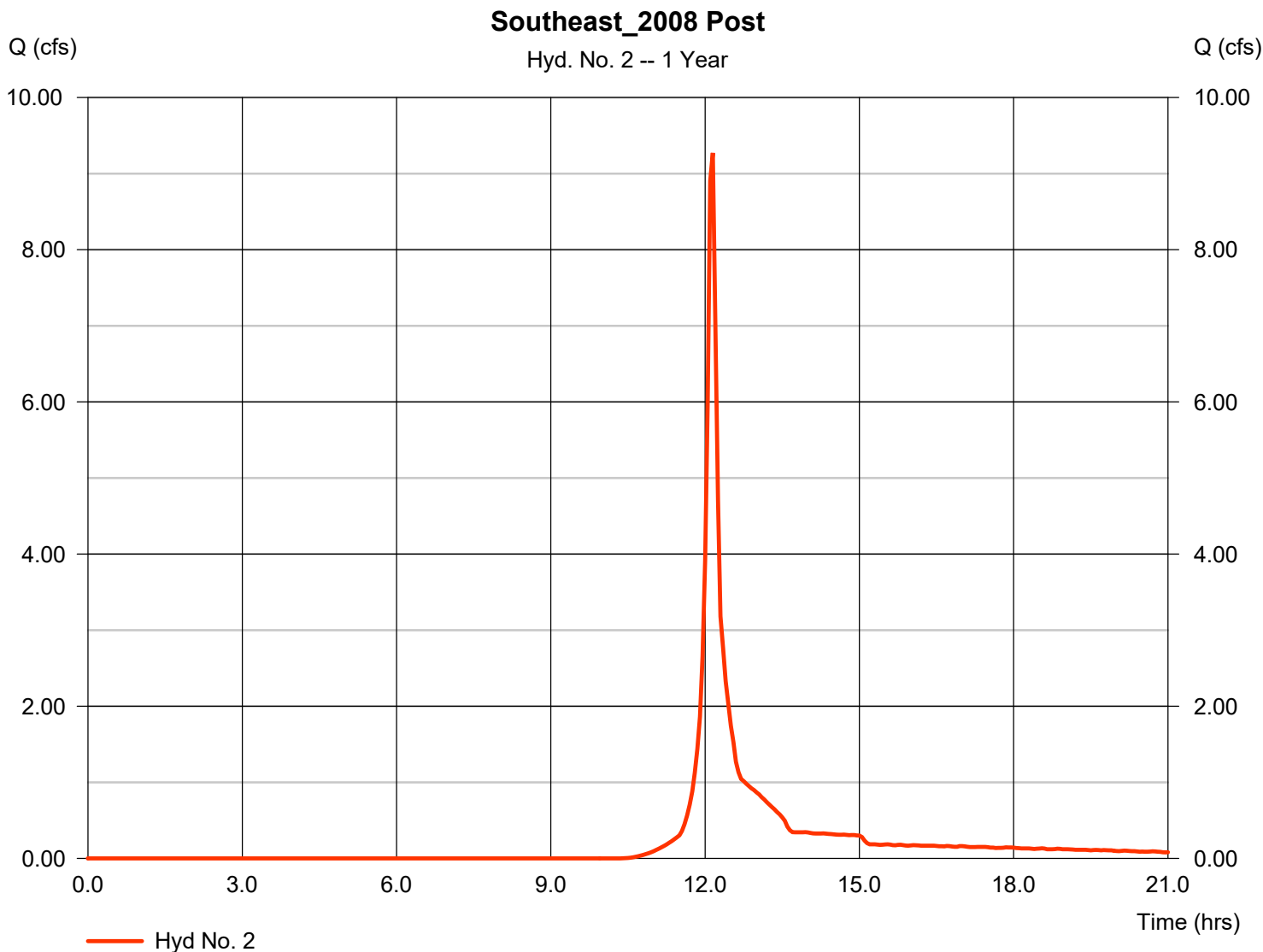
Hydrograph Report

Hyd. No. 2

Southeast_2008 Post

Hydrograph type	= SCS Runoff	Peak discharge	= 9.272 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 20,099 cuft
Drainage area	= 5.450 ac	Curve number	= 85*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.38 in	Distribution	= Custom
Storm duration	= S:\Design Resources\Hydraflow\Map Factors	Shape Factor	= 484

* Composite (Area/CN) = [(2.760 x 98) + (0.390 x 98) + (1.970 x 61) + (0.330 x 98)] / 5.450



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

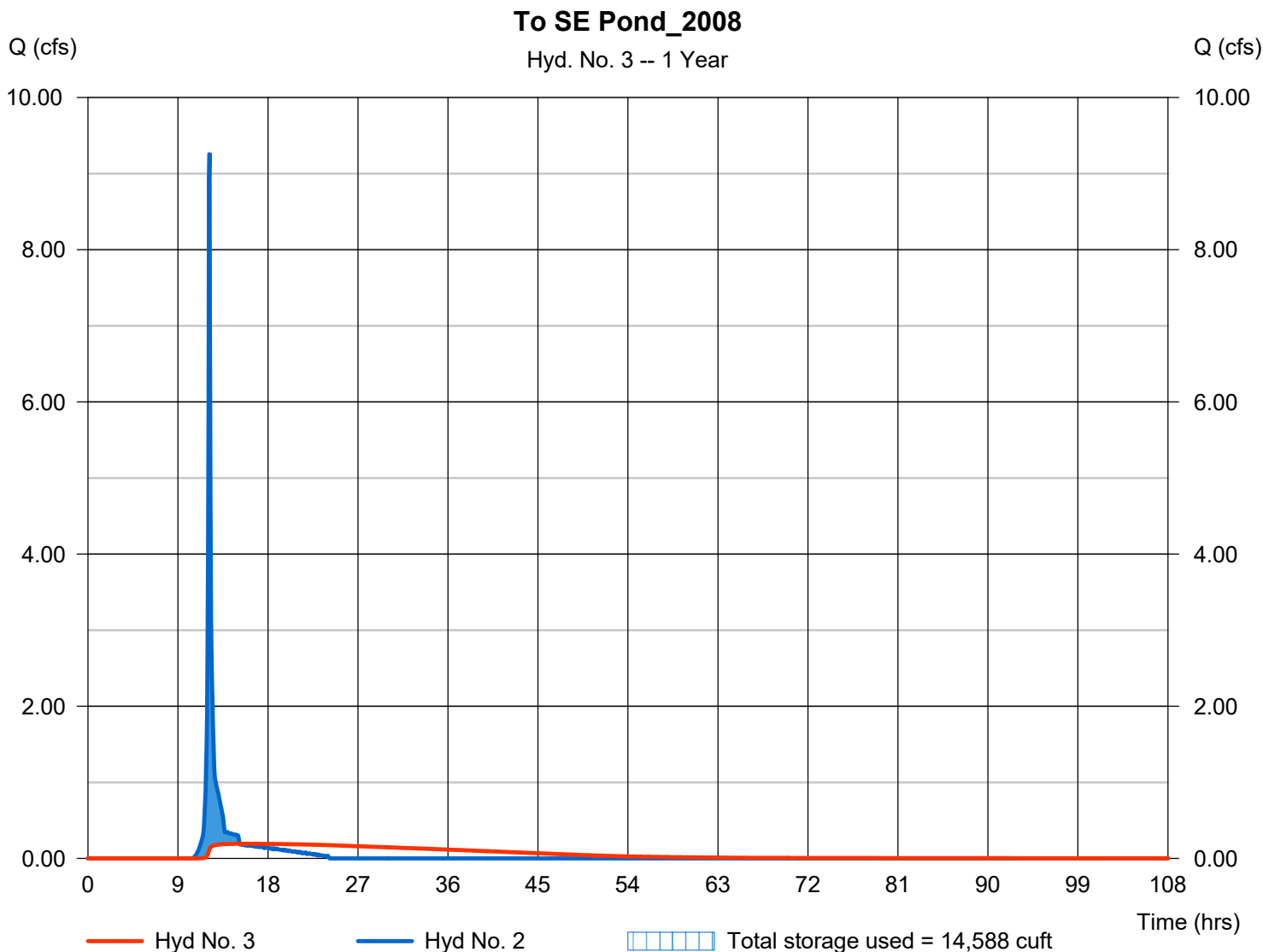
Thursday, 05 / 9 / 2019

Hyd. No. 3

To SE Pond_2008

Hydrograph type	= Reservoir	Peak discharge	= 0.193 cfs
Storm frequency	= 1 yrs	Time to peak	= 15.20 hrs
Time interval	= 3 min	Hyd. volume	= 20,002 cuft
Inflow hyd. No.	= 2 - Southeast_2008 Post	Max. Elevation	= 811.48 ft
Reservoir name	= Southeast	Max. Storage	= 14,588 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

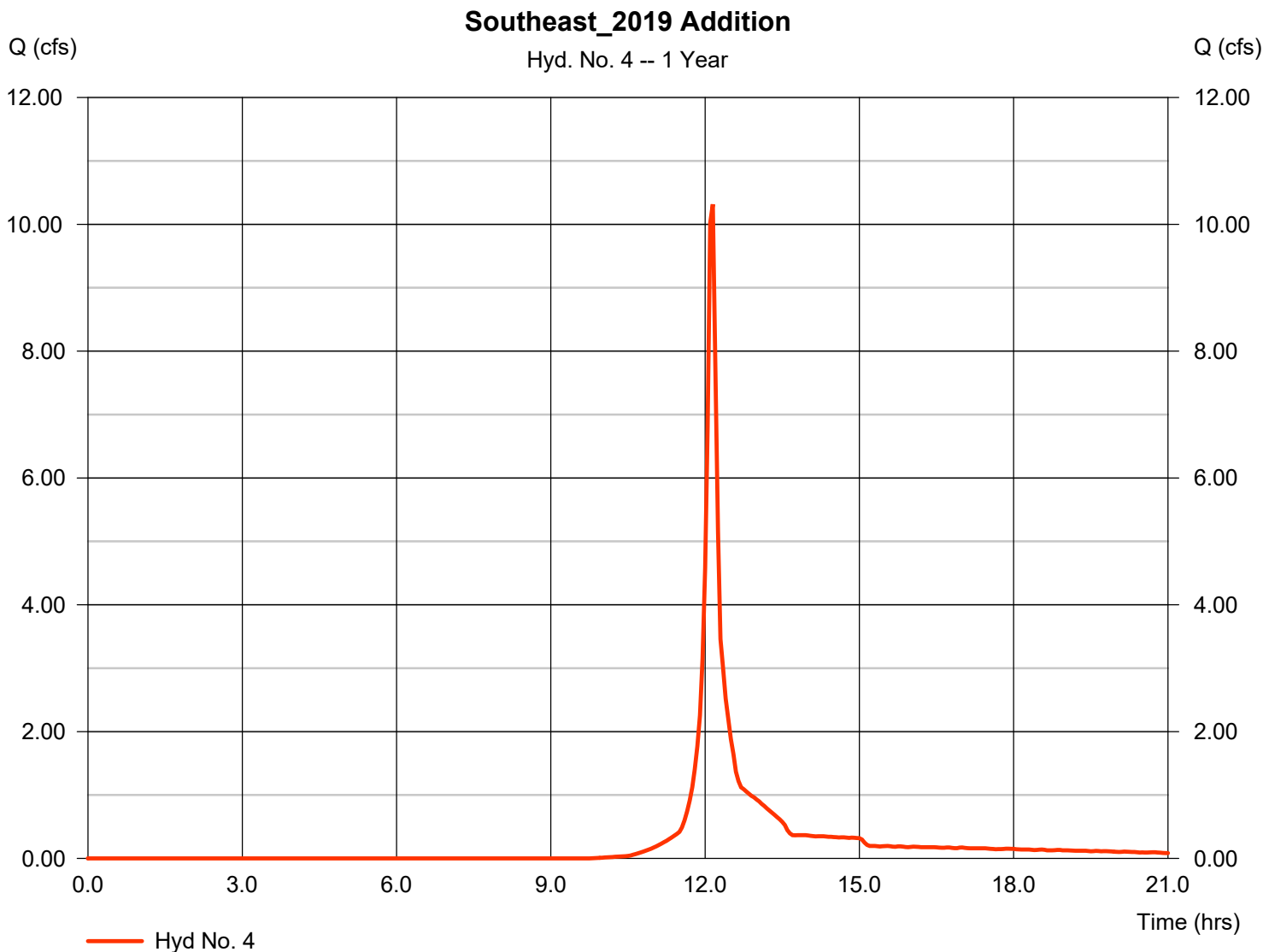
Thursday, 05 / 9 / 2019

Hyd. No. 4

Southeast_2019 Addition

Hydrograph type	= SCS Runoff	Peak discharge	= 10.32 cfs
Storm frequency	= 1 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 22,468 cuft
Drainage area	= 5.450 ac	Curve number	= 87*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.38 in	Distribution	= Custom
Storm duration	= S:\Design Resources\Hydraflow\Map Factors	Time of base	= 484

* Composite (Area/CN) = [(2.870 x 98) + (0.650 x 98) + (1.600 x 61) + (0.330 x 98)] / 5.450



Hydrograph Report

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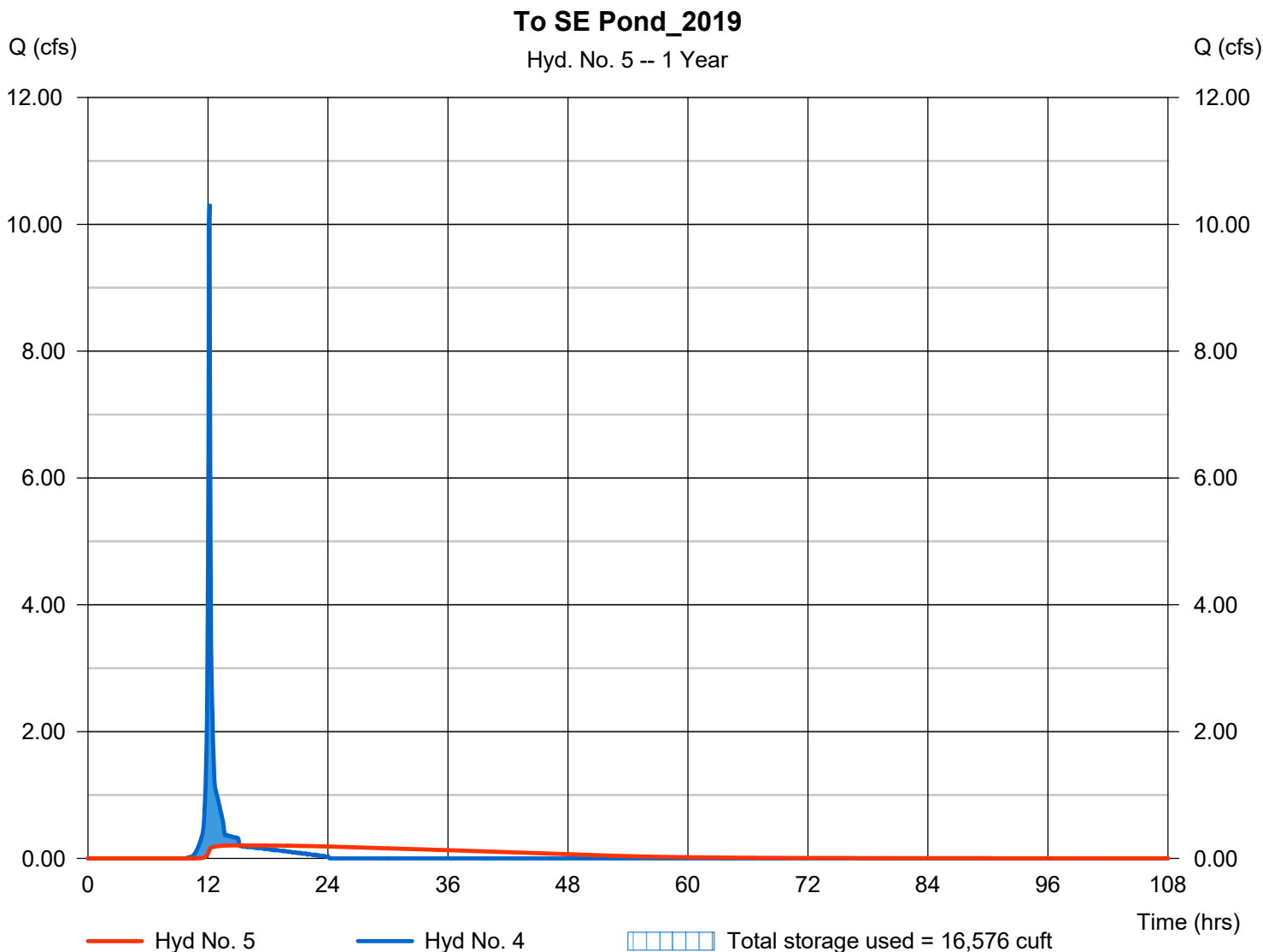
Thursday, 05 / 9 / 2019

Hyd. No. 5

To SE Pond_2019

Hydrograph type	= Reservoir	Peak discharge	= 0.206 cfs
Storm frequency	= 1 yrs	Time to peak	= 15.15 hrs
Time interval	= 3 min	Hyd. volume	= 22,370 cuft
Inflow hyd. No.	= 4 - Southeast_2019 Addition	Max. Elevation	= 811.60 ft
Reservoir name	= Southeast	Max. Storage	= 16,576 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	SCS Runoff	2.105	3	744	10,100	-----	-----	-----	Southeast_2008 Pre	
2	SCS Runoff	11.36	3	729	24,697	-----	-----	-----	Southeast_2008 Post	
3	Reservoir	0.217	3	918	24,600	2	811.70	18,279	To SE Pond_2008	
4	SCS Runoff	12.46	3	729	27,293	-----	-----	-----	Southeast_2019 Addition	
5	Reservoir	0.230	3	912	27,196	4	811.83	20,481	To SE Pond_2019	
Weld-All_South.gpw					Return Period: 2 Year			Thursday, 05 / 9 / 2019		

Hydrograph Report

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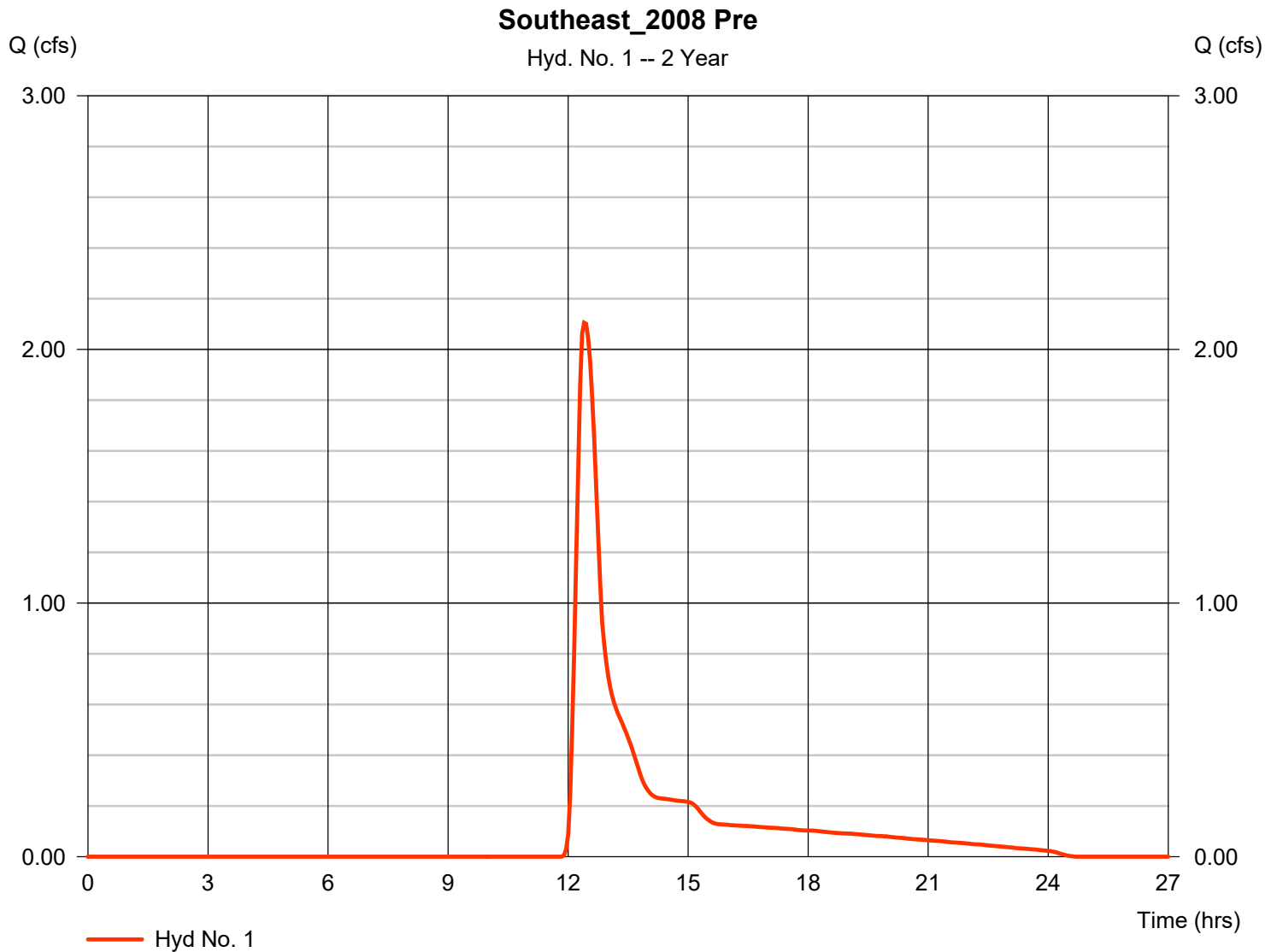
Thursday, 05 / 9 / 2019

Hyd. No. 1

Southeast_2008 Pre

Hydrograph type	= SCS Runoff	Peak discharge	= 2.105 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.40 hrs
Time interval	= 3 min	Hyd. volume	= 10,100 cuft
Drainage area	= 5.450 ac	Curve number	= 69*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 25.90 min
Total precip.	= 2.69 in	Distribution	= Custom
Storm duration	= S:\Design Resources\Hydraflow\Map Factors	Shape Factor	= 484

* Composite (Area/CN) = [(5.450 x 69)] / 5.450



Hydrograph Report

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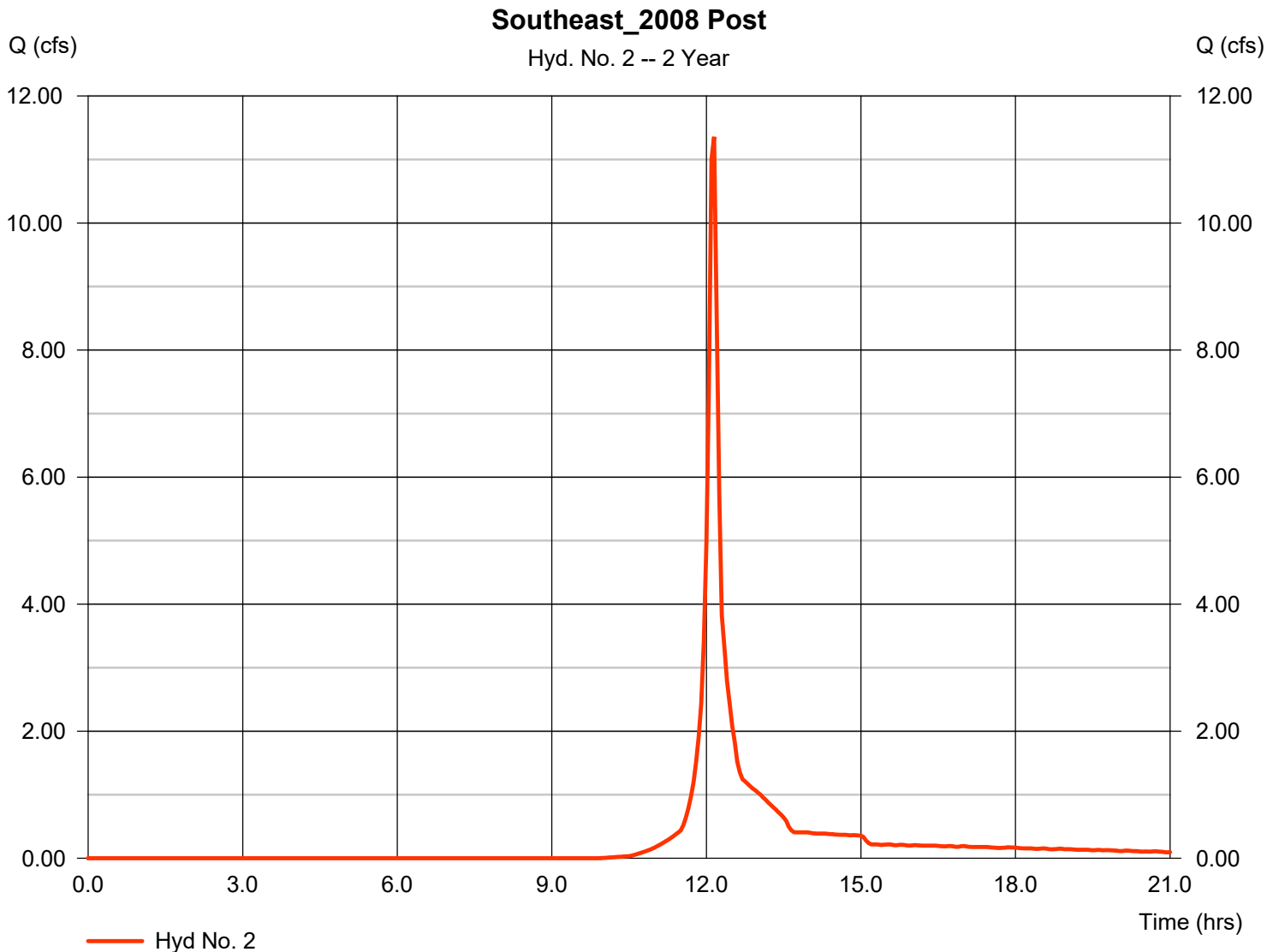
Thursday, 05 / 9 / 2019

Hyd. No. 2

Southeast_2008 Post

Hydrograph type	= SCS Runoff	Peak discharge	= 11.36 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 24,697 cuft
Drainage area	= 5.450 ac	Curve number	= 85*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.69 in	Distribution	= Custom
Storm duration	= S:\Design Resources\Hydraflow\Map Factors	Shape factor	= 484

* Composite (Area/CN) = [(2.760 x 98) + (0.390 x 98) + (1.970 x 61) + (0.330 x 98)] / 5.450



Hydrograph Report

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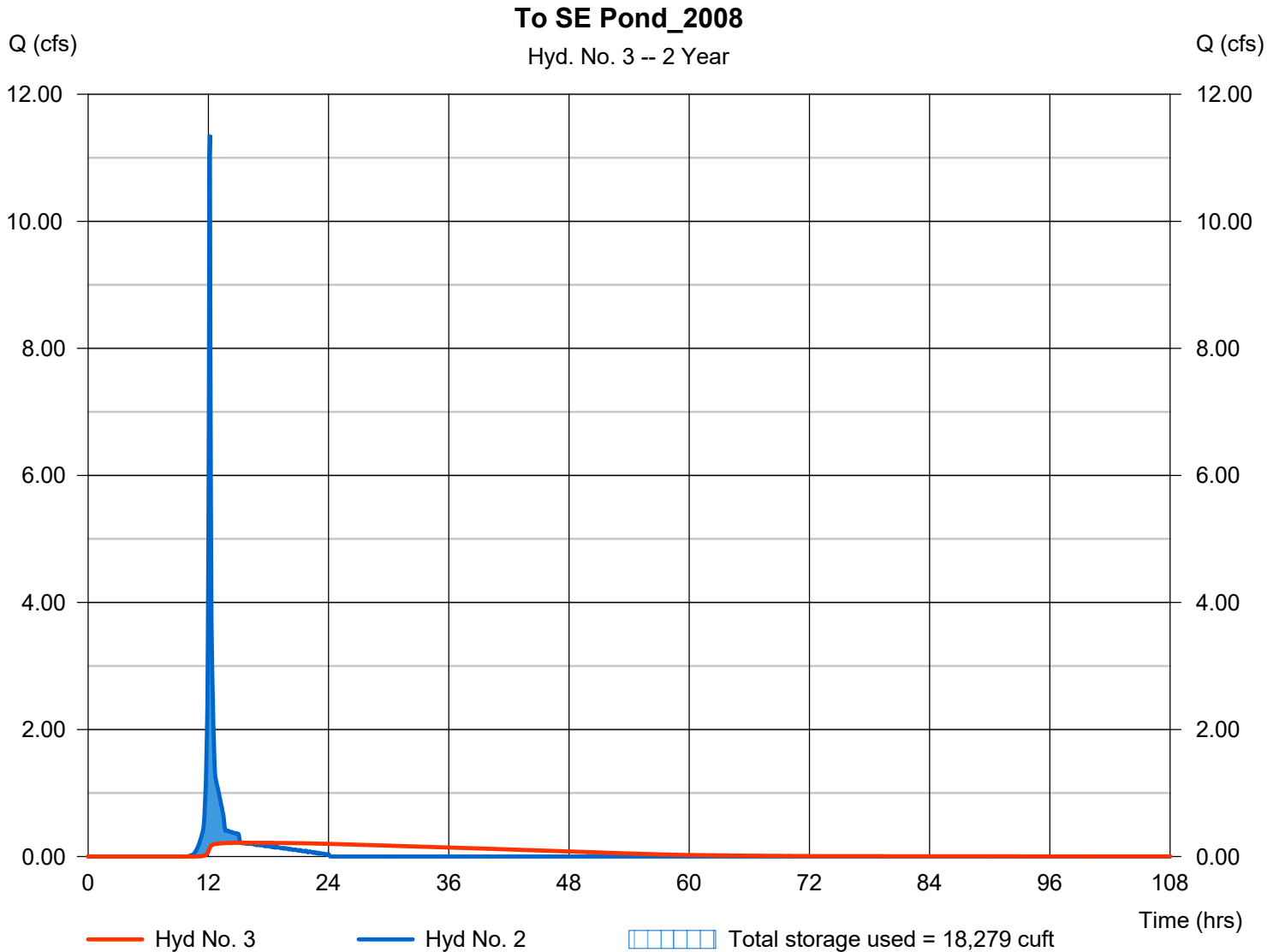
Thursday, 05 / 9 / 2019

Hyd. No. 3

To SE Pond_2008

Hydrograph type	= Reservoir	Peak discharge	= 0.217 cfs
Storm frequency	= 2 yrs	Time to peak	= 15.30 hrs
Time interval	= 3 min	Hyd. volume	= 24,600 cuft
Inflow hyd. No.	= 2 - Southeast_2008 Post	Max. Elevation	= 811.70 ft
Reservoir name	= Southeast	Max. Storage	= 18,279 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

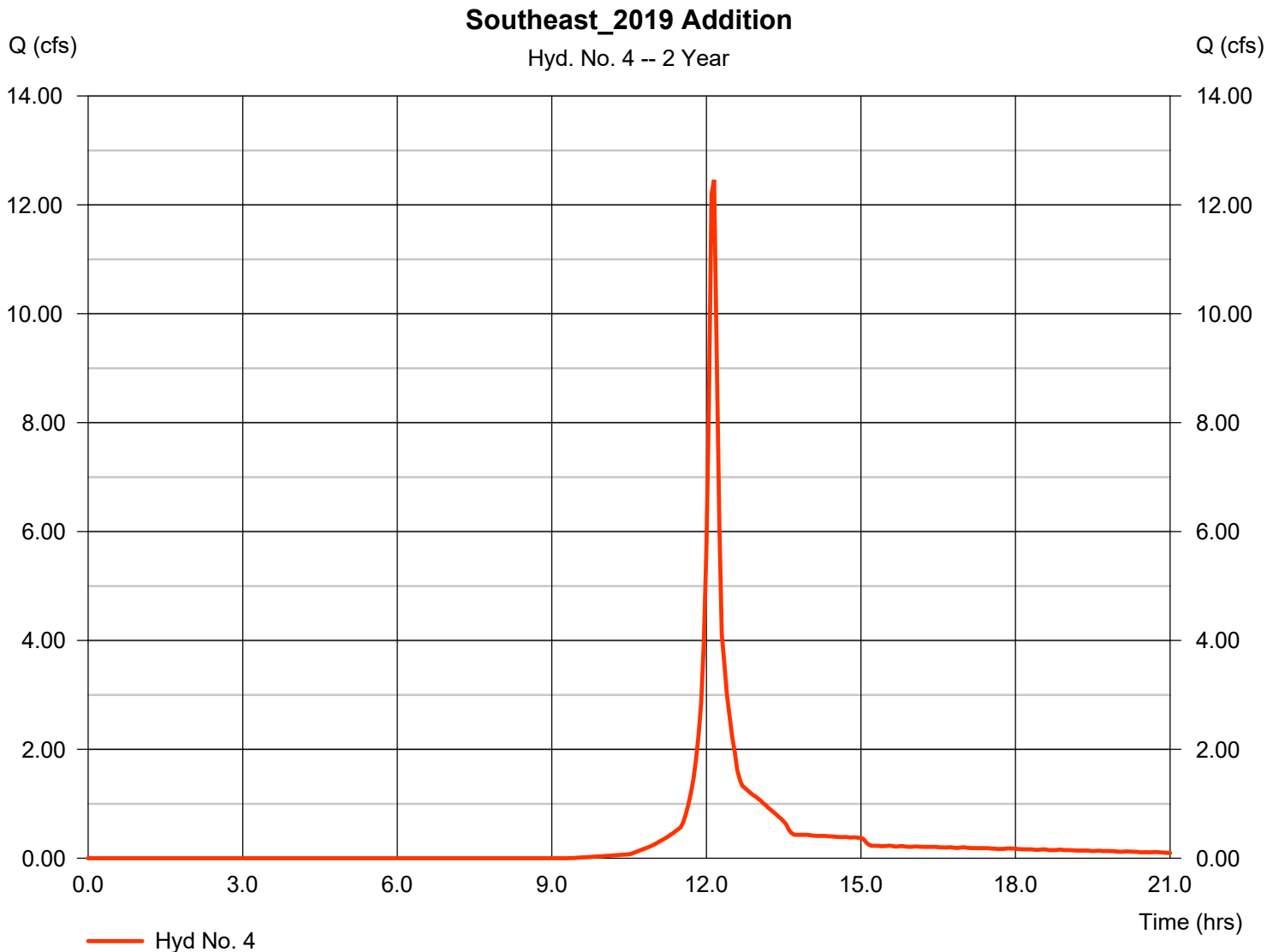
Thursday, 05 / 9 / 2019

Hyd. No. 4

Southeast_2019 Addition

Hydrograph type	= SCS Runoff	Peak discharge	= 12.46 cfs
Storm frequency	= 2 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 27,293 cuft
Drainage area	= 5.450 ac	Curve number	= 87*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 2.69 in	Distribution	= Custom
Storm duration	= S:\Design Resources\Hydraflow\Map Factors	Time of base	= 484

* Composite (Area/CN) = [(2.870 x 98) + (0.650 x 98) + (1.600 x 61) + (0.330 x 98)] / 5.450



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

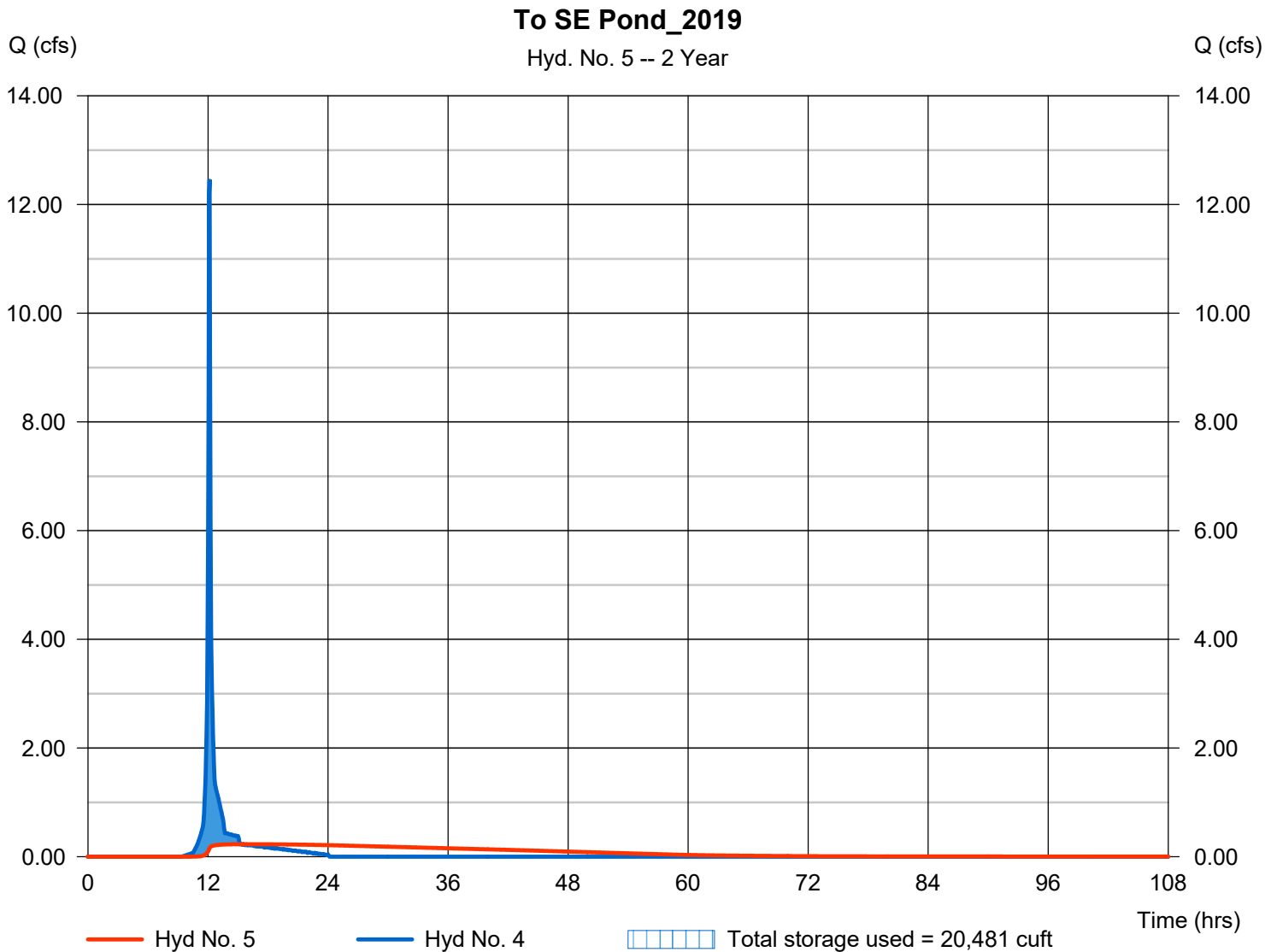
Thursday, 05 / 9 / 2019

Hyd. No. 5

To SE Pond_2019

Hydrograph type	= Reservoir	Peak discharge	= 0.230 cfs
Storm frequency	= 2 yrs	Time to peak	= 15.20 hrs
Time interval	= 3 min	Hyd. volume	= 27,196 cuft
Inflow hyd. No.	= 4 - Southeast_2019 Addition	Max. Elevation	= 811.83 ft
Reservoir name	= Southeast	Max. Storage	= 20,481 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	SCS Runoff	5.511	3	741	22,649	-----	-----	-----	Southeast_2008 Pre	
2	SCS Runoff	19.18	3	729	42,449	-----	-----	-----	Southeast_2008 Post	
3	Reservoir	0.290	3	1008	42,352	2	812.54	32,988	To SE Pond_2008	
4	SCS Runoff	20.40	3	729	45,681	-----	-----	-----	Southeast_2019 Addition	
5	Reservoir	0.302	3	1008	45,582	4	812.69	35,794	To SE Pond_2019	
Weld-All_South.gpw					Return Period: 10 Year			Thursday, 05 / 9 / 2019		

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

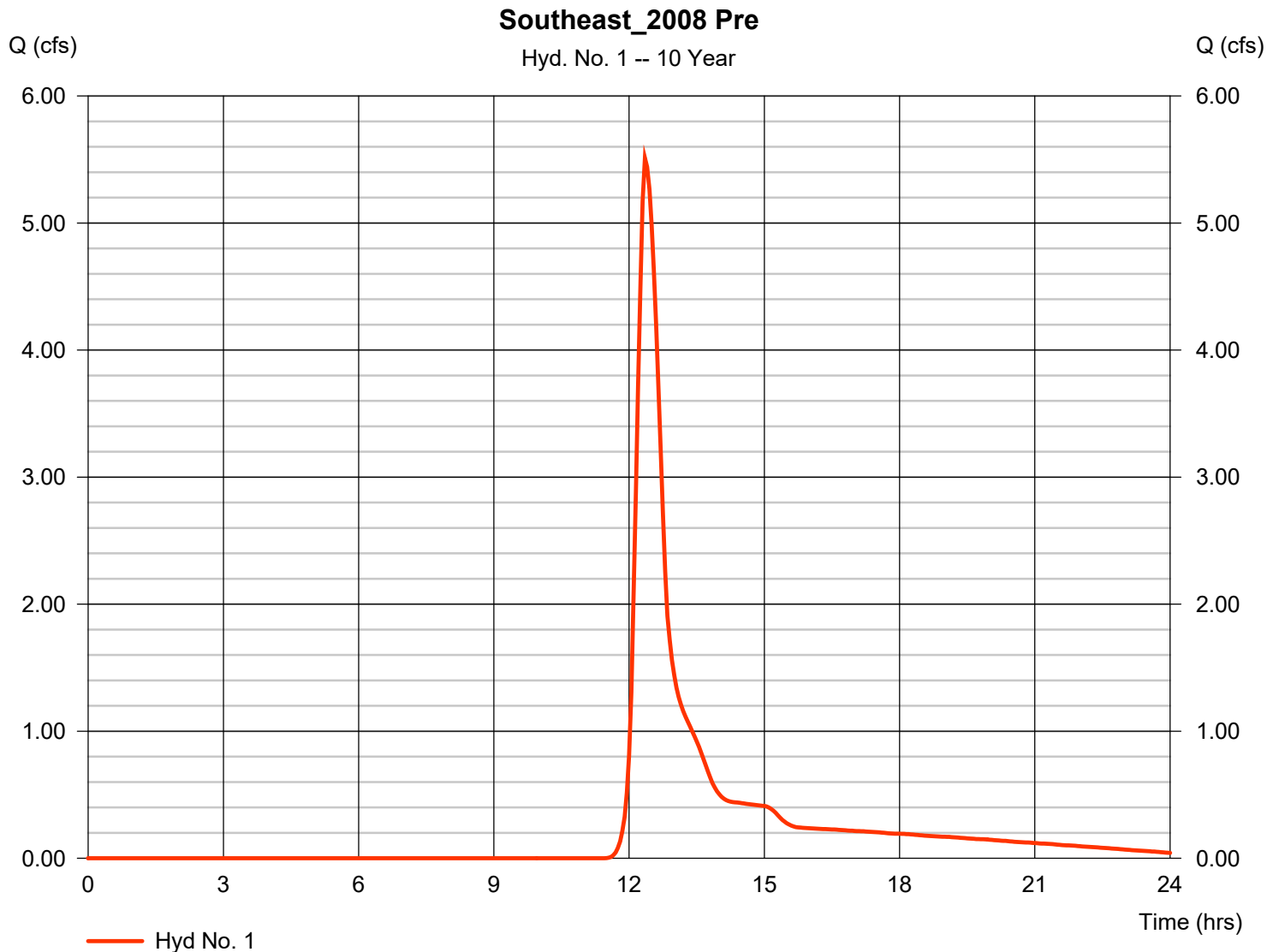
Thursday, 05 / 9 / 2019

Hyd. No. 1

Southeast_2008 Pre

Hydrograph type	= SCS Runoff	Peak discharge	= 5.511 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.35 hrs
Time interval	= 3 min	Hyd. volume	= 22,649 cuft
Drainage area	= 5.450 ac	Curve number	= 69*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 25.90 min
Total precip.	= 3.81 in	Distribution	= Custom
Storm duration	= S:\Design Resources\Hydraflow\Map Factors	Shape factor	= 484

* Composite (Area/CN) = [(5.450 x 69)] / 5.450



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

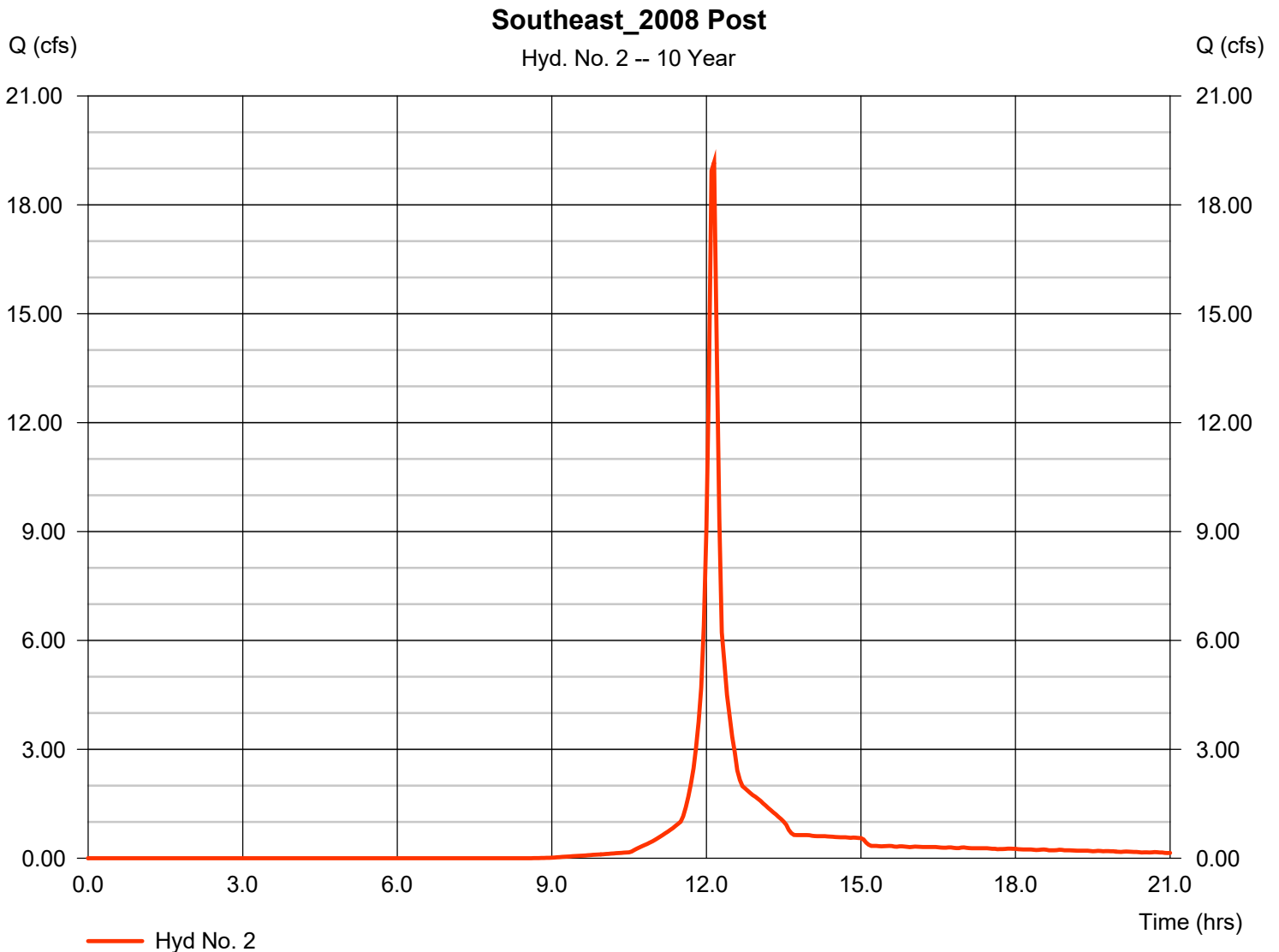
Thursday, 05 / 9 / 2019

Hyd. No. 2

Southeast_2008 Post

Hydrograph type	= SCS Runoff	Peak discharge	= 19.18 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 42,449 cuft
Drainage area	= 5.450 ac	Curve number	= 85*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.81 in	Distribution	= Custom
Storm duration	= S:\Design Resources\Hydraflow\Map Factors	Time of base	= 484

* Composite (Area/CN) = [(2.760 x 98) + (0.390 x 98) + (1.970 x 61) + (0.330 x 98)] / 5.450



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

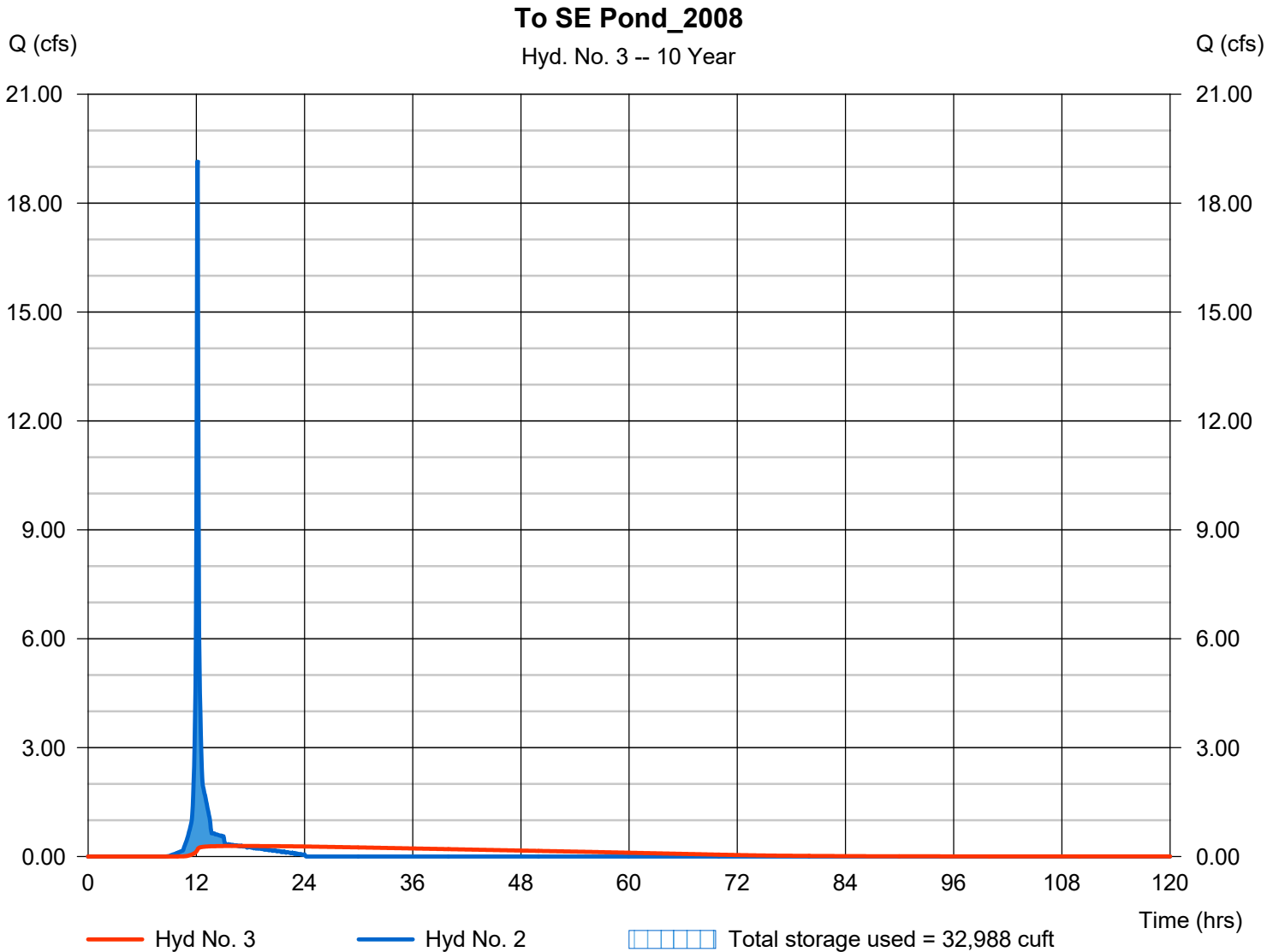
Thursday, 05 / 9 / 2019

Hyd. No. 3

To SE Pond_2008

Hydrograph type	= Reservoir	Peak discharge	= 0.290 cfs
Storm frequency	= 10 yrs	Time to peak	= 16.80 hrs
Time interval	= 3 min	Hyd. volume	= 42,352 cuft
Inflow hyd. No.	= 2 - Southeast_2008 Post	Max. Elevation	= 812.54 ft
Reservoir name	= Southeast	Max. Storage	= 32,988 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Thursday, 05 / 9 / 2019

Hyd. No. 4

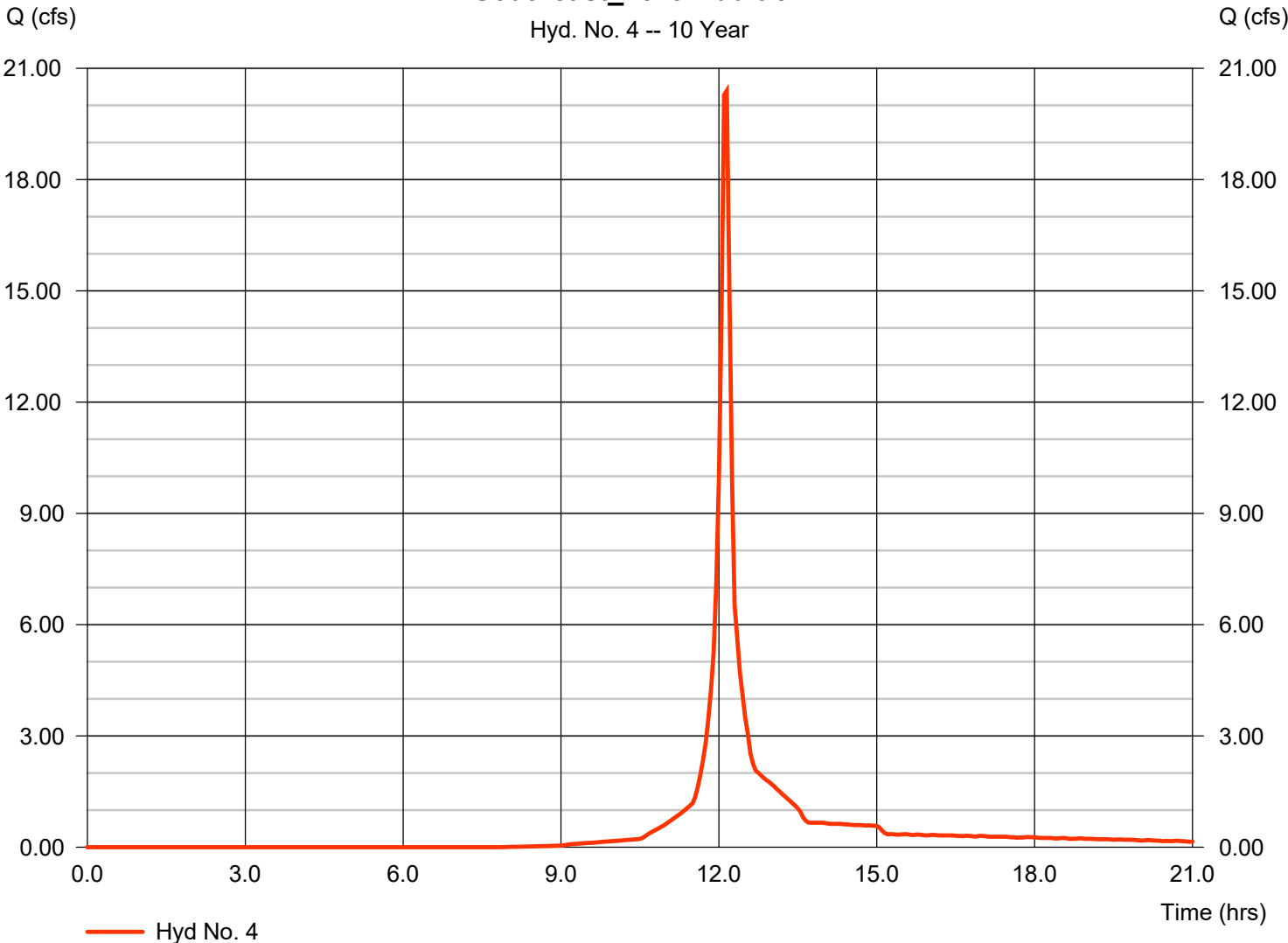
Southeast_2019 Addition

Hydrograph type	= SCS Runoff	Peak discharge	= 20.40 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.15 hrs
Time interval	= 3 min	Hyd. volume	= 45,681 cuft
Drainage area	= 5.450 ac	Curve number	= 87*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 3.81 in	Distribution	= Custom
Storm duration	= S:\Design Resources\Hydraflow\Map Factors	Time to peak	= 484

* Composite (Area/CN) = [(2.870 x 98) + (0.650 x 98) + (1.600 x 61) + (0.330 x 98)] / 5.450

Southeast_2019 Addition

Hyd. No. 4 -- 10 Year



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

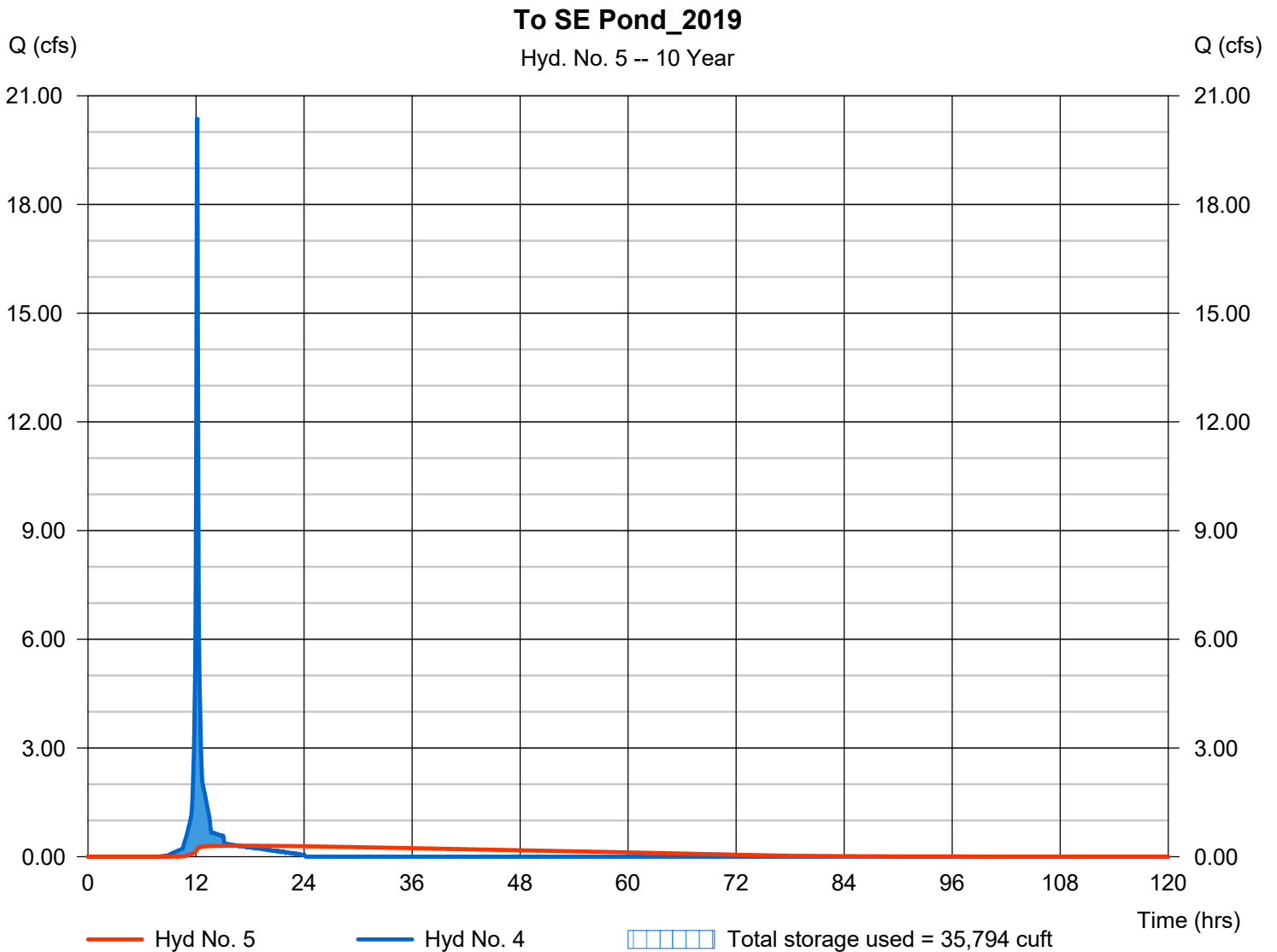
Thursday, 05 / 9 / 2019

Hyd. No. 5

To SE Pond_2019

Hydrograph type	= Reservoir	Peak discharge	= 0.302 cfs
Storm frequency	= 10 yrs	Time to peak	= 16.80 hrs
Time interval	= 3 min	Hyd. volume	= 45,582 cuft
Inflow hyd. No.	= 4 - Southeast_2019 Addition	Max. Elevation	= 812.69 ft
Reservoir name	= Southeast	Max. Storage	= 35,794 cuft

Storage Indication method used.



Hydrograph Summary Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description	
1	SCS Runoff	14.63	3	741	56,302	-----	-----	-----	Southeast_2008 Pre	
2	SCS Runoff	36.22	3	726	82,777	-----	-----	-----	Southeast_2008 Post	
3	Reservoir	0.402	3	1116	82,517	2	814.29	67,959	To SE Pond_2008	
4	SCS Runoff	37.60	3	726	86,801	-----	-----	-----	Southeast_2019 Addition	
5	Reservoir	0.410	3	1116	86,516	4	814.44	71,526	To SE Pond_2019	
Weld-All_South.gpw					Return Period: 100 Year			Thursday, 05 / 9 / 2019		

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

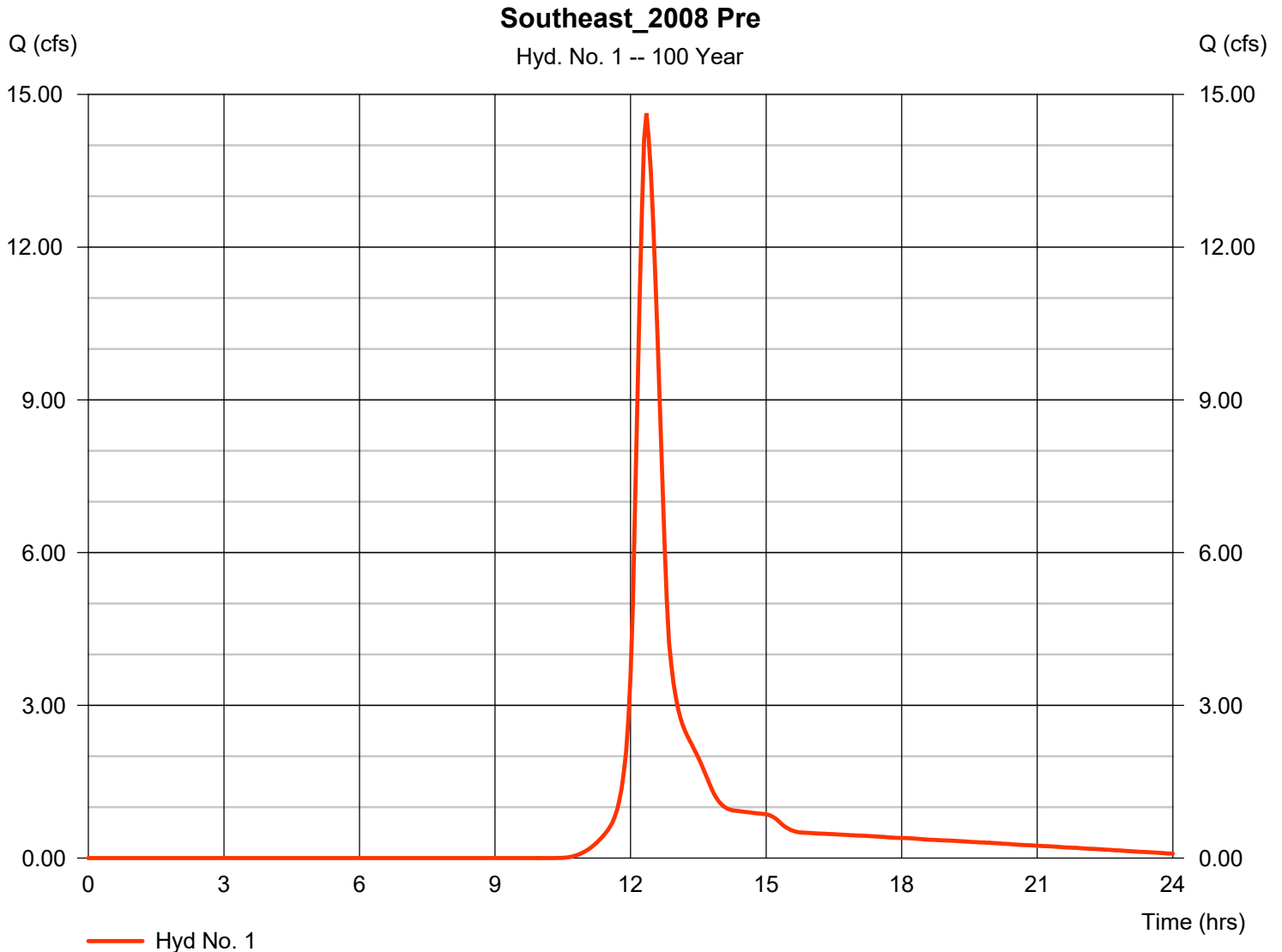
Thursday, 05 / 9 / 2019

Hyd. No. 1

Southeast_2008 Pre

Hydrograph type	= SCS Runoff	Peak discharge	= 14.63 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.35 hrs
Time interval	= 3 min	Hyd. volume	= 56,302 cuft
Drainage area	= 5.450 ac	Curve number	= 69*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= TR55	Time of conc. (Tc)	= 25.90 min
Total precip.	= 6.17 in	Distribution	= Custom
Storm duration	= S:\Design Resources\Hydraflow\Map Factors	Time Factor	= 484

* Composite (Area/CN) = [(5.450 x 69)] / 5.450



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

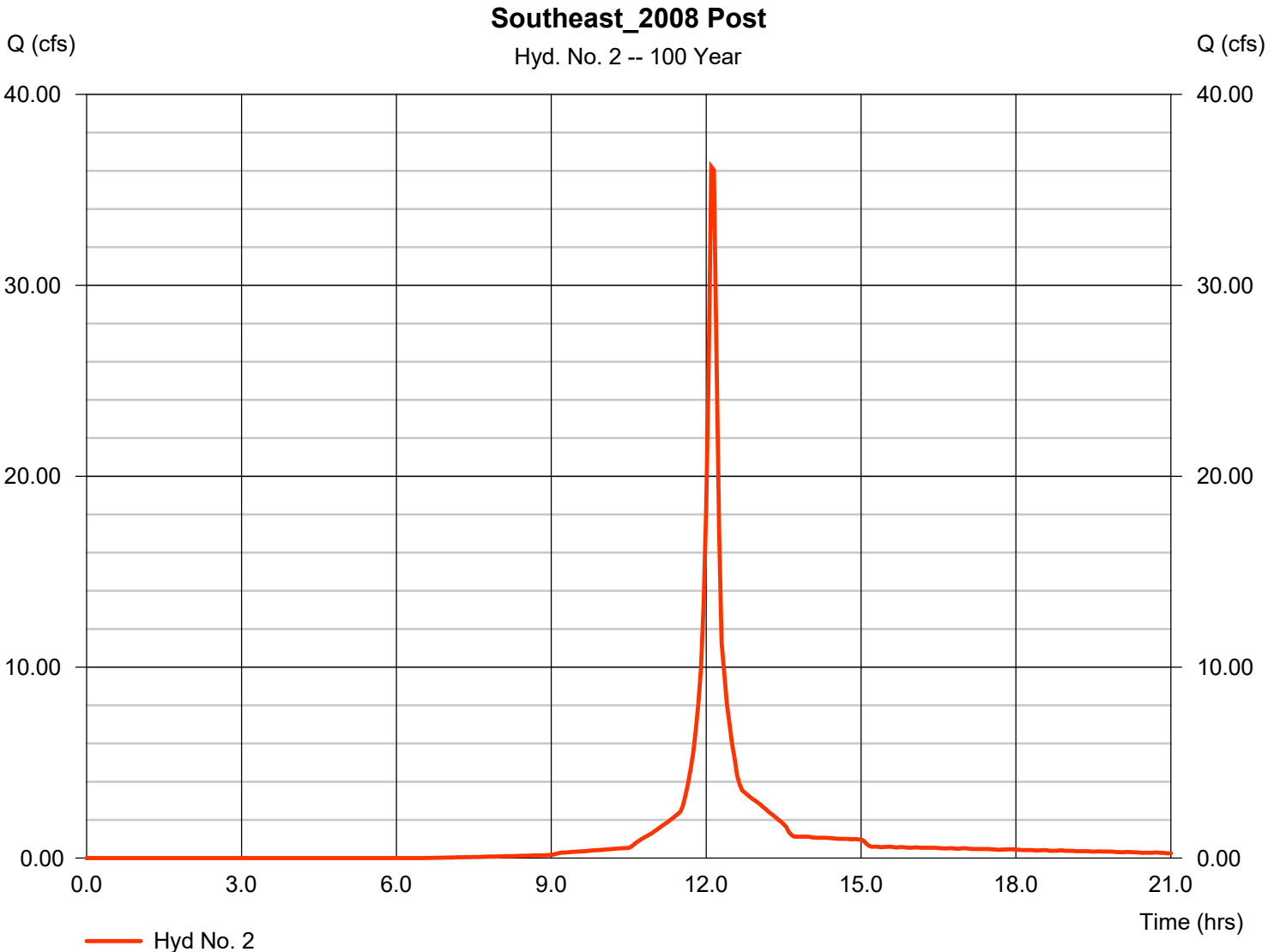
Thursday, 05 / 9 / 2019

Hyd. No. 2

Southeast_2008 Post

Hydrograph type	= SCS Runoff	Peak discharge	= 36.22 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 82,777 cuft
Drainage area	= 5.450 ac	Curve number	= 85*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.17 in	Distribution	= Custom
Storm duration	= S:\Design Resources\Hydraflow\Map Factors	Shape Factor	= 484

* Composite (Area/CN) = [(2.760 x 98) + (0.390 x 98) + (1.970 x 61) + (0.330 x 98)] / 5.450



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

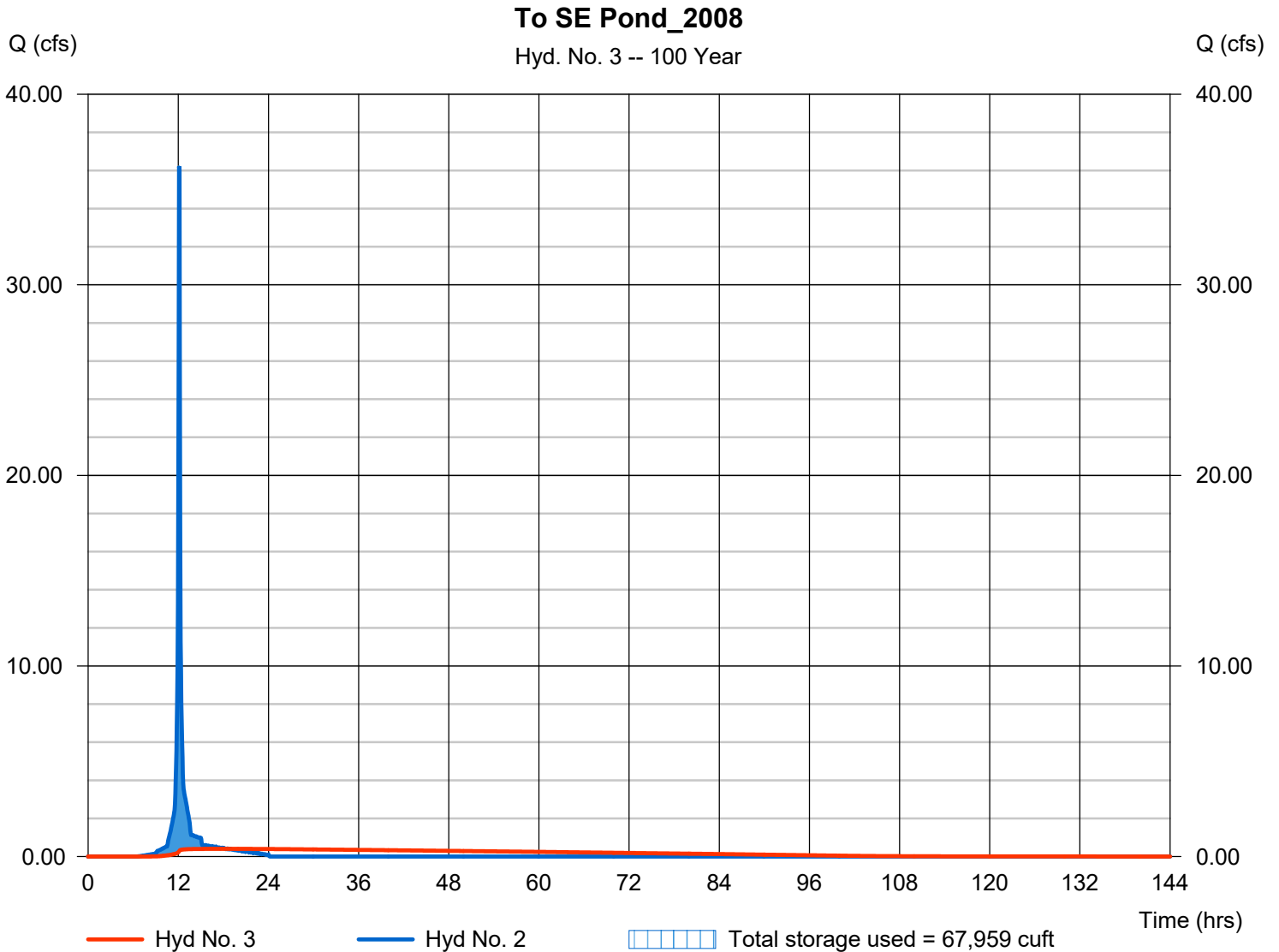
Thursday, 05 / 9 / 2019

Hyd. No. 3

To SE Pond_2008

Hydrograph type	= Reservoir	Peak discharge	= 0.402 cfs
Storm frequency	= 100 yrs	Time to peak	= 18.60 hrs
Time interval	= 3 min	Hyd. volume	= 82,517 cuft
Inflow hyd. No.	= 2 - Southeast_2008 Post	Max. Elevation	= 814.29 ft
Reservoir name	= Southeast	Max. Storage	= 67,959 cuft

Storage Indication method used.



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

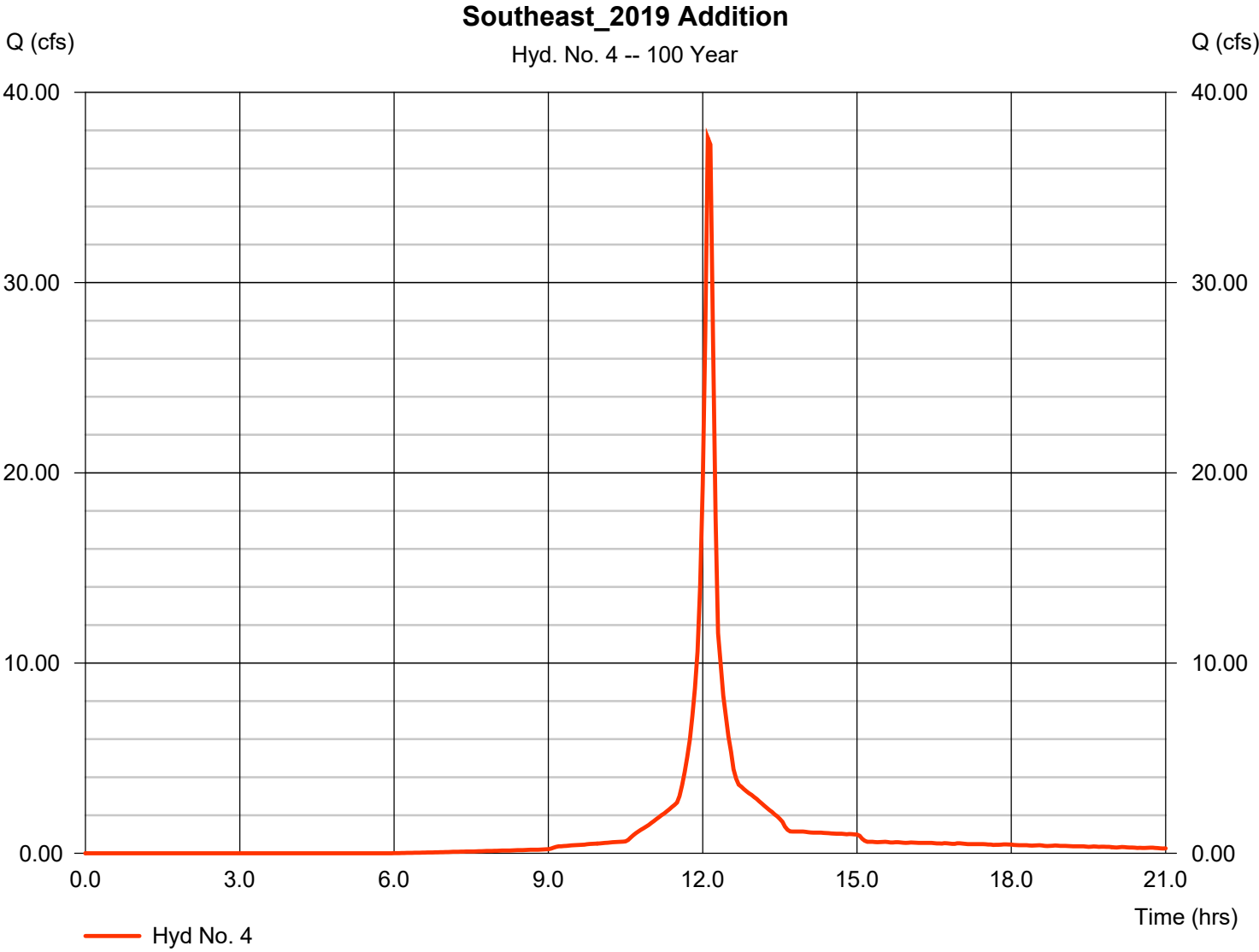
Thursday, 05 / 9 / 2019

Hyd. No. 4

Southeast_2019 Addition

Hydrograph type	= SCS Runoff	Peak discharge	= 37.60 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.10 hrs
Time interval	= 3 min	Hyd. volume	= 86,801 cuft
Drainage area	= 5.450 ac	Curve number	= 87*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 5.00 min
Total precip.	= 6.17 in	Distribution	= Custom
Storm duration	= S:\Design Resources\Hydraflow\Map Factors	Shape factor	= 484

* Composite (Area/CN) = [(2.870 x 98) + (0.650 x 98) + (1.600 x 61) + (0.330 x 98)] / 5.450



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12

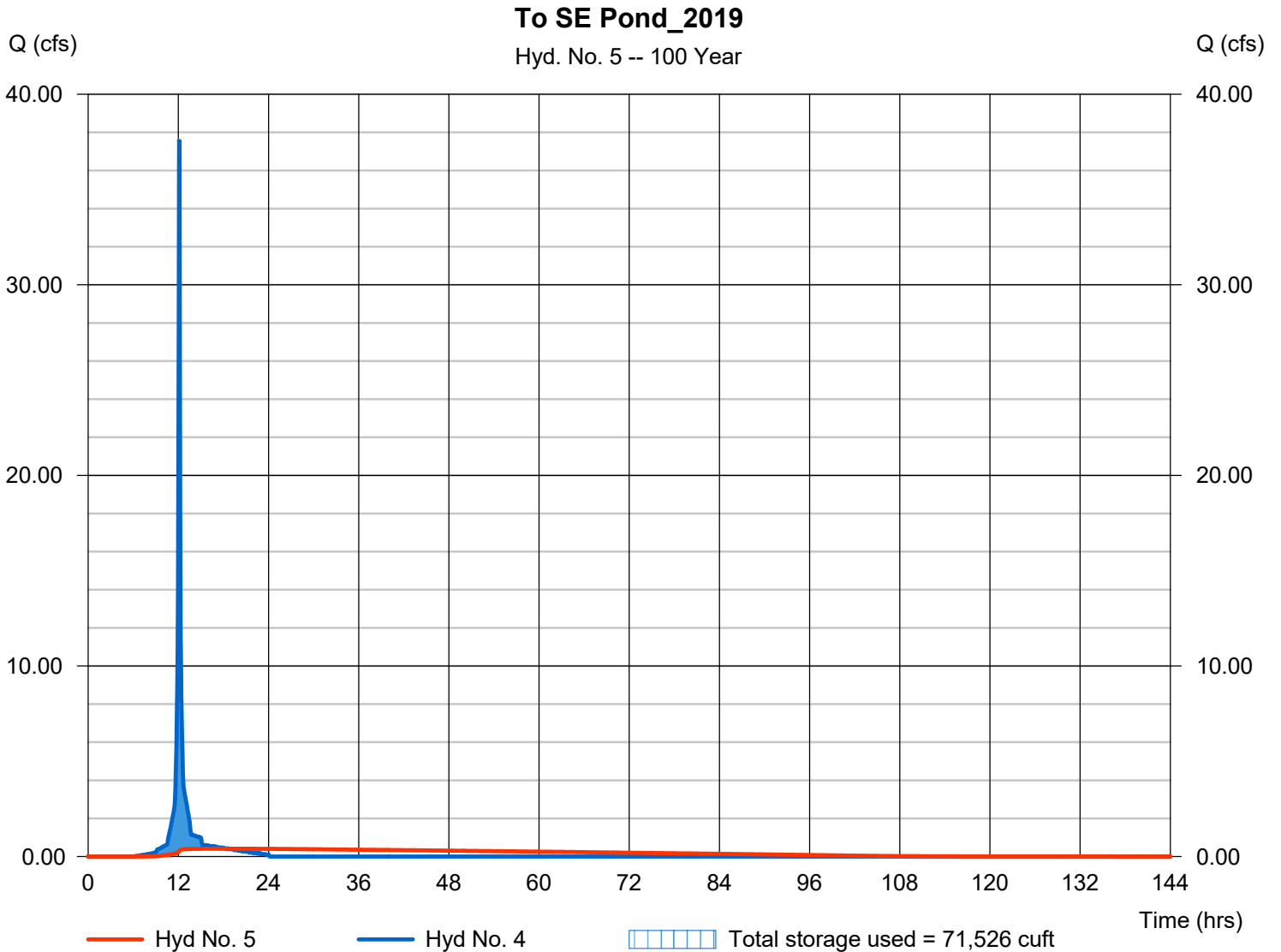
Thursday, 05 / 9 / 2019

Hyd. No. 5

To SE Pond_2019

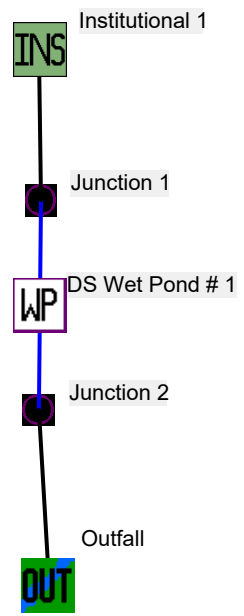
Hydrograph type	= Reservoir	Peak discharge	= 0.410 cfs
Storm frequency	= 100 yrs	Time to peak	= 18.60 hrs
Time interval	= 3 min	Hyd. volume	= 86,516 cuft
Inflow hyd. No.	= 4 - Southeast_2019 Addition	Max. Elevation	= 814.44 ft
Reservoir name	= Southeast	Max. Storage	= 71,526 cuft

Storage Indication method used.



Data file name: T:\Project Admin\C569-19 Weld-All\SWM\Weld-All_South.mdb
WinSLAMM Version 10.4.1
Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee WI 1969.RAN
Particulate Solids Concentration file name: C:\WinSLAMM Files\W10.1 WI_AVG01.pscx
Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx
Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GEO03.ppdx
Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv
Cost Data file name:
Seed for random number generator: -42
Study period starting date: 01/05/69 Study period ending date: 12/31/69
Start of Winter Season: 12/06 End of Winter Season: 03/28
Model Run Start Date: 01/05/69 Model Run End Date: 12/31/69
Date of run: 05-14-2019 Time of run: 08:26:11
Total Area Modeled (acres): 5.450
Years in Model Run: 0.99

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Total of all Land Uses without Controls:	91334	-	57.76	329.3	-
Outfall Total with Controls:	0	100.00%	0	0	100.00%
Annualized Total After Outfall Controls:	0			0	



Weld-All_South - InputData.txt

Data file name: T:\Project Admin\C569-19 Weld-All\SWM\Weld-All_South.mdb

WinSLAMM Version 10.4.1

Rain file name: C:\WinSLAMM Files\Rain Files\WisReg - Milwaukee WI 1969.RAN

Particulate Solids Concentration file name: C:\WinSLAMM Files\v10.1 WI_AVG01.pscx

Runoff Coefficient file name: C:\WinSLAMM Files\WI_SL06 Dec06.rsvx

Residential Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std

Institutional Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std

Commercial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std

Industrial Street Delivery file name: C:\WinSLAMM Files\WI_Com Inst Indust Dec06.std

Other Urban Street Delivery file name: C:\WinSLAMM Files\WI_Res and Other Urban Dec06.std

Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std

Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False

Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI_GE003.ppdx

Source Area PSD and Peak to Average Flow Ratio File: C:\WinSLAMM Files\NURP Source Area PSD Files.csv

Cost Data file name:

Seed for random number generator: -42

Study period starting date: 01/05/69

Study period ending date: 12/31/69

Start of Winter Season: 12/06

End of Winter Season: 03/28

Date: 05-14-2019

Time: 08:21:59

Site information:

Weld-All South Wet Pond

2001 S. Prairie Ave

Waukesha, WI

LU# 1 - Institutional: Institutional 1 Total area (ac): 5.450

1 - Roofs 1: 0.390 ac. Flat Connected Source Area PSD File: C:\WinSLAMM Files\NURP.cpz

13 - Paved Parking 1: 2.760 ac. Disconnected Normal Silty Source Area PSD File: C:\WinSLAMM

Files\NURP.cpz

45 - Large Landscaped Areas 1: 1.970 ac. Normal Silty Source Area PSD File: C:\WinSLAMM

Files\NURP.cpz

70 - Water Body Areas: 0.330 ac. Source Area PSD File:

Control Practice 1: Wet Detention Pond CP# 1 (DS) - DS Wet Pond # 1

Particle Size Distribution file name: Not needed - calculated by program

Initial stage elevation (ft): 810.55

Weld-All_South - InputData.txt

Peak to Average Flow Ratio: 3.8

Maximum flow allowed into pond (cfs): No maximum value entered

Outlet Characteristics:

Outlet type: Orifice 1

1. Orifice diameter (ft): 0.17
2. Number of orifices: 1
3. Invert elevation above datum (ft): 810.55

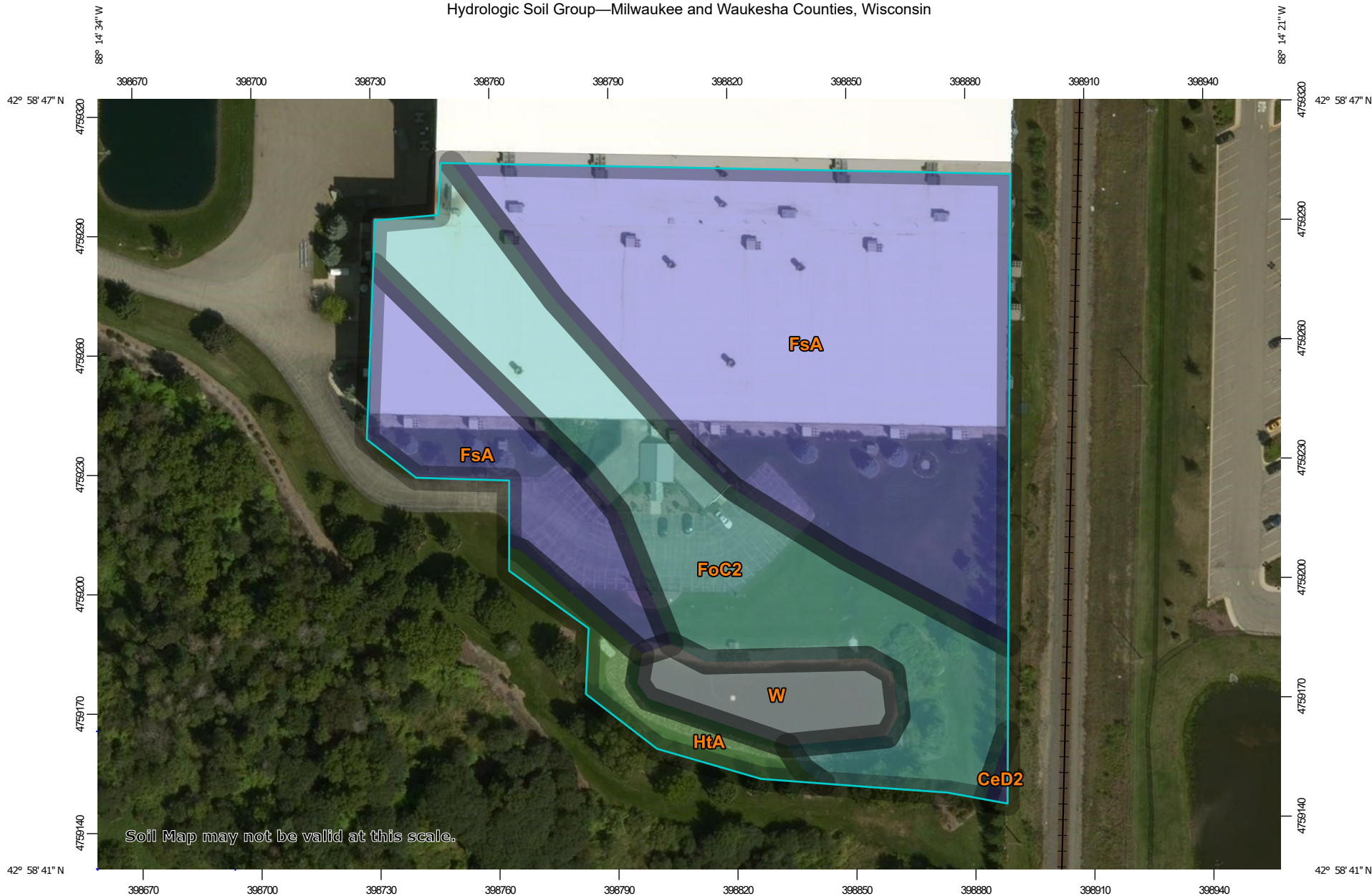
Outlet type: Broad Crested Weir

1. Weir crest length (ft): 12
2. Weir crest width (ft): 10
3. Height from datum to bottom of weir opening: 818

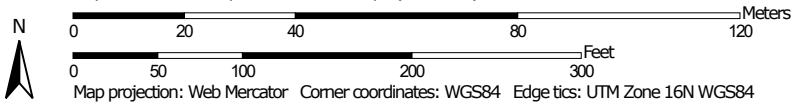
Pond stage and surface area

Entry Number	Stage (ft)	Pond Area (acres)	Natural Seepage (in/hr)	Other Outflow (cfs)
0	804.00	0.0000	0.00	0.00
1	804.54	0.0001	0.00	0.00
2	804.55	0.0480	0.00	0.00
3	805.55	0.0710	0.00	0.00
4	806.55	0.1240	0.00	0.00
5	807.55	0.1830	0.00	0.00
6	808.55	0.1830	0.00	0.00
7	809.55	0.2150	0.00	0.00
8	810.55	0.3310	0.00	0.00
9	812.00	0.3690	0.00	0.00
10	813.00	0.4080	0.00	0.00
11	814.00	0.4480	0.00	0.00
12	815.00	0.5040	0.00	0.00
13	816.00	0.5620	0.00	0.00
14	817.00	0.6230	0.00	0.00
15	818.00	0.6860	0.00	0.00
16	819.00	0.7510	0.00	0.00

Hydrologic Soil Group—Milwaukee and Waukesha Counties, Wisconsin



Map Scale: 1:1,360 if printed on A landscape (11" x 8.5") sheet.



Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CeD2	Casco loam, 12 to 20 percent slopes, eroded	B	0.0	0.2%
FoC2	Fox loam, 6 to 12 percent slopes, eroded	C	1.5	30.0%
FsA	Fox silt loam, 0 to 2 percent slopes	B	3.1	60.1%
HtA	Houghton muck, 0 to 2 percent slopes	A/D	0.2	4.1%
W	Water		0.3	5.5%
Totals for Area of Interest			5.1	100.0%