

INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN – REVISION 01
40 C.F.R. SECTION 257.82
GULF CLEAN ENERGY CENTER GYPSUM STORAGE AREA
FLORIDA POWER & LIGHT COMPANY

This Inflow Design Flood Control System Plan was prepared for Florida Power & Light Company's (FPL) Gulf Clean Energy Center (GCEC, formerly Plant Crist) Gypsum Storage Area, located in Pensacola, Florida. United States Environmental Protection Agency's "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments" Final Rule (40 C.F.R. Part 257, Subpart D), §257.82 requires the owner or operator of an existing CCR surface impoundment to design, construct, operate, and maintain an inflow design flood control system capable of adequately managing flow during and following the peak discharge of the specified inflow design flood. The owner or operator must prepare a written inflow design system plan documenting how the inflow design flood control system has been designed and constructed to meet the requirements of 40 C.F.R. §257.82. The original plan was prepared on October 17, 2016, and is being revised in accordance with 40 C.F.R. §257.82(c)(4).

The GCEC Gypsum Storage Area, consisting of a lined 15.5 acre gypsum storage pond, is currently inactive following the facility ceasing coal-fired operation, and is undergoing engineering design evaluation for closure by removal in accordance with 40 C.F.R. §257.102(c).

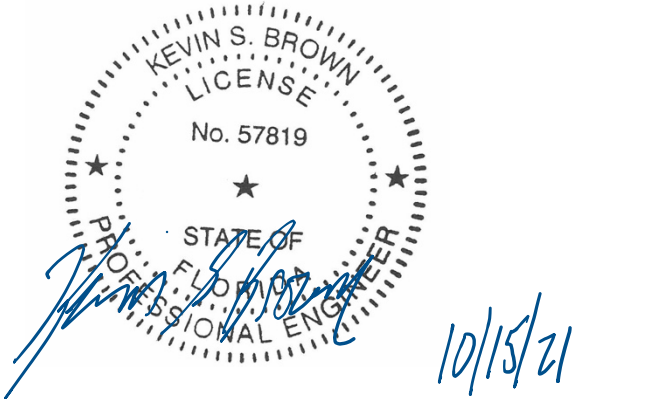
According to 40 C.F.R. §257.82(a)(3)(ii), a hazard potential rating of "Significant" for the Gypsum Storage Area requires an evaluation of the 1,000-year, 24-hour storm event. The 1,000-year, 24-hour storm depth for the site is 26.2 inches.

At the time of this submittal, the Gypsum Storage Area no longer receives gypsum, and gypsum is periodically removed for beneficial reuse purposes. The Gypsum Storage Area inflow analysis includes Gypsum Cell 2, the regulated CCR unit, and the adjacent ponds and associated drainage systems in order to provide accurate tailwater estimates; these adjacent ponds and drainage systems are not regulated under 40 C.F.R. Part 257, Subpart D. The Gypsum Storage Area drainage basin is currently divided into separate sub-basins which contain stormwater inflow within external and internal embankment dikes. The stormwater drainage basins included within this area are: Gypsum Cell 2 drainage basin, Sedimentation Pond drainage basin, Return Process Water Pond drainage basin, and the Gypsum Dewatering Facility drainage basin. The Gypsum Cell 2 Drainage Basin represents the Gypsum Storage Area referenced in this demonstration.

Interim conditions at the Gypsum Storage Area were evaluated as of topographic conditions in December 2020. Engineering analysis in its current condition demonstrates that the GCEC Gypsum Storage Area and associated drainage basin is capable of adequately managing the inflow from the design inflow storm event without overtopping any of the system's external embankments and has adequate capacity to manage the resulting outflow.

CERTIFICATION

I certify that this Inflow Design Flood Control Plan for the GCEC Gypsum Storage Area was prepared in accordance with 40 C.F.R. §257.82.



Kevin S. Brown, P.E.
Florida Licensed Professional Engineer No. 57819
Golder Associates Inc.



Subject: GULF CLEAN ENERGY CENTER 2021 CCR INFLOW DESIGN FLOOD CONTROL PLAN

Date: October 15, 2021 **Made By:** SEB

Project No.: 21482735 **Checked By:** JDG / LS

Project Short Title: Florida Power & Light/GCEC Gypsum Storage Area **Reviewed By:** KSB

1.0 OBJECTIVE

The objective of this report is to demonstrate the hydraulic capacity of the Florida Power & Light Company (FPL) Gulf Clean Energy Center (GCEC) Gypsum Storage Area interim condition systems in order to prepare an inflow design flood control plan as required by the United States Environmental Protection Agency’s (EPA) final rule for Disposal of CCR from Electric Utilities. The hydrologic conditions of the GCEC Gypsum Storage Area in the interim condition were evaluated as were captured based on the 2017 NOAA LiDAR survey and the 2020 gypsum topography.

2.0 METHODOLOGY

The GCEC Gypsum Storage Area interim condition systems were modeled within the Autodesk Storm and Sanitary Analysis (SSA) 2019 program. The adjacent Sedimentation Pond, Process Water Return Pond, and Gypsum Dewatering Facility are included in the analysis in order to provide accurate tailwater estimates from the GCEC Gypsum Storage Area spillway systems.

2.1 DESIGN CRITERIA

The GCEC Gypsum Storage Area is classified as a significant hazard structure, per the 2021 Hazard Potential Classification Assessment. The design storm for a significant hazard structure is a 1,000-year rainfall event. A summary of the design storm parameters and rainfall distribution methodology for these calculations is summarized below in Table 1. Additional storm events from the NOAA Atlas 14 Precipitation Frequency Estimates are shown in the in Graphic 1. The 1,000 year, 24 hour storm event is highlighted.

Table 1. GCEC Gypsum Storage Area Storm Distribution

Hazard Classification	Return Period (years)	Storm Duration (hours)	Rainfall Total (inches)	Rainfall Source	Storm Distribution
Significant	1,000	24	26.2	NOAA Atlas 14	SCS Type III



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Graphic 1. NOAA Atlas 14 Point Precipitation Frequency Estimates

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches) ¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.571 (0.478-0.689)	0.659 (0.550-0.796)	0.798 (0.664-0.967)	0.910 (0.752-1.11)	1.06 (0.837-1.32)	1.17 (0.901-1.48)	1.27 (0.945-1.66)	1.37 (0.973-1.84)	1.50 (1.02-2.08)	1.59 (1.05-2.25)
10-min	0.836 (0.699-1.01)	0.965 (0.806-1.17)	1.17 (0.973-1.42)	1.33 (1.10-1.62)	1.55 (1.23-1.93)	1.71 (1.32-2.17)	1.86 (1.38-2.42)	2.01 (1.43-2.70)	2.20 (1.49-3.04)	2.33 (1.54-3.30)
15-min	1.02 (0.853-1.23)	1.18 (0.983-1.42)	1.43 (1.19-1.73)	1.63 (1.34-1.98)	1.89 (1.49-2.36)	2.08 (1.61-2.64)	2.27 (1.69-2.96)	2.45 (1.74-3.29)	2.68 (1.82-3.71)	2.85 (1.88-4.02)
30-min	1.56 (1.31-1.88)	1.77 (1.48-2.14)	2.12 (1.76-2.57)	2.41 (2.00-2.94)	2.82 (2.25-3.55)	3.14 (2.44-4.01)	3.47 (2.59-4.55)	3.80 (2.71-5.13)	4.25 (2.89-5.91)	4.60 (3.04-6.50)
60-min	2.13 (1.78-2.57)	2.40 (2.01-2.90)	2.87 (2.39-3.48)	3.28 (2.71-3.99)	3.86 (3.08-4.88)	4.33 (3.37-5.55)	4.82 (3.60-6.34)	5.34 (3.80-7.23)	6.05 (4.13-8.43)	6.61 (4.37-9.35)
2-hr	2.70 (2.27-3.24)	3.04 (2.55-3.65)	3.62 (3.03-4.36)	4.14 (3.44-5.00)	4.90 (3.94-6.16)	5.52 (4.32-7.04)	6.17 (4.64-8.08)	6.87 (4.93-9.26)	7.85 (5.39-10.9)	8.63 (5.74-12.1)
3-hr	3.07 (2.59-3.67)	3.46 (2.91-4.13)	4.14 (3.48-4.96)	4.76 (3.97-5.73)	5.68 (4.60-7.14)	6.45 (5.07-8.22)	7.27 (5.49-9.50)	8.15 (5.88-11.0)	9.40 (6.48-13.0)	10.4 (6.94-14.6)
6-hr	3.72 (3.15-4.41)	4.21 (3.57-5.00)	5.12 (4.32-6.10)	5.98 (5.01-7.14)	7.29 (5.96-9.18)	8.42 (6.68-10.7)	9.65 (7.35-12.6)	11.0 (7.99-14.8)	12.9 (9.00-17.8)	14.5 (9.76-20.2)
12-hr	4.39 (3.74-5.16)	5.02 (4.27-5.91)	6.23 (5.29-7.37)	7.41 (6.25-8.80)	9.28 (7.66-11.7)	10.9 (8.73-13.9)	12.7 (9.79-16.6)	14.8 (10.8-19.8)	17.7 (12.4-24.3)	20.1 (13.6-27.8)
24-hr	5.08 (4.35-5.94)	5.89 (5.04-6.89)	7.46 (6.37-8.76)	9.01 (7.64-10.6)	11.5 (9.57-14.5)	13.7 (11.0-17.3)	16.1 (12.5-20.9)	18.9 (13.9-25.2)	22.9 (16.2-31.3)	26.2 (17.8-35.9)
2-day	5.84 (5.03-6.78)	6.81 (5.86-7.91)	8.70 (7.46-10.1)	10.6 (8.99-12.4)	13.5 (11.3-16.9)	16.2 (13.1-20.4)	19.1 (14.9-24.7)	22.4 (16.7-29.7)	27.2 (19.4-37.0)	31.2 (21.4-42.6)
3-day	6.37 (5.51-7.37)	7.34 (6.34-8.49)	9.26 (7.97-10.8)	11.2 (9.56-13.0)	14.3 (12.0-17.8)	17.1 (13.9-21.4)	20.2 (15.8-26.0)	23.7 (17.7-31.3)	28.8 (20.6-39.1)	33.1 (22.8-44.9)
4-day	6.82 (5.91-7.86)	7.76 (6.72-8.96)	9.68 (8.34-11.2)	11.6 (9.94-13.5)	14.8 (12.5-18.3)	17.6 (14.4-22.0)	20.8 (16.3-26.6)	24.4 (18.2-32.1)	29.6 (21.2-40.1)	34.1 (23.5-46.1)
7-day	7.92 (6.89-9.07)	8.86 (7.70-10.2)	10.8 (9.33-12.4)	12.7 (10.9-14.7)	15.9 (13.5-19.6)	18.7 (15.4-23.3)	22.0 (17.3-28.0)	25.6 (19.3-33.5)	30.9 (22.3-41.6)	35.4 (24.6-47.7)
10-day	8.86 (7.74-10.1)	9.85 (8.59-11.3)	11.8 (10.3-13.5)	13.8 (11.9-15.8)	16.9 (14.3-20.7)	19.7 (16.2-24.4)	22.9 (18.1-29.0)	26.4 (19.9-34.4)	31.6 (22.8-42.3)	36.0 (25.0-48.3)
20-day	11.5 (10.1-13.1)	12.8 (11.2-14.5)	15.0 (13.1-17.1)	17.1 (14.8-19.5)	20.2 (17.1-24.2)	22.9 (18.8-27.8)	25.8 (20.4-32.1)	28.9 (21.8-37.0)	33.3 (24.2-44.0)	37.0 (25.9-49.3)
30-day	13.8 (12.2-15.6)	15.4 (13.5-17.4)	18.0 (15.8-20.4)	20.3 (17.7-23.1)	23.5 (19.8-27.8)	26.2 (21.5-31.4)	28.9 (22.8-35.6)	31.7 (24.0-40.3)	35.6 (25.8-46.6)	38.7 (27.2-51.4)
45-day	16.9 (14.9-18.9)	18.8 (16.6-21.2)	22.1 (19.4-24.9)	24.7 (21.6-28.0)	28.3 (23.8-33.0)	31.0 (25.4-36.8)	33.6 (26.6-41.0)	36.3 (27.5-45.6)	39.8 (28.9-51.5)	42.3 (29.9-56.0)
60-day	19.5 (17.3-21.9)	21.9 (19.4-24.6)	25.7 (22.7-29.0)	28.8 (25.2-32.5)	32.7 (27.5-37.9)	35.6 (29.3-42.0)	38.3 (30.4-46.4)	41.0 (31.0-51.1)	44.2 (32.1-56.9)	46.5 (33.0-61.3)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.



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2.2 HYDROLOGIC ANALYSES

The drainage areas for the GCEC Gypsum Storage were delineated based on 2017 NOAA LiDAR survey and the 2020 Gypsum Topography provided by FPL. Runoff characteristics were developed based on the Soil Conservation Service (SCS) methodologies as outlined in TR-55. An overall SCS curve number for the drainage area was developed based on the National Engineering Handbook Part 630, Chapter 9 which provides a breakdown of curve numbers for each soil type and land use combination. Soil types were obtained from the USGS online soils database. Land use areas were delineated based on aerial photography. Time of Concentration calculations were developed based on the overland flow method as described in the National Engineering Handbook Part 630, Chapter 15. The curve numbers used for the different types of landuse on site are shown below in Table 2.

Table 2. Curve Numbers

Landuse Type	Curve Number
Stacked Gypsum	95
Liner	95
Water	100

Pertinent characteristics of the delineated basins are provided below.

Gypsum Cell 2 Basin

Drainage Basin Area: 17.8 acres
 Hydrologic Curve Number, CN: 96.8
 Time of Concentration: 6 minutes

Sedimentation Pond

Drainage Basin Area: 5.5 acres
 Hydrologic Curve Number, CN: 97.4
 Time of Concentration: 6 minutes

Process Return Water Pond

Drainage Basin Area: 3.5 acres
 Hydrologic Curve Number, CN: 98.3
 Time of Concentration: 6 minutes

Gypsum Dewatering Facility Basin

Drainage Basin Area Total: 5.03 acres
 Hydrologic Curve Number, CN: 95
 Time of Concentration: 6 minutes

Note: Six minutes is the minimum allowable time of concentration as per the TR-55.

Note: The Gypsum Dewatering Facility Basin contains several small subbasins. The area listed above is the total area of all of the subbasins.

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2.3 HYDRAULIC ANALYSES

An arrangement of the basins is shown in the attached Figure 1. The Gypsum Storage Area basin has three outflow structures.

1. A stop-log riser structure that flows into a 30-inch HDPE pipe leading into a junction and continuing into a 48-inch pipe toward the Sedimentation Pond. (Ref: 2008 Gulf Power As-Built Drawing E4C39054)
2. 7-foot by 5-foot box culvert flowing into the Sedimentation Pond. (Ref: 2008 Gulf Power As-Built Drawing E4C39053)
3. A junction (Jun-06) located on the Gypsum Cell 2 basin east slope that flows into Junction-06 and continues along the pipe system to the Sedimentation Pond. (Ref: 2008 Gulf Power As-Built Drawing E4C39054 and E4C39050).

Additionally, the Gypsum Cell 2 is modeled to receive an additional approximately 2.12 cfs of process inflow from GCEC based on normal plant operations.

The stormwater collected in the Sedimentation Pond discharges through a riser structure (Ref: 2008 Gulf Power As-Built Drawing E4C39051) and travels along a series of pipes and junction boxes toward Process Return Water Pond. Design details for the junction boxes can be found in the 2008 Gulf Power As-Built Drawing E4C39050. Additionally, an overtopping control section (Ref: 2008 Gulf Power As-Built Drawing E4C39049) is located along the northeast edge of the Sedimentation Pond to allow for any overtopping flow to travel into the receiving channel. This overtopping feature is modeled as a weir within SSA.

From the Process Return Water Pond, the stormwater can then flow, as needed, into an overtopping control section (Ref: 2008 Gulf Power As-Built Drawing E4C39049) that is modeled as a weir within SSA and discharges into the receiving channel. A pump intake structure is located in the Process Return Water Pond that is used to pump water into the Return Water Pump Building. The pump was not modeled within SSA to account for the most conservative scenario of pump failure during the 1,000 year storm event.

The stormwater collected in the Gypsum Dewatering Facility Basin flows through a piping network and continues into the junction (Junction 3) located on the slope of the Process Return Water Pond and continues into the pond. A summary of the modeled conveyance links including, channels, culverts, and weirs are shown below in Table 3.

2.3 ASSUMPTIONS

Elevations throughout the site pipe system are estimated based on the slopes and inlet elevations provided on the 2008 As-Built Drawing E4C39054. Junction box maximum rim elevations are based on the 2017 NOAA LiDAR topography along with visual interpretation of the available Google Earth aerial photography for the site.

The Gypsum Storage Area Cell 2 riser structure is assumed to have an inlet elevation at the normal pool elevation of 109 feet-msl.

The Sedimentation Pond normal pool elevation is assumed to be 92 feet-msl as provided by the 2008 As-Built Drawing E4C39054. All temporary pipes shown on this drawing are assumed to have been removed from the system.



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Table 3. Basin Connections

Link	Basin	US Invert Elevation (ft-msl)	DS Invert Elevation (ft-msl)	Dimension	Slope (ft/ft)	Length (ft)	Capacity (cfs)
Gypsum Riser Weir	Gypsum Cell 2	109	NA	Rectangular weir Crest length: 3 feet Weir height: 13 feet Discharge coeff.: 3.3	NA	NA	NA
Gypsum Riser pipe to Junction 7	Gypsum Cell 2	94.5	92.9	30-inch diameter HDPE pipe	0.005	320	31.4
Gypsum Cell 2 to Junction 5 Weir	Gypsum Cell 2	120	NA	Rectangular weir Crest length: 6.28 feet Weir height: 1 feet Discharge coeff.: 3.3	NA	NA	NA
Junction 5 to Junction 6	Gypsum Cell 2	112	93.95	24.08-inch diameter HDPE pipe	0.1246	144.9	87.3
Junction 6 to Junction 7	Gypsum Cell 2 to Sedimentation Pond	93.95	92.9	30-inch diameter HDPE pipe	0.005	210	31.4
Junction 7 Pipe to Sed. Pond	Gypsum Cell 2 to Sedimentation Pond	92.9	90.6	47.6-inch diameter HDPE pipe	0.003	760.2	83.4
Box Culvert	Gypsum Cell 2 to Sedimentation Pond	115.9	115.8	Box Culvert Height: 5 feet Width: 7 feet	0.003	36	248.3
Sed. Overtopping Weir	Sedimentation Pond	116.89	NA	Trapezoidal weir Crest length: 20 feet Weir height: 2.1 feet Discharge coeff.: 2.8	NA	NA	NA



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Sed. Pond Riser Weir	Sedimentation Pond	92	NA	Rectangular weir Crest length: 8.5 feet Weir height: 1 feet Discharge coeff.: 3.3	NA	NA	NA
Sed. Riser to Junction 1	Sedimentation Pond to Process Return Water Pond	88	87.3	28.15-inch diameter HDPE pipe	0.003	233	20.5
Junction 1 to Junction 2	Sedimentation Pond to Process Return Water Pond	87.3	86.4	28.15-inch diameter HDPE pipe	0.003	290	20.9
Junction 2 to Junction 3	Sedimentation Pond to Process Return Water Pond	86.4	85.72	30-inch diameter HDPE pipe with flap gate	0.003	224	24.3
Junction 3 to Process Return Water Pond	Sedimentation Pond to Process Return Water Pond	85.72	85.3	41.4-inch diameter HDPE pipe	0.003	140	57.5
Process Return Overtopping Weir	Process Return Water Pond	106	NA	Trapezoidal weir Crest length: 20 feet Weir height: 2 feet Discharge coeff.: 2.6	NA	NA	NA

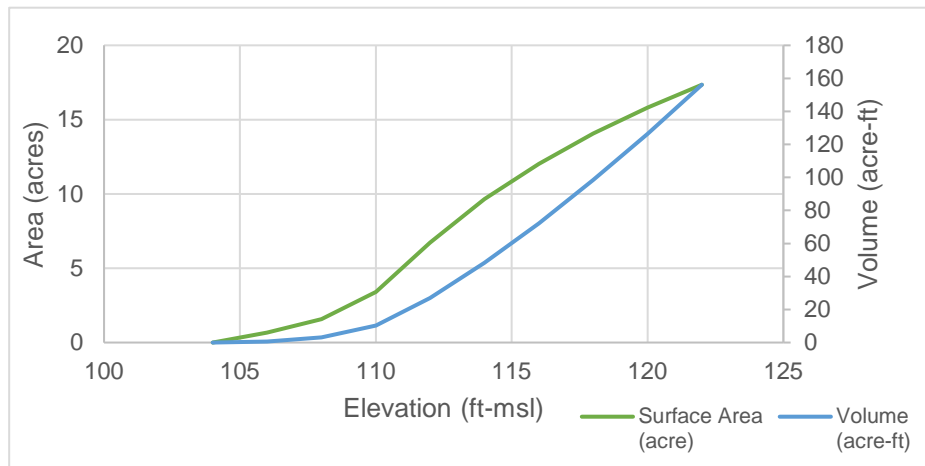
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2.4 STAGE-STORAGE

A stage-storage relationship was determined using the 2017 NOAA LiDAR along with the 2020 gypsum topography for the following basins: Gypsum Cell 2 (Gypsum Storage Area), Sedimentation Pond, Return Process Water Pond. These storage curves are shown below.

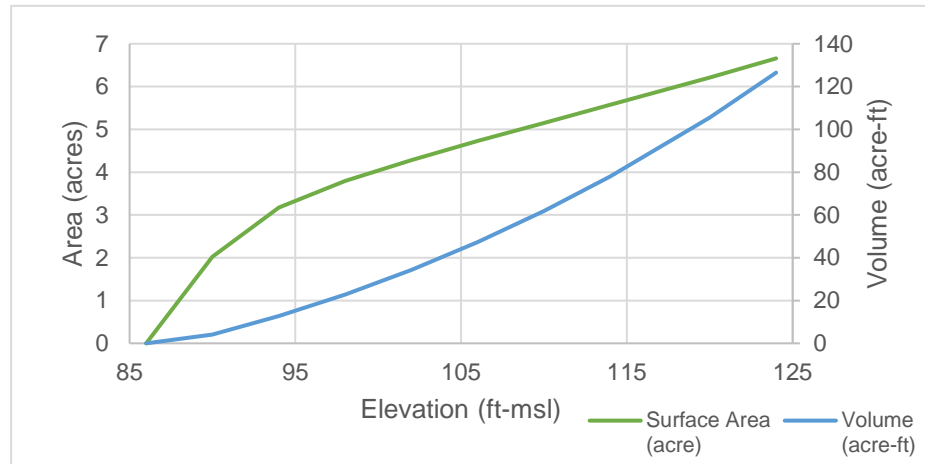
Gypsum Cell 2 Basin

Elevation (ft-msl)	Surface Area (acre)	Volume (acre-ft)
104	0.0	0.0
106	0.7	0.7
108	1.6	3.1
110	3.4	10.2
112	6.7	26.9
114	9.7	48.3
116	12.0	72.1
118	14.1	98.5
120	15.8	126.5
122	17.3	156.1



Sedimentation Pond

Elevation (ft-msl)	Surface Area (acre)	Volume (acre-ft)
86	0.0	0.0
90	2.0	4.0
94	3.2	12.7
98	3.8	22.8
102	4.3	34.3
106	4.7	47.3
110	5.2	61.8
114	5.6	78.0
120	6.2	105.6
124	6.7	126.5



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Process Return Water Pond

Elevation (ft-msl)	Surface Area (acre)	Volume (acre-ft)
85	0.0	0.00
88	0.0	0.03
90	0.1	0.20
94	0.2	0.98
100	1.9	14.13
102	2.3	19.49
104	2.7	25.22
106	3.0	31.34
108	3.3	37.96

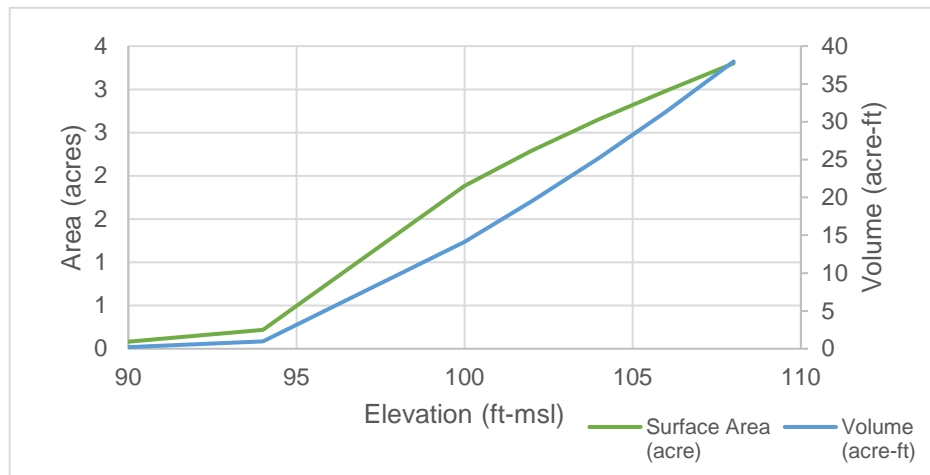
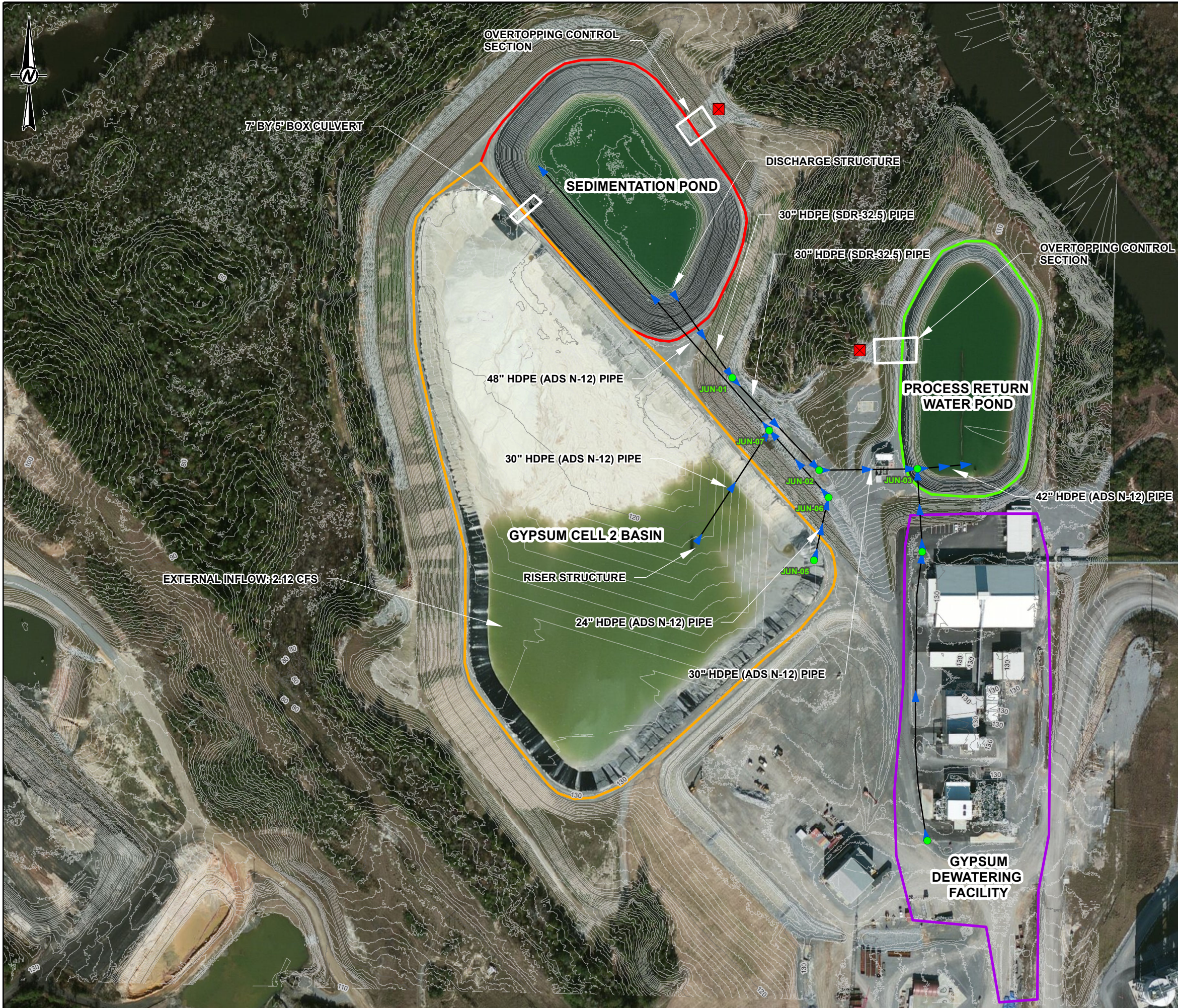

3.0 MODEL RESULTS

Table 4 shows the results from the SSA model. Additional outputs can be found in the attachments.

Table 4. Storage Unit Routing Results

Basin	Initial Pool Elevation (feet-msl)	Top of Embankment Elevation (feet-msl)	Peak Water Surface Elevation (feet-msl)	Freeboard (feet)	Peak Inflow (cfs)	Peak Outflow (cfs)
Gypsum Cell 2 Basin	109.0	122.0	112.3	9.7	393	60
Sedimentation Pond	92.0	118.0	105.9	12.1	161	82
Return Water Pond	98.0	107.0	106.2	0.8	189	4

Note: Pump from Process Return Water Pond not modeled.

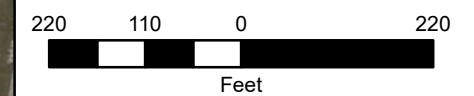


- LEGEND**
- GYPSUM DEWATERING FACILITY
 - GYPSUM CELL 2 BASIN
 - PROCESS RETURN WATER POND
 - SEDIMENTATION POND
 - ▶▶▶ PIPE
 - 10-FOOT 2017 NOAA LIDAR TOPOGRAPHY
 - 1-FOOT 2017 NOAA LIDAR TOPOGRAPHY
 - JUNCTIONS
 - ✕ OUTFALL

REFERENCE

2017 LIDAR SURVEY, CONTOURS, AND IMAGERY PROVIDED BY GULF POWER. 2021 GYPSUM TOPOGRAPHY FROM GULF POWER.

SERVICE LAYER CREDITS: SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRID, IGN, AND THE GIS USER COMMUNITY



CLIENT GULF POWER / FLORIDA POWER & LIGHT		
PROJECT GULF CLEAN ENERGY CENTER CCR INFLOW DESIGN FLOOD CONTROL PLAN 2021		
TITLE SITE BASIN AND H&H MODEL COMPONENTS PLAN		
CONSULTANT	YYYY-MM-DD	2021-10-15
GOLDER MEMBER OF WSP	PREPARED	SEB
	DESIGN	SEB
	REVIEW	JDG
	APPROVED	KSB
PROJECT No. 21482735	CONTROL	Rev. 0
		FIGURE 1

Path: C:\Users\jgolder\OneDrive\Documents\2021\21482735\Inflow Design Flood Control Plan\PlanSet_CCR\Rev\Drawings\2021.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET HAS BEEN MODIFIED FROM ANS/B

Project Description

File Name Plant Crist - Inflow Design Flood Control Plan 2021.SPF

Project Options

Flow Units CFS
 Elevation Type Elevation
 Hydrology Method SCS TR-55
 Time of Concentration (TOC) Method SCS TR-55
 Link Routing Method Hydrodynamic
 Enable Overflow Ponding at Nodes NO
 Skip Steady State Analysis Time Periods ... NO

Analysis Options

Start Analysis On Sep 07, 2021 00:00:00
 End Analysis On Sep 09, 2021 00:00:00
 Start Reporting On Sep 07, 2021 00:00:00
 Antecedent Dry Days 0 days
 Runoff (Dry Weather) Time Step 0 01:00:00 days hh:mm:ss
 Runoff (Wet Weather) Time Step 0 00:05:00 days hh:mm:ss
 Reporting Time Step 0 00:05:00 days hh:mm:ss
 Routing Time Step 1 seconds

Number of Elements

Qty
 Rain Gages 1
 Subbasins..... 13
 Nodes..... 24
 Junctions 19
 Outfalls 2
 Flow Diversions 0
 Inlets 0
 Storage Nodes 3
 Links..... 25
 Channels 0
 Pipes 20
 Pumps 0
 Orifices 0
 Weirs 5
 Outlets 0
 Pollutants 0
 Land Uses 0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1		Time Series	1000 year	Cumulative	inches	Florida	Escambia	100	26.20	SCS Type III 24-hr

Subbasin Summary

SN	Subbasin ID	Area	Weighted Curve Number	Total Rainfall	Total Runoff	Total Runoff Volume	Peak Runoff	Time of Concentration
		(ac)		(in)	(in)	(ac-in)	(cfs)	(days hh:mm:ss)
1	GypsumCell2	17.87	96.84	26.20	25.81	461.26	393.10	0 00:06:00
2	ProcessReturnWaterPond	3.52	98.25	26.20	25.99	91.47	77.47	0 00:06:00
3	SCB-001	0.67	95.00	26.20	25.58	17.14	14.85	0 00:05:00
4	SCB-002	1.10	95.00	26.20	25.58	28.14	24.33	0 00:05:00
5	SCB-003	0.20	95.00	26.20	25.58	5.12	4.38	0 00:05:00
6	SCB-004	0.19	95.00	26.20	25.58	4.86	4.24	0 00:05:00
7	SCB-005	0.55	95.00	26.20	25.58	14.07	12.16	0 00:05:00
8	SCB-010	0.34	95.00	26.20	25.58	8.70	7.50	0 00:05:00
9	SCB-011	0.37	95.00	26.20	25.58	9.46	8.20	0 00:05:00
10	SCB-012	0.27	95.00	26.20	25.58	6.91	5.94	0 00:05:00
11	SCB-013	0.46	95.00	26.20	25.58	11.77	10.18	0 00:05:00
12	SCB-015	0.88	95.00	26.20	25.58	22.51	19.52	0 00:05:00
13	SedimentationBasin	5.55	97.39	26.20	25.88	143.64	122.09	0 00:06:00

Node Summary

SN Element ID	Element Type	Invert Elevation	Ground/Rim (Max) Elevation	Initial Water Elevation	Surcharge Elevation	Ponded Area	Peak Inflow	Max HGL Elevation Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
		(ft)	(ft)	(ft)	(ft)	(ft²)	(cfs)	(ft)	(ft)	(ft)	(days hh:mm)	(ac-in)	(min)
1 CB-001	Junction	121.50	126.20	121.50	300.00	100.00	47.50	280.04	153.84	0.00	0 00:00	0.00	0.00
2 CB-002	Junction	118.80	126.50	118.80	300.00	100.00	71.72	270.19	143.69	0.00	0 00:00	0.00	0.00
3 CB-003	Junction	117.50	127.50	117.50	300.00	100.00	95.56	222.11	94.61	0.00	0 00:00	0.00	0.00
4 CB-004	Junction	117.00	129.10	117.00	200.00	100.00	111.93	192.39	63.29	0.00	0 00:00	0.00	0.00
5 CB-005	Junction	117.80	127.50	117.80	300.00	100.00	12.14	200.71	73.21	0.00	0 00:00	0.00	0.00
6 CB-010	Junction	127.30	129.80	127.30	300.00	100.00	7.48	300.00	170.20	0.00	0 12:10	0.00	0.00
7 CB-011	Junction	127.70	129.90	127.70	300.00	100.00	8.19	296.71	166.81	0.00	0 00:00	0.00	0.00
8 CB-012	Junction	126.40	129.50	126.40	300.00	100.00	21.48	295.91	166.41	0.00	0 00:00	0.00	0.00
9 CB-013	Junction	122.70	128.80	122.70	300.00	100.00	32.27	288.36	159.56	0.00	0 00:00	0.00	0.00
10 CB-015	Junction	124.95	128.00	124.95	300.00	1000.00	19.48	285.15	157.15	0.00	0 00:00	0.00	0.00
11 Jun-01	Junction	86.50	104.00	0.00	200.00	0.00	34.64	138.46	34.46	0.00	0 00:00	0.00	0.00
12 Jun-02	Junction	86.40	103.00	0.00	250.00	0.00	18.92	105.94	2.94	0.00	0 00:00	0.00	0.00
13 Jun-03	Junction	85.72	107.00	85.72	150.00	100.00	153.05	123.65	16.65	0.00	0 00:00	0.00	0.00
14 Jun-05	Junction	112.00	120.00	0.00	300.00	0.00	0.00	112.00	0.00	18.00	0 00:00	0.00	0.00
15 Jun-06	Junction	93.95	111.00	0.00	210.00	0.00	0.53	105.94	0.00	5.06	0 00:00	0.00	0.00
16 Jun-07	Junction	92.90	112.00	0.00	300.00	0.00	59.53	105.94	0.00	6.06	0 00:00	0.00	0.00
17 MH-023	Junction	118.10	129.70	118.10	300.00	0.00	91.19	249.35	119.65	0.00	0 00:00	0.00	0.00
18 Riser	Junction	94.50	111.00	0.00	120.00	0.00	59.60	107.12	0.00	6.38	0 00:00	0.00	0.00
19 SedRiser	Junction	88.00	96.67	108.00	200.00	0.00	2.13	105.94	9.27	0.00	0 00:00	0.00	0.00
20 Outfall_fromReturn	Outfall	84.15					4.07	84.15					
21 Outfall_fromSed	Outfall	88.00					0.00	88.00					
22 Gypsum	Storage Node	103.00	122.00	109.00		0.00	393.27	112.29				0.00	0.00
23 ProcessReturnWater	Storage Node	85.00	107.00	98.00		0.00	189.03	106.17				0.00	0.00
24 Sedimentation	Storage Node	86.00	118.00	92.00		0.00	160.83	105.94				0.00	0.00

Link Summary

SN Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)
1 3	Pipe	CB-005	CB-004	55.58	117.80	117.20	1.0800	12.000	0.0110	12.14	4.37	2.77	15.46	1.00	1.00	41.00
2 4	Pipe	CB-003	CB-004	79.04	117.50	117.20	0.3800	23.000	0.0110	95.56	14.70	6.50	33.12	1.92	1.00	40.00
3 6	Pipe	CB-002	MH-023	124.39	118.80	118.30	0.4000	23.000	0.0110	71.71	15.13	4.74	24.86	1.92	1.00	65.00
4 7	Pipe	CB-001	CB-002	143.40	121.50	119.00	1.7400	23.000	0.0110	47.51	31.51	1.51	16.47	1.92	1.00	52.00
5 11	Pipe	CB-010	CB-012	49.55	127.30	126.60	1.4100	11.000	0.0110	7.44	3.97	1.88	11.28	0.92	1.00	44.00
6 13	Pipe	CB-015	MH-023	65.37	124.95	124.35	0.9200	11.000	0.0110	19.48	3.20	6.09	29.51	0.92	1.00	48.00
7 15	Pipe	CB-011	CB-012	68.66	127.70	126.60	1.6000	17.000	0.0110	8.19	13.49	0.61	5.19	1.42	1.00	42.00
8 18	Pipe	CB-012	CB-013	118.14	126.40	125.90	0.4200	17.000	0.0110	21.52	6.93	3.10	13.65	1.42	1.00	44.00
9 24	Pipe	MH-023	CB-003	80.52	118.10	117.80	0.3700	23.000	0.0110	91.19	14.57	6.26	31.61	1.92	1.00	61.00
10 BoxCulvert	Pipe	Gypsum	Sedimentation	36.00	115.88	115.77	0.3100	60.000	0.0150	0.00	246.48	0.00	0.00	0.00	0.00	0.00
11 Dewatering_to_Return	Pipe	CB-004	Jun-03	282.00	117.00	97.14	7.0400	23.000	0.0110	111.93	63.34	1.77	38.79	1.92	1.00	28.00
12 Gypsum(J5)_to_J6	Pipe	Jun-05	Jun-06	144.90	112.00	93.95	12.4600	24.080	0.0120	0.00	87.27	0.00	0.00	1.00	0.50	0.00
13 GypsumRiser_to_J7	Pipe	Riser	Jun-07	320.00	94.50	92.90	0.5000	30.000	0.0120	59.52	31.42	1.89	12.13	2.50	1.00	2164.00
14 J1_to_J2	Pipe	Jun-01	Jun-02	290.00	87.30	86.40	0.3100	28.150	0.0120	18.92	20.89	0.91	7.57	2.35	1.00	2748.00
15 J2_to_J3(ProcessReturnWater)	Pipe	Jun-02	Jun-03	224.00	86.40	85.72	0.3000	30.000	0.0120	0.23	24.48	0.01	0.05	2.50	1.00	2773.00
16 J3_to_ProcessReturn	Pipe	Jun-03	ProcessReturnWater	140.00	85.72	85.30	0.3000	41.400	0.0120	153.05	57.45	2.66	16.37	3.45	1.00	2880.00
17 J6_to_J7	Pipe	Jun-06	Jun-07	210.00	93.95	92.90	0.5000	30.000	0.0120	0.53	31.42	0.02	0.11	2.50	1.00	2151.00
18 J7_to_Sed	Pipe	Jun-07	Sedimentation	760.20	92.90	90.60	0.3000	47.600	0.0120	59.52	83.71	0.71	4.82	3.97	1.00	2148.00
19 Link-19-1	Pipe	CB-013	CB-001	94.25	122.70	121.70	1.0600	19.256	0.0110	32.30	15.31	2.11	15.97	1.60	1.00	51.00
20 SedRiser_to_J1	Pipe	SedRiser	Jun-01	233.00	88.00	87.30	0.3000	28.150	0.0120	34.64	20.55	1.69	8.28	2.35	1.00	2743.00
21 GypsumJ5_Weir	Weir	Gypsum	Jun-05		103.00	112.00				0.00						
22 GypsumRiser_Weir	Weir	Gypsum	Riser		103.00	94.50				59.60						
23 ReturnWater_OvertoppingWeir	Weir	ProcessReturnWater	Outfall_fromReturn		85.00	84.15				4.07						
24 Sed_OvertoppingWeir	Weir	Sedimentation	Outfall_fromSed		86.00	88.00				0.00						
25 SedRiser_Weir	Weir	Sedimentation	SedRiser		86.00	88.00				81.86						

Subbasin Hydrology

Subbasin : GypsumCell2

Input Data

Area (ac) 17.87
 Weighted Curve Number 96.84
 Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
CCR	6.55	-	95.00
Water	6.56	-	100.00
ClosureTurf	4.76	-	95.00
Composite Area & Weighted CN	17.87		96.84

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

$$T_c = (0.007 * ((n * L_f)^{0.8})) / ((P^{0.5}) * (S_f^{0.4}))$$

Where :

- Tc = Time of Concentration (hr)
- n = Manning's roughness
- Lf = Flow Length (ft)
- P = 2 yr, 24 hr Rainfall (inches)
- Sf = Slope (ft/ft)

Shallow Concentrated Flow Equation :

- V = 16.1345 * (Sf^{0.5}) (unpaved surface)
- V = 20.3282 * (Sf^{0.5}) (paved surface)
- V = 15.0 * (Sf^{0.5}) (grassed waterway surface)
- V = 10.0 * (Sf^{0.5}) (nearly bare & untilled surface)
- V = 9.0 * (Sf^{0.5}) (cultivated straight rows surface)
- V = 7.0 * (Sf^{0.5}) (short grass pasture surface)
- V = 5.0 * (Sf^{0.5}) (woodland surface)
- V = 2.5 * (Sf^{0.5}) (forest w/heavy litter surface)
- Tc = (Lf / V) / (3600 sec/hr)

Where:

- Tc = Time of Concentration (hr)
- Lf = Flow Length (ft)
- V = Velocity (ft/sec)
- Sf = Slope (ft/ft)

Channel Flow Equation :

$$V = (1.49 * (R^{2/3})) * (S_f^{0.5}) / n$$

$$R = A_q / W_p$$

$$T_c = (L_f / V) / (3600 \text{ sec/hr})$$

Where :

- Tc = Time of Concentration (hr)
- Lf = Flow Length (ft)
- R = Hydraulic Radius (ft)
- Aq = Flow Area (ft²)
- Wp = Wetted Perimeter (ft)
- V = Velocity (ft/sec)
- Sf = Slope (ft/ft)
- n = Manning's roughness

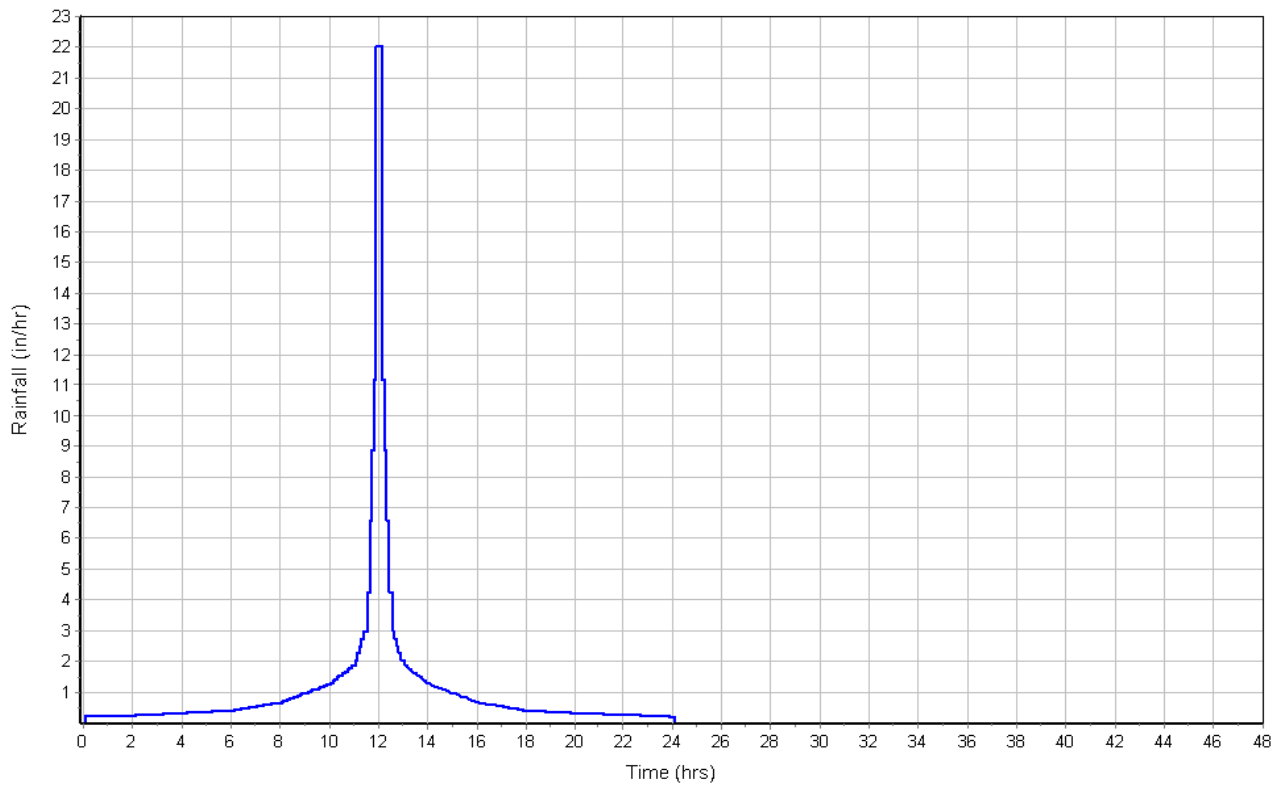
User-Defined TOC override (minutes): 6

Subbasin Runoff Results

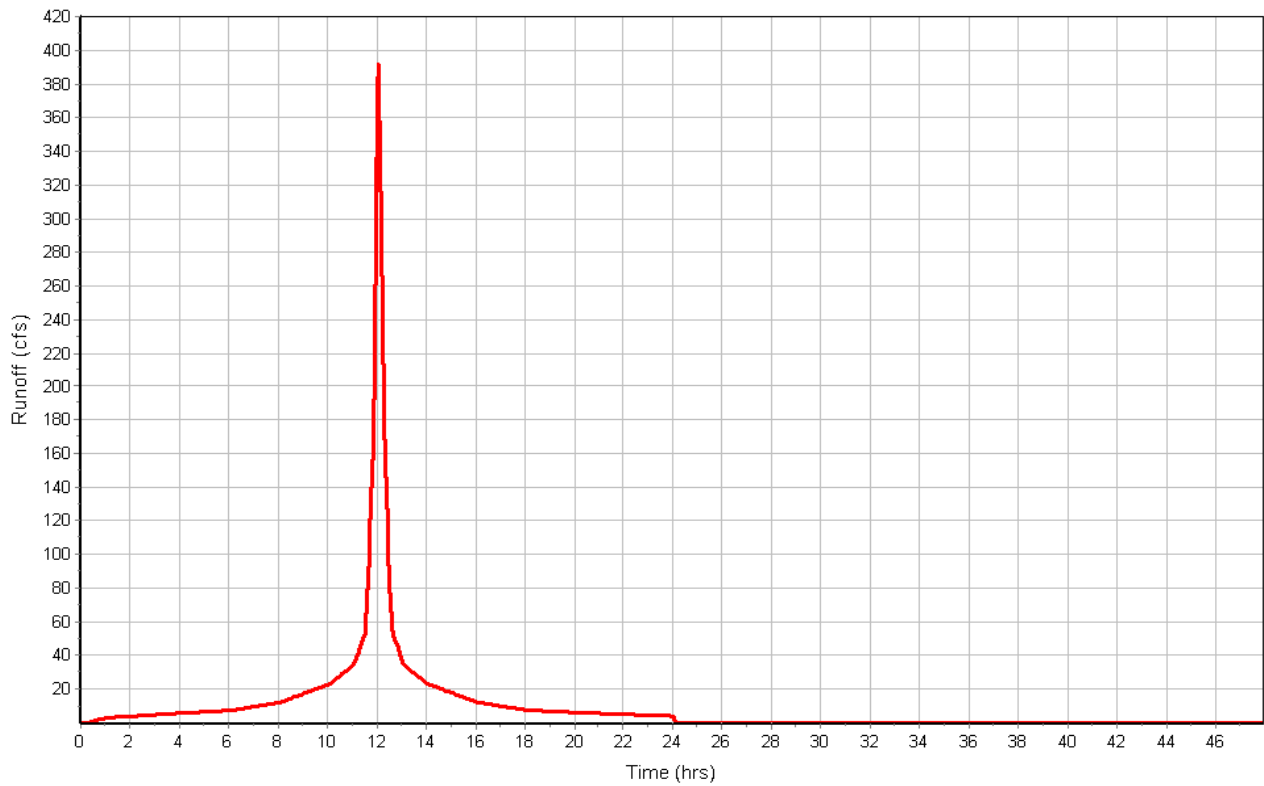
Total Rainfall (in) 26.20
 Total Runoff (in) 25.81
 Peak Runoff (cfs) 393.10
 Weighted Curve Number 96.84
 Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : GypsumCell2

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : ProcessReturnWaterPond

Input Data

Area (ac) 3.52
Weighted Curve Number 98.25
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
ClosureTurf	1.22	-	95.00
Water	2.27	-	100.00
Composite Area & Weighted CN	3.49		98.25

Time of Concentration

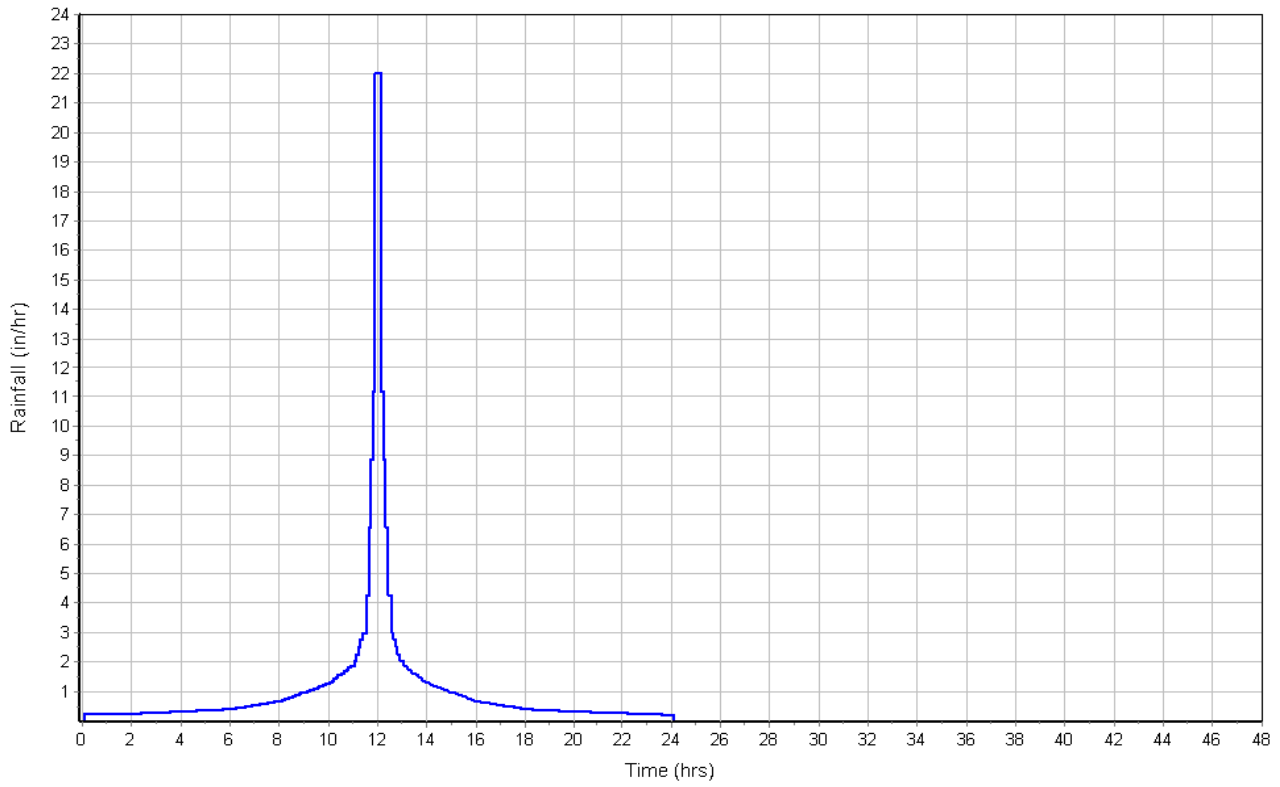
User-Defined TOC override (minutes): 6

Subbasin Runoff Results

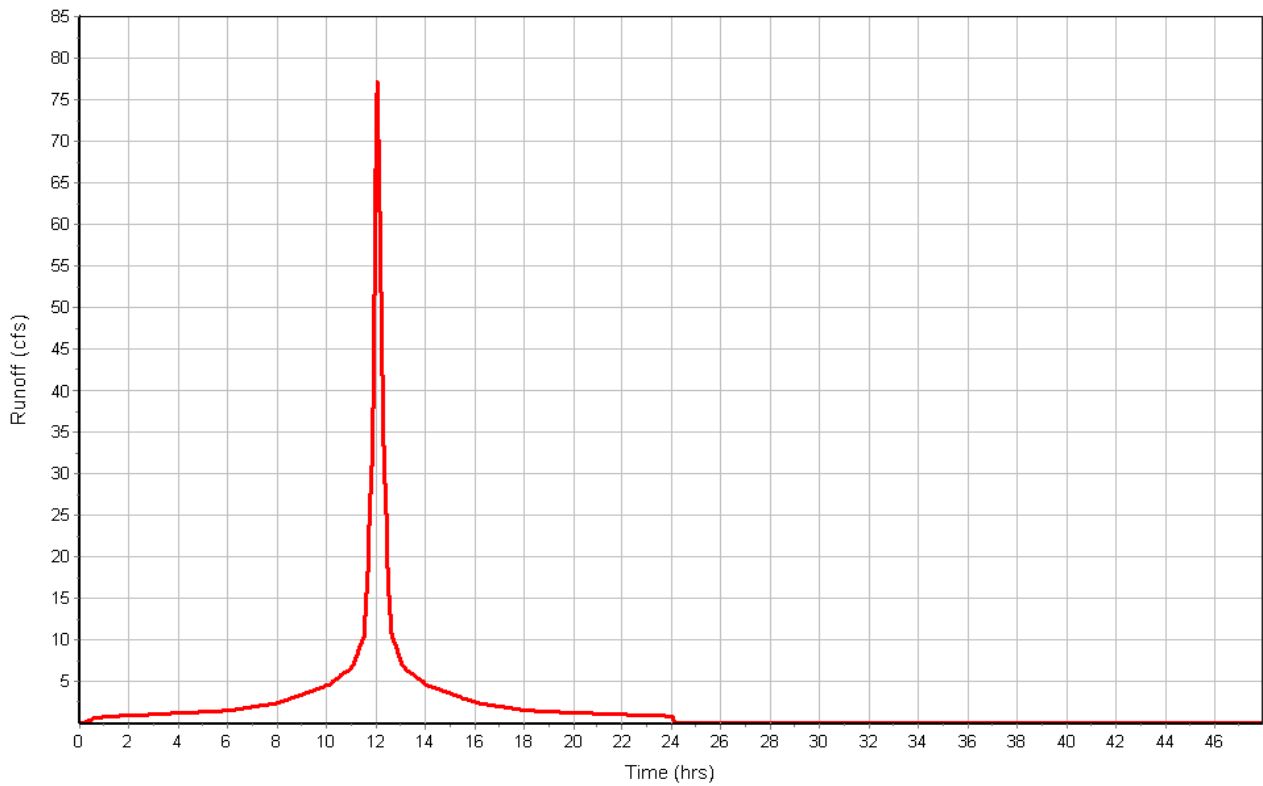
Total Rainfall (in) 26.20
Total Runoff (in) 25.99
Peak Runoff (cfs) 77.47
Weighted Curve Number 98.25
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : ProcessReturnWaterPond

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SCB-001

Input Data

Area (ac) 0.67
Weighted Curve Number 95.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	0.67	-	95.00
Composite Area & Weighted CN	0.67		95.00

Time of Concentration

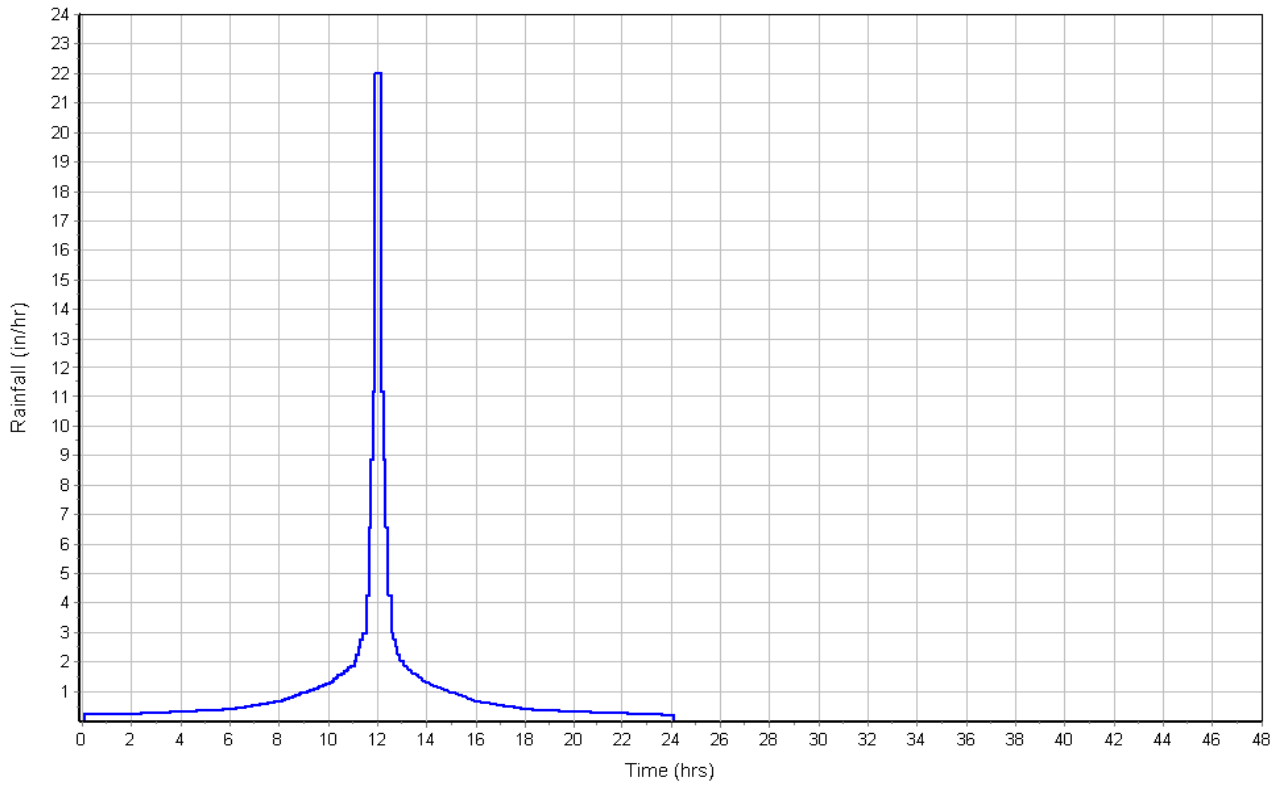
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

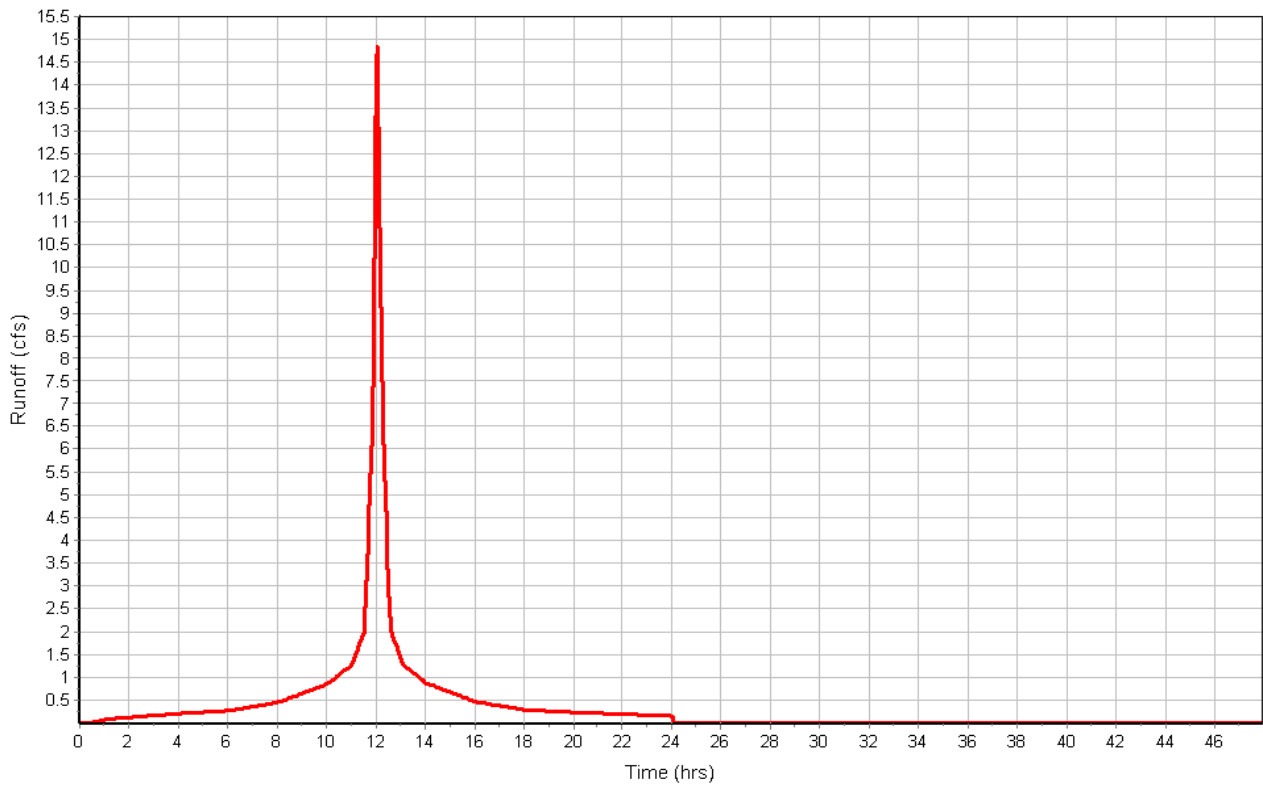
Total Rainfall (in) 26.20
Total Runoff (in) 25.58
Peak Runoff (cfs) 14.85
Weighted Curve Number 95.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : SCB-001

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SCB-002

Input Data

Area (ac) 1.10
Weighted Curve Number 95.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	1.10	-	95.00
Composite Area & Weighted CN	1.10		95.00

Time of Concentration

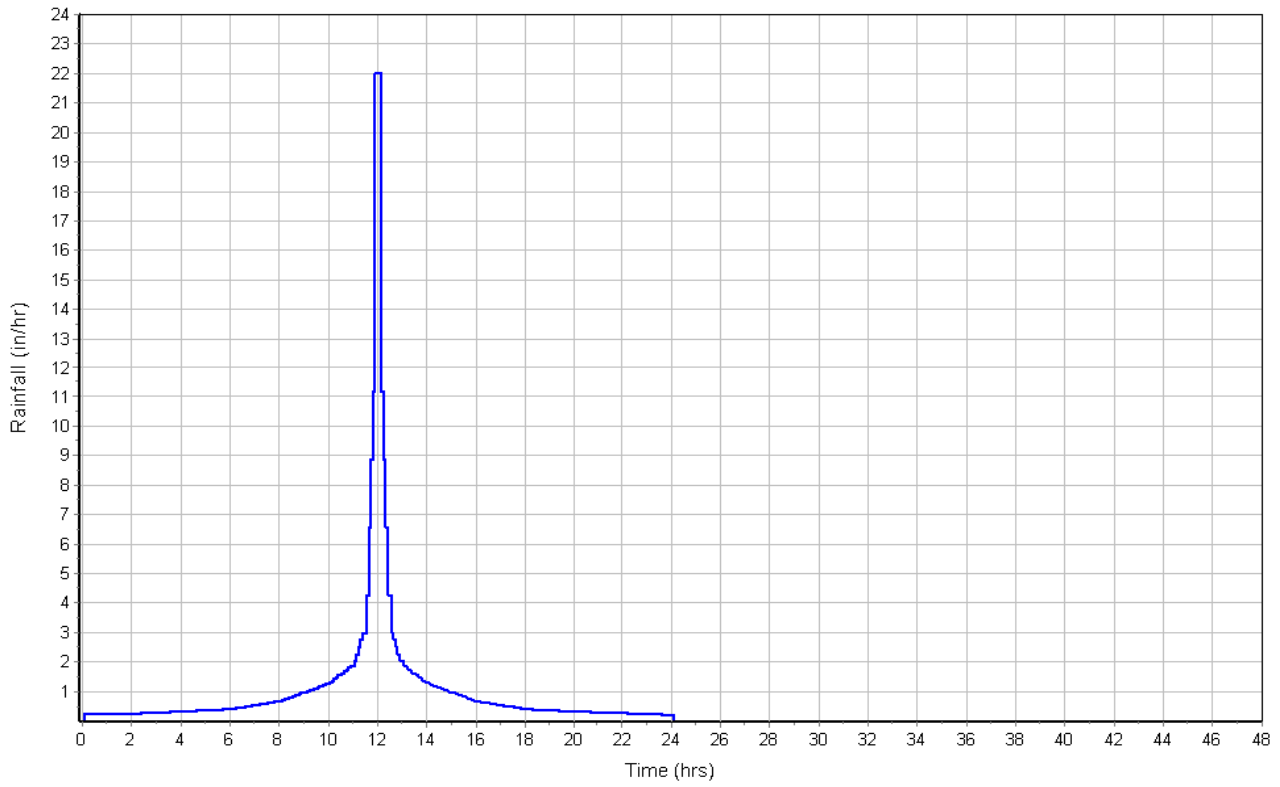
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

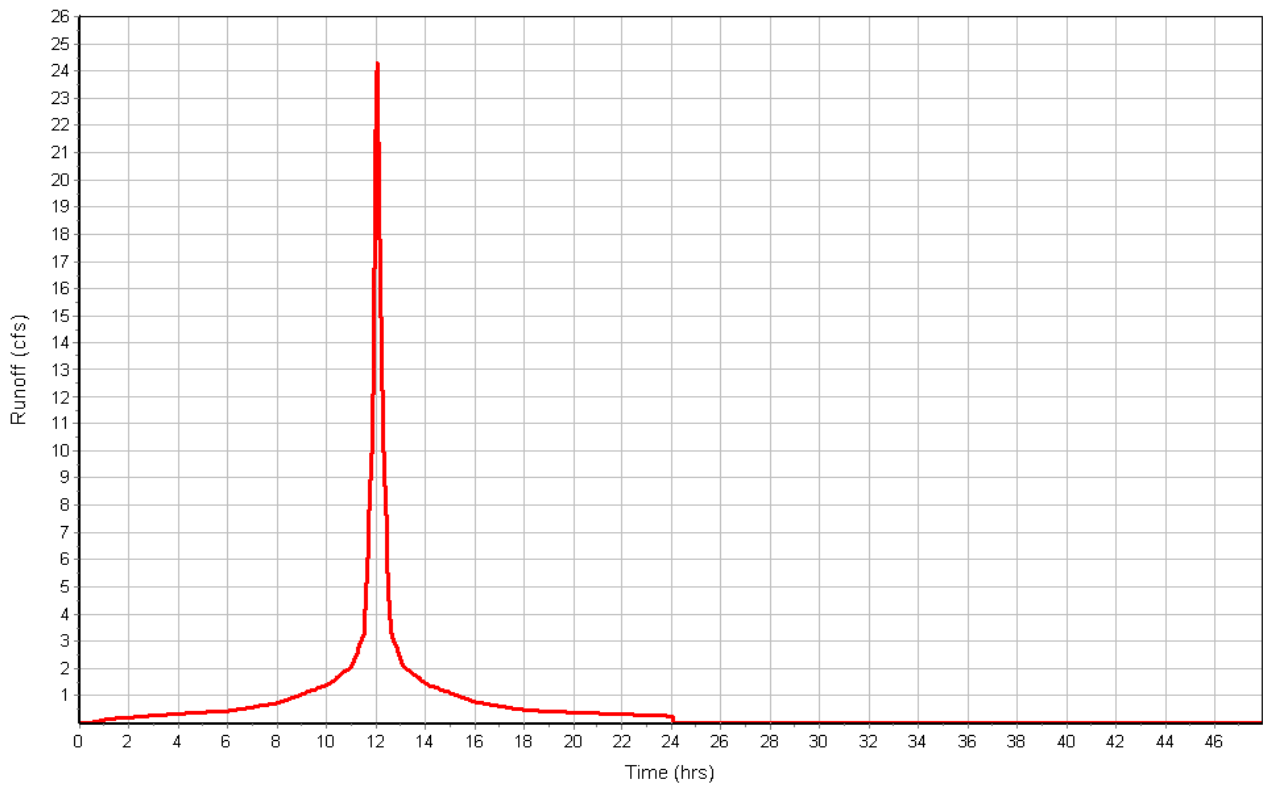
Total Rainfall (in) 26.20
Total Runoff (in) 25.58
Peak Runoff (cfs) 24.33
Weighted Curve Number 95.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : SCB-002

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SCB-003

Input Data

Area (ac) 0.20
Weighted Curve Number 95.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	0.20	-	95.00
Composite Area & Weighted CN	0.20		95.00

Time of Concentration

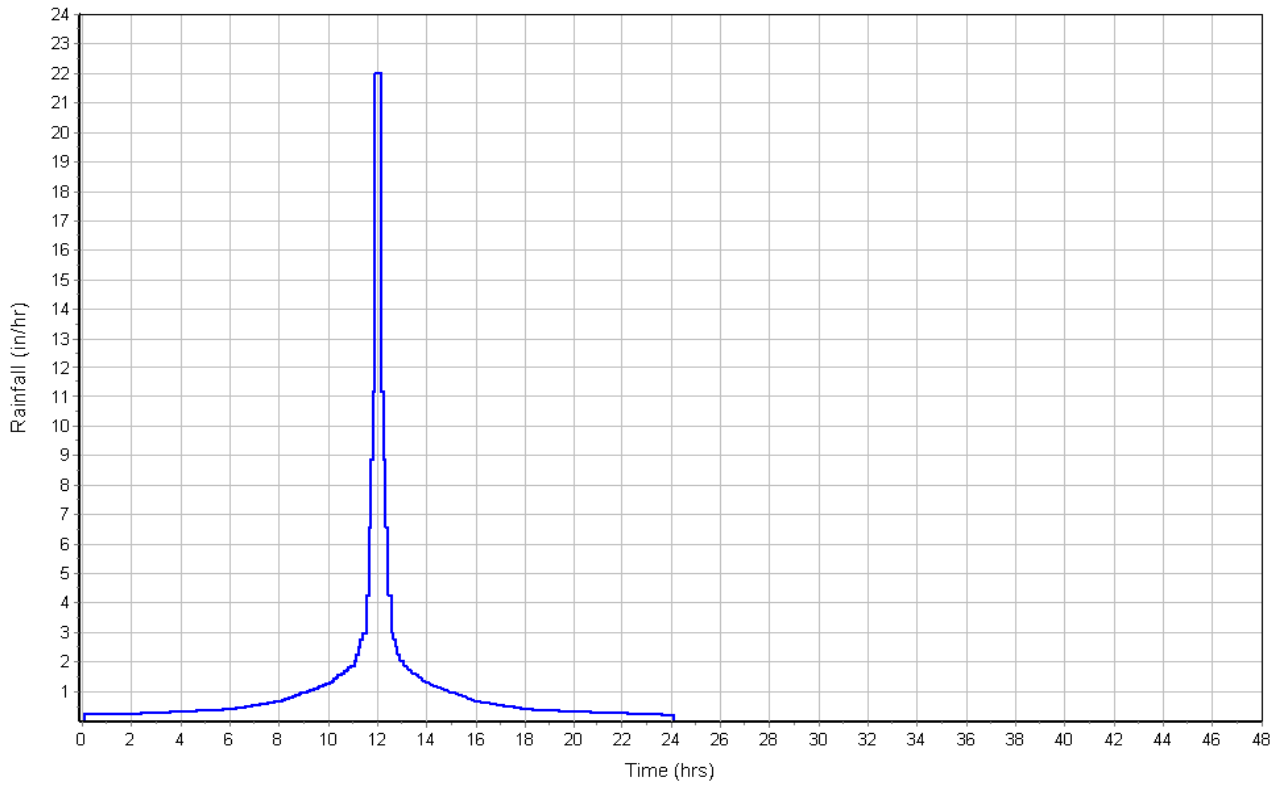
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

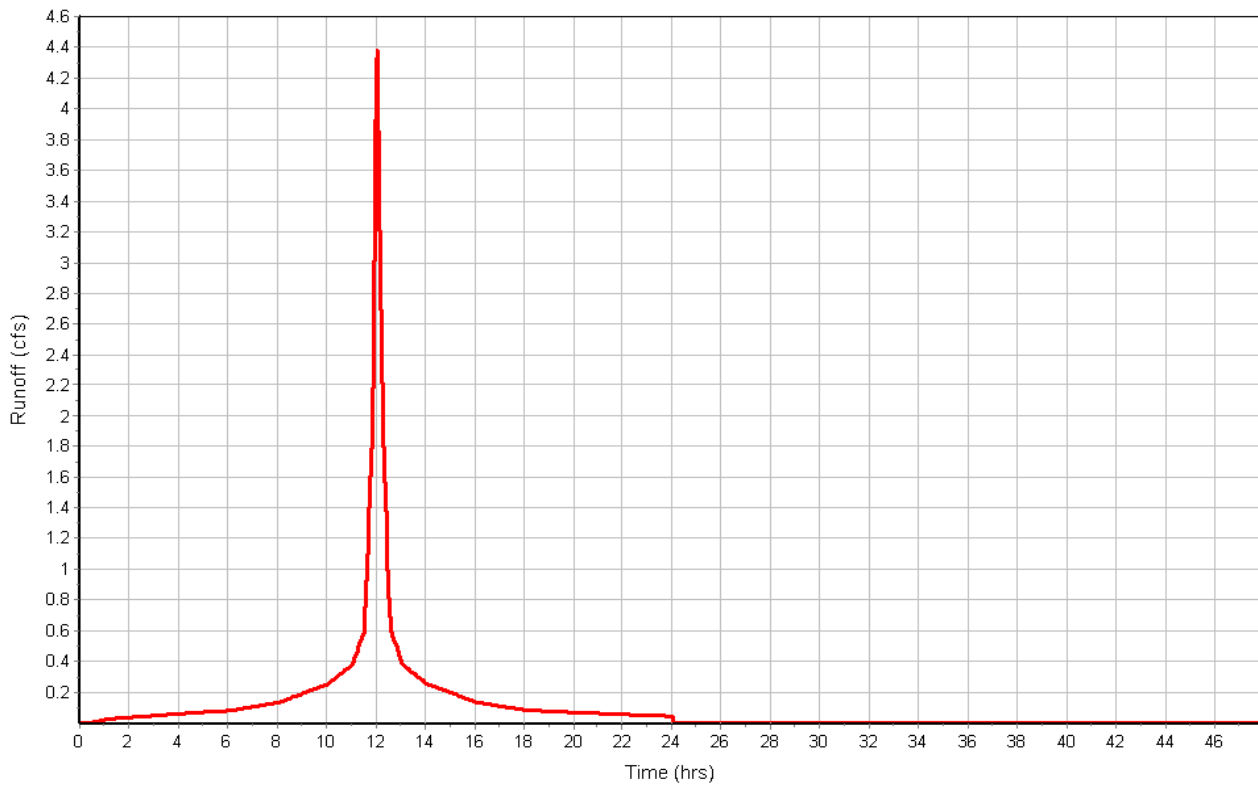
Total Rainfall (in) 26.20
Total Runoff (in) 25.58
Peak Runoff (cfs) 4.38
Weighted Curve Number 95.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : SCB-003

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SCB-004

Input Data

Area (ac) 0.19
Weighted Curve Number 95.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	0.19	-	95.00
Composite Area & Weighted CN	0.19		95.00

Time of Concentration

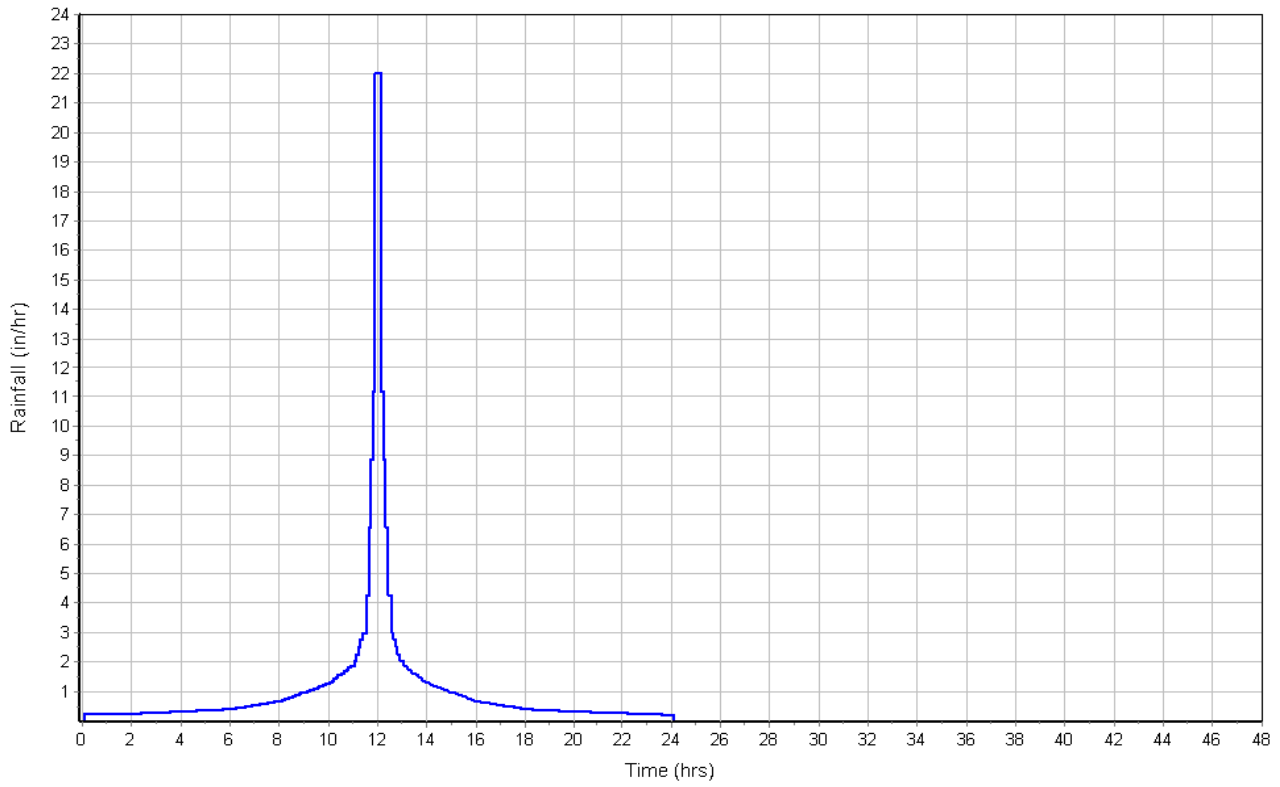
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

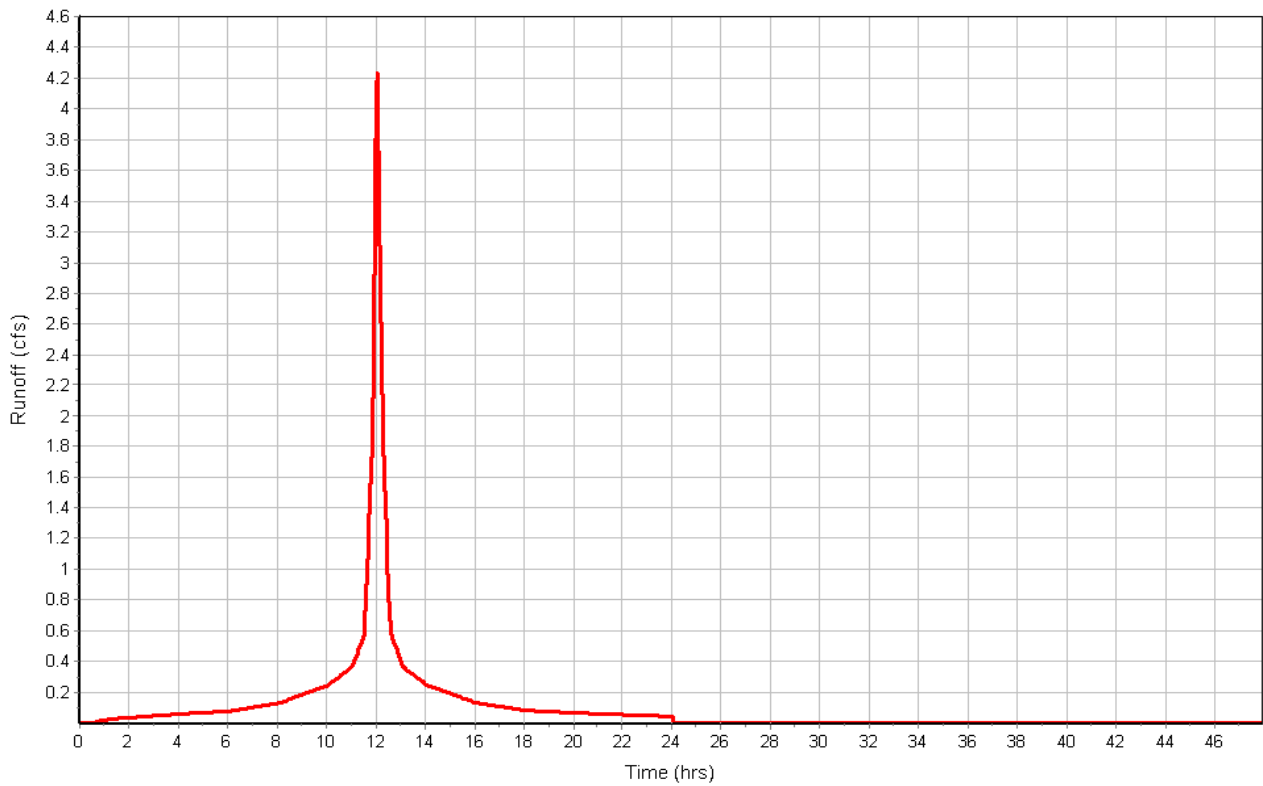
Total Rainfall (in) 26.20
Total Runoff (in) 25.58
Peak Runoff (cfs) 4.24
Weighted Curve Number 95.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : SCB-004

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SCB-005

Input Data

Area (ac) 0.55
Weighted Curve Number 95.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	0.55	-	95.00
Composite Area & Weighted CN	0.55		95.00

Time of Concentration

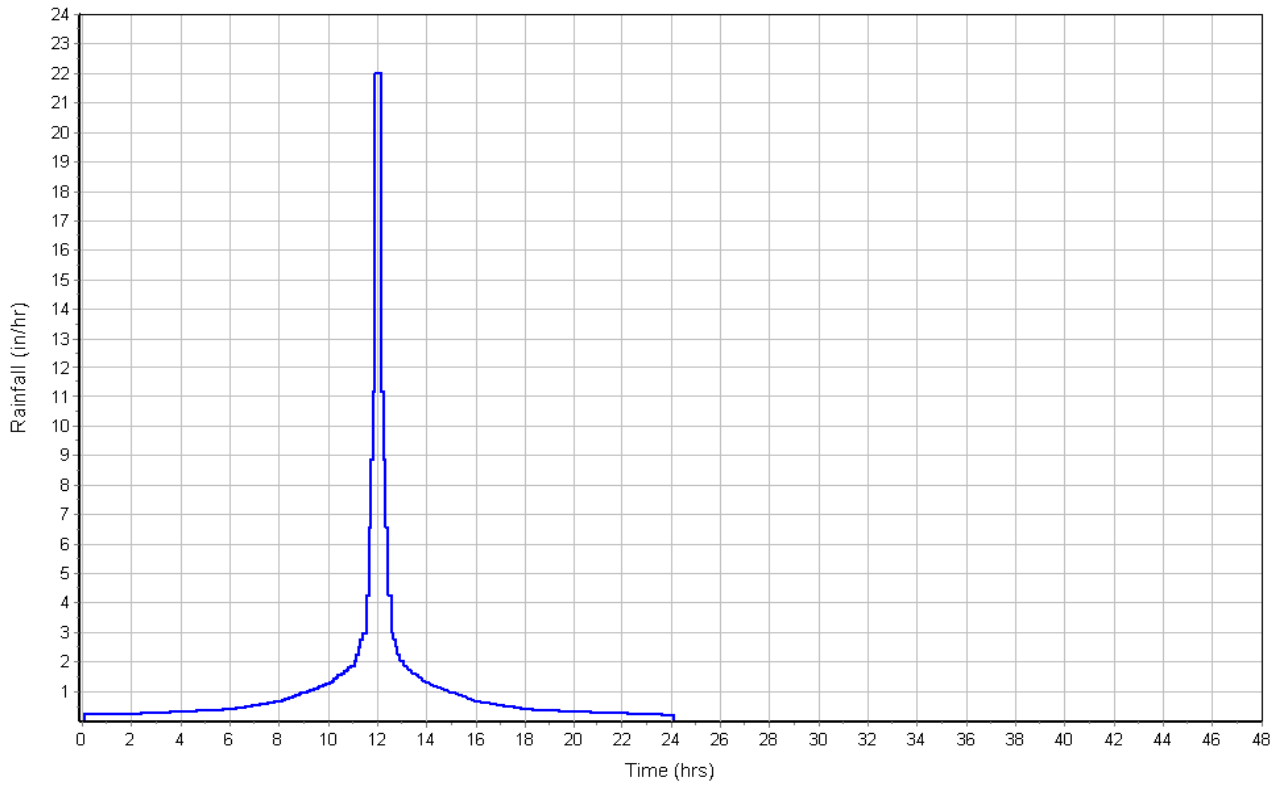
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

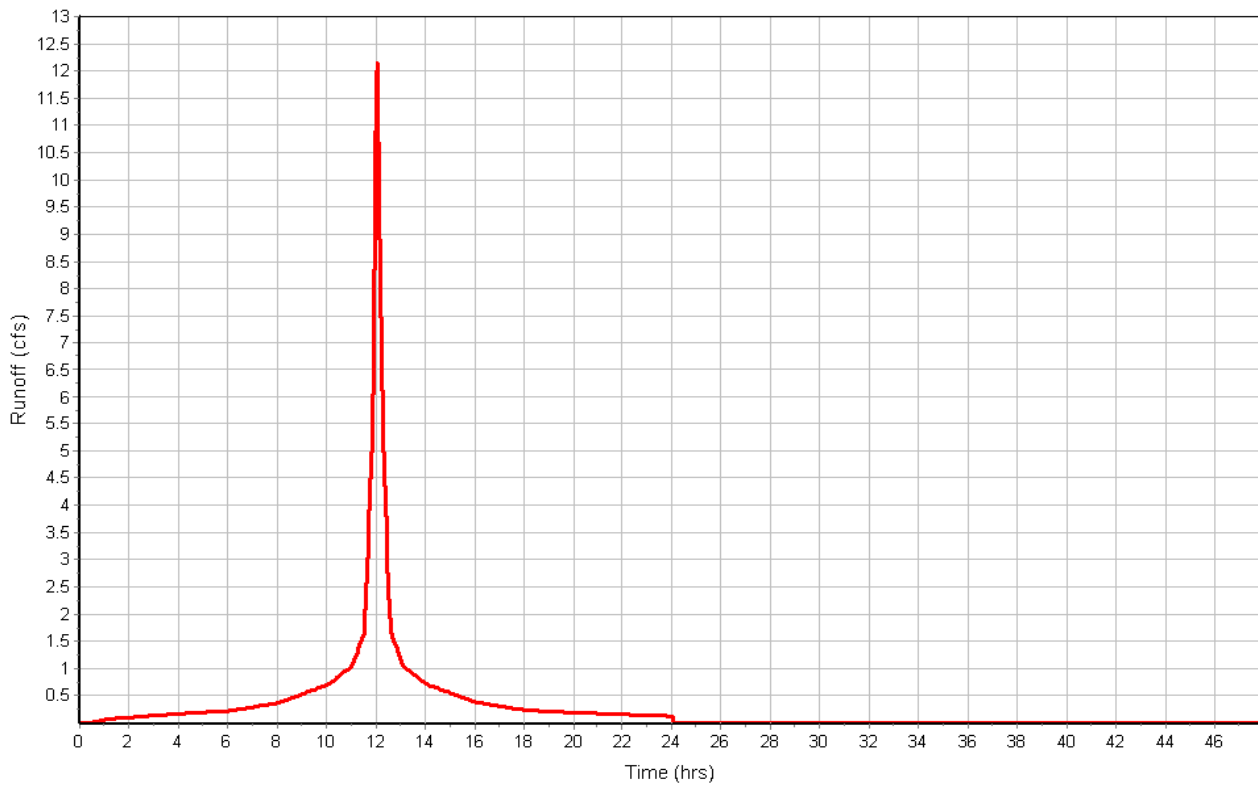
Total Rainfall (in) 26.20
Total Runoff (in) 25.58
Peak Runoff (cfs) 12.16
Weighted Curve Number 95.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : SCB-005

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SCB-010

Input Data

Area (ac) 0.34
Weighted Curve Number 95.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	0.34	-	95.00
Composite Area & Weighted CN	0.34		95.00

Time of Concentration

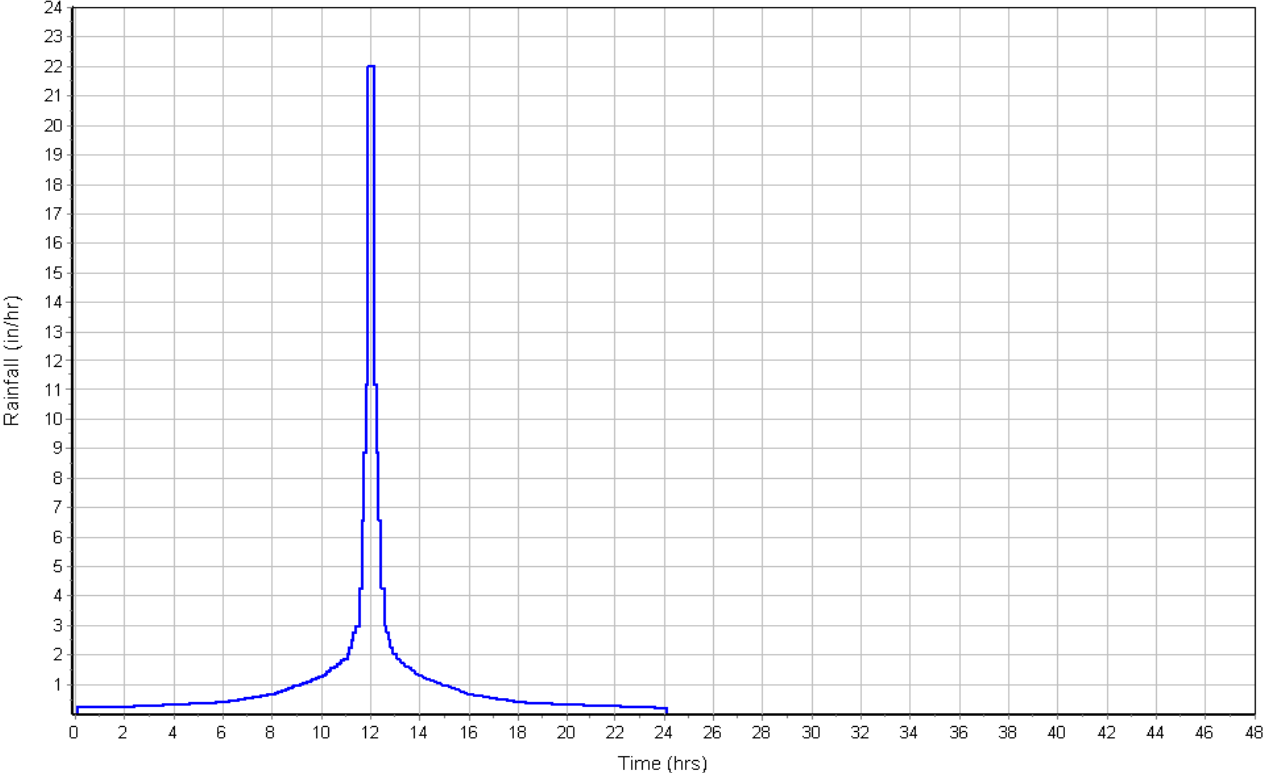
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

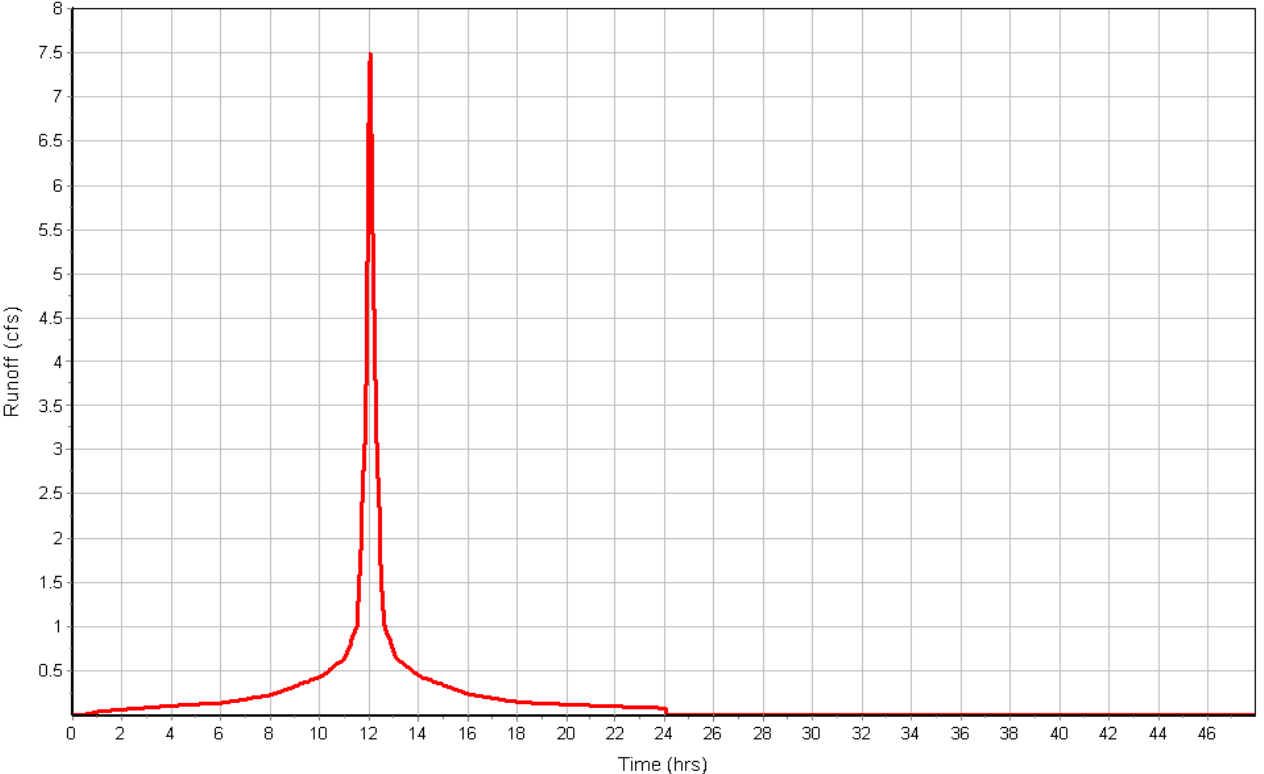
Total Rainfall (in) 26.20
Total Runoff (in) 25.58
Peak Runoff (cfs) 7.50
Weighted Curve Number 95.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : SCB-010

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SCB-011

Input Data

Area (ac) 0.37
Weighted Curve Number 95.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	0.37	-	95.00
Composite Area & Weighted CN	0.37		95.00

Time of Concentration

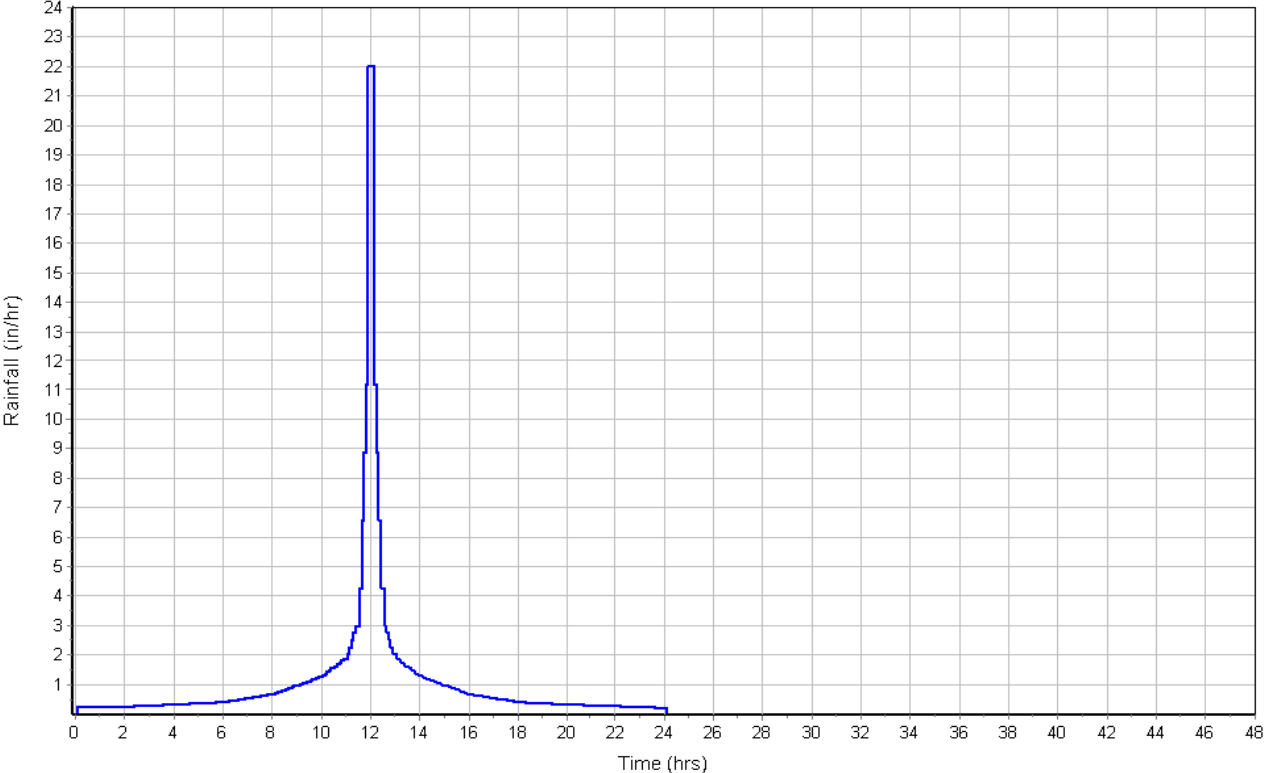
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

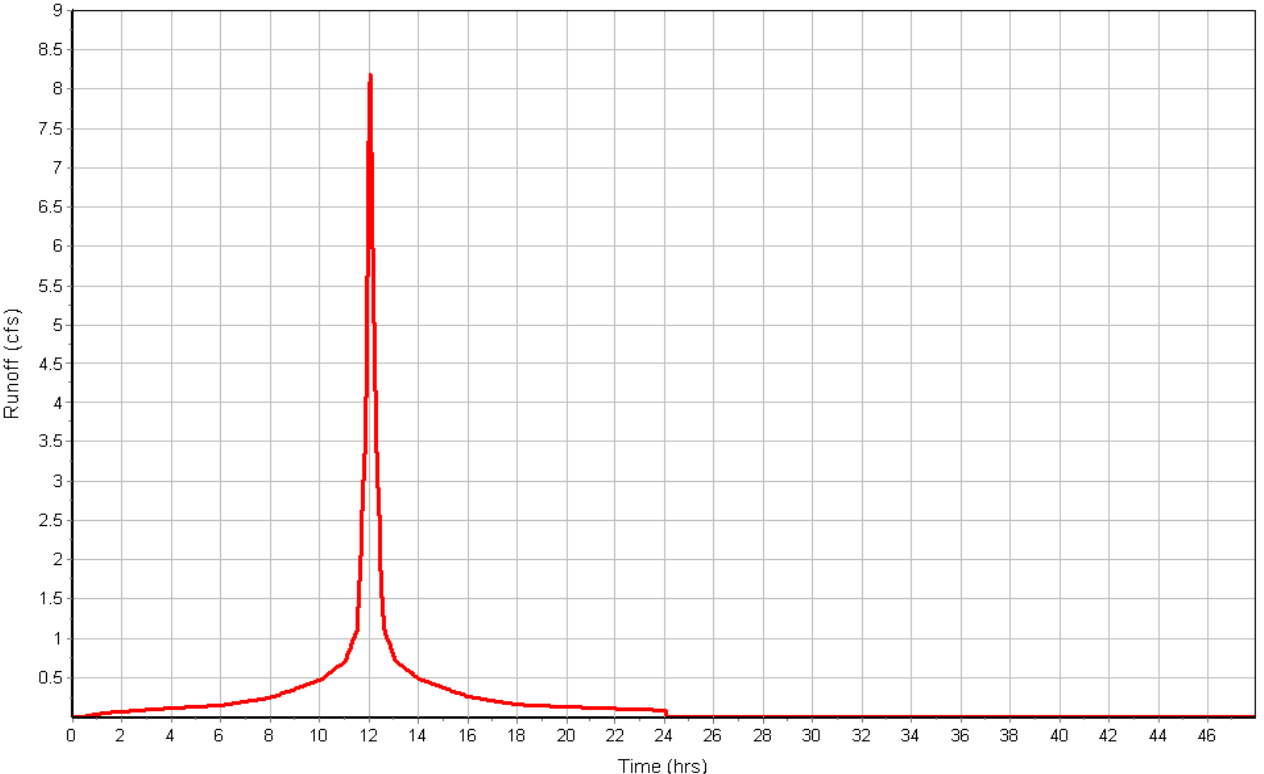
Total Rainfall (in) 26.20
Total Runoff (in) 25.58
Peak Runoff (cfs) 8.20
Weighted Curve Number 95.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : SCB-011

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SCB-012

Input Data

Area (ac) 0.27
Weighted Curve Number 95.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	0.27	-	95.00
Composite Area & Weighted CN	0.27		95.00

Time of Concentration

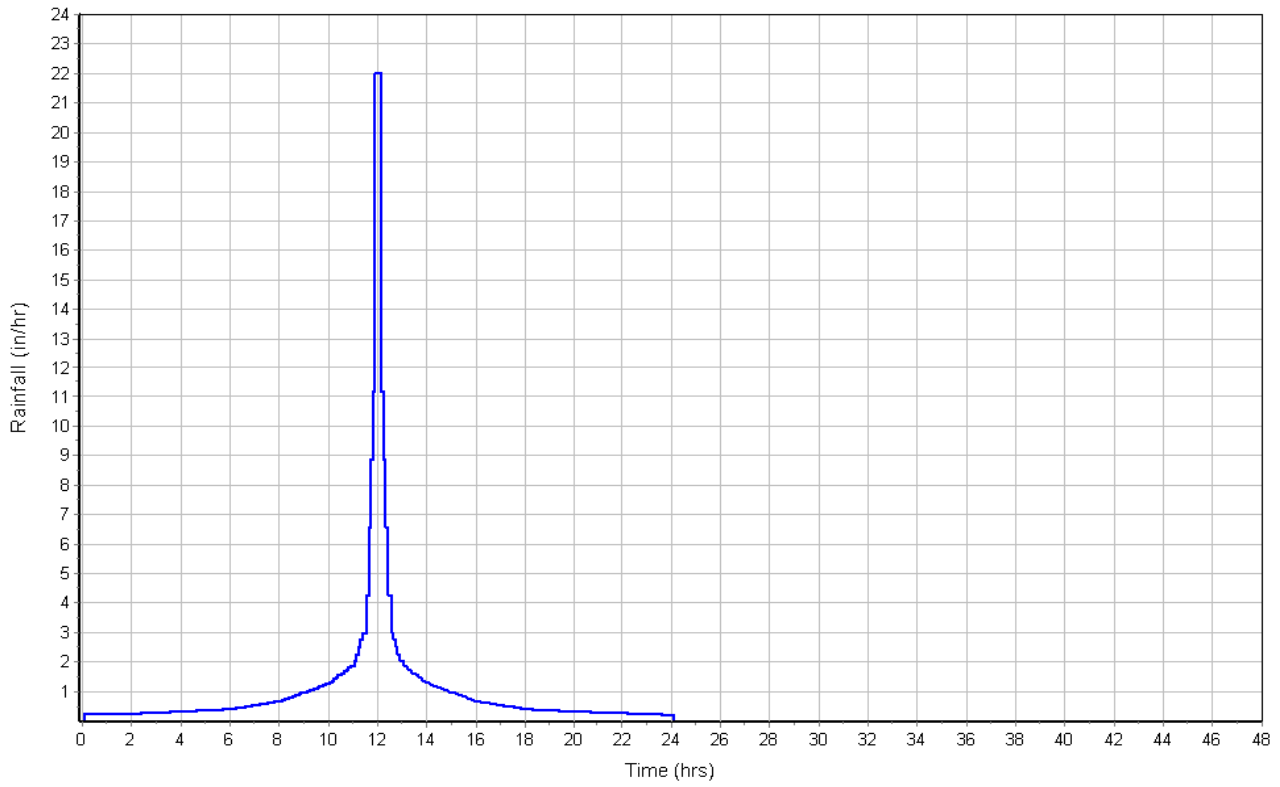
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

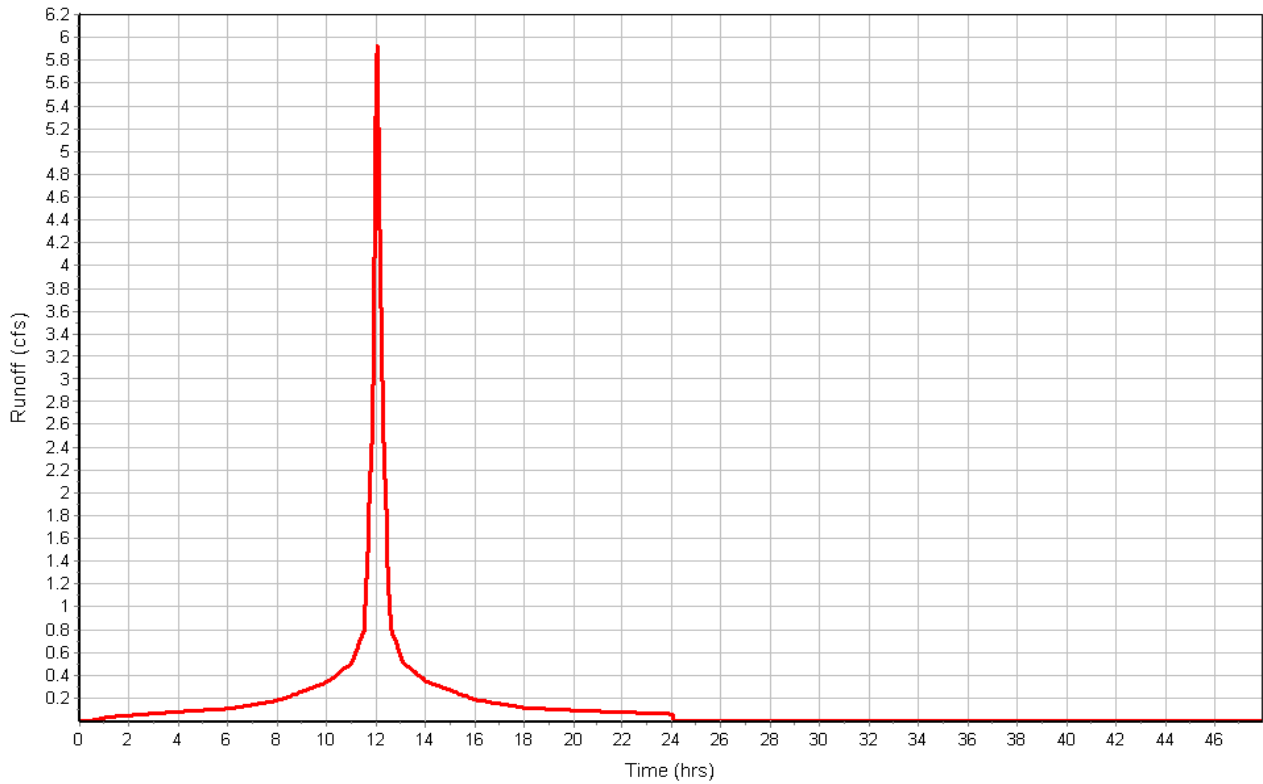
Total Rainfall (in) 26.20
Total Runoff (in) 25.58
Peak Runoff (cfs) 5.94
Weighted Curve Number 95.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : SCB-012

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SCB-013

Input Data

Area (ac) 0.46
Weighted Curve Number 95.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	0.46	-	95.00
Composite Area & Weighted CN	0.46		95.00

Time of Concentration

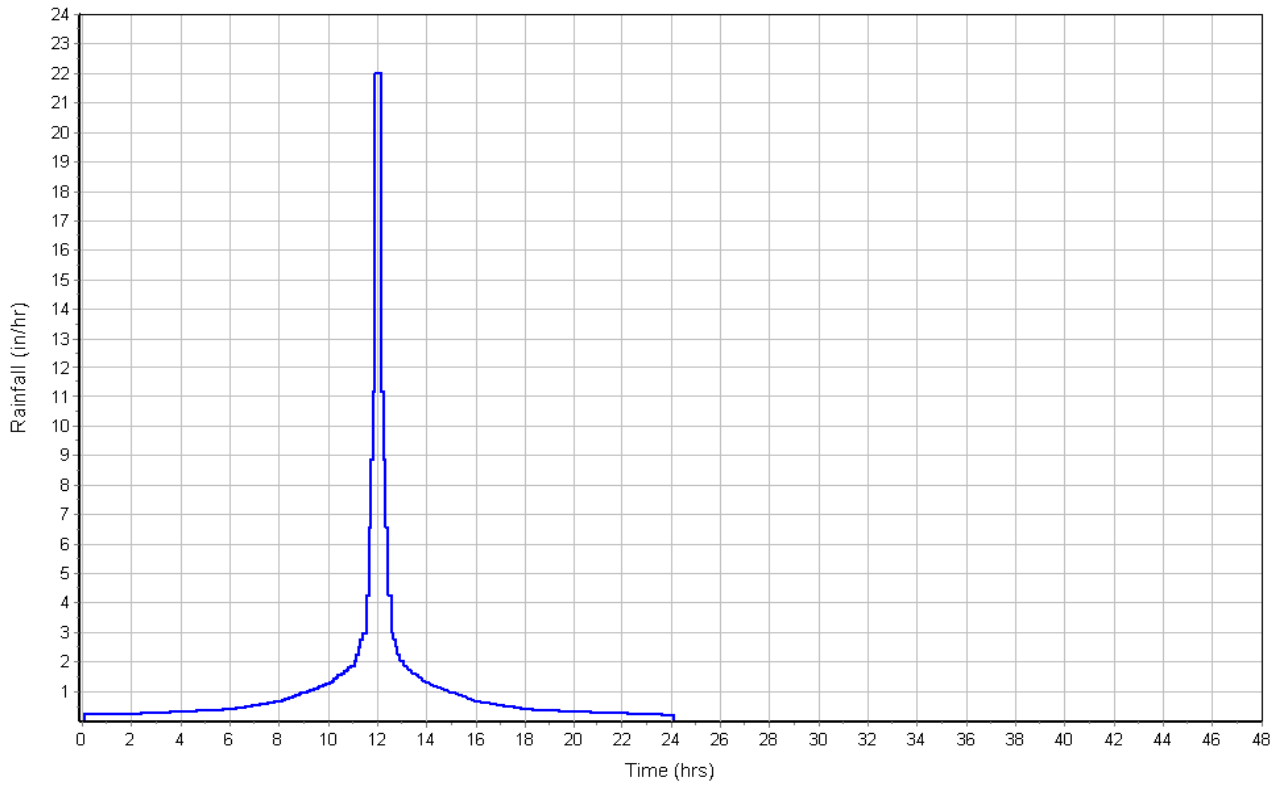
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

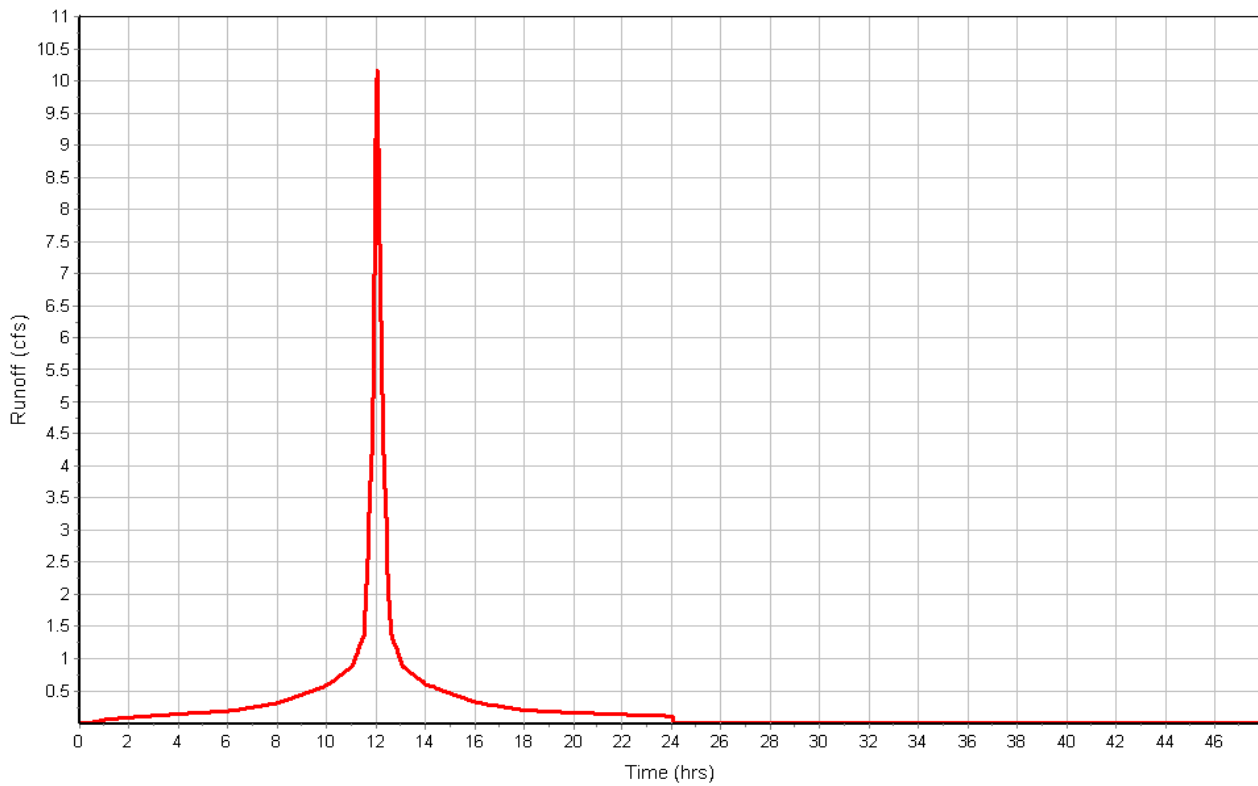
Total Rainfall (in) 26.20
Total Runoff (in) 25.58
Peak Runoff (cfs) 10.18
Weighted Curve Number 95.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : SCB-013

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SCB-015

Input Data

Area (ac) 0.88
Weighted Curve Number 95.00
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
-	0.88	-	95.00
Composite Area & Weighted CN	0.88		95.00

Time of Concentration

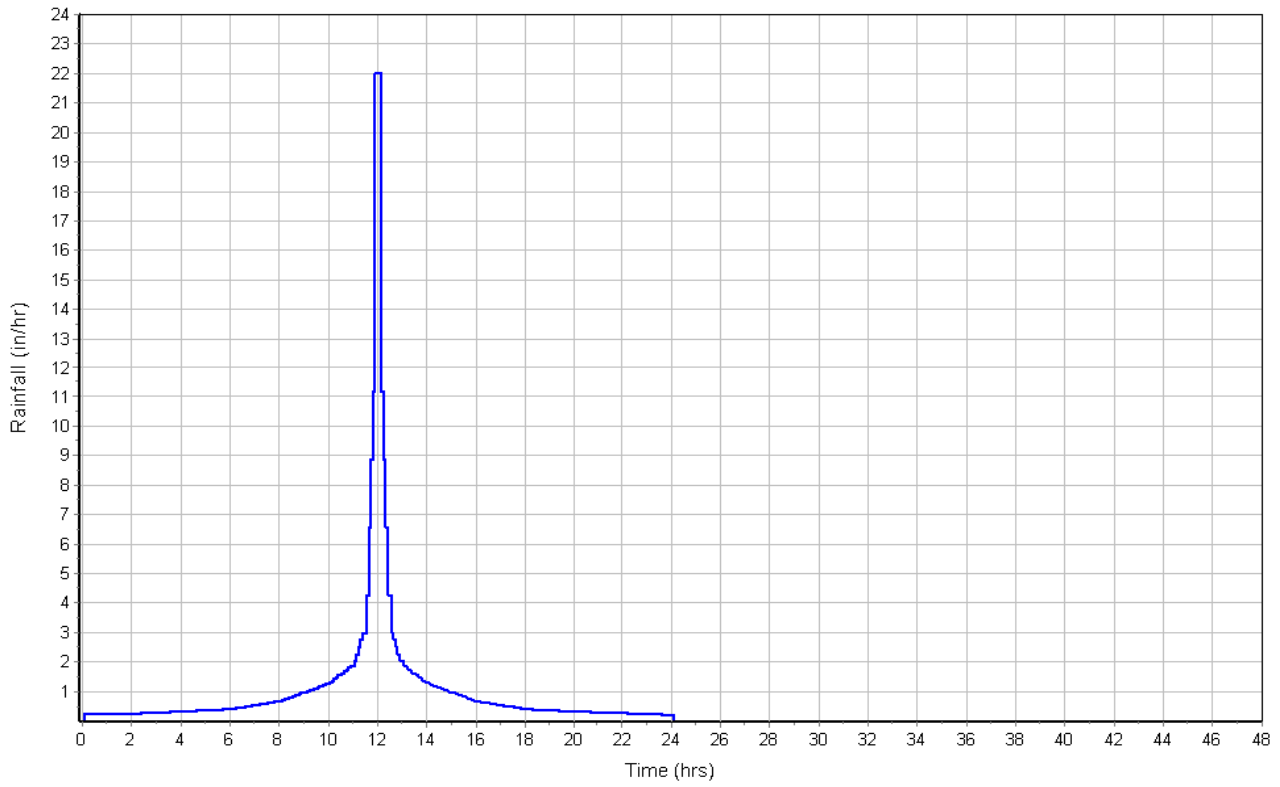
User-Defined TOC override (minutes): 5

Subbasin Runoff Results

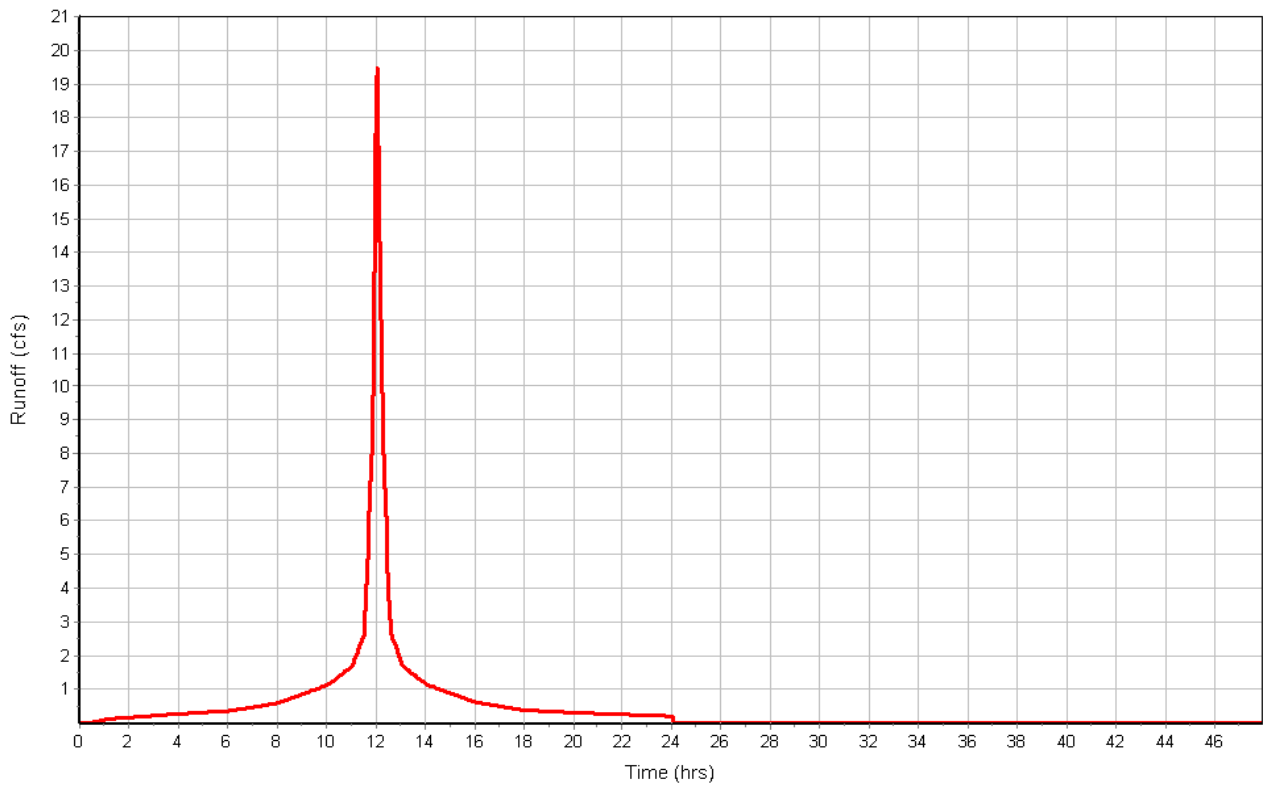
Total Rainfall (in) 26.20
Total Runoff (in) 25.58
Peak Runoff (cfs) 19.52
Weighted Curve Number 95.00
Time of Concentration (days hh:mm:ss) 0 00:05:00

Subbasin : SCB-015

Rainfall Intensity Graph



Runoff Hydrograph



Subbasin : SedimentationBasin

Input Data

Area (ac) 5.55
Weighted Curve Number 97.39
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
ClosureTurf	2.87	-	95.00
Water	2.64	-	100.00
Composite Area & Weighted CN	5.51		97.39

Time of Concentration

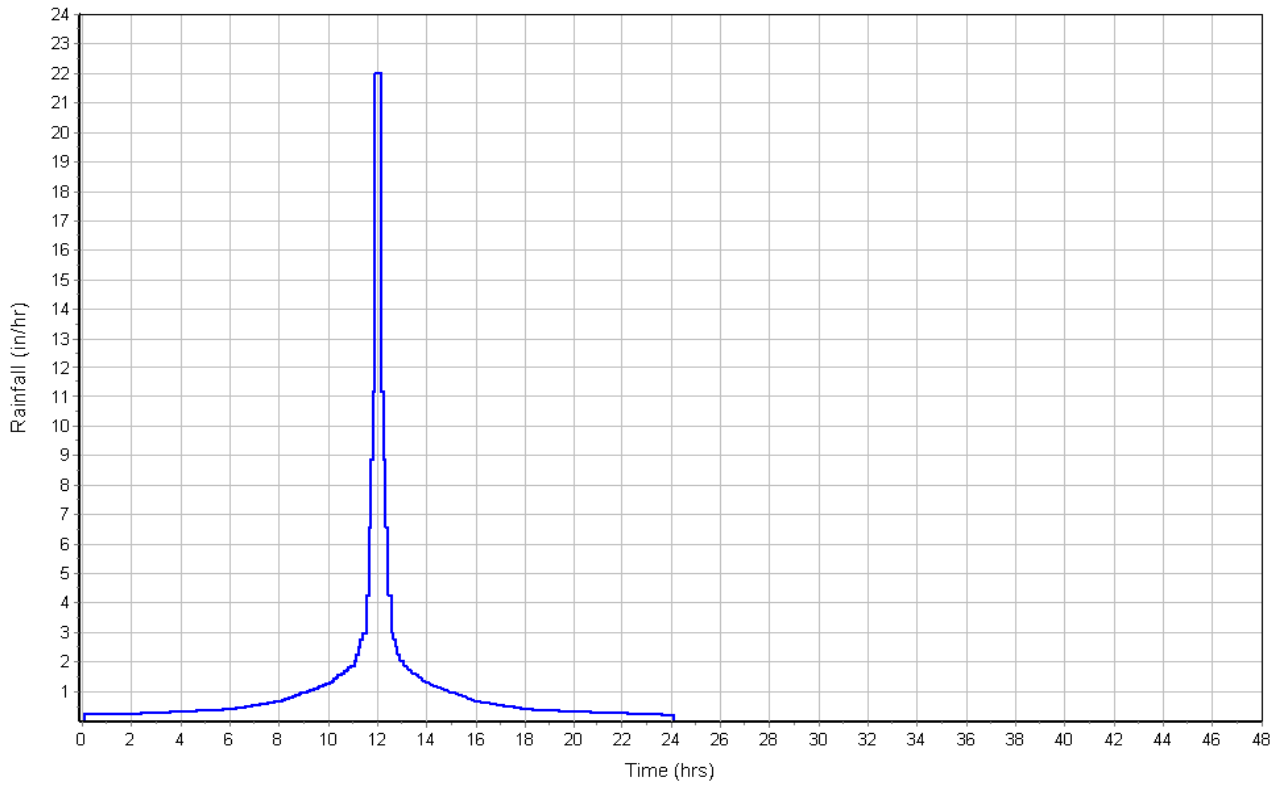
User-Defined TOC override (minutes): 6.00

Subbasin Runoff Results

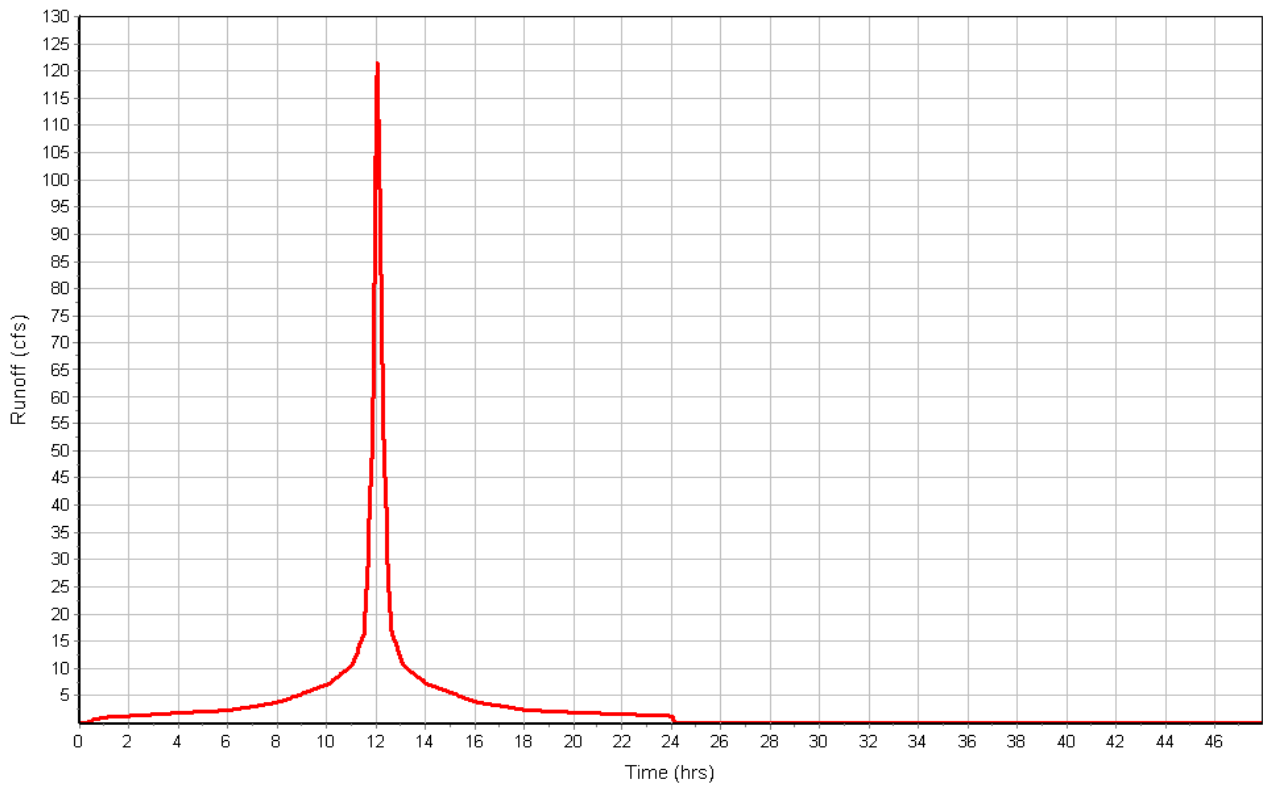
Total Rainfall (in) 26.20
Total Runoff (in) 25.88
Peak Runoff (cfs) 122.09
Weighted Curve Number 97.39
Time of Concentration (days hh:mm:ss) 0 00:06:00

Subbasin : SedimentationBasin

Rainfall Intensity Graph



Runoff Hydrograph



Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft ²)	Minimum Pipe Cover (in)
1	CB-001	121.50	126.20	4.70	121.50	0.00	300.00	173.80	100.00	0.00
2	CB-002	118.80	126.50	7.70	118.80	0.00	300.00	173.50	100.00	0.00
3	CB-003	117.50	127.50	10.00	117.50	0.00	300.00	172.50	100.00	0.00
4	CB-004	117.00	129.10	12.10	117.00	0.00	200.00	70.90	100.00	0.00
5	CB-005	117.80	127.50	9.70	117.80	0.00	300.00	172.50	100.00	0.00
6	CB-010	127.30	129.80	2.50	127.30	0.00	300.00	170.20	100.00	0.00
7	CB-011	127.70	129.90	2.20	127.70	0.00	300.00	170.10	100.00	0.00
8	CB-012	126.40	129.50	3.10	126.40	0.00	300.00	170.50	100.00	0.00
9	CB-013	122.70	128.80	6.10	122.70	0.00	300.00	171.20	100.00	0.00
10	CB-015	124.95	128.00	3.05	124.95	0.00	300.00	172.00	1000.00	0.00
11	Jun-01	86.50	104.00	17.50	0.00	-86.50	200.00	96.00	0.00	0.00
12	Jun-02	86.40	103.00	16.60	0.00	-86.40	250.00	147.00	0.00	0.00
13	Jun-03	85.72	107.00	21.28	85.72	0.00	150.00	43.00	100.00	0.00
14	Jun-05	112.00	120.00	8.00	0.00	-112.00	300.00	180.00	0.00	0.00
15	Jun-06	93.95	111.00	17.05	0.00	-93.95	210.00	99.00	0.00	0.00
16	Jun-07	92.90	112.00	19.10	0.00	-92.90	300.00	188.00	0.00	0.00
17	MH-023	118.10	129.70	11.60	118.10	0.00	300.00	170.30	0.00	0.00
18	Riser	94.50	111.00	16.50	0.00	-94.50	120.00	9.00	0.00	0.00
19	SedRiser	88.00	96.67	8.67	108.00	20.00	200.00	103.33	0.00	0.00

Junction Results

SN Element ID	Peak Inflow	Peak Lateral Inflow	Max HGL Elevation	Max HGL Depth Attained	Max Surcharge Depth Attained	Min Freeboard Attained	Average HGL Elevation	Average HGL Depth Attained	Time of Max HGL Occurrence	Time of Peak Flooding Occurrence	Total Flooded Volume	Total Time Flooded
	(cfs)	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(days hh:mm)	(days hh:mm)	(ac-in)	(min)
1 CB-001	47.50	15.30	280.04	158.54	153.84	0.00	122.60	1.10	0 12:09	0 00:00	0.00	0.00
2 CB-002	71.72	24.28	270.19	151.39	143.69	0.00	120.10	1.30	0 12:09	0 00:00	0.00	0.00
3 CB-003	95.56	4.38	222.11	104.61	94.61	0.00	118.59	1.09	0 12:10	0 00:00	0.00	0.00
4 CB-004	111.93	4.23	192.39	75.39	63.29	0.00	117.58	0.58	0 12:09	0 00:00	0.00	0.00
5 CB-005	12.14	12.14	200.71	82.91	73.21	0.00	118.26	0.46	0 12:09	0 00:00	0.00	0.00
6 CB-010	7.48	7.48	300.00	172.70	170.20	0.00	128.19	0.89	0 12:09	0 12:10	0.00	0.00
7 CB-011	8.19	8.19	296.71	169.01	166.81	0.00	128.55	0.85	0 12:09	0 00:00	0.00	0.00
8 CB-012	21.48	5.93	295.91	169.51	166.41	0.00	127.34	0.94	0 12:09	0 00:00	0.00	0.00
9 CB-013	32.27	10.83	288.36	165.66	159.56	0.00	123.83	1.13	0 12:09	0 00:00	0.00	0.00
10 CB-015	19.48	19.48	285.15	160.20	157.15	0.00	125.85	0.90	0 12:09	0 00:00	0.00	0.00
11 Jun-01	34.64	0.00	138.46	51.96	34.46	0.00	101.41	14.91	0 00:00	0 00:00	0.00	0.00
12 Jun-02	18.92	0.00	105.94	19.54	2.94	0.00	101.41	15.01	1 23:59	0 00:00	0.00	0.00
13 Jun-03	153.05	0.00	123.65	37.93	16.65	0.00	104.31	18.59	0 00:00	0 00:00	0.00	0.00
14 Jun-05	0.00	0.00	112.00	0.00	0.00	18.00	112.00	0.00	0 00:00	0 00:00	0.00	0.00
15 Jun-06	0.53	0.00	105.94	11.99	0.00	5.06	102.00	8.05	2 00:00	0 00:00	0.00	0.00
16 Jun-07	59.53	0.00	105.94	13.04	0.00	6.06	101.89	8.99	2 00:00	0 00:00	0.00	0.00
17 MH-023	91.19	0.00	249.35	131.25	119.65	0.00	119.35	1.25	0 12:09	0 00:00	0.00	0.00
18 Riser	59.60	0.00	107.12	12.62	0.00	6.38	103.01	8.51	0 13:05	0 00:00	0.00	0.00
19 SedRiser	2.13	0.00	105.94	17.94	9.27	0.00	101.41	13.41	2 00:00	0 00:00	0.00	0.00

Pipe Input

SN Element ID	Length	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses
1 3	55.58	117.80	0.00	117.20	0.20	0.60	1.0800	CIRCULAR	12.000	12.000	0.0110	0.5000	0.5000	0.0000
2 4	79.04	117.50	0.00	117.20	0.20	0.30	0.3800	CIRCULAR	23.040	23.040	0.0110	0.5000	0.5000	0.0000
3 6	124.39	118.80	0.00	118.30	0.20	0.50	0.4000	CIRCULAR	23.040	23.040	0.0110	0.5000	0.5000	0.0000
4 7	143.40	121.50	0.00	119.00	0.20	2.50	1.7400	CIRCULAR	23.040	23.040	0.0110	0.5000	0.5000	0.0000
5 11	49.55	127.30	0.00	126.60	0.20	0.70	1.4100	CIRCULAR	11.040	11.040	0.0110	0.5000	0.5000	0.0000
6 13	65.37	124.95	0.00	124.35	6.25	0.60	0.9200	CIRCULAR	11.040	11.040	0.0110	0.5000	0.5000	0.0000
7 15	68.66	127.70	0.00	126.60	0.20	1.10	1.6000	CIRCULAR	17.040	17.040	0.0110	0.5000	0.5000	0.0000
8 18	118.14	126.40	0.00	125.90	3.20	0.50	0.4200	CIRCULAR	17.040	17.040	0.0110	0.5000	0.5000	0.0000
9 24	80.52	118.10	0.00	117.80	0.30	0.30	0.3700	CIRCULAR	23.040	23.040	0.0110	0.5000	0.5000	0.0000
10 BoxCulvert	36.00	115.88	12.88	115.77	29.77	0.11	0.3100	Rectangular	60.000	84.000	0.0150	0.5000	0.5000	0.0000
11 Dewatering_to_Return	282.00	117.00	0.00	97.14	11.42	19.86	7.0400	CIRCULAR	23.040	23.040	0.0110	0.5000	0.5000	0.0000
12 Gypsum(J5)_to_J6	144.90	112.00	0.00	93.95	0.00	18.05	12.4600	CIRCULAR	24.120	24.120	0.0120	0.5000	0.5000	0.0000
13 GypsumRiser_to_J7	320.00	94.50	0.00	92.90	0.00	1.60	0.5000	CIRCULAR	30.000	30.000	0.0120	0.5000	0.5000	0.0000
14 J1_to_J2	290.00	87.30	0.80	86.40	0.00	0.90	0.3100	CIRCULAR	28.200	28.200	0.0120	0.5000	0.5000	0.0000
15 J2_to_J3(ProcessReturnWater)	224.00	86.40	0.00	85.72	0.00	0.68	0.3000	CIRCULAR	30.000	30.000	0.0120	0.5000	0.5000	0.0000
16 J3_to_ProcessReturn	140.00	85.72	0.00	85.30	0.30	0.42	0.3000	CIRCULAR	41.400	41.400	0.0120	0.5000	0.5000	0.0000
17 J6_to_J7	210.00	93.95	0.00	92.90	0.00	1.05	0.5000	CIRCULAR	30.000	30.000	0.0120	0.5000	0.5000	0.0000
18 J7_to_Sed	760.20	92.90	0.00	90.60	4.60	2.30	0.3000	CIRCULAR	47.640	47.640	0.0120	0.5000	0.5000	0.0000
19 Link-19-1	94.25	122.70	0.00	121.70	0.20	1.00	1.0600	CIRCULAR	19.200	19.200	0.0110	0.5000	0.5000	0.0000
20 SedRiser_to_J1	233.00	88.00	0.00	87.30	0.80	0.70	0.3000	CIRCULAR	28.200	28.200	0.0120	0.5000	0.5000	0.0000

Initial Flap No. of
Flow Gate Barrels

(cfs)		
0.00	No	1
0.00	No	1
0.00	No	1
0.00	No	1
0.00	No	1
0.00	No	1
0.00	No	1
0.00	No	1
0.00	No	1
0.00	No	1
0.00	No	1
0.00	No	1
0.00	No	1
0.00	No	1
0.00	No	1
0.00	No	1
0.00	No	1
0.00	Yes	1
0.00	No	1
0.00	No	1
0.00	No	1
0.00	No	1
0.00	No	1

Pipe Results

SN Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
	(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1 3	12.14	0 12:09	4.37	2.77	15.46	0.06	1.00	1.00	41.00		SURCHARGED
2 4	95.56	0 12:10	14.70	6.50	33.12	0.04	1.92	1.00	40.00		SURCHARGED
3 6	71.71	0 12:09	15.13	4.74	24.86	0.08	1.92	1.00	65.00		SURCHARGED
4 7	47.51	0 12:10	31.51	1.51	16.47	0.15	1.92	1.00	52.00		SURCHARGED
5 11	7.44	0 12:09	3.97	1.88	11.28	0.07	0.92	1.00	44.00		SURCHARGED
6 13	19.48	0 12:09	3.20	6.09	29.51	0.04	0.92	1.00	48.00		SURCHARGED
7 15	8.19	0 12:10	13.49	0.61	5.19	0.22	1.42	1.00	42.00		SURCHARGED
8 18	21.52	0 12:10	6.93	3.10	13.65	0.14	1.42	1.00	44.00		SURCHARGED
9 24	91.19	0 12:10	14.57	6.26	31.61	0.04	1.92	1.00	61.00		SURCHARGED
10 BoxCulvert	0.00	0 00:00	246.48	0.00	0.00		0.00	0.00	0.00		Calculated
11 Dewatering_to_Return	111.93	0 12:10	63.34	1.77	38.79	0.12	1.92	1.00	28.00		SURCHARGED
12 Gypsum(J5)_to_J6	0.00	0 00:00	87.27	0.00	0.00		1.00	0.50	0.00		Calculated
13 GypsumRiser_to_J7	59.52	0 12:43	31.42	1.89	12.13	0.44	2.50	1.00	2164.00		SURCHARGED
14 J1_to_J2	18.92	0 00:00	20.89	0.91	7.57	0.64	2.35	1.00	2748.00		SURCHARGED
15 J2_to_J3(ProcessReturnWater)	0.23	0 00:01	24.48	0.01	0.05	74.67	2.50	1.00	2773.00		SURCHARGED
16 J3_to_ProcessReturn	153.05	0 00:00	57.45	2.66	16.37	0.14	3.45	1.00	2880.00		SURCHARGED
17 J6_to_J7	0.53	0 12:05	31.42	0.02	0.11	31.82	2.50	1.00	2151.00		SURCHARGED
18 J7_to_Sed	59.52	0 12:43	83.71	0.71	4.82	2.63	3.97	1.00	2148.00		SURCHARGED
19 Link-19-1	32.30	0 12:10	15.31	2.11	15.97	0.10	1.60	1.00	51.00		SURCHARGED
20 SedRiser_to_J1	34.64	0 00:00	20.55	1.69	8.28	0.47	2.35	1.00	2743.00		SURCHARGED

Storage Nodes

Storage Node : Gypsum

Input Data

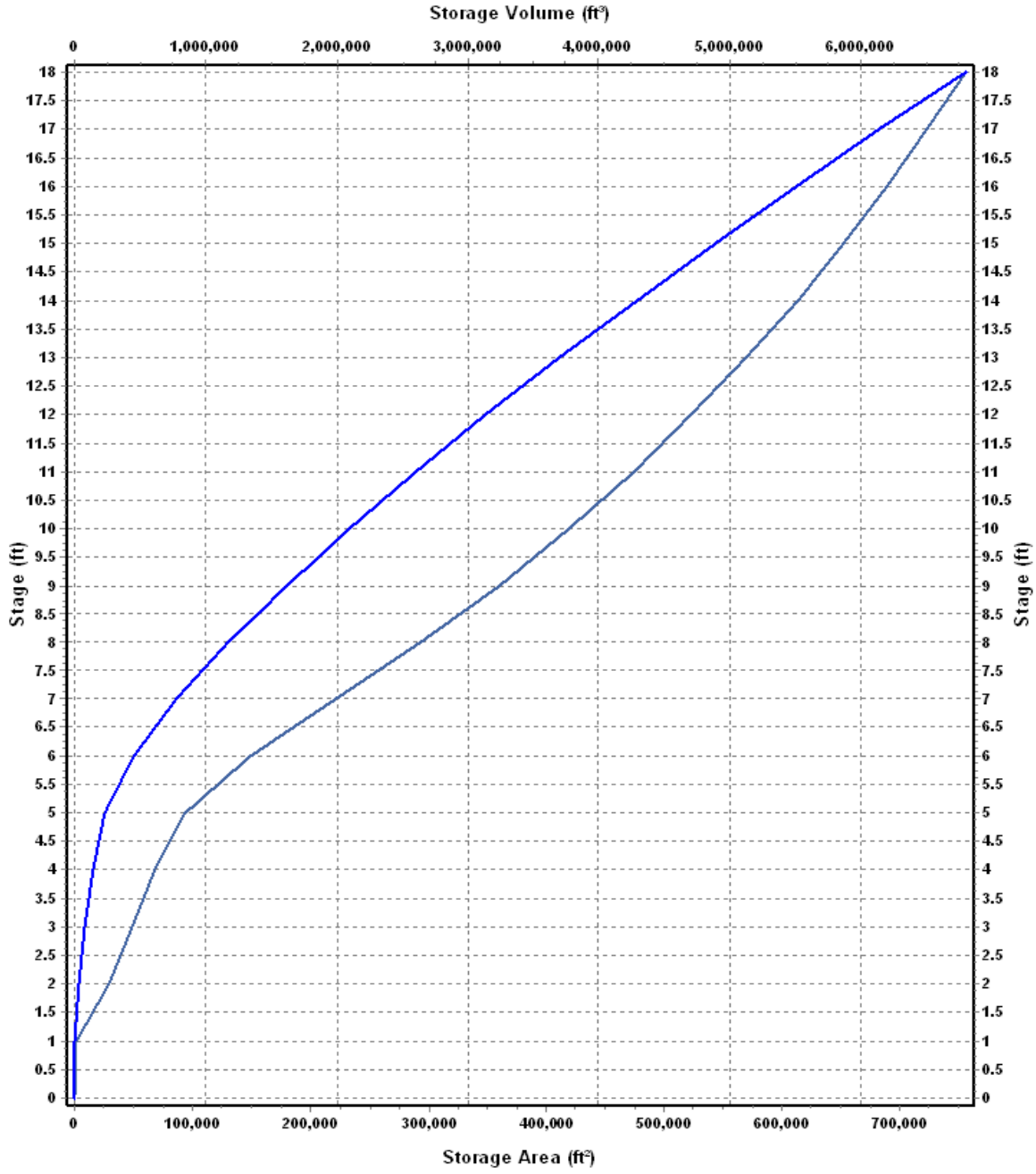
Invert Elevation (ft)	103.00
Max (Rim) Elevation (ft)	122.00
Max (Rim) Offset (ft)	19.00
Initial Water Elevation (ft)	109.00
Initial Water Depth (ft)	6.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Gypsum

Stage	Storage Area	Storage Volume
(ft)	(ft²)	(ft³)
0	0	0
1	1188.00	594.0012273
2	29106.06	29106.06014
3	48258.10	72387.14956
4	68472.14	136944.2829
5	93571.39	233928.4833
6	148581.31	445743.921
7	221570.17	775495.6023
8	292707.60	1170830.419
9	360372.74	1621677.351
10	420450.27	2102251.343
11	474518.62	2609852.392
12	523805.58	3142833.493
13	569996.10	3704974.655
14	612943.70	4290605.865
15	652231.35	4891735.107
16	688633.05	5509064.382
17	723236.20	6147507.701
18	755734.56	6801611.053

Storage Area Volume Curves



— Storage Area — Storage Volume

Storage Node : Gypsum (continued)

Outflow Weirs

SN Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1 GypsumJ5_Weir	Rectangular	No	120.00	17.00	6.28	1.00	3.33
2 GypsumRiser_Weir	Rectangular	No	109.00	6.00	3.00	13.00	3.33

Output Summary Results

Peak Inflow (cfs)	393.27
Peak Lateral Inflow (cfs)	393.27
Peak Outflow (cfs)	59.60
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	112.29
Max HGL Depth Attained (ft)	9.29
Average HGL Elevation Attained (ft)	109.86
Average HGL Depth Attained (ft)	6.86
Time of Max HGL Occurrence (days hh:mm)	0 12:42
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : ProcessReturnWater

Input Data

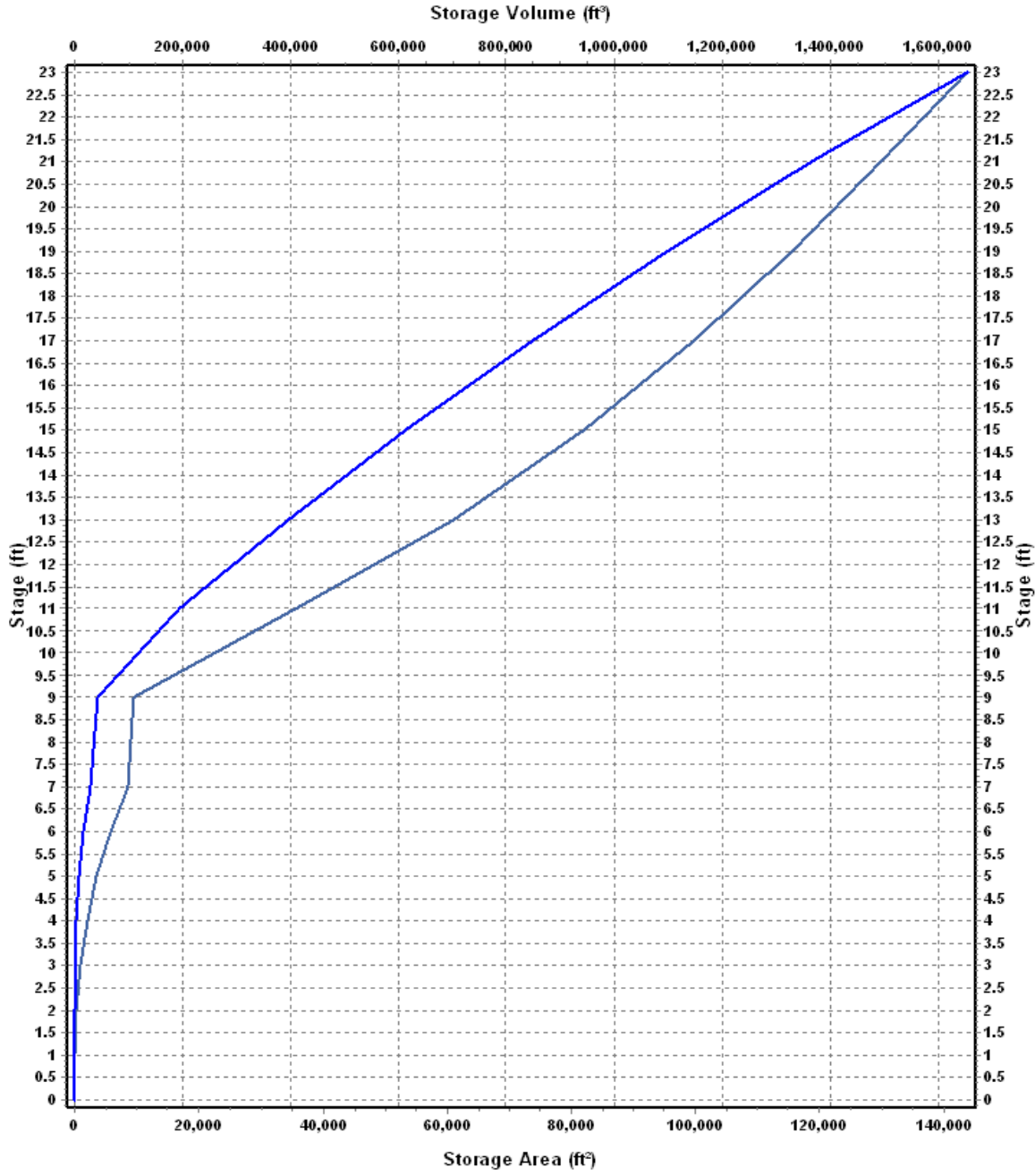
Invert Elevation (ft)	85.00
Max (Rim) Elevation (ft)	107.00
Max (Rim) Offset (ft)	22.00
Initial Water Elevation (ft)	98.00
Initial Water Depth (ft)	13.00
Ponded Area (ft²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : ProcessReturnWater

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	0	0
1	52.60	26.3
2	322.10	322.1
3	930.27	1395.4
4	1974.60	3949.2
5	3540.08	8850.2
6	5703.83	17111.5
7	8537.11	29879.9
9	9448.94	42520.24653
11	35550.40	195527.2075
13	61188.32	397724.0501
15	82082.60	615619.4722
17	99872.58	848916.9601
19	115618.76	1098378.225
21	130009.47	1365099.402
23	143787.76	1653559.21

Storage Area Volume Curves



— Storage Area — Storage Volume

Storage Node : ProcessReturnWater (continued)

Outflow Weirs

SN Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1 ReturnWater_OvertoppingWeir	Trapezoidal	No	106.00	21.00	20.00	2.00	2.60

Output Summary Results

Peak Inflow (cfs)	189.03
Peak Lateral Inflow (cfs)	77.10
Peak Outflow (cfs)	153.05
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	106.17
Max HGL Depth Attained (ft)	21.17
Average HGL Elevation Attained (ft)	104.28
Average HGL Depth Attained (ft)	19.28
Time of Max HGL Occurrence (days hh:mm)	0 20:13
Total Exfiltration Volume (1000-ft ³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00

Storage Node : Sedimentation

Input Data

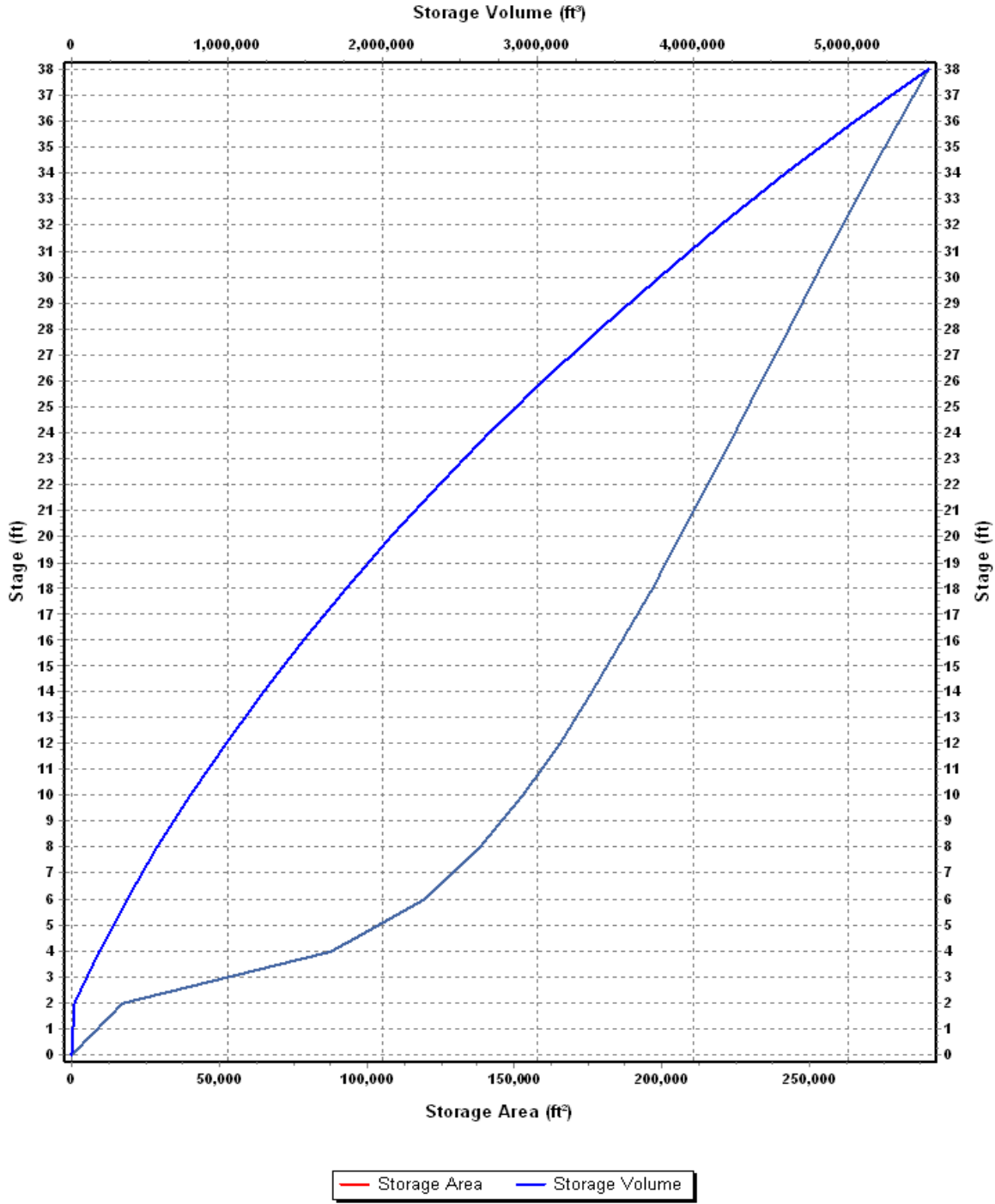
Invert Elevation (ft)	86.00
Max (Rim) Elevation (ft)	118.00
Max (Rim) Offset (ft)	32.00
Initial Water Elevation (ft)	92.00
Initial Water Depth (ft)	6.00
Ponded Area (ft ²)	0.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Sedimentation

Stage (ft)	Storage Area (ft ²)	Storage Volume (ft ³)
0	0	0
2	17325.81	17325.81179
4	88002.25	176004.492
6	118989.01	356967.0261
8	138308.61	553234.4264
10	152926.45	764632.2352
12	165247.57	991485.3907
14	176299.70	1234097.934
16	186589.82	1492718.569
18	196408.35	1767675.151
20	205922.57	2059225.735
22	215233.16	2367564.809
24	224437.13	2693245.542
26	233587.48	3036637.179
28	242712.97	3397981.545
30	251852.96	3777794.399
32	261064.23	4177027.656
34	270459.41	4597810.051
36	280157.86	5042841.507
38	290055.46	5511053.758

Storage Area Volume Curves



Storage Node : Sedimentation (continued)

Outflow Weirs

SN Element ID	Weir Type	Flap Gate	Crest Elevation (ft)	Crest Offset (ft)	Length (ft)	Weir Total Height (ft)	Discharge Coefficient
1 Sed_OvertoppingWeir	Trapezoidal	No	116.89	30.89	20.00	2.11	2.80
2 SedRiser_Weir	Rectangular	No	92.00	6.00	8.50	1.00	3.30

Output Summary Results

Peak Inflow (cfs)	160.83
Peak Lateral Inflow (cfs)	121.48
Peak Outflow (cfs)	2.13
Peak Exfiltration Flow Rate (cfm)	0.00
Max HGL Elevation Attained (ft)	105.94
Max HGL Depth Attained (ft)	19.94
Average HGL Elevation Attained (ft)	101.57
Average HGL Depth Attained (ft)	15.57
Time of Max HGL Occurrence (days hh:mm)	2 00:00
Total Exfiltration Volume (1000-ft³)	0.000
Total Flooded Volume (ac-in)	0
Total Time Flooded (min)	0
Total Retention Time (sec)	0.00