

APPENDIX C
BASIN HYDROLOGY DATA

NOAA ATLAS 14 OUTPUT



**POINT PRECIPITATION
FREQUENCY ESTIMATES
FROM NOAA ATLAS 14**



Virginia 37.9903 N 79.12105 W 1594 feet
from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 2, Version 3
G.M. Bonnin, D. Marin, B. Lin, T. Parzybok, M. Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2004
Extracted: Tue Apr 14 2009

- [Confidence Limits](#)
- [Seasonality](#)
- [Location Maps](#)
- [Other Info.](#)
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Precipitation Frequency Estimates (inches)																		
ARI* (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.31	0.50	0.62	0.85	1.06	1.27	1.39	1.78	2.24	2.76	3.24	3.69	4.26	4.87	6.46	7.96	10.01	11.83
2	0.37	0.59	0.75	1.03	1.30	1.55	1.69	2.15	2.70	3.35	3.92	4.46	5.13	5.85	7.70	9.42	11.80	13.88
5	0.45	0.71	0.91	1.28	1.65	1.98	2.14	2.69	3.37	4.25	4.95	5.61	6.39	7.17	9.23	11.08	13.67	15.86
10	0.51	0.81	1.02	1.48	1.93	2.33	2.51	3.17	3.98	4.99	5.79	6.54	7.39	8.18	10.43	12.34	15.06	17.32
25	0.57	0.91	1.16	1.72	2.29	2.77	3.00	3.81	4.83	6.07	6.98	7.86	8.78	9.55	12.04	13.98	16.84	19.13
50	0.62	0.99	1.26	1.90	2.57	3.14	3.41	4.35	5.58	6.97	7.97	8.94	9.90	10.64	13.29	15.22	18.14	20.44
100	0.67	1.07	1.35	2.07	2.86	3.52	3.83	4.92	6.39	7.95	9.03	10.10	11.07	11.74	14.55	16.42	19.41	21.66
200	0.72	1.14	1.44	2.25	3.15	3.91	4.26	5.54	7.29	9.01	10.16	11.31	12.30	12.86	15.82	17.61	20.61	22.79
500	0.78	1.23	1.55	2.46	3.53	4.43	4.86	6.41	8.60	10.56	11.79	13.06	14.01	14.37	17.52	19.15	22.13	24.15
1000	0.82	1.29	1.62	2.63	3.84	4.85	5.34	7.16	9.75	11.86	13.13	14.48	15.39	15.64	18.83	20.28	23.22	25.11

50-yr, 24-hr
= 6.97 in

100-yr, 24-hr
= 7.95 in

* These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval. Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting forces estimates near zero to appear as zero.

* Upper bound of the 90% confidence interval Precipitation Frequency Estimates (inches)																		
ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.34	0.55	0.69	0.94	1.18	1.40	1.54	1.99	2.54	3.07	3.56	4.06	4.66	5.30	6.97	8.54	10.66	12.52
2	0.41	0.66	0.83	1.14	1.44	1.71	1.87	2.40	3.05	3.71	4.31	4.91	5.61	6.36	8.30	10.11	12.56	14.69
5	0.49	0.79	1.00	1.42	1.82	2.18	2.37	3.00	3.82	4.70	5.45	6.18	6.99	7.79	9.96	11.89	14.55	16.77
10	0.56	0.89	1.13	1.63	2.13	2.56	2.78	3.52	4.50	5.52	6.36	7.20	8.06	8.89	11.25	13.23	16.03	18.32
25	0.63	1.01	1.28	1.89	2.52	3.06	3.33	4.24	5.47	6.70	7.68	8.64	9.59	10.38	12.99	14.99	17.93	20.24
50	0.69	1.10	1.39	2.10	2.84	3.47	3.78	4.85	6.32	7.70	8.76	9.83	10.82	11.56	14.36	16.34	19.34	21.64
100	0.75	1.19	1.50	2.30	3.17	3.89	4.26	5.50	7.27	8.78	9.92	11.12	12.10	12.76	15.75	17.66	20.71	22.93
200	0.80	1.27	1.60	2.50	3.50	4.34	4.76	6.22	8.32	9.96	11.17	12.46	13.46	14.01	17.14	18.97	22.03	24.16
500	0.87	1.38	1.73	2.76	3.96	4.96	5.46	7.25	9.92	11.68	12.99	14.40	15.37	15.69	19.05	20.68	23.70	25.65
1000	0.93	1.46	1.83	2.97	4.33	5.47	6.05	8.15	11.34	13.16	14.51	16.00	16.90	17.11	20.52	21.96	24.91	26.71

* The upper bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are greater than.
** These precipitation frequency estimates are based on a partial duration series. ARI is the Average Recurrence Interval.

Please refer to NOAA Atlas 14 Document for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

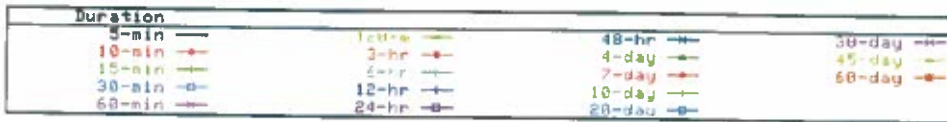
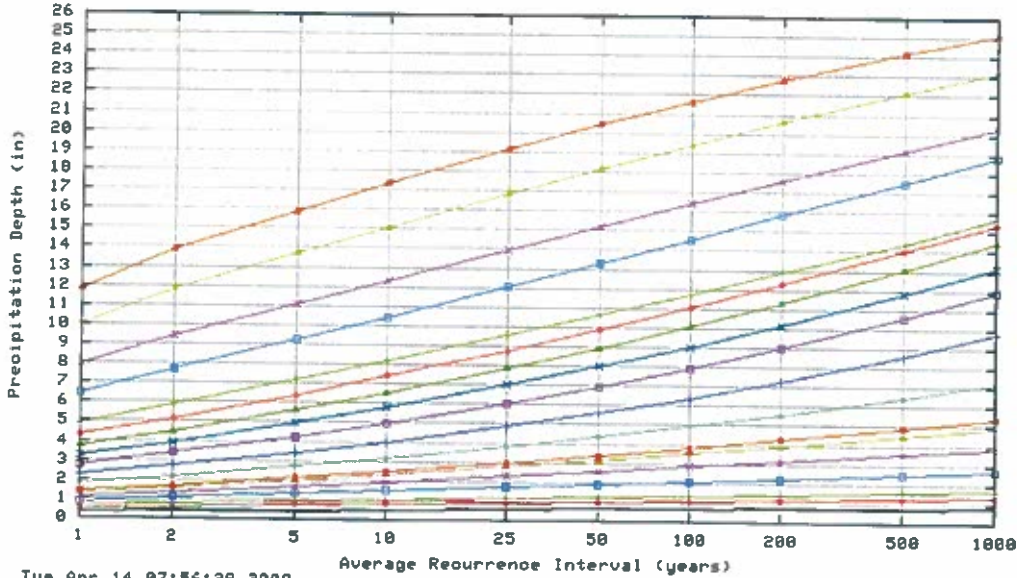
* Lower bound of the 90% confidence interval Precipitation Frequency Estimates (inches)																		
ARI** (years)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
1	0.28	0.45	0.56	0.77	0.96	1.15	1.26	1.62	2.02	2.50	2.95	3.36	3.90	4.48	6.01	7.43	9.39	11.18
2	0.34	0.54	0.68	0.94	1.18	1.41	1.53	1.95	2.43	3.03	3.57	4.05	4.70	5.38	7.15	8.80	11.07	13.12
5	0.40	0.65	0.82	1.16	1.49	1.79	1.94	2.44	3.02	3.83	4.50	5.09	5.84	6.58	8.56	10.33	12.80	14.96
10	0.46	0.73	0.92	1.33	1.74	2.10	2.27	2.85	3.55	4.49	5.24	5.92	6.73	7.50	9.66	11.49	14.10	16.33
25	0.51	0.82	1.04	1.54	2.05	2.49	2.70	3.40	4.27	5.43	6.29	7.07	7.96	8.71	11.11	12.98	15.72	18.02
50	0.56	0.89	1.12	1.69	2.29	2.81	3.04	3.85	4.87	6.20	7.14	8.01	8.93	9.66	12.23	14.10	16.92	19.22
100	0.59	0.95	1.20	1.83	2.52	3.11	3.38	4.31	5.49	7.02	8.03	8.98	9.94	10.62	13.34	15.17	18.04	20.32
200	0.63	1.00	1.26	1.96	2.75	3.42	3.72	4.78	6.16	7.89	8.97	10.01	10.97	11.58	14.44	16.20	19.11	21.34
500	0.67	1.06	1.33	2.12	3.04	3.81	4.17	5.42	7.07	9.11	10.29	11.42	12.37	12.84	15.88	17.52	20.41	22.53
1000	0.70	1.10	1.38	2.24	3.26	4.12	4.51	5.94	7.85	10.11	11.34	12.54	13.48	13.89	16.96	18.50	21.34	23.38

* The lower bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are less than.

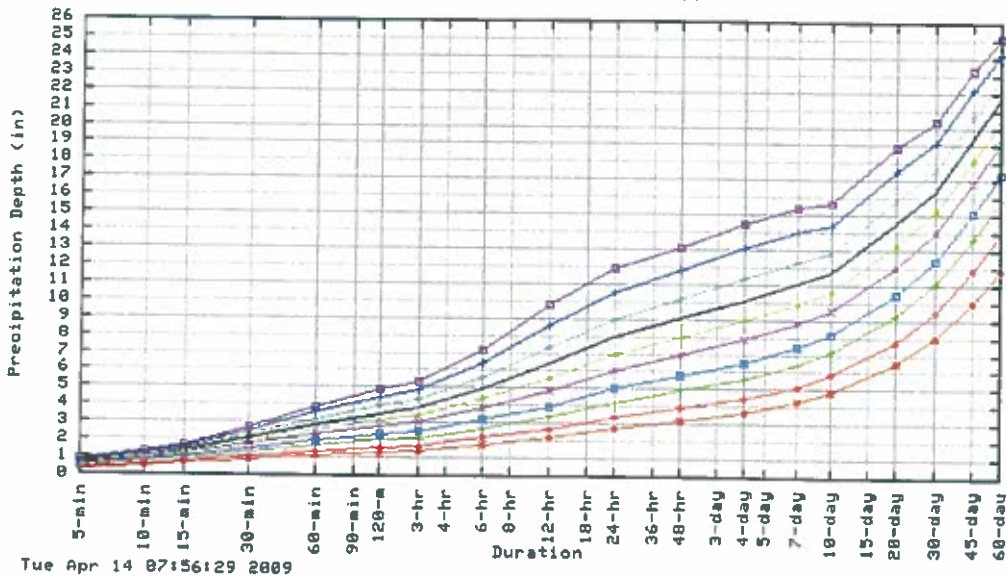
** These precipitation frequency estimates are based on a partial duration maxima series. ARI is the Average Recurrence Interval.
 Please refer to [NOAA Atlas 14 Document](#) for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

Text version of tables

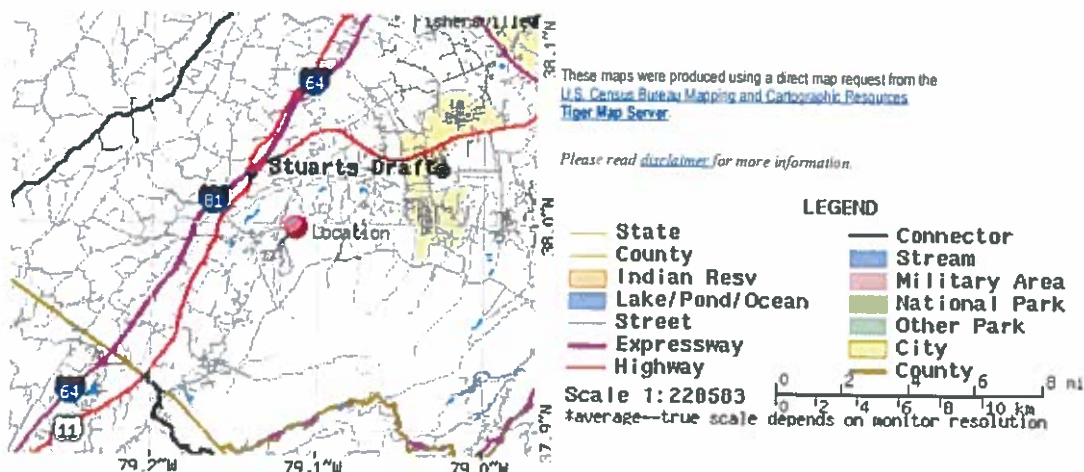
Partial duration based Point Precipitation Frequency Estimates - Version: 3
 37.9903 N 79.12105 W 1594 ft



Partial duration based Point Precipitation Frequency Estimates - Version: 3
 37.9903 N 79.12105 W 1594 ft



Maps -



Other Maps/Photographs -

[View USGS digital orthophoto quadrangle \(DOQ\)](#) covering this location from TerraServer; [USGS Aerial Photograph](#) may also be available from this site. A DOQ is a computer-generated image of an aerial photograph in which image displacement caused by terrain relief and camera tilts has been removed. It combines the image characteristics of a photograph with the geometric qualities of a map. Visit the [USGS](#) for more information.

Watershed/Stream Flow Information -

[Find the Watershed](#) for this location using the U.S. Environmental Protection Agency's site.

Climate Data Sources -

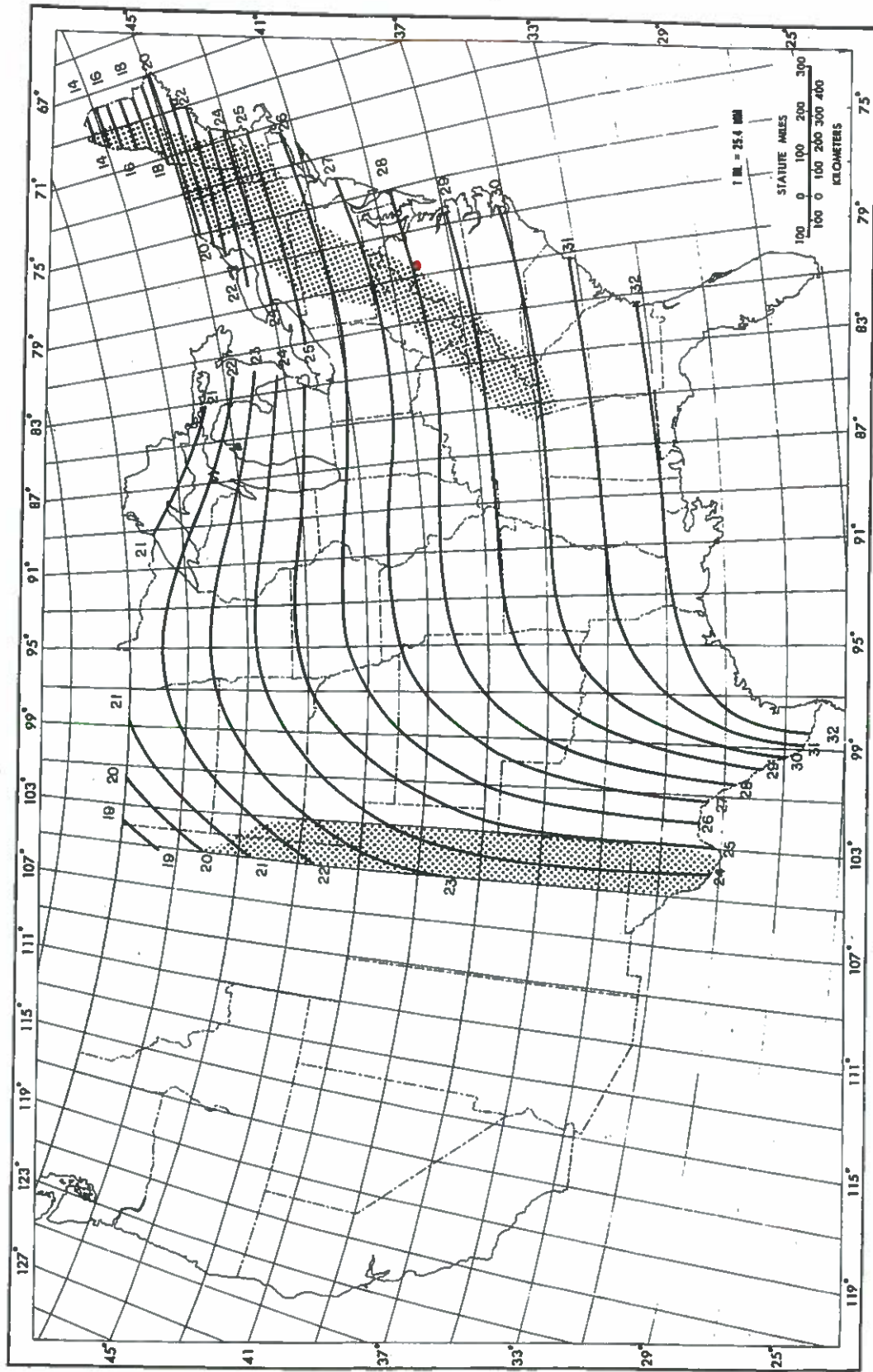
Precipitation frequency results are based on data from a variety of sources, but largely NCDC. The following links provide general information about observing sites in the area, regardless of if their data was used in this study. For detailed information about the stations used in this study, please refer to [NOAA Atlas 14 Document](#).

Using the [National Climatic Data Center's \(NCDC\)](#) station search engine, locate other climate stations within:

...OR... of this location (37.9903/-79.12105). Digital ASCII data can be obtained directly from [NCDC](#).

Hydrometeorological Design Studies Center
 DDC/NOAA/National Weather Service
 1325 East-West Highway
 Silver Spring, MD 20910
 (301) 713-1669
 Questions? [HDSC Questions@noaa.gov](#)

[Disclaimer](#)



PMP = 28 in
1/2 PMP = 14 in

Figure 18. ---All-season PMF (in.) for 6 hr 10 min² (26 km²).

SCS CURVE NUMBER AND LAG TIME CALCULATIONS



Worksheet 2: Runoff Curve Number*

Project: Stoney Creek Dam
 Location: Augusta County, Virginia
 Subbasin: Gum Springs
 Dev. Condition: Present

By: WRW Date: 3/5/2009
 Checked: TAM Date: 4-14-09

Soil Name and Hydrologic Group	Cover Description (Cover type, treatment, and hydrologic description; % impervious; connected or disconnected, etc)	CN*			Area** Acres	Product CN*Area
		Table 2 2	Figure 2-3	Figure 2-4		
Water	Lake	100			5	500
Drall (B)	Woods, Fair Hydrologic Condition	60			362	21720
Hazleton C	Woods, Fair Hydrologic Condition	73			63	4599
Leetonia (B)	Woods, Fair Hydrologic Condition	60			59	3540
Monongahela C	Woods, Fair Hydrologic Condition	73			132	9636
Pits and Dumps (D)	Woods, Fair Hydrologic Condition	79			10	790
Purdy (D)	Woods, Fair Hydrologic Condition	79			0	0
Sherando (B)	Woods, Fair Hydrologic Condition	60			679	40740
						0
						0
Totals:					1310	81525

*Use only one CN source per line.

**Indicate units (acres, square miles, or %)

Composite CN=

62



Worksheet 2: Runoff Curve Number*

Project: **Stoney Creek Dam**
 Location: **Augusta County, Virginia**
 Subbasin: **Deep Pond Run**
 Dev. Condition: **Present**

By: **WRW** Date: **3/5/2009**
 Checked: **TAM** Date: **4-14-09**

Soil Name and Hydrologic Group	Cover Description (Cover type, treatment, and hydrologic description; % impervious; connected or disconnected, etc)	CN*			Area** Acres	Product CN*Area
		Table 2 2	Figure 2-3	Figure 2-4		
Water	Lake	100			3	300
Drall (B)	Woods, Fair Hydrologic Condition	60			22	1320
Frederick-Christian (B)	Woods, Fair Hydrologic Condition	60			14	840
Hazleton C	Woods, Fair Hydrologic Condition	73			10	730
Monongahela C	Woods, Fair Hydrologic Condition	73			88	6424
Pits and Dumps (D)	Woods, Fair Hydrologic Condition	79			37	2923
Sherando (B)	Woods, Fair Hydrologic Condition	60			142	8520
						0
						0
						0
Totals:					316	21057

*Use only one CN source per line.

**Indicate units (acres, square miles, or %)

Composite CN=

67



Worksheet 2: Runoff Curve Number*

Project: Stoney Creek Dam
 Location: Augusta County, Virginia
 Subbasin: Cold Spring
 Dev. Condition: Present

By: WRW Date: 3/5/2009
 Checked: TAM Date: 4-14-09

Soil Name and Hydrologic Group	Cover Description (Cover type, treatment, and hydrologic description; % impervious; connected or disconnected, etc)	CN*			Area** Acres	Product CN*Area
		Table 2 2	Figure 2-3	Figure 2-4		
Water	Lake	100			2	200
Burketown C	Woods, Fair Hydrologic Condition	73			6	438
Drall (B)	Woods, Fair Hydrologic Condition	60			438	26280
Frederick-Christian (B)	Woods, Fair Hydrologic Condition	60			4	240
Leetonia (B)	Woods, Fair Hydrologic Condition	60			95	5700
Monongahela C	Woods, Fair Hydrologic Condition	73			63	4599
Pits and Dumps (D)	Woods, Fair Hydrologic Condition	79			15	1185
Sherando (B)	Woods, Fair Hydrologic Condition	60			365	21900
Udorthents C	Woods, Fair Hydrologic Condition	73			20	1460
Unison (B)	Woods, Fair Hydrologic Condition	60			5	300
Totals:					1013	62302

*Use only one CN source per line.

**Indicate units (acres, square miles, or %)

Composite CN=

62



Worksheet 3: Time of Concentration (Tc)*

Project: Stoney Creek Dam
Location: Augusta County, Virginia
Subbasin: Gum Springs
Dev. Condition: Present

By: WRW **Date:** 3/5/2009
Checked: TAM **Date:** 4-14-09

Note: Attach map indicating flow segments

Sheet Flow

1 Surface Description (Table 3-1)	Segment	1
2 Manning's n (Table 3-1)	Woods	0.400
3 Flow Length L (L ≤ 300 ft)	ft	300
4 Change in Elevation	ft	90
5 2-yr Rainfall, P2	in	3.0
6 Land Slope, s	ft/ft	0.300
7 $T_t = 0.007(nL)^{0.8} / (P2^{0.5} s^{0.4})$	hr	0.30

Shallow Concentrated Flow

8 Surface Description (paved/unpaved)	Segment	2
9 Flow Length L	unpaved	3400
10 Change in Elevation	ft	1160
11 Watercourse Slope, s	ft/ft	0.341
12 Average Velocity, V (Fig 3-1)	fps	9.5
13 $T_t = L / (3600V)$	hr	0.10

Shallow Concentrated Flow

14 Surface Description (paved/unpaved)	Segment	3
15 Flow Length L	unpaved	2850
16 Change in Elevation	ft	280
17 Watercourse Slope, s	ft/ft	0.098
18 Average Velocity, V (Fig 3-1)	fps	5
19 $T_t = L / (3600V)$	hr	0.16

Channel Flow

20a Channel Bottom Width, B	Segment	4
20b Channel Side Slope z, where zH:1V	ft	5.00
20c Full Bank Flow Depth, d		1
20d Cross Sectional Flow Area, A	ft	2.00
21 Wetted Perimeter, P	sf	14.00
22 Hydraulic Radius, R=A/P	ft	10.66
23 Channel Drop	ft	1.31
24 Channel Slope, S	ft	290
	ft/ft	0.041

25 Manning's n		0.100
26 $V=1.49*R^{0.667}*S^{0.5}/n$	fps	3.6
27 Flow Length L	ft	7000
28 $T_t=L/(3600V)$	hr	0.53

Flow in Reservoir

29 Acceleration due to Gravity g	Segment	5
30 Mean Depth of Reservoir Dm	fps ²	32.2
31 $V_w=(gD_m)^{0.5}$	ft	4
32 Flow Length L	fps	11.3
33 $T_t=L/(3600V_w)$	ft	725
	hr	0.02
34 Total T_t or T_c (7+13+19+28+33)	hr	1.11
	LAG (hr)	0.67

*Reference: Procedure from SCS TR-55, Urban Hydrology for Small Watersheds (June 1986)



Worksheet 3: Time of Concentration (Tc)*

Project: Stoney Creek Dam
 Location: Augusta County, Virginia
 Subbasin: Deep Pond Run
 Dev. Condition: Present

By: WRW Date: 3/5/2009
 Checked: TAM Date: 4-14-09

Note: Attach map indicating flow segments

Sheet Flow

- 1 Surface Description (Table 3-1)
- 2 Manning's n (Table 3-1)
- 3 Flow Length L (L <= 300 ft)
- 4 Change in Elevation
- 5 2-yr Rainfall, P2
- 6 Land Slope, s
- 7 $T_t = 0.007(nL)^{0.8} / (P2^{0.5} s^{0.4})$

Segment	1
	Woods
	0.400
ft	300
ft	130
in	3.0
ft/ft	0.433
hr	0.26

Shallow Concentrated Flow

- 8 Surface Description (paved/unpaved)
- 9 Flow Length L
- 10 Change in Elevation
- 11 Watercourse Slope, s
- 12 Average Velocity, V (Fig 3-1)
- 13 $T_t = L / (3600V)$

Segment	2
	unpaved
ft	1440
ft	670
ft/ft	0.465
fps	11
hr	0.04

Shallow Concentrated Flow

- 14 Surface Description (paved/unpaved)
- 15 Flow Length L
- 16 Change in Elevation
- 17 Watercourse Slope, s
- 18 Average Velocity, V (Fig 3-1)
- 19 $T_t = L / (3600V)$

Segment	3
	unpaved
ft	900
ft	40
ft/ft	0.044
fps	3.4
hr	0.07

Channel Flow

- 20a Channel Bottom Width, B
- 20b Channel Side Slope z, where zH:1V
- 20c Full Bank Flow Depth, d
- 20d Cross Sectional Flow Area, A
- 21 Wetted Perimeter, P
- 22 Hydraulic Radius, R=A/P
- 23 Channel Drop
- 24 Channel Slope, S

Segment	4
ft	5.00
	1
ft	2.00
sf	14.00
ft	10.66
ft	1.31
ft	560
ft/ft	0.050

25 Manning's n		0.100
26 $V = 1.49 * R^{0.667} * S^{0.5} / n$	fps	4.0
27 Flow Length L	ft	11100
28 $T_t = L / (3600V)$	hr	0.77

Flow in Reservoir

29 Acceleration due to Gravity g	Segment	5
30 Mean Depth of Reservoir Dm	fps ²	32.2
31 $V_w = (gD_m)^{0.5}$	ft	4
32 Flow Length L	fps	11.3
33 $T_t = L / (3600V_w)$	ft	560
	hr	0.01
34 Total Tt or Tc (7+13+19+28+33)	hr	1.15
	LAG (hr)	0.69

*Reference: Procedure from SCS TR-55, Urban Hydrology for Small Watersheds (June 1986)



Worksheet 3: Time of Concentration (Tc)*

Project: Stoney Creek Dam
 Location: Augusta County, Virginia
 Subbasin: Cold Spring
 Dev. Condition: Present

By: WRW Date: 3/5/2009
 Checked: TAM Date: 4-14-09

Note: Attach map indicating flow segments

Sheet Flow

1 Surface Description (Table 3-1)	Segment	1
2 Manning's n (Table 3-1)	Woods	0.400
3 Flow Length L (L <= 300 ft)	ft	300
4 Change in Elevation	ft	40
5 2-yr Rainfall, P2	in	3.0
6 Land Slope, s	ft/ft	0.133
7 $T_t = 0.007(nL)^{0.8} / (P2^{0.5} s^{0.4})$	hr	0.42

Shallow Concentrated Flow

8 Surface Description (paved/unpaved)	Segment	2
9 Flow Length L	unpaved	170
10 Change in Elevation	ft	20
11 Watercourse Slope, s	ft/ft	0.118
12 Average Velocity, V (Fig 3-1)	fps	5.6
13 $T_t = L / (3600V)$	hr	0.01

Shallow Concentrated Flow

14 Surface Description (paved/unpaved)	Segment	3
15 Flow Length L	unpaved	2100
16 Change in Elevation	ft	680
17 Watercourse Slope, s	ft/ft	0.324
18 Average Velocity, V (Fig 3-1)	fps	9.25
19 $T_t = L / (3600V)$	hr	0.06

Channel Flow

20a Channel Bottom Width, B	Segment	4
20b Channel Side Slope z, where zH:1V	ft	5.00
20c Full Bank Flow Depth, d		1
20d Cross Sectional Flow Area, A	ft	2.00
21 Wetted Perimeter, P	sf	14.00
22 Hydraulic Radius, R=A/P	ft	10.66
23 Channel Drop	ft	1.31
24 Channel Slope, S	ft/ft	300
		0.143

25 Manning's n		0.100
26 $V=1.49 \cdot R^{0.667} \cdot S^{0.5/n}$	fps	6.8
27 Flow Length L	ft	2100
28 $T_t=L/(3600V)$	hr	0.09

Channel Flow

29a Channel Bottom Width, B	Segment	5
29b Channel Side Slope z, where zH:1V	ft	5.00
29c Full Bank Flow Depth, d		1
29d Cross Sectional Flow Area, A	ft	2.00
30 Wetted Perimeter, P	sf	14.00
31 Hydraulic Radius, $R=A/P$	ft	10.66
32 Channel Drop	ft	1.31
33 Channel Slope, S	ft/ft	700
34 Manning's n		0.047
35 $V=1.49 \cdot R^{0.667} \cdot S^{0.5/n}$		0.100
36 Flow Length L	fps	3.9
37 $T_t=L/(3600V)$	ft	14900
	hr	1.07

Flow in Reservoir

38 Acceleration due to Gravity g	Segment	6
39 Mean Depth of Reservoir Dm	fps ²	32.2
40 $V_w=(gD_m)^{0.5}$	ft	4
41 Flow Length L	fps	11.3
42 $T_t=L/(3600V_w)$	ft	800
	hr	0.02
43 Total T_t or T_c (7+13+19+28+37+42)	hr	1.66
	LAG (hr)	1.00

*Reference: Procedure from SCS TR-55, Urban Hydrology for Small Watersheds (June 1986)

HEC-HMS HYDROGRAPH OUTPUT

South River Dam #6 - Augusta County, Virginia
 HEC-HMS Hydrograph Output
 24-hr 50-yr Type II Storm

Date	Time	Inflow (CFS)	Date	Time	Inflow (CFS)	Date	Time	Inflow (CFS)	Date	Time	Inflow (CFS)
1-Jan-10	0:00	0	1-Jan-10	12:30	2,741	2-Jan-10	1:00	73	2-Jan-10	13:30	0
1-Jan-10	0:15	0	1-Jan-10	12:45	2,936	2-Jan-10	1:15	49	2-Jan-10	13:45	0
1-Jan-10	0:30	0	1-Jan-10	13:00	2,610	2-Jan-10	1:30	32	2-Jan-10	14:00	0
1-Jan-10	0:45	0	1-Jan-10	13:15	2,125	2-Jan-10	1:45	21	2-Jan-10	14:15	0
1-Jan-10	1:00	0	1-Jan-10	13:30	1,705	2-Jan-10	2:00	14	2-Jan-10	14:30	0
1-Jan-10	1:15	0	1-Jan-10	13:45	1,355	2-Jan-10	2:15	9	2-Jan-10	14:45	0
1-Jan-10	1:30	0	1-Jan-10	14:00	1,103	2-Jan-10	2:30	6	2-Jan-10	15:00	0
1-Jan-10	1:45	0	1-Jan-10	14:15	919	2-Jan-10	2:45	4	2-Jan-10	15:15	0
1-Jan-10	2:00	0	1-Jan-10	14:30	778	2-Jan-10	3:00	3	2-Jan-10	15:30	0
1-Jan-10	2:15	0	1-Jan-10	14:45	672	2-Jan-10	3:15	2	2-Jan-10	15:45	0
1-Jan-10	2:30	0	1-Jan-10	15:00	594	2-Jan-10	3:30	1	2-Jan-10	16:00	0
1-Jan-10	2:45	0	1-Jan-10	15:15	534	2-Jan-10	3:45	1	2-Jan-10	16:15	0
1-Jan-10	3:00	0	1-Jan-10	15:30	486	2-Jan-10	4:00	1	2-Jan-10	16:30	0
1-Jan-10	3:15	0	1-Jan-10	15:45	446	2-Jan-10	4:15	0	2-Jan-10	16:45	0
1-Jan-10	3:30	0	1-Jan-10	16:00	414	2-Jan-10	4:30	0	2-Jan-10	17:00	0
1-Jan-10	3:45	0	1-Jan-10	16:15	386	2-Jan-10	4:45	0	2-Jan-10	17:15	0
1-Jan-10	4:00	0	1-Jan-10	16:30	362	2-Jan-10	5:00	0	2-Jan-10	17:30	0
1-Jan-10	4:15	0	1-Jan-10	16:45	340	2-Jan-10	5:15	0	2-Jan-10	17:45	0
1-Jan-10	4:30	0	1-Jan-10	17:00	323	2-Jan-10	5:30	0	2-Jan-10	18:00	0
1-Jan-10	4:45	0	1-Jan-10	17:15	308	2-Jan-10	5:45	0	2-Jan-10	18:15	0
1-Jan-10	5:00	0	1-Jan-10	17:30	296	2-Jan-10	6:00	0	2-Jan-10	18:30	0
1-Jan-10	5:15	0	1-Jan-10	17:45	286	2-Jan-10	6:15	0	2-Jan-10	18:45	0
1-Jan-10	5:30	0	1-Jan-10	18:00	276	2-Jan-10	6:30	0	2-Jan-10	19:00	0
1-Jan-10	5:45	0	1-Jan-10	18:15	267	2-Jan-10	6:45	0	2-Jan-10	19:15	0
1-Jan-10	6:00	0	1-Jan-10	18:30	259	2-Jan-10	7:00	0	2-Jan-10	19:30	0
1-Jan-10	6:15	0	1-Jan-10	18:45	251	2-Jan-10	7:15	0	2-Jan-10	19:45	0
1-Jan-10	6:30	0	1-Jan-10	19:00	243	2-Jan-10	7:30	0	2-Jan-10	20:00	0
1-Jan-10	6:45	0	1-Jan-10	19:15	235	2-Jan-10	7:45	0	2-Jan-10	20:15	0
1-Jan-10	7:00	0	1-Jan-10	19:30	227	2-Jan-10	8:00	0	2-Jan-10	20:30	0
1-Jan-10	7:15	0	1-Jan-10	19:45	219	2-Jan-10	8:15	0	2-Jan-10	20:45	0
1-Jan-10	7:30	0	1-Jan-10	20:00	211	2-Jan-10	8:30	0	2-Jan-10	21:00	0
1-Jan-10	7:45	0	1-Jan-10	20:15	203	2-Jan-10	8:45	0	2-Jan-10	21:15	0
1-Jan-10	8:00	0	1-Jan-10	20:30	195	2-Jan-10	9:00	0	2-Jan-10	21:30	0
1-Jan-10	8:15	0	1-Jan-10	20:45	189	2-Jan-10	9:15	0	2-Jan-10	21:45	0
1-Jan-10	8:30	0	1-Jan-10	21:00	184	2-Jan-10	9:30	0	2-Jan-10	22:00	0
1-Jan-10	8:45	0	1-Jan-10	21:15	180	2-Jan-10	9:45	0	2-Jan-10	22:15	0
1-Jan-10	9:00	0	1-Jan-10	21:30	177	2-Jan-10	10:00	0	2-Jan-10	22:30	0
1-Jan-10	9:15	0	1-Jan-10	21:45	174	2-Jan-10	10:15	0	2-Jan-10	22:45	0
1-Jan-10	9:30	1	1-Jan-10	22:00	172	2-Jan-10	10:30	0	2-Jan-10	23:00	0
1-Jan-10	9:45	1	1-Jan-10	22:15	171	2-Jan-10	10:45	0	2-Jan-10	23:15	0
1-Jan-10	10:00	2	1-Jan-10	22:30	169	2-Jan-10	11:00	0	2-Jan-10	23:30	0
1-Jan-10	10:15	5	1-Jan-10	22:45	167	2-Jan-10	11:15	0	2-Jan-10	23:45	0
1-Jan-10	10:30	10	1-Jan-10	23:00	165	2-Jan-10	11:30	0	3-Jan-10	0:00	0
1-Jan-10	10:45	19	1-Jan-10	23:15	163	2-Jan-10	11:45	0			
1-Jan-10	11:00	35	1-Jan-10	23:30	162	2-Jan-10	12:00	0			
1-Jan-10	11:15	61	1-Jan-10	23:45	160	2-Jan-10	12:15	0			
1-Jan-10	11:30	102	2-Jan-10	0:00	159	2-Jan-10	12:30	0			
1-Jan-10	11:45	223	2-Jan-10	0:15	152	2-Jan-10	12:45	0			
1-Jan-10	12:00	787	2-Jan-10	0:30	132	2-Jan-10	13:00	0			
1-Jan-10	12:15	1,859	2-Jan-10	0:45	103	2-Jan-10	13:15	0			

South River Dam #6 - Augusta County, Virginia
 HEC-HMS Hydrograph Output
 24-hr 100-yr Type II Storm

Date	Time	Inflow (CFS)	Date	Time	Inflow (CFS)	Date	Time	Inflow (CFS)	Date	Time	Inflow (CFS)
1-Jan-10	0:00	0	1-Jan-10	12:30	3,559	2-Jan-10	1:00	87	2-Jan-10	13:30	0.00
1-Jan-10	0:15	0	1-Jan-10	12:45	3,776	2-Jan-10	1:15	59	2-Jan-10	13:45	0.00
1-Jan-10	0:30	0	1-Jan-10	13:00	3,334	2-Jan-10	1:30	39	2-Jan-10	14:00	0.00
1-Jan-10	0:45	0	1-Jan-10	13:15	2,699	2-Jan-10	1:45	25	2-Jan-10	14:15	0.00
1-Jan-10	1:00	0	1-Jan-10	13:30	2,153	2-Jan-10	2:00	17	2-Jan-10	14:30	0.00
1-Jan-10	1:15	0	1-Jan-10	13:45	1,702	2-Jan-10	2:15	11	2-Jan-10	14:45	0.00
1-Jan-10	1:30	0	1-Jan-10	14:00	1,377	2-Jan-10	2:30	7	2-Jan-10	15:00	0.00
1-Jan-10	1:45	0	1-Jan-10	14:15	1,142	2-Jan-10	2:45	5	2-Jan-10	15:15	0.00
1-Jan-10	2:00	0	1-Jan-10	14:30	963	2-Jan-10	3:00	3	2-Jan-10	15:30	0.00
1-Jan-10	2:15	0	1-Jan-10	14:45	830	2-Jan-10	3:15	2	2-Jan-10	15:45	0.00
1-Jan-10	2:30	0	1-Jan-10	15:00	730	2-Jan-10	3:30	1	2-Jan-10	16:00	0.00
1-Jan-10	2:45	0	1-Jan-10	15:15	655	2-Jan-10	3:45	1	2-Jan-10	16:15	0.00
1-Jan-10	3:00	0	1-Jan-10	15:30	594	2-Jan-10	4:00	1	2-Jan-10	16:30	0.00
1-Jan-10	3:15	0	1-Jan-10	15:45	544	2-Jan-10	4:15	0	2-Jan-10	16:45	0.00
1-Jan-10	3:30	0	1-Jan-10	16:00	504	2-Jan-10	4:30	0	2-Jan-10	17:00	0.00
1-Jan-10	3:45	0	1-Jan-10	16:15	470	2-Jan-10	4:45	0	2-Jan-10	17:15	0.00
1-Jan-10	4:00	0	1-Jan-10	16:30	440	2-Jan-10	5:00	0	2-Jan-10	17:30	0.00
1-Jan-10	4:15	0	1-Jan-10	16:45	414	2-Jan-10	5:15	0	2-Jan-10	17:45	0.00
1-Jan-10	4:30	0	1-Jan-10	17:00	392	2-Jan-10	5:30	0	2-Jan-10	18:00	0.00
1-Jan-10	4:45	0	1-Jan-10	17:15	374	2-Jan-10	5:45	0	2-Jan-10	18:15	0.00
1-Jan-10	5:00	0	1-Jan-10	17:30	359	2-Jan-10	6:00	0	2-Jan-10	18:30	0.00
1-Jan-10	5:15	0	1-Jan-10	17:45	346	2-Jan-10	6:15	0	2-Jan-10	18:45	0.00
1-Jan-10	5:30	0	1-Jan-10	18:00	335	2-Jan-10	6:30	0	2-Jan-10	19:00	0.00
1-Jan-10	5:45	0	1-Jan-10	18:15	324	2-Jan-10	6:45	0	2-Jan-10	19:15	0.00
1-Jan-10	6:00	0	1-Jan-10	18:30	313	2-Jan-10	7:00	0	2-Jan-10	19:30	0.00
1-Jan-10	6:15	0	1-Jan-10	18:45	304	2-Jan-10	7:15	0	2-Jan-10	19:45	0.00
1-Jan-10	6:30	0	1-Jan-10	19:00	294	2-Jan-10	7:30	0	2-Jan-10	20:00	0.00
1-Jan-10	6:45	0	1-Jan-10	19:15	284	2-Jan-10	7:45	0	2-Jan-10	20:15	0.00
1-Jan-10	7:00	0	1-Jan-10	19:30	274	2-Jan-10	8:00	0	2-Jan-10	20:30	0.00
1-Jan-10	7:15	0	1-Jan-10	19:45	264	2-Jan-10	8:15	0	2-Jan-10	20:45	0.00
1-Jan-10	7:30	0	1-Jan-10	20:00	255	2-Jan-10	8:30	0	2-Jan-10	21:00	0.00
1-Jan-10	7:45	0	1-Jan-10	20:15	245	2-Jan-10	8:45	0	2-Jan-10	21:15	0.00
1-Jan-10	8:00	0	1-Jan-10	20:30	236	2-Jan-10	9:00	0	2-Jan-10	21:30	0.00
1-Jan-10	8:15	0	1-Jan-10	20:45	228	2-Jan-10	9:15	0	2-Jan-10	21:45	0.00
1-Jan-10	8:30	0	1-Jan-10	21:00	222	2-Jan-10	9:30	0	2-Jan-10	22:00	0.00
1-Jan-10	8:45	0	1-Jan-10	21:15	217	2-Jan-10	9:45	0	2-Jan-10	22:15	0.00
1-Jan-10	9:00	1	1-Jan-10	21:30	213	2-Jan-10	10:00	0	2-Jan-10	22:30	0.00
1-Jan-10	9:15	2	1-Jan-10	21:45	210	2-Jan-10	10:15	0	2-Jan-10	22:45	0.00
1-Jan-10	9:30	3	1-Jan-10	22:00	208	2-Jan-10	10:30	0	2-Jan-10	23:00	0.00
1-Jan-10	9:45	6	1-Jan-10	22:15	205	2-Jan-10	10:45	0	2-Jan-10	23:15	0.00
1-Jan-10	10:00	12	1-Jan-10	22:30	203	2-Jan-10	11:00	0	2-Jan-10	23:30	0.00
1-Jan-10	10:15	21	1-Jan-10	22:45	201	2-Jan-10	11:15	0	2-Jan-10	23:45	0.00
1-Jan-10	10:30	35	1-Jan-10	23:00	198	2-Jan-10	11:30	0	3-Jan-10	0:00	0.00
1-Jan-10	10:45	55	1-Jan-10	23:15	196	2-Jan-10	11:45	0			
1-Jan-10	11:00	83	1-Jan-10	23:30	194	2-Jan-10	12:00	0			
1-Jan-10	11:15	123	1-Jan-10	23:45	193	2-Jan-10	12:15	0			
1-Jan-10	11:30	183	2-Jan-10	0:00	191	2-Jan-10	12:30	0			
1-Jan-10	11:45	351	2-Jan-10	0:15	183	2-Jan-10	12:45	0			
1-Jan-10	12:00	1,087	2-Jan-10	0:30	159	2-Jan-10	13:00	0			
1-Jan-10	12:15	2,454	2-Jan-10	0:45	124	2-Jan-10	13:15	0			

South River Dam #6 - Augusta County, Virginia
 HEC-HMS Hydrograph Output
 6-hour 0.5 PMF

Date	Time	Inflow (CFS)	Date	Time	Inflow (CFS)
1-Jan-10	0:00	0	1-Jan-10	12:30	0
1-Jan-10	0:15	0	1-Jan-10	12:45	0
1-Jan-10	0:30	81	1-Jan-10	13:00	0
1-Jan-10	0:45	515	1-Jan-10	13:15	0
1-Jan-10	1:00	1,364	1-Jan-10	13:30	0
1-Jan-10	1:15	2,229	1-Jan-10	13:45	0
1-Jan-10	1:30	2,709	1-Jan-10	14:00	0
1-Jan-10	1:45	2,775	1-Jan-10	14:15	0
1-Jan-10	2:00	2,648	1-Jan-10	14:30	0
1-Jan-10	2:15	2,469	1-Jan-10	14:45	0
1-Jan-10	2:30	2,319	1-Jan-10	15:00	0
1-Jan-10	2:45	2,363	1-Jan-10	15:15	0
1-Jan-10	3:00	2,830	1-Jan-10	15:30	0
1-Jan-10	3:15	4,075	1-Jan-10	15:45	0
1-Jan-10	3:30	5,723	1-Jan-10	16:00	0
1-Jan-10	3:45	6,680	1-Jan-10	16:15	0
1-Jan-10	4:00	6,544	1-Jan-10	16:30	0
1-Jan-10	4:15	5,804	1-Jan-10	16:45	0
1-Jan-10	4:30	5,020	1-Jan-10	17:00	0
1-Jan-10	4:45	4,417	1-Jan-10	17:15	0
1-Jan-10	5:00	3,964	1-Jan-10	17:30	0
1-Jan-10	5:15	3,661	1-Jan-10	17:45	0
1-Jan-10	5:30	3,447	1-Jan-10	18:00	0
1-Jan-10	5:45	3,284	1-Jan-10	18:15	0
1-Jan-10	6:00	3,158	1-Jan-10	18:30	0
1-Jan-10	6:15	2,961	1-Jan-10	18:45	0
1-Jan-10	6:30	2,547	1-Jan-10	19:00	0
1-Jan-10	6:45	1,959	1-Jan-10	19:15	0
1-Jan-10	7:00	1,379	1-Jan-10	19:30	0
1-Jan-10	7:15	926	1-Jan-10	19:45	0
1-Jan-10	7:30	613	1-Jan-10	20:00	0
1-Jan-10	7:45	401	1-Jan-10	20:15	0
1-Jan-10	8:00	264	1-Jan-10	20:30	0
1-Jan-10	8:15	175	1-Jan-10	20:45	0
1-Jan-10	8:30	115	1-Jan-10	21:00	0
1-Jan-10	8:45	75	1-Jan-10	21:15	0
1-Jan-10	9:00	50	1-Jan-10	21:30	0
1-Jan-10	9:15	32	1-Jan-10	21:45	0
1-Jan-10	9:30	21	1-Jan-10	22:00	0
1-Jan-10	9:45	13	1-Jan-10	22:15	0
1-Jan-10	10:00	9	1-Jan-10	22:30	0
1-Jan-10	10:15	6	1-Jan-10	22:45	0
1-Jan-10	10:30	4	1-Jan-10	23:00	0
1-Jan-10	10:45	2	1-Jan-10	23:15	0
1-Jan-10	11:00	1	1-Jan-10	23:30	0
1-Jan-10	11:15	0	1-Jan-10	23:45	0
1-Jan-10	11:30	0	2-Jan-10	0:00	0
1-Jan-10	11:45	0			
1-Jan-10	12:00	0			
1-Jan-10	12:15	0			

South River Dam #6 - Augusta County, Virginia
 HEC-HMS Hydrograph Output
 6-hour PMF

Date	Time	Inflow (CFS)	Date	Time	Inflow (CFS)
1-Jan-10	0:00	0	1-Jan-10	12:30	0
1-Jan-10	0:15	0	1-Jan-10	12:45	0
1-Jan-10	0:30	525	1-Jan-10	13:00	0
1-Jan-10	0:45	2,575	1-Jan-10	13:15	0
1-Jan-10	1:00	5,813	1-Jan-10	13:30	0
1-Jan-10	1:15	8,492	1-Jan-10	13:45	0
1-Jan-10	1:30	9,497	1-Jan-10	14:00	0
1-Jan-10	1:45	9,111	1-Jan-10	14:15	0
1-Jan-10	2:00	8,236	1-Jan-10	14:30	0
1-Jan-10	2:15	7,319	1-Jan-10	14:45	0
1-Jan-10	2:30	6,590	1-Jan-10	15:00	0
1-Jan-10	2:45	6,441	1-Jan-10	15:15	0
1-Jan-10	3:00	7,366	1-Jan-10	15:30	0
1-Jan-10	3:15	10,125	1-Jan-10	15:45	0
1-Jan-10	3:30	13,778	1-Jan-10	16:00	0
1-Jan-10	3:45	15,800	1-Jan-10	16:15	0
1-Jan-10	4:00	15,305	1-Jan-10	16:30	0
1-Jan-10	4:15	13,446	1-Jan-10	16:45	0
1-Jan-10	4:30	11,525	1-Jan-10	17:00	0
1-Jan-10	4:45	10,049	1-Jan-10	17:15	0
1-Jan-10	5:00	8,942	1-Jan-10	17:30	0
1-Jan-10	5:15	8,193	1-Jan-10	17:45	0
1-Jan-10	5:30	7,661	1-Jan-10	18:00	0
1-Jan-10	5:45	7,254	1-Jan-10	18:15	0
1-Jan-10	6:00	6,940	1-Jan-10	18:30	0
1-Jan-10	6:15	6,480	1-Jan-10	18:45	0
1-Jan-10	6:30	5,559	1-Jan-10	19:00	0
1-Jan-10	6:45	4,271	1-Jan-10	19:15	0
1-Jan-10	7:00	3,005	1-Jan-10	19:30	0
1-Jan-10	7:15	2,018	1-Jan-10	19:45	0
1-Jan-10	7:30	1,336	1-Jan-10	20:00	0
1-Jan-10	7:45	874	1-Jan-10	20:15	0
1-Jan-10	8:00	577	1-Jan-10	20:30	0
1-Jan-10	8:15	381	1-Jan-10	20:45	0
1-Jan-10	8:30	250	1-Jan-10	21:00	0
1-Jan-10	8:45	164	1-Jan-10	21:15	0
1-Jan-10	9:00	108	1-Jan-10	21:30	0
1-Jan-10	9:15	70	1-Jan-10	21:45	0
1-Jan-10	9:30	45	1-Jan-10	22:00	0
1-Jan-10	9:45	28	1-Jan-10	22:15	0
1-Jan-10	10:00	19	1-Jan-10	22:30	0
1-Jan-10	10:15	12	1-Jan-10	22:45	0
1-Jan-10	10:30	8	1-Jan-10	23:00	0
1-Jan-10	10:45	4	1-Jan-10	23:15	0
1-Jan-10	11:00	2	1-Jan-10	23:30	0
1-Jan-10	11:15	1	1-Jan-10	23:45	0
1-Jan-10	11:30	0	2-Jan-10	0:00	0
1-Jan-10	11:45	0			
1-Jan-10	12:00	0			
1-Jan-10	12:15	0			