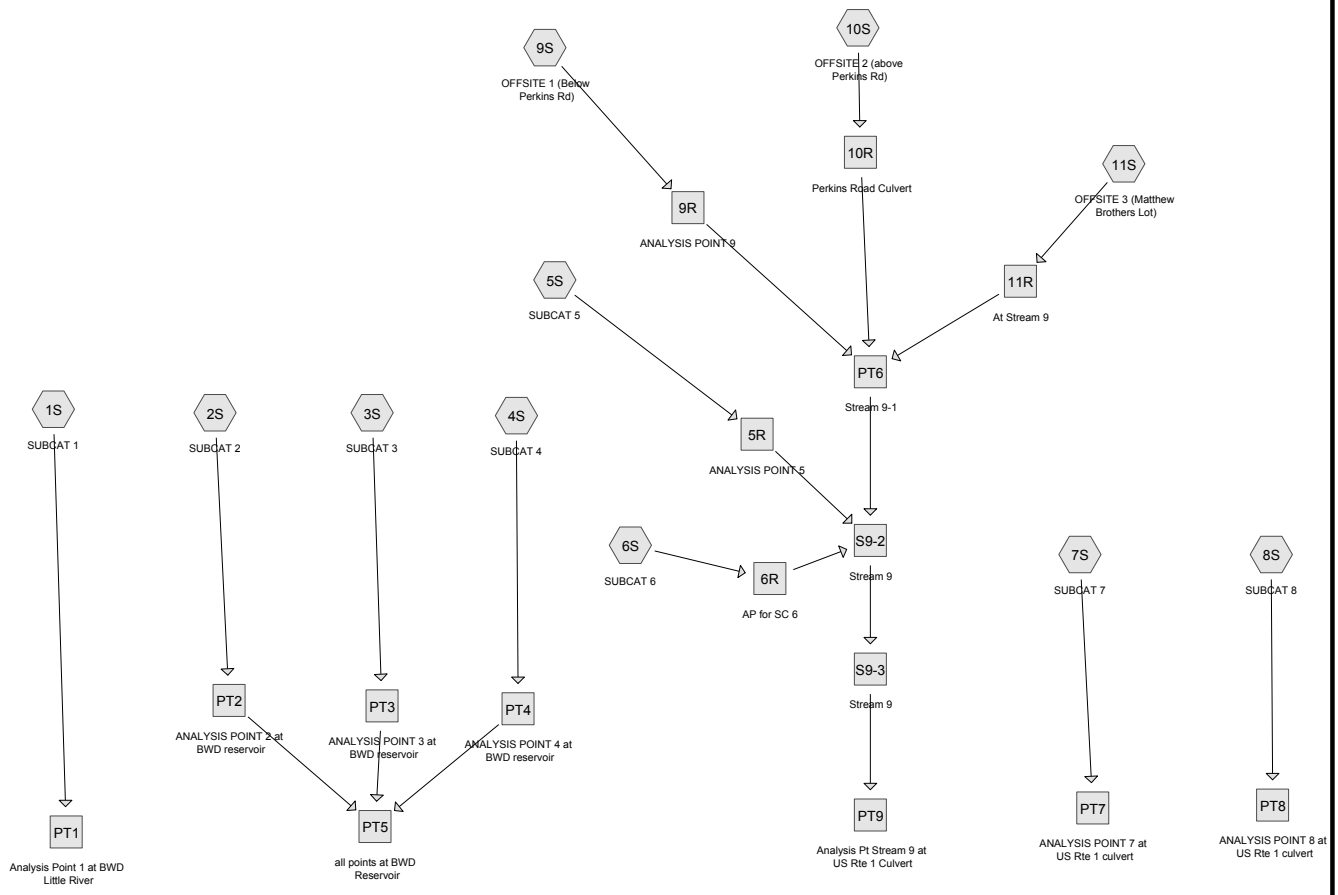
APPENDIX D

Pre-Development HydroCAD and Backup Calculations



Subcat Reach Pond Link

Routing Diagram for pre conditions

Prepared by Ransom Consulting, Printed 4/21/2019

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
3.049	74	>75% Grass cover, Good, HSG C (3S, 4S, 5S, 6S, 9S)
59.528	74	>75% Grass cover, Good, HSG C/D (2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S)
1.194	80	>75% Grass cover, Good, HSG D (6S)
0.179	96	Gravel (6S)
0.088	94	Gravel roads, HSG C/D (9S)
5.078	98	Impervious (6S, 9S, 10S, 11S)
5.217	70	Woods, Good, HSG C (1S, 3S, 4S, 6S)
41.291	70	Woods, Good, HSG C/D (1S, 2S, 4S, 6S, 7S, 8S, 10S, 11S)
0.735	77	Woods, Good, HSG D (6S)
116.358	**74**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
109.172	HSG C	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S
1.929	HSG D	6S
5.257	Other	6S, 9S, 10S, 11S
116.358		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	62.577	1.194	0.000	63.770	>75% Grass cover, Good	2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S
0.000	0.000	0.000	0.000	0.179	0.179	Gravel	6S
0.000	0.000	0.088	0.000	0.000	0.088	Gravel roads	9S
0.000	0.000	0.000	0.000	5.078	5.078	Impervious	6S, 9S, 10S, 11S
0.000	0.000	46.507	0.735	0.000	47.243	Woods, Good	1S, 2S, 3S, 4S, 6S, 7S, 8S, 10S, 11S
0.000	**0.000**	**109.172**	**1.929**	**5.257**	**116.358**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	10R	75.50	75.00	25.0	0.0200	0.013	24.0	0.0	0.0
2	PT7	21.60	18.30	83.0	0.0398	0.013	18.0	0.0	0.0
3	PT8	23.40	18.60	76.0	0.0632	0.011	36.0	24.0	0.0
4	PT9	20.00	14.00	93.0	0.0645	0.011	36.0	0.0	0.0

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SUBCAT1 Runoff Area=316,158 sf 0.00% Impervious Runoff Depth>0.58"
Flow Length=898' Tc=57.7 min CN=70 Runoff=1.92 cfs 0.348 af

Subcatchment2S: SUBCAT2 Runoff Area=692,288 sf 0.00% Impervious Runoff Depth>0.56"
Flow Length=1,533' Tc=101.5 min CN=70 Runoff=2.92 cfs 0.741 af

Subcatchment3S: SUBCAT3 Runoff Area=391,117 sf 0.00% Impervious Runoff Depth>0.66"
Flow Length=1,335' Tc=48.7 min CN=72 Runoff=3.11 cfs 0.495 af

Subcatchment4S: SUBCAT4 Runoff Area=254,691 sf 0.00% Impervious Runoff Depth>0.67"
Flow Length=1,170' Tc=30.2 min CN=72 Runoff=2.58 cfs 0.326 af

Subcatchment5S: SUBCAT5 Runoff Area=231,278 sf 0.00% Impervious Runoff Depth>0.76"
Flow Length=839' Tc=31.3 min CN=74 Runoff=2.69 cfs 0.335 af

Subcatchment6S: SUBCAT6 Runoff Area=342,649 sf 10.21% Impervious Runoff Depth>0.85"
Flow Length=445' Tc=41.6 min CN=76 Runoff=3.99 cfs 0.558 af

Subcatchment7S: SUBCAT7 Runoff Area=96,383 sf 0.00% Impervious Runoff Depth>0.57"
Flow Length=541' Tc=64.7 min CN=70 Runoff=0.55 cfs 0.106 af

Subcatchment8S: SUBCAT8 Runoff Area=14,976 sf 0.00% Impervious Runoff Depth>0.62"
Flow Length=276' Tc=34.7 min CN=71 Runoff=0.13 cfs 0.018 af

Subcatchment9S: OFFSITE 1 (Below Runoff Area=570,508 sf 4.47% Impervious Runoff Depth>0.80"
Flow Length=1,353' Tc=35.1 min CN=75 Runoff=6.75 cfs 0.878 af

Subcatchment10S: OFFSITE 2 (above Runoff Area=1,644,982 sf 2.57% Impervious Runoff Depth>0.73"
Flow Length=2,221' Tc=94.2 min CN=74 Runoff=10.03 cfs 2.307 af

Subcatchment11S: OFFSITE 3 (Matthew Runoff Area=513,527 sf 23.06% Impervious Runoff Depth>0.97"
Flow Length=532' Tc=6.8 min CN=78 Runoff=13.59 cfs 0.953 af

Reach 5R: ANALYSISPOINT 5 Inflow=2.69 cfs 0.335 af
Outflow=2.69 cfs 0.335 af

Reach 6R: AP for SC 6 Inflow=3.99 cfs 0.558 af
Outflow=3.99 cfs 0.558 af

Reach 9R: ANALYSISPOINT 9 Inflow=6.75 cfs 0.878 af
Outflow=6.75 cfs 0.878 af

Reach 10R: Perkins Road Culvert Avg. Flow Depth=0.77' Max Vel=9.01 fps Inflow=10.03 cfs 2.307 af
24.0" Round Pipe n=0.013 L=25.0' S=0.0200 '/' Capacity=31.99 cfs Outflow=10.03 cfs 2.307 af

Reach 11R: At Stream 9 Inflow=13.59 cfs 0.953 af
Outflow=13.59 cfs 0.953 af

Reach PT1: Analysis Point 1 at BWD Little River Inflow=1.92 cfs 0.348 af
Outflow=1.92 cfs 0.348 af

Reach PT2: ANALYSIS POINT 2 at BWD reservoir Inflow=2.92 cfs 0.741 af
Outflow=2.92 cfs 0.741 af

Reach PT3: ANALYSIS POINT 3 at BWD reservoir Inflow=3.11 cfs 0.495 af
Outflow=3.11 cfs 0.495 af

Reach PT4: ANALYSIS POINT 4 at BWD reservoir Inflow=2.58 cfs 0.326 af
Outflow=2.58 cfs 0.326 af

Reach PT5: all points at BWD Reservoir Inflow=6.18 cfs 1.561 af
Outflow=6.18 cfs 1.561 af

Reach PT6: Stream 9-1 Avg. Flow Depth=0.64' Max Vel=3.81 fps Inflow=15.78 cfs 4.137 af
n=0.030 L=483.0' S=0.0145 '/' Capacity=535.88 cfs Outflow=14.92 cfs 4.122 af

Reach PT7: ANALYSIS POINT 7 at US Avg. Flow Depth=0.17' Max Vel=5.08 fps Inflow=0.55 cfs 0.106 af
18.0" Round Pipe n=0.013 L=83.0' S=0.0398 '/' Capacity=20.95 cfs Outflow=0.55 cfs 0.106 af

Reach PT8: ANALYSIS POINT 8 at US Avg. Flow Depth=0.02' Max Vel=2.48 fps Inflow=0.13 cfs 0.018 af
36.0" x 24.0" Box Pipe n=0.011 L=76.0' S=0.0632 '/' Capacity=144.91 cfs Outflow=0.13 cfs 0.018 af

Reach PT9: Analysis Pt Stream 9 at Avg. Flow Depth=0.63' Max Vel=18.00 fps Inflow=19.61 cfs 4.954 af
36.0" Round Pipe n=0.011 L=93.0' S=0.0645 '/' Capacity=200.22 cfs Outflow=19.61 cfs 4.954 af

Reach S9-2: Stream 9 Avg. Flow Depth=0.64' Max Vel=4.85 fps Inflow=19.89 cfs 5.015 af
n=0.030 L=1,580.0' S=0.0233 '/' Capacity=161.21 cfs Outflow=19.65 cfs 4.967 af

Reach S9-3: Stream 9 Avg. Flow Depth=0.65' Max Vel=4.37 fps Inflow=19.65 cfs 4.967 af
n=0.030 L=364.0' S=0.0199 '/' Capacity=177.67 cfs Outflow=19.61 cfs 4.954 af

Total Runoff Area = 116.358 ac Runoff Volume = 7.063 af Average Runoff Depth = 0.73"
95.64% Pervious = 111.280 ac 4.36% Impervious = 5.078 ac

Summary for Subcatchment 1S: SUBCAT 1

Runoff = 1.92 cfs @ 12.89 hrs, Volume= 0.348 af, Depth> 0.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=2.90"

	Area (sf)	CN	Description
*	303,390	70	Woods, Good, HSG C/D
	12,768	70	Woods, Good, HSG C
	316,158	70	Weighted Average
	316,158		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.6	88	0.0450	0.06		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
3.5	65	0.0150	0.31		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
2.0	72	0.0550	0.59		**Shallow Concentrated Flow, c-d** Forest w/Heavy Litter Kv= 2.5 fps
25.6	470	0.0150	0.31		**Shallow Concentrated Flow, d-e** Forest w/Heavy Litter Kv= 2.5 fps
1.0	203	0.1000	3.41	13.64	**Trap/Vee/Rect Channel Flow, e-f** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
57.7	898	Total			

Summary for Subcatchment 2S: SUBCAT 2

Runoff = 2.92 cfs @ 13.53 hrs, Volume= 0.741 af, Depth> 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=2.90"

	Area (sf)	CN	Description
*	653,559	70	Woods, Good, HSG C/D
*	38,729	74	>75% Grass cover, Good, HSG C/D
	692,288	70	Weighted Average
	692,288		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
55.7	134	0.0150	0.04		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
5.8	175	0.0400	0.50		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
13.3	199	0.0100	0.25		**Shallow Concentrated Flow, c-d** Forest w/Heavy Litter Kv= 2.5 fps
1.2	41	0.0490	0.55		**Shallow Concentrated Flow, d-e** Forest w/Heavy Litter Kv= 2.5 fps
22.1	468	0.0200	0.35		**Shallow Concentrated Flow, e-f** Forest w/Heavy Litter Kv= 2.5 fps
3.4	516	0.0550	2.53	10.11	**Trap/Vee/Rect Channel Flow, f-g** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
101.5	1,533	Total			

Summary for Subcatchment 3S: SUBCAT 3

Runoff = 3.11 cfs @ 12.74 hrs, Volume= 0.495 af, Depth> 0.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=2.90"

	Area (sf)	CN	Description
*	205,588	74	>75% Grass cover, Good, HSG C/D
	22,290	74	>75% Grass cover, Good, HSG C
	163,239	70	Woods, Good, HSG C
	391,117	72	Weighted Average
	391,117		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1	115	0.0400	0.10		**Sheet Flow, a-b** Woods: Light underbrush n= 0.400 P2= 2.90"
3.4	155	0.0230	0.76		**Shallow Concentrated Flow, b-c** Woodland Kv= 5.0 fps
9.3	372	0.0090	0.66		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
2.3	134	0.0190	0.96		**Shallow Concentrated Flow, d-e** Short Grass Pasture Kv= 7.0 fps
12.6	254	0.0180	0.34		**Shallow Concentrated Flow, e-f** Forest w/Heavy Litter Kv= 2.5 fps
2.0	305	0.0560	2.55	10.21	**Trap/Vee/Rect Channel Flow, f-g** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
48.7	1,335	Total			

Summary for Subcatchment 4S: SUBCAT 4

Runoff = 2.58 cfs @ 12.48 hrs, Volume= 0.326 af, Depth> 0.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=2.90"

	Area (sf)	CN	Description
*	130,853	74	>75% Grass cover, Good, HSG C/D
	26,033	74	>75% Grass cover, Good, HSG C
	40,857	70	Woods, Good, HSG C
*	56,948	70	Woods, Good, HSG C/D
	254,691	72	Weighted Average
	254,691		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	135	0.0270	0.13		**Sheet Flow, a-b** Grass: Dense n= 0.240 P2= 2.90"
7.8	462	0.0200	0.99		**Shallow Concentrated Flow, b-c** Short Grass Pasture Kv= 7.0 fps
2.2	184	0.0380	1.36		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
3.3	389	0.0330	1.96	7.83	**Trap/Vee/Rect Channel Flow, d-e** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
30.2	1,170	Total			

Summary for Subcatchment 5S: SUBCAT 5

Runoff = 2.69 cfs @ 12.49 hrs, Volume= 0.335 af, Depth> 0.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=2.90"

	Area (sf)	CN	Description
*	156,287	74	>75% Grass cover, Good, HSG C/D
	74,991	74	>75% Grass cover, Good, HSG C
	231,278	74	Weighted Average
	231,278		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.0	198	0.0270	0.14		**Sheet Flow, a-b** Grass: Dense n= 0.240 P2= 2.90"
2.9	146	0.0140	0.83		**Shallow Concentrated Flow, b-c** Short Grass Pasture Kv= 7.0 fps
3.8	285	0.0320	1.25		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
1.6	210	0.0430	2.24	8.94	**Trap/Vee/Rect Channel Flow, d-e** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
31.3	839	Total			

Summary for Subcatchment 6S: SUBCAT 6

Runoff = 3.99 cfs @ 12.62 hrs, Volume= 0.558 af, Depth> 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=2.90"

	Area (sf)	CN	Description
*	142,888	70	Woods, Good, HSG C/D
	10,372	70	Woods, Good, HSG C
*	61,952	74	>75% Grass cover, Good, HSG C/D
	635	74	>75% Grass cover, Good, HSG C
	51,989	80	>75% Grass cover, Good, HSG D
*	7,818	96	Gravel
*	34,971	98	Impervious
	32,024	77	Woods, Good, HSG D
	342,649	76	Weighted Average
	307,678		89.79% Pervious Area
	34,971		10.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.0	67	0.0150	0.03		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
5.2	92	0.0140	0.30		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
1.8	74	0.0100	0.70		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
1.7	163	0.0550	1.64		**Shallow Concentrated Flow, d-e** Short Grass Pasture Kv= 7.0 fps
0.8	39	0.1000	0.79		**Shallow Concentrated Flow, e-f** Forest w/Heavy Litter Kv= 2.5 fps
0.1	10	0.5000	1.77		**Shallow Concentrated Flow, f-g** Forest w/Heavy Litter Kv= 2.5 fps
41.6	445	Total			

Summary for Subcatchment 7S: SUBCAT 7

Runoff = 0.55 cfs @ 12.99 hrs, Volume= 0.106 af, Depth> 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=2.90"

	Area (sf)	CN	Description
*	93,505	70	Woods, Good, HSG C/D
*	2,878	74	>75% Grass cover, Good, HSG C/D
	96,383	70	Weighted Average
	96,383		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
54.6	172	0.0260	0.05		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
2.8	112	0.0700	0.66		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
0.2	13	0.2300	1.20		**Shallow Concentrated Flow, c-d** Forest w/Heavy Litter Kv= 2.5 fps
6.6	171	0.0300	0.43		**Shallow Concentrated Flow, d-e** Forest w/Heavy Litter Kv= 2.5 fps
0.5	73	0.0600	2.64	10.56	**Trap/Vee/Rect Channel Flow, e-f** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
64.7	541	Total			

Summary for Subcatchment 8S: SUBCAT 8

Runoff = 0.13 cfs @ 12.55 hrs, Volume= 0.018 af, Depth> 0.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=2.90"

	Area (sf)	CN	Description
*	12,652	70	Woods, Good, HSG C/D
*	2,324	74	>75% Grass cover, Good, HSG C/D
	14,976	71	Weighted Average
	14,976		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.0	67	0.0150	0.03		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
1.1	43	0.0700	0.66		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
0.1	14	0.7100	2.11		**Shallow Concentrated Flow, c-d** Forest w/Heavy Litter Kv= 2.5 fps
1.5	152	0.0240	1.67	6.68	**Trap/Vee/Rect Channel Flow, d-e** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100
34.7	276	Total			

Summary for Subcatchment 9S: OFFSITE 1 (Below Perkins Rd)

Runoff = 6.75 cfs @ 12.53 hrs, Volume= 0.878 af, Depth> 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=2.90"

	Area (sf)	CN	Description
*	25,513	98	Impervious
*	532,320	74	>75% Grass cover, Good, HSG C/D
*	3,818	94	Gravel roads, HSG C/D
	8,857	74	>75% Grass cover, Good, HSG C
	570,508	75	Weighted Average
	544,995		95.53% Pervious Area
	25,513		4.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	15	0.2000	2.25		**Sheet Flow, a-b** Smooth surfaces n= 0.011 P2= 2.90"
12.6	373	0.0050	0.49		**Shallow Concentrated Flow, b-c** Short Grass Pasture Kv= 7.0 fps
13.1	715	0.0170	0.91		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
9.3	250	0.0320	0.45		**Shallow Concentrated Flow, d-e** Forest w/Heavy Litter Kv= 2.5 fps
35.1	1,353	Total			

Summary for Subcatchment 10S: OFFSITE 2 (above Perkins Rd)

Runoff = 10.03 cfs @ 13.35 hrs, Volume= 2.307 af, Depth> 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=2.90"

	Area (sf)	CN	Description
*	298,066	70	Woods, Good, HSG C/D
*	42,276	98	Impervious
*	1,304,640	74	>75% Grass cover, Good, HSG C/D
	1,644,982	74	Weighted Average
	1,602,706		97.43% Pervious Area
	42,276		2.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
45.2	141	0.0280	0.05		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
15.3	384	0.0280	0.42		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
2.5	227	0.0480	1.53		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
18.6	780	0.0100	0.70		**Shallow Concentrated Flow, d-e** Short Grass Pasture Kv= 7.0 fps
12.6	689	0.0170	0.91		**Shallow Concentrated Flow, e-f** Short Grass Pasture Kv= 7.0 fps
94.2	2,221	Total			

Summary for Subcatchment 11S: OFFSITE 3 (Matthew Brothers Lot)

Runoff = 13.59 cfs @ 12.11 hrs, Volume= 0.953 af, Depth> 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-year Rainfall=2.90"

	Area (sf)	CN	Description
*	118,437	98	Impervious
*	237,621	70	Woods, Good, HSG C/D
*	157,469	74	>75% Grass cover, Good, HSG C/D
	513,527	78	Weighted Average
	395,090		76.94% Pervious Area
	118,437		23.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	16	0.1870	2.22		**Sheet Flow, a-b** Smooth surfaces n= 0.011 P2= 2.90"
4.7	419	0.0100	1.50		**Shallow Concentrated Flow, b-c** Grassed Waterway Kv= 15.0 fps
2.0	97	0.1000	0.79		**Shallow Concentrated Flow, c-d** Forest w/Heavy Litter Kv= 2.5 fps
6.8	532	Total			

Summary for Reach 5R: ANALYSIS POINT 5

Inflow Area = 5.309 ac, 0.00% Impervious, Inflow Depth > 0.76" for 2-year event
Inflow = 2.69 cfs @ 12.49 hrs, Volume= 0.335 af
Outflow = 2.69 cfs @ 12.49 hrs, Volume= 0.335 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach 6R: AP for SC 6

Inflow Area = 7.866 ac, 10.21% Impervious, Inflow Depth > 0.85" for 2-year event
Inflow = 3.99 cfs @ 12.62 hrs, Volume= 0.558 af
Outflow = 3.99 cfs @ 12.62 hrs, Volume= 0.558 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach 9R: ANALYSIS POINT 9

Inflow Area = 13.097 ac, 4.47% Impervious, Inflow Depth > 0.80" for 2-year event
Inflow = 6.75 cfs @ 12.53 hrs, Volume= 0.878 af
Outflow = 6.75 cfs @ 12.53 hrs, Volume= 0.878 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

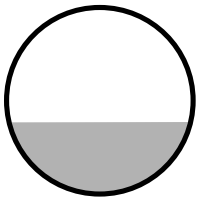
Summary for Reach 10R: Perkins Road Culvert

Inflow Area = 37.764 ac, 2.57% Impervious, Inflow Depth > 0.73" for 2-year event
Inflow = 10.03 cfs @ 13.35 hrs, Volume= 2.307 af
Outflow = 10.03 cfs @ 13.36 hrs, Volume= 2.307 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 9.01 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 5.80 fps, Avg. Travel Time= 0.1 min

Peak Storage= 28 cf @ 13.35 hrs
Average Depth at Peak Storage= 0.77'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 31.99 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 25.0' Slope= 0.0200 '/'
Inlet Invert= 75.50', Outlet Invert= 75.00'



Summary for Reach 11R: At Stream 9

Inflow Area = 11.789 ac, 23.06% Impervious, Inflow Depth > 0.97" for 2-year event
Inflow = 13.59 cfs @ 12.11 hrs, Volume= 0.953 af
Outflow = 13.59 cfs @ 12.11 hrs, Volume= 0.953 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT1: Analysis Point 1 at BWD Little River

Inflow Area = 7.258 ac, 0.00% Impervious, Inflow Depth > 0.58" for 2-year event
Inflow = 1.92 cfs @ 12.89 hrs, Volume= 0.348 af
Outflow = 1.92 cfs @ 12.89 hrs, Volume= 0.348 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT2: ANALYSIS POINT 2 at BWD reservoir

Inflow Area = 15.893 ac, 0.00% Impervious, Inflow Depth > 0.56" for 2-year event
Inflow = 2.92 cfs @ 13.53 hrs, Volume= 0.741 af
Outflow = 2.92 cfs @ 13.53 hrs, Volume= 0.741 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT3: ANALYSIS POINT 3 at BWD reservoir

Inflow Area = 8.979 ac, 0.00% Impervious, Inflow Depth > 0.66" for 2-year event
Inflow = 3.11 cfs @ 12.74 hrs, Volume= 0.495 af
Outflow = 3.11 cfs @ 12.74 hrs, Volume= 0.495 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT4: ANALYSIS POINT 4 at BWD reservoir

Inflow Area = 5.847 ac, 0.00% Impervious, Inflow Depth > 0.67" for 2-year event
Inflow = 2.58 cfs @ 12.48 hrs, Volume= 0.326 af
Outflow = 2.58 cfs @ 12.48 hrs, Volume= 0.326 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT5: all points at BWD Reservoir

Inflow Area = 30.718 ac, 0.00% Impervious, Inflow Depth > 0.61" for 2-year event
Inflow = 6.18 cfs @ 12.74 hrs, Volume= 1.561 af
Outflow = 6.18 cfs @ 12.74 hrs, Volume= 1.561 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT6: Stream 9-1

Inflow Area = 62.650 ac, 6.82% Impervious, Inflow Depth > 0.79" for 2-year event
Inflow = 15.78 cfs @ 12.12 hrs, Volume= 4.137 af
Outflow = 14.92 cfs @ 12.19 hrs, Volume= 4.122 af, Atten= 5%, Lag= 4.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.81 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 2.35 fps, Avg. Travel Time= 3.4 min

Peak Storage= 1,935 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.64'
Bank-Full Depth= 4.00' Flow Area= 52.0 sf, Capacity= 535.88 cfs

5.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 21.00'
Length= 483.0' Slope= 0.0145 '/'
Inlet Invert= 71.00', Outlet Invert= 64.00'

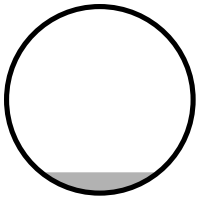
Summary for Reach PT7: ANALYSIS POINT 7 at US Rte 1 culvert

Inflow Area = 2.213 ac, 0.00% Impervious, Inflow Depth > 0.57" for 2-year event
Inflow = 0.55 cfs @ 12.99 hrs, Volume= 0.106 af
Outflow = 0.55 cfs @ 13.00 hrs, Volume= 0.106 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.08 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 3.22 fps, Avg. Travel Time= 0.4 min

Peak Storage= 9 cf @ 12.99 hrs
Average Depth at Peak Storage= 0.17'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 20.95 cfs

18.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 83.0' Slope= 0.0398 '/'
Inlet Invert= 21.60', Outlet Invert= 18.30'



Summary for Reach PT8: ANALYSIS POINT 8 at US Rte 1 culvert

Inflow Area = 0.344 ac, 0.00% Impervious, Inflow Depth > 0.62" for 2-year event
Inflow = 0.13 cfs @ 12.55 hrs, Volume= 0.018 af
Outflow = 0.13 cfs @ 12.57 hrs, Volume= 0.018 af, Atten= 0%, Lag= 1.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.48 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 2.48 fps, Avg. Travel Time= 0.5 min

Peak Storage= 4 cf @ 12.56 hrs
Average Depth at Peak Storage= 0.02'
Bank-Full Depth= 2.00' Flow Area= 6.0 sf, Capacity= 144.91 cfs

36.0" W x 24.0" H Box Pipe
n= 0.011 Concrete pipe, straight & clean
Length= 76.0' Slope= 0.0632 '/'
Inlet Invert= 23.40', Outlet Invert= 18.60'

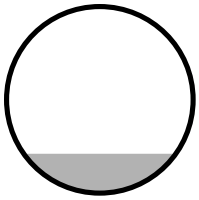
Summary for Reach PT9: Analysis Pt Stream 9 at US Rte 1 Culvert

Inflow Area = 75.825 ac, 6.70% Impervious, Inflow Depth > 0.78" for 2-year event
Inflow = 19.61 cfs @ 12.73 hrs, Volume= 4.954 af
Outflow = 19.61 cfs @ 12.73 hrs, Volume= 4.954 af, Atten= 0%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 18.00 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 11.40 fps, Avg. Travel Time= 0.1 min

Peak Storage= 101 cf @ 12.73 hrs
Average Depth at Peak Storage= 0.63'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 200.22 cfs

36.0" Round Pipe
n= 0.011 Concrete pipe, straight & clean
Length= 93.0' Slope= 0.0645 '/'
Inlet Invert= 20.00', Outlet Invert= 14.00'



Summary for Reach S9-2: Stream 9

Inflow Area = 75.825 ac, 6.70% Impervious, Inflow Depth > 0.79" for 2-year event
Inflow = 19.89 cfs @ 12.53 hrs, Volume= 5.015 af
Outflow = 19.65 cfs @ 12.69 hrs, Volume= 4.967 af, Atten= 1%, Lag= 9.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.85 fps, Min. Travel Time= 5.4 min
Avg. Velocity = 2.88 fps, Avg. Travel Time= 9.1 min

Peak Storage= 6,408 cf @ 12.60 hrs
Average Depth at Peak Storage= 0.64'
Bank-Full Depth= 2.00' Flow Area= 18.0 sf, Capacity= 161.21 cfs

5.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 13.00'
Length= 1,580.0' Slope= 0.0233 '/'
Inlet Invert= 64.00', Outlet Invert= 27.25'

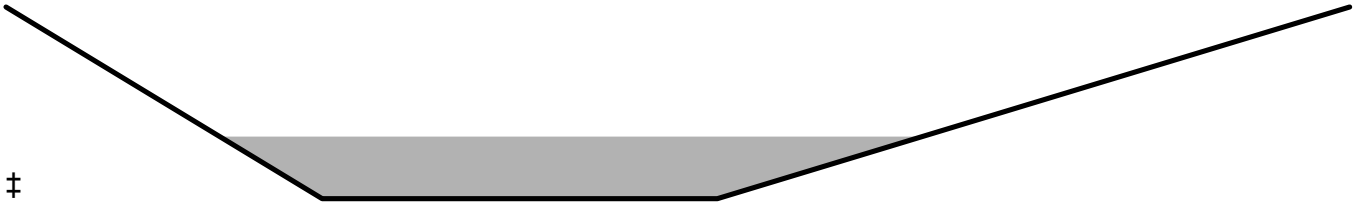
Summary for Reach S9-3: Stream 9

Inflow Area = 75.825 ac, 6.70% Impervious, Inflow Depth > 0.79" for 2-year event
Inflow = 19.65 cfs @ 12.69 hrs, Volume= 4.967 af
Outflow = 19.61 cfs @ 12.73 hrs, Volume= 4.954 af, Atten= 0%, Lag= 2.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.37 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 2.65 fps, Avg. Travel Time= 2.3 min

Peak Storage= 1,638 cf @ 12.71 hrs
Average Depth at Peak Storage= 0.65'
Bank-Full Depth= 2.00' Flow Area= 22.0 sf, Capacity= 177.67 cfs

5.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 4.0 '/' Top Width= 17.00'
Length= 364.0' Slope= 0.0199 '/'
Inlet Invert= 27.25', Outlet Invert= 20.00'



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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SUBCAT 1 Runoff Area=316,158 sf 0.00% Impervious Runoff Depth>1.31"
Flow Length=898' Tc=57.7 min CN=70 Runoff=4.77 cfs 0.792 af

Subcatchment2S: SUBCAT 2 Runoff Area=692,288 sf 0.00% Impervious Runoff Depth>1.28"
Flow Length=1,533' Tc=101.5 min CN=70 Runoff=7.25 cfs 1.695 af

Subcatchment3S: SUBCAT 3 Runoff Area=391,117 sf 0.00% Impervious Runoff Depth>1.44"
Flow Length=1,335' Tc=48.7 min CN=72 Runoff=7.24 cfs 1.081 af

Subcatchment4S: SUBCAT 4 Runoff Area=254,691 sf 0.00% Impervious Runoff Depth>1.46"
Flow Length=1,170' Tc=30.2 min CN=72 Runoff=6.00 cfs 0.710 af

Subcatchment5S: SUBCAT 5 Runoff Area=231,278 sf 0.00% Impervious Runoff Depth>1.59"
Flow Length=839' Tc=31.3 min CN=74 Runoff=5.90 cfs 0.704 af

Subcatchment6S: SUBCAT 6 Runoff Area=342,649 sf 10.21% Impervious Runoff Depth>1.73"
Flow Length=445' Tc=41.6 min CN=76 Runoff=8.32 cfs 1.132 af

Subcatchment7S: SUBCAT 7 Runoff Area=96,383 sf 0.00% Impervious Runoff Depth>1.30"
Flow Length=541' Tc=64.7 min CN=70 Runoff=1.36 cfs 0.241 af

Subcatchment8S: SUBCAT 8 Runoff Area=14,976 sf 0.00% Impervious Runoff Depth>1.39"
Flow Length=276' Tc=34.7 min CN=71 Runoff=0.31 cfs 0.040 af

Subcatchment9S: OFFSITE 1 (Below Runoff Area=570,508 sf 4.47% Impervious Runoff Depth>1.66"
Flow Length=1,353' Tc=35.1 min CN=75 Runoff=14.44 cfs 1.811 af

Subcatchment10S: OFFSITE 2 (above Runoff Area=1,644,982 sf 2.57% Impervious Runoff Depth>1.55"
Flow Length=2,221' Tc=94.2 min CN=74 Runoff=22.26 cfs 4.868 af

Subcatchment11S: OFFSITE 3 (Matthew Runoff Area=513,527 sf 23.06% Impervious Runoff Depth>1.90"
Flow Length=532' Tc=6.8 min CN=78 Runoff=27.08 cfs 1.865 af

Reach 5R: ANALYSISPOINT 5 Inflow=5.90 cfs 0.704 af
Outflow=5.90 cfs 0.704 af

Reach 6R: AP for SC 6 Inflow=8.32 cfs 1.132 af
Outflow=8.32 cfs 1.132 af

Reach 9R: ANALYSISPOINT 9 Inflow=14.44 cfs 1.811 af
Outflow=14.44 cfs 1.811 af

Reach 10R: Perkins Road Culvert Avg. Flow Depth=1.23' Max Vel=11.00 fps Inflow=22.26 cfs 4.868 af
24.0" Round Pipe n=0.013 L=25.0' S=0.0200 '/' Capacity=31.99 cfs Outflow=22.25 cfs 4.868 af

Reach 11R: At Stream 9 Inflow=27.08 cfs 1.865 af
Outflow=27.08 cfs 1.865 af

Reach PT1: Analysis Point 1 at BWD Little River Inflow=4.77 cfs 0.792 af
Outflow=4.77 cfs 0.792 af

Reach PT2: ANALYSIS POINT 2 at BWD reservoir Inflow=7.25 cfs 1.695 af
Outflow=7.25 cfs 1.695 af

Reach PT3: ANALYSIS POINT 3 at BWD reservoir Inflow=7.24 cfs 1.081 af
Outflow=7.24 cfs 1.081 af

Reach PT4: ANALYSIS POINT 4 at BWD reservoir Inflow=6.00 cfs 0.710 af
Outflow=6.00 cfs 0.710 af

Reach PT5: all points at BWD Reservoir Inflow=14.99 cfs 3.485 af
Outflow=14.99 cfs 3.485 af

Reach PT6: Stream 9-1 Avg. Flow Depth=0.99' Max Vel=4.84 fps Inflow=34.26 cfs 8.544 af
n=0.030 L=483.0' S=0.0145 '/' Capacity=535.88 cfs Outflow=32.89 cfs 8.523 af

Reach PT7: ANALYSIS POINT 7 at US Avg. Flow Depth=0.26' Max Vel=6.67 fps Inflow=1.36 cfs 0.241 af
18.0" Round Pipe n=0.013 L=83.0' S=0.0398 '/' Capacity=20.95 cfs Outflow=1.36 cfs 0.240 af

Reach PT8: ANALYSIS POINT 8 at US Avg. Flow Depth=0.03' Max Vel=3.45 fps Inflow=0.31 cfs 0.040 af
36.0" x 24.0" Box Pipe n=0.011 L=76.0' S=0.0632 '/' Capacity=144.91 cfs Outflow=0.31 cfs 0.040 af

Reach PT9: Analysis Pt Stream 9 at Avg. Flow Depth=0.94' Max Vel=22.55 fps Inflow=42.91 cfs 10.273 af
36.0" Round Pipe n=0.011 L=93.0' S=0.0645 '/' Capacity=200.22 cfs Outflow=42.90 cfs 10.272 af

Reach S9-2: Stream 9 Avg. Flow Depth=1.00' Max Vel=6.17 fps Inflow=43.38 cfs 10.359 af
n=0.030 L=1,580.0' S=0.0233 '/' Capacity=161.21 cfs Outflow=42.98 cfs 10.290 af

Reach S9-3: Stream 9 Avg. Flow Depth=0.98' Max Vel=5.49 fps Inflow=42.98 cfs 10.290 af
n=0.030 L=364.0' S=0.0199 '/' Capacity=177.67 cfs Outflow=42.91 cfs 10.273 af

Total Runoff Area = 116.358 ac Runoff Volume = 14.938 af Average Runoff Depth = 1.54"
95.64% Pervious = 111.280 ac 4.36% Impervious = 5.078 ac

Summary for Subcatchment 1S: SUBCAT 1

Runoff = 4.77 cfs @ 12.83 hrs, Volume= 0.792 af, Depth> 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.20"

	Area (sf)	CN	Description
*	303,390	70	Woods, Good, HSG C/D
	12,768	70	Woods, Good, HSG C
	316,158	70	Weighted Average
	316,158		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.6	88	0.0450	0.06		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
3.5	65	0.0150	0.31		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
2.0	72	0.0550	0.59		**Shallow Concentrated Flow, c-d** Forest w/Heavy Litter Kv= 2.5 fps
25.6	470	0.0150	0.31		**Shallow Concentrated Flow, d-e** Forest w/Heavy Litter Kv= 2.5 fps
1.0	203	0.1000	3.41	13.64	**Trap/Vee/Rect Channel Flow, e-f** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
57.7	898	Total			

Summary for Subcatchment 2S: SUBCAT 2

Runoff = 7.25 cfs @ 13.43 hrs, Volume= 1.695 af, Depth> 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.20"

	Area (sf)	CN	Description
*	653,559	70	Woods, Good, HSG C/D
*	38,729	74	>75% Grass cover, Good, HSG C/D
	692,288	70	Weighted Average
	692,288		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
55.7	134	0.0150	0.04		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
5.8	175	0.0400	0.50		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
13.3	199	0.0100	0.25		**Shallow Concentrated Flow, c-d** Forest w/Heavy Litter Kv= 2.5 fps
1.2	41	0.0490	0.55		**Shallow Concentrated Flow, d-e** Forest w/Heavy Litter Kv= 2.5 fps
22.1	468	0.0200	0.35		**Shallow Concentrated Flow, e-f** Forest w/Heavy Litter Kv= 2.5 fps
3.4	516	0.0550	2.53	10.11	**Trap/Vee/Rect Channel Flow, f-g** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
101.5	1,533	Total			

Summary for Subcatchment 3S: SUBCAT 3

Runoff = 7.24 cfs @ 12.70 hrs, Volume= 1.081 af, Depth> 1.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.20"

	Area (sf)	CN	Description
*	205,588	74	>75% Grass cover, Good, HSG C/D
	22,290	74	>75% Grass cover, Good, HSG C
	163,239	70	Woods, Good, HSG C
	391,117	72	Weighted Average
	391,117		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1	115	0.0400	0.10		**Sheet Flow, a-b** Woods: Light underbrush n= 0.400 P2= 2.90"
3.4	155	0.0230	0.76		**Shallow Concentrated Flow, b-c** Woodland Kv= 5.0 fps
9.3	372	0.0090	0.66		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
2.3	134	0.0190	0.96		**Shallow Concentrated Flow, d-e** Short Grass Pasture Kv= 7.0 fps
12.6	254	0.0180	0.34		**Shallow Concentrated Flow, e-f** Forest w/Heavy Litter Kv= 2.5 fps
2.0	305	0.0560	2.55	10.21	**Trap/Vee/Rect Channel Flow, f-g** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
48.7	1,335	Total			

Summary for Subcatchment 4S: SUBCAT 4

Runoff = 6.00 cfs @ 12.45 hrs, Volume= 0.710 af, Depth> 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.20"

	Area (sf)	CN	Description
*	130,853	74	>75% Grass cover, Good, HSG C/D
	26,033	74	>75% Grass cover, Good, HSG C
	40,857	70	Woods, Good, HSG C
*	56,948	70	Woods, Good, HSG C/D
	254,691	72	Weighted Average
	254,691		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	135	0.0270	0.13		**Sheet Flow, a-b** Grass: Dense n= 0.240 P2= 2.90"
7.8	462	0.0200	0.99		**Shallow Concentrated Flow, b-c** Short Grass Pasture Kv= 7.0 fps
2.2	184	0.0380	1.36		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
3.3	389	0.0330	1.96	7.83	**Trap/Vee/Rect Channel Flow, d-e** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
30.2	1,170	Total			

Summary for Subcatchment 5S: SUBCAT 5

Runoff = 5.90 cfs @ 12.46 hrs, Volume= 0.704 af, Depth> 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.20"

	Area (sf)	CN	Description
*	156,287	74	>75% Grass cover, Good, HSG C/D
	74,991	74	>75% Grass cover, Good, HSG C
	231,278	74	Weighted Average
	231,278		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.0	198	0.0270	0.14		**Sheet Flow, a-b** Grass: Dense n= 0.240 P2= 2.90"
2.9	146	0.0140	0.83		**Shallow Concentrated Flow, b-c** Short Grass Pasture Kv= 7.0 fps
3.8	285	0.0320	1.25		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
1.6	210	0.0430	2.24	8.94	**Trap/Vee/Rect Channel Flow, d-e** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
31.3	839	Total			

Summary for Subcatchment 6S: SUBCAT 6

Runoff = 8.32 cfs @ 12.59 hrs, Volume= 1.132 af, Depth> 1.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.20"

	Area (sf)	CN	Description
*	142,888	70	Woods, Good, HSG C/D
	10,372	70	Woods, Good, HSG C
*	61,952	74	>75% Grass cover, Good, HSG C/D
	635	74	>75% Grass cover, Good, HSG C
	51,989	80	>75% Grass cover, Good, HSG D
*	7,818	96	Gravel
*	34,971	98	Impervious
	32,024	77	Woods, Good, HSG D
	342,649	76	Weighted Average
	307,678		89.79% Pervious Area
	34,971		10.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.0	67	0.0150	0.03		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
5.2	92	0.0140	0.30		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
1.8	74	0.0100	0.70		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
1.7	163	0.0550	1.64		**Shallow Concentrated Flow, d-e** Short Grass Pasture Kv= 7.0 fps
0.8	39	0.1000	0.79		**Shallow Concentrated Flow, e-f** Forest w/Heavy Litter Kv= 2.5 fps
0.1	10	0.5000	1.77		**Shallow Concentrated Flow, f-g** Forest w/Heavy Litter Kv= 2.5 fps
41.6	445	Total			

Summary for Subcatchment 7S: SUBCAT 7

Runoff = 1.36 cfs @ 12.92 hrs, Volume= 0.241 af, Depth> 1.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.20"

	Area (sf)	CN	Description
*	93,505	70	Woods, Good, HSG C/D
*	2,878	74	>75% Grass cover, Good, HSG C/D
	96,383	70	Weighted Average
	96,383		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
54.6	172	0.0260	0.05		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
2.8	112	0.0700	0.66		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
0.2	13	0.2300	1.20		**Shallow Concentrated Flow, c-d** Forest w/Heavy Litter Kv= 2.5 fps
6.6	171	0.0300	0.43		**Shallow Concentrated Flow, d-e** Forest w/Heavy Litter Kv= 2.5 fps
0.5	73	0.0600	2.64	10.56	**Trap/Vee/Rect Channel Flow, e-f** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
64.7	541	Total			

Summary for Subcatchment 8S: SUBCAT 8

Runoff = 0.31 cfs @ 12.52 hrs, Volume= 0.040 af, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.20"

	Area (sf)	CN	Description
*	12,652	70	Woods, Good, HSG C/D
*	2,324	74	>75% Grass cover, Good, HSG C/D
	14,976	71	Weighted Average
	14,976		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.0	67	0.0150	0.03		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
1.1	43	0.0700	0.66		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
0.1	14	0.7100	2.11		**Shallow Concentrated Flow, c-d** Forest w/Heavy Litter Kv= 2.5 fps
1.5	152	0.0240	1.67	6.68	**Trap/Vee/Rect Channel Flow, d-e** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100
34.7	276	Total			

Summary for Subcatchment 9S: OFFSITE 1 (Below Perkins Rd)

Runoff = 14.44 cfs @ 12.51 hrs, Volume= 1.811 af, Depth> 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.20"

	Area (sf)	CN	Description
*	25,513	98	Impervious
*	532,320	74	>75% Grass cover, Good, HSG C/D
*	3,818	94	Gravel roads, HSG C/D
	8,857	74	>75% Grass cover, Good, HSG C
	570,508	75	Weighted Average
	544,995		95.53% Pervious Area
	25,513		4.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	15	0.2000	2.25		**Sheet Flow, a-b** Smooth surfaces n= 0.011 P2= 2.90"
12.6	373	0.0050	0.49		**Shallow Concentrated Flow, b-c** Short Grass Pasture Kv= 7.0 fps
13.1	715	0.0170	0.91		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
9.3	250	0.0320	0.45		**Shallow Concentrated Flow, d-e** Forest w/Heavy Litter Kv= 2.5 fps
35.1	1,353	Total			

Summary for Subcatchment 10S: OFFSITE 2 (above Perkins Rd)

Runoff = 22.26 cfs @ 13.30 hrs, Volume= 4.868 af, Depth> 1.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.20"

	Area (sf)	CN	Description
*	298,066	70	Woods, Good, HSG C/D
*	42,276	98	Impervious
*	1,304,640	74	>75% Grass cover, Good, HSG C/D
	1,644,982	74	Weighted Average
	1,602,706		97.43% Pervious Area
	42,276		2.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
45.2	141	0.0280	0.05		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
15.3	384	0.0280	0.42		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
2.5	227	0.0480	1.53		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
18.6	780	0.0100	0.70		**Shallow Concentrated Flow, d-e** Short Grass Pasture Kv= 7.0 fps
12.6	689	0.0170	0.91		**Shallow Concentrated Flow, e-f** Short Grass Pasture Kv= 7.0 fps
94.2	2,221	Total			

Summary for Subcatchment 11S: OFFSITE 3 (Matthew Brothers Lot)

Runoff = 27.08 cfs @ 12.10 hrs, Volume= 1.865 af, Depth> 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-year Rainfall=4.20"

	Area (sf)	CN	Description
*	118,437	98	Impervious
*	237,621	70	Woods, Good, HSG C/D
*	157,469	74	>75% Grass cover, Good, HSG C/D
	513,527	78	Weighted Average
	395,090		76.94% Pervious Area
	118,437		23.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	16	0.1870	2.22		**Sheet Flow, a-b** Smooth surfaces n= 0.011 P2= 2.90"
4.7	419	0.0100	1.50		**Shallow Concentrated Flow, b-c** Grassed Waterway Kv= 15.0 fps
2.0	97	0.1000	0.79		**Shallow Concentrated Flow, c-d** Forest w/Heavy Litter Kv= 2.5 fps
6.8	532	Total			

Summary for Reach 5R: ANALYSIS POINT 5

Inflow Area = 5.309 ac, 0.00% Impervious, Inflow Depth > 1.59" for 10-year event
Inflow = 5.90 cfs @ 12.46 hrs, Volume= 0.704 af
Outflow = 5.90 cfs @ 12.46 hrs, Volume= 0.704 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach 6R: AP for SC 6

Inflow Area = 7.866 ac, 10.21% Impervious, Inflow Depth > 1.73" for 10-year event
Inflow = 8.32 cfs @ 12.59 hrs, Volume= 1.132 af
Outflow = 8.32 cfs @ 12.59 hrs, Volume= 1.132 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach 9R: ANALYSIS POINT 9

Inflow Area = 13.097 ac, 4.47% Impervious, Inflow Depth > 1.66" for 10-year event
Inflow = 14.44 cfs @ 12.51 hrs, Volume= 1.811 af
Outflow = 14.44 cfs @ 12.51 hrs, Volume= 1.811 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

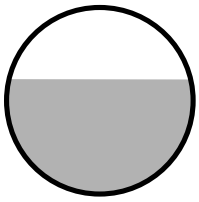
Summary for Reach 10R: Perkins Road Culvert

Inflow Area = 37.764 ac, 2.57% Impervious, Inflow Depth > 1.55" for 10-year event
Inflow = 22.26 cfs @ 13.30 hrs, Volume= 4.868 af
Outflow = 22.25 cfs @ 13.30 hrs, Volume= 4.868 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 11.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 6.58 fps, Avg. Travel Time= 0.1 min

Peak Storage= 51 cf @ 13.30 hrs
Average Depth at Peak Storage= 1.23'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 31.99 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 25.0' Slope= 0.0200 '/'
Inlet Invert= 75.50', Outlet Invert= 75.00'



Summary for Reach 11R: At Stream 9

Inflow Area = 11.789 ac, 23.06% Impervious, Inflow Depth > 1.90" for 10-year event
Inflow = 27.08 cfs @ 12.10 hrs, Volume= 1.865 af
Outflow = 27.08 cfs @ 12.10 hrs, Volume= 1.865 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT1: Analysis Point 1 at BWD Little River

Inflow Area = 7.258 ac, 0.00% Impervious, Inflow Depth > 1.31" for 10-year event
Inflow = 4.77 cfs @ 12.83 hrs, Volume= 0.792 af
Outflow = 4.77 cfs @ 12.83 hrs, Volume= 0.792 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT2: ANALYSIS POINT 2 at BWD reservoir

Inflow Area = 15.893 ac, 0.00% Impervious, Inflow Depth > 1.28" for 10-year event
Inflow = 7.25 cfs @ 13.43 hrs, Volume= 1.695 af
Outflow = 7.25 cfs @ 13.43 hrs, Volume= 1.695 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT3: ANALYSIS POINT 3 at BWD reservoir

Inflow Area = 8.979 ac, 0.00% Impervious, Inflow Depth > 1.44" for 10-year event
Inflow = 7.24 cfs @ 12.70 hrs, Volume= 1.081 af
Outflow = 7.24 cfs @ 12.70 hrs, Volume= 1.081 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT4: ANALYSIS POINT 4 at BWD reservoir

Inflow Area = 5.847 ac, 0.00% Impervious, Inflow Depth > 1.46" for 10-year event
Inflow = 6.00 cfs @ 12.45 hrs, Volume= 0.710 af
Outflow = 6.00 cfs @ 12.45 hrs, Volume= 0.710 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT5: all points at BWD Reservoir

Inflow Area = 30.718 ac, 0.00% Impervious, Inflow Depth > 1.36" for 10-year event
Inflow = 14.99 cfs @ 12.70 hrs, Volume= 3.485 af
Outflow = 14.99 cfs @ 12.70 hrs, Volume= 3.485 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT6: Stream 9-1

Inflow Area = 62.650 ac, 6.82% Impervious, Inflow Depth > 1.64" for 10-year event
Inflow = 34.26 cfs @ 12.11 hrs, Volume= 8.544 af
Outflow = 32.89 cfs @ 12.17 hrs, Volume= 8.523 af, Atten= 4%, Lag= 3.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.84 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 2.74 fps, Avg. Travel Time= 2.9 min

Peak Storage= 3,327 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.99'
Bank-Full Depth= 4.00' Flow Area= 52.0 sf, Capacity= 535.88 cfs

5.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 21.00'
Length= 483.0' Slope= 0.0145 '/'
Inlet Invert= 71.00', Outlet Invert= 64.00'

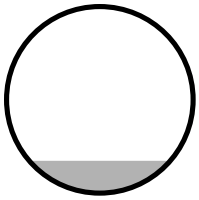
Summary for Reach PT7: ANALYSIS POINT 7 at US Rte 1 culvert

Inflow Area = 2.213 ac, 0.00% Impervious, Inflow Depth > 1.30" for 10-year event
Inflow = 1.36 cfs @ 12.92 hrs, Volume= 0.241 af
Outflow = 1.36 cfs @ 12.93 hrs, Volume= 0.240 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.67 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.80 fps, Avg. Travel Time= 0.4 min

Peak Storage= 17 cf @ 12.92 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 20.95 cfs

18.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 83.0' Slope= 0.0398 '/'
Inlet Invert= 21.60', Outlet Invert= 18.30'



Summary for Reach PT8: ANALYSIS POINT 8 at US Rte 1 culvert

Inflow Area = 0.344 ac, 0.00% Impervious, Inflow Depth > 1.39" for 10-year event
Inflow = 0.31 cfs @ 12.52 hrs, Volume= 0.040 af
Outflow = 0.31 cfs @ 12.53 hrs, Volume= 0.040 af, Atten= 0%, Lag= 0.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.45 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 2.53 fps, Avg. Travel Time= 0.5 min

Peak Storage= 7 cf @ 12.52 hrs
Average Depth at Peak Storage= 0.03'
Bank-Full Depth= 2.00' Flow Area= 6.0 sf, Capacity= 144.91 cfs

36.0" W x 24.0" H Box Pipe
n= 0.011 Concrete pipe, straight & clean
Length= 76.0' Slope= 0.0632 '/'
Inlet Invert= 23.40', Outlet Invert= 18.60'

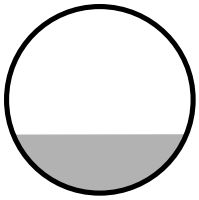
Summary for Reach PT9: Analysis Pt Stream 9 at US Rte 1 Culvert

Inflow Area = 75.825 ac, 6.70% Impervious, Inflow Depth > 1.63" for 10-year event
Inflow = 42.91 cfs @ 12.67 hrs, Volume= 10.273 af
Outflow = 42.90 cfs @ 12.67 hrs, Volume= 10.272 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 22.55 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 13.08 fps, Avg. Travel Time= 0.1 min

Peak Storage= 177 cf @ 12.67 hrs
Average Depth at Peak Storage= 0.94'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 200.22 cfs

36.0" Round Pipe
n= 0.011 Concrete pipe, straight & clean
Length= 93.0' Slope= 0.0645 '/'
Inlet Invert= 20.00', Outlet Invert= 14.00'



Summary for Reach S9-2: Stream 9

Inflow Area = 75.825 ac, 6.70% Impervious, Inflow Depth > 1.64" for 10-year event
Inflow = 43.38 cfs @ 12.51 hrs, Volume= 10.359 af
Outflow = 42.98 cfs @ 12.64 hrs, Volume= 10.290 af, Atten= 1%, Lag= 7.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.17 fps, Min. Travel Time= 4.3 min
Avg. Velocity = 3.37 fps, Avg. Travel Time= 7.8 min

Peak Storage= 11,030 cf @ 12.57 hrs
Average Depth at Peak Storage= 1.00'
Bank-Full Depth= 2.00' Flow Area= 18.0 sf, Capacity= 161.21 cfs

5.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 13.00'
Length= 1,580.0' Slope= 0.0233 '/'
Inlet Invert= 64.00', Outlet Invert= 27.25'

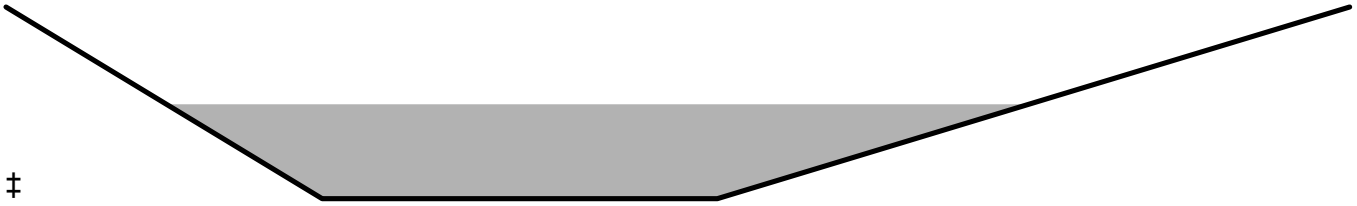
Summary for Reach S9-3: Stream 9

Inflow Area = 75.825 ac, 6.70% Impervious, Inflow Depth > 1.63" for 10-year event
Inflow = 42.98 cfs @ 12.64 hrs, Volume= 10.290 af
Outflow = 42.91 cfs @ 12.67 hrs, Volume= 10.273 af, Atten= 0%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.49 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 3.08 fps, Avg. Travel Time= 2.0 min

Peak Storage= 2,850 cf @ 12.65 hrs
Average Depth at Peak Storage= 0.98'
Bank-Full Depth= 2.00' Flow Area= 22.0 sf, Capacity= 177.67 cfs

5.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 4.0 '/' Top Width= 17.00'
Length= 364.0' Slope= 0.0199 '/'
Inlet Invert= 27.25', Outlet Invert= 20.00'



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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SUBCAT 1 Runoff Area=316,158 sf 0.00% Impervious Runoff Depth>1.97"
Flow Length=898' Tc=57.7 min CN=70 Runoff=7.33 cfs 1.193 af

Subcatchment2S: SUBCAT 2 Runoff Area=692,288 sf 0.00% Impervious Runoff Depth>1.93"
Flow Length=1,533' Tc=101.5 min CN=70 Runoff=11.16 cfs 2.559 af

Subcatchment3S: SUBCAT 3 Runoff Area=391,117 sf 0.00% Impervious Runoff Depth>2.14"
Flow Length=1,335' Tc=48.7 min CN=72 Runoff=10.85 cfs 1.601 af

Subcatchment4S: SUBCAT 4 Runoff Area=254,691 sf 0.00% Impervious Runoff Depth>2.16"
Flow Length=1,170' Tc=30.2 min CN=72 Runoff=8.98 cfs 1.051 af

Subcatchment5S: SUBCAT 5 Runoff Area=231,278 sf 0.00% Impervious Runoff Depth>2.32"
Flow Length=839' Tc=31.3 min CN=74 Runoff=8.65 cfs 1.026 af

Subcatchment6S: SUBCAT 6 Runoff Area=342,649 sf 10.21% Impervious Runoff Depth>2.48"
Flow Length=445' Tc=41.6 min CN=76 Runoff=11.99 cfs 1.626 af

Subcatchment7S: SUBCAT 7 Runoff Area=96,383 sf 0.00% Impervious Runoff Depth>1.97"
Flow Length=541' Tc=64.7 min CN=70 Runoff=2.09 cfs 0.363 af

Subcatchment8S: SUBCAT 8 Runoff Area=14,976 sf 0.00% Impervious Runoff Depth>2.07"
Flow Length=276' Tc=34.7 min CN=71 Runoff=0.48 cfs 0.059 af

Subcatchment9S: OFFSITE 1 (Below Runoff Area=570,508 sf 4.47% Impervious Runoff Depth>2.40"
Flow Length=1,353' Tc=35.1 min CN=75 Runoff=20.97 cfs 2.620 af

Subcatchment10S: OFFSITE 2 (above Runoff Area=1,644,982 sf 2.57% Impervious Runoff Depth>2.26"
Flow Length=2,221' Tc=94.2 min CN=74 Runoff=32.78 cfs 7.112 af

Subcatchment11S: OFFSITE 3 (Matthew Runoff Area=513,527 sf 23.06% Impervious Runoff Depth>2.69"
Flow Length=532' Tc=6.8 min CN=78 Runoff=38.24 cfs 2.640 af

Reach 5R: ANALYSISPOINT 5 Inflow=8.65 cfs 1.026 af
Outflow=8.65 cfs 1.026 af

Reach 6R: AP for SC 6 Inflow=11.99 cfs 1.626 af
Outflow=11.99 cfs 1.626 af

Reach 9R: ANALYSISPOINT 9 Inflow=20.97 cfs 2.620 af
Outflow=20.97 cfs 2.620 af

Reach 10R: Perkins Road Culvert Avg. Flow Depth=1.69' Max Vel=11.61 fps Inflow=32.78 cfs 7.112 af
24.0" Round Pipe n=0.013 L=25.0' S=0.0200 '/' Capacity=31.99 cfs Outflow=32.77 cfs 7.112 af

Reach 11R: At Stream 9 Inflow=38.24 cfs 2.640 af
Outflow=38.24 cfs 2.640 af

Reach PT1: Analysis Point 1 at BWD Little River Inflow=7.33 cfs 1.193 af
Outflow=7.33 cfs 1.193 af

Reach PT2: ANALYSIS POINT 2 at BWD reservoir Inflow=11.16 cfs 2.559 af
Outflow=11.16 cfs 2.559 af

Reach PT3: ANALYSIS POINT 3 at BWD reservoir Inflow=10.85 cfs 1.601 af
Outflow=10.85 cfs 1.601 af

Reach PT4: ANALYSIS POINT 4 at BWD reservoir Inflow=8.98 cfs 1.051 af
Outflow=8.98 cfs 1.051 af

Reach PT5: all points at BWD Reservoir Inflow=22.88 cfs 5.211 af
Outflow=22.88 cfs 5.211 af

Reach PT6: Stream 9-1 Avg. Flow Depth=1.22' Max Vel=5.41 fps Inflow=50.22 cfs 12.372 af
n=0.030 L=483.0' S=0.0145 '/' Capacity=535.88 cfs Outflow=48.36 cfs 12.346 af

Reach PT7: ANALYSIS POINT 7 at US Avg. Flow Depth=0.32' Max Vel=7.57 fps Inflow=2.09 cfs 0.363 af
18.0" Round Pipe n=0.013 L=83.0' S=0.0398 '/' Capacity=20.95 cfs Outflow=2.08 cfs 0.363 af

Reach PT8: ANALYSIS POINT 8 at US Avg. Flow Depth=0.04' Max Vel=3.93 fps Inflow=0.48 cfs 0.059 af
36.0" x 24.0" Box Pipe n=0.011 L=76.0' S=0.0632 '/' Capacity=144.91 cfs Outflow=0.48 cfs 0.059 af

Reach PT9: Analysis Pt Stream 9 at Avg. Flow Depth=1.16' Max Vel=25.08 fps Inflow=62.97 cfs 14.895 af
36.0" Round Pipe n=0.011 L=93.0' S=0.0645 '/' Capacity=200.22 cfs Outflow=62.97 cfs 14.894 af

Reach S9-2: Stream 9 Avg. Flow Depth=1.23' Max Vel=6.90 fps Inflow=63.56 cfs 14.998 af
n=0.030 L=1,580.0' S=0.0233 '/' Capacity=161.21 cfs Outflow=63.09 cfs 14.916 af

Reach S9-3: Stream 9 Avg. Flow Depth=1.20' Max Vel=6.11 fps Inflow=63.09 cfs 14.916 af
n=0.030 L=364.0' S=0.0199 '/' Capacity=177.67 cfs Outflow=62.97 cfs 14.895 af

Total Runoff Area = 116.358 ac Runoff Volume = 21.851 af Average Runoff Depth = 2.25"
95.64% Pervious = 111.280 ac 4.36% Impervious = 5.078 ac

Summary for Subcatchment 1S: SUBCAT 1

Runoff = 7.33 cfs @ 12.81 hrs, Volume= 1.193 af, Depth> 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.20"

	Area (sf)	CN	Description
*	303,390	70	Woods, Good, HSG C/D
	12,768	70	Woods, Good, HSG C
	316,158	70	Weighted Average
	316,158		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.6	88	0.0450	0.06		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
3.5	65	0.0150	0.31		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
2.0	72	0.0550	0.59		**Shallow Concentrated Flow, c-d** Forest w/Heavy Litter Kv= 2.5 fps
25.6	470	0.0150	0.31		**Shallow Concentrated Flow, d-e** Forest w/Heavy Litter Kv= 2.5 fps
1.0	203	0.1000	3.41	13.64	**Trap/Vee/Rect Channel Flow, e-f** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
57.7	898	Total			

Summary for Subcatchment 2S: SUBCAT 2

Runoff = 11.16 cfs @ 13.41 hrs, Volume= 2.559 af, Depth> 1.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.20"

	Area (sf)	CN	Description
*	653,559	70	Woods, Good, HSG C/D
*	38,729	74	>75% Grass cover, Good, HSG C/D
	692,288	70	Weighted Average
	692,288		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
55.7	134	0.0150	0.04		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
5.8	175	0.0400	0.50		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
13.3	199	0.0100	0.25		**Shallow Concentrated Flow, c-d** Forest w/Heavy Litter Kv= 2.5 fps
1.2	41	0.0490	0.55		**Shallow Concentrated Flow, d-e** Forest w/Heavy Litter Kv= 2.5 fps
22.1	468	0.0200	0.35		**Shallow Concentrated Flow, e-f** Forest w/Heavy Litter Kv= 2.5 fps
3.4	516	0.0550	2.53	10.11	**Trap/Vee/Rect Channel Flow, f-g** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
101.5	1,533	Total			

Summary for Subcatchment 3S: SUBCAT 3

Runoff = 10.85 cfs @ 12.69 hrs, Volume= 1.601 af, Depth> 2.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.20"

	Area (sf)	CN	Description
*	205,588	74	>75% Grass cover, Good, HSG C/D
	22,290	74	>75% Grass cover, Good, HSG C
	163,239	70	Woods, Good, HSG C
	391,117	72	Weighted Average
	391,117		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1	115	0.0400	0.10		**Sheet Flow, a-b** Woods: Light underbrush n= 0.400 P2= 2.90"
3.4	155	0.0230	0.76		**Shallow Concentrated Flow, b-c** Woodland Kv= 5.0 fps
9.3	372	0.0090	0.66		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
2.3	134	0.0190	0.96		**Shallow Concentrated Flow, d-e** Short Grass Pasture Kv= 7.0 fps
12.6	254	0.0180	0.34		**Shallow Concentrated Flow, e-f** Forest w/Heavy Litter Kv= 2.5 fps
2.0	305	0.0560	2.55	10.21	**Trap/Vee/Rect Channel Flow, f-g** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
48.7	1,335	Total			

Summary for Subcatchment 4S: SUBCAT 4

Runoff = 8.98 cfs @ 12.43 hrs, Volume= 1.051 af, Depth> 2.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.20"

	Area (sf)	CN	Description
*	130,853	74	>75% Grass cover, Good, HSG C/D
	26,033	74	>75% Grass cover, Good, HSG C
	40,857	70	Woods, Good, HSG C
*	56,948	70	Woods, Good, HSG C/D
	254,691	72	Weighted Average
	254,691		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	135	0.0270	0.13		**Sheet Flow, a-b** Grass: Dense n= 0.240 P2= 2.90"
7.8	462	0.0200	0.99		**Shallow Concentrated Flow, b-c** Short Grass Pasture Kv= 7.0 fps
2.2	184	0.0380	1.36		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
3.3	389	0.0330	1.96	7.83	**Trap/Vee/Rect Channel Flow, d-e** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
30.2	1,170	Total			

Summary for Subcatchment 5S: SUBCAT 5

Runoff = 8.65 cfs @ 12.45 hrs, Volume= 1.026 af, Depth> 2.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.20"

	Area (sf)	CN	Description
*	156,287	74	>75% Grass cover, Good, HSG C/D
	74,991	74	>75% Grass cover, Good, HSG C
	231,278	74	Weighted Average
	231,278		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.0	198	0.0270	0.14		**Sheet Flow, a-b** Grass: Dense n= 0.240 P2= 2.90"
2.9	146	0.0140	0.83		**Shallow Concentrated Flow, b-c** Short Grass Pasture Kv= 7.0 fps
3.8	285	0.0320	1.25		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
1.6	210	0.0430	2.24	8.94	**Trap/Vee/Rect Channel Flow, d-e** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
31.3	839	Total			

Summary for Subcatchment 6S: SUBCAT 6

Runoff = 11.99 cfs @ 12.58 hrs, Volume= 1.626 af, Depth> 2.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.20"

	Area (sf)	CN	Description
*	142,888	70	Woods, Good, HSG C/D
	10,372	70	Woods, Good, HSG C
*	61,952	74	>75% Grass cover, Good, HSG C/D
	635	74	>75% Grass cover, Good, HSG C
	51,989	80	>75% Grass cover, Good, HSG D
*	7,818	96	Gravel
*	34,971	98	Impervious
	32,024	77	Woods, Good, HSG D
	342,649	76	Weighted Average
	307,678		89.79% Pervious Area
	34,971		10.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.0	67	0.0150	0.03		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
5.2	92	0.0140	0.30		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
1.8	74	0.0100	0.70		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
1.7	163	0.0550	1.64		**Shallow Concentrated Flow, d-e** Short Grass Pasture Kv= 7.0 fps
0.8	39	0.1000	0.79		**Shallow Concentrated Flow, e-f** Forest w/Heavy Litter Kv= 2.5 fps
0.1	10	0.5000	1.77		**Shallow Concentrated Flow, f-g** Forest w/Heavy Litter Kv= 2.5 fps
41.6	445	Total			

Summary for Subcatchment 7S: SUBCAT 7

Runoff = 2.09 cfs @ 12.90 hrs, Volume= 0.363 af, Depth> 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.20"

	Area (sf)	CN	Description
*	93,505	70	Woods, Good, HSG C/D
*	2,878	74	>75% Grass cover, Good, HSG C/D
	96,383	70	Weighted Average
	96,383		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
54.6	172	0.0260	0.05		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
2.8	112	0.0700	0.66		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
0.2	13	0.2300	1.20		**Shallow Concentrated Flow, c-d** Forest w/Heavy Litter Kv= 2.5 fps
6.6	171	0.0300	0.43		**Shallow Concentrated Flow, d-e** Forest w/Heavy Litter Kv= 2.5 fps
0.5	73	0.0600	2.64	10.56	**Trap/Vee/Rect Channel Flow, e-f** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
64.7	541	Total			

Summary for Subcatchment 8S: SUBCAT 8

Runoff = 0.48 cfs @ 12.50 hrs, Volume= 0.059 af, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.20"

	Area (sf)	CN	Description
*	12,652	70	Woods, Good, HSG C/D
*	2,324	74	>75% Grass cover, Good, HSG C/D
	14,976	71	Weighted Average
	14,976		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.0	67	0.0150	0.03		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
1.1	43	0.0700	0.66		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
0.1	14	0.7100	2.11		**Shallow Concentrated Flow, c-d** Forest w/Heavy Litter Kv= 2.5 fps
1.5	152	0.0240	1.67	6.68	**Trap/Vee/Rect Channel Flow, d-e** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100
34.7	276	Total			

Summary for Subcatchment 9S: OFFSITE 1 (Below Perkins Rd)

Runoff = 20.97 cfs @ 12.50 hrs, Volume= 2.620 af, Depth> 2.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.20"

	Area (sf)	CN	Description
*	25,513	98	Impervious
*	532,320	74	>75% Grass cover, Good, HSG C/D
*	3,818	94	Gravel roads, HSG C/D
	8,857	74	>75% Grass cover, Good, HSG C
	570,508	75	Weighted Average
	544,995		95.53% Pervious Area
	25,513		4.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	15	0.2000	2.25		**Sheet Flow, a-b** Smooth surfaces n= 0.011 P2= 2.90"
12.6	373	0.0050	0.49		**Shallow Concentrated Flow, b-c** Short Grass Pasture Kv= 7.0 fps
13.1	715	0.0170	0.91		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
9.3	250	0.0320	0.45		**Shallow Concentrated Flow, d-e** Forest w/Heavy Litter Kv= 2.5 fps
35.1	1,353	Total			

Summary for Subcatchment 10S: OFFSITE 2 (above Perkins Rd)

Runoff = 32.78 cfs @ 13.29 hrs, Volume= 7.112 af, Depth> 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.20"

	Area (sf)	CN	Description
*	298,066	70	Woods, Good, HSG C/D
*	42,276	98	Impervious
*	1,304,640	74	>75% Grass cover, Good, HSG C/D
	1,644,982	74	Weighted Average
	1,602,706		97.43% Pervious Area
	42,276		2.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
45.2	141	0.0280	0.05		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
15.3	384	0.0280	0.42		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
2.5	227	0.0480	1.53		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
18.6	780	0.0100	0.70		**Shallow Concentrated Flow, d-e** Short Grass Pasture Kv= 7.0 fps
12.6	689	0.0170	0.91		**Shallow Concentrated Flow, e-f** Short Grass Pasture Kv= 7.0 fps
94.2	2,221	Total			

Summary for Subcatchment 11S: OFFSITE 3 (Matthew Brothers Lot)

Runoff = 38.24 cfs @ 12.10 hrs, Volume= 2.640 af, Depth> 2.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-year Rainfall=5.20"

	Area (sf)	CN	Description
*	118,437	98	Impervious
*	237,621	70	Woods, Good, HSG C/D
*	157,469	74	>75% Grass cover, Good, HSG C/D
	513,527	78	Weighted Average
	395,090		76.94% Pervious Area
	118,437		23.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	16	0.1870	2.22		**Sheet Flow, a-b** Smooth surfaces n= 0.011 P2= 2.90"
4.7	419	0.0100	1.50		**Shallow Concentrated Flow, b-c** Grassed Waterway Kv= 15.0 fps
2.0	97	0.1000	0.79		**Shallow Concentrated Flow, c-d** Forest w/Heavy Litter Kv= 2.5 fps
6.8	532	Total			

Summary for Reach 5R: ANALYSIS POINT 5

Inflow Area = 5.309 ac, 0.00% Impervious, Inflow Depth > 2.32" for 25-year event
Inflow = 8.65 cfs @ 12.45 hrs, Volume= 1.026 af
Outflow = 8.65 cfs @ 12.45 hrs, Volume= 1.026 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach 6R: AP for SC 6

Inflow Area = 7.866 ac, 10.21% Impervious, Inflow Depth > 2.48" for 25-year event
Inflow = 11.99 cfs @ 12.58 hrs, Volume= 1.626 af
Outflow = 11.99 cfs @ 12.58 hrs, Volume= 1.626 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach 9R: ANALYSIS POINT 9

Inflow Area = 13.097 ac, 4.47% Impervious, Inflow Depth > 2.40" for 25-year event
Inflow = 20.97 cfs @ 12.50 hrs, Volume= 2.620 af
Outflow = 20.97 cfs @ 12.50 hrs, Volume= 2.620 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

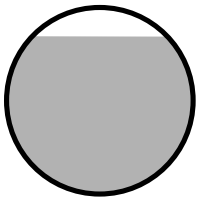
Summary for Reach 10R: Perkins Road Culvert

Inflow Area = 37.764 ac, 2.57% Impervious, Inflow Depth > 2.26" for 25-year event
Inflow = 32.78 cfs @ 13.29 hrs, Volume= 7.112 af
Outflow = 32.77 cfs @ 13.29 hrs, Volume= 7.112 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 11.61 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 7.03 fps, Avg. Travel Time= 0.1 min

Peak Storage= 71 cf @ 13.29 hrs
Average Depth at Peak Storage= 1.69'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 31.99 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 25.0' Slope= 0.0200 '/'
Inlet Invert= 75.50', Outlet Invert= 75.00'



Summary for Reach 11R: At Stream 9

Inflow Area = 11.789 ac, 23.06% Impervious, Inflow Depth > 2.69" for 25-year event
Inflow = 38.24 cfs @ 12.10 hrs, Volume= 2.640 af
Outflow = 38.24 cfs @ 12.10 hrs, Volume= 2.640 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT1: Analysis Point 1 at BWD Little River

Inflow Area = 7.258 ac, 0.00% Impervious, Inflow Depth > 1.97" for 25-year event
Inflow = 7.33 cfs @ 12.81 hrs, Volume= 1.193 af
Outflow = 7.33 cfs @ 12.81 hrs, Volume= 1.193 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT2: ANALYSIS POINT 2 at BWD reservoir

Inflow Area = 15.893 ac, 0.00% Impervious, Inflow Depth > 1.93" for 25-year event
Inflow = 11.16 cfs @ 13.41 hrs, Volume= 2.559 af
Outflow = 11.16 cfs @ 13.41 hrs, Volume= 2.559 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT3: ANALYSIS POINT 3 at BWD reservoir

Inflow Area = 8.979 ac, 0.00% Impervious, Inflow Depth > 2.14" for 25-year event
Inflow = 10.85 cfs @ 12.69 hrs, Volume= 1.601 af
Outflow = 10.85 cfs @ 12.69 hrs, Volume= 1.601 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT4: ANALYSIS POINT 4 at BWD reservoir

Inflow Area = 5.847 ac, 0.00% Impervious, Inflow Depth > 2.16" for 25-year event
Inflow = 8.98 cfs @ 12.43 hrs, Volume= 1.051 af
Outflow = 8.98 cfs @ 12.43 hrs, Volume= 1.051 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT5: all points at BWD Reservoir

Inflow Area = 30.718 ac, 0.00% Impervious, Inflow Depth > 2.04" for 25-year event
Inflow = 22.88 cfs @ 12.68 hrs, Volume= 5.211 af
Outflow = 22.88 cfs @ 12.68 hrs, Volume= 5.211 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT6: Stream 9-1

Inflow Area = 62.650 ac, 6.82% Impervious, Inflow Depth > 2.37" for 25-year event
Inflow = 50.22 cfs @ 12.11 hrs, Volume= 12.372 af
Outflow = 48.36 cfs @ 12.16 hrs, Volume= 12.346 af, Atten= 4%, Lag= 3.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.41 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 2.96 fps, Avg. Travel Time= 2.7 min

Peak Storage= 4,366 cf @ 12.14 hrs
Average Depth at Peak Storage= 1.22'
Bank-Full Depth= 4.00' Flow Area= 52.0 sf, Capacity= 535.88 cfs

5.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 21.00'
Length= 483.0' Slope= 0.0145 '/'
Inlet Invert= 71.00', Outlet Invert= 64.00'

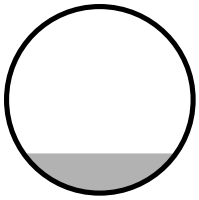
Summary for Reach PT7: ANALYSIS POINT 7 at US Rte 1 culvert

Inflow Area = 2.213 ac, 0.00% Impervious, Inflow Depth > 1.97" for 25-year event
Inflow = 2.09 cfs @ 12.90 hrs, Volume= 0.363 af
Outflow = 2.08 cfs @ 12.91 hrs, Volume= 0.363 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.57 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 4.12 fps, Avg. Travel Time= 0.3 min

Peak Storage= 23 cf @ 12.90 hrs
Average Depth at Peak Storage= 0.32'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 20.95 cfs

18.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 83.0' Slope= 0.0398 '/'
Inlet Invert= 21.60', Outlet Invert= 18.30'



Summary for Reach PT8: ANALYSIS POINT 8 at US Rte 1 culvert

Inflow Area = 0.344 ac, 0.00% Impervious, Inflow Depth > 2.07" for 25-year event
Inflow = 0.48 cfs @ 12.50 hrs, Volume= 0.059 af
Outflow = 0.48 cfs @ 12.51 hrs, Volume= 0.059 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.93 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.58 fps, Avg. Travel Time= 0.5 min

Peak Storage= 9 cf @ 12.50 hrs
Average Depth at Peak Storage= 0.04'
Bank-Full Depth= 2.00' Flow Area= 6.0 sf, Capacity= 144.91 cfs

36.0" W x 24.0" H Box Pipe
n= 0.011 Concrete pipe, straight & clean
Length= 76.0' Slope= 0.0632 '/'
Inlet Invert= 23.40', Outlet Invert= 18.60'

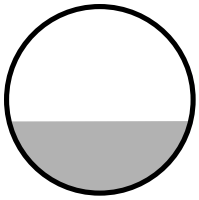
Summary for Reach PT9: Analysis Pt Stream 9 at US Rte 1 Culvert

Inflow Area = 75.825 ac, 6.70% Impervious, Inflow Depth > 2.36" for 25-year event
Inflow = 62.97 cfs @ 12.65 hrs, Volume= 14.895 af
Outflow = 62.97 cfs @ 12.65 hrs, Volume= 14.894 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 25.08 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 14.03 fps, Avg. Travel Time= 0.1 min

Peak Storage= 233 cf @ 12.65 hrs
Average Depth at Peak Storage= 1.16'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 200.22 cfs

36.0" Round Pipe
n= 0.011 Concrete pipe, straight & clean
Length= 93.0' Slope= 0.0645 '/'
Inlet Invert= 20.00', Outlet Invert= 14.00'



Summary for Reach S9-2: Stream 9

Inflow Area = 75.825 ac, 6.70% Impervious, Inflow Depth > 2.37" for 25-year event
Inflow = 63.56 cfs @ 12.51 hrs, Volume= 14.998 af
Outflow = 63.09 cfs @ 12.62 hrs, Volume= 14.916 af, Atten= 1%, Lag= 6.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.90 fps, Min. Travel Time= 3.8 min
Avg. Velocity = 3.65 fps, Avg. Travel Time= 7.2 min

Peak Storage= 14,468 cf @ 12.55 hrs
Average Depth at Peak Storage= 1.23'
Bank-Full Depth= 2.00' Flow Area= 18.0 sf, Capacity= 161.21 cfs

5.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 13.00'
Length= 1,580.0' Slope= 0.0233 '/'
Inlet Invert= 64.00', Outlet Invert= 27.25'

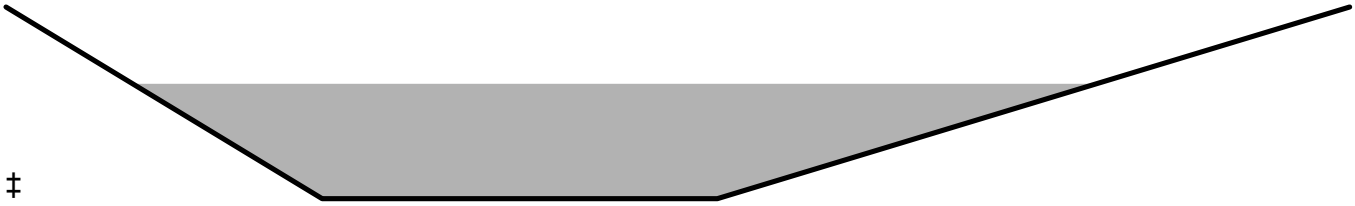
Summary for Reach S9-3: Stream 9

Inflow Area = 75.825 ac, 6.70% Impervious, Inflow Depth > 2.36" for 25-year event
Inflow = 63.09 cfs @ 12.62 hrs, Volume= 14.916 af
Outflow = 62.97 cfs @ 12.65 hrs, Volume= 14.895 af, Atten= 0%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.11 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 3.32 fps, Avg. Travel Time= 1.8 min

Peak Storage= 3,757 cf @ 12.63 hrs
Average Depth at Peak Storage= 1.20'
Bank-Full Depth= 2.00' Flow Area= 22.0 sf, Capacity= 177.67 cfs

5.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 4.0 '/' Top Width= 17.00'
Length= 364.0' Slope= 0.0199 '/'
Inlet Invert= 27.25', Outlet Invert= 20.00'



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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SUBCAT1 Runoff Area=316,158 sf 0.00% Impervious Runoff Depth>3.46"
Flow Length=898' Tc=57.7 min CN=70 Runoff=12.93 cfs 2.090 af

Subcatchment2S: SUBCAT2 Runoff Area=692,288 sf 0.00% Impervious Runoff Depth>3.39"
Flow Length=1,533' Tc=101.5 min CN=70 Runoff=19.74 cfs 4.494 af

Subcatchment3S: SUBCAT3 Runoff Area=391,117 sf 0.00% Impervious Runoff Depth>3.68"
Flow Length=1,335' Tc=48.7 min CN=72 Runoff=18.64 cfs 2.750 af

Subcatchment4S: SUBCAT4 Runoff Area=254,691 sf 0.00% Impervious Runoff Depth>3.70"
Flow Length=1,170' Tc=30.2 min CN=72 Runoff=15.44 cfs 1.803 af

Subcatchment5S: SUBCAT5 Runoff Area=231,278 sf 0.00% Impervious Runoff Depth>3.91"
Flow Length=839' Tc=31.3 min CN=74 Runoff=14.53 cfs 1.729 af

Subcatchment6S: SUBCAT6 Runoff Area=342,649 sf 10.21% Impervious Runoff Depth>4.11"
Flow Length=445' Tc=41.6 min CN=76 Runoff=19.71 cfs 2.692 af

Subcatchment7S: SUBCAT7 Runoff Area=96,383 sf 0.00% Impervious Runoff Depth>3.45"
Flow Length=541' Tc=64.7 min CN=70 Runoff=3.68 cfs 0.636 af

Subcatchment8S: SUBCAT8 Runoff Area=14,976 sf 0.00% Impervious Runoff Depth>3.59"
Flow Length=276' Tc=34.7 min CN=71 Runoff=0.83 cfs 0.103 af

Subcatchment9S: OFFSITE 1 (Below Runoff Area=570,508 sf 4.47% Impervious Runoff Depth>4.01"
Flow Length=1,353' Tc=35.1 min CN=75 Runoff=34.83 cfs 4.375 af

Subcatchment10S: OFFSITE 2 (above Runoff Area=1,644,982 sf 2.57% Impervious Runoff Depth>3.82"
Flow Length=2,221' Tc=94.2 min CN=74 Runoff=55.26 cfs 12.013 af

Subcatchment11S: OFFSITE 3 (Matthew Runoff Area=513,527 sf 23.06% Impervious Runoff Depth>4.37"
Flow Length=532' Tc=6.8 min CN=78 Runoff=61.36 cfs 4.292 af

Reach 5R: ANALYSISPOINT 5 Inflow=14.53 cfs 1.729 af
Outflow=14.53 cfs 1.729 af

Reach 6R: AP for SC 6 Inflow=19.71 cfs 2.692 af
Outflow=19.71 cfs 2.692 af

Reach 9R: ANALYSISPOINT 9 Inflow=34.83 cfs 4.375 af
Outflow=34.83 cfs 4.375 af

Reach 10R: Perkins Road Culvert Avg. Flow Depth=2.00' Max Vel=11.61 fps Inflow=55.26 cfs 12.013 af
24.0" Round Pipe n=0.013 L=25.0' S=0.0200 '/' Capacity=31.99 cfs Outflow=31.99 cfs 12.014 af

Reach 11R: At Stream 9 Inflow=61.36 cfs 4.292 af
Outflow=61.36 cfs 4.292 af

Reach PT1: Analysis Point 1 at BWD Little River Inflow=12.93 cfs 2.090 af
Outflow=12.93 cfs 2.090 af

Reach PT2: ANALYSIS POINT 2 at BWD reservoir Inflow=19.74 cfs 4.494 af
Outflow=19.74 cfs 4.494 af

Reach PT3: ANALYSIS POINT 3 at BWD reservoir Inflow=18.64 cfs 2.750 af
Outflow=18.64 cfs 2.750 af

Reach PT4: ANALYSIS POINT 4 at BWD reservoir Inflow=15.44 cfs 1.803 af
Outflow=15.44 cfs 1.803 af

Reach PT5: all points at BWD Reservoir Inflow=40.15 cfs 9.047 af
Outflow=40.15 cfs 9.047 af

Reach PT6: Stream 9-1 Avg. Flow Depth=1.60' Max Vel=6.26 fps Inflow=84.29 cfs 20.681 af
n=0.030 L=483.0' S=0.0145 '/' Capacity=535.88 cfs Outflow=81.42 cfs 20.647 af

Reach PT7: ANALYSIS POINT 7 at US Avg. Flow Depth=0.43' Max Vel=8.92 fps Inflow=3.68 cfs 0.636 af
18.0" Round Pipe n=0.013 L=83.0' S=0.0398 '/' Capacity=20.95 cfs Outflow=3.68 cfs 0.635 af

Reach PT8: ANALYSIS POINT 8 at US Avg. Flow Depth=0.06' Max Vel=4.91 fps Inflow=0.83 cfs 0.103 af
36.0" x 24.0" Box Pipe n=0.011 L=76.0' S=0.0632 '/' Capacity=144.91 cfs Outflow=0.83 cfs 0.103 af

Reach PT9: Analysis Pt Stream 9 at Avg. Flow Depth=1.55' Max Vel=28.72 fps Inflow=105.90 cfs 24.934 af
36.0" Round Pipe n=0.011 L=93.0' S=0.0645 '/' Capacity=200.22 cfs Outflow=105.88 cfs 24.932 af

Reach S9-2: Stream 9 Avg. Flow Depth=1.61' Max Vel=7.99 fps Inflow=106.62 cfs 25.068 af
n=0.030 L=1,580.0' S=0.0233 '/' Capacity=161.21 cfs Outflow=106.06 cfs 24.961 af

Reach S9-3: Stream 9 Avg. Flow Depth=1.56' Max Vel=7.04 fps Inflow=106.06 cfs 24.961 af
n=0.030 L=364.0' S=0.0199 '/' Capacity=177.67 cfs Outflow=105.90 cfs 24.934 af

Total Runoff Area = 116.358 ac Runoff Volume = 36.977 af Average Runoff Depth = 3.81"
95.64% Pervious = 111.280 ac 4.36% Impervious = 5.078 ac

Summary for Subcatchment 1S: SUBCAT 1

Runoff = 12.93 cfs @ 12.78 hrs, Volume= 2.090 af, Depth> 3.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.20"

	Area (sf)	CN	Description
*	303,390	70	Woods, Good, HSG C/D
	12,768	70	Woods, Good, HSG C
	316,158	70	Weighted Average
	316,158		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.6	88	0.0450	0.06		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
3.5	65	0.0150	0.31		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
2.0	72	0.0550	0.59		**Shallow Concentrated Flow, c-d** Forest w/Heavy Litter Kv= 2.5 fps
25.6	470	0.0150	0.31		**Shallow Concentrated Flow, d-e** Forest w/Heavy Litter Kv= 2.5 fps
1.0	203	0.1000	3.41	13.64	**Trap/Vee/Rect Channel Flow, e-f** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
57.7	898	Total			

Summary for Subcatchment 2S: SUBCAT 2

Runoff = 19.74 cfs @ 13.39 hrs, Volume= 4.494 af, Depth> 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.20"

	Area (sf)	CN	Description
*	653,559	70	Woods, Good, HSG C/D
*	38,729	74	>75% Grass cover, Good, HSG C/D
	692,288	70	Weighted Average
	692,288		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
55.7	134	0.0150	0.04		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
5.8	175	0.0400	0.50		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
13.3	199	0.0100	0.25		**Shallow Concentrated Flow, c-d** Forest w/Heavy Litter Kv= 2.5 fps
1.2	41	0.0490	0.55		**Shallow Concentrated Flow, d-e** Forest w/Heavy Litter Kv= 2.5 fps
22.1	468	0.0200	0.35		**Shallow Concentrated Flow, e-f** Forest w/Heavy Litter Kv= 2.5 fps
3.4	516	0.0550	2.53	10.11	**Trap/Vee/Rect Channel Flow, f-g** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
101.5	1,533	Total			

Summary for Subcatchment 3S: SUBCAT 3

Runoff = 18.64 cfs @ 12.67 hrs, Volume= 2.750 af, Depth> 3.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.20"

	Area (sf)	CN	Description
*	205,588	74	>75% Grass cover, Good, HSG C/D
	22,290	74	>75% Grass cover, Good, HSG C
	163,239	70	Woods, Good, HSG C
	391,117	72	Weighted Average
	391,117		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.1	115	0.0400	0.10		**Sheet Flow, a-b** Woods: Light underbrush n= 0.400 P2= 2.90"
3.4	155	0.0230	0.76		**Shallow Concentrated Flow, b-c** Woodland Kv= 5.0 fps
9.3	372	0.0090	0.66		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
2.3	134	0.0190	0.96		**Shallow Concentrated Flow, d-e** Short Grass Pasture Kv= 7.0 fps
12.6	254	0.0180	0.34		**Shallow Concentrated Flow, e-f** Forest w/Heavy Litter Kv= 2.5 fps
2.0	305	0.0560	2.55	10.21	**Trap/Vee/Rect Channel Flow, f-g** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
48.7	1,335	Total			

Summary for Subcatchment 4S: SUBCAT 4

Runoff = 15.44 cfs @ 12.42 hrs, Volume= 1.803 af, Depth> 3.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.20"

	Area (sf)	CN	Description
*	130,853	74	>75% Grass cover, Good, HSG C/D
	26,033	74	>75% Grass cover, Good, HSG C
	40,857	70	Woods, Good, HSG C
*	56,948	70	Woods, Good, HSG C/D
	254,691	72	Weighted Average
	254,691		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	135	0.0270	0.13		**Sheet Flow, a-b** Grass: Dense n= 0.240 P2= 2.90"
7.8	462	0.0200	0.99		**Shallow Concentrated Flow, b-c** Short Grass Pasture Kv= 7.0 fps
2.2	184	0.0380	1.36		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
3.3	389	0.0330	1.96	7.83	**Trap/Vee/Rect Channel Flow, d-e** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
30.2	1,170	Total			

Summary for Subcatchment 5S: SUBCAT 5

Runoff = 14.53 cfs @ 12.43 hrs, Volume= 1.729 af, Depth> 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.20"

	Area (sf)	CN	Description
*	156,287	74	>75% Grass cover, Good, HSG C/D
	74,991	74	>75% Grass cover, Good, HSG C
	231,278	74	Weighted Average
	231,278		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.0	198	0.0270	0.14		**Sheet Flow, a-b** Grass: Dense n= 0.240 P2= 2.90"
2.9	146	0.0140	0.83		**Shallow Concentrated Flow, b-c** Short Grass Pasture Kv= 7.0 fps
3.8	285	0.0320	1.25		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
1.6	210	0.0430	2.24	8.94	**Trap/Vee/Rect Channel Flow, d-e** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
31.3	839	Total			

Summary for Subcatchment 6S: SUBCAT 6

Runoff = 19.71 cfs @ 12.57 hrs, Volume= 2.692 af, Depth> 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.20"

	Area (sf)	CN	Description
*	142,888	70	Woods, Good, HSG C/D
	10,372	70	Woods, Good, HSG C
*	61,952	74	>75% Grass cover, Good, HSG C/D
	635	74	>75% Grass cover, Good, HSG C
	51,989	80	>75% Grass cover, Good, HSG D
*	7,818	96	Gravel
*	34,971	98	Impervious
	32,024	77	Woods, Good, HSG D
	342,649	76	Weighted Average
	307,678		89.79% Pervious Area
	34,971		10.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.0	67	0.0150	0.03		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
5.2	92	0.0140	0.30		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
1.8	74	0.0100	0.70		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
1.7	163	0.0550	1.64		**Shallow Concentrated Flow, d-e** Short Grass Pasture Kv= 7.0 fps
0.8	39	0.1000	0.79		**Shallow Concentrated Flow, e-f** Forest w/Heavy Litter Kv= 2.5 fps
0.1	10	0.5000	1.77		**Shallow Concentrated Flow, f-g** Forest w/Heavy Litter Kv= 2.5 fps
41.6	445	Total			

Summary for Subcatchment 7S: SUBCAT 7

Runoff = 3.68 cfs @ 12.88 hrs, Volume= 0.636 af, Depth> 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.20"

	Area (sf)	CN	Description
*	93,505	70	Woods, Good, HSG C/D
*	2,878	74	>75% Grass cover, Good, HSG C/D
	96,383	70	Weighted Average
	96,383		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
54.6	172	0.0260	0.05		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
2.8	112	0.0700	0.66		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
0.2	13	0.2300	1.20		**Shallow Concentrated Flow, c-d** Forest w/Heavy Litter Kv= 2.5 fps
6.6	171	0.0300	0.43		**Shallow Concentrated Flow, d-e** Forest w/Heavy Litter Kv= 2.5 fps
0.5	73	0.0600	2.64	10.56	**Trap/Vee/Rect Channel Flow, e-f** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100 Earth, dense brush, high stage
64.7	541	Total			

Summary for Subcatchment 8S: SUBCAT 8

Runoff = 0.83 cfs @ 12.48 hrs, Volume= 0.103 af, Depth> 3.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.20"

	Area (sf)	CN	Description
*	12,652	70	Woods, Good, HSG C/D
*	2,324	74	>75% Grass cover, Good, HSG C/D
	14,976	71	Weighted Average
	14,976		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
32.0	67	0.0150	0.03		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
1.1	43	0.0700	0.66		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
0.1	14	0.7100	2.11		**Shallow Concentrated Flow, c-d** Forest w/Heavy Litter Kv= 2.5 fps
1.5	152	0.0240	1.67	6.68	**Trap/Vee/Rect Channel Flow, d-e** Bot.W=2.00' D=1.00' Z= 2.0 '/' Top.W=6.00' n= 0.100
34.7	276	Total			

Summary for Subcatchment 9S: OFFSITE 1 (Below Perkins Rd)

Runoff = 34.83 cfs @ 12.48 hrs, Volume= 4.375 af, Depth> 4.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.20"

	Area (sf)	CN	Description
*	25,513	98	Impervious
*	532,320	74	>75% Grass cover, Good, HSG C/D
*	3,818	94	Gravel roads, HSG C/D
	8,857	74	>75% Grass cover, Good, HSG C
	570,508	75	Weighted Average
	544,995		95.53% Pervious Area
	25,513		4.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	15	0.2000	2.25		**Sheet Flow, a-b** Smooth surfaces n= 0.011 P2= 2.90"
12.6	373	0.0050	0.49		**Shallow Concentrated Flow, b-c** Short Grass Pasture Kv= 7.0 fps
13.1	715	0.0170	0.91		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
9.3	250	0.0320	0.45		**Shallow Concentrated Flow, d-e** Forest w/Heavy Litter Kv= 2.5 fps
35.1	1,353	Total			

Summary for Subcatchment 10S: OFFSITE 2 (above Perkins Rd)

Runoff = 55.26 cfs @ 13.28 hrs, Volume= 12.013 af, Depth> 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.20"

	Area (sf)	CN	Description
*	298,066	70	Woods, Good, HSG C/D
*	42,276	98	Impervious
*	1,304,640	74	>75% Grass cover, Good, HSG C/D
	1,644,982	74	Weighted Average
	1,602,706		97.43% Pervious Area
	42,276		2.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
45.2	141	0.0280	0.05		**Sheet Flow, a-b** Woods: Dense underbrush n= 0.800 P2= 2.90"
15.3	384	0.0280	0.42		**Shallow Concentrated Flow, b-c** Forest w/Heavy Litter Kv= 2.5 fps
2.5	227	0.0480	1.53		**Shallow Concentrated Flow, c-d** Short Grass Pasture Kv= 7.0 fps
18.6	780	0.0100	0.70		**Shallow Concentrated Flow, d-e** Short Grass Pasture Kv= 7.0 fps
12.6	689	0.0170	0.91		**Shallow Concentrated Flow, e-f** Short Grass Pasture Kv= 7.0 fps
94.2	2,221	Total			

Summary for Subcatchment 11S: OFFSITE 3 (Matthew Brothers Lot)

Runoff = 61.36 cfs @ 12.10 hrs, Volume= 4.292 af, Depth> 4.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-year Rainfall=7.20"

	Area (sf)	CN	Description
*	118,437	98	Impervious
*	237,621	70	Woods, Good, HSG C/D
*	157,469	74	>75% Grass cover, Good, HSG C/D
	513,527	78	Weighted Average
	395,090		76.94% Pervious Area
	118,437		23.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	16	0.1870	2.22		**Sheet Flow, a-b** Smooth surfaces n= 0.011 P2= 2.90"
4.7	419	0.0100	1.50		**Shallow Concentrated Flow, b-c** Grassed Waterway Kv= 15.0 fps
2.0	97	0.1000	0.79		**Shallow Concentrated Flow, c-d** Forest w/Heavy Litter Kv= 2.5 fps
6.8	532	Total			

Summary for Reach 5R: ANALYSIS POINT 5

Inflow Area = 5.309 ac, 0.00% Impervious, Inflow Depth > 3.91" for 100-year event
Inflow = 14.53 cfs @ 12.43 hrs, Volume= 1.729 af
Outflow = 14.53 cfs @ 12.43 hrs, Volume= 1.729 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach 6R: AP for SC 6

Inflow Area = 7.866 ac, 10.21% Impervious, Inflow Depth > 4.11" for 100-year event
Inflow = 19.71 cfs @ 12.57 hrs, Volume= 2.692 af
Outflow = 19.71 cfs @ 12.57 hrs, Volume= 2.692 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach 9R: ANALYSIS POINT 9

Inflow Area = 13.097 ac, 4.47% Impervious, Inflow Depth > 4.01" for 100-year event
Inflow = 34.83 cfs @ 12.48 hrs, Volume= 4.375 af
Outflow = 34.83 cfs @ 12.48 hrs, Volume= 4.375 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

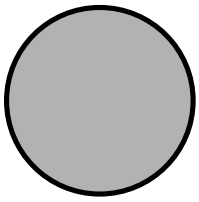
Summary for Reach 10R: Perkins Road Culvert

Inflow Area = 37.764 ac, 2.57% Impervious, Inflow Depth > 3.82" for 100-year event
Inflow = 55.26 cfs @ 13.28 hrs, Volume= 12.013 af
Outflow = 31.99 cfs @ 12.75 hrs, Volume= 12.014 af, Atten= 42%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 11.61 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 7.35 fps, Avg. Travel Time= 0.1 min

Peak Storage= 79 cf @ 12.70 hrs
Average Depth at Peak Storage= 2.00'
Bank-Full Depth= 2.00' Flow Area= 3.1 sf, Capacity= 31.99 cfs

24.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 25.0' Slope= 0.0200 '/'
Inlet Invert= 75.50', Outlet Invert= 75.00'



Summary for Reach 11R: At Stream 9

Inflow Area = 11.789 ac, 23.06% Impervious, Inflow Depth > 4.37" for 100-year event
Inflow = 61.36 cfs @ 12.10 hrs, Volume= 4.292 af
Outflow = 61.36 cfs @ 12.10 hrs, Volume= 4.292 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT1: Analysis Point 1 at BWD Little River

Inflow Area = 7.258 ac, 0.00% Impervious, Inflow Depth > 3.46" for 100-year event
Inflow = 12.93 cfs @ 12.78 hrs, Volume= 2.090 af
Outflow = 12.93 cfs @ 12.78 hrs, Volume= 2.090 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT2: ANALYSIS POINT 2 at BWD reservoir

Inflow Area = 15.893 ac, 0.00% Impervious, Inflow Depth > 3.39" for 100-year event
Inflow = 19.74 cfs @ 13.39 hrs, Volume= 4.494 af
Outflow = 19.74 cfs @ 13.39 hrs, Volume= 4.494 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT3: ANALYSIS POINT 3 at BWD reservoir

Inflow Area = 8.979 ac, 0.00% Impervious, Inflow Depth > 3.68" for 100-year event
Inflow = 18.64 cfs @ 12.67 hrs, Volume= 2.750 af
Outflow = 18.64 cfs @ 12.67 hrs, Volume= 2.750 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT4: ANALYSIS POINT 4 at BWD reservoir

Inflow Area = 5.847 ac, 0.00% Impervious, Inflow Depth > 3.70" for 100-year event
Inflow = 15.44 cfs @ 12.42 hrs, Volume= 1.803 af
Outflow = 15.44 cfs @ 12.42 hrs, Volume= 1.803 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT5: all points at BWD Reservoir

Inflow Area = 30.718 ac, 0.00% Impervious, Inflow Depth > 3.53" for 100-year event
Inflow = 40.15 cfs @ 12.65 hrs, Volume= 9.047 af
Outflow = 40.15 cfs @ 12.65 hrs, Volume= 9.047 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Summary for Reach PT6: Stream 9-1

Inflow Area = 62.650 ac, 6.82% Impervious, Inflow Depth > 3.96" for 100-year event
Inflow = 84.29 cfs @ 12.11 hrs, Volume= 20.681 af
Outflow = 81.42 cfs @ 12.16 hrs, Volume= 20.647 af, Atten= 3%, Lag= 2.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.26 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 3.32 fps, Avg. Travel Time= 2.4 min

Peak Storage= 6,341 cf @ 12.13 hrs
Average Depth at Peak Storage= 1.60'
Bank-Full Depth= 4.00' Flow Area= 52.0 sf, Capacity= 535.88 cfs

5.00' x 4.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 21.00'
Length= 483.0' Slope= 0.0145 '/'
Inlet Invert= 71.00', Outlet Invert= 64.00'

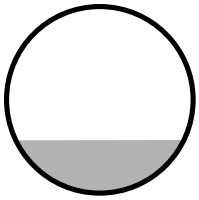
Summary for Reach PT7: ANALYSIS POINT 7 at US Rte 1 culvert

Inflow Area = 2.213 ac, 0.00% Impervious, Inflow Depth > 3.45" for 100-year event
Inflow = 3.68 cfs @ 12.88 hrs, Volume= 0.636 af
Outflow = 3.68 cfs @ 12.88 hrs, Volume= 0.635 af, Atten= 0%, Lag= 0.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.92 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 4.60 fps, Avg. Travel Time= 0.3 min

Peak Storage= 34 cf @ 12.88 hrs
Average Depth at Peak Storage= 0.43'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 20.95 cfs

18.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 83.0' Slope= 0.0398 '/'
Inlet Invert= 21.60', Outlet Invert= 18.30'



Summary for Reach PT8: ANALYSIS POINT 8 at US Rte 1 culvert

Inflow Area = 0.344 ac, 0.00% Impervious, Inflow Depth > 3.59" for 100-year event
Inflow = 0.83 cfs @ 12.48 hrs, Volume= 0.103 af
Outflow = 0.83 cfs @ 12.49 hrs, Volume= 0.103 af, Atten= 0%, Lag= 0.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.91 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.66 fps, Avg. Travel Time= 0.5 min

Peak Storage= 13 cf @ 12.49 hrs
Average Depth at Peak Storage= 0.06'
Bank-Full Depth= 2.00' Flow Area= 6.0 sf, Capacity= 144.91 cfs

36.0" W x 24.0" H Box Pipe
n= 0.011 Concrete pipe, straight & clean
Length= 76.0' Slope= 0.0632 '/'
Inlet Invert= 23.40', Outlet Invert= 18.60'

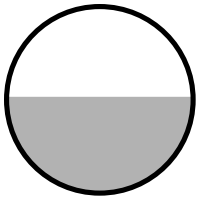
Summary for Reach PT9: Analysis Pt Stream 9 at US Rte 1 Culvert

Inflow Area = 75.825 ac, 6.70% Impervious, Inflow Depth > 3.95" for 100-year event
Inflow = 105.90 cfs @ 12.62 hrs, Volume= 24.934 af
Outflow = 105.88 cfs @ 12.62 hrs, Volume= 24.932 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 28.72 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 15.60 fps, Avg. Travel Time= 0.1 min

Peak Storage= 343 cf @ 12.62 hrs
Average Depth at Peak Storage= 1.55'
Bank-Full Depth= 3.00' Flow Area= 7.1 sf, Capacity= 200.22 cfs

36.0" Round Pipe
n= 0.011 Concrete pipe, straight & clean
Length= 93.0' Slope= 0.0645 '/'
Inlet Invert= 20.00', Outlet Invert= 14.00'



Summary for Reach S9-2: Stream 9

Inflow Area = 75.825 ac, 6.70% Impervious, Inflow Depth > 3.97" for 100-year event
Inflow = 106.62 cfs @ 12.50 hrs, Volume= 25.068 af
Outflow = 106.06 cfs @ 12.59 hrs, Volume= 24.961 af, Atten= 1%, Lag= 5.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.99 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 4.10 fps, Avg. Travel Time= 6.4 min

Peak Storage= 20,992 cf @ 12.54 hrs
Average Depth at Peak Storage= 1.61'
Bank-Full Depth= 2.00' Flow Area= 18.0 sf, Capacity= 161.21 cfs

5.00' x 2.00' deep channel, n= 0.030 Stream, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 13.00'
Length= 1,580.0' Slope= 0.0233 '/'
Inlet Invert= 64.00', Outlet Invert= 27.25'

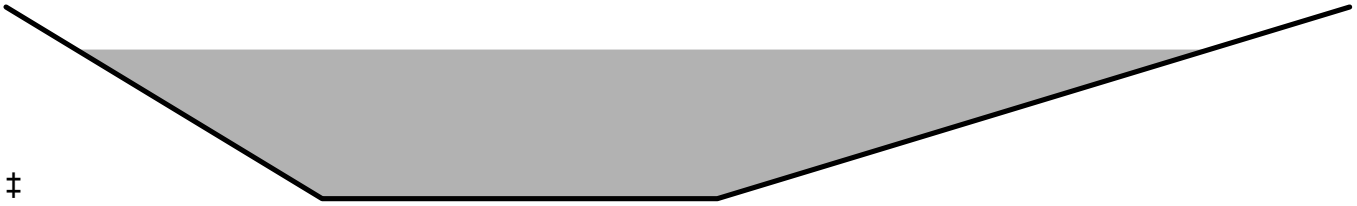
Summary for Reach S9-3: Stream 9

Inflow Area = 75.825 ac, 6.70% Impervious, Inflow Depth > 3.95" for 100-year event
Inflow = 106.06 cfs @ 12.59 hrs, Volume= 24.961 af
Outflow = 105.90 cfs @ 12.62 hrs, Volume= 24.934 af, Atten= 0%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.04 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 3.71 fps, Avg. Travel Time= 1.6 min

Peak Storage= 5,483 cf @ 12.60 hrs
Average Depth at Peak Storage= 1.56'
Bank-Full Depth= 2.00' Flow Area= 22.0 sf, Capacity= 177.67 cfs

5.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 4.0 '/' Top Width= 17.00'
Length= 364.0' Slope= 0.0199 '/'
Inlet Invert= 27.25', Outlet Invert= 20.00'



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PROJECT NO. 171.05027 SITE NAF
SHEET NO. 1 OF
CALCULATED BY MH DATE
CHECKED BY MPM DATE 4/1/19
SCALE N/A SJB 4/17/19

NAF Stormer Pre-Conditions

2/12/19

Purpose: To determine the existing conditions of the site (land cover conditions, hydrologic characteristics, stormwater runoff volumes, and Tc paths).

Assumptions:

1. Soil classifications with corresponding hydrolmic soil groups are based off of the HISS mapping/ Delineation Report prepared for Ransom by Broadwater LLC.

Soil Map Symbol	HSG
PwA	C/D
SwA	C/D
PwC	C/D
PwB	C/D
PwD	C/D
BaA	C
UdA	D

2. Soils that have a HSG of "C/D" are classified as type C soils. This is a more conservative approach than using CN value of D soils

3. AutoCAD 2016 used to determine areas, lengths of Tc Paths and slopes using polylines.

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PROJECT NO. 71.05027 SITE WAP
SHEET NO. 2 OF
CALCULATED BY MH DATE 2/12/19
CHECKED BY MPM DATE
SCALE N/A SJB 4/17/19

4. HydroCAD used to calculate ~~areas~~, flow rates, and T_c path times based on inputs provided.

5. Classified the Site as Type III 24-hr rainfall based on Maine DEP, Chapter 500: Stormwater Management, Appendix H. 24-hr duration rainfalls for varius return periods.

6. HydroCAD automatically selects/calculates the velocity factor, Mannings number, and T_c times based off of inputs selected.

7. Subcatchments 9 and 10 are runoff from offsite. Ransom used Lidar to determine contours/elevations of those areas.

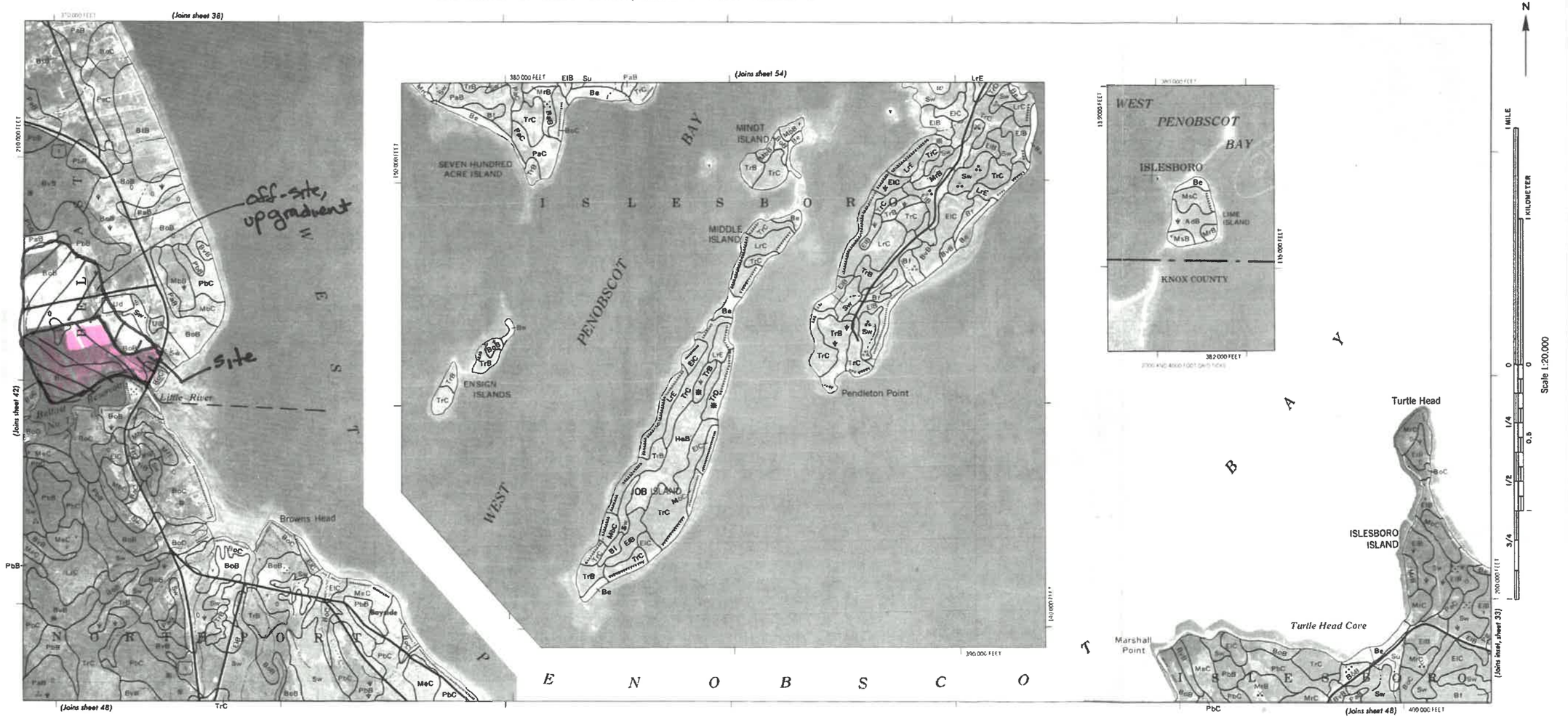
8. "Field is referred to as the Former Goldenrod Property "Old field" is referred to as the only existing field now used for logging on the east side of the site.

9. Soil type/classification is assumed to all be type C/D soils in offsite subcatchments (Subcatchment 9, 10, & 11) besides BaA in Subcatchment 9. Refer to NRCS soils Map for Waldo County. Assumed

2A

SJB
4/17/19

SOIL SURVEY OF WALDO COUNTY, MAINE — SHEET NUMBER 43



SDB 4/17/19 2B

Table 5-1 - Hydrologic Soil Groups for Maine Soils

This table provides information on the hydrologic soil series recognized in Maine and is current as of January 1, 2016. It is understood that these ratings may, and some probably will, change over time and with better data. The USDA - NRCS (Natural Resources Conservation Service) should be contacted for more accurate information.
http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

HSG A	HSG A/D	HSG B	HSG B/D	HSG C	HSG C/D	HSG D
Adams	Au Gres	Agawam	Atherton	Becket	Boothbay #	Abram
Colton	Bucksport	Allagash	Belgrade	Chesuncook *	Buxton #	Aurelie
Croghan	Chocorua	Bangor	Charles	Conant	Chesuncook **	Bemis
Danforth	Kinsman	Berkshire	Cornish	Dixfield *	Dixfield **	Benson
Deerfield	Markey	Caribou	Elmwood +	Elliottsville	Dixmont	Biddeford
Eldridge	Moosabec	Charlton	Fredon	Howland *	Easton	Brayton
Enchanted	Naskeag	Fryeburg	Halsey	Linneus	Howland **	Burnham
Hermon	Naumburg	Hadley	Limerick	Mapleton	Lamoine	Cabot
Hinckley	Rifle	Hartland	Lovewell +	Marlow	Leicester	Canaan
Mahoosuc	Scarboro	Nicholville ^	Medomak	Melrose	Perham **	Canandaigua
Masardis	Searsport	Machias ^	Ninigret +	Paxton	Pushaw	Colonel
Merrimac	Sebago	Madawaska ^	Podunk +	Penquis	Ragmuff **	Creasey
Skowhegan	Togus	Monadnock	Raynham	Perham *	Peru **	Daigle
Stetson	Vassalboro	Ondawa	Red Hook	Peru *	Skerry *	Gouldsboro
Sunday	Walpole	Salmon	Roundabout	Plaisted	Surplus **	Hogback
Udipsamments	Waskish	Sheepscot ^	Rumney	Ragmuff *	Washburn	Hollis
Windsor			Saco	Rawsonville	Woodbridge	Knob Lock
			Scio +	Sisk		Lyman
			Sutton +	Skerry **		Monarda
			Swanton	Suffield		Monson
			Whately	Surplus *		Peacham
			Winooski +	Tunbridge		Pillsbury
			Wonsqueak	Winnecook		Ricker
						Ridgebury
	Soils (with *) are HSG C or C/D depending on depth to Cd (C horizon with a dense unconsolidated material) and depth to water table - (with **) most commonly HSG C/D					Saddleback
						Scantic
						Saugatuck
	Soils (with +) are HSG B or B/D if aquic-redox is within 60cm					Schoodic
						Swanville
	Soils (with ^) are HSG B if water table is below 60cm and Ksat of lower horizon greater than 10					Telos
						Thorndike
	Soils (with #) are HSG C - or C/D if aquic-redox is within 60cm					Westbury
						Whitman

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PROJECT NO. 171.05027 SITE NAF
SHEET NO. 3 OF
CALCULATED BY MH DATE 2/12/19
CHECKED BY MPM DATE
SCALE N/A SJB 4/17/19

A. Subcatchment 1

1. Area (sq. ft.)	CN	Description
303,390	70	Good woods, HSG C/D
12,768	70	Good woods, HSG C
Total: 316,158 ✓		

* Combined all soils w/ the same HSG and description. For example, PwA and PwC located in "Good woods" areas are added together.

2. Tc Path

a-b sheet flow
Woods: Dense Underbrush
Mannings No.: 0.8
Flow Length: 88 ft
2-yr 24-hr rain: 2.90 in.

$$\text{Slope} = \frac{Y_2 - Y_1}{\text{Flow length}} = \frac{(80-76)\text{ft}}{88} = 0.045\ \text{ft/ft}$$

$$T_{t\ a\text{-}b} = \frac{0.007(nL)^{0.8}}{P_2^{0.5}\, S^{0.4}}$$

$$= \frac{0.007[(0.8)(88\text{ft})]^{0.8}}{(2.90)^{0.5}(0.045)^{0.4}}$$

$$T_{t\ a\text{-}b} = 25.6\ \text{min}$$

n = friction factor
L = flow length (ft)
P_2 = rainfall (in.)
S = Slope (ft/ft)
T_t = travel time (min.)

Use Tc and Tt generated from HydroCAD
Check in w/ formula

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PROJECT NO. 171.05027 SITE NAF
SHEET NO. 4 OF
CALCULATED BY MH DATE 2/12/19
CHECKED BY MPM DATE
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b-c Shallow concentrated flow
Forest w/ Heavy Litter
Velocity Factor: 2.5 ft/s
Flow Length: 65 ft
Slope: 0.015 ft/ft
Elevations: $y_2 = 76$ ft $y_1 = 75$ ft

$T_{t_{b-c}} = \frac{L}{3600\,V} = \frac{34\text{ ft}}{3600\,V}$

$T_{t_{b-c}} = 2.5$ min

* Average Velocity calculated by HydroCAD *
V = avg. velocity (ft/s)
L = flow length (ft)

c-d Shallow concentrated flow
Forest w/ Heavy Litter
Vel. Factor: 2.5 ft/s
Flow length: 72 ft
Slope: 0.055 ft/ft
($y_2 = 75$ ft, $y_1 = 71$ ft)
$T_{t_{c-d}} = 2.0$ min

d-e Shallow conc. flow
Forest w/ Heavy Litter
Length: 470 ft
Slope: 0.015
($y_2 = 71$ ft, $y_1 = 64$ ft)

$T_{t_{d-e}} = 25.6$ min

$T_c = (25.6 + 2.5 + 2.0 + 25.6 + 13.5)$ min
1 min
$T_c = 69.2$ min
57.7

e-f ~~Shallow conc. flow~~ Channel w/ 2' bottom 2:1 sideslopes
~~Forest w/ Heavy Litter~~ Earth, dense brush
Length: 203 ft
Slope: 0.1
($y_2 = 65$ ft, $y_1 = 45$)

$T_{t_{e-f}} = 4.3$ min
1 min

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PROJECT NO. 171.05027 SITE NAF
SHEET NO. 5 OF
CALCULATED BY MH DATE 2/12/19
CHECKED BY MPM DATE
SCALE N/A SJB 4/17/19

B. Subcatchment 2

1.

Area (sq. ft)	CN	Description
653559	70	Good woods, HSG C/D
38729	74	>75% Grass, HSG C/D
Total: 692,288 ✓		

2. T_c Path

a-b sheet flow
Woods: dense underbrush
Manning's No.: 0.8
Flow length: 134 ft
P2: 2.90 in.
Slope = 0.015 ft/ft
(y_2 = 80 ft, y_1 = 7.8 ft)

$$T_{t_{a-b}} = \frac{0.007\,(0.8 \times 134\ ft)^{0.8}}{(2.90\ in)^{0.5}\,(0.015)^{0.4}} \left(\frac{60\ min}{1\ hr}\right)$$

$$T_{t_{a-b}} = 55.7\ min$$

b-c shallow conc. flow
Forest w/ Heavy Litter
Velocity Factor: 2.5 ft/s
Flow length: 175 ft
Slope: 0.04 ft/ft
(y_2 = 78 ft y_1 = 71 ft)

$$T_{t_{b-c}} = 5.8\ min$$

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PROJECT NO. 171.05027 SITE NAm
SHEET NO. 6 OF
CALCULATED BY MH DATE 3/12/19
CHECKED BY MPM DATE
SCALE N/A SJB 4/17/19

- C-d Shallow conc. flow
  Forest w/ Heavy Litter
  Vel. Factor = 2.5 ft/s
  Flow length = 199 ft
  P2 = 2.9 in
  Slope : 0.01 ft/ft
  (y_2 = 71ft, y_1 = 69 ft)
  $T_{t_{c-d}}$ = 13.3 min

- d-e Shallow conc. flow
  Forest w/ heavy litter
  length = 411 ft
  Slope : 0.049
  (y_2 = 69 ft, y_1 = 67 ft)
  $T_{t_{d-e}}$ = 1.2 min

T_c = ~~47.8~~ 101.5 min

- e-f Shallow conc. flow
  Forest w/ Heavy Litter
  length : 468 ft
  Slope : 0.02
  (y_2 = 67 ft, y_1 = 58 ft)
  $T_{t_{e-f}}$ = 22.1 min

- f-g ~~Shallow conc. flow~~ Channel w/ 2' bottom 2:1 slopes
  Forest w/ litter Earth, dense Brush
  Length : 511 ft
  Slope : 0.055
  (y_2 = 58 ft y_1 = 29.5 ft)
  $T_{t_{f-g}}$ = ~~44.4~~ 3.4 min

C. Subcatchment 3

1.

Area (Sq. ft)	CN	Description
205,588	74	>75% grass, HSG C/D (Field)
163,239	70	Good Woods, HSG C
22290	74	>75% grass, HSG C (Field)
Total: 391,117 ✓		

2. T_c Path

a-b Sheet flow
~~Grass: Dense~~ Woods w/ Light
~~Mannings No: 0.24~~ 0.40
Flow Length : 115 ft
P2 = 2.9 in.
Slope : 0.04 ft/ft
(y_2 = ~~74.5~~ ft, y_1 = 70. ft)
$T_{t_{a-b}}$ = 19.1 min

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PROJECT NO. 171.25027 SITE NAF
SHEET NO. 7 OF
CALCULATED BY MH DATE 2/12/19
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SCALE N/A SJB 4/17/19

$$T_{t\ a-b} = \frac{0.007\,(0.24 \times 300\text{ ft})^{0.8}}{(2.9)^{0.5}\,(0.029)^{0.4}}\,(60\text{ min})$$

$T_{t\ a-b} = 31.1$ min

MxH

b-c Shallow conc. flow
~~Short Grass Pasture~~ Wooded
Vel. Factor: 7 ft/s
Flow Length: 155 ft
Slope: 0.023 ft/ft
($y_2 = 70$ ft, $y_1 = 66.5$ ft)

$T_{t\ b-c} = 3.4$ min

c-d Shallow conc. flow
Short Grass Pasture
Vel. Factor: 7 ft/s
Flow Length: 372 ft
Slope = 0.009 ft/ft
($y_2 = 66.5$ ft, $y_1 = 63$ ft)

$T_{t\ c-d} = 9.3$ min

d-e Shallow conc. flow
Short grass pasture
Length: 134 ft
Slope: 0.019
($y_2 = 63$ ft, $y_1 = 60.5$ ft)

$T_{t\ d-e} = 2.3$ min

e-f Shallow conc. flow
Forest w/ heavy litter
Length: 254 ft
Slope: 0.018
($y_2 = 60.5$ ft, $y_1 = 56$ ft)

$T_{t\ e-f} = 12.6$ min

channel w/ 2' bottom; 2:1 sides; earthy, dense brush

f-g ~~Shallow conc. flow~~
Forest w/ heavy litter
Length: 305 ft
Slope: 0.056
($y_2 = 56$ ft, $y_1 = 39$ ft)

$T_{t\ f-g} = \frac{8.6}{2}$ min

$T_c = 55.7$ min
~~423~~
48.7

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SHEET NO. 8 OF
CALCULATED BY MH DATE 2/12/19
CHECKED BY MPM DATE
SCALE N/A SJB 4/17/19

D. Subcatchment 4

1.

Area (sq. ft.)	CN	Description
130853	74	75% grass, HSG C/D (Field)
26033	74	75% grass, HSG C (Field)
40857	70	Good woods, HSG C
56948	70	Good woods, HSG C/D
Total: 254,691 ✓		

2. Tc Path

a-b sheet flow
Grass: Dense
Mannings No: 0.24
Flow Length: 135 ft
P2 : 2.9 in
Slope : 0.027 ft/ft
(y_2 = 71.75 ft, y_1 = 68 ft)

$$T_{t\ a-b} = \frac{0.007\,(0.24 \times 135)^{0.8}}{(2.9\text{in})^{0.5}(0.027)^{0.4}}\ (60\ \text{min})$$

$T_{t\ a-b}$ = 16.9 min

b-c shallow conc. flow
Short grass pasture
Vel. Factor : 7 ft/s
Flow Length : 462 ft
Slope : 0.02
(y_2 = 68 ft, y_1 = 59 ft)

$T_{t\ b-c}$ = 7.8 min

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PROJECT NO. 171.05027 SITE NAF
SHEET NO. 9 OF
CALCULATED BY MH DATE 2/12/19
CHECKED BY MPM DATE
SCALE N/A SJB 4/17/19

c-d shallow conc. flow
Short grass pasture
Vel. Factor : 7.0 ft/s
Flow Length : 184 ft
Slope : 0.038
(y_2 = 59 ft, y_1 = 52 ft)
T_t = 2.2 min
c-d

d-e ~~shallow conc. flow~~ channel w/ 2' bottom 2:1 slopes Earth, dense brush
~~Forest w/ heavy litter~~
Length : 389
Slope : 0.033
(y_2 = 50 ft, y_1 = 39 ft)
T_t = ~~1.3 min~~ 3.3 min.
d-e

T_c = ~~41.2~~ 30.2 min

E. Subcatchment 5

1.	Area (sq. ft.)	CN	Description
156,289	~~207,423~~	74	> 75% grass, HSG C/D (Field)
74,991	~~23355~~	~~74~~ 70	~~> 75% grass HSG C (Field)~~ Good woods
	Total: 231,278 ✓		

2. Tc Path

a-b sheet flow
Grass : Dense
Mannings No : 0.24
Flow length : 198 ft
P_2 = 2.9 in
Slope : 0.027
(y_2 = 69.5 ft, y_1 = 64 ft)

T_t = 23 min
a-b

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PROJECT NO. 171.0S027 SITE NAF
SHEET NO. 10 OF
CALCULATED BY MH DATE 2/12/19
CHECKED BY MPM DATE
SCALE N/A SJB 4/17/19

$T_{c\ a-b} = \frac{0.007\,(0.24 \times 300\ ft)^{0.8}}{(2.9\ in)^{0.5}\,(0.02)^{0.4}}\ (60\ min)$

$T_{c\ a-b} = 36.1\ min$

MKH

b-c Shallow conc. flow
Short grass pasture
Vel. Factor: 7 ft/s
Flow Length: 146 ft
Slope: 0.014
(y_2 = 64 ft, y_1 = 62 ft)
$T_{t\ b-c}$ = 2.9 min

c-d Shallow conc. flow
Short grass pasture
Length: 285 ft
Slope: 0.032
(y_2 = 62 ft, y_1 = 53 ft)
$T_{t\ c-d}$ = 3.8 min

d-e ~~Shallow conc. flow~~ Channel, 2' bottom 2:1 side earth, dense brush
Forest w/ heavy litter
Length: 210 ft
Slope: 0.043
(y_2 = 53 ft, y_1 = 44 ft)
$T_{t\ d-e}$ = ~~0.1~~ 1.6 min

31.3
T_c = ~~37.6~~ min

→ Discharge to Stream 9
New Reach - S9-2 (analysis 6)

Refer to page 21

F. Subcatchment 6

	Area (sq. ft)	CN	Description
1.	142,888	70	Good woods, HSG C/D
	10372	70	Good woods, HSG C
	61952	74	>75% grass, HSG C/D
	635	74	>75% grass, HSG C
	51,989	80	>75% grass, HSG D
	7,818	96	Gravel, (NE of paved driveway)
	34,971	98	Impervious (Roofs, pavement)
	32,024	77	Good woods, HSG D
Total: 342,649 ✓			

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PROJECT NO. 171.05027 SITE NAF
SHEET NO. 11 OF
CALCULATED BY MH DATE 2/12/19
CHECKED BY MPM DATE
SCALE N/A SJB 4/17/19

2. Tc Path

- a-b Sheet flow
  Woods : Dense Underbrush
  Mannings No: 0.8
  Flow Length : 67 ft
  P2 : 2.9 in
  Slope : 0.015
  (y_2 = 57 ft, y_1 = 56 ft)
  $T_{t_{a-b}}$ = 32 min

- b-c Shallow conc. flow
  Forest w/ heavy litter
  Length : 92 ft
  Slope : 0.014 (y_2 = 56 ft, y_1 = 54.75 ft)
  $T_{t_{b-c}}$ = 5.2 min

- c-d Shallow conc. flow
  Short grass pasture
  Flow length : 74 ft
  P2 = 2.9 in
  Slope : 0.01
  (y_2 = 54.75 ft, y_1 = 54 ft)
  $T_{t_{c-d}}$ = 1.8 min

- d-e Shallow conc. flow
  short grass pasture
  Length : 163 ft
  Slope : 0.055
  (y_2 = 54 ft, y_1 = 45 ft)
  $T_{t_{d-e}}$ = 1.7 min

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PROJECT NO. 171.65027 SITE NAF
SHEET NO. 12 OF
CALCULATED BY MH DATE 2/12/19
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SCALE N/A SJB 4/17/19

- e-f Shallow conc. flow
  Forest w/ heavy litter
  Length: 39 ft
  Slope: 0.1
  (y_2 = 45 ft, y_1 = 41 ft)
  T_t = 0.8 min
  e-f

T_c = 41.6 min

- f-g Shallow conc. flow
  Forest w/ heavy litter
  Length: 10 ft
  Slope: 0.5
  (y_2 = 41 ft, y_1 = 36 ft)
  T_t = 0.1 min
  f-g

INTO Stream 9 @ Reach S9-2
See Sheets 20-21

New Reach - S9- to 36" culvert

- g-h Shallow conc. flow
  ~~Forest w/ heavy litter~~ ← Channel flow (Stream 9)
  5' bottom; 2:1 sideslopes
  Rocky; gravel
  Length: 568 ft
  Slope: 0.014
  (y_2 = 36 ft, y_1 = 28 ft)
  T_t = 32 min
  g-h

- h-i Shallow conc. flow
  Grassed Waterway
  Length: 350 ft
  Slope: 0.02
  (y_2 = 28 ft, y_1 = 20.75 ft)
  T_t = 2.7 min
  h-i

Channel flow (stream 9)
5' bottom; 2:1 sideslopes
Grassed

T_c = 76.3 min

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PROJECT NO. 171.05027 SITE NAF
SHEET NO. 13 OF
CALCULATED BY MH DATE 2/12/19
CHECKED BY MPM DATE
SCALE N/A SJB 4/17/19

G. Subcatchment 7

1.

Area (sq ft)	CN	Description
93805	70	Good woods, HSG C/D
2578	74	> 75% grass, HSG C/D

Total: 96,383 ✓

2. Tc Path

a-b sheet flow
Woods: Dense Underbrush
Mannings No: 0.8
Flow Length: 172 ft ✓
P2: 2.9 in
Slope: 0.026
(y_2 = 45.5 ft, y_1 = 41 ft) ✓
T_t = 54.6 min
a-b

b-c shallow conc. flow
Forest w/ Heavy Litter
Vel. Factor: 2.5 ft/s
Flow length: 112 ft
Slope: 0.07
(y_2 = 41 ft, y_1 = 33 ft) ✓
T_t = 2.8 min
b-c

c-d shallow conc. flow
Forest w/ heavy litter
Length: 13 ft
Slope: 0.23
(y_2 = 33 ft, y_1 = 30 ft)
T_t = 0.2 min
c-d

d-e ~~shallow channel flow, Paved~~ shallow conc. flow, unpaved
Forest w/ heavy litter
Length: 171 ft ✓
Slope: 0.03
(y_2 = 30 ft, y_1 = 26 ft) ✓
T_t = 6.6 min
d-e

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PROJECT NO. 171.05027 SITE VAR
SHEET NO. 14 OF
CALCULATED BY MH DATE 2/12/19
CHECKED BY MPM DATE
SCALE N/A SJB 4/17/19

channel 2' bottom 2:1 sides
e-f ~~Shallow conc. flow~~
~~Forest w/ Heavy Litter~~ earth, dense litter
Vel. Factor : 2.5 ft/s
Flow Length : 173'
Slope : 0.06
(y_2 = 26 ft, y_1 = 21.6 (inv. culvert)
T_t = ~~2 min~~ 0.5 min
e-f
T_c = ~~6.2 min~~ 6.7 min.

Discharge through 18" culvert under Rt. 1 (assume HDS)
inv. in = 21.6
inv. out = 18.3
l = 83'

H. Subcatchment 8

1. Area (sq. ft.)	CN	Description
12652	70	Good woods, HSG C/D
2956	74	>75% grass, HSG C/D
Total: 15608 ✓		

Q. T_c Path

a-b sheet flow
Woods: Dense Underbrush
Mannings No: 0.8
Flow Length: 58 ft ✓
P2: 2.9 in
Slope: 0.017
(y_2 = 41 ft, 40 ft) ✓
T_t = 27.1 min
a-b

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PROJECT NO. 17.05027 SITE NAF
SHEET NO. 15 OF
CALCULATED BY MH DATE 2/12/19
CHECKED BY MPM DATE
SCALE N/A SJB 4/17/19

~~$T_{t\ a-b} = \frac{0.007(0.8 \times 112\ ft)^{0.8}}{(2.9_{in})^{0.5}(0.04)^{0.4}}(60)$~~

$T_{t\ a-b} = 32.6$ min

MKH

b-c Shallow conc. flow
Forest w/ Heavy Litter
Vel. Factor: 2.5 ft/s
Flow Length: 43 ft ✓
Slope: 0.07
(Y_2 = 40 ft, Y_1 = 37 ft) ✓
$T_{t\ b-c}$ = 1.1 min

c-d Shallow conc. flow
Forest w/ Heavy Litter
Vel. Factor: 2.5 ft/s
Flow Length: 14 ft ✓
Slope: 0.071
(Y_2 = 37 ft, Y_1 = 27 ft) ✓
$T_{t\ c-d}$ = 0.1 min

Channel 2' bottom; 2:1 sides, earth, dense brush

d-e ~~Shallow conc. flow~~
Forest w/ heavy litter
Length: 152 ft.
Slope: 0.024
(Y_2 = 27 ft, Y_1 = 23.4 ft.)
$T_{t\ d-e}$ = ~~6.5 min~~ 1.5 min

Discharge through
3'x3' culvert under Rt. 1
Inv. In = 23.4
Inv. Out = 18.6
l = 76'
concrete

T_c = ~~34.8 min~~
34.7 min

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PROJECT NO. 171.0527 SITE VAF
SHEET NO. 16 OF
CALCULATED BY MH DATE 2/12/19
CHECKED BY MPM DATE
SCALE N/A SJB 4/17/19

I. Subcatchment 9 (offsite)

1.

Area (sq ft)	CN	Description
8857	74	>75% grass, HSG C
3818	94	Gravel Roads (Roosevelt)
25513	98	Impervious (Perkins/houses)
532320	74	>75% grass, HSG C/D
Total 570508		

2. T_c Path

a-b Sheet flow
Smooth surface
Length 15 ft
Slope: 0.2
(y_2 = 87 ft, y_1 = 84 ft)
T_t = 0.1 min
a-b

Perkins Rd to Ditch

b-c Shallow conc. flow
Short grass pasture
Length: 373 ft
Slope: 0.005
(y_2 = 84 ft, y_1 = 82 ft)
T_t = 12.6 min
b-c

c-d Shallow conc. flow
Short grass pasture
Length: 715 ft
Slope: 0.017
(y_2 = 82 ft, y_1 = 70 ft)
T_t = 13.1 min
c-d

d-e Shallow conc. flow
Forest w/ heavy litter
Length: 250 ft
Slope: 0.032
(y_2 = 70 ft, y_1 = 62 ft)
T_t = 9.3 min
d-e

T_c = 35.1 min

To stream 9
into S9-1
see page 20

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PROJECT NO. 171.25027 SITE NAF
SHEET NO. 17 OF
CALCULATED BY MH DATE 2/12/19
CHECKED BY MPM DATE
SCALE N/A SJB 4/17/19

J. Subcatchment 10 (offsite) upGradient of Perkins

1.

Area (sq. ft.)	CN	Description
298066	70	Good woods, HSG C/D
42276	98	Impervious (Roadway)
1,304,640	74	>75% grass, HSG C/D
Total: 1,644,982 ✓		

2. Tc Path

a-b sheet flow
Woods: Dense Underbrush
Length: 141 ft ✓
Slope: 0.028
(y_2=122 ft, y_1=118 ft) ✓
T_t a-b = 45.2 min

b-c shallow conc. flow
Length: 384 ft ✓
Slope: 0.028
(y_2 = 118 ft, y_1 = 107 ft) ✓
Forest w/ Heavy Litter
T_t = 15.3 min
b-c

c-d shallow conc. flow
Short grass pasture
Length: 227 ft ✓
Slope: 0.048
(y_2 = 107 ft, y_1 = 96 ft) ✓
T_t c-d = 2.5 min

d-e shallow conc. flow
Short grass pasture
Length: 780 ft ✓
Slope: 0.01
(y_2 = 96 ft, y_1 = 88 ft ✓
T_t = 18.6 min
d-e

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PROJECT NO. 171.05027 SITE NAF
SHEET NO. 18 OF
CALCULATED BY MH DATE 2/12/19
CHECKED BY MPM DATE
SCALE N/A SJB 4/17/19

e-f Shallow conc. flow
Short Grass Pasture
Length: 689 ft ✓
Slope: 0.017
(y_2 = 88 ft, y_1 = 76 ft) ✓
T_t = 12.6 min
d-e

T_c = 94.2 min

Discharge under Perkins through culvert. To start of stream 9 modelled as Reach S9
24" assumed
Assume 25'l w/ S=0.02 HDPE, smooth walled
assume inv. in = 75.5
calc. inv. out = 75.5 - [(25)(0.02)] = 75.0

K. Subcatchment 11 (offsite)

11. Area (sq. ft.)	CN	Description
118437	98	Impervious
237621	70	Good woods, HSG C/D
157469	74	>75% grass, HSG C/D
Total: 513527 ✓		

2. Tc Path

a-b Sheet flow
Smooth Surface
Length: 16 ft off of Perkins to ditch
Slope: 0.187
(y_2 = 87 ft, y_1 = 84 ft)
$T_{t_{a-b}}$ = 0.1 min

b-c Shallow Conc. flow
Grassed waterway
Length: 419 ft Roadside ditch
Slope: 0.01
(y_2 = 84 y_1 = 80 ft)
$T_{t_{b-c}}$ = 4.7 min

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PROJECT NO. 171.05027 SITE NAF
SHEET NO. 19 OF
CALCULATED BY MH DATE 2/12/19
CHECKED BY MPM DATE
SCALE N/A SJB 4/17/19

Subcatchment 11

C-d Shallow conc. flow
Forest w/ heavy litter
Length 97 ft ✓
Slope: 0.1
(Y_2 = 80 ft, Y_1 = 70 ft) ✓
T_t = 2.0 min
C-d

BRING INTO Reach S9

d-e Shallow conc. flow
Forest w/ heavy litter
Length: 470 ft
Slope: 0.017
(Y_2 = 70 ft, Y_1 = 62 ft)
T_t = 2.4 min
d-e

e-f shallow conc flow
Forest w/ heavy litter
Length: 26 ft
Slope: 0.15
(Y_2 = 62 ft, Y_1 = 58 ft)
T_t = 0.4 min
e-f

f-g Shallow conc. flow
Forest w/ heavy litter
Length: 877 ft
Slope: 0.025
(Y_2 = 58 ft, Y_1 = 36 ft)
T_t = 3.7 min
f-g

TO S9-1 see Page 20

g-h Shallow conc. flow
Forest w/ heavy litter
Length: 79 ft
Slope: 0.038
(Y_2 = 36 ft, Y_1 = 33 ft)
T_t = 2.7 min
g-h

T_c = 7.2 min

T_c = 16.8 min

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PROJECT NO. 171.05027 SITE NAF
SHEET NO. 20 OF
CALCULATED BY MPM DATE 4/1/19
CHECKED BY SJB DATE 4/17/19
SCALE N/A

Reach S9 - 3 sections of Stream 9

Subcatch 11 discharges to upper portion of Stream 9 which follows RL along subcatch boundary between S11 and S10 through wooded on both sides of stream through to Sub6.

Channel averages 5' wide w/ 2:1 slopes

Discharge from subcatch 10 under Perkins Road @ begin of stream.

Discharge of culvert @ +/- 75, but culvert elevated from ditch/stream.

Segment 1: Sub 10 discharge to Property line.

Assume 2:1 side slopes
5' channel bottom (average) assume Natural stream clean/straight manning = 0.03

L = 483'

Δ = 71-64

S = 0.014

depth: varies 6' to 8'
assume 4' available for water depth (downstream limitations)

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PROJECT NO. 171.05027 SITE NAF
SHEET NO. 21 OF
CALCULATED BY MPM DATE 4/1/19
CHECKED BY DATE
SCALE N/A SJB 4/17/19

Stream 9: Section 2 along property boundary between where off site flow ends and the ground cover change from stream in the woods to grassed channel

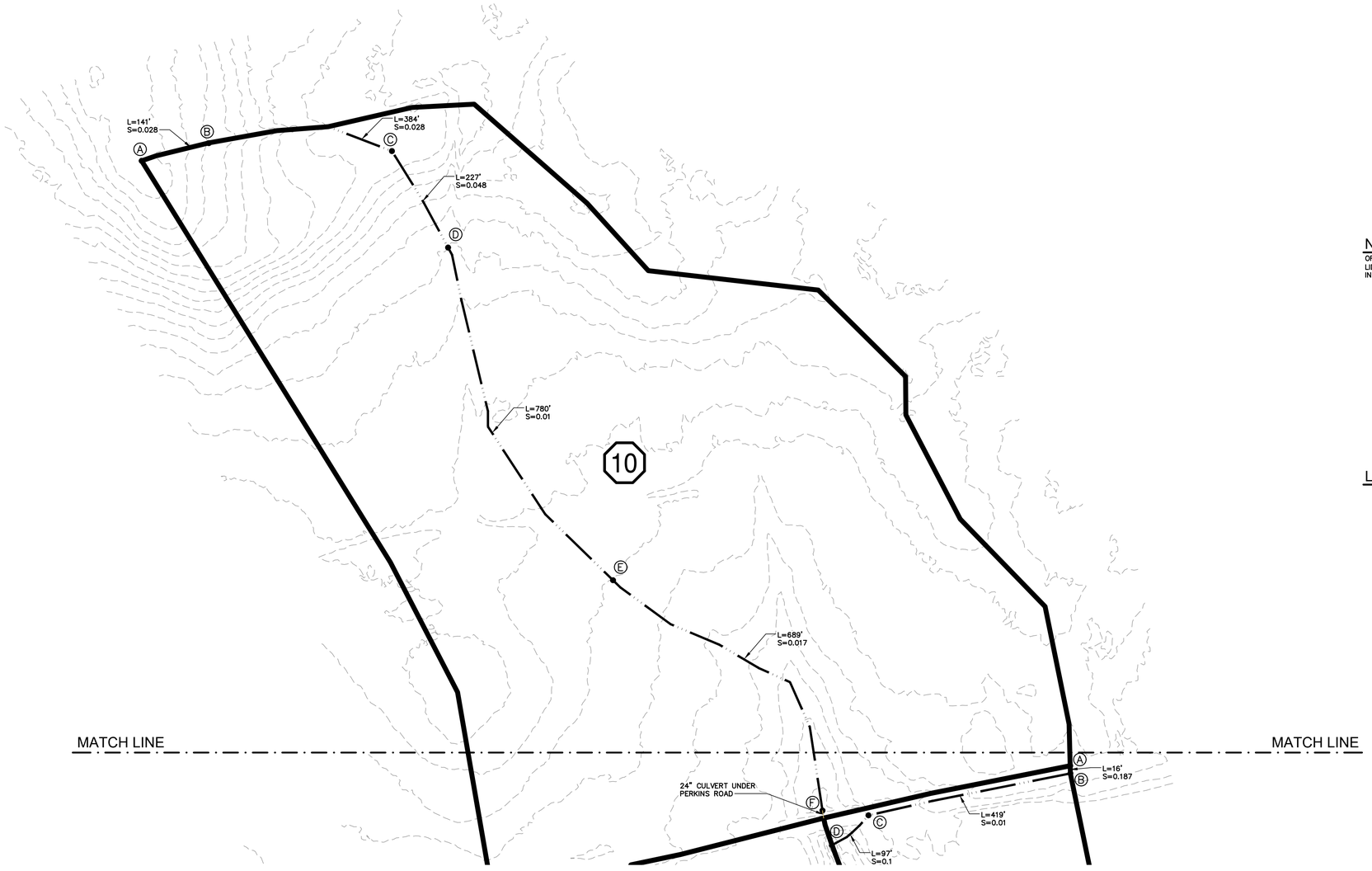
Assume 2:1 slopes along length
5' channel bottom width
L= 1580 ft.
Δ= 64' to 27.25
S= 0.02
depth: between 2' & 4'
assume 2' flow depth max

Stream winding
Mannings = 0.04

Stream 9: Section 3 along roadway in grassed lined swale to culvert under Rt. 1 (36")

Assume side slopes LT 2:1 ; Rt 4:1
5' channel bottom width
L= 364'
Δ= 27.25 to 20' (inv. of 36" culvert)
S= 0.02

culvert is 36"
L= 93'
Inv. in= 20.0
Inv. out= 19.0



NOTE

OFF-SITE TOPOGRAPHY PROVIDED BY LIDAR SURVEY. CONTOURS ARE AT 2' INTERVALS.

LEGEND

- SUBCATCHMENT BOUNDARY
- 9 — SUBCATCHMENT ID
- Ⓐ — FLOW LINE BREAK POINTS
- HYDRAULIC FLOW LINE
- PT — ANALYSIS POINT

RANSOM Consulting Engineers and Scientists

WOODARD & CURRAN

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REV	DESCRIPTION	DATE
0	ISSUED FOR PERMIT	5-14-19

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NORDIC AQUAFARMS MULTIPHASE PROJECT

158 HIGH STREET, BELFAST, MAINE

PRE-DEVELOPMENT WATERSHED PLAN - OFF-SITE AREAS

0 60 120 240
SCALE in FEET
1"=120'

PROJECT MANAGER: MPM
PROJECT NO: 171.05027
DRAWN BY: JAR

CW-101

NOT FOR CONSTRUCTION

24x36

MATCH LINE

MATCH LINE

24" CULVERT UNDER PERKINS ROAD

L=16' S=0.187

L=419' S=0.01

L=97' S=0.1

REACH S9-1 L=483' S=0.014 STREAM

L=15' S=0.2

L=373' S=0.005

L=715' S=0.017

L=250' S=0.032

PT6

REACH S9-2 L=1580' S=0.02 STREAM

LIMIT OF SOIL SURVEY, TYPICAL

L=198' S=0.027

L=146' S=0.014

L=115' S=0.04

L=134' S=0.015

L=88' S=0.045

ROCKY SPOT

L=65' S=0.015

L=72' S=0.055

L=175' S=0.04

L=155' S=0.023

L=135' S=0.027

L=462' S=0.02

L=372' S=0.009

L=285' S=0.032

L=210' S=0.043

L=199' S=0.01

L=41' S=0.049

L=470' S=0.015

L=468' S=0.02

L=134' S=0.019

L=184' S=0.038

L=67' S=0.015

L=92' S=0.014

L=74' S=0.01

L=163' S=0.055

L=39' S=0.10

L=10' S=0.5

REACH S9-2 CONT.

L=58' S=0.017

L=43' S=0.07

L=14' S=0.10

L=152' S=0.024

PT8

L=172' S=0.026

L=13' S=0.23

L=112' S=0.07

L=112' S=0.07

L=73' S=0.06

PT7

L=254' S=0.018

L=389' S=0.033

L=305' S=0.056

L=203' S=0.01

L=516' S=0.055

PT1

PT5

PT9

REACH S9-3 L=364' S=0.02 STREAM

BELFAST

NORTHPORT

NORTHPORT AVENUE (U.S. ROUTE 1)

24" CMP INV.=46.0'

12" STEEL CULVERT INV.=46.0'

12" CMP INV.=44.0'

12" CONC. CULVERTS INV.=42.6' INV.=42.0'

2" DRAIN INV.=35.6'

12" CMP INV.=18.9'

3" PVC DRAIN INV.=15.2'

6" METAL DRAIN INV.=21.6'

18" CONC. BOX CULVERT 3'x2'

INV.=23.4'

18" CONC. CULVERT

INV.=21.6'

35" CONC. CULVERT

INV.=14.0'

SwA PwA PwB PwC BaA UdA PwD

1 2 3 4 5 6 7 8 9 11

LEGEND

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