STORMWATER MANAGEMENT REPORT

OLD BARN ESTATES
ICE POND DRIVE
FALMOUTH, MAINE

JANUARY 2013

Introduction

Land Design Solutions (LDS) was retained to assist the TPO Properties, LLC in the design and permitting of a 12 unit residential subdivision located on the southerly side of Ledgewood Drive, across from the intersection of Slocum Drive in Falmouth, Maine. Although, the entrance to the site is located in Falmouth, the majority of the site is located within the City of Portland. The proposed subdivision includes the construction of a 760-foot local street and associated stormwater and landscaping amenities to access 12 approximately 0.5 acre single family residential lots. It is anticipated that, upon final construction, each lot will include approximately 5,000 square feet of impervious area and 10,000 square feet of lawn area.

This Stormwater Management Report assesses both pre-development and post-development peak runoff rates to establish appropriate control of stormwater runoff to reduce and minimize significant impact on the local environs in accordance with the City of Portland and Town of Falmouth ordinances.

Methodology

The stormwater runoff analysis has been undertaken utilizing the HydroCAD Stormwater Modeling System software (Version 9.10) developed by the Applied Microcomputer Systems of Chocorua, New Hampshire. The program is based upon the TR-20 computer program and the TR-55 tabular method, both of which are based upon techniques developed by the USDA Soil Conservation Service. The analysis was undertaken for the 2-, 10-, 25- and 50-year frequencies (3.0, 4.7, 5.5 and 5.9 inches, respectively). Twenty-four hour storms with a Type III distribution were the basis for the analysis.

All storm drainage piping and detention basins have been sized for the 50-year, 24-hour storm utilizing the HydroCAD program.

Pre-Development Conditions

The site of the proposed subdivision is located on Ledgewood Drive in Falmouth, across from the intersection of Slocum Drive.

The parcel consists of three parcels totaling approximately 10.5 acres of forested area. The site topography is irregular, generally in a mound and depression configuration, with shallow soil over ledge. Wetlands are located on the northern and southern portions of

the site. An intermittent stream is located on the southern portion of the property, which feeds into one of the southerly wetlands. As taken from the website of the "*Natural Resources Conservation Service, United States Department of Agriculture, Web Soil Survey,"* the predominant soil types in the development area are Hollis Fine Sandy Loam (HrB) and Hollis Very Rocky Fine Sandy Loam (HsB), which are both classified as hydrologic soil group (HSG) C/D. The southern portion of the site contains Scantic Silt Loam (Sn), which is classified as HSG D. The soil boundaries are shown on drawings D-100 Pre-development Drainage Plan, and D-102 Post-development Drainage Plan.

The northern portion of the site (SC1) drains from south to north towards a very large wetland that borders the northern side of the site, which ultimately drains to a 5-foot diameter culvert under Ledgewood Drive. A large offsite drainage area (OS1) also contributes to the wetland, which is shown on drawing D-101 Off-Site Subcatchment Plan. A small portion of the site near the proposed entrance (SC2) drains east toward Ledgewood Drive, where it leaves the site via a 15" culvert under Ledgewood Drive. The southern portion of the site and some additional off-site area (SC3) drains to a large wetland on the southern portion of the site (pond P3), which outlets to a large, well defined channel on the south side of the wetland. A section of the southerly portion of the site (SC4) drains directly to the well-defined channel south of the large wetland. A small offsite area (OS2) also drains toward the southerly wetland through two parallel 15" diameter culverts under Ledgewood Drive, and is routed around the wetland by a channel (reach R3.2).

Runoff from the site was analyzed at the large wetland on the north side of the site (AP1), the 15" culvert under Ledgewood Drive (AP2), and the large wetland on the southern portion of the site (AP3). Pre-development HydroCAD calculations and a drainage plan can be found in Appendix A. Pre-development peak flow rates at each of the analysis points are summarized in Table 1, for the 2-, 10-, 25-, and 50-year storm events.

Post-Development Conditions

The project includes the construction of a 760' local street with associated landscaping, the construction of a 12' wide 300-foot driveway to access Lot 2, the construction of two grassed underdrained soil filters, and the use of vegetated buffers for stormwater treatment. The stormwater analysis was performed assuming full buildout of the subdivision, which includes an assumed 5,000 square feet of impervious area and 10,000 square feet of lawn area per lot. The lot allowances are in addition to the impervious and landscaped areas associated with the street and stormwater pond construction.

Post-development stormwater runoff from the site and tributary area was analyzed by routing stormwater flows from the various developed subcatchments through proposed conveyance and treatment measures. Post-development HydroCAD calculations and drainage plan can be found in Appendix B. Post-development peak flow rates at each of the analysis points are summarized in Table 1, for the 2-, 10-, 25-, and 50-year storm events.

Stormwater Quantity

Stormwater quantity at AP1 is partially controlled through detention in the grassed underdrained soil filter (pond T1) located on the northern corner of Lot 9. Flow from pond T1 is released through a level spreader directly to the large wetland north of the site. Calculations indicate that the peak flow from the wetland is essentially not impacted as result of the development. The peak runoff from the site reaches the wetland well before the peak rate from the large offsite subcatchment reaches the wetland. Therefore, we anticipate there will be no impact on capacities of downstream drainage systems, including the 5' diameter culvert under Ledgwood Drive.

Stormwater quantity at AP2 is controlled by ndetention in the underdrained soil filter (pond T2) located in the open space on the south side of the site entrance. Pond T2 is oversized to allow for detention of stormwater prior to being discharged to the 15" culvert.

Stormwater quantity at AP3 is controlled by natural detention upstream of a proposed 30" culvert under the proposed Lot 2 driveway and by detention and attenuation in the large wetland on the south side of the site.

The detention systems were sized and analyzed through an iterative process using HydroCAD, in order to provide attenuation of post-development peak flow rates to remain at or below pre-development peak flow rates at the analysis points.

Table 1 – Comparison of Pre and Post -Development Runoff Rates
Runoff rates in cubic feet per second (c.f.s.)

Peak Flow Rate Table				
	Storm			
AP1	**2**	**10**	**25**	**50**
PRE	122.1	270.9	346.2	384.9
POST	122.2	271.0	346.3	385.0
	Storm			
AP2	**2**	**10**	**25**	**50**
PRE	1.3	3.2	4.8	4.4
POST	0.7	2.2	3.6	4.2
	Storm			
AP3	**2**	**10**	**25**	**50**
PRE	3.5	7.9	10.2	11.4
POST	3.5	7.9	10.2	11.4

As shown in the Table 1, the peak runoff rates at analysis points AP2 and AP3 under the post-development conditions will remain essentially at or below the peak pre-development runoff rates for the 2-, 10-, 25- and 50-year storm events. The slight increases (0.1 cfs) at AP1 during the 2, 10, 25, and 50 years storms are considered

negligible considering the size of the contributing subcatchments and the size of the receiving wetland. Based on this analysis, we do not anticipate any impact on downgradient drainage systems due to the proposed development.

Stormwater Quality

A number of Best Management Practices (BMPs) will be employed to manage stormwater quantity and quality associated with the proposed subdivision. The BMPs have been designed in accordance with the Maine DEP Chapter 500 rules. These measures, incorporated into the site development, will attenuate stormwater runoff rates to at or below pre-development rates and will provide water quality enhancement per Maine DEP, City of Portland, and Town of Falmouth rules and regulations.

Runoff from the road from approximately station 3+50 to the end, lots 7, 8, 9, and portions of lots 5 and 6 will be treated in pond T1. Runoff from the road, lots 5, 6, 7, and 8 is diverted by the interceptor swale on the western side of the site and directed through the culvert under the proposed trail to the pond T1. Based on the subcatchment boundaries, it is assumed that only the front portion of lots 5 and 6 will drain to pond T1. The houses from lots 7, 8, and 9 will be fitted with underdrained dripline filters to treat runoff from the roofs, thus reducing the required size of pond T1.

Runoff from the beginning of the road to station 3+50 and the front portions of lots 1, 3, and 4 will be treated in pond T2.

Runoff from lots 10, 11, 12 and the rear portions of 3, 4, 5, and 6 will be treated via buffers adjacent to residential lots.

Runoff from approximately 200 feet of the lot 2 driveway will be treated in a ditch turnout buffer with a level lip spreader.

The total required treatment area was calculated based on treating 75% of impervious area and 50% of developed area from linear portions of the site (road/driveway) and 95% of impervious area and 80% of developed area from the remainder of the site. See Table T-1 in Appendix C for treatment area calculations and pond sizing calculations.

Erosion Control

BMPs such as silt fence and/or filter berms of erosion control mix, ditch check dams, riprap pipe inlet and outlet protection, temporary catch basin inlet protection, mulch, and permanent seeding will be used to prevent erosion and downstream migration of sediment during construction. The locations of temporary and permanent erosion control measures are shown on Drawing C-201 Grading, Drainage and Erosion Control Plan. Erosion and sedimentation control notes and details can be found on Drawing C-300.

Inspection & Maintenance

TPO Properties, LLC will be responsible for maintaining the stormwater facilities for the project until the homeowner's association takes over. An Inspection and Maintenance Plan is included as Appendix D.

Conclusions

The stormwater management for this project includes a variety of BMPs to control both the quantity and quality of stormwater runoff. The HydroCAD calculations show that the peak runoff rates at the analysis points under post-development conditions are estimated to be equal to or less than the peak pre-development runoff rates for the 2-, 10-, 25- and 50-year storm events. This meets the stormwater detention requirements of the City of Portland and Town of Falmouth ordinances. The proposed stormwater management BMPs are also designed to meet the Chapter 500 Basic and General standards to provide water quality enhancement.

SUPPORTING DATA AND CALCULATIONS

The following material presents calculations and copies of source material used during the analysis for this study.

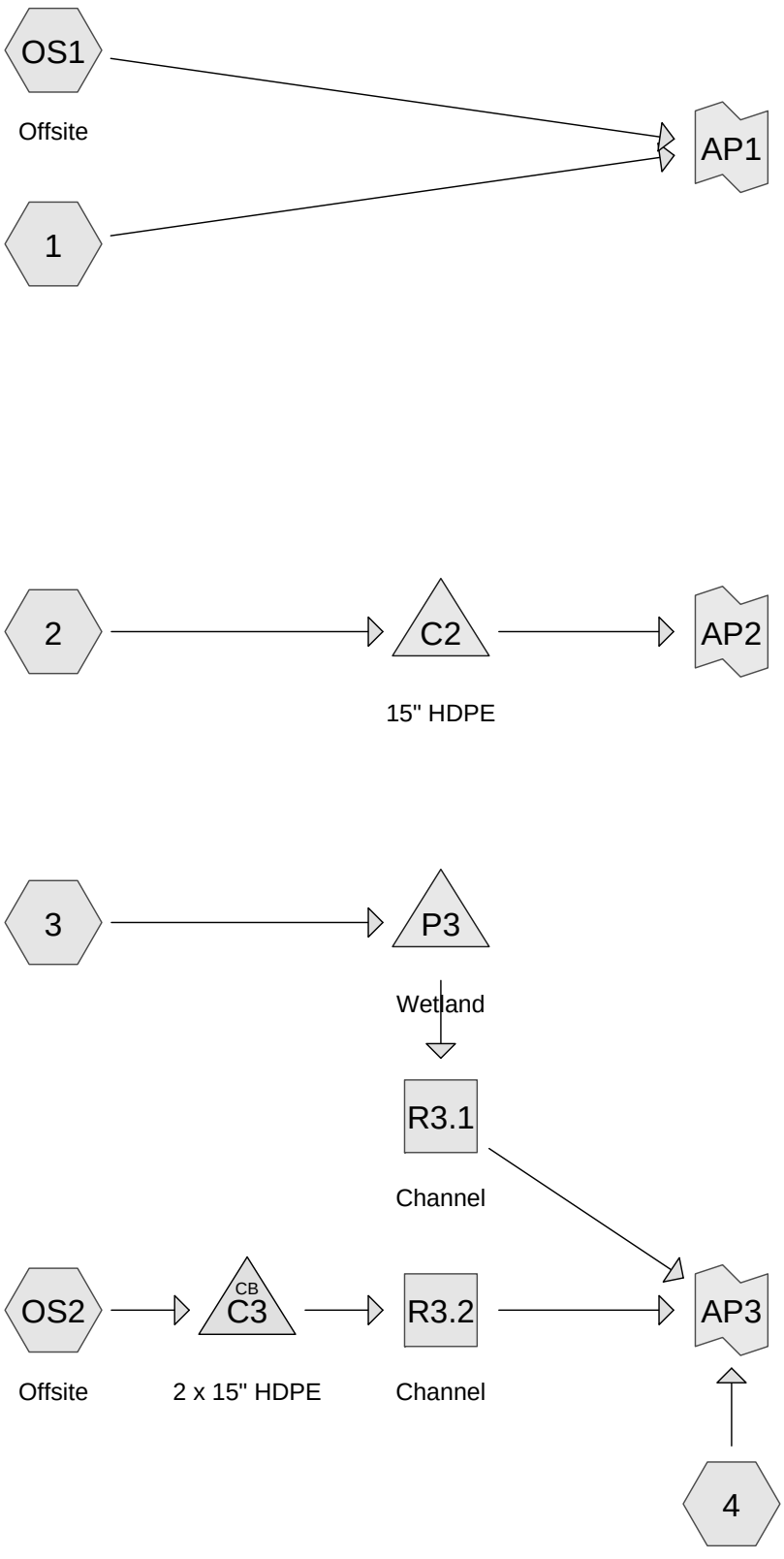
Appendix A: Pre-Development HydroCAD Calculations, Pre-Development Drainage Plan, D-100, and Off-Site Drainage Plan D-101.

Appendix B: Post-Development HydroCAD Calculations & Post-Development Drainage Plan, D-102

Appendix C: Stormwater BMP Treatment Calculations

Appendix D: Inspection & Maintenance Plan

Appendix A:
Pre-Development HydroCAD Calculations
Pre-Development Drainage Plan
D-100, and Off-Site Drainage Plan D-101



Subcat Reach Pond Link

Drainage Diagram for Pre Development
Prepared by Land Design Solutions, Printed 1/1/2013

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Runoff Area=251,996 sf 1.93% Impervious Runoff Depth>0.75"
Flow Length=620' Tc=37.4 min CN=71 Runoff=2.34 cfs 0.362 af

Subcatchment 2: Runoff Area=88,355 sf 9.11% Impervious Runoff Depth>0.90"
Flow Length=300' Tc=22.1 min CN=74 Runoff=1.29 cfs 0.153 af

Subcatchment 3: Runoff Area=632,118 sf 4.30% Impervious Runoff Depth>0.89"
Flow Length=1,188' Tc=54.9 min CN=74 Runoff=5.93 cfs 1.081 af

Subcatchment 4: Runoff Area=95,578 sf 6.65% Impervious Runoff Depth>1.12"
Flow Length=165' Tc=20.2 min CN=78 Runoff=1.88 cfs 0.205 af

Subcatchment OS1: Offsite Runoff Area=397.000 ac 22.17% Impervious Runoff Depth>1.14"
Flow Length=8,561' Slope=0.0110 '/' Tc=135.5 min CN=79 Runoff=121.49 cfs 37.834 af

Subcatchment OS2: Offsite Runoff Area=83,865 sf 6.20% Impervious Runoff Depth>1.12"
Flow Length=150' Slope=0.0100 '/' Tc=16.5 min CN=78 Runoff=1.79 cfs 0.180 af

Reach R3.1: Channel Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.050 L=190.0' S=0.0205 '/' Capacity=342.91 cfs Outflow=0.00 cfs 0.000 af

Reach R3.2: Channel Avg. Flow Depth=0.16' Max Vel=1.02 fps Inflow=1.79 cfs 0.180 af
n=0.022 L=460.0' S=0.0043 '/' Capacity=358.68 cfs Outflow=1.58 cfs 0.179 af

Pond C2: 15" HDPE Peak Elev=73.73' Storage=95 cf Inflow=1.29 cfs 0.153 af
15.0" Round Culvert n=0.013 L=46.0' S=0.0185 '/' Outflow=1.29 cfs 0.152 af

Pond C3: 2 x 15" HDPE Peak Elev=60.41' Inflow=1.79 cfs 0.180 af
15.0" Round Culvert x 2.00 n=0.013 L=50.0' S=0.0080 '/' Outflow=1.79 cfs 0.180 af

Pond P3: Wetland Peak Elev=62.01' Storage=47,072 cf Inflow=5.93 cfs 1.081 af
Outflow=0.00 cfs 0.000 af

Link AP1: Inflow=122.06 cfs 38.197 af
Primary=122.06 cfs 38.197 af

Link AP2: Inflow=1.29 cfs 0.152 af
Primary=1.29 cfs 0.152 af

Link AP3: Inflow=3.45 cfs 0.385 af
Primary=3.45 cfs 0.385 af

Total Runoff Area = 423.444 ac Runoff Volume = 39.816 af Average Runoff Depth = 1.13"
78.94% Pervious = 334.258 ac 21.06% Impervious = 89.186 ac

Summary for Subcatchment 1:

Runoff = 2.34 cfs @ 12.59 hrs, Volume= 0.362 af, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.00"

Area (sf)	CN	Description
19,462	80	1/2 acre lots, 25% imp, HSG C
232,534	70	Woods, Good, HSG C
251,996	71	Weighted Average
247,131		98.07% Pervious Area
4,866		1.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.6	150	0.0260	0.09		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
9.4	360	0.0652	0.64		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
0.4	110	0.0110	5.06	141.56	**Trap/Vee/Rect Channel Flow, CD** Bot.W=10.00' D=2.00' Z= 2.0 '/' Top.W=18.00' n= 0.040 Winding stream, pools & shoals
37.4	620	Total			

Summary for Subcatchment 2:

Runoff = 1.29 cfs @ 12.34 hrs, Volume= 0.153 af, Depth> 0.90"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.00"

Area (sf)	CN	Description
32,188	80	1/2 acre lots, 25% imp, HSG C
56,167	70	Woods, Good, HSG C
88,355	74	Weighted Average
80,308		90.89% Pervious Area
8,047		9.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.2	150	0.0733	0.14		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
2.5	60	0.0250	0.40		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
1.4	90	0.0250	1.11		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
22.1	300	Total			

Summary for Subcatchment 3:

Runoff = 5.93 cfs @ 12.81 hrs, Volume= 1.081 af, Depth> 0.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.00"

	Area (sf)	CN	Description
	47,802	80	1/2 acre lots, 25% imp, HSG C
*	15,248	98	Impervious
	271,936	70	Woods, Good, HSG C
	154,981	77	Woods, Good, HSG D
	111,025	71	Meadow, non-grazed, HSG C
	31,126	78	Meadow, non-grazed, HSG D
	632,118	74	Weighted Average
	604,920		95.70% Pervious Area
	27,199		4.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.4	150	0.0150	0.07		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
17.2	298	0.0134	0.29		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
0.4	300	0.0230	11.98	251.57	**Trap/Vee/Rect Channel Flow, CD** Bot.W=4.00' D=3.00' Z= 2.0 & 0.0 '/' Top.W=10.00' n= 0.025 Earth, clean & winding
2.9	440	0.0200	2.53	135.18	**Parabolic Channel, DE** W=40.00' D=2.00' Area=53.3 sf Perim=40.3' n= 0.100 Very weedy reaches w/pools
54.9	1,188	Total			

Summary for Subcatchment 4:

Runoff = 1.88 cfs @ 12.30 hrs, Volume= 0.205 af, Depth> 1.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.00"

Area (sf)	CN	Description
70,142	77	Woods, Good, HSG D
25,436	80	1/2 acre lots, 25% imp, HSG C
95,578	78	Weighted Average
89,219		93.35% Pervious Area
6,359		6.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0350	0.09		**Sheet Flow, AB**
					Woods: Light underbrush n= 0.400 P2= 3.00"
2.5	65	0.0310	0.44		**Shallow Concentrated Flow, BC**
					Forest w/Heavy Litter Kv= 2.5 fps
20.2	165	Total			

Summary for Subcatchment OS1: Offsite

Runoff = 121.49 cfs @ 13.87 hrs, Volume= 37.834 af, Depth> 1.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.00"

Area (ac)	CN	Description
200.000	83	1/4 acre lots, 38% imp, HSG C
60.000	79	1 acre lots, 20% imp, HSG C
137.000	72	Woods/grass comb., Good, HSG C
397.000	79	Weighted Average
309.000		77.83% Pervious Area
88.000		22.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
67.8	150	0.0110	0.04		**Sheet Flow, AB**
					Woods: Dense underbrush n= 0.800 P2= 3.00"
21.6	340	0.0110	0.26		**Shallow Concentrated Flow, BC**
					Forest w/Heavy Litter Kv= 2.5 fps
6.2	272	0.0110	0.73		**Shallow Concentrated Flow, CD**
					Short Grass Pasture Kv= 7.0 fps
16.6	733	0.0110	0.73		**Shallow Concentrated Flow, DE**
					Short Grass Pasture Kv= 7.0 fps
23.3	7,066	0.0110	5.06	141.56	**Trap/Vee/Rect Channel Flow, EF**
					Bot.W=10.00' D=2.00' Z= 2.0 '/' Top.W=18.00'
					n= 0.040 Winding stream, pools & shoals
135.5	8,561	Total			

Summary for Subcatchment OS2: Offsite

Runoff = 1.79 cfs @ 12.24 hrs, Volume= 0.180 af, Depth> 1.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.00"

Area (sf)	CN	Description
20,802	80	1/2 acre lots, 25% imp, HSG C
63,063	78	Meadow, non-grazed, HSG D
83,865	78	Weighted Average
78,665		93.80% Pervious Area
5,201		6.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	150	0.0100	0.15		**Sheet Flow, AB**
					Range n= 0.130 P2= 3.00"

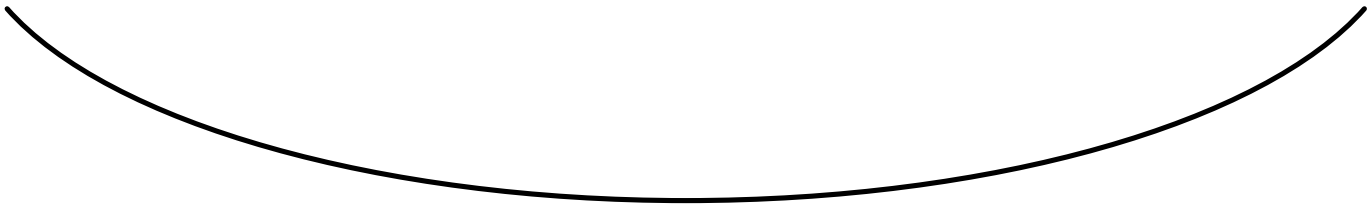
Summary for Reach R3.1: Channel

Inflow Area = 14.511 ac, 4.30% Impervious, Inflow Depth = 0.00" for 2 Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 342.91 cfs

50.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 190.0' Slope= 0.0205 '/'
Inlet Invert= 63.00', Outlet Invert= 59.10'



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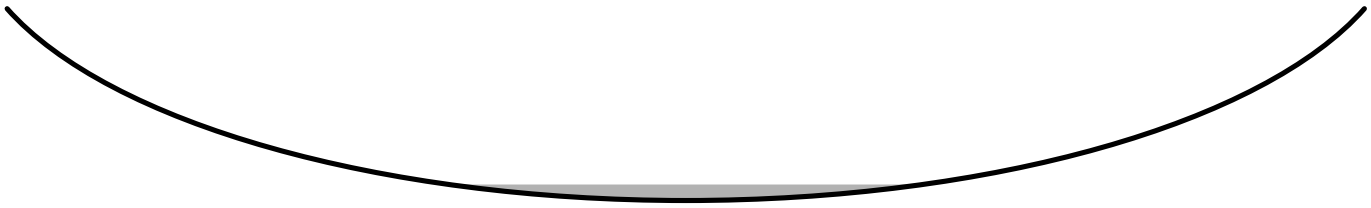
Summary for Reach R3.2: Channel

Inflow Area = 1.925 ac, 6.20% Impervious, Inflow Depth > 1.12" for 2 Year event
Inflow = 1.79 cfs @ 12.24 hrs, Volume= 0.180 af
Outflow = 1.58 cfs @ 12.34 hrs, Volume= 0.179 af, Atten= 11%, Lag= 5.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.02 fps, Min. Travel Time= 7.5 min
Avg. Velocity = 0.44 fps, Avg. Travel Time= 17.3 min

Peak Storage= 717 cf @ 12.34 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 358.68 cfs

50.00' x 2.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 460.0' Slope= 0.0043 '/'
Inlet Invert= 59.00', Outlet Invert= 57.00'



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Summary for Pond C2: 15" HDPE

Inflow Area = 2.028 ac, 9.11% Impervious, Inflow Depth > 0.90" for 2 Year event
Inflow = 1.29 cfs @ 12.34 hrs, Volume= 0.153 af
Outflow = 1.29 cfs @ 12.36 hrs, Volume= 0.152 af, Atten= 0%, Lag= 1.4 min
Primary = 1.29 cfs @ 12.36 hrs, Volume= 0.152 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 73.73' @ 12.36 hrs Surf.Area= 304 sf Storage= 95 cf
Flood Elev= 74.40' Surf.Area= 983 sf Storage= 494 cf

Plug-Flow detention time= 1.7 min calculated for 0.152 af (100% of inflow)
Center-of-Mass det. time= 1.1 min (879.0 - 877.9)

Volume	Invert	Avail.Storage	Storage Description
#1	73.00'	1,372 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
73.00	16	14.0	0	0	16
74.00	501	134.0	202	202	1,431
75.00	2,007	244.0	1,170	1,372	4,745

Device	Routing	Invert	Outlet Devices
#1	Primary	73.11'	**15.0" Round Culvert** L= 46.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.11' / 72.26' S= 0.0185 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.28 cfs @ 12.36 hrs HW=73.73' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 1.28 cfs @ 2.11 fps)

Summary for Pond C3: 2 x 15" HDPE

Inflow Area = 1.925 ac, 6.20% Impervious, Inflow Depth > 1.12" for 2 Year event
Inflow = 1.79 cfs @ 12.24 hrs, Volume= 0.180 af
Outflow = 1.79 cfs @ 12.24 hrs, Volume= 0.180 af, Atten= 0%, Lag= 0.0 min
Primary = 1.79 cfs @ 12.24 hrs, Volume= 0.180 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 60.41' @ 12.24 hrs
Flood Elev= 61.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	59.90'	**15.0" Round Culvert X 2.00** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 59.90' / 59.50' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.78 cfs @ 12.24 hrs HW=60.41' TW=59.15' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.78 cfs @ 1.91 fps)

Summary for Pond P3: Wetland

Inflow Area = 14.511 ac, 4.30% Impervious, Inflow Depth > 0.89" for 2 Year event
Inflow = 5.93 cfs @ 12.81 hrs, Volume= 1.081 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 62.01' @ 24.00 hrs Surf.Area= 24,849 sf Storage= 47,072 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	60.00'	115,705 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
60.00	22,018	689.0	0	0	22,018
62.00	24,835	718.0	46,825	46,825	25,557
64.00	27,769	747.0	52,577	99,401	29,241
64.50	37,697	836.0	16,303	115,705	40,460

Device	Routing	Invert	Outlet Devices
#1	Primary	64.00'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=60.00' TW=63.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link AP1:

Inflow Area = 402.785 ac, 21.88% Impervious, Inflow Depth > 1.14" for 2 Year event
Inflow = 122.06 cfs @ 13.87 hrs, Volume= 38.197 af
Primary = 122.06 cfs @ 13.87 hrs, Volume= 38.197 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP2:

Inflow Area = 2.028 ac, 9.11% Impervious, Inflow Depth > 0.90" for 2 Year event
Inflow = 1.29 cfs @ 12.36 hrs, Volume= 0.152 af
Primary = 1.29 cfs @ 12.36 hrs, Volume= 0.152 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP3:

Inflow Area = 18.631 ac, 4.78% Impervious, Inflow Depth > 0.25" for 2 Year event
Inflow = 3.45 cfs @ 12.32 hrs, Volume= 0.385 af
Primary = 3.45 cfs @ 12.32 hrs, Volume= 0.385 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Runoff Area=251,996 sf 1.93% Impervious Runoff Depth>1.88"
Flow Length=620' Tc=37.4 min CN=71 Runoff=6.38 cfs 0.904 af

Subcatchment 2: Runoff Area=88,355 sf 9.11% Impervious Runoff Depth>2.12"
Flow Length=300' Tc=22.1 min CN=74 Runoff=3.23 cfs 0.358 af

Subcatchment 3: Runoff Area=632,118 sf 4.30% Impervious Runoff Depth>2.10"
Flow Length=1,188' Tc=54.9 min CN=74 Runoff=14.84 cfs 2.539 af

Subcatchment 4: Runoff Area=95,578 sf 6.65% Impervious Runoff Depth>2.45"
Flow Length=165' Tc=20.2 min CN=78 Runoff=4.22 cfs 0.448 af

Subcatchment OS1: Offsite Runoff Area=397.000 ac 22.17% Impervious Runoff Depth>2.46"
Flow Length=8,561' Slope=0.0110 '/' Tc=135.5 min CN=79 Runoff=269.51 cfs 81.499 af

Subcatchment OS2: Offsite Runoff Area=83,865 sf 6.20% Impervious Runoff Depth>2.45"
Flow Length=150' Slope=0.0100 '/' Tc=16.5 min CN=78 Runoff=4.01 cfs 0.393 af

Reach R3.1: Channel Avg. Flow Depth=0.11' Max Vel=0.77 fps Inflow=0.71 cfs 0.234 af
n=0.050 L=190.0' S=0.0205 '/' Capacity=342.91 cfs Outflow=0.71 cfs 0.231 af

Reach R3.2: Channel Avg. Flow Depth=0.24' Max Vel=1.32 fps Inflow=4.01 cfs 0.393 af
n=0.022 L=460.0' S=0.0043 '/' Capacity=358.68 cfs Outflow=3.72 cfs 0.391 af

Pond C2: 15" HDPE Peak Elev=74.19' Storage=318 cf Inflow=3.23 cfs 0.358 af
15.0" Round Culvert n=0.013 L=46.0' S=0.0185 '/' Outflow=3.16 cfs 0.358 af

Pond C3: 2 x 15" HDPE Peak Elev=60.70' Inflow=4.01 cfs 0.393 af
15.0" Round Culvert x 2.00 n=0.013 L=50.0' S=0.0080 '/' Outflow=4.01 cfs 0.393 af

Pond P3: Wetland Peak Elev=64.04' Storage=100,664 cf Inflow=14.84 cfs 2.539 af
Outflow=0.71 cfs 0.234 af

Link AP1: Inflow=270.85 cfs 82.403 af
Primary=270.85 cfs 82.403 af

Link AP2: Inflow=3.16 cfs 0.358 af
Primary=3.16 cfs 0.358 af

Link AP3: Inflow=7.93 cfs 1.070 af
Primary=7.93 cfs 1.070 af

Total Runoff Area = 423.444 ac Runoff Volume = 86.142 af Average Runoff Depth = 2.44"
78.94% Pervious = 334.258 ac 21.06% Impervious = 89.186 ac

Summary for Subcatchment 1:

Runoff = 6.38 cfs @ 12.54 hrs, Volume= 0.904 af, Depth> 1.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.70"

Area (sf)	CN	Description
19,462	80	1/2 acre lots, 25% imp, HSG C
232,534	70	Woods, Good, HSG C
251,996	71	Weighted Average
247,131		98.07% Pervious Area
4,866		1.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.6	150	0.0260	0.09		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
9.4	360	0.0652	0.64		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
0.4	110	0.0110	5.06	141.56	**Trap/Vee/Rect Channel Flow, CD** Bot.W=10.00' D=2.00' Z= 2.0 '/' Top.W=18.00' n= 0.040 Winding stream, pools & shoals
37.4	620	Total			

Summary for Subcatchment 2:

Runoff = 3.23 cfs @ 12.32 hrs, Volume= 0.358 af, Depth> 2.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.70"

Area (sf)	CN	Description
32,188	80	1/2 acre lots, 25% imp, HSG C
56,167	70	Woods, Good, HSG C
88,355	74	Weighted Average
80,308		90.89% Pervious Area
8,047		9.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.2	150	0.0733	0.14		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
2.5	60	0.0250	0.40		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
1.4	90	0.0250	1.11		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
22.1	300	Total			

Summary for Subcatchment 3:

Runoff = 14.84 cfs @ 12.76 hrs, Volume= 2.539 af, Depth> 2.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.70"

	Area (sf)	CN	Description
	47,802	80	1/2 acre lots, 25% imp, HSG C
*	15,248	98	Impervious
	271,936	70	Woods, Good, HSG C
	154,981	77	Woods, Good, HSG D
	111,025	71	Meadow, non-grazed, HSG C
	31,126	78	Meadow, non-grazed, HSG D
	632,118	74	Weighted Average
	604,920		95.70% Pervious Area
	27,199		4.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.4	150	0.0150	0.07		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
17.2	298	0.0134	0.29		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
0.4	300	0.0230	11.98	251.57	**Trap/Vee/Rect Channel Flow, CD** Bot.W=4.00' D=3.00' Z= 2.0 & 0.0 '/' Top.W=10.00' n= 0.025 Earth, clean & winding
2.9	440	0.0200	2.53	135.18	**Parabolic Channel, DE** W=40.00' D=2.00' Area=53.3 sf Perim=40.3' n= 0.100 Very weedy reaches w/pools
54.9	1,188	Total			

Summary for Subcatchment 4:

Runoff = 4.22 cfs @ 12.28 hrs, Volume= 0.448 af, Depth> 2.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.70"

Area (sf)	CN	Description
70,142	77	Woods, Good, HSG D
25,436	80	1/2 acre lots, 25% imp, HSG C
95,578	78	Weighted Average
89,219		93.35% Pervious Area
6,359		6.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0350	0.09		**Sheet Flow, AB**
					Woods: Light underbrush n= 0.400 P2= 3.00"
2.5	65	0.0310	0.44		**Shallow Concentrated Flow, BC**
					Forest w/Heavy Litter Kv= 2.5 fps
20.2	165	Total			

Summary for Subcatchment OS1: Offsite

Runoff = 269.51 cfs @ 13.77 hrs, Volume= 81.499 af, Depth> 2.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.70"

Area (ac)	CN	Description
200.000	83	1/4 acre lots, 38% imp, HSG C
60.000	79	1 acre lots, 20% imp, HSG C
137.000	72	Woods/grass comb., Good, HSG C
397.000	79	Weighted Average
309.000		77.83% Pervious Area
88.000		22.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
67.8	150	0.0110	0.04		**Sheet Flow, AB**
					Woods: Dense underbrush n= 0.800 P2= 3.00"
21.6	340	0.0110	0.26		**Shallow Concentrated Flow, BC**
					Forest w/Heavy Litter Kv= 2.5 fps
6.2	272	0.0110	0.73		**Shallow Concentrated Flow, CD**
					Short Grass Pasture Kv= 7.0 fps
16.6	733	0.0110	0.73		**Shallow Concentrated Flow, DE**
					Short Grass Pasture Kv= 7.0 fps
23.3	7,066	0.0110	5.06	141.56	**Trap/Vee/Rect Channel Flow, EF**
					Bot.W=10.00' D=2.00' Z= 2.0 '/' Top.W=18.00'
					n= 0.040 Winding stream, pools & shoals
135.5	8,561	Total			

Summary for Subcatchment OS2: Offsite

Runoff = 4.01 cfs @ 12.23 hrs, Volume= 0.393 af, Depth> 2.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.70"

Area (sf)	CN	Description
20,802	80	1/2 acre lots, 25% imp, HSG C
63,063	78	Meadow, non-grazed, HSG D
83,865	78	Weighted Average
78,665		93.80% Pervious Area
5,201		6.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	150	0.0100	0.15		**Sheet Flow, AB**
					Range n= 0.130 P2= 3.00"

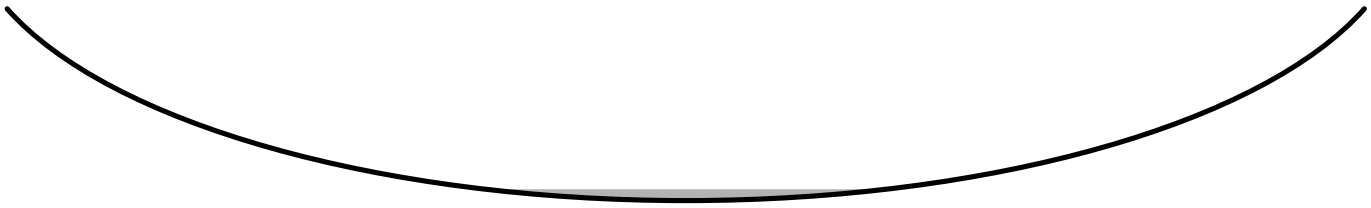
Summary for Reach R3.1: Channel

Inflow Area = 14.511 ac, 4.30% Impervious, Inflow Depth > 0.19" for 10 Year event
Inflow = 0.71 cfs @ 20.58 hrs, Volume= 0.234 af
Outflow = 0.71 cfs @ 20.63 hrs, Volume= 0.231 af, Atten= 0%, Lag= 3.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.77 fps, Min. Travel Time= 4.1 min
Avg. Velocity = 0.71 fps, Avg. Travel Time= 4.4 min

Peak Storage= 175 cf @ 20.63 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 342.91 cfs

50.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 190.0' Slope= 0.0205 '/'
Inlet Invert= 63.00', Outlet Invert= 59.10'



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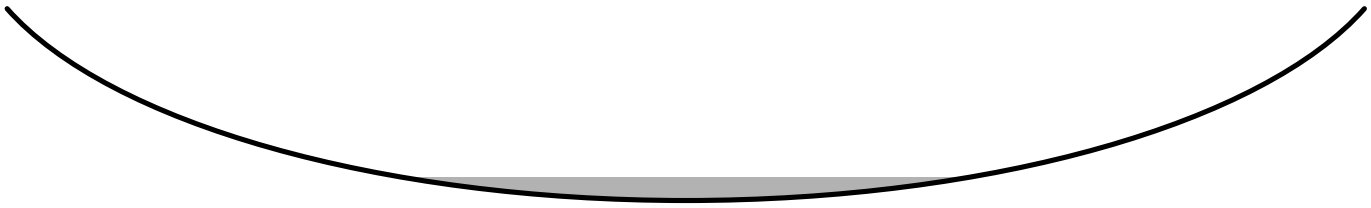
Summary for Reach R3.2: Channel

Inflow Area = 1.925 ac, 6.20% Impervious, Inflow Depth > 2.45" for 10 Year event
Inflow = 4.01 cfs @ 12.23 hrs, Volume= 0.393 af
Outflow = 3.72 cfs @ 12.30 hrs, Volume= 0.391 af, Atten= 7%, Lag= 4.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.32 fps, Min. Travel Time= 5.8 min
Avg. Velocity = 0.52 fps, Avg. Travel Time= 14.6 min

Peak Storage= 1,294 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 358.68 cfs

50.00' x 2.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 460.0' Slope= 0.0043 '/'
Inlet Invert= 59.00', Outlet Invert= 57.00'



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Summary for Pond C2: 15" HDPE

Inflow Area = 2.028 ac, 9.11% Impervious, Inflow Depth > 2.12" for 10 Year event
Inflow = 3.23 cfs @ 12.32 hrs, Volume= 0.358 af
Outflow = 3.16 cfs @ 12.36 hrs, Volume= 0.358 af, Atten= 2%, Lag= 2.8 min
Primary = 3.16 cfs @ 12.36 hrs, Volume= 0.358 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 74.19' @ 12.36 hrs Surf.Area= 712 sf Storage= 318 cf
Flood Elev= 74.40' Surf.Area= 983 sf Storage= 494 cf

Plug-Flow detention time= 1.5 min calculated for 0.357 af (100% of inflow)
Center-of-Mass det. time= 1.2 min (853.7 - 852.6)

Volume	Invert	Avail.Storage	Storage Description
#1	73.00'	1,372 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
73.00	16	14.0	0	0	16
74.00	501	134.0	202	202	1,431
75.00	2,007	244.0	1,170	1,372	4,745

Device	Routing	Invert	Outlet Devices
#1	Primary	73.11'	**15.0" Round Culvert** L= 46.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.11' / 72.26' S= 0.0185 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=3.14 cfs @ 12.36 hrs HW=74.19' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 3.14 cfs @ 2.79 fps)

Summary for Pond C3: 2 x 15" HDPE

Inflow Area = 1.925 ac, 6.20% Impervious, Inflow Depth > 2.45" for 10 Year event
Inflow = 4.01 cfs @ 12.23 hrs, Volume= 0.393 af
Outflow = 4.01 cfs @ 12.23 hrs, Volume= 0.393 af, Atten= 0%, Lag= 0.0 min
Primary = 4.01 cfs @ 12.23 hrs, Volume= 0.393 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 60.70' @ 12.23 hrs
Flood Elev= 61.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	59.90'	**15.0" Round Culvert X 2.00** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 59.90' / 59.50' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=3.98 cfs @ 12.23 hrs HW=60.70' TW=59.23' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 3.98 cfs @ 2.40 fps)

Summary for Pond P3: Wetland

Inflow Area = 14.511 ac, 4.30% Impervious, Inflow Depth > 2.10" for 10 Year event
Inflow = 14.84 cfs @ 12.76 hrs, Volume= 2.539 af
Outflow = 0.71 cfs @ 20.58 hrs, Volume= 0.234 af, Atten= 95%, Lag= 469.0 min
Primary = 0.71 cfs @ 20.58 hrs, Volume= 0.234 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 64.04' @ 20.58 hrs Surf.Area= 28,597 sf Storage= 100,664 cf

Plug-Flow detention time= 588.5 min calculated for 0.234 af (9% of inflow)
Center-of-Mass det. time= 423.6 min (1,301.8 - 878.2)

Volume	Invert	Avail.Storage	Storage Description
#1	60.00'	115,705 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
60.00	22,018	689.0	0	0	22,018
62.00	24,835	718.0	46,825	46,825	25,557
64.00	27,769	747.0	52,577	99,401	29,241
64.50	37,697	836.0	16,303	115,705	40,460

Device	Routing	Invert	Outlet Devices
#1	Primary	64.00'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.71 cfs @ 20.58 hrs HW=64.04' TW=63.11' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.71 cfs @ 0.53 fps)

Summary for Link AP1:

Inflow Area = 402.785 ac, 21.88% Impervious, Inflow Depth > 2.46" for 10 Year event
Inflow = 270.85 cfs @ 13.76 hrs, Volume= 82.403 af
Primary = 270.85 cfs @ 13.76 hrs, Volume= 82.403 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP2:

Inflow Area = 2.028 ac, 9.11% Impervious, Inflow Depth > 2.12" for 10 Year event
Inflow = 3.16 cfs @ 12.36 hrs, Volume= 0.358 af
Primary = 3.16 cfs @ 12.36 hrs, Volume= 0.358 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP3:

Inflow Area = 18.631 ac, 4.78% Impervious, Inflow Depth > 0.69" for 10 Year event
Inflow = 7.93 cfs @ 12.29 hrs, Volume= 1.070 af
Primary = 7.93 cfs @ 12.29 hrs, Volume= 1.070 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Runoff Area=251,996 sf 1.93% Impervious Runoff Depth>2.48"
Flow Length=620' Tc=37.4 min CN=71 Runoff=8.54 cfs 1.196 af

Subcatchment 2: Runoff Area=88,355 sf 9.11% Impervious Runoff Depth>2.76"
Flow Length=300' Tc=22.1 min CN=74 Runoff=4.24 cfs 0.466 af

Subcatchment 3: Runoff Area=632,118 sf 4.30% Impervious Runoff Depth>2.74"
Flow Length=1,188' Tc=54.9 min CN=74 Runoff=19.48 cfs 3.308 af

Subcatchment 4: Runoff Area=95,578 sf 6.65% Impervious Runoff Depth>3.13"
Flow Length=165' Tc=20.2 min CN=78 Runoff=5.40 cfs 0.572 af

Subcatchment OS1: Offsite Runoff Area=397.000 ac 22.17% Impervious Runoff Depth>3.14"
Flow Length=8,561' Slope=0.0110 '/' Tc=135.5 min CN=79 Runoff=344.44 cfs 103.799 af

Subcatchment OS2: Offsite Runoff Area=83,865 sf 6.20% Impervious Runoff Depth>3.13"
Flow Length=150' Slope=0.0100 '/' Tc=16.5 min CN=78 Runoff=5.14 cfs 0.502 af

Reach R3.1: Channel Avg. Flow Depth=0.21' Max Vel=1.16 fps Inflow=2.70 cfs 0.999 af
n=0.050 L=190.0' S=0.0205 '/' Capacity=342.91 cfs Outflow=2.70 cfs 0.995 af

Reach R3.2: Channel Avg. Flow Depth=0.27' Max Vel=1.43 fps Inflow=5.14 cfs 0.502 af
n=0.022 L=460.0' S=0.0043 '/' Capacity=358.68 cfs Outflow=4.80 cfs 0.500 af

Pond C2: 15" HDPE Peak Elev=74.46' Storage=560 cf Inflow=4.24 cfs 0.466 af
15.0" Round Culvert n=0.013 L=46.0' S=0.0185 '/' Outflow=3.98 cfs 0.466 af

Pond C3: 2 x 15" HDPE Peak Elev=60.84' Inflow=5.14 cfs 0.502 af
15.0" Round Culvert x 2.00 n=0.013 L=50.0' S=0.0080 '/' Outflow=5.14 cfs 0.502 af

Pond P3: Wetland Peak Elev=64.11' Storage=102,551 cf Inflow=19.48 cfs 3.308 af
Outflow=2.70 cfs 0.999 af

Link AP1: Inflow=346.17 cfs 104.994 af
Primary=346.17 cfs 104.994 af

Link AP2: Inflow=3.98 cfs 0.466 af
Primary=3.98 cfs 0.466 af

Link AP3: Inflow=10.20 cfs 2.067 af
Primary=10.20 cfs 2.067 af

Total Runoff Area = 423.444 ac Runoff Volume = 109.843 af Average Runoff Depth = 3.11"
78.94% Pervious = 334.258 ac 21.06% Impervious = 89.186 ac

Summary for Subcatchment 1:

Runoff = 8.54 cfs @ 12.53 hrs, Volume= 1.196 af, Depth> 2.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.50"

Area (sf)	CN	Description
19,462	80	1/2 acre lots, 25% imp, HSG C
232,534	70	Woods, Good, HSG C
251,996	71	Weighted Average
247,131		98.07% Pervious Area
4,866		1.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.6	150	0.0260	0.09		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
9.4	360	0.0652	0.64		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
0.4	110	0.0110	5.06	141.56	**Trap/Vee/Rect Channel Flow, CD** Bot.W=10.00' D=2.00' Z= 2.0 '/' Top.W=18.00' n= 0.040 Winding stream, pools & shoals
37.4	620	Total			

Summary for Subcatchment 2:

Runoff = 4.24 cfs @ 12.31 hrs, Volume= 0.466 af, Depth> 2.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.50"

Area (sf)	CN	Description
32,188	80	1/2 acre lots, 25% imp, HSG C
56,167	70	Woods, Good, HSG C
88,355	74	Weighted Average
80,308		90.89% Pervious Area
8,047		9.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.2	150	0.0733	0.14		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
2.5	60	0.0250	0.40		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
1.4	90	0.0250	1.11		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
22.1	300	Total			

Summary for Subcatchment 3:

Runoff = 19.48 cfs @ 12.76 hrs, Volume= 3.308 af, Depth> 2.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.50"

	Area (sf)	CN	Description
	47,802	80	1/2 acre lots, 25% imp, HSG C
*	15,248	98	Impervious
	271,936	70	Woods, Good, HSG C
	154,981	77	Woods, Good, HSG D
	111,025	71	Meadow, non-grazed, HSG C
	31,126	78	Meadow, non-grazed, HSG D
	632,118	74	Weighted Average
	604,920		95.70% Pervious Area
	27,199		4.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.4	150	0.0150	0.07		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
17.2	298	0.0134	0.29		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
0.4	300	0.0230	11.98	251.57	**Trap/Vee/Rect Channel Flow, CD** Bot.W=4.00' D=3.00' Z= 2.0 & 0.0 '/' Top.W=10.00' n= 0.025 Earth, clean & winding
2.9	440	0.0200	2.53	135.18	**Parabolic Channel, DE** W=40.00' D=2.00' Area=53.3 sf Perim=40.3' n= 0.100 Very weedy reaches w/pools
54.9	1,188	Total			

Summary for Subcatchment 4:

Runoff = 5.40 cfs @ 12.28 hrs, Volume= 0.572 af, Depth> 3.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.50"

Area (sf)	CN	Description
70,142	77	Woods, Good, HSG D
25,436	80	1/2 acre lots, 25% imp, HSG C
95,578	78	Weighted Average
89,219		93.35% Pervious Area
6,359		6.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0350	0.09		**Sheet Flow, AB**
					Woods: Light underbrush n= 0.400 P2= 3.00"
2.5	65	0.0310	0.44		**Shallow Concentrated Flow, BC**
					Forest w/Heavy Litter Kv= 2.5 fps
20.2	165	Total			

Summary for Subcatchment OS1: Offsite

Runoff = 344.44 cfs @ 13.74 hrs, Volume= 103.799 af, Depth> 3.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.50"

Area (ac)	CN	Description
200.000	83	1/4 acre lots, 38% imp, HSG C
60.000	79	1 acre lots, 20% imp, HSG C
137.000	72	Woods/grass comb., Good, HSG C
397.000	79	Weighted Average
309.000		77.83% Pervious Area
88.000		22.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
67.8	150	0.0110	0.04		**Sheet Flow, AB**
					Woods: Dense underbrush n= 0.800 P2= 3.00"
21.6	340	0.0110	0.26		**Shallow Concentrated Flow, BC**
					Forest w/Heavy Litter Kv= 2.5 fps
6.2	272	0.0110	0.73		**Shallow Concentrated Flow, CD**
					Short Grass Pasture Kv= 7.0 fps
16.6	733	0.0110	0.73		**Shallow Concentrated Flow, DE**
					Short Grass Pasture Kv= 7.0 fps
23.3	7,066	0.0110	5.06	141.56	**Trap/Vee/Rect Channel Flow, EF**
					Bot.W=10.00' D=2.00' Z= 2.0 '/' Top.W=18.00'
					n= 0.040 Winding stream, pools & shoals
135.5	8,561	Total			

Summary for Subcatchment OS2: Offsite

Runoff = 5.14 cfs @ 12.23 hrs, Volume= 0.502 af, Depth> 3.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.50"

Area (sf)	CN	Description
20,802	80	1/2 acre lots, 25% imp, HSG C
63,063	78	Meadow, non-grazed, HSG D
83,865	78	Weighted Average
78,665		93.80% Pervious Area
5,201		6.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	150	0.0100	0.15		**Sheet Flow, AB**
					Range n= 0.130 P2= 3.00"

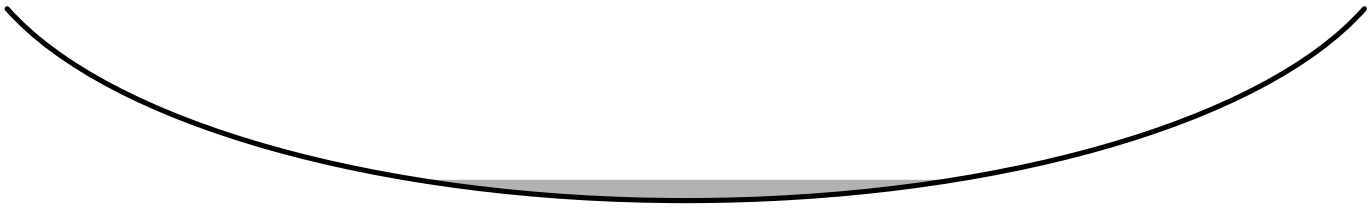
Summary for Reach R3.1: Channel

Inflow Area = 14.511 ac, 4.30% Impervious, Inflow Depth > 0.83" for 25 Year event
Inflow = 2.70 cfs @ 15.38 hrs, Volume= 0.999 af
Outflow = 2.70 cfs @ 15.42 hrs, Volume= 0.995 af, Atten= 0%, Lag= 2.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.16 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 0.90 fps, Avg. Travel Time= 3.5 min

Peak Storage= 442 cf @ 15.42 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 342.91 cfs

50.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 190.0' Slope= 0.0205 '/'
Inlet Invert= 63.00', Outlet Invert= 59.10'



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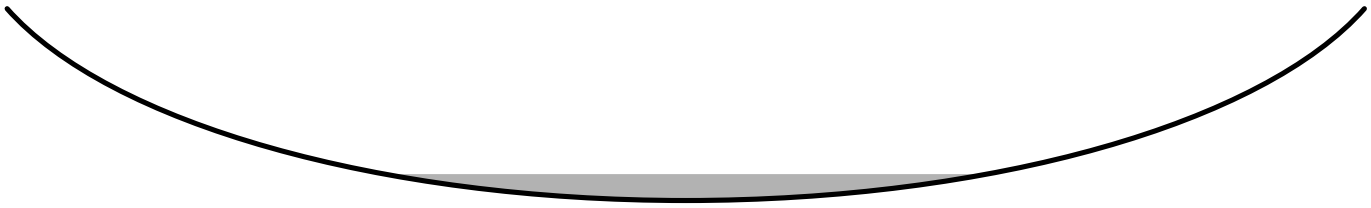
Summary for Reach R3.2: Channel

Inflow Area = 1.925 ac, 6.20% Impervious, Inflow Depth > 3.13" for 25 Year event
Inflow = 5.14 cfs @ 12.23 hrs, Volume= 0.502 af
Outflow = 4.80 cfs @ 12.30 hrs, Volume= 0.500 af, Atten= 7%, Lag= 4.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.43 fps, Min. Travel Time= 5.4 min
Avg. Velocity = 0.55 fps, Avg. Travel Time= 13.8 min

Peak Storage= 1,544 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 358.68 cfs

50.00' x 2.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 460.0' Slope= 0.0043 '/'
Inlet Invert= 59.00', Outlet Invert= 57.00'



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Summary for Pond C2: 15" HDPE

Inflow Area = 2.028 ac, 9.11% Impervious, Inflow Depth > 2.76" for 25 Year event
Inflow = 4.24 cfs @ 12.31 hrs, Volume= 0.466 af
Outflow = 3.98 cfs @ 12.39 hrs, Volume= 0.466 af, Atten= 6%, Lag= 4.7 min
Primary = 3.98 cfs @ 12.39 hrs, Volume= 0.466 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 74.46' @ 12.39 hrs Surf.Area= 1,076 sf Storage= 560 cf
Flood Elev= 74.40' Surf.Area= 983 sf Storage= 494 cf

Plug-Flow detention time= 1.6 min calculated for 0.465 af (100% of inflow)
Center-of-Mass det. time= 1.3 min (846.3 - 845.0)

Volume	Invert	Avail.Storage	Storage Description
#1	73.00'	1,372 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
73.00	16	14.0	0	0	16
74.00	501	134.0	202	202	1,431
75.00	2,007	244.0	1,170	1,372	4,745

Device	Routing	Invert	Outlet Devices
#1	Primary	73.11'	**15.0" Round Culvert** L= 46.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.11' / 72.26' S= 0.0185 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=3.98 cfs @ 12.39 hrs HW=74.46' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 3.98 cfs @ 3.24 fps)

Summary for Pond C3: 2 x 15" HDPE

Inflow Area = 1.925 ac, 6.20% Impervious, Inflow Depth > 3.13" for 25 Year event
Inflow = 5.14 cfs @ 12.23 hrs, Volume= 0.502 af
Outflow = 5.14 cfs @ 12.23 hrs, Volume= 0.502 af, Atten= 0%, Lag= 0.0 min
Primary = 5.14 cfs @ 12.23 hrs, Volume= 0.502 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 60.84' @ 12.23 hrs
Flood Elev= 61.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	59.90'	**15.0" Round Culvert X 2.00** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 59.90' / 59.50' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=5.09 cfs @ 12.23 hrs HW=60.83' TW=59.26' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 5.09 cfs @ 2.59 fps)

Summary for Pond P3: Wetland

Inflow Area = 14.511 ac, 4.30% Impervious, Inflow Depth > 2.74" for 25 Year event
Inflow = 19.48 cfs @ 12.76 hrs, Volume= 3.308 af
Outflow = 2.70 cfs @ 15.38 hrs, Volume= 0.999 af, Atten= 86%, Lag= 157.5 min
Primary = 2.70 cfs @ 15.38 hrs, Volume= 0.999 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 64.11' @ 15.38 hrs Surf.Area= 29,812 sf Storage= 102,551 cf

Plug-Flow detention time= 355.7 min calculated for 0.999 af (30% of inflow)
Center-of-Mass det. time= 223.2 min (1,094.0 - 870.9)

Volume	Invert	Avail.Storage	Storage Description
#1	60.00'	115,705 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
60.00	22,018	689.0	0	0	22,018
62.00	24,835	718.0	46,825	46,825	25,557
64.00	27,769	747.0	52,577	99,401	29,241
64.50	37,697	836.0	16,303	115,705	40,460

Device	Routing	Invert	Outlet Devices
#1	Primary	64.00'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=2.70 cfs @ 15.38 hrs HW=64.11' TW=63.21' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 2.70 cfs @ 0.82 fps)

Summary for Link AP1:

Inflow Area = 402.785 ac, 21.88% Impervious, Inflow Depth > 3.13" for 25 Year event
Inflow = 346.17 cfs @ 13.73 hrs, Volume= 104.994 af
Primary = 346.17 cfs @ 13.73 hrs, Volume= 104.994 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP2:

Inflow Area = 2.028 ac, 9.11% Impervious, Inflow Depth > 2.76" for 25 Year event
Inflow = 3.98 cfs @ 12.39 hrs, Volume= 0.466 af
Primary = 3.98 cfs @ 12.39 hrs, Volume= 0.466 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP3:

Inflow Area = 18.631 ac, 4.78% Impervious, Inflow Depth > 1.33" for 25 Year event
Inflow = 10.20 cfs @ 12.29 hrs, Volume= 2.067 af
Primary = 10.20 cfs @ 12.29 hrs, Volume= 2.067 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: Runoff Area=251,996 sf 1.93% Impervious Runoff Depth>2.80"
Flow Length=620' Tc=37.4 min CN=71 Runoff=9.66 cfs 1.348 af

Subcatchment 2: Runoff Area=88,355 sf 9.11% Impervious Runoff Depth>3.09"
Flow Length=300' Tc=22.1 min CN=74 Runoff=4.75 cfs 0.522 af

Subcatchment 3: Runoff Area=632,118 sf 4.30% Impervious Runoff Depth>3.06"
Flow Length=1,188' Tc=54.9 min CN=74 Runoff=21.86 cfs 3.705 af

Subcatchment 4: Runoff Area=95,578 sf 6.65% Impervious Runoff Depth>3.48"
Flow Length=165' Tc=20.2 min CN=78 Runoff=6.00 cfs 0.636 af

Subcatchment OS1: Offsite Runoff Area=397.000 ac 22.17% Impervious Runoff Depth>3.48"
Flow Length=8,561' Slope=0.0110 '/' Tc=135.5 min CN=79 Runoff=382.59 cfs 115.218 af

Subcatchment OS2: Offsite Runoff Area=83,865 sf 6.20% Impervious Runoff Depth>3.48"
Flow Length=150' Slope=0.0100 '/' Tc=16.5 min CN=78 Runoff=5.71 cfs 0.558 af

Reach R3.1: Channel Avg. Flow Depth=0.26' Max Vel=1.34 fps Inflow=4.29 cfs 1.394 af
n=0.050 L=190.0' S=0.0205 '/' Capacity=342.91 cfs Outflow=4.28 cfs 1.390 af

Reach R3.2: Channel Avg. Flow Depth=0.29' Max Vel=1.48 fps Inflow=5.71 cfs 0.558 af
n=0.022 L=460.0' S=0.0043 '/' Capacity=358.68 cfs Outflow=5.35 cfs 0.556 af

Pond C2: 15" HDPE Peak Elev=74.61' Storage=738 cf Inflow=4.75 cfs 0.522 af
15.0" Round Culvert n=0.013 L=46.0' S=0.0185 '/' Outflow=4.37 cfs 0.522 af

Pond C3: 2 x 15" HDPE Peak Elev=60.91' Inflow=5.71 cfs 0.558 af
15.0" Round Culvert x 2.00 n=0.013 L=50.0' S=0.0080 '/' Outflow=5.71 cfs 0.558 af

Pond P3: Wetland Peak Elev=64.15' Storage=103,740 cf Inflow=21.86 cfs 3.705 af
Outflow=4.29 cfs 1.394 af

Link AP1: Inflow=384.89 cfs 116.565 af
Primary=384.89 cfs 116.565 af

Link AP2: Inflow=4.37 cfs 0.522 af
Primary=4.37 cfs 0.522 af

Link AP3: Inflow=11.35 cfs 2.583 af
Primary=11.35 cfs 2.583 af

Total Runoff Area = 423.444 ac Runoff Volume = 121.987 af Average Runoff Depth = 3.46"
78.94% Pervious = 334.258 ac 21.06% Impervious = 89.186 ac

Summary for Subcatchment 1:

Runoff = 9.66 cfs @ 12.53 hrs, Volume= 1.348 af, Depth> 2.80"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=5.90"

Area (sf)	CN	Description
19,462	80	1/2 acre lots, 25% imp, HSG C
232,534	70	Woods, Good, HSG C
251,996	71	Weighted Average
247,131		98.07% Pervious Area
4,866		1.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.6	150	0.0260	0.09		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
9.4	360	0.0652	0.64		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
0.4	110	0.0110	5.06	141.56	**Trap/Vee/Rect Channel Flow, CD** Bot.W=10.00' D=2.00' Z= 2.0 '/' Top.W=18.00' n= 0.040 Winding stream, pools & shoals
37.4	620	Total			

Summary for Subcatchment 2:

Runoff = 4.75 cfs @ 12.31 hrs, Volume= 0.522 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=5.90"

Area (sf)	CN	Description
32,188	80	1/2 acre lots, 25% imp, HSG C
56,167	70	Woods, Good, HSG C
88,355	74	Weighted Average
80,308		90.89% Pervious Area
8,047		9.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.2	150	0.0733	0.14		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
2.5	60	0.0250	0.40		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
1.4	90	0.0250	1.11		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
22.1	300	Total			

Summary for Subcatchment 3:

Runoff = 21.86 cfs @ 12.75 hrs, Volume= 3.705 af, Depth> 3.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=5.90"

	Area (sf)	CN	Description
	47,802	80	1/2 acre lots, 25% imp, HSG C
*	15,248	98	Impervious
	271,936	70	Woods, Good, HSG C
	154,981	77	Woods, Good, HSG D
	111,025	71	Meadow, non-grazed, HSG C
	31,126	78	Meadow, non-grazed, HSG D
	632,118	74	Weighted Average
	604,920		95.70% Pervious Area
	27,199		4.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
34.4	150	0.0150	0.07		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
17.2	298	0.0134	0.29		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
0.4	300	0.0230	11.98	251.57	**Trap/Vee/Rect Channel Flow, CD** Bot.W=4.00' D=3.00' Z= 2.0 & 0.0 '/' Top.W=10.00' n= 0.025 Earth, clean & winding
2.9	440	0.0200	2.53	135.18	**Parabolic Channel, DE** W=40.00' D=2.00' Area=53.3 sf Perim=40.3' n= 0.100 Very weedy reaches w/pools
54.9	1,188	Total			

Summary for Subcatchment 4:

Runoff = 6.00 cfs @ 12.28 hrs, Volume= 0.636 af, Depth> 3.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=5.90"

Area (sf)	CN	Description
70,142	77	Woods, Good, HSG D
25,436	80	1/2 acre lots, 25% imp, HSG C
95,578	78	Weighted Average
89,219		93.35% Pervious Area
6,359		6.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0350	0.09		**Sheet Flow, AB**
					Woods: Light underbrush n= 0.400 P2= 3.00"
2.5	65	0.0310	0.44		**Shallow Concentrated Flow, BC**
					Forest w/Heavy Litter Kv= 2.5 fps
20.2	165	Total			

Summary for Subcatchment OS1: Offsite

Runoff = 382.59 cfs @ 13.73 hrs, Volume= 115.218 af, Depth> 3.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=5.90"

Area (ac)	CN	Description
200.000	83	1/4 acre lots, 38% imp, HSG C
60.000	79	1 acre lots, 20% imp, HSG C
137.000	72	Woods/grass comb., Good, HSG C
397.000	79	Weighted Average
309.000		77.83% Pervious Area
88.000		22.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
67.8	150	0.0110	0.04		**Sheet Flow, AB**
					Woods: Dense underbrush n= 0.800 P2= 3.00"
21.6	340	0.0110	0.26		**Shallow Concentrated Flow, BC**
					Forest w/Heavy Litter Kv= 2.5 fps
6.2	272	0.0110	0.73		**Shallow Concentrated Flow, CD**
					Short Grass Pasture Kv= 7.0 fps
16.6	733	0.0110	0.73		**Shallow Concentrated Flow, DE**
					Short Grass Pasture Kv= 7.0 fps
23.3	7,066	0.0110	5.06	141.56	**Trap/Vee/Rect Channel Flow, EF**
					Bot.W=10.00' D=2.00' Z= 2.0 '/' Top.W=18.00'
					n= 0.040 Winding stream, pools & shoals
135.5	8,561	Total			

Summary for Subcatchment OS2: Offsite

Runoff = 5.71 cfs @ 12.23 hrs, Volume= 0.558 af, Depth> 3.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=5.90"

Area (sf)	CN	Description
20,802	80	1/2 acre lots, 25% imp, HSG C
63,063	78	Meadow, non-grazed, HSG D
83,865	78	Weighted Average
78,665		93.80% Pervious Area
5,201		6.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	150	0.0100	0.15		**Sheet Flow, AB** Range n= 0.130 P2= 3.00"

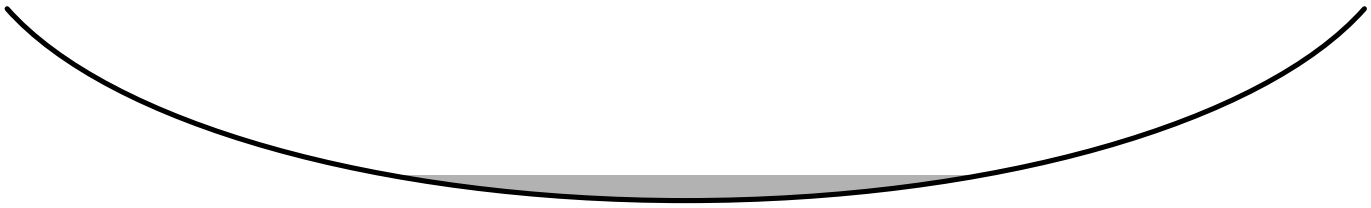
Summary for Reach R3.1: Channel

Inflow Area = 14.511 ac, 4.30% Impervious, Inflow Depth > 1.15" for 50 Year event
Inflow = 4.29 cfs @ 14.46 hrs, Volume= 1.394 af
Outflow = 4.28 cfs @ 14.48 hrs, Volume= 1.390 af, Atten= 0%, Lag= 1.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.34 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 0.97 fps, Avg. Travel Time= 3.3 min

Peak Storage= 608 cf @ 14.48 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 342.91 cfs

50.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 190.0' Slope= 0.0205 '/'
Inlet Invert= 63.00', Outlet Invert= 59.10'



‡

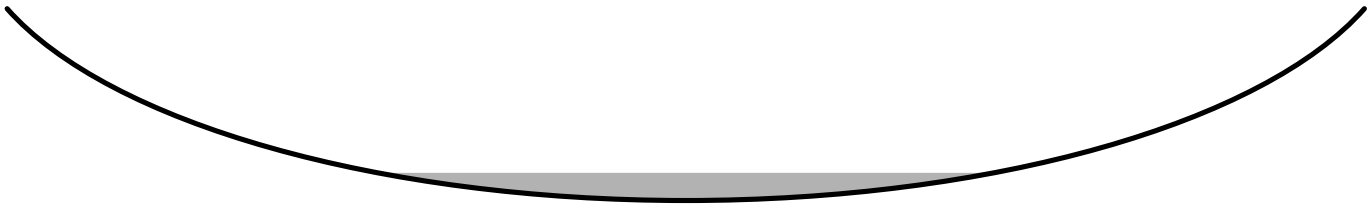
Summary for Reach R3.2: Channel

Inflow Area = 1.925 ac, 6.20% Impervious, Inflow Depth > 3.48" for 50 Year event
Inflow = 5.71 cfs @ 12.23 hrs, Volume= 0.558 af
Outflow = 5.35 cfs @ 12.29 hrs, Volume= 0.556 af, Atten= 6%, Lag= 4.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.48 fps, Min. Travel Time= 5.2 min
Avg. Velocity = 0.57 fps, Avg. Travel Time= 13.5 min

Peak Storage= 1,665 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 358.68 cfs

50.00' x 2.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 460.0' Slope= 0.0043 '/'
Inlet Invert= 59.00', Outlet Invert= 57.00'



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Summary for Pond C2: 15" HDPE

Inflow Area = 2.028 ac, 9.11% Impervious, Inflow Depth > 3.09" for 50 Year event
Inflow = 4.75 cfs @ 12.31 hrs, Volume= 0.522 af
Outflow = 4.37 cfs @ 12.40 hrs, Volume= 0.522 af, Atten= 8%, Lag= 5.5 min
Primary = 4.37 cfs @ 12.40 hrs, Volume= 0.522 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 74.61' @ 12.40 hrs Surf.Area= 1,306 sf Storage= 738 cf
Flood Elev= 74.40' Surf.Area= 983 sf Storage= 494 cf

Plug-Flow detention time= 1.7 min calculated for 0.521 af (100% of inflow)
Center-of-Mass det. time= 1.4 min (843.2 - 841.8)

Volume	Invert	Avail.Storage	Storage Description
#1	73.00'	1,372 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
73.00	16	14.0	0	0	16
74.00	501	134.0	202	202	1,431
75.00	2,007	244.0	1,170	1,372	4,745

Device	Routing	Invert	Outlet Devices
#1	Primary	73.11'	**15.0" Round Culvert** L= 46.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.11' / 72.26' S= 0.0185 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=4.37 cfs @ 12.40 hrs HW=74.61' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 4.37 cfs @ 3.56 fps)

Summary for Pond C3: 2 x 15" HDPE

Inflow Area = 1.925 ac, 6.20% Impervious, Inflow Depth > 3.48" for 50 Year event
Inflow = 5.71 cfs @ 12.23 hrs, Volume= 0.558 af
Outflow = 5.71 cfs @ 12.23 hrs, Volume= 0.558 af, Atten= 0%, Lag= 0.0 min
Primary = 5.71 cfs @ 12.23 hrs, Volume= 0.558 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 60.91' @ 12.23 hrs
Flood Elev= 61.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	59.90'	**15.0" Round Culvert X 2.00** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 59.90' / 59.50' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=5.65 cfs @ 12.23 hrs HW=60.90' TW=59.28' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 5.65 cfs @ 2.69 fps)

Summary for Pond P3: Wetland

Inflow Area = 14.511 ac, 4.30% Impervious, Inflow Depth > 3.06" for 50 Year event
Inflow = 21.86 cfs @ 12.75 hrs, Volume= 3.705 af
Outflow = 4.29 cfs @ 14.46 hrs, Volume= 1.394 af, Atten= 80%, Lag= 102.1 min
Primary = 4.29 cfs @ 14.46 hrs, Volume= 1.394 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 64.15' @ 14.46 hrs Surf.Area= 30,565 sf Storage= 103,740 cf

Plug-Flow detention time= 302.5 min calculated for 1.392 af (38% of inflow)
Center-of-Mass det. time= 178.2 min (1,045.9 - 867.7)

Volume	Invert	Avail.Storage	Storage Description
#1	60.00'	115,705 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
60.00	22,018	689.0	0	0	22,018
62.00	24,835	718.0	46,825	46,825	25,557
64.00	27,769	747.0	52,577	99,401	29,241
64.50	37,697	836.0	16,303	115,705	40,460

Device	Routing	Invert	Outlet Devices
#1	Primary	64.00'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=4.29 cfs @ 14.46 hrs HW=64.15' TW=63.26' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 4.29 cfs @ 0.96 fps)

Summary for Link AP1:

Inflow Area = 402.785 ac, 21.88% Impervious, Inflow Depth > 3.47" for 50 Year event
Inflow = 384.89 cfs @ 13.72 hrs, Volume= 116.565 af
Primary = 384.89 cfs @ 13.72 hrs, Volume= 116.565 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP2:

Inflow Area = 2.028 ac, 9.11% Impervious, Inflow Depth > 3.09" for 50 Year event
Inflow = 4.37 cfs @ 12.40 hrs, Volume= 0.522 af
Primary = 4.37 cfs @ 12.40 hrs, Volume= 0.522 af, Atten= 0%, Lag= 0.0 min

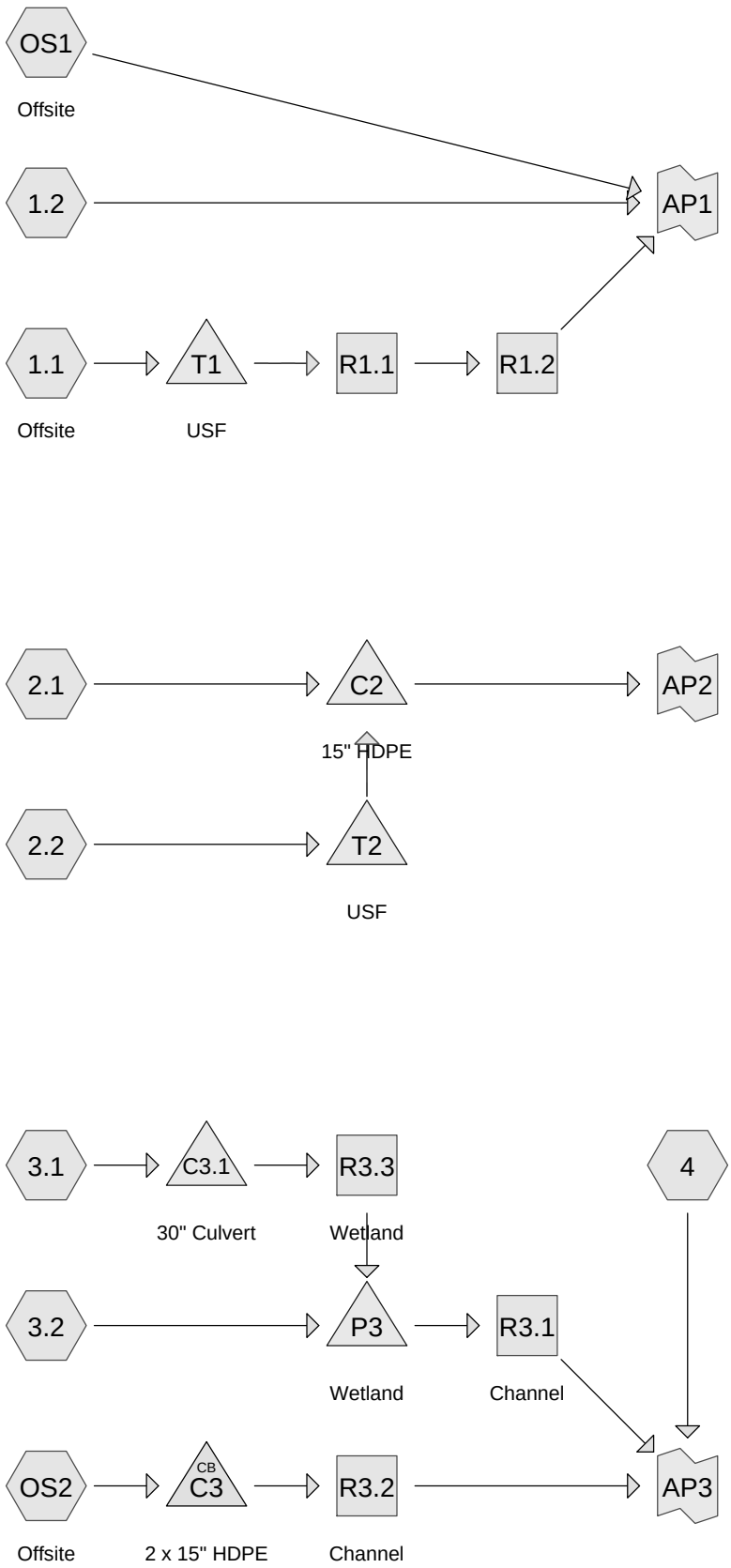
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP3:

Inflow Area = 18.631 ac, 4.78% Impervious, Inflow Depth > 1.66" for 50 Year event
Inflow = 11.35 cfs @ 12.29 hrs, Volume= 2.583 af
Primary = 11.35 cfs @ 12.29 hrs, Volume= 2.583 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Appendix B:
Post-Development HydroCAD Calculations
Post-Development Drainage Plan, D-102



Subcat Reach Pond Link

Drainage Diagram for Post Development
Prepared by Land Design Solutions, Printed 1/1/2013

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1.1: Offsite Runoff Area=99,362 sf 31.72% Impervious Runoff Depth>1.30"
Flow Length=479' Tc=35.7 min CN=81 Runoff=1.81 cfs 0.248 af

Subcatchment 1.2: Runoff Area=144,202 sf 17.40% Impervious Runoff Depth>1.01"
Flow Length=560' Tc=23.8 min CN=76 Runoff=2.34 cfs 0.278 af

Subcatchment 2.1: Runoff Area=38,308 sf 15.62% Impervious Runoff Depth>1.01"
Flow Length=282' Tc=23.4 min CN=76 Runoff=0.63 cfs 0.074 af

Subcatchment 2.2: Runoff Area=45,163 sf 33.53% Impervious Runoff Depth>1.31"
Flow Length=458' Tc=18.0 min CN=81 Runoff=1.10 cfs 0.113 af

Subcatchment 3.1: Runoff Area=437,068 sf 6.91% Impervious Runoff Depth>0.90"
Flow Length=650' Tc=47.9 min CN=74 Runoff=4.44 cfs 0.749 af

Subcatchment 3.2: Runoff Area=187,873 sf 10.61% Impervious Runoff Depth>1.06"
Flow Length=345' Tc=25.3 min CN=77 Runoff=3.16 cfs 0.383 af

Subcatchment 4: Runoff Area=95,578 sf 6.65% Impervious Runoff Depth>1.12"
Flow Length=165' Tc=20.2 min CN=78 Runoff=1.88 cfs 0.205 af

Subcatchment OS1: Offsite Runoff Area=397.000 ac 22.17% Impervious Runoff Depth>1.14"
Flow Length=8,561' Slope=0.0110 '/' Tc=135.5 min CN=79 Runoff=121.49 cfs 37.834 af

Subcatchment OS2: Offsite Runoff Area=83,865 sf 6.20% Impervious Runoff Depth>1.12"
Flow Length=150' Slope=0.0100 '/' Tc=16.5 min CN=78 Runoff=1.79 cfs 0.180 af

Reach R1.1: Avg. Flow Depth=0.12' Max Vel=0.86 fps Inflow=1.04 cfs 0.165 af
n=0.035 L=85.0' S=0.0118 '/' Capacity=22.13 cfs Outflow=1.03 cfs 0.164 af

Reach R1.2: Avg. Flow Depth=0.11' Max Vel=0.87 fps Inflow=1.03 cfs 0.164 af
n=0.040 L=302.0' S=0.0110 '/' Capacity=141.52 cfs Outflow=0.96 cfs 0.163 af

Reach R3.1: Channel Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.050 L=150.0' S=0.0400 '/' Capacity=478.69 cfs Outflow=0.00 cfs 0.000 af

Reach R3.2: Channel Avg. Flow Depth=0.16' Max Vel=1.02 fps Inflow=1.79 cfs 0.180 af
n=0.022 L=460.0' S=0.0043 '/' Capacity=358.68 cfs Outflow=1.58 cfs 0.179 af

Reach R3.3: Wetland Avg. Flow Depth=0.40' Max Vel=0.92 fps Inflow=4.42 cfs 0.748 af
n=0.100 L=356.0' S=0.0225 '/' Capacity=143.29 cfs Outflow=4.33 cfs 0.744 af

Pond C2: 15" HDPE Peak Elev=73.54' Storage=48 cf Inflow=0.67 cfs 0.128 af
15.0" Round Culvert n=0.013 L=46.0' S=0.0185 '/' Outflow=0.66 cfs 0.128 af

Pond C3: 2 x 15" HDPE Peak Elev=60.41' Inflow=1.79 cfs 0.180 af
15.0" Round Culvert x 2.00 n=0.013 L=50.0' S=0.0080 '/' Outflow=1.79 cfs 0.180 af

Pond C3.1: 30" Culvert Peak Elev=76.23' Storage=474 cf Inflow=4.44 cfs 0.749 af
30.0" Round Culvert w/ 6.0" fill n=0.020 L=55.0' S=0.0200 '/' Outflow=4.42 cfs 0.748 af

Pond P3: Wetland Peak Elev=62.09' Storage=49,027 cf Inflow=6.02 cfs 1.126 af
Outflow=0.00 cfs 0.000 af

Pond T1: USF Peak Elev=67.12' Storage=4,050 cf Inflow=1.81 cfs 0.248 af
Primary=0.06 cfs 0.062 af Secondary=0.98 cfs 0.102 af Outflow=1.04 cfs 0.165 af

Pond T2: USF Peak Elev=77.33' Storage=3,059 cf Inflow=1.10 cfs 0.113 af
Primary=0.05 cfs 0.054 af Secondary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.054 af

Link AP1: Inflow=122.23 cfs 38.275 af
Primary=122.23 cfs 38.275 af

Link AP2: Inflow=0.66 cfs 0.128 af
Primary=0.66 cfs 0.128 af

Link AP3: Inflow=3.45 cfs 0.385 af
Primary=3.45 cfs 0.385 af

Total Runoff Area = 422.974 ac Runoff Volume = 40.065 af Average Runoff Depth = 1.14"
78.44% Pervious = 331.773 ac 21.56% Impervious = 91.201 ac

Summary for Subcatchment 1.1: Offsite

Runoff = 1.81 cfs @ 12.51 hrs, Volume= 0.248 af, Depth> 1.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.00"

	Area (sf)	CN	Description
*	14,020	98	New Road Impervious
*	17,500	98	New Lot Impervious
*	22,068	74	New Road Landscaped (HSG C)
*	35,000	74	New Lot Lawn HSG C
	10,774	70	Woods, Good, HSG C
	99,362	81	Weighted Average
	67,842		68.28% Pervious Area
	31,520		31.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.7	150	0.0800	0.08		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.00"
3.9	60	0.0800	0.26		**Sheet Flow, BC** Grass: Short n= 0.150 P2= 3.00"
0.7	76	0.0600	1.71		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
0.4	193	0.0470	7.17	28.70	**Trap/Vee/Rect Channel Flow, DE** Bot.W=1.00' D=1.00' Z= 3.0 '/' Top.W=7.00' n= 0.030 Earth, grassed & winding
35.7	479	Total			

Summary for Subcatchment 1.2:

Runoff = 2.34 cfs @ 12.36 hrs, Volume= 0.278 af, Depth> 1.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.00"

	Area (sf)	CN	Description
*	2,557	98	New Road Impervious
*	15,000	98	New Lot Impervious
*	30,684	74	New Lanscaped Area, HSG C
	30,159	80	1/2 acre lots, 25% imp, HSG C
	65,802	70	Woods, Good, HSG C
	144,202	76	Weighted Average
	119,105		82.60% Pervious Area
	25,097		17.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.3	140	0.0140	0.15		**Sheet Flow, AB**
					Grass: Short n= 0.150 P2= 3.00"
8.1	310	0.0652	0.64		**Shallow Concentrated Flow, BC**
					Forest w/Heavy Litter Kv= 2.5 fps
0.4	110	0.0110	5.06	141.56	**Trap/Vee/Rect Channel Flow, CD**
					Bot.W=10.00' D=2.00' Z= 2.0 '/' Top.W=18.00'
					n= 0.040 Winding stream, pools & shoals
23.8	560	Total			

Summary for Subcatchment 2.1:

Runoff = 0.63 cfs @ 12.35 hrs, Volume= 0.074 af, Depth> 1.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.00"

	Area (sf)	CN	Description
*	2,500	98	New Lot Impervious
*	5,000	74	New Landscaped Area, HSG C
	13,940	80	1/2 acre lots, 25% imp, HSG C
	16,868	70	Woods, Good, HSG C
	38,308	76	Weighted Average
	32,323		84.38% Pervious Area
	5,985		15.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0800	0.14		**Sheet Flow, AB**
					Woods: Light underbrush n= 0.400 P2= 3.00"
5.8	132	0.0230	0.38		**Shallow Concentrated Flow, BC**
					Forest w/Heavy Litter Kv= 2.5 fps
23.4	282	Total			

Summary for Subcatchment 2.2:

Runoff = 1.10 cfs @ 12.26 hrs, Volume= 0.113 af, Depth> 1.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.00"

	Area (sf)	CN	Description
*	10,645	98	New Road Impervious
*	4,500	98	New Lot Impervious
*	21,459	74	New Landscaped Area, HSG C
	8,559	70	Woods, Good, HSG C
	45,163	81	Weighted Average
	30,018		66.47% Pervious Area
	15,145		33.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0640	0.10		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
0.5	281	0.0340	9.29	130.05	**Trap/Vee/Rect Channel Flow, BC** Bot.W=1.00' D=2.00' Z= 3.0 '/' Top.W=13.00' n= 0.030 Earth, grassed & winding
9.5	127	0.0080	0.22		**Shallow Concentrated Flow, DE** Forest w/Heavy Litter Kv= 2.5 fps
18.0	458	Total			

Summary for Subcatchment 3.1:

Runoff = 4.44 cfs @ 12.72 hrs, Volume= 0.749 af, Depth> 0.90"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.00"

	Area (sf)	CN	Description
*	14,680	98	Existing Impervious
*	15,500	98	New Lot Impervious
*	0	98	New Road Impervious
	164,031	70	Woods, Good, HSG C
	74,338	77	Woods, Good, HSG D
	111,026	71	Meadow, non-grazed, HSG C
	25,011	78	Meadow, non-grazed, HSG D
*	32,482	74	New Lawn, HSG C
	437,068	74	Weighted Average
	406,888		93.09% Pervious Area
	30,180		6.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.0	150	0.0134	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
11.5	200	0.0134	0.29		**Shallow Concentrated Flow, AB** Forest w/Heavy Litter Kv= 2.5 fps
0.4	300	0.0230	12.95	388.60	**Trap/Vee/Rect Channel Flow, DE** Bot.W=4.00' D=3.00' Z= 2.0 '/' Top.W=16.00' n= 0.025 Earth, clean & winding
47.9	650	Total			

Summary for Subcatchment 3.2:

Runoff = 3.16 cfs @ 12.38 hrs, Volume= 0.383 af, Depth> 1.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.00"

	Area (sf)	CN	Description
	46,211	80	1/2 acre lots, 25% imp, HSG C
*	568	98	Existing Impervious
*	2,812	98	New Road Impervious
	52,212	70	Woods, Good, HSG C
	68,291	77	Woods, Good, HSG D
*	12,779	74	New Landscaped Area, HSG C
*	5,000	98	New Lot Impervious
	187,873	77	Weighted Average
	167,940		89.39% Pervious Area
	19,933		10.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	150	0.1000	0.16		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
9.2	195	0.0200	0.35		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
25.3	345	Total			

Summary for Subcatchment 4:

Runoff = 1.88 cfs @ 12.30 hrs, Volume= 0.205 af, Depth> 1.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.00"

	Area (sf)	CN	Description
	70,142	77	Woods, Good, HSG D
	25,436	80	1/2 acre lots, 25% imp, HSG C
	95,578	78	Weighted Average
	89,219		93.35% Pervious Area
	6,359		6.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0350	0.09		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
2.5	65	0.0310	0.44		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
20.2	165	Total			

Summary for Subcatchment OS1: Offsite

Runoff = 121.49 cfs @ 13.87 hrs, Volume= 37.834 af, Depth> 1.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.00"

Area (ac)	CN	Description
200.000	83	1/4 acre lots, 38% imp, HSG C
60.000	79	1 acre lots, 20% imp, HSG C
137.000	72	Woods/grass comb., Good, HSG C
397.000	79	Weighted Average
309.000		77.83% Pervious Area
88.000		22.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
67.8	150	0.0110	0.04		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.00"
21.6	340	0.0110	0.26		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
6.2	272	0.0110	0.73		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
16.6	733	0.0110	0.73		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
23.3	7,066	0.0110	5.06	141.56	**Trap/Vee/Rect Channel Flow, EF** Bot.W=10.00' D=2.00' Z= 2.0 '/' Top.W=18.00' n= 0.040 Winding stream, pools & shoals
135.5	8,561	Total			

Summary for Subcatchment OS2: Offsite

Runoff = 1.79 cfs @ 12.24 hrs, Volume= 0.180 af, Depth> 1.12"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.00"

Area (sf)	CN	Description
20,802	80	1/2 acre lots, 25% imp, HSG C
63,063	78	Meadow, non-grazed, HSG D
83,865	78	Weighted Average
78,665		93.80% Pervious Area
5,201		6.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	150	0.0100	0.15		**Sheet Flow, AB** Range n= 0.130 P2= 3.00"

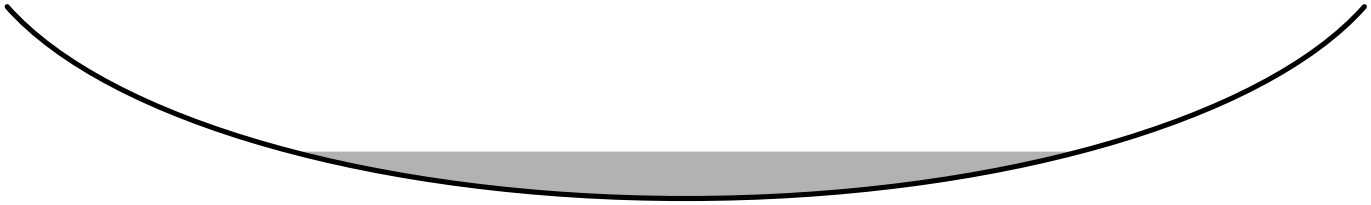
Summary for Reach R1.1:

Inflow Area = 2.281 ac, 31.72% Impervious, Inflow Depth > 0.87" for 2 Year event
Inflow = 1.04 cfs @ 12.92 hrs, Volume= 0.165 af
Outflow = 1.03 cfs @ 12.95 hrs, Volume= 0.164 af, Atten= 1%, Lag= 1.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.86 fps, Min. Travel Time= 1.6 min
Avg. Velocity = 0.41 fps, Avg. Travel Time= 3.4 min

Peak Storage= 102 cf @ 12.95 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 22.13 cfs

30.00' x 0.50' deep Parabolic Channel, n= 0.035 High grass
Length= 85.0' Slope= 0.0118 '/'
Inlet Invert= 63.00', Outlet Invert= 62.00'



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Summary for Reach R1.2:

Inflow Area = 2.281 ac, 31.72% Impervious, Inflow Depth > 0.86" for 2 Year event
Inflow = 1.03 cfs @ 12.95 hrs, Volume= 0.164 af
Outflow = 0.96 cfs @ 13.04 hrs, Volume= 0.163 af, Atten= 7%, Lag= 5.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.87 fps, Min. Travel Time= 5.8 min
Avg. Velocity = 0.38 fps, Avg. Travel Time= 13.1 min

Peak Storage= 332 cf @ 13.04 hrs
Average Depth at Peak Storage= 0.11'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 141.52 cfs

10.00' x 2.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/' Top Width= 18.00'
Length= 302.0' Slope= 0.0110 '/'
Inlet Invert= 61.00', Outlet Invert= 57.68'

‡

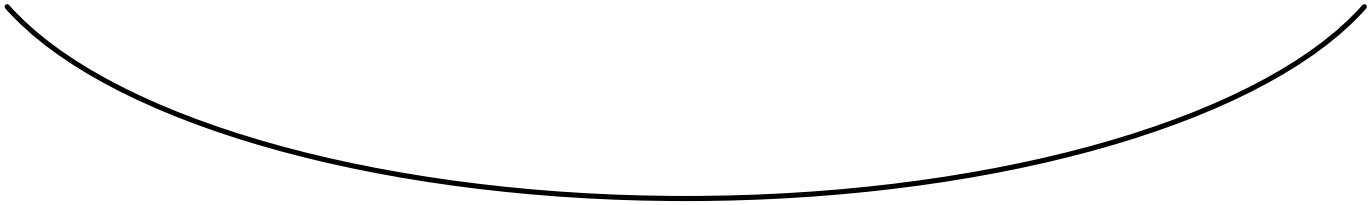
Summary for Reach R3.1: Channel

Inflow Area = 14.347 ac, 8.02% Impervious, Inflow Depth = 0.00" for 2 Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 478.69 cfs

50.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 150.0' Slope= 0.0400 '/'
Inlet Invert= 63.00', Outlet Invert= 57.00'



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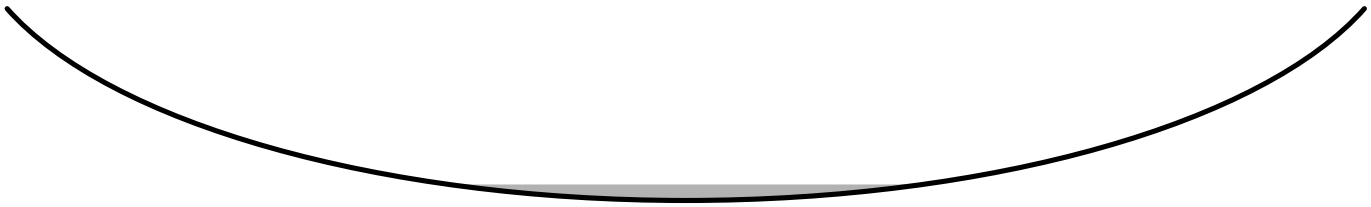
Summary for Reach R3.2: Channel

Inflow Area = 1.925 ac, 6.20% Impervious, Inflow Depth > 1.12" for 2 Year event
Inflow = 1.79 cfs @ 12.24 hrs, Volume= 0.180 af
Outflow = 1.58 cfs @ 12.34 hrs, Volume= 0.179 af, Atten= 11%, Lag= 5.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.02 fps, Min. Travel Time= 7.5 min
Avg. Velocity = 0.44 fps, Avg. Travel Time= 17.3 min

Peak Storage= 717 cf @ 12.34 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 358.68 cfs

50.00' x 2.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 460.0' Slope= 0.0043 '/'
Inlet Invert= 59.00', Outlet Invert= 57.00'



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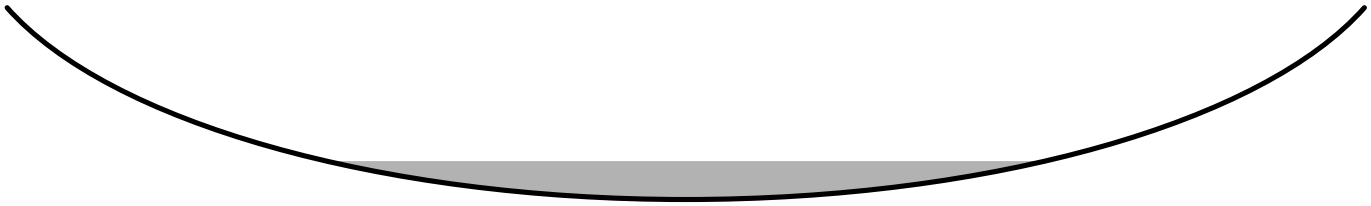
Summary for Reach R3.3: Wetland

Inflow Area = 10.034 ac, 6.91% Impervious, Inflow Depth > 0.89" for 2 Year event
Inflow = 4.42 cfs @ 12.75 hrs, Volume= 0.748 af
Outflow = 4.33 cfs @ 12.82 hrs, Volume= 0.744 af, Atten= 2%, Lag= 4.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.92 fps, Min. Travel Time= 6.5 min
Avg. Velocity = 0.47 fps, Avg. Travel Time= 12.5 min

Peak Storage= 1,680 cf @ 12.82 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 143.29 cfs

40.00' x 2.00' deep Parabolic Channel, n= 0.100 Very weedy reaches w/pools
Length= 356.0' Slope= 0.0225 '/'
Inlet Invert= 73.00', Outlet Invert= 65.00'



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Summary for Pond C2: 15" HDPE

Inflow Area = 1.916 ac, 25.31% Impervious, Inflow Depth > 0.80" for 2 Year event
Inflow = 0.67 cfs @ 12.35 hrs, Volume= 0.128 af
Outflow = 0.66 cfs @ 12.37 hrs, Volume= 0.128 af, Atten= 0%, Lag= 1.1 min
Primary = 0.66 cfs @ 12.37 hrs, Volume= 0.128 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 73.54' @ 12.37 hrs Surf.Area= 195 sf Storage= 48 cf
Flood Elev= 75.11' Surf.Area= 2,007 sf Storage= 1,372 cf

Plug-Flow detention time= 1.9 min calculated for 0.128 af (100% of inflow)
Center-of-Mass det. time= 1.1 min (949.9 - 948.9)

Volume	Invert	Avail.Storage	Storage Description
#1	73.00'	1,372 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
73.00	16	14.0	0	0	16
74.00	501	134.0	202	202	1,431
75.00	2,007	244.0	1,170	1,372	4,745

Device	Routing	Invert	Outlet Devices
#1	Primary	73.11'	**15.0" Round Culvert** L= 46.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.11' / 72.26' S= 0.0185 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=0.66 cfs @ 12.37 hrs HW=73.54' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.66 cfs @ 1.76 fps)

Summary for Pond C3: 2 x 15" HDPE

Inflow Area = 1.925 ac, 6.20% Impervious, Inflow Depth > 1.12" for 2 Year event
Inflow = 1.79 cfs @ 12.24 hrs, Volume= 0.180 af
Outflow = 1.79 cfs @ 12.24 hrs, Volume= 0.180 af, Atten= 0%, Lag= 0.0 min
Primary = 1.79 cfs @ 12.24 hrs, Volume= 0.180 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 60.41' @ 12.24 hrs
Flood Elev= 61.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	59.90'	**15.0" Round Culvert X 2.00** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 59.90' / 59.50' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=1.78 cfs @ 12.24 hrs HW=60.41' TW=59.15' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.78 cfs @ 1.91 fps)

Summary for Pond C3.1: 30" Culvert

Inflow Area = 10.034 ac, 6.91% Impervious, Inflow Depth > 0.90" for 2 Year event
Inflow = 4.44 cfs @ 12.72 hrs, Volume= 0.749 af
Outflow = 4.42 cfs @ 12.75 hrs, Volume= 0.748 af, Atten= 0%, Lag= 1.8 min
Primary = 4.42 cfs @ 12.75 hrs, Volume= 0.748 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 76.23' @ 12.75 hrs Surf.Area= 896 sf Storage= 474 cf
Flood Elev= 77.50' Surf.Area= 2,715 sf Storage= 2,664 cf

Plug-Flow detention time= 2.6 min calculated for 0.746 af (100% of inflow)
Center-of-Mass det. time= 1.6 min (899.0 - 897.4)

Volume	Invert	Avail.Storage	Storage Description
#1	74.90'	2,664 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
74.90	0	0.0	0	0	0
75.50	296	71.0	59	59	402
77.50	2,715	271.0	2,605	2,664	5,856

Device	Routing	Invert	Outlet Devices
#1	Primary	75.40'	**30.0" Round Culvert w/ 6.0" fill** L= 55.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 74.90' / 73.80' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=4.42 cfs @ 12.75 hrs HW=76.23' TW=73.39' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 4.42 cfs @ 2.26 fps)

Summary for Pond P3: Wetland

Inflow Area = 14.347 ac, 8.02% Impervious, Inflow Depth > 0.94" for 2 Year event
Inflow = 6.02 cfs @ 12.68 hrs, Volume= 1.126 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 62.09' @ 24.00 hrs Surf.Area= 24,961 sf Storage= 49,027 cf

Plug-Flow detention time= (not calculated: initial storage excedes outflow)

Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	60.00'	115,705 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
60.00	22,018	689.0	0	0	22,018
62.00	24,835	718.0	46,825	46,825	25,557
64.00	27,769	747.0	52,577	99,401	29,241
64.50	37,697	836.0	16,303	115,705	40,460

Device	Routing	Invert	Outlet Devices
#1	Primary	64.00'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=60.00' TW=63.00' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond T1: USF

Inflow Area = 2.281 ac, 31.72% Impervious, Inflow Depth > 1.30" for 2 Year event
Inflow = 1.81 cfs @ 12.51 hrs, Volume= 0.248 af
Outflow = 1.04 cfs @ 12.92 hrs, Volume= 0.165 af, Atten= 42%, Lag= 24.6 min
Primary = 0.06 cfs @ 12.92 hrs, Volume= 0.062 af
Secondary = 0.98 cfs @ 12.92 hrs, Volume= 0.102 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 67.12' @ 12.92 hrs Surf.Area= 3,626 sf Storage= 4,050 cf

Plug-Flow detention time= 173.3 min calculated for 0.164 af (66% of inflow)
Center-of-Mass det. time= 72.5 min (938.0 - 865.5)

Volume	Invert	Avail.Storage	Storage Description
#1	65.50'	5,619 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
65.50	1,644	257.0	0	0	1,644
66.00	2,104	289.0	935	935	3,041
67.00	3,369	308.0	2,712	3,646	3,992
67.50	4,549	332.0	1,972	5,619	5,225

Device	Routing	Invert	Outlet Devices
#1	Primary	65.50'	**0.750 in/hr Exfiltration over Horizontal area**
#2	Secondary	67.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.06 cfs @ 12.92 hrs HW=67.11' TW=63.12' (Dynamic Tailwater)
1=Exfiltration (Exfiltration Controls 0.06 cfs)

Secondary OutFlow Max=0.96 cfs @ 12.92 hrs HW=67.11' TW=63.12' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 0.96 cfs @ 0.84 fps)

Summary for Pond T2: USF

Inflow Area = 1.037 ac, 33.53% Impervious, Inflow Depth > 1.31" for 2 Year event
Inflow = 1.10 cfs @ 12.26 hrs, Volume= 0.113 af
Outflow = 0.05 cfs @ 16.94 hrs, Volume= 0.054 af, Atten= 95%, Lag= 281.2 min
Primary = 0.05 cfs @ 16.94 hrs, Volume= 0.054 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 77.33' @ 16.94 hrs Surf.Area= 3,022 sf Storage= 3,059 cf

Plug-Flow detention time= 323.0 min calculated for 0.054 af (48% of inflow)
Center-of-Mass det. time= 202.2 min (1,053.9 - 851.6)

Volume	Invert	Avail.Storage	Storage Description
#1	76.00'	5,501 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.00	1,641	211.0	0	0	1,641
77.50	3,226	333.0	3,584	3,584	6,938
78.00	4,476	424.0	1,917	5,501	12,423

Device	Routing	Invert	Outlet Devices
#1	Primary	76.00'	**0.750 in/hr Exfiltration over Horizontal area**
#2	Secondary	77.50'	**7.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.05 cfs @ 16.94 hrs HW=77.33' TW=73.26' (Dynamic Tailwater)
1=Exfiltration (Exfiltration Controls 0.05 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=76.00' TW=73.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Link AP1:

Inflow Area = 402.591 ac, 22.18% Impervious, Inflow Depth > 1.14" for 2 Year event
Inflow = 122.23 cfs @ 13.86 hrs, Volume= 38.275 af
Primary = 122.23 cfs @ 13.86 hrs, Volume= 38.275 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP2:

Inflow Area = 1.916 ac, 25.31% Impervious, Inflow Depth > 0.80" for 2 Year event
Inflow = 0.66 cfs @ 12.37 hrs, Volume= 0.128 af
Primary = 0.66 cfs @ 12.37 hrs, Volume= 0.128 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP3:

Inflow Area = 18.466 ac, 7.67% Impervious, Inflow Depth > 0.25" for 2 Year event
Inflow = 3.45 cfs @ 12.32 hrs, Volume= 0.385 af
Primary = 3.45 cfs @ 12.32 hrs, Volume= 0.385 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1.1: Offsite Runoff Area=99,362 sf 31.72% Impervious Runoff Depth>2.70"
Flow Length=479' Tc=35.7 min CN=81 Runoff=3.79 cfs 0.514 af

Subcatchment 1.2: Runoff Area=144,202 sf 17.40% Impervious Runoff Depth>2.28"
Flow Length=560' Tc=23.8 min CN=76 Runoff=5.52 cfs 0.629 af

Subcatchment 2.1: Runoff Area=38,308 sf 15.62% Impervious Runoff Depth>2.28"
Flow Length=282' Tc=23.4 min CN=76 Runoff=1.48 cfs 0.167 af

Subcatchment 2.2: Runoff Area=45,163 sf 33.53% Impervious Runoff Depth>2.71"
Flow Length=458' Tc=18.0 min CN=81 Runoff=2.32 cfs 0.234 af

Subcatchment 3.1: Runoff Area=437,068 sf 6.91% Impervious Runoff Depth>2.10"
Flow Length=650' Tc=47.9 min CN=74 Runoff=11.06 cfs 1.759 af

Subcatchment 3.2: Runoff Area=187,873 sf 10.61% Impervious Runoff Depth>2.36"
Flow Length=345' Tc=25.3 min CN=77 Runoff=7.29 cfs 0.849 af

Subcatchment 4: Runoff Area=95,578 sf 6.65% Impervious Runoff Depth>2.45"
Flow Length=165' Tc=20.2 min CN=78 Runoff=4.22 cfs 0.448 af

Subcatchment OS1: Offsite Runoff Area=397.000 ac 22.17% Impervious Runoff Depth>2.46"
Flow Length=8,561' Slope=0.0110 '/' Tc=135.5 min CN=79 Runoff=269.51 cfs 81.499 af

Subcatchment OS2: Offsite Runoff Area=83,865 sf 6.20% Impervious Runoff Depth>2.45"
Flow Length=150' Slope=0.0100 '/' Tc=16.5 min CN=78 Runoff=4.01 cfs 0.393 af

Reach R1.1: Avg. Flow Depth=0.22' Max Vel=1.28 fps Inflow=3.70 cfs 0.429 af
n=0.035 L=85.0' S=0.0118 '/' Capacity=22.13 cfs Outflow=3.69 cfs 0.429 af

Reach R1.2: Avg. Flow Depth=0.24' Max Vel=1.45 fps Inflow=3.69 cfs 0.429 af
n=0.040 L=302.0' S=0.0110 '/' Capacity=141.52 cfs Outflow=3.65 cfs 0.427 af

Reach R3.1: Channel Avg. Flow Depth=0.10' Max Vel=1.00 fps Inflow=0.77 cfs 0.294 af
n=0.050 L=150.0' S=0.0400 '/' Capacity=478.69 cfs Outflow=0.77 cfs 0.292 af

Reach R3.2: Channel Avg. Flow Depth=0.24' Max Vel=1.32 fps Inflow=4.01 cfs 0.393 af
n=0.022 L=460.0' S=0.0043 '/' Capacity=358.68 cfs Outflow=3.72 cfs 0.391 af

Reach R3.3: Wetland Avg. Flow Depth=0.61' Max Vel=1.22 fps Inflow=10.99 cfs 1.757 af
n=0.100 L=356.0' S=0.0225 '/' Capacity=143.29 cfs Outflow=10.87 cfs 1.750 af

Pond C2: 15" HDPE Peak Elev=73.97' Storage=185 cf Inflow=2.25 cfs 0.322 af
15.0" Round Culvert n=0.013 L=46.0' S=0.0185 '/' Outflow=2.22 cfs 0.322 af

Pond C3: 2 x 15" HDPE Peak Elev=60.70' Inflow=4.01 cfs 0.393 af
15.0" Round Culvert x 2.00 n=0.013 L=50.0' S=0.0080 '/' Outflow=4.01 cfs 0.393 af

Pond C3.1: 30" Culvert Peak Elev=76.90' Storage=1,348 cf Inflow=11.06 cfs 1.759 af
30.0" Round Culvert w/ 6.0" fill n=0.020 L=55.0' S=0.0200 '/' Outflow=10.99 cfs 1.757 af

Pond P3: Wetland Peak Elev=64.05' Storage=100,743 cf Inflow=14.87 cfs 2.599 af
Outflow=0.77 cfs 0.294 af

Pond T1: USF Peak Elev=67.28' Storage=4,658 cf Inflow=3.79 cfs 0.514 af
Primary=0.07 cfs 0.069 af Secondary=3.63 cfs 0.360 af Outflow=3.70 cfs 0.429 af

Pond T2: USF Peak Elev=77.66' Storage=4,124 cf Inflow=2.32 cfs 0.234 af
Primary=0.06 cfs 0.065 af Secondary=1.10 cfs 0.090 af Outflow=1.16 cfs 0.155 af

Link AP1: Inflow=271.01 cfs 82.555 af
Primary=271.01 cfs 82.555 af

Link AP2: Inflow=2.22 cfs 0.322 af
Primary=2.22 cfs 0.322 af

Link AP3: Inflow=7.93 cfs 1.131 af
Primary=7.93 cfs 1.131 af

Total Runoff Area = 422.974 ac Runoff Volume = 86.492 af Average Runoff Depth = 2.45"
78.44% Pervious = 331.773 ac 21.56% Impervious = 91.201 ac

Summary for Subcatchment 1.1: Offsite

Runoff = 3.79 cfs @ 12.50 hrs, Volume= 0.514 af, Depth> 2.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.70"

	Area (sf)	CN	Description
*	14,020	98	New Road Impervious
*	17,500	98	New Lot Impervious
*	22,068	74	New Road Landscaped (HSG C)
*	35,000	74	New Lot Lawn HSG C
	10,774	70	Woods, Good, HSG C
	99,362	81	Weighted Average
	67,842		68.28% Pervious Area
	31,520		31.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.7	150	0.0800	0.08		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.00"
3.9	60	0.0800	0.26		**Sheet Flow, BC** Grass: Short n= 0.150 P2= 3.00"
0.7	76	0.0600	1.71		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
0.4	193	0.0470	7.17	28.70	**Trap/Vee/Rect Channel Flow, DE** Bot.W=1.00' D=1.00' Z= 3.0 '/' Top.W=7.00' n= 0.030 Earth, grassed & winding
35.7	479	Total			

Summary for Subcatchment 1.2:

Runoff = 5.52 cfs @ 12.34 hrs, Volume= 0.629 af, Depth> 2.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.70"

	Area (sf)	CN	Description
*	2,557	98	New Road Impervious
*	15,000	98	New Lot Impervious
*	30,684	74	New Lanscaped Area, HSG C
	30,159	80	1/2 acre lots, 25% imp, HSG C
	65,802	70	Woods, Good, HSG C
	144,202	76	Weighted Average
	119,105		82.60% Pervious Area
	25,097		17.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.3	140	0.0140	0.15		**Sheet Flow, AB**
					Grass: Short n= 0.150 P2= 3.00"
8.1	310	0.0652	0.64		**Shallow Concentrated Flow, BC**
					Forest w/Heavy Litter Kv= 2.5 fps
0.4	110	0.0110	5.06	141.56	**Trap/Vee/Rect Channel Flow, CD**
					Bot.W=10.00' D=2.00' Z= 2.0 '/' Top.W=18.00'
					n= 0.040 Winding stream, pools & shoals
23.8	560	Total			

Summary for Subcatchment 2.1:

Runoff = 1.48 cfs @ 12.33 hrs, Volume= 0.167 af, Depth> 2.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.70"

	Area (sf)	CN	Description
*	2,500	98	New Lot Impervious
*	5,000	74	New Landscaped Area, HSG C
	13,940	80	1/2 acre lots, 25% imp, HSG C
	16,868	70	Woods, Good, HSG C
	38,308	76	Weighted Average
	32,323		84.38% Pervious Area
	5,985		15.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0800	0.14		**Sheet Flow, AB**
					Woods: Light underbrush n= 0.400 P2= 3.00"
5.8	132	0.0230	0.38		**Shallow Concentrated Flow, BC**
					Forest w/Heavy Litter Kv= 2.5 fps
23.4	282	Total			

Summary for Subcatchment 2.2:

Runoff = 2.32 cfs @ 12.25 hrs, Volume= 0.234 af, Depth> 2.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.70"

	Area (sf)	CN	Description
*	10,645	98	New Road Impervious
*	4,500	98	New Lot Impervious
*	21,459	74	New Landscaped Area, HSG C
	8,559	70	Woods, Good, HSG C
	45,163	81	Weighted Average
	30,018		66.47% Pervious Area
	15,145		33.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0640	0.10		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
0.5	281	0.0340	9.29	130.05	**Trap/Vee/Rect Channel Flow, BC** Bot.W=1.00' D=2.00' Z= 3.0 '/' Top.W=13.00' n= 0.030 Earth, grassed & winding
9.5	127	0.0080	0.22		**Shallow Concentrated Flow, DE** Forest w/Heavy Litter Kv= 2.5 fps
18.0	458	Total			

Summary for Subcatchment 3.1:

Runoff = 11.06 cfs @ 12.68 hrs, Volume= 1.759 af, Depth> 2.10"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.70"

	Area (sf)	CN	Description
*	14,680	98	Existing Impervious
*	15,500	98	New Lot Impervious
*	0	98	New Road Impervious
	164,031	70	Woods, Good, HSG C
	74,338	77	Woods, Good, HSG D
	111,026	71	Meadow, non-grazed, HSG C
	25,011	78	Meadow, non-grazed, HSG D
*	32,482	74	New Lawn, HSG C
	437,068	74	Weighted Average
	406,888		93.09% Pervious Area
	30,180		6.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.0	150	0.0134	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
11.5	200	0.0134	0.29		**Shallow Concentrated Flow, AB** Forest w/Heavy Litter Kv= 2.5 fps
0.4	300	0.0230	12.95	388.60	**Trap/Vee/Rect Channel Flow, DE** Bot.W=4.00' D=3.00' Z= 2.0 '/' Top.W=16.00' n= 0.025 Earth, clean & winding
47.9	650	Total			

Summary for Subcatchment 3.2:

Runoff = 7.29 cfs @ 12.36 hrs, Volume= 0.849 af, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.70"

	Area (sf)	CN	Description
	46,211	80	1/2 acre lots, 25% imp, HSG C
*	568	98	Existing Impervious
*	2,812	98	New Road Impervious
	52,212	70	Woods, Good, HSG C
	68,291	77	Woods, Good, HSG D
*	12,779	74	New Landscaped Area, HSG C
*	5,000	98	New Lot Impervious
	187,873	77	Weighted Average
	167,940		89.39% Pervious Area
	19,933		10.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	150	0.1000	0.16		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
9.2	195	0.0200	0.35		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
25.3	345	Total			

Summary for Subcatchment 4:

Runoff = 4.22 cfs @ 12.28 hrs, Volume= 0.448 af, Depth> 2.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.70"

	Area (sf)	CN	Description
	70,142	77	Woods, Good, HSG D
	25,436	80	1/2 acre lots, 25% imp, HSG C
	95,578	78	Weighted Average
	89,219		93.35% Pervious Area
	6,359		6.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0350	0.09		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
2.5	65	0.0310	0.44		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
20.2	165	Total			

Summary for Subcatchment OS1: Offsite

Runoff = 269.51 cfs @ 13.77 hrs, Volume= 81.499 af, Depth> 2.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.70"

Area (ac)	CN	Description
200.000	83	1/4 acre lots, 38% imp, HSG C
60.000	79	1 acre lots, 20% imp, HSG C
137.000	72	Woods/grass comb., Good, HSG C
397.000	79	Weighted Average
309.000		77.83% Pervious Area
88.000		22.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
67.8	150	0.0110	0.04		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.00"
21.6	340	0.0110	0.26		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
6.2	272	0.0110	0.73		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
16.6	733	0.0110	0.73		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
23.3	7,066	0.0110	5.06	141.56	**Trap/Vee/Rect Channel Flow, EF** Bot.W=10.00' D=2.00' Z= 2.0 '/' Top.W=18.00' n= 0.040 Winding stream, pools & shoals
135.5	8,561	Total			

Summary for Subcatchment OS2: Offsite

Runoff = 4.01 cfs @ 12.23 hrs, Volume= 0.393 af, Depth> 2.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.70"

Area (sf)	CN	Description
20,802	80	1/2 acre lots, 25% imp, HSG C
63,063	78	Meadow, non-grazed, HSG D
83,865	78	Weighted Average
78,665		93.80% Pervious Area
5,201		6.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	150	0.0100	0.15		**Sheet Flow, AB** Range n= 0.130 P2= 3.00"

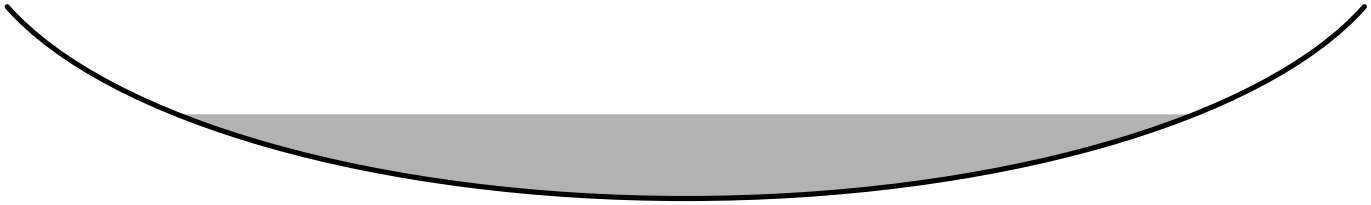
Summary for Reach R1.1:

Inflow Area = 2.281 ac, 31.72% Impervious, Inflow Depth > 2.26" for 10 Year event
Inflow = 3.70 cfs @ 12.57 hrs, Volume= 0.429 af
Outflow = 3.69 cfs @ 12.58 hrs, Volume= 0.429 af, Atten= 0%, Lag= 0.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.28 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 0.49 fps, Avg. Travel Time= 2.9 min

Peak Storage= 246 cf @ 12.58 hrs
Average Depth at Peak Storage= 0.22'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 22.13 cfs

30.00' x 0.50' deep Parabolic Channel, n= 0.035 High grass
Length= 85.0' Slope= 0.0118 '/'
Inlet Invert= 63.00', Outlet Invert= 62.00'



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Summary for Reach R1.2:

Inflow Area = 2.281 ac, 31.72% Impervious, Inflow Depth > 2.26" for 10 Year event
Inflow = 3.69 cfs @ 12.58 hrs, Volume= 0.429 af
Outflow = 3.65 cfs @ 12.63 hrs, Volume= 0.427 af, Atten= 1%, Lag= 2.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.45 fps, Min. Travel Time= 3.5 min
Avg. Velocity = 0.48 fps, Avg. Travel Time= 10.5 min

Peak Storage= 760 cf @ 12.63 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 141.52 cfs

10.00' x 2.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/' Top Width= 18.00'
Length= 302.0' Slope= 0.0110 '/'
Inlet Invert= 61.00', Outlet Invert= 57.68'

‡

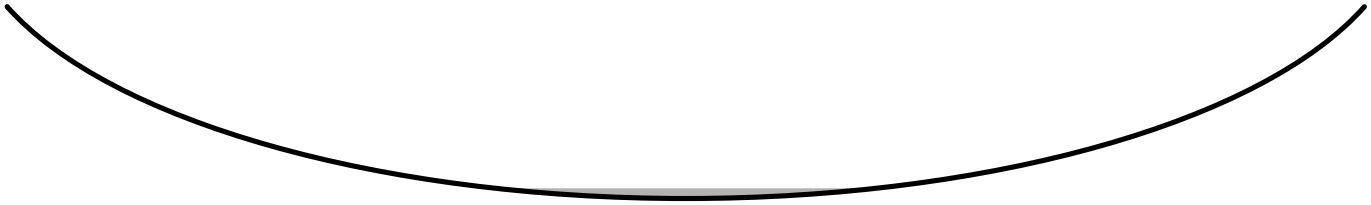
Summary for Reach R3.1: Channel

Inflow Area = 14.347 ac, 8.02% Impervious, Inflow Depth > 0.25" for 10 Year event
Inflow = 0.77 cfs @ 19.66 hrs, Volume= 0.294 af
Outflow = 0.77 cfs @ 19.69 hrs, Volume= 0.292 af, Atten= 0%, Lag= 1.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.00 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 0.92 fps, Avg. Travel Time= 2.7 min

Peak Storage= 116 cf @ 19.69 hrs
Average Depth at Peak Storage= 0.10'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 478.69 cfs

50.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 150.0' Slope= 0.0400 '/'
Inlet Invert= 63.00', Outlet Invert= 57.00'



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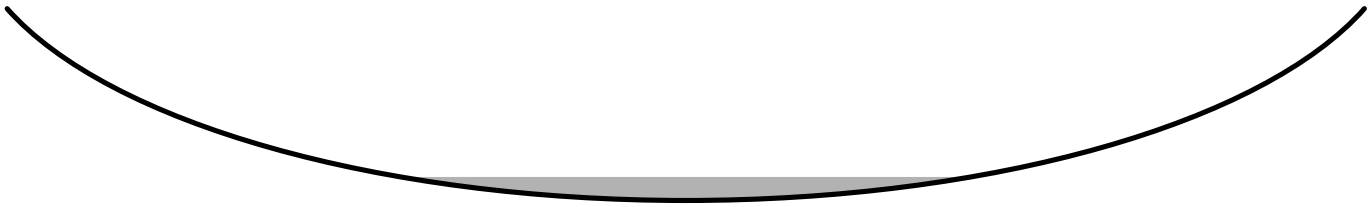
Summary for Reach R3.2: Channel

Inflow Area = 1.925 ac, 6.20% Impervious, Inflow Depth > 2.45" for 10 Year event
Inflow = 4.01 cfs @ 12.23 hrs, Volume= 0.393 af
Outflow = 3.72 cfs @ 12.30 hrs, Volume= 0.391 af, Atten= 7%, Lag= 4.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.32 fps, Min. Travel Time= 5.8 min
Avg. Velocity = 0.52 fps, Avg. Travel Time= 14.6 min

Peak Storage= 1,294 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 358.68 cfs

50.00' x 2.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 460.0' Slope= 0.0043 '/'
Inlet Invert= 59.00', Outlet Invert= 57.00'



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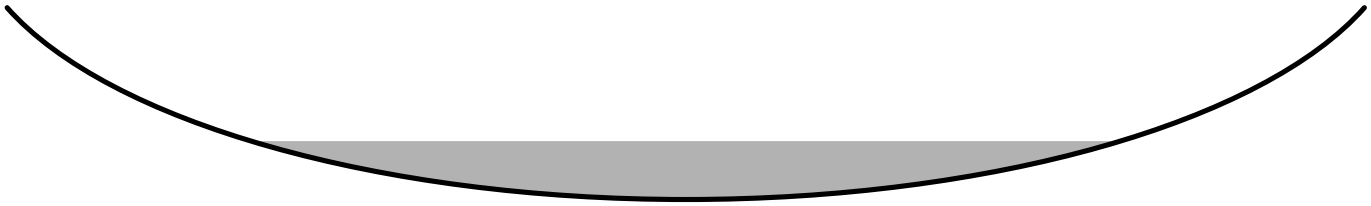
Summary for Reach R3.3: Wetland

Inflow Area = 10.034 ac, 6.91% Impervious, Inflow Depth > 2.10" for 10 Year event
Inflow = 10.99 cfs @ 12.72 hrs, Volume= 1.757 af
Outflow = 10.87 cfs @ 12.78 hrs, Volume= 1.750 af, Atten= 1%, Lag= 3.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.22 fps, Min. Travel Time= 4.9 min
Avg. Velocity = 0.58 fps, Avg. Travel Time= 10.3 min

Peak Storage= 3,177 cf @ 12.78 hrs
Average Depth at Peak Storage= 0.61'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 143.29 cfs

40.00' x 2.00' deep Parabolic Channel, n= 0.100 Very weedy reaches w/pools
Length= 356.0' Slope= 0.0225 '/'
Inlet Invert= 73.00', Outlet Invert= 65.00'



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Summary for Pond C2: 15" HDPE

Inflow Area = 1.916 ac, 25.31% Impervious, Inflow Depth > 2.02" for 10 Year event
Inflow = 2.25 cfs @ 12.53 hrs, Volume= 0.322 af
Outflow = 2.22 cfs @ 12.57 hrs, Volume= 0.322 af, Atten= 1%, Lag= 2.0 min
Primary = 2.22 cfs @ 12.57 hrs, Volume= 0.322 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 73.97' @ 12.57 hrs Surf.Area= 473 sf Storage= 185 cf
Flood Elev= 75.11' Surf.Area= 2,007 sf Storage= 1,372 cf

Plug-Flow detention time= 1.5 min calculated for 0.321 af (100% of inflow)
Center-of-Mass det. time= 1.1 min (878.2 - 877.1)

Volume	Invert	Avail.Storage	Storage Description
#1	73.00'	1,372 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
73.00	16	14.0	0	0	16
74.00	501	134.0	202	202	1,431
75.00	2,007	244.0	1,170	1,372	4,745

Device	Routing	Invert	Outlet Devices
#1	Primary	73.11'	**15.0" Round Culvert** L= 46.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.11' / 72.26' S= 0.0185 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=2.21 cfs @ 12.57 hrs HW=73.96' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 2.21 cfs @ 2.48 fps)

Summary for Pond C3: 2 x 15" HDPE

Inflow Area = 1.925 ac, 6.20% Impervious, Inflow Depth > 2.45" for 10 Year event
Inflow = 4.01 cfs @ 12.23 hrs, Volume= 0.393 af
Outflow = 4.01 cfs @ 12.23 hrs, Volume= 0.393 af, Atten= 0%, Lag= 0.0 min
Primary = 4.01 cfs @ 12.23 hrs, Volume= 0.393 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 60.70' @ 12.23 hrs
Flood Elev= 61.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	59.90'	**15.0" Round Culvert X 2.00** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 59.90' / 59.50' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=3.98 cfs @ 12.23 hrs HW=60.70' TW=59.23' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 3.98 cfs @ 2.40 fps)

Summary for Pond C3.1: 30" Culvert

Inflow Area = 10.034 ac, 6.91% Impervious, Inflow Depth > 2.10" for 10 Year event
Inflow = 11.06 cfs @ 12.68 hrs, Volume= 1.759 af
Outflow = 10.99 cfs @ 12.72 hrs, Volume= 1.757 af, Atten= 1%, Lag= 2.7 min
Primary = 10.99 cfs @ 12.72 hrs, Volume= 1.757 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 76.90' @ 12.72 hrs Surf.Area= 1,740 sf Storage= 1,348 cf
Flood Elev= 77.50' Surf.Area= 2,715 sf Storage= 2,664 cf

Plug-Flow detention time= 2.2 min calculated for 1.754 af (100% of inflow)
Center-of-Mass det. time= 1.6 min (874.4 - 872.8)

Volume	Invert	Avail.Storage	Storage Description
#1	74.90'	2,664 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
74.90	0	0.0	0	0	0
75.50	296	71.0	59	59	402
77.50	2,715	271.0	2,605	2,664	5,856

Device	Routing	Invert	Outlet Devices
#1	Primary	75.40'	**30.0" Round Culvert w/ 6.0" fill** L= 55.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 74.90' / 73.80' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=10.96 cfs @ 12.72 hrs HW=76.90' TW=73.60' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 10.96 cfs @ 3.12 fps)

Summary for Pond P3: Wetland

Inflow Area = 14.347 ac, 8.02% Impervious, Inflow Depth > 2.17" for 10 Year event
Inflow = 14.87 cfs @ 12.64 hrs, Volume= 2.599 af
Outflow = 0.77 cfs @ 19.66 hrs, Volume= 0.294 af, Atten= 95%, Lag= 421.4 min
Primary = 0.77 cfs @ 19.66 hrs, Volume= 0.294 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 64.05' @ 19.66 hrs Surf.Area= 28,648 sf Storage= 100,743 cf

Plug-Flow detention time= 563.0 min calculated for 0.293 af (11% of inflow)

Center-of-Mass det. time= 402.2 min (1,271.4 - 869.3)

Volume	Invert	Avail.Storage	Storage Description
#1	60.00'	115,705 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
60.00	22,018	689.0	0	0	22,018
62.00	24,835	718.0	46,825	46,825	25,557
64.00	27,769	747.0	52,577	99,401	29,241
64.50	37,697	836.0	16,303	115,705	40,460

Device	Routing	Invert	Outlet Devices
#1	Primary	64.00'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.77 cfs @ 19.66 hrs HW=64.05' TW=63.10' (Dynamic Tailwater)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 0.77 cfs @ 0.54 fps)

Summary for Pond T1: USF

Inflow Area = 2.281 ac, 31.72% Impervious, Inflow Depth > 2.70" for 10 Year event
Inflow = 3.79 cfs @ 12.50 hrs, Volume= 0.514 af
Outflow = 3.70 cfs @ 12.57 hrs, Volume= 0.429 af, Atten= 2%, Lag= 4.3 min
Primary = 0.07 cfs @ 12.57 hrs, Volume= 0.069 af
Secondary = 3.63 cfs @ 12.57 hrs, Volume= 0.360 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 67.28' @ 12.57 hrs Surf.Area= 3,996 sf Storage= 4,658 cf

Plug-Flow detention time= 99.3 min calculated for 0.429 af (84% of inflow)
Center-of-Mass det. time= 33.2 min (878.1 - 844.9)

Volume	Invert	Avail.Storage	Storage Description
#1	65.50'	5,619 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
65.50	1,644	257.0	0	0	1,644
66.00	2,104	289.0	935	935	3,041
67.00	3,369	308.0	2,712	3,646	3,992
67.50	4,549	332.0	1,972	5,619	5,225

Device	Routing	Invert	Outlet Devices
#1	Primary	65.50'	**0.750 in/hr Exfiltration over Horizontal area**
#2	Secondary	67.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.07 cfs @ 12.57 hrs HW=67.27' TW=63.22' (Dynamic Tailwater)
└**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Secondary OutFlow Max=3.61 cfs @ 12.57 hrs HW=67.27' TW=63.22' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 3.61 cfs @ 1.32 fps)

Summary for Pond T2: USF

Inflow Area = 1.037 ac, 33.53% Impervious, Inflow Depth > 2.71" for 10 Year event
Inflow = 2.32 cfs @ 12.25 hrs, Volume= 0.234 af
Outflow = 1.16 cfs @ 12.58 hrs, Volume= 0.155 af, Atten= 50%, Lag= 19.8 min
Primary = 0.06 cfs @ 12.58 hrs, Volume= 0.065 af
Secondary = 1.10 cfs @ 12.58 hrs, Volume= 0.090 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 77.66' @ 12.58 hrs Surf.Area= 3,600 sf Storage= 4,124 cf

Plug-Flow detention time= 175.6 min calculated for 0.155 af (66% of inflow)
Center-of-Mass det. time= 77.2 min (908.0 - 830.8)

Volume	Invert	Avail.Storage	Storage Description
#1	76.00'	5,501 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.00	1,641	211.0	0	0	1,641
77.50	3,226	333.0	3,584	3,584	6,938
78.00	4,476	424.0	1,917	5,501	12,423

Device	Routing	Invert	Outlet Devices
#1	Primary	76.00'	**0.750 in/hr Exfiltration over Horizontal area**
#2	Secondary	77.50'	**7.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.06 cfs @ 12.58 hrs HW=77.66' TW=73.96' (Dynamic Tailwater)
└**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Secondary OutFlow Max=1.09 cfs @ 12.58 hrs HW=77.66' TW=73.96' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 1.09 cfs @ 0.99 fps)

Summary for Link AP1:

Inflow Area = 402.591 ac, 22.18% Impervious, Inflow Depth > 2.46" for 10 Year event
Inflow = 271.01 cfs @ 13.76 hrs, Volume= 82.555 af
Primary = 271.01 cfs @ 13.76 hrs, Volume= 82.555 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP2:

Inflow Area = 1.916 ac, 25.31% Impervious, Inflow Depth > 2.01" for 10 Year event
Inflow = 2.22 cfs @ 12.57 hrs, Volume= 0.322 af
Primary = 2.22 cfs @ 12.57 hrs, Volume= 0.322 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP3:

Inflow Area = 18.466 ac, 7.67% Impervious, Inflow Depth > 0.73" for 10 Year event
Inflow = 7.93 cfs @ 12.29 hrs, Volume= 1.131 af
Primary = 7.93 cfs @ 12.29 hrs, Volume= 1.131 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1.1: Offsite Runoff Area=99,362 sf 31.72% Impervious Runoff Depth>3.41"
Flow Length=479' Tc=35.7 min CN=81 Runoff=4.77 cfs 0.648 af

Subcatchment 1.2: Runoff Area=144,202 sf 17.40% Impervious Runoff Depth>2.94"
Flow Length=560' Tc=23.8 min CN=76 Runoff=7.15 cfs 0.811 af

Subcatchment 2.1: Runoff Area=38,308 sf 15.62% Impervious Runoff Depth>2.94"
Flow Length=282' Tc=23.4 min CN=76 Runoff=1.91 cfs 0.215 af

Subcatchment 2.2: Runoff Area=45,163 sf 33.53% Impervious Runoff Depth>3.42"
Flow Length=458' Tc=18.0 min CN=81 Runoff=2.92 cfs 0.296 af

Subcatchment 3.1: Runoff Area=437,068 sf 6.91% Impervious Runoff Depth>2.74"
Flow Length=650' Tc=47.9 min CN=74 Runoff=14.51 cfs 2.291 af

Subcatchment 3.2: Runoff Area=187,873 sf 10.61% Impervious Runoff Depth>3.03"
Flow Length=345' Tc=25.3 min CN=77 Runoff=9.39 cfs 1.090 af

Subcatchment 4: Runoff Area=95,578 sf 6.65% Impervious Runoff Depth>3.13"
Flow Length=165' Tc=20.2 min CN=78 Runoff=5.40 cfs 0.572 af

Subcatchment OS1: Offsite Runoff Area=397.000 ac 22.17% Impervious Runoff Depth>3.14"
Flow Length=8,561' Slope=0.0110 '/' Tc=135.5 min CN=79 Runoff=344.44 cfs 103.799 af

Subcatchment OS2: Offsite Runoff Area=83,865 sf 6.20% Impervious Runoff Depth>3.13"
Flow Length=150' Slope=0.0100 '/' Tc=16.5 min CN=78 Runoff=5.14 cfs 0.502 af

Reach R1.1: Avg. Flow Depth=0.24' Max Vel=1.37 fps Inflow=4.70 cfs 0.563 af
n=0.035 L=85.0' S=0.0118 '/' Capacity=22.13 cfs Outflow=4.69 cfs 0.562 af

Reach R1.2: Avg. Flow Depth=0.28' Max Vel=1.59 fps Inflow=4.69 cfs 0.562 af
n=0.040 L=302.0' S=0.0110 '/' Capacity=141.52 cfs Outflow=4.66 cfs 0.560 af

Reach R3.1: Channel Avg. Flow Depth=0.19' Max Vel=1.49 fps Inflow=2.86 cfs 1.062 af
n=0.050 L=150.0' S=0.0400 '/' Capacity=478.69 cfs Outflow=2.86 cfs 1.059 af

Reach R3.2: Channel Avg. Flow Depth=0.27' Max Vel=1.43 fps Inflow=5.14 cfs 0.502 af
n=0.022 L=460.0' S=0.0043 '/' Capacity=358.68 cfs Outflow=4.80 cfs 0.500 af

Reach R3.3: Wetland Avg. Flow Depth=0.69' Max Vel=1.32 fps Inflow=14.35 cfs 2.289 af
n=0.100 L=356.0' S=0.0225 '/' Capacity=143.29 cfs Outflow=14.22 cfs 2.281 af

Pond C2: 15" HDPE Peak Elev=74.33' Storage=427 cf Inflow=3.82 cfs 0.429 af
15.0" Round Culvert n=0.013 L=46.0' S=0.0185 '/' Outflow=3.62 cfs 0.429 af

Pond C3: 2 x 15" HDPE Peak Elev=60.84' Inflow=5.14 cfs 0.502 af
15.0" Round Culvert x 2.00 n=0.013 L=50.0' S=0.0080 '/' Outflow=5.14 cfs 0.502 af

Pond C3.1: 30" Culvert Peak Elev=77.22' Storage=1,979 cf Inflow=14.51 cfs 2.291 af
30.0" Round Culvert w/ 6.0" fill n=0.020 L=55.0' S=0.0200 '/' Outflow=14.35 cfs 2.289 af

Pond P3: Wetland Peak Elev=64.11' Storage=102,679 cf Inflow=19.34 cfs 3.371 af
Outflow=2.86 cfs 1.062 af

Pond T1: USF Peak Elev=67.32' Storage=4,848 cf Inflow=4.77 cfs 0.648 af
Primary=0.07 cfs 0.072 af Secondary=4.63 cfs 0.491 af Outflow=4.70 cfs 0.563 af

Pond T2: USF Peak Elev=77.73' Storage=4,404 cf Inflow=2.92 cfs 0.296 af
Primary=0.07 cfs 0.067 af Secondary=1.98 cfs 0.147 af Outflow=2.05 cfs 0.214 af

Link AP1: Inflow=346.30 cfs 105.170 af
Primary=346.30 cfs 105.170 af

Link AP2: Inflow=3.62 cfs 0.429 af
Primary=3.62 cfs 0.429 af

Link AP3: Inflow=10.20 cfs 2.132 af
Primary=10.20 cfs 2.132 af

Total Runoff Area = 422.974 ac Runoff Volume = 110.223 af Average Runoff Depth = 3.13"
78.44% Pervious = 331.773 ac 21.56% Impervious = 91.201 ac

Summary for Subcatchment 1.1: Offsite

Runoff = 4.77 cfs @ 12.49 hrs, Volume= 0.648 af, Depth> 3.41"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.50"

	Area (sf)	CN	Description
*	14,020	98	New Road Impervious
*	17,500	98	New Lot Impervious
*	22,068	74	New Road Landscaped (HSG C)
*	35,000	74	New Lot Lawn HSG C
	10,774	70	Woods, Good, HSG C
	99,362	81	Weighted Average
	67,842		68.28% Pervious Area
	31,520		31.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.7	150	0.0800	0.08		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.00"
3.9	60	0.0800	0.26		**Sheet Flow, BC** Grass: Short n= 0.150 P2= 3.00"
0.7	76	0.0600	1.71		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
0.4	193	0.0470	7.17	28.70	**Trap/Vee/Rect Channel Flow, DE** Bot.W=1.00' D=1.00' Z= 3.0 '/' Top.W=7.00' n= 0.030 Earth, grassed & winding
35.7	479	Total			

Summary for Subcatchment 1.2:

Runoff = 7.15 cfs @ 12.33 hrs, Volume= 0.811 af, Depth> 2.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.50"

	Area (sf)	CN	Description
*	2,557	98	New Road Impervious
*	15,000	98	New Lot Impervious
*	30,684	74	New Lanscaped Area, HSG C
	30,159	80	1/2 acre lots, 25% imp, HSG C
	65,802	70	Woods, Good, HSG C
	144,202	76	Weighted Average
	119,105		82.60% Pervious Area
	25,097		17.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.3	140	0.0140	0.15		**Sheet Flow, AB**
					Grass: Short n= 0.150 P2= 3.00"
8.1	310	0.0652	0.64		**Shallow Concentrated Flow, BC**
					Forest w/Heavy Litter Kv= 2.5 fps
0.4	110	0.0110	5.06	141.56	**Trap/Vee/Rect Channel Flow, CD**
					Bot.W=10.00' D=2.00' Z= 2.0 '/' Top.W=18.00'
					n= 0.040 Winding stream, pools & shoals
23.8	560	Total			

Summary for Subcatchment 2.1:

Runoff = 1.91 cfs @ 12.33 hrs, Volume= 0.215 af, Depth> 2.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.50"

	Area (sf)	CN	Description
*	2,500	98	New Lot Impervious
*	5,000	74	New Landscaped Area, HSG C
	13,940	80	1/2 acre lots, 25% imp, HSG C
	16,868	70	Woods, Good, HSG C
	38,308	76	Weighted Average
	32,323		84.38% Pervious Area
	5,985		15.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0800	0.14		**Sheet Flow, AB**
					Woods: Light underbrush n= 0.400 P2= 3.00"
5.8	132	0.0230	0.38		**Shallow Concentrated Flow, BC**
					Forest w/Heavy Litter Kv= 2.5 fps
23.4	282	Total			

Summary for Subcatchment 2.2:

Runoff = 2.92 cfs @ 12.25 hrs, Volume= 0.296 af, Depth> 3.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.50"

	Area (sf)	CN	Description
*	10,645	98	New Road Impervious
*	4,500	98	New Lot Impervious
*	21,459	74	New Landscaped Area, HSG C
	8,559	70	Woods, Good, HSG C
	45,163	81	Weighted Average
	30,018		66.47% Pervious Area
	15,145		33.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0640	0.10		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
0.5	281	0.0340	9.29	130.05	**Trap/Vee/Rect Channel Flow, BC** Bot.W=1.00' D=2.00' Z= 3.0 '/' Top.W=13.00' n= 0.030 Earth, grassed & winding
9.5	127	0.0080	0.22		**Shallow Concentrated Flow, DE** Forest w/Heavy Litter Kv= 2.5 fps
18.0	458	Total			

Summary for Subcatchment 3.1:

Runoff = 14.51 cfs @ 12.67 hrs, Volume= 2.291 af, Depth> 2.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.50"

	Area (sf)	CN	Description
*	14,680	98	Existing Impervious
*	15,500	98	New Lot Impervious
*	0	98	New Road Impervious
	164,031	70	Woods, Good, HSG C
	74,338	77	Woods, Good, HSG D
	111,026	71	Meadow, non-grazed, HSG C
	25,011	78	Meadow, non-grazed, HSG D
*	32,482	74	New Lawn, HSG C
	437,068	74	Weighted Average
	406,888		93.09% Pervious Area
	30,180		6.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.0	150	0.0134	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
11.5	200	0.0134	0.29		**Shallow Concentrated Flow, AB** Forest w/Heavy Litter Kv= 2.5 fps
0.4	300	0.0230	12.95	388.60	**Trap/Vee/Rect Channel Flow, DE** Bot.W=4.00' D=3.00' Z= 2.0 '/' Top.W=16.00' n= 0.025 Earth, clean & winding
47.9	650	Total			

Summary for Subcatchment 3.2:

Runoff = 9.39 cfs @ 12.35 hrs, Volume= 1.090 af, Depth> 3.03"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.50"

	Area (sf)	CN	Description
	46,211	80	1/2 acre lots, 25% imp, HSG C
*	568	98	Existing Impervious
*	2,812	98	New Road Impervious
	52,212	70	Woods, Good, HSG C
	68,291	77	Woods, Good, HSG D
*	12,779	74	New Landscaped Area, HSG C
*	5,000	98	New Lot Impervious
	187,873	77	Weighted Average
	167,940		89.39% Pervious Area
	19,933		10.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	150	0.1000	0.16		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
9.2	195	0.0200	0.35		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
25.3	345	Total			

Summary for Subcatchment 4:

Runoff = 5.40 cfs @ 12.28 hrs, Volume= 0.572 af, Depth> 3.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.50"

	Area (sf)	CN	Description
	70,142	77	Woods, Good, HSG D
	25,436	80	1/2 acre lots, 25% imp, HSG C
	95,578	78	Weighted Average
	89,219		93.35% Pervious Area
	6,359		6.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0350	0.09		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
2.5	65	0.0310	0.44		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
20.2	165	Total			

Summary for Subcatchment OS1: Offsite

Runoff = 344.44 cfs @ 13.74 hrs, Volume= 103.799 af, Depth> 3.14"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.50"

Area (ac)	CN	Description
200.000	83	1/4 acre lots, 38% imp, HSG C
60.000	79	1 acre lots, 20% imp, HSG C
137.000	72	Woods/grass comb., Good, HSG C
397.000	79	Weighted Average
309.000		77.83% Pervious Area
88.000		22.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
67.8	150	0.0110	0.04		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.00"
21.6	340	0.0110	0.26		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
6.2	272	0.0110	0.73		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
16.6	733	0.0110	0.73		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
23.3	7,066	0.0110	5.06	141.56	**Trap/Vee/Rect Channel Flow, EF** Bot.W=10.00' D=2.00' Z= 2.0 '/' Top.W=18.00' n= 0.040 Winding stream, pools & shoals
135.5	8,561	Total			

Summary for Subcatchment OS2: Offsite

Runoff = 5.14 cfs @ 12.23 hrs, Volume= 0.502 af, Depth> 3.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 Year Rainfall=5.50"

Area (sf)	CN	Description
20,802	80	1/2 acre lots, 25% imp, HSG C
63,063	78	Meadow, non-grazed, HSG D
83,865	78	Weighted Average
78,665		93.80% Pervious Area
5,201		6.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	150	0.0100	0.15		**Sheet Flow, AB** Range n= 0.130 P2= 3.00"

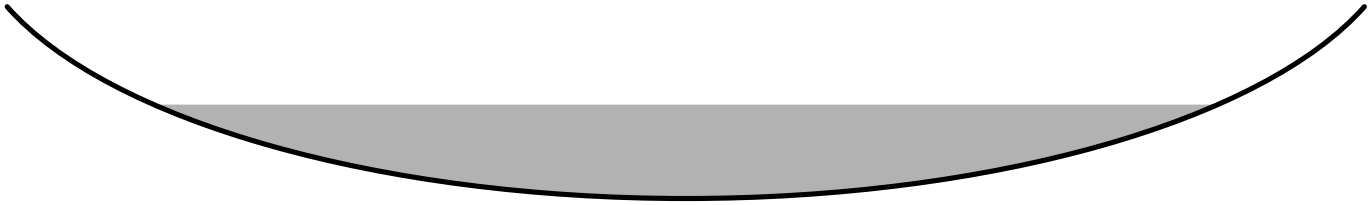
Summary for Reach R1.1:

Inflow Area = 2.281 ac, 31.72% Impervious, Inflow Depth > 2.96" for 25 Year event
Inflow = 4.70 cfs @ 12.55 hrs, Volume= 0.563 af
Outflow = 4.69 cfs @ 12.56 hrs, Volume= 0.562 af, Atten= 0%, Lag= 0.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.37 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 0.51 fps, Avg. Travel Time= 2.8 min

Peak Storage= 291 cf @ 12.56 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 22.13 cfs

30.00' x 0.50' deep Parabolic Channel, n= 0.035 High grass
Length= 85.0' Slope= 0.0118 '/'
Inlet Invert= 63.00', Outlet Invert= 62.00'



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Summary for Reach R1.2:

Inflow Area = 2.281 ac, 31.72% Impervious, Inflow Depth > 2.96" for 25 Year event
Inflow = 4.69 cfs @ 12.56 hrs, Volume= 0.562 af
Outflow = 4.66 cfs @ 12.59 hrs, Volume= 0.560 af, Atten= 1%, Lag= 2.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.59 fps, Min. Travel Time= 3.2 min
Avg. Velocity = 0.51 fps, Avg. Travel Time= 9.9 min

Peak Storage= 886 cf @ 12.59 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 141.52 cfs

10.00' x 2.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/' Top Width= 18.00'
Length= 302.0' Slope= 0.0110 '/'
Inlet Invert= 61.00', Outlet Invert= 57.68'

‡

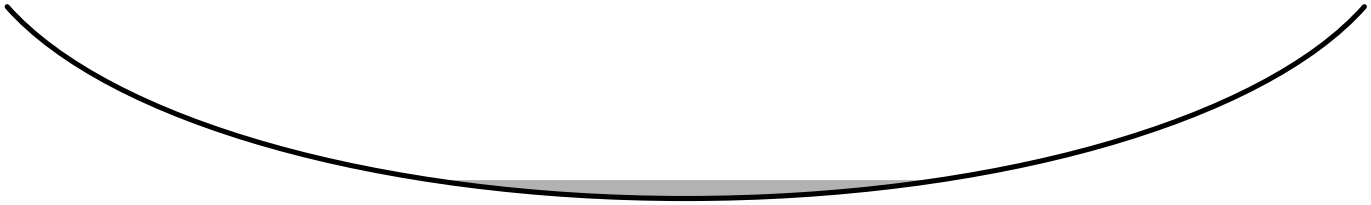
Summary for Reach R3.1: Channel

Inflow Area = 14.347 ac, 8.02% Impervious, Inflow Depth > 0.89" for 25 Year event
Inflow = 2.86 cfs @ 15.05 hrs, Volume= 1.062 af
Outflow = 2.86 cfs @ 15.07 hrs, Volume= 1.059 af, Atten= 0%, Lag= 1.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.49 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 1.14 fps, Avg. Travel Time= 2.2 min

Peak Storage= 288 cf @ 15.07 hrs
Average Depth at Peak Storage= 0.19'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 478.69 cfs

50.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 150.0' Slope= 0.0400 '/'
Inlet Invert= 63.00', Outlet Invert= 57.00'



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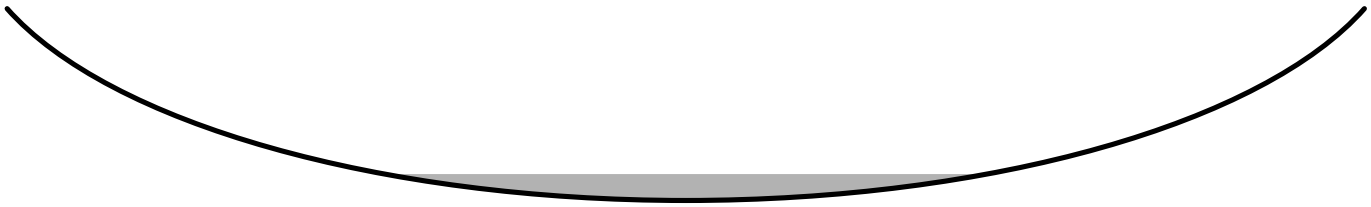
Summary for Reach R3.2: Channel

Inflow Area = 1.925 ac, 6.20% Impervious, Inflow Depth > 3.13" for 25 Year event
Inflow = 5.14 cfs @ 12.23 hrs, Volume= 0.502 af
Outflow = 4.80 cfs @ 12.30 hrs, Volume= 0.500 af, Atten= 7%, Lag= 4.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.43 fps, Min. Travel Time= 5.4 min
Avg. Velocity = 0.55 fps, Avg. Travel Time= 13.8 min

Peak Storage= 1,544 cf @ 12.30 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 358.68 cfs

50.00' x 2.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 460.0' Slope= 0.0043 '/'
Inlet Invert= 59.00', Outlet Invert= 57.00'



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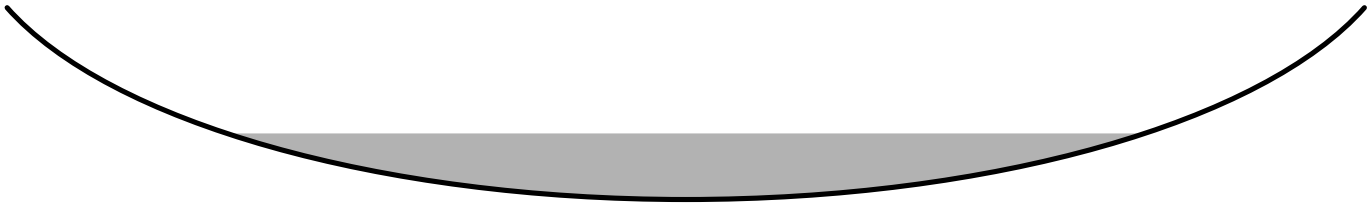
Summary for Reach R3.3: Wetland

Inflow Area = 10.034 ac, 6.91% Impervious, Inflow Depth > 2.74" for 25 Year event
Inflow = 14.35 cfs @ 12.73 hrs, Volume= 2.289 af
Outflow = 14.22 cfs @ 12.78 hrs, Volume= 2.281 af, Atten= 1%, Lag= 3.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.32 fps, Min. Travel Time= 4.5 min
Avg. Velocity = 0.61 fps, Avg. Travel Time= 9.7 min

Peak Storage= 3,828 cf @ 12.78 hrs
Average Depth at Peak Storage= 0.69'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 143.29 cfs

40.00' x 2.00' deep Parabolic Channel, n= 0.100 Very weedy reaches w/pools
Length= 356.0' Slope= 0.0225 '/'
Inlet Invert= 73.00', Outlet Invert= 65.00'



‡

Summary for Pond C2: 15" HDPE

Inflow Area = 1.916 ac, 25.31% Impervious, Inflow Depth > 2.69" for 25 Year event
Inflow = 3.82 cfs @ 12.42 hrs, Volume= 0.429 af
Outflow = 3.62 cfs @ 12.48 hrs, Volume= 0.429 af, Atten= 5%, Lag= 3.9 min
Primary = 3.62 cfs @ 12.48 hrs, Volume= 0.429 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 74.33' @ 12.48 hrs Surf.Area= 886 sf Storage= 427 cf
Flood Elev= 75.11' Surf.Area= 2,007 sf Storage= 1,372 cf

Plug-Flow detention time= 1.5 min calculated for 0.429 af (100% of inflow)
Center-of-Mass det. time= 1.2 min (861.7 - 860.5)

Volume	Invert	Avail.Storage	Storage Description
#1	73.00'	1,372 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
73.00	16	14.0	0	0	16
74.00	501	134.0	202	202	1,431
75.00	2,007	244.0	1,170	1,372	4,745

Device	Routing	Invert	Outlet Devices
#1	Primary	73.11'	**15.0" Round Culvert** L= 46.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.11' / 72.26' S= 0.0185 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=3.60 cfs @ 12.48 hrs HW=74.32' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 3.60 cfs @ 2.96 fps)

Summary for Pond C3: 2 x 15" HDPE

Inflow Area = 1.925 ac, 6.20% Impervious, Inflow Depth > 3.13" for 25 Year event
Inflow = 5.14 cfs @ 12.23 hrs, Volume= 0.502 af
Outflow = 5.14 cfs @ 12.23 hrs, Volume= 0.502 af, Atten= 0%, Lag= 0.0 min
Primary = 5.14 cfs @ 12.23 hrs, Volume= 0.502 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 60.84' @ 12.23 hrs
Flood Elev= 61.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	59.90'	**15.0" Round Culvert X 2.00** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 59.90' / 59.50' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=5.09 cfs @ 12.23 hrs HW=60.83' TW=59.26' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 5.09 cfs @ 2.59 fps)

Summary for Pond C3.1: 30" Culvert

Inflow Area = 10.034 ac, 6.91% Impervious, Inflow Depth > 2.74" for 25 Year event
Inflow = 14.51 cfs @ 12.67 hrs, Volume= 2.291 af
Outflow = 14.35 cfs @ 12.73 hrs, Volume= 2.289 af, Atten= 1%, Lag= 3.5 min
Primary = 14.35 cfs @ 12.73 hrs, Volume= 2.289 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 77.22' @ 12.73 hrs Surf.Area= 2,234 sf Storage= 1,979 cf
Flood Elev= 77.50' Surf.Area= 2,715 sf Storage= 2,664 cf

Plug-Flow detention time= 2.2 min calculated for 2.289 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (867.1 - 865.4)

Volume	Invert	Avail.Storage	Storage Description
#1	74.90'	2,664 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
74.90	0	0.0	0	0	0
75.50	296	71.0	59	59	402
77.50	2,715	271.0	2,605	2,664	5,856

Device	Routing	Invert	Outlet Devices
#1	Primary	75.40'	**30.0" Round Culvert w/ 6.0" fill** L= 55.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 74.90' / 73.80' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=14.32 cfs @ 12.73 hrs HW=77.22' TW=73.68' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 14.32 cfs @ 3.53 fps)

Summary for Pond P3: Wetland

Inflow Area = 14.347 ac, 8.02% Impervious, Inflow Depth > 2.82" for 25 Year event
Inflow = 19.34 cfs @ 12.63 hrs, Volume= 3.371 af
Outflow = 2.86 cfs @ 15.05 hrs, Volume= 1.062 af, Atten= 85%, Lag= 145.5 min
Primary = 2.86 cfs @ 15.05 hrs, Volume= 1.062 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 64.11' @ 15.05 hrs Surf.Area= 29,894 sf Storage= 102,679 cf

Plug-Flow detention time= 348.2 min calculated for 1.060 af (31% of inflow)

Center-of-Mass det. time= 216.7 min (1,078.7 - 861.9)

Volume	Invert	Avail.Storage	Storage Description
#1	60.00'	115,705 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
60.00	22,018	689.0	0	0	22,018
62.00	24,835	718.0	46,825	46,825	25,557
64.00	27,769	747.0	52,577	99,401	29,241
64.50	37,697	836.0	16,303	115,705	40,460

Device	Routing	Invert	Outlet Devices
#1	Primary	64.00'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=2.86 cfs @ 15.05 hrs HW=64.11' TW=63.19' (Dynamic Tailwater)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 2.86 cfs @ 0.84 fps)

Summary for Pond T1: USF

Inflow Area = 2.281 ac, 31.72% Impervious, Inflow Depth > 3.41" for 25 Year event
Inflow = 4.77 cfs @ 12.49 hrs, Volume= 0.648 af
Outflow = 4.70 cfs @ 12.55 hrs, Volume= 0.563 af, Atten= 2%, Lag= 3.3 min
Primary = 0.07 cfs @ 12.55 hrs, Volume= 0.072 af
Secondary = 4.63 cfs @ 12.55 hrs, Volume= 0.491 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 67.32' @ 12.55 hrs Surf.Area= 4,108 sf Storage= 4,848 cf

Plug-Flow detention time= 84.4 min calculated for 0.562 af (87% of inflow)
Center-of-Mass det. time= 28.5 min (866.9 - 838.4)

Volume	Invert	Avail.Storage	Storage Description
#1	65.50'	5,619 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
65.50	1,644	257.0	0	0	1,644
66.00	2,104	289.0	935	935	3,041
67.00	3,369	308.0	2,712	3,646	3,992
67.50	4,549	332.0	1,972	5,619	5,225

Device	Routing	Invert	Outlet Devices
#1	Primary	65.50'	**0.750 in/hr Exfiltration over Horizontal area**
#2	Secondary	67.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.07 cfs @ 12.55 hrs HW=67.32' TW=63.24' (Dynamic Tailwater)
└**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Secondary OutFlow Max=4.62 cfs @ 12.55 hrs HW=67.32' TW=63.24' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 4.62 cfs @ 1.44 fps)

Summary for Pond T2: USF

Inflow Area = 1.037 ac, 33.53% Impervious, Inflow Depth > 3.42" for 25 Year event
Inflow = 2.92 cfs @ 12.25 hrs, Volume= 0.296 af
Outflow = 2.05 cfs @ 12.45 hrs, Volume= 0.214 af, Atten= 30%, Lag= 12.0 min
Primary = 0.07 cfs @ 12.45 hrs, Volume= 0.067 af
Secondary = 1.98 cfs @ 12.45 hrs, Volume= 0.147 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 77.73' @ 12.45 hrs Surf.Area= 3,786 sf Storage= 4,404 cf

Plug-Flow detention time= 145.1 min calculated for 0.214 af (72% of inflow)
Center-of-Mass det. time= 55.6 min (879.8 - 824.2)

Volume	Invert	Avail.Storage	Storage Description
#1	76.00'	5,501 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.00	1,641	211.0	0	0	1,641
77.50	3,226	333.0	3,584	3,584	6,938
78.00	4,476	424.0	1,917	5,501	12,423

Device	Routing	Invert	Outlet Devices
#1	Primary	76.00'	**0.750 in/hr Exfiltration over Horizontal area**
#2	Secondary	77.50'	**7.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.07 cfs @ 12.45 hrs HW=77.73' TW=74.32' (Dynamic Tailwater)
└**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Secondary OutFlow Max=1.98 cfs @ 12.45 hrs HW=77.73' TW=74.32' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 1.98 cfs @ 1.21 fps)

Summary for Link AP1:

Inflow Area = 402.591 ac, 22.18% Impervious, Inflow Depth > 3.13" for 25 Year event
Inflow = 346.30 cfs @ 13.73 hrs, Volume= 105.170 af
Primary = 346.30 cfs @ 13.73 hrs, Volume= 105.170 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP2:

Inflow Area = 1.916 ac, 25.31% Impervious, Inflow Depth > 2.69" for 25 Year event
Inflow = 3.62 cfs @ 12.48 hrs, Volume= 0.429 af
Primary = 3.62 cfs @ 12.48 hrs, Volume= 0.429 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP3:

Inflow Area = 18.466 ac, 7.67% Impervious, Inflow Depth > 1.39" for 25 Year event
Inflow = 10.20 cfs @ 12.29 hrs, Volume= 2.132 af
Primary = 10.20 cfs @ 12.29 hrs, Volume= 2.132 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1.1: Offsite Runoff Area=99,362 sf 31.72% Impervious Runoff Depth>3.77"
Flow Length=479' Tc=35.7 min CN=81 Runoff=5.26 cfs 0.716 af

Subcatchment 1.2: Runoff Area=144,202 sf 17.40% Impervious Runoff Depth>3.28"
Flow Length=560' Tc=23.8 min CN=76 Runoff=7.98 cfs 0.905 af

Subcatchment 2.1: Runoff Area=38,308 sf 15.62% Impervious Runoff Depth>3.28"
Flow Length=282' Tc=23.4 min CN=76 Runoff=2.14 cfs 0.240 af

Subcatchment 2.2: Runoff Area=45,163 sf 33.53% Impervious Runoff Depth>3.78"
Flow Length=458' Tc=18.0 min CN=81 Runoff=3.22 cfs 0.327 af

Subcatchment 3.1: Runoff Area=437,068 sf 6.91% Impervious Runoff Depth>3.07"
Flow Length=650' Tc=47.9 min CN=74 Runoff=16.28 cfs 2.566 af

Subcatchment 3.2: Runoff Area=187,873 sf 10.61% Impervious Runoff Depth>3.38"
Flow Length=345' Tc=25.3 min CN=77 Runoff=10.45 cfs 1.213 af

Subcatchment 4: Runoff Area=95,578 sf 6.65% Impervious Runoff Depth>3.48"
Flow Length=165' Tc=20.2 min CN=78 Runoff=6.00 cfs 0.636 af

Subcatchment OS1: Offsite Runoff Area=397.000 ac 22.17% Impervious Runoff Depth>3.48"
Flow Length=8,561' Slope=0.0110 '/' Tc=135.5 min CN=79 Runoff=382.59 cfs 115.218 af

Subcatchment OS2: Offsite Runoff Area=83,865 sf 6.20% Impervious Runoff Depth>3.48"
Flow Length=150' Slope=0.0100 '/' Tc=16.5 min CN=78 Runoff=5.71 cfs 0.558 af

Reach R1.1: Avg. Flow Depth=0.26' Max Vel=1.42 fps Inflow=5.19 cfs 0.631 af
n=0.035 L=85.0' S=0.0118 '/' Capacity=22.13 cfs Outflow=5.19 cfs 0.631 af

Reach R1.2: Avg. Flow Depth=0.29' Max Vel=1.65 fps Inflow=5.19 cfs 0.631 af
n=0.040 L=302.0' S=0.0110 '/' Capacity=141.52 cfs Outflow=5.16 cfs 0.629 af

Reach R3.1: Channel Avg. Flow Depth=0.23' Max Vel=1.72 fps Inflow=4.53 cfs 1.458 af
n=0.050 L=150.0' S=0.0400 '/' Capacity=478.69 cfs Outflow=4.53 cfs 1.456 af

Reach R3.2: Channel Avg. Flow Depth=0.29' Max Vel=1.48 fps Inflow=5.71 cfs 0.558 af
n=0.022 L=460.0' S=0.0043 '/' Capacity=358.68 cfs Outflow=5.35 cfs 0.556 af

Reach R3.3: Wetland Avg. Flow Depth=0.72' Max Vel=1.37 fps Inflow=16.03 cfs 2.564 af
n=0.100 L=356.0' S=0.0225 '/' Capacity=143.29 cfs Outflow=15.91 cfs 2.556 af

Pond C2: 15" HDPE Peak Elev=74.54' Storage=641 cf Inflow=4.55 cfs 0.485 af
15.0" Round Culvert n=0.013 L=46.0' S=0.0185 '/' Outflow=4.18 cfs 0.485 af

Pond C3: 2 x 15" HDPE Peak Elev=60.91' Inflow=5.71 cfs 0.558 af
15.0" Round Culvert x 2.00 n=0.013 L=50.0' S=0.0080 '/' Outflow=5.71 cfs 0.558 af

Pond C3.1: 30" Culvert Peak Elev=77.39' Storage=2,385 cf Inflow=16.28 cfs 2.566 af
30.0" Round Culvert w/ 6.0" fill n=0.020 L=55.0' S=0.0200 '/' Outflow=16.03 cfs 2.564 af

Pond P3: Wetland Peak Elev=64.15' Storage=103,908 cf Inflow=21.57 cfs 3.769 af
Outflow=4.53 cfs 1.458 af

Pond T1: USF Peak Elev=67.34' Storage=4,938 cf Inflow=5.26 cfs 0.716 af
Primary=0.07 cfs 0.074 af Secondary=5.12 cfs 0.558 af Outflow=5.19 cfs 0.631 af

Pond T2: USF Peak Elev=77.77' Storage=4,531 cf Inflow=3.22 cfs 0.327 af
Primary=0.07 cfs 0.068 af Secondary=2.43 cfs 0.176 af Outflow=2.50 cfs 0.245 af

Link AP1: Inflow=385.00 cfs 116.751 af
Primary=385.00 cfs 116.751 af

Link AP2: Inflow=4.18 cfs 0.485 af
Primary=4.18 cfs 0.485 af

Link AP3: Inflow=11.35 cfs 2.648 af
Primary=11.35 cfs 2.648 af

Total Runoff Area = 422.974 ac Runoff Volume = 122.379 af Average Runoff Depth = 3.47"
78.44% Pervious = 331.773 ac 21.56% Impervious = 91.201 ac

Summary for Subcatchment 1.1: Offsite

Runoff = 5.26 cfs @ 12.49 hrs, Volume= 0.716 af, Depth> 3.77"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=5.90"

	Area (sf)	CN	Description
*	14,020	98	New Road Impervious
*	17,500	98	New Lot Impervious
*	22,068	74	New Road Landscaped (HSG C)
*	35,000	74	New Lot Lawn HSG C
	10,774	70	Woods, Good, HSG C
	99,362	81	Weighted Average
	67,842		68.28% Pervious Area
	31,520		31.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.7	150	0.0800	0.08		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.00"
3.9	60	0.0800	0.26		**Sheet Flow, BC** Grass: Short n= 0.150 P2= 3.00"
0.7	76	0.0600	1.71		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
0.4	193	0.0470	7.17	28.70	**Trap/Vee/Rect Channel Flow, DE** Bot.W=1.00' D=1.00' Z= 3.0 '/' Top.W=7.00' n= 0.030 Earth, grassed & winding
35.7	479	Total			

Summary for Subcatchment 1.2:

Runoff = 7.98 cfs @ 12.33 hrs, Volume= 0.905 af, Depth> 3.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=5.90"

	Area (sf)	CN	Description
*	2,557	98	New Road Impervious
*	15,000	98	New Lot Impervious
*	30,684	74	New Lanscaped Area, HSG C
	30,159	80	1/2 acre lots, 25% imp, HSG C
	65,802	70	Woods, Good, HSG C
	144,202	76	Weighted Average
	119,105		82.60% Pervious Area
	25,097		17.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.3	140	0.0140	0.15		**Sheet Flow, AB**
					Grass: Short n= 0.150 P2= 3.00"
8.1	310	0.0652	0.64		**Shallow Concentrated Flow, BC**
					Forest w/Heavy Litter Kv= 2.5 fps
0.4	110	0.0110	5.06	141.56	**Trap/Vee/Rect Channel Flow, CD**
					Bot.W=10.00' D=2.00' Z= 2.0 '/' Top.W=18.00'
					n= 0.040 Winding stream, pools & shoals
23.8	560	Total			

Summary for Subcatchment 2.1:

Runoff = 2.14 cfs @ 12.33 hrs, Volume= 0.240 af, Depth> 3.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=5.90"

	Area (sf)	CN	Description
*	2,500	98	New Lot Impervious
*	5,000	74	New Landscaped Area, HSG C
	13,940	80	1/2 acre lots, 25% imp, HSG C
	16,868	70	Woods, Good, HSG C
	38,308	76	Weighted Average
	32,323		84.38% Pervious Area
	5,985		15.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.0800	0.14		**Sheet Flow, AB**
					Woods: Light underbrush n= 0.400 P2= 3.00"
5.8	132	0.0230	0.38		**Shallow Concentrated Flow, BC**
					Forest w/Heavy Litter Kv= 2.5 fps
23.4	282	Total			

Summary for Subcatchment 2.2:

Runoff = 3.22 cfs @ 12.25 hrs, Volume= 0.327 af, Depth> 3.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=5.90"

	Area (sf)	CN	Description
*	10,645	98	New Road Impervious
*	4,500	98	New Lot Impervious
*	21,459	74	New Landscaped Area, HSG C
	8,559	70	Woods, Good, HSG C
	45,163	81	Weighted Average
	30,018		66.47% Pervious Area
	15,145		33.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.0	50	0.0640	0.10		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
0.5	281	0.0340	9.29	130.05	**Trap/Vee/Rect Channel Flow, BC** Bot.W=1.00' D=2.00' Z= 3.0 '/' Top.W=13.00' n= 0.030 Earth, grassed & winding
9.5	127	0.0080	0.22		**Shallow Concentrated Flow, DE** Forest w/Heavy Litter Kv= 2.5 fps
18.0	458	Total			

Summary for Subcatchment 3.1:

Runoff = 16.28 cfs @ 12.66 hrs, Volume= 2.566 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=5.90"

	Area (sf)	CN	Description
*	14,680	98	Existing Impervious
*	15,500	98	New Lot Impervious
*	0	98	New Road Impervious
	164,031	70	Woods, Good, HSG C
	74,338	77	Woods, Good, HSG D
	111,026	71	Meadow, non-grazed, HSG C
	25,011	78	Meadow, non-grazed, HSG D
*	32,482	74	New Lawn, HSG C
	437,068	74	Weighted Average
	406,888		93.09% Pervious Area
	30,180		6.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.0	150	0.0134	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
11.5	200	0.0134	0.29		**Shallow Concentrated Flow, AB** Forest w/Heavy Litter Kv= 2.5 fps
0.4	300	0.0230	12.95	388.60	**Trap/Vee/Rect Channel Flow, DE** Bot.W=4.00' D=3.00' Z= 2.0 '/' Top.W=16.00' n= 0.025 Earth, clean & winding
47.9	650	Total			

Summary for Subcatchment 3.2:

Runoff = 10.45 cfs @ 12.35 hrs, Volume= 1.213 af, Depth> 3.38"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=5.90"

	Area (sf)	CN	Description
	46,211	80	1/2 acre lots, 25% imp, HSG C
*	568	98	Existing Impervious
*	2,812	98	New Road Impervious
	52,212	70	Woods, Good, HSG C
	68,291	77	Woods, Good, HSG D
*	12,779	74	New Landscaped Area, HSG C
*	5,000	98	New Lot Impervious
	187,873	77	Weighted Average
	167,940		89.39% Pervious Area
	19,933		10.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.1	150	0.1000	0.16		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
9.2	195	0.0200	0.35		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
25.3	345	Total			

Summary for Subcatchment 4:

Runoff = 6.00 cfs @ 12.28 hrs, Volume= 0.636 af, Depth> 3.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=5.90"

	Area (sf)	CN	Description
	70,142	77	Woods, Good, HSG D
	25,436	80	1/2 acre lots, 25% imp, HSG C
	95,578	78	Weighted Average
	89,219		93.35% Pervious Area
	6,359		6.65% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0350	0.09		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.00"
2.5	65	0.0310	0.44		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
20.2	165	Total			

Summary for Subcatchment OS1: Offsite

Runoff = 382.59 cfs @ 13.73 hrs, Volume= 115.218 af, Depth> 3.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=5.90"

Area (ac)	CN	Description
200.000	83	1/4 acre lots, 38% imp, HSG C
60.000	79	1 acre lots, 20% imp, HSG C
137.000	72	Woods/grass comb., Good, HSG C
397.000	79	Weighted Average
309.000		77.83% Pervious Area
88.000		22.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
67.8	150	0.0110	0.04		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.00"
21.6	340	0.0110	0.26		**Shallow Concentrated Flow, BC** Forest w/Heavy Litter Kv= 2.5 fps
6.2	272	0.0110	0.73		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
16.6	733	0.0110	0.73		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
23.3	7,066	0.0110	5.06	141.56	**Trap/Vee/Rect Channel Flow, EF** Bot.W=10.00' D=2.00' Z= 2.0 '/' Top.W=18.00' n= 0.040 Winding stream, pools & shoals
135.5	8,561	Total			

Summary for Subcatchment OS2: Offsite

Runoff = 5.71 cfs @ 12.23 hrs, Volume= 0.558 af, Depth> 3.48"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 50 Year Rainfall=5.90"

Area (sf)	CN	Description
20,802	80	1/2 acre lots, 25% imp, HSG C
63,063	78	Meadow, non-grazed, HSG D
83,865	78	Weighted Average
78,665		93.80% Pervious Area
5,201		6.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	150	0.0100	0.15		**Sheet Flow, AB** Range n= 0.130 P2= 3.00"

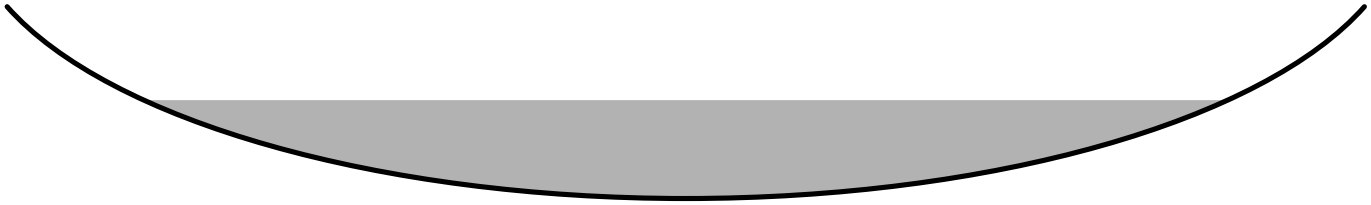
Summary for Reach R1.1:

Inflow Area = 2.281 ac, 31.72% Impervious, Inflow Depth > 3.32" for 50 Year event
Inflow = 5.19 cfs @ 12.54 hrs, Volume= 0.631 af
Outflow = 5.19 cfs @ 12.55 hrs, Volume= 0.631 af, Atten= 0%, Lag= 0.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.42 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 0.52 fps, Avg. Travel Time= 2.7 min

Peak Storage= 311 cf @ 12.55 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 0.50', Capacity at Bank-Full= 22.13 cfs

30.00' x 0.50' deep Parabolic Channel, n= 0.035 High grass
Length= 85.0' Slope= 0.0118 '/'
Inlet Invert= 63.00', Outlet Invert= 62.00'



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Summary for Reach R1.2:

Inflow Area = 2.281 ac, 31.72% Impervious, Inflow Depth > 3.32" for 50 Year event
Inflow = 5.19 cfs @ 12.55 hrs, Volume= 0.631 af
Outflow = 5.16 cfs @ 12.59 hrs, Volume= 0.629 af, Atten= 1%, Lag= 2.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.65 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.52 fps, Avg. Travel Time= 9.7 min

Peak Storage= 943 cf @ 12.59 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 141.52 cfs

10.00' x 2.00' deep channel, n= 0.040 Winding stream, pools & shoals
Side Slope Z-value= 2.0 '/' Top Width= 18.00'
Length= 302.0' Slope= 0.0110 '/'
Inlet Invert= 61.00', Outlet Invert= 57.68'

‡

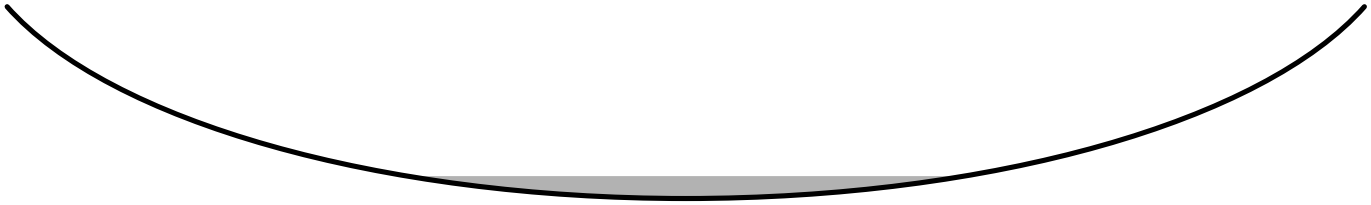
Summary for Reach R3.1: Channel

Inflow Area = 14.347 ac, 8.02% Impervious, Inflow Depth > 1.22" for 50 Year event
Inflow = 4.53 cfs @ 14.18 hrs, Volume= 1.458 af
Outflow = 4.53 cfs @ 14.20 hrs, Volume= 1.456 af, Atten= 0%, Lag= 1.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.72 fps, Min. Travel Time= 1.5 min
Avg. Velocity = 1.22 fps, Avg. Travel Time= 2.0 min

Peak Storage= 396 cf @ 14.20 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 478.69 cfs

50.00' x 2.00' deep Parabolic Channel, n= 0.050 Scattered brush, heavy weeds
Length= 150.0' Slope= 0.0400 '/'
Inlet Invert= 63.00', Outlet Invert= 57.00'



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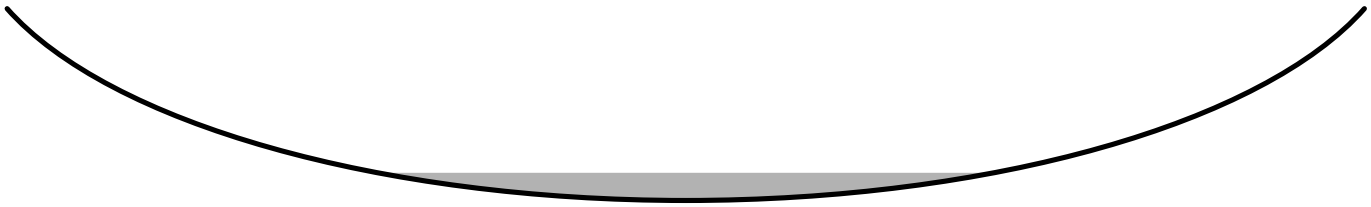
Summary for Reach R3.2: Channel

Inflow Area = 1.925 ac, 6.20% Impervious, Inflow Depth > 3.48" for 50 Year event
Inflow = 5.71 cfs @ 12.23 hrs, Volume= 0.558 af
Outflow = 5.35 cfs @ 12.29 hrs, Volume= 0.556 af, Atten= 6%, Lag= 4.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.48 fps, Min. Travel Time= 5.2 min
Avg. Velocity = 0.57 fps, Avg. Travel Time= 13.5 min

Peak Storage= 1,665 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.29'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 358.68 cfs

50.00' x 2.00' deep Parabolic Channel, n= 0.022 Earth, clean & straight
Length= 460.0' Slope= 0.0043 '/'
Inlet Invert= 59.00', Outlet Invert= 57.00'



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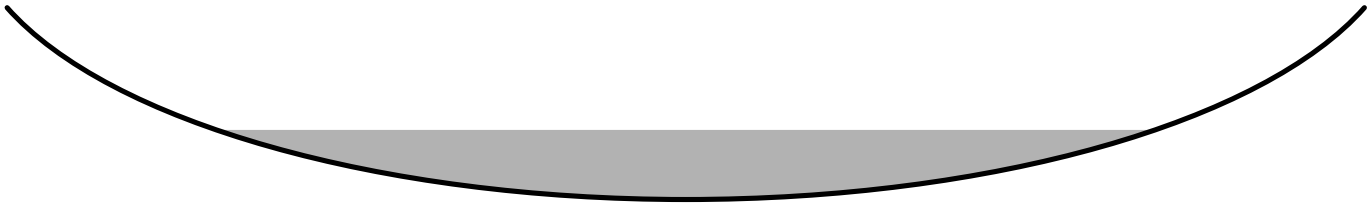
Summary for Reach R3.3: Wetland

Inflow Area = 10.034 ac, 6.91% Impervious, Inflow Depth > 3.07" for 50 Year event
Inflow = 16.03 cfs @ 12.73 hrs, Volume= 2.564 af
Outflow = 15.91 cfs @ 12.78 hrs, Volume= 2.556 af, Atten= 1%, Lag= 3.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.37 fps, Min. Travel Time= 4.3 min
Avg. Velocity = 0.63 fps, Avg. Travel Time= 9.4 min

Peak Storage= 4,138 cf @ 12.78 hrs
Average Depth at Peak Storage= 0.72'
Bank-Full Depth= 2.00', Capacity at Bank-Full= 143.29 cfs

40.00' x 2.00' deep Parabolic Channel, n= 0.100 Very weedy reaches w/pools
Length= 356.0' Slope= 0.0225 '/'
Inlet Invert= 73.00', Outlet Invert= 65.00'



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Summary for Pond C2: 15" HDPE

Inflow Area = 1.916 ac, 25.31% Impervious, Inflow Depth > 3.04" for 50 Year event
Inflow = 4.55 cfs @ 12.38 hrs, Volume= 0.485 af
Outflow = 4.18 cfs @ 12.47 hrs, Volume= 0.485 af, Atten= 8%, Lag= 5.4 min
Primary = 4.18 cfs @ 12.47 hrs, Volume= 0.485 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 74.54' @ 12.47 hrs Surf.Area= 1,184 sf Storage= 641 cf
Flood Elev= 75.11' Surf.Area= 2,007 sf Storage= 1,372 cf

Plug-Flow detention time= 1.7 min calculated for 0.484 af (100% of inflow)
Center-of-Mass det. time= 1.3 min (856.1 - 854.8)

Volume	Invert	Avail.Storage	Storage Description
#1	73.00'	1,372 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
73.00	16	14.0	0	0	16
74.00	501	134.0	202	202	1,431
75.00	2,007	244.0	1,170	1,372	4,745

Device	Routing	Invert	Outlet Devices
#1	Primary	73.11'	**15.0" Round Culvert** L= 46.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 73.11' / 72.26' S= 0.0185 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=4.16 cfs @ 12.47 hrs HW=74.53' TW=0.00' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 4.16 cfs @ 3.39 fps)

Summary for Pond C3: 2 x 15" HDPE

Inflow Area = 1.925 ac, 6.20% Impervious, Inflow Depth > 3.48" for 50 Year event
Inflow = 5.71 cfs @ 12.23 hrs, Volume= 0.558 af
Outflow = 5.71 cfs @ 12.23 hrs, Volume= 0.558 af, Atten= 0%, Lag= 0.0 min
Primary = 5.71 cfs @ 12.23 hrs, Volume= 0.558 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 60.91' @ 12.23 hrs
Flood Elev= 61.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	59.90'	**15.0" Round Culvert X 2.00** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 59.90' / 59.50' S= 0.0080 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior

Primary OutFlow Max=5.65 cfs @ 12.23 hrs HW=60.90' TW=59.28' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 5.65 cfs @ 2.69 fps)

Summary for Pond C3.1: 30" Culvert

Inflow Area = 10.034 ac, 6.91% Impervious, Inflow Depth > 3.07" for 50 Year event
Inflow = 16.28 cfs @ 12.66 hrs, Volume= 2.566 af
Outflow = 16.03 cfs @ 12.73 hrs, Volume= 2.564 af, Atten= 2%, Lag= 4.1 min
Primary = 16.03 cfs @ 12.73 hrs, Volume= 2.564 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 77.39' @ 12.73 hrs Surf.Area= 2,525 sf Storage= 2,385 cf
Flood Elev= 77.50' Surf.Area= 2,715 sf Storage= 2,664 cf

Plug-Flow detention time= 2.2 min calculated for 2.559 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (864.0 - 862.2)

Volume	Invert	Avail.Storage	Storage Description
#1	74.90'	2,664 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
74.90	0	0.0	0	0	0
75.50	296	71.0	59	59	402
77.50	2,715	271.0	2,605	2,664	5,856

Device	Routing	Invert	Outlet Devices
#1	Primary	75.40'	**30.0" Round Culvert w/ 6.0" fill** L= 55.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 74.90' / 73.80' S= 0.0200 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior

Primary OutFlow Max=16.00 cfs @ 12.73 hrs HW=77.39' TW=73.72' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 16.00 cfs @ 3.80 fps)

Summary for Pond P3: Wetland

Inflow Area = 14.347 ac, 8.02% Impervious, Inflow Depth > 3.15" for 50 Year event
Inflow = 21.57 cfs @ 12.62 hrs, Volume= 3.769 af
Outflow = 4.53 cfs @ 14.18 hrs, Volume= 1.458 af, Atten= 79%, Lag= 93.4 min
Primary = 4.53 cfs @ 14.18 hrs, Volume= 1.458 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 64.15' @ 14.18 hrs Surf.Area= 30,671 sf Storage= 103,908 cf

Plug-Flow detention time= 298.0 min calculated for 1.455 af (39% of inflow)

Center-of-Mass det. time= 174.0 min (1,032.8 - 858.8)

Volume	Invert	Avail.Storage	Storage Description
#1	60.00'	115,705 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
60.00	22,018	689.0	0	0	22,018
62.00	24,835	718.0	46,825	46,825	25,557
64.00	27,769	747.0	52,577	99,401	29,241
64.50	37,697	836.0	16,303	115,705	40,460

Device	Routing	Invert	Outlet Devices
#1	Primary	64.00'	**30.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=4.52 cfs @ 14.18 hrs HW=64.15' TW=63.23' (Dynamic Tailwater)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 4.52 cfs @ 0.98 fps)

Summary for Pond T1: USF

Inflow Area = 2.281 ac, 31.72% Impervious, Inflow Depth > 3.77" for 50 Year event
Inflow = 5.26 cfs @ 12.49 hrs, Volume= 0.716 af
Outflow = 5.19 cfs @ 12.54 hrs, Volume= 0.631 af, Atten= 1%, Lag= 3.1 min
Primary = 0.07 cfs @ 12.54 hrs, Volume= 0.074 af
Secondary = 5.12 cfs @ 12.54 hrs, Volume= 0.558 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 67.34' @ 12.54 hrs Surf.Area= 4,161 sf Storage= 4,938 cf

Plug-Flow detention time= 79.1 min calculated for 0.630 af (88% of inflow)
Center-of-Mass det. time= 27.0 min (862.6 - 835.7)

Volume	Invert	Avail.Storage	Storage Description
#1	65.50'	5,619 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
65.50	1,644	257.0	0	0	1,644
66.00	2,104	289.0	935	935	3,041
67.00	3,369	308.0	2,712	3,646	3,992
67.50	4,549	332.0	1,972	5,619	5,225

Device	Routing	Invert	Outlet Devices
#1	Primary	65.50'	**0.750 in/hr Exfiltration over Horizontal area**
#2	Secondary	67.00'	**10.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.07 cfs @ 12.54 hrs HW=67.34' TW=63.26' (Dynamic Tailwater)
└**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Secondary OutFlow Max=5.11 cfs @ 12.54 hrs HW=67.34' TW=63.26' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 5.11 cfs @ 1.49 fps)

Summary for Pond T2: USF

Inflow Area = 1.037 ac, 33.53% Impervious, Inflow Depth > 3.78" for 50 Year event
Inflow = 3.22 cfs @ 12.25 hrs, Volume= 0.327 af
Outflow = 2.50 cfs @ 12.41 hrs, Volume= 0.245 af, Atten= 22%, Lag= 9.6 min
Primary = 0.07 cfs @ 12.41 hrs, Volume= 0.068 af
Secondary = 2.43 cfs @ 12.41 hrs, Volume= 0.176 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 77.77' @ 12.41 hrs Surf.Area= 3,869 sf Storage= 4,531 cf

Plug-Flow detention time= 134.8 min calculated for 0.245 af (75% of inflow)
Center-of-Mass det. time= 49.7 min (871.1 - 821.4)

Volume	Invert	Avail.Storage	Storage Description
#1	76.00'	5,501 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
76.00	1,641	211.0	0	0	1,641
77.50	3,226	333.0	3,584	3,584	6,938
78.00	4,476	424.0	1,917	5,501	12,423

Device	Routing	Invert	Outlet Devices
#1	Primary	76.00'	**0.750 in/hr Exfiltration over Horizontal area**
#2	Secondary	77.50'	**7.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.07 cfs @ 12.41 hrs HW=77.77' TW=74.49' (Dynamic Tailwater)
└**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Secondary OutFlow Max=2.42 cfs @ 12.41 hrs HW=77.77' TW=74.49' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 2.42 cfs @ 1.30 fps)

Summary for Link AP1:

Inflow Area = 402.591 ac, 22.18% Impervious, Inflow Depth > 3.48" for 50 Year event
Inflow = 385.00 cfs @ 13.72 hrs, Volume= 116.751 af
Primary = 385.00 cfs @ 13.72 hrs, Volume= 116.751 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP2:

Inflow Area = 1.916 ac, 25.31% Impervious, Inflow Depth > 3.03" for 50 Year event
Inflow = 4.18 cfs @ 12.47 hrs, Volume= 0.485 af
Primary = 4.18 cfs @ 12.47 hrs, Volume= 0.485 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link AP3:

Inflow Area = 18.466 ac, 7.67% Impervious, Inflow Depth > 1.72" for 50 Year event
Inflow = 11.35 cfs @ 12.29 hrs, Volume= 2.648 af
Primary = 11.35 cfs @ 12.29 hrs, Volume= 2.648 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Appendix C:
Stormwater BMP Treatment Calculations

TABLE T-1
STORMWATER TREATMENT SUMMARY
OLD BARN ESTATES, FALMOUTH, MAINE

SC	Treatment Method	LOTS	NEW IMPERVIOUS AREA (IA)		NEW LANDSCAPED AREA (LA)		TREATED IMPERVIOUS AREA (TIA)	TREATED LANDSCAPED AREA (TLA)	FINAL DESTINATION	WATER QUALITY VOLUME REQUIRED	WATER QUALITY VOLUME PROVIDED	FILTER AREA REQUIRED (SQ. FT.)	FILTER AREA PROVIDED
			ROAD	LOTS	ROAD	LOTS				(IA x 1" + LA x 0.4")		(IA x 5% + LA x 2%)	
			SQUARE FT				SQUARE FT	SQUARE FT		CUBIC FT	CUBIC FT	SQUARE FT	SQUARE FT
OS1	None		0	0	0	0	0	0	AP1	0	0	0	0
OS2	None		0	0	0	0	0	0	AP3	0	0	0	0
1.1	Dripline Filters (House Only)	7, 8, 9	0	6,000	0	0	6,000	0	AP1	498	500	NA	NA
	Underdrained Soil Filter T1	**5, 6**, 7, 8, 9	14,020	11,500	22,068	35,000	25,520	27,068	AP1	3,011	3,646	1,817	1,644
1.2	Buffer	10, 11, 12	2,557	15,000	684	30,000	15,000	30,000	AP1	NA	NA	NA	NA
2.1	None	1	0	2,500	0	5,000	2,500	0	AP2	NA	NA	NA	NA
2.2	Underdrained Soil Filter T2	**3, 4**	10,645	4,500	12,459	9,000	15,145	21,459	AP2	1,965	3,584	1,186	1,641
3.1	Buffer	**3, 4**, **5**, **6**	0	15,500	1,482	31,000	15,500	31,000	AP3	NA	NA	NA	NA
3.2	Buffer	2	2,812	5,000	2,779	10,000	1,663	1,215	AP3	NA	NA	NA	NA
4.0	None		0	0	0	0	0	0	AP3	NA	NA	NA	NA
Sub Total			30,034	60,000	39,472	120,000	**81,328**	110,742					
Total Developed Area Treated								**192,070**	(TIA + TLA)				

Treatment Area Requirements* (square feet)				
	Linear Portion	Non Linear Portion	Total Treatment Area Required	Treatment Area Provided
Impervious	22,526	57,000	79,526	81,328
Developed	34,753	144,000	178,753	192,070

* Required treatment areas calculated based on Maine DEP requirements of treating 75% of impervious area and 50% of developed area for linear portions and 95% of impervious area and 80% of developed area for non-linear portions of the project.

Prepared By:
Site Design Associates, Inc.
December 28, 2012

STORMWATER BMP BUFFER SIZING CALCULATIONS
Ledgewood Drive Subidivision
Falmouth, Maine

Buffers B1 and B2
Buffer Type: Buffer Downgradient of a Single Family Residential Lot

Per Maine DEP Stormwater BMP Manual – Volume III Section 5.2.5:

Soil Type: HSG C (Loamy Sand)
Slope: < 15%
Buffer Type: Forested

Required Buffer Length of Flow = 50 ft
Buffer Length of Flow Provided = 50 ft

Buffer B3
Buffer Type: Ditch Turnout Buffer

Per Maine DEP Stormwater BMP Manual – Volume III Section 5.2.4:

Soil Type: HSG C (Loamy Sand)
Slope: < 8%
Buffer Type: Forested
Buffer Length of Flow = 60 ft
Contributing Area: 200 ft of road

Required Buffer Flow Length = 60 ft
Buffer Flow Length Provided = 60 ft

Required Level Spreader Length = 20 ft
Level Spreader Length Provided = 20 ft

Appendix D:
Inspection & Maintenance Plan

Inspection and Maintenance Plan
For Stormwater Management Facilities

Old Barn Estates
Ice Pond Drive
Falmouth, Maine

January 2013

Stormwater management facilities include paved surfaces, ditches/swales, catch basins, culverts, storm drain pipe, level spreaders, buffers, and grassed underdrain soil filters. During construction activities, the maintenance of all stormwater measures will be the direct responsibility of the Contractor. After acceptance by the Owner, the maintenance of all stormwater management facilities, the establishment of any contract services required to implement the program, and the keeping of records and maintenance log book will be the responsibility of the Owner. At a minimum, the following maintenance activities for each stormwater management system shall be performed on a prescribed schedule.

Paved Surfaces

Accumulations of winter sand along paved surfaces shall be cleared at least once a year, preferably in the spring, and periodically during the year on an as-needed basis, to minimize transportation of sediment during rainfall events. Accumulations on pavement may be removed by pavement sweeping or vacuuming. Accumulations of sand along road shoulders may be removed by grading excess sand to the pavement edge and removing it manually or by a front-end loader. Grading of gravel roads, or grading of the gravel shoulders of gravel or paved roads, must be routinely performed to ensure that stormwater drains immediately off the road surface to adjacent buffer areas or stable ditches, and is not impeded by accumulations of graded material on the road shoulder or by excavation of false ditches in the shoulder.

Ditches and Swales

Open swales and ditches shall be inspected twice per year (in spring and fall) to assure that debris and/or sediments do not reduce the effectiveness of the system. Debris and sediments shall be removed at that time. Any sign of erosion or blockage shall be immediately repaired to assure a vigorous growth of vegetation for the stability of the ditches and slopes proper function. Maintenance shall include, but not be limited to, mowing, trimming and removal vegetation in the ditches and slopes as required in order to prevent vegetation from blocking or diverting storm flows, replacement of riprap channel lining to prevent scour of the channel invert, removing vegetation and debris from the culverts.

Vegetated ditches should be mowed at least monthly during the growing season. Larger brush or trees must not be allowed to become established in the channel. Any areas

where the vegetation fails will be subject to erosion and should be reseeded and mulched immediately.

Riprap ditches and aprons where stone is displaced should be replaced and chinked to assure stability. With time, additional riprap may be added. Vegetation growing through riprap should be removed on an annual basis.

Catch Basins

All catch basins, and any other field inlets throughout the collection system, shall be inspected twice per year (in spring and fall) to assure that the inlet entry and grates are clear of debris and will accept the intended flows. Any debris and sediments shall be cleared.

Sediment should be removed from these structures when it accumulates within 12 inches of the lowest pipe invert. If the basin outlet is designed with a hood to trap floatable materials (i.e. Snout or Casco Bay trap), check to ensure watertight seal is working. At a minimum, remove floating debris and hydrocarbons at the time of the inspection. The removed material must be disposed of in accordance with the Maine Solid Waste Disposal Rules. Confined space entry safety procedures shall be practiced should entry into these structures be required.

Culverts and Storm Drainage Pipes

Culverts and piped drainage systems shall be inspected on an annual basis to remove any obstructions to flow; remove accumulated sediments and debris at the inlet, at the outlet, and within the conduit; and to repair any erosion damage at the pipe inlet and outlet. Sediment should be removed when its level exceeds 20% of the pipe diameter. This may be accomplished by hydraulic flushing or any mechanical means; however, care should be taken to contain the sediment at the pipe outlet, and not flush the sediments into the detention/infiltration pond areas as this will reduce the ponds capacity and ability to infiltrate runoff, and will hasten the time when the pond must be cleaned or rehabilitated.

Underdrained Soil Filters

Mowing and removal of woody growth – underdrained soil filters are designed to grow water tolerant plantings and mowing is not required in the interior of the structure. However, the external and top slopes of earthen embankments will be mowed up to three times per growing season to control over growth.

Outlet inspection and cleaning – The soil filter outlet consists of a layer of planting loam and sand with a stone and perforated pipe underdrain. Influx of sediments will be limited by sumps on all upstream catch basin structures and vegetated swales. Outlet inspections shall include flushing of the underdrain through the cleanout at the end of the pipe. Trash, sediment and debris shall be removed from the vicinity of the outlet and disposed

of at a licensed off-site facility. The basin shall be inspected bi-annually for evidence of excessive retention or rapid release of flow.

Sediment removal and soil replacement – Every five years the planting soil in the underdrained soil filter area shall be removed and replaced with clean material. Every effort should be made to retain and re-plant existing vegetation. The stone underdrain shall also be replaced at this time, along with the perforated pipe.

Underdrained soil filters shall not be used for snow storage area.

Vehicular equipment used to maintain or rehabilitate underdrained soil filters should work from the basin perimeter and not enter the basin area, as this will compact the soil surface and reduce the design infiltration rate.

Level Spreaders

Level spreaders shall be inspected twice per year (in spring and fall) to assure that debris and/or sediments do not reduce the effectiveness of the system. Debris and sediments shall be removed at that time. Any sign of erosion or blockage shall be immediately repaired to assure a vigorous growth of vegetation and stability of stone berms for the stability of the level spreader for proper function. Maintenance shall include, but not be limited to, mowing, trimming and removal vegetation in the level spreaders as required in order to prevent vegetation from blocking or diverting storm flows, replacement of riprap as necessary to prevent scour of the level lip, removing vegetation and debris from the level spreaders.

Riprap ditches and aprons where stone is displaced should be replaced and chinked to assure stability. With time, additional riprap may be added. Vegetation growing through riprap should be removed on an annual basis.

Disposal

Any sediment or debris removed during maintenance of the stormwater system must be disposed of in accordance with the Maine Solid Waste Disposal Rules.

Recordkeeping

The Owner will keep a written maintenance log that summarizes inspections, maintenance, an any corrective actions taken. The log shall include the date on which each inspection or maintenance task was performed, a description of the inspection findings or maintenance completed, and the name of the inspector or maintenance personnel performing the task. If a maintenance task requires the clean-out of any sediment or debris, the location where the sediment or debris was disposed after removal will be indicated. This log shall be made available to the Maine Department of Environmental Protection upon request.

Sample Inspection Report:

OLD BARN ESTATES
ICE POND ROAD, FALMOUTH, MAINE
STORMWATER FACILITIES INSPECTION REPORT

NAME: _____ SIGNATURE: _____

TITLE: _____ COMPANY: _____

DATE: _____

OBSERVATIONS:

BMP	Defects	Location(s)	Repair/Action Needed	Date/Action taken
Ditches/ Swales	Yes/no			
Roads, Sidewalks and Parking Areas	Yes/no			
Catch Basins	Yes/no			
Pipes and Culverts	Yes/no			
Rip Rap Aprons	Yes/no			
Grassed Underdrained Soil Filters	Yes/no			