

STORMWATER MANAGEMENT REPORT

5-LOT COMMERCIAL SUBDIVISION ROOSEVELT TRAIL & DANIELLE DRIVE WINDHAM, MAINE

A. Narrative

Moose Landing North, LLC is proposing to develop property at the end of Danielle Drive and along Roosevelt Trail in Windham. The project site is identified as Lot 2 on the Town of Windham Assessors Map 15. The 10-acre lot is located in the C-3 Commercial zoning district.

The project will consist of 5 commercial lots including the construction of approximately 525 linear feet of roadway, utilities and stormwater infrastructure. In general, the site drains either southeasterly through a drainage swale to the abutting property or easterly to the drainage swale along Roosevelt Trail. The site's runoff ultimately drains to the Pleasant River.

B. Alterations to Land Cover

The 10-acre lot is currently undeveloped consisting of wooded and meadow vegetation. The proposed development will be permitted as a 5-lot commercial subdivision on a 10 acre lot which does not require Maine Department of Environmental Protection (MDEP) Site Location of Development Act approval but because the applicant may develop each of the lots, the project will require a Chapter 500 Stormwater Permit for the proposed roadway and estimated lot impervious surface. The proposed roadway and paved sidewalk will generate approximately 16,235 square feet (0.37 acres) of impervious area while the proposed lot development as indicated on the Lot Development Plan will generate an additional 123,060 square feet (2.83 acres) totaling approximately 139,295 square feet (3.20 acres) of new impervious area.

There is also potential in the future for the road to be extended to the abutting property to the southeast which is the reasoning for the right of way extending through the property. This road and sidewalk impervious will not be part of the project permitting but was incorporated in the sizing of the tributary Best Management Practices (BMPs) and in the stormwater model.

The site is moderately sloped, draining easterly or southeasterly. The slopes that form the natural drainage swale are much steeper (3:1). Soils on the property were determined utilizing the Medium Intensity Soil Maps for Cumberland County, Maine published by the Natural Resources Conservation Service.

Table 1 – On-Site Soils		
Soils Label	Soils Name	HSG
BuB	Lamoine silt loam	C/D
HfC2	Hartland very fine sandy loam	B
Sn	Scantic silt loam	D
WmB	Windsor loamy sand	A

The Lamoine silt loam has been identified within the hydrologic soils group (HSG) "C/D". For stormwater modeling purposes this soil was modeled as a "D" soil since its natural condition is group "D".

C. Methodology and Modeling Assumptions

The proposed stormwater management system has been designed utilizing Best Management Practices to maintain existing drainage patterns while providing stormwater quality improvement measures. The goal of the storm drainage system design is to remove potential stormwater pollutants from runoff generated by the development while providing attenuation of the peak rates of runoff leaving the site. The method utilized to predict the surface water runoff rates in this analysis is a computer program entitled HydroCAD, which is based on the same methods that were originally developed by the U.S. Department of Agriculture (USDA), Natural Resources Conservation Service, and utilized in the TR-20 modeling program. Peak rates of runoff are forecasted based upon land use, hydrologic soil conditions, vegetative cover, contributing watershed area, time of concentration, rainfall data, storage volumes of detention basins and the hydraulic capacity of structures. The computer model predicts the amount of runoff as a function of time, with the ability to include the attenuation effect due to dams, lakes, large wetlands, floodplains and constructed stormwater management basins. The input data for rainfalls with statistical recurrence frequencies of 2-, 10- and 25 years was obtained from Appendix H of the MDEP, Chapter 500 Stormwater Management, last revised in 2015. The National Weather Service developed four synthetic storm types to simulate rainfall patterns around the country. For analysis in Cumberland County, Maine, the type III rainfall pattern with a 24-hour duration is appropriate.

D. Basic Standards

The project is required by the Town and the MDEP to provide permanent and temporary Erosion Control Best Management Practices. These methods are outlined in detail in the plan set.

E. Flooding Standard

The MDEP Flooding Standard and the Town of Windham Land Use Ordinance require the project to detain, retain or result in the infiltration of stormwater from the 24-hour storms of the 2-year, 10-year and 25-year frequencies such that the peak flows of stormwater from the project site do not exceed the peak flows of stormwater prior to undertaking the project. The proposed stormwater infrastructure includes the construction of two underdrained filter basins and a wet pond which will provide both stormwater quality treatment and peak runoff attenuation.

The first study point (SP-1) is the location where the runoff that drains easterly is collected in the roadside swale along Roosevelt Trail. The second study point (SP-2) is the location where the runoff that drains southeasterly through the center of the property is collected in a natural drainage swale and leaves the property. The third study point (SP-3) is the location where drainage is collected in another natural depression crosses the southeastern property boundary. This flow eventually combines with the flow from SP-2 on the abutting property. The following tables summarize the analysis:

Table 2 – Peak Rates of Stormwater Runoff						
Study Point	2-Year (cfs)		10-Year (cfs)		25-Year (cfs)	
	Pre	Post	Pre	Post	Pre	Post
SP-1	0.22	0.20	1.65	0.70	3.56	2.27
SP-2	5.80	2.67	18.72	11.78	31.15	19.38
SP-3	2.28	1.83	4.83	3.76	7.04	5.43

As a result of the installation of the two filter basins and the wet pond, the site effectively reduces the peak rates of runoff at both study points for all storm events. The watershed maps showing pre-development and post-development drainage patterns are included in the plan set and the Offsite Watershed Map and computations performed with the HydroCAD software program are included as Attachments 1 and 3 in this report respectively.

F. General Standard

The MDEP and Town of Windham requires the project to meet the General Standards outlined in the MDEP Chapter 500 to provide water quality treatment for no less than 95% of the new impervious surface and 80% of the total developed area associated with the project. This standard will be met by constructing two underdrained filter basins and a wet pond to provide water quality treatment for 99% of the new impervious surface and 88% of the new developed area. Calculations can be found on the Watershed Maps and enclosed as Attachment 2 in this report.

G. Maintenance of common facilities or property

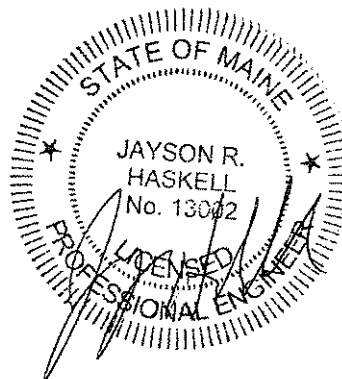
The owner of the facility will be responsible for the maintenance of the stormwater facilities until an association is created. Enclosed within this submission is an Inspection, Maintenance and Housekeeping Plan for the project.

Prepared by:

DM ROMA CONSULTING ENGINEERS

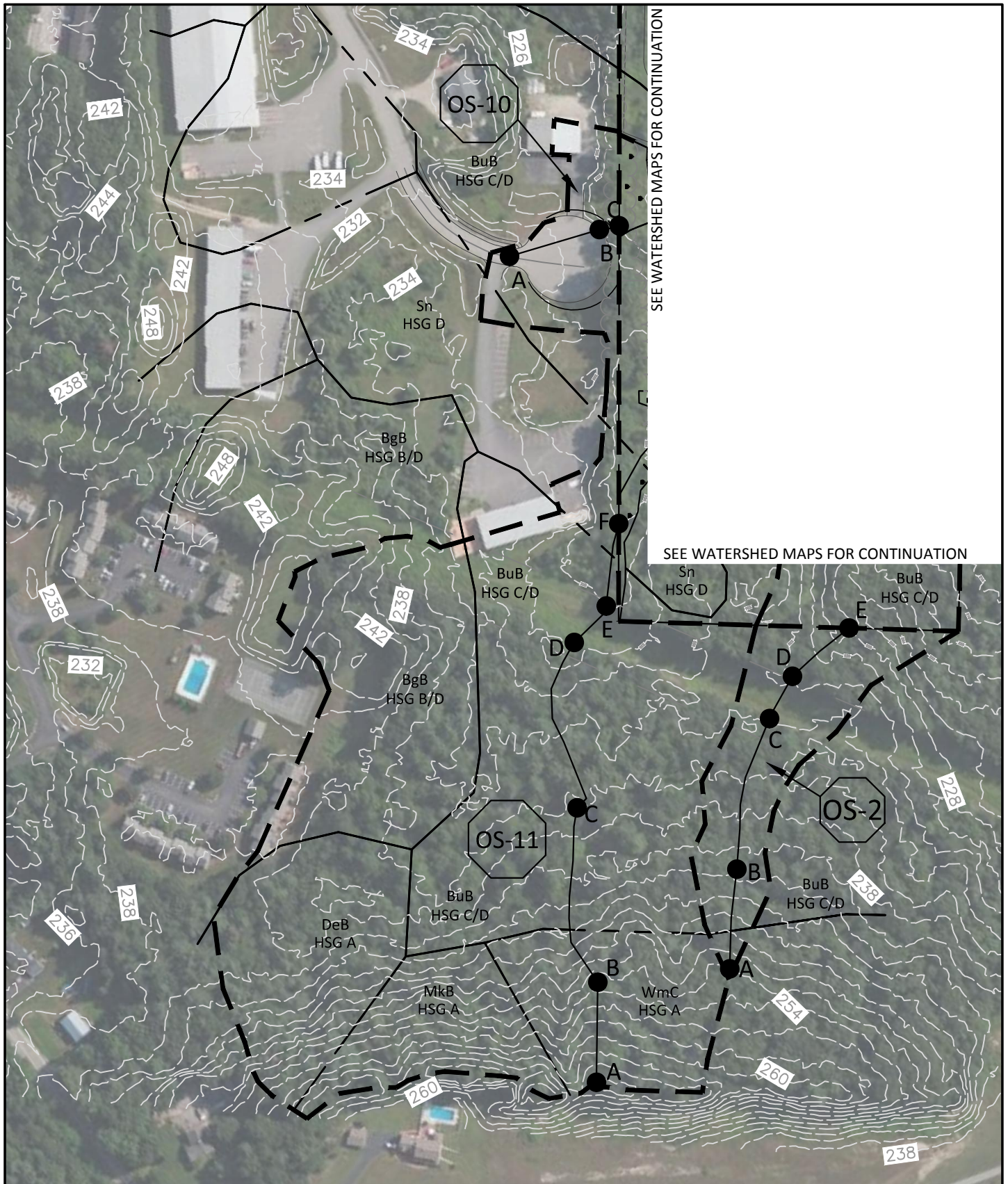


Jayson R. Haskell, P.E.
Project Manager



ATTACHMENT 1

OFFSITE WATERSHED MAP



OFFSITE WATERSHED MAP

5-LOT COMMERCIAL SUBDIVISION
WINDHAM, MAINE

FOR:
MOOSE LANDING NORTH, LLC
PO BOX 177
NAPLES, MAINE 04055

SCALE: 1"=200'
DATE: 05-30-2017
JOB NUMBER: 17011

DM ROMA

CONSULTING ENGINEERS

59 HARVEST HILL RD
WINDHAM, ME 04062
(207) 310 - 0506

ATTACHMENT 2

STORMWATER TREATMENT CALCULATIONS

Stormwater Treatment Table

5 Lot Commercial Subdivision

	Total Watershed Area (SF)	New Impervious Area (SF)	New Landscaped Area (SF)	Future Road Ext. Impervious Area* (SF)	Future Road Ext. Landscaped Area* (SF)	Existing/Offsite Impervious Area (SF)	Existing/Offsite Landscaping Area (SF)	Existing Undeveloped Area (SF)	Treatment Provided	Impervious Area Treated (SF)	Landscaped Area Treated (SF)	Treatment Device
WS-10	26,345	20,395	5,950	0	0	0	0	0	Yes	20,395	5,950	Filter Basin 1
WS-11	44,495	0	18,225	0	0	3,635	8,910	13,725	No	0	0	None
WS-20	88,480	49,505	35,765	0	0	0	1,175	2,035	Yes	49,505	35,765	Wet Pond 1
WS-21	44,955	3,170	8,865	0	0	0	3,400	29,520	Yes	3,170	8,865	Wet Pond 1
WS-22	114,530	36,600	42,785	0	0	0	0	35,145	Yes	36,600	42,785	Wet Pond 1
WS-23	68,960	28,025	30,325	3,410	1,355	0	0	5,845	Yes	28,025	30,325	Filter Basin 2
WS-24	15,575	1,160	14,300	0	0	0	0	115	No	0	0	None
WS-30	28,765	0	910	5,475	4,780	0	0	17,600	No	0	0	None
OS-10	20,435	230	210	0	0	13,665	0	6,330	Yes	230	210	Wet Pond 1
OS-11	568,610	210	210	0	0	20,380	22,005	525,805	Yes	210	210	Wet Pond 1
OS-2	70,110	0	0	0	0	0	0	70,110	No	0	0	None
Total		139,295	157,545	8,885	6,135					138,135	124,110	

* Impervious area and Landscaped area associated with the potential future road extension is not included in this project's development calculations but is included in BMP sizing and stormwater model.

New Impervious Area =	139,295 sf
New Impervious Area Requiring Treatment (95%)	132,330 sf
Provided New Impervious Treatment=	138,135 sf
	99% New Impervious Area Treated
 New Developed Area =	 296,840 sf
New Developed Area Requiring Treatment (80%)=	237,472 sf
New Developed Area Treated=	262,245 sf
	88% New Developed Area Treated

Filter Basin FB-1

Tributary Impervious Area= 20,395 sf (WS-10 Impervious)
Tributary Landscaped Area= 5,950 sf (WS-10 Landscaped Area)

Water Quality Volume (WQV) Calculation

WQV (Required) = $1.0 \times \text{Impervious Area} + 0.4 \times \text{Landscaped Area}$

WQV (Required) = 1,898 cf

Stage Storage Volume

Elevation	Area (sf)	Storage (cf)
213.5	1,390	0
214	1,660	763
216	2,885	5,308

Outlet Elevation = 215.00
Storage Volume Provided = 3,035 cf > Required
Total Storage Volume Provided=

Filter Bottom Calculation

Filter Area (Required) = $5\% \times \text{Impervious Area} + 2\% \times \text{Landscaped Area}$

Filter Area Required = 1,139 sf

Filter Area Provided = 1,390 sf > Required

Filter Basin FB-2

Tributary Impervious Area= 31,435 sf (WS-23 Impervious)
Tributary Landscaped Area= 31,680 sf (WS-23 Landscaped Area)

Water Quality Volume (WQV) Calculation

WQV (Required) = $1.0 \times \text{Impervious Area} + 0.4 \times \text{Landscaped Area}$

WQV (Required) = 3,676 cf

Stage Storage Volume

Elevation	Area (sf)	Storage (cf)
213	2,460	0
214	3,210	2,835
216	4,880	10,925

Outlet Elevation = 214.50
Storage Volume Provided = 4,858 cf > Required
Total Storage Volume Provided=

Filter Bottom Calculation

Filter Area (Required) = $5\% \times \text{Impervious Area} + 2\% \times \text{Landscaped Area}$

Filter Area Required = 2,205 sf

Filter Area Provided = 2,460 sf > Required

Wet Pond Calculations

Tributary Impervious Area= 123,760 sf (WS-20 thru 22, OS-10 & OS-11 Impervious Area)
Tributary Landscaped Area= 114,415 sf (WS-20 thru 22, OS-10 & OS-11 Landscape Area)

Permanent Pool Volume (PPV) Calculation

PPV (Required) = 2.0"xImpervious Area + 0.8"xLandscaped Area

PPV (Required) = 28,254 cf

Stage Storage Volume

Elevation	Area (sf)	Storage (cf)
207	2,270	0
208	3,345	2,808
210	5,600	11,753
212.5	8,760	29,703
213.3	12,525	38,217
214	13,910	47,469
216	17,205	78,584

Permanent Pool Elevation= 212.5
Provided PPV= 29,703 cf > Required

Mean Depth Calculation

Mean Depth @ 1' Below Permanent Pool (El. 93.0)

Mean Depth= Storage Volume / Surface Area > 3.0

211.5	22,523 cf
	7,496 sf

Mean Depth= 3.00 > 3'

Channel Protection Volume (CPV) Calculation

CPV (Required) = 1.0"xImpervious Area + 0.4"xLandscaped Area

CPV (Required) = 14,127 cf

Outlet of Pond Set @ 214
Storage Volume @Outlet 47,469 cf
CPV=Storage Volume @ Outlet - Permanent Pool Volume=
Provided CPV= 17,766 cf > Required

Gravel Bench Calculations

Bench Length (Required) = 3' for every 1,000 cf of Provided CPV

Bench Length (Required) = 53.3 lf

Bench Length (Provided): 55.0 lf > Required

Flow Rate of Gravel Bench = Surface Area of Gravel Bench x Gravel Infiltration Rate

Infiltration Rate of Gravel = 20 in/hr

Surface Area of Bench = 220 sf

Exfiltration Flow Rate of Bench= 0.102 cfs

Sediment Forebay Sizing

Tributary Pavement Requiring Sanding 123,760 sf

Required Sediment Forebay Volume :

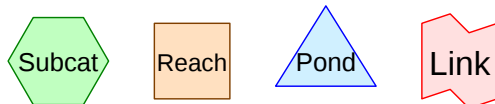
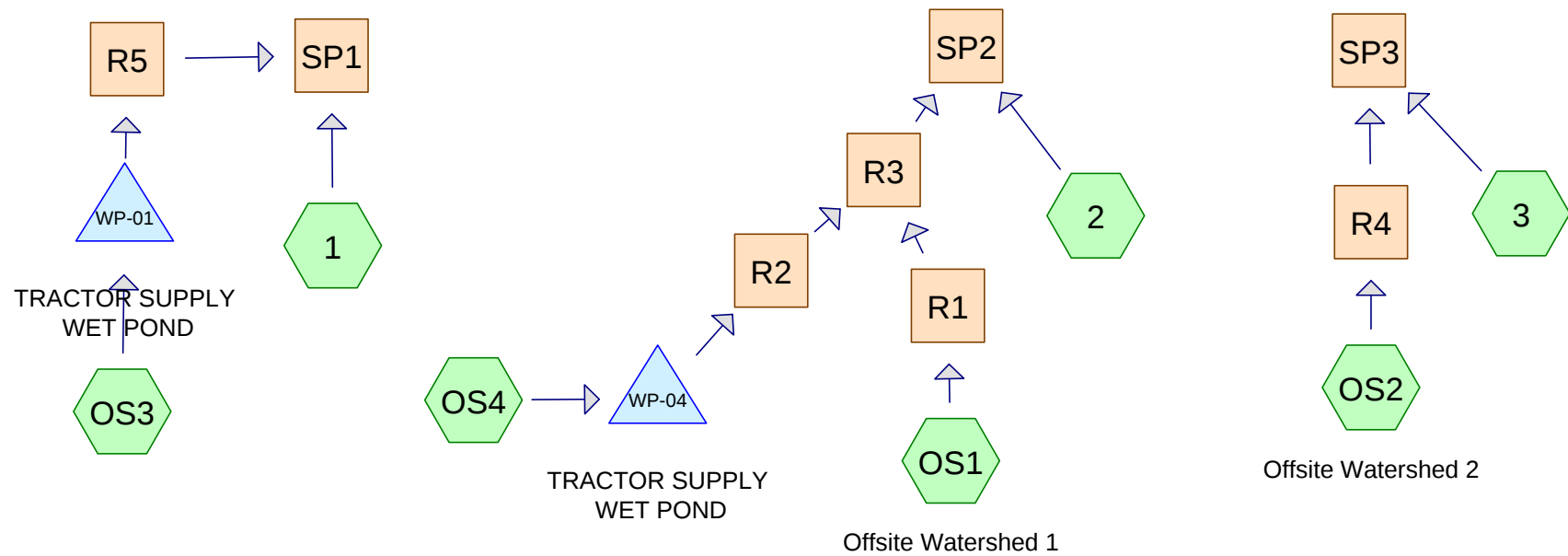
10 storms/year x sanded area (acres) x 500lbs/acre-storm / 90 lbs/cf

Sediment Volume (Required) 157.8 cf

Sediment Volume (Provided): 440.0 cf > Required

ATTACHMENT 3

HYDROCAD OUTPUT



Routing Diagram for 17011-PRE
 Prepared by DM Roma Consulting Engineers, Printed 5/30/2017
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17011-PRE

Type III 24-hr 25-Year Rainfall=5.80"

Prepared by DM Roma Consulting Engineers

Printed 5/30/2017

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

Subcatchment1: Runoff Area=69,780 sf 5.21% Impervious Runoff Depth>1.04"
 Flow Length=408' Tc=30.8 min CN=52 Runoff=1.03 cfs 0.139 af

Subcatchment2: Runoff Area=300,985 sf 0.00% Impervious Runoff Depth>2.51"
 Flow Length=640' Tc=34.2 min CN=71 Runoff=11.70 cfs 1.445 af

Subcatchment3: Runoff Area=61,285 sf 0.00% Impervious Runoff Depth>3.07"
 Flow Length=295' Tc=19.7 min CN=77 Runoff=3.69 cfs 0.360 af

Subcatchment OS1: Offsite Watershed 1 Runoff Area=589,045 sf 5.78% Impervious Runoff Depth>1.77"
 Flow Length=896' Tc=30.0 min CN=62 Runoff=16.66 cfs 1.991 af

Subcatchment OS2: Offsite Watershed 2 Runoff Area=70,110 sf 0.00% Impervious Runoff Depth>2.97"
 Flow Length=567' Tc=25.7 min CN=76 Runoff=3.66 cfs 0.399 af

Subcatchment OS3: Runoff Area=96,725 sf 71.83% Impervious Runoff Depth>4.18"
 Flow Length=354' Tc=14.0 min CN=88 Runoff=8.66 cfs 0.773 af

Subcatchment OS4: Runoff Area=87,150 sf 65.09% Impervious Runoff Depth>3.87"
 Flow Length=592' Tc=12.1 min CN=85 Runoff=7.75 cfs 0.645 af

Reach R1: Avg. Flow Depth=0.59' Max Vel=5.95 fps Inflow=16.66 cfs 1.991 af
 n=0.022 L=470.0' S=0.0250 '/ Capacity=1,057.58 cfs Outflow=16.56 cfs 1.986 af

Reach R2: Avg. Flow Depth=0.21' Max Vel=2.38 fps Inflow=3.00 cfs 0.497 af
 n=0.022 L=231.0' S=0.0150 '/ Capacity=419.84 cfs Outflow=2.99 cfs 0.495 af

Reach R3: Avg. Flow Depth=0.64' Max Vel=6.23 fps Inflow=19.52 cfs 2.482 af
 n=0.022 L=230.0' S=0.0250 '/ Capacity=1,057.58 cfs Outflow=19.48 cfs 2.479 af

Reach R4: Avg. Flow Depth=0.14' Max Vel=3.52 fps Inflow=3.66 cfs 0.399 af
 n=0.022 L=232.0' S=0.0474 '/ Capacity=169.82 cfs Outflow=3.64 cfs 0.398 af

Reach R5: Avg. Flow Depth=0.23' Max Vel=2.49 fps Inflow=2.61 cfs 0.526 af
 n=0.025 L=224.0' S=0.0150 '/ Capacity=358.92 cfs Outflow=2.60 cfs 0.524 af

Reach SP1: Inflow=3.56 cfs 0.664 af
 Outflow=3.56 cfs 0.664 af

Reach SP2: Inflow=31.15 cfs 3.924 af
 Outflow=31.15 cfs 3.924 af

Reach SP3: Inflow=7.04 cfs 0.758 af
 Outflow=7.04 cfs 0.758 af

Pond WP-01: TRACTOR SUPPLY WET Peak Elev=220.48' Storage=17,871 cf Inflow=8.66 cfs 0.773 af
 Outflow=2.61 cfs 0.526 af

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Type III 24-hr 25-Year Rainfall=5.80"

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Pond WP-04: TRACTOR SUPPLY WET

Peak Elev=221.99' Storage=12,907 cf Inflow=7.75 cfs 0.645 af

Outflow=3.00 cfs 0.497 af

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Type III 24-hr 25-Year Rainfall=5.80"

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Summary for Subcatchment 1:

Runoff = 1.03 cfs @ 12.52 hrs, Volume= 0.139 af, Depth> 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.80"

Area (sf)	CN	Description
* 3,635	98	Paved Road
30,705	30	Woods, Good, HSG A
9,310	55	Woods, Good, HSG B
17,220	77	Woods, Good, HSG D
2,300	39	>75% Grass cover, Good, HSG A
4,600	61	>75% Grass cover, Good, HSG B
2,010	80	>75% Grass cover, Good, HSG D
69,780	52	Weighted Average
66,145		94.79% Pervious Area
3,635		5.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.3	103	0.0200	0.08		Sheet Flow, A TO B Woods: Light underbrush n= 0.400 P2= 3.10"
6.5	47	0.0900	0.12		Sheet Flow, B TO C Woods: Light underbrush n= 0.400 P2= 3.10"
1.8	158	0.0850	1.46		Shallow Concentrated Flow, C TO D Woodland Kv= 5.0 fps
0.2	100	0.0150	10.40	358.92	Trap/Vee/Rect Channel Flow, D TO E Bot.W=4.00' D=3.00' Z= 2.0 & 3.0 ' Top.W=19.00' n= 0.025 Earth, grassed & winding
30.8	408	Total			

Summary for Subcatchment 2:

Runoff = 11.70 cfs @ 12.49 hrs, Volume= 1.445 af, Depth> 2.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.80"

Area (sf)	CN	Description
40,115	30	Woods, Good, HSG A
139,065	77	Woods, Good, HSG D
120	30	Meadow, non-grazed, HSG A
116,700	78	Meadow, non-grazed, HSG D
3,390	39	>75% Grass cover, Good, HSG A
1,595	80	>75% Grass cover, Good, HSG D
300,985	71	Weighted Average
300,985		100.00% Pervious Area

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Type III 24-hr 25-Year Rainfall=5.80"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.5	110	0.0200	0.08		Sheet Flow, A TO B Woods: Light underbrush n= 0.400 P2= 3.10"
7.3	40	0.0500	0.09		Sheet Flow, B TO C Woods: Light underbrush n= 0.400 P2= 3.10"
3.1	225	0.0600	1.22		Shallow Concentrated Flow, C TO D Woodland Kv= 5.0 fps
0.3	265	0.0250	17.63	1,057.58	Trap/Vee/Rect Channel Flow, D TO E Bot.W=3.00' D=4.00' Z= 3.0 ' Top.W=27.00' n= 0.022 Earth, clean & straight
34.2	640	Total			

Summary for Subcatchment 3:

Runoff = 3.69 cfs @ 12.27 hrs, Volume= 0.360 af, Depth> 3.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.80"

Area (sf)	CN	Description
61,285	77	Woods, Good, HSG D
61,285		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.3	150	0.0800	0.14		Sheet Flow, A TO B Woods: Light underbrush n= 0.400 P2= 3.10"
2.4	145	0.0400	1.00		Shallow Concentrated Flow, B TO C Woodland Kv= 5.0 fps
19.7	295	Total			

Summary for Subcatchment OS1: Offsite Watershed 1

Runoff = 16.66 cfs @ 12.45 hrs, Volume= 1.991 af, Depth> 1.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.80"

Area (sf)	CN	Description
* 34,045	98	Paved parking
200,185	30	Woods, Good, HSG A
273,240	77	Woods, Good, HSG D
59,570	78	Meadow, non-grazed, HSG D
1,800	39	>75% Grass cover, Good, HSG A
20,205	80	>75% Grass cover, Good, HSG D
589,045	62	Weighted Average
555,000		94.22% Pervious Area
34,045		5.78% Impervious Area

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Type III 24-hr 25-Year Rainfall=5.80"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	150	0.0850	0.15		Sheet Flow, A TO B Woods: Light underbrush n= 0.400 P2= 3.10"
3.7	275	0.0600	1.22		Shallow Concentrated Flow, B TO C Woodland Kv= 5.0 fps
5.7	271	0.0250	0.79		Shallow Concentrated Flow, C TO D Woodland Kv= 5.0 fps
1.1	75	0.0250	1.11		Shallow Concentrated Flow, D TO E Short Grass Pasture Kv= 7.0 fps
2.6	125	0.0250	0.79		Shallow Concentrated Flow, E TO F Woodland Kv= 5.0 fps
30.0	896	Total			

Summary for Subcatchment OS2: Offsite Watershed 2

Runoff = 3.66 cfs @ 12.36 hrs, Volume= 0.399 af, Depth> 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.80"

Area (sf)	CN	Description
2,375	30	Woods, Good, HSG A
57,490	77	Woods, Good, HSG D
10,245	78	Meadow, non-grazed, HSG D
70,110	76	Weighted Average
70,110		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0700	0.14		Sheet Flow, A TO B Woods: Light underbrush n= 0.400 P2= 3.10"
4.5	233	0.0300	0.87		Shallow Concentrated Flow, B TO C Woodland Kv= 5.0 fps
1.0	72	0.0275	1.16		Shallow Concentrated Flow, C TO D Short Grass Pasture Kv= 7.0 fps
1.9	112	0.0400	1.00		Shallow Concentrated Flow, D TO E Woodland Kv= 5.0 fps
25.7	567	Total			

Summary for Subcatchment OS3:

Runoff = 8.66 cfs @ 12.19 hrs, Volume= 0.773 af, Depth> 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.80"

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Type III 24-hr 25-Year Rainfall=5.80"

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	Area (sf)	CN	Description
*	63,795	98	Paved Parking and Road
*	5,685	98	Water Surface
	350	39	>75% Grass cover, Good, HSG A
	22,830	61	>75% Grass cover, Good, HSG B
	4,065	80	>75% Grass cover, Good, HSG D
	96,725	88	Weighted Average
	27,245		28.17% Pervious Area
	69,480		71.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	76	0.0070	0.10		Sheet Flow, A TO B Grass: Short n= 0.150 P2= 3.10"
1.1	128	0.0100	2.03		Shallow Concentrated Flow, B TO C Paved Kv= 20.3 fps
0.7	150	0.0050	3.47	2.73	Pipe Channel, C TO D 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
14.0	354	Total			

Summary for Subcatchment OS4:

Runoff = 7.75 cfs @ 12.16 hrs, Volume= 0.645 af, Depth> 3.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.80"

	Area (sf)	CN	Description
*	51,225	98	Existing Pavement and Building
*	5,500	98	Water Surface
	11,050	39	>75% Grass cover, Good, HSG A
	255	61	>75% Grass cover, Good, HSG B
	16,960	80	>75% Grass cover, Good, HSG D
	2,160	30	Woods, Good, HSG A
	87,150	85	Weighted Average
	30,425		34.91% Pervious Area
	56,725		65.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	71	0.0140	0.14		Sheet Flow, A TO B Grass: Short n= 0.150 P2= 3.10"
0.3	41	0.0100	2.03		Shallow Concentrated Flow, B TO C Paved Kv= 20.3 fps
3.1	480	0.0050	2.61	15.66	Trap/Vee/Rect Channel Flow, C TO D Bot.W=3.00' D=1.00' Z= 3.0 ' Top.W=9.00' n= 0.030
12.1	592	Total			

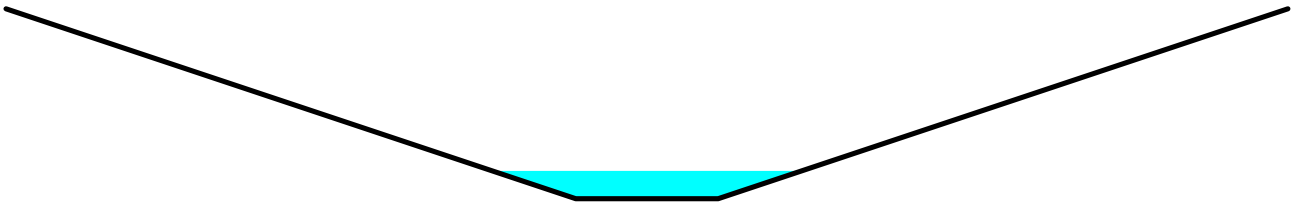
Summary for Reach R1:

Inflow Area = 13.523 ac, 5.78% Impervious, Inflow Depth > 1.77" for 25-Year event
 Inflow = 16.66 cfs @ 12.45 hrs, Volume= 1.991 af
 Outflow = 16.56 cfs @ 12.49 hrs, Volume= 1.986 af, Atten= 1%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 5.95 fps, Min. Travel Time= 1.3 min
 Avg. Velocity = 2.92 fps, Avg. Travel Time= 2.7 min

Peak Storage= 1,312 cf @ 12.47 hrs
 Average Depth at Peak Storage= 0.59'
 Bank-Full Depth= 4.00' Flow Area= 60.0 sf, Capacity= 1,057.58 cfs

3.00' x 4.00' deep channel, n= 0.022
 Side Slope Z-value= 3.0 '/' Top Width= 27.00'
 Length= 470.0' Slope= 0.0250 '/'
 Inlet Invert= 0.00', Outlet Invert= -11.75'

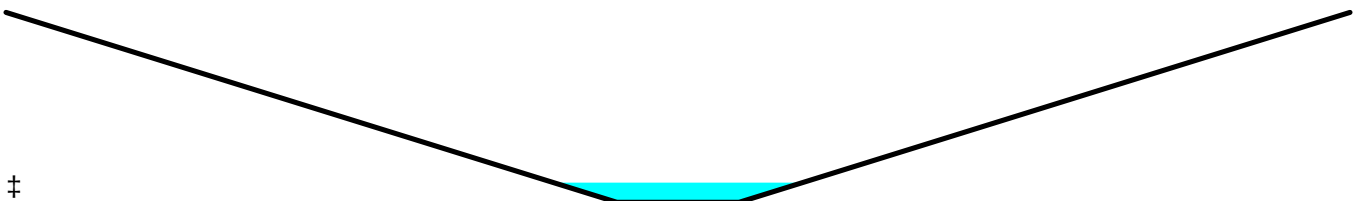
**Summary for Reach R2:**

Inflow Area = 2.001 ac, 65.09% Impervious, Inflow Depth > 2.98" for 25-Year event
 Inflow = 3.00 cfs @ 12.50 hrs, Volume= 0.497 af
 Outflow = 2.99 cfs @ 12.55 hrs, Volume= 0.495 af, Atten= 0%, Lag= 2.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 2.38 fps, Min. Travel Time= 1.6 min
 Avg. Velocity = 1.06 fps, Avg. Travel Time= 3.6 min

Peak Storage= 290 cf @ 12.52 hrs
 Average Depth at Peak Storage= 0.21'
 Bank-Full Depth= 2.00' Flow Area= 48.0 sf, Capacity= 419.84 cfs

4.00' x 2.00' deep channel, n= 0.022
 Side Slope Z-value= 10.0 '/' Top Width= 44.00'
 Length= 231.0' Slope= 0.0150 '/'
 Inlet Invert= 0.00', Outlet Invert= -3.47'



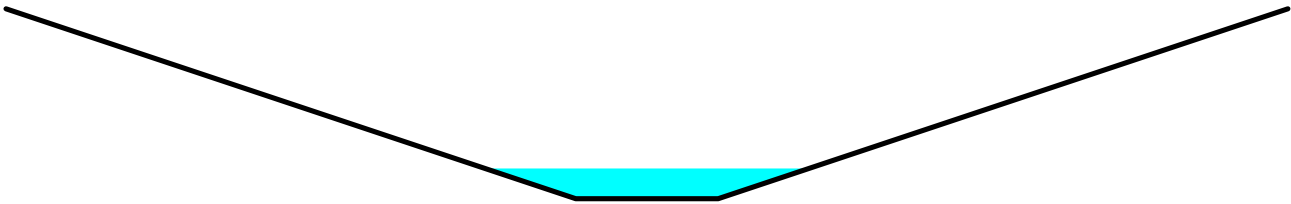
Summary for Reach R3:

Inflow Area = 15.523 ac, 13.42% Impervious, Inflow Depth > 1.92" for 25-Year event
 Inflow = 19.52 cfs @ 12.50 hrs, Volume= 2.482 af
 Outflow = 19.48 cfs @ 12.51 hrs, Volume= 2.479 af, Atten= 0%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 6.23 fps, Min. Travel Time= 0.6 min
 Avg. Velocity = 2.53 fps, Avg. Travel Time= 1.5 min

Peak Storage= 721 cf @ 12.50 hrs
 Average Depth at Peak Storage= 0.64'
 Bank-Full Depth= 4.00' Flow Area= 60.0 sf, Capacity= 1,057.58 cfs

3.00' x 4.00' deep channel, n= 0.022
 Side Slope Z-value= 3.0 ' ' Top Width= 27.00'
 Length= 230.0' Slope= 0.0250 ' '
 Inlet Invert= 0.00', Outlet Invert= -5.75'

**Summary for Reach R4:**

Inflow Area = 1.610 ac, 0.00% Impervious, Inflow Depth > 2.97" for 25-Year event
 Inflow = 3.66 cfs @ 12.36 hrs, Volume= 0.399 af
 Outflow = 3.64 cfs @ 12.39 hrs, Volume= 0.398 af, Atten= 1%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 3.52 fps, Min. Travel Time= 1.1 min
 Avg. Velocity = 1.37 fps, Avg. Travel Time= 2.8 min

Peak Storage= 240 cf @ 12.37 hrs
 Average Depth at Peak Storage= 0.14'
 Bank-Full Depth= 1.00' Flow Area= 16.0 sf, Capacity= 169.82 cfs

6.00' x 1.00' deep channel, n= 0.022 Earth, clean & straight
 Side Slope Z-value= 10.0 ' ' Top Width= 26.00'
 Length= 232.0' Slope= 0.0474 ' '
 Inlet Invert= 227.00', Outlet Invert= 216.00'



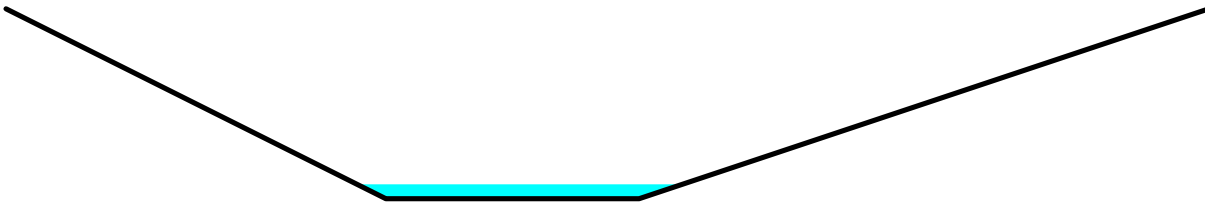
Summary for Reach R5:

Inflow Area = 2.221 ac, 71.83% Impervious, Inflow Depth > 2.84" for 25-Year event
 Inflow = 2.61 cfs @ 12.62 hrs, Volume= 0.526 af
 Outflow = 2.60 cfs @ 12.66 hrs, Volume= 0.524 af, Atten= 0%, Lag= 2.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 2.49 fps, Min. Travel Time= 1.5 min
 Avg. Velocity = 1.13 fps, Avg. Travel Time= 3.3 min

Peak Storage= 234 cf @ 12.63 hrs
 Average Depth at Peak Storage= 0.23'
 Bank-Full Depth= 3.00' Flow Area= 34.5 sf, Capacity= 358.92 cfs

4.00' x 3.00' deep channel, n= 0.025
 Side Slope Z-value= 2.0 3.0 ' / ' Top Width= 19.00'
 Length= 224.0' Slope= 0.0150 ' / '
 Inlet Invert= 0.00', Outlet Invert= -3.36'

**Summary for Reach SP1:**

Inflow Area = 3.822 ac, 43.91% Impervious, Inflow Depth > 2.08" for 25-Year event
 Inflow = 3.56 cfs @ 12.60 hrs, Volume= 0.664 af
 Outflow = 3.56 cfs @ 12.60 hrs, Volume= 0.664 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SP2:

Inflow Area = 22.433 ac, 9.29% Impervious, Inflow Depth > 2.10" for 25-Year event
 Inflow = 31.15 cfs @ 12.51 hrs, Volume= 3.924 af
 Outflow = 31.15 cfs @ 12.51 hrs, Volume= 3.924 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SP3:

Inflow Area = 3.016 ac, 0.00% Impervious, Inflow Depth > 3.02" for 25-Year event
 Inflow = 7.04 cfs @ 12.33 hrs, Volume= 0.758 af
 Outflow = 7.04 cfs @ 12.33 hrs, Volume= 0.758 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond WP-01: TRACTOR SUPPLY WET POND

Inflow Area = 2.221 ac, 71.83% Impervious, Inflow Depth > 4.18" for 25-Year event
 Inflow = 8.66 cfs @ 12.19 hrs, Volume= 0.773 af
 Outflow = 2.61 cfs @ 12.62 hrs, Volume= 0.526 af, Atten= 70%, Lag= 25.5 min
 Primary = 2.61 cfs @ 12.62 hrs, Volume= 0.526 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 220.48' @ 12.62 hrs Surf.Area= 8,800 sf Storage= 17,871 cf

Plug-Flow detention time= 160.6 min calculated for 0.526 af (68% of inflow)
 Center-of-Mass det. time= 93.0 min (861.7 - 768.8)

Volume	Invert	Avail.Storage	Storage Description
#1	218.00'	33,903 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
218.00	5,685	0	0
219.00	6,900	6,293	6,293
220.00	8,160	7,530	13,823
221.00	9,500	8,830	22,653
222.00	13,000	11,250	33,903

Device	Routing	Invert	Outlet Devices
#1	Device 2	218.00'	20.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#2	Primary	218.00'	2.410 in/hr Exfiltration over Surface area above 218.00' Excluded Surface area = 5,685 sf
#3	Primary	219.45'	12.0" Round Culvert L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 219.45' / 219.29' S= 0.0080 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#4	Primary	220.50'	8.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=2.60 cfs @ 12.62 hrs HW=220.48' (Free Discharge)

- 2=Exfiltration (Exfiltration Controls 0.17 cfs)
- 1=Broad-Crested Rectangular Weir (Passes 0.17 cfs of 211.83 cfs potential flow)
- 3=Culvert (Barrel Controls 2.43 cfs @ 3.74 fps)
- 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond WP-04: TRACTOR SUPPLY WET POND

Inflow Area = 2.001 ac, 65.09% Impervious, Inflow Depth > 3.87" for 25-Year event
 Inflow = 7.75 cfs @ 12.16 hrs, Volume= 0.645 af
 Outflow = 3.00 cfs @ 12.50 hrs, Volume= 0.497 af, Atten= 61%, Lag= 20.2 min
 Primary = 3.00 cfs @ 12.50 hrs, Volume= 0.497 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 221.99' @ 12.50 hrs Surf.Area= 7,488 sf Storage= 12,907 cf

Plug-Flow detention time= 126.8 min calculated for 0.495 af (77% of inflow)
 Center-of-Mass det. time= 70.7 min (845.9 - 775.2)

Volume	Invert	Avail.Storage	Storage Description
#1	220.00'	21,250 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
220.00	5,500	0	0
221.00	6,500	6,000	6,000
222.00	7,500	7,000	13,000
223.00	9,000	8,250	21,250

Device	Routing	Invert	Outlet Devices
#1	Device 2	220.00'	20.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#2	Primary	220.00'	2.410 in/hr Exfiltration over Surface area above 220.00' Excluded Surface area = 5,500 sf
#3	Primary	220.90'	12.0" Round Culvert L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 220.90' / 220.42' S= 0.0080 ' /' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#4	Primary	222.00'	8.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=3.00 cfs @ 12.50 hrs HW=221.99' (Free Discharge)

- 2=Exfiltration (Exfiltration Controls 0.11 cfs)
- 1=Broad-Crested Rectangular Weir (Passes 0.11 cfs of 150.10 cfs potential flow)
- 3=Culvert (Barrel Controls 2.89 cfs @ 4.21 fps)
- 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

17011-PRE

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Type III 24-hr 2-Year Rainfall=3.10"

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Page 1

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

Subcatchment1:	Runoff Area=69,780 sf 5.21% Impervious Runoff Depth>0.12" Flow Length=408' Tc=30.8 min CN=52 Runoff=0.04 cfs 0.016 af
Subcatchment2:	Runoff Area=300,985 sf 0.00% Impervious Runoff Depth>0.73" Flow Length=640' Tc=34.2 min CN=71 Runoff=3.17 cfs 0.420 af
Subcatchment3:	Runoff Area=61,285 sf 0.00% Impervious Runoff Depth>1.04" Flow Length=295' Tc=19.7 min CN=77 Runoff=1.23 cfs 0.122 af
Subcatchment OS1: Offsite Watershed 1	Runoff Area=589,045 sf 5.78% Impervious Runoff Depth>0.38" Flow Length=896' Tc=30.0 min CN=62 Runoff=2.71 cfs 0.426 af
Subcatchment OS2: Offsite Watershed 2	Runoff Area=70,110 sf 0.00% Impervious Runoff Depth>0.98" Flow Length=567' Tc=25.7 min CN=76 Runoff=1.18 cfs 0.132 af
Subcatchment OS3:	Runoff Area=96,725 sf 71.83% Impervious Runoff Depth>1.78" Flow Length=354' Tc=14.0 min CN=88 Runoff=3.83 cfs 0.330 af
Subcatchment OS4:	Runoff Area=87,150 sf 65.09% Impervious Runoff Depth>1.55" Flow Length=592' Tc=12.1 min CN=85 Runoff=3.19 cfs 0.259 af
Reach R1:	Avg. Flow Depth=0.22' Max Vel=3.42 fps Inflow=2.71 cfs 0.426 af n=0.022 L=470.0' S=0.0250 '/' Capacity=1,057.58 cfs Outflow=2.69 cfs 0.424 af
Reach R2:	Avg. Flow Depth=0.06' Max Vel=1.15 fps Inflow=0.30 cfs 0.122 af n=0.022 L=231.0' S=0.0150 '/' Capacity=419.84 cfs Outflow=0.30 cfs 0.120 af
Reach R3:	Avg. Flow Depth=0.22' Max Vel=3.46 fps Inflow=2.79 cfs 0.544 af n=0.022 L=230.0' S=0.0250 '/' Capacity=1,057.58 cfs Outflow=2.78 cfs 0.542 af
Reach R4:	Avg. Flow Depth=0.07' Max Vel=2.40 fps Inflow=1.18 cfs 0.132 af n=0.022 L=232.0' S=0.0474 '/' Capacity=169.82 cfs Outflow=1.17 cfs 0.131 af
Reach R5:	Avg. Flow Depth=0.05' Max Vel=0.99 fps Inflow=0.20 cfs 0.099 af n=0.025 L=224.0' S=0.0150 '/' Capacity=358.92 cfs Outflow=0.20 cfs 0.098 af
Reach SP1:	Inflow=0.22 cfs 0.113 af Outflow=0.22 cfs 0.113 af
Reach SP2:	Inflow=5.80 cfs 0.962 af Outflow=5.80 cfs 0.962 af
Reach SP3:	Inflow=2.28 cfs 0.253 af Outflow=2.28 cfs 0.253 af
Pond WP-01: TRACTOR SUPPLY WET	Peak Elev=219.60' Storage=10,676 cf Inflow=3.83 cfs 0.330 af Outflow=0.20 cfs 0.099 af

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Type III 24-hr 2-Year Rainfall=3.10"

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Pond WP-04: TRACTOR SUPPLY WET POND Peak Elev=221.15' Storage=6,964 cf Inflow=3.19 cfs 0.259 af
Outflow=0.30 cfs 0.122 af

17011-PRE

Type III 24-hr 10-Year Rainfall=4.60"

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

Subcatchment1:	Runoff Area=69,780 sf 5.21% Impervious Runoff Depth>0.54" Flow Length=408' Tc=30.8 min CN=52 Runoff=0.45 cfs 0.073 af
Subcatchment2:	Runoff Area=300,985 sf 0.00% Impervious Runoff Depth>1.65" Flow Length=640' Tc=34.2 min CN=71 Runoff=7.64 cfs 0.952 af
Subcatchment3:	Runoff Area=61,285 sf 0.00% Impervious Runoff Depth>2.12" Flow Length=295' Tc=19.7 min CN=77 Runoff=2.54 cfs 0.248 af
Subcatchment OS1: Offsite Watershed 1	Runoff Area=589,045 sf 5.78% Impervious Runoff Depth>1.07" Flow Length=896' Tc=30.0 min CN=62 Runoff=9.62 cfs 1.205 af
Subcatchment OS2: Offsite Watershed 2	Runoff Area=70,110 sf 0.00% Impervious Runoff Depth>2.03" Flow Length=567' Tc=25.7 min CN=76 Runoff=2.51 cfs 0.273 af
Subcatchment OS3:	Runoff Area=96,725 sf 71.83% Impervious Runoff Depth>3.09" Flow Length=354' Tc=14.0 min CN=88 Runoff=6.51 cfs 0.572 af
Subcatchment OS4:	Runoff Area=87,150 sf 65.09% Impervious Runoff Depth>2.81" Flow Length=592' Tc=12.1 min CN=85 Runoff=5.70 cfs 0.469 af
Reach R1:	Avg. Flow Depth=0.44' Max Vel=5.08 fps Inflow=9.62 cfs 1.205 af n=0.022 L=470.0' S=0.0250 '/' Capacity=1,057.58 cfs Outflow=9.56 cfs 1.201 af
Reach R2:	Avg. Flow Depth=0.15' Max Vel=2.02 fps Inflow=1.72 cfs 0.325 af n=0.022 L=231.0' S=0.0150 '/' Capacity=419.84 cfs Outflow=1.72 cfs 0.323 af
Reach R3:	Avg. Flow Depth=0.48' Max Vel=5.31 fps Inflow=11.19 cfs 1.524 af n=0.022 L=230.0' S=0.0250 '/' Capacity=1,057.58 cfs Outflow=11.16 cfs 1.522 af
Reach R4:	Avg. Flow Depth=0.11' Max Vel=3.11 fps Inflow=2.51 cfs 0.273 af n=0.022 L=232.0' S=0.0474 '/' Capacity=169.82 cfs Outflow=2.49 cfs 0.272 af
Reach R5:	Avg. Flow Depth=0.15' Max Vel=1.93 fps Inflow=1.27 cfs 0.331 af n=0.025 L=224.0' S=0.0150 '/' Capacity=358.92 cfs Outflow=1.26 cfs 0.329 af
Reach SP1:	Inflow=1.65 cfs 0.402 af Outflow=1.65 cfs 0.402 af
Reach SP2:	Inflow=18.72 cfs 2.474 af Outflow=18.72 cfs 2.474 af
Reach SP3:	Inflow=4.83 cfs 0.520 af Outflow=4.83 cfs 0.520 af
Pond WP-01: TRACTOR SUPPLY WET	Peak Elev=220.07' Storage=14,404 cf Inflow=6.51 cfs 0.572 af Outflow=1.27 cfs 0.331 af

17011-PRE

Type III 24-hr 10-Year Rainfall=4.60"

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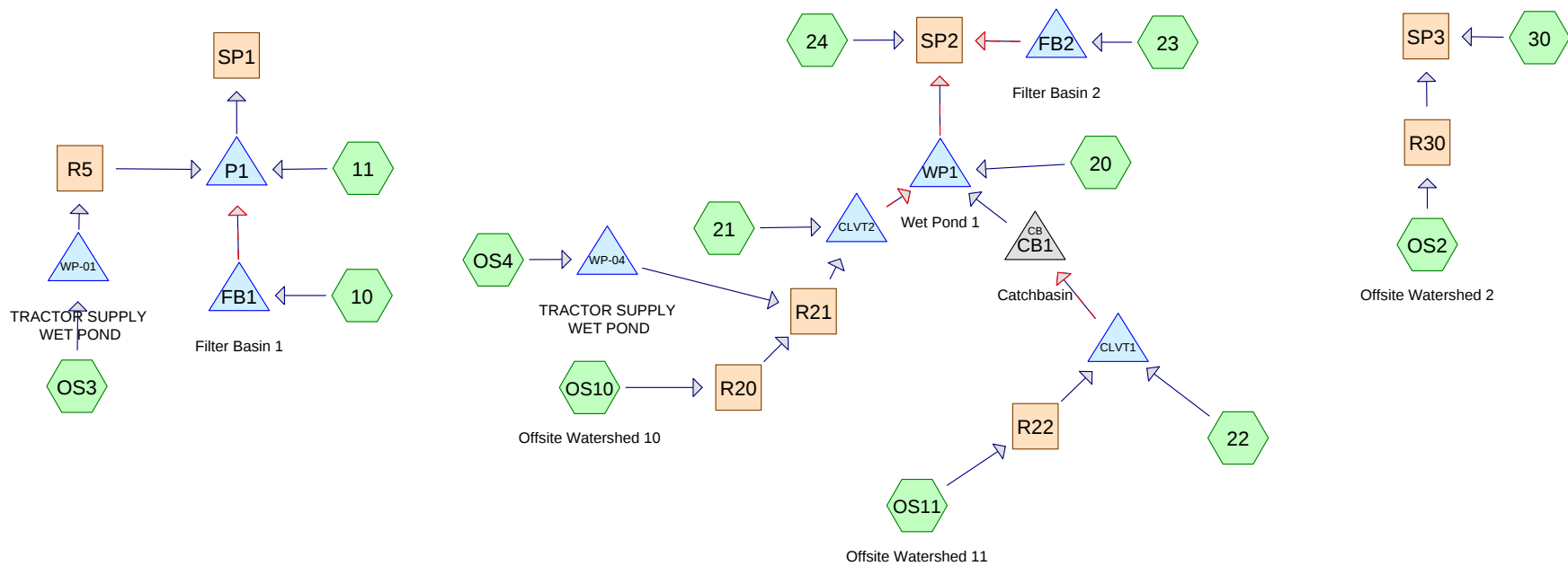
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Pond WP-04: TRACTOR SUPPLY WET

Peak Elev=221.62' Storage=10,236 cf Inflow=5.70 cfs 0.469 af

Outflow=1.72 cfs 0.325 af



Routing Diagram for 17011-POST

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17011-POST

Type III 24-hr 25-Year Rainfall=5.80"

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Page 1

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

Subcatchment10:	Runoff Area=26,345 sf 0.00% Impervious Runoff Depth>4.29" Tc=6.0 min CN=89 Runoff=3.03 cfs 0.216 af
Subcatchment11:	Runoff Area=44,495 sf 8.17% Impervious Runoff Depth>1.93" Flow Length=386' Tc=25.6 min CN=64 Runoff=1.48 cfs 0.164 af
Subcatchment20:	Runoff Area=88,480 sf 18.90% Impervious Runoff Depth>4.18" Flow Length=342' Tc=9.3 min CN=88 Runoff=8.98 cfs 0.708 af
Subcatchment21:	Runoff Area=44,955 sf 7.05% Impervious Runoff Depth>2.90" Flow Length=194' Tc=8.8 min CN=75 Runoff=3.35 cfs 0.249 af
Subcatchment22:	Runoff Area=114,530 sf 31.96% Impervious Runoff Depth>3.85" Flow Length=618' Slope=0.0250 '/ Tc=31.7 min CN=85 Runoff=6.89 cfs 0.843 af
Subcatchment23:	Runoff Area=68,960 sf 45.58% Impervious Runoff Depth>4.18" Flow Length=270' Tc=8.7 min CN=88 Runoff=7.17 cfs 0.552 af
Subcatchment24:	Runoff Area=15,575 sf 0.00% Impervious Runoff Depth>2.63" Flow Length=72' Slope=0.1000 '/ Tc=6.0 min CN=72 Runoff=1.16 cfs 0.078 af
Subcatchment30:	Runoff Area=28,765 sf 19.03% Impervious Runoff Depth>3.56" Flow Length=102' Slope=0.0350 '/ Tc=17.7 min CN=82 Runoff=2.07 cfs 0.196 af
SubcatchmentOS10: Offsite Watershed 10	Runoff Area=20,435 sf 67.90% Impervious Runoff Depth>4.50" Flow Length=171' Tc=6.0 min CN=91 Runoff=2.43 cfs 0.176 af
SubcatchmentOS11: Offsite Watershed 11	Runoff Area=568,610 sf 3.62% Impervious Runoff Depth>1.69" Flow Length=896' Tc=30.0 min CN=61 Runoff=15.28 cfs 1.838 af
SubcatchmentOS2: Offsite Watershed 2	Runoff Area=70,110 sf 0.00% Impervious Runoff Depth>2.97" Flow Length=567' Tc=25.7 min CN=76 Runoff=3.66 cfs 0.399 af
SubcatchmentOS3:	Runoff Area=96,725 sf 71.83% Impervious Runoff Depth>4.18" Flow Length=354' Tc=14.0 min CN=88 Runoff=8.66 cfs 0.773 af
SubcatchmentOS4:	Runoff Area=87,150 sf 65.09% Impervious Runoff Depth>3.87" Flow Length=592' Tc=12.1 min CN=85 Runoff=7.75 cfs 0.645 af
Reach R20:	Avg. Flow Depth=0.18' Max Vel=2.24 fps Inflow=2.43 cfs 0.176 af n=0.022 L=200.0' S=0.0153 '/ Capacity=423.71 cfs Outflow=2.27 cfs 0.176 af
Reach R21:	Avg. Flow Depth=0.23' Max Vel=2.57 fps Inflow=3.80 cfs 0.672 af n=0.022 L=62.0' S=0.0153 '/ Capacity=424.02 cfs Outflow=3.79 cfs 0.672 af
Reach R22:	Avg. Flow Depth=0.56' Max Vel=5.81 fps Inflow=15.28 cfs 1.838 af n=0.022 L=294.0' S=0.0250 '/ Capacity=1,057.58 cfs Outflow=15.21 cfs 1.835 af

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Type III 24-hr 25-Year Rainfall=5.80"

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Reach R30: Avg. Flow Depth=0.27' Max Vel=4.96 fps Inflow=3.66 cfs 0.399 af
 n=0.022 L=187.0' S=0.0428 ' /' Capacity=348.66 cfs Outflow=3.64 cfs 0.398 af

Reach R5: Avg. Flow Depth=0.23' Max Vel=2.50 fps Inflow=2.61 cfs 0.526 af
 n=0.025 L=63.0' S=0.0151 ' /' Capacity=359.86 cfs Outflow=2.60 cfs 0.525 af

Reach SP1: Inflow=2.27 cfs 0.586 af
 Outflow=2.27 cfs 0.586 af

Reach SP2: Inflow=19.38 cfs 4.317 af
 Outflow=19.38 cfs 4.317 af

Reach SP3: Inflow=5.43 cfs 0.594 af
 Outflow=5.43 cfs 0.594 af

Pond CB1: Catchbasin Peak Elev=221.07' Inflow=20.93 cfs 2.677 af
 30.0" Round Culvert n=0.013 L=17.0' S=0.0088 ' /' Outflow=20.93 cfs 2.677 af

Pond CLVT1: Peak Elev=221.61' Storage=3,350 cf Inflow=22.04 cfs 2.677 af
 Primary=20.93 cfs 2.677 af Secondary=0.00 cfs 0.000 af Outflow=20.93 cfs 2.677 af

Pond CLVT2: Peak Elev=221.40' Storage=5,512 cf Inflow=6.77 cfs 0.921 af
 Primary=4.11 cfs 0.916 af Secondary=0.00 cfs 0.000 af Outflow=4.11 cfs 0.916 af

Pond FB1: Filter Basin 1 Peak Elev=215.17' Storage=3,128 cf Inflow=3.03 cfs 0.216 af
 Primary=1.97 cfs 0.174 af Secondary=0.00 cfs 0.000 af Outflow=1.97 cfs 0.174 af

Pond FB2: Filter Basin 2 Peak Elev=214.92' Storage=6,154 cf Inflow=7.17 cfs 0.552 af
 Primary=5.79 cfs 0.462 af Secondary=0.00 cfs 0.000 af Outflow=5.79 cfs 0.462 af

Pond P1: Peak Elev=210.68' Storage=13,832 cf Inflow=4.76 cfs 0.864 af
 Outflow=2.27 cfs 0.586 af

Pond WP-01: TRACTOR SUPPLY WET Peak Elev=220.48' Storage=17,871 cf Inflow=8.66 cfs 0.773 af
 Outflow=2.61 cfs 0.526 af

Pond WP-04: TRACTOR SUPPLY WET Peak Elev=221.99' Storage=12,907 cf Inflow=7.75 cfs 0.645 af
 Outflow=3.00 cfs 0.497 af

Pond WP1: Wet Pond 1 Peak Elev=216.37' Storage=55,943 cf Inflow=27.50 cfs 4.301 af
 Primary=18.30 cfs 3.777 af Secondary=0.00 cfs 0.000 af Outflow=18.30 cfs 3.777 af

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Type III 24-hr 25-Year Rainfall=5.80"

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Summary for Subcatchment 10:

Runoff = 3.03 cfs @ 12.09 hrs, Volume= 0.216 af, Depth> 4.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.80"

	Area (sf)	CN	Description
*	20,395	96	Gravel surface
	2,405	39	>75% Grass cover, Good, HSG A
	3,545	80	>75% Grass cover, Good, HSG D
	26,345	89	Weighted Average
	26,345		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, 6 MINUTE MIN. TC

Summary for Subcatchment 11:

Runoff = 1.48 cfs @ 12.38 hrs, Volume= 0.164 af, Depth> 1.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.80"

	Area (sf)	CN	Description
*	3,635	98	Existing Pavement
*	5,085	39	New Grass A
*	8,605	61	New Grass B
*	4,535	80	New Grass D
*	2,300	39	Existing Grass A
*	4,600	61	Existing Grass B
*	2,010	80	Exisitng Grass D
	3,740	30	Woods, Good, HSG A
	710	55	Woods, Good, HSG B
	9,275	77	Woods, Good, HSG D
	44,495	64	Weighted Average
	40,860		91.83% Pervious Area
	3,635		8.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.8	112	0.0250	0.09		Sheet Flow, A TO B Woods: Light underbrush n= 0.400 P2= 3.10"
2.8	38	0.0700	0.23		Sheet Flow, B TO C Grass: Short n= 0.150 P2= 3.10"
0.8	105	0.0900	2.10		Shallow Concentrated Flow, C TO D Short Grass Pasture Kv= 7.0 fps
0.2	131	0.0150	10.40	358.92	Trap/Vee/Rect Channel Flow, D TO E Bot.W=4.00' D=3.00' Z= 2.0 & 3.0 ' Top.W=19.00' n= 0.025

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Type III 24-hr 25-Year Rainfall=5.80"

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25.6 386 Total

Summary for Subcatchment 20:

Runoff = 8.98 cfs @ 12.13 hrs, Volume= 0.708 af, Depth> 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.80"

	Area (sf)	CN	Description
*	7,195	98	New Pavement
*	41,545	96	New Gravel Surface
*	765	98	Future Lot Development
*	2,820	39	New Lawn A
*	24,185	80	New Lawn D
*	1,175	39	Existing Lawn A
	2,035	30	Woods, Good, HSG A
*	8,760	98	Water Surface
	88,480	88	Weighted Average
	71,760		81.10% Pervious Area
	16,720		18.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	23	0.0200	0.06		Sheet Flow, A TO B Woods: Light underbrush n= 0.400 P2= 3.10"
0.9	11	0.1000	0.20		Sheet Flow, B TO C Grass: Short n= 0.150 P2= 3.10"
0.8	76	0.0300	1.51		Sheet Flow, C TO D Smooth surfaces n= 0.011 P2= 3.10"
0.5	87	0.0300	2.79		Shallow Concentrated Flow, D TO E Unpaved Kv= 16.1 fps
0.0	12	0.3300	4.02		Shallow Concentrated Flow, D TO E Short Grass Pasture Kv= 7.0 fps
0.4	133	0.0125	5.38	26.88	Trap/Vee/Rect Channel Flow, E TO F Bot.W=2.00' D=1.00' Z= 3.0 ' Top.W=8.00' n= 0.022
9.3	342	Total			

Summary for Subcatchment 21:

Runoff = 3.35 cfs @ 12.13 hrs, Volume= 0.249 af, Depth> 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.80"

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Type III 24-hr 25-Year Rainfall=5.80"

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	Area (sf)	CN	Description
*	3,170	98	New Pavement
*	535	39	New Grass A
*	8,330	80	New Grass D
*	1,805	39	Exisitng Grass A
*	1,595	80	Existing Grass D
	120	30	Meadow, non-grazed, HSG A
	25,140	78	Meadow, non-grazed, HSG D
	2,500	30	Woods, Good, HSG A
	1,760	77	Woods, Good, HSG D
	44,955	75	Weighted Average
	41,785		92.95% Pervious Area
	3,170		7.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.6	82	0.0500	0.16		Sheet Flow, A TO B Grass: Dense n= 0.240 P2= 3.10"
0.2	112	0.0150	8.74	419.53	Trap/Vee/Rect Channel Flow, B TO C Bot.W=4.00' D=2.00' Z= 10.0 ' /' Top.W=44.00' n= 0.022
8.8	194	Total			

Summary for Subcatchment 22:

Runoff = 6.89 cfs @ 12.43 hrs, Volume= 0.843 af, Depth> 3.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.80"

	Area (sf)	CN	Description
*	6,090	98	New Pavement
*	30,510	98	Future Lot Development Imp.
*	42,785	80	New Grass D
	8,350	78	Meadow, non-grazed, HSG D
	26,795	77	Woods, Good, HSG D
	114,530	85	Weighted Average
	77,930		68.04% Pervious Area
	36,600		31.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.6	150	0.0250	0.09		Sheet Flow, A TO B Woods: Light underbrush n= 0.400 P2= 3.10"
3.8	178	0.0250	0.79		Shallow Concentrated Flow, B TO C Woodland Kv= 5.0 fps
0.3	290	0.0250	17.63	1,057.58	Trap/Vee/Rect Channel Flow, C TO D Bot.W=3.00' D=4.00' Z= 3.0 ' /' Top.W=27.00' n= 0.022
31.7	618	Total			

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Type III 24-hr 25-Year Rainfall=5.80"

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Summary for Subcatchment 23:

Runoff = 7.17 cfs @ 12.12 hrs, Volume= 0.552 af, Depth> 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.80"

	Area (sf)	CN	Description
*	3,410	98	Future Road
*	28,025	98	Future Lot Impervious
	31,680	80	>75% Grass cover, Good, HSG D
	5,845	77	Woods, Good, HSG D
	68,960	88	Weighted Average
	37,525		54.42% Pervious Area
	31,435		45.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	150	0.0700	0.30		Sheet Flow, A TO B Grass: Short n= 0.150 P2= 3.10"
0.4	120	0.0100	5.33	51.95	Trap/Vee/Rect Channel Flow, B TO C Bot.W=2.00' D=1.50' Z= 3.0 '/' Top.W=11.00' n= 0.025
8.7	270	Total			

Summary for Subcatchment 24:

Runoff = 1.16 cfs @ 12.09 hrs, Volume= 0.078 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.80"

	Area (sf)	CN	Description
*	1,160	96	New Gravel
*	3,520	39	New Lawn A
*	10,780	80	New Lawn D
	115	77	Woods, Good, HSG D
	15,575	72	Weighted Average
	15,575		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	72	0.1000	0.30		Sheet Flow, A TO B Grass: Short n= 0.150 P2= 3.10"
2.0					Direct Entry, 6 MINUTE MIN. TC
6.0	72	Total			

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Type III 24-hr 25-Year Rainfall=5.80"

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Summary for Subcatchment 30:

Runoff = 2.07 cfs @ 12.24 hrs, Volume= 0.196 af, Depth> 3.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.80"

	Area (sf)	CN	Description
*	5,475	98	Future Road Pavement
*	5,690	80	New Lawn D
	17,600	77	Woods, Good, HSG D
	28,765	82	Weighted Average
	23,290		80.97% Pervious Area
	5,475		19.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	102	0.0350	0.10		Sheet Flow, A TO B Woods: Light underbrush n= 0.400 P2= 3.10"

Summary for Subcatchment OS10: Offsite Watershed 10

Runoff = 2.43 cfs @ 12.09 hrs, Volume= 0.176 af, Depth> 4.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.80"

	Area (sf)	CN	Description
*	210	98	New Pavement
*	210	80	New Lawn D
*	13,665	98	Existing Pavement
	3,315	77	Woods, Good, HSG D
	3,035	78	Meadow, non-grazed, HSG D
	20,435	91	Weighted Average
	6,560		32.10% Pervious Area
	13,875		67.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	140	0.0280	1.66		Sheet Flow, A TO B Smooth surfaces n= 0.011 P2= 3.10"
0.2	31	0.1000	2.21		Shallow Concentrated Flow, B TO C Short Grass Pasture Kv= 7.0 fps
4.4					Direct Entry, 6 MINUTE MIN. TC
6.0	171	Total			

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Type III 24-hr 25-Year Rainfall=5.80"

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Summary for Subcatchment OS11: Offsite Watershed 11

Runoff = 15.28 cfs @ 12.46 hrs, Volume= 1.838 af, Depth> 1.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.80"

	Area (sf)	CN	Description
*	20,380	98	Existing Pavement
	200,185	30	Woods, Good, HSG A
	269,085	77	Woods, Good, HSG D
	56,535	78	Meadow, non-grazed, HSG D
	1,800	39	>75% Grass cover, Good, HSG A
	20,205	80	>75% Grass cover, Good, HSG D
*	210	98	New Pavement
*	210	80	New Grass D
	568,610	61	Weighted Average
	548,020		96.38% Pervious Area
	20,590		3.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.9	150	0.0850	0.15		Sheet Flow, A TO B Woods: Light underbrush n= 0.400 P2= 3.10"
3.7	275	0.0600	1.22		Shallow Concentrated Flow, B TO C Woodland Kv= 5.0 fps
5.7	271	0.0250	0.79		Shallow Concentrated Flow, C TO D Woodland Kv= 5.0 fps
1.1	75	0.0250	1.11		Shallow Concentrated Flow, D TO E Short Grass Pasture Kv= 7.0 fps
2.6	125	0.0250	0.79		Shallow Concentrated Flow, E TO F Woodland Kv= 5.0 fps
30.0	896	Total			

Summary for Subcatchment OS2: Offsite Watershed 2

Runoff = 3.66 cfs @ 12.36 hrs, Volume= 0.399 af, Depth> 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.80"

Area (sf)	CN	Description
2,375	30	Woods, Good, HSG A
57,490	77	Woods, Good, HSG D
10,245	78	Meadow, non-grazed, HSG D
70,110	76	Weighted Average
70,110		100.00% Pervious Area

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Type III 24-hr 25-Year Rainfall=5.80"

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.3	150	0.0700	0.14		Sheet Flow, A TO B Woods: Light underbrush n= 0.400 P2= 3.10"
4.5	233	0.0300	0.87		Shallow Concentrated Flow, B TO C Woodland Kv= 5.0 fps
1.0	72	0.0275	1.16		Shallow Concentrated Flow, C TO D Short Grass Pasture Kv= 7.0 fps
1.9	112	0.0400	1.00		Shallow Concentrated Flow, D TO E Woodland Kv= 5.0 fps
25.7	567	Total			

Summary for Subcatchment OS3:

Runoff = 8.66 cfs @ 12.19 hrs, Volume= 0.773 af, Depth> 4.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.80"

	Area (sf)	CN	Description
*	63,795	98	Paved Parking and Road
*	5,685	98	Water Surface
	350	39	>75% Grass cover, Good, HSG A
	22,830	61	>75% Grass cover, Good, HSG B
	4,065	80	>75% Grass cover, Good, HSG D
	96,725	88	Weighted Average
	27,245		28.17% Pervious Area
	69,480		71.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	76	0.0070	0.10		Sheet Flow, A TO B Grass: Short n= 0.150 P2= 3.10"
1.1	128	0.0100	2.03		Shallow Concentrated Flow, B TO C Paved Kv= 20.3 fps
0.7	150	0.0050	3.47	2.73	Pipe Channel, C TO D 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012
14.0	354	Total			

Summary for Subcatchment OS4:

Runoff = 7.75 cfs @ 12.16 hrs, Volume= 0.645 af, Depth> 3.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-Year Rainfall=5.80"

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Type III 24-hr 25-Year Rainfall=5.80"

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	Area (sf)	CN	Description
*	51,225	98	Existing Pavement and Building
*	5,500	98	Water Surface
	11,050	39	>75% Grass cover, Good, HSG A
	255	61	>75% Grass cover, Good, HSG B
	16,960	80	>75% Grass cover, Good, HSG D
	2,160	30	Woods, Good, HSG A
	87,150	85	Weighted Average
	30,425		34.91% Pervious Area
	56,725		65.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.7	71	0.0140	0.14		Sheet Flow, A TO B Grass: Short n= 0.150 P2= 3.10"
0.3	41	0.0100	2.03		Shallow Concentrated Flow, B TO C Paved Kv= 20.3 fps
3.1	480	0.0050	2.61	15.66	Trap/Vee/Rect Channel Flow, C TO D Bot.W=3.00' D=1.00' Z= 3.0 ' Top.W=9.00' n= 0.030
12.1	592	Total			

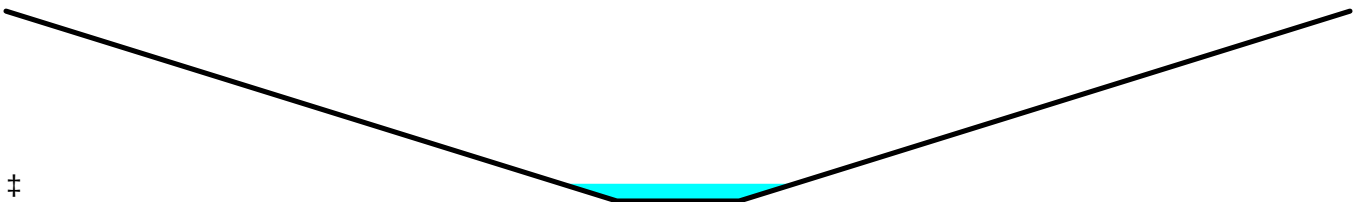
Summary for Reach R20:

Inflow Area = 0.469 ac, 67.90% Impervious, Inflow Depth > 4.50" for 25-Year event
 Inflow = 2.43 cfs @ 12.09 hrs, Volume= 0.176 af
 Outflow = 2.27 cfs @ 12.13 hrs, Volume= 0.176 af, Atten= 6%, Lag= 2.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Max. Velocity= 2.24 fps, Min. Travel Time= 1.5 min
 Avg. Velocity = 0.78 fps, Avg. Travel Time= 4.3 min

Peak Storage= 213 cf @ 12.11 hrs
 Average Depth at Peak Storage= 0.18'
 Bank-Full Depth= 2.00' Flow Area= 48.0 sf, Capacity= 423.71 cfs

4.00' x 2.00' deep channel, n= 0.022
 Side Slope Z-value= 10.0 ' Top Width= 44.00'
 Length= 200.0' Slope= 0.0153 '
 Inlet Invert= 0.00', Outlet Invert= -3.06'



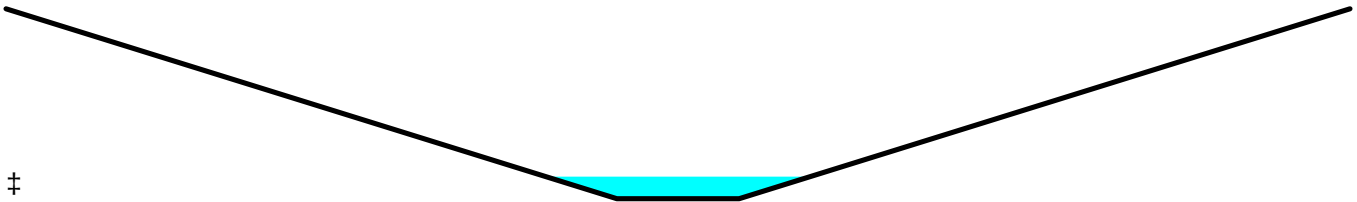
Summary for Reach R21:

Inflow Area = 2.470 ac, 65.62% Impervious, Inflow Depth > 3.27" for 25-Year event
Inflow = 3.80 cfs @ 12.36 hrs, Volume= 0.672 af
Outflow = 3.79 cfs @ 12.37 hrs, Volume= 0.672 af, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.57 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.16 fps, Avg. Travel Time= 0.9 min

Peak Storage= 92 cf @ 12.37 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 2.00' Flow Area= 48.0 sf, Capacity= 424.02 cfs

4.00' x 2.00' deep channel, n= 0.022
Side Slope Z-value= 10.0 '/' Top Width= 44.00'
Length= 62.0' Slope= 0.0153 '/
Inlet Invert= 0.00', Outlet Invert= -0.95'

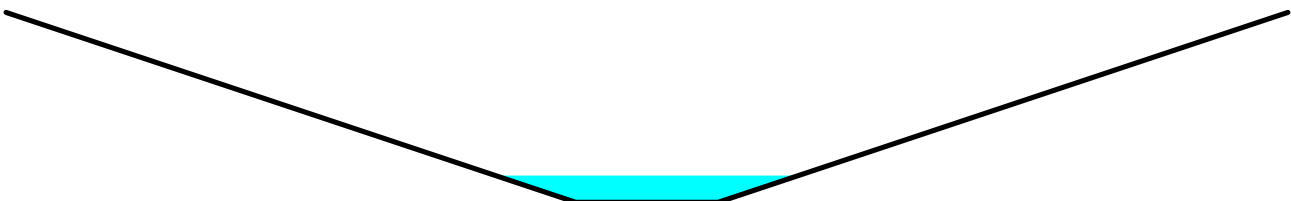
**Summary for Reach R22:**

Inflow Area = 13.053 ac, 3.62% Impervious, Inflow Depth > 1.69" for 25-Year event
Inflow = 15.28 cfs @ 12.46 hrs, Volume= 1.838 af
Outflow = 15.21 cfs @ 12.48 hrs, Volume= 1.835 af, Atten= 0%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.81 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 2.86 fps, Avg. Travel Time= 1.7 min

Peak Storage= 773 cf @ 12.47 hrs
Average Depth at Peak Storage= 0.56'
Bank-Full Depth= 4.00' Flow Area= 60.0 sf, Capacity= 1,057.58 cfs

3.00' x 4.00' deep channel, n= 0.022
Side Slope Z-value= 3.0 '/' Top Width= 27.00'
Length= 294.0' Slope= 0.0250 '/
Inlet Invert= 0.00', Outlet Invert= -7.35'



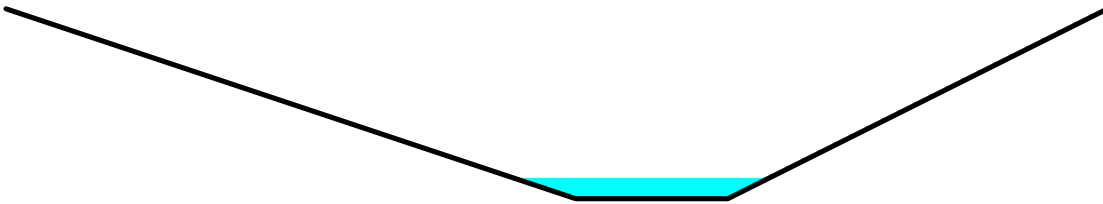
Summary for Reach R30:

Inflow Area = 1.610 ac, 0.00% Impervious, Inflow Depth > 2.97" for 25-Year event
Inflow = 3.66 cfs @ 12.36 hrs, Volume= 0.399 af
Outflow = 3.64 cfs @ 12.38 hrs, Volume= 0.398 af, Atten= 0%, Lag= 1.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.96 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 2.04 fps, Avg. Travel Time= 1.5 min

Peak Storage= 138 cf @ 12.37 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 2.50' Flow Area= 20.6 sf, Capacity= 348.66 cfs

2.00' x 2.50' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 2.0 '/' Top Width= 14.50'
Length= 187.0' Slope= 0.0428 '/'
Inlet Invert= 227.00', Outlet Invert= 219.00'

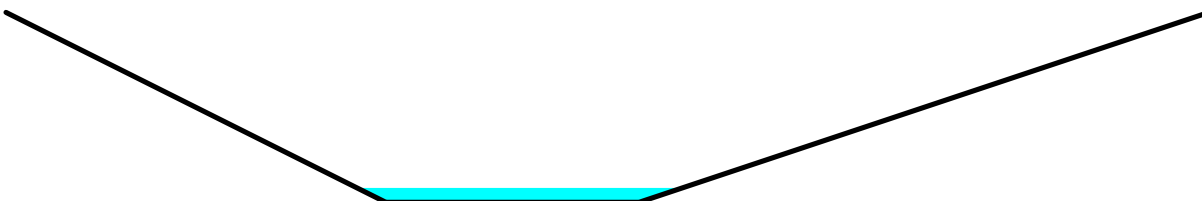
**Summary for Reach R5:**

Inflow Area = 2.221 ac, 71.83% Impervious, Inflow Depth > 2.84" for 25-Year event
Inflow = 2.61 cfs @ 12.62 hrs, Volume= 0.526 af
Outflow = 2.60 cfs @ 12.63 hrs, Volume= 0.525 af, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.50 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 1.13 fps, Avg. Travel Time= 0.9 min

Peak Storage= 66 cf @ 12.62 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 3.00' Flow Area= 34.5 sf, Capacity= 359.86 cfs

4.00' x 3.00' deep channel, n= 0.025
Side Slope Z-value= 2.0 3.0 '/' Top Width= 19.00'
Length= 63.0' Slope= 0.0151 '/'
Inlet Invert= 0.00', Outlet Invert= -0.95'



Summary for Reach SP1:

Inflow Area = 3.847 ac, 43.63% Impervious, Inflow Depth > 1.83" for 25-Year event
 Inflow = 2.27 cfs @ 13.34 hrs, Volume= 0.586 af
 Outflow = 2.27 cfs @ 13.34 hrs, Volume= 0.586 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SP2:

Inflow Area = 23.156 ac, 17.76% Impervious, Inflow Depth > 2.24" for 25-Year event
 Inflow = 19.38 cfs @ 12.85 hrs, Volume= 4.317 af
 Outflow = 19.38 cfs @ 12.85 hrs, Volume= 4.317 af, Atten= 0%, Lag= 0.0 min

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

Summary for Reach SP3:

Inflow Area = 2.270 ac, 5.54% Impervious, Inflow Depth > 3.14" for 25-Year event
 Inflow = 5.43 cfs @ 12.32 hrs, Volume= 0.594 af
 Outflow = 5.43 cfs @ 12.32 hrs, Volume= 0.594 af, Atten= 0%, Lag= 0.0 min

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

Summary for Pond CB1: Catchbasin

Inflow Area = 15.683 ac, 8.37% Impervious, Inflow Depth > 2.05" for 25-Year event
 Inflow = 20.93 cfs @ 12.56 hrs, Volume= 2.677 af
 Outflow = 20.93 cfs @ 12.56 hrs, Volume= 2.677 af, Atten= 0%, Lag= 0.0 min
 Primary = 20.93 cfs @ 12.56 hrs, Volume= 2.677 af

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

Peak Elev= 221.07' @ 12.56 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	218.65'	30.0" Round Culvert L= 17.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 218.65' / 218.50' S= 0.0088 '/ Cc= 0.900 n= 0.013, Flow Area= 4.91 sf

Primary OutFlow Max=20.91 cfs @ 12.56 hrs HW=221.07' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 20.91 cfs @ 5.47 fps)

Summary for Pond CLVT1:

Inflow Area = 15.683 ac, 8.37% Impervious, Inflow Depth > 2.05" for 25-Year event
 Inflow = 22.04 cfs @ 12.47 hrs, Volume= 2.677 af
 Outflow = 20.93 cfs @ 12.56 hrs, Volume= 2.677 af, Atten= 5%, Lag= 5.4 min
 Primary = 20.93 cfs @ 12.56 hrs, Volume= 2.677 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

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Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 221.61' @ 12.56 hrs Surf.Area= 3,967 sf Storage= 3,350 cf

Plug-Flow detention time= 1.1 min calculated for 2.668 af (100% of inflow)
 Center-of-Mass det. time= 1.0 min (824.4 - 823.4)

Volume	Invert	Avail.Storage	Storage Description
#1	219.10'	33,096 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
219.10	10	0	0
220.00	125	61	61
222.00	4,905	5,030	5,091
224.00	23,100	28,005	33,096

Device	Routing	Invert	Outlet Devices
#1	Primary	219.10'	30.0" Round Culvert L= 37.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 219.10' / 218.75' S= 0.0095 ' S= 0.0095 ' Cc= 0.900 n= 0.013, Flow Area= 4.91 sf
#2	Secondary	223.64'	20.0' long x 24.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=20.90 cfs @ 12.56 hrs HW=221.60' (Free Discharge)

↑**1=Culvert** (Inlet Controls 20.90 cfs @ 4.26 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=219.10' (Free Discharge)

↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond CLVT2:

Inflow Area = 3.502 ac, 48.36% Impervious, Inflow Depth > 3.16" for 25-Year event
 Inflow = 6.77 cfs @ 12.16 hrs, Volume= 0.921 af
 Outflow = 4.11 cfs @ 12.60 hrs, Volume= 0.916 af, Atten= 39%, Lag= 26.6 min
 Primary = 4.11 cfs @ 12.60 hrs, Volume= 0.916 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 221.40' @ 12.60 hrs Surf.Area= 7,772 sf Storage= 5,512 cf

Plug-Flow detention time= 17.0 min calculated for 0.916 af (99% of inflow)
 Center-of-Mass det. time= 14.7 min (830.5 - 815.7)

Volume	Invert	Avail.Storage	Storage Description
#1	220.00'	52,208 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

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Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
220.00	98	0	0
222.00	11,055	11,153	11,153
224.00	30,000	41,055	52,208

Device	Routing	Invert	Outlet Devices
#1	Primary	220.00'	15.0" Round Culvert L= 109.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 220.00' / 216.70' S= 0.0303 ' / Cc= 0.900 n= 0.013, Flow Area= 1.23 sf
#2	Secondary	224.00'	20.0' long x 24.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=4.11 cfs @ 12.60 hrs HW=221.40' (Free Discharge)↑**1=Culvert** (Inlet Controls 4.11 cfs @ 3.35 fps)**Secondary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=220.00' (Free Discharge)↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond FB1: Filter Basin 1**

Inflow Area =	0.605 ac,	0.00% Impervious,	Inflow Depth > 4.29" for 25-Year event
Inflow =	3.03 cfs @ 12.09 hrs,	Volume=	0.216 af
Outflow =	1.97 cfs @ 12.20 hrs,	Volume=	0.174 af, Atten= 35%, Lag= 6.8 min
Primary =	1.97 cfs @ 12.20 hrs,	Volume=	0.174 af
Secondary =	0.00 cfs @ 5.00 hrs,	Volume=	0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 215.17' @ 12.20 hrs Surf.Area= 2,378 sf Storage= 3,128 cf

Plug-Flow detention time= 114.7 min calculated for 0.174 af (81% of inflow)
 Center-of-Mass det. time= 62.3 min (821.9 - 759.7)

Volume	Invert	Avail.Storage	Storage Description
#1	213.50'	8,540 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
213.50	1,390	0	0
214.00	1,660	763	763
216.00	2,885	4,545	5,308
217.00	3,580	3,233	8,540

Device	Routing	Invert	Outlet Devices
#1	Primary	211.20'	12.0" Round Culvert L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 211.20' / 211.00' S= 0.0067 ' / Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	213.50'	2.410 in/hr Exfiltration over Surface area
#3	Device 1	215.00'	2.0" x 2.0" Horiz. Rim X 64.00

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C= 0.600 in 23.7" x 23.7" Grate (46% open area)
 Limited to weir flow at low heads
 #4 Secondary 215.70' **10.0' long x 1.0' breadth Spillway**
 Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
 2.50 3.00
 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31
 3.30 3.31 3.32

Primary OutFlow Max=1.96 cfs @ 12.20 hrs HW=215.17' (Free Discharge)

↑ **1=Culvert** (Passes 1.96 cfs of 7.05 cfs potential flow)

↑ **2=Exfiltration** (Exfiltration Controls 0.13 cfs)

↑ **3=Rim** (Weir Controls 1.83 cfs @ 1.35 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=213.50' (Free Discharge)

↑ **4=Spillway** (Controls 0.00 cfs)

Summary for Pond FB2: Filter Basin 2

Inflow Area = 1.583 ac, 45.58% Impervious, Inflow Depth > 4.18" for 25-Year event
 Inflow = 7.17 cfs @ 12.12 hrs, Volume= 0.552 af
 Outflow = 5.79 cfs @ 12.20 hrs, Volume= 0.462 af, Atten= 19%, Lag= 4.7 min
 Primary = 5.79 cfs @ 12.20 hrs, Volume= 0.462 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 214.92' @ 12.20 hrs Surf.Area= 3,981 sf Storage= 6,154 cf

Plug-Flow detention time= 79.9 min calculated for 0.460 af (83% of inflow)
 Center-of-Mass det. time= 33.9 min (798.4 - 764.5)

Volume	Invert	Avail.Storage	Storage Description
#1	213.00'	10,925 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
213.00	2,460	0	0
214.00	3,210	2,835	2,835
216.00	4,880	8,090	10,925

Device	Routing	Invert	Outlet Devices
#1	Primary	210.70'	12.0" Round Culvert L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 210.70' / 210.00' S= 0.0194 ' /' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	213.00'	2.410 in/hr Exfiltration over Surface area
#3	Device 1	214.50'	2.0" x 2.0" Horiz. Rim X 64.00 C= 0.600 in 23.7" x 23.7" Grate (46% open area) Limited to weir flow at low heads
#4	Secondary	215.00'	15.0' long x 18.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

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Primary OutFlow Max=5.78 cfs @ 12.20 hrs HW=214.92' (Free Discharge)↑ **1=Culvert** (Passes 5.78 cfs of 7.30 cfs potential flow)↑ **2=Exfiltration** (Exfiltration Controls 0.22 cfs)↑ **3=Rim** (Orifice Controls 5.56 cfs @ 3.13 fps)**Secondary OutFlow** Max=0.00 cfs @ 5.00 hrs HW=213.00' (Free Discharge)↑ **4=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)**Summary for Pond P1:**

Inflow Area = 3.847 ac, 43.63% Impervious, Inflow Depth > 2.69" for 25-Year event
 Inflow = 4.76 cfs @ 12.43 hrs, Volume= 0.864 af
 Outflow = 2.27 cfs @ 13.34 hrs, Volume= 0.586 af, Atten= 52%, Lag= 54.9 min
 Primary = 2.27 cfs @ 13.34 hrs, Volume= 0.586 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 210.68' @ 13.34 hrs Surf.Area= 11,410 sf Storage= 13,832 cf

Plug-Flow detention time= 141.5 min calculated for 0.586 af (68% of inflow)
 Center-of-Mass det. time= 64.4 min (912.1 - 847.7)

Volume	Invert	Avail.Storage	Storage Description
#1	209.00'	30,725 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
209.00	3,140	0	0
210.00	9,980	6,560	6,560
212.00	14,185	24,165	30,725

Device	Routing	Invert	Outlet Devices
#1	Primary	208.15'	8.0" Round Culvert L= 24.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 208.15' / 208.00' S= 0.0063 ' / Cc= 0.900 n= 0.013, Flow Area= 0.35 sf
#2	Device 1	209.00'	3.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	210.50'	2.0" x 2.0" Horiz. RIM X 64.00 C= 0.600 in 23.7" x 23.7" Grate (46% open area) Limited to weir flow at low heads

Primary OutFlow Max=2.27 cfs @ 13.34 hrs HW=210.68' (Free Discharge)↑ **1=Culvert** (Passes 2.27 cfs of 2.38 cfs potential flow)↑ **2=Orifice/Grate** (Orifice Controls 0.29 cfs @ 6.00 fps)↑ **3=RIM** (Weir Controls 1.97 cfs @ 1.39 fps)

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Summary for Pond WP-01: TRACTOR SUPPLY WET POND

Inflow Area = 2.221 ac, 71.83% Impervious, Inflow Depth > 4.18" for 25-Year event
 Inflow = 8.66 cfs @ 12.19 hrs, Volume= 0.773 af
 Outflow = 2.61 cfs @ 12.62 hrs, Volume= 0.526 af, Atten= 70%, Lag= 25.5 min
 Primary = 2.61 cfs @ 12.62 hrs, Volume= 0.526 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 220.48' @ 12.62 hrs Surf.Area= 8,800 sf Storage= 17,871 cf

Plug-Flow detention time= 160.6 min calculated for 0.526 af (68% of inflow)
 Center-of-Mass det. time= 93.0 min (861.7 - 768.8)

Volume	Invert	Avail.Storage	Storage Description
#1	218.00'	33,903 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
218.00	5,685	0	0
219.00	6,900	6,293	6,293
220.00	8,160	7,530	13,823
221.00	9,500	8,830	22,653
222.00	13,000	11,250	33,903

Device	Routing	Invert	Outlet Devices
#1	Device 2	218.00'	20.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#2	Primary	218.00'	2.410 in/hr Exfiltration over Surface area above 218.00' Excluded Surface area = 5,685 sf
#3	Primary	219.45'	12.0" Round Culvert L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 219.45' / 219.29' S= 0.0080 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#4	Primary	220.50'	8.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=2.60 cfs @ 12.62 hrs HW=220.48' (Free Discharge)

- 2=Exfiltration (Exfiltration Controls 0.17 cfs)
 1=Broad-Crested Rectangular Weir (Passes 0.17 cfs of 211.83 cfs potential flow)
 3=Culvert (Barrel Controls 2.43 cfs @ 3.74 fps)
 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond WP-04: TRACTOR SUPPLY WET POND

Inflow Area = 2.001 ac, 65.09% Impervious, Inflow Depth > 3.87" for 25-Year event
 Inflow = 7.75 cfs @ 12.16 hrs, Volume= 0.645 af
 Outflow = 3.00 cfs @ 12.50 hrs, Volume= 0.497 af, Atten= 61%, Lag= 20.2 min
 Primary = 3.00 cfs @ 12.50 hrs, Volume= 0.497 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 221.99' @ 12.50 hrs Surf.Area= 7,488 sf Storage= 12,907 cf

Plug-Flow detention time= 126.8 min calculated for 0.495 af (77% of inflow)
 Center-of-Mass det. time= 70.7 min (845.9 - 775.2)

Volume	Invert	Avail.Storage	Storage Description
#1	220.00'	21,250 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
220.00	5,500	0	0
221.00	6,500	6,000	6,000
222.00	7,500	7,000	13,000
223.00	9,000	8,250	21,250

Device	Routing	Invert	Outlet Devices
#1	Device 2	220.00'	20.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32
#2	Primary	220.00'	2.410 in/hr Exfiltration over Surface area above 220.00' Excluded Surface area = 5,500 sf
#3	Primary	220.90'	12.0" Round Culvert L= 60.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 220.90' / 220.42' S= 0.0080 '/ Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#4	Primary	222.00'	8.0' long x 3.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=3.00 cfs @ 12.50 hrs HW=221.99' (Free Discharge)

- 2=Exfiltration (Exfiltration Controls 0.11 cfs)
 1=Broad-Crested Rectangular Weir (Passes 0.11 cfs of 150.10 cfs potential flow)
 3=Culvert (Barrel Controls 2.89 cfs @ 4.21 fps)
 4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

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Summary for Pond WP1: Wet Pond 1

Inflow Area = 21.216 ac, 15.98% Impervious, Inflow Depth > 2.43" for 25-Year event
 Inflow = 27.50 cfs @ 12.49 hrs, Volume= 4.301 af
 Outflow = 18.30 cfs @ 12.89 hrs, Volume= 3.777 af, Atten= 33%, Lag= 23.7 min
 Primary = 18.30 cfs @ 12.89 hrs, Volume= 3.777 af
 Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
 Peak Elev= 216.37' @ 12.89 hrs Surf.Area= 18,624 sf Storage= 55,943 cf

Plug-Flow detention time= 80.7 min calculated for 3.765 af (88% of inflow)
 Center-of-Mass det. time= 44.5 min (860.4 - 815.9)

Volume	Invert	Avail.Storage	Storage Description
#1	212.50'	90,683 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
212.50	8,760	0	0
213.30	12,525	8,514	8,514
214.00	14,045	9,299	17,813
216.00	17,375	31,420	49,233
218.00	24,075	41,450	90,683

Device	Routing	Invert	Outlet Devices
#1	Primary	209.90'	18.0" Round Culvert L= 43.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 209.90' / 209.00' S= 0.0209 ' / Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	212.50'	0.10 cfs Exfiltration from Gravel Trench at all elevations
#3	Device 1	214.00'	24.0" W x 12.0" H Vert. Notch In Structure C= 0.600
#4	Device 1	215.35'	13.8" Horiz. Rim C= 0.600 Limited to weir flow at low heads
#5	Secondary	216.40'	15.0' long x 35.0' breadth Spillway Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=18.29 cfs @ 12.89 hrs HW=216.37' (Free Discharge)

↑ **1=Culvert** (Passes 18.29 cfs of 20.35 cfs potential flow)
 ↑ **2=Exfiltration from Gravel Trench** (Exfiltration Controls 0.10 cfs)
 ↑ **3=Notch In Structure** (Orifice Controls 13.13 cfs @ 6.57 fps)
 ↑ **4=Rim** (Orifice Controls 5.05 cfs @ 4.87 fps)

Secondary OutFlow Max=0.00 cfs @ 5.00 hrs HW=212.50' (Free Discharge)

↑ **5=Spillway** (Controls 0.00 cfs)

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Type III 24-hr 2-Year Rainfall=3.10"

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

Subcatchment10:	Runoff Area=26,345 sf 0.00% Impervious Runoff Depth>1.87" Tc=6.0 min CN=89 Runoff=1.37 cfs 0.094 af
Subcatchment11:	Runoff Area=44,495 sf 8.17% Impervious Runoff Depth>0.45" Flow Length=386' Tc=25.6 min CN=64 Runoff=0.28 cfs 0.038 af
Subcatchment20:	Runoff Area=88,480 sf 18.90% Impervious Runoff Depth>1.78" Flow Length=342' Tc=9.3 min CN=88 Runoff=3.98 cfs 0.302 af
Subcatchment21:	Runoff Area=44,955 sf 7.05% Impervious Runoff Depth>0.94" Flow Length=194' Tc=8.8 min CN=75 Runoff=1.05 cfs 0.081 af
Subcatchment22:	Runoff Area=114,530 sf 31.96% Impervious Runoff Depth>1.54" Flow Length=618' Slope=0.0250 '/' Tc=31.7 min CN=85 Runoff=2.84 cfs 0.338 af
Subcatchment23:	Runoff Area=68,960 sf 45.58% Impervious Runoff Depth>1.78" Flow Length=270' Tc=8.7 min CN=88 Runoff=3.17 cfs 0.235 af
Subcatchment24:	Runoff Area=15,575 sf 0.00% Impervious Runoff Depth>0.79" Flow Length=72' Slope=0.1000 '/' Tc=6.0 min CN=72 Runoff=0.33 cfs 0.023 af
Subcatchment30:	Runoff Area=28,765 sf 19.03% Impervious Runoff Depth>1.34" Flow Length=102' Slope=0.0350 '/' Tc=17.7 min CN=82 Runoff=0.79 cfs 0.074 af
SubcatchmentOS10: Offsite Watershed 10	Runoff Area=20,435 sf 67.90% Impervious Runoff Depth>2.04" Flow Length=171' Tc=6.0 min CN=91 Runoff=1.15 cfs 0.080 af
SubcatchmentOS11: Offsite Watershed 11	Runoff Area=568,610 sf 3.62% Impervious Runoff Depth>0.35" Flow Length=896' Tc=30.0 min CN=61 Runoff=2.29 cfs 0.376 af
SubcatchmentOS2: Offsite Watershed 2	Runoff Area=70,110 sf 0.00% Impervious Runoff Depth>0.98" Flow Length=567' Tc=25.7 min CN=76 Runoff=1.18 cfs 0.132 af
SubcatchmentOS3:	Runoff Area=96,725 sf 71.83% Impervious Runoff Depth>1.78" Flow Length=354' Tc=14.0 min CN=88 Runoff=3.83 cfs 0.330 af
SubcatchmentOS4:	Runoff Area=87,150 sf 65.09% Impervious Runoff Depth>1.55" Flow Length=592' Tc=12.1 min CN=85 Runoff=3.19 cfs 0.259 af
Reach R20:	Avg. Flow Depth=0.12' Max Vel=1.77 fps Inflow=1.15 cfs 0.080 af n=0.022 L=200.0' S=0.0153 '/' Capacity=423.71 cfs Outflow=1.07 cfs 0.079 af
Reach R21:	Avg. Flow Depth=0.12' Max Vel=1.77 fps Inflow=1.10 cfs 0.201 af n=0.022 L=62.0' S=0.0153 '/' Capacity=424.02 cfs Outflow=1.08 cfs 0.201 af
Reach R22:	Avg. Flow Depth=0.20' Max Vel=3.24 fps Inflow=2.29 cfs 0.376 af n=0.022 L=294.0' S=0.0250 '/' Capacity=1,057.58 cfs Outflow=2.28 cfs 0.375 af

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Type III 24-hr 2-Year Rainfall=3.10"

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Reach R30: Avg. Flow Depth=0.14' Max Vel=3.46 fps Inflow=1.18 cfs 0.132 af
n=0.022 L=187.0' S=0.0428 ' /' Capacity=348.66 cfs Outflow=1.18 cfs 0.132 af

Reach R5: Avg. Flow Depth=0.05' Max Vel=0.99 fps Inflow=0.20 cfs 0.099 af
n=0.025 L=63.0' S=0.0151 ' /' Capacity=359.86 cfs Outflow=0.20 cfs 0.099 af

Reach SP1: Inflow=0.20 cfs 0.108 af
Outflow=0.20 cfs 0.108 af

Reach SP2: Inflow=2.67 cfs 1.022 af
Outflow=2.67 cfs 1.022 af

Reach SP3: Inflow=1.83 cfs 0.206 af
Outflow=1.83 cfs 0.206 af

Pond CB1: Catchbasin Peak Elev=219.67' Inflow=4.87 cfs 0.713 af
30.0" Round Culvert n=0.013 L=17.0' S=0.0088 ' /' Outflow=4.87 cfs 0.713 af

Pond CLVT1: Peak Elev=220.10' Storage=84 cf Inflow=4.88 cfs 0.713 af
Primary=4.87 cfs 0.713 af Secondary=0.00 cfs 0.000 af Outflow=4.87 cfs 0.713 af

Pond CLVT2: Peak Elev=220.63' Storage=1,153 cf Inflow=2.12 cfs 0.281 af
Primary=1.33 cfs 0.278 af Secondary=0.00 cfs 0.000 af Outflow=1.33 cfs 0.278 af

Pond FB1: Filter Basin 1 Peak Elev=214.60' Storage=1,873 cf Inflow=1.37 cfs 0.094 af
Primary=0.11 cfs 0.082 af Secondary=0.00 cfs 0.000 af Outflow=0.11 cfs 0.082 af

Pond FB2: Filter Basin 2 Peak Elev=214.55' Storage=4,724 cf Inflow=3.17 cfs 0.235 af
Primary=0.50 cfs 0.173 af Secondary=0.00 cfs 0.000 af Outflow=0.50 cfs 0.173 af

Pond P1: Peak Elev=209.81' Storage=4,825 cf Inflow=0.46 cfs 0.219 af
Outflow=0.20 cfs 0.108 af

Pond WP-01: TRACTOR SUPPLY WET Peak Elev=219.60' Storage=10,676 cf Inflow=3.83 cfs 0.330 af
Outflow=0.20 cfs 0.099 af

Pond WP-04: TRACTOR SUPPLY WET POND Peak Elev=221.15' Storage=6,964 cf Inflow=3.19 cfs 0.259 af
Outflow=0.30 cfs 0.122 af

Pond WP1: Wet Pond 1 Peak Elev=214.49' Storage=24,952 cf Inflow=7.33 cfs 1.293 af
Primary=2.33 cfs 0.826 af Secondary=0.00 cfs 0.000 af Outflow=2.33 cfs 0.826 af

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Type III 24-hr 10-Year Rainfall=4.60"

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

Subcatchment10:	Runoff Area=26,345 sf 0.00% Impervious Runoff Depth>3.20" Tc=6.0 min CN=89 Runoff=2.29 cfs 0.161 af
Subcatchment11:	Runoff Area=44,495 sf 8.17% Impervious Runoff Depth>1.19" Flow Length=386' Tc=25.6 min CN=64 Runoff=0.88 cfs 0.102 af
Subcatchment20:	Runoff Area=88,480 sf 18.90% Impervious Runoff Depth>3.10" Flow Length=342' Tc=9.3 min CN=88 Runoff=6.76 cfs 0.524 af
Subcatchment21:	Runoff Area=44,955 sf 7.05% Impervious Runoff Depth>1.97" Flow Length=194' Tc=8.8 min CN=75 Runoff=2.28 cfs 0.169 af
Subcatchment22:	Runoff Area=114,530 sf 31.96% Impervious Runoff Depth>2.79" Flow Length=618' Slope=0.0250 '/' Tc=31.7 min CN=85 Runoff=5.07 cfs 0.612 af
Subcatchment23:	Runoff Area=68,960 sf 45.58% Impervious Runoff Depth>3.10" Flow Length=270' Tc=8.7 min CN=88 Runoff=5.39 cfs 0.409 af
Subcatchment24:	Runoff Area=15,575 sf 0.00% Impervious Runoff Depth>1.75" Flow Length=72' Slope=0.1000 '/' Tc=6.0 min CN=72 Runoff=0.77 cfs 0.052 af
Subcatchment30:	Runoff Area=28,765 sf 19.03% Impervious Runoff Depth>2.54" Flow Length=102' Slope=0.0350 '/' Tc=17.7 min CN=82 Runoff=1.49 cfs 0.140 af
SubcatchmentOS10: Offsite Watershed 10	Runoff Area=20,435 sf 67.90% Impervious Runoff Depth>3.40" Flow Length=171' Tc=6.0 min CN=91 Runoff=1.86 cfs 0.133 af
SubcatchmentOS11: Offsite Watershed 11	Runoff Area=568,610 sf 3.62% Impervious Runoff Depth>1.01" Flow Length=896' Tc=30.0 min CN=61 Runoff=8.65 cfs 1.099 af
SubcatchmentOS2: Offsite Watershed 2	Runoff Area=70,110 sf 0.00% Impervious Runoff Depth>2.03" Flow Length=567' Tc=25.7 min CN=76 Runoff=2.51 cfs 0.273 af
SubcatchmentOS3:	Runoff Area=96,725 sf 71.83% Impervious Runoff Depth>3.09" Flow Length=354' Tc=14.0 min CN=88 Runoff=6.51 cfs 0.572 af
SubcatchmentOS4:	Runoff Area=87,150 sf 65.09% Impervious Runoff Depth>2.81" Flow Length=592' Tc=12.1 min CN=85 Runoff=5.70 cfs 0.469 af
Reach R20:	Avg. Flow Depth=0.16' Max Vel=2.06 fps Inflow=1.86 cfs 0.133 af n=0.022 L=200.0' S=0.0153 '/' Capacity=423.71 cfs Outflow=1.74 cfs 0.133 af
Reach R21:	Avg. Flow Depth=0.17' Max Vel=2.19 fps Inflow=2.20 cfs 0.457 af n=0.022 L=62.0' S=0.0153 '/' Capacity=424.02 cfs Outflow=2.20 cfs 0.457 af
Reach R22:	Avg. Flow Depth=0.41' Max Vel=4.92 fps Inflow=8.65 cfs 1.099 af n=0.022 L=294.0' S=0.0250 '/' Capacity=1,057.58 cfs Outflow=8.62 cfs 1.097 af

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Type III 24-hr 10-Year Rainfall=4.60"

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Reach R30: Avg. Flow Depth=0.22' Max Vel=4.41 fps Inflow=2.51 cfs 0.273 af
 n=0.022 L=187.0' S=0.0428 ' /' Capacity=348.66 cfs Outflow=2.49 cfs 0.272 af

Reach R5: Avg. Flow Depth=0.15' Max Vel=1.93 fps Inflow=1.27 cfs 0.331 af
 n=0.025 L=63.0' S=0.0151 ' /' Capacity=359.86 cfs Outflow=1.27 cfs 0.330 af

Reach SP1: Inflow=0.70 cfs 0.282 af
 Outflow=0.70 cfs 0.282 af

Reach SP2: Inflow=11.78 cfs 2.735 af
 Outflow=11.78 cfs 2.735 af

Reach SP3: Inflow=3.76 cfs 0.412 af
 Outflow=3.76 cfs 0.412 af

Pond CB1: Catchbasin Peak Elev=220.47' Inflow=13.34 cfs 1.709 af
 30.0" Round Culvert n=0.013 L=17.0' S=0.0088 ' /' Outflow=13.34 cfs 1.709 af

Pond CLVT1: Peak Elev=220.93' Storage=1,204 cf Inflow=13.58 cfs 1.709 af
 Primary=13.34 cfs 1.709 af Secondary=0.00 cfs 0.000 af Outflow=13.34 cfs 1.709 af

Pond CLVT2: Peak Elev=221.00' Storage=2,857 cf Inflow=4.13 cfs 0.626 af
 Primary=2.84 cfs 0.622 af Secondary=0.00 cfs 0.000 af Outflow=2.84 cfs 0.622 af

Pond FB1: Filter Basin 1 Peak Elev=215.08' Storage=2,917 cf Inflow=2.29 cfs 0.161 af
 Primary=0.74 cfs 0.125 af Secondary=0.00 cfs 0.000 af Outflow=0.74 cfs 0.125 af

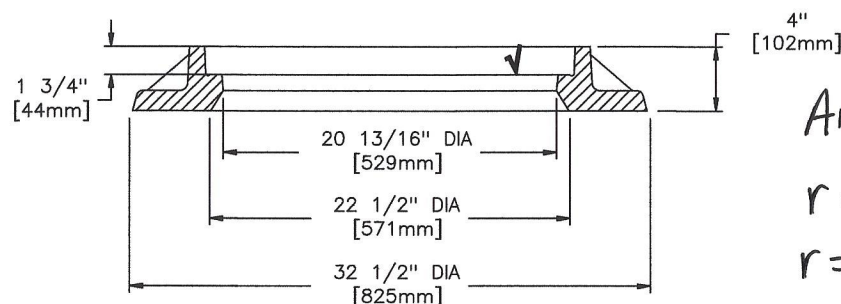
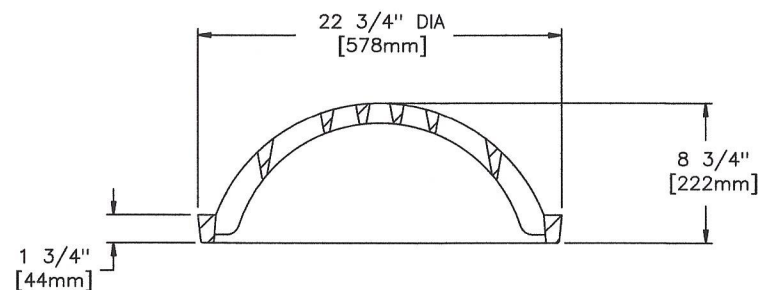
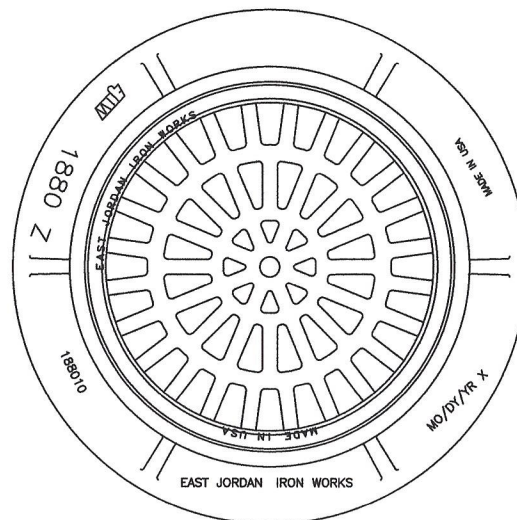
Pond FB2: Filter Basin 2 Peak Elev=214.77' Storage=5,536 cf Inflow=5.39 cfs 0.409 af
 Primary=3.75 cfs 0.328 af Secondary=0.00 cfs 0.000 af Outflow=3.75 cfs 0.328 af

Pond P1: Peak Elev=210.56' Storage=12,522 cf Inflow=2.41 cfs 0.557 af
 Outflow=0.70 cfs 0.282 af

Pond WP-01: TRACTOR SUPPLY WET Peak Elev=220.07' Storage=14,404 cf Inflow=6.51 cfs 0.572 af
 Outflow=1.27 cfs 0.331 af

Pond WP-04: TRACTOR SUPPLY WET Peak Elev=221.62' Storage=10,236 cf Inflow=5.70 cfs 0.469 af
 Outflow=1.72 cfs 0.325 af

Pond WP1: Wet Pond 1 Peak Elev=215.55' Storage=41,628 cf Inflow=18.15 cfs 2.855 af
 Primary=10.97 cfs 2.355 af Secondary=0.00 cfs 0.000 af Outflow=10.97 cfs 2.355 af



$$\text{Area} = \pi r^2$$

$$r = \sqrt{\text{Area} / \pi}$$

$$r = \sqrt{150 / \pi}$$

$$r = 6.91"$$

$$\therefore D = 13.82"$$

Effective Diameter

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COATING

DIPPED

ESTIMATED WEIGHT

ASSEMBLED: 330 LBS

MATERIAL SPECIFICATION

FRAME & COVER -
GRAY IRON
ASTM A48 CL35B

OPEN AREA

150 SQ INCHES
968 SQ cm

✓ MACHINED SURFACE

DRAWN

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DATE

04/13/06

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06/09/06

REFERENCE INFORMATION

00102045
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