STORMWATER MANAGEMENT REPORT

"55+ MANUFACTURED HOUSING COMMUNITY"
LOT 3 BERRY FARMS ROAD
STURBRIDGE, MA 01566

Prepared for:
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Section I - Introduction

A. Scope of Analysis

The project Applicant, Justin Stelmok, retained McClure Engineering, Inc. (McClure) to prepare this engineering analysis of pre and post-development drainage runoff conditions for the proposed "55+ Manufactured Housing Community" Plan for the property located at Lot 3 Berry Farms Road, Sturbridge, MA (Site).

This Stormwater Management Report provides the required analysis of the proposed stormwater system for compliance with the Town of Sturbridge Bylaw requirements, and the Massachusetts 310 CMR 10.00 Wetland Protection Regulations as promulgated by the Commissioner of the Massachusetts Department of Environmental Protection (MassDEP) pursuant to the authority granted under the Wetland Protection Act, M.G.L. c. 131 sec. 40 (WPA). The analysis includes pre- and post- conditions hydrologic modeling, and hydraulic sizing of the conveyance systems, sizing and analysis of Stormwater Best Management Practices (BMPs) of structural or non-structural techniques for managing stormwater to prevent or reduce non-point source pollutants from entering surface waters or ground waters. This report will demonstrate that the stormwater management system as designed and laid out at Lot 3 Berry Farms Road, Sturbridge, MA, complies with the referenced regulations.

A copy of the "MA-DEP Checklist for Stormwater Report" is included as Appendix A.

B. Site Description

The subject site consists of approximately 41.5 acres. The property lies on the northern side of Main Street and along the Southbridge Town Line. The property is shown as Lot 3 of the Berry Farms Road Definitive Subdivision. The site is located within the Town of Sturbridge Rural Residential zoning district. The existing site consists of mostly wooded area, as well as wetlands. The site has previously been logged and some existing logging trails still exist throughout the property. The site topography slopes generally in a westerly direction towards a valley containing wetlands. The site is surrounded by wetlands on the western boundary, as well as (3) vernal pools as determined by LEC Environmental.

The site is located within an area of minimal flood hazard (Zone X) per Flood Insurance Rate Map (FIRM) Worcester County Massachusetts (All Jurisdictions), Map Number 25027C0933E, effective on 07/04/2011 (see Appendix C).

C. Proposed Construction

The proposed site layout is for the construction of a 55+ Manufactured Housing Community. The community is proposed with (4) 20' wide private roads, (3) cul-de-sacs, (1) emergency access drive through the Town of Southbridge, a common clubhouse and active open space area, and (63) total units. The community will be serviced by municipal water and sewer through Berry Farms Road. The stormwater management system for the site consists of country style drainage, including swales and rain gardens with minimal structures for conveyance. Rain gardens will be placed between all units, and will act as a stormwater structure, but also on-site landscaping and yard separation/privacy barrier. Other than a single deep sump and hooded catch basin in the parking lot for the club house, all stormwater will be conveyed on the surface to rain gardens. These rain gardens will provide for peak flow attenuation, water quality treatment, and groundwater recharge. A total of (71) rain gardens are proposed, with the majority being smaller rain gardens positioned between units which will detain and treat runoff from the units, roads, and driveway. A few larger secondary rain gardens are also proposed. A single large infiltration basin is proposed within an existing natural depression. Interception trenches are proposed behind the units on Roads A and D to convey clean runoff from the undeveloped portions of the property towards the existing discharge points of the property.

The **"Special Permit and Site Plan, Blueberry Hill Estates, 55+ Manufactured Housing Community, Lot 3 Berry Farms Road, Sturbridge, MA" Plan Set prepared by McClure Engineering, Inc., dated 4/28/23** provides details of the complete stormwater management system design**.**

Section II - Hydrologic Analysis

A. Purpose

The purpose of this analysis is to determine the peak rate of stormwater runoff leaving the site and to design a stormwater management system that will prevent offsite flooding impacts. MassDEP Stormwater Management Policy, Standard No. 2, requires that post-development peak stormwater discharge rates shall not exceed pre-development levels.

B. Methodology

The pre- and post-development stormwater runoff has been analyzed using HydroCAD, a stormwater modeling computer program. HydroCAD is a collection of techniques for the generation and routing of hydrographs, including Soil Conservation Service (SCS) Technical Release No. 20 (TR-20) and SCS Technical Release 55 (TR-55), Urban Hydrology for Small Watersheds. The analysis routes completely through one node at a time determining each outflow hydrograph before considering the next node.

The subcatchments have been modeled using SCS methods. Curve numbers, which are based upon the type of development and soil classifications, coupled with the time of concentration have been used to generate the peak storm flow for each area. The detailed information and results are provided in this report.

Hydrology

Computer Model:	HydroCAD 10.0 © 2013 Applied Microcomputer Systems, drainage modeling software;
Hydrologic Methodology:	TR-55 Methodology is used for analysis of peak flow and infiltration basin sizing.
Watershed Areas:	Watershed areas are calculated using AutoCAD software based on the subcatchment areas delineated on topographic mapping included as “Pre-Development Drainage” and “Post-Development Drainage”. The areas shown, times of concentration and runoff coefficients are all consistent with the TR-55 drainage calculation method.

C. Selection of Storm Events

The intensity for each storm event was determined from the National Oceanic and Atmospheric Administration National Weather Service Atlas 14 Point Precipitation Frequency Estimates (See Appendix C). Evaluations were based upon a Type **III**, 24-hour storm. Rainfall frequency and intensity used in this analysis are as follows:

Design Storm Event	Rainfall Intensity
2 year	3.24 inches
10 year	5.05 inches
25 year	6.18 inches
100 year	7.93 inches

D. Soils Classification

Site soils classifications were obtained from the following sources:

1.) Advanced soil mapping performed by the U.S. Department of Agriculture’s Natural Resources Conservation Service (NRCS), “Soil Survey of Worcester County, Massachusetts, Southern Part.” (See Appendix C for detailed soil information).

The soils descriptions are mapped as follows:

71B – Ridgebury Fine Sandy Loam – "HSG D"
305C – Paxton Fine Sandy Loam – "HSG C"
307C – Paxton Fine Sandy Loam – "HSG C"
312B – Woodbridge Fine Sandy Loam – "HSG C"

2.) On site soil testing performed by Peter Engle, P.E. (SE#14009) on 9/3/20 and 4/12/23
Testing pit locations and results are shown on the Existing Conditions Plans within the Plan Set.

Soil Permeability (k):
Design permeability (k) value:
k = 2.41 in / hr (Rawls Rate for Loamy Sand based upon on-site soil testing)
k = 1.02 in / hr (Rawls Rate for Sandy Loam based upon on-site soil testing)

E. Pre-Development Model Summary

The pre-development hydrologic model analyzes the existing stormwater runoff from the site to (8) analysis points. The analysis points are: Southbridge Parcel 019-048 (0 Cournoyer Blvd), Wetland Series A (Flags A56-87), Wetland Series A (Flags A47-A56 and downstream Vernal Pool), Wetland Series A (Flags A32-A47), Wetland Series A (Flags A23-32 and upstream Vernal Pool), Wetland Series B (off-site), Wetland Series E (Vernal Pool), and Southbridge Parcel 032-092 Idlewood Street. The graphical presentation of the pre-development model is shown in Appendix D.

F. Post-Development Model Summary

The configuration of the post development analysis points, sub-catchments, ponds and reaches are generally configured as the pre-model. The post-development subcatchment has been broken into several smaller subcatchments for the analysis, in order to properly size the proposed rain gardens, infiltration basin, pipe network, etc. The analysis points are the same as the pre-development model. The graphical presentation of the post-development model is shown in Appendix E. For ease of the model, areas of the proposed units have been modeled as Residential Development – 1/8 acre lots with 65% impervious surface. The model should be considered conservative as the average lot is closer to 55% impervious surface as taken from the site plan. The unit sizes used in the analysis are also the largest units that will be made available to prospective buyers, and it is very unlikely all units will be this size.

G. Summary of Peak Stormwater Discharge Rates

The Pre- and Post-Analyses HydroCAD Reports of the 2, 10, 25 and 100 year frequency storms are provided in Appendix D and E respectively. The following summary table present results for the pre- and post-development analysis for the 2, 10, 25 and 100 year, 24-hr storm events at the analysis point as previously described. The table shows that post peak rate of runoff is less than or equal to that of pre-existing peak rate of runoff for all the storms as studied.

Table No. 1
Analysis Point 1: Southbridge Parcel 019-048 (0 Cournoyer Blvd)

	Pre-Development (cfs)	Post-Development (cfs)
2 Year Storm	2.58	2.56
10 Year Storm	6.90	6.86
25 Year Storm	9.96	9.90
100 Year Storm	15.00	14.91

Table No. 2
Analysis Point 2: Wetland A (A56-A87)

	Pre-Development (cfs)	Post-Development (cfs)
2 Year Storm	7.95	7.92
10 Year Storm	22.72	20.93
25 Year Storm	33.38	31.68
100 Year Storm	51.05	47.25

Table No. 3
Analysis Point 3: Wetland (A47-A56 / downstream A series Vernal Pool)

	Pre-Development (cfs)	Post-Development (cfs)
2 Year Storm	0.34	0.33
10 Year Storm	2.55	2.07
25 Year Storm	4.48	3.58
100 Year Storm	7.93	6.69

Table No. 4
Analysis Point 4: Wetland Series A (A32-A47)

	Pre-Development (cfs)	Post-Development (cfs)
2 Year Storm	3.07	2.76
10 Year Storm	9.20	8.89
25 Year Storm	13.66	13.06
100 Year Storm	21.07	20.28

Table No. 5
Analysis Point 5: Wetland Series A (A23-A32/ Upstream Vernal Pool)

	Pre-Development (cfs)	Post-Development (cfs)
2 Year Storm	2.87	2.86
10 Year Storm	8.60	7.57
25 Year Storm	12.80	10.66
100 Year Storm	19.79	19.16

Table No. 6
Analysis Point 6: Wetland Series B

	Pre-Development (cfs)	Post-Development (cfs)
2 Year Storm	1.57	1.37
10 Year Storm	4.36	4.34
25 Year Storm	6.35	6.35
100 Year Storm	9.62	9.54

Table No. 7
Analysis Point 7: Wetland Series E

	Pre-Development (cfs)	Post-Development (cfs)
2 Year Storm	1.61	1.48
10 Year Storm	6.18	6.04
25 Year Storm	9.74	9.29
100 Year Storm	15.87	15.69

Table No. 8
Analysis Point 8: Southbridge Parcel 032-092 Idlewood Street

	Pre-Development (cfs)	Post-Development (cfs)
2 Year Storm	0.40	0.08
10 Year Storm	1.05	1.04
25 Year Storm	1.50	1.46
100 Year Storm	2.23	2.18

Section III – Stormwater Standards

A. Standard 1 – Computations to Show That Discharge Does Not Cause Scour or Erosion

No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

Proposed Full Compliance:
The site drainage system has been designed from calculations based upon the 100-year design storm event using the peak flows predicted by the HydroCAD 10 Dynamic Modelling Program. The Manning's Equation has been used to size the drainage system pipe runs.

Manning's Equation: Q = A 1.486 R2/3 S1/2 / n
Where: Q = Flow Discharge, cfs
A = Cross Sectional Area of Wetted Perimeter
n = Manning Coefficient of Channel Roughness
R = Hydraulic Radius (A/WP)
WP = Wetted Perimeter
S = Slope of Energy Gradient

No new untreated discharges are proposed for the development. All stormwater discharges for the site will have been conveyed through water quality treatment BMPs which meet Standard 4 prior to discharge. All stormwater discharges will also be conveyed to either rip rap outfalls or perforated pipe level spreaders to reduce runoff velocities and to prevent erosion or sedimentation of downstream discharge points. Rip rap outfalls and level spreaders as shown on the site plans have been designed for the applicable flows and velocities directed towards them.

B. Standard 2 – Peak Rate Attenuation

Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for land subject to coastal storm flowage.

Proposed Full Compliance:
The peak rate attenuation analyses and summaries have been reported in hydrologic analysis provided in Section D of this report documenting there is no increase to off-site peak flow rates. A review of FEMA Flood Insurance Rate Map (FIRM) #25027C0933E (reduced scale provided in Appendix C) was reviewed for this site. The site is located in an area of minimal flood hazard (Zone X). The analysis as submitted indicates that there will be no increase in rate of runoff that would cause an increase of the flooding downstream.

C. Standard 3 – Recharge

Loss of annual recharge to ground water shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development conditions based on soil type. This Standard is met when the storm water management system is design to infiltrate the required recharge volume as determined in accordance with the Massachusetts Storm water Handbook.

Proposed Full Compliance:
The majority of the stormwater runoff from the proposed impervious area will be directed to the proposed rain gardens. Rain gardens within areas of fill and which will meet the required separation to groundwater and bedrock will provide for groundwater recharge as well as peak flow attenuation and water quality treatment. Rain gardens in areas of cut which will not meet the required separation to groundwater or bedrock will be lined with a 10 mil

impervious poly barrier and will only provide for peak flow attenuation and water quality treatment. A single large infiltration basin is also proposed and will provide for significant ground water recharge. All together the rain gardens and the infiltration basin will far exceed the required recharge volume. See Appendix F for computations of Standards 3 and 4. The following is a summary of the recharge for the three basins

1. Required Recharge Volume
   a. Impervious Area, as obtained from proposed Site Plan:
      103,640 s.f. HSG B
      219,110 s.f. HSG C
      10,730 s.f. HSG D
   b. Required recharge volume Rv = F x Impervious Area (F = target depth factor)
      Rv = 103,640 sf x 0.35 in/sf + 219,110 sf x 0.25 in/sf + 10,730 sf x 0.1 in/sf = 7,678 c.f.

2. Provided Recharge Volume
   a. The proposed infiltration basin alone provides for 8,159 c.f. of storage volume below the lowest outlet (bottom of basin 704.00, orifice in outlet control structure at elevation 705.40), which is enough to meet the recharge volume requirement. According to the HydroCAD model, the basin infiltrates 18,906 c.f. during a two year storm event. The typical infiltrating rain garden between units provides for 265 c.f. of storage volume and provides for 840 c.f. of groundwater recharge during a two year storm event. Rain garden 2.1 provides for 3,865 c.f. of storage volume and provides for 10,643 c.f. of groundwater recharge during a two year storm event. Rain garden 3.1 provides for 1,156 c.f. of storage volume and provides for 2,277 c.f. of groundwater recharge during a two year storm event. Rain garden 4.1 provides for 2,992 c.f. of storage volume and provides for 6,434 c.f. of groundwater recharge during a two year storm event. Rain garden 4.2 provides for 1,920 c.f. of storage volume and provides for 4,076 c.f. of groundwater recharge during a two year storm event. Rain garden 5.1 provides for 1,526 c.f. of storage volume and provides for 994 c.f. of groundwater recharge during a two year storm event.

3. Drawdown within 72 hours:
   T = 12 x Provided Recharge Volume / (Rawls Rate x Basin Bottom Area)
   Infiltration Basin T= 8.7 hours
   Rain Garden 5.1 T = 8.2 hours
   Rain Garden 4.1 T = 9.1 hours
   Rain Garden 4.2 T = 9.9 hours
   Rain Garden 3.1 T = 8.1 hours
   Rain Garden 2.1 T = 4.6 hours
   Typical between unit Rain Garden T= 4.4 hours

D. Standard 4 – Water Quality

Stormwater management systems must be designed to remove 80% of the average annual post construction load of Total Suspended Solids (TSS). This standard is met when:

a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan and thereafter implemented and maintained;

b. Stormwater BMPs are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and

c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

Proposed Full Compliance:

TSS removal percentage computations are provided in Appendix F for the BMP treatment train as designed. There are several treatment trains created for the proposed drainage system:

a. Runoff from pavement travels to an infiltrating rain garden with a sediment forebay and is discharged to a non-critical area. TSS removal equals 90%. The typical rain garden has an impervious area of 5,000 s.f. directed towards it, and therefore has a required water quality volume of 210 c.f. (0.5" water quality depth). During a two year storm event, the typical rain garden has an inflow of 1,150 c.f., therefore meeting the water quality volume requirement.
b. Runoff from pavement travels to a lined rain garden with a sediment forebay and is discharged to a critical area (Vernal Pool). TSS removal equals 90%. The typical rain garden has an impervious area of 5,000 s.f. directed towards it, and therefore has a required water quality volume of 420 c.f. (1.0" water quality depth). During a two year storm event, the typical rain garden has an inflow of 1,150 c.f., therefore meeting the water quality volume requirement.
c. Runoff from pavement travels to an infiltrating rain garden with (2) sediment forebays (44% pretreatment) and is discharged to a critical area (vernal pool). TSS removal equals 93%. The typical rain garden has an impervious area of 5,000 s.f. directed towards it, and therefore has a required water quality volume of 420 c.f. (1.0" water quality depth). During a two year storm event, the typical rain garden has an inflow of 1,150 c.f., therefore meeting the water quality volume requirement.
d. Runoff from pavement travels to an infiltrating rain garden with a sediment forebay and is discharged to an additional infiltrating rain garden prior to discharge to a non-critical area. TSS removal equals 99%. The typical rain garden has an impervious area of 5,000 s.f. directed towards it, and therefore has a required water quality volume of 210 c.f. (0.5" water quality depth). During a two year storm event, the typical rain garden has an inflow of 1,150 c.f., therefore meeting the water quality volume requirement.
e. Runoff from pavement travels to a lined rain garden with a sediment forebay and is discharged to an infiltrating rain garden prior to discharge to a non-critical area. TSS removal equals 99%. The typical rain garden has an impervious area of 5,000 s.f. directed towards it, and therefore has a required water quality volume of 210 c.f. (0.5" water quality depth). During a two year storm event, the typical rain garden has an inflow of 1,150 c.f., therefore meeting the water quality volume requirement.
f. Runoff from pavement travels to a lined rain garden with a sediment forebay (90% pretreatment) and is discharged to an infiltrating rain garden prior to discharge to a critical area (vernal pool). TSS removal equals 99%. The typical rain garden has an impervious area of 5,000 s.f. directed towards it, and therefore has a required water quality volume of 420 c.f. (1.0" water quality depth). During a two year storm event, the typical rain garden has an inflow of 1,150 c.f., therefore meeting the water quality volume requirement.
g. Runoff from pavement travels to a rain garden with a Rain Guardian pretreatment device and is discharged to a non-critical area. TSS removal equals 90%. Rain garden 2.1 has an impervious area of 32,675 s.f. directed towards it, and therefore has a required water quality volume of 1,360 c.f. (0.5" water quality depth). During a two year storm event, rain garden 2.1 has an inflow of 12,150 c.f., therefore meeting the water quality volume requirement.
h. Runoff from pavement travels to a rain garden (lined or infiltrating) with a sediment forebay (90% pretreatment) and is discharged to an infiltration basin prior to discharge to a critical area (vernal pool). TSS removal equals 98%. The typical rain garden has an impervious area of 5,000 s.f. directed towards it, and therefore has a required water quality volume of 420 c.f. (1.0" water quality depth). During a two year storm event, the typical rain garden has an inflow of 1,150 c.f., therefore meeting the water quality volume requirement. The infiltration basin has an impervious area of 116,880 s.f. directed towards it, and therefore has a required water quality volume of 9,740 c.f. (1.0" water quality depth). During a two year storm event, the infiltration basin has an inflow of 31,784 c.f., therefore meeting the water quality volume requirement.
i. Runoff from pavement travels to an infiltration basin with a sediment forebay from a deep sump and hooded catch basin (44% pretreatment) prior to discharge to a critical area (vernal pool). TSS removal equals 85%. The deep sump catch basin has an impervious area of 6,100 s.f. directed

towards it, and therefore has a required water quality volume of 510 c.f. (1.0” water quality depth). During a two year storm event, the deep sump catch basin has an inflow of 1,776 c.f., therefore meeting the water quality volume requirement. The infiltration basin has an impervious area of 116,880 s.f. directed towards it, and therefore has a required water quality volume of 9,740 c.f. (1.0” water quality depth). During a two year storm event, the infiltration basin has an inflow of 31,784 c.f., therefore meeting the water quality volume requirement.

All discharges from pavement are treated to a minimum of 85% TSS removal and all discharges to or near a critical area (Vernal Pools) are treated for 44% pretreatment prior to infiltration.

Rain gardens are proposed with outlet control devices which include orifices above full soil depth, however these are for control of large storm flows. No water quality flows bypass any rain gardens therefore meeting the requirements of Standard 4 and providing adequate water quality treatment:

	High Orifice Elev	WQ Event Peak	High Orifice Storm Event	Discharges To	Pretreatment %	WQ Event Treat %
RG1	674.00	672.58	2 year	RG5.1	25%	90%
RG2	676.00	674.44	10 year	RG5.1	25%	90%
RG3	678.00	676.66	2 year	RG5.1	25%	90%
RG6	676.00	673.50	10 year	RG4.1	25%	90%
RG7	677.50	675.00	10 year	RG4.1	25%	90%
RG8	678.00	675.50	10 year	RG4.1	25%	90%
RG9	679.50	677.00	10 year	RG4.1	25%	90%
RG10	681.50	679.00	10 year	RG4.1	25%	90%
RG11	684.00	681.50	10 year	RG4.1	25%	90%
RG12	688.50	687.47	2 year	RG4.2	25%	90%
RG13	697.00	696.10	2 year	RG4.2	25%	90%
RG14	703.75	702.82	2 year	RG2.1	25%	90%
RG15L	709.25	709.00	2 year	GW & Inf. Basin	25%	90%
RG15H	718.00	717.60	2 year	GW & Inf. Basin	25%	90%
RG16	732.75	732.31	2 year	GW & Inf. Basin	25%	90%
RG17	734.50	732.90	10 year	Inf. Basin	25%	90%
RG18	732.00	730.40	10 year	Inf. Basin	25%	90%
RG19	728.50	726.90	10 year	Inf. Basin	25%	90%
RG20	726.50	724.90	10 year	Inf. Basin	25%	90%
RG22	727.25	726.75	10 year	Outfall VP E	44%	90%
RG23	728.75	727.25	10 year	Inf. Basin	25%	90%
RG24	733.25	731.75	10 year	Inf. Basin	25%	90%
RG25	734.25	732.75	10 year	Inf. Basin	25%	90%
RG26	746.00	744.50	2 year	Inf. Basin	25%	90%
RG27L	750.50	749.00	2 year	Inf. Basin	25%	90%
RG27H	757.00	756.30	2 year	Inf. Basin	25%	90%
RG28H	756.25	755.10	10 year	Inf. Basin	25%	90%
RG28L	748.50	747.33	2 year	Inf. Basin	25%	90%
RG29	742.00	740.82	2 year	Inf. Basin	25%	90%
RG30	730.00	728.52	10 year	Inf. Basin	25%	90%
RG31	731.00	730.10	10 year	RG2.1	25%	90%
RG32	733.50	731.60	10 year	RG2.1	25%	90%
RG33	735.50	733.60	10 year	RG2.1	25%	90%
RG34	738.50	736.60	10 year	RG2.1	25%	90%
RG35	740.00	738.10	10 year	RG2.1	25%	90%
RG36	739.00	737.10	10 year	Outfall Wet A	25%	90%
RG37	738.50	736.60	10 year	Outfall Wet A	25%	90%
RG38	736.50	734.60	10 year	Outfall Wet A	25%	90%
RG39	734.00	732.10	10 year	Outfall Wet A	25%	90%
RG40	732.00	731.00	2 year	Outfall North	25%	90%
RG41	731.00	730.40	2 year	Outfall North	25%	90%
RG42	731.00	730.34	2 year	GW & Outfall Wet A	25%	90%
RG43	732.50	731.80	2 year	GW & Outfall Wet A	25%	90%
RG44	736.00	735.30	2 year	GW & Outfall Wet A	25%	90%
RG45	737.50	736.80	2 year	GW & Outfall Wet A	25%	90%

RG46	739.00	738.30	2 year	GW & Outfall Wet A	25%	90%
RG47	739.00	738.30	2 year	GW & Outfall Wet A	25%	90%
RG48	737.50	736.80	2 year	GW & RG2.1	25%	90%
RG49	734.50	733.30	10 year	GW & RG2.1	25%	90%
RG50	731.00	729.80	10 year	GW & RG2.1	25%	90%
RG51	694.00	692.97	2 year	RG4.2	25%	90%
RG52	695.50	694.40	10 year	Outfall Wet A	25%	90%
RG53	692.50	691.40	10 year	Outfall Wet A	25%	90%
RG54	689.00	687.90	10 year	Outfall Wet A	25%	90%
RG55	688.00	686.31	10 year	Outfall Wet A	25%	90%
RG57	689.25	688.85	2 year	GW & RG4.2	25%	90%
RG58	694.25	693.85	2 year	GW & RG4.2	25%	90%
RG59	689.75	689.35	2 year	GW & RG4.2	25%	90%
RG60	686.25	685.60	2 year	GW & RG4.2	25%	90%
RG61	683.25	682.60	2 year	GW & RG4.1	25%	90%
RG62	680.75	680.10	2 year	GW & RG4.1	25%	90%
RG63	678.25	677.60	2 year	GW & RG4.1	25%	90%
RG64	677.25	676.60	2 year	GW & RG4.1	25%	90%
RG69	677.75	675.66	10 year	GW & Outfall VPA1	44%	90%
RG70	673.75	673.21	2 year	GW & Outfall VPA1	44%	90%
RG2.1	701.75	699.62	10 year	GW & Outfall Wet A	25%/90%	90%/99%
RG3.1	686.00	684.02	10 year	GW & Outfall VPA2	44%	90%
RG4.1	671.25	671.25	2 year	GW & Outfall Wet A	90%	99%
RG4.2	678.25	678.08	2 year	GW & Outfall Wet A	90%	99%
RG5.1	671.75	671.39	2 year	GW & Outfall VPA1	44%/90%	90%/99%

Per the EPA Region 1 BMP Performance Extrapolation Tool and the MA Stormwater Handbook, all treatment trains will also provide for a minimum 60% phosphorous removal as well.

The TSS removal computations are provided in Appendix F.

A “Long Term Operation and Maintenance Plan” is being provided as Appendix H.

E. __Standard 5 – Land Uses with Higher Potential Pollutant Loads__

For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Storm water Handbook to eliminate or reduce the discharge of storm water runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention, all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, or storm water runoff, the proponent shall use the specific storm water BMP’s determined by the Department to be suitable for such use as provided in the Massachusetts Storm water Handbook.

Proposed Full Compliance:

- Not applicable - the Site is not a Land Use with High Potential Pollutant Loads.

F. __Standard 6 – Critical Areas__

Storm water discharges to a Zone II or Interim Wellhead Protection Area of a public water supply and storm water discharges near or any other critical area require the use of the specific storm water best management practices determined by the Department to be suitable for managing discharges to such area as provided in the Massachusetts Storm water Handbook.

Proposed Full Compliance:

- The site does discharge to or near critical areas: three on- and off-site vernal pools. All discharges from pavement are treated to a minimum of 85% TSS removal and all discharges to or near a critical area (vernal pools) are treated for 44% pretreatment prior to infiltration. The 1" water quality depth was used to ensure the treatment BMPs treat the required water quality volumes.

G. Standard 7 - Redevelopment

A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable; Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

Proposed Full Compliance:

- The Site is not considered a redevelopment, and all of the standards will be fully met.

H. Standard 8 – Construction Period Controls

A plan to control construction related impacts including erosion sedimentation and other pollution prevention sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) must be implemented.

Proposed Full Compliance:

- Draft - Weekly Construction Period Inspection Report is provided as Appendix G.
- Project will disturb > 1 Acre, therefore an EPA–NPDES Stormwater General Permit is required.
- The construction period erosion and sedimentation controls are outlined on the referenced site plans along with the sequence for implementation and construction phasing.

I. Standard 9 – Operation and Maintenance Plan

A long term operation and maintenance plan must be developed and implemented to ensure that storm water management systems function as designed.

Proposed Full Compliance:

- Long Term Operation and Maintenance Plan is included in the Stormwater Management Report, Appendix H.

J. Standard 10 – Illicit Discharges to Drainage System

All illicit discharges to the stormwater management system are prohibited.

Proposed Full Compliance:

- The Long Term Operation and Maintenance Plan provided in Appendix H addresses illicit discharges to drainage system and includes an Illicit Discharge Compliance Statement signed by the applicant.

Tables No. 1-8 provide a summary of off-site Pre- and Post-Development peak runoff flow rates and volumes**.**

Appendix A includes a copy of the "MA-DEP Checklist for Stormwater Report".

Appendix B & C includes maps and information regarding rainfall data and soils for the site.

Appendix D & E includes the complete Pre-Development and Post-Development *HydroCAD* drainage calculation reports figures for your review.

Appendix F provides additional stormwater calculations relating to compliance with the MA Stormwater Management Standards

Appendix G provides a DRAFT "Weekly Construction Period Inspection Report"

Appendix H provides a "Long Term Stormwater Operation & Maintenance Plan"

The **"Special Permit and Site Plan, Blueberry Hill Estates, 55+ Manufactured Housing Community, Lot 3 Berry Farms Road, Sturbridge, MA" Plan Set prepared by McClure Engineering, Inc., dated 4/1/22, Rev 6/27/23** provides details of the complete stormwater management system design**.**

APPENDIX A

MA-DEP STORMWATER CHECKLIST

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

---

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

COMMONWEALTH OF MASSACHUSETTS
PETER C
ENGLE
CIVIL
No. 53736
REGISTERED
PROFESSIONAL ENGINEER

6-27-23

Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

☒ No disturbance to any Wetland Resource Areas

☒ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☐ Reduced Impervious Area (Redevelopment Only)

☒ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

- ☐ Credit 1
- ☐ Credit 2
- ☐ Credit 3

☒ Use of "country drainage" versus curb and gutter conveyance and pipe

☒ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☐ Other (describe): ______________________

Standard 1: No New Untreated Discharges

☒ No new untreated discharges

☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth

☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☒ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☒ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☒ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist (continued)

Standard 3: Recharge (continued)

☒ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:
- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☒ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

☐ is within the Zone II or Interim Wellhead Protection Area

☒ is near or to other critical areas

☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)

☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☐ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☒ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☒ Critical areas and BMPs are identified in the Stormwater Report.

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

- ☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

- ☐ The project is ***not*** covered by a NPDES Construction General Permit.
- ☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.
- ☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

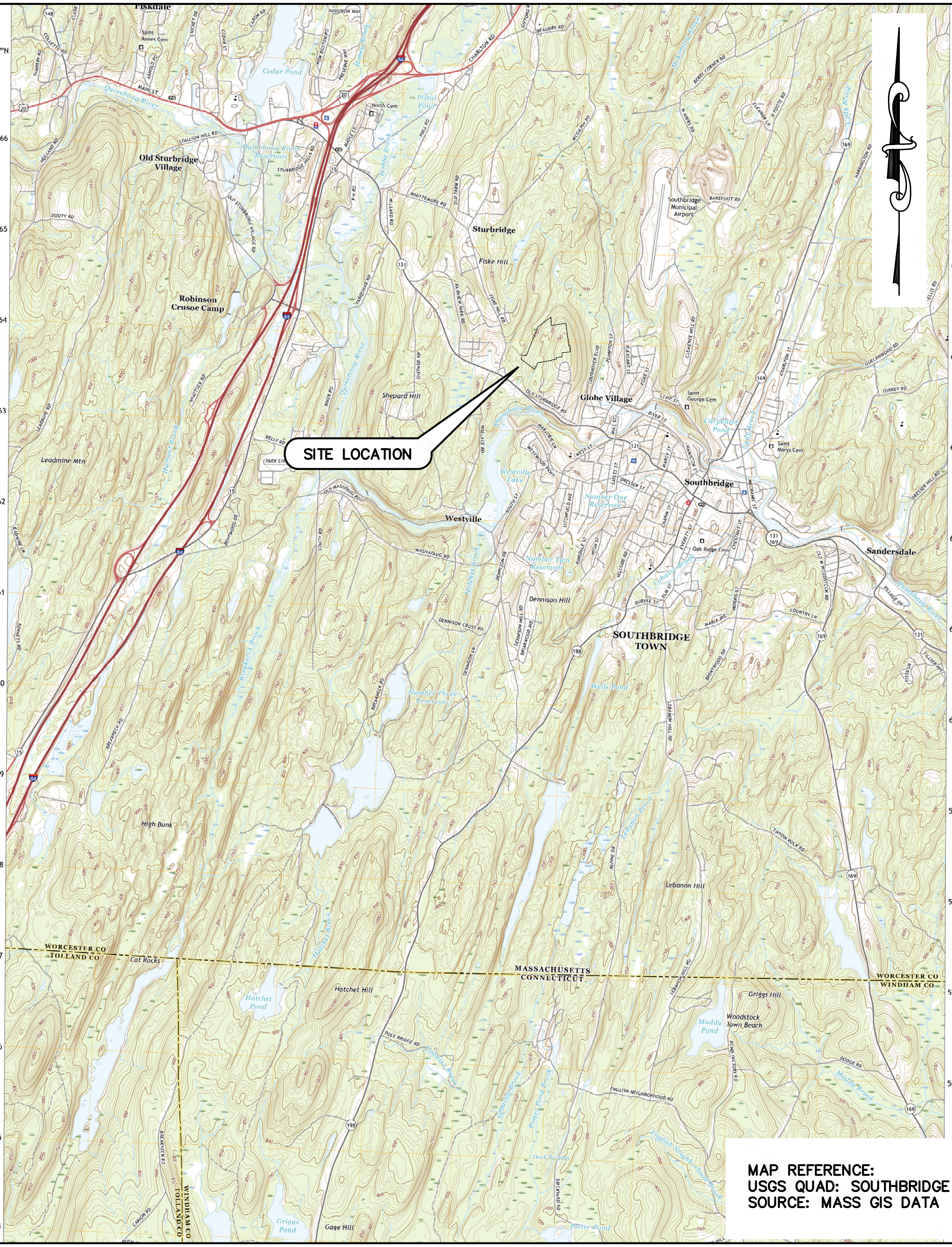
- ☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:
  - ☒ Name of the stormwater management system owners;
  - ☒ Party responsible for operation and maintenance;
  - ☒ Schedule for implementation of routine and non-routine maintenance tasks;
  - ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
  - ☒ Description and delineation of public safety features;
  - ☒ Estimated operation and maintenance budget; and
  - ☒ Operation and Maintenance Log Form.
- ☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:
  - ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
  - ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

- ☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
- ☒ An Illicit Discharge Compliance Statement is attached;
- ☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

APPENDIX B

USGS – Figure 1



DATE:	3.31.22
DRAWN BY:	MM
APPROVED BY:	PE
SCALE:	
HORZ:	1"=5000'

0 2500' 5000'

McCLURE ENGINEERING, INC
119 Worcester Road
Charlton, MA 01507
Tel: (508) 248-2005
Fax (508) 248-4887
Email: pengle@mcclureengineers.com

USGS SITE LOCATION

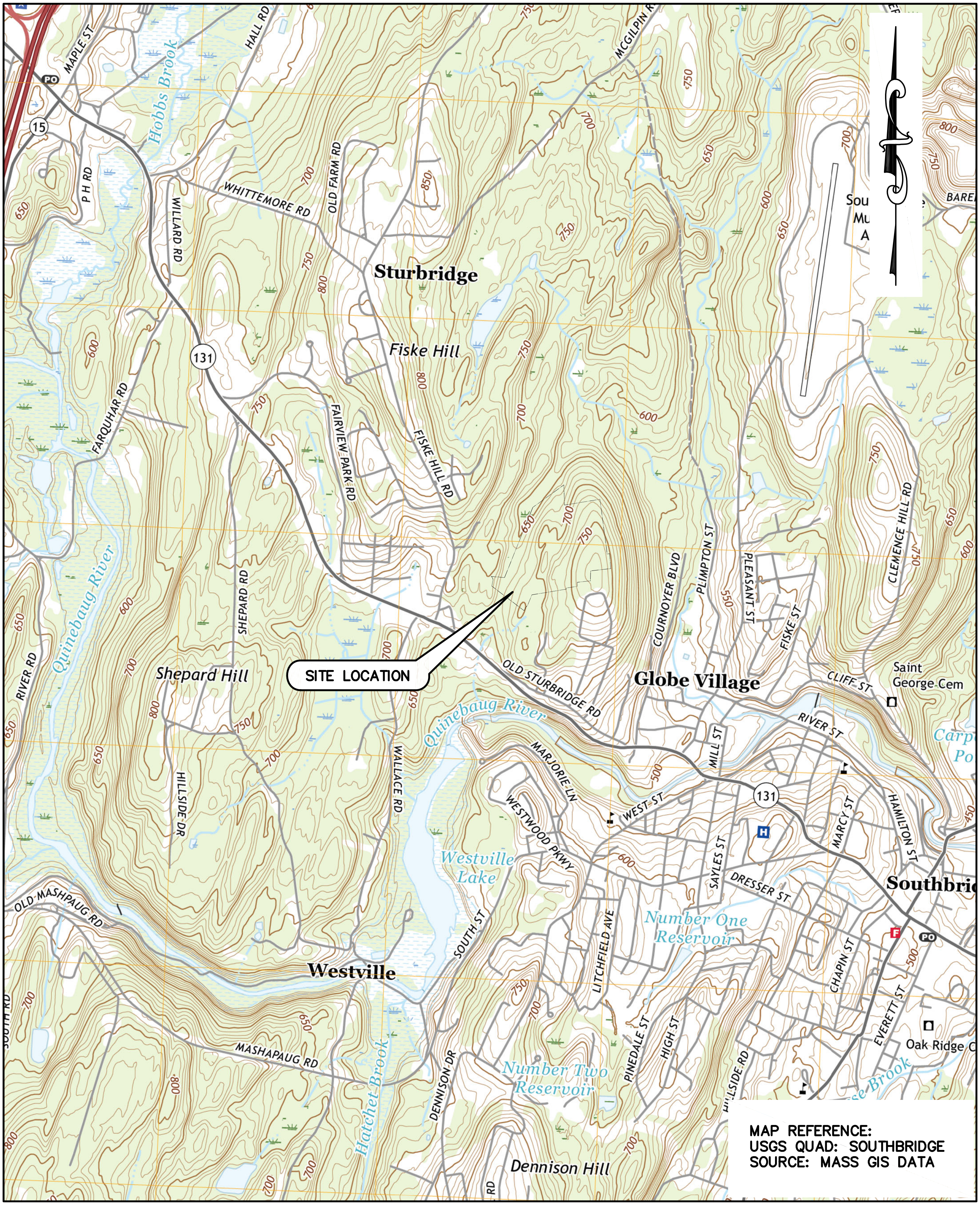
LOT 3

BERRY FARMS ROAD

STURBRIDGE, MASSACHUSETTS

PROJ. NO.	287-2118-K
DWG.	USGS

FIG 1.1



DATE:	3.31.22
DRAWN BY:	MM
APPROVED BY:	PE
SCALE:	
HORZ: 1"=2000'	

0 1000' 2000'

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USGS SITE LOCATION

LOT 3

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DWG.	USGS

FIG 1.2

APPENDIX C

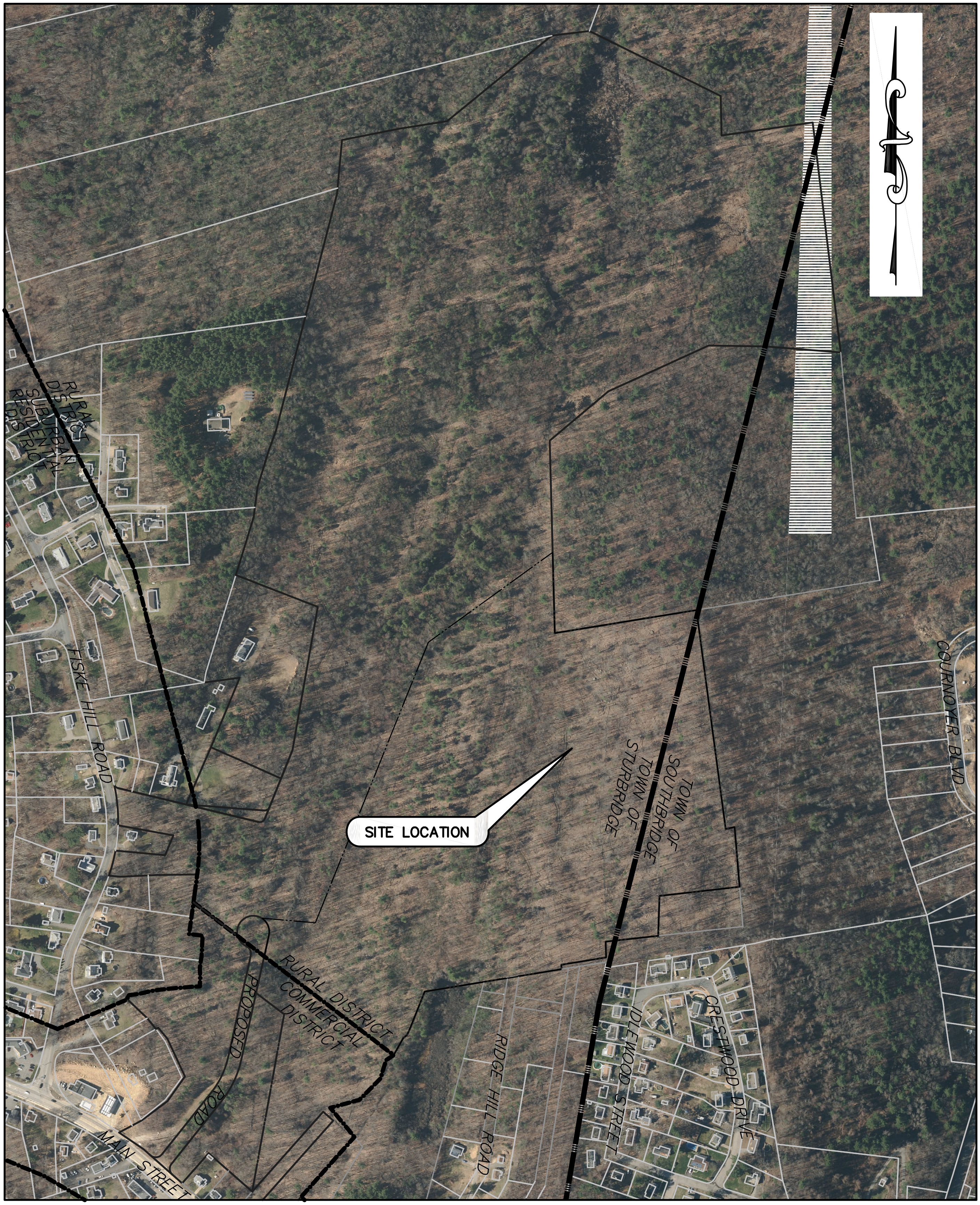
FEMA - FLOOD PLAIN MAPPING

NCRS SOIL MAPPING

ON-SITE SOIL TESTING LOGS

RAWLS TABLE

NOAA PRECIPITATION FREQUENCY ESTIMATES



DATE:	3.31.22
DRAWN BY:	MM
APPROVED BY:	PE
SCALE:	
HORZ:	1"=500'

0 250 500'

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ORTHO IMAGERY
LOT 3
BERRY FARMS ROAD
STURBRIDGE, MASSACHUSETTS

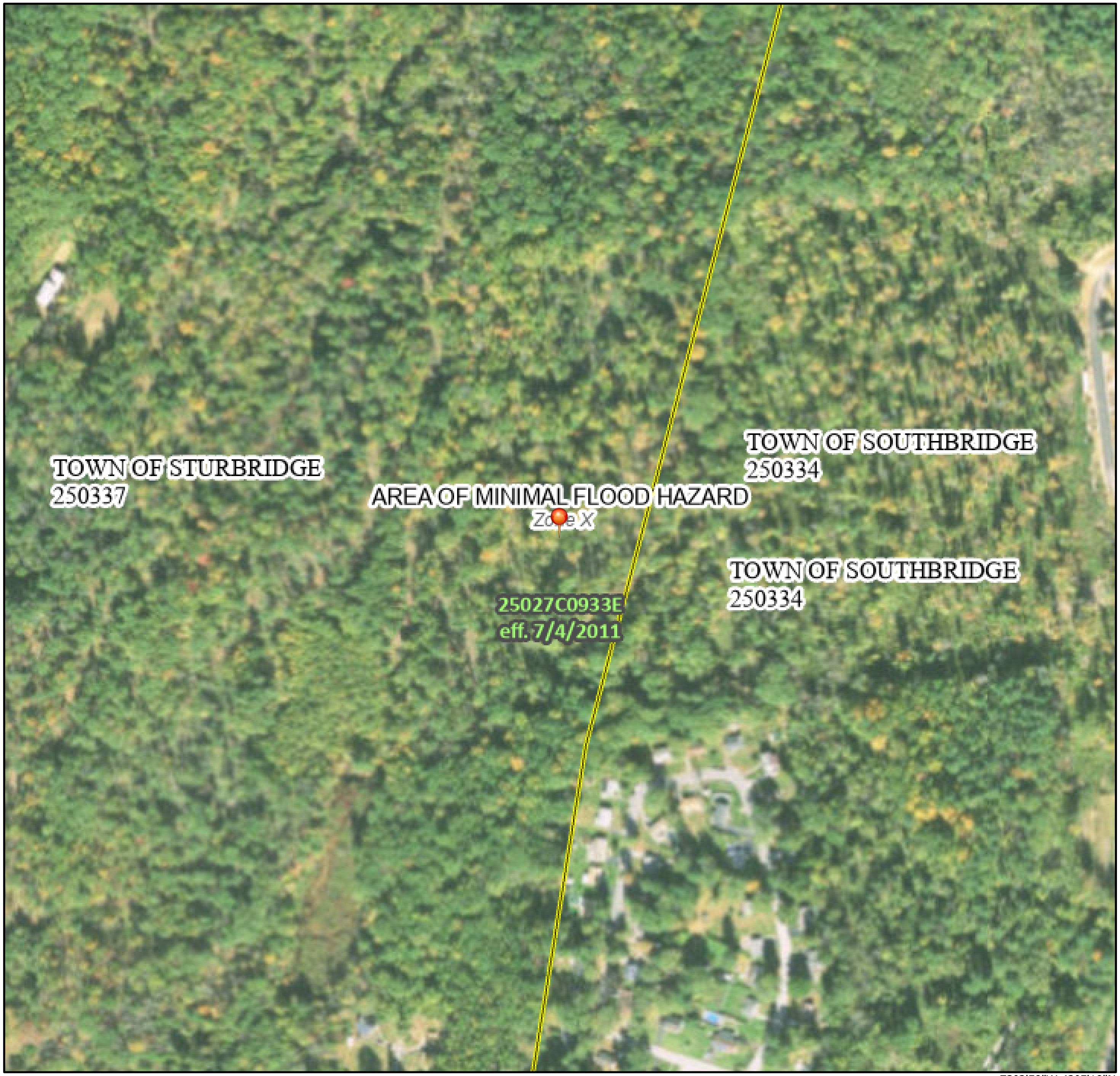
PROJ. NO.	287-2118-K
DWG.	ORTHO

FIG 2

National Flood Hazard Layer FIRMette

FEMA

72°3'27"W 42°5'37"N



72°2'50"W 42°5'10"N

Feet 0 250 500 1,000 1,500 2,000

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS	Without Base Flood Elevation (BFE) *Zone A, V, A99*
	With BFE or Depth *Zone AE, AO, AH, VE, AR*
	Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD	0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
	Future Conditions 1% Annual Chance Flood Hazard *Zone X*
	Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
	Area with Flood Risk due to Levee *Zone D*
OTHER AREAS	NO SCREEN Area of Minimal Flood Hazard *Zone X*
	Effective LOMRs
	Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES	Channel, Culvert, or Storm Sewer
	Levee, Dike, or Floodwall
OTHER FEATURES	B 20.2 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
	8 Coastal Transect
	513 Base Flood Elevation Line (BFE)
	Limit of Study
	Jurisdiction Boundary
	Coastal Transect Baseline
	Profile Baseline
	Hydrographic Feature
MAP PANELS	Digital Data Available
	No Digital Data Available
	Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/31/2022 at 10:34 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

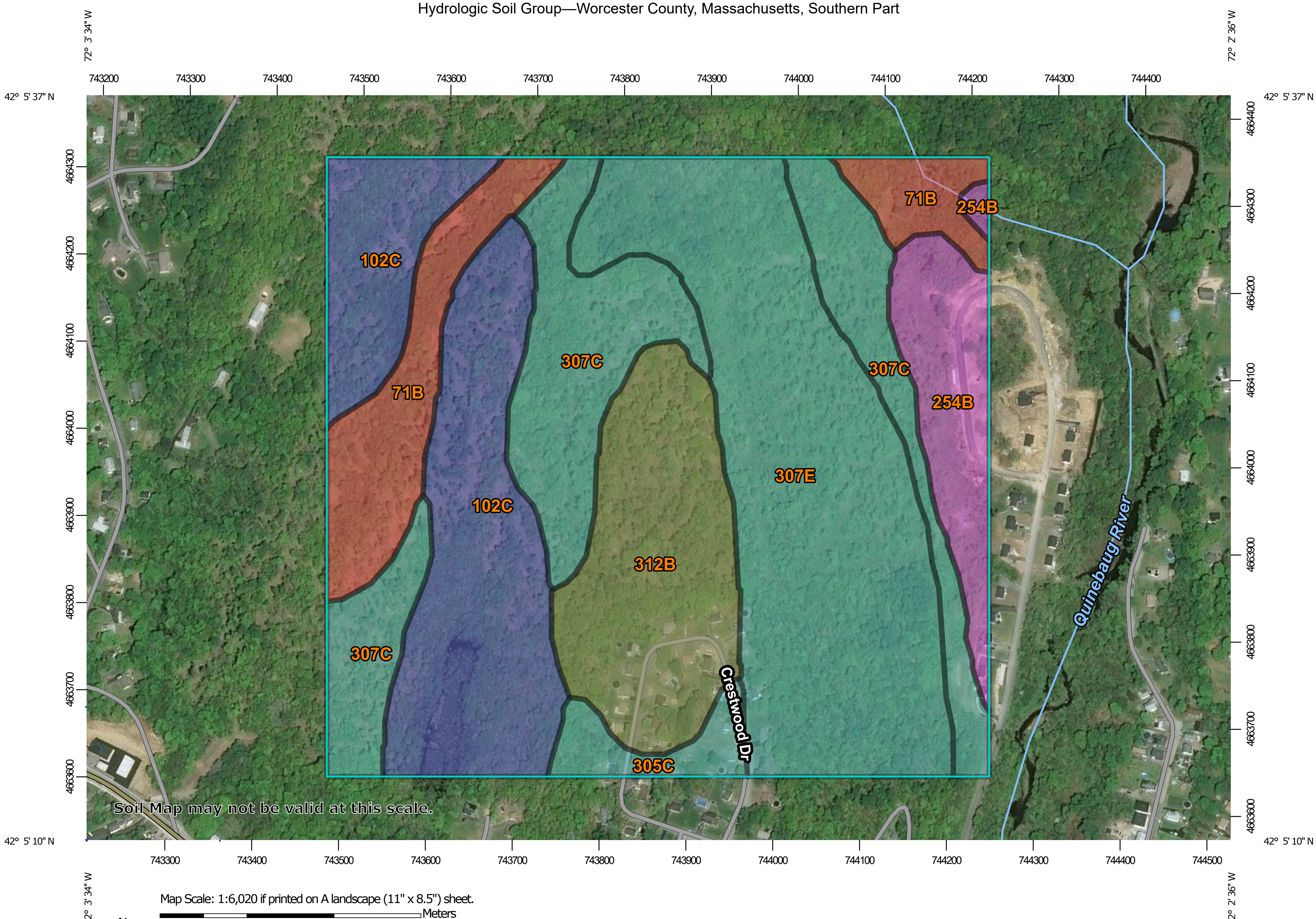
MassGIS Soil Map

Property Tax Parcels

Soils Outlines

Top 20 Soils: Hydrologic Soil Group

- A
- A/D
- B
- B/D
- C
- C/D
- D



Map Scale: 1:6,020 if printed on A landscape (11" x 8.5") sheet.

Meters: 0, 50, 100, 200, 300

Feet: 0, 250, 500, 1000, 1500

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Worcester County, Massachusetts, Southern Part
Survey Area Data: Version 14, Sep 3, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 18, 2019—Jul 9, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
71B	Ridgebury fine sandy loam, 3 to 8 percent slopes, extremely stony	D	12.8	9.5%
102C	Chatfield-Hollis-Rock outcrop complex, 0 to 15 percent slopes	B	28.2	20.9%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	9.1	6.7%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	C	3.2	2.4%
307C	Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony	C	25.3	18.8%
307E	Paxton fine sandy loam, 15 to 35 percent slopes, extremely stony	C	38.0	28.3%
312B	Woodbridge fine sandy loam, 0 to 8 percent slopes, extremely stony	C/D	17.9	13.3%
Totals for Area of Interest			**134.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Table 2.3.3. 1982 Rawls Rates[18]

Texture Class	NRCS Hydrologic Soil Group (HSG)	Infiltration Rate Inches/Hour
Sand	A	8.27
Loamy Sand	A	2.41
Sandy Loam	B	1.02
Loam	B	0.52
Silt Loam	C	0.27
Sandy Clay Loam	C	0.17
Clay Loam	D	0.09
Silty Clay Loam	D	0.06
Sandy Clay	D	0.05
Silty Clay	D	0.04
Clay	D	0.02

[18] Rawls, Brakensiek and Saxton, 1982

NOAA Atlas 14, Volume 10, Version 3
Location name: Sturbridge, Massachusetts, USA*
Latitude: 42.091°, Longitude: -72.0529°
Elevation: 691.19 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	**2**	**5**	**10**	**25**	**50**	**100**	**200**	**500**	**1000**
5-min	**0.338** (0.263-0.428)	**0.399** (0.310-0.506)	**0.499** (0.386-0.635)	**0.582** (0.448-0.745)	**0.696** (0.518-0.930)	**0.782** (0.570-1.07)	**0.871** (0.616-1.24)	**0.967** (0.652-1.41)	**1.10** (0.714-1.67)	**1.21** (0.763-1.87)
10-min	**0.479** (0.373-0.607)	**0.566** (0.440-0.717)	**0.707** (0.547-0.899)	**0.824** (0.635-1.06)	**0.985** (0.734-1.32)	**1.11** (0.808-1.51)	**1.23** (0.872-1.75)	**1.37** (0.923-2.00)	**1.56** (1.01-2.37)	**1.71** (1.08-2.65)
15-min	**0.564** (0.439-0.714)	**0.665** (0.517-0.843)	**0.831** (0.643-1.06)	**0.969** (0.747-1.24)	**1.16** (0.864-1.55)	**1.30** (0.951-1.78)	**1.45** (1.03-2.06)	**1.61** (1.09-2.36)	**1.83** (1.19-2.78)	**2.01** (1.27-3.12)
30-min	**0.768** (0.597-0.972)	**0.906** (0.704-1.15)	**1.13** (0.877-1.44)	**1.32** (1.02-1.69)	**1.58** (1.18-2.11)	**1.77** (1.29-2.43)	**1.98** (1.40-2.80)	**2.19** (1.48-3.21)	**2.50** (1.62-3.79)	**2.74** (1.73-4.25)
60-min	**0.971** (0.756-1.23)	**1.15** (0.891-1.45)	**1.43** (1.11-1.82)	**1.67** (1.29-2.14)	**2.00** (1.49-2.67)	**2.25** (1.64-3.07)	**2.50** (1.77-3.55)	**2.78** (1.87-4.06)	**3.16** (2.05-4.80)	**3.46** (2.19-5.37)
2-hr	**1.25** (0.976-1.57)	**1.46** (1.14-1.84)	**1.82** (1.42-2.30)	**2.11** (1.64-2.69)	**2.52** (1.89-3.36)	**2.82** (2.08-3.85)	**3.14** (2.25-4.47)	**3.51** (2.37-5.11)	**4.06** (2.64-6.13)	**4.52** (2.87-6.98)
3-hr	**1.43** (1.13-1.79)	**1.68** (1.32-2.11)	**2.09** (1.64-2.64)	**2.44** (1.90-3.09)	**2.91** (2.19-3.87)	**3.25** (2.41-4.44)	**3.63** (2.62-5.18)	**4.08** (2.76-5.92)	**4.76** (3.10-7.17)	**5.34** (3.40-8.22)
6-hr	**1.79** (1.42-2.23)	**2.13** (1.69-2.66)	**2.69** (2.12-3.36)	**3.15** (2.47-3.96)	**3.79** (2.88-5.02)	**4.25** (3.18-5.79)	**4.76** (3.47-6.79)	**5.40** (3.67-7.79)	**6.38** (4.17-9.56)	**7.23** (4.61-11.1)
12-hr	**2.20** (1.76-2.72)	**2.67** (2.13-3.31)	**3.44** (2.73-4.27)	**4.08** (3.21-5.09)	**4.95** (3.79-6.54)	**5.60** (4.21-7.59)	**6.31** (4.62-8.96)	**7.18** (4.90-10.3)	**8.55** (5.60-12.7)	**9.74** (6.23-14.8)
24-hr	**2.63** (2.11-3.23)	**3.24** (2.60-3.98)	**4.23** (3.38-5.22)	**5.05** (4.01-6.27)	**6.18** (4.76-8.12)	**7.02** (5.30-9.46)	**7.93** (5.84-11.2)	**9.07** (6.21-12.9)	**10.8** (7.12-16.1)	**12.4** (7.94-18.7)
2-day	**3.05** (2.47-3.72)	**3.78** (3.05-4.61)	**4.96** (3.99-6.07)	**5.94** (4.75-7.32)	**7.28** (5.65-9.50)	**8.28** (6.29-11.1)	**9.36** (6.94-13.2)	**10.7** (7.37-15.2)	**12.8** (8.47-18.9)	**14.7** (9.46-22.1)
3-day	**3.33** (2.71-4.05)	**4.12** (3.34-5.01)	**5.41** (4.37-6.60)	**6.48** (5.20-7.96)	**7.95** (6.19-10.3)	**9.03** (6.89-12.1)	**10.2** (7.60-14.3)	**11.7** (8.07-16.6)	**14.1** (9.29-20.6)	**16.1** (10.4-24.1)
4-day	**3.57** (2.91-4.32)	**4.41** (3.59-5.35)	**5.78** (4.68-7.03)	**6.92** (5.57-8.47)	**8.48** (6.62-11.0)	**9.63** (7.37-12.8)	**10.9** (8.12-15.2)	**12.5** (8.62-17.6)	**15.0** (9.93-22.0)	**17.2** (11.1-25.7)
7-day	**4.24** (3.47-5.10)	**5.18** (4.24-6.25)	**6.72** (5.48-8.14)	**8.00** (6.48-9.75)	**9.76** (7.66-12.6)	**11.1** (8.50-14.7)	**12.5** (9.34-17.4)	**14.3** (9.89-20.0)	**17.1** (11.4-24.9)	**19.6** (12.7-29.1)
10-day	**4.92** (4.04-5.90)	**5.92** (4.86-7.11)	**7.55** (6.17-9.10)	**8.90** (7.23-10.8)	**10.8** (8.47-13.8)	**12.1** (9.35-16.0)	**13.6** (10.2-18.9)	**15.5** (10.8-21.7)	**18.4** (12.3-26.8)	**21.0** (13.6-31.1)
20-day	**7.09** (5.87-8.44)	**8.14** (6.73-9.71)	**9.86** (8.12-11.8)	**11.3** (9.24-13.6)	**13.3** (10.5-16.8)	**14.7** (11.3-19.1)	**16.3** (12.1-22.0)	**18.1** (12.7-25.1)	**20.8** (13.9-29.9)	**23.0** (14.9-33.9)
30-day	**8.90** (7.40-10.6)	**9.98** (8.29-11.9)	**11.7** (9.71-14.0)	**13.2** (10.8-15.8)	**15.2** (12.0-19.1)	**16.7** (12.9-21.5)	**18.3** (13.6-24.4)	**20.0** (14.0-27.6)	**22.3** (15.0-32.1)	**24.2** (15.8-35.6)
45-day	**11.1** (9.31-13.2)	**12.3** (10.2-14.5)	**14.1** (11.7-16.7)	**15.6** (12.9-18.6)	**17.7** (14.0-21.9)	**19.3** (14.8-24.5)	**20.9** (15.4-27.4)	**22.4** (15.8-30.7)	**24.4** (16.4-34.8)	**25.8** (16.8-37.8)
60-day	**13.0** (10.9-15.3)	**14.1** (11.8-16.7)	**16.0** (13.4-19.0)	**17.6** (14.6-21.0)	**19.8** (15.7-24.4)	**21.5** (16.5-27.1)	**23.1** (17.0-30.1)	**24.5** (17.3-33.5)	**26.2** (17.7-37.4)	**27.4** (17.9-40.1)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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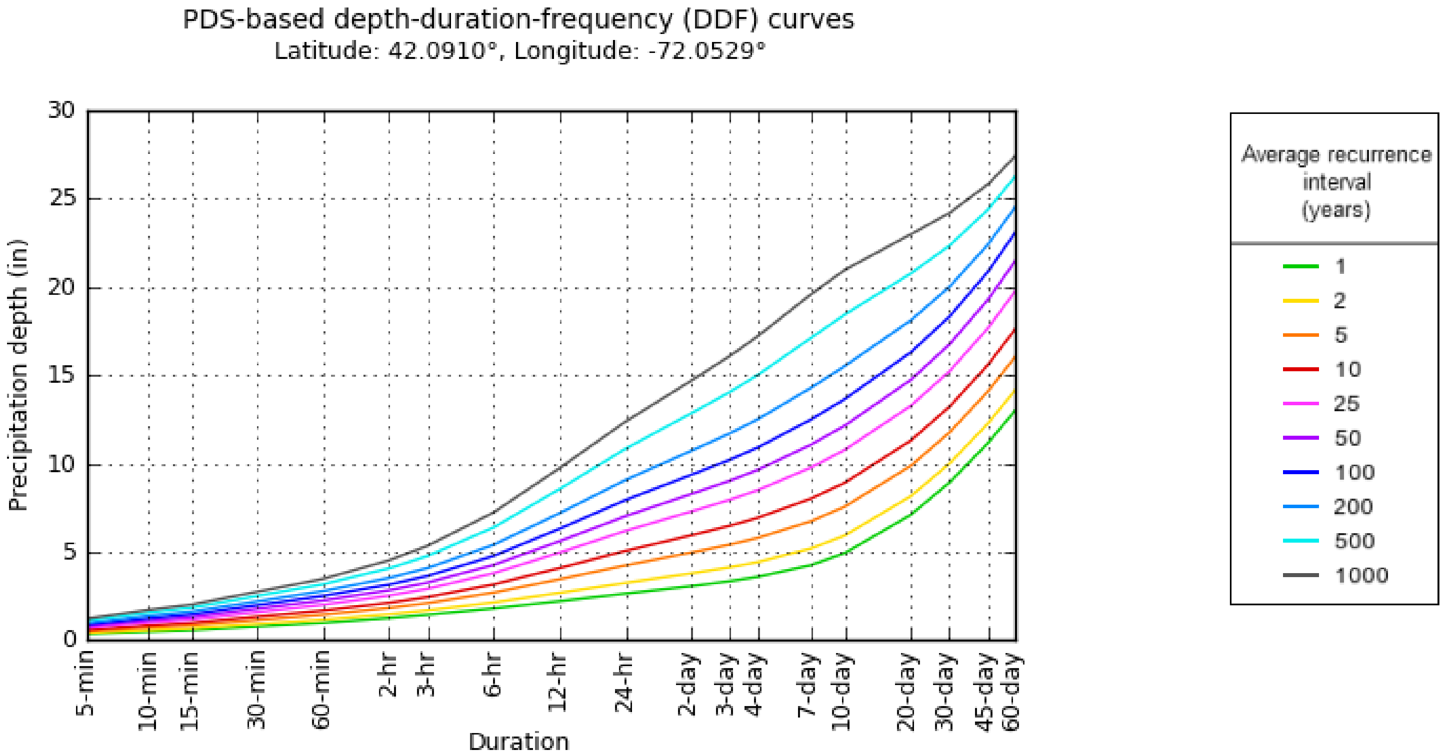
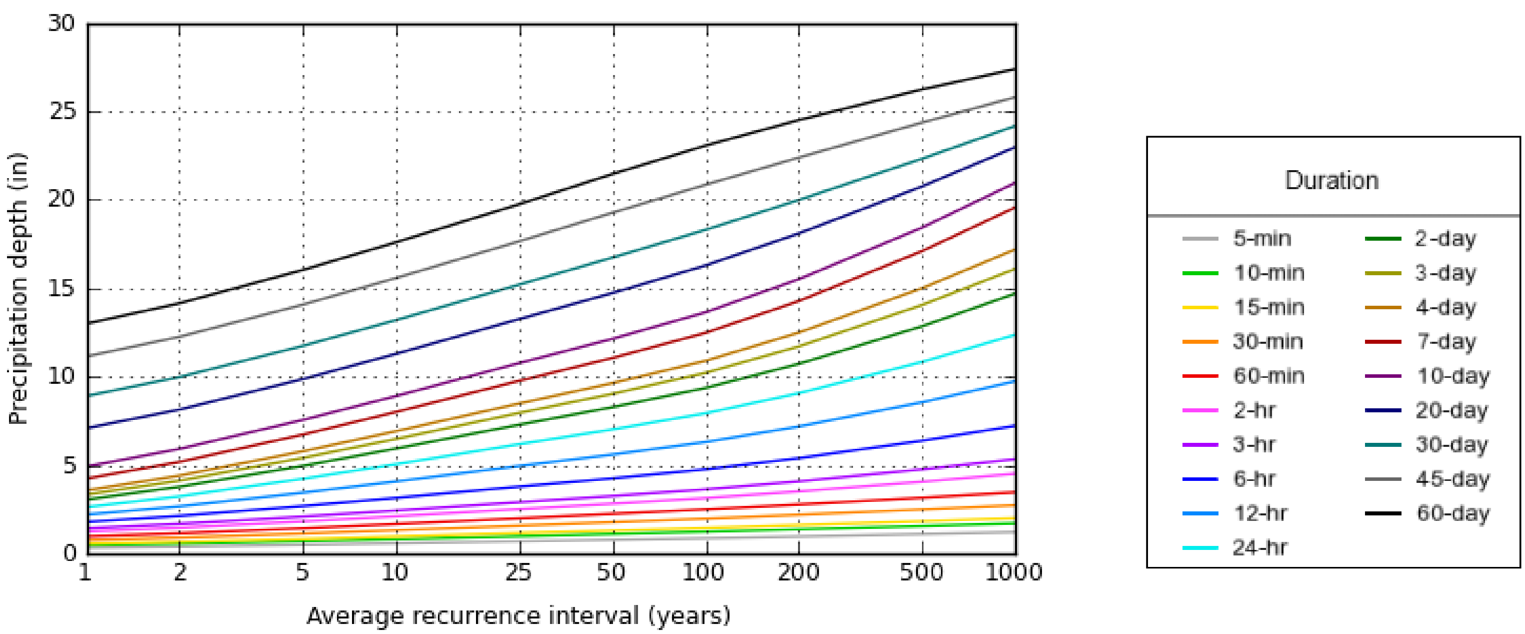
PF graphical





NOAA Atlas 14, Volume 10, Version 3 Created (GMT): Thu Dec 9 18:26:44 2021

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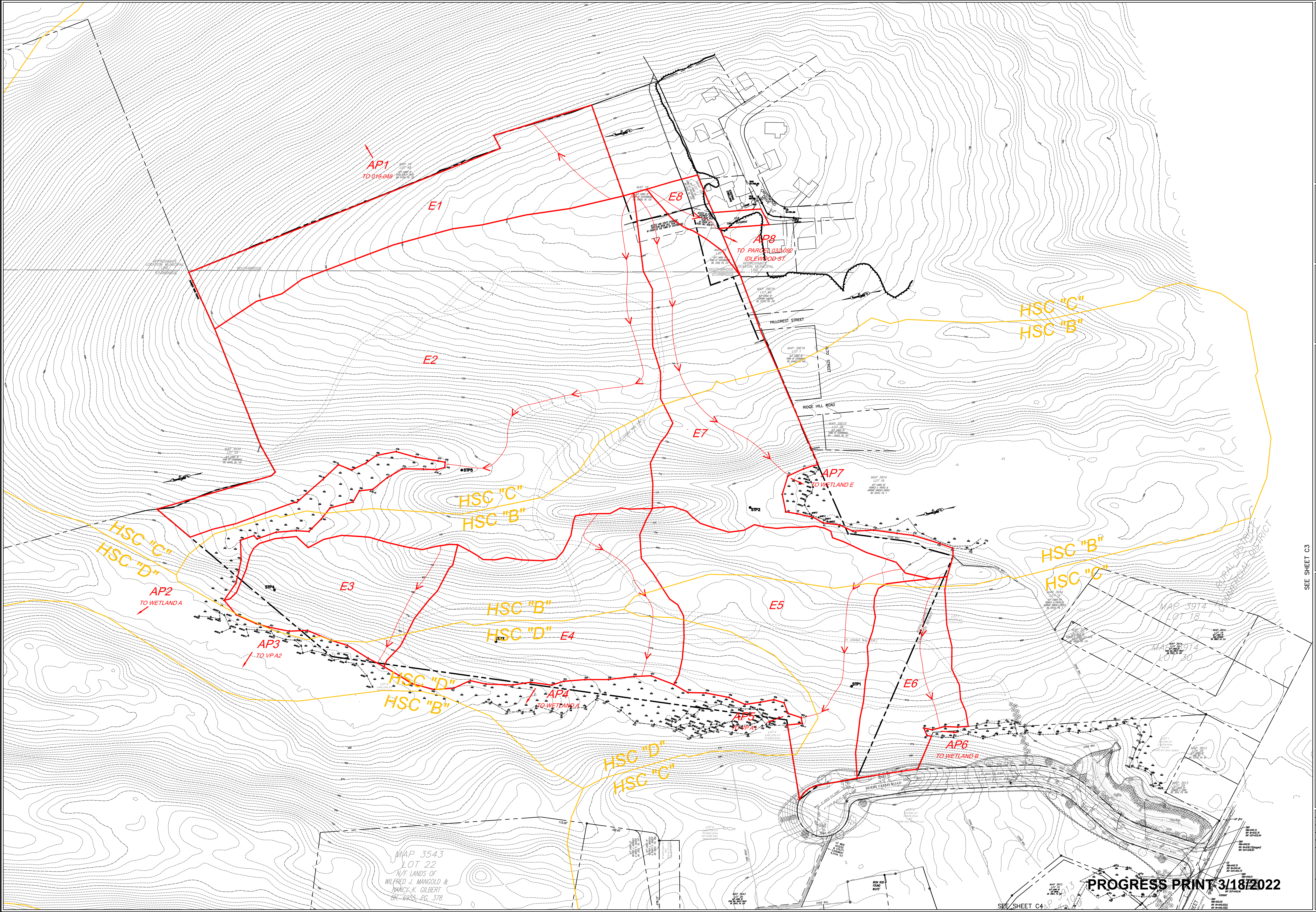
Maps & aerials

Small scale terrain

APPENDIX D

PRE-DEVELOPMENT
HYDROCAD DRAINAGE CALCULATIONS



HOR. SCALE IN FEET: 1"=100'

100 0 100 200 300

REVISIONS

REV	DATE	DESCRIPTION	MADE	APV'D

PETER C. ENGLE, P.E.
PROFESSIONAL ENGINEER
MA LIC. NO. 53736

McCLURE
ENGINEERING, INC
119 Worcester Road
Charlton, MA 01507
Tel: (508) 248-2005
Fax (508) 248-4887
Email: pengle@mcclureengineers.com

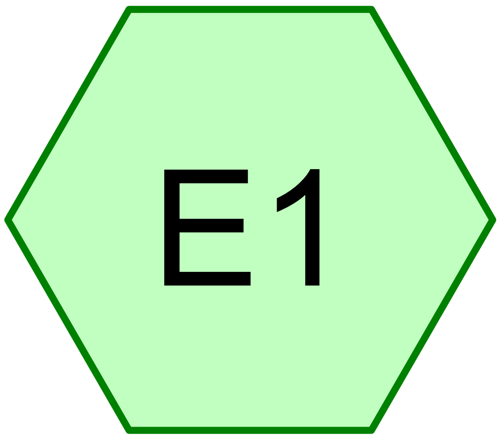
WATERSHED ANALYSIS
LOT 3 BERRY FARMS ROAD
STURBRIDGE, MA 01566

PREPARED FOR
JUSTIN STELMOK
557 SOUTHWEST CUTOFF
WORCESTER, MA 01607

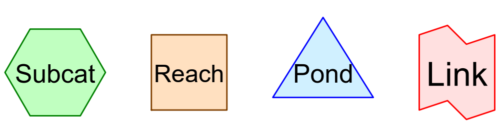
DRAWN BY:	WCN
DATE:	3/31/2022
CHK BY:	PE
SCALE:	1"=100'
PROJ. NO.	287-2118-K

PRE-DEVELOPMENT

SHEET 1 OF 2



AP1 - To Southbridge Parcel 019-048 (0 Cournoyer Blvd)



Routing Diagram for AP1
Prepared by Microsoft, Printed 4/4/2022
HydroCAD® 10.00-19 s/n 03362 © 2016 HydroCAD Software Solutions LLC

Summary for Subcatchment E1: AP1 - To Southbridge Parcel 019-048 (0 Cournoyer Blvd)

Runoff = 2.58 cfs @ 12.23 hrs, Volume= 11,834 cf, Depth> 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
167,515	70	Woods, Good, HSG C
167,515		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.4	220	0.0950	1.54		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.1	270	Total			

Summary for Subcatchment E1: AP1 - To Southbridge Parcel 019-048 (0 Cournoyer Blvd)

Runoff = 6.90 cfs @ 12.22 hrs, Volume= 28,841 cf, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
167,515	70	Woods, Good, HSG C
167,515		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.4	220	0.0950	1.54		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.1	270	Total			

Summary for Subcatchment E1: AP1 - To Southbridge Parcel 019-048 (0 Cournoyer Blvd)

Runoff = 9.96 cfs @ 12.21 hrs, Volume= 41,026 cf, Depth> 2.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
167,515	70	Woods, Good, HSG C
167,515		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.4	220	0.0950	1.54		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.1	270	Total			

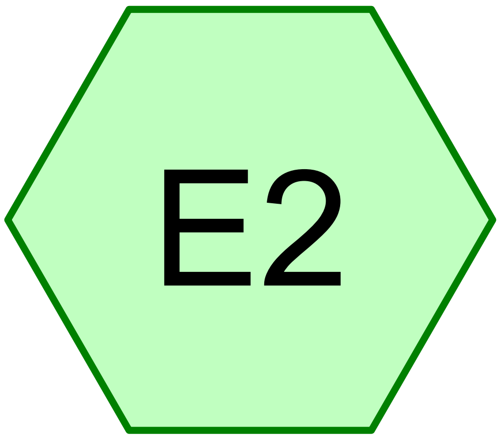
Summary for Subcatchment E1: AP1 - To Southbridge Parcel 019-048 (0 Cournoyer Blvd)

Runoff = 15.00 cfs @ 12.20 hrs, Volume= 61,293 cf, Depth> 4.39"

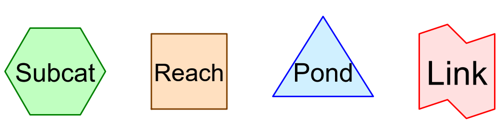
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
167,515	70	Woods, Good, HSG C
167,515		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.4	220	0.0950	1.54		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.1	270	Total			



AP2 - To Wetland A (A56-A87)



Routing Diagram for AP2
Prepared by Microsoft, Printed 4/4/2022
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Summary for Subcatchment E2: AP2 - To Wetland A (A56-A87)

Runoff = 7.95 cfs @ 12.38 hrs, Volume= 45,298 cf, Depth> 0.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
613,900	70	Woods, Good, HSG C
111,680	55	Woods, Good, HSG B
725,580	68	Weighted Average
725,580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
9.3	740	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	100	0.1700	2.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	60	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.6	950	Total			

Summary for Subcatchment E2: AP2 - To Wetland A (A56-A87)

Runoff = 22.72 cfs @ 12.35 hrs, Volume= 115,158 cf, Depth> 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
613,900	70	Woods, Good, HSG C
111,680	55	Woods, Good, HSG B
725,580	68	Weighted Average
725,580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
9.3	740	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	100	0.1700	2.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	60	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.6	950	Total			

Summary for Subcatchment E2: AP2 - To Wetland A (A56-A87)

Runoff = 33.38 cfs @ 12.34 hrs, Volume= 166,010 cf, Depth> 2.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
613,900	70	Woods, Good, HSG C
111,680	55	Woods, Good, HSG B
725,580	68	Weighted Average
725,580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
9.3	740	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	100	0.1700	2.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	60	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.6	950	Total			

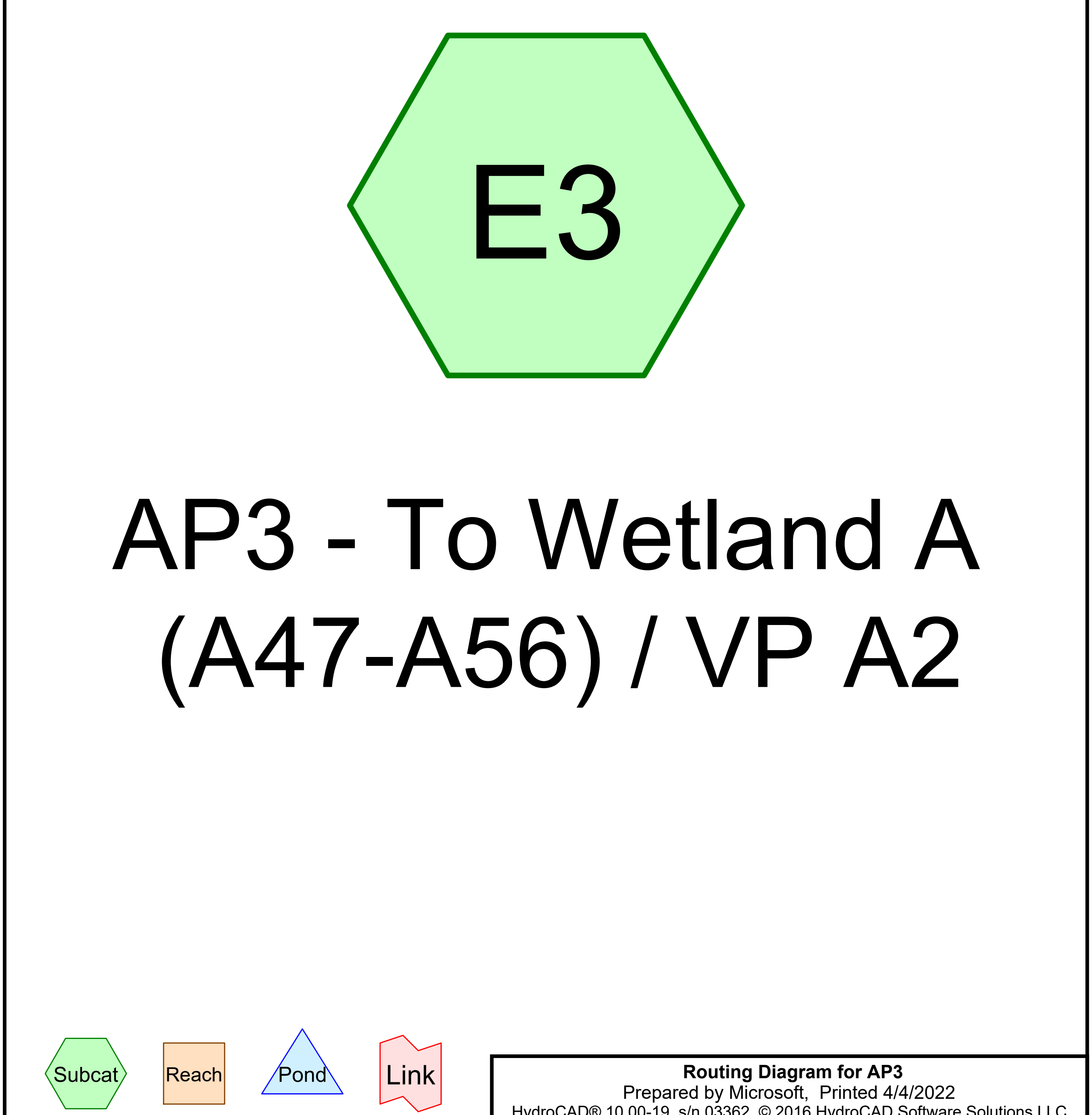
Summary for Subcatchment E2: AP2 - To Wetland A (A56-A87)

Runoff = 51.05 cfs @ 12.33 hrs, Volume= 251,343 cf, Depth> 4.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
613,900	70	Woods, Good, HSG C
111,680	55	Woods, Good, HSG B
725,580	68	Weighted Average
725,580		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
9.3	740	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	100	0.1700	2.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	60	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
23.6	950	Total			



Routing Diagram for AP3
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Summary for Subcatchment E3: AP3 - To Wetland A (A47-A56) / VP A2

Runoff = 0.34 cfs @ 12.33 hrs, Volume= 2,780 cf, Depth> 0.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
108,890	55	Woods, Good, HSG B
5,640	77	Woods, Good, HSG D
114,530	56	Weighted Average
114,530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.1	280	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.8	330	Total			

Summary for Subcatchment E3: AP3 - To Wetland A (A47-A56) / VP A2

Runoff = 2.55 cfs @ 12.13 hrs, Volume= 10,163 cf, Depth> 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
108,890	55	Woods, Good, HSG B
5,640	77	Woods, Good, HSG D
114,530	56	Weighted Average
114,530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.1	280	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.8	330	Total			

Summary for Subcatchment E3: AP3 - To Wetland A (A47-A56) / VP A2

Runoff = 4.48 cfs @ 12.12 hrs, Volume= 16,226 cf, Depth> 1.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
108,890	55	Woods, Good, HSG B
5,640	77	Woods, Good, HSG D
114,530	56	Weighted Average
114,530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.1	280	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.8	330	Total			

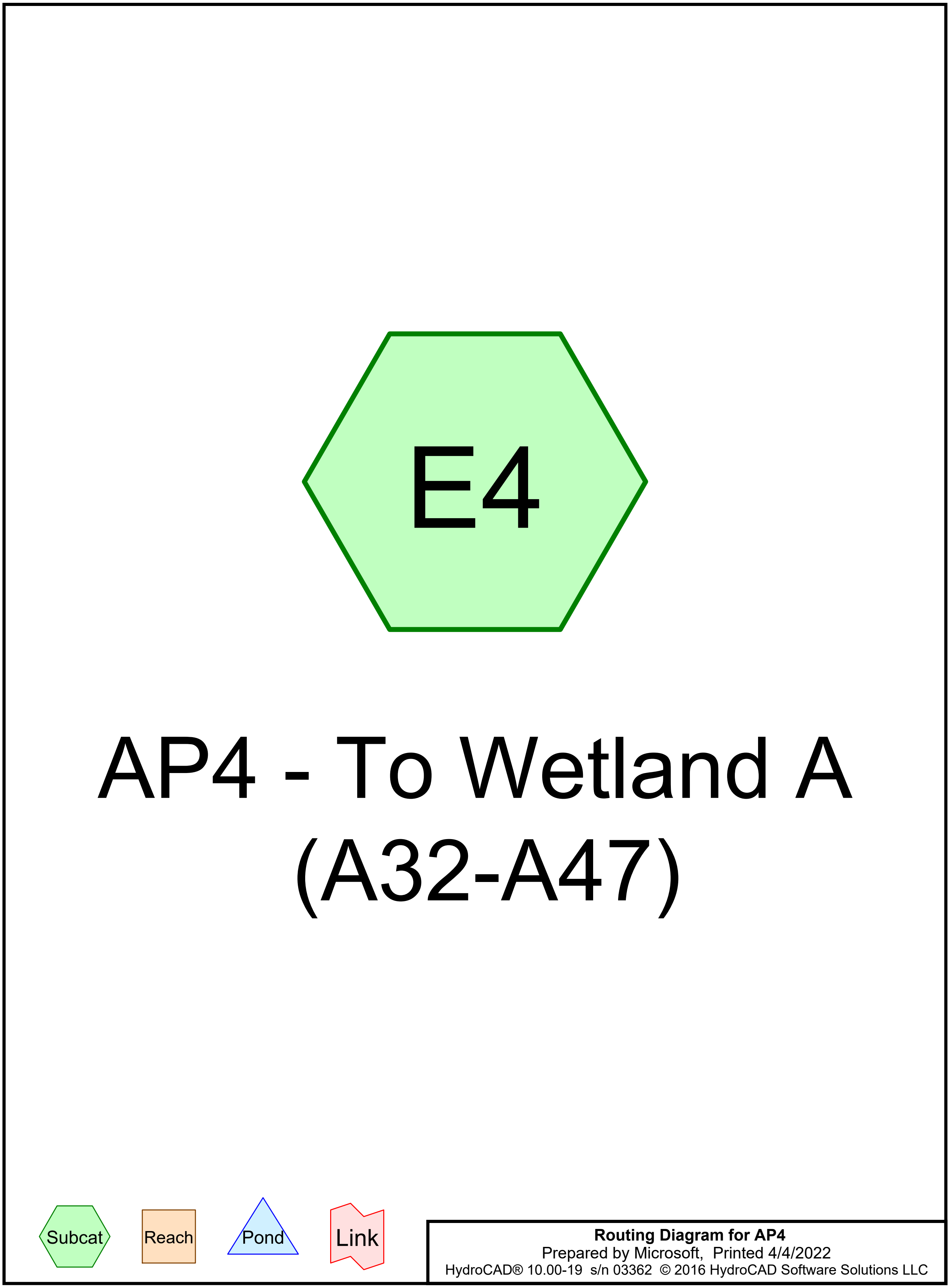
Summary for Subcatchment E3: AP3 - To Wetland A (A47-A56) / VP A2

Runoff = 7.93 cfs @ 12.12 hrs, Volume= 27,093 cf, Depth> 2.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
108,890	55	Woods, Good, HSG B
5,640	77	Woods, Good, HSG D
114,530	56	Weighted Average
114,530		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.1	280	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.8	330	Total			


E4
AP4 - To Wetland A (A32-A47)
Subcat
Reach
Pond
Link
Routing Diagram for AP4
Prepared by Microsoft, Printed 4/4/2022
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Summary for Subcatchment E4: AP4 - To Wetland A (A32-A47)

Runoff = 3.07 cfs @ 12.15 hrs, Volume= 12,702 cf, Depth= 0.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
100,155	55	Woods, Good, HSG B
6,695	70	Woods, Good, HSG C
108,390	77	Woods, Good, HSG D
215,240	67	Weighted Average
215,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.3500	0.21		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
5.1	435	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.2	485	Total			

Summary for Subcatchment E4: AP4 - To Wetland A (A32-A47)

Runoff = 9.20 cfs @ 12.14 hrs, Volume= 32,966 cf, Depth= 1.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
100,155	55	Woods, Good, HSG B
6,695	70	Woods, Good, HSG C
108,390	77	Woods, Good, HSG D
215,240	67	Weighted Average
215,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.3500	0.21		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
5.1	435	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.2	485	Total			

Summary for Subcatchment E4: AP4 - To Wetland A (A32-A47)

Runoff = 13.66 cfs @ 12.13 hrs, Volume= 47,831 cf, Depth= 2.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
100,155	55	Woods, Good, HSG B
6,695	70	Woods, Good, HSG C
108,390	77	Woods, Good, HSG D
215,240	67	Weighted Average
215,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.3500	0.21		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
5.1	435	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.2	485	Total			

Summary for Subcatchment E4: AP4 - To Wetland A (A32-A47)

Runoff = 21.07 cfs @ 12.13 hrs, Volume= 72,881 cf, Depth= 4.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
100,155	55	Woods, Good, HSG B
6,695	70	Woods, Good, HSG C
108,390	77	Woods, Good, HSG D
215,240	67	Weighted Average
215,240		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.3500	0.21		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
5.1	435	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.2	485	Total			

Routing Diagram for AP5&6
Prepared by Microsoft, Printed 4/4/2022
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Summary for Subcatchment E5: AP5 - To Wetland A (A23-A32) / VP A1

Runoff = 2.87 cfs @ 12.27 hrs, Volume= 14,691 cf, Depth> 0.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
80,545	55	Woods, Good, HSG B
121,865	70	Woods, Good, HSG C
47,880	77	Woods, Good, HSG D
250,290	67	Weighted Average
250,290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.9	115	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.3500	2.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.9	310	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.8	505	Total			

Summary for Subcatchment E6: AP6 - To Wetland B (off-site)

Runoff = 1.57 cfs @ 12.15 hrs, Volume= 6,195 cf, Depth> 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
7,985	55	Woods, Good, HSG B
84,935	70	Woods, Good, HSG C
92,920	69	Weighted Average
92,920		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	45	0.2200	2.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	290	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.2	385	Total			

Summary for Subcatchment E5: AP5 - To Wetland A (A23-A32) / VP A1

Runoff = 8.60 cfs @ 12.24 hrs, Volume= 38,172 cf, Depth> 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
80,545	55	Woods, Good, HSG B
121,865	70	Woods, Good, HSG C
47,880	77	Woods, Good, HSG D
250,290	67	Weighted Average
250,290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.9	115	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.3500	2.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.9	310	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.8	505	Total			

Summary for Subcatchment E6: AP6 - To Wetland B (off-site)

Runoff = 4.36 cfs @ 12.13 hrs, Volume= 15,405 cf, Depth> 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
7,985	55	Woods, Good, HSG B
84,935	70	Woods, Good, HSG C
92,920	69	Weighted Average
92,920		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	45	0.2200	2.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	290	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.2	385	Total			

Summary for Subcatchment E5: AP5 - To Wetland A (A23-A32) / VP A1

Runoff = 12.80 cfs @ 12.23 hrs, Volume= 55,402 cf, Depth> 2.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
80,545	55	Woods, Good, HSG B
121,865	70	Woods, Good, HSG C
47,880	77	Woods, Good, HSG D
250,290	67	Weighted Average
250,290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.9	115	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.3500	2.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.9	310	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.8	505	Total			

Summary for Subcatchment E6: AP6 - To Wetland B (off-site)

Runoff = 6.35 cfs @ 12.13 hrs, Volume= 22,053 cf, Depth> 2.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
7,985	55	Woods, Good, HSG B
84,935	70	Woods, Good, HSG C
92,920	69	Weighted Average
92,920		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	45	0.2200	2.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	290	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.2	385	Total			

Summary for Subcatchment E5: AP5 - To Wetland A (A23-A32) / VP A1

Runoff = 19.79 cfs @ 12.23 hrs, Volume= 84,447 cf, Depth> 4.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
80,545	55	Woods, Good, HSG B
121,865	70	Woods, Good, HSG C
47,880	77	Woods, Good, HSG D
250,290	67	Weighted Average
250,290		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0300	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.9	115	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.3500	2.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.9	310	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.8	505	Total			

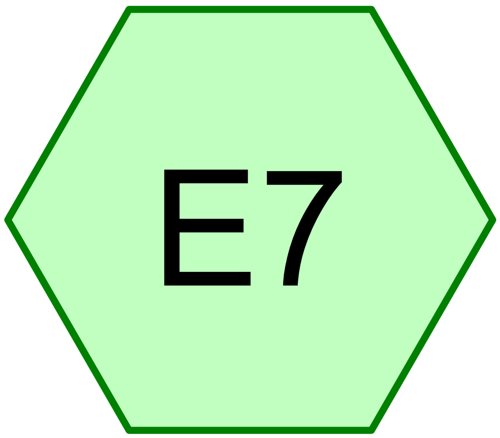
Summary for Subcatchment E6: AP6 - To Wetland B (off-site)

Runoff = 9.62 cfs @ 12.13 hrs, Volume= 33,159 cf, Depth> 4.28"

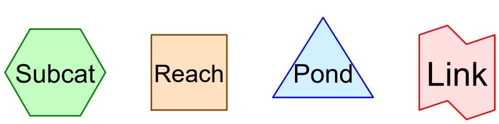
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
7,985	55	Woods, Good, HSG B
84,935	70	Woods, Good, HSG C
92,920	69	Weighted Average
92,920		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	45	0.2200	2.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	290	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.2	385	Total			



AP7 - To Wetland E



Routing Diagram for AP7
Prepared by Microsoft, Printed 4/4/2022

Summary for Subcatchment E7: AP7 - To Wetland E

Runoff = 1.61 cfs @ 12.40 hrs, Volume= 10,728 cf, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
147,040	55	Woods, Good, HSG B
113,445	70	Woods, Good, HSG C
260,485	62	Weighted Average
260,485		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
8.0	675	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	85	0.3000	2.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	30	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
21.5	840	Total			

Summary for Subcatchment E7: AP7 - To Wetland E

Runoff = 6.18 cfs @ 12.33 hrs, Volume= 31,700 cf, Depth> 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
147,040	55	Woods, Good, HSG B
113,445	70	Woods, Good, HSG C
260,485	62	Weighted Average
260,485		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
8.0	675	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	85	0.3000	2.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	30	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
21.5	840	Total			

Summary for Subcatchment E7: AP7 - To Wetland E

Runoff = 9.74 cfs @ 12.31 hrs, Volume= 47,805 cf, Depth> 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
147,040	55	Woods, Good, HSG B
113,445	70	Woods, Good, HSG C
260,485	62	Weighted Average
260,485		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
8.0	675	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	85	0.3000	2.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	30	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
21.5	840	Total			

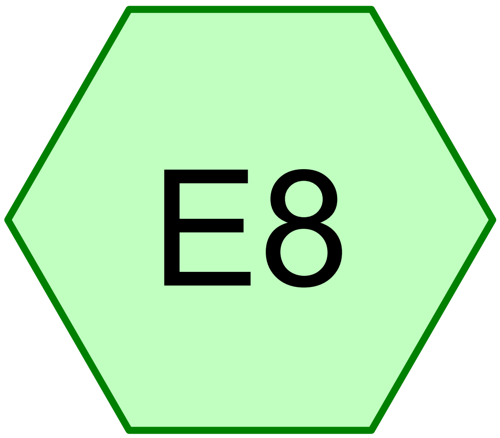
Summary for Subcatchment E7: AP7 - To Wetland E

Runoff = 15.87 cfs @ 12.30 hrs, Volume= 75,646 cf, Depth> 3.48"

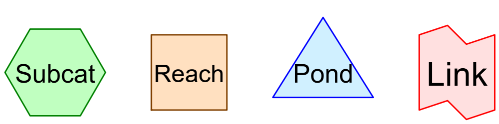
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
147,040	55	Woods, Good, HSG B
113,445	70	Woods, Good, HSG C
260,485	62	Weighted Average
260,485		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
8.0	675	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.5	85	0.3000	2.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	30	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
21.5	840	Total			



AP8 - To Southbridge
Parcel 032-092
Idlewood Street



Routing Diagram for AP8
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Summary for Subcatchment E8: AP8 - To Southbridge Parcel 032-092 Idlewood Street

Runoff = 0.40 cfs @ 12.17 hrs, Volume= 1,626 cf, Depth> 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
18,055	70	Woods, Good, HSG C
3,635	74	>75% Grass cover, Good, HSG C
21,690	71	Weighted Average
21,690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.2	150	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.0	200	Total			

Summary for Subcatchment E8: AP8 - To Southbridge Parcel 032-092 Idlewood Street

Runoff = 1.05 cfs @ 12.16 hrs, Volume= 3,884 cf, Depth> 2.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
18,055	70	Woods, Good, HSG C
3,635	74	>75% Grass cover, Good, HSG C
21,690	71	Weighted Average
21,690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.2	150	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.0	200	Total			

Summary for Subcatchment E8: AP8 - To Southbridge Parcel 032-092 Idlewood Street

Runoff = 1.50 cfs @ 12.16 hrs, Volume= 5,490 cf, Depth> 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
18,055	70	Woods, Good, HSG C
3,635	74	>75% Grass cover, Good, HSG C
21,690	71	Weighted Average
21,690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.2	150	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.0	200	Total			

Summary for Subcatchment E8: AP8 - To Southbridge Parcel 032-092 Idlewood Street

Runoff = 2.23 cfs @ 12.15 hrs, Volume= 8,149 cf, Depth> 4.51"

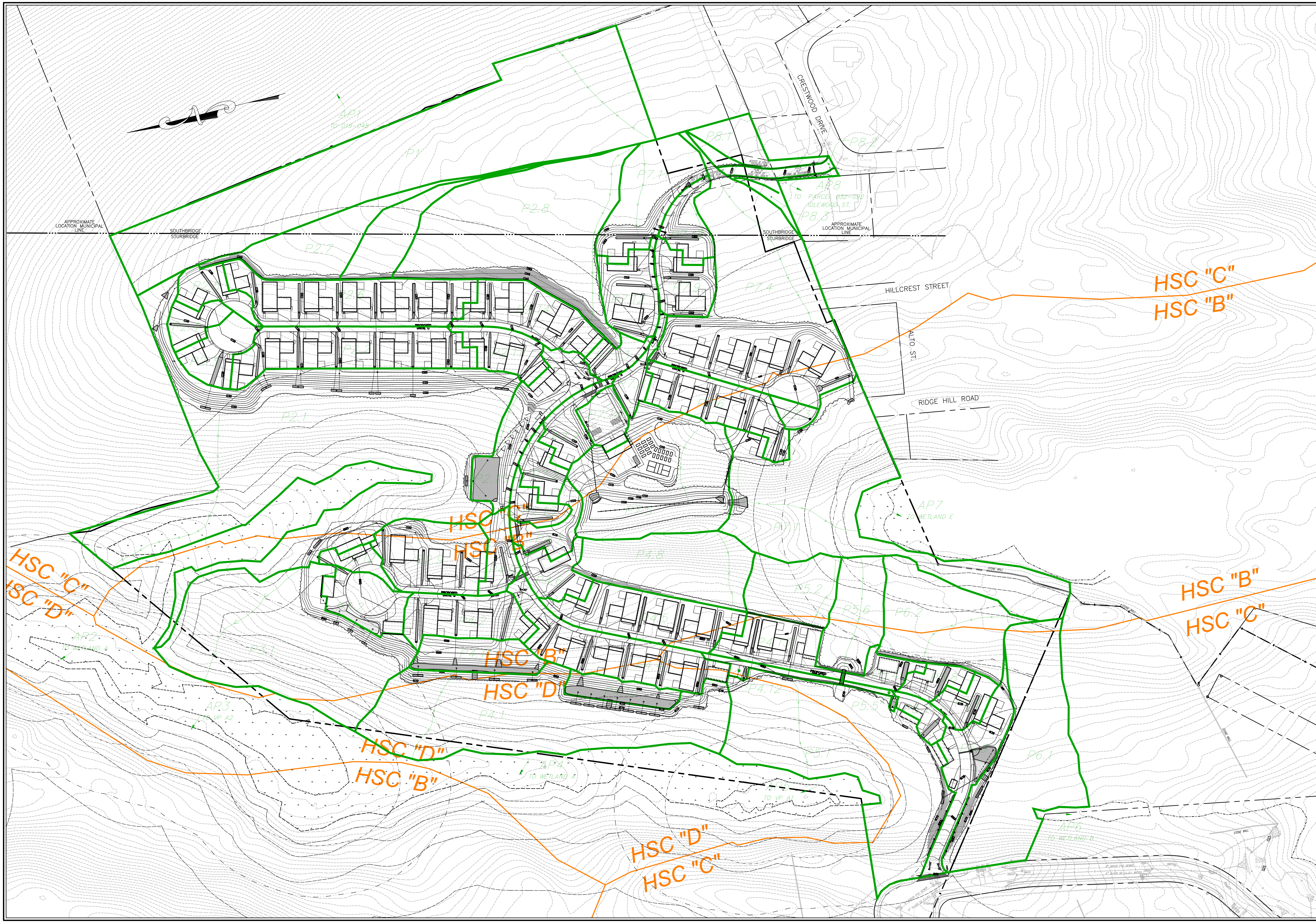
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
18,055	70	Woods, Good, HSG C
3,635	74	>75% Grass cover, Good, HSG C
21,690	71	Weighted Average
21,690		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.2	150	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.0	200	Total			

APPENDIX E

POST-DEVELOPMENT
HYDROCAD DRAINAGE CALCULATIONS



HOR. SCALE IN FEET: 1"=80'

80 0 80 160 240

REVISIONS

REV	DATE	DESCRIPTION	MADE	APV'D
1	11.10.22	REV PER PLAN CHANGES	PE	PE
2	4.28.23	PER CONS. & PEER ENG. COMMENTS	PE	PE
3	6.27.23	PER CONS. COMMENTS	PE	PE

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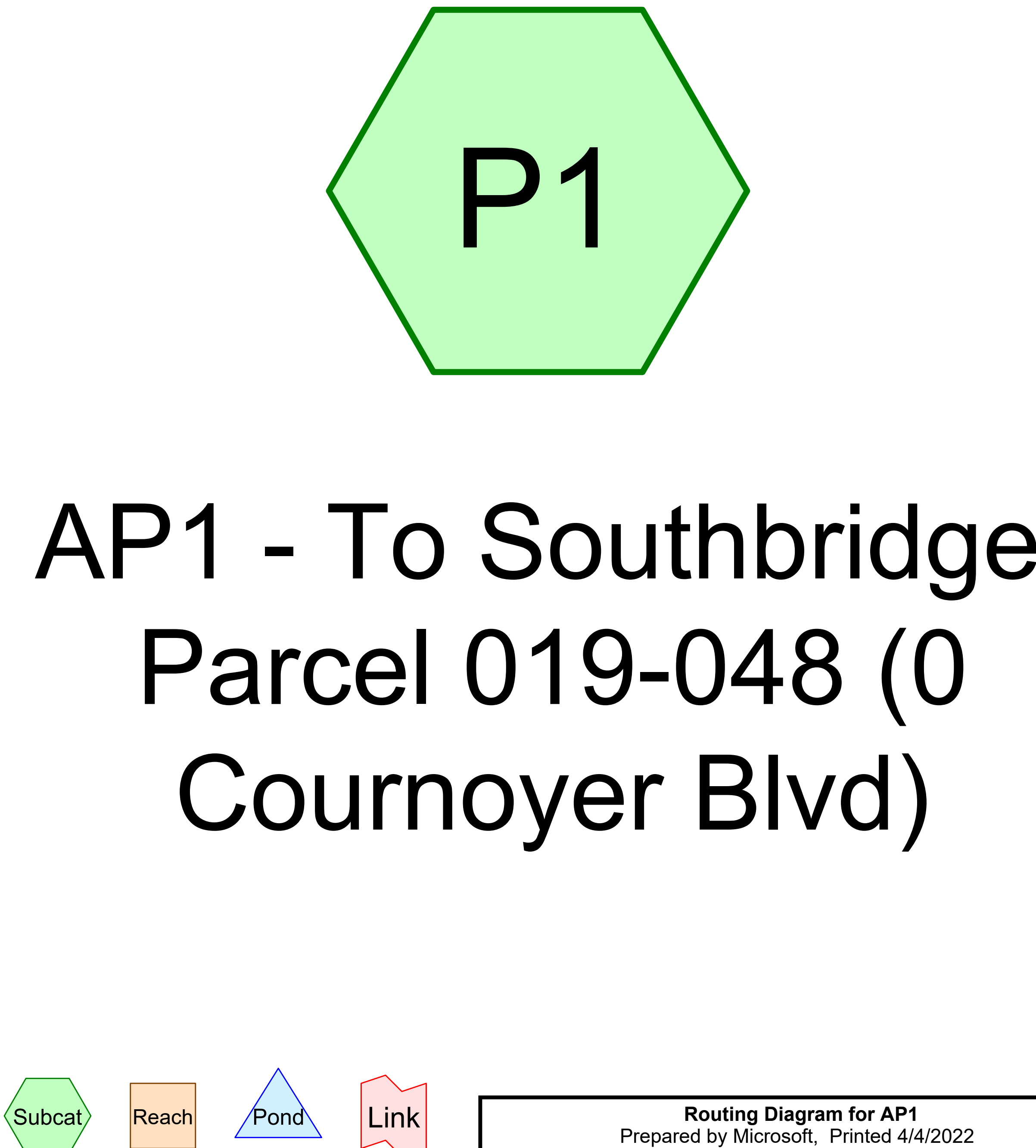
WATERSHED ANALYSIS
"BLUEBERRY HILL ESTATES"
LOT 3 BERRY FARMS ROAD
STURBRIDGE, MA 01566
PREPARED FOR
JUSTIN STELMOK
557 SOUTHWEST CUTOFF
WORCESTER, MA 01607

DRAWN BY:	WCN
DATE:	3/31/22
CHK BY:	PCE
SCALE:	1"=80'
PROJ. NO.	287-2118K

POSTDEVELOPMENT

DA-PR



Routing Diagram for AP1
Prepared by Microsoft, Printed 4/4/2022

Summary for Subcatchment P1: AP1 - To Southbridge Parcel 019-048 (0 Cournoyer Blvd)

Runoff = 2.56 cfs @ 12.23 hrs, Volume= 11,765 cf, Depth> 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
166,550	70	Woods, Good, HSG C
166,550		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.4	220	0.0950	1.54		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.1	270	Total			

Summary for Subcatchment P1: AP1 - To Southbridge Parcel 019-048 (0 Cournoyer Blvd)

Runoff = 6.86 cfs @ 12.22 hrs, Volume= 28,675 cf, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
166,550	70	Woods, Good, HSG C
166,550		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.4	220	0.0950	1.54		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.1	270	Total			

Summary for Subcatchment P1: AP1 - To Southbridge Parcel 019-048 (0 Cournoyer Blvd)

Runoff = 9.90 cfs @ 12.21 hrs, Volume= 40,790 cf, Depth> 2.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
166,550	70	Woods, Good, HSG C
166,550		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.4	220	0.0950	1.54		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.1	270	Total			

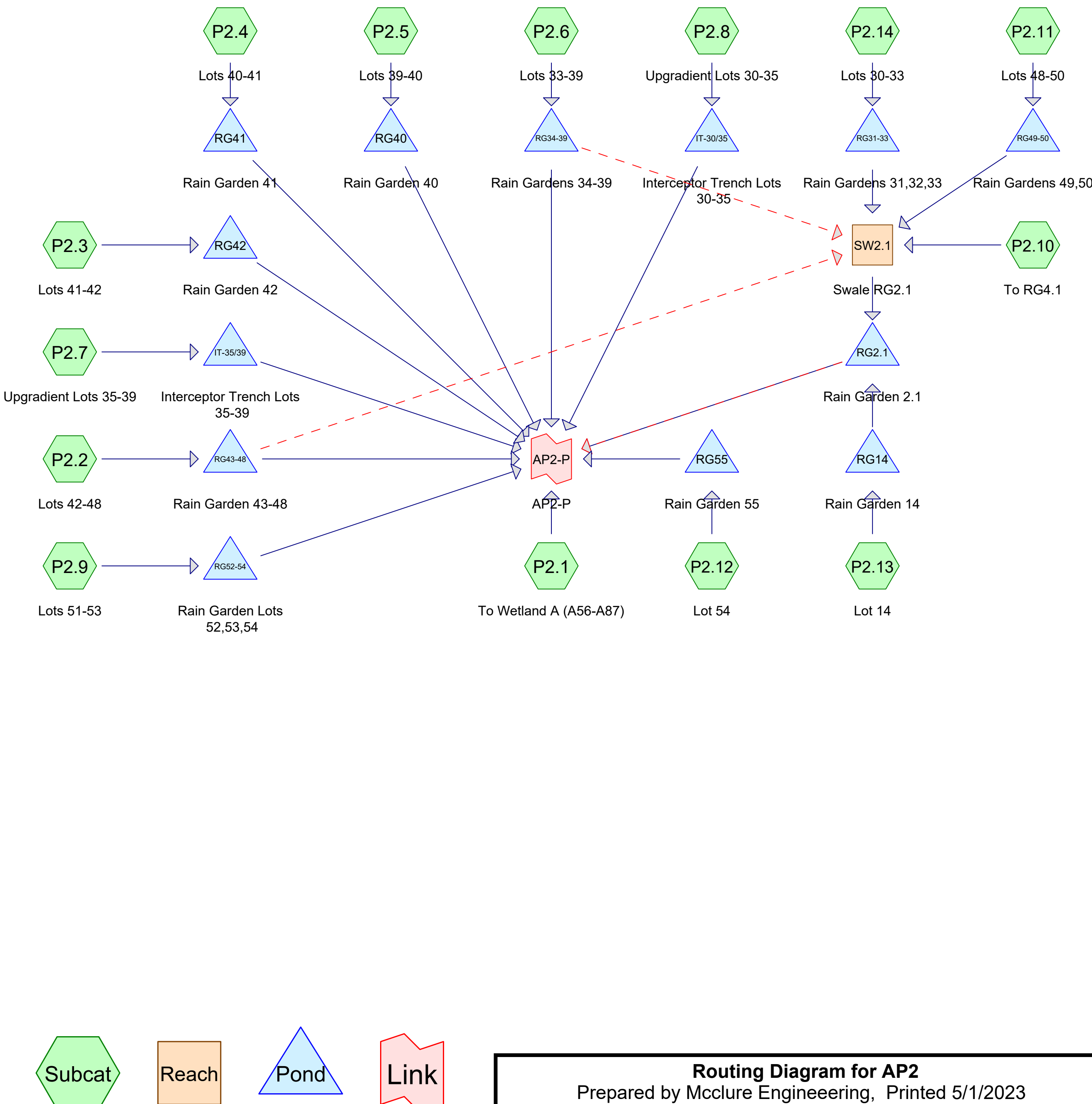
Summary for Subcatchment P1: AP1 - To Southbridge Parcel 019-048 (0 Cournoyer Blvd)

Runoff = 14.91 cfs @ 12.20 hrs, Volume= 60,940 cf, Depth> 4.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
166,550	70	Woods, Good, HSG C
166,550		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.4	220	0.0950	1.54		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
15.1	270	Total			



Routing Diagram for AP2
Prepared by Mcclure Engineeering, Printed 5/1/2023
HydroCAD® 10.20-2g s/n 03362 © 2022 HydroCAD Software Solutions LLC

Summary for Subcatchment P2.1: To Wetland A (A56-A87)

Runoff = 3.65 cfs @ 12.15 hrs, Volume= 14,371 cf, Depth> 0.85"
Routed to Link AP2-P : AP2-P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
142,635	70	Woods, Good, HSG C
45,615	74	>75% Grass cover, Good, HSG C
10,360	55	Woods, Good, HSG B
3,340	61	>75% Grass cover, Good, HSG B
1,060	98	Unconnected roofs, HSG B
203,010	70	Weighted Average
201,950		99.48% Pervious Area
1,060		0.52% Impervious Area
1,060		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	50	0.2000	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	90	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	290	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.5	430	Total			

Summary for Subcatchment P2.10: To RG4.1

Runoff = 1.01 cfs @ 12.11 hrs, Volume= 3,318 cf, Depth> 1.50"
Routed to Reach SW2.1 : Swale RG2.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
*	12,070	90	Residential Lots, 65% imp, HSG C
	2,925	70	Woods, Good, HSG C
	11,575	74	>75% Grass cover, Good, HSG C
	26,570	81	Weighted Average
	18,725		70.47% Pervious Area
	7,846		29.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.1200	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	100	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.2	150	Total			

Summary for Subcatchment P2.11: Lots 48-50

Runoff = 0.61 cfs @ 12.07 hrs, Volume= 1,912 cf, Depth> 2.20"
Routed to Pond RG49-50 : Rain Gardens 49,50

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
*	10,410	90	Residential Lots, 65% imp, HSG C
	3,644		35.00% Pervious Area
	6,767		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.12: Lot 54

Runoff = 0.32 cfs @ 12.07 hrs, Volume= 1,001 cf, Depth> 2.20"
Routed to Pond RG55 : Rain Garden 55

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
*	5,450	90	Residential Lots, 65% imp, HSG C
	1,908		35.00% Pervious Area
	3,543		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.13: Lot 14

Runoff = 0.39 cfs @ 12.07 hrs, Volume= 1,212 cf, Depth> 2.12"
Routed to Pond RG14 : Rain Garden 14

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
5,915	90	1/8 acre lots, 65% imp, HSG C
955	85	1/8 acre lots, 65% imp, HSG B
6,870	89	Weighted Average
2,405		35.00% Pervious Area
4,466		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.14: Lots 30-33

Runoff = 1.27 cfs @ 12.07 hrs, Volume= 3,950 cf, Depth> 2.20"
Routed to Pond RG31-33 : Rain Gardens 31,32,33

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
*	21,505	90	Residential Lots, 65% imp, HSG C
	7,527		35.00% Pervious Area
	13,978		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.2: Lots 42-48

Runoff = 2.35 cfs @ 12.07 hrs, Volume= 7,325 cf, Depth> 2.20"
Routed to Pond RG43-48 : Rain Garden 43-48

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
*	39,875	90	Residential Lots, 65% imp, HSG C
	13,956		35.00% Pervious Area
	25,919		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.3: Lots 41-42

Runoff = 0.75 cfs @ 12.07 hrs, Volume= 2,336 cf, Depth> 2.20"
Routed to Pond RG42 : Rain Garden 42

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
12,715	90	1/8 acre lots, 65% imp, HSG C
4,450		35.00% Pervious Area
8,265		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.4: Lots 40-41

Runoff = 0.44 cfs @ 12.07 hrs, Volume= 1,382 cf, Depth> 2.20"
Routed to Pond RG41 : Rain Garden 41

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
7,525	90	1/8 acre lots, 65% imp, HSG C
2,634		35.00% Pervious Area
4,891		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.5: Lots 39-40

Runoff = 0.56 cfs @ 12.07 hrs, Volume= 1,750 cf, Depth> 2.20"
Routed to Pond RG40 : Rain Garden 40

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
9,525	90	1/8 acre lots, 65% imp, HSG C
3,334		35.00% Pervious Area
6,191		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.6: Lots 33-39

Runoff = 2.67 cfs @ 12.07 hrs, Volume= 8,319 cf, Depth> 2.20"
Routed to Pond RG34-39 : Rain Gardens 34-39

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
*	45,285	90	Residential Lots, 65% imp, HSG C
	15,850		35.00% Pervious Area
	29,435		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.7: Upgradient Lots 35-39

Runoff = 0.63 cfs @ 12.31 hrs, Volume= 3,211 cf, Depth> 0.85"
Routed to Pond IT-35/39 : Interceptor Trench Lots 35-39

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
4,550	74	>75% Grass cover, Good, HSG C
40,950	70	Woods, Good, HSG C
45,500	70	Weighted Average
45,500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
7.1	560	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	20	0.5000	4.95		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
19.9	630	Total			

Summary for Subcatchment P2.8: Upgradient Lots 30-35

Runoff = 1.42 cfs @ 12.25 hrs, Volume= 6,623 cf, Depth> 0.90"
Routed to Pond IT-30/35 : Interceptor Trench Lots 30-35

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
11,085	74	>75% Grass cover, Good, HSG C
77,375	70	Woods, Good, HSG C
88,460	71	Weighted Average
88,460		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
3.5	280	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	30	0.5000	4.95		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.3	360	Total			

Summary for Subcatchment P2.9: Lots 51-53

Runoff = 1.19 cfs @ 12.08 hrs, Volume= 3,680 cf, Depth> 1.57"
Routed to Pond RG52-54 : Rain Garden Lots 52,53,54

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
2,430	90	1/8 acre lots, 65% imp, HSG C
20,825	85	1/8 acre lots, 65% imp, HSG B
3,605	70	Woods, Good, HSG C
1,280	55	Woods, Good, HSG B
28,140	82	Weighted Average
13,024		46.28% Pervious Area
15,116		53.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Reach SW2.1: Swale RG2.1

Inflow Area = 58,485 sf, 48.88% Impervious, Inflow Depth > 2.32" for 2YearMass event
Inflow = 1.98 cfs @ 12.16 hrs, Volume= 11,286 cf
Outflow = 1.97 cfs @ 12.16 hrs, Volume= 11,284 cf, Atten= 0%, Lag= 0.3 min
Routed to Pond RG2.1 : Rain Garden 2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.61 fps, Min. Travel Time= 0.3 min
Avg. Velocity = 2.45 fps, Avg. Travel Time= 0.8 min

Peak Storage= 36 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.21' , Surface Width= 1.84'
Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 46.26 cfs

1.00' x 1.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 2.0 '/' Top Width= 5.00'
Length= 120.0' Slope= 0.1500 '/'
Inlet Invert= 722.00', Outlet Invert= 704.00'

Summary for Pond IT-30/35: Interceptor Trench Lots 30-35

Inflow Area = 88,460 sf, 0.00% Impervious, Inflow Depth > 0.90" for 2YearMass event
Inflow = 1.42 cfs @ 12.25 hrs, Volume= 6,623 cf
Outflow = 1.36 cfs @ 12.31 hrs, Volume= 6,565 cf, Atten= 4%, Lag= 3.6 min
Primary = 1.36 cfs @ 12.31 hrs, Volume= 6,565 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 732.56' @ 12.31 hrs Surf.Area= 1,470 sf Storage= 421 cf

Plug-Flow detention time= 12.1 min calculated for 6,565 cf (99% of inflow)
Center-of-Mass det. time= 7.3 min (885.7 - 878.4)

Volume	Invert	Avail.Storage	Storage Description
#1	732.00'	1,696 cf	**3.00'W x 490.00'L x 3.00'H Prismatoid**
			4,410 cf Overall - 171 cf Embedded = 4,239 cf x 40.0% Voids
#2	732.00'	171 cf	**8.0" Round Pipe Storage** Inside #1
			L= 490.0'
		1,867 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	732.00'	**15.0" Round Culvert**
			L= 250.0' CPP, square edge headwall, Ke= 0.500

Inlet / Outlet Invert= 732.00' / 724.00' S= 0.0320 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.35 cfs @ 12.31 hrs HW=732.56' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.35 cfs @ 2.54 fps)

Summary for Pond IT-35/39: Interceptor Trench Lots 35-39

Inflow Area = 45,500 sf, 0.00% Impervious, Inflow Depth > 0.85" for 2YearMass event
Inflow = 0.63 cfs @ 12.31 hrs, Volume= 3,211 cf
Outflow = 0.58 cfs @ 12.40 hrs, Volume= 3,173 cf, Atten= 7%, Lag= 5.4 min
Primary = 0.58 cfs @ 12.40 hrs, Volume= 3,173 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 734.41' @ 12.40 hrs Surf.Area= 1,200 sf Storage= 251 cf

Plug-Flow detention time= 15.6 min calculated for 3,173 cf (99% of inflow)
Center-of-Mass det. time= 9.3 min (893.8 - 884.6)

Volume	Invert	Avail.Storage	Storage Description
#1	734.00'	1,384 cf	**3.00'W x 400.00'L x 3.00'H Prismatoid** 3,600 cf Overall - 140 cf Embedded = 3,460 cf x 40.0% Voids
#2	734.00'	140 cf	**8.0" Round Pipe Storage** Inside #1 L= 400.0'
		1,524 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	734.00'	**10.0" Round Culvert** L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 734.00' / 733.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=0.58 cfs @ 12.40 hrs HW=734.41' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.58 cfs @ 2.18 fps)

Summary for Pond RG14: Rain Garden 14

Inflow Area = 6,870 sf, 65.00% Impervious, Inflow Depth > 2.12" for 2YearMass event
Inflow = 0.39 cfs @ 12.07 hrs, Volume= 1,212 cf
Outflow = 0.25 cfs @ 12.18 hrs, Volume= 1,201 cf, Atten= 37%, Lag= 6.2 min
Primary = 0.25 cfs @ 12.18 hrs, Volume= 1,201 cf
Routed to Pond RG2.1 : Rain Garden 2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 703.98' @ 12.18 hrs Surf.Area= 240 sf Storage= 218 cf

Plug-Flow detention time= 20.7 min calculated for 1,201 cf (99% of inflow)
Center-of-Mass det. time= 15.4 min (824.7 - 809.3)

Volume	Invert	Avail.Storage	Storage Description
#1	702.00'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	702.00'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	704.25'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	704.50'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	702.00'	**6.0" Round Culvert** L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 702.00' / 702.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	705.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	702.00'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	703.75'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.24 cfs @ 12.18 hrs HW=703.97' TW=699.63' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.24 cfs of 0.70 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.61 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.10 cfs @ 1.60 fps)

Summary for Pond RG2.1: Rain Garden 2.1

Inflow Area = 65,355 sf, 50.58% Impervious, Inflow Depth > 2.29" for 2YearMass event
Inflow = 2.23 cfs @ 12.17 hrs, Volume= 12,485 cf
Outflow = 0.65 cfs @ 13.36 hrs, Volume= 12,485 cf, Atten= 71%, Lag= 71.5 min
Discarded = 0.48 cfs @ 13.36 hrs, Volume= 10,942 cf
Primary = 0.17 cfs @ 13.35 hrs, Volume= 1,542 cf
Routed to Link AP2-P : AP2-P
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 701.75' @ 13.35 hrs Surf.Area= 8,500 sf Storage= 5,147 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 153.5 min (976.9 - 823.4)

Volume	Invert	Avail.Storage	Storage Description
#1	698.75'	67 cf	**12.0" Round Pipe Storage** Inside #2 L= 85.0'
#2	698.75'	5,073 cf	**50.00'W x 85.00'L x 3.00'H Soil Media and Gravel** 12,750 cf Overall - 67 cf Embedded = 12,683 cf x 40.0% Voids
#3	701.75'	531 cf	**50.00'W x 85.00'L x 0.25'H Mulch** 1,063 cf Overall x 50.0% Voids
#4	702.00'	9,623 cf	**50.00'W x 85.00'L x 2.00'H Ponding Z=2.0**
		15,294 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	701.00'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 701.00' / 699.65' S= 0.1350 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	703.00'	**10.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	701.00'	**2.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	701.75'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Secondary	703.75'	**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
#6	Discarded	698.75'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.47 cfs @ 13.36 hrs HW=701.75' (Free Discharge)
└─**6=Exfiltration** (Exfiltration Controls 0.47 cfs)

Primary OutFlow Max=0.17 cfs @ 13.35 hrs HW=701.75' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.17 cfs of 1.87 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.17 cfs @ 3.94 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.19 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=698.75' TW=0.00' (Dynamic Tailwater)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG31-33: Rain Gardens 31,32,33

Inflow Area = 21,505 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event
Inflow = 1.27 cfs @ 12.07 hrs, Volume= 3,950 cf
Outflow = 0.50 cfs @ 12.31 hrs, Volume= 3,934 cf, Atten= 61%, Lag= 14.0 min
Primary = 0.50 cfs @ 12.31 hrs, Volume= 3,934 cf
Routed to Reach SW2.1 : Swale RG2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 730.84' @ 12.31 hrs Surf.Area= 720 sf Storage= 829 cf

Plug-Flow detention time= 18.5 min calculated for 3,934 cf (100% of inflow)
Center-of-Mass det. time= 16.0 min (821.1 - 805.1)

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	141 cf	**12.0" Round Pipe Storage** x 3 Inside #2 L= 60.0'
#2	728.25'	807 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	731.25'	90 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 3 180 cf Overall x 50.0% Voids
#4	731.50'	1,120 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 3
		2,159 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	728.25'	**6.0" Round Culvert X 3.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	732.00'	**6.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	728.25'	**2.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	731.00'	**3.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.50 cfs @ 12.31 hrs HW=730.83' TW=722.19' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.50 cfs of 4.33 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.50 cfs @ 7.61 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond RG34-39: Rain Gardens 34-39

Inflow Area = 45,285 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event
Inflow = 2.67 cfs @ 12.07 hrs, Volume= 8,319 cf
Outflow = 1.04 cfs @ 12.31 hrs, Volume= 8,285 cf, Atten= 61%, Lag= 13.9 min
Primary = 0.70 cfs @ 12.31 hrs, Volume= 5,523 cf
Routed to Link AP2-P : AP2-P
Secondary = 0.35 cfs @ 12.31 hrs, Volume= 2,762 cf
Routed to Reach SW2.1 : Swale RG2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 731.03' @ 12.31 hrs Surf.Area= 1,440 sf Storage= 1,769 cf

Plug-Flow detention time= 18.8 min calculated for 8,268 cf (99% of inflow)
Center-of-Mass det. time= 16.3 min (821.4 - 805.1)

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	283 cf	**12.0" Round Pipe Storage** x 6 Inside #2 L= 60.0'
#2	728.25'	1,615 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 6 4,320 cf Overall - 283 cf Embedded = 4,037 cf x 40.0% Voids
#3	731.25'	180 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 6 360 cf Overall x 50.0% Voids
#4	731.50'	2,240 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 6
		4,318 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	728.25'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	728.25'	**6.0" Round Culvert X 2.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 1	732.00'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	732.00'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 1	728.25'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#6	Device 2	728.25'	**2.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#7	Device 1	731.00'	**3.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#8	Device 2	731.00'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.69 cfs @ 12.31 hrs HW=731.02' TW=0.00' (Dynamic Tailwater)
1=Culvert (Passes 0.69 cfs of 6.01 cfs potential flow)
3=Orifice/Grate (Controls 0.00 cfs)
5=Orifice/Grate (Orifice Controls 0.69 cfs @ 7.90 fps)
7=Orifice/Grate (Orifice Controls 0.01 cfs @ 0.53 fps)

Secondary OutFlow Max=0.35 cfs @ 12.31 hrs HW=731.02' TW=722.19' (Dynamic Tailwater)
2=Culvert (Passes 0.35 cfs of 3.00 cfs potential flow)
4=Orifice/Grate (Controls 0.00 cfs)
6=Orifice/Grate (Orifice Controls 0.34 cfs @ 7.90 fps)
8=Orifice/Grate (Orifice Controls 0.00 cfs @ 0.53 fps)

Summary for Pond RG40: Rain Garden 40

Inflow Area = 9,525 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event
Inflow = 0.56 cfs @ 12.07 hrs, Volume= 1,750 cf
Outflow = 0.42 cfs @ 12.16 hrs, Volume= 1,743 cf, Atten= 25%, Lag= 5.0 min
Primary = 0.42 cfs @ 12.16 hrs, Volume= 1,743 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 732.52' @ 12.16 hrs Surf.Area= 240 sf Storage= 294 cf

Plug-Flow detention time= 16.2 min calculated for 1,740 cf (99% of inflow)
Center-of-Mass det. time= 13.9 min (819.0 - 805.1)

Volume	Invert	Avail.Storage	Storage Description
#1	729.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	729.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	732.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	733.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	729.75'	**8.0" Round Culvert** L= 140.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 729.75' / 728.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	733.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	729.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	732.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.41 cfs @ 12.16 hrs HW=732.50' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.41 cfs of 1.82 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.17 cfs @ 7.86 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.24 cfs @ 2.78 fps)

Summary for Pond RG41: Rain Garden 41

Inflow Area = 7,525 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event
Inflow = 0.44 cfs @ 12.07 hrs, Volume= 1,382 cf
Outflow = 0.30 cfs @ 12.16 hrs, Volume= 1,331 cf, Atten= 32%, Lag= 5.3 min
Discarded = 0.04 cfs @ 12.15 hrs, Volume= 750 cf
Primary = 0.26 cfs @ 12.17 hrs, Volume= 581 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 731.51' @ 12.17 hrs Surf.Area= 723 sf Storage= 349 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 79.0 min (884.1 - 805.1)

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	728.25'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	731.25'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	731.50'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	730.25'	**6.0" Round Culvert** L= 26.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.00' S= 0.0096 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	732.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	731.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 12.15 hrs HW=731.50' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.26 cfs @ 12.17 hrs HW=731.49' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.26 cfs of 0.83 cfs potential flow)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.19 fps)
  └─**5=Orifice/Grate** (Orifice Controls 0.14 cfs @ 2.92 fps)

Summary for Pond RG42: Rain Garden 42

Inflow Area = 12,715 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event
Inflow = 0.75 cfs @ 12.07 hrs, Volume= 2,336 cf
Outflow = 0.40 cfs @ 12.21 hrs, Volume= 1,848 cf, Atten= 47%, Lag= 8.3 min
Discarded = 0.02 cfs @ 12.15 hrs, Volume= 669 cf
Primary = 0.38 cfs @ 12.21 hrs, Volume= 1,179 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 731.44' @ 12.21 hrs Surf.Area= 960 sf Storage= 748 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 46.5 min (851.6 - 805.1)

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	212 cf	**18.0" Round Pipe Storage** x 2 Inside #2 L= 60.0'
#2	728.25'	491 cf	**8.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 1,440 cf Overall - 212 cf Embedded = 1,228 cf x 40.0% Voids
#3	731.25'	60 cf	**8.00'W x 60.00'L x 0.25'H Mulch** 120 cf Overall x 50.0% Voids
#4	731.50'	621 cf	**8.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		1,385 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	730.25'	**8.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Device 2	732.00'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	731.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 12.15 hrs HW=731.38' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.37 cfs @ 12.21 hrs HW=731.43' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.37 cfs of 1.54 cfs potential flow)
 ├─**3=Orifice/Grate** (Controls 0.00 cfs)
 ├─**4=Orifice/Grate** (Orifice Controls 0.24 cfs @ 4.95 fps)
 └─**5=Orifice/Grate** (Orifice Controls 0.13 cfs @ 2.66 fps)

Summary for Pond RG43-48: Rain Garden 43-48

Inflow Area = 39,875 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event
Inflow = 2.35 cfs @ 12.07 hrs, Volume= 7,325 cf
Outflow = 1.27 cfs @ 12.22 hrs, Volume= 5,907 cf, Atten= 46%, Lag= 8.6 min
Discarded = 0.09 cfs @ 12.23 hrs, Volume= 2,453 cf
Primary = 0.99 cfs @ 12.22 hrs, Volume= 2,878 cf
 Routed to Link AP2-P : AP2-P
Secondary = 0.20 cfs @ 12.22 hrs, Volume= 576 cf
 Routed to Reach SW2.1 : Swale RG2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 732.79' @ 12.21 hrs Surf.Area= 3,600 sf Storage= 2,361 cf

Plug-Flow detention time= 128.5 min calculated for 5,895 cf (80% of inflow)
Center-of-Mass det. time= 54.8 min (859.9 - 805.1)

Volume	Invert	Avail.Storage	Storage Description
#1	729.75'	283 cf	**12.0" Round Pipe Storage** x 6 Inside #2 L= 60.0'
#2	729.75'	2,047 cf	**5.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 6 5,400 cf Overall - 283 cf Embedded = 5,117 cf x 40.0% Voids
#3	732.75'	225 cf	**5.00'W x 60.00'L x 0.25'H Mulch** x 6 450 cf Overall x 50.0% Voids
#4	733.00'	2,612 cf	**5.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 6
		5,167 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	729.75'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	731.75'	**6.0" Round Culvert X 5.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 731.75' / 731.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Secondary	731.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 731.75' / 731.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#4	Device 2	733.50'	**6.0" Horiz. Orifice/Grate X 5.00** C= 0.600 Limited to weir flow at low heads
#5	Device 3	733.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 2	731.75'	**2.0" Vert. Orifice/Grate X 5.00** C= 0.600 Limited to weir flow at low heads
#7	Device 3	731.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#8	Device 2	732.50'	**3.0" Vert. Orifice/Grate X 5.00** C= 0.600 Limited to weir flow at low heads
#9	Device 3	732.50'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.08 cfs @ 12.23 hrs HW=732.77' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.97 cfs @ 12.22 hrs HW=732.78' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.97 cfs of 4.12 cfs potential flow)
├─**4=Orifice/Grate** (Controls 0.00 cfs)
├─**6=Orifice/Grate** (Orifice Controls 0.51 cfs @ 4.68 fps)
└─**8=Orifice/Grate** (Orifice Controls 0.46 cfs @ 1.87 fps)

Secondary OutFlow Max=0.19 cfs @ 12.22 hrs HW=732.78' TW=722.20' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.19 cfs of 0.82 cfs potential flow)
├─**5=Orifice/Grate** (Controls 0.00 cfs)
├─**7=Orifice/Grate** (Orifice Controls 0.10 cfs @ 4.68 fps)
└─**9=Orifice/Grate** (Orifice Controls 0.09 cfs @ 1.87 fps)

Summary for Pond RG49-50: Rain Gardens 49,50

Inflow Area = 10,410 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event
Inflow = 0.61 cfs @ 12.07 hrs, Volume= 1,912 cf
Outflow = 0.18 cfs @ 12.40 hrs, Volume= 1,494 cf, Atten= 70%, Lag= 19.7 min
Discarded = 0.01 cfs @ 10.50 hrs, Volume= 797 cf
Primary = 0.17 cfs @ 12.40 hrs, Volume= 697 cf
Routed to Reach SW2.1 : Swale RG2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 730.99' @ 12.40 hrs Surf.Area= 600 sf Storage= 715 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 81.0 min (886.1 - 805.1)

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	94 cf	**12.0" Round Pipe Storage** x 2 Inside #2 L= 60.0'
#2	728.25'	682 cf	**5.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 2 1,800 cf Overall - 94 cf Embedded = 1,706 cf x 40.0% Voids
#3	731.25'	75 cf	**5.00'W x 60.00'L x 0.25'H Mulch** x 2 150 cf Overall x 50.0% Voids
#4	731.50'	871 cf	**5.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 2
		1,722 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	730.25'	**6.0" Round Culvert X 2.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	732.00'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	**2.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	731.00'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 10.50 hrs HW=728.29' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.17 cfs @ 12.40 hrs HW=730.99' TW=722.18' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.17 cfs of 1.22 cfs potential flow)
 ├─**3=Orifice/Grate** (Controls 0.00 cfs)
 ├─**4=Orifice/Grate** (Orifice Controls 0.17 cfs @ 3.91 fps)
 └─**5=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond RG52-54: Rain Garden Lots 52,53,54

Inflow Area = 28,140 sf, 53.72% Impervious, Inflow Depth > 1.57" for 2YearMass event
Inflow = 1.19 cfs @ 12.08 hrs, Volume= 3,680 cf
Outflow = 0.50 cfs @ 12.31 hrs, Volume= 3,662 cf, Atten= 58%, Lag= 14.1 min
Primary = 0.50 cfs @ 12.31 hrs, Volume= 3,662 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 689.07' @ 12.32 hrs Surf.Area= 720 sf Storage= 752 cf

Plug-Flow detention time= 18.0 min calculated for 3,654 cf (99% of inflow)
Center-of-Mass det. time= 15.1 min (849.4 - 834.3)

Volume	Invert	Avail.Storage	Storage Description
#1	686.75'	141 cf	**12.0" Round Pipe Storage** x 3 Inside #2 L= 60.0'
#2	686.75'	807 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	689.75'	90 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 3 180 cf Overall x 50.0% Voids
#4	690.00'	1,120 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 3
		2,159 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	686.75'	**6.0" Round Culvert X 3.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 686.75' / 686.70' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	690.50'	**6.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	686.75'	**2.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	689.00'	**4.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.50 cfs @ 12.31 hrs HW=689.06' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.50 cfs of 4.07 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.47 cfs @ 7.19 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.03 cfs @ 0.84 fps)

Summary for Pond RG55: Rain Garden 55

Inflow Area = 5,450 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event
Inflow = 0.32 cfs @ 12.07 hrs, Volume= 1,001 cf
Outflow = 0.13 cfs @ 12.31 hrs, Volume= 996 cf, Atten= 61%, Lag= 14.2 min
Primary = 0.13 cfs @ 12.31 hrs, Volume= 996 cf
Routed to Link AP2-P : AP2-P

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

Peak Elev= 687.25' @ 12.31 hrs Surf.Area= 240 sf Storage= 208 cf

Plug-Flow detention time= 18.9 min calculated for 996 cf (100% of inflow)
Center-of-Mass det. time= 15.9 min (821.1 - 805.1)

Volume	Invert	Avail.Storage	Storage Description
#1	685.75'	106 cf	**18.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	685.75'	246 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 106 cf Embedded = 614 cf x 40.0% Voids
#3	688.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	689.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		755 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	685.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 685.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	689.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	685.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	688.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.12 cfs @ 12.31 hrs HW=687.25' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.12 cfs of 1.06 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.12 cfs @ 5.73 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link AP2-P: AP2-P

Inflow Area = 550,840 sf, 23.14% Impervious, Inflow Depth > 0.92" for 2YearMass event
Inflow = 7.92 cfs @ 12.20 hrs, Volume= 42,215 cf
Primary = 7.92 cfs @ 12.20 hrs, Volume= 42,215 cf, Atten= 0%, Lag= 0.0 min

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

Summary for Subcatchment P2.1: To Wetland A (A56-A87)

Runoff = 9.73 cfs @ 12.14 hrs, Volume= 35,011 cf, Depth> 2.07"
Routed to Link AP2-P : AP2-P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
142,635	70	Woods, Good, HSG C
45,615	74	>75% Grass cover, Good, HSG C
10,360	55	Woods, Good, HSG B
3,340	61	>75% Grass cover, Good, HSG B
1,060	98	Unconnected roofs, HSG B
203,010	70	Weighted Average
201,950		99.48% Pervious Area
1,060		0.52% Impervious Area
1,060		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	50	0.2000	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	90	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	290	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.5	430	Total			

Summary for Subcatchment P2.10: To RG4.1

Runoff = 2.05 cfs @ 12.11 hrs, Volume= 6,701 cf, Depth> 3.03"
Routed to Reach SW2.1 : Swale RG2.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
*	12,070	90	Residential Lots, 65% imp, HSG C
	2,925	70	Woods, Good, HSG C
	11,575	74	>75% Grass cover, Good, HSG C
	26,570	81	Weighted Average
	18,725		70.47% Pervious Area
	7,846		29.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.1200	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	100	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.2	150	Total			

Summary for Subcatchment P2.11: Lots 48-50

Runoff = 1.07 cfs @ 12.07 hrs, Volume= 3,403 cf, Depth> 3.92"
Routed to Pond RG49-50 : Rain Gardens 49,50

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
*	10,410	90	Residential Lots, 65% imp, HSG C
	3,644		35.00% Pervious Area
	6,767		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.12: Lot 54

Runoff = 0.56 cfs @ 12.07 hrs, Volume= 1,781 cf, Depth> 3.92"
Routed to Pond RG55 : Rain Garden 55

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
*	5,450	90	Residential Lots, 65% imp, HSG C
	1,908		35.00% Pervious Area
	3,543		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.13: Lot 14

Runoff = 0.69 cfs @ 12.07 hrs, Volume= 2,186 cf, Depth> 3.82"
Routed to Pond RG14 : Rain Garden 14

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
5,915	90	1/8 acre lots, 65% imp, HSG C
955	85	1/8 acre lots, 65% imp, HSG B
6,870	89	Weighted Average
2,405		35.00% Pervious Area
4,466		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.14: Lots 30-33

Runoff = 2.20 cfs @ 12.07 hrs, Volume= 7,029 cf, Depth> 3.92"
Routed to Pond RG31-33 : Rain Gardens 31,32,33

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
*	21,505	90	Residential Lots, 65% imp, HSG C
	7,527		35.00% Pervious Area
	13,978		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.2: Lots 42-48

Runoff = 4.08 cfs @ 12.07 hrs, Volume= 13,034 cf, Depth> 3.92"
Routed to Pond RG43-48 : Rain Garden 43-48

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
*	39,875	90	Residential Lots, 65% imp, HSG C
	13,956		35.00% Pervious Area
	25,919		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.3: Lots 41-42

Runoff = 1.30 cfs @ 12.07 hrs, Volume= 4,156 cf, Depth> 3.92"
Routed to Pond RG42 : Rain Garden 42

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
12,715	90	1/8 acre lots, 65% imp, HSG C
4,450		35.00% Pervious Area
8,265		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.4: Lots 40-41

Runoff = 0.77 cfs @ 12.07 hrs, Volume= 2,460 cf, Depth> 3.92"
Routed to Pond RG41 : Rain Garden 41

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
7,525	90	1/8 acre lots, 65% imp, HSG C
2,634		35.00% Pervious Area
4,891		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.5: Lots 39-40

Runoff = 0.98 cfs @ 12.07 hrs, Volume= 3,113 cf, Depth> 3.92"
Routed to Pond RG40 : Rain Garden 40

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
9,525	90	1/8 acre lots, 65% imp, HSG C
3,334		35.00% Pervious Area
6,191		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.6: Lots 33-39

Runoff = 4.64 cfs @ 12.07 hrs, Volume= 14,802 cf, Depth> 3.92"
Routed to Pond RG34-39 : Rain Gardens 34-39

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
*	45,285	90	Residential Lots, 65% imp, HSG C
	15,850		35.00% Pervious Area
	29,435		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.7: Upgradient Lots 35-39

Runoff = 1.67 cfs @ 12.29 hrs, Volume= 7,827 cf, Depth> 2.06"
Routed to Pond IT-35/39 : Interceptor Trench Lots 35-39

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
4,550	74	>75% Grass cover, Good, HSG C
40,950	70	Woods, Good, HSG C
45,500	70	Weighted Average
45,500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
7.1	560	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	20	0.5000	4.95		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
19.9	630	Total			

Summary for Subcatchment P2.8: Upgradient Lots 30-35

Runoff = 3.67 cfs @ 12.24 hrs, Volume= 15,826 cf, Depth> 2.15"
Routed to Pond IT-30/35 : Interceptor Trench Lots 30-35

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
11,085	74	>75% Grass cover, Good, HSG C
77,375	70	Woods, Good, HSG C
88,460	71	Weighted Average
88,460		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
3.5	280	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	30	0.5000	4.95		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.3	360	Total			

Summary for Subcatchment P2.9: Lots 51-53

Runoff = 2.36 cfs @ 12.08 hrs, Volume= 7,321 cf, Depth> 3.12"
Routed to Pond RG52-54 : Rain Garden Lots 52,53,54

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
2,430	90	1/8 acre lots, 65% imp, HSG C
20,825	85	1/8 acre lots, 65% imp, HSG B
3,605	70	Woods, Good, HSG C
1,280	55	Woods, Good, HSG B
28,140	82	Weighted Average
13,024		46.28% Pervious Area
15,116		53.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

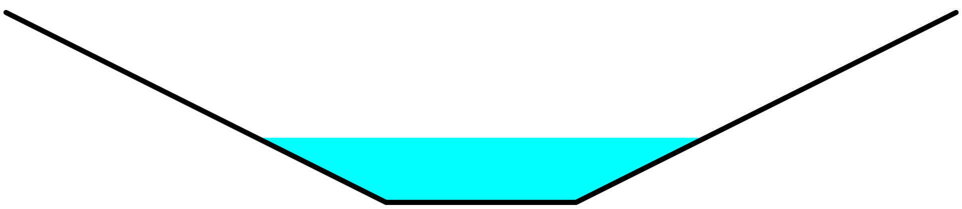
Summary for Reach SW2.1: Swale RG2.1

Inflow Area = 58,485 sf, 48.88% Impervious, Inflow Depth > 4.51" for 10YearMass event
Inflow = 4.87 cfs @ 12.12 hrs, Volume= 22,003 cf
Outflow = 4.89 cfs @ 12.12 hrs, Volume= 22,000 cf, Atten= 0%, Lag= 0.0 min
Routed to Pond RG2.1 : Rain Garden 2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.51 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 2.91 fps, Avg. Travel Time= 0.7 min

Peak Storage= 69 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.34' , Surface Width= 2.36'
Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 46.26 cfs

1.00' x 1.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 2.0 '/' Top Width= 5.00'
Length= 120.0' Slope= 0.1500 '/'
Inlet Invert= 722.00', Outlet Invert= 704.00'



Summary for Pond IT-30/35: Interceptor Trench Lots 30-35

Inflow Area = 88,460 sf, 0.00% Impervious, Inflow Depth > 2.15" for 10YearMass event
Inflow = 3.67 cfs @ 12.24 hrs, Volume= 15,826 cf
Outflow = 3.61 cfs @ 12.27 hrs, Volume= 15,743 cf, Atten= 2%, Lag= 2.0 min
Primary = 3.61 cfs @ 12.27 hrs, Volume= 15,743 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 733.01' @ 12.27 hrs Surf.Area= 1,470 sf Storage= 694 cf

Plug-Flow detention time= 8.3 min calculated for 15,743 cf (99% of inflow)
Center-of-Mass det. time= 5.2 min (857.3 - 852.0)

Volume	Invert	Avail.Storage	Storage Description
#1	732.00'	1,696 cf	**3.00'W x 490.00'L x 3.00'H Prismatoid** 4,410 cf Overall - 171 cf Embedded = 4,239 cf x 40.0% Voids
#2	732.00'	171 cf	**8.0" Round Pipe Storage** Inside #1 L= 490.0'
		1,867 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	732.00'	**15.0" Round Culvert** L= 250.0' CPP, square edge headwall, Ke= 0.500

Inlet / Outlet Invert= 732.00' / 724.00' S= 0.0320 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=3.57 cfs @ 12.27 hrs HW=733.00' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 3.57 cfs @ 3.40 fps)

Summary for Pond IT-35/39: Interceptor Trench Lots 35-39

Inflow Area = 45,500 sf, 0.00% Impervious, Inflow Depth > 2.06" for 10YearMass event
Inflow = 1.67 cfs @ 12.29 hrs, Volume= 7,827 cf
Outflow = 1.61 cfs @ 12.35 hrs, Volume= 7,774 cf, Atten= 4%, Lag= 3.5 min
Primary = 1.61 cfs @ 12.35 hrs, Volume= 7,774 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 734.79' @ 12.35 hrs Surf.Area= 1,200 sf Storage= 461 cf

Plug-Flow detention time= 10.6 min calculated for 7,758 cf (99% of inflow)
Center-of-Mass det. time= 6.8 min (864.1 - 857.4)

Volume	Invert	Avail.Storage	Storage Description
#1	734.00'	1,384 cf	**3.00'W x 400.00'L x 3.00'H Prismatoid** 3,600 cf Overall - 140 cf Embedded = 3,460 cf x 40.0% Voids
#2	734.00'	140 cf	**8.0" Round Pipe Storage** Inside #1 L= 400.0'
		1,524 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	734.00'	**10.0" Round Culvert** L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 734.00' / 733.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=1.61 cfs @ 12.35 hrs HW=734.79' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.61 cfs @ 3.02 fps)

Summary for Pond RG14: Rain Garden 14

Inflow Area = 6,870 sf, 65.00% Impervious, Inflow Depth > 3.82" for 10YearMass event
Inflow = 0.69 cfs @ 12.07 hrs, Volume= 2,186 cf
Outflow = 0.50 cfs @ 12.15 hrs, Volume= 2,173 cf, Atten= 28%, Lag= 4.8 min
Primary = 0.50 cfs @ 12.15 hrs, Volume= 2,173 cf
Routed to Pond RG2.1 : Rain Garden 2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 704.54' @ 12.15 hrs Surf.Area= 730 sf Storage= 312 cf

Plug-Flow detention time= 16.9 min calculated for 2,173 cf (99% of inflow)
Center-of-Mass det. time= 13.3 min (806.0 - 792.7)

Volume	Invert	Avail.Storage	Storage Description
#1	702.00'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	702.00'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	704.25'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	704.50'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	702.00'	**6.0" Round Culvert** L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 702.00' / 702.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	705.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	702.00'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	703.75'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.50 cfs @ 12.15 hrs HW=704.54' TW=701.25' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.50 cfs of 0.83 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.16 cfs @ 7.54 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.33 cfs @ 3.80 fps)

Summary for Pond RG2.1: Rain Garden 2.1

```
Inflow Area =      65,355 sf,  50.58% Impervious,  Inflow Depth >   4.44"    for  10YearMass event
Inflow      =      5.39 cfs @   12.12 hrs,  Volume=        24,173 cf
Outflow     =      2.20 cfs @   12.56 hrs,  Volume=        23,340 cf,  Atten= 59%,  Lag= 26.0 min
Discarded   =      0.72 cfs @   12.56 hrs,  Volume=        15,934 cf
Primary     =      1.48 cfs @   12.56 hrs,  Volume=         7,405 cf
    Routed to Link AP2-P : AP2-P
Secondary =        0.00 cfs @    0.00 hrs,  Volume=             0 cf
    Routed to Link AP2-P : AP2-P
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 702.43' @ 12.56 hrs Surf.Area= 12,983 sf Storage= 7,529 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 96.2 min (903.0 - 806.8)

Volume	Invert	Avail.Storage	Storage Description
#1	698.75'	67 cf	**12.0" Round Pipe Storage** Inside #2 L= 85.0'
#2	698.75'	5,073 cf	**50.00'W x 85.00'L x 3.00'H Soil Media and Gravel** 12,750 cf Overall - 67 cf Embedded = 12,683 cf x 40.0% Voids
#3	701.75'	531 cf	**50.00'W x 85.00'L x 0.25'H Mulch** 1,063 cf Overall x 50.0% Voids
#4	702.00'	9,623 cf	**50.00'W x 85.00'L x 2.00'H Ponding Z=2.0**
		15,294 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	701.00'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 701.00' / 699.65' S= 0.1350 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	703.00'	**10.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	701.00'	**2.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	701.75'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Secondary	703.75'	**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
#6	Discarded	698.75'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.72 cfs @ 12.56 hrs HW=702.42' (Free Discharge)
└─**6=Exfiltration** (Exfiltration Controls 0.72 cfs)

Primary OutFlow Max=1.47 cfs @ 12.56 hrs HW=702.42' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.47 cfs of 3.64 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.24 cfs @ 5.58 fps)
  └─**4=Orifice/Grate** (Orifice Controls 1.23 cfs @ 3.14 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=698.75' TW=0.00' (Dynamic Tailwater)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG31-33: Rain Gardens 31,32,33

Inflow Area = 21,505 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event
Inflow = 2.20 cfs @ 12.07 hrs, Volume= 7,029 cf
Outflow = 1.18 cfs @ 12.20 hrs, Volume= 7,008 cf, Atten= 46%, Lag= 7.9 min
Primary = 1.18 cfs @ 12.20 hrs, Volume= 7,008 cf
Routed to Reach SW2.1 : Swale RG2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 731.83' @ 12.20 hrs Surf.Area= 2,417 sf Storage= 1,317 cf

Plug-Flow detention time= 17.1 min calculated for 7,008 cf (100% of inflow)
Center-of-Mass det. time= 15.1 min (804.2 - 789.1)

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	141 cf	**12.0" Round Pipe Storage** x 3 Inside #2 L= 60.0'
#2	728.25'	807 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	731.25'	90 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 3 180 cf Overall x 50.0% Voids
#4	731.50'	1,120 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 3
		2,159 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	728.25'	**6.0" Round Culvert X 3.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	732.00'	**6.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	728.25'	**2.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	731.00'	**3.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.18 cfs @ 12.20 hrs HW=731.83' TW=722.32' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.18 cfs of 5.17 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.59 cfs @ 9.00 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.59 cfs @ 4.03 fps)

Summary for Pond RG34-39: Rain Gardens 34-39

Inflow Area = 45,285 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event
Inflow = 4.64 cfs @ 12.07 hrs, Volume= 14,802 cf
Outflow = 2.44 cfs @ 12.21 hrs, Volume= 14,758 cf, Atten= 47%, Lag= 8.2 min
Primary = 1.63 cfs @ 12.21 hrs, Volume= 9,839 cf
Routed to Link AP2-P : AP2-P
Secondary = 0.81 cfs @ 12.21 hrs, Volume= 4,919 cf
Routed to Reach SW2.1 : Swale RG2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 731.90' @ 12.21 hrs Surf.Area= 4,953 sf Storage= 2,783 cf

Plug-Flow detention time= 17.1 min calculated for 14,727 cf (99% of inflow)
Center-of-Mass det. time= 15.2 min (804.3 - 789.1)

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	283 cf	**12.0" Round Pipe Storage** x 6 Inside #2 L= 60.0'
#2	728.25'	1,615 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 6 4,320 cf Overall - 283 cf Embedded = 4,037 cf x 40.0% Voids
#3	731.25'	180 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 6 360 cf Overall x 50.0% Voids
#4	731.50'	2,240 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 6
		4,318 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	728.25'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	728.25'	**6.0" Round Culvert X 2.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 1	732.00'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	732.00'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 1	728.25'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#6	Device 2	728.25'	**2.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#7	Device 1	731.00'	**3.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#8	Device 2	731.00'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.62 cfs @ 12.21 hrs HW=731.90' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 1.62 cfs of 6.97 cfs potential flow)
  ├**3=Orifice/Grate** (Controls 0.00 cfs)
  ├**5=Orifice/Grate** (Orifice Controls 0.79 cfs @ 9.09 fps)
  └**7=Orifice/Grate** (Orifice Controls 0.83 cfs @ 4.23 fps)

Secondary OutFlow Max=0.81 cfs @ 12.21 hrs HW=731.90' TW=722.32' (Dynamic Tailwater)
└**2=Culvert** (Passes 0.81 cfs of 3.49 cfs potential flow)
  ├**4=Orifice/Grate** (Controls 0.00 cfs)
  ├**6=Orifice/Grate** (Orifice Controls 0.40 cfs @ 9.09 fps)
  └**8=Orifice/Grate** (Orifice Controls 0.42 cfs @ 4.23 fps)

Summary for Pond RG40: Rain Garden 40

Inflow Area = 9,525 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event
Inflow = 0.98 cfs @ 12.07 hrs, Volume= 3,113 cf
Outflow = 0.65 cfs @ 12.16 hrs, Volume= 3,105 cf, Atten= 33%, Lag= 5.4 min
Primary = 0.65 cfs @ 12.16 hrs, Volume= 3,105 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 733.35' @ 12.16 hrs Surf.Area= 811 sf Storage= 446 cf

Plug-Flow detention time= 14.5 min calculated for 3,105 cf (100% of inflow)
Center-of-Mass det. time= 12.8 min (801.9 - 789.1)

Volume	Invert	Avail.Storage	Storage Description
#1	729.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	729.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	732.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	733.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	729.75'	**8.0" Round Culvert** L= 140.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 729.75' / 728.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	733.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	729.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	732.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.65 cfs @ 12.16 hrs HW=733.34' TW=0.00' (Dynamic Tailwater)
1=Culvert (Passes 0.65 cfs of 2.01 cfs potential flow)
2=Orifice/Grate (Controls 0.00 cfs)
3=Orifice/Grate (Orifice Controls 0.20 cfs @ 9.01 fps)
4=Orifice/Grate (Orifice Controls 0.45 cfs @ 5.21 fps)

Summary for Pond RG41: Rain Garden 41

Inflow Area = 7,525 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event
Inflow = 0.77 cfs @ 12.07 hrs, Volume= 2,460 cf
Outflow = 0.49 cfs @ 12.17 hrs, Volume= 2,307 cf, Atten= 36%, Lag= 5.9 min
Discarded = 0.05 cfs @ 12.17 hrs, Volume= 894 cf
Primary = 0.44 cfs @ 12.17 hrs, Volume= 1,412 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 732.07' @ 12.17 hrs Surf.Area= 870 sf Storage= 524 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 35.8 min (824.9 - 789.1)

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	728.25'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	731.25'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	731.50'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	730.25'	**6.0" Round Culvert** L= 26.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.00' S= 0.0096 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	732.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	731.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.05 cfs @ 12.17 hrs HW=732.05' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.43 cfs @ 12.17 hrs HW=732.05' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.43 cfs of 1.04 cfs potential flow)
 ├─**3=Orifice/Grate** (Weir Controls 0.07 cfs @ 0.77 fps)
 ├─**4=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.32 fps)
 └─**5=Orifice/Grate** (Orifice Controls 0.23 cfs @ 4.64 fps)

Summary for Pond RG42: Rain Garden 42

Inflow Area = 12,715 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event
Inflow = 1.30 cfs @ 12.07 hrs, Volume= 4,156 cf
Outflow = 0.86 cfs @ 12.17 hrs, Volume= 3,640 cf, Atten= 34%, Lag= 5.9 min
Discarded = 0.04 cfs @ 12.17 hrs, Volume= 804 cf
Primary = 0.82 cfs @ 12.17 hrs, Volume= 2,836 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 732.12' @ 12.17 hrs Surf.Area= 1,615 sf Storage= 1,115 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 31.8 min (820.9 - 789.1)

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	212 cf	**18.0" Round Pipe Storage** x 2 Inside #2 L= 60.0'
#2	728.25'	491 cf	**8.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 1,440 cf Overall - 212 cf Embedded = 1,228 cf x 40.0% Voids
#3	731.25'	60 cf	**8.00'W x 60.00'L x 0.25'H Mulch** 120 cf Overall x 50.0% Voids
#4	731.50'	621 cf	**8.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		1,385 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	730.25'	**8.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Device 2	732.00'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	731.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 12.17 hrs HW=732.11' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.78 cfs @ 12.17 hrs HW=732.11' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.78 cfs of 2.07 cfs potential flow)
  ├─**3=Orifice/Grate** (Weir Controls 0.24 cfs @ 1.07 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 0.31 cfs @ 6.34 fps)
  └─**5=Orifice/Grate** (Orifice Controls 0.23 cfs @ 4.77 fps)

Summary for Pond RG43-48: Rain Garden 43-48

Inflow Area = 39,875 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event
Inflow = 4.08 cfs @ 12.07 hrs, Volume= 13,034 cf
Outflow = 2.21 cfs @ 12.20 hrs, Volume= 11,422 cf, Atten= 46%, Lag= 7.8 min
Discarded = 0.14 cfs @ 12.20 hrs, Volume= 2,928 cf
Primary = 1.72 cfs @ 12.20 hrs, Volume= 7,079 cf
Routed to Link AP2-P : AP2-P
Secondary = 0.34 cfs @ 12.20 hrs, Volume= 1,416 cf
Routed to Reach SW2.1 : Swale RG2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 733.42' @ 12.20 hrs Surf.Area= 6,080 sf Storage= 3,463 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 31.3 min (820.4 - 789.1)

Volume	Invert	Avail.Storage	Storage Description
#1	729.75'	283 cf	**12.0" Round Pipe Storage** x 6 Inside #2 L= 60.0'
#2	729.75'	2,047 cf	**5.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 6 5,400 cf Overall - 283 cf Embedded = 5,117 cf x 40.0% Voids
#3	732.75'	225 cf	**5.00'W x 60.00'L x 0.25'H Mulch** x 6 450 cf Overall x 50.0% Voids
#4	733.00'	2,612 cf	**5.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 6
		5,167 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	729.75'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	731.75'	**6.0" Round Culvert X 5.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 731.75' / 731.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Secondary	731.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 731.75' / 731.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#4	Device 2	733.50'	**6.0" Horiz. Orifice/Grate X 5.00** C= 0.600 Limited to weir flow at low heads
#5	Device 3	733.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 2	731.75'	**2.0" Vert. Orifice/Grate X 5.00** C= 0.600 Limited to weir flow at low heads
#7	Device 3	731.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#8	Device 2	732.50'	**3.0" Vert. Orifice/Grate X 5.00** C= 0.600 Limited to weir flow at low heads
#9	Device 3	732.50'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.14 cfs @ 12.20 hrs HW=733.42' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=1.72 cfs @ 12.20 hrs HW=733.42' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.72 cfs of 5.64 cfs potential flow)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  ├─**6=Orifice/Grate** (Orifice Controls 0.66 cfs @ 6.07 fps)
  └─**8=Orifice/Grate** (Orifice Controls 1.06 cfs @ 4.30 fps)

Secondary OutFlow Max=0.34 cfs @ 12.20 hrs HW=733.42' TW=722.32' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.34 cfs of 1.13 cfs potential flow)
  ├─**5=Orifice/Grate** (Controls 0.00 cfs)
  ├─**7=Orifice/Grate** (Orifice Controls 0.13 cfs @ 6.07 fps)
  └─**9=Orifice/Grate** (Orifice Controls 0.21 cfs @ 4.30 fps)

Summary for Pond RG49-50: Rain Gardens 49,50

Inflow Area = 10,410 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event
Inflow = 1.07 cfs @ 12.07 hrs, Volume= 3,403 cf
Outflow = 0.64 cfs @ 12.18 hrs, Volume= 2,887 cf, Atten= 40%, Lag= 6.4 min
Discarded = 0.04 cfs @ 12.18 hrs, Volume= 927 cf
Primary = 0.60 cfs @ 12.18 hrs, Volume= 1,960 cf
Routed to Reach SW2.1 : Swale RG2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 731.68' @ 12.18 hrs Surf.Area= 1,895 sf Storage= 969 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 36.9 min (825.9 - 789.1)

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	94 cf	**12.0" Round Pipe Storage** x 2 Inside #2 L= 60.0'
#2	728.25'	682 cf	**5.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 2 1,800 cf Overall - 94 cf Embedded = 1,706 cf x 40.0% Voids
#3	731.25'	75 cf	**5.00'W x 60.00'L x 0.25'H Mulch** x 2 150 cf Overall x 50.0% Voids
#4	731.50'	871 cf	**5.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 2
		1,722 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	730.25'	**6.0" Round Culvert X 2.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	732.00'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	**2.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	731.00'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 12.18 hrs HW=731.68' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.59 cfs @ 12.18 hrs HW=731.68' TW=722.33' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.59 cfs of 2.05 cfs potential flow)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Orifice Controls 0.24 cfs @ 5.58 fps)
  └─**5=Orifice/Grate** (Orifice Controls 0.35 cfs @ 3.58 fps)

Summary for Pond RG52-54: Rain Garden Lots 52,53,54

Inflow Area = 28,140 sf, 53.72% Impervious, Inflow Depth > 3.12" for 10YearMass event
Inflow = 2.36 cfs @ 12.08 hrs, Volume= 7,321 cf
Outflow = 1.76 cfs @ 12.15 hrs, Volume= 7,297 cf, Atten= 25%, Lag= 4.5 min
Primary = 1.76 cfs @ 12.15 hrs, Volume= 7,297 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 690.06' @ 12.15 hrs Surf.Area= 2,209 sf Storage= 1,086 cf

Plug-Flow detention time= 14.9 min calculated for 7,281 cf (99% of inflow)
Center-of-Mass det. time= 12.9 min (827.4 - 814.5)

Volume	Invert	Avail.Storage	Storage Description
#1	686.75'	141 cf	**12.0" Round Pipe Storage** x 3 Inside #2 L= 60.0'
#2	686.75'	807 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	689.75'	90 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 3 180 cf Overall x 50.0% Voids
#4	690.00'	1,120 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 3
		2,159 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	686.75'	**6.0" Round Culvert X 3.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 686.75' / 686.70' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	690.50'	**6.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	686.75'	**2.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	689.00'	**4.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.76 cfs @ 12.15 hrs HW=690.06' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.76 cfs of 4.96 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.57 cfs @ 8.65 fps)
  └─**4=Orifice/Grate** (Orifice Controls 1.19 cfs @ 4.56 fps)

Summary for Pond RG55: Rain Garden 55

Inflow Area = 5,450 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event
Inflow = 0.56 cfs @ 12.07 hrs, Volume= 1,781 cf
Outflow = 0.41 cfs @ 12.16 hrs, Volume= 1,775 cf, Atten= 27%, Lag= 5.5 min
Primary = 0.41 cfs @ 12.16 hrs, Volume= 1,775 cf
Routed to Link AP2-P : AP2-P

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

Peak Elev= 688.48' @ 12.16 hrs Surf.Area= 240 sf Storage= 326 cf

Plug-Flow detention time= 18.2 min calculated for 1,771 cf (99% of inflow)
Center-of-Mass det. time= 15.9 min (805.0 - 789.1)

Volume	Invert	Avail.Storage	Storage Description
#1	685.75'	106 cf	**18.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	685.75'	246 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 106 cf Embedded = 614 cf x 40.0% Voids
#3	688.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	689.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		755 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	685.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 685.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	689.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	685.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	688.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.39 cfs @ 12.16 hrs HW=688.45' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.39 cfs of 1.48 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.17 cfs @ 7.78 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.22 cfs @ 2.54 fps)

Summary for Link AP2-P: AP2-P

Inflow Area = 550,840 sf, 23.14% Impervious, Inflow Depth > 2.16" for 10YearMass event
Inflow = 20.93 cfs @ 12.17 hrs, Volume= 99,276 cf
Primary = 20.93 cfs @ 12.17 hrs, Volume= 99,276 cf, Atten= 0%, Lag= 0.0 min

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

Summary for Subcatchment P2.1: To Wetland A (A56-A87)

Runoff = 14.02 cfs @ 12.14 hrs, Volume= 49,797 cf, Depth> 2.94"
Routed to Link AP2-P : AP2-P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
142,635	70	Woods, Good, HSG C
45,615	74	>75% Grass cover, Good, HSG C
10,360	55	Woods, Good, HSG B
3,340	61	>75% Grass cover, Good, HSG B
1,060	98	Unconnected roofs, HSG B
203,010	70	Weighted Average
201,950		99.48% Pervious Area
1,060		0.52% Impervious Area
1,060		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	50	0.2000	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	90	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	290	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.5	430	Total			

Summary for Subcatchment P2.10: To RG4.1

Runoff = 2.72 cfs @ 12.10 hrs, Volume= 8,954 cf, Depth> 4.04"
Routed to Reach SW2.1 : Swale RG2.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
*	12,070	90	Residential Lots, 65% imp, HSG C
	2,925	70	Woods, Good, HSG C
	11,575	74	>75% Grass cover, Good, HSG C
	26,570	81	Weighted Average
	18,725		70.47% Pervious Area
	7,846		29.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.1200	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	100	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.2	150	Total			

Summary for Subcatchment P2.11: Lots 48-50

Runoff = 1.35 cfs @ 12.07 hrs, Volume= 4,354 cf, Depth> 5.02"
Routed to Pond RG49-50 : Rain Gardens 49,50

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
*	10,410	90	Residential Lots, 65% imp, HSG C
	3,644		35.00% Pervious Area
	6,767		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.12: Lot 54

Runoff = 0.70 cfs @ 12.07 hrs, Volume= 2,279 cf, Depth> 5.02"
Routed to Pond RG55 : Rain Garden 55

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
*	5,450	90	Residential Lots, 65% imp, HSG C
	1,908		35.00% Pervious Area
	3,543		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.13: Lot 14

Runoff = 0.87 cfs @ 12.07 hrs, Volume= 2,809 cf, Depth> 4.91"
Routed to Pond RG14 : Rain Garden 14

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
5,915	90	1/8 acre lots, 65% imp, HSG C
955	85	1/8 acre lots, 65% imp, HSG B
6,870	89	Weighted Average
2,405		35.00% Pervious Area
4,466		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.14: Lots 30-33

Runoff = 2.78 cfs @ 12.07 hrs, Volume= 8,994 cf, Depth> 5.02"
Routed to Pond RG31-33 : Rain Gardens 31,32,33

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
*	21,505	90	Residential Lots, 65% imp, HSG C
	7,527		35.00% Pervious Area
	13,978		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.2: Lots 42-48

Runoff = 5.16 cfs @ 12.07 hrs, Volume= 16,676 cf, Depth> 5.02"
Routed to Pond RG43-48 : Rain Garden 43-48

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
*	39,875	90	Residential Lots, 65% imp, HSG C
	13,956		35.00% Pervious Area
	25,919		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.3: Lots 41-42

Runoff = 1.64 cfs @ 12.07 hrs, Volume= 5,318 cf, Depth> 5.02"
Routed to Pond RG42 : Rain Garden 42

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
12,715	90	1/8 acre lots, 65% imp, HSG C
4,450		35.00% Pervious Area
8,265		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.4: Lots 40-41

Runoff = 0.97 cfs @ 12.07 hrs, Volume= 3,147 cf, Depth> 5.02"
Routed to Pond RG41 : Rain Garden 41

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
7,525	90	1/8 acre lots, 65% imp, HSG C
2,634		35.00% Pervious Area
4,891		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.5: Lots 39-40

Runoff = 1.23 cfs @ 12.07 hrs, Volume= 3,984 cf, Depth> 5.02"
Routed to Pond RG40 : Rain Garden 40

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
9,525	90	1/8 acre lots, 65% imp, HSG C
3,334		35.00% Pervious Area
6,191		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.6: Lots 33-39

Runoff = 5.86 cfs @ 12.07 hrs, Volume= 18,939 cf, Depth> 5.02"
Routed to Pond RG34-39 : Rain Gardens 34-39

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
*	45,285	90	Residential Lots, 65% imp, HSG C
	15,850		35.00% Pervious Area
	29,435		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.7: Upgradient Lots 35-39

Runoff = 2.41 cfs @ 12.28 hrs, Volume= 11,134 cf, Depth> 2.94"
Routed to Pond IT-35/39 : Interceptor Trench Lots 35-39

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
4,550	74	>75% Grass cover, Good, HSG C
40,950	70	Woods, Good, HSG C
45,500	70	Weighted Average
45,500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
7.1	560	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	20	0.5000	4.95		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
19.9	630	Total			

Summary for Subcatchment P2.8: Upgradient Lots 30-35

Runoff = 5.25 cfs @ 12.23 hrs, Volume= 22,370 cf, Depth> 3.03"
Routed to Pond IT-30/35 : Interceptor Trench Lots 30-35

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
11,085	74	>75% Grass cover, Good, HSG C
77,375	70	Woods, Good, HSG C
88,460	71	Weighted Average
88,460		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
3.5	280	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	30	0.5000	4.95		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.3	360	Total			

Summary for Subcatchment P2.9: Lots 51-53

Runoff = 3.13 cfs @ 12.07 hrs, Volume= 9,733 cf, Depth> 4.15"
Routed to Pond RG52-54 : Rain Garden Lots 52,53,54

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
2,430	90	1/8 acre lots, 65% imp, HSG C
20,825	85	1/8 acre lots, 65% imp, HSG B
3,605	70	Woods, Good, HSG C
1,280	55	Woods, Good, HSG B
28,140	82	Weighted Average
13,024		46.28% Pervious Area
15,116		53.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

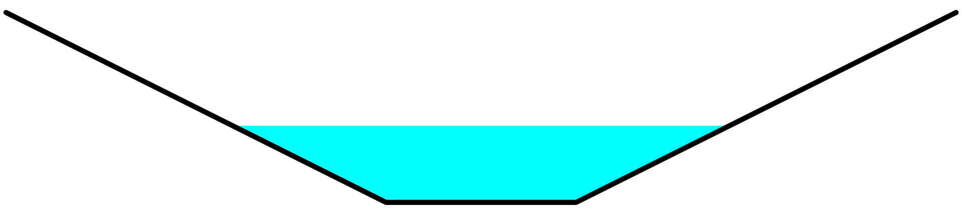
Summary for Reach SW2.1: Swale RG2.1

Inflow Area = 58,485 sf, 48.88% Impervious, Inflow Depth > 5.96" for 25YearMass event
Inflow = 6.87 cfs @ 12.15 hrs, Volume= 29,023 cf
Outflow = 6.83 cfs @ 12.15 hrs, Volume= 29,019 cf, Atten= 1%, Lag= 0.2 min
Routed to Pond RG2.1 : Rain Garden 2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 9.37 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.15 fps, Avg. Travel Time= 0.6 min

Peak Storage= 87 cf @ 12.15 hrs
Average Depth at Peak Storage= 0.40' , Surface Width= 2.61'
Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 46.26 cfs

1.00' x 1.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 2.0 '/' Top Width= 5.00'
Length= 120.0' Slope= 0.1500 '/'
Inlet Invert= 722.00', Outlet Invert= 704.00'



Summary for Pond IT-30/35: Interceptor Trench Lots 30-35

Inflow Area = 88,460 sf, 0.00% Impervious, Inflow Depth > 3.03" for 25YearMass event
Inflow = 5.25 cfs @ 12.23 hrs, Volume= 22,370 cf
Outflow = 5.08 cfs @ 12.27 hrs, Volume= 22,274 cf, Atten= 3%, Lag= 2.7 min
Primary = 5.08 cfs @ 12.27 hrs, Volume= 22,274 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 733.36' @ 12.27 hrs Surf.Area= 1,470 sf Storage= 905 cf

Plug-Flow detention time= 7.2 min calculated for 22,228 cf (99% of inflow)
Center-of-Mass det. time= 4.7 min (846.7 - 842.0)

Volume	Invert	Avail.Storage	Storage Description
#1	732.00'	1,696 cf	**3.00'W x 490.00'L x 3.00'H Prismatoid** 4,410 cf Overall - 171 cf Embedded = 4,239 cf x 40.0% Voids
#2	732.00'	171 cf	**8.0" Round Pipe Storage** Inside #1 L= 490.0'
		1,867 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	732.00'	**15.0" Round Culvert** L= 250.0' CPP, square edge headwall, Ke= 0.500

Inlet / Outlet Invert= 732.00' / 724.00' S= 0.0320 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=5.03 cfs @ 12.27 hrs HW=733.35' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 5.03 cfs @ 4.10 fps)

Summary for Pond IT-35/39: Interceptor Trench Lots 35-39

Inflow Area = 45,500 sf, 0.00% Impervious, Inflow Depth > 2.94" for 25YearMass event
Inflow = 2.41 cfs @ 12.28 hrs, Volume= 11,134 cf
Outflow = 2.26 cfs @ 12.36 hrs, Volume= 11,073 cf, Atten= 6%, Lag= 4.6 min
Primary = 2.26 cfs @ 12.36 hrs, Volume= 11,073 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 735.16' @ 12.36 hrs Surf.Area= 1,200 sf Storage= 640 cf

Plug-Flow detention time= 9.3 min calculated for 11,050 cf (99% of inflow)
Center-of-Mass det. time= 6.2 min (853.3 - 847.2)

Volume	Invert	Avail.Storage	Storage Description
#1	734.00'	1,384 cf	**3.00'W x 400.00'L x 3.00'H Prismatoid** 3,600 cf Overall - 140 cf Embedded = 3,460 cf x 40.0% Voids
#2	734.00'	140 cf	**8.0" Round Pipe Storage** Inside #1 L= 400.0'
		1,524 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	734.00'	**10.0" Round Culvert** L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 734.00' / 733.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=2.26 cfs @ 12.36 hrs HW=735.16' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 2.26 cfs @ 4.14 fps)

Summary for Pond RG14: Rain Garden 14

Inflow Area = 6,870 sf, 65.00% Impervious, Inflow Depth > 4.91" for 25YearMass event
Inflow = 0.87 cfs @ 12.07 hrs, Volume= 2,809 cf
Outflow = 0.56 cfs @ 12.17 hrs, Volume= 2,795 cf, Atten= 36%, Lag= 5.6 min
Primary = 0.56 cfs @ 12.17 hrs, Volume= 2,795 cf
Routed to Pond RG2.1 : Rain Garden 2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 704.76' @ 12.17 hrs Surf.Area= 789 sf Storage= 396 cf

Plug-Flow detention time= 16.7 min calculated for 2,795 cf (100% of inflow)
Center-of-Mass det. time= 13.6 min (799.5 - 785.9)

Volume	Invert	Avail.Storage	Storage Description
#1	702.00'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	702.00'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	704.25'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	704.50'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	702.00'	**6.0" Round Culvert** L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 702.00' / 702.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	705.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	702.00'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	703.75'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.55 cfs @ 12.17 hrs HW=704.75' TW=702.23' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.55 cfs of 0.87 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.17 cfs @ 7.65 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.38 cfs @ 4.41 fps)

Summary for Pond RG2.1: Rain Garden 2.1

Inflow Area = 65,355 sf, 50.58% Impervious, Inflow Depth > 5.84" for 25YearMass event
Inflow = 7.39 cfs @ 12.15 hrs, Volume= 31,815 cf
Outflow = 2.87 cfs @ 12.60 hrs, Volume= 30,160 cf, Atten= 61%, Lag= 26.7 min
Discarded = 0.74 cfs @ 12.60 hrs, Volume= 17,724 cf
Primary = 2.13 cfs @ 12.60 hrs, Volume= 12,436 cf
Routed to Link AP2-P : AP2-P
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 702.95' @ 12.60 hrs Surf.Area= 13,275 sf Storage= 9,939 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 73.4 min (874.6 - 801.2)

Volume	Invert	Avail.Storage	Storage Description
#1	698.75'	67 cf	**12.0" Round Pipe Storage** Inside #2 L= 85.0'
#2	698.75'	5,073 cf	**50.00'W x 85.00'L x 3.00'H Soil Media and Gravel** 12,750 cf Overall - 67 cf Embedded = 12,683 cf x 40.0% Voids
#3	701.75'	531 cf	**50.00'W x 85.00'L x 0.25'H Mulch** 1,063 cf Overall x 50.0% Voids
#4	702.00'	9,623 cf	**50.00'W x 85.00'L x 2.00'H Ponding Z=2.0**
		15,294 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	701.00'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 701.00' / 699.65' S= 0.1350 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	703.00'	**10.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	701.00'	**2.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	701.75'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Secondary	703.75'	**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
#6	Discarded	698.75'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.74 cfs @ 12.60 hrs HW=702.95' (Free Discharge)
└─**6=Exfiltration** (Exfiltration Controls 0.74 cfs)

Primary OutFlow Max=2.13 cfs @ 12.60 hrs HW=702.95' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.13 cfs of 4.55 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.29 cfs @ 6.57 fps)
  └─**4=Orifice/Grate** (Orifice Controls 1.84 cfs @ 4.68 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=698.75' TW=0.00' (Dynamic Tailwater)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG31-33: Rain Gardens 31,32,33

Inflow Area = 21,505 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event
Inflow = 2.78 cfs @ 12.07 hrs, Volume= 8,994 cf
Outflow = 1.84 cfs @ 12.17 hrs, Volume= 8,970 cf, Atten= 34%, Lag= 5.8 min
Primary = 1.84 cfs @ 12.17 hrs, Volume= 8,970 cf
Routed to Reach SW2.1 : Swale RG2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 732.11' @ 12.17 hrs Surf.Area= 2,648 sf Storage= 1,627 cf

Plug-Flow detention time= 16.9 min calculated for 8,970 cf (100% of inflow)
Center-of-Mass det. time= 15.2 min (797.7 - 782.5)

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	141 cf	**12.0" Round Pipe Storage** x 3 Inside #2 L= 60.0'
#2	728.25'	807 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	731.25'	90 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 3 180 cf Overall x 50.0% Voids
#4	731.50'	1,120 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 3
		2,159 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	728.25'	**6.0" Round Culvert X 3.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	732.00'	**6.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	728.25'	**2.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	731.00'	**3.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.77 cfs @ 12.17 hrs HW=732.10' TW=722.40' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.77 cfs of 5.38 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 0.46 cfs @ 1.01 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.61 cfs @ 9.34 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.70 cfs @ 4.75 fps)

Summary for Pond RG34-39: Rain Gardens 34-39

Inflow Area = 45,285 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event
Inflow = 5.86 cfs @ 12.07 hrs, Volume= 18,939 cf
Outflow = 4.31 cfs @ 12.16 hrs, Volume= 18,889 cf, Atten= 26%, Lag= 5.3 min
Primary = 2.87 cfs @ 12.16 hrs, Volume= 12,593 cf
Routed to Link AP2-P : AP2-P
Secondary = 1.44 cfs @ 12.16 hrs, Volume= 6,296 cf
Routed to Reach SW2.1 : Swale RG2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 732.14' @ 12.16 hrs Surf.Area= 5,348 sf Storage= 3,331 cf

Plug-Flow detention time= 16.8 min calculated for 18,889 cf (100% of inflow)
Center-of-Mass det. time= 15.1 min (797.6 - 782.5)

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	283 cf	**12.0" Round Pipe Storage** x 6 Inside #2 L= 60.0'
#2	728.25'	1,615 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 6 4,320 cf Overall - 283 cf Embedded = 4,037 cf x 40.0% Voids
#3	731.25'	180 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 6 360 cf Overall x 50.0% Voids
#4	731.50'	2,240 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 6
		4,318 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	728.25'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	728.25'	**6.0" Round Culvert X 2.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 1	732.00'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	732.00'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 1	728.25'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#6	Device 2	728.25'	**2.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#7	Device 1	731.00'	**3.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#8	Device 2	731.00'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.76 cfs @ 12.16 hrs HW=732.13' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.76 cfs of 7.21 cfs potential flow)
  ├─**3=Orifice/Grate** (Weir Controls 0.99 cfs @ 1.19 fps)
  ├─**5=Orifice/Grate** (Orifice Controls 0.82 cfs @ 9.38 fps)
  └─**7=Orifice/Grate** (Orifice Controls 0.95 cfs @ 4.83 fps)

Secondary OutFlow Max=1.38 cfs @ 12.16 hrs HW=732.13' TW=722.40' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.38 cfs of 3.60 cfs potential flow)
  ├─**4=Orifice/Grate** (Weir Controls 0.49 cfs @ 1.19 fps)
  ├─**6=Orifice/Grate** (Orifice Controls 0.41 cfs @ 9.38 fps)
  └─**8=Orifice/Grate** (Orifice Controls 0.47 cfs @ 4.83 fps)

Summary for Pond RG40: Rain Garden 40

Inflow Area = 9,525 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event
Inflow = 1.23 cfs @ 12.07 hrs, Volume= 3,984 cf
Outflow = 0.92 cfs @ 12.16 hrs, Volume= 3,974 cf, Atten= 25%, Lag= 5.0 min
Primary = 0.92 cfs @ 12.16 hrs, Volume= 3,974 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 733.62' @ 12.16 hrs Surf.Area= 885 sf Storage= 546 cf

Plug-Flow detention time= 14.4 min calculated for 3,974 cf (100% of inflow)
Center-of-Mass det. time= 12.8 min (795.3 - 782.5)

Volume	Invert	Avail.Storage	Storage Description
#1	729.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	729.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	732.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	733.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	729.75'	**8.0" Round Culvert** L= 140.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 729.75' / 728.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	733.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	729.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	732.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.91 cfs @ 12.16 hrs HW=733.61' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.91 cfs of 2.07 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 0.20 cfs @ 1.10 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.20 cfs @ 9.36 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.51 cfs @ 5.79 fps)

Summary for Pond RG41: Rain Garden 41

Inflow Area = 7,525 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event
Inflow = 0.97 cfs @ 12.07 hrs, Volume= 3,147 cf
Outflow = 0.79 cfs @ 12.14 hrs, Volume= 2,955 cf, Atten= 19%, Lag= 4.1 min
Discarded = 0.05 cfs @ 12.14 hrs, Volume= 955 cf
Primary = 0.74 cfs @ 12.14 hrs, Volume= 2,001 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 732.17' @ 12.14 hrs Surf.Area= 899 sf Storage= 566 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 25.7 min (808.2 - 782.5)

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	728.25'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	731.25'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	731.50'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	730.25'	**6.0" Round Culvert** L= 26.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.00' S= 0.0096 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	732.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	731.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.05 cfs @ 12.14 hrs HW=732.16' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.72 cfs @ 12.14 hrs HW=732.16' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.72 cfs of 1.08 cfs potential flow)
  ├─**3=Orifice/Grate** (Weir Controls 0.34 cfs @ 1.32 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.51 fps)
  └─**5=Orifice/Grate** (Orifice Controls 0.24 cfs @ 4.91 fps)

Summary for Pond RG42: Rain Garden 42

Inflow Area = 12,715 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event
Inflow = 1.64 cfs @ 12.07 hrs, Volume= 5,318 cf
Outflow = 1.34 cfs @ 12.14 hrs, Volume= 4,798 cf, Atten= 18%, Lag= 3.9 min
Discarded = 0.04 cfs @ 12.14 hrs, Volume= 856 cf
Primary = 1.30 cfs @ 12.14 hrs, Volume= 3,942 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 732.23' @ 12.14 hrs Surf.Area= 1,646 sf Storage= 1,186 cf

Plug-Flow detention time= 76.7 min calculated for 4,788 cf (90% of inflow)
Center-of-Mass det. time= 29.6 min (812.1 - 782.5)

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	212 cf	**18.0" Round Pipe Storage** x 2 Inside #2 L= 60.0'
#2	728.25'	491 cf	**8.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 1,440 cf Overall - 212 cf Embedded = 1,228 cf x 40.0% Voids
#3	731.25'	60 cf	**8.00'W x 60.00'L x 0.25'H Mulch** 120 cf Overall x 50.0% Voids
#4	731.50'	621 cf	**8.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		1,385 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	730.25'	**8.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Device 2	732.00'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	731.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 12.14 hrs HW=732.22' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=1.27 cfs @ 12.14 hrs HW=732.22' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.27 cfs of 2.15 cfs potential flow)
  ├─**3=Orifice/Grate** (Weir Controls 0.70 cfs @ 1.53 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 0.32 cfs @ 6.54 fps)
  └─**5=Orifice/Grate** (Orifice Controls 0.25 cfs @ 5.04 fps)

Summary for Pond RG43-48: Rain Garden 43-48

Inflow Area = 39,875 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event
Inflow = 5.16 cfs @ 12.07 hrs, Volume= 16,676 cf
Outflow = 3.55 cfs @ 12.17 hrs, Volume= 15,048 cf, Atten= 31%, Lag= 5.6 min
Discarded = 0.15 cfs @ 12.17 hrs, Volume= 3,138 cf
Primary = 2.84 cfs @ 12.17 hrs, Volume= 9,925 cf
Routed to Link AP2-P : AP2-P
Secondary = 0.57 cfs @ 12.17 hrs, Volume= 1,985 cf
Routed to Reach SW2.1 : Swale RG2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 733.61' @ 12.17 hrs Surf.Area= 6,394 sf Storage= 3,961 cf

Plug-Flow detention time= 77.4 min calculated for 15,048 cf (90% of inflow)
Center-of-Mass det. time= 29.7 min (812.1 - 782.5)

Volume	Invert	Avail.Storage	Storage Description
#1	729.75'	283 cf	**12.0" Round Pipe Storage** x 6 Inside #2 L= 60.0'
#2	729.75'	2,047 cf	**5.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 6 5,400 cf Overall - 283 cf Embedded = 5,117 cf x 40.0% Voids
#3	732.75'	225 cf	**5.00'W x 60.00'L x 0.25'H Mulch** x 6 450 cf Overall x 50.0% Voids
#4	733.00'	2,612 cf	**5.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 6
		5,167 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	729.75'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	731.75'	**6.0" Round Culvert X 5.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 731.75' / 731.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Secondary	731.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 731.75' / 731.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#4	Device 2	733.50'	**6.0" Horiz. Orifice/Grate X 5.00** C= 0.600 Limited to weir flow at low heads
#5	Device 3	733.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 2	731.75'	**2.0" Vert. Orifice/Grate X 5.00** C= 0.600 Limited to weir flow at low heads
#7	Device 3	731.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#8	Device 2	732.50'	**3.0" Vert. Orifice/Grate X 5.00** C= 0.600 Limited to weir flow at low heads
#9	Device 3	732.50'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.15 cfs @ 12.17 hrs HW=733.60' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Primary OutFlow Max=2.72 cfs @ 12.17 hrs HW=733.60' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 2.72 cfs of 5.98 cfs potential flow)
├─**4=Orifice/Grate** (Weir Controls 0.85 cfs @ 1.05 fps)
├─**6=Orifice/Grate** (Orifice Controls 0.70 cfs @ 6.41 fps)
└─**8=Orifice/Grate** (Orifice Controls 1.17 cfs @ 4.76 fps)

Secondary OutFlow Max=0.54 cfs @ 12.17 hrs HW=733.60' TW=722.40' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.54 cfs of 1.20 cfs potential flow)
├─**5=Orifice/Grate** (Weir Controls 0.17 cfs @ 1.05 fps)
├─**7=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.41 fps)
└─**9=Orifice/Grate** (Orifice Controls 0.23 cfs @ 4.76 fps)

Summary for Pond RG49-50: Rain Gardens 49,50

Inflow Area = 10,410 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event
Inflow = 1.35 cfs @ 12.07 hrs, Volume= 4,354 cf
Outflow = 0.73 cfs @ 12.20 hrs, Volume= 3,818 cf, Atten= 46%, Lag= 7.7 min
Discarded = 0.05 cfs @ 12.20 hrs, Volume= 999 cf
Primary = 0.69 cfs @ 12.20 hrs, Volume= 2,818 cf
Routed to Reach SW2.1 : Swale RG2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 731.92' @ 12.20 hrs Surf.Area= 2,023 sf Storage= 1,149 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 31.9 min (814.4 - 782.5)

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	94 cf	**12.0" Round Pipe Storage** x 2 Inside #2 L= 60.0'
#2	728.25'	682 cf	**5.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 2 1,800 cf Overall - 94 cf Embedded = 1,706 cf x 40.0% Voids
#3	731.25'	75 cf	**5.00'W x 60.00'L x 0.25'H Mulch** x 2 150 cf Overall x 50.0% Voids
#4	731.50'	871 cf	**5.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 2
		1,722 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	730.25'	**6.0" Round Culvert X 2.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	732.00'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	**2.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	731.00'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.05 cfs @ 12.20 hrs HW=731.92' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.69 cfs @ 12.20 hrs HW=731.92' TW=722.38' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.69 cfs of 2.25 cfs potential flow)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Orifice Controls 0.26 cfs @ 6.06 fps)
  └─**5=Orifice/Grate** (Orifice Controls 0.42 cfs @ 4.29 fps)

Summary for Pond RG52-54: Rain Garden Lots 52,53,54

```
Inflow Area =        28,140 sf, 53.72% Impervious, Inflow Depth >  4.15"   for 25YearMass event
Inflow      =      3.13 cfs @  12.07 hrs, Volume=         9,733 cf
Outflow     =      2.02 cfs @  12.17 hrs, Volume=         9,705 cf, Atten= 35%, Lag= 5.8 min
Primary     =      2.02 cfs @  12.17 hrs, Volume=         9,705 cf
   Routed to Link AP2-P : AP2-P
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 690.44' @ 12.17 hrs Surf.Area= 2,506 sf Storage= 1,430 cf

Plug-Flow detention time= 14.6 min calculated for 9,705 cf (100% of inflow)
Center-of-Mass det. time= 12.8 min (819.3 - 806.5)

Volume	Invert	Avail.Storage	Storage Description
#1	686.75'	141 cf	**12.0" Round Pipe Storage** x 3 Inside #2 L= 60.0'
#2	686.75'	807 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	689.75'	90 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 3 180 cf Overall x 50.0% Voids
#4	690.00'	1,120 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 3
		2,159 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	686.75'	**6.0" Round Culvert X 3.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 686.75' / 686.70' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	690.50'	**6.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	686.75'	**2.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	689.00'	**4.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.01 cfs @ 12.17 hrs HW=690.42' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.01 cfs of 5.25 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.60 cfs @ 9.12 fps)
  └─**4=Orifice/Grate** (Orifice Controls 1.41 cfs @ 5.40 fps)

Summary for Pond RG55: Rain Garden 55

```
Inflow Area =         5,450 sf, 65.00% Impervious, Inflow Depth >  5.02"   for 25YearMass event
Inflow      =      0.70 cfs @  12.07 hrs, Volume=         2,279 cf
Outflow     =      0.54 cfs @  12.14 hrs, Volume=         2,272 cf, Atten= 24%, Lag= 4.3 min
Primary     =      0.54 cfs @  12.14 hrs, Volume=         2,272 cf
   Routed to Link AP2-P : AP2-P
```

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

Peak Elev= 688.88' @ 12.14 hrs Surf.Area= 480 sf Storage= 367 cf

Plug-Flow detention time= 16.9 min calculated for 2,267 cf (99% of inflow)
Center-of-Mass det. time= 14.9 min (797.4 - 782.5)

Volume	Invert	Avail.Storage	Storage Description
#1	685.75'	106 cf	**18.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	685.75'	246 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 106 cf Embedded = 614 cf x 40.0% Voids
#3	688.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	689.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		755 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	685.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 685.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	689.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	685.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	688.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.53 cfs @ 12.14 hrs HW=688.86' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 0.53 cfs of 1.60 cfs potential flow)
  ├**2=Orifice/Grate** (Controls 0.00 cfs)
  ├**3=Orifice/Grate** (Orifice Controls 0.18 cfs @ 8.38 fps)
  └**4=Orifice/Grate** (Orifice Controls 0.35 cfs @ 4.02 fps)

Summary for Link AP2-P: AP2-P

Inflow Area = 550,840 sf, 23.14% Impervious, Inflow Depth > 3.05" for 25YearMass event
Inflow = 31.68 cfs @ 12.16 hrs, Volume= 139,992 cf
Primary = 31.68 cfs @ 12.16 hrs, Volume= 139,992 cf, Atten= 0%, Lag= 0.0 min

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

Summary for Subcatchment P2.1: To Wetland A (A56-A87)

Runoff = 21.04 cfs @ 12.14 hrs, Volume= 74,387 cf, Depth> 4.40"
Routed to Link AP2-P : AP2-P

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
142,635	70	Woods, Good, HSG C
45,615	74	>75% Grass cover, Good, HSG C
10,360	55	Woods, Good, HSG B
3,340	61	>75% Grass cover, Good, HSG B
1,060	98	Unconnected roofs, HSG B
203,010	70	Weighted Average
201,950		99.48% Pervious Area
1,060		0.52% Impervious Area
1,060		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	50	0.2000	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	90	0.2000	2.24		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.7	290	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.5	430	Total			

Summary for Subcatchment P2.10: To RG4.1

Runoff = 3.77 cfs @ 12.10 hrs, Volume= 12,556 cf, Depth> 5.67"
Routed to Reach SW2.1 : Swale RG2.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	12,070	90	Residential Lots, 65% imp, HSG C
	2,925	70	Woods, Good, HSG C
	11,575	74	>75% Grass cover, Good, HSG C
	26,570	81	Weighted Average
	18,725		70.47% Pervious Area
	7,846		29.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.1200	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.0	100	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.2	150	Total			

Summary for Subcatchment P2.11: Lots 48-50

Runoff = 1.78 cfs @ 12.07 hrs, Volume= 5,841 cf, Depth> 6.73"
Routed to Pond RG49-50 : Rain Gardens 49,50

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	10,410	90	Residential Lots, 65% imp, HSG C
	3,644		35.00% Pervious Area
	6,767		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.12: Lot 54

Runoff = 0.93 cfs @ 12.07 hrs, Volume= 3,058 cf, Depth> 6.73"
Routed to Pond RG55 : Rain Garden 55

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	5,450	90	Residential Lots, 65% imp, HSG C
	1,908		35.00% Pervious Area
	3,543		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.13: Lot 14

Runoff = 1.16 cfs @ 12.07 hrs, Volume= 3,787 cf, Depth> 6.61"
Routed to Pond RG14 : Rain Garden 14

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
	5,915	90	1/8 acre lots, 65% imp, HSG C
	955	85	1/8 acre lots, 65% imp, HSG B
	6,870	89	Weighted Average
	2,405		35.00% Pervious Area
	4,466		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.14: Lots 30-33

Runoff = 3.67 cfs @ 12.07 hrs, Volume= 12,066 cf, Depth> 6.73"
Routed to Pond RG31-33 : Rain Gardens 31,32,33

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	21,505	90	Residential Lots, 65% imp, HSG C
	7,527		35.00% Pervious Area
	13,978		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.2: Lots 42-48

Runoff = 6.81 cfs @ 12.07 hrs, Volume= 22,374 cf, Depth> 6.73"
Routed to Pond RG43-48 : Rain Garden 43-48

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	39,875	90	Residential Lots, 65% imp, HSG C
	13,956		35.00% Pervious Area
	25,919		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.3: Lots 41-42

Runoff = 2.17 cfs @ 12.07 hrs, Volume= 7,134 cf, Depth> 6.73"
Routed to Pond RG42 : Rain Garden 42

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
12,715	90	1/8 acre lots, 65% imp, HSG C
4,450		35.00% Pervious Area
8,265		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.4: Lots 40-41

Runoff = 1.28 cfs @ 12.07 hrs, Volume= 4,222 cf, Depth> 6.73"
Routed to Pond RG41 : Rain Garden 41

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
7,525	90	1/8 acre lots, 65% imp, HSG C
2,634		35.00% Pervious Area
4,891		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.5: Lots 39-40

Runoff = 1.63 cfs @ 12.07 hrs, Volume= 5,344 cf, Depth> 6.73"
Routed to Pond RG40 : Rain Garden 40

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
9,525	90	1/8 acre lots, 65% imp, HSG C
3,334		35.00% Pervious Area
6,191		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.6: Lots 33-39

Runoff = 7.73 cfs @ 12.07 hrs, Volume= 25,409 cf, Depth> 6.73"
Routed to Pond RG34-39 : Rain Gardens 34-39

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	45,285	90	Residential Lots, 65% imp, HSG C
	15,850		35.00% Pervious Area
	29,435		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P2.7: Upgradient Lots 35-39

Runoff = 3.63 cfs @ 12.28 hrs, Volume= 16,636 cf, Depth> 4.39"
Routed to Pond IT-35/39 : Interceptor Trench Lots 35-39

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
4,550	74	>75% Grass cover, Good, HSG C
40,950	70	Woods, Good, HSG C
45,500	70	Weighted Average
45,500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
7.1	560	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	20	0.5000	4.95		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
19.9	630	Total			

Summary for Subcatchment P2.8: Upgradient Lots 30-35

Runoff = 7.86 cfs @ 12.22 hrs, Volume= 33,209 cf, Depth> 4.50"
Routed to Pond IT-30/35 : Interceptor Trench Lots 30-35

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
11,085	74	>75% Grass cover, Good, HSG C
77,375	70	Woods, Good, HSG C
88,460	71	Weighted Average
88,460		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
3.5	280	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	30	0.5000	4.95		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
16.3	360	Total			

Summary for Subcatchment P2.9: Lots 51-53

Runoff = 4.31 cfs @ 12.07 hrs, Volume= 13,577 cf, Depth> 5.79"
Routed to Pond RG52-54 : Rain Garden Lots 52,53,54

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
2,430	90	1/8 acre lots, 65% imp, HSG C
20,825	85	1/8 acre lots, 65% imp, HSG B
3,605	70	Woods, Good, HSG C
1,280	55	Woods, Good, HSG B
28,140	82	Weighted Average
13,024		46.28% Pervious Area
15,116		53.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

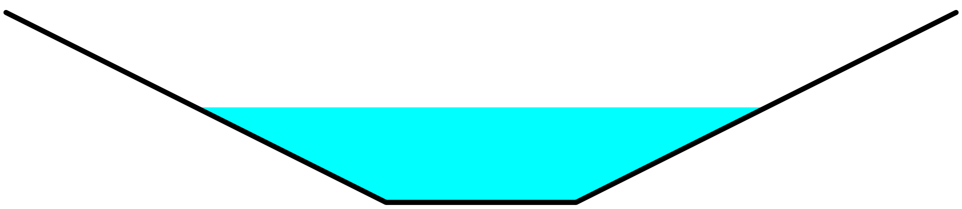
Summary for Reach SW2.1: Swale RG2.1

Inflow Area = 58,485 sf, 48.88% Impervious, Inflow Depth > 8.24" for 100YearMass event
Inflow = 10.45 cfs @ 12.13 hrs, Volume= 40,149 cf
Outflow = 10.52 cfs @ 12.13 hrs, Volume= 40,144 cf, Atten= 0%, Lag= 0.5 min
Routed to Pond RG2.1 : Rain Garden 2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 10.50 fps, Min. Travel Time= 0.2 min
Avg. Velocity = 3.46 fps, Avg. Travel Time= 0.6 min

Peak Storage= 120 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.50' , Surface Width= 3.00'
Bank-Full Depth= 1.00' Flow Area= 3.0 sf, Capacity= 46.26 cfs

1.00' x 1.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 2.0 '/' Top Width= 5.00'
Length= 120.0' Slope= 0.1500 '/'
Inlet Invert= 722.00', Outlet Invert= 704.00'



Summary for Pond IT-30/35: Interceptor Trench Lots 30-35

Inflow Area = 88,460 sf, 0.00% Impervious, Inflow Depth > 4.50" for 100YearMass event
Inflow = 7.86 cfs @ 12.22 hrs, Volume= 33,209 cf
Outflow = 7.38 cfs @ 12.29 hrs, Volume= 33,096 cf, Atten= 6%, Lag= 3.7 min
Primary = 7.38 cfs @ 12.29 hrs, Volume= 33,096 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 734.18' @ 12.29 hrs Surf.Area= 1,470 sf Storage= 1,387 cf

Plug-Flow detention time= 6.2 min calculated for 33,027 cf (99% of inflow)
Center-of-Mass det. time= 4.2 min (835.0 - 830.8)

Volume	Invert	Avail.Storage	Storage Description
#1	732.00'	1,696 cf	**3.00'W x 490.00'L x 3.00'H Prismatoid** 4,410 cf Overall - 171 cf Embedded = 4,239 cf x 40.0% Voids
#2	732.00'	171 cf	**8.0" Round Pipe Storage** Inside #1 L= 490.0'
		1,867 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	732.00'	**15.0" Round Culvert** L= 250.0' CPP, square edge headwall, Ke= 0.500

Inlet / Outlet Invert= 732.00' / 724.00' S= 0.0320 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=7.34 cfs @ 12.29 hrs HW=734.17' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 7.34 cfs @ 5.98 fps)

Summary for Pond IT-35/39: Interceptor Trench Lots 35-39

Inflow Area = 45,500 sf, 0.00% Impervious, Inflow Depth > 4.39" for 100YearMass event
Inflow = 3.63 cfs @ 12.28 hrs, Volume= 16,636 cf
Outflow = 3.10 cfs @ 12.40 hrs, Volume= 16,563 cf, Atten= 14%, Lag= 7.5 min
Primary = 3.10 cfs @ 12.40 hrs, Volume= 16,563 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 736.20' @ 12.40 hrs Surf.Area= 1,200 sf Storage= 1,139 cf

Plug-Flow detention time= 8.5 min calculated for 16,529 cf (99% of inflow)
Center-of-Mass det. time= 5.9 min (841.7 - 835.7)

Volume	Invert	Avail.Storage	Storage Description
#1	734.00'	1,384 cf	**3.00'W x 400.00'L x 3.00'H Prismatoid** 3,600 cf Overall - 140 cf Embedded = 3,460 cf x 40.0% Voids
#2	734.00'	140 cf	**8.0" Round Pipe Storage** Inside #1 L= 400.0'
		1,524 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	734.00'	**10.0" Round Culvert** L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 734.00' / 733.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf

Primary OutFlow Max=3.10 cfs @ 12.40 hrs HW=736.20' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 3.10 cfs @ 5.69 fps)

Summary for Pond RG14: Rain Garden 14

Inflow Area = 6,870 sf, 65.00% Impervious, Inflow Depth > 6.61" for 100YearMass event
Inflow = 1.16 cfs @ 12.07 hrs, Volume= 3,787 cf
Outflow = 0.74 cfs @ 12.17 hrs, Volume= 3,771 cf, Atten= 36%, Lag= 5.7 min
Primary = 0.74 cfs @ 12.17 hrs, Volume= 3,771 cf
Routed to Pond RG2.1 : Rain Garden 2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 705.09' @ 12.17 hrs Surf.Area= 878 sf Storage= 535 cf

Plug-Flow detention time= 16.3 min calculated for 3,763 cf (99% of inflow)
Center-of-Mass det. time= 13.6 min (791.7 - 778.1)

Volume	Invert	Avail.Storage	Storage Description
#1	702.00'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	702.00'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	704.25'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	704.50'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	702.00'	**6.0" Round Culvert** L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 702.00' / 702.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	705.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	702.00'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	703.75'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.72 cfs @ 12.17 hrs HW=705.08' TW=703.01' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.72 cfs of 0.83 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 0.11 cfs @ 0.91 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.15 cfs @ 6.92 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.45 cfs @ 5.19 fps)

Summary for Pond RG2.1: Rain Garden 2.1

Inflow Area = 65,355 sf, 50.58% Impervious, Inflow Depth > 8.06" for 100YearMass event
Inflow = 11.23 cfs @ 12.14 hrs, Volume= 43,915 cf
Outflow = 5.91 cfs @ 12.33 hrs, Volume= 41,265 cf, Atten= 47%, Lag= 11.8 min
Discarded = 0.75 cfs @ 12.33 hrs, Volume= 19,820 cf
Primary = 5.16 cfs @ 12.33 hrs, Volume= 21,446 cf
Routed to Link AP2-P : AP2-P
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 703.36' @ 12.33 hrs Surf.Area= 13,513 sf Storage= 11,958 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 52.4 min (846.6 - 794.2)

Volume	Invert	Avail.Storage	Storage Description
#1	698.75'	67 cf	**12.0" Round Pipe Storage** Inside #2 L= 85.0'
#2	698.75'	5,073 cf	**50.00'W x 85.00'L x 3.00'H Soil Media and Gravel** 12,750 cf Overall - 67 cf Embedded = 12,683 cf x 40.0% Voids
#3	701.75'	531 cf	**50.00'W x 85.00'L x 0.25'H Mulch** 1,063 cf Overall x 50.0% Voids
#4	702.00'	9,623 cf	**50.00'W x 85.00'L x 2.00'H Ponding Z=2.0**
		15,294 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	701.00'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 701.00' / 699.65' S= 0.1350 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Device 1	703.00'	**10.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	701.00'	**2.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	701.75'	**6.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Secondary	703.75'	**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
#6	Discarded	698.75'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.75 cfs @ 12.33 hrs HW=703.36' (Free Discharge)
└─**6=Exfiltration** (Exfiltration Controls 0.75 cfs)

Primary OutFlow Max=5.15 cfs @ 12.33 hrs HW=703.36' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 5.15 cfs @ 6.56 fps)
  ├─**2=Orifice/Grate** (Passes < 3.14 cfs potential flow)
  ├─**3=Orifice/Grate** (Passes < 0.32 cfs potential flow)
  └─**4=Orifice/Grate** (Passes < 2.20 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=698.75' TW=0.00' (Dynamic Tailwater)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG31-33: Rain Gardens 31,32,33

Inflow Area = 21,505 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event
Inflow = 3.67 cfs @ 12.07 hrs, Volume= 12,066 cf
Outflow = 2.90 cfs @ 12.14 hrs, Volume= 12,038 cf, Atten= 21%, Lag= 3.9 min
Primary = 2.90 cfs @ 12.14 hrs, Volume= 12,038 cf
Routed to Reach SW2.1 : Swale RG2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 732.28' @ 12.14 hrs Surf.Area= 2,791 sf Storage= 1,847 cf

Plug-Flow detention time= 16.1 min calculated for 12,013 cf (100% of inflow)
Center-of-Mass det. time= 14.6 min (789.5 - 774.9)

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	141 cf	**12.0" Round Pipe Storage** x 3 Inside #2 L= 60.0'
#2	728.25'	807 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	731.25'	90 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 3 180 cf Overall x 50.0% Voids
#4	731.50'	1,120 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 3
		2,159 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	728.25'	**6.0" Round Culvert X 3.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	732.00'	**6.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	728.25'	**2.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	731.00'	**3.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.87 cfs @ 12.14 hrs HW=732.27' TW=722.50' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.87 cfs of 5.51 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.48 cfs @ 2.52 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.63 cfs @ 9.56 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.76 cfs @ 5.16 fps)

Summary for Pond RG34-39: Rain Gardens 34-39

Inflow Area = 45,285 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event
Inflow = 7.73 cfs @ 12.07 hrs, Volume= 25,409 cf
Outflow = 6.05 cfs @ 12.14 hrs, Volume= 25,351 cf, Atten= 22%, Lag= 4.0 min
Primary = 4.03 cfs @ 12.14 hrs, Volume= 16,901 cf
Routed to Link AP2-P : AP2-P
Secondary = 2.02 cfs @ 12.14 hrs, Volume= 8,450 cf
Routed to Reach SW2.1 : Swale RG2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 732.32' @ 12.14 hrs Surf.Area= 5,652 sf Storage= 3,805 cf

Plug-Flow detention time= 16.1 min calculated for 25,298 cf (100% of inflow)
Center-of-Mass det. time= 14.6 min (789.4 - 774.9)

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	283 cf	**12.0" Round Pipe Storage** x 6 Inside #2 L= 60.0'
#2	728.25'	1,615 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 6 4,320 cf Overall - 283 cf Embedded = 4,037 cf x 40.0% Voids
#3	731.25'	180 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 6 360 cf Overall x 50.0% Voids
#4	731.50'	2,240 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 6
		4,318 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	728.25'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Secondary	728.25'	**6.0" Round Culvert X 2.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 728.25' / 728.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 1	732.00'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	732.00'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 1	728.25'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#6	Device 2	728.25'	**2.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#7	Device 1	731.00'	**3.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#8	Device 2	731.00'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.99 cfs @ 12.14 hrs HW=732.32' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 3.99 cfs of 7.39 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 2.12 cfs @ 2.70 fps)
  ├─**5=Orifice/Grate** (Orifice Controls 0.84 cfs @ 9.61 fps)
  └─**7=Orifice/Grate** (Orifice Controls 1.03 cfs @ 5.25 fps)

Secondary OutFlow Max=2.00 cfs @ 12.14 hrs HW=732.32' TW=722.50' (Dynamic Tailwater)
└─**2=Culvert** (Passes 2.00 cfs of 3.69 cfs potential flow)
  ├─**4=Orifice/Grate** (Orifice Controls 1.06 cfs @ 2.70 fps)
  ├─**6=Orifice/Grate** (Orifice Controls 0.42 cfs @ 9.61 fps)
  └─**8=Orifice/Grate** (Orifice Controls 0.52 cfs @ 5.25 fps)

Summary for Pond RG40: Rain Garden 40

Inflow Area = 9,525 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event
Inflow = 1.63 cfs @ 12.07 hrs, Volume= 5,344 cf
Outflow = 1.30 cfs @ 12.13 hrs, Volume= 5,333 cf, Atten= 20%, Lag= 3.8 min
Primary = 1.30 cfs @ 12.13 hrs, Volume= 5,333 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 733.83' @ 12.13 hrs Surf.Area= 944 sf Storage= 637 cf

Plug-Flow detention time= 14.1 min calculated for 5,322 cf (100% of inflow)
Center-of-Mass det. time= 12.8 min (787.7 - 774.9)

Volume	Invert	Avail.Storage	Storage Description
#1	729.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	729.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	732.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	733.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	729.75'	**8.0" Round Culvert** L= 140.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 729.75' / 728.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	733.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	729.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	732.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.28 cfs @ 12.13 hrs HW=733.82' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.28 cfs of 2.11 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.53 cfs @ 2.71 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.21 cfs @ 9.61 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.54 cfs @ 6.18 fps)

Summary for Pond RG41: Rain Garden 41

Inflow Area = 7,525 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event
Inflow = 1.28 cfs @ 12.07 hrs, Volume= 4,222 cf
Outflow = 1.02 cfs @ 12.13 hrs, Volume= 4,004 cf, Atten= 21%, Lag= 3.8 min
Discarded = 0.05 cfs @ 12.13 hrs, Volume= 1,032 cf
Primary = 0.97 cfs @ 12.13 hrs, Volume= 2,972 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 732.35' @ 12.13 hrs Surf.Area= 948 sf Storage= 644 cf

Plug-Flow detention time= 48.6 min calculated for 3,996 cf (95% of inflow)
Center-of-Mass det. time= 20.0 min (794.8 - 774.9)

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	728.25'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	731.25'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	731.50'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	730.25'	**6.0" Round Culvert** L= 26.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.00' S= 0.0096 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	732.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	731.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.05 cfs @ 12.13 hrs HW=732.34' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.96 cfs @ 12.13 hrs HW=732.34' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.96 cfs of 1.13 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.55 cfs @ 2.79 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 0.15 cfs @ 6.81 fps)
  └─**5=Orifice/Grate** (Orifice Controls 0.26 cfs @ 5.30 fps)

Summary for Pond RG42: Rain Garden 42

Inflow Area = 12,715 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event
Inflow = 2.17 cfs @ 12.07 hrs, Volume= 7,134 cf
Outflow = 1.73 cfs @ 12.13 hrs, Volume= 6,611 cf, Atten= 20%, Lag= 3.8 min
Discarded = 0.04 cfs @ 12.13 hrs, Volume= 919 cf
Primary = 1.69 cfs @ 12.13 hrs, Volume= 5,691 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 732.41' @ 12.13 hrs Surf.Area= 1,701 sf Storage= 1,318 cf

Plug-Flow detention time= 66.1 min calculated for 6,611 cf (93% of inflow)
Center-of-Mass det. time= 27.3 min (802.2 - 774.9)

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	212 cf	**18.0" Round Pipe Storage** x 2 Inside #2 L= 60.0'
#2	728.25'	491 cf	**8.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 1,440 cf Overall - 212 cf Embedded = 1,228 cf x 40.0% Voids
#3	731.25'	60 cf	**8.00'W x 60.00'L x 0.25'H Mulch** 120 cf Overall x 50.0% Voids
#4	731.50'	621 cf	**8.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		1,385 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	730.25'	**8.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Device 2	732.00'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	731.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 12.13 hrs HW=732.40' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=1.67 cfs @ 12.13 hrs HW=732.40' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.67 cfs of 2.27 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 1.06 cfs @ 3.05 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 0.34 cfs @ 6.85 fps)
  └─**5=Orifice/Grate** (Orifice Controls 0.27 cfs @ 5.44 fps)

Summary for Pond RG43-48: Rain Garden 43-48

Inflow Area = 39,875 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event
Inflow = 6.81 cfs @ 12.07 hrs, Volume= 22,374 cf
Outflow = 5.36 cfs @ 12.14 hrs, Volume= 20,731 cf, Atten= 21%, Lag= 3.9 min
Discarded = 0.16 cfs @ 12.14 hrs, Volume= 3,375 cf
Primary = 4.34 cfs @ 12.14 hrs, Volume= 14,464 cf
Routed to Link AP2-P : AP2-P
Secondary = 0.87 cfs @ 12.14 hrs, Volume= 2,893 cf
Routed to Reach SW2.1 : Swale RG2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 733.75' @ 12.14 hrs Surf.Area= 6,622 sf Storage= 4,353 cf

Plug-Flow detention time= 65.9 min calculated for 20,688 cf (92% of inflow)
Center-of-Mass det. time= 27.7 min (802.6 - 774.9)

Volume	Invert	Avail.Storage	Storage Description
#1	729.75'	283 cf	**12.0" Round Pipe Storage** x 6 Inside #2 L= 60.0'
#2	729.75'	2,047 cf	**5.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 6 5,400 cf Overall - 283 cf Embedded = 5,117 cf x 40.0% Voids
#3	732.75'	225 cf	**5.00'W x 60.00'L x 0.25'H Mulch** x 6 450 cf Overall x 50.0% Voids
#4	733.00'	2,612 cf	**5.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 6
		5,167 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	729.75'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	731.75'	**6.0" Round Culvert X 5.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 731.75' / 731.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Secondary	731.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 731.75' / 731.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#4	Device 2	733.50'	**6.0" Horiz. Orifice/Grate X 5.00** C= 0.600 Limited to weir flow at low heads
#5	Device 3	733.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 2	731.75'	**2.0" Vert. Orifice/Grate X 5.00** C= 0.600 Limited to weir flow at low heads
#7	Device 3	731.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#8	Device 2	732.50'	**3.0" Vert. Orifice/Grate X 5.00** C= 0.600 Limited to weir flow at low heads
#9	Device 3	732.50'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.16 cfs @ 12.14 hrs HW=733.74' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=4.29 cfs @ 12.14 hrs HW=733.74' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 4.29 cfs of 6.24 cfs potential flow)
  ├─**4=Orifice/Grate** (Orifice Controls 2.32 cfs @ 2.36 fps)
  ├─**6=Orifice/Grate** (Orifice Controls 0.73 cfs @ 6.65 fps)
  └─**8=Orifice/Grate** (Orifice Controls 1.25 cfs @ 5.09 fps)

Secondary OutFlow Max=0.86 cfs @ 12.14 hrs HW=733.74' TW=722.50' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.86 cfs of 1.25 cfs potential flow)
  ├─**5=Orifice/Grate** (Orifice Controls 0.46 cfs @ 2.36 fps)
  ├─**7=Orifice/Grate** (Orifice Controls 0.15 cfs @ 6.65 fps)
  └─**9=Orifice/Grate** (Orifice Controls 0.25 cfs @ 5.09 fps)

Summary for Pond RG49-50: Rain Gardens 49,50

Inflow Area = 10,410 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event
Inflow = 1.78 cfs @ 12.07 hrs, Volume= 5,841 cf
Outflow = 1.28 cfs @ 12.16 hrs, Volume= 5,298 cf, Atten= 28%, Lag= 5.4 min
Discarded = 0.05 cfs @ 12.16 hrs, Volume= 1,086 cf
Primary = 1.23 cfs @ 12.16 hrs, Volume= 4,212 cf
Routed to Reach SW2.1 : Swale RG2.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 732.13' @ 12.16 hrs Surf.Area= 2,140 sf Storage= 1,334 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 30.0 min (804.9 - 774.9)

Volume	Invert	Avail.Storage	Storage Description
#1	728.25'	94 cf	**12.0" Round Pipe Storage** x 2 Inside #2 L= 60.0'
#2	728.25'	682 cf	**5.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 2 1,800 cf Overall - 94 cf Embedded = 1,706 cf x 40.0% Voids
#3	731.25'	75 cf	**5.00'W x 60.00'L x 0.25'H Mulch** x 2 150 cf Overall x 50.0% Voids
#4	731.50'	871 cf	**5.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 2
		1,722 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	728.25'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	730.25'	**6.0" Round Culvert X 2.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 730.25' / 730.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	732.00'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	730.25'	**2.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	731.00'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.05 cfs @ 12.16 hrs HW=732.12' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=1.18 cfs @ 12.16 hrs HW=732.12' TW=722.49' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.18 cfs of 2.41 cfs potential flow)
├─**3=Orifice/Grate** (Weir Controls 0.43 cfs @ 1.13 fps)
├─**4=Orifice/Grate** (Orifice Controls 0.28 cfs @ 6.44 fps)
└─**5=Orifice/Grate** (Orifice Controls 0.47 cfs @ 4.80 fps)

Summary for Pond RG52-54: Rain Garden Lots 52,53,54

Inflow Area = 28,140 sf, 53.72% Impervious, Inflow Depth > 5.79" for 100YearMass event
Inflow = 4.31 cfs @ 12.07 hrs, Volume= 13,577 cf
Outflow = 3.47 cfs @ 12.14 hrs, Volume= 13,545 cf, Atten= 20%, Lag= 4.1 min
Primary = 3.47 cfs @ 12.14 hrs, Volume= 13,545 cf
Routed to Link AP2-P : AP2-P

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 690.70' @ 12.14 hrs Surf.Area= 2,723 sf Storage= 1,740 cf

Plug-Flow detention time= 14.3 min calculated for 13,545 cf (100% of inflow)
Center-of-Mass det. time= 12.7 min (809.9 - 797.1)

Volume	Invert	Avail.Storage	Storage Description
#1	686.75'	141 cf	**12.0" Round Pipe Storage** x 3 Inside #2 L= 60.0'
#2	686.75'	807 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	689.75'	90 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 3 180 cf Overall x 50.0% Voids
#4	690.00'	1,120 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 3
		2,159 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	686.75'	**6.0" Round Culvert X 3.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 686.75' / 686.70' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	690.50'	**6.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	686.75'	**2.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	689.00'	**4.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.43 cfs @ 12.14 hrs HW=690.69' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 3.43 cfs of 5.45 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.25 cfs @ 2.12 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.62 cfs @ 9.46 fps)
  └─**4=Orifice/Grate** (Orifice Controls 1.56 cfs @ 5.95 fps)

Summary for Pond RG55: Rain Garden 55

Inflow Area = 5,450 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event
Inflow = 0.93 cfs @ 12.07 hrs, Volume= 3,058 cf
Outflow = 0.64 cfs @ 12.16 hrs, Volume= 3,050 cf, Atten= 31%, Lag= 5.2 min
Primary = 0.64 cfs @ 12.16 hrs, Volume= 3,050 cf
Routed to Link AP2-P : AP2-P

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

Peak Elev= 689.28' @ 12.16 hrs Surf.Area= 793 sf Storage= 459 cf

Plug-Flow detention time= 16.1 min calculated for 3,050 cf (100% of inflow)
Center-of-Mass det. time= 14.4 min (789.3 - 774.9)

Volume	Invert	Avail.Storage	Storage Description
#1	685.75'	106 cf	**18.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	685.75'	246 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 106 cf Embedded = 614 cf x 40.0% Voids
#3	688.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	689.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		755 cf	Total Available Storage

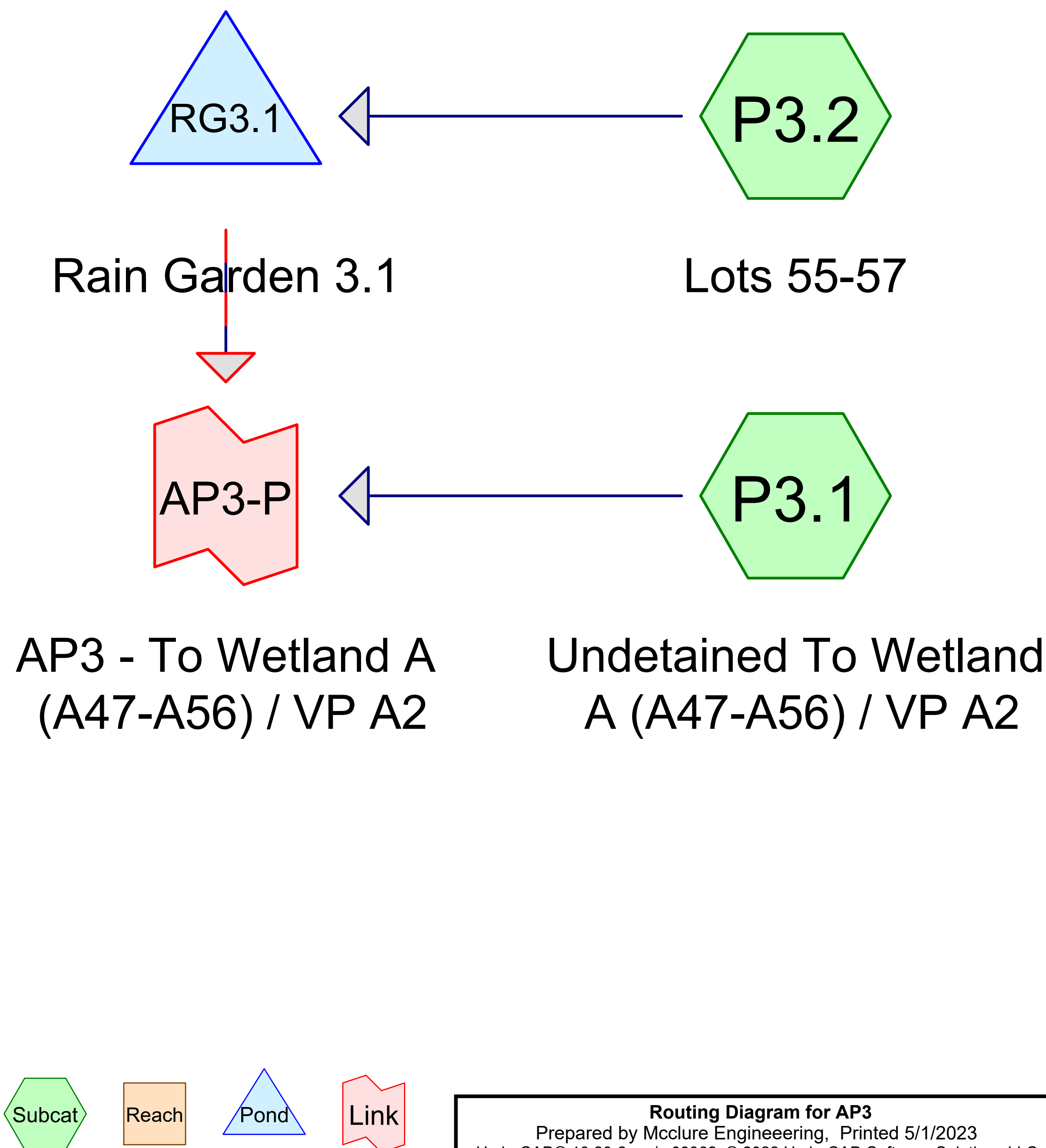
Device	Routing	Invert	Outlet Devices
#1	Primary	685.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 685.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	689.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	685.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	688.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.64 cfs @ 12.16 hrs HW=689.27' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.64 cfs of 1.71 cfs potential flow)
 ├─**2=Orifice/Grate** (Controls 0.00 cfs)
 ├─**3=Orifice/Grate** (Orifice Controls 0.19 cfs @ 8.93 fps)
 └─**4=Orifice/Grate** (Orifice Controls 0.44 cfs @ 5.06 fps)

Summary for Link AP2-P: AP2-P

Inflow Area = 550,840 sf, 23.14% Impervious, Inflow Depth > 4.52" for 100YearMass event
Inflow = 47.25 cfs @ 12.16 hrs, Volume= 207,448 cf
Primary = 47.25 cfs @ 12.16 hrs, Volume= 207,448 cf, Atten= 0%, Lag= 0.0 min

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



Routing Diagram for AP3
Prepared by Mcclure Engineeering, Printed 5/1/2023
HydroCAD® 10.20-2g s/n 03362 © 2022 HydroCAD Software Solutions LLC

Summary for Subcatchment P3.1: Undetained To Wetland A (A47-A56) / VP A2

Runoff = 0.33 cfs @ 12.35 hrs, Volume= 2,511 cf, Depth> 0.32"
Routed to Link AP3-P : AP3 - To Wetland A (A47-A56) / VP A2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
6,255	77	Woods, Good, HSG D
75,890	55	Woods, Good, HSG B
11,530	61	>75% Grass cover, Good, HSG B
93,675	57	Weighted Average
93,675		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.2	250	0.1400	1.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.4	300	Total			

Summary for Subcatchment P3.2: Lots 55-57

Runoff = 0.76 cfs @ 12.07 hrs, Volume= 2,276 cf, Depth> 1.79"
Routed to Pond RG3.1 : Rain Garden 3.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
15,255	85	1/8 acre lots, 65% imp, HSG B
5,339		35.00% Pervious Area
9,916		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Pond RG3.1: Rain Garden 3.1

Inflow Area = 15,255 sf, 65.00% Impervious, Inflow Depth > 1.79" for 2YearMass event
Inflow = 0.76 cfs @ 12.07 hrs, Volume= 2,276 cf
Outflow = 0.08 cfs @ 11.79 hrs, Volume= 2,277 cf, Atten= 90%, Lag= 0.0 min
Discarded = 0.08 cfs @ 11.79 hrs, Volume= 2,277 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP3-P : AP3 - To Wetland A (A47-A56) / VP A2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 684.88' @ 12.90 hrs Surf.Area= 1,430 sf Storage= 801 cf
Flood Elev= 687.50' Surf.Area= 4,668 sf Storage= 3,120 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 79.4 min (903.4 - 824.0)

Volume	Invert	Avail.Storage	Storage Description
#1	683.50'	20 cf	**6.0" Round Pipe Storage** Inside #2 L= 100.0'
#2	683.50'	1,708 cf	**13.00'W x 110.00'L x 3.00'H Soil Media and Gravel** 4,290 cf Overall - 20 cf Embedded = 4,270 cf x 40.0% Voids
#3	686.50'	179 cf	**13.00'W x 110.00'L x 0.25'H Mulch** 358 cf Overall x 50.0% Voids
#4	686.75'	2,717 cf	**13.00'W x 110.00'L x 1.50'H Ponding Z=2.0**
		4,623 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	683.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	685.50'	**6.0" Round Culvert X 3.00** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.50' / 685.00' S= 0.0417 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	685.50'	**0.5" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	686.50'	**3.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	687.25'	**6.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.08 cfs @ 11.79 hrs HW=683.55' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=683.50' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link AP3-P: AP3 - To Wetland A (A47-A56) / VP A2

Inflow Area = 108,930 sf, 9.10% Impervious, Inflow Depth > 0.28" for 2YearMass event
Inflow = 0.33 cfs @ 12.35 hrs, Volume= 2,511 cf
Primary = 0.33 cfs @ 12.35 hrs, Volume= 2,511 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment P3.1: Undetained To Wetland A (A47-A56) / VP A2

Runoff = 2.07 cfs @ 12.17 hrs, Volume= 8,803 cf, Depth> 1.13"
Routed to Link AP3-P : AP3 - To Wetland A (A47-A56) / VP A2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
6,255	77	Woods, Good, HSG D
75,890	55	Woods, Good, HSG B
11,530	61	>75% Grass cover, Good, HSG B
93,675	57	Weighted Average
93,675		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.2	250	0.1400	1.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.4	300	Total			

Summary for Subcatchment P3.2: Lots 55-57

Runoff = 1.44 cfs @ 12.07 hrs, Volume= 4,337 cf, Depth> 3.41"
Routed to Pond RG3.1 : Rain Garden 3.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
15,255	85	1/8 acre lots, 65% imp, HSG B
5,339		35.00% Pervious Area
9,916		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Pond RG3.1: Rain Garden 3.1

Inflow Area = 15,255 sf, 65.00% Impervious, Inflow Depth > 3.41" for 10YearMass event
Inflow = 1.44 cfs @ 12.07 hrs, Volume= 4,337 cf
Outflow = 0.18 cfs @ 12.63 hrs, Volume= 4,338 cf, Atten= 87%, Lag= 33.1 min
Discarded = 0.16 cfs @ 12.51 hrs, Volume= 4,036 cf
Primary = 0.02 cfs @ 12.63 hrs, Volume= 302 cf
Routed to Link AP3-P : AP3 - To Wetland A (A47-A56) / VP A2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 686.52' @ 12.63 hrs Surf.Area= 2,860 sf Storage= 1,744 cf
Flood Elev= 687.50' Surf.Area= 4,668 sf Storage= 3,120 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 165.3 min (970.9 - 805.7)

Volume	Invert	Avail.Storage	Storage Description
#1	683.50'	20 cf	**6.0" Round Pipe Storage** Inside #2 L= 100.0'
#2	683.50'	1,708 cf	**13.00'W x 110.00'L x 3.00'H Soil Media and Gravel** 4,290 cf Overall - 20 cf Embedded = 4,270 cf x 40.0% Voids
#3	686.50'	179 cf	**13.00'W x 110.00'L x 0.25'H Mulch** 358 cf Overall x 50.0% Voids
#4	686.75'	2,717 cf	**13.00'W x 110.00'L x 1.50'H Ponding Z=2.0**
		4,623 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	683.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	685.50'	**6.0" Round Culvert X 3.00** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.50' / 685.00' S= 0.0417 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	685.50'	**0.5" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	686.50'	**3.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	687.25'	**6.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.16 cfs @ 12.51 hrs HW=686.50' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.16 cfs)

Primary OutFlow Max=0.02 cfs @ 12.63 hrs HW=686.52' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.02 cfs of 2.49 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.02 cfs @ 4.82 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.52 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link AP3-P: AP3 - To Wetland A (A47-A56) / VP A2

Inflow Area = 108,930 sf, 9.10% Impervious, Inflow Depth > 1.00" for 10YearMass event
Inflow = 2.07 cfs @ 12.17 hrs, Volume= 9,104 cf
Primary = 2.07 cfs @ 12.17 hrs, Volume= 9,104 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment P3.1: Undetained To Wetland A (A47-A56) / VP A2

Runoff = 3.56 cfs @ 12.16 hrs, Volume= 13,905 cf, Depth> 1.78"
Routed to Link AP3-P : AP3 - To Wetland A (A47-A56) / VP A2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
6,255	77	Woods, Good, HSG D
75,890	55	Woods, Good, HSG B
11,530	61	>75% Grass cover, Good, HSG B
93,675	57	Weighted Average
93,675		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.2	250	0.1400	1.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.4	300	Total			

Summary for Subcatchment P3.2: Lots 55-57

Runoff = 1.86 cfs @ 12.07 hrs, Volume= 5,681 cf, Depth> 4.47"
Routed to Pond RG3.1 : Rain Garden 3.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
15,255	85	1/8 acre lots, 65% imp, HSG B
5,339		35.00% Pervious Area
9,916		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Pond RG3.1: Rain Garden 3.1

Inflow Area = 15,255 sf, 65.00% Impervious, Inflow Depth > 4.47" for 25YearMass event
Inflow = 1.86 cfs @ 12.07 hrs, Volume= 5,681 cf
Outflow = 0.56 cfs @ 12.39 hrs, Volume= 5,643 cf, Atten= 70%, Lag= 19.1 min
Discarded = 0.24 cfs @ 12.39 hrs, Volume= 4,761 cf
Primary = 0.32 cfs @ 12.39 hrs, Volume= 882 cf
Routed to Link AP3-P : AP3 - To Wetland A (A47-A56) / VP A2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 686.80' @ 12.39 hrs Surf.Area= 4,313 sf Storage= 1,972 cf
Flood Elev= 687.50' Surf.Area= 4,668 sf Storage= 3,120 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 142.8 min (940.9 - 798.1)

Volume	Invert	Avail.Storage	Storage Description
#1	683.50'	20 cf	**6.0" Round Pipe Storage** Inside #2 L= 100.0'
#2	683.50'	1,708 cf	**13.00'W x 110.00'L x 3.00'H Soil Media and Gravel** 4,290 cf Overall - 20 cf Embedded = 4,270 cf x 40.0% Voids
#3	686.50'	179 cf	**13.00'W x 110.00'L x 0.25'H Mulch** 358 cf Overall x 50.0% Voids
#4	686.75'	2,717 cf	**13.00'W x 110.00'L x 1.50'H Ponding Z=2.0**
		4,623 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	683.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	685.50'	**6.0" Round Culvert X 3.00** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.50' / 685.00' S= 0.0417 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	685.50'	**0.5" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	686.50'	**3.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	687.25'	**6.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.24 cfs @ 12.39 hrs HW=686.80' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.24 cfs)

Primary OutFlow Max=0.32 cfs @ 12.39 hrs HW=686.80' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.32 cfs of 2.90 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.02 cfs @ 5.44 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 0.29 cfs @ 1.99 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link AP3-P: AP3 - To Wetland A (A47-A56) / VP A2

Inflow Area = 108,930 sf, 9.10% Impervious, Inflow Depth > 1.63" for 25YearMass event
Inflow = 3.58 cfs @ 12.16 hrs, Volume= 14,787 cf
Primary = 3.58 cfs @ 12.16 hrs, Volume= 14,787 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment P3.1: Undetained To Wetland A (A47-A56) / VP A2

Runoff = 6.21 cfs @ 12.15 hrs, Volume= 22,989 cf, Depth> 2.94"
Routed to Link AP3-P : AP3 - To Wetland A (A47-A56) / VP A2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
6,255	77	Woods, Good, HSG D
75,890	55	Woods, Good, HSG B
11,530	61	>75% Grass cover, Good, HSG B
93,675	57	Weighted Average
93,675		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.2	250	0.1400	1.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.4	300	Total			

Summary for Subcatchment P3.2: Lots 55-57

Runoff = 2.52 cfs @ 12.07 hrs, Volume= 7,807 cf, Depth> 6.14"
Routed to Pond RG3.1 : Rain Garden 3.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
15,255	85	1/8 acre lots, 65% imp, HSG B
5,339		35.00% Pervious Area
9,916		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Pond RG3.1: Rain Garden 3.1

Inflow Area = 15,255 sf, 65.00% Impervious, Inflow Depth > 6.14" for 100YearMass event
Inflow = 2.52 cfs @ 12.07 hrs, Volume= 7,807 cf
Outflow = 0.81 cfs @ 12.36 hrs, Volume= 7,462 cf, Atten= 68%, Lag= 17.3 min
Discarded = 0.25 cfs @ 12.36 hrs, Volume= 5,450 cf
Primary = 0.56 cfs @ 12.36 hrs, Volume= 2,013 cf
Routed to Link AP3-P : AP3 - To Wetland A (A47-A56) / VP A2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 687.19' @ 12.36 hrs Surf.Area= 4,507 sf Storage= 2,576 cf
Flood Elev= 687.50' Surf.Area= 4,668 sf Storage= 3,120 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 102.0 min (891.3 - 789.3)

Volume	Invert	Avail.Storage	Storage Description
#1	683.50'	20 cf	**6.0" Round Pipe Storage** Inside #2 L= 100.0'
#2	683.50'	1,708 cf	**13.00'W x 110.00'L x 3.00'H Soil Media and Gravel** 4,290 cf Overall - 20 cf Embedded = 4,270 cf x 40.0% Voids
#3	686.50'	179 cf	**13.00'W x 110.00'L x 0.25'H Mulch** 358 cf Overall x 50.0% Voids
#4	686.75'	2,717 cf	**13.00'W x 110.00'L x 1.50'H Ponding Z=2.0**
		4,623 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	683.50'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	685.50'	**6.0" Round Culvert X 3.00** L= 12.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.50' / 685.00' S= 0.0417 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	685.50'	**0.5" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	686.50'	**3.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	687.25'	**6.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads

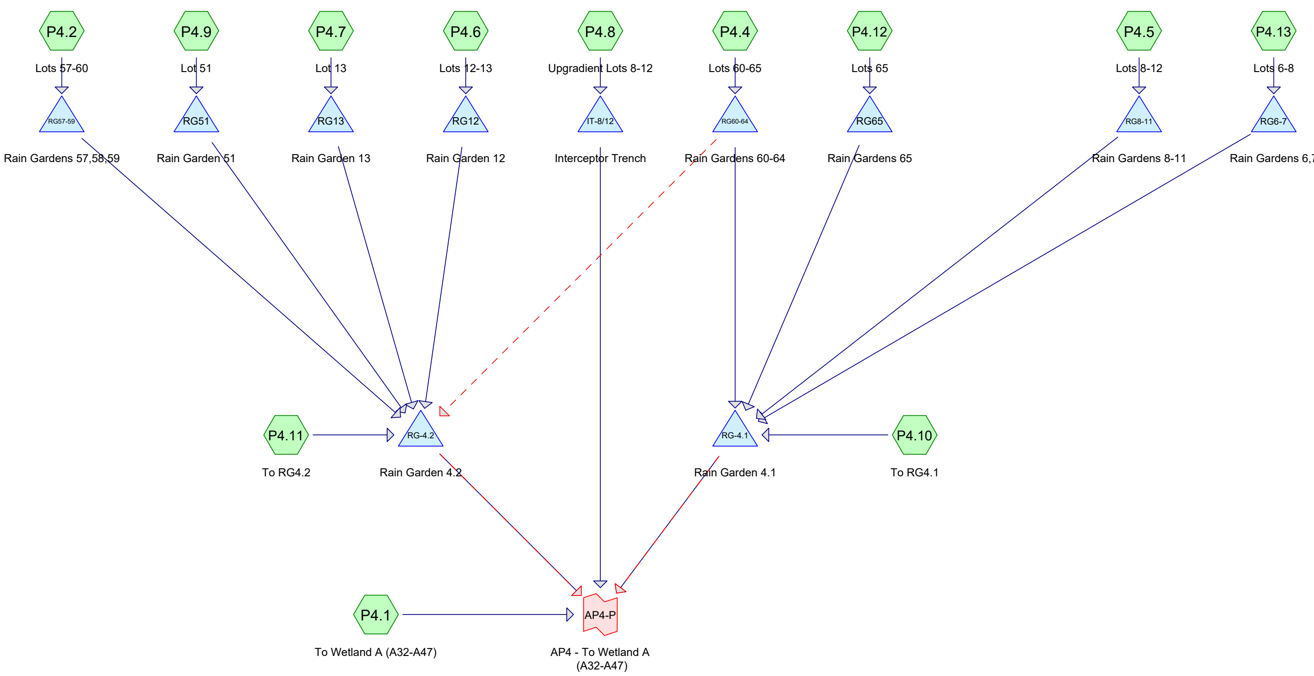
Discarded OutFlow Max=0.25 cfs @ 12.36 hrs HW=687.19' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.25 cfs)

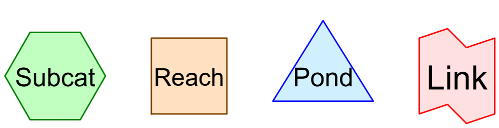
Primary OutFlow Max=0.56 cfs @ 12.36 hrs HW=687.19' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.56 cfs of 3.40 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.03 cfs @ 6.21 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 0.53 cfs @ 3.60 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link AP3-P: AP3 - To Wetland A (A47-A56) / VP A2

Inflow Area = 108,930 sf, 9.10% Impervious, Inflow Depth > 2.75" for 100YearMass event
Inflow = 6.69 cfs @ 12.15 hrs, Volume= 25,002 cf
Primary = 6.69 cfs @ 12.15 hrs, Volume= 25,002 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs





Routing Diagram for AP4

Prepared by Mcclure Engineeering, Printed 6/28/2023

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Summary for Subcatchment P4.1: To Wetland A (A32-A47)

Runoff = 2.76 cfs @ 12.11 hrs, Volume= 9,132 cf, Depth= 1.18"
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
630	55	Woods, Good, HSG B
79,935	77	Woods, Good, HSG D
4,660	61	>75% Grass cover, Good, HSG B
7,645	80	>75% Grass cover, Good, HSG D
92,870	76	Weighted Average
92,870		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.2	135	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.9	185	Total			

Summary for Subcatchment P4.10: To RG4.1

Runoff = 0.38 cfs @ 12.08 hrs, Volume= 1,149 cf, Depth= 1.43"
Routed to Pond RG-4.1 : Rain Garden 4.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
9,500	80	>75% Grass cover, Good, HSG D
125	61	>75% Grass cover, Good, HSG B
9,625	80	Weighted Average
9,625		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.11: To RG4.2

Runoff = 0.12 cfs @ 12.14 hrs, Volume= 600 cf, Depth= 0.46"
Routed to Pond RG-4.2 : Rain Garden 4.2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
15,520	61	>75% Grass cover, Good, HSG B
110	80	>75% Grass cover, Good, HSG D
15,630	61	Weighted Average
15,630		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	150	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.0	200	Total			

Summary for Subcatchment P4.12: Lots 65

Runoff = 0.30 cfs @ 12.07 hrs, Volume= 1,020 cf, Depth= 3.01"
Routed to Pond RG65 : Rain Gardens 65

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
3,830	98	Paved roads w/curbs & sewers, HSG C
240	98	Paved roads w/curbs & sewers, HSG C
4,070	98	Weighted Average
4,070		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.13: Lots 6-8

Runoff = 1.17 cfs @ 12.07 hrs, Volume= 3,501 cf, Depth= 1.79"
Routed to Pond RG6-7 : Rain Gardens 6,7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
23,175	85	1/8 acre lots, 65% imp, HSG B
270	90	1/8 acre lots, 65% imp, HSG C
23,445	85	Weighted Average
8,206		35.00% Pervious Area
15,239		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.2: Lots 57-60

Runoff = 1.05 cfs @ 12.07 hrs, Volume= 3,126 cf, Depth= 1.79"
Routed to Pond RG57-59 : Rain Gardens 57,58,59

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
20,938	85	1/8 acre lots, 65% imp, HSG B
7,328		35.00% Pervious Area
13,610		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.4: Lots 60-65

Runoff = 1.87 cfs @ 12.07 hrs, Volume= 5,578 cf, Depth= 1.95"
Routed to Pond RG60-64 : Rain Gardens 60-64

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
21,420	85	1/8 acre lots, 65% imp, HSG B
9,605	92	1/8 acre lots, 65% imp, HSG D
3,295	90	1/8 acre lots, 65% imp, HSG C
34,320	87	Weighted Average
12,012		35.00% Pervious Area
22,308		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.5: Lots 8-12

Runoff = 1.55 cfs @ 12.07 hrs, Volume= 4,629 cf, Depth= 1.79"
Routed to Pond RG8-11 : Rain Gardens 8-11

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
31,000	85	1/8 acre lots, 65% imp, HSG B
10,850		35.00% Pervious Area
20,150		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.6: Lots 12-13

Runoff = 0.51 cfs @ 12.09 hrs, Volume= 1,594 cf, Depth= 1.79"
Routed to Pond RG12 : Rain Garden 12

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
10,675	85	1/8 acre lots, 65% imp, HSG B
3,736		35.00% Pervious Area
6,939		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.1200	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	30	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.4	80	Total			

Summary for Subcatchment P4.7: Lot 13

Runoff = 0.50 cfs @ 12.07 hrs, Volume= 1,487 cf, Depth= 1.87"
Routed to Pond RG13 : Rain Garden 13

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
7,505	85	1/8 acre lots, 65% imp, HSG B
2,040	90	1/8 acre lots, 65% imp, HSG C
9,545	86	Weighted Average
3,341		35.00% Pervious Area
6,204		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.8: Upgradient Lots 8-12

Runoff = 0.11 cfs @ 12.47 hrs, Volume= 935 cf, Depth= 0.29"
Routed to Pond IT-8/12 : Interceptor Trench

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
3,850	61	>75% Grass cover, Good, HSG B
34,550	55	Woods, Good, HSG B
38,400	56	Weighted Average
38,400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
3.5	280	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.2	330	Total			

Summary for Subcatchment P4.9: Lot 51

Runoff = 0.48 cfs @ 12.07 hrs, Volume= 1,419 cf, Depth= 1.87"
Routed to Pond RG51 : Rain Garden 51

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
1,910	90	1/8 acre lots, 65% imp, HSG C
7,195	85	1/8 acre lots, 65% imp, HSG B
9,105	86	Weighted Average
3,187		35.00% Pervious Area
5,918		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Pond IT-8/12: Interceptor Trench

```
Inflow Area =        38,400 sf,   0.00% Impervious,  Inflow Depth =   0.29"    for  2YearMass event
Inflow      =       0.11 cfs @  12.47 hrs,  Volume=            935 cf
Outflow     =       0.08 cfs @  12.64 hrs,  Volume=            933 cf,  Atten= 20%,  Lag= 10.2 min
Primary     =       0.08 cfs @  12.64 hrs,  Volume=            933 cf
   Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 680.46' @ 12.64 hrs Surf.Area= 1,050 sf Storage= 79 cf

Plug-Flow detention time= 28.5 min calculated for 933 cf (100% of inflow)
Center-of-Mass det. time= 27.3 min (981.7 - 954.3)

Volume	Invert	Avail.Storage	Storage Description
#1	680.30'	1,211 cf	**3.00'W x 350.00'L x 3.00'H Prismatoid** 3,150 cf Overall - 122 cf Embedded = 3,028 cf x 40.0% Voids
#2	680.30'	122 cf	**8.0" Round Pipe Storage** Inside #1 L= 350.0'
		1,333 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	680.30'	**8.0" Round Culvert** L= 224.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 680.30' / 668.00' S= 0.0549 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.08 cfs @ 12.64 hrs HW=680.46' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.08 cfs @ 1.35 fps)

Summary for Pond RG-4.1: Rain Garden 4.1

```
Inflow Area =       102,460 sf,  60.28% Impervious,  Inflow Depth =   1.37"    for  2YearMass event
Inflow      =       2.43 cfs @  12.16 hrs,  Volume=         11,675 cf
Outflow     =       0.97 cfs @  12.79 hrs,  Volume=         11,320 cf,  Atten= 60%,  Lag= 37.8 min
Discarded   =       0.09 cfs @  11.28 hrs,  Volume=          6,434 cf
Primary     =       0.89 cfs @  12.79 hrs,  Volume=          4,885 cf
   Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)
Secondary   =       0.00 cfs @   0.00 hrs,  Volume=              0 cf
   Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 671.66' @ 12.79 hrs Surf.Area= 3,740 sf Storage= 4,351 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 205.2 min (1,031.7 - 826.4)

Volume	Invert	Avail.Storage	Storage Description
#1	668.75'	4,488 cf	**17.00'W x 220.00'L x 3.00'H Soil Media and Gravel** 11,220 cf Overall x 40.0% Voids
#2	671.75'	468 cf	**17.00'W x 220.00'L x 0.25'H Mulch** 935 cf Overall x 50.0% Voids
#3	672.00'	9,419 cf	**17.00'W x 220.00'L x 2.00'H Ponding Z=2.0**
		14,374 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	668.75'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	670.75'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 670.75' / 670.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Primary	670.75'	**10.0" Round Culvert X 3.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 670.75' / 670.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#4	Device 2	670.75'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	671.25'	**3.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#6	Device 2	672.75'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#7	Device 3	673.25'	**10.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#8	Secondary	673.50'	**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

Discarded OutFlow Max=0.09 cfs @ 11.28 hrs HW=668.80' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=0.89 cfs @ 12.79 hrs HW=671.66' TW=0.00' (Dynamic Tailwater)
├─**2=Culvert** (Passes 0.89 cfs of 2.97 cfs potential flow)
│ ├─**4=Orifice/Grate** (Orifice Controls 0.38 cfs @ 4.37 fps)
│ ├─**5=Orifice/Grate** (Orifice Controls 0.50 cfs @ 2.56 fps)
│ └─**6=Orifice/Grate** (Controls 0.00 cfs)
└─**3=Culvert** (Passes 0.00 cfs of 4.89 cfs potential flow)
  └─**7=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=668.75' TW=0.00' (Dynamic Tailwater)
└─**8=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG-4.2: Rain Garden 4.2

Inflow Area = 65,893 sf, 49.58% Impervious, Inflow Depth = 1.19" for 2YearMass event
Inflow = 1.70 cfs @ 12.19 hrs, Volume= 6,530 cf
Outflow = 0.52 cfs @ 12.90 hrs, Volume= 6,436 cf, Atten= 69%, Lag= 42.6 min
Discarded = 0.06 cfs @ 11.65 hrs, Volume= 4,077 cf
Primary = 0.46 cfs @ 12.90 hrs, Volume= 2,359 cf
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 678.37' @ 12.90 hrs Surf.Area= 2,400 sf Storage= 2,516 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 229.7 min (1,060.1 - 830.3)

Volume	Invert	Avail.Storage	Storage Description
#1	675.75'	2,880 cf	**10.00'W x 240.00'L x 3.00'H Soil Media and Gravel**
			7,200 cf Overall x 40.0% Voids
#2	678.75'	300 cf	**10.00'W x 240.00'L x 0.25'H Mulch**
			600 cf Overall x 50.0% Voids
#3	679.00'	6,843 cf	**10.00'W x 240.00'L x 2.00'H Ponding Z=2.0**
		10,023 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	675.75'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	677.75'	**6.0" Round Culvert X 4.00**
			L= 10.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 677.75' / 677.65' S= 0.0100 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	677.75'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600
			Limited to weir flow at low heads
#4	Device 2	678.25'	**5.0" Vert. Orifice/Grate X 4.00** C= 0.600
			Limited to weir flow at low heads
#5	Device 2	680.50'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600
			Limited to weir flow at low heads
#6	Secondary	680.50'	**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

Discarded OutFlow Max=0.06 cfs @ 11.65 hrs HW=675.80' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.46 cfs @ 12.90 hrs HW=678.37' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.46 cfs of 2.11 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.31 cfs @ 3.53 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 0.16 cfs @ 1.19 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=675.75' TW=0.00' (Dynamic Tailwater)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG12: Rain Garden 12

Inflow Area = 10,675 sf, 65.00% Impervious, Inflow Depth = 1.79" for 2YearMass event
Inflow = 0.51 cfs @ 12.09 hrs, Volume= 1,594 cf
Outflow = 0.35 cfs @ 12.18 hrs, Volume= 1,594 cf, Atten= 31%, Lag= 5.2 min
Primary = 0.35 cfs @ 12.18 hrs, Volume= 1,594 cf
Routed to Pond RG-4.2 : Rain Garden 4.2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 688.86' @ 12.18 hrs Surf.Area= 240 sf Storage= 279 cf

Plug-Flow detention time= 16.7 min calculated for 1,593 cf (100% of inflow)
Center-of-Mass det. time= 16.7 min (842.6 - 825.9)

Volume	Invert	Avail.Storage	Storage Description
#1	686.25'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	686.25'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	689.25'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	689.50'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	686.25'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 686.25' / 686.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	690.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	686.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	688.50'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.35 cfs @ 12.18 hrs HW=688.86' TW=676.51' (Dynamic Tailwater)
1=Culvert (Passes 0.35 cfs of 1.45 cfs potential flow)
2=Orifice/Grate (Controls 0.00 cfs)
3=Orifice/Grate (Orifice Controls 0.17 cfs @ 7.65 fps)
4=Orifice/Grate (Orifice Controls 0.18 cfs @ 2.10 fps)

Summary for Pond RG13: Rain Garden 13

Inflow Area = 9,545 sf, 65.00% Impervious, Inflow Depth = 1.87" for 2YearMass event
Inflow = 0.50 cfs @ 12.07 hrs, Volume= 1,487 cf
Outflow = 0.32 cfs @ 12.16 hrs, Volume= 1,487 cf, Atten= 35%, Lag= 5.2 min
Primary = 0.32 cfs @ 12.16 hrs, Volume= 1,487 cf
Routed to Pond RG-4.2 : Rain Garden 4.2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 697.31' @ 12.16 hrs Surf.Area= 240 sf Storage= 264 cf

Plug-Flow detention time= 16.3 min calculated for 1,487 cf (100% of inflow)
Center-of-Mass det. time= 16.2 min (837.2 - 821.1)

Volume	Invert	Avail.Storage	Storage Description
#1	694.75'	31 cf	**12.0" Round Pipe Storage** Inside #2 L= 40.0'
#2	694.75'	275 cf	**6.00'W x 40.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 31 cf Embedded = 689 cf x 40.0% Voids
#3	697.75'	30 cf	**6.00'W x 40.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	698.00'	337 cf	**6.00'W x 40.00'L x 1.00'H Ponding Z=2.0**
		674 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	694.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 694.75' / 694.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	698.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	694.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	697.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.32 cfs @ 12.16 hrs HW=697.31' TW=676.39' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.32 cfs of 1.44 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.17 cfs @ 7.57 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.16 cfs @ 1.89 fps)

Summary for Pond RG51: Rain Garden 51

Inflow Area = 9,105 sf, 65.00% Impervious, Inflow Depth = 1.87" for 2YearMass event
Inflow = 0.48 cfs @ 12.07 hrs, Volume= 1,419 cf
Outflow = 0.28 cfs @ 12.18 hrs, Volume= 1,419 cf, Atten= 42%, Lag= 6.2 min
Primary = 0.28 cfs @ 12.18 hrs, Volume= 1,419 cf
Routed to Pond RG-4.2 : Rain Garden 4.2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 694.24' @ 12.18 hrs Surf.Area= 240 sf Storage= 268 cf

Plug-Flow detention time= 17.4 min calculated for 1,418 cf (100% of inflow)
Center-of-Mass det. time= 17.3 min (838.4 - 821.1)

Volume	Invert	Avail.Storage	Storage Description
#1	691.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	691.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	694.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	695.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	691.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 691.75' / 691.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	695.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	691.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	694.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.28 cfs @ 12.18 hrs HW=694.24' TW=676.49' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.28 cfs of 1.42 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.16 cfs @ 7.47 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.11 cfs @ 1.68 fps)

Summary for Pond RG57-59: Rain Gardens 57,58,59

Inflow Area = 20,938 sf, 65.00% Impervious, Inflow Depth = 1.79" for 2YearMass event
Inflow = 1.05 cfs @ 12.07 hrs, Volume= 3,126 cf
Outflow = 0.52 cfs @ 12.22 hrs, Volume= 3,127 cf, Atten= 50%, Lag= 8.6 min
Discarded = 0.04 cfs @ 11.37 hrs, Volume= 2,092 cf
Primary = 0.48 cfs @ 12.22 hrs, Volume= 1,035 cf
Routed to Pond RG-4.2 : Rain Garden 4.2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 689.94' @ 12.22 hrs Surf.Area= 720 sf Storage= 860 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 118.0 min (942.6 - 824.6)

Volume	Invert	Avail.Storage	Storage Description
#1	687.25'	141 cf	**12.0" Round Pipe Storage** x 3 Inside #2 L= 60.0'
#2	687.25'	807 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	690.25'	90 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 3 180 cf Overall x 50.0% Voids
#4	690.50'	1,120 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 3
		2,159 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	687.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	689.25'	**6.0" Round Culvert X 3.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.25' / 689.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	691.00'	**6.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	689.25'	**2.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	689.75'	**4.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 11.37 hrs HW=687.29' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.48 cfs @ 12.22 hrs HW=689.94' TW=676.73' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.48 cfs of 1.89 cfs potential flow)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Orifice Controls 0.25 cfs @ 3.76 fps)
  └─**5=Orifice/Grate** (Orifice Controls 0.24 cfs @ 1.50 fps)

Summary for Pond RG6-7: Rain Gardens 6,7

Inflow Area = 23,445 sf, 65.00% Impervious, Inflow Depth = 1.79" for 2YearMass event
Inflow = 1.17 cfs @ 12.07 hrs, Volume= 3,501 cf
Outflow = 0.62 cfs @ 12.20 hrs, Volume= 3,500 cf, Atten= 47%, Lag= 7.5 min
Primary = 0.62 cfs @ 12.20 hrs, Volume= 3,500 cf
Routed to Pond RG-4.1 : Rain Garden 4.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 678.60' @ 12.20 hrs Surf.Area= 600 sf Storage= 500 cf

Plug-Flow detention time= 11.4 min calculated for 3,500 cf (100% of inflow)
Center-of-Mass det. time= 11.3 min (835.9 - 824.6)

Volume	Invert	Avail.Storage	Storage Description
#1	676.75'	94 cf	**12.0" Round Pipe Storage** x 2 Inside #2 L= 60.0'
#2	676.75'	682 cf	**5.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 2 1,800 cf Overall - 94 cf Embedded = 1,706 cf x 40.0% Voids
#3	679.75'	75 cf	**5.00'W x 60.00'L x 0.25'H Mulch** x 2 150 cf Overall x 50.0% Voids
#4	680.00'	871 cf	**5.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 2
		1,722 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	676.75'	**6.0" Round Culvert X 2.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 676.75' / 676.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

#2	Device 1	680.50'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	676.75'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	679.00'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.62 cfs @ 12.20 hrs HW=678.60' TW=670.23' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.62 cfs of 2.39 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.62 cfs @ 6.32 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond RG60-64: Rain Gardens 60-64

Inflow Area = 34,320 sf, 65.00% Impervious, Inflow Depth = 1.95" for 2YearMass event
Inflow = 1.87 cfs @ 12.07 hrs, Volume= 5,578 cf
Outflow = 1.12 cfs @ 12.17 hrs, Volume= 5,579 cf, Atten= 40%, Lag= 5.9 min
Discarded = 0.07 cfs @ 11.22 hrs, Volume= 3,599 cf
Primary = 0.84 cfs @ 12.17 hrs, Volume= 1,584 cf
Routed to Pond RG-4.1 : Rain Garden 4.1
Secondary = 0.21 cfs @ 12.17 hrs, Volume= 396 cf
Routed to Pond RG-4.2 : Rain Garden 4.2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 686.51' @ 12.17 hrs Surf.Area= 1,200 sf Storage= 1,465 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 112.3 min (929.7 - 817.4)

Volume	Invert	Avail.Storage	Storage Description
#1	683.75'	236 cf	**12.0" Round Pipe Storage** x 5 Inside #2 L= 60.0'
#2	683.75'	1,346 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 5 3,600 cf Overall - 236 cf Embedded = 3,364 cf x 40.0% Voids
#3	686.75'	150 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 5 300 cf Overall x 50.0% Voids
#4	687.00'	1,867 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 5
		3,598 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	683.75'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	685.75'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 684.65' S= 0.1100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Secondary	685.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 684.65' S= 0.1100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#4	Device 2	687.50'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600

			Limited to weir flow at low heads
#5	Device 3	687.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 2	685.75'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#7	Device 3	685.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#8	Device 2	686.25'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#9	Device 3	686.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.07 cfs @ 11.22 hrs HW=683.79' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.84 cfs @ 12.17 hrs HW=686.51' TW=670.07' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.84 cfs of 2.69 cfs potential flow)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  ├─**6=Orifice/Grate** (Orifice Controls 0.34 cfs @ 3.95 fps)
  └─**8=Orifice/Grate** (Orifice Controls 0.50 cfs @ 1.73 fps)

Secondary OutFlow Max=0.21 cfs @ 12.17 hrs HW=686.51' TW=676.45' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.21 cfs of 0.67 cfs potential flow)
  ├─**5=Orifice/Grate** (Controls 0.00 cfs)
  ├─**7=Orifice/Grate** (Orifice Controls 0.09 cfs @ 3.95 fps)
  └─**9=Orifice/Grate** (Orifice Controls 0.12 cfs @ 1.73 fps)

Summary for Pond RG65: Rain Gardens 65

Inflow Area = 4,070 sf,100.00% Impervious, Inflow Depth = 3.01" for 2YearMass event
Inflow = 0.30 cfs @ 12.07 hrs, Volume= 1,020 cf
Outflow = 0.30 cfs @ 12.09 hrs, Volume= 990 cf, Atten= 2%, Lag= 0.9 min
Discarded = 0.00 cfs @ 4.30 hrs, Volume= 176 cf
Primary = 0.30 cfs @ 12.09 hrs, Volume= 814 cf
Routed to Pond RG-4.1 : Rain Garden 4.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 677.65' @ 12.09 hrs Surf.Area= 75 sf Storage= 94 cf

Plug-Flow detention time= 72.9 min calculated for 990 cf (97% of inflow)
Center-of-Mass det. time= 54.8 min (810.1 - 755.2)

Volume	Invert	Avail.Storage	Storage Description
#1	674.75'	12 cf	**12.0" Round Pipe Storage** Inside #2 L= 15.0'
#2	674.75'	85 cf	**5.00'W x 15.00'L x 3.00'H Soil Media and Gravel** 225 cf Overall - 12 cf Embedded = 213 cf x 40.0% Voids
#3	677.75'	9 cf	**5.00'W x 15.00'L x 0.25'H Mulch** 19 cf Overall x 50.0% Voids
#4	678.00'	120 cf	**5.00'W x 15.00'L x 1.00'H Ponding Z=2.0**
		227 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	674.75'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	676.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 676.75' / 675.15' S= 0.1600 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	678.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	676.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	677.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 4.30 hrs HW=674.77' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.30 cfs @ 12.09 hrs HW=677.65' TW=669.63' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.30 cfs of 0.76 cfs potential flow)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Orifice Controls 0.09 cfs @ 4.34 fps)
  └─**5=Orifice/Grate** (Orifice Controls 0.20 cfs @ 2.31 fps)

Summary for Pond RG8-11: Rain Gardens 8-11

Inflow Area = 31,000 sf, 65.00% Impervious, Inflow Depth = 1.79" for 2YearMass event
Inflow = 1.55 cfs @ 12.07 hrs, Volume= 4,629 cf
Outflow = 0.57 cfs @ 12.34 hrs, Volume= 4,627 cf, Atten= 64%, Lag= 16.1 min
Primary = 0.57 cfs @ 12.34 hrs, Volume= 4,627 cf
Routed to Pond RG-4.1 : Rain Garden 4.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 677.64' @ 12.34 hrs Surf.Area= 1,200 sf Storage= 1,021 cf

Plug-Flow detention time= 21.4 min calculated for 4,626 cf (100% of inflow)
Center-of-Mass det. time= 21.2 min (845.9 - 824.6)

Volume	Invert	Avail.Storage	Storage Description
#1	675.75'	188 cf	**12.0" Round Pipe Storage** x 4 Inside #2 L= 60.0'
#2	675.75'	1,365 cf	**5.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 4 3,600 cf Overall - 188 cf Embedded = 3,412 cf x 40.0% Voids
#3	678.75'	150 cf	**5.00'W x 60.00'L x 0.25'H Mulch** x 4 300 cf Overall x 50.0% Voids
#4	679.00'	1,741 cf	**5.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 4
		3,444 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	675.75'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 675.75' / 675.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	679.50'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

#3	Device 1	675.75'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	678.00'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.57 cfs @ 12.34 hrs HW=677.64' TW=670.92' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.57 cfs of 4.85 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.57 cfs @ 6.48 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Link AP4-P: AP4 - To Wetland A (A32-A47)

Inflow Area = 299,623 sf, 31.52% Impervious, Inflow Depth = 0.69" for 2YearMass event
Inflow = 2.76 cfs @ 12.11 hrs, Volume= 17,309 cf
Primary = 2.76 cfs @ 12.11 hrs, Volume= 17,309 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Subcatchment P4.1: To Wetland A (A32-A47)

Runoff = 6.23 cfs @ 12.10 hrs, Volume= 19,942 cf, Depth= 2.58"
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
630	55	Woods, Good, HSG B
79,935	77	Woods, Good, HSG D
4,660	61	>75% Grass cover, Good, HSG B
7,645	80	>75% Grass cover, Good, HSG D
92,870	76	Weighted Average
92,870		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.2	135	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.9	185	Total			

Summary for Subcatchment P4.10: To RG4.1

Runoff = 0.79 cfs @ 12.07 hrs, Volume= 2,355 cf, Depth= 2.94"
Routed to Pond RG-4.1 : Rain Garden 4.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
9,500	80	>75% Grass cover, Good, HSG D
125	61	>75% Grass cover, Good, HSG B
9,625	80	Weighted Average
9,625		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.11: To RG4.2

Runoff = 0.52 cfs @ 12.11 hrs, Volume= 1,822 cf, Depth= 1.40"
Routed to Pond RG-4.2 : Rain Garden 4.2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
15,520	61	>75% Grass cover, Good, HSG B
110	80	>75% Grass cover, Good, HSG D
15,630	61	Weighted Average
15,630		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	150	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.0	200	Total			

Summary for Subcatchment P4.12: Lots 65

Runoff = 0.48 cfs @ 12.07 hrs, Volume= 1,632 cf, Depth= 4.81"
Routed to Pond RG65 : Rain Gardens 65

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
3,830	98	Paved roads w/curbs & sewers, HSG C
240	98	Paved roads w/curbs & sewers, HSG C
4,070	98	Weighted Average
4,070		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.13: Lots 6-8

Runoff = 2.21 cfs @ 12.07 hrs, Volume= 6,671 cf, Depth= 3.41"
Routed to Pond RG6-7 : Rain Gardens 6,7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
23,175	85	1/8 acre lots, 65% imp, HSG B
270	90	1/8 acre lots, 65% imp, HSG C
23,445	85	Weighted Average
8,206		35.00% Pervious Area
15,239		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.2: Lots 57-60

Runoff = 1.97 cfs @ 12.07 hrs, Volume= 5,957 cf, Depth= 3.41"
Routed to Pond RG57-59 : Rain Gardens 57,58,59

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
20,938	85	1/8 acre lots, 65% imp, HSG B
7,328		35.00% Pervious Area
13,610		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.4: Lots 60-65

Runoff = 3.40 cfs @ 12.07 hrs, Volume= 10,337 cf, Depth= 3.61"
Routed to Pond RG60-64 : Rain Gardens 60-64

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
21,420	85	1/8 acre lots, 65% imp, HSG B
9,605	92	1/8 acre lots, 65% imp, HSG D
3,295	90	1/8 acre lots, 65% imp, HSG C
34,320	87	Weighted Average
12,012		35.00% Pervious Area
22,308		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.5: Lots 8-12

Runoff = 2.92 cfs @ 12.07 hrs, Volume= 8,820 cf, Depth= 3.41"
Routed to Pond RG8-11 : Rain Gardens 8-11

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
31,000	85	1/8 acre lots, 65% imp, HSG B
10,850		35.00% Pervious Area
20,150		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.6: Lots 12-13

Runoff = 0.96 cfs @ 12.09 hrs, Volume= 3,037 cf, Depth= 3.41"
Routed to Pond RG12 : Rain Garden 12

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
10,675	85	1/8 acre lots, 65% imp, HSG B
3,736		35.00% Pervious Area
6,939		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.1200	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	30	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.4	80	Total			

Summary for Subcatchment P4.7: Lot 13

Runoff = 0.92 cfs @ 12.07 hrs, Volume= 2,795 cf, Depth= 3.51"
Routed to Pond RG13 : Rain Garden 13

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
7,505	85	1/8 acre lots, 65% imp, HSG B
2,040	90	1/8 acre lots, 65% imp, HSG C
9,545	86	Weighted Average
3,341		35.00% Pervious Area
6,204		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.8: Upgradient Lots 8-12

Runoff = 0.66 cfs @ 12.26 hrs, Volume= 3,416 cf, Depth= 1.07"
Routed to Pond IT-8/12 : Interceptor Trench

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
3,850	61	>75% Grass cover, Good, HSG B
34,550	55	Woods, Good, HSG B
38,400	56	Weighted Average
38,400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
3.5	280	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.2	330	Total			

Summary for Subcatchment P4.9: Lot 51

Runoff = 0.88 cfs @ 12.07 hrs, Volume= 2,666 cf, Depth= 3.51"
Routed to Pond RG51 : Rain Garden 51

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
1,910	90	1/8 acre lots, 65% imp, HSG C
7,195	85	1/8 acre lots, 65% imp, HSG B
9,105	86	Weighted Average
3,187		35.00% Pervious Area
5,918		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Pond IT-8/12: Interceptor Trench

Inflow Area = 38,400 sf, 0.00% Impervious, Inflow Depth = 1.07" for 10YearMass event
Inflow = 0.66 cfs @ 12.26 hrs, Volume= 3,416 cf
Outflow = 0.60 cfs @ 12.36 hrs, Volume= 3,413 cf, Atten= 9%, Lag= 6.0 min
Primary = 0.60 cfs @ 12.36 hrs, Volume= 3,413 cf
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 680.76' @ 12.36 hrs Surf.Area= 1,050 sf Storage= 250 cf

Plug-Flow detention time= 15.0 min calculated for 3,413 cf (100% of inflow)
Center-of-Mass det. time= 14.6 min (912.1 - 897.5)

Volume	Invert	Avail.Storage	Storage Description
#1	680.30'	1,211 cf	**3.00'W x 350.00'L x 3.00'H Prismatoid** 3,150 cf Overall - 122 cf Embedded = 3,028 cf x 40.0% Voids
#2	680.30'	122 cf	**8.0" Round Pipe Storage** Inside #1 L= 350.0'
		1,333 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	680.30'	**8.0" Round Culvert** L= 224.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 680.30' / 668.00' S= 0.0549 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.60 cfs @ 12.36 hrs HW=680.76' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.60 cfs @ 2.32 fps)

Summary for Pond RG-4.1: Rain Garden 4.1

Inflow Area = 102,460 sf, 60.28% Impervious, Inflow Depth = 2.79" for 10YearMass event
Inflow = 6.59 cfs @ 12.12 hrs, Volume= 23,821 cf
Outflow = 2.23 cfs @ 12.50 hrs, Volume= 22,783 cf, Atten= 66%, Lag= 22.7 min
Discarded = 0.28 cfs @ 12.50 hrs, Volume= 8,179 cf
Primary = 1.95 cfs @ 12.50 hrs, Volume= 14,605 cf
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 672.80' @ 12.50 hrs Surf.Area= 11,989 sf Storage= 8,255 cf

Plug-Flow detention time= 134.7 min calculated for 22,783 cf (96% of inflow)
Center-of-Mass det. time= 110.5 min (918.0 - 807.5)

Volume	Invert	Avail.Storage	Storage Description
#1	668.75'	4,488 cf	**17.00'W x 220.00'L x 3.00'H Soil Media and Gravel** 11,220 cf Overall x 40.0% Voids
#2	671.75'	468 cf	**17.00'W x 220.00'L x 0.25'H Mulch** 935 cf Overall x 50.0% Voids
#3	672.00'	9,419 cf	**17.00'W x 220.00'L x 2.00'H Ponding Z=2.0**
		14,374 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	668.75'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	670.75'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 670.75' / 670.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Primary	670.75'	**10.0" Round Culvert X 3.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 670.75' / 670.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#4	Device 2	670.75'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	671.25'	**3.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#6	Device 2	672.75'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#7	Device 3	673.25'	**10.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#8	Secondary	673.50'	**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

Discarded OutFlow Max=0.28 cfs @ 12.50 hrs HW=672.80' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.28 cfs)

Primary OutFlow Max=1.95 cfs @ 12.50 hrs HW=672.80' TW=0.00' (Dynamic Tailwater)
├─**2=Culvert** (Passes 1.95 cfs of 5.07 cfs potential flow)
│ ├─**4=Orifice/Grate** (Orifice Controls 0.59 cfs @ 6.75 fps)
│ ├─**5=Orifice/Grate** (Orifice Controls 1.13 cfs @ 5.75 fps)
│ └─**6=Orifice/Grate** (Weir Controls 0.23 cfs @ 0.73 fps)
└─**3=Culvert** (Passes 0.00 cfs of 10.07 cfs potential flow)
  └─**7=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=668.75' TW=0.00' (Dynamic Tailwater)
└─**8=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG-4.2: Rain Garden 4.2

Inflow Area = 65,893 sf, 49.58% Impervious, Inflow Depth = 2.68" for 10YearMass event
Inflow = 4.26 cfs @ 12.13 hrs, Volume= 14,701 cf
Outflow = 2.87 cfs @ 12.34 hrs, Volume= 14,095 cf, Atten= 33%, Lag= 12.2 min
Discarded = 0.17 cfs @ 12.34 hrs, Volume= 4,569 cf
Primary = 2.69 cfs @ 12.34 hrs, Volume= 9,526 cf
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 679.17' @ 12.34 hrs Surf.Area= 7,366 sf Storage= 3,590 cf

Plug-Flow detention time= 121.6 min calculated for 14,095 cf (96% of inflow)
Center-of-Mass det. time= 99.0 min (909.3 - 810.4)

Volume	Invert	Avail.Storage	Storage Description
#1	675.75'	2,880 cf	**10.00'W x 240.00'L x 3.00'H Soil Media and Gravel** 7,200 cf Overall x 40.0% Voids
#2	678.75'	300 cf	**10.00'W x 240.00'L x 0.25'H Mulch** 600 cf Overall x 50.0% Voids
#3	679.00'	6,843 cf	**10.00'W x 240.00'L x 2.00'H Ponding Z=2.0**
		10,023 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	675.75'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	677.75'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.75' / 677.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	677.75'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	678.25'	**5.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	680.50'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#6	Secondary	680.50'	**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

Discarded OutFlow Max=0.17 cfs @ 12.34 hrs HW=679.16' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.17 cfs)

Primary OutFlow Max=2.69 cfs @ 12.34 hrs HW=679.16' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 2.69 cfs of 4.08 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.48 cfs @ 5.56 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 2.21 cfs @ 4.05 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=675.75' TW=0.00' (Dynamic Tailwater)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG12: Rain Garden 12

```
Inflow Area =        10,675 sf, 65.00% Impervious, Inflow Depth = 3.41"  for 10YearMass event
Inflow    =     0.96 cfs @  12.09 hrs, Volume=        3,037 cf
Outflow   =     0.65 cfs @  12.18 hrs, Volume=        3,037 cf, Atten= 32%, Lag= 5.3 min
Primary   =     0.65 cfs @  12.18 hrs, Volume=        3,037 cf
   Routed to Pond RG-4.2 : Rain Garden 4.2
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 689.83' @ 12.18 hrs Surf.Area= 806 sf Storage= 439 cf

Plug-Flow detention time= 14.6 min calculated for 3,036 cf (100% of inflow)
Center-of-Mass det. time= 14.6 min (822.1 - 807.5)

Volume	Invert	Avail.Storage	Storage Description
#1	686.25'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	686.25'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	689.25'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	689.50'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	686.25'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 686.25' / 686.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	690.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	686.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	688.50'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.65 cfs @ 12.18 hrs HW=689.83' TW=678.97' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.65 cfs of 1.72 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.20 cfs @ 9.00 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.45 cfs @ 5.19 fps)

Summary for Pond RG13: Rain Garden 13

```
Inflow Area =         9,545 sf, 65.00% Impervious, Inflow Depth = 3.51"  for 10YearMass event
Inflow    =     0.92 cfs @  12.07 hrs, Volume=        2,795 cf
Outflow   =     0.63 cfs @  12.15 hrs, Volume=        2,795 cf, Atten= 31%, Lag= 4.6 min
Primary   =     0.63 cfs @  12.15 hrs, Volume=        2,795 cf
   Routed to Pond RG-4.2 : Rain Garden 4.2
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 698.25' @ 12.15 hrs Surf.Area= 768 sf Storage= 404 cf

Plug-Flow detention time= 14.0 min calculated for 2,795 cf (100% of inflow)
Center-of-Mass det. time= 14.0 min (817.1 - 803.1)

Volume	Invert	Avail.Storage	Storage Description
#1	694.75'	31 cf	**12.0" Round Pipe Storage** Inside #2 L= 40.0'
#2	694.75'	275 cf	**6.00'W x 40.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 31 cf Embedded = 689 cf x 40.0% Voids
#3	697.75'	30 cf	**6.00'W x 40.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	698.00'	337 cf	**6.00'W x 40.00'L x 1.00'H Ponding Z=2.0**
		674 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	694.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 694.75' / 694.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	698.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	694.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	697.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.63 cfs @ 12.15 hrs HW=698.25' TW=678.79' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.63 cfs of 1.71 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.19 cfs @ 8.90 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.44 cfs @ 5.02 fps)

Summary for Pond RG51: Rain Garden 51

Inflow Area = 9,105 sf, 65.00% Impervious, Inflow Depth = 3.51" for 10YearMass event
Inflow = 0.88 cfs @ 12.07 hrs, Volume= 2,666 cf
Outflow = 0.62 cfs @ 12.15 hrs, Volume= 2,666 cf, Atten= 30%, Lag= 4.5 min
Primary = 0.62 cfs @ 12.15 hrs, Volume= 2,666 cf
Routed to Pond RG-4.2 : Rain Garden 4.2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 695.18' @ 12.15 hrs Surf.Area= 768 sf Storage= 395 cf

Plug-Flow detention time= 14.8 min calculated for 2,665 cf (100% of inflow)
Center-of-Mass det. time= 14.8 min (817.9 - 803.1)

Volume	Invert	Avail.Storage	Storage Description
#1	691.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	691.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	694.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	695.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	691.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 691.75' / 691.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	695.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	691.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	694.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.62 cfs @ 12.15 hrs HW=695.18' TW=678.77' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.62 cfs of 1.69 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.19 cfs @ 8.81 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.42 cfs @ 4.85 fps)

Summary for Pond RG57-59: Rain Gardens 57,58,59

Inflow Area = 20,938 sf, 65.00% Impervious, Inflow Depth = 3.41" for 10YearMass event
Inflow = 1.97 cfs @ 12.07 hrs, Volume= 5,957 cf
Outflow = 1.52 cfs @ 12.13 hrs, Volume= 5,958 cf, Atten= 23%, Lag= 3.7 min
Discarded = 0.12 cfs @ 12.13 hrs, Volume= 2,717 cf
Primary = 1.40 cfs @ 12.13 hrs, Volume= 3,241 cf
Routed to Pond RG-4.2 : Rain Garden 4.2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 690.60' @ 12.13 hrs Surf.Area= 2,240 sf Storage= 1,117 cf

Plug-Flow detention time= 86.8 min calculated for 5,956 cf (100% of inflow)
Center-of-Mass det. time= 86.9 min (893.1 - 806.2)

Volume	Invert	Avail.Storage	Storage Description
#1	687.25'	141 cf	**12.0" Round Pipe Storage** x 3 Inside #2 L= 60.0'
#2	687.25'	807 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	690.25'	90 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 3 180 cf Overall x 50.0% Voids
#4	690.50'	1,120 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 3
		2,159 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	687.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	689.25'	**6.0" Round Culvert X 3.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.25' / 689.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	691.00'	**6.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	689.25'	**2.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	689.75'	**4.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.12 cfs @ 12.13 hrs HW=690.60' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=1.40 cfs @ 12.13 hrs HW=690.60' TW=678.66' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.40 cfs of 2.98 cfs potential flow)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Orifice Controls 0.36 cfs @ 5.42 fps)
  └─**5=Orifice/Grate** (Orifice Controls 1.04 cfs @ 3.99 fps)

Summary for Pond RG6-7: Rain Gardens 6,7

Inflow Area = 23,445 sf, 65.00% Impervious, Inflow Depth = 3.41" for 10YearMass event
Inflow = 2.21 cfs @ 12.07 hrs, Volume= 6,671 cf
Outflow = 1.61 cfs @ 12.14 hrs, Volume= 6,670 cf, Atten= 27%, Lag= 4.1 min
Primary = 1.61 cfs @ 12.14 hrs, Volume= 6,670 cf
Routed to Pond RG-4.1 : Rain Garden 4.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 680.01' @ 12.14 hrs Surf.Area= 1,806 sf Storage= 858 cf

Plug-Flow detention time= 10.2 min calculated for 6,668 cf (100% of inflow)
Center-of-Mass det. time= 10.2 min (816.4 - 806.2)

Volume	Invert	Avail.Storage	Storage Description
#1	676.75'	94 cf	**12.0" Round Pipe Storage** x 2 Inside #2 L= 60.0'
#2	676.75'	682 cf	**5.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 2 1,800 cf Overall - 94 cf Embedded = 1,706 cf x 40.0% Voids
#3	679.75'	75 cf	**5.00'W x 60.00'L x 0.25'H Mulch** x 2 150 cf Overall x 50.0% Voids
#4	680.00'	871 cf	**5.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 2
		1,722 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	676.75'	**6.0" Round Culvert X 2.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 676.75' / 676.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

#2	Device 1	680.50'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	676.75'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	679.00'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.61 cfs @ 12.14 hrs HW=680.01' TW=672.10' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.61 cfs of 3.28 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.84 cfs @ 8.53 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.77 cfs @ 4.42 fps)

Summary for Pond RG60-64: Rain Gardens 60-64

Inflow Area = 34,320 sf, 65.00% Impervious, Inflow Depth = 3.61" for 10YearMass event
Inflow = 3.40 cfs @ 12.07 hrs, Volume= 10,337 cf
Outflow = 2.59 cfs @ 12.14 hrs, Volume= 10,337 cf, Atten= 24%, Lag= 3.8 min
Discarded = 0.21 cfs @ 12.14 hrs, Volume= 4,639 cf
Primary = 1.90 cfs @ 12.14 hrs, Volume= 4,559 cf
Routed to Pond RG-4.1 : Rain Garden 4.1
Secondary = 0.47 cfs @ 12.14 hrs, Volume= 1,140 cf
Routed to Pond RG-4.2 : Rain Garden 4.2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 687.13' @ 12.14 hrs Surf.Area= 3,770 sf Storage= 1,901 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 84.5 min (884.5 - 799.9)

Volume	Invert	Avail.Storage	Storage Description
#1	683.75'	236 cf	**12.0" Round Pipe Storage** x 5 Inside #2 L= 60.0'
#2	683.75'	1,346 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 5 3,600 cf Overall - 236 cf Embedded = 3,364 cf x 40.0% Voids
#3	686.75'	150 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 5 300 cf Overall x 50.0% Voids
#4	687.00'	1,867 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 5
		3,598 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	683.75'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	685.75'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 684.65' S= 0.1100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Secondary	685.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 684.65' S= 0.1100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#4	Device 2	687.50'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600

			Limited to weir flow at low heads
#5	Device 3	687.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 2	685.75'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#7	Device 3	685.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#8	Device 2	686.25'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#9	Device 3	686.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.21 cfs @ 12.14 hrs HW=687.13' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=1.90 cfs @ 12.14 hrs HW=687.13' TW=672.07' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.90 cfs of 4.02 cfs potential flow)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  ├─**6=Orifice/Grate** (Orifice Controls 0.48 cfs @ 5.49 fps)
  └─**8=Orifice/Grate** (Orifice Controls 1.42 cfs @ 4.07 fps)

Secondary OutFlow Max=0.47 cfs @ 12.14 hrs HW=687.13' TW=678.67' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.47 cfs of 1.01 cfs potential flow)
  ├─**5=Orifice/Grate** (Controls 0.00 cfs)
  ├─**7=Orifice/Grate** (Orifice Controls 0.12 cfs @ 5.49 fps)
  └─**9=Orifice/Grate** (Orifice Controls 0.36 cfs @ 4.07 fps)

Summary for Pond RG65: Rain Gardens 65

Inflow Area = 4,070 sf,100.00% Impervious, Inflow Depth = 4.81" for 10YearMass event
Inflow = 0.48 cfs @ 12.07 hrs, Volume= 1,632 cf
Outflow = 0.45 cfs @ 12.10 hrs, Volume= 1,602 cf, Atten= 6%, Lag= 1.7 min
Discarded = 0.01 cfs @ 12.10 hrs, Volume= 184 cf
Primary = 0.44 cfs @ 12.10 hrs, Volume= 1,418 cf
Routed to Pond RG-4.1 : Rain Garden 4.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 678.03' @ 12.10 hrs Surf.Area= 227 sf Storage= 108 cf

Plug-Flow detention time= 51.9 min calculated for 1,602 cf (98% of inflow)
Center-of-Mass det. time= 39.9 min (786.8 - 746.9)

Volume	Invert	Avail.Storage	Storage Description
#1	674.75'	12 cf	**12.0" Round Pipe Storage** Inside #2 L= 15.0'
#2	674.75'	85 cf	**5.00'W x 15.00'L x 3.00'H Soil Media and Gravel** 225 cf Overall - 12 cf Embedded = 213 cf x 40.0% Voids
#3	677.75'	9 cf	**5.00'W x 15.00'L x 0.25'H Mulch** 19 cf Overall x 50.0% Voids
#4	678.00'	120 cf	**5.00'W x 15.00'L x 1.00'H Ponding Z=2.0**
		227 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	674.75'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	676.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 676.75' / 675.15' S= 0.1600 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	678.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	676.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	677.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 12.10 hrs HW=678.03' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.44 cfs @ 12.10 hrs HW=678.03' TW=671.76' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.44 cfs of 0.96 cfs potential flow)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.26 fps)
  └─**5=Orifice/Grate** (Orifice Controls 0.33 cfs @ 3.76 fps)

Summary for Pond RG8-11: Rain Gardens 8-11

Inflow Area = 31,000 sf, 65.00% Impervious, Inflow Depth = 3.41" for 10YearMass event
Inflow = 2.92 cfs @ 12.07 hrs, Volume= 8,820 cf
Outflow = 2.03 cfs @ 12.15 hrs, Volume= 8,819 cf, Atten= 30%, Lag= 4.5 min
Primary = 2.03 cfs @ 12.15 hrs, Volume= 8,819 cf
Routed to Pond RG-4.1 : Rain Garden 4.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 678.78' @ 12.15 hrs Surf.Area= 2,400 sf Storage= 1,569 cf

Plug-Flow detention time= 19.0 min calculated for 8,816 cf (100% of inflow)
Center-of-Mass det. time= 19.0 min (825.2 - 806.2)

Volume	Invert	Avail.Storage	Storage Description
#1	675.75'	188 cf	**12.0" Round Pipe Storage** x 4 Inside #2 L= 60.0'
#2	675.75'	1,365 cf	**5.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 4 3,600 cf Overall - 188 cf Embedded = 3,412 cf x 40.0% Voids
#3	678.75'	150 cf	**5.00'W x 60.00'L x 0.25'H Mulch** x 4 300 cf Overall x 50.0% Voids
#4	679.00'	1,741 cf	**5.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 4
		3,444 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	675.75'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 675.75' / 675.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	679.50'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

#3	Device 1	675.75'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	678.00'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.03 cfs @ 12.15 hrs HW=678.78' TW=672.13' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.03 cfs of 6.30 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.72 cfs @ 8.26 fps)
  └─**4=Orifice/Grate** (Orifice Controls 1.31 cfs @ 3.76 fps)

Summary for Link AP4-P: AP4 - To Wetland A (A32-A47)

Inflow Area = 299,623 sf, 31.52% Impervious, Inflow Depth = 1.90" for 10YearMass event
Inflow = 8.89 cfs @ 12.15 hrs, Volume= 47,486 cf
Primary = 8.89 cfs @ 12.15 hrs, Volume= 47,486 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Subcatchment P4.1: To Wetland A (A32-A47)

Runoff = 8.56 cfs @ 12.10 hrs, Volume= 27,365 cf, Depth= 3.54"
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
630	55	Woods, Good, HSG B
79,935	77	Woods, Good, HSG D
4,660	61	>75% Grass cover, Good, HSG B
7,645	80	>75% Grass cover, Good, HSG D
92,870	76	Weighted Average
92,870		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.2	135	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.9	185	Total			

Summary for Subcatchment P4.10: To RG4.1

Runoff = 1.05 cfs @ 12.07 hrs, Volume= 3,163 cf, Depth= 3.94"
Routed to Pond RG-4.1 : Rain Garden 4.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
9,500	80	>75% Grass cover, Good, HSG D
125	61	>75% Grass cover, Good, HSG B
9,625	80	Weighted Average
9,625		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.11: To RG4.2

Runoff = 0.83 cfs @ 12.11 hrs, Volume= 2,770 cf, Depth= 2.13"
Routed to Pond RG-4.2 : Rain Garden 4.2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
15,520	61	>75% Grass cover, Good, HSG B
110	80	>75% Grass cover, Good, HSG D
15,630	61	Weighted Average
15,630		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	150	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.0	200	Total			

Summary for Subcatchment P4.12: Lots 65

Runoff = 0.59 cfs @ 12.07 hrs, Volume= 2,015 cf, Depth= 5.94"
Routed to Pond RG65 : Rain Gardens 65

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
3,830	98	Paved roads w/curbs & sewers, HSG C
240	98	Paved roads w/curbs & sewers, HSG C
4,070	98	Weighted Average
4,070		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.13: Lots 6-8

Runoff = 2.86 cfs @ 12.07 hrs, Volume= 8,738 cf, Depth= 4.47"
Routed to Pond RG6-7 : Rain Gardens 6,7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
23,175	85	1/8 acre lots, 65% imp, HSG B
270	90	1/8 acre lots, 65% imp, HSG C
23,445	85	Weighted Average
8,206		35.00% Pervious Area
15,239		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.2: Lots 57-60

Runoff = 2.56 cfs @ 12.07 hrs, Volume= 7,804 cf, Depth= 4.47"
Routed to Pond RG57-59 : Rain Gardens 57,58,59

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
20,938	85	1/8 acre lots, 65% imp, HSG B
7,328		35.00% Pervious Area
13,610		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.4: Lots 60-65

Runoff = 4.35 cfs @ 12.07 hrs, Volume= 13,412 cf, Depth= 4.69"
Routed to Pond RG60-64 : Rain Gardens 60-64

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
21,420	85	1/8 acre lots, 65% imp, HSG B
9,605	92	1/8 acre lots, 65% imp, HSG D
3,295	90	1/8 acre lots, 65% imp, HSG C
34,320	87	Weighted Average
12,012		35.00% Pervious Area
22,308		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.5: Lots 8-12

Runoff = 3.79 cfs @ 12.07 hrs, Volume= 11,554 cf, Depth= 4.47"
Routed to Pond RG8-11 : Rain Gardens 8-11

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
31,000	85	1/8 acre lots, 65% imp, HSG B
10,850		35.00% Pervious Area
20,150		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.6: Lots 12-13

Runoff = 1.24 cfs @ 12.09 hrs, Volume= 3,979 cf, Depth= 4.47"
Routed to Pond RG12 : Rain Garden 12

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
10,675	85	1/8 acre lots, 65% imp, HSG B
3,736		35.00% Pervious Area
6,939		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.1200	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	30	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.4	80	Total			

Summary for Subcatchment P4.7: Lot 13

Runoff = 1.19 cfs @ 12.07 hrs, Volume= 3,644 cf, Depth= 4.58"
Routed to Pond RG13 : Rain Garden 13

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
7,505	85	1/8 acre lots, 65% imp, HSG B
2,040	90	1/8 acre lots, 65% imp, HSG C
9,545	86	Weighted Average
3,341		35.00% Pervious Area
6,204		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.8: Upgradient Lots 8-12

Runoff = 1.17 cfs @ 12.25 hrs, Volume= 5,452 cf, Depth= 1.70"
Routed to Pond IT-8/12 : Interceptor Trench

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
3,850	61	>75% Grass cover, Good, HSG B
34,550	55	Woods, Good, HSG B
38,400	56	Weighted Average
38,400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
3.5	280	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.2	330	Total			

Summary for Subcatchment P4.9: Lot 51

Runoff = 1.13 cfs @ 12.07 hrs, Volume= 3,476 cf, Depth= 4.58"
Routed to Pond RG51 : Rain Garden 51

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
1,910	90	1/8 acre lots, 65% imp, HSG C
7,195	85	1/8 acre lots, 65% imp, HSG B
9,105	86	Weighted Average
3,187		35.00% Pervious Area
5,918		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Pond IT-8/12: Interceptor Trench

Inflow Area = 38,400 sf, 0.00% Impervious, Inflow Depth = 1.70" for 25YearMass event
Inflow = 1.17 cfs @ 12.25 hrs, Volume= 5,452 cf
Outflow = 1.06 cfs @ 12.33 hrs, Volume= 5,450 cf, Atten= 9%, Lag= 5.2 min
Primary = 1.06 cfs @ 12.33 hrs, Volume= 5,450 cf
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 681.03' @ 12.33 hrs Surf.Area= 1,050 sf Storage= 380 cf

Plug-Flow detention time= 12.1 min calculated for 5,448 cf (100% of inflow)
Center-of-Mass det. time= 11.9 min (893.3 - 881.4)

Volume	Invert	Avail.Storage	Storage Description
#1	680.30'	1,211 cf	**3.00'W x 350.00'L x 3.00'H Prismatoid** 3,150 cf Overall - 122 cf Embedded = 3,028 cf x 40.0% Voids
#2	680.30'	122 cf	**8.0" Round Pipe Storage** Inside #1 L= 350.0'
		1,333 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	680.30'	**8.0" Round Culvert** L= 224.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 680.30' / 668.00' S= 0.0549 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=1.06 cfs @ 12.33 hrs HW=681.03' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.06 cfs @ 3.03 fps)

Summary for Pond RG-4.1: Rain Garden 4.1

Inflow Area = 102,460 sf, 60.28% Impervious, Inflow Depth = 3.73" for 25YearMass event
Inflow = 7.77 cfs @ 12.12 hrs, Volume= 31,862 cf
Outflow = 4.66 cfs @ 12.40 hrs, Volume= 30,679 cf, Atten= 40%, Lag= 17.2 min
Discarded = 0.29 cfs @ 12.40 hrs, Volume= 8,714 cf
Primary = 4.37 cfs @ 12.40 hrs, Volume= 21,965 cf
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 673.17' @ 12.40 hrs Surf.Area= 12,354 sf Storage= 10,005 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 88.0 min (888.9 - 800.8)

Volume	Invert	Avail.Storage	Storage Description
#1	668.75'	4,488 cf	**17.00'W x 220.00'L x 3.00'H Soil Media and Gravel** 11,220 cf Overall x 40.0% Voids
#2	671.75'	468 cf	**17.00'W x 220.00'L x 0.25'H Mulch** 935 cf Overall x 50.0% Voids
#3	672.00'	9,419 cf	**17.00'W x 220.00'L x 2.00'H Ponding Z=2.0**
		14,374 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	668.75'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	670.75'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 670.75' / 670.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Primary	670.75'	**10.0" Round Culvert X 3.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 670.75' / 670.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#4	Device 2	670.75'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	671.25'	**3.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#6	Device 2	672.75'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#7	Device 3	673.25'	**10.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#8	Secondary	673.50'	**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

Discarded OutFlow Max=0.29 cfs @ 12.40 hrs HW=673.17' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.29 cfs)

Primary OutFlow Max=4.37 cfs @ 12.40 hrs HW=673.17' TW=0.00' (Dynamic Tailwater)
├─**2=Culvert** (Passes 4.37 cfs of 5.57 cfs potential flow)
│ ├─**4=Orifice/Grate** (Orifice Controls 0.64 cfs @ 7.37 fps)
│ ├─**5=Orifice/Grate** (Orifice Controls 1.27 cfs @ 6.46 fps)
│ └─**6=Orifice/Grate** (Orifice Controls 2.46 cfs @ 3.13 fps)
└─**3=Culvert** (Passes 0.00 cfs of 11.16 cfs potential flow)
  └─**7=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=668.75' TW=0.00' (Dynamic Tailwater)
└─**8=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG-4.2: Rain Garden 4.2

Inflow Area = 65,893 sf, 49.58% Impervious, Inflow Depth = 3.70" for 25YearMass event
Inflow = 5.35 cfs @ 12.15 hrs, Volume= 20,299 cf
Outflow = 3.53 cfs @ 12.40 hrs, Volume= 19,567 cf, Atten= 34%, Lag= 14.8 min
Discarded = 0.18 cfs @ 12.40 hrs, Volume= 4,881 cf
Primary = 3.35 cfs @ 12.40 hrs, Volume= 14,687 cf
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 679.59' @ 12.40 hrs Surf.Area= 7,796 sf Storage= 4,771 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 73.8 min (878.5 - 804.8)

Volume	Invert	Avail.Storage	Storage Description
#1	675.75'	2,880 cf	**10.00'W x 240.00'L x 3.00'H Soil Media and Gravel** 7,200 cf Overall x 40.0% Voids
#2	678.75'	300 cf	**10.00'W x 240.00'L x 0.25'H Mulch** 600 cf Overall x 50.0% Voids
#3	679.00'	6,843 cf	**10.00'W x 240.00'L x 2.00'H Ponding Z=2.0**
		10,023 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	675.75'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	677.75'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.75' / 677.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	677.75'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	678.25'	**5.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	680.50'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#6	Secondary	680.50'	**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

Discarded OutFlow Max=0.18 cfs @ 12.40 hrs HW=679.59' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.18 cfs)

Primary OutFlow Max=3.35 cfs @ 12.40 hrs HW=679.59' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 3.35 cfs of 4.77 cfs potential flow)
├─**3=Orifice/Grate** (Orifice Controls 0.56 cfs @ 6.38 fps)
├─**4=Orifice/Grate** (Orifice Controls 2.79 cfs @ 5.12 fps)
└─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=675.75' TW=0.00' (Dynamic Tailwater)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG12: Rain Garden 12

```
Inflow Area =          10,675 sf,  65.00% Impervious,  Inflow Depth =   4.47"    for  25YearMass event
Inflow      =       1.24 cfs @   12.09 hrs,  Volume=            3,979 cf
Outflow     =       0.93 cfs @   12.16 hrs,  Volume=            3,978 cf,  Atten= 25%,  Lag= 4.3 min
Primary     =       0.93 cfs @   12.16 hrs,  Volume=            3,978 cf
   Routed to Pond RG-4.2 : Rain Garden 4.2
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 690.12' @ 12.16 hrs Surf.Area= 886 sf Storage= 547 cf

Plug-Flow detention time= 14.5 min calculated for 3,977 cf (100% of inflow)
Center-of-Mass det. time= 14.5 min (814.4 - 799.9)

Volume	Invert	Avail.Storage	Storage Description
#1	686.25'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	686.25'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	689.25'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	689.50'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	686.25'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 686.25' / 686.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	690.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	686.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	688.50'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.93 cfs @ 12.16 hrs HW=690.12' TW=679.29' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.93 cfs of 1.80 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 0.22 cfs @ 1.14 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.20 cfs @ 9.37 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.51 cfs @ 5.81 fps)

Summary for Pond RG13: Rain Garden 13

```
Inflow Area =           9,545 sf,  65.00% Impervious,  Inflow Depth =   4.58"    for  25YearMass event
Inflow      =       1.19 cfs @   12.07 hrs,  Volume=            3,644 cf
Outflow     =       0.83 cfs @   12.15 hrs,  Volume=            3,643 cf,  Atten= 30%,  Lag= 4.4 min
Primary     =       0.83 cfs @   12.15 hrs,  Volume=            3,643 cf
   Routed to Pond RG-4.2 : Rain Garden 4.2
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 698.59' @ 12.15 hrs Surf.Area= 833 sf Storage= 510 cf

Plug-Flow detention time= 13.9 min calculated for 3,643 cf (100% of inflow)
Center-of-Mass det. time= 13.8 min (809.5 - 795.7)

Volume	Invert	Avail.Storage	Storage Description
#1	694.75'	31 cf	**12.0" Round Pipe Storage** Inside #2 L= 40.0'
#2	694.75'	275 cf	**6.00'W x 40.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 31 cf Embedded = 689 cf x 40.0% Voids
#3	697.75'	30 cf	**6.00'W x 40.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	698.00'	337 cf	**6.00'W x 40.00'L x 1.00'H Ponding Z=2.0**
		674 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	694.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 694.75' / 694.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	698.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	694.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	697.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.83 cfs @ 12.15 hrs HW=698.59' TW=679.24' (Dynamic Tailwater)
1=Culvert (Passes 0.83 cfs of 1.79 cfs potential flow)
2=Orifice/Grate (Weir Controls 0.13 cfs @ 0.96 fps)
3=Orifice/Grate (Orifice Controls 0.20 cfs @ 9.33 fps)
4=Orifice/Grate (Orifice Controls 0.50 cfs @ 5.74 fps)

Summary for Pond RG51: Rain Garden 51

Inflow Area = 9,105 sf, 65.00% Impervious, Inflow Depth = 4.58" for 25YearMass event
Inflow = 1.13 cfs @ 12.07 hrs, Volume= 3,476 cf
Outflow = 0.71 cfs @ 12.16 hrs, Volume= 3,475 cf, Atten= 37%, Lag= 5.3 min
Primary = 0.71 cfs @ 12.16 hrs, Volume= 3,475 cf
Routed to Pond RG-4.2 : Rain Garden 4.2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 695.53' @ 12.16 hrs Surf.Area= 859 sf Storage= 509 cf

Plug-Flow detention time= 14.6 min calculated for 3,474 cf (100% of inflow)
Center-of-Mass det. time= 14.6 min (810.3 - 795.7)

Volume	Invert	Avail.Storage	Storage Description
#1	691.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	691.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	694.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	695.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	691.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 691.75' / 691.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	695.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	691.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	694.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.71 cfs @ 12.16 hrs HW=695.53' TW=679.28' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.71 cfs of 1.78 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 0.02 cfs @ 0.54 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.20 cfs @ 9.25 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.49 cfs @ 5.62 fps)

Summary for Pond RG57-59: Rain Gardens 57,58,59

Inflow Area = 20,938 sf, 65.00% Impervious, Inflow Depth = 4.47" for 25YearMass event
Inflow = 2.56 cfs @ 12.07 hrs, Volume= 7,804 cf
Outflow = 1.74 cfs @ 12.15 hrs, Volume= 7,804 cf, Atten= 32%, Lag= 4.7 min
Discarded = 0.14 cfs @ 12.15 hrs, Volume= 3,026 cf
Primary = 1.60 cfs @ 12.15 hrs, Volume= 4,778 cf
Routed to Pond RG-4.2 : Rain Garden 4.2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 690.84' @ 12.15 hrs Surf.Area= 2,430 sf Storage= 1,333 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 77.0 min (875.6 - 798.6)

Volume	Invert	Avail.Storage	Storage Description
#1	687.25'	141 cf	**12.0" Round Pipe Storage** x 3 Inside #2 L= 60.0'
#2	687.25'	807 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	690.25'	90 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 3 180 cf Overall x 50.0% Voids
#4	690.50'	1,120 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 3
		2,159 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	687.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	689.25'	**6.0" Round Culvert X 3.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.25' / 689.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	691.00'	**6.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	689.25'	**2.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	689.75'	**4.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.14 cfs @ 12.15 hrs HW=690.84' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Primary OutFlow Max=1.60 cfs @ 12.15 hrs HW=690.84' TW=679.25' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.60 cfs of 3.29 cfs potential flow)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Orifice Controls 0.39 cfs @ 5.92 fps)
  └─**5=Orifice/Grate** (Orifice Controls 1.21 cfs @ 4.64 fps)

Summary for Pond RG6-7: Rain Gardens 6,7

Inflow Area = 23,445 sf, 65.00% Impervious, Inflow Depth = 4.47" for 25YearMass event
Inflow = 2.86 cfs @ 12.07 hrs, Volume= 8,738 cf
Outflow = 1.83 cfs @ 12.16 hrs, Volume= 8,738 cf, Atten= 36%, Lag= 5.2 min
Primary = 1.83 cfs @ 12.16 hrs, Volume= 8,738 cf
Routed to Pond RG-4.1 : Rain Garden 4.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 680.41' @ 12.16 hrs Surf.Area= 2,020 sf Storage= 1,145 cf

Plug-Flow detention time= 9.9 min calculated for 8,738 cf (100% of inflow)
Center-of-Mass det. time= 9.9 min (808.5 - 798.6)

Volume	Invert	Avail.Storage	Storage Description
#1	676.75'	94 cf	**12.0" Round Pipe Storage** x 2 Inside #2 L= 60.0'
#2	676.75'	682 cf	**5.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 2 1,800 cf Overall - 94 cf Embedded = 1,706 cf x 40.0% Voids
#3	679.75'	75 cf	**5.00'W x 60.00'L x 0.25'H Mulch** x 2 150 cf Overall x 50.0% Voids
#4	680.00'	871 cf	**5.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 2
		1,722 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	676.75'	**6.0" Round Culvert X 2.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 676.75' / 676.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

#2	Device 1	680.50'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	676.75'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	679.00'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.83 cfs @ 12.16 hrs HW=680.41' TW=672.69' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.83 cfs of 3.49 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.89 cfs @ 9.06 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.94 cfs @ 5.38 fps)

Summary for Pond RG60-64: Rain Gardens 60-64

Inflow Area = 34,320 sf, 65.00% Impervious, Inflow Depth = 4.69" for 25YearMass event
Inflow = 4.35 cfs @ 12.07 hrs, Volume= 13,412 cf
Outflow = 2.93 cfs @ 12.15 hrs, Volume= 13,413 cf, Atten= 33%, Lag= 4.8 min
Discarded = 0.23 cfs @ 12.15 hrs, Volume= 5,149 cf
Primary = 2.16 cfs @ 12.15 hrs, Volume= 6,611 cf
Routed to Pond RG-4.1 : Rain Garden 4.1
Secondary = 0.54 cfs @ 12.15 hrs, Volume= 1,653 cf
Routed to Pond RG-4.2 : Rain Garden 4.2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 687.37' @ 12.15 hrs Surf.Area= 4,081 sf Storage= 2,259 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 75.7 min (868.4 - 792.7)

Volume	Invert	Avail.Storage	Storage Description
#1	683.75'	236 cf	**12.0" Round Pipe Storage** x 5 Inside #2 L= 60.0'
#2	683.75'	1,346 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 5 3,600 cf Overall - 236 cf Embedded = 3,364 cf x 40.0% Voids
#3	686.75'	150 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 5 300 cf Overall x 50.0% Voids
#4	687.00'	1,867 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 5
		3,598 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	683.75'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	685.75'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 684.65' S= 0.1100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Secondary	685.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 684.65' S= 0.1100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#4	Device 2	687.50'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600

			Limited to weir flow at low heads
#5	Device 3	687.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 2	685.75'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#7	Device 3	685.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#8	Device 2	686.25'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#9	Device 3	686.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.23 cfs @ 12.15 hrs HW=687.37' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=2.16 cfs @ 12.15 hrs HW=687.37' TW=672.66' (Dynamic Tailwater)
└─**2=Culvert** (Passes 2.16 cfs of 4.42 cfs potential flow)
├─**4=Orifice/Grate** (Controls 0.00 cfs)
├─**6=Orifice/Grate** (Orifice Controls 0.52 cfs @ 5.96 fps)
└─**8=Orifice/Grate** (Orifice Controls 1.64 cfs @ 4.69 fps)

Secondary OutFlow Max=0.54 cfs @ 12.15 hrs HW=687.37' TW=679.25' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.54 cfs of 1.11 cfs potential flow)
├─**5=Orifice/Grate** (Controls 0.00 cfs)
├─**7=Orifice/Grate** (Orifice Controls 0.13 cfs @ 5.96 fps)
└─**9=Orifice/Grate** (Orifice Controls 0.41 cfs @ 4.69 fps)

Summary for Pond RG65: Rain Gardens 65

Inflow Area = 4,070 sf,100.00% Impervious, Inflow Depth = 5.94" for 25YearMass event
Inflow = 0.59 cfs @ 12.07 hrs, Volume= 2,015 cf
Outflow = 0.51 cfs @ 12.11 hrs, Volume= 1,985 cf, Atten= 13%, Lag= 2.5 min
Discarded = 0.01 cfs @ 12.11 hrs, Volume= 187 cf
Primary = 0.51 cfs @ 12.11 hrs, Volume= 1,798 cf
Routed to Pond RG-4.1 : Rain Garden 4.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 678.24' @ 12.11 hrs Surf.Area= 245 sf Storage= 127 cf

Plug-Flow detention time= 44.3 min calculated for 1,984 cf (98% of inflow)
Center-of-Mass det. time= 34.5 min (778.3 - 743.8)

Volume	Invert	Avail.Storage	Storage Description
#1	674.75'	12 cf	**12.0" Round Pipe Storage** Inside #2 L= 15.0'
#2	674.75'	85 cf	**5.00'W x 15.00'L x 3.00'H Soil Media and Gravel** 225 cf Overall - 12 cf Embedded = 213 cf x 40.0% Voids
#3	677.75'	9 cf	**5.00'W x 15.00'L x 0.25'H Mulch** 19 cf Overall x 50.0% Voids
#4	678.00'	120 cf	**5.00'W x 15.00'L x 1.00'H Ponding Z=2.0**
		227 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	674.75'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	676.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 676.75' / 675.15' S= 0.1600 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	678.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	676.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	677.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 12.11 hrs HW=678.24' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.51 cfs @ 12.11 hrs HW=678.24' TW=672.46' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.51 cfs of 1.05 cfs potential flow)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Orifice Controls 0.12 cfs @ 5.72 fps)
  └─**5=Orifice/Grate** (Orifice Controls 0.38 cfs @ 4.38 fps)

Summary for Pond RG8-11: Rain Gardens 8-11

Inflow Area = 31,000 sf, 65.00% Impervious, Inflow Depth = 4.47" for 25YearMass event
Inflow = 3.79 cfs @ 12.07 hrs, Volume= 11,554 cf
Outflow = 2.46 cfs @ 12.16 hrs, Volume= 11,553 cf, Atten= 35%, Lag= 5.0 min
Primary = 2.46 cfs @ 12.16 hrs, Volume= 11,553 cf
Routed to Pond RG-4.1 : Rain Garden 4.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 679.18' @ 12.16 hrs Surf.Area= 3,793 sf Storage= 1,941 cf

Plug-Flow detention time= 18.1 min calculated for 11,553 cf (100% of inflow)
Center-of-Mass det. time= 18.0 min (816.7 - 798.6)

Volume	Invert	Avail.Storage	Storage Description
#1	675.75'	188 cf	**12.0" Round Pipe Storage** x 4 Inside #2 L= 60.0'
#2	675.75'	1,365 cf	**5.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 4 3,600 cf Overall - 188 cf Embedded = 3,412 cf x 40.0% Voids
#3	678.75'	150 cf	**5.00'W x 60.00'L x 0.25'H Mulch** x 4 300 cf Overall x 50.0% Voids
#4	679.00'	1,741 cf	**5.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 4
		3,444 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	675.75'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 675.75' / 675.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	679.50'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

#3	Device 1	675.75'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	678.00'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.46 cfs @ 12.16 hrs HW=679.18' TW=672.68' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.46 cfs of 6.75 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.77 cfs @ 8.81 fps)
  └─**4=Orifice/Grate** (Orifice Controls 1.69 cfs @ 4.85 fps)

Summary for Link AP4-P: AP4 - To Wetland A (A32-A47)

Inflow Area = 299,623 sf, 31.52% Impervious, Inflow Depth = 2.78" for 25YearMass event
Inflow = 13.06 cfs @ 12.11 hrs, Volume= 69,466 cf
Primary = 13.06 cfs @ 12.11 hrs, Volume= 69,466 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Summary for Subcatchment P4.1: To Wetland A (A32-A47)

Runoff = 12.27 cfs @ 12.10 hrs, Volume= 39,425 cf, Depth= 5.09"
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
630	55	Woods, Good, HSG B
79,935	77	Woods, Good, HSG D
4,660	61	>75% Grass cover, Good, HSG B
7,645	80	>75% Grass cover, Good, HSG D
92,870	76	Weighted Average
92,870		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.2	135	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.9	185	Total			

Summary for Subcatchment P4.10: To RG4.1

Runoff = 1.47 cfs @ 12.07 hrs, Volume= 4,459 cf, Depth= 5.56"
Routed to Pond RG-4.1 : Rain Garden 4.1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
9,500	80	>75% Grass cover, Good, HSG D
125	61	>75% Grass cover, Good, HSG B
9,625	80	Weighted Average
9,625		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.11: To RG4.2

Runoff = 1.36 cfs @ 12.11 hrs, Volume= 4,417 cf, Depth= 3.39"
Routed to Pond RG-4.2 : Rain Garden 4.2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
15,520	61	>75% Grass cover, Good, HSG B
110	80	>75% Grass cover, Good, HSG D
15,630	61	Weighted Average
15,630		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.3	150	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.0	200	Total			

Summary for Subcatchment P4.12: Lots 65

Runoff = 0.75 cfs @ 12.07 hrs, Volume= 2,608 cf, Depth= 7.69"
Routed to Pond RG65 : Rain Gardens 65

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
3,830	98	Paved roads w/curbs & sewers, HSG C
240	98	Paved roads w/curbs & sewers, HSG C
4,070	98	Weighted Average
4,070		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.13: Lots 6-8

Runoff = 3.88 cfs @ 12.07 hrs, Volume= 12,007 cf, Depth= 6.15"
Routed to Pond RG6-7 : Rain Gardens 6,7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
23,175	85	1/8 acre lots, 65% imp, HSG B
270	90	1/8 acre lots, 65% imp, HSG C
23,445	85	Weighted Average
8,206		35.00% Pervious Area
15,239		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.2: Lots 57-60

Runoff = 3.46 cfs @ 12.07 hrs, Volume= 10,723 cf, Depth= 6.15"
Routed to Pond RG57-59 : Rain Gardens 57,58,59

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
20,938	85	1/8 acre lots, 65% imp, HSG B
7,328		35.00% Pervious Area
13,610		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.4: Lots 60-65

Runoff = 5.83 cfs @ 12.07 hrs, Volume= 18,251 cf, Depth= 6.38"
Routed to Pond RG60-64 : Rain Gardens 60-64

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
21,420	85	1/8 acre lots, 65% imp, HSG B
9,605	92	1/8 acre lots, 65% imp, HSG D
3,295	90	1/8 acre lots, 65% imp, HSG C
34,320	87	Weighted Average
12,012		35.00% Pervious Area
22,308		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.5: Lots 8-12

Runoff = 5.13 cfs @ 12.07 hrs, Volume= 15,876 cf, Depth= 6.15"
Routed to Pond RG8-11 : Rain Gardens 8-11

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
31,000	85	1/8 acre lots, 65% imp, HSG B
10,850		35.00% Pervious Area
20,150		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.6: Lots 12-13

Runoff = 1.68 cfs @ 12.09 hrs, Volume= 5,467 cf, Depth= 6.15"
Routed to Pond RG12 : Rain Garden 12

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
10,675	85	1/8 acre lots, 65% imp, HSG B
3,736		35.00% Pervious Area
6,939		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	50	0.1200	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	30	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
6.4	80	Total			

Summary for Subcatchment P4.7: Lot 13

Runoff = 1.60 cfs @ 12.07 hrs, Volume= 4,982 cf, Depth= 6.26"
Routed to Pond RG13 : Rain Garden 13

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
7,505	85	1/8 acre lots, 65% imp, HSG B
2,040	90	1/8 acre lots, 65% imp, HSG C
9,545	86	Weighted Average
3,341		35.00% Pervious Area
6,204		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P4.8: Upgradient Lots 8-12

Runoff = 2.07 cfs @ 12.23 hrs, Volume= 9,101 cf, Depth= 2.84"
Routed to Pond IT-8/12 : Interceptor Trench

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
3,850	61	>75% Grass cover, Good, HSG B
34,550	55	Woods, Good, HSG B
38,400	56	Weighted Average
38,400		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.7	50	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
3.5	280	0.0700	1.32		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.2	330	Total			

Summary for Subcatchment P4.9: Lot 51

Runoff = 1.53 cfs @ 12.07 hrs, Volume= 4,752 cf, Depth= 6.26"
Routed to Pond RG51 : Rain Garden 51

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
1,910	90	1/8 acre lots, 65% imp, HSG C
7,195	85	1/8 acre lots, 65% imp, HSG B
9,105	86	Weighted Average
3,187		35.00% Pervious Area
5,918		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Pond IT-8/12: Interceptor Trench

Inflow Area = 38,400 sf, 0.00% Impervious, Inflow Depth = 2.84" for 100YearMass event
Inflow = 2.07 cfs @ 12.23 hrs, Volume= 9,101 cf
Outflow = 1.77 cfs @ 12.34 hrs, Volume= 9,099 cf, Atten= 14%, Lag= 6.6 min
Primary = 1.77 cfs @ 12.34 hrs, Volume= 9,099 cf
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 681.75' @ 12.34 hrs Surf.Area= 1,050 sf Storage= 682 cf

Plug-Flow detention time= 10.2 min calculated for 9,099 cf (100% of inflow)
Center-of-Mass det. time= 10.1 min (875.3 - 865.3)

Volume	Invert	Avail.Storage	Storage Description
#1	680.30'	1,211 cf	**3.00'W x 350.00'L x 3.00'H Prismatoid** 3,150 cf Overall - 122 cf Embedded = 3,028 cf x 40.0% Voids
#2	680.30'	122 cf	**8.0" Round Pipe Storage** Inside #1 L= 350.0'
		1,333 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	680.30'	**8.0" Round Culvert** L= 224.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 680.30' / 668.00' S= 0.0549 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=1.77 cfs @ 12.34 hrs HW=681.75' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.77 cfs @ 5.08 fps)

Summary for Pond RG-4.1: Rain Garden 4.1

Inflow Area = 102,460 sf, 60.28% Impervious, Inflow Depth = 5.24" for 100YearMass event
Inflow = 11.16 cfs @ 12.14 hrs, Volume= 44,754 cf
Outflow = 7.74 cfs @ 12.28 hrs, Volume= 43,502 cf, Atten= 31%, Lag= 8.9 min
Discarded = 0.30 cfs @ 12.28 hrs, Volume= 9,492 cf
Primary = 7.45 cfs @ 12.28 hrs, Volume= 34,010 cf
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 673.45' @ 12.28 hrs Surf.Area= 12,625 sf Storage= 11,377 cf

Plug-Flow detention time= 86.9 min calculated for 43,488 cf (97% of inflow)
Center-of-Mass det. time= 70.6 min (864.9 - 794.3)

Volume	Invert	Avail.Storage	Storage Description
#1	668.75'	4,488 cf	**17.00'W x 220.00'L x 3.00'H Soil Media and Gravel** 11,220 cf Overall x 40.0% Voids
#2	671.75'	468 cf	**17.00'W x 220.00'L x 0.25'H Mulch** 935 cf Overall x 50.0% Voids
#3	672.00'	9,419 cf	**17.00'W x 220.00'L x 2.00'H Ponding Z=2.0**
		14,374 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	668.75'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	670.75'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 670.75' / 670.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Primary	670.75'	**10.0" Round Culvert X 3.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 670.75' / 670.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.55 sf
#4	Device 2	670.75'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	671.25'	**3.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#6	Device 2	672.75'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#7	Device 3	673.25'	**10.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#8	Secondary	673.50'	**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

Discarded OutFlow Max=0.30 cfs @ 12.28 hrs HW=673.45' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=7.44 cfs @ 12.28 hrs HW=673.45' TW=0.00' (Dynamic Tailwater)
├─**2=Culvert** (Passes 5.20 cfs of 5.92 cfs potential flow)
│ ├─**4=Orifice/Grate** (Orifice Controls 0.68 cfs @ 7.78 fps)
│ ├─**5=Orifice/Grate** (Orifice Controls 1.36 cfs @ 6.93 fps)
│ └─**6=Orifice/Grate** (Orifice Controls 3.16 cfs @ 4.02 fps)
└─**3=Culvert** (Passes 2.25 cfs of 11.90 cfs potential flow)
  └─**7=Orifice/Grate** (Weir Controls 2.25 cfs @ 1.45 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=668.75' TW=0.00' (Dynamic Tailwater)
└─**8=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG-4.2: Rain Garden 4.2

Inflow Area = 65,893 sf, 49.58% Impervious, Inflow Depth = 5.37" for 100YearMass event
Inflow = 8.39 cfs @ 12.13 hrs, Volume= 29,482 cf
Outflow = 4.30 cfs @ 12.43 hrs, Volume= 28,702 cf, Atten= 49%, Lag= 18.1 min
Discarded = 0.20 cfs @ 12.43 hrs, Volume= 5,315 cf
Primary = 4.11 cfs @ 12.43 hrs, Volume= 23,386 cf
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP4-P : AP4 - To Wetland A (A32-A47)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 680.19' @ 12.43 hrs Surf.Area= 8,417 sf Storage= 6,767 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 57.4 min (856.8 - 799.5)

Volume	Invert	Avail.Storage	Storage Description
#1	675.75'	2,880 cf	**10.00'W x 240.00'L x 3.00'H Soil Media and Gravel**
			7,200 cf Overall x 40.0% Voids
#2	678.75'	300 cf	**10.00'W x 240.00'L x 0.25'H Mulch**
			600 cf Overall x 50.0% Voids
#3	679.00'	6,843 cf	**10.00'W x 240.00'L x 2.00'H Ponding Z=2.0**
		10,023 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	675.75'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	677.75'	**6.0" Round Culvert X 4.00**
			L= 10.0' CPP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 677.75' / 677.65' S= 0.0100 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	677.75'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600
			Limited to weir flow at low heads
#4	Device 2	678.25'	**5.0" Vert. Orifice/Grate X 4.00** C= 0.600
			Limited to weir flow at low heads
#5	Device 2	680.50'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600
			Limited to weir flow at low heads
#6	Secondary	680.50'	**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

Discarded OutFlow Max=0.20 cfs @ 12.43 hrs HW=680.19' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.20 cfs)

Primary OutFlow Max=4.11 cfs @ 12.43 hrs HW=680.19' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 4.11 cfs of 5.60 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.65 cfs @ 7.40 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 3.46 cfs @ 6.34 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=675.75' TW=0.00' (Dynamic Tailwater)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG12: Rain Garden 12

Inflow Area = 10,675 sf, 65.00% Impervious, Inflow Depth = 6.15" for 100YearMass event
Inflow = 1.68 cfs @ 12.09 hrs, Volume= 5,467 cf
Outflow = 1.33 cfs @ 12.15 hrs, Volume= 5,467 cf, Atten= 21%, Lag= 3.8 min
Primary = 1.33 cfs @ 12.15 hrs, Volume= 5,467 cf
Routed to Pond RG-4.2 : Rain Garden 4.2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 690.36' @ 12.15 hrs Surf.Area= 953 sf Storage= 652 cf

Plug-Flow detention time= 14.1 min calculated for 5,465 cf (100% of inflow)
Center-of-Mass det. time= 14.1 min (805.3 - 791.1)

Volume	Invert	Avail.Storage	Storage Description
#1	686.25'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	686.25'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	689.25'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	689.50'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	686.25'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 686.25' / 686.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	690.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	686.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	688.50'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.33 cfs @ 12.15 hrs HW=690.36' TW=679.77' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.33 cfs of 1.86 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.57 cfs @ 2.90 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.21 cfs @ 9.66 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.55 cfs @ 6.27 fps)

Summary for Pond RG13: Rain Garden 13

Inflow Area = 9,545 sf, 65.00% Impervious, Inflow Depth = 6.26" for 100YearMass event
Inflow = 1.60 cfs @ 12.07 hrs, Volume= 4,982 cf
Outflow = 1.28 cfs @ 12.13 hrs, Volume= 4,982 cf, Atten= 20%, Lag= 3.4 min
Primary = 1.28 cfs @ 12.13 hrs, Volume= 4,982 cf
Routed to Pond RG-4.2 : Rain Garden 4.2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Peak Elev= 698.81' @ 12.13 hrs Surf.Area= 880 sf Storage= 596 cf

Plug-Flow detention time= 13.5 min calculated for 4,982 cf (100% of inflow)
Center-of-Mass det. time= 13.4 min (800.6 - 787.1)

Volume	Invert	Avail.Storage	Storage Description
#1	694.75'	31 cf	**12.0" Round Pipe Storage** Inside #2 L= 40.0'
#2	694.75'	275 cf	**6.00'W x 40.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 31 cf Embedded = 689 cf x 40.0% Voids
#3	697.75'	30 cf	**6.00'W x 40.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	698.00'	337 cf	**6.00'W x 40.00'L x 1.00'H Ponding Z=2.0**
		674 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	694.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 694.75' / 694.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	698.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	694.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	697.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.28 cfs @ 12.13 hrs HW=698.81' TW=679.63' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.28 cfs of 1.85 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.53 cfs @ 2.69 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.21 cfs @ 9.60 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.54 cfs @ 6.18 fps)

Summary for Pond RG51: Rain Garden 51

Inflow Area = 9,105 sf, 65.00% Impervious, Inflow Depth = 6.26" for 100YearMass event
Inflow = 1.53 cfs @ 12.07 hrs, Volume= 4,752 cf
Outflow = 1.20 cfs @ 12.13 hrs, Volume= 4,752 cf, Atten= 21%, Lag= 3.5 min
Primary = 1.20 cfs @ 12.13 hrs, Volume= 4,752 cf
Routed to Pond RG-4.2 : Rain Garden 4.2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 695.75' @ 12.13 hrs Surf.Area= 920 sf Storage= 599 cf

Plug-Flow detention time= 14.2 min calculated for 4,751 cf (100% of inflow)
Center-of-Mass det. time= 14.2 min (801.4 - 787.1)

Volume	Invert	Avail.Storage	Storage Description
#1	691.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	691.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	694.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	695.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	691.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 691.75' / 691.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	695.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	691.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	694.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.20 cfs @ 12.13 hrs HW=695.75' TW=679.64' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.20 cfs of 1.83 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.47 cfs @ 2.39 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.21 cfs @ 9.52 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.53 cfs @ 6.05 fps)

Summary for Pond RG57-59: Rain Gardens 57,58,59

Inflow Area = 20,938 sf, 65.00% Impervious, Inflow Depth = 6.15" for 100YearMass event
Inflow = 3.46 cfs @ 12.07 hrs, Volume= 10,723 cf
Outflow = 2.61 cfs @ 12.14 hrs, Volume= 10,723 cf, Atten= 25%, Lag= 3.9 min
Discarded = 0.15 cfs @ 12.14 hrs, Volume= 3,366 cf
Primary = 2.46 cfs @ 12.14 hrs, Volume= 7,357 cf
Routed to Pond RG-4.2 : Rain Garden 4.2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 691.12' @ 12.14 hrs Surf.Area= 2,656 sf Storage= 1,639 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 64.7 min (854.6 - 789.8)

Volume	Invert	Avail.Storage	Storage Description
#1	687.25'	141 cf	**12.0" Round Pipe Storage** x 3 Inside #2 L= 60.0'
#2	687.25'	807 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 3 2,160 cf Overall - 141 cf Embedded = 2,019 cf x 40.0% Voids
#3	690.25'	90 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 3 180 cf Overall x 50.0% Voids
#4	690.50'	1,120 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 3
		2,159 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	687.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	689.25'	**6.0" Round Culvert X 3.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 689.25' / 689.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	691.00'	**6.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	689.25'	**2.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Device 2	689.75'	**4.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.15 cfs @ 12.14 hrs HW=691.12' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Primary OutFlow Max=2.45 cfs @ 12.14 hrs HW=691.12' TW=679.68' (Dynamic Tailwater)
└─**2=Culvert** (Passes 2.45 cfs of 3.61 cfs potential flow)
├─**3=Orifice/Grate** (Weir Controls 0.65 cfs @ 1.14 fps)
├─**4=Orifice/Grate** (Orifice Controls 0.42 cfs @ 6.44 fps)
└─**5=Orifice/Grate** (Orifice Controls 1.38 cfs @ 5.28 fps)

Summary for Pond RG6-7: Rain Gardens 6,7

Inflow Area = 23,445 sf, 65.00% Impervious, Inflow Depth = 6.15" for 100YearMass event
Inflow = 3.88 cfs @ 12.07 hrs, Volume= 12,007 cf
Outflow = 2.93 cfs @ 12.14 hrs, Volume= 12,006 cf, Atten= 24%, Lag= 3.8 min
Primary = 2.93 cfs @ 12.14 hrs, Volume= 12,006 cf
Routed to Pond RG-4.1 : Rain Garden 4.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 680.75' @ 12.14 hrs Surf.Area= 2,207 sf Storage= 1,450 cf

Plug-Flow detention time= 9.6 min calculated for 12,006 cf (100% of inflow)
Center-of-Mass det. time= 9.5 min (799.4 - 789.8)

Volume	Invert	Avail.Storage	Storage Description
#1	676.75'	94 cf	**12.0" Round Pipe Storage** x 2 Inside #2 L= 60.0'
#2	676.75'	682 cf	**5.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 2 1,800 cf Overall - 94 cf Embedded = 1,706 cf x 40.0% Voids
#3	679.75'	75 cf	**5.00'W x 60.00'L x 0.25'H Mulch** x 2 150 cf Overall x 50.0% Voids
#4	680.00'	871 cf	**5.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 2
		1,722 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	676.75'	**6.0" Round Culvert X 2.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 676.75' / 676.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

#2	Device 1	680.50'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	676.75'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	679.00'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.93 cfs @ 12.14 hrs HW=680.75' TW=673.15' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.93 cfs of 3.66 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.94 cfs @ 2.39 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.93 cfs @ 9.47 fps)
  └─**4=Orifice/Grate** (Orifice Controls 1.06 cfs @ 6.05 fps)

Summary for Pond RG60-64: Rain Gardens 60-64

Inflow Area = 34,320 sf, 65.00% Impervious, Inflow Depth = 6.38" for 100YearMass event
Inflow = 5.83 cfs @ 12.07 hrs, Volume= 18,251 cf
Outflow = 4.44 cfs @ 12.13 hrs, Volume= 18,252 cf, Atten= 24%, Lag= 3.8 min
Discarded = 0.25 cfs @ 12.13 hrs, Volume= 5,719 cf
Primary = 3.35 cfs @ 12.13 hrs, Volume= 10,027 cf
Routed to Pond RG-4.1 : Rain Garden 4.1
Secondary = 0.84 cfs @ 12.13 hrs, Volume= 2,507 cf
Routed to Pond RG-4.2 : Rain Garden 4.2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 687.63' @ 12.13 hrs Surf.Area= 4,435 sf Storage= 2,744 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 64.2 min (848.6 - 784.3)

Volume	Invert	Avail.Storage	Storage Description
#1	683.75'	236 cf	**12.0" Round Pipe Storage** x 5 Inside #2 L= 60.0'
#2	683.75'	1,346 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 5 3,600 cf Overall - 236 cf Embedded = 3,364 cf x 40.0% Voids
#3	686.75'	150 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 5 300 cf Overall x 50.0% Voids
#4	687.00'	1,867 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 5
		3,598 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	683.75'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	685.75'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 684.65' S= 0.1100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Secondary	685.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 685.75' / 684.65' S= 0.1100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#4	Device 2	687.50'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600

			Limited to weir flow at low heads
#5	Device 3	687.50'	**6.0" Horiz. Orifice/Grate** C= 0.600
			Limited to weir flow at low heads
#6	Device 2	685.75'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600
			Limited to weir flow at low heads
#7	Device 3	685.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#8	Device 2	686.25'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600
			Limited to weir flow at low heads
#9	Device 3	686.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.25 cfs @ 12.13 hrs HW=687.63' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=3.34 cfs @ 12.13 hrs HW=687.63' TW=673.15' (Dynamic Tailwater)
└─**2=Culvert** (Passes 3.34 cfs of 4.82 cfs potential flow)
  ├─**4=Orifice/Grate** (Weir Controls 0.93 cfs @ 1.17 fps)
  ├─**6=Orifice/Grate** (Orifice Controls 0.56 cfs @ 6.45 fps)
  └─**8=Orifice/Grate** (Orifice Controls 1.85 cfs @ 5.30 fps)

Secondary OutFlow Max=0.84 cfs @ 12.13 hrs HW=687.63' TW=679.67' (Dynamic Tailwater)
└─**3=Culvert** (Passes 0.84 cfs of 1.21 cfs potential flow)
  ├─**5=Orifice/Grate** (Weir Controls 0.23 cfs @ 1.17 fps)
  ├─**7=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.45 fps)
  └─**9=Orifice/Grate** (Orifice Controls 0.46 cfs @ 5.30 fps)

Summary for Pond RG65: Rain Gardens 65

Inflow Area = 4,070 sf,100.00% Impervious, Inflow Depth = 7.69" for 100YearMass event
Inflow = 0.75 cfs @ 12.07 hrs, Volume= 2,608 cf
Outflow = 0.67 cfs @ 12.11 hrs, Volume= 2,578 cf, Atten= 12%, Lag= 2.5 min
Discarded = 0.01 cfs @ 12.11 hrs, Volume= 191 cf
Primary = 0.66 cfs @ 12.11 hrs, Volume= 2,387 cf
Routed to Pond RG-4.1 : Rain Garden 4.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 678.56' @ 12.11 hrs Surf.Area= 275 sf Storage= 162 cf

Plug-Flow detention time= 36.4 min calculated for 2,577 cf (99% of inflow)
Center-of-Mass det. time= 28.7 min (769.1 - 740.4)

Volume	Invert	Avail.Storage	Storage Description
#1	674.75'	12 cf	**12.0" Round Pipe Storage** Inside #2
			L= 15.0'
#2	674.75'	85 cf	**5.00'W x 15.00'L x 3.00'H Soil Media and Gravel**
			225 cf Overall - 12 cf Embedded = 213 cf x 40.0% Voids
#3	677.75'	9 cf	**5.00'W x 15.00'L x 0.25'H Mulch**
			19 cf Overall x 50.0% Voids
#4	678.00'	120 cf	**5.00'W x 15.00'L x 1.00'H Ponding Z=2.0**
		227 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	674.75'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	676.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 676.75' / 675.15' S= 0.1600 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	678.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	676.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	677.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 12.11 hrs HW=678.56' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.66 cfs @ 12.11 hrs HW=678.56' TW=673.03' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.66 cfs of 1.18 cfs potential flow)
  ├─**3=Orifice/Grate** (Weir Controls 0.07 cfs @ 0.78 fps)
  ├─**4=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.32 fps)
  └─**5=Orifice/Grate** (Orifice Controls 0.45 cfs @ 5.14 fps)

Summary for Pond RG8-11: Rain Gardens 8-11

Inflow Area = 31,000 sf, 65.00% Impervious, Inflow Depth = 6.15" for 100YearMass event
Inflow = 5.13 cfs @ 12.07 hrs, Volume= 15,876 cf
Outflow = 3.28 cfs @ 12.16 hrs, Volume= 15,875 cf, Atten= 36%, Lag= 5.2 min
Primary = 3.28 cfs @ 12.16 hrs, Volume= 15,875 cf
Routed to Pond RG-4.1 : Rain Garden 4.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Peak Elev= 679.58' @ 12.16 hrs Surf.Area= 4,226 sf Storage= 2,580 cf

Plug-Flow detention time= 17.9 min calculated for 15,875 cf (100% of inflow)
Center-of-Mass det. time= 17.8 min (807.6 - 789.8)

Volume	Invert	Avail.Storage	Storage Description
#1	675.75'	188 cf	**12.0" Round Pipe Storage** x 4 Inside #2 L= 60.0'
#2	675.75'	1,365 cf	**5.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 4 3,600 cf Overall - 188 cf Embedded = 3,412 cf x 40.0% Voids
#3	678.75'	150 cf	**5.00'W x 60.00'L x 0.25'H Mulch** x 4 300 cf Overall x 50.0% Voids
#4	679.00'	1,741 cf	**5.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 4
		3,444 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	675.75'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 675.75' / 675.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	679.50'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

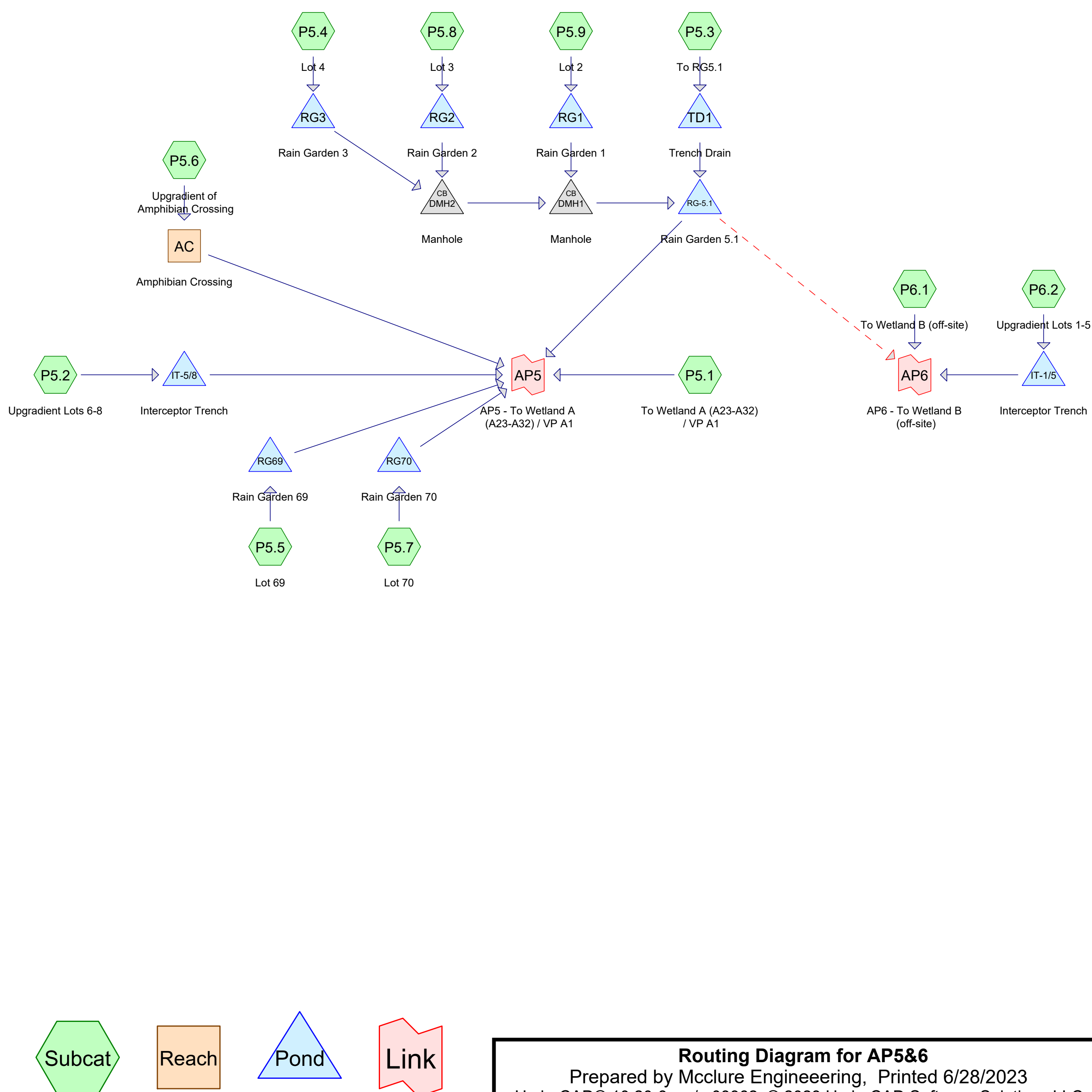
#3	Device 1	675.75'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	678.00'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.28 cfs @ 12.16 hrs HW=679.58' TW=673.26' (Dynamic Tailwater)
└─**1=Culvert** (Passes 3.28 cfs of 7.16 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 0.47 cfs @ 0.93 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.81 cfs @ 9.32 fps)
  └─**4=Orifice/Grate** (Orifice Controls 2.00 cfs @ 5.73 fps)

Summary for Link AP4-P: AP4 - To Wetland A (A32-A47)

Inflow Area = 299,623 sf, 31.52% Impervious, Inflow Depth = 4.24" for 100YearMass event
Inflow = 20.28 cfs @ 12.12 hrs, Volume= 105,921 cf
Primary = 20.28 cfs @ 12.12 hrs, Volume= 105,921 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs



Routing Diagram for AP5&6
Prepared by Mcclure Engineeering, Printed 6/28/2023

Summary for Subcatchment P5.1: To Wetland A (A23-A32) / VP A1

Runoff = 2.32 cfs @ 12.14 hrs, Volume= 8,481 cf, Depth> 1.06"
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
37,235	70	Woods, Good, HSG C
47,100	77	Woods, Good, HSG D
960	80	>75% Grass cover, Good, HSG D
9,640	74	>75% Grass cover, Good, HSG C
950	98	Unconnected roofs, HSG C
95,885	74	Weighted Average
94,935		99.01% Pervious Area
950		0.99% Impervious Area
950		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0750	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.8	150	0.0750	1.37		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.3	200	Total			

Summary for Subcatchment P5.2: Upgradient Lots 6-8

Runoff = 0.06 cfs @ 12.32 hrs, Volume= 518 cf, Depth> 0.29"
Routed to Pond IT-5/8 : Interceptor Trench

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
300	61	>75% Grass cover, Good, HSG B
485	74	>75% Grass cover, Good, HSG C
19,455	55	Woods, Good, HSG B
1,085	70	Woods, Good, HSG C
21,325	56	Weighted Average
21,325		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.1000	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.9	85	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.0	5	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.6	140	Total			

Summary for Subcatchment P5.3: To RG5.1

Runoff = 1.31 cfs @ 12.07 hrs, Volume= 3,957 cf, Depth> 2.20"
Routed to Pond TD1 : Trench Drain

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
21,545	90	1/8 acre lots, 65% imp, HSG C
7,541		35.00% Pervious Area
14,004		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P5.4: Lot 4

Runoff = 0.38 cfs @ 12.07 hrs, Volume= 1,148 cf, Depth> 2.03"
Routed to Pond RG3 : Rain Garden 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
6,030	90	1/8 acre lots, 65% imp, HSG C
750	70	Woods, Good, HSG C
6,780	88	Weighted Average
2,861		42.19% Pervious Area
3,920		57.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P5.5: Lot 69

Runoff = 0.10 cfs @ 12.07 hrs, Volume= 342 cf, Depth> 3.01"
Routed to Pond RG69 : Rain Garden 69

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
1,365	98	Paved roads w/curbs & sewers, HSG C
1,365		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P5.6: Upgradient of Amphibian Crossing

Runoff = 0.19 cfs @ 12.15 hrs, Volume= 936 cf, Depth> 0.50"
Routed to Reach AC : Amphibian Crossing

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
1,860	74	>75% Grass cover, Good, HSG C
8,330	70	Woods, Good, HSG C
12,415	55	Woods, Good, HSG B
22,605	62	Weighted Average
22,605		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.1000	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.6	150	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	30	0.3000	3.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.4	230	Total			

Summary for Subcatchment P5.7: Lot 70

Runoff = 0.33 cfs @ 12.07 hrs, Volume= 994 cf, Depth> 2.20"
Routed to Pond RG70 : Rain Garden 70

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
5,415	90	1/8 acre lots, 65% imp, HSG C
1,895		35.00% Pervious Area
3,520		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P5.8: Lot 3

Runoff = 0.41 cfs @ 12.07 hrs, Volume= 1,253 cf, Depth> 2.20"
Routed to Pond RG2 : Rain Garden 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
6,820	90	1/8 acre lots, 65% imp, HSG C
2,387		35.00% Pervious Area
4,433		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P5.9: Lot 2

Runoff = 0.47 cfs @ 12.07 hrs, Volume= 1,418 cf, Depth> 2.20"
Routed to Pond RG1 : Rain Garden 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
7,720	90	1/8 acre lots, 65% imp, HSG C
2,702		35.00% Pervious Area
5,018		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P6.1: To Wetland B (off-site)

Runoff = 1.28 cfs @ 12.14 hrs, Volume= 4,951 cf, Depth> 0.85"
Routed to Link AP6 : AP6 - To Wetland B (off-site)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
6,465	74	>75% Grass cover, Good, HSG C
1,875	55	Woods, Good, HSG B
61,615	70	Woods, Good, HSG C
69,955	70	Weighted Average
69,955		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	45	0.2200	2.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	290	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.2	385	Total			

Summary for Subcatchment P6.2: Upgradient Lots 1-5

Runoff = 0.28 cfs @ 12.20 hrs, Volume= 1,599 cf, Depth> 0.46"
Routed to Pond IT-1/5 : Interceptor Trench

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
2,130	74	>75% Grass cover, Good, HSG C
24,405	55	Woods, Good, HSG B
15,310	70	Woods, Good, HSG C
41,845	61	Weighted Average
41,845		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.7	160	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.9	210	Total			

Summary for Reach AC: Amphibian Crossing

Inflow Area = 22,605 sf, 0.00% Impervious, Inflow Depth > 0.50" for 2YearMass event
Inflow = 0.19 cfs @ 12.15 hrs, Volume= 936 cf
Outflow = 0.19 cfs @ 12.17 hrs, Volume= 934 cf, Atten= 2%, Lag= 1.3 min
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.28 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 0.14 fps, Avg. Travel Time= 3.6 min

Peak Storage= 20 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.11' , Surface Width= 6.00'
Bank-Full Depth= 3.50' Flow Area= 21.0 sf, Capacity= 35.65 cfs

6.00' x 3.50' deep channel, n= 0.022 Earth, clean & straight
Length= 30.0' Slope= 0.0003 '/'
Inlet Invert= 675.83', Outlet Invert= 675.82'

Summary for Pond DMH1: Manhole

Inflow Area = 21,320 sf, 62.71% Impervious, Inflow Depth > 2.13" for 2YearMass event
Inflow = 0.48 cfs @ 12.25 hrs, Volume= 3,791 cf
Outflow = 0.48 cfs @ 12.25 hrs, Volume= 3,791 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.48 cfs @ 12.25 hrs, Volume= 3,791 cf
Routed to Pond RG-5.1 : Rain Garden 5.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 673.20' @ 12.54 hrs
Flood Elev= 675.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	671.50'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 671.50' / 671.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.32 cfs @ 12.25 hrs HW=673.06' TW=673.05' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.32 cfs @ 0.41 fps)

Summary for Pond DMH2: Manhole

Inflow Area = 13,600 sf, 61.42% Impervious, Inflow Depth > 2.10" for 2YearMass event
Inflow = 0.28 cfs @ 12.34 hrs, Volume= 2,385 cf
Outflow = 0.28 cfs @ 12.34 hrs, Volume= 2,385 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.28 cfs @ 12.34 hrs, Volume= 2,385 cf
Routed to Pond DMH1 : Manhole

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 673.78' @ 12.45 hrs
Flood Elev= 678.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	673.50'	**12.0" Round Culvert** L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.50' / 671.60' S= 0.0237 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.28 cfs @ 12.34 hrs HW=673.78' TW=673.13' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.28 cfs @ 2.31 fps)

Summary for Pond IT-1/5: Interceptor Trench

Inflow Area = 41,845 sf, 0.00% Impervious, Inflow Depth > 0.46" for 2YearMass event
Inflow = 0.28 cfs @ 12.20 hrs, Volume= 1,599 cf
Outflow = 0.24 cfs @ 12.34 hrs, Volume= 1,580 cf, Atten= 12%, Lag= 8.5 min
Primary = 0.24 cfs @ 12.34 hrs, Volume= 1,580 cf
Routed to Link AP6 : AP6 - To Wetland B (off-site)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 677.28' @ 12.34 hrs Surf.Area= 750 sf Storage= 103 cf

Plug-Flow detention time= 14.7 min calculated for 1,579 cf (99% of inflow)
Center-of-Mass det. time= 8.5 min (924.1 - 915.5)

Volume	Invert	Avail.Storage	Storage Description
#1	677.00'	865 cf	**3.00'W x 250.00'L x 3.00'H Prismatoid** 2,250 cf Overall - 87 cf Embedded = 2,163 cf x 40.0% Voids
#2	677.00'	87 cf	**8.0" Round Pipe Storage** Inside #1 L= 250.0'
		952 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	677.00'	**8.0" Round Culvert** L= 220.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.00' / 668.00' S= 0.0409 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.24 cfs @ 12.34 hrs HW=677.28' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.24 cfs @ 1.79 fps)

Summary for Pond IT-5/8: Interceptor Trench

Inflow Area = 21,325 sf, 0.00% Impervious, Inflow Depth > 0.29" for 2YearMass event
Inflow = 0.06 cfs @ 12.32 hrs, Volume= 518 cf
Outflow = 0.06 cfs @ 12.43 hrs, Volume= 510 cf, Atten= 9%, Lag= 6.7 min
Primary = 0.06 cfs @ 12.43 hrs, Volume= 510 cf
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 680.14' @ 12.43 hrs Surf.Area= 465 sf Storage= 31 cf

Plug-Flow detention time= 16.8 min calculated for 510 cf (99% of inflow)
Center-of-Mass det. time= 9.5 min (954.2 - 944.6)

Volume	Invert	Avail.Storage	Storage Description
#1	680.00'	546 cf	**3.00'W x 155.00'L x 3.00'H Prismatoid** 1,395 cf Overall - 30 cf Embedded = 1,365 cf x 40.0% Voids
#2	680.00'	30 cf	**6.0" Round Pipe Storage** Inside #1 L= 155.0'
		576 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	680.00'	**6.0" Round Culvert** L= 110.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 680.00' / 678.00' S= 0.0182 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.06 cfs @ 12.43 hrs HW=680.14' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.06 cfs @ 1.28 fps)

Summary for Pond RG-5.1: Rain Garden 5.1

Inflow Area = 42,865 sf, 63.86% Impervious, Inflow Depth > 2.17" for 2YearMass event
Inflow = 1.63 cfs @ 12.08 hrs, Volume= 7,746 cf
Outflow = 0.58 cfs @ 12.54 hrs, Volume= 6,162 cf, Atten= 64%, Lag= 27.8 min
Discarded = 0.22 cfs @ 12.54 hrs, Volume= 972 cf
Primary = 0.37 cfs @ 12.54 hrs, Volume= 5,190 cf
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP6 : AP6 - To Wetland B (off-site)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 673.19' @ 12.54 hrs Surf.Area= 3,821 sf Storage= 2,867 cf

Plug-Flow detention time= 142.6 min calculated for 6,160 cf (80% of inflow)
Center-of-Mass det. time= 67.6 min (886.1 - 818.5)

Volume	Invert	Avail.Storage	Storage Description
#1	669.75'	47 cf	**12.0" Round Pipe Storage** Inside #3 L= 60.0'
#2	669.75'	1,123 cf	**24.00'W x 39.00'L x 3.00'H Soil Media and Gravel**-Impervious 2,808 cf Overall x 40.0% Voids
#3	669.75'	1,104 cf	**24.00'W x 39.00'L x 3.00'H Soil Media and Gravel**-Impervious 2,808 cf Overall - 47 cf Embedded = 2,761 cf x 40.0% Voids
#4	672.75'	234 cf	**24.00'W x 78.00'L x 0.25'H Mulch** 468 cf Overall x 50.0% Voids
#5	673.00'	4,603 cf	**24.00'W x 78.00'L x 2.00'H Ponding Z=2.0**
		7,111 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	672.75'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	671.75'	**12.0" Round Culvert** L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 671.75' / 668.00' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	671.75'	**2.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	674.25'	**12.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Secondary	674.50'	**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

Discarded OutFlow Max=0.22 cfs @ 12.54 hrs HW=673.19' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.22 cfs)

Primary OutFlow Max=0.37 cfs @ 12.54 hrs HW=673.19' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.37 cfs of 3.66 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.37 cfs @ 5.60 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=669.75' TW=0.00' (Dynamic Tailwater)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG1: Rain Garden 1

Inflow Area = 7,720 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event
Inflow = 0.47 cfs @ 12.07 hrs, Volume= 1,418 cf
Outflow = 0.21 cfs @ 12.24 hrs, Volume= 1,406 cf, Atten= 56%, Lag= 10.0 min
Primary = 0.21 cfs @ 12.24 hrs, Volume= 1,406 cf
Routed to Pond DMH1 : Manhole

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 674.22' @ 12.24 hrs Surf.Area= 300 sf Storage= 324 cf

Plug-Flow detention time= 37.2 min calculated for 1,406 cf (99% of inflow)
Center-of-Mass det. time= 32.2 min (837.1 - 805.0)

Volume	Invert	Avail.Storage	Storage Description
#1	671.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	671.75'	341 cf	**5.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 900 cf Overall - 47 cf Embedded = 853 cf x 40.0% Voids
#3	674.75'	38 cf	**5.00'W x 60.00'L x 0.25'H Mulch** 75 cf Overall x 50.0% Voids
#4	675.00'	435 cf	**5.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		861 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	671.75'	**6.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 671.75' / 671.60' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	675.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	671.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	674.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.21 cfs @ 12.24 hrs HW=674.22' TW=673.05' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.21 cfs of 1.02 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.20 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.09 cfs @ 1.58 fps)

Summary for Pond RG2: Rain Garden 2

Inflow Area = 6,820 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event
Inflow = 0.41 cfs @ 12.07 hrs, Volume= 1,253 cf
Outflow = 0.13 cfs @ 12.37 hrs, Volume= 1,243 cf, Atten= 68%, Lag= 18.1 min
Primary = 0.13 cfs @ 12.37 hrs, Volume= 1,243 cf
Routed to Pond DMH2 : Manhole

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 675.40' @ 12.37 hrs Surf.Area= 440 sf Storage= 316 cf

Plug-Flow detention time= 28.9 min calculated for 1,243 cf (99% of inflow)
Center-of-Mass det. time= 24.3 min (829.2 - 805.0)

Volume	Invert	Avail.Storage	Storage Description
#1	673.75'	43 cf	**12.0" Round Pipe Storage** Inside #2 L= 55.0'
#2	673.75'	511 cf	**8.00'W x 55.00'L x 3.00'H Soil Media and Gravel** 1,320 cf Overall - 43 cf Embedded = 1,277 cf x 40.0% Voids
#3	676.75'	55 cf	**8.00'W x 55.00'L x 0.25'H Mulch** 110 cf Overall x 50.0% Voids
#4	677.00'	571 cf	**8.00'W x 55.00'L x 1.00'H Ponding Z=2.0**
		1,180 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	673.75'	**6.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.75' / 673.60' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	677.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	673.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	676.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.13 cfs @ 12.37 hrs HW=675.40' TW=673.78' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.13 cfs of 1.12 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.13 cfs @ 6.03 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond RG3: Rain Garden 3

Inflow Area = 6,780 sf, 57.81% Impervious, Inflow Depth > 2.03" for 2YearMass event
Inflow = 0.38 cfs @ 12.07 hrs, Volume= 1,148 cf
Outflow = 0.15 cfs @ 12.31 hrs, Volume= 1,142 cf, Atten= 62%, Lag= 14.4 min
Primary = 0.15 cfs @ 12.31 hrs, Volume= 1,142 cf
Routed to Pond DMH2 : Manhole

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 677.75' @ 12.31 hrs Surf.Area= 280 sf Storage= 241 cf

Plug-Flow detention time= 19.2 min calculated for 1,141 cf (99% of inflow)
Center-of-Mass det. time= 16.0 min (829.1 - 813.1)

Volume	Invert	Avail.Storage	Storage Description
#1	675.75'	27 cf	**12.0" Round Pipe Storage** Inside #2 L= 35.0'
#2	675.75'	325 cf	**8.00'W x 35.00'L x 3.00'H Soil Media and Gravel** 840 cf Overall - 27 cf Embedded = 813 cf x 40.0% Voids
#3	678.75'	35 cf	**8.00'W x 35.00'L x 0.25'H Mulch** 70 cf Overall x 50.0% Voids
#4	679.00'	371 cf	**8.00'W x 35.00'L x 1.00'H Ponding Z=2.0**
		759 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	675.75'	**6.0" Round Culvert** L= 76.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 675.75' / 673.60' S= 0.0283 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	679.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	675.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	678.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.15 cfs @ 12.31 hrs HW=677.75' TW=673.78' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.15 cfs of 1.10 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.15 cfs @ 6.67 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond RG69: Rain Garden 69

Inflow Area = 1,365 sf,100.00% Impervious, Inflow Depth > 3.01" for 2YearMass event
Inflow = 0.10 cfs @ 12.07 hrs, Volume= 342 cf
Outflow = 0.01 cfs @ 12.86 hrs, Volume= 342 cf, Atten= 91%, Lag= 47.5 min
Discarded = 0.01 cfs @ 11.57 hrs, Volume= 340 cf
Primary = 0.00 cfs @ 12.86 hrs, Volume= 2 cf
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 677.28' @ 12.86 hrs Surf.Area= 144 sf Storage= 122 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 107.5 min (862.2 - 754.8)

Volume	Invert	Avail.Storage	Storage Description
#1	675.25'	9 cf	**12.0" Round Pipe Storage** Inside #2 L= 12.0'
#2	675.25'	169 cf	**12.00'W x 12.00'L x 3.00'H Soil Media and Gravel** 432 cf Overall - 9 cf Embedded = 423 cf x 40.0% Voids
#3	678.25'	18 cf	**12.00'W x 12.00'L x 0.25'H Mulch** 36 cf Overall x 50.0% Voids
#4	678.50'	197 cf	**12.00'W x 12.00'L x 1.00'H Ponding Z=2.0**
		394 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	675.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	677.25'	**6.0" Round Culvert** L= 26.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.25' / 677.00' S= 0.0096 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	679.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	677.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	677.75'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 11.57 hrs HW=675.29' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 12.86 hrs HW=677.28' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.00 cfs of 0.00 cfs potential flow)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Orifice Controls 0.00 cfs @ 0.57 fps)
  └─**5=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond RG70: Rain Garden 70

Inflow Area = 5,415 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event
Inflow = 0.33 cfs @ 12.07 hrs, Volume= 994 cf
Outflow = 0.12 cfs @ 12.32 hrs, Volume= 994 cf, Atten= 63%, Lag= 14.6 min
Discarded = 0.02 cfs @ 11.35 hrs, Volume= 752 cf
Primary = 0.11 cfs @ 12.32 hrs, Volume= 242 cf
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 673.86' @ 12.32 hrs Surf.Area= 280 sf Storage= 309 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 110.9 min (915.9 - 805.0)

Volume	Invert	Avail.Storage	Storage Description
#1	671.25'	27 cf	**12.0" Round Pipe Storage** Inside #2 L= 35.0'
#2	671.25'	325 cf	**8.00'W x 35.00'L x 3.00'H Soil Media and Gravel** 840 cf Overall - 27 cf Embedded = 813 cf x 40.0% Voids
#3	674.25'	35 cf	**8.00'W x 35.00'L x 0.25'H Mulch** 70 cf Overall x 50.0% Voids
#4	674.50'	371 cf	**8.00'W x 35.00'L x 1.00'H Ponding Z=2.0**
		759 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	671.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	673.25'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.25' / 673.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	675.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	673.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	673.75'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 11.35 hrs HW=671.29' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.11 cfs @ 12.32 hrs HW=673.86' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.11 cfs of 0.57 cfs potential flow)
 ├─**3=Orifice/Grate** (Controls 0.00 cfs)
 ├─**4=Orifice/Grate** (Orifice Controls 0.08 cfs @ 3.51 fps)
 └─**5=Orifice/Grate** (Orifice Controls 0.03 cfs @ 1.15 fps)

Summary for Pond TD1: Trench Drain

Inflow Area = 21,545 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event
Inflow = 1.31 cfs @ 12.07 hrs, Volume= 3,957 cf
Outflow = 1.31 cfs @ 12.08 hrs, Volume= 3,955 cf, Atten= 0%, Lag= 0.2 min
Primary = 1.31 cfs @ 12.08 hrs, Volume= 3,955 cf
Routed to Pond RG-5.1 : Rain Garden 5.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 673.77' @ 12.08 hrs Surf.Area= 30 sf Storage= 20 cf

Plug-Flow detention time= 0.8 min calculated for 3,955 cf (100% of inflow)
Center-of-Mass det. time= 0.5 min (805.5 - 805.0)

Volume	Invert	Avail.Storage	Storage Description
#1	673.10'	60 cf	**1.50'W x 20.00'L x 2.00'H Prismatoid**

Device	Routing	Invert	Outlet Devices
#1	Primary	673.10'	**12.0" Round Culvert** L= 2.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.10' / 673.00' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.31 cfs @ 12.08 hrs HW=673.77' TW=672.45' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 1.31 cfs @ 3.32 fps)

Summary for Link AP5: AP5 - To Wetland A (A23-A32) / VP A1

Inflow Area = 189,460 sf, 17.53% Impervious, Inflow Depth > 0.97" for 2YearMass event
Inflow = 2.86 cfs @ 12.15 hrs, Volume= 15,359 cf
Primary = 2.86 cfs @ 12.15 hrs, Volume= 15,359 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link AP6: AP6 - To Wetland B (off-site)

Inflow Area = 111,800 sf, 0.00% Impervious, Inflow Depth > 0.70" for 2YearMass event
Inflow = 1.37 cfs @ 12.16 hrs, Volume= 6,530 cf
Primary = 1.37 cfs @ 12.16 hrs, Volume= 6,530 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment P5.1: To Wetland A (A23-A32) / VP A1

Runoff = 5.51 cfs @ 12.13 hrs, Volume= 19,172 cf, Depth> 2.40"
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
37,235	70	Woods, Good, HSG C
47,100	77	Woods, Good, HSG D
960	80	>75% Grass cover, Good, HSG D
9,640	74	>75% Grass cover, Good, HSG C
950	98	Unconnected roofs, HSG C
95,885	74	Weighted Average
94,935		99.01% Pervious Area
950		0.99% Impervious Area
950		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0750	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.8	150	0.0750	1.37		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.3	200	Total			

Summary for Subcatchment P5.2: Upgradient Lots 6-8

Runoff = 0.48 cfs @ 12.13 hrs, Volume= 1,892 cf, Depth> 1.06"
Routed to Pond IT-5/8 : Interceptor Trench

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
300	61	>75% Grass cover, Good, HSG B
485	74	>75% Grass cover, Good, HSG C
19,455	55	Woods, Good, HSG B
1,085	70	Woods, Good, HSG C
21,325	56	Weighted Average
21,325		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.1000	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.9	85	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.0	5	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.6	140	Total			

Summary for Subcatchment P5.3: To RG5.1

Runoff = 2.27 cfs @ 12.07 hrs, Volume= 7,041 cf, Depth> 3.92"
Routed to Pond TD1 : Trench Drain

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
21,545	90	1/8 acre lots, 65% imp, HSG C
7,541		35.00% Pervious Area
14,004		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P5.4: Lot 4

Runoff = 0.69 cfs @ 12.07 hrs, Volume= 2,098 cf, Depth> 3.71"
Routed to Pond RG3 : Rain Garden 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
6,030	90	1/8 acre lots, 65% imp, HSG C
750	70	Woods, Good, HSG C
6,780	88	Weighted Average
2,861		42.19% Pervious Area
3,920		57.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P5.5: Lot 69

Runoff = 0.16 cfs @ 12.07 hrs, Volume= 547 cf, Depth> 4.81"
Routed to Pond RG69 : Rain Garden 69

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
1,365	98	Paved roads w/curbs & sewers, HSG C
1,365		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P5.6: Upgradient of Amphibian Crossing

Runoff = 0.76 cfs @ 12.13 hrs, Volume= 2,762 cf, Depth> 1.47"
Routed to Reach AC : Amphibian Crossing

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
1,860	74	>75% Grass cover, Good, HSG C
8,330	70	Woods, Good, HSG C
12,415	55	Woods, Good, HSG B
22,605	62	Weighted Average
22,605		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.1000	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.6	150	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	30	0.3000	3.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.4	230	Total			

Summary for Subcatchment P5.7: Lot 70

Runoff = 0.57 cfs @ 12.07 hrs, Volume= 1,770 cf, Depth> 3.92"
Routed to Pond RG70 : Rain Garden 70

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
5,415	90	1/8 acre lots, 65% imp, HSG C
1,895		35.00% Pervious Area
3,520		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P5.8: Lot 3

Runoff = 0.72 cfs @ 12.07 hrs, Volume= 2,229 cf, Depth> 3.92"
Routed to Pond RG2 : Rain Garden 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
6,820	90	1/8 acre lots, 65% imp, HSG C
2,387		35.00% Pervious Area
4,433		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P5.9: Lot 2

Runoff = 0.81 cfs @ 12.07 hrs, Volume= 2,523 cf, Depth> 3.92"
Routed to Pond RG1 : Rain Garden 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
7,720	90	1/8 acre lots, 65% imp, HSG C
2,702		35.00% Pervious Area
5,018		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P6.1: To Wetland B (off-site)

Runoff = 3.43 cfs @ 12.13 hrs, Volume= 12,062 cf, Depth> 2.07"
Routed to Link AP6 : AP6 - To Wetland B (off-site)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
6,465	74	>75% Grass cover, Good, HSG C
1,875	55	Woods, Good, HSG B
61,615	70	Woods, Good, HSG C
69,955	70	Weighted Average
69,955		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	45	0.2200	2.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	290	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.2	385	Total			

Summary for Subcatchment P6.2: Upgradient Lots 1-5

Runoff = 1.21 cfs @ 12.17 hrs, Volume= 4,864 cf, Depth> 1.39"
Routed to Pond IT-1/5 : Interceptor Trench

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
2,130	74	>75% Grass cover, Good, HSG C
24,405	55	Woods, Good, HSG B
15,310	70	Woods, Good, HSG C
41,845	61	Weighted Average
41,845		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.7	160	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.9	210	Total			

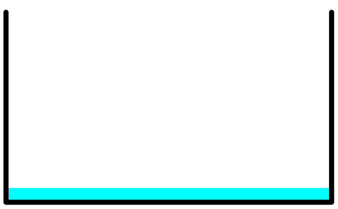
Summary for Reach AC: Amphibian Crossing

Inflow Area = 22,605 sf, 0.00% Impervious, Inflow Depth > 1.47" for 10YearMass event
Inflow = 0.76 cfs @ 12.13 hrs, Volume= 2,762 cf
Outflow = 0.75 cfs @ 12.14 hrs, Volume= 2,758 cf, Atten= 1%, Lag= 0.7 min
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.48 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 0.16 fps, Avg. Travel Time= 3.0 min

Peak Storage= 47 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.26' , Surface Width= 6.00'
Bank-Full Depth= 3.50' Flow Area= 21.0 sf, Capacity= 35.65 cfs

6.00' x 3.50' deep channel, n= 0.022 Earth, clean & straight
Length= 30.0' Slope= 0.0003 '/'
Inlet Invert= 675.83', Outlet Invert= 675.82'



Summary for Pond DMH1: Manhole

Inflow Area = 21,320 sf, 62.71% Impervious, Inflow Depth > 3.84" for 10YearMass event
Inflow = 1.41 cfs @ 12.16 hrs, Volume= 6,815 cf
Outflow = 1.41 cfs @ 12.16 hrs, Volume= 6,815 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.41 cfs @ 12.16 hrs, Volume= 6,815 cf
Routed to Pond RG-5.1 : Rain Garden 5.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 674.33' @ 12.45 hrs
Flood Elev= 675.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	671.50'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 671.50' / 671.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.22 cfs @ 12.16 hrs HW=673.89' TW=673.77' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.22 cfs @ 1.56 fps)

Summary for Pond DMH2: Manhole

Inflow Area = 13,600 sf, 61.42% Impervious, Inflow Depth > 3.80" for 10YearMass event
Inflow = 0.87 cfs @ 12.16 hrs, Volume= 4,307 cf
Outflow = 0.87 cfs @ 12.16 hrs, Volume= 4,307 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.87 cfs @ 12.16 hrs, Volume= 4,307 cf
Routed to Pond DMH1 : Manhole

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 674.37' @ 12.44 hrs
Flood Elev= 678.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	673.50'	**12.0" Round Culvert** L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.50' / 671.60' S= 0.0237 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.82 cfs @ 12.16 hrs HW=674.17' TW=673.90' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.82 cfs @ 2.08 fps)

Summary for Pond IT-1/5: Interceptor Trench

Inflow Area = 41,845 sf, 0.00% Impervious, Inflow Depth > 1.39" for 10YearMass event
Inflow = 1.21 cfs @ 12.17 hrs, Volume= 4,864 cf
Outflow = 1.10 cfs @ 12.22 hrs, Volume= 4,835 cf, Atten= 9%, Lag= 3.5 min
Primary = 1.10 cfs @ 12.22 hrs, Volume= 4,835 cf
Routed to Link AP6 : AP6 - To Wetland B (off-site)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 677.76' @ 12.22 hrs Surf.Area= 750 sf Storage= 280 cf

Plug-Flow detention time= 8.8 min calculated for 4,833 cf (99% of inflow)
Center-of-Mass det. time= 5.4 min (879.8 - 874.4)

Volume	Invert	Avail.Storage	Storage Description
#1	677.00'	865 cf	**3.00'W x 250.00'L x 3.00'H Prismatoid** 2,250 cf Overall - 87 cf Embedded = 2,163 cf x 40.0% Voids
#2	677.00'	87 cf	**8.0" Round Pipe Storage** Inside #1 L= 250.0'
		952 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	677.00'	**8.0" Round Culvert** L= 220.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.00' / 668.00' S= 0.0409 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=1.10 cfs @ 12.22 hrs HW=677.76' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.10 cfs @ 3.14 fps)

Summary for Pond IT-5/8: Interceptor Trench

Inflow Area = 21,325 sf, 0.00% Impervious, Inflow Depth > 1.06" for 10YearMass event
Inflow = 0.48 cfs @ 12.13 hrs, Volume= 1,892 cf
Outflow = 0.43 cfs @ 12.18 hrs, Volume= 1,880 cf, Atten= 10%, Lag= 2.9 min
Primary = 0.43 cfs @ 12.18 hrs, Volume= 1,880 cf
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 680.45' @ 12.18 hrs Surf.Area= 465 sf Storage= 102 cf

Plug-Flow detention time= 8.9 min calculated for 1,879 cf (99% of inflow)
Center-of-Mass det. time= 5.3 min (893.4 - 888.2)

Volume	Invert	Avail.Storage	Storage Description
#1	680.00'	546 cf	**3.00'W x 155.00'L x 3.00'H Prismatoid** 1,395 cf Overall - 30 cf Embedded = 1,365 cf x 40.0% Voids
#2	680.00'	30 cf	**6.0" Round Pipe Storage** Inside #1 L= 155.0'
		576 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	680.00'	**6.0" Round Culvert** L= 110.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 680.00' / 678.00' S= 0.0182 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.43 cfs @ 12.18 hrs HW=680.45' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.43 cfs @ 2.29 fps)

Summary for Pond RG-5.1: Rain Garden 5.1

Inflow Area = 42,865 sf, 63.86% Impervious, Inflow Depth > 3.88" for 10YearMass event
Inflow = 3.35 cfs @ 12.10 hrs, Volume= 13,854 cf
Outflow = 1.12 cfs @ 12.47 hrs, Volume= 12,253 cf, Atten= 67%, Lag= 22.5 min
Discarded = 0.25 cfs @ 12.47 hrs, Volume= 2,839 cf
Primary = 0.87 cfs @ 12.47 hrs, Volume= 9,414 cf
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP6 : AP6 - To Wetland B (off-site)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 674.30' @ 12.47 hrs Surf.Area= 4,303 sf Storage= 5,305 cf

Plug-Flow detention time= 129.3 min calculated for 12,248 cf (88% of inflow)
Center-of-Mass det. time= 77.1 min (880.1 - 803.0)

Volume	Invert	Avail.Storage	Storage Description
#1	669.75'	47 cf	**12.0" Round Pipe Storage** Inside #3 L= 60.0'
#2	669.75'	1,123 cf	**24.00'W x 39.00'L x 3.00'H Soil Media and Gravel**-Impervious 2,808 cf Overall x 40.0% Voids
#3	669.75'	1,104 cf	**24.00'W x 39.00'L x 3.00'H Soil Media and Gravel**-Impervious 2,808 cf Overall - 47 cf Embedded = 2,761 cf x 40.0% Voids
#4	672.75'	234 cf	**24.00'W x 78.00'L x 0.25'H Mulch** 468 cf Overall x 50.0% Voids
#5	673.00'	4,603 cf	**24.00'W x 78.00'L x 2.00'H Ponding Z=2.0**
		7,111 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	672.75'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	671.75'	**12.0" Round Culvert** L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 671.75' / 668.00' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	671.75'	**2.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	674.25'	**12.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Secondary	674.50'	**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

Discarded OutFlow Max=0.25 cfs @ 12.47 hrs HW=674.30' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=0.87 cfs @ 12.47 hrs HW=674.30' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.87 cfs of 5.42 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.50 cfs @ 7.57 fps)
  └─**4=Orifice/Grate** (Weir Controls 0.37 cfs @ 0.75 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=669.75' TW=0.00' (Dynamic Tailwater)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG1: Rain Garden 1

Inflow Area = 7,720 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event
Inflow = 0.81 cfs @ 12.07 hrs, Volume= 2,523 cf
Outflow = 0.53 cfs @ 12.13 hrs, Volume= 2,508 cf, Atten= 34%, Lag= 3.8 min
Primary = 0.53 cfs @ 12.13 hrs, Volume= 2,508 cf
Routed to Pond DMH1 : Manhole

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 675.13' @ 12.15 hrs Surf.Area= 935 sf Storage= 468 cf

Plug-Flow detention time= 37.8 min calculated for 2,508 cf (99% of inflow)
Center-of-Mass det. time= 34.0 min (822.9 - 789.0)

Volume	Invert	Avail.Storage	Storage Description
#1	671.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	671.75'	341 cf	**5.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 900 cf Overall - 47 cf Embedded = 853 cf x 40.0% Voids
#3	674.75'	38 cf	**5.00'W x 60.00'L x 0.25'H Mulch** 75 cf Overall x 50.0% Voids
#4	675.00'	435 cf	**5.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		861 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	671.75'	**6.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 671.75' / 671.60' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	675.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	671.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	674.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.53 cfs @ 12.13 hrs HW=675.12' TW=673.79' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.53 cfs of 1.09 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.12 cfs @ 5.55 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.41 cfs @ 4.71 fps)

Summary for Pond RG2: Rain Garden 2

Inflow Area = 6,820 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event
Inflow = 0.72 cfs @ 12.07 hrs, Volume= 2,229 cf
Outflow = 0.39 cfs @ 12.18 hrs, Volume= 2,217 cf, Atten= 46%, Lag= 6.7 min
Primary = 0.39 cfs @ 12.18 hrs, Volume= 2,217 cf
Routed to Pond DMH2 : Manhole

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 676.46' @ 12.19 hrs Surf.Area= 440 sf Storage= 503 cf

Plug-Flow detention time= 29.6 min calculated for 2,217 cf (99% of inflow)
Center-of-Mass det. time= 26.1 min (815.1 - 789.0)

Volume	Invert	Avail.Storage	Storage Description
#1	673.75'	43 cf	**12.0" Round Pipe Storage** Inside #2 L= 55.0'
#2	673.75'	511 cf	**8.00'W x 55.00'L x 3.00'H Soil Media and Gravel** 1,320 cf Overall - 43 cf Embedded = 1,277 cf x 40.0% Voids
#3	676.75'	55 cf	**8.00'W x 55.00'L x 0.25'H Mulch** 110 cf Overall x 50.0% Voids
#4	677.00'	571 cf	**8.00'W x 55.00'L x 1.00'H Ponding Z=2.0**
		1,180 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	673.75'	**6.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.75' / 673.60' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	677.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	673.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	676.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.39 cfs @ 12.18 hrs HW=676.46' TW=674.20' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.39 cfs of 1.42 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.16 cfs @ 7.24 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.23 cfs @ 2.61 fps)

Summary for Pond RG3: Rain Garden 3

Inflow Area = 6,780 sf, 57.81% Impervious, Inflow Depth > 3.71" for 10YearMass event
Inflow = 0.69 cfs @ 12.07 hrs, Volume= 2,098 cf
Outflow = 0.50 cfs @ 12.14 hrs, Volume= 2,091 cf, Atten= 27%, Lag= 4.1 min
Primary = 0.50 cfs @ 12.14 hrs, Volume= 2,091 cf
Routed to Pond DMH2 : Manhole

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 678.75' @ 12.14 hrs Surf.Area= 280 sf Storage= 352 cf

Plug-Flow detention time= 16.9 min calculated for 2,090 cf (100% of inflow)
Center-of-Mass det. time= 14.6 min (810.7 - 796.1)

Volume	Invert	Avail.Storage	Storage Description
#1	675.75'	27 cf	**12.0" Round Pipe Storage** Inside #2 L= 35.0'
#2	675.75'	325 cf	**8.00'W x 35.00'L x 3.00'H Soil Media and Gravel** 840 cf Overall - 27 cf Embedded = 813 cf x 40.0% Voids
#3	678.75'	35 cf	**8.00'W x 35.00'L x 0.25'H Mulch** 70 cf Overall x 50.0% Voids
#4	679.00'	371 cf	**8.00'W x 35.00'L x 1.00'H Ponding Z=2.0**
		759 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	675.75'	**6.0" Round Culvert** L= 76.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 675.75' / 673.60' S= 0.0283 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	679.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	675.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	678.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.50 cfs @ 12.14 hrs HW=678.75' TW=674.13' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.50 cfs of 1.24 cfs potential flow)
 ├─**2=Orifice/Grate** (Controls 0.00 cfs)
 ├─**3=Orifice/Grate** (Orifice Controls 0.18 cfs @ 8.22 fps)
 └─**4=Orifice/Grate** (Orifice Controls 0.32 cfs @ 3.67 fps)

Summary for Pond RG69: Rain Garden 69

Inflow Area = 1,365 sf,100.00% Impervious, Inflow Depth > 4.81" for 10YearMass event
Inflow = 0.16 cfs @ 12.07 hrs, Volume= 547 cf
Outflow = 0.07 cfs @ 12.22 hrs, Volume= 547 cf, Atten= 55%, Lag= 9.1 min
Discarded = 0.01 cfs @ 10.81 hrs, Volume= 430 cf
Primary = 0.06 cfs @ 12.22 hrs, Volume= 117 cf
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 677.71' @ 12.22 hrs Surf.Area= 144 sf Storage= 147 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 91.1 min (837.5 - 746.5)

Volume	Invert	Avail.Storage	Storage Description
#1	675.25'	9 cf	**12.0" Round Pipe Storage** Inside #2 L= 12.0'
#2	675.25'	169 cf	**12.00'W x 12.00'L x 3.00'H Soil Media and Gravel** 432 cf Overall - 9 cf Embedded = 423 cf x 40.0% Voids
#3	678.25'	18 cf	**12.00'W x 12.00'L x 0.25'H Mulch** 36 cf Overall x 50.0% Voids
#4	678.50'	197 cf	**12.00'W x 12.00'L x 1.00'H Ponding Z=2.0**
		394 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	675.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	677.25'	**6.0" Round Culvert** L= 26.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.25' / 677.00' S= 0.0096 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	679.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	677.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	677.75'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 10.81 hrs HW=675.29' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.06 cfs @ 12.22 hrs HW=677.71' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.06 cfs of 0.39 cfs potential flow)
 ├─**3=Orifice/Grate** (Controls 0.00 cfs)
 ├─**4=Orifice/Grate** (Orifice Controls 0.06 cfs @ 2.95 fps)
 └─**5=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond RG70: Rain Garden 70

Inflow Area = 5,415 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event
Inflow = 0.57 cfs @ 12.07 hrs, Volume= 1,770 cf
Outflow = 0.45 cfs @ 12.13 hrs, Volume= 1,724 cf, Atten= 21%, Lag= 3.4 min
Discarded = 0.03 cfs @ 12.06 hrs, Volume= 920 cf
Primary = 0.42 cfs @ 12.13 hrs, Volume= 805 cf
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 674.46' @ 12.13 hrs Surf.Area= 560 sf Storage= 382 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 71.1 min (860.0 - 789.0)

Volume	Invert	Avail.Storage	Storage Description
#1	671.25'	27 cf	**12.0" Round Pipe Storage** Inside #2 L= 35.0'
#2	671.25'	325 cf	**8.00'W x 35.00'L x 3.00'H Soil Media and Gravel** 840 cf Overall - 27 cf Embedded = 813 cf x 40.0% Voids
#3	674.25'	35 cf	**8.00'W x 35.00'L x 0.25'H Mulch** 70 cf Overall x 50.0% Voids
#4	674.50'	371 cf	**8.00'W x 35.00'L x 1.00'H Ponding Z=2.0**
		759 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	671.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	673.25'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.25' / 673.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	675.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	673.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	673.75'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.03 cfs @ 12.06 hrs HW=674.28' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.42 cfs @ 12.13 hrs HW=674.46' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.42 cfs of 0.88 cfs potential flow)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.11 fps)
  └─**5=Orifice/Grate** (Orifice Controls 0.31 cfs @ 3.55 fps)

Summary for Pond TD1: Trench Drain

Inflow Area = 21,545 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event
Inflow = 2.27 cfs @ 12.07 hrs, Volume= 7,041 cf
Outflow = 2.27 cfs @ 12.07 hrs, Volume= 7,039 cf, Atten= 0%, Lag= 0.1 min
Primary = 2.27 cfs @ 12.07 hrs, Volume= 7,039 cf
Routed to Pond RG-5.1 : Rain Garden 5.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 674.32' @ 12.46 hrs Surf.Area= 30 sf Storage= 37 cf

Plug-Flow detention time= 1.0 min calculated for 7,036 cf (100% of inflow)
Center-of-Mass det. time= 0.8 min (789.8 - 789.0)

Volume	Invert	Avail.Storage	Storage Description
#1	673.10'	60 cf	**1.50'W x 20.00'L x 2.00'H Prismatoid**

Device	Routing	Invert	Outlet Devices
#1	Primary	673.10'	**12.0" Round Culvert** L= 2.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.10' / 673.00' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.27 cfs @ 12.07 hrs HW=674.06' TW=673.41' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 2.27 cfs @ 3.76 fps)

Summary for Link AP5: AP5 - To Wetland A (A23-A32) / VP A1

Inflow Area = 189,460 sf, 17.53% Impervious, Inflow Depth > 2.16" for 10YearMass event
Inflow = 7.57 cfs @ 12.14 hrs, Volume= 34,146 cf
Primary = 7.57 cfs @ 12.14 hrs, Volume= 34,146 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link AP6: AP6 - To Wetland B (off-site)

Inflow Area = 111,800 sf, 0.00% Impervious, Inflow Depth > 1.81" for 10YearMass event
Inflow = 4.34 cfs @ 12.15 hrs, Volume= 16,896 cf
Primary = 4.34 cfs @ 12.15 hrs, Volume= 16,896 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment P5.1: To Wetland A (A23-A32) / VP A1

Runoff = 7.69 cfs @ 12.13 hrs, Volume= 26,613 cf, Depth> 3.33"
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
37,235	70	Woods, Good, HSG C
47,100	77	Woods, Good, HSG D
960	80	>75% Grass cover, Good, HSG D
9,640	74	>75% Grass cover, Good, HSG C
950	98	Unconnected roofs, HSG C
95,885	74	Weighted Average
94,935		99.01% Pervious Area
950		0.99% Impervious Area
950		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0750	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.8	150	0.0750	1.37		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.3	200	Total			

Summary for Subcatchment P5.2: Upgradient Lots 6-8

Runoff = 0.84 cfs @ 12.12 hrs, Volume= 3,021 cf, Depth> 1.70"
Routed to Pond IT-5/8 : Interceptor Trench

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
300	61	>75% Grass cover, Good, HSG B
485	74	>75% Grass cover, Good, HSG C
19,455	55	Woods, Good, HSG B
1,085	70	Woods, Good, HSG C
21,325	56	Weighted Average
21,325		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.1000	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.9	85	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.0	5	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.6	140	Total			

Summary for Subcatchment P5.3: To RG5.1

Runoff = 2.87 cfs @ 12.07 hrs, Volume= 9,009 cf, Depth> 5.02"
Routed to Pond TD1 : Trench Drain

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
21,545	90	1/8 acre lots, 65% imp, HSG C
7,541		35.00% Pervious Area
14,004		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P5.4: Lot 4

Runoff = 0.88 cfs @ 12.07 hrs, Volume= 2,710 cf, Depth> 4.80"
Routed to Pond RG3 : Rain Garden 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
6,030	90	1/8 acre lots, 65% imp, HSG C
750	70	Woods, Good, HSG C
6,780	88	Weighted Average
2,861		42.19% Pervious Area
3,920		57.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P5.5: Lot 69

Runoff = 0.20 cfs @ 12.07 hrs, Volume= 675 cf, Depth> 5.94"
Routed to Pond RG69 : Rain Garden 69

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
1,365	98	Paved roads w/curbs & sewers, HSG C
1,365		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P5.6: Upgradient of Amphibian Crossing

Runoff = 1.19 cfs @ 12.13 hrs, Volume= 4,163 cf, Depth> 2.21"
Routed to Reach AC : Amphibian Crossing

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
1,860	74	>75% Grass cover, Good, HSG C
8,330	70	Woods, Good, HSG C
12,415	55	Woods, Good, HSG B
22,605	62	Weighted Average
22,605		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.1000	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.6	150	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	30	0.3000	3.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.4	230	Total			

Summary for Subcatchment P5.7: Lot 70

Runoff = 0.72 cfs @ 12.07 hrs, Volume= 2,264 cf, Depth> 5.02"
Routed to Pond RG70 : Rain Garden 70

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
5,415	90	1/8 acre lots, 65% imp, HSG C
1,895		35.00% Pervious Area
3,520		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P5.8: Lot 3

Runoff = 0.91 cfs @ 12.07 hrs, Volume= 2,852 cf, Depth> 5.02"
Routed to Pond RG2 : Rain Garden 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
6,820	90	1/8 acre lots, 65% imp, HSG C
2,387		35.00% Pervious Area
4,433		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P5.9: Lot 2

Runoff = 1.03 cfs @ 12.07 hrs, Volume= 3,228 cf, Depth> 5.02"
Routed to Pond RG1 : Rain Garden 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
7,720	90	1/8 acre lots, 65% imp, HSG C
2,702		35.00% Pervious Area
5,018		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P6.1: To Wetland B (off-site)

Runoff = 4.95 cfs @ 12.13 hrs, Volume= 17,156 cf, Depth> 2.94"
Routed to Link AP6 : AP6 - To Wetland B (off-site)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
6,465	74	>75% Grass cover, Good, HSG C
1,875	55	Woods, Good, HSG B
61,615	70	Woods, Good, HSG C
69,955	70	Weighted Average
69,955		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	45	0.2200	2.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	290	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.2	385	Total			

Summary for Subcatchment P6.2: Upgradient Lots 1-5

Runoff = 1.94 cfs @ 12.16 hrs, Volume= 7,396 cf, Depth> 2.12"
Routed to Pond IT-1/5 : Interceptor Trench

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
2,130	74	>75% Grass cover, Good, HSG C
24,405	55	Woods, Good, HSG B
15,310	70	Woods, Good, HSG C
41,845	61	Weighted Average
41,845		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.7	160	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.9	210	Total			

Summary for Reach AC: Amphibian Crossing

Inflow Area = 22,605 sf, 0.00% Impervious, Inflow Depth > 2.21" for 25YearMass event
Inflow = 1.19 cfs @ 12.13 hrs, Volume= 4,163 cf
Outflow = 1.19 cfs @ 12.14 hrs, Volume= 4,158 cf, Atten= 0%, Lag= 0.6 min
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.57 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 0.18 fps, Avg. Travel Time= 2.8 min

Peak Storage= 63 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.35' , Surface Width= 6.00'
Bank-Full Depth= 3.50' Flow Area= 21.0 sf, Capacity= 35.65 cfs

6.00' x 3.50' deep channel, n= 0.022 Earth, clean & straight
Length= 30.0' Slope= 0.0003 '/'
Inlet Invert= 675.83', Outlet Invert= 675.82'

Summary for Pond DMH1: Manhole

Inflow Area = 21,320 sf, 62.71% Impervious, Inflow Depth > 4.92" for 25YearMass event
Inflow = 1.69 cfs @ 12.13 hrs, Volume= 8,750 cf
Outflow = 1.69 cfs @ 12.13 hrs, Volume= 8,750 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.69 cfs @ 12.13 hrs, Volume= 8,750 cf
Routed to Pond RG-5.1 : Rain Garden 5.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 674.58' @ 12.25 hrs
Flood Elev= 675.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	671.50'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 671.50' / 671.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.49 cfs @ 12.13 hrs HW=674.28' TW=674.11' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.49 cfs @ 1.90 fps)

Summary for Pond DMH2: Manhole

Inflow Area = 13,600 sf, 61.42% Impervious, Inflow Depth > 4.89" for 25YearMass event
Inflow = 1.13 cfs @ 12.16 hrs, Volume= 5,539 cf
Outflow = 1.13 cfs @ 12.16 hrs, Volume= 5,539 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.13 cfs @ 12.16 hrs, Volume= 5,539 cf
Routed to Pond DMH1 : Manhole

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 674.69' @ 12.25 hrs
Flood Elev= 678.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	673.50'	**12.0" Round Culvert** L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.50' / 671.60' S= 0.0237 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.97 cfs @ 12.16 hrs HW=674.51' TW=674.39' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.97 cfs @ 1.52 fps)

Summary for Pond IT-1/5: Interceptor Trench

Inflow Area = 41,845 sf, 0.00% Impervious, Inflow Depth > 2.12" for 25YearMass event
Inflow = 1.94 cfs @ 12.16 hrs, Volume= 7,396 cf
Outflow = 1.68 cfs @ 12.23 hrs, Volume= 7,361 cf, Atten= 13%, Lag= 4.3 min
Primary = 1.68 cfs @ 12.23 hrs, Volume= 7,361 cf
Routed to Link AP6 : AP6 - To Wetland B (off-site)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 678.33' @ 12.23 hrs Surf.Area= 750 sf Storage= 452 cf

Plug-Flow detention time= 7.6 min calculated for 7,358 cf (99% of inflow)
Center-of-Mass det. time= 4.9 min (866.2 - 861.3)

Volume	Invert	Avail.Storage	Storage Description
#1	677.00'	865 cf	**3.00'W x 250.00'L x 3.00'H Prismatoid** 2,250 cf Overall - 87 cf Embedded = 2,163 cf x 40.0% Voids
#2	677.00'	87 cf	**8.0" Round Pipe Storage** Inside #1 L= 250.0'
		952 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	677.00'	**8.0" Round Culvert** L= 220.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.00' / 668.00' S= 0.0409 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=1.68 cfs @ 12.23 hrs HW=678.33' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 1.68 cfs @ 4.81 fps)

Summary for Pond IT-5/8: Interceptor Trench

Inflow Area = 21,325 sf, 0.00% Impervious, Inflow Depth > 1.70" for 25YearMass event
Inflow = 0.84 cfs @ 12.12 hrs, Volume= 3,021 cf
Outflow = 0.72 cfs @ 12.18 hrs, Volume= 3,006 cf, Atten= 14%, Lag= 3.4 min
Primary = 0.72 cfs @ 12.18 hrs, Volume= 3,006 cf
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 680.83' @ 12.18 hrs Surf.Area= 465 sf Storage= 173 cf

Plug-Flow detention time= 7.3 min calculated for 3,006 cf (99% of inflow)
Center-of-Mass det. time= 4.5 min (876.7 - 872.2)

Volume	Invert	Avail.Storage	Storage Description
#1	680.00'	546 cf	**3.00'W x 155.00'L x 3.00'H Prismatoid** 1,395 cf Overall - 30 cf Embedded = 1,365 cf x 40.0% Voids
#2	680.00'	30 cf	**6.0" Round Pipe Storage** Inside #1 L= 155.0'
		576 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	680.00'	**6.0" Round Culvert** L= 110.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 680.00' / 678.00' S= 0.0182 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.72 cfs @ 12.18 hrs HW=680.83' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.72 cfs @ 3.67 fps)

Summary for Pond RG-5.1: Rain Garden 5.1

Inflow Area = 42,865 sf, 63.86% Impervious, Inflow Depth > 4.97" for 25YearMass event
Inflow = 4.37 cfs @ 12.09 hrs, Volume= 17,756 cf
Outflow = 2.61 cfs @ 12.28 hrs, Volume= 16,146 cf, Atten= 40%, Lag= 11.6 min
Discarded = 0.25 cfs @ 12.28 hrs, Volume= 3,289 cf
Primary = 2.36 cfs @ 12.28 hrs, Volume= 12,857 cf
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link AP6 : AP6 - To Wetland B (off-site)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 674.40' @ 12.28 hrs Surf.Area= 4,348 sf Storage= 5,553 cf

Plug-Flow detention time= 113.6 min calculated for 16,146 cf (91% of inflow)
Center-of-Mass det. time= 69.4 min (865.1 - 795.7)

Volume	Invert	Avail.Storage	Storage Description
#1	669.75'	47 cf	**12.0" Round Pipe Storage** Inside #3 L= 60.0'
#2	669.75'	1,123 cf	**24.00'W x 39.00'L x 3.00'H Soil Media and Gravel**-Impervious 2,808 cf Overall x 40.0% Voids
#3	669.75'	1,104 cf	**24.00'W x 39.00'L x 3.00'H Soil Media and Gravel**-Impervious 2,808 cf Overall - 47 cf Embedded = 2,761 cf x 40.0% Voids
#4	672.75'	234 cf	**24.00'W x 78.00'L x 0.25'H Mulch** 468 cf Overall x 50.0% Voids
#5	673.00'	4,603 cf	**24.00'W x 78.00'L x 2.00'H Ponding Z=2.0**
		7,111 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	672.75'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	671.75'	**12.0" Round Culvert** L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 671.75' / 668.00' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	671.75'	**2.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	674.25'	**12.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Secondary	674.50'	**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

Discarded OutFlow Max=0.25 cfs @ 12.28 hrs HW=674.40' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=2.36 cfs @ 12.28 hrs HW=674.40' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 2.36 cfs of 5.55 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 0.51 cfs @ 7.72 fps)
  └─**4=Orifice/Grate** (Weir Controls 1.85 cfs @ 1.28 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=669.75' TW=0.00' (Dynamic Tailwater)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG1: Rain Garden 1

Inflow Area = 7,720 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event
Inflow = 1.03 cfs @ 12.07 hrs, Volume= 3,228 cf
Outflow = 0.58 cfs @ 12.12 hrs, Volume= 3,211 cf, Atten= 44%, Lag= 2.9 min
Primary = 0.58 cfs @ 12.12 hrs, Volume= 3,211 cf
Routed to Pond DMH1 : Manhole

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 675.45' @ 12.20 hrs Surf.Area= 1,021 sf Storage= 589 cf

Plug-Flow detention time= 35.8 min calculated for 3,211 cf (99% of inflow)
Center-of-Mass det. time= 32.3 min (814.6 - 782.3)

Volume	Invert	Avail.Storage	Storage Description
#1	671.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	671.75'	341 cf	**5.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 900 cf Overall - 47 cf Embedded = 853 cf x 40.0% Voids
#3	674.75'	38 cf	**5.00'W x 60.00'L x 0.25'H Mulch** 75 cf Overall x 50.0% Voids
#4	675.00'	435 cf	**5.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		861 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	671.75'	**6.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 671.75' / 671.60' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	675.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	671.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	674.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.57 cfs @ 12.12 hrs HW=675.37' TW=674.20' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.57 cfs of 1.02 cfs potential flow)
  - **2=Orifice/Grate** (Controls 0.00 cfs)
  - **3=Orifice/Grate** (Orifice Controls 0.11 cfs @ 5.20 fps)
  - **4=Orifice/Grate** (Orifice Controls 0.45 cfs @ 5.20 fps)

Summary for Pond RG2: Rain Garden 2

Inflow Area = 6,820 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event
Inflow = 0.91 cfs @ 12.07 hrs, Volume= 2,852 cf
Outflow = 0.53 cfs @ 12.16 hrs, Volume= 2,838 cf, Atten= 41%, Lag= 5.5 min
Primary = 0.53 cfs @ 12.16 hrs, Volume= 2,838 cf
Routed to Pond DMH2 : Manhole

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 676.94' @ 12.17 hrs Surf.Area= 880 sf Storage= 595 cf

Plug-Flow detention time= 27.8 min calculated for 2,837 cf (99% of inflow)
Center-of-Mass det. time= 24.7 min (807.1 - 782.3)

Volume	Invert	Avail.Storage	Storage Description
#1	673.75'	43 cf	**12.0" Round Pipe Storage** Inside #2 L= 55.0'
#2	673.75'	511 cf	**8.00'W x 55.00'L x 3.00'H Soil Media and Gravel** 1,320 cf Overall - 43 cf Embedded = 1,277 cf x 40.0% Voids
#3	676.75'	55 cf	**8.00'W x 55.00'L x 0.25'H Mulch** 110 cf Overall x 50.0% Voids
#4	677.00'	571 cf	**8.00'W x 55.00'L x 1.00'H Ponding Z=2.0**
		1,180 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	673.75'	**6.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.75' / 673.60' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	677.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	673.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	676.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.53 cfs @ 12.16 hrs HW=676.93' TW=674.53' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.53 cfs of 1.46 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.16 cfs @ 7.46 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.37 cfs @ 4.22 fps)

Summary for Pond RG3: Rain Garden 3

Inflow Area = 6,780 sf, 57.81% Impervious, Inflow Depth > 4.80" for 25YearMass event
Inflow = 0.88 cfs @ 12.07 hrs, Volume= 2,710 cf
Outflow = 0.60 cfs @ 12.15 hrs, Volume= 2,701 cf, Atten= 31%, Lag= 4.6 min
Primary = 0.60 cfs @ 12.15 hrs, Volume= 2,701 cf
Routed to Pond DMH2 : Manhole

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 679.13' @ 12.15 hrs Surf.Area= 862 sf Storage= 425 cf

Plug-Flow detention time= 16.1 min calculated for 2,701 cf (100% of inflow)
Center-of-Mass det. time= 14.0 min (803.1 - 789.1)

Volume	Invert	Avail.Storage	Storage Description
#1	675.75'	27 cf	**12.0" Round Pipe Storage** Inside #2 L= 35.0'
#2	675.75'	325 cf	**8.00'W x 35.00'L x 3.00'H Soil Media and Gravel** 840 cf Overall - 27 cf Embedded = 813 cf x 40.0% Voids
#3	678.75'	35 cf	**8.00'W x 35.00'L x 0.25'H Mulch** 70 cf Overall x 50.0% Voids
#4	679.00'	371 cf	**8.00'W x 35.00'L x 1.00'H Ponding Z=2.0**
		759 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	675.75'	**6.0" Round Culvert** L= 76.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 675.75' / 673.60' S= 0.0283 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	679.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	675.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	678.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.60 cfs @ 12.15 hrs HW=679.13' TW=674.48' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.60 cfs of 1.24 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.19 cfs @ 8.74 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.41 cfs @ 4.72 fps)

Summary for Pond RG69: Rain Garden 69

Inflow Area = 1,365 sf,100.00% Impervious, Inflow Depth > 5.94" for 25YearMass event
Inflow = 0.20 cfs @ 12.07 hrs, Volume= 675 cf
Outflow = 0.16 cfs @ 12.13 hrs, Volume= 675 cf, Atten= 20%, Lag= 3.3 min
Discarded = 0.01 cfs @ 10.27 hrs, Volume= 475 cf
Primary = 0.15 cfs @ 12.13 hrs, Volume= 201 cf
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 677.93' @ 12.13 hrs Surf.Area= 144 sf Storage= 160 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 84.7 min (828.1 - 743.3)

Volume	Invert	Avail.Storage	Storage Description
#1	675.25'	9 cf	**12.0" Round Pipe Storage** Inside #2 L= 12.0'
#2	675.25'	169 cf	**12.00'W x 12.00'L x 3.00'H Soil Media and Gravel** 432 cf Overall - 9 cf Embedded = 423 cf x 40.0% Voids
#3	678.25'	18 cf	**12.00'W x 12.00'L x 0.25'H Mulch** 36 cf Overall x 50.0% Voids
#4	678.50'	197 cf	**12.00'W x 12.00'L x 1.00'H Ponding Z=2.0**
		394 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	675.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	677.25'	**6.0" Round Culvert** L= 26.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.25' / 677.00' S= 0.0096 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	679.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	677.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	677.75'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 10.27 hrs HW=675.29' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.15 cfs @ 12.13 hrs HW=677.93' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.15 cfs of 0.55 cfs potential flow)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Orifice Controls 0.08 cfs @ 3.71 fps)
  └─**5=Orifice/Grate** (Orifice Controls 0.07 cfs @ 1.44 fps)

Summary for Pond RG70: Rain Garden 70

Inflow Area = 5,415 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event
Inflow = 0.72 cfs @ 12.07 hrs, Volume= 2,264 cf
Outflow = 0.53 cfs @ 12.14 hrs, Volume= 2,167 cf, Atten= 27%, Lag= 4.1 min
Discarded = 0.05 cfs @ 12.14 hrs, Volume= 983 cf
Primary = 0.48 cfs @ 12.14 hrs, Volume= 1,184 cf
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 674.65' @ 12.14 hrs Surf.Area= 866 sf Storage= 431 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 50.9 min (833.2 - 782.3)

Volume	Invert	Avail.Storage	Storage Description
#1	671.25'	27 cf	**12.0" Round Pipe Storage** Inside #2 L= 35.0'
#2	671.25'	325 cf	**8.00'W x 35.00'L x 3.00'H Soil Media and Gravel** 840 cf Overall - 27 cf Embedded = 813 cf x 40.0% Voids
#3	674.25'	35 cf	**8.00'W x 35.00'L x 0.25'H Mulch** 70 cf Overall x 50.0% Voids
#4	674.50'	371 cf	**8.00'W x 35.00'L x 1.00'H Ponding Z=2.0**
		759 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	671.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	673.25'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.25' / 673.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	675.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	673.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	673.75'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.05 cfs @ 12.14 hrs HW=674.65' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.48 cfs @ 12.14 hrs HW=674.65' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.48 cfs of 0.96 cfs potential flow)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Orifice Controls 0.12 cfs @ 5.52 fps)
  └─**5=Orifice/Grate** (Orifice Controls 0.36 cfs @ 4.12 fps)

Summary for Pond TD1: Trench Drain

Inflow Area = 21,545 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event
Inflow = 2.87 cfs @ 12.07 hrs, Volume= 9,009 cf
Outflow = 2.83 cfs @ 12.07 hrs, Volume= 9,006 cf, Atten= 1%, Lag= 0.0 min
Primary = 2.83 cfs @ 12.07 hrs, Volume= 9,006 cf
Routed to Pond RG-5.1 : Rain Garden 5.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 674.50' @ 12.25 hrs Surf.Area= 30 sf Storage= 42 cf

Plug-Flow detention time= 0.9 min calculated for 9,003 cf (100% of inflow)
Center-of-Mass det. time= 0.8 min (783.1 - 782.3)

Volume	Invert	Avail.Storage	Storage Description
#1	673.10'	60 cf	**1.50'W x 20.00'L x 2.00'H Prismatoid**

Device	Routing	Invert	Outlet Devices
#1	Primary	673.10'	**12.0" Round Culvert** L= 2.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.10' / 673.00' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.69 cfs @ 12.07 hrs HW=674.25' TW=673.75' (Dynamic Tailwater)
1=Culvert (Inlet Controls 2.69 cfs @ 3.42 fps)

Summary for Link AP5: AP5 - To Wetland A (A23-A32) / VP A1

Inflow Area = 189,460 sf, 17.53% Impervious, Inflow Depth > 3.04" for 25YearMass event
Inflow = 10.66 cfs @ 12.14 hrs, Volume= 48,019 cf
Primary = 10.66 cfs @ 12.14 hrs, Volume= 48,019 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link AP6: AP6 - To Wetland B (off-site)

Inflow Area = 111,800 sf, 0.00% Impervious, Inflow Depth > 2.63" for 25YearMass event
Inflow = 6.35 cfs @ 12.14 hrs, Volume= 24,517 cf
Primary = 6.35 cfs @ 12.14 hrs, Volume= 24,517 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment P5.1: To Wetland A (A23-A32) / VP A1

Runoff = 11.19 cfs @ 12.13 hrs, Volume= 38,791 cf, Depth> 4.85"
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
37,235	70	Woods, Good, HSG C
47,100	77	Woods, Good, HSG D
960	80	>75% Grass cover, Good, HSG D
9,640	74	>75% Grass cover, Good, HSG C
950	98	Unconnected roofs, HSG C
95,885	74	Weighted Average
94,935		99.01% Pervious Area
950		0.99% Impervious Area
950		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	50	0.0750	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.8	150	0.0750	1.37		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.3	200	Total			

Summary for Subcatchment P5.2: Upgradient Lots 6-8

Runoff = 1.49 cfs @ 12.12 hrs, Volume= 5,045 cf, Depth> 2.84"
Routed to Pond IT-5/8 : Interceptor Trench

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
300	61	>75% Grass cover, Good, HSG B
485	74	>75% Grass cover, Good, HSG C
19,455	55	Woods, Good, HSG B
1,085	70	Woods, Good, HSG C
21,325	56	Weighted Average
21,325		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.1000	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.9	85	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.0	5	0.1000	2.21		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
7.6	140	Total			

Summary for Subcatchment P5.3: To RG5.1

Runoff = 3.79 cfs @ 12.07 hrs, Volume= 12,086 cf, Depth> 6.73"
Routed to Pond TD1 : Trench Drain

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
21,545	90	1/8 acre lots, 65% imp, HSG C
7,541		35.00% Pervious Area
14,004		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P5.4: Lot 4

Runoff = 1.17 cfs @ 12.07 hrs, Volume= 3,670 cf, Depth> 6.49"
Routed to Pond RG3 : Rain Garden 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
6,030	90	1/8 acre lots, 65% imp, HSG C
750	70	Woods, Good, HSG C
6,780	88	Weighted Average
2,861		42.19% Pervious Area
3,920		57.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P5.5: Lot 69

Runoff = 0.25 cfs @ 12.07 hrs, Volume= 874 cf, Depth> 7.69"
Routed to Pond RG69 : Rain Garden 69

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
1,365	98	Paved roads w/curbs & sewers, HSG C
1,365		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P5.6: Upgradient of Amphibian Crossing

Runoff = 1.94 cfs @ 12.12 hrs, Volume= 6,585 cf, Depth> 3.50"
Routed to Reach AC : Amphibian Crossing

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
1,860	74	>75% Grass cover, Good, HSG C
8,330	70	Woods, Good, HSG C
12,415	55	Woods, Good, HSG B
22,605	62	Weighted Average
22,605		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	50	0.1000	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.6	150	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	30	0.3000	3.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
8.4	230	Total			

Summary for Subcatchment P5.7: Lot 70

Runoff = 0.95 cfs @ 12.07 hrs, Volume= 3,038 cf, Depth> 6.73"
Routed to Pond RG70 : Rain Garden 70

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
5,415	90	1/8 acre lots, 65% imp, HSG C
1,895		35.00% Pervious Area
3,520		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P5.8: Lot 3

Runoff = 1.20 cfs @ 12.07 hrs, Volume= 3,826 cf, Depth> 6.73"
Routed to Pond RG2 : Rain Garden 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
6,820	90	1/8 acre lots, 65% imp, HSG C
2,387		35.00% Pervious Area
4,433		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P5.9: Lot 2

Runoff = 1.36 cfs @ 12.07 hrs, Volume= 4,331 cf, Depth> 6.73"
Routed to Pond RG1 : Rain Garden 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
7,720	90	1/8 acre lots, 65% imp, HSG C
2,702		35.00% Pervious Area
5,018		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P6.1: To Wetland B (off-site)

Runoff = 7.44 cfs @ 12.13 hrs, Volume= 25,628 cf, Depth> 4.40"
Routed to Link AP6 : AP6 - To Wetland B (off-site)

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
6,465	74	>75% Grass cover, Good, HSG C
1,875	55	Woods, Good, HSG B
61,615	70	Woods, Good, HSG C
69,955	70	Weighted Average
69,955		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.3	45	0.2200	2.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	290	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.2	385	Total			

Summary for Subcatchment P6.2: Upgradient Lots 1-5

Runoff = 3.19 cfs @ 12.15 hrs, Volume= 11,797 cf, Depth> 3.38"
Routed to Pond IT-1/5 : Interceptor Trench

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
2,130	74	>75% Grass cover, Good, HSG C
24,405	55	Woods, Good, HSG B
15,310	70	Woods, Good, HSG C
41,845	61	Weighted Average
41,845		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
2.7	160	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.9	210	Total			

Summary for Reach AC: Amphibian Crossing

Inflow Area = 22,605 sf, 0.00% Impervious, Inflow Depth > 3.50" for 100YearMass event
Inflow = 1.94 cfs @ 12.12 hrs, Volume= 6,585 cf
Outflow = 1.93 cfs @ 12.13 hrs, Volume= 6,579 cf, Atten= 0%, Lag= 0.5 min
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.68 fps, Min. Travel Time= 0.7 min
Avg. Velocity = 0.21 fps, Avg. Travel Time= 2.4 min

Peak Storage= 85 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.47' , Surface Width= 6.00'
Bank-Full Depth= 3.50' Flow Area= 21.0 sf, Capacity= 35.65 cfs

6.00' x 3.50' deep channel, n= 0.022 Earth, clean & straight
Length= 30.0' Slope= 0.0003 '/'
Inlet Invert= 675.83', Outlet Invert= 675.82'

Summary for Pond DMH1: Manhole

Inflow Area = 21,320 sf, 62.71% Impervious, Inflow Depth > 6.63" for 100YearMass event
Inflow = 2.21 cfs @ 12.16 hrs, Volume= 11,780 cf
Outflow = 2.21 cfs @ 12.16 hrs, Volume= 11,780 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.21 cfs @ 12.16 hrs, Volume= 11,780 cf
Routed to Pond RG-5.1 : Rain Garden 5.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 674.88' @ 12.16 hrs
Flood Elev= 675.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	671.50'	**12.0" Round Culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 671.50' / 671.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.21 cfs @ 12.16 hrs HW=674.88' TW=674.51' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 2.21 cfs @ 2.81 fps)

Summary for Pond DMH2: Manhole

Inflow Area = 13,600 sf, 61.42% Impervious, Inflow Depth > 6.59" for 100YearMass event
Inflow = 1.34 cfs @ 12.16 hrs, Volume= 7,470 cf
Outflow = 1.34 cfs @ 12.16 hrs, Volume= 7,470 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.34 cfs @ 12.16 hrs, Volume= 7,470 cf
Routed to Pond DMH1 : Manhole

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 675.06' @ 12.17 hrs
Flood Elev= 678.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	673.50'	**12.0" Round Culvert** L= 80.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.50' / 671.60' S= 0.0237 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.33 cfs @ 12.16 hrs HW=675.06' TW=674.88' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.33 cfs @ 1.69 fps)

Summary for Pond IT-1/5: Interceptor Trench

Inflow Area = 41,845 sf, 0.00% Impervious, Inflow Depth > 3.38" for 100YearMass event
Inflow = 3.19 cfs @ 12.15 hrs, Volume= 11,797 cf
Outflow = 2.54 cfs @ 12.25 hrs, Volume= 11,754 cf, Atten= 20%, Lag= 5.8 min
Primary = 2.54 cfs @ 12.25 hrs, Volume= 11,754 cf
Routed to Link AP6 : AP6 - To Wetland B (off-site)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 679.67' @ 12.25 hrs Surf.Area= 750 sf Storage= 854 cf

Plug-Flow detention time= 6.9 min calculated for 11,754 cf (100% of inflow)
Center-of-Mass det. time= 4.7 min (852.2 - 847.4)

Volume	Invert	Avail.Storage	Storage Description
#1	677.00'	865 cf	**3.00'W x 250.00'L x 3.00'H Prismatoid** 2,250 cf Overall - 87 cf Embedded = 2,163 cf x 40.0% Voids
#2	677.00'	87 cf	**8.0" Round Pipe Storage** Inside #1 L= 250.0'
		952 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	677.00'	**8.0" Round Culvert** L= 220.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.00' / 668.00' S= 0.0409 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=2.54 cfs @ 12.25 hrs HW=679.67' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 2.54 cfs @ 7.28 fps)

Summary for Pond IT-5/8: Interceptor Trench

Inflow Area = 21,325 sf, 0.00% Impervious, Inflow Depth > 2.84" for 100YearMass event
Inflow = 1.49 cfs @ 12.12 hrs, Volume= 5,045 cf
Outflow = 0.96 cfs @ 12.24 hrs, Volume= 5,026 cf, Atten= 36%, Lag= 7.5 min
Primary = 0.96 cfs @ 12.24 hrs, Volume= 5,026 cf
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 682.27' @ 12.24 hrs Surf.Area= 465 sf Storage= 441 cf

Plug-Flow detention time= 7.0 min calculated for 5,026 cf (100% of inflow)
Center-of-Mass det. time= 4.9 min (861.1 - 856.2)

Volume	Invert	Avail.Storage	Storage Description
#1	680.00'	546 cf	**3.00'W x 155.00'L x 3.00'H Prismatoid** 1,395 cf Overall - 30 cf Embedded = 1,365 cf x 40.0% Voids
#2	680.00'	30 cf	**6.0" Round Pipe Storage** Inside #1 L= 155.0'
		576 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	680.00'	**6.0" Round Culvert** L= 110.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 680.00' / 678.00' S= 0.0182 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.96 cfs @ 12.24 hrs HW=682.27' TW=0.00' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.96 cfs @ 4.88 fps)

Summary for Pond RG-5.1: Rain Garden 5.1

Inflow Area = 42,865 sf, 63.86% Impervious, Inflow Depth > 6.68" for 100YearMass event
Inflow = 5.69 cfs @ 12.09 hrs, Volume= 23,864 cf
Outflow = 4.76 cfs @ 12.15 hrs, Volume= 22,238 cf, Atten= 16%, Lag= 3.7 min
Discarded = 0.25 cfs @ 12.15 hrs, Volume= 4,050 cf
Primary = 4.50 cfs @ 12.15 hrs, Volume= 18,187 cf
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1
Secondary = 0.01 cfs @ 12.15 hrs, Volume= 1 cf
Routed to Link AP6 : AP6 - To Wetland B (off-site)

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 674.51' @ 12.15 hrs Surf.Area= 4,395 sf Storage= 5,808 cf

Plug-Flow detention time= 97.4 min calculated for 22,238 cf (93% of inflow)
Center-of-Mass det. time= 61.7 min (849.3 - 787.6)

Volume	Invert	Avail.Storage	Storage Description
#1	669.75'	47 cf	**12.0" Round Pipe Storage** Inside #3 L= 60.0'
#2	669.75'	1,123 cf	**24.00'W x 39.00'L x 3.00'H Soil Media and Gravel**-Impervious 2,808 cf Overall x 40.0% Voids
#3	669.75'	1,104 cf	**24.00'W x 39.00'L x 3.00'H Soil Media and Gravel**-Impervious 2,808 cf Overall - 47 cf Embedded = 2,761 cf x 40.0% Voids
#4	672.75'	234 cf	**24.00'W x 78.00'L x 0.25'H Mulch** 468 cf Overall x 50.0% Voids
#5	673.00'	4,603 cf	**24.00'W x 78.00'L x 2.00'H Ponding Z=2.0**
		7,111 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	672.75'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	671.75'	**12.0" Round Culvert** L= 75.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 671.75' / 668.00' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	671.75'	**2.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	674.25'	**12.0" Horiz. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads
#5	Secondary	674.50'	**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

Discarded OutFlow Max=0.25 cfs @ 12.15 hrs HW=674.51' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=4.49 cfs @ 12.15 hrs HW=674.51' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 4.49 cfs of 5.68 cfs potential flow)
 ├─**3=Orifice/Grate** (Orifice Controls 0.52 cfs @ 7.87 fps)
 └─**4=Orifice/Grate** (Weir Controls 3.98 cfs @ 1.65 fps)

Secondary OutFlow Max=0.01 cfs @ 12.15 hrs HW=674.51' TW=0.00' (Dynamic Tailwater)
└─**5=Broad-Crested Rectangular Weir** (Weir Controls 0.01 cfs @ 0.18 fps)

Summary for Pond RG1: Rain Garden 1

Inflow Area = 7,720 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event
Inflow = 1.36 cfs @ 12.07 hrs, Volume= 4,331 cf
Outflow = 0.90 cfs @ 12.12 hrs, Volume= 4,310 cf, Atten= 34%, Lag= 2.8 min
Primary = 0.90 cfs @ 12.12 hrs, Volume= 4,310 cf
Routed to Pond DMH1 : Manhole

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 675.73' @ 12.16 hrs Surf.Area= 1,097 sf Storage= 715 cf

Plug-Flow detention time= 33.5 min calculated for 4,308 cf (99% of inflow)
Center-of-Mass det. time= 30.3 min (805.1 - 774.8)

Volume	Invert	Avail.Storage	Storage Description
#1	671.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	671.75'	341 cf	**5.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 900 cf Overall - 47 cf Embedded = 853 cf x 40.0% Voids
#3	674.75'	38 cf	**5.00'W x 60.00'L x 0.25'H Mulch** 75 cf Overall x 50.0% Voids
#4	675.00'	435 cf	**5.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		861 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	671.75'	**6.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 671.75' / 671.60' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	675.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	671.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	674.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.88 cfs @ 12.12 hrs HW=675.69' TW=674.82' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.88 cfs @ 4.49 fps)
2=Orifice/Grate (Passes < 0.41 cfs potential flow)
3=Orifice/Grate (Passes < 0.10 cfs potential flow)
4=Orifice/Grate (Passes < 0.39 cfs potential flow)

Summary for Pond RG2: Rain Garden 2

Inflow Area = 6,820 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event
Inflow = 1.20 cfs @ 12.07 hrs, Volume= 3,826 cf
Outflow = 0.62 cfs @ 12.20 hrs, Volume= 3,810 cf, Atten= 49%, Lag= 7.7 min
Primary = 0.62 cfs @ 12.20 hrs, Volume= 3,810 cf
Routed to Pond DMH2 : Manhole

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 677.35' @ 12.19 hrs Surf.Area= 1,410 sf Storage= 779 cf

Plug-Flow detention time= 27.0 min calculated for 3,810 cf (100% of inflow)
Center-of-Mass det. time= 24.3 min (799.0 - 774.8)

Volume	Invert	Avail.Storage	Storage Description
#1	673.75'	43 cf	**12.0" Round Pipe Storage** Inside #2 L= 55.0'
#2	673.75'	511 cf	**8.00'W x 55.00'L x 3.00'H Soil Media and Gravel** 1,320 cf Overall - 43 cf Embedded = 1,277 cf x 40.0% Voids
#3	676.75'	55 cf	**8.00'W x 55.00'L x 0.25'H Mulch** 110 cf Overall x 50.0% Voids
#4	677.00'	571 cf	**8.00'W x 55.00'L x 1.00'H Ponding Z=2.0**
		1,180 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	673.75'	**6.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.75' / 673.60' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	677.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	673.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	676.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.62 cfs @ 12.20 hrs HW=677.35' TW=675.04' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.62 cfs of 1.44 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.16 cfs @ 7.32 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.46 cfs @ 5.24 fps)

Summary for Pond RG3: Rain Garden 3

Inflow Area = 6,780 sf, 57.81% Impervious, Inflow Depth > 6.49" for 100YearMass event
Inflow = 1.17 cfs @ 12.07 hrs, Volume= 3,670 cf
Outflow = 0.72 cfs @ 12.16 hrs, Volume= 3,660 cf, Atten= 38%, Lag= 5.4 min
Primary = 0.72 cfs @ 12.16 hrs, Volume= 3,660 cf
Routed to Pond DMH2 : Manhole

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 679.53' @ 12.16 hrs Surf.Area= 936 sf Storage= 562 cf

Plug-Flow detention time= 15.8 min calculated for 3,660 cf (100% of inflow)
Center-of-Mass det. time= 14.0 min (795.0 - 780.9)

Volume	Invert	Avail.Storage	Storage Description
#1	675.75'	27 cf	**12.0" Round Pipe Storage** Inside #2 L= 35.0'
#2	675.75'	325 cf	**8.00'W x 35.00'L x 3.00'H Soil Media and Gravel** 840 cf Overall - 27 cf Embedded = 813 cf x 40.0% Voids
#3	678.75'	35 cf	**8.00'W x 35.00'L x 0.25'H Mulch** 70 cf Overall x 50.0% Voids
#4	679.00'	371 cf	**8.00'W x 35.00'L x 1.00'H Ponding Z=2.0**
		759 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	675.75'	**6.0" Round Culvert** L= 76.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 675.75' / 673.60' S= 0.0283 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	679.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	675.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	678.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.72 cfs @ 12.16 hrs HW=679.53' TW=675.06' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.72 cfs of 1.22 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 0.03 cfs @ 0.58 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.20 cfs @ 9.26 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.49 cfs @ 5.63 fps)

Summary for Pond RG69: Rain Garden 69

Inflow Area = 1,365 sf,100.00% Impervious, Inflow Depth > 7.69" for 100YearMass event
Inflow = 0.25 cfs @ 12.07 hrs, Volume= 874 cf
Outflow = 0.24 cfs @ 12.09 hrs, Volume= 874 cf, Atten= 4%, Lag= 1.3 min
Discarded = 0.01 cfs @ 9.38 hrs, Volume= 531 cf
Primary = 0.24 cfs @ 12.09 hrs, Volume= 343 cf
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 678.04' @ 12.09 hrs Surf.Area= 144 sf Storage= 166 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 78.0 min (818.0 - 739.9)

Volume	Invert	Avail.Storage	Storage Description
#1	675.25'	9 cf	**12.0" Round Pipe Storage** Inside #2 L= 12.0'
#2	675.25'	169 cf	**12.00'W x 12.00'L x 3.00'H Soil Media and Gravel** 432 cf Overall - 9 cf Embedded = 423 cf x 40.0% Voids
#3	678.25'	18 cf	**12.00'W x 12.00'L x 0.25'H Mulch** 36 cf Overall x 50.0% Voids
#4	678.50'	197 cf	**12.00'W x 12.00'L x 1.00'H Ponding Z=2.0**
		394 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	675.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	677.25'	**6.0" Round Culvert** L= 26.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 677.25' / 677.00' S= 0.0096 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	679.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	677.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	677.75'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 9.38 hrs HW=675.29' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.23 cfs @ 12.09 hrs HW=678.04' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.23 cfs of 0.61 cfs potential flow)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Orifice Controls 0.09 cfs @ 4.04 fps)
  └─**5=Orifice/Grate** (Orifice Controls 0.15 cfs @ 1.83 fps)

Summary for Pond RG70: Rain Garden 70

Inflow Area = 5,415 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event
Inflow = 0.95 cfs @ 12.07 hrs, Volume= 3,038 cf
Outflow = 0.61 cfs @ 12.16 hrs, Volume= 2,878 cf, Atten= 36%, Lag= 5.1 min
Discarded = 0.05 cfs @ 12.16 hrs, Volume= 1,065 cf
Primary = 0.56 cfs @ 12.16 hrs, Volume= 1,813 cf
Routed to Link AP5 : AP5 - To Wetland A (A23-A32) / VP A1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 674.93' @ 12.16 hrs Surf.Area= 917 sf Storage= 525 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 33.7 min (808.5 - 774.8)

Volume	Invert	Avail.Storage	Storage Description
#1	671.25'	27 cf	**12.0" Round Pipe Storage** Inside #2 L= 35.0'
#2	671.25'	325 cf	**8.00'W x 35.00'L x 3.00'H Soil Media and Gravel** 840 cf Overall - 27 cf Embedded = 813 cf x 40.0% Voids
#3	674.25'	35 cf	**8.00'W x 35.00'L x 0.25'H Mulch** 70 cf Overall x 50.0% Voids
#4	674.50'	371 cf	**8.00'W x 35.00'L x 1.00'H Ponding Z=2.0**
		759 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	671.25'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	673.25'	**6.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.25' / 673.00' S= 0.0125 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#3	Device 2	675.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 2	673.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 2	673.75'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.05 cfs @ 12.16 hrs HW=674.93' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.56 cfs @ 12.16 hrs HW=674.93' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.56 cfs of 1.07 cfs potential flow)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**4=Orifice/Grate** (Orifice Controls 0.13 cfs @ 6.09 fps)
  └─**5=Orifice/Grate** (Orifice Controls 0.42 cfs @ 4.85 fps)

Summary for Pond TD1: Trench Drain

Inflow Area = 21,545 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event
Inflow = 3.79 cfs @ 12.07 hrs, Volume= 12,086 cf
Outflow = 3.84 cfs @ 12.07 hrs, Volume= 12,084 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.84 cfs @ 12.07 hrs, Volume= 12,084 cf
Routed to Pond RG-5.1 : Rain Garden 5.1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 675.31' @ 12.09 hrs Surf.Area= 30 sf Storage= 60 cf

Plug-Flow detention time= 0.8 min calculated for 12,084 cf (100% of inflow)
Center-of-Mass det. time= 0.7 min (775.5 - 774.8)

Volume	Invert	Avail.Storage	Storage Description
#1	673.10'	60 cf	**1.50'W x 20.00'L x 2.00'H Prismatoid**

Device	Routing	Invert	Outlet Devices
#1	Primary	673.10'	**12.0" Round Culvert** L= 2.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 673.10' / 673.00' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.70 cfs @ 12.07 hrs HW=675.24' TW=674.29' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 3.70 cfs @ 4.70 fps)

Summary for Link AP5: AP5 - To Wetland A (A23-A32) / VP A1

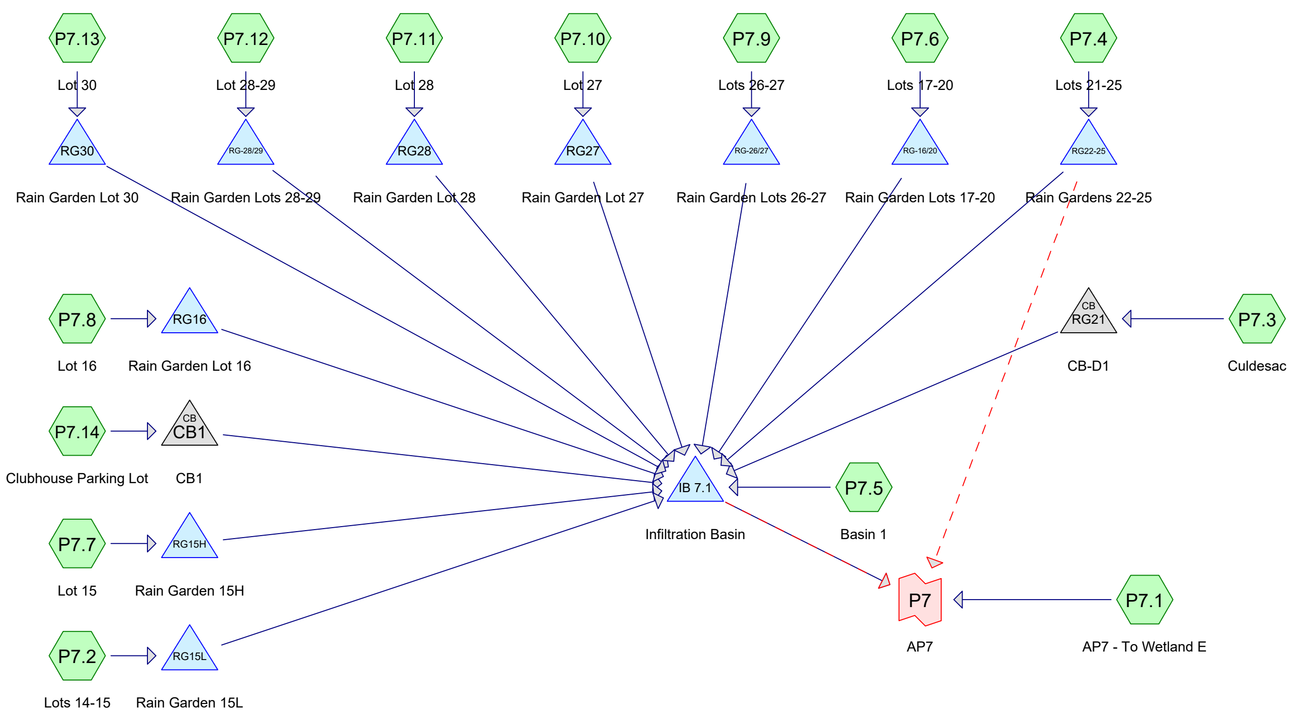
Inflow Area = 189,460 sf, 17.53% Impervious, Inflow Depth > 4.48" for 100YearMass event
Inflow = 19.16 cfs @ 12.14 hrs, Volume= 70,739 cf
Primary = 19.16 cfs @ 12.14 hrs, Volume= 70,739 cf, Atten= 0%, Lag= 0.0 min

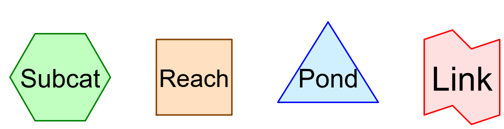
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Link AP6: AP6 - To Wetland B (off-site)

Inflow Area = 111,800 sf, 0.00% Impervious, Inflow Depth > 4.01" for 100YearMass event
Inflow = 9.54 cfs @ 12.14 hrs, Volume= 37,382 cf
Primary = 9.54 cfs @ 12.14 hrs, Volume= 37,382 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs





Routing Diagram for AP7
Prepared by Mcclure Engineering, Printed 6/28/2023

Summary for Subcatchment P7.1: AP7 - To Wetland E

Runoff = 0.30 cfs @ 12.34 hrs, Volume= 2,396 cf, Depth> 0.29"
Routed to Link P7 : AP7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Adj	Description
83,680	55		Woods, Good, HSG B
13,515	61		>75% Grass cover, Good, HSG B
1,560	98		Unconnected roofs, HSG B
98,755	57	56	Weighted Average, UI Adjusted
97,195			98.42% Pervious Area
1,560			1.58% Impervious Area
1,560			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.3000	0.19		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	25	0.3000	2.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.1	245	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.6	320	Total			

Summary for Subcatchment P7.10: Lot 27

Runoff = 0.36 cfs @ 12.14 hrs, Volume= 1,287 cf, Depth> 1.43"
Routed to Pond RG27 : Rain Garden Lot 27

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
*	3,845	90	Residential Lots, 65% imp, HSG C
	2,045	70	Woods, Good, HSG C
	940	89	Gravel roads, HSG C
	3,970	74	>75% Grass cover, Good, HSG C
	10,800	80	Weighted Average
	8,301		76.86% Pervious Area
	2,499		23.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	35	0.2000	3.13		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.9	85	Total			

Summary for Subcatchment P7.11: Lot 28

Runoff = 0.64 cfs @ 12.17 hrs, Volume= 2,534 cf, Depth> 1.06"
Routed to Pond RG28 : Rain Garden Lot 28

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
*	4,250	90	Residential Lots, 65% imp, HSG C
	18,600	70	Woods, Good, HSG C
	960	89	Gravel roads, HSG C
	4,855	74	>75% Grass cover, Good, HSG C
	28,665	74	Weighted Average
	25,903		90.36% Pervious Area
	2,763		9.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.7	100	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.2000	3.13		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.6	180	Total			

Summary for Subcatchment P7.12: Lot 28-29

Runoff = 1.04 cfs @ 12.07 hrs, Volume= 3,141 cf, Depth> 2.20"
Routed to Pond RG-28/29 : Rain Garden Lots 28-29

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
*	17,105	90	Residential Lots, 65% imp, HSG C
	5,987		35.00% Pervious Area
	11,118		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.13: Lot 30

Runoff = 0.41 cfs @ 12.07 hrs, Volume= 1,238 cf, Depth> 2.20"
Routed to Pond RG30 : Rain Garden Lot 30

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
*	6,740	90	Residential Lots, 65% imp, HSG C
	2,359		35.00% Pervious Area
	4,381		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.14: Clubhouse Parking Lot

Runoff = 0.57 cfs @ 12.07 hrs, Volume= 1,776 cf, Depth> 2.58"
Routed to Pond CB1 : CB1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
1,410	74	>75% Grass cover, Good, HSG C
750	98	Roofs, HSG C
6,100	98	Paved parking, HSG C
8,260	94	Weighted Average
1,410		17.07% Pervious Area
6,850		82.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.2: Lots 14-15

Runoff = 0.50 cfs @ 12.07 hrs, Volume= 1,504 cf, Depth> 2.20"
Routed to Pond RG15L : Rain Garden 15L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
*	8,190	90	Residential Lots, 65% imp, HSG C
	2,867		35.00% Pervious Area
	5,324		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.3: Culdesac

Runoff = 0.27 cfs @ 12.07 hrs, Volume= 909 cf, Depth> 3.01"
Routed to Pond RG21 : CB-D1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
3,630	98	Paved roads w/curbs & sewers, HSG C
3,630		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.4: Lots 21-25

Runoff = 2.84 cfs @ 12.18 hrs, Volume= 11,217 cf, Depth> 1.36"
Routed to Pond RG22-25 : Rain Gardens 22-25

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
	38,735	90	1/8 acre lots, 65% imp, HSG C
	10,220	85	1/8 acre lots, 65% imp, HSG B
	49,505	70	Woods, Good, HSG C
*	320	74	Grass Paver, Good, HSG C
	98,780	79	Weighted Average
	66,959		67.79% Pervious Area
	31,821		32.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.8	50	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.6	230	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.1	330	Total			

Summary for Subcatchment P7.5: Basin 1

Runoff = 1.30 cfs @ 12.11 hrs, Volume= 4,573 cf, Depth> 0.85"
Routed to Pond IB 7.1 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
13,590	98	Water Surface, HSG B
1,860	98	Paved parking, HSG C
1,425	98	Paved parking, HSG B
28,270	55	Woods, Good, HSG B
8,160	74	>75% Grass cover, Good, HSG C
750	98	Roofs, HSG C
10,520	61	>75% Grass cover, Good, HSG B
64,575	70	Weighted Average
46,950		72.71% Pervious Area
17,625		27.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.9	110	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.6	160	Total			

Summary for Subcatchment P7.6: Lots 17-20

Runoff = 1.32 cfs @ 12.07 hrs, Volume= 3,943 cf, Depth> 1.95"
Routed to Pond RG-16/20 : Rain Garden Lots 17-20

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
	11,200	90	1/8 acre lots, 65% imp, HSG C
	13,081	85	1/8 acre lots, 65% imp, HSG B
	24,281	87	Weighted Average
	8,498		35.00% Pervious Area
	15,783		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.7: Lot 15

Runoff = 0.64 cfs @ 12.07 hrs, Volume= 1,928 cf, Depth> 2.20"
Routed to Pond RG15H : Rain Garden 15H

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
*	10,500	90	Residential Lots, 65% imp, HSG C
	3,675		35.00% Pervious Area
	6,825		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.8: Lot 16

Runoff = 0.41 cfs @ 12.07 hrs, Volume= 1,239 cf, Depth> 2.20"
Routed to Pond RG16 : Rain Garden Lot 16

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
*	6,745	90	Residential Lots, 65% imp, HSG C
	2,361		35.00% Pervious Area
	4,384		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.9: Lots 26-27

Runoff = 0.83 cfs @ 12.07 hrs, Volume= 2,499 cf, Depth> 2.20"
Routed to Pond RG-26/27 : Rain Garden Lots 26-27

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

	Area (sf)	CN	Description
*	13,605	90	Residential Lots, 65% imp, HSG C
	4,762		35.00% Pervious Area
	8,843		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Pond CB1: CB1

Inflow Area = 8,260 sf, 82.93% Impervious, Inflow Depth > 2.58" for 2YearMass event
Inflow = 0.57 cfs @ 12.07 hrs, Volume= 1,776 cf
Outflow = 0.57 cfs @ 12.07 hrs, Volume= 1,776 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.57 cfs @ 12.07 hrs, Volume= 1,776 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 727.39' @ 12.07 hrs
Flood Elev= 730.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	727.00'	**12.0" Round Culvert** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 727.00' / 726.60' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.57 cfs @ 12.07 hrs HW=727.39' TW=704.58' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.57 cfs @ 2.97 fps)

Summary for Pond IB 7.1: Infiltration Basin

Inflow Area = 301,876 sf, 40.36% Impervious, Inflow Depth > 1.29" for 2YearMass event
Inflow = 6.38 cfs @ 12.15 hrs, Volume= 32,412 cf
Outflow = 1.70 cfs @ 13.00 hrs, Volume= 28,313 cf, Atten= 73%, Lag= 51.3 min
Discarded = 0.46 cfs @ 13.00 hrs, Volume= 19,158 cf
Primary = 1.24 cfs @ 13.00 hrs, Volume= 9,156 cf
Routed to Link P7 : AP7
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link P7 : AP7

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 705.99' @ 13.00 hrs Surf.Area= 8,224 sf Storage= 12,701 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 119.4 min (955.1 - 835.7)

Volume	Invert	Avail.Storage	Storage Description
#1	704.00'	58,843 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)
704.00	4,675	575.0	0	0	4,675
706.00	8,235	615.0	12,743	12,743	8,645
708.00	11,620	650.0	19,758	32,501	12,389
710.00	14,785	680.0	26,342	58,843	15,831

Device	Routing	Invert	Outlet Devices
#1	Discarded	704.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Secondary	709.00'	**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
#3	Primary	704.00'	**18.0" Round Culvert** L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 704.00' / 704.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#4	Device 3	709.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 3	704.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.40 1.40 2.00 3.00 3.25 3.25 4.00 4.00 5.00 Width (feet) 0.00 0.00 0.25 0.25 0.25 0.25 0.50 0.50 0.75 0.75
#6	Device 3	705.40'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.46 cfs @ 13.00 hrs HW=705.99' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.46 cfs)

Primary OutFlow Max=1.24 cfs @ 13.00 hrs HW=705.99' TW=0.00' (Dynamic Tailwater)
└─**3=Culvert** (Passes 1.24 cfs of 6.89 cfs potential flow)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  ├─**5=Custom Weir/Orifice** (Weir Controls 0.38 cfs @ 2.53 fps)
  └─**6=Orifice/Grate** (Orifice Controls 0.86 cfs @ 2.63 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=704.00' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG-16/20: Rain Garden Lots 17-20

Inflow Area = 24,281 sf, 65.00% Impervious, Inflow Depth > 1.95" for 2YearMass event
Inflow = 1.32 cfs @ 12.07 hrs, Volume= 3,943 cf
Outflow = 0.54 cfs @ 12.29 hrs, Volume= 3,916 cf, Atten= 59%, Lag= 12.8 min
Primary = 0.54 cfs @ 12.29 hrs, Volume= 3,916 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 725.98' @ 12.29 hrs Surf.Area= 960 sf Storage= 777 cf

Plug-Flow detention time= 18.8 min calculated for 3,916 cf (99% of inflow)
Center-of-Mass det. time= 14.6 min (831.5 - 816.8)

Volume	Invert	Avail.Storage	Storage Description
#1	724.25'	188 cf	**12.0" Round Pipe Storage** x 4 Inside #2 L= 60.0'
#2	724.25'	1,077 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 4 2,880 cf Overall - 188 cf Embedded = 2,692 cf x 40.0% Voids
#3	727.25'	120 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 4 240 cf Overall x 50.0% Voids
#4	727.50'	1,493 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 4
		2,878 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	724.25'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.25' / 724.25' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	728.00'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	724.25'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	726.50'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.54 cfs @ 12.29 hrs HW=725.98' TW=705.30' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.54 cfs of 4.60 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.54 cfs @ 6.17 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond RG-26/27: Rain Garden Lots 26-27

Inflow Area = 13,605 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event
Inflow = 0.83 cfs @ 12.07 hrs, Volume= 2,499 cf
Outflow = 0.36 cfs @ 12.25 hrs, Volume= 2,488 cf, Atten= 56%, Lag= 10.6 min
Primary = 0.36 cfs @ 12.25 hrs, Volume= 2,488 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 746.60' @ 12.25 hrs Surf.Area= 480 sf Storage= 508 cf

Plug-Flow detention time= 18.0 min calculated for 2,487 cf (100% of inflow)
Center-of-Mass det. time= 15.4 min (820.3 - 805.0)

Volume	Invert	Avail.Storage	Storage Description
#1	744.25'	94 cf	**12.0" Round Pipe Storage** x 2 Inside #2 L= 60.0'
#2	744.25'	538 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 2 1,440 cf Overall - 94 cf Embedded = 1,346 cf x 40.0% Voids
#3	747.25'	60 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 2 120 cf Overall x 50.0% Voids
#4	747.50'	747 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 2
		1,439 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	744.25'	**6.0" Round Culvert X 2.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 744.25' / 744.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	748.00'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	744.25'	**2.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	746.50'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.36 cfs @ 12.25 hrs HW=746.60' TW=705.19' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.36 cfs of 2.74 cfs potential flow)
 ├─**2=Orifice/Grate** (Controls 0.00 cfs)
 ├─**3=Orifice/Grate** (Orifice Controls 0.32 cfs @ 7.25 fps)
 └─**4=Orifice/Grate** (Orifice Controls 0.05 cfs @ 1.07 fps)

Summary for Pond RG-28/29: Rain Garden Lots 28-29

Inflow Area = 17,105 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event
Inflow = 1.04 cfs @ 12.07 hrs, Volume= 3,141 cf
Outflow = 0.71 cfs @ 12.15 hrs, Volume= 3,129 cf, Atten= 32%, Lag= 4.7 min
Primary = 0.71 cfs @ 12.15 hrs, Volume= 3,129 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 742.37' @ 12.15 hrs Surf.Area= 480 sf Storage= 559 cf

Plug-Flow detention time= 16.8 min calculated for 3,129 cf (100% of inflow)
Center-of-Mass det. time= 14.4 min (819.3 - 805.0)

Volume	Invert	Avail.Storage	Storage Description
#1	739.75'	94 cf	**12.0" Round Pipe Storage** x 2 Inside #2 L= 60.0'
#2	739.75'	538 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 2 1,440 cf Overall - 94 cf Embedded = 1,346 cf x 40.0% Voids
#3	742.75'	60 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 2 120 cf Overall x 50.0% Voids
#4	743.00'	747 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 2
		1,439 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	739.75'	**6.0" Round Culvert X 2.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 739.75' / 739.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	743.50'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	739.75'	**2.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	742.00'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.71 cfs @ 12.15 hrs HW=742.37' TW=704.86' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.71 cfs of 2.91 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.33 cfs @ 7.67 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.38 cfs @ 2.16 fps)

Summary for Pond RG15H: Rain Garden 15H

Inflow Area = 10,500 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event
Inflow = 0.64 cfs @ 12.07 hrs, Volume= 1,928 cf
Outflow = 0.47 cfs @ 12.14 hrs, Volume= 1,807 cf, Atten= 26%, Lag= 4.0 min
Discarded = 0.04 cfs @ 12.07 hrs, Volume= 778 cf
Primary = 0.43 cfs @ 12.14 hrs, Volume= 1,029 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 718.63' @ 12.14 hrs Surf.Area= 720 sf Storage= 378 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 45.1 min (850.1 - 805.0)

Volume	Invert	Avail.Storage	Storage Description
#1	715.25'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	715.25'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	718.25'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	718.50'	240 cf	**4.00'W x 60.00'L x 1.00'H Ponding**
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	717.25'	**8.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 717.25' / 717.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	719.00'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	717.25'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	718.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Discarded	715.25'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 12.07 hrs HW=718.51' (Free Discharge)
└─**5=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.43 cfs @ 12.14 hrs HW=718.63' TW=704.82' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.43 cfs of 1.72 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.26 cfs @ 5.40 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.17 cfs @ 3.42 fps)

Summary for Pond RG15L: Rain Garden 15L

Inflow Area = 8,190 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event
Inflow = 0.50 cfs @ 12.07 hrs, Volume= 1,504 cf
Outflow = 0.41 cfs @ 12.13 hrs, Volume= 1,435 cf, Atten= 18%, Lag= 3.2 min
Discarded = 0.03 cfs @ 12.08 hrs, Volume= 746 cf
Primary = 0.38 cfs @ 12.13 hrs, Volume= 689 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 709.84' @ 12.13 hrs Surf.Area= 480 sf Storage= 327 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 68.5 min (873.5 - 805.0)

Volume	Invert	Avail.Storage	Storage Description
#1	706.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	706.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	709.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	710.00'	240 cf	**4.00'W x 60.00'L x 1.00'H Ponding**
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	708.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 708.75' / 708.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	710.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	708.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	709.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Discarded	706.75'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.03 cfs @ 12.08 hrs HW=709.76' (Free Discharge)
5=Exfiltration (Exfiltration Controls 0.03 cfs)

Primary OutFlow Max=0.38 cfs @ 12.13 hrs HW=709.84' TW=704.77' (Dynamic Tailwater)
1=Culvert (Passes 0.38 cfs of 0.87 cfs potential flow)
2=Orifice/Grate (Controls 0.00 cfs)
3=Orifice/Grate (Orifice Controls 0.11 cfs @ 4.84 fps)
4=Orifice/Grate (Orifice Controls 0.27 cfs @ 3.14 fps)

Summary for Pond RG16: Rain Garden Lot 16

Inflow Area = 6,745 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event
Inflow = 0.41 cfs @ 12.07 hrs, Volume= 1,239 cf
Outflow = 0.30 cfs @ 12.14 hrs, Volume= 1,209 cf, Atten= 26%, Lag= 4.1 min
Discarded = 0.01 cfs @ 10.84 hrs, Volume= 727 cf
Primary = 0.29 cfs @ 12.14 hrs, Volume= 482 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 733.13' @ 12.14 hrs Surf.Area= 240 sf Storage= 305 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 90.9 min (895.8 - 805.0)

Volume	Invert	Avail.Storage	Storage Description
#1	730.25'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	730.25'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	733.25'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	733.50'	240 cf	**4.00'W x 60.00'L x 1.00'H Ponding**
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	732.25'	**6.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 732.25' / 732.00' S= 0.0417 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	734.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	732.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	732.75'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Discarded	730.25'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 10.84 hrs HW=730.29' (Free Discharge)
└─**5=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.29 cfs @ 12.14 hrs HW=733.13' TW=704.82' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.29 cfs of 0.75 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.09 cfs @ 4.30 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.20 cfs @ 2.24 fps)

Summary for Pond RG21: CB-D1

Inflow Area = 3,630 sf,100.00% Impervious, Inflow Depth > 3.01" for 2YearMass event
Inflow = 0.27 cfs @ 12.07 hrs, Volume= 909 cf
Outflow = 0.27 cfs @ 12.07 hrs, Volume= 909 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.27 cfs @ 12.07 hrs, Volume= 909 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 725.77' @ 12.07 hrs
Flood Elev= 728.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	725.50'	**12.0" Round Culvert** L= 104.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 725.50' / 724.70' S= 0.0077 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.27 cfs @ 12.07 hrs HW=725.77' TW=704.58' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.27 cfs @ 2.37 fps)

Summary for Pond RG22-25: Rain Gardens 22-25

Inflow Area = 98,780 sf, 32.21% Impervious, Inflow Depth > 1.36" for 2YearMass event
Inflow = 2.84 cfs @ 12.18 hrs, Volume= 11,217 cf
Outflow = 2.35 cfs @ 12.29 hrs, Volume= 11,174 cf, Atten= 17%, Lag= 6.0 min
Primary = 1.76 cfs @ 12.29 hrs, Volume= 8,380 cf
Routed to Pond IB 7.1 : Infiltration Basin
Secondary = 0.59 cfs @ 12.29 hrs, Volume= 2,793 cf
Routed to Link P7 : AP7

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 726.42' @ 12.29 hrs Surf.Area= 960 sf Storage= 755 cf

Plug-Flow detention time= 6.5 min calculated for 11,169 cf (100% of inflow)
Center-of-Mass det. time= 4.2 min (854.3 - 850.1)

Volume	Invert	Avail.Storage	Storage Description
#1	724.75'	188 cf	**12.0" Round Pipe Storage** x 4 Inside #2 L= 60.0'
#2	724.75'	1,077 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 4 2,880 cf Overall - 188 cf Embedded = 2,692 cf x 40.0% Voids
#3	727.75'	120 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 4 240 cf Overall x 50.0% Voids
#4	728.00'	1,493 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 4
		2,878 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	724.75'	**8.0" Round Culvert X 3.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.75' / 724.75' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Secondary	724.75'	**8.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.75' / 724.75' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Device 1	728.50'	**6.0" Horiz. Orifice/Grate X 6.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	728.50'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 1	724.75'	**3.0" Vert. Orifice/Grate X 6.00** C= 0.600 Limited to weir flow at low heads
#6	Device 2	724.75'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#7	Device 1	727.25'	**3.0" Vert. Orifice/Grate X 6.00** C= 0.600 Limited to weir flow at low heads
#8	Device 2	727.25'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.76 cfs @ 12.29 hrs HW=726.42' TW=705.29' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.76 cfs of 5.83 cfs potential flow)
 ├─**3=Orifice/Grate** (Controls 0.00 cfs)
 ├─**5=Orifice/Grate** (Orifice Controls 1.76 cfs @ 5.99 fps)
 └─**7=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.59 cfs @ 12.29 hrs HW=726.42' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.59 cfs of 1.94 cfs potential flow)
 ├─**4=Orifice/Grate** (Controls 0.00 cfs)
 ├─**6=Orifice/Grate** (Orifice Controls 0.59 cfs @ 5.99 fps)
 └─**8=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond RG27: Rain Garden Lot 27

Inflow Area = 10,800 sf, 23.14% Impervious, Inflow Depth > 1.43" for 2YearMass event
Inflow = 0.36 cfs @ 12.14 hrs, Volume= 1,287 cf
Outflow = 0.19 cfs @ 12.38 hrs, Volume= 1,280 cf, Atten= 48%, Lag= 14.3 min
Primary = 0.19 cfs @ 12.38 hrs, Volume= 1,280 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 757.11' @ 12.38 hrs Surf.Area= 240 sf Storage= 255 cf

Plug-Flow detention time= 17.9 min calculated for 1,280 cf (99% of inflow)
Center-of-Mass det. time= 15.0 min (859.4 - 844.4)

Volume	Invert	Avail.Storage	Storage Description
#1	754.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	754.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	757.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	758.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	754.75'	**6.0" Round Culvert** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 754.75' / 753.50' S= 0.0347 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	758.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	754.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	757.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.19 cfs @ 12.38 hrs HW=757.11' TW=705.53' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.19 cfs of 1.33 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.16 cfs @ 7.26 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.03 cfs @ 1.12 fps)

Summary for Pond RG28: Rain Garden Lot 28

Inflow Area = 28,665 sf, 9.64% Impervious, Inflow Depth > 1.06" for 2YearMass event
Inflow = 0.64 cfs @ 12.17 hrs, Volume= 2,534 cf
Outflow = 0.53 cfs @ 12.27 hrs, Volume= 2,527 cf, Atten= 18%, Lag= 5.7 min
Primary = 0.53 cfs @ 12.27 hrs, Volume= 2,527 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 755.13' @ 12.27 hrs Surf.Area= 240 sf Storage= 161 cf

Plug-Flow detention time= 5.1 min calculated for 2,527 cf (100% of inflow)
Center-of-Mass det. time= 3.5 min (868.2 - 864.7)

Volume	Invert	Avail.Storage	Storage Description
#1	753.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	753.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	756.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	757.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	753.75'	**8.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 753.75' / 753.50' S= 0.0083 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	757.50'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	753.75'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	756.25'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.53 cfs @ 12.27 hrs HW=755.13' TW=705.24' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.53 cfs of 1.56 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.53 cfs @ 5.39 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond RG30: Rain Garden Lot 30

Inflow Area = 6,740 sf, 65.00% Impervious, Inflow Depth > 2.20" for 2YearMass event
Inflow = 0.41 cfs @ 12.07 hrs, Volume= 1,238 cf
Outflow = 0.18 cfs @ 12.26 hrs, Volume= 1,233 cf, Atten= 57%, Lag= 11.2 min
Primary = 0.18 cfs @ 12.26 hrs, Volume= 1,233 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 730.09' @ 12.26 hrs Surf.Area= 240 sf Storage= 252 cf

Plug-Flow detention time= 18.1 min calculated for 1,232 cf (100% of inflow)
Center-of-Mass det. time= 15.4 min (820.4 - 805.0)

Volume	Invert	Avail.Storage	Storage Description
#1	727.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	727.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	730.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	731.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	727.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 727.75' / 727.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	731.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	727.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	730.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.18 cfs @ 12.26 hrs HW=730.09' TW=705.21' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.18 cfs of 1.37 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.16 cfs @ 7.23 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.02 cfs @ 0.99 fps)

Summary for Link P7: AP7

Inflow Area = 400,631 sf, 30.80% Impervious, Inflow Depth > 0.43" for 2YearMass event
Inflow = 1.48 cfs @ 12.72 hrs, Volume= 14,345 cf
Primary = 1.48 cfs @ 12.72 hrs, Volume= 14,345 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment P7.1: AP7 - To Wetland E

Runoff = 2.13 cfs @ 12.14 hrs, Volume= 8,761 cf, Depth> 1.06"
Routed to Link P7 : AP7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Adj	Description
83,680	55		Woods, Good, HSG B
13,515	61		>75% Grass cover, Good, HSG B
1,560	98		Unconnected roofs, HSG B
98,755	57	56	Weighted Average, UI Adjusted
97,195			98.42% Pervious Area
1,560			1.58% Impervious Area
1,560			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.3000	0.19		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	25	0.3000	2.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.1	245	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.6	320	Total			

Summary for Subcatchment P7.10: Lot 27

Runoff = 0.75 cfs @ 12.14 hrs, Volume= 2,638 cf, Depth> 2.93"
Routed to Pond RG27 : Rain Garden Lot 27

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
*	3,845	90	Residential Lots, 65% imp, HSG C
	2,045	70	Woods, Good, HSG C
	940	89	Gravel roads, HSG C
	3,970	74	>75% Grass cover, Good, HSG C
	10,800	80	Weighted Average
	8,301		76.86% Pervious Area
	2,499		23.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	35	0.2000	3.13		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.9	85	Total			

Summary for Subcatchment P7.11: Lot 28

Runoff = 1.53 cfs @ 12.16 hrs, Volume= 5,729 cf, Depth> 2.40"
Routed to Pond RG28 : Rain Garden Lot 28

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
*	4,250	90	Residential Lots, 65% imp, HSG C
	18,600	70	Woods, Good, HSG C
	960	89	Gravel roads, HSG C
	4,855	74	>75% Grass cover, Good, HSG C
	28,665	74	Weighted Average
	25,903		90.36% Pervious Area
	2,763		9.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.7	100	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.2000	3.13		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.6	180	Total			

Summary for Subcatchment P7.12: Lot 28-29

Runoff = 1.80 cfs @ 12.07 hrs, Volume= 5,590 cf, Depth> 3.92"
Routed to Pond RG-28/29 : Rain Garden Lots 28-29

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
*	17,105	90	Residential Lots, 65% imp, HSG C
	5,987		35.00% Pervious Area
	11,118		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.13: Lot 30

Runoff = 0.71 cfs @ 12.07 hrs, Volume= 2,203 cf, Depth> 3.92"
Routed to Pond RG30 : Rain Garden Lot 30

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
*	6,740	90	Residential Lots, 65% imp, HSG C
	2,359		35.00% Pervious Area
	4,381		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.14: Clubhouse Parking Lot

Runoff = 0.93 cfs @ 12.07 hrs, Volume= 2,997 cf, Depth> 4.35"
Routed to Pond CB1 : CB1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
1,410	74	>75% Grass cover, Good, HSG C
750	98	Roofs, HSG C
6,100	98	Paved parking, HSG C
8,260	94	Weighted Average
1,410		17.07% Pervious Area
6,850		82.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.2: Lots 14-15

Runoff = 0.86 cfs @ 12.07 hrs, Volume= 2,676 cf, Depth> 3.92"
Routed to Pond RG15L : Rain Garden 15L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
*	8,190	90	Residential Lots, 65% imp, HSG C
	2,867		35.00% Pervious Area
	5,324		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.3: Culdesac

Runoff = 0.43 cfs @ 12.07 hrs, Volume= 1,455 cf, Depth> 4.81"
Routed to Pond RG21 : CB-D1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
	3,630	98	Paved roads w/curbs & sewers, HSG C
	3,630		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.4: Lots 21-25

Runoff = 6.03 cfs @ 12.18 hrs, Volume= 23,356 cf, Depth> 2.84"
Routed to Pond RG22-25 : Rain Gardens 22-25

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
	38,735	90	1/8 acre lots, 65% imp, HSG C
	10,220	85	1/8 acre lots, 65% imp, HSG B
	49,505	70	Woods, Good, HSG C
*	320	74	Grass Paver, Good, HSG C
	98,780	79	Weighted Average
	66,959		67.79% Pervious Area
	31,821		32.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.8	50	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.6	230	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.1	330	Total			

Summary for Subcatchment P7.5: Basin 1

Runoff = 3.47 cfs @ 12.10 hrs, Volume= 11,141 cf, Depth> 2.07"
Routed to Pond IB 7.1 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
13,590	98	Water Surface, HSG B
1,860	98	Paved parking, HSG C
1,425	98	Paved parking, HSG B
28,270	55	Woods, Good, HSG B
8,160	74	>75% Grass cover, Good, HSG C
750	98	Roofs, HSG C
10,520	61	>75% Grass cover, Good, HSG B
64,575	70	Weighted Average
46,950		72.71% Pervious Area
17,625		27.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.9	110	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.6	160	Total			

Summary for Subcatchment P7.6: Lots 17-20

Runoff = 2.40 cfs @ 12.07 hrs, Volume= 7,307 cf, Depth> 3.61"
Routed to Pond RG-16/20 : Rain Garden Lots 17-20

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
11,200	90	1/8 acre lots, 65% imp, HSG C
13,081	85	1/8 acre lots, 65% imp, HSG B
24,281	87	Weighted Average
8,498		35.00% Pervious Area
15,783		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.7: Lot 15

Runoff = 1.11 cfs @ 12.07 hrs, Volume= 3,431 cf, Depth> 3.92"
Routed to Pond RG15H : Rain Garden 15H

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
*	10,500	90	Residential Lots, 65% imp, HSG C
	3,675		35.00% Pervious Area
	6,825		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.8: Lot 16

Runoff = 0.71 cfs @ 12.07 hrs, Volume= 2,204 cf, Depth> 3.92"
Routed to Pond RG16 : Rain Garden Lot 16

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
*	6,745	90	Residential Lots, 65% imp, HSG C
	2,361		35.00% Pervious Area
	4,384		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.9: Lots 26-27

Runoff = 1.44 cfs @ 12.07 hrs, Volume= 4,446 cf, Depth> 3.92"
Routed to Pond RG-26/27 : Rain Garden Lots 26-27

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

	Area (sf)	CN	Description
*	13,605	90	Residential Lots, 65% imp, HSG C
	4,762		35.00% Pervious Area
	8,843		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Pond CB1: CB1

Inflow Area = 8,260 sf, 82.93% Impervious, Inflow Depth > 4.35" for 10YearMass event
Inflow = 0.93 cfs @ 12.07 hrs, Volume= 2,997 cf
Outflow = 0.93 cfs @ 12.07 hrs, Volume= 2,997 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.93 cfs @ 12.07 hrs, Volume= 2,997 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 727.52' @ 12.07 hrs
Flood Elev= 730.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	727.00'	**12.0" Round Culvert** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 727.00' / 726.60' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.93 cfs @ 12.07 hrs HW=727.52' TW=705.67' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.93 cfs @ 3.32 fps)

Summary for Pond IB 7.1: Infiltration Basin

Inflow Area = 301,876 sf, 40.36% Impervious, Inflow Depth > 2.63" for 10YearMass event
Inflow = 15.78 cfs @ 12.14 hrs, Volume= 66,106 cf
Outflow = 4.69 cfs @ 12.67 hrs, Volume= 59,182 cf, Atten= 70%, Lag= 32.0 min
Discarded = 0.57 cfs @ 12.67 hrs, Volume= 22,737 cf
Primary = 4.12 cfs @ 12.67 hrs, Volume= 36,445 cf
Routed to Link P7 : AP7
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link P7 : AP7

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 707.25' @ 12.67 hrs Surf.Area= 10,275 sf Storage= 24,249 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 70.2 min (888.9 - 818.7)

Volume	Invert	Avail.Storage	Storage Description
#1	704.00'	58,843 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)
704.00	4,675	575.0	0	0	4,675
706.00	8,235	615.0	12,743	12,743	8,645
708.00	11,620	650.0	19,758	32,501	12,389
710.00	14,785	680.0	26,342	58,843	15,831

Device	Routing	Invert	Outlet Devices
#1	Discarded	704.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Secondary	709.00'	**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
#3	Primary	704.00'	**18.0" Round Culvert** L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 704.00' / 704.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#4	Device 3	709.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 3	704.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.40 1.40 2.00 3.00 3.25 3.25 4.00 4.00 5.00 Width (feet) 0.00 0.00 0.25 0.25 0.25 0.25 0.50 0.50 0.75 0.75
#6	Device 3	705.40'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.57 cfs @ 12.67 hrs HW=707.25' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.57 cfs)

Primary OutFlow Max=4.12 cfs @ 12.67 hrs HW=707.25' TW=0.00' (Dynamic Tailwater)
└─**3=Culvert** (Passes 4.12 cfs of 12.81 cfs potential flow)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  ├─**5=Custom Weir/Orifice** (Weir Controls 2.05 cfs @ 4.45 fps)
  └─**6=Orifice/Grate** (Orifice Controls 2.07 cfs @ 5.92 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=704.00' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG-16/20: Rain Garden Lots 17-20

Inflow Area = 24,281 sf, 65.00% Impervious, Inflow Depth > 3.61" for 10YearMass event
Inflow = 2.40 cfs @ 12.07 hrs, Volume= 7,307 cf
Outflow = 1.80 cfs @ 12.14 hrs, Volume= 7,274 cf, Atten= 25%, Lag= 3.9 min
Primary = 1.80 cfs @ 12.14 hrs, Volume= 7,274 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 727.09' @ 12.14 hrs Surf.Area= 960 sf Storage= 1,205 cf

Plug-Flow detention time= 16.7 min calculated for 7,274 cf (100% of inflow)
Center-of-Mass det. time= 13.8 min (813.2 - 799.4)

Volume	Invert	Avail.Storage	Storage Description
#1	724.25'	188 cf	**12.0" Round Pipe Storage** x 4 Inside #2 L= 60.0'
#2	724.25'	1,077 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 4 2,880 cf Overall - 188 cf Embedded = 2,692 cf x 40.0% Voids
#3	727.25'	120 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 4 240 cf Overall x 50.0% Voids
#4	727.50'	1,493 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 4
		2,878 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	724.25'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.25' / 724.25' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	728.00'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	724.25'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	726.50'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.80 cfs @ 12.14 hrs HW=727.09' TW=706.07' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.80 cfs of 6.09 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.70 cfs @ 8.00 fps)
  └─**4=Orifice/Grate** (Orifice Controls 1.10 cfs @ 3.14 fps)

Summary for Pond RG-26/27: Rain Garden Lots 26-27

Inflow Area = 13,605 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event
Inflow = 1.44 cfs @ 12.07 hrs, Volume= 4,446 cf
Outflow = 1.10 cfs @ 12.13 hrs, Volume= 4,432 cf, Atten= 23%, Lag= 3.7 min
Primary = 1.10 cfs @ 12.13 hrs, Volume= 4,432 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 747.42' @ 12.13 hrs Surf.Area= 960 sf Storage= 674 cf

Plug-Flow detention time= 15.2 min calculated for 4,430 cf (100% of inflow)
Center-of-Mass det. time= 13.2 min (802.2 - 789.0)

Volume	Invert	Avail.Storage	Storage Description
#1	744.25'	94 cf	**12.0" Round Pipe Storage** x 2 Inside #2 L= 60.0'
#2	744.25'	538 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 2 1,440 cf Overall - 94 cf Embedded = 1,346 cf x 40.0% Voids
#3	747.25'	60 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 2 120 cf Overall x 50.0% Voids
#4	747.50'	747 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 2
		1,439 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	744.25'	**6.0" Round Culvert X 2.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 744.25' / 744.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	748.00'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	744.25'	**2.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	746.50'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.10 cfs @ 12.13 hrs HW=747.42' TW=706.04' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.10 cfs of 3.23 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.37 cfs @ 8.46 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.73 cfs @ 4.19 fps)

Summary for Pond RG-28/29: Rain Garden Lots 28-29

Inflow Area = 17,105 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event
Inflow = 1.80 cfs @ 12.07 hrs, Volume= 5,590 cf
Outflow = 1.25 cfs @ 12.15 hrs, Volume= 5,574 cf, Atten= 31%, Lag= 4.5 min
Primary = 1.25 cfs @ 12.15 hrs, Volume= 5,574 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 743.22' @ 12.15 hrs Surf.Area= 1,557 sf Storage= 813 cf

Plug-Flow detention time= 14.7 min calculated for 5,574 cf (100% of inflow)
Center-of-Mass det. time= 12.8 min (801.8 - 789.0)

Volume	Invert	Avail.Storage	Storage Description
#1	739.75'	94 cf	**12.0" Round Pipe Storage** x 2 Inside #2 L= 60.0'
#2	739.75'	538 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 2 1,440 cf Overall - 94 cf Embedded = 1,346 cf x 40.0% Voids
#3	742.75'	60 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 2 120 cf Overall x 50.0% Voids
#4	743.00'	747 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 2
		1,439 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	739.75'	**6.0" Round Culvert X 2.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 739.75' / 739.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	743.50'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	739.75'	**2.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	742.00'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.25 cfs @ 12.15 hrs HW=743.22' TW=706.12' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.25 cfs of 3.40 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.39 cfs @ 8.87 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.86 cfs @ 4.95 fps)

Summary for Pond RG15H: Rain Garden 15H

Inflow Area = 10,500 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event
Inflow = 1.11 cfs @ 12.07 hrs, Volume= 3,431 cf
Outflow = 1.00 cfs @ 12.11 hrs, Volume= 3,224 cf, Atten= 10%, Lag= 2.2 min
Discarded = 0.04 cfs @ 11.98 hrs, Volume= 897 cf
Primary = 0.96 cfs @ 12.11 hrs, Volume= 2,327 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 719.15' @ 12.11 hrs Surf.Area= 720 sf Storage= 503 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 19.2 min (808.2 - 789.0)

Volume	Invert	Avail.Storage	Storage Description
#1	715.25'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	715.25'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	718.25'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	718.50'	240 cf	**4.00'W x 60.00'L x 1.00'H Ponding**
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	717.25'	**8.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 717.25' / 717.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	719.00'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	717.25'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	718.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Discarded	715.25'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.98 hrs HW=718.52' (Free Discharge)
└─**5=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.96 cfs @ 12.11 hrs HW=719.15' TW=705.89' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.96 cfs of 2.10 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 0.40 cfs @ 1.27 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.32 cfs @ 6.42 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.24 cfs @ 4.88 fps)

Summary for Pond RG15L: Rain Garden 15L

Inflow Area = 8,190 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event
Inflow = 0.86 cfs @ 12.07 hrs, Volume= 2,676 cf
Outflow = 0.59 cfs @ 12.15 hrs, Volume= 2,506 cf, Atten= 31%, Lag= 4.6 min
Discarded = 0.04 cfs @ 12.03 hrs, Volume= 859 cf
Primary = 0.55 cfs @ 12.15 hrs, Volume= 1,647 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 710.42' @ 12.15 hrs Surf.Area= 720 sf Storage= 447 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 29.1 min (818.1 - 789.0)

Volume	Invert	Avail.Storage	Storage Description
#1	706.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	706.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	709.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	710.00'	240 cf	**4.00'W x 60.00'L x 1.00'H Ponding**
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	708.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 708.75' / 708.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	710.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	708.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	709.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Discarded	706.75'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 12.03 hrs HW=710.02' (Free Discharge)
└─**5=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.55 cfs @ 12.15 hrs HW=710.42' TW=706.13' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.55 cfs of 1.13 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.13 cfs @ 6.06 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.42 cfs @ 4.82 fps)

Summary for Pond RG16: Rain Garden Lot 16

Inflow Area = 6,745 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event
Inflow = 0.71 cfs @ 12.07 hrs, Volume= 2,204 cf
Outflow = 0.53 cfs @ 12.14 hrs, Volume= 2,074 cf, Atten= 25%, Lag= 3.9 min
Discarded = 0.04 cfs @ 12.06 hrs, Volume= 833 cf
Primary = 0.49 cfs @ 12.14 hrs, Volume= 1,241 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 733.69' @ 12.14 hrs Surf.Area= 720 sf Storage= 391 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 40.4 min (829.3 - 789.0)

Volume	Invert	Avail.Storage	Storage Description
#1	730.25'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	730.25'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	733.25'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	733.50'	240 cf	**4.00'W x 60.00'L x 1.00'H Ponding**
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	732.25'	**6.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 732.25' / 732.00' S= 0.0417 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	734.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	732.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	732.75'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Discarded	730.25'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 12.06 hrs HW=733.53' (Free Discharge)
└─**5=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.49 cfs @ 12.14 hrs HW=733.69' TW=706.06' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.49 cfs of 1.03 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.12 cfs @ 5.60 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.37 cfs @ 4.23 fps)

Summary for Pond RG21: CB-D1

Inflow Area = 3,630 sf,100.00% Impervious, Inflow Depth > 4.81" for 10YearMass event
Inflow = 0.43 cfs @ 12.07 hrs, Volume= 1,455 cf
Outflow = 0.43 cfs @ 12.07 hrs, Volume= 1,455 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.43 cfs @ 12.07 hrs, Volume= 1,455 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 725.84' @ 12.07 hrs
Flood Elev= 728.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	725.50'	**12.0" Round Culvert** L= 104.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 725.50' / 724.70' S= 0.0077 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.43 cfs @ 12.07 hrs HW=725.84' TW=705.66' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.43 cfs @ 2.68 fps)

Summary for Pond RG22-25: Rain Gardens 22-25

Inflow Area = 98,780 sf, 32.21% Impervious, Inflow Depth > 2.84" for 10YearMass event
Inflow = 6.03 cfs @ 12.18 hrs, Volume= 23,356 cf
Outflow = 5.19 cfs @ 12.26 hrs, Volume= 23,300 cf, Atten= 14%, Lag= 4.8 min
Primary = 3.89 cfs @ 12.26 hrs, Volume= 17,475 cf
Routed to Pond IB 7.1 : Infiltration Basin
Secondary = 1.30 cfs @ 12.26 hrs, Volume= 5,825 cf
Routed to Link P7 : AP7

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 728.21' @ 12.26 hrs Surf.Area= 3,102 sf Storage= 1,614 cf

Plug-Flow detention time= 5.5 min calculated for 23,300 cf (100% of inflow)
Center-of-Mass det. time= 4.1 min (833.1 - 829.0)

Volume	Invert	Avail.Storage	Storage Description
#1	724.75'	188 cf	**12.0" Round Pipe Storage** x 4 Inside #2 L= 60.0'
#2	724.75'	1,077 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 4 2,880 cf Overall - 188 cf Embedded = 2,692 cf x 40.0% Voids
#3	727.75'	120 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 4 240 cf Overall x 50.0% Voids
#4	728.00'	1,493 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 4
		2,878 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	724.75'	**8.0" Round Culvert X 3.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.75' / 724.75' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Secondary	724.75'	**8.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.75' / 724.75' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Device 1	728.50'	**6.0" Horiz. Orifice/Grate X 6.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	728.50'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 1	724.75'	**3.0" Vert. Orifice/Grate X 6.00** C= 0.600 Limited to weir flow at low heads
#6	Device 2	724.75'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#7	Device 1	727.25'	**3.0" Vert. Orifice/Grate X 6.00** C= 0.600 Limited to weir flow at low heads
#8	Device 2	727.25'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.89 cfs @ 12.26 hrs HW=728.21' TW=706.67' (Dynamic Tailwater)
└─**1=Culvert** (Passes 3.89 cfs of 8.92 cfs potential flow)
  ├─**3=Orifice/Grate** (Controls 0.00 cfs)
  ├─**5=Orifice/Grate** (Orifice Controls 2.59 cfs @ 8.80 fps)
  └─**7=Orifice/Grate** (Orifice Controls 1.30 cfs @ 4.41 fps)

Secondary OutFlow Max=1.30 cfs @ 12.26 hrs HW=728.21' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.30 cfs of 2.97 cfs potential flow)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  ├─**6=Orifice/Grate** (Orifice Controls 0.86 cfs @ 8.80 fps)
  └─**8=Orifice/Grate** (Orifice Controls 0.43 cfs @ 4.41 fps)

Summary for Pond RG27: Rain Garden Lot 27

Inflow Area = 10,800 sf, 23.14% Impervious, Inflow Depth > 2.93" for 10YearMass event
Inflow = 0.75 cfs @ 12.14 hrs, Volume= 2,638 cf
Outflow = 0.59 cfs @ 12.22 hrs, Volume= 2,629 cf, Atten= 21%, Lag= 5.2 min
Primary = 0.59 cfs @ 12.22 hrs, Volume= 2,629 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 758.07' @ 12.22 hrs Surf.Area= 738 sf Storage= 363 cf

Plug-Flow detention time= 14.8 min calculated for 2,629 cf (100% of inflow)
Center-of-Mass det. time= 12.8 min (836.6 - 823.8)

Volume	Invert	Avail.Storage	Storage Description
#1	754.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	754.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	757.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	758.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	754.75'	**6.0" Round Culvert** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 754.75' / 753.50' S= 0.0347 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	758.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	754.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	757.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.59 cfs @ 12.22 hrs HW=758.07' TW=706.52' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.59 cfs of 1.52 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.19 cfs @ 8.66 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.40 cfs @ 4.57 fps)

Summary for Pond RG28: Rain Garden Lot 28

Inflow Area = 28,665 sf, 9.64% Impervious, Inflow Depth > 2.40" for 10YearMass event
Inflow = 1.53 cfs @ 12.16 hrs, Volume= 5,729 cf
Outflow = 1.45 cfs @ 12.20 hrs, Volume= 5,719 cf, Atten= 5%, Lag= 2.5 min
Primary = 1.45 cfs @ 12.20 hrs, Volume= 5,719 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 756.97' @ 12.20 hrs Surf.Area= 480 sf Storage= 342 cf

Plug-Flow detention time= 4.5 min calculated for 5,719 cf (100% of inflow)
Center-of-Mass det. time= 3.5 min (844.1 - 840.6)

Volume	Invert	Avail.Storage	Storage Description
#1	753.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	753.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	756.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	757.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	753.75'	**8.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 753.75' / 753.50' S= 0.0083 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	757.50'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	753.75'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	756.25'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.45 cfs @ 12.20 hrs HW=756.96' TW=706.43' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.45 cfs of 2.65 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.83 cfs @ 8.46 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.62 cfs @ 3.56 fps)

Summary for Pond RG30: Rain Garden Lot 30

Inflow Area = 6,740 sf, 65.00% Impervious, Inflow Depth > 3.92" for 10YearMass event
Inflow = 0.71 cfs @ 12.07 hrs, Volume= 2,203 cf
Outflow = 0.55 cfs @ 12.13 hrs, Volume= 2,196 cf, Atten= 23%, Lag= 3.7 min
Primary = 0.55 cfs @ 12.13 hrs, Volume= 2,196 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 730.91' @ 12.13 hrs Surf.Area= 480 sf Storage= 335 cf

Plug-Flow detention time= 15.3 min calculated for 2,196 cf (100% of inflow)
Center-of-Mass det. time= 13.3 min (802.2 - 789.0)

Volume	Invert	Avail.Storage	Storage Description
#1	727.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	727.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	730.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	731.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	727.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 727.75' / 727.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	731.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	727.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	730.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.55 cfs @ 12.13 hrs HW=730.91' TW=706.04' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.55 cfs of 1.61 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.18 cfs @ 8.44 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.36 cfs @ 4.14 fps)

Summary for Link P7: AP7

Inflow Area = 400,631 sf, 30.80% Impervious, Inflow Depth > 1.53" for 10YearMass event
Inflow = 6.04 cfs @ 12.37 hrs, Volume= 51,031 cf
Primary = 6.04 cfs @ 12.37 hrs, Volume= 51,031 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment P7.1: AP7 - To Wetland E

Runoff = 3.76 cfs @ 12.13 hrs, Volume= 13,988 cf, Depth> 1.70"
Routed to Link P7 : AP7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Adj	Description
83,680	55		Woods, Good, HSG B
13,515	61		>75% Grass cover, Good, HSG B
1,560	98		Unconnected roofs, HSG B
98,755	57	56	Weighted Average, UI Adjusted
97,195			98.42% Pervious Area
1,560			1.58% Impervious Area
1,560			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.3000	0.19		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	25	0.3000	2.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.1	245	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.6	320	Total			

Summary for Subcatchment P7.10: Lot 27

Runoff = 1.00 cfs @ 12.14 hrs, Volume= 3,543 cf, Depth> 3.94"
Routed to Pond RG27 : Rain Garden Lot 27

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
*	3,845	90	Residential Lots, 65% imp, HSG C
	2,045	70	Woods, Good, HSG C
	940	89	Gravel roads, HSG C
	3,970	74	>75% Grass cover, Good, HSG C
	10,800	80	Weighted Average
	8,301		76.86% Pervious Area
	2,499		23.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	35	0.2000	3.13		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.9	85	Total			

Summary for Subcatchment P7.11: Lot 28

Runoff = 2.14 cfs @ 12.16 hrs, Volume= 7,952 cf, Depth> 3.33"
Routed to Pond RG28 : Rain Garden Lot 28

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
*	4,250	90	Residential Lots, 65% imp, HSG C
	18,600	70	Woods, Good, HSG C
	960	89	Gravel roads, HSG C
	4,855	74	>75% Grass cover, Good, HSG C
	28,665	74	Weighted Average
	25,903		90.36% Pervious Area
	2,763		9.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.7	100	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.2000	3.13		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.6	180	Total			

Summary for Subcatchment P7.12: Lot 28-29

Runoff = 2.28 cfs @ 12.07 hrs, Volume= 7,152 cf, Depth> 5.02"
Routed to Pond RG-28/29 : Rain Garden Lots 28-29

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
*	17,105	90	Residential Lots, 65% imp, HSG C
	5,987		35.00% Pervious Area
	11,118		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.13: Lot 30

Runoff = 0.90 cfs @ 12.07 hrs, Volume= 2,818 cf, Depth> 5.02"
Routed to Pond RG30 : Rain Garden Lot 30

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
*	6,740	90	Residential Lots, 65% imp, HSG C
	2,359		35.00% Pervious Area
	4,381		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.14: Clubhouse Parking Lot

Runoff = 1.16 cfs @ 12.07 hrs, Volume= 3,766 cf, Depth> 5.47"
Routed to Pond CB1 : CB1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
1,410	74	>75% Grass cover, Good, HSG C
750	98	Roofs, HSG C
6,100	98	Paved parking, HSG C
8,260	94	Weighted Average
1,410		17.07% Pervious Area
6,850		82.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.2: Lots 14-15

Runoff = 1.09 cfs @ 12.07 hrs, Volume= 3,425 cf, Depth> 5.02"
Routed to Pond RG15L : Rain Garden 15L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
*	8,190	90	Residential Lots, 65% imp, HSG C
	2,867		35.00% Pervious Area
	5,324		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.3: Culdesac

Runoff = 0.52 cfs @ 12.07 hrs, Volume= 1,796 cf, Depth> 5.94"
Routed to Pond RG21 : CB-D1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
3,630	98	Paved roads w/curbs & sewers, HSG C
3,630		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.4: Lots 21-25

Runoff = 8.12 cfs @ 12.18 hrs, Volume= 31,538 cf, Depth> 3.83"
Routed to Pond RG22-25 : Rain Gardens 22-25

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
	38,735	90	1/8 acre lots, 65% imp, HSG C
	10,220	85	1/8 acre lots, 65% imp, HSG B
	49,505	70	Woods, Good, HSG C
*	320	74	Grass Paver, Good, HSG C
	98,780	79	Weighted Average
	66,959		67.79% Pervious Area
	31,821		32.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.8	50	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.6	230	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.1	330	Total			

Summary for Subcatchment P7.5: Basin 1

Runoff = 5.00 cfs @ 12.10 hrs, Volume= 15,846 cf, Depth> 2.94"
Routed to Pond IB 7.1 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
13,590	98	Water Surface, HSG B
1,860	98	Paved parking, HSG C
1,425	98	Paved parking, HSG B
28,270	55	Woods, Good, HSG B
8,160	74	>75% Grass cover, Good, HSG C
750	98	Roofs, HSG C
10,520	61	>75% Grass cover, Good, HSG B
64,575	70	Weighted Average
46,950		72.71% Pervious Area
17,625		27.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.9	110	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.6	160	Total			

Summary for Subcatchment P7.6: Lots 17-20

Runoff = 3.08 cfs @ 12.07 hrs, Volume= 9,482 cf, Depth> 4.69"
Routed to Pond RG-16/20 : Rain Garden Lots 17-20

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
11,200	90	1/8 acre lots, 65% imp, HSG C
13,081	85	1/8 acre lots, 65% imp, HSG B
24,281	87	Weighted Average
8,498		35.00% Pervious Area
15,783		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.7: Lot 15

Runoff = 1.40 cfs @ 12.07 hrs, Volume= 4,390 cf, Depth> 5.02"
Routed to Pond RG15H : Rain Garden 15H

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
*	10,500	90	Residential Lots, 65% imp, HSG C
	3,675		35.00% Pervious Area
	6,825		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.8: Lot 16

Runoff = 0.90 cfs @ 12.07 hrs, Volume= 2,820 cf, Depth> 5.02"
Routed to Pond RG16 : Rain Garden Lot 16

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
*	6,745	90	Residential Lots, 65% imp, HSG C
	2,361		35.00% Pervious Area
	4,384		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.9: Lots 26-27

Runoff = 1.81 cfs @ 12.07 hrs, Volume= 5,689 cf, Depth> 5.02"
Routed to Pond RG-26/27 : Rain Garden Lots 26-27

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

	Area (sf)	CN	Description
*	13,605	90	Residential Lots, 65% imp, HSG C
	4,762		35.00% Pervious Area
	8,843		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Pond CB1: CB1

Inflow Area = 8,260 sf, 82.93% Impervious, Inflow Depth > 5.47" for 25YearMass event
Inflow = 1.16 cfs @ 12.07 hrs, Volume= 3,766 cf
Outflow = 1.16 cfs @ 12.07 hrs, Volume= 3,766 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.16 cfs @ 12.07 hrs, Volume= 3,766 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 727.59' @ 12.07 hrs
Flood Elev= 730.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	727.00'	**12.0" Round Culvert** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 727.00' / 726.60' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.16 cfs @ 12.07 hrs HW=727.59' TW=706.33' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 1.16 cfs @ 3.48 fps)

Summary for Pond IB 7.1: Infiltration Basin

Inflow Area = 301,876 sf, 40.36% Impervious, Inflow Depth > 3.53" for 25YearMass event
Inflow = 20.44 cfs @ 12.11 hrs, Volume= 88,832 cf
Outflow = 7.22 cfs @ 12.57 hrs, Volume= 80,863 cf, Atten= 65%, Lag= 27.5 min
Discarded = 0.65 cfs @ 12.57 hrs, Volume= 24,626 cf
Primary = 6.57 cfs @ 12.57 hrs, Volume= 56,237 cf
Routed to Link P7 : AP7
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link P7 : AP7

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 708.02' @ 12.57 hrs Surf.Area= 11,650 sf Storage= 32,734 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 62.6 min (874.6 - 812.0)

Volume	Invert	Avail.Storage	Storage Description
#1	704.00'	58,843 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)
704.00	4,675	575.0	0	0	4,675
706.00	8,235	615.0	12,743	12,743	8,645
708.00	11,620	650.0	19,758	32,501	12,389
710.00	14,785	680.0	26,342	58,843	15,831

Device	Routing	Invert	Outlet Devices
#1	Discarded	704.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Secondary	709.00'	**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
#3	Primary	704.00'	**18.0" Round Culvert** L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 704.00' / 704.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#4	Device 3	709.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 3	704.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.40 1.40 2.00 3.00 3.25 3.25 4.00 4.00 5.00 Width (feet) 0.00 0.00 0.25 0.25 0.25 0.25 0.50 0.50 0.75 0.75
#6	Device 3	705.40'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.65 cfs @ 12.57 hrs HW=708.02' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.65 cfs)

Primary OutFlow Max=6.57 cfs @ 12.57 hrs HW=708.02' TW=0.00' (Dynamic Tailwater)
└─**3=Culvert** (Passes 6.57 cfs of 15.39 cfs potential flow)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  ├─**5=Custom Weir/Orifice** (Weir Controls 4.03 cfs @ 4.72 fps)
  └─**6=Orifice/Grate** (Orifice Controls 2.54 cfs @ 7.28 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=704.00' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG-16/20: Rain Garden Lots 17-20

Inflow Area = 24,281 sf, 65.00% Impervious, Inflow Depth > 4.69" for 25YearMass event
Inflow = 3.08 cfs @ 12.07 hrs, Volume= 9,482 cf
Outflow = 2.31 cfs @ 12.14 hrs, Volume= 9,445 cf, Atten= 25%, Lag= 3.9 min
Primary = 2.31 cfs @ 12.14 hrs, Volume= 9,445 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 727.53' @ 12.14 hrs Surf.Area= 2,912 sf Storage= 1,415 cf

Plug-Flow detention time= 15.5 min calculated for 9,445 cf (100% of inflow)
Center-of-Mass det. time= 13.0 min (805.2 - 792.2)

Volume	Invert	Avail.Storage	Storage Description
#1	724.25'	188 cf	**12.0" Round Pipe Storage** x 4 Inside #2 L= 60.0'
#2	724.25'	1,077 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 4 2,880 cf Overall - 188 cf Embedded = 2,692 cf x 40.0% Voids
#3	727.25'	120 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 4 240 cf Overall x 50.0% Voids
#4	727.50'	1,493 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 4
		2,878 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	724.25'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.25' / 724.25' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	728.00'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	724.25'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	726.50'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.31 cfs @ 12.14 hrs HW=727.53' TW=706.77' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.31 cfs of 6.58 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.75 cfs @ 8.61 fps)
  └─**4=Orifice/Grate** (Orifice Controls 1.56 cfs @ 4.47 fps)

Summary for Pond RG-26/27: Rain Garden Lots 26-27

Inflow Area = 13,605 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event
Inflow = 1.81 cfs @ 12.07 hrs, Volume= 5,689 cf
Outflow = 1.26 cfs @ 12.15 hrs, Volume= 5,673 cf, Atten= 31%, Lag= 4.5 min
Primary = 1.26 cfs @ 12.15 hrs, Volume= 5,673 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 747.73' @ 12.15 hrs Surf.Area= 1,561 sf Storage= 818 cf

Plug-Flow detention time= 14.6 min calculated for 5,671 cf (100% of inflow)
Center-of-Mass det. time= 12.8 min (795.2 - 782.3)

Volume	Invert	Avail.Storage	Storage Description
#1	744.25'	94 cf	**12.0" Round Pipe Storage** x 2 Inside #2 L= 60.0'
#2	744.25'	538 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 2 1,440 cf Overall - 94 cf Embedded = 1,346 cf x 40.0% Voids
#3	747.25'	60 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 2 120 cf Overall x 50.0% Voids
#4	747.50'	747 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 2
		1,439 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	744.25'	**6.0" Round Culvert X 2.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 744.25' / 744.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	748.00'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	744.25'	**2.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	746.50'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.25 cfs @ 12.15 hrs HW=747.73' TW=706.83' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.25 cfs of 3.40 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.39 cfs @ 8.88 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.87 cfs @ 4.97 fps)

Summary for Pond RG-28/29: Rain Garden Lots 28-29

Inflow Area = 17,105 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event
Inflow = 2.28 cfs @ 12.07 hrs, Volume= 7,152 cf
Outflow = 1.45 cfs @ 12.16 hrs, Volume= 7,134 cf, Atten= 36%, Lag= 5.2 min
Primary = 1.45 cfs @ 12.16 hrs, Volume= 7,134 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 743.54' @ 12.16 hrs Surf.Area= 1,723 sf Storage= 1,024 cf

Plug-Flow detention time= 14.5 min calculated for 7,134 cf (100% of inflow)
Center-of-Mass det. time= 12.9 min (795.2 - 782.3)

Volume	Invert	Avail.Storage	Storage Description
#1	739.75'	94 cf	**12.0" Round Pipe Storage** x 2 Inside #2 L= 60.0'
#2	739.75'	538 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 2 1,440 cf Overall - 94 cf Embedded = 1,346 cf x 40.0% Voids
#3	742.75'	60 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 2 120 cf Overall x 50.0% Voids
#4	743.00'	747 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 2
		1,439 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	739.75'	**6.0" Round Culvert X 2.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 739.75' / 739.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	743.50'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	739.75'	**2.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	742.00'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.45 cfs @ 12.16 hrs HW=743.53' TW=706.90' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.45 cfs of 3.55 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 0.07 cfs @ 0.61 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.40 cfs @ 9.26 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.98 cfs @ 5.63 fps)

Summary for Pond RG15H: Rain Garden 15H

Inflow Area = 10,500 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event
Inflow = 1.40 cfs @ 12.07 hrs, Volume= 4,390 cf
Outflow = 1.37 cfs @ 12.09 hrs, Volume= 4,170 cf, Atten= 2%, Lag= 1.0 min
Discarded = 0.04 cfs @ 11.90 hrs, Volume= 954 cf
Primary = 1.33 cfs @ 12.09 hrs, Volume= 3,216 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 719.23' @ 12.09 hrs Surf.Area= 720 sf Storage= 521 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 15.9 min (798.2 - 782.3)

Volume	Invert	Avail.Storage	Storage Description
#1	715.25'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	715.25'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	718.25'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	718.50'	240 cf	**4.00'W x 60.00'L x 1.00'H Ponding**
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	717.25'	**8.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 717.25' / 717.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	719.00'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	717.25'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	718.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Discarded	715.25'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.90 hrs HW=718.51' (Free Discharge)
└─**5=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=1.32 cfs @ 12.09 hrs HW=719.23' TW=706.45' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.32 cfs of 2.16 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 0.75 cfs @ 1.57 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.32 cfs @ 6.56 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.25 cfs @ 5.06 fps)

Summary for Pond RG15L: Rain Garden 15L

Inflow Area = 8,190 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event
Inflow = 1.09 cfs @ 12.07 hrs, Volume= 3,425 cf
Outflow = 0.92 cfs @ 12.12 hrs, Volume= 3,221 cf, Atten= 16%, Lag= 2.9 min
Discarded = 0.04 cfs @ 11.99 hrs, Volume= 915 cf
Primary = 0.88 cfs @ 12.12 hrs, Volume= 2,306 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 710.64' @ 12.12 hrs Surf.Area= 720 sf Storage= 500 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 21.2 min (803.5 - 782.3)

Volume	Invert	Avail.Storage	Storage Description
#1	706.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	706.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	709.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	710.00'	240 cf	**4.00'W x 60.00'L x 1.00'H Ponding**
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	708.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 708.75' / 708.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	710.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	708.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	709.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Discarded	706.75'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.99 hrs HW=710.00' (Free Discharge)
└─**5=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.88 cfs @ 12.12 hrs HW=710.64' TW=706.67' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.88 cfs of 1.21 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 0.27 cfs @ 1.23 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.47 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.46 cfs @ 5.33 fps)

Summary for Pond RG16: Rain Garden Lot 16

Inflow Area = 6,745 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event
Inflow = 0.90 cfs @ 12.07 hrs, Volume= 2,820 cf
Outflow = 0.61 cfs @ 12.15 hrs, Volume= 2,647 cf, Atten= 32%, Lag= 4.7 min
Discarded = 0.04 cfs @ 12.02 hrs, Volume= 887 cf
Primary = 0.57 cfs @ 12.15 hrs, Volume= 1,759 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 733.98' @ 12.15 hrs Surf.Area= 720 sf Storage= 461 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 28.1 min (810.5 - 782.3)

Volume	Invert	Avail.Storage	Storage Description
#1	730.25'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	730.25'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	733.25'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	733.50'	240 cf	**4.00'W x 60.00'L x 1.00'H Ponding**
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	732.25'	**6.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 732.25' / 732.00' S= 0.0417 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	734.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	732.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	732.75'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Discarded	730.25'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 12.02 hrs HW=733.50' (Free Discharge)
└─**5=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.57 cfs @ 12.15 hrs HW=733.98' TW=706.85' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.57 cfs of 1.15 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.13 cfs @ 6.17 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.43 cfs @ 4.96 fps)

Summary for Pond RG21: CB-D1

Inflow Area = 3,630 sf,100.00% Impervious, Inflow Depth > 5.94" for 25YearMass event
Inflow = 0.52 cfs @ 12.07 hrs, Volume= 1,796 cf
Outflow = 0.52 cfs @ 12.07 hrs, Volume= 1,796 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.52 cfs @ 12.07 hrs, Volume= 1,796 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 725.88' @ 12.07 hrs
Flood Elev= 728.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	725.50'	**12.0" Round Culvert** L= 104.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 725.50' / 724.70' S= 0.0077 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.52 cfs @ 12.07 hrs HW=725.88' TW=706.33' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.52 cfs @ 2.83 fps)

Summary for Pond RG22-25: Rain Gardens 22-25

Inflow Area = 98,780 sf, 32.21% Impervious, Inflow Depth > 3.83" for 25YearMass event
Inflow = 8.12 cfs @ 12.18 hrs, Volume= 31,538 cf
Outflow = 7.62 cfs @ 12.23 hrs, Volume= 31,476 cf, Atten= 6%, Lag= 2.9 min
Primary = 5.71 cfs @ 12.23 hrs, Volume= 23,607 cf
Routed to Pond IB 7.1 : Infiltration Basin
Secondary = 1.90 cfs @ 12.23 hrs, Volume= 7,869 cf
Routed to Link P7 : AP7

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 728.63' @ 12.23 hrs Surf.Area= 3,546 sf Storage= 2,192 cf

Plug-Flow detention time= 5.3 min calculated for 31,463 cf (100% of inflow)
Center-of-Mass det. time= 4.1 min (824.6 - 820.5)

Volume	Invert	Avail.Storage	Storage Description
#1	724.75'	188 cf	**12.0" Round Pipe Storage** x 4 Inside #2 L= 60.0'
#2	724.75'	1,077 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 4 2,880 cf Overall - 188 cf Embedded = 2,692 cf x 40.0% Voids
#3	727.75'	120 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 4 240 cf Overall x 50.0% Voids
#4	728.00'	1,493 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 4
		2,878 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	724.75'	**8.0" Round Culvert X 3.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.75' / 724.75' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Secondary	724.75'	**8.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.75' / 724.75' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Device 1	728.50'	**6.0" Horiz. Orifice/Grate X 6.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	728.50'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 1	724.75'	**3.0" Vert. Orifice/Grate X 6.00** C= 0.600 Limited to weir flow at low heads
#6	Device 2	724.75'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#7	Device 1	727.25'	**3.0" Vert. Orifice/Grate X 6.00** C= 0.600 Limited to weir flow at low heads
#8	Device 2	727.25'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.71 cfs @ 12.23 hrs HW=728.63' TW=707.27' (Dynamic Tailwater)
└─**1=Culvert** (Passes 5.71 cfs of 9.49 cfs potential flow)
  ├─**3=Orifice/Grate** (Weir Controls 1.38 cfs @ 1.16 fps)
  ├─**5=Orifice/Grate** (Orifice Controls 2.75 cfs @ 9.33 fps)
  └─**7=Orifice/Grate** (Orifice Controls 1.59 cfs @ 5.39 fps)

Secondary OutFlow Max=1.90 cfs @ 12.23 hrs HW=728.63' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 1.90 cfs of 3.16 cfs potential flow)
  ├─**4=Orifice/Grate** (Weir Controls 0.46 cfs @ 1.16 fps)
  ├─**6=Orifice/Grate** (Orifice Controls 0.92 cfs @ 9.33 fps)
  └─**8=Orifice/Grate** (Orifice Controls 0.53 cfs @ 5.39 fps)

Summary for Pond RG27: Rain Garden Lot 27

Inflow Area = 10,800 sf, 23.14% Impervious, Inflow Depth > 3.94" for 25YearMass event
Inflow = 1.00 cfs @ 12.14 hrs, Volume= 3,543 cf
Outflow = 0.68 cfs @ 12.26 hrs, Volume= 3,533 cf, Atten= 32%, Lag= 7.3 min
Primary = 0.68 cfs @ 12.26 hrs, Volume= 3,533 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 758.49' @ 12.26 hrs Surf.Area= 848 sf Storage= 493 cf

Plug-Flow detention time= 14.6 min calculated for 3,532 cf (100% of inflow)
Center-of-Mass det. time= 12.9 min (828.3 - 815.4)

Volume	Invert	Avail.Storage	Storage Description
#1	754.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	754.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	757.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	758.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	754.75'	**6.0" Round Culvert** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 754.75' / 753.50' S= 0.0347 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	758.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	754.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	757.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.68 cfs @ 12.26 hrs HW=758.48' TW=707.41' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.68 cfs of 1.60 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.20 cfs @ 9.20 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.48 cfs @ 5.53 fps)

Summary for Pond RG28: Rain Garden Lot 28

Inflow Area = 28,665 sf, 9.64% Impervious, Inflow Depth > 3.33" for 25YearMass event
Inflow = 2.14 cfs @ 12.16 hrs, Volume= 7,952 cf
Outflow = 1.85 cfs @ 12.23 hrs, Volume= 7,941 cf, Atten= 14%, Lag= 4.4 min
Primary = 1.85 cfs @ 12.23 hrs, Volume= 7,941 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 757.53' @ 12.23 hrs Surf.Area= 861 sf Storage= 511 cf

Plug-Flow detention time= 4.3 min calculated for 7,941 cf (100% of inflow)
Center-of-Mass det. time= 3.5 min (834.7 - 831.2)

Volume	Invert	Avail.Storage	Storage Description
#1	753.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	753.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	756.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	757.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	753.75'	**8.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 753.75' / 753.50' S= 0.0083 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	757.50'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	753.75'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	756.25'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.85 cfs @ 12.23 hrs HW=757.53' TW=707.30' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.85 cfs of 2.91 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 0.06 cfs @ 0.58 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.90 cfs @ 9.21 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.89 cfs @ 5.08 fps)

Summary for Pond RG30: Rain Garden Lot 30

Inflow Area = 6,740 sf, 65.00% Impervious, Inflow Depth > 5.02" for 25YearMass event
Inflow = 0.90 cfs @ 12.07 hrs, Volume= 2,818 cf
Outflow = 0.62 cfs @ 12.15 hrs, Volume= 2,810 cf, Atten= 30%, Lag= 4.5 min
Primary = 0.62 cfs @ 12.15 hrs, Volume= 2,810 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 731.22' @ 12.15 hrs Surf.Area= 777 sf Storage= 406 cf

Plug-Flow detention time= 14.6 min calculated for 2,809 cf (100% of inflow)
Center-of-Mass det. time= 12.8 min (795.2 - 782.3)

Volume	Invert	Avail.Storage	Storage Description
#1	727.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	727.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	730.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	731.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	727.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 727.75' / 727.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	731.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	727.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	730.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.62 cfs @ 12.15 hrs HW=731.22' TW=706.83' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.62 cfs of 1.70 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.19 cfs @ 8.86 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.43 cfs @ 4.94 fps)

Summary for Link P7: AP7

Inflow Area = 400,631 sf, 30.80% Impervious, Inflow Depth > 2.34" for 25YearMass event
Inflow = 9.29 cfs @ 12.43 hrs, Volume= 78,094 cf
Primary = 9.29 cfs @ 12.43 hrs, Volume= 78,094 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment P7.1: AP7 - To Wetland E

Runoff = 6.65 cfs @ 12.13 hrs, Volume= 23,356 cf, Depth> 2.84"
Routed to Link P7 : AP7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Adj	Description
83,680	55		Woods, Good, HSG B
13,515	61		>75% Grass cover, Good, HSG B
1,560	98		Unconnected roofs, HSG B
98,755	57	56	Weighted Average, UI Adjusted
97,195			98.42% Pervious Area
1,560			1.58% Impervious Area
1,560			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	50	0.3000	0.19		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	25	0.3000	2.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.1	245	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
8.6	320	Total			

Summary for Subcatchment P7.10: Lot 27

Runoff = 1.40 cfs @ 12.13 hrs, Volume= 4,995 cf, Depth> 5.55"
Routed to Pond RG27 : Rain Garden Lot 27

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	3,845	90	Residential Lots, 65% imp, HSG C
	2,045	70	Woods, Good, HSG C
	940	89	Gravel roads, HSG C
	3,970	74	>75% Grass cover, Good, HSG C
	10,800	80	Weighted Average
	8,301		76.86% Pervious Area
	2,499		23.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.2	35	0.2000	3.13		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
9.9	85	Total			

Summary for Subcatchment P7.11: Lot 28

Runoff = 3.12 cfs @ 12.16 hrs, Volume= 11,591 cf, Depth> 4.85"
Routed to Pond RG28 : Rain Garden Lot 28

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	4,250	90	Residential Lots, 65% imp, HSG C
	18,600	70	Woods, Good, HSG C
	960	89	Gravel roads, HSG C
	4,855	74	>75% Grass cover, Good, HSG C
	28,665	74	Weighted Average
	25,903		90.36% Pervious Area
	2,763		9.64% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.7	100	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	30	0.2000	3.13		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
11.6	180	Total			

Summary for Subcatchment P7.12: Lot 28-29

Runoff = 3.01 cfs @ 12.07 hrs, Volume= 9,596 cf, Depth> 6.73"
Routed to Pond RG-28/29 : Rain Garden Lots 28-29

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	17,105	90	Residential Lots, 65% imp, HSG C
	5,987		35.00% Pervious Area
	11,118		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.13: Lot 30

Runoff = 1.18 cfs @ 12.07 hrs, Volume= 3,781 cf, Depth> 6.73"
Routed to Pond RG30 : Rain Garden Lot 30

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	6,740	90	Residential Lots, 65% imp, HSG C
	2,359		35.00% Pervious Area
	4,381		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.14: Clubhouse Parking Lot

Runoff = 1.50 cfs @ 12.07 hrs, Volume= 4,961 cf, Depth> 7.21"
Routed to Pond CB1 : CB1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
1,410	74	>75% Grass cover, Good, HSG C
750	98	Roofs, HSG C
6,100	98	Paved parking, HSG C
8,260	94	Weighted Average
1,410		17.07% Pervious Area
6,850		82.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.2: Lots 14-15

Runoff = 1.44 cfs @ 12.07 hrs, Volume= 4,594 cf, Depth> 6.73"
Routed to Pond RG15L : Rain Garden 15L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	8,190	90	Residential Lots, 65% imp, HSG C
	2,867		35.00% Pervious Area
	5,324		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.3: Culdesac

Runoff = 0.67 cfs @ 12.07 hrs, Volume= 2,325 cf, Depth> 7.69"
Routed to Pond RG21 : CB-D1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
3,630	98	Paved roads w/curbs & sewers, HSG C
3,630		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.4: Lots 21-25

Runoff = 11.42 cfs @ 12.18 hrs, Volume= 44,700 cf, Depth> 5.43"
Routed to Pond RG22-25 : Rain Gardens 22-25

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
	38,735	90	1/8 acre lots, 65% imp, HSG C
	10,220	85	1/8 acre lots, 65% imp, HSG B
	49,505	70	Woods, Good, HSG C
*	320	74	Grass Paver, Good, HSG C
	98,780	79	Weighted Average
	66,959		67.79% Pervious Area
	31,821		32.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.8	50	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.6	230	0.0900	1.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.1	330	Total			

Summary for Subcatchment P7.5: Basin 1

Runoff = 7.50 cfs @ 12.10 hrs, Volume= 23,670 cf, Depth> 4.40"
Routed to Pond IB 7.1 : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
13,590	98	Water Surface, HSG B
1,860	98	Paved parking, HSG C
1,425	98	Paved parking, HSG B
28,270	55	Woods, Good, HSG B
8,160	74	>75% Grass cover, Good, HSG C
750	98	Roofs, HSG C
10,520	61	>75% Grass cover, Good, HSG B
64,575	70	Weighted Average
46,950		72.71% Pervious Area
17,625		27.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	50	0.1500	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.9	110	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.6	160	Total			

Summary for Subcatchment P7.6: Lots 17-20

Runoff = 4.12 cfs @ 12.07 hrs, Volume= 12,903 cf, Depth> 6.38"
Routed to Pond RG-16/20 : Rain Garden Lots 17-20

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
	11,200	90	1/8 acre lots, 65% imp, HSG C
	13,081	85	1/8 acre lots, 65% imp, HSG B
	24,281	87	Weighted Average
	8,498		35.00% Pervious Area
	15,783		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.7: Lot 15

Runoff = 1.85 cfs @ 12.07 hrs, Volume= 5,890 cf, Depth> 6.73"
Routed to Pond RG15H : Rain Garden 15H

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	10,500	90	Residential Lots, 65% imp, HSG C
	3,675		35.00% Pervious Area
	6,825		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.8: Lot 16

Runoff = 1.19 cfs @ 12.07 hrs, Volume= 3,784 cf, Depth> 6.73"
Routed to Pond RG16 : Rain Garden Lot 16

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	6,745	90	Residential Lots, 65% imp, HSG C
	2,361		35.00% Pervious Area
	4,384		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P7.9: Lots 26-27

Runoff = 2.39 cfs @ 12.07 hrs, Volume= 7,632 cf, Depth> 6.73"
Routed to Pond RG-26/27 : Rain Garden Lots 26-27

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

	Area (sf)	CN	Description
*	13,605	90	Residential Lots, 65% imp, HSG C
	4,762		35.00% Pervious Area
	8,843		65.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Pond CB1: CB1

Inflow Area = 8,260 sf, 82.93% Impervious, Inflow Depth > 7.21" for 100YearMass event
Inflow = 1.50 cfs @ 12.07 hrs, Volume= 4,961 cf
Outflow = 1.50 cfs @ 12.07 hrs, Volume= 4,961 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.50 cfs @ 12.07 hrs, Volume= 4,961 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 727.69' @ 12.07 hrs
Flood Elev= 730.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	727.00'	**12.0" Round Culvert** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 727.00' / 726.60' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.50 cfs @ 12.07 hrs HW=727.69' TW=707.20' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 1.50 cfs @ 3.68 fps)

Summary for Pond IB 7.1: Infiltration Basin

Inflow Area = 301,876 sf, 40.36% Impervious, Inflow Depth > 4.99" for 100YearMass event
Inflow = 30.22 cfs @ 12.13 hrs, Volume= 125,463 cf
Outflow = 11.90 cfs @ 12.53 hrs, Volume= 116,685 cf, Atten= 61%, Lag= 24.0 min
Discarded = 0.73 cfs @ 12.53 hrs, Volume= 27,162 cf
Primary = 11.17 cfs @ 12.53 hrs, Volume= 89,523 cf
Routed to Link P7 : AP7
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link P7 : AP7

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 708.97' @ 12.53 hrs Surf.Area= 13,105 sf Storage= 44,466 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 58.1 min (862.3 - 804.1)

Volume	Invert	Avail.Storage	Storage Description
#1	704.00'	58,843 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)
704.00	4,675	575.0	0	0	4,675
706.00	8,235	615.0	12,743	12,743	8,645
708.00	11,620	650.0	19,758	32,501	12,389
710.00	14,785	680.0	26,342	58,843	15,831

Device	Routing	Invert	Outlet Devices
#1	Discarded	704.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Secondary	709.00'	**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
#3	Primary	704.00'	**18.0" Round Culvert** L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 704.00' / 704.00' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#4	Device 3	709.00'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 3	704.00'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.40 1.40 2.00 3.00 3.25 3.25 4.00 4.00 5.00 Width (feet) 0.00 0.00 0.25 0.25 0.25 0.25 0.50 0.50 0.75 0.75
#6	Device 3	705.40'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.73 cfs @ 12.53 hrs HW=708.97' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.73 cfs)

Primary OutFlow Max=11.17 cfs @ 12.53 hrs HW=708.97' TW=0.00' (Dynamic Tailwater)
└─**3=Culvert** (Passes 11.17 cfs of 17.48 cfs potential flow)
  ├─**4=Orifice/Grate** (Controls 0.00 cfs)
  ├─**5=Custom Weir/Orifice** (Weir Controls 8.14 cfs @ 5.21 fps)
  └─**6=Orifice/Grate** (Orifice Controls 3.02 cfs @ 8.66 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=704.00' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond RG-16/20: Rain Garden Lots 17-20

Inflow Area = 24,281 sf, 65.00% Impervious, Inflow Depth > 6.38" for 100YearMass event
Inflow = 4.12 cfs @ 12.07 hrs, Volume= 12,903 cf
Outflow = 2.66 cfs @ 12.16 hrs, Volume= 12,862 cf, Atten= 35%, Lag= 5.1 min
Primary = 2.66 cfs @ 12.16 hrs, Volume= 12,862 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 727.90' @ 12.16 hrs Surf.Area= 3,301 sf Storage= 1,854 cf

Plug-Flow detention time= 14.8 min calculated for 12,862 cf (100% of inflow)
Center-of-Mass det. time= 12.8 min (796.6 - 783.8)

Volume	Invert	Avail.Storage	Storage Description
#1	724.25'	188 cf	**12.0" Round Pipe Storage** x 4 Inside #2 L= 60.0'
#2	724.25'	1,077 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 4 2,880 cf Overall - 188 cf Embedded = 2,692 cf x 40.0% Voids
#3	727.25'	120 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 4 240 cf Overall x 50.0% Voids
#4	727.50'	1,493 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 4
		2,878 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	724.25'	**6.0" Round Culvert X 4.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.25' / 724.25' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	728.00'	**6.0" Horiz. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	724.25'	**2.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	726.50'	**4.0" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.66 cfs @ 12.16 hrs HW=727.90' TW=707.85' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.66 cfs of 6.97 cfs potential flow)
  ├─**2=Orifice/Grate** (Controls 0.00 cfs)
  ├─**3=Orifice/Grate** (Orifice Controls 0.79 cfs @ 9.09 fps)
  └─**4=Orifice/Grate** (Orifice Controls 1.87 cfs @ 5.35 fps)

Summary for Pond RG-26/27: Rain Garden Lots 26-27

Inflow Area = 13,605 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event
Inflow = 2.39 cfs @ 12.07 hrs, Volume= 7,632 cf
Outflow = 1.63 cfs @ 12.15 hrs, Volume= 7,614 cf, Atten= 32%, Lag= 4.6 min
Primary = 1.63 cfs @ 12.15 hrs, Volume= 7,614 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 748.08' @ 12.15 hrs Surf.Area= 1,747 sf Storage= 1,059 cf

Plug-Flow detention time= 14.4 min calculated for 7,611 cf (100% of inflow)
Center-of-Mass det. time= 12.9 min (787.6 - 774.8)

Volume	Invert	Avail.Storage	Storage Description
#1	744.25'	94 cf	**12.0" Round Pipe Storage** x 2 Inside #2 L= 60.0'
#2	744.25'	538 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 2 1,440 cf Overall - 94 cf Embedded = 1,346 cf x 40.0% Voids
#3	747.25'	60 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 2 120 cf Overall x 50.0% Voids
#4	747.50'	747 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 2
		1,439 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	744.25'	**6.0" Round Culvert X 2.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 744.25' / 744.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	748.00'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	744.25'	**2.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	746.50'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.63 cfs @ 12.15 hrs HW=748.08' TW=707.79' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.63 cfs of 3.58 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 0.23 cfs @ 0.92 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.41 cfs @ 9.32 fps)
  └─**4=Orifice/Grate** (Orifice Controls 1.00 cfs @ 5.72 fps)

Summary for Pond RG-28/29: Rain Garden Lots 28-29

Inflow Area = 17,105 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event
Inflow = 3.01 cfs @ 12.07 hrs, Volume= 9,596 cf
Outflow = 2.38 cfs @ 12.13 hrs, Volume= 9,575 cf, Atten= 21%, Lag= 3.4 min
Primary = 2.38 cfs @ 12.13 hrs, Volume= 9,575 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 743.73' @ 12.13 hrs Surf.Area= 1,833 sf Storage= 1,187 cf

Plug-Flow detention time= 14.2 min calculated for 9,575 cf (100% of inflow)
Center-of-Mass det. time= 12.8 min (787.5 - 774.8)

Volume	Invert	Avail.Storage	Storage Description
#1	739.75'	94 cf	**12.0" Round Pipe Storage** x 2 Inside #2 L= 60.0'
#2	739.75'	538 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 2 1,440 cf Overall - 94 cf Embedded = 1,346 cf x 40.0% Voids
#3	742.75'	60 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 2 120 cf Overall x 50.0% Voids
#4	743.00'	747 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 2
		1,439 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	739.75'	**6.0" Round Culvert X 2.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 739.75' / 739.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	743.50'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	739.75'	**2.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	742.00'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.38 cfs @ 12.13 hrs HW=743.73' TW=707.63' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.38 cfs of 3.65 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.91 cfs @ 2.33 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.41 cfs @ 9.51 fps)
  └─**4=Orifice/Grate** (Orifice Controls 1.05 cfs @ 6.03 fps)

Summary for Pond RG15H: Rain Garden 15H

Inflow Area = 10,500 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event
Inflow = 1.85 cfs @ 12.07 hrs, Volume= 5,890 cf
Outflow = 1.72 cfs @ 12.10 hrs, Volume= 5,666 cf, Atten= 7%, Lag= 1.7 min
Discarded = 0.04 cfs @ 11.80 hrs, Volume= 1,022 cf
Primary = 1.68 cfs @ 12.10 hrs, Volume= 4,645 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 719.41' @ 12.10 hrs Surf.Area= 720 sf Storage= 565 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 14.4 min (789.2 - 774.8)

Volume	Invert	Avail.Storage	Storage Description
#1	715.25'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	715.25'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	718.25'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	718.50'	240 cf	**4.00'W x 60.00'L x 1.00'H Ponding**
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	717.25'	**8.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 717.25' / 717.15' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	719.00'	**8.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	717.25'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	718.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Discarded	715.25'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.80 hrs HW=718.51' (Free Discharge)
5=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=1.68 cfs @ 12.10 hrs HW=719.41' TW=707.42' (Dynamic Tailwater)
1=Culvert (Passes 1.68 cfs of 2.27 cfs potential flow)
2=Orifice/Grate (Orifice Controls 1.08 cfs @ 3.09 fps)
3=Orifice/Grate (Orifice Controls 0.34 cfs @ 6.87 fps)
4=Orifice/Grate (Orifice Controls 0.27 cfs @ 5.46 fps)

Summary for Pond RG15L: Rain Garden 15L

Inflow Area = 8,190 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event
Inflow = 1.44 cfs @ 12.07 hrs, Volume= 4,594 cf
Outflow = 1.26 cfs @ 12.11 hrs, Volume= 4,373 cf, Atten= 13%, Lag= 2.5 min
Discarded = 0.04 cfs @ 11.91 hrs, Volume= 983 cf
Primary = 1.22 cfs @ 12.11 hrs, Volume= 3,390 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 710.86' @ 12.11 hrs Surf.Area= 720 sf Storage= 552 cf

Plug-Flow detention time= 44.6 min calculated for 4,372 cf (95% of inflow)
Center-of-Mass det. time= 17.3 min (792.0 - 774.8)

Volume	Invert	Avail.Storage	Storage Description
#1	706.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	706.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	709.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	710.00'	240 cf	**4.00'W x 60.00'L x 1.00'H Ponding**
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	708.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 708.75' / 708.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	710.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	708.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	709.25'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Discarded	706.75'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.91 hrs HW=710.01' (Free Discharge)
└─**5=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=1.22 cfs @ 12.11 hrs HW=710.86' TW=707.51' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.22 cfs of 1.29 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 0.56 cfs @ 2.87 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.15 cfs @ 6.85 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.50 cfs @ 5.78 fps)

Summary for Pond RG16: Rain Garden Lot 16

Inflow Area = 6,745 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event
Inflow = 1.19 cfs @ 12.07 hrs, Volume= 3,784 cf
Outflow = 1.06 cfs @ 12.11 hrs, Volume= 3,574 cf, Atten= 11%, Lag= 2.3 min
Discarded = 0.04 cfs @ 11.97 hrs, Volume= 956 cf
Primary = 1.02 cfs @ 12.11 hrs, Volume= 2,618 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 734.18' @ 12.11 hrs Surf.Area= 720 sf Storage= 510 cf

Plug-Flow detention time= 50.7 min calculated for 3,574 cf (94% of inflow)
Center-of-Mass det. time= 19.9 min (794.6 - 774.8)

Volume	Invert	Avail.Storage	Storage Description
#1	730.25'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	730.25'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	733.25'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	733.50'	240 cf	**4.00'W x 60.00'L x 1.00'H Ponding**
		586 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	732.25'	**6.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 732.25' / 732.00' S= 0.0417 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	734.00'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	732.25'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	732.75'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Discarded	730.25'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.97 hrs HW=733.50' (Free Discharge)
└─**5=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=1.02 cfs @ 12.11 hrs HW=734.18' TW=707.49' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.02 cfs of 1.23 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 0.40 cfs @ 1.40 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.14 cfs @ 6.55 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.47 cfs @ 5.42 fps)

Summary for Pond RG21: CB-D1

Inflow Area = 3,630 sf,100.00% Impervious, Inflow Depth > 7.69" for 100YearMass event
Inflow = 0.67 cfs @ 12.07 hrs, Volume= 2,325 cf
Outflow = 0.67 cfs @ 12.07 hrs, Volume= 2,325 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.67 cfs @ 12.07 hrs, Volume= 2,325 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 725.94' @ 12.07 hrs
Flood Elev= 728.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	725.50'	**12.0" Round Culvert** L= 104.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 725.50' / 724.70' S= 0.0077 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.67 cfs @ 12.07 hrs HW=725.94' TW=707.20' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.67 cfs @ 3.01 fps)

Summary for Pond RG22-25: Rain Gardens 22-25

Inflow Area = 98,780 sf, 32.21% Impervious, Inflow Depth > 5.43" for 100YearMass event
Inflow = 11.42 cfs @ 12.18 hrs, Volume= 44,700 cf
Outflow = 10.71 cfs @ 12.22 hrs, Volume= 44,628 cf, Atten= 6%, Lag= 2.8 min
Primary = 8.03 cfs @ 12.22 hrs, Volume= 33,471 cf
Routed to Pond IB 7.1 : Infiltration Basin
Secondary = 2.68 cfs @ 12.22 hrs, Volume= 11,157 cf
Routed to Link P7 : AP7

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 728.87' @ 12.22 hrs Surf.Area= 3,822 sf Storage= 2,626 cf

Plug-Flow detention time= 4.9 min calculated for 44,628 cf (100% of inflow)
Center-of-Mass det. time= 3.9 min (814.5 - 810.7)

Volume	Invert	Avail.Storage	Storage Description
#1	724.75'	188 cf	**12.0" Round Pipe Storage** x 4 Inside #2 L= 60.0'
#2	724.75'	1,077 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** x 4 2,880 cf Overall - 188 cf Embedded = 2,692 cf x 40.0% Voids
#3	727.75'	120 cf	**4.00'W x 60.00'L x 0.25'H Mulch** x 4 240 cf Overall x 50.0% Voids
#4	728.00'	1,493 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0** x 4
		2,878 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	724.75'	**8.0" Round Culvert X 3.00** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.75' / 724.75' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Secondary	724.75'	**8.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 724.75' / 724.75' S= 0.0000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#3	Device 1	728.50'	**6.0" Horiz. Orifice/Grate X 6.00** C= 0.600 Limited to weir flow at low heads
#4	Device 2	728.50'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#5	Device 1	724.75'	**3.0" Vert. Orifice/Grate X 6.00** C= 0.600 Limited to weir flow at low heads
#6	Device 2	724.75'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#7	Device 1	727.25'	**3.0" Vert. Orifice/Grate X 6.00** C= 0.600 Limited to weir flow at low heads
#8	Device 2	727.25'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=8.03 cfs @ 12.22 hrs HW=728.87' TW=708.28' (Dynamic Tailwater)
└─**1=Culvert** (Passes 8.03 cfs of 9.81 cfs potential flow)
  ├─**3=Orifice/Grate** (Orifice Controls 3.46 cfs @ 2.93 fps)
  ├─**5=Orifice/Grate** (Orifice Controls 2.83 cfs @ 9.63 fps)
  └─**7=Orifice/Grate** (Orifice Controls 1.73 cfs @ 5.89 fps)

Secondary OutFlow Max=2.68 cfs @ 12.22 hrs HW=728.87' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 2.68 cfs of 3.27 cfs potential flow)
  ├─**4=Orifice/Grate** (Orifice Controls 1.15 cfs @ 2.93 fps)
  ├─**6=Orifice/Grate** (Orifice Controls 0.94 cfs @ 9.63 fps)
  └─**8=Orifice/Grate** (Orifice Controls 0.58 cfs @ 5.89 fps)

Summary for Pond RG27: Rain Garden Lot 27

Inflow Area = 10,800 sf, 23.14% Impervious, Inflow Depth > 5.55" for 100YearMass event
Inflow = 1.40 cfs @ 12.13 hrs, Volume= 4,995 cf
Outflow = 1.19 cfs @ 12.20 hrs, Volume= 4,983 cf, Atten= 15%, Lag= 4.0 min
Primary = 1.19 cfs @ 12.20 hrs, Volume= 4,983 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 758.73' @ 12.20 hrs Surf.Area= 916 sf Storage= 592 cf

Plug-Flow detention time= 14.2 min calculated for 4,981 cf (100% of inflow)
Center-of-Mass det. time= 12.7 min (818.5 - 805.7)

Volume	Invert	Avail.Storage	Storage Description
#1	754.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	754.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	757.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	758.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	754.75'	**6.0" Round Culvert** L= 36.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 754.75' / 753.50' S= 0.0347 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	758.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	754.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	757.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.19 cfs @ 12.20 hrs HW=758.73' TW=708.15' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.19 cfs of 1.64 cfs potential flow)
 ├─**2=Orifice/Grate** (Orifice Controls 0.45 cfs @ 2.31 fps)
 ├─**3=Orifice/Grate** (Orifice Controls 0.21 cfs @ 9.51 fps)
 └─**4=Orifice/Grate** (Orifice Controls 0.53 cfs @ 6.02 fps)

Summary for Pond RG28: Rain Garden Lot 28

Inflow Area = 28,665 sf, 9.64% Impervious, Inflow Depth > 4.85" for 100YearMass event
Inflow = 3.12 cfs @ 12.16 hrs, Volume= 11,591 cf
Outflow = 2.95 cfs @ 12.20 hrs, Volume= 11,578 cf, Atten= 5%, Lag= 2.4 min
Primary = 2.95 cfs @ 12.20 hrs, Volume= 11,578 cf
 Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 757.80' @ 12.20 hrs Surf.Area= 934 sf Storage= 622 cf

Plug-Flow detention time= 4.1 min calculated for 11,578 cf (100% of inflow)
Center-of-Mass det. time= 3.4 min (823.9 - 820.5)

Volume	Invert	Avail.Storage	Storage Description
#1	753.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	753.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	756.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	757.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	753.75'	**8.0" Round Culvert** L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 753.75' / 753.50' S= 0.0083 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#2	Device 1	757.50'	**6.0" Horiz. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#3	Device 1	753.75'	**3.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads
#4	Device 1	756.25'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.95 cfs @ 12.20 hrs HW=757.80' TW=708.13' (Dynamic Tailwater)
└─**1=Culvert** (Passes 2.95 cfs of 3.02 cfs potential flow)
 ├─**2=Orifice/Grate** (Orifice Controls 1.03 cfs @ 2.62 fps)
 ├─**3=Orifice/Grate** (Orifice Controls 0.94 cfs @ 9.54 fps)
 └─**4=Orifice/Grate** (Orifice Controls 0.99 cfs @ 5.66 fps)

Summary for Pond RG30: Rain Garden Lot 30

Inflow Area = 6,740 sf, 65.00% Impervious, Inflow Depth > 6.73" for 100YearMass event
Inflow = 1.18 cfs @ 12.07 hrs, Volume= 3,781 cf
Outflow = 0.80 cfs @ 12.15 hrs, Volume= 3,772 cf, Atten= 32%, Lag= 4.7 min
Primary = 0.80 cfs @ 12.15 hrs, Volume= 3,772 cf
Routed to Pond IB 7.1 : Infiltration Basin

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 731.57' @ 12.15 hrs Surf.Area= 872 sf Storage= 526 cf

Plug-Flow detention time= 14.5 min calculated for 3,770 cf (100% of inflow)
Center-of-Mass det. time= 12.9 min (787.6 - 774.8)

Volume	Invert	Avail.Storage	Storage Description
#1	727.75'	47 cf	**12.0" Round Pipe Storage** Inside #2 L= 60.0'
#2	727.75'	269 cf	**4.00'W x 60.00'L x 3.00'H Soil Media and Gravel** 720 cf Overall - 47 cf Embedded = 673 cf x 40.0% Voids
#3	730.75'	30 cf	**4.00'W x 60.00'L x 0.25'H Mulch** 60 cf Overall x 50.0% Voids
#4	731.00'	373 cf	**4.00'W x 60.00'L x 1.00'H Ponding Z=2.0**
		720 cf	Total Available Storage

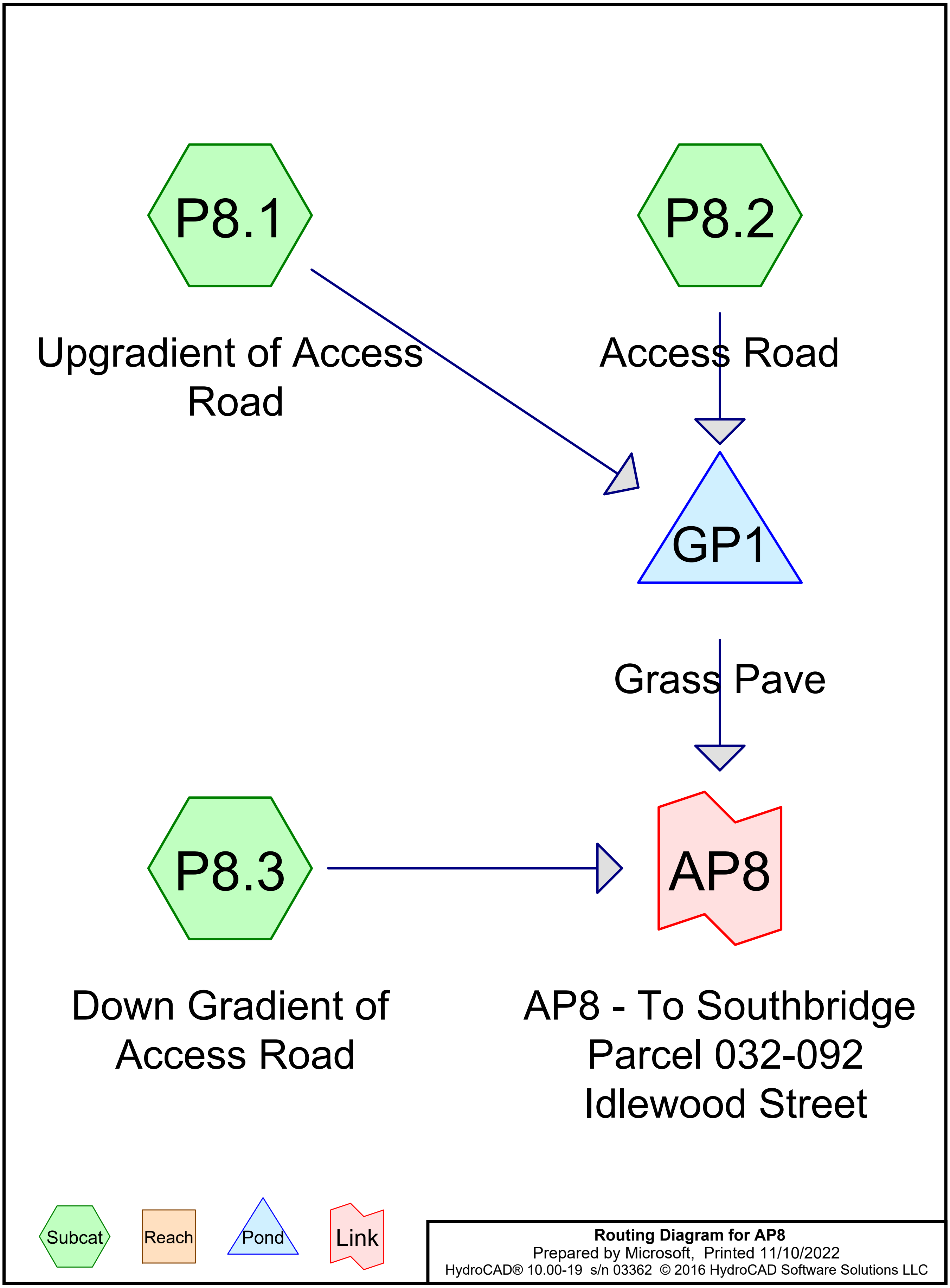
Device	Routing	Invert	Outlet Devices
#1	Primary	727.75'	**6.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 727.75' / 727.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.20 sf
#2	Device 1	731.50'	**6.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	727.75'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	730.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.80 cfs @ 12.15 hrs HW=731.57' TW=707.80' (Dynamic Tailwater)
└─**1=Culvert** (Passes 0.80 cfs of 1.79 cfs potential flow)
  ├─**2=Orifice/Grate** (Weir Controls 0.10 cfs @ 0.88 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 0.20 cfs @ 9.31 fps)
  └─**4=Orifice/Grate** (Orifice Controls 0.50 cfs @ 5.71 fps)

Summary for Link P7: AP7

Inflow Area = 400,631 sf, 30.80% Impervious, Inflow Depth > 3.72" for 100YearMass event
Inflow = 15.69 cfs @ 12.32 hrs, Volume= 124,036 cf
Primary = 15.69 cfs @ 12.32 hrs, Volume= 124,036 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs



P8.1
Upgradient of Access Road
P8.2
Access Road
GP1
Grass Pave
P8.3
Down Gradient of Access Road
AP8
AP8 - To Southbridge Parcel 032-092 Idlewood Street
Subcat
Reach
Pond
Link
Routing Diagram for AP8
Prepared by Microsoft, Printed 11/10/2022
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Summary for Subcatchment P8.1: Upgradient of Access Road

Runoff = 0.24 cfs @ 12.16 hrs, Volume= 958 cf, Depth> 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
10,315	70	Woods, Good, HSG C
2,460	74	>75% Grass cover, Good, HSG C
12,775	71	Weighted Average
12,775		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.6	110	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.4	160	Total			

Summary for Subcatchment P8.2: Access Road

Runoff = 0.13 cfs @ 12.08 hrs, Volume= 395 cf, Depth> 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
4,460	74	>75% Grass cover, Good, HSG C
4,460		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P8.3: Down Gradient of Access Road

Runoff = 0.08 cfs @ 12.15 hrs, Volume= 310 cf, Depth> 0.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2YearMass Rainfall=3.24"

Area (sf)	CN	Description
4,095	70	Woods, Good, HSG C
290	74	>75% Grass cover, Good, HSG C
4,385	70	Weighted Average
4,385		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	50	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.5	100	Total			

Summary for Pond GP1: Grass Pave

Inflow Area = 17,235 sf, 0.00% Impervious, Inflow Depth > 0.94" for 2YearMass event
Inflow = 0.34 cfs @ 12.13 hrs, Volume= 1,353 cf
Outflow = 0.10 cfs @ 12.02 hrs, Volume= 1,353 cf, Atten= 70%, Lag= 0.0 min
Discarded = 0.10 cfs @ 12.02 hrs, Volume= 1,353 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 764.37' @ 12.59 hrs Surf.Area= 1,800 sf Storage= 267 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 14.5 min (884.1 - 869.6)

Volume	Invert	Avail.Storage	Storage Description
#1	764.00'	958 cf	**8.00'W x 225.00'L x 1.33'H Prismatoid** 2,394 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	764.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	764.75'	**225.0' long x 5.0' 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) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.10 cfs @ 12.02 hrs HW=764.01' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=764.00' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link AP8: AP8 - To Southbridge Parcel 032-092 Idlewood Street

Inflow Area = 21,620 sf, 0.00% Impervious, Inflow Depth > 0.17" for 2YearMass event
Inflow = 0.08 cfs @ 12.15 hrs, Volume= 310 cf
Primary = 0.08 cfs @ 12.15 hrs, Volume= 310 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment P8.1: Upgradient of Access Road

Runoff = 0.63 cfs @ 12.15 hrs, Volume= 2,288 cf, Depth> 2.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
10,315	70	Woods, Good, HSG C
2,460	74	>75% Grass cover, Good, HSG C
12,775	71	Weighted Average
12,775		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.6	110	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.4	160	Total			

Summary for Subcatchment P8.2: Access Road

Runoff = 0.30 cfs @ 12.08 hrs, Volume= 893 cf, Depth> 2.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
4,460	74	>75% Grass cover, Good, HSG C
4,460		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P8.3: Down Gradient of Access Road

Runoff = 0.21 cfs @ 12.14 hrs, Volume= 756 cf, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10YearMass Rainfall=5.05"

Area (sf)	CN	Description
4,095	70	Woods, Good, HSG C
290	74	>75% Grass cover, Good, HSG C
4,385	70	Weighted Average
4,385		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	50	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.5	100	Total			

Summary for Pond GP1: Grass Pave

Inflow Area = 17,235 sf, 0.00% Impervious, Inflow Depth > 2.21" for 10YearMass event
Inflow = 0.86 cfs @ 12.12 hrs, Volume= 3,181 cf
Outflow = 0.94 cfs @ 12.18 hrs, Volume= 3,181 cf, Atten= 0%, Lag= 3.6 min
Discarded = 0.10 cfs @ 11.77 hrs, Volume= 2,560 cf
Primary = 0.84 cfs @ 12.18 hrs, Volume= 621 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 764.76' @ 12.18 hrs Surf.Area= 1,800 sf Storage= 549 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 34.9 min (878.8 - 843.9)

Volume	Invert	Avail.Storage	Storage Description
#1	764.00'	958 cf	**8.00'W x 225.00'L x 1.33'H Prismatoid** 2,394 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	764.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	764.75'	**225.0' long x 5.0' 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) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.10 cfs @ 11.77 hrs HW=764.01' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=0.73 cfs @ 12.18 hrs HW=764.76' TW=0.00' (Dynamic Tailwater)
2=Broad-Crested Rectangular Weir (Weir Controls 0.73 cfs @ 0.26 fps)

Summary for Link AP8: AP8 - To Southbridge Parcel 032-092 Idlewood Street

Inflow Area = 21,620 sf, 0.00% Impervious, Inflow Depth > 0.76" for 10YearMass event
Inflow = 1.04 cfs @ 12.18 hrs, Volume= 1,377 cf
Primary = 1.04 cfs @ 12.18 hrs, Volume= 1,377 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment P8.1: Upgradient of Access Road

Runoff = 0.90 cfs @ 12.15 hrs, Volume= 3,234 cf, Depth> 3.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
10,315	70	Woods, Good, HSG C
2,460	74	>75% Grass cover, Good, HSG C
12,775	71	Weighted Average
12,775		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.6	110	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.4	160	Total			

Summary for Subcatchment P8.2: Access Road

Runoff = 0.42 cfs @ 12.08 hrs, Volume= 1,239 cf, Depth> 3.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
4,460	74	>75% Grass cover, Good, HSG C
4,460		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P8.3: Down Gradient of Access Road

Runoff = 0.31 cfs @ 12.14 hrs, Volume= 1,075 cf, Depth> 2.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25YearMass Rainfall=6.18"

Area (sf)	CN	Description
4,095	70	Woods, Good, HSG C
290	74	>75% Grass cover, Good, HSG C
4,385	70	Weighted Average
4,385		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	50	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.5	100	Total			

Summary for Pond GP1: Grass Pave

Inflow Area = 17,235 sf, 0.00% Impervious, Inflow Depth > 3.11" for 25YearMass event
Inflow = 1.23 cfs @ 12.12 hrs, Volume= 4,473 cf
Outflow = 1.27 cfs @ 12.10 hrs, Volume= 4,474 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.10 cfs @ 11.67 hrs, Volume= 3,093 cf
Primary = 1.17 cfs @ 12.10 hrs, Volume= 1,380 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 764.77' @ 12.10 hrs Surf.Area= 1,800 sf Storage= 552 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 32.1 min (866.2 - 834.1)

Volume	Invert	Avail.Storage	Storage Description
#1	764.00'	958 cf	**8.00'W x 225.00'L x 1.33'H Prismatoid** 2,394 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	764.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	764.75'	**225.0' long x 5.0' 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) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.10 cfs @ 11.67 hrs HW=764.01' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=1.17 cfs @ 12.10 hrs HW=764.77' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 1.17 cfs @ 0.31 fps)

Summary for Link AP8: AP8 - To Southbridge Parcel 032-092 Idlewood Street

Inflow Area = 21,620 sf, 0.00% Impervious, Inflow Depth > 1.36" for 25YearMass event
Inflow = 1.46 cfs @ 12.10 hrs, Volume= 2,456 cf
Primary = 1.46 cfs @ 12.10 hrs, Volume= 2,456 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Subcatchment P8.1: Upgradient of Access Road

Runoff = 1.34 cfs @ 12.14 hrs, Volume= 4,800 cf, Depth> 4.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
10,315	70	Woods, Good, HSG C
2,460	74	>75% Grass cover, Good, HSG C
12,775	71	Weighted Average
12,775		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
1.6	110	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.4	160	Total			

Summary for Subcatchment P8.2: Access Road

Runoff = 0.60 cfs @ 12.07 hrs, Volume= 1,806 cf, Depth> 4.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
4,460	74	>75% Grass cover, Good, HSG C
4,460		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment P8.3: Down Gradient of Access Road

Runoff = 0.46 cfs @ 12.13 hrs, Volume= 1,606 cf, Depth> 4.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YearMass Rainfall=7.93"

Area (sf)	CN	Description
4,095	70	Woods, Good, HSG C
290	74	>75% Grass cover, Good, HSG C
4,385	70	Weighted Average
4,385		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.8	50	0.0500	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.00"
0.7	50	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.5	100	Total			

Summary for Pond GP1: Grass Pave

Inflow Area = 17,235 sf, 0.00% Impervious, Inflow Depth > 4.60" for 100YearMass event
Inflow = 1.82 cfs @ 12.12 hrs, Volume= 6,606 cf
Outflow = 1.82 cfs @ 12.12 hrs, Volume= 6,606 cf, Atten= 0%, Lag= 0.1 min
Discarded = 0.10 cfs @ 11.35 hrs, Volume= 3,805 cf
Primary = 1.72 cfs @ 12.12 hrs, Volume= 2,801 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 764.77' @ 12.12 hrs Surf.Area= 1,800 sf Storage= 556 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 28.1 min (851.0 - 823.0)

Volume	Invert	Avail.Storage	Storage Description
#1	764.00'	958 cf	**8.00'W x 225.00'L x 1.33'H Prismatoid** 2,394 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	764.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	764.75'	**225.0' long x 5.0' 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) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.10 cfs @ 11.35 hrs HW=764.01' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Primary OutFlow Max=1.72 cfs @ 12.12 hrs HW=764.77' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 1.72 cfs @ 0.35 fps)

Summary for Link AP8: AP8 - To Southbridge Parcel 032-092 Idlewood Street

Inflow Area = 21,620 sf, 0.00% Impervious, Inflow Depth > 2.45" for 100YearMass event
Inflow = 2.18 cfs @ 12.12 hrs, Volume= 4,408 cf
Primary = 2.18 cfs @ 12.12 hrs, Volume= 4,408 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

APPENDIX F

ADDITIONAL DRAINAGE CALCULATION WORKSHEETS

Groundwater Mounding Analysis - Hantush Method

Project:	Lot 3 Berry Farms Road	**Project #:**	287-2118-K
Performed By:	PE	**Description:**	Infiltration Basin 7.1
		Calculated Mound Height:	1.2 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	0.5	days	Basin Drains in 9 Hours
Width of Field	W =	28	feet	
Length of Field	L =	260	feet	
Hydraulic Conductivity	K =	44.33	ft/day	Loamy Sand per chart = 5.13E-4 ft/s = 44.3 ft/d
Specific Yield	V =	0.21	ft^3/ft^3	Loamy Sand per chart = 0.21 (70% medium sand, 30% silt)
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	61,033	gpd	8,159 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	14	feet
1/2 length	b =	130	feet
Recharge Rate	j =	1.12	ft/day

$$\gamma = \frac{KD}{V} = 1055.5 \text{ ft}^2\text{/day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.3047$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 2.8295$$

Reference #1

Material	Specific Yield Maximum	Minimum	Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1of Hantush (1967), attached:

Function S*(a , b) = 0.5229

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha,\beta)\right]}$$

h_m = 6.2 feet

Mound Height = h_m - D = 1.2 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation."
Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project: Blueberry Hill Estates **Project #:** 287-2119-K

Performed By: PE **Description:** RG Type C

Calculated Mound Height: 0.1 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	0.2	days	Basin Drains in 4.5 Hours
Width of Field	W =	4	feet	
Length of Field	L =	60	feet	
Hydraulic Conductivity	K =	44.3	ft/day	Loamy Sand per chart = 5.13E-4 ft/s = 44.3 ft/d
Specific Yield	V =	0.21	ft^3/ft^3	Loamy Sand per chart = 0.21 (70% medium sand, 30% silt)
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	2,005	gpd	268 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	2	feet
1/2 length	b =	30	feet
Recharge Rate	j =	1.12	ft/day

$$\gamma = \frac{KD}{V} = 1054.8 \text{ ft}^2\text{/day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.0689$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 1.0328$$

Reference #1

Material	Specific Yield		
	Maximum	Minimum	Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.1413

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha, \beta)\right]}$$

h_m = 5.1 feet

Mound Height = h_m - D = 0.1 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation."
Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project: Blueberry Hill Estates **Project #:** 287-2119-K
Performed By: PE **Description:** RG Type D
Calculated Mound Height: 0.2 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	0.2	days	Basin Drains in 4.5 Hours
Width of Field	W =	5	feet	
Length of Field	L =	60	feet	
Hydraulic Conductivity	K =	11.23	ft/day	Sandy Loam per chart = 1.13E-4 ft/s = 8.86 ft/d
Specific Yield	V =	0.19	ft^3/ft^3	Sandy Loam per chart = 0.15 (60% medium sand, 40% silt)
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	1,645	gpd	220 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	2.5	feet
1/2 length	b =	30	feet
Recharge Rate	j =	0.73	ft/day
	$\gamma = \frac{KD}{V} =$	295.5	ft^2/day
Dimensionless width	$\alpha = \frac{a}{\sqrt{4\gamma t}} =$	0.1626	
Dimensionless length	$\beta = \frac{b}{\sqrt{4\gamma t}} =$	1.9511	

Reference #1

Material	Specific Yield		
	Maximum	Minimum	Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.3165

Water Table + Mound
$$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha,\beta)\right]}$$

h_m = 5.2 feet

Mound Height = h_m - D = 0.2 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation."
Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project: Blueberry Hill Estates **Project #:** 287-2119-K

Performed By: PE **Description:** RG2.1

Calculated Mound Height: 1.0 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	0.3	days	Basin Drains in 5 Hours
Width of Field	W =	50	feet	
Length of Field	L =	85	feet	
Hydraulic Conductivity	K =	44.3	ft/day	Loamy Sand per chart = 5.13E-4 ft/s = 44.3 ft/d
Specific Yield	V =	0.21	ft^3/ft^3	Loamy Sand per chart = 0.21 (70% medium sand, 30% silt)
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	28,275	gpd	3,780 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	25	feet
1/2 length	b =	42.5	feet
Recharge Rate	j =	0.89	ft/day

$$\gamma = \frac{KD}{V} = 1054.8 \ \text{ft}^2/\text{day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.7027$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 1.1946$$

Reference #1			
Material	Specific Yield		
	Maximum	Minimum	Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.8265

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha, \beta)\right]}$$

h_m = 6.0 feet

Mound Height = h_m - D = 1.0 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation." Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project: Blueberry Hill Estates **Project #:** 287-2119-K

Performed By: PE **Description:** RG3.1

Calculated Mound Height: 0.5 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	0.5	days	Basin Drains in 13 Hours
Width of Field	W =	13	feet	
Length of Field	L =	110	feet	
Hydraulic Conductivity	K =	44.3	ft/day	Loamy Sand per chart = 5.13E-4 ft/s = 44.3 ft/d
Specific Yield	V =	0.21	ft^3/ft^3	Loamy Sand per chart = 0.21 (70% medium sand, 30% silt)
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	8,648	gpd	1,156 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	6.5	feet
1/2 length	b =	55	feet
Recharge Rate	j =	0.81	ft/day

$$\gamma = \frac{KD}{V} = 1054.8 \text{ ft}^2\text{/day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.1415$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 1.1975$$

Reference #1

Material	Specific Yield		
	Maximum	Minimum	Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.2764

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha,\beta)\right]}$$

h_m = 5.5 feet

Mound Height = h_m - D = 0.5 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation."

Water Resources Research, 3, pp. 227-234.

α \ β	0.02	0.04	0.06	0.08	0.10	0.14	0.18	0.22	0.26
0.02	0.0041	0.0073	0.0101	0.0125	0.0146	0.0184	0.0216	0.0243	0.0267
0.04	0.0073	0.0135	0.0188	0.0236	0.0278	0.0353	0.0416	0.0470	0.0518
0.06	0.0101	0.0188	0.0266	0.0335	0.0398	0.0509	0.0602	0.0684	0.0754
0.08	0.0125	0.0236	0.0335	0.0425	0.0508	0.0652	0.0776	0.0884	0.0978
0.10	0.0146	0.0278	0.0398	0.0508	0.0608	0.0786	0.0939	0.1072	0.1188
0.14	0.0184	0.0353	0.0509	0.0652	0.0786	0.1025	0.1232	0.1414	0.1573
0.18	0.0216	0.0416	0.0602	0.0776	0.0939	0.1232	0.1490	0.1716	0.1916
0.22	0.0243	0.0470	0.0684	0.0884	0.1072	0.1414	0.1716	0.1984	0.2222
0.26	0.0267	0.0518	0.0754	0.0978	0.1188	0.1573	0.1916	0.2222	0.2494
0.30	0.0288	0.0559	0.0817	0.1060	0.1290	0.1714	0.2094	0.2433	0.2737
0.34	0.0306	0.0596	0.0871	0.1133	0.1381	0.1839	0.2251	0.2621	0.2954
0.38	0.0322	0.0628	0.0920	0.1197	0.1461	0.1949	0.2391	0.2789	0.3147
0.42	0.0337	0.0657	0.0963	0.1254	0.1532	0.2048	0.2515	0.2938	0.3320
0.46	0.0349	0.0683	0.1001	0.1305	0.1595	0.2135	0.2626	0.3071	0.3474
0.50	0.0361	0.0705	0.1035	0.1350	0.1650	0.2212	0.2724	0.3189	0.3612
0.54	0.0371	0.0725	0.1065	0.1389	0.1700	0.2281	0.2812	0.3295	0.3735
0.58	0.0380	0.0743	0.1091	0.1425	0.1744	0.2343	0.2890	0.3389	0.3844
0.62	0.0387	0.0759	0.1115	0.1456	0.1783	0.2397	0.2959	0.3472	0.3941
0.66	0.0394	0.0773	0.1136	0.1484	0.1818	0.2445	0.3020	0.3547	0.4027
0.70	0.0401	0.0785	0.1154	0.1509	0.1849	0.2488	0.3075	0.3612	0.4104
0.74	0.0406	0.0796	0.1171	0.1531	0.1876	0.2526	0.3123	0.3671	0.4172
0.78	0.0411	0.0806	0.1185	0.1550	0.1900	0.2559	0.3166	0.3722	0.4232
0.82	0.0415	0.0814	0.1198	0.1567	0.1921	0.2589	0.3203	0.3768	0.4286
0.86	0.0419	0.0822	0.1209	0.1582	0.1940	0.2615	0.3237	0.3808	0.4333
0.90	0.0422	0.0828	0.1219	0.1595	0.1957	0.2638	0.3266	0.3844	0.4374
0.94	0.0425	0.0834	0.1228	0.1607	0.1971	0.2658	0.3292	0.3875	0.4411
0.98	0.0428	0.0839	0.1236	0.1617	0.1984	0.2676	0.3314	0.3902	0.4442
1.00	0.0429	0.0842	0.1239	0.1622	0.1990	0.2684	0.3324	0.3914	0.4457
1.20	0.0437	0.0858	0.1263	0.1654	0.2030	0.2740	0.3396	0.4001	0.4558
1.40	0.0441	0.0866	0.1275	0.1669	0.2049	0.2767	0.3431	0.4043	0.4608
1.80	0.0444	0.0871	0.1283	0.1680	0.2062	0.2785	0.3454	0.4071	0.4641
2.00	0.0444	0.0871	0.1284	0.1681	0.2064	0.2787	0.3457	0.4075	0.4645
2.20	0.0444	0.0872	0.1284	0.1682	0.2065	0.2788	0.3458	0.4076	0.4646
2.50	0.0444	0.0872	0.1284	0.1682	0.2065	0.2788	0.3458	0.4077	0.4647
3.00	0.0444	0.0872	0.1284	0.1682	0.2065	0.2789	0.3458	0.4077	0.4647

0.30	0.34	0.38	0.42	0.46	0.50	0.54	0.58	0.62	0.66
0.0288	0.0306	0.0322	0.0337	0.0349	0.0361	0.0371	0.0380	0.0387	0.0394
0.0559	0.0596	0.0628	0.0657	0.0683	0.0705	0.0725	0.0743	0.0759	0.0773
0.0817	0.0871	0.0920	0.0963	0.1001	0.1035	0.1065	0.1091	0.1115	0.1136
0.1060	0.1133	0.1197	0.1254	0.1305	0.1350	0.1389	0.1425	0.1456	0.1484
0.1290	0.1381	0.1461	0.1532	0.1595	0.1650	0.1700	0.1744	0.1783	0.1818
0.1714	0.1839	0.1949	0.2048	0.2135	0.2212	0.2281	0.2343	0.2397	0.2445
0.2094	0.2251	0.2391	0.2515	0.2626	0.2724	0.2812	0.2890	0.2959	0.3020
0.2433	0.2621	0.2789	0.2938	0.3071	0.3189	0.3295	0.3389	0.3472	0.3547
0.2737	0.2954	0.3147	0.3320	0.3474	0.3612	0.3735	0.3844	0.3941	0.4027
0.3009	0.3252	0.3470	0.3665	0.3839	0.3995	0.4134	0.4257	0.4368	0.4466
0.3252	0.3520	0.3761	0.3976	0.4169	0.4341	0.4495	0.4633	0.4756	0.4865
0.3470	0.3761	0.4022	0.4256	0.4466	0.4654	0.4823	0.4973	0.5108	0.5227
0.3665	0.3976	0.4256	0.4508	0.4734	0.4937	0.5119	0.5281	0.5427	0.5556
0.3839	0.4169	0.4466	0.4734	0.4975	0.5191	0.5385	0.5559	0.5715	0.5854
0.3995	0.4341	0.4654	0.4937	0.5191	0.5420	0.5626	0.5810	0.5975	0.6122
0.4134	0.4495	0.4823	0.5119	0.5385	0.5626	0.5842	0.6036	0.6209	0.6364
0.4257	0.4633	0.4973	0.5281	0.5559	0.5810	0.6036	0.6238	0.6420	0.6582
0.4368	0.4756	0.5108	0.5427	0.5715	0.5975	0.6209	0.6420	0.6609	0.6778
0.4466	0.4865	0.5227	0.5556	0.5854	0.6122	0.6364	0.6582	0.6778	0.6953
0.4553	0.4962	0.5334	0.5672	0.5977	0.6254	0.6503	0.6728	0.6929	0.7110
0.4630	0.5048	0.5429	0.5774	0.6087	0.6371	0.6627	0.6857	0.7064	0.7250
0.4699	0.5125	0.5513	0.5865	0.6185	0.6475	0.6736	0.6972	0.7184	0.7375
0.4760	0.5192	0.5587	0.5946	0.6272	0.6567	0.6834	0.7074	0.7291	0.7486
0.4813	0.5252	0.5653	0.6017	0.6348	0.6648	0.6920	0.7165	0.7386	0.7584
0.4860	0.5305	0.5711	0.6080	0.6416	0.6721	0.6996	0.7245	0.7469	0.7671
0.4902	0.5351	0.5762	0.6136	0.6476	0.6784	0.7063	0.7316	0.7543	0.7748
0.4938	0.5392	0.5807	0.6184	0.6528	0.6840	0.7123	0.7378	0.7608	0.7816
0.4955	0.5410	0.5827	0.6206	0.6552	0.6865	0.7150	0.7406	0.7638	0.7846
0.5070	0.5540	0.5969	0.6362	0.6719	0.7044	0.7339	0.7605	0.7846	0.8064
0.5127	0.5603	0.6039	0.6438	0.6801	0.7132	0.7432	0.7704	0.7949	0.8171
0.5165	0.5645	0.6086	0.6489	0.6856	0.7190	0.7494	0.7769	0.8018	0.8243
0.5169	0.5651	0.6092	0.6495	0.6863	0.7198	0.7502	0.7778	0.8027	0.8252
0.5171	0.5653	0.6094	0.6497	0.6865	0.7200	0.7505	0.7781	0.8030	0.8255
0.5172	0.5653	0.6095	0.6498	0.6867	0.7202	0.7506	0.7782	0.8032	0.8257
0.5172	0.5654	0.6095	0.6499	0.6867	0.7202	0.7506	0.7782	0.8032	0.8257

0.70	**0.74**	**0.78**	**0.82**	**0.86**	**0.90**	**0.94**	**0.98**	**1.00**	**1.20**
0.0401	0.0406	0.0411	0.0415	0.0419	0.0422	0.0425	0.0428	0.0429	0.0437
0.0785	0.0796	0.0806	0.0814	0.0822	0.0828	0.0834	0.0839	0.0842	0.0858
0.1154	0.1171	0.1185	0.1198	0.1209	0.1219	0.1228	0.1236	0.1239	0.1263
0.1509	0.1531	0.1550	0.1567	0.1582	0.1595	0.1607	0.1617	0.1622	0.1654
0.1849	0.1876	0.1900	0.1921	0.1940	0.1957	0.1971	0.1984	0.1990	0.2030
0.2488	0.2526	0.2559	0.2589	0.2615	0.2638	0.2658	0.2676	0.2684	0.2740
0.3075	0.3123	0.3166	0.3203	0.3237	0.3266	0.3292	0.3314	0.3324	0.3396
0.3612	0.3671	0.3722	0.3768	0.3808	0.3844	0.3875	0.3902	0.3914	0.4001
0.4104	0.4172	0.4232	0.4286	0.4333	0.4374	0.4411	0.4442	0.4457	0.4558
0.4553	0.4630	0.4699	0.4760	0.4813	0.4860	0.4902	0.4938	0.4955	0.5070
0.4962	0.5048	0.5125	0.5192	0.5252	0.5305	0.5351	0.5392	0.5410	0.5540
0.5334	0.5429	0.5513	0.5587	0.5653	0.5711	0.5762	0.5807	0.5827	0.5969
0.5672	0.5774	0.5865	0.5946	0.6017	0.6080	0.6136	0.6184	0.6206	0.6362
0.5977	0.6087	0.6185	0.6272	0.6348	0.6416	0.6476	0.6528	0.6552	0.6719
0.6254	0.6371	0.6475	0.6567	0.6648	0.6721	0.6784	0.6840	0.6865	0.7044
0.6503	0.6627	0.6736	0.6834	0.6920	0.6996	0.7063	0.7123	0.7150	0.7339
0.6728	0.6857	0.6972	0.7074	0.7165	0.7245	0.7316	0.7378	0.7406	0.7605
0.6929	0.7064	0.7184	0.7291	0.7386	0.7469	0.7543	0.7608	0.7638	0.7846
0.7110	0.7250	0.7375	0.7486	0.7584	0.7671	0.7748	0.7816	0.7846	0.8064
0.7272	0.7417	0.7546	0.7660	0.7762	0.7852	0.7932	0.8002	0.8034	0.8259
0.7417	0.7566	0.7698	0.7816	0.7921	0.8014	0.8096	0.8168	0.8201	0.8434
0.7546	0.7698	0.7834	0.7956	0.8063	0.8159	0.8243	0.8317	0.8351	0.8591
0.7660	0.7816	0.7956	0.8080	0.8190	0.8288	0.8374	0.8450	0.8485	0.8731
0.7762	0.7921	0.8063	0.8190	6.8302	0.8402	0.8491	0.8569	0.8604	0.8855
0.7852	0.8014	0.8159	0.8288	0.8402	0.8504	0.8594	0.8674	0.8710	0.8966
0.7932	0.8096	0.8243	0.8374	0.8491	0.8594	0.8686	0.8767	0.8803	0.9064
0.8002	0.8168	0.8317	0.8450	0.8569	0.8674	0.8767	0.8849	0.8886	0.9151
0.8034	0.8201	0.8351	0.8485	0.8604	0.8710	0.8803	0.8886	0.8924	0.9191
0.8259	0.8434	0.8591	0.8731	0.8855	0.8966	0.9064	0.9151	0.9191	0.9472
0.9370	0.8549	0.8710	0.8853	0.8980	0.9094	0.9195	0.9284	0.9324	0.9614
0.8445	0.8627	0.8789	0.8935	0.9065	0.9180	0.9282	0.9373	0.9414	0.9709
0.8454	0.8636	0.8799	0.8945	0.9075	0.9191	0.9294	0.9384	0.9426	0.9722
0.8458	0.8640	0.8803	0.8949	0.9079	0.9195	0.9298	0.9389	0.9430	0.9726
0.8460	0.8642	0.8805	0.8951	0.9081	0.9197	0.9300	0.9391	0.9432	0.9728
0.8460	0.8642	0.8805	0.8951	0.9081	0.9197	0.9300	0.9391	0.9433	0.9729

1.40	**1.80**	**2.00**	**2.20**	**2.50**	**3.00**
0.0441	0.0444	0.0444	0.0444	0.0444	0.0444
0.0866	0.0871	0.0871	0.0872	0.0872	0.0872
0.1275	0.1283	0.1284	0.1284	0.1284	0.1284
0.1669	0.1680	0.1681	0.1682	0.1682	0.1682
0.2049	0.2062	0.2064	0.2065	0.2065	0.2065
0.2767	0.2785	0.2787	0.2788	0.2788	0.2789
0.3431	0.3454	0.3457	0.3458	0.3458	0.3458
0.4043	0.4071	0.4075	0.4076	0.4077	0.4077
0.4608	0.4641	0.4645	0.4646	0.4647	0.4647
0.5127	0.5165	0.5169	0.5171	0.5172	0.5172
0.5603	0.5645	0.5651	0.5653	0.5653	0.5654
0.6039	0.6086	0.6092	0.6094	0.6095	0.6095
0.6438	0.6489	0.6495	0.6497	0.6498	0.6499
0.6801	0.6856	0.6863	0.6865	0.6867	0.6867
0.7132	0.7190	0.7198	0.7200	0.7202	0.7202
0.7432	0.7494	0.7502	0.7505	0.7506	0.7506
0.7704	0.7769	0.7778	0.7781	0.7782	0.7782
0.7949	0.8018	0.8027	0.8030	0.8032	0.8032
0.8171	0.8243	0.8252	0.8255	0.8257	0.8257
0.8370	0.8445	0.8454	0.8458	0.8460	0.8460
0.8549	0.8627	0.8636	0.8640	0.8642	0.8642
0.8710	0.8789	0.8799	0.8803	0.8805	0.8805
0.8853	0.8935	0.8945	0.8949	0.8951	0.8951
0.8980	0.9065	0.9015	0.9079	0.9081	0.9081
0.9094	0.9180	0.9191	0.9195	0.9197	0.9197
0.9195	0.9282	0.9294	0.9298	0.9300	0.9300
0.9284	0.9373	0.9384	0.9389	0.9391	0.9391
0.9324	0.9414	0.9426	0.9430	0.9432	0.9433
0.9614	0.9709	0.9722	0.9726	0.9728	0.9729
0.9759	0.9858	0.9871	0.9875	0.9878	0.9878
0.9858	0.9959	0.9972	0.9977	0.9979	0.9980
0.9871	0.9972	0.9985	0.9990	0.9992	0.9993
0.9875	0.9977	0.9990	0.9995	0.9997	0.9998
0.9878	0.9979	0.9992	0.9997	1.0000	1.0000
0.9878	0.9980	0.9993	0.9998	1.0000	1.0000

Field measurements of hydraulic conductivity should be used for all but pr

What follows are four sets of qualitative conductivity estimates. An est on the most similar soil type from as many sou

Reference #1		
Material	Intrinsic Permeability (darcys)	Hydraulic Conductivity (cm/s)
Clay	10^{-6}-10^{-3}	10^{-9}-10^{-6}
Silt, sandy silts, clayey sands, till	10^{-3}-10^{-1}	10^{-6}-10^{-4}
Silty sands, fine sands	10^{-2}-10^{-1}	10^{-5}-10^{-3}
Well-sorted sands, glacial outwash	1.0-10^{2}	10^{-3}-10^{-1}
Well-sorted gravel	10.0-10^{3}	10^{-2}-1.0
Applied Hydrology 4th Edition, C.W. Fetter		

Sediment or rock type	Hydraulic conductivity, m/day
Clays	10^{-7}-10^{-3}
Silts	10^{-4}-10^{-0}
Fine to coarse sands	10^{-2}-10^{+3}
Gravels	10^{+2}-10^{+5}
Glacial till	See Table 1
Shales (matrix)	10^{-8}-10^{-4}
Shales (fractured and weathered)	10^{-4}-10^{0}
Sandstones (well-cemented)	10^{-5}-10^{-2}
Sandstones (friable)	10^{-3}-10^{0}
Carbonates	See Table 3
Salt	10^{-10}-10^{-8}
Anhydrite	10^{-7}-10^{-6}
Unfractured igneous and metamorphic rocks	10^{-9}-10^{-5}
Fractured igneous and	10^{-5}-10^{-1}

Table
Rock Type
Cenozoic floo
Dense, unfractured
Vesicular
Interbeds
Quaternary
Vesicular
Tuffs
Densely welded (matrix)
Densely welded (fractured)
Nonwelded

metamorphic rocks	[illegible]
Basalts	See Table 2

Hand

Referenc

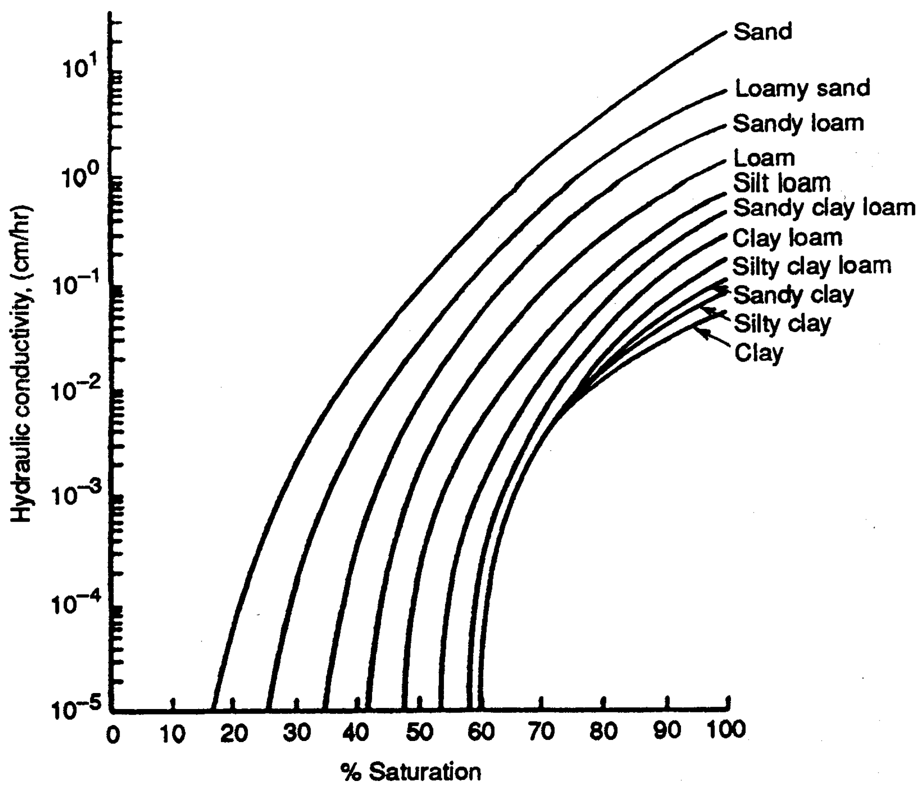

FIGURE 5.3.2 Hydraulic conductivity sorted by soil texture. *(Reproduced from Ref. 83 with permission.)*

reliminary evaluation of mounding

imated conductivity should be selected based
rces as are applicable.

Reference #2	
Geologic Material	Hydraulic Conductivity, m/s
Coarse gravels	10^{-1}-10^{-2}
Sands and gravels	10^{-2}-10^{-5}
Fine sands, silts, loess	10^{-5}-10^{-9}
Clay, shale, glacial till	10^{-5}-10^{-13}
Dolomitic limestones	10^{-3}-10^{-5}
Weathered chalk	10^{-3}-10^{-5}
Unweathered chalk	10^{-6}-10^{-9}
Limestone	10^{-3}-10^{-9}
Sandstone	10^{-4}-10^{-10}
Unweathered granite, gneiss, compact basalt	10^{-7}-10^{-13}
Practical Handbook of Ground-Water Monitoring 1991, David M. Nielsen	

Reference #3

1
Hydraulic Conductivity, m/day
d basalts
10^{-6}-10^{-3}
10^{-4}-10^{-3}
10^{-3}-10^{+3}
basalts
10^{+1}-10^{+3}
<10^{-6}
10^{-6}-10^{+1}
10^{-3}-10^{-2}

Table 2			
Hydraulic Conductivity, m/day			
Glacial Deposits	Unweathered	Weathered	Fractured
Basal till	10^{-6}-10^{-2}	10^{-4}-10^{-1}	10^{-4}-10^{0}
Supraglacial till	10^{-4}-10^{0}	10^{-4}-10^{0}	10^{-4}-10^{0}
Glaciolacustrine	10^{-8}-10^{-4}		10^{-6}-10^{-3}
Loess	10^{-6}-10^{0}	10^{-5}-10^{-2}	
Glaciofluvial	10^{-6}-10^{+2}		
Handbook of Hydrology, David R. Maidment			

Tab
Lithology
Carbonate mud
Dolomite
Tertiary limestone
Paleozoic limestone
Oolitic limestone
Holocene coral limestone
Karstified limestone
Chalk

e #4

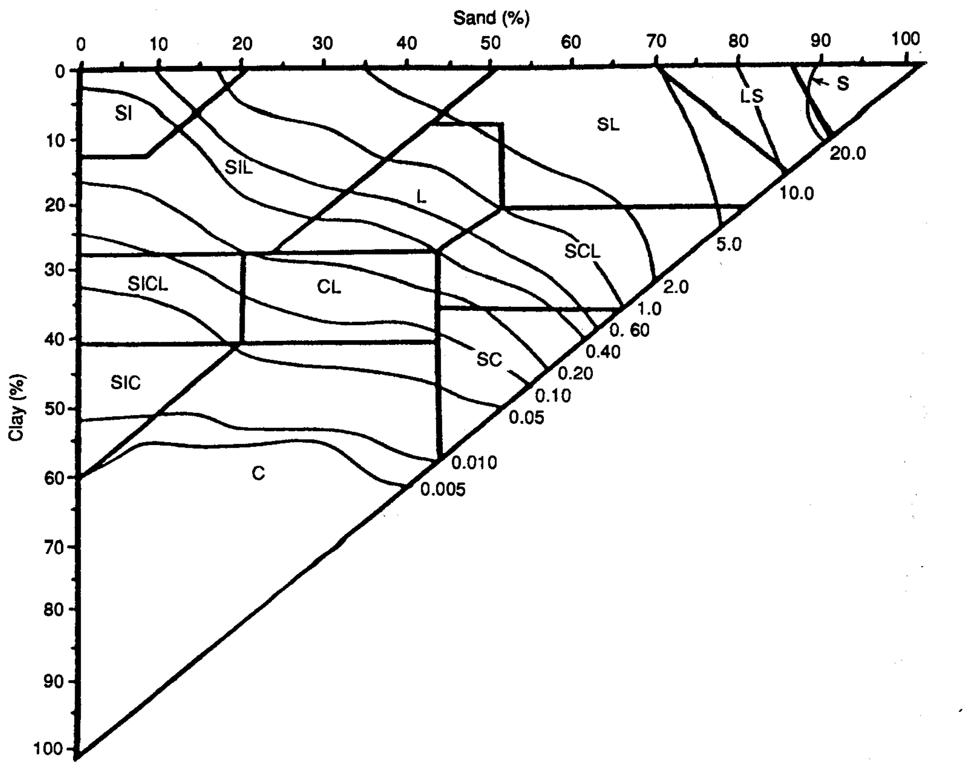

FIGURE 5.3.3 **Saturated hydraulic conductivity for USDA soil texture triangle.** *(Reproduced from Ref. 80 by permission of ASCE.)*

le 3
Hydraulic Conductivity, m/day
10^{-3}-10^{-1}
10^{-4}-10^{0}
10^{-4}-10^{0}
10^{-4}-10^{0}
10^{-2}-10^{-1}
10^{2}-10^{4}
10^{-1}-10^{7}
10^{-3}-10^{0}

What follows are two sets of specific yield estimates. An estimated specific yield should be selected based on the most similar soil type from as many sources as are applicable.

Reference #1			
Material	**Specific Yield**		
	Maximum	**Minimum**	**Average**
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22
Applied Hydrology 4th Edition, C.W. Fetter			

Reference #2	
Rocks	**Specific Yield**
Clay	0.01-0.10
Sand	0.10-0.30
Gravel	0.15-0.30
Sand and gravel	0.15-0.25
Sandstone	0.05-0.15
Shale	0.005-0.05
Limestone	0.005-0.05
Practical Handbook of Ground-water Monitoring 1991, David M. Nielsen	

Groundwater Mounding Analysis - Hantush Method

Project: Blueberry Hill Estates **Project #:** 287-2119-K
Performed By: PE **Description:** RG4.1
Calculated Mound Height: 1.0 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	1.5	days	Basin Drains in 4 Hours
Width of Field	W =	12	feet	
Length of Field	L =	360	feet	
Hydraulic Conductivity	K =	33.3	ft/day	1/3 Sandy Loam, 2/3 Loamy Sand
Specific Yield	V =	0.2	ft^3/ft^3	1/3 Sandy Loam, 2/3 Loamy Sand
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	25,852	gpd	3,456 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	6	feet
1/2 length	b =	180	feet
Recharge Rate	j =	0.80	ft/day

$$\gamma = \frac{KD}{V} = 832.5 \text{ ft}^2\text{/day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.0849$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 2.5469$$

Reference #1			
Material	Specific Yield		
	Maximum	Minimum	Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.1776

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha,\beta)\right]}$$

h_m = 6.0 feet

Mound Height = h_m - D = 1.0 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation." Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project: Blueberry Hill Estates **Project #:** 287-2119-K
Performed By: PE **Description:** RG4.2
Calculated Mound Height: 0.7 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	1	days	Basin Drains in 4 Hours
Width of Field	W =	10	feet	
Length of Field	L =	240	feet	
Hydraulic Conductivity	K =	27.8	ft/day	1/2 Sandy Loam, 1/2 Loamy Sand
Specific Yield	V =	0.2	ft^3/ft^3	1/2 Sandy Loam, 1/2 Loamy Sand
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	14,362	gpd	1,920 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	5	feet
1/2 length	b =	120	feet
Recharge Rate	j =	0.80	ft/day

$$\gamma = \frac{KD}{V} = 695.0 \text{ ft}^2\text{/day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.0948$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 2.2759$$

Reference #1

Material	Specific Yield Maximum	Specific Yield Minimum	Specific Yield Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.1966

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha,\beta)\right]}$$

h_m = 5.7 feet

Mound Height = h_m - D = 0.7 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation."
Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project: Blueberry Hill Estates **Project #:** 287-2119-K
Performed By: PE **Description:** RG5.1
Calculated Mound Height: 1.0 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	0.2	days	Basin Drains in 4 Hours
Width of Field	W =	12	feet	
Length of Field	L =	39	feet	
Hydraulic Conductivity	K =	44.3	ft/day	Loamy Sand per chart = 5.13E-4 ft/s = 44.3 ft/d
Specific Yield	V =	0.21	ft^3/ft^3	Loamy Sand per chart = 0.21 (70% medium sand, 30% silt)
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	11,415	gpd	1,526 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	6	feet
1/2 length	b =	19.5	feet
Recharge Rate	j =	3.26	ft/day

$$\gamma = \frac{KD}{V} = 1054.8 \text{ ft}^2\text{/day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.2066$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 0.6713$$

Reference #1			
Material	Specific Yield		
	Maximum	Minimum	Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22
Applied Hydrology 4th Edition, C.W. Fetter			

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.3387

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha, \beta)\right]}$$

h_m = 6.0 feet

Mound Height = h_m - D = 1.0 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation."
Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project:	Blueberry Hill Estates	**Project #:**	287-2119-K
Performed By:	PE	**Description:**	RG15H
		Calculated Mound Height:	0.1 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	0.3	days	Basin Drains in 4.5 Hours
Width of Field	W =	4	feet	
Length of Field	L =	60	feet	
Hydraulic Conductivity	K =	44.3	ft/day	Loamy Sand per chart = 5.13E-4 ft/s = 44.3 ft/d
Specific Yield	V =	0.21	ft^3/ft^3	Loamy Sand per chart = 0.21 (70% medium sand, 30% silt)
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	1,645	gpd	220 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	2	feet
1/2 length	b =	30	feet
Recharge Rate	j =	0.92	ft/day

$$\gamma = \frac{KD}{V} = 1054.8 \ ft^2/day$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.0562$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 0.8432$$

Reference #1

Material	Specific Yield Maximum	Specific Yield Minimum	Specific Yield Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.1131

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha,\beta)\right]}$$

h_m = 5.1 feet

Mound Height = h_m - D = 0.1 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation." Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project: Blueberry Hill Estates **Project #:** 287-2119-K
Performed By: PE **Description:** RG 42
Calculated Mound Height: 0.3 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	0.3	days	Basin Drains in 4.5 Hours
Width of Field	W =	8	feet	
Length of Field	L =	60	feet	
Hydraulic Conductivity	K =	44.3	ft/day	Loamy Sand per chart = 5.13E-4 ft/s = 44.3 ft/d
Specific Yield	V =	0.21	ft^3/ft^3	Loamy Sand per chart = 0.21 (70% medium sand, 30% silt)
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	3,965	gpd	530 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	4	feet
1/2 length	b =	30	feet
Recharge Rate	j =	1.10	ft/day

$$\gamma = \frac{KD}{V} = 1054.8 \text{ ft}^2\text{/day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.1124$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 0.8432$$

Reference #1

Material	Specific Yield		
	Maximum	Minimum	Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.2141

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha, \beta)\right]}$$

h_m = 5.3 feet

Mound Height = h_m - D = 0.3 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation."
Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project:	Blueberry Hill Estates	**Project #:**	287-2119-K
Performed By:	PE	**Description:**	RG69
		Calculated Mound Height:	0.1 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	0.2	days	Basin Drains in 4.5 Hours
Width of Field	W =	6	feet	
Length of Field	L =	35	feet	
Hydraulic Conductivity	K =	44.3	ft/day	Loamy Sand per chart = 5.13E-4 ft/s = 44.3 ft/d
Specific Yield	V =	0.21	ft^3/ft^3	Loamy Sand per chart = 0.21 (70% medium sand, 30% silt)
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	1,375	gpd	184 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	3	feet
1/2 length	b =	17.5	feet
Recharge Rate	j =	0.88	ft/day

$$\gamma = \frac{KD}{V} = 1054.8 \text{ ft}^2\text{/day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.1033$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 0.6024$$

Reference #1

Material	Specific Yield Maximum	Specific Yield Minimum	Specific Yield Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.1816

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha, \beta)\right]}$$

h_m = 5.1 feet

Mound Height = h_m - D = 0.1 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation." Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project: Blueberry Hill Estates **Project #:** 287-2119-K
Performed By: PE **Description:** RG70
Calculated Mound Height: 0.1 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	0.2	days	Basin Drains in 4.5 Hours
Width of Field	W =	6	feet	
Length of Field	L =	35	feet	
Hydraulic Conductivity	K =	44.3	ft/day	Loamy Sand per chart = 5.13E-4 ft/s = 44.3 ft/d
Specific Yield	V =	0.21	ft^3/ft^3	Loamy Sand per chart = 0.21 (70% medium sand, 30% silt)
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	1,375	gpd	184 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	3	feet
1/2 length	b =	17.5	feet
Recharge Rate	j =	0.88	ft/day

$$\gamma = \frac{KD}{V} = 1054.8 \ \text{ft}^2\text{/day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.1033$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 0.6024$$

Reference #1

Material	Specific Yield		
	Maximum	Minimum	Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.1816

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha, \beta)\right]}$$

h_m = 5.1 feet

Mound Height = h_m - D = 0.1 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation." Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project: Lot 3 Berry Farms Road **Project #:** 287-2118-K

Performed By: PE **Description:** Infiltration Basin 7.1

Calculated Mound Height: 1.2 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	0.5	days	Basin Drains in 9 Hours
Width of Field	W =	28	feet	
Length of Field	L =	260	feet	
Hydraulic Conductivity	K =	44.33	ft/day	Loamy Sand per chart = 5.13E-4 ft/s = 44.3 ft/d
Specific Yield	V =	0.21	ft^3/ft^3	Loamy Sand per chart = 0.21 (70% medium sand, 30% silt)
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	61,033	gpd	8,159 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	14	feet
1/2 length	b =	130	feet
Recharge Rate	j =	1.12	ft/day

$$\gamma = \frac{KD}{V} = 1055.5 \text{ ft}^2\text{/day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.3047$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 2.8295$$

Reference #1

Material	Specific Yield		
	Maximum	Minimum	Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1of Hantush (1967), attached:

Function S*(a , b) = 0.5229

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha, \beta)\right]}$$

h_m = 6.2 feet

Mound Height = h_m - D = 1.2 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation." Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project: Blueberry Hill Estates **Project #:** 287-2119-K

Performed By: PE **Description:** RG Type C

Calculated Mound Height: 0.1 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	0.2	days	Basin Drains in 4.5 Hours
Width of Field	W =	4	feet	
Length of Field	L =	60	feet	
Hydraulic Conductivity	K =	44.3	ft/day	Loamy Sand per chart = 5.13E-4 ft/s = 44.3 ft/d
Specific Yield	V =	0.21	ft^3/ft^3	Loamy Sand per chart = 0.21 (70% medium sand, 30% silt)
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	2,005	gpd	268 c.f.

Calculated Parameters:

1/2 width	a =	2	feet
1/2 length	b =	30	feet
Recharge Rate	j =	1.12	ft/day

$$\gamma = \frac{KD}{V} = 1054.8 \text{ ft}^2\text{/day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.0689$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 1.0328$$

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Reference #1

Material	Specific Yield		
	Maximum	Minimum	Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.1413

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha, \beta)\right]}$$

h_m = 5.1 feet

Mound Height = h_m - D = 0.1 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation." Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project: Blueberry Hill Estates **Project #:** 287-2119-K

Performed By: PE **Description:** RG Type D

Calculated Mound Height: 0.2 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	0.2	days	Basin Drains in 4.5 Hours
Width of Field	W =	5	feet	
Length of Field	L =	60	feet	
Hydraulic Conductivity	K =	11.23	ft/day	Sandy Loam per chart = 1.13E-4 ft/s = 8.86 ft/d
Specific Yield	V =	0.19	ft^3/ft^3	Sandy Loam per chart = 0.15 (60% medium sand, 40% silt)
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	1,645	gpd	220 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	2.5	feet
1/2 length	b =	30	feet
Recharge Rate	j =	0.73	ft/day

$$\gamma = \frac{KD}{V} = 295.5 \text{ ft}^2\text{/day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.1626$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 1.9511$$

Reference #1

Material	Specific Yield		
	Maximum	Minimum	Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.3165

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha,\beta)\right]}$$

h_m = 5.2 feet

Mound Height = h_m - D = 0.2 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation." Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project: Blueberry Hill Estates **Project #:** 287-2119-K

Performed By: PE **Description:** RG2.1

Calculated Mound Height: 1.0 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	0.3	days	Basin Drains in 5 Hours
Width of Field	W =	50	feet	
Length of Field	L =	85	feet	
Hydraulic Conductivity	K =	44.3	ft/day	Loamy Sand per chart = 5.13E-4 ft/s = 44.3 ft/d
Specific Yield	V =	0.21	ft^3/ft^3	Loamy Sand per chart = 0.21 (70% medium sand, 30% silt)
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	28,275	gpd	3,780 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	25	feet
1/2 length	b =	42.5	feet
Recharge Rate	j =	0.89	ft/day

$$\gamma = \frac{KD}{V} = 1054.8 \ \text{ft}^2/\text{day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.7027$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 1.1946$$

Reference #1			
Material	Specific Yield		
	Maximum	Minimum	Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22
Applied Hydrology 4th Edition, C.W. Fetter			

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.8265

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha,\beta)\right]}$$

h_m = 6.0 feet

Mound Height = h_m - D = 1.0 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation." Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project: Blueberry Hill Estates **Project #:** 287-2119-K

Performed By: PE **Description:** RG3.1

Calculated Mound Height: 0.5 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	0.5	days	Basin Drains in 13 Hours
Width of Field	W =	13	feet	
Length of Field	L =	110	feet	
Hydraulic Conductivity	K =	44.3	ft/day	Loamy Sand per chart = 5.13E-4 ft/s = 44.3 ft/d
Specific Yield	V =	0.21	ft³/ft³	Loamy Sand per chart = 0.21 (70% medium sand, 30% silt)
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	8,648	gpd	1,156 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	6.5	feet
1/2 length	b =	55	feet
Recharge Rate	j =	0.81	ft/day

$$\gamma = \frac{KD}{V} = 1054.8 \text{ ft}^2\text{/day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.1415$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 1.1975$$

Reference #1

Material	Specific Yield		
	Maximum	Minimum	Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

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Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.2764

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha, \beta)\right]}$$

h_m = 5.5 feet

Mound Height =	**h_m - D =**	**0.5**	**feet**

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation."

Water Resources Research, 3, pp. 227-234.

α \ β	0.02	0.04	0.06	0.08	0.10	0.14	0.18	0.22	0.26
0.02	0.0041	0.0073	0.0101	0.0125	0.0146	0.0184	0.0216	0.0243	0.0267
0.04	0.0073	0.0135	0.0188	0.0236	0.0278	0.0353	0.0416	0.0470	0.0518
0.06	0.0101	0.0188	0.0266	0.0335	0.0398	0.0509	0.0602	0.0684	0.0754
0.08	0.0125	0.0236	0.0335	0.0425	0.0508	0.0652	0.0776	0.0884	0.0978
0.10	0.0146	0.0278	0.0398	0.0508	0.0608	0.0786	0.0939	0.1072	0.1188
0.14	0.0184	0.0353	0.0509	0.0652	0.0786	0.1025	0.1232	0.1414	0.1573
0.18	0.0216	0.0416	0.0602	0.0776	0.0939	0.1232	0.1490	0.1716	0.1916
0.22	0.0243	0.0470	0.0684	0.0884	0.1072	0.1414	0.1716	0.1984	0.2222
0.26	0.0267	0.0518	0.0754	0.0978	0.1188	0.1573	0.1916	0.2222	0.2494
0.30	0.0288	0.0559	0.0817	0.1060	0.1290	0.1714	0.2094	0.2433	0.2737
0.34	0.0306	0.0596	0.0871	0.1133	0.1381	0.1839	0.2251	0.2621	0.2954
0.38	0.0322	0.0628	0.0920	0.1197	0.1461	0.1949	0.2391	0.2789	0.3147
0.42	0.0337	0.0657	0.0963	0.1254	0.1532	0.2048	0.2515	0.2938	0.3320
0.46	0.0349	0.0683	0.1001	0.1305	0.1595	0.2135	0.2626	0.3071	0.3474
0.50	0.0361	0.0705	0.1035	0.1350	0.1650	0.2212	0.2724	0.3189	0.3612
0.54	0.0371	0.0725	0.1065	0.1389	0.1700	0.2281	0.2812	0.3295	0.3735
0.58	0.0380	0.0743	0.1091	0.1425	0.1744	0.2343	0.2890	0.3389	0.3844
0.62	0.0387	0.0759	0.1115	0.1456	0.1783	0.2397	0.2959	0.3472	0.3941
0.66	0.0394	0.0773	0.1136	0.1484	0.1818	0.2445	0.3020	0.3547	0.4027
0.70	0.0401	0.0785	0.1154	0.1509	0.1849	0.2488	0.3075	0.3612	0.4104
0.74	0.0406	0.0796	0.1171	0.1531	0.1876	0.2526	0.3123	0.3671	0.4172
0.78	0.0411	0.0806	0.1185	0.1550	0.1900	0.2559	0.3166	0.3722	0.4232
0.82	0.0415	0.0814	0.1198	0.1567	0.1921	0.2589	0.3203	0.3768	0.4286
0.86	0.0419	0.0822	0.1209	0.1582	0.1940	0.2615	0.3237	0.3808	0.4333
0.90	0.0422	0.0828	0.1219	0.1595	0.1957	0.2638	0.3266	0.3844	0.4374
0.94	0.0425	0.0834	0.1228	0.1607	0.1971	0.2658	0.3292	0.3875	0.4411
0.98	0.0428	0.0839	0.1236	0.1617	0.1984	0.2676	0.3314	0.3902	0.4442
1.00	0.0429	0.0842	0.1239	0.1622	0.1990	0.2684	0.3324	0.3914	0.4457
1.20	0.0437	0.0858	0.1263	0.1654	0.2030	0.2740	0.3396	0.4001	0.4558
1.40	0.0441	0.0866	0.1275	0.1669	0.2049	0.2767	0.3431	0.4043	0.4608
1.80	0.0444	0.0871	0.1283	0.1680	0.2062	0.2785	0.3454	0.4071	0.4641
2.00	0.0444	0.0871	0.1284	0.1681	0.2064	0.2787	0.3457	0.4075	0.4645
2.20	0.0444	0.0872	0.1284	0.1682	0.2065	0.2788	0.3458	0.4076	0.4646
2.50	0.0444	0.0872	0.1284	0.1682	0.2065	0.2788	0.3458	0.4077	0.4647
3.00	0.0444	0.0872	0.1284	0.1682	0.2065	0.2789	0.3458	0.4077	0.4647

0.30	0.34	0.38	0.42	0.46	0.50	0.54	0.58	0.62	0.66
0.0288	0.0306	0.0322	0.0337	0.0349	0.0361	0.0371	0.0380	0.0387	0.0394
0.0559	0.0596	0.0628	0.0657	0.0683	0.0705	0.0725	0.0743	0.0759	0.0773
0.0817	0.0871	0.0920	0.0963	0.1001	0.1035	0.1065	0.1091	0.1115	0.1136
0.1060	0.1133	0.1197	0.1254	0.1305	0.1350	0.1389	0.1425	0.1456	0.1484
0.1290	0.1381	0.1461	0.1532	0.1595	0.1650	0.1700	0.1744	0.1783	0.1818
0.1714	0.1839	0.1949	0.2048	0.2135	0.2212	0.2281	0.2343	0.2397	0.2445
0.2094	0.2251	0.2391	0.2515	0.2626	0.2724	0.2812	0.2890	0.2959	0.3020
0.2433	0.2621	0.2789	0.2938	0.3071	0.3189	0.3295	0.3389	0.3472	0.3547
0.2737	0.2954	0.3147	0.3320	0.3474	0.3612	0.3735	0.3844	0.3941	0.4027
0.3009	0.3252	0.3470	0.3665	0.3839	0.3995	0.4134	0.4257	0.4368	0.4466
0.3252	0.3520	0.3761	0.3976	0.4169	0.4341	0.4495	0.4633	0.4756	0.4865
0.3470	0.3761	0.4022	0.4256	0.4466	0.4654	0.4823	0.4973	0.5108	0.5227
0.3665	0.3976	0.4256	0.4508	0.4734	0.4937	0.5119	0.5281	0.5427	0.5556
0.3839	0.4169	0.4466	0.4734	0.4975	0.5191	0.5385	0.5559	0.5715	0.5854
0.3995	0.4341	0.4654	0.4937	0.5191	0.5420	0.5626	0.5810	0.5975	0.6122
0.4134	0.4495	0.4823	0.5119	0.5385	0.5626	0.5842	0.6036	0.6209	0.6364
0.4257	0.4633	0.4973	0.5281	0.5559	0.5810	0.6036	0.6238	0.6420	0.6582
0.4368	0.4756	0.5108	0.5427	0.5715	0.5975	0.6209	0.6420	0.6609	0.6778
0.4466	0.4865	0.5227	0.5556	0.5854	0.6122	0.6364	0.6582	0.6778	0.6953
0.4553	0.4962	0.5334	0.5672	0.5977	0.6254	0.6503	0.6728	0.6929	0.7110
0.4630	0.5048	0.5429	0.5774	0.6087	0.6371	0.6627	0.6857	0.7064	0.7250
0.4699	0.5125	0.5513	0.5865	0.6185	0.6475	0.6736	0.6972	0.7184	0.7375
0.4760	0.5192	0.5587	0.5946	0.6272	0.6567	0.6834	0.7074	0.7291	0.7486
0.4813	0.5252	0.5653	0.6017	0.6348	0.6648	0.6920	0.7165	0.7386	0.7584
0.4860	0.5305	0.5711	0.6080	0.6416	0.6721	0.6996	0.7245	0.7469	0.7671
0.4902	0.5351	0.5762	0.6136	0.6476	0.6784	0.7063	0.7316	0.7543	0.7748
0.4938	0.5392	0.5807	0.6184	0.6528	0.6840	0.7123	0.7378	0.7608	0.7816
0.4955	0.5410	0.5827	0.6206	0.6552	0.6865	0.7150	0.7406	0.7638	0.7846
0.5070	0.5540	0.5969	0.6362	0.6719	0.7044	0.7339	0.7605	0.7846	0.8064
0.5127	0.5603	0.6039	0.6438	0.6801	0.7132	0.7432	0.7704	0.7949	0.8171
0.5165	0.5645	0.6086	0.6489	0.6856	0.7190	0.7494	0.7769	0.8018	0.8243
0.5169	0.5651	0.6092	0.6495	0.6863	0.7198	0.7502	0.7778	0.8027	0.8252
0.5171	0.5653	0.6094	0.6497	0.6865	0.7200	0.7505	0.7781	0.8030	0.8255
0.5172	0.5653	0.6095	0.6498	0.6867	0.7202	0.7506	0.7782	0.8032	0.8257
0.5172	0.5654	0.6095	0.6499	0.6867	0.7202	0.7506	0.7782	0.8032	0.8257

0.70	**0.74**	**0.78**	**0.82**	**0.86**	**0.90**	**0.94**	**0.98**	**1.00**	**1.20**
0.0401	0.0406	0.0411	0.0415	0.0419	0.0422	0.0425	0.0428	0.0429	0.0437
0.0785	0.0796	0.0806	0.0814	0.0822	0.0828	0.0834	0.0839	0.0842	0.0858
0.1154	0.1171	0.1185	0.1198	0.1209	0.1219	0.1228	0.1236	0.1239	0.1263
0.1509	0.1531	0.1550	0.1567	0.1582	0.1595	0.1607	0.1617	0.1622	0.1654
0.1849	0.1876	0.1900	0.1921	0.1940	0.1957	0.1971	0.1984	0.1990	0.2030
0.2488	0.2526	0.2559	0.2589	0.2615	0.2638	0.2658	0.2676	0.2684	0.2740
0.3075	0.3123	0.3166	0.3203	0.3237	0.3266	0.3292	0.3314	0.3324	0.3396
0.3612	0.3671	0.3722	0.3768	0.3808	0.3844	0.3875	0.3902	0.3914	0.4001
0.4104	0.4172	0.4232	0.4286	0.4333	0.4374	0.4411	0.4442	0.4457	0.4558
0.4553	0.4630	0.4699	0.4760	0.4813	0.4860	0.4902	0.4938	0.4955	0.5070
0.4962	0.5048	0.5125	0.5192	0.5252	0.5305	0.5351	0.5392	0.5410	0.5540
0.5334	0.5429	0.5513	0.5587	0.5653	0.5711	0.5762	0.5807	0.5827	0.5969
0.5672	0.5774	0.5865	0.5946	0.6017	0.6080	0.6136	0.6184	0.6206	0.6362
0.5977	0.6087	0.6185	0.6272	0.6348	0.6416	0.6476	0.6528	0.6552	0.6719
0.6254	0.6371	0.6475	0.6567	0.6648	0.6721	0.6784	0.6840	0.6865	0.7044
0.6503	0.6627	0.6736	0.6834	0.6920	0.6996	0.7063	0.7123	0.7150	0.7339
0.6728	0.6857	0.6972	0.7074	0.7165	0.7245	0.7316	0.7378	0.7406	0.7605
0.6929	0.7064	0.7184	0.7291	0.7386	0.7469	0.7543	0.7608	0.7638	0.7846
0.7110	0.7250	0.7375	0.7486	0.7584	0.7671	0.7748	0.7816	0.7846	0.8064
0.7272	0.7417	0.7546	0.7660	0.7762	0.7852	0.7932	0.8002	0.8034	0.8259
0.7417	0.7566	0.7698	0.7816	0.7921	0.8014	0.8096	0.8168	0.8201	0.8434
0.7546	0.7698	0.7834	0.7956	0.8063	0.8159	0.8243	0.8317	0.8351	0.8591
0.7660	0.7816	0.7956	0.8080	0.8190	0.8288	0.8374	0.8450	0.8485	0.8731
0.7762	0.7921	0.8063	0.8190	6.8302	0.8402	0.8491	0.8569	0.8604	0.8855
0.7852	0.8014	0.8159	0.8288	0.8402	0.8504	0.8594	0.8674	0.8710	0.8966
0.7932	0.8096	0.8243	0.8374	0.8491	0.8594	0.8686	0.8767	0.8803	0.9064
0.8002	0.8168	0.8317	0.8450	0.8569	0.8674	0.8767	0.8849	0.8886	0.9151
0.8034	0.8201	0.8351	0.8485	0.8604	0.8710	0.8803	0.8886	0.8924	0.9191
0.8259	0.8434	0.8591	0.8731	0.8855	0.8966	0.9064	0.9151	0.9191	0.9472
0.9370	0.8549	0.8710	0.8853	0.8980	0.9094	0.9195	0.9284	0.9324	0.9614
0.8445	0.8627	0.8789	0.8935	0.9065	0.9180	0.9282	0.9373	0.9414	0.9709
0.8454	0.8636	0.8799	0.8945	0.9075	0.9191	0.9294	0.9384	0.9426	0.9722
0.8458	0.8640	0.8803	0.8949	0.9079	0.9195	0.9298	0.9389	0.9430	0.9726
0.8460	0.8642	0.8805	0.8951	0.9081	0.9197	0.9300	0.9391	0.9432	0.9728
0.8460	0.8642	0.8805	0.8951	0.9081	0.9197	0.9300	0.9391	0.9433	0.9729

1.40	1.80	2.00	2.20	2.50	3.00
0.0441	0.0444	0.0444	0.0444	0.0444	0.0444
0.0866	0.0871	0.0871	0.0872	0.0872	0.0872
0.1275	0.1283	0.1284	0.1284	0.1284	0.1284
0.1669	0.1680	0.1681	0.1682	0.1682	0.1682
0.2049	0.2062	0.2064	0.2065	0.2065	0.2065
0.2767	0.2785	0.2787	0.2788	0.2788	0.2789
0.3431	0.3454	0.3457	0.3458	0.3458	0.3458
0.4043	0.4071	0.4075	0.4076	0.4077	0.4077
0.4608	0.4641	0.4645	0.4646	0.4647	0.4647
0.5127	0.5165	0.5169	0.5171	0.5172	0.5172
0.5603	0.5645	0.5651	0.5653	0.5653	0.5654
0.6039	0.6086	0.6092	0.6094	0.6095	0.6095
0.6438	0.6489	0.6495	0.6497	0.6498	0.6499
0.6801	0.6856	0.6863	0.6865	0.6867	0.6867
0.7132	0.7190	0.7198	0.7200	0.7202	0.7202
0.7432	0.7494	0.7502	0.7505	0.7506	0.7506
0.7704	0.7769	0.7778	0.7781	0.7782	0.7782
0.7949	0.8018	0.8027	0.8030	0.8032	0.8032
0.8171	0.8243	0.8252	0.8255	0.8257	0.8257
0.8370	0.8445	0.8454	0.8458	0.8460	0.8460
0.8549	0.8627	0.8636	0.8640	0.8642	0.8642
0.8710	0.8789	0.8799	0.8803	0.8805	0.8805
0.8853	0.8935	0.8945	0.8949	0.8951	0.8951
0.8980	0.9065	0.9015	0.9079	0.9081	0.9081
0.9094	0.9180	0.9191	0.9195	0.9197	0.9197
0.9195	0.9282	0.9294	0.9298	0.9300	0.9300
0.9284	0.9373	0.9384	0.9389	0.9391	0.9391
0.9324	0.9414	0.9426	0.9430	0.9432	0.9433
0.9614	0.9709	0.9722	0.9726	0.9728	0.9729
0.9759	0.9858	0.9871	0.9875	0.9878	0.9878
0.9858	0.9959	0.9972	0.9977	0.9979	0.9980
0.9871	0.9972	0.9985	0.9990	0.9992	0.9993
0.9875	0.9977	0.9990	0.9995	0.9997	0.9998
0.9878	0.9979	0.9992	0.9997	1.0000	1.0000
0.9878	0.9980	0.9993	0.9998	1.0000	1.0000

Field measurements of hydraulic conductivity should be used for all but pr

What follows are four sets of qualitative conductivity estimates. An est
on the most similar soil type from as many sour

Reference #1		
Material	Intrinsic Permeability (darcys)	Hydraulic Conductivity (cm/s)
Clay	10^{-6}-10^{-3}	10^{-9}-10^{-6}
Silt, sandy silts, clayey sands, till	10^{-3}-10^{-1}	10^{-6}-10^{-4}
Silty sands, fine sands	10^{-2}-10^{-1}	10^{-5}-10^{-3}
Well-sorted sands, glacial outwash	1.0-10^{2}	10^{-3}-10^{-1}
Well-sorted gravel	10.0-10^{3}	10^{-2}-1.0
Applied Hydrology 4th Edition, C.W. Fetter		

Sediment or rock type	Hydraulic conductivity, m/day
Clays	10^{-7}-10^{-3}
Silts	10^{-4}-10^{-0}
Fine to coarse sands	10^{-2}-10^{+3}
Gravels	10^{+2}-10^{+5}
Glacial till	See Table 1
Shales (matrix)	10^{-8}-10^{-4}
Shales (fractured and weathered)	10^{-4}-10^{0}
Sandstones (well-cemented)	10^{-5}-10^{-2}
Sandstones (friable)	10^{-3}-10^{0}
Carbonates	See Table 3
Salt	10^{-10}-10^{-8}
Anhydrite	10^{-7}-10^{-6}
Unfractured igneous and metamorphic rocks	10^{-9}-10^{-5}
Fractured igneous and	10^{-5}-10^{-1}

Table
Rock Type
Cenozoic floo
Dense, unfractured
Vesicular
Interbeds
Quaternary
Vesicular
Tuffs
Densely welded (matrix)
Densely welded (fractured)
Nonwelded

metamorphic rocks	[illegible]
Basalts	See Table 2

Referenc

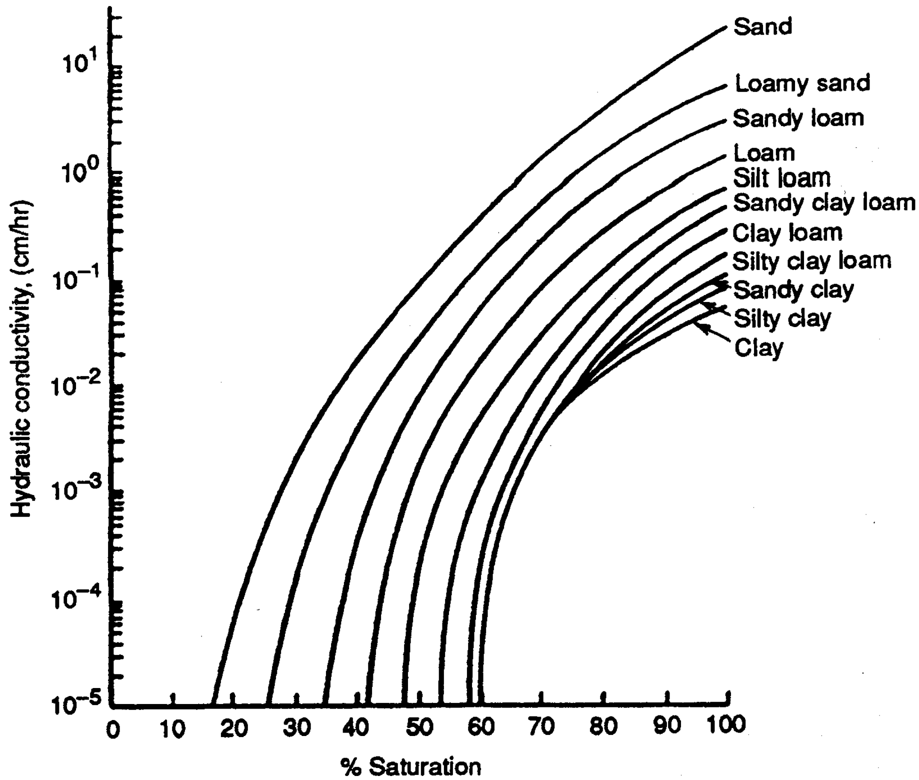

FIGURE 5.3.2 Hydraulic conductivity sorted by soil texture. *(Reproduced from Ref. 83 with permission.)*

reliminary evaluation of mounding

:imated conductivity should be selected based
rces as are applicable.

Reference #2	
Geologic Material	Hydraulic Conductivity, m/s
Coarse gravels	10^{-1}-10^{-2}
Sands and gravels	10^{-2}-10^{-5}
Fine sands, silts, loess	10^{-5}-10^{-9}
Clay, shale, glacial till	10^{-5}-10^{-13}
Dolomitic limestones	10^{-3}-10^{-5}
Weathered chalk	10^{-3}-10^{-5}
Unweathered chalk	10^{-6}-10^{-9}
Limestone	10^{-3}-10^{-9}
Sandstone	10^{-4}-10^{-10}
Unweathered granite, gneiss, compact basalt	10^{-7}-10^{-13}
Practical Handbook of Ground-Water Monitoring 1991, David M. Nielsen	

Reference #3

1
Hydraulic Conductivity, m/day
d basalts
10^{-6}-10^{-3}
10^{-4}-10^{-3}
10^{-3}-10^{+3}
basalts
10^{+1}-10^{+3}
$<10^{-6}$
10^{-6}-10^{+1}
10^{-3}-10^{-2}

Table 2			
Hydraulic Conductivity, m/day			
Glacial Deposits	Unweathered	Weathered	Fractured
Basal till	10^{-6}-10^{-2}	10^{-4}-10^{-1}	10^{-4}-10^{0}
Supraglacial till	10^{-4}-10^{0}	10^{-4}-10^{0}	10^{-4}-10^{0}
Glaciolacustrine	10^{-8}-10^{-4}		10^{-6}-10^{-3}
Loess	10^{-6}-10^{0}	10^{-5}-10^{-2}	
Glaciofluvial	10^{-6}-10^{+2}		
Handbook of Hydrology, David R. Maidment			

Tab
Lithology
Carbonate mud
Dolomite
Tertiary limestone
Paleozoic limestone
Oolitic limestone
Holocene coral limestone
Karstified limestone
Chalk

e #4

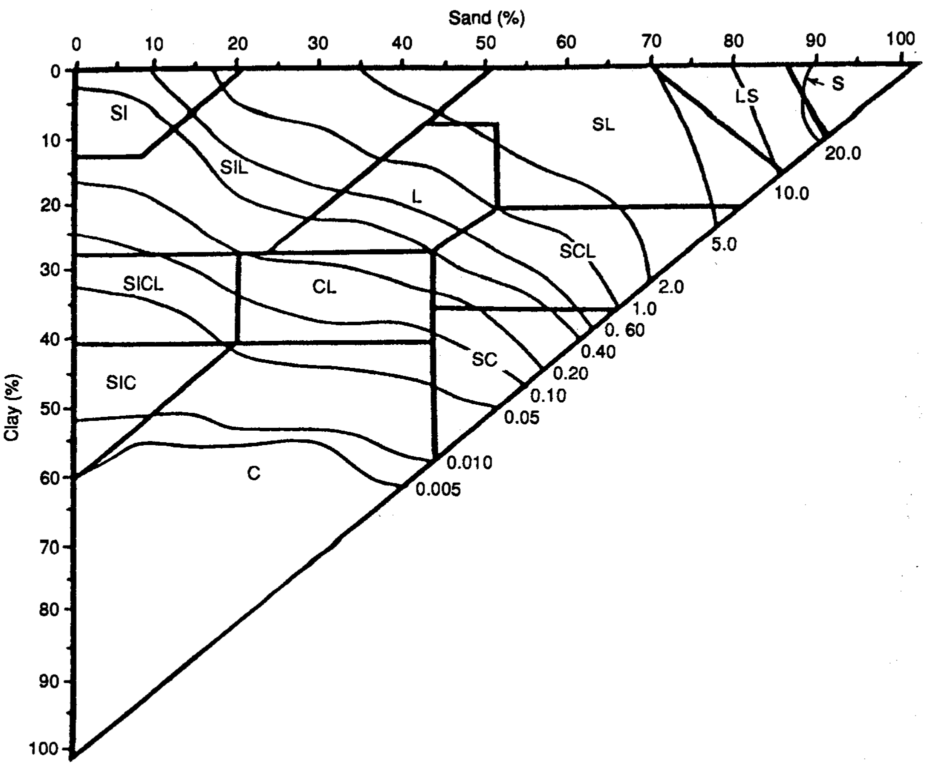

FIGURE 5.3.3 Saturated hydraulic conductivity for USDA soil texture triangle. *(Reproduced from Ref. 80 by permission of ASCE.)*

le 3

Hydraulic Conductivity, m/day
10^{-3}-10^{-1}
10^{-4}-10^{0}
10^{-4}-10^{0}
10^{-4}-10^{0}
10^{-2}-10^{-1}
10^{2}-10^{4}
10^{-1}-10^{7}
10^{-3}-10^{0}

What follows are two sets of specific yield estimates. An estimated specific yield should be selected based on the most similar soil type from as many sources as are applicable.

Reference #1			
Material	**Specific Yield**		
	Maximum	**Minimum**	**Average**
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22
Applied Hydrology 4th Edition, C.W. Fetter			

Reference #2	
Rocks	**Specific Yield**
Clay	0.01-0.10
Sand	0.10-0.30
Gravel	0.15-0.30
Sand and gravel	0.15-0.25
Sandstone	0.05-0.15
Shale	0.005-0.05
Limestone	0.005-0.05
Practical Handbook of Ground-water Monitoring 1991, David M. Nielsen	

Groundwater Mounding Analysis - Hantush Method

Project: Blueberry Hill Estates **Project #:** 287-2119-K

Performed By: PE **Description:** RG4.1

Calculated Mound Height: 1.3 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	1.5	days	Basin Drains in 4 Hours
Width of Field	W =	17	feet	
Length of Field	L =	220	feet	
Hydraulic Conductivity	K =	33.3	ft/day	1/3 Sandy Loam, 2/3 Loamy Sand
Specific Yield	V =	0.2	ft^3/ft^3	1/3 Sandy Loam, 2/3 Loamy Sand
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	22,382	gpd	2992 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	8.5	feet
1/2 length	b =	110	feet
Recharge Rate	j =	0.80	ft/day

$$\gamma = \frac{KD}{V} = 832.5 \text{ ft}^2\text{/day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.1203$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 1.5564$$

Reference #1

Material	Specific Yield Maximum	Specific Yield Minimum	Specific Yield Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.2419

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha,\beta)\right]}$$

h_m = 6.3 feet

Mound Height = h_m - D = 1.3 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation."

Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project: Blueberry Hill Estates **Project #:** 287-2119-K

Performed By: PE **Description:** RG4.2

Calculated Mound Height: 0.7 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	1	days	Basin Drains in 4 Hours
Width of Field	W =	10	feet	
Length of Field	L =	240	feet	
Hydraulic Conductivity	K =	27.8	ft/day	1/2 Sandy Loam, 1/2 Loamy Sand
Specific Yield	V =	0.2	ft^3/ft^3	1/2 Sandy Loam, 1/2 Loamy Sand
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	14,362	gpd	1,920 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	5	feet
1/2 length	b =	120	feet
Recharge Rate	j =	0.80	ft/day

$$\gamma = \frac{KD}{V} = 695.0 \text{ ft}^2\text{/day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.0948$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 2.2759$$

Reference #1

Material	Specific Yield Maximum	Specific Yield Minimum	Specific Yield Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.1966

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha, \beta)\right]}$$

h_m = 5.7 feet

Mound Height = h_m - D = 0.7 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation."
Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project: Blueberry Hill Estates — **Project #:** 287-2119-K

Performed By: PE — **Description:** RG5.1

Calculated Mound Height: 1.0 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	0.2	days	Basin Drains in 4 Hours
Width of Field	W =	12	feet	
Length of Field	L =	39	feet	
Hydraulic Conductivity	K =	44.3	ft/day	Loamy Sand per chart = 5.13E-4 ft/s = 44.3 ft/d
Specific Yield	V =	0.21	ft^3/ft^3	Loamy Sand per chart = 0.21 (70% medium sand, 30% silt)
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	11,415	gpd	1,526 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	6	feet
1/2 length	b =	19.5	feet
Recharge Rate	j =	3.26	ft/day

$$\gamma = \frac{KD}{V} = 1054.8 \text{ ft}^2\text{/day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.2066$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 0.6713$$

Reference #1

Material	Specific Yield		
	Maximum	Minimum	Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.3387

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha, \beta)\right]}$$

h_m = 6.0 feet

Mound Height = h_m - D = 1.0 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation." Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project: Blueberry Hill Estates	**Project #:** 287-2119-K
Performed By: PE	**Description:** RG15H
	Calculated Mound Height: 0.1 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	0.3	days	Basin Drains in 4.5 Hours
Width of Field	W =	4	feet	
Length of Field	L =	60	feet	
Hydraulic Conductivity	K =	44.3	ft/day	Loamy Sand per chart = 5.13E-4 ft/s = 44.3 ft/d
Specific Yield	V =	0.21	ft^3/ft^3	Loamy Sand per chart = 0.21 (70% medium sand, 30% silt)
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	1,645	gpd	220 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	2	feet
1/2 length	b =	30	feet
Recharge Rate	j =	0.92	ft/day

$$\gamma = \frac{KD}{V} = 1054.8 \text{ ft}^2\text{/day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.0562$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 0.8432$$

Reference #1

Material	Specific Yield Maximum	Specific Yield Minimum	Specific Yield Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.1131

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha, \beta)\right]}$$

h_m = 5.1 feet

Mound Height =	**h_m - D =**	**0.1**	**feet**

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation."
Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project: Blueberry Hill Estates **Project #:** 287-2119-K

Performed By: PE **Description:** RG 42

Calculated Mound Height: 0.3 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	0.3	days	Basin Drains in 4.5 Hours
Width of Field	W =	8	feet	
Length of Field	L =	60	feet	
Hydraulic Conductivity	K =	44.3	ft/day	Loamy Sand per chart = 5.13E-4 ft/s = 44.3 ft/d
Specific Yield	V =	0.21	ft^3/ft^3	Loamy Sand per chart = 0.21 (70% medium sand, 30% silt)
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	3,965	gpd	530 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	4	feet
1/2 length	b =	30	feet
Recharge Rate	j =	1.10	ft/day

$$\gamma = \frac{KD}{V} = 1054.8 \text{ ft}^2\text{/day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.1124$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 0.8432$$

Reference #1

Material	Specific Yield		
	Maximum	Minimum	Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.2141

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha,\beta)\right]}$$

h_m = 5.3 feet

Mound Height = h_m - D = 0.3 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation."
Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project: Blueberry Hill Estates **Project #:** 287-2119-K

Performed By: PE **Description:** RG69

Calculated Mound Height: 0.1 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	0.2	days	Basin Drains in 4.5 Hours
Width of Field	W =	6	feet	
Length of Field	L =	35	feet	
Hydraulic Conductivity	K =	44.3	ft/day	Loamy Sand per chart = 5.13E-4 ft/s = 44.3 ft/d
Specific Yield	V =	0.21	ft^3/ft^3	Loamy Sand per chart = 0.21 (70% medium sand, 30% silt)
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	1,375	gpd	184 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	3	feet
1/2 length	b =	17.5	feet
Recharge Rate	j =	0.88	ft/day

$$\gamma = \frac{KD}{V} = 1054.8 \text{ ft}^2\text{/day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.1033$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 0.6024$$

Reference #1

Material	Specific Yield		
	Maximum	Minimum	Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.1816

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha,\beta)\right]}$$

h_m = 5.1 feet

Mound Height = h_m - D = 0.1 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation."
Water Resources Research, 3, pp. 227-234.

Groundwater Mounding Analysis - Hantush Method

Project: Blueberry Hill Estates **Project #:** 287-2119-K
Performed By: PE **Description:** RG70
Calculated Mound Height: 0.1 **feet**

Input Parameters (input only shaded areas):

Recharge Period	t =	0.2	days	Basin Drains in 4.5 Hours
Width of Field	W =	6	feet	
Length of Field	L =	35	feet	
Hydraulic Conductivity	K =	44.3	ft/day	Loamy Sand per chart = 5.13E-4 ft/s = 44.3 ft/d
Specific Yield	V =	0.21	ft^3/ft^3	Loamy Sand per chart = 0.21 (70% medium sand, 30% silt)
Saturated Thickness	D =	5	feet	
Daily Flow	Q =	1,375	gpd	184 c.f.

Description	k (ft/s) [m/s]
Sand	(5.77E-04) [1.76E-04]
Loamy	(5.13E-04) [1.56E-04]
Sandy Loam	(1.13E-04) [3.45E-05]
Silty Loam	(2.36E-05) [7.19E-06]
Loamy	(2.28E-05) [6.94E-06]
Sandy Clayey Loam	(2.07E-05) [6.31E-06]
Silty Clayey Loam	(5.57E-06) [1.70E-06]
Clay Loam	(8.04E-06) [2.45E-06]
Sandy Clayey Loam	(7.11E-06) [2.17E-06]
Silty Clay	(3.34E-06) [1.02E-06]
Clay	(4.21E-06) [1.28E-06]

Calculated Parameters:

1/2 width	a =	3	feet
1/2 length	b =	17.5	feet
Recharge Rate	j =	0.88	ft/day

$$\gamma = \frac{KD}{V} = 1054.8 \text{ ft}^2\text{/day}$$

Dimensionless width $$\alpha = \frac{a}{\sqrt{4\gamma t}} = 0.1033$$

Dimensionless length $$\beta = \frac{b}{\sqrt{4\gamma t}} = 0.6024$$

Reference #1

Material	Specific Yield		
	Maximum	Minimum	Average
Clay	0.05	0	0.02
Sandy clay	0.12	0.03	0.07
Silt	0.19	0.03	0.07
Fine Sand	0.28	0.1	0.21
Medium Sand	0.32	0.15	0.26
Coarse Sand	0.35	0.2	0.27
Gravelly Sand	0.35	0.2	0.25
Fine gravel	0.35	0.21	0.25
Medium gravel	0.26	0.13	0.23
Coarse gravel	0.26	0.12	0.22

Applied Hydrology 4th Edition, C.W. Fetter

Solution:

From Table 1 of Hantush (1967), attached:

Function S*(a , b) = 0.1816

Water Table + Mound $$h_m = \sqrt{h_i^2 + \left[\frac{2j}{K}\lambda t \cdot S^*(\alpha, \beta)\right]}$$

h_m = 5.1 feet

Mound Height = h_m - D = 0.1 feet

Reference: Hantush, M.S. 1967. "Growth and Decay of Groundwater Mounds in Response to Uniform Percolation."
Water Resources Research, 3, pp. 227-234.

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Treatment A, B, G

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Rain Garden	0.90	1.00	0.90	0.10
	0.00	0.10	0.00	0.10
	0.00	0.10	0.00	0.10
	0.00	0.10	0.00	0.10
	0.00	0.10	0.00	0.10

Total TSS Removal = 90%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: Lot 3 Berry Farms Rd
Prepared By: PCE
Date: 4.1.22

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Treatment C

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Sediment Forebay	**0.25**	**1.00**	**0.25**	**0.75**
Rain Garden	**0.90**	**0.75**	**0.68**	**0.08**
	0.00	**0.08**	**0.00**	**0.08**
	0.00	**0.08**	**0.00**	**0.08**
	0.00	**0.08**	**0.00**	**0.08**

Total TSS Removal = 93%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: **Lot 3 Berry Farms Rd**
Prepared By: **PCE**
Date: **4.1.22**

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet
must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

Mass. Dept. of Environmental Protection

Version 1, Automated: Mar. 4, 2008

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Location: Treatment D, E, F

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Rain Garden	0.90	1.00	0.90	0.10
Rain Garden	0.90	0.10	0.09	0.01
	0.00	0.01	0.00	0.01
	0.00	0.01	0.00	0.01
	0.00	0.01	0.00	0.01

Total TSS Removal = 99%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: Lot 3 Berry Farms Rd
Prepared By: PCE
Date: 4.1.22

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet
must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Treatment H

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Rain Garden	**0.90**	**1.00**	**0.90**	**0.10**
Infiltration Basin	**0.80**	**0.10**	**0.08**	**0.02**
	0.00	**0.02**	**0.00**	**0.02**
	0.00	**0.02**	**0.00**	**0.02**
	0.00	**0.02**	**0.00**	**0.02**

Total TSS Removal = 98%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: **Lot 3 Berry Farms Rd**
Prepared By: **PCE**
Date: **4.1.22**

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet
must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

Mass. Dept. of Environmental Protection

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Treatment I

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	**0.25**	**1.00**	**0.25**	**0.75**
Infiltration Basin	**0.80**	**0.75**	**0.60**	**0.15**
	0.00	**0.15**	**0.00**	**0.15**
	0.00	**0.15**	**0.00**	**0.15**
	0.00	**0.15**	**0.00**	**0.15**

Total TSS Removal = **85%**

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: **Lot 3 Berry Farms Rd**
Prepared By: **PCE**
Date: **4.1.22**

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet
must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

Mass. Dept. of Environmental Protection

APPENDIX G

CONSTRUCTION PERIOD STORMWATER POLLUTION PREVENTION PLAN AND DRAFT WEEKLY CONSTRUCTION PERIOD INSPECTION REPORT

Weekly Stormwater Construction Site Inspection Report
Lot 3 Berry Farms Road, Sturbridge, MA 01566

General Information			
Project Name	**55+ MANUFACTURED HOUSING COMMUNITY**		
MassDEP File Number:			
Date of Inspection		**Start/End Time**	
Inspector's Name(s) & Contact Information			
Type of Inspection: ❑ Regular ❑ Pre-storm event ❑ During storm event ❑ Post-storm event			
Weather Information			
Has there been a storm event since the last inspection? ❑Yes ❑No **If yes, provide:** Storm Start Date & Time: Storm Duration (hrs): Approximate Amount of Precipitation (in):			
Weather at time of this inspection? ❑ Clear ❑Cloudy ❑ Rain ❑ Sleet ❑ Fog ❑ Snowing ❑ High Winds ❑ Other: Temperature:			
Have any discharges occurred since the last inspection? ❑Yes ❑No **If yes, describe:**			
Are there any discharges at the time of inspection? ❑Yes ❑No **If yes, describe:**			

	Site – Specific BMPs	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
1	Erosion Control Barrier	❑Yes ❑No	❑Yes ❑No	
2	Catch Basin Inlet Protection	❑Yes ❑No	❑Yes ❑No	
3	Temporary Soil Stabilization	❑Yes ❑No	❑Yes ❑No	
4	Stormwater System	❑Yes ❑No	❑Yes ❑No	

CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print name and title: ____

Signature:____ **Date:**____________________

Overall Site Issues
Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	**Slopes** and disturbed areas not actively being worked properly stabilized?	❑Yes ❑No	❑Yes ❑No	
2	**Natural Resource** areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	❑Yes ❑No	❑Yes ❑No	
3	**Perimeter Controls** and sediment barriers adequately installed (keyed into substrate) and maintained?	❑Yes ❑No	❑Yes ❑No	
4	**Discharge Points** and receiving waters free of any sediment deposits?	❑Yes ❑No	❑Yes ❑No	
5	**Storm Drain Inlets** properly protected?	❑Yes ❑No	❑Yes ❑No	
6	**Construction exit** preventing sediment from being tracked into the street?	❑Yes ❑No	❑Yes ❑No	
7	**Trash / Litter** from work areas collected and placed in covered dumpsters?	❑Yes ❑No	❑Yes ❑No	
8	**Washout Facilities** (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	❑Yes ❑No	❑Yes ❑No	
9	**Vehicle and Equipment Fueling,** cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	❑Yes ❑No	❑Yes ❑No	
10	**Materials** that are potential stormwater contaminants stored inside or under cover?	❑Yes ❑No	❑Yes ❑No	
11	**Non-stormwater discharges** (wash water, dewatering) properly controlled?	❑Yes ❑No	❑Yes ❑No	

APPENDIX H

STORMWATER MANAGEMENT SYSTEM
LONG-TERM OPERATION & MAINTENANCE (O & M) PLAN

STORMWATER MANAGEMENT SYSTEM

Long Term Operations and Maintenance Plan

"Blueberry Hill Estates"
Lot 3 Berry Farms Road
Sturbridge, MA 01566

Prepared For:
Justin Stelmok
557 Southwest Cutoff
Worcester, MA 01607

March 31, 2022
Rev. November 10, 2022

McCLURE
ENGINEERING, INC

119 Worcester Road – Charlton, Massachusetts 01507 – T: 508.248.2005

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TABLES

ATTACHMENTS

Long-Term Operation & Maintenance Plan
Site Stormwater Management System
Lot 3 Berry Farms Road, Sturbridge, MA

Property Owner/Responsible Party: Justin Stelmok
557 Southwest Cutoff
Worcester, MA 01607
Phone: (508) 832-5324 Office
Phone: (508) 868-3996 Cell

Storm Water Management System Owner: **(same as above)**

Site subject to Wetlands Protection Act: **Yes**

The Responsible Party Shall:

- Prepare an **"Operation and Maintenance (O & M) Compliance Statement" (Attachment #1)**
- Implement the routine and non-routine operation, maintenance, and inspection tasks in accordance with the procedures specified in this document to ensure that all storm water management systems function as designed.
- Maintain a log of all operation and maintenance (O & M) activities. Keep records for the last three (3) years, including inspections, repairs, replacement and disposal (for disposal, the log shall indicate the type of material and disposal location).
- Make this log available to **Town of Sturbridge** official representatives upon request;
- Allow **Town of Sturbridge** official representatives to inspect each storm water system "best management practice" (BMP) to determine whether the responsible party is implementing the operation and maintenance plan;
- Agree to notify in writing all future property owners of the presence of the storm water management system and the requirement for proper operation and maintenance.

Responsible Party shall maintain a contract with the following companies:

Landscaping and Pavement Maintenance: ________________________________

Snow Removal and Plowing: ________________________________

Storm Water System Maintenance: ________________________________

Long-Term Operation & Maintenance Plan
Blueberry Hill Estates
Lot 3 Berry Farms Road, Sturbridge, MA

Site Description:

The Subject Site consists of approximately 41.5 acres. The property lies on the northern side of Main Street and along the Southbridge Town Line. The property is shown as Lot 3 of the Berry Farms Road Definitive Subdivision. The site is located within the Town of Sturbridge Rural Residential zoning district. The existing site consists of mostly wooded area, as well as wetlands. The site has previously been logged and some existing logging trails still exist throughout the property. The site topography slopes generally in a westerly direction towards a valley containing wetlands. The site is surrounded by wetlands on the western boundary, as well as (3) vernal pools as determined by LEC Environmental.

The site is located within an area of minimal flood hazard (Zone X) per Flood Insurance Rate Map (FIRM) Worcester County Massachusetts (All Jurisdictions), Map Number 25027C0933E, effective on 07/04/2011 (see Appendix C).

The proposed site layout is for the construction of a 55+ Manufactured Housing Community. The community is proposed with (4) 20’ wide private roads, (3) cul-de-sacs, (1) emergency access drive through the Town of Southbridge, a common clubhouse and active open space area, and (71) total units. The community will be serviced by municipal water and sewer through Berry Farms Road. The stormwater management system for the site consists of country style drainage, including swales and rain gardens with minimal structures for conveyance. Rain gardens will be placed between all units, and will act as a stormwater structure, but also on-site landscaping and yard separation/ privacy barrier. Other than a single deep sump and hooded catch basin in the parking lot for the club house, all stormwater will be conveyed on the surface to rain gardens. These rain gardens will provide for peak flow attenuation, water quality treatment, and groundwater recharge. A total of (77) rain gardens are proposed, with the majority being smaller rain gardens positioned between units which will detain and treat runoff from the units, roads, and driveway. A few larger secondary rain gardens are also proposed. A single large infiltration basin is proposed within an existing natural depression. Interception trenches are proposed behind the units on Roads A and D to convey clean runoff from the undeveloped portions of the property towards the existing discharge points of the property.

The “Special Permit and Site Plan, Blueberry Hill Estates, 55+ Manufactured Housing Community, Lot 3 Berry Farms Road, Sturbridge, MA” Plan Set prepared by McClure Engineering, Inc., dated 4/1/22, revised 11/10/22 provides details of the complete stormwater management system design.

Operation and Maintenance (O&M) Plan

The purpose of this Storm Water Management System Operation and Maintenance Plan is to prevent erosion, sedimentation, pollution or other deterioration of the storm water management system and resource areas located on and adjacent to the property located at Lot 3 Berry Farms Road, Sturbridge, MA. The storm water management system shall be maintained properly to assure its continued performance. Inspection and maintenance for the system should be in compliance with Table 1.

TABLE 1

STORMWATER SYSTEM INSPECTION AND MAINTENANCE SCHEDULE “Blueberry Hill Estates” Lot 3 Berry Farms Road, Sturbridge, MA		
Best Management Practice (BMP)	**Inspection Frequency**	**Maintenance Frequency**
STRUCTURAL BMPs		
Infiltration Basin	After every major storm during first 3 months of operation and twice a year thereafter and when there are discharges through the high outlet orifice.	Bi-Annual Min (Early Spring & Late Fall) and/or As Needed
Deep Sump Hooded Catch Basin	Quarterly	Quarterly and/or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the basin to the lowest pipe invert in the basin.
Sediment Forebay	Monthly	Quarterly and/or As Needed
Interceptor Trench	Quarterly	As Needed
Rain Garden	Monthly	As Needed
Rain Guardian	Quarterly	As Needed
Pipe Outfall/ Rip Rap Apron/ Level Spreader	After heavy rains and Bi-Annually Min (Early Spring & Late Fall)	Bi-Annual Min (Early Spring & Late Fall) and/or As Needed
Trench Drain	After heavy rains and Bi-Annually Min (Early Spring & Late Fall)	Bi-Annual Min (Early Spring & Late Fall) and/or As Needed

NON-STRUCTURAL STORMWATER CONTROLS		
Invasive Species	Quarterly	As Needed
Retaining Walls	Quarterly	As Needed
Wildlife Crossing Structure	Quarterly	As Needed
Landscaping	Bi-Annual (Early Spring & Late Fall)	Seasonally As Needed
Parking Area Sweeping	Bi-Annual (Early Spring & Late Fall)	Bi-Annual (2-Times / Year) (Apr/May and Oct/Nov.)
Snow Removal	Seasonally As Needed	In Accordance with M.G.L. Title XIV. Public Ways and Works; Chapter 85
Site Inspections	Bi-Annual (Early Spring & Late Fall)	Keep Records on File at Site for Three (3) Years

Responsible Party shall be responsible for the system and all Operation and Maintenance procedures, including those outlined in the following sections.

STRUCTURAL STORM WATER BMP MAINTENANCE:

Infiltration Basin:
Infiltration basins are prone to clogging and failure so it is imperative to develop and implement aggressive maintenance plans and schedules. Installing the required pretreatment BMPs will significantly reduce maintenance requirements for the basin. Perform inspections and preventive maintenance at least twice a year, and after every time drainage discharges through the high outlet orifice. Inspect the pretreatment BMPs in accordance with the minimal requirements specified for those practices and after every major storm event. A major storm event is defined as a storm that is equal to or greater than the 2-year, 24-hour storm (generally 2.9 to 3.6 inches in a 24-hour period, depending in geographic location in Massachusetts). Once the basin is in use, inspect it after every major storm for the first few months to ensure it is stabilized and functioning properly and if necessary take corrective action. Note how long water remains standing in the basin after a storm; standing water within the basin 48 to 72 hours after a storm indicates that the infiltration capacity may have been overestimated. If the ponding is due to clogging, immediately address the reasons for the clogging (such as upland sediment erosion, excessive compaction of soils, or low spots). Thereafter, inspect the infiltration basin at least twice per year. Important items to check during the inspection include: signs of differential settlement, cracking, erosion, leakage in the embankments, tree growth on the embankments, condition of riprap, sediment accumulation, and the health of the turf. At least twice a year, mow the buffer area, side slopes, and basin bottom. Remove grass clippings and accumulated organic matter to prevent an impervious organic mat from forming. Remove trash and debris at the same time. Use deep tilling to break up clogged surfaces, and revegetate immediately. Remove sediment from the basin as necessary, but wait until the floor of the basin is thoroughly dry. Use light equipment to remove the top layer so as to not compact the underlying soil. Deeply till the remaining soil, and revegetate as soon as possible. Inspect and clean pretreatment devices associated with basins at least twice a year, and ideally every other month.

Deep Sump Hooded Catch Basin:
Regular maintenance is essential. Deep sump catch basins remain effective at removing pollutants only if they are cleaned out frequently. Inspect or clean deep sump basins at least four times per year and at the end of the foliage and snow removal seasons. Sediments must also be removed four times per year or whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin. Clamshell buckets are typically used to remove sediment in Massachusetts. However, vacuum trucks are preferable, because they remove more trapped sediment and supernatant than clamshells. Vacuuming is also a speedier process and is less likely to snap the cast iron hood within the deep sump catch basin. Although catch basin debris often contains concentrations of oil and hazardous materials such as petroleum hydrocarbons and metals, MassDEP classifies them as solid waste. Unless there is evidence that they have been contaminated by a spill or other means, MassDEP does not routinely require catch basin cleanings to be tested before disposal. Contaminated catch basin cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000, and handled as hazardous waste. In the absence of evidence of contamination, catch basin cleanings may be taken to a landfill or other facility permitted by MassDEP to accept solid waste, without any prior approval by MassDEP. However, some landfills require catch basin cleanings to be tested before they are accepted.

Sediment Forebay:
Sediment forebays should be readily accessible for maintenance and sediment removal. Inspect sediment forebays after each significant rainfall. Remove and properly dispose of sediment at least 2 times per year or when sediment deposits total approximately 12”. The effectiveness of a sediment forebay is based less on its size than on regular sediment removal. Place waste material in designated disposal areas. Smooth site to blend with surrounding area and stabilize. Clean or replace gravel when sediment pool does not drain properly. Stabilize the floor and sidewalls of the sediment forebay before making it operational, otherwise the practice will discharge excess amounts of suspended sediments. After removing the sediment, replace any vegetation damaged during the clean-out by reseeding. When reseeding, incorporate practices such as hydroseeding with a tackifier, blanket, or similar practice to ensure that no scour occurs in the forebay, while the seeds germinate and develop roots. Check embankment, emergency spillway, and outlet for erosion damage. Check embankment for: settlement, seepage, or slumping along the toe or around pipe. Look for signs of seepage or erosion. Repair immediately. Remove trash and other debris from principal spillway, emergency spillway, and pool area.

Rain Garden/ Bioretention:
Bioretention areas require careful attention while plants are being established and seasonal landscaping maintenance thereafter. Inspect pretreatment devices and bioretention cells regularly for sediment build-up, structural damage, and standing water. Inspect soil and repair eroded areas monthly. Re-mulch void areas as needed. Remove litter and debris monthly. Treat diseased vegetation as needed. Remove and replace dead vegetation twice per year (spring and fall). Proper selection of plant species and support during establishment of vegetation should minimize—if not eliminate—the need for fertilizers and pesticides. Remove invasive species as needed to prevent these species from spreading into the bioretention area. Replace mulch every two years, in the early spring. Upon failure, excavate bioretention area, scarify bottom and sides, replace filter fabric and soil, replant, and mulch. Because the soil medium filters contaminants from runoff, the cation exchange capacity of the soil media will eventually be exhausted. When

the cation exchange capacity of the soil media decreases, change the soil media to prevent contaminants from migrating to the groundwater, or from being discharged via an underdrain outlet. Using small shrubs and plants instead of larger trees will make it easier to replace the media with clean material when needed. Plant maintenance is critical. Concentrated salts in roadway runoff may kill plants, necessitating removal of dead vegetation each spring and replanting. Never store snow in bioretention areas.

Pipe Outfall/Rip Rap Apron/Level Spreader:
Inspect riprap outlet structures after heavy rains for erosion at sides and ends of apron and for stone displacement. Rock may need to be added if sediment builds up in the pore spaces of the outlet pad. Make repairs immediately using appropriate stone sizes. Do not place stones above finished grade. If erosion is occurring down gradient of the outfall, the down gradient vegetation is not stable and the area should be stabilized, the rip rap apron is not long or wide enough and needs to be increased, or the riprap stones are too small or not graded well. If movement of stone is occurring: riprap stones may be too small or not graded well, or the appropriate filter fabric may not be installed under riprap. If erosion occurs around apron and scour holes appear at outlet, foundation may not be excavated wide or deep enough. If erosion of the foundation is occurring, the appropriate filter fabric may not be installed under riprap.

Level spreaders should be inspected periodically and after every major storm. Any detrimental sediment accumulation should be removed. If rilling has taken place on the lip, the damage should be repaired and re-vegetated. Vegetation should be mowed occasionally to control weeds and encroachment of woody vegetation. Clippings should be removed and disposed of outside the spreader and away from the outlet area. Fertilization should be done as necessary to keep the vegetation healthy and dense. The spreader should be inspected after every runoff event to ensure that it is functioning correctly.

Interceptor Trench
Interceptor trenches are prone to failure due to clogging, it is imperative that they be aggressively maintained on a regular schedule. Using pretreatment BMPs will significantly reduce the maintenance requirements for the trench itself. Removing accumulated sediment from a deep sump catch basin or a vegetated filter strip is considerably less difficult and less costly than rehabilitating a trench. Perform preventive maintenance at least twice a year. Inspect and clean pretreatment BMPs every six months and after every major storm event (2 year return frequency). Check inlet and outlet pipes to determine if they are clogged. Remove accumulated sediment, trash, debris, leaves and grass clippings from mowing. Remove tree seedlings, before they become firmly established. Inspect the trench after the first several rainfall events, after all major storms, and on regularly scheduled dates every six months. If the top of the trench is grassed, it must be mowed on a seasonal basis. Grass height must be maintained to be no more than four inches. Routinely remove grass clippings leaves and accumulated sediment from the surface of the trench. Inspect the trench 24 hours or several days after a rain event, to look for ponded water. If there is ponded water at the surface of the trench, it is likely that the trench surface is clogged. To address surface clogging, remove and replace the topsoil or first layer of stone aggregate and the filter fabric. If water is ponded inside the trench, it may indicate that the bottom of the trench has failed. To rehabilitate a failed trench, all accumulated sediment must be stripped from the bottom, the bottom of the trench must be scarified and tilled to induce

infiltration, and all of the stone aggregate and filter fabric or media must be removed and replaced.

Rain Guardian

Rain Guardian pretreatment chambers simplify bioretention maintenance by collecting sand, leaves, grass clippings, and other debris in an easy to clean, confined location. Regularly maintaining the Rain Guardian sustains its functionality by maximizing storage and filtration capacities. Maintenance frequency is variable and depends on many factors such as rainfall frequency, drainage area size and land use type, and season of the year. Following rain events, inspect the pretreatment chamber for debris on the top grate, within the chamber, and on the vertical, drop-in filter wall. The maintenance steps described below should be completed if areas of the top grate are clogged, the chamber is >75% full, or the vertical filter wall is clogged. Maintenance should be completed when stormwater has completely drained from the bioretention practice. The filter wall allows the chamber to dry between rain events, which further simplifies maintenance by ensuring removed debris is largely dry. Ensure all debris collected during cleaning of the chamber is completely removed from the site and properly disposed of according to local environmental rules. Once cleaning is complete, reinstall the filter wall with filter fabric facing the inside of the chamber and replace the top grate.

Trench Drain

Maintenance frequency is variable and depends on many factors such as rainfall frequency, drainage area size and land use type, and season of the year. Perform preventive maintenance at least twice a year, inspect and clean the trench every six months. Following rain events, inspect the trench for debris on the top grate, within the chamber, and at the outlet. Check inlet and outlet pipes to determine if they are clogged. Remove accumulated sediment, trash, debris, leaves, grass clippings, etc. by hand, or with a pressure washer. Ensure all debris collected during cleaning of the chamber is completely removed from the site and properly disposed of according to local environmental rules. Once cleaning is complete, replace the top grate.

NON - STRUCTURAL STORM WATER MANAGEMENT CONTROLS / GOOD HOUSEKEEPING PRACTICES:

Invasive Species:

Basins, rain gardens, landscape areas, and common areas will be monitored for the presence of invasive species throughout the year. These areas will be kept free of invasive species utilizing best management practices for removal and disposal.

Retaining Walls:

Inspect retaining walls for leaning, undermining, and failure. Remove vegetation from retaining walls as necessary.

Wildlife Crossing Structure:

Inspect wildlife crossing structure opening and ensure they are not blocked or clogged with debris. Inspect natural light providing grates to ensure they are not clogged with debris. Clean the structure openings and grates as necessary. Ensure the natural substrate on the bottom of the structure is maintained and is not eroding or rutting. If erosion is observed, a paver style system may be necessary to lock natural soils within structure and stabilize surface.

Hay bales:
Inspect straw/hay bales before a forecasted storm event, immediately after each runoff producing rainfall and at least daily during prolonged rainfall. Ensure there are not gaps between bales or evidence of undermining. Close attention should be paid to the repair of damaged bales, undercutting beneath bales, and flow around the ends of the bales. Necessary repairs to barriers or replacement of bales should be accomplished promptly. Replace rotted or sediment covered bales as necessary. Sediment deposits should be checked after each runoff-producing rainfall. They must be removed when the level of deposition reaches approximately one-half the height of the barrier. Any sediment deposits remaining in place after the straw bale barrier is no longer required should be dressed to conform to the existing grade, prepared and seeded.

Silt Fence:
A sediment fence requires a great deal of maintenance. Silt fences should be inspected immediately after each rainfall and at least daily during prolonged rainfall. Remove accumulated sediment when it reaches one half the height of the sediment fence. Remove sediment deposits promptly to provide adequate storage volume for the next rain and to reduce pressure on fence. Take care to avoid undermining fence during cleanout. Sagging, frayed, torn, or otherwise damaged fabric should be repaired or replaced. Repair end runs and undercutting. Inspect reinforcement and staking materials for structural integrity, and replace when necessary. Sediment deposits remaining after the fabric has been removed should be graded to conform to the existing topography and vegetated.

Mulching:
Mulching shall be used in areas which cannot be seeded because of the season, or are otherwise unfavorable for plant growth (traffic and parking areas). When properly applied, mulch offers a fast, effective means of controlling erosion and dust. Soil surfaces should be roughened prior to mulching. Run track-mounted machinery up and down the slope in order to leave horizontal depressions in the soil running parallel to the slope. Roughened soil surfaces should be mulched and/or seeded as soon as possible. Ensure there is a continuous, uniform, even coverage. Ensure mulch layer is not so thick that it suppresses desired seed germination and plant growth. Ensure rilling or gullying does not occur beneath "binded" mulch. Replace or repair mulch if washed or blown away. On steep slopes and critical areas such as waterways, use netting or anchoring with mulch to hold it in place. Inspect after rainstorms to check for movement of mulch or erosion. If washout, breakage, or erosion occurs, repair surface, reseed, remulch, and install new netting. Straw or grass mulches that blow or wash away should be repaired promptly. Blanket mulch that is displaced by flowing water should be repaired as soon as possible. Continue inspections until vegetation is well established.

Temporary & Permanent Seeding
Well-established vegetation is widely considered the most effective form of erosion control. The presence of temporary or permanent cover will provide stabilization and erosion protection to disturbed areas. Temporary seed mixes contain annual vegetation that grows quickly and helps stabilize an area until permanent vegetation can be established. Proper soil bed preparation, seeding method and soil moisture are critical for successful seed application. Before planting,

scarify/roughen the soil surface and install appropriate surface drainage measures to prevent erosion and scouring. Seed with an approved conservation cover mix during the specified growing season, using native plant species. Seeding operations should be performed within one of the following periods: April 1 - May 31, August 1 - September 10, November 1 - December 15 as a dormant seeding (seeding rates shall be increased by 50% for dormant seeding). As needed, provide water, fertilizer, lime, and mulch to the seedbed. If it is unlikely that growth will occur due to cold weather, apply mulch for temporary stabilization. Inspect within 6 weeks of planting to see if stands are adequate. Check for damage after heavy rains. Stands should be uniform and dense. Fertilize, reseed, and mulch damaged and sparse areas immediately. Tack or tie down mulch as necessary. Seeds should be supplied with adequate moisture. Furnish water as needed, especially in abnormally hot or dry weather or on adverse sites. Water application rates should be controlled to prevent runoff. Inspect seeded areas for failure and make appropriate repairs and re-seed and re-plant as necessary. Inspect for bare spots, rilling, or gullying and correct as necessary. If stand has less than 40% cover, re-evaluate selection of seeding materials and quantities of fertilizer. Re-establish the stand following seedbed preparation and seeding recommendations. If the season prevents resowing, mulch or jute netting is an effective temporary cover. Lack of water may also be an issue. Conduct a follow up survey after one year and re-seed failed areas. Temporarily stabilized areas will require permanent stabilization when the area has been completed as designed or when the growing season begins.

Landscape & Parking Area Maintenance
Landscape areas shall be maintained in a neat and orderly fashion. Landscape maintenance debris shall not be deposited on adjacent properties and properly disposed of off-site as necessary to maintain a clean and orderly appearance. Parking Areas shall be inspected often and after significant rainfall events. Inspect for signs of erosion, rilling, gullying. Regrade and repair parking areas as necessary. If areas are needing constant maintenance apply mulch/wood chips to help prevent further erosion. Areas not used for parking or traffic should be seeded for stabilization. All parking areas should be stabilized prior to off season shutdown, preferably with a mulch application.

Fertilizer, Herbicide, and Pesticide Storage
Storage of all fertilizers, herbicides, and pesticides will be indoors. Use of all fertilizers, herbicides, and pesticides shall be in a manner consistent with the products intended use.

Waste Storage & Trash Removal
All waste products are to be stored indoors, under cover, or within a covered dumpster. Inspect on-site area for litter and trash on a weekly basis. Any accumulated trash, litter, and discarded materials in this area will be removed and will be disposed of at a suitable location on a weekly basis. The loading and dumpster areas throughout the site will be inspected on a daily basis for cardboard and/or paper products and will be inspected on a weekly basis for any accumulated trash, litter, and discarded material. Dumpster to be kept closed when not in use. Gates to the dumpster enclosure areas are proposed to be locked when not in use.

Hazardous Waste or Oil Spill Response Procedure

Initial Notification: In the event of a spill of hazardous waste or oil the facility manager or supervisor will be notified immediately by telephone.

Assessment – Initial Containment: The supervisor or manager will assess the incident and initiate control measures. The supervisor will first contact the Town of Sturbridge Fire Department and then notify the Town of Sturbridge. The Fire Department is ultimately responsible for matters of public health and safety and should be notified immediately.

Fire Department Telephone:	911 (Emergency) 508-347-2525 (Non-Emergency/Dispatch)
Police Department Telephone:	911 (Emergency) 508-347-2525 (Non-Emergency/Dispatch)

Further Notification: Based on the assessment by the Fire Chief, additional notification to a clean up contractor may be made. The Massachusetts Department of Environmental Protection and the EPA may be notified depending upon the nature and severity of the spill. The Fire Chief will be responsible for determining the level of clean up and notification required.

SNOW MANAGEMENT PLAN:

Snow plowing, blowing, and shoveling will be done to allow safe passage of interior roadways, emergency access roadway, as well as access to home sites and the common areas. No salt shall be used to treat unpaved areas during snow and ice conditions. Snow from lighter storms will be plowed to the perimeter of the roadways, sidewalks, driveways, and parking lots and allowed to melt to on-site ran gardens or infiltrations basins. Snow will be temporarily stock piled behind the clubhouse in the event that snow storage along roadways and driveways becomes an issue. If site snow storage interferes with site operations (i.e. blocking of travel aisles, sight distance, or parking) the snow pile will be either removed or reduced legally in a legal manner by the snow plow vendor within 24 hours. Snow shall not be stored directed in or on rain gardens.

Winter Road Salt & Sand Use Restrictions
Salt and sand for winter de-icing will only be stored indoors or under cover. Use of road salt and sand will only be used on a limited basis during the winter months to insure safe passage of roadways, driveways, pedestrian walkways, and parking areas. A reduced salt area shall be enforced along the roadways in close vicinity to vernal pools.

INSPECTIONS / RECORDKEEPING / TRAINING:

Routine Inspections

Routine inspections and maintenance to be conducted with the frequency described in this Operation and Maintenance Plan. An example inspection form is provided in **Attachment #2.**

Recordkeeping

Records of all drainage system inspections and maintenance shall be kept on file for a period of at least three (3) years and provided to the Town of Sturbridge upon request.

PUBLIC SAFETY FEATURES:

All cast iron storm water structure grates and covers shall be kept in good condition and kept closed at all times. Any damaged or broken structures will be replaced immediately upon discovery;

OPERATION AND MAINTENANCE BUDGET ESTIMATE:

The responsible party agrees to maintain an adequate annual budget to provide for the routine maintenance activities detailed in this document including but not limited to:

- Infiltration Basin Maintenance
- Rain Garden Maintenance
- Interceptor Trench Maintenance
- Rain Guardian Maintenance
- Deep Sump Hooded Catch Basin Maintenance
- Sediment Forebay Maintenance
- Pipe Outfall/ Rip Rap Apron/ Level Spreader Maintenance
- Landscape Maintenance
- Trash Removal
- Snow Plowing & Removal

Attachment #1

Operation & Maintenance (O & M)
Compliance Statement

Illicit Discharge Compliance Statement
Site Storm water Management System
Blueberry Hill Estates
Lot 3 Berry Farms Road, Sturbridge, MA

Property Owner/Responsible Party: Justin Stelmok
557 Southwest Cutoff
Worcester, MA 01607
Phone: (508) 832-5324 Office
Phone: (508) 868-3996 Cell

Storm water Management System Owner: **(same as above)**

Site subject to Wetlands Protection Act: **Yes**

The above listed Responsible Party is responsible for implementation of this "Long-Term Operation and Maintenance Plan" and certifies that:

- The site has been inspected for erosion and appropriate steps have been taken to permanently stabilize any eroded areas.
- All aspects of storm water BMPs have been inspected for damage, wear and malfunction, and appropriate steps have been taken to repair or replace the system or portions of the system so that the storm water at the site may be managed in accordance with the Stormwater Management Standards, revise date January 2, 2008.
- There is no record or knowledge of existing illicit discharges to the on-site stormwater management system.
- All "future property owners" must be notified of their continuing legal responsibility to operate and maintain the existing stormwater management system structures.
- The "Long-Term Operation and Maintenance Plan" for the storm water BMPs is being implemented.

Signature of Responsible Party:

______________________________ ______

Justin Stelmok Date

Attachment #2

Inspection & Maintenance Reports

Long-Term Operation and Maintenance Plan
Storm Water Management System

Lot 3 Berry Farms Road, Sturbridge, MA

INSPECTION AND MAINTENANCE REPORT FORM

Note: This Log should be copied prior to use. Note Additional Comments on back of Form.

Inspector's Name: ____________________ Date: ___________ Time: ________ am/pm
Inspector's Qualifications: ____
Days Since Last Rainfall: ______________ Amount of Last Rainfall: _______ inches

Item/Condition to be Checked	Maintenance Required		Corrective Action & Date
	No	Yes	
Infiltration Basin			
Deep Sump Hooded Catch Basin			
Sediment Forebay			
Rain Guardian			
Rain Garden			
Interceptor Trench			
Pipe Outfall/ Rip Rap Apron/ Level Spreader			
Trench Drain			
Landscaping / Trash Removal			
Invasive Species			
Snow Removal (seasonal)			
Retaining Walls			
Wildlife Crossing Structure			