STORMWATER ANALYSIS AND CALCULATIONS

for

THE VILLAGE AT SHEPLEY HILL
SAND HILL ROAD/LONGLEY ROAD
GROTON, MASSACHUSETTS

Prepared for:

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CALCULATION METHODS

- TR 20 SCS Unit Hydrograph Procedure

- Runoff Curve Numbers

- Time of Concentration by TR55 Methodology

- Reach and Pond Rating by the Storage-Indication Method

- Manning Equation

SOURCE OF DATA

- Technical Report No. 20

- Technical Report No. 55

- Partial Field Survey by MAI

- Massachusetts Stormwater Management Handbook, February 2008

REPORT SUMMARY:

Calculation Objectives

The objective of these calculations is to document that the proposed project described in the Stormwater Management Report does not result in an increase of offsite rates of runoff or flooding down gradient of the site. The analysis is separated into existing and proposed conditions. Watershed plans have been incorporated into this report to depict existing and proposed watershed areas.

Selection of Storm Events

The storm events have been compiled from the Soil Conservation Service Technical Report No. 55 and the U.S. Department of Commerce Technical Paper No. 40. Rainfall frequency data has been provided as follows:

Frequency (Years)	Rainfall [24-Hour Event (inches)]
2	3.1
10	4.5
25	5.3
100	6.5

Classification of Soils

Drainage classes have been established based on soil maps provided by U.S. Department of Agriculture Natural Resources Conservation Service Web Soil Survey as well as onsite soil testing. Soil maps and descriptions are part of "Soil Survey of Middlesex County". According to NRCS, the following soil types and hydrologic groups are delineated within the limit of the hydrologic study:

103: Chatfield-Hollis Rock outcrop - hydrologic soil group A
255: Windsor, loamy sand, sands - hydrologic soil group A
260: Sudbury, loamy sand, sands - hydrologic soil group B
305: Paxton, fine sandy loam - hydrologic soil group C
320: Birchwood, sands to sandy loam – hydrologic soil group A/D
420: Canton, sandy loam to loamy sands – hydrologic soil group B
422: Canton, sandy loam to loamy sands – hydrologic soil group B

Hydrologic soil groups are assigned to each soil type by NRCS based on their potential rate of water infiltration. Group A soils typically have a high infiltration rate when thoroughly wet and consist of deep well drained sands or gravelly sands. Group B soils typically have moderate infiltration rates when thoroughly wet and consist of loamy sands and sandy loams. Group C soils have slow infiltration rates when thoroughly wet and consist of silt loams and sandy clay loams. Group D soils have very slow infiltration rates when thoroughly wet. These soils 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.   A dual hydrologic group (A/D) the first letter is for drained areas and the second is for undrained areas. Only soils that in their natural condition are in group D are assigned dual classes. Soil testing performed throughout the locus property confirm the ratings based on evidence of sands, loamy sands, sandy loams and silt loam.

Existing Conditions Overview

The locus property is comprised of approximately 47.8± acres located at the intersection of Sand Hill Road and Longley Road. The locus is surrounded by residential properties with the exception of the western property line which abuts conservation land. The property is currently vacant woodlands and includes approximately 8 acres of bordering vegetated wetland interconnected and ultimately heading downgradient to the wetland on the conservation land to the west. Upland area from the existing roadways slopes up to the top of a hill running north through the site. Topography is mild at the top of the hill and bottom of the hill at about 5% with steeper side slopes to the west and east between 2:1 and 3:1.

For the purpose of analyzing existing and proposed stormwater runoff, a single design point has been designated for comparison. The design point selected is the bordering vegetated wetland on the conservation land to the west which is the culmination of stormwater runoff from the property either directly or from passing through the wetland on the locus. Stormwater contributing to this design point expands beyond the locus property and into neighboring residential developments. Three (3) watershed subcatchment areas have been delineated based on topography. For area outside of the locus property, topography and development has been compiled from the Town of Groton MapGeo GIS mapping.

Existing Design Point and Subcatchment Areas:

Design Point #1 selected is the bordering vegetated wetland on the conservation land to the west of the property. Stormwater runoff generated from each of the subcatchment areas is directed into overland directly to the wetland or culminates there via the existing wetland area onsite.

Subcatchment #1 splits the hill onsite and includes area on the western side of the property. Stormwater flows overland directly to the existing wetland on the conservation land.

Subcatchment #2 includes the remaining locus property on the east of the hill as well as a portion of offsite area which directs stormwater onto the locus property. Runoff is directed overland to the bordering vegetated wetland onsite. A stream bed runs throughout the wetland area downgradient to design point #1.

Subcatchment #3 is comprised of offsite properties along Longley Rd contributing stormwater to the locus. Stormwater runs overland to a depression and culvert on the east side of Longley Rd. The culvert passes under the roadway and discharges on the locus property into the existing wetland. From there, runoff follows the wetland downgradient to dp#1.

Proposed Conditions Overview

The applicant is proposing a 14 lot subdivision with one residential duplex dwelling per lot. Two roadways 20 feet wide are proposed, one from Sand Hill Road and one from Longley Road. The roadway from Longley will intersect near the midpoint of the other as it continues to a cul de sac near the top of the existing hill.

Revision - February 5, 2021:

The applicant has removed one lot (to 13 total) and one residential duplex dwelling from the project. In addition, the location of the cul de sac has been adjusted and the associated roadway length has been reduced by approximately 220'.

Stormwater Management:

This proposal utilizes low impact development strategies as well as conventional stormwater management techniques. Incorporated in this design are surface infiltration basins, subsurface infiltration facilities, vortex units and deep sump catchbasins for treatment and recharge of stormwater. Proposed surface infiltration basins have been located in various locations onsite in the most permeable soil conditions to promote a decentralized system. Design strategies for the stormwater systems follow methods from the Massachusetts Stormwater Handbook along with the Town of Groton Stormwater Design Criteria.

Surface Infiltration Basin

A surface infiltration basin is a stormwater runoff impoundment constructed over permeable soils which can provide storage and exfiltration of the required recharge volume. Mitigation of stormwater peak flows as well as treatment of the required water quality volume is also provided. The basin is comprised of a flat bottom and side slopes stabilized with a dense turf of water tolerant grass capable of surviving in both wet and dry conditions. This BMP achieves a TSS removal rate of 80%.

Subsurface Infiltration Facility:

Subsurface infiltration facilities have been incorporated into this design to provide recharge of stormwater from dwelling rooftops only. Each facility consists of plastic chambers with open bottoms placed atop a stone bed. Chambers are constructed to store stormwater temporarily and let it infiltrate into the underlying soil. A TSS removal rate of 80% is achieved by this BMP.

Contech CDS Water Quality Unit:

The Contech CDS is a continuous deflective separation technology which screens, separates and traps debris, sediment, oil and grease from stormwater runoff. Stormwater enters the diversion chamber where the diversion weir guides the flow into the unit's separation chamber. Swirl concentration and screen deflection force floatables and solids to the center of the separation chamber where floatables and neutrally buoyant debris larger than screen apertures are trapped. Stormwater then moves through the separation screen, under the oil baffle and exits the system. The separation screen remains clog free due to continuous deflection. This BMP

achieves a TSS Removal Rate of 80% based on required proprietary structure sizing calculations issued by MA DEP effective on October 15, 2013.

Deep Sump Catchbasin:

Similar to an ordinary catchbasin but fitted with an outlet hood to separate floatables such as oil, grease, trash and debris. They also have four foot deep sumps that promote settling of suspended solids. A TSS removal rate of 25% is achieved by this BMP.

Proposed Design Points and Subcatchment Areas

The design point remains the same in the existing and proposed conditions as the bordering vegetated wetland on the conservation land to the west of the property. The proposed project is divided into 18 subcatchment watershed areas. This includes existing subcatchment SC#3 (outside the locus property) which will remain the same in existing and proposed conditions. This subcatchment is listed with the same numeric configuration in both hydrologic models. General descriptions of the proposed subcatchment areas are as follows:

Several subcatchments act in a similar manner capturing stormwater runoff from the proposed roadways along with the front yards of several of the dwelling lots. Included are sc#10, #11, #16, #16a, and #20. Stormwater is directed overland from the yards or roadways into the conventional pipe system. Treatment is provided through catchbasins and vortex units before discharging to one of the 5 separate surface infiltration basins proposed onsite.

Six subcatchments (sc#12, #14, #19, #17, #22 and #26) are defined by area including one of the surface infiltration basins along with the areas which contribute overland flow to the basin. Each basin is proposed with an outlet control structure and emergency overflow weir ultimately discharging into the existing wetland area onsite.

Subcatchments #23-#24 are individual rooftop areas. The roof runoff from these subcatchments are directed into either a surface basin or subsurface infiltration system for recharge of the stormwater. Emergency overflow from these systems will discharge overland through wooded areas to the existing wetland onsite.

Subcatchments #13, 15, 18 & #21 are the remaining larger areas on the outer edges of the development and include offsite contributions. Stormwater from these areas flow overland towards one of the existing wetlands onsite.

<u>**Summary of Flows at All Design Points (CFS)**</u>

A detailed analysis of existing and proposed subcatchment areas, ponds, and reaches is included in the HydroCAD analysis section of this report.

Peak Discharge Rates in CFS (cubic feet per second):

	2-Year 24-Hour Storm Event	**10-Year 24-Hour Storm Event**	**25-Year 24 Hour Storm Event**	**100-Year 24-Hour Storm Event**
Existing	14.2 CFS	52.4 CFS	79.3 CFS	123.8 CFS
Proposed	12.9 CFS	44.1 CFS	66.6 CFS	105.4 CFS

Peak Discharge Volumes in AF (acre-feet):

	2-Year 24-Hour Storm Event	**10-Year 24-Hour Storm Event**	**25-Year 24 Hour Storm Event**	**100-Year 24-Hour Storm Event**
Existing	2.5 AF	6.5 AF	9.2 AF	13.6 AF
Proposed	2.5 AF	6.5 AF	9.1 AF	13.5 AF

Conclusion

The calculations indicate peak flows and volumes have been reduced for the 2-year, 10-year, 25-year and 100-year storm events. We can therefore anticipate no adverse impacts or downstream flooding with the completion of this project.

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EXISTING CONDITIONS
WATERSHED ROUTING DIAGRAM
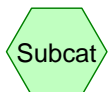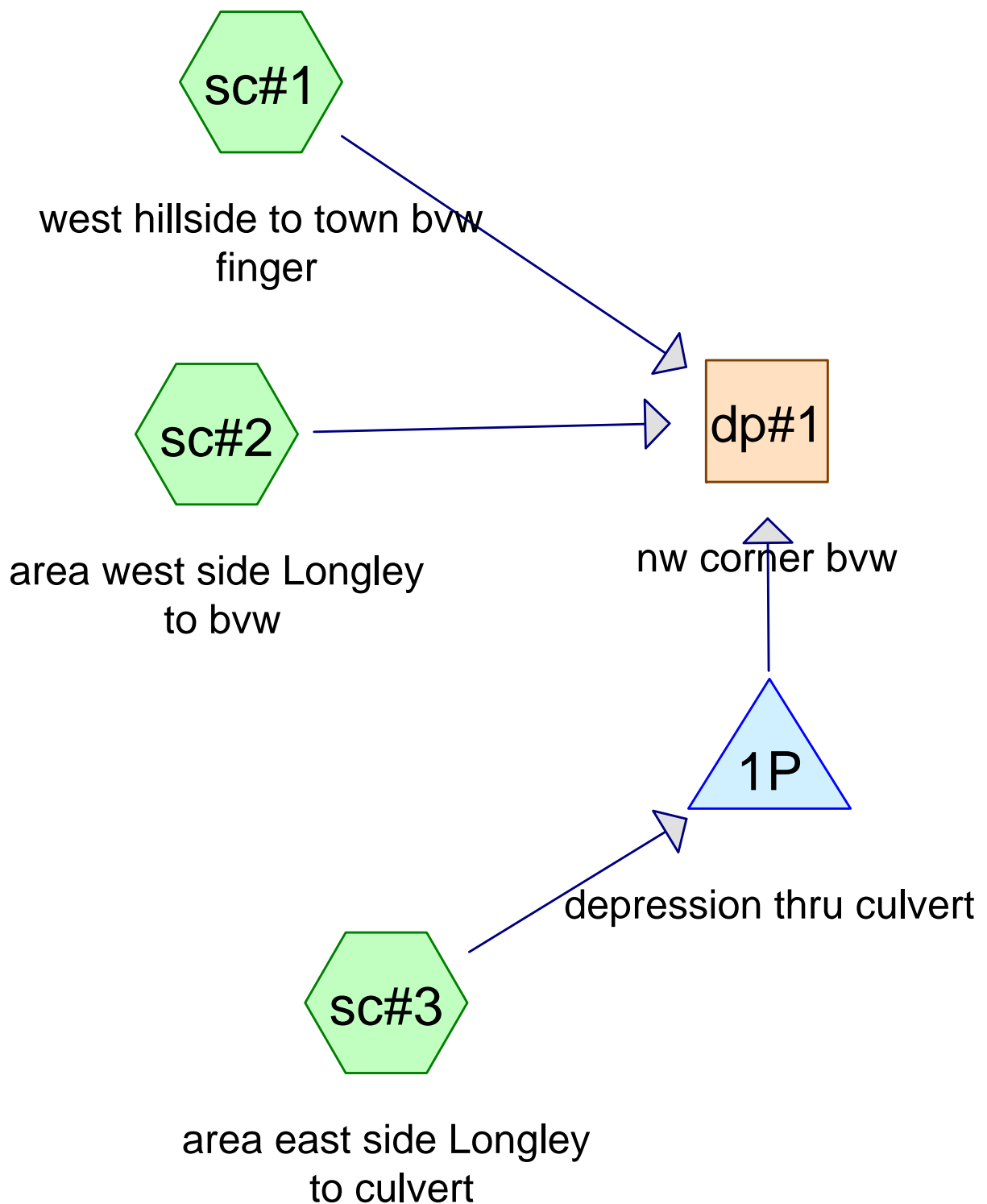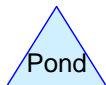
sc#1

west hillside to town bvw
finger

sc#2

area west side Longley
to bvw

dp#1

nw corner bvw

1P

depression thru culvert

sc#3

area east side Longley
to culvert

Subcat   Reach   Pond   Link

EXISTING CONDITIONS
2-YEAR 24-HOUR STORM EVENT ANALYSIS

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Type III 24-hr 2 YR Rainfall=3.10"
Printed 11/25/2020
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Summary for Subcatchment sc#1: west hillside to town bvw finger

Runoff   =   6.9 cfs @ 12.20 hrs, Volume=   0.75 af, Depth> 0.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

Area (sf)	CN	Description
48,455	30	Woods, Good, HSG A
555,195	70	Woods, Good, HSG C
15,860	77	Woods, Good, HSG D
619,510	67	Weighted Average
619,510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	50	0.0400	0.1		**Sheet Flow, top of hill**
					Woods: Light underbrush n= 0.400 P2= 3.10"
2.0	290	0.2400	2.4		**Shallow Concentrated Flow, overland downhill**
					Woodland Kv= 5.0 fps
1.1	85	0.0700	1.3		**Shallow Concentrated Flow, bottom hill to bvw**
					Woodland Kv= 5.0 fps
12.6	425	Total			

Summary for Subcatchment sc#2: area west side Longley to bvw

Runoff   =   8.5 cfs @ 12.40 hrs, Volume=   1.45 af, Depth> 0.37"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	361,025	98	BVW
*	20,730	98	impervious area
	93,765	51	1 acre lots, 20% imp, HSG A
	2,930	68	1 acre lots, 20% imp, HSG B
	672,425	30	Woods, Good, HSG A
	272,035	55	Woods, Good, HSG B
	400,935	70	Woods, Good, HSG C
	239,965	77	Woods, Good, HSG D
	2,063,810	60	Weighted Average
	1,662,716		80.57% Pervious Area
	401,094		19.43% Impervious Area

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Type III 24-hr 2 YR Rainfall=3.10"
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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0750	0.1		**Sheet Flow, overland from hill**
					Woods: Light underbrush n= 0.400 P2= 3.10"
4.1	475	0.1500	1.9		**Shallow Concentrated Flow, hill to bvw**
					Woodland Kv= 5.0 fps
5.8	525	0.0100	1.5		**Shallow Concentrated Flow, thru bvw**
					Grassed Waterway Kv= 15.0 fps
17.3	1,050	Total			

Summary for Subcatchment sc#3: area east side Longley to culvert

Runoff   =   1.9 cfs @   12.42 hrs, Volume=   0.31 af, Depth> 0.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	9,060	98	impervious area
	172,750	51	1 acre lots, 20% imp, HSG A
	223,820	68	1 acre lots, 20% imp, HSG B
	405,630	61	Weighted Average
	317,256		78.21% Pervious Area
	88,374		21.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	50	0.0300	0.1		**Sheet Flow, high elevation**
					Woods: Light underbrush n= 0.400 P2= 3.10"
3.6	285	0.0700	1.3		**Shallow Concentrated Flow, overland thru woods**
					Woodland Kv= 5.0 fps
3.4	345	0.0600	1.7		**Shallow Concentrated Flow, thru residential**
					Short Grass Pasture Kv= 7.0 fps
2.7	295	0.1300	1.8		**Shallow Concentrated Flow, woods to culvert**
					Woodland Kv= 5.0 fps
20.4	975	Total			

Summary for Reach dp#1: nw corner bvw

Inflow Area =   70.913 ac, 15.85% Impervious, Inflow Depth > 0.42"   for 2 YR event
Inflow   =   14.2 cfs @   12.33 hrs, Volume=   2.50 af
Outflow   =   14.2 cfs @   12.33 hrs, Volume=   2.50 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

6332-PRE
Type III 24-hr 2 YR Rainfall=3.10"
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Summary for Pond 1P: depression thru culvert

Inflow Area = 9.312 ac, 21.79% Impervious, Inflow Depth > 0.40" for 2 YR event
Inflow = 1.9 cfs @ 12.42 hrs, Volume= 0.31 af
Outflow = 1.1 cfs @ 12.79 hrs, Volume= 0.30 af, Atten= 43%, Lag= 22.3 min
Primary = 1.1 cfs @ 12.79 hrs, Volume= 0.30 af
Secondary = 0.0 cfs @ 0.00 hrs, Volume= 0.00 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 306.59' @ 12.79 hrs Surf.Area= 3,551 sf Storage= 2,252 cf

Plug-Flow detention time= 55.3 min calculated for 0.30 af (95% of inflow)
Center-of-Mass det. time= 31.7 min (959.8 - 928.1)

Volume	Invert	Avail.Storage	Storage Description
#1	305.90'	7,652 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)
305.90	3,000	260.0	0	0	3,000
306.90	3,815	284.0	3,399	3,399	4,074
307.90	4,705	308.0	4,252	7,652	5,243

Device	Routing	Invert	Outlet Devices
#1	Primary	305.90'	**12.0" Round Culvert - Longley** L= 44.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 305.90' / 305.40' S= 0.0114 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf
#2	Secondary	307.50'	**10.0' long x 1.0' breadth Broad-Crested Rectangular Weir - heads north alon** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=1.1 cfs @ 12.79 hrs HW=306.59' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert - Longley** (Barrel Controls 1.1 cfs @ 2.6 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=305.90' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir - heads north along Longley**(Controls 0.0 cfs)

EXISTING CONDITIONS
10-YEAR 24-HOUR STORM EVENT ANALYSIS

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Type III 24-hr 10 YR Rainfall=4.50"
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Summary for Subcatchment sc#1: west hillside to town bvw finger

Runoff   =   18.6 cfs @ 12.19 hrs, Volume=   1.73 af, Depth> 1.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

Area (sf)	CN	Description
48,455	30	Woods, Good, HSG A
555,195	70	Woods, Good, HSG C
15,860	77	Woods, Good, HSG D
619,510	67	Weighted Average
619,510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	50	0.0400	0.1		**Sheet Flow, top of hill**
					Woods: Light underbrush n= 0.400 P2= 3.10"
2.0	290	0.2400	2.4		**Shallow Concentrated Flow, overland downhill**
					Woodland Kv= 5.0 fps
1.1	85	0.0700	1.3		**Shallow Concentrated Flow, bottom hill to bvw**
					Woodland Kv= 5.0 fps
12.6	425	Total			

Summary for Subcatchment sc#2: area west side Longley to bvw

Runoff   =   34.2 cfs @ 12.28 hrs, Volume=   4.00 af, Depth> 1.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

	Area (sf)	CN	Description
*	361,025	98	BVW
*	20,730	98	impervious area
	93,765	51	1 acre lots, 20% imp, HSG A
	2,930	68	1 acre lots, 20% imp, HSG B
	672,425	30	Woods, Good, HSG A
	272,035	55	Woods, Good, HSG B
	400,935	70	Woods, Good, HSG C
	239,965	77	Woods, Good, HSG D
	2,063,810	60	Weighted Average
	1,662,716		80.57% Pervious Area
	401,094		19.43% Impervious Area

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Type III 24-hr 10 YR Rainfall=4.50"
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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0750	0.1		**Sheet Flow, overland from hill**
					Woods: Light underbrush n= 0.400 P2= 3.10"
4.1	475	0.1500	1.9		**Shallow Concentrated Flow, hill to bvw**
					Woodland Kv= 5.0 fps
5.8	525	0.0100	1.5		**Shallow Concentrated Flow, thru bvw**
					Grassed Waterway Kv= 15.0 fps
17.3	1,050	Total			

Summary for Subcatchment sc#3: area east side Longley to culvert

Runoff   =   6.8 cfs @   12.32 hrs, Volume=   0.83 af, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

	Area (sf)	CN	Description
*	9,060	98	impervious area
	172,750	51	1 acre lots, 20% imp, HSG A
	223,820	68	1 acre lots, 20% imp, HSG B
	405,630	61	Weighted Average
	317,256		78.21% Pervious Area
	88,374		21.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	50	0.0300	0.1		**Sheet Flow, high elevation**
					Woods: Light underbrush n= 0.400 P2= 3.10"
3.6	285	0.0700	1.3		**Shallow Concentrated Flow, overland thru woods**
					Woodland Kv= 5.0 fps
3.4	345	0.0600	1.7		**Shallow Concentrated Flow, thru residential**
					Short Grass Pasture Kv= 7.0 fps
2.7	295	0.1300	1.8		**Shallow Concentrated Flow, woods to culvert**
					Woodland Kv= 5.0 fps
20.4	975	Total			

Summary for Reach dp#1: nw corner bvw

Inflow Area =   70.913 ac, 15.85% Impervious, Inflow Depth >   1.10"   for 10 YR event
Inflow   =   52.4 cfs @   12.25 hrs, Volume=   6.49 af
Outflow   =   52.4 cfs @   12.25 hrs, Volume=   6.49 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: depression thru culvert

Inflow Area =   9.312 ac, 21.79% Impervious, Inflow Depth > 1.07"   for 10 YR event
Inflow   =   6.8 cfs @   12.32 hrs, Volume=   0.83 af
Outflow   =   4.9 cfs @   12.57 hrs, Volume=   0.81 af, Atten= 27%, Lag= 14.8 min
Primary   =   2.8 cfs @   12.57 hrs, Volume=   0.76 af
Secondary =   2.2 cfs @   12.57 hrs, Volume=   0.05 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 307.69' @ 12.57 hrs   Surf.Area= 4,507 sf   Storage= 6,667 cf

Plug-Flow detention time= 38.4 min calculated for 0.81 af (97% of inflow)
Center-of-Mass det. time= 24.8 min (914.9 - 890.1)

Volume	Invert	Avail.Storage	Storage Description
#1	305.90'	7,652 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)
305.90	3,000	260.0	0	0	3,000
306.90	3,815	284.0	3,399	3,399	4,074
307.90	4,705	308.0	4,252	7,652	5,243

Device	Routing	Invert	Outlet Devices
#1	Primary	305.90'	**12.0" Round Culvert - Longley** L= 44.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 305.90' / 305.40' S= 0.0114 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf
#2	Secondary	307.50'	**10.0' long x 1.0' breadth Broad-Crested Rectangular Weir - heads north alon** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=2.8 cfs @ 12.57 hrs HW=307.69' TW=0.00'   (Dynamic Tailwater)
└─**1=Culvert - Longley** (Barrel Controls 2.8 cfs @ 3.5 fps)

Secondary OutFlow Max=2.2 cfs @ 12.57 hrs HW=307.69'   (Free Discharge)
└─**2=Broad-Crested Rectangular Weir - heads north along Longley** (Weir Controls 2.2 cfs @ 1.2 fps)

EXISTING CONDITIONS
25-YEAR 24-HOUR STORM EVENT ANALYSIS

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Type III 24-hr 25 YR Rainfall=5.30"
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Summary for Subcatchment sc#1: west hillside to town bvw finger

Runoff   =   26.3 cfs @ 12.18 hrs, Volume=   2.38 af, Depth> 2.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

Area (sf)	CN	Description
48,455	30	Woods, Good, HSG A
555,195	70	Woods, Good, HSG C
15,860	77	Woods, Good, HSG D
619,510	67	Weighted Average
619,510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	50	0.0400	0.1		**Sheet Flow, top of hill** Woods: Light underbrush n= 0.400 P2= 3.10"
2.0	290	0.2400	2.4		**Shallow Concentrated Flow, overland downhill** Woodland Kv= 5.0 fps
1.1	85	0.0700	1.3		**Shallow Concentrated Flow, bottom hill to bvw** Woodland Kv= 5.0 fps
12.6	425	Total			

Summary for Subcatchment sc#2: area west side Longley to bvw

Runoff   =   53.2 cfs @ 12.26 hrs, Volume=   5.81 af, Depth> 1.47"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

	Area (sf)	CN	Description
*	361,025	98	BVW
*	20,730	98	impervious area
	93,765	51	1 acre lots, 20% imp, HSG A
	2,930	68	1 acre lots, 20% imp, HSG B
	672,425	30	Woods, Good, HSG A
	272,035	55	Woods, Good, HSG B
	400,935	70	Woods, Good, HSG C
	239,965	77	Woods, Good, HSG D
	2,063,810	60	Weighted Average
	1,662,716		80.57% Pervious Area
	401,094		19.43% Impervious Area

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Type III 24-hr 25 YR Rainfall=5.30"
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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0750	0.1		**Sheet Flow, overland from hill**
					Woods: Light underbrush n= 0.400 P2= 3.10"
4.1	475	0.1500	1.9		**Shallow Concentrated Flow, hill to bvw**
					Woodland Kv= 5.0 fps
5.8	525	0.0100	1.5		**Shallow Concentrated Flow, thru bvw**
					Grassed Waterway Kv= 15.0 fps
17.3	1,050	Total			

Summary for Subcatchment sc#3: area east side Longley to culvert

Runoff   =   10.4 cfs @ 12.31 hrs, Volume=   1.20 af, Depth> 1.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

	Area (sf)	CN	Description
*	9,060	98	impervious area
	172,750	51	1 acre lots, 20% imp, HSG A
	223,820	68	1 acre lots, 20% imp, HSG B
	405,630	61	Weighted Average
	317,256		78.21% Pervious Area
	88,374		21.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	50	0.0300	0.1		**Sheet Flow, high elevation**
					Woods: Light underbrush n= 0.400 P2= 3.10"
3.6	285	0.0700	1.3		**Shallow Concentrated Flow, overland thru woods**
					Woodland Kv= 5.0 fps
3.4	345	0.0600	1.7		**Shallow Concentrated Flow, thru residential**
					Short Grass Pasture Kv= 7.0 fps
2.7	295	0.1300	1.8		**Shallow Concentrated Flow, woods to culvert**
					Woodland Kv= 5.0 fps
20.4	975	Total			

Summary for Reach dp#1: nw corner bvw

Inflow Area =   70.913 ac, 15.85% Impervious, Inflow Depth > 1.55"   for 25 YR event
Inflow   =   79.3 cfs @ 12.24 hrs, Volume=   9.16 af
Outflow   =   79.3 cfs @ 12.24 hrs, Volume=   9.16 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Type III 24-hr 25 YR Rainfall=5.30"
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Summary for Pond 1P: depression thru culvert

Inflow Area =   9.312 ac, 21.79% Impervious, Inflow Depth > 1.54"   for 25 YR event
Inflow   =   10.4 cfs @ 12.31 hrs, Volume=   1.20 af
Outflow   =   9.4 cfs @ 12.42 hrs, Volume=   1.17 af, Atten= 10%, Lag= 6.8 min
Primary   =   3.0 cfs @ 12.42 hrs, Volume=   0.96 af
Secondary =   6.4 cfs @ 12.42 hrs, Volume=   0.21 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 307.88' @ 12.42 hrs   Surf.Area= 4,686 sf   Storage= 7,559 cf

Plug-Flow detention time= 32.3 min calculated for 1.17 af (98% of inflow)
Center-of-Mass det. time= 21.1 min (899.4 - 878.3)

Volume	Invert	Avail.Storage	Storage Description
#1	305.90'	7,652 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)
305.90	3,000	260.0	0	0	3,000
306.90	3,815	284.0	3,399	3,399	4,074
307.90	4,705	308.0	4,252	7,652	5,243

Device	Routing	Invert	Outlet Devices
#1	Primary	305.90'	**12.0" Round Culvert - Longley** L= 44.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 305.90' / 305.40' S= 0.0114 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf
#2	Secondary	307.50'	**10.0' long x 1.0' breadth Broad-Crested Rectangular Weir - heads north alon** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=3.0 cfs @ 12.42 hrs HW=307.88' TW=0.00'   (Dynamic Tailwater)
└─**1=Culvert - Longley** (Barrel Controls 3.0 cfs @ 3.8 fps)

Secondary OutFlow Max=6.4 cfs @ 12.42 hrs HW=307.88'   (Free Discharge)
└─**2=Broad-Crested Rectangular Weir - heads north along Longley**(Weir Controls 6.4 cfs @ 1.7 fps)

EXISTING CONDITIONS
100-YEAR 24-HOUR STORM EVENT ANALYSIS

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Type III 24-hr 100 YR Rainfall=6.50"
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Summary for Subcatchment sc#1: west hillside to town bvw finger

Runoff   =   38.8 cfs @ 12.18 hrs, Volume=   3.44 af, Depth> 2.90"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

Area (sf)	CN	Description
48,455	30	Woods, Good, HSG A
555,195	70	Woods, Good, HSG C
15,860	77	Woods, Good, HSG D
619,510	67	Weighted Average
619,510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.5	50	0.0400	0.1		**Sheet Flow, top of hill**
					Woods: Light underbrush n= 0.400 P2= 3.10"
2.0	290	0.2400	2.4		**Shallow Concentrated Flow, overland downhill**
					Woodland Kv= 5.0 fps
1.1	85	0.0700	1.3		**Shallow Concentrated Flow, bottom hill to bvw**
					Woodland Kv= 5.0 fps
12.6	425	Total			

Summary for Subcatchment sc#2: area west side Longley to bvw

Runoff   =   85.4 cfs @ 12.25 hrs, Volume=   8.87 af, Depth> 2.25"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

	Area (sf)	CN	Description
*	361,025	98	BVW
*	20,730	98	impervious area
	93,765	51	1 acre lots, 20% imp, HSG A
	2,930	68	1 acre lots, 20% imp, HSG B
	672,425	30	Woods, Good, HSG A
	272,035	55	Woods, Good, HSG B
	400,935	70	Woods, Good, HSG C
	239,965	77	Woods, Good, HSG D
	2,063,810	60	Weighted Average
	1,662,716		80.57% Pervious Area
	401,094		19.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	50	0.0750	0.1		**Sheet Flow, overland from hill**
					Woods: Light underbrush n= 0.400 P2= 3.10"
4.1	475	0.1500	1.9		**Shallow Concentrated Flow, hill to bvw**
					Woodland Kv= 5.0 fps
5.8	525	0.0100	1.5		**Shallow Concentrated Flow, thru bvw**
					Grassed Waterway Kv= 15.0 fps
17.3	1,050	Total			

Summary for Subcatchment sc#3: area east side Longley to culvert

Runoff   =   16.5 cfs @ 12.30 hrs, Volume=   1.81 af, Depth> 2.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

	Area (sf)	CN	Description
*	9,060	98	impervious area
	172,750	51	1 acre lots, 20% imp, HSG A
	223,820	68	1 acre lots, 20% imp, HSG B
	405,630	61	Weighted Average
	317,256		78.21% Pervious Area
	88,374		21.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	50	0.0300	0.1		**Sheet Flow, high elevation**
					Woods: Light underbrush n= 0.400 P2= 3.10"
3.6	285	0.0700	1.3		**Shallow Concentrated Flow, overland thru woods**
					Woodland Kv= 5.0 fps
3.4	345	0.0600	1.7		**Shallow Concentrated Flow, thru residential**
					Short Grass Pasture Kv= 7.0 fps
2.7	295	0.1300	1.8		**Shallow Concentrated Flow, woods to culvert**
					Woodland Kv= 5.0 fps
20.4	975	Total			

Summary for Reach dp#1: nw corner bvw

Inflow Area =   70.913 ac, 15.85% Impervious, Inflow Depth > 2.30"   for 100 YR event
Inflow   =   123.8 cfs @ 12.23 hrs, Volume=   13.56 af
Outflow   =   123.8 cfs @ 12.23 hrs, Volume=   13.56 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Type III 24-hr 100 YR Rainfall=6.50"
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Summary for Pond 1P: depression thru culvert

Inflow Area =		9.312 ac, 21.79% Impervious, Inflow Depth > 2.33" for 100 YR event				
Inflow	=	16.5 cfs @	12.30 hrs, Volume=	1.81 af		
Outflow	=	18.2 cfs @	12.31 hrs, Volume=	1.78 af,	Atten= 0%, Lag= 0.3 min	
Primary	=	3.3 cfs @	12.31 hrs, Volume=	1.25 af		
Secondary =		14.9 cfs @	12.31 hrs, Volume=	0.53 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 308.16' @ 12.31 hrs   Surf.Area= 4,705 sf   Storage= 7,652 cf

Plug-Flow detention time= 26.8 min calculated for 1.78 af (98% of inflow)
Center-of-Mass det. time= 17.8 min (883.5 - 865.7)

Volume	Invert	Avail.Storage	Storage Description
#1	305.90'	7,652 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)
305.90	3,000	260.0	0	0	3,000
306.90	3,815	284.0	3,399	3,399	4,074
307.90	4,705	308.0	4,252	7,652	5,243

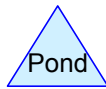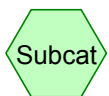| Device	Routing	Invert	Outlet Devices
#1	Primary	305.90'	**12.0" Round Culvert - Longley** L= 44.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 305.90' / 305.40' S= 0.0114 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf
#2	Secondary	307.50'	**10.0' long x 1.0' breadth Broad-Crested Rectangular Weir - heads north alon** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=3.3 cfs @ 12.31 hrs HW=308.16' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert - Longley** (Barrel Controls 3.3 cfs @ 4.1 fps)

Secondary OutFlow Max=14.9 cfs @ 12.31 hrs HW=308.16' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir - heads north along Longley**(Weir Controls 14.9 cfs @ 2.3 fps)

PROPOSED CONDITIONS
WATERSHED ROUTING DIAGRAM
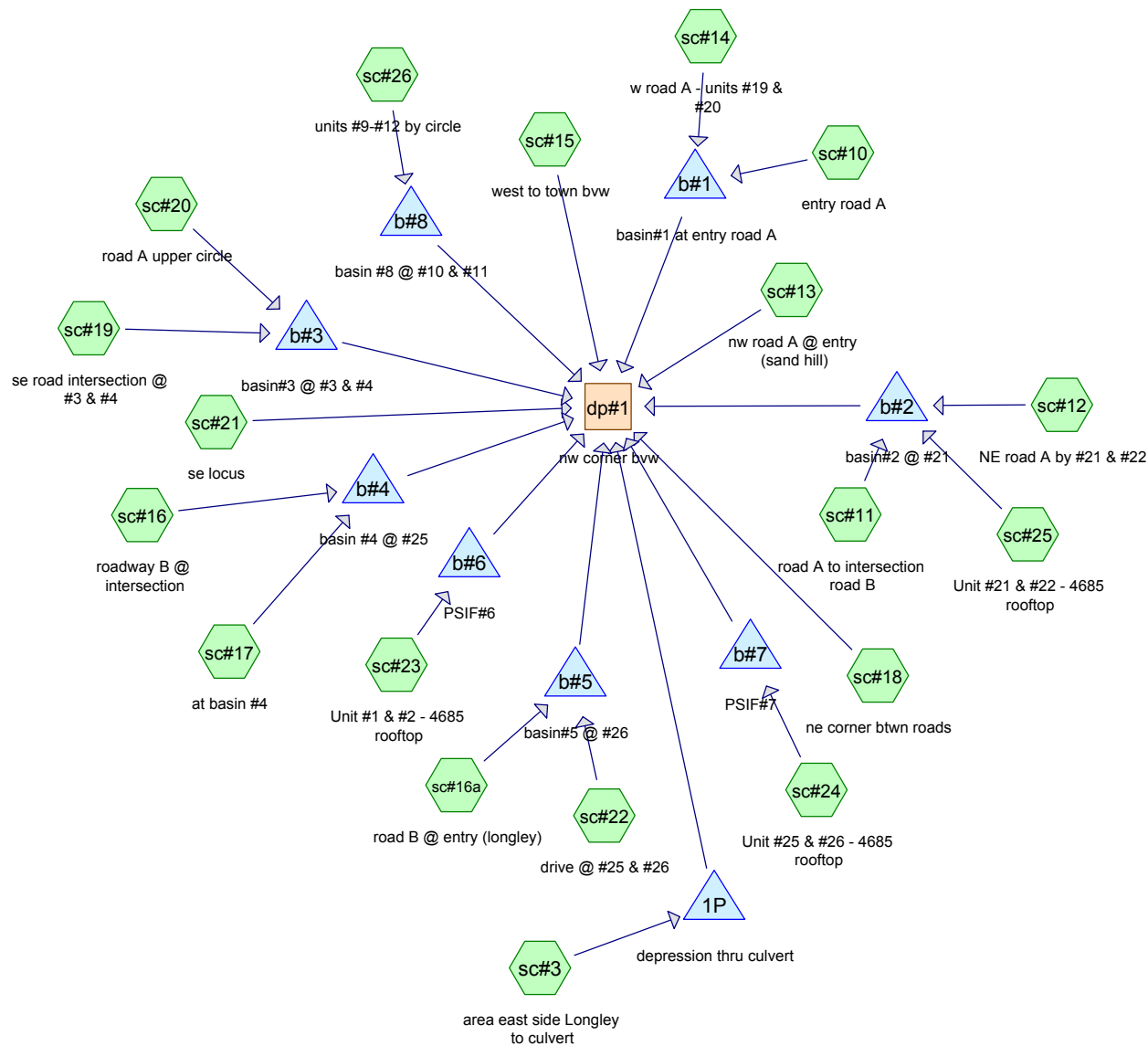
sc#14
w road A - units #19 & #20

sc#26
units #9-#12 by circle

sc#15
west to town bvw

sc#10
entry road A

b#1
basin#1 at entry road A

sc#20
road A upper circle

b#8
basin #8 @ #10 & #11

sc#19
se road intersection @ #3 & #4

b#3
basin#3 @ #3 & #4

sc#13
nw road A @ entry (sand hill)

sc#21
se locus

dp#1
nw corner bvw

b#2
basin#2 @ #21

sc#12
NE road A by #21 & #22

sc#16
roadway B @ intersection

b#4
basin #4 @ #25

sc#11

sc#25
Unit #21 & #22 - 4685 rooftop

sc#17
at basin #4

b#6
PSIF#6

sc#23
Unit #1 & #2 - 4685 rooftop

road A to intersection road B

b#7
PSIF#7

sc#18
ne corner btwn roads

b#5
basin#5 @ #26

sc#16a
road B @ entry (longley)

sc#22
drive @ #25 & #26

sc#24
Unit #25 & #26 - 4685 rooftop

1P
depression thru culvert

sc#3
area east side Longley to culvert

Subcat   Reach   Pond   Link

PROPOSED CONDITIONS
2-YEAR 24-HOUR STORM EVENT ANALYSIS

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Type III 24-hr 2 YR Rainfall=3.10"
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Summary for Subcatchment sc#10: entry road A

CN per Groton SH2O requirements

Runoff   =   1.0 cfs @ 12.08 hrs, Volume=   0.07 af, Depth> 2.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	13,405	98	impervious area
	1,105	68	<50% Grass cover, Poor, HSG A
	685	86	<50% Grass cover, Poor, HSG C
	15,195	95	Weighted Average
	1,790		11.78% Pervious Area
	13,405		88.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, roadway to cb**

Summary for Subcatchment sc#11: road A to intersection road B

CN per Groton SH2O requirements

Runoff   =   2.5 cfs @ 12.12 hrs, Volume=   0.21 af, Depth> 2.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	25,970	98	impervious area
	4,855	86	<50% Grass cover, Poor, HSG C
*	2,060	98	impervious area
	4,770	86	<50% Grass cover, Poor, HSG C
*	4,685	98	impervious area
	42,340	95	Weighted Average
	9,625		22.73% Pervious Area
	32,715		77.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0200	0.1		**Sheet Flow,**
					Grass: Dense n= 0.240 P2= 3.10"
0.3	58	0.1700	2.9		**Shallow Concentrated Flow, overland to roadway**
					Short Grass Pasture Kv= 7.0 fps
0.1	33	0.0850	5.9		**Shallow Concentrated Flow, roadway to cb**
					Paved Kv= 20.3 fps
8.7	141	Total			

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Type III 24-hr 2 YR Rainfall=3.10"
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Summary for Subcatchment sc#12: NE road A by #21 & #22

CN per Groton SH2O requirements

Runoff   =   0.5 cfs @ 12.10 hrs, Volume=   0.04 af, Depth> 0.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	1,705	98	impervious area
	6,465	68	<50% Grass cover, Poor, HSG A
	12,380	74	>75% Grass cover, Good, HSG C
	20,550	74	Weighted Average
	18,845		91.70% Pervious Area
	1,705		8.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.1200	0.2		**Sheet Flow, yard downgrade**
					Grass: Dense n= 0.240 P2= 3.10"
0.5	80	0.1350	2.6		**Shallow Concentrated Flow, overland to basin**
					Short Grass Pasture Kv= 7.0 fps
1.4					**Direct Entry, minimum tc**
6.0	130	Total			

Summary for Subcatchment sc#13: nw road A @ entry (sand hill)

CN per Groton SH2O requirements

Runoff   =   0.4 cfs @ 12.34 hrs, Volume=   0.08 af, Depth> 0.31"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	570	98	impervious area
	62,350	30	Woods, Good, HSG A
	33,455	77	Woods, Good, HSG D
	13,980	68	<50% Grass cover, Poor, HSG A
	2,525	86	<50% Grass cover, Poor, HSG C
*	23,180	98	BVW
	136,060	58	Weighted Average
	112,310		82.54% Pervious Area
	23,750		17.46% Impervious Area

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Type III 24-hr 2 YR Rainfall=3.10"
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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1200	0.1		**Sheet Flow, woods edge**
					Woods: Light underbrush n= 0.400 P2= 3.10"
0.7	105	0.2700	2.6		**Shallow Concentrated Flow, to bvw and stream**
					Woodland Kv= 5.0 fps
3.0	266	0.0100	1.5		**Shallow Concentrated Flow, thru bvw**
					Grassed Waterway Kv= 15.0 fps
9.8	421	Total			

Summary for Subcatchment sc#14: w road A - units #19 & #20

CN per Groton SH2O requirements

Runoff   =   0.7 cfs @ 12.09 hrs, Volume=   0.05 af, Depth> 1.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	6,125	98	impervious area
	8,050	68	<50% Grass cover, Poor, HSG A
	2,985	86	<50% Grass cover, Poor, HSG C
	17,160	82	Weighted Average
	11,035		64.31% Pervious Area
	6,125		35.69% Impervious Area

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

Summary for Subcatchment sc#15: west to town bvw

CN per Groton SH2O requirements

Runoff   =   9.0 cfs @ 12.12 hrs, Volume=   0.77 af, Depth> 0.77"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	10,500	98	impervious area
	48,455	30	Woods, Good, HSG A
	333,805	70	Woods, Good, HSG C
	16,120	77	Woods, Good, HSG D
	111,985	86	<50% Grass cover, Poor, HSG C
	520,865	70	Weighted Average
	510,365		97.98% Pervious Area
	10,500		2.02% Impervious Area

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Type III 24-hr 2 YR Rainfall=3.10"
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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.2		**Sheet Flow, woods**
					Woods: Light underbrush n= 0.400 P2= 3.10"
2.1	290	0.2200	2.3		**Shallow Concentrated Flow, overland to bvw**
					Woodland Kv= 5.0 fps
7.6	340	Total			

Summary for Subcatchment sc#16: roadway B @ intersection

CN per Groton SH2O requirements

Runoff   =   1.3 cfs @ 12.08 hrs, Volume=   0.10 af, Depth> 2.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	14,215	98	impervious area
	2,140	79	<50% Grass cover, Poor, HSG B
	4,365	86	<50% Grass cover, Poor, HSG C
	20,720	94	Weighted Average
	6,505		31.39% Pervious Area
	14,215		68.61% Impervious Area

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

Summary for Subcatchment sc#16a: road B @ entry (longley)

Runoff   =   2.4 cfs @ 12.09 hrs, Volume=   0.17 af, Depth> 1.75"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	21,875	98	impervious area
	6,340	68	<50% Grass cover, Poor, HSG A
	23,750	79	<50% Grass cover, Poor, HSG B
	51,965	86	Weighted Average
	30,090		57.90% Pervious Area
	21,875		42.10% Impervious Area

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

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Type III 24-hr 2 YR Rainfall=3.10"
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Summary for Subcatchment sc#17: at basin #4

CN per Groton SH2O requirements

Runoff   =   0.7 cfs @   12.09 hrs, Volume=   0.05 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	1,245	98	impervious area
	19,995	79	<50% Grass cover, Poor, HSG B
	21,240	80	Weighted Average
	19,995		94.14% Pervious Area
	1,245		5.86% Impervious Area

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

Summary for Subcatchment sc#18: ne corner btwn roads

CN per Groton SH2O requirements

Runoff   =   5.3 cfs @   12.30 hrs, Volume=   0.66 af, Depth> 0.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	16,540	98	impervious area
	60,600	51	1 acre lots, 20% imp, HSG A
	122,980	30	Woods, Good, HSG A
	33,600	55	Woods, Good, HSG B
	30,185	70	Woods, Good, HSG C
	93,990	77	Woods, Good, HSG D
	24,860	68	<50% Grass cover, Poor, HSG A
	18,840	79	<50% Grass cover, Poor, HSG B
	42,475	86	<50% Grass cover, Poor, HSG C
*	105,090	98	BVW
	549,160	67	Weighted Average
	415,410		75.64% Pervious Area
	133,750		24.36% Impervious Area

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Type III 24-hr 2 YR Rainfall=3.10"
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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0700	0.1		**Sheet Flow, edge woods**
					Woods: Light underbrush n= 0.400 P2= 3.10"
2.5	200	0.0700	1.3		**Shallow Concentrated Flow, to bvw**
					Woodland Kv= 5.0 fps
2.3	360	0.0300	2.6		**Shallow Concentrated Flow, leg bvw**
					Grassed Waterway Kv= 15.0 fps
5.8	525	0.0100	1.5		**Shallow Concentrated Flow, thru bvw**
					Grassed Waterway Kv= 15.0 fps
18.2	1,135	Total			

Summary for Subcatchment sc#19: se road intersection @ #3 & #4

CN per Groton SH2O requirements

Runoff   =   2.3 cfs @ 12.11 hrs, Volume=   0.18 af, Depth> 1.82"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	8,190	98	impervious area
	6,950	79	<50% Grass cover, Poor, HSG B
	35,225	86	<50% Grass cover, Poor, HSG C
	50,365	87	Weighted Average
	42,175		83.74% Pervious Area
	8,190		16.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.0400	0.1		**Sheet Flow, knob**
					Grass: Dense n= 0.240 P2= 3.10"
1.2	235	0.2300	3.4		**Shallow Concentrated Flow, overland yard to basin**
					Short Grass Pasture Kv= 7.0 fps
7.5	285	Total			

Summary for Subcatchment sc#20: road A upper circle

CN per Groton SH2O requirements

Runoff   =   4.7 cfs @ 12.09 hrs, Volume=   0.35 af, Depth> 2.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	23,900	98	impervious area
	14,500	86	<50% Grass cover, Poor, HSG C
*	11,705	98	impervious area
	18,340	86	<50% Grass cover, Poor, HSG C
*	4,685	98	impervious area
*	4,065	98	impervious area
	77,195	93	Weighted Average
	32,840		42.54% Pervious Area
	44,355		57.46% Impervious Area

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

Summary for Subcatchment sc#21: se locus

CN per Groton SH2O requirements

Runoff   =   3.0 cfs @ 12.58 hrs, Volume=   0.64 af, Depth> 0.30"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	13,975	98	impervious area
	33,165	51	1 acre lots, 20% imp, HSG A
	2,930	68	1 acre lots, 20% imp, HSG B
	463,470	30	Woods, Good, HSG A
	97,000	55	Woods, Good, HSG B
	147,970	70	Woods, Good, HSG C
	27,315	77	Woods, Good, HSG D
	16,595	68	<50% Grass cover, Poor, HSG A
	29,185	79	<50% Grass cover, Poor, HSG B
	39,985	86	<50% Grass cover, Poor, HSG C
*	230,400	98	bvw
	1,101,990	58	Weighted Average
	850,396		77.17% Pervious Area
	251,594		22.83% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.1500	0.1		**Sheet Flow, offsite knob**
					Woods: Light underbrush n= 0.400 P2= 3.10"
3.7	430	0.1500	1.9		**Shallow Concentrated Flow, overland to bvw**
					Woodland Kv= 5.0 fps
1.2	280	0.0700	4.0		**Shallow Concentrated Flow, bvw to stream by road**
					Grassed Waterway Kv= 15.0 fps
9.5	1,050	0.0150	1.8		**Shallow Concentrated Flow, stream thru bvw to crossing**
					Grassed Waterway Kv= 15.0 fps
5.8	525	0.0100	1.5		**Shallow Concentrated Flow, thru bvw**
					Grassed Waterway Kv= 15.0 fps
25.8	2,335	Total			

Summary for Subcatchment sc#22: drive @ #25 & #26

CN per Groton SH2O requirements

Runoff   =   0.4 cfs @ 12.09 hrs, Volume=   0.03 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	1,985	98	impervious area
	2,680	68	<50% Grass cover, Poor, HSG A
	5,860	79	<50% Grass cover, Poor, HSG B
	10,525	80	Weighted Average
	8,540		81.14% Pervious Area
	1,985		18.86% Impervious Area

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

Summary for Subcatchment sc#23: Unit #1 & #2 - 4685 rooftop

Runoff   =   0.3 cfs @ 12.08 hrs, Volume=   0.03 af, Depth> 2.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	4,685	98	impervious area
	4,685		100.00% Impervious Area

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Type III 24-hr 2 YR Rainfall=3.10"
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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, minimum tc**

Summary for Subcatchment sc#24: Unit #25 & #26 - 4685 rooftop

Runoff   =   0.3 cfs @ 12.08 hrs, Volume=   0.03 af, Depth> 2.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	4,685	98	impervious area
	4,685		100.00% Impervious Area

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

Summary for Subcatchment sc#25: Unit #21 & #22 - 4685 rooftop

Runoff   =   0.3 cfs @ 12.08 hrs, Volume=   0.03 af, Depth> 2.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	4,685	98	impervious area
	4,685		100.00% Impervious Area

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

Summary for Subcatchment sc#26: units #9-#12 by circle

Runoff   =   1.9 cfs @ 12.09 hrs, Volume=   0.14 af, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	12,190	98	impervious area
	22,345	86	<50% Grass cover, Poor, HSG C
	34,535	90	Weighted Average
	22,345		64.70% Pervious Area
	12,190		35.30% Impervious Area

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

Summary for Subcatchment sc#3: area east side Longley to culvert

Runoff   =   1.9 cfs @ 12.42 hrs, Volume=   0.31 af, Depth> 0.40"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.10"

	Area (sf)	CN	Description
*	9,060	98	impervious area
	172,750	51	1 acre lots, 20% imp, HSG A
	223,820	68	1 acre lots, 20% imp, HSG B
	405,630	61	Weighted Average
	317,256		78.21% Pervious Area
	88,374		21.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	50	0.0300	0.1		**Sheet Flow, high elevation** Woods: Light underbrush n= 0.400 P2= 3.10"
3.6	285	0.0700	1.3		**Shallow Concentrated Flow, overland thru woods** Woodland Kv= 5.0 fps
3.4	345	0.0600	1.7		**Shallow Concentrated Flow, thru residential** Short Grass Pasture Kv= 7.0 fps
2.7	295	0.1300	1.8		**Shallow Concentrated Flow, woods to culvert** Woodland Kv= 5.0 fps
20.4	975				Total

Summary for Reach dp#1: nw corner bvw

Inflow Area =   70.926 ac, 22.01% Impervious, Inflow Depth > 0.43"   for 2 YR event
Inflow   =   12.9 cfs @ 12.35 hrs, Volume=   2.51 af
Outflow   =   12.9 cfs @ 12.35 hrs, Volume=   2.51 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: depression thru culvert

Inflow Area =   9.312 ac, 21.79% Impervious, Inflow Depth > 0.40"   for 2 YR event
Inflow   =   1.9 cfs @ 12.42 hrs, Volume=   0.31 af
Outflow   =   1.1 cfs @ 12.79 hrs, Volume=   0.30 af, Atten= 43%, Lag= 22.3 min
Primary   =   1.1 cfs @ 12.79 hrs, Volume=   0.30 af
Secondary =   0.0 cfs @   0.00 hrs, Volume=   0.00 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Peak Elev= 306.59' @ 12.79 hrs   Surf.Area= 3,551 sf   Storage= 2,252 cf

Plug-Flow detention time= 55.3 min calculated for 0.30 af (95% of inflow)
Center-of-Mass det. time= 31.7 min (959.8 - 928.1)

Volume	Invert	Avail.Storage	Storage Description
#1	305.90'	7,652 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)
305.90	3,000	260.0	0	0	3,000
306.90	3,815	284.0	3,399	3,399	4,074
307.90	4,705	308.0	4,252	7,652	5,243

Device	Routing	Invert	Outlet Devices
#1	Primary	305.90'	**12.0" Round Culvert - Longley** L= 44.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 305.90' / 305.40' S= 0.0114 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf
#2	Secondary	307.50'	**10.0' long x 1.0' breadth Broad-Crested Rectangular Weir - heads north along** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=1.1 cfs @ 12.79 hrs HW=306.59' TW=0.00'   (Dynamic Tailwater)
└─**1=Culvert - Longley** (Barrel Controls 1.1 cfs @ 2.6 fps)

Secondary OutFlow Max=0.0 cfs @ 0.00 hrs HW=305.90'   (Free Discharge)
└─**2=Broad-Crested Rectangular Weir - heads north along Longley** (Controls 0.0 cfs)

Summary for Pond b#1: basin#1 at entry road A

Inflow Area =	0.743 ac, 60.36% Impervious, Inflow Depth > 1.97" for 2 YR event			
Inflow =	1.7 cfs @ 12.09 hrs, Volume=	0.12 af		
Outflow =	0.3 cfs @ 12.55 hrs, Volume=	0.12 af,	Atten= 82%,	Lag= 27.5 min
Discarded =	0.3 cfs @ 12.55 hrs, Volume=	0.12 af		
Primary =	0.0 cfs @ 0.00 hrs, Volume=	0.00 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 251.14' @ 12.55 hrs   Surf.Area= 1,595 sf   Storage= 1,518 cf

Plug-Flow detention time= 34.1 min calculated for 0.12 af (100% of inflow)
Center-of-Mass det. time= 34.0 min (837.2 - 803.2)

Volume	Invert	Avail.Storage	Storage Description
#1	250.00'	8,286 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)
250.00	1,085	128.0	0	0	1,085
252.00	2,045	174.0	3,080	3,080	2,231
254.00	3,205	211.0	5,207	8,286	3,428

Device	Routing	Invert	Outlet Devices
#1	Discarded	250.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	253.00'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68
			2.72 2.81 2.92 2.97 3.07 3.32
#3	Primary	251.50'	**12.0" Round Culvert**
			L= 20.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 251.50' / 251.00' S= 0.0250 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Device 3	252.00'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.3 cfs @ 12.55 hrs HW=251.14' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.3 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=250.00' TW=0.00' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)
└─**3=Culvert** (Controls 0.0 cfs)
  └─**4=Orifice/Grate** (Controls 0.0 cfs)

Summary for Pond b#2: basin#2 @ #21

Inflow Area =	1.551 ac, 57.87% Impervious, Inflow Depth > 2.09" for 2 YR event	
Inflow =	3.3 cfs @ 12.11 hrs, Volume=	0.27 af
Outflow =	0.6 cfs @ 12.58 hrs, Volume=	0.27 af, Atten= 81%, Lag= 28.4 min
Discarded =	0.6 cfs @ 12.58 hrs, Volume=	0.27 af
Primary =	0.0 cfs @ 0.00 hrs, Volume=	0.00 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 261.11' @ 12.58 hrs   Surf.Area= 3,313 sf Storage= 3,258 cf

Plug-Flow detention time= 32.8 min calculated for 0.27 af (100% of inflow)
Center-of-Mass det. time= 32.7 min (825.0 - 792.3)

Volume	Invert	Avail.Storage	Storage Description
#1	260.00'	15,995 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)
260.00	2,585	211.0	0	0	2,585
262.00	3,965	249.0	6,501	6,501	4,050
264.00	5,575	286.0	9,494	15,995	5,714

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Device	Routing	Invert	Outlet Devices
#1	Discarded	260.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	263.00'	**8.0' long x 3.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68
			2.72 2.81 2.92 2.97 3.07 3.32
#3	Primary	260.70'	**12.0" Round Culvert**
			L= 35.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 260.70' / 260.00' S= 0.0200 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Device 3	262.00'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.6 cfs @ 12.58 hrs HW=261.11' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.6 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=260.00' TW=0.00' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)
└─**3=Culvert** (Controls 0.0 cfs)
  └─**4=Orifice/Grate** (Controls 0.0 cfs)

Summary for Pond b#3: basin#3 @ #3 & #4

Inflow Area =		2.928 ac, 41.19% Impervious, Inflow Depth > 2.14" for 2 YR event		
Inflow	=	7.0 cfs @ 12.09 hrs, Volume=	0.52 af	
Outflow	=	1.3 cfs @ 12.56 hrs, Volume=	0.52 af, Atten= 82%, Lag= 28.1 min	
Discarded	=	1.3 cfs @ 12.56 hrs, Volume=	0.52 af	
Primary	=	0.0 cfs @ 0.00 hrs, Volume=	0.00 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 287.07' @ 12.56 hrs Surf.Area= 6,609 sf Storage= 6,487 cf

Plug-Flow detention time= 33.2 min calculated for 0.52 af (100% of inflow)
Center-of-Mass det. time= 33.0 min (835.5 - 802.4)

Volume	Invert	Avail.Storage	Storage Description
#1	286.00'	30,774 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)
286.00	5,480	345.0	0	0	5,480
288.00	7,665	383.0	13,084	13,084	7,799
290.00	10,080	421.0	17,690	30,774	10,359

Device	Routing	Invert	Outlet Devices
#1	Discarded	286.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	289.00'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68
			2.72 2.81 2.92 2.97 3.07 3.32

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#3	Primary	287.00'	**12.0" Round Culvert**
			L= 40.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 287.00' / 286.50' S= 0.0125 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Device 3	287.50'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=1.3 cfs @ 12.56 hrs HW=287.07' (Free Discharge)
└—**1=Exfiltration** (Exfiltration Controls 1.3 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=286.00' TW=0.00' (Dynamic Tailwater)
├—**2=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)
└—**3=Culvert** (Controls 0.0 cfs)
  └—**4=Orifice/Grate** (Controls 0.0 cfs)

Summary for Pond b#4: basin #4 @ #25

Inflow Area =	0.963 ac, 36.84% Impervious, Inflow Depth > 1.88" for 2 YR event		
Inflow =	2.1 cfs @ 12.09 hrs, Volume=	0.15 af	
Outflow =	0.1 cfs @ 14.33 hrs, Volume=	0.12 af, Atten= 94%, Lag= 134.6 min	
Discarded =	0.1 cfs @ 14.33 hrs, Volume=	0.12 af	
Primary =	0.0 cfs @ 0.00 hrs, Volume=	0.00 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 264.09' @ 14.33 hrs Surf.Area= 2,062 sf Storage= 3,256 cf

Plug-Flow detention time= 266.6 min calculated for 0.12 af (80% of inflow)
Center-of-Mass det. time= 189.2 min (996.8 - 807.6)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	8,201 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)
262.00	1,100	135.0	0	0	1,100
264.00	2,015	172.0	3,069	3,069	2,055
266.00	3,160	210.0	5,132	8,201	3,271

Device	Routing	Invert	Outlet Devices
#1	Discarded	262.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	265.00'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68
			2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.1 cfs @ 14.33 hrs HW=264.09' (Free Discharge)
└—**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=262.00' TW=0.00' (Dynamic Tailwater)
└—**2=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)

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Summary for Pond b#5: basin#5 @ #26

Inflow Area =   1.435 ac, 38.18% Impervious, Inflow Depth > 1.68"   for 2 YR event
Inflow   =   2.8 cfs @ 12.09 hrs, Volume=   0.20 af
Outflow   =   0.6 cfs @ 12.53 hrs, Volume=   0.16 af, Atten= 80%, Lag= 26.8 min
Discarded   =   0.1 cfs @ 12.53 hrs, Volume=   0.12 af
Primary   =   0.5 cfs @ 12.53 hrs, Volume=   0.04 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 253.57' @ 12.53 hrs   Surf.Area= 2,121 sf   Storage= 3,742 cf

Plug-Flow detention time= 217.3 min calculated for 0.16 af (79% of inflow)
Center-of-Mass det. time= 136.7 min (962.7 - 825.9)

Volume	Invert	Avail.Storage	Storage Description		
#1	251.00'	7,373 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)
251.00	860	128.0	0	0	860
253.00	1,815	177.0	2,616	2,616	2,088
255.00	2,990	215.0	4,756	7,373	3,336

Device	Routing	Invert	Outlet Devices
#1	Discarded	251.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	254.00'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68
			2.72 2.81 2.92 2.97 3.07 3.32
#3	Primary	252.50'	**12.0" Round Culvert**
			L= 20.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 252.50' / 252.00' S= 0.0250 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Device 3	253.30'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.1 cfs @ 12.53 hrs HW=253.57' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=0.5 cfs @ 12.53 hrs HW=253.57' TW=0.00' (Dynamic Tailwater)
├**2=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)
└**3=Culvert** (Passes 0.5 cfs of 2.9 cfs potential flow)
  └**4=Orifice/Grate** (Orifice Controls 0.5 cfs @ 1.7 fps)

Summary for Pond b#6: PSIF#6

Inflow Area =   0.108 ac, 100.00% Impervious, Inflow Depth > 2.87"   for 2 YR event
Inflow   =   0.3 cfs @ 12.08 hrs, Volume=   0.03 af
Outflow   =   0.0 cfs @ 11.56 hrs, Volume=   0.03 af, Atten= 91%, Lag= 0.0 min
Discarded   =   0.0 cfs @ 11.56 hrs, Volume=   0.03 af
Primary   =   0.0 cfs @   0.00 hrs, Volume=   0.00 af

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 1.22' @ 12.97 hrs   Surf.Area= 504 sf   Storage= 396 cf

Plug-Flow detention time= 99.5 min calculated for 0.03 af (100% of inflow)
Center-of-Mass det. time= 99.4 min (855.9 - 756.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	446 cf	**20.58'W x 24.50'L x 3.54'H Field A** 1,786 cf Overall - 671 cf Embedded = 1,115 cf x 40.0% Voids
#2A	0.50'	671 cf	**Cultec R-330XL** x 12 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		1,117 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**2.400 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	3.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.0 cfs @ 11.56 hrs HW=0.04'   (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=0.00' TW=0.00'   (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 0.0 cfs)

Summary for Pond b#7: PSIF#7

Inflow Area =	0.108 ac,100.00% Impervious,	Inflow Depth > 2.87"	for 2 YR event
Inflow =	0.3 cfs @ 12.08 hrs, Volume=	0.03 af	
Outflow =	0.0 cfs @ 11.56 hrs, Volume=	0.03 af,	Atten= 91%, Lag= 0.0 min
Discarded =	0.0 cfs @ 11.56 hrs, Volume=	0.03 af	
Primary =	0.0 cfs @ 0.00 hrs, Volume=	0.00 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 1.22' @ 12.97 hrs   Surf.Area= 504 sf   Storage= 396 cf

Plug-Flow detention time= 99.5 min calculated for 0.03 af (100% of inflow)
Center-of-Mass det. time= 99.4 min (855.9 - 756.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	446 cf	**20.58'W x 24.50'L x 3.54'H Field A** 1,786 cf Overall - 671 cf Embedded = 1,115 cf x 40.0% Voids
#2A	0.50'	671 cf	**Cultec R-330XL** x 12 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		1,117 cf	Total Available Storage

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Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**2.400 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	3.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.0 cfs @ 11.56 hrs HW=0.04'   (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=0.00' TW=0.00'   (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 0.0 cfs)

Summary for Pond b#8: basin #8 @ #10 & #11

Inflow Area =   0.793 ac, 35.30% Impervious, Inflow Depth > 2.07"   for 2 YR event
Inflow   =   1.9 cfs @ 12.09 hrs, Volume=   0.14 af
Outflow   =   0.1 cfs @ 14.56 hrs, Volume=   0.05 af, Atten= 95%, Lag= 148.3 min
Discarded =   0.0 cfs @ 14.56 hrs, Volume=   0.02 af
Primary   =   0.1 cfs @ 14.56 hrs, Volume=   0.03 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 336.69' @ 14.56 hrs   Surf.Area= 2,232 sf   Storage= 4,142 cf

Plug-Flow detention time= 330.7 min calculated for 0.05 af (33% of inflow)
Center-of-Mass det. time= 200.9 min (1,008.4 - 807.5)

Volume	Invert	Avail.Storage	Storage Description
#1	334.00'	7,579 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)
334.00	925	137.0	0	0	925
336.00	1,865	175.0	2,736	2,736	1,919
338.00	3,025	213.0	4,843	7,579	3,155

Device	Routing	Invert	Outlet Devices
#1	Discarded	334.00'	**0.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	337.20'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#3	Primary	334.00'	**8.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 334.00' / 330.00' S= 0.1333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#4	Device 3	336.60'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.0 cfs @ 14.56 hrs HW=336.69'   (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.1 cfs @ 14.56 hrs HW=336.69' TW=0.00'   (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)
└─**3=Culvert** (Passes 0.1 cfs of 2.6 cfs potential flow)
  └─**4=Orifice/Grate** (Orifice Controls 0.1 cfs @ 0.9 fps)

**PROPOSED CONDITIONS
10-YEAR 24-HOUR STORM EVENT ANALYSIS**

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Summary for Subcatchment sc#10: entry road A

CN per Groton SH2O requirements

Runoff   =   1.5 cfs @ 12.08 hrs, Volume=   0.11 af, Depth> 3.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

	Area (sf)	CN	Description
*	13,405	98	impervious area
	1,105	68	<50% Grass cover, Poor, HSG A
	685	86	<50% Grass cover, Poor, HSG C
	15,195	95	Weighted Average
	1,790		11.78% Pervious Area
	13,405		88.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, roadway to cb**

Summary for Subcatchment sc#11: road A to intersection road B

CN per Groton SH2O requirements

Runoff   =   3.8 cfs @ 12.12 hrs, Volume=   0.32 af, Depth> 3.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

	Area (sf)	CN	Description
*	25,970	98	impervious area
	4,855	86	<50% Grass cover, Poor, HSG C
*	2,060	98	impervious area
	4,770	86	<50% Grass cover, Poor, HSG C
*	4,685	98	impervious area
	42,340	95	Weighted Average
	9,625		22.73% Pervious Area
	32,715		77.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0200	0.1		**Sheet Flow,**
					Grass: Dense n= 0.240 P2= 3.10"
0.3	58	0.1700	2.9		**Shallow Concentrated Flow, overland to roadway**
					Short Grass Pasture Kv= 7.0 fps
0.1	33	0.0850	5.9		**Shallow Concentrated Flow, roadway to cb**
					Paved Kv= 20.3 fps
8.7	141	Total			

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Summary for Subcatchment sc#12: NE road A by #21 & #22

CN per Groton SH2O requirements

Runoff   =   1.1 cfs @ 12.09 hrs, Volume=   0.08 af, Depth> 1.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

	Area (sf)	CN	Description
*	1,705	98	impervious area
	6,465	68	<50% Grass cover, Poor, HSG A
	12,380	74	>75% Grass cover, Good, HSG C
	20,550	74	Weighted Average
	18,845		91.70% Pervious Area
	1,705		8.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.1200	0.2		**Sheet Flow, yard downgrade**
					Grass: Dense n= 0.240 P2= 3.10"
0.5	80	0.1350	2.6		**Shallow Concentrated Flow, overland to basin**
					Short Grass Pasture Kv= 7.0 fps
1.4					**Direct Entry, minimum tc**
6.0	130	Total			

Summary for Subcatchment sc#13: nw road A @ entry (sand hill)

CN per Groton SH2O requirements

Runoff   =   2.3 cfs @ 12.16 hrs, Volume=   0.23 af, Depth> 0.90"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

	Area (sf)	CN	Description
*	570	98	impervious area
	62,350	30	Woods, Good, HSG A
	33,455	77	Woods, Good, HSG D
	13,980	68	<50% Grass cover, Poor, HSG A
	2,525	86	<50% Grass cover, Poor, HSG C
*	23,180	98	BVW
	136,060	58	Weighted Average
	112,310		82.54% Pervious Area
	23,750		17.46% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1200	0.1		**Sheet Flow, woods edge**
					Woods: Light underbrush n= 0.400 P2= 3.10"
0.7	105	0.2700	2.6		**Shallow Concentrated Flow, to bvw and stream**
					Woodland Kv= 5.0 fps
3.0	266	0.0100	1.5		**Shallow Concentrated Flow, thru bvw**
					Grassed Waterway Kv= 15.0 fps
9.8	421	Total			

Summary for Subcatchment sc#14: w road A - units #19 & #20

CN per Groton SH2O requirements

Runoff   =   1.2 cfs @ 12.09 hrs, Volume=   0.09 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

	Area (sf)	CN	Description
*	6,125	98	impervious area
	8,050	68	<50% Grass cover, Poor, HSG A
	2,985	86	<50% Grass cover, Poor, HSG C
	17,160	82	Weighted Average
	11,035		64.31% Pervious Area
	6,125		35.69% Impervious Area

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

Summary for Subcatchment sc#15: west to town bvw

CN per Groton SH2O requirements

Runoff   =   21.5 cfs @ 12.12 hrs, Volume=   1.66 af, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

	Area (sf)	CN	Description
*	10,500	98	impervious area
	48,455	30	Woods, Good, HSG A
	333,805	70	Woods, Good, HSG C
	16,120	77	Woods, Good, HSG D
	111,985	86	<50% Grass cover, Poor, HSG C
	520,865	70	Weighted Average
	510,365		97.98% Pervious Area
	10,500		2.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.2		**Sheet Flow, woods**
					Woods: Light underbrush n= 0.400 P2= 3.10"
2.1	290	0.2200	2.3		**Shallow Concentrated Flow, overland to bvw**
					Woodland Kv= 5.0 fps
7.6	340	Total			

Summary for Subcatchment sc#16: roadway B @ intersection

CN per Groton SH2O requirements

Runoff   =   2.0 cfs @ 12.08 hrs, Volume=   0.15 af, Depth> 3.81"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

	Area (sf)	CN	Description
*	14,215	98	impervious area
	2,140	79	<50% Grass cover, Poor, HSG B
	4,365	86	<50% Grass cover, Poor, HSG C
	20,720	94	Weighted Average
	6,505		31.39% Pervious Area
	14,215		68.61% Impervious Area

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

Summary for Subcatchment sc#16a: road B @ entry (longley)

Runoff   =   4.2 cfs @ 12.09 hrs, Volume=   0.30 af, Depth> 3.00"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

	Area (sf)	CN	Description
*	21,875	98	impervious area
	6,340	68	<50% Grass cover, Poor, HSG A
	23,750	79	<50% Grass cover, Poor, HSG B
	51,965	86	Weighted Average
	30,090		57.90% Pervious Area
	21,875		42.10% Impervious Area

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

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Type III 24-hr 10 YR Rainfall=4.50"

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Summary for Subcatchment sc#17: at basin #4

CN per Groton SH2O requirements

Runoff   =   1.4 cfs @ 12.09 hrs, Volume=   0.10 af, Depth> 2.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

	Area (sf)	CN	Description
*	1,245	98	impervious area
	19,995	79	<50% Grass cover, Poor, HSG B
	21,240	80	Weighted Average
	19,995		94.14% Pervious Area
	1,245		5.86% Impervious Area

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

Summary for Subcatchment sc#18: ne corner btwn roads

CN per Groton SH2O requirements

Runoff   =   14.3 cfs @ 12.27 hrs, Volume=   1.53 af, Depth> 1.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

	Area (sf)	CN	Description
*	16,540	98	impervious area
	60,600	51	1 acre lots, 20% imp, HSG A
	122,980	30	Woods, Good, HSG A
	33,600	55	Woods, Good, HSG B
	30,185	70	Woods, Good, HSG C
	93,990	77	Woods, Good, HSG D
	24,860	68	<50% Grass cover, Poor, HSG A
	18,840	79	<50% Grass cover, Poor, HSG B
	42,475	86	<50% Grass cover, Poor, HSG C
*	105,090	98	BVW
	549,160	67	Weighted Average
	415,410		75.64% Pervious Area
	133,750		24.36% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0700	0.1		**Sheet Flow, edge woods**
					Woods: Light underbrush n= 0.400 P2= 3.10"
2.5	200	0.0700	1.3		**Shallow Concentrated Flow, to bvw**
					Woodland Kv= 5.0 fps
2.3	360	0.0300	2.6		**Shallow Concentrated Flow, leg bvw**
					Grassed Waterway Kv= 15.0 fps
5.8	525	0.0100	1.5		**Shallow Concentrated Flow, thru bvw**
					Grassed Waterway Kv= 15.0 fps
18.2	1,135	Total			

Summary for Subcatchment sc#19: se road intersection @ #3 & #4

CN per Groton SH2O requirements

Runoff   =   3.9 cfs @   12.11 hrs, Volume=   0.30 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

	Area (sf)	CN	Description
*	8,190	98	impervious area
	6,950	79	<50% Grass cover, Poor, HSG B
	35,225	86	<50% Grass cover, Poor, HSG C
	50,365	87	Weighted Average
	42,175		83.74% Pervious Area
	8,190		16.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.0400	0.1		**Sheet Flow, knob**
					Grass: Dense n= 0.240 P2= 3.10"
1.2	235	0.2300	3.4		**Shallow Concentrated Flow, overland yard to basin**
					Short Grass Pasture Kv= 7.0 fps
7.5	285	Total			

Summary for Subcatchment sc#20: road A upper circle

CN per Groton SH2O requirements

Runoff   =   7.3 cfs @   12.08 hrs, Volume=   0.55 af, Depth> 3.70"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

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	Area (sf)	CN	Description
*	23,900	98	impervious area
	14,500	86	<50% Grass cover, Poor, HSG C
*	11,705	98	impervious area
	18,340	86	<50% Grass cover, Poor, HSG C
*	4,685	98	impervious area
*	4,065	98	impervious area
	77,195	93	Weighted Average
	32,840		42.54% Pervious Area
	44,355		57.46% Impervious Area

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

Summary for Subcatchment sc#21: se locus

CN per Groton SH2O requirements

Runoff   =   13.2 cfs @ 12.44 hrs, Volume=   1.89 af, Depth> 0.90"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

	Area (sf)	CN	Description
*	13,975	98	impervious area
	33,165	51	1 acre lots, 20% imp, HSG A
	2,930	68	1 acre lots, 20% imp, HSG B
	463,470	30	Woods, Good, HSG A
	97,000	55	Woods, Good, HSG B
	147,970	70	Woods, Good, HSG C
	27,315	77	Woods, Good, HSG D
	16,595	68	<50% Grass cover, Poor, HSG A
	29,185	79	<50% Grass cover, Poor, HSG B
	39,985	86	<50% Grass cover, Poor, HSG C
*	230,400	98	bvw
	1,101,990	58	Weighted Average
	850,396		77.17% Pervious Area
	251,594		22.83% Impervious Area

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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.1500	0.1		**Sheet Flow, offsite knob**
					Woods: Light underbrush n= 0.400 P2= 3.10"
3.7	430	0.1500	1.9		**Shallow Concentrated Flow, overland to bvw**
					Woodland Kv= 5.0 fps
1.2	280	0.0700	4.0		**Shallow Concentrated Flow, bvw to stream by road**
					Grassed Waterway Kv= 15.0 fps
9.5	1,050	0.0150	1.8		**Shallow Concentrated Flow, stream thru bvw to crossing**
					Grassed Waterway Kv= 15.0 fps
5.8	525	0.0100	1.5		**Shallow Concentrated Flow, thru bvw**
					Grassed Waterway Kv= 15.0 fps
25.8	2,335	Total			

Summary for Subcatchment sc#22: drive @ #25 & #26

CN per Groton SH2O requirements

Runoff   =   0.7 cfs @ 12.09 hrs, Volume=   0.05 af, Depth> 2.46"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

	Area (sf)	CN	Description
*	1,985	98	impervious area
	2,680	68	<50% Grass cover, Poor, HSG A
	5,860	79	<50% Grass cover, Poor, HSG B
	10,525	80	Weighted Average
	8,540		81.14% Pervious Area
	1,985		18.86% Impervious Area

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

Summary for Subcatchment sc#23: Unit #1 & #2 - 4685 rooftop

Runoff   =   0.5 cfs @ 12.08 hrs, Volume=   0.04 af, Depth> 4.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

	Area (sf)	CN	Description
*	4,685	98	impervious area
	4,685		100.00% Impervious Area

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

Summary for Subcatchment sc#24: Unit #25 & #26 - 4685 rooftop

Runoff   =   0.5 cfs @ 12.08 hrs, Volume=   0.04 af, Depth> 4.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

	Area (sf)	CN	Description
*	4,685	98	impervious area
	4,685		100.00% Impervious Area

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

Summary for Subcatchment sc#25: Unit #21 & #22 - 4685 rooftop

Runoff   =   0.5 cfs @ 12.08 hrs, Volume=   0.04 af, Depth> 4.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

	Area (sf)	CN	Description
*	4,685	98	impervious area
	4,685		100.00% Impervious Area

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

Summary for Subcatchment sc#26: units #9-#12 by circle

Runoff   =   3.1 cfs @ 12.09 hrs, Volume=   0.22 af, Depth> 3.39"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

	Area (sf)	CN	Description
*	12,190	98	impervious area
	22,345	86	<50% Grass cover, Poor, HSG C
	34,535	90	Weighted Average
	22,345		64.70% Pervious Area
	12,190		35.30% Impervious Area

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

Summary for Subcatchment sc#3: area east side Longley to culvert

Runoff = 6.8 cfs @ 12.32 hrs, Volume= 0.83 af, Depth> 1.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.50"

Area (sf)	CN	Description
* 9,060	98	impervious area
172,750	51	1 acre lots, 20% imp, HSG A
223,820	68	1 acre lots, 20% imp, HSG B
405,630	61	Weighted Average
317,256		78.21% Pervious Area
88,374		21.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	50	0.0300	0.1		**Sheet Flow, high elevation**
					Woods: Light underbrush n= 0.400 P2= 3.10"
3.6	285	0.0700	1.3		**Shallow Concentrated Flow, overland thru woods**
					Woodland Kv= 5.0 fps
3.4	345	0.0600	1.7		**Shallow Concentrated Flow, thru residential**
					Short Grass Pasture Kv= 7.0 fps
2.7	295	0.1300	1.8		**Shallow Concentrated Flow, woods to culvert**
					Woodland Kv= 5.0 fps
20.4	975				Total

Summary for Reach dp#1: nw corner bvw

Inflow Area = 70.926 ac, 22.01% Impervious, Inflow Depth > 1.08" for 10 YR event
Inflow = 44.1 cfs @ 12.30 hrs, Volume= 6.41 af
Outflow = 44.1 cfs @ 12.30 hrs, Volume= 6.41 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: depression thru culvert

Inflow Area = 9.312 ac, 21.79% Impervious, Inflow Depth > 1.07" for 10 YR event
Inflow = 6.8 cfs @ 12.32 hrs, Volume= 0.83 af
Outflow = 4.9 cfs @ 12.57 hrs, Volume= 0.81 af, Atten= 27%, Lag= 14.8 min
Primary = 2.8 cfs @ 12.57 hrs, Volume= 0.76 af
Secondary = 2.2 cfs @ 12.57 hrs, Volume= 0.05 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Peak Elev= 307.69' @ 12.57 hrs   Surf.Area= 4,507 sf   Storage= 6,667 cf

Plug-Flow detention time= 38.4 min calculated for 0.81 af (97% of inflow)
Center-of-Mass det. time= 24.8 min (914.9 - 890.1)

Volume	Invert	Avail.Storage	Storage Description
#1	305.90'	7,652 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)
305.90	3,000	260.0	0	0	3,000
306.90	3,815	284.0	3,399	3,399	4,074
307.90	4,705	308.0	4,252	7,652	5,243

Device	Routing	Invert	Outlet Devices
#1	Primary	305.90'	**12.0" Round Culvert - Longley** L= 44.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 305.90' / 305.40' S= 0.0114 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf
#2	Secondary	307.50'	**10.0' long x 1.0' breadth Broad-Crested Rectangular Weir - heads north along** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=2.8 cfs @ 12.57 hrs HW=307.69' TW=0.00'   (Dynamic Tailwater)
└─**1=Culvert - Longley** (Barrel Controls 2.8 cfs @ 3.5 fps)

Secondary OutFlow Max=2.2 cfs @ 12.57 hrs HW=307.69'   (Free Discharge)
└─**2=Broad-Crested Rectangular Weir - heads north along Longley** (Weir Controls 2.2 cfs @ 1.2 fps)

Summary for Pond b#1: basin#1 at entry road A

Inflow Area =	0.743 ac, 60.36% Impervious, Inflow Depth > 3.24" for 10 YR event			
Inflow =	2.7 cfs @ 12.09 hrs, Volume=	0.20 af		
Outflow =	0.4 cfs @ 12.60 hrs, Volume=	0.20 af, Atten= 86%, Lag= 31.0 min		
Discarded =	0.4 cfs @ 12.60 hrs, Volume=	0.20 af		
Primary =	0.0 cfs @ 0.00 hrs, Volume=	0.00 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 251.93' @ 12.60 hrs   Surf.Area= 2,005 sf   Storage= 2,931 cf

Plug-Flow detention time= 61.2 min calculated for 0.20 af (100% of inflow)
Center-of-Mass det. time= 61.0 min (852.9 - 791.8)

Volume	Invert	Avail.Storage	Storage Description
#1	250.00'	8,286 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

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Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
250.00	1,085	128.0	0	0	1,085
252.00	2,045	174.0	3,080	3,080	2,231
254.00	3,205	211.0	5,207	8,286	3,428

Device	Routing	Invert	Outlet Devices
#1	Discarded	250.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	253.00'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#3	Primary	251.50'	**12.0" Round Culvert** L= 20.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 251.50' / 251.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Device 3	252.00'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.4 cfs @ 12.60 hrs HW=251.93' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.4 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=250.00' TW=0.00' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)
└─**3=Culvert** (Controls 0.0 cfs)
  └─**4=Orifice/Grate** (Controls 0.0 cfs)

Summary for Pond b#2: basin#2 @ #21

Inflow Area =		1.551 ac,	57.87% Impervious,	Inflow Depth >	3.35"	for 10 YR event
Inflow	=	5.3 cfs @	12.11 hrs,	Volume=	0.43 af	
Outflow	=	0.7 cfs @	12.68 hrs,	Volume=	0.43 af,	Atten= 86%, Lag= 34.2 min
Discarded	=	0.7 cfs @	12.68 hrs,	Volume=	0.43 af	
Primary	=	0.0 cfs @	0.00 hrs,	Volume=	0.00 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 261.92' @ 12.68 hrs Surf.Area= 3,907 sf Storage= 6,201 cf

Plug-Flow detention time= 62.3 min calculated for 0.43 af (100% of inflow)
Center-of-Mass det. time= 62.2 min (845.2 - 783.0)

Volume	Invert	Avail.Storage	Storage Description
#1	260.00'	15,995 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)
260.00	2,585	211.0	0	0	2,585
262.00	3,965	249.0	6,501	6,501	4,050
264.00	5,575	286.0	9,494	15,995	5,714

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Device	Routing	Invert	Outlet Devices
#1	Discarded	260.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	263.00'	**8.0' long x 3.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68
			2.72 2.81 2.92 2.97 3.07 3.32
#3	Primary	260.70'	**12.0" Round Culvert**
			L= 35.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 260.70' / 260.00' S= 0.0200 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Device 3	262.00'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.7 cfs @ 12.68 hrs HW=261.92' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.7 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=260.00' TW=0.00' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)
└─**3=Culvert** (Controls 0.0 cfs)
　└─**4=Orifice/Grate** (Controls 0.0 cfs)

Summary for Pond b#3: basin#3 @ #3 & #4

Inflow Area =	2.928 ac,	41.19% Impervious,	Inflow Depth > 3.46"	for 10 YR event
Inflow =	11.2 cfs @	12.09 hrs, Volume=	0.85 af	
Outflow =	2.1 cfs @	12.55 hrs, Volume=	0.85 af,	Atten= 81%, Lag= 27.3 min
Discarded =	1.4 cfs @	12.55 hrs, Volume=	0.81 af	
Primary =	0.6 cfs @	12.55 hrs, Volume=	0.04 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 287.84' @ 12.55 hrs Surf.Area= 7,479 sf Storage= 11,885 cf

Plug-Flow detention time= 55.7 min calculated for 0.84 af (100% of inflow)
Center-of-Mass det. time= 55.6 min (845.3 - 789.7)

Volume	Invert	Avail.Storage	Storage Description
#1	286.00'	30,774 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)
286.00	5,480	345.0	0	0	5,480
288.00	7,665	383.0	13,084	13,084	7,799
290.00	10,080	421.0	17,690	30,774	10,359

Device	Routing	Invert	Outlet Devices
#1	Discarded	286.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	289.00'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68
			2.72 2.81 2.92 2.97 3.07 3.32

#3	Primary	287.00'	**12.0" Round Culvert**
			L= 40.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 287.00' / 286.50' S= 0.0125 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Device 3	287.50'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=1.4 cfs @ 12.55 hrs HW=287.84' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 1.4 cfs)

Primary OutFlow Max=0.6 cfs @ 12.55 hrs HW=287.84' TW=0.00' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)
└─**3=Culvert** (Passes 0.6 cfs of 2.2 cfs potential flow)
  └─**4=Orifice/Grate** (Orifice Controls 0.6 cfs @ 1.9 fps)

Summary for Pond b#4: basin #4 @ #25

Inflow Area =   0.963 ac, 36.84% Impervious, Inflow Depth > 3.13"   for 10 YR event
Inflow   =   3.4 cfs @ 12.09 hrs, Volume=   0.25 af
Outflow   =   0.4 cfs @ 12.85 hrs, Volume=   0.18 af, Atten= 89%, Lag= 46.0 min
Discarded =   0.1 cfs @ 12.85 hrs, Volume=   0.16 af
Primary   =   0.2 cfs @ 12.85 hrs, Volume=   0.02 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 265.04' @ 12.85 hrs   Surf.Area= 2,580 sf Storage= 5,460 cf

Plug-Flow detention time= 264.6 min calculated for 0.18 af (70% of inflow)
Center-of-Mass det. time= 171.3 min (967.1 - 795.7)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	8,201 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

| Elevation | Surf.Area | Perim. | Inc.Store | Cum.Store | Wet.Area |
(feet)	(sq-ft)	(feet)	(cubic-feet)	(cubic-feet)	(sq-ft)
262.00	1,100	135.0	0	0	1,100
264.00	2,015	172.0	3,069	3,069	2,055
266.00	3,160	210.0	5,132	8,201	3,271

Device	Routing	Invert	Outlet Devices
#1	Discarded	262.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	265.00'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68
			2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.1 cfs @ 12.85 hrs HW=265.04' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=0.2 cfs @ 12.85 hrs HW=265.04' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir**(Weir Controls 0.2 cfs @ 0.5 fps)

Summary for Pond b#5: basin#5 @ #26

Inflow Area =	1.435 ac, 38.18% Impervious, Inflow Depth > 2.91" for 10 YR event					
Inflow	=	4.9 cfs @	12.09 hrs,	Volume=	0.35 af	
Outflow	=	2.7 cfs @	12.21 hrs,	Volume=	0.29 af,	Atten= 45%, Lag= 7.6 min
Discarded	=	0.1 cfs @	12.21 hrs,	Volume=	0.13 af	
Primary	=	2.5 cfs @	12.21 hrs,	Volume=	0.16 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 254.10' @ 12.21 hrs   Surf.Area= 2,425 sf   Storage= 4,939 cf

Plug-Flow detention time= 135.8 min calculated for 0.29 af (84% of inflow)
Center-of-Mass det. time= 68.4 min (878.8 - 810.4)

Volume	Invert	Avail.Storage	Storage Description
#1	251.00'	7,373 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)
251.00	860	128.0	0	0	860
253.00	1,815	177.0	2,616	2,616	2,088
255.00	2,990	215.0	4,756	7,373	3,336

Device	Routing	Invert	Outlet Devices
#1	Discarded	251.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	254.00'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#3	Primary	252.50'	**12.0" Round Culvert** L= 20.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 252.50' / 252.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Device 3	253.30'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.1 cfs @ 12.21 hrs HW=254.10' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=2.5 cfs @ 12.21 hrs HW=254.10' TW=0.00' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.8 cfs @ 0.8 fps)
└─**3=Culvert** (Passes 1.8 cfs of 4.0 cfs potential flow)
  └─**4=Orifice/Grate** (Orifice Controls 1.8 cfs @ 3.5 fps)

Summary for Pond b#6: PSIF#6

Inflow Area =	0.108 ac,100.00% Impervious, Inflow Depth > 4.26" for 10 YR event					
Inflow	=	0.5 cfs @	12.08 hrs,	Volume=	0.04 af	
Outflow	=	0.0 cfs @	11.02 hrs,	Volume=	0.04 af,	Atten= 94%, Lag= 0.0 min
Discarded	=	0.0 cfs @	11.02 hrs,	Volume=	0.04 af	
Primary	=	0.0 cfs @	0.00 hrs,	Volume=	0.00 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 1.96' @ 13.74 hrs Surf.Area= 504 sf Storage= 686 cf

Plug-Flow detention time= 192.6 min calculated for 0.04 af (99% of inflow)
Center-of-Mass det. time= 187.1 min (936.4 - 749.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	446 cf	**20.58'W x 24.50'L x 3.54'H Field A**
			1,786 cf Overall - 671 cf Embedded = 1,115 cf x 40.0% Voids
#2A	0.50'	671 cf	**Cultec R-330XL** x 12 Inside #1
			Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
			Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
			Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		1,117 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**2.400 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	3.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.0 cfs @ 11.02 hrs HW=0.04' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=0.00' TW=0.00' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 0.0 cfs)

Summary for Pond b#7: PSIF#7

Inflow Area =	0.108 ac,100.00% Impervious,	Inflow Depth > 4.26"	for 10 YR event
Inflow =	0.5 cfs @ 12.08 hrs, Volume=	0.04 af	
Outflow =	0.0 cfs @ 11.02 hrs, Volume=	0.04 af, Atten= 94%, Lag= 0.0 min	
Discarded =	0.0 cfs @ 11.02 hrs, Volume=	0.04 af	
Primary =	0.0 cfs @ 0.00 hrs, Volume=	0.00 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 1.96' @ 13.74 hrs Surf.Area= 504 sf Storage= 686 cf

Plug-Flow detention time= 192.6 min calculated for 0.04 af (99% of inflow)
Center-of-Mass det. time= 187.1 min (936.4 - 749.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	446 cf	**20.58'W x 24.50'L x 3.54'H Field A**
			1,786 cf Overall - 671 cf Embedded = 1,115 cf x 40.0% Voids
#2A	0.50'	671 cf	**Cultec R-330XL** x 12 Inside #1
			Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
			Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
			Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		1,117 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**2.400 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	3.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.0 cfs @ 11.02 hrs HW=0.04'   (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=0.00' TW=0.00'   (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 0.0 cfs)

Summary for Pond b#8: basin #8 @ #10 & #11

Inflow Area =   0.793 ac, 35.30% Impervious, Inflow Depth > 3.39"   for 10 YR event
Inflow   =   3.1 cfs @ 12.09 hrs, Volume=   0.22 af
Outflow   =   0.9 cfs @ 12.42 hrs, Volume=   0.13 af, Atten= 71%, Lag= 20.3 min
Discarded =   0.0 cfs @ 12.42 hrs, Volume=   0.02 af
Primary   =   0.9 cfs @ 12.42 hrs, Volume=   0.11 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 337.02' @ 12.42 hrs Surf.Area= 2,421 sf Storage= 4,912 cf

Plug-Flow detention time= 201.9 min calculated for 0.13 af (59% of inflow)
Center-of-Mass det. time= 98.4 min (892.1 - 793.7)

Volume	Invert	Avail.Storage	Storage Description
#1	334.00'	7,579 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)
334.00	925	137.0	0	0	925
336.00	1,865	175.0	2,736	2,736	1,919
338.00	3,025	213.0	4,843	7,579	3,155

Device	Routing	Invert	Outlet Devices
#1	Discarded	334.00'	**0.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	337.20'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#3	Primary	334.00'	**8.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 334.00' / 330.00' S= 0.1333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#4	Device 3	336.60'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

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Type III 24-hr 10 YR Rainfall=4.50"
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Discarded OutFlow Max=0.0 cfs @ 12.42 hrs HW=337.02'   (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.9 cfs @ 12.42 hrs HW=337.02' TW=0.00'   (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)
└─**3=Culvert** (Passes 0.9 cfs of 2.8 cfs potential flow)
　　└─**4=Orifice/Grate** (Orifice Controls 0.9 cfs @ 2.1 fps)

PROPOSED CONDITIONS
25-YEAR 24-HOUR STORM EVENT ANALYSIS

Summary for Subcatchment sc#10: entry road A

CN per Groton SH2O requirements

Runoff   =   1.8 cfs @ 12.08 hrs, Volume=   0.14 af, Depth> 4.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

	Area (sf)	CN	Description
*	13,405	98	impervious area
	1,105	68	<50% Grass cover, Poor, HSG A
	685	86	<50% Grass cover, Poor, HSG C
	15,195	95	Weighted Average
	1,790		11.78% Pervious Area
	13,405		88.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, roadway to cb**

Summary for Subcatchment sc#11: road A to intersection road B

CN per Groton SH2O requirements

Runoff   =   4.5 cfs @ 12.12 hrs, Volume=   0.38 af, Depth> 4.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

	Area (sf)	CN	Description
*	25,970	98	impervious area
	4,855	86	<50% Grass cover, Poor, HSG C
*	2,060	98	impervious area
	4,770	86	<50% Grass cover, Poor, HSG C
*	4,685	98	impervious area
	42,340	95	Weighted Average
	9,625		22.73% Pervious Area
	32,715		77.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0200	0.1		**Sheet Flow,**
					Grass: Dense n= 0.240 P2= 3.10"
0.3	58	0.1700	2.9		**Shallow Concentrated Flow, overland to roadway**
					Short Grass Pasture Kv= 7.0 fps
0.1	33	0.0850	5.9		**Shallow Concentrated Flow, roadway to cb**
					Paved Kv= 20.3 fps
8.7	141	Total			

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Type III 24-hr 25 YR Rainfall=5.30"
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Summary for Subcatchment sc#12: NE road A by #21 & #22

CN per Groton SH2O requirements

Runoff   =   1.4 cfs @ 12.09 hrs, Volume=   0.10 af, Depth> 2.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

	Area (sf)	CN	Description
*	1,705	98	impervious area
	6,465	68	<50% Grass cover, Poor, HSG A
	12,380	74	>75% Grass cover, Good, HSG C
	20,550	74	Weighted Average
	18,845		91.70% Pervious Area
	1,705		8.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.1200	0.2		**Sheet Flow, yard downgrade**
					Grass: Dense n= 0.240 P2= 3.10"
0.5	80	0.1350	2.6		**Shallow Concentrated Flow, overland to basin**
					Short Grass Pasture Kv= 7.0 fps
1.4					**Direct Entry, minimum tc**
6.0	130	Total			

Summary for Subcatchment sc#13: nw road A @ entry (sand hill)

CN per Groton SH2O requirements

Runoff   =   3.8 cfs @ 12.15 hrs, Volume=   0.35 af, Depth> 1.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

	Area (sf)	CN	Description
*	570	98	impervious area
	62,350	30	Woods, Good, HSG A
	33,455	77	Woods, Good, HSG D
	13,980	68	<50% Grass cover, Poor, HSG A
	2,525	86	<50% Grass cover, Poor, HSG C
*	23,180	98	BVW
	136,060	58	Weighted Average
	112,310		82.54% Pervious Area
	23,750		17.46% Impervious Area

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Type III 24-hr 25 YR Rainfall=5.30"
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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1200	0.1		**Sheet Flow, woods edge**
					Woods: Light underbrush n= 0.400 P2= 3.10"
0.7	105	0.2700	2.6		**Shallow Concentrated Flow, to bvw and stream**
					Woodland Kv= 5.0 fps
3.0	266	0.0100	1.5		**Shallow Concentrated Flow, thru bvw**
					Grassed Waterway Kv= 15.0 fps
9.8	421	Total			

Summary for Subcatchment sc#14: w road A - units #19 & #20

CN per Groton SH2O requirements

Runoff   =   1.5 cfs @ 12.09 hrs, Volume=   0.11 af, Depth> 3.35"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

	Area (sf)	CN	Description
*	6,125	98	impervious area
	8,050	68	<50% Grass cover, Poor, HSG A
	2,985	86	<50% Grass cover, Poor, HSG C
	17,160	82	Weighted Average
	11,035		64.31% Pervious Area
	6,125		35.69% Impervious Area

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

Summary for Subcatchment sc#15: west to town bvw

CN per Groton SH2O requirements

Runoff   =   29.6 cfs @ 12.11 hrs, Volume=   2.25 af, Depth> 2.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

	Area (sf)	CN	Description
*	10,500	98	impervious area
	48,455	30	Woods, Good, HSG A
	333,805	70	Woods, Good, HSG C
	16,120	77	Woods, Good, HSG D
	111,985	86	<50% Grass cover, Poor, HSG C
	520,865	70	Weighted Average
	510,365		97.98% Pervious Area
	10,500		2.02% Impervious Area

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Type III 24-hr 25 YR Rainfall=5.30"
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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.2		**Sheet Flow, woods**
					Woods: Light underbrush n= 0.400 P2= 3.10"
2.1	290	0.2200	2.3		**Shallow Concentrated Flow, overland to bvw**
					Woodland Kv= 5.0 fps
7.6	340	Total			

Summary for Subcatchment sc#16: roadway B @ intersection

CN per Groton SH2O requirements

Runoff   =   2.4 cfs @ 12.08 hrs, Volume=   0.18 af, Depth> 4.60"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

	Area (sf)	CN	Description
*	14,215	98	impervious area
	2,140	79	<50% Grass cover, Poor, HSG B
	4,365	86	<50% Grass cover, Poor, HSG C
	20,720	94	Weighted Average
	6,505		31.39% Pervious Area
	14,215		68.61% Impervious Area

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

Summary for Subcatchment sc#16a: road B @ entry (longley)

Runoff   =   5.2 cfs @ 12.09 hrs, Volume=   0.37 af, Depth> 3.74"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

	Area (sf)	CN	Description
*	21,875	98	impervious area
	6,340	68	<50% Grass cover, Poor, HSG A
	23,750	79	<50% Grass cover, Poor, HSG B
	51,965	86	Weighted Average
	30,090		57.90% Pervious Area
	21,875		42.10% Impervious Area

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

Summary for Subcatchment sc#17: at basin #4

CN per Groton SH2O requirements

Runoff   =   1.8 cfs @ 12.09 hrs, Volume=   0.13 af, Depth> 3.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

	Area (sf)	CN	Description
*	1,245	98	impervious area
	19,995	79	<50% Grass cover, Poor, HSG B
	21,240	80	Weighted Average
	19,995		94.14% Pervious Area
	1,245		5.86% Impervious Area

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

Summary for Subcatchment sc#18: ne corner btwn roads

CN per Groton SH2O requirements

Runoff   =   20.2 cfs @ 12.27 hrs, Volume=   2.11 af, Depth> 2.01"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

	Area (sf)	CN	Description
*	16,540	98	impervious area
	60,600	51	1 acre lots, 20% imp, HSG A
	122,980	30	Woods, Good, HSG A
	33,600	55	Woods, Good, HSG B
	30,185	70	Woods, Good, HSG C
	93,990	77	Woods, Good, HSG D
	24,860	68	<50% Grass cover, Poor, HSG A
	18,840	79	<50% Grass cover, Poor, HSG B
	42,475	86	<50% Grass cover, Poor, HSG C
*	105,090	98	BVW
	549,160	67	Weighted Average
	415,410		75.64% Pervious Area
	133,750		24.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0700	0.1		**Sheet Flow, edge woods** Woods: Light underbrush n= 0.400 P2= 3.10"
2.5	200	0.0700	1.3		**Shallow Concentrated Flow, to bvw** Woodland Kv= 5.0 fps
2.3	360	0.0300	2.6		**Shallow Concentrated Flow, leg bvw** Grassed Waterway Kv= 15.0 fps
5.8	525	0.0100	1.5		**Shallow Concentrated Flow, thru bvw** Grassed Waterway Kv= 15.0 fps
18.2	1,135	Total			

Summary for Subcatchment sc#19: se road intersection @ #3 & #4

CN per Groton SH2O requirements

Runoff   =   4.9 cfs @   12.11 hrs, Volume=   0.37 af, Depth> 3.85"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

	Area (sf)	CN	Description
*	8,190	98	impervious area
	6,950	79	<50% Grass cover, Poor, HSG B
	35,225	86	<50% Grass cover, Poor, HSG C
	50,365	87	Weighted Average
	42,175		83.74% Pervious Area
	8,190		16.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.0400	0.1		**Sheet Flow, knob** Grass: Dense n= 0.240 P2= 3.10"
1.2	235	0.2300	3.4		**Shallow Concentrated Flow, overland yard to basin** Short Grass Pasture Kv= 7.0 fps
7.5	285	Total			

Summary for Subcatchment sc#20: road A upper circle

CN per Groton SH2O requirements

Runoff   =   8.7 cfs @   12.08 hrs, Volume=   0.66 af, Depth> 4.49"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

Area (sf)	CN	Description
* 23,900	98	impervious area
14,500	86	<50% Grass cover, Poor, HSG C
* 11,705	98	impervious area
18,340	86	<50% Grass cover, Poor, HSG C
* 4,685	98	impervious area
* 4,065	98	impervious area
77,195	93	Weighted Average
32,840		42.54% Pervious Area
44,355		57.46% Impervious Area

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

Summary for Subcatchment sc#21: se locus

CN per Groton SH2O requirements

Runoff   =   21.3 cfs @ 12.41 hrs, Volume=   2.80 af, Depth> 1.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

Area (sf)	CN	Description
* 13,975	98	impervious area
33,165	51	1 acre lots, 20% imp, HSG A
2,930	68	1 acre lots, 20% imp, HSG B
463,470	30	Woods, Good, HSG A
97,000	55	Woods, Good, HSG B
147,970	70	Woods, Good, HSG C
27,315	77	Woods, Good, HSG D
16,595	68	<50% Grass cover, Poor, HSG A
29,185	79	<50% Grass cover, Poor, HSG B
39,985	86	<50% Grass cover, Poor, HSG C
* 230,400	98	bvw
1,101,990	58	Weighted Average
850,396		77.17% Pervious Area
251,594		22.83% Impervious Area

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Type III 24-hr 25 YR Rainfall=5.30"
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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.1500	0.1		**Sheet Flow, offsite knob**
					Woods: Light underbrush n= 0.400 P2= 3.10"
3.7	430	0.1500	1.9		**Shallow Concentrated Flow, overland to bvw**
					Woodland Kv= 5.0 fps
1.2	280	0.0700	4.0		**Shallow Concentrated Flow, bvw to stream by road**
					Grassed Waterway Kv= 15.0 fps
9.5	1,050	0.0150	1.8		**Shallow Concentrated Flow, stream thru bvw to crossing**
					Grassed Waterway Kv= 15.0 fps
5.8	525	0.0100	1.5		**Shallow Concentrated Flow, thru bvw**
					Grassed Waterway Kv= 15.0 fps
25.8	2,335	Total			

Summary for Subcatchment sc#22: drive @ #25 & #26

CN per Groton SH2O requirements

Runoff   =   0.9 cfs @ 12.09 hrs, Volume=   0.06 af, Depth> 3.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

	Area (sf)	CN	Description
*	1,985	98	impervious area
	2,680	68	<50% Grass cover, Poor, HSG A
	5,860	79	<50% Grass cover, Poor, HSG B
	10,525	80	Weighted Average
	8,540		81.14% Pervious Area
	1,985		18.86% Impervious Area

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

Summary for Subcatchment sc#23: Unit #1 & #2 - 4685 rooftop

Runoff   =   0.6 cfs @ 12.08 hrs, Volume=   0.05 af, Depth> 5.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

	Area (sf)	CN	Description
*	4,685	98	impervious area
	4,685		100.00% Impervious Area

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Type III 24-hr 25 YR Rainfall=5.30"
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Tc	Length	Slope	Velocity	Capacity	Description
(min)	(feet)	(ft/ft)	(ft/sec)	(cfs)	
6.0					**Direct Entry, minimum tc**

Summary for Subcatchment sc#24: Unit #25 & #26 - 4685 rooftop

Runoff   =   0.6 cfs @ 12.08 hrs, Volume=   0.05 af, Depth> 5.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

	Area (sf)	CN	Description
*	4,685	98	impervious area
	4,685		100.00% Impervious Area

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

Summary for Subcatchment sc#25: Unit #21 & #22 - 4685 rooftop

Runoff   =   0.6 cfs @ 12.08 hrs, Volume=   0.05 af, Depth> 5.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

	Area (sf)	CN	Description
*	4,685	98	impervious area
	4,685		100.00% Impervious Area

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

Summary for Subcatchment sc#26: units #9-#12 by circle

Runoff   =   3.7 cfs @ 12.08 hrs, Volume=   0.27 af, Depth> 4.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

	Area (sf)	CN	Description
*	12,190	98	impervious area
	22,345	86	<50% Grass cover, Poor, HSG C
	34,535	90	Weighted Average
	22,345		64.70% Pervious Area
	12,190		35.30% Impervious Area

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Type III 24-hr 25 YR Rainfall=5.30"
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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, minimum tc**

Summary for Subcatchment sc#3: area east side Longley to culvert

Runoff   =   10.4 cfs @ 12.31 hrs, Volume=   1.20 af, Depth> 1.54"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 YR Rainfall=5.30"

	Area (sf)	CN	Description
*	9,060	98	impervious area
	172,750	51	1 acre lots, 20% imp, HSG A
	223,820	68	1 acre lots, 20% imp, HSG B
	405,630	61	Weighted Average
	317,256		78.21% Pervious Area
	88,374		21.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	50	0.0300	0.1		**Sheet Flow, high elevation**
					Woods: Light underbrush n= 0.400 P2= 3.10"
3.6	285	0.0700	1.3		**Shallow Concentrated Flow, overland thru woods**
					Woodland Kv= 5.0 fps
3.4	345	0.0600	1.7		**Shallow Concentrated Flow, thru residential**
					Short Grass Pasture Kv= 7.0 fps
2.7	295	0.1300	1.8		**Shallow Concentrated Flow, woods to culvert**
					Woodland Kv= 5.0 fps
20.4	975	Total			

Summary for Reach dp#1: nw corner bvw

Inflow Area =   70.926 ac, 22.01% Impervious, Inflow Depth > 1.54"   for 25 YR event
Inflow   =   66.6 cfs @ 12.29 hrs, Volume=   9.08 af
Outflow   =   66.6 cfs @ 12.29 hrs, Volume=   9.08 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: depression thru culvert

Inflow Area =   9.312 ac, 21.79% Impervious, Inflow Depth > 1.54"   for 25 YR event
Inflow   =   10.4 cfs @ 12.31 hrs, Volume=   1.20 af
Outflow   =   9.4 cfs @ 12.42 hrs, Volume=   1.17 af, Atten= 10%, Lag= 6.8 min
Primary   =   3.0 cfs @ 12.42 hrs, Volume=   0.96 af
Secondary =   6.4 cfs @ 12.42 hrs, Volume=   0.21 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Peak Elev= 307.88' @ 12.42 hrs   Surf.Area= 4,686 sf   Storage= 7,559 cf

Plug-Flow detention time= 32.3 min calculated for 1.17 af (98% of inflow)
Center-of-Mass det. time= 21.1 min (899.4 - 878.3)

Volume	Invert	Avail.Storage	Storage Description
#1	305.90'	7,652 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)
305.90	3,000	260.0	0	0	3,000
306.90	3,815	284.0	3,399	3,399	4,074
307.90	4,705	308.0	4,252	7,652	5,243

Device	Routing	Invert	Outlet Devices
#1	Primary	305.90'	**12.0" Round Culvert - Longley** L= 44.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 305.90' / 305.40' S= 0.0114 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf
#2	Secondary	307.50'	**10.0' long x 1.0' breadth Broad-Crested Rectangular Weir - heads north along** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=3.0 cfs @ 12.42 hrs HW=307.88' TW=0.00'   (Dynamic Tailwater)
└─**1=Culvert - Longley** (Barrel Controls 3.0 cfs @ 3.8 fps)

Secondary OutFlow Max=6.4 cfs @ 12.42 hrs HW=307.88'   (Free Discharge)
└─**2=Broad-Crested Rectangular Weir - heads north along Longley** (Weir Controls 6.4 cfs @ 1.7 fps)

Summary for Pond b#1: basin#1 at entry road A

Inflow Area =	0.743 ac, 60.36% Impervious, Inflow Depth > 3.99" for 25 YR event
Inflow =	3.3 cfs @ 12.09 hrs, Volume= 0.25 af
Outflow =	0.8 cfs @ 12.49 hrs, Volume= 0.25 af, Atten= 77%, Lag= 24.1 min
Discarded =	0.4 cfs @ 12.49 hrs, Volume= 0.23 af
Primary =	0.3 cfs @ 12.49 hrs, Volume= 0.01 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 252.23' @ 12.49 hrs   Surf.Area= 2,163 sf   Storage= 3,555 cf

Plug-Flow detention time= 64.5 min calculated for 0.25 af (100% of inflow)
Center-of-Mass det. time= 64.4 min (851.5 - 787.1)

Volume	Invert	Avail.Storage	Storage Description
#1	250.00'	8,286 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)
250.00	1,085	128.0	0	0	1,085
252.00	2,045	174.0	3,080	3,080	2,231
254.00	3,205	211.0	5,207	8,286	3,428

Device	Routing	Invert	Outlet Devices
#1	Discarded	250.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	253.00'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68
			2.72 2.81 2.92 2.97 3.07 3.32
#3	Primary	251.50'	**12.0" Round Culvert**
			L= 20.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 251.50' / 251.00' S= 0.0250 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Device 3	252.00'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.4 cfs @ 12.49 hrs HW=252.23' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.4 cfs)

Primary OutFlow Max=0.3 cfs @ 12.49 hrs HW=252.23' TW=0.00' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)
└─**3=Culvert** (Passes 0.3 cfs of 1.8 cfs potential flow)
 └─**4=Orifice/Grate** (Orifice Controls 0.3 cfs @ 1.5 fps)

Summary for Pond b#2: basin#2 @ #21

Inflow Area =	1.551 ac, 57.87% Impervious, Inflow Depth > 4.09" for 25 YR event	
Inflow =	6.4 cfs @ 12.11 hrs, Volume=	0.53 af
Outflow =	1.3 cfs @ 12.56 hrs, Volume=	0.53 af, Atten= 80%, Lag= 27.4 min
Discarded =	0.8 cfs @ 12.56 hrs, Volume=	0.51 af
Primary =	0.5 cfs @ 12.56 hrs, Volume=	0.02 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 262.28' @ 12.56 hrs Surf.Area= 4,175 sf Storage= 7,646 cf

Plug-Flow detention time= 68.5 min calculated for 0.53 af (100% of inflow)
Center-of-Mass det. time= 68.4 min (847.6 - 779.2)

Volume	Invert	Avail.Storage	Storage Description
#1	260.00'	15,995 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)
260.00	2,585	211.0	0	0	2,585
262.00	3,965	249.0	6,501	6,501	4,050
264.00	5,575	286.0	9,494	15,995	5,714

Device	Routing	Invert	Outlet Devices
#1	Discarded	260.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	263.00'	**8.0' long x 3.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68
			2.72 2.81 2.92 2.97 3.07 3.32
#3	Primary	260.70'	**12.0" Round Culvert**
			L= 35.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 260.70' / 260.00' S= 0.0200 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Device 3	262.00'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.8 cfs @ 12.56 hrs HW=262.28'   (Free Discharge)
└—**1=Exfiltration** (Exfiltration Controls 0.8 cfs)

Primary OutFlow Max=0.5 cfs @ 12.56 hrs HW=262.28' TW=0.00'   (Dynamic Tailwater)
├—**2=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)
└—**3=Culvert** (Passes 0.5 cfs of 3.9 cfs potential flow)
  └—**4=Orifice/Grate** (Orifice Controls 0.5 cfs @ 1.7 fps)

Summary for Pond b#3: basin#3 @ #3 & #4

Inflow Area =		2.928 ac,	41.19% Impervious,	Inflow Depth >	4.23" for 25 YR event	
Inflow	=	13.5 cfs @	12.09 hrs, Volume=	1.03 af		
Outflow	=	3.0 cfs @	12.50 hrs, Volume=	1.03 af,	Atten= 78%,	Lag= 24.8 min
Discarded	=	1.5 cfs @	12.50 hrs, Volume=	0.92 af		
Primary	=	1.5 cfs @	12.50 hrs, Volume=	0.11 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 288.16' @ 12.50 hrs   Surf.Area= 7,843 sf Storage= 14,306 cf

Plug-Flow detention time= 56.4 min calculated for 1.03 af (100% of inflow)
Center-of-Mass det. time= 56.3 min (840.8 - 784.5)

Volume	Invert	Avail.Storage	Storage Description
#1	286.00'	30,774 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)
286.00	5,480	345.0	0	0	5,480
288.00	7,665	383.0	13,084	13,084	7,799
290.00	10,080	421.0	17,690	30,774	10,359

Device	Routing	Invert	Outlet Devices
#1	Discarded	286.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	289.00'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68
			2.72 2.81 2.92 2.97 3.07 3.32

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#3	Primary	287.00'	**12.0" Round Culvert**
			L= 40.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 287.00' / 286.50' S= 0.0125 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Device 3	287.50'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=1.5 cfs @ 12.50 hrs HW=288.16' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 1.5 cfs)

Primary OutFlow Max=1.5 cfs @ 12.50 hrs HW=288.16' TW=0.00' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)
└─**3=Culvert** (Passes 1.5 cfs of 3.1 cfs potential flow)
　└─**4=Orifice/Grate** (Orifice Controls 1.5 cfs @ 3.0 fps)

Summary for Pond b#4: basin #4 @ #25

Inflow Area =	0.963 ac,	36.84% Impervious,	Inflow Depth >	3.87"	for 25 YR event
Inflow =	4.2 cfs @	12.09 hrs,	Volume=	0.31 af	
Outflow =	1.5 cfs @	12.36 hrs,	Volume=	0.23 af,	Atten= 65%, Lag= 16.8 min
Discarded =	0.1 cfs @	12.36 hrs,	Volume=	0.16 af	
Primary =	1.3 cfs @	12.36 hrs,	Volume=	0.06 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 265.14' @ 12.36 hrs Surf.Area= 2,637 sf Storage= 5,718 cf

Plug-Flow detention time= 216.5 min calculated for 0.23 af (74% of inflow)
Center-of-Mass det. time= 128.8 min (919.6 - 790.8)

Volume	Invert	Avail.Storage	Storage Description
#1	262.00'	8,201 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)
262.00	1,100	135.0	0	0	1,100
264.00	2,015	172.0	3,069	3,069	2,055
266.00	3,160	210.0	5,132	8,201	3,271

Device	Routing	Invert	Outlet Devices
#1	Discarded	262.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	265.00'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68
			2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.1 cfs @ 12.36 hrs HW=265.14' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=1.3 cfs @ 12.36 hrs HW=265.14' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir**(Weir Controls 1.3 cfs @ 0.9 fps)

Summary for Pond b#5: basin#5 @ #26

Inflow Area =	1.435 ac,	38.18% Impervious,	Inflow Depth >	3.64"	for 25 YR event
Inflow =	6.0 cfs @	12.09 hrs,	Volume=	0.44 af	
Outflow =	5.0 cfs @	12.14 hrs,	Volume=	0.37 af,	Atten= 17%, Lag= 3.3 min
Discarded =	0.1 cfs @	12.14 hrs,	Volume=	0.14 af	
Primary =	4.8 cfs @	12.14 hrs,	Volume=	0.24 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 254.24' @ 12.14 hrs   Surf.Area= 2,508 sf   Storage= 5,281 cf

Plug-Flow detention time= 113.4 min calculated for 0.37 af (86% of inflow)
Center-of-Mass det. time= 51.4 min (855.5 - 804.1)

Volume	Invert	Avail.Storage	Storage Description
#1	251.00'	7,373 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)
251.00	860	128.0	0	0	860
253.00	1,815	177.0	2,616	2,616	2,088
255.00	2,990	215.0	4,756	7,373	3,336

Device	Routing	Invert	Outlet Devices
#1	Discarded	251.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	254.00'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68
			2.72 2.81 2.92 2.97 3.07 3.32
#3	Primary	252.50'	**12.0" Round Culvert**
			L= 20.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 252.50' / 252.00' S= 0.0250 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Device 3	253.30'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.1 cfs @ 12.14 hrs HW=254.24'   (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=4.8 cfs @ 12.14 hrs HW=254.24' TW=0.00'   (Dynamic Tailwater)
├**2=Broad-Crested Rectangular Weir** (Weir Controls 2.9 cfs @ 1.2 fps)
└**3=Culvert** (Passes 2.0 cfs of 4.2 cfs potential flow)
  └**4=Orifice/Grate** (Orifice Controls 2.0 cfs @ 4.0 fps)

Summary for Pond b#6: PSIF#6

Inflow Area =	0.108 ac,	100.00% Impervious,	Inflow Depth >	5.06"	for 25 YR event
Inflow =	0.6 cfs @	12.08 hrs,	Volume=	0.05 af	
Outflow =	0.0 cfs @	10.60 hrs,	Volume=	0.04 af,	Atten= 95%, Lag= 0.0 min
Discarded =	0.0 cfs @	10.60 hrs,	Volume=	0.04 af	
Primary =	0.0 cfs @	0.00 hrs,	Volume=	0.00 af	

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 2.50' @ 14.12 hrs   Surf.Area= 504 sf   Storage= 875 cf

Plug-Flow detention time= 232.2 min calculated for 0.04 af (87% of inflow)
Center-of-Mass det. time= 171.9 min (918.4 - 746.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	446 cf	**20.58'W x 24.50'L x 3.54'H Field A**
			1,786 cf Overall - 671 cf Embedded = 1,115 cf x 40.0% Voids
#2A	0.50'	671 cf	**Cultec R-330XL** x 12 Inside #1
			Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
			Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
			Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		1,117 cf	**Total Available Storage**

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**2.400 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	3.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.0 cfs @ 10.60 hrs HW=0.04'   (Free Discharge)
⌐**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=0.00' TW=0.00'   (Dynamic Tailwater)
⌐**2=Orifice/Grate** (Controls 0.0 cfs)

Summary for Pond b#7: PSIF#7

Inflow Area =		0.108 ac,100.00% Impervious,	Inflow Depth >	5.06"	for 25 YR event	
Inflow	=	0.6 cfs @ 12.08 hrs,	Volume=	0.05 af		
Outflow	=	0.0 cfs @ 10.60 hrs,	Volume=	0.04 af,	Atten= 95%,	Lag= 0.0 min
Discarded =		0.0 cfs @ 10.60 hrs,	Volume=	0.04 af		
Primary	=	0.0 cfs @ 0.00 hrs,	Volume=	0.00 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 2.50' @ 14.12 hrs   Surf.Area= 504 sf   Storage= 875 cf

Plug-Flow detention time= 232.2 min calculated for 0.04 af (87% of inflow)
Center-of-Mass det. time= 171.9 min (918.4 - 746.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	446 cf	**20.58'W x 24.50'L x 3.54'H Field A**
			1,786 cf Overall - 671 cf Embedded = 1,115 cf x 40.0% Voids
#2A	0.50'	671 cf	**Cultec R-330XL** x 12 Inside #1
			Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
			Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
			Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		1,117 cf	**Total Available Storage**

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Type III 24-hr 25 YR Rainfall=5.30"
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Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**2.400 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	3.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.0 cfs @ 10.60 hrs HW=0.04'   (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=0.00' TW=0.00'   (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 0.0 cfs)

Summary for Pond b#8: basin #8 @ #10 & #11

Inflow Area =	0.793 ac, 35.30% Impervious, Inflow Depth > 4.16" for 25 YR event			
Inflow =	3.7 cfs @ 12.08 hrs, Volume=	0.27 af		
Outflow =	1.5 cfs @ 12.29 hrs, Volume=	0.18 af, Atten= 58%, Lag= 12.4 min		
Discarded =	0.0 cfs @ 12.29 hrs, Volume=	0.02 af		
Primary =	1.5 cfs @ 12.29 hrs, Volume=	0.16 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 337.22' @ 12.29 hrs Surf.Area= 2,542 sf Storage= 5,422 cf

Plug-Flow detention time= 177.9 min calculated for 0.18 af (66% of inflow)
Center-of-Mass det. time= 81.9 min (870.1 - 788.2)

Volume	Invert	Avail.Storage	Storage Description
#1	334.00'	7,579 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)
334.00	925	137.0	0	0	925
336.00	1,865	175.0	2,736	2,736	1,919
338.00	3,025	213.0	4,843	7,579	3,155

Device	Routing	Invert	Outlet Devices
#1	Discarded	334.00'	**0.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	337.20'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#3	Primary	334.00'	**8.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 334.00' / 330.00' S= 0.1333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#4	Device 3	336.60'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

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Type III 24-hr 25 YR Rainfall=5.30"
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Discarded OutFlow Max=0.0 cfs @ 12.29 hrs HW=337.22'   (Free Discharge)
└—**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=1.5 cfs @ 12.29 hrs HW=337.22' TW=0.00'   (Dynamic Tailwater)
├—**2=Broad-Crested Rectangular Weir**(Weir Controls 0.1 cfs @ 0.4 fps)
└—**3=Culvert** (Passes 1.4 cfs of 2.9 cfs potential flow)
  └—**4=Orifice/Grate** (Orifice Controls 1.4 cfs @ 2.9 fps)

PROPOSED CONDITIONS
100-YEAR 24-HOUR STORM EVENT ANALYSIS

Summary for Subcatchment sc#10: entry road A

CN per Groton SH2O requirements

Runoff   =   2.2 cfs @ 12.08 hrs, Volume=   0.17 af, Depth> 5.90"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

	Area (sf)	CN	Description
*	13,405	98	impervious area
	1,105	68	<50% Grass cover, Poor, HSG A
	685	86	<50% Grass cover, Poor, HSG C
	15,195	95	Weighted Average
	1,790		11.78% Pervious Area
	13,405		88.22% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry, roadway to cb**

Summary for Subcatchment sc#11: road A to intersection road B

CN per Groton SH2O requirements

Runoff   =   5.6 cfs @ 12.12 hrs, Volume=   0.48 af, Depth> 5.90"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

	Area (sf)	CN	Description
*	25,970	98	impervious area
	4,855	86	<50% Grass cover, Poor, HSG C
*	2,060	98	impervious area
	4,770	86	<50% Grass cover, Poor, HSG C
*	4,685	98	impervious area
	42,340	95	Weighted Average
	9,625		22.73% Pervious Area
	32,715		77.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0200	0.1		**Sheet Flow,**
					Grass: Dense n= 0.240 P2= 3.10"
0.3	58	0.1700	2.9		**Shallow Concentrated Flow, overland to roadway**
					Short Grass Pasture Kv= 7.0 fps
0.1	33	0.0850	5.9		**Shallow Concentrated Flow, roadway to cb**
					Paved Kv= 20.3 fps
8.7	141	Total			

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Type III 24-hr 100 YR Rainfall=6.50"
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Summary for Subcatchment sc#12: NE road A by #21 & #22

CN per Groton SH2O requirements

Runoff = 2.0 cfs @ 12.09 hrs, Volume= 0.14 af, Depth> 3.61"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

	Area (sf)	CN	Description
*	1,705	98	impervious area
	6,465	68	<50% Grass cover, Poor, HSG A
	12,380	74	>75% Grass cover, Good, HSG C
	20,550	74	Weighted Average
	18,845		91.70% Pervious Area
	1,705		8.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	50	0.1200	0.2		**Sheet Flow, yard downgrade**
					Grass: Dense n= 0.240 P2= 3.10"
0.5	80	0.1350	2.6		**Shallow Concentrated Flow, overland to basin**
					Short Grass Pasture Kv= 7.0 fps
1.4					**Direct Entry, minimum tc**
6.0	130	Total			

Summary for Subcatchment sc#13: nw road A @ entry (sand hill)

CN per Groton SH2O requirements

Runoff = 6.3 cfs @ 12.15 hrs, Volume= 0.54 af, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

	Area (sf)	CN	Description
*	570	98	impervious area
	62,350	30	Woods, Good, HSG A
	33,455	77	Woods, Good, HSG D
	13,980	68	<50% Grass cover, Poor, HSG A
	2,525	86	<50% Grass cover, Poor, HSG C
*	23,180	98	BVW
	136,060	58	Weighted Average
	112,310		82.54% Pervious Area
	23,750		17.46% Impervious Area

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Type III 24-hr 100 YR Rainfall=6.50"
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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	50	0.1200	0.1		**Sheet Flow, woods edge**
					Woods: Light underbrush n= 0.400 P2= 3.10"
0.7	105	0.2700	2.6		**Shallow Concentrated Flow, to bvw and stream**
					Woodland Kv= 5.0 fps
3.0	266	0.0100	1.5		**Shallow Concentrated Flow, thru bvw**
					Grassed Waterway Kv= 15.0 fps
9.8	421	Total			

Summary for Subcatchment sc#14: w road A - units #19 & #20

CN per Groton SH2O requirements

Runoff   =   2.0 cfs @ 12.09 hrs, Volume=   0.15 af, Depth> 4.44"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

	Area (sf)	CN	Description
*	6,125	98	impervious area
	8,050	68	<50% Grass cover, Poor, HSG A
	2,985	86	<50% Grass cover, Poor, HSG C
	17,160	82	Weighted Average
	11,035		64.31% Pervious Area
	6,125		35.69% Impervious Area

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

Summary for Subcatchment sc#15: west to town bvw

CN per Groton SH2O requirements

Runoff   =   42.4 cfs @ 12.11 hrs, Volume=   3.19 af, Depth> 3.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

	Area (sf)	CN	Description
*	10,500	98	impervious area
	48,455	30	Woods, Good, HSG A
	333,805	70	Woods, Good, HSG C
	16,120	77	Woods, Good, HSG D
	111,985	86	<50% Grass cover, Poor, HSG C
	520,865	70	Weighted Average
	510,365		97.98% Pervious Area
	10,500		2.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.5	50	0.1600	0.2		**Sheet Flow, woods**
					Woods: Light underbrush n= 0.400 P2= 3.10"
2.1	290	0.2200	2.3		**Shallow Concentrated Flow, overland to bvw**
					Woodland Kv= 5.0 fps
7.6	340	Total			

Summary for Subcatchment sc#16: roadway B @ intersection

CN per Groton SH2O requirements

Runoff   =   3.0 cfs @ 12.08 hrs, Volume=   0.23 af, Depth> 5.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

	Area (sf)	CN	Description
*	14,215	98	impervious area
	2,140	79	<50% Grass cover, Poor, HSG B
	4,365	86	<50% Grass cover, Poor, HSG C
	20,720	94	Weighted Average
	6,505		31.39% Pervious Area
	14,215		68.61% Impervious Area

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

Summary for Subcatchment sc#16a: road B @ entry (longley)

Runoff   =   6.6 cfs @ 12.09 hrs, Volume=   0.49 af, Depth> 4.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

	Area (sf)	CN	Description
*	21,875	98	impervious area
	6,340	68	<50% Grass cover, Poor, HSG A
	23,750	79	<50% Grass cover, Poor, HSG B
	51,965	86	Weighted Average
	30,090		57.90% Pervious Area
	21,875		42.10% Impervious Area

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

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Type III 24-hr 100 YR Rainfall=6.50"
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Summary for Subcatchment sc#17: at basin #4

CN per Groton SH2O requirements

Runoff   =   2.4 cfs @   12.09 hrs, Volume=   0.17 af, Depth> 4.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

	Area (sf)	CN	Description
*	1,245	98	impervious area
	19,995	79	<50% Grass cover, Poor, HSG B
	21,240	80	Weighted Average
	19,995		94.14% Pervious Area
	1,245		5.86% Impervious Area

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

Summary for Subcatchment sc#18: ne corner btwn roads

CN per Groton SH2O requirements

Runoff   =   29.8 cfs @   12.26 hrs, Volume=   3.05 af, Depth> 2.90"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

	Area (sf)	CN	Description
*	16,540	98	impervious area
	60,600	51	1 acre lots, 20% imp, HSG A
	122,980	30	Woods, Good, HSG A
	33,600	55	Woods, Good, HSG B
	30,185	70	Woods, Good, HSG C
	93,990	77	Woods, Good, HSG D
	24,860	68	<50% Grass cover, Poor, HSG A
	18,840	79	<50% Grass cover, Poor, HSG B
	42,475	86	<50% Grass cover, Poor, HSG C
*	105,090	98	BVW
	549,160	67	Weighted Average
	415,410		75.64% Pervious Area
	133,750		24.36% Impervious Area

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Type III 24-hr 100 YR Rainfall=6.50"
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Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	50	0.0700	0.1		**Sheet Flow, edge woods**
					Woods: Light underbrush n= 0.400 P2= 3.10"
2.5	200	0.0700	1.3		**Shallow Concentrated Flow, to bvw**
					Woodland Kv= 5.0 fps
2.3	360	0.0300	2.6		**Shallow Concentrated Flow, leg bvw**
					Grassed Waterway Kv= 15.0 fps
5.8	525	0.0100	1.5		**Shallow Concentrated Flow, thru bvw**
					Grassed Waterway Kv= 15.0 fps
18.2	1,135	Total			

Summary for Subcatchment sc#19: se road intersection @ #3 & #4

CN per Groton SH2O requirements

Runoff   =   6.2 cfs @   12.10 hrs, Volume=   0.48 af, Depth> 4.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

	Area (sf)	CN	Description
*	8,190	98	impervious area
	6,950	79	<50% Grass cover, Poor, HSG B
	35,225	86	<50% Grass cover, Poor, HSG C
	50,365	87	Weighted Average
	42,175		83.74% Pervious Area
	8,190		16.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.0400	0.1		**Sheet Flow, knob**
					Grass: Dense n= 0.240 P2= 3.10"
1.2	235	0.2300	3.4		**Shallow Concentrated Flow, overland yard to basin**
					Short Grass Pasture Kv= 7.0 fps
7.5	285	Total			

Summary for Subcatchment sc#20: road A upper circle

CN per Groton SH2O requirements

Runoff   =   10.9 cfs @   12.08 hrs, Volume=   0.84 af, Depth> 5.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

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Type III 24-hr 100 YR Rainfall=6.50"
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Area (sf)	CN	Description
* 23,900	98	impervious area
14,500	86	<50% Grass cover, Poor, HSG C
* 11,705	98	impervious area
18,340	86	<50% Grass cover, Poor, HSG C
* 4,685	98	impervious area
* 4,065	98	impervious area
77,195	93	Weighted Average
32,840		42.54% Pervious Area
44,355		57.46% Impervious Area

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

Summary for Subcatchment sc#21: se locus

CN per Groton SH2O requirements

Runoff   =   35.0 cfs @ 12.39 hrs, Volume=   4.35 af, Depth> 2.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

Area (sf)	CN	Description
* 13,975	98	impervious area
33,165	51	1 acre lots, 20% imp, HSG A
2,930	68	1 acre lots, 20% imp, HSG B
463,470	30	Woods, Good, HSG A
97,000	55	Woods, Good, HSG B
147,970	70	Woods, Good, HSG C
27,315	77	Woods, Good, HSG D
16,595	68	<50% Grass cover, Poor, HSG A
29,185	79	<50% Grass cover, Poor, HSG B
39,985	86	<50% Grass cover, Poor, HSG C
* 230,400	98	bvw
1,101,990	58	Weighted Average
850,396		77.17% Pervious Area
251,594		22.83% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.6	50	0.1500	0.1		**Sheet Flow, offsite knob**
					Woods: Light underbrush n= 0.400 P2= 3.10"
3.7	430	0.1500	1.9		**Shallow Concentrated Flow, overland to bvw**
					Woodland Kv= 5.0 fps
1.2	280	0.0700	4.0		**Shallow Concentrated Flow, bvw to stream by road**
					Grassed Waterway Kv= 15.0 fps
9.5	1,050	0.0150	1.8		**Shallow Concentrated Flow, stream thru bvw to crossing**
					Grassed Waterway Kv= 15.0 fps
5.8	525	0.0100	1.5		**Shallow Concentrated Flow, thru bvw**
					Grassed Waterway Kv= 15.0 fps
25.8	2,335	Total			

Summary for Subcatchment sc#22: drive @ #25 & #26

CN per Groton SH2O requirements

Runoff   =   1.2 cfs @ 12.09 hrs, Volume=   0.09 af, Depth> 4.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

	Area (sf)	CN	Description
*	1,985	98	impervious area
	2,680	68	<50% Grass cover, Poor, HSG A
	5,860	79	<50% Grass cover, Poor, HSG B
	10,525	80	Weighted Average
	8,540		81.14% Pervious Area
	1,985		18.86% Impervious Area

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

Summary for Subcatchment sc#23: Unit #1 & #2 - 4685 rooftop

Runoff   =   0.7 cfs @ 12.08 hrs, Volume=   0.06 af, Depth> 6.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

	Area (sf)	CN	Description
*	4,685	98	impervious area
	4,685		100.00% Impervious Area

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

Summary for Subcatchment sc#24: Unit #25 & #26 - 4685 rooftop

Runoff   =   0.7 cfs @ 12.08 hrs, Volume=   0.06 af, Depth> 6.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

	Area (sf)	CN	Description
*	4,685	98	impervious area
	4,685		100.00% Impervious Area

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

Summary for Subcatchment sc#25: Unit #21 & #22 - 4685 rooftop

Runoff   =   0.7 cfs @ 12.08 hrs, Volume=   0.06 af, Depth> 6.26"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

	Area (sf)	CN	Description
*	4,685	98	impervious area
	4,685		100.00% Impervious Area

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

Summary for Subcatchment sc#26: units #9-#12 by circle

Runoff   =   4.7 cfs @ 12.08 hrs, Volume=   0.35 af, Depth> 5.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

	Area (sf)	CN	Description
*	12,190	98	impervious area
	22,345	86	<50% Grass cover, Poor, HSG C
	34,535	90	Weighted Average
	22,345		64.70% Pervious Area
	12,190		35.30% Impervious Area

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

Summary for Subcatchment sc#3: area east side Longley to culvert

Runoff   =   16.5 cfs @ 12.30 hrs, Volume=   1.81 af, Depth> 2.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=6.50"

	Area (sf)	CN	Description
*	9,060	98	impervious area
	172,750	51	1 acre lots, 20% imp, HSG A
	223,820	68	1 acre lots, 20% imp, HSG B
	405,630	61	Weighted Average
	317,256		78.21% Pervious Area
	88,374		21.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	50	0.0300	0.1		**Sheet Flow, high elevation**
					Woods: Light underbrush n= 0.400 P2= 3.10"
3.6	285	0.0700	1.3		**Shallow Concentrated Flow, overland thru woods**
					Woodland Kv= 5.0 fps
3.4	345	0.0600	1.7		**Shallow Concentrated Flow, thru residential**
					Short Grass Pasture Kv= 7.0 fps
2.7	295	0.1300	1.8		**Shallow Concentrated Flow, woods to culvert**
					Woodland Kv= 5.0 fps
20.4	975				Total

Summary for Reach dp#1: nw corner bvw

Inflow Area =   70.926 ac, 22.01% Impervious, Inflow Depth > 2.28"   for 100 YR event
Inflow   =   105.4 cfs @ 12.18 hrs, Volume=   13.50 af
Outflow   =   105.4 cfs @ 12.18 hrs, Volume=   13.50 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Summary for Pond 1P: depression thru culvert

Inflow Area =   9.312 ac, 21.79% Impervious, Inflow Depth > 2.33"   for 100 YR event
Inflow   =   16.5 cfs @ 12.30 hrs, Volume=   1.81 af
Outflow   =   18.2 cfs @ 12.31 hrs, Volume=   1.78 af, Atten= 0%, Lag= 0.3 min
Primary   =   3.3 cfs @ 12.31 hrs, Volume=   1.25 af
Secondary =   14.9 cfs @ 12.31 hrs, Volume=   0.53 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

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Peak Elev= 308.16' @ 12.31 hrs   Surf.Area= 4,705 sf   Storage= 7,652 cf

Plug-Flow detention time= 26.8 min calculated for 1.78 af (98% of inflow)
Center-of-Mass det. time= 17.8 min (883.5 - 865.7)

Volume	Invert	Avail.Storage	Storage Description
#1	305.90'	7,652 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)
305.90	3,000	260.0	0	0	3,000
306.90	3,815	284.0	3,399	3,399	4,074
307.90	4,705	308.0	4,252	7,652	5,243

Device	Routing	Invert	Outlet Devices
#1	Primary	305.90'	**12.0" Round Culvert - Longley** L= 44.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 305.90' / 305.40' S= 0.0114 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf
#2	Secondary	307.50'	**10.0' long x 1.0' breadth Broad-Crested Rectangular Weir - heads north along** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=3.3 cfs @ 12.31 hrs HW=308.16' TW=0.00'   (Dynamic Tailwater)
⌐—**1=Culvert - Longley** (Barrel Controls 3.3 cfs @ 4.1 fps)

Secondary OutFlow Max=14.9 cfs @ 12.31 hrs HW=308.16'   (Free Discharge)
⌐—**2=Broad-Crested Rectangular Weir - heads north along Longley** (Weir Controls 14.9 cfs @ 2.3 fps)

Summary for Pond b#1: basin#1 at entry road A

Inflow Area =	0.743 ac, 60.36% Impervious, Inflow Depth > 5.13" for 100 YR event	
Inflow =	4.2 cfs @ 12.08 hrs, Volume=	0.32 af
Outflow =	1.5 cfs @ 12.35 hrs, Volume=	0.32 af, Atten= 65%, Lag= 16.0 min
Discarded =	0.4 cfs @ 12.35 hrs, Volume=	0.27 af
Primary =	1.1 cfs @ 12.35 hrs, Volume=	0.05 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 252.48' @ 12.35 hrs   Surf.Area= 2,298 sf   Storage= 4,114 cf

Plug-Flow detention time= 60.5 min calculated for 0.32 af (100% of inflow)
Center-of-Mass det. time= 60.4 min (841.7 - 781.4)

Volume	Invert	Avail.Storage	Storage Description
#1	250.00'	8,286 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

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Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
250.00	1,085	128.0	0	0	1,085
252.00	2,045	174.0	3,080	3,080	2,231
254.00	3,205	211.0	5,207	8,286	3,428

Device	Routing	Invert	Outlet Devices
#1	Discarded	250.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	253.00'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#3	Primary	251.50'	**12.0" Round Culvert** L= 20.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 251.50' / 251.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Device 3	252.00'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.4 cfs @ 12.35 hrs HW=252.48'   (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.4 cfs)

Primary OutFlow Max=1.1 cfs @ 12.35 hrs HW=252.48' TW=0.00'   (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)
└─**3=Culvert** (Passes 1.1 cfs of 2.6 cfs potential flow)
 └─**4=Orifice/Grate** (Orifice Controls 1.1 cfs @ 2.2 fps)

Summary for Pond b#2: basin#2 @ #21

Inflow Area =		1.551 ac,	57.87% Impervious,	Inflow Depth > 5.23"	for 100 YR event
Inflow	=	8.1 cfs @	12.11 hrs,	Volume=	0.68 af
Outflow	=	2.3 cfs @	12.47 hrs,	Volume=	0.68 af, Atten= 71%, Lag= 22.0 min
Discarded	=	0.9 cfs @	12.47 hrs,	Volume=	0.58 af
Primary	=	1.5 cfs @	12.47 hrs,	Volume=	0.09 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 262.65' @ 12.47 hrs   Surf.Area= 4,455 sf Storage= 9,216 cf

Plug-Flow detention time= 65.8 min calculated for 0.68 af (100% of inflow)
Center-of-Mass det. time= 65.7 min (840.2 - 774.5)

Volume	Invert	Avail.Storage	Storage Description
#1	260.00'	15,995 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)
260.00	2,585	211.0	0	0	2,585
262.00	3,965	249.0	6,501	6,501	4,050
264.00	5,575	286.0	9,494	15,995	5,714

Device	Routing	Invert	Outlet Devices
#1	Discarded	260.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	263.00'	**8.0' long x 3.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68
			2.72 2.81 2.92 2.97 3.07 3.32
#3	Primary	260.70'	**12.0" Round Culvert**
			L= 35.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 260.70' / 260.00' S= 0.0200 '/' Cc= 0.900
			n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Device 3	262.00'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.9 cfs @ 12.47 hrs HW=262.65' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.9 cfs)

Primary OutFlow Max=1.5 cfs @ 12.47 hrs HW=262.65' TW=0.00' (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)
└─**3=Culvert** (Passes 1.5 cfs of 4.5 cfs potential flow)
  └─**4=Orifice/Grate** (Orifice Controls 1.5 cfs @ 3.0 fps)

Summary for Pond b#3: basin#3 @ #3 & #4

Inflow Area =	2.928 ac,	41.19% Impervious,	Inflow Depth > 5.40"	for 100 YR event
Inflow =	17.0 cfs @	12.09 hrs,	Volume= 1.32 af	
Outflow =	3.9 cfs @	12.50 hrs,	Volume= 1.32 af,	Atten= 77%, Lag= 24.3 min
Discarded =	1.6 cfs @	12.50 hrs,	Volume= 1.08 af	
Primary =	2.3 cfs @	12.50 hrs,	Volume= 0.24 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 288.66' @ 12.50 hrs Surf.Area= 8,428 sf Storage= 18,409 cf

Plug-Flow detention time= 57.6 min calculated for 1.32 af (100% of inflow)
Center-of-Mass det. time= 57.5 min (835.9 - 778.3)

Volume	Invert	Avail.Storage	Storage Description
#1	286.00'	30,774 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)
286.00	5,480	345.0	0	0	5,480
288.00	7,665	383.0	13,084	13,084	7,799
290.00	10,080	421.0	17,690	30,774	10,359

Device	Routing	Invert	Outlet Devices
#1	Discarded	286.00'	**8.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	289.00'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
			2.50 3.00 3.50 4.00 4.50
			Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68
			2.72 2.81 2.92 2.97 3.07 3.32

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#3	Primary	287.00'	**12.0" Round Culvert**	

L= 40.0' RCP, sq.cut end projecting, Ke= 0.500
Inlet / Outlet Invert= 287.00' / 286.50' S= 0.0125 '/' Cc= 0.900
n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

#4	Device 3	287.50'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=1.6 cfs @ 12.50 hrs HW=288.66'   (Free Discharge)
└—**1=Exfiltration** (Exfiltration Controls 1.6 cfs)

Primary OutFlow Max=2.3 cfs @ 12.50 hrs HW=288.66' TW=0.00'   (Dynamic Tailwater)
├—**2=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)
└—**3=Culvert** (Passes 2.3 cfs of 4.1 cfs potential flow)
  └—**4=Orifice/Grate** (Orifice Controls 2.3 cfs @ 4.6 fps)

Summary for Pond b#4: basin #4 @ #25

Inflow Area =		0.963 ac, 36.84% Impervious, Inflow Depth > 5.00" for 100 YR event			
Inflow	=	5.4 cfs @	12.09 hrs,	Volume=	0.40 af
Outflow	=	3.5 cfs @	12.17 hrs,	Volume=	0.31 af, Atten= 34%, Lag= 5.3 min
Discarded	=	0.2 cfs @	12.17 hrs,	Volume=	0.17 af
Primary	=	3.4 cfs @	12.17 hrs,	Volume=	0.14 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 265.27' @ 12.17 hrs Surf.Area= 2,710 sf Storage= 6,047 cf

Plug-Flow detention time= 171.5 min calculated for 0.31 af (78% of inflow)
Center-of-Mass det. time= 90.6 min (875.4 - 784.9)

Volume	Invert	Avail.Storage	Storage Description	
#1	262.00'	8,201 cf	**Custom Stage Data (Irregular)**Listed below (Recalc)	

Elevation	Surf.Area	Perim.	Inc.Store	Cum.Store	Wet.Area
(feet)	(sq-ft)	(feet)	(cubic-feet)	(cubic-feet)	(sq-ft)
262.00	1,100	135.0	0	0	1,100
264.00	2,015	172.0	3,069	3,069	2,055
266.00	3,160	210.0	5,132	8,201	3,271

Device	Routing	Invert	Outlet Devices
#1	Discarded	262.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	265.00'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir**

Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
2.50 3.00 3.50 4.00 4.50
Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68
2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.2 cfs @ 12.17 hrs HW=265.26'   (Free Discharge)
└—**1=Exfiltration** (Exfiltration Controls 0.2 cfs)

Primary OutFlow Max=3.4 cfs @ 12.17 hrs HW=265.26' TW=0.00'   (Dynamic Tailwater)
└—**2=Broad-Crested Rectangular Weir**(Weir Controls 3.4 cfs @ 1.3 fps)

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Summary for Pond b#5: basin#5 @ #26

Inflow Area =   1.435 ac, 38.18% Impervious, Inflow Depth > 4.77"   for 100 YR event
Inflow   =   7.8 cfs @ 12.09 hrs, Volume=   0.57 af
Outflow   =   7.4 cfs @ 12.12 hrs, Volume=   0.50 af, Atten= 6%, Lag= 1.8 min
Discarded =   0.1 cfs @ 12.12 hrs, Volume=   0.14 af
Primary   =   7.2 cfs @ 12.12 hrs, Volume=   0.36 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 254.34' @ 12.12 hrs   Surf.Area= 2,571 sf   Storage= 5,545 cf

Plug-Flow detention time= 93.5 min calculated for 0.50 af (88% of inflow)
Center-of-Mass det. time= 38.2 min (834.8 - 796.6)

Volume	Invert	Avail.Storage	Storage Description
#1	251.00'	7,373 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)
251.00	860	128.0	0	0	860
253.00	1,815	177.0	2,616	2,616	2,088
255.00	2,990	215.0	4,756	7,373	3,336

Device	Routing	Invert	Outlet Devices
#1	Discarded	251.00'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	254.00'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#3	Primary	252.50'	**12.0" Round Culvert** L= 20.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 252.50' / 252.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#4	Device 3	253.30'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.1 cfs @ 12.12 hrs HW=254.34'   (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=7.2 cfs @ 12.12 hrs HW=254.34' TW=0.00'   (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir** (Weir Controls 5.1 cfs @ 1.5 fps)
└─**3=Culvert** (Passes 2.1 cfs of 4.4 cfs potential flow)
  └─**4=Orifice/Grate** (Orifice Controls 2.1 cfs @ 4.3 fps)

Summary for Pond b#6: PSIF#6

Inflow Area =   0.108 ac, 100.00% Impervious, Inflow Depth > 6.26"   for 100 YR event
Inflow   =   0.7 cfs @ 12.08 hrs, Volume=   0.06 af
Outflow   =   0.1 cfs @ 12.65 hrs, Volume=   0.05 af, Atten= 88%, Lag= 34.2 min
Discarded =   0.0 cfs @   9.99 hrs, Volume=   0.04 af
Primary   =   0.1 cfs @ 12.65 hrs, Volume=   0.00 af

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Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 3.16' @ 12.65 hrs   Surf.Area= 504 sf   Storage= 1,039 cf

Plug-Flow detention time= 219.3 min calculated for 0.05 af (80% of inflow)
Center-of-Mass det. time= 143.0 min (886.4 - 743.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	446 cf	**20.58'W x 24.50'L x 3.54'H Field A**
			1,786 cf Overall - 671 cf Embedded = 1,115 cf x 40.0% Voids
#2A	0.50'	671 cf	**Cultec R-330XL** x 12 Inside #1
			Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
			Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
			Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		1,117 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**2.400 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	3.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.0 cfs @ 9.99 hrs HW=0.04'   (Free Discharge)
└—**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.1 cfs @ 12.65 hrs HW=3.16' TW=0.00'   (Dynamic Tailwater)
└—**2=Orifice/Grate** (Orifice Controls 0.1 cfs @ 1.3 fps)

Summary for Pond b#7: PSIF#7

Inflow Area =	0.108 ac,100.00% Impervious,	Inflow Depth >	6.26"	for 100 YR event
Inflow =	0.7 cfs @ 12.08 hrs,	Volume=	0.06 af	
Outflow =	0.1 cfs @ 12.65 hrs,	Volume=	0.05 af,	Atten= 88%, Lag= 34.2 min
Discarded =	0.0 cfs @ 9.99 hrs,	Volume=	0.04 af	
Primary =	0.1 cfs @ 12.65 hrs,	Volume=	0.00 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 3.16' @ 12.65 hrs   Surf.Area= 504 sf   Storage= 1,039 cf

Plug-Flow detention time= 219.3 min calculated for 0.05 af (80% of inflow)
Center-of-Mass det. time= 143.0 min (886.4 - 743.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	446 cf	**20.58'W x 24.50'L x 3.54'H Field A**
			1,786 cf Overall - 671 cf Embedded = 1,115 cf x 40.0% Voids
#2A	0.50'	671 cf	**Cultec R-330XL** x 12 Inside #1
			Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
			Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
			Row Length Adjustment= +1.50' x 7.45 sf x 4 rows
		1,117 cf	Total Available Storage

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Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**2.400 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	3.00'	**4.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.0 cfs @ 9.99 hrs HW=0.04' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.1 cfs @ 12.65 hrs HW=3.16' TW=0.00' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Orifice Controls 0.1 cfs @ 1.3 fps)

Summary for Pond b#8: basin #8 @ #10 & #11

Inflow Area =		0.793 ac, 35.30% Impervious,	Inflow Depth >	5.33"	for 100 YR event	
Inflow	=	4.7 cfs @	12.08 hrs,	Volume=	0.35 af	
Outflow	=	3.7 cfs @	12.15 hrs,	Volume=	0.26 af,	Atten= 22%, Lag= 3.8 min
Discarded	=	0.0 cfs @	12.15 hrs,	Volume=	0.02 af	
Primary	=	3.7 cfs @	12.15 hrs,	Volume=	0.24 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 337.38' @ 12.15 hrs Surf.Area= 2,637 sf Storage= 5,834 cf

Plug-Flow detention time= 155.3 min calculated for 0.26 af (74% of inflow)
Center-of-Mass det. time= 69.1 min (850.7 - 781.6)

Volume	Invert	Avail.Storage	Storage Description
#1	334.00'	7,579 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)
334.00	925	137.0	0	0	925
336.00	1,865	175.0	2,736	2,736	1,919
338.00	3,025	213.0	4,843	7,579	3,155

Device	Routing	Invert	Outlet Devices
#1	Discarded	334.00'	**0.270 in/hr Exfiltration over Surface area** Phase-In= 0.01'
#2	Primary	337.20'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32
#3	Primary	334.00'	**8.0" Round Culvert** L= 30.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 334.00' / 330.00' S= 0.1333 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf
#4	Device 3	336.60'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.0 cfs @ 12.15 hrs HW=337.38'   (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=3.6 cfs @ 12.15 hrs HW=337.38' TW=0.00'   (Dynamic Tailwater)
├─**2=Broad-Crested Rectangular Weir**(Weir Controls 1.9 cfs @ 1.0 fps)
└─**3=Culvert** (Passes 1.7 cfs of 2.9 cfs potential flow)
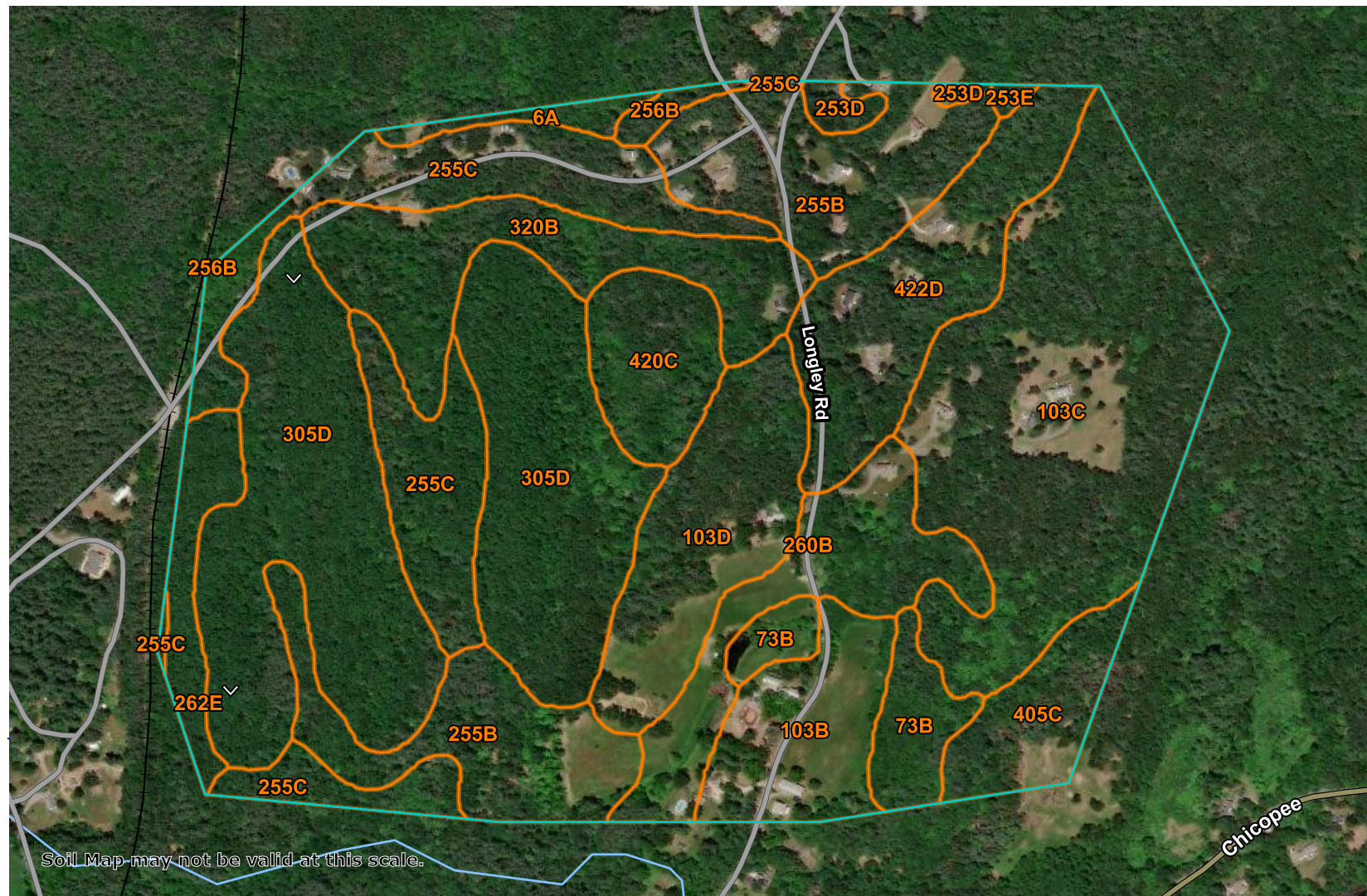   └─**4=Orifice/Grate** (Orifice Controls 1.7 cfs @ 3.5 fps)

APPENDIX

Soil Map may not be valid at this scale.

Map Scale: 1:7,950 if printed on A landscape (11" x 8.5") sheet.

Meters
0   100   200   400   600

Feet
0   350   700   1400   2100

N
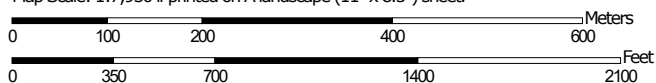
Map projection: Web Mercator   Corner coordinates: WGS84

USDA   **Natural Resources**
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

11/17/2020
Page 1 of 3

MAP LEGEND

MAP INFORMATION

Area of Interest (AOI)

☐ Area of Interest (AOI)

Soils

☐ Soil Map Unit Polygons

Soil Map Unit Lines

■ Soil Map Unit Points

Special Point Features

◎ Blowout

⊠ Borrow Pit

✻ Clay Spot

◇ Closed Depression

✖ Gravel Pit

∴ Gravelly Spot

⊚ Landfill

⋏ Lava Flow

⬇ Marsh or swamp

⚙ Mine or Quarry

◎ Miscellaneous Water

○ Perennial Water

ⱽ Rock Outcrop

+ Saline Spot

∴ Sandy Spot

⊜ Severely Eroded Spot

◇ Sinkhole

⟫ Slide or Slip

⌀ Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

△ Other

Special Line Features

Water Features

〜 Streams and Canals

Transportation

╂╂╂ Rails

〜 Interstate Highways

〜 US Routes

〜 Major Roads

〜 Local Roads

Background

Aerial Photography

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: Middlesex County, Massachusetts
Survey Area Data: Version 20, Jun 9, 2020

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

Date(s) aerial images were photographed: May 22, 2015—Jun 14, 2017

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.
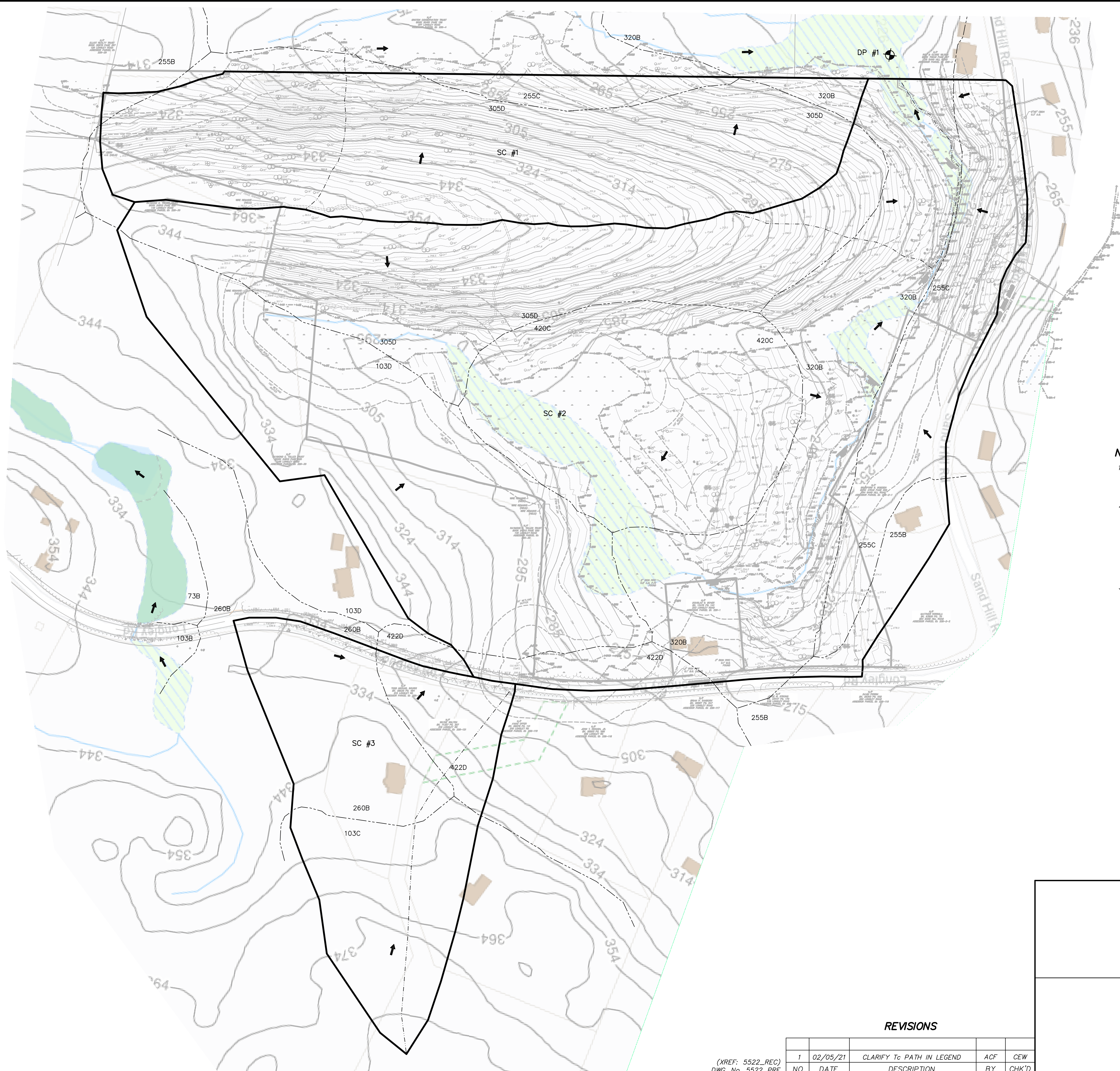
Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
6A	Scarboro mucky fine sandy loam, 0 to 3 percent slopes	1.9	0.7%
73B	Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony	6.9	2.6%
103B	Charlton-Hollis-Rock outcrop complex, 3 to 8 percent slopes	11.6	4.3%
103C	Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes	44.4	16.5%
103D	Charlton-Hollis-Rock outcrop complex, 15 to 25 percent slopes	16.8	6.2%
253D	Hinckley loamy sand, 15 to 25 percent slopes	1.6	0.6%
253E	Hinckley loamy sand, 25 to 35 percent slopes	0.4	0.1%
255B	Windsor loamy sand, 3 to 8 percent slopes	29.9	11.1%
255C	Windsor loamy sand, 8 to 15 percent slopes	28.7	10.7%
256B	Deerfield loamy fine sand, 3 to 8 percent slopes	1.2	0.5%
260B	Sudbury fine sandy loam, 3 to 8 percent slopes	14.1	5.2%
262E	Quonset sandy loam, 25 to 35 percent slopes	5.6	2.1%
305D	Paxton fine sandy loam, 15 to 25 percent slopes	54.7	20.4%
320B	Birchwood fine sandy loam, 3 to 8 percent slopes	17.4	6.5%
405C	Charlton fine sandy loam, 8 to 15 percent slopes	7.6	2.8%
420C	Canton fine sandy loam, 8 to 15 percent slopes	8.4	3.1%
422D	Canton fine sandy loam, 15 to 35 percent slopes, extremely stony	17.6	6.6%
Totals for Area of Interest		**268.7**	**100.0%**

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
6A	Scarboro mucky fine sandy loam, 0 to 3 percent slopes	A/D	0.9	0.8%
73B	Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony	D	0.5	0.4%
103B	Charlton-Hollis-Rock outcrop complex, 3 to 8 percent slopes	A	0.2	0.2%
103D	Charlton-Hollis-Rock outcrop complex, 15 to 25 percent slopes	A	13.5	11.8%
255B	Windsor loamy sand, 3 to 8 percent slopes	A	7.4	6.5%
255C	Windsor loamy sand, 8 to 15 percent slopes	A	20.2	17.8%
256B	Deerfield loamy fine sand, 3 to 8 percent slopes	A	0.8	0.7%
260B	Sudbury fine sandy loam, 3 to 8 percent slopes	B	5.5	4.8%
262E	Quonset sandy loam, 25 to 35 percent slopes	A	0.2	0.2%
305D	Paxton fine sandy loam, 15 to 25 percent slopes	C	34.6	30.4%
320B	Birchwood fine sandy loam, 3 to 8 percent slopes	A/D	17.4	15.3%
420C	Canton fine sandy loam, 8 to 15 percent slopes	B	8.4	7.4%
422D	Canton fine sandy loam, 15 to 35 percent slopes, extremely stony	B	4.1	3.6%
Totals for Area of Interest			**113.7**	**100.0%**

LEGEND

SC#1 ————	SUBCATCHMENT
DP#1 ⊕	DESIGN POINT
→	OVERLAND FLOW DIRECTION
— · — · —	TIME OF CONCENTRATION (Tc) PATH
420C	SOIL TYPE
————	LIMIT OF SOIL DELINEATION (NRCS)

NOTES:

1. LOCATIONS AND TYPES OF SOIL DESIGNATIONS WITHIN THE SUBCATCHMENT LIMITS HAVE BEEN COMPILED FROM MAPPING DELINEATED BY USDA NATURAL RESOURCES CONSERVATION SERVICE (NRCS).

2. BASED ON NRCS, THE STUDY AREA IS CLASSIFIED WITH THE FOLLOWING SOIL TYPES AND ASSOCIATED HYDROLOGIC SOIL GROUPS (HSG):
   103 — HSG A
   255 — HSG A
   260 — HSG B
   305 — HSG C
   320 — HSG A/D
   420 — HSG B
   422 — HSG B

3. EXPANDED TOPOGRAPHIC INFORMATION OUTSIDE LOCUS PROPERTY COMPILED FROM THE TOWN OF GROTON MAPGEO GIS MAPPING.

SAND HILL RD/LONGLEY RD
EXISTING CONDITIONS WATERSHED
LOCATED IN
GROTON, MASSACHUSETTS
(MIDDLESEX COUNTY)

PREPARED FOR
SHEPLEY HILL CAPITAL PARTNERS, LLC
SCALE: 1"= 120'   DATE: NOVEMBER 23, 2020

MERIDIAN ASSOCIATES

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BEVERLY, MASSACHUSETTS 01915   WESTBOROUGH, MASSACHUSETTS 01581
TELEPHONE: (978) 299-0447   TELEPHONE: (508) 871-7030
WWW.MERIDIANASSOC.COM

SHEET No. 1 OF 2   PROJECT No. 6332

REVISIONS

NO.	DATE	DESCRIPTION	BY	CHK'D
1	02/05/21	CLARIFY Tc PATH IN LEGEND	ACF	CEW

(XREF: 5522_REC)
DWG. No. 5522_PRE
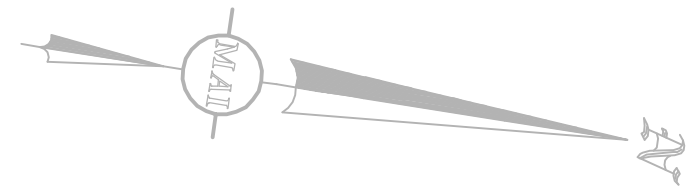
LEGEND

SC#1 ──	SUBCATCHMENT
DP #1 ✛	DESIGN POINT
→	OVERLAND FLOW DIRECTION
‑ ‑ ‑	TIME OF CONCENTRATION (Tc) PATH
420C	SOIL TYPE
──	LIMIT OF SOIL DELINEATION (NRCS)
B#3	PROPOSED INFILTRATION BASIN

NOTES:

1. LOCATIONS AND TYPES OF SOIL DESIGNATIONS WITHIN THE SUBCATCHMENT LIMITS HAVE BEEN COMPILED FROM MAPPING DELINEATED BY USDA NATURAL RESOURCES CONSERVATION SERVICE (NRCS).

2. BASED ON NRCS, THE STUDY AREA IS CLASSIFIED WITH THE FOLLOWING SOIL TYPES AND ASSOCIATED HYDROLOGIC SOIL GROUPS (HSG):
   103 – HSG A
   255 – HSG A
   260 – HSG B
   305 – HSG C
   320 – HSG A/D
   420 – HSG B
   422 – HSG B

3. EXPANDED TOPOGRAPHIC INFORMATION OUTSIDE LOCUS PROPERTY COMPILED FROM THE TOWN OF GROTON MAPGEO GIS MAPPING.

SAND HILL RD/LONGLEY RD
PROPOSED CONDITION WATERSHED
LOCATED IN
GROTON, MASSACHUSETTS
(MIDDLESEX COUNTY)

PREPARED FOR
SHEPLEY HILL CAPITAL PARTNERS, LLC
SCALE: 1"= 120'   DATE: NOVEMBER 23, 2020

MERIDIAN
ASSOCIATES

SHEET No. 2 OF 2   PROJECT No. 6332

REVISIONS

NO.	DATE	DESCRIPTION	BY	CHK'D
1	02/05/21	–1 BLDG, LESS RD A, SC RECONFIG	ACF	CEW

(XREF: 5522_REC, 5522_SITE)
DWG. No. 5522_POST