JC ENGINEERING, Inc.

Civil & Environmental Engineering

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October 26, 2022

Town of Wareham Planning Board
Memorial Town Hall
54 Marion Road
Wareham, MA 02571

RE: Definitive Subdivision Plan for Peyton Estates,
Off Squirrel Island Road, Wareham, MA

Dear Board Members,

JC Engineering has received comments from Charles L. Rowley, PE, PLS, dated October 3, 2022 pertaining to the proposed development of Peyton Estates (Off Squirrel Island Road, Wareham) and offers the following in response (*Mr. Rowley's comments in italics*):

Plans:

1. *The plan set consists of five sheets showing the project location and lot configuration proposed. It did not evolve from a preliminary plan (not required for residential development).* No response necessary.

2. *Sheet 2 of the plan set shows test logs for three soil test pits however they are not significant to the subject property and do not represent conditions that may be found on the proposed lots.* Additional test pits have been completed on either end of the proposed infiltration basin. The test pit data is included on the revised plan set.

3. *Sheet 3 shows the proposed two lots which meet the standard for shape and frontage. Lot 1010-D1 includes some wetlands but the amount of upland is more than 80% as required by the Zoning By-Law.* No response necessary.

4. Sheet 4 shows the proposed road profile and plan of construction. The pavement width proposed is 12 feet. A simple hammerhead type turnaround is proposed instead of a circular pavement.
   a. *It is recommended that the pavement width be made 18 feet as required by Section VI, C of the Rules and Regulations. Two-way traffic cannot safely travel on a 12-foot wide pavement.* The pavement width has been increased to 18 feet. The request for a waiver has been removed.

b. *The fire apparatus backing movement shown on Sheet 5 of the plans shows that it takes up all of the available space for the limited turning area. It is recommended that along with widening the travel surface, that this turning area be made longer. In the event the new Tower needs to gain access, it will be difficult to make appropriate movements.* The pavement width has been widened to 18 feet for the entire roadway, including turnaround. Also, the Wareham Fire Department prepared a follow up response letter on 10/4/22 which states that the Swept Analysis parameters meet the Tower 1 specifications.

c. *Sheet 4 also shows that portions of the construction will be within the 100-foot buffer that is subject to the jurisdiction of the Conservation Commission. In addition to Planning Board approval for the layout and construction of the street, Conservation Commission approval will also be necessary.* A Notice of Intent application will be filed with the Conservation Commission pending approval from the Planning Board.

5. *The applicant should provide evidence that the plan was also filed with the Wareham Board of Health.* The application was submitted to the Health Department on the same day it was submitted to the Planning Department (July 20, 2022).

6. *Sheet 4 of the plans shows a swale running parallel to and along the northeasterly side of the proposed road. This swale is an acceptable way of intercepting runoff and may be considered as low impact design. However, it is recommended that a series of check dams be incorporated into the swale to slow down the rate of runoff to the grassed infiltration basin.* Check dams have been included on the plan. A detail is also shown on Sheet 5.

7. *The pavement cross section should show the base material of crushed stone extending beyond the limit of pavement in order to provide support for the mix. Without a berm on the northeast side, the pavement will be subject to damage unless the base can support it.* The gravel base has been extended an additional 1 foot beyond the limits of the pavement to provide additional edge support. The Roadway Cross Section detail has been revised.

8. *The drainage infiltration basin shown extends beyond the street limits as shown on pages 3 and 4. It is recommended that the easement limits shown be extended sufficiently to give some space at the tow of the proposed slope for maintenance purposes.* The easement has been increased in size to allow for the construction of a gravel access path around the easterly and northerly sides of the basin.

<u>Drainage Report:</u>

1. *The drainage report is not supported by information that shows what the soil conditions are like on site. Soil tests should be performed in the proposed infiltration area to show that infiltration will actually work.* Additional test pits have been completed on either end of the proposed infiltration basin. The test pit data is included on the revised plan set.

2. *Adequate infiltration may not be provided with a grassed surface. The rate should be checked to be sure that infiltration will not be impeded by frozen surfaces during the winter months. A note says that contact should be made with soils in the "C" layer but this layer has not been confirmed.* The infiltration basin was designed using a Rawls infiltration rate for Sandy Loam materials (1.02 in/hr). The additional test pits confirm that the soils are consistent with the sizing calculations for the infiltration basin.

3. *There needs to be information to show that the infiltration basin will have at least a two (2) foot separation to high ground water.* Additional test pits have been completed on either end of the proposed infiltration basin. Groundwater has been determined to be at least 2 feet below the bottom of the infiltration basin.

4. *No evidence was included to show that the stormwater standards have been followed. Also there needs to be an Operation and Maintenance Plan included which will need to be incorporated into any approval that the Board may grant.* The Stormwater Management Policy does not apply for developments of 4 or fewer lots. The revised HydroCAD calculations show that the infiltration basin is sized to contain a 25-year storm event, which exceeds the 20-year storm event required per the Rules and Regulations. The pre-development HydroCAD calculations are also included. As can be seen, the 100-year post-development runoff rate and volume from the Infiltration basin is considerably less than the pre-development runoff rate and volume for the equivalent drainage area. An Operations and Maintenance Plan has been added to the Detail Sheet.

Waiver Requests:

1. *It is recommended that the waiver of pavement width not be granted. A full width of 18 feet is essential for safety, access and egress.* The request for the waiver has been removed.

2. *A waiver from a full cul-de-sac could be considered provided that it is extended sufficiently to give a solid surface for the Wareham Fire Department tower apparatus.* The pavement width has been widened to 18 feet for the entire roadway, including turnaround.

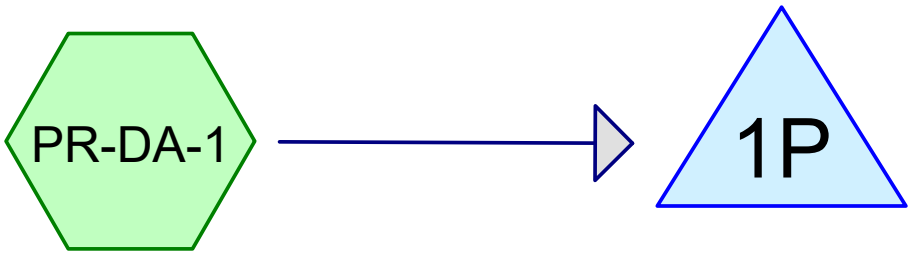
3. *Other waiver requests appear to be reasonable given the location of the project.* No response necessary.

Respectfully yours,

Bradley Bertolo

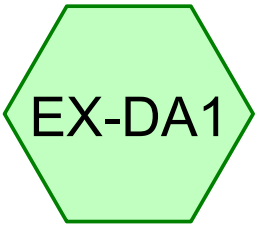
Bradley M. Bertolo, EIT, CSE
Project Engineer

Cc: File; Client



Right of Way

Detention Basin



Right of Way

Subcat Reach Pond Link

Routing Diagram for Peyton Estates-Proposed Conditions-REV1
Prepared by JC Engineering, Inc., Printed 10/26/2022
HydroCAD® 10.00-22 s/n 02717 © 2018 HydroCAD Software Solutions LLC

Summary for Subcatchment EX-DA1: Right of Way

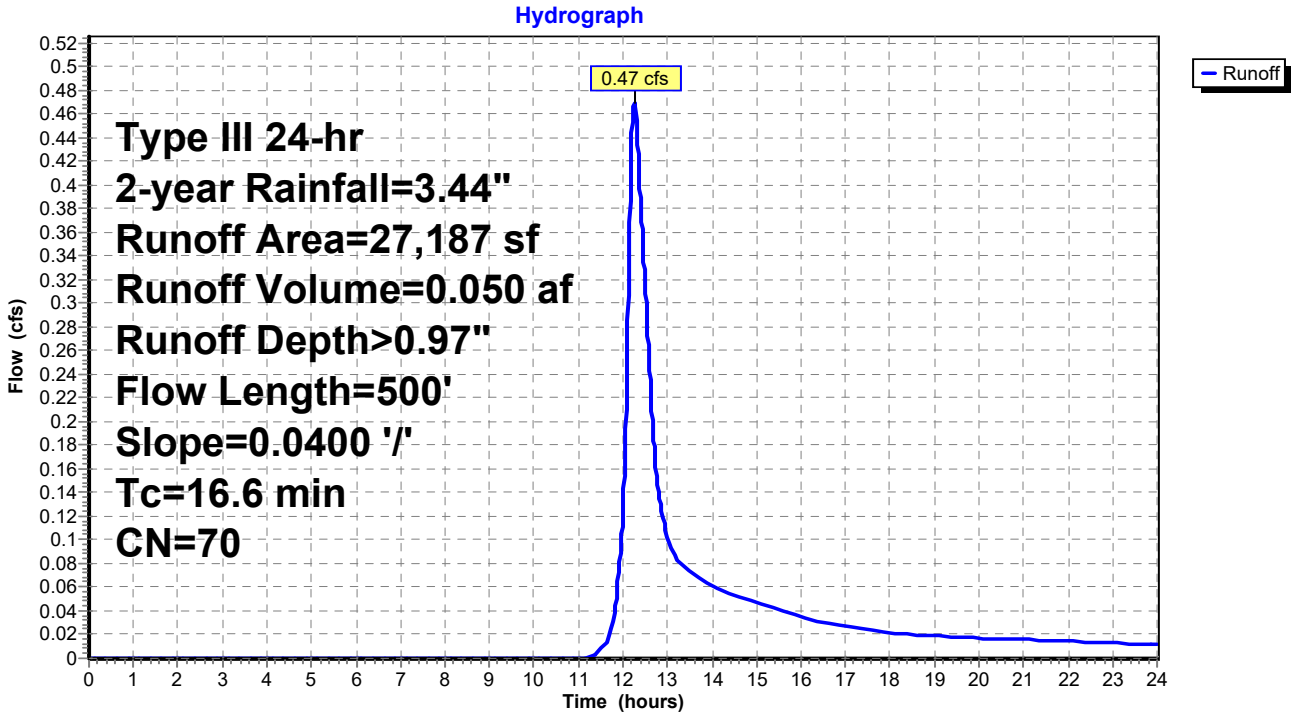
Runoff = 0.47 cfs @ 12.25 hrs, Volume= 0.050 af, Depth> 0.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.44"

Area (sf)	CN	Description
27,187	70	Woods, Good, HSG C
27,187		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
7.5	450	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.6	500	Total			

Subcatchment EX-DA1: Right of Way



Summary for Subcatchment PR-DA-1: Right of Way

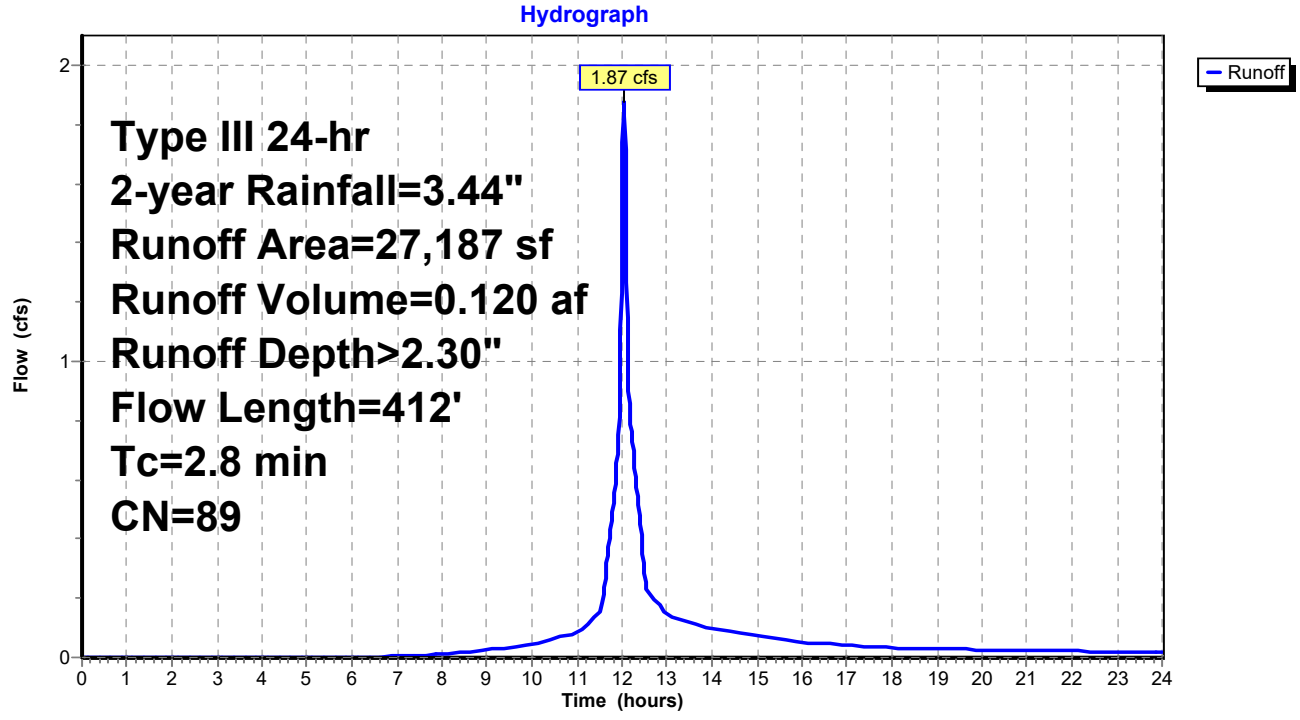
Runoff = 1.87 cfs @ 12.04 hrs, Volume= 0.120 af, Depth> 2.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-year Rainfall=3.44"

	Area (sf)	CN	Description
*	10,580	98	Paved roads, HSG C
*	3,215	98	Infiltration Basin, HSG C to elev. 43.7
	13,392	79	50-75% Grass cover, Fair, HSG C
	27,187	89	Weighted Average
	13,392		49.26% Pervious Area
	13,795		50.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.45		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
2.2	362	0.0330	2.72		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
2.8	412	Total			

Subcatchment PR-DA-1: Right of Way



Summary for Pond 1P: Detention Basin

Inflow Area = 0.624 ac, 50.74% Impervious, Inflow Depth > 2.30" for 2-year event
Inflow = 1.87 cfs @ 12.04 hrs, Volume= 0.120 af
Outflow = 0.05 cfs @ 16.37 hrs, Volume= 0.051 af, Atten= 97%, Lag= 259.6 min
Discarded = 0.05 cfs @ 16.37 hrs, Volume= 0.051 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 41.92' @ 16.37 hrs Surf.Area= 2,028 sf Storage= 3,518 cf

Plug-Flow detention time= 346.2 min calculated for 0.051 af (42% of inflow)
Center-of-Mass det. time= 227.2 min (1,032.2 - 805.0)

Volume	Invert	Avail.Storage	Storage Description
#1	39.00'	9,887 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

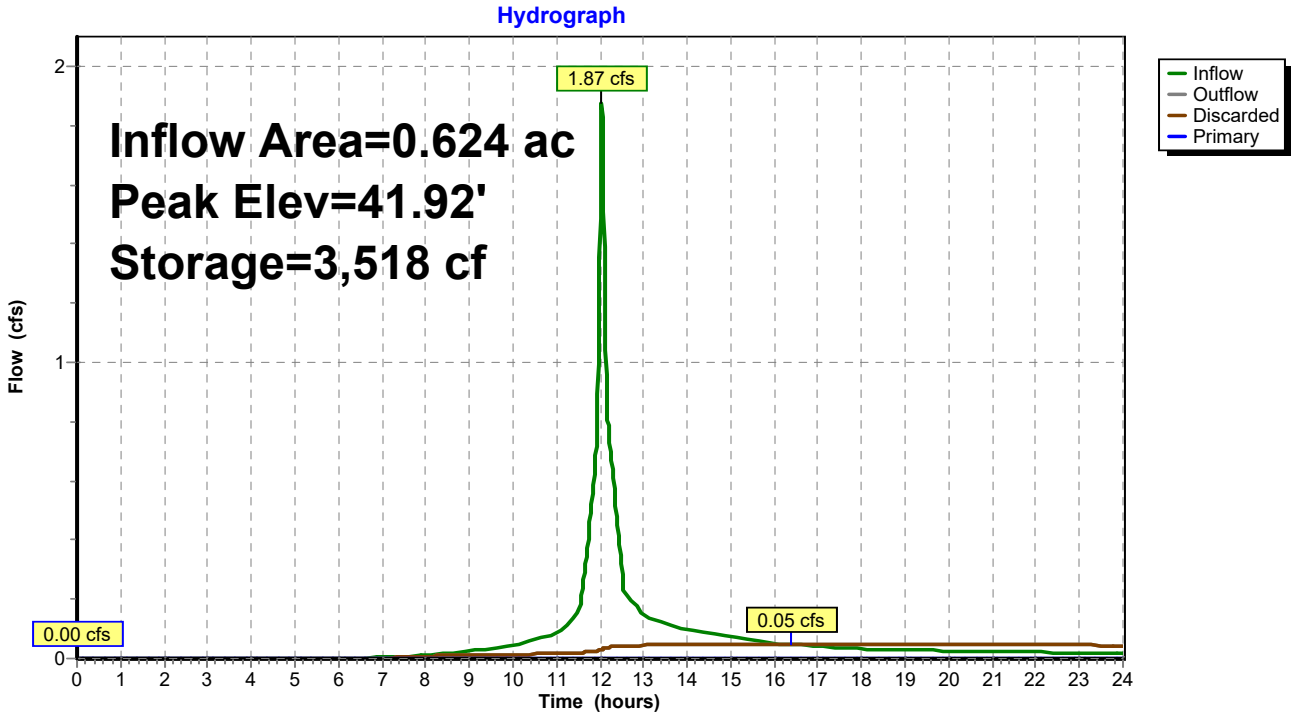
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
39.00	488	0	0	488
40.00	943	703	703	953
41.00	1,478	1,201	1,904	1,501
42.00	2,077	1,769	3,673	2,119
43.00	2,737	2,399	6,072	2,801
44.00	3,451	3,087	9,159	3,542
44.20	3,828	728	9,887	3,921

Device	Routing	Invert	Outlet Devices
#1	Discarded	39.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	43.70'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.05 cfs @ 16.37 hrs HW=41.92' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=39.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Detention Basin



Summary for Subcatchment EX-DA1: Right of Way

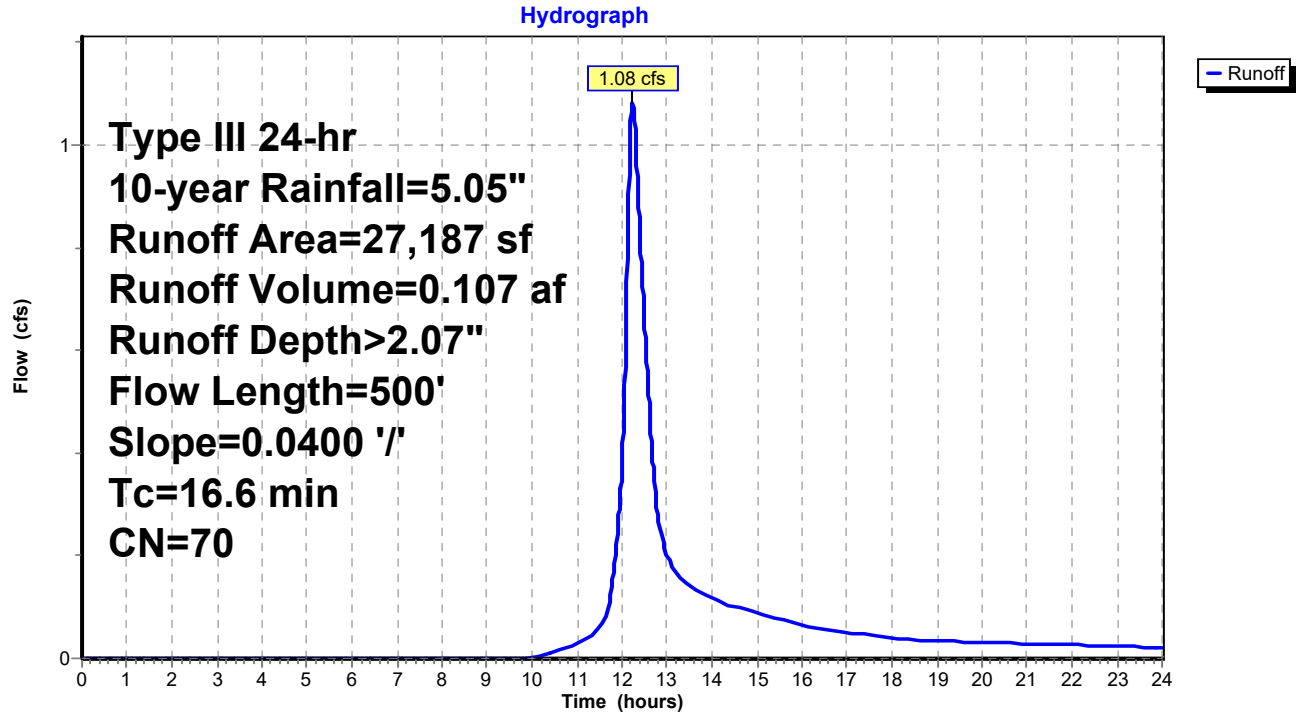
Runoff = 1.08 cfs @ 12.23 hrs, Volume= 0.107 af, Depth> 2.07"

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

Area (sf)	CN	Description
27,187	70	Woods, Good, HSG C
27,187		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
7.5	450	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.6	500	Total			

Subcatchment EX-DA1: Right of Way



Summary for Subcatchment PR-DA-1: Right of Way

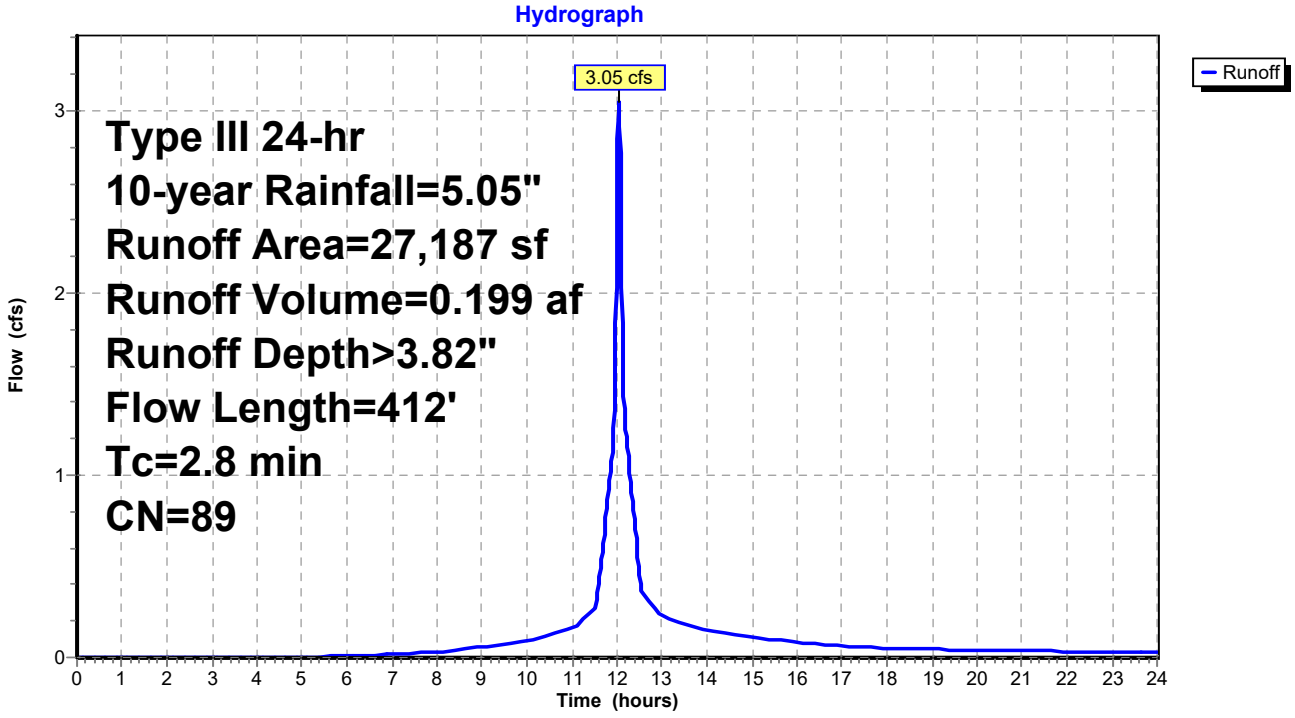
Runoff = 3.05 cfs @ 12.04 hrs, Volume= 0.199 af, Depth> 3.82"

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

	Area (sf)	CN	Description
*	10,580	98	Paved roads, HSG C
*	3,215	98	Infiltration Basin, HSG C to elev. 43.7
	13,392	79	50-75% Grass cover, Fair, HSG C
	27,187	89	Weighted Average
	13,392		49.26% Pervious Area
	13,795		50.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.45		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
2.2	362	0.0330	2.72		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
2.8	412	Total			

Subcatchment PR-DA-1: Right of Way



Summary for Pond 1P: Detention Basin

Inflow Area = 0.624 ac, 50.74% Impervious, Inflow Depth > 3.82" for 10-year event
Inflow = 3.05 cfs @ 12.04 hrs, Volume= 0.199 af
Outflow = 0.07 cfs @ 16.93 hrs, Volume= 0.071 af, Atten= 98%, Lag= 293.2 min
Discarded = 0.07 cfs @ 16.93 hrs, Volume= 0.071 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 43.04' @ 16.93 hrs Surf.Area= 2,762 sf Storage= 6,173 cf

Plug-Flow detention time= 363.6 min calculated for 0.071 af (36% of inflow)
Center-of-Mass det. time= 232.1 min (1,022.9 - 790.8)

Volume	Invert	Avail.Storage	Storage Description
#1	39.00'	9,887 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

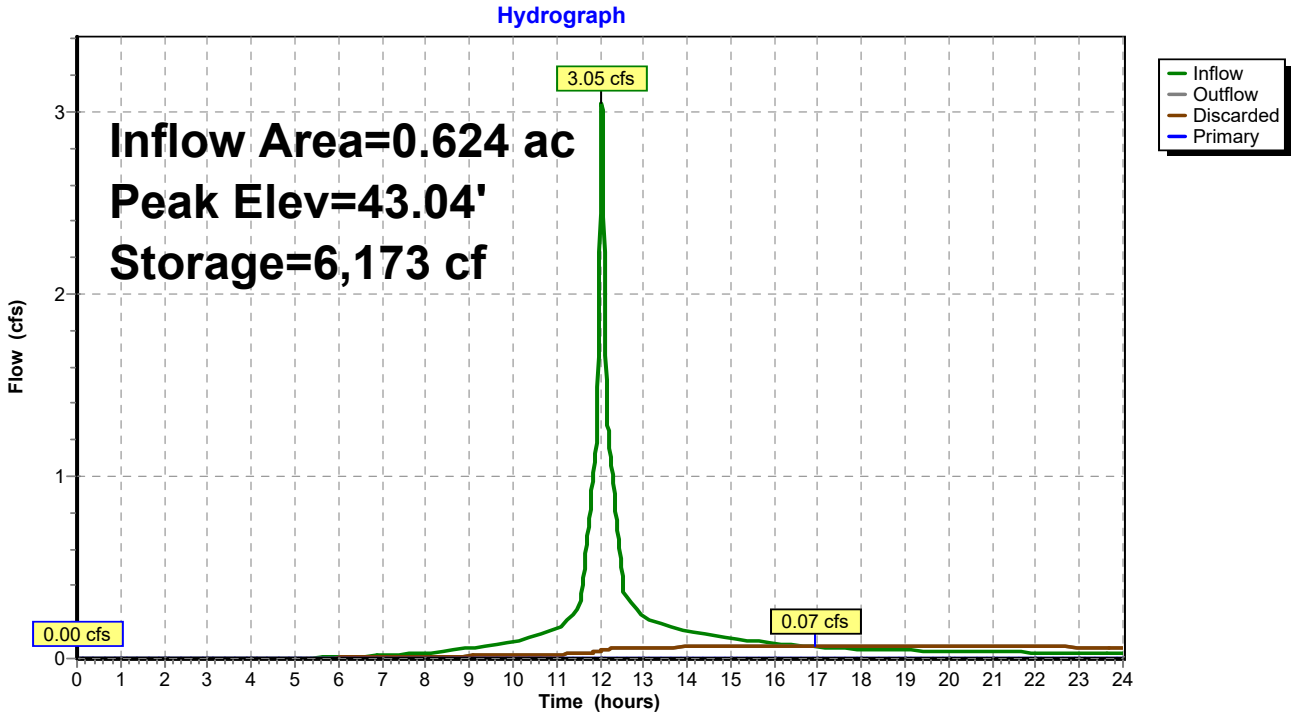
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
39.00	488	0	0	488
40.00	943	703	703	953
41.00	1,478	1,201	1,904	1,501
42.00	2,077	1,769	3,673	2,119
43.00	2,737	2,399	6,072	2,801
44.00	3,451	3,087	9,159	3,542
44.20	3,828	728	9,887	3,921

Device	Routing	Invert	Outlet Devices
#1	Discarded	39.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	43.70'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.07 cfs @ 16.93 hrs HW=43.04' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=39.00' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Detention Basin



Summary for Subcatchment EX-DA1: Right of Way

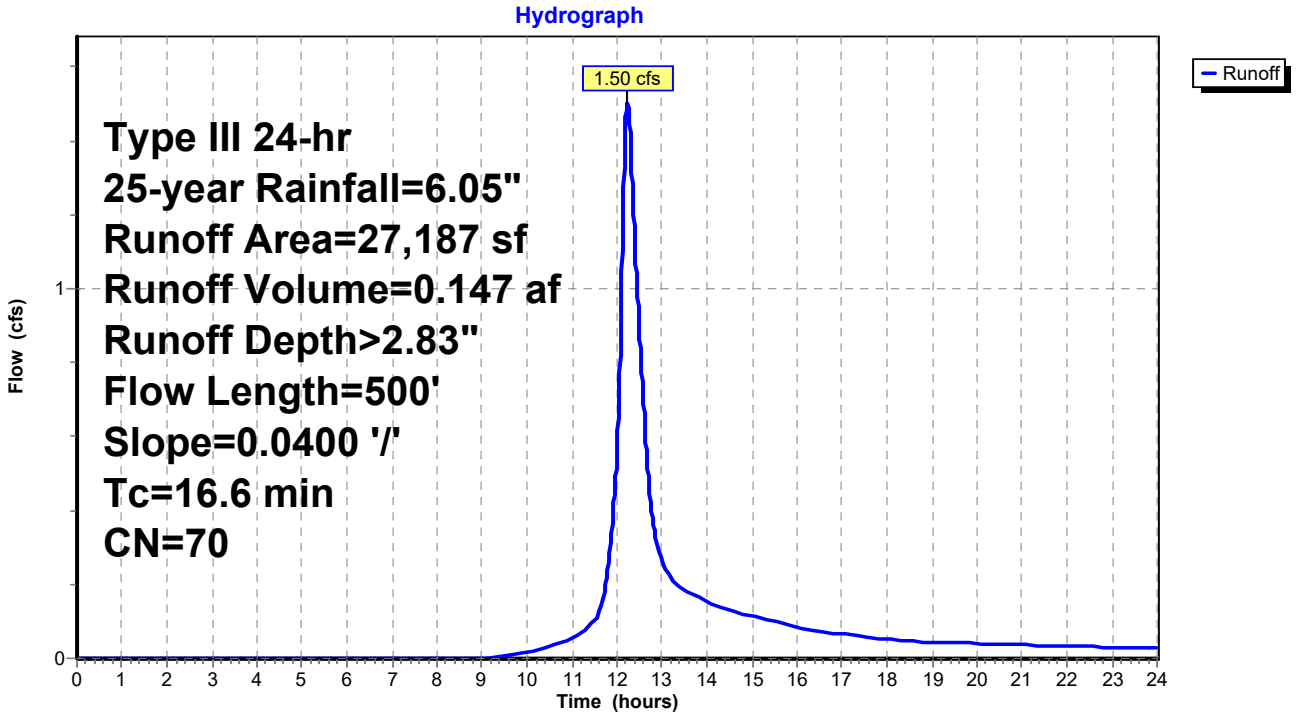
Runoff = 1.50 cfs @ 12.23 hrs, Volume= 0.147 af, Depth> 2.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.05"

Area (sf)	CN	Description
27,187	70	Woods, Good, HSG C
27,187		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
7.5	450	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.6	500	Total			

Subcatchment EX-DA1: Right of Way



Summary for Subcatchment PR-DA-1: Right of Way

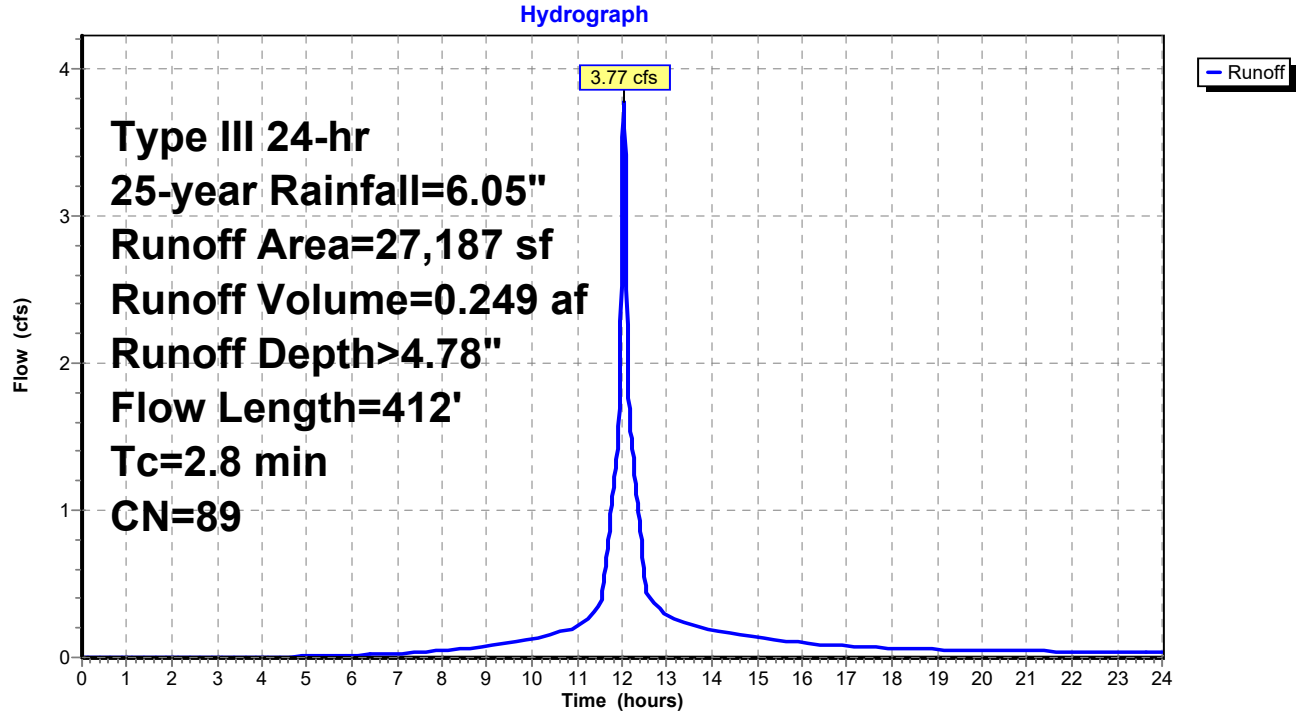
Runoff = 3.77 cfs @ 12.04 hrs, Volume= 0.249 af, Depth> 4.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-year Rainfall=6.05"

	Area (sf)	CN	Description
*	10,580	98	Paved roads, HSG C
*	3,215	98	Infiltration Basin, HSG C to elev. 43.7
	13,392	79	50-75% Grass cover, Fair, HSG C
	27,187	89	Weighted Average
	13,392		49.26% Pervious Area
	13,795		50.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.45		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
2.2	362	0.0330	2.72		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
2.8	412	Total			

Subcatchment PR-DA-1: Right of Way



Summary for Pond 1P: Detention Basin

Inflow Area = 0.624 ac, 50.74% Impervious, Inflow Depth > 4.78" for 25-year event
Inflow = 3.77 cfs @ 12.04 hrs, Volume= 0.249 af
Outflow = 0.07 cfs @ 17.17 hrs, Volume= 0.082 af, Atten= 98%, Lag= 307.4 min
Discarded = 0.07 cfs @ 17.17 hrs, Volume= 0.082 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 43.62' @ 17.17 hrs Surf.Area= 3,169 sf Storage= 7,900 cf

Plug-Flow detention time= 374.0 min calculated for 0.082 af (33% of inflow)
Center-of-Mass det. time= 233.8 min (1,018.5 - 784.7)

Volume	Invert	Avail.Storage	Storage Description
#1	39.00'	9,887 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

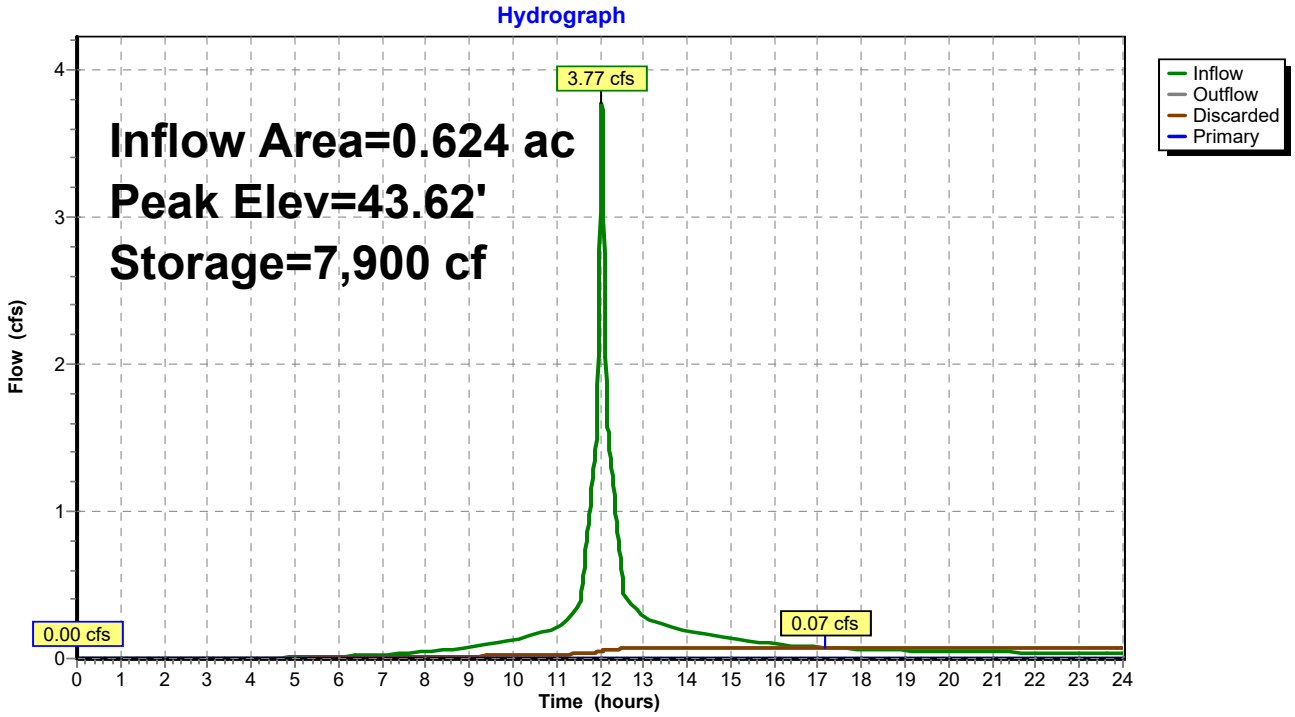
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
39.00	488	0	0	488
40.00	943	703	703	953
41.00	1,478	1,201	1,904	1,501
42.00	2,077	1,769	3,673	2,119
43.00	2,737	2,399	6,072	2,801
44.00	3,451	3,087	9,159	3,542
44.20	3,828	728	9,887	3,921

Device	Routing	Invert	Outlet Devices
#1	Discarded	39.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	43.70'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.07 cfs @ 17.17 hrs HW=43.62' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=39.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Detention Basin



Summary for Subcatchment EX-DA1: Right of Way

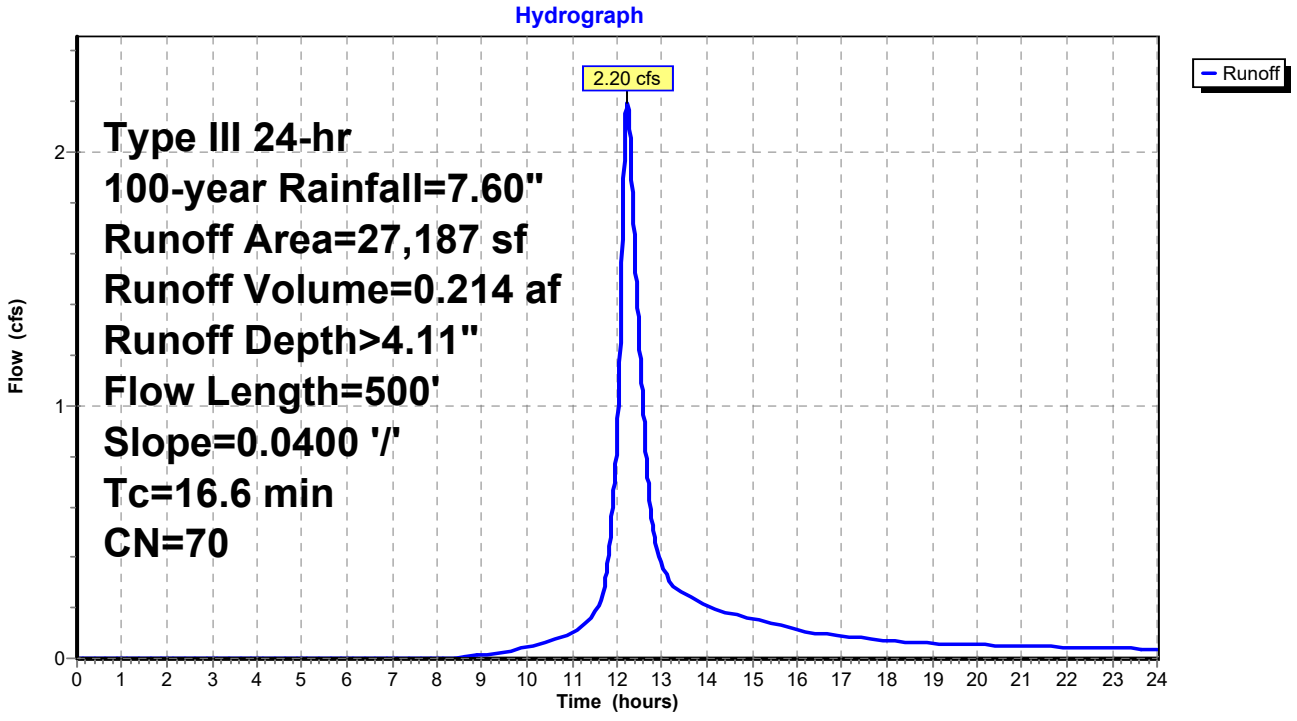
Runoff = 2.20 cfs @ 12.23 hrs, Volume= 0.214 af, Depth> 4.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.60"

Area (sf)	CN	Description
27,187	70	Woods, Good, HSG C
27,187		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.1	50	0.0400	0.09		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.40"
7.5	450	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
16.6	500	Total			

Subcatchment EX-DA1: Right of Way



Summary for Subcatchment PR-DA-1: Right of Way

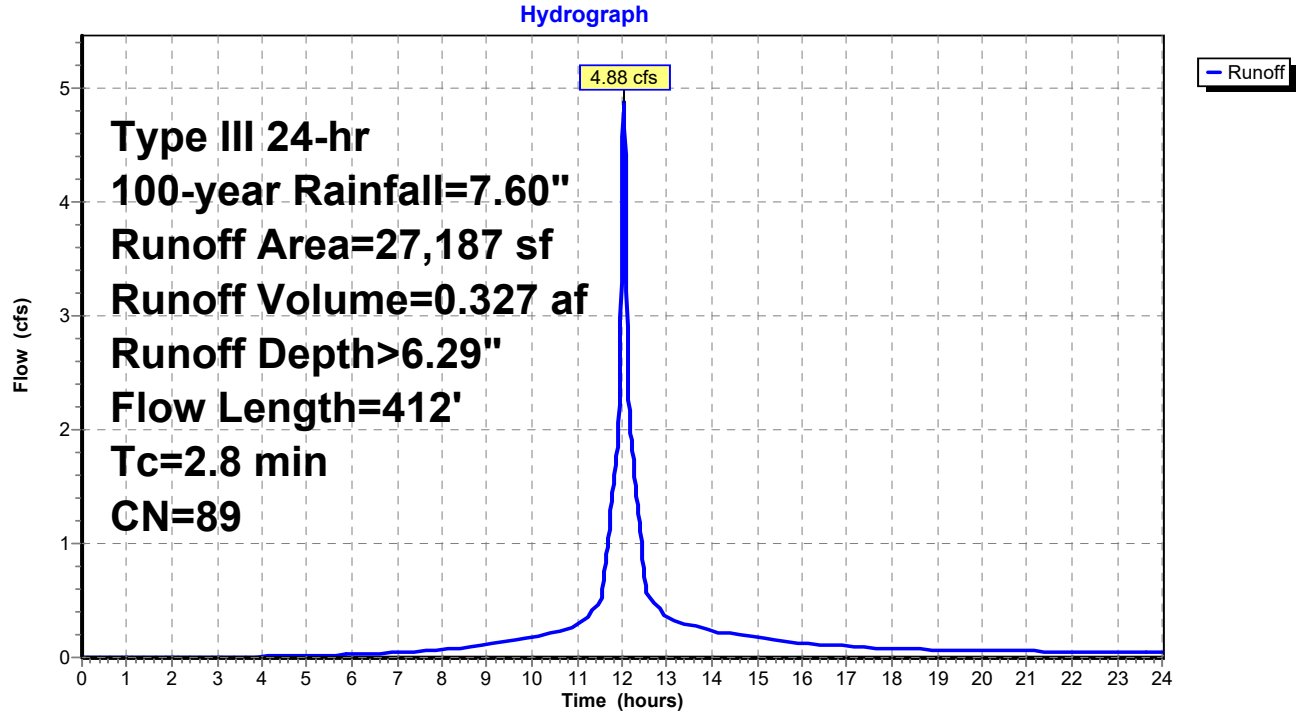
Runoff = 4.88 cfs @ 12.04 hrs, Volume= 0.327 af, Depth> 6.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-year Rainfall=7.60"

	Area (sf)	CN	Description
*	10,580	98	Paved roads, HSG C
*	3,215	98	Infiltration Basin, HSG C to elev. 43.7
	13,392	79	50-75% Grass cover, Fair, HSG C
	27,187	89	Weighted Average
	13,392		49.26% Pervious Area
	13,795		50.74% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.6	50	0.0300	1.45		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.40"
2.2	362	0.0330	2.72		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
2.8	412	Total			

Subcatchment PR-DA-1: Right of Way



Summary for Pond 1P: Detention Basin

Inflow Area = 0.624 ac, 50.74% Impervious, Inflow Depth > 6.29" for 100-year event
Inflow = 4.88 cfs @ 12.04 hrs, Volume= 0.327 af
Outflow = 0.51 cfs @ 12.63 hrs, Volume= 0.149 af, Atten= 90%, Lag= 35.2 min
Discarded = 0.08 cfs @ 12.63 hrs, Volume= 0.088 af
Primary = 0.43 cfs @ 12.63 hrs, Volume= 0.061 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 43.79' @ 12.63 hrs Surf.Area= 3,292 sf Storage= 8,441 cf

Plug-Flow detention time= 276.9 min calculated for 0.149 af (46% of inflow)
Center-of-Mass det. time= 155.7 min (933.1 - 777.4)

Volume	Invert	Avail.Storage	Storage Description
#1	39.00'	9,887 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

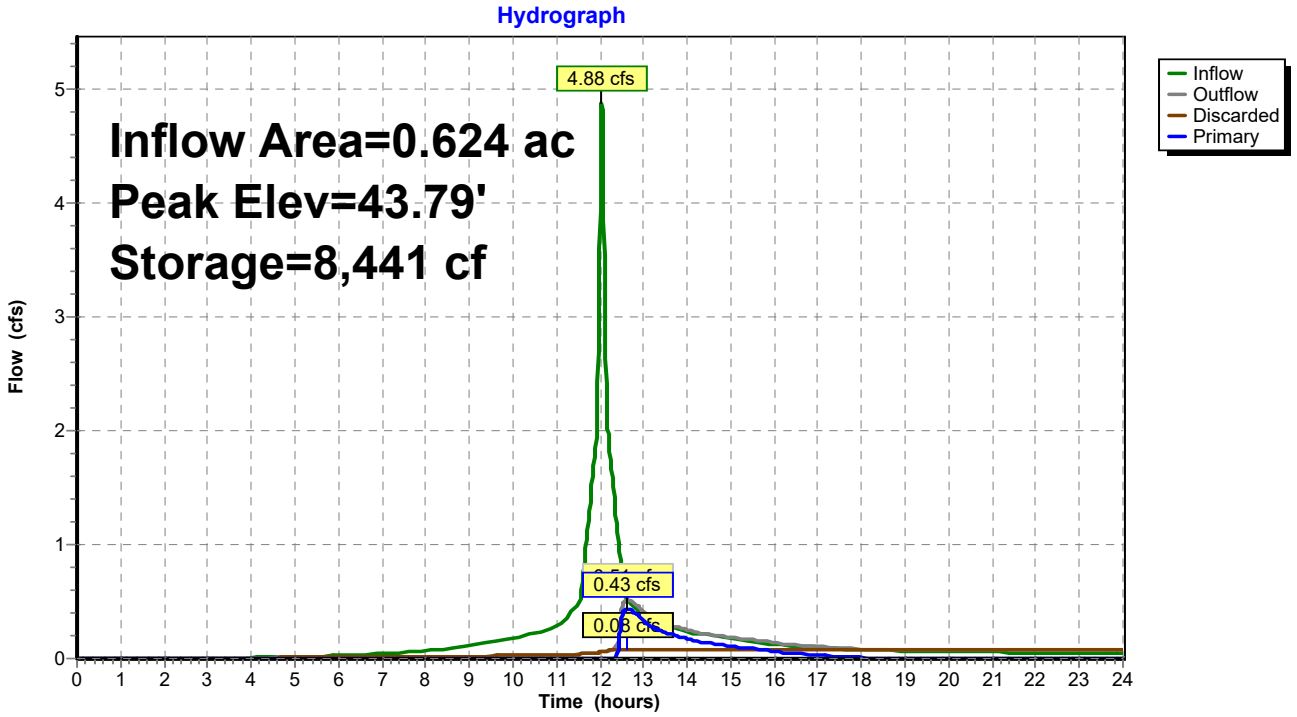
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
39.00	488	0	0	488
40.00	943	703	703	953
41.00	1,478	1,201	1,904	1,501
42.00	2,077	1,769	3,673	2,119
43.00	2,737	2,399	6,072	2,801
44.00	3,451	3,087	9,159	3,542
44.20	3,828	728	9,887	3,921

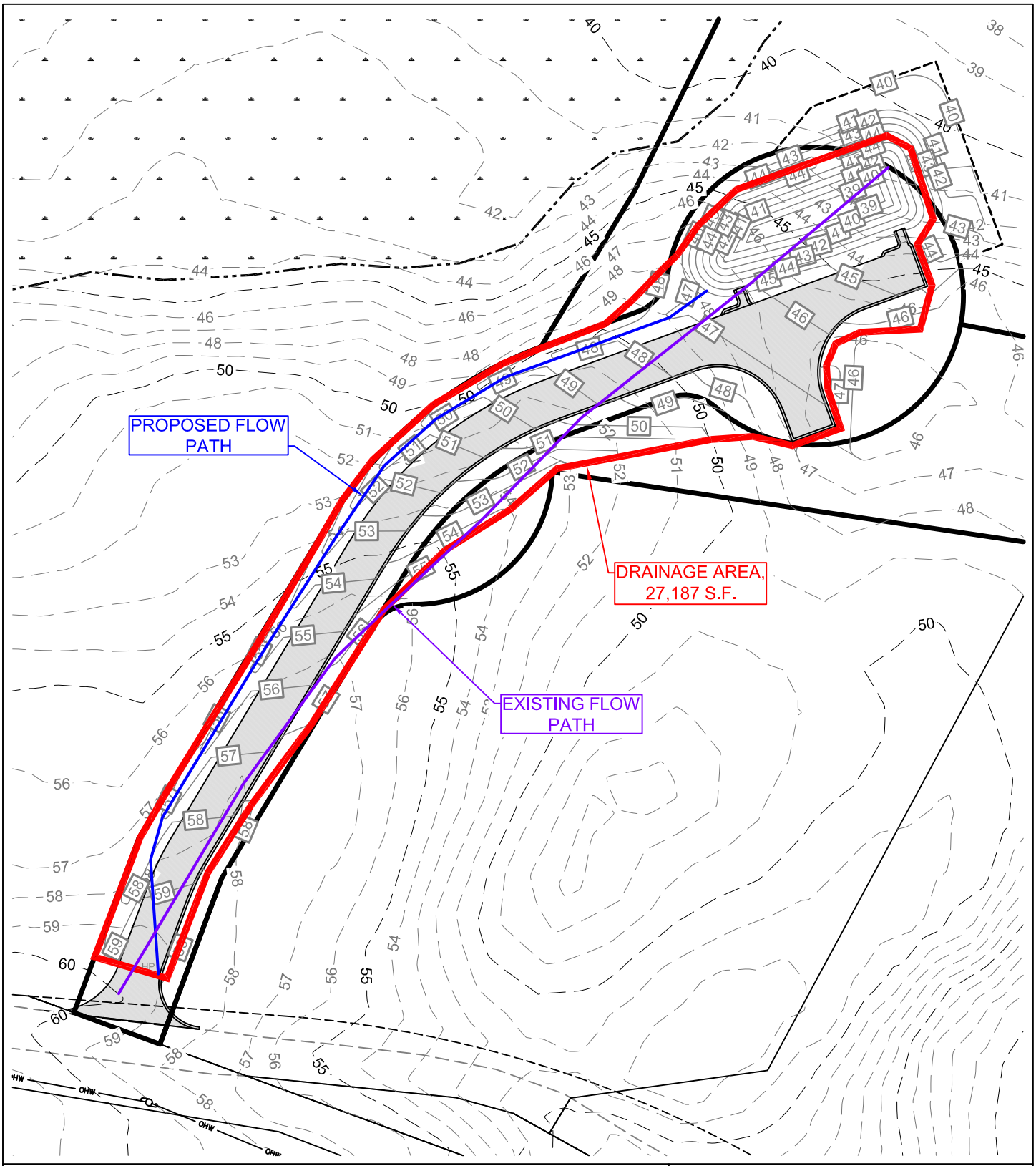
Device	Routing	Invert	Outlet Devices
#1	Discarded	39.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	43.70'	**6.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.08 cfs @ 12.63 hrs HW=43.79' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.43 cfs @ 12.63 hrs HW=43.79' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.43 cfs @ 0.83 fps)

Pond 1P: Detention Basin





DRAINAGE AREA

PEYTON ESTATES
W. WAREHAM, MA 02576

SCALE: 1" = 60'

PREPARED BY:
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