

STORMWATER REPORT & CALCULATIONS

Project

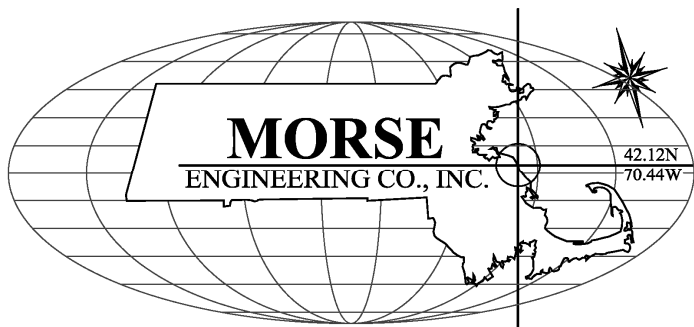
**Swimming Pool Patio, Hardscaping, and Utilities
33 Gardner Street
Hingham, MA 02043
Assessor's Map 179, Lot 23**

Applicant / Owner

**Kimberly Donlan Holmes
33 Gardner Street
Hingham, MA 02043**

Date: July 13, 2026

Prepared by:



*Registered Professional Engineers,
Project Managers & Environmental Consultants*

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Project Narrative

33 Gardner Street, Hingham, MA

Project Summary

The applicant proposes to construct new hardscaping, landscaping, and utilities at 33 Gardner Street, Hingham, MA. The property is shown as Assessor's Map 179, Lot 23 and is in the Hingham Residence B Zoning District. It is approximately 66,743 square feet in size and has frontage on Gardner Street to the south. It is abutted by developed residentially zoned properties on all other sides.

The property is located in Zone "X" as shown on the FEMA Community Map Panel 25023C 0084K dated July 3, 2024. The property is not located within the buffer zone to any wetland resource area, and does not lie within a DEP Zone I, or A, but does lie within a DEP Zone II.

Pre-Development Condition

The existing surfaces include roof, pavement, hardscaped, landscaped, lawn, and wooded areas. In the existing conditions, stormwater flows untreated to the north, towards the wetland resource areas on-site. Additional flow discharges to the wetlands from a municipal culvert in the southwest portion of the property, though no easement is associated with this pipe.

Soils information was obtained from the Soils Conservation Service (SCS) Survey of Plymouth County. The soils on the site are listed as:

- ❖ 52A – Freetown Muck – 0-1% Slopes – HSG B/D
- ❖ 266B – Warwick Fine Sandy Loam – 3-8% Slopes – HSG A

On-site soil testing was performed registered Soil Evaluators from Morse Engineering on June 12, 2026 and found the upper horizon consisting of sandy loam and the lower horizons consisting of loamy sand. Testing locations and results have been included on the Site Plan.

In both the pre-development and post-development stormwater analysis, the watershed area analyzed was approximately 30,576 square feet. Refer to Watershed Delineation Plan WS-1 for a delineation of drainage subareas for the pre-development design condition.

HydroCAD version 10.2 was utilized to develop the stormwater model. HydroCAD uses the SCS Technical Release 20 (TR-20) Program for Formulation Hydrology developed by the Soil Conservation Service (SCS) to develop rates of runoff from subcatchment areas.

Drainage calculations were performed for the pre-development condition for the 2, 10 and 100-year Type III storm events. Refer to Appendix B for computer results, soil characteristics, cover descriptions and times of concentrations for all subareas.

Post-Development Condition

In the post-development condition stormwater analysis, the same watershed area was analyzed for the purpose of determining the rates and volumes of runoff from the proposed project area. The project proposes a reduction in impervious areas, but a crushed stone infiltration trench has been provided along the existing driveway to provide additional runoff rate reduction, treatment, and recharge.

Refer to Watershed Delineation Plan WS-2 for a delineation of post-development drainage subareas. The design points for the post-development design condition correspond to the design points for the pre-development design condition and it is shown on Plan No. WS-1 and Plan No. WS-2.

The stormwater management system was designed to be in compliance with the DEP Stormwater Management Policy to the extent practicable, as the project is a redevelopment.

Erosion and Siltation Control

The potential for temporary off-site impacts due to erosion and migration of sediments will be mitigated by adherence to basic erosion control practices. These include:

1. Clearly define the limits of work in the field in order to minimize the extent of clearing and soil disturbance, and install erosion control barriers at those limits.
2. Install stabilized crushed stone construction entrances and silt sacks on existing catch basins in the vicinity.
3. Regrade, loam and seed exposed soil areas immediately following construction.

Summary of Stormwater Standards 1 - 10

33 Gardner Street, Hingham, MA

Standard #1: No new stormwater conveyances (i.e. outfalls)...

The project complies as it does not propose any new untreated stormwater outfalls. It is the intent of the proposed design to follow the natural/existing conditions stormwater flow paths to the extent practicable.

Standard #2: Post-Development peak discharge rates do not exceed pre-development rates...

The project has been designed to mitigate peak rates and volumes of runoff. See below for calculations of the runoff discharges and volumes for the 2, 10 and 100-yr. storm events.

Peak Discharge Rates (cfs):

<u>Design Point #1:</u>	<u>2-Yr.</u>	<u>10-Yr.</u>	<u>100-Yr.</u>
Pre-Development	0.14	0.59	1.70
Post-Development	0.143	0.51	1.47

Volume of Runoff (ac-ft.):

<u>Design Point #1:</u>	<u>2-Yr.</u>	<u>10-Yr.</u>	<u>100-Yr.</u>
Pre-Development	0.021	0.054	0.131
Post-Development	0.015	0.042	0.111

Standard #3: Loss of annual recharge to groundwater shall be eliminated...

There is no loss of annual recharge to groundwater because the project reduces impervious and provides a crushed stone trench to promote groundwater recharge.

Recharge Volume = (Increased Impervious Area) (Hydrologic Soil Group A)

The project proposes a decrease of 510 square feet in impervious area.

Therefore: Minimum Recharge Volume = (0.60 in.)(0 s.f.)(1 ft./12 in.) = 0 c.f. (min.)

Provided Recharge Volume in Trench = 115 c.f.

Provided Recharge from Impervious Reduction = (0.60 in.)(510 s.f.)(1 ft./12 in.) = 26 c.f.

Standard #4: Stormwater management systems...shall remove 80% of the average... TSS....

Requirement: Provide 80% TSS Removal of the Water Quality Volume.

Water Quality Volume (WQV) = (1 inch of runoff)(Increased Impervious Areas)

The project proposes an increase of 0 square feet in impervious area.

Therefore: Minimum WQV = (1 inch)(0 s.f.)(1 ft./12 in.) = 0 c.f. (min.)*

Provided WQV = 0 c.f.

Standard #5: Stormwater discharges from Land Uses with Higher Potential Pollutant Loads

Not applicable. A single-family home is not a land use with higher potential pollutant loads.

Standard #6: Stormwater discharges to critical areas...

The project is located within a critical area, specifically a DEP Zone II. The project does not propose any increase in impervious areas.

Standard #7: A redevelopment project is required to meet standards....only to the extent practicable

The project is considered a redevelopment. The project complies to the extent practicable.

Standard #8: Erosion & Sedimental Control Plan

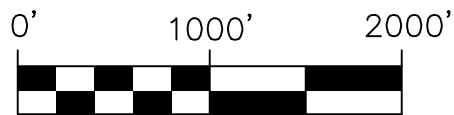
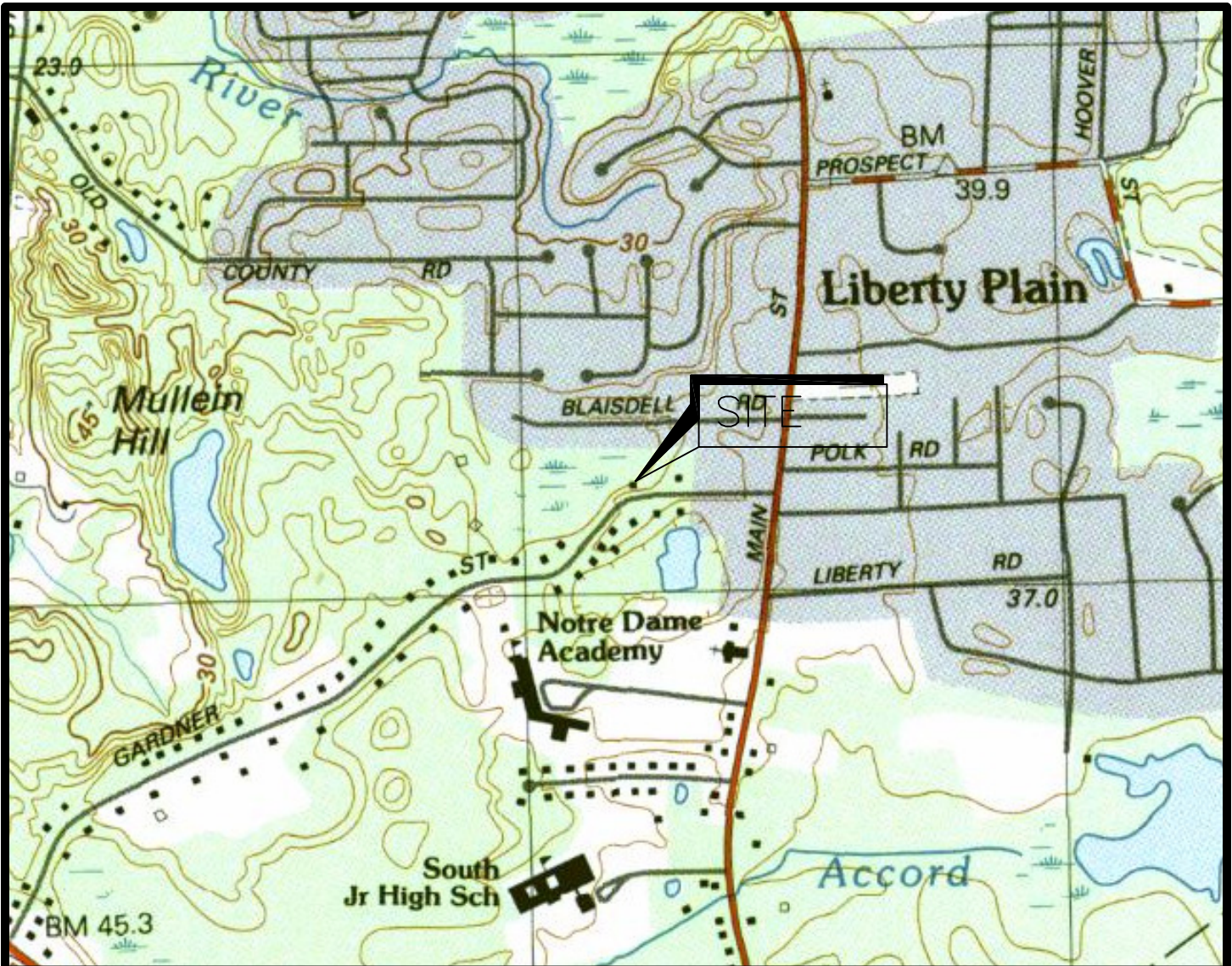
An Erosion & Sedimentation Control plan is submitted in Appendix B of this report.

Standard #9: A Long Term Operation & Maintenance Plan shall be developed...

A Post-Construction Operation & Maintenance Plan is submitted in Appendix B of this report.

Standard #10: All illicit discharges to the stormwater management system are prohibited.

There are no known illicit discharges. The project does not propose any illicit discharges. A signed Illicit Discharge Statement is included in Appendix A.



SCALE: 1" = 1,000'

U.S. GEOLOGICAL SURVEY
7.5 X 15 MINUTE SERIES

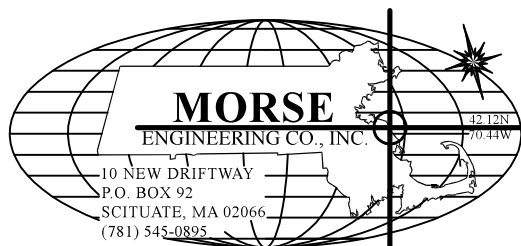
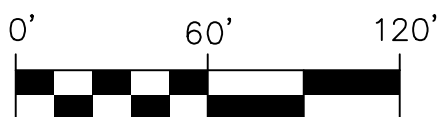


FIGURE — 1

USGS LOCUS MAP
33 GARDNER STREET
HINGHAM, MASSACHUSETTS



SCALE: 1" = 60'

NRCS SOILS MAP

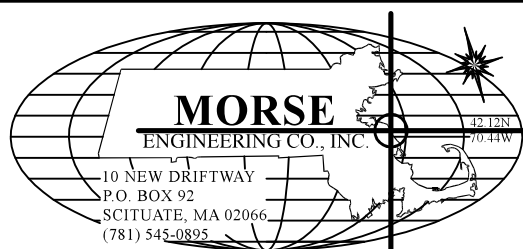


FIGURE — 2

NRCS SOILS MAP
33 GARDNER STREET
HINGHAM, MASSACHUSETTS

APPENDIX A

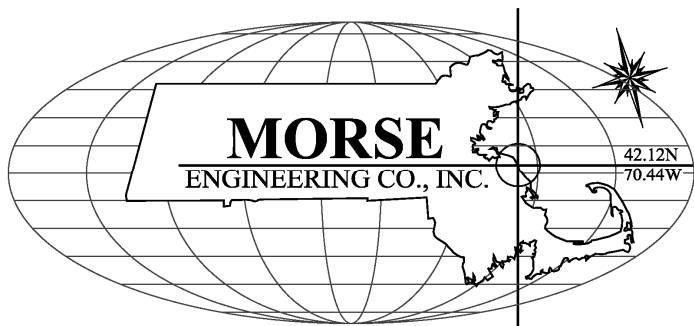
Const. Phase Stormwater Management Plan
Post-Development and Long-Term O&M Plan
Illicit Discharge Statement
TSS Removal Calculations
Drawdown Calculations

Construction Phase
Operation & Maintenance Plan
Best Management Practices
MA DEP Stormwater Management Policy

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Assessor's Map 179, Lot 23

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Construction Phase Operation & Maintenance Plan
Best Management Practices
33 Gardner Street
Hingham, MA

Responsible Parties & Contact Information:

Owner:

Kimberly Donlan Holmes
33 Gardner Street
Hingham, MA 02043
ksdonlan@gmail.com

Contractor / Stormwater Manager:

Name:

Address:

Address:

Contact:

Inspection & Record Keeping:

The responsible party shall maintain an operation and maintenance log during construction to control construction-related impacts, including erosion, sedimentation and other pollutant sources and land disturbance activities.

The responsible party shall inspect the construction site at least once every 14 calendar days and within 24 hours of a storm event of ½ inch or greater. Inspections shall be performed until the site is fully stabilized and the temporary sedimentation controls have been removed. The inspector shall inspect each measure to determine if it was installed/performed correctly. The inspector shall also determine if the measures have been damaged and if so the corrective action.

The log shall be kept on-site at all times and shall be made available to MassDEP and Town officials upon request. Member and agents of MassDEP and the Town officials shall be allowed to enter and inspect the premises to evaluate and ensure that the responsible party complies with the Operation and Maintenance Plan requirements for each BMP.

Operation & Maintenance:

During land disturbance and construction activities, project proponents must implement controls that prevent erosion, control sediment movement, and stabilize exposed soils to prevent pollutants from moving offsite or entering wetlands or waters. Land disturbance activities include demolition, construction, clearing, excavation, grading, filling, and reconstruction. Construction activities increase the potential for erosion and sedimentation at a site which may adversely impact wetland resource areas. To prevent this impact, the following conditions shall be imposed to control erosion and sedimentation:

Erosion Control Barrier: A mulch sock shall be placed along the limit of work or clearing prior to commencement of any construction activity. The integrity of the erosion control barrier shall be maintained by periodic inspection and replacement as necessary. The erosion control barrier shall remain in place until all disturbed surfaces have been loamed and seeded and vegetation has been established.

Stabilized Construction Entrance: The existing paved driveway shall be used as a stabilized construction entrance. The entrance shall be inspected weekly and maintained in good condition. Mud and sediment tracked onto the roadway shall be removed immediately.

Stabilization Practices: Disturbed areas shall be stabilized and protected as soon as practicable. Disturbed areas shall be stabilized when construction activity in the area has ceased for more than 14 days unless not feasible due to snow cover or if construction activities will resume within 21 days after construction temporarily ceased. Stabilization measures include the following:

- Temporary Seeding
- Geotextiles
- Mulching and Netting
- Permanent Seeding

If seeding is not used to stabilize disturbed areas 6 weeks before first frost, jute mesh or mulching and netting should be used to stabilize the site until the next recommended seeding period. Seeding should take place in late spring or early fall. During the recommended seeding season, seed should receive watering twice a day, for a total of 3-4 inches per week. If municipal water restrictions are in effect that limit the availability of water, jute mesh or mulching and netting should be implemented until such a time that sufficient water is available to maintain any seeding.

Air Quality/Dust: Dust can be generated by dumping, excavating and moving the raw materials and exposed soil storage during periods of mechanical disturbance, transfer operations or high winds. Measures to mitigate dust emissions shall be utilized to reduce emissions and to minimize related impacts. These measures include watering areas of exposed soils on a regular basis, vegetative cover, calcium chloride, stone and the use of tarpaulin covered trucks when transporting material.

Stockpiling: Temporary construction phase soil storage piles shall be stabilized or protected with sediment trapping measures to keep soil in place and prevent sediment runoff. Temporary perimeter protection such as berms, dikes and silt fences shall be applied to all soil piles. If stockpile is to remain undisturbed for more than a 30-day period it shall be stabilized with vegetative cover.

Catch Basin Silt Sacks: Catch basins silt sacks should be installed on nearby existing basins. Silt sacks should be periodically inspected to ensure proper placement, as well as to remove accumulated debris or sediment to ensure continued function. Silt sacks should only be removed on the site has been fully stabilized.

Storage and Disposal of Hazardous Materials: Hazardous materials shall be stored and disposed of in accordance with the U.S. Environmental Protection Agency hazardous waste regulations and all other applicable regulations to ensure they do not adversely impact the environment.

In the event of a spill, the supervisor is to first contact the Fire Department and then notify the Police Department, Department of Public Works, Board of Health, and Conservation Commission. The Fire Department will assess the spill and determine if additional notifications are necessary and the level of cleanup.

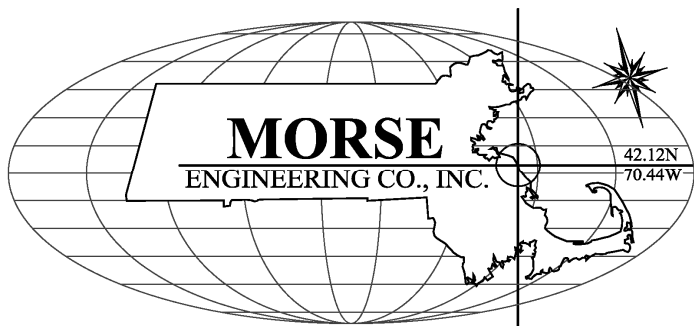
The following equipment and materials shall be stored on-site at all times; sorbent pads, sand bags, speedi-dri absorbent and square end shovels.

Post-Construction Phase
Operation & Maintenance Plan
Best Management Practices
MA DEP Stormwater Management Policy

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Date: June 13, 2026



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Post Construction Phase Operation & Maintenance Plan

Best Management Practices

**33 Gardner Street
Hingham, MA**

Responsible Parties & Contact Information:

Owner:

Kimberly Donlan Holmes
33 Gardner Street
Hingham, MA 02043
ksdonlan@gmail.com

Record Keeping:

The responsible party shall maintain an operation and maintenance log for a minimum of three years prior including inspections, repairs, replacement and disposal. The log shall be kept on-site at all times.

The log shall be made available to MassDEP and the Town upon request. Members and agents of MassDEP and the Town shall be allowed to enter and inspect the premises to evaluate and ensure that the responsible party complies with the Operation and Maintenance Plan requirements for each BMP.

Operation & Maintenance:

In order to maintain the integrity of the stormwater management system, frequent inspections and maintenance shall be performed by the owner. The BMPs require continuous inspections and maintenance in order to function properly. The BMPs should be inspected and maintained as specified and after all major storm events.

Ground Cover shall be inspected at a minimum of every month and maintained as necessary. Maintenance includes removing any accumulated sediment, trash and debris and repairing erosion. Disposal of accumulated sediment must be in accordance with applicable local, state and federal guidelines and regulations. Important items to check during inspection include: signs of differential settlement or cracking of the pavement, erosion, tree growth on any embankments, condition of riprap and the health of the turf.

Crushed Stone Trenches shall be inspected quarterly. All sediment, trash and debris shall be removed. The pea stone or mulch filter shall be replaced as necessary.

Illicit Discharges:

No illicit discharges shall be created. An illicit discharge is any discharge that is not composed entirely of stormwater.

Storage and Disposal of Hazardous Materials:

Hazardous materials shall be stored and disposed of in accordance with the U.S. Environmental Protection Agency hazardous waste regulations and all other applicable regulations to ensure they do not adversely impact the environment.

The exterior storage of hazardous materials shall be prohibited.

In the event of a spill, the supervisor is to first contact the Fire Department and then notify the Police Department, Department of Public Works, Board of Health, and Conservation Commission. The Fire Department will assess the spill and determine if additional notifications are necessary and the level of cleanup.

Costs and Funding

The funding for operation and maintenance of the ground cover, subsurface drywells, and gutters and downspouts is the responsibility of property owner. The estimated annual cost for operation and maintenance of these items is \$300.

Illicit Discharge Compliance Statement

To: Town of Hingham
210 Central Street
Hingham, MA 02043

RE: 33 Gardner Street

To Whom it May Concern:

This letter is a statement that to the best of my knowledge, no illicit discharges currently exist or are being considered by me to the stormwater management system at the above referenced property.

Morse Engineering Company, Inc.

A handwritten signature in black ink, appearing to read "Paul G. Gunn", written in a cursive style.

Paul G. Gunn, P.E.
Applicant's Representative

INSTRUCTIONS:

- 1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
- 2. Select BMP from Drop Down Menu
- 3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Location: 33 Gardner Street, Hingham

B	C	D	E	F
BMP ¹	TSS Removal Rate ¹	Starting TSS Load*	Amount Removed (C*D)	Remaining Load (D-E)
Infiltration Trench	0.80	1.00	0.80	0.20
	0.00	0.20	0.00	0.20
	0.00	0.20	0.00	0.20
	0.00	0.20	0.00	0.20
	0.00	0.20	0.00	0.20

Separate Form Needs to be Completed for Each Outlet or BMP Train

80%

Total TSS Removal =

Project:	25-232
Prepared By:	PGG
Date:	6/25/2026

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed

1. From MassDEP Stormwater Handbook Vol. 1

Drawdown Calculations for Infiltration BMP

Address: 33 Gardner Street

Date: 6/25/2026

Project #: 25-232

Computed by: PGG

Driveway Infiltration Trench

Variables

Vt	195 cf	Total volume if BMP were filled to capacity (see HydroCAD).
i	2.41 in/hr	Infiltration rate based on soil class.
A	192 sf	Area of infiltration BMP.

Estimated Drawdown Time

Drawdown Time = $Vt / (i * A * 1"/12')$

Drawdown Time = 5.06 hours = 0.21 days

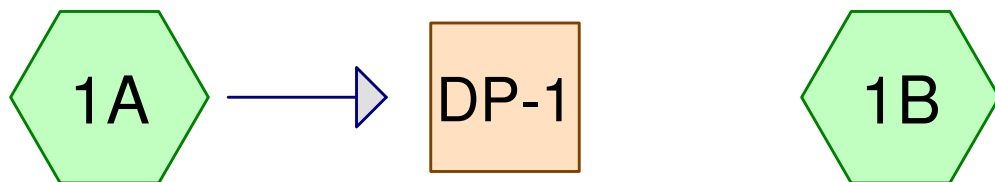
Does system drain within 72 hours?

YES

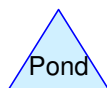
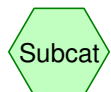
APPENDIX B

Pre-Development HydroCAD Analysis

Post-Development HydroCAD Analysis



Wetlands



Existing Conditions

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Page 2

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 YR	Type III 24-hr		Default	24.00	1	3.40	2
2	10 YR	Type III 24-hr		Default	24.00	1	4.70	2
3	100 YR	Type III 24-hr		Default	24.00	1	7.00	2

Existing Conditions

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.296	39	>75% Grass cover, Good, HSG A (1A)
0.023	98	Hardscaping (1A)
0.001	98	Koi Pond (1A)
0.044	39	Off-site >75% Grass cover, Good, HSG A (1A)
0.035	98	Off-site Pavement (1A)
0.074	30	Off-site Woods, Good, HSG A (1A)
0.108	98	Pavement (1A)
0.056	98	Roof (1A)
0.022	98	Swimming Pool (1B)
0.045	30	Woods, Good, HSG A (1A)
0.702	58	TOTAL AREA

Existing Conditions

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Page 4

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.459	HSG A	1A
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.243	Other	1A, 1B
0.702		TOTAL AREA

Existing Conditions

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Page 5

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchmen Numbers
0.296	0.000	0.000	0.000	0.000	0.296	>75% Grass cover, Good	
0.000	0.000	0.000	0.000	0.023	0.023	Hardscaping	
0.000	0.000	0.000	0.000	0.001	0.001	Koi Pond	
0.044	0.000	0.000	0.000	0.000	0.044	Off-site >75% Grass cover, Good	
0.000	0.000	0.000	0.000	0.035	0.035	Off-site Pavement	
0.074	0.000	0.000	0.000	0.000	0.074	Off-site Woods, Good	
0.000	0.000	0.000	0.000	0.108	0.108	Pavement	
0.000	0.000	0.000	0.000	0.056	0.056	Roof	
0.000	0.000	0.000	0.000	0.022	0.022	Swimming Pool	
0.045	0.000	0.000	0.000	0.000	0.045	Woods, Good	
0.459	0.000	0.000	0.000	0.243	0.702	TOTAL AREA	

Existing Conditions

Type III 24-hr 2 YR Rainfall=3.40"

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Page 6

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A:

Runoff Area=29,638 sf 32.61% Impervious Runoff Depth=0.38"

Flow Length=150' Tc=6.9 min CN=57 Runoff=0.14 cfs 0.021 af

Subcatchment 1B:

Runoff Area=938 sf 100.00% Impervious Runoff Depth=3.17"

Tc=6.0 min CN=98 Runoff=0.07 cfs 0.006 af

Reach DP-1: Wetlands

Inflow=0.14 cfs 0.021 af

Outflow=0.14 cfs 0.021 af

Total Runoff Area = 0.702 ac Runoff Volume = 0.027 af Average Runoff Depth = 0.46"

65.33% Pervious = 0.459 ac 34.67% Impervious = 0.243 ac

Existing Conditions

Type III 24-hr 2 YR Rainfall=3.40"

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Summary for Subcatchment 1A:

Runoff = 0.14 cfs @ 12.16 hrs, Volume= 0.021 af, Depth= 0.38"
 Routed to Reach DP-1 : Wetlands

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2 YR Rainfall=3.40"

	Area (sf)	CN	Description
*	2,421	98	Roof
*	24	98	Koi Pond
*	1,004	98	Hardscaping
*	4,704	98	Pavement
	1,963	30	Woods, Good, HSG A
	12,900	39	>75% Grass cover, Good, HSG A
*	1,511	98	Off-site Pavement
*	1,899	39	Off-site >75% Grass cover, Good, HSG A
*	3,212	30	Off-site Woods, Good, HSG A
	29,638	57	Weighted Average
	19,974		67.39% Pervious Area
	9,664		32.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0880	0.13		Sheet Flow, 0-16
					Woods: Light underbrush n= 0.400 P2= 3.40"
0.3	100	0.1260	5.71		Shallow Concentrated Flow, 50-150
					Unpaved Kv= 16.1 fps
6.9	150	Total			

Existing Conditions

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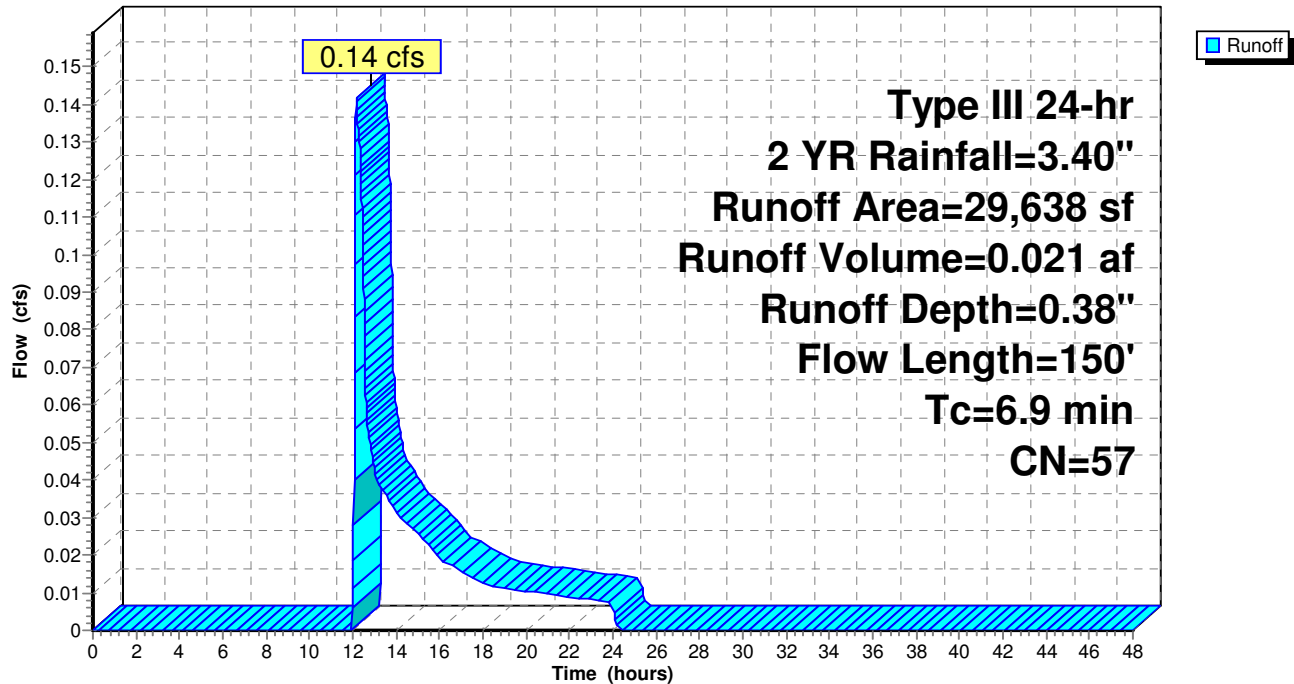
HydroCAD® 10.20-9a s/n 14062 © 2026 HydroCAD Software Solutions LLC

Type III 24-hr 2 YR Rainfall=3.40"

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Subcatchment 1A:

Hydrograph



Existing Conditions

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Type III 24-hr 2 YR Rainfall=3.40"

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Summary for Subcatchment 1B:

Runoff = 0.07 cfs @ 12.08 hrs, Volume= 0.006 af, Depth= 3.17"

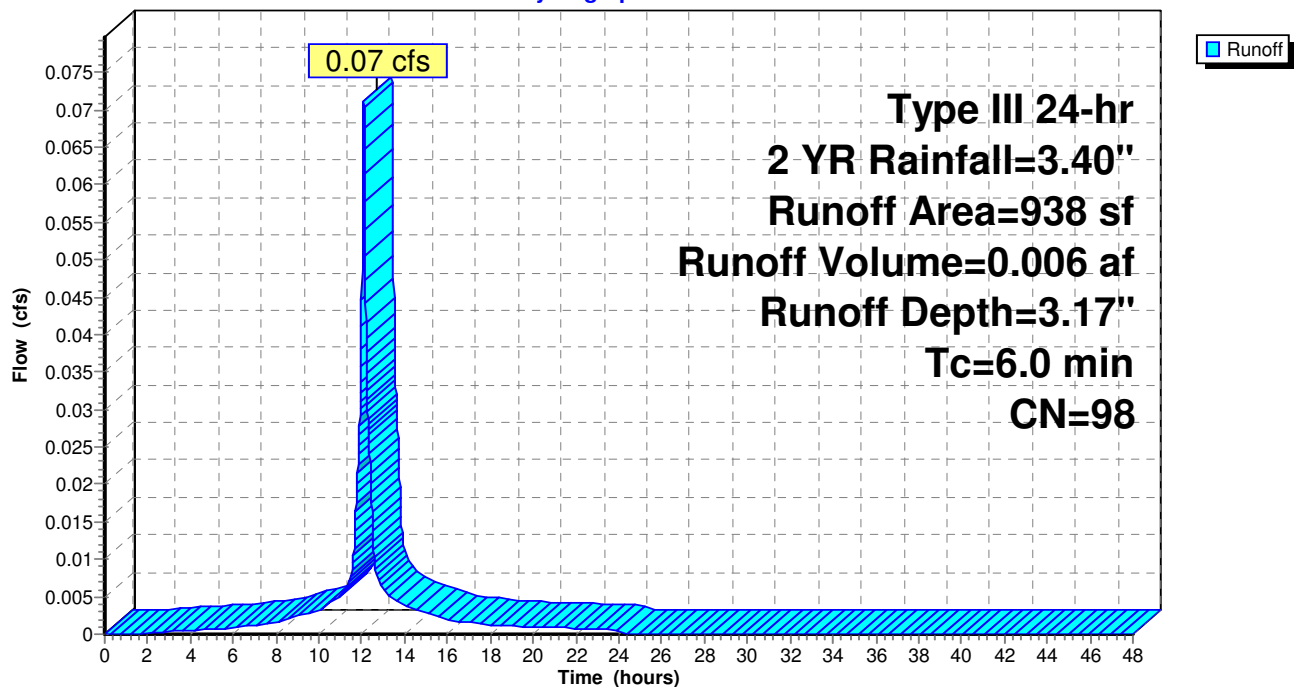
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.40"

	Area (sf)	CN	Description
*	938	98	Swimming Pool
	938		100.00% Impervious Area

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

Subcatchment 1B:

Hydrograph



Existing Conditions

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Type III 24-hr 2 YR Rainfall=3.40"

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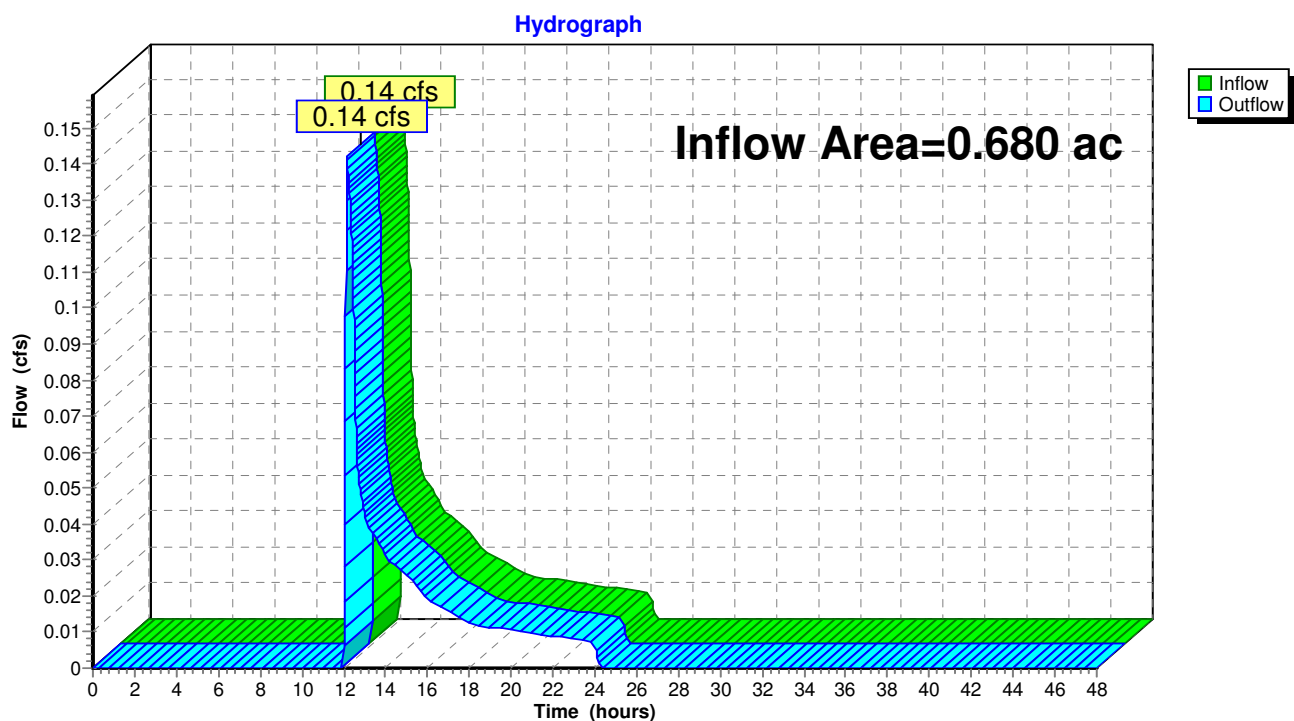
Summary for Reach DP-1: Wetlands

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.680 ac, 32.61% Impervious, Inflow Depth = 0.38" for 2 YR event
Inflow = 0.14 cfs @ 12.16 hrs, Volume= 0.021 af
Outflow = 0.14 cfs @ 12.16 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

Reach DP-1: Wetlands



Existing Conditions

Type III 24-hr 10 YR Rainfall=4.70"

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A:

Runoff Area=29,638 sf 32.61% Impervious Runoff Depth=0.95"

Flow Length=150' Tc=6.9 min CN=57 Runoff=0.59 cfs 0.054 af

Subcatchment 1B:

Runoff Area=938 sf 100.00% Impervious Runoff Depth=4.46"

Tc=6.0 min CN=98 Runoff=0.10 cfs 0.008 af

Reach DP-1: Wetlands

Inflow=0.59 cfs 0.054 af

Outflow=0.59 cfs 0.054 af

Total Runoff Area = 0.702 ac Runoff Volume = 0.062 af Average Runoff Depth = 1.06"

65.33% Pervious = 0.459 ac 34.67% Impervious = 0.243 ac

Existing Conditions

Type III 24-hr 10 YR Rainfall=4.70"

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Summary for Subcatchment 1A:

Runoff = 0.59 cfs @ 12.12 hrs, Volume= 0.054 af, Depth= 0.95"
 Routed to Reach DP-1 : Wetlands

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10 YR Rainfall=4.70"

	Area (sf)	CN	Description
*	2,421	98	Roof
*	24	98	Koi Pond
*	1,004	98	Hardscaping
*	4,704	98	Pavement
	1,963	30	Woods, Good, HSG A
	12,900	39	>75% Grass cover, Good, HSG A
*	1,511	98	Off-site Pavement
*	1,899	39	Off-site >75% Grass cover, Good, HSG A
*	3,212	30	Off-site Woods, Good, HSG A
	29,638	57	Weighted Average
	19,974		67.39% Pervious Area
	9,664		32.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0880	0.13		Sheet Flow, 0-16
					Woods: Light underbrush n= 0.400 P2= 3.40"
0.3	100	0.1260	5.71		Shallow Concentrated Flow, 50-150
					Unpaved Kv= 16.1 fps
6.9	150	Total			

Existing Conditions

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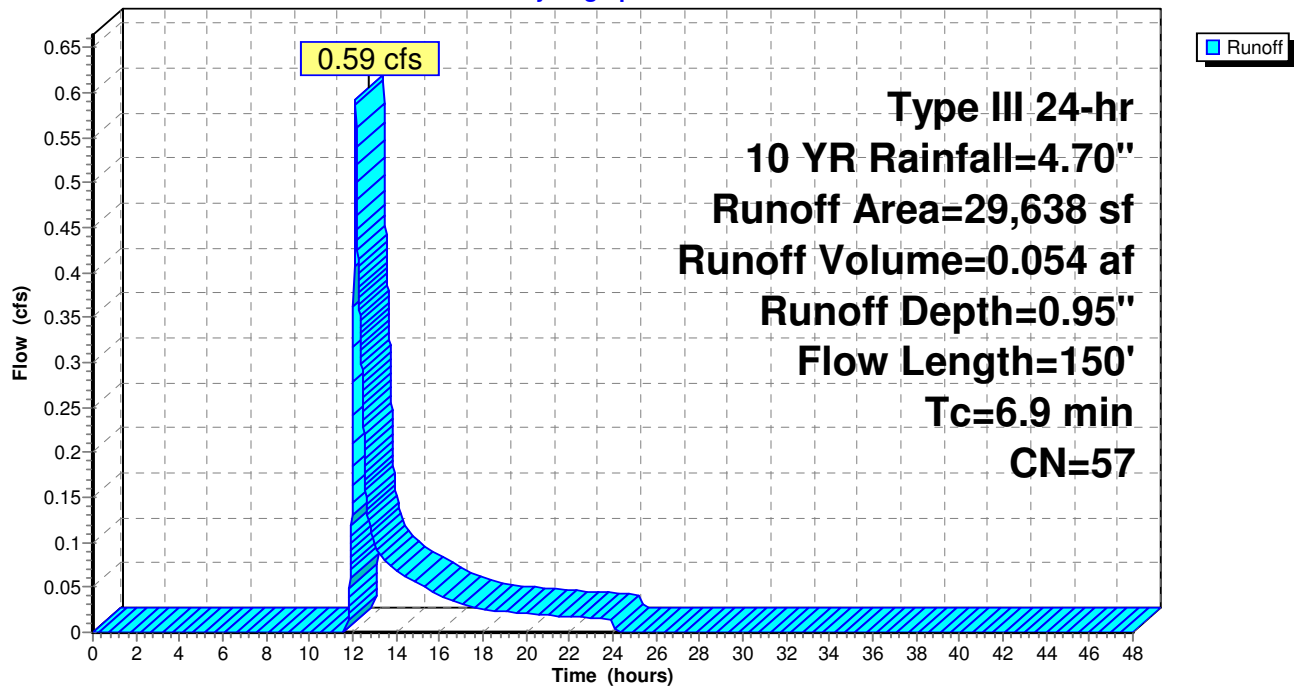
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Type III 24-hr 10 YR Rainfall=4.70"

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Subcatchment 1A:

Hydrograph



Existing Conditions

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Type III 24-hr 10 YR Rainfall=4.70"

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Summary for Subcatchment 1B:

Runoff = 0.10 cfs @ 12.08 hrs, Volume= 0.008 af, Depth= 4.46"

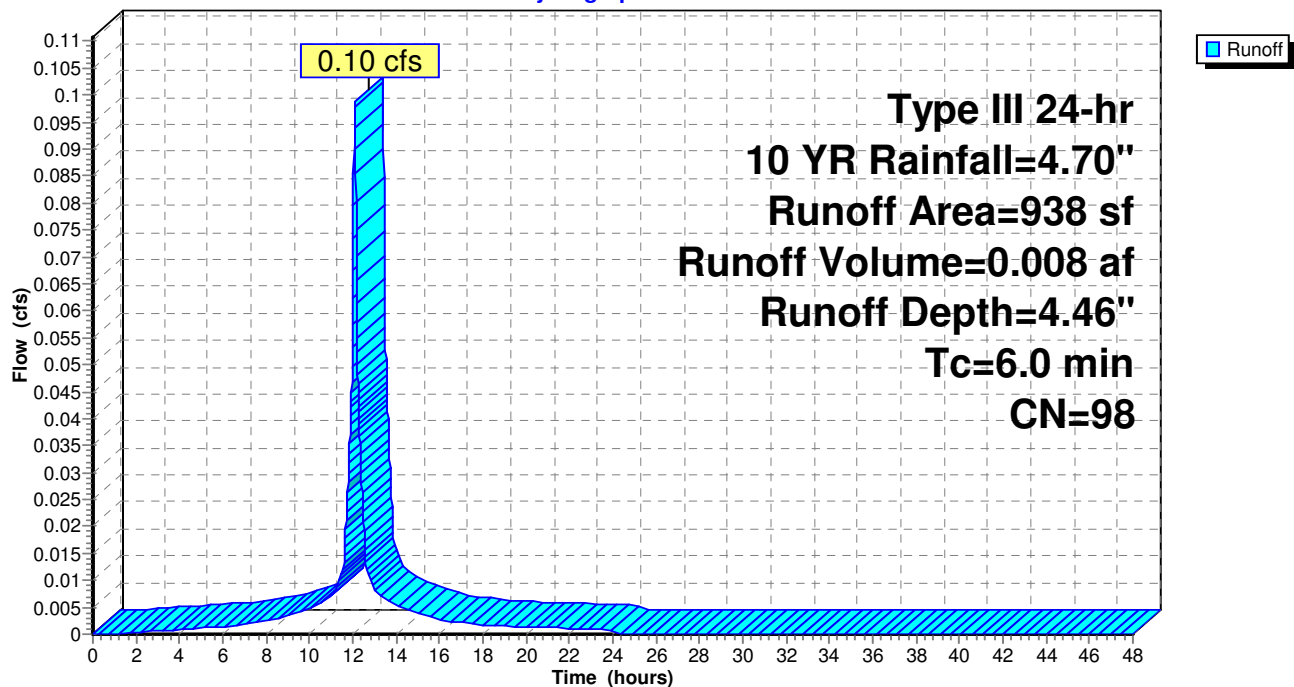
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.70"

	Area (sf)	CN	Description
*	938	98	Swimming Pool
	938		100.00% Impervious Area

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

Subcatchment 1B:

Hydrograph



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Type III 24-hr 10 YR Rainfall=4.70"

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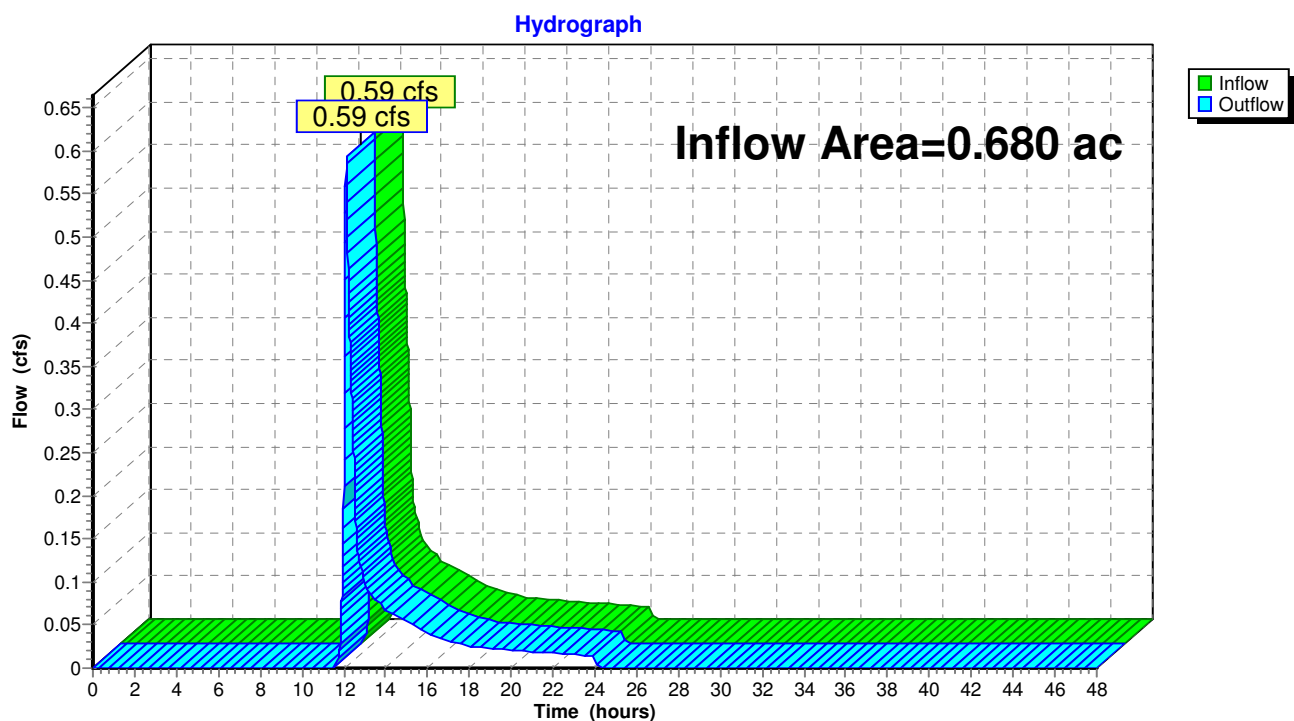
Summary for Reach DP-1: Wetlands

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.680 ac, 32.61% Impervious, Inflow Depth = 0.95" for 10 YR event
Inflow = 0.59 cfs @ 12.12 hrs, Volume= 0.054 af
Outflow = 0.59 cfs @ 12.12 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

Reach DP-1: Wetlands



Existing Conditions

Type III 24-hr 100 YR Rainfall=7.00"

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A:

Runoff Area=29,638 sf 32.61% Impervious Runoff Depth=2.31"
Flow Length=150' Tc=6.9 min CN=57 Runoff=1.70 cfs 0.131 af

Subcatchment 1B:

Runoff Area=938 sf 100.00% Impervious Runoff Depth=6.76"
Tc=6.0 min CN=98 Runoff=0.15 cfs 0.012 af

Reach DP-1: Wetlands

Inflow=1.70 cfs 0.131 af
Outflow=1.70 cfs 0.131 af

Total Runoff Area = 0.702 ac Runoff Volume = 0.143 af Average Runoff Depth = 2.45"
65.33% Pervious = 0.459 ac 34.67% Impervious = 0.243 ac

Existing Conditions

Type III 24-hr 100 YR Rainfall=7.00"

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Summary for Subcatchment 1A:

Runoff = 1.70 cfs @ 12.11 hrs, Volume= 0.131 af, Depth= 2.31"
 Routed to Reach DP-1 : Wetlands

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100 YR Rainfall=7.00"

	Area (sf)	CN	Description
*	2,421	98	Roof
*	24	98	Koi Pond
*	1,004	98	Hardscaping
*	4,704	98	Pavement
	1,963	30	Woods, Good, HSG A
	12,900	39	>75% Grass cover, Good, HSG A
*	1,511	98	Off-site Pavement
*	1,899	39	Off-site >75% Grass cover, Good, HSG A
*	3,212	30	Off-site Woods, Good, HSG A
	29,638	57	Weighted Average
	19,974		67.39% Pervious Area
	9,664		32.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0880	0.13		Sheet Flow, 0-16
					Woods: Light underbrush n= 0.400 P2= 3.40"
0.3	100	0.1260	5.71		Shallow Concentrated Flow, 50-150
					Unpaved Kv= 16.1 fps
6.9	150	Total			

Existing Conditions

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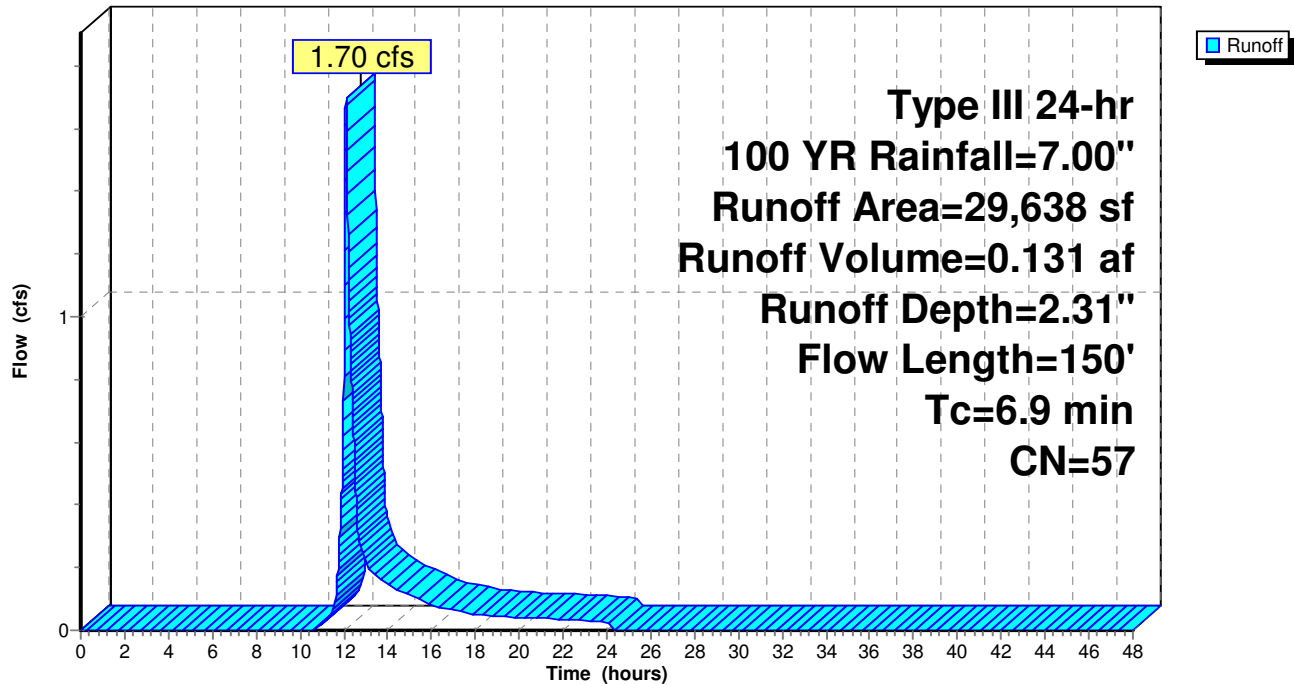
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Type III 24-hr 100 YR Rainfall=7.00"

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Subcatchment 1A:

Hydrograph



Existing Conditions

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Type III 24-hr 100 YR Rainfall=7.00"

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Summary for Subcatchment 1B:

Runoff = 0.15 cfs @ 12.08 hrs, Volume= 0.012 af, Depth= 6.76"

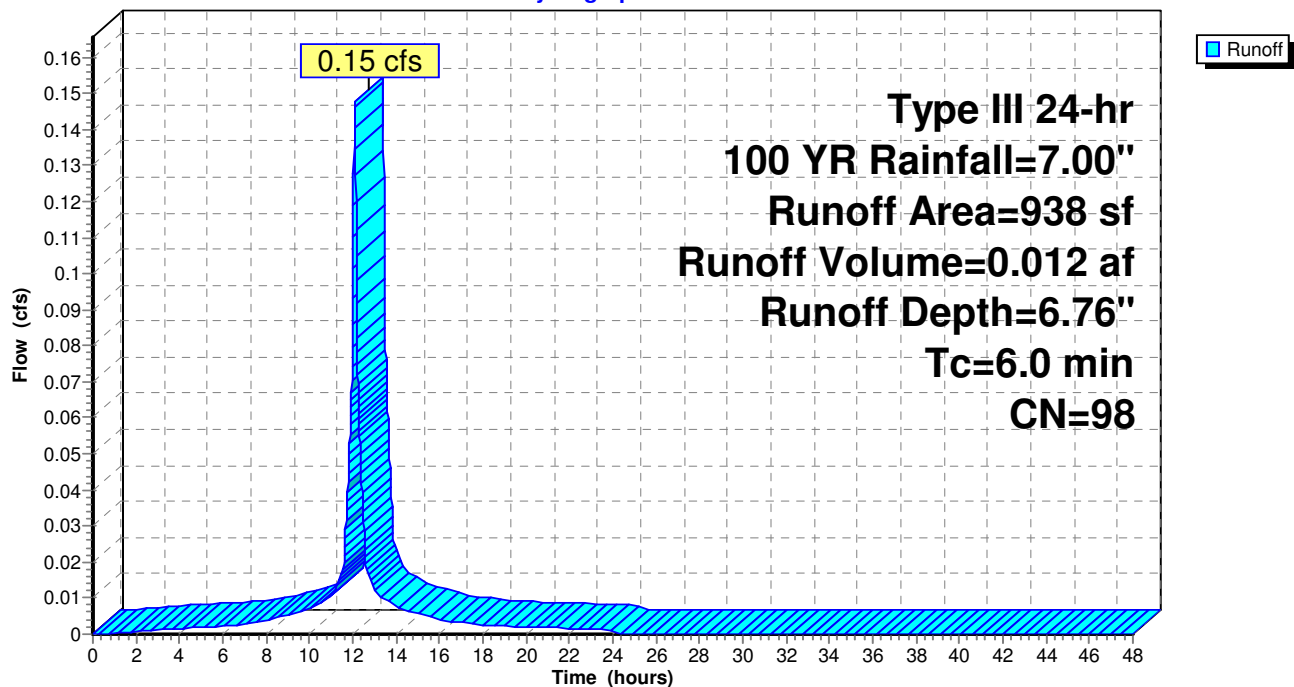
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=7.00"

	Area (sf)	CN	Description
*	938	98	Swimming Pool
	938		100.00% Impervious Area

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

Subcatchment 1B:

Hydrograph



Existing Conditions

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Type III 24-hr 100 YR Rainfall=7.00"

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Summary for Reach DP-1: Wetlands

[40] Hint: Not Described (Outflow=Inflow)

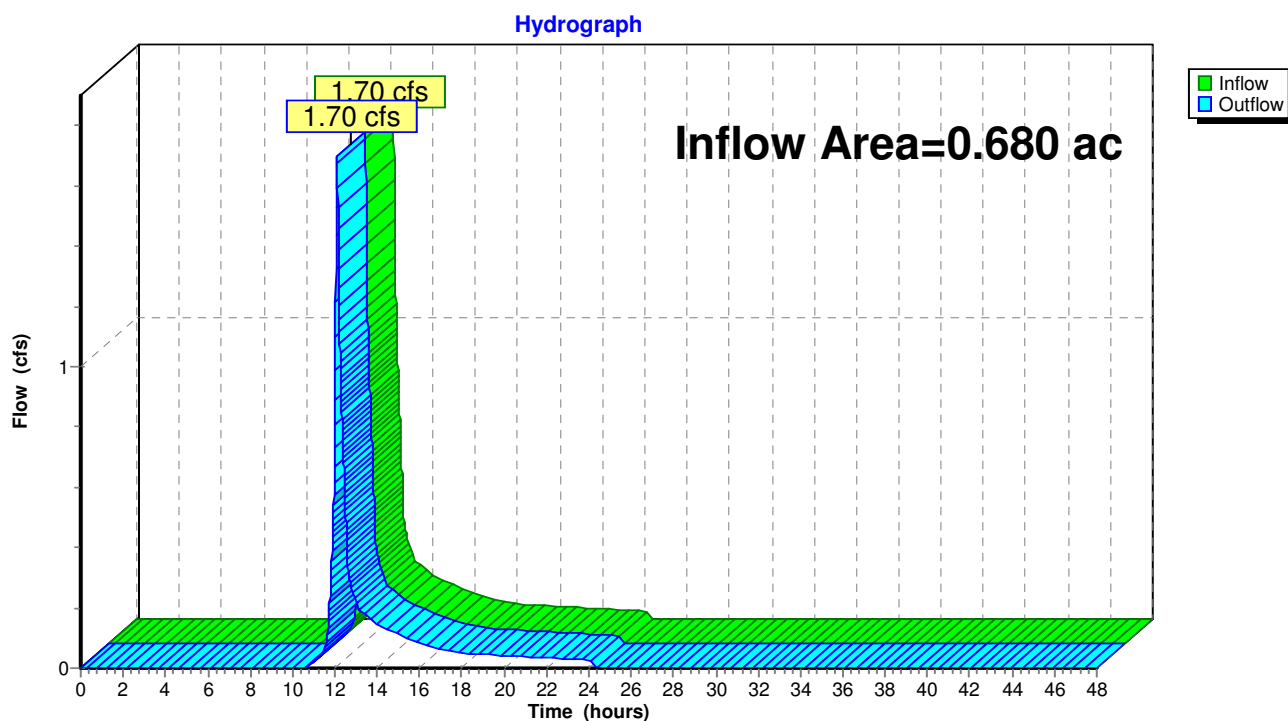
Inflow Area = 0.680 ac, 32.61% Impervious, Inflow Depth = 2.31" for 100 YR event

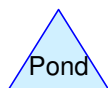
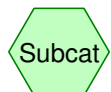
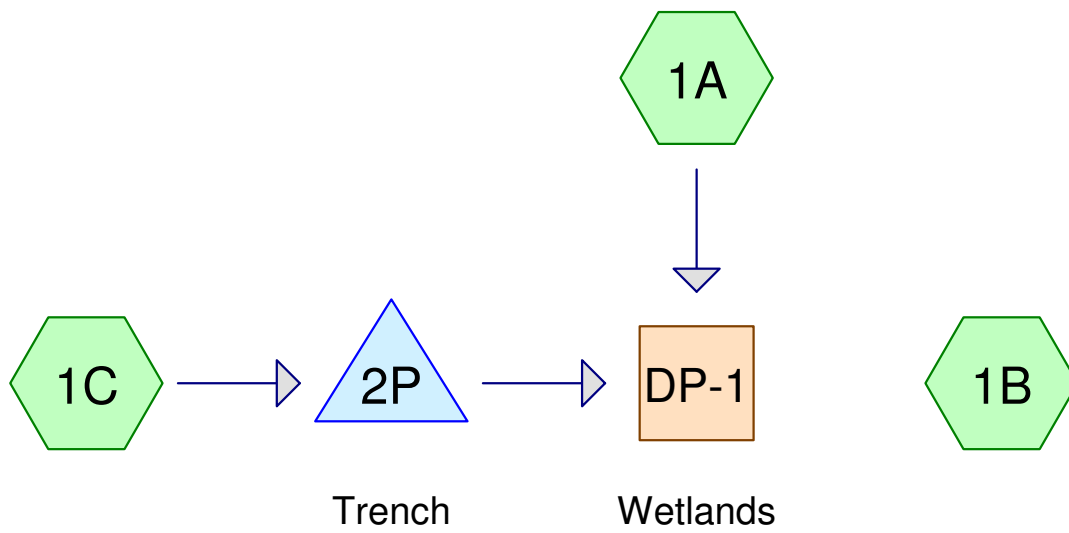
Inflow = 1.70 cfs @ 12.11 hrs, Volume= 0.131 af

Outflow = 1.70 cfs @ 12.11 hrs, Volume= 0.131 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 2

Reach DP-1: Wetlands





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Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 YR	Type III 24-hr		Default	24.00	1	3.40	2
2	10 YR	Type III 24-hr		Default	24.00	1	4.70	2
3	100 YR	Type III 24-hr		Default	24.00	1	7.00	2

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.308	39	>75% Grass cover, Good, HSG A (1A, 1C)
0.012	98	Hardscaping (1A)
0.044	39	Off-site >75% Grass cover, Good, HSG A (1A)
0.035	98	Off-site Pavement (1A)
0.074	30	Off-site Woods, Good, HSG A (1A)
0.108	98	Pavement (1A, 1C)
0.056	98	Roof (1A, 1C)
0.022	98	Swimming Pool (1B)
0.045	30	Woods, Good, HSG A (1A)
0.702	57	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.470	HSG A	1A, 1C
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.232	Other	1A, 1B, 1C
0.702		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchmen Numbers
0.308	0.000	0.000	0.000	0.000	0.308	>75% Grass cover, Good	
0.000	0.000	0.000	0.000	0.012	0.012	Hardscaping	
0.044	0.000	0.000	0.000	0.000	0.044	Off-site >75% Grass cover, Good	
0.000	0.000	0.000	0.000	0.035	0.035	Off-site Pavement	
0.074	0.000	0.000	0.000	0.000	0.074	Off-site Woods, Good	
0.000	0.000	0.000	0.000	0.108	0.108	Pavement	
0.000	0.000	0.000	0.000	0.056	0.056	Roof	
0.000	0.000	0.000	0.000	0.022	0.022	Swimming Pool	
0.045	0.000	0.000	0.000	0.000	0.045	Woods, Good	
0.470	0.000	0.000	0.000	0.232	0.702	TOTAL AREA	

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	2P	125.70	124.00	25.0	0.0680	0.010	0.0	4.0	0.0	

Proposed Conditions

Type III 24-hr 2 YR Rainfall=3.40"

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A:

Runoff Area=27,128 sf 25.13% Impervious Runoff Depth=0.22"
Flow Length=150' Tc=6.9 min CN=52 Runoff=0.05 cfs 0.012 af

Subcatchment 1B:

Runoff Area=938 sf 100.00% Impervious Runoff Depth=3.17"
Tc=6.0 min CN=98 Runoff=0.07 cfs 0.006 af

Subcatchment 1C:

Runoff Area=2,510 sf 93.07% Impervious Runoff Depth=2.74"
Tc=6.0 min CN=94 Runoff=0.18 cfs 0.013 af

Reach DP-1: Wetlands

Inflow=0.13 cfs 0.015 af
Outflow=0.13 cfs 0.015 af

Pond 2P: Trench

Peak Elev=125.97' Storage=138 cf Inflow=0.18 cfs 0.013 af
Discarded=0.01 cfs 0.010 af Primary=0.10 cfs 0.003 af Outflow=0.11 cfs 0.013 af

Total Runoff Area = 0.702 ac Runoff Volume = 0.030 af Average Runoff Depth = 0.52"
66.99% Pervious = 0.470 ac 33.01% Impervious = 0.232 ac

Proposed Conditions

Type III 24-hr 2 YR Rainfall=3.40"

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Summary for Subcatchment 1A:

Runoff = 0.05 cfs @ 12.38 hrs, Volume= 0.012 af, Depth= 0.22"
Routed to Reach DP-1 : Wetlands

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.40"

	Area (sf)	CN	Description
*	1,661	98	Roof
*	0	98	Koi Pond
*	518	98	Hardscaping
*	3,128	98	Pavement
	1,963	30	Woods, Good, HSG A
	13,236	39	>75% Grass cover, Good, HSG A
*	1,511	98	Off-site Pavement
*	1,899	39	Off-site >75% Grass cover, Good, HSG A
*	3,212	30	Off-site Woods, Good, HSG A
	27,128	52	Weighted Average
	20,310		74.87% Pervious Area
	6,818		25.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0880	0.13		Sheet Flow, 0-16
					Woods: Light underbrush n= 0.400 P2= 3.40"
0.3	100	0.1260	5.71		Shallow Concentrated Flow, 50-150
					Unpaved Kv= 16.1 fps
6.9	150	Total			

Proposed Conditions

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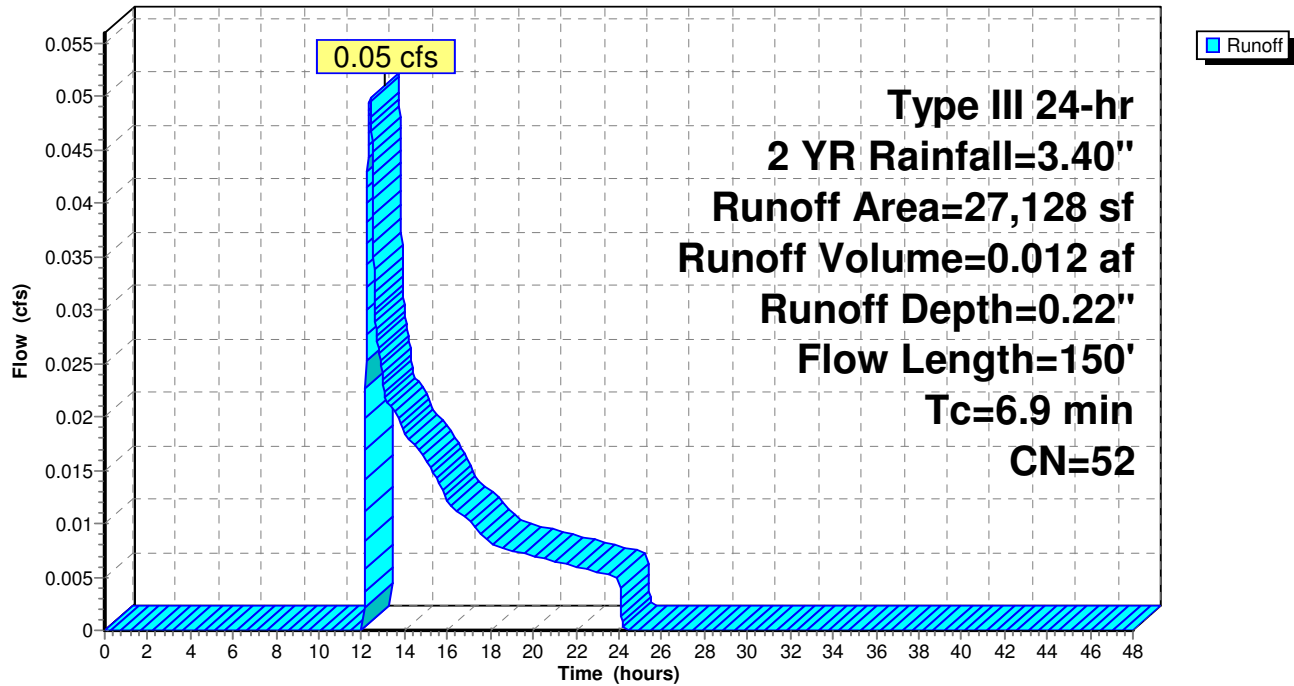
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Type III 24-hr 2 YR Rainfall=3.40"

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Subcatchment 1A:

Hydrograph



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Type III 24-hr 2 YR Rainfall=3.40"

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Summary for Subcatchment 1B:

Runoff = 0.07 cfs @ 12.08 hrs, Volume= 0.006 af, Depth= 3.17"

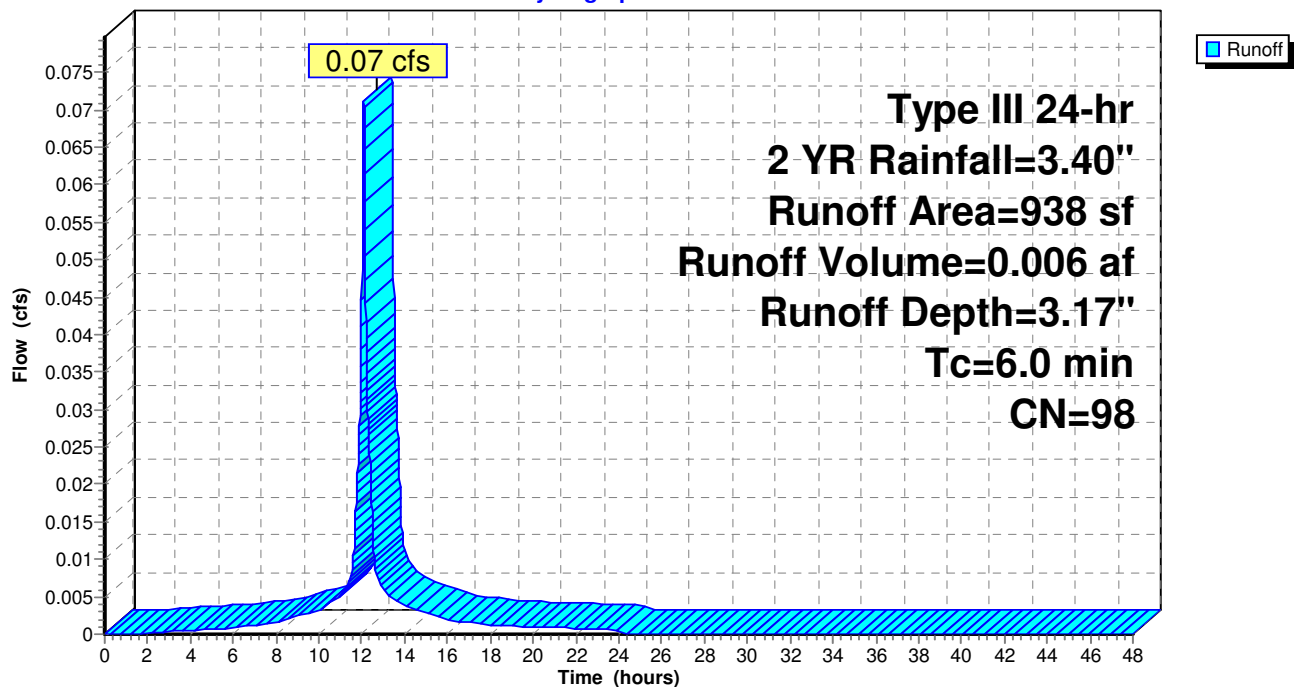
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.40"

	Area (sf)	CN	Description
*	938	98	Swimming Pool
	938		100.00% Impervious Area

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

Subcatchment 1B:

Hydrograph



Proposed Conditions

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Type III 24-hr 2 YR Rainfall=3.40"

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Summary for Subcatchment 1C:

Runoff = 0.18 cfs @ 12.08 hrs, Volume= 0.013 af, Depth= 2.74"
Routed to Pond 2P : Trench

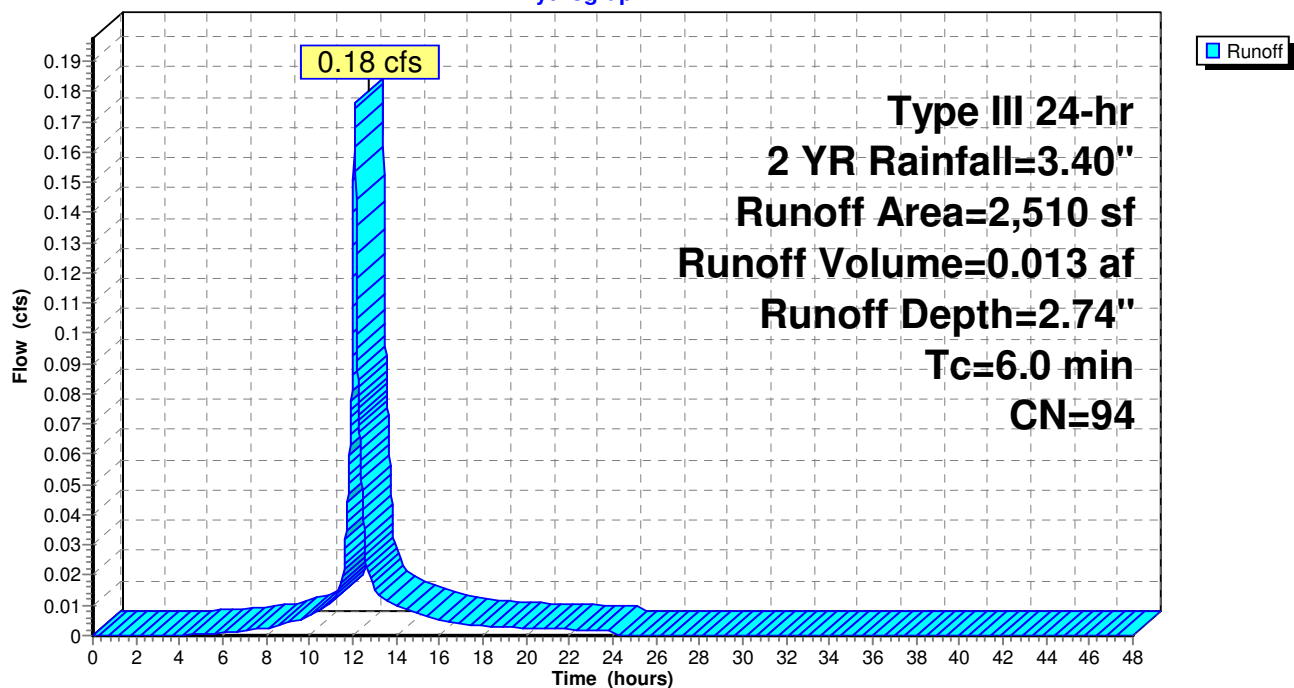
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 YR Rainfall=3.40"

	Area (sf)	CN	Description
*	760	98	Roof
*	1,576	98	Pavement
	174	39	>75% Grass cover, Good, HSG A
	2,510	94	Weighted Average
	174		6.93% Pervious Area
	2,336		93.07% Impervious Area

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

Subcatchment 1C:

Hydrograph



Proposed Conditions

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Type III 24-hr 2 YR Rainfall=3.40"

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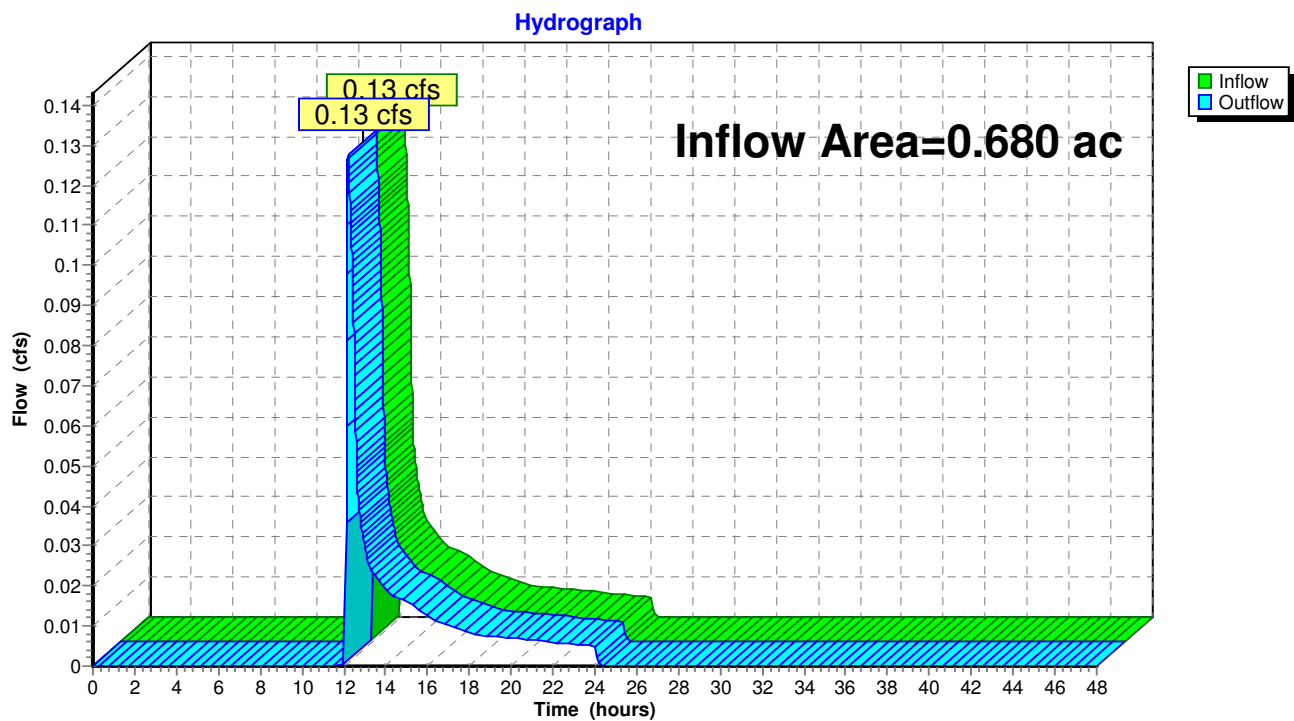
Summary for Reach DP-1: Wetlands

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.680 ac, 30.89% Impervious, Inflow Depth = 0.26" for 2 YR event
Inflow = 0.13 cfs @ 12.20 hrs, Volume= 0.015 af
Outflow = 0.13 cfs @ 12.20 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

Reach DP-1: Wetlands



Proposed Conditions

Type III 24-hr 2 YR Rainfall=3.40"

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Summary for Pond 2P: Trench

Inflow Area = 0.058 ac, 93.07% Impervious, Inflow Depth = 2.74" for 2 YR event
Inflow = 0.18 cfs @ 12.08 hrs, Volume= 0.013 af
Outflow = 0.11 cfs @ 12.18 hrs, Volume= 0.013 af, Atten= 35%, Lag= 5.5 min
Discarded = 0.01 cfs @ 11.26 hrs, Volume= 0.010 af
Primary = 0.10 cfs @ 12.18 hrs, Volume= 0.003 af
Routed to Reach DP-1 : Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 125.97' @ 12.18 hrs Surf.Area= 192 sf Storage= 138 cf

Plug-Flow detention time= 67.6 min calculated for 0.013 af (100% of inflow)
Center-of-Mass det. time= 67.6 min (852.7 - 785.1)

Volume	Invert	Avail.Storage	Storage Description
#1	124.20'	190 cf	Crushed Stone (Prismatic) Listed below (Recalc) 480 cf Overall - 5 cf Embedded = 475 cf x 40.0% Voids
#2	125.70'	5 cf	4.0" Round 4" PVC Inside #1 L= 55.6'
		195 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
124.20	192	0	0
126.20	192	384	384
126.70	192	96	480

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.20'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	125.70'	4.0" Round Culvert L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 125.70' / 124.00' S= 0.0680 ' S= 0.0680 ' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf

Discarded OutFlow Max=0.01 cfs @ 11.26 hrs HW=124.23' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.10 cfs @ 12.18 hrs HW=125.97' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Inlet Controls 0.10 cfs @ 1.39 fps)

Proposed Conditions

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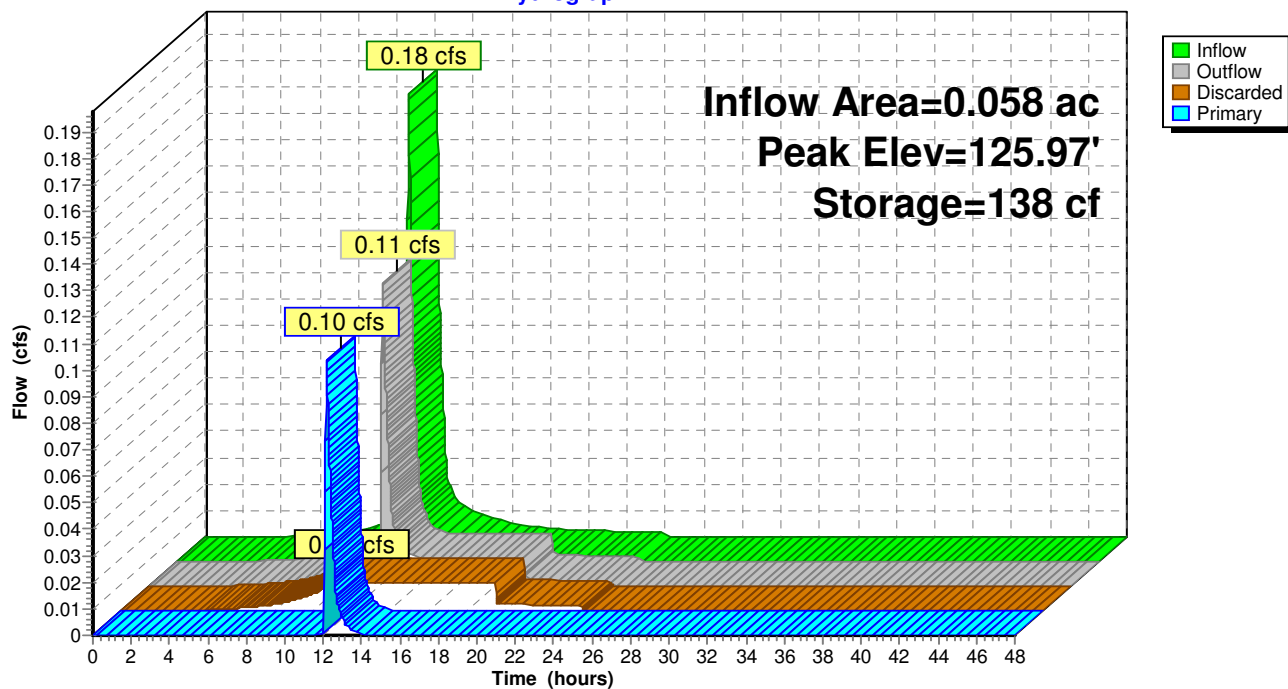
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Type III 24-hr 2 YR Rainfall=3.40"

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Pond 2P: Trench

Hydrograph



Proposed Conditions*Type III 24-hr 2 YR Rainfall=3.40"*

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Stage-Area-Storage for Pond 2P: Trench

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
124.20	192	0
124.25	192	4
124.30	192	8
124.35	192	12
124.40	192	15
124.45	192	19
124.50	192	23
124.55	192	27
124.60	192	31
124.65	192	35
124.70	192	38
124.75	192	42
124.80	192	46
124.85	192	50
124.90	192	54
124.95	192	58
125.00	192	61
125.05	192	65
125.10	192	69
125.15	192	73
125.20	192	77
125.25	192	81
125.30	192	84
125.35	192	88
125.40	192	92
125.45	192	96
125.50	192	100
125.55	192	104
125.60	192	108
125.65	192	111
125.70	192	115
125.75	192	119
125.80	192	124
125.85	192	128
125.90	192	132
125.95	192	137
126.00	192	141
126.05	192	145
126.10	192	149
126.15	192	153
126.20	192	157
126.25	192	160
126.30	192	164
126.35	192	168
126.40	192	172
126.45	192	176
126.50	192	180
126.55	192	183
126.60	192	187
126.65	192	191
126.70	192	195

Proposed Conditions

Type III 24-hr 10 YR Rainfall=4.70"

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A:

Runoff Area=27,128 sf 25.13% Impervious Runoff Depth=0.67"
Flow Length=150' Tc=6.9 min CN=52 Runoff=0.31 cfs 0.035 af

Subcatchment 1B:

Runoff Area=938 sf 100.00% Impervious Runoff Depth=4.46"
Tc=6.0 min CN=98 Runoff=0.10 cfs 0.008 af

Subcatchment 1C:

Runoff Area=2,510 sf 93.07% Impervious Runoff Depth=4.01"
Tc=6.0 min CN=94 Runoff=0.25 cfs 0.019 af

Reach DP-1: Wetlands

Inflow=0.51 cfs 0.042 af
Outflow=0.51 cfs 0.042 af

Pond 2P: Trench

Peak Elev=126.24' Storage=160 cf Inflow=0.25 cfs 0.019 af
Discarded=0.01 cfs 0.012 af Primary=0.20 cfs 0.007 af Outflow=0.21 cfs 0.019 af

Total Runoff Area = 0.702 ac Runoff Volume = 0.062 af Average Runoff Depth = 1.06"
66.99% Pervious = 0.470 ac 33.01% Impervious = 0.232 ac

Proposed Conditions

Type III 24-hr 10 YR Rainfall=4.70"

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Summary for Subcatchment 1A:

Runoff = 0.31 cfs @ 12.13 hrs, Volume= 0.035 af, Depth= 0.67"
Routed to Reach DP-1 : Wetlands

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.70"

	Area (sf)	CN	Description
*	1,661	98	Roof
*	0	98	Koi Pond
*	518	98	Hardscaping
*	3,128	98	Pavement
	1,963	30	Woods, Good, HSG A
	13,236	39	>75% Grass cover, Good, HSG A
*	1,511	98	Off-site Pavement
*	1,899	39	Off-site >75% Grass cover, Good, HSG A
*	3,212	30	Off-site Woods, Good, HSG A
	27,128	52	Weighted Average
	20,310		74.87% Pervious Area
	6,818		25.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0880	0.13		Sheet Flow, 0-16
					Woods: Light underbrush n= 0.400 P2= 3.40"
0.3	100	0.1260	5.71		Shallow Concentrated Flow, 50-150
					Unpaved Kv= 16.1 fps
6.9	150	Total			

Proposed Conditions

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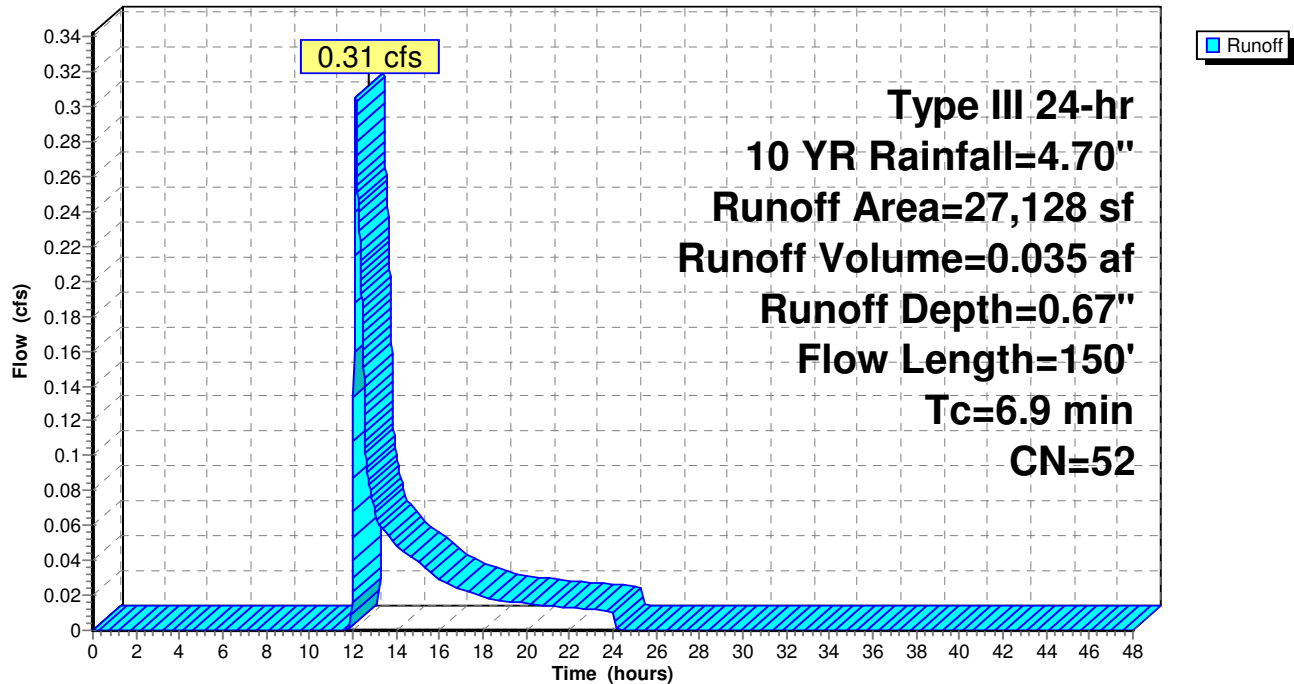
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Type III 24-hr 10 YR Rainfall=4.70"

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Subcatchment 1A:

Hydrograph



Proposed Conditions

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Type III 24-hr 10 YR Rainfall=4.70"

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Summary for Subcatchment 1B:

Runoff = 0.10 cfs @ 12.08 hrs, Volume= 0.008 af, Depth= 4.46"

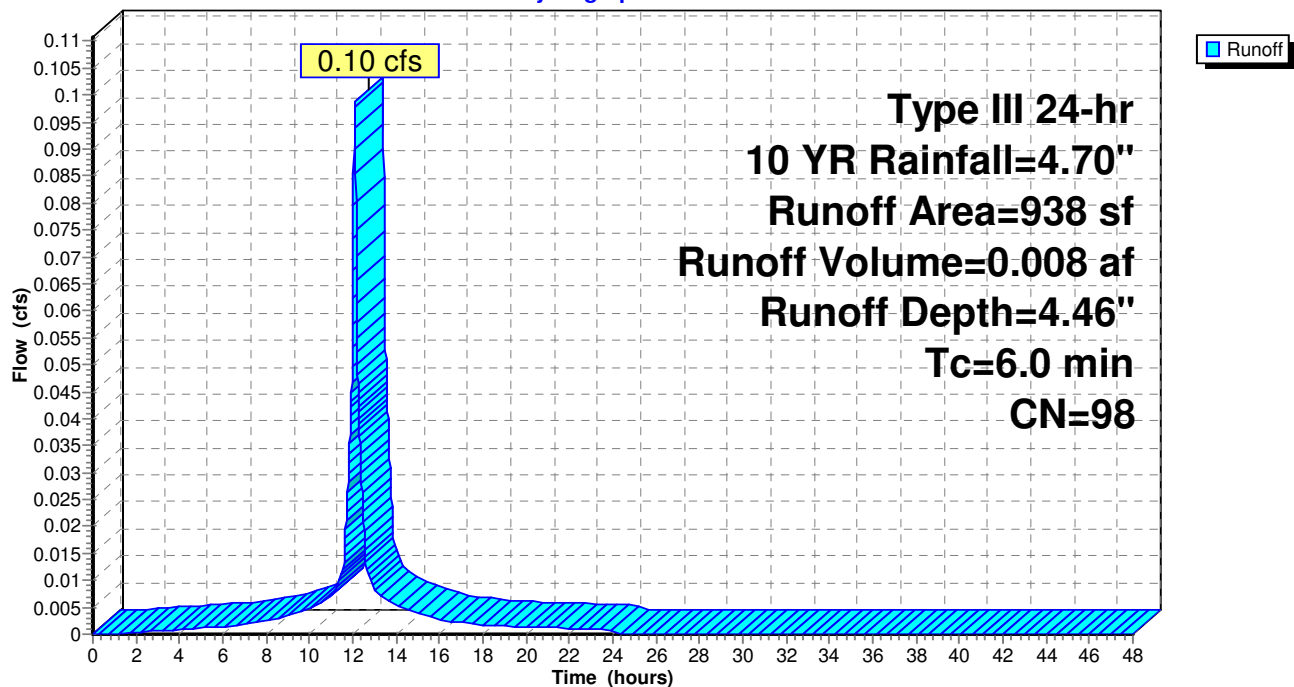
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.70"

	Area (sf)	CN	Description
*	938	98	Swimming Pool
	938		100.00% Impervious Area

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

Subcatchment 1B:

Hydrograph



Proposed Conditions

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Type III 24-hr 10 YR Rainfall=4.70"

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Summary for Subcatchment 1C:

Runoff = 0.25 cfs @ 12.08 hrs, Volume= 0.019 af, Depth= 4.01"
Routed to Pond 2P : Trench

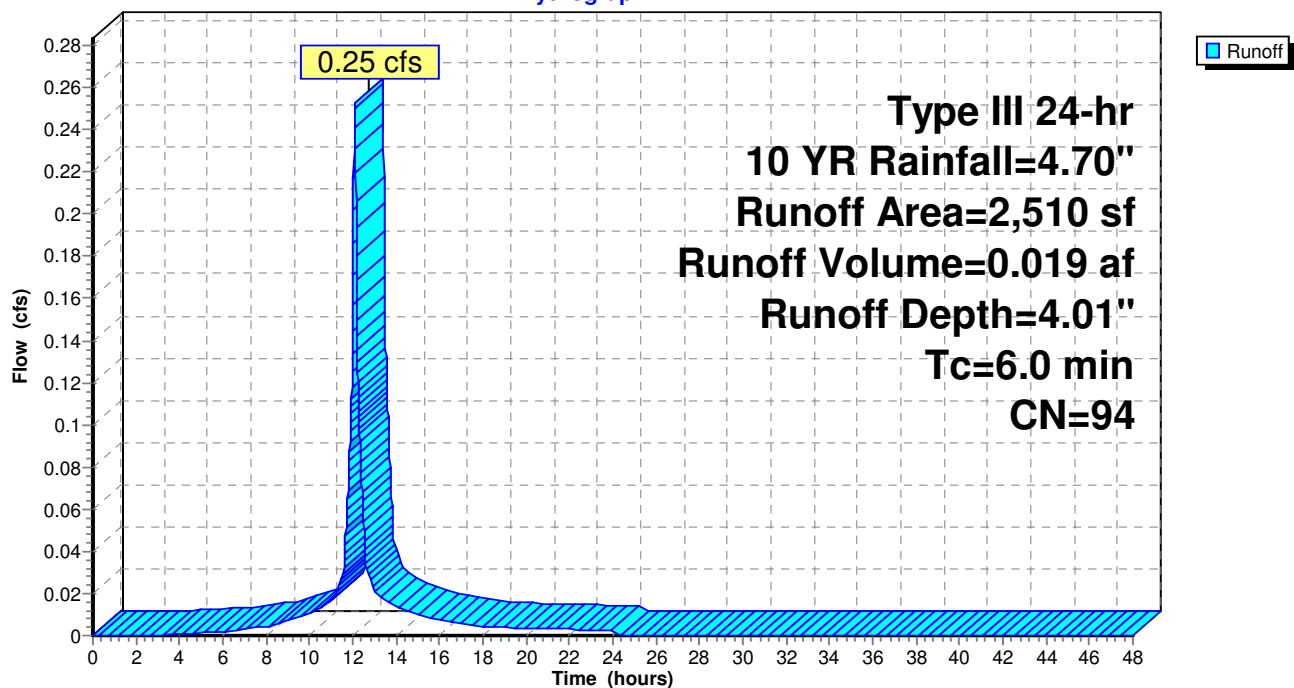
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 YR Rainfall=4.70"

	Area (sf)	CN	Description
*	760	98	Roof
*	1,576	98	Pavement
	174	39	>75% Grass cover, Good, HSG A
	2,510	94	Weighted Average
	174		6.93% Pervious Area
	2,336		93.07% Impervious Area

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

Subcatchment 1C:

Hydrograph



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Type III 24-hr 10 YR Rainfall=4.70"

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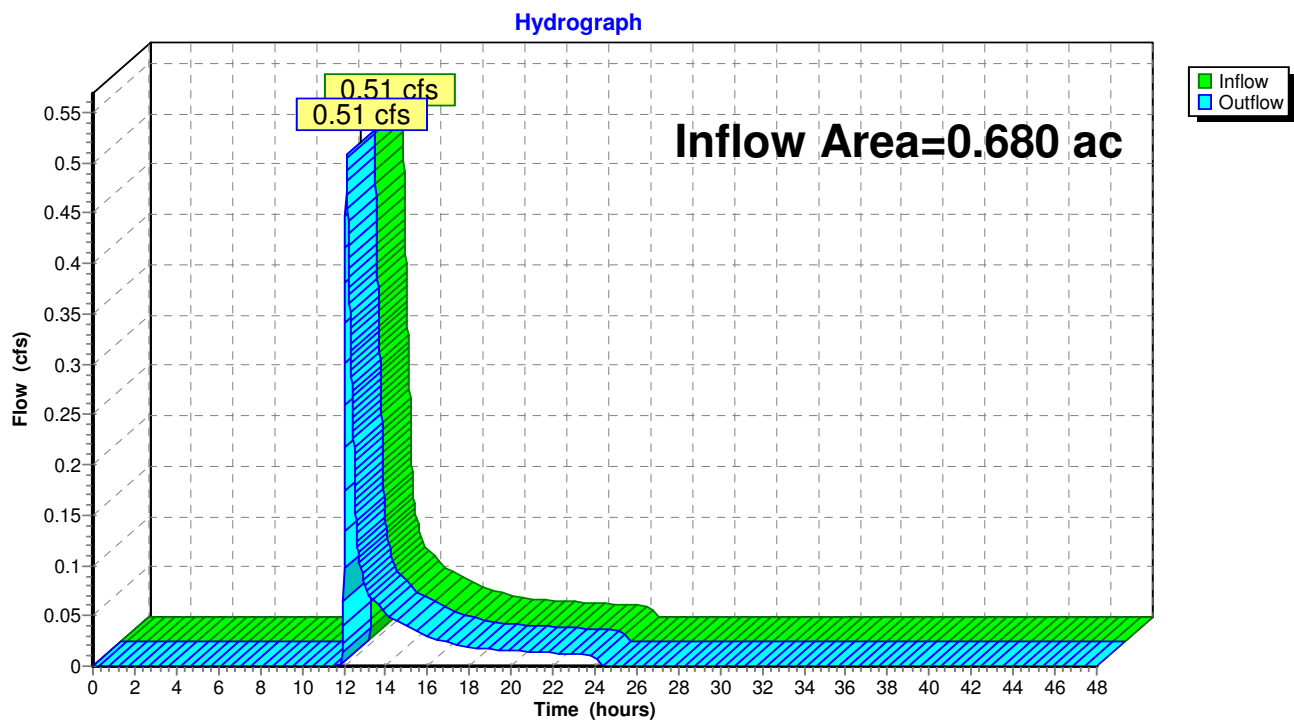
Summary for Reach DP-1: Wetlands

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.680 ac, 30.89% Impervious, Inflow Depth = 0.74" for 10 YR event
Inflow = 0.51 cfs @ 12.13 hrs, Volume= 0.042 af
Outflow = 0.51 cfs @ 12.13 hrs, Volume= 0.042 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

Reach DP-1: Wetlands



Proposed Conditions

Type III 24-hr 10 YR Rainfall=4.70"

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Summary for Pond 2P: Trench

Inflow Area = 0.058 ac, 93.07% Impervious, Inflow Depth = 4.01" for 10 YR event
Inflow = 0.25 cfs @ 12.08 hrs, Volume= 0.019 af
Outflow = 0.21 cfs @ 12.13 hrs, Volume= 0.019 af, Atten= 16%, Lag= 3.0 min
Discarded = 0.01 cfs @ 10.44 hrs, Volume= 0.012 af
Primary = 0.20 cfs @ 12.13 hrs, Volume= 0.007 af
Routed to Reach DP-1 : Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 126.24' @ 12.13 hrs Surf.Area= 192 sf Storage= 160 cf

Plug-Flow detention time= 59.2 min calculated for 0.019 af (100% of inflow)
Center-of-Mass det. time= 59.2 min (834.5 - 775.3)

Volume	Invert	Avail.Storage	Storage Description
#1	124.20'	190 cf	Crushed Stone (Prismatic) Listed below (Recalc) 480 cf Overall - 5 cf Embedded = 475 cf x 40.0% Voids
#2	125.70'	5 cf	4.0" Round 4" PVC Inside #1 L= 55.6'
		195 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
124.20	192	0	0
126.20	192	384	384
126.70	192	96	480

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.20'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	125.70'	4.0" Round Culvert L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 125.70' / 124.00' S= 0.0680 ' / Cc= 0.900 n= 0.010, Flow Area= 0.09 sf

Discarded OutFlow Max=0.01 cfs @ 10.44 hrs HW=124.23' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.20 cfs @ 12.13 hrs HW=126.24' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Inlet Controls 0.20 cfs @ 2.32 fps)

Proposed Conditions

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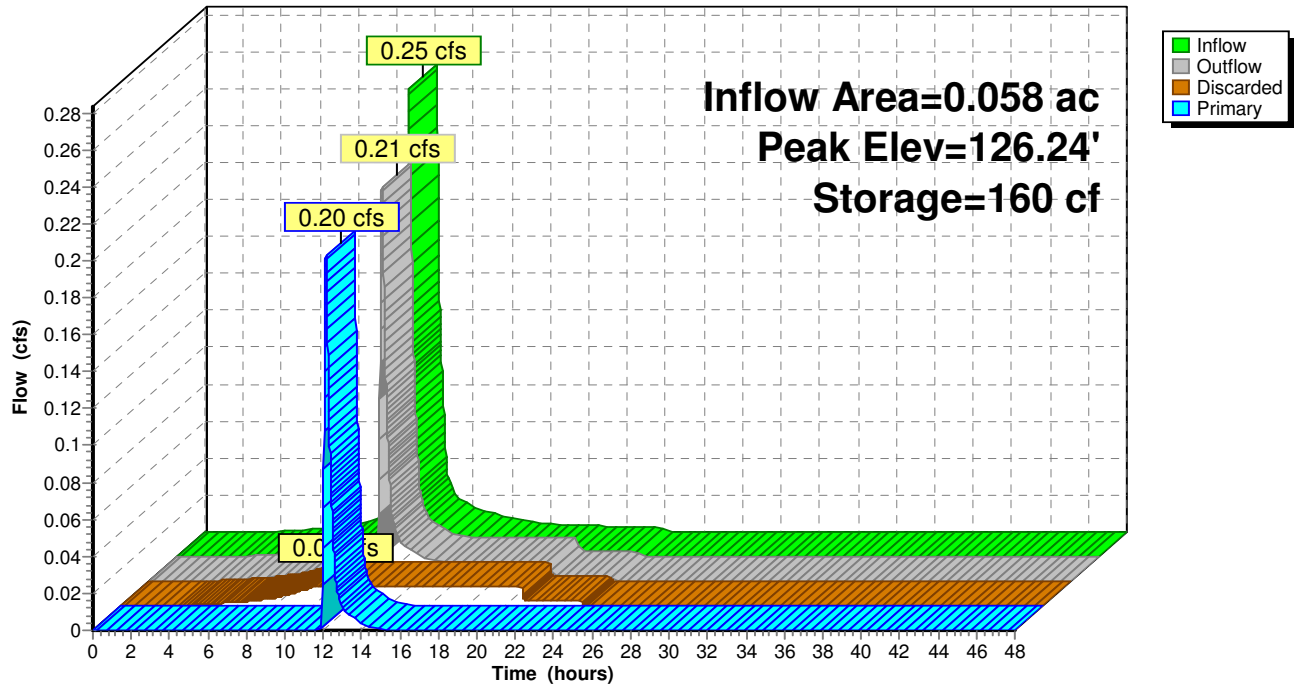
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Type III 24-hr 10 YR Rainfall=4.70"

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Pond 2P: Trench

Hydrograph



Proposed Conditions*Type III 24-hr 10 YR Rainfall=4.70"*

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Stage-Area-Storage for Pond 2P: Trench

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
124.20	192	0
124.25	192	4
124.30	192	8
124.35	192	12
124.40	192	15
124.45	192	19
124.50	192	23
124.55	192	27
124.60	192	31
124.65	192	35
124.70	192	38
124.75	192	42
124.80	192	46
124.85	192	50
124.90	192	54
124.95	192	58
125.00	192	61
125.05	192	65
125.10	192	69
125.15	192	73
125.20	192	77
125.25	192	81
125.30	192	84
125.35	192	88
125.40	192	92
125.45	192	96
125.50	192	100
125.55	192	104
125.60	192	108
125.65	192	111
125.70	192	115
125.75	192	119
125.80	192	124
125.85	192	128
125.90	192	132
125.95	192	137
126.00	192	141
126.05	192	145
126.10	192	149
126.15	192	153
126.20	192	157
126.25	192	160
126.30	192	164
126.35	192	168
126.40	192	172
126.45	192	176
126.50	192	180
126.55	192	183
126.60	192	187
126.65	192	191
126.70	192	195

Proposed Conditions

Type III 24-hr 100 YR Rainfall=7.00"

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Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points x 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1A:

Runoff Area=27,128 sf 25.13% Impervious Runoff Depth=1.85"
Flow Length=150' Tc=6.9 min CN=52 Runoff=1.17 cfs 0.096 af

Subcatchment 1B:

Runoff Area=938 sf 100.00% Impervious Runoff Depth=6.76"
Tc=6.0 min CN=98 Runoff=0.15 cfs 0.012 af

Subcatchment 1C:

Runoff Area=2,510 sf 93.07% Impervious Runoff Depth=6.29"
Tc=6.0 min CN=94 Runoff=0.39 cfs 0.030 af

Reach DP-1: Wetlands

Inflow=1.47 cfs 0.111 af
Outflow=1.47 cfs 0.111 af

Pond 2P: Trench

Peak Elev=126.68' Storage=194 cf Inflow=0.39 cfs 0.030 af
Discarded=0.01 cfs 0.015 af Primary=0.30 cfs 0.015 af Outflow=0.31 cfs 0.030 af

Total Runoff Area = 0.702 ac Runoff Volume = 0.138 af Average Runoff Depth = 2.36"
66.99% Pervious = 0.470 ac 33.01% Impervious = 0.232 ac

Proposed Conditions

Type III 24-hr 100 YR Rainfall=7.00"

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Summary for Subcatchment 1A:

Runoff = 1.17 cfs @ 12.11 hrs, Volume= 0.096 af, Depth= 1.85"
Routed to Reach DP-1 : Wetlands

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=7.00"

	Area (sf)	CN	Description
*	1,661	98	Roof
*	0	98	Koi Pond
*	518	98	Hardscaping
*	3,128	98	Pavement
	1,963	30	Woods, Good, HSG A
	13,236	39	>75% Grass cover, Good, HSG A
*	1,511	98	Off-site Pavement
*	1,899	39	Off-site >75% Grass cover, Good, HSG A
*	3,212	30	Off-site Woods, Good, HSG A
	27,128	52	Weighted Average
	20,310		74.87% Pervious Area
	6,818		25.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.6	50	0.0880	0.13		Sheet Flow, 0-16
					Woods: Light underbrush n= 0.400 P2= 3.40"
0.3	100	0.1260	5.71		Shallow Concentrated Flow, 50-150
					Unpaved Kv= 16.1 fps
6.9	150	Total			

Proposed Conditions

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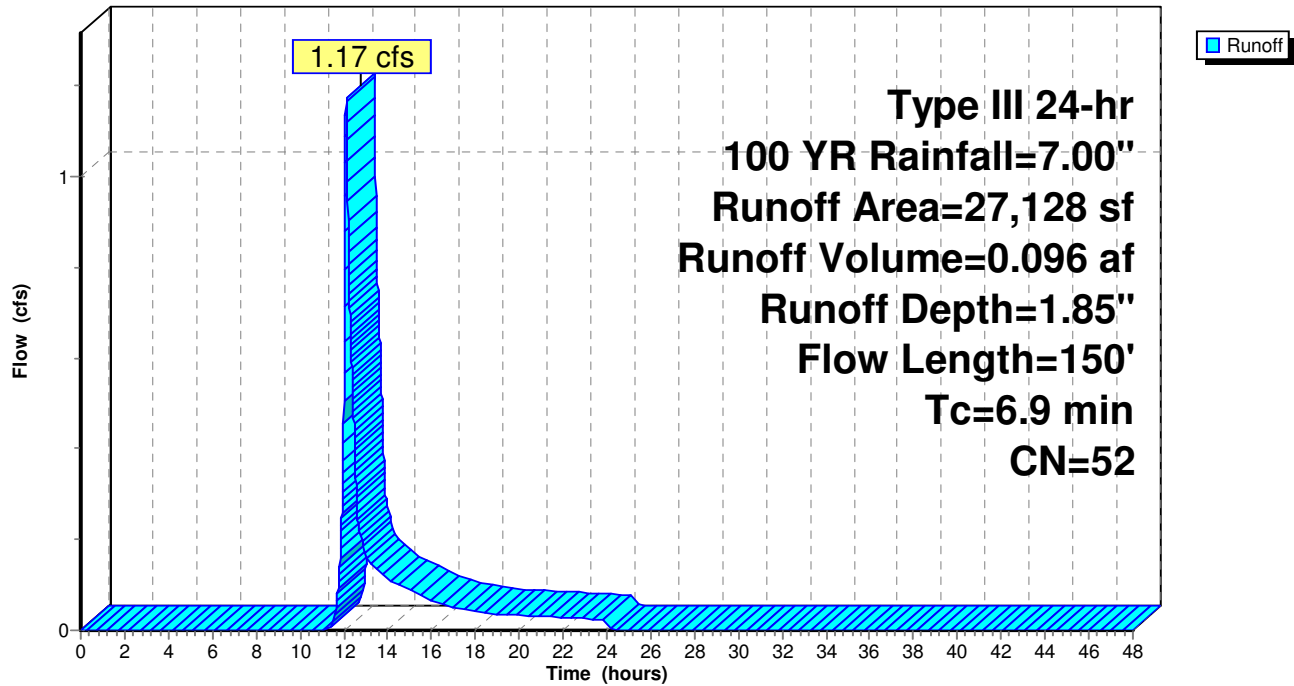
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Type III 24-hr 100 YR Rainfall=7.00"

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Subcatchment 1A:

Hydrograph



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Type III 24-hr 100 YR Rainfall=7.00"

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Summary for Subcatchment 1B:

Runoff = 0.15 cfs @ 12.08 hrs, Volume= 0.012 af, Depth= 6.76"

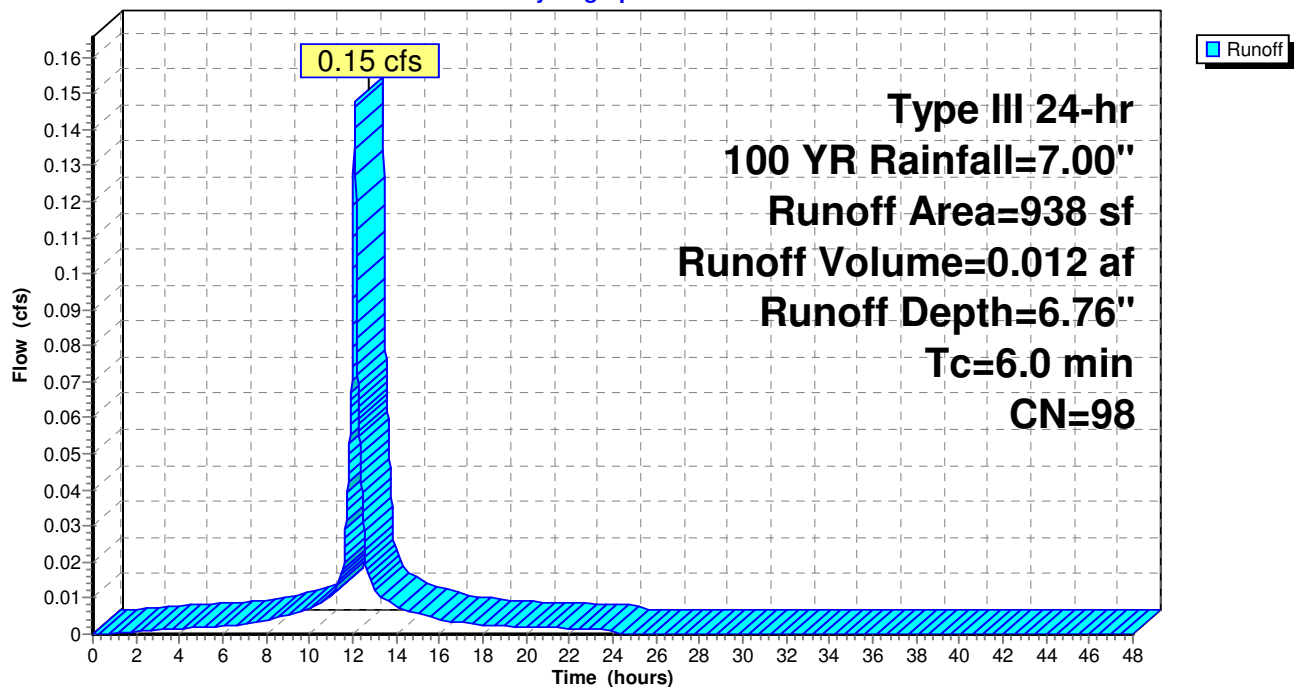
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=7.00"

	Area (sf)	CN	Description
*	938	98	Swimming Pool
	938		100.00% Impervious Area

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

Subcatchment 1B:

Hydrograph



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Type III 24-hr 100 YR Rainfall=7.00"

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Summary for Subcatchment 1C:

Runoff = 0.39 cfs @ 12.08 hrs, Volume= 0.030 af, Depth= 6.29"
Routed to Pond 2P : Trench

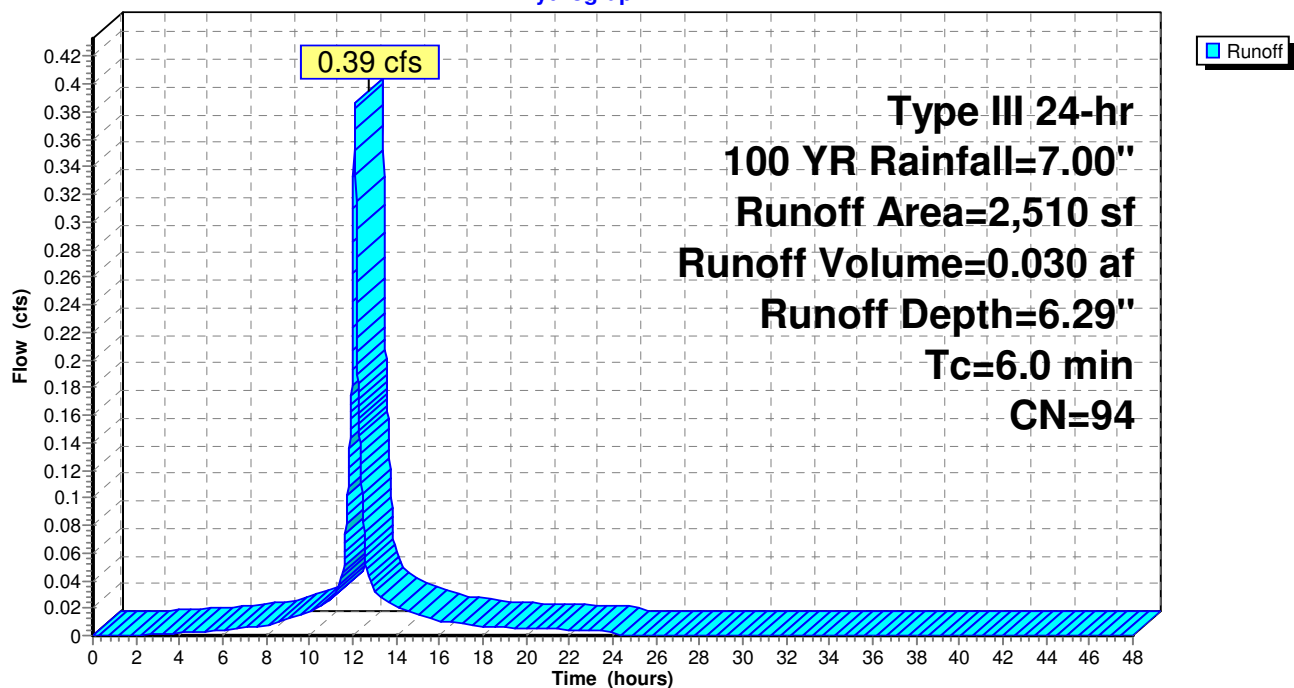
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 YR Rainfall=7.00"

	Area (sf)	CN	Description
*	760	98	Roof
*	1,576	98	Pavement
	174	39	>75% Grass cover, Good, HSG A
	2,510	94	Weighted Average
	174		6.93% Pervious Area
	2,336		93.07% Impervious Area

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

Subcatchment 1C:

Hydrograph



Proposed Conditions

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Type III 24-hr 100 YR Rainfall=7.00"

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Summary for Reach DP-1: Wetlands

[40] Hint: Not Described (Outflow=Inflow)

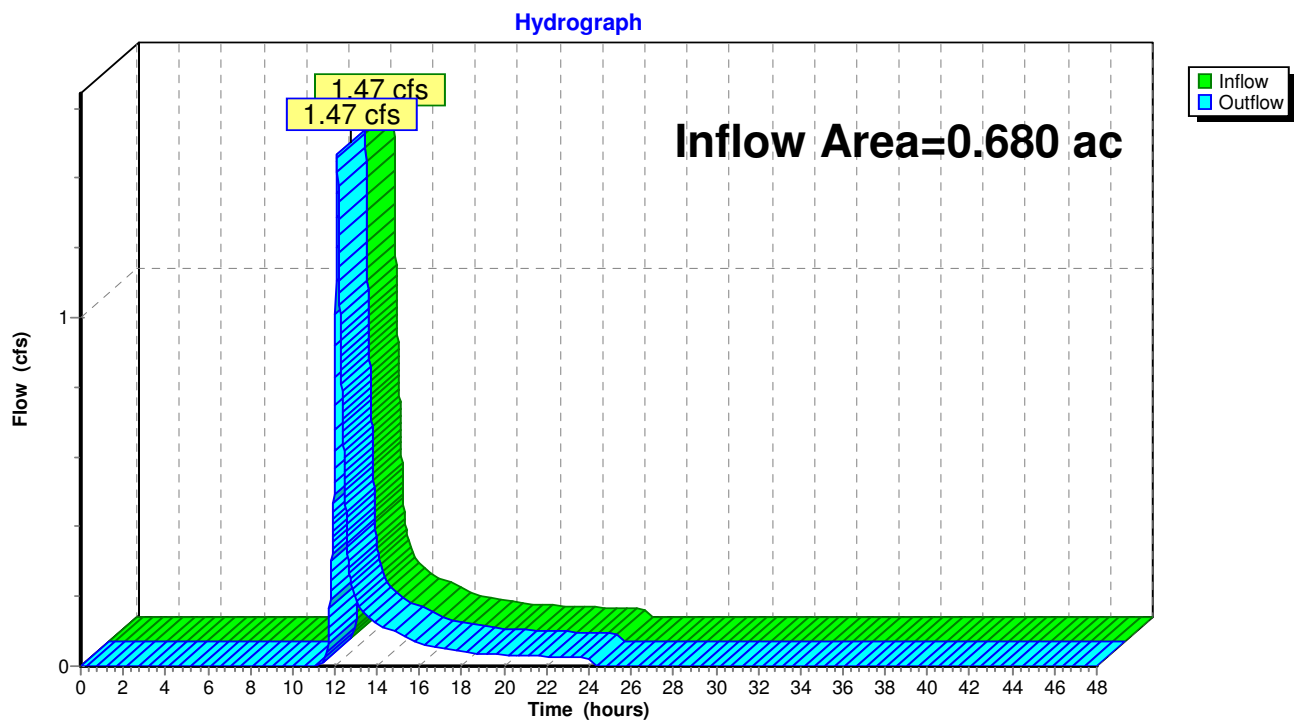
Inflow Area = 0.680 ac, 30.89% Impervious, Inflow Depth = 1.96" for 100 YR event

Inflow = 1.47 cfs @ 12.12 hrs, Volume= 0.111 af

Outflow = 1.47 cfs @ 12.12 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3

Reach DP-1: Wetlands



Proposed Conditions

Type III 24-hr 100 YR Rainfall=7.00"

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Summary for Pond 2P: Trench

Inflow Area = 0.058 ac, 93.07% Impervious, Inflow Depth = 6.29" for 100 YR event
Inflow = 0.39 cfs @ 12.08 hrs, Volume= 0.030 af
Outflow = 0.31 cfs @ 12.14 hrs, Volume= 0.030 af, Atten= 20%, Lag= 3.5 min
Discarded = 0.01 cfs @ 9.07 hrs, Volume= 0.015 af
Primary = 0.30 cfs @ 12.14 hrs, Volume= 0.015 af
Routed to Reach DP-1 : Wetlands

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 126.68' @ 12.14 hrs Surf.Area= 192 sf Storage= 194 cf

Plug-Flow detention time= 52.3 min calculated for 0.030 af (100% of inflow)
Center-of-Mass det. time= 52.3 min (816.9 - 764.6)

Volume	Invert	Avail.Storage	Storage Description
#1	124.20'	190 cf	Crushed Stone (Prismatic) Listed below (Recalc) 480 cf Overall - 5 cf Embedded = 475 cf x 40.0% Voids
#2	125.70'	5 cf	4.0" Round 4" PVC Inside #1 L= 55.6'
		195 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
124.20	192	0	0
126.20	192	384	384
126.70	192	96	480

Device	Routing	Invert	Outlet Devices
#1	Discarded	124.20'	2.410 in/hr Exfiltration over Surface area Phase-In= 0.01'
#2	Primary	125.70'	4.0" Round Culvert L= 25.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 125.70' / 124.00' S= 0.0680 '/' Cc= 0.900 n= 0.010, Flow Area= 0.09 sf

Discarded OutFlow Max=0.01 cfs @ 9.07 hrs HW=124.23' (Free Discharge)

↑ **1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.30 cfs @ 12.14 hrs HW=126.68' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Inlet Controls 0.30 cfs @ 3.43 fps)

Proposed Conditions

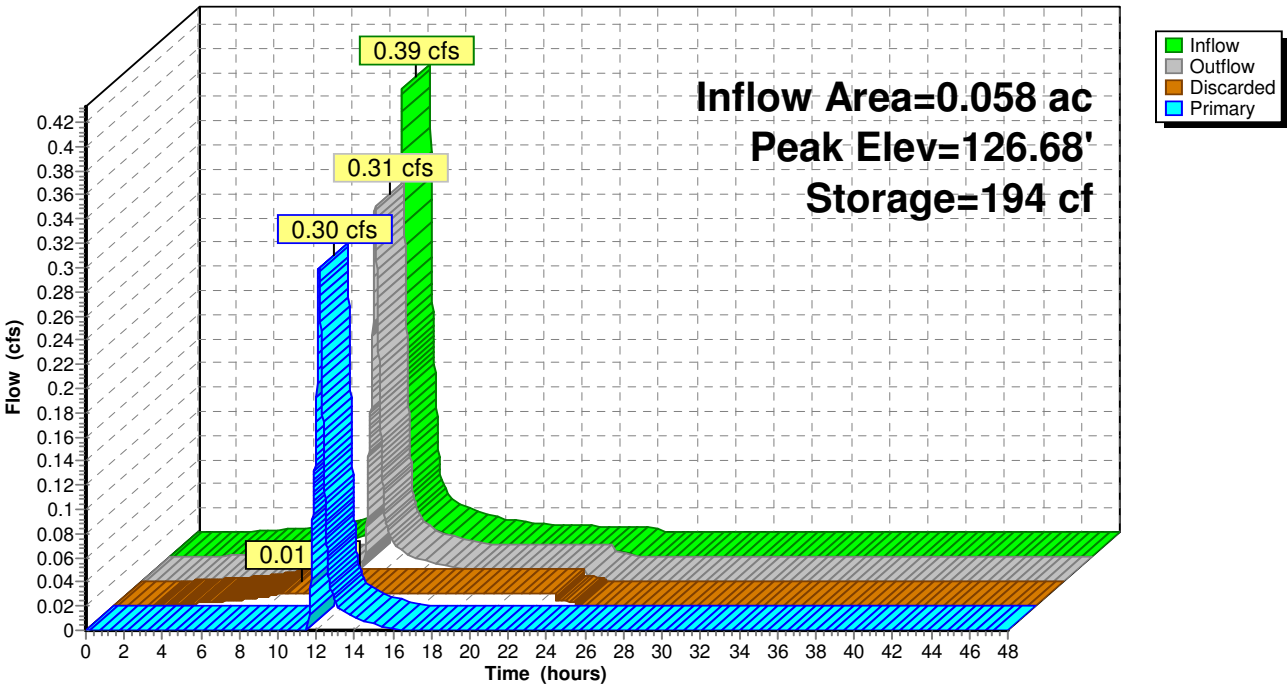
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Type III 24-hr 100 YR Rainfall=7.00"

Pond 2P: Trench

Hydrograph



Proposed Conditions*Type III 24-hr 100 YR Rainfall=7.00"*

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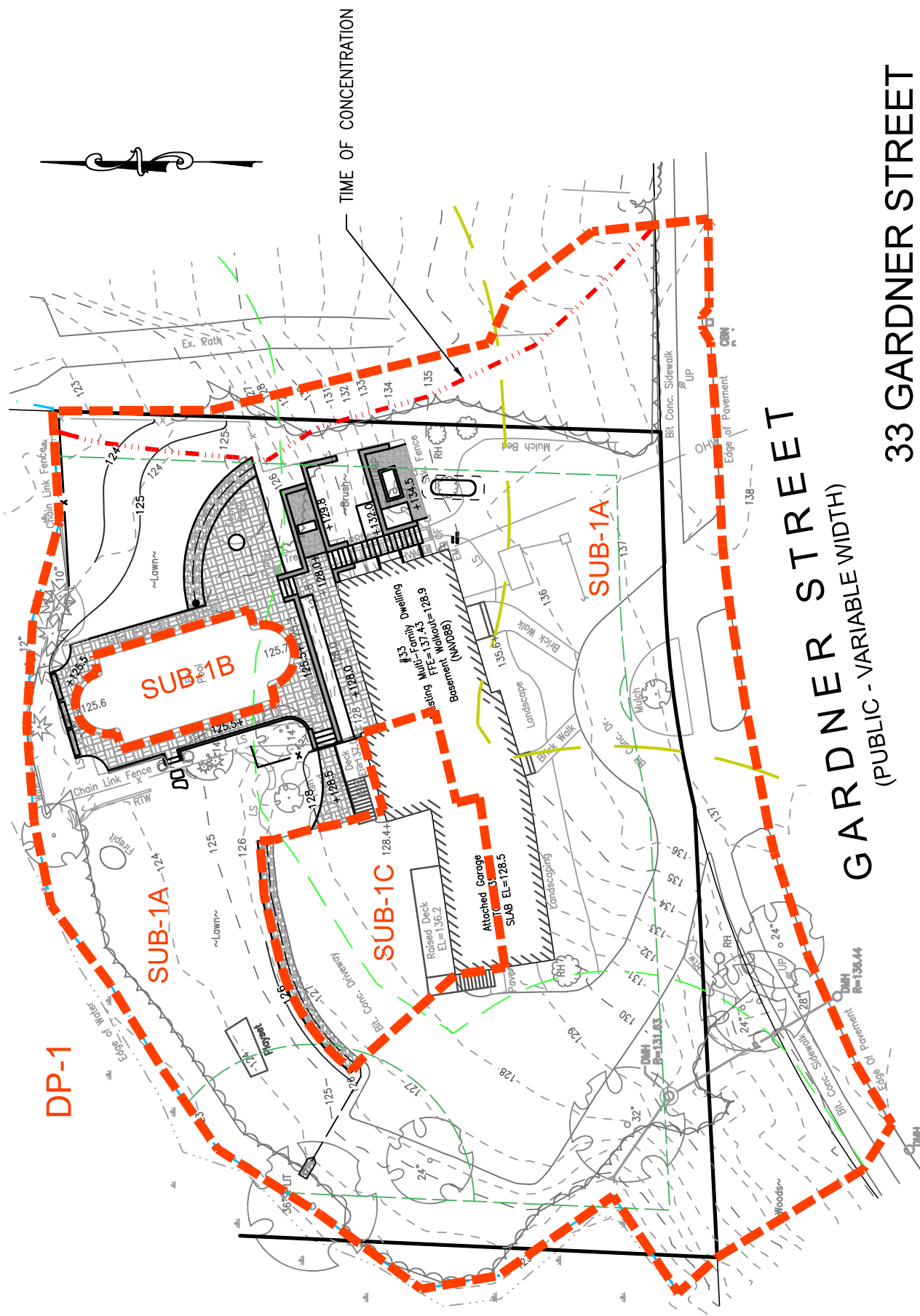
Stage-Area-Storage for Pond 2P: Trench

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
124.20	192	0
124.25	192	4
124.30	192	8
124.35	192	12
124.40	192	15
124.45	192	19
124.50	192	23
124.55	192	27
124.60	192	31
124.65	192	35
124.70	192	38
124.75	192	42
124.80	192	46
124.85	192	50
124.90	192	54
124.95	192	58
125.00	192	61
125.05	192	65
125.10	192	69
125.15	192	73
125.20	192	77
125.25	192	81
125.30	192	84
125.35	192	88
125.40	192	92
125.45	192	96
125.50	192	100
125.55	192	104
125.60	192	108
125.65	192	111
125.70	192	115
125.75	192	119
125.80	192	124
125.85	192	128
125.90	192	132
125.95	192	137
126.00	192	141
126.05	192	145
126.10	192	149
126.15	192	153
126.20	192	157
126.25	192	160
126.30	192	164
126.35	192	168
126.40	192	172
126.45	192	176
126.50	192	180
126.55	192	183
126.60	192	187
126.65	192	191
126.70	192	195

APPENDIX C

Pre-Development Watershed Plan

Post-Development Watershed Plan



SCALE: 1" = 30'