DESIGN GROUP, INC.
CIVIL ENGINEERS • SURVEYORS • CONSULTANTS

DRAINAGE
HIGHWAYS
REPORTS
LAND PLANNING
BUILDING DESIGN
SURVEY

March 1, 2021

Mr. Paul Gaudette Chairman
Sandisfield Conservation Commission
66 Sandisfield Road
P.O. Box 663
Sandisfield, MA 01255

RE: Notice of Intent Submission
SAMA Productions, LLC
Abby Road and Town Hill Road
Sandisfield, MA

Dear Mr. Gaudette;

Enclosed please find eight (8) copies of a Notice of Intent prepared for SAMA Productions, LLC and property located at Lot 8 Abby Road (Portion of Map 408-Block 0-Lot 31) in Sandisfield, MA. As required, a copy has been forwarded to the Western Regional Office of the Massachusetts Department of Environmental Protection in Springfield, MA. The project does not fall within NHESP jurisdiction.

The proposed project includes the construction of a 100,000± square-feet of commercial greenhouses and a 5,000 sf one story metal building with related construction work, such as tree clearing and utilities. A portion of the work falls within buffer zone of a bordering vegetated wetlands. A detailed project narrative and plans have been provided in support of this NOI submission.

If you should have any questions or concerns, or require additional information, please do not hesitate to contact the office.

Sincerely,
SK DESIGN GROUP, INC.

Jim Scalise PE

Enclosures

Cc: MADEP – Western Region
SAMA Productions, LLC
File

C:\Users\jscalise\Desktop\SAMA Notice of Intent\01 NOI Cover Letter.doc

TABLE OF CONTENTS

Notice of Intent
SAMA Productions LLC
Abby Road,
Sandisfield, Massachusetts

Massachusetts Department of Environmental Protection

eDEP Transaction Copy

Here is the file you requested for your records.

To retain a copy of this file you must save and/or print.

Username:	**SKDESIGN**
Transaction ID:	**1259789**
Document:	**WPA Form 3 - NOI**
Size of File:	**250.28K**
Status of Transaction:	**In Process**
Date and Time Created:	**3/3/2021:1:09:36 PM**

Note: This file only includes forms that were part of your transaction as of the date and time indicated above. If you need a more current copy of your transaction, return to eDEP and select to “Download a Copy” from the Current Submittals page.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 3 - Notice of Intent
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
MassDEP File #:
eDEP Transaction #:1259789
City/Town:SANDISFIELD

A.General Information

1. Project Location:

a. Street Address	LOT 8 ABBY ROAD		
b. City/Town	SANDISFIELD	c. Zip Code	01255
d. Latitude	42.14593N	e. Longitude	73.14030W
f. Map/Plat #	408	g.Parcel/Lot #	31

2. Applicant:

☐ Individual ☑ Organization

a. First Name	JOHN		b.Last Name	HECK	
c. Organization	SAMA PRODUCTIONS, LLC				
d. Mailing Address	28 PRISCILLA AVENUE				
e. City/Town	YONKERS	f. State	NY	g. Zip Code	10710
h. Phone Number	914-263-6627	i. Fax		j. Email	generalpushing@gmail.com

3.Property Owner:

☐ more than one owner

a. First Name	JAMES		b. Last Name	MIECZKOWSKI	
c. Organization	EXECUTOR OF ESTATE OF OF PAUL BOBRYK				
d. Mailing Address	535 FISH ROCK ROAD				
e. City/Town	SOUTHBURY	f.State	CT	g. Zip Code	06488-2131
h. Phone Number	413-443-3537	i. Fax		j.Email	jscalise@sk-designgroup.com

4.Representative:

a. First Name	JAMES		b. Last Name	SCALISE	
c. Organization	SK DESIGN GROUP, INC				
d. Mailing Address	2 FEDERICO DRIVE, SUITE 2				
e. City/Town	PITTSFIELD	f. State	MA	g. Zip Code	01201
h.Phone Number	413-443-3537	i.Fax	413-445-5376	j.Email	jscalise@sk-designgroup.com

5.Total WPA Fee Paid (Automatically inserted from NOI Wetland Fee Transmittal Form):

a.Total Fee Paid	1,050.00	b.State Fee Paid	512.50	c.City/Town Fee Paid	537.50

6.General Project Description:

CONSTRUCTION OF COMMERCIAL GREENHOUSES. GRADING AND STORMWATER BMPS. THE BMPS ARE IN THE BUFFER ZONE.

7a.Project Type:

1. ☐ Single Family Home	2. ☐ Residential Subdivision
3. ☐ Limited Project Driveway Crossing	4. ☑ Commercial/Industrial
5. ☐ Dock/Pier	6. ☐ Utilities
7. ☐ Coastal Engineering Structure	8. ☐ Agriculture (eg., cranberries, forestry)
9. ☐ Transportation	10. ☐ Other

7b.Is any portion of the proposed activity eligible to be treated as a limited project subject to 310 CMR 10.24 (coastal) or 310

CMR 10.53 (inland)?

1. ☐ Yes ☑ No If yes, describe which limited project applies to this project:
2. Limited Project

8.Property recorded at the Registry of Deeds for:

a.County:	b.Certificate:	c.Book:	d.Page:
SOUTHERN BERKSHIRE		390	398

B. Buffer Zone & Resource Area Impacts (temporary & permanent)

1.Buffer Zone & Resource Area Impacts (temporary & permanent):

☑ This is a Buffer Zone only project - Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, Inland Bank, or Coastal Resource Area.

2.Inland Resource Areas: (See 310 CMR 10.54 - 10.58, if not applicable, go to Section B.3. Coastal Resource Areas)

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a.☐ Bank	1. linear feet	2. linear feet
b.☐ Bordering Vegetated Wetland	1. square feet	2. square feet
c.☐ Land under Waterbodies and Waterways	1. Square feet	2. square feet
	3. cubic yards dredged	
d.☐ Bordering Land Subject to Flooding	1. square feet	2. square feet
	3. cubic feet of flood storage lost	4. cubic feet replaced
e.☐ Isolated Land Subject to Flooding	1. square feet	
	2. cubic feet of flood storage lost	3. cubic feet replaced

f.☐ Riverfront Area

1. Name of Waterway (if any)

2. Width of Riverfront Area (check one)

☐ 25 ft. - Designated Densely Developed Areas only
☐ 100 ft. - New agricultural projects only
☐ 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project

square feet

4. Proposed Alteration of the Riverfront Area:

a. total square feet	b. square feet within 100 ft.	c. square feet between 100 ft. and 200 ft.

5. Has an alternatives analysis been done and is it attached to this NOI? ☐ Yes ☐ No

6. Was the lot where the activity is proposed created prior to August 1, 1996? ☐ Yes ☐ No

3.Coastal Resource Areas: (See 310 CMR 10.25 - 10.35)

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
a. ☐ Designated Port Areas	Indicate size under	Land under the ocean below,
b. ☐ Land Under the Ocean	1. square feet 2. cubic yards dredged	
c. ☐ Barrier Beaches	Indicate size under Coastal Beaches and/or Coatstal Dunes, below	
d. ☐ Coastal Beaches	1. square feet	2. cubic yards beach nourishment
e. ☐ Coastal Dunes	1. square feet	2. cubic yards dune nourishment
f. ☐ Coastal Banks	1. linear feet	
g. ☐ Rocky Intertidal Shores	1. square feet	
h. ☐ Salt Marshes	1. square feet	2. sq ft restoration, rehab, crea.
i. ☐ Land Under Salt Ponds	1. square feet	
	2. cubic yards dredged	
j. ☐ Land Containing Shellfish	1. square feet	
k. ☐ Fish Runs	Indicate size under Coastal Banks, Inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above	
	1. cubic yards dredged	
l. ☐ Land Subject to Coastal Storm Flowage	1. square feet	

4.Restoration/Enhancement

☐ Restoration/Replacement

If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b or B.3.h above, please entered the additional amount here.

a. square feet of BVW b. square feet of Salt Marsh

5.Projects Involves Stream Crossings

☐ Project Involves Streams Crossings

If the project involves Stream Crossings, please enter the number of new stream crossings/number of replacement stream crossings.

a. number of new stream crossings

b. number of replacement stream crossings

C. Other Applicable Standards and Requirements

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage of Endangered Species program (NHESP)?

a. ☐ Yes ☑ No

If yes, include proof of mailing or hand delivery of NOI to:
Natural Heritage and Endangered Species
Program
Division of Fisheries and Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

b. Date of map:FROM MAP VIEWER

If yes, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18)....

c. Submit Supplemental Information for Endangered Species Review * (Check boxes as they apply)

1. ☐ Percentage/acreage of property to be altered:

(a) within Wetland Resource Area — percentage/acreage

(b) outside Resource Area — percentage/acreage

2. ☐ Assessor's Map or right-of-way plan of site

3. ☐ Project plans for entire project site, including wetland resource areas and areas outside of wetland jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work **

a. ☐ Project description (including description of impacts outside of wetland resource area & buffer zone)

b. ☐ Photographs representative of the site

c. ☐ MESA filing fee (fee information available at: http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/mass-endangered-species-act-mesa/mesa-fee-schedule.html)
Make check payable to "Natural Heritage & Endangered Species Fund" and **mail to NHESP** at above address

*Projects altering **10 or more acres** of land, also submit:*

d. ☐ Vegetation cover type map of site

e. ☐ Project plans showing Priority & Estimated Habitat boundaries

d. OR Check One of the following

1. ☐ Project is exempt from MESA review. Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, http://www.mass.gov/eea/agencies/dfg/dfw/laws-regulations/cmr/321-cmr-1000-massachusetts-endangered-species-act.html#10.14; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.37 and 10.59.)

2. ☐ Separate MESA review ongoing.

a. NHESP Tracking Number

b. Date submitted to NHESP

3. ☐ Separate MESA review completed.
Include copy of NHESP "no Take" determination or valid Conservation & Management Permit with approved plan.

* Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review...

2. For coastal projects only, is any portion of the proposed project located below the mean high waterline or in a fish run?
a. ☑ Not applicable - project is in inland resource area only
b. ☐ Yes ☐ No

If yes, include proof of mailing or hand delivery of NOI to either:

South Shore - Cohasset to Rhode Island, and the Cape & Islands:

Division of Marine Fisheries -
Southeast Marine Fisheries Station
Attn: Environmental Reviewer
836 S. Rodney French Blvd
New Bedford, MA 02744

North Shore - Hull to New Hampshire:

Division of Marine Fisheries -
North Shore Office
Attn: Environmental Reviewer
30 Emerson Avenue
Gloucester, MA 01930

If yes, it may require a Chapter 91 license. For coastal towns in the Northeast Region, please contact MassDEP's Boston Office. For coastal towns in the Southeast Region, please contact MassDEP's Southeast Regional office.

3. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

a. ☐ Yes ☑ No

If yes, provide name of ACEC (see instructions to WPA Form 3 or DEP Website for ACEC locations). **Note:** electronic filers click on Website.

b. ACEC Name

4. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?
a. ☐ Yes ☑ No

5. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L.c. 131, § 40A) or the Coastal Wetlands Restriction Act (M.G.L.c. 130, § 105)?
a. ☐ Yes ☑ No

6. Is this project subject to provisions of the MassDEP Stormwater Management Standards?
a. ☑ Yes, Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:
1. ☐ Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol.2, Chapter 3)
2. ☐ A portion of the site constitutes redevelopment
3. ☐ Proprietary BMPs are included in the Stormwater Management System

b. ☐ No, Explain why the project is exempt:
1. ☐ Single Family Home

2. ☐ Emergency Road Repair

3. ☐ Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

D. Additional Information

Applicants must include the following with this Notice of Intent (NOI). See instructions for details.

Online Users: Attach the document transaction number (provided on your receipt page) for any of the following information you submit to the Department by regular mail delivery.

1. USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the ☑ Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)
2. Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland ☑ [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.
3. Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s). ☑ Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.
4. List the titles and dates for all plans and other materials submitted with this NOI. ☑

a. Plan Title:	b. Plan Prepared By:	c. Plan Signed/Stamped By:	c. Revised Final Date:	e. Scale:
PLANS TO ACCOMPANY NOTICE OF INTENT PREPARED FOR SAMA PRODUCTIONS, LLC TOWN HILL ROAD, SANDISFIELD, MA	SK DESIGN GROUP, INC	JAMES SCALISE	March 2, 2021	VARIES

5. If there is more than one property owner, please attach a list of these property owners not listed on this form. ☐

6. Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed. ☐

7. Attach proof of mailing for Massachusetts Division of Marine Fisheries, if needed. ☐

8. Attach NOI Wetland Fee Transmittal Form. ☑

9. Attach Stormwater Report, if needed. ☑

E. Fees

1. Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment:

120	3/2/21
2. Municipal Check Number	3. Check date
122	3/2/21
4. State Check Number	5. Check date
John	Heck
6. Payer name on check: First Name	7. Payer name on check: Last Name

F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

1. Signature of Applicant	2. Date
3. Signature of Property Owner(if different)	4. Date
5. Signature of Representative (if any)	6. Date

For Conservation Commission:

Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:

One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a **copy** of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:

If the applicant has checked the "yes" box in Section C, Items 1-3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 3 - Notice of Wetland FeeTransmittal Form
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
MassDEP File #:
eDEP Transaction #:1259789
City/Town:SANDISFIELD

A. Applicant Information

1. Applicant:

a. First Name	JOHN	b.Last Name	HECK		
c. Organization	SAMA PRODUCTIONS, LLC				
d. Mailing Address	28 PRISCILLA AVENUE				
e. City/Town	YONKERS	f. State	NY	g. Zip Code	10710
h. Phone Number	9142636627	i. Fax		j. Email	generalpushing@gmail.com

2.Property Owner:(if different)

a. First Name	JAMES	b. Last Name	MIECZKOWSKI		
c. Organization	EXECUTOR OF ESTATE OF OF PAUL BOBRYK				
d. Mailing Address	535 FISH ROCK ROAD				
e. City/Town	SOUTHBURY	f.State	CT	g. Zip Code	06488-2131
h. Phone Number	4134433537	i. Fax		j.Email	jscalise@sk-designgroup.com

3. Project Location:

a. Street Address	LOT 8 ABBY ROAD	b. City/Town	SANDISFIELD

Are you exempted from Fee? ☐

Note: Fee will be exempted if you are one of the following:

- City/Town/County/District
- Municipal Housing Authority
- Indian Tribe Housing Authority
- MBTA

State agencies are only exempt if the fee is less than $100

B. Fees

Activity Type	Activity Number	Activity Fee	RF Multiplier	Sub Total
B.)STORMWATER BMPS IN THE BUFFER ZONE	1	1050.00		1050.00

City/Town share of filling fee	State share of filing fee	Total Project Fee
$537.50	$512.50	$1,050.00

E. Fees

1.

Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to pages 1 and 2 of the NOI Wetland Fee Transmittal Form) to confirm fee payment.

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2. Municipal Check Number

3/2/21
3. Check date

122
4. State Check Number

3/2/21
5. Check date

John
6. Payer name on check: First Name

Heck
7. Payer name on check: Last Name

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I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

1. Signature of Applicant

3/3/21
2. Date

3. Signature of Property Owner (if different)

3/3/21
4. Date

5. Signature of Representative (if any)

6. Date

For Conservation Commission:

Two copies of the completed Notice of Intent (Form 3), including supporting plans and documents, two copies of the NOI Wetland Fee Transmittal Form, and the city/town fee payment, to the Conservation Commission by certified mail or hand delivery.

For MassDEP:

One copy of the completed Notice of Intent (Form 3), including supporting plans and documents, one copy of the NOI Wetland Fee Transmittal Form, and a copy of the state fee payment to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery.

Other:

If the applicant has checked the "yes" box in Section C, Items 1-3, above, refer to that section and the Instructions for additional submittal requirements.

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

Affidavit of Payment

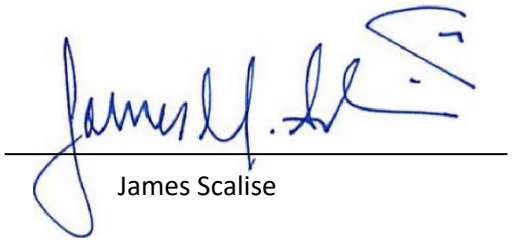
Notice of Intent Application
SAMA Productions LLC
Lot 8 Abby Road
Sandisfield, MA

Submitted with this Notice of Intent Application were the required filing fees for the above referenced project. These filing fees are as follows:

Town of Sandisfield
$537.50 check per NOI Activity Fee

Commonwealth of Massachusetts
$512.50 check per NOI Activity Fee

The checks were issued by SAMA Productions LLC on or about March 2, 2021.



James Scalise

Notice of Intent Narrative

NOTICE OF INTENT NARRATIVE

SAMA Productions LLC
East Hubbard Road (aka Abby Road) and Town Hill Road,
Sandisfield, Massachusetts
(Portion of Map 408, Lot 31)

1.0 EXISTING CONDITIONS

The property is a 46.7 Acre lot located on the south side of Abby Road, 1000 feet, more or less, west of the intersection of East Hubbard Road and Town Hill Road (see Figure 1). The lot is undeveloped forest and includes Town Hill a topographic feature. The property is bordered by state land to the west and remining land of Lot 31 to the south and east. North of the lot is bordered by Abby Road and undeveloped residential property. The parcel is defined as Lot 8 on the attached survey prepared for "Franklin Woods Investments" A copy of the survey is included in Attachment B. A bordering vegetated wetland is located along the westerly property line along the length of the proposed development. The proposed work is located in the buffer zone and provides a 50 foot setback from the BVW boundary.

The property is not located within a habitat boundary established by the Natural Heritage and Endangered Species Program (NHESP)(see Figure 2).

2.0 PROJECT DESCRIPTION & SEQUENCE

The proposed project includes: the construction of a 105,000 S.F. of buildings including 23 greenhouse structures and a single 5,000 sf pre-engineered metal building. The site improvements include a fenced in yard surrounding the greenhouses, entrance drive, parking, septic system, well for drinking water and stormwater BMPs. The project may include an irrigation well in the development area for watering plants.

The design proposes grading and stormwater BMPs in the buffer zone. This was unavoidable due to the lot configuration and site topography. Shifting the development area south or east required significant removal of soil to depths over 15 feet as the work area infringes upon the hillside. As a result of the site constraints the project infringes in the outer buffer zone.

The general sequence for construction would consist of the following:

Proposed Project Sequence

1. Install MADEP file number sign.
2. File Order in the Registry of Deeds
3. Contact surveyor to locate clearing limits.
4. Install erosion controls along resource areas and limit of work as shown on project plans.
5. Contact Conservation Commission for site inspection and notify commencement of work.
6. Clear trees as shown on the project plan.
7. Start construction of building and related site work.
8. Maintain erosion controls regularly.
9. Construct temporary stormwater controls.
10. Complete earthwork and infrastructure including lighting, drainage and fencing.
11. Construct buildings.
12. Backfill and install topsoil, planting beds, seed, and straw mulch.

13. Restore temporary construction access and dewatering measures.
14. Loam, seed and mulch all remaining disturbed areas.
15. Contact Conservation Commission for a site visit.
16. Remove erosion controls.

3.0 BUFFER ZONE (310 CMR 10.02)

Buffer zone is associated with the onsite Bordering Vegetated Wetland. A portion of the proposed work falls within the Buffer Zone.

4.0 BANK (310 CMR 10.54)

There is a small channel in the BVW. This boundary was estimated, and field located by SK Design Group. None of the proposed work falls within the Bank resource.

5.0 BORDERING VEGETATED WETLAND (310 CMR 10.55)

There is no alteration of bordering vegetated wetlands associated with the project. The boundary was inspected and delineated in accordance with procedures under the Wetland Protection Act. Specifics are found in Attachment C.

6.0 LAND UNDER WATER BODIES AND WATERWAYS (310 CMR 10.56)

No Land under water bodies and waterways is associated with this property.

7.0 LAND SUBJECT TO FLOODING (310 CMR 10.57)

BORDERING

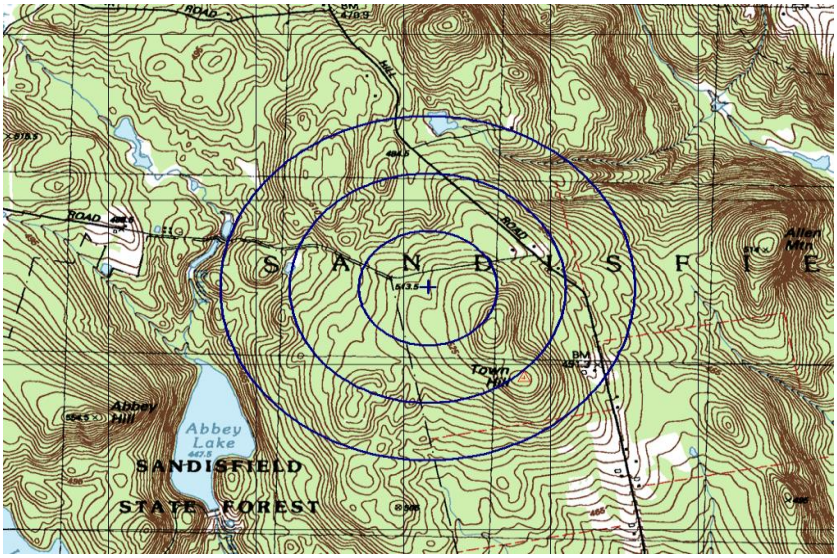
There is bordering no land subject to flooding (100-year floodplain) associated with this property. A FEMA map is included as Figure 3.

ISOLATED

There is no known isolated land subject to flooding associated with the project site.

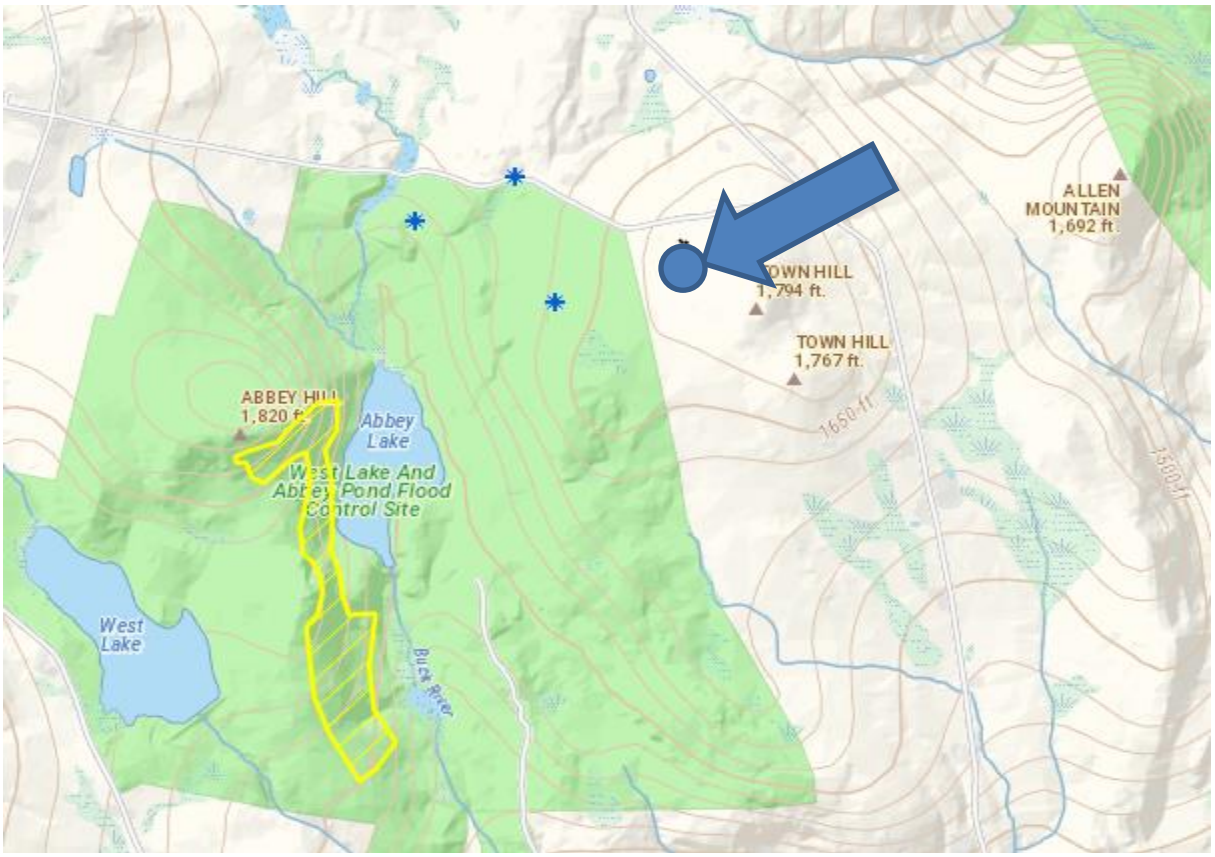
8.0 RIVERFRONT (310 CMR 10.58)

Rivers are solid blue lines depicted on the USGS map. The figure copied below depicts no such line. Thus, no such rivers exist on or near the property.



9.0 ESTIMATED HABITATS OF RARE WILDLIFE (310 CMR 10.59)

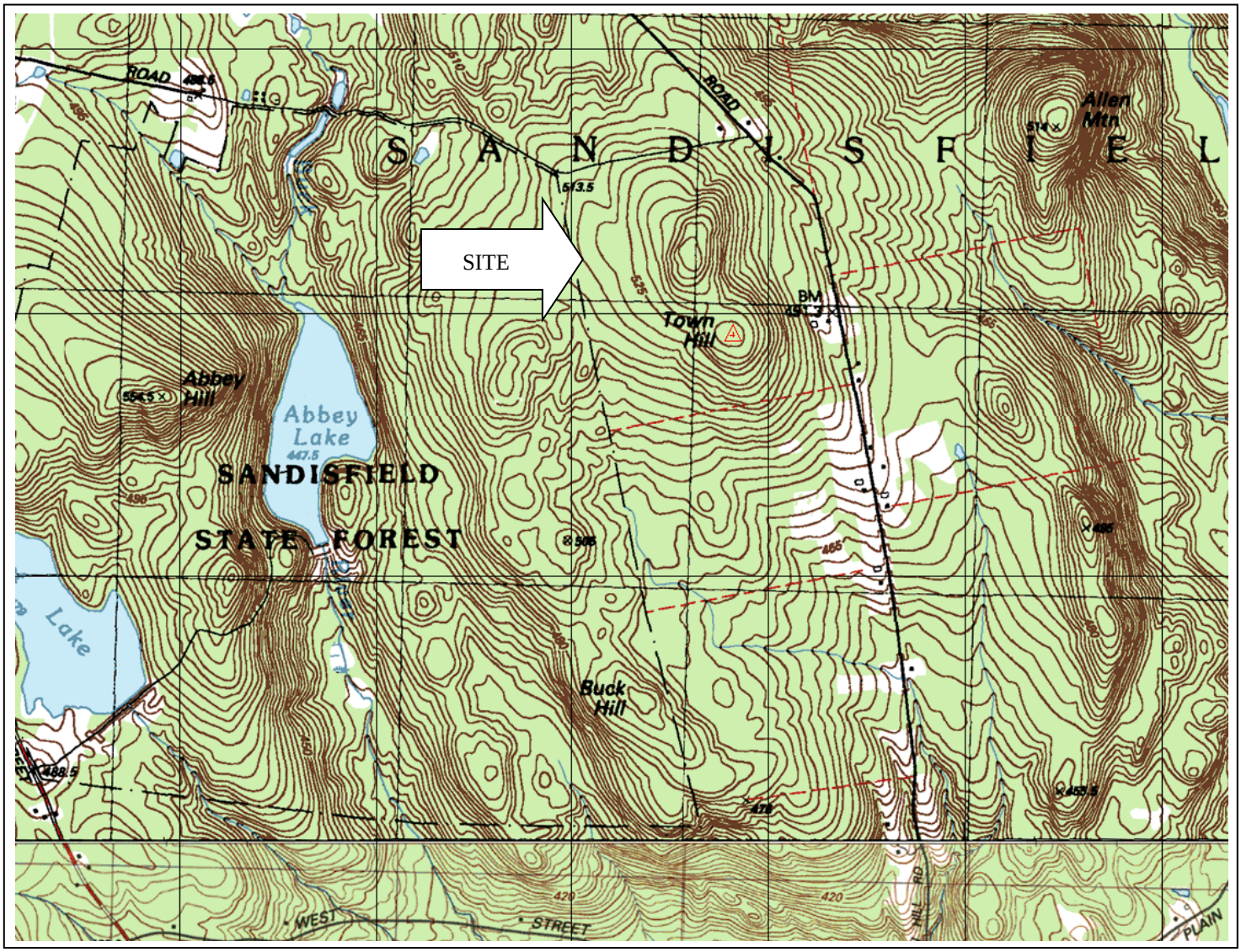
Per the Mass. NHESP website interactive map (14th Edition Natural Heritage Atlas, August 1, 2017) the property does not fall within a polygon established by the Natural Heritage and Endangered Species Program.



10.0 STREAM CROSSING STANDARDS

There are no stream crossings proposed as a part of this application.

G:\SK DESIGN GROUP\2020\200181 Fulcrum-Town Hill Rd, Sandisfield-MJ Greenhouses\Documents\Word\SAMA Notice of Intent\05 NOI narrative.docx

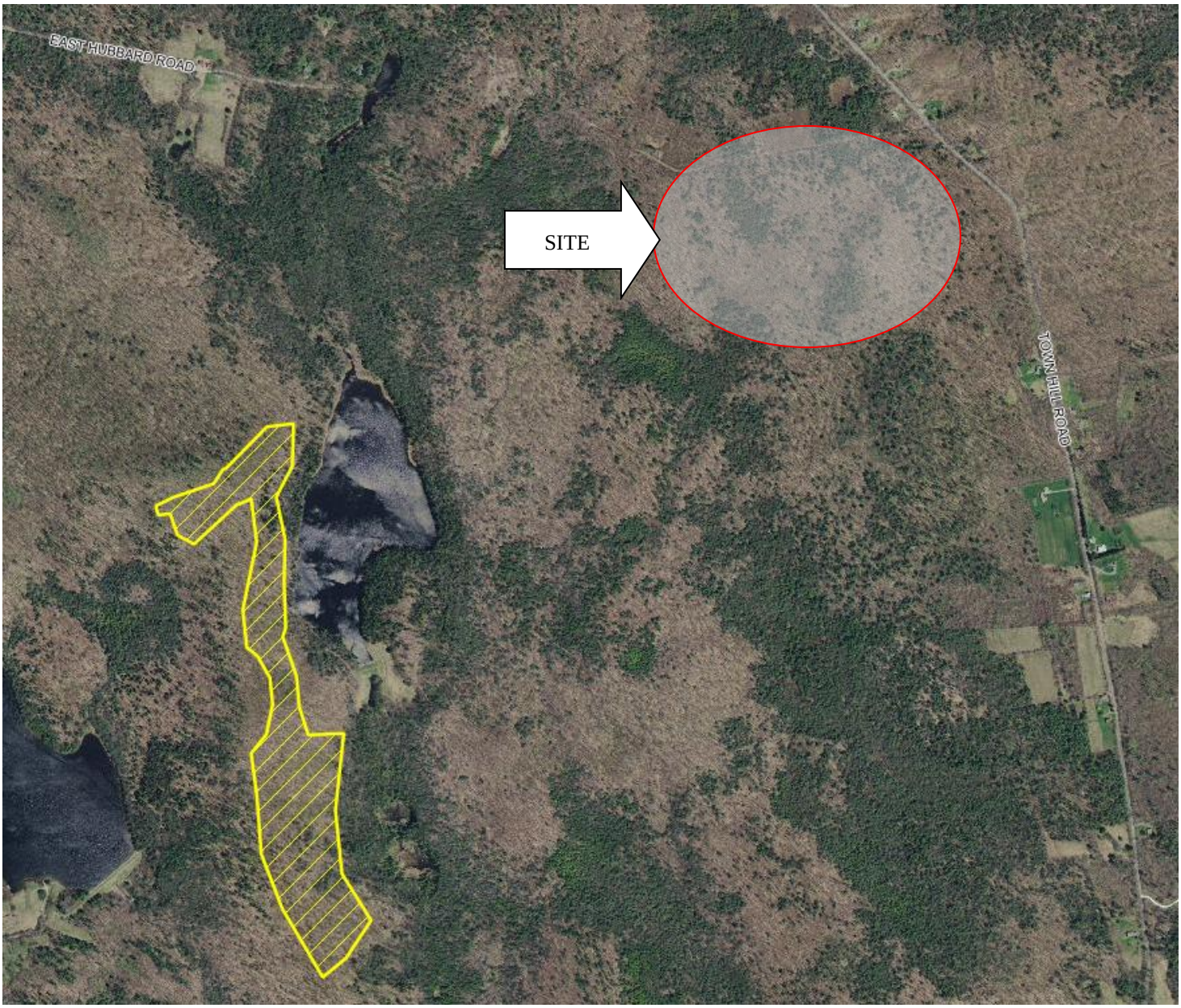


Source: U.S.G.S. Map

FIGURE #1

U.S.G.S. Map
Lot8 Abby Road
Sandisfield, MA

DESIGN GROUP, INC.
CIVIL ENGINEERS - SURVEYORS - CONSULTANTS
2 FEDERICO DR., PITTSFIELD, MA 01201 (413) 443-3537



PRIORITY & ESTIMATED HABITAT

FIGURE #2

N.H.E.S.P. MAP
Lot-8 Abby Road
Sandisfield, MA

DESIGN GROUP, INC.
CIVIL ENGINEERS - SURVEYORS - CONSULTANTS
2 FEDERICO DR., PITTSFIELD, MA 01201 (413) 443-3537

Source: www.msc.fema.gov

FIGURE #3

FEMA Floodplain Map
Lot-8 Abby Road
Sandisfield, MA

DESIGN GROUP, INC.
CIVIL ENGINEERS - SURVEYORS - CONSULTANTS
2 FEDERICO DR., PITTSFIELD, MA 01201 (413) 443-3537

Source: Sandisfield GIS Map

FIGURE #4

Town of Sandisfield Town Map
Abby Road
Sandisfield, MA
Portion of Lot 31

DESIGN GROUP, INC.
CIVIL ENGINEERS - SURVEYORS - CONSULTANTS
2 FEDERICO DR., PITTSFIELD, MA 01201 (413) 443-3537

100 foot Abutters List Report

Sandisfield, MA
February 24, 2021

Subject Property:

Parcel Number:	408-0-31	Mailing Address:	BOBRYK PAUL ESTATE OF MIECZKOWSKI JAMES EXECUTOR 535 FISH ROCK RD SOUTHBURY, CT 06488-2131
CAMA Number:	408-0-31		
Property Address:	TOWN HILL RD		

Abutters:

Parcel Number:	405-0-20	Mailing Address:	ARICO THOMAS 94 GREAT HILL POND ROAD PORTLAND, CT 06480
CAMA Number:	405-0-20		
Property Address:	102 TOWN HILL RD		
Parcel Number:	405-0-22	Mailing Address:	REIDEMAN JON FALK MADELILNE PO BOX 172 NORFOLK, CT 06058
CAMA Number:	405-0-22		
Property Address:	ABBY ROAD		
Parcel Number:	405-0-26.1	Mailing Address:	TRUE CYNTHIA M PO BOX 502 SANDISFIELD, MA 01255-0502
CAMA Number:	405-0-26.1		
Property Address:	103 TOWN HILL RD		
Parcel Number:	408-0-1	Mailing Address:	MACK BRENNA 69 NORFOLK RD WINSTED, CT 06089
CAMA Number:	408-0-1		
Property Address:	TOWN HILL RD		
Parcel Number:	408-0-28	Mailing Address:	HOLT HENRY G PO BOX 89 VINAL HAVEN, ME 04863-0089
CAMA Number:	408-0-28		
Property Address:	75 TOWN HILL RD		
Parcel Number:	408-0-3	Mailing Address:	HULL FORESTLANDS, LP 101 HAMPTON ROAD POMFRET CENTER, CT 06259
CAMA Number:	408-0-3		
Property Address:	TOWN HILL RD		
Parcel Number:	408-0-4	Mailing Address:	COSTIGAN JAMES V COSTIGAN MARY K 7 RODERICK LANE GARDEN CITY, NY 11530
CAMA Number:	408-0-4		
Property Address:	TOWN HILL RD		
Parcel Number:	408-0-5	Mailing Address:	HOLT HENRY G PO BOX 89 VINAL HAVEN, ME 04863-0089
CAMA Number:	408-0-5		
Property Address:	TOWN HILL RD		

Abutters List, Notification and
Certificate of Mailings

NOTIFICATION TO ABUTTERS UNDER THE MASSACHUSETTS WETLANDS PROTECTION ACT

In accordance with the second paragraph of Massachusetts General Laws Chapter 131, Section 40, you are hereby notified of the following:

The name of the applicant is **SAMA Productions LLC.**

The applicant has filed a Notice of Intent with the Sandisfield Conservation Commission seeking permission to remove, fill, dredge or alter an Area Subject to Protection under the Wetlands Protection Act (General Laws Chapter 131, Section 40).

The street address of the property where the activity is proposed is: **Abby Road** and the Town's Assessor's Map/Lot is: **408/31**.

A brief description of the proposed work is **the construction commercial greenhouses along Abby Road on a 46 acre lot.**

Copies of the Notice of Intent may be **examined** at the Sandisfield Conservation Commission office, Town Hall-66sandisfield road, Sandisfield. For more information, please call the Commission office at 413-258-4711Ext #.

Copies of the Notice of Intent may be **obtained** from either (check one) the applicant ___ or the applicant's representative **X**, by calling this telephone number 413-443-3537 between the hours of 9:00 am and 4:00 pm, Monday through Friday. *NOTE: Provider may charge for the cost of reproduction*.

Information regarding the date, time and place of the public hearing regarding this application may be obtained from the Sandisfield Conservation Commission by calling 413-258-4711 Ext #. Meetings are usually held on the 3rd Tuesday of each month.

Notice of the public hearing, including its date, time and place will be published at least five (5) days in advance in the **Berkshire Eagle** under the legal notice section.

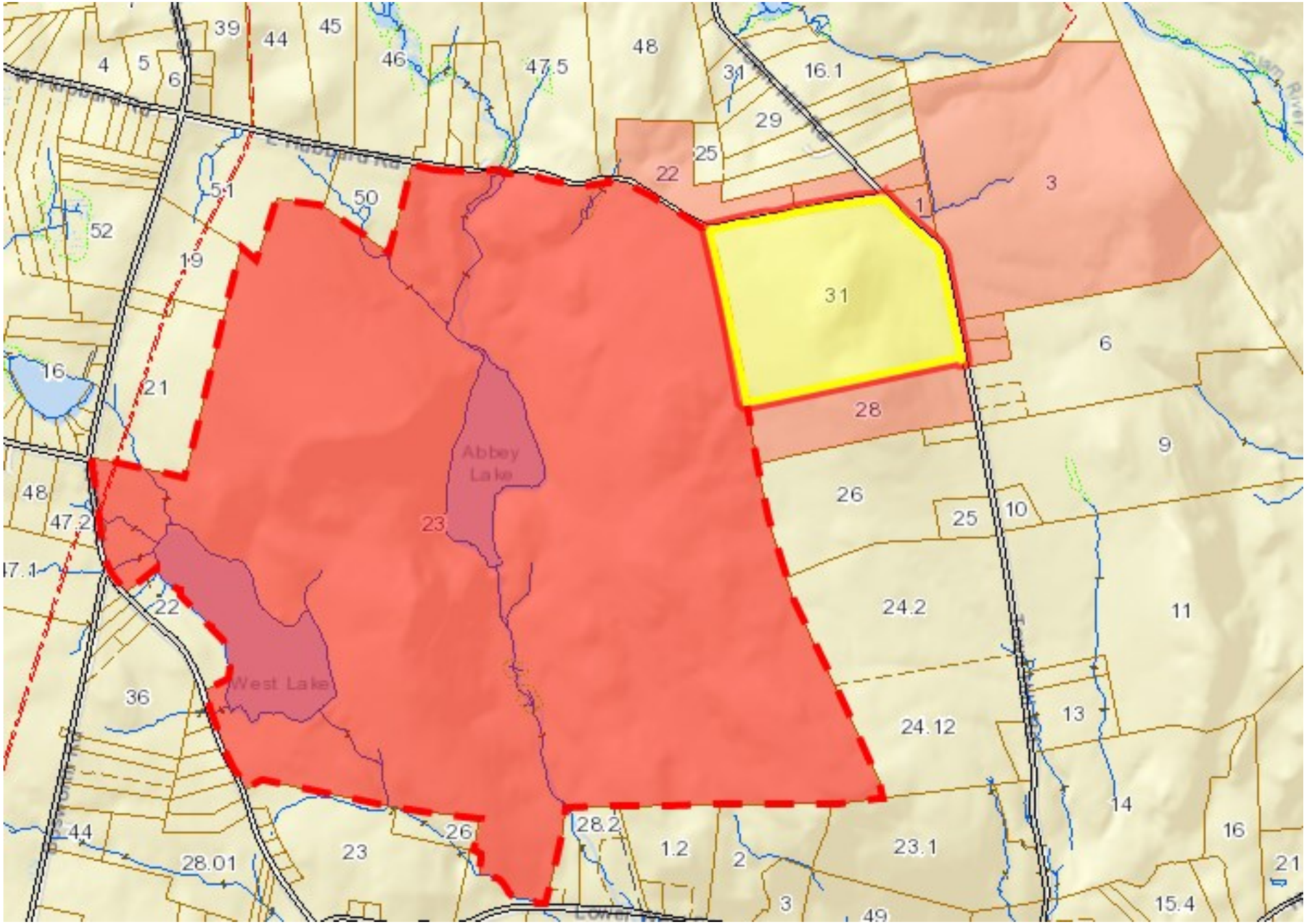
Notice of the public hearing, including its date, time and place will be posted in City Hall at least forty-eight (48) hours in advance.

The date that this notification was sent to abutters is **March 9, 2021.**
Month/Day/Year

A completed copy of this form and a list of the abutters to whom it was sent shall be submitted by the applicant to the Sandisfield Conservation Commission with the Notice of Intent.

You may also contact the nearest Department of Environmental Protection Regional Office at 413-784-1100 for more information about this application or the Wetlands Protection Act.

Western Region: 413-784-1100	Central Region: 508-792-7650
Northeast Region: 617-935-2160	Southeast Region: 508-946-2800



Map of notified abutters

Attachment A

Survey of Property

We, WOLODYMYR DUTKA and STEPHANIA DUTKA, husband and wife, both of 211 State Road in Kerhonkson, in the County of Ulster and State of New York, for consideration paid in the amount of ONE HUNDRED THIRTEEN THOUSAND AND NO/100 ($113,000.00) DOLLARS, GRANT to FRANK J. BOBRYK and PAUL P. BOBRYK, both of whom have a residence and post office address at 35 Boswell Street, in Stratford, in the County of Fairfield, and State of Connecticut, to be held by them as joint tenants and not as tenants in common, with WARRANTY COVENANTS, the land with the buildings thereon situated in the Town of Sandisfield, Berkshire County, Massachusetts, bounded and described as follows:

For Lis Pendens See Bk 607 Pg 74

For Estate Affidavit See Bk 1515 Pg 107

Beginning at a point on the westerly line of Town Hill Road which marks the northeast corner of land now or formerly of Anothony and Nora Parilli, which point is the southeast corner of the parcel being conveyed; thence westerly along said Parillis' north line 2850 feet more or less to a concrete bound set in the ground on the easterly line of land of the Commonwealth of Massachusetts acquired by taking dated June 30, 1965 and recorded in the Southern Berkshire Registry of Deeds in Book 347, Page 535; thence northerly along said easterly line of the said Commonwealth of Massachusetts the following two courses: North 2 degrees 05 minutes 25 seconds East 1,863.74 feet to a concrete bound set in the ground; and North 00 degrees 42 minutes 50 seconds East 1,176.96 feet more or less to a concrete bound set in the southerly line of Hubbard Road; thence easterly and southeasterly along said southerly line of Hubbard Road to the intersection of that road with the westerly line of Town Hill Road; thence southerly along the said westerly line of said Town Hill Road to the point or place of beginning.

Containing 200 acres, more or less.

Being all and the same premises as were conveyed to Wolodymyr Dutka and Stephania Dutka by Joseph V. Haber and Amalia H. Yalch Haber by Warranty Deed dated September 26, 1966, and recorded in said Registry of Deeds in Book 354, Page 69, however the same may be therein described, except for the parcel of land consisting of 8 acres, more or less, which was conveyed by the said Dutka et ux to Joseph V. Haber et ux by deed dated September 26, 1966, and recorded in the said Registry of Deeds in Book 354, Page 71.

Being also all and the same premises described in Parcel One in a deed from Jane L. Stratton and Michael Waters to

ROBERT J. DONOVAN

1973 00390398
Bk: 390 Pg: 0398 Doc:DEED
Page 1 of 2 09/07/1973 12:00PM

Joseph Frankel and Samuel Neidorf dated November 12, 1918 and recorded in the said Registry of Deeds in Book 221, Page 401, however the same may be otherwise described.

For a sketch of the premises herein conveyed, reference is made to the map accompanying the taking by the Commonwealth of Massachusetts, Water Resources Commission, dated June 30, 1965, and recorded in the said Registry of Deeds in Map File No. 43, being Sheet 5 of 6 on said map.

Taxes for the year 1973 having been apportioned among the parties, the grantees herein assume and agree to pay the same in full.

WITNESS our hands and seals this 7th day of September, 1973.

BERKSHIRE SOUTH COMMONWEALTH OF MASSACHUSETTS DEEDS EXCISE Cancelled 9000

Wolodymyr Dutka

Wolodymyr Dutka

BERKSHIRE SOUTH Cancelled 9000

Stephania Dutka

Stephania Dutka

BERKSHIRE SOUTH Cancelled DEEDS EXCISE 7765

COMMONWEALTH OF MASSACHUSETTS

Berkshire, ss. September 7, 1973.

Then personally appeared the above-named Wolodymyr Dutka and Stephania Dutka and acknowledged the foregoing instrument to be their free act and deed, before me,

Received Southern Berkshire Registry of Deeds
September 7, 1973 at 1:10 p.m.

Claire K. Height
Sr. Clerk.
Chap. 36, Sec. 8

Robert J. Donelan
Notary Public
My commission expires: September 21, 1974.

Attachment B

Survey Map

THESE PARCELS ARE SUBJECT TO AND WITH THE BENEFIT OF ALL RIGHTS, RESTRICTIONS, CONDITIONS, EASEMENTS, LEASES, ENCUMBRANCES AND APPURTENANCES OF RECORD.

UNLESS OTHERWISE NOTED HEREON, THIS SURVEY PLAN SHALL NOT BE CONSTRUED AS DEPICTING THE PRESENCE, ABSENCE, OR LIMITS OF ANY OR ALL REGULATED WETLANDS OR FLOODPLAINS. ANY SURFACE WATER FEATURES SHOWN, SUCH AS STREAMS OR PONDS, ARE NOT REPRESENTED AS INDICATING LIMITS OF WETLAND RESOURCE AREAS.

RECORD OWNER: THE ESTATE OF PAUL P. BOBRYK

LOCUS DEED: BK – 390 PG – 398

ASSESSOR MAP 408 LOT 31

THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF AN ATTORNEY'S ABSTRACT OF TITLE AND/OR TITLE REPORT AND IS SUBJECT TO ANY STATEMENT OF FACTS SUCH ABSTRACT OR REPORT WOULD HAVE REVEALED. THIS PROPERTY WAS SURVEYED BY THE POSSESSION LINES FOUND AT THE TIME THE SURVEY WAS MADE.

PLANNING BOARD ENDORSEMENT DOES NOT IMPLY COMPLIANCE WITH THE MASS. WETLANDS PROTECTION ACT.

LEGEND

- △ POINT COMPUTED
- ● IRON PIPE FOUND
- ○ IRON ROD TO BE SET
- ■ CONCRETE BOUND FOUND
- ⊕ BLAZED TREE W/FENCE
- ⊙ UTILITY POLE
- STONE WALL

SANDISFIELD ZONING REGULATIONS	
MINIMUM LOT AREA	1 ACRE
MINIMUM LOT FRONTAGE	200 FT.
MINIMUM LOT DEPTH	150 FT.
MINIMUM SETBACKS:	
FRONT	30 FT.
SIDE AND REAR	30 FT.

N

MERIDIAN FROM PLAT FILE B–148

FOR REGISTRY USE ONLY

N\F LAND OF
REIDEMAN & FALK
BK – 1446 PG – 20
(SEE PLAN IN MAP BK – 4 PG – 19)

N\F LAND OF
TRUE
BK – 2095 PG – 111
(SEE PLAN IN MAP BK – 7 PG – 199)

EAST HUBBARD ROAD
a.k.a. ABBY ROAD
(LEGAL STATUS NOT DETERMINED)

APPROX. SIDELINE

200.90' S 89°44'29" W
160.35' S 87°39'19" W
132.41' S 88°41'16" W
N 87°43'53" W 70.28'
N 86°48'10" W 271.15'
171.83' S 87°30'14" W
N 89°41'12" W 295.57'
N 86°14'35" W 290.62'
N 87°44'17" W 618.96'
N 32°23'32" W 311.84'

N\F LAND OF
MACK
BK – 2146 PG – 65
(PARCEL G ON PLAN IN MAP FILE #81)

484.55' S 00°42'02" W
S 03°06'48" E 77.14'
571.14' S 00°17'25" E

LOT - 8
46.749 - ACRES
LOT FRONTAGE: 311.84'
ON TOWN HILL ROAD

1112.30' S 89°16'19" E
N 18°16'10" W 259.97'
S 34°18'05" E 300.20'

LOT - 7
6.524 - ACRES
LOT FRONTAGE: 300.20'

1200.00' N 89°16'19" W
S 18°16'10" E 274.50'
N 18°16'10" W 826.62'
N 36°10'57" W 243.04'

LOT - 6
7.502 - ACRES
LOT FRONTAGE: 329.32'

N 34°33'20" W 86.28'
1313.13' S 89°16'19" E
S 34°33'20" E 5.48'
S 17°56'22" E 47.67'
S 02°52'25" E 123.43'
PULLOFF
CULVERT (TYP.)
S 00°18'36" W 103.42'

LOT - 5
8.163 - ACRES
LOT FRONTAGE: 280.00'

1244.96' N 89°16'19" W
320.00' N 00°43'41" E
280.00' S 00°43'41" W

LOT - 4
8.009 - ACRES
LOT FRONTAGE: 280.01'

280.01' N 00°43'41" E
1247.00' S 89°16'19" E
S 00°04'56" W 138.26'
S 00°32'56" W 113.37'

LOT - 3
8.024 - ACRES
LOT FRONTAGE: 280.01'

888.86' N 01°05'43" E
N 00°43'41" E 280.00'
520.00' S 00°43'41" W
280.00' S 00°43'41" W

LOT - 2
8.032 - ACRES
LOT FRONTAGE: 280.00'

1249.12' N 89°16'19" W
280.00' N 00°32'56" E
1250.00' S 89°16'19" E

TOWN HILL ROAD

S 80°03'00" E 1542.10'

LOT - 1
40.010 - ACRES

N\F LAND OF
HULL FORESTLANDS LP
BK – 1217 PG – 1

N\F LAND OF
COMMONWEALTH OF MASSACHUSETTS
BK – 347 PG – 535
(SEE PLAN IN MAP FILE #43 ENTITLED
"WEST LAKE & ABBEY LAKE AREA
COMMONWEALTH OF MASSACHUSETTS WATER
RESOURCES COMMISSION
PLAN OF LAND IN THE TOWN OF SANDISFIELD
TAKEN UNDER THE AUTHORITY OF CHAPTER
565 ACTS OF 1963" (SHEET 5 OF 6)

N 03°11'51" E 151.85'
SEE DETAIL
2556.31' N 89°16'19" W
200.00' S 00°10'02" E

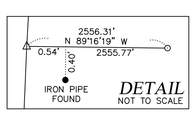
N 64°06'56" W 41.53'
191.57' N 87°07'18" W
ENCROACHMENT OF MOWED LAWN ONTO SUBJECT PROPERTY

298.25' S 00°32'56" W
200.00' N 00°31'27" E "TIE COURSE"

N\F LAND OF
COSTIGAN
BK – 1279 PG – 193
(EXCEPTION FROM CURRENT LOCUS DEED
SEE BK – 354 PG – 71)

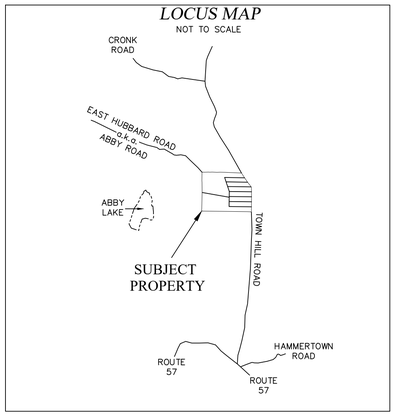
N\F LAND OF
HOLT
BK – 1402 PG – 339
(EXCEPTION FROM CURRENT LOCUS DEED
SEE BK – 354 PG – 71)

N\F LAND OF
HOLT
BK – 1213 PG – 184
ALSO SEE BK – 572 PG – 49
(SEE PLAN IN PLAT FILE B – 148)



150 0 150 300 450
Scale 1" = 150'

LOCUS MAP
NOT TO SCALE



I HEREBY REPORT THAT THIS PLAN HAS BEEN PREPARED IN CONFORMITY WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

SIGNED : _____
PROFESSIONAL LAND SURVEYOR

APPROVAL NOT REQUIRED UNDER THE SUBDIVISION CONTROL LAW

SANDISFIELD PLANNING BOARD

_____ CHAIRMAN

_____

_____

_____

_____

_____

_____2020

PLAN OF LAND SURVEYED FOR
FRANKLIN WOODS INVESTMENTS LLC
SANDISFIELD, MASSACHUSETTS
SEPTEMBER – 2020 SCALE 1" = 150'

KELLY, GRANGER, PARSONS & ASSOCIATES, INC.
PROFESSIONAL LAND SURVEYORS
312 MAIN STREET P.O. BOX 88
GREAT BARRINGTON, MASSACHUSETTS 01230
FAX (413) 528–1912 PHONE (413) 528–3291
C:\Carlson Projects\SANDISFIELD\TOWN HILL ROAD\SANDERS\SANDERS920.dwg\JMM

Attachment C

Wetland Report

DESIGN GROUP, INC.
Civil Engineers • Surveyors • Consultants

Drainage
Highways
Reports
Land Planning
Building Design
Survey

February 3, 2021

Via email: generalpushing@gmail.com
Gwheck21@gmail.com

John Heck
SAMA Productions LLC

RE: Resource Area Delineation
Town Hill Road / Abbey Road
Map 408, Lot 31
Sandifield, MA
SKDG Project No. 200181

Dear Mr. Heck;

On November 13, 2020, SK Design Group, Inc. (SKDG) conducted a resource area delineation on the above referenced site. The site consists of an undeveloped, forested parcel of land at the southwest corner of the intersection of Town Hill Road and Abbey Road in Sandisfield, Massachusetts. Town Hill Road abuts the east property line of the property while Abbey Hill is located along the north property line. The property slopes from upward from both Town Hill and Abbey Roads to the top of Town Hill. Two (2)areas of Bordering Vegetated Wetland (BVW) were identified on the property, one (1) on the far western portion and one (1) at the intersection of Abbey and Town Hill Roads.

The area of BVW identified on the western portion of the property (BVW "A") is classified as a Forested Wetland system. This BVW area was directly influenced by groundwater elevation and topography of the surrounding area. Multiple water carrying channels (Bank) are located within this BVW area. There were several indicators of hydrology present in this BVW areas, including, areas of inundation, hydric soils with a sapric O-horizon, hydrophytic plant species, saturation and standing water within the top 12 inches of soil, and mottling and gleying in the soils. The BVW area was dominated by Sphagnum (*Sphagnum spp.)*, Yellow Birch (*Betula allegehensis*), and Eastern Hemlock (*Tsuga canadensis).* The soils observed in the BVW area revealed a sapric O-horizon, a low chroma color matrix with mottling and concretions in the A and B horizons, saturation within 12-inches of the surface and gleying in the B-Horizon. These characteristics are typical of hydric soil conditions (See field data forms for soil profiles). Soil profiles were recorded along the BVW and upland boundaries on the subject property and are represented in the Appendix G Forms attached hereto. Other soil borings were taken throughout the wetland area to verify soil conditions but were not recorded. The BVW area identified on November 13, 2020 was marked in the field utilizing blue flagging numbered sequentially and field surveyed.

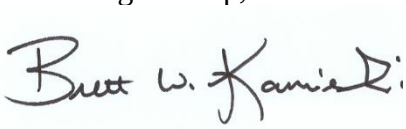
The area of BVW identified on the eastern portion of the property (BVW "B") is also classified as a Forested Wetland system. This BVW area was directly influenced by groundwater elevation, hydrology of an unnamed intermittent stream, and topography of the surrounding area.

There were several indicators of hydrology present in this BVW areas, including, areas of inundation, hydric soils with a sapric O-horizon, hydrophytic plant species, saturation and standing water within the top 12 inches of soil, and mottling and gleying in the soils. The BVW area was dominated by Sphagnum (*Sphagnum spp.),* Sensitive Fern (*Onoclea sensiblis*), Yellow Birch (*Betula allegehensis*), and Eastern Hemlock (*Tsuga canadensis).* The soils observed in the BVW area revealed a sapric O-horizon, a low chroma color matrix with mottling and concretions in the A and B horizons, saturation within 12-inches of the surface and gleying in the B-Horizon. These characteristics are typical of hydric soil conditions (See field data forms for soil profiles). Soil profiles were recorded along the BVW and upland boundaries on the subject property and are represented in the Appendix G Forms attached hereto. Other soil borings were taken throughout the wetland area to verify soil conditions but were not recorded. The BVW area identified on November 13, 2020 was marked in the field utilizing blue flagging numbered sequentially and field surveyed.

Forested upland areas were observed surrounding both BVW areas on the property. The uplands were dominated by Evergreen Woodfern (*Dryopteris intermedia*), Christmas Fern (*Polystichum acrostichoides*), Mountain Laurel (*Kalmia latifolia*), American Beech (*Fagus grandifolia*), Northern Red Oak (*Quercus rubra*), Black Cherry (*Prunus serotina*), and Eastern White Pine (*Pinus strobus*). The upland soils revealed a high chroma color matrix with no redoximorphic features, typical of non-hydric soil conditions. Upland soil profiles were recorded on the Appendix G field data sheets attached hereto. Other soil profiles were collected throughout the upland areas to verify soil conditions but were not recorded.

If you should have any questions concerning this matter, please contact our office.

Sincerely,
S-K Design Group, Inc.



Brett W. Kamienski,
Wetland Scientist

G:\SK DESIGN GROUP\2020\200181 Fulcrum-Town Hill Rd, Sandisfield-MJ Greenhouses\Documents\Word\Resource Area Delineation\Resorce Area Delineation.docx

Cc: File

MassDEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant: Fulcrum Prepared by: SK Design Group, Inc. Project location: Town Hill Rd – (408-31) Sandisfield DEP File #: _____

Check all that apply:

- ❑ Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only
- ☒ Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II
- ❑ Method other than dominance test used (attach additional information)

Section I.

Vegetation	Observation Plot Number: **A-15 (BVW)**		Transect Number: 15	Date of Delineation: 11/13/2020
A. Sample Layer & Plant Species (by common/*scientific name*)	B. Percent Cover (or basal Area) (Midpoint)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator Category*
Groundcover:				
None				
Shrubs/Sapling:				
*Eastern Hemlock (*Tsuga canadensis)*	3.0	50%	Yes	FACW
*Yellow Birch (*Betula alleghaniensis*)	3.0	50%	Yes	FAC
Tree:				
*Eastern Hemlock (*Tsuga canadensis)*	85.0	89%	Yes	FACW
*Yellow Birch (*Betula alleghaniensis*)	10.5	11%	No	FAC

* *Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FAC+, FACW-, FACW, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.*

Vegetation conclusion:

Number of dominant wetland indicator plants: 4 Number of dominant non-wetland indicator plants: 0

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? (yes) no

If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent

Section II. Indicators of Hydrology A-15 (BVW)

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site? (yes) no
title/date: Soil Survey of Berkshire County,1988
map number: 48
soil type mapped: PmC - Peru-Marlow Association
hydric soil inclusions: No

Are field observations consistent with soil survey? yes (no)
Remarks:

BVW located in drainageway and depression area.

2. Soil Description

Horizon	Depth	Matrix Color	Mottles Color
A	0-6”	10 YR 3/1	
Bw1	6-12”	10 YR 4/2	10YR 4/6~40%

Remarks:

Redox @ 6”+

3. Other:

Conclusion: Is soil hydric? (yes) no

Other Indicators of Hydrology: (check all that apply & describe)

- ❑ Site Inundated: _____
- ❑ Depth to free water in observation hole: _____
- ☒ Depth to soil saturation in observation hole: <12”
- ❑ Water marks: _____
- ❑ Drift lines: _____
- ❑ Sediment Deposits: _____
- ☒ Drainage patterns in BVW: _____
- ❑ Oxidized rhizospheres: _____
- ☒ Water-stained leaves: Evidence of standing water
- ❑ Recorded Data (streams, lake, or tidal gauge; aerial photo; other): _____
- ❑ Other: _____

Vegetation and Hydrology Conclusion

	Yes	No
Number of wetland indicator plants ≥ # of non-wetland indicator plants	X	
Wetland hydrology present:		
Hydric soil present	X	
Other indicators of hydrology present	X	
Sample location is in a BVW	X	

Submit this form with the Request for Determination of Applicability or Notice of Intent.

MassDEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant: Fulcrum Prepared by: SK Design Group, Inc. Project location: Town Hill Rd – (408-31) Sandisfield DEP File #:

Check all that apply:

- ❑ Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only
- ☒ Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II
- ❑ Method other than dominance test used (attach additional information)

Section I.

Vegetation	Observation Plot Number: **A-15 (UP)**		Transect Number: 15	Date of Delineation: 11/13/2020
A. Sample Layer & Plant Species (by common/*scientific name*)	B. Percent Cover (or basal Area) (Midpoint)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator Category*
Groundcover:				
Evergreen Woodfern (*Dryopteris intermedia*)	10.5	78%	Yes	FACU
Christmas Fern (*Polystichum acrostichoides))*	3.0	22%	Yes	FACU
Shrubs/Sapling:				
American Beech (*Fagus grandifolia*)	3.0	50%	Yes	FACU
Mountain Laurel (*Kalmia latifolia*)	3.0	50%	Yes	FACU
Trees:				
Northern Red Oak (*Quercus rubra*)	38.0	48%	Yes	FACU
Black Cherry (*Prunus serotina*)	38.0	48%	Yes	FACU
*Eastern Hemlock (*Tsuga canadensis*)	3.0	4%	No	FACW

* *Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FAC+, FACW-, FACW, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.*

Vegetation conclusion:

Number of dominant wetland indicator plants: 0 Number of dominant non-wetland indicator plants: 6

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? yes (no)

If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent

Section II. Indicators of Hydrology A-15 (UP)

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site? (yes) no
title/date: Soil Survey of Berkshire County,1988
map number: 48
soil type mapped: PmC – Peru-Marlow Association
hydric soil inclusions: No

Are field observations consistent with soil survey? (yes) no
Remarks:

Well-drained soil on glacial till uplands

2. Soil Description

Horizon	Depth	Matrix Color	Mottles Color
A	0-7”	10 YR 3/2	
Bw1	7-14”	10 YR 3/4	

Remarks:

No redox to 14”, stony soils

3. Other:

Conclusion: Is soil hydric? yes (no)

Other Indicators of Hydrology: (check all that apply & describe)

- ❑ Site Inundated: _____
- ❑ Depth to free water in observation hole: _____
- ❑ Depth to soil saturation in observation hole: _____
- ❑ Water marks: _____
- ❑ Drift lines: _____
- ❑ Sediment Deposits: _____
- ❑ Drainage patterns in BVW: _____
- ❑ Oxidized rhizospheres: _____
- ❑ Water-stained leaves: _____
- ❑ Recorded Data (streams, lake, or tidal gauge; aerial photo; other): _____ _____ _____

Vegetation and Hydrology Conclusion

	Yes	No
Number of wetland indicator plants ≥ # of non-wetland indicator plants	____	__X__
Wetland hydrology present:		
Hydric soil present	____	__X__
Other indicators of hydrology present	____	__X__
Sample location is in a BVW	____	__X__

Submit this form with the Request for Determination of Applicability or Notice of Intent.

MassDEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant: Fulcrum Prepared by: SK Design Group, Inc. Project location: Town Hill Rd – (408-31) Sandisfield DEP File #: _____

Check all that apply:

- ❑ Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only
- ☒ Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II
- ❑ Method other than dominance test used (attach additional information)

Section I.

Vegetation	Observation Plot Number: **A-5 (BVW)**		Transect Number: 5	Date of Delineation: 11/13/2020
A. Sample Layer & Plant Species (by common/*scientific name*)	B. Percent Cover (or basal Area) (Midpoint)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator Category*
Groundcover:				
*Sphagnum (*Sphagnum spp.*)	63.0	100%	Yes	FACW
Shrubs/Sapling:				
*Eastern Hemlock (*Tsuga canadensis)*	10.5	100%	Yes	FACW
Tree:				
*Eastern Hemlock (*Tsuga canadensis)*	85.0	69%	Yes	FACW
*Yellow Birch (*Betula alleghaniensis)*	38.0	31%	Yes	FAC

* *Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FAC+, FACW-, FACW, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.*

Vegetation conclusion:

Number of dominant wetland indicator plants: 5 Number of dominant non-wetland indicator plants: 0

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? (yes) no

If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent

Section II. Indicators of Hydrology A-5 (BVW)

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site? (yes) no
title/date: Soil Survey of Berkshire County,1988
map number: 48
soil type mapped: PmC – Peru-Marlow Association
hydric soil inclusions: No

Are field observations consistent with soil survey? yes (no)
Remarks:

BVW located in low lying drainageway

2. Soil Description

Horizon	Depth	Matrix Color	Mottles Color
A	0-5”	10 YR 3/1	
Bw1	5-12”	10 YR 5/2	7.5YR 4/6~20% 10YR 2/1<5%

Remarks:

Redox @ 5”+

Bw1 – silt & clay, tight & stony

3. Other:

Conclusion: Is soil hydric? (yes) no

Other Indicators of Hydrology: (check all that apply & describe)

- [X] Site Inundated: Portions of BVW
- [X] Depth to free water in observation hole: <12”
- [X] Depth to soil saturation in observation hole:<12”
- [ ] Water marks: _____
- [ ] Drift lines: _____
- [ ] Sediment Deposits: _____
- [X] Drainage patterns in BVW: _____
- [ ] Oxidized rhizospheres: _____
- [X] Water-stained leaves: Evidence of standing water
- [ ] Recorded Data (streams, lake, or tidal gauge; aerial photo; other): _____ _____
- [X] Other: Pockets of sapric O horizon

Vegetation and Hydrology Conclusion

	Yes	No
Number of wetland indicator plants ≥ # of non-wetland indicator plants	X	
Wetland hydrology present:		
Hydric soil present	X	
Other indicators of hydrology present	X	
Sample location is in a BVW	X	

Submit this form with the Request for Determination of Applicability or Notice of Intent.

MassDEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant:____Fulcrum___ Prepared by:_SK Design Group, Inc._____ Project location:_Town Hill Rd (408-31)_____ DEP File #:_____
Sandisfield

Check all that apply:

- ❑ Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only
- ☒ Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II
- ❑ Method other than dominance test used (attach additional information)

Section I.

Vegetation	Observation Plot Number: **A-5 (UP)**		Transect Number: 5	Date of Delineation: 11/13/2020
A. Sample Layer & Plant Species (by common/*scientific name*)	B. Percent Cover (or basal Area) (Midpoint)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator Category*
Groundcover:				
Evergreen Woodfern (*Dryopteris intermedia*)	10.5	22%	Yes	FACU
Christmas Fern (*Polystichum acrostichoides))*	38.0	78%	Yes	FACU
Shrubs/Sapling:				
American Beech (*Fagus grandifolia*)	3.0	50%	Yes	FACU
*Eastern Hemlock (*Tsuga canadensis*)	3.0	50%	Yes	FACW
Trees:				
American Beech (*Fagus grandifolia*)	38.0	33%	Yes	FACU
Black Cherry (*Prunus serotina*)	63.0	55%	Yes	FACU
*Eastern Hemlock (*Tsuga canadensis*)	10.5	9%	No	FACW
*Yellow Birch (Betula allegehensis)	3.0	3%	No	FAC

* *Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FAC+, FACW-, FACW, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.*

Vegetation conclusion:

Number of dominant wetland indicator plants: 1 Number of dominant non-wetland indicator plants: 5

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? yes (no)

If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent

Section II. Indicators of Hydrology A-5 (UP)

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site? (yes) no
title/date: Soil Survey of Berkshire County,1988
map number: 48
soil type mapped: PmC – Peru-Marlow Association
hydric soil inclusions: No

Are field observations consistent with soil survey? (yes) no
Remarks:

Well drained stony soil on glacial till uplands.

2. Soil Description

Horizon	Depth	Matrix Color	Mottles Color
A	0-7”	10 YR 3/2	
Bw1	7-14”	10 YR 3/4	

Remarks:

3. Other:

Conclusion: Is soil hydric? yes (no)

Other Indicators of Hydrology: (check all that apply & describe)

- ❑ Site Inundated: _____
- ❑ Depth to free water in observation hole: _____
- ❑ Depth to soil saturation in observation hole: _____
- ❑ Water marks: _____
- ❑ Drift lines: _____
- ❑ Sediment Deposits: _____
- ❑ Drainage patterns in BVW: _____
- ❑ Oxidized rhizospheres: _____
- ❑ Water-stained leaves: _____
- ❑ Recorded Data (streams, lake, or tidal gauge; aerial photo; other): _____ _____ _____

Vegetation and Hydrology Conclusion

	Yes	No
Number of wetland indicator plants ≥ # of non-wetland indicator plants	____	__X__
Wetland hydrology present:		
Hydric soil present	____	__X__
Other indicators of hydrology present	____	__X__
Sample location is in a BVW	____	__X__

Submit this form with the Request for Determination of Applicability or Notice of Intent.

MassDEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant: Fulcrum Prepared by: SK Design Group, Inc. Project location: Town Hill Rd – (408-31) Sandisfield DEP File #:

Check all that apply:

- ❑ Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only
- ☒ Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II
- ❑ Method other than dominance test used (attach additional information)

Section I.

Vegetation	Observation Plot Number: **B-20 (BVW)**		Transect Number: 20	Date of Delineation: 11/13/2020
A. Sample Layer & Plant Species (by common/*scientific name*)	B. Percent Cover (or basal Area) (Midpoint)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator Category*
Groundcover:				
*Sensitive Fern (*Onoclea sensibilis*)	10.5	100%	Yes	FACW
Shrubs/Sapling:				
*Eastern Hemlock (*Tsuga canadensis)*	10.5	78%	Yes	FACW
*Yellow Birch (Betula alleghaniensis)	3.0	22%	Yes	FAC
Tree:				
*Eastern Hemlock (*Tsuga canadensis)*	85.0	69%	Yes	FACW
*Yellow Birch (*Betula alleghaniensis)*	38.0	31%	Yes	FAC

* *Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FAC+, FACW-, FACW, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.*

Vegetation conclusion:

Number of dominant wetland indicator plants: 5 Number of dominant non-wetland indicator plants: 0

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? (yes) no

If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent

Section II. Indicators of Hydrology B-20 (BVW)

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site? (yes) no
title/date: Soil Survey of Berkshire County,1988
map number: 48
soil type mapped: PoB – Pillsbury loam
hydric soil inclusions: Yes

Are field observations consistent with soil survey? (yes) no
Remarks:

BVW located in drainageway

2. Soil Description

Horizon	Depth	Matrix Color	Mottles Color
Oa	3-0”	10 YR 2/1	
A	0-4”	10 YR 3/1	
Bw1	4-12”	10 YR 5/2	7.5YR 4/6~40% 10YR 2/1<5%

Remarks:

Sapric O horizon

3. Other:

Conclusion: Is soil hydric? (yes) no

Other Indicators of Hydrology: (check all that apply & describe)

- [X] Site Inundated: Portions of BVW
- [X] Depth to free water in observation hole: <12”
- [X] Depth to soil saturation in observation hole:<12”
- [ ] Water marks: _____
- [ ] Drift lines: _____
- [X] Sediment Deposits: _____
- [X] Drainage patterns in BVW: _____
- [ ] Oxidized rhizospheres: _____
- [X] Water-stained leaves: Evidence of standing water
- [ ] Recorded Data (streams, lake, or tidal gauge; aerial photo; other): _____
- [X] Other: Pockets of sapric O horizon

Vegetation and Hydrology Conclusion

	Yes	No
Number of wetland indicator plants ≥ # of non-wetland indicator plants	X	
Wetland hydrology present:		
Hydric soil present	X	
Other indicators of hydrology present	X	
Sample location is in a BVW	X	

Submit this form with the Request for Determination of Applicability or Notice of Intent.

MassDEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant: Fulcrum Prepared by: SK Design Group, Inc. Project location: Town Hill Rd – (408-31) Sandisfield DEP File #: _____

Check all that apply:

- ❑ Vegetation alone presumed adequate to delineate BVW boundary: fill out Section I only
- ☒ Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II
- ❑ Method other than dominance test used (attach additional information)

Section I.

Vegetation	Observation Plot Number: **B-20 (UP)**		Transect Number: 20	Date of Delineation: 11/13/2020
A. Sample Layer & Plant Species (by common/*scientific name*)	B. Percent Cover (or basal Area) (Midpoint)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. Wetland Indicator Category*
Groundcover:				
Christmas Fern (*Polystichum acrostichoides)*	3.0	100%	Yes	FACU
Shrubs/Sapling:				
Mountain Laurel (*Kalmia latifolia*)	3.0	100%	Yes	FACU
Trees:				
Northern Red Oak (*Quercus rubra*)	38.0	48%	Yes	FACU
Eastern White Pine (*Pinus strobus*)	38.0	48%	Yes	FACU
*Eastern Hemlock (*Tsuga canadensis*)	10.5	4%	No	FACW

* *Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus Sphagnum; plants listed as FAC, FAC+, FACW-, FACW, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.*

Vegetation conclusion:

Number of dominant wetland indicator plants: 0 Number of dominant non-wetland indicator plants: 6

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? yes (no)

If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability or Notice of Intent

Section II. Indicators of Hydrology B-20 (UP)

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site? (yes) no
title/date: Soil Survey of Berkshire County,1988
map number: 48
soil type mapped: PmC – Peru-Marlow Association
hydric soil inclusions: No

Are field observations consistent with soil survey? (yes) no
Remarks:

Well-drained soil on glacial till uplands

2. Soil Description

Horizon	Depth	Matrix Color	Mottles Color
A	0-7”	10 YR 3/2	
Bw1	7-14”	10 YR 3/4	

Remarks:

No redox to 14”, stony soils

3. Other:

Conclusion: Is soil hydric? yes (no)

Other Indicators of Hydrology: (check all that apply & describe)

- ❑ Site Inundated: _____
- ❑ Depth to free water in observation hole: _____
- ❑ Depth to soil saturation in observation hole: _____
- ❑ Water marks: _____
- ❑ Drift lines: _____
- ❑ Sediment Deposits: _____
- ❑ Drainage patterns in BVW: _____
- ❑ Oxidized rhizospheres: _____
- ❑ Water-stained leaves: _____
- ❑ Recorded Data (streams, lake, or tidal gauge; aerial photo; other):
  _____
  _____
  _____

Vegetation and Hydrology Conclusion

	Yes	No
Number of wetland indicator plants ≥ # of non-wetland indicator plants	____	__X__
Wetland hydrology present:		
Hydric soil present	____	__X__
Other indicators of hydrology present	____	__X__
Sample location is in a BVW	____	__X__

Submit this form with the Request for Determination of Applicability or Notice of Intent.

Attachment D

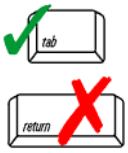
Stormwater Report

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

Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

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

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

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

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

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

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

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

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

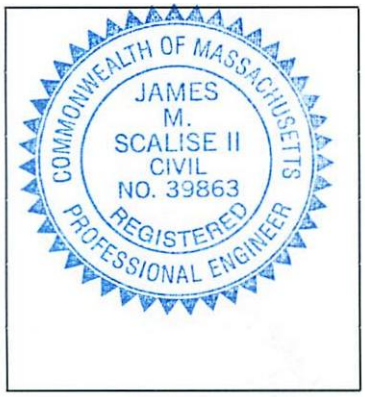
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



Signature and Date 3/1/21

Checklist

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

- [x] New development
- [ ] Redevelopment
- [ ] Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

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

- [x] No disturbance to any Wetland Resource Areas
- [ ] Site Design Practices (e.g. clustered development, reduced frontage setbacks)
- [ ] Reduced Impervious Area (Redevelopment Only)
- [ ] Minimizing disturbance to existing trees and shrubs
- [ ] LID Site Design Credit Requested:
  - [ ] Credit 1
  - [ ] Credit 2
  - [ ] Credit 3
- [x] Use of "country drainage" versus curb and gutter conveyance and pipe
- [x] Bioretention Cells (includes Rain Gardens)
- [ ] Constructed Stormwater Wetlands (includes Gravel Wetlands designs)
- [x] Treebox Filter
- [ ] Water Quality Swale
- [ ] Grass Channel
- [ ] Green Roof
- [ ] Other (describe): _____

Standard 1: No New Untreated Discharges

- [x] No new untreated discharges
- [x] Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth
- [x] Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

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

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

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

Standard 3: Recharge

☑ Soil Analysis provided.

☑ Required Recharge Volume calculation provided.

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

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

☑ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

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

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

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

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

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

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

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

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

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

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

☑ The ½" or 1" Water Quality Volume or

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

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

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

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

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

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

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

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

☐ All exposure has been eliminated.

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

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

Standard 6: Critical Areas

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

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

Checklist for Stormwater Report

Checklist (continued)

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

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

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

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

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

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

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☑ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☑ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☑ Name of the stormwater management system owners;
- ☑ Party responsible for operation and maintenance;
- ☑ Schedule for implementation of routine and non-routine maintenance tasks;
- ☑ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☑ Description and delineation of public safety features;
- ☑ Estimated operation and maintenance budget; and
- ☑ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☑ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☑ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

STORMWATER MANAGEMENT NARRATIVE

To Accompany Special Permit Application

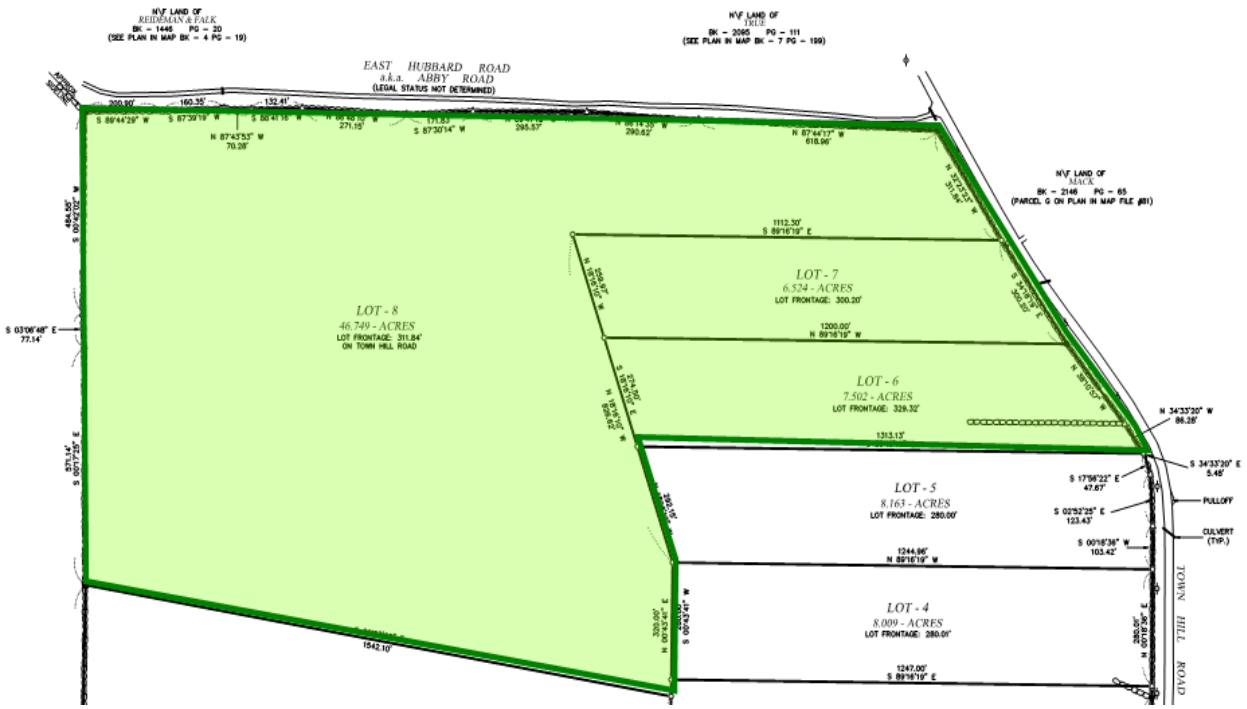
SAMA Productions LLC

Abby Road

Sandisfield, MA

Introduction

The project site is located along Abby road near the intersection of Abby Road and Town Hill Road in Sandisfield, MA.



Portion of property survey (Prepared By Kelly Granger and Parsons Assoc.)

The property contains 60 acres of land, more or less, accessed Abby Road traveling west along Abby road. The existing site is known as Town Hill and is a forested hillside. The entire development is located on lot 8 which includes 46 acres of land.

The proposed project includes the construction of (23) green houses and a 5,000-sf pre-engineered processing building. The project also includes the construction of gravel driveways, with parking areas, grading, utilities, and stormwater infrastructure.

The method to be used to analyze both the existing and proposed drainage flow is outlined in the Soil Conservation Services Technical Release 20 (TR-20) and Soil Conservation Services Technical Release 55 (TR-55) "Urban Hydrology for Small Watersheds", 2nd Edition, 1986. The SCS methods are utilized by HydroCAD stormwater modeling software, which provides methods to calculate stormwater runoff volumes, peak rates of runoff and hydrographs for small watersheds. The input data includes site use, published hydrologic soil type and statistical rainfall data. The analysis will show no increase in runoff for a 24- hour, type III storm during a 2-year, 10-year, and 100-year storm event.

The time of concentration calculations are based upon the travel time from the hydraulically most distant point within the watershed to the final design point. The times were calculated utilizing the *Soil Conservation Services* Technical Note *Hydrology No. N4* dated July 1986.

The proposed drain pipes will be high density polyethylene (HDPE), more specifically we have specified Advance Drainage System (ADS N-12). This type of pipe is light weight, durable, and provides the capacity of other types of pipe (i.e. metal, concrete, etc.)

The stormwater design mimics existing drainage patterns and is design following the Mass Department of Environmental Protection Stormwater Management Standards.

Standard #1-No new stormwater conveyances (e.g. outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

The project as proposed includes the collection, treatment and mitigation of stormwater runoff from all developed areas and by-passes upgradient stormwater to insure hydrology is not interrupted to downgradient areas. The onsite drainage channel is designed at less than 5% slope. The conveyance is designed to have sufficient capacity to convey runoff safely during the 10-year storm. The maximum calculated velocity is 4.4 fps. The drainage channel will be planted with tall fescue grass mix and a grass legume mixture. This ground cover will prevent erosion. Should erosive conditions persist, check dams shall be installed. Check dams shall be installed at 50' intervals 18 inches high and well graded 6-inch minus stone.

Standard #2-Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR 10.04.

Peak flows are managed according to the standards as outlined below:

Event	Westerly DP Existing Outflow (cfs)	Westerly DP Proposed Outflow (cfs)
2 year	5.64	5.55
10 year	13.12	12.09
100 year	33.83	31.15
Event	**Easterly DP Existing Outflow (cfs)**	**Easterly DP Proposed Outflow (cfs)**
2 year	4.94	4.87
10 year	11.48	11.44
100 year	29.58	28.72

Standard #3 Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures.

Infiltration volume is provided using the static method. All infiltration BMPs are proposed in fill areas onsite. Other infiltration measures are proposed to collect stormwater onsite but are not included in the calculations for compliance under this standard. Construction of the BMPs in fill insures the BMPS meet the separation to groundwater requirements under this section. The below summary indicates the standard is met.

Groundwater recharge

Target Depth Factor	0.25	inch
	0.021	feet
impervious area	1.45	acres (West)
sum	1.45	
Area	62,998	square feet
Recharge volume required	**1,312**	**Cubic feet**
Infiltration trenches proposed		
Greenhouse group 1	0	Cubic feet
Greenhouse group 2	989	Cubic feet
Greenhouse group 3	897	Cubic feet
Volume Provided	**1,886**	**Cubic feet**

The infiltration trenches installed above groundwater by 2 feet minimum will include 1830 LF of trench. The design includes a trench 18 inches deep by 12 inches wide with a 4-inch perforated pipe. This provides 1,886 cubic feet of storage meeting the standard.

Onsite soils were investigated by advancing 12 test excavations. Onsite soils were characterized as fine sandy loam to depths of greater than 10 feet in all tested areas. Groundwater depth varied from 18"-24" below existing grade based upon >5% soil mottling. Soil permeability is 0.6 in/hr. for design purposes. Infiltration BMPs require a minimum of 0.17 in/hr. therefore this criterion is met.

The westerly subarea is subject to jurisdiction under the Wetlands Protection Act. The westerly subarea includes 1.446 acres of impervious area with a total area of 14.4 acres. Approximately 10,000 sf of area in the gravel yard will not be recharged. This amounts to 10,000 SF/(1.45 x 43560) = 15%.
Solution:
Rv = F x Impervious Area therefore RV = (0.25/12)(1.45)(43560)
Rv = 1315 CF
Adjusted Volume is (1/.848) * 1315 cf = 1550.1 cf required.
1586 cf provided. **The design meets the standard.**

Infiltration BMPs must drawdown within 72 hours. The following calculation for drawdown is provided:

Time = Rv
(K) (Bottom Area)

Rv = 1884 cf

K = 0.17 conservatively

Bottom Area = 150*1'x46* 26.5% = 1830 SF

Time = 1884/(0.17/12) x 1830 SF = 72 hours. **This standard is met.**

Standard #4-Water Quality

Stormwater will be treated using best management practices. The project site has been separated into several sub-areas to manage stormwater. Upstream undeveloped forests are by-passed around the development to avoid mixing with developed area stormwater. Clean by-pass water will replenish the downgradient wetlands with hydrology. Further rooftop runoff is also captured, infiltrated, and discharged separately to avoid the treatment train and avoid mingling of "contaminated" and "uncontaminated" runoff. The remaining development area is reduced to 4± acres of impervious area including both the easterly and westerly subareas. The Westerly sub area includes about 2.9 acres of gravel drive and unaccounted for

rooftop that is collected and treated. The treatment train for the westerly greenhouse group #1 and #3 is as follows:

TSS Removal Calculation Worksheet

Location: Abby Road West

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Bioretention Area	0.90	1.00	0.90	0.10
Extended Dry Detention Basin	0.50	0.10	0.05	0.05
	0.00	0.05	0.00	0.05
	0.00	0.05	0.00	0.05
	0.00	0.05	0.00	0.05

Total TSS Removal = 95%

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

Project: SAMA Productions
Prepared By: JMS
Date: 2/15/2021

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

The easterly area includes the metal building and a portion of greenhouse group #2. The treatment train is as follows:

Location: Easterly greenhouses

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Bioretention Area	0.90	1.00	0.90	0.10
Extended Dry Detention Basin	0.50	0.10	0.05	0.05
	0.00	0.05	0.00	0.05
	0.00	0.05	0.00	0.05
	0.00	0.05	0.00	0.05

Total TSS Removal = 95%

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

Location: Parking Area

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Treebox Filter	0.80	1.00	0.80	0.20
Extended Dry Detention Basin	0.50	0.20	0.10	0.10
	0.00	0.10	0.00	0.10
	0.00	0.10	0.00	0.10
	0.00	0.10	0.00	0.10

Total TSS Removal = 90%

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

WESTERLY:

Water quality treatment volume:

V_{WQ} = (D_{WQ}/12 inch/ft) * (Aimp * 43560 Sf/Acre)

V_{WQ} = (1/2-inch/12 in/ft) * (2.9 * 43560 sf/acre)

= 5264 cf

Volume of 5P (forebay) = 13547 CF

5264 < 13547 OK

EASTERLY:

Water quality treatment volume:

V_{WQ} = (1/2-inch/12 in/ft) * (1.0 * 43560 sf/acre)

= 1815 CF < (0.109 AF * 43560) = 4748 OK

The parking area around the building is supplemented with tree box filters thus it has a similar treatment train to the above.

Standard #5-Land Uses with Higher Potential Pollutant Loads (LUPPL)

The proposed project is not considered a LUPPL therefore this does not apply.

Standard #6-Critial Areas

The proposed project is not located in, nor discharge to a Critical Area, therefore this does not apply.

Standard #7-Redevelopment

The proposed project is not considered a redevelopment project therefore this does not apply.

Standard #8-Construction Period Controls

The proposed site disturbance is greater than 1 acre, therefore a National Pollutant Discharge Elimination System (NPDES) Stormwater Pollution Prevention Plan (SWPPP) will be filed. This will be completed prior to land disturbance. In the interim, an Erosion Control plan with details is included herein. Silt fence with straw wattles are located along all downgradient limits of work, sediment traps are proposed in each catch basin and each building will be phased to minimize site disturbance.

Standard #9-Operation and Maintenance

Swales and ponds shall be inspected annually, and sediment should be removed when it has accumulated to 12” in depth.

ILLICIT DISCHARGE COMPLIANCE STATEMENT

SAMA Productions LLC

Abby Road Sandisfield, MA

This statement is provided in accordance with the provisions of the Massachusetts Stormwater Management Standard 10 and of the Massachusetts Stormwater Management Handbook.
Note the following:

All stormwater management systems contain no connection to the site's wastewater sewer system or to any other non-stormwater collection system.

Groundwater collection systems on the site are not connected to the site's wastewater sewer system or to any other non-stormwater collection system.

The facility's Operations & Maintenance Plan is designed to prevent any discharge of non-stormwater to the drainage system.

Any illicit discharges identified during or after construction will be immediately disconnected.

Date: February 2021

Operation and Maintenance Plan

of

The Stormwater System

For

SAMA Productions

Located at
Abby Road
Sandisfield, Massachusetts

February 2021

Background

Once rain reaches the ground, what happens next depends largely on land cover type. Rain falling in a forest is slowed, filtered, and absorbed as it makes its way into the ground or to the nearest stream, river, or reservoir. In contrast, hard, impervious surfaces such as roof tops and roads send stormwater rushing to the nearest ditch, culvert, storm drain, and stream. This stormwater picks up pollutants, such as heavy metals, gas, oil, nutrients, and sediment along the way. Uncontrolled stormwater erodes stream banks, causes flooding, and carries nutrients and sediment downstream. An excess of nutrients contributes to the expansion of oxygen-depleted "dead zones" in local waterways. The solution to improve the quality and reduce the quantity of stormwater runoff before it enters natural waterways are referred to as Best Management Practices, or BMPs. **BMPs** range from structural facilities, such as ponds, bio-retention areas, and underground vaults, to non-structural practices, such as street sweeping and educational efforts.

Routine maintenance will keep a **BMPs** functioning properly and will pay off in the long run by preventing unnecessary repairs. Also, preventing pollutants from reaching the **BMP** will result in lower maintenance costs and cleaner water.

Common Routine Maintenance Needs for Most BMPs

- Regular Inspections
- Vegetation Management
- Mowing
- Pest and Weed control
- Removing Sediment Build-Up
- Stabilize Eroded Areas or Bare Spots
- Unwanted Vegetation
- Embankment and Outlet Stabilization
- Debris and Litter Control
- Mechanical Components Maintenance
- Insect Control
- Access Maintenance
- Overall Pond Maintenance
- Regular Inspections

Each of the above is briefly described below:

Vegetation Management

Most **BMPs** rely on vegetation to filter sediment from stormwater. Vegetation also serves to prevent erosion of the banks and stabilize the bottom of the facility. While turf grass is the most common groundcover, many **BMPs** are designed with woody vegetation and wetland plants to increase pollutant removal.

Mowing.
Most grass is hardiest if it is maintained as an upland meadow. Therefore, grass within BMPs (drainage channels) should not be mowed shorter than six to eight inches. Grass should be cut at least twice during the growing seasons and once during the summer.

Pest and Weed Control
To reduce the amount of pollutants reaching the **BMP**, avoid using any fertilization and/or pesticides.

Removing Sediment Build-Up.
Since the vegetation surrounding the **BMP** is designed to trap sediment, it is likely to become laden with sediment. When this happens, the sediment should be removed prior to it rendering the **BMPs** ineffective.

Stabilize Eroded Areas or Bare Spots.
Bare spots should be vigorously raked, backfilled if needed, covered with top soil, and seeded. This is particularly import during the initial construction period.

Unwanted Vegetation.
Some vegetation is destructive to a **BMP**. Keeping dams and bottom areas free of deep-rooted vegetation is critical as roots may destabilize the structure. Consistent mowing and monitoring will control any unwanted vegetation.

Embankment and Outlet Stabilization
A stable embankment is important to ensure that erosion does not contribute to water quality problems and that embankments are not breached resulting in downstream flooding. Maintaining a healthy vegetative cover and preventing the growth of deep-rooted (woody) vegetation on embankment areas is an important component to stabilization. Animal burrows will also deteriorate the structural integrity of an embankment. Muskrats and groundhogs in particular will burrow tunnels up to six inches in diameter. Efforts should be made to control excessive animal burrowing and existing burrows should be filled as soon as possible. Outlet structures are particularly prone to undercutting and erosion. Unchecked, a small problem can easily result in the need to replace the entire structure. A professional engineer should be consulted if sink holes, cracking, wet areas around the outlet pipe, displacement, or rusting of the pipe is observed.

Debris and Litter Control
Regular removal of debris and litter can be expected to help in the following areas: reduce the chance of clogging outlet structures and trash racks; prevent damage to vegetated structures; reduce mosquito breeding habitats; maintain facility appearance; and, reduce conditions for excessive algae growth. Special attention should be given to the removal of floating debris which can clog inlets, outlets, and low-flow orifices.

Mechanical Components Maintenance
Some **BMPs** have mechanical components that need periodic attention - valves, sluice gates, pumps, **anti-vortex devices**, fence gates, locks, and access hatches should be functional at all times. This type of routine maintenance is best left to a professional.

Insect Control
A healthy ecosystem actually promotes biological controls of mosquitoes. However, mosquito and other insect breeding grounds can be created by standing water. Though perceived as a significant nuisance, mosquitoes are not as big a problem as is often thought, and there are ways to address the issue.

The best technique is to ensure that stagnant pools of water do not develop. For **BMPs** that have a permanent pool of water, this means the prompt removal of floatable debris.

The development of a mosquito problem, particularly in dry ponds, infiltration trenches, and rain gardens, is usually an early indication that there is a maintenance problem, such as clogging. In such cases, the infiltration capacity of the **BMP** needs to be increased or sediment needs to be removed.

Access Maintenance
Most **BMPs** are designed so that heavy equipment can safely and easily reach the facility for non-routine maintenance. Routine maintenance of access areas is particularly important since one never knows when emergency access will be needed. Maintenance includes removal of woody vegetation, upkeep of gravel areas, fences, and locks.

Overall Pond Maintenance
An often overlooked aspect of maintenance, especially for wet ponds, is the need to ensure a healthy aquatic ecosystem. A healthy ecosystem should require little maintenance. An indicator of an unhealthy system is excessive algal growth or the proliferation of a single species of plant in the permanent pool of a wet pond. This may be caused by excess nutrients from fertilization practices (of a landscape company or surrounding neighbors), or by excess sediment. Steps should be taken to reduce excess nutrients at their source and to encourage the growth of native aquatic and semi-aquatic vegetation in and around the permanent pool.

Goals of this document

- **Section 1: Identify Facility Characteristics and Maintenance Needs**
- **Section 2: Outline Routine Inspections**
- **Section 3 Define Maintenance Tasks, for each BMP**
- **Section 4 Establish a Record Keeping Procedure**

SECTION #1

Identify Facility Characteristics and Maintenance Needs

Understand how the facility works and its specific maintenance needs. The system owner and the Best Management Practices (BMPs) included in the system are outlined below:

Stormwater Management System Operator: SAMA Productions LLC

- The owner of the property will be responsible for the operation and maintenance of the system. The maintenance will be performed by a combination of hired staff and an appropriate contractor.

- Future property owners will be made aware of this Operation & Maintenance Plan by means of a condition in the Order of Conditions. The Condition attached to the deed will indicate that there is a long-term plan that must be followed in perpetuity.

- The following documentation describes the maintenance required for each stormwater best management practice (BMP). The BMPS are as follows:

    - Deep Sump Catch Basins
    - Rain Garden
    - Underground Infiltration Bed

- The project plans have been attached, which shows the locations of the BMPs that must be maintained.

Note that all waste should be disposed in accordance with applicable local, state, and federal guidelines and regulations.

SECTION #2

Perform Routine Inspections

The frequency of required inspections is dependant upon the **BMP** and is outlined below. Inspections and maintenance of the stormwater system is the responsibility of the property owner and/or operator. BMPs will be visually inspected in accordance with the following chart

BMPs	Inspection Frequency	What to Look For							
		Erosion	Tree growth	Vegetation	Slope integrity	Trash Debris	Sediment accumulatio	Outlet	Remarks
1. Bio Retention cells	Annually Monthly	✔	✔	✔	✔	✔ ✔	✔	✔	Inspect for debris, mulch annually.
2. Forebay	Quarterly Monthly	✔	✔	✔	✔	✔ ✔	✔	✔	Inspect for debris, and remove sediment as needed
3. Dry Detention Basin	Bi-Annually Every 5 years	✔	✔	✔	✔	✔	✔ ✔	✔	Inspect Inlet Manholes, Remove debris as needed. Use vacuum truck to clean isolator row as needed

SECTION #3

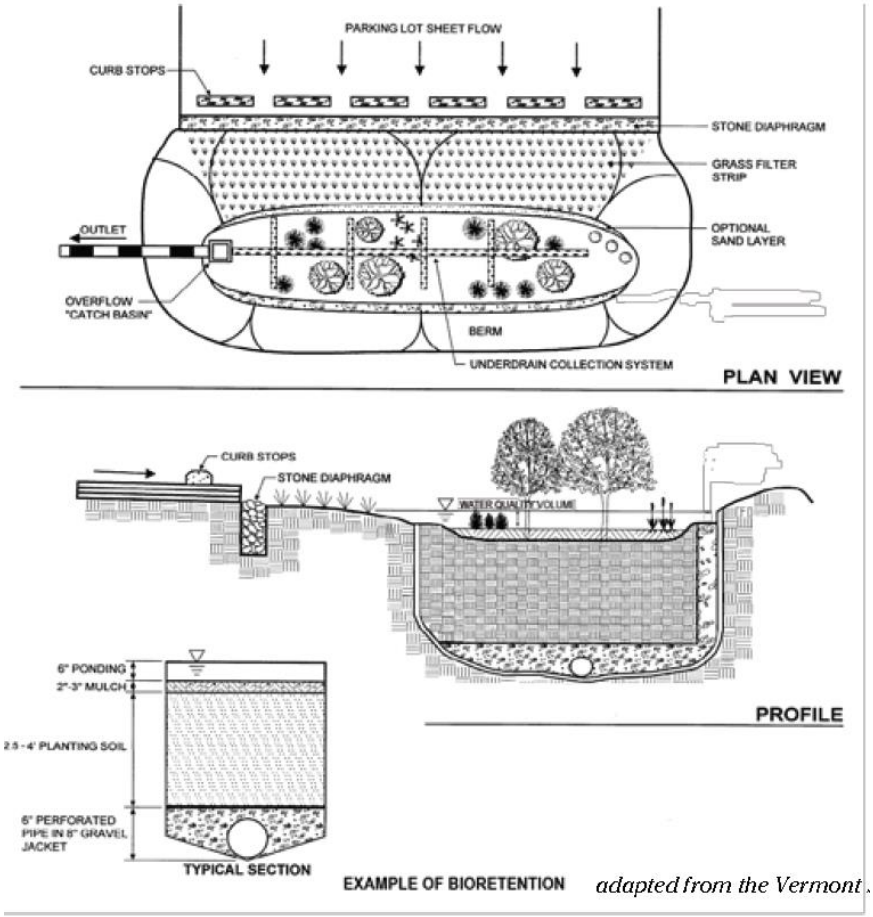
Define Maintenance Tasks, for each BMP

Defining maintenance tasks and who will undertake these tasks – along with establishing a regular inspection program - is the core of a successful stormwater management facility maintenance program. Each BMP is outlined as follows:

- Section 3.1 – Rain Garden
- Section 3.2 – Sediment Forebays
- Section 3.3 – Dry Detention Basin

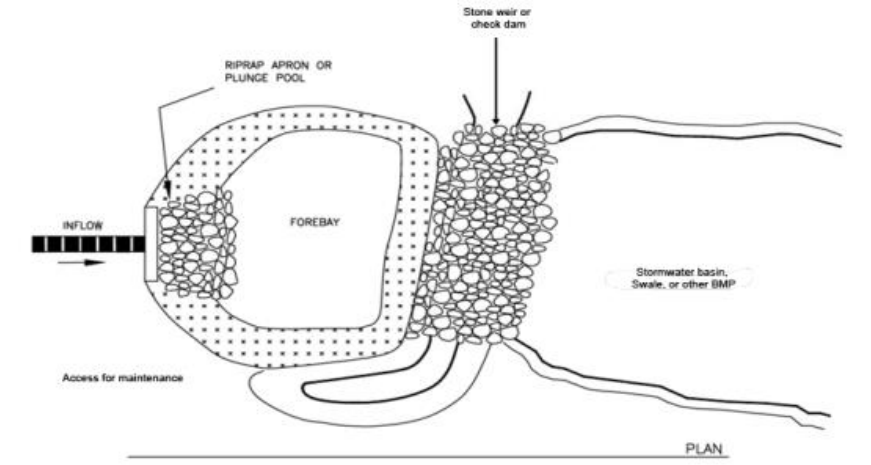
Section 3.1- Rain Garden

Rain gardens remove pollutant through filtration, microbe activity and uptake by pants. Therefore, careful maintenance is required to ensure proper vegetation and soil media.



Bioretention Maintenance Schedule		
Activity	***Time of Year***	***Frequency***
Inspect & remove trash	Year round	Monthly
Mulch	Spring	Annually
Remove dead vegetation	Fall or Spring	Annually
Replace dead vegetation	Spring	Annually
Prune	Spring or Fall	Annually
Replace entire media & all vegetation	Late Spring/early Summer	As needed*

Section 3.2 – Sediment Forebays



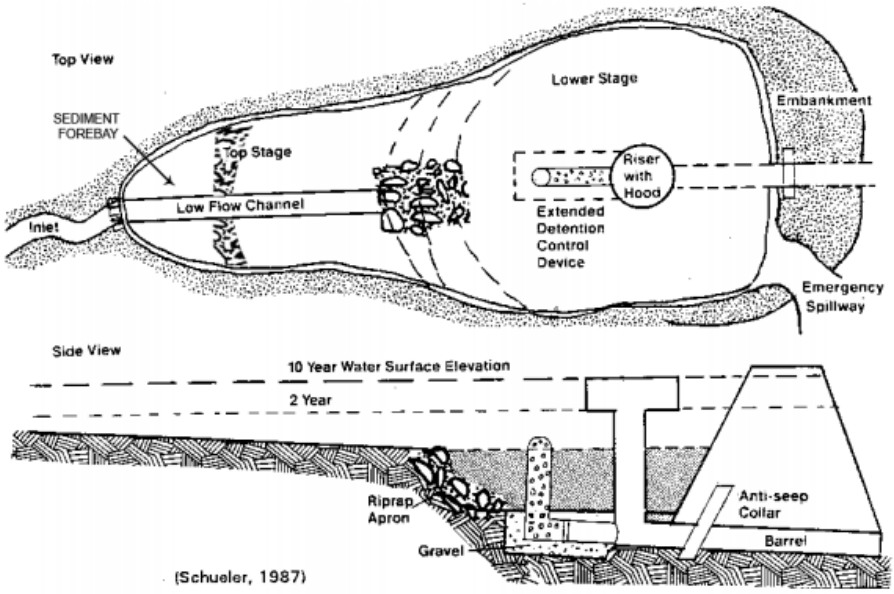
adapted from the Vermont Stormwater Handbook

Maintenance

Activity	Frequency
Inspect sediment forebays	Monthly
Clean sediment forebays	Four times per year and when sediment depth is between 3 to 6 feet.

Sediments and associated pollutants are removed only when sediment forebays are actually cleaned out, so regular maintenance is essential. Frequently removing accumulated sediments will make it less likely that sediments will be resuspended. At a minimum, inspect sediment forebays monthly and clean them out at least four times per year. Stabilize the floor and sidewalls of the sediment forebay before making it operational, otherwise the practice will discharge excess amounts of suspended sediments. When mowing grasses, keep the grass height no greater than 6 inches. Set mower blades no lower than 3 to 4 inches. Check for signs of rilling and gullying and repair as needed. After removing the sediment, replace any vegetation damaged during the clean-out by either reseeding or resodding. When reseeding, incorporate practices such as hydroseeding with a tackifier, blanket, or similar practice to ensure that no scour occurs in the forebay, while the seeds germinate and develop roots.

Section 3.3 – Dry detention basin



Maintenance *adapted from Controlling Urban Runoff, Schueler 1987*

Activity	Frequency
Inspect extended dry detention basins	At least twice a year and during and after major storms.
Examine the outlet structure for evidence of clogging or outflow release velocities that are greater than design flow.	At least twice a year.
Mow the upper-stage, side slopes, embankment, and emergency spillway.	At least twice a year.
Remove trash and debris.	At least twice a year.
Remove sediment from the basin.	At least once every 5 years.

Inspect extended dry detention basins at least once per year to ensure that the basins are operating as intended. Inspect extended dry detention basins during and after major storms to

determine if the basin is meeting the expected detention times. Examine the outlet structure for evidence of clogging or outflow release velocities that are greater than design flow. Potential problems that should be checked include subsidence, erosion, cracking or tree growth on the embankment; damage to the emergency spillway; sediment accumulation around the outlet; inadequacy of the inlet/outlet channel erosion control measures; changes in the condition of the pilot channel; and erosion within the basin and banks. Make any necessary repairs immediately. During inspections, note any changes to the extended dry detention basin or the contributing watershed, because these could affect basin performance. Mow the upper-stage, side slopes, embankment, and emergency spillway at least twice per year. Also remove trash and debris at least twice per year. Remove sediment from the extended dry detention basin as necessary, but at least once every 5 years. Providing an on-site sediment disposal area will reduce the overall sediment removal costs.

SECTION #4

Establish a Record Keeping Procedure

Establishing a record keeping procedure will help to define chronic maintenance problems and aid in future budget preparation. A periodic examination of maintenance practices will assist in identifying persistent problems early.

Attached is a sample Stormwater Inspection Form.

Budget for Maintenance:

BMP STRUCTURE	EST. AVG. ANNUAL MAINTENANCE COST
Inspection Services	$ 1500.00
Plowing Services	$ 400.00
Pavement Sweeping	$ 350.00
Infiltration Trenches	$ 600.00
Roof Gutters	$ 100.00
Catchbasins	$ 300.00
Bio-Retention System	$ 600.00
TOTAL	$ 3850.00

Stormwater Inspection Form

Project:_____

Inspector Name:_____ Weather:_____

Date: _____ Time: _____

1. Rain Garden:

Depth of sediment Yes No Depth:_____

Conditions of Mulch: Good Poor

Conditions of Vegetation: Good Poor

Action Required: _____

_____

*Attach additional pages as necessary.

2. Forebay:

Inspect Inlet and outlets

Depth of sediment: _____ inches

Structural Integrity: Good Poor

Inspect Outlet

Depth of sediment: _____ inches

Structural Integrity: Good Poor

Action Required:_____

_____

_____

*Attach additional pages as necessary.

3. Dry detention Basin

Inspect Inlet and outlets

Depth of sediment: _____ inches

Structural Integrity: Good Poor

Inspect Outlet

Depth of sediment: _____ inches

Structural Integrity: Good Poor

Action Required:_____

_____

_____

*Attach additional pages as necessary.

Statement of Compliance

Based on the above observations, this report can serve as confirmation that the stormwater system **is** being maintained and operated in general conformance with the approved plans and the discharge permit referenced above, and that the stormwater system is in good operating condition.

_____ _____

Signature Date

_____

Print or Type Name

Record Keeping:

A copy of this Inspection Form and any supporting documents, including but not limited to, photographs, vendor receipts, notes or other records, must be kept on file at the premises for a minimum of three (3) years.

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	Massachusetts
Location	
Longitude	73.137 degrees West
Latitude	42.145 degrees North
Elevation	0 feet
Date/Time	Fri, 29 Jan 2021 11:18:19 -0500

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.31	0.47	0.59	0.77	0.96	1.20	**1yr**	0.83	1.10	1.37	1.70	2.09	2.58	2.85	**1yr**	2.28	2.74	3.25	3.89	4.45	**1yr**
2yr	0.36	0.56	0.69	0.91	1.15	1.44	**2yr**	0.99	1.31	1.65	2.04	2.50	3.07	3.47	**2yr**	2.72	3.34	3.85	4.57	5.24	**2yr**
5yr	0.43	0.67	0.84	1.13	1.45	1.82	**5yr**	1.25	1.63	2.10	2.59	3.17	3.86	4.39	**5yr**	3.41	4.22	4.90	5.70	6.54	**5yr**
10yr	0.49	0.77	0.98	1.33	1.72	2.19	**10yr**	1.49	1.93	2.52	3.11	3.79	4.59	5.26	**10yr**	4.06	5.05	5.87	6.74	7.74	**10yr**
25yr	0.58	0.92	1.18	1.63	2.17	2.78	**25yr**	1.87	2.40	3.22	3.97	4.82	5.78	6.67	**25yr**	5.11	6.41	7.47	8.42	9.68	**25yr**
50yr	0.67	1.07	1.38	1.93	2.59	3.34	**50yr**	2.24	2.83	3.87	4.76	5.76	6.88	7.99	**50yr**	6.09	7.68	8.97	9.97	11.47	**50yr**
100yr	0.77	1.24	1.60	2.27	3.10	4.02	**100yr**	2.68	3.35	4.66	5.72	6.89	8.19	9.57	**100yr**	7.25	9.20	10.77	11.81	13.59	**100yr**
200yr	0.88	1.44	1.87	2.69	3.71	4.83	**200yr**	3.20	3.96	5.61	6.88	8.26	9.77	11.47	**200yr**	8.64	11.03	12.95	13.99	16.13	**200yr**
500yr	1.08	1.78	2.32	3.37	4.71	6.16	**500yr**	4.07	4.95	7.16	8.76	10.48	12.32	14.60	**500yr**	10.91	14.04	16.52	17.53	20.23	**500yr**

Lower Confidence Limits

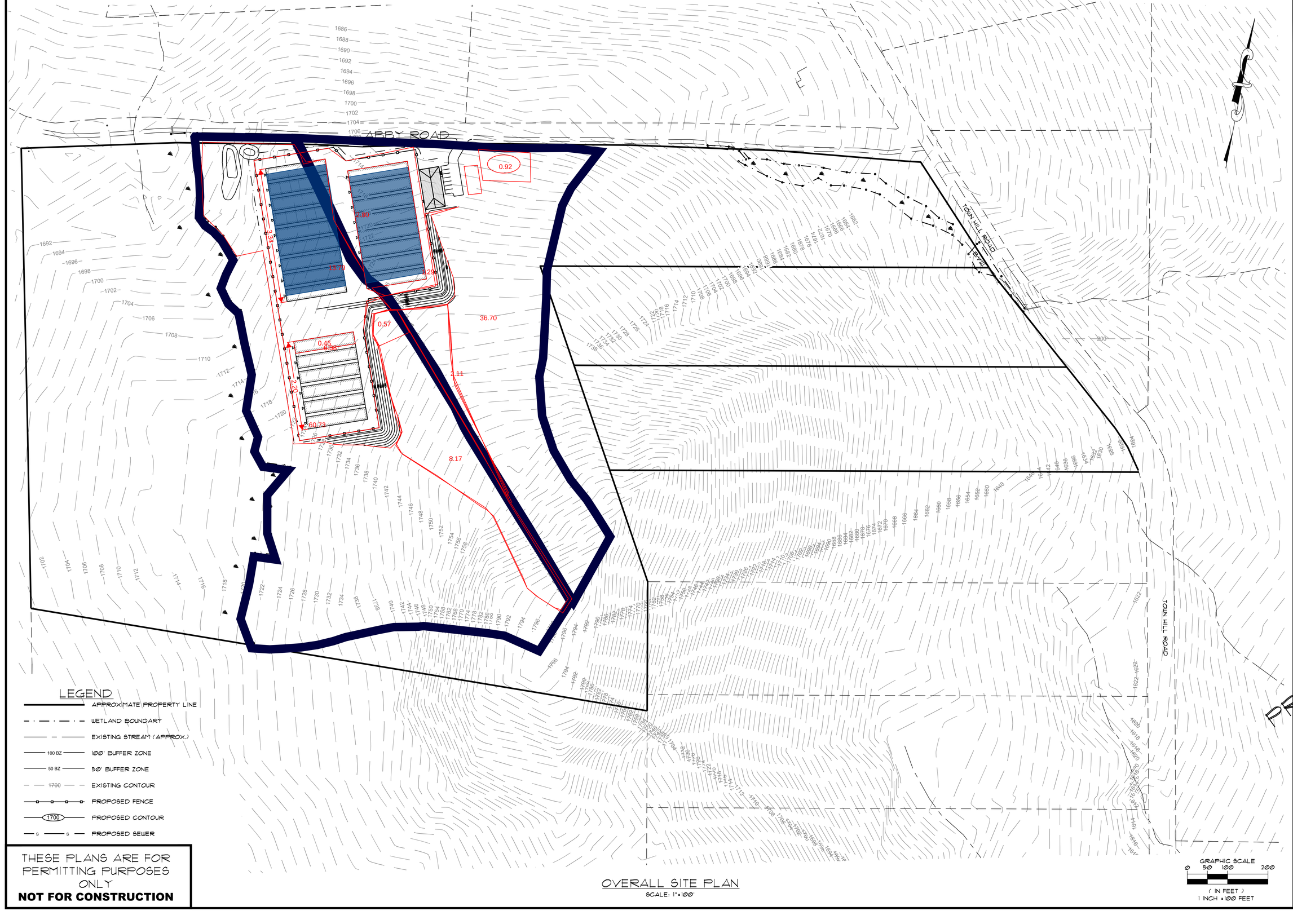
	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.37	0.45	0.61	0.74	0.97	**1yr**	0.64	0.95	1.06	1.40	1.71	2.25	2.41	**1yr**	1.99	2.31	2.67	3.38	3.74	**1yr**
2yr	0.35	0.54	0.66	0.90	1.10	1.31	**2yr**	0.95	1.28	1.48	1.90	2.44	2.98	3.35	**2yr**	2.64	3.23	3.71	4.42	5.08	**2yr**
5yr	0.40	0.62	0.76	1.05	1.33	1.53	**5yr**	1.15	1.50	1.74	2.24	2.83	3.54	4.01	**5yr**	3.13	3.86	4.45	5.21	5.95	**5yr**
10yr	0.44	0.68	0.84	1.18	1.52	1.73	**10yr**	1.31	1.69	1.98	2.52	3.15	4.02	4.56	**10yr**	3.56	4.38	5.10	5.82	6.55	**10yr**
25yr	0.51	0.78	0.97	1.39	1.83	2.05	**25yr**	1.58	2.00	2.32	2.92	3.62	4.76	5.41	**25yr**	4.21	5.20	6.09	6.77	7.96	**25yr**
50yr	0.57	0.87	1.08	1.56	2.10	2.31	**50yr**	1.81	2.26	2.64	3.25	4.02	5.39	6.17	**50yr**	4.77	5.93	6.97	7.56	9.06	**50yr**
100yr	0.64	0.97	1.21	1.75	2.40	2.61	**100yr**	2.08	2.55	3.00	3.62	4.47	6.10	7.02	**100yr**	5.40	6.75	7.97	8.40	8.73	**100yr**
200yr	0.72	1.08	1.37	1.99	2.77	2.95	**200yr**	2.39	2.88	3.41	4.06	4.98	6.88	8.01	**200yr**	6.09	7.70	9.12	9.33	9.42	**200yr**
500yr	0.85	1.26	1.62	2.36	3.36	3.47	**500yr**	2.90	3.40	4.06	4.73	5.72	8.05	9.54	**500yr**	7.13	9.18	10.88	10.66	10.31	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.35	0.53	0.65	0.88	1.08	1.27	**1yr**	0.93	1.24	1.44	1.79	2.34	2.80	3.10	**1yr**	2.47	2.98	3.49	4.17	4.83	**1yr**
2yr	0.38	0.59	0.72	0.98	1.21	1.40	**2yr**	1.04	1.37	1.59	2.08	2.62	3.19	3.63	**2yr**	2.82	3.49	4.02	4.77	5.54	**2yr**
5yr	0.47	0.72	0.90	1.23	1.57	1.82	**5yr**	1.36	1.78	2.04	2.65	3.35	4.20	4.78	**5yr**	3.72	4.60	5.39	6.24	7.09	**5yr**
10yr	0.56	0.86	1.07	1.50	1.93	2.21	**10yr**	1.67	2.16	2.49	3.22	4.04	5.20	5.91	**10yr**	4.60	5.68	6.75	7.69	8.67	**10yr**
25yr	0.72	1.09	1.36	1.94	2.55	2.89	**25yr**	2.20	2.82	3.22	4.19	5.21	6.90	7.84	**25yr**	6.11	7.54	9.10	10.17	11.47	**25yr**
50yr	0.86	1.31	1.63	2.34	3.15	3.53	**50yr**	2.72	3.45	3.93	5.10	6.31	8.55	9.72	**50yr**	7.57	9.35	11.40	12.56	14.03	**50yr**
100yr	1.04	1.57	1.97	2.84	3.89	4.32	**100yr**	3.36	4.22	4.79	6.23	7.64	10.61	12.05	**100yr**	9.39	11.58	14.30	15.57	17.02	**100yr**
200yr	1.25	1.88	2.38	3.45	4.81	5.30	**200yr**	4.15	5.18	5.83	7.60	9.26	13.17	14.94	**200yr**	11.66	14.36	17.96	19.31	20.93	**200yr**
500yr	1.61	2.40	3.08	4.48	6.37	6.94	**500yr**	5.50	6.78	7.59	9.89	12.01	17.59	19.87	**500yr**	15.56	19.11	24.32	25.69	27.63	**500yr**

Powered by ACIS Northeast Regional Climate Center

E Hubbard Rd
C/D
366,939 sf
607,173 sf
C/D
D
C
LOT #8
LOT #7
LOT #6
LOT #5
LOT #4
LOT #3
LOT #2
LOT #1
APPROX. PROPERTY LINE
905C
75B
904E
909C
TOWN HILL ROAD
LEGEND
APPROXIMATE PROPERTY LINE
WETLAND BOUNDARY
EXISTING STREAM (APPROX)
100' BUFFER ZONE
50' BUFFER ZONE
EXISTING CONTOUR
THESE PLANS ARE FOR PERMITTING PURPOSES ONLY
NOT FOR CONSTRUCTION
OVERALL SITE PLAN
SCALE: 1"=100'
GRAPHIC SCALE
(IN FEET)
1 INCH = 100 FEET
PLANS TO ACCOMPANY PERMIT APPLICATIONS
PREPARED FOR:
ABBY ROAD LAND LLC.
LOCATED AT:
TOWN HILL ROAD
SANDISFIELD MA
SK Design Group, Inc.
Civil Engineers * Surveyors * Consultants
2 FEDERICO DRIVE * PITTSFIELD, MASSACHUSETTS 01201 * (413) 443-3537
PLAN DESCRIPTION:
EXISTING CONDITIONS PLAN
SK DESIGN GROUP PROJECT #:
200181
PRELIMINARY
JAMES M. SCALISE II
SK DESIGN GROUP PRESIDENT
LICENSE #39863
PROFESSIONAL OF RECORD
PHONE: 413-443-3537
REVISION:
DRAWN BY: AMS
CHECKED BY: JMS II
ORIG. DATE: NOVEMBER 6, 2020
SHEET NO. 2 OF XX
ISSUED FOR: Permit
SCALE: As Noted



THESE PLANS ARE FOR PERMITTING PURPOSES ONLY

NOT FOR CONSTRUCTION

OVERALL SITE PLAN

SCALE: 1"=100'

PLANS TO ACCOMPANY PERMIT APPLICATIONS

PREPARED FOR:

ABBY ROAD LAND LLC.

LOCATED AT:

TOWN HILL ROAD

SANDISFIELD MA

Design Group, Inc.

Civil Engineers ' Surveyors ' Consultants

2 FEDERICO DRIVE ' PITTSFIELD, MASSACHUSETTS 01201 ' (413) 443-3537

PLAN DESCRIPTION:

OVERALL SITE PLAN

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200181

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DRAWN BY:	CHECKED BY:
AMS	JMS II
ORIG. DATE: NOVEMBER 6, 2020	SHEET NO. 3 OF XX
ISSUED FOR: Permit	
SCALE: As Noted	

G:\SK DESIGN GROUP\2020\200181 Fulcrum-Town Hill Rd, Sandisfield-MJ Greenhouses\Drawings\Permit Plans\200181 PERMIT.dwg
Plotted On: Friday, January 29, 2021 - 2:34pm
User Name: asaufley

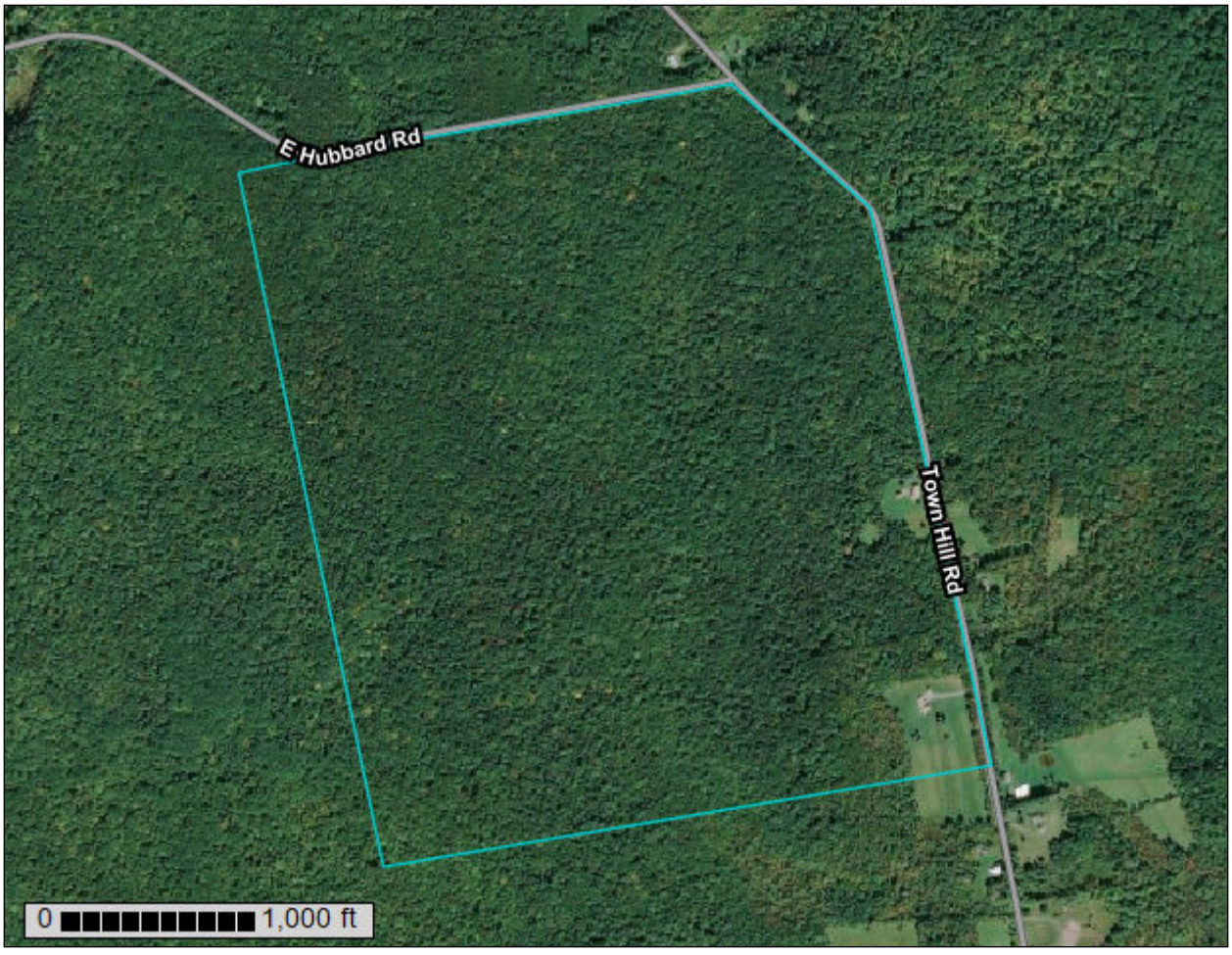
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Berkshire County, Massachusetts



January 29, 2021

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

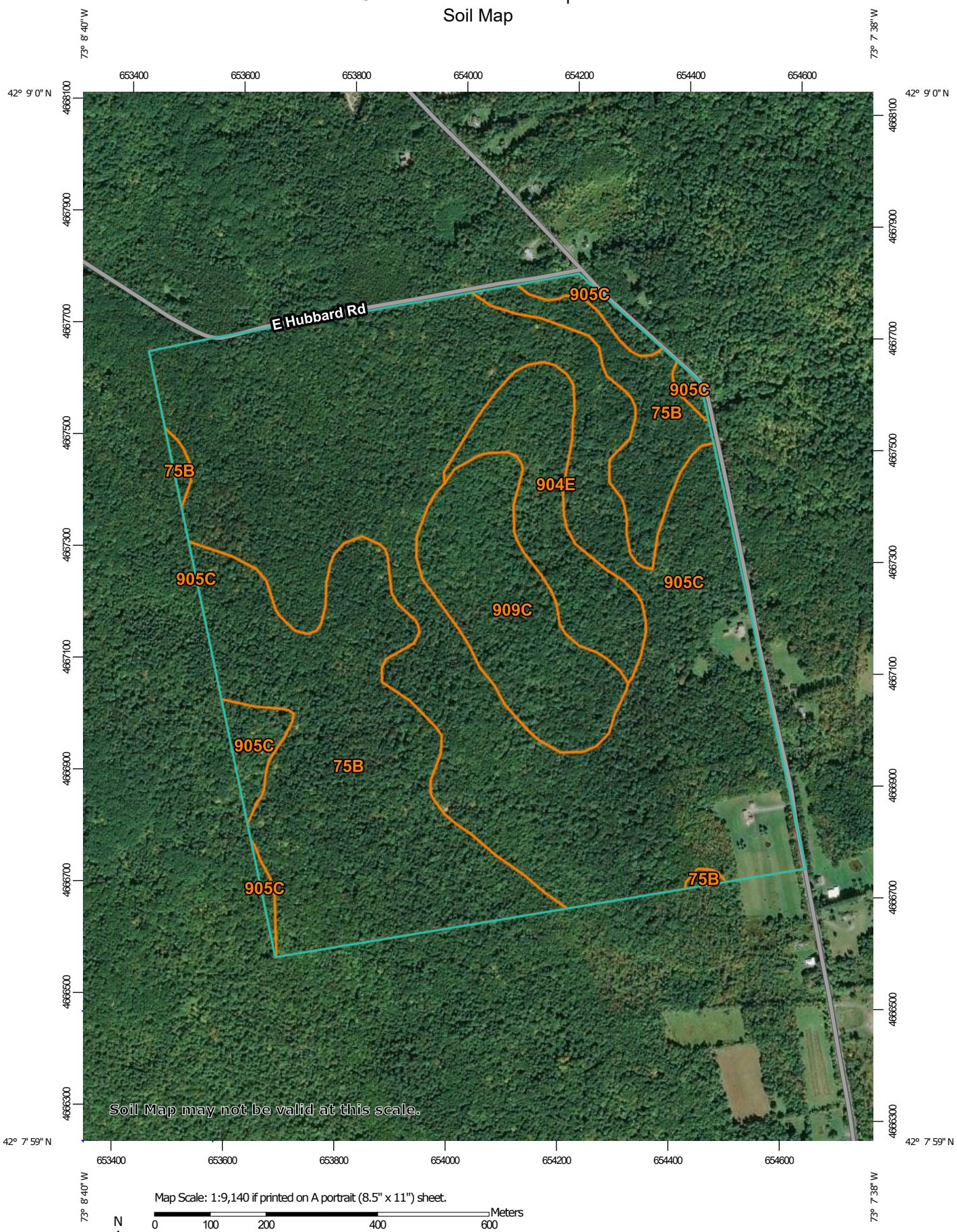
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:9,140 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 100 200 400 600

Feet
0 400 800 1600 2400

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil 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
- 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

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Berkshire County, Massachusetts
Survey Area Data: Version 15, 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: Jul 8, 2019—Sep 17, 2019

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
75B	Pillsbury fine sandy loam, 0 to 8 percent slopes, very stony	71.6	27.4%
904E	Lyman-Tunbridge association, 15 to 60 percent slopes, extremely stony	16.9	6.5%
905C	Peru-Marlow association, 3 to 15 percent slopes, extremely stony	148.4	56.9%
909C	Tunbridge-Lyman association, 3 to 15 percent slopes, extremely stony	23.9	9.2%
Totals for Area of Interest		**260.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it

was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Berkshire County, Massachusetts

75B—Pillsbury fine sandy loam, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2ty6x
Elevation: 360 to 2,070 feet
Mean annual precipitation: 31 to 95 inches
Mean annual air temperature: 27 to 52 degrees F
Frost-free period: 90 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition

Pillsbury, very stony, and similar soils: 79 percent
Minor components: 21 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pillsbury, Very Stony

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Mountainbase, interfluve, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loamy lodgment till derived from gneiss and/or loamy lodgment till derived from mica schist and/or loamy lodgment till derived from granite

Typical profile

Oe - 0 to 1 inches: mucky peat
A - 1 to 6 inches: fine sandy loam
Bg1 - 6 to 13 inches: cobbly fine sandy loam
Bg2 - 13 to 23 inches: cobbly fine sandy loam
Cd - 23 to 65 inches: cobbly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.1 percent
Depth to restrictive feature: 21 to 43 inches to densic material
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Hydric soil rating: Yes

Minor Components

Peru, very stony

Percent of map unit: 9 percent
Landform: Mountains, hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Mountainbase, base slope, interfluve
Microfeatures of landform position: Rises, rises
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Peacham, very stony

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Mountainbase, interfluve, base slope
Microfeatures of landform position: Closed depressions, closed depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Wonsqueak

Percent of map unit: 4 percent
Landform: Mountains, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Mountainbase, interfluve, base slope
Microfeatures of landform position: Closed depressions, closed depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Lyman, very stony

Percent of map unit: 3 percent
Landform: Mountains, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Mountainbase, interfluve, base slope
Microfeatures of landform position: Rises, rises
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

904E—Lyman-Tunbridge association, 15 to 60 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2ty75
Elevation: 850 to 2,360 feet
Mean annual precipitation: 31 to 95 inches
Mean annual air temperature: 27 to 52 degrees F

Frost-free period: 60 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Lyman, extremely stony, and similar soils: 45 percent
Tunbridge, extremely stony, and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lyman, Extremely Stony

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Mountaintop, mountainflank, crest, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy supraglacial till derived from granite and gneiss and/or loamy supraglacial till derived from phyllite and/or loamy supraglacial till derived from mica schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loam
E - 3 to 5 inches: fine sandy loam
Bhs - 5 to 7 inches: loam
Bs1 - 7 to 11 inches: loam
Bs2 - 11 to 18 inches: channery loam
R - 18 to 28 inches: bedrock

Properties and qualities

Slope: 15 to 60 percent
Surface area covered with cobbles, stones or boulders: 6.0 percent
Depth to restrictive feature: 11 to 24 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 14.03 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Tunbridge, Extremely Stony

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Mountaintop, mountainflank, crest, side slope
Down-slope shape: Convex

Across-slope shape: Convex
Parent material: Loamy supraglacial till derived from granite and gneiss and/or loamy supraglacial till derived from phyllite and/or loamy supraglacial till derived from mica schist

Typical profile

Oe - 0 to 3 inches: moderately decomposed plant material
Oa - 3 to 5 inches: highly decomposed plant material
E - 5 to 8 inches: fine sandy loam
Bhs - 8 to 11 inches: fine sandy loam
Bs - 11 to 26 inches: fine sandy loam
BC - 26 to 28 inches: fine sandy loam
R - 28 to 38 inches: bedrock

Properties and qualities

Slope: 15 to 60 percent
Surface area covered with cobbles, stones or boulders: 6.0 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 14.03 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Berkshire, extremely stony

Percent of map unit: 9 percent
Landform: Mountains, hills
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Mountaintop, mountainflank, crest, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Wonsqueak

Percent of map unit: 2 percent
Landform: Mountains, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Mountainbase, mountaintop, crest, side slope
Microfeatures of landform position: Open depressions, open depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Peacham, extremely stony

Percent of map unit: 2 percent

Landform: Mountains, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Mountaintop, mountainflank, crest, side slope
Microfeatures of landform position: Open depressions, open depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Pillsbury, extremely stony

Percent of map unit: 2 percent
Landform: Mountains, hills
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Mountaintop, mountainflank, crest, side slope
Microfeatures of landform position: Open depressions, open depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

905C—Peru-Marlow association, 3 to 15 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2ty7p
Elevation: 790 to 2,100 feet
Mean annual precipitation: 31 to 95 inches
Mean annual air temperature: 27 to 52 degrees F
Frost-free period: 90 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Peru, extremely stony, and similar soils: 61 percent
Marlow, extremely stony, and similar soils: 20 percent
Minor components: 19 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Peru, Extremely Stony

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Mountainflank, mountainbase, interfluve, nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy lodgment till derived from granite and/or loamy lodgment till derived from mica schist and/or loamy lodgment till derived from phyllite

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 5 inches: fine sandy loam
E - 5 to 6 inches: fine sandy loam
Bs1 - 6 to 7 inches: fine sandy loam
Bs2 - 7 to 13 inches: fine sandy loam
Bs3 - 13 to 18 inches: fine sandy loam
BC - 18 to 21 inches: fine sandy loam
Cd1 - 21 to 37 inches: fine sandy loam
Cd2 - 37 to 65 inches: fine sandy loam

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 6.0 percent
Depth to restrictive feature: 21 to 43 inches to densic material
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: About 17 to 34 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C/D
Hydric soil rating: No

Description of Marlow, Extremely Stony

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainbase, mountainflank, interfluve, nose slope, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy lodgment till derived from granite and/or loamy lodgment till derived from mica schist and/or loamy lodgment till derived from phyllite

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: fine sandy loam
E - 5 to 8 inches: fine sandy loam
Bs1 - 8 to 15 inches: fine sandy loam
Bs2 - 15 to 19 inches: fine sandy loam
BC - 19 to 33 inches: gravelly fine sandy loam
Cd - 33 to 65 inches: fine sandy loam

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 6.0 percent
Depth to restrictive feature: 20 to 41 inches to densic material
Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 1.42 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Lyman, extremely stony

Percent of map unit: 6 percent
Landform: Mountains, hills
Landform position (two-dimensional): Shoulder, summit, backslope
Landform position (three-dimensional): Mountainflank, mountainbase, side slope, interfluve, nose slope
Microfeatures of landform position: Rises, rises
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Pillsbury, extremely stony

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Mountainflank, mountainbase, nose slope, side slope, interfluve
Microfeatures of landform position: Closed depressions, closed depressions, open depressions, open depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Berkshire, extremely stony

Percent of map unit: 5 percent
Landform: Mountains, hills
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Mountainflank, mountainbase, nose slope, side slope, interfluve
Microfeatures of landform position: Rises, rises
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Monadnock, extremely stony

Percent of map unit: 3 percent
Landform: Mountains, hills
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Mountainbase, mountainflank, interfluve, nose slope, side slope
Microfeatures of landform position: Rises, rises

Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

909C—Tunbridge-Lyman association, 3 to 15 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2trrm
Elevation: 1,080 to 2,390 feet
Mean annual precipitation: 31 to 95 inches
Mean annual air temperature: 27 to 52 degrees F
Frost-free period: 60 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Tunbridge, extremely stony, and similar soils: 50 percent
Lyman, extremely stony, and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tunbridge, Extremely Stony

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainbase, mountainflank, mountaintop, side slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy supraglacial till derived from granite and gneiss and/or loamy supraglacial till derived from phyllite and/or loamy supraglacial till derived from mica schist

Typical profile

Oe - 0 to 3 inches: moderately decomposed plant material
Oa - 3 to 5 inches: highly decomposed plant material
E - 5 to 8 inches: fine sandy loam
Bhs - 8 to 11 inches: fine sandy loam
Bs - 11 to 26 inches: fine sandy loam
BC - 26 to 28 inches: fine sandy loam
R - 28 to 38 inches: bedrock

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 7.1 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 14.03 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Lyman, Extremely Stony

Setting

Landform: Mountains, hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Mountainbase, mountainflank, mountaintop, side slope, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy supraglacial till derived from granite and gneiss and/or loamy supraglacial till derived from phyllite and/or loamy supraglacial till derived from mica schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loam
E - 3 to 5 inches: fine sandy loam
Bhs - 5 to 7 inches: loam
Bs1 - 7 to 11 inches: loam
Bs2 - 11 to 18 inches: channery loam
R - 18 to 28 inches: bedrock

Properties and qualities

Slope: 3 to 15 percent
Surface area covered with cobbles, stones or boulders: 6.0 percent
Depth to restrictive feature: 11 to 24 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 14.03 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Berkshire, extremely stony

Percent of map unit: 8 percent

Landform: Mountains, hills
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Mountainflank, mountainbase, side slope, interfluve, nose slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Peacham, extremely stony

Percent of map unit: 4 percent
Landform: Mountains, hills
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Mountainbase, base slope, interfluve
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Pillsbury, extremely stony

Percent of map unit: 3 percent
Landform: Mountains, hills
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Mountainbase, mountainflank, side slope, nose slope, interfluve
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

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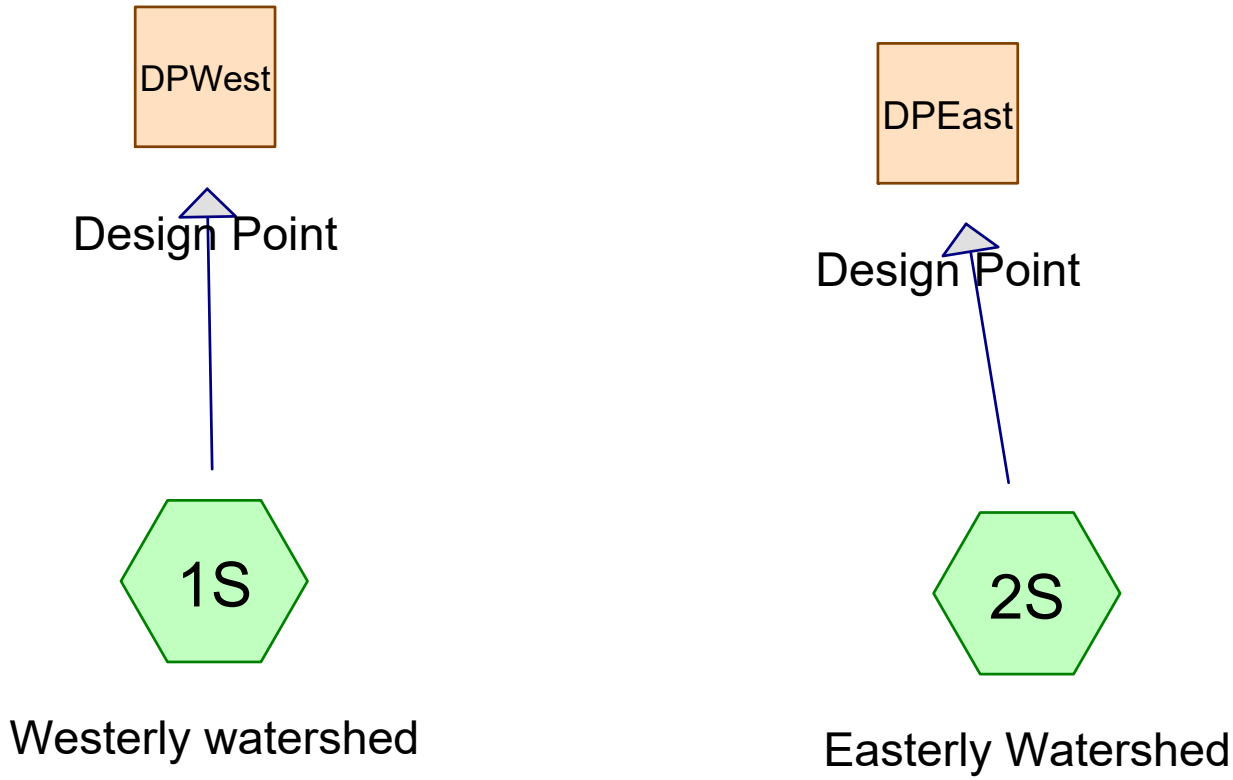


Subcat Reach Pond Link

Routing Diagram for Existing conditions
Prepared by {enter your company name here}, Printed 2/24/2021

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
8.424	73	Woods, Fair, HSG C (2S)
13.939	73	Woods, Fair, HSG C (fair condition C/D soil) (1S)
22.363	**73**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
22.363	HSG C	1S, 2S
0.000	HSG D	
0.000	Other	
22.363		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	22.363	0.000	0.000	22.363	Woods, Fair	1S, 2S
0.000	**0.000**	**22.363**	**0.000**	**0.000**	**22.363**	**TOTAL AREA**	

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

Subcatchment 1S: Westerly watershed Runoff Area=607,173 sf 0.00% Impervious Runoff Depth>0.80"
Flow Length=1,729' Tc=54.5 min CN=73 Runoff=5.64 cfs 0.928 af

Subcatchment 2S: Easterly Watershed Runoff Area=366,938 sf 0.00% Impervious Runoff Depth>0.81"
Flow Length=1,160' Tc=26.0 min CN=73 Runoff=4.94 cfs 0.569 af

Reach DPEast: Design Point Inflow=4.94 cfs 0.569 af
Outflow=4.94 cfs 0.569 af

Reach DPWest: Design Point Inflow=5.64 cfs 0.928 af
Outflow=5.64 cfs 0.928 af

Total Runoff Area = 22.363 ac Runoff Volume = 1.496 af Average Runoff Depth = 0.80"
100.00% Pervious = 22.363 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Westerly watershed

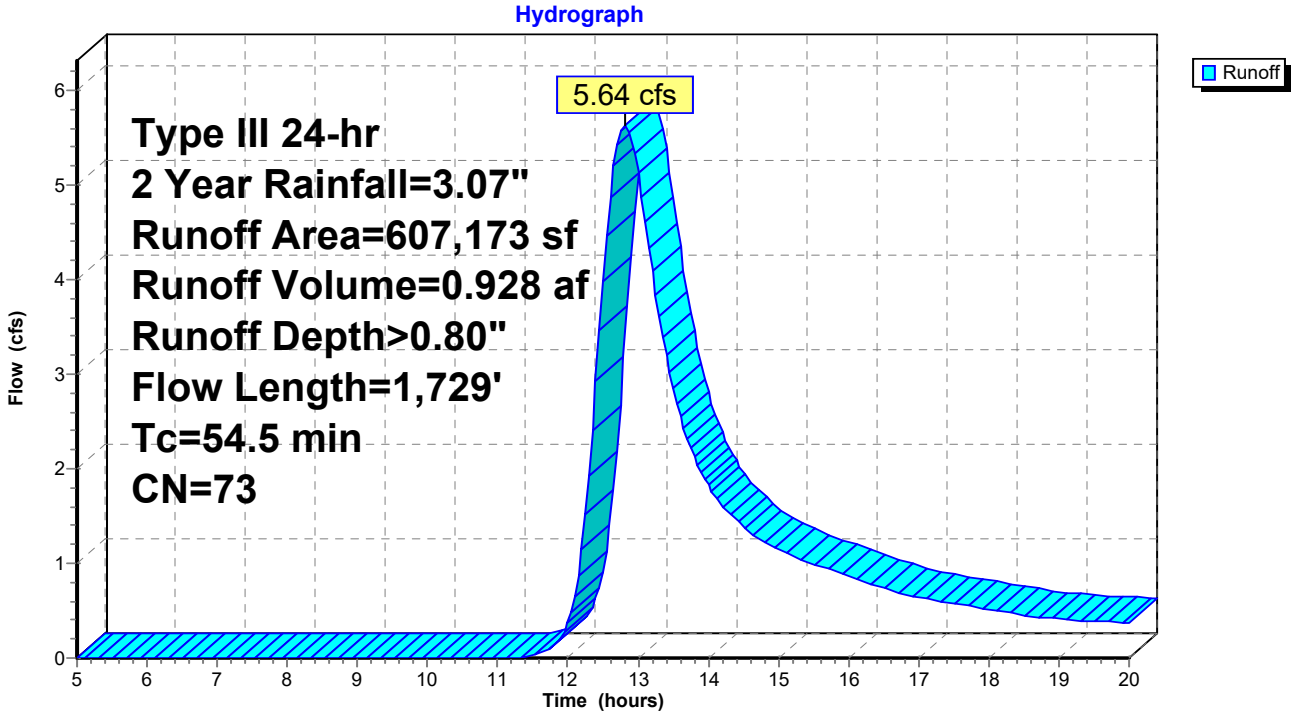
Runoff = 5.64 cfs @ 12.81 hrs, Volume= 0.928 af, Depth> 0.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.07"

	Area (sf)	CN	Description
*	607,173	73	Woods, Fair, HSG C (fair condition C/D soil)
	607,173		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.8	50	0.0100	0.03		**Sheet Flow, Sheet Flow** Woods: Dense underbrush n= 0.800 P2= 2.90"
1.9	138	0.0580	1.20		**Shallow Concentrated Flow, hillside segment 1** Woodland Kv= 5.0 fps
0.8	127	0.2519	2.51		**Shallow Concentrated Flow, Hillside segement 2** Woodland Kv= 5.0 fps
5.8	461	0.0694	1.32		**Shallow Concentrated Flow, Hillside Segment 3** Woodland Kv= 5.0 fps
4.9	258	0.0310	0.88		**Shallow Concentrated Flow, Hillside Segment 4** Woodland Kv= 5.0 fps
11.3	695	0.0417	1.02		**Shallow Concentrated Flow, Hillsdie Segment 5** Woodland Kv= 5.0 fps
54.5	1,729	Total			

Subcatchment 1S: Westerly watershed



Summary for Subcatchment 2S: Easterly Watershed

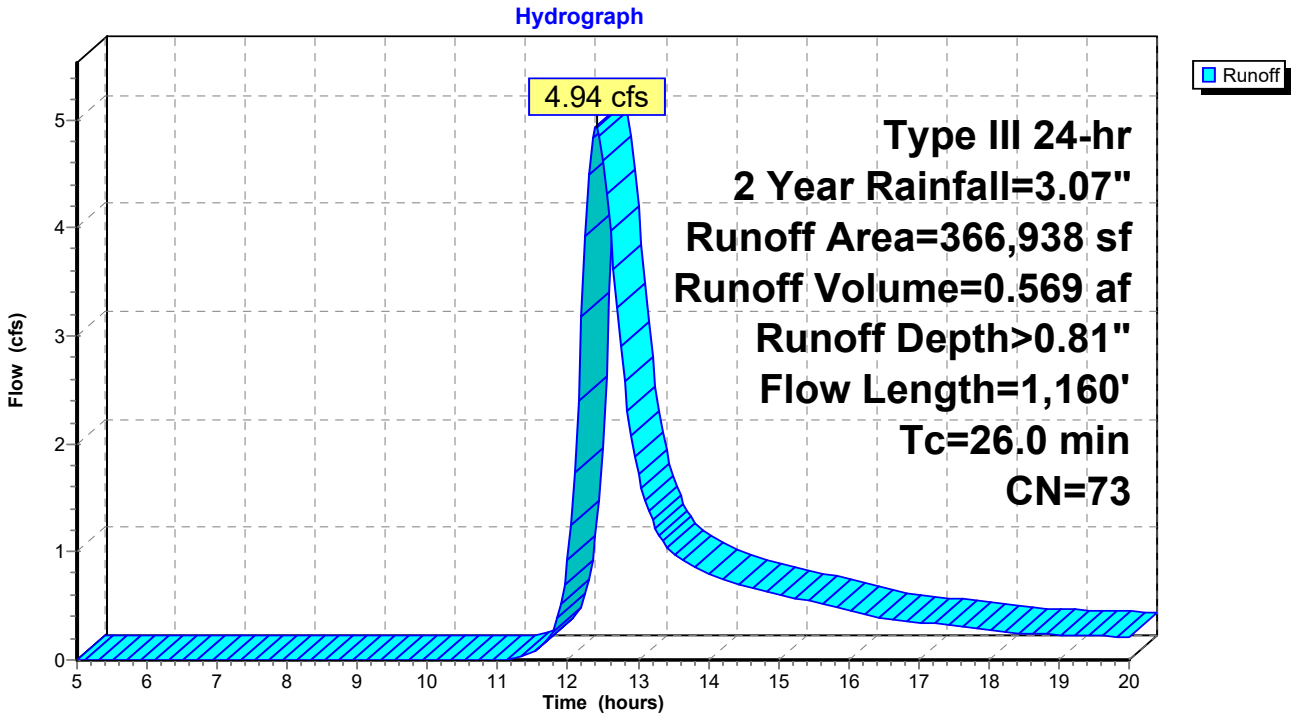
Runoff = 4.94 cfs @ 12.40 hrs, Volume= 0.569 af, Depth> 0.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 Year Rainfall=3.07"

Area (sf)	CN	Description
366,938	73	Woods, Fair, HSG C
366,938		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	50	0.0200	0.06		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.90"
2.7	277	0.1155	1.70		**Shallow Concentrated Flow, Hillside Segment 1** Woodland Kv= 5.0 fps
6.9	524	0.0648	1.27		**Shallow Concentrated Flow, Hillside Segemnt #2** Woodland Kv= 5.0 fps
3.4	309	0.0906	1.50		**Shallow Concentrated Flow, Hillside segment #3** Woodland Kv= 5.0 fps
26.0	1,160	Total			

Subcatchment 2S: Easterly Watershed



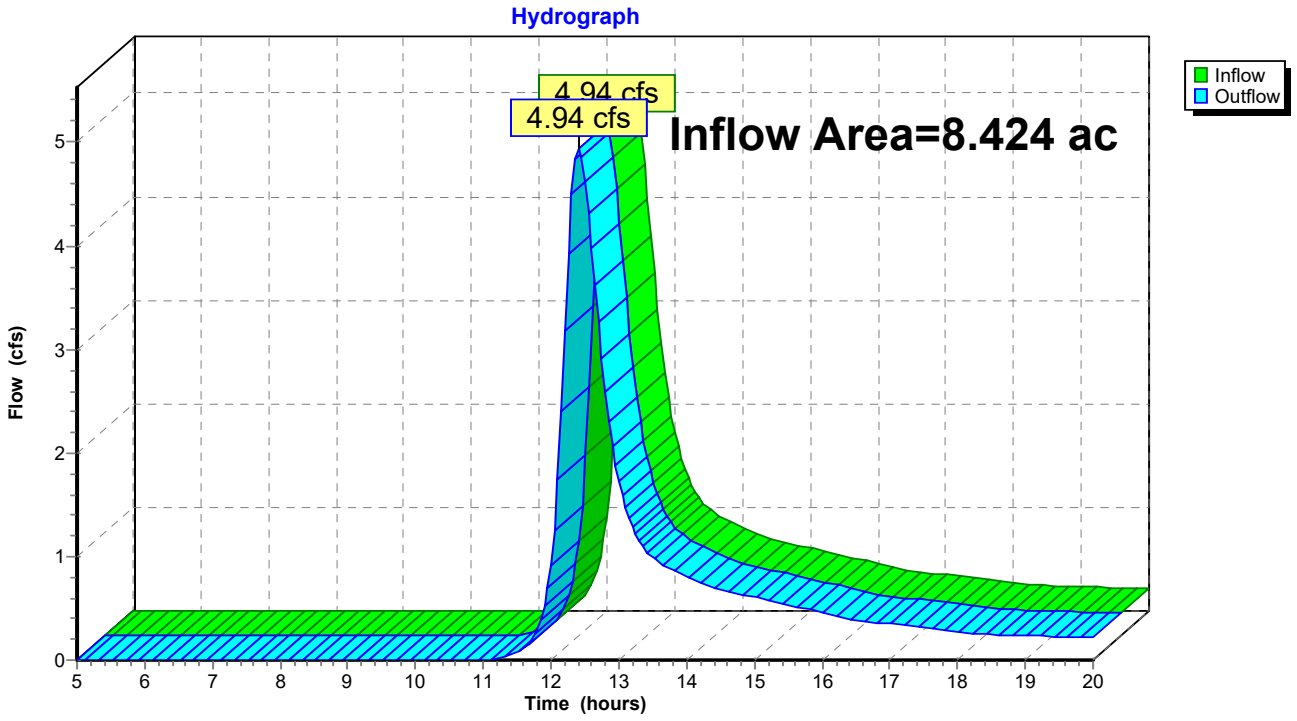
Summary for Reach DPEast: Design Point

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

Inflow Area = 8.424 ac, 0.00% Impervious, Inflow Depth > 0.81" for 2 Year event
Inflow = 4.94 cfs @ 12.40 hrs, Volume= 0.569 af
Outflow = 4.94 cfs @ 12.40 hrs, Volume= 0.569 af, Atten= 0%, Lag= 0.0 min

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

Reach DPEast: Design Point



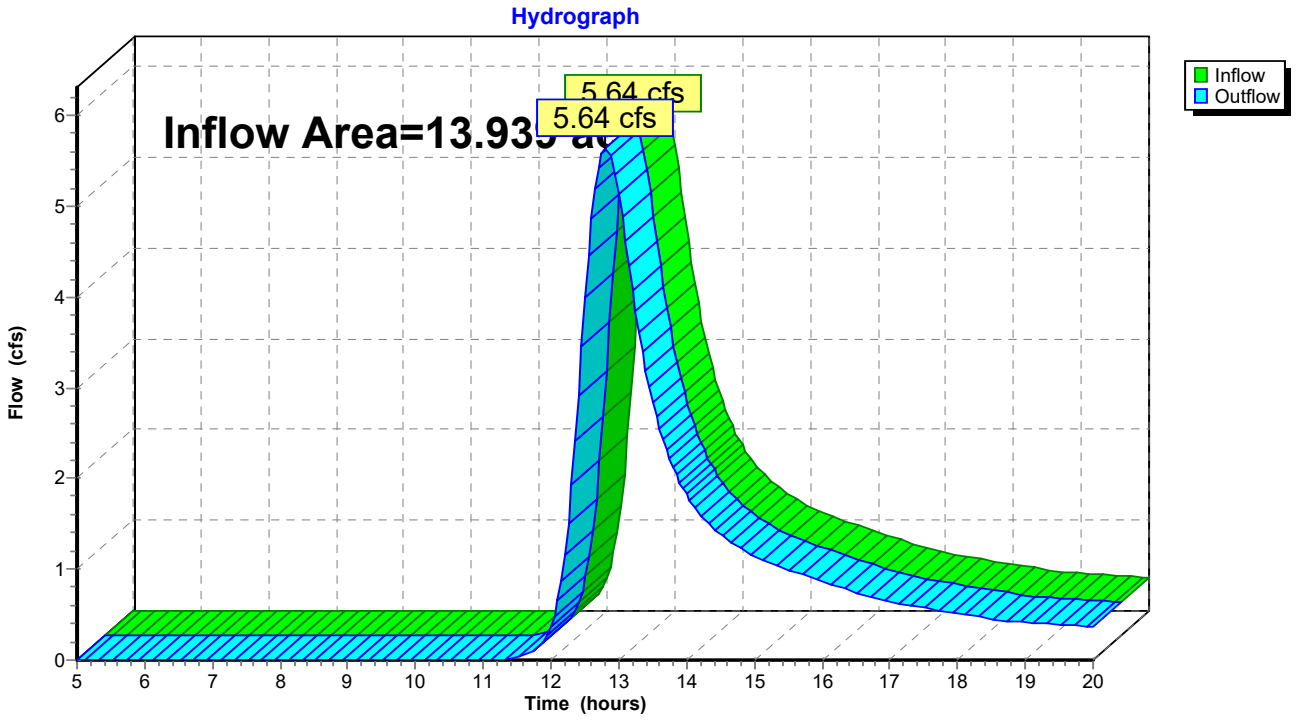
Summary for Reach DPWest: Design Point

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

Inflow Area = 13.939 ac, 0.00% Impervious, Inflow Depth > 0.80" for 2 Year event
Inflow = 5.64 cfs @ 12.81 hrs, Volume= 0.928 af
Outflow = 5.64 cfs @ 12.81 hrs, Volume= 0.928 af, Atten= 0%, Lag= 0.0 min

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

Reach DPWest: Design Point



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

Subcatchment 1S: Westerly watershed Runoff Area=607,173 sf 0.00% Impervious Runoff Depth>1.78"
Flow Length=1,729' Tc=54.5 min CN=73 Runoff=13.12 cfs 2.064 af

Subcatchment 2S: Easterly Watershed Runoff Area=366,938 sf 0.00% Impervious Runoff Depth>1.80"
Flow Length=1,160' Tc=26.0 min CN=73 Runoff=11.48 cfs 1.262 af

Reach DPEast: Design Point Inflow=11.48 cfs 1.262 af
Outflow=11.48 cfs 1.262 af

Reach DPWest: Design Point Inflow=13.12 cfs 2.064 af
Outflow=13.12 cfs 2.064 af

Total Runoff Area = 22.363 ac Runoff Volume = 3.326 af Average Runoff Depth = 1.78"
100.00% Pervious = 22.363 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Westerly watershed

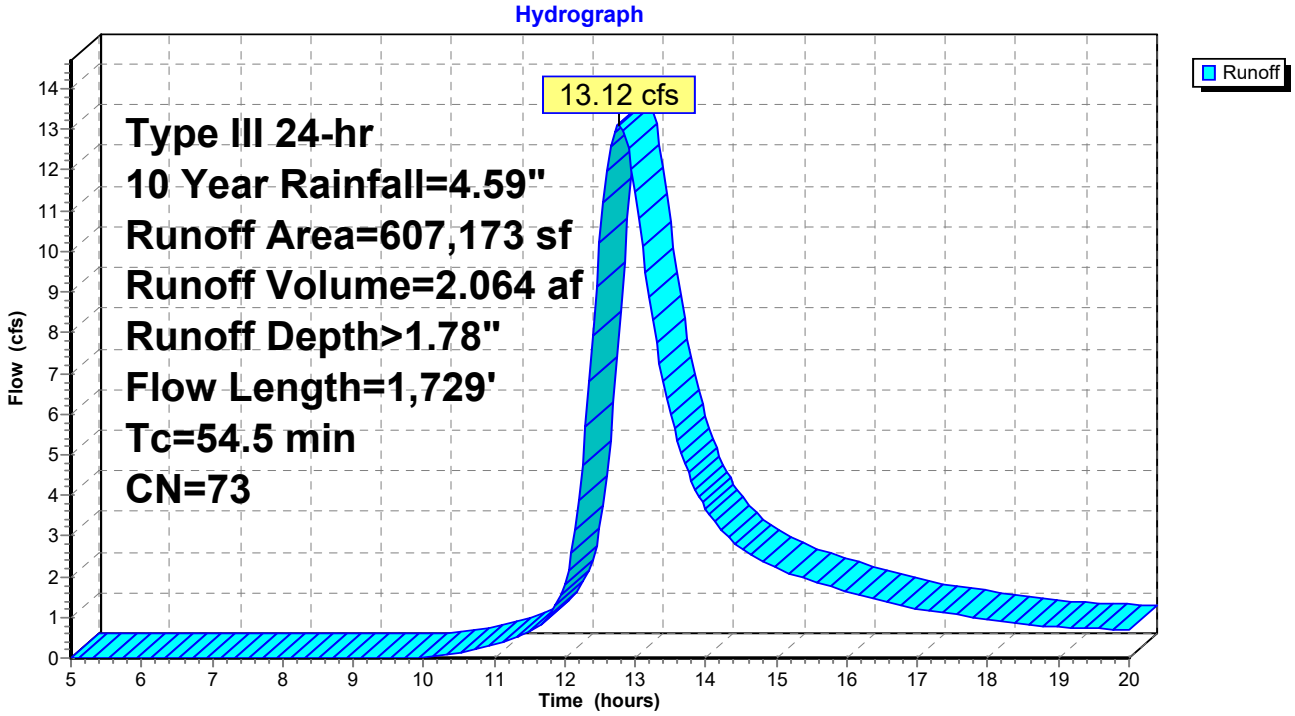
Runoff = 13.12 cfs @ 12.77 hrs, Volume= 2.064 af, Depth> 1.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.59"

	Area (sf)	CN	Description
*	607,173	73	Woods, Fair, HSG C (fair condition C/D soil)
	607,173		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.8	50	0.0100	0.03		**Sheet Flow, Sheet Flow** Woods: Dense underbrush n= 0.800 P2= 2.90"
1.9	138	0.0580	1.20		**Shallow Concentrated Flow, hillside segment 1** Woodland Kv= 5.0 fps
0.8	127	0.2519	2.51		**Shallow Concentrated Flow, Hillside segement 2** Woodland Kv= 5.0 fps
5.8	461	0.0694	1.32		**Shallow Concentrated Flow, Hillside Segment 3** Woodland Kv= 5.0 fps
4.9	258	0.0310	0.88		**Shallow Concentrated Flow, Hillside Segment 4** Woodland Kv= 5.0 fps
11.3	695	0.0417	1.02		**Shallow Concentrated Flow, Hillsdie Segment 5** Woodland Kv= 5.0 fps
54.5	1,729	Total			

Subcatchment 1S: Westerly watershed



Summary for Subcatchment 2S: Easterly Watershed

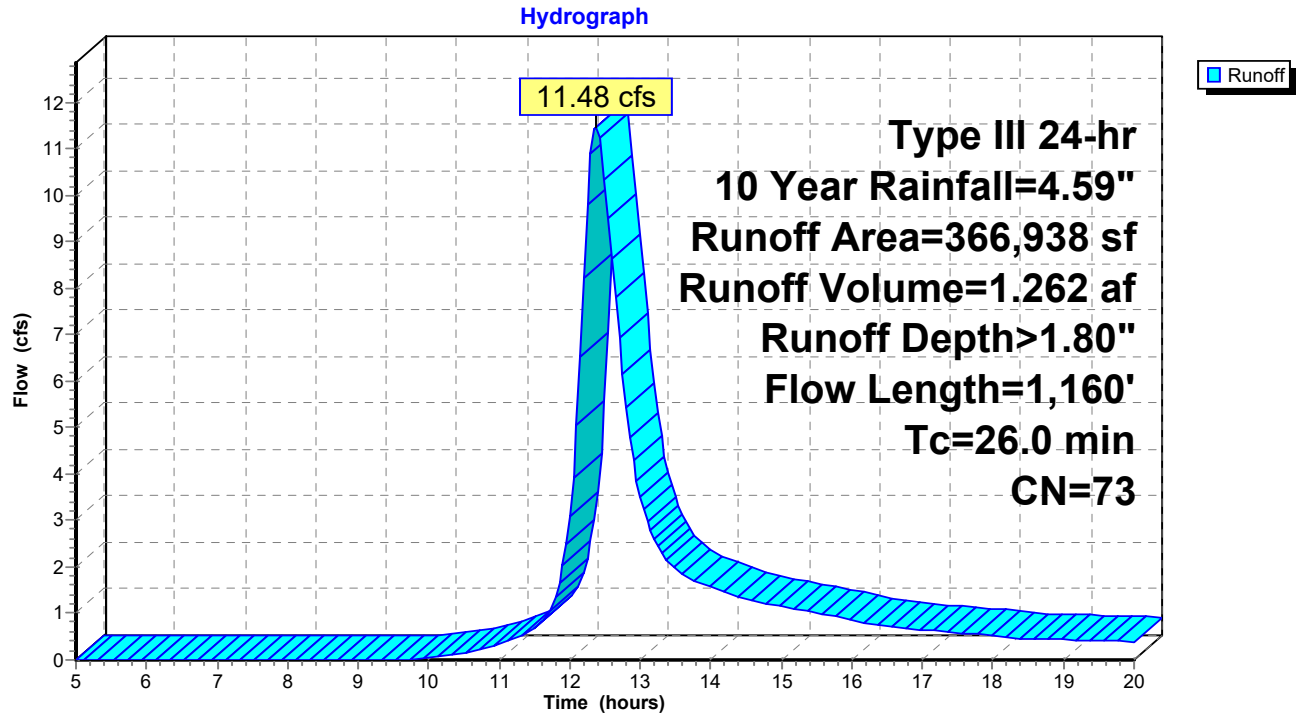
Runoff = 11.48 cfs @ 12.38 hrs, Volume= 1.262 af, Depth> 1.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 Year Rainfall=4.59"

Area (sf)	CN	Description
366,938	73	Woods, Fair, HSG C
366,938		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	50	0.0200	0.06		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.90"
2.7	277	0.1155	1.70		**Shallow Concentrated Flow, Hillside Segment 1** Woodland Kv= 5.0 fps
6.9	524	0.0648	1.27		**Shallow Concentrated Flow, Hillside Segemnt #2** Woodland Kv= 5.0 fps
3.4	309	0.0906	1.50		**Shallow Concentrated Flow, Hillside segment #3** Woodland Kv= 5.0 fps
26.0	1,160	Total			

Subcatchment 2S: Easterly Watershed



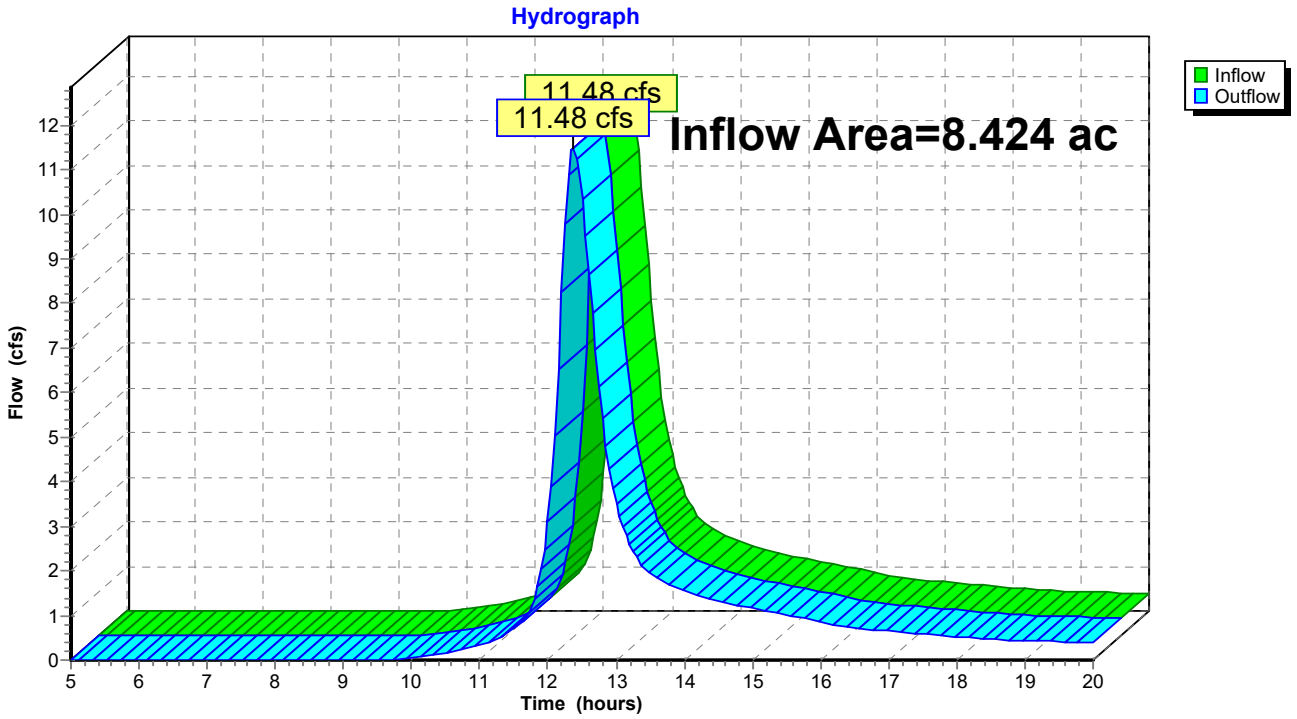
Summary for Reach DPEast: Design Point

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

Inflow Area = 8.424 ac, 0.00% Impervious, Inflow Depth > 1.80" for 10 Year event
Inflow = 11.48 cfs @ 12.38 hrs, Volume= 1.262 af
Outflow = 11.48 cfs @ 12.38 hrs, Volume= 1.262 af, Atten= 0%, Lag= 0.0 min

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

Reach DPEast: Design Point



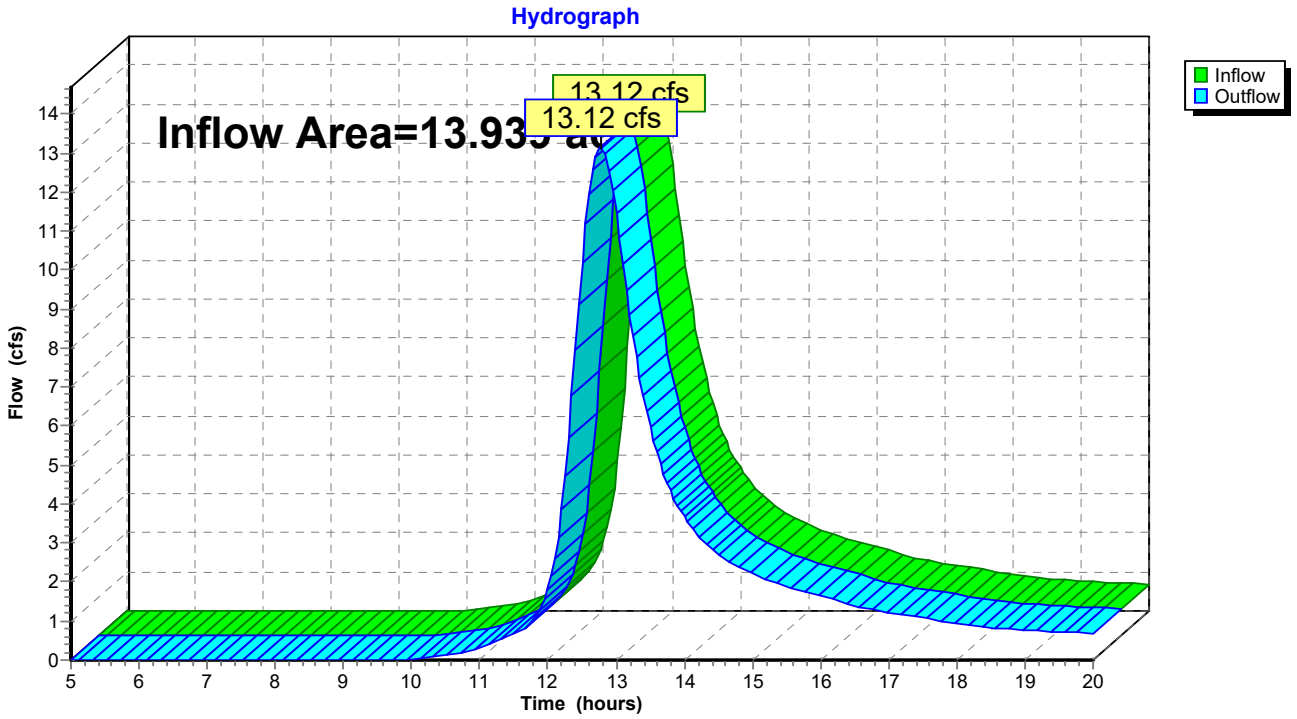
Summary for Reach DPWest: Design Point

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

Inflow Area = 13.939 ac, 0.00% Impervious, Inflow Depth > 1.78" for 10 Year event
Inflow = 13.12 cfs @ 12.77 hrs, Volume= 2.064 af
Outflow = 13.12 cfs @ 12.77 hrs, Volume= 2.064 af, Atten= 0%, Lag= 0.0 min

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

Reach DPWest: Design Point



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

Subcatchment 1S: Westerly watershed Runoff Area=607,173 sf 0.00% Impervious Runoff Depth>4.59"
Flow Length=1,729' Tc=54.5 min CN=73 Runoff=33.83 cfs 5.326 af

Subcatchment 2S: Easterly Watershed Runoff Area=366,938 sf 0.00% Impervious Runoff Depth>4.63"
Flow Length=1,160' Tc=26.0 min CN=73 Runoff=29.58 cfs 3.250 af

Reach DPEast: Design Point Inflow=29.58 cfs 3.250 af
Outflow=29.58 cfs 3.250 af

Reach DPWest: Design Point Inflow=33.83 cfs 5.326 af
Outflow=33.83 cfs 5.326 af

Total Runoff Area = 22.363 ac Runoff Volume = 8.576 af Average Runoff Depth = 4.60"
100.00% Pervious = 22.363 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: Westerly watershed

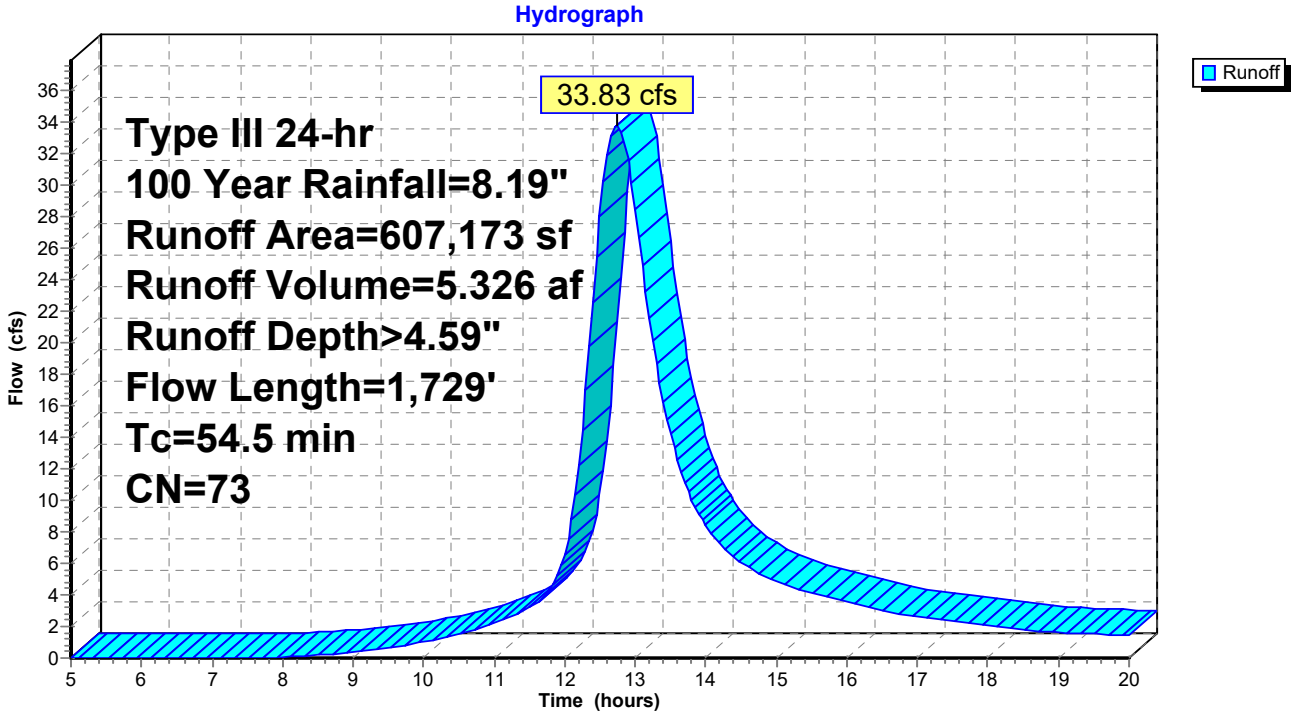
Runoff = 33.83 cfs @ 12.74 hrs, Volume= 5.326 af, Depth> 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.19"

	Area (sf)	CN	Description
*	607,173	73	Woods, Fair, HSG C (fair condition C/D soil)
	607,173		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.8	50	0.0100	0.03		**Sheet Flow, Sheet Flow** Woods: Dense underbrush n= 0.800 P2= 2.90"
1.9	138	0.0580	1.20		**Shallow Concentrated Flow, hillside segment 1** Woodland Kv= 5.0 fps
0.8	127	0.2519	2.51		**Shallow Concentrated Flow, Hillside segement 2** Woodland Kv= 5.0 fps
5.8	461	0.0694	1.32		**Shallow Concentrated Flow, Hillside Segment 3** Woodland Kv= 5.0 fps
4.9	258	0.0310	0.88		**Shallow Concentrated Flow, Hillside Segment 4** Woodland Kv= 5.0 fps
11.3	695	0.0417	1.02		**Shallow Concentrated Flow, Hillsdie Segment 5** Woodland Kv= 5.0 fps
54.5	1,729	Total			

Subcatchment 1S: Westerly watershed



Summary for Subcatchment 2S: Easterly Watershed

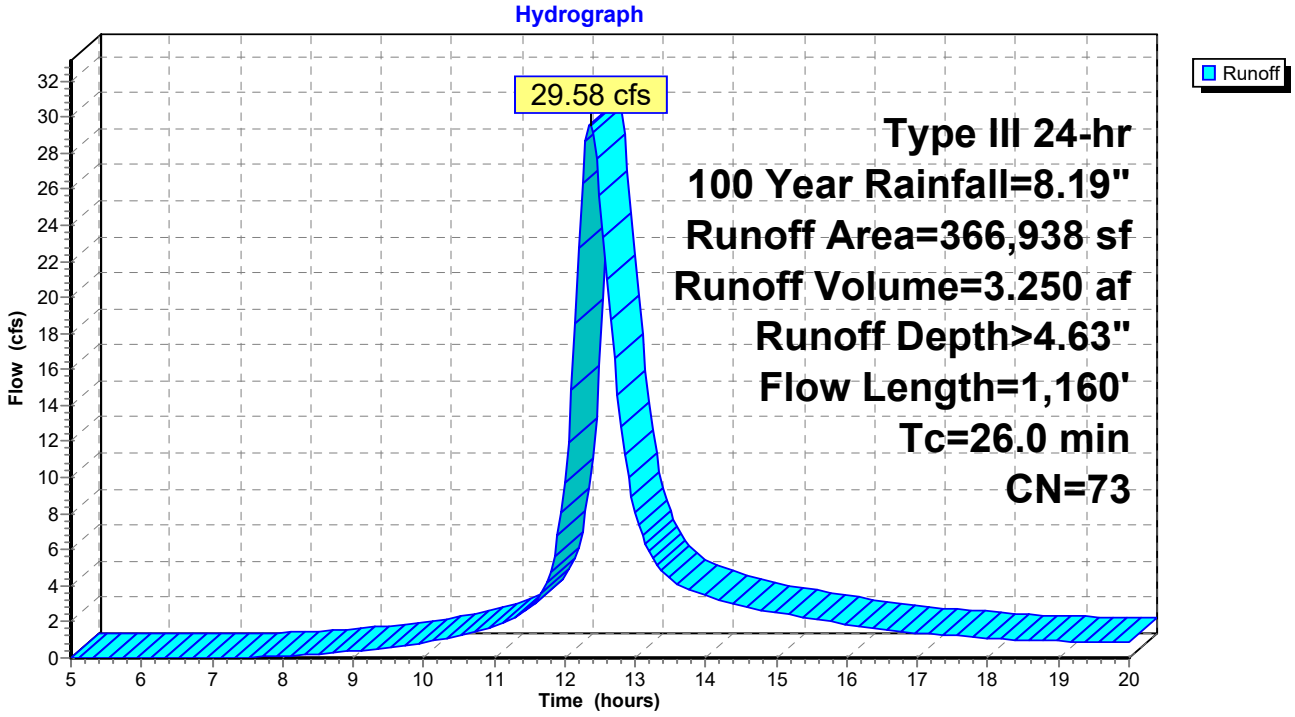
Runoff = 29.58 cfs @ 12.36 hrs, Volume= 3.250 af, Depth> 4.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 Year Rainfall=8.19"

Area (sf)	CN	Description
366,938	73	Woods, Fair, HSG C
366,938		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	50	0.0200	0.06		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.90"
2.7	277	0.1155	1.70		**Shallow Concentrated Flow, Hillside Segment 1** Woodland Kv= 5.0 fps
6.9	524	0.0648	1.27		**Shallow Concentrated Flow, Hillside Segemnt #2** Woodland Kv= 5.0 fps
3.4	309	0.0906	1.50		**Shallow Concentrated Flow, Hillside segment #3** Woodland Kv= 5.0 fps
26.0	1,160	Total			

Subcatchment 2S: Easterly Watershed



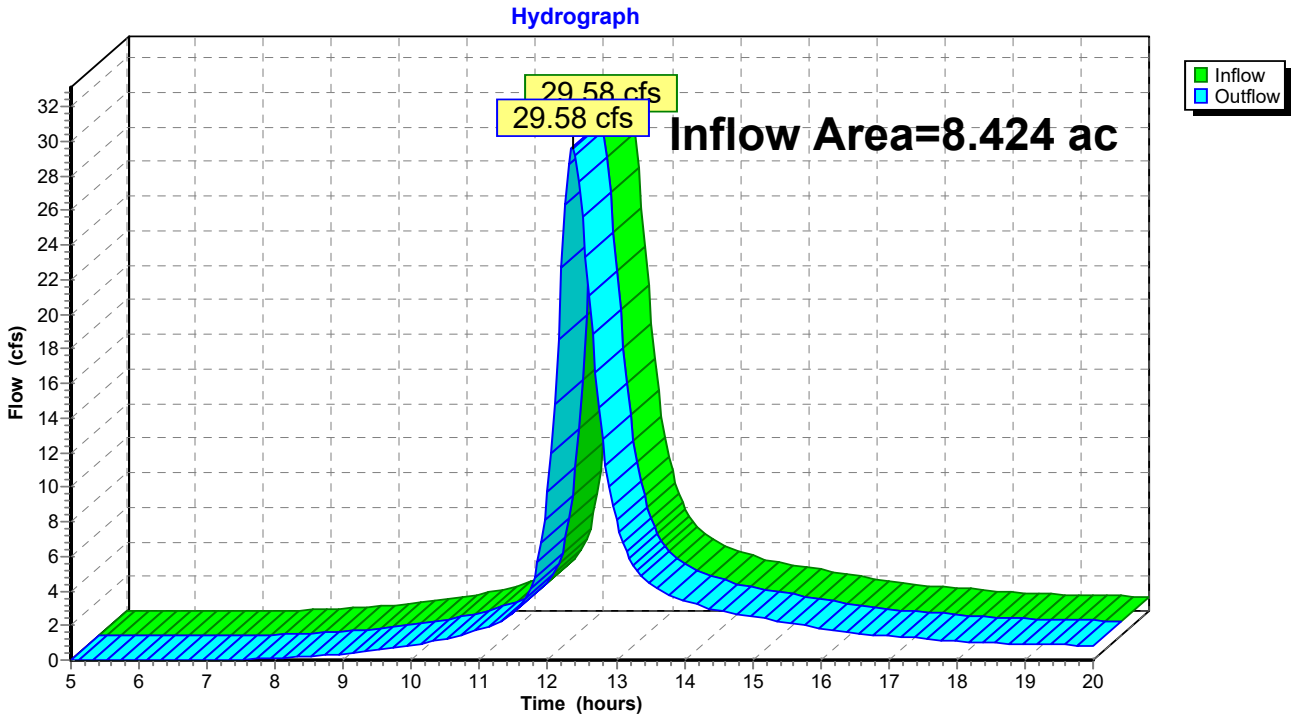
Summary for Reach DPEast: Design Point

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

Inflow Area = 8.424 ac, 0.00% Impervious, Inflow Depth > 4.63" for 100 Year event
Inflow = 29.58 cfs @ 12.36 hrs, Volume= 3.250 af
Outflow = 29.58 cfs @ 12.36 hrs, Volume= 3.250 af, Atten= 0%, Lag= 0.0 min

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

Reach DPEast: Design Point



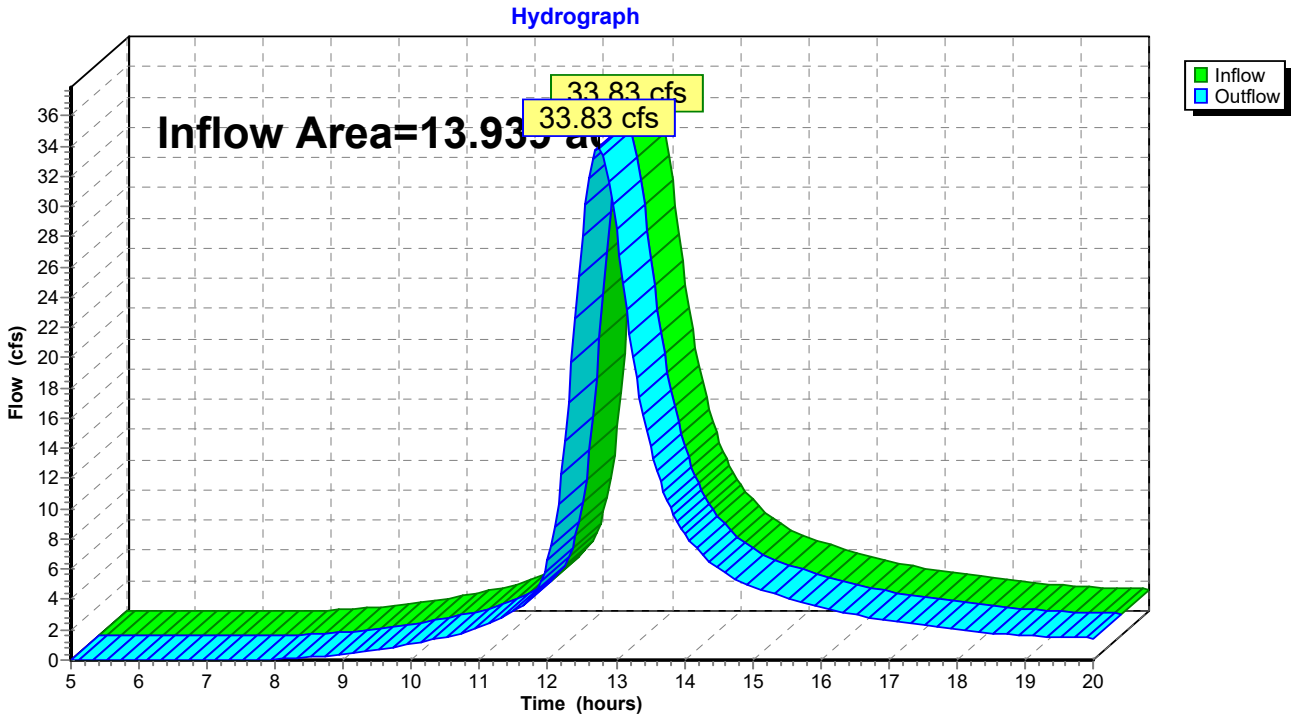
Summary for Reach DPWest: Design Point

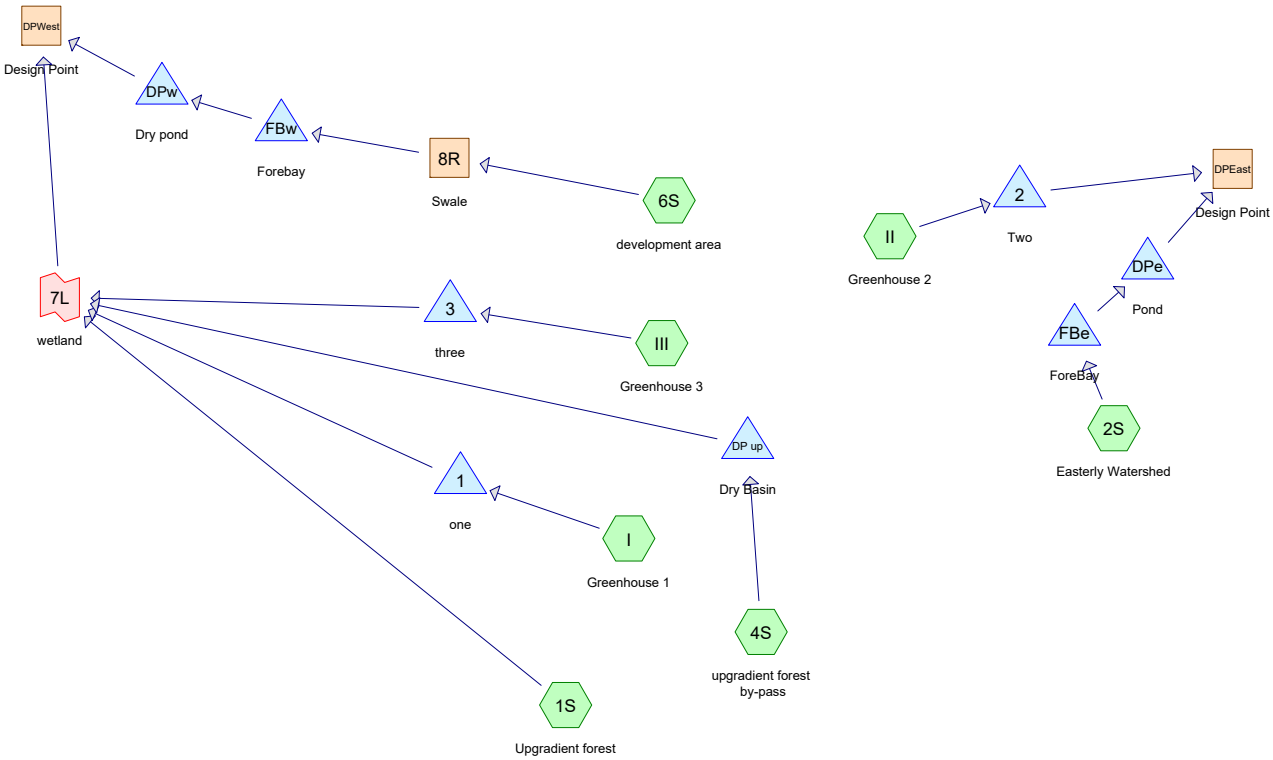
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 13.939 ac, 0.00% Impervious, Inflow Depth > 4.59" for 100 Year event
Inflow = 33.83 cfs @ 12.74 hrs, Volume= 5.326 af
Outflow = 33.83 cfs @ 12.74 hrs, Volume= 5.326 af, Atten= 0%, Lag= 0.0 min

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

Reach DPWest: Design Point





Subcat Reach Pond Link

Routing Diagram for Proposed Conditions
Prepared by {enter your company name here}, Printed 2/24/2021

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.781	74	>75% Grass cover, Good, HSG C (2S, I, II, III)
2.096	96	Gravel surface, HSG C (2S, 6S)
1.892	71	Meadow, non-grazed, HSG C (2S, 4S, 6S)
2.066	98	Roof (I, II, III)
0.115	98	Roofs, HSG C (2S)
1.848	73	Woods, Fair, HSG C (2S, 4S)
8.016	73	Woods, Fair, HSG C (fair condition C/D soil) (1S)
5.447	70	Woods, Good, HSG C (2S)
0.103	98	rooftop (6S)
22.363	**77**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
20.194	HSG C	1S, 2S, 4S, 6S, I, II, III
0.000	HSG D	
2.169	Other	6S, I, II, III
22.363		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.781	0.000	0.000	0.781	>75% Grass cover, Good	2S, I, II, III
0.000	0.000	2.096	0.000	0.000	2.096	Gravel surface	2S, 6S
0.000	0.000	1.892	0.000	0.000	1.892	Meadow, non-grazed	2S, 4S, 6S
0.000	0.000	0.000	0.000	2.066	2.066	Roof	I, II, III
0.000	0.000	0.115	0.000	0.000	0.115	Roofs	2S
0.000	0.000	9.864	0.000	0.000	9.864	Woods, Fair	1S, 2S, 4S
0.000	0.000	5.447	0.000	0.000	5.447	Woods, Good	2S
0.000	0.000	0.000	0.000	0.103	0.103	rooftop	6S
0.000	**0.000**	**20.194**	**0.000**	**2.169**	**22.363**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1	1,712.00	1,711.00	150.0	0.0067	0.011	6.0	0.0	0.0
2	2	1,712.00	1,711.00	150.0	0.0067	0.011	12.0	0.0	0.0
3	3	1,712.00	1,711.00	150.0	0.0067	0.011	6.0	0.0	0.0
4	DP up	1,731.25	1,716.00	300.0	0.0508	0.011	8.0	0.0	0.0
5	DPe	1,706.00	1,706.00	35.0	0.0000	0.011	15.0	0.0	0.0
6	DPw	1,702.50	1,699.00	40.0	0.0875	0.012	15.0	0.0	0.0
7	DPw	1,700.00	1,696.00	30.0	0.1333	0.011	4.0	0.0	0.0
8	FBe	1,708.00	1,706.00	24.0	0.0833	0.012	18.0	0.0	0.0
9	FBw	1,703.50	1,703.00	40.0	0.0125	0.012	18.0	0.0	0.0
10	FBw	1,702.25	1,702.00	35.0	0.0071	0.011	4.0	0.0	0.0

Time span=1.00-40.00 hrs, dt=0.01 hrs, 3901 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Upgradient forest Runoff Area=349,185 sf 0.00% Impervious Runoff Depth=0.90"
Flow Length=1,729' Tc=54.5 min CN=73 Runoff=3.24 cfs 0.602 af

Subcatchment 2S: Easterly Watershed Runoff Area=306,150 sf 1.63% Impervious Runoff Depth=0.95"
Flow Length=1,201' Tc=23.3 min CN=74 Runoff=4.64 cfs 0.558 af

Subcatchment 4S: upgradient forest by-pass Runoff Area=81,700 sf 0.00% Impervious Runoff Depth=0.90"
Tc=0.0 min CN=73 Runoff=2.24 cfs 0.141 af

Subcatchment 6S: development area Runoff Area=123,100 sf 3.66% Impervious Runoff Depth=1.50"
Tc=0.0 min CN=83 Runoff=6.08 cfs 0.354 af

Subcatchment I: Greenhouse 1 Runoff Area=28,500 sf 78.95% Impervious Runoff Depth=2.32"
Flow Length=25' Slope=0.2000 '/' Tc=0.2 min CN=93 Runoff=2.10 cfs 0.127 af

Subcatchment II: Greenhouse 2 Runoff Area=39,900 sf 78.95% Impervious Runoff Depth=2.32"
Flow Length=25' Slope=0.2000 '/' Tc=0.2 min CN=93 Runoff=2.94 cfs 0.177 af

Subcatchment III: Greenhouse 3 Runoff Area=45,600 sf 78.95% Impervious Runoff Depth=2.32"
Flow Length=25' Slope=0.2000 '/' Tc=0.2 min CN=93 Runoff=3.36 cfs 0.202 af

Reach 8R: Swale Avg. Flow Depth=0.49' Max Vel=3.63 fps Inflow=6.08 cfs 0.354 af
n=0.035 L=600.0' S=0.0300 '/' Capacity=93.83 cfs Outflow=5.25 cfs 0.354 af

Reach DPEast: Design Point Inflow=4.87 cfs 0.733 af
Outflow=4.87 cfs 0.733 af

Reach DPWest: Design Point Inflow=5.55 cfs 1.261 af
Outflow=5.55 cfs 1.261 af

Pond 1: one Peak Elev=1,713.51' Storage=0.000 af Inflow=2.10 cfs 0.127 af
Discarded=0.04 cfs 0.002 af Primary=2.05 cfs 0.124 af Outflow=2.09 cfs 0.127 af

Pond 2: Two Peak Elev=1,713.51' Storage=0.000 af Inflow=2.94 cfs 0.177 af
Discarded=0.04 cfs 0.003 af Primary=2.89 cfs 0.175 af Outflow=2.93 cfs 0.177 af

Pond 3: three Peak Elev=1,713.51' Storage=0.000 af Inflow=3.36 cfs 0.202 af
Discarded=0.06 cfs 0.004 af Primary=3.29 cfs 0.199 af Outflow=3.34 cfs 0.202 af

Pond DP up: Dry Basin Peak Elev=1,731.40' Storage=0.105 af Inflow=2.24 cfs 0.141 af
8.0" Round Culvert n=0.011 L=300.0' S=0.0508 '/' Outflow=0.07 cfs 0.048 af

Pond DPe: Pond Peak Elev=1,707.61' Storage=0.024 af Inflow=4.62 cfs 0.558 af
Outflow=4.37 cfs 0.558 af

Pond DPw: Dry pond Peak Elev=1,703.17' Storage=0.094 af Inflow=3.40 cfs 0.354 af
Outflow=1.89 cfs 0.289 af

Pond FBe: ForeBay Peak Elev=1,708.70' Storage=0.008 af Inflow=4.64 cfs 0.558 af
18.0" Round Culvert x 2.00 n=0.012 L=24.0' S=0.0833 '/' Outflow=4.62 cfs 0.558 af

Pond FBw: Forebay Peak Elev=1,704.31' Storage=0.067 af Inflow=5.25 cfs 0.354 af
Outflow=3.40 cfs 0.354 af

Link 7L: wetland Inflow=5.55 cfs 0.972 af
Primary=5.55 cfs 0.972 af

Total Runoff Area = 22.363 ac Runoff Volume = 2.161 af Average Runoff Depth = 1.16"
89.79% Pervious = 20.079 ac 10.21% Impervious = 2.284 ac

Summary for Subcatchment 1S: Upgradient forest

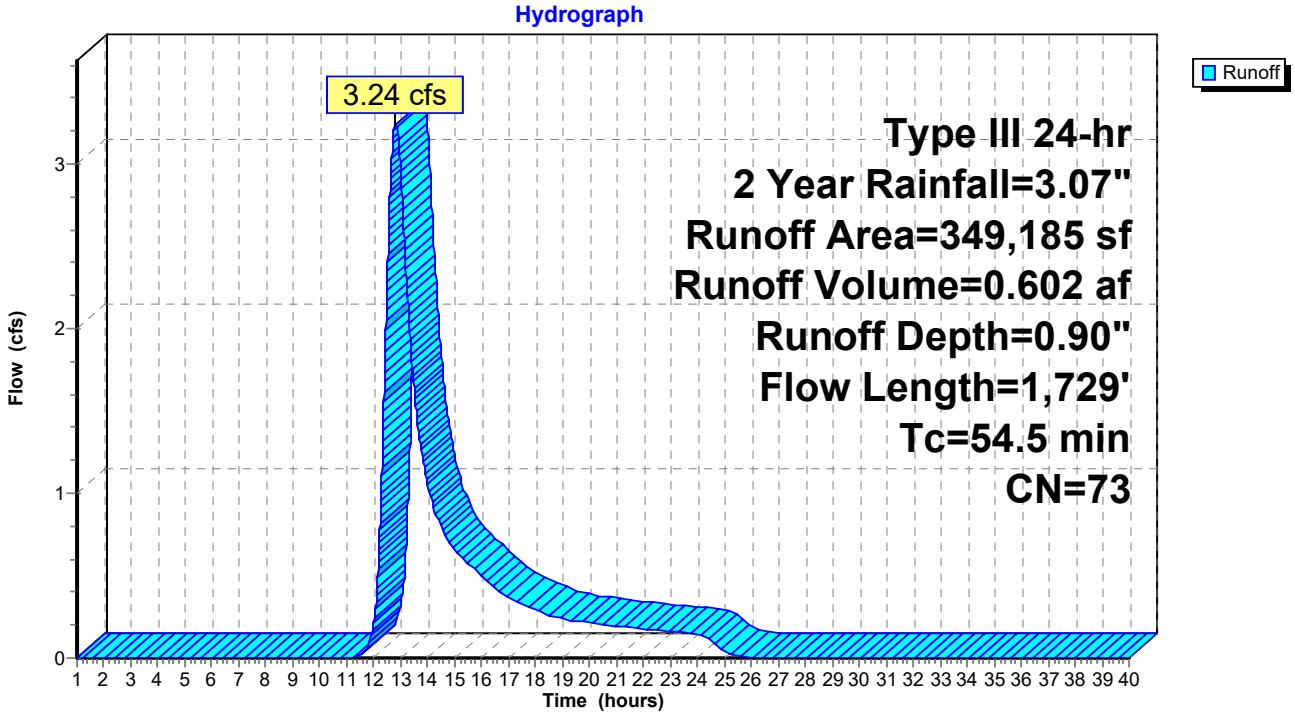
Runoff = 3.24 cfs @ 12.78 hrs, Volume= 0.602 af, Depth= 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.07"

	Area (sf)	CN	Description
*	349,185	73	Woods, Fair, HSG C (fair condition C/D soil)
	349,185		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.8	50	0.0100	0.03		**Sheet Flow, Sheet Flow** Woods: Dense underbrush n= 0.800 P2= 2.90"
1.9	138	0.0580	1.20		**Shallow Concentrated Flow, hillside segment 1** Woodland Kv= 5.0 fps
0.8	127	0.2519	2.51		**Shallow Concentrated Flow, Hillside segement 2** Woodland Kv= 5.0 fps
5.8	461	0.0694	1.32		**Shallow Concentrated Flow, Hillside Segment 3** Woodland Kv= 5.0 fps
4.9	258	0.0310	0.88		**Shallow Concentrated Flow, Hillside Segment 4** Woodland Kv= 5.0 fps
11.3	695	0.0417	1.02		**Shallow Concentrated Flow, Hillsdie Segment 5** Woodland Kv= 5.0 fps
54.5	1,729	Total			

Subcatchment 1S: Upgradient forest



Summary for Subcatchment 2S: Easterly Watershed

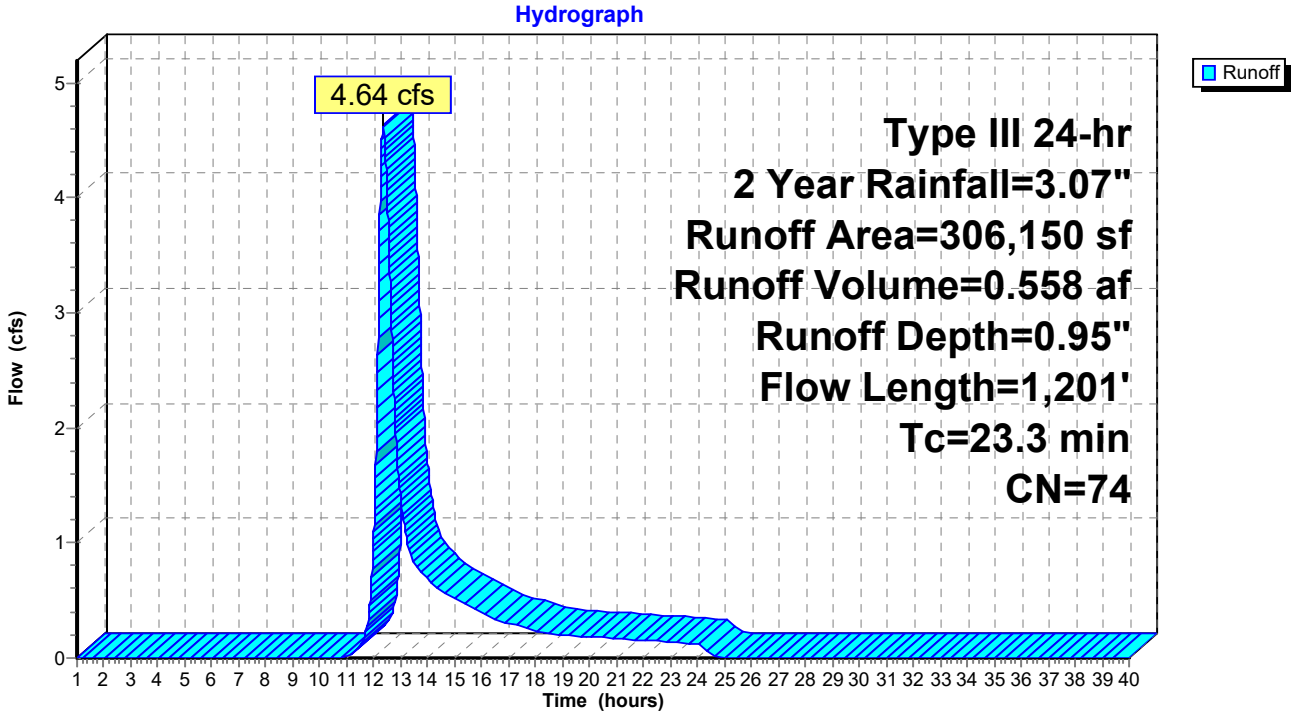
Runoff = 4.64 cfs @ 12.35 hrs, Volume= 0.558 af, Depth= 0.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.07"

Area (sf)	CN	Description
4,500	73	Woods, Fair, HSG C
5,000	98	Roofs, HSG C
36,500	96	Gravel surface, HSG C
10,000	74	>75% Grass cover, Good, HSG C
12,900	71	Meadow, non-grazed, HSG C
237,250	70	Woods, Good, HSG C
306,150	74	Weighted Average
301,150		98.37% Pervious Area
5,000		1.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	50	0.0200	0.06		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.90"
2.7	277	0.1155	1.70		**Shallow Concentrated Flow, Hillside Segment 1** Woodland Kv= 5.0 fps
6.9	524	0.0648	1.27		**Shallow Concentrated Flow, Hillside Segemnt #2** Woodland Kv= 5.0 fps
0.7	350	0.0500	7.85	23.56	**Channel Flow,** Area= 3.0 sf Perim= 8.0' r= 0.38' n= 0.022 Earth, clean & straight
23.3	1,201	Total			

Subcatchment 2S: Easterly Watershed



Summary for Subcatchment 4S: upgradient forest by-pass

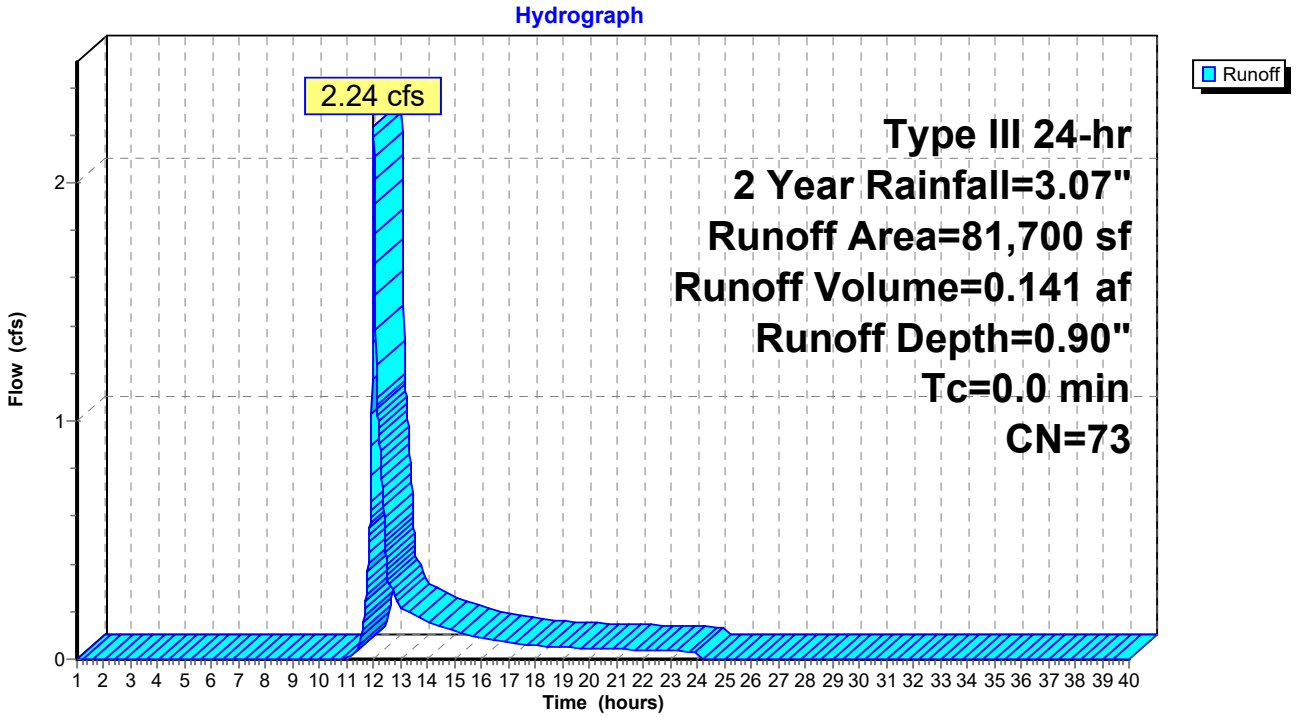
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 2.24 cfs @ 12.00 hrs, Volume= 0.141 af, Depth= 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.07"

Area (sf)	CN	Description
76,000	73	Woods, Fair, HSG C
5,700	71	Meadow, non-grazed, HSG C
81,700	73	Weighted Average
81,700		100.00% Pervious Area

Subcatchment 4S: upgradient forest by-pass



Summary for Subcatchment 6S: development area

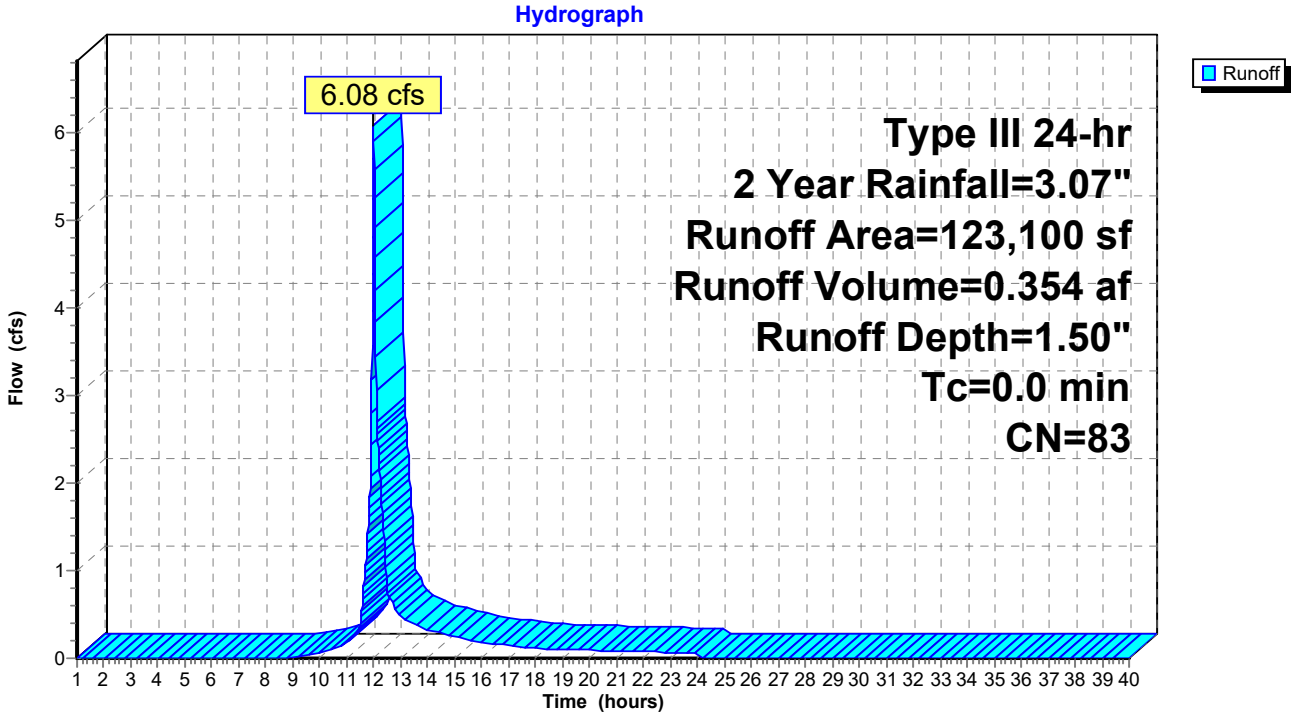
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 6.08 cfs @ 12.00 hrs, Volume= 0.354 af, Depth= 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.07"

	Area (sf)	CN	Description
	54,800	96	Gravel surface, HSG C
*	4,500	98	rooftop
	63,800	71	Meadow, non-grazed, HSG C
	123,100	83	Weighted Average
	118,600		96.34% Pervious Area
	4,500		3.66% Impervious Area

Subcatchment 6S: development area



Summary for Subcatchment I: Greenhouse 1

[49] Hint: Tc<2dt may require smaller dt

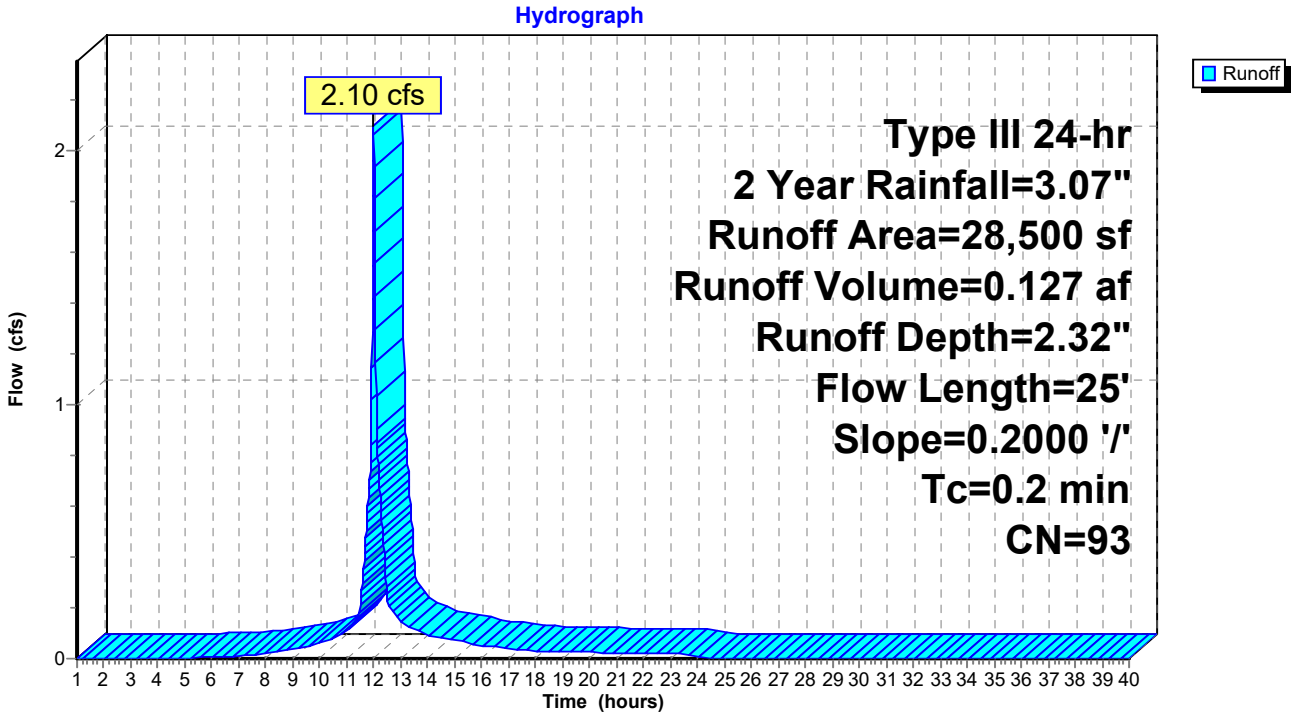
Runoff = 2.10 cfs @ 12.00 hrs, Volume= 0.127 af, Depth= 2.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.07"

	Area (sf)	CN	Description
*	22,500	98	Roof
	6,000	74	>75% Grass cover, Good, HSG C
	28,500	93	Weighted Average
	6,000		21.05% Pervious Area
	22,500		78.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	25	0.2000	2.49		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 2.90"

Subcatchment I: Greenhouse 1



Summary for Subcatchment II: Greenhouse 2

[49] Hint: Tc<2dt may require smaller dt

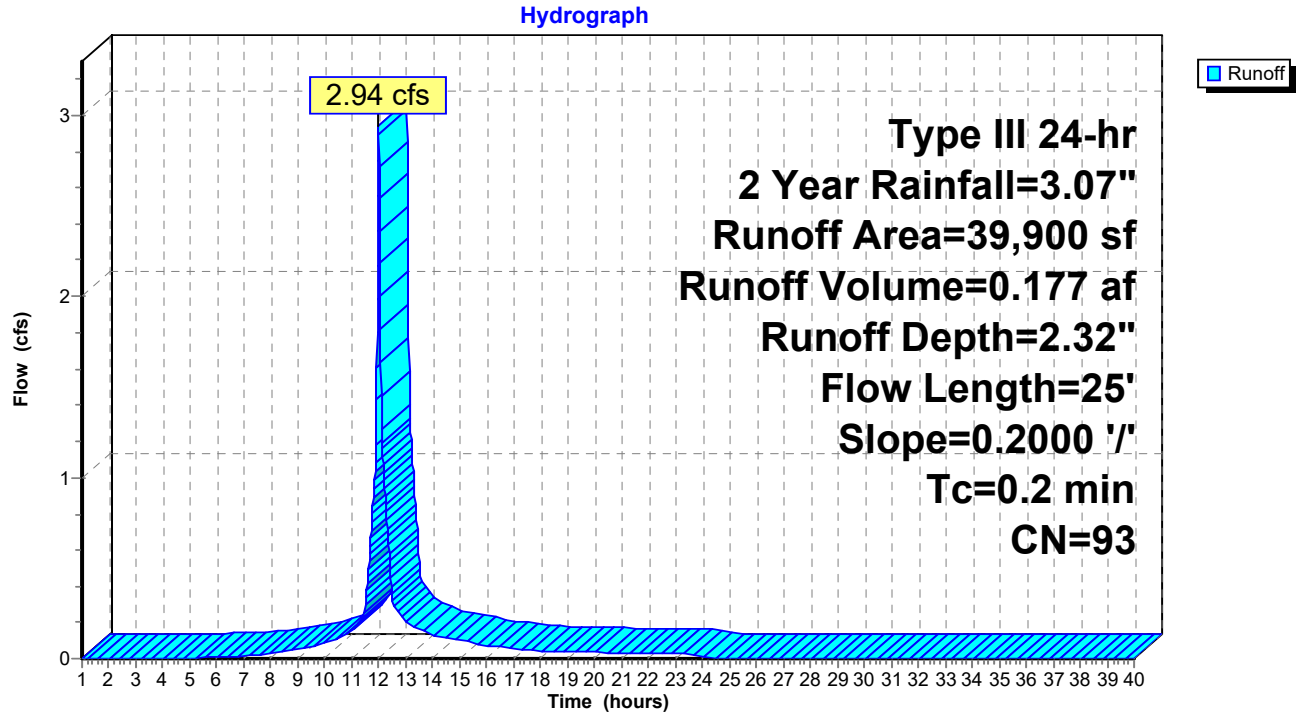
Runoff = 2.94 cfs @ 12.00 hrs, Volume= 0.177 af, Depth= 2.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.07"

	Area (sf)	CN	Description
*	31,500	98	Roof
	8,400	74	>75% Grass cover, Good, HSG C
	39,900	93	Weighted Average
	8,400		21.05% Pervious Area
	31,500		78.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	25	0.2000	2.49		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 2.90"

Subcatchment II: Greenhouse 2



Summary for Subcatchment III: Greenhouse 3

[49] Hint: Tc<2dt may require smaller dt

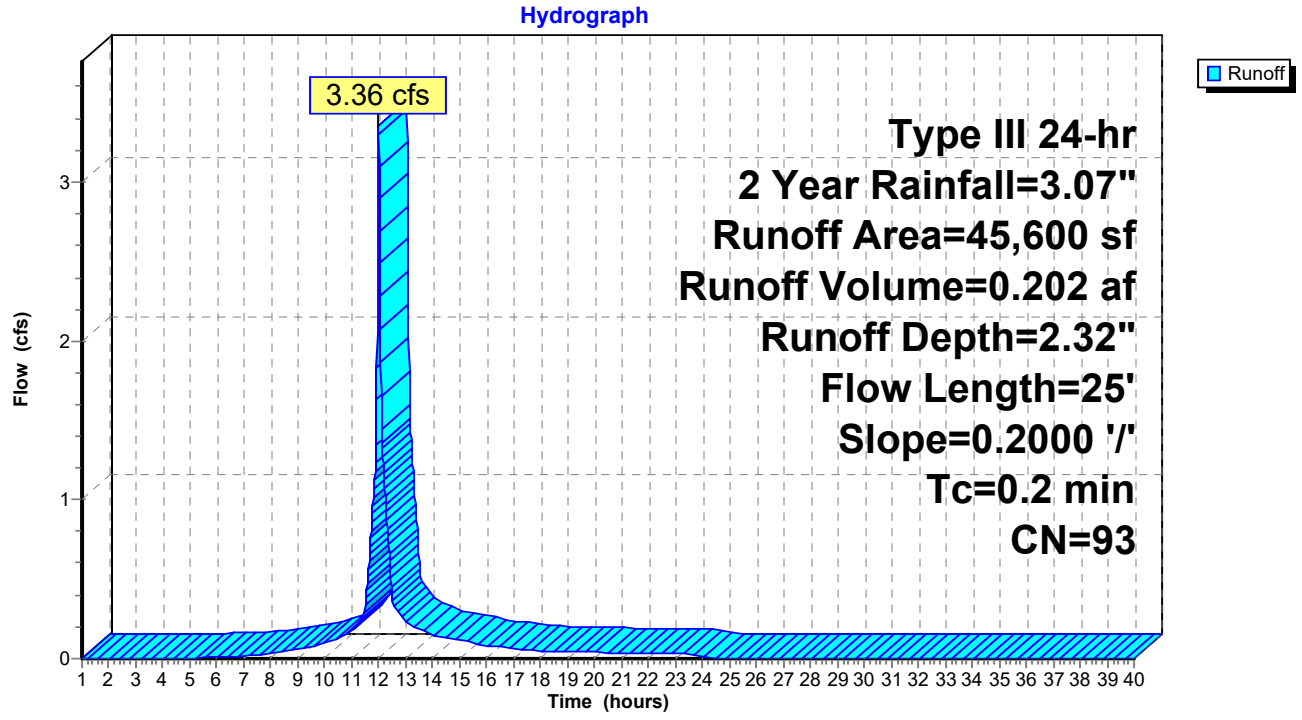
Runoff = 3.36 cfs @ 12.00 hrs, Volume= 0.202 af, Depth= 2.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 Year Rainfall=3.07"

	Area (sf)	CN	Description
*	36,000	98	Roof
	9,600	74	>75% Grass cover, Good, HSG C
	45,600	93	Weighted Average
	9,600		21.05% Pervious Area
	36,000		78.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	25	0.2000	2.49		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 2.90"

Subcatchment III: Greenhouse 3



Summary for Reach 8R: Swale

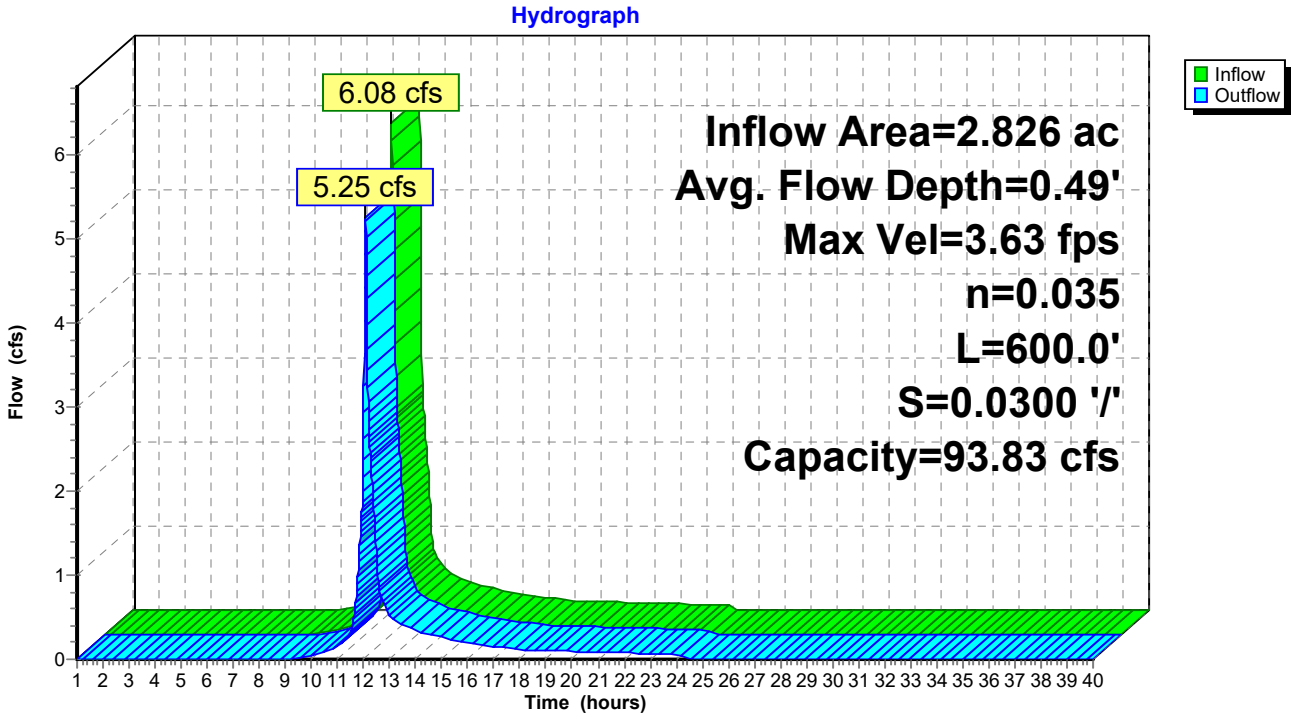
Inflow Area = 2.826 ac, 3.66% Impervious, Inflow Depth = 1.50" for 2 Year event
Inflow = 6.08 cfs @ 12.00 hrs, Volume= 0.354 af
Outflow = 5.25 cfs @ 12.08 hrs, Volume= 0.354 af, Atten= 14%, Lag= 4.5 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.63 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 1.09 fps, Avg. Travel Time= 9.1 min

Peak Storage= 869 cf @ 12.03 hrs
Average Depth at Peak Storage= 0.49'
Bank-Full Depth= 2.00' Flow Area= 12.0 sf, Capacity= 93.83 cfs

2.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 600.0' Slope= 0.0300 '/'
Inlet Invert= 1,720.00', Outlet Invert= 1,702.00'

Reach 8R: Swale



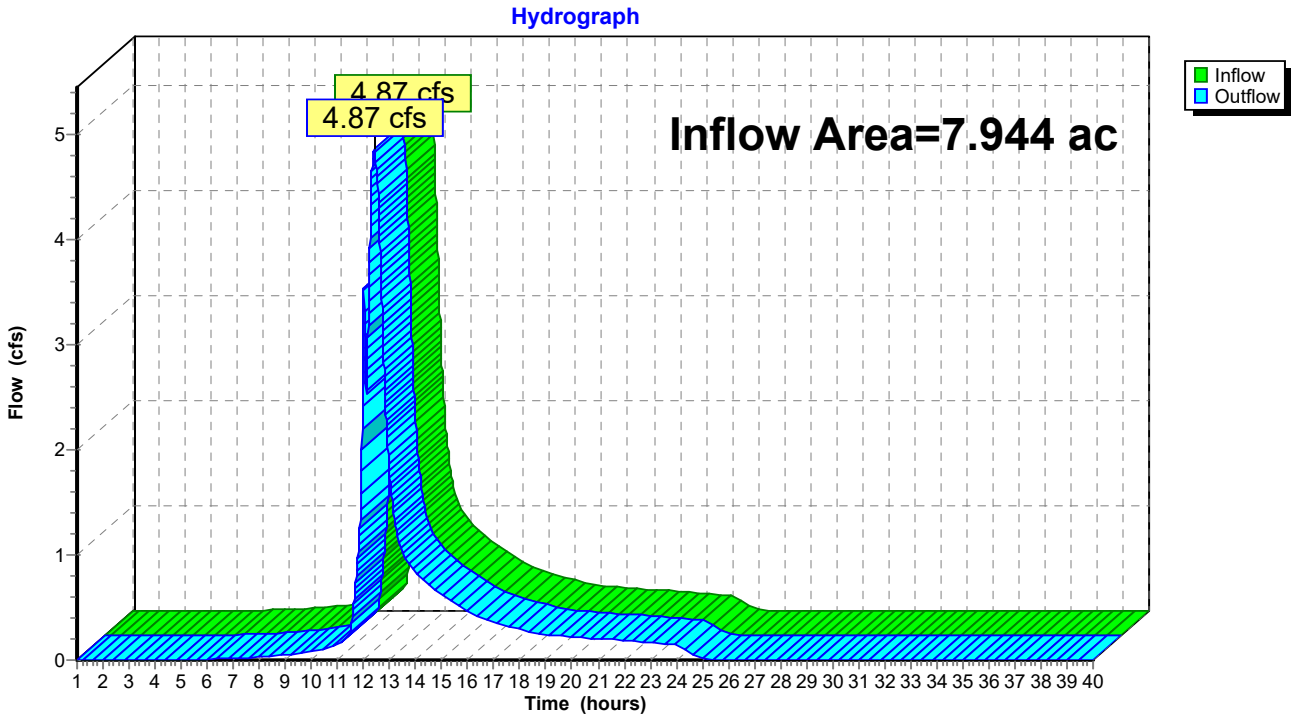
Summary for Reach DPEast: Design Point

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

Inflow Area = 7.944 ac, 10.55% Impervious, Inflow Depth = 1.11" for 2 Year event
Inflow = 4.87 cfs @ 12.40 hrs, Volume= 0.733 af
Outflow = 4.87 cfs @ 12.40 hrs, Volume= 0.733 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs

Reach DPEast: Design Point



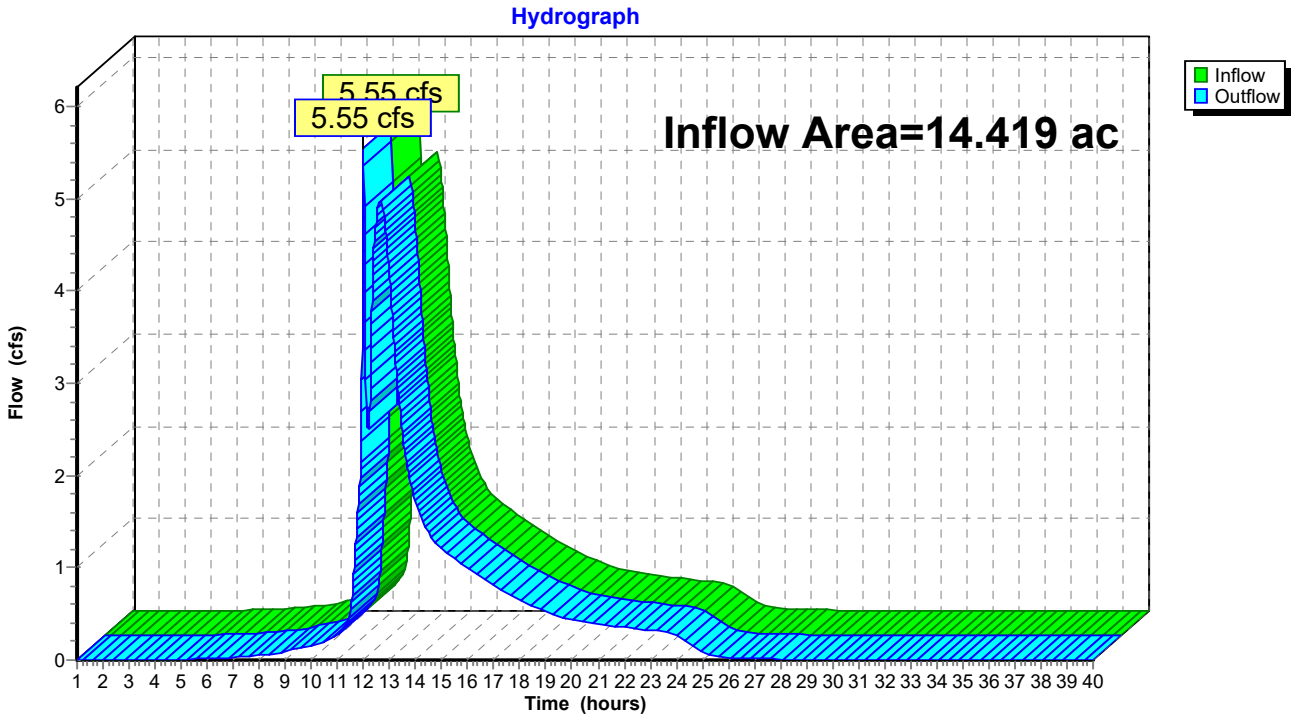
Summary for Reach DPWest: Design Point

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

Inflow Area = 14.419 ac, 10.03% Impervious, Inflow Depth > 1.05" for 2 Year event
Inflow = 5.55 cfs @ 12.00 hrs, Volume= 1.261 af
Outflow = 5.55 cfs @ 12.00 hrs, Volume= 1.261 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs

Reach DPWest: Design Point



Summary for Pond 1: one

Inflow Area = 0.654 ac, 78.95% Impervious, Inflow Depth = 2.32" for 2 Year event
Inflow = 2.10 cfs @ 12.00 hrs, Volume= 0.127 af
Outflow = 2.09 cfs @ 12.00 hrs, Volume= 0.127 af, Atten= 1%, Lag= 0.1 min
Discarded = 0.04 cfs @ 12.00 hrs, Volume= 0.002 af
Primary = 2.05 cfs @ 12.00 hrs, Volume= 0.124 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 1,713.51' @ 12.00 hrs Surf.Area= 0.056 ac Storage= 0.000 af

Plug-Flow detention time= 0.1 min calculated for 0.127 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (788.8 - 788.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	1,713.50'	0.032 af	**16.37'W x 150.00'L x 1.48'H Field A** 0.083 af Overall - 0.004 af Embedded = 0.079 af x 40.0% Voids
#2A	1,713.83'	0.004 af	**CPP single-wall 4"** x 84 Inside #1 Inside= 4.0"W x 4.0"H => 0.11 sf x 20.00'L = 2.2 cf Outside= 4.7"W x 4.7"H => 0.11 sf x 20.00'L = 2.2 cf 12 Rows of 7 Chambers
		0.036 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	1,712.00'	**6.0" Round Culvert X 4.00** L= 150.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,712.00' / 1,711.00' S= 0.0067 '/' Cc= 0.900 n= 0.011, Flow Area= 0.20 sf
#2	Discarded	1,713.50'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.00'

Discarded OutFlow Max=0.06 cfs @ 12.00 hrs HW=1,713.51' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=2.83 cfs @ 12.00 hrs HW=1,713.51' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 2.83 cfs @ 3.60 fps)

Pond 1: one - Chamber Wizard Field A

Chamber Model = CPP single-wall 4" (Single-wall corrugated HDPE pipe)
Inside= 4.0"W x 4.0"H => 0.11 sf x 20.00'L = 2.2 cf
Outside= 4.7"W x 4.7"H => 0.11 sf x 20.00'L = 2.2 cf

4.7" Wide + 12.0" Spacing = 16.7" C-C Row Spacing

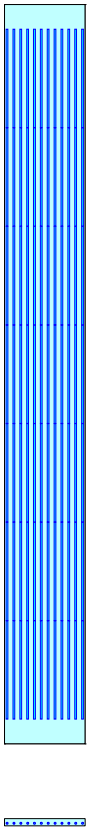
7 Chambers/Row x 20.00' Long = 140.00' Row Length +60.0" End Stone x 2 = 150.00' Base Length
12 Rows x 4.7" Wide + 12.0" Spacing x 11 + 4.0" Side Stone x 2 = 16.37' Base Width
4.0" Base + 4.7" Chamber Height + 9.0" Cover = 1.48' Field Height

84 Chambers x 2.2 cf = 182.8 cf Chamber Storage

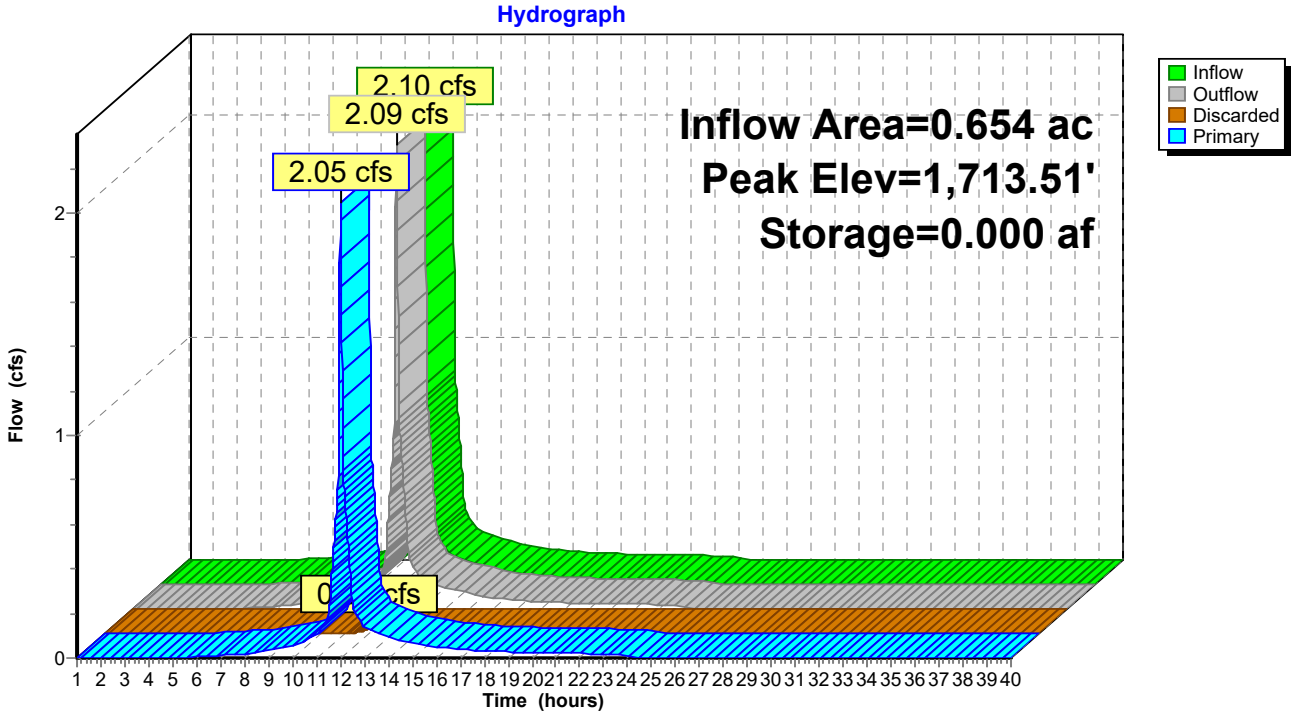
3,621.1 cf Field - 182.8 cf Chambers = 3,438.3 cf Stone x 40.0% Voids = 1,375.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,558.1 cf = 0.036 af
Overall Storage Efficiency = 43.0%
Overall System Size = 150.00' x 16.37' x 1.48'

84 Chambers
134.1 cy Field
127.3 cy Stone



Pond 1: one


Hydrograph
2.10 cfs
2.09 cfs
2.05 cfs
Inflow Area=0.654 ac
Peak Elev=1,713.51'
Storage=0.000 af
Inflow
Outflow
Discarded
Primary
Flow (cfs)
0
1
2
Time (hours)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

Summary for Pond 2: Two

Inflow Area = 0.916 ac, 78.95% Impervious, Inflow Depth = 2.32" for 2 Year event
Inflow = 2.94 cfs @ 12.00 hrs, Volume= 0.177 af
Outflow = 2.93 cfs @ 12.00 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.04 cfs @ 12.00 hrs, Volume= 0.003 af
Primary = 2.89 cfs @ 12.00 hrs, Volume= 0.175 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1,713.51' @ 12.00 hrs Surf.Area= 0.051 ac Storage= 0.000 af

Plug-Flow detention time= 0.1 min calculated for 0.177 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (788.8 - 788.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	1,713.50'	0.029 af	**21.93'W x 102.00'L x 1.48'H Field A** 0.076 af Overall - 0.004 af Embedded = 0.072 af x 40.0% Voids
#2A	1,713.83'	0.004 af	**CPP single-wall 4"** x 80 Inside #1 Inside= 4.0"W x 4.0"H => 0.11 sf x 20.00'L = 2.2 cf Outside= 4.7"W x 4.7"H => 0.11 sf x 20.00'L = 2.2 cf 16 Rows of 5 Chambers
		0.033 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	1,712.00'	**12.0" Round Culvert** L= 150.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,712.00' / 1,711.00' S= 0.0067 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Discarded	1,713.50'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.00'

Discarded OutFlow Max=0.05 cfs @ 12.00 hrs HW=1,713.51' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.05 cfs)

Primary OutFlow Max=3.51 cfs @ 12.00 hrs HW=1,713.51' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 3.51 cfs @ 4.47 fps)

Pond 2: Two - Chamber Wizard Field A

Chamber Model = CPP single-wall 4" (Single-wall corrugated HDPE pipe)
Inside= 4.0"W x 4.0"H => 0.11 sf x 20.00'L = 2.2 cf
Outside= 4.7"W x 4.7"H => 0.11 sf x 20.00'L = 2.2 cf

4.7" Wide + 12.0" Spacing = 16.7" C-C Row Spacing

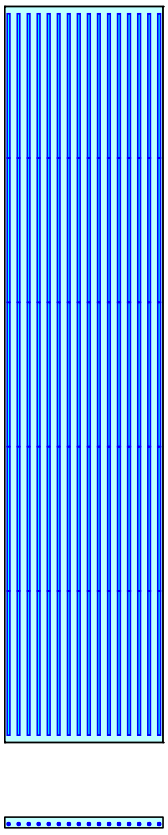
5 Chambers/Row x 20.00' Long = 100.00' Row Length +12.0" End Stone x 2 = 102.00' Base Length
16 Rows x 4.7" Wide + 12.0" Spacing x 15 + 4.0" Side Stone x 2 = 21.93' Base Width
4.0" Base + 4.7" Chamber Height + 9.0" Cover = 1.48' Field Height

80 Chambers x 2.2 cf = 174.1 cf Chamber Storage

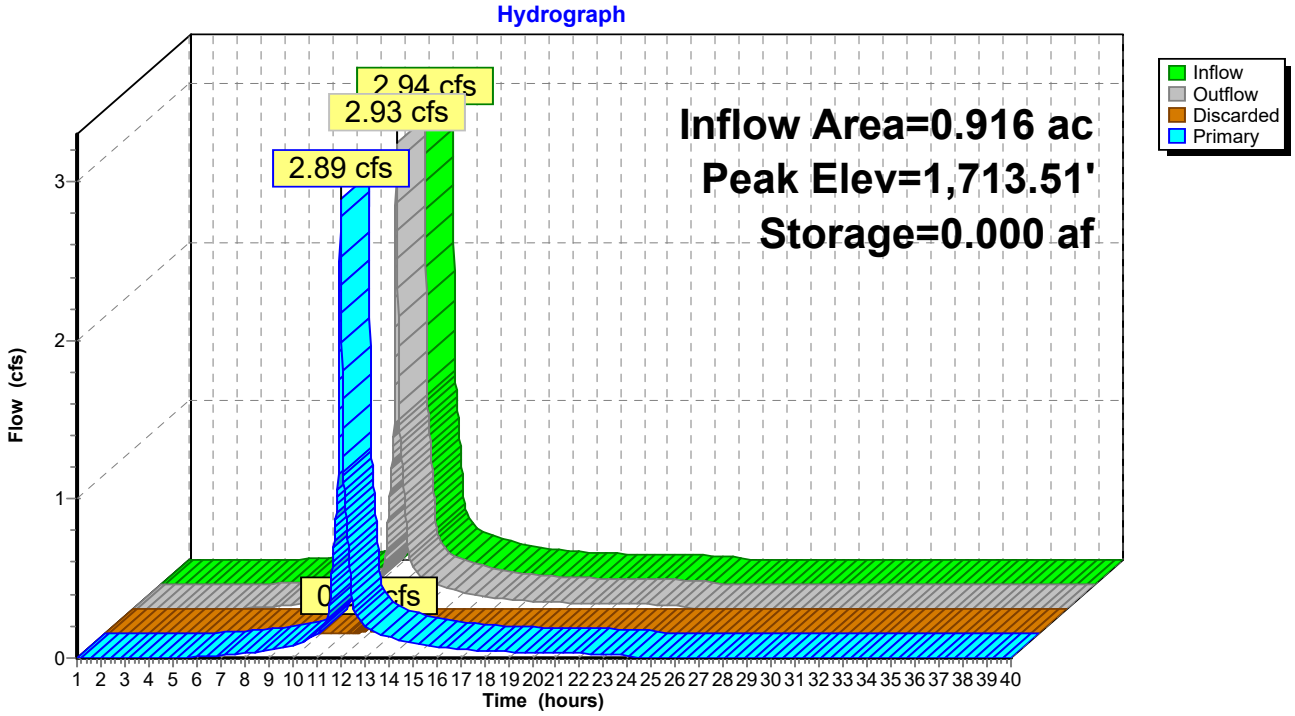
3,299.9 cf Field - 174.1 cf Chambers = 3,125.8 cf Stone x 40.0% Voids = 1,250.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,424.4 cf = 0.033 af
Overall Storage Efficiency = 43.2%
Overall System Size = 102.00' x 21.93' x 1.48'

80 Chambers
122.2 cy Field
115.8 cy Stone



Pond 2: Two


Hydrograph
2.94 cfs
2.93 cfs
2.89 cfs
Inflow Area=0.916 ac
Peak Elev=1,713.51'
Storage=0.000 af
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)

Summary for Pond 3: three

Inflow Area = 1.047 ac, 78.95% Impervious, Inflow Depth = 2.32" for 2 Year event
Inflow = 3.36 cfs @ 12.00 hrs, Volume= 0.202 af
Outflow = 3.34 cfs @ 12.00 hrs, Volume= 0.202 af, Atten= 1%, Lag= 0.1 min
Discarded = 0.06 cfs @ 12.00 hrs, Volume= 0.004 af
Primary = 3.29 cfs @ 12.00 hrs, Volume= 0.199 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 1,713.51' @ 12.00 hrs Surf.Area= 0.076 ac Storage= 0.000 af

Plug-Flow detention time= 0.1 min calculated for 0.202 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (788.8 - 788.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	1,713.50'	0.042 af	**21.93'W x 150.00'L x 1.48'H Field A** 0.111 af Overall - 0.006 af Embedded = 0.106 af x 40.0% Voids
#2A	1,713.83'	0.006 af	**CPP single-wall 4"** x 112 Inside #1 Inside= 4.0"W x 4.0"H => 0.11 sf x 20.00'L = 2.2 cf Outside= 4.7"W x 4.7"H => 0.11 sf x 20.00'L = 2.2 cf 16 Rows of 7 Chambers
		0.048 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	1,712.00'	**6.0" Round Culvert X 6.00** L= 150.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,712.00' / 1,711.00' S= 0.0067 '/' Cc= 0.900 n= 0.011, Flow Area= 0.20 sf
#2	Discarded	1,713.50'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.00'

Discarded OutFlow Max=0.08 cfs @ 12.00 hrs HW=1,713.51' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.08 cfs)

Primary OutFlow Max=4.24 cfs @ 12.00 hrs HW=1,713.51' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 4.24 cfs @ 3.60 fps)

Pond 3: three - Chamber Wizard Field A

Chamber Model = CPP single-wall 4" (Single-wall corrugated HDPE pipe)
Inside= 4.0"W x 4.0"H => 0.11 sf x 20.00'L = 2.2 cf
Outside= 4.7"W x 4.7"H => 0.11 sf x 20.00'L = 2.2 cf

4.7" Wide + 12.0" Spacing = 16.7" C-C Row Spacing

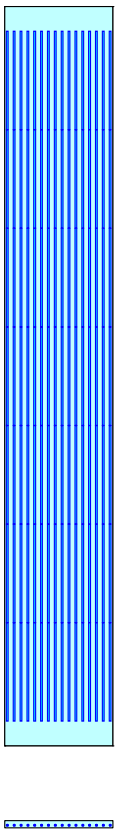
7 Chambers/Row x 20.00' Long = 140.00' Row Length +60.0" End Stone x 2 = 150.00' Base Length
16 Rows x 4.7" Wide + 12.0" Spacing x 15 + 4.0" Side Stone x 2 = 21.93' Base Width
4.0" Base + 4.7" Chamber Height + 9.0" Cover = 1.48' Field Height

112 Chambers x 2.2 cf = 243.8 cf Chamber Storage

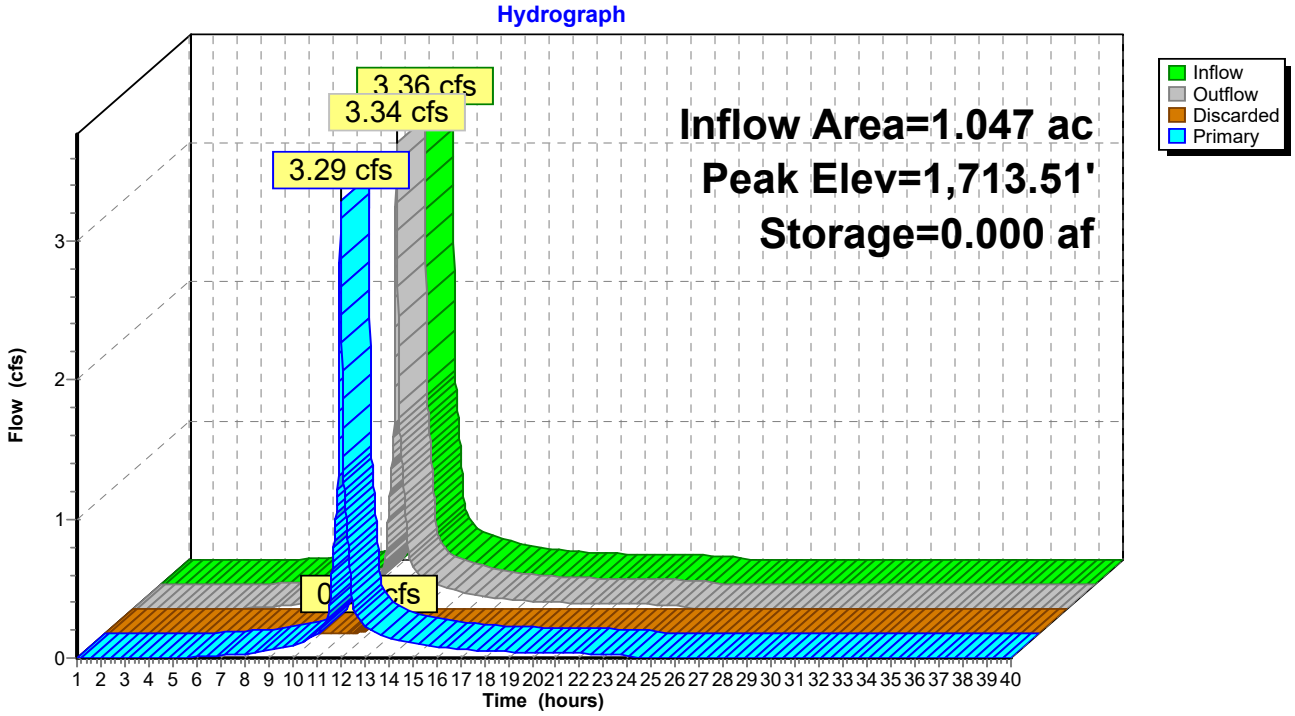
4,852.7 cf Field - 243.8 cf Chambers = 4,609.0 cf Stone x 40.0% Voids = 1,843.6 cf Stone Storage

Chamber Storage + Stone Storage = 2,087.4 cf = 0.048 af
Overall Storage Efficiency = 43.0%
Overall System Size = 150.00' x 21.93' x 1.48'

112 Chambers
179.7 cy Field
170.7 cy Stone



Pond 3: three


Hydrograph
3.36 cfs
3.34 cfs
3.29 cfs
Inflow Area=1.047 ac
Peak Elev=1,713.51'
Storage=0.000 af
Inflow
Outflow
Discarded
Primary
Flow (cfs)
0
1
2
3
Time (hours)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

Summary for Pond DP up: Dry Basin

Inflow Area = 1.876 ac, 0.00% Impervious, Inflow Depth = 0.90" for 2 Year event
Inflow = 2.24 cfs @ 12.00 hrs, Volume= 0.141 af
Outflow = 0.07 cfs @ 16.98 hrs, Volume= 0.048 af, Atten= 97%, Lag= 298.7 min
Primary = 0.07 cfs @ 16.98 hrs, Volume= 0.048 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1,731.40' @ 16.98 hrs Surf.Area= 0.082 ac Storage= 0.105 af

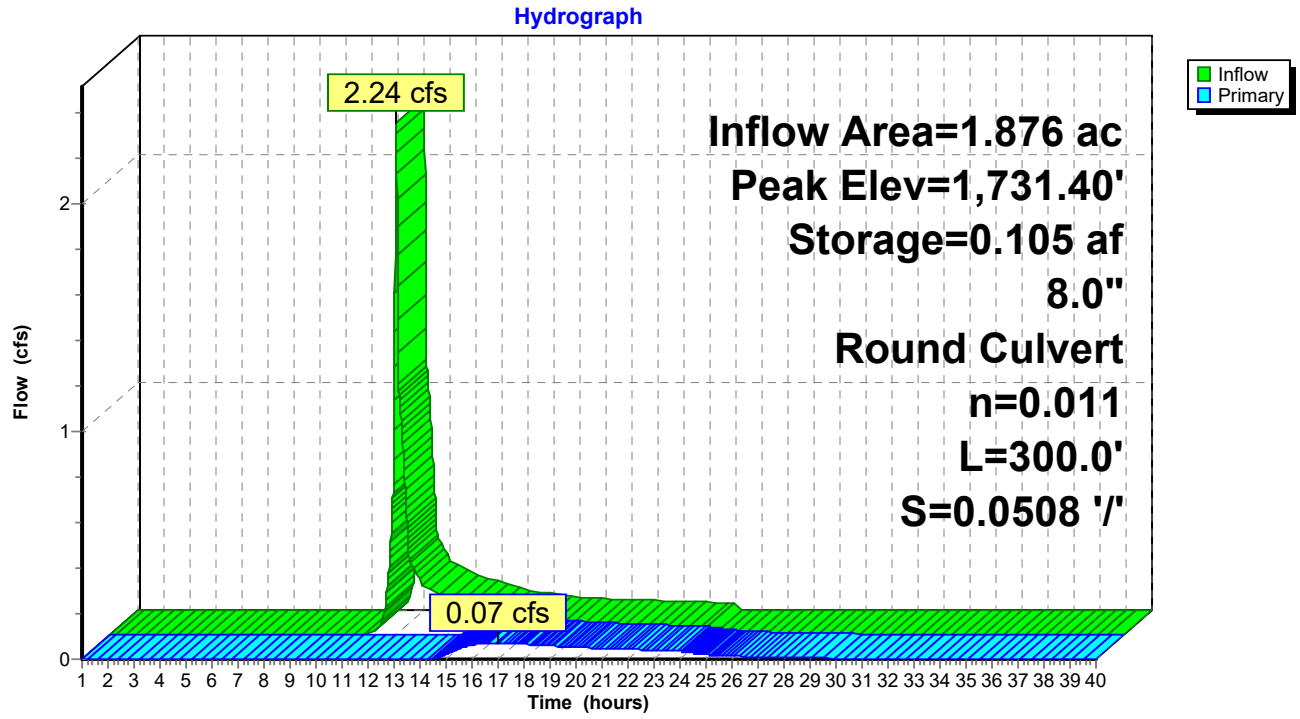
Plug-Flow detention time= 510.3 min calculated for 0.048 af (34% of inflow)
Center-of-Mass det. time= 366.5 min (1,229.1 - 862.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,730.00'	0.357 af	**45.00'W x 65.00'L x 4.00'H Hillside pond Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	1,731.25'	**8.0" Round Culvert** L= 300.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,731.25' / 1,716.00' S= 0.0508 '/' Cc= 0.900 n= 0.011, Flow Area= 0.35 sf

Primary OutFlow Max=0.07 cfs @ 16.98 hrs HW=1,731.40' (Free Discharge)
1=Culvert (Inlet Controls 0.07 cfs @ 1.18 fps)

Pond DP up: Dry Basin



Summary for Pond DPe: Pond

[79] Warning: Submerged Pond FBe Primary device # 1 OUTLET by 1.61'

Inflow Area = 7.028 ac, 1.63% Impervious, Inflow Depth = 0.95" for 2 Year event
Inflow = 4.62 cfs @ 12.37 hrs, Volume= 0.558 af
Outflow = 4.37 cfs @ 12.45 hrs, Volume= 0.558 af, Atten= 5%, Lag= 5.1 min
Primary = 4.37 cfs @ 12.45 hrs, Volume= 0.558 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 1,707.61' @ 12.45 hrs Surf.Area= 0.022 ac Storage= 0.024 af

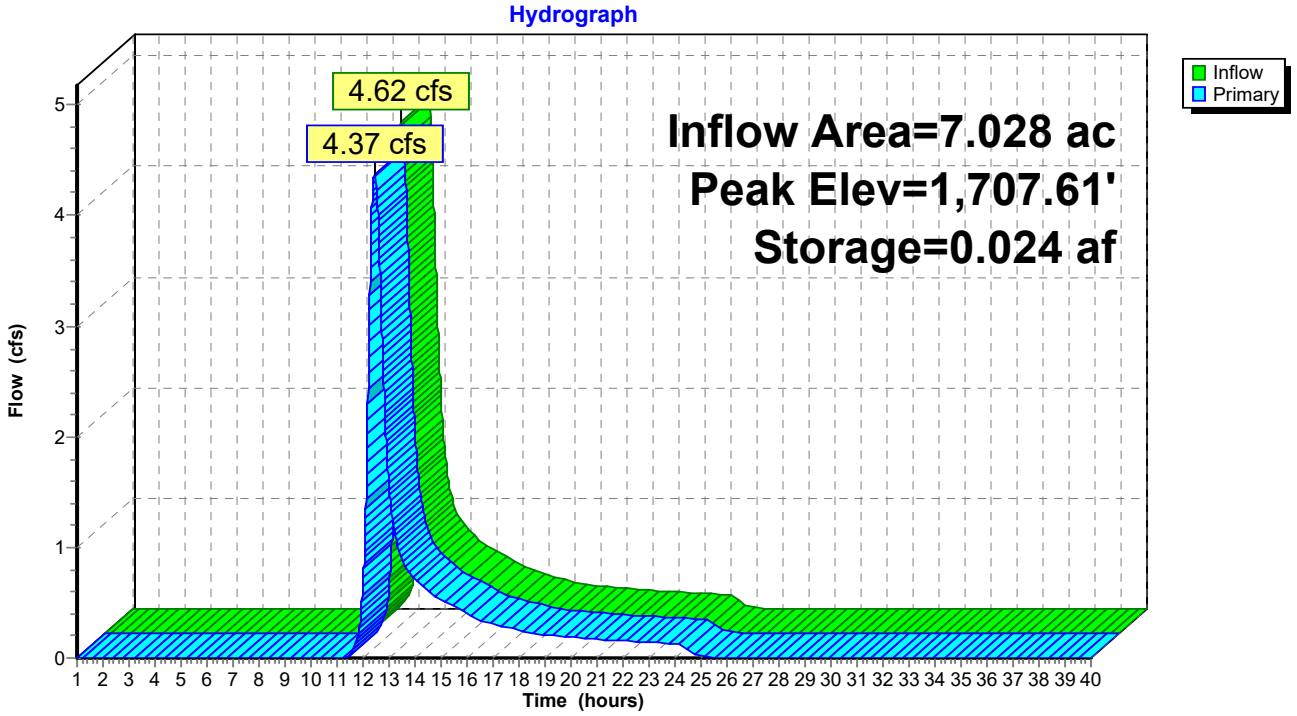
Plug-Flow detention time= 6.8 min calculated for 0.558 af (100% of inflow)
Center-of-Mass det. time= 6.8 min (890.3 - 883.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,706.00'	0.105 af	**10.00'W x 38.00'L x 4.00'H Pond Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	1,706.00'	**15.0" Round Culvert** L= 35.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,706.00' / 1,706.00' S= 0.0000 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Primary	1,708.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=4.38 cfs @ 12.45 hrs HW=1,707.61' (Free Discharge)
1=Culvert (Barrel Controls 4.38 cfs @ 3.60 fps)
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond DPe: Pond



Summary for Pond DPw: Dry pond

[81] Warning: Exceeded Pond FBw by 0.13' @ 19.18 hrs

Inflow Area = 2.826 ac, 3.66% Impervious, Inflow Depth = 1.50" for 2 Year event
Inflow = 3.40 cfs @ 12.16 hrs, Volume= 0.354 af
Outflow = 1.89 cfs @ 12.47 hrs, Volume= 0.289 af, Atten= 44%, Lag= 18.4 min
Primary = 1.89 cfs @ 12.47 hrs, Volume= 0.289 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 1,703.17' @ 12.47 hrs Surf.Area= 0.048 ac Storage= 0.094 af

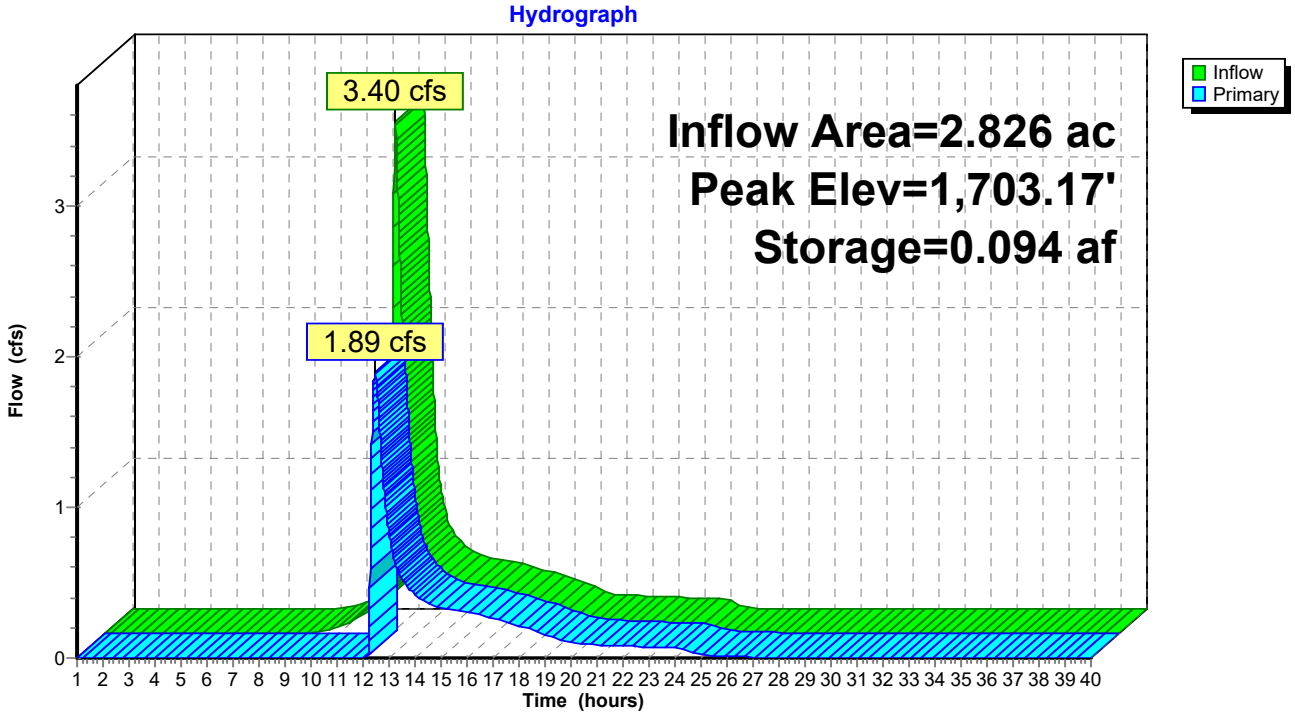
Plug-Flow detention time= 133.8 min calculated for 0.289 af (82% of inflow)
Center-of-Mass det. time= 61.1 min (932.5 - 871.3)

Volume	Invert	Avail.Storage	Storage Description
#1	1,700.00'	0.153 af	**16.00'W x 40.00'L x 4.25'H Prismatoid Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	1,702.50'	**15.0" Round Culvert** L= 40.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,702.50' / 1,699.00' S= 0.0875 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Primary	1,700.00'	**4.0" Round Culvert X 0.00** L= 30.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,700.00' / 1,696.00' S= 0.1333 '/' Cc= 0.900 n= 0.011, Flow Area= 0.09 sf
#3	Primary	1,703.50'	**8.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=1.89 cfs @ 12.47 hrs HW=1,703.17' (Free Discharge)
- **1=Culvert** (Inlet Controls 1.89 cfs @ 2.80 fps)
- **2=Culvert** (Controls 0.00 cfs)
- **3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond DPw: Dry pond



Summary for Pond FBe: ForeBay

Inflow Area = 7.028 ac, 1.63% Impervious, Inflow Depth = 0.95" for 2 Year event
Inflow = 4.64 cfs @ 12.35 hrs, Volume= 0.558 af
Outflow = 4.62 cfs @ 12.37 hrs, Volume= 0.558 af, Atten= 0%, Lag= 0.9 min
Primary = 4.62 cfs @ 12.37 hrs, Volume= 0.558 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1,708.70' @ 12.37 hrs Surf.Area= 0.014 ac Storage= 0.008 af

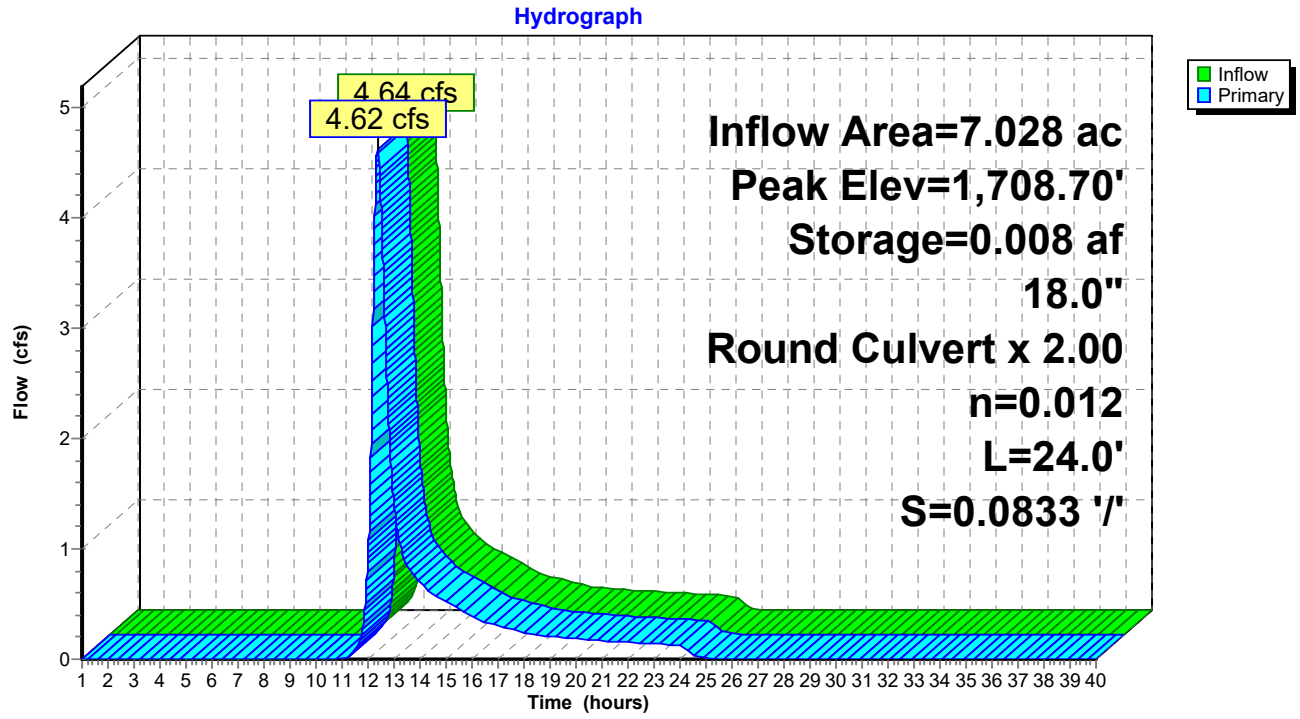
Plug-Flow detention time= 2.7 min calculated for 0.558 af (100% of inflow)
Center-of-Mass det. time= 2.7 min (883.5 - 880.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,708.00'	0.109 af	**10.00'W x 40.00'L x 4.00'H Prismatoid Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	1,708.00'	**18.0" Round Culvert X 2.00** L= 24.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,708.00' / 1,706.00' S= 0.0833 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=4.62 cfs @ 12.37 hrs HW=1,708.70' (Free Discharge)
1=Culvert (Inlet Controls 4.62 cfs @ 2.85 fps)

Pond FBe: ForeBay



Summary for Pond FBw: Forebay

[62] Hint: Exceeded Reach 8R OUTLET depth by 1.97' @ 12.18 hrs

Inflow Area = 2.826 ac, 3.66% Impervious, Inflow Depth = 1.50" for 2 Year event
Inflow = 5.25 cfs @ 12.08 hrs, Volume= 0.354 af
Outflow = 3.40 cfs @ 12.16 hrs, Volume= 0.354 af, Atten= 35%, Lag= 5.1 min
Primary = 3.40 cfs @ 12.16 hrs, Volume= 0.354 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1,704.31' @ 12.16 hrs Surf.Area= 0.050 ac Storage= 0.067 af

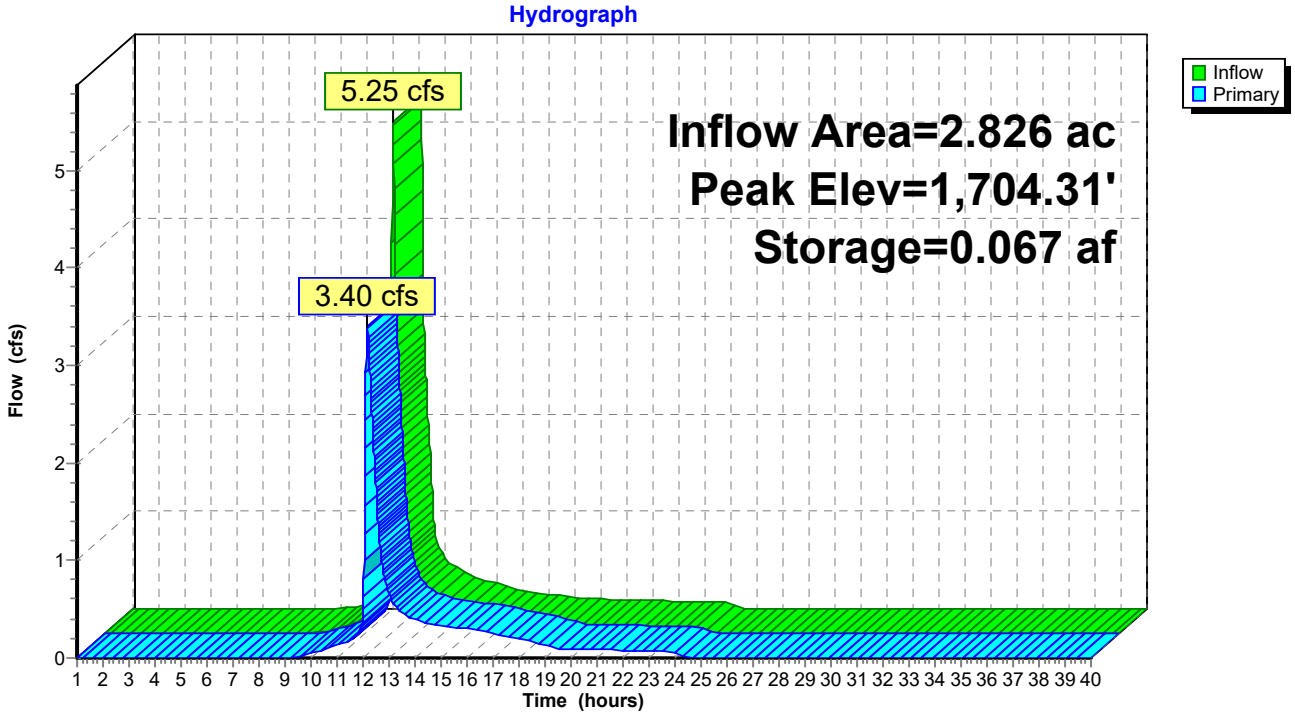
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 33.2 min (871.3 - 838.1)

Volume	Invert	Avail.Storage	Storage Description
#1	1,702.50'	0.237 af	**16.00'W x 70.00'L x 4.25'H Prismatoid Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	1,703.50'	**18.0" Round Culvert** L= 40.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,703.50' / 1,703.00' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Primary	1,702.25'	**4.0" Round Culvert** L= 35.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,702.25' / 1,702.00' S= 0.0071 '/' Cc= 0.900 n= 0.011, Flow Area= 0.09 sf

Primary OutFlow Max=3.39 cfs @ 12.16 hrs HW=1,704.31' (Free Discharge)
1=Culvert (Inlet Controls 2.96 cfs @ 3.06 fps)
2=Culvert (Barrel Controls 0.44 cfs @ 4.99 fps)

Pond FBw: Forebay

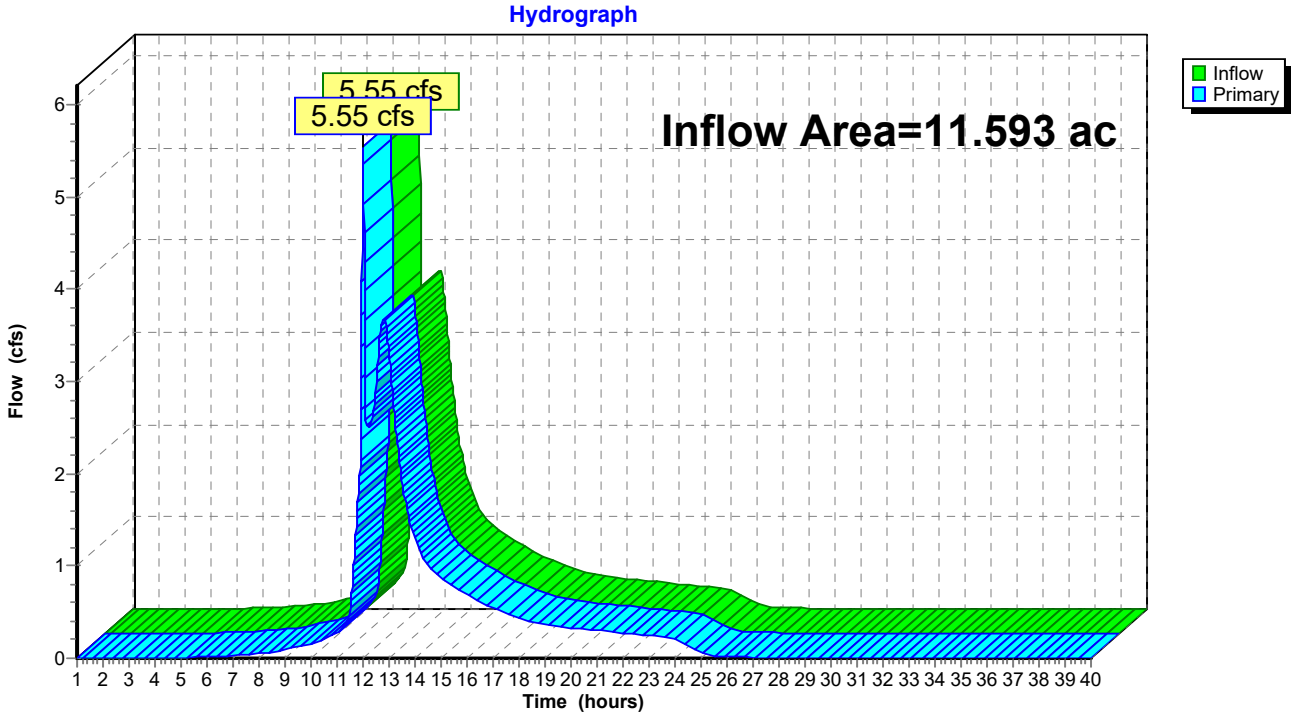


Summary for Link 7L: wetland

Inflow Area = 11.593 ac, 11.58% Impervious, Inflow Depth > 1.01" for 2 Year event
Inflow = 5.55 cfs @ 12.00 hrs, Volume= 0.972 af
Primary = 5.55 cfs @ 12.00 hrs, Volume= 0.972 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs

Link 7L: wetland



Time span=1.00-40.00 hrs, dt=0.01 hrs, 3901 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Upgradient forest Runoff Area=349,185 sf 0.00% Impervious Runoff Depth=1.96"
Flow Length=1,729' Tc=54.5 min CN=73 Runoff=7.57 cfs 1.312 af

Subcatchment 2S: Easterly Watershed Runoff Area=306,150 sf 1.63% Impervious Runoff Depth=2.04"
Flow Length=1,201' Tc=23.3 min CN=74 Runoff=10.49 cfs 1.196 af

Subcatchment 4S: upgradient forest by-pass Runoff Area=81,700 sf 0.00% Impervious Runoff Depth=1.96"
Tc=0.0 min CN=73 Runoff=5.22 cfs 0.307 af

Subcatchment 6S: development area Runoff Area=123,100 sf 3.66% Impervious Runoff Depth=2.81"
Tc=0.0 min CN=83 Runoff=11.36 cfs 0.661 af

Subcatchment I: Greenhouse 1 Runoff Area=28,500 sf 78.95% Impervious Runoff Depth=3.80"
Flow Length=25' Slope=0.2000 '/' Tc=0.2 min CN=93 Runoff=3.35 cfs 0.207 af

Subcatchment II: Greenhouse 2 Runoff Area=39,900 sf 78.95% Impervious Runoff Depth=3.80"
Flow Length=25' Slope=0.2000 '/' Tc=0.2 min CN=93 Runoff=4.68 cfs 0.290 af

Subcatchment III: Greenhouse 3 Runoff Area=45,600 sf 78.95% Impervious Runoff Depth=3.80"
Flow Length=25' Slope=0.2000 '/' Tc=0.2 min CN=93 Runoff=5.35 cfs 0.331 af

Reach 8R: Swale Avg. Flow Depth=0.69' Max Vel=4.36 fps Inflow=11.36 cfs 0.661 af
n=0.035 L=600.0' S=0.0300 '/' Capacity=93.83 cfs Outflow=10.06 cfs 0.661 af

Reach DPEast: Design Point Inflow=11.44 cfs 1.481 af
Outflow=11.44 cfs 1.481 af

Reach DPWest: Design Point Inflow=12.09 cfs 2.650 af
Outflow=12.09 cfs 2.650 af

Pond 1: one Peak Elev=1,713.56' Storage=0.001 af Inflow=3.35 cfs 0.207 af
Discarded=0.06 cfs 0.004 af Primary=2.86 cfs 0.203 af Outflow=2.92 cfs 0.207 af

Pond 2: Two Peak Elev=1,713.68' Storage=0.004 af Inflow=4.68 cfs 0.290 af
Discarded=0.05 cfs 0.004 af Primary=3.71 cfs 0.286 af Outflow=3.76 cfs 0.290 af

Pond 3: three Peak Elev=1,713.61' Storage=0.003 af Inflow=5.35 cfs 0.331 af
Discarded=0.08 cfs 0.006 af Primary=4.34 cfs 0.325 af Outflow=4.42 cfs 0.331 af

Pond DP up: Dry Basin Peak Elev=1,731.82' Storage=0.139 af Inflow=5.22 cfs 0.307 af
8.0" Round Culvert n=0.011 L=300.0' S=0.0508 '/' Outflow=0.72 cfs 0.214 af

Pond DPe: Pond Peak Elev=1,708.28' Storage=0.040 af Inflow=10.47 cfs 1.196 af
Outflow=10.45 cfs 1.196 af

Pond DPw: Dry pond Peak Elev=1,703.73' Storage=0.123 af Inflow=7.43 cfs 0.661 af
Outflow=6.71 cfs 0.595 af

Pond FBe: ForeBay Peak Elev=1,709.14' Storage=0.015 af Inflow=10.49 cfs 1.196 af
18.0" Round Culvert x 2.00 n=0.012 L=24.0' S=0.0833 '/' Outflow=10.47 cfs 1.196 af

Pond FBw: Forebay Peak Elev=1,704.91' Storage=0.100 af Inflow=10.06 cfs 0.661 af
Outflow=7.43 cfs 0.661 af

Link 7L: wetland Inflow=8.94 cfs 2.054 af
Primary=8.94 cfs 2.054 af

Total Runoff Area = 22.363 ac Runoff Volume = 4.303 af Average Runoff Depth = 2.31"
89.79% Pervious = 20.079 ac 10.21% Impervious = 2.284 ac

Summary for Subcatchment 1S: Upgradient forest

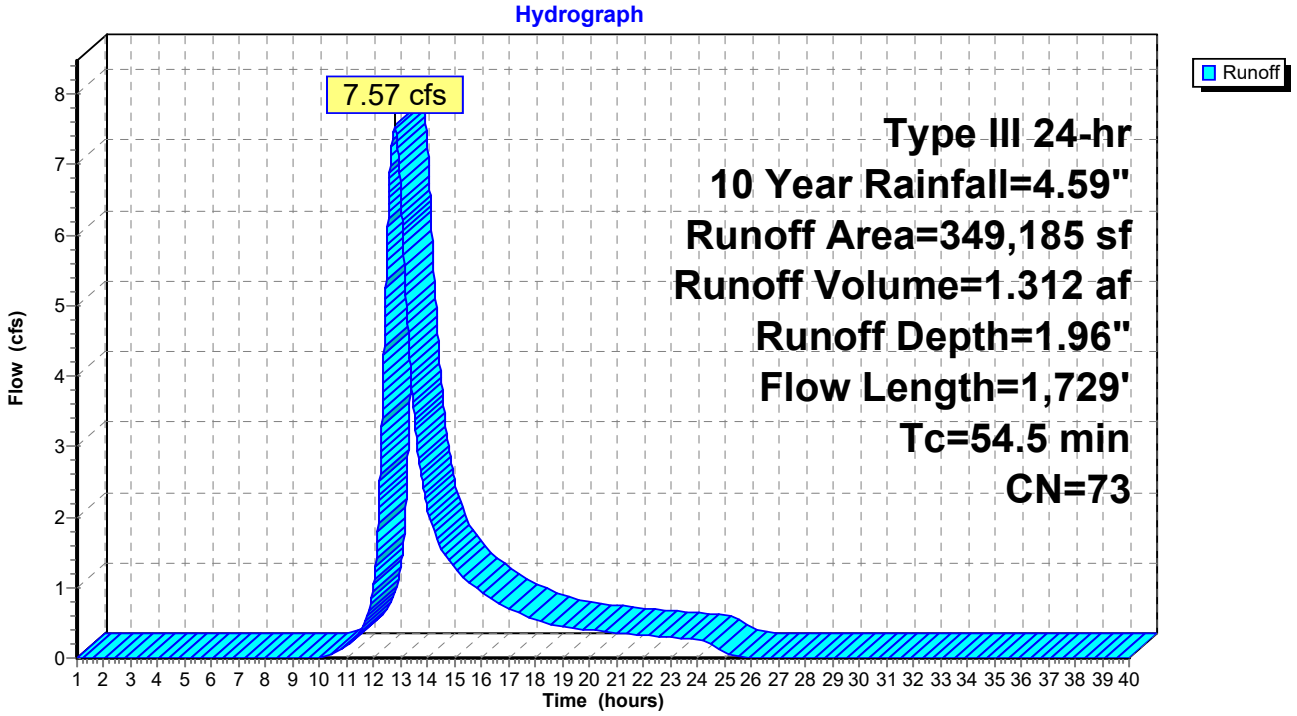
Runoff = 7.57 cfs @ 12.78 hrs, Volume= 1.312 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.59"

	Area (sf)	CN	Description
*	349,185	73	Woods, Fair, HSG C (fair condition C/D soil)
	349,185		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.8	50	0.0100	0.03		**Sheet Flow, Sheet Flow** Woods: Dense underbrush n= 0.800 P2= 2.90"
1.9	138	0.0580	1.20		**Shallow Concentrated Flow, hillside segment 1** Woodland Kv= 5.0 fps
0.8	127	0.2519	2.51		**Shallow Concentrated Flow, Hillside segement 2** Woodland Kv= 5.0 fps
5.8	461	0.0694	1.32		**Shallow Concentrated Flow, Hillside Segment 3** Woodland Kv= 5.0 fps
4.9	258	0.0310	0.88		**Shallow Concentrated Flow, Hillside Segment 4** Woodland Kv= 5.0 fps
11.3	695	0.0417	1.02		**Shallow Concentrated Flow, Hillsdie Segment 5** Woodland Kv= 5.0 fps
54.5	1,729	Total			

Subcatchment 1S: Upgradient forest



Summary for Subcatchment 2S: Easterly Watershed

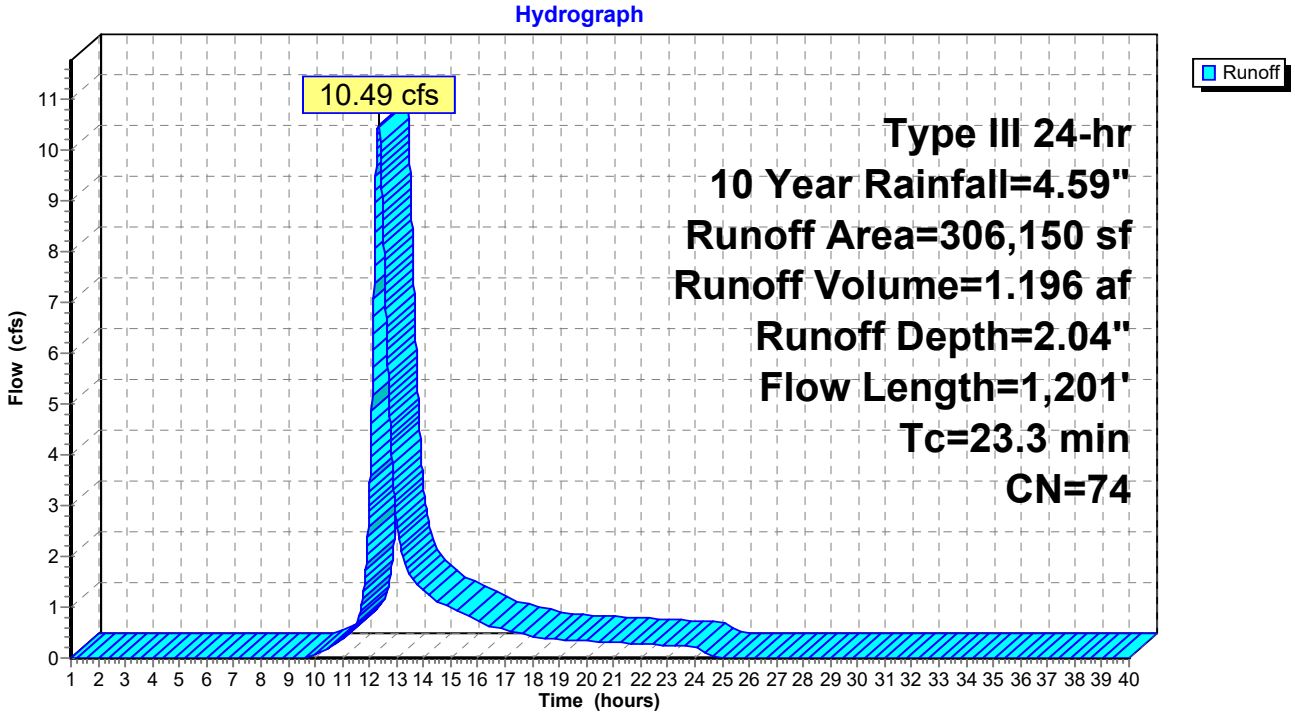
Runoff = 10.49 cfs @ 12.34 hrs, Volume= 1.196 af, Depth= 2.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.59"

Area (sf)	CN	Description
4,500	73	Woods, Fair, HSG C
5,000	98	Roofs, HSG C
36,500	96	Gravel surface, HSG C
10,000	74	>75% Grass cover, Good, HSG C
12,900	71	Meadow, non-grazed, HSG C
237,250	70	Woods, Good, HSG C
306,150	74	Weighted Average
301,150		98.37% Pervious Area
5,000		1.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	50	0.0200	0.06		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.90"
2.7	277	0.1155	1.70		**Shallow Concentrated Flow, Hillside Segment 1** Woodland Kv= 5.0 fps
6.9	524	0.0648	1.27		**Shallow Concentrated Flow, Hillside Segemnt #2** Woodland Kv= 5.0 fps
0.7	350	0.0500	7.85	23.56	**Channel Flow,** Area= 3.0 sf Perim= 8.0' r= 0.38' n= 0.022 Earth, clean & straight
23.3	1,201	Total			

Subcatchment 2S: Easterly Watershed



Summary for Subcatchment 4S: upgradient forest by-pass

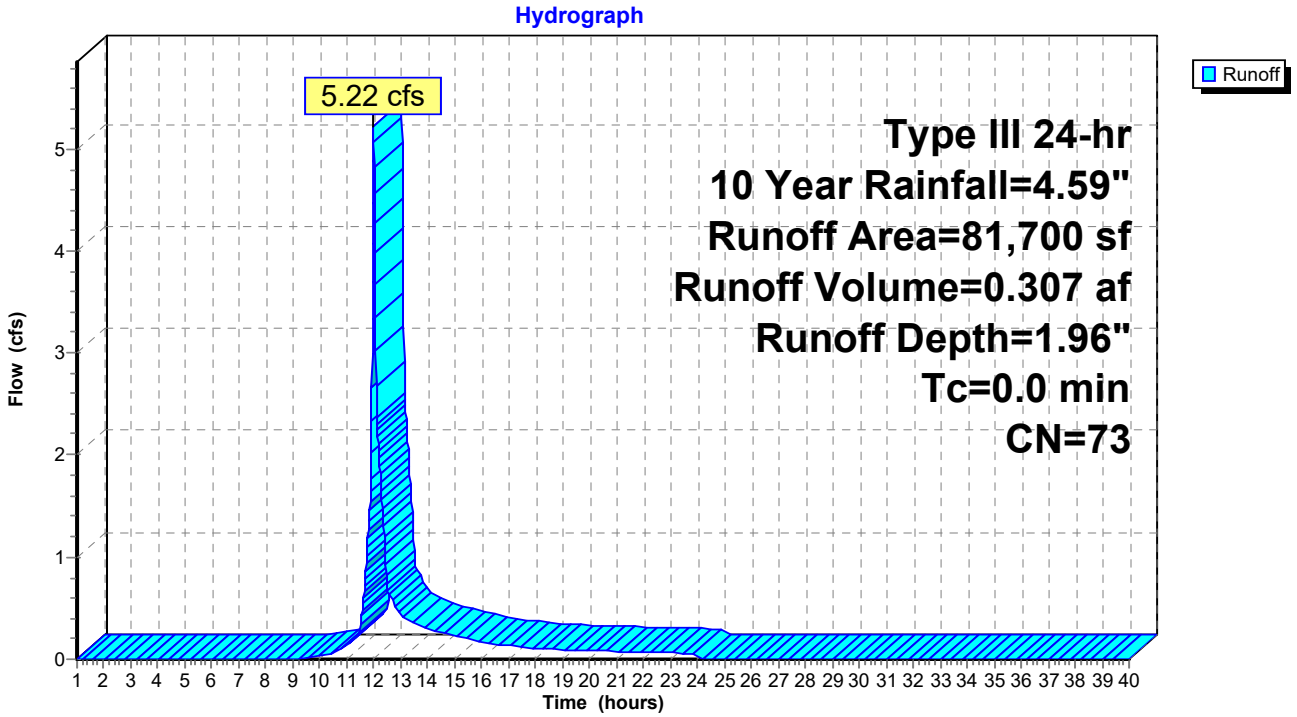
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 5.22 cfs @ 12.00 hrs, Volume= 0.307 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.59"

Area (sf)	CN	Description
76,000	73	Woods, Fair, HSG C
5,700	71	Meadow, non-grazed, HSG C
81,700	73	Weighted Average
81,700		100.00% Pervious Area

Subcatchment 4S: upgradient forest by-pass



Summary for Subcatchment 6S: development area

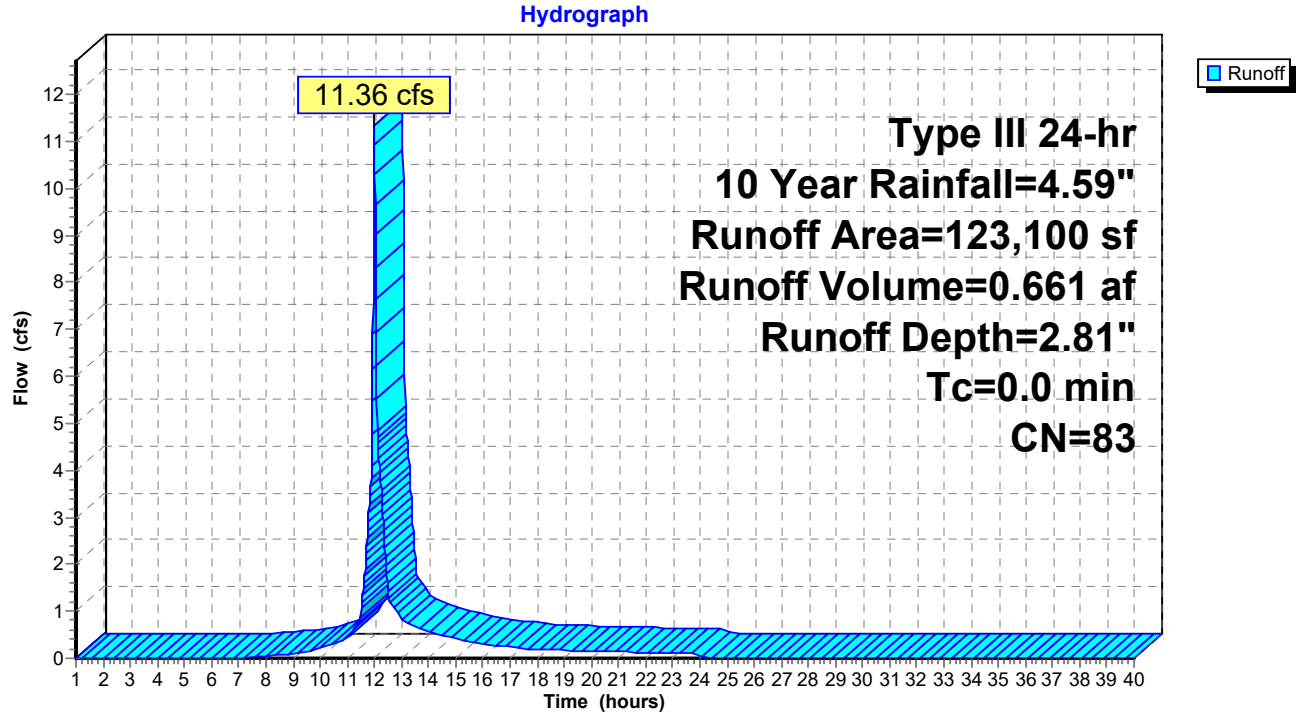
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 11.36 cfs @ 12.00 hrs, Volume= 0.661 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.59"

	Area (sf)	CN	Description
	54,800	96	Gravel surface, HSG C
*	4,500	98	rooftop
	63,800	71	Meadow, non-grazed, HSG C
	123,100	83	Weighted Average
	118,600		96.34% Pervious Area
	4,500		3.66% Impervious Area

Subcatchment 6S: development area



Summary for Subcatchment I: Greenhouse 1

[49] Hint: Tc<2dt may require smaller dt

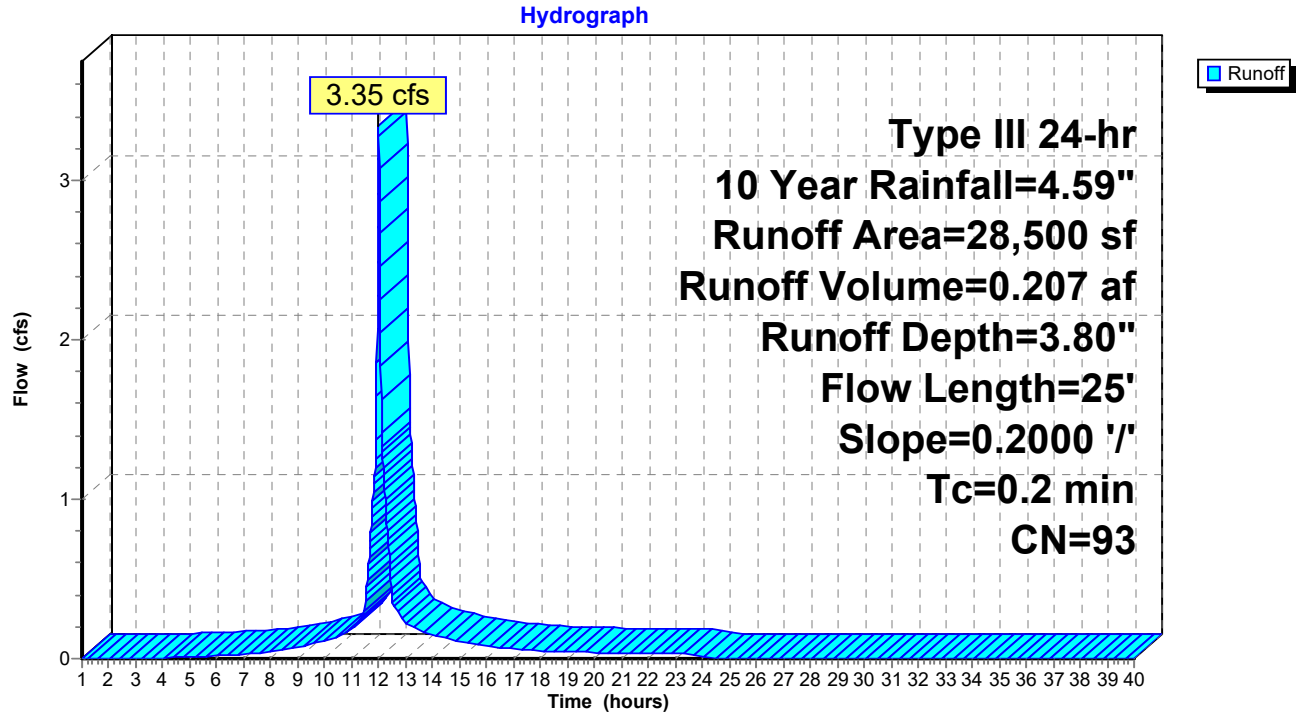
Runoff = 3.35 cfs @ 12.00 hrs, Volume= 0.207 af, Depth= 3.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.59"

	Area (sf)	CN	Description
*	22,500	98	Roof
	6,000	74	>75% Grass cover, Good, HSG C
	28,500	93	Weighted Average
	6,000		21.05% Pervious Area
	22,500		78.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	25	0.2000	2.49		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 2.90"

Subcatchment I: Greenhouse 1



Summary for Subcatchment II: Greenhouse 2

[49] Hint: Tc<2dt may require smaller dt

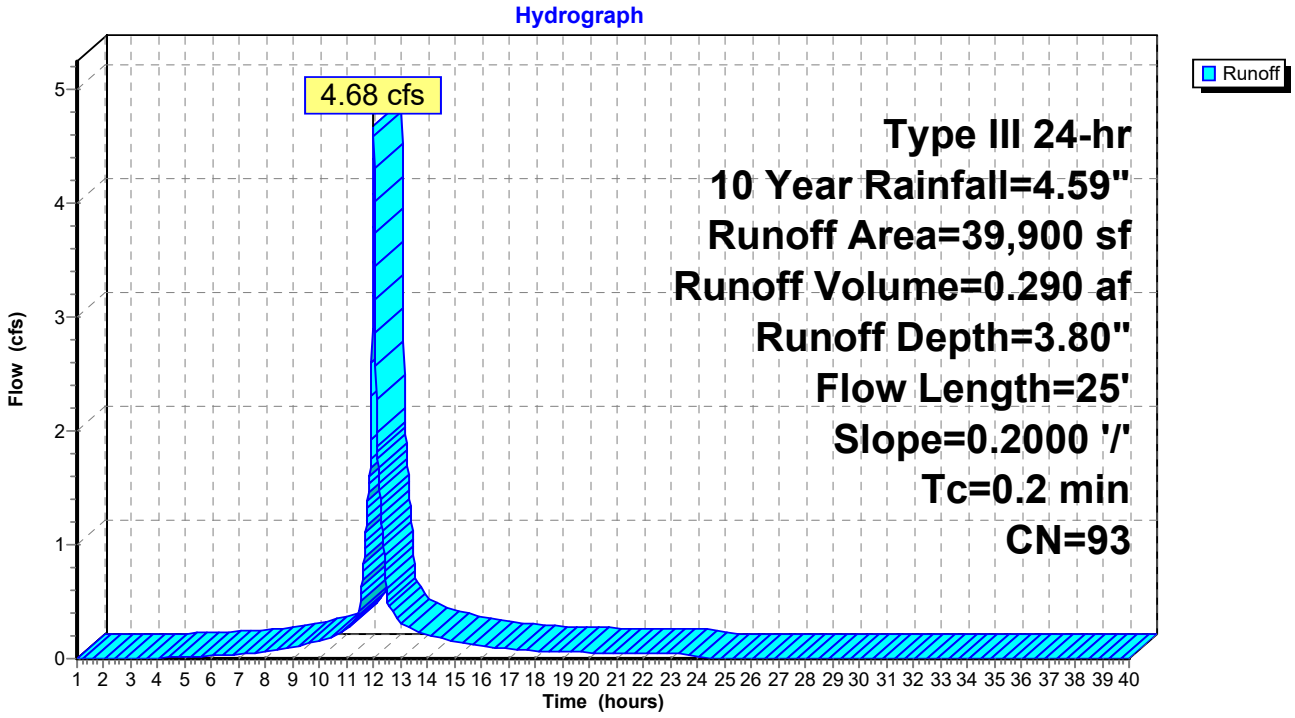
Runoff = 4.68 cfs @ 12.00 hrs, Volume= 0.290 af, Depth= 3.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.59"

	Area (sf)	CN	Description
*	31,500	98	Roof
	8,400	74	>75% Grass cover, Good, HSG C
	39,900	93	Weighted Average
	8,400		21.05% Pervious Area
	31,500		78.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	25	0.2000	2.49		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 2.90"

Subcatchment II: Greenhouse 2



Summary for Subcatchment III: Greenhouse 3

[49] Hint: Tc<2dt may require smaller dt

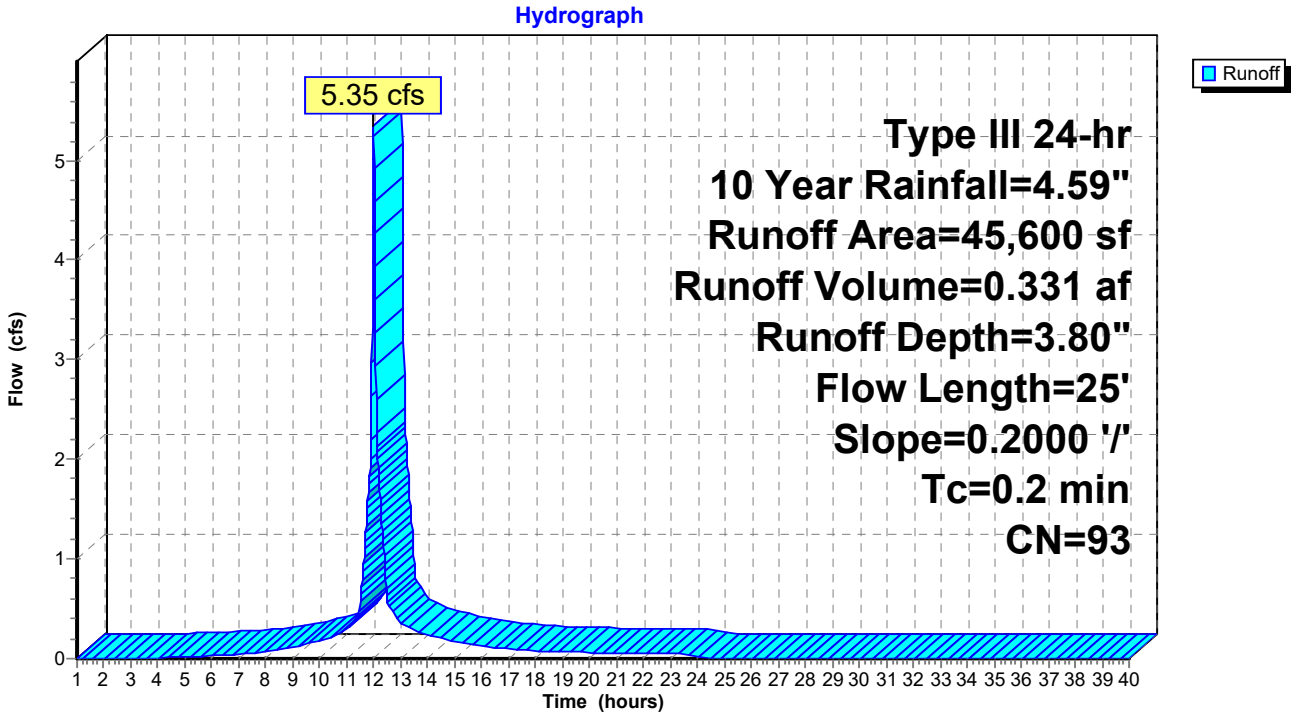
Runoff = 5.35 cfs @ 12.00 hrs, Volume= 0.331 af, Depth= 3.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Rainfall=4.59"

	Area (sf)	CN	Description
*	36,000	98	Roof
	9,600	74	>75% Grass cover, Good, HSG C
	45,600	93	Weighted Average
	9,600		21.05% Pervious Area
	36,000		78.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	25	0.2000	2.49		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 2.90"

Subcatchment III: Greenhouse 3



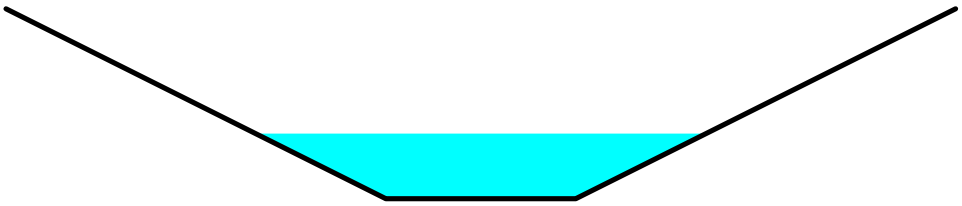
Summary for Reach 8R: Swale

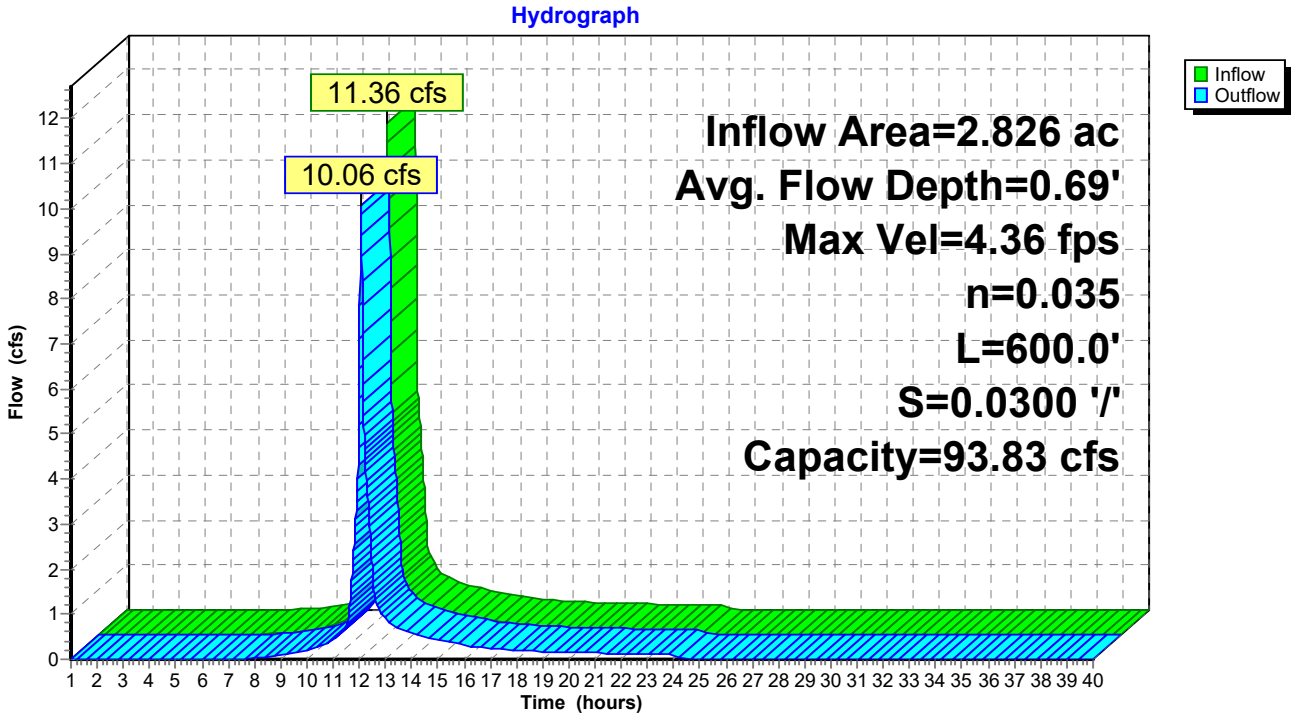
Inflow Area = 2.826 ac, 3.66% Impervious, Inflow Depth = 2.81" for 10 Year event
Inflow = 11.36 cfs @ 12.00 hrs, Volume= 0.661 af
Outflow = 10.06 cfs @ 12.06 hrs, Volume= 0.661 af, Atten= 11%, Lag= 3.7 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.36 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 1.28 fps, Avg. Travel Time= 7.8 min

Peak Storage= 1,388 cf @ 12.02 hrs
Average Depth at Peak Storage= 0.69'
Bank-Full Depth= 2.00' Flow Area= 12.0 sf, Capacity= 93.83 cfs

2.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 600.0' Slope= 0.0300 '/'
Inlet Invert= 1,720.00', Outlet Invert= 1,702.00'





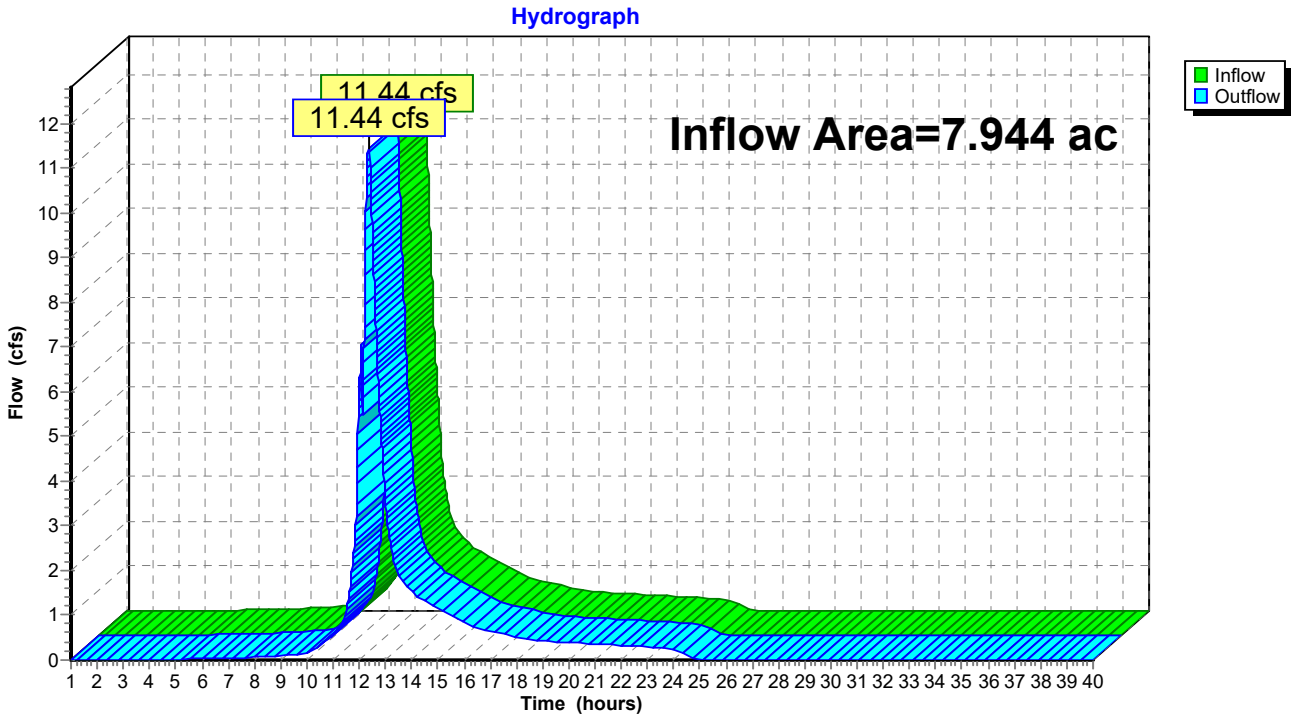
Summary for Reach DPEast: Design Point

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

Inflow Area = 7.944 ac, 10.55% Impervious, Inflow Depth = 2.24" for 10 Year event
Inflow = 11.44 cfs @ 12.35 hrs, Volume= 1.481 af
Outflow = 11.44 cfs @ 12.35 hrs, Volume= 1.481 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs

Reach DPEast: Design Point



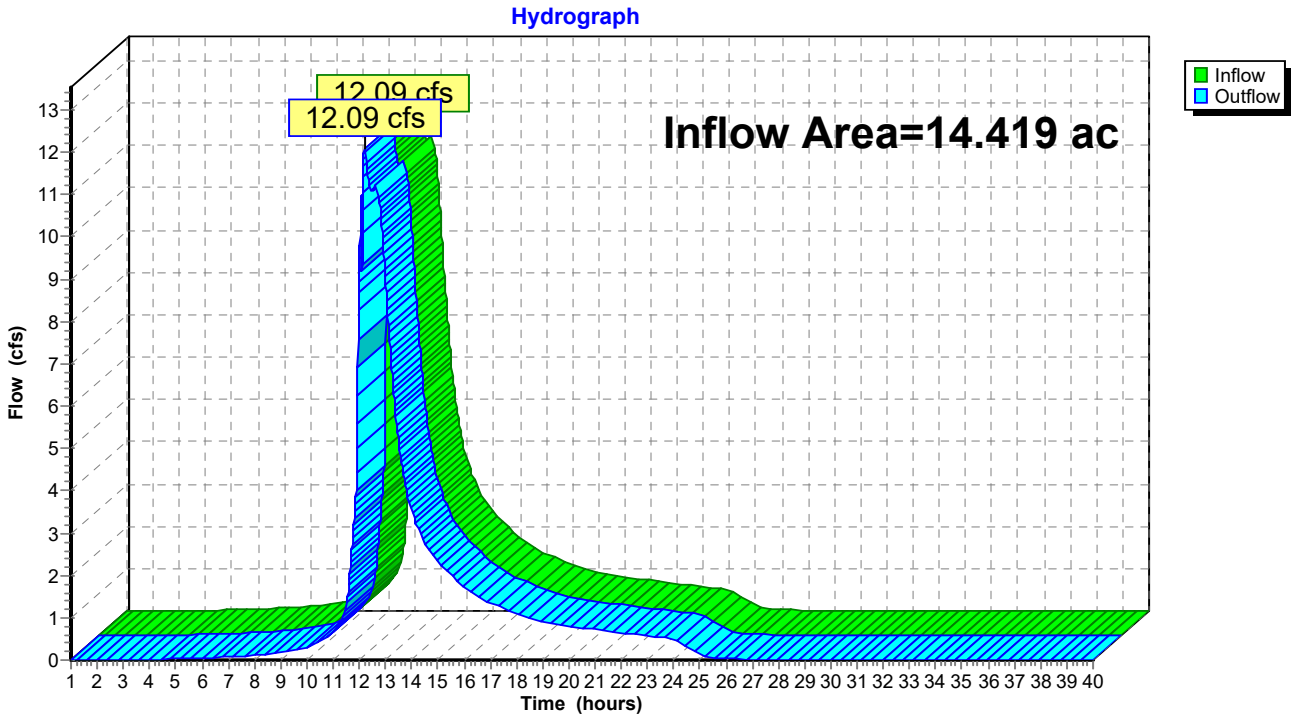
Summary for Reach DPWest: Design Point

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

Inflow Area = 14.419 ac, 10.03% Impervious, Inflow Depth > 2.21" for 10 Year event
Inflow = 12.09 cfs @ 12.20 hrs, Volume= 2.650 af
Outflow = 12.09 cfs @ 12.20 hrs, Volume= 2.650 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs

Reach DPWest: Design Point



Summary for Pond 1: one

Inflow Area = 0.654 ac, 78.95% Impervious, Inflow Depth = 3.80" for 10 Year event
Inflow = 3.35 cfs @ 12.00 hrs, Volume= 0.207 af
Outflow = 2.92 cfs @ 12.03 hrs, Volume= 0.207 af, Atten= 13%, Lag= 1.5 min
Discarded = 0.06 cfs @ 12.03 hrs, Volume= 0.004 af
Primary = 2.86 cfs @ 12.03 hrs, Volume= 0.203 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 1,713.56' @ 12.03 hrs Surf.Area= 0.056 ac Storage= 0.001 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (775.6 - 775.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	1,713.50'	0.032 af	**16.37'W x 150.00'L x 1.48'H Field A** 0.083 af Overall - 0.004 af Embedded = 0.079 af x 40.0% Voids
#2A	1,713.83'	0.004 af	**CPP single-wall 4"** x 84 Inside #1 Inside= 4.0"W x 4.0"H => 0.11 sf x 20.00'L = 2.2 cf Outside= 4.7"W x 4.7"H => 0.11 sf x 20.00'L = 2.2 cf 12 Rows of 7 Chambers
		0.036 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	1,712.00'	**6.0" Round Culvert X 4.00** L= 150.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,712.00' / 1,711.00' S= 0.0067 '/' Cc= 0.900 n= 0.011, Flow Area= 0.20 sf
#2	Discarded	1,713.50'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.00'

Discarded OutFlow Max=0.06 cfs @ 12.03 hrs HW=1,713.56' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=2.86 cfs @ 12.03 hrs HW=1,713.56' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 2.86 cfs @ 3.64 fps)

Pond 1: one - Chamber Wizard Field A

Chamber Model = CPP single-wall 4" (Single-wall corrugated HDPE pipe)
Inside= 4.0"W x 4.0"H => 0.11 sf x 20.00'L = 2.2 cf
Outside= 4.7"W x 4.7"H => 0.11 sf x 20.00'L = 2.2 cf

4.7" Wide + 12.0" Spacing = 16.7" C-C Row Spacing

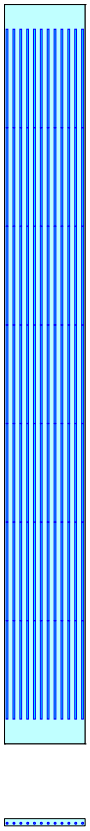
7 Chambers/Row x 20.00' Long = 140.00' Row Length +60.0" End Stone x 2 = 150.00' Base Length
12 Rows x 4.7" Wide + 12.0" Spacing x 11 + 4.0" Side Stone x 2 = 16.37' Base Width
4.0" Base + 4.7" Chamber Height + 9.0" Cover = 1.48' Field Height

84 Chambers x 2.2 cf = 182.8 cf Chamber Storage

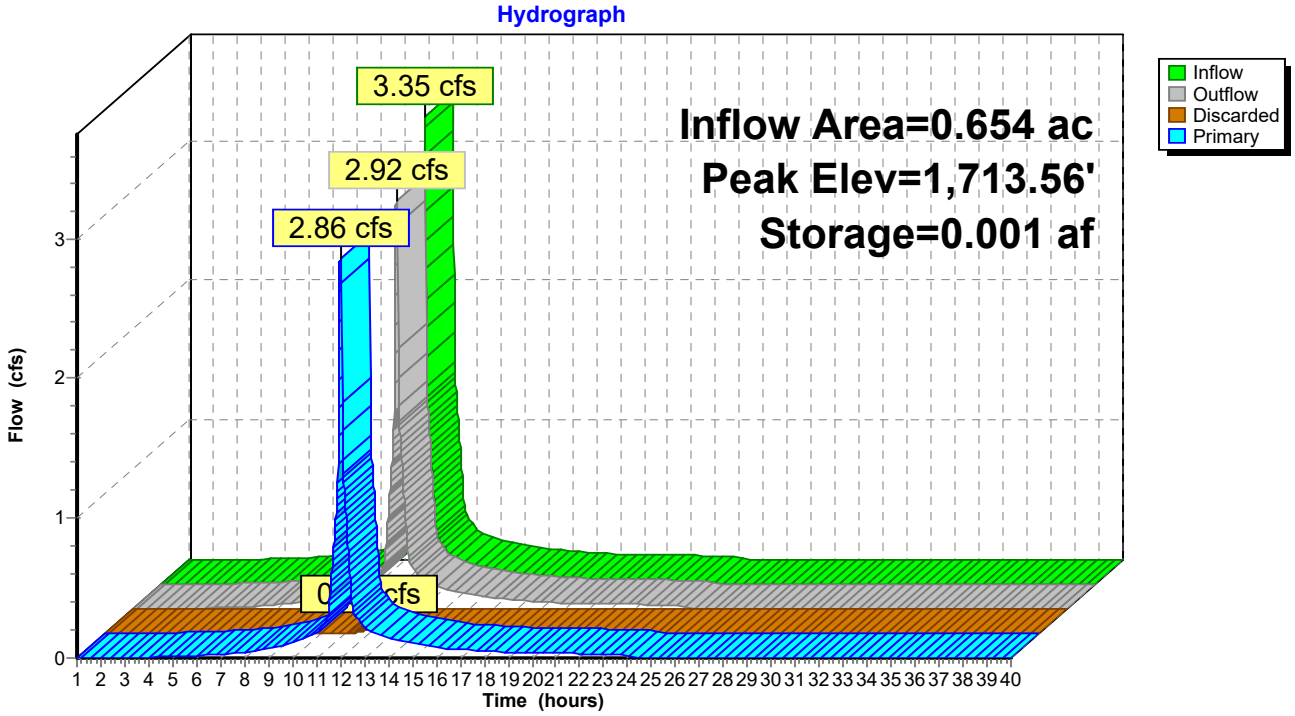
3,621.1 cf Field - 182.8 cf Chambers = 3,438.3 cf Stone x 40.0% Voids = 1,375.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,558.1 cf = 0.036 af
Overall Storage Efficiency = 43.0%
Overall System Size = 150.00' x 16.37' x 1.48'

84 Chambers
134.1 cy Field
127.3 cy Stone



Pond 1: one


Hydrograph
3.35 cfs
2.92 cfs
2.86 cfs
Inflow Area=0.654 ac
Peak Elev=1,713.56'
Storage=0.001 af
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)

Summary for Pond 2: Two

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=1)

Inflow Area = 0.916 ac, 78.95% Impervious, Inflow Depth = 3.80" for 10 Year event
Inflow = 4.68 cfs @ 12.00 hrs, Volume= 0.290 af
Outflow = 3.76 cfs @ 12.04 hrs, Volume= 0.290 af, Atten= 20%, Lag= 2.2 min
Discarded = 0.05 cfs @ 12.04 hrs, Volume= 0.004 af
Primary = 3.71 cfs @ 12.04 hrs, Volume= 0.286 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1,713.68' @ 12.04 hrs Surf.Area= 0.051 ac Storage= 0.004 af

Plug-Flow detention time= 0.1 min calculated for 0.290 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (775.6 - 775.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	1,713.50'	0.029 af	**21.93'W x 102.00'L x 1.48'H Field A** 0.076 af Overall - 0.004 af Embedded = 0.072 af x 40.0% Voids
#2A	1,713.83'	0.004 af	**CPP single-wall 4"** x 80 Inside #1 Inside= 4.0"W x 4.0"H => 0.11 sf x 20.00'L = 2.2 cf Outside= 4.7"W x 4.7"H => 0.11 sf x 20.00'L = 2.2 cf 16 Rows of 5 Chambers
		0.033 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	1,712.00'	**12.0" Round Culvert** L= 150.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,712.00' / 1,711.00' S= 0.0067 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Discarded	1,713.50'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.00'

Discarded OutFlow Max=0.05 cfs @ 12.04 hrs HW=1,713.68' (Free Discharge)
↑**2=Exfiltration** (Controls 0.05 cfs)

Primary OutFlow Max=3.70 cfs @ 12.04 hrs HW=1,713.68' (Free Discharge)
↑**1=Culvert** (Barrel Controls 3.70 cfs @ 4.72 fps)

Pond 2: Two - Chamber Wizard Field A

Chamber Model = CPP single-wall 4" (Single-wall corrugated HDPE pipe)
Inside= 4.0"W x 4.0"H => 0.11 sf x 20.00'L = 2.2 cf
Outside= 4.7"W x 4.7"H => 0.11 sf x 20.00'L = 2.2 cf

4.7" Wide + 12.0" Spacing = 16.7" C-C Row Spacing

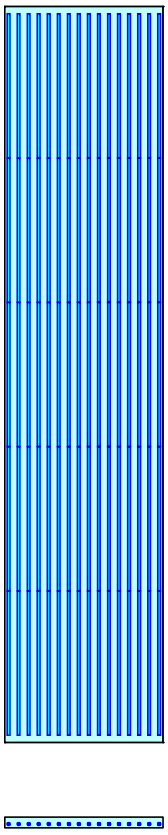
5 Chambers/Row x 20.00' Long = 100.00' Row Length +12.0" End Stone x 2 = 102.00' Base Length
16 Rows x 4.7" Wide + 12.0" Spacing x 15 + 4.0" Side Stone x 2 = 21.93' Base Width
4.0" Base + 4.7" Chamber Height + 9.0" Cover = 1.48' Field Height

80 Chambers x 2.2 cf = 174.1 cf Chamber Storage

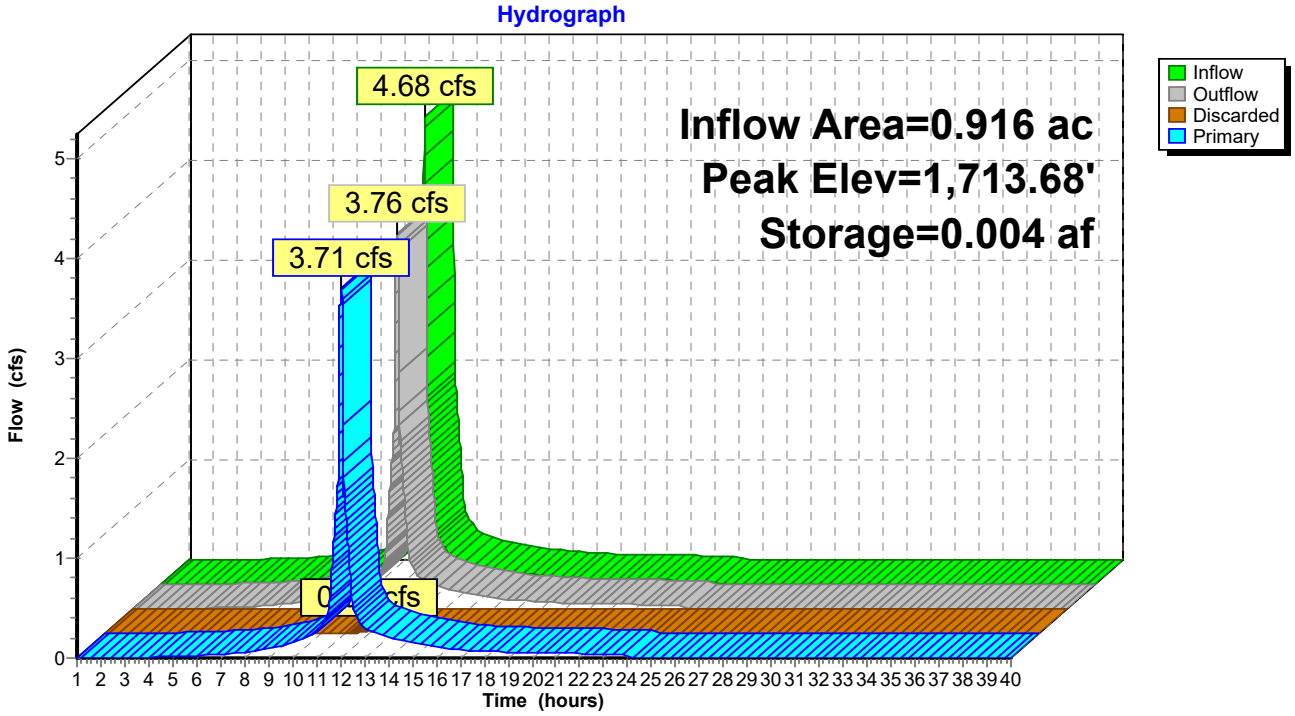
3,299.9 cf Field - 174.1 cf Chambers = 3,125.8 cf Stone x 40.0% Voids = 1,250.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,424.4 cf = 0.033 af
Overall Storage Efficiency = 43.2%
Overall System Size = 102.00' x 21.93' x 1.48'

80 Chambers
122.2 cy Field
115.8 cy Stone



Pond 2: Two


Hydrograph
4.68 cfs
3.76 cfs
3.71 cfs
Inflow Area=0.916 ac
Peak Elev=1,713.68'
Storage=0.004 af
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)

Summary for Pond 3: three

Inflow Area = 1.047 ac, 78.95% Impervious, Inflow Depth = 3.80" for 10 Year event
Inflow = 5.35 cfs @ 12.00 hrs, Volume= 0.331 af
Outflow = 4.42 cfs @ 12.04 hrs, Volume= 0.331 af, Atten= 17%, Lag= 2.0 min
Discarded = 0.08 cfs @ 12.04 hrs, Volume= 0.006 af
Primary = 4.34 cfs @ 12.04 hrs, Volume= 0.325 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 1,713.61' @ 12.04 hrs Surf.Area= 0.076 ac Storage= 0.003 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (775.6 - 775.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	1,713.50'	0.042 af	**21.93'W x 150.00'L x 1.48'H Field A** 0.111 af Overall - 0.006 af Embedded = 0.106 af x 40.0% Voids
#2A	1,713.83'	0.006 af	**CPP single-wall 4"** x 112 Inside #1 Inside= 4.0"W x 4.0"H => 0.11 sf x 20.00'L = 2.2 cf Outside= 4.7"W x 4.7"H => 0.11 sf x 20.00'L = 2.2 cf 16 Rows of 7 Chambers
		0.048 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	1,712.00'	**6.0" Round Culvert X 6.00** L= 150.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,712.00' / 1,711.00' S= 0.0067 '/' Cc= 0.900 n= 0.011, Flow Area= 0.20 sf
#2	Discarded	1,713.50'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.00'

Discarded OutFlow Max=0.08 cfs @ 12.04 hrs HW=1,713.61' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.08 cfs)

Primary OutFlow Max=4.34 cfs @ 12.04 hrs HW=1,713.61' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 4.34 cfs @ 3.69 fps)

Pond 3: three - Chamber Wizard Field A

Chamber Model = CPP single-wall 4" (Single-wall corrugated HDPE pipe)
Inside= 4.0"W x 4.0"H => 0.11 sf x 20.00'L = 2.2 cf
Outside= 4.7"W x 4.7"H => 0.11 sf x 20.00'L = 2.2 cf

4.7" Wide + 12.0" Spacing = 16.7" C-C Row Spacing

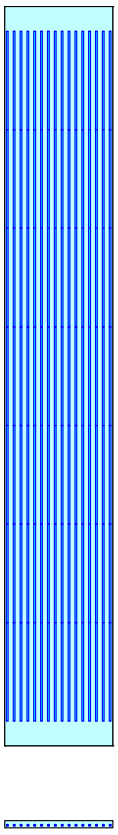
7 Chambers/Row x 20.00' Long = 140.00' Row Length +60.0" End Stone x 2 = 150.00' Base Length
16 Rows x 4.7" Wide + 12.0" Spacing x 15 + 4.0" Side Stone x 2 = 21.93' Base Width
4.0" Base + 4.7" Chamber Height + 9.0" Cover = 1.48' Field Height

112 Chambers x 2.2 cf = 243.8 cf Chamber Storage

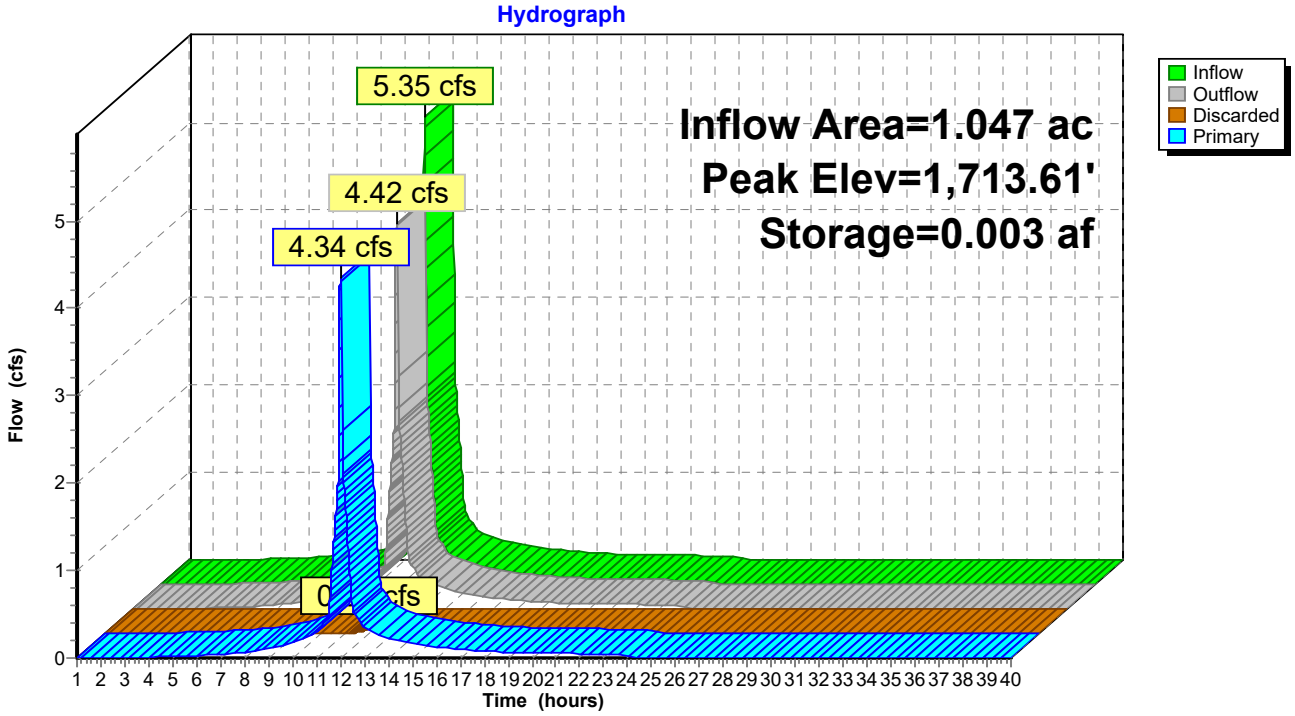
4,852.7 cf Field - 243.8 cf Chambers = 4,609.0 cf Stone x 40.0% Voids = 1,843.6 cf Stone Storage

Chamber Storage + Stone Storage = 2,087.4 cf = 0.048 af
Overall Storage Efficiency = 43.0%
Overall System Size = 150.00' x 21.93' x 1.48'

112 Chambers
179.7 cy Field
170.7 cy Stone



Pond 3: three


Hydrograph
5.35 cfs
4.42 cfs
4.34 cfs
Inflow Area=1.047 ac
Peak Elev=1,713.61'
Storage=0.003 af
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)

Summary for Pond DP up: Dry Basin

Inflow Area = 1.876 ac, 0.00% Impervious, Inflow Depth = 1.96" for 10 Year event
Inflow = 5.22 cfs @ 12.00 hrs, Volume= 0.307 af
Outflow = 0.72 cfs @ 12.49 hrs, Volume= 0.214 af, Atten= 86%, Lag= 29.2 min
Primary = 0.72 cfs @ 12.49 hrs, Volume= 0.214 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1,731.82' @ 12.49 hrs Surf.Area= 0.087 ac Storage= 0.139 af

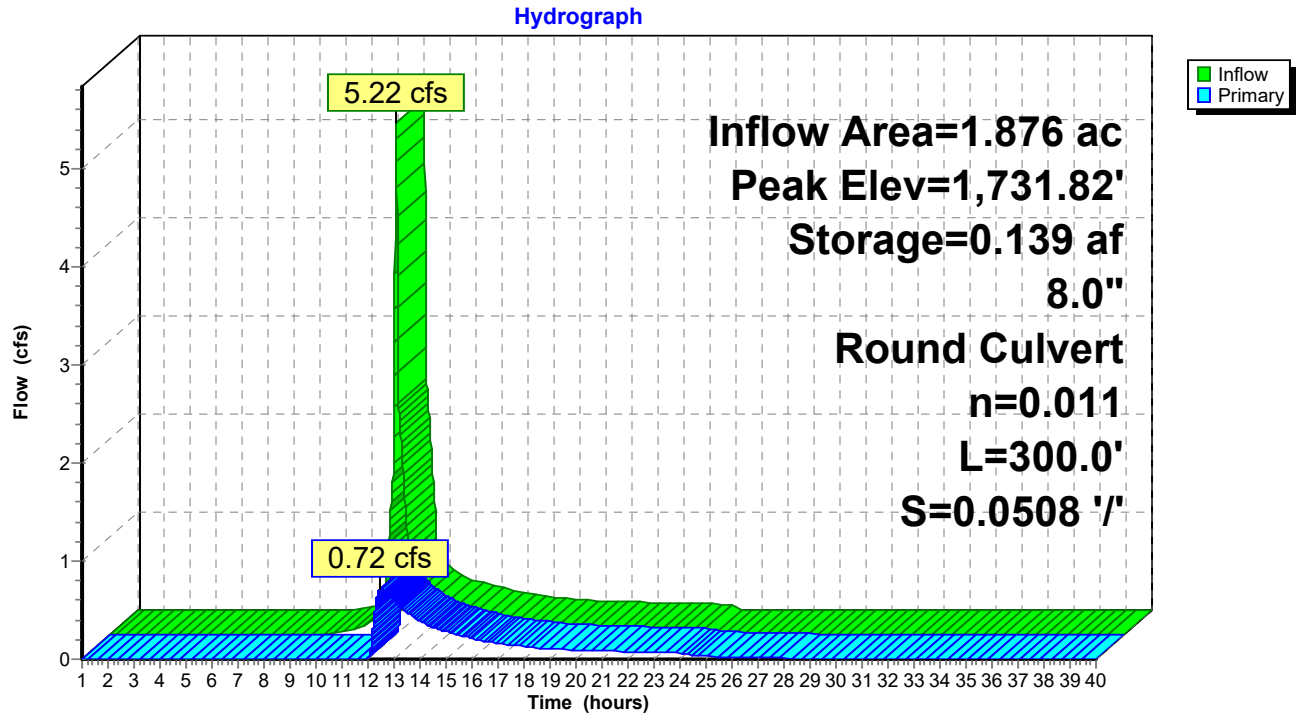
Plug-Flow detention time= 235.0 min calculated for 0.214 af (70% of inflow)
Center-of-Mass det. time= 134.1 min (972.9 - 838.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,730.00'	0.357 af	**45.00'W x 65.00'L x 4.00'H Hillside pond Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	1,731.25'	**8.0" Round Culvert** L= 300.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,731.25' / 1,716.00' S= 0.0508 '/' Cc= 0.900 n= 0.011, Flow Area= 0.35 sf

Primary OutFlow Max=0.72 cfs @ 12.49 hrs HW=1,731.82' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 0.72 cfs @ 2.26 fps)

Pond DP up: Dry Basin



Summary for Pond DPe: Pond

[79] Warning: Submerged Pond FBe Primary device # 1 INLET by 0.28'

Inflow Area = 7.028 ac, 1.63% Impervious, Inflow Depth = 2.04" for 10 Year event
Inflow = 10.47 cfs @ 12.35 hrs, Volume= 1.196 af
Outflow = 10.45 cfs @ 12.37 hrs, Volume= 1.196 af, Atten= 0%, Lag= 0.8 min
Primary = 10.45 cfs @ 12.37 hrs, Volume= 1.196 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 1,708.28' @ 12.37 hrs Surf.Area= 0.028 ac Storage= 0.040 af

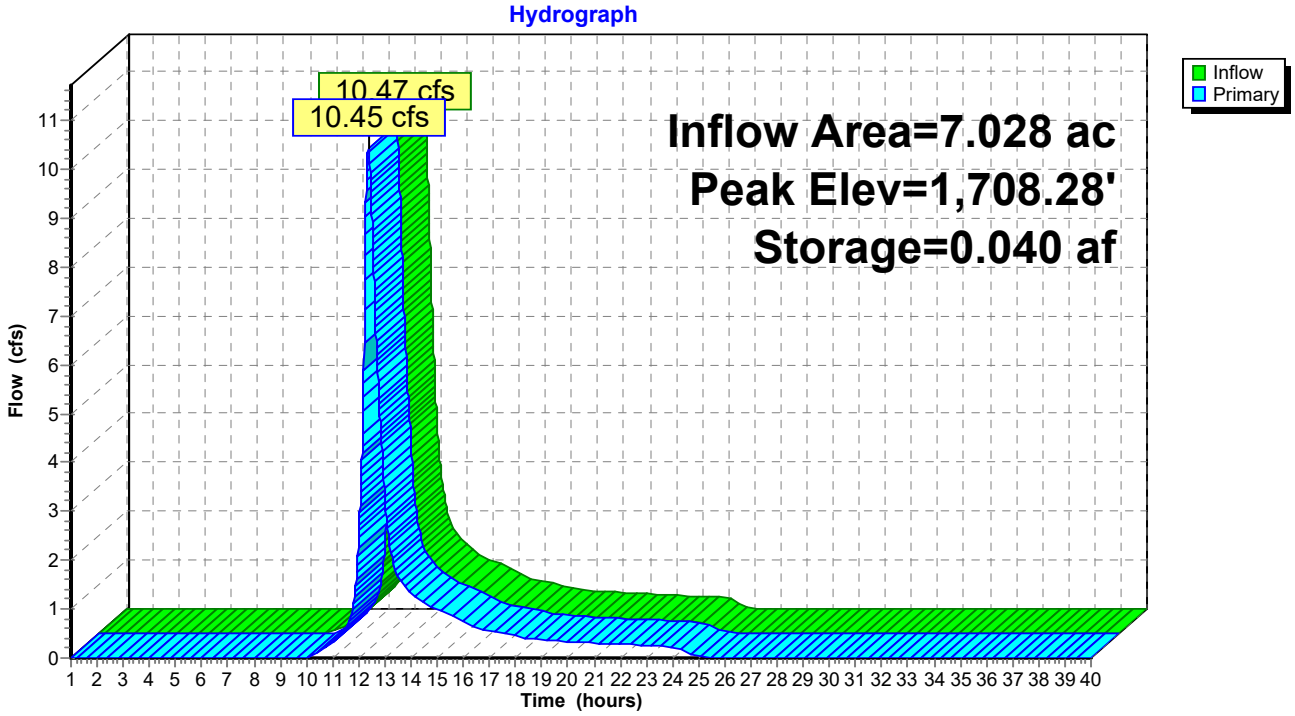
Plug-Flow detention time= 5.2 min calculated for 1.196 af (100% of inflow)
Center-of-Mass det. time= 5.2 min (865.0 - 859.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,706.00'	0.105 af	**10.00'W x 38.00'L x 4.00'H Pond Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	1,706.00'	**15.0" Round Culvert** L= 35.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,706.00' / 1,706.00' S= 0.0000 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Primary	1,708.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=10.44 cfs @ 12.37 hrs HW=1,708.28' (Free Discharge)
1=Culvert (Barrel Controls 6.92 cfs @ 5.64 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 3.53 cfs @ 1.27 fps)

Pond DPe: Pond



Summary for Pond DPw: Dry pond

[81] Warning: Exceeded Pond FBw by 0.13' @ 22.67 hrs

Inflow Area = 2.826 ac, 3.66% Impervious, Inflow Depth = 2.81" for 10 Year event
Inflow = 7.43 cfs @ 12.13 hrs, Volume= 0.661 af
Outflow = 6.71 cfs @ 12.19 hrs, Volume= 0.595 af, Atten= 10%, Lag= 3.8 min
Primary = 6.71 cfs @ 12.19 hrs, Volume= 0.595 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 1,703.73' @ 12.19 hrs Surf.Area= 0.055 ac Storage= 0.123 af

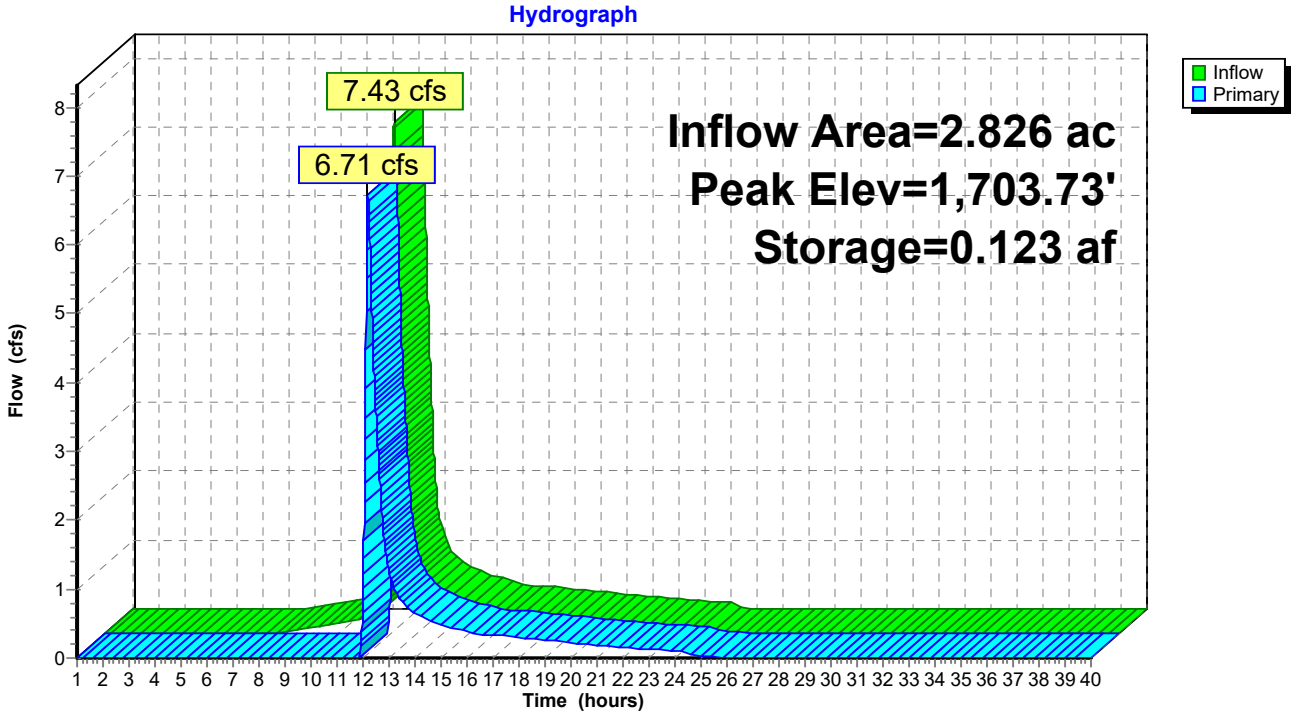
Plug-Flow detention time= 86.0 min calculated for 0.595 af (90% of inflow)
Center-of-Mass det. time= 38.1 min (885.8 - 847.6)

Volume	Invert	Avail.Storage	Storage Description
#1	1,700.00'	0.153 af	**16.00'W x 40.00'L x 4.25'H Prismatoid Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	1,702.50'	**15.0" Round Culvert** L= 40.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,702.50' / 1,699.00' S= 0.0875 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Primary	1,700.00'	**4.0" Round Culvert X 0.00** L= 30.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,700.00' / 1,696.00' S= 0.1333 '/' Cc= 0.900 n= 0.011, Flow Area= 0.09 sf
#3	Primary	1,703.50'	**8.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=6.71 cfs @ 12.19 hrs HW=1,703.73' (Free Discharge)
- **1=Culvert** (Inlet Controls 4.62 cfs @ 3.78 fps)
- **2=Culvert** (Controls 0.00 cfs)
- **3=Broad-Crested Rectangular Weir** (Weir Controls 2.09 cfs @ 1.13 fps)

Pond DPw: Dry pond



Summary for Pond FBe: ForeBay

Inflow Area = 7.028 ac, 1.63% Impervious, Inflow Depth = 2.04" for 10 Year event
Inflow = 10.49 cfs @ 12.34 hrs, Volume= 1.196 af
Outflow = 10.47 cfs @ 12.35 hrs, Volume= 1.196 af, Atten= 0%, Lag= 0.8 min
Primary = 10.47 cfs @ 12.35 hrs, Volume= 1.196 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1,709.14' @ 12.35 hrs Surf.Area= 0.018 ac Storage= 0.015 af

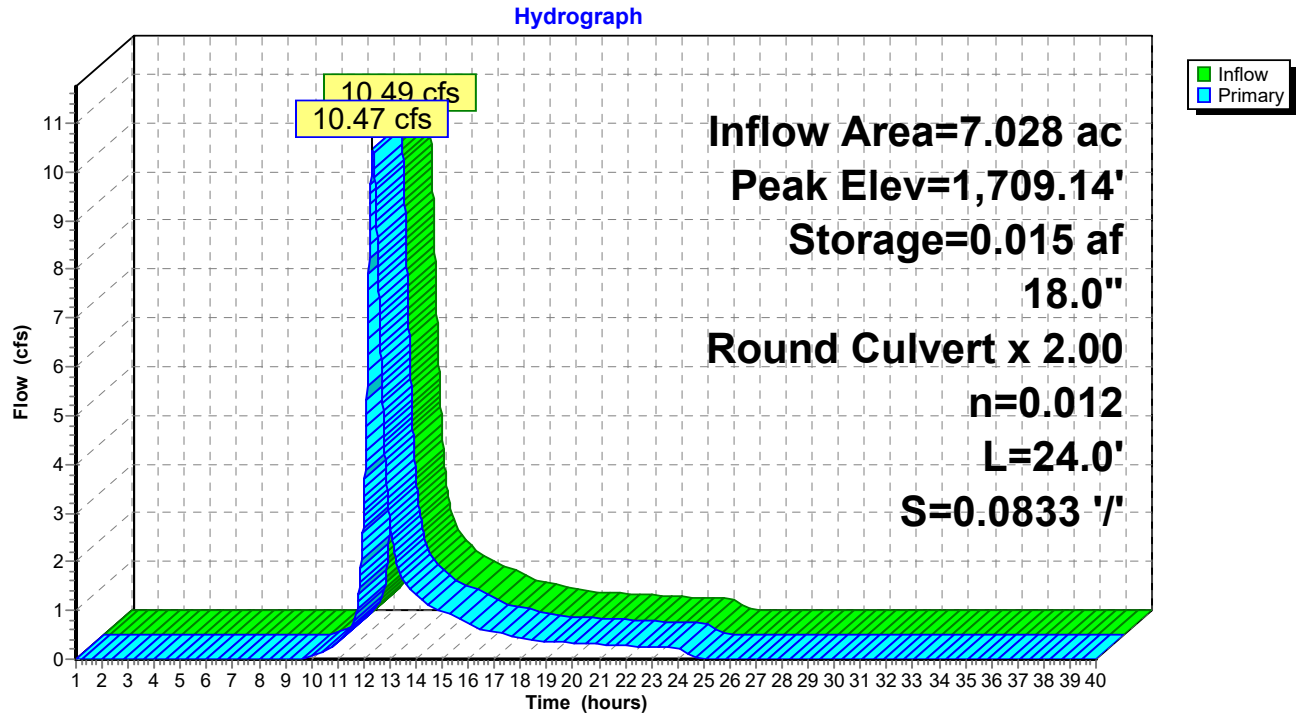
Plug-Flow detention time= 2.1 min calculated for 1.196 af (100% of inflow)
Center-of-Mass det. time= 2.0 min (859.8 - 857.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,708.00'	0.109 af	**10.00'W x 40.00'L x 4.00'H Prismatoid Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	1,708.00'	**18.0" Round Culvert X 2.00** L= 24.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,708.00' / 1,706.00' S= 0.0833 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=10.47 cfs @ 12.35 hrs HW=1,709.14' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 10.47 cfs @ 3.63 fps)

Pond FBe: ForeBay



Summary for Pond FBw: Forebay

[62] Hint: Exceeded Reach 8R OUTLET depth by 2.41' @ 12.14 hrs

Inflow Area = 2.826 ac, 3.66% Impervious, Inflow Depth = 2.81" for 10 Year event
Inflow = 10.06 cfs @ 12.06 hrs, Volume= 0.661 af
Outflow = 7.43 cfs @ 12.13 hrs, Volume= 0.661 af, Atten= 26%, Lag= 3.9 min
Primary = 7.43 cfs @ 12.13 hrs, Volume= 0.661 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1,704.91' @ 12.13 hrs Surf.Area= 0.059 ac Storage= 0.100 af

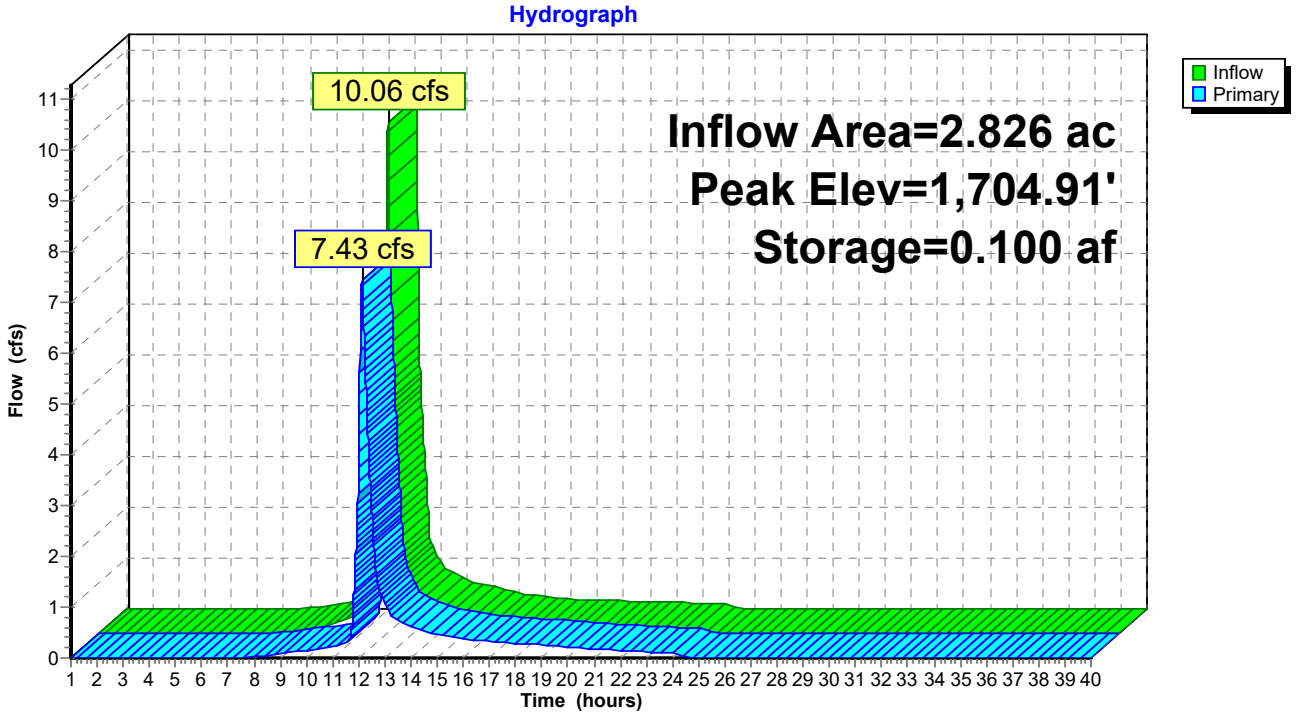
Plug-Flow detention time= 29.0 min calculated for 0.661 af (100% of inflow)
Center-of-Mass det. time= 29.0 min (847.6 - 818.7)

Volume	Invert	Avail.Storage	Storage Description
#1	1,702.50'	0.237 af	**16.00'W x 70.00'L x 4.25'H Prismatoid Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	1,703.50'	**18.0" Round Culvert** L= 40.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,703.50' / 1,703.00' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Primary	1,702.25'	**4.0" Round Culvert** L= 35.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,702.25' / 1,702.00' S= 0.0071 '/' Cc= 0.900 n= 0.011, Flow Area= 0.09 sf

Primary OutFlow Max=7.44 cfs @ 12.13 hrs HW=1,704.90' (Free Discharge)
1=Culvert (Inlet Controls 6.94 cfs @ 4.03 fps)
2=Culvert (Barrel Controls 0.50 cfs @ 5.70 fps)

Pond FBw: Forebay

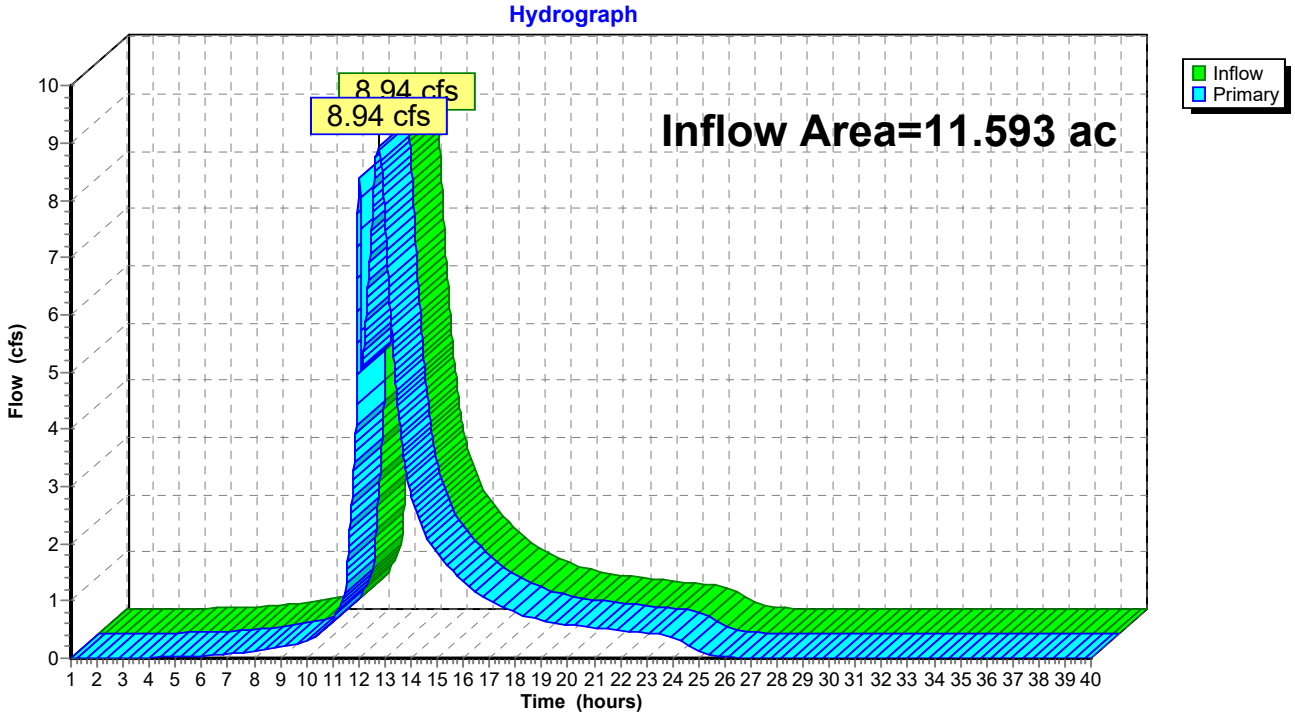


Summary for Link 7L: wetland

Inflow Area = 11.593 ac, 11.58% Impervious, Inflow Depth > 2.13" for 10 Year event
Inflow = 8.94 cfs @ 12.77 hrs, Volume= 2.054 af
Primary = 8.94 cfs @ 12.77 hrs, Volume= 2.054 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs

Link 7L: wetland



Time span=1.00-40.00 hrs, dt=0.01 hrs, 3901 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Upgradient forest Runoff Area=349,185 sf 0.00% Impervious Runoff Depth=4.98"
Flow Length=1,729' Tc=54.5 min CN=73 Runoff=19.45 cfs 3.326 af

Subcatchment 2S: Easterly Watershed Runoff Area=306,150 sf 1.63% Impervious Runoff Depth=5.10"
Flow Length=1,201' Tc=23.3 min CN=74 Runoff=26.49 cfs 2.985 af

Subcatchment 4S: upgradient forest by-pass Runoff Area=81,700 sf 0.00% Impervious Runoff Depth=4.98"
Tc=0.0 min CN=73 Runoff=13.38 cfs 0.778 af

Subcatchment 6S: development area Runoff Area=123,100 sf 3.66% Impervious Runoff Depth=6.16"
Tc=0.0 min CN=83 Runoff=24.24 cfs 1.450 af

Subcatchment I: Greenhouse 1 Runoff Area=28,500 sf 78.95% Impervious Runoff Depth=7.35"
Flow Length=25' Slope=0.2000 '/' Tc=0.2 min CN=93 Runoff=6.24 cfs 0.401 af

Subcatchment II: Greenhouse 2 Runoff Area=39,900 sf 78.95% Impervious Runoff Depth=7.35"
Flow Length=25' Slope=0.2000 '/' Tc=0.2 min CN=93 Runoff=8.73 cfs 0.561 af

Subcatchment III: Greenhouse 3 Runoff Area=45,600 sf 78.95% Impervious Runoff Depth=7.35"
Flow Length=25' Slope=0.2000 '/' Tc=0.2 min CN=93 Runoff=9.98 cfs 0.641 af

Reach 8R: Swale Avg. Flow Depth=1.02' Max Vel=5.38 fps Inflow=24.24 cfs 1.450 af
n=0.035 L=600.0' S=0.0300 '/' Capacity=93.83 cfs Outflow=22.04 cfs 1.450 af

Reach DPEast: Design Point Inflow=28.72 cfs 3.538 af
Outflow=28.72 cfs 3.538 af

Reach DPWest: Design Point Inflow=31.15 cfs 6.418 af
Outflow=31.15 cfs 6.418 af

Pond 1: one Peak Elev=1,714.36' Storage=0.022 af Inflow=6.24 cfs 0.401 af
Discarded=0.06 cfs 0.008 af Primary=3.37 cfs 0.393 af Outflow=3.43 cfs 0.400 af

Pond 2: Two Peak Elev=1,714.95' Storage=0.032 af Inflow=8.73 cfs 0.561 af
Discarded=0.05 cfs 0.008 af Primary=4.91 cfs 0.553 af Outflow=4.96 cfs 0.561 af

Pond 3: three Peak Elev=1,714.64' Storage=0.038 af Inflow=9.98 cfs 0.641 af
Discarded=0.08 cfs 0.011 af Primary=5.30 cfs 0.630 af Outflow=5.37 cfs 0.641 af

Pond DP up: Dry Basin Peak Elev=1,733.88' Storage=0.343 af Inflow=13.38 cfs 0.778 af
8.0" Round Culvert n=0.011 L=300.0' S=0.0508 '/' Outflow=2.25 cfs 0.685 af

Pond DPe: Pond Peak Elev=1,708.74' Storage=0.054 af Inflow=25.50 cfs 2.985 af
Outflow=25.47 cfs 2.985 af

Pond DPw: Dry pond Peak Elev=1,703.99' Storage=0.138 af Inflow=12.83 cfs 1.450 af
Outflow=12.70 cfs 1.385 af

Pond FBe: ForeBay Peak Elev=1,711.00' Storage=0.066 af Inflow=26.49 cfs 2.985 af
18.0" Round Culvert x 2.00 n=0.012 L=24.0' S=0.0833 '/' Outflow=25.50 cfs 2.985 af

Pond FBw: Forebay Peak Elev=1,706.31' Storage=0.199 af Inflow=22.04 cfs 1.450 af
Outflow=12.83 cfs 1.450 af

Link 7L: wetland Inflow=22.97 cfs 5.033 af
Primary=22.97 cfs 5.033 af

Total Runoff Area = 22.363 ac Runoff Volume = 10.142 af Average Runoff Depth = 5.44"
89.79% Pervious = 20.079 ac 10.21% Impervious = 2.284 ac

Summary for Subcatchment 1S: Upgradient forest

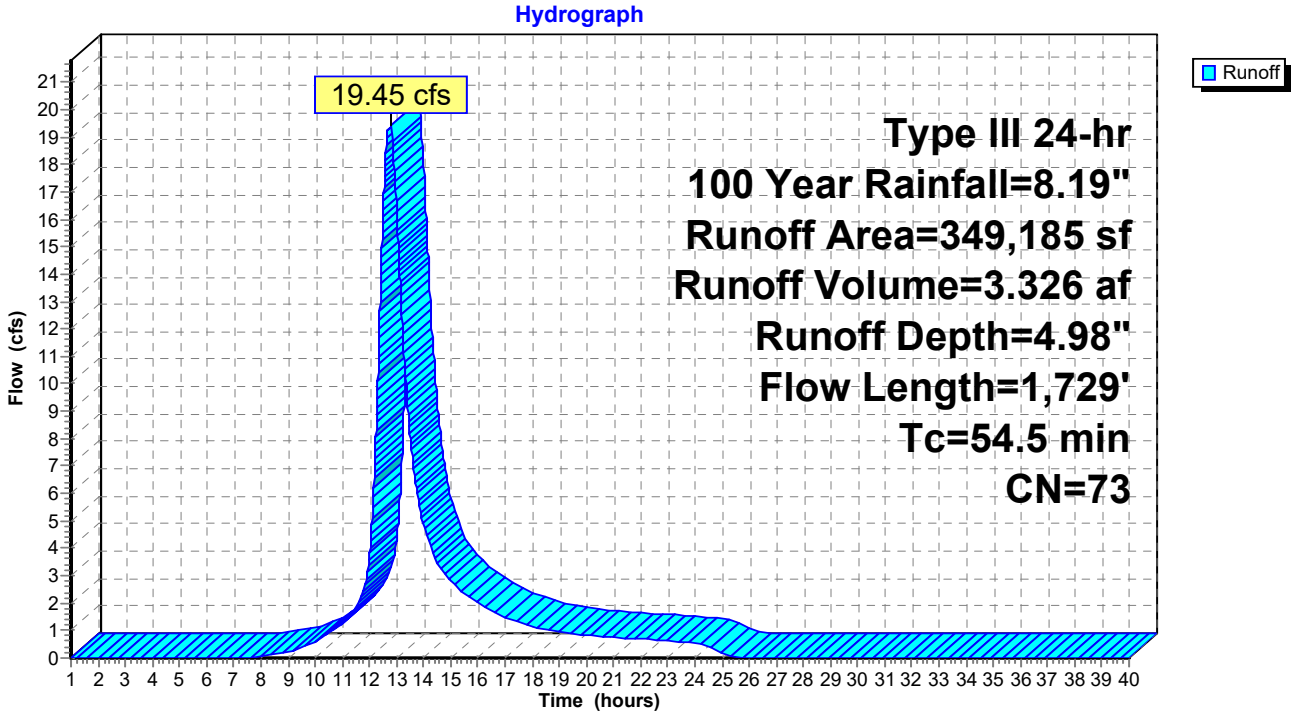
Runoff = 19.45 cfs @ 12.77 hrs, Volume= 3.326 af, Depth= 4.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.19"

	Area (sf)	CN	Description
*	349,185	73	Woods, Fair, HSG C (fair condition C/D soil)
	349,185		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.8	50	0.0100	0.03		**Sheet Flow, Sheet Flow** Woods: Dense underbrush n= 0.800 P2= 2.90"
1.9	138	0.0580	1.20		**Shallow Concentrated Flow, hillside segment 1** Woodland Kv= 5.0 fps
0.8	127	0.2519	2.51		**Shallow Concentrated Flow, Hillside segement 2** Woodland Kv= 5.0 fps
5.8	461	0.0694	1.32		**Shallow Concentrated Flow, Hillside Segment 3** Woodland Kv= 5.0 fps
4.9	258	0.0310	0.88		**Shallow Concentrated Flow, Hillside Segment 4** Woodland Kv= 5.0 fps
11.3	695	0.0417	1.02		**Shallow Concentrated Flow, Hillsdie Segment 5** Woodland Kv= 5.0 fps
54.5	1,729	Total			

Subcatchment 1S: Upgradient forest



Summary for Subcatchment 2S: Easterly Watershed

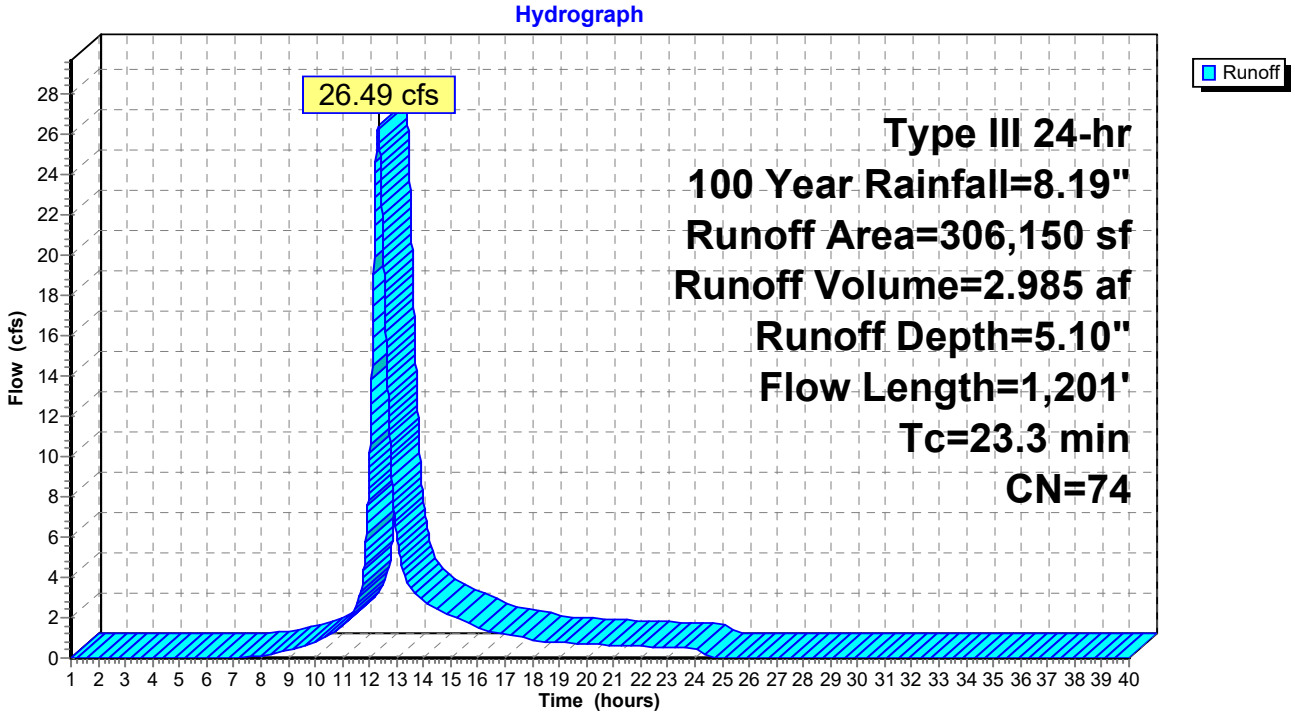
Runoff = 26.49 cfs @ 12.32 hrs, Volume= 2.985 af, Depth= 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.19"

Area (sf)	CN	Description
4,500	73	Woods, Fair, HSG C
5,000	98	Roofs, HSG C
36,500	96	Gravel surface, HSG C
10,000	74	>75% Grass cover, Good, HSG C
12,900	71	Meadow, non-grazed, HSG C
237,250	70	Woods, Good, HSG C
306,150	74	Weighted Average
301,150		98.37% Pervious Area
5,000		1.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	50	0.0200	0.06		**Sheet Flow, Sheet Flow** Woods: Light underbrush n= 0.400 P2= 2.90"
2.7	277	0.1155	1.70		**Shallow Concentrated Flow, Hillside Segment 1** Woodland Kv= 5.0 fps
6.9	524	0.0648	1.27		**Shallow Concentrated Flow, Hillside Segemnt #2** Woodland Kv= 5.0 fps
0.7	350	0.0500	7.85	23.56	**Channel Flow,** Area= 3.0 sf Perim= 8.0' r= 0.38' n= 0.022 Earth, clean & straight
23.3	1,201	Total			

Subcatchment 2S: Easterly Watershed



Summary for Subcatchment 4S: upgradient forest by-pass

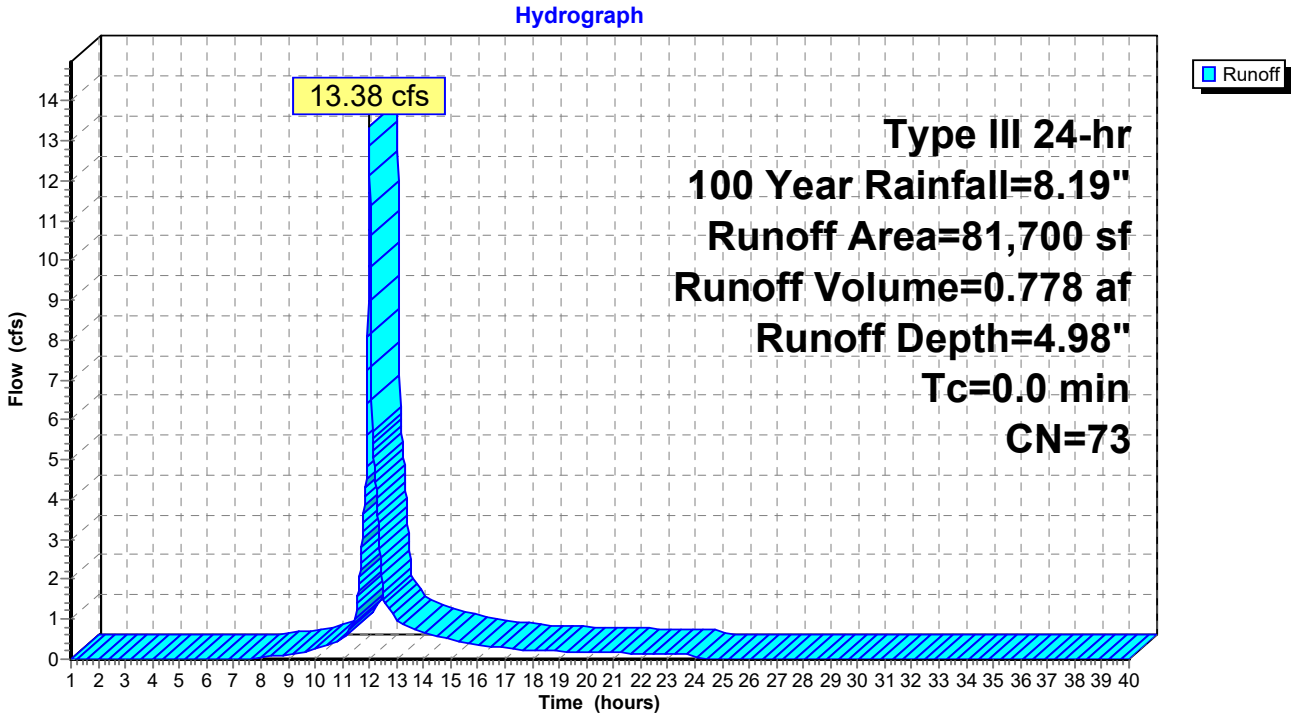
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 13.38 cfs @ 12.00 hrs, Volume= 0.778 af, Depth= 4.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.19"

Area (sf)	CN	Description
76,000	73	Woods, Fair, HSG C
5,700	71	Meadow, non-grazed, HSG C
81,700	73	Weighted Average
81,700		100.00% Pervious Area

Subcatchment 4S: upgradient forest by-pass



Summary for Subcatchment 6S: development area

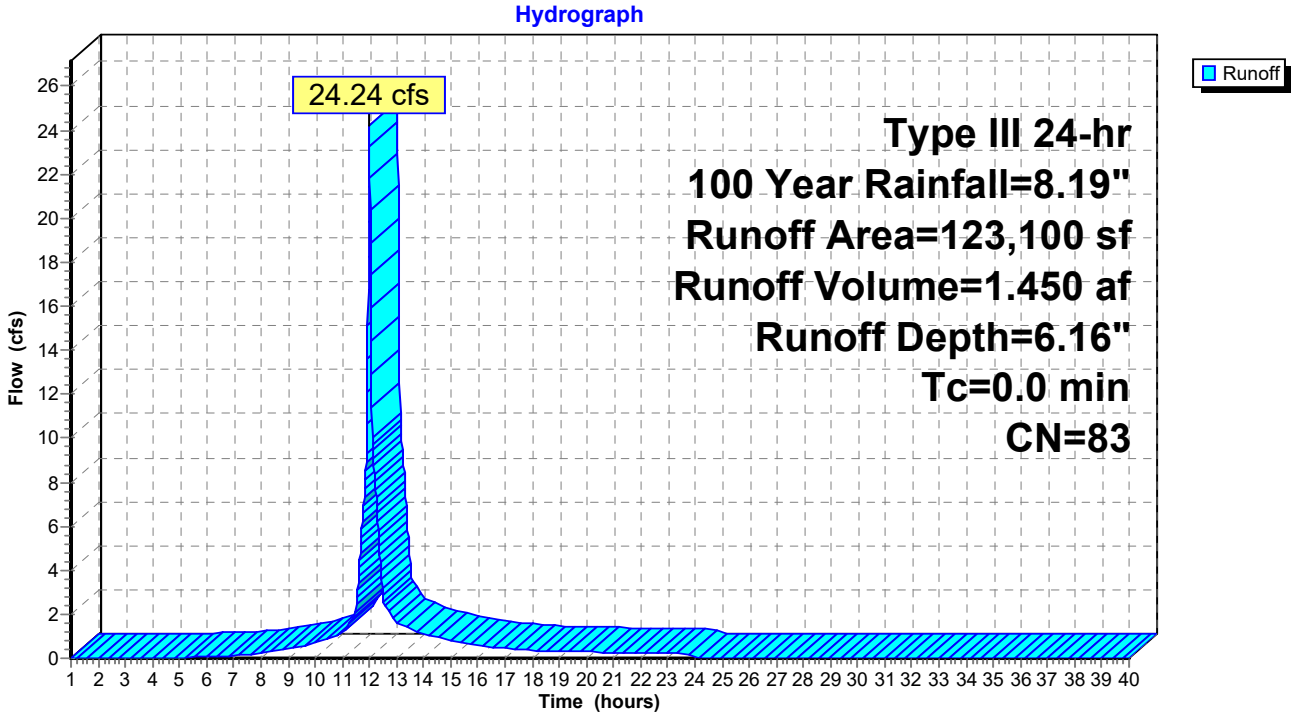
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 24.24 cfs @ 12.00 hrs, Volume= 1.450 af, Depth= 6.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.19"

	Area (sf)	CN	Description
	54,800	96	Gravel surface, HSG C
*	4,500	98	rooftop
	63,800	71	Meadow, non-grazed, HSG C
	123,100	83	Weighted Average
	118,600		96.34% Pervious Area
	4,500		3.66% Impervious Area

Subcatchment 6S: development area



Summary for Subcatchment I: Greenhouse 1

[49] Hint: Tc<2dt may require smaller dt

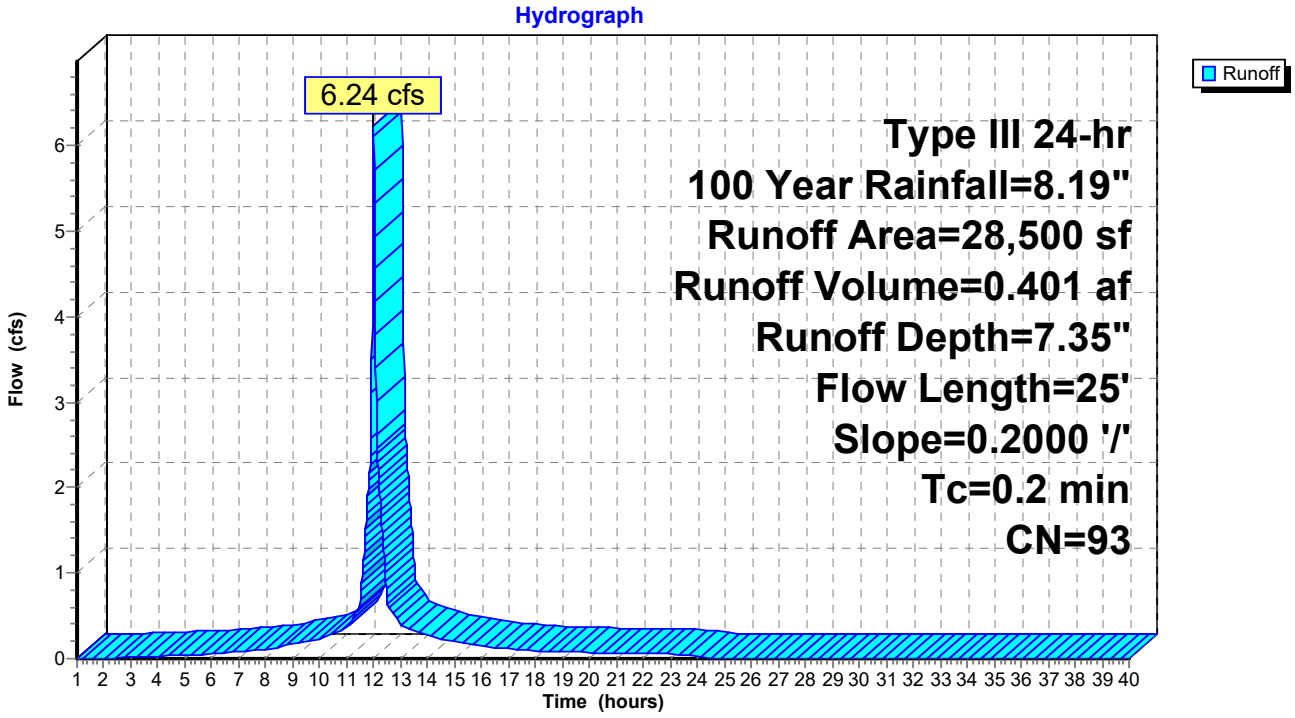
Runoff = 6.24 cfs @ 12.00 hrs, Volume= 0.401 af, Depth= 7.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.19"

	Area (sf)	CN	Description
*	22,500	98	Roof
	6,000	74	>75% Grass cover, Good, HSG C
	28,500	93	Weighted Average
	6,000		21.05% Pervious Area
	22,500		78.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	25	0.2000	2.49		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 2.90"

Subcatchment I: Greenhouse 1



Summary for Subcatchment II: Greenhouse 2

[49] Hint: Tc<2dt may require smaller dt

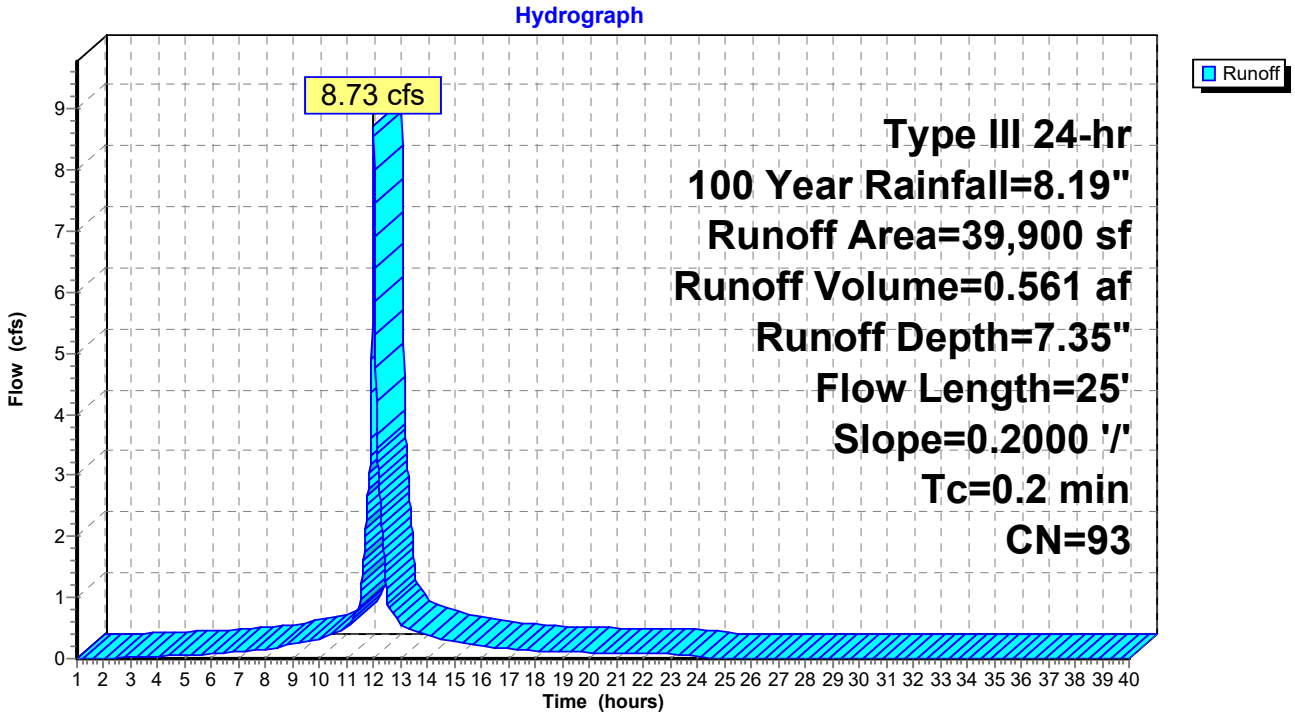
Runoff = 8.73 cfs @ 12.00 hrs, Volume= 0.561 af, Depth= 7.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.19"

	Area (sf)	CN	Description
*	31,500	98	Roof
	8,400	74	>75% Grass cover, Good, HSG C
	39,900	93	Weighted Average
	8,400		21.05% Pervious Area
	31,500		78.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	25	0.2000	2.49		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 2.90"

Subcatchment II: Greenhouse 2



Summary for Subcatchment III: Greenhouse 3

[49] Hint: Tc<2dt may require smaller dt

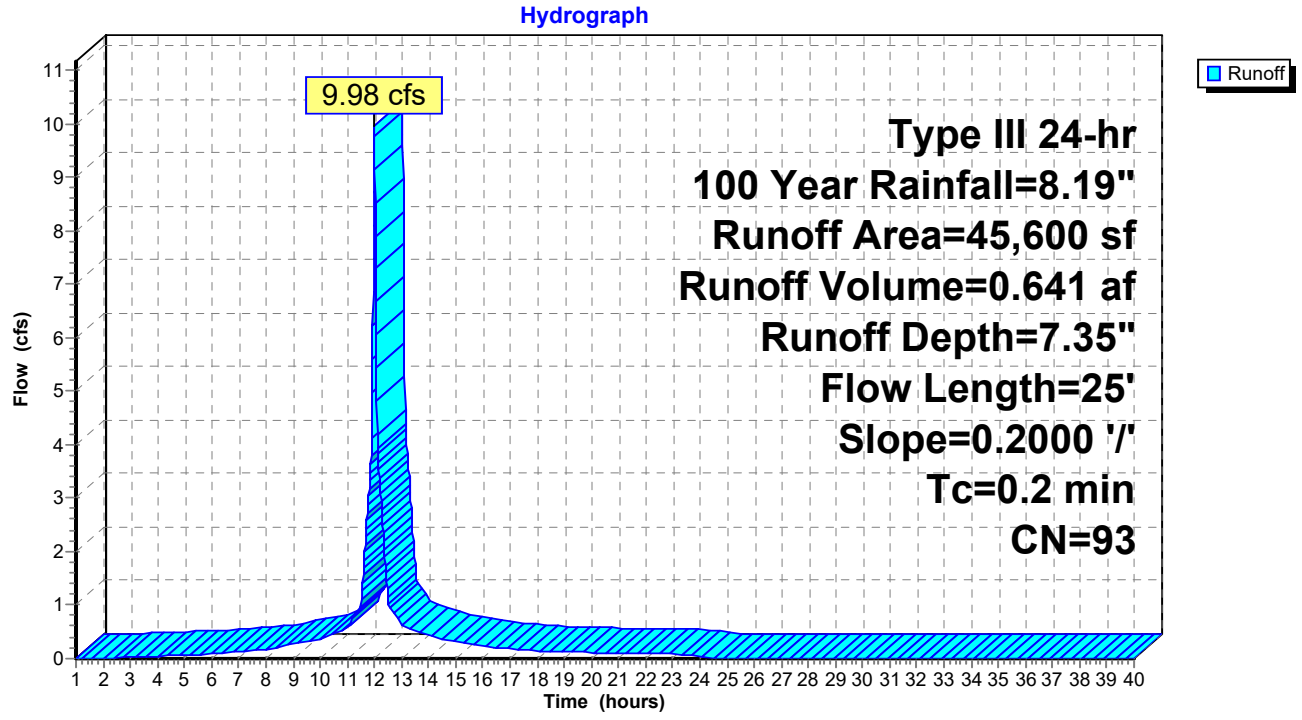
Runoff = 9.98 cfs @ 12.00 hrs, Volume= 0.641 af, Depth= 7.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Rainfall=8.19"

	Area (sf)	CN	Description
*	36,000	98	Roof
	9,600	74	>75% Grass cover, Good, HSG C
	45,600	93	Weighted Average
	9,600		21.05% Pervious Area
	36,000		78.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	25	0.2000	2.49		**Sheet Flow, Roof** Smooth surfaces n= 0.011 P2= 2.90"

Subcatchment III: Greenhouse 3



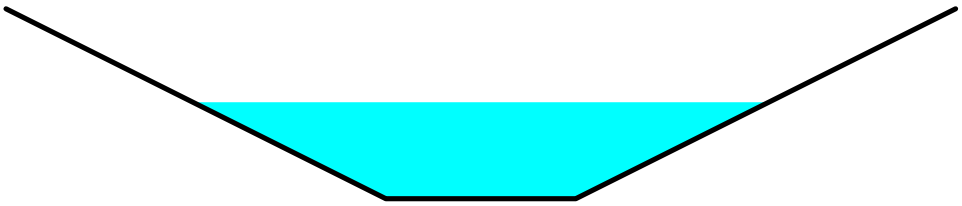
Summary for Reach 8R: Swale

Inflow Area = 2.826 ac, 3.66% Impervious, Inflow Depth = 6.16" for 100 Year event
Inflow = 24.24 cfs @ 12.00 hrs, Volume= 1.450 af
Outflow = 22.04 cfs @ 12.05 hrs, Volume= 1.450 af, Atten= 9%, Lag= 3.0 min

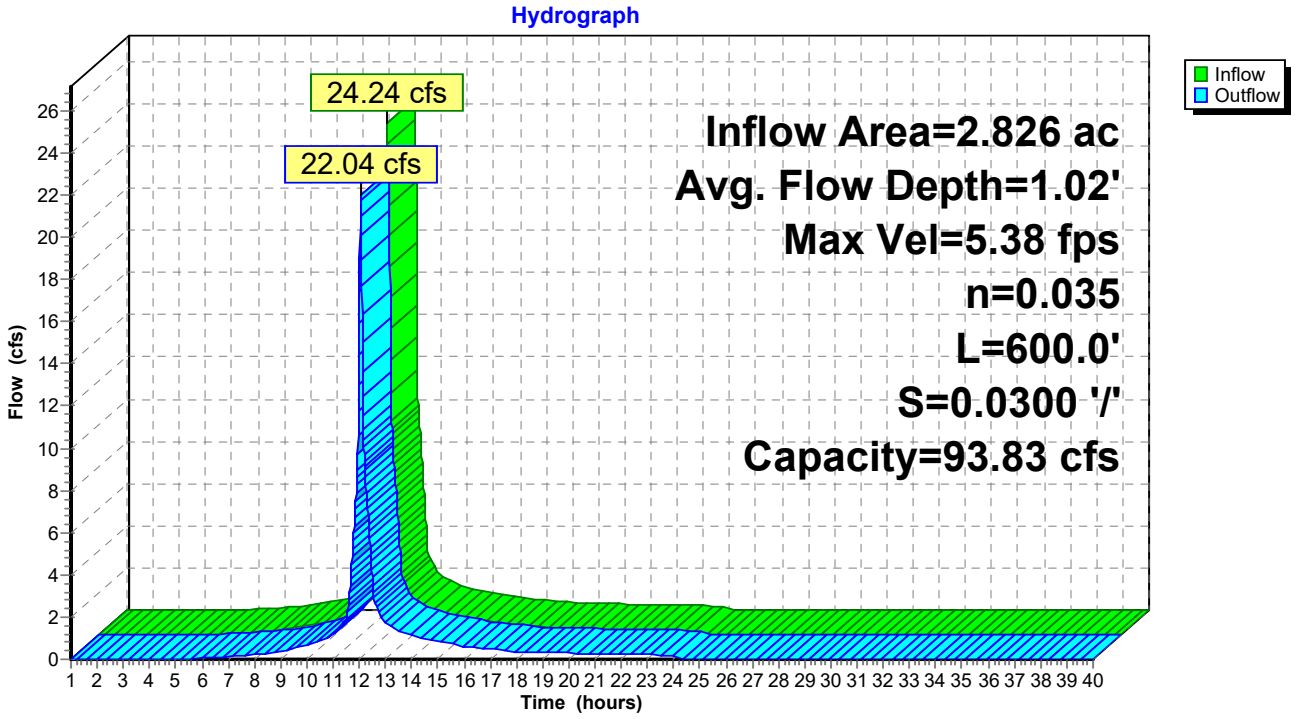
Routing by Stor-Ind+Trans method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Max. Velocity= 5.38 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 1.58 fps, Avg. Travel Time= 6.3 min

Peak Storage= 2,460 cf @ 12.02 hrs
Average Depth at Peak Storage= 1.02'
Bank-Full Depth= 2.00' Flow Area= 12.0 sf, Capacity= 93.83 cfs

2.00' x 2.00' deep channel, n= 0.035
Side Slope Z-value= 2.0 '/' Top Width= 10.00'
Length= 600.0' Slope= 0.0300 '/'
Inlet Invert= 1,720.00', Outlet Invert= 1,702.00'



Reach 8R: Swale



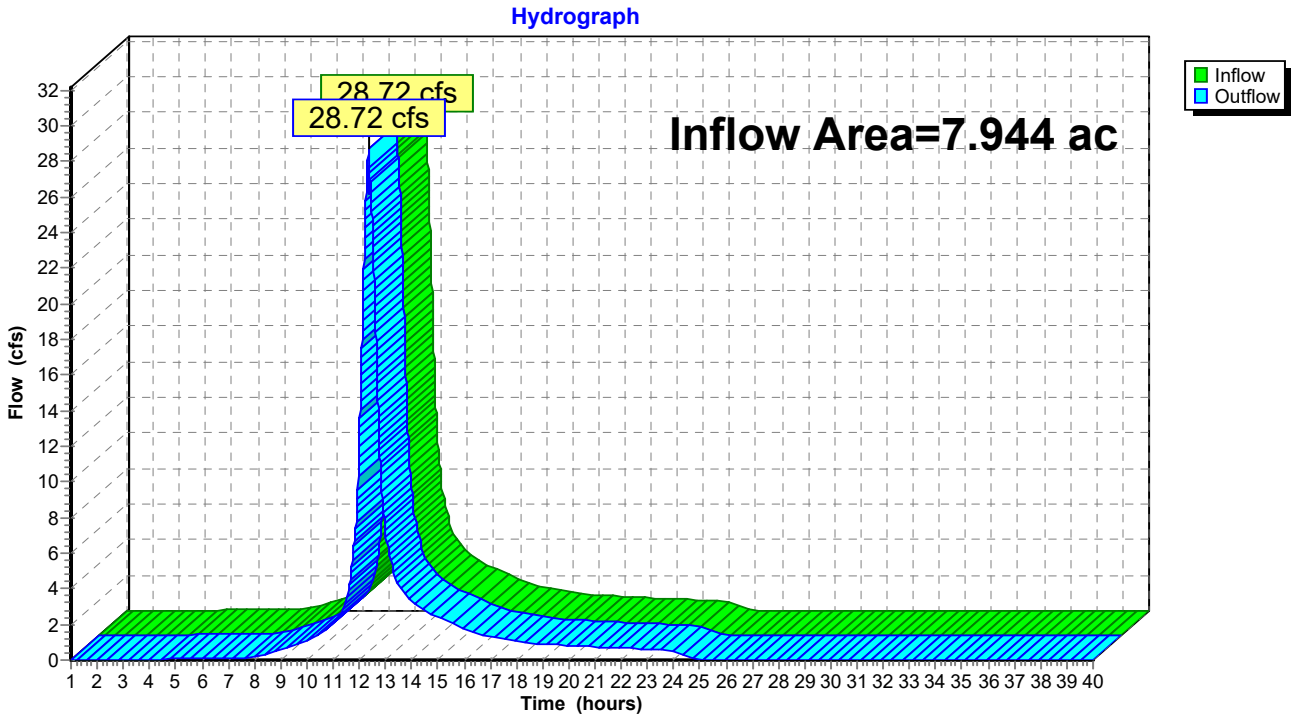
Summary for Reach DPEast: Design Point

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

Inflow Area = 7.944 ac, 10.55% Impervious, Inflow Depth = 5.34" for 100 Year event
Inflow = 28.72 cfs @ 12.34 hrs, Volume= 3.538 af
Outflow = 28.72 cfs @ 12.34 hrs, Volume= 3.538 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs

Reach DPEast: Design Point



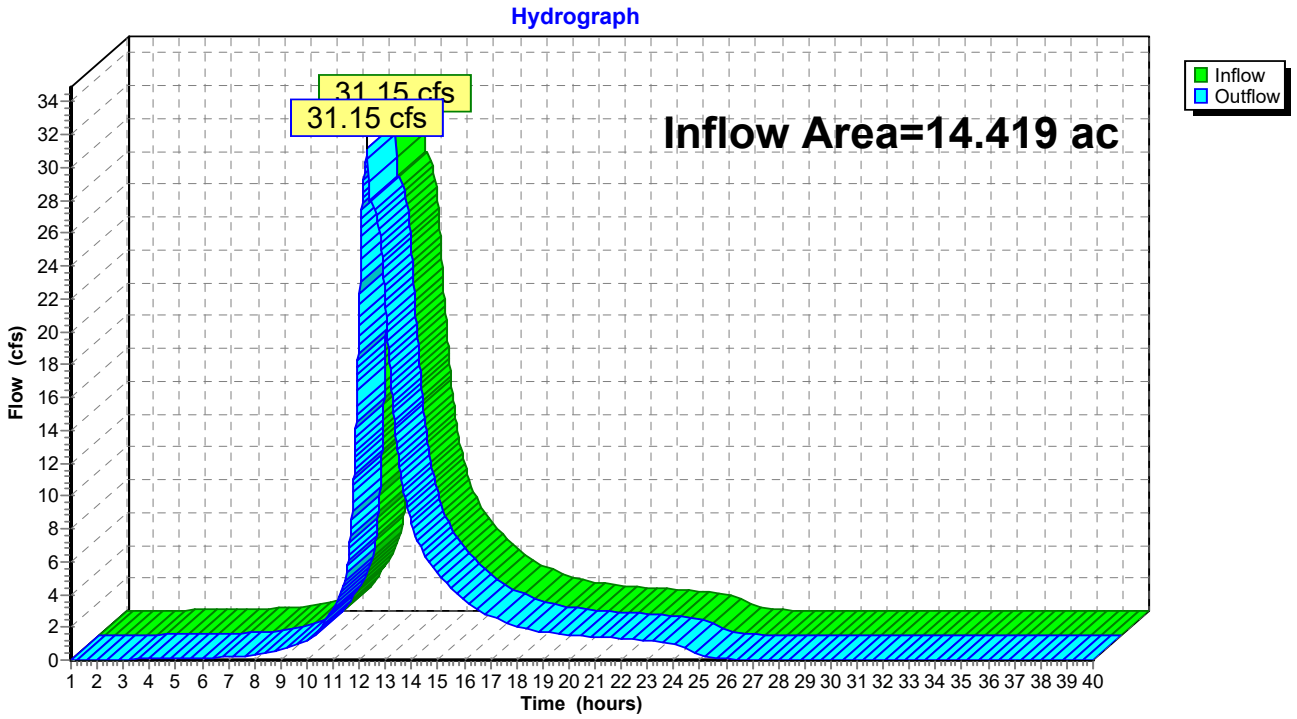
Summary for Reach DPWest: Design Point

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

Inflow Area = 14.419 ac, 10.03% Impervious, Inflow Depth = 5.34" for 100 Year event
Inflow = 31.15 cfs @ 12.31 hrs, Volume= 6.418 af
Outflow = 31.15 cfs @ 12.31 hrs, Volume= 6.418 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs

Reach DPWest: Design Point



Summary for Pond 1: one

Inflow Area = 0.654 ac, 78.95% Impervious, Inflow Depth = 7.35" for 100 Year event
Inflow = 6.24 cfs @ 12.00 hrs, Volume= 0.401 af
Outflow = 3.43 cfs @ 12.08 hrs, Volume= 0.400 af, Atten= 45%, Lag= 4.6 min
Discarded = 0.06 cfs @ 12.08 hrs, Volume= 0.008 af
Primary = 3.37 cfs @ 12.08 hrs, Volume= 0.393 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 1,714.36' @ 12.08 hrs Surf.Area= 0.056 ac Storage= 0.022 af

Plug-Flow detention time= 1.4 min calculated for 0.400 af (100% of inflow)
Center-of-Mass det. time= 0.8 min (760.2 - 759.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	1,713.50'	0.032 af	**16.37'W x 150.00'L x 1.48'H Field A** 0.083 af Overall - 0.004 af Embedded = 0.079 af x 40.0% Voids
#2A	1,713.83'	0.004 af	**CPP single-wall 4"** x 84 Inside #1 Inside= 4.0"W x 4.0"H => 0.11 sf x 20.00'L = 2.2 cf Outside= 4.7"W x 4.7"H => 0.11 sf x 20.00'L = 2.2 cf 12 Rows of 7 Chambers
		0.036 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	1,712.00'	**6.0" Round Culvert X 4.00** L= 150.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,712.00' / 1,711.00' S= 0.0067 '/' Cc= 0.900 n= 0.011, Flow Area= 0.20 sf
#2	Discarded	1,713.50'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.00'

Discarded OutFlow Max=0.06 cfs @ 12.08 hrs HW=1,714.36' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=3.37 cfs @ 12.08 hrs HW=1,714.36' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 3.37 cfs @ 4.29 fps)

Pond 1: one - Chamber Wizard Field A

Chamber Model = CPP single-wall 4" (Single-wall corrugated HDPE pipe)
Inside= 4.0"W x 4.0"H => 0.11 sf x 20.00'L = 2.2 cf
Outside= 4.7"W x 4.7"H => 0.11 sf x 20.00'L = 2.2 cf

4.7" Wide + 12.0" Spacing = 16.7" C-C Row Spacing

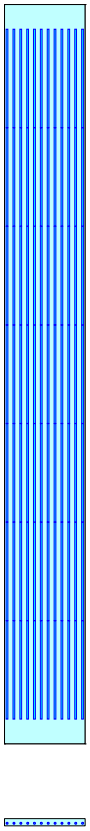
7 Chambers/Row x 20.00' Long = 140.00' Row Length +60.0" End Stone x 2 = 150.00' Base Length
12 Rows x 4.7" Wide + 12.0" Spacing x 11 + 4.0" Side Stone x 2 = 16.37' Base Width
4.0" Base + 4.7" Chamber Height + 9.0" Cover = 1.48' Field Height

84 Chambers x 2.2 cf = 182.8 cf Chamber Storage

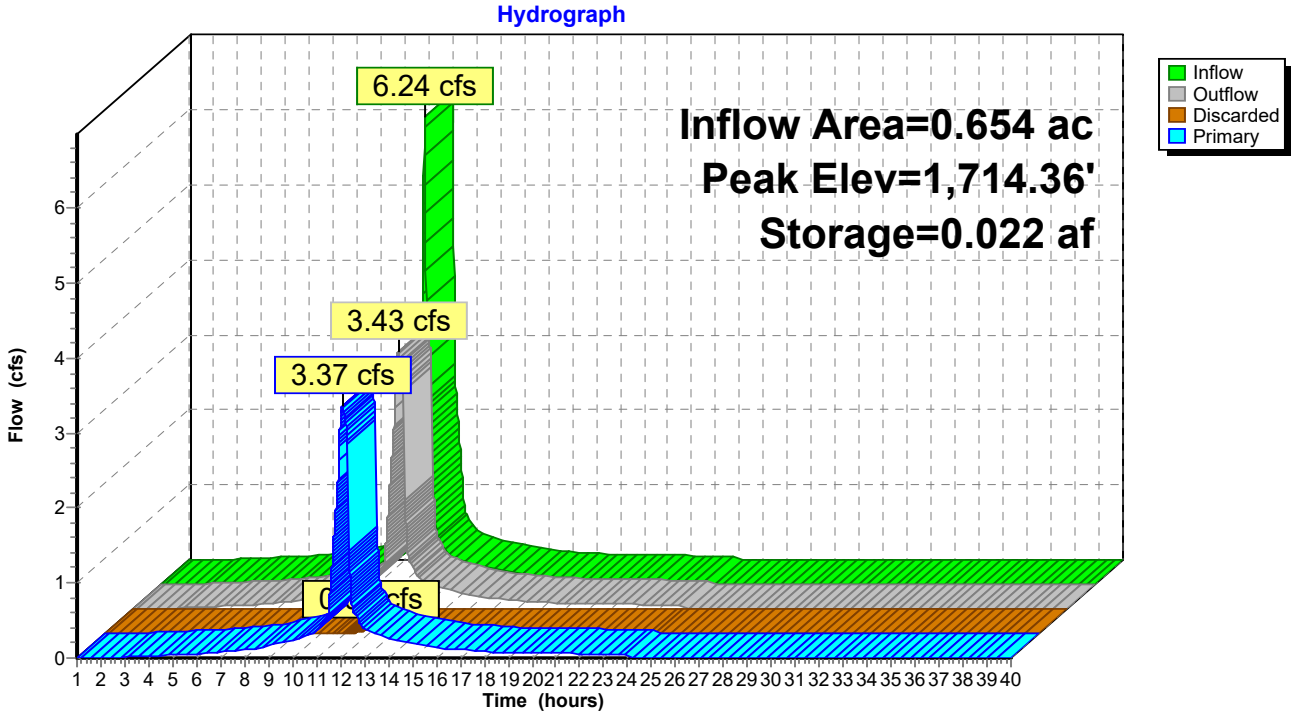
3,621.1 cf Field - 182.8 cf Chambers = 3,438.3 cf Stone x 40.0% Voids = 1,375.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,558.1 cf = 0.036 af
Overall Storage Efficiency = 43.0%
Overall System Size = 150.00' x 16.37' x 1.48'

84 Chambers
134.1 cy Field
127.3 cy Stone



Pond 1: one


Hydrograph
6.24 cfs
3.43 cfs
3.37 cfs
Inflow Area=0.654 ac
Peak Elev=1,714.36'
Storage=0.022 af
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)

Summary for Pond 2: Two

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=2)

Inflow Area = 0.916 ac, 78.95% Impervious, Inflow Depth = 7.35" for 100 Year event
Inflow = 8.73 cfs @ 12.00 hrs, Volume= 0.561 af
Outflow = 4.96 cfs @ 12.08 hrs, Volume= 0.561 af, Atten= 43%, Lag= 4.4 min
Discarded = 0.05 cfs @ 12.08 hrs, Volume= 0.008 af
Primary = 4.91 cfs @ 12.08 hrs, Volume= 0.553 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1,714.95' @ 12.08 hrs Surf.Area= 0.051 ac Storage= 0.032 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.8 min (760.2 - 759.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	1,713.50'	0.029 af	**21.93'W x 102.00'L x 1.48'H Field A** 0.076 af Overall - 0.004 af Embedded = 0.072 af x 40.0% Voids
#2A	1,713.83'	0.004 af	**CPP single-wall 4"** x 80 Inside #1 Inside= 4.0"W x 4.0"H => 0.11 sf x 20.00'L = 2.2 cf Outside= 4.7"W x 4.7"H => 0.11 sf x 20.00'L = 2.2 cf 16 Rows of 5 Chambers
		0.033 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	1,712.00'	**12.0" Round Culvert** L= 150.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,712.00' / 1,711.00' S= 0.0067 '/' Cc= 0.900 n= 0.011, Flow Area= 0.79 sf
#2	Discarded	1,713.50'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.00'

Discarded OutFlow Max=0.05 cfs @ 12.08 hrs HW=1,714.95' (Free Discharge)
↑**2=Exfiltration** (Controls 0.05 cfs)

Primary OutFlow Max=4.90 cfs @ 12.08 hrs HW=1,714.95' (Free Discharge)
↑**1=Culvert** (Barrel Controls 4.90 cfs @ 6.24 fps)

Pond 2: Two - Chamber Wizard Field A

Chamber Model = CPP single-wall 4" (Single-wall corrugated HDPE pipe)
Inside= 4.0"W x 4.0"H => 0.11 sf x 20.00'L = 2.2 cf
Outside= 4.7"W x 4.7"H => 0.11 sf x 20.00'L = 2.2 cf

4.7" Wide + 12.0" Spacing = 16.7" C-C Row Spacing

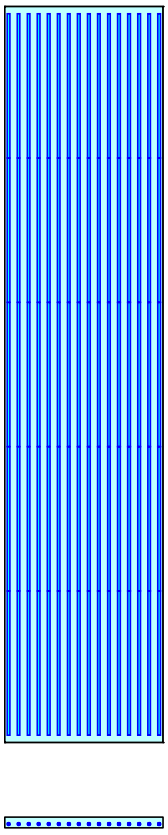
5 Chambers/Row x 20.00' Long = 100.00' Row Length +12.0" End Stone x 2 = 102.00' Base Length
16 Rows x 4.7" Wide + 12.0" Spacing x 15 + 4.0" Side Stone x 2 = 21.93' Base Width
4.0" Base + 4.7" Chamber Height + 9.0" Cover = 1.48' Field Height

80 Chambers x 2.2 cf = 174.1 cf Chamber Storage

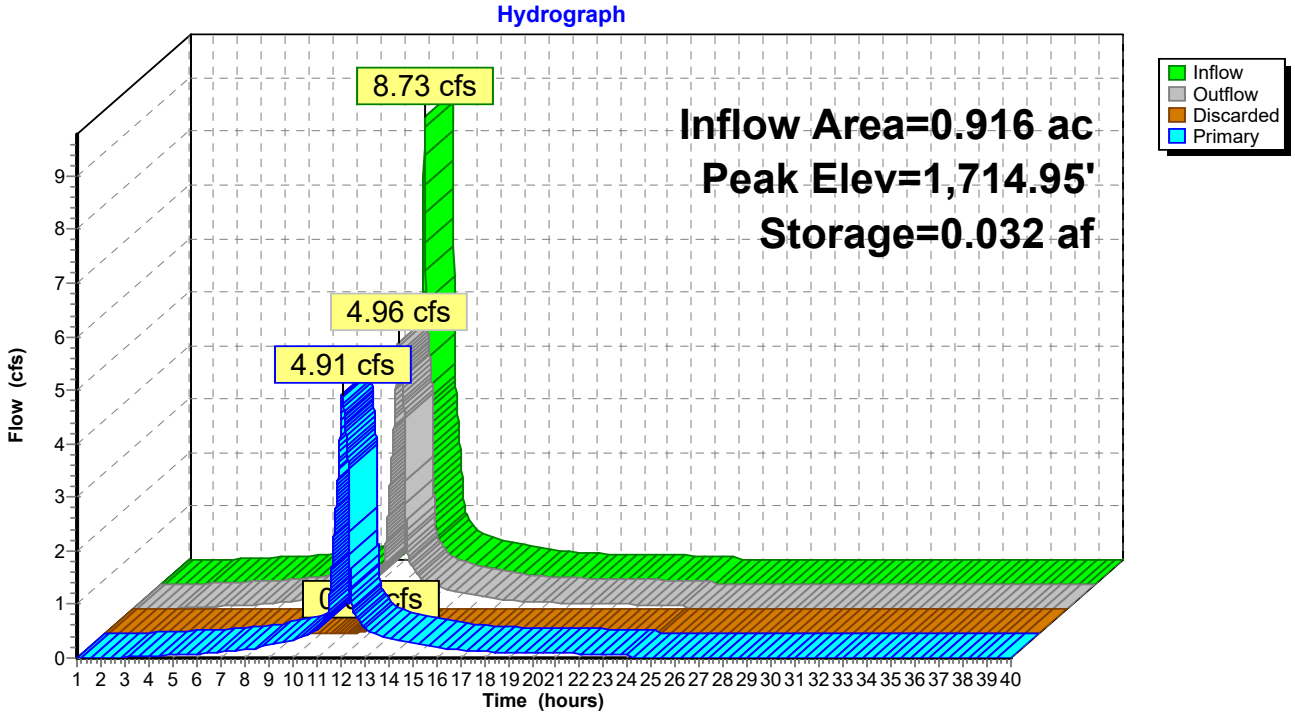
3,299.9 cf Field - 174.1 cf Chambers = 3,125.8 cf Stone x 40.0% Voids = 1,250.3 cf Stone Storage

Chamber Storage + Stone Storage = 1,424.4 cf = 0.033 af
Overall Storage Efficiency = 43.2%
Overall System Size = 102.00' x 21.93' x 1.48'

80 Chambers
122.2 cy Field
115.8 cy Stone



Pond 2: Two


Hydrograph
8.73 cfs
4.96 cfs
4.91 cfs
Inflow Area=0.916 ac
Peak Elev=1,714.95'
Storage=0.032 af
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)

Summary for Pond 3: three

Inflow Area = 1.047 ac, 78.95% Impervious, Inflow Depth = 7.35" for 100 Year event
Inflow = 9.98 cfs @ 12.00 hrs, Volume= 0.641 af
Outflow = 5.37 cfs @ 12.08 hrs, Volume= 0.641 af, Atten= 46%, Lag= 4.7 min
Discarded = 0.08 cfs @ 12.08 hrs, Volume= 0.011 af
Primary = 5.30 cfs @ 12.08 hrs, Volume= 0.630 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 1,714.64' @ 12.08 hrs Surf.Area= 0.076 ac Storage= 0.038 af

Plug-Flow detention time= 1.7 min calculated for 0.641 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (760.3 - 759.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	1,713.50'	0.042 af	**21.93'W x 150.00'L x 1.48'H Field A** 0.111 af Overall - 0.006 af Embedded = 0.106 af x 40.0% Voids
#2A	1,713.83'	0.006 af	**CPP single-wall 4"** x 112 Inside #1 Inside= 4.0"W x 4.0"H => 0.11 sf x 20.00'L = 2.2 cf Outside= 4.7"W x 4.7"H => 0.11 sf x 20.00'L = 2.2 cf 16 Rows of 7 Chambers
		0.048 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	1,712.00'	**6.0" Round Culvert X 6.00** L= 150.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,712.00' / 1,711.00' S= 0.0067 '/' Cc= 0.900 n= 0.011, Flow Area= 0.20 sf
#2	Discarded	1,713.50'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.00'

Discarded OutFlow Max=0.08 cfs @ 12.08 hrs HW=1,714.64' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.08 cfs)

Primary OutFlow Max=5.30 cfs @ 12.08 hrs HW=1,714.64' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 5.30 cfs @ 4.50 fps)

Pond 3: three - Chamber Wizard Field A

Chamber Model = CPP single-wall 4" (Single-wall corrugated HDPE pipe)
Inside= 4.0"W x 4.0"H => 0.11 sf x 20.00'L = 2.2 cf
Outside= 4.7"W x 4.7"H => 0.11 sf x 20.00'L = 2.2 cf

4.7" Wide + 12.0" Spacing = 16.7" C-C Row Spacing

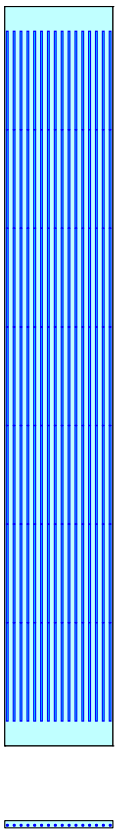
7 Chambers/Row x 20.00' Long = 140.00' Row Length +60.0" End Stone x 2 = 150.00' Base Length
16 Rows x 4.7" Wide + 12.0" Spacing x 15 + 4.0" Side Stone x 2 = 21.93' Base Width
4.0" Base + 4.7" Chamber Height + 9.0" Cover = 1.48' Field Height

112 Chambers x 2.2 cf = 243.8 cf Chamber Storage

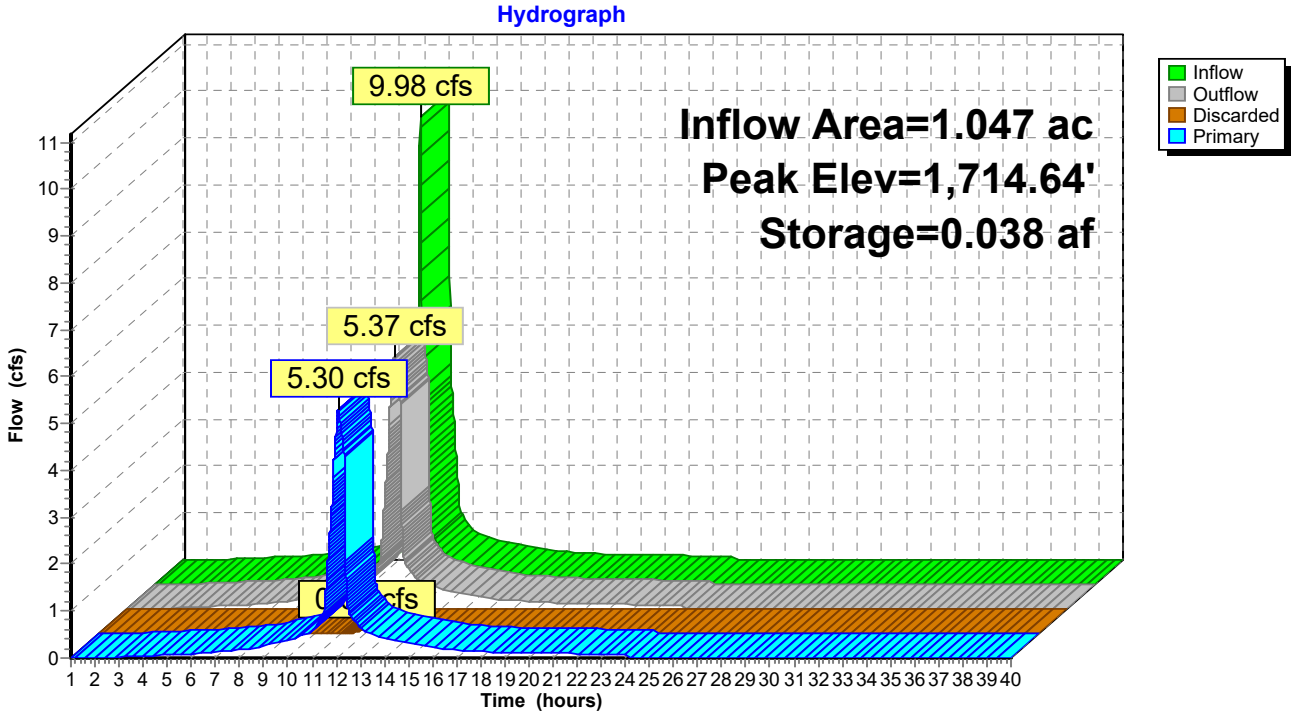
4,852.7 cf Field - 243.8 cf Chambers = 4,609.0 cf Stone x 40.0% Voids = 1,843.6 cf Stone Storage

Chamber Storage + Stone Storage = 2,087.4 cf = 0.048 af
Overall Storage Efficiency = 43.0%
Overall System Size = 150.00' x 21.93' x 1.48'

112 Chambers
179.7 cy Field
170.7 cy Stone



Pond 3: three


Hydrograph
9.98 cfs
5.37 cfs
5.30 cfs
Inflow Area=1.047 ac
Peak Elev=1,714.64'
Storage=0.038 af
Inflow
Outflow
Discarded
Primary
Flow (cfs)
Time (hours)

Summary for Pond DP up: Dry Basin

Inflow Area = 1.876 ac, 0.00% Impervious, Inflow Depth = 4.98" for 100 Year event
Inflow = 13.38 cfs @ 12.00 hrs, Volume= 0.778 af
Outflow = 2.25 cfs @ 12.43 hrs, Volume= 0.685 af, Atten= 83%, Lag= 25.9 min
Primary = 2.25 cfs @ 12.43 hrs, Volume= 0.685 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1,733.88' @ 12.43 hrs Surf.Area= 0.112 ac Storage= 0.343 af

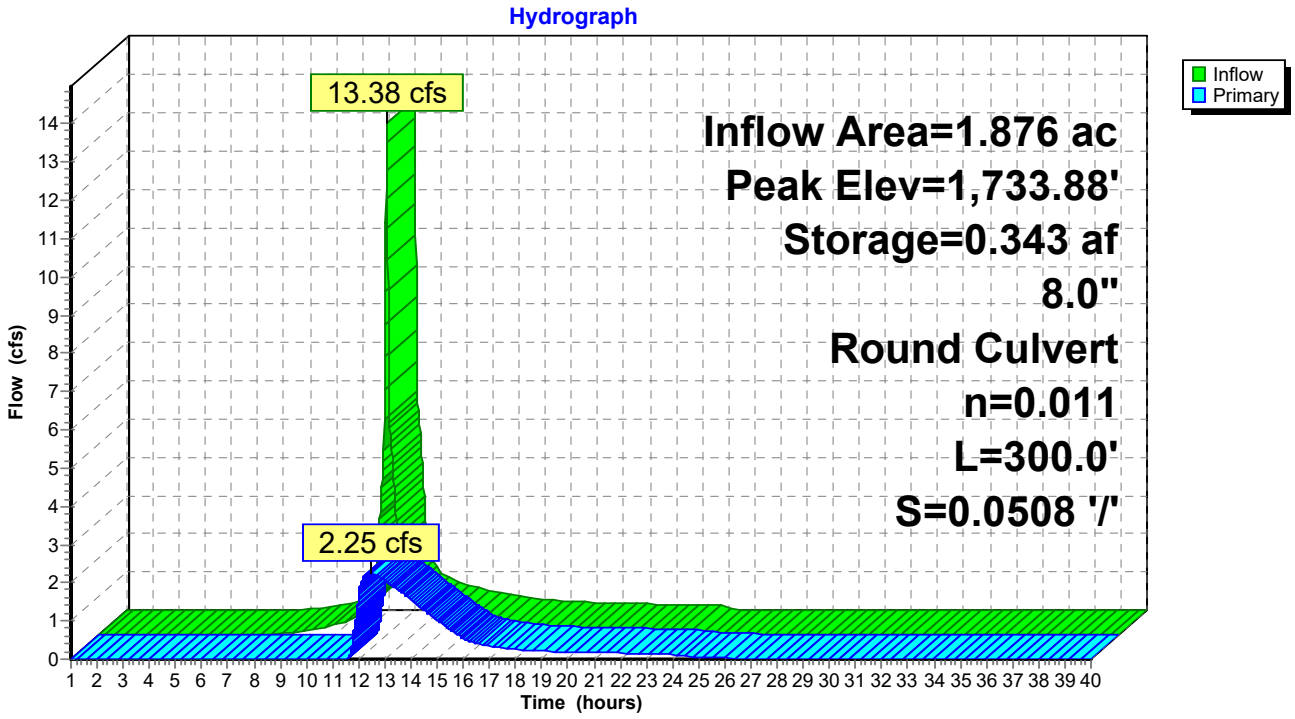
Plug-Flow detention time= 147.5 min calculated for 0.685 af (88% of inflow)
Center-of-Mass det. time= 92.1 min (904.0 - 811.9)

Volume	Invert	Avail.Storage	Storage Description
#1	1,730.00'	0.357 af	**45.00'W x 65.00'L x 4.00'H Hillside pond Z=2.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	1,731.25'	**8.0" Round Culvert** L= 300.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,731.25' / 1,716.00' S= 0.0508 '/' Cc= 0.900 n= 0.011, Flow Area= 0.35 sf

Primary OutFlow Max=2.25 cfs @ 12.43 hrs HW=1,733.88' (Free Discharge)
↳**1=Culvert** (Inlet Controls 2.25 cfs @ 6.43 fps)

Pond DP up: Dry Basin



Summary for Pond DPe: Pond

[79] Warning: Submerged Pond FBe Primary device # 1 INLET by 0.74'

Inflow Area = 7.028 ac, 1.63% Impervious, Inflow Depth = 5.10" for 100 Year event
Inflow = 25.50 cfs @ 12.38 hrs, Volume= 2.985 af
Outflow = 25.47 cfs @ 12.39 hrs, Volume= 2.985 af, Atten= 0%, Lag= 0.7 min
Primary = 25.47 cfs @ 12.39 hrs, Volume= 2.985 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 1,708.74' @ 12.39 hrs Surf.Area= 0.033 ac Storage= 0.054 af

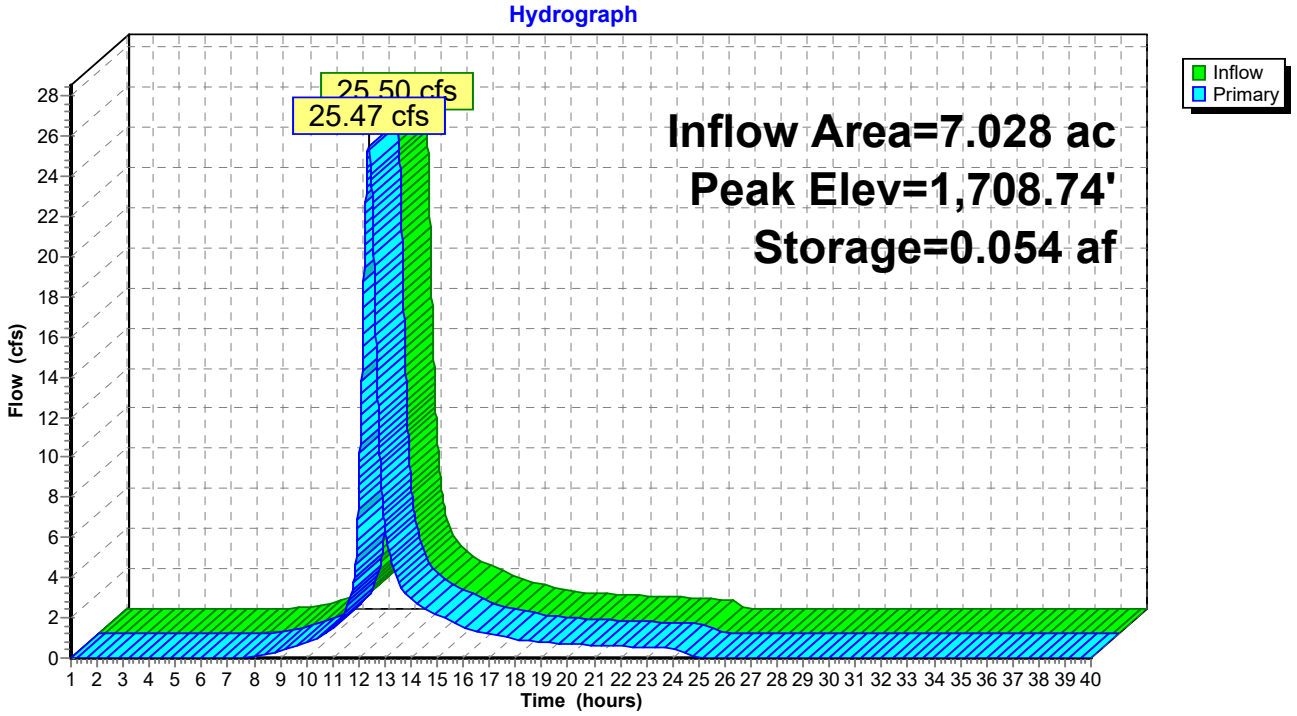
Plug-Flow detention time= 3.6 min calculated for 2.984 af (100% of inflow)
Center-of-Mass det. time= 3.6 min (836.7 - 833.1)

Volume	Invert	Avail.Storage	Storage Description
#1	1,706.00'	0.105 af	**10.00'W x 38.00'L x 4.00'H Pond Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	1,706.00'	**15.0" Round Culvert** L= 35.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,706.00' / 1,706.00' S= 0.0000 '/' Cc= 0.900 n= 0.011, Flow Area= 1.23 sf
#2	Primary	1,708.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=25.47 cfs @ 12.39 hrs HW=1,708.74' (Free Discharge)
1=Culvert (Barrel Controls 8.33 cfs @ 6.79 fps)
2=Broad-Crested Rectangular Weir (Weir Controls 17.14 cfs @ 2.31 fps)

Pond DPe: Pond



Summary for Pond DPw: Dry pond

[81] Warning: Exceeded Pond FBw by 0.16' @ 24.98 hrs

Inflow Area = 2.826 ac, 3.66% Impervious, Inflow Depth = 6.16" for 100 Year event
Inflow = 12.83 cfs @ 12.14 hrs, Volume= 1.450 af
Outflow = 12.70 cfs @ 12.17 hrs, Volume= 1.385 af, Atten= 1%, Lag= 2.0 min
Primary = 12.70 cfs @ 12.17 hrs, Volume= 1.385 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 1,703.99' @ 12.17 hrs Surf.Area= 0.059 ac Storage= 0.138 af

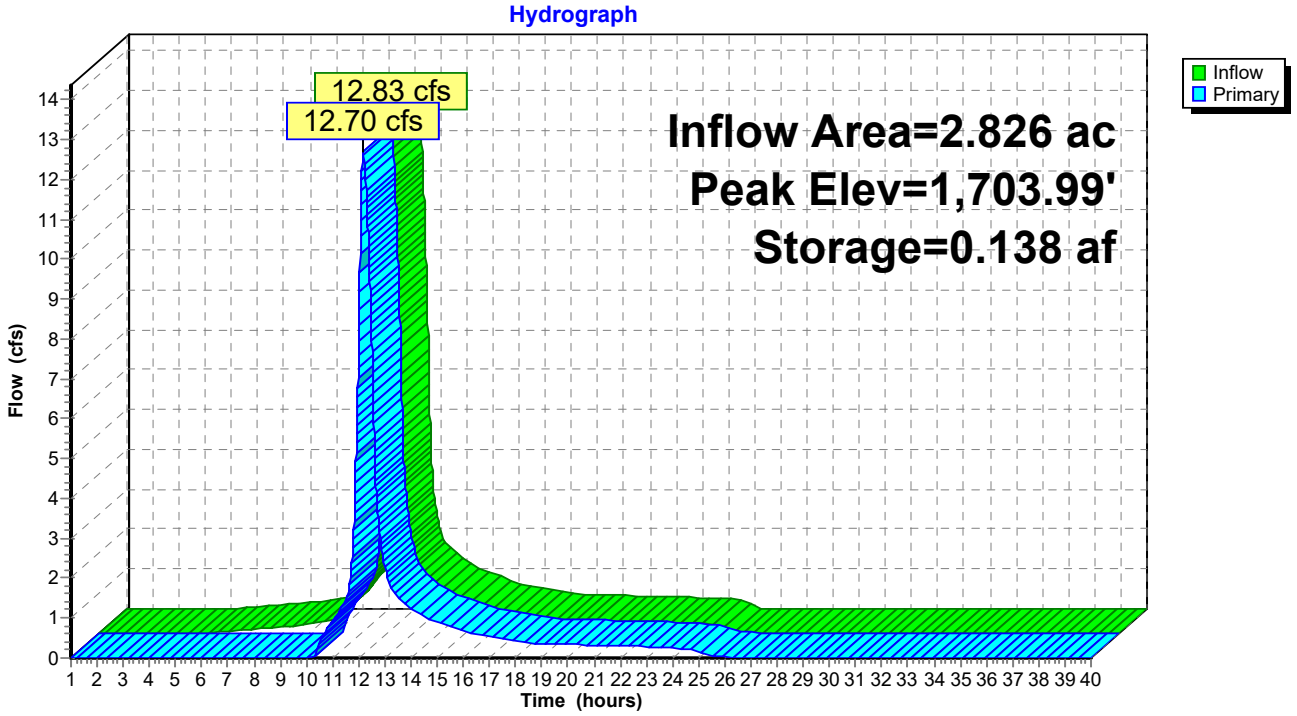
Plug-Flow detention time= 52.9 min calculated for 1.385 af (95% of inflow)
Center-of-Mass det. time= 25.9 min (846.8 - 820.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,700.00'	0.153 af	**16.00'W x 40.00'L x 4.25'H Prismatoid Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	1,702.50'	**15.0" Round Culvert** L= 40.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,702.50' / 1,699.00' S= 0.0875 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Primary	1,700.00'	**4.0" Round Culvert X 0.00** L= 30.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,700.00' / 1,696.00' S= 0.1333 '/' Cc= 0.900 n= 0.011, Flow Area= 0.09 sf
#3	Primary	1,703.50'	**8.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=12.69 cfs @ 12.17 hrs HW=1,703.99' (Free Discharge)
- **1=Culvert** (Inlet Controls 5.51 cfs @ 4.49 fps)
- **2=Culvert** (Controls 0.00 cfs)
- **3=Broad-Crested Rectangular Weir** (Weir Controls 7.19 cfs @ 1.82 fps)

Pond DPw: Dry pond



Summary for Pond FBe: ForeBay

Inflow Area = 7.028 ac, 1.63% Impervious, Inflow Depth = 5.10" for 100 Year event
Inflow = 26.49 cfs @ 12.32 hrs, Volume= 2.985 af
Outflow = 25.50 cfs @ 12.38 hrs, Volume= 2.985 af, Atten= 4%, Lag= 3.8 min
Primary = 25.50 cfs @ 12.38 hrs, Volume= 2.985 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1,711.00' @ 12.38 hrs Surf.Area= 0.037 ac Storage= 0.066 af

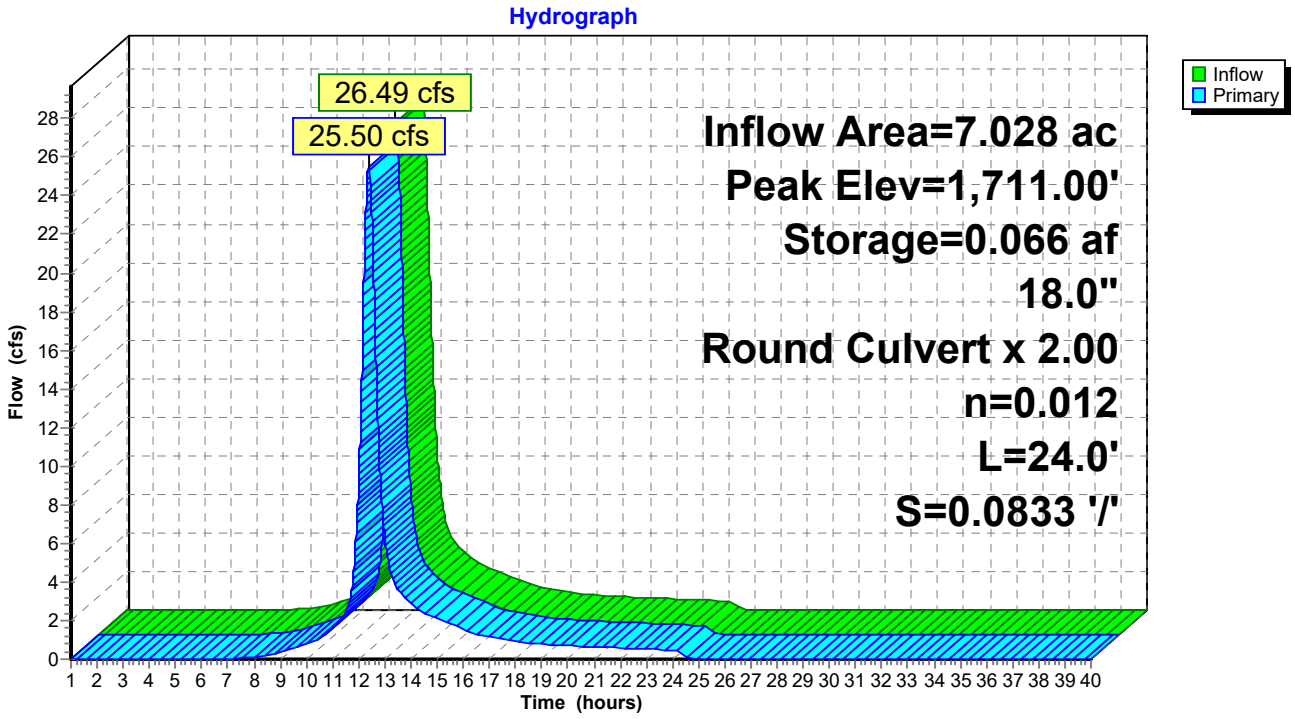
Plug-Flow detention time= 1.7 min calculated for 2.984 af (100% of inflow)
Center-of-Mass det. time= 1.7 min (833.1 - 831.4)

Volume	Invert	Avail.Storage	Storage Description
#1	1,708.00'	0.109 af	**10.00'W x 40.00'L x 4.00'H Prismatoid Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	1,708.00'	**18.0" Round Culvert X 2.00** L= 24.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,708.00' / 1,706.00' S= 0.0833 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf

Primary OutFlow Max=25.50 cfs @ 12.38 hrs HW=1,710.99' (Free Discharge)
1=Culvert (Inlet Controls 25.50 cfs @ 7.21 fps)

Pond FBe: ForeBay



Summary for Pond FBw: Forebay

[62] Hint: Exceeded Reach 8R OUTLET depth by 3.62' @ 12.15 hrs

Inflow Area = 2.826 ac, 3.66% Impervious, Inflow Depth = 6.16" for 100 Year event
Inflow = 22.04 cfs @ 12.05 hrs, Volume= 1.450 af
Outflow = 12.83 cfs @ 12.14 hrs, Volume= 1.450 af, Atten= 42%, Lag= 5.2 min
Primary = 12.83 cfs @ 12.14 hrs, Volume= 1.450 af

Routing by Stor-Ind method, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 1,706.31' @ 12.14 hrs Surf.Area= 0.083 ac Storage= 0.199 af

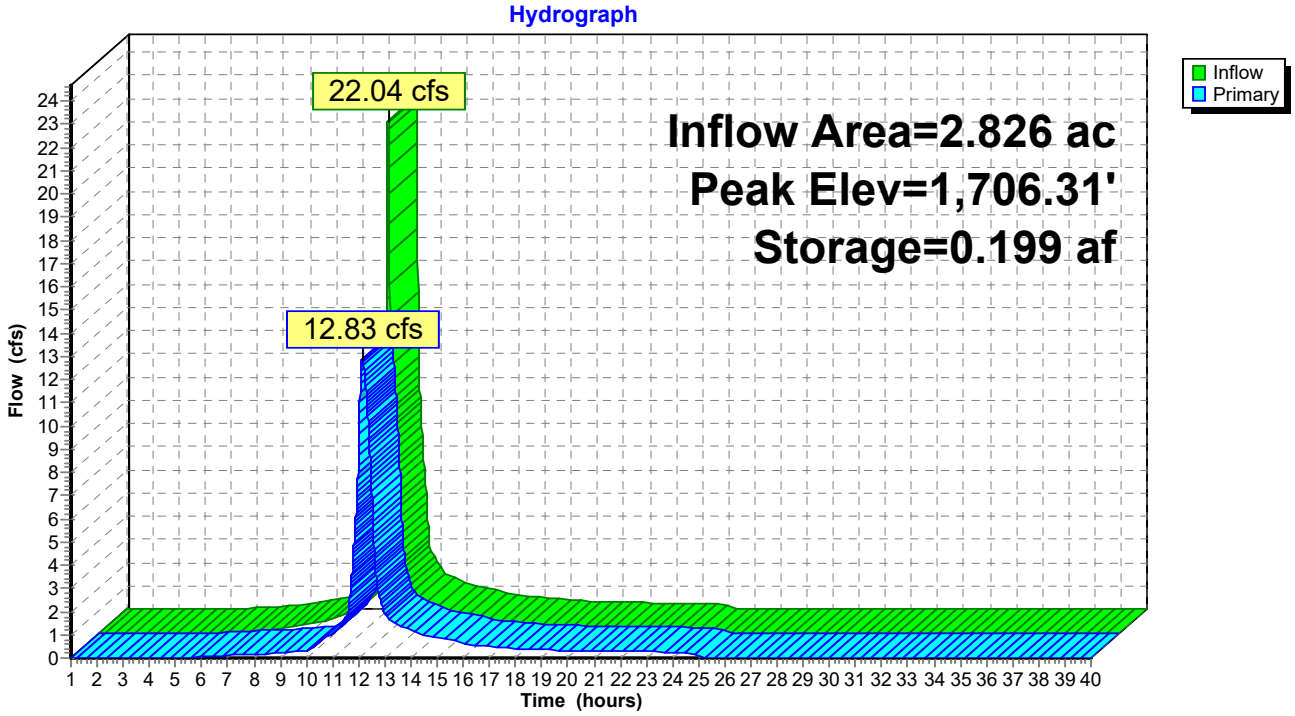
Plug-Flow detention time= 25.8 min calculated for 1.450 af (100% of inflow)
Center-of-Mass det. time= 25.8 min (820.8 - 795.1)

Volume	Invert	Avail.Storage	Storage Description
#1	1,702.50'	0.237 af	**16.00'W x 70.00'L x 4.25'H Prismatoid Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	1,703.50'	**18.0" Round Culvert** L= 40.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1,703.50' / 1,703.00' S= 0.0125 '/' Cc= 0.900 n= 0.012, Flow Area= 1.77 sf
#2	Primary	1,702.25'	**4.0" Round Culvert** L= 35.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,702.25' / 1,702.00' S= 0.0071 '/' Cc= 0.900 n= 0.011, Flow Area= 0.09 sf

Primary OutFlow Max=12.83 cfs @ 12.14 hrs HW=1,706.31' (Free Discharge)
1=Culvert (Inlet Controls 12.21 cfs @ 6.91 fps)
2=Culvert (Barrel Controls 0.62 cfs @ 7.08 fps)

Pond FBw: Forebay

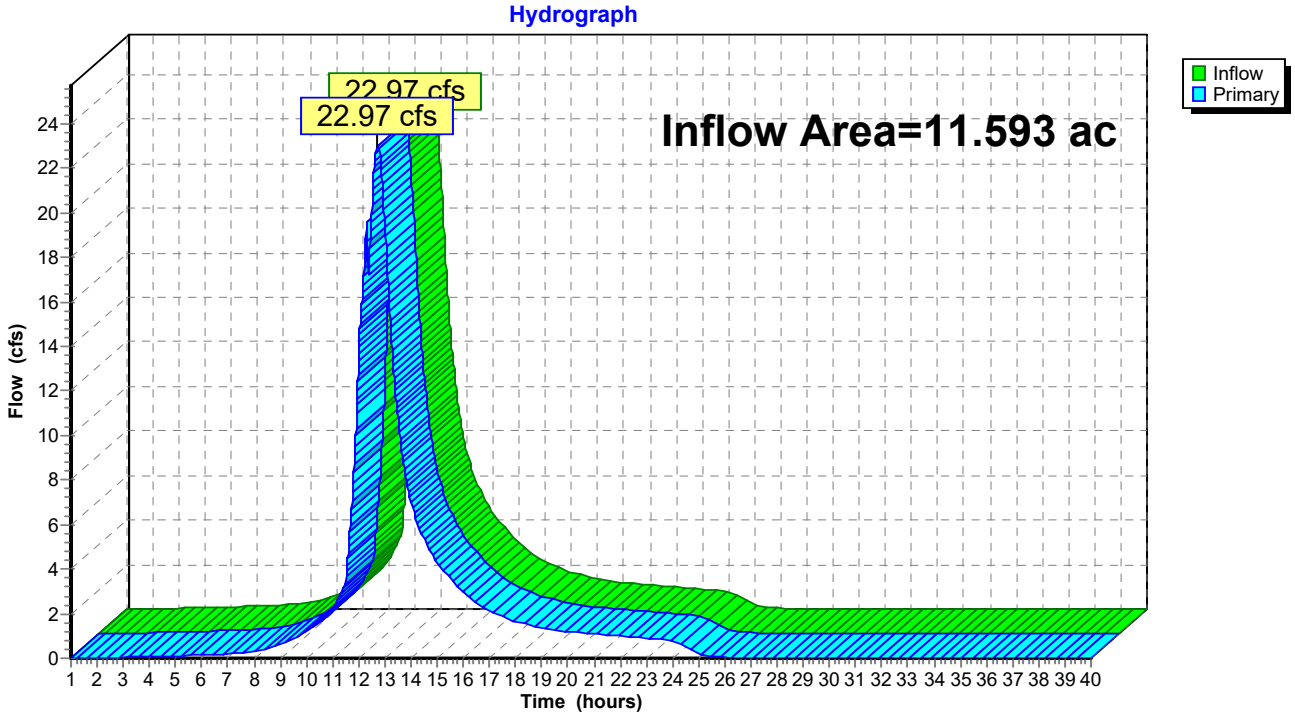


Summary for Link 7L: wetland

Inflow Area = 11.593 ac, 11.58% Impervious, Inflow Depth = 5.21" for 100 Year event
Inflow = 22.97 cfs @ 12.72 hrs, Volume= 5.033 af
Primary = 22.97 cfs @ 12.72 hrs, Volume= 5.033 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 1.00-40.00 hrs, dt= 0.01 hrs

Link 7L: wetland



Attachment E

Plans to Accompany Notice of Intent Application
Prepared for SAMA Productions LLC

N/F
JOHN REIDEMAN

N/F
CYNTHIA TRUE

N/F
ARICO THOMAS

N/F
MACK BRENNA

ABBY ROAD

PROPOSED MODULAR BLOCK RETAINING WALL

PROPOSED PARKING AREA

PROPOSED BUILDING

PROPOSED FENCE

PROPOSED FENCE

PROPOSED GREENHOUSES (SEE ENLARGED PLAN)

4.7± ACRES

375'±

925'±

B.V.W.

TOWN HILL ROAD

LOT #8
PORTION OF
MAP 408, LOT 31
47.6± AC

LOT #7

LOT #6

LOT #5

LOT #4

LOT #3

LOT #2

LOT #1

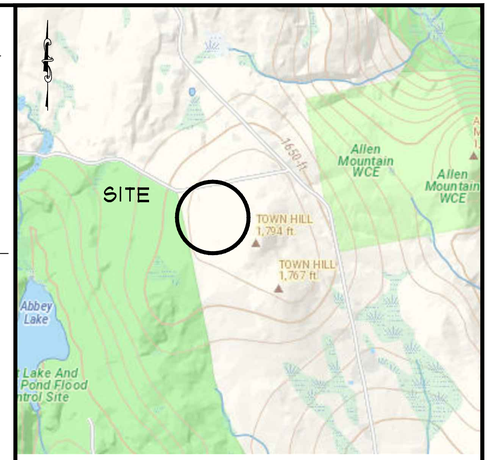
APPROX. PROPERTY LINE

N/F
COMMONWEALTH OF MASSACHUSETTS

N/F
ESTATE OF PAUL BOBRYK

N/F
HULL FORESTLANDS, LP

TOWN HILL ROAD



LOCUS PLAN
SCALE: N.T.S.

LEGEND

- APPROXIMATE PROPERTY LINE
- WETLAND BOUNDARY
- EXISTING STREAM (APPROX.)
- 100 BZ — 100' BUFFER ZONE
- 50 BZ — 50' BUFFER ZONE
- 1700 — EXISTING CONTOUR
- PROPOSED FENCE
- 1700 — PROPOSED CONTOUR
- S — S — PROPOSED SEWER
- PROPOSED DRAIN
- PROPOSED CLEARING LIMITS
- EC — PROPOSED EROSION CONTROL

THESE PLANS ARE FOR PERMITTING PURPOSES ONLY
NOT FOR CONSTRUCTION

OVERALL SITE PLAN
SCALE: 1"=100'

GRAPHIC SCALE
0 50 100 200
(IN FEET)
1 INCH = 100 FEET

PLANS TO ACCOMPANY NOTICE OF INTENT
PREPARED FOR:
SAMA PRODUCTIONS, LLC.
LOCATED AT:
TOWN HILL ROAD
SANDISFIELD MA

Design Group, Inc.
Civil Engineers * Surveyors * Consultants
2 FEDERICO DRIVE * FITCHBURG, MASSACHUSETTS 01301 * (413) 443-3537

PLAN DESCRIPTION:
OVERALL SITE PLAN

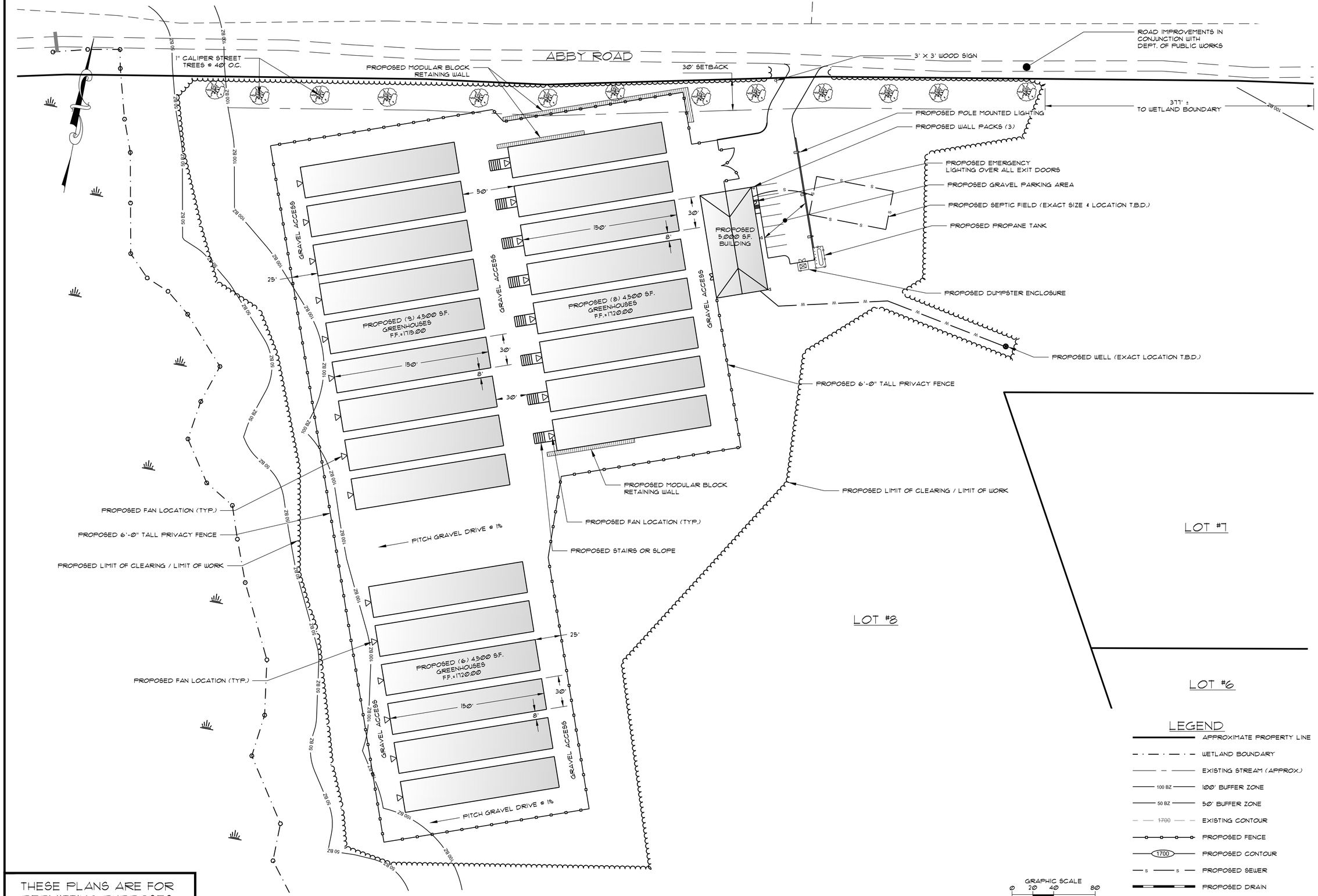
SK DESIGN GROUP PROJECT #:
20018

JAMES M. SCALISE, II CIVIL No. 39863 REGISTERED PROFESSIONAL ENGINEER
JAMES M. SCALISE II
SK DESIGN GROUP PRESIDENT
LICENSE #39863
PROFESSIONAL OF RECORD
PHONE: 413-443-3537

REVISION:

DRAWN BY:	CHECKED BY:
AMS	JMS II
ORIG. DATE: MARCH 2, 2021	SHEET NO. 1 OF 6
ISSUED FOR: Permit	
SCALE: As Noted	

G:\SK DESIGN GROUP\2020\20018 Fulcrum-Town Hill Rd, Sandisfield-MJ Greenhouses\Drawings\MGV\20018 NOI.dwg
Plotted On: Thursday, March 04, 2021 - 11:18am
User Name: ascalfaro



ENLARGED SITE PLAN

SCALE: 1" = 40'

THESE PLANS ARE FOR PERMITTING PURPOSES ONLY

NOT FOR CONSTRUCTION

GRAPHIC SCALE
0 20 40 80
(IN FEET)
1 INCH = 40 FEET

LEGEND

- APPROXIMATE PROPERTY LINE
- WETLAND BOUNDARY
- EXISTING STREAM (APPROX.)
- 100 BZ — 100' BUFFER ZONE
- 50 BZ — 50' BUFFER ZONE
- 1700 — EXISTING CONTOUR
- PROPOSED FENCE
- 1700 — PROPOSED CONTOUR
- S — S — PROPOSED SEWER
- PROPOSED DRAIN
- PROPOSED CLEARING LIMITS
- EC — PROPOSED EROSION CONTROL

PLANS TO ACCOMPANY NOTICE OF INTENT

PREPARED FOR:

SAMA PRODUCTIONS, LLC.

LOCATED AT:

TOWN HILL ROAD
SANDISFIELD MA

Design Group, Inc.
Civil Engineers * Surveyors * Consultants
2 FEDERICO DRIVE * PITTSFIELD, MASSACHUSETTS 01201 * (413) 443-3537

PLAN DESCRIPTION:

ENLARGED SITE PLAN

SK DESIGN GROUP PROJECT #: 200181

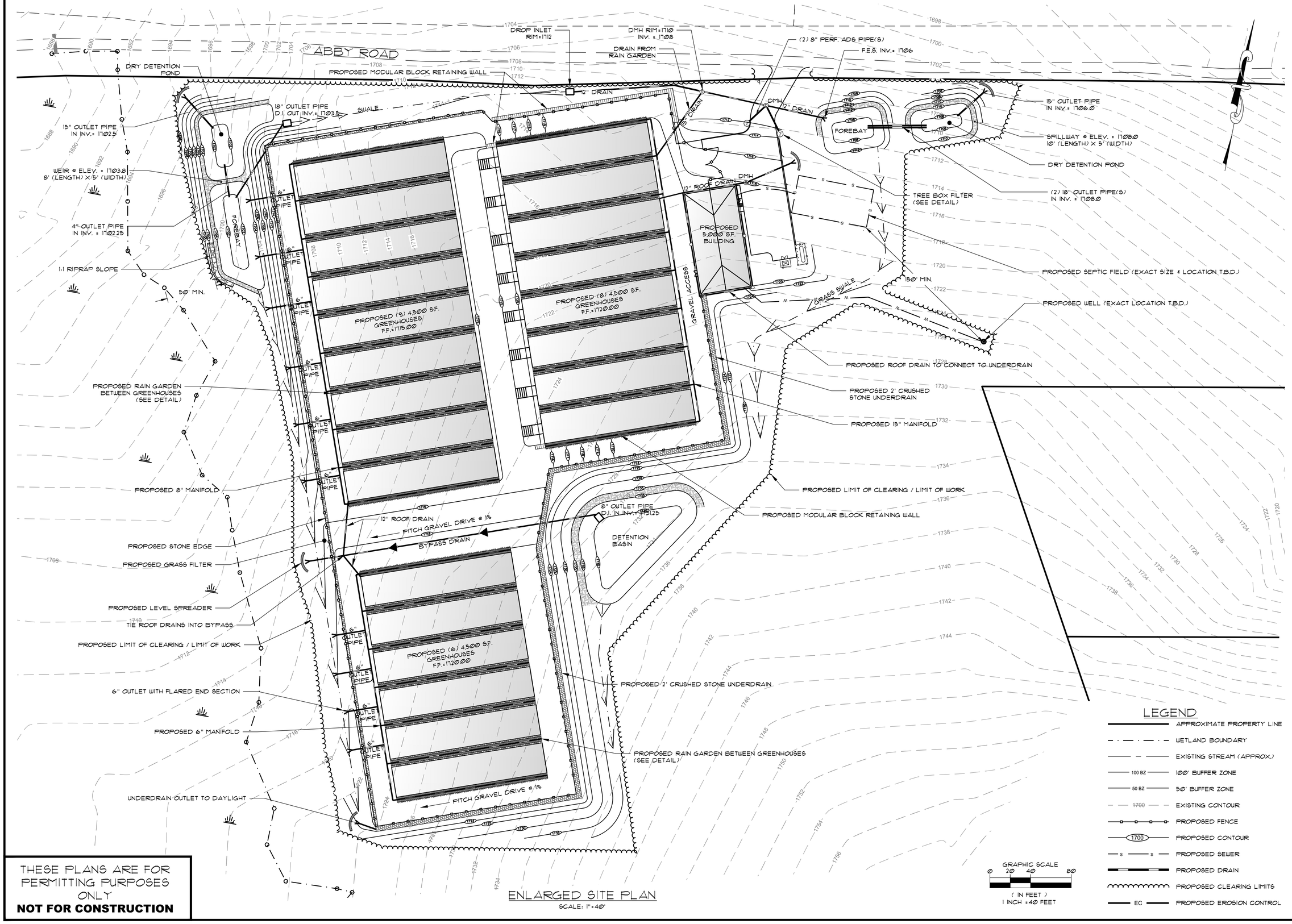
JAMES M. SCALISE, II
CIVIL
No. 39863
REGISTERED PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS

JAMES M. SCALISE II
SK DESIGN GROUP PRESIDENT
LICENSE #39863
PROFESSIONAL OF RECORD
PHONE: 413-443-3537

REVISION:

DRAWN BY:	CHECKED BY:
AMS	JMS II
ORIG. DATE: MARCH 2, 2021	SHEET NO. 2 OF 6
ISSUED FOR: Permit	
SCALE: As Noted	

G:\SK DESIGN GROUP\2020\200181 Fulcrum-Town Hill Rd, Sandisfield-MJ Greenhouses\Drawings\NOI\200181 NOI.dwg
Plotted On: Thursday, March 04, 2021 - 11:18am
User Name: cscolfaro



ENLARGED SITE PLAN
SCALE: 1"=40'

GRAPHIC SCALE
0 20 40 80
(IN FEET)
1 INCH =40 FEET

LEGEND

- APPROXIMATE PROPERTY LINE
- WETLAND BOUNDARY
- EXISTING STREAM (APPROX.)
- 100 BZ — 100' BUFFER ZONE
- 50 BZ — 50' BUFFER ZONE
- 1700 — EXISTING CONTOUR
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LOCATED AT:
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SANDISFIELD MA

Design Group, Inc.
Civil Engineers * Surveyors * Consultants
2 FEDERICO DRIVE * PITTSFIELD, MASSACHUSETTS 01201 * (413) 443-3537

PLAN DESCRIPTION:
GRADING PLAN

SK DESIGN GROUP PROJECT #:
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COMMONWEALTH OF MASSACHUSETTS
JAMES M. SCALISE, II
CIVIL
No. 39863
REGISTERED PROFESSIONAL ENGINEER

JAMES M. SCALISE II
SK DESIGN GROUP PRESIDENT
LICENSE #39863
PROFESSIONAL OF RECORD
PHONE: 413-443-3537

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AMS	JMS II
ORIG. DATE:	SHEET NO.
MARCH 2, 2021	3
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Permit	6
SCALE:	
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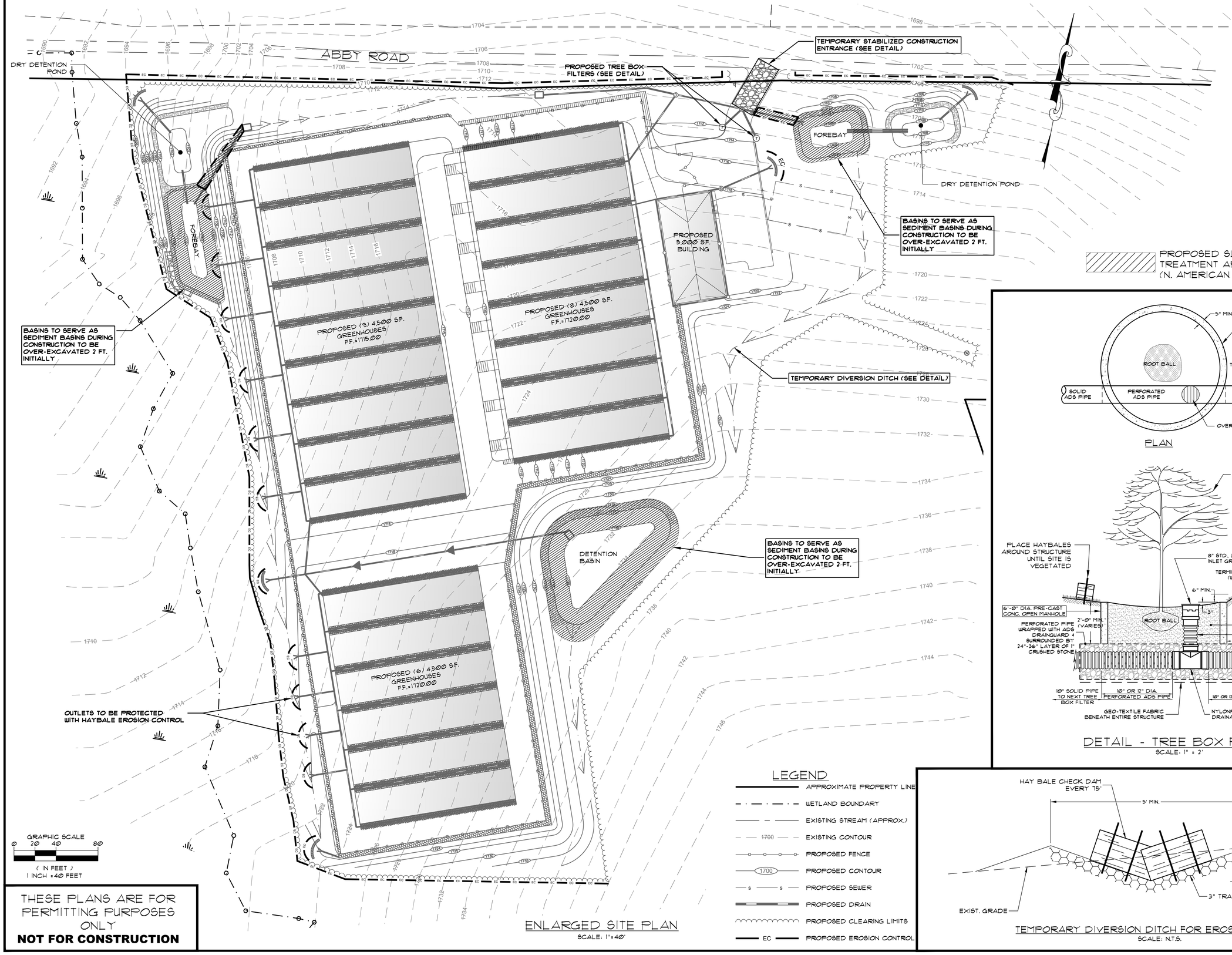
User Name: cscofield



ENLARGED SITE PLAN

SCALE: 1" = 40'

THESE PLANS ARE FOR PERMITTING PURPOSES ONLY

NOT FOR CONSTRUCTION

PLAN

DETAIL - TREE BOX FILTER

SCALE: 1" = 2'

TEMPORARY DIVERSION DITCH FOR EROSION CONTROL

SCALE: N.T.S.

LEGEND

- APPROXIMATE PROPERTY LINE
- WETLAND BOUNDARY
- EXISTING STREAM (APPROX.)
- 1700 EXISTING CONTOUR
- PROPOSED FENCE
- 1700 PROPOSED CONTOUR
- S S PROPOSED SEWER
- PROPOSED DRAIN
- PROPOSED CLEARING LIMITS
- EC EC PROPOSED EROSION CONTROL

PLANS TO ACCOMPANY NOTICE OF INTENT

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SAMA PRODUCTIONS, LLC.

LOCATED AT:

TOWN HILL ROAD
SANDISFIELD MA

Design Group, Inc.

Civil Engineers * Surveyors * Consultants

2 FEDERICO DRIVE * PITTSFIELD, MASSACHUSETTS 01201 * (413) 443-3537

PLAN DESCRIPTION:

EROSION CONTROL PLAN

SK DESIGN GROUP PROJECT #: 20018

JAMES M. SCALISE II
SK DESIGN GROUP PRESIDENT
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PHONE: 413-443-3537

REVISION:

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SCALE: As Noted	

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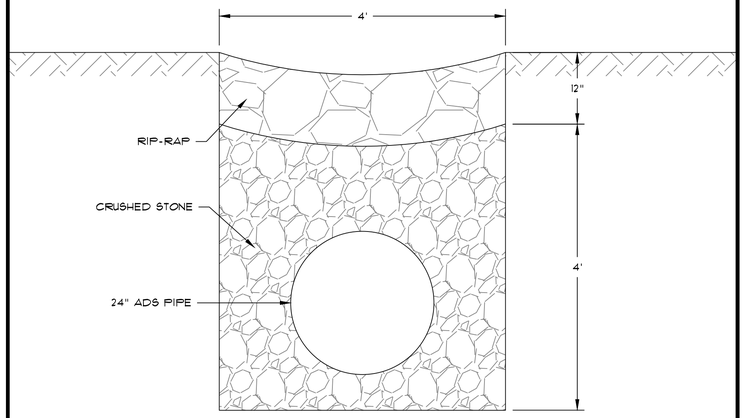
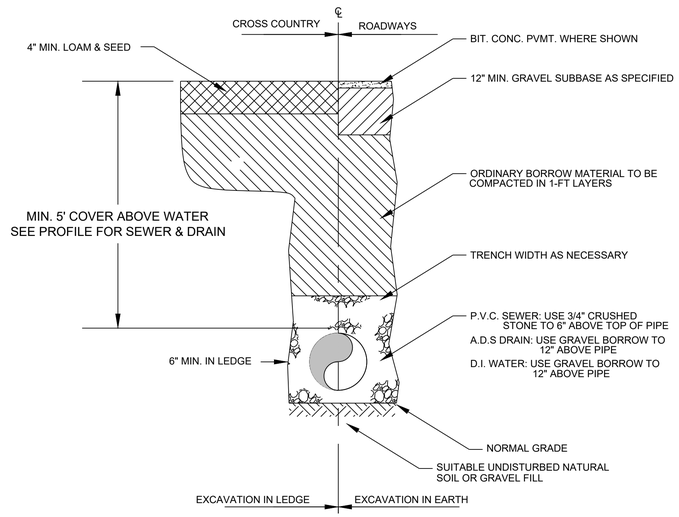
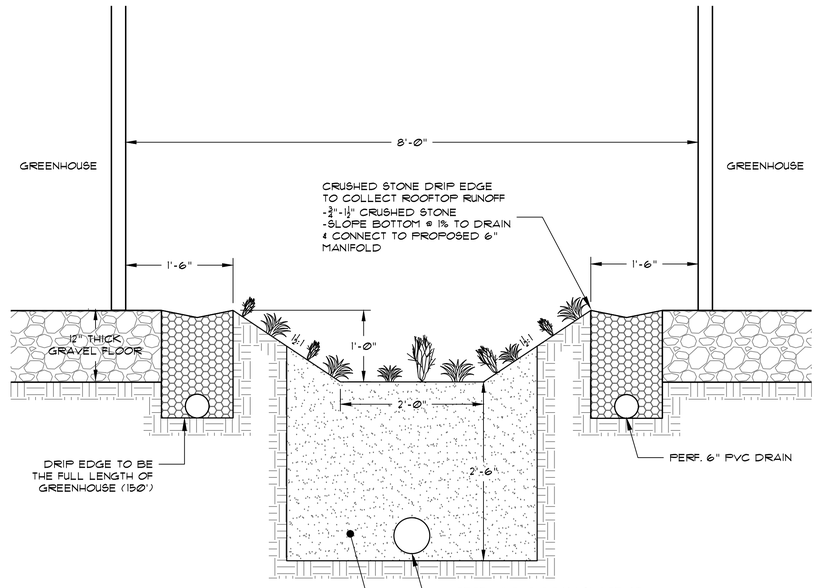
Plotted: Tuesday, March 04, 2021 - 11:19am
User Name: ascollard



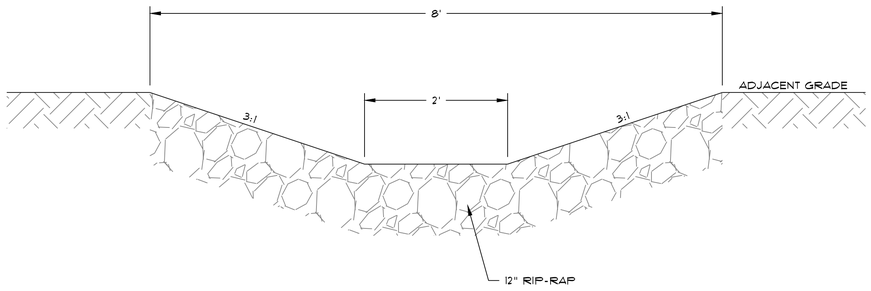
PROPOSED BY-PASS DRAIN
SCALE: 1"=1'



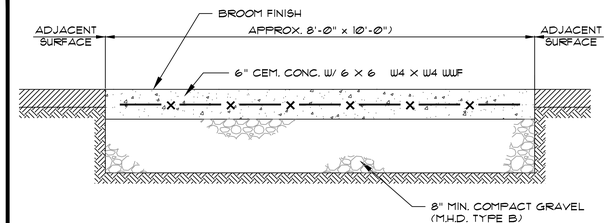
TYPICAL PIPE TRENCH DETAIL
N.T.S.



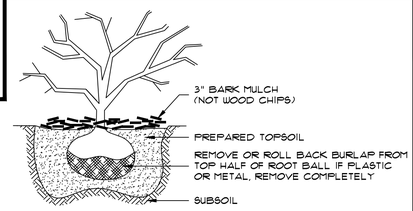
DETAIL - RAIN GARDEN
SCALE: 1"=1'



PROPOSED BY-PASS SWALE
SCALE: 1"=1'

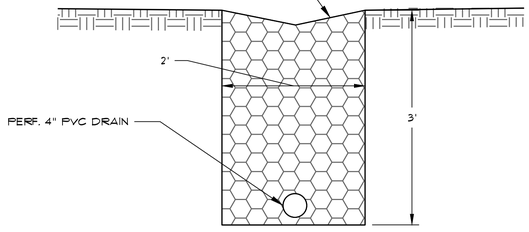


DETAIL - DUMPSTER PAD
SCALE: N.T.S.

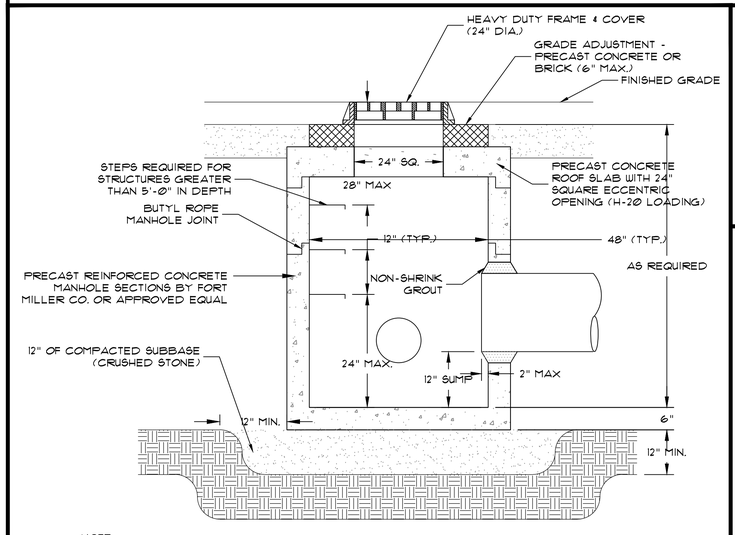


NOTE TO ALL CONTRACTORS: SURROUND ROOT BALL WITH 6" OF GOOD QUALITY TOPSOIL, AS SHOWN. WORK WILL BE CHECKED

DETAIL - SHRUB PLANTING
SCALE: NTS

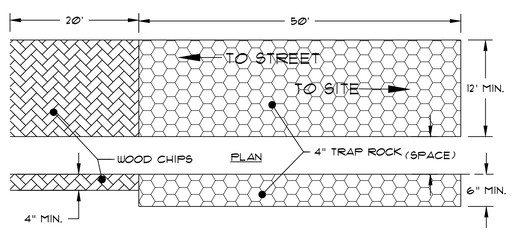


DETAIL - UNDERDRAIN
SCALE: 1"=1'



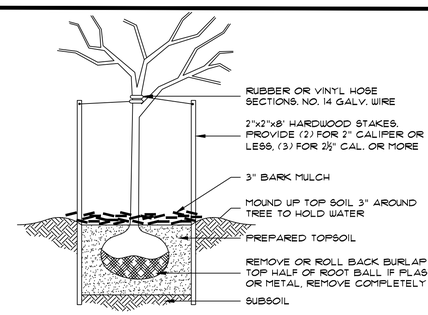
NOTE:
1. FRAME AND GRATE/COVER FOR EACH STORM STRUCTURE SHALL BE SET IN MORTAR BED.

PRECAST DRAIN MANHOLE DETAIL
SCALE: NTS



SECTION

TEMPORARY STABILIZED CONSTRUCTION ENTRANCE
SCALE: N.T.S.



NOTE TO ALL CONTRACTORS: SURROUND ROOT BALL WITH 6" OF GOOD QUALITY TOPSOIL, AS SHOWN. WORK WILL BE CHECKED

DETAIL - TREE PLANTING & STAKING
SCALE: NTS

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PLANS TO ACCOMPANY NOTICE OF INTENT
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SAMA PRODUCTIONS, LLC.
LOCATED AT:
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SANDISFIELD MA

Design Group, Inc.
Civil Engineers * Surveyors * Consultants
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PLAN DESCRIPTION:
DETAILS

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COMMONWEALTH OF MASSACHUSETTS
JAMES M. SCALISE, II
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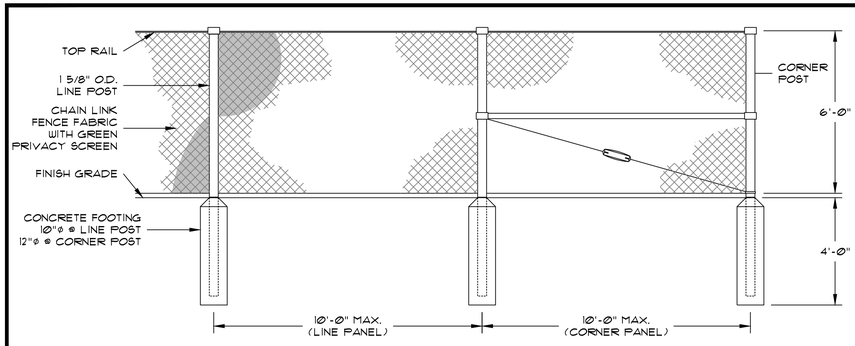
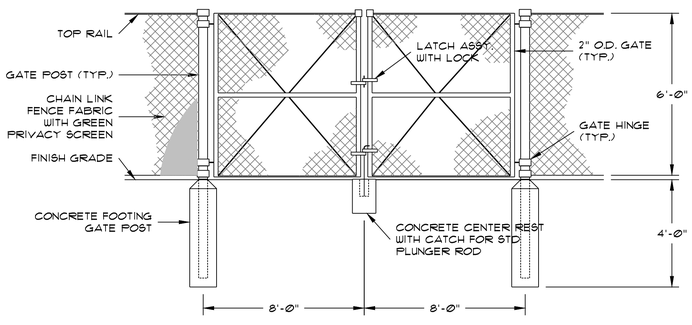


TYPICAL PANEL

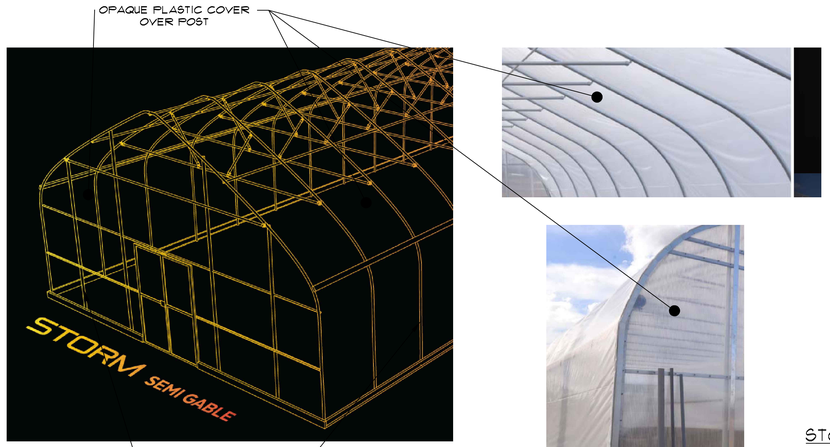


GATE DETAIL

CHAIN-LINK FENCE DETAILS
SCALE: NTS

SCHEMATIC SECURITY
SCALE: NOT TO SCALE

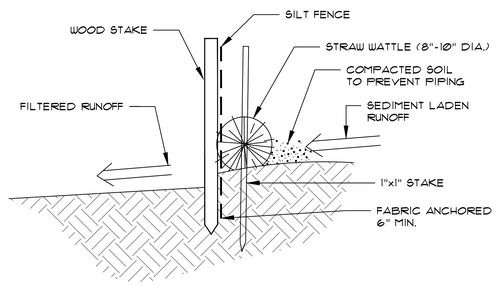
NOTE: DUE TO SAFETY & SECURITY CONCERNS, NO FINAL DESIGN OR LAYOUT WILL BE PROVIDED FOR PUBLIC CONSUMPTION. ALL SECURITY WILL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE STATE AND LOCAL REGULATIONS.



GREENHOUSE HEIGHT = 16FT

STORM SEMI GABLE GREENHOUSE BY HORTITECH GREENHOUSE
SCALE: NOT TO SCALE

NOTE:
1. STRAW WATTLE INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE ROLL IN A TRENCH, 3"-5" DEEP, DUG ON CONTOUR. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND ROLL.



DETAIL - STANDARD EROSION BARRIER
SCALE: N.T.S.

EROSION CONTROL NOTES

1. TEMPORARY SEDIMENT CONTROL FEATURES ARE TO BE CONSTRUCTED & FULLY OPERATIONAL PRIOR TO ANY OTHER CONSTRUCTION OR GRADING, AND ARE TO BE MAINTAINED THROUGHOUT CONSTRUCTION, UNTIL PERMANENT GROUND COVER IS ESTABLISHED & APPROVED.

2. ALL SLOPES SHALL BE SODDED, HYDRO-SEEDED OR APPLIED WITH GROUND COVER SPECIFIED AS SOON AS CONSTRUCTION PHASES PERMIT.

3. CONTRACTOR IS RESPONSIBLE FOR DAILY INSPECTIONS AND MAINTENANCE OF THE DETENTION FACILITIES THROUGH CONSTRUCTION AND UNTIL ESTABLISHMENT OF PERMANENT GROUND COVER. SEDIMENT SHALL BE REMOVED AS NECESSARY TO INSURE EFFICIENT OPERATION OF THE FACILITIES DURING AND AFTER CONSTRUCTION.

4. CONTRACTOR IS RESPONSIBLE FOR MONITORING DOWNSTREAM CONDITIONS THROUGHOUT THE CONSTRUCTION PERIOD AND CLEARING ANY DEBRIS AND SEDIMENT CAUSED BY THE CONSTRUCTION.

5. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED BY THE ENGINEER OR REGULATING AGENCIES.

6. THE SOIL EROSION SEDIMENT CONTROL PROCEDURES AND DETAILS AS SHOWN SHALL BE FOLLOWED AND INSTALLED IN A MANNER SO AS TO MINIMIZE EROSION OF THE DISTURBED AREAS AND PREVENT SEDIMENT FROM LEAVING THE SITE, OR ENTERING THE ADJACENT WETLANDS.

7. ANY DISTURBED EARTH AREAS THAT SHALL BE IDLE FOR 20 DAYS OR LONGER, SHALL HAVE TEMPORARY GRASSING APPLIED.

8. PRIOR TO ANY OTHER CONSTRUCTION, A STABILIZED CONSTRUCTION ENTRANCE SHALL BE CONSTRUCTED AT THE ENTRY TO THE SITE

9. AFTER CONSTRUCTION, THE DETENTION POND AND POND OUTLET STRUCTURES SHALL BE CLEANED OF ALL DEBRIS AND EXCESS SEDIMENT. BOTTOMS OF PONDS SHALL BE BROUGHT TO ELEVATION AND SHAPED AS SHOWN ON SITE GRADING PLAN AND DETAILS.

10. ADDITIONAL EROSION CONTROL DEVICES SHALL BE INSTALLED IMMEDIATELY AFTER GROUND DISTURBANCE OCCURS. THE LOCATION OF SOME OF THE EROSION CONTROL DEVICES MAY HAVE TO BE ALTERED FROM THAT SHOWN ON THE APPROVED PLANS IF DRAINAGE PATTERNS DURING CONSTRUCTION ARE DIFFERENT FROM THE FINAL PROPOSED DRAINAGE PATTERNS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ACCOMPLISH EROSION CONTROL FOR ALL DRAINAGE PATTERNS CREATED AT VARIOUS STAGES DURING CONSTRUCTION. ANY DIFFICULTY IN CONTROLLING EROSION DURING ANY PHASE OF CONSTRUCTION SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY. IN NO CASE SHALL LESS EROSION CONTROLS THAN APPROVED BE PERMITTED.

11. ALL OPEN SWALES MUST BE STABILIZED W/ MULCH & SEED OR RIP-RAP IMMEDIATELY AFTER CONSTRUCTION.

12. CONDUIT OUTLET PROTECTION (RIP-RAP & EROSION CONTROLS) MUST BE INSTALLED AT ALL REQUIRED OUT FALLS PRIOR TO THE DRAINAGE SYSTEM BECOMING OPERATIONAL.

14. AT THE TIME WHEN SITE PREPARATION FOR PERMANENT VEGETATIVE STABILIZATION IS TO BE ESTABLISHED, ANY SOIL THAT WILL NOT PROVIDE A SUITABLE ENVIRONMENT TO SUPPORT ADEQUATE VEGETATIVE GROUND COVER SHALL BE REMOVED OR TREATED IN SUCH A WAY THAT WILL PERMANENTLY ADJUST THE SOIL CONDITIONS AND RENDER IT SUITABLE FOR VEGETATIVE GROUND COVER.

15. IF THE REMOVAL OR TREATMENT OF THE SOIL WILL NOT PROVIDE SUITABLE CONDITIONS,ANOTHER MEANS OF PERMANENT GROUND STABILIZATION WILL HAVE TO BE EMPLOYED.

16. HAY BALES AND/OR STRAW BALES SHALL BE REPLACED EVERY 3 MONTHS TO MAINTAIN THEIR EFFECTIVENESS.

OPERATION & MAINTENANCE PLAN (STORMWATER SYSTEM)

1. MAINTENANCE OF THE ON-SITE STORM WATER SYSTEM IS THE RESPONSIBILITY OF THE PROPERTY OWNER. THIS INCLUDES ALL CATCH BASINS, YARD DRAINS, TRENCH DRAIN, SYSTEM PIPING, MANHOLES, ROOF LEADERS, WATER QUALITY BASINS, OUTLETS AND ASSOCIATED PIPING.

2. IN GENERAL, GOOD HOUSEKEEPING PRACTICES SHALL BE INCORPORATED INTO THE ROUTINE SITE AND FACILITY MAINTENANCE PLAN TO MINIMIZE DEPOSITION OF SEDIMENT, LITTER, AND CONTAMINANTS INTO THE STORM DRAINAGE SYSTEM, PAVED PARKING AREAS AND DRIVES, TRUCK LOADING AREA, AND FACILITY GROUNDS.

3. MAINTENANCE RECORDS DOCUMENTING SYSTEM INSPECTION AND CLEANING OPERATIONS SHALL BE MAINTAINED BY THE PROPERTY OWNER AND SHALL BE MADE AVAILABLE FOR INSPECTION BY THE TOWN AS REQUESTED.

THE FOLLOWING SCHEDULE OF MAINTENANCE SHALL BE FOLLOWED:

ANNUALLY: (IN LATE SPRING):
A. VISUALLY INSPECT ALL DRAINAGE STRUCTURES, STRUCTURES CONSIST OF CATCH BASINS, YARD DRAINS, MANHOLES, TRENCH DRAIN, AND ALL OTHER SITE DRAINAGE FACILITIES, INCLUDING THE WATER QUALITY BASINS, OUTLETS AND DISCHARGE PIPING AND RIP RAP EROSION CONTROLS AT THE OUTFALLS. NOTE ANY DEFICIENCIES AND MAKE REPAIRS.

B. CLEAN THE CATCH BASINS, YARD DRAINS, TRENCH DRAIN, AND ALL OTHER SITE DRAINAGE SITE FACILITIES OF ANY ACCUMULATION OF SEDIMENT AND/OR DEBRIS.

B.1. ALL CLEANING AND REMOVAL OF SEDIMENT AND DEBRIS TO BE PERFORMED BY A LICENSED CONTRACTOR.

B.2. CLEANING TO BE DONE WITH A VACUUM TRUCK SO THAT DIRECT ACCESS INTO THE DRAINAGE STRUCTURES IS NOT REQUIRED.

B.3. ALL MATERIAL REMOVED SHALL BE DISPOSED ACCORDING TO THE REQUIREMENTS OF THE STATE OF CONNECTICUT AND LOCAL REGULATIONS. IF ANY REPAIR WORK IS REQUIRED FOR THE STORMWATER MANAGEMENT SYSTEM, THE WORK INVOLVED SHALL BE CONDUCTED ACCORDING TO FEDERAL, STATE AND LOCAL REGULATIONS.

SEMI-ANNUALLY: (LATE SPRING, AFTER WINTER SANDING OPERATIONS AND MID FALL, AFTER LEAF LITTER):
A. SWEEP OR VACUUM ALL PAVED DRIVES AND PARKING AREAS TO REMOVE ACCUMULATED SEDIMENT. DISPOSE OF MATERIALS AT LICENSED FACILITY.

MONTHLY:
A. REMOVE LITTER AND OTHER DEBRIS FROM THE SITE, INCLUDING TRUCK LOADING AREA.

B. VERIFY THAT THE OUTLET STRUCTURES FOR THE WATER QUALITY BASINS ARE FREE OF DEBRIS AND LITTER. CLEAN, AS NECESSARY.

ANNUALLY:
A. INSPECT WATER QUALITY BASINS.

A.1. CUT TRIM AND REMOVE WOODY VEGETATION GROWTH IN SIDESLOPES, BERMS AND BASIN BOTTOM.

A.2. INSPECT SEDIMENT FOREBAYS FOR ACCUMULATED SEDIMENT, REMOVE AS NECESSARY.

A.3. INSPECT STONE CHECK DAMS AND REPLACE/REPAIR AS NECESSARY.

A.4. VERIFY THAT BASINS DRAIN BELOW THE LEVEL OF THE OUTLET ORIFICES WITHIN 24 HOURS FOLLOWING A STORM EVENT. IF REQUIRED, REMOVE DEBRIS FROM OUTLET ORIFICES TO RESTORE FUNCTIONALITY.

AS NEEDED:
A. MAINTAIN LAWN AREAS BY CUTTING WITH MULCHING BLADES OR COLLECTING TRIMMINGS AND DISPOSING OFF SITE.

B. DO NOT DISPOSE OF LAWN CUTTINGS OR LANDSCAPE TRIMMING ON SITE. DO NOT DEPOSIT OVER FILL SLOPES! DISPOSE OFF SITE.

C. STABILIZE OR REPAIR ANY LANDSCAPED AREAS ON THE SITE.

D. CLEAN UP ANY SPILLS OR MATERIAL DEPOSITS IMMEDIATELY AS REQUIRED ACCORDING TO THE REQUIREMENTS OF THE STATE OF CONNECTICUT AND LOCAL REGULATIONS.

E. PROHIBIT VEHICULAR REPAIR AND VEHICLE WASHING ON THE PREMISES.

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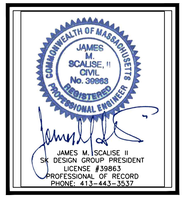

JAMES M. SCALISE II
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PHONE: 413-443-3537

REVISION:

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ORG. DATE: MARCH 2, 2021	SHEET NO. 6 OF 6
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