NOTICE OF PUBLIC HEARING
SUDBURY CONSERVATION COMMISSION

The Sudbury Conservation Commission will hold a public hearing to review the Notice of Intent filing for construction of a new roadway with associated drainage system and utilities, within the 100-foot Buffer Zone, under the State Act and Local Wetlands Bylaw at 74-80 Maynard Road. John Derderian, Bonnie Brook Realty Corp., applicant. The hearing will be held virtually on Monday, June 7, 2021, at 6:45pm, via Zoom. Please see the Conservation Commission web page for further information.

https://sudbury.ma.us/conservationcommission/meeting/conservation-commission-meeting-monday-june-7-2021/

SUDBURY CONSERVATION COMMISSION
May 25, 2021

Creative
LAND & WATER
Engineering, LLC

www.claweng.com
P.O Box 584
Southborough, MA 01722
clawe@claweng.com
(774) 454-0266 (cell)
(508) 281-1694 (office)

EFFECTIVE, AFFORDABLE, AND SUSTAINABLE SOLUTIONS FOR LAND & WATER ENVIRONMENT

To: Town of Sudbury- Conservation Commission, 275 Old Lancaster Rod, MA 01776
Attn. Ms. Lori Capone

Date: May 24, 2021

Re: Notice of Intent for 74-80 Maynard Road, Sudbury, MA (Assessors map G08 Parcels 0025 and 0500)

On behalf of Mr. John Derderian, Bonnie Brook Realty Corp, we are pleased to submit the Notice of Intent under MA Wetland Protection Act and Sudbury Wetlands Protection Bylaw for a property located at 74, 80 Maynard Road (Assessors map G08 Parcels 0025 and 0500) for Construction of roadway and associated drainage system and utilities in 100-ft buffer zone for a 9-lot residential subdivision. No wetland or other protected resources under WPA will be altered. All buildings, septic, and drainage systems will be located 100ft away from BVW except limited road access and associated drainage recharge systems and minor grading within 100 ft buffer with minimum setback of 46 ft. 2.01:1 buffer zone mitigation is provided under Sudbury bylaw. Stormwater management system comply with 310 CMR10.05 (6)k. Erosion control to be installed prior to any earth work. Each lot will file a separate permit for construction later. Three sets of documents and plans are enclosed.

We would like to request a bylaw fee waiver for the adjacent upland area alteration, which partially overlaps the same area of roadway and drainage with paid fee of $3382. In addition, the altered area will be mitigated with 2.01 to 1 ratio.

Detailed information can be found in the following enclosed items:

1. WPA Form 3- Notice of Intent
2. DEP Wetland Fee Transmittal Form
3. Copy of checks
4. Affidavit of service
5. Notification to Abutters
6. List of Abutters
7. USGS Quadrangle Map
8. Order of Resource Area Delineation (DEP file #: 301-1220), issued on 12/5/2017, extension 12/5/2021
9. Alterative Analysis and Mitigation Plan, Creative Land & Water Engineering, LCC, May 18, 2021
   9a. Alternatives 1 and 2 plans
10. Stormwater Management Report, dated March 2021 by Bruce Saluk & Assoc., Inc.
11. Bonnie Brook Estates Definitive Subdivision, dated March 18,2021 by Bruce Saluk & Assoc., Inc.

Please feel free to call us if you have any questions.

Thank you.

Sincerely,
Creative Land & Water Engineering, LLC
by

Desheng Wang

Desheng Wang, Ph.D., P.E.

cc:
DEP-Northeast Region Office - Wetland Division, 205 B Lowell Street, Wilmington, MA 01887
John Derderian, Waltham Lumber, 71 Massasoit Street, Waltham, MA 02453
Bruce Saluk

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 Number

Document Transaction Number

Sudbury
City/Town

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

✓ tab

✗ return

Note: Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

A. General Information

1. Project Location (**Note:** electronic filers will click on button to locate project site):

74, 80 Maynard Road	Sudbury	01776
a. Street Address	b. City/Town	c. Zip Code

Latitude and Longitude:

42° 23' 35.1512"	71° 25' 05.016"
d. Latitude	e. Longitude

Map G 08	0025, 0500
f. Assessors Map/Plat Number	g. Parcel /Lot Number

2. Applicant:

John	Derderian
a. First Name	b. Last Name

Bonnie Brook Realty Corp.
c. Organization

12 Cornell Road
d. Street Address

Wellesley	MA	02482
e. City/Town	f. State	g. Zip Code
(781) 894-4430	(781) 894-8178	jd@walthamlumber.com
h. Phone Number	i. Fax Number	j. Email Address

3. Property owner (required if different from applicant): ☐ Check if more than one owner

John	Derderian
a. First Name	b. Last Name

Bonnie Brook Realty Corp
c. Organization

12 Cornell Road
d. Street Address

Wellesley	MA	02482
e. City/Town	f. State	g. Zip Code
h. Phone Number	i. Fax Number	j. Email address

4. Representative (if any):

Desheng	Wang
a. First Name	b. Last Name

Creative Land & Water Engineering, LLC
c. Company

P.O. Box 584
d. Street Address

Southboro	MA	01771
e. City/Town	f. State	g. Zip Code
(508) 281-1694		deshengw@yahoo.com
h. Phone Number	i. Fax Number	j. Email address

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

$2550	$1262.5	$1287.50+ bylaw fee $3882.0
a. Total Fee Paid	b. State Fee Paid	c. City/Town Fee Paid

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 Number

Document Transaction Number

Sudbury
City/Town

A. General Information (continued)

6. General Project Description:

Construction of roadway and associated drainage system and utilities in 100-ft buffer zone for a 9-lot residential subdivision. No wetland or other protected resources under WPA will be altered. All buildings, septic, and drainage systems will be located 100ft away from BVW except limited road access and associated drainage recharge systems within 100 ft buffer with minimum setback of 46 ft. 2.01:1 buffer zone mitigation is provided under Sudbury bylaw. Stormwater management system comply with 310 CMR10.05 (6)k. Erosion control to be installed prior to any earth work. Each lot will file a separate permit for construction later.

7a. Project Type Checklist: (Limited Project Types see Section A. 7b.)

1. ☐ Single Family Home
3. ☐ Commercial/Industrial
5. ☐ Utilities
7. ☐ Agriculture (e.g., cranberries, forestry)
9. ☐ Other
2. ☒ Residential Subdivision
4. ☐ Dock/Pier
6. ☐ Coastal engineering Structure
8. ☐ Transportation

7b. Is any portion of the proposed activity eligible to be treated as a limited project (including Ecological Restoration 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. (See 310 CMR 10.24 and 10.53 for a complete list and description of limited project types)

2. Limited Project Type

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR10.24(8), 310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Limited Project Checklist and Signed Certification.

8. Property recorded at the Registry of Deeds for:

Middlesex County South
a. County

b. Certificate # (if registered land)

26711
c. Book

331
d. Page Number

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

1. ☒ Buffer Zone Only – 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).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

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 Number

Document Transaction Number

Sudbury
City/Town

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

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

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 3. cubic yards dredged	2. square feet

Resource Area	Size of Proposed Alteration	Proposed Replacement (if any)
d. ☐ Bordering Land Subject to Flooding	1. square feet 3. cubic feet of flood storage lost	2. square feet 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 available) - **specify coastal or inland**	

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)

Note: for coastal riverfront areas, please complete **Section B.2.f**. above.

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

Check all that apply below. Attach narrative and supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

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 Beach	Indicate size under Coastal Beaches and/or Coastal Dunes below	
d. ☐ Coastal Beaches	1. square feet	2. cubic yards beach nourishment
e. ☐ Coastal Dunes	1. square feet	2. cubic yards dune nourishment
	Size of Proposed Alteration	**Proposed Replacement (if any)**
f. ☐ Coastal Banks	1. linear feet	
g. ☐ Rocky Intertidal Shores	1. square feet	
h. ☐ Salt Marshes	1. square feet	2. sq ft restoration, rehab., creation
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
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 enter the additional amount here.

a. square feet of BVW

b. square feet of Salt Marsh

5. ☐ Project Involves Stream Crossings

a. number of new stream crossings

b. number of replacement stream crossings

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Sudbury
City/Town

C. Other Applicable Standards and Requirements

☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section C and complete Appendix A: Ecological Restoration Limited Project Checklists – Required Actions (310 CMR 10.11).

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 and Endangered Species Program (NHESP)? To view habitat maps, see the *Massachusetts Natural Heritage Atlas* or go to http://maps.massgis.state.ma.us/PRI_EST_HAB/viewer.htm.

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

MGIS
b. Date of map

If *yes*, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); *OR* complete Section C.2.f, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

c. Submit Supplemental Information for Endangered Species Review[*]

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

2. ☐ Project plans for entire project site, including wetland resource areas and areas outside of wetlands 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

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[*] Some projects **not** in Estimated Habitat may be located in Priority Habitat, and require NHESP review (see https://www.mass.gov/ma-endangered-species-act-mesa-regulatory-review).
Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

[**] MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.

C. Other Applicable Standards and Requirements (cont'd)

(c) ☐ MESA filing fee (fee information available at https://www.mass.gov/how-to/how-to-file-for-a-mesa-project-review).
Make check payable to "Commonwealth of Massachusetts - NHESP" 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

(f) 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, https://www.mass.gov/service-details/exemptions-from-review-for-projectsactivities-in-priority-habitat; 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 # ____________ 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.

3. For coastal projects only, is any portion of the proposed project located below the mean high water line or in a fish run?

a. ☐ Not applicable – project is in inland resource area only b. ☐ Yes ☐ No

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

South Shore - Cohasset to Rhode Island border, and the Cape & Islands:	North Shore - Hull to New Hampshire border:
Division of Marine Fisheries - Southeast Marine Fisheries Station Attn: Environmental Reviewer 836 South Rodney French Blvd. New Bedford, MA 02744 Email: dmf.envreview-south@mass.gov	Division of Marine Fisheries - North Shore Office Attn: Environmental Reviewer 30 Emerson Avenue Gloucester, MA 01930 Email: dmf.envreview-north@mass.gov

Also if yes, the project 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.

c. ☐ Is this an aquaculture project? d. ☐ Yes ☐ No

If yes, include a copy of the Division of Marine Fisheries Certification Letter (M.G.L. c. 130, § 57).

C. Other Applicable Standards and Requirements (cont'd)

Online Users: Include your document transaction number (provided on your receipt page) with all supplementary information you submit to the Department.

4. 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 MassDEP Website for ACEC locations). **Note:** electronic filers click on Website.

b. ACEC

5. 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

6. 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

7. 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. Check why the project is exempt:
   1. ☐ Single-family house
   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

☐ This is a proposal for an Ecological Restoration Limited Project. Skip Section D and complete Appendix A: Ecological Restoration Notice of Intent – Minimum Required Documents (310 CMR 10.12).

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.

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.

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 Number

Document Transaction Number

Sudbury
City/Town

D. Additional Information (cont'd)

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.

Bonnie Brook Estates Definitive Subdivision Plan
a. Plan Title

Bruce Saluk & Associates., INC
b. Prepared By

Bruce Saluk
c. Signed and Stamped by

03/18/21
d. Final Revision Date

Indicated
e. Scale

f. Additional Plan or Document Title

10/01/20
g. Date

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:

42515
2. Municipal Check Number

05/19/21
3. Check date

42508
4. State Check Number

05/19/21
5. Check date

Waltham Lumber Building Materials
6. Payor name on check: First Name

7. Payor name on check: Last Name

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:

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City/Town

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.

John Daccnian
1. Signature of Applicant

5/20/2021
2. Date

3. Signature of Property Owner (if different)

4. Date

Deshy Wang
5. Signature of Representative (if any)

5/20/2021
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 any part of Section C, Item 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

NOI Wetland Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. Applicant Information

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

✓ tab

return ✗

1. Location of Project:

74, 80 Maynard Road
a. Street Address

Sudbury
b. City/Town

42508
c. Check number

$1262.5
d. Fee amount

2. Applicant Mailing Address:

John
a. First Name

Derderian
b. Last Name

Bonnie Brook Realty Corp.
c. Organization

12 Cornell Road
d. Mailing Address

Wellesley
e. City/Town

MA
f. State

02482
g. Zip Code

(781) 894-4430
h. Phone Number

(781) 894-8178
i. Fax Number

jd@walthamlumber.com
j. Email Address

3. Property Owner (if different):

a. First Name

b. Last Name

c. Organization

d. Mailing Address

e. City/Town

f. State

g. Zip Code

h. Phone Number

i. Fax Number

j. Email Address

B. Fees

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).

Fee should be calculated using the following process & worksheet. ***Please see Instructions before filling out worksheet.***

Step 1/Type of Activity: Describe each type of activity that will occur in wetland resource area and buffer zone.

Step 2/Number of Activities: Identify the number of each type of activity.

Step 3/Individual Activity Fee: Identify each activity fee from the six project categories listed in the instructions.

Step 4/Subtotal Activity Fee: Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5/Total Project Fee: Determine the total project fee by adding the subtotal amounts from Step 4.

Step 6/Fee Payments: To calculate the state share of the fee, divide the total fee in half and subtract $12.50. To calculate the city/town share of the fee, divide the total fee in half and add $12.50.

B. Fees (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
3c roadway	1050	1	1050
2g drainage discharge	500	3	150

Step 5/Total Project Fee: 2550

Step 6/Fee Payments:

Total Project Fee: $2550
a. Total Fee from Step 5

State share of filing Fee: $1262.5
b. 1/2 Total Fee **less $**12.50

City/Town share of filling Fee: $1287.5
c. 1/2 Total Fee **plus** $12.50

C. Submittal Requirements

a.) Complete pages 1 and 2 and send with a check or money order for the state share of the fee, payable to the Commonwealth of Massachusetts.

Department of Environmental Protection
Box 4062
Boston, MA 02211

b.) **To the Conservation Commission:** Send the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and the city/town fee payment.

To MassDEP Regional Office (see Instructions): Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment. (E-filers of Notices of Intent may submit these electronically.)

AFFIDAVIT OF SERVICE

Under the Massachusetts Wetlands Protection Act

I, **Desheng Wang of Creative Land & Water Engineering, LLC** hereby certify under the pains and penalties of perjury that on **May 24, 2021** I gave notification to abutters in Compliance with the second paragraph of Massachusetts General Law Chapter 131, Section 40, and the DEP Guide to Abutter Notification dating April, 8, 1994 in connection with the following matter:

A Notice of Intent filed under the Massachusetts Wetlands Protection Act and Sudbury Wetland Bylaw by **Bonnie Brook Realty Corp** with the **Sudbury** Conservation Commission on **May 24, 2021** for property located at **Map G08, Parcels 0025 and 0500 a.k.a.– 74, 80 Maynard Road**

The form of the notification, and the list of abutters to whom it was given, and their addresses, are attached to this Affidavit of Service.

Desheng Wang

(Name)

May 18, 2021

(Date)

Notification to Abutters Under the Massachusetts Wetlands Protection Act and Sudbury Wetland Protection Bylaw

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

A. The name of the applicant is **Bonnie Brook Realty Corp**

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

C. The address of the lot where the activity is proposed is **Map G08, Parcels 0025 and 0500 – 74, 80 Maynard Road.**

D. Copies of the Notice of Intent may be examined at **Sudbury Conservation Commission** between the hours of **8:00am and 3:30pm, Monday – Friday.**
For more information, **Email:** concom@sudbury.ma.us, **Phone:** (978) 440 – 5471; Department of Public Works Building, 275 Old Lancaster Road, Sudbury, MA 01776
Check One: This is the applicant ☐, representative ☐, or other ☒ (specify): Conservation

E. Copies of the Abbreviated Notice of Resource Area Delineation may be obtained for a fee from either (check one) the applicant ☐, or the applicant's representative ☒, by calling **(508) 281-1694** between the hours of **10:00an and 3:00pm, Monday-Friday.**

F. Information regarding the date, time, and place of the public hearing may be obtained from **Sudbury Conservation Commission** by calling (978) 440 – 5471.
Check One: This is the applicant ☐, representative ☐, or other ☒(specify): **Sudbury Conservation Commission**.

NOTE: Notice of the public hearing, including its date, time, and place, will be published at least five (5) days in advance in the **Metro West Daily News**.

NOTE: Notice of the public hearing, including the date, time, and place, will be posted in the City or Town Hall not less than forty-eight (48) hours in advance.

Note: You also may contact your local Conservation Commission or the nearest Department of Environmental Protection Regional Office for more information about this application or the Wetlands Protection Act. To contact DEP, call:

☐ Central Region: (508) 792-7650
☐ Southeast Region: (508) 946-2700
☒ **Northeast Region: (978) 694-3200**
☐ Western Region: (413) 784-1100

abutters_id_field	abutters_owner1	abutters_owner2	abutters_address	abutters_address2	abutters_town	abutters_state	abutters_zip	abutters_bookpage	abutters_location
F08-0020	TOUCHE CHRISTIAN & ELIZABETH		98 MAYNARD RD		SUDBURY	MA	01776	56002-294	98 MAYNARD RD
F08-0321	KESEBERG WAYNE E & JUDY M		67 WAKE ROBIN RD		SUDBURY	MA	01776	15426-251	67 WAKE ROBIN RD
F08-0322	NEALE ADAM T &	NEALE DOREEN FONTAINE TRUSTEES	75 WAKE ROBIN RD		SUDBURY	MA	01776	75164-86	75 WAKE ROBIN RD
F08-0402	FLECKE GREGG W & ERIN M		18 MINEBROOK RD		SUDBURY	MA	01776	37660-463	18 MINEBROOK RD
F08-0403	DROPKIN LISA R & LOUIS STEPHAN		26 MINEBROOK RD		SUDBURY	MA	01776	48611-220	26 MINEBROOK RD
F08-0404	CUSHING JOSEPH F & SUZANNE J		34 MINEBROOK ROAD		SUDBURY	MA	01776	43616-582	34 MINEBROOK RD
F08-0405	WOLLNER DAVID ALAN &	WOLLNER RACHEL PAULA	40 MINEBROOK RD		SUDBURY	MA	01776	71009-66	40 MINEBROOK RD
F08-0406	HOLDEN SCOTT W		44 MINEBROOK RD		SUDBURY	MA	01776	76856-53	44 MINEBROOK RD
F08-0506	SUDBURY VALLEY TRUSTEES INC		18 WOLBACH RD		SUDBURY	MA	01776	27913-447	WILLIS RD
F09-0001	TOWN OF SUDBURY	CONSERVATION	278 OLD SUDBURY ROAD		SUDBURY	MA	01776	12501-703	0 WAKE ROBIN RD
G08-0024	SZWARC LANA B & KEVIN A		72 MAYNARD RD		SUDBURY	MA	01776	46596-385	72 MAYNARD RD
G08-0025	BONNIE BROOK REALTY CORP	C/O NANCY BAGDASARIAN	60 WINDSOR RD		WELLESLEY	MA	02481	26711-331	MAYNARD RD
G08-0026	DICHTER BRONISLAW K & PATRICIA M		82 MAYNARD RD		SUDBURY	MA	01776	1475-32	82 MAYNARD RD
G08-0027	WEN HUAQIANG & LIANG SHAOJUAN		71 MAYNARD RD		SUDBURY	MA	01776	51844-556	71 MAYNARD RD
G08-0500	BONNIE BROOK REALTY CORP	C/O NANCY BAGDASARIAN	60 WINDSOR RD		WELLESLEY	MA	02481	206397	MAYNARD RD
G08-0618	BEAL ANDREW & PATEL INA		79 MAYNARD ROAD		SUDBURY	MA	01776	77001-349	79 MAYNARD RD
G08-0017	TOWN OF SUDBURY	CONSERVATION	278 OLD SUDBURY RD		SUDBURY	MA	01776	12814-243	0-OFF MORSE RD
G08-0262	SAMIOTES ANNA E & BHATTACHARYA	RAJIV	84 MAYNARD RD		SUDBURY	MA	01776	1486-22	84 MAYNARD RD

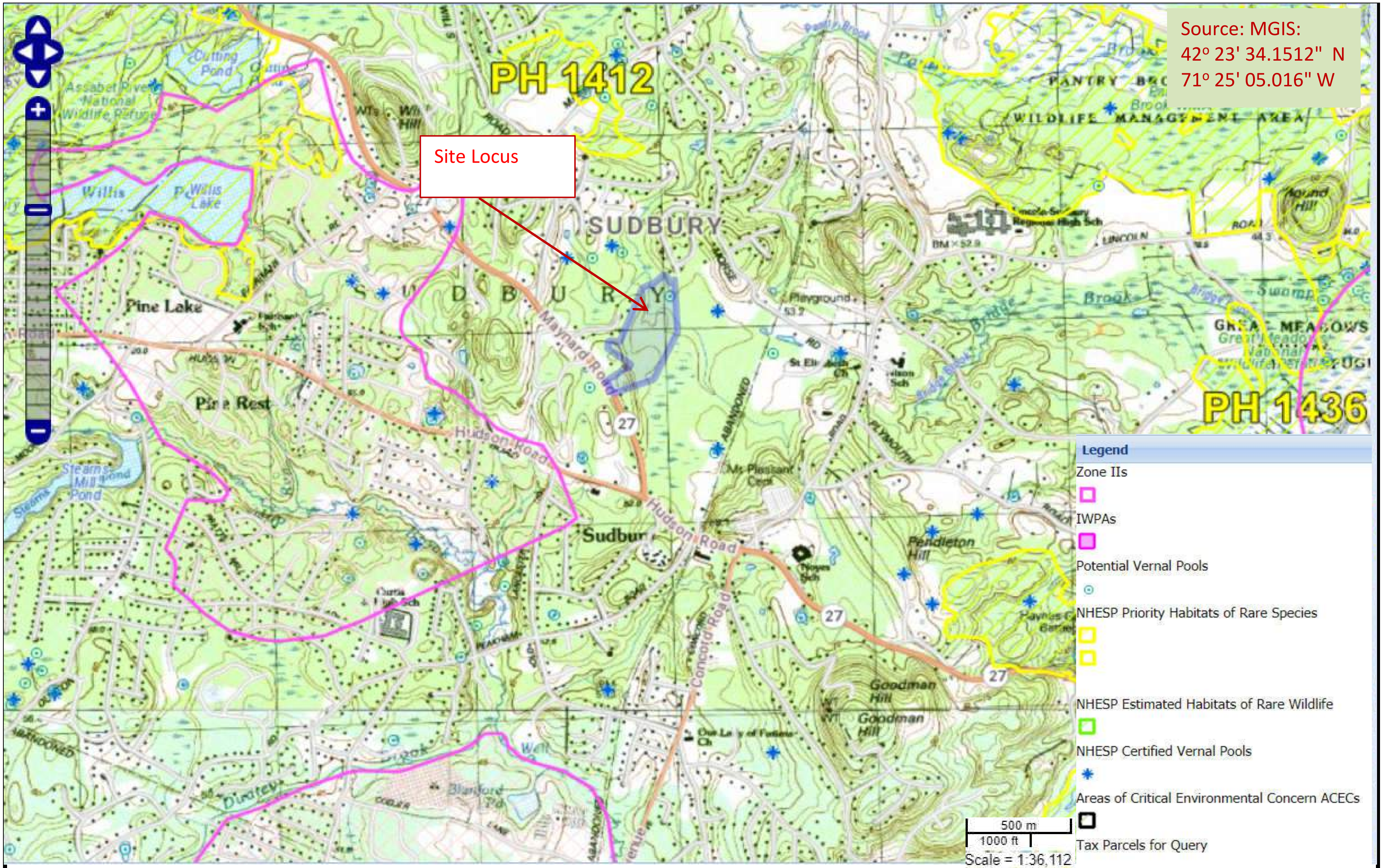

Figure 1. USGS Site Locus Map

Project:

74-80 Maynard Road
Sudbury, MA

By:
Desheng Wang, Ph.D., P.E.
Creative Land & Water Engineering, LLC
P.O. Box 584
Southborough, MA 01772
508-281-1694 WWW.CLAWENG.COM

b B

TOWN OF SUDBURY
CONSERVATION COMMISSION

SUDBURY WETLANDS ADMINISTRATION BYLAW

BOTH WAYS

ORDER OF CONDITIONS

From: SUDBURY CONSERVATION COMMISSION
Swab File #: **190211**

Applicant: John Derderian
Bonnie Brook Realty Trust
12 Cornell St.
Wellesley MA 02482

Bonnie Brook Realty Corp

Property Owner: same

Project Location: Assessor's Map/Parcel G08-0025/0500
Maynard Rd.
Sudbury, MA

72-82 Maynard Rd Sudbury

Unimp lot

Registry of Deeds: Book 26711 Page 331

206309-1162-47

Dates:
Notice of Intent Filed: January 10, 2019
Public Hearing Closed: February 11, 2019
Order of Conditions Issued: March 5, 2019 (March 4, 2019 snow day)

Final Approved Plans:
Title: Order of Resource Area Delineation DEP Fil e#301-1220 dated 11/16/2017;
Preliminary Layout Plan, dated May 22, 2018 by Bruce Saluk & Assoc., Inc.

Other Documents: Notice of Intent

See attached Special Conditions

206309

ORDER OF CONDITIONS- Sudbury Wetlands Administration Bylaw
SWAB FILE #190211
74, 80 Maynard Rd.
John Derderian, Bonnie Brook Realty Trust ; Applicant

Feb. 11, 2019

The Sudbury Conservation Commission hereby finds that the following conditions are necessary, in accordance with the Performance Standards set forth in the Sudbury Wetlands Administration Bylaw and its Regulations, to protect those interests referenced in this Order. To aid in implementation, compliance, and enforcement the specific conditions are divided into several broad categories for reference.

The Sudbury Conservation Commission orders that all work shall be performed in accordance with said conditions, with the Notice of Intent and plans referenced. To the extent that the following conditions modify or differ from the plans, specifications or other proposals submitted with the Notice of Intent, the Conditions shall control.

SPECIAL CONDITIONS:

Findings:

The Notice of Intent was filed under the Sudbury Wetlands Administration Bylaw for soil borings associated with design work for septic systems on six possible lots on an undeveloped parcel of land. Access wil l be required in upland resource area jurisdiction for soil testing associated with several of these lots..

The Applicant did not attempt to overcome the presumptions of significance of the WPA or Bylaw resource areas.

The Conservation Commission finds that the wetland and upland values and functions on the Project Site are protected through the Project's adherence to the Conditions in this Order. Based on the Notice of Intent (NOI) and accompanying documents, the plans submitted, and the information presented at the public hearing, the Commission approves this Project subject to strict adherence to the Conditions below.

I. CONDITIONS IN PERPETUITY:

a. The following conditions shall be recorded at the Registry of Deeds as part of this Order of Conditions and shall continue in perpetuity and be included in the Certificate of Compliance. The recording of this Order shall provide notice to subsequent owners of the Project Site of restrictions in perpetuity on the activities allowed in connection with the Project on the Project Site. If good cause exists to support an amendment to the conditions in perpetuity, the owner of the Project or Project Site (as may be applicable) shall have the right to make a request for an amendment to the Commission. If, in the judgment of the Commission, the proposed activities will not detrimentally impact the wetland resource area functions, this Order, or the Certificate of Compliance shall be amended.

b. Jurisdictional wetland and upland areas are located on this Project Site that are subject of the Massachusetts Protection Act (Chapter 131, section 40) and the Sudbury Wetlands Administration Bylaw. Any work within a wetland resource area or within 100' of a wetland resource area requires review and approval by the Sudbury Conservation Commission prior to the commencement of such work.

II. GENERAL PROJECT CONDITIONS:
PART I

These conditions apply to all projects permitted by the Sudbury Conservation Commission. They shall remain in force until issuance of a Certificate of Compliance by the Commission. A violation of any of these conditions shall constitute reason for enforcement action by the issuing authority:

a. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.

b. This Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.

c. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, by-laws, or regulations.

d. The work authorized hereunder, except for that work which has specific timeframes indicated, shall be completed within three years from the date of issuance of this Order.

e. This Order may be extended for up to one year by the Commission upon application to the Commission at least thirty days prior to the expiration date of this Order. In determining whether or not to grant an Extension Permit, the Commission shall review and apply the criteria for extensions of time as set forth in the Regulations.

f. Any fill used in connection with this Project shall be clean fill, containing no trash, refuse, rubbish or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles or parts of any of the foregoing.

g. No work shall be undertaken until all administrative appeal periods from the date of issuance of this Order have elapsed or, if such an appeal has been filed, until all proceedings before the Department of Environmental Protection have been completed in accordance with the Regulations.

h. **No work authorized hereunder shall be undertaken until the Order has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the Project Site or as otherwise may be permitted in accordance with the Regulations**. In the case of recorded land, the Order shall also be noted in the Registry's Grantor index under the name of the owner of the land upon which the proposed work is to be done. In the case of registered land, the Order shall also be noted on the Land Court Certificate of title of the owner of the land upon which the proposed work is to be done.

The recording information shall be submitted to the Commission on the form at the end of the Order, or other form acceptable to the Commission, within thirty days of the issuance of this Order or prior to the start of construction, whichever is sooner.

i. Where the Department of Environmental Protection ("Department") is requested to make a determination and to issue a Superseding Order, the Commission shall be party to all agency proceedings and hearings before the Department.

j. Upon completion of the Project, the Applicant shall forthwith request in writing that a Certificate of Compliance be issued by the Commission stating that the work has been satisfactorily completed and clearly documenting any deviations or deficiencies from the approved plans (See Section V, below).

k. No equipment refueling may occur within a wetland or upland resource area.

PART II

a. All work must conform to the plans referenced, the Notice of Intent (NOI) and accompanying narratives, and this Order of Conditions and its special conditions. In case of conflict, the requirements in this Order shall prevail.

b. No spoils of construction, construction material, or equipment shall be placed or operated in the wetland resource areas or the wetland buffer zone (upland resource area under the Bylaw), except as reflected in the NOI as permitted by this Order and as necessary for the soils investigation as described in the Notice of Intent and accompanying documents.

c. The project engineer, contractors, and all subcontractors must be informed of the conditions in this Order.

d. The Applicant and Property Owner are held responsible for compliance with this Order of Conditions. The name and contact information for the person in charge of compliance with these conditions shall be submitted to the Commission prior to any activity on site. The Commission shall be notified, in writing, within three (3) business days of any transfers of title on this property or changes to personnel responsible for compliance with this Order.

e. This Order of Conditions shall apply to any successor in control, or successor in interest, of the Project Site as described in the NOI and accompanying plans.

f. Members and agents of the Commission shall have the right to enter and inspect the Project Site upon prior reasonable attempts to notify the Applicant and after checking in with the Applicant's general contractor's on-site personnel to evaluate compliance with the conditions stated in this Order.

g. There shall be no disturbance within the Project Site beyond the limits of activities permitted as part of this Order. No work or activity may occur within jurisdictional areas except as permitted in this Order.

Project-Specific Conditions

h. The Commission requires an Environmental Monitor ("EM"), be on-site to monitor compliance with all aspects of this Order and ensure that the equipment and vegetation clearing do not exceed that described in the Notice of Intent. The EM will monitor approved activities, erosion control, wildlife presence on the site and compliance with the conditions of this Order. The EM will have the ability to require work to cease and desist immediately for failure of the applicant to adhere to the requirements in this Order.

i. Prior to the start of any activity on the Project Site related to this Order, a time table for activities subject to this Order shall be submitted by the Applicant to the Commission.

j. Leaf mats shall be saved when appropriate and reinstalled at the completion of work.

k. No disposal of any cut vegation is permitted in any wetland resource area.

l. No test pit sahl be located within 100' of any wetland resource area.

m. A spill kit shall be kept on site at all times when equipment is present.

n. The use of herbicides or pesticides is prohibited within any jurisdictional areas as part of this Order.

III. EROSION, SEDIMENTATION, STABILIZATION CONDITIONS

a. Erosion control shall be properly installed as necessary. Erosion control shall not include the use of staked haybales or siltation fencing as these may impede the movement of wildlife. Straw wattles, filter mits, etc. are preferred. All erosion control shall be immediately removed from locations where it is no longer necessary and the disturbed area is stabilized.

b. The EM shall have the authority to require immediate installation of erosion control as he deems necessary for the protection of the resource areas.

c. It is the Applicant's responsibility to take additional appropriate measures, to the extent necessary, to control sedimentation into the wetland resource areas.

IV. PLAN MODIFICATIONS:

a. Any modifications or revisions to the plans referenced, as modified per requirements of II.i above, or any new plans for the Project that implicate interests protected under the Act or Bylaw, must be submitted to the Commission for review and a determination as to whether a new Notice of Intent is required. If the Commission determines that a new NOI is not necessary, the Commission may amend this Order. No additional work not specifically allowed by this Order shall be accomplished within jurisdictional areas on the Project Site without the approval of the Commission and the approval of appropriate new filings or amendment requests. Amendment procedures as described in the Wetlands Protection Act, the Regulations, and the Department of Environmental Protection's Wetlands Program Policies shall be followed.

b. The Commission reserves the right to require the filing of a new NOI for any plan changes or submittals for activities on the Project Site that fall under the jurisdiction of the Wetlands Protection Act.

c. No additional new construction or disturbance of a wetland resource area, as defined in the Wetlands Protection Act and its regulations, or within the 100' wetland resource area buffer zone, not included in the NOI shall be permitted on this Project Site until a determination has been made by the Commission as to whether a new NOI is required, and the new work or disturbance is incorporated into a new or amended Order of Conditions.

d. Should the Commission become aware of work on Project Site being accomplished that was not approved as part of the Order of Conditions or subsequent amendments, the Commission reserves the right to require a new NOI. The plan filed with the new NOI must be based on an interim as-built plan prepared by a registered engineer that takes into account any pending applications related to the redevelopment of the overall Property. The new NOI must provide a detailed description of the discrepancies between the approved plan and the site conditions to date

V. CERTIFICATE OF COMPLIANCE REQUIREMENTS:

a. Following completion of work and stabilization of the Project Site, a report detailing any deviations from the approved plans, shall be submitted to the Commission at the same time as a written request for a Certificate of Compliance.

b. At the request of the Applicant, the Commission will consider issuing status reports for the Project in progress provided a site inspection is performed by the Commission or its representative.

Sudbury Wetlands Administration By-law

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

~~WPA Form 5~~ – Order of Conditions

~~Massachusetts Wetlands Protection Act M.G.L. c. 131, §40~~

~~Provided by MassDEP:~~
301-
~~MassDEP File #~~

eDEP Transaction #

Sudbury
City/Town

E. Signatures

This Order is valid for three years, unless otherwise specified as a special condition pursuant to General Conditions #4, from the date of issuance.

March 5, 2019
1. Date of Issuance

Please indicate the number of members who will sign this form.
This Order must be signed by a majority of the Conservation Commission.

7
2. Number of Signers

The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate Department of Environmental Protection Regional Office, if not filing electronically, and the property owner, if different from applicant.

Signatures:

MARK SEVIER
Kathleen Rogers Kathleen Rogers
BRUCE PORTER
Richard Morse Richard Morse
DAVID Henkels
Charles Russo

☐ by hand delivery on

Date

☑ by certified mail, return receipt requested, on

March 5, 2019
Date

F. Appeals

~~The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate MassDEP Regional Office to issue a Superseding Order of Conditions. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.~~

~~Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order, or providing written information to the Department prior to issuance of a Superseding Order.~~

~~The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40), and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal ordinance or bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.~~

Unofficial Property Record Card - Sudbury, MA

General Property Data

Parcel ID G08-0500
Prior Parcel ID --
Property Owner BONNIE BROOK REALTY CORP
C/O NANCY BAGDASARIAN
Mailing Address 60 WINDSOR RD

City WELLESLEY
Mailing State MA **Zip** 02481
ParcelZoning RESA

Account Number

Property Location MAYNARD RD
Property Use UNDEV
Most Recent Sale Date 9/30/1996
Legal Reference 206397
Grantor
Sale Price 1
Land Area 27.500 acres

Current Property Assessment

Land Value 238,000
Building Value 0
Total Value 238,000

Building Description

Building Style N/A
# of Living Units N/A
Year Built N/A
Building Grade N/A
Building Condition N/A
Finished Area (SF) N/A
Number Rooms 0
# of 3/4 Baths 0

Foundation Type N/A
Frame Type N/A
Roof Structure N/A
Roof Cover N/A
Siding N/A
Interior Walls N/A
# of Bedrooms 0
# of 1/2 Baths 0

Flooring Type N/A
Basement Floor N/A
Heating Type N/A
Heating Fuel N/A
Air Conditioning 0%
# of Bsmt Garages 0
# of Full Baths 0
# of Other Fixtures 0

Legal Description

Narrative Description of Property

This property contains 27.500 acres of land mainly classified as UNDEV with a(n) N/A style building, built about N/A , having N/A exterior and N/A roof cover, with N/A unit(s), 0 room(s), 0 bedroom(s), 0 bath(s), 0 half bath(s).

Property Images

No Sketch
Available

No Picture
Available

Unofficial Property Record Card - Sudbury, MA

General Property Data

Parcel ID G08-0025
Prior Parcel ID LOT-001 -PLAN 7033--95
Property Owner BONNIE BROOK REALTY CORP
C/O NANCY BAGDASARIAN
Mailing Address 60 WINDSOR RD

City WELLESLEY
Mailing State MA **Zip** 02481
ParcelZoning RESA

Account Number

Property Location MAYNARD RD
Property Use LAND
Most Recent Sale Date 9/30/1996
Legal Reference 26711-331
Grantor
Sale Price 1
Land Area 2.768 acres

Current Property Assessment

Land Value 417,000
Building Value 0
Total Value 417,000

Building Description

Building Style N/A
# of Living Units N/A
Year Built N/A
Building Grade N/A
Building Condition N/A
Finished Area (SF) N/A
Number Rooms 0
# of 3/4 Baths 0

Foundation Type N/A
Frame Type N/A
Roof Structure N/A
Roof Cover N/A
Siding N/A
Interior Walls N/A
# of Bedrooms 0
# of 1/2 Baths 0

Flooring Type N/A
Basement Floor N/A
Heating Type N/A
Heating Fuel N/A
Air Conditioning 0%
# of Bsmt Garages 0
# of Full Baths 0
# of Other Fixtures 0

Legal Description

Narrative Description of Property

This property contains 2.768 acres of land mainly classified as LAND with a(n) N/A style building, built about N/A , having N/A exterior and N/A roof cover, with N/A unit(s), 0 room(s), 0 bedroom(s), 0 bath(s), 0 half bath(s).

Property Images

No Sketch Available

No Picture Available

May 18, 2021

Request for Variances &
Alternative Analysis In Support of the Variance Request
74, 80 Maynard Road (Map G08, Lot 0025 & 0500), Sudbury MA

Relief Sought

The applicant, John Derderian of Bonnie Brook Realty Corp., seeks relief under Section 7.2 of the Town of Sudbury Wetlands Administration Bylaw Regulations per Section 7.2.2.3 and 7.2.2.4 of the same Bylaw. Specifically, the applicant requests variances and permission to conduct fill and cut work within the Adjacent Upland Resource Areas (AURA) located on the parcels. No portion of the parcels are located within a NHESP Habitat of Rare Species or Areas of Critical Environmental Concern (ACEC). The proposed work is for development of a nine (09) lot single family house residential subdivision as a limited project access per *310 CMR 10.53 (3)(e)*. See Figure 1 for the locus map and site plan for details of the proposed project. This request is made under the provision whereby the variance can be issued because "*…it is necessary to avoid so restricting the use of the property as to constitute an unconstitutional taking without compensation.*"

Introduction

The project consists of two assessor's parcel lots, 74 Maynard Road (Map G08, Lot 0025, 2.768 acres), and 80 Maynard Road (Map G08, Lot 0500, 27.5 acres) with a total area of 30.268 acres Both lots are vacant woodland with about 20.518 acres of upland and 9.75 acres of wetland and intermittent stream (Mineway Brook). Most of the upland is located in the southern part which can be assessed from Maynard Road. Going north to central narrowing down to an peninsula of about 1.64 acres. Then further north crossing Mineway brook and wetland, there is another peninsula which can only be accessed from south. See Table 1 for detailed general land use breakdown. The dominant upland plans are white pine and oaks in upland area and red maple in wetland area with sparse understory growth shrubs and various groundcover growth. Soil in the area varies from medium sand to loamy sand with moderate to thick topsoil. Some old field stone walls indicate that it was once farmland. See Figure 2 for soil map.

Table 1. Land Use Summary

Land use	Area, acres
Total	30.268
Upland	20.518
Main	14.908
Pen 1	1.99
Pen 2	3.62
Wetland	9.75

The wetland delineation was approved by an ORAD on December 5, 2017 and extended to December 2021. In addition, on February 11, 2019, we received an Order of Conditions for soil testing using the same wetland line, which would extend the wetland line to February 11, 2022. The wetland resource area around the large northern peninsula was amended during the soil testing time and reviewed and approved by the Conservation Administrator.

Alternative Analysis

We have done 3 alternative analysis and discussed them at working meeting with the Conservation Administrator and Mr. Thomas Friedlander to come to the final design plan (Alternative 3). This session will discuss the details of the alternatives.

The alternative analysis is following the principle that avoidance of impact first, and then to minimize the impact with adequate mitigation to allow proper use of one's property.

1. Alternative 1: Access road crossing buffer zone only with retaining walls and include the most northern ninth lot with 50-ft buffer and BVW and stream crossing: This alternative is allowed under both 310 CMR 10.53 (3) (e) and the Sudbury Wetlands Protection Bylaw as a limited project status. However, it will result in direct impact on core wetland resource and intermittent stream. It is not a good option. See Details in the following table and attached alternative 1 plan.

Impacted Area reference	**Alternative 1**					
	Impacted WPA Resource Area		**Impacted 0-50-Ft Buffer/AURA**		**Impacted 50-100-ft buffer/AURA,**	
	Permanent Dist. Area (Sq.Ft)		Permanent Dist. Area (Sq.Ft)		Permanent Dist. Area (Sq.Ft)	
	Pervious	N/A	Pervious	Impervious	Pervious	Impervious
# 1	0	0	0	0	17594	10317
# 2A	0	0	1605	2179	578.16	828.33
# 2B	0	0	0	0	0	3503
# 2C	0	714	0	2004.69	0	0
# 3	0	0	0	0	0	2938
# 4A	0	0	0	0	1274	3728
# 4B	N/A	N/A	N/A	N/A	N/A	N/A
# 4C	N/A	N/A	N/A	N/A	N/A	N/A
# 4D	N/A	N/A	N/A	N/A	N/A	N/A
Sub Total (Sq.Ft)	0	714	1605	4184	19446	21315
Total (Sq.Ft)	**47,264**					
Mitigation Required (Ratio)	2:1					

2. Alternative 2: using sloped access road/driveway crossing and move the northern lot construction into the middle peninsula area in the 50-100 ft buffer zone: This option will eliminate direct impact on wetland and stream resources and use the area for mitigation for AUAR impact. As a tradeoff, we would located a house in the middle smaller peninsula. The detailed impact is show in the following table. See attached alternative 2 plan.

Impacted Area reference	Alternative 2					
	50-Ft Buffer/AURA (Sq.Ft)	**Impacted 50-100-ft buffer/AURA, (Sq.ft)**	**Impacted 50-100-ft buffer/AURA breakdown**			
			Temporary Dist. Area (Sq.Ft)	Limited Dist. Area, pervious (Sq.Ft)	Permanent Dist. Area (Sq.Ft)	
					Pervious	Impervious
# 1	0	29,054	0	11424	8116	9514
# 2	0	1,151	0	0	1151	0
# 3	0	8,215	0	3828	4160	227
# 4	0	1,170	0	0	1170	0
# 5	0	17,641	-	0	13545	4096
# 6	0	6,754	0	0	6754	0
#7 (Peninsula)	5335	6,430	-	2117	-	4313
Sub Total (Sq.Ft)	5335	70415	0	17370	34896	18149
Total (Sq.Ft)	**75,750**					
Mitigation Required (Ratio)	2:1					

3. Alternative 3: like Alternative 2 without the lot on peninsula. After in depth discussion with the Conservation Agent, we understand that under the current Sudbury Wetlands Protection Bylaw, it is not permissible to put the house inside the 50-100 ft buffer zone unless a variance is granted, which can only be granted for access purpose under the current practice of the bylaw. Therefore, we removed the house and access driveway to keep the Lot 5 as open space and partially for mitigation purpose. As a tradeoff, we seeking some minor grading work into the 50-100 ft buffer (AURA) as shown in the plan. This is the plan we are seeking approval from the Commission. See the following Table for a summary and following with some detailed discussion.

Impacted Area reference	Alternative 3					
	50-Ft Buffer/AURA (Sq.Ft)	**Impacted 50-100-ft buffer/AURA, (Sq.ft)**	**Impacted 50-100-ft buffer/AURA breakdown**			
			Temporary Dist. Area (Sq.Ft)	Limited Dist. Area, pervious (Sq.Ft)	Permanent Dist. Area (Sq.Ft)	
					Pervious	Impervious
# 1	0	29,054	0	11424	8116	9514
# 2	0	1,151	0	0	1151	0
# 3	0	8,215	0	3828	4387	0
# 4	0	1,170	0	0	1170	0
# 5	0	17,641		0	13545	4096
# 6	0	6,754	0	0	6754	0
Sub Total (Sq.Ft)	0	63985	0	15253	35123	13610
Total (Sq.Ft)	**63,985**					
Mitigation Required (Ratio)	2:1					
Mitigation Proposed (Sq.Ft)	128,294					
Mitigation Proposed (Ratio)	2.01					

Northern large Peninsula 157687.2 sq. ft (3.62 acres); middle peninsula 86848 sq. ft (1.99 acres).

The proposed work is for a nine (09) lot single family subdivision and includes a lot that is not consider a buildable lot at this time. Work will include the construction of a road, grading for the houses, utilities, septic systems and stormwater managements systems with the AURA. No work is proposed within the 50-Ft Wetland Buffer.

The subdivision will be accessed from Maynard Road via a bituminous asphalt road to be named Bonnie Brook Road. The road will be 24-ft wide and approximately 1100-ft long and will give access to Lots 1-7. It will also include a 5-ft wide sidewalk along the left side of the road, which will extend to Lot 6. Lots 8 and 9 will be accessed through an approximate 890-ft long communal driveway. The driveway is 20-ft wide up to the house on Lot 9 and then reduced to 12-ft wide up to the house on Lot 8.

Based on the current design, the AURA will be impacted in six (06) different locations. More than 15000 sq. ft road side slop area will have limited disturbance after construction and will provide a decent habitat for bird and wildlife. The impacted buffer locations and areas are summarized in Table 1. See Below:

Table 1 - Buffer Impact Areas

Buffer Area	Location	Impact Area (Sq.Ft)
#1	Lot 3, Lot 4, Road	29,054
#2	Lot 4	1,151
#3	Lot 4, Lot 5, Lot 6	8,215
#4	Lot 6	1,170
#5	Lot 7, Lot 9, Road, Sidewalk	17,641
#6	Lot 8	6,754
Total		63,985

We have proposed 128,284 Sq. Ft of total mitigation for the 63,985 Sq. Ft upland resource area that will be impacted with this current design for a mitigation ratio of 2.01:1. The mitigation consists of six (6) separate mitigation areas. The mitigation areas and locations are summarized in table 2. See below:

Table 2 - Buffer Mitigation Area

Buffer Area	Location	Mitigation Area (Sq.Ft)
#1	Lot 5	3,870
#2	Lot 5	10,355
#3	Lot 5	18,555
#4	Lot 5	5,963
#5	Lot 5	42,285
#6	Lot 5	47,266
Total		128,294

Feel free to contact us if you have any questions.

Sincerely,
Creative Land & Water Engineering, LLC
By

STATE OF NEW HAMPSHIRE
DESHENG WANG, PhD
No. 065
CERTIFIED WETLAND SCIENTIST

COMMONWEALTH OF MASSACHUSETTS
DESHENG WANG
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Francis Alves

Desheng Wang, Ph.D., P.E.
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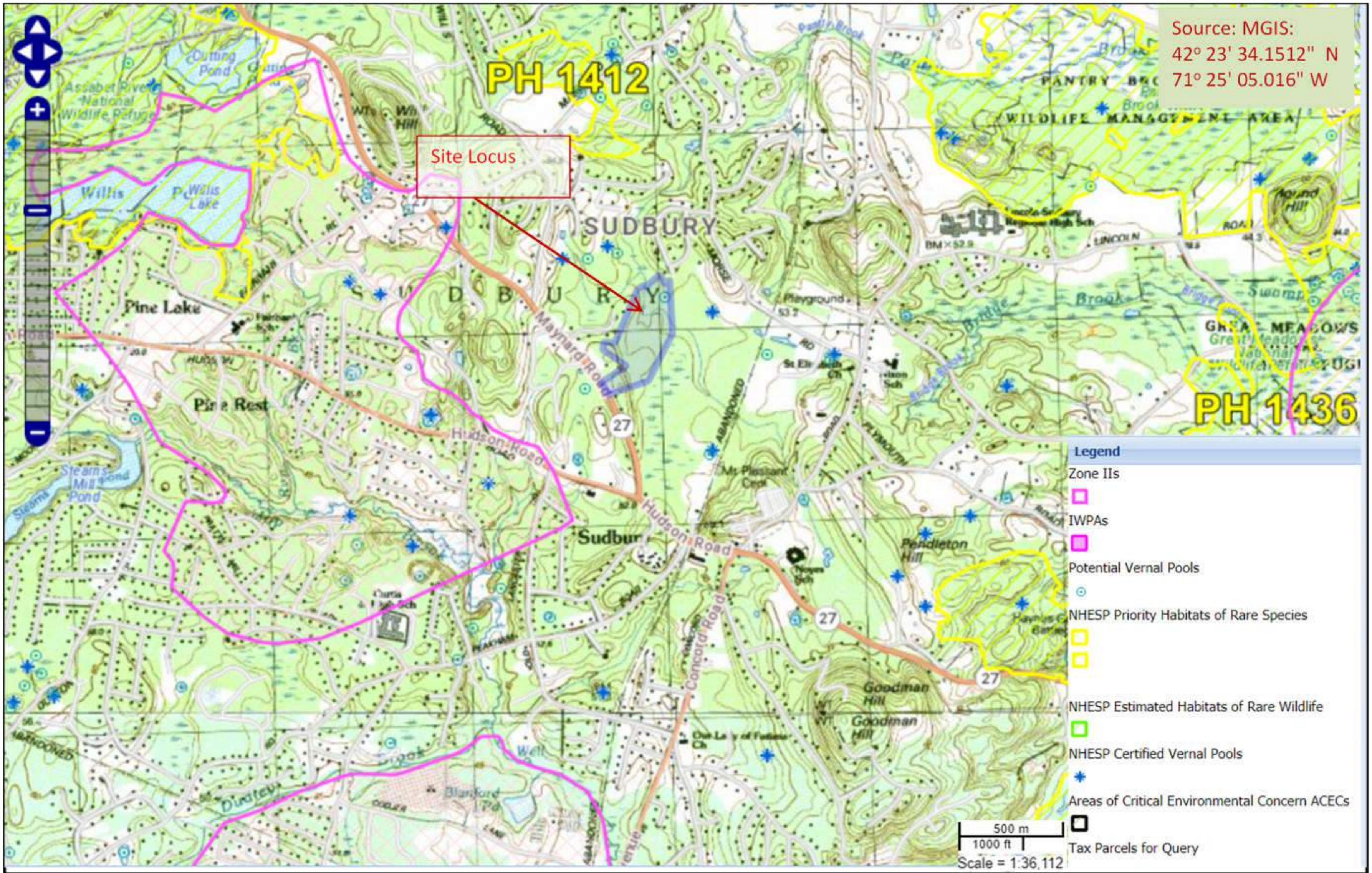


Figure 1. USGS Site Locus Map

Project:

74-80 Maynard Road
Sudbury, MA

By: Desheng Wang, Ph.D., P.E.
Creative Land & Water Engineering, LLC
P.O. Box 584
Southborough, MA 01772
508-281-1694 WWW.CLAWENG.COM

Impacted Area reference	Alternative 1					
	Impacted WPA Resource Area		Impacted 0-50-Ft Buffer/AURA		Impacted 50-100-ft buffer/AURA,	
	Permanent Dist. Area (Sq.Ft)		Permanent Dist. Area (Sq.Ft)		Permanent Dist. Area (Sq.Ft)	
	Pervious	N/A	Pervious	Impervious	Pervious	Impervious
# 1	0	0	0	0	17594	10317
# 2A	0	0	1605	2179	578.16	828.33
# 2B	0	0	0	0	0	3503
# 2C	0	714	0	2004.69	0	0
# 3	0	0	0	0	0	2938
# 4A	0	0	0	0	1274	3728
# 4B	N/A	N/A	N/A	N/A	N/A	N/A
# 4C	N/A	N/A	N/A	N/A	N/A	N/A
# 4D	N/A	N/A	N/A	N/A	N/A	N/A
Sub Total (Sq.Ft)	0	714	1605	4184	19446	21315
Total (Sq.Ft)	**47,264**					
Mitigation Required (Ratio)	2:1					

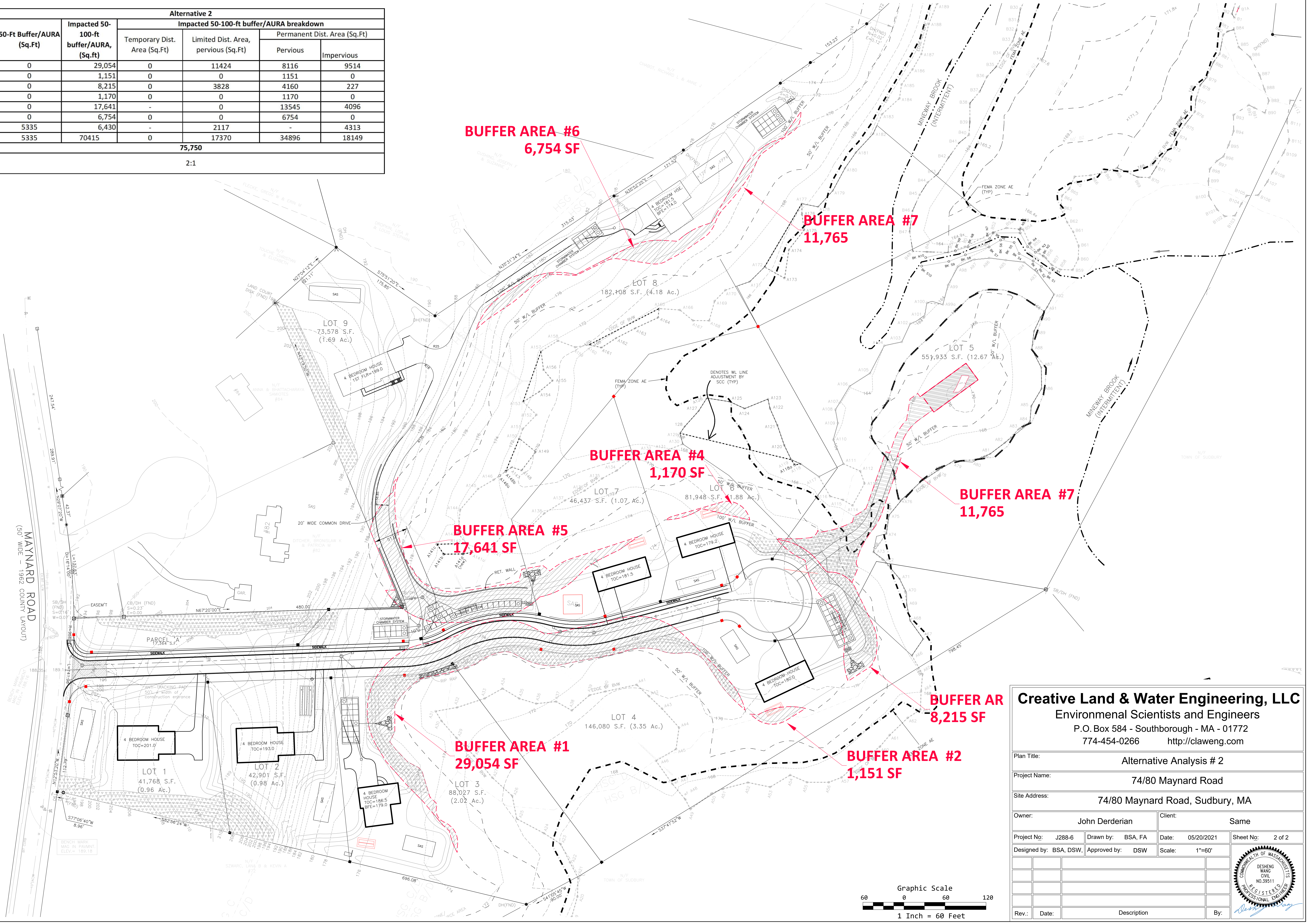
Creative Land & Water Engineering, LLC
Environmental Scientists and Engineers
P.O. Box 584 - Southborough - MA - 01772
774-454-0266 http://claweng.com

Plan Title:	Alternative Analysis # 1
Project Name:	74/80 Maynard Road
Site Address:	74/80 Maynard Road, Sudbury, MA
Owner: John Derderian	Client: Same
Project No: J288-6	Drawn by: BSA, FA
Date: 05/20/2021	Sheet No: 1 of 2
Designed by: BSA, DSW,	Approved by: DSW
Scale: 1"=60'	

Rev.:	Date:	Description	By:

DESHENG WANG
CIVIL
NO.39511

Impacted Area reference	Alternative 2					
	50-Ft Buffer/AURA (Sq.Ft)	Impacted 50-100-ft buffer/AURA, (Sq.ft)	Impacted 50-100-ft buffer/AURA breakdown			
			Temporary Dist. Area (Sq.Ft)	Limited Dist. Area, pervious (Sq.Ft)	Permanent Dist. Area (Sq.Ft)	
					Pervious	Impervious
# 1	0	29,054	0	11424	8116	9514
# 2	0	1,151	0	0	1151	0
# 3	0	8,215	0	3828	4160	227
# 4	0	1,170	0	0	1170	0
# 5	0	17,641	-	0	13545	4096
# 6	0	6,754	0	0	6754	0
#7 (Peninsula)	5335	6,430	-	2117	-	4313
Sub Total (Sq.Ft)	5335	70415	0	17370	34896	18149
Total (Sq.Ft)	**75,750**					
Mitigation Required (Ratio)	2:1					



Creative Land & Water Engineering, LLC
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Plan Title: Alternative Analysis # 2
Project Name: 74/80 Maynard Road
Site Address: 74/80 Maynard Road, Sudbury, MA
Owner: John Derderian
Client: Same
Project No: J288-6
Drawn by: BSA, FA
Date: 05/20/2021
Sheet No: 2 of 2
Designed by: BSA, DSW,
Approved by: DSW
Scale: 1"=60'

Rev.:	Date:	Description	By:

DESHENG WANG CIVIL NO.39511

Desheng Wang

Storm Water Management Report

Bonnie Brook Estates

Maynard Road
Sudbury, MA

Prepared By: Bruce Saluk & Associates, Inc.
Civil Engineering & Land Surveying
576 Boston Post Road East
Marlborough, MA 01752
Tel# 508-485-1662

Applicant: John Derderian
60 Windsor Road
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Commonwealth of Massachusetts
BRUCE M.
SALUK
CIVIL
No. 32375
Registered
Professional Engineer

March 2021

TABLE OF CONTENTS

SECTION 1: Existing and Proposed Conditions

SECTION 1: Existing and Proposed Conditions

The 30.5 Ac. project site is situated on the east side of Maynard RD approximately 900 FT south of Minebrook RD. It is listed as Assessor parcels 0500 & 0025 on Map G08 in zoning district Residence A-1. The front portion of the property along Maynard RD is in the zone 3 Water Resource Protection Overlay District(WRPOD). The intermittent Mineway Brook crosses the easterly side of the property. This brook is encompassed by the FEMA zone AE, which coincides with the Sudbury Flood Plain Overlay District (FPOD). The low area adjacent to the brook is a bordering vegetated wetland(BVW). There are no buildings or structures on the property. The land coverage is wooded, predominantly white pine, oaks, and maples. Most of the property or 29.2 Ac., drains easterly toward Mineway Brook. The remaining, or 1.3 Ac. drains toward Maynard RD, which is part of the Hop Brook watershed.

The site runoff that enters the Mineway Brook is conveyed to the Pantry Brook, which then flows easterly to the Sudbury River. The Sudbury River flows northerly to the Confluence with the Assabet River at the head of the Concord River.

The topographical elevations vary from the lowest, at elevation 163 at the northeast property corner adjacent to the Mineway Brook, to elevation 213 at the top of the hill near Maynard RD.

There were 65 soil tests performed within the proposed 9.2 Ac. development portion of the property. The purpose of the soil evaluation was to determine the soil texture and groundwater elevations. The soil logs are included in Appendix ‘D’ , together with the NRCS soil report. The test hole locations are shown on the existing conditions plan.

The proposed development consists of single-family residential subdivision for nine(9) lots served by a 1107 FT long road. There will be one common drive that will serve 2 Lots. The 12.7 Ac. Lot 5 is not intended for development under this application.

Project residences will be served by Town water, underground electric, communication conduits, gas, and a drainage system. The total proposed impervious area for the development is 2.03 Ac.. The limit of disturbance area is 9.22 Ac. There will be 0.86 Ac. of wooded restoration planting areas. The Stormwater system will include a treatment system for the removal of Total Suspended Solids(TSS). This treatment system has 5 water quality structures that include CDS hydrodynamic separators manufactured by Contech. Roof Dry wells for roof areas and six(6) chamber system for site areas will provide groundwater recharge that will meet Massachusetts DEP Best management Practice (BMP) Standards. The chambers systems and associated outlet control structures were designed to fulfill the hydrological runoff requirements of the MassDEP and Town of Sudbury.

SECTION 2: Hydrologic Design Criteria

SECTION 2: Hydrologic Design Criteria

1. **DESIGN STORMS:** Both the existing and proposed conditions were analyzed for the 1-inch, 2, 10, 25 and 100-year storm frequencies. The rainfalls used for the above storms were 1-inch, 3.2, 4.8, 6.0 and 8.6 inches, respectively. The rainfall distribution used for each of the storms was a SCS type III, 24-hour rainfall distribution.

2. **METHODOLOGY:** The HYDROCAD Stormwater Modeling Software was used to calculate the runoff and route the hydrographs through the Stormwater system. This Program uses the hydrology techniques developed by the Soil Conservation Services (SCS) now the Natural Resource Conservation Services (NRCS). The runoff values were derived by the SCS unit hydrograph procedure.

3. **HYDROLOGIC SOIL GROUP:** NRCS mapping defined the soils within the Drainage Area to be comprised of:
   - -Woodbridge,fine sandy loam with a 'C/D' Hydrologic Soil Group(HSG)
   - -Paxton, fine sandy loam with a 'C' HSG
   - -Raynham, silt loam with a 'C/D' HSG

   Soil evaluation of the site within the proposed Limit of Disturbance consisted of 65 test pits, which disclosed a different type of soils than described in the NRCS soil survey.
   The NRCS soil surveys are mapped at 1:25,000 and include the following statement *"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."*
   In accordance with Volume 3, Chapter 1, the soil texture found suggests that the soils fall under 'A/B' HSG. Soil texture at most of the proposed groundwater recharge system areas is HSG 'A' . The HSG 'B' classification was conservatively used for the overall drainage area for calculating runoff.

4. **RUNOFF:** The quantity of rainfall that was calculated as runoff was based on (1) soil types and associated hydrologic soil classification, (2) the area of existing and proposed impervious and pervious surfaces; i.e. driveways, and man-made and natural surface slopes.

SECTION 3: Summary and Conclusions

SECTION 3: Summary & Conclusion

The proposed design complies with MassDEP and the Sudbury Stormwater Management Bylaw stormwater performance standards that include Total Suspended solids Removal(TSS) , groundwater recharge, peak rate of runoff and erosion control.

Proposed stormwater BMP's for this project include :

- 11 hooded deep sump catch basins
- 5 Total suspended Solid(TSS) treatment removal CDS hydrodynamic separators.
- 6 chamber systems that will detain and recharge stormwater into the ground.
- 5 Roof Dry Well chambers
- 3 Level spreaders

A Long Term Pollution Prevention, Operation & Maintenance Plan for this project is attached in Appendix 'B'.

The Construction Period Operation & Maintenance Plan included in Appendix 'C' will provide measures to eliminate and mitigate construction impacts.

Table 3-1 below summarizes compliance with DEP Standard #2 for Pre & Post Development Peak Discharge Rates and Volume of runoff.

PEAK FLOW (CFS)					
DESIGN POINT & PEAK RUNOFF CONDITION	**1 YR**	**2 YR**	**10YR**	**25YR**	**100YR**
MAYNARD RD					
- EXISTING	0	0.13	0.87	1.73	4.00
- PROPOSED	0	0.12	0.50	0.87	1.81
WETLAND BUFFER					
- EXISTING	0	1.17	7.32	14.05	31.65
- PROPOSED	0	1.06	6.11	13.58	29.07
TOTAL					
- EXISTING	0	1.29	8.19	15.79	35.65
- PROPOSED	0	1.15	6.39	14.04	30.33

Table 3-1 continued :

VOLUME (AF)					
DESIGN POINT & VOLUME RUNOFF CONDITION	**1 YR**	**2 YR**	**10YR**	**25YR**	**100YR**
MAYNARD RD					
- EXISTING	0	0.027	0.093	0.161	0.339
- PROPOSED	0	0.014	0.041	0.066	0.129
WETLAND BUFFER					
- EXISTING	0	0.226	0.759	1.289	2.680
- PROPOSED	0	0.134	0.537	1.032	2.367
TOTAL					
- EXISTING	0	0.252	0.853	1.450	3.019
- PROPOSED	0	0.148	0.577	1.098	2.497

The flow values given in Table 3-1 were taken from the HYDROCAD. calculations in Appendix “G” . Refer to Appendix ‘G’ for more information on runoff, coverages, soils conditions, times of concentration, runoff rates, etc.

APPENDIX A
DEP Stormwater Management Standards

Documentation & Calculations for DEP Stormwater Management Policy Standards

This project will meet the Stormwater Management Standards. The proposed Best Management Practices (BMP's) will reduce peak rates and remove TSS from runoff leaving the site. The following stormwater management standards pertain to the Massachusetts DEP Stormwater Policy.

Standard #1-Untreated Stormwater

This project was designed to not discharge untreated contaminated stormwater into, or cause erosion to wetlands or waters of the Commonwealth. The stormwater discharge treatment from the proposed project will exceed 80% TSS leaving the site. Refer to Standard #4 below where TSS removal calculations are provided.

Standard #2-Post Development Peak Discharge Rates

All performance requirements for this standard have been met. Refer to summary and conclusions in Section 3 of this report where runoff flow summaries for both existing and proposed conditions are given.

Standard #3-Recharge To Groundwater

Full performance requirements for this standard have been met. The NRCS soil mapping classifies the site soils as Hydrologic Soil Groups (HSG): “C”, “B/D”,”C/D” & ”D”. Soil evaluation was performed by DeSheng Wang, PHD, P.E.. Approximately 65 test holes were evaluated throughout the proposed 9 Ac. area that is proposed for development. Mr. Wang found the NRCS soil classifications to be inconsistent with the site soils. Therefore, a Hydrologic Group (HSG) ‘B’ has been used for the 10.4 Ac. site and off site drainage area.

The target depth factors for calculating the required recharge volume in the Stormwater Management Policy (SMP) is as follows:

NRCS Soil Group	Target depth factor (F)
A	0.6-inch
B	0.35-inch
C	0.25-inch
D	0.1-inch

SITE & OFFSITE RUNOFF Rv

Rv= (0.35-inch) x (1FT/12inches) (2.08 Ac) (43,560 SF/Ac.)=2,643 CF (0.061 AF)

The above required Rv value will be met by the proposed 5 roof dry wells and 6 chamber infiltration systems as follows:

The retained volume for the 11 proposed infiltration areas is summarized in the following schedule.

RETAINED VOLUME SCHEDULE	
Infiltration Area	Volume of Storage Below Outlet (CF)
CS#1	578
CS#2	440
CS#3	1034
CS#4	1835
CS#5	364
CS#6	4575
DW#2	1157
DW#3	607
DW#4	538
DW#5	534
Dw#6	534
	TOTAL=12,196 CF

The material dimensions and quantities are included the HYDROCAD calculations in Appendix ‘G’ and on the Design plans.

TOTAL RECHARGE VOL PROVIDED = 12,196 CF > REQUIRED 2,643 CF VOLUME(Rv)

Check for BMP draw down time:

-Draw down time(max.) =4.43 ft(1ft/12Inches)/2.41 inches/hr. = 22 hr. < 72hr

Standard #4 (Water Quality)

TSS removal will be met by using deep sump catch basins followed by Water Quality Structures, which are proprietary treatment units by Contech. A long-term pollution prevention & Operation and Maintenance plan is included in Appendix "B" of this report.

.

Vwq= DwqxAwq

Vwq= water quality volume (CF)
Dwq= water quality depth (inches)
Awq=On site Impervious area proposed (Ac.)

The required water quality volume is 1-INCH.
The design meets Standard #4 criteria for a 1-inch WQV.

TSS will be removed prior to entering the proposed groundwater recharge chamber systems by the following means:

- Water Quality Structures (proprietary treatment units by Contech)
- Deep sump Catch basins.

The TSS treatment system is designed to remove greater than 80% of the TSS from the catchment area.

The TSS efficiency values in the TSS calculations were taken from DEP SWMP, Volume 1, Chapter 1, Table 'TSS' (Revised 2008) and the TSS removal for the proprietary units were provided by Contech.

Removal of TSS meets DEP Requirements. See proprietary TSS removal and calculation sheets for TSS removal and Excel spreadsheet included in the following pages.

BSA

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Marlborough, MA 01752
(508) 485-1662

TSS Removal Calculation Worksheet

Name: Bonnie Brook Estates, Sudbury , MA
Proj. No.: 2671
Date: 3/17/21
Location: Maynard RD
Suudbury, MA
Computed by: BMS

Impervious area Tributary to WQU#1

imperv. Area 0.48 Ac.

A **BMP**	**B** **TSS Removal Rate (%)**	**C** **Starting TSS Load***	**D** **Amount Removed (BxC)**	**E** **Remaining Load (C-D)**
CB	25	1.00	0.25	0.75
WQU	85	0.75	0.64	0.11
	0	0.11	0.00	0.11

Total TSS Removal = 89%

Notes:

1) Starting TSS Load for first BMP= 1.00. TSS load for subsequent BMP's is equal to the Remaining Load (E) from the previous BMP.

BSA

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576 Boston Post Road East
Marlborough, MA 01752
(508) 485-1662

TSS Removal Calculation Worksheet

Name: Bonnie Brook Estates, Sudbury , MA

Proj. No.: 2671
Date: 3/17/21
Computed by: BMS

Location: Maynard RD
Suudbury, MA

Impervious area Tributary to WQU#2

imperv. Area 0.68 Ac.

A BMP	B TSS Removal Rate (%)	C Starting TSS Load*	D Amount Removed (BxC)	E Remaining Load (C-D)
CB	25	1.00	0.25	0.75
WQU	82	0.75	0.62	0.13
	0	0.13	0.00	0.13

Total TSS Removal = 87%

Notes:

1) Starting TSS Load for first BMP= 1.00. TSS load for subsequent BMP's is equal to the Remaining Load (E) from the previous BMP.

BSA

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TSS Removal Calculation Worksheet

Name: Bonnie Brook Estates, Sudbury , MA
Proj. No.: 2671
Date: 3/17/21
Location: Maynard RD
Suudbury, MA
Computed by: BMS

Impervious area Tributary to WQU#3

imperv. Area 0.29 Ac.

A **BMP**	**B** **TSS Removal Rate (%)**	**C** **Starting TSS Load***	**D** **Amount Removed (BxC)**	**E** **Remaining Load (C-D)**
CB	25	1.00	0.25	0.75
WQU	87	0.75	0.65	0.10
	0	0.10	0.00	0.10

Total TSS Removal = 90%

Notes:

1) Starting TSS Load for first BMP= 1.00. TSS load for subsequent BMP's is equal to the Remaining Load (E) from the previous BMP.

BSA

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Marlborough, MA 01752
(508) 485-1662

TSS Removal Calculation Worksheet

Name: Bonnie Brook Estates, Sudbury , MA

Proj. No.: 2671
Date: 3/17/21
Computed by: BMS

Location: Maynard RD
Suudbury, MA

Impervious area Tributary to WQU#4

imperv. Area 0.13 Ac.

A **BMP**	**B** **TSS Removal Rate (%)**	**C** **Starting TSS Load***	**D** **Amount Removed (BxC)**	**E** **Remaining Load (C-D)**
WQU	95	1.00	0.95	0.05
	0	0.05	0.00	0.05
	0	0.05	0.00	0.05

Total TSS Removal = 95%

Notes:

1) Starting TSS Load for first BMP= 1.00. TSS load for subsequent BMP's is equal to the Remaining Load (E) from the previous BMP.

BSA

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TSS Removal Calculation Worksheet

Name: Bonnie Brook Estates, Sudbury , MA

Proj. No.: 2671
Date: 3/17/21
Computed by: BMS

Location: Maynard RD
Suudbury, MA

Impervious area Tributary to WQU#5

imperv. Area 0.07 Ac.

A **BMP**	**B** **TSS Removal Rate (%)**	**C** **Starting TSS Load***	**D** **Amount Removed (BxC)**	**E** **Remaining Load (C-D)**
WQU	97	1.00	0.97	0.03
	0	0.03	0.00	0.03
	0	0.03	0.00	0.03

Total TSS Removal = 97%

Notes:

1) Starting TSS Load for first BMP= 1.00. TSS load for subsequent BMP's is equal to the Remaining Load (E) from the previous BMP.

BSA

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TSS Removal Calculation Worksheet

Name: Bonnie Brook Estates
Sudbury, MA

Proj. No.: 2671
Date: 3/17/21
Computed by: BMS

Location: Maynard RD
Sudbury, MA

Roof Areas

Lots 2-4 & 6-8
imperv. Area
0.390

A BMP	B TSS Removal Rate (%)	C Starting TSS Load*	D Amount Removed (BxC)	E Remaining Load (C-D)
ROOF RECHARGE	80	1.00	0.80	0.20

Total TSS Removal = 80%

Notes:

*) Starting TSS Load for first BMP= 1.00. TSS load for subsequent BMP's is equal to the Remaining Load (E) from the previous BMP.

BSA

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TSS Removal Calculation Worksheet

Name: Bonnie Brook Estates
Sudbury, MA

Proj. No.: 2671
Date: 3/17/21
Computed by: BMS

Location: Maynard RD
Sudbury, MA

Offsite Roof Area
To CS#1
imperv. Area
0.050

A BMP	B TSS Removal Rate (%)	C Starting TSS Load*	D Amount Removed (BxC)	E Remaining Load (C-D)
ROOF RECHARGE	80	1.00	0.80	0.20

Total TSS Removal = 80%

Notes:

*) Starting TSS Load for first BMP= 1.00. TSS load for subsequent BMP's is equal to the Remaining Load (E) from the previous BMP.

BSA ***Bruce Saluk & Associates, Inc.***
Civil Engineering & Land Surveying
576 Boston Post Road East
Marlborough, MA 01752
(508) 485-1662

TSS Removal Calculation Worksheet

Name: Bonnie Brook Estates
Proj. No.: 2671
Date: 3/17/21
Location: Maynard RD
Sudbury, MA
Computed by: BMS

TSS SUMMARY SHEET

Total impervious offsite & on site area=2.08 Ac.

TSS REMOVAL=[(0.89x0.48Ac)+(0.87x0.68Ac)+((0.90x0.29Ac)+(0.95x0.13Ac)+(0.97x0.07Ac)+(0.80X0.44Ac)]x100 = 88%
2.08 Ac

Note:
Off site impervious area that flows through the site will receive treatment.

Project: **Bonnie Brook Estates**
Location: **Sudbury, MA**
Prepared For: **Bruce Saluk & Associates**

CONTECH
ENGINEERED SOLUTIONS

Purpose: To calculate the water quality flow rate (WQF) over a given site area. In this situation the WQF is derived from the first 1" of runoff from the contributing impervious surface.

Reference: Massachusetts Dept. of Environmental Protection Wetlands Program / United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual

Procedure: Determine unit peak discharge using Figure 1 or 2. Figure 2 is in tabular form so is preferred. Using the tc, read the unit peak discharge (qu) from Figure 1 or Table in Figure 2. qu is expressed in the following units: cfs/mi^2/watershed inches (csm/in).

Compute Q Rate using the following equation:

$$\mathbf{Q = (qu)\ (A)\ (WQV)}$$

where:

Q = flow rate associated with first 1" of runoff
qu = the unit peak discharge, in csm/in.
A = impervious surface drainage area (in square miles)
WQV = water quality volume in watershed inches (1" in this case)

Structure Name	Impv. (acres)	A (miles^2)	t_c (min)	t_c (hr)	WQV (in)	qu (csm/in.)	Q (cfs)
WQU 1	0.48	0.0007500	6.0	0.100	1.00	774.00	0.58
WQU 2	0.68	0.0010625	6.0	0.100	1.00	774.00	0.82
WQU 3	0.29	0.0004531	6.0	0.100	1.00	774.00	0.35
WQU 4	0.13	0.0002031	6.0	0.100	1.00	774.00	0.16
WQU 5	0.07	0.0001094	6.0	0.100	1.00	774.00	0.08

The WQf sizing calculation selects the minimum size CDS/Cascade/StormCeptor model capable of operating at the computed WQf peak flowrate prior to bypassing. It assumes free discharge of the WQf through the unit and ignores the routing effect of any upstream storm drain piping. As with all hydrodynamic separators, there will be some impact to the Hydraulic Gradient of the corresponding drainage system, and evaluation of this impact should be considered in the design.

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

BONNIE BROOK ESTATES
SUDBURY, MA

Area	0.48 ac	Unit Site Designation	WQU 1
Weighted C	0.9	Rainfall Station #	69
t_c	6 min		
CDS Model	1515-3	CDS Treatment Capacity	**1.0 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.02	10.2%	10.2%	0.01	0.01	9.8
0.04	9.6%	19.8%	0.02	0.02	9.3
0.06	9.4%	29.3%	0.03	0.03	9.0
0.08	7.7%	37.0%	0.03	0.03	7.3
0.10	8.6%	45.6%	0.04	0.04	8.1
0.12	6.3%	51.9%	0.05	0.05	5.9
0.14	4.7%	56.5%	0.06	0.06	4.3
0.16	4.6%	61.2%	0.07	0.07	4.3
0.18	3.5%	64.7%	0.08	0.08	3.3
0.20	4.3%	69.1%	0.09	0.09	4.0
0.25	8.0%	77.1%	0.11	0.11	7.2
0.30	5.6%	82.7%	0.13	0.13	4.9
0.35	4.4%	87.0%	0.15	0.15	3.8
0.40	2.5%	89.5%	0.17	0.17	2.2
0.45	2.5%	92.1%	0.19	0.19	2.1
0.50	1.4%	93.5%	0.22	0.22	1.1
0.75	5.0%	98.5%	0.32	0.32	3.8
1.00	1.0%	99.5%	0.43	0.43	0.7
1.50	0.0%	99.5%	0.65	0.65	0.0
2.00	0.0%	99.5%	0.86	0.86	0.0
3.00	0.5%	100.0%	1.30	1.00	0.1
					91.2

Removal Efficiency Adjustment[2] = 6.5%

Predicted % Annual Rainfall Treated = 93.4%

Predicted Net Annual Load Removal Efficiency = 84.8%

1 - Based on 10 years of hourly precipitation data from NCDC Station 770, Boston WSFO AP, Suffolk County, MA

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

BONNIE BROOK ESTATES
SUDBURY, MA

Area	**0.68 ac**	Unit Site Designation	**WQU 2**
Weighted C	**0.9**	Rainfall Station #	**69**
t_c	**6 min**		
CDS Model	**1515-3**	CDS Treatment Capacity	**1.0 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.02	10.2%	10.2%	0.01	0.01	9.8
0.04	9.6%	19.8%	0.02	0.02	9.2
0.06	9.4%	29.3%	0.04	0.04	8.9
0.08	7.7%	37.0%	0.05	0.05	7.3
0.10	8.6%	45.6%	0.06	0.06	8.0
0.12	6.3%	51.9%	0.07	0.07	5.8
0.14	4.7%	56.5%	0.09	0.09	4.3
0.16	4.6%	61.2%	0.10	0.10	4.2
0.18	3.5%	64.7%	0.11	0.11	3.2
0.20	4.3%	69.1%	0.12	0.12	3.9
0.25	8.0%	77.1%	0.15	0.15	6.9
0.30	5.6%	82.7%	0.18	0.18	4.7
0.35	4.4%	87.0%	0.21	0.21	3.6
0.40	2.5%	89.5%	0.24	0.24	2.0
0.45	2.5%	92.1%	0.28	0.28	2.0
0.50	1.4%	93.5%	0.31	0.31	1.1
0.75	5.0%	98.5%	0.46	0.46	3.3
1.00	1.0%	99.5%	0.61	0.61	0.6
1.50	0.0%	99.5%	0.92	0.92	0.0
2.00	0.0%	99.5%	1.22	1.00	0.0
3.00	0.5%	100.0%	1.84	1.00	0.1
					88.8

Removal Efficiency Adjustment[2] = 6.5%

Predicted % Annual Rainfall Treated = 93.3%

Predicted Net Annual Load Removal Efficiency = 82.4%

1 - Based on 10 years of hourly precipitation data from NCDC Station 770, Boston WSFO AP, Suffolk County, MA

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

BONNIE BROOK ESTATES
SUDBURY, MA

Area	0.29 ac	Unit Site Designation	WQU 3
Weighted C	0.9	Rainfall Station #	69
t_c	6 min		
CDS Model	1515-3	CDS Treatment Capacity	1.0 cfs

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.02	10.2%	10.2%	0.01	0.01	9.9
0.04	9.6%	19.8%	0.01	0.01	9.3
0.06	9.4%	29.3%	0.02	0.02	9.1
0.08	7.7%	37.0%	0.02	0.02	7.4
0.10	8.6%	45.6%	0.03	0.03	8.2
0.12	6.3%	51.9%	0.03	0.03	6.0
0.14	4.7%	56.5%	0.04	0.04	4.4
0.16	4.6%	61.2%	0.04	0.04	4.4
0.18	3.5%	64.7%	0.05	0.05	3.3
0.20	4.3%	69.1%	0.05	0.05	4.1
0.25	8.0%	77.1%	0.07	0.07	7.4
0.30	5.6%	82.7%	0.08	0.08	5.1
0.35	4.4%	87.0%	0.09	0.09	4.0
0.40	2.5%	89.5%	0.10	0.10	2.3
0.45	2.5%	92.1%	0.12	0.12	2.3
0.50	1.4%	93.5%	0.13	0.13	1.2
0.75	5.0%	98.5%	0.20	0.20	4.2
1.00	1.0%	99.5%	0.26	0.26	0.8
1.50	0.0%	99.5%	0.39	0.39	0.0
2.00	0.0%	99.5%	0.52	0.52	0.0
3.00	0.5%	100.0%	0.78	0.78	0.2
					93.6

Removal Efficiency Adjustment[2] = 6.5%

Predicted % Annual Rainfall Treated = 93.5%

Predicted Net Annual Load Removal Efficiency = 87.1%

1 - Based on 10 years of hourly precipitation data from NCDC Station 770, Boston WSFO AP, Suffolk County, MA
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

Brief Stormceptor Sizing Report - WQU 4

Project Information & Location			
Project Name	Bonnie Brook Estates	**Project Number**	673128
City	Sudbury	**State/ Province**	Massachusetts
Country	United States of America	**Date**	3/16/2021
Designer Information		**EOR Information (optional)**	
Name	David Adams	**Name**	
Company	Contech	**Company**	Bruce Saluk Associates
Phone #	207-885-6191	**Phone #**	
Email	dadams@conteches.com	**Email**	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	WQU 4
Target TSS Removal (%)	80
TSS Removal (%) Provided	95
Recommended Stormceptor Model	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 450i	95
STC 900	97
STC 1200	98
STC 1800	98
STC 2400	98
STC 3600	99
STC 4800	99
STC 6000	99
STC 7200	99
STC 11000	100
STC 13000	100
STC 16000	100

Sizing Details

Drainage Area

Total Area (acres)	0.13
Imperviousness %	100.0

Rainfall

Station Name	BOSTON WSFO AP
State/Province	Massachusetts
Station ID #	0770
Years of Records	58
Latitude	42°21'38"N
Longitude	71°0'38"W

Water Quality Objective

TSS Removal (%)	80.0
Runoff Volume Capture (%)	
Oil Spill Capture Volume (Gal)	
Peak Conveyed Flow Rate (CFS)	
Water Quality Flow Rate (CFS)	

Up Stream Storage

Storage (ac-ft)	Discharge (cfs)
0.000	0.000

Up Stream Flow Diversion

Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD)
The selected PSD defines TSS removal

OK-110

Particle Diameter (microns)	Distribution %	Specific Gravity
1.0	0.0	2.65
53.0	3.0	2.65
75.0	15.0	2.65
88.0	25.0	2.65
106.0	41.0	2.65
125.0	15.0	2.65
150.0	1.0	2.65
212.0	0.0	2.65

Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
- For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

For Stormceptor Specifications and Drawings Please Visit:
https://www.conteches.com/technical-guides/search?filter=1WBC0O5EYX

Brief Stormceptor Sizing Report - WQU 5

Project Information & Location			
Project Name	Bonnie Brook Estates	**Project Number**	673128
City	Sudbury	**State/ Province**	Massachusetts
Country	United States of America	**Date**	3/16/2021
Designer Information		**EOR Information (optional)**	
Name	David Adams	**Name**	
Company	Contech	**Company**	Bruce Saluk Associates
Phone #	207-885-6191	**Phone #**	
Email	dadams@conteches.com	**Email**	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	WQU 5
Target TSS Removal (%)	80
TSS Removal (%) Provided	97
Recommended Stormceptor Model	STC 450i

The recommended Stormceptor Model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary

Stormceptor Model	% TSS Removal Provided
STC 450i	97
STC 900	98
STC 1200	99
STC 1800	99
STC 2400	99
STC 3600	99
STC 4800	99
STC 6000	100
STC 7200	100
STC 11000	100
STC 13000	100
STC 16000	100

Sizing Details

Drainage Area

Total Area (acres)	0.07
Imperviousness %	100.0

Rainfall

Station Name	BOSTON WSFO AP
State/Province	Massachusetts
Station ID #	0770
Years of Records	58
Latitude	42°21'38"N
Longitude	71°0'38"W

Water Quality Objective

TSS Removal (%)	80.0
Runoff Volume Capture (%)	
Oil Spill Capture Volume (Gal)	
Peak Conveyed Flow Rate (CFS)	
Water Quality Flow Rate (CFS)	

Up Stream Storage

Storage (ac-ft)	Discharge (cfs)
0.000	0.000

Up Stream Flow Diversion

Max. Flow to Stormceptor (cfs)	

Particle Size Distribution (PSD)
The selected PSD defines TSS removal

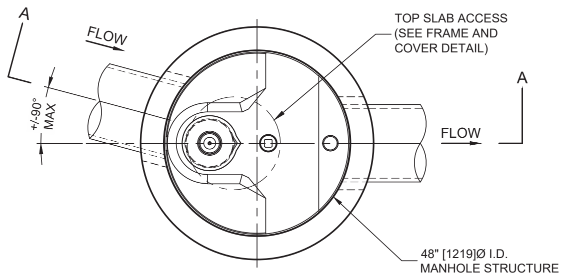
OK-110

Particle Diameter (microns)	Distribution %	Specific Gravity
1.0	0.0	2.65
53.0	3.0	2.65
75.0	15.0	2.65
88.0	25.0	2.65
106.0	41.0	2.65
125.0	15.0	2.65
150.0	1.0	2.65
212.0	0.0	2.65

Notes

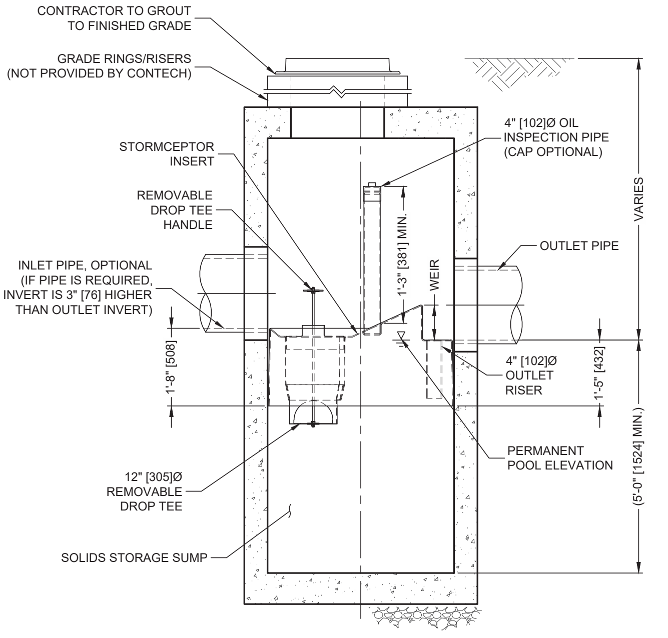
- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
- For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

For Stormceptor Specifications and Drawings Please Visit:
https://www.conteches.com/technical-guides/search?filter=1WBC0O5EYX



PLAN VIEW

TOP SLAB NOT SHOWN



SECTION A-A

Stormceptor®

FOR PATENT INFORMATION, GO TO www.ContechES.com/IP

STORMCEPTOR DESIGN NOTES

THE STANDARD STC450I CONFIGURATION WITH ROUND, SOLID FRAME AND COVER, AND INLET PIPE IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

STORMCEPTOR STC450I RATED TREATMENT CAPACITY IS 0.40 CFS, OR PER LOCAL REGULATIONS

CONFIGURATION DESCRIPTION

GRATED INLET ONLY (NO INLET PIPE)

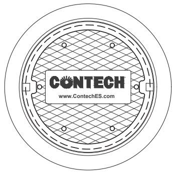
GRATED INLET WITH INLET PIPE OR PIPES

CURB INLET ONLY (NO INLET PIPE)

CURB INLET WITH INLET PIPE OR PIPES

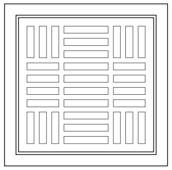
SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (cfs [L/s])			
PEAK FLOW RATE (cfs [L/s])			
RETURN PERIOD OF PEAK FLOW (yrs)			
RIM ELEVATION			
PIPE DATA:	INVERT	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
NOTES / SPECIAL REQUIREMENTS:			



FRAME AND COVER

(MAY VARY)
NOT TO SCALE



FRAME AND GRATE

(MAY VARY)
NOT TO SCALE

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. STORMCEPTOR WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STORMCEPTOR STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2' [610], AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. STORMCEPTOR STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C478 AND AASHTO LOAD FACTOR DESIGN METHOD.
6. ALTERNATE UNITS ARE SHOWN IN MILLIMETERS [mm].

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMCEPTOR MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH®
ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

STC450i
STORMCEPTOR
STANDARD DETAIL

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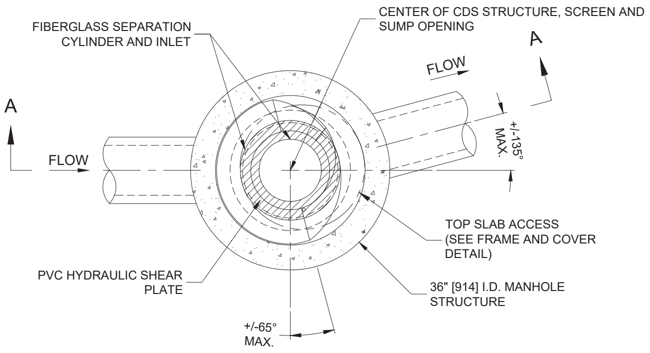
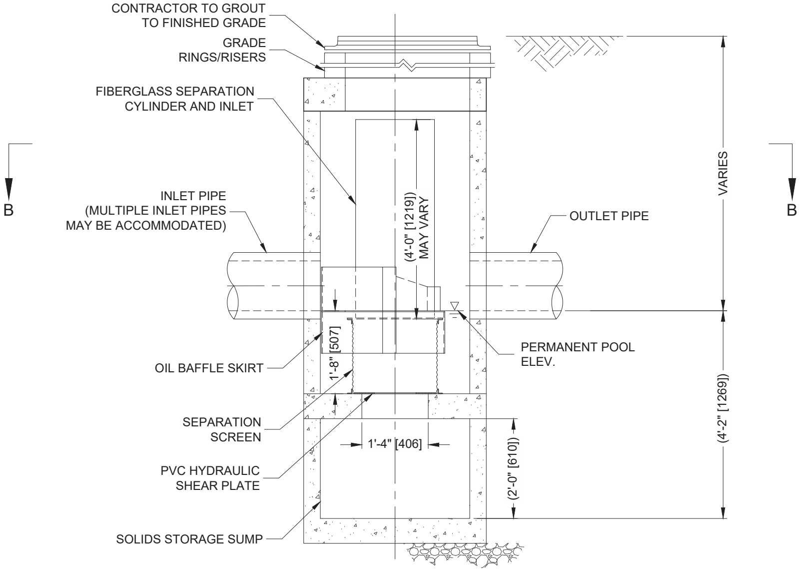


PLAN VIEW B-B

N.T.S.



ELEVATION A-A

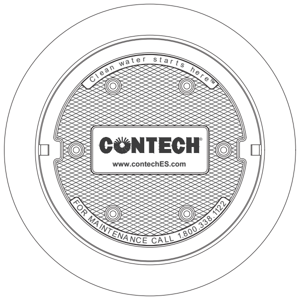
N.T.S.

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,788,848; 6,641,720; 6,511,595; 6,581,783; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

CDS1515-3-C DESIGN NOTES

CDS1515-3-C RATED TREATMENT CAPACITY IS 1.0 CFS, OR PER LOCAL REGULATIONS.

THE STANDARD CDS1515-3-C CONFIGURATION IS SHOWN.



FRAME AND COVER

(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/s)			*
PEAK FLOW RATE (CFS OR L/s)			*
RETURN PERIOD OF PEAK FLOW (YRS)			*
SCREEN APERTURE (2400 OR 4700)			*
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION			*
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT
		*	*
NOTES/SPECIAL REQUIREMENTS:			
* PER ENGINEER OF RECORD			

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO..
5. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
6. CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH®
ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS1515-3-C
ONLINE CDS
STANDARD DETAIL

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

This project land use is not subject to higher pollution control requirements

Standard #6 (Protection of Critical Areas)

The project is not located near a Critical area.

Standard #7 (Redevelopment)

This site is not a redevelopment project.

Standard #8 (Erosion /Sediment Control)

This standard has been fully met. Refer to the "Construction Period Operation and Maintenance Plan" included in Appendix 'C'

Standard #9 (Operation & Maintenance Plan)

This standard has been fully met. Refer to the Long Term Pollution Prevention & Operation and Maintenance Plan in Appendix "B"

Standard #10 (Illicit Discharge Compliance Statement)

This standard has been fully met. The applicant will submit an illicit discharge compliance statement prior to the discharge of any stormwater to post-development BMP's.

APPENDIX B:

Long Term Pollution Prevention, Operation and Maintenance Plan

LONG TERM POLLUTION PREVENTION, OPERATION AND MAINTENANCE PLAN

-STANDARDS 4,6,9 &10-
For
Bonnie Brook Estates

The following items are intended as a guideline for continued maintenance of the storm drain system after construction. There may be other measures that should be applied to certain drainage appurtenances not mentioned herein. Therefore, the current owner, followed by the future owners of the Stormwater system should be updating this plan on an as needed basis.

Responsible Party for the Operation, Maintenance & Financing repairs

Initially, and until the Road and Drainage system is turned over to another ownership, the responsible party will be the property owner(s):

Bonnie Brook Realty
60 Windsor Road
Wellesley, MA 01481

Inspection and Maintenance Requirements

The responsible party shall retain and pay for inspectional services by a designated person that is qualified, and approved to perform such inspectional services. Training for individual(s) involved with implementing the Long-term Pollution Prevention Plan shall be provided by the responsible party. Said party shall also pay the maintenance and repair cost. After each inspection, the inspector shall complete the inspection report forms. These reports shall be kept for future review by Federal, State or Local authorities. The frequency of the inspections shall be as updated to the amended DEP Stormwater Management Regulations, and, in the case of the subsurface Water Quality Structures, according to the O & M schedules recommended by those Manufacturers.

The estimated annual operation & Maintenance Budget for the Stormwater system is $1500. The entity providing maintenance services shall follow confined space entry procedures in accordance with OSHA requirements.

The inspection and maintenance outlined below shall be followed and submitted by the inspector to the owner and the designated Town Department.

Catch Basin

In accordance with DEP Stormwater Manual, catch basins shall be inspected 4 times per year and cleaned of debris when the depth of sediment reaches 2FT(50 % of the sump depth). Disposal shall comply with local, State and Federal regulations.

Erosion

Significant erosion along slopes shall be protected with engineered soil reinforcement, jute mesh, ground cover and/or erosion control, as approved.

Water Quality Structures

There are 5 water quality structures proposed and designated on the drainage plans as WQU#1 through WQU#5. These Water quality structures are CDS hydrodynamic separators manufactured by Contech shall be inspected twice per year(spring & fall). Following the first year, inspection sequence shall be performed as recommended by the inspector, but not less than once per year. Removal of sediment shall be required when the sediment reaches 75% of the capacity of the sump. Measurements shall be taken at each inspection and recorded in the Inspection & Maintenance log. Removal of the sediment from the sump area and disposal shall be in accordance with local, State and Federal regulations. Sediment removal shall be performed by a certified CDS unit maintenance provider using a Vac Truck, or equal. The procedures and Inspection & maintenance shall follow the manual entitled *“ CDS Inspection & Maintenance Guide”*, by Contech at wwww.conteches.com

Roof Drain - Subsurface Recharge Chambers by Cultec, Inc

Inspection and maintenance of the chamber system shall be in accordance with the proprietary guidelines entitled *“ Contactor & Recharger Stormwater Chamber- operation and maintenance guidelines”.* www.cultec.com Access to the subsurface chambers shall be from the inspection ports provided. If inspection shows that any of the chamber systems are not fully draining within 72 hours following a storm event, the responsible party shall retain a qualified engineer to assess the reason for infiltration failure and to recommend corrective action for restoring the infiltration rate. The responsible party shall implement corrective action based on this evaluation. Check the upstream roof leader overflow tees and inspection port overflow system consisting of perforated access port cap and grate. Any sign of needed gutter repair should be reported.

Concrete Chamber Systems (Retain It)

Underground stormwater detention and infiltration systems must be inspected and maintained at regular intervals for purposes of performance and longevity.

Inspection

Inspection is the key to effective maintenance of infiltration/ detention system. DEP recommends inspections by done twice a year. This should be done during the 2nd and 3rd quarter of each year. Inspection access is at Manholes positioned to provide more than 1 access point to each chamber area. The best time to inspect will be 3 days after a large rainfall. Water levels present above the bottom elevation of the chamber system should be recorded in the report. A non-receding water depth would indicate that maintenance is required. The rate at which the system collects pollutants will depend more on site specific activities rather than the size or configuration of the system. Inspections should be performed more often when sanding and/or other instances in which one would expect higher accumulations of sediment conditions. A record of each inspection is to be maintained for the life of the system.

Maintenance

The infiltration/detention chambers should be cleaned when an inspection reveals accumulated sediment or debris is clogging the stone below the chambers. This is evident as disclosed by the inspection procedure noted above.

Accumulated sediment can typically be removed with a vacuum truck. Manhole covers shall be securely seated following cleaning activities. Should it be necessary to get inside the system to perform maintenance activities, all appropriate precautions regarding confined space entry and OSHA regulations should be followed.

The foregoing inspection and maintenance efforts help ensure underground system continues to function as intended by the recommended inspection and maintenance practices.

Outlet Control Structures

There are 2 outlet control structures on the drainage plans. They are designated as OCS#1 and OCS#2. These structures should be inspected once per year and cleaned of debris at the outlet orifices.

Level Spreaders

The level spreaders shall be inspected after large rainfalls or once per year, whichever occurs more often. The inspector shall note any erosion or uneven alignment creating erosion and confined flow zones. Repair of stone shall be periodically done as necessary to maintain the flow as intended.

Snow removal, Deicing Treatment & Storage Operations

Snow disposal, if required, shall be in accordance with Mass DEP Guideline No. BRPG01-01 requirements. Salt application shall be minimal and shall only be used where necessary. The use of sodium Chloride (NaCl) is prohibited. Storage of Roadway deicing salt shall be offsite. Snow quantities in excess of the onsite storage capacity shall be removed from the site by the snow removal contractor.

Good House Keeping Practices & Illicit Discharge Prevention

Inspections of the entire site and shall identify and report to the owner any erosion, pollution, and accumulation of any unsuitable material on the site. The inspector shall note and report any sign of an illicit discharge on the property. These illicit discharges may include spills, pet waste, wastewater discharges, illegal pipe connections to the storm water system, oil and grease. The owner shall assign qualified workers to fulfill recommendations by the inspector for cleanup and illicit discharge elimination.

All hazardous waste materials discovered will be disposed of in the manner specified by local and state regulation. The owner will be responsible for seeing that these procedures are followed.

Pavement Sweeping

Pavement shall be swept every spring at the frequency required to remove sand and other debris.

Accidental Spill Containment

The drainage system provides sufficient capacity to isolate and contain a large spill within the stormwater system for an accidental spill. The company providing the cleanup services for the spill shall follow public safety practices and cordon off the spill containment work zone for the protection of the public. Regardless of the size, spills of toxic or hazardous material will be reported to the appropriate State or local government authorities. The inspector shall report all inspections and make recommendations to the owner for actions and maintenance deemed necessary by the inspector.

The above recommendations are applicable to project completion with 100% established vegetative cover, and are not intended for construction progress measures.

Storage of Materials and Waste

Long term storage of waste or trash that is harmful to the groundwater and wetland resources is prohibited. Such waste shall be immediately removed from the property by a licensed contractor. Weekly garbage removal shall be by a commercial trash removal company.

Vehicle Washing Control

Vehicle washing shall be at commercial car washing facility that already has environmental controls in place.

Fertilizers, Herbicides, Pesticides and Fungicides

It is recommended that the common application of fertilizers, herbicides, pesticides and fungicides be restricted, and only used on a limited basis in the approved application zone as follows: Chemical additives applied to the ground cover and plants within 100 FT of the Wetlands are prohibited. Application for such chemicals shall only be used on a limited basis beyond said Wetland setback zone.
Use of chemicals in these areas shall be applied in a manner that prevents the chemical from being washed down gradient of the application zone; e.g., fertilizer shall be worked into the soil to prevent washout. Storage of these chemicals shall be in the product containers in a safe dry enclosure, such as a locked shed, or offsite landscape company's storage facility.

INSPECTION REPORT No. ____

Bonnie Brook Estates
Sudbury, MA

INSPECTION DATE:

INSPECTOR:

1) CATCH BASINS

The inspector shall refer to the narrative on Pg 2

COMMENTS & RECOMMENDATIONS:

____

____

____

____

MEASUREMENTS: ____

SIGNS OF ILLICIT DISCHARGES: YES NO
CLEANING REQUIRED: YES NO
DEPTH OF SEDIMENT___________________
DATE CLEANED: _______________________
PERFORMED BY: _______________________

2) EROSION

The inspector shall refer to the narrative on Pg 2

COMMENTS & RECOMMENDATIONS: _____________________________________

____

____

____

____

____

MEASUREMENTS: ____

CLEANING REQUIRED: YES NO
DATE CLEANED: _______________________
PERFORMED BY: _______________________

3) WATER QUALITY STRUCTURES:

The procedures and Inspection & maintenance shall follow the manual entitled “ CDS Inspection & Maintenance Guide”, by Contech at wwww.conteches.com
Inspection frequency shall be 2 times per year for the first 2 years following construction, then no less than once per year thereafter, or as recommended by the manufacturer, whichever occurs more often.

The inspector shall refer to the narrative on Pg 2

COMMENTS & RECOMMENDATIONS: ______________________________________
____
____
____
____
____
____

OBSERVATIONS: ____

CLEANING REQUIRED: YES NO
DATE CLEANED: _______________________

PERFORMED BY: _______________________

4) ROOF DRY WELL CHAMBER SYSTEMS

Inspection and maintenance of the chamber system shall be in accordance with the proprietary guidelines entitled “ Contactor & Recharger Stormwater Chamber- operation and maintenance guidelines”. www.cultec.com

The inspector shall refer to the narrative on Pg 2

COMMENTS & RECOMMENDATIONS: ______________________________________
____
____
____
____
____

MEASUREMENTS: ____

CLEANING REQUIRED: YES NO

DATE CLEANED: ________________________
PERFORMED BY: ________________________

5) LEVEL SPREADERS

The inspector shall refer to the narrative. Inspection frequency shall be twice per year to check and remove accumulated sediment, trash and debris.

The inspector shall refer to the narrative on Pg 3

COMMENTS & RECOMMENDATIONS:
____
____
____
____

MEASUREMENTS: ____

SIGNS OF RILLING OR GULLYING: YES NO
CLEANING REQUIRED: YES NO
DEPTH OF SEDIMENT____________________
REPAIR OF REPLACEMENT OF STONE IS NECESSARY YES NO
DATE CLEANED: ________________________
PERFORMED BY: ________________________

6) GOOD HOUSE KEEPING & PREVENTION OF ILLICIT DISCHARGES:

The inspector shall refer to the narrative on Pg 4

COMMENTS & RECOMMENDATIONS: ______________________________________
____
____
____
____
____
____

MEASUREMENTS: ____

CLEANING REQUIRED: YES NO
DATE CLEANED: ________________________

PERFORMED BY: ________________________

7) PAVEMENT SWEEPING:

The inspector shall refer to the narrative on Pg 4

COMMENTS & RECOMMENDATIONS: ______________________________

MEASUREMENTS: ______________________________

CLEANING REQUIRED: YES NO
DATE CLEANED: ______________________

PERFORMED BY: ______________________

8) CONCRETE CHAMBER SYSTEMS:

The inspector shall refer to the narrative on Pg 3

COMMENTS & RECOMMENDATIONS: ______________________________

MEASUREMENTS: ______________________________

CLEANING REQUIRED: YES NO
DATE CLEANED: ______________________

PERFORMED BY: ______________________

APPENDIX C:

Construction Period Operation & Maintenance Plan

Construction Pollution Prevention & Erosion/Sedimentation Control Plan

- Bonnie Brook Estates, Sudbury, MA-
-STANDARD #8-

Purpose:

The following provides the Construction Period Sequencing, Erosion/ Sedimentation measures, Operation, Maintenance & Pollution Prevention in accordance with Standard #8.

Narrative of surface water flow through the site and receiving downstream resource areas:

Most of the property or 29.2 Ac., drains easterly toward Mineway Brook. The remaining, or 1.3 Ac. drains toward Maynard RD, which is part of the Hop Brook watershed.

The site runoff that enters the Mineway Brook is conveyed to the Pantry Brook, which then flows easterly to the Sudbury River. The Sudbury river flows northerly to the Confluence with the Assabet River at the head of the Concord River.

Responsible Party for Compliance to the Construction Pollution Prevention & Erosion/Sedimentation Control Plan:

Initially, and until the Road and Drainage system is turned over to another ownership, the responsible party will be:

Bonnie Brook Realty
60 Windsor Road
Wellesley, MA 01481

Erosion Control & Construction Sequencing:

The following is a general construction sequence outline:

1) Obtain a National Pollution Discharge Elimination System (NPDES) Construction General Permit (CGP) and prepare a project Storm Water Pollution Prevention Plan (SWPPP).
2) Set all Erosion Control measures, and anti-tracking berms called for on the approved plan. Said erosion control measures includes, but is not limited to staked wattles & siltation fence, silt sacks, etc.
3) A pre-construction conference is held with Sudbury Town officials, Owner, Applicant, Site Engineer, and the Contractor.

4) Construct a sedimentation traps 1,2,3,& 4. All sedimentation traps shall include a standpipe sand filter, or equal means to filter the stormwater. Provide temporary channels and ditches to divert runoff from the work zone into the sedimentation traps. Provide other temporary sedimentation traps where required.
5) Start earthwork stage: remove and stockpile top and subsoils for future use.
6) Bring site to Road Subgrade, construct underground utilities, water, and drain systems.
7) Build road infrastructure.
8) When the site is fully stabilized, and when authorized by the Conservation Commission, remove erosion control and silt sacks.

Throughout the construction period the contractor shall provide erosion control operation, Maintenance & Pollution Prevention Measures in accordance with Standard #8, outlined below and as required by permitting authorities.

Erosion and Sedimentation Controls:

Structural Practices

Wattles & Siltation Fencing
Siltation fencing with wattles to be installed to protect the downstream resource areas and will be maintained throughout the course of construction until the site has been fully stabilized. The contractor shall have additional straw bales, siltation fencing available to address washouts and other emergencies. Additional straw bales and siltation fence shall be stored at the site for quick access and reinforcement of selected sections of the erosion control line where necessary.

Exposed Slopes
On exposed slopes, mechanical cultivation of soils shall include grooves created by dozer treads set perpendicular to the slope direction. On long slopes, runoff shall be directed via swales to temporary sedimentation traps where directed by the construction manager.

Soil Stabilization
Soil stabilization measures shall be implemented immediately after finish grading.

Clearing and grubbing
De-stumping and grubbing shall be done in stages to minimize soil tracking and site erosion. The site superintendent shall implement soil striping if the exposed soil is or will soon become eroded or tracked by vehicles. It is recommended that stripping & stockpile of soils be done in stages to minimize the amount overall exposed soils. Soil stabilization measures shall be implemented immediately after finish grading.

Temporary Sedimentation Traps
Construct sedimentation traps designated on the grading plan. All sedimentation traps shall include a standpipe sand filter, or equal means to filter the stormwater. Provide

temporary channels and ditches to divert runoff from the work zone into the sedimentation traps. Provide other temporary sedimentation traps where required.

Provide additional small sedimentation traps intended for short-term use (overnight to several weeks). Typical dimensions for small traps are 5ft x 10ft and 3-5 ft. in height. Temporary sedimentation traps may be used at various locations to control erosion and sediment. They can remain in place until it obstructs construction operations or fills up with deposit, when it can be replaced with another trap. Temporary sedimentation traps can be produced by a natural depression, excavation, or with an impoundment berm. Typical locations for drainage ways include the bottoms of embankments, the lower end of waste or borrow areas, or at the downgrade area of a cut section. Temporary sediment traps may include a standpipe filter to provide additional removal of excess sediment where applicable.

Dewatering

Excavated areas, trenches and sediment traps that require dewatering shall not be discharged without treatment. On a regular basis, provide slow rate pump down and treatment of the captured storm water in each sedimentation trap. This should also be performed before rainfall events. Slow release and filtration shall be treated by approved means. Acceptable practices will include the use of filtration bags shown on the Detail sheet leaf mulch, stump grindings and/or additional sedimentation traps where water can be collected and recharged into the ground.

Catch Basin filters

Install silt sacks in the proposed catch basins as soon as they are functional. Silt sacks shall be installed and maintained until the site has been fully stabilized.

Drainage swales

Swales will be constructed at various locations throughout the site during construction to divert runoff to the sedimentation traps.

Offsite Vehicle Tracking

Stabilized the construction entrance with an anti-tracking pad. The anti-tracking pad will be approximately 50-feet long by the width of the drive access and will be constructed of 12-inches of 3/4 to 3-inch crushed stone. The removal and stockpiling of topsoil and subsoil in the work zone shall be accomplished as soon as feasible to minimize the amount of cohesive soil exposure to vehicles.

Pavement Sweeping

Pavement areas that have deposits of sediment from the construction area shall be swept using a mechanical street sweeper on an as needed basis.

Stabilization Practices

Temporary Stabilization

Topsoil stockpiles and disturbed portions of the site where construction activity ceases for a growing season will be stabilized with temporary seed and mulch . The temporary seed shall be as follows:

New England Erosion Control / Restoration Mix

Application Rate: 35 lbs./acre 1,245 sq. ft./lb.

The New England Erosion Control/Restoration Mix contains a selection of native grasses and wildflowers designed to colonize generally moist, recently disturbed sites where quick growth of vegetation is desired to stabilize the soil surface. This mix is particularly appropriate for detention basins that do not normally hold standing water. The plants in this mix can tolerate infrequent inundation, but no constant flooding. In New England, the best results are obtained with a spring or early fall seeding. Summer and fall seeding can be successful with a light mulching of weed-free straw to conserved moisture. Late fall and winter dormant seeding require a slight increase in the seeding rate. Fertilization is not required unless the soils are particularly infertile. Species include: Swithgrass (*Panicum virgatum*), Creeping Red Fescue (*Festuca rubra*), Virginia Wild Rye (*Elymus vierinicus*), Fox Sedge (*Carex vulpinoidea*), Creeping Bentgrass (*Agrostis stolonifera*), Silky Wild Rye (*Elymus villosus*), Nodding Bur-marigold (*Bidens cernua*), Soft Rush (*Juncus effuses*), Grass-leaved Goldenrod (*Solidago graminifolia*), Sensitive fern (*Onoclea sensibilis*), Joe-Pye Weed (*Eupatorium maculatum*), boneset (*Eupatorium perfoliatum*), Flat-top Aster (*Aster umbellatus*), New York Aster (*Aster novi-belgii*), and Blue Vervain (*Verbena hastate*).

Areas of the site that are to be paved will be temporarily stabilized by installing the subbase until bituminous pavement can be applied.

Other Controls

Waste Disposal

Waste Materials

All waste materials will be collected and stored in metal dumpsters rented from a licensed solid waste management company. The dumpsters will meet all local and state solid waste management regulations. All trash and construction debris from the site will be deposited in the dumpsters. No construction waste will be buried or burned onsite. All personnel will be instructed regarding the correct procedure for waste disposal. The construction site superintendent will be responsible for seeing that these procedures are followed.

Hazardous Waste

All hazardous waste materials will be disposed of in the manner specified by local and state regulation or by the manufacturer. Site personnel will be instructed in these practices and the construction site superintendent will be responsible for seeing that these procedures are followed.

Sanitary Waste
All sanitary waste will be collected from the portable units by a licensed sanitary waste management company, as required by local and state regulation.

Construction Stage Maintenance / Inspection Procedures

Erosion and Sediment Control Inspection and Maintenance Practices

- All control measures will be inspected at least once each week and following any storm event of 0.5 inches or greater.

- All measures will be maintained in good working order; if a repair is necessary, it will be initiated within 24 hours of report.

- Accumulated sediment will be removed from silt fence when it has reached a depth of 6-inches.

- Silt fencing will be inspected for depth of sediment to check that fabric is securely set along the bottom attached to the fence posts. Inspection shall confirm that the fence posts are firmly set in the ground.

- All sedimentation basins will be inspected for depth of sediment, and accumulated sediment will be removed on a regular basis to allow natural recharge into the ground. Temporary sediment traps can be allowed to fill with sediment, and either excavated and re-used or stabilized. Traps, always, shall be maintained with slopes that are 3 to 1 (max.) and collected mud and silt that must be removed when depth reaches 8-inches.

- All diversion dikes and channels will be inspected, and any breaches promptly repaired.

- Temporary and permanent seeding and plantings will be inspected for bare spots, washouts, and healthy growth.

- A Construction Stormwater Maintenance Inspection Report will be submitted after each inspection. A copy of the report form to be completed by the inspector is attached.

- The site superintendent will select a site worker who will be responsible for inspections, maintenance, and repair activities, and filling out the inspection and maintenance report.

- Personnel selected for inspection and maintenance responsibilities will receive training from the site superintendent. They will be trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used onsite in good working order.

Non-Storm Water Discharges

Uncontaminated non-rainfall related discharges from the site during the construction period may occur from dewater of excavated trenches. Any non-stormwater discharges shall be directed to the sedimentation traps .

Construction Spill Prevention

Material Management Practices

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff.

Good Housekeeping – The following good housekeeping practices will be followed onsite during the construction project:

- An effort will be made to store only enough product required to do the job.
- All materials stored onsite will be stored in a neat, orderly manner in their appropriate containers and if possible under a roof or other enclosure.
- Products will be kept in their original containers with the manufacturer's label affixed.
- Substances will not be mixed with one another unless recommended by the manufacturer.
- Whenever possible, all a product will be used up before disposing of the container.
- Manufacturer's recommendations for proper use and disposal will be followed.
- The site superintendent will inspect daily to ensure proper use and disposal of materials.

Hazardous Products – These practices are used to reduce the risks associated with hazardous materials.

- Products will be kept in original containers unless they are not resealable.
- Original labels and material safety data will be retained; they contain important product information.

- If surplus product must be disposed of manufacturers' or local and state recommended methods for proper disposal will be followed.

Construction Practices for Equipment & Products

Use and storage of motorized vehicles/Machinery.

All maintenance, including, but not limited to lubricating, refueling fluid replacement and washing shall be done outside the 100-FT wetland buffer.

Petroleum Products

All onsite vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers that are clearly labeled. Any asphalt substances used onsite will be applied according to the manufacturer's recommendations.

Fertilizers

Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to stormwater. Storage will be in a covered shed. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.

Paints

All containers will be tightly sealed and stored when not required for use. Excess paint will not be discharged to the stormwater system but will be properly disposed of according to manufacturer's instructions or State and local regulations.

Spill Control Practices

In addition to the good housekeeping and material management practices discussed in the previous sections of this plan, the following practices will be followed for spill prevention and cleanup:

- Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.

- Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite. Equipment and materials will include but not be limited to brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose.

- All spills will be cleaned up immediately after discovery.

- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.

- Spills of toxic or hazardous material will be reported to the appropriate State or local government agency, regardless of the size.

- The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures will also be included.

- The site superintendent will be the spill prevention and cleanup coordinator. This individual will designate a site worker who will receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of responsible spill personnel will be posted in the material storage areas and in the office trailer onsite.

Pre-Blast Survey & Blasting

Ledge blasting practices and other aspects involving material, storage and procedures shall be in conformance with Massachusetts 527 CMR 1.00 regulations and applicable federal regulations.

Federal agencies that regulate explosives include:

- Alcohol, Tobacco, Firearms and Explosives (ATF) – sales and storage
- Department of Transportation (DOT) – transportation
- Occupational Safety and Health Administration (OSHA) –construction use and handling
- Mining Safety and Health Administration (MSHA) – mining use and handling

Record Keeping

The construction trailer shall include, but not limited to the following:

- Copy of NPDES General Construction permit
- Dates of grading, construction activity, and stabilization
- Construction plans
- Signed copy of the SWPPP manual
- Copy of the letter from the EPA notifying you of receipt of your NOI
- Inspection reports prepared by the contractor during construction
- Emergency Response Contact & Telephone list of State & Local authorities
- Construction Pollution Prevention & Erosion/Sedimentation Control Plan

INSPECTION AND MAINTENANCE REPORT FORM

For

Bonnie Brook Estates
Sudbury, MA

TO BE COMPLETED EVERY 7 DAYS AND WITHIN 24-HOURS OF A RAINFALL EVENT OF 0.5 INCHES OR MORE.

INSPECTOR: ______________________________ DATE: ______________________

INSPECTOR'S JOB TITLE: ____

DAYS SINCE LAST RAINFALL: ________ AMOUNT OF LAST RAINFALL: ________ INCHES

STABILIZATION MEASURES

ACTION ITEM	(Y/N)	CONDITIION	COMMENTS
Any signs of sediment by-passing wattles or siltation fencing			
Is there sufficient storage available in both sedimentation traps for the next 2-inch rainfall			
Are CBs protected with Silt-Sacs and has the accumulated silt exceeding 6-inches been removed?			
Is there sufficient capacity in the sedimentation traps to retain the next rainfall?			
Has any dirt been tracked onto Public Way			
Are materials that are potential stormwater contaminants stored inside or under cover?			
Is the water quality leaving the site clean			
Has the contractor complied with the applicable requirements of the SWPPP & Construction Pollution Prevention & Erosion/Sedimentation Control Plan			

STABILIZATION
REQUIRED:____
____
____

TO BE PERFORMED BY: ON OR BEFORE:

INSPECTION AND MAINTENANCE REPORT FORM

For
Bonnie Brook Estates
Sudbury, MA

WATTLE / SILT FENCING:

FROM*	TO*	IS LINE STABILIZED?	WASHOUT OR OVERTOPPING?

*- List erosion control section, or if inspection applies to all sections, list ALL.

MAINTENANCE REQUIRED FOR WATTLES/SILTFENCE LINE:____
____
____
____

TO BE PERFORMED BY:____________________________ ON OR BEFORE:____________________

INSPECTION AND MAINTENANCE REPORT FORM

For

Bonnie Brook Estates
Sudbury, MA

ANTI-TRACKING PAD

LOCATION	SEDIMENT ON ROAD?	IS THE STONE SILTED-UP?	DOES ALL TRAFFIC USE THE PAD?	CONDITION OF DRAINAGE DIVERSION

MAINTENANCE REQUIRED FOR ANTI-TRACKING PADS:____

____

____

____

____

____

TO BE PERFORMED BY:________________________ ON OR BEFORE:__________________

INSPECTION AND MAINTENANCE REPORT FORM

For

Bonnie Brook Estates
Sudbury, MA

SEDIMENTATION BASINS / TRAPS

LOCATION	DEPTH OF SEDIMENT	SIGNS OF OVERTOPPING OR WASHOUT?	IS THERE ENOUGH AVAILABLE STORAGE FOR 2-INCH RAINFALL ?	CONDITION / STATUS OF STANDPIPE SAND FILTER, OUTFALL/OUTLET DEVICE/PUMP DOWN TREATMENT SYSTEM

MAINTENANCE REQUIRED FOR SEDIMENTATION BASINS/TRAPS:____

____

____

____

____

____

TO BE PERFORMED BY:____________________ ON OR BEFORE:____________________

INSPECTION AND MAINTENANCE REPORT FORM

For
Bonnie Brook Estates
Sudbury, MA

CHANGES REQUIRED TO THE POLLUTION PREVENTION PLAN:

REASONS FOR CHANGES:

Signed:______________________________________ Date: ___________________

APPENDIX D:

Soil data

Creative
LAND & WATER
Engineering, LLC

www.claweng.com
P.O Box 584
Southborough, MA 01722

clawe@claweng.com
(774) 454-0266 (cell)
(508) 281-1694 (office)

EFFECTIVE, AFFORDABLE, AND SUSTAINABLE SOLUTIONS FOR LAND & WATER ENVIRONMENT

3/19/2021

Soil Evlaution Logs: 74 & 80 Maynard Road, Sudbury, MA
by Creative Land & Water Engineering, LLC

TP#	Date	Depth From Surface (In)	Soil Horizon	Soil Texture	Soil Color	Other
NDHT 1-1	9/22/2020	0-4	A	S.L.	10 YR 3/2	Friable
		4-24	B	S.L.	2.5 Y 6/6	Friable. Boulders
		24-84	C	S.L.-L.S.	2.5 Y 6/2	Firm-Dense
		84+	Cr	-	-	Mottles 10 YR 6/8 @ 60"
		Perc. Depth (In.): 45 Perc. Rate (MPI): 13 Standing Water: None Weeping: None Estimated High Water (In): 60				
NDHT 1-2	9/22/2020	0-4	A	S.L.	10 YR 3/2	Friable
		4-24	B	S.L.	2.5 Y 6/6	Friable. Boulders
		24-60	C	L.S.	2.5 Y 6/4	Dense
		60+	Cr	Ledge	-	Large Boulders
		Standing Water: None Weeping: None Estimated High Water (In): 60				
NDHT 1-3	9/22/2020	0-4	A	S.L.	10 YR 3/2	Friable
		4-24	Bw	S.L.	2.5 Y 6/6	Friable
		24-96+	C	S.L.-L.S.	2.5 Y 6/4	Dense. Boulders
		Perc. Depth (In.): 45 Perc. Rate (MPI): 3 Standing Water: None Weeping: None Estimated High Water (In): 60				
NDHT 2-1	9/21/2020	0-6	A	S.L.	10 YR 3/2	Friable
		6-24	Bw	S.L.	2.5 Y 6/6	Friable
		24-60	C1	M.S.	2.5 Y 6/4	Loose
		60-108+	C2	M.L.S.	2.5 Y 5/4	Dense
		Perc. Depth (In.): 45 Perc. Rate (MPI): < 2 Standing Water: None Weeping: None Estimated High Water (In): 72				
NDHT 2-2	9/21/2020	0-5	A	S.L.	10 YR 3/2	Friable
		5-24	Bw	S.L.	2.5 Y 6/6	Friable
		24-72	C1	F.M.S.	2.5 Y 6/4	Loose
		72-120+	C2	L.S.	2.5 Y 5/4	Dense. Firm
		Perc. Depth (In.): 45 Perc. Rate (MPI): < 2 Standing Water: None Weeping: None Estimated High Water (In): 84				

NDHT 7-1	9/21/2020	0-6	A	S.L.	10 YR 3/2	Friable
		6-24	Bw	S.L.	2.5 Y 6/6	Friable
		24-120+	C	S.L.-L.S.	2.5 Y 6/4	Firm-Dense. Stones
		Standing Water: None Weeping: None Estimated High Water (In): 84				
NDHT 7-2	9/21/2020	0-6	A	S.L.	10 YR 3/2	Friable
		6-36	B	S.L.	2.5 Y 6/6	Friable
		36-108+	C	S.L.-L.S.	2.5 Y 6/4	Dense. Stone
		Perc. Depth (In.): 43 Perc. Rate (MPI): 4 Standing Water: None Weeping: None Estimated High Water (In): 84				
NDHT 7-3	9/21/2020	0-6	A	S.L.	10 YR 3/2	Friable
		6-40	B	S.L.	2.5 Y 6/6	Friable. Stone
		40-120+	C	S.L.-L.S.	2.5 Y 5/4	Dense. Stone
		Perc. Depth (In.): 45 Perc. Rate (MPI): 6 Standing Water: None Weeping: None Estimated High Water (In): 84				
STW -E1	9/22/2020	0-4	A	S.L.	10 YR 3/2	Friable
		4-26	B	S.L.	2.5 Y 6/6	Friable
		26-66	C	S.L.-L.S.	2.5 Y 6/4	Dense
		66+	Cr	Ledge	-	Boulders
		Standing Water: None Weeping: None Estimated High Water (In): 60				
STW -E2	9/22/2020	0-4	A	S.L.	10 YR 3/2	Friable
		4-24	Bw	S.L.	2.5 Y 6/6	Friable
		24-60	C1	S.L.-L.S.	2.5 Y 6/4	Dense
		60-120	C2	S.L.	2.5 Y 5/4	Dense
		Standing Water: None Weeping: None Estimated High Water (In): 84				
STW 1-1 (Falling Head Test)	9/22/2020	0-4	A	S.L.	10 YR 3/2	Friable
		4-24	B	S.L.	2.5 Y 6/6	Friable. Boulders
		24-126	C	S.L.-L.S.	2.5 Y 6/4	Dense. Stones
		Standing Water: None Weeping: None Estimated High Water (In): 84				
STW 2-1	9/23/2020	0-5	A	S.L.	10 YR 3/2	Friable
		5-30	B	S.L.	2.5 Y 6/6	Friable
		30-84	C1	L.S.	2.5 Y 6/4	Dense
		84-124	C2	S.L.-L.S.	2.5 Y 5/4	Dense
		Standing Water: None Weeping: None Estimated High Water (In): 120				

STW 3-1	9/22/2020	0-6	A	S.L.	10 YR 3/2	Friable
		6-30	Bw	S.L.	2.5 Y 6/6	Friable
		30-96	C1	F.M.S.	2.5 Y 6/4	Loose
		96-108+	C2	M.L.S.	2.5 Y 5/4	Firm
		Standing Water: None Weeping: None Estimated High Water (In): 60				
STW 3-2	9/23/2020	0-4	A	S.L.	10 YR 3/2	Friable
		4-24	Bw	S.L.	2.5 Y 6/6	Friable
		24-72	C1	S.L.-L.S.	2.5 Y 6/4	Dense
		72-120+	C2	S.L.	2.5 Y 5/4	Dense-C
		Standing Water: None Weeping: None Estimated High Water (In): 72				
STW 4-1	9/24/2020	0-5	A	S.L.	10 YR 3/2	Friable
		5-30	Bw	L.S.	2.5 Y 6/6	Friable
		30-132	C	L.S.	2.5 Y 5/4	Dense
		Standing Water: None Weeping: None Estimated High Water (In): 60				
STW 4-2	9/24/2020	0-4	A	S.L.	10 YR 3/2	Friable
		4-18	B	S.L.-L.S.	10 YR 6/6	Friable
		18-84	C1	M.F.M.S	2.5 Y 6/4	Loose
		84-100	C2	F.Sil. S.	2.5 Y 5/4	Blocky
		Standing Water (In): 108 Weeping (In): 108 Estimated High Water (In): 72				
STW 6-1	9/23/2020	0-5	A	S.L.	10 YR 3/2	Friable
		5-36	B	S.L.	2.5 Y 6/6	Friable
		36-108+	C1	M.L.S.	2.5 Y 5/4	Firm
		Standing Water: None Weeping: None Estimated High Water (In): 84				
STW 7-1	9/23/2020	0-5	A	S.L.	10 YR 3/2	Friable
		5-30	Bw	S.L.	2.5 Y 6/6	Friable
		30-144	C	M.L.S.	2.5 Y 5/4	Dense
		Standing Water: None Weeping: None Estimated High Water (In): 96				
STW 8-1	9/24/2020	0-4	A	S.L.	10 YR 3/2	Friable
		4-24	Bw	S.L.	2.5 Y 6/6	Friable
		24-72	C1	F.M.S.L.-L.S.	2.5 Y 6/6	Friable-Dense
		72+	Cr	-	-	Refusal or Large Boulder
		Standing Water (In): None Weeping (In): None Estimated High Water (In): 72				

STW 8-2	9/24/2020	0-4	A	S.L.	10 YR 3/2	Friable
		4-24	B	S.L.-L.S.	2.5 Y 6/6	Friable
		24-72	C1	F.M.L.S	2.5 Y 6/4	Dense. Stony
		72-120	C2	M.L.S.	2.5 Y 5/4	Dense
		Standing Water (In): None				
		Weeping (In): None				
		Estimated High Water (In): 84				
STW 8-3	9/24/2020	0-5	A	S.L.	10 YR 3/2	Friable
		5-24	Bw	S.L.	2.5 Y 6/6	Friable
		24-84	C1	F.M.L.S	2.5 Y 6/4	Dense. Stones & Boulders
		84-120+	C2	M.L.S.	2.5 Y 5/4	Dense
		Standing Water (In): None				
		Weeping (In): None				
		Estimated High Water (In): 84				
STW 9-1	9/23/2020	0-6	A	S.L.	10 YR 3/2	Friable
		6-36	B	S.L.	2.5 Y 6/6	Friable
		36-84	C1	S.L.-L.S.	2.5 Y 6/4	Dense
		84-132	C2	S.L.-L.S.	2.5 Y 5/4	Dense
		Standing Water: None				
		Weeping: None				
		Estimated High Water (In): 84				
STW 9-2	9/23/2020	0-4	A	S.L.	10 YR 2/1	Friable
		4-18	B	L.S.	2.5 Y 6/6	Friable-Loose
		18-60	C1	F.M.S.	2.5 Y 6/4	Loose
		60-132	C2	L.S.-S.L.	2.5 Y 5/4	Dense
		Standing Water: None				
		Weeping: None				
		Estimated High Water (In): 72				
STW 9-3	9/23/2020	0-10	A	S.L.	10 YR 2/1	Friable
		10-24	B	M.L.S.	2.5 Y 6/6	Friable
		24-84	C1	F.M.S.	2.5 Y 6/4	Loose. Mottles @ 4' 10 YR 6/8, 2.5 Y 7/2
		84-120	C2	F.S.	2.5 Y 5/4	Loose
		120-132	C3	F.Sil. S.	2.5 Y 5/4	Blocky
		Standing Water: None				
		Weeping: None				
		Estimated High Water (In): 48				
STW 9-4 & STW 9-4 (A)	9/23/2020	0-8	A	S.L.	10 YR 2/1	Friable
		8-24	B	L.S.	10 YR 6/6	Friable-Loose
		24-48	C1	F.M.S.	2.5 Y 6/4	Loose. Mottles @ 36'' 10 YR 6/8. 2.5 Y 2/2
		48-120	C2	F. Sil. S.	2.5 Y 5/4	Chunky
		120-126	C3	Sil C.S.L.	2.5 Y 5/4	Blocky
		Standing Water (In): 126				
		Weeping (In): 120				
		Estimated High Water (In): 36				

STW 9-5	9/24/2020	0-6	A	S.L.	10 YR 3/2	Friable
		6-30	Bw	S.L.	2.5 Y 6/6	Friable. Large Boulder
		30-108	C	S.L.-L.S.	2.5 Y 6/4	Dense
		Standing Water (In): None				
		Weeping (In): None				
		Estimated High Water (In): 84				
STW 9-6	9/24/2020	0-6	A	S.L.	10 YR 3/2	Friable
		6-30	B	S.L.	2.5 Y 6/6	Friable
		30-84	C1	F.M.L.S	2.5 Y 6/4	Dense
		84-120	C2	M.L.S.	2.5 Y 5/4	Dense
		Standing Water (In): None				
		Weeping (In): None				
		Estimated High Water (In): 84				
STW 9-7	9/24/2020	0-4	A	S.L.	10 YR 3/2	Friable
		4-24	B	S.L.	2.5 Y 6/6	Friable
		24-96	C1	F.M.L.S	2.5 Y 6/4	Dense. Stony
		96-132	C2	M.L.S.	2.5 Y 5/4	Dense
		Standing Water (In): None				
		Weeping (In): None				
		Estimated High Water (In): 96				
STW 9-8	9/24/2020	0-10	A	S.L.	10 YR 3/2	Friable
		10-24	B	S.L.	2.5 Y 6/6	Friable
		24-96	C	S.L.-L.S.	2.5 Y 5/6	Dense
		96+	Cr	-	-	Refusal or Large Boulder
		Standing Water (In): None				
		Weeping (In): None				
		Estimated High Water (In): 84				

Notes:

1. NDHT 2-1 new deep hole testpit for septic; 1- lot number; 2-test pit number.
2. STW 9-5: test pit for stormwater locations; 9-lot, 5-test pit number.
3. Title 5 soil evaluation are performed by Desheng Wang, certified soil evaluator SE2445 and witnessed by Robert Landry of Sudbury Board of Health.

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EFFECTIVE, AFFORDABLE, AND SUSTAINABLE SOLUTIONS FOR LAND & WATER ENVIRONMENT

Summary of soil evaluation
74 & 80 Maynard Road, Sudbury, MA

Test Pit	**Date**	**Test Type**	**Soil texture**	**Estimated HGW, in**	**Percolation**		**Note**
					Depth, in	**Perc. Rate, MPI**	
DHT 1-1	4/30/2019	Perc.	S.L.	149	54	48	
DHT 1-2	4/30/2019	Perc.	S.L.	168	54	17	
DHT 1-3	4/30/2019	Deep	S.L.	144	-	-	
DHT 2-1	4/30/2019	Deep	S.L.	120	-	-	
DHT 2-2	4/30/2019	Perc.	S.L.	120	60	14	Perched water @ 60''
DHT 2-3	4/30/2019	Perc.	S.L.	156	60	44	
DHT 3-1	5/1/2019	Deep	F.M.S	36	-	-	
DHT 3-2	5/1/2019 - Perc on 8/14/19	Perc.	F.M.S	42	36	<2	
DHT 3-3	5/1/2019 - Perc on 8/14/19	Perc.	F.M.S.	45	36	<2	
DHT 4-1	8/14/2019	Perc.	M.S.	60	36	<2	
DHT 4-2	8/14/2019	Deep	M.L.S.	44	-	-	
DHT 4-3	8/14/2019	Perc.	F.M.S	43	36	<2	
DHT 5-1	8/14/2019	Perc.	M.L.S-M.S	42	36	2	
DHT 5-2	8/14/2019	Deep	L.S.	60	-	-	
DHT 5-3	8/14/2019	Perc.	M.L.S.	48	36	5	
DHT 6-1	5/2/2019	Perc.	Co.M.S.L.	84	42	10	
DHT 6-2	5/1/2019	Perc.	L.S.	84	42	5	
DHT 6-3	5/2/2019	Deep	S.L.-L.S.	96	-	-	
DHT 7-1	8/15/2019	Deep	F.M.S.	30	-	-	
DHT 7-2	8/15/2019	Perc.	F.M.S.	30	42	33	
DHT 7-3	8/15/2019	Perc.	M.L.S.	48	42	9	
DHT 8-1	8/15/2019	Perc.	L.S.	46	42	3	
DHT 8-2	8/15/2019	Perc.	M.L.S.	60	42	7	
DHT 8-3	8/15/2019	Deep	F.M.S.	36	-	-	
DHT 9-1	5/2/2019	Perc.	S.L.-L.S.	108	46	4	
DHT 9-2	5/2/2019	Perc.	S.L.-L.S.	84	42	7	
DHT 9-3	5/2/2019	Deep	L.S.	60	-	-	
DHT 10-1	5/1/2019	Deep	S.L.	156	-	-	
DHT 10-2	5/1/2019	Perc.	S.L.	132	54	17	
DHT 10-3	5/1/2019	Perc.	F.M.S.	72	42	10	
TP-RD 1 (0+90)	4/29/2019	Deep	S.L.	168	-	-	
TP-RD 2 (2+00)	4/29/2019	Deep	S.L.	168	-	-	
TP-RD 3 (5+00)	4/29/2019	Deep	M.S.	24	-	-	

TP-RD 4 (9+50)	4/29/2019	Deep	S.L.	24	-	-	
TP-RD 5(11+00)	8/15/2019	Deep	L.S.	36	-	-	
NDHT 1-1	9/22/2020	Perc.	S.L.-L.S.	60	45	13	
NDHT 1-2	9/22/2020	Deep	2.5 Y 6/4	60	-	-	
NDHT 1-3	9/22/2020	Perc.	S.L.-L.S.	60	45	3	
NDHT 2-1	9/21/2020	Perc.	M.S.	72	45	<2	
NDHT 2-2	9/21/2020	Perc.	F.M.S.	84	45	<2	
NDHT 7-1	9/21/2020	Deep	S.L.-L.S.	84	-	-	
NDHT 7-2	9/21/2020	Perc.	S.L.-L.S.	84	43	4	
NDHT 7-3	9/21/2020	Perc.	S.L.-L.S.	84	45	6	
STW E-1	9/22/2020	Deep	S.L.-L.S.	60	-	-	Large boulder or Refusal at 66''
STW E-2	9/22/2020	Perm.	S.L.-L.S.	84	-	-	
STW 1-1	9/22/2020	Perm.	S.L.	84	-	-	
STW 2-1	9/23/2020	Perm.	L.S.	120	-	-	
STW 3-1	9/22/2020	Perm.	F.M.S	60	-	-	
STW 3-2	9/23/2020	Perm.	S.L.-L.S.	72	-	-	
STW 4-1	9/24/2020	Perm.	L.S.	60	-	-	
STW 4-2	9/24/2020	Perm.	M.F.M.S.	72	-	-	
STW 6-1	9/23/2020	Perm.	M.L.S.	84	-	-	
STW 7-1	9/23/2020	Perm.	M.L.S	96	-	-	
STW 8-1	9/24/2020	Perm.	F.M.S.L-L.S	72	-	-	
STW 8-2	9/24/2020	Perm.	F.M.L.S.	84	-	-	
STW 8-3	9/24/2020	Perm.	F.M.L.S.	84	-	-	
STW 9-1	9/23/2020	Perm.	S.L.-L.S.	84	-	-	
STW 9-2	9/23/2020	Perm.	F.M.S.	72	-	-	
STW 9-3	9/23/2020	Perm.	F.M.S.	48	-	-	
STW 9-4	9/23/2020	Perm.	F.M.S.	36	-	-	lower layer
STW 9-4 (A)	9/23/2020	Perm.	M.S.	36	-	-	upper layer
STW 9-5	9/24/2020	Perm.	S.L.-L.S.	84	-	-	
STW 9-6	9/24/2020	Perm.	F.M.L.S.	84	-	-	
STW 9-7	9/24/2020	Perm.	F.M.L.S.	96	-	-	
STW 9-8	9/24/2020	Perm.	S.L.-L.S	84	-	-	

Notes:

1. DHT-1-1 First SAS deep hole test pits with old layout.
2. NDHT 1-1 new SAS deep hole test pits for the new layout.
3. STW 9-1 stormwater soil test pits

If you have any questions, please feel free to contact us.

Sincrerely,
Creative Land & Water Engineering, LLC.
by

COMMONWEALTH OF MASSACHUSETTS
DESHENG WANG
CIVIL
NO.39511
REGISTERED
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Desheng Wang

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Certified Soil Evaluator

United States
Department of
Agriculture

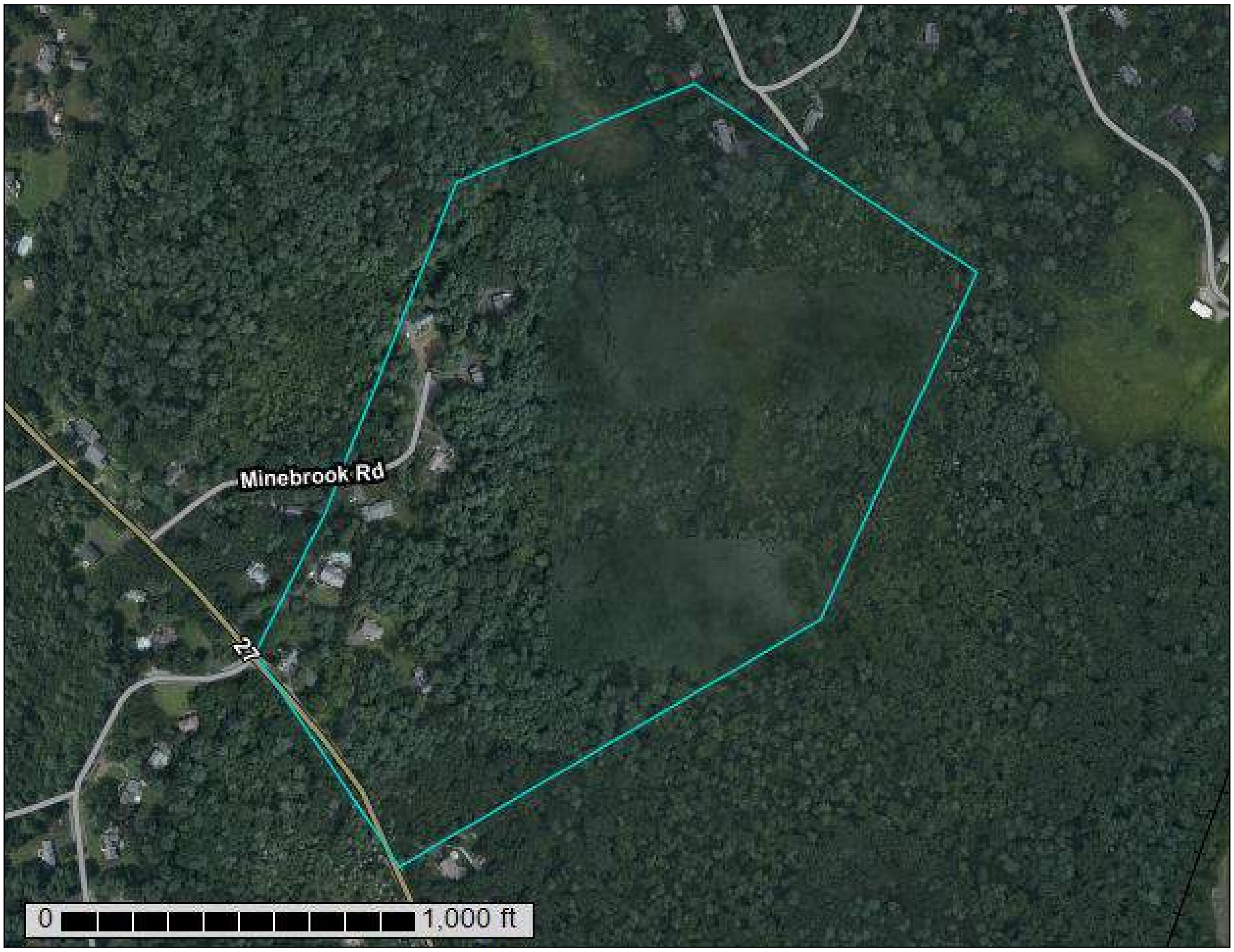
Natural
Resources
Conservation
Service

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

Middlesex County, Massachusetts

Bonnie Brook Estates



March 8, 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.

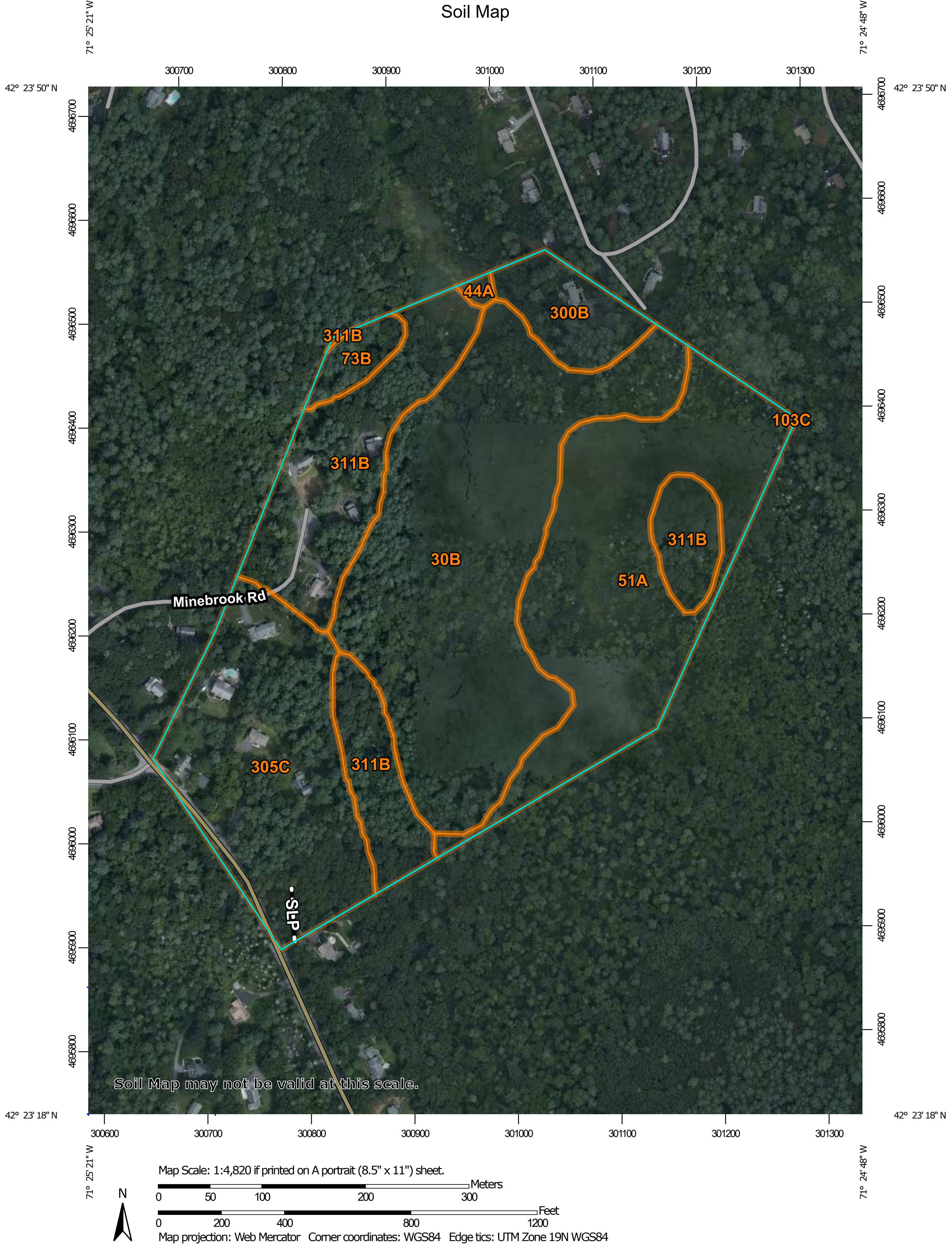
The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

Contents

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.

Soil Map



Map Scale: 1:4,820 if printed on A portrait (8.5" x 11") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N 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: Middlesex County, Massachusetts
Survey Area Data: Version 20, Jun 9, 2020

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

Date(s) aerial images were photographed: Jul 28, 2019—Aug 15, 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
30B	Raynham silt loam, 0 to 5 percent slopes	19.8	33.2%
44A	Birdsall mucky silt loam, 0 to 1 percent slopes	0.2	0.3%
51A	Swansea muck, 0 to 1 percent slopes	13.7	23.0%
73B	Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony	1.0	1.7%
103C	Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes	0.0	0.0%
300B	Montauk fine sandy loam, 3 to 8 percent slopes	2.5	4.2%
305C	Paxton fine sandy loam, 8 to 15 percent slopes	11.1	18.6%
311B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	11.3	18.9%
Totals for Area of Interest		**59.6**	**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.

Middlesex County, Massachusetts

30B—Raynham silt loam, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 991x
Elevation: 50 to 1,000 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Raynham and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Raynham

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loamy glaciolacustrine deposits and/or silty glaciolacustrine deposits

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 33 inches: silt loam
H3 - 33 to 65 inches: silt

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water capacity: High (about 11.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C/D
Ecological site: F144AY019NH - Wet Lake Plain
Hydric soil rating: Yes

Minor Components

Birdsall

Percent of map unit: 10 percent

Landform: Depressions, flats
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

Wareham

Percent of map unit: 5 percent
Landform: Terraces, depressions, deltas
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Raypol

Percent of map unit: 5 percent
Landform: Depressions, terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

44A—Birdsall mucky silt loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: vzt4
Elevation: 0 to 2,100 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Birdsall and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Birdsall

Setting

Landform: Depressions, flats
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Silty eolian deposits and/or loamy eolian deposits over glaciofluvial deposits and/or ablation till

Typical profile

H1 - 0 to 15 inches: mucky silt loam
H2 - 15 to 30 inches: silt loam
H3 - 30 to 65 inches: silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water capacity: Very high (about 13.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Ecological site: F144AY031MA - Very Wet Outwash
Hydric soil rating: Yes

Minor Components

Wareham

Percent of map unit: 4 percent
Landform: Terraces, depressions, deltas
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 2 percent
Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Raypol

Percent of map unit: 2 percent
Landform: Depressions, terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Swansea

Percent of map unit: 2 percent
Landform: Bogs, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip

Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

51A—Swansea muck, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2trl2
Elevation: 0 to 1,140 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Swansea and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Swansea

Setting

Landform: Swamps, bogs
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Highly decomposed organic material over loose sandy and gravelly glaciofluvial deposits

Typical profile

Oa1 - 0 to 24 inches: muck
Oa2 - 24 to 34 inches: muck
Cg - 34 to 79 inches: coarse sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Available water capacity: Very high (about 16.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: B/D
Ecological site: F144AY043MA - Acidic Organic Wetlands

Hydric soil rating: Yes

Minor Components

Freetown

Percent of map unit: 10 percent
Landform: Bogs, swamps
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Whitman

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread, dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

73B—Whitman fine sandy loam, 0 to 3 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2w695
Elevation: 0 to 1,580 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Whitman, extremely stony, and similar soils: 81 percent
Minor components: 19 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Whitman, Extremely Stony

Setting

Landform: Depressions, drainageways, hills, ground moraines, drumlins
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope

Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 1 inches: peat
A - 1 to 10 inches: fine sandy loam
Bg - 10 to 17 inches: gravelly fine sandy loam
Cdg - 17 to 61 inches: fine sandy loam

Properties and qualities

Slope: 0 to 3 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 7 to 38 inches to densic material
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY041MA - Very Wet Till Depressions
Hydric soil rating: Yes

Minor Components

Ridgebury, extremely stony

Percent of map unit: 10 percent
Landform: Depressions, drumlins, drainageways, hills, ground moraines
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 5 percent
Landform: Outwash terraces, depressions, drainageways, outwash deltas
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Swansea

Percent of map unit: 3 percent
Landform: Bogs, marshes, swamps
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Woodbridge, extremely stony

Percent of map unit: 1 percent
Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

103C—Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2wzp1
Elevation: 0 to 1,390 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton, extremely stony, and similar soils: 50 percent
Hollis, extremely stony, and similar soils: 20 percent
Rock outcrop: 10 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton, Extremely Stony

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: fine sandy loam
Bw - 4 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 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: Moderate (about 8.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Hollis, Extremely Stony

Setting

Landform: Hills, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Coarse-loamy melt-out till derived from granite, gneiss, and/or schist

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 7 inches: gravelly fine sandy loam
Bw - 7 to 16 inches: gravelly fine sandy loam
2R - 16 to 26 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 8 to 23 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 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: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hills, ridges

Parent material: Igneous and metamorphic rock

Typical profile

R - 0 to 79 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Available water capacity: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Woodbridge, extremely stony

Percent of map unit: 8 percent
Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

Canton, extremely stony

Percent of map unit: 5 percent
Landform: Moraines, ridges, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Chatfield, extremely stony

Percent of map unit: 5 percent
Landform: Hills, ridges
Landform position (two-dimensional): Summit, backslope, shoulder
Landform position (three-dimensional): Crest, side slope, nose slope
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Ridgebury, extremely stony

Percent of map unit: 2 percent
Landform: Hills, ground moraines, depressions, drumlins, drainageways
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

300B—Montauk fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyrh
Elevation: 0 to 1,030 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Montauk and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Montauk

Setting

Landform: Hills, ground moraines, recessionial moraines, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy over sandy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 4 inches: fine sandy loam
Bw1 - 4 to 26 inches: fine sandy loam
Bw2 - 26 to 34 inches: sandy loam
2Cd - 34 to 72 inches: gravelly loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 1.42 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Scituate

Percent of map unit: 6 percent
Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Hydric soil rating: No

Canton

Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex
Hydric soil rating: No

Ridgebury

Percent of map unit: 4 percent
Landform: Depressions, drainageways, hills, ground moraines
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

305C—Paxton fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2w66y
Elevation: 0 to 1,320 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Paxton and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Paxton

Setting

Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, convex
Across-slope shape: Convex
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 8 inches: fine sandy loam
Bw1 - 8 to 15 inches: fine sandy loam
Bw2 - 15 to 26 inches: fine sandy loam
Cd - 26 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F144AY007CT - Well Drained Dense Till Uplands
Hydric soil rating: No

Minor Components

Charlton

Percent of map unit: 7 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Woodbridge

Percent of map unit: 6 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Ridgebury

Percent of map unit: 2 percent
Landform: Hills, ground moraines, depressions, drainageways, drumlins
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Base slope, head slope
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: Yes

311B—Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2t2qr
Elevation: 0 to 1,440 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Woodbridge, very stony, and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge, Very Stony

Setting

Landform: Drumlins, hills, ground moraines
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 2 inches: moderately decomposed plant material
A - 2 to 9 inches: fine sandy loam
Bw1 - 9 to 20 inches: fine sandy loam
Bw2 - 20 to 32 inches: fine sandy loam
Cd - 32 to 67 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: 20 to 43 inches to densic material
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)

Depth to water table: About 19 to 27 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water capacity: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C/D
Ecological site: F144AY037MA - Moist Dense Till Uplands
Hydric soil rating: No

Minor Components

Paxton, very stony

Percent of map unit: 10 percent
Landform: Ground moraines, drumlins, hills
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Hydric soil rating: No

Ridgebury, very stony

Percent of map unit: 8 percent
Landform: Ground moraines, depressions, drumlins, drainageways, hills
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Head slope, base slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

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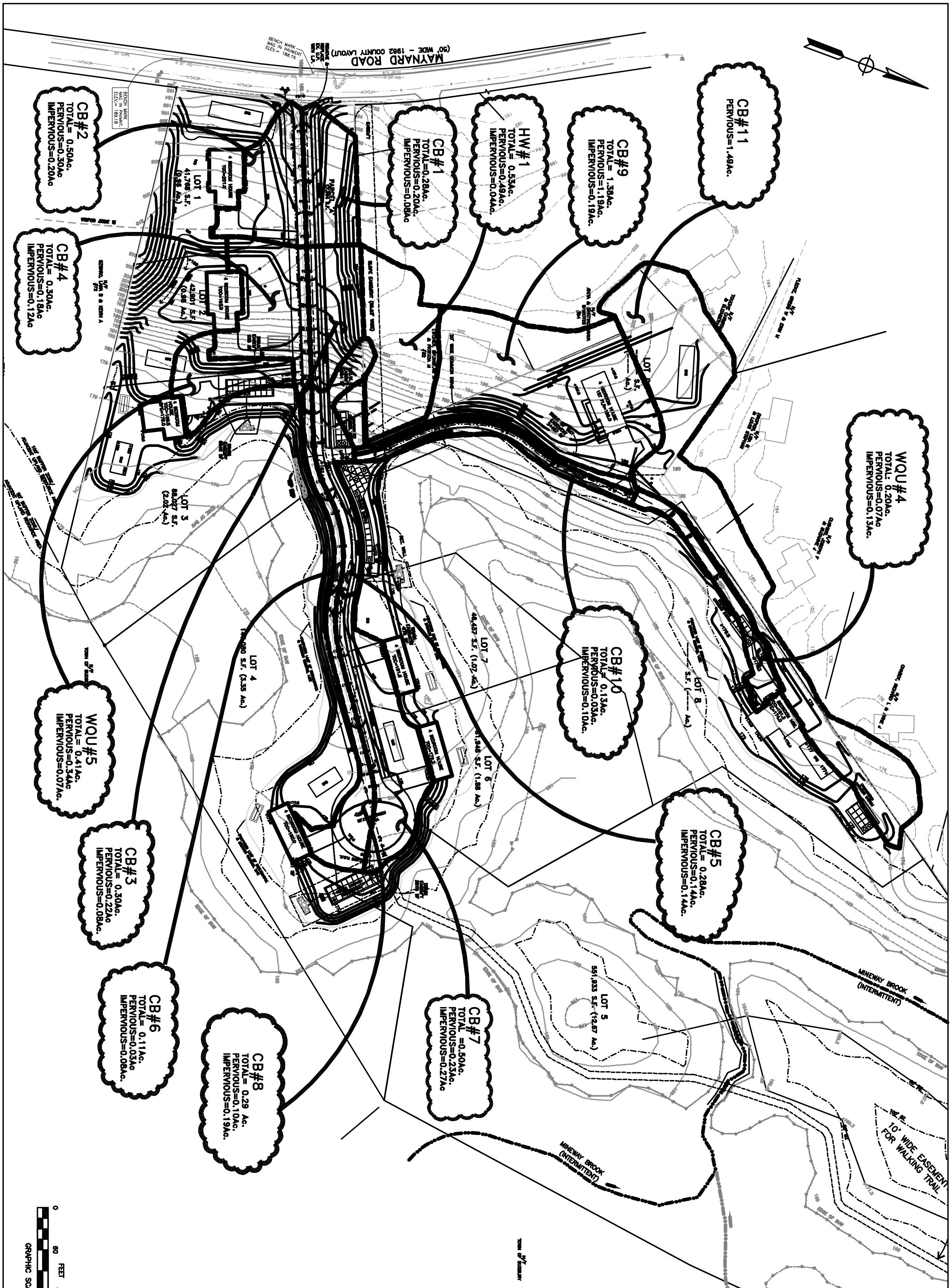
APPENDIX E:
Drainage Collection System Calculations
Plan: DA3-Drainage System Subareas



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DA3

PREPARED FOR:
JOHN DERDERIAN
60 WINDSOR ROAD
WELLESLEY, MA 02481

DATE: MARCH 9, 2021

BRUCE N. SALUK

PROPOSED DRAINAGE SUBCATCHMENT AREAS

MAYNARD ROAD
SUDBURY, MA

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752
TEL: 508-485-1662
FAX: 508-481-9929

NO.	DATE	DESCRIPTION	BY

Bruce Saluk & Associates, Inc.
Civil Engineering and Land Surveying
576 Boston Post Road East
Marlborough, MA 01752
(508) 485-1662
fax (508) 481-9929

Subject: BONNIE BROOK ESTATES
Job No. 2671
Computed By: AD
Checked By: BMS
Date: 3/9/2021

Table #1

Drainage Subareas & Runoff Coefficients

SUBAREA (system component)	Pervious Area, As (C=0.20)	Impervious Area, Ap (C=0.90)	(Asx0.20)+ (Apx0.90)	Total Tributary Area (acres)	WEIGHTED "C"
CB#1	0.20	0.080	0.112	0.280	0.40
CB#2	0.30	0.200	0.240	0.500	0.48
CB#3	0.22	0.080	0.116	0.300	0.39
CB#4	0.18	0.120	0.144	0.300	0.48
CB#5	0.14	0.140	0.154	0.280	0.55
CB#6	0.03	0.080	0.078	0.110	0.71
CB #7	0.23	0.270	0.289	0.500	0.58
CB #8	0.10	0.190	0.191	0.290	0.66
CB #9	1.19	0.190	0.409	1.380	0.30
CB #10	0.03	0.100	0.096	0.130	0.74
WQI #4	0.07	0.130	0.131	0.200	0.66
WQI #5	0.34	0.070	0.131	0.410	0.32
HW #1	0.49	0.040	0.134	0.530	0.25
CB #11	1.49	0.000	0.298	1.490	0.20

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Storm Drainage Computations

Name: Bonnie Brook Estates
Location: Maynard RD

Proj. No.: 2671
Date: 3/9/2021
Computed by: AD
Checked by: BMS

Design Parameters:
25 Year Storm*

RUNOFF										DESIGN									
LOCATION		AREA	C	C x A	SUM	FLOW TIME (MIN)		i		PIPE ASBUILT			CAPACITY		PROFILE				
FROM	TO	(AC.)			or C x A	PIPE	CONC TIME		Q cfs	PIPE TYPE	PIPE SIZE	SLOPE (ft/ft)	Q full cfs	V full ft/s	LENGTH	FALL	RIM UPPER	INV UPPER	INV LOWER
CB #1	DMH #1	0.28	0.40	0.11	0.11	0.03	5.00	6	0.7	RCP	12	0.0300	6.2	7.9	16	0.48	189.30	185.06	184.58
CB #2	DMH #1	0.50	0.48	0.24	0.24	0.06	5.00	6	1.5	RCP	12	0.0200	5.0	6.4	24	0.48	189.30	185.06	184.58
DMH #1	WQU #1	0.78	NA	NA	0.35	1.26	5.00	6	2.1	RCP	12	0.0120	3.9	5.0	375	4.50	189.47	184.48	179.98
CB #3	WQU #1	0.30	0.39	0.12	0.12	0.03	5.00	6	0.7	RCP	12	0.0292	6.1	7.8	13	0.38	184.91	181.41	181.03
CB #4	WQU #1	0.30	0.48	0.14	0.14	0.05	5.00	6	0.9	RCP	12	0.0200	5.0	6.4	19	0.38	184.91	181.41	181.03
WQU #1	CS #5	1.38	NA	NA	0.61	0.18	5.00	6	3.7	RCP	15	0.0120	7.1	5.8	61	0.73	185.75	179.73	179.00
WQU #5	CS #5	0.41	0.32	0.13	0.13	0.04	5.00	6	0.8	HDPE	8	0.0708	3.8	10.9	24	1.70	184.70	180.70	179.00
CB #5	DMH #3	0.28	0.55	0.15	0.15	0.01	5.00	6	0.9	RCP	12	0.0457	7.6	9.7	7	0.32	180.00	176.00	175.68
CB #6	DMH #3	0.11	0.71	0.08	0.08	0.04	5.00	6	0.5	RCP	12	0.0200	5.0	6.4	16	0.32	180.00	176.00	175.68
DMH #3	DMH #4	0.39	NA	NA	0.23	0.15	5.00	6	1.4	RCP	12	0.0116	3.8	4.9	45	0.52	179.98	175.68	175.16
DMH #4	WQU #2	0.39	NA	NA	0.23	0.63	5.00	6	1.4	RCP	12	0.0115	3.8	4.9	185	2.13	179.37	175.11	172.98
CB #7	WQU #2	0.50	0.58	0.29	0.29	0.00	5.00	6	1.7	RCP	12	0.0933	10.9	13.9	3	0.28	177.26	173.26	172.98
CB #8	WQU #2	0.29	0.66	0.19	0.19	0.04	5.00	6	1.2	RCP	12	0.0200	5.0	6.4	14	0.28	177.26	173.26	172.98

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Storm Drainage Computations

Name: Bonnie Brook Estates

Location: Maynard RD

Proj. No.: 2671
Date: 3/9/2021
Computed by: AD
Checked by: BMS

Design Parameters:
25 Year Storm*

RUNOFF										DESIGN									
LOCATION		AREA	C	C x A	SUM	FLOW TIME (MIN)		i		PIPE ASBUILT			CAPACITY		PROFILE				
FROM	TO	(AC.)			or C x A	PIPE	CONC TIME		Q cfs	PIPE TYPE	PIPE SIZE	SLOPE (ft/ft)	Q full cfs	V full ft/s	LENGTH	FALL	RIM UPPER	INV UPPER	INV LOWER
WQU #2	CS #3	1.18	NA	NA	0.71	0.64	5.00	6	4.3	RCP	15	0.0050	4.6	3.7	144	0.72	177.39	172.72	172.00
CB #9	WQU #3	1.38	0.30	0.41	0.41	0.02	5.00	6	2.5	RCP	12	0.0715	9.5	12.1	13	0.93	183.54	179.00	178.07
CB #10	WQU #3	0.13	0.74	0.10	0.10	0.01	5.00	6	0.6	RCP	12	0.1033	11.5	14.6	9	0.93	183.54	179.00	178.07
WQU #3	CS #2	1.51	NA	NA	0.51	0.03	5.00	6	3.1	RCP	12	0.0229	5.4	6.9	14	0.32	183.47	177.82	177.50
HW #1	DMH #5	0.53	0.25	0.13	0.13	0.06	5.00	6	0.8	RCP	12	0.0320	6.4	8.1	30	0.96	NA	178.00	177.04
DMH #5	CS #1	0.53	NA	NA	0.13	0.03	5.00	6	0.8	RCP	12	0.0243	5.6	7.1	14	0.34	182.30	177.04	176.70
WQU#4	CS#4	0.20	0.66	0.13	0.13	0.05	5.00	6	0.8	HDPE	8	0.0189	2.0	5.6	18	0.34	179.30	175.80	175.46
CB#11	CS#6	1.49	0.20	0.30	0.30	0.05	5.00	6	1.8	RCP	12	0.0200	5.0	6.4	20	0.40	171.20	168.50	168.10
* Intensity (i) - Duration - Frequency Curve for Boston, MA																			

APPENDIX F:
DEP Stormwater Report Certification & Checklist

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

BRUCE M.
SALUK
CIVIL
No. 32375

3-18-21

Signature and Date

Checklist

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

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist (continued)

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

☒ No disturbance to any Wetland Resource Areas

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

☐ Reduced Impervious Area (Redevelopment Only)

☒ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

  ☐ Credit 1

  ☐ Credit 2

  ☐ Credit 3

☐ Use of “country drainage” versus curb and gutter conveyance and pipe

☐ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☐ Other (describe): ____________________

Standard 1: No New Untreated Discharges

☒ No new untreated discharges

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

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

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
☒ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

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

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

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

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

☐ Static ☒ Simple Dynamic ☐ Dynamic Field[1]

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

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

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

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

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

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

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

---

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

Checklist 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 (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 (continued)

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

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

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

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

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

Standard 9: Operation and Maintenance Plan

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

  ☒ Name of the stormwater management system owners;

  ☒ Party responsible for operation and maintenance;

  ☒ Schedule for implementation of routine and non-routine maintenance tasks;

  ☒ Plan showing the location of all stormwater BMPs maintenance access areas;

  ☒ Description and delineation of public safety features;

  ☒ Estimated operation and maintenance budget; and

  ☒ Operation and Maintenance Log Form.

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

  ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;

  ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

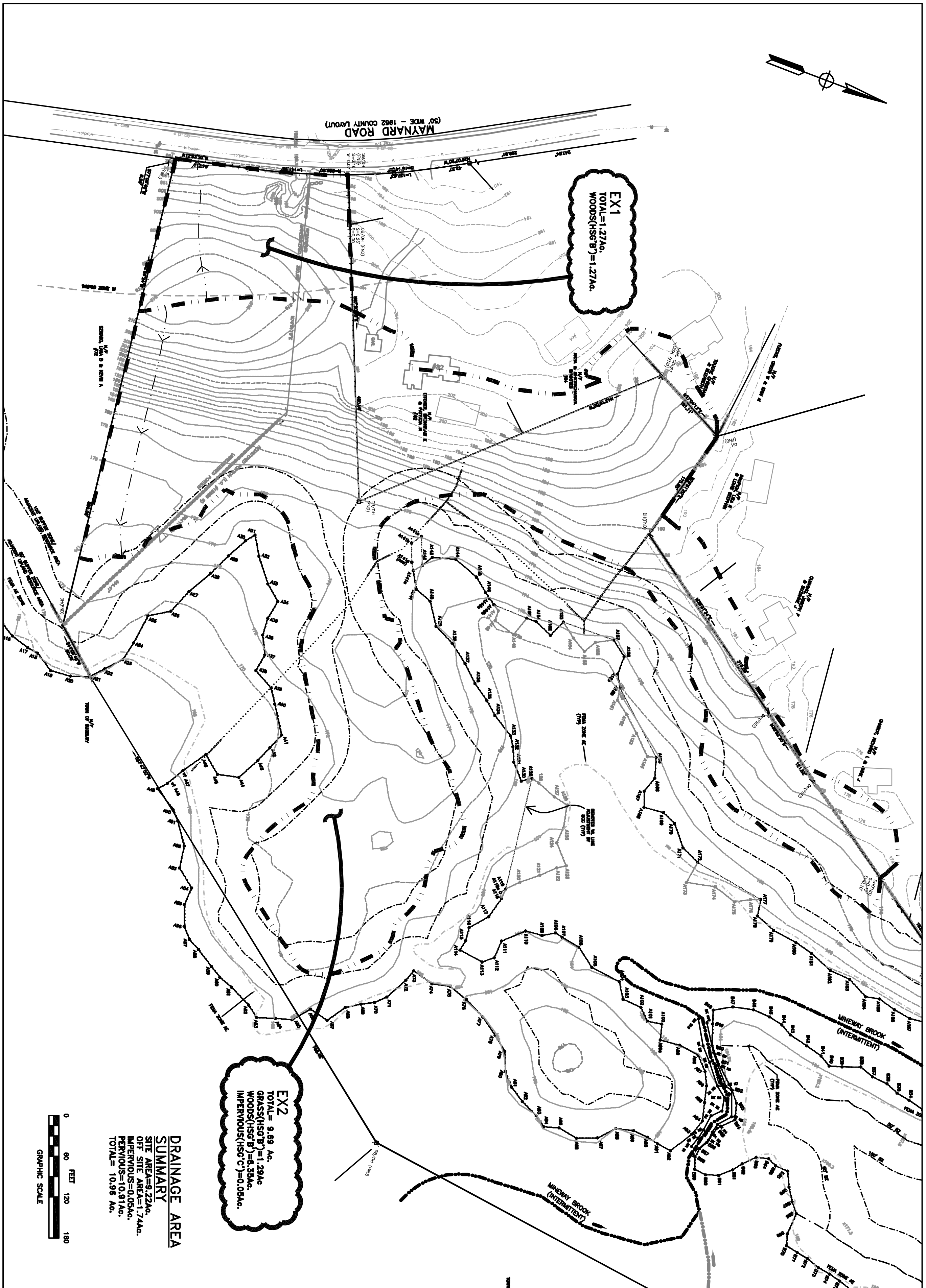
Standard 10: Prohibition of Illicit Discharges

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

☐ An Illicit Discharge Compliance Statement is attached;

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

APPENDIX G:
Hydrologic Calculations for Peak Runoff Rates
-Existing & Proposed Conditions-
PLANS: DA1-Existing Conditions Drainage Areas
DA2-Proposed Conditions Drainage Areas



EX1
TOTAL=1.27Ac.
WOODS(HSG'B')=1.27Ac.

EX2
TOTAL= 9.69 Ac.
GRASS(HSG'B')=1.29Ac
WOODS(HSG'B')=8.35Ac.
IMPERVIOUS(HSG'C')=0.05Ac.

DRAINAGE AREA SUMMARY

SITE AREA=9.22Ac.
OFF SITE AREA=1.74Ac.
IMPERVIOUS=0.05Ac.
PERVIOUS=10.91Ac.
TOTAL= 10.96 Ac.

DA1

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PREPARED FOR:
JOHN DERDERIAN
60 WINDSOR ROAD
WELLESLEY, MA 02481

DATE: MARCH 9, 2021

BRUCE M. SALUK

EXISTING CONDITIONS
DRAINAGE AREAS
MAYNARD ROAD
SUDBURY, MA

PREPARED BY:
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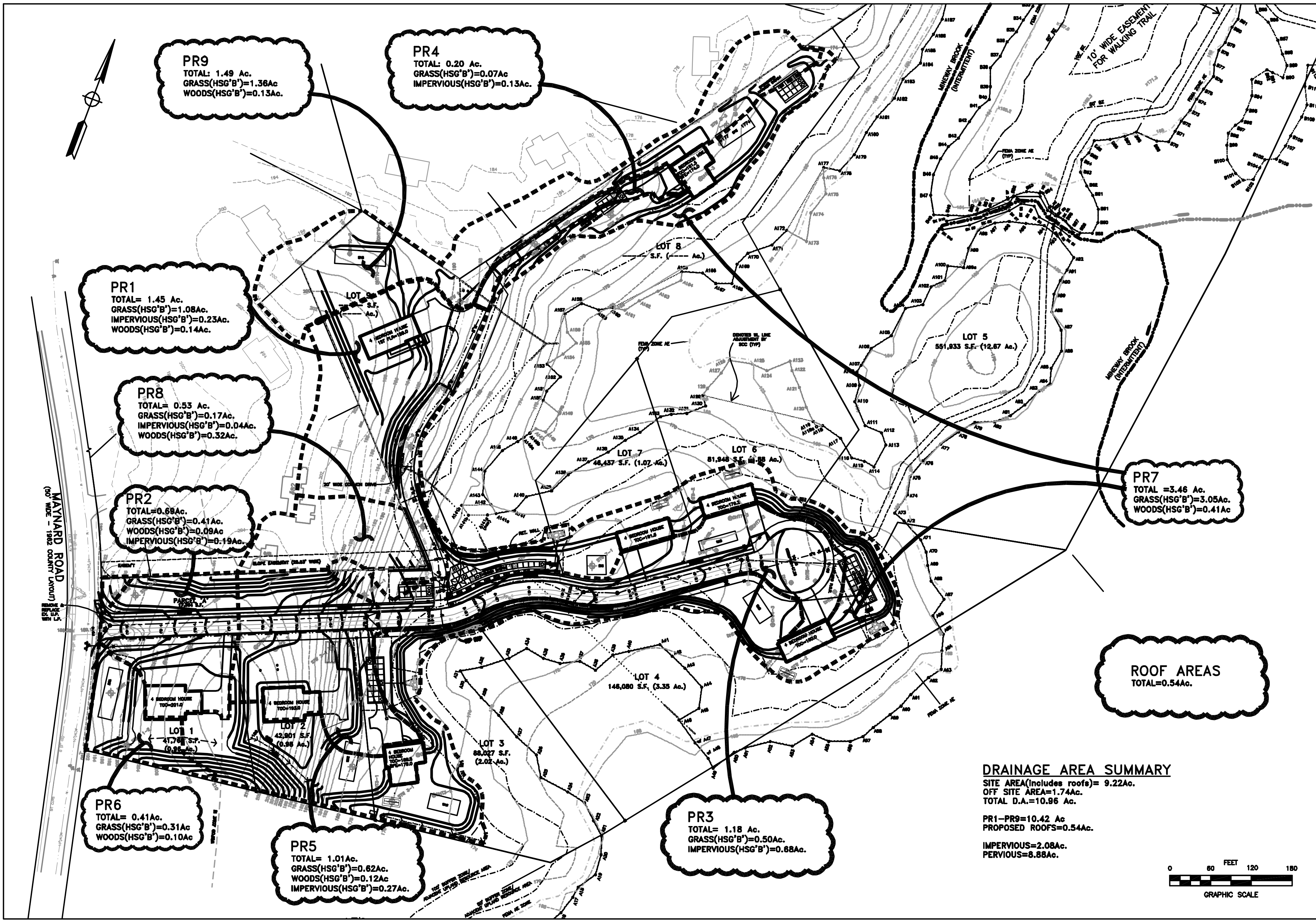
			BY



DRAINAGE AREA SUMMARY

SITE AREA(Includes roofs)= 9.22Ac.
OFF SITE AREA=1.74Ac.
TOTAL D.A.=10.96 Ac.

PR1-PR9=10.42 Ac
PROPOSED ROOFS=0.54Ac.

IMPERVIOUS=2.08Ac.
PERVIOUS=8.88Ac.

PREPARED FOR:
JOHN DERDERIAN
60 WINDSOR ROAD
WELLESLEY, MA 02481

DATE: MARCH 9, 2021

BRUCE L. SALUK
CIVIL
No. 32375

PROPOSED CONDITIONS
DRAINAGE AREAS

MAYNARD ROAD
SUDBURY, MA

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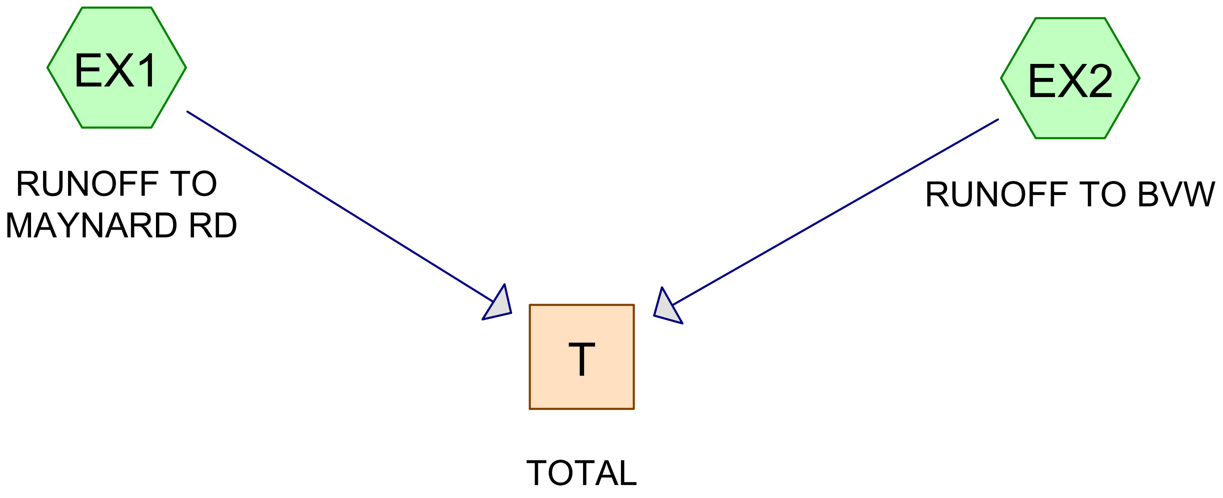
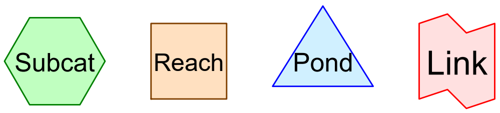
NO.	DATE	DESCRIPTION	BY

DA2

FILE #2671C1.dwg





Routing Diagram for Pre Development Conditions
Prepared by Bruce Saluk & Associates, Inc, Printed 3/18/2021
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Summary for Subcatchment EX1: RUNOFF TO MAYNARD RD

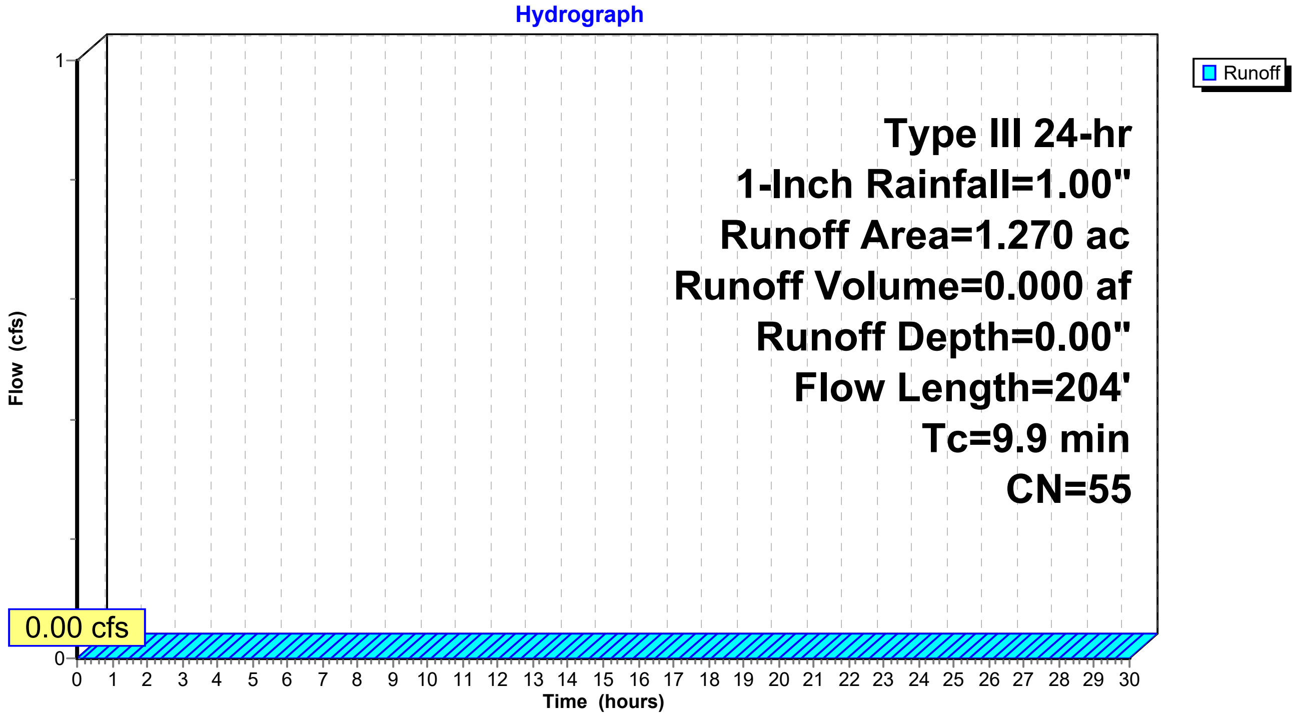
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

Area (ac)	CN	Description
1.270	55	Woods, Good, HSG B
1.270		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0520	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.5	154	0.1250	1.77		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.9	204	Total			

Subcatchment EX1: RUNOFF TO MAYNARD RD



Summary for Subcatchment EX2: RUNOFF TO BVW

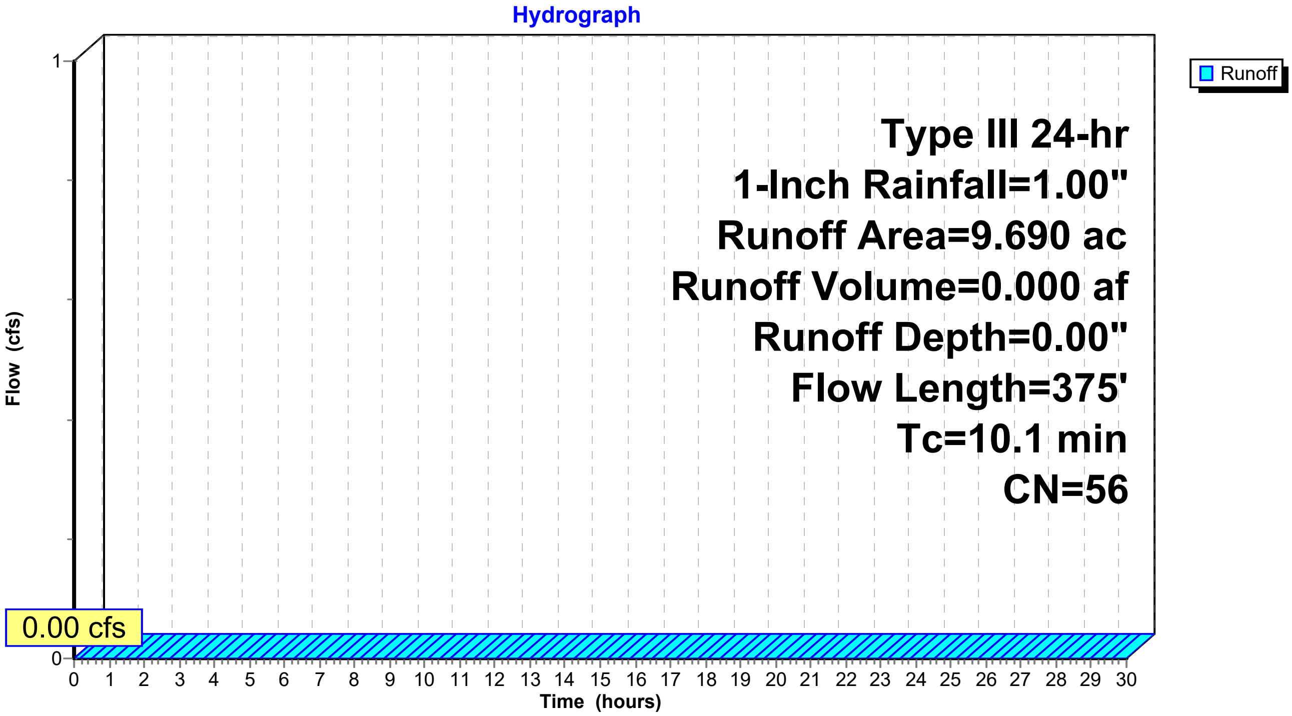
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (ac)	CN	Description
*	0.050	98	Abutter HSG B
	1.290	61	>75% Grass cover, Good, HSG B
	8.350	55	Woods, Good, HSG B
	9.690	56	Weighted Average
	9.640		99.48% Pervious Area
	0.050		0.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0900	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.3	325	0.1070	1.64		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.1	375	Total			

Subcatchment EX2: RUNOFF TO BVW

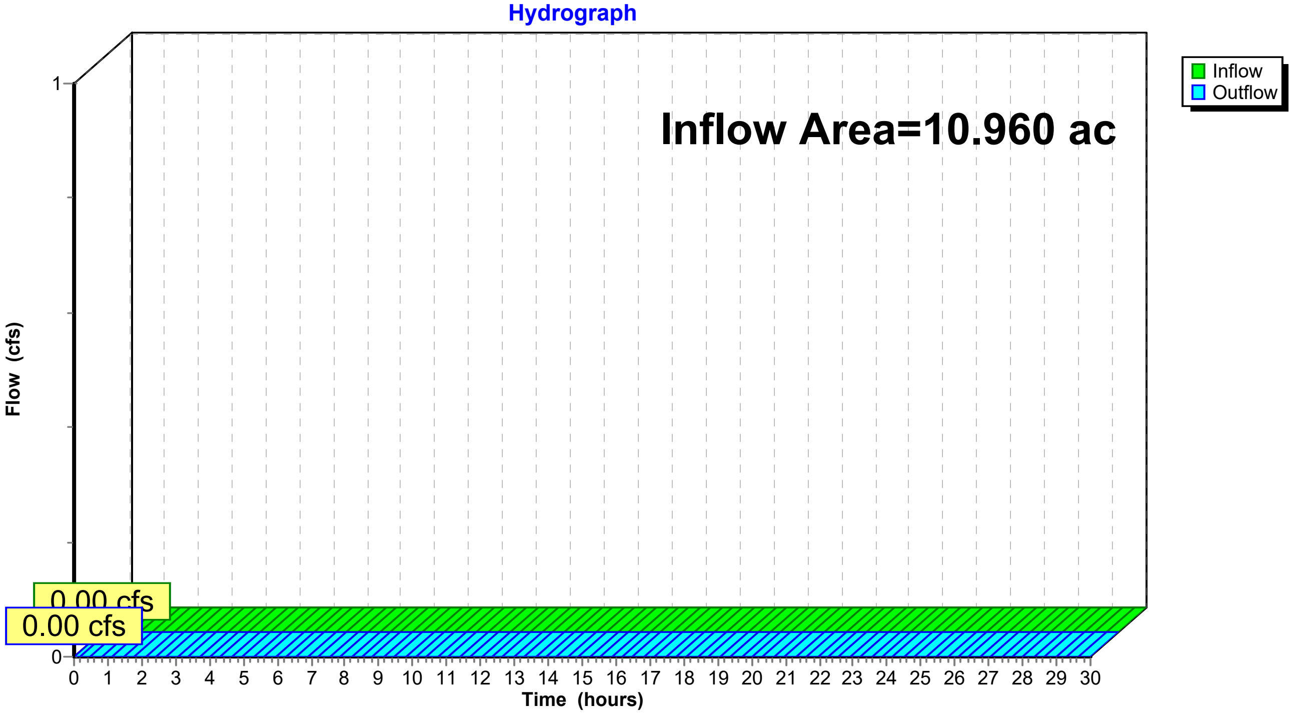


Summary for Reach T: TOTAL

Inflow Area = 10.960 ac, 0.46% Impervious, Inflow Depth = 0.00" for 1-Inch event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs

Reach T: TOTAL



Summary for Subcatchment EX1: RUNOFF TO MAYNARD RD

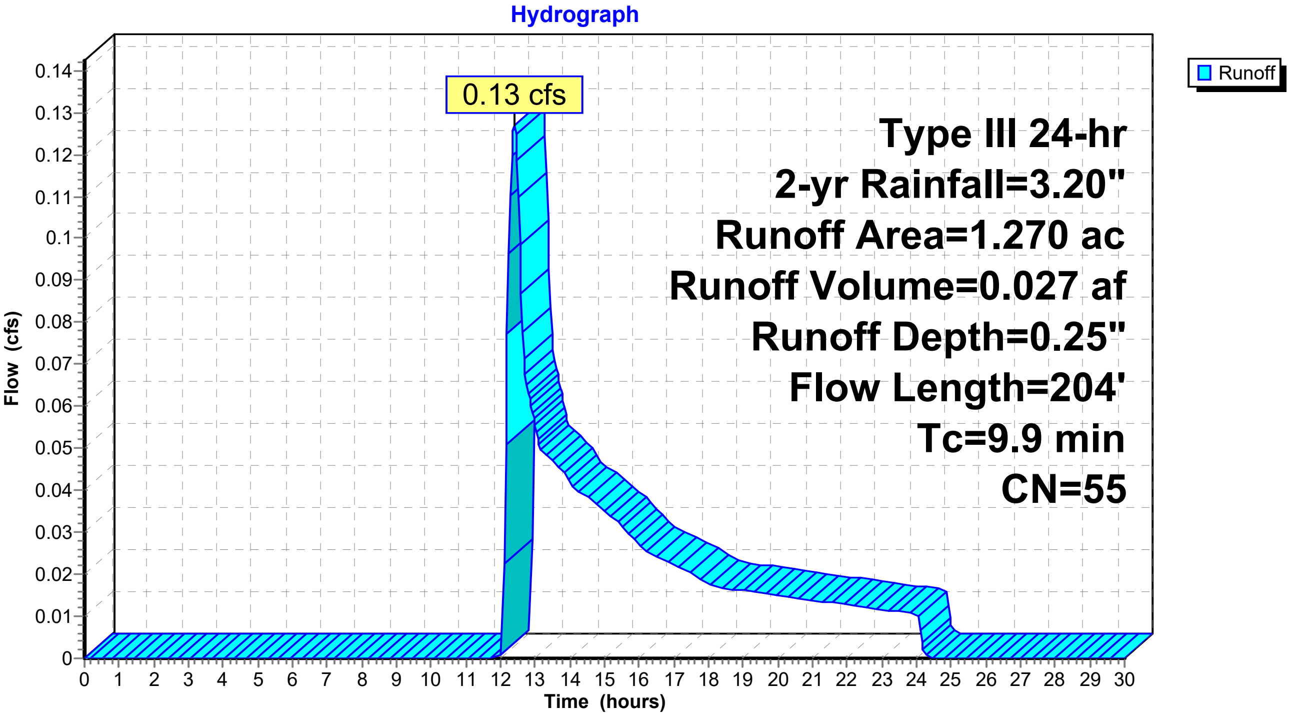
Runoff = 0.13 cfs @ 12.40 hrs, Volume= 0.027 af, Depth= 0.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-yr Rainfall=3.20"

Area (ac)	CN	Description
1.270	55	Woods, Good, HSG B
1.270		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0520	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.5	154	0.1250	1.77		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.9	204	Total			

Subcatchment EX1: RUNOFF TO MAYNARD RD



Summary for Subcatchment EX2: RUNOFF TO BVW

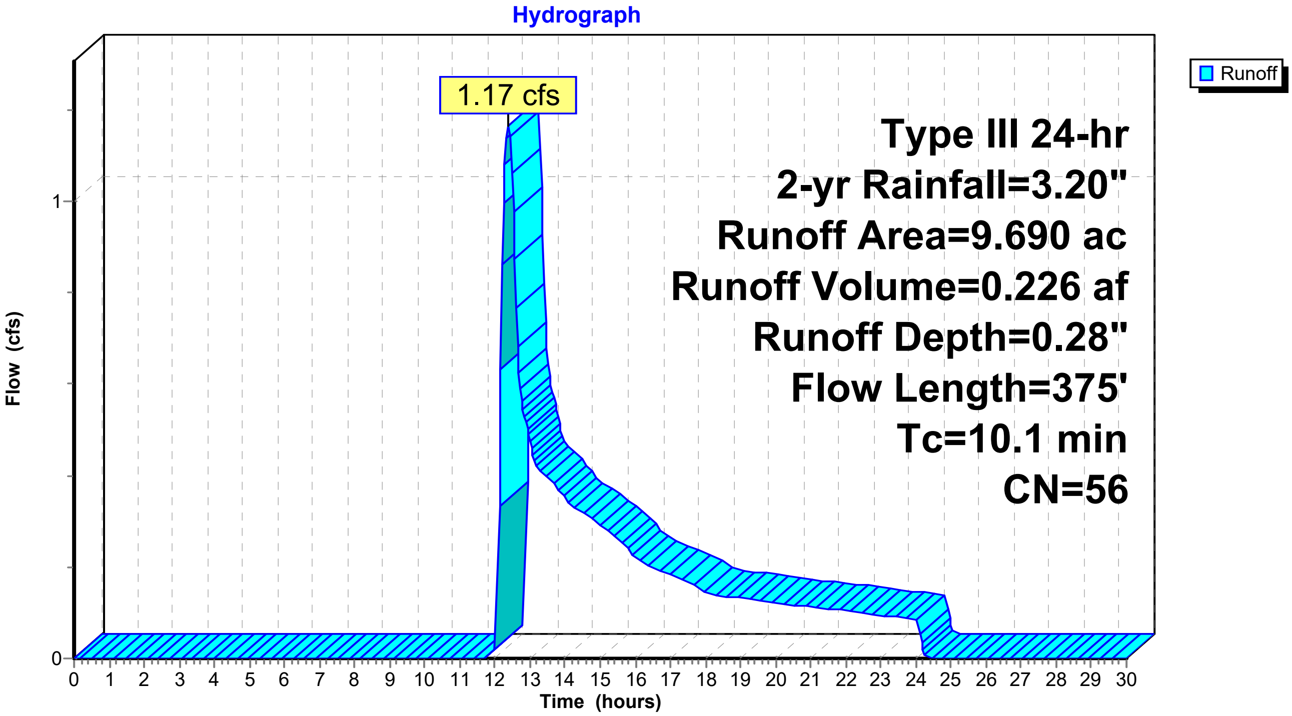
Runoff = 1.17 cfs @ 12.37 hrs, Volume= 0.226 af, Depth= 0.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs
Type III 24-hr 2-yr Rainfall=3.20"

	Area (ac)	CN	Description
*	0.050	98	Abutter HSG B
	1.290	61	>75% Grass cover, Good, HSG B
	8.350	55	Woods, Good, HSG B
	9.690	56	Weighted Average
	9.640		99.48% Pervious Area
	0.050		0.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0900	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.3	325	0.1070	1.64		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.1	375	Total			

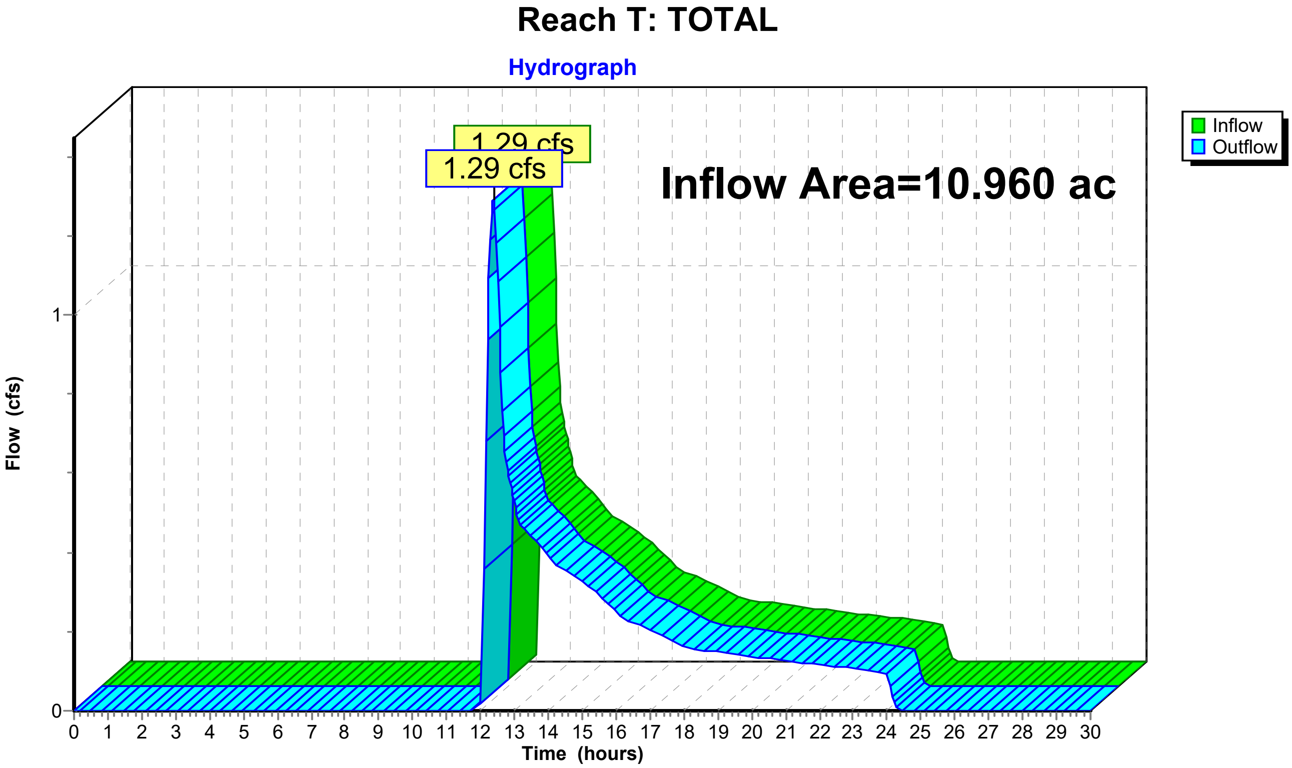
Subcatchment EX2: RUNOFF TO BVW



Summary for Reach T: TOTAL

```
Inflow Area =      10.960 ac,   0.46% Impervious,  Inflow Depth =   0.28"    for  2-yr event
Inflow      =        1.29 cfs @  12.38 hrs,  Volume=          0.252 af
Outflow     =        1.29 cfs @  12.38 hrs,  Volume=          0.252 af,  Atten= 0%,  Lag= 0.0 min
```

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs



Summary for Subcatchment EX1: RUNOFF TO MAYNARD RD

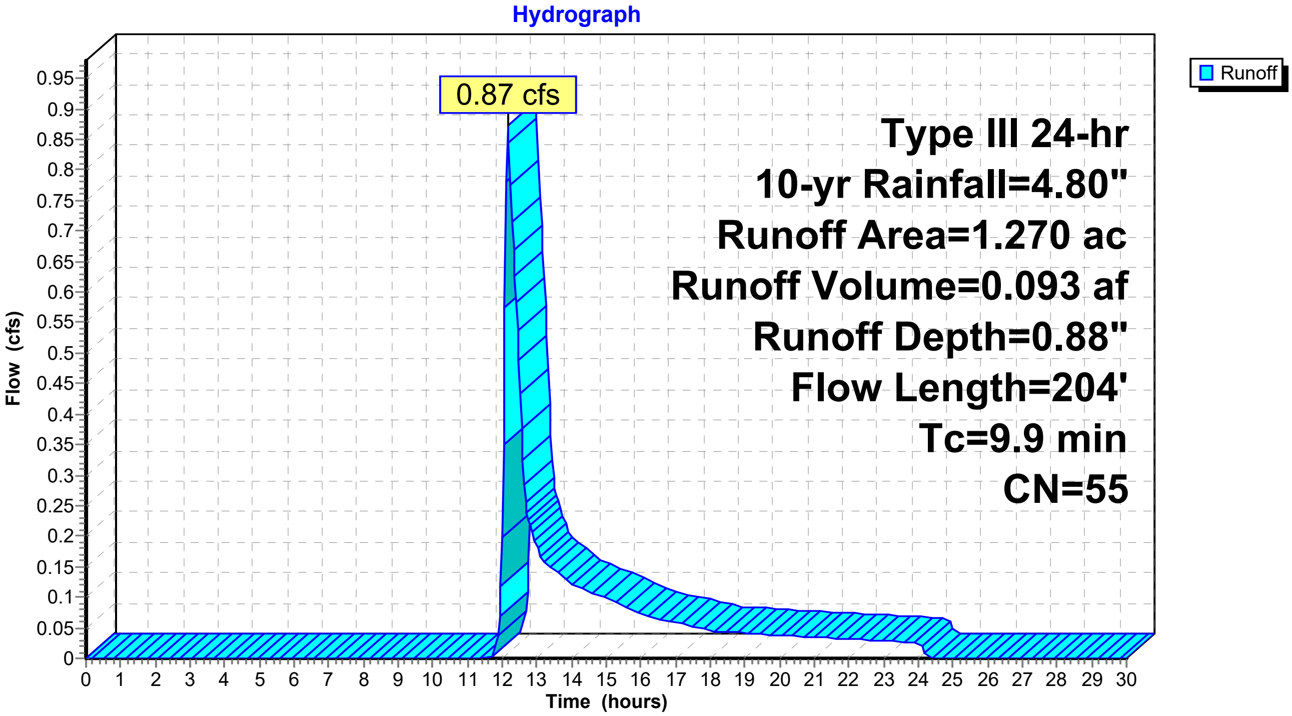
Runoff = 0.87 cfs @ 12.17 hrs, Volume= 0.093 af, Depth= 0.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-yr Rainfall=4.80"

Area (ac)	CN	Description
1.270	55	Woods, Good, HSG B
1.270		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0520	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.5	154	0.1250	1.77		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.9	204	Total			

Subcatchment EX1: RUNOFF TO MAYNARD RD



Summary for Subcatchment EX2: RUNOFF TO BVW

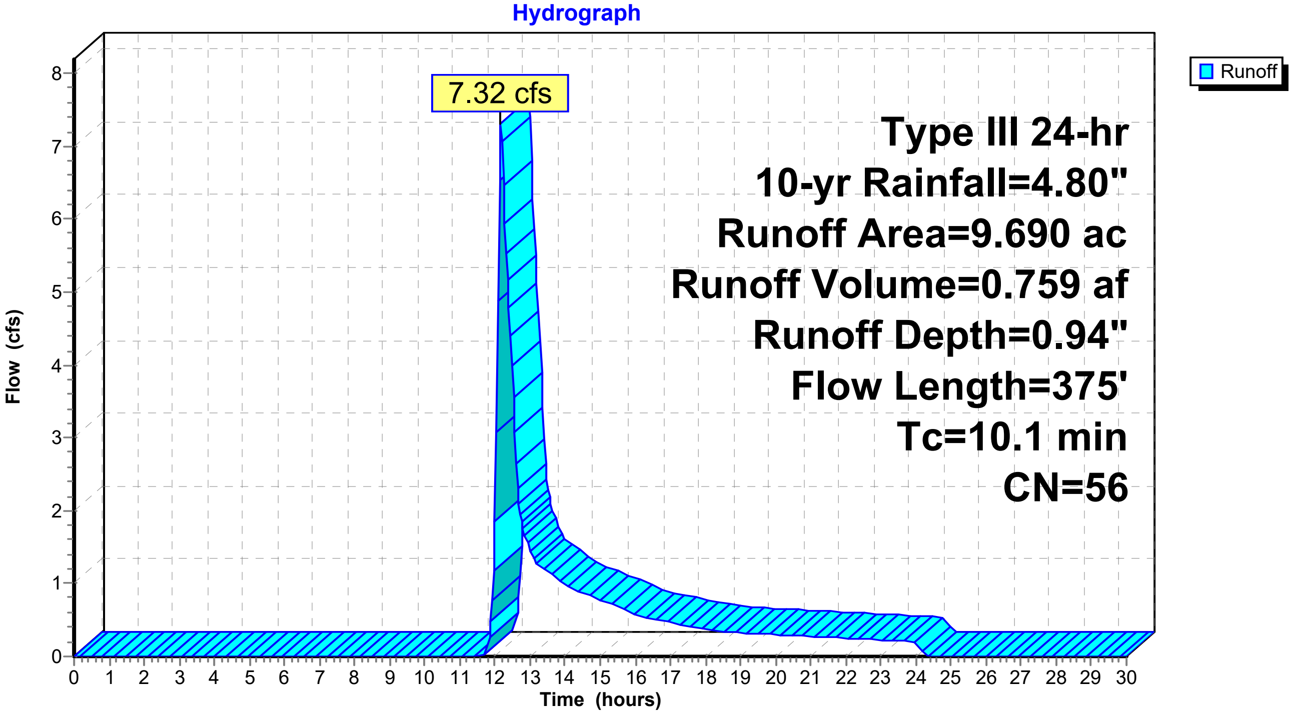
Runoff = 7.32 cfs @ 12.17 hrs, Volume= 0.759 af, Depth= 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (ac)	CN	Description
*	0.050	98	Abutter HSG B
	1.290	61	>75% Grass cover, Good, HSG B
	8.350	55	Woods, Good, HSG B
	9.690	56	Weighted Average
	9.640		99.48% Pervious Area
	0.050		0.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0900	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.3	325	0.1070	1.64		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.1	375	Total			

Subcatchment EX2: RUNOFF TO BVW

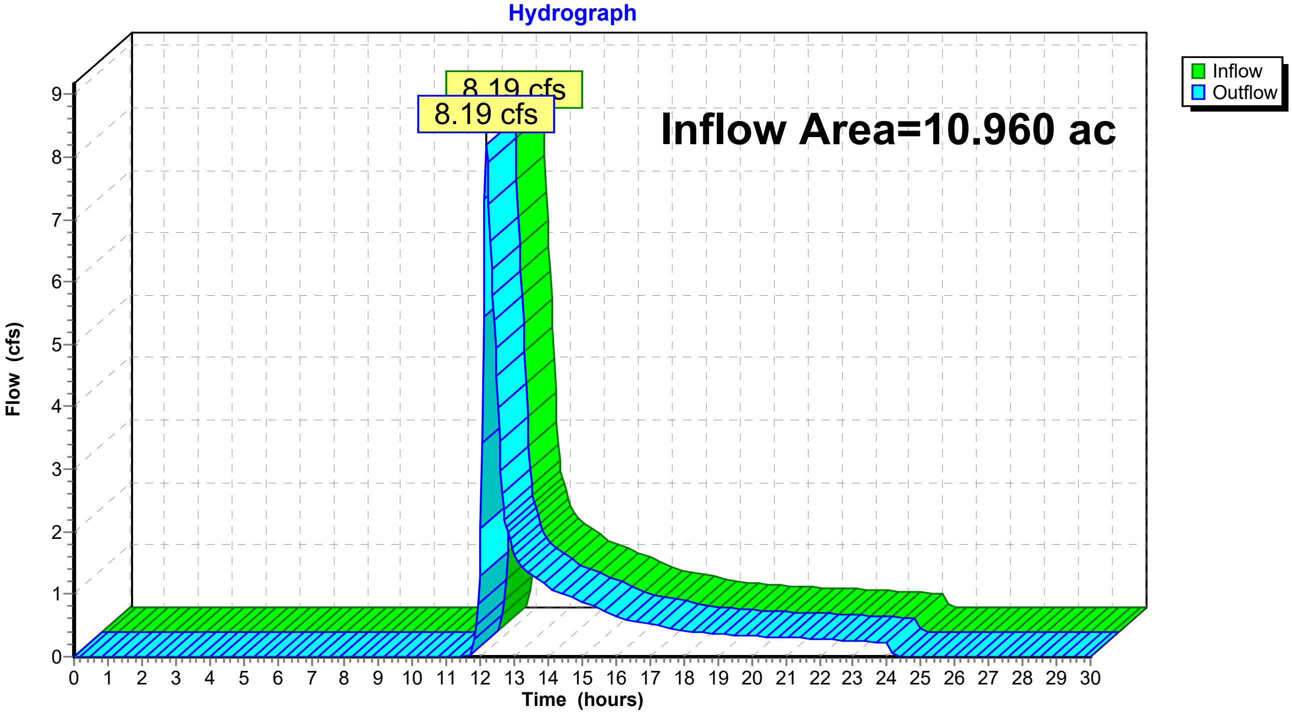


Summary for Reach T: TOTAL

Inflow Area = 10.960 ac, 0.46% Impervious, Inflow Depth = 0.93" for 10-yr event
Inflow = 8.19 cfs @ 12.17 hrs, Volume= 0.853 af
Outflow = 8.19 cfs @ 12.17 hrs, Volume= 0.853 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs

Reach T: TOTAL



Summary for Subcatchment EX1: RUNOFF TO MAYNARD RD

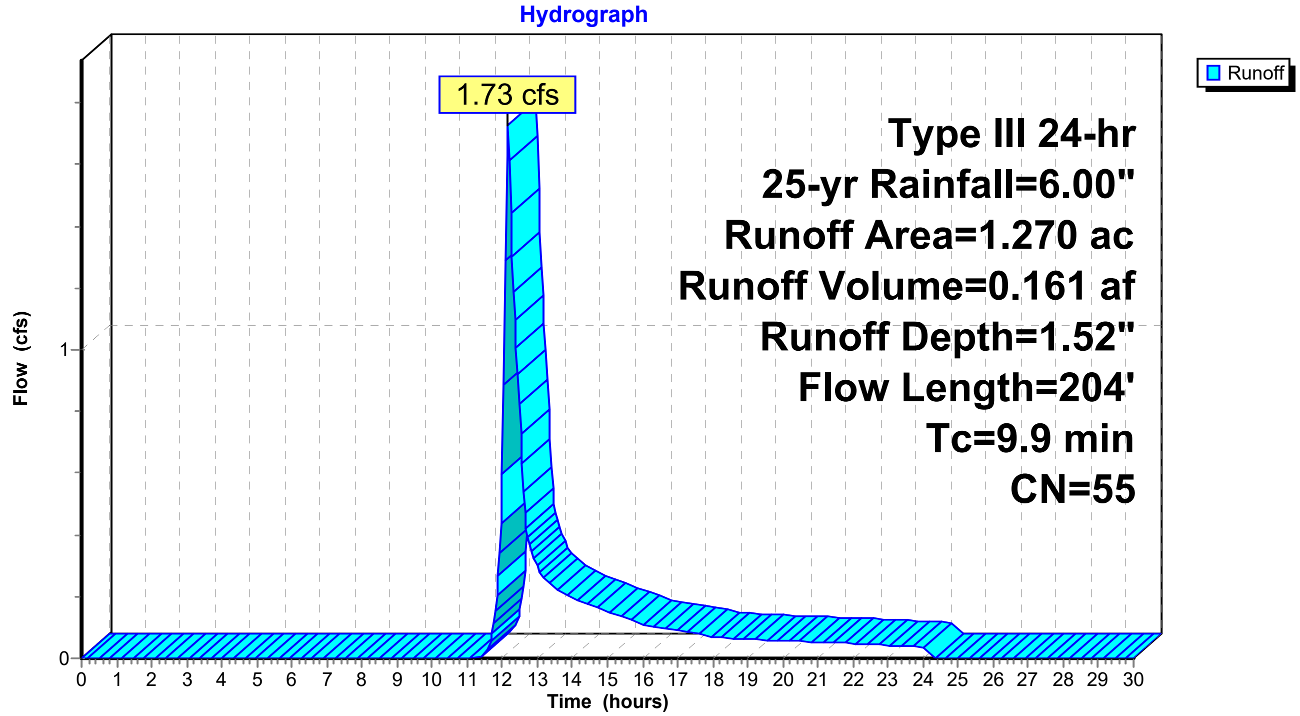
Runoff = 1.73 cfs @ 12.16 hrs, Volume= 0.161 af, Depth= 1.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-yr Rainfall=6.00"

Area (ac)	CN	Description
1.270	55	Woods, Good, HSG B
1.270		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0520	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.5	154	0.1250	1.77		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.9	204	Total			

Subcatchment EX1: RUNOFF TO MAYNARD RD



Summary for Subcatchment EX2: RUNOFF TO BVW

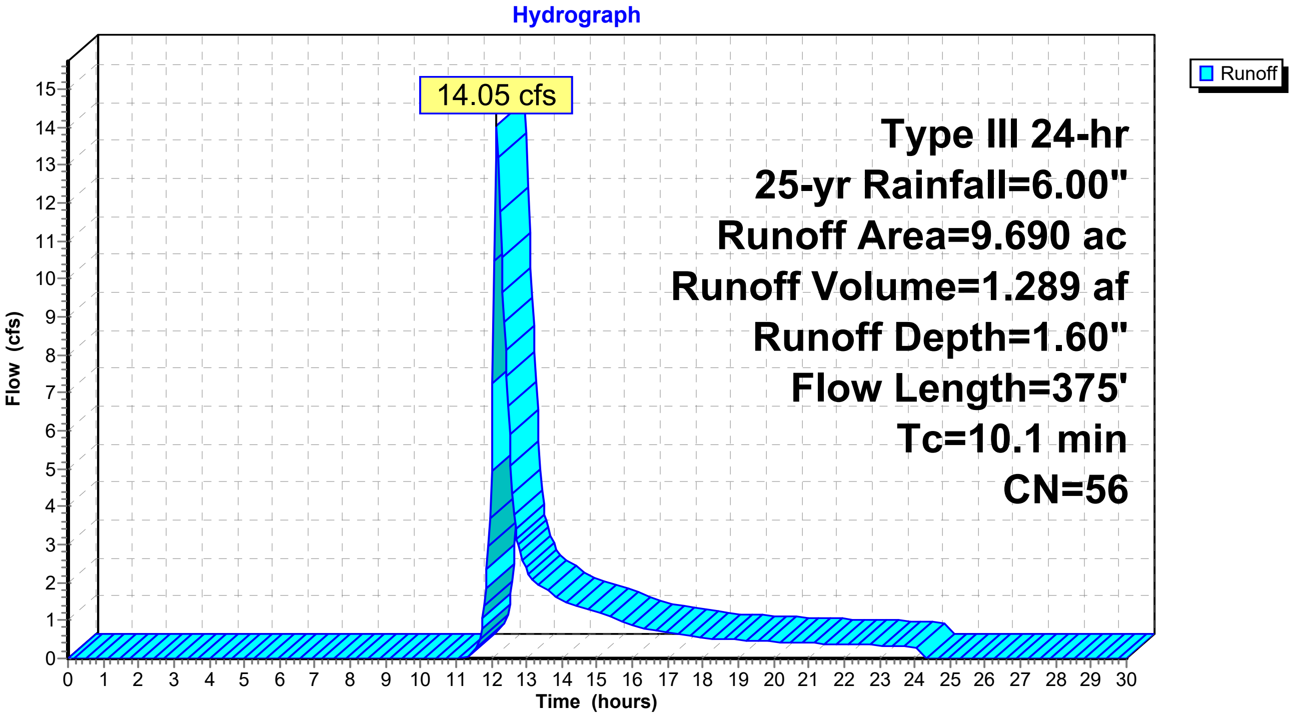
Runoff = 14.05 cfs @ 12.16 hrs, Volume= 1.289 af, Depth= 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs
Type III 24-hr 25-yr Rainfall=6.00"

	Area (ac)	CN	Description
*	0.050	98	Abutter HSG B
	1.290	61	>75% Grass cover, Good, HSG B
	8.350	55	Woods, Good, HSG B
	9.690	56	Weighted Average
	9.640		99.48% Pervious Area
	0.050		0.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0900	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.3	325	0.1070	1.64		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.1	375	Total			

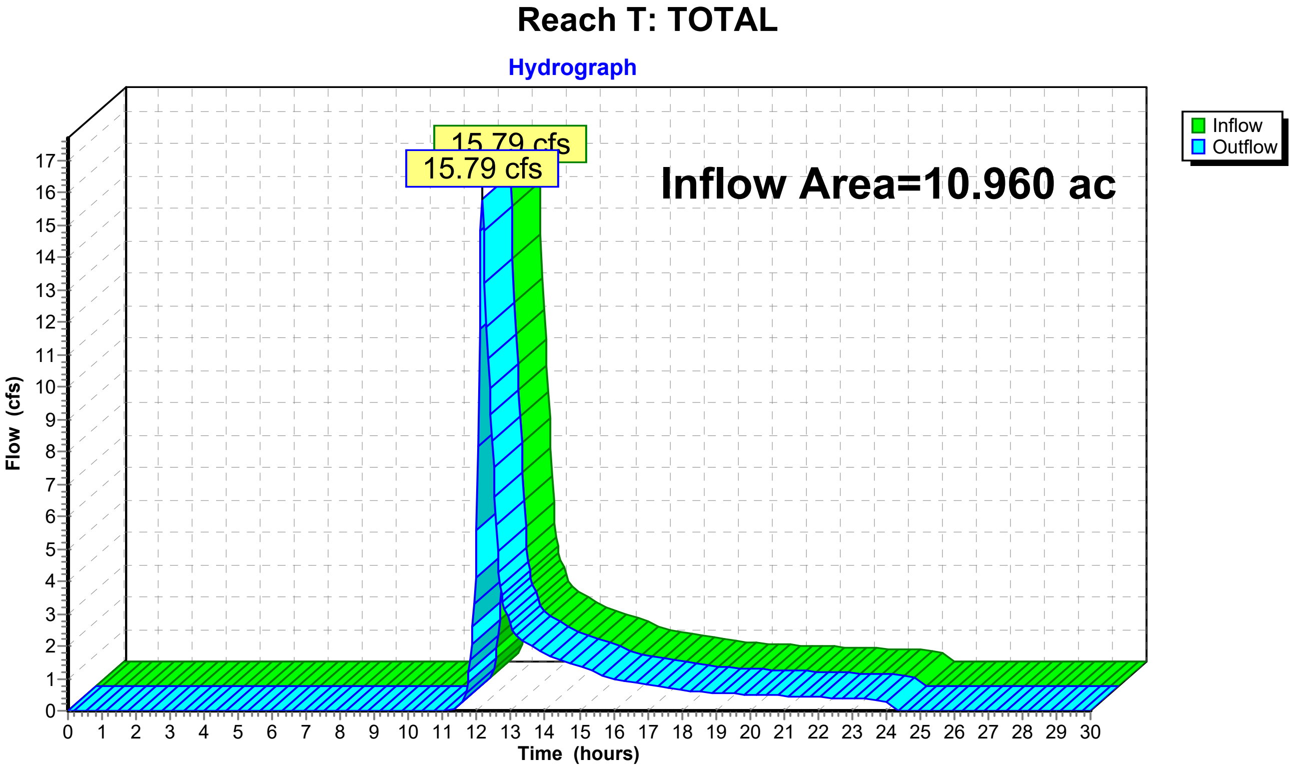
Subcatchment EX2: RUNOFF TO BVW



Summary for Reach T: TOTAL

```
Inflow Area =      10.960 ac,   0.46% Impervious,  Inflow Depth =   1.59"    for  25-yr event
Inflow      =      15.79 cfs @   12.16 hrs,  Volume=          1.450 af
Outflow     =      15.79 cfs @   12.16 hrs,  Volume=          1.450 af,  Atten= 0%,  Lag= 0.0 min
```

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs



Summary for Subcatchment EX1: RUNOFF TO MAYNARD RD

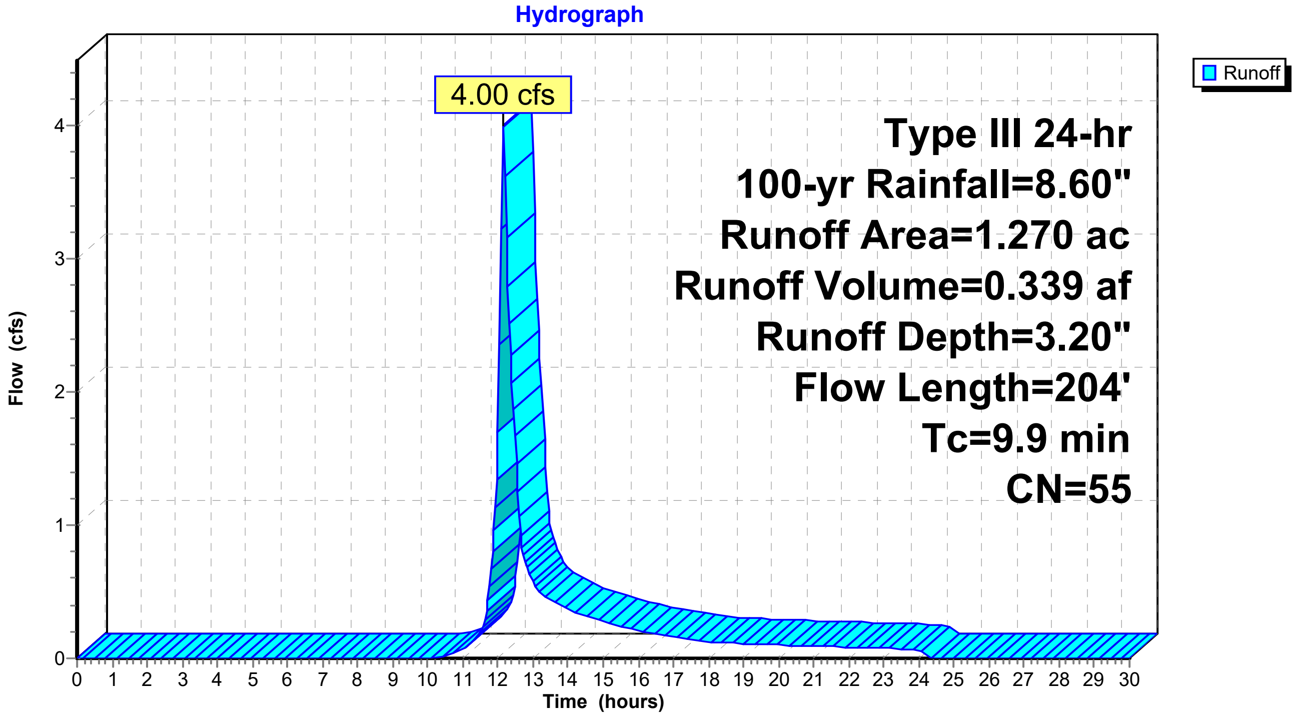
Runoff = 4.00 cfs @ 12.15 hrs, Volume= 0.339 af, Depth= 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-yr Rainfall=8.60"

Area (ac)	CN	Description
1.270	55	Woods, Good, HSG B
1.270		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.4	50	0.0520	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
1.5	154	0.1250	1.77		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.9	204	Total			

Subcatchment EX1: RUNOFF TO MAYNARD RD



Summary for Subcatchment EX2: RUNOFF TO BVW

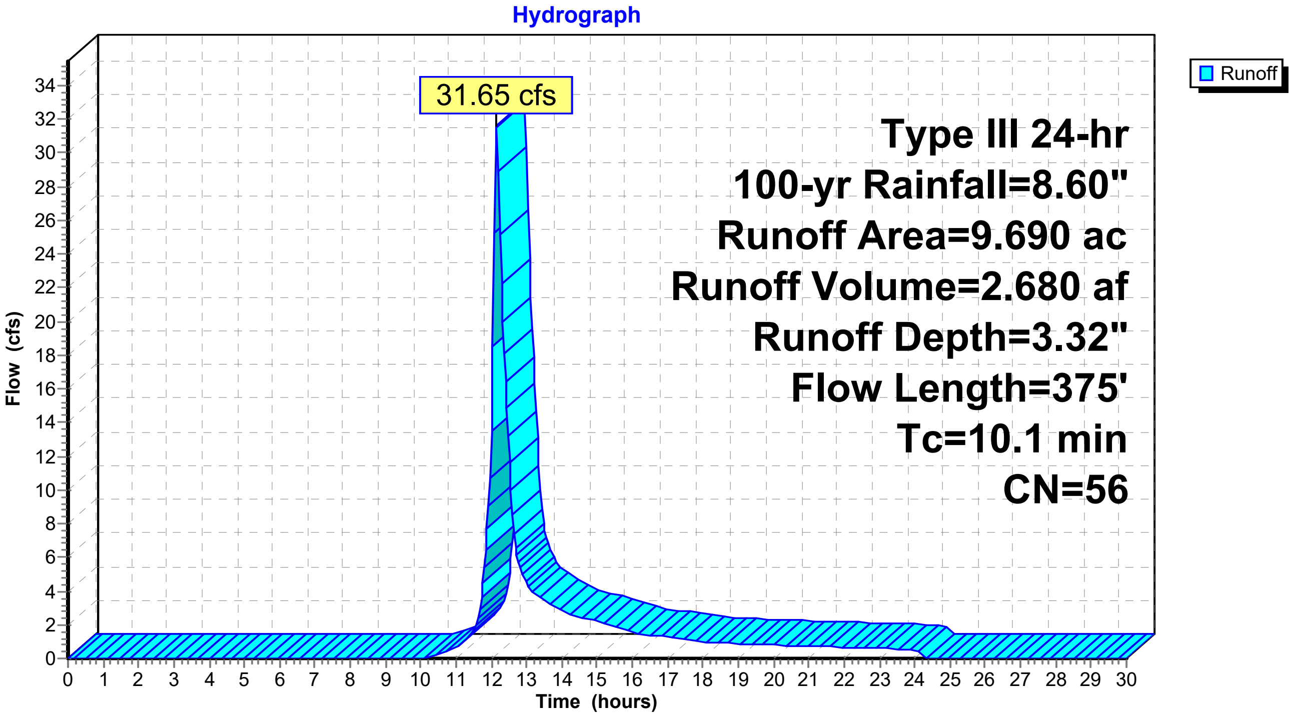
Runoff = 31.65 cfs @ 12.15 hrs, Volume= 2.680 af, Depth= 3.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs
Type III 24-hr 100-yr Rainfall=8.60"

	Area (ac)	CN	Description
*	0.050	98	Abutter HSG B
	1.290	61	>75% Grass cover, Good, HSG B
	8.350	55	Woods, Good, HSG B
	9.690	56	Weighted Average
	9.640		99.48% Pervious Area
	0.050		0.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	50	0.0900	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.3	325	0.1070	1.64		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.1	375	Total			

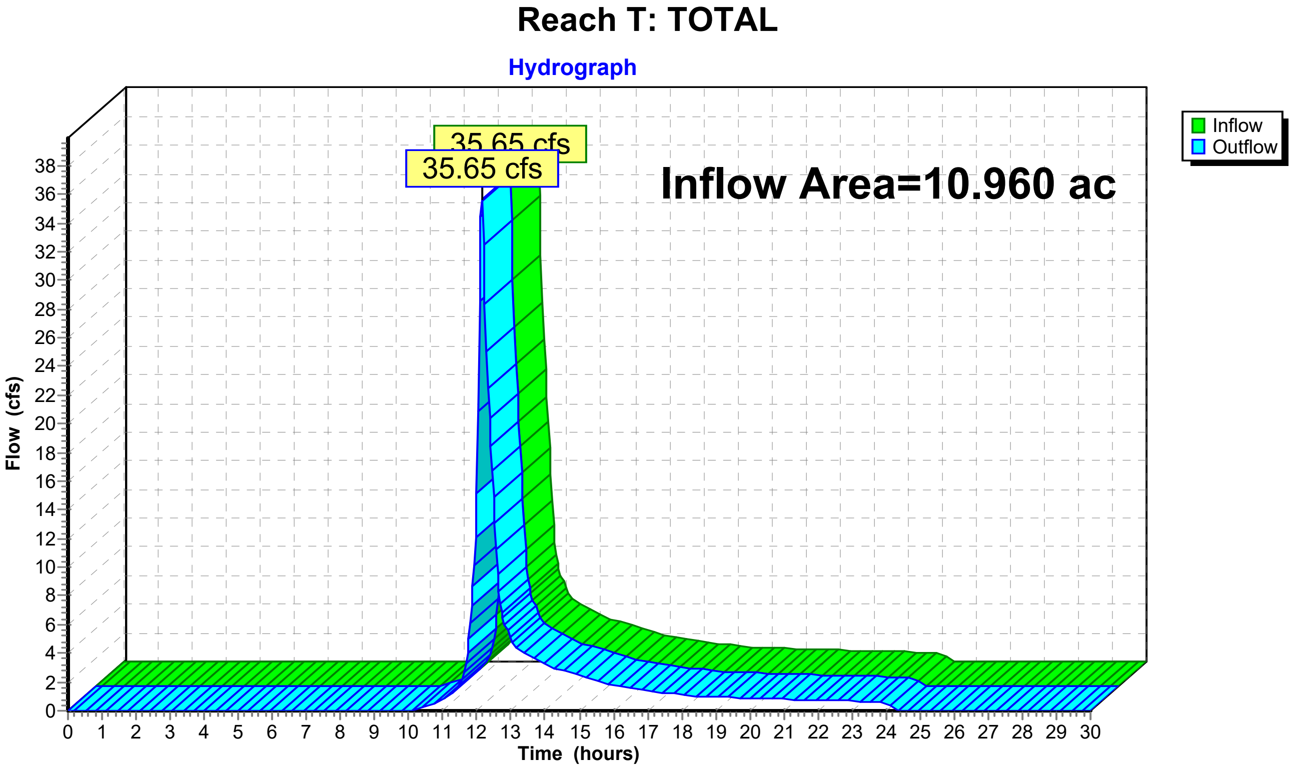
Subcatchment EX2: RUNOFF TO BVW

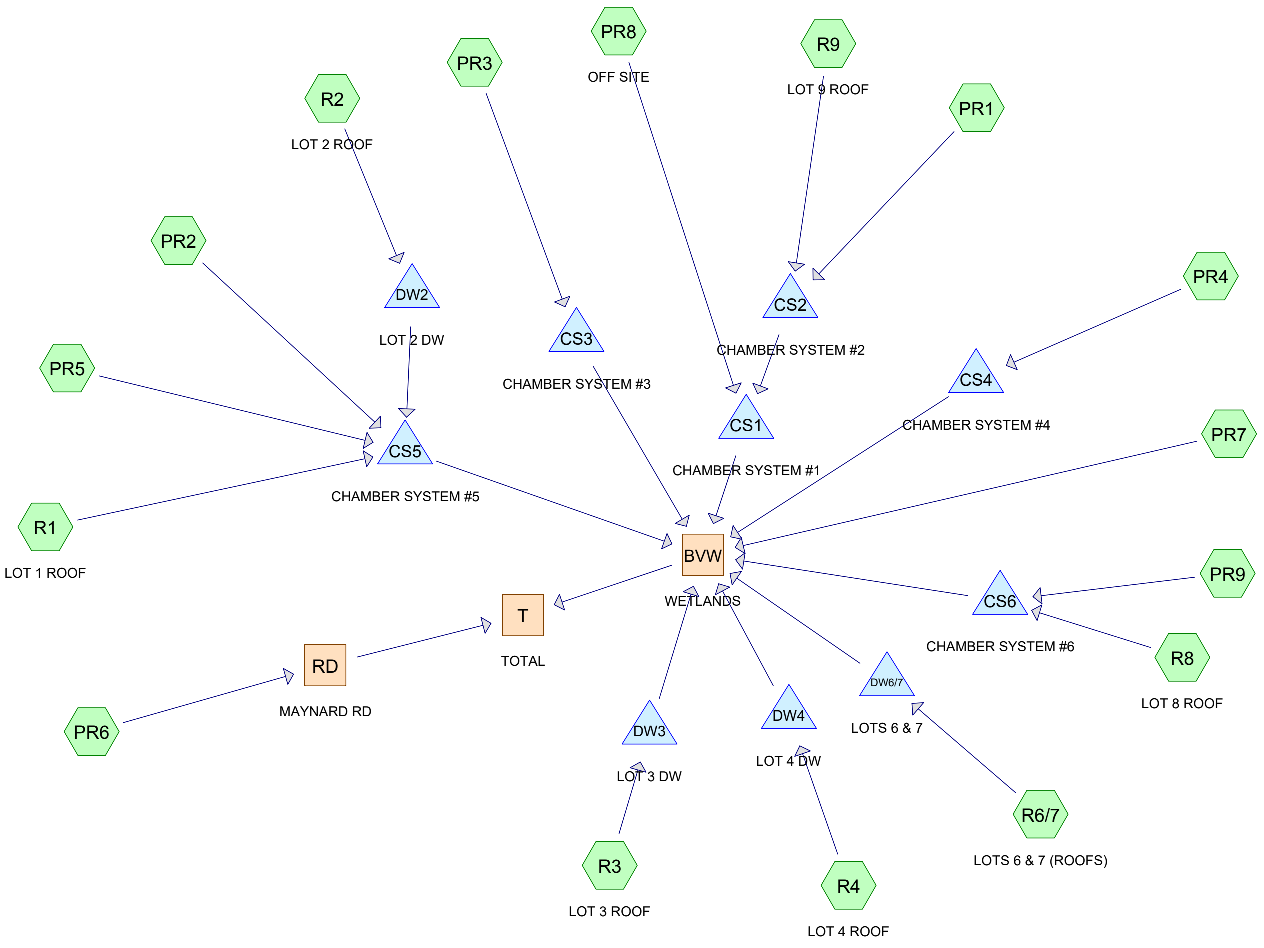


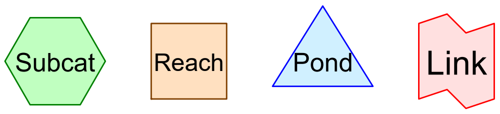
Summary for Reach T: TOTAL

Inflow Area = 10.960 ac, 0.46% Impervious, Inflow Depth = 3.31" for 100-yr event
Inflow = 35.65 cfs @ 12.15 hrs, Volume= 3.019 af
Outflow = 35.65 cfs @ 12.15 hrs, Volume= 3.019 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-30.00 hrs, dt= 0.04 hrs







Routing Diagram for Proposed Conditions-2671
Prepared by Bruce Saluk & Associates, Inc, Printed 3/20/2021
HydroCAD® 10.00-25 s/n 02049 © 2019 HydroCAD Software Solutions LLC

Summary for Subcatchment PR1:

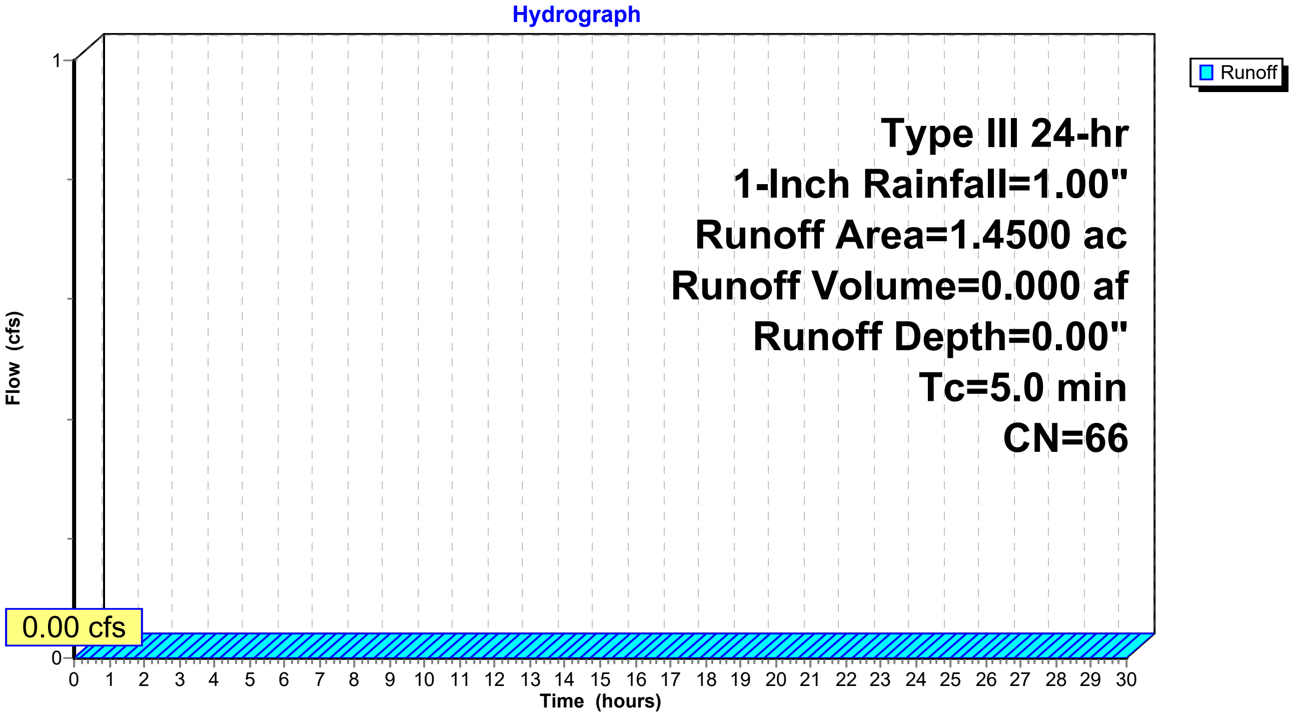
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (ac)	CN	Description
	1.0800	61	>75% Grass cover, Good, HSG B
*	0.2300	98	Pavement
	0.1400	55	Woods, Good, HSG B
	1.4500	66	Weighted Average
	1.2200		84.14% Pervious Area
	0.2300		15.86% Impervious Area

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

Subcatchment PR1:



Summary for Subcatchment PR2:

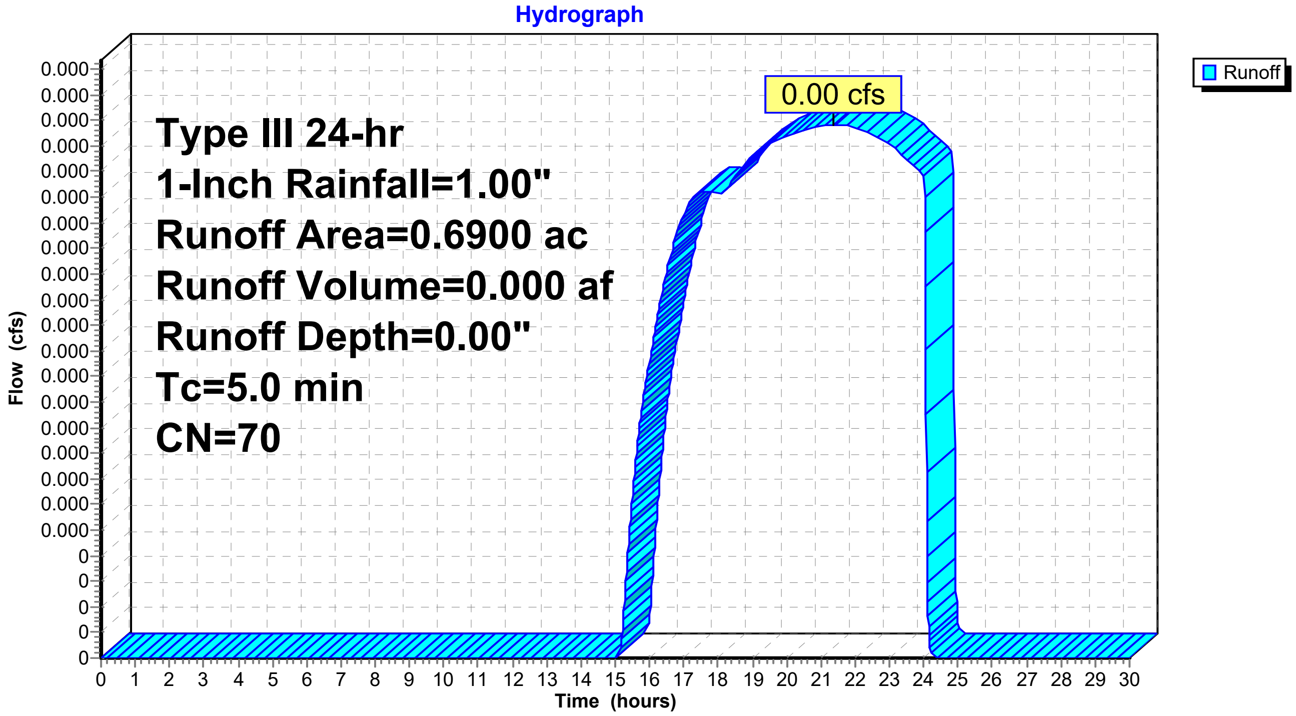
Runoff = 0.00 cfs @ 21.35 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (ac)	CN	Description
	0.4100	61	>75% Grass cover, Good, HSG B
*	0.1900	98	Pavement
	0.0900	55	Woods, Good, HSG B
	0.6900	70	Weighted Average
	0.5000		72.46% Pervious Area
	0.1900		27.54% Impervious Area

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

Subcatchment PR2:



Summary for Subcatchment PR3:

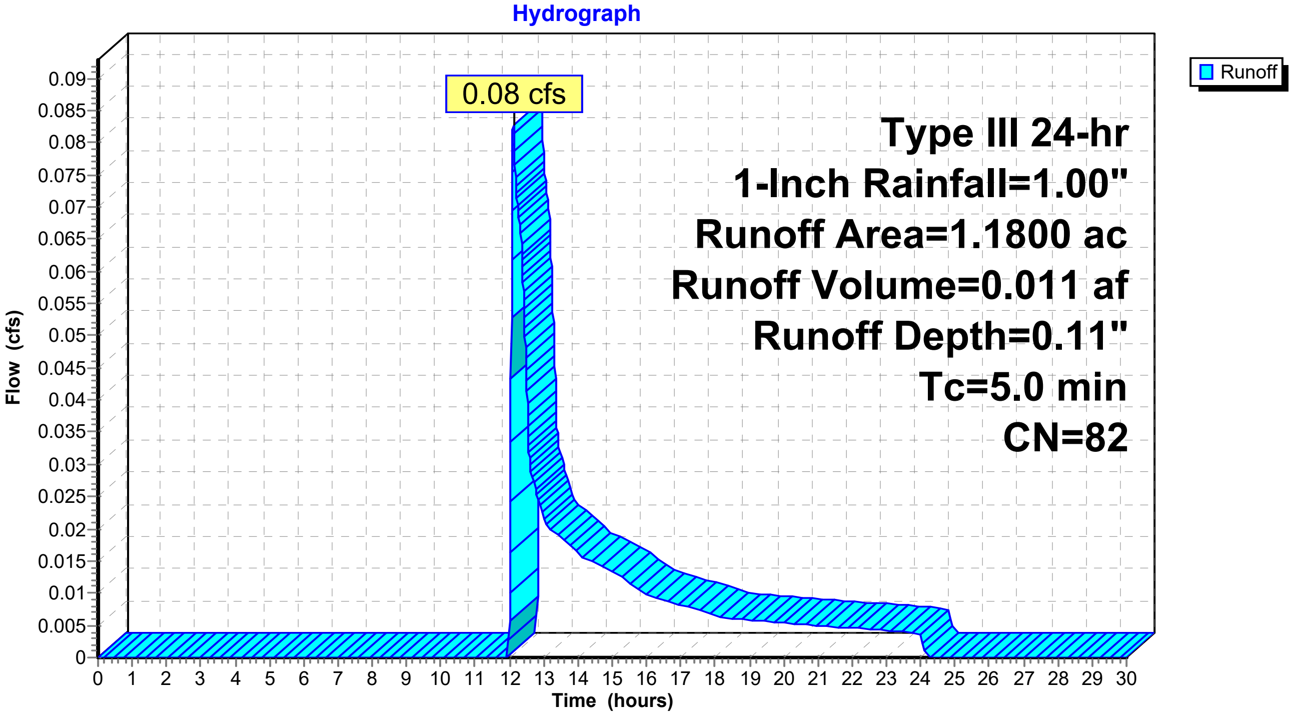
Runoff = 0.08 cfs @ 12.12 hrs, Volume= 0.011 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (ac)	CN	Description
	0.5000	61	>75% Grass cover, Good, HSG B
*	0.6800	98	Pavement
	1.1800	82	Weighted Average
	0.5000		42.37% Pervious Area
	0.6800		57.63% Impervious Area

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

Subcatchment PR3:



Summary for Subcatchment PR4:

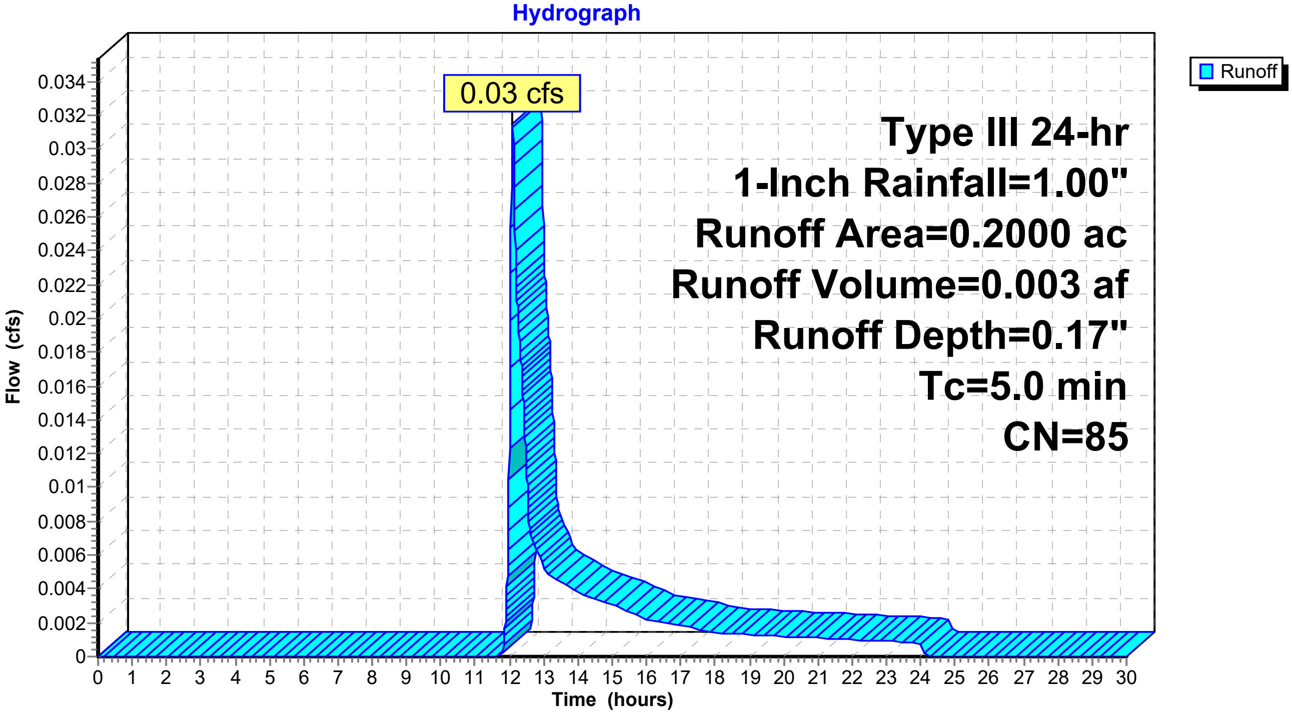
Runoff = 0.03 cfs @ 12.10 hrs, Volume= 0.003 af, Depth= 0.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (ac)	CN	Description
	0.0700	61	>75% Grass cover, Good, HSG B
*	0.1300	98	Pavement
	0.2000	85	Weighted Average
	0.0700		35.00% Pervious Area
	0.1300		65.00% Impervious Area

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

Subcatchment PR4:



Summary for Subcatchment PR5:

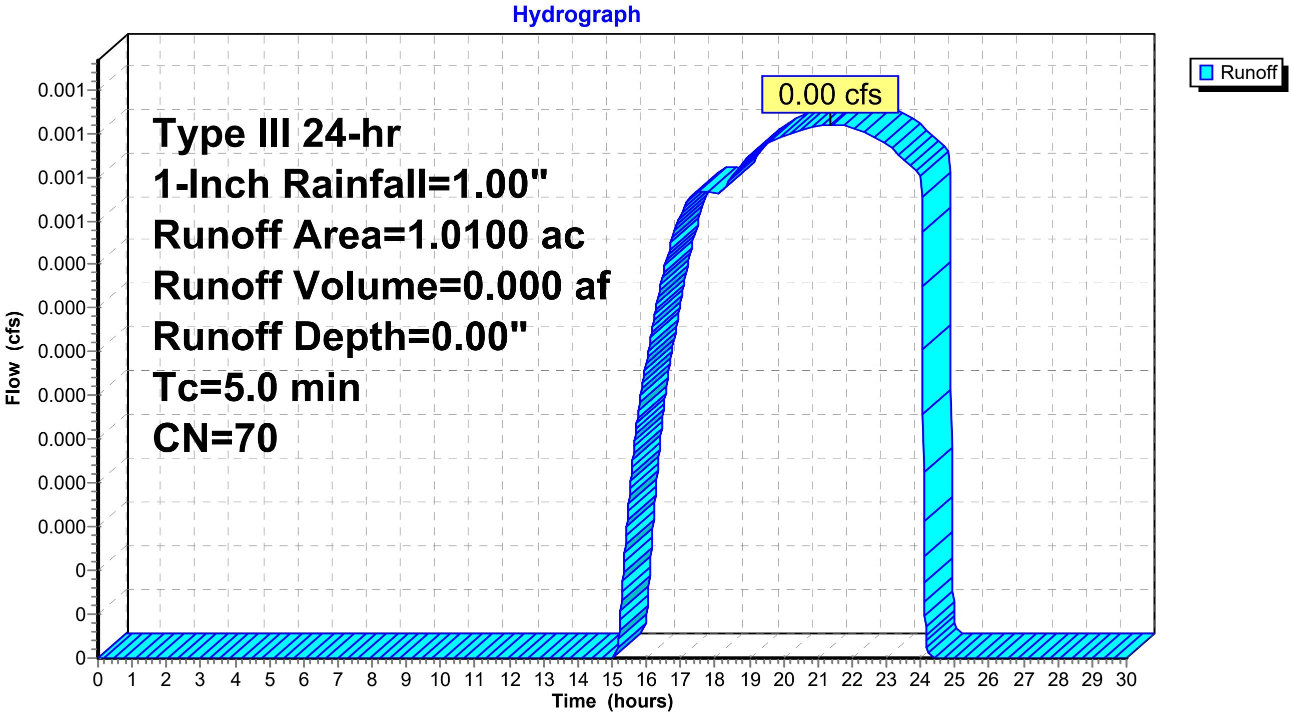
Runoff = 0.00 cfs @ 21.35 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (ac)	CN	Description
	0.6200	61	>75% Grass cover, Good, HSG B
*	0.2700	98	Pavement
	0.1200	55	Woods, Good, HSG B
	1.0100	70	Weighted Average
	0.7400		73.27% Pervious Area
	0.2700		26.73% Impervious Area

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

Subcatchment PR5:



Summary for Subcatchment PR6:

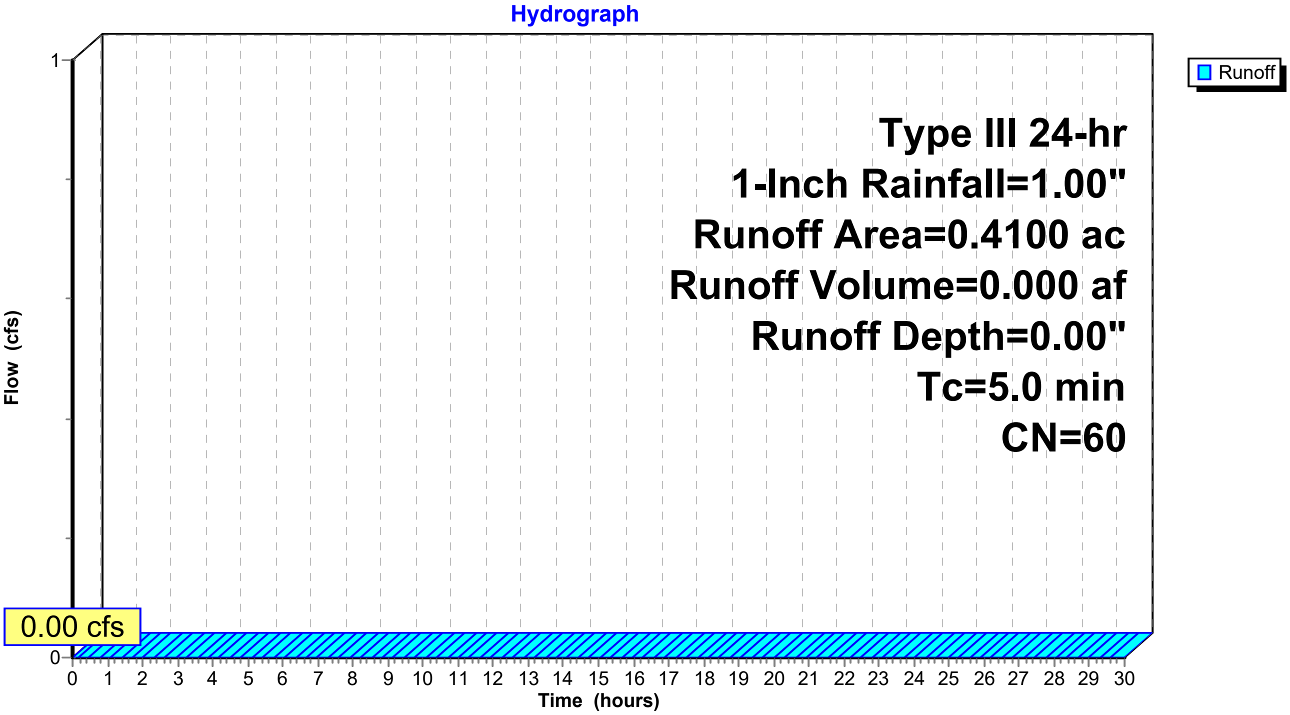
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

Area (ac)	CN	Description
0.3100	61	>75% Grass cover, Good, HSG B
0.1000	55	Woods, Good, HSG B
0.4100	60	Weighted Average
0.4100		100.00% Pervious Area

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

Subcatchment PR6:



Summary for Subcatchment PR7:

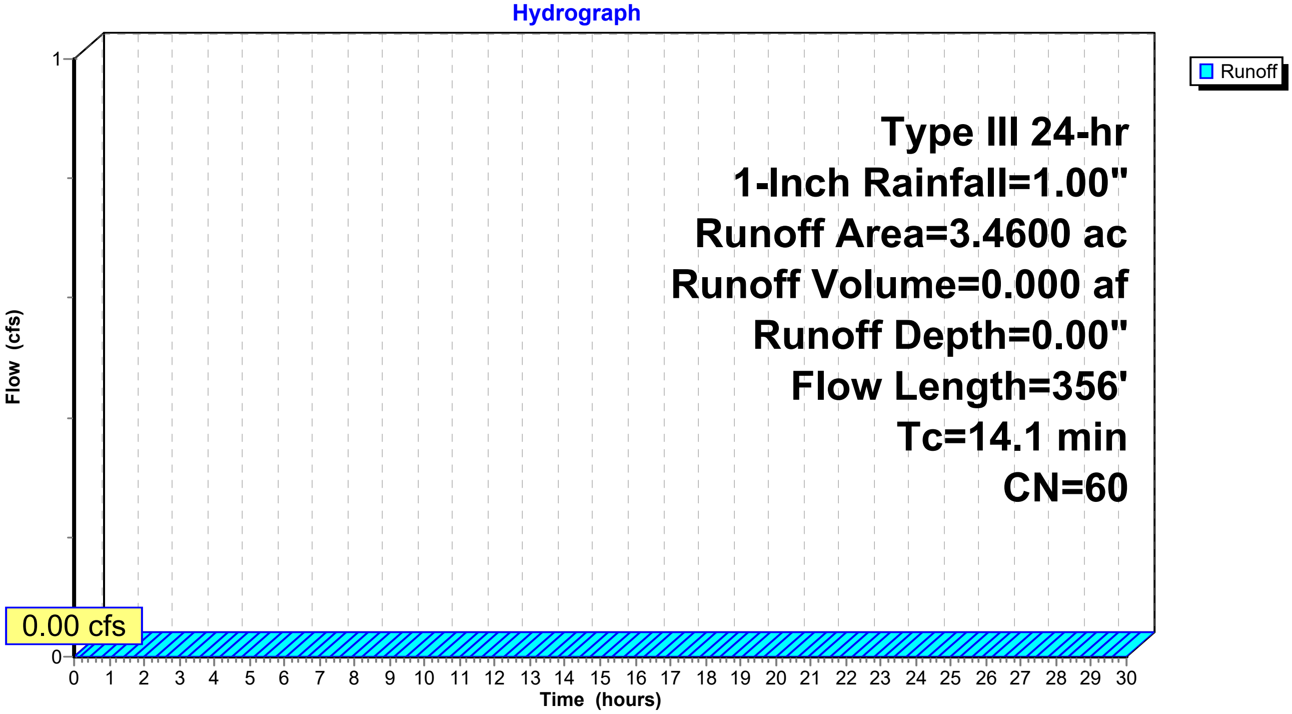
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

Area (ac)	CN	Description
3.0500	61	>75% Grass cover, Good, HSG B
0.4100	55	Woods, Good, HSG B
3.4600	60	Weighted Average
3.4600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.08		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.20"
0.2	16	0.0100	1.50		**Shallow Concentrated Flow, SCF** Grassed Waterway Kv= 15.0 fps
1.4	117	0.0090	1.42		**Shallow Concentrated Flow, SCF** Grassed Waterway Kv= 15.0 fps
1.7	173	0.0130	1.71		**Shallow Concentrated Flow, SCF** Grassed Waterway Kv= 15.0 fps
14.1	356	Total			

Subcatchment PR7:



Summary for Subcatchment PR8: OFF SITE

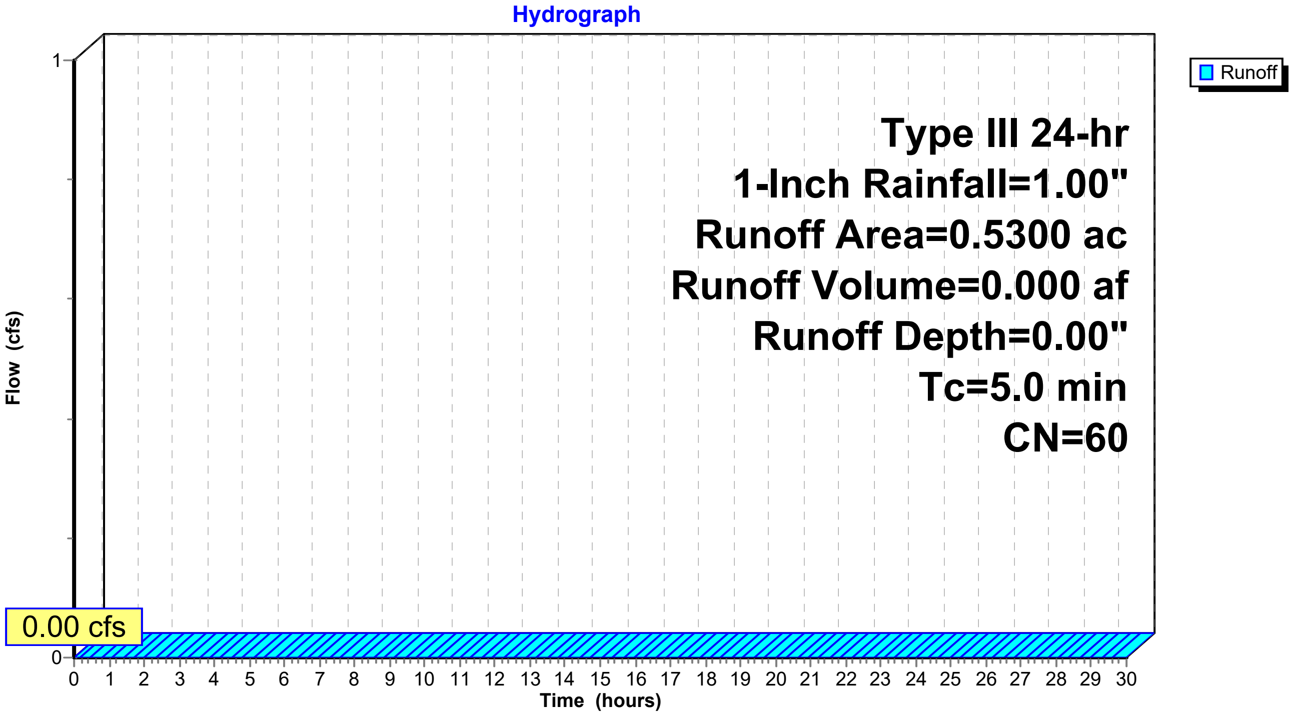
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (ac)	CN	Description
	0.3200	55	Woods, Good, HSG B
*	0.0400	98	Impervious
	0.1700	61	>75% Grass cover, Good, HSG B
	0.5300	60	Weighted Average
	0.4900		92.45% Pervious Area
	0.0400		7.55% Impervious Area

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

Subcatchment PR8: OFF SITE



Summary for Subcatchment PR9:

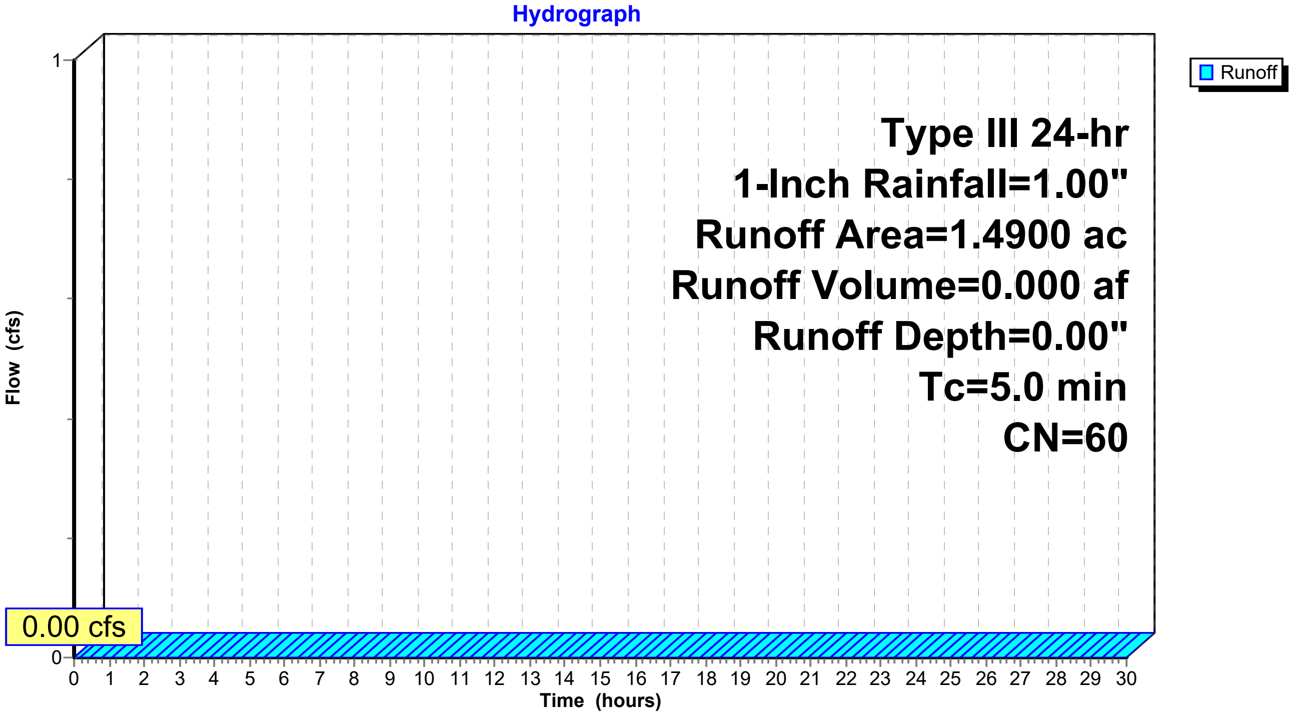
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

Area (ac)	CN	Description
1.3600	61	>75% Grass cover, Good, HSG B
0.1300	55	Woods, Good, HSG B
1.4900	60	Weighted Average
1.4900		100.00% Pervious Area

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

Subcatchment PR9:



Summary for Subcatchment R1: LOT 1 ROOF

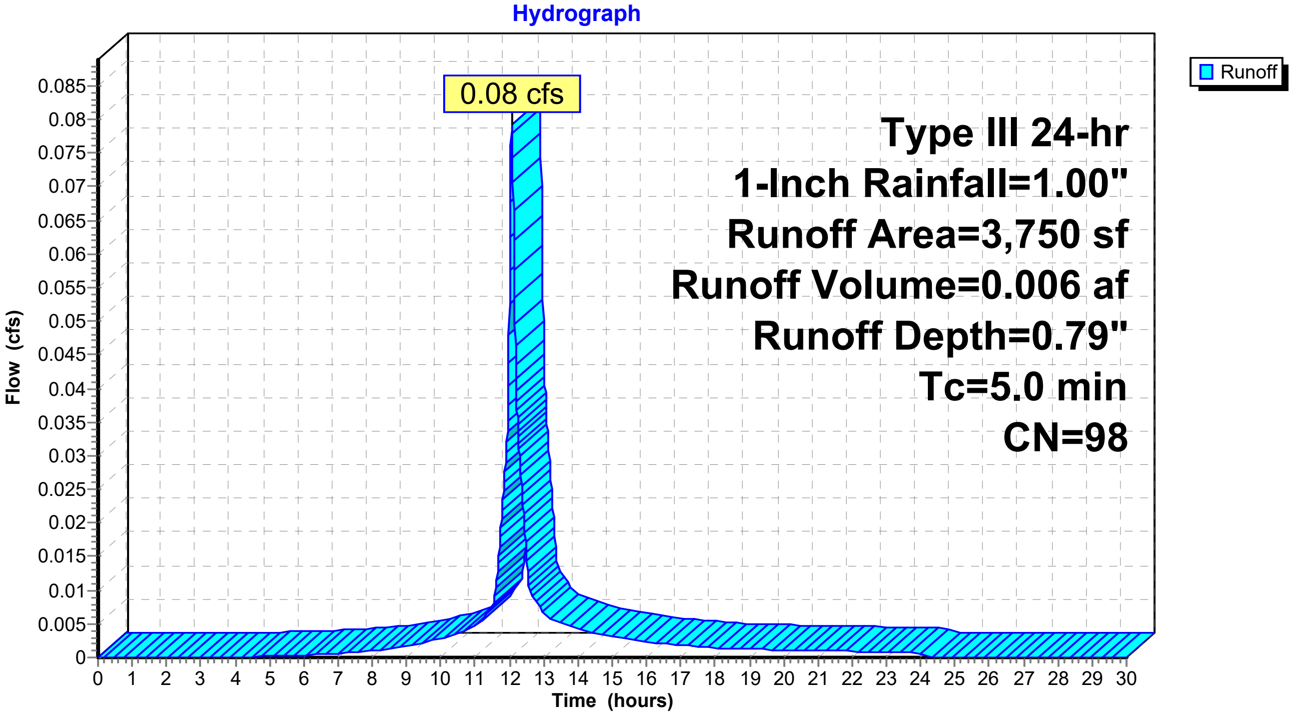
Runoff = 0.08 cfs @ 12.07 hrs, Volume= 0.006 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	3,750	98	ROOF AREA
	3,750		100.00% Impervious Area

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

Subcatchment R1: LOT 1 ROOF



Summary for Subcatchment R2: LOT 2 ROOF

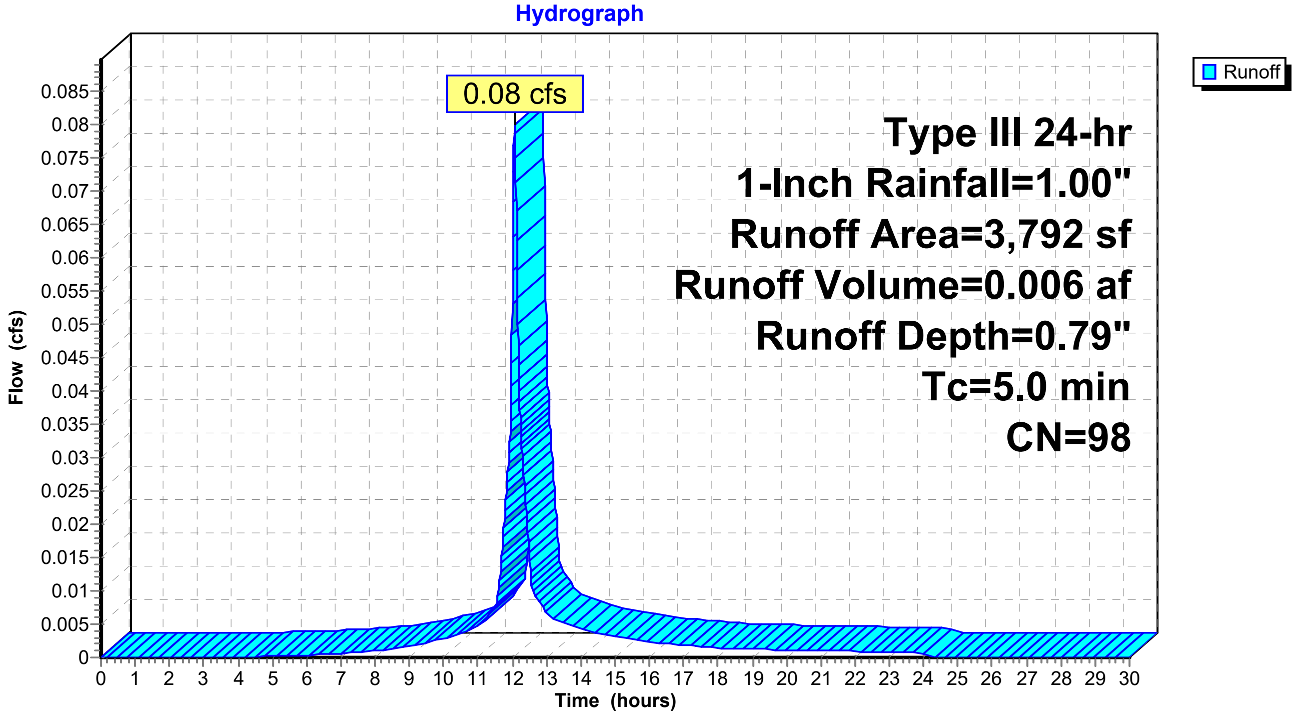
Runoff = 0.08 cfs @ 12.07 hrs, Volume= 0.006 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	3,792	98	ROOF AREA
	3,792		100.00% Impervious Area

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

Subcatchment R2: LOT 2 ROOF



Summary for Subcatchment R3: LOT 3 ROOF

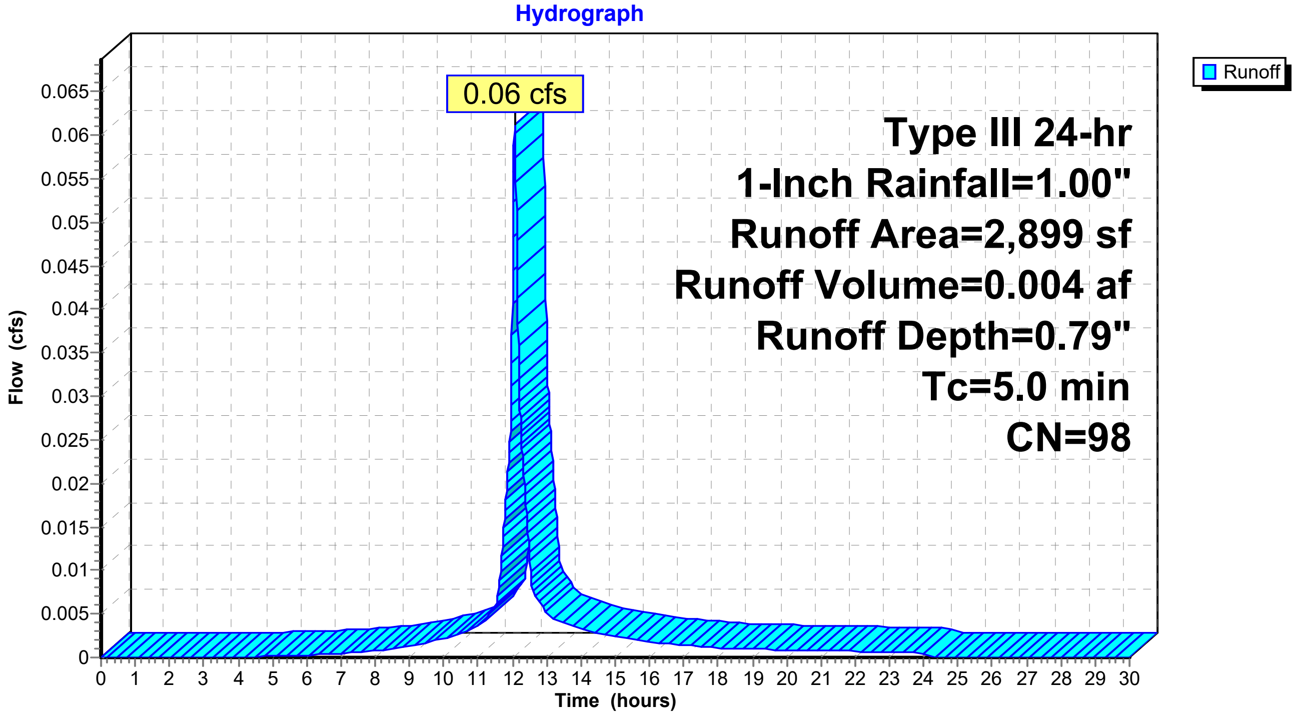
Runoff = 0.06 cfs @ 12.07 hrs, Volume= 0.004 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	2,899	98	ROOF AREA
	2,899		100.00% Impervious Area

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

Subcatchment R3: LOT 3 ROOF



Summary for Subcatchment R4: LOT 4 ROOF

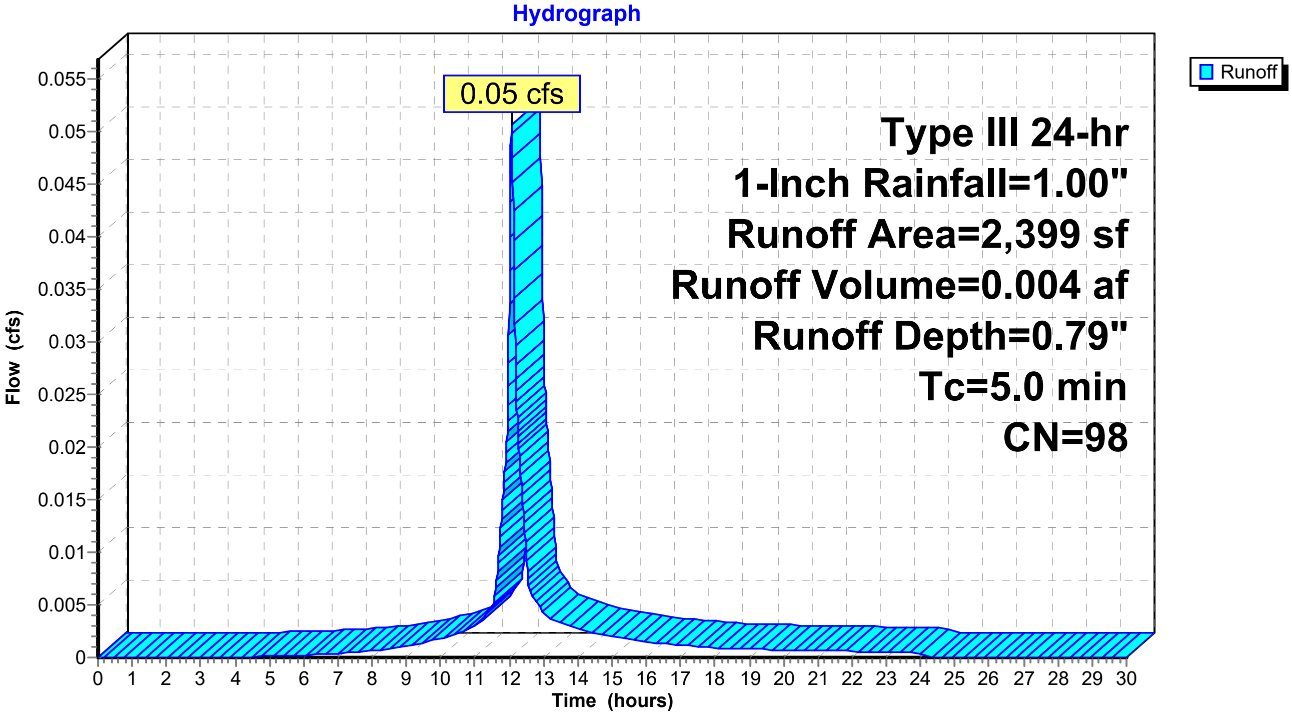
Runoff = 0.05 cfs @ 12.07 hrs, Volume= 0.004 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	2,399	98	ROOF AREA
	2,399		100.00% Impervious Area

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

Subcatchment R4: LOT 4 ROOF



Summary for Subcatchment R6/7: LOTS 6 & 7 (ROOFS)

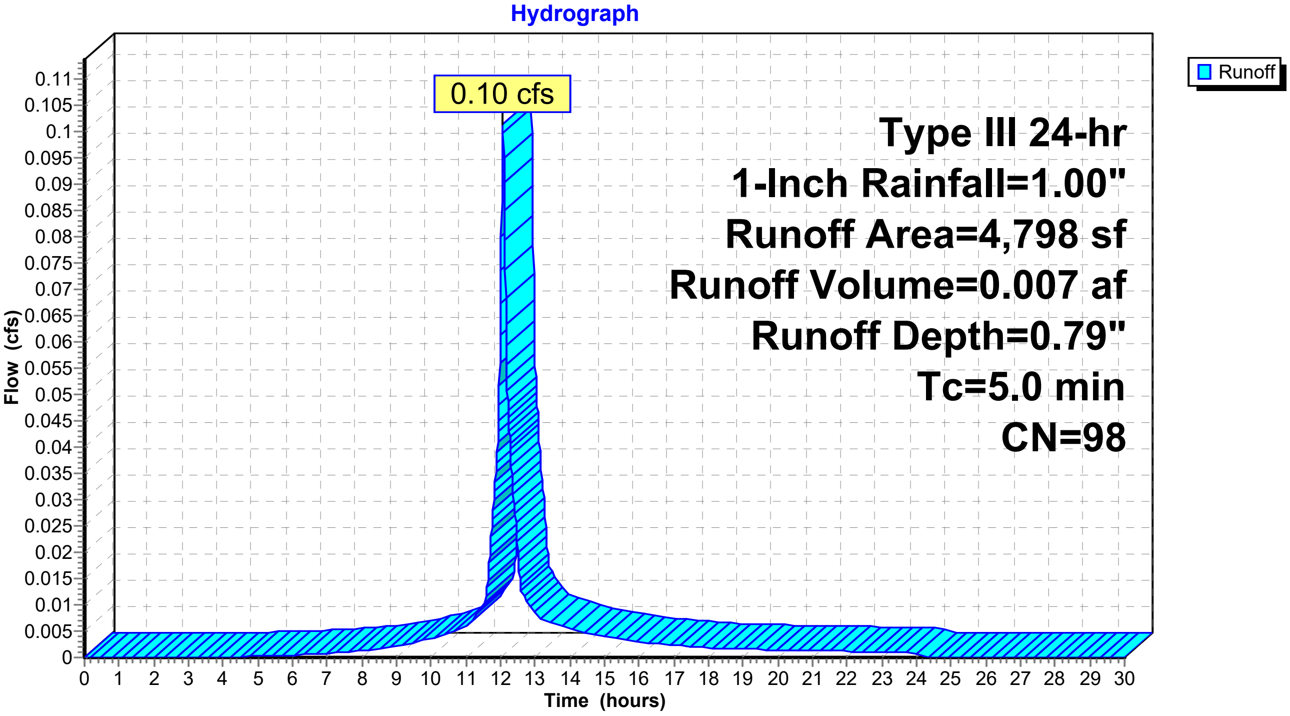
Runoff = 0.10 cfs @ 12.07 hrs, Volume= 0.007 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	4,798	98	ROOF AREA
	4,798		100.00% Impervious Area

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

Subcatchment R6/7: LOTS 6 & 7 (ROOFS)



Summary for Subcatchment R8: LOT 8 ROOF

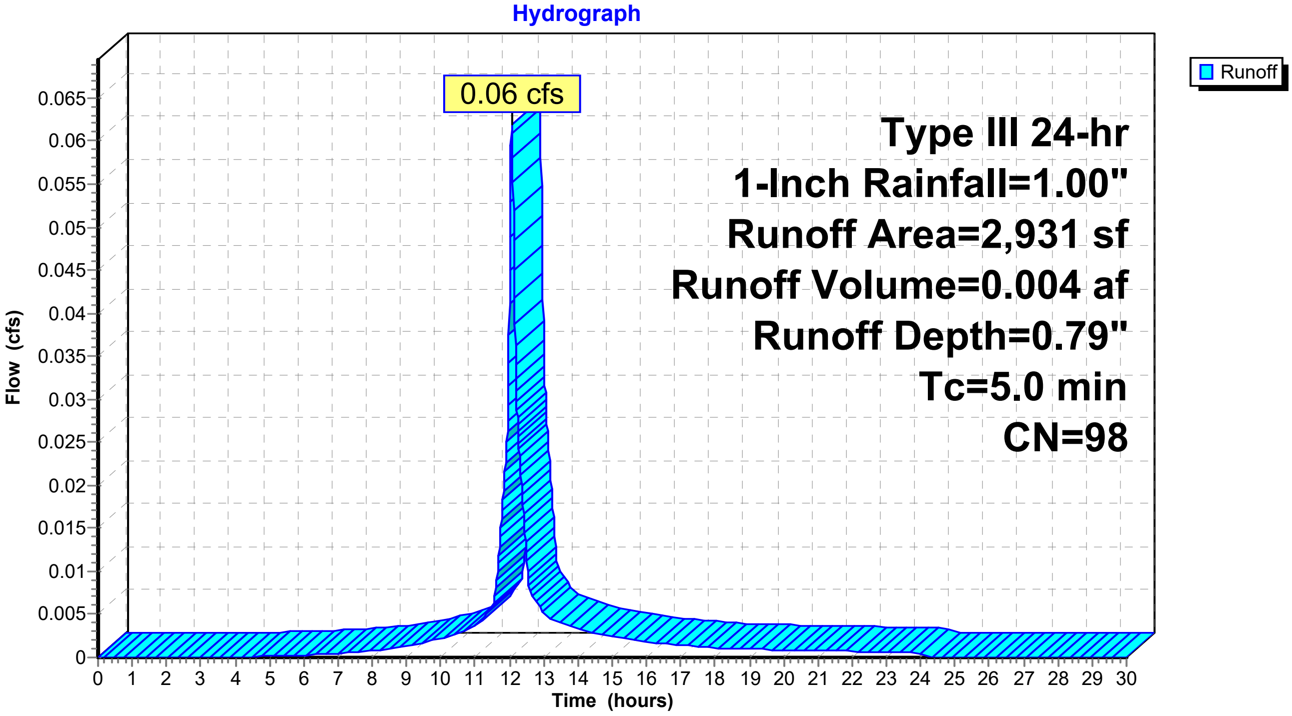
Runoff = 0.06 cfs @ 12.07 hrs, Volume= 0.004 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	2,931	98	ROOF AREA
	2,931		100.00% Impervious Area

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

Subcatchment R8: LOT 8 ROOF



Summary for Subcatchment R9: LOT 9 ROOF

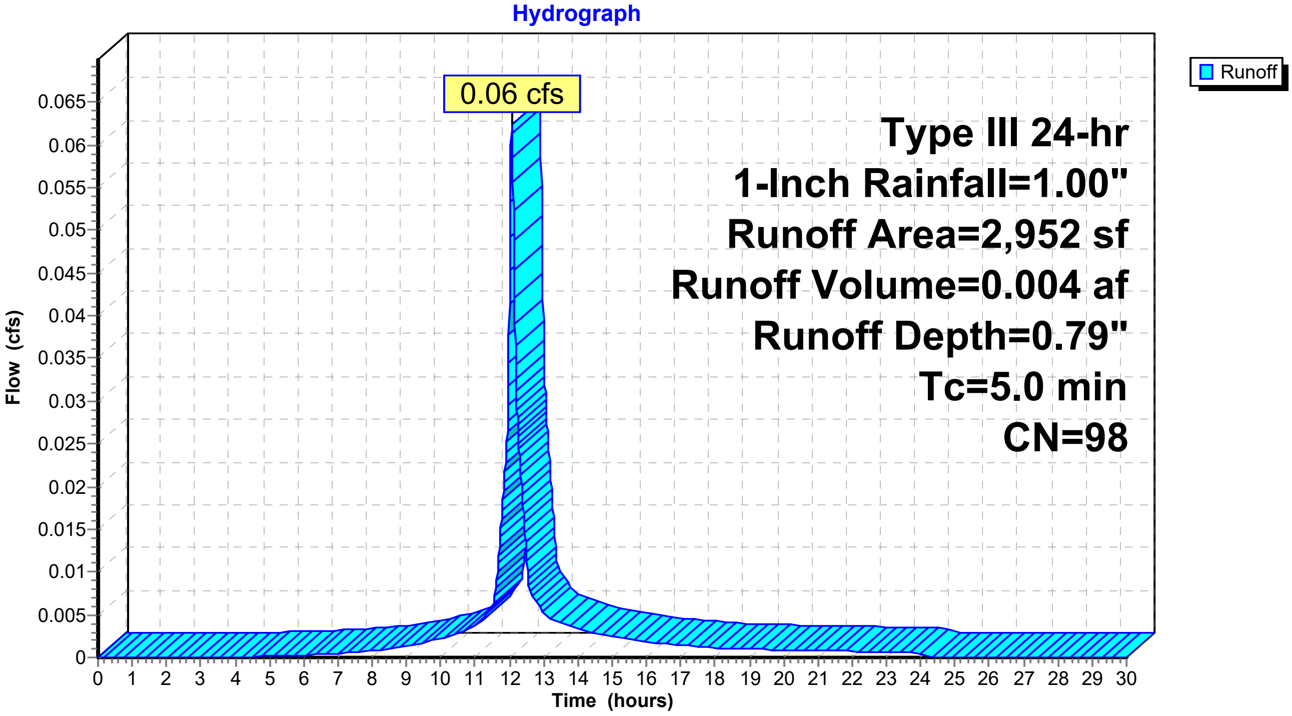
Runoff = 0.06 cfs @ 12.07 hrs, Volume= 0.004 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 1-Inch Rainfall=1.00"

	Area (sf)	CN	Description
*	2,952	98	ROOF AREA
	2,952		100.00% Impervious Area

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

Subcatchment R9: LOT 9 ROOF

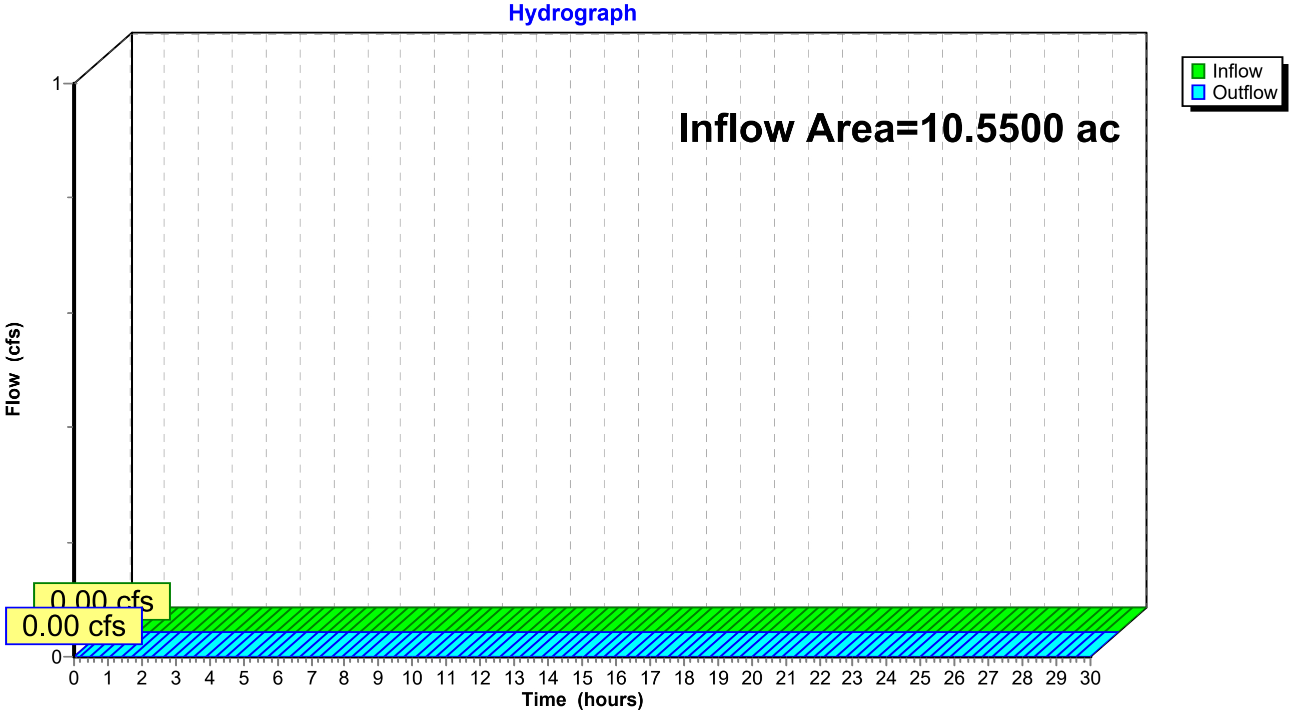


Summary for Reach BVW: WETLANDS

Inflow Area = 10.5500 ac, 19.72% Impervious, Inflow Depth = 0.00" for 1-Inch event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Reach BVW: WETLANDS

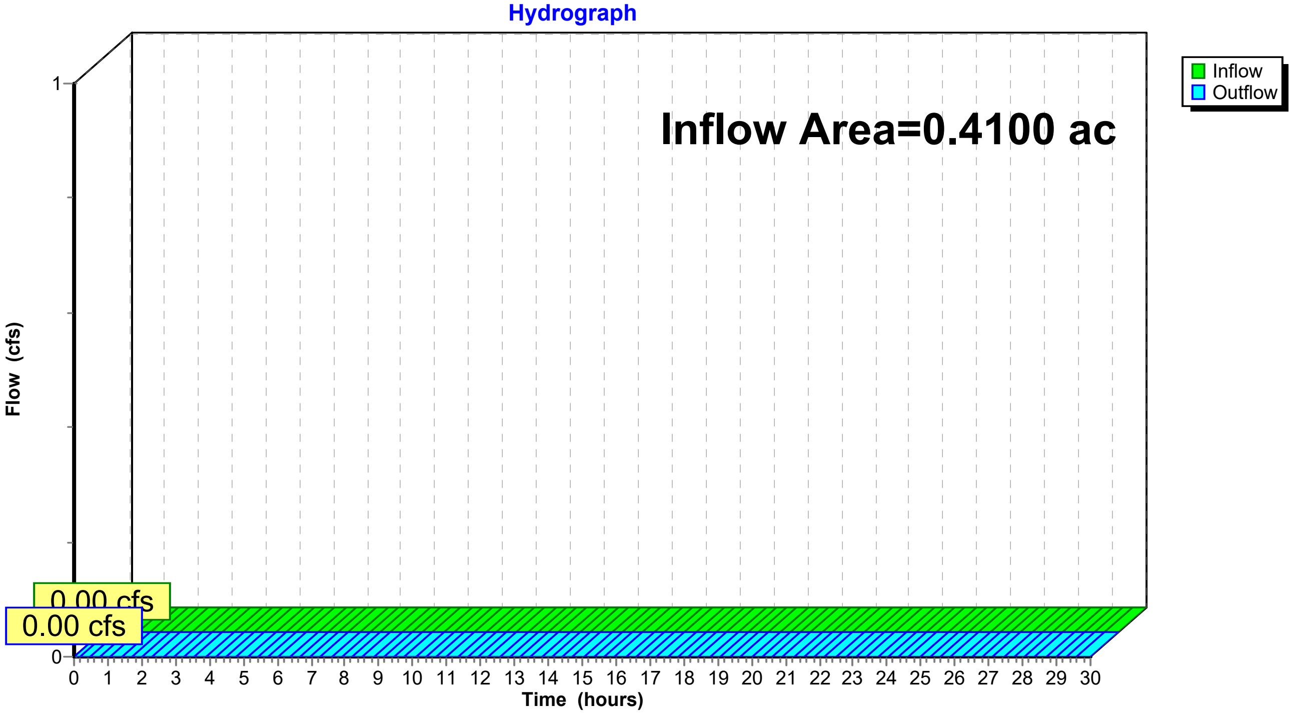


Summary for Reach RD: MAYNARD RD

Inflow Area =	0.4100 ac,	0.00% Impervious,	Inflow Depth =	0.00"	for 1-Inch event	
Inflow =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af		
Outflow =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af,	Atten= 0%,	Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Reach RD: MAYNARD RD

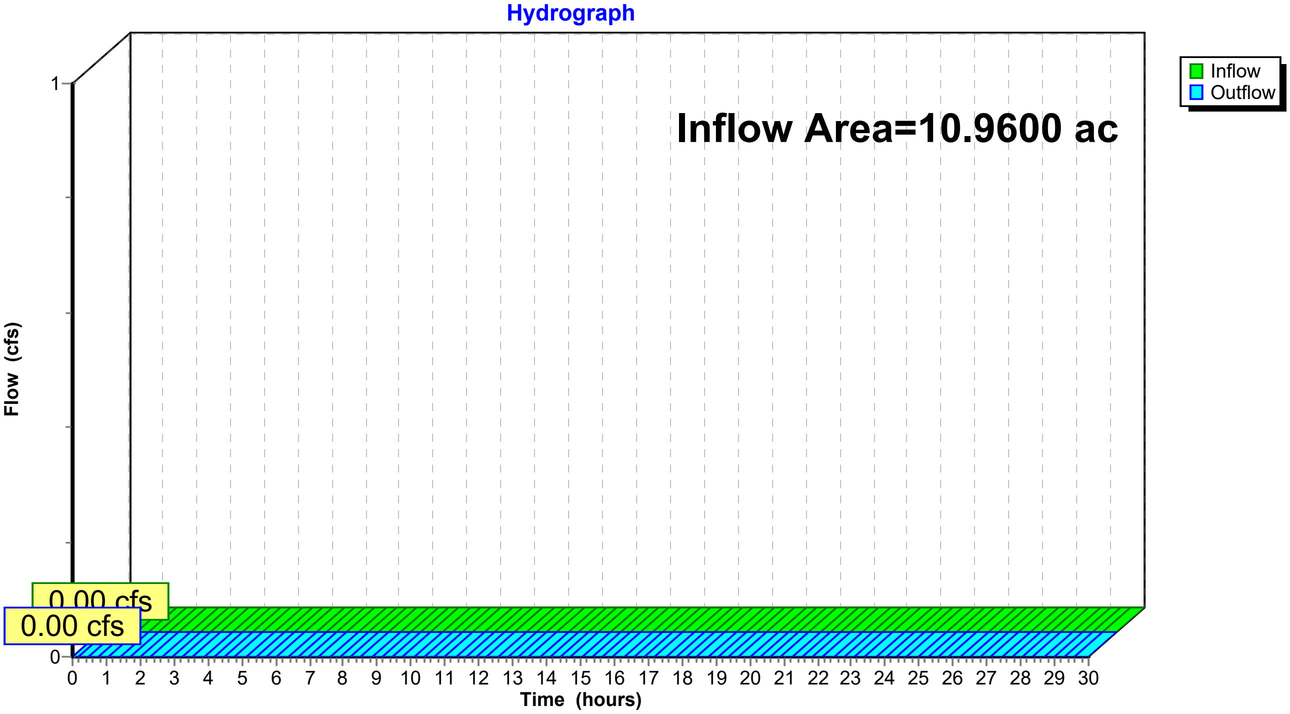


Summary for Reach T: TOTAL

```
Inflow Area =       10.9600 ac, 18.98% Impervious, Inflow Depth =  0.00"   for 1-Inch event
Inflow      =        0.00 cfs @    0.00 hrs, Volume=          0.000 af
Outflow     =        0.00 cfs @    0.00 hrs, Volume=          0.000 af, Atten= 0%, Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

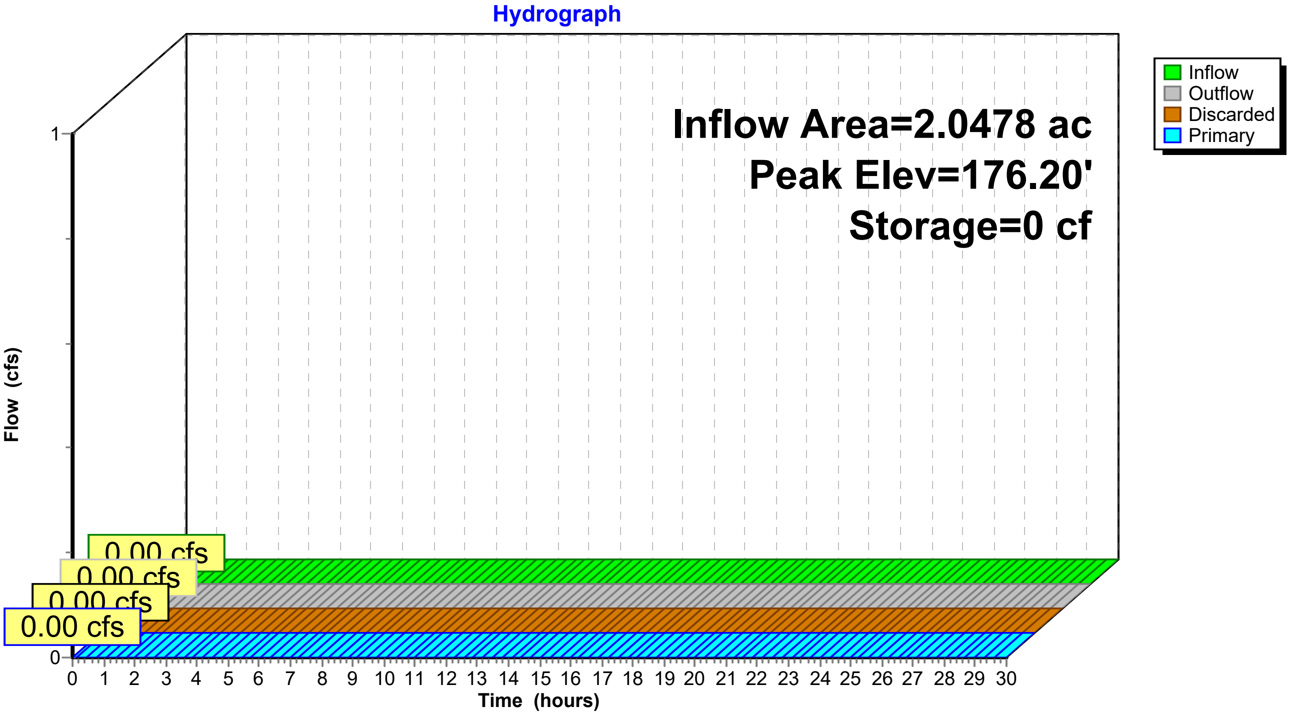
Reach T: TOTAL



Summary for Pond CS1: CHAMBER SYSTEM #1

```
Inflow Area =        2.0478 ac,  16.49% Impervious,  Inflow Depth =   0.00"    for  1-Inch event
Inflow      =       0.00 cfs @    0.00 hrs,  Volume=           0.000 af
Outflow     =       0.00 cfs @    0.00 hrs,  Volume=           0.000 af,  Atten= 0%,  Lag= 0.0 min
Discarded   =       0.00 cfs @    0.00 hrs,  Volume=           0.000 af
Primary     =       0.00 cfs @    0.00 hrs,  Volume=           0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 176.20' @ 0.00 hrs   Surf.Area= 2,888 sf   Storage= 0 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume       Invert    Avail.Storage   Storage Description
   #1       176.20'           578 cf   Custom Stage Data (Prismatic)Listed below (Recalc)
                                       1,444 cf Overall  x 40.0% Voids
   #2       176.70'         4,777 cf   retain_it retain_it  3.0' x 28
                                       Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
                                       Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
   #3       179.70'            44 cf   2.00'D x 2.80'H Vertical Cone/Cylinder x 5 -Impervious
                            5,399 cf   Total Available Storage

 Elevation        Surf.Area       Inc.Store      Cum.Store
    (feet)          (sq-ft)    (cubic-feet)   (cubic-feet)
    176.20            2,888               0              0
    176.70            2,888           1,444          1,444

Device   Routing           Invert   Outlet Devices
   #1    Discarded        176.20'   8.270 in/hr Exfiltration over Surface area
   #2    Primary          176.70'   8.0" Vert. Orifice/Grate   C= 0.600
   #3    Primary          179.30'   4.2' long Sharp-Crested Rectangular Weir  2 End Contraction(s)
                                    3.5' Crest Height

Discarded OutFlow  Max=0.00 cfs @ 0.00 hrs  HW=176.20'   (Free Discharge)
└─1=Exfiltration  (Passes 0.00 cfs of 0.55 cfs potential flow)

Primary OutFlow  Max=0.00 cfs @ 0.00 hrs  HW=176.20'  TW=0.00'   (Dynamic Tailwater)
├─2=Orifice/Grate  ( Controls 0.00 cfs)
└─3=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)
```

Pond CS1: CHAMBER SYSTEM #1



Summary for Pond CS2: CHAMBER SYSTEM #2

Inflow Area = 1.5178 ac, 19.62% Impervious, Inflow Depth = 0.04" for 1-Inch event
Inflow = 0.06 cfs @ 12.07 hrs, Volume= 0.004 af
Outflow = 0.06 cfs @ 12.07 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.06 cfs @ 12.07 hrs, Volume= 0.004 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 177.00' @ 0.00 hrs Surf.Area= 1,100 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (786.9 - 786.9)

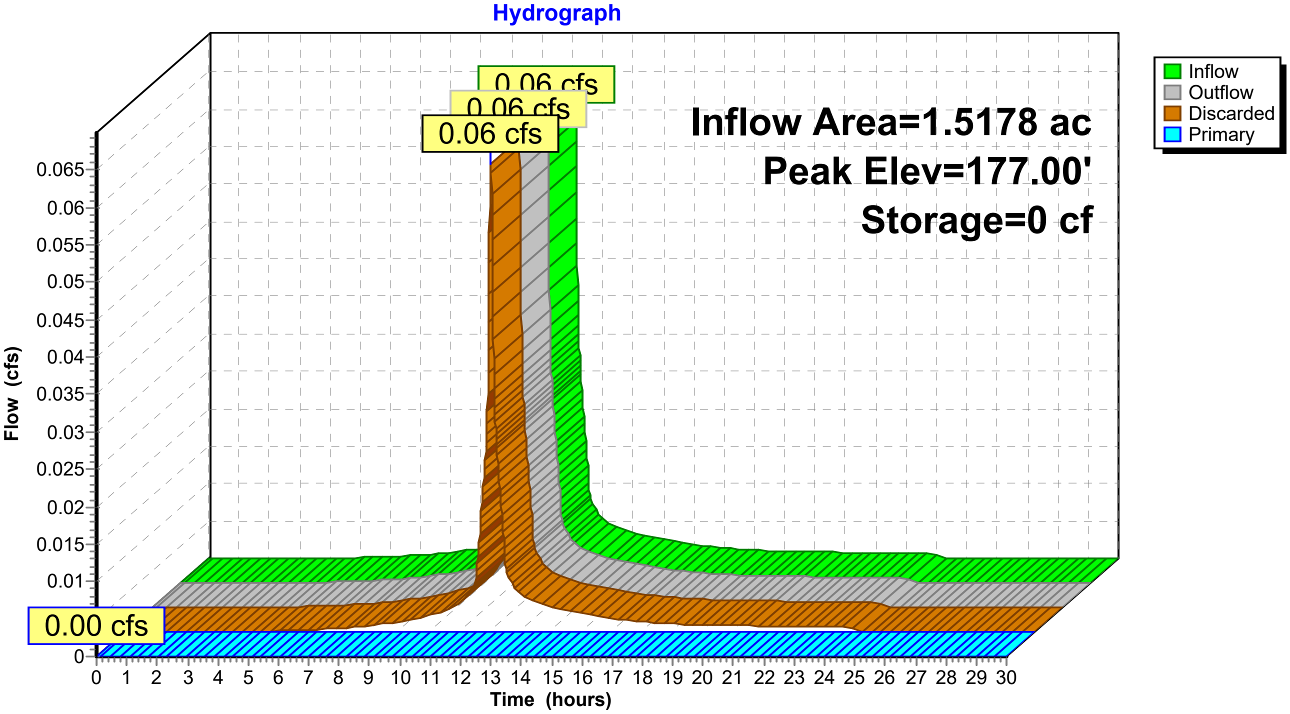
Volume	Invert	Avail.Storage	Storage Description
#1	177.00'	854 cf	**22.00'W x 50.00'L x 5.20'H Prismatoid** 5,720 cf Overall - 3,584 cf Embedded = 2,136 cf x 40.0% Voids
#2	177.50'	2,650 cf	**retain_it retain_it 4.0'** x 12 Inside #1 Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf 2 Rows adjusted for 120.8 cf perimeter wall
		3,505 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	177.50'	**10.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	177.00'	**8.270 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.00 cfs @ 12.07 hrs HW=177.00' (Free Discharge)
↑**2=Exfiltration** (Passes 0.00 cfs of 0.21 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=177.00' TW=176.20' (Dynamic Tailwater)
↑**1=Orifice/Grate** (Controls 0.00 cfs)

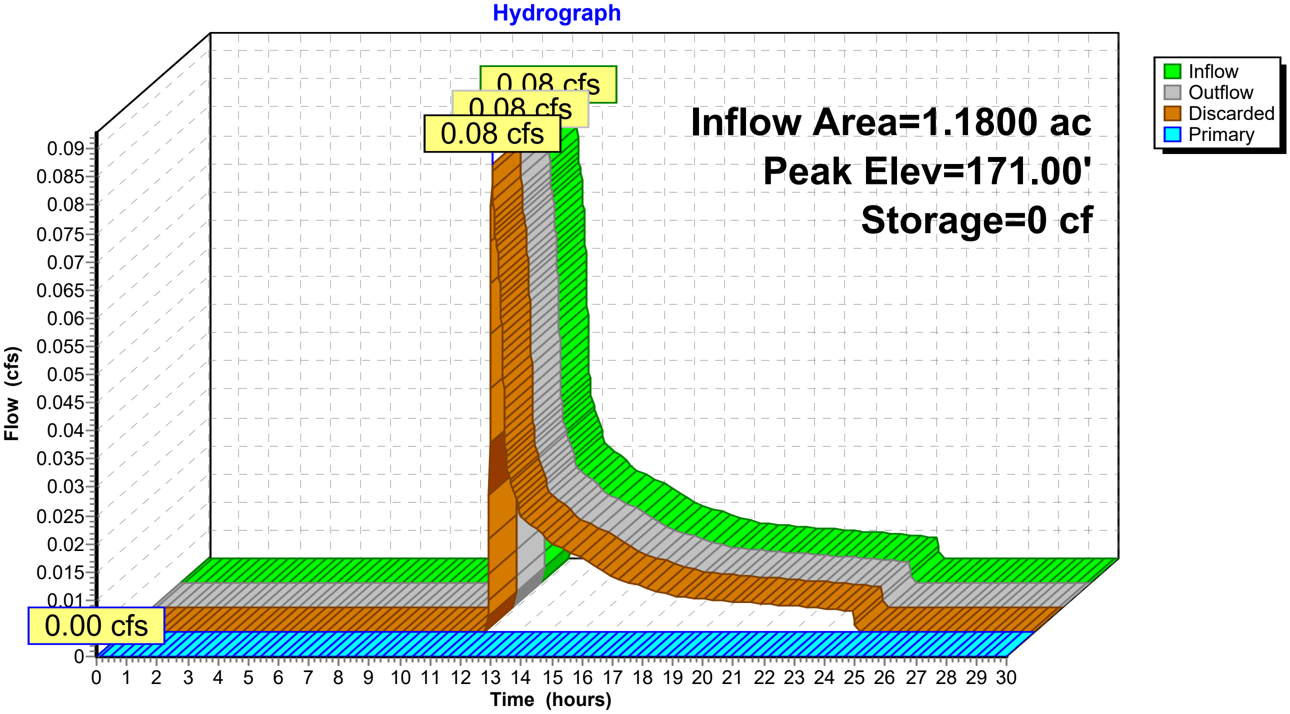
Pond CS2: CHAMBER SYSTEM #2



Summary for Pond CS3: CHAMBER SYSTEM #3

```
Inflow Area =        1.1800 ac,  57.63% Impervious,  Inflow Depth =   0.11"    for  1-Inch event
Inflow      =        0.08 cfs @   12.12 hrs,  Volume=          0.011 af
Outflow     =        0.08 cfs @   12.12 hrs,  Volume=          0.011 af,  Atten= 0%,  Lag= 0.0 min
Discarded   =        0.08 cfs @   12.12 hrs,  Volume=          0.011 af
Primary     =        0.00 cfs @    0.00 hrs,  Volume=          0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 171.00' @ 12.12 hrs   Surf.Area= 2,584 sf   Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min ( 927.1 - 927.1 )

Volume       Invert    Avail.Storage   Storage Description
   #1       171.00'         1,034 cf   34.00'W x 76.00'L x 1.00'H Prismatoid
                                       2,584 cf Overall  x 40.0% Voids
   #2       172.00'           339 cf   2.00'W x 212.00'L x 2.00'H Prismatoid-Impervious
                                       848 cf Overall  x 40.0% Voids
   #3       172.00'         5,274 cf   retain_it retain_it  3.5' x 27
                                       Inside= 84.0"W x 42.0"H => 25.10 sf x 8.00'L = 200.8 cf
                                       Outside= 96.0"W x 50.0"H => 33.33 sf x 8.00'L = 266.7 cf
                                       3 Rows adjusted for 147.4 cf perimeter wall
   #4       172.00'           177 cf   15.0"  Round Pipe Storage-Impervious
                                       L= 144.0'  S= 0.0050 '/'
                                6,823 cf   Total Available Storage

Device   Routing         Invert   Outlet Devices
   #1    Primary        172.50'   4.0" Vert. Orifice/Grate   C= 0.600
   #2    Primary        173.50'   12.0" Vert. Orifice/Grate   C= 0.600
   #3    Discarded      171.00'   2.410 in/hr Exfiltration over Horizontal area

Discarded OutFlow  Max=0.14 cfs @ 12.12 hrs  HW=171.00'   (Free Discharge)
└─3=Exfiltration  (Exfiltration Controls 0.14 cfs)

Primary OutFlow  Max=0.00 cfs @ 0.00 hrs  HW=171.00'  TW=0.00'   (Dynamic Tailwater)
├─1=Orifice/Grate  ( Controls 0.00 cfs)
└─2=Orifice/Grate  ( Controls 0.00 cfs)
```

Pond CS3: CHAMBER SYSTEM #3



Summary for Pond CS4: CHAMBER SYSTEM #4

Inflow Area = 0.2000 ac, 65.00% Impervious, Inflow Depth = 0.17" for 1-Inch event
Inflow = 0.03 cfs @ 12.10 hrs, Volume= 0.003 af
Outflow = 0.03 cfs @ 12.10 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.03 cfs @ 12.10 hrs, Volume= 0.003 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 173.50' @ 12.10 hrs Surf.Area= 924 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (899.3 - 899.3)

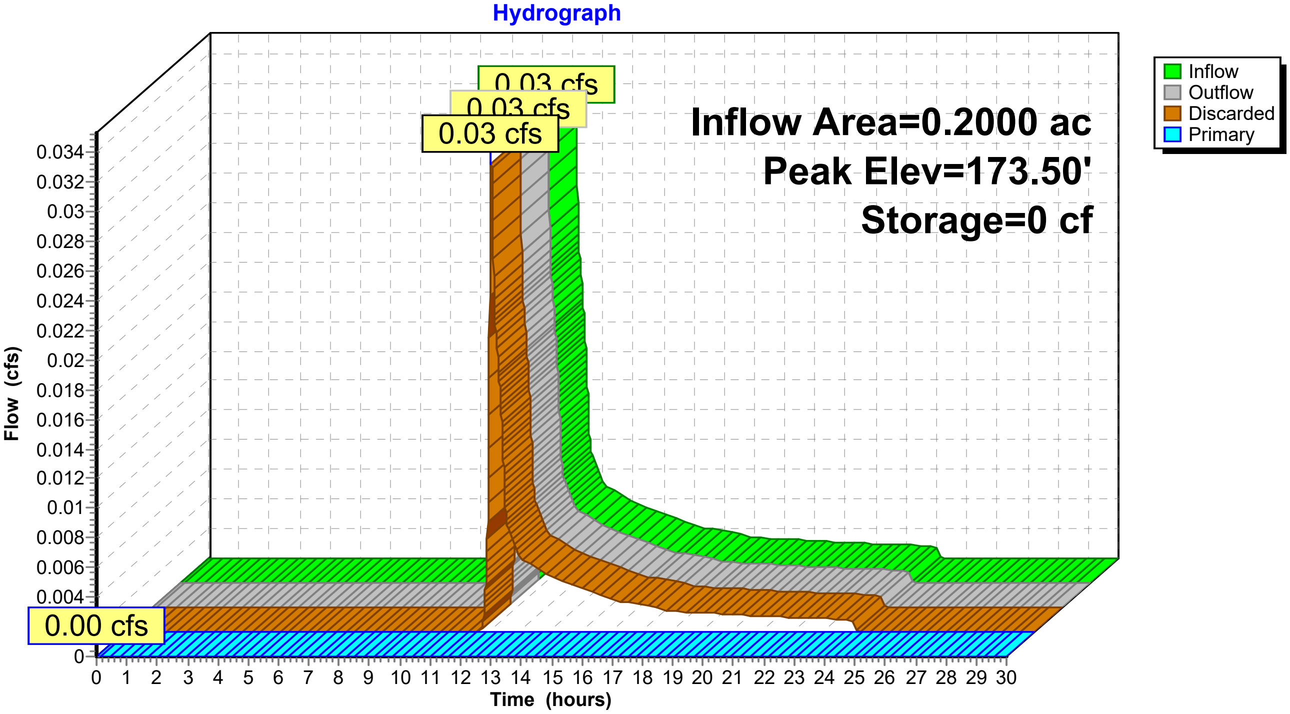
Volume	Invert	Avail.Storage	Storage Description
#1	173.50'	614 cf	**22.00'W x 42.00'L x 4.20'H Prismatoid** 3,881 cf Overall - 2,347 cf Embedded = 1,534 cf x 40.0% Voids
#2	174.00'	1,640 cf	**retain_it retain_it 3.0'** x 10 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 2 Rows adjusted for 66.1 cf perimeter wall
		2,254 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	176.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	173.50'	**2.410 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.05 cfs @ 12.10 hrs HW=173.50' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=173.50' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

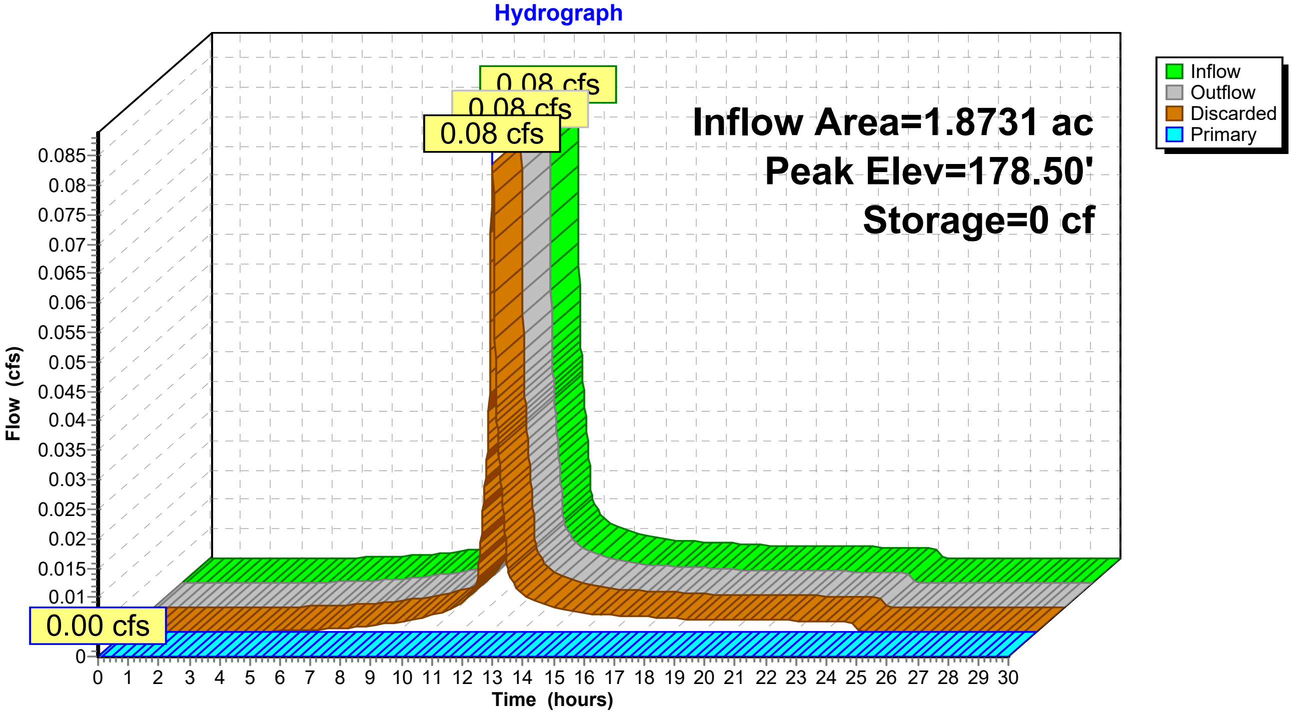
Pond CS4: CHAMBER SYSTEM #4



Summary for Pond CS5: CHAMBER SYSTEM #5

```
Inflow Area =      1.8731 ac, 33.80% Impervious, Inflow Depth =  0.04"   for 1-Inch event
Inflow      =     0.08 cfs @  12.07 hrs, Volume=          0.006 af
Outflow     =     0.08 cfs @  12.07 hrs, Volume=          0.006 af, Atten= 0%, Lag= 0.0 min
Discarded   =     0.08 cfs @  12.07 hrs, Volume=          0.006 af
Primary     =     0.00 cfs @   0.00 hrs, Volume=          0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 178.50' @ 0.00 hrs   Surf.Area= 1,820 sf   Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min ( 829.8 - 829.8 )

Volume      Invert   Avail.Storage  Storage Description
------------------------------------------------------------------------------------
  #1       178.50'          364 cf  26.00'W x 70.00'L x 0.50'H Prismatoid
                                    910 cf Overall  x 40.0% Voids
  #2       179.00'        5,376 cf  retain_it retain_it  4.0' x 24
                                    Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf
                                    Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf
                                    3 Rows adjusted for 166.1 cf perimeter wall
------------------------------------------------------------------------------------
                          5,740 cf  Total Available Storage

Device  Routing       Invert  Outlet Devices
------------------------------------------------------------------------------------
  #1    Primary      179.00'  10.0" Vert. Orifice/Grate   C= 0.600
  #2    Discarded    178.50'  8.270 in/hr Exfiltration over Horizontal area

Discarded OutFlow  Max=0.00 cfs @ 12.07 hrs  HW=178.50'   (Free Discharge)
  └─2=Exfiltration  (Passes 0.00 cfs of 0.35 cfs potential flow)

Primary OutFlow  Max=0.00 cfs @ 0.00 hrs  HW=178.50'  TW=0.00'   (Dynamic Tailwater)
  └─1=Orifice/Grate  ( Controls 0.00 cfs)
```

Pond CS5: CHAMBER SYSTEM #5



Summary for Pond CS6: CHAMBER SYSTEM #6

Inflow Area = 1.5573 ac, 4.32% Impervious, Inflow Depth = 0.03" for 1-Inch event
Inflow = 0.06 cfs @ 12.07 hrs, Volume= 0.004 af
Outflow = 0.06 cfs @ 12.07 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.06 cfs @ 12.07 hrs, Volume= 0.004 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 167.00' @ 12.07 hrs Surf.Area= 1,260 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (786.9 - 786.9)

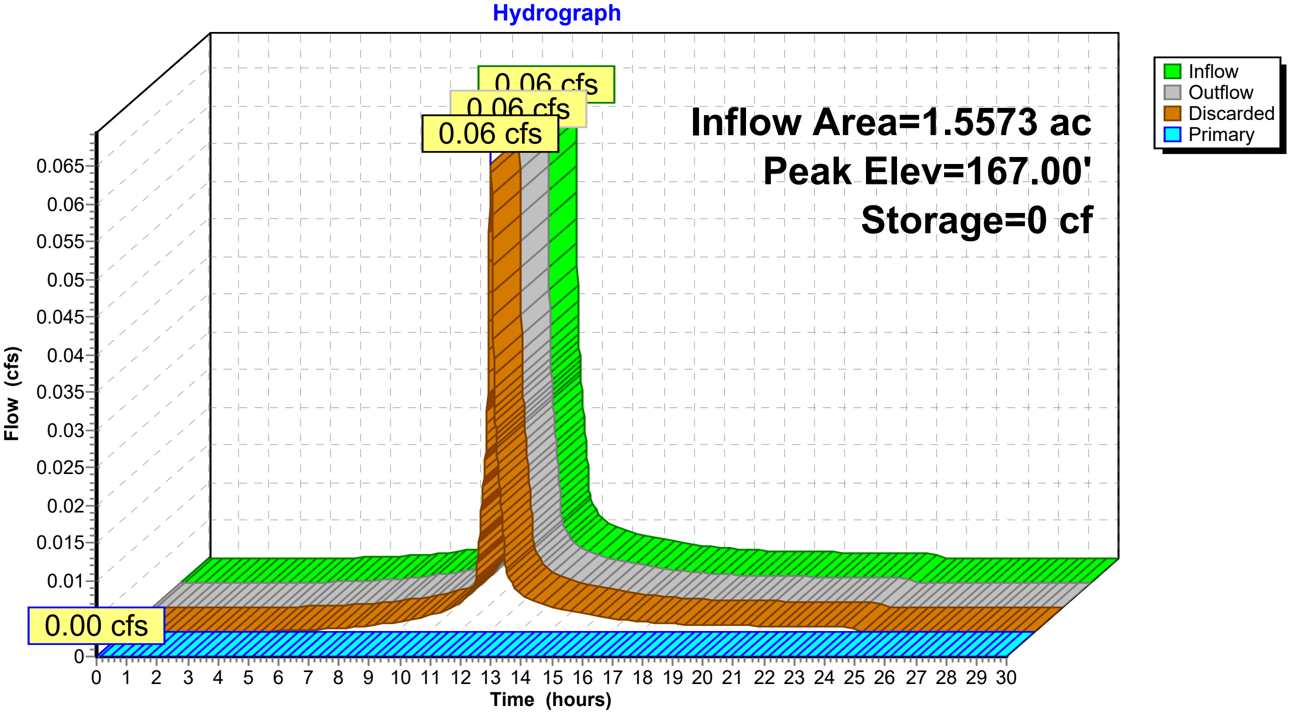
Volume	Invert	Avail.Storage	Storage Description
#1	167.00'	252 cf	**30.00'W x 42.00'L x 0.50'H Prismatoid** 630 cf Overall x 40.0% Voids
#2	167.50'	3,773 cf	**retain_it retain_it 4.5'** x 15 Inside= 84.0"W x 54.0"H => 32.64 sf x 8.00'L = 261.1 cf Outside= 96.0"W x 62.0"H => 41.33 sf x 8.00'L = 330.7 cf 3 Rows adjusted for 143.5 cf perimeter wall
		4,025 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	171.20'	**2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns** X 12 rows C= 0.600 in 48.0" x 24.0" Grate (25% open area) Limited to weir flow at low heads
#2	Discarded	167.00'	**2.410 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.07 cfs @ 12.07 hrs HW=167.00' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=167.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Pond CS6: CHAMBER SYSTEM #6



Summary for Pond DW2: LOT 2 DW

Inflow Area = 0.0871 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.08 cfs @ 12.07 hrs, Volume= 0.006 af
Outflow = 0.04 cfs @ 12.15 hrs, Volume= 0.006 af, Atten= 45%, Lag= 4.7 min
Discarded = 0.04 cfs @ 12.15 hrs, Volume= 0.006 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 183.05' @ 12.18 hrs Surf.Area= 792 sf Storage= 15 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.1 min (788.0 - 786.9)

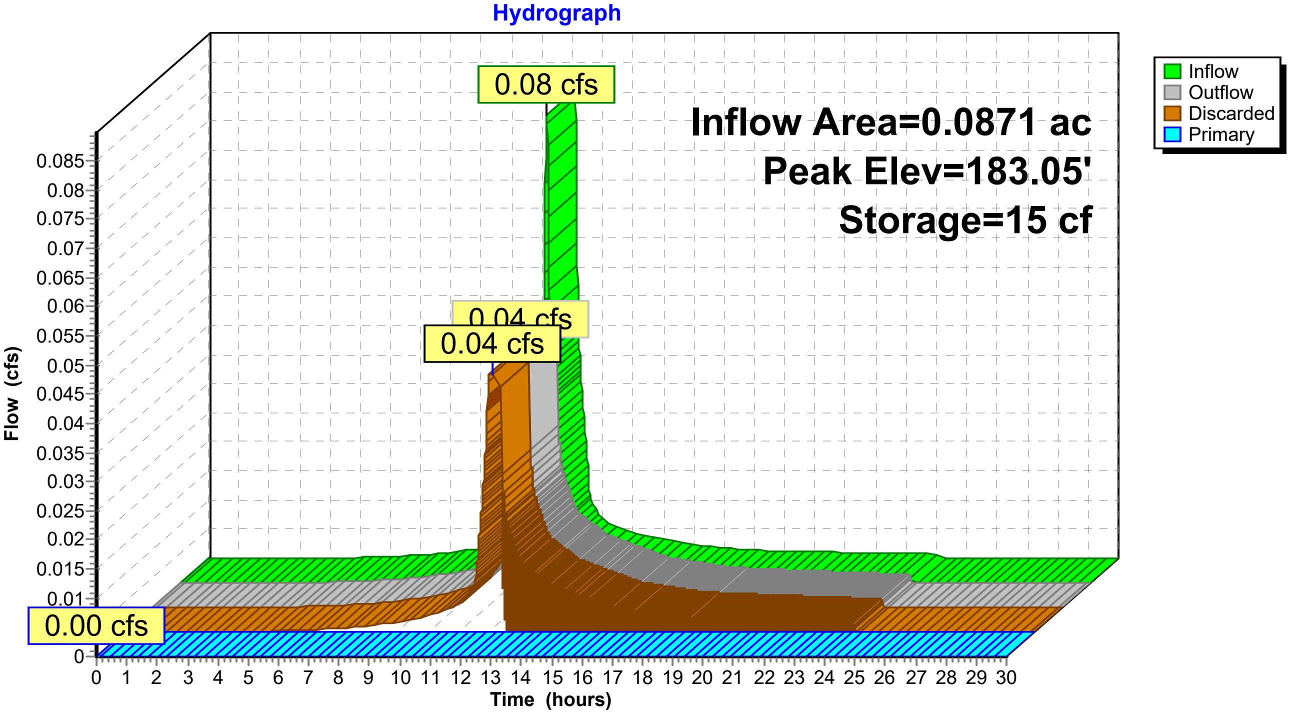
Volume	Invert	Avail.Storage	Storage Description
#1	183.00'	602 cf	**18.00'W x 44.00'L x 2.60'H Prismatoid** 2,059 cf Overall - 553 cf Embedded = 1,506 cf x 40.0% Voids
#2	183.50'	553 cf	**Cultec R-150XLHD** x 20 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 5 rows
#3	184.70'	1 cf	**0.33'D x 6.30'H Vertical Cone/Cylinder** x 2
		1,157 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	183.00'	**2.410 in/hr Exfiltration over Horizontal area**
#2	Primary	192.00'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600

Discarded OutFlow Max=0.04 cfs @ 12.15 hrs HW=183.04' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=183.00' TW=178.50' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

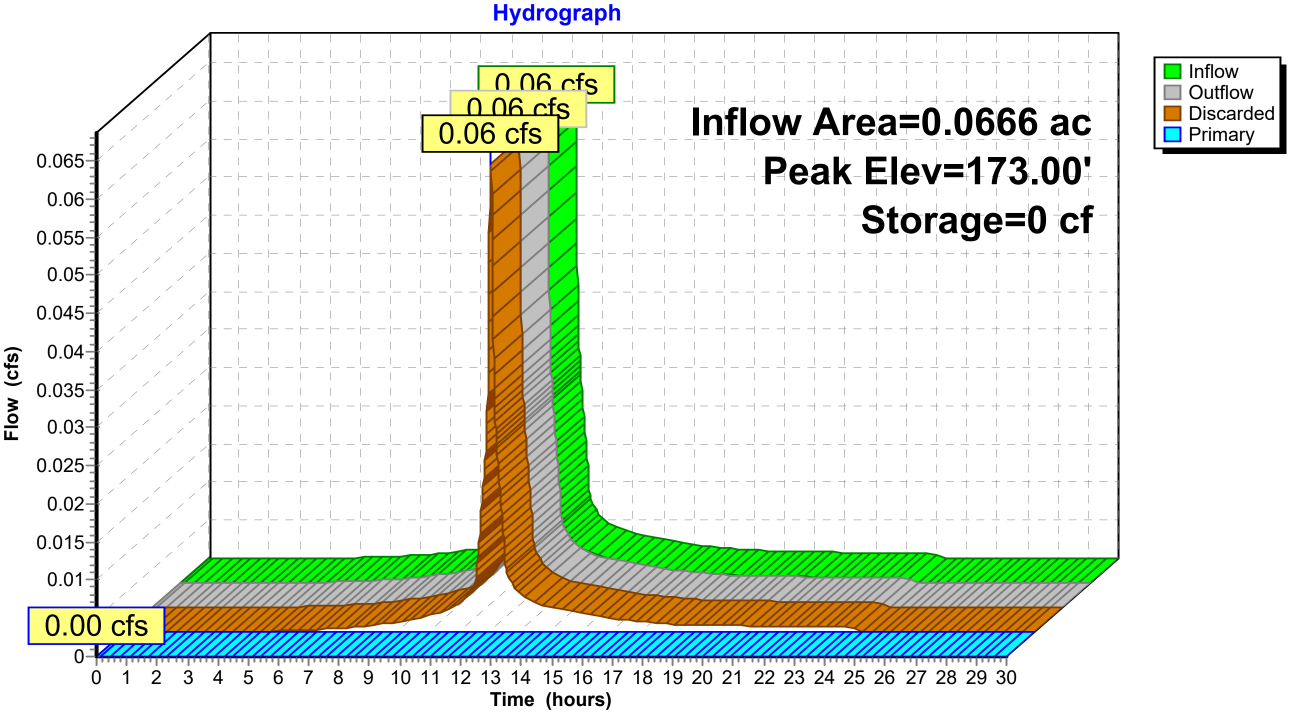
Pond DW2: LOT 2 DW



Summary for Pond DW3: LOT 3 DW

```
Inflow Area =        0.0666 ac,100.00% Impervious,  Inflow Depth =   0.79"    for  1-Inch event
Inflow      =       0.06 cfs @   12.07 hrs,  Volume=            0.004 af
Outflow     =       0.06 cfs @   12.07 hrs,  Volume=            0.004 af,  Atten= 0%,  Lag= 0.1 min
Discarded   =       0.06 cfs @   12.07 hrs,  Volume=            0.004 af
Primary     =       0.00 cfs @    0.00 hrs,  Volume=            0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 173.00' @ 12.07 hrs   Surf.Area= 338 sf   Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min ( 786.9 - 786.9 )

Volume      Invert    Avail.Storage   Storage Description
   #1       173.00'          339 cf   13.00'W x 26.00'L x 3.30'H Prismatoid
                                      1,115 cf Overall - 267 cf Embedded = 848 cf  x 40.0% Voids
   #2       173.50'          267 cf   Cultec R-280HD x 6  Inside #1
                                      Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf
                                      Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap
                                      Row Length Adjustment= +1.00' x 6.07 sf x 2 rows
   #3       175.60'            1 cf   0.33'D x 4.30'H Vertical Cone/Cylinder x 2
                                 607 cf   Total Available Storage

Device   Routing         Invert    Outlet Devices
   #1    Discarded      173.00'    8.270 in/hr Exfiltration over Horizontal area
   #2    Primary        179.00'    4.0" Vert. Orifice/Grate X 2.00   C= 0.600

Discarded OutFlow  Max=0.06 cfs @ 12.07 hrs  HW=173.00'   (Free Discharge)
└─1=Exfiltration  (Exfiltration Controls 0.06 cfs)

Primary OutFlow  Max=0.00 cfs @ 0.00 hrs  HW=173.00'  TW=0.00'   (Dynamic Tailwater)
└─2=Orifice/Grate  ( Controls 0.00 cfs)
```

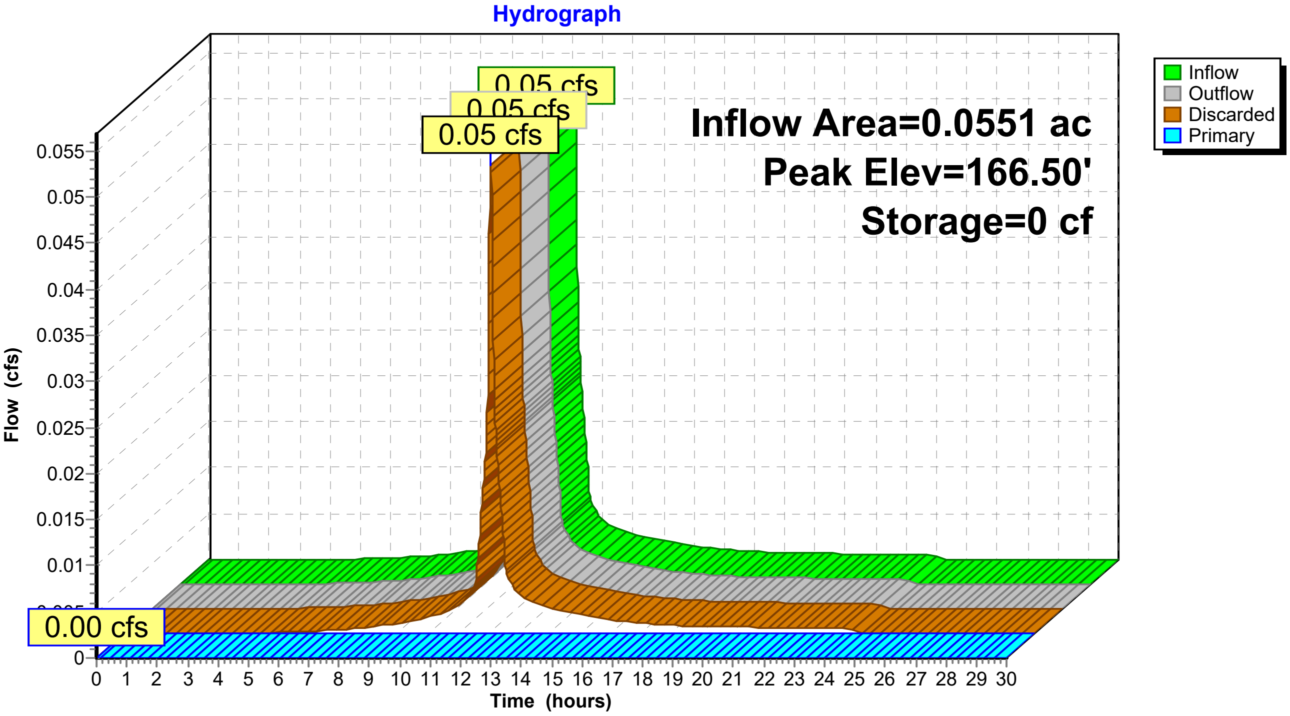
Pond DW3: LOT 3 DW



Summary for Pond DW4: LOT 4 DW

```
Inflow Area =        0.0551 ac,100.00% Impervious,  Inflow Depth =   0.79"    for  1-Inch event
Inflow      =        0.05 cfs @   12.07 hrs,  Volume=          0.004 af
Outflow     =        0.05 cfs @   12.07 hrs,  Volume=          0.004 af,  Atten= 0%,  Lag= 0.1 min
Discarded   =        0.05 cfs @   12.07 hrs,  Volume=          0.004 af
Primary     =        0.00 cfs @    0.00 hrs,  Volume=          0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 166.50' @ 12.07 hrs   Surf.Area= 286 sf   Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min ( 786.9 - 786.9 )

Volume       Invert    Avail.Storage   Storage Description
   #1       166.50'           271 cf   11.00'W x 26.00'L x 3.30'H Prismatoid
                                       944 cf Overall - 267 cf Embedded = 677 cf  x 40.0% Voids
   #2       167.00'           267 cf   Cultec R-280HD x 6  Inside #1
                                       Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf
                                       Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap
                                       Row Length Adjustment= +1.00' x 6.07 sf x 2 rows
   #3       169.20'             0 cf   0.33'D x 2.50'H Vertical Cone/Cylinder x 2
                              538 cf   Total Available Storage

Device   Routing          Invert   Outlet Devices
   #1    Discarded       166.50'   8.270 in/hr Exfiltration over Horizontal area
   #2    Primary         173.00'   4.0" Vert. Orifice/Grate X 12.00   C= 0.600

Discarded OutFlow  Max=0.05 cfs @ 12.07 hrs  HW=166.50'   (Free Discharge)
 └─1=Exfiltration  (Exfiltration Controls 0.05 cfs)

Primary OutFlow  Max=0.00 cfs @ 0.00 hrs  HW=166.50'  TW=0.00'   (Dynamic Tailwater)
 └─2=Orifice/Grate  ( Controls 0.00 cfs)
```

Pond DW4: LOT 4 DW



Summary for Pond DW6/7: LOTS 6 & 7

Inflow Area = 0.1101 ac,100.00% Impervious, Inflow Depth = 0.79" for 1-Inch event
Inflow = 0.10 cfs @ 12.07 hrs, Volume= 0.007 af
Outflow = 0.10 cfs @ 12.07 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.10 cfs @ 12.07 hrs, Volume= 0.007 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 100.00' @ 12.07 hrs Surf.Area= 572 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (786.9 - 786.9)

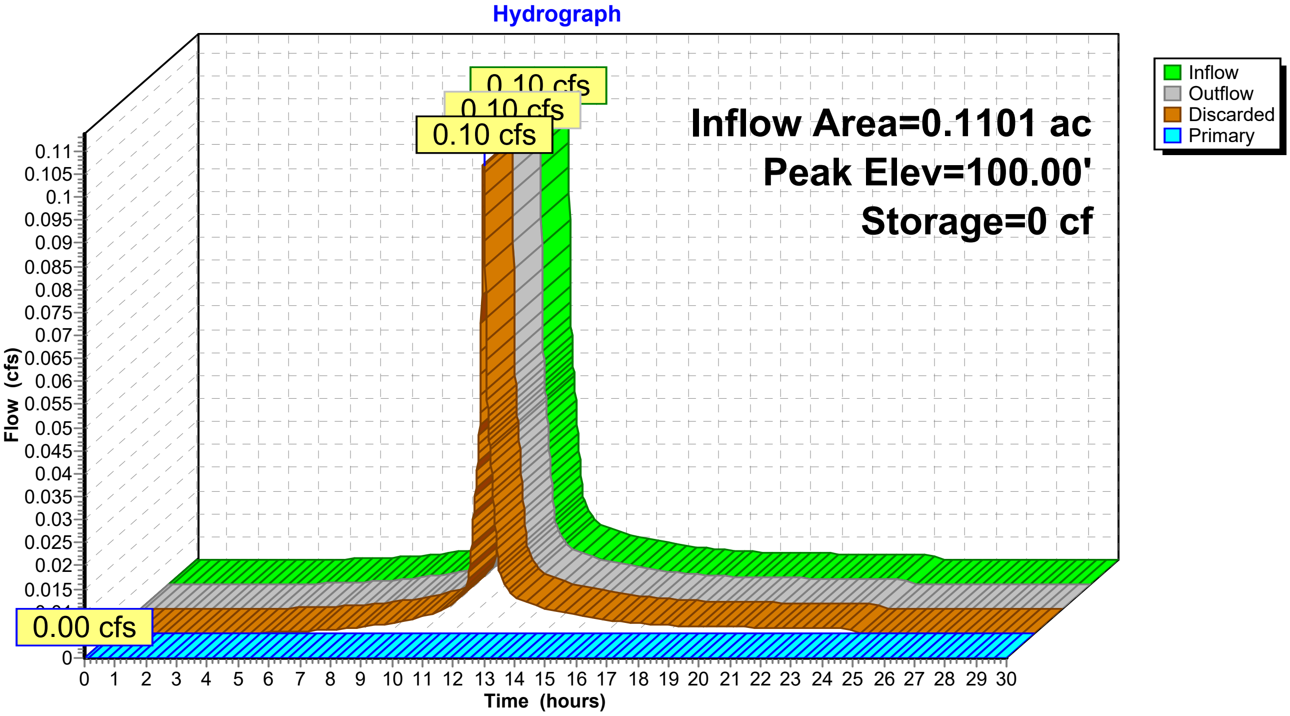
Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	546 cf	**11.00'W x 26.00'L x 3.30'H Prismatoid** x 2 1,888 cf Overall - 522 cf Embedded = 1,365 cf x 40.0% Voids
#2	100.50'	522 cf	**Cultec R-280HD** x 12 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 2 rows
#3	101.00'	0 cf	**0.33'D x 2.00'H Vertical Cone/Cylinder** x 2
		1,069 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	176.00'	**4.0" Vert. Orifice/Grate X 12.00** C= 0.600

Discarded OutFlow Max=0.11 cfs @ 12.07 hrs HW=100.00' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=100.00' TW=0.00' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond DW6/7: LOTS 6 & 7



Summary for Subcatchment PR1:

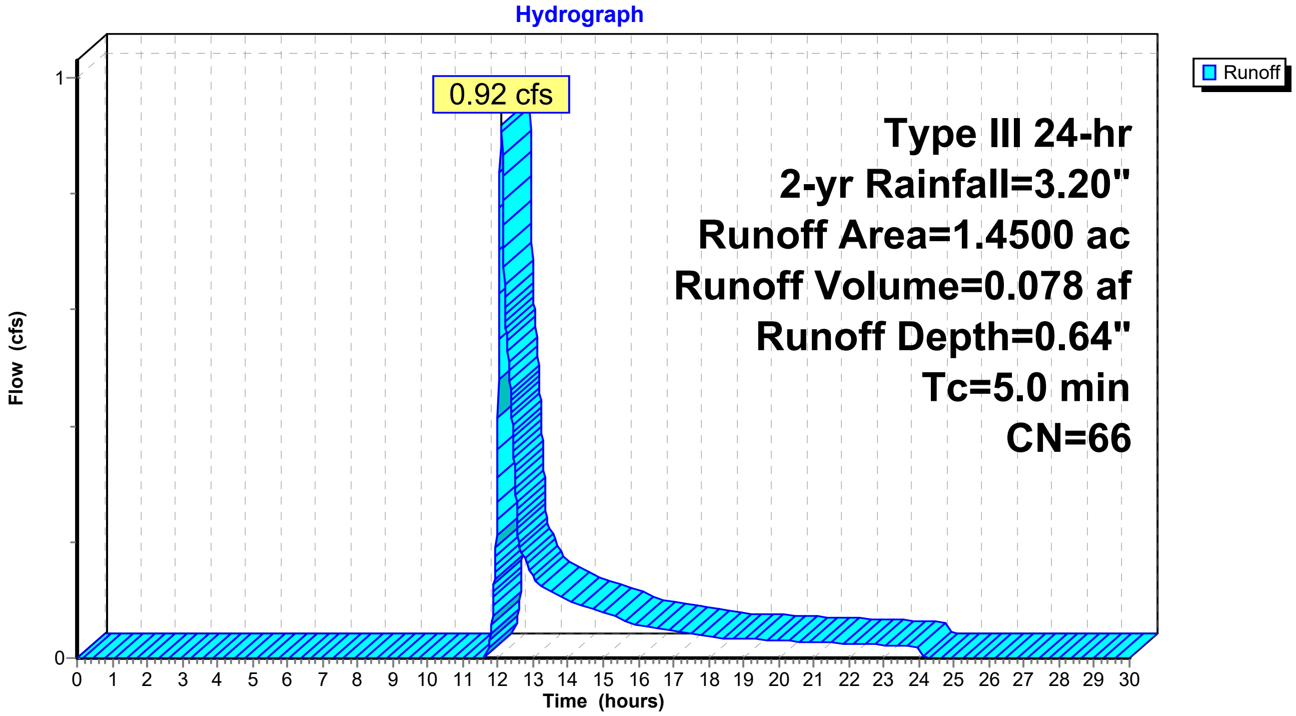
Runoff = 0.92 cfs @ 12.09 hrs, Volume= 0.078 af, Depth= 0.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.20"

	Area (ac)	CN	Description
	1.0800	61	>75% Grass cover, Good, HSG B
*	0.2300	98	Pavement
	0.1400	55	Woods, Good, HSG B
	1.4500	66	Weighted Average
	1.2200		84.14% Pervious Area
	0.2300		15.86% Impervious Area

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

Subcatchment PR1:



Summary for Subcatchment PR2:

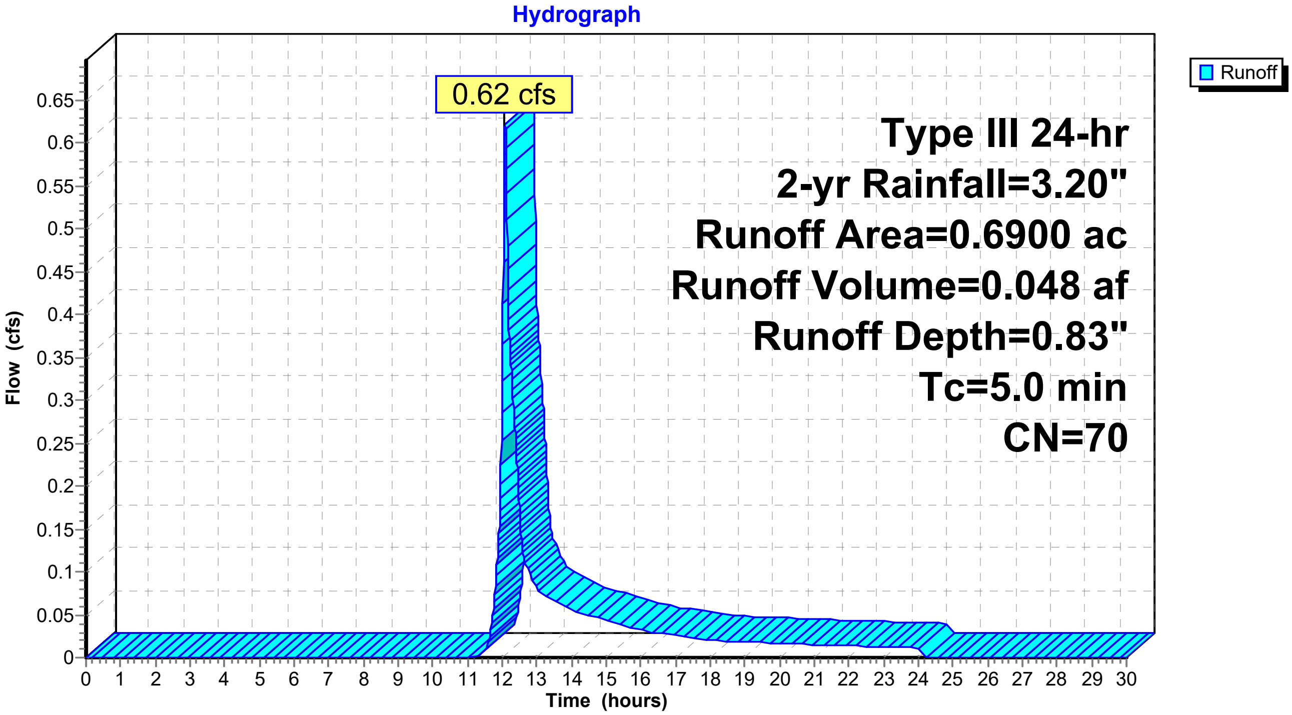
Runoff = 0.62 cfs @ 12.09 hrs, Volume= 0.048 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.20"

	Area (ac)	CN	Description
	0.4100	61	>75% Grass cover, Good, HSG B
*	0.1900	98	Pavement
	0.0900	55	Woods, Good, HSG B
	0.6900	70	Weighted Average
	0.5000		72.46% Pervious Area
	0.1900		27.54% Impervious Area

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

Subcatchment PR2:



Summary for Subcatchment PR3:

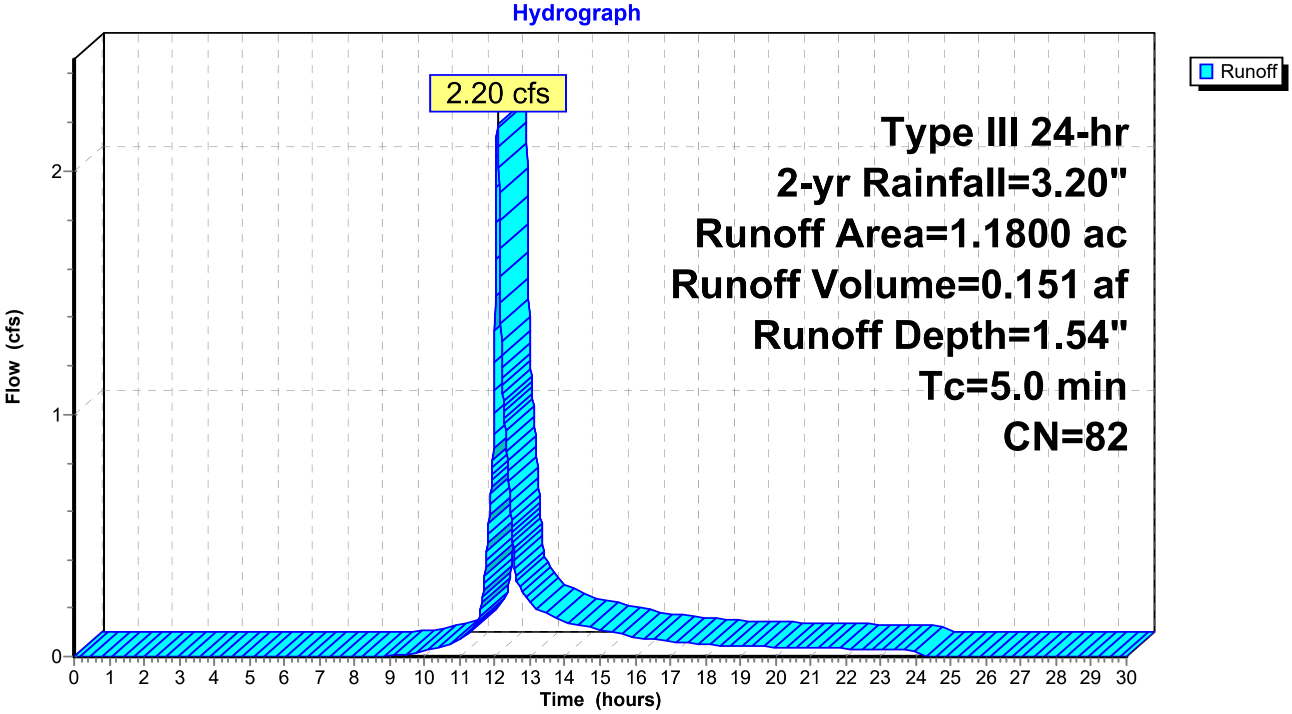
Runoff = 2.20 cfs @ 12.08 hrs, Volume= 0.151 af, Depth= 1.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.20"

	Area (ac)	CN	Description
	0.5000	61	>75% Grass cover, Good, HSG B
*	0.6800	98	Pavement
	1.1800	82	Weighted Average
	0.5000		42.37% Pervious Area
	0.6800		57.63% Impervious Area

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

Subcatchment PR3:



Summary for Subcatchment PR4:

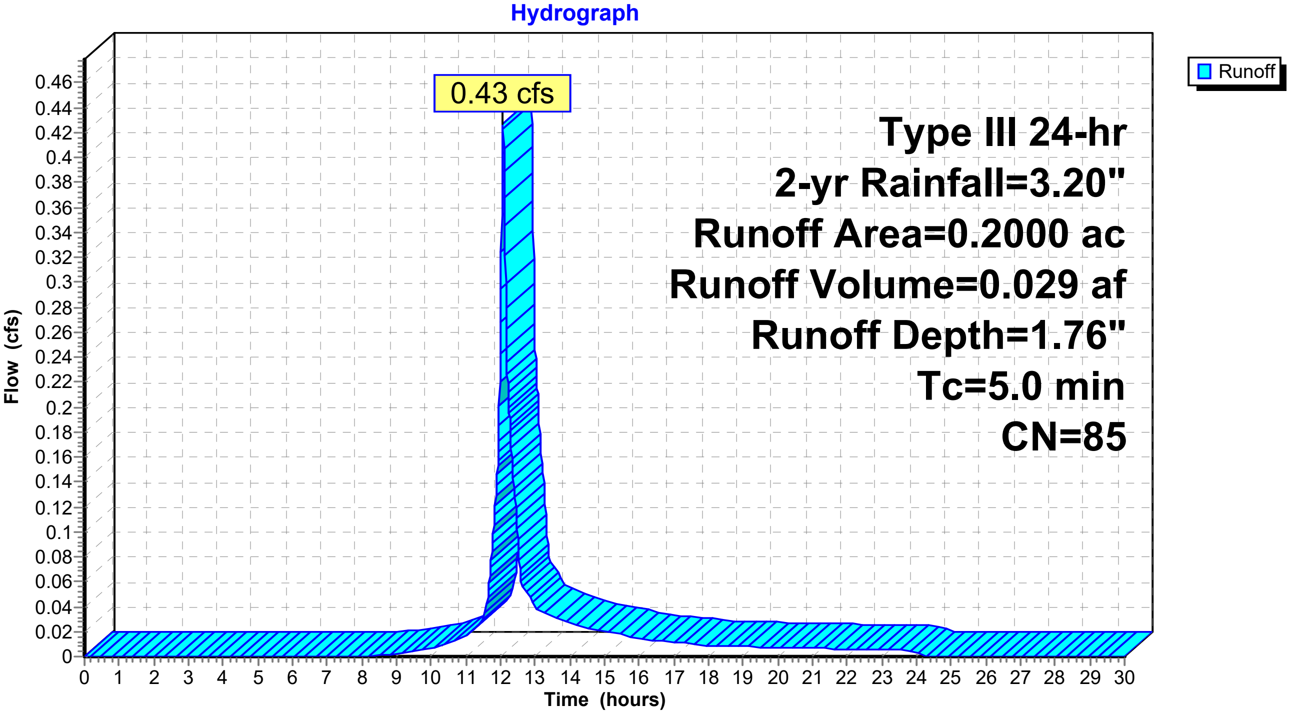
Runoff = 0.43 cfs @ 12.08 hrs, Volume= 0.029 af, Depth= 1.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.20"

	Area (ac)	CN	Description
	0.0700	61	>75% Grass cover, Good, HSG B
*	0.1300	98	Pavement
	0.2000	85	Weighted Average
	0.0700		35.00% Pervious Area
	0.1300		65.00% Impervious Area

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

Subcatchment PR4:



Summary for Subcatchment PR5:

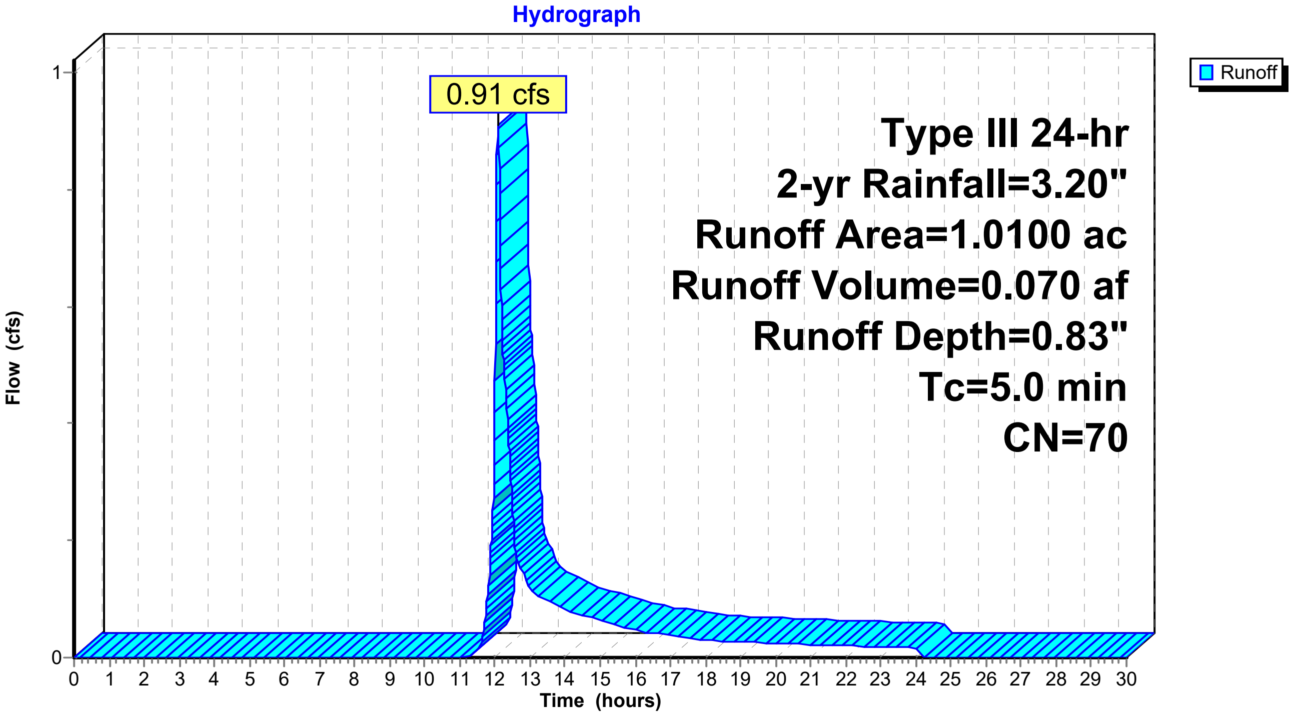
Runoff = 0.91 cfs @ 12.09 hrs, Volume= 0.070 af, Depth= 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.20"

	Area (ac)	CN	Description
	0.6200	61	>75% Grass cover, Good, HSG B
*	0.2700	98	Pavement
	0.1200	55	Woods, Good, HSG B
	1.0100	70	Weighted Average
	0.7400		73.27% Pervious Area
	0.2700		26.73% Impervious Area

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

Subcatchment PR5:



Summary for Subcatchment PR6:

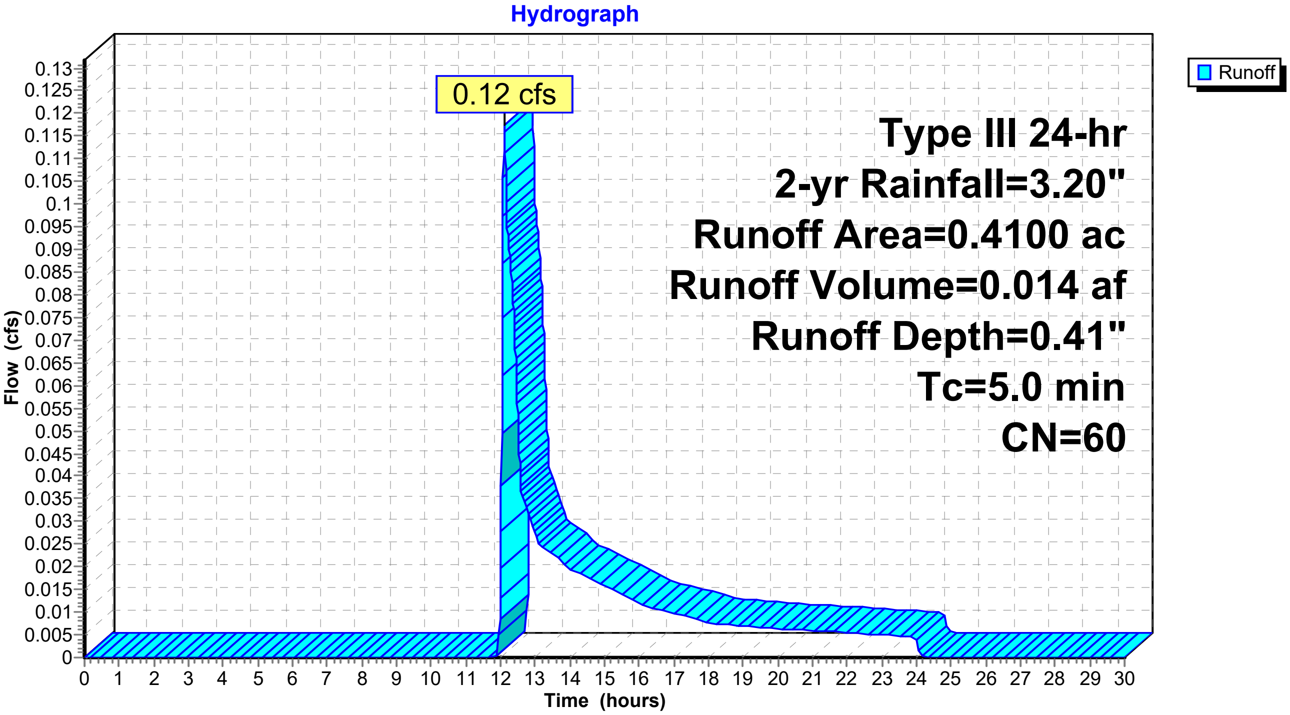
Runoff = 0.12 cfs @ 12.11 hrs, Volume= 0.014 af, Depth= 0.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.20"

Area (ac)	CN	Description
0.3100	61	>75% Grass cover, Good, HSG B
0.1000	55	Woods, Good, HSG B
0.4100	60	Weighted Average
0.4100		100.00% Pervious Area

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

Subcatchment PR6:



Summary for Subcatchment PR7:

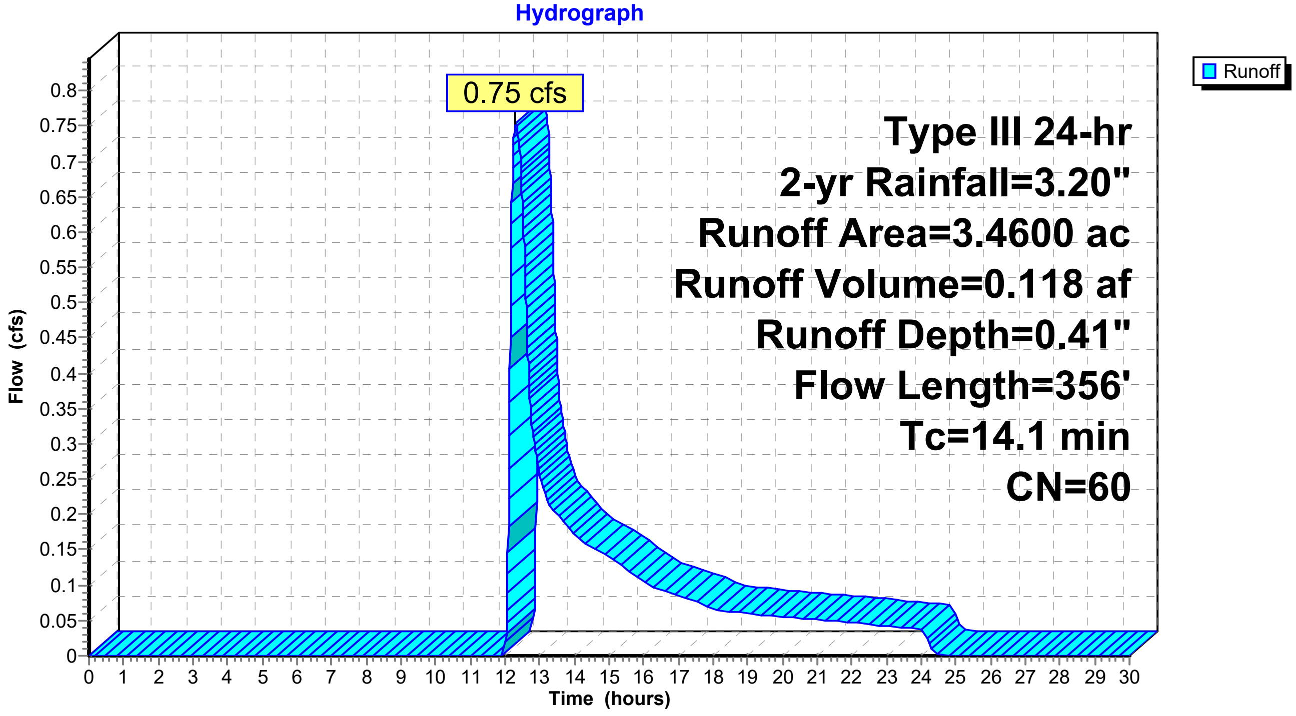
Runoff = 0.75 cfs @ 12.30 hrs, Volume= 0.118 af, Depth= 0.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.20"

Area (ac)	CN	Description
3.0500	61	>75% Grass cover, Good, HSG B
0.4100	55	Woods, Good, HSG B
3.4600	60	Weighted Average
3.4600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.08		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.20"
0.2	16	0.0100	1.50		**Shallow Concentrated Flow, SCF** Grassed Waterway Kv= 15.0 fps
1.4	117	0.0090	1.42		**Shallow Concentrated Flow, SCF** Grassed Waterway Kv= 15.0 fps
1.7	173	0.0130	1.71		**Shallow Concentrated Flow, SCF** Grassed Waterway Kv= 15.0 fps
14.1	356	Total			

Subcatchment PR7:



Summary for Subcatchment PR8: OFF SITE

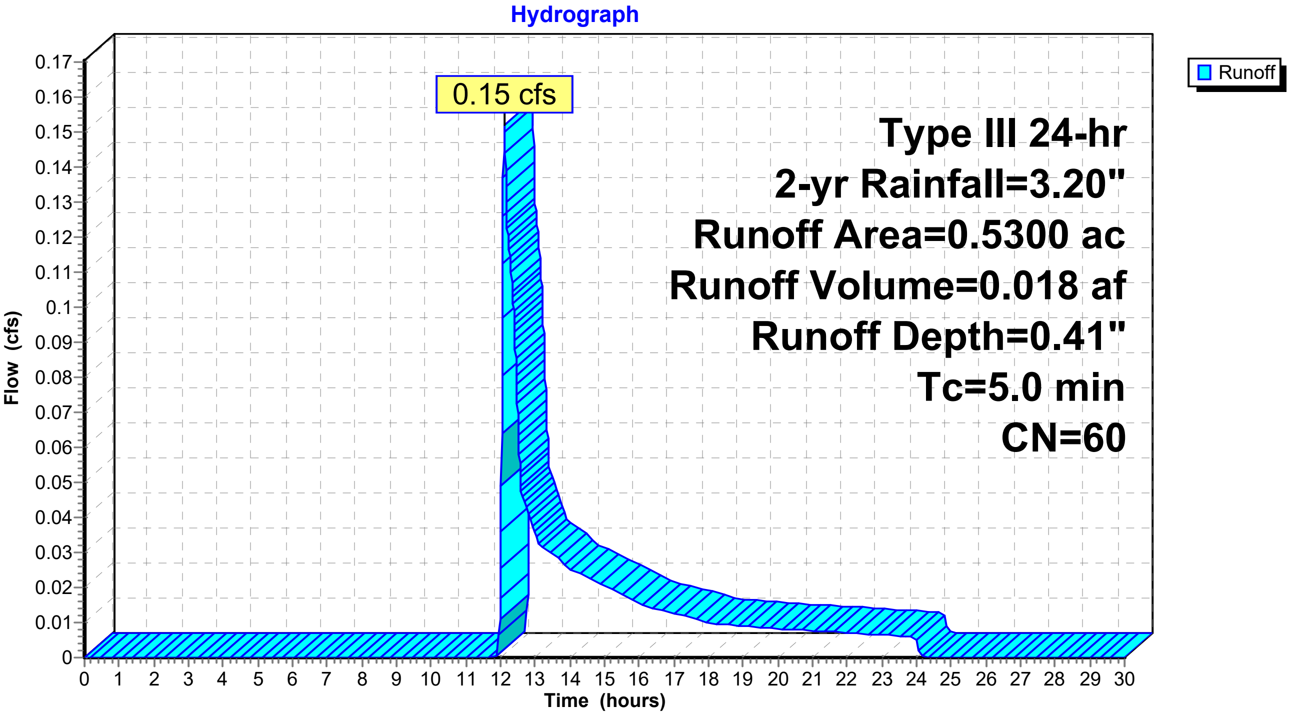
Runoff = 0.15 cfs @ 12.11 hrs, Volume= 0.018 af, Depth= 0.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.20"

	Area (ac)	CN	Description
	0.3200	55	Woods, Good, HSG B
*	0.0400	98	Impervious
	0.1700	61	>75% Grass cover, Good, HSG B
	0.5300	60	Weighted Average
	0.4900		92.45% Pervious Area
	0.0400		7.55% Impervious Area

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

Subcatchment PR8: OFF SITE



Summary for Subcatchment PR9:

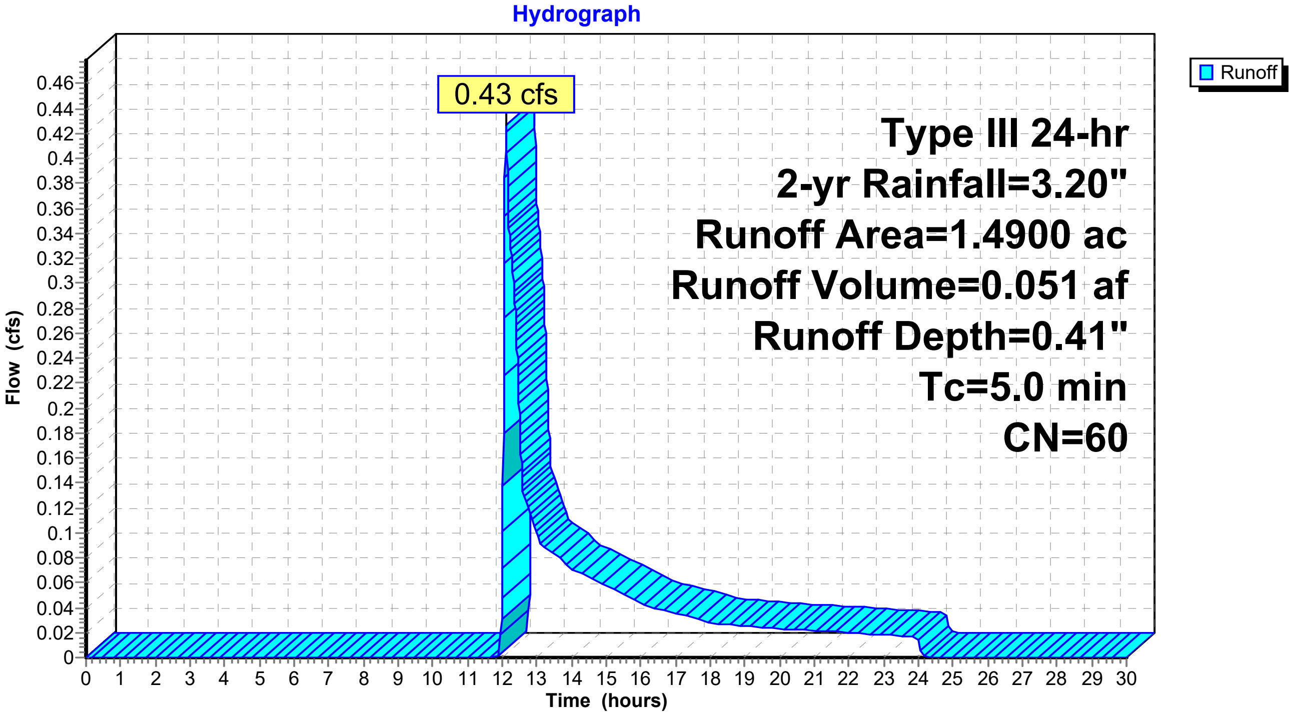
Runoff = 0.43 cfs @ 12.11 hrs, Volume= 0.051 af, Depth= 0.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.20"

Area (ac)	CN	Description
1.3600	61	>75% Grass cover, Good, HSG B
0.1300	55	Woods, Good, HSG B
1.4900	60	Weighted Average
1.4900		100.00% Pervious Area

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

Subcatchment PR9:



Summary for Subcatchment R1: LOT 1 ROOF

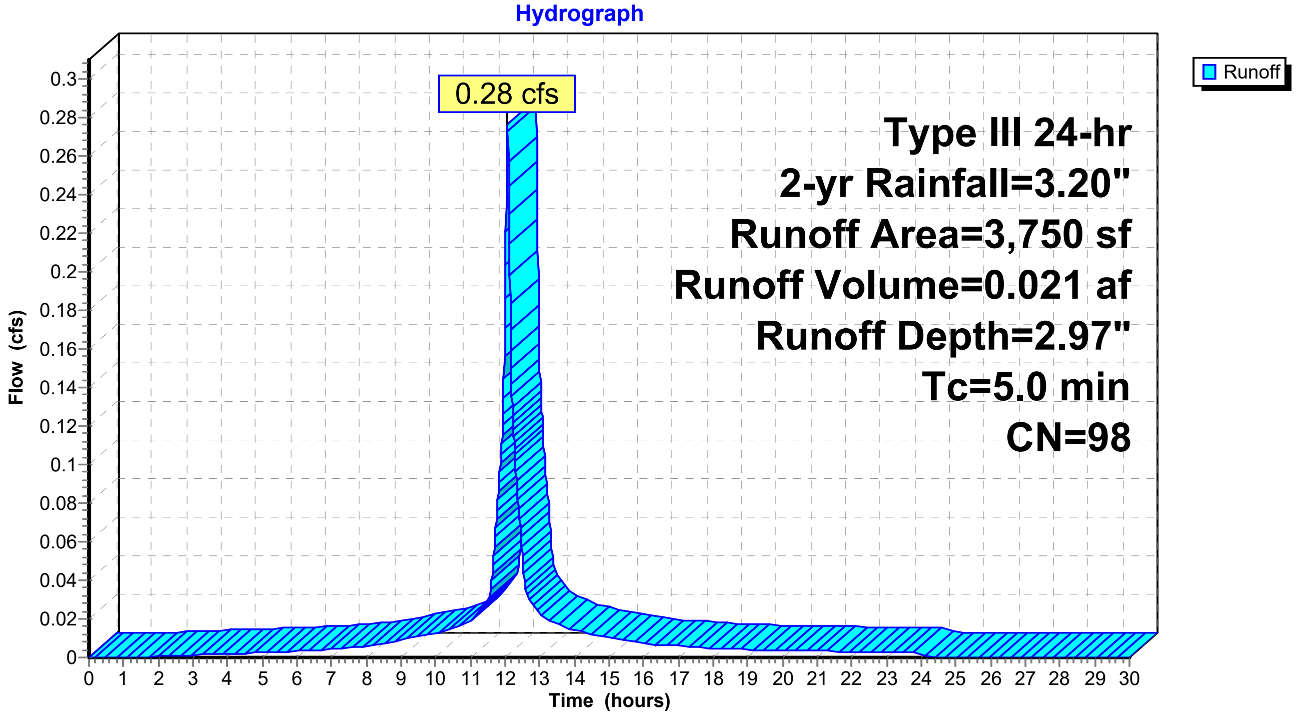
Runoff = 0.28 cfs @ 12.07 hrs, Volume= 0.021 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.20"

	Area (sf)	CN	Description
*	3,750	98	ROOF AREA
	3,750		100.00% Impervious Area

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

Subcatchment R1: LOT 1 ROOF



Summary for Subcatchment R2: LOT 2 ROOF

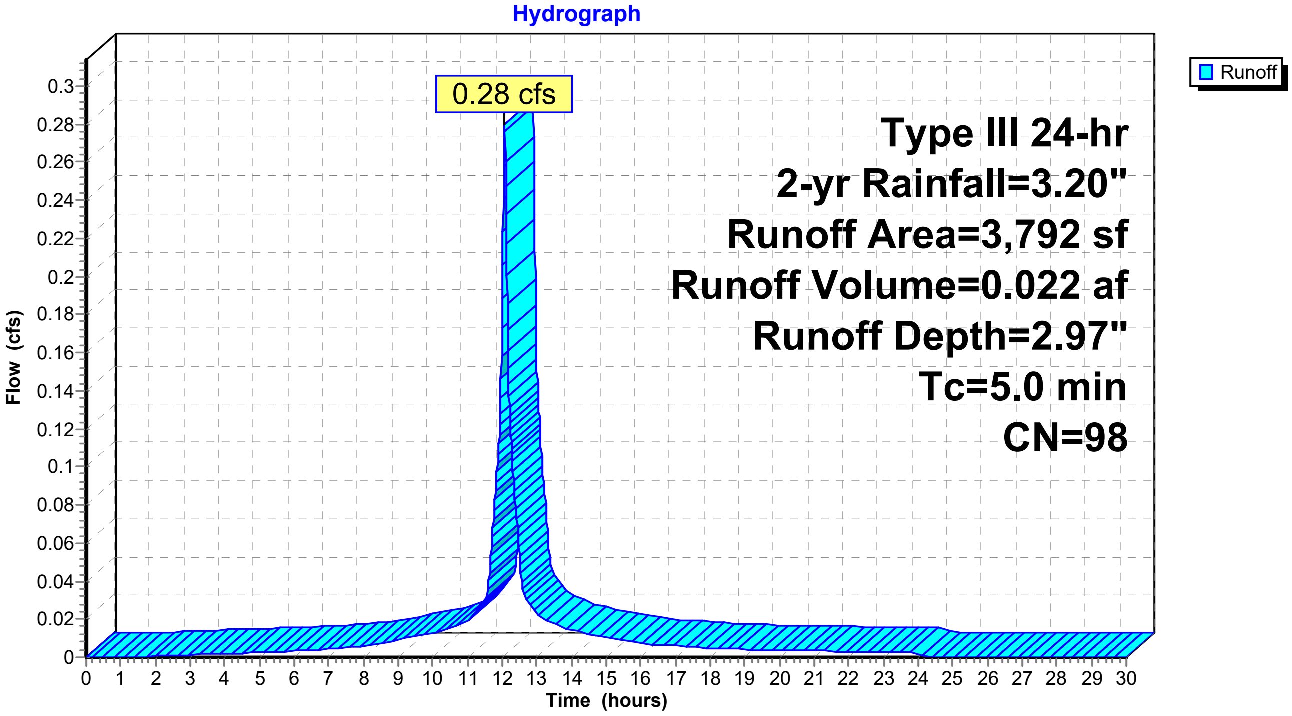
Runoff = 0.28 cfs @ 12.07 hrs, Volume= 0.022 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.20"

	Area (sf)	CN	Description
*	3,792	98	ROOF AREA
	3,792		100.00% Impervious Area

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

Subcatchment R2: LOT 2 ROOF



Summary for Subcatchment R3: LOT 3 ROOF

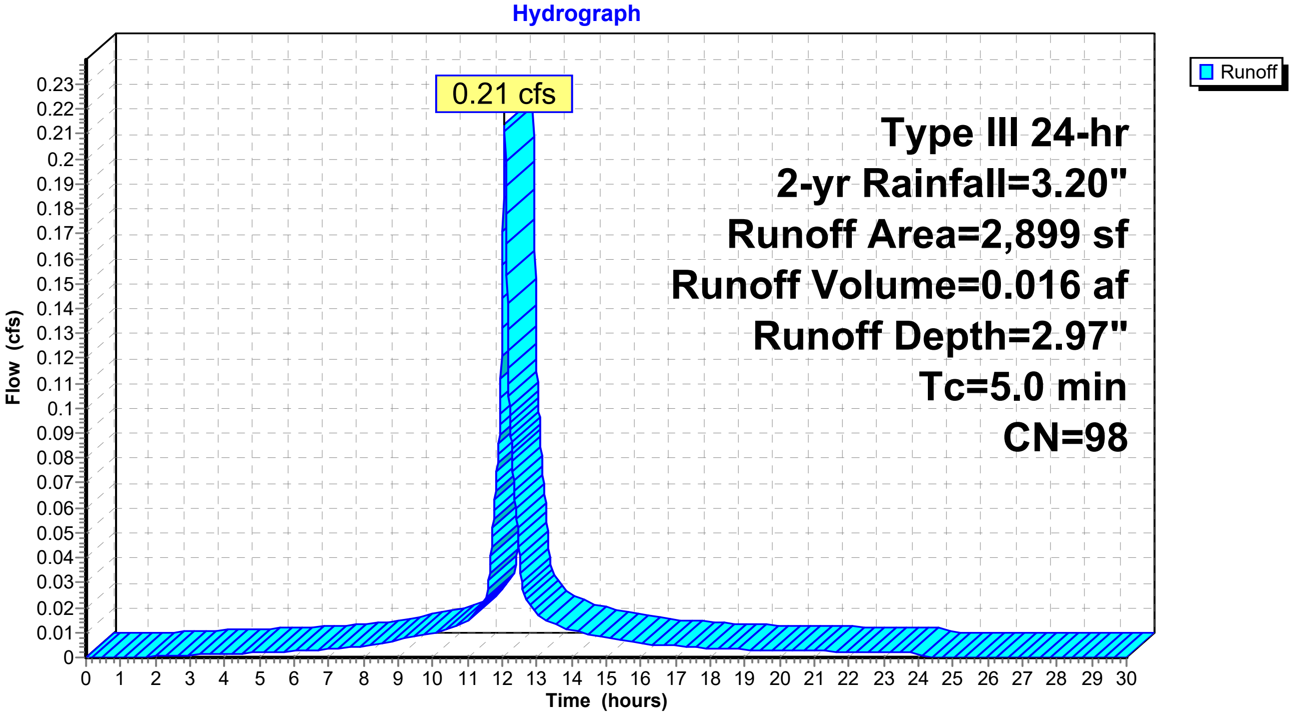
Runoff = 0.21 cfs @ 12.07 hrs, Volume= 0.016 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.20"

	Area (sf)	CN	Description
*	2,899	98	ROOF AREA
	2,899		100.00% Impervious Area

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

Subcatchment R3: LOT 3 ROOF



Summary for Subcatchment R4: LOT 4 ROOF

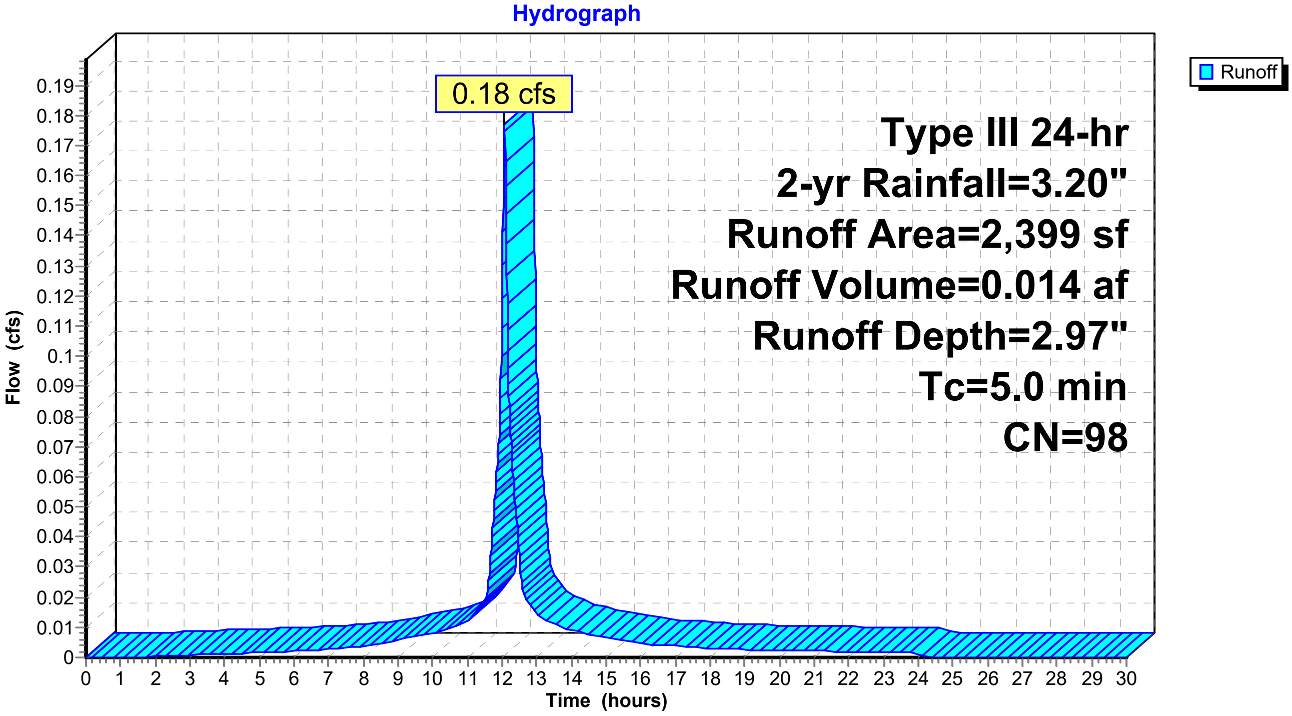
Runoff = 0.18 cfs @ 12.07 hrs, Volume= 0.014 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.20"

	Area (sf)	CN	Description
*	2,399	98	ROOF AREA
	2,399		100.00% Impervious Area

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

Subcatchment R4: LOT 4 ROOF



Summary for Subcatchment R6/7: LOTS 6 & 7 (ROOFS)

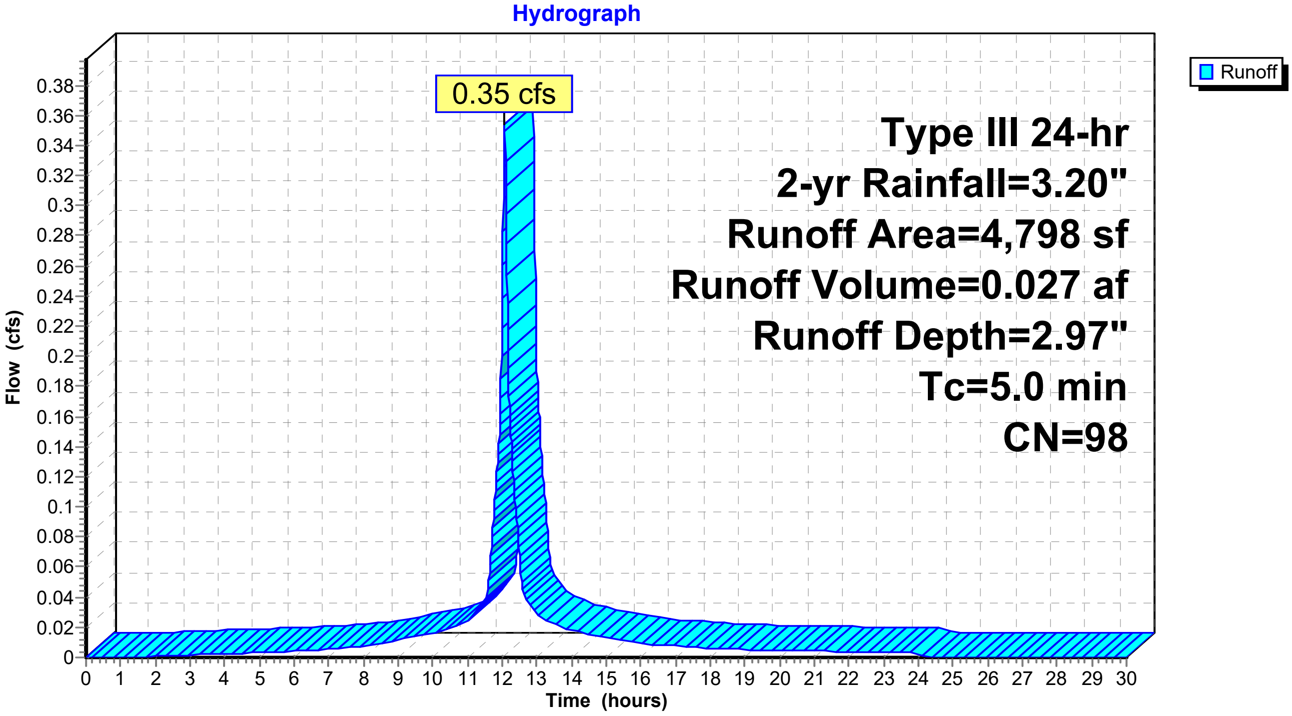
Runoff = 0.35 cfs @ 12.07 hrs, Volume= 0.027 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.20"

	Area (sf)	CN	Description
*	4,798	98	ROOF AREA
	4,798		100.00% Impervious Area

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

Subcatchment R6/7: LOTS 6 & 7 (ROOFS)



Summary for Subcatchment R8: LOT 8 ROOF

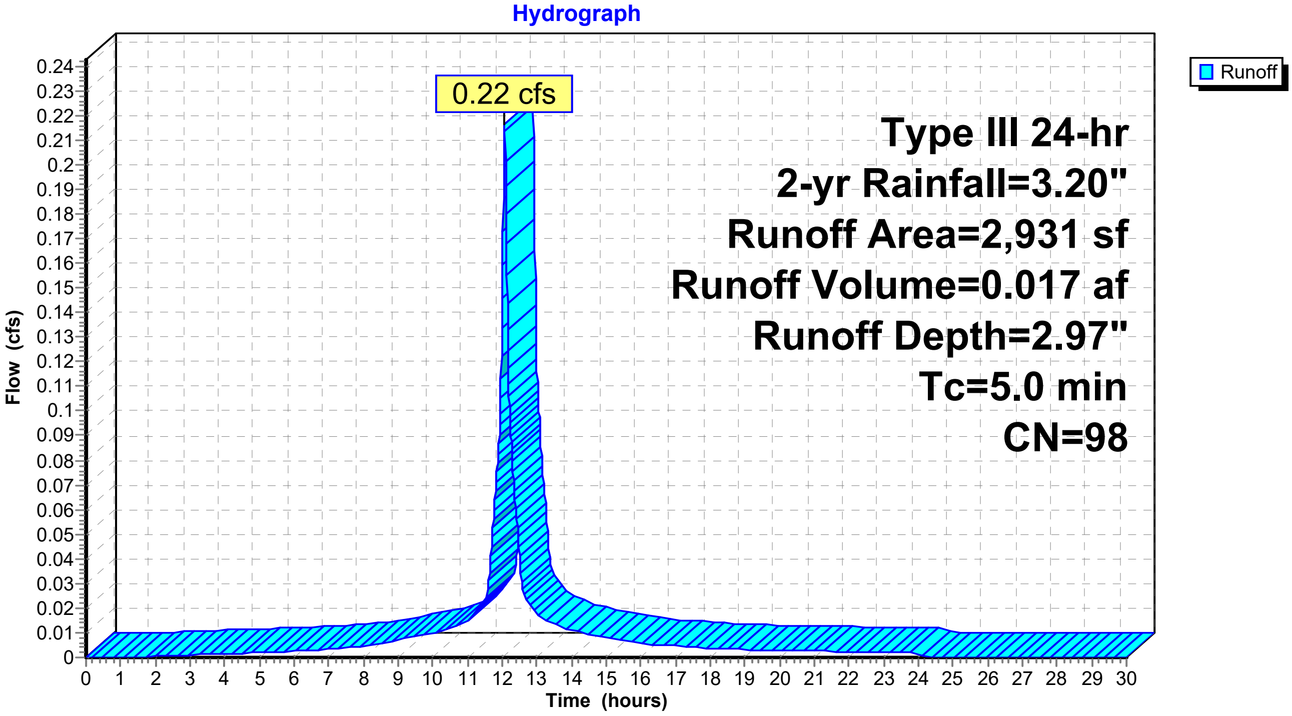
Runoff = 0.22 cfs @ 12.07 hrs, Volume= 0.017 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.20"

	Area (sf)	CN	Description
*	2,931	98	ROOF AREA
	2,931		100.00% Impervious Area

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

Subcatchment R8: LOT 8 ROOF



Summary for Subcatchment R9: LOT 9 ROOF

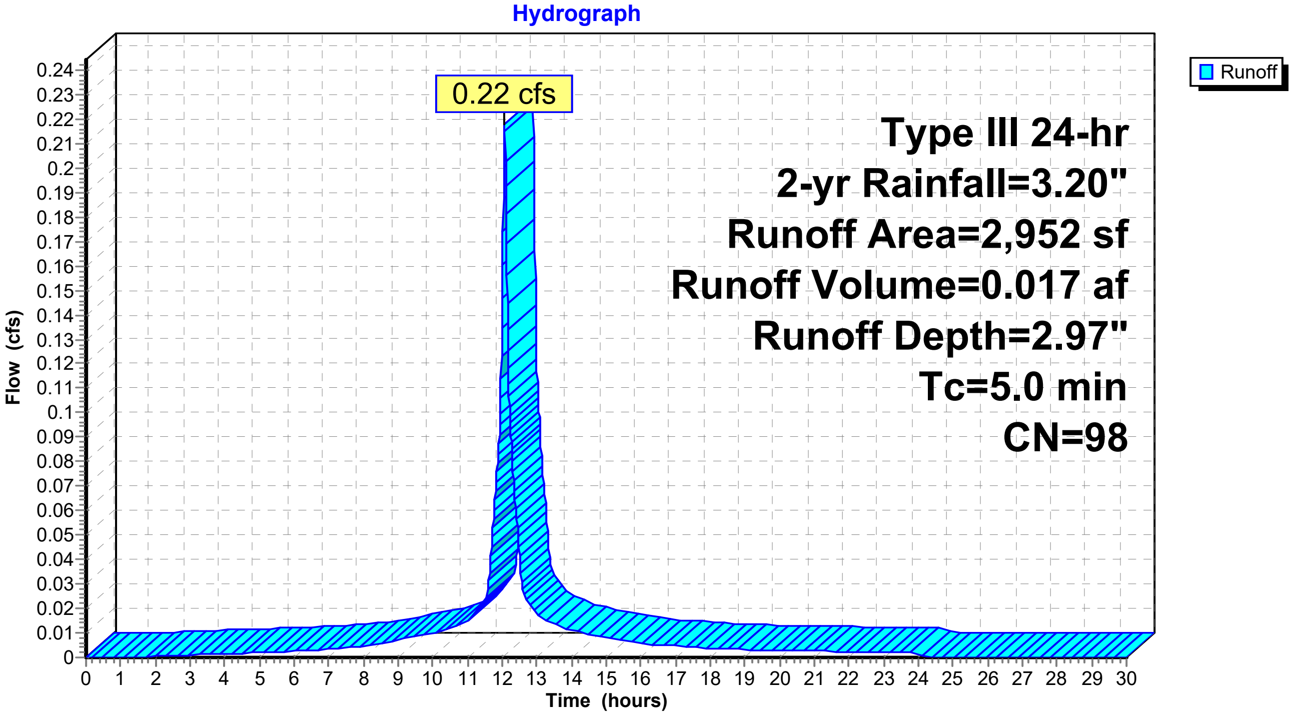
Runoff = 0.22 cfs @ 12.07 hrs, Volume= 0.017 af, Depth= 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 2-yr Rainfall=3.20"

	Area (sf)	CN	Description
*	2,952	98	ROOF AREA
	2,952		100.00% Impervious Area

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

Subcatchment R9: LOT 9 ROOF

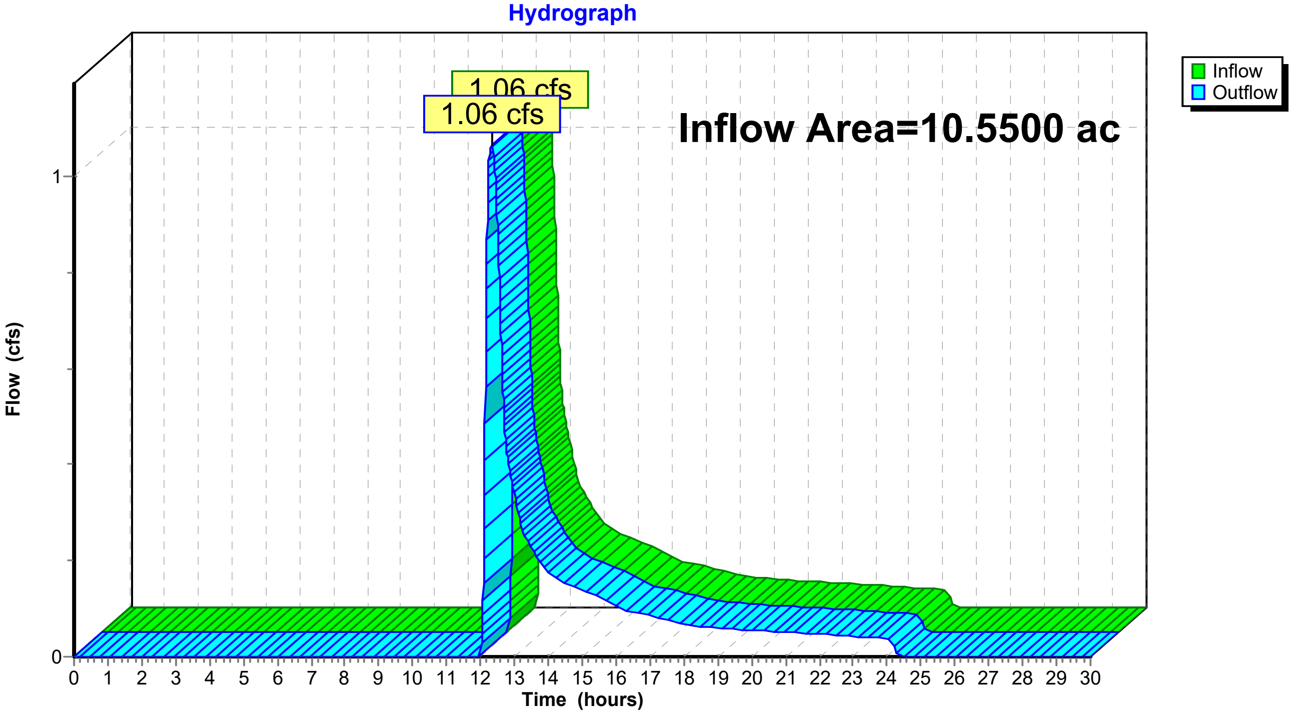


Summary for Reach BVW: WETLANDS

Inflow Area = 10.5500 ac, 19.72% Impervious, Inflow Depth = 0.15" for 2-yr event
Inflow = 1.06 cfs @ 12.33 hrs, Volume= 0.134 af
Outflow = 1.06 cfs @ 12.33 hrs, Volume= 0.134 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Reach BVW: WETLANDS

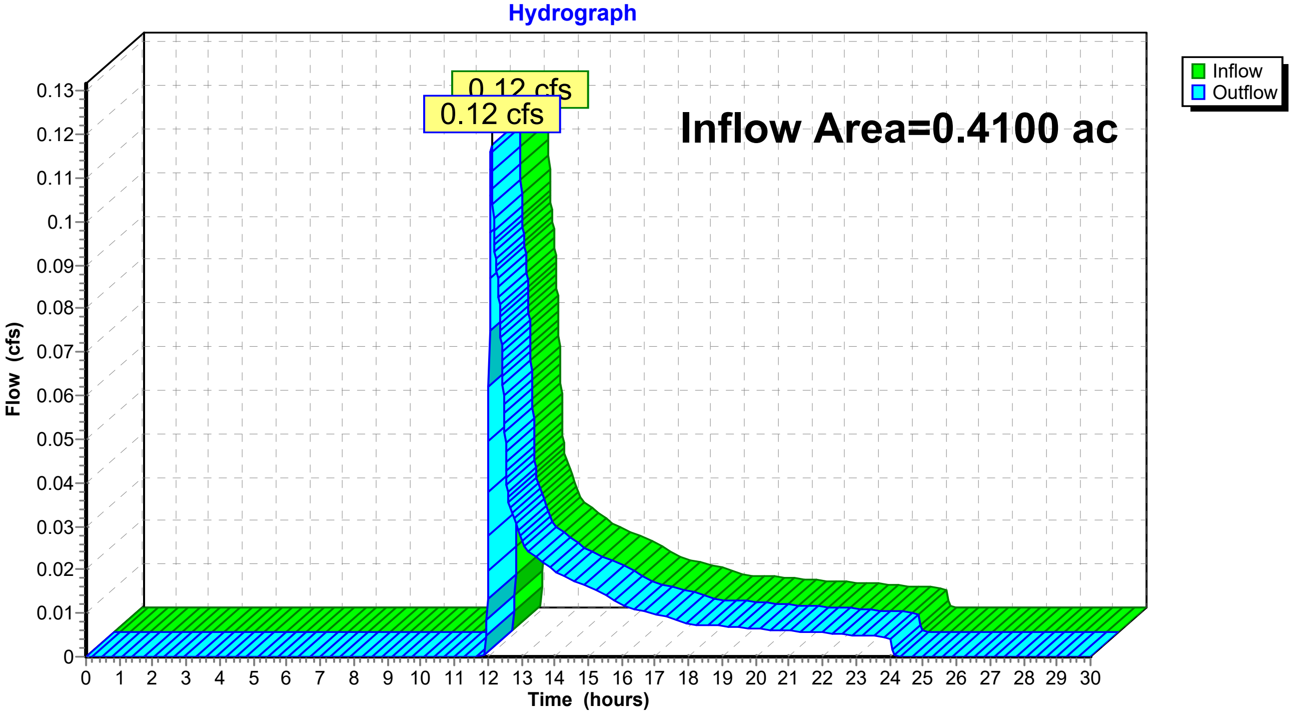


Summary for Reach RD: MAYNARD RD

Inflow Area =	0.4100 ac,	0.00% Impervious,	Inflow Depth = 0.41"	for 2-yr event	
Inflow =	0.12 cfs @	12.11 hrs,	Volume=	0.014 af	
Outflow =	0.12 cfs @	12.11 hrs,	Volume=	0.014 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Reach RD: MAYNARD RD

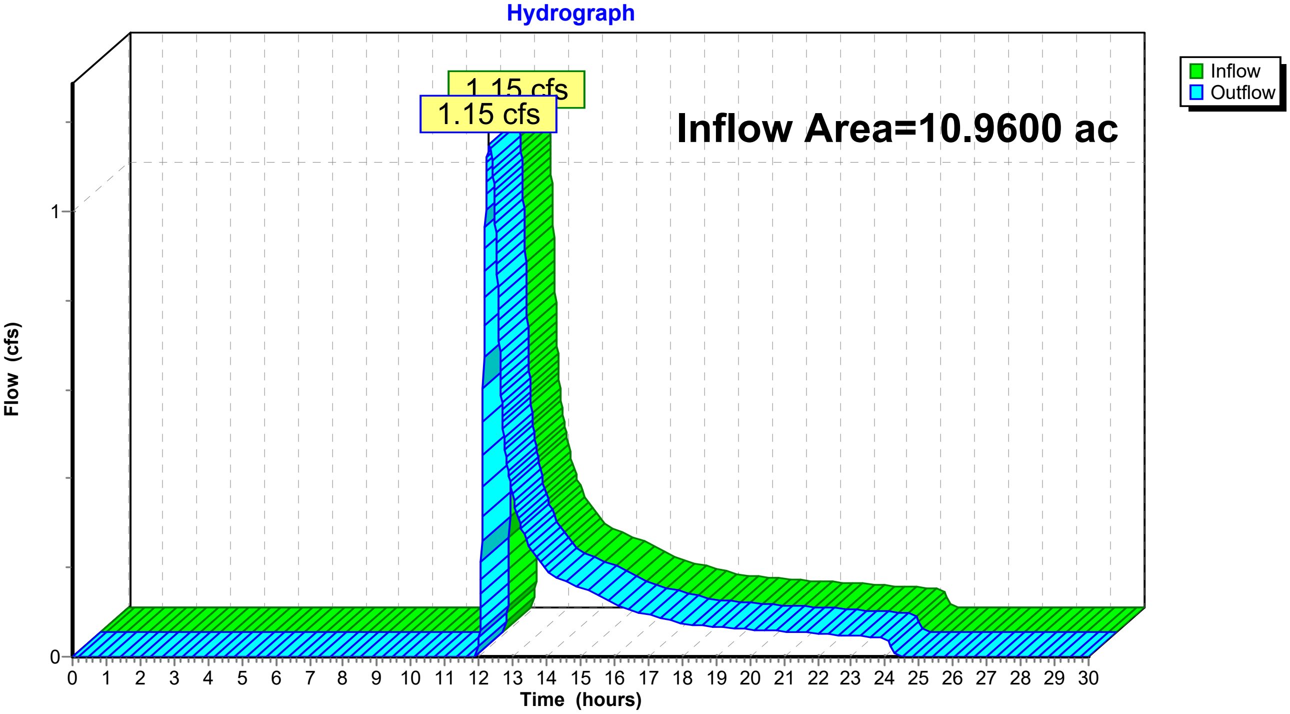


Summary for Reach T: TOTAL

Inflow Area =	10.9600 ac,	18.98% Impervious,	Inflow Depth = 0.16"	for 2-yr event
Inflow =	1.15 cfs @	12.31 hrs, Volume=	0.148 af	
Outflow =	1.15 cfs @	12.31 hrs, Volume=	0.148 af, Atten= 0%, Lag= 0.0 min	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

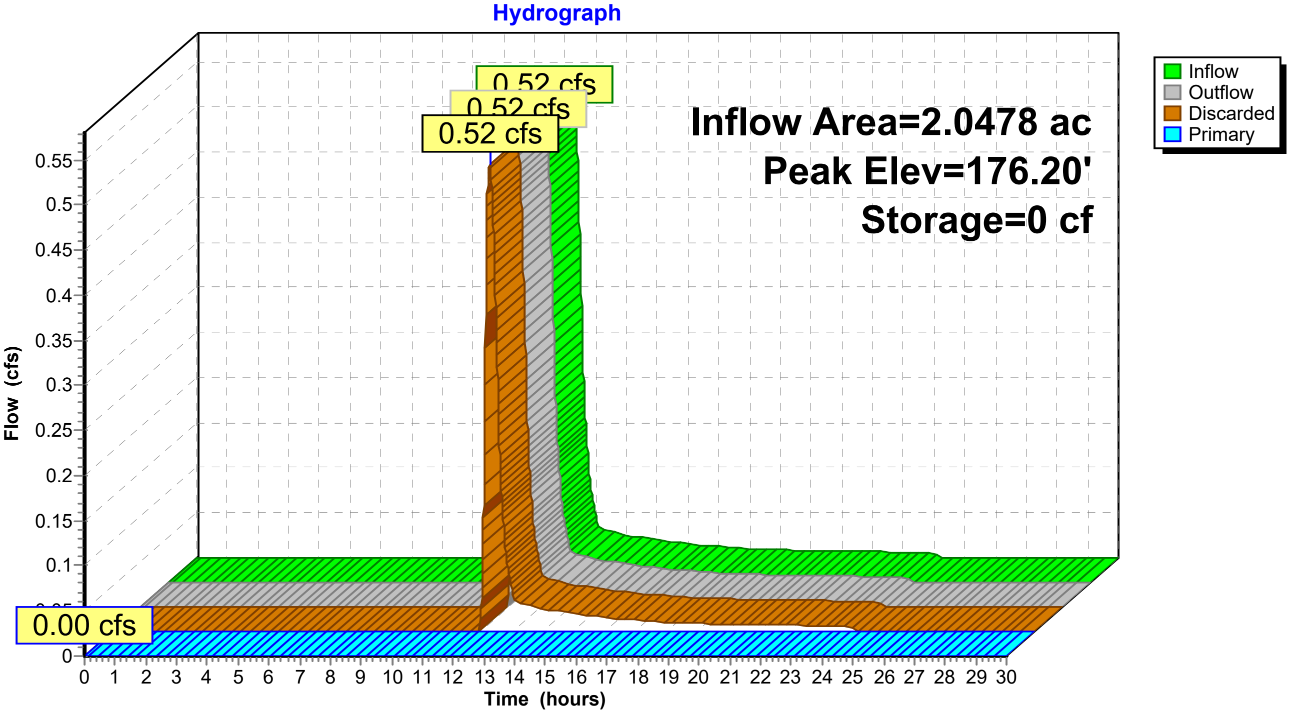
Reach T: TOTAL



Summary for Pond CS1: CHAMBER SYSTEM #1

```
Inflow Area =       2.0478 ac, 16.49% Impervious, Inflow Depth =  0.19"   for 2-yr event
Inflow      =      0.52 cfs @  12.27 hrs, Volume=          0.032 af
Outflow     =      0.52 cfs @  12.27 hrs, Volume=          0.032 af, Atten= 0%, Lag= 0.1 min
Discarded   =      0.52 cfs @  12.27 hrs, Volume=          0.032 af
Primary     =      0.00 cfs @   0.00 hrs, Volume=          0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 176.20' @ 12.27 hrs   Surf.Area= 2,888 sf   Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min ( 841.5 - 841.5 )

Volume      Invert    Avail.Storage   Storage Description
   #1       176.20'          578 cf   Custom Stage Data (Prismatic)Listed below (Recalc)
                                      1,444 cf Overall  x 40.0% Voids
   #2       176.70'        4,777 cf   retain_it retain_it  3.0' x 28
                                      Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
                                      Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
   #3       179.70'           44 cf   2.00'D x 2.80'H Vertical Cone/Cylinder x 5 -Impervious
                           5,399 cf   Total Available Storage

 Elevation        Surf.Area        Inc.Store       Cum.Store
    (feet)          (sq-ft)    (cubic-feet)    (cubic-feet)
    176.20            2,888               0               0
    176.70            2,888           1,444           1,444

Device   Routing      Invert   Outlet Devices
   #1    Discarded   176.20'   8.270 in/hr Exfiltration over Surface area
   #2    Primary     176.70'   8.0" Vert. Orifice/Grate   C= 0.600
   #3    Primary     179.30'   4.2' long Sharp-Crested Rectangular Weir 2 End Contraction(s)
                               3.5' Crest Height

Discarded OutFlow Max=0.55 cfs @ 12.27 hrs  HW=176.20'   (Free Discharge)
└─1=Exfiltration  (Exfiltration Controls 0.55 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs  HW=176.20'  TW=0.00'   (Dynamic Tailwater)
├─2=Orifice/Grate  ( Controls 0.00 cfs)
└─3=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)
```

Pond CS1: CHAMBER SYSTEM #1



Summary for Pond CS2: CHAMBER SYSTEM #2

Inflow Area = 1.5178 ac, 19.62% Impervious, Inflow Depth = 0.75" for 2-yr event
Inflow = 1.13 cfs @ 12.09 hrs, Volume= 0.094 af
Outflow = 0.61 cfs @ 12.27 hrs, Volume= 0.094 af, Atten= 46%, Lag= 11.2 min
Discarded = 0.21 cfs @ 11.98 hrs, Volume= 0.080 af
Primary = 0.40 cfs @ 12.27 hrs, Volume= 0.014 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 177.83' @ 12.27 hrs Surf.Area= 1,100 sf Storage= 486 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 7.2 min (873.5 - 866.3)

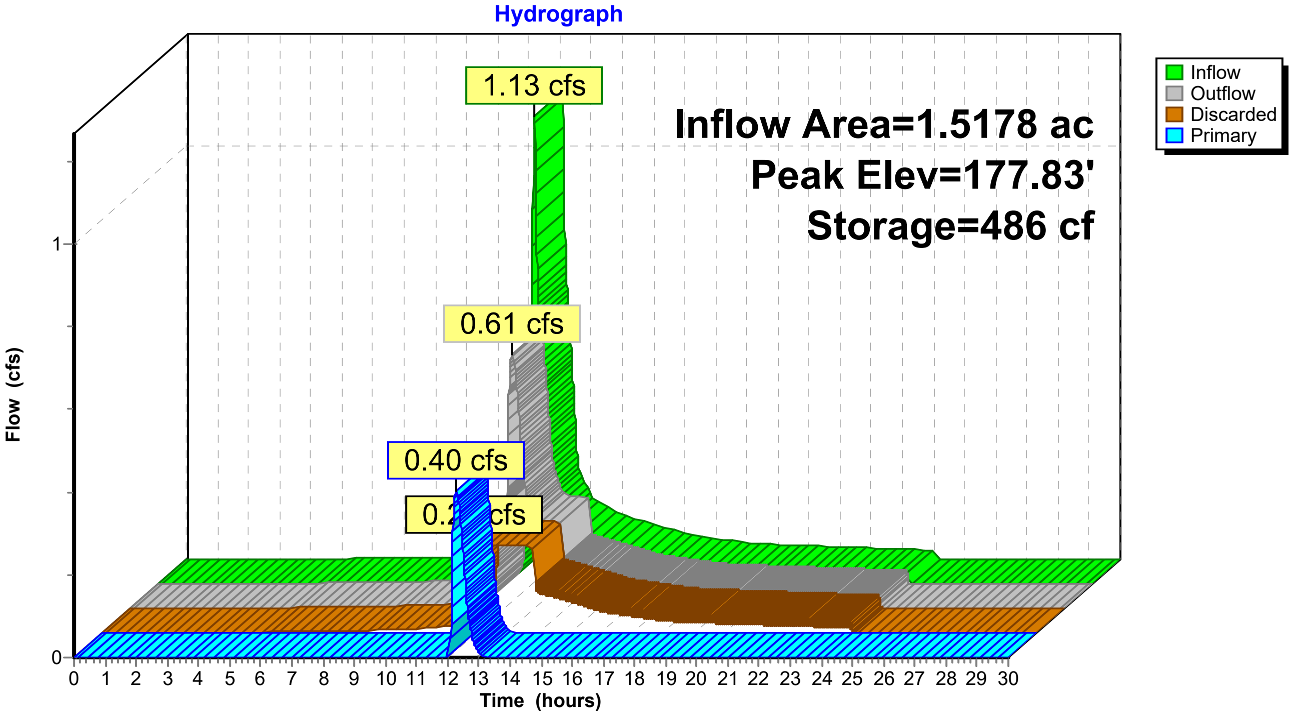
Volume	Invert	Avail.Storage	Storage Description
#1	177.00'	854 cf	**22.00'W x 50.00'L x 5.20'H Prismatoid** 5,720 cf Overall - 3,584 cf Embedded = 2,136 cf x 40.0% Voids
#2	177.50'	2,650 cf	**retain_it retain_it 4.0'** x 12 Inside #1 Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf 2 Rows adjusted for 120.8 cf perimeter wall
		3,505 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	177.50'	**10.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	177.00'	**8.270 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.21 cfs @ 11.98 hrs HW=177.06' (Free Discharge)
⮤**2=Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=0.40 cfs @ 12.27 hrs HW=177.83' TW=176.20' (Dynamic Tailwater)
⮤**1=Orifice/Grate** (Orifice Controls 0.40 cfs @ 1.97 fps)

Pond CS2: CHAMBER SYSTEM #2



Summary for Pond CS3: CHAMBER SYSTEM #3

Inflow Area = 1.1800 ac, 57.63% Impervious, Inflow Depth = 1.54" for 2-yr event
Inflow = 2.20 cfs @ 12.08 hrs, Volume= 0.151 af
Outflow = 0.34 cfs @ 12.58 hrs, Volume= 0.151 af, Atten= 84%, Lag= 30.3 min
Discarded = 0.23 cfs @ 12.08 hrs, Volume= 0.143 af
Primary = 0.11 cfs @ 12.58 hrs, Volume= 0.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 172.74' @ 12.58 hrs Surf.Area= 4,096 sf Storage= 2,326 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 83.4 min (918.7 - 835.3)

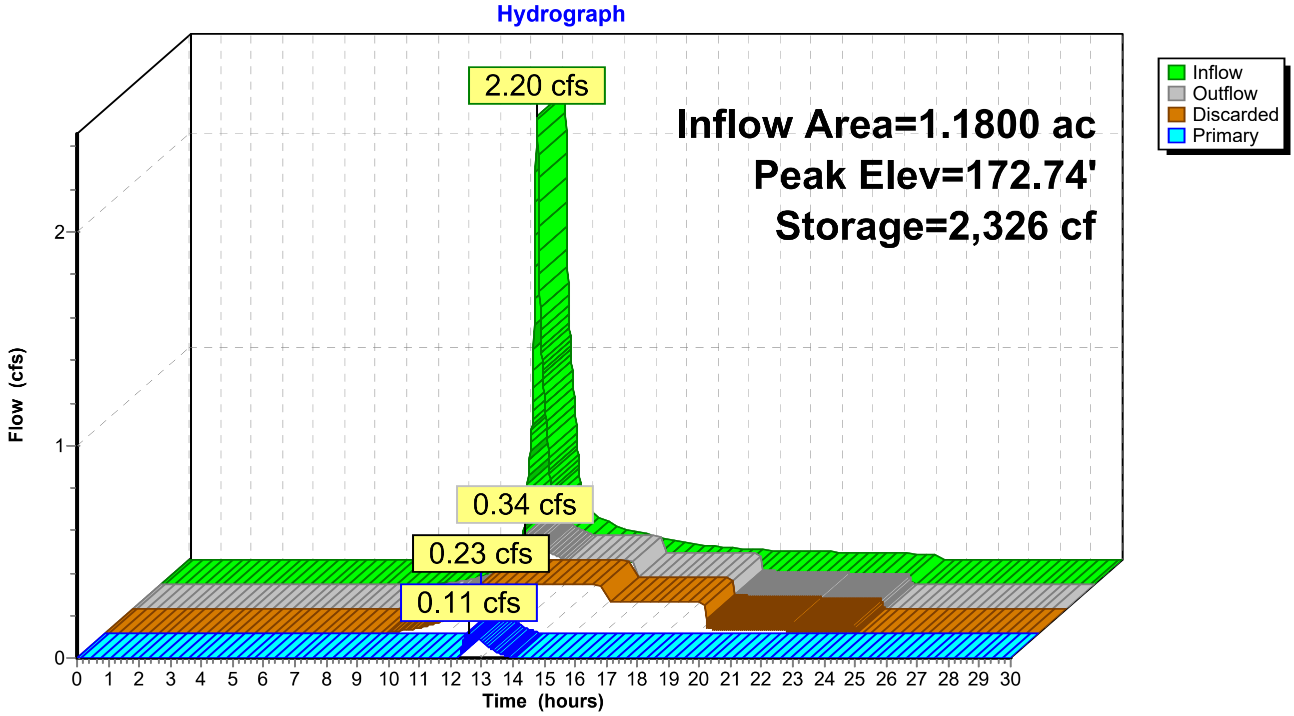
Volume	Invert	Avail.Storage	Storage Description
#1	171.00'	1,034 cf	**34.00'W x 76.00'L x 1.00'H Prismatoid** 2,584 cf Overall x 40.0% Voids
#2	172.00'	339 cf	**2.00'W x 212.00'L x 2.00'H Prismatoid**-Impervious 848 cf Overall x 40.0% Voids
#3	172.00'	5,274 cf	**retain_it retain_it 3.5'** x 27 Inside= 84.0"W x 42.0"H => 25.10 sf x 8.00'L = 200.8 cf Outside= 96.0"W x 50.0"H => 33.33 sf x 8.00'L = 266.7 cf 3 Rows adjusted for 147.4 cf perimeter wall
#4	172.00'	177 cf	**15.0" Round Pipe Storage**-Impervious L= 144.0' S= 0.0050 '/'
		6,823 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	172.50'	**4.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	173.50'	**12.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	171.00'	**2.410 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.23 cfs @ 12.08 hrs HW=172.03' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.11 cfs @ 12.58 hrs HW=172.74' TW=0.00' (Dynamic Tailwater)
├─**1=Orifice/Grate** (Orifice Controls 0.11 cfs @ 1.68 fps)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond CS3: CHAMBER SYSTEM #3



Summary for Pond CS4: CHAMBER SYSTEM #4

Inflow Area = 0.2000 ac, 65.00% Impervious, Inflow Depth = 1.76" for 2-yr event
Inflow = 0.43 cfs @ 12.08 hrs, Volume= 0.029 af
Outflow = 0.05 cfs @ 11.81 hrs, Volume= 0.029 af, Atten= 88%, Lag= 0.0 min
Discarded = 0.05 cfs @ 11.81 hrs, Volume= 0.029 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 174.35' @ 12.75 hrs Surf.Area= 924 sf Storage= 419 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 60.3 min (885.5 - 825.2)

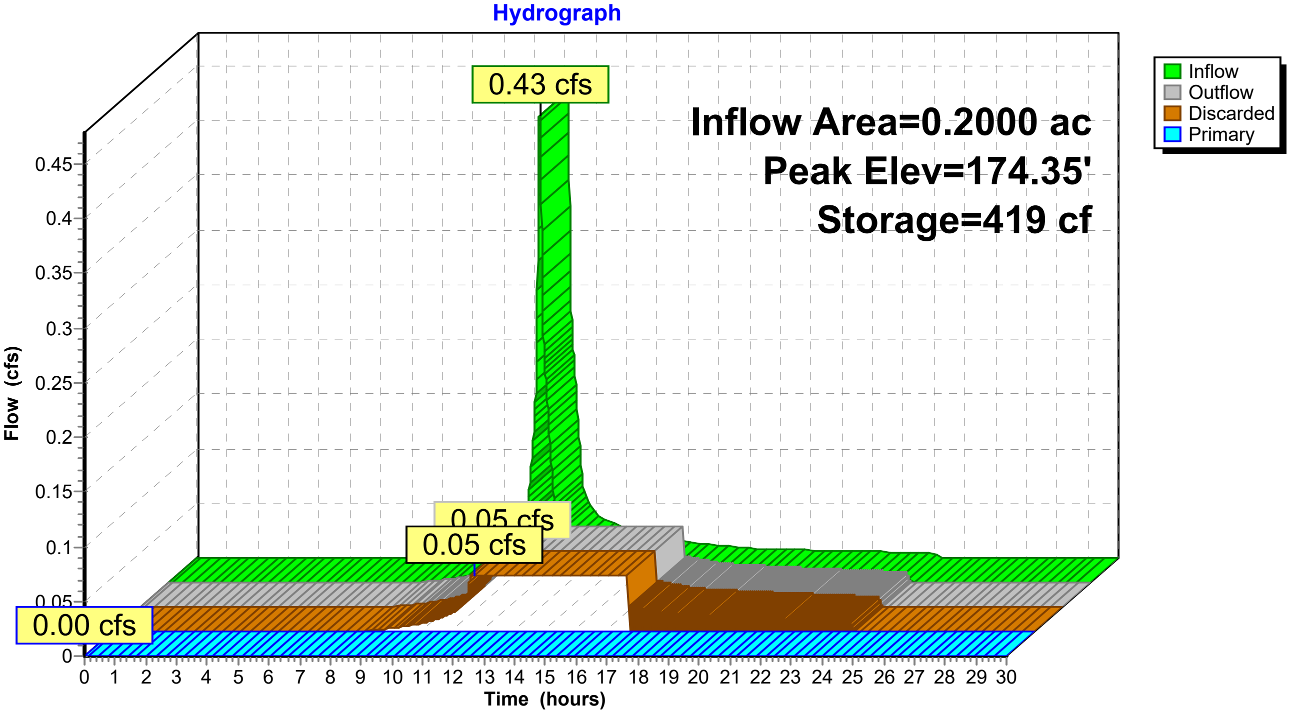
Volume	Invert	Avail.Storage	Storage Description
#1	173.50'	614 cf	**22.00'W x 42.00'L x 4.20'H Prismatoid** 3,881 cf Overall - 2,347 cf Embedded = 1,534 cf x 40.0% Voids
#2	174.00'	1,640 cf	**retain_it retain_it 3.0'** x 10 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 2 Rows adjusted for 66.1 cf perimeter wall
		2,254 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	176.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	173.50'	**2.410 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.05 cfs @ 11.81 hrs HW=173.54' (Free Discharge)
↰**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=173.50' TW=0.00' (Dynamic Tailwater)
↰**1=Orifice/Grate** (Controls 0.00 cfs)

Pond CS4: CHAMBER SYSTEM #4



Summary for Pond CS5: CHAMBER SYSTEM #5

Inflow Area = 1.8731 ac, 33.80% Impervious, Inflow Depth = 0.89" for 2-yr event
Inflow = 1.80 cfs @ 12.08 hrs, Volume= 0.139 af
Outflow = 0.91 cfs @ 12.28 hrs, Volume= 0.139 af, Atten= 50%, Lag= 11.6 min
Discarded = 0.61 cfs @ 12.07 hrs, Volume= 0.130 af
Primary = 0.30 cfs @ 12.28 hrs, Volume= 0.009 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 179.29' @ 12.28 hrs Surf.Area= 3,164 sf Storage= 747 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 5.9 min (862.4 - 856.5)

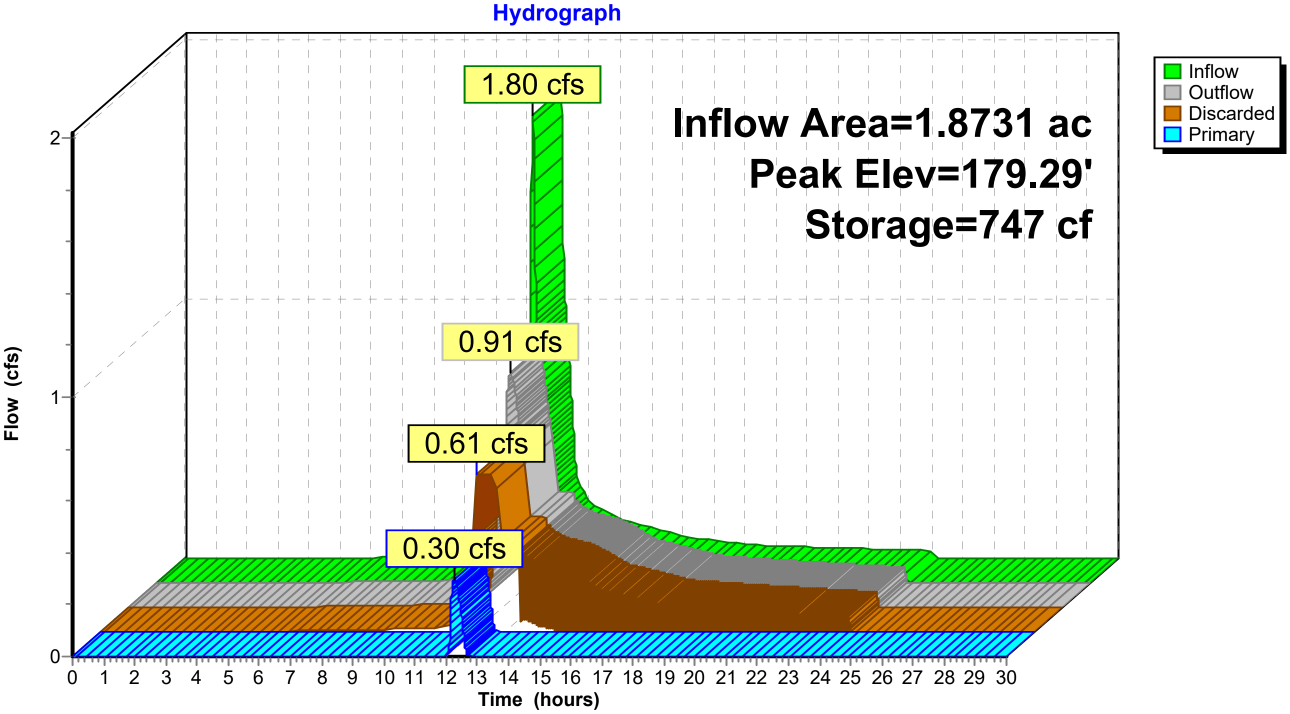
Volume	Invert	Avail.Storage	Storage Description
#1	178.50'	364 cf	**26.00'W x 70.00'L x 0.50'H Prismatoid** 910 cf Overall x 40.0% Voids
#2	179.00'	5,376 cf	**retain_it retain_it 4.0'** x 24 Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf 3 Rows adjusted for 166.1 cf perimeter wall
		5,740 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	179.00'	**10.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	178.50'	**8.270 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.61 cfs @ 12.07 hrs HW=179.01' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.61 cfs)

Primary OutFlow Max=0.30 cfs @ 12.28 hrs HW=179.29' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.30 cfs @ 1.82 fps)

Pond CS5: CHAMBER SYSTEM #5



Summary for Pond CS6: CHAMBER SYSTEM #6

Inflow Area = 1.5573 ac, 4.32% Impervious, Inflow Depth = 0.52" for 2-yr event
Inflow = 0.62 cfs @ 12.10 hrs, Volume= 0.067 af
Outflow = 0.12 cfs @ 12.15 hrs, Volume= 0.067 af, Atten= 81%, Lag= 3.0 min
Discarded = 0.12 cfs @ 12.15 hrs, Volume= 0.067 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 167.95' @ 12.98 hrs Surf.Area= 2,100 sf Storage= 628 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 43.6 min (922.5 - 878.9)

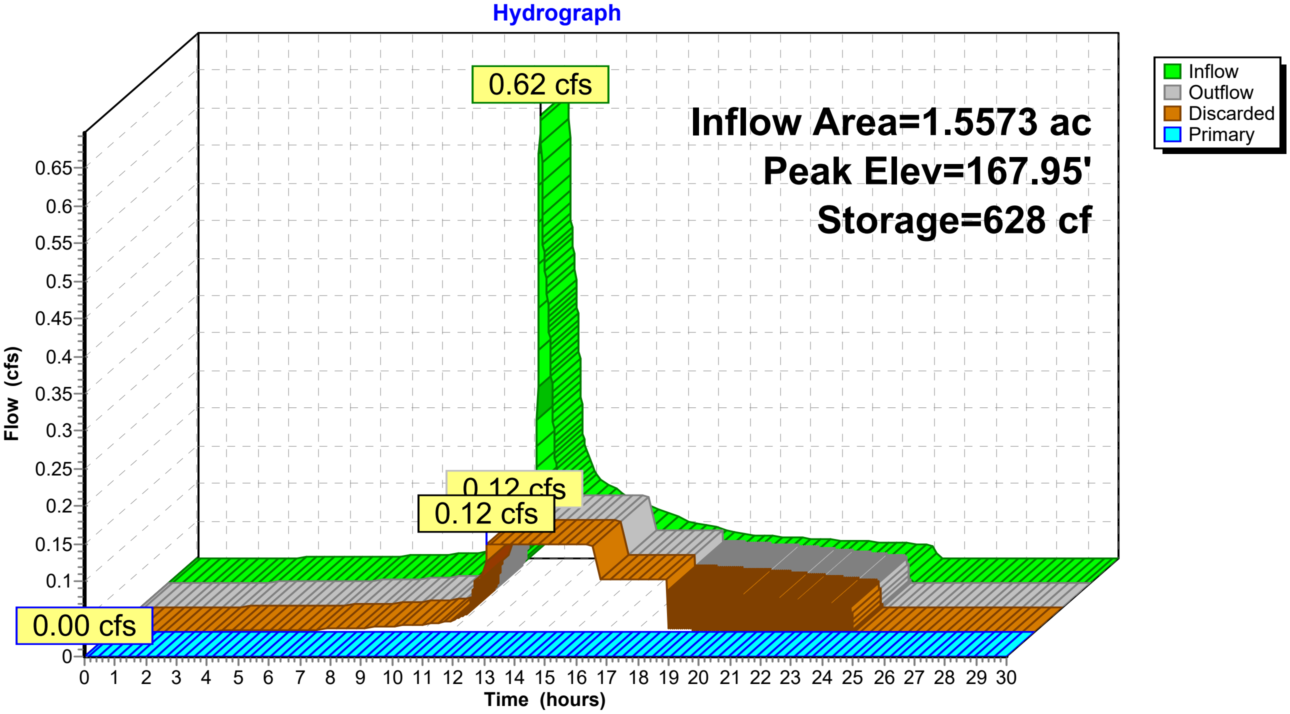
Volume	Invert	Avail.Storage	Storage Description
#1	167.00'	252 cf	**30.00'W x 42.00'L x 0.50'H Prismatoid** 630 cf Overall x 40.0% Voids
#2	167.50'	3,773 cf	**retain_it retain_it 4.5'** x 15 Inside= 84.0"W x 54.0"H => 32.64 sf x 8.00'L = 261.1 cf Outside= 96.0"W x 62.0"H => 41.33 sf x 8.00'L = 330.7 cf 3 Rows adjusted for 143.5 cf perimeter wall
		4,025 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	171.20'	**2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns** X 12 rows C= 0.600 in 48.0" x 24.0" Grate (25% open area) Limited to weir flow at low heads
#2	Discarded	167.00'	**2.410 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.12 cfs @ 12.15 hrs HW=167.50' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=167.00' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Pond CS6: CHAMBER SYSTEM #6



Summary for Pond DW2: LOT 2 DW

Inflow Area = 0.0871 ac,100.00% Impervious, Inflow Depth = 2.97" for 2-yr event
Inflow = 0.28 cfs @ 12.07 hrs, Volume= 0.022 af
Outflow = 0.04 cfs @ 11.89 hrs, Volume= 0.022 af, Atten= 84%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.89 hrs, Volume= 0.022 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 183.64' @ 12.53 hrs Surf.Area= 792 sf Storage= 244 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 29.5 min (785.0 - 755.5)

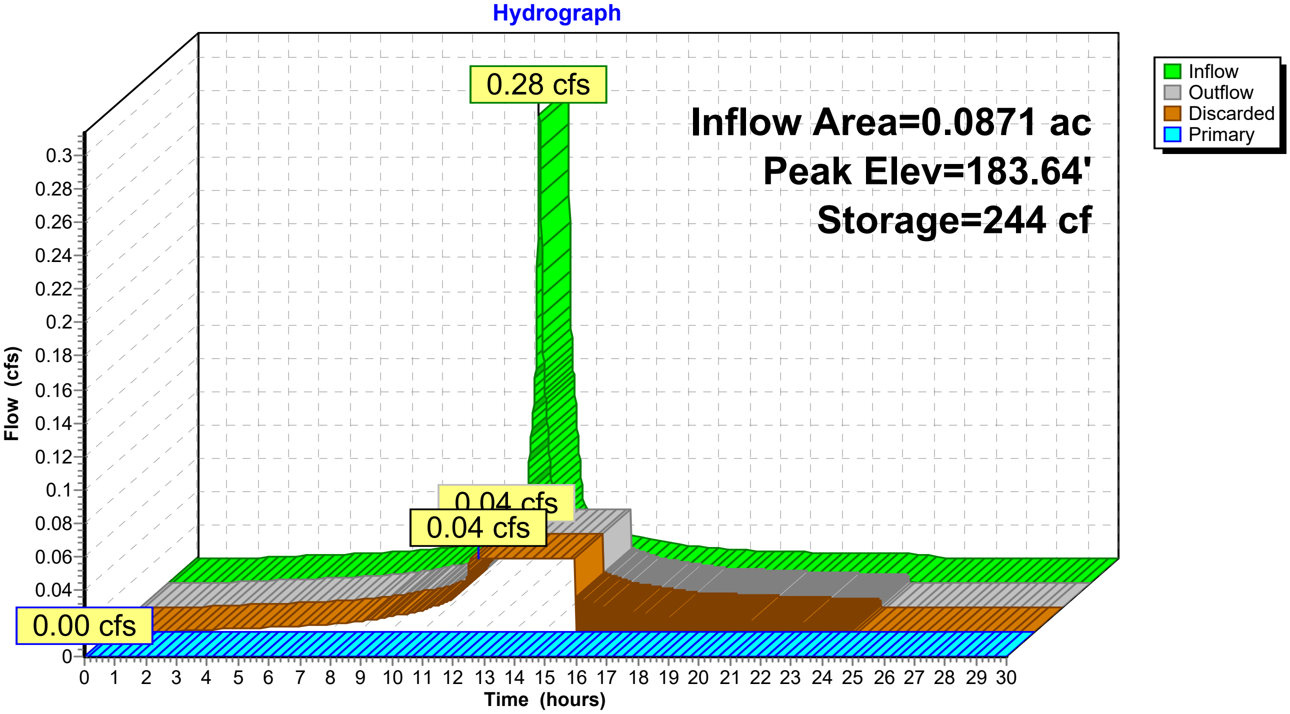
Volume	Invert	Avail.Storage	Storage Description
#1	183.00'	602 cf	**18.00'W x 44.00'L x 2.60'H Prismatoid** 2,059 cf Overall - 553 cf Embedded = 1,506 cf x 40.0% Voids
#2	183.50'	553 cf	**Cultec R-150XLHD** x 20 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 5 rows
#3	184.70'	1 cf	**0.33'D x 6.30'H Vertical Cone/Cylinder** x 2
		1,157 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	183.00'	**2.410 in/hr Exfiltration over Horizontal area**
#2	Primary	192.00'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600

Discarded OutFlow Max=0.04 cfs @ 11.89 hrs HW=183.10' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=183.00' TW=178.50' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond DW2: LOT 2 DW



Summary for Pond DW3: LOT 3 DW

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Inflow Area =     0.0666 ac,100.00% Impervious,  Inflow Depth =   2.97"    for  2-yr event
Inflow      =      0.21 cfs @  12.07 hrs,  Volume=        0.016 af
Outflow     =      0.06 cfs @  11.96 hrs,  Volume=        0.016 af,  Atten= 70%,  Lag= 0.0 min
Discarded  =       0.06 cfs @  11.96 hrs,  Volume=        0.016 af
Primary     =      0.00 cfs @   0.00 hrs,  Volume=        0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 173.65' @ 12.37 hrs   Surf.Area= 338 sf   Storage= 104 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 6.5 min ( 762.0 - 755.5 )

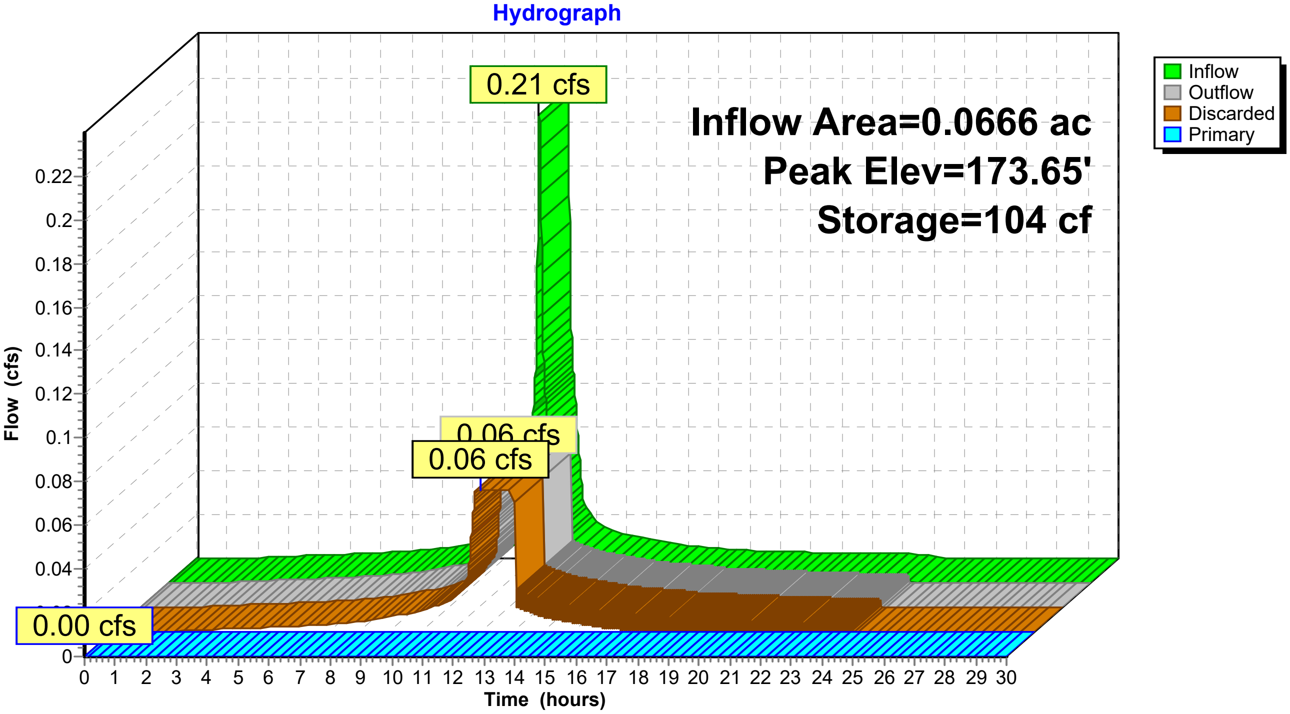
Volume      Invert    Avail.Storage   Storage Description
  #1       173.00'          339 cf    13.00'W x 26.00'L x 3.30'H Prismatoid
                                      1,115 cf Overall - 267 cf Embedded = 848 cf  x 40.0% Voids
  #2       173.50'          267 cf    Cultec R-280HD x 6  Inside #1
                                      Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf
                                      Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap
                                      Row Length Adjustment= +1.00' x 6.07 sf x 2 rows
  #3       175.60'            1 cf    0.33'D x 4.30'H Vertical Cone/Cylinder x 2
                            607 cf    Total Available Storage

Device   Routing        Invert   Outlet Devices
  #1     Discarded     173.00'   8.270 in/hr Exfiltration over Horizontal area
  #2     Primary       179.00'   4.0" Vert. Orifice/Grate X 2.00   C= 0.600

Discarded OutFlow  Max=0.06 cfs @ 11.96 hrs  HW=173.07'   (Free Discharge)
└─1=Exfiltration  (Exfiltration Controls 0.06 cfs)

Primary OutFlow  Max=0.00 cfs @ 0.00 hrs  HW=173.00'  TW=0.00'   (Dynamic Tailwater)
└─2=Orifice/Grate  ( Controls 0.00 cfs)
```

Pond DW3: LOT 3 DW



Summary for Pond DW4: LOT 4 DW

```
Inflow Area =       0.0551 ac,100.00% Impervious,  Inflow Depth =   2.97"    for  2-yr event
Inflow      =      0.18 cfs @   12.07 hrs,  Volume=          0.014 af
Outflow     =      0.05 cfs @   11.97 hrs,  Volume=          0.014 af,  Atten= 69%,  Lag= 0.0 min
Discarded   =      0.05 cfs @   11.97 hrs,  Volume=          0.014 af
Primary     =      0.00 cfs @    0.00 hrs,  Volume=          0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 167.12' @ 12.36 hrs   Surf.Area= 286 sf   Storage= 84 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 6.1 min ( 761.6 - 755.5 )

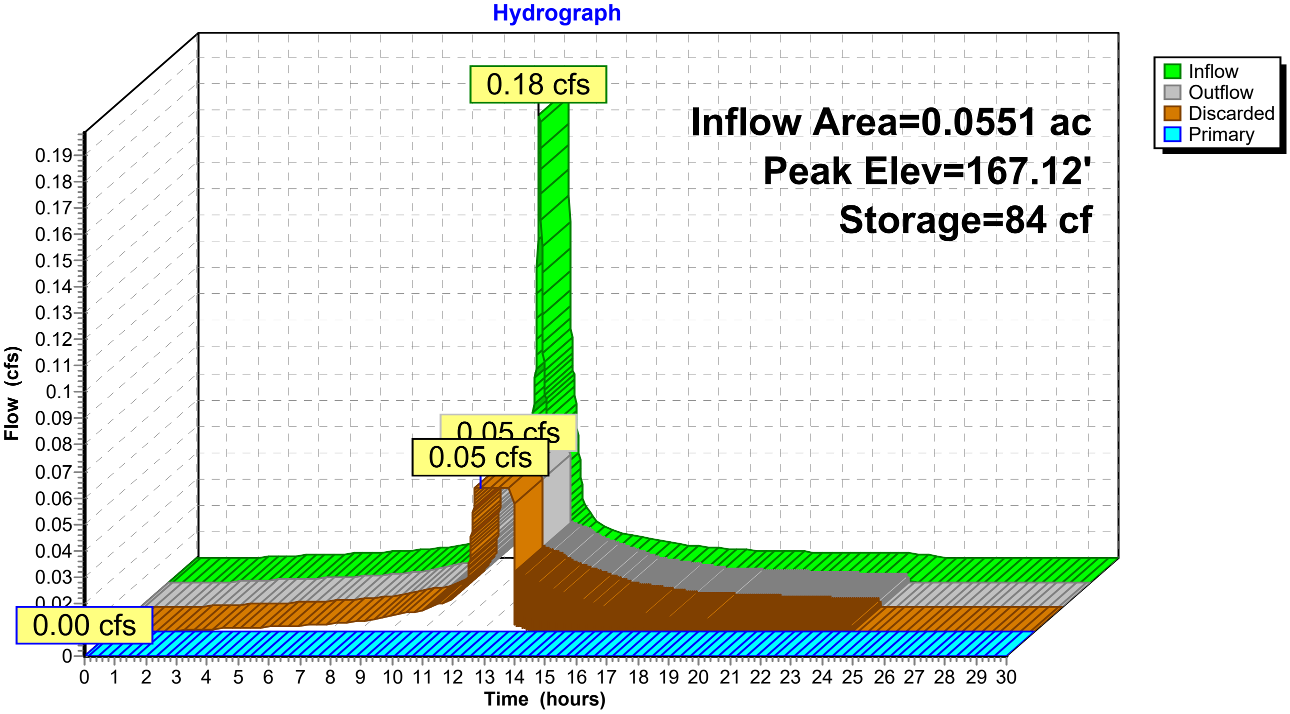
Volume      Invert    Avail.Storage   Storage Description
   #1      166.50'           271 cf   11.00'W x 26.00'L x 3.30'H Prismatoid
                                      944 cf Overall - 267 cf Embedded = 677 cf  x 40.0% Voids
   #2      167.00'           267 cf   Cultec R-280HD x 6  Inside #1
                                      Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf
                                      Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap
                                      Row Length Adjustment= +1.00' x 6.07 sf x 2 rows
   #3      169.20'             0 cf   0.33'D x 2.50'H Vertical Cone/Cylinder x 2
                             538 cf   Total Available Storage

Device   Routing       Invert   Outlet Devices
   #1    Discarded    166.50'   8.270 in/hr Exfiltration over Horizontal area
   #2    Primary      173.00'   4.0" Vert. Orifice/Grate X 12.00   C= 0.600

Discarded OutFlow  Max=0.05 cfs @ 11.97 hrs  HW=166.58'   (Free Discharge)
└─1=Exfiltration  (Exfiltration Controls 0.05 cfs)

Primary OutFlow  Max=0.00 cfs @ 0.00 hrs  HW=166.50'  TW=0.00'   (Dynamic Tailwater)
└─2=Orifice/Grate  ( Controls 0.00 cfs)
```

Pond DW4: LOT 4 DW



Summary for Pond DW6/7: LOTS 6 & 7

Inflow Area = 0.1101 ac,100.00% Impervious, Inflow Depth = 2.97" for 2-yr event
Inflow = 0.35 cfs @ 12.07 hrs, Volume= 0.027 af
Outflow = 0.11 cfs @ 12.12 hrs, Volume= 0.027 af, Atten= 69%, Lag= 3.0 min
Discarded = 0.11 cfs @ 12.12 hrs, Volume= 0.027 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 100.62' @ 12.36 hrs Surf.Area= 572 sf Storage= 168 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 6.1 min (761.6 - 755.5)

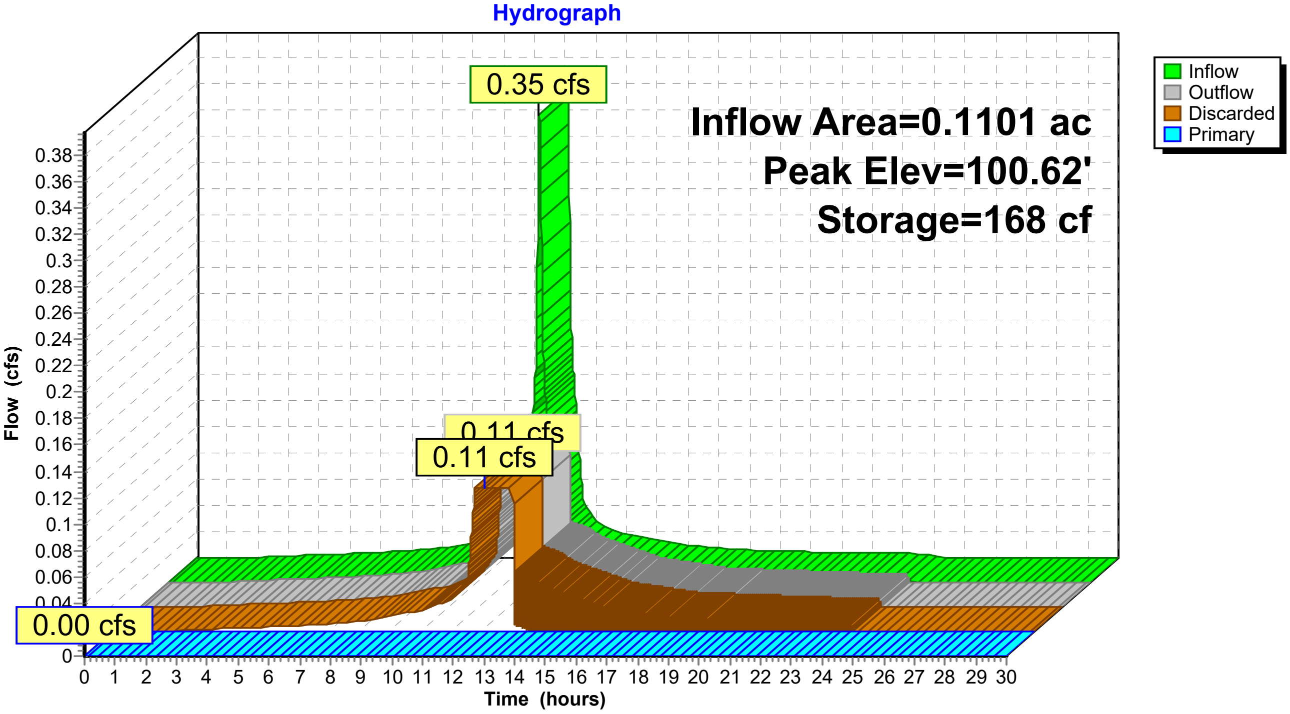
Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	546 cf	**11.00'W x 26.00'L x 3.30'H Prismatoid** x 2 1,888 cf Overall - 522 cf Embedded = 1,365 cf x 40.0% Voids
#2	100.50'	522 cf	**Cultec R-280HD** x 12 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 2 rows
#3	101.00'	0 cf	**0.33'D x 2.00'H Vertical Cone/Cylinder** x 2
		1,069 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	176.00'	**4.0" Vert. Orifice/Grate X 12.00** C= 0.600

Discarded OutFlow Max=0.11 cfs @ 12.12 hrs HW=100.51' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=100.00' TW=0.00' (Dynamic Tailwater)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Pond DW6/7: LOTS 6 & 7



Summary for Subcatchment PR1:

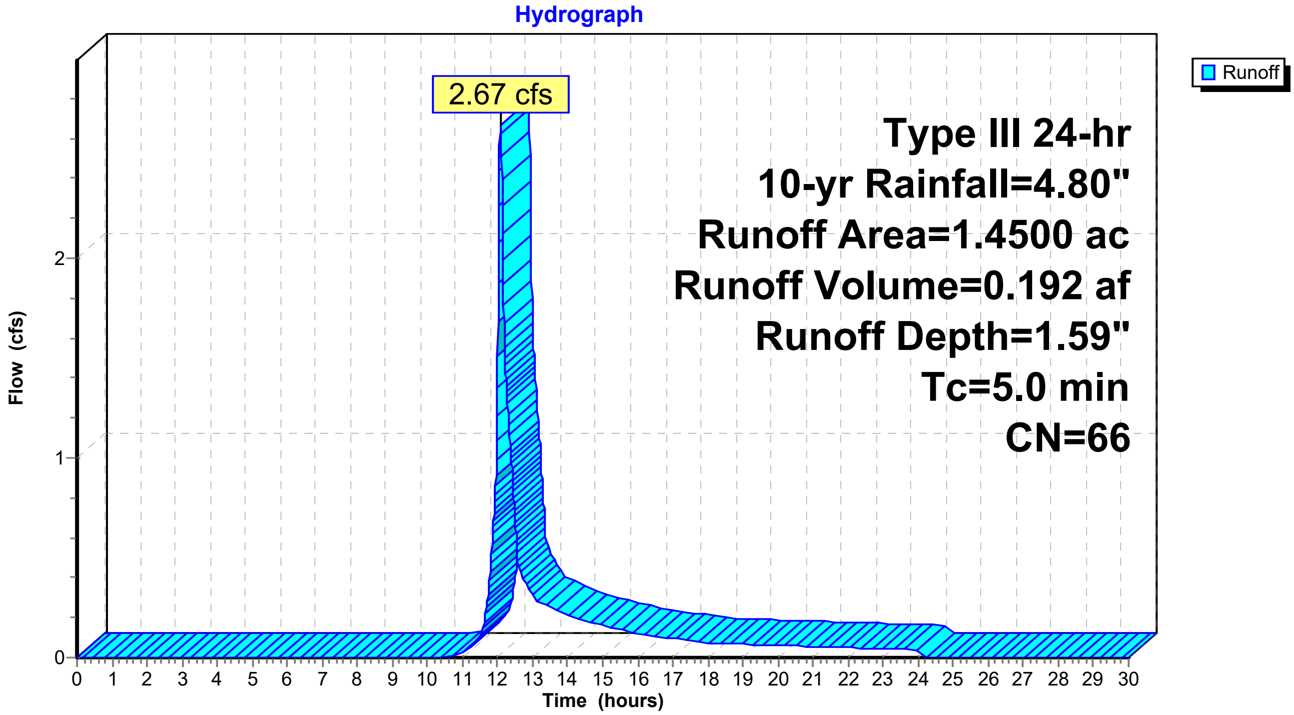
Runoff = 2.67 cfs @ 12.08 hrs, Volume= 0.192 af, Depth= 1.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (ac)	CN	Description
	1.0800	61	>75% Grass cover, Good, HSG B
*	0.2300	98	Pavement
	0.1400	55	Woods, Good, HSG B
	1.4500	66	Weighted Average
	1.2200		84.14% Pervious Area
	0.2300		15.86% Impervious Area

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

Subcatchment PR1:



Summary for Subcatchment PR2:

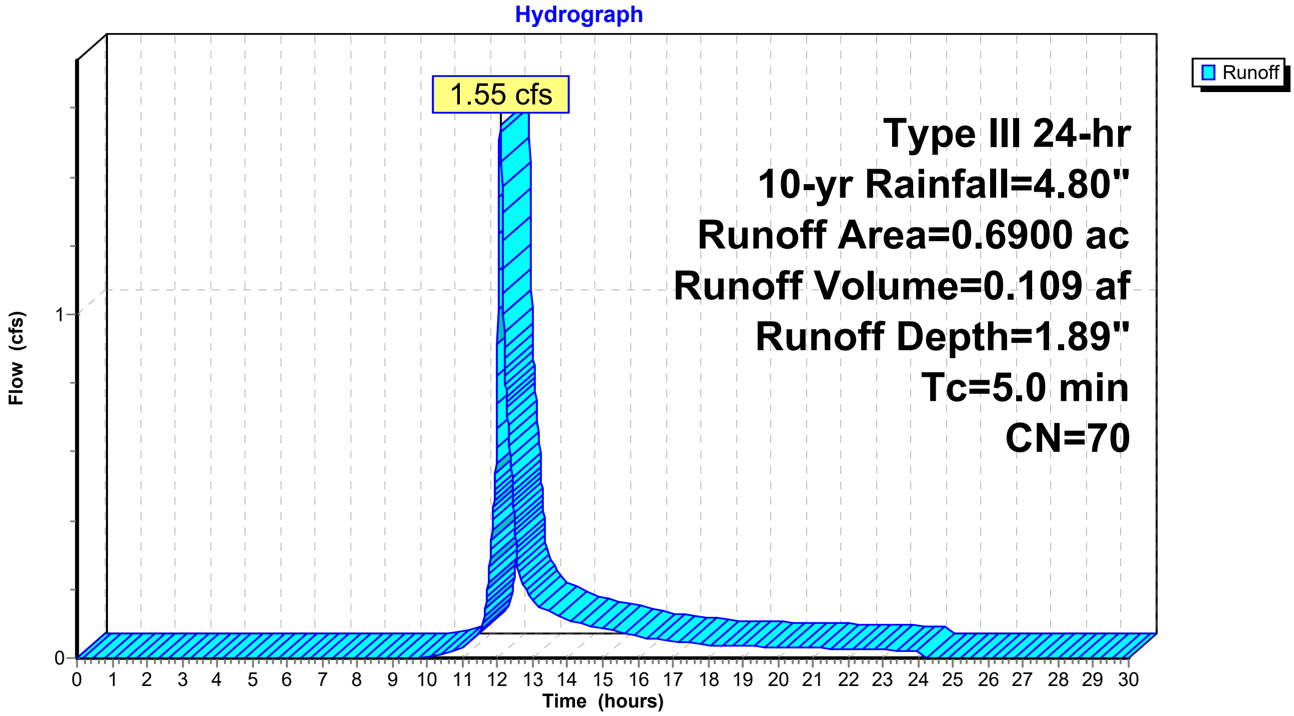
Runoff = 1.55 cfs @ 12.08 hrs, Volume= 0.109 af, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (ac)	CN	Description
	0.4100	61	>75% Grass cover, Good, HSG B
*	0.1900	98	Pavement
	0.0900	55	Woods, Good, HSG B
	0.6900	70	Weighted Average
	0.5000		72.46% Pervious Area
	0.1900		27.54% Impervious Area

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

Subcatchment PR2:



Summary for Subcatchment PR3:

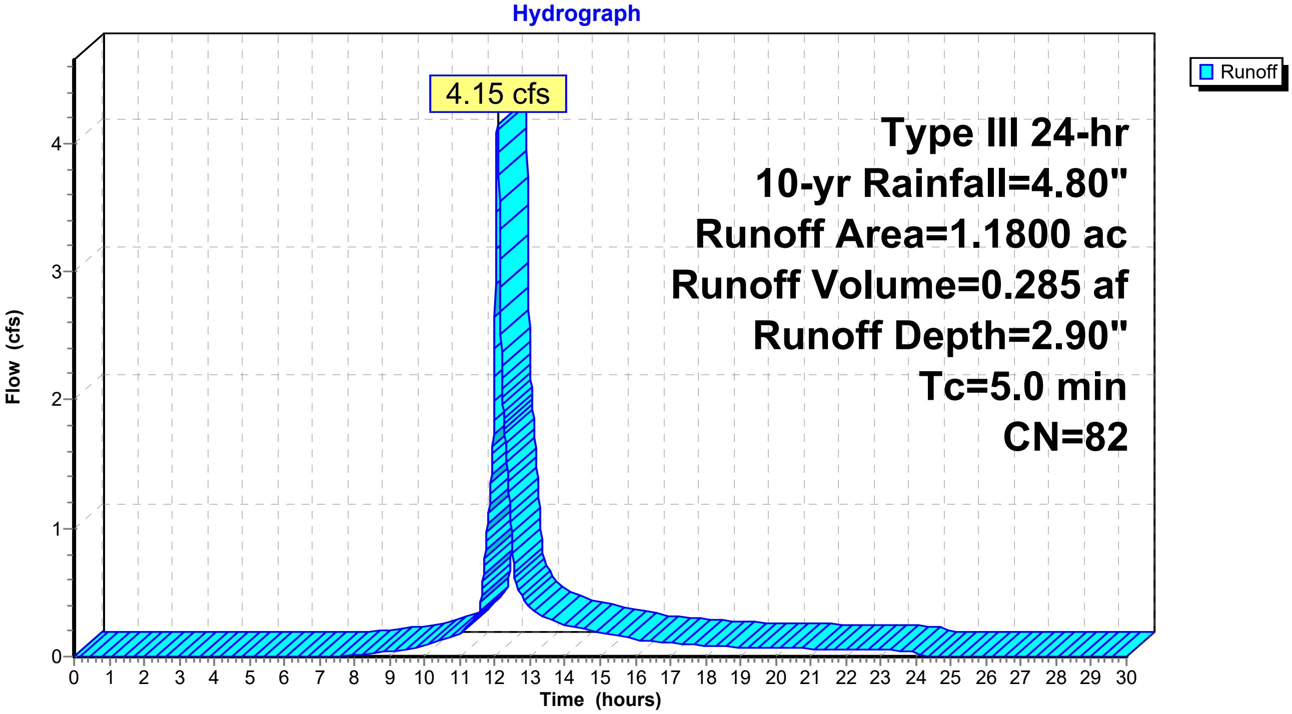
Runoff = 4.15 cfs @ 12.07 hrs, Volume= 0.285 af, Depth= 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (ac)	CN	Description
	0.5000	61	>75% Grass cover, Good, HSG B
*	0.6800	98	Pavement
	1.1800	82	Weighted Average
	0.5000		42.37% Pervious Area
	0.6800		57.63% Impervious Area

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

Subcatchment PR3:



Summary for Subcatchment PR4:

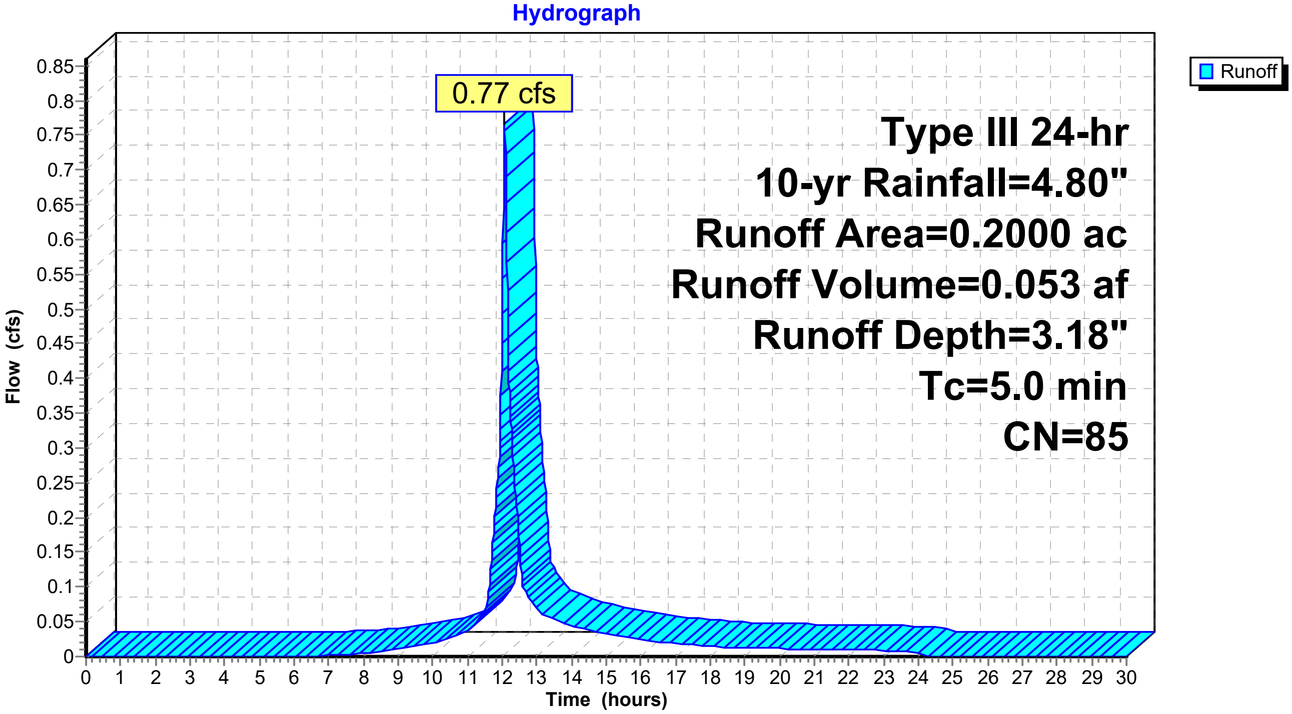
Runoff = 0.77 cfs @ 12.07 hrs, Volume= 0.053 af, Depth= 3.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (ac)	CN	Description
	0.0700	61	>75% Grass cover, Good, HSG B
*	0.1300	98	Pavement
	0.2000	85	Weighted Average
	0.0700		35.00% Pervious Area
	0.1300		65.00% Impervious Area

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

Subcatchment PR4:



Summary for Subcatchment PR5:

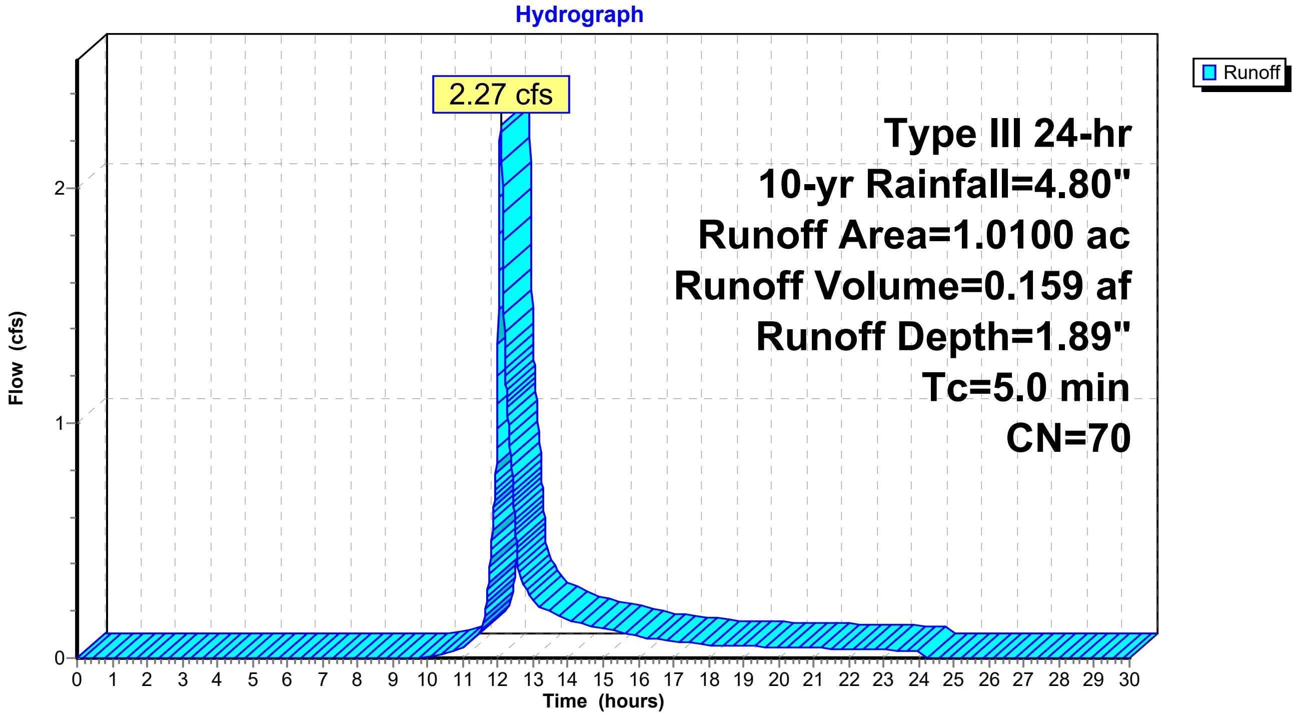
Runoff = 2.27 cfs @ 12.08 hrs, Volume= 0.159 af, Depth= 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (ac)	CN	Description
	0.6200	61	>75% Grass cover, Good, HSG B
*	0.2700	98	Pavement
	0.1200	55	Woods, Good, HSG B
	1.0100	70	Weighted Average
	0.7400		73.27% Pervious Area
	0.2700		26.73% Impervious Area

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

Subcatchment PR5:



Summary for Subcatchment PR6:

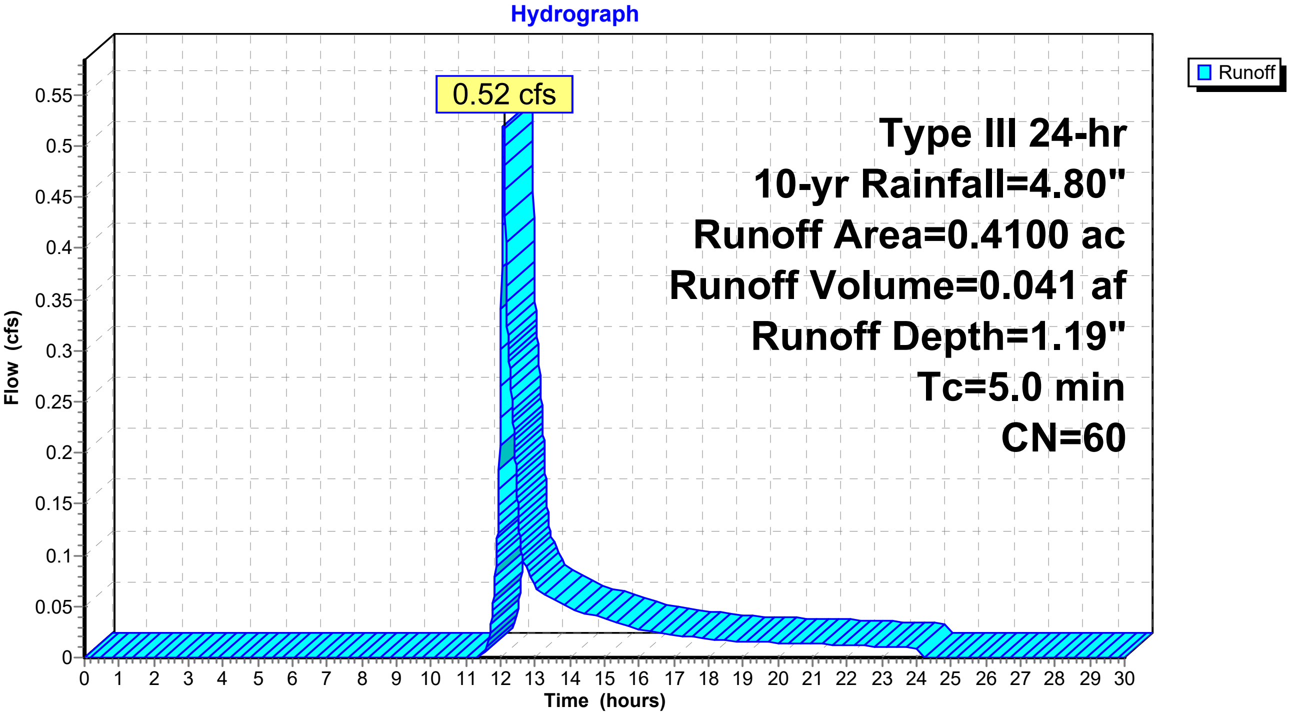
Runoff = 0.52 cfs @ 12.09 hrs, Volume= 0.041 af, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

Area (ac)	CN	Description
0.3100	61	>75% Grass cover, Good, HSG B
0.1000	55	Woods, Good, HSG B
0.4100	60	Weighted Average
0.4100		100.00% Pervious Area

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

Subcatchment PR6:



Summary for Subcatchment PR7:

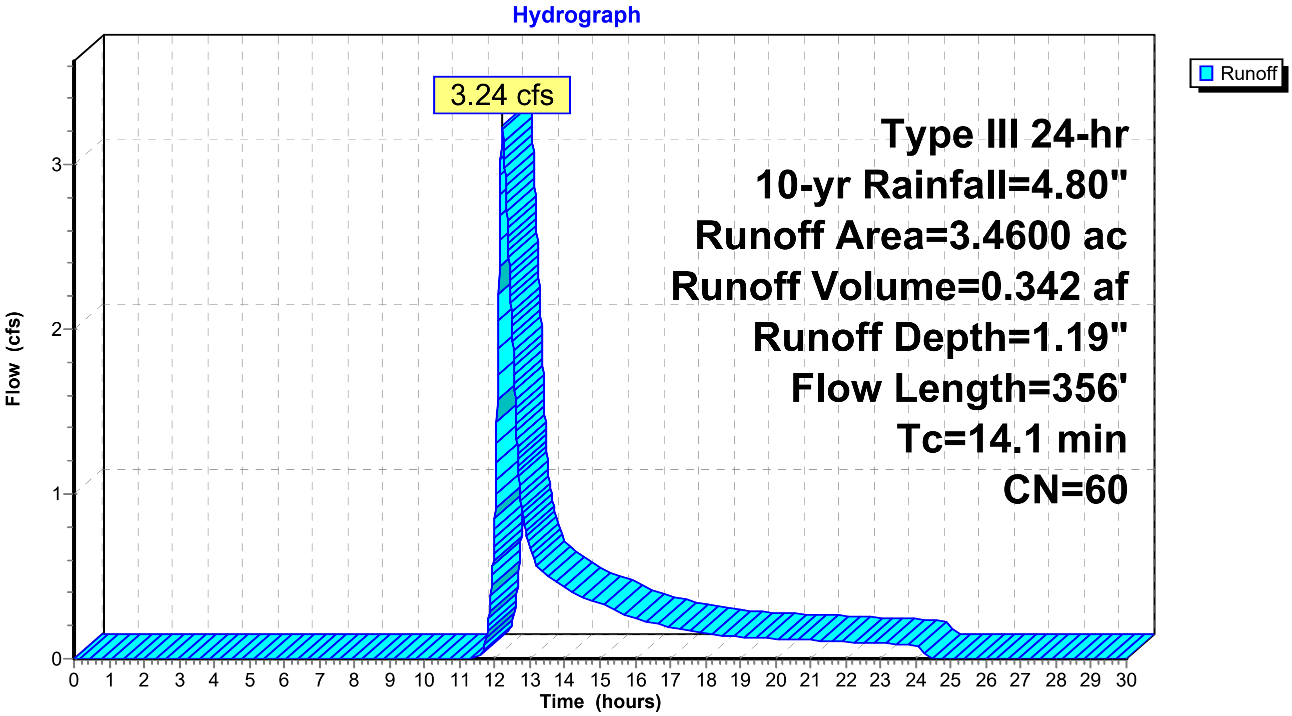
Runoff = 3.24 cfs @ 12.22 hrs, Volume= 0.342 af, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

Area (ac)	CN	Description
3.0500	61	>75% Grass cover, Good, HSG B
0.4100	55	Woods, Good, HSG B
3.4600	60	Weighted Average
3.4600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.08		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.20"
0.2	16	0.0100	1.50		**Shallow Concentrated Flow, SCF** Grassed Waterway Kv= 15.0 fps
1.4	117	0.0090	1.42		**Shallow Concentrated Flow, SCF** Grassed Waterway Kv= 15.0 fps
1.7	173	0.0130	1.71		**Shallow Concentrated Flow, SCF** Grassed Waterway Kv= 15.0 fps
14.1	356	Total			

Subcatchment PR7:



Summary for Subcatchment PR8: OFF SITE

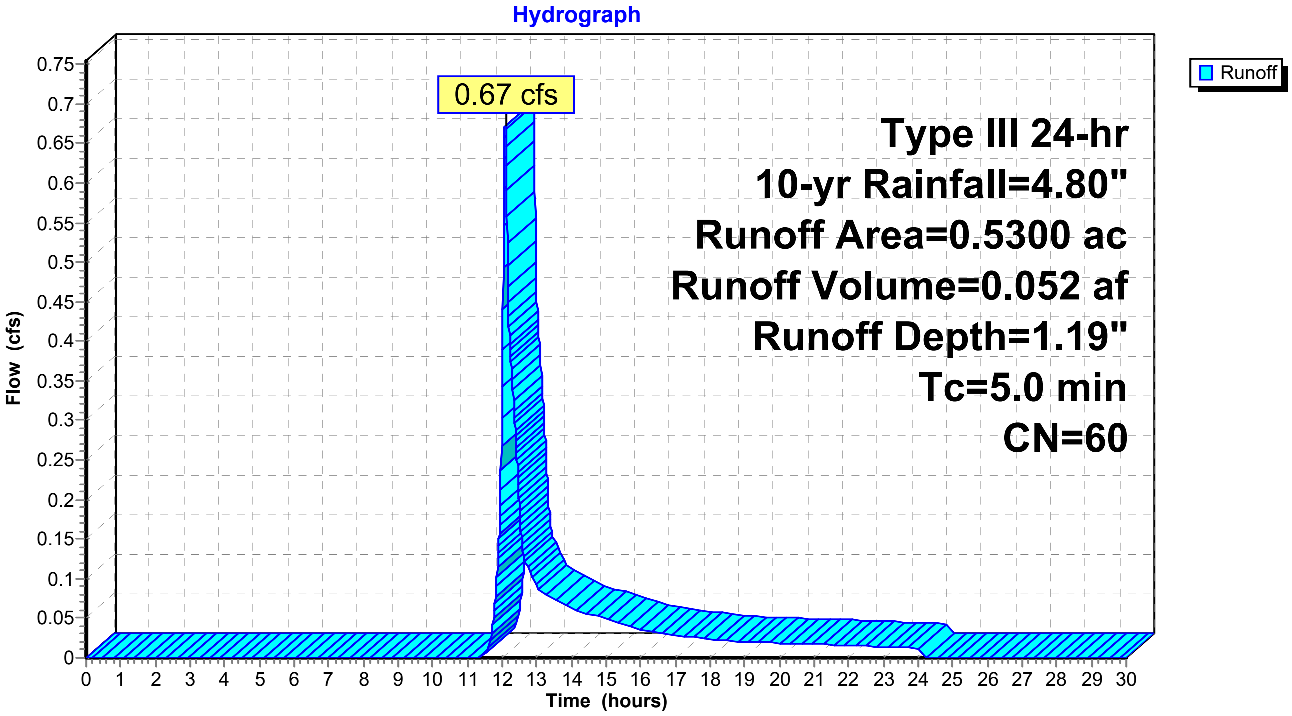
Runoff = 0.67 cfs @ 12.09 hrs, Volume= 0.052 af, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (ac)	CN	Description
	0.3200	55	Woods, Good, HSG B
*	0.0400	98	Impervious
	0.1700	61	>75% Grass cover, Good, HSG B
	0.5300	60	Weighted Average
	0.4900		92.45% Pervious Area
	0.0400		7.55% Impervious Area

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

Subcatchment PR8: OFF SITE



Summary for Subcatchment PR9:

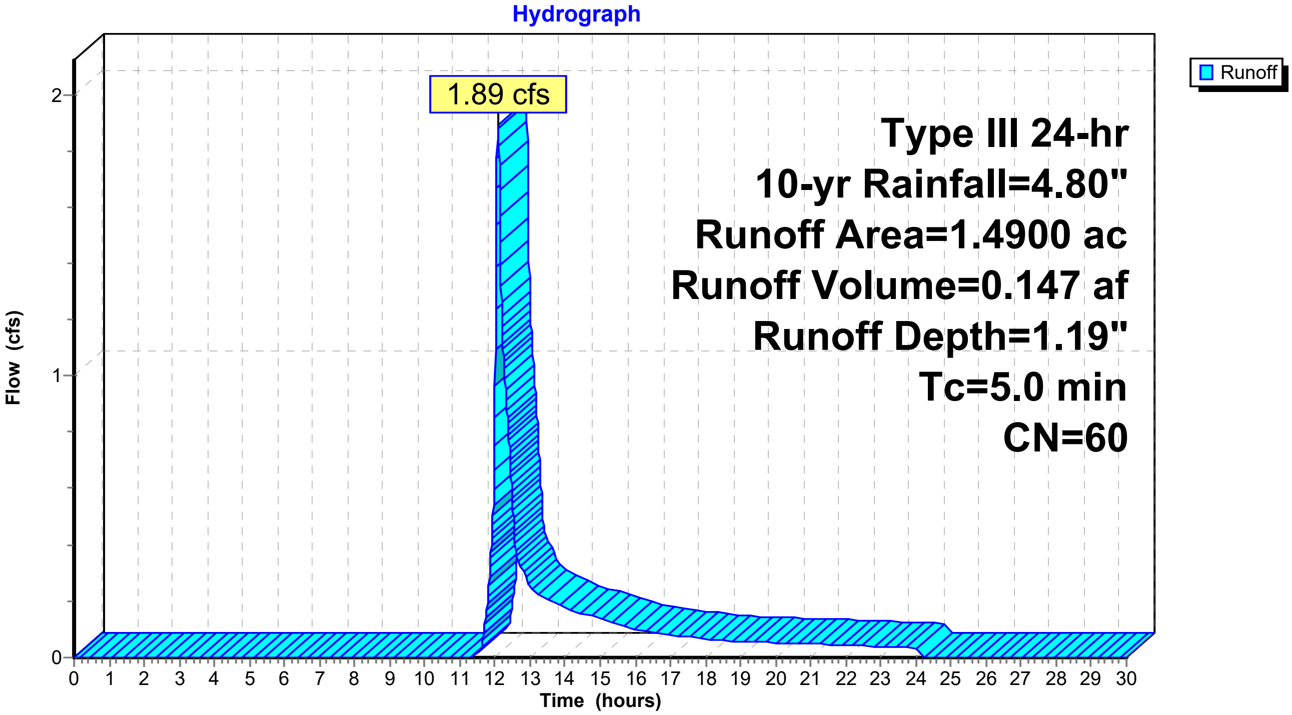
Runoff = 1.89 cfs @ 12.09 hrs, Volume= 0.147 af, Depth= 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

Area (ac)	CN	Description
1.3600	61	>75% Grass cover, Good, HSG B
0.1300	55	Woods, Good, HSG B
1.4900	60	Weighted Average
1.4900		100.00% Pervious Area

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

Subcatchment PR9:



Summary for Subcatchment R1: LOT 1 ROOF

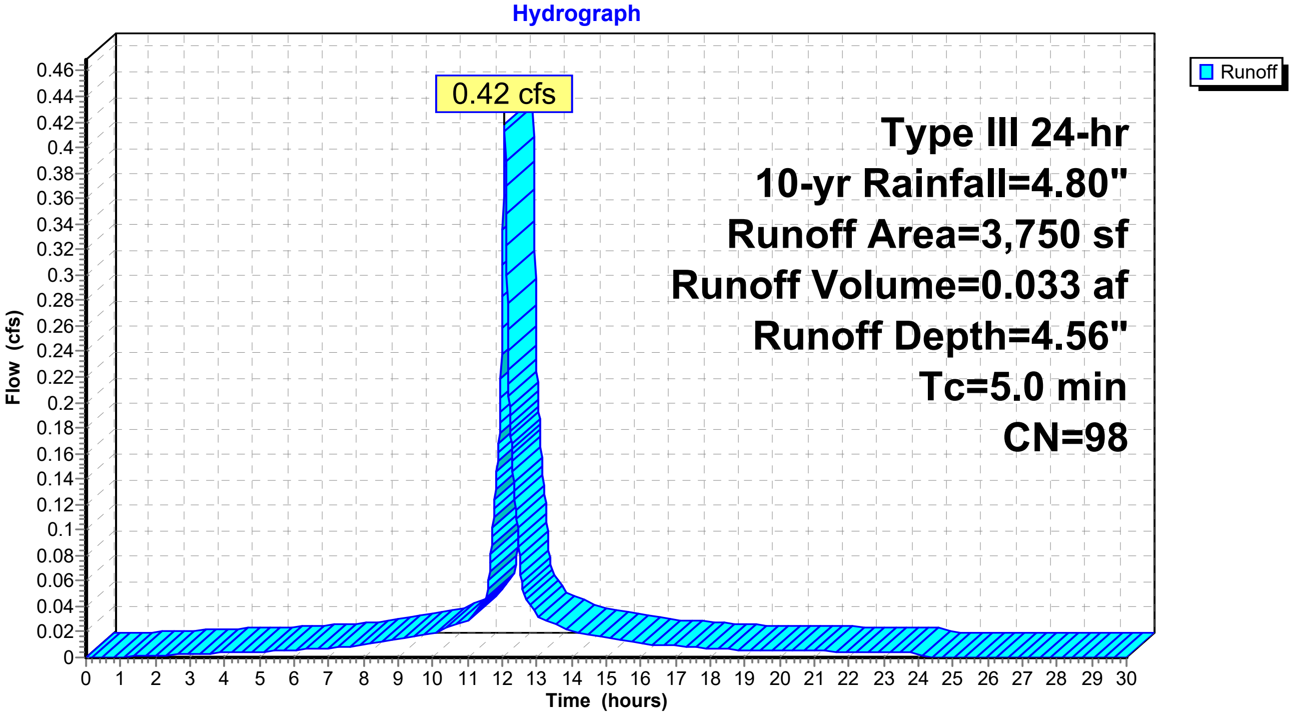
Runoff = 0.42 cfs @ 12.07 hrs, Volume= 0.033 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
*	3,750	98	ROOF AREA
	3,750		100.00% Impervious Area

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

Subcatchment R1: LOT 1 ROOF



Summary for Subcatchment R2: LOT 2 ROOF

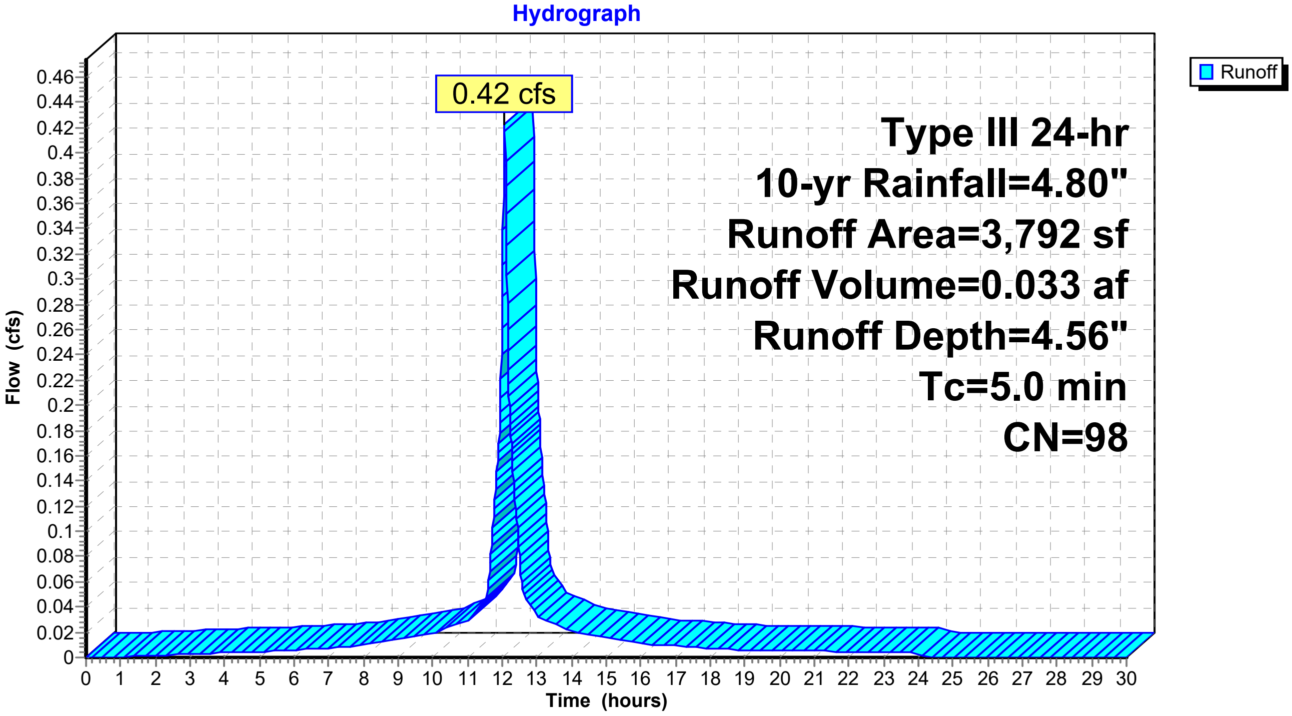
Runoff = 0.42 cfs @ 12.07 hrs, Volume= 0.033 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
*	3,792	98	ROOF AREA
	3,792		100.00% Impervious Area

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

Subcatchment R2: LOT 2 ROOF



Summary for Subcatchment R3: LOT 3 ROOF

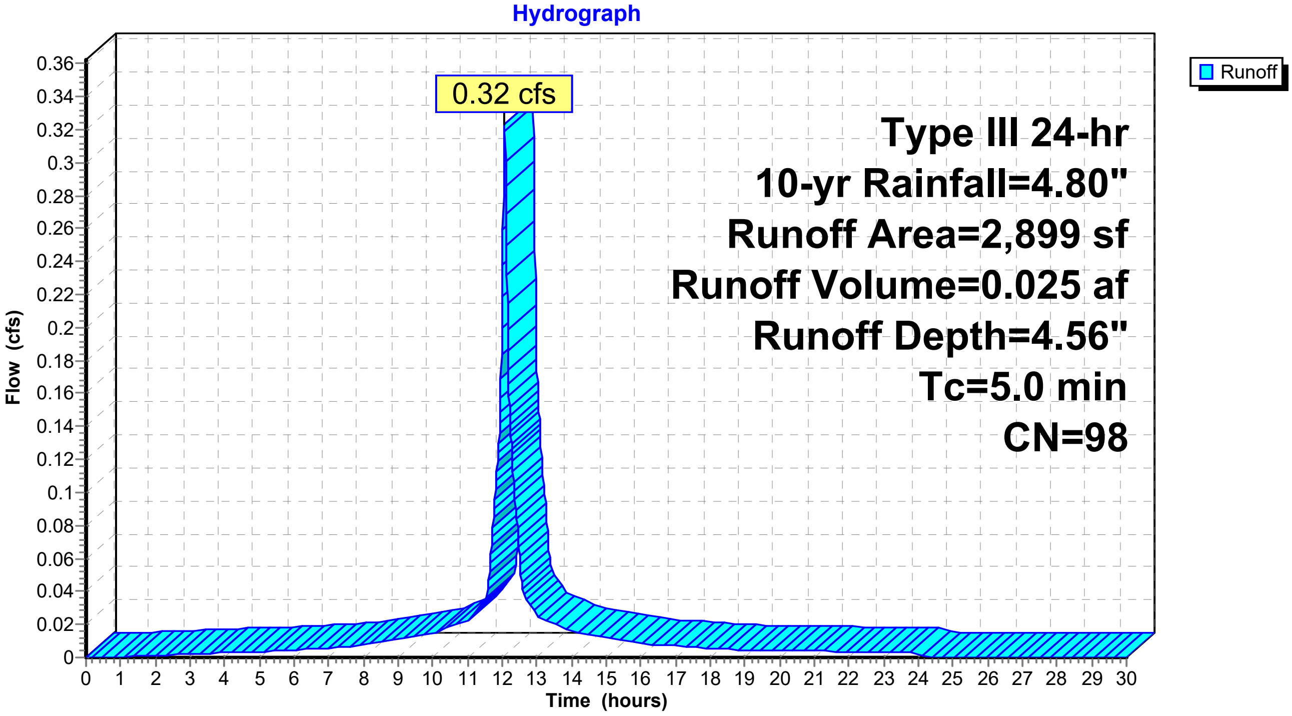
Runoff = 0.32 cfs @ 12.07 hrs, Volume= 0.025 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
*	2,899	98	ROOF AREA
	2,899		100.00% Impervious Area

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

Subcatchment R3: LOT 3 ROOF



Summary for Subcatchment R4: LOT 4 ROOF

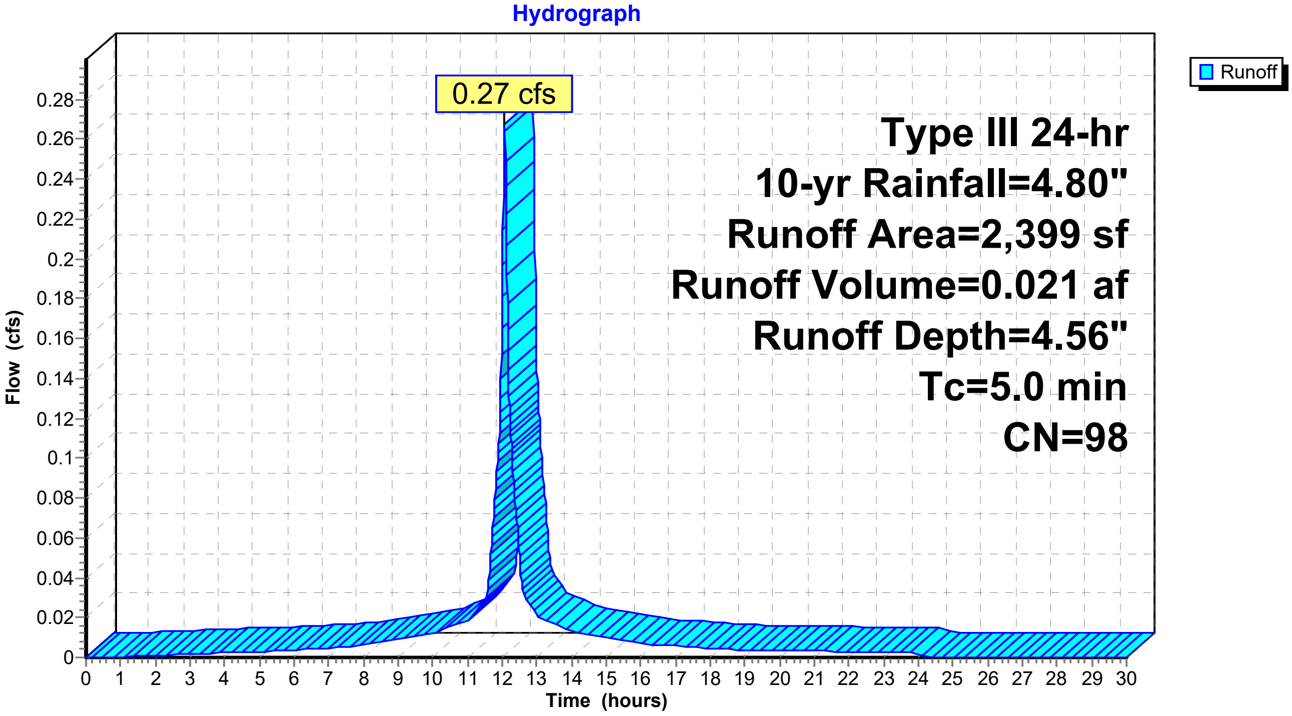
Runoff = 0.27 cfs @ 12.07 hrs, Volume= 0.021 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
*	2,399	98	ROOF AREA
	2,399		100.00% Impervious Area

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

Subcatchment R4: LOT 4 ROOF



Summary for Subcatchment R6/7: LOTS 6 & 7 (ROOFS)

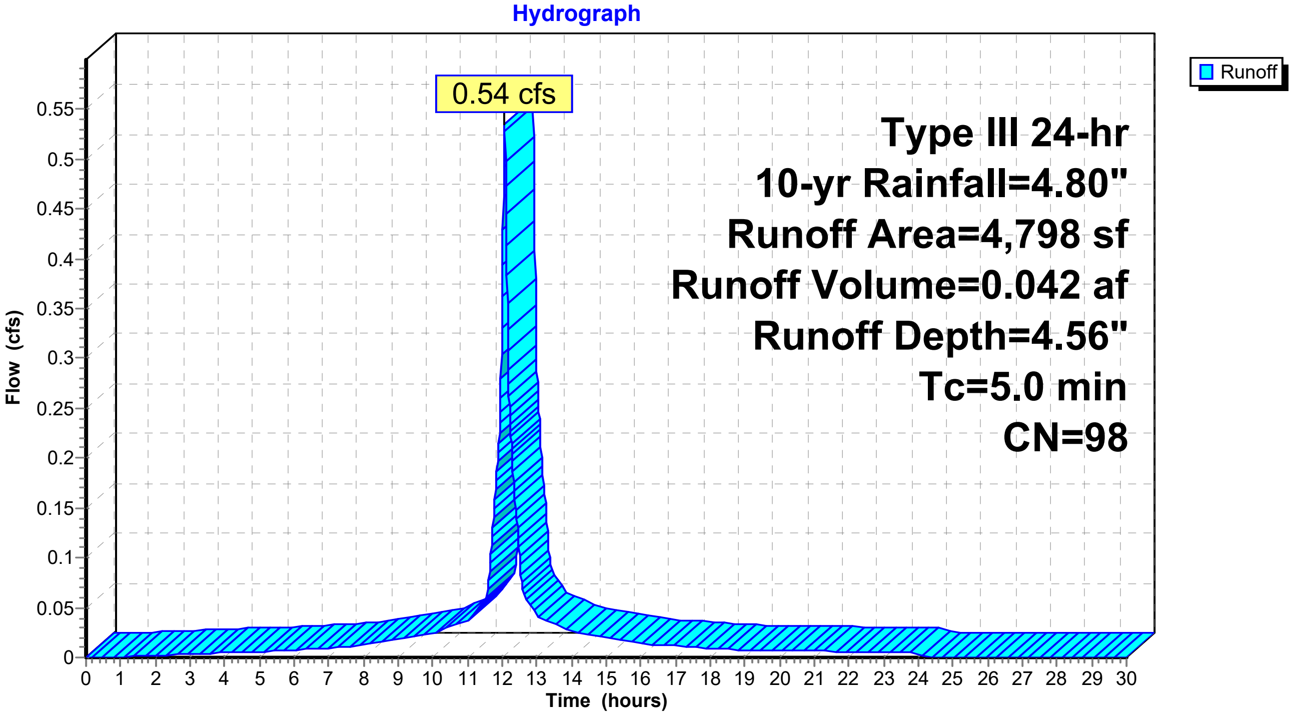
Runoff = 0.54 cfs @ 12.07 hrs, Volume= 0.042 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
*	4,798	98	ROOF AREA
	4,798		100.00% Impervious Area

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

Subcatchment R6/7: LOTS 6 & 7 (ROOFS)



Summary for Subcatchment R8: LOT 8 ROOF

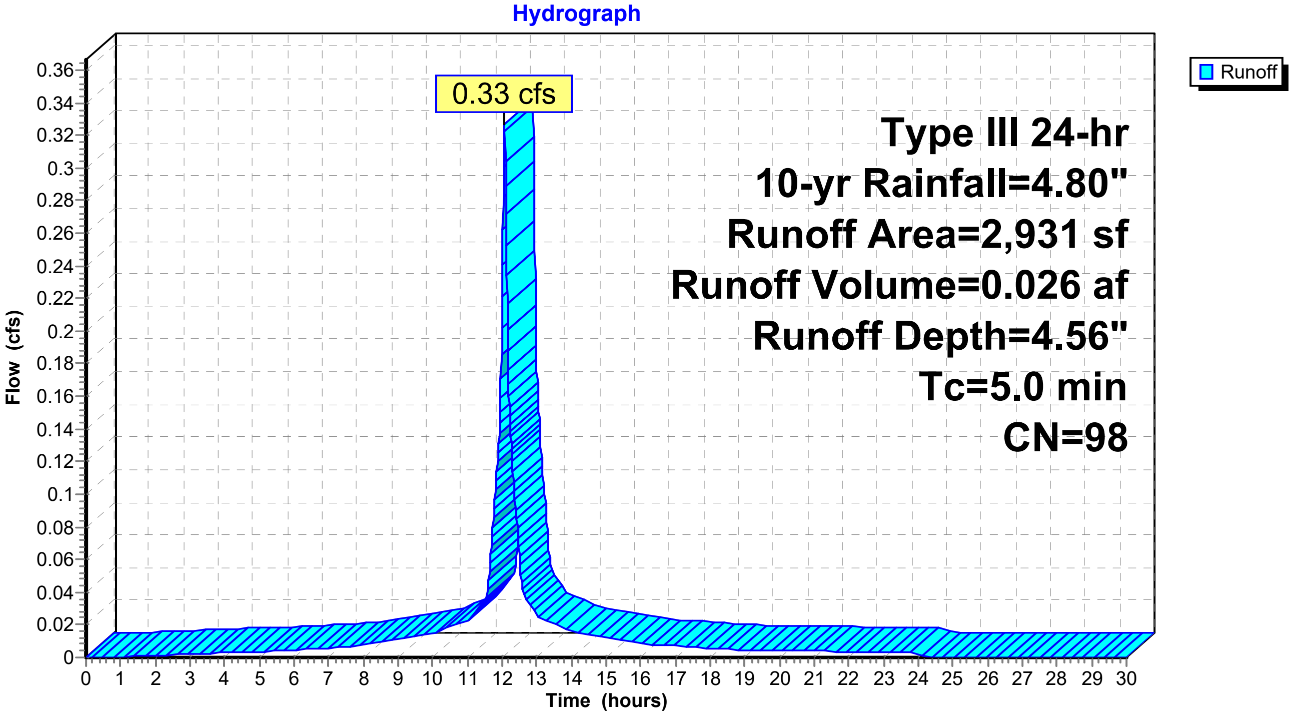
Runoff = 0.33 cfs @ 12.07 hrs, Volume= 0.026 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
*	2,931	98	ROOF AREA
	2,931		100.00% Impervious Area

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

Subcatchment R8: LOT 8 ROOF



Summary for Subcatchment R9: LOT 9 ROOF

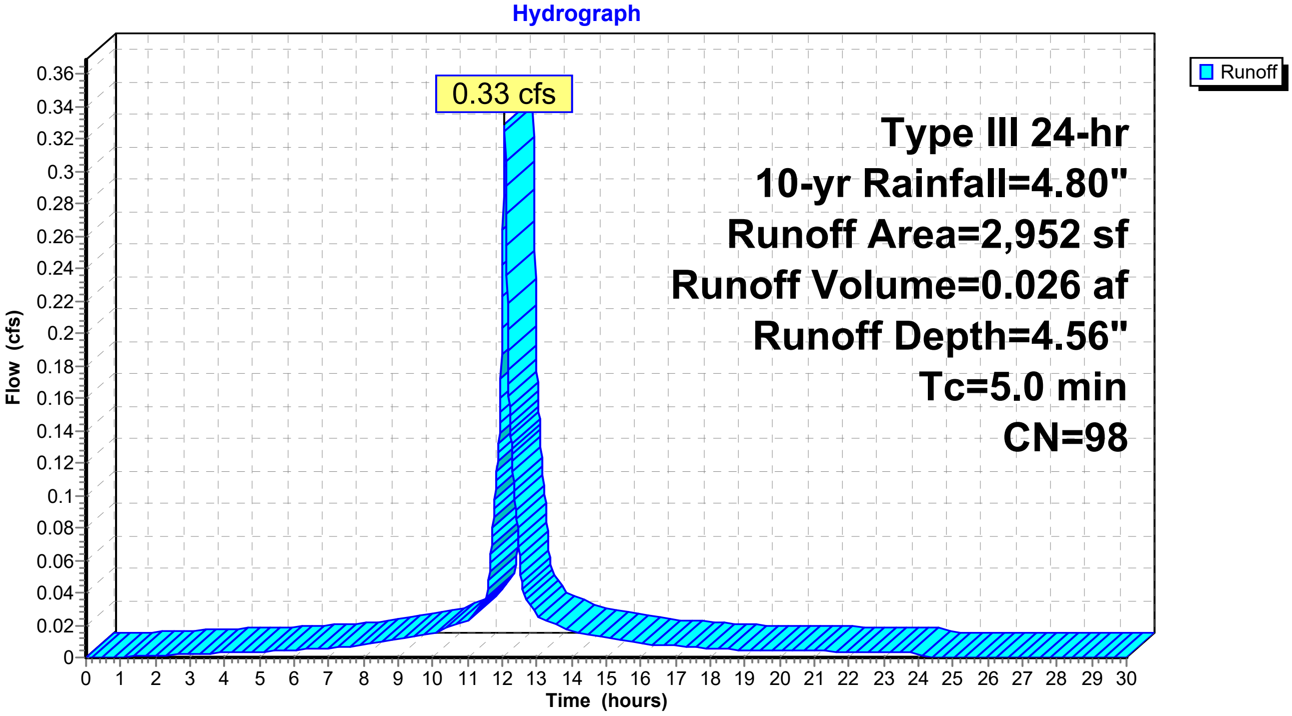
Runoff = 0.33 cfs @ 12.07 hrs, Volume= 0.026 af, Depth= 4.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 10-yr Rainfall=4.80"

	Area (sf)	CN	Description
*	2,952	98	ROOF AREA
	2,952		100.00% Impervious Area

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

Subcatchment R9: LOT 9 ROOF

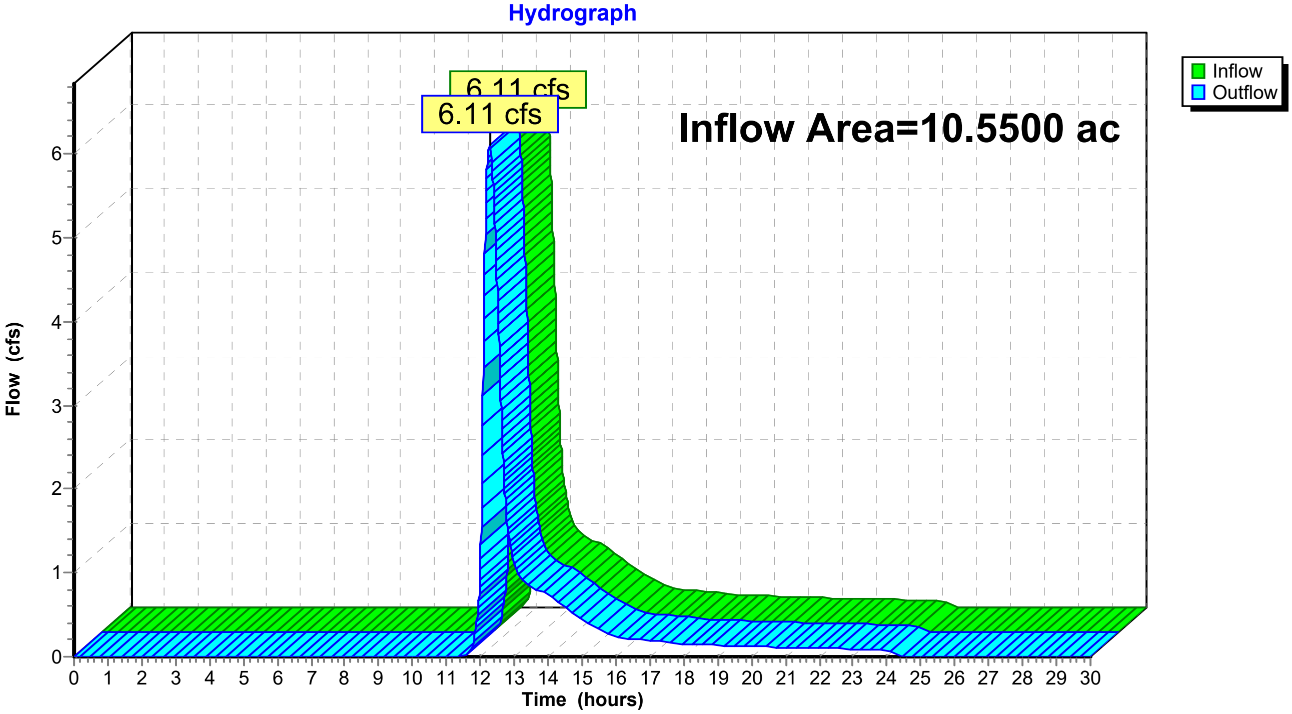


Summary for Reach BVW: WETLANDS

Inflow Area =	10.5500 ac,	19.72% Impervious,	Inflow Depth = 0.61"	for 10-yr event		
Inflow =	6.11 cfs @	12.26 hrs,	Volume=	0.537 af		
Outflow =	6.11 cfs @	12.26 hrs,	Volume=	0.537 af,	Atten= 0%,	Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

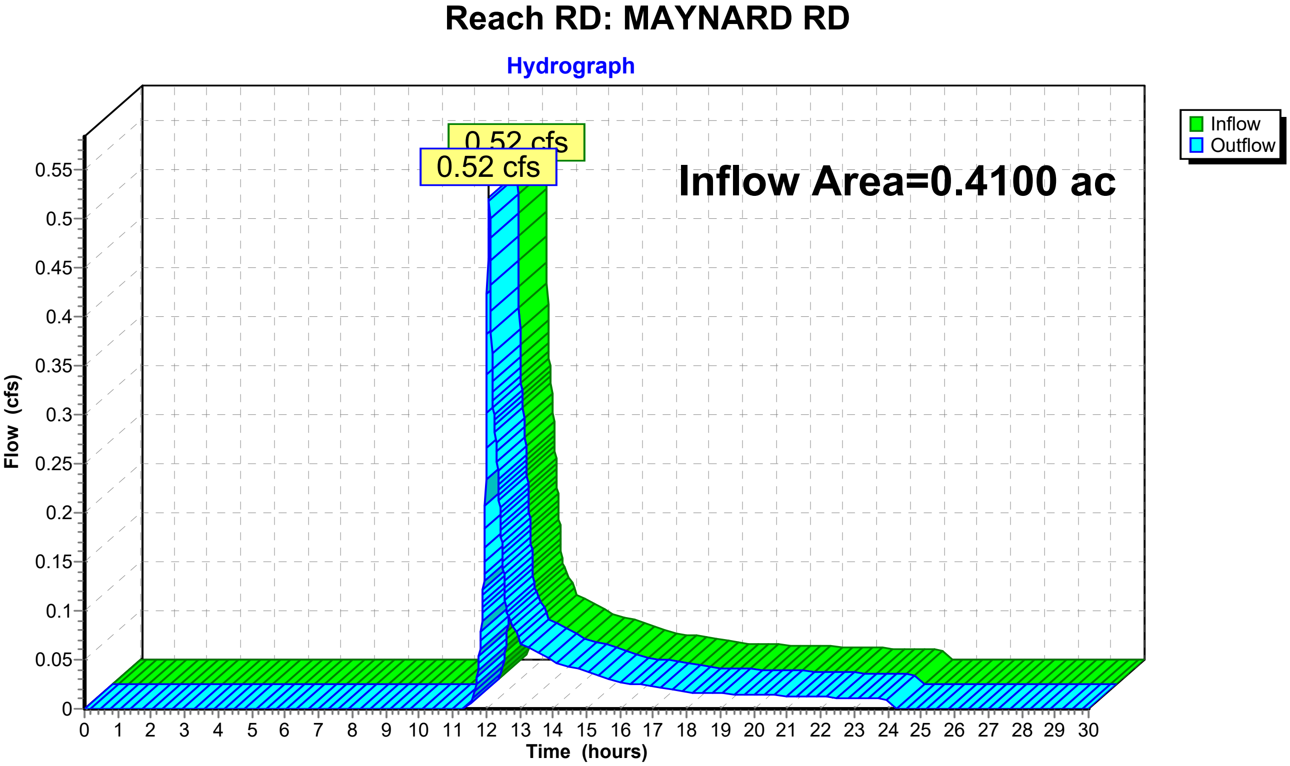
Reach BVW: WETLANDS



Summary for Reach RD: MAYNARD RD

```
Inflow Area =        0.4100 ac,   0.00% Impervious,  Inflow Depth =   1.19"    for  10-yr event
Inflow      =       0.52 cfs @   12.09 hrs,  Volume=           0.041 af
Outflow     =       0.52 cfs @   12.09 hrs,  Volume=           0.041 af,  Atten= 0%,  Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

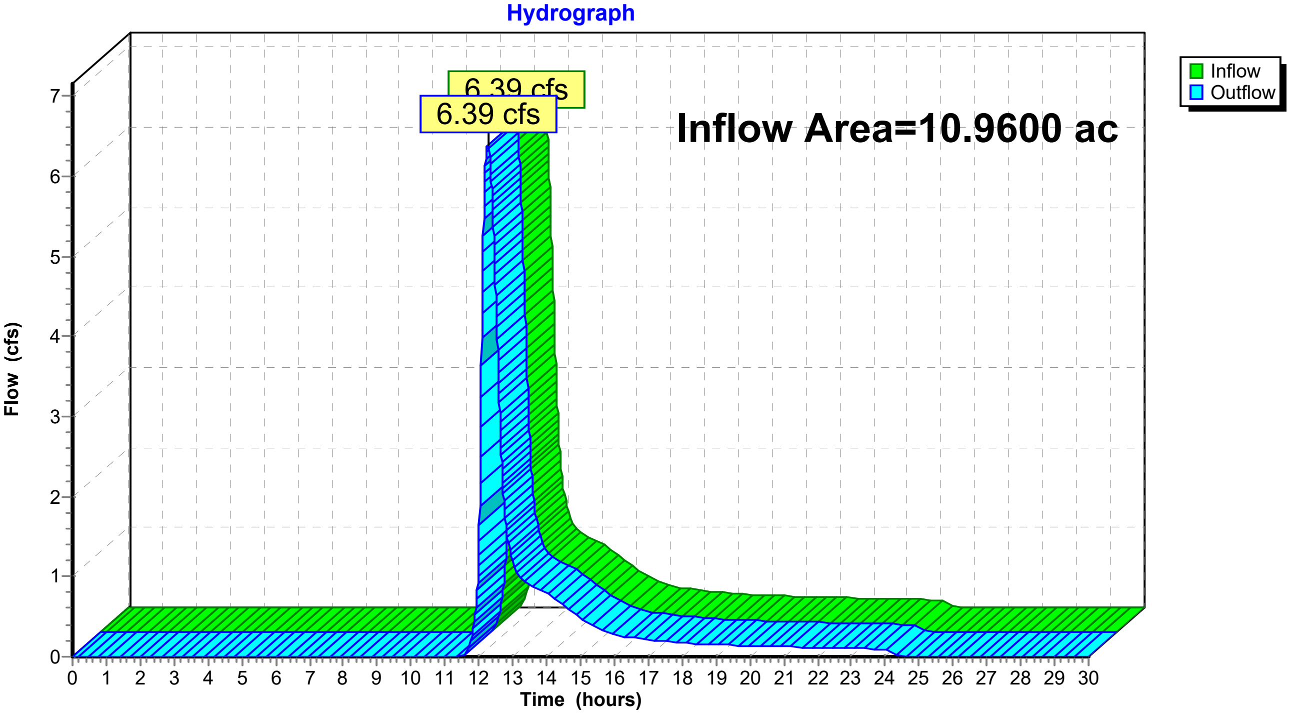


Summary for Reach T: TOTAL

Inflow Area = 10.9600 ac, 18.98% Impervious, Inflow Depth = 0.63" for 10-yr event
Inflow = 6.39 cfs @ 12.26 hrs, Volume= 0.577 af
Outflow = 6.39 cfs @ 12.26 hrs, Volume= 0.577 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Reach T: TOTAL



Summary for Pond CS1: CHAMBER SYSTEM #1

Inflow Area = 2.0478 ac, 16.49% Impervious, Inflow Depth = 0.80" for 10-yr event
Inflow = 2.58 cfs @ 12.13 hrs, Volume= 0.137 af
Outflow = 1.53 cfs @ 12.37 hrs, Volume= 0.137 af, Atten= 41%, Lag= 14.7 min
Discarded = 0.85 cfs @ 12.12 hrs, Volume= 0.116 af
Primary = 0.68 cfs @ 12.37 hrs, Volume= 0.021 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 177.20' @ 12.37 hrs Surf.Area= 4,456 sf Storage= 1,376 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 10.0 min (806.2 - 796.2)

Volume	Invert	Avail.Storage	Storage Description
#1	176.20'	578 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 1,444 cf Overall x 40.0% Voids
#2	176.70'	4,777 cf	**retain_it retain_it 3.0'** x 28 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
#3	179.70'	44 cf	**2.00'D x 2.80'H Vertical Cone/Cylinder** x 5 -Impervious
		5,399 cf	Total Available Storage

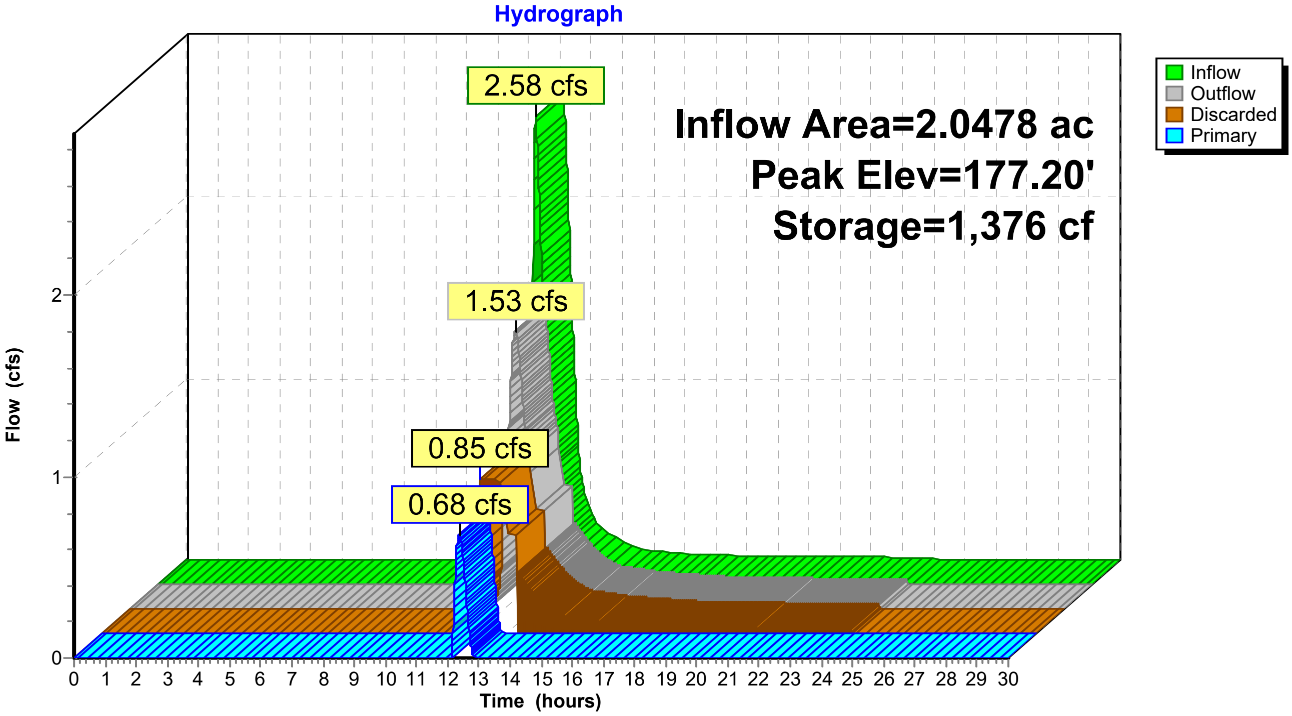
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
176.20	2,888	0	0
176.70	2,888	1,444	1,444

Device	Routing	Invert	Outlet Devices
#1	Discarded	176.20'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	176.70'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	179.30'	**4.2' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 3.5' Crest Height

Discarded OutFlow Max=0.85 cfs @ 12.12 hrs HW=176.72' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.85 cfs)

Primary OutFlow Max=0.68 cfs @ 12.37 hrs HW=177.20' TW=0.00' (Dynamic Tailwater)
├─**2=Orifice/Grate** (Orifice Controls 0.68 cfs @ 2.41 fps)
└─**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond CS1: CHAMBER SYSTEM #1



Summary for Pond CS2: CHAMBER SYSTEM #2

```
Inflow Area =      1.5178 ac,  19.62% Impervious,  Inflow Depth =   1.73"    for  10-yr event
Inflow      =      3.00 cfs @  12.08 hrs,  Volume=           0.218 af
Outflow     =      2.23 cfs @  12.15 hrs,  Volume=           0.218 af,  Atten= 26%,  Lag= 4.2 min
Discarded   =      0.21 cfs @  11.71 hrs,  Volume=           0.134 af
Primary     =      2.02 cfs @  12.15 hrs,  Volume=           0.085 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 178.51' @ 12.15 hrs   Surf.Area= 1,100 sf   Storage= 1,020 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 9.0 min ( 855.5 - 846.5 )

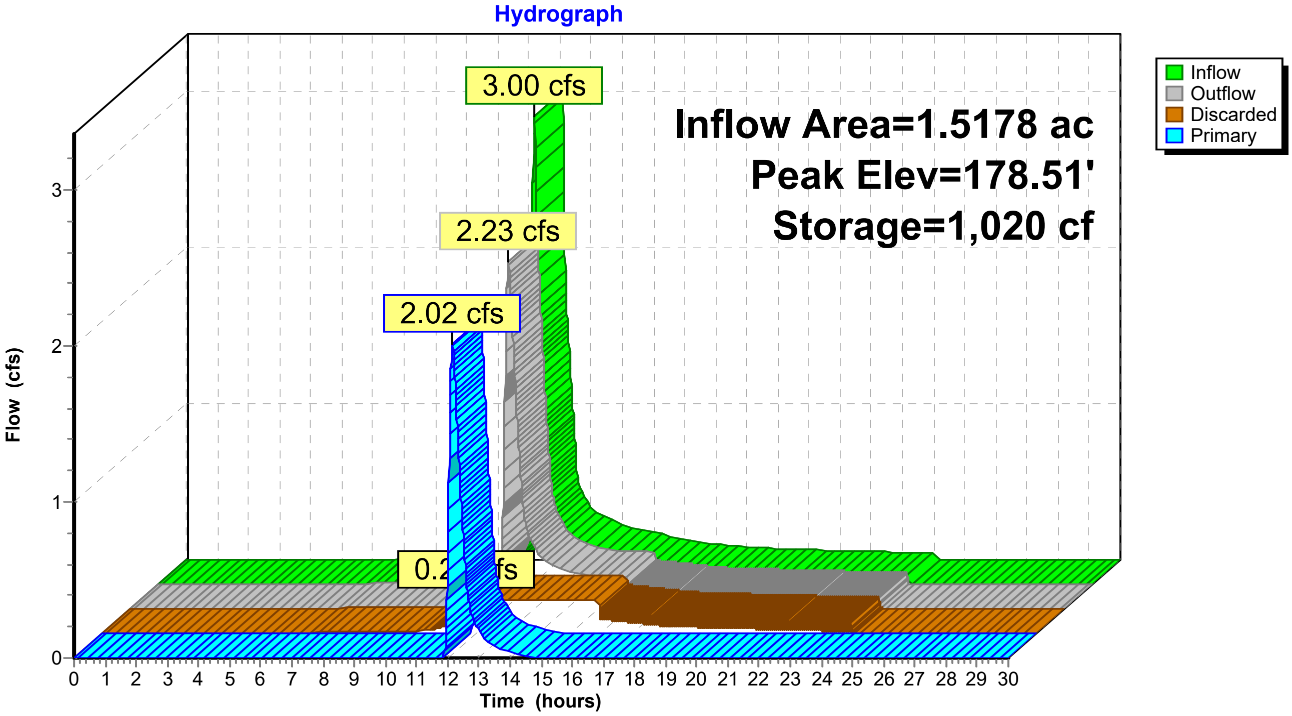
Volume      Invert    Avail.Storage   Storage Description
  #1       177.00'           854 cf   22.00'W x 50.00'L x 5.20'H Prismatoid
                                      5,720 cf Overall - 3,584 cf Embedded = 2,136 cf  x 40.0% Voids
  #2       177.50'         2,650 cf   retain_it retain_it  4.0' x 12  Inside #1
                                      Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf
                                      Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf
                                      2 Rows adjusted for 120.8 cf perimeter wall
                           3,505 cf   Total Available Storage

Device   Routing        Invert   Outlet Devices
   #1    Primary       177.50'   10.0" Vert. Orifice/Grate   C= 0.600
   #2    Discarded     177.00'   8.270 in/hr Exfiltration over Horizontal area

Discarded OutFlow  Max=0.21 cfs @ 11.71 hrs  HW=177.06'   (Free Discharge)
└─2=Exfiltration  (Exfiltration Controls 0.21 cfs)

Primary OutFlow  Max=2.02 cfs @ 12.15 hrs  HW=178.51'  TW=176.83'   (Dynamic Tailwater)
└─1=Orifice/Grate  (Orifice Controls 2.02 cfs @ 3.69 fps)
```

Pond CS2: CHAMBER SYSTEM #2



Summary for Pond CS3: CHAMBER SYSTEM #3

Inflow Area = 1.1800 ac, 57.63% Impervious, Inflow Depth = 2.90" for 10-yr event
Inflow = 4.15 cfs @ 12.07 hrs, Volume= 0.285 af
Outflow = 1.15 cfs @ 12.43 hrs, Volume= 0.285 af, Atten= 72%, Lag= 21.3 min
Discarded = 0.23 cfs @ 11.89 hrs, Volume= 0.197 af
Primary = 0.92 cfs @ 12.43 hrs, Volume= 0.088 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 173.84' @ 12.43 hrs Surf.Area= 4,096 sf Storage= 4,293 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 82.1 min (899.1 - 817.1)

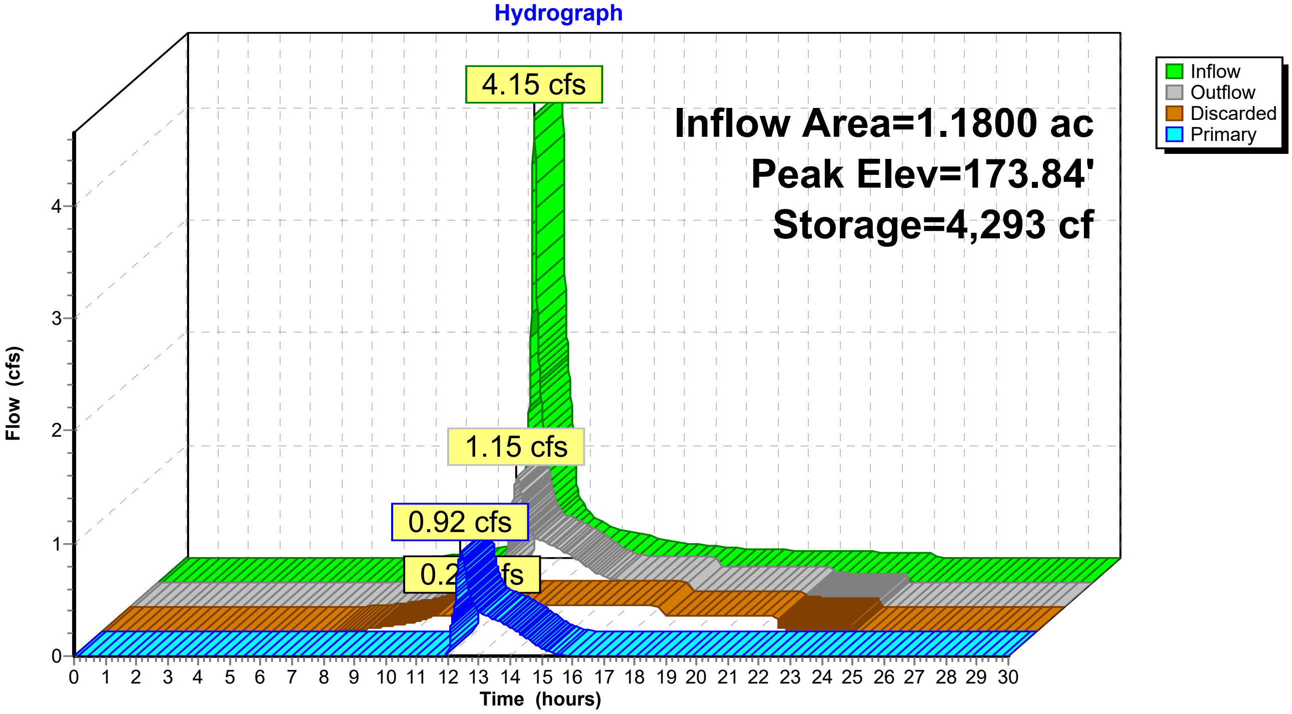
Volume	Invert	Avail.Storage	Storage Description
#1	171.00'	1,034 cf	**34.00'W x 76.00'L x 1.00'H Prismatoid** 2,584 cf Overall x 40.0% Voids
#2	172.00'	339 cf	**2.00'W x 212.00'L x 2.00'H Prismatoid**-Impervious 848 cf Overall x 40.0% Voids
#3	172.00'	5,274 cf	**retain_it retain_it 3.5'** x 27 Inside= 84.0"W x 42.0"H => 25.10 sf x 8.00'L = 200.8 cf Outside= 96.0"W x 50.0"H => 33.33 sf x 8.00'L = 266.7 cf 3 Rows adjusted for 147.4 cf perimeter wall
#4	172.00'	177 cf	**15.0" Round Pipe Storage**-Impervious L= 144.0' S= 0.0050 '/'
		6,823 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	172.50'	**4.0" Vert. Orifice/Grate** C= 0.600
#2	Primary	173.50'	**12.0" Vert. Orifice/Grate** C= 0.600
#3	Discarded	171.00'	**2.410 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.23 cfs @ 11.89 hrs HW=172.01' (Free Discharge)
└─**3=Exfiltration** (Exfiltration Controls 0.23 cfs)

Primary OutFlow Max=0.92 cfs @ 12.43 hrs HW=173.84' TW=0.00' (Dynamic Tailwater)
├─**1=Orifice/Grate** (Orifice Controls 0.46 cfs @ 5.21 fps)
└─**2=Orifice/Grate** (Orifice Controls 0.47 cfs @ 1.98 fps)

Pond CS3: CHAMBER SYSTEM #3



Summary for Pond CS4: CHAMBER SYSTEM #4

Inflow Area = 0.2000 ac, 65.00% Impervious, Inflow Depth = 3.18" for 10-yr event
Inflow = 0.77 cfs @ 12.07 hrs, Volume= 0.053 af
Outflow = 0.05 cfs @ 11.63 hrs, Volume= 0.053 af, Atten= 93%, Lag= 0.0 min
Discarded = 0.05 cfs @ 11.63 hrs, Volume= 0.053 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 175.19' @ 13.61 hrs Surf.Area= 924 sf Storage= 972 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 164.9 min (973.1 - 808.2)

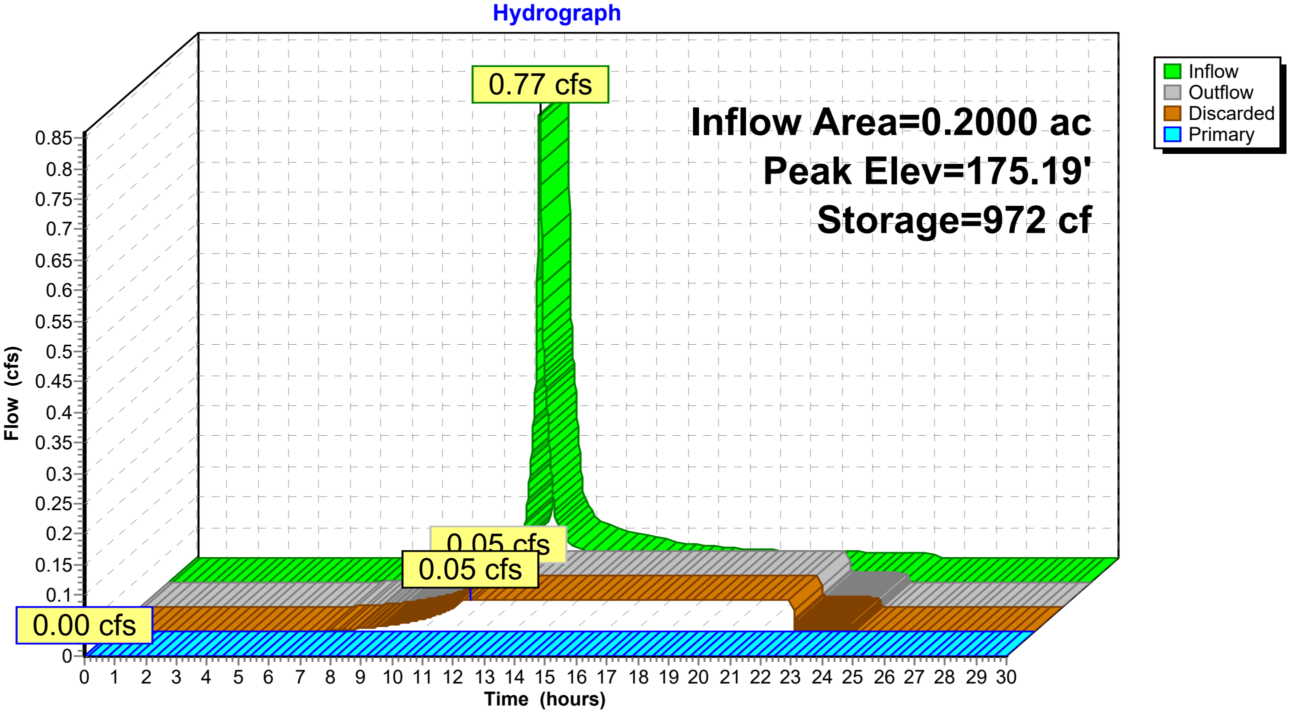
Volume	Invert	Avail.Storage	Storage Description
#1	173.50'	614 cf	**22.00'W x 42.00'L x 4.20'H Prismatoid** 3,881 cf Overall - 2,347 cf Embedded = 1,534 cf x 40.0% Voids
#2	174.00'	1,640 cf	**retain_it retain_it 3.0'** x 10 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 2 Rows adjusted for 66.1 cf perimeter wall
		2,254 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	176.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	173.50'	**2.410 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.05 cfs @ 11.63 hrs HW=173.55' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=173.50' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Pond CS4: CHAMBER SYSTEM #4



Summary for Pond CS5: CHAMBER SYSTEM #5

```
Inflow Area =       1.8731 ac,  33.80% Impervious,  Inflow Depth =   1.92"    for  10-yr event
Inflow      =      4.24 cfs @   12.08 hrs,  Volume=          0.300 af
Outflow     =      2.63 cfs @   12.17 hrs,  Volume=          0.300 af,  Atten= 38%,  Lag= 5.8 min
Discarded   =      0.61 cfs @   11.88 hrs,  Volume=          0.222 af
Primary     =      2.03 cfs @   12.17 hrs,  Volume=          0.079 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 180.01' @ 12.17 hrs   Surf.Area= 3,164 sf   Storage= 1,727 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 7.9 min ( 845.9 - 837.9 )

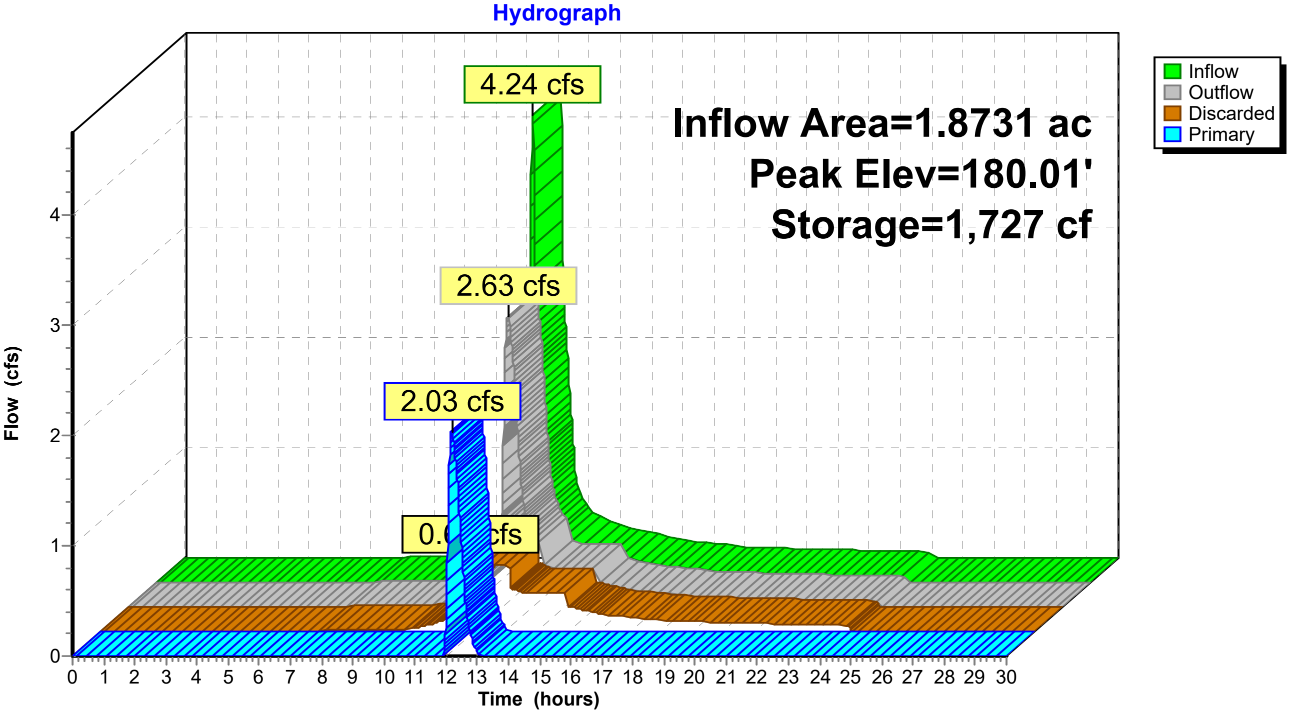
Volume        Invert    Avail.Storage   Storage Description
   #1         178.50'          364 cf   26.00'W x 70.00'L x 0.50'H Prismatoid
                                        910 cf Overall  x 40.0% Voids
   #2         179.00'        5,376 cf   retain_it retain_it  4.0' x 24
                                        Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf
                                        Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf
                                        3 Rows adjusted for 166.1 cf perimeter wall
                             5,740 cf   Total Available Storage

Device   Routing         Invert   Outlet Devices
   #1    Primary        179.00'   10.0" Vert. Orifice/Grate   C= 0.600
   #2    Discarded      178.50'   8.270 in/hr Exfiltration over Horizontal area

Discarded OutFlow  Max=0.61 cfs @ 11.88 hrs  HW=179.00'   (Free Discharge)
└─2=Exfiltration  (Exfiltration Controls 0.61 cfs)

Primary OutFlow  Max=2.03 cfs @ 12.17 hrs  HW=180.01'  TW=0.00'   (Dynamic Tailwater)
└─1=Orifice/Grate  (Orifice Controls 2.03 cfs @ 3.72 fps)
```

Pond CS5: CHAMBER SYSTEM #5



Summary for Pond CS6: CHAMBER SYSTEM #6

Inflow Area = 1.5573 ac, 4.32% Impervious, Inflow Depth = 1.33" for 10-yr event
Inflow = 2.22 cfs @ 12.08 hrs, Volume= 0.173 af
Outflow = 0.20 cfs @ 13.93 hrs, Volume= 0.173 af, Atten= 91%, Lag= 110.7 min
Discarded = 0.12 cfs @ 11.93 hrs, Volume= 0.166 af
Primary = 0.08 cfs @ 13.93 hrs, Volume= 0.007 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 171.22' @ 13.93 hrs Surf.Area= 2,100 sf Storage= 3,368 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 298.4 min (1,156.8 - 858.4)

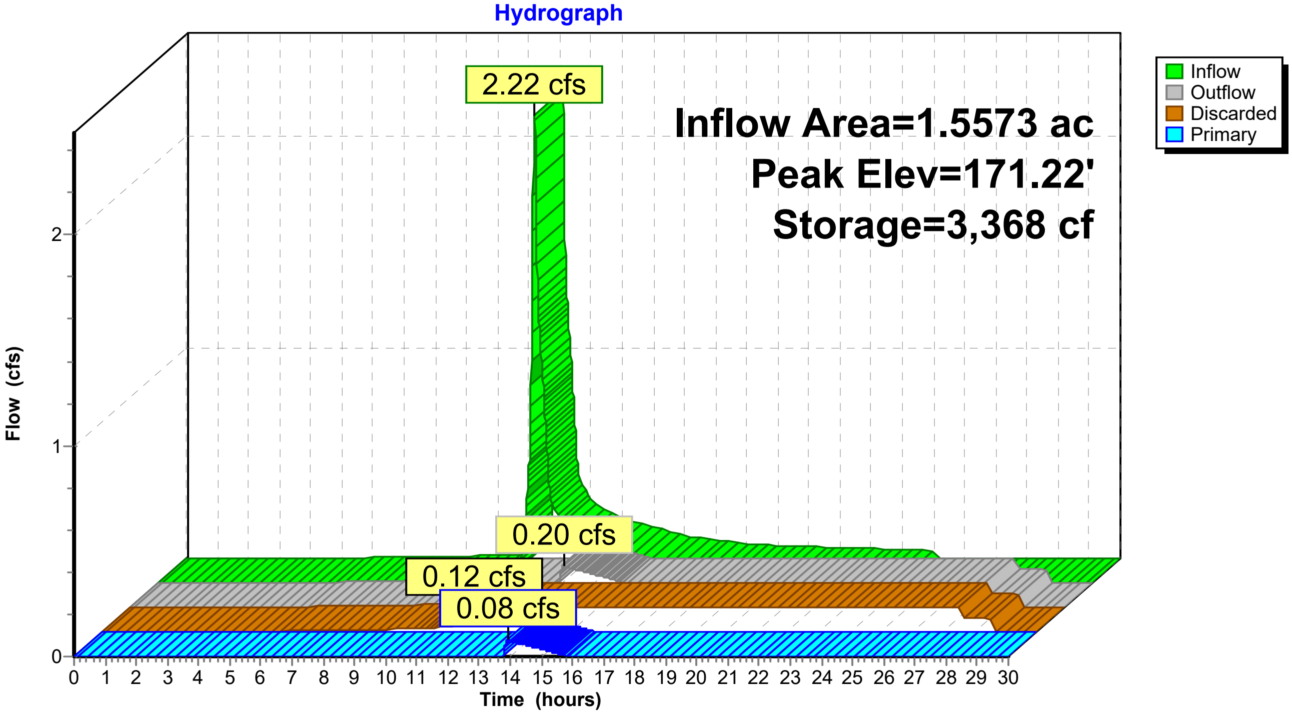
Volume	Invert	Avail.Storage	Storage Description
#1	167.00'	252 cf	**30.00'W x 42.00'L x 0.50'H Prismatoid** 630 cf Overall x 40.0% Voids
#2	167.50'	3,773 cf	**retain_it retain_it 4.5'** x 15 Inside= 84.0"W x 54.0"H => 32.64 sf x 8.00'L = 261.1 cf Outside= 96.0"W x 62.0"H => 41.33 sf x 8.00'L = 330.7 cf 3 Rows adjusted for 143.5 cf perimeter wall
		4,025 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	171.20'	**2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns** X 12 rows C= 0.600 in 48.0" x 24.0" Grate (25% open area) Limited to weir flow at low heads
#2	Discarded	167.00'	**2.410 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.12 cfs @ 11.93 hrs HW=167.50' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.08 cfs @ 13.93 hrs HW=171.22' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Weir Controls 0.08 cfs @ 0.41 fps)

Pond CS6: CHAMBER SYSTEM #6



Summary for Pond DW2: LOT 2 DW

```
Inflow Area =      0.0871 ac,100.00% Impervious,  Inflow Depth =   4.56"    for  10-yr event
Inflow      =      0.42 cfs @   12.07 hrs,  Volume=          0.033 af
Outflow     =      0.04 cfs @   11.77 hrs,  Volume=          0.033 af,  Atten= 90%,  Lag= 0.0 min
Discarded   =      0.04 cfs @   11.77 hrs,  Volume=          0.033 af
Primary     =      0.00 cfs @    0.00 hrs,  Volume=          0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 183.98' @ 12.73 hrs   Surf.Area= 792 sf   Storage= 452 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 64.3 min ( 812.0 - 747.8 )

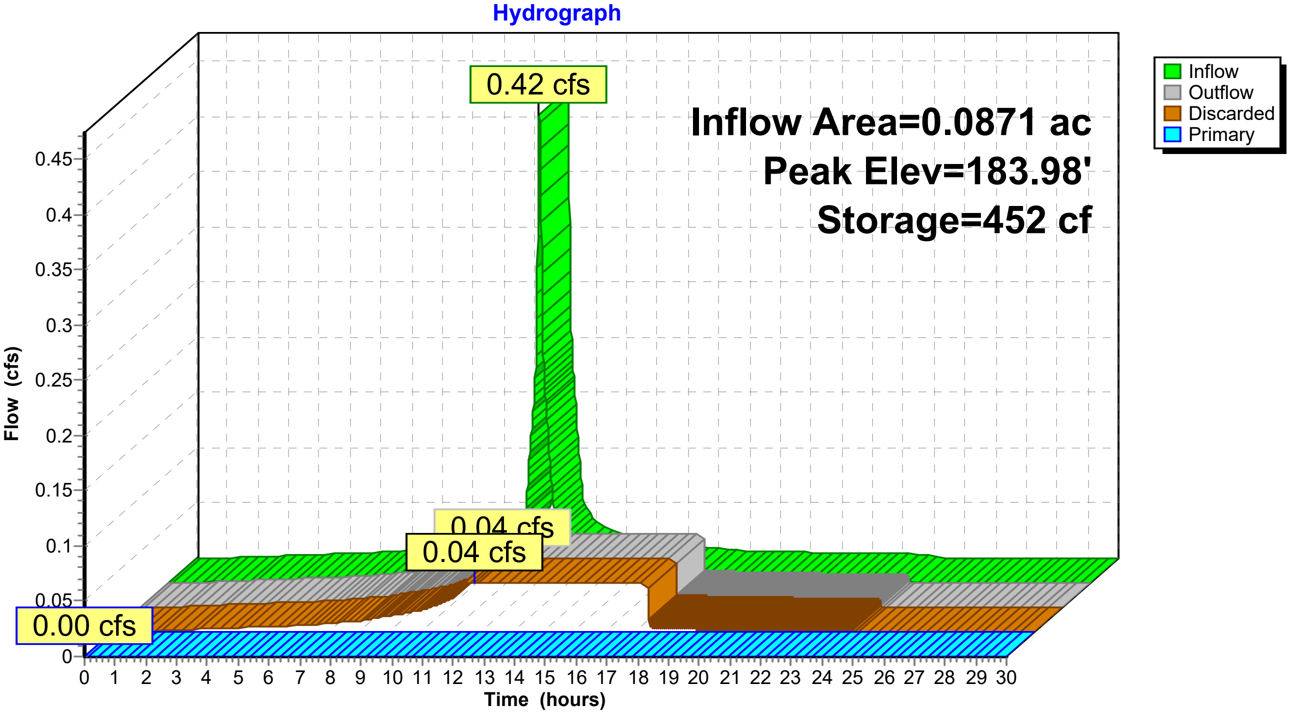
Volume      Invert    Avail.Storage   Storage Description
   #1      183.00'           602 cf   18.00'W x 44.00'L x 2.60'H Prismatoid
                                      2,059 cf Overall - 553 cf Embedded = 1,506 cf  x 40.0% Voids
   #2      183.50'           553 cf   Cultec R-150XLHD x 20  Inside #1
                                      Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
                                      Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
                                      Row Length Adjustment= +0.75' x 2.65 sf x 5 rows
   #3      184.70'             1 cf   0.33'D x 6.30'H Vertical Cone/Cylinder x 2
                               1,157 cf   Total Available Storage

Device   Routing        Invert   Outlet Devices
   #1    Discarded     183.00'   2.410 in/hr Exfiltration over Horizontal area
   #2    Primary       192.00'   4.0" Vert. Orifice/Grate X 2.00   C= 0.600

Discarded OutFlow  Max=0.04 cfs @ 11.77 hrs  HW=183.10'   (Free Discharge)
└─1=Exfiltration  (Exfiltration Controls 0.04 cfs)

Primary OutFlow  Max=0.00 cfs @ 0.00 hrs  HW=183.00'  TW=178.50'   (Dynamic Tailwater)
└─2=Orifice/Grate  ( Controls 0.00 cfs)
```

Pond DW2: LOT 2 DW



Summary for Pond DW3: LOT 3 DW

```
Inflow Area =      0.0666 ac,100.00% Impervious,  Inflow Depth =   4.56"    for  10-yr event
Inflow      =      0.32 cfs @  12.07 hrs,  Volume=           0.025 af
Outflow     =      0.06 cfs @  11.81 hrs,  Volume=           0.025 af,  Atten= 80%,  Lag= 0.0 min
Discarded   =      0.06 cfs @  11.81 hrs,  Volume=           0.025 af
Primary     =      0.00 cfs @   0.00 hrs,  Volume=           0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 174.24' @ 12.48 hrs   Surf.Area= 338 sf   Storage= 240 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 17.5 min ( 765.3 - 747.8 )

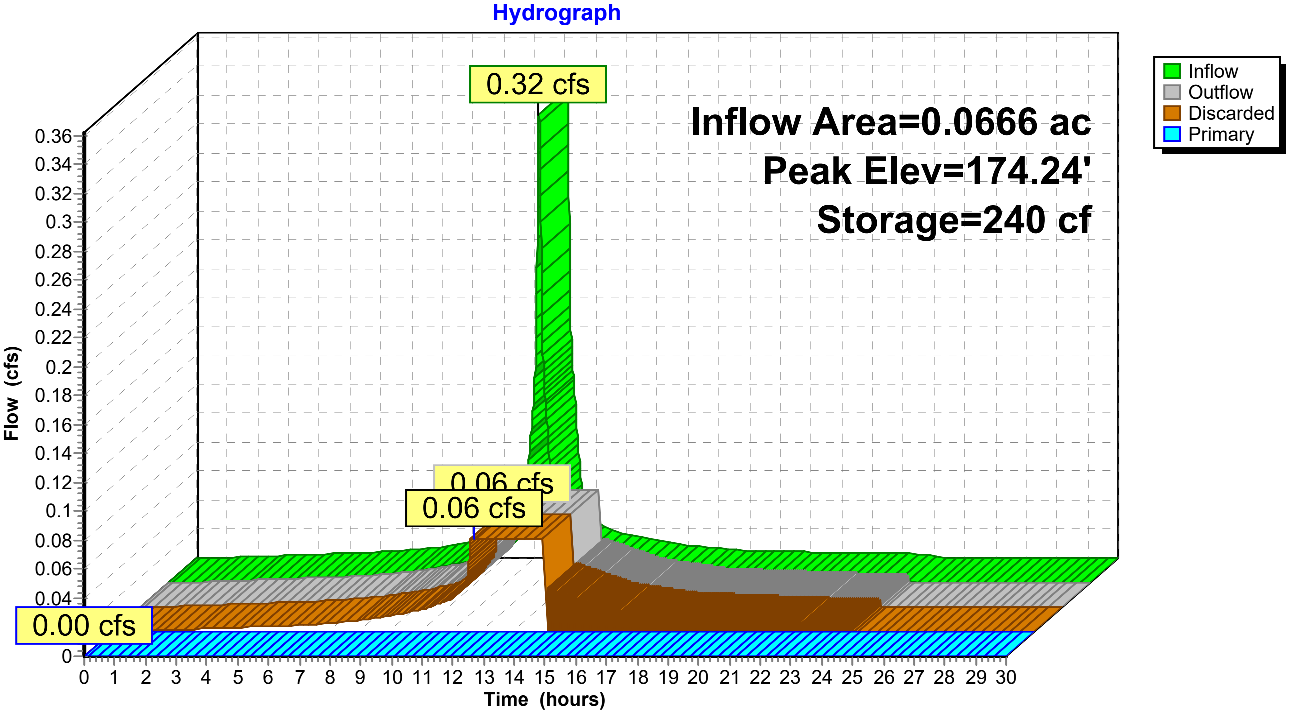
Volume      Invert   Avail.Storage   Storage Description
   #1      173.00'          339 cf   13.00'W x 26.00'L x 3.30'H Prismatoid
                                     1,115 cf Overall - 267 cf Embedded = 848 cf  x 40.0% Voids
   #2      173.50'          267 cf   Cultec R-280HD x 6  Inside #1
                                     Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf
                                     Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap
                                     Row Length Adjustment= +1.00' x 6.07 sf x 2 rows
   #3      175.60'            1 cf   0.33'D x 4.30'H Vertical Cone/Cylinder x 2
                            607 cf   Total Available Storage

Device  Routing          Invert   Outlet Devices
   #1   Discarded       173.00'   8.270 in/hr Exfiltration over Horizontal area
   #2   Primary         179.00'   4.0" Vert. Orifice/Grate X 2.00    C= 0.600

Discarded OutFlow  Max=0.06 cfs @ 11.81 hrs  HW=173.07'   (Free Discharge)
└─1=Exfiltration  (Exfiltration Controls 0.06 cfs)

Primary OutFlow  Max=0.00 cfs @ 0.00 hrs  HW=173.00'  TW=0.00'   (Dynamic Tailwater)
└─2=Orifice/Grate  ( Controls 0.00 cfs)
```

Pond DW3: LOT 3 DW



Summary for Pond DW4: LOT 4 DW

Inflow Area = 0.0551 ac,100.00% Impervious, Inflow Depth = 4.56" for 10-yr event
Inflow = 0.27 cfs @ 12.07 hrs, Volume= 0.021 af
Outflow = 0.05 cfs @ 11.82 hrs, Volume= 0.021 af, Atten= 80%, Lag= 0.0 min
Discarded = 0.05 cfs @ 11.82 hrs, Volume= 0.021 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 167.65' @ 12.48 hrs Surf.Area= 286 sf Storage= 195 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 16.7 min (764.5 - 747.8)

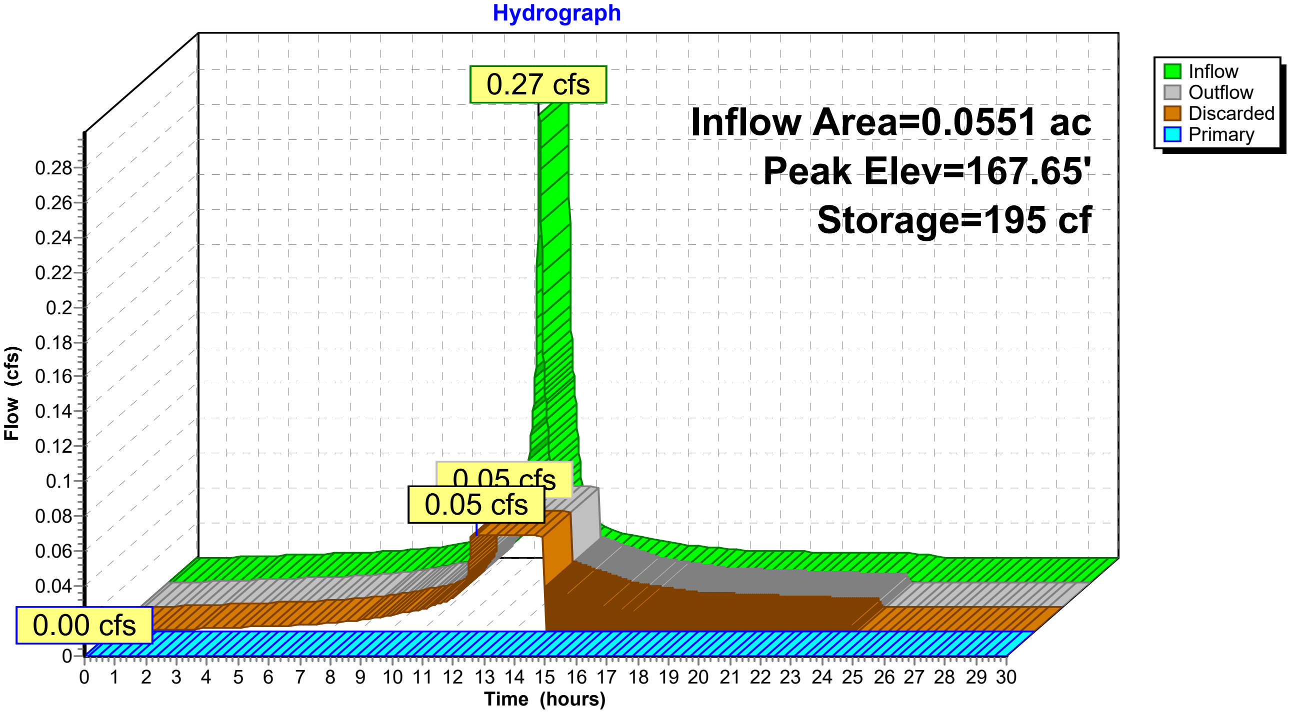
Volume	Invert	Avail.Storage	Storage Description
#1	166.50'	271 cf	**11.00'W x 26.00'L x 3.30'H Prismatoid**
			944 cf Overall - 267 cf Embedded = 677 cf x 40.0% Voids
#2	167.00'	267 cf	**Cultec R-280HD** x 6 Inside #1
			Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf
			Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap
			Row Length Adjustment= +1.00' x 6.07 sf x 2 rows
#3	169.20'	0 cf	**0.33'D x 2.50'H Vertical Cone/Cylinder** x 2
		538 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	166.50'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	173.00'	**4.0" Vert. Orifice/Grate X 12.00** C= 0.600

Discarded OutFlow Max=0.05 cfs @ 11.82 hrs HW=166.57' (Free Discharge)
└—**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=166.50' TW=0.00' (Dynamic Tailwater)
└—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond DW4: LOT 4 DW



Summary for Pond DW6/7: LOTS 6 & 7

Inflow Area = 0.1101 ac,100.00% Impervious, Inflow Depth = 4.56" for 10-yr event
Inflow = 0.54 cfs @ 12.07 hrs, Volume= 0.042 af
Outflow = 0.11 cfs @ 12.21 hrs, Volume= 0.042 af, Atten= 80%, Lag= 8.4 min
Discarded = 0.11 cfs @ 12.21 hrs, Volume= 0.042 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 101.16' @ 12.48 hrs Surf.Area= 572 sf Storage= 390 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 16.7 min (764.5 - 747.8)

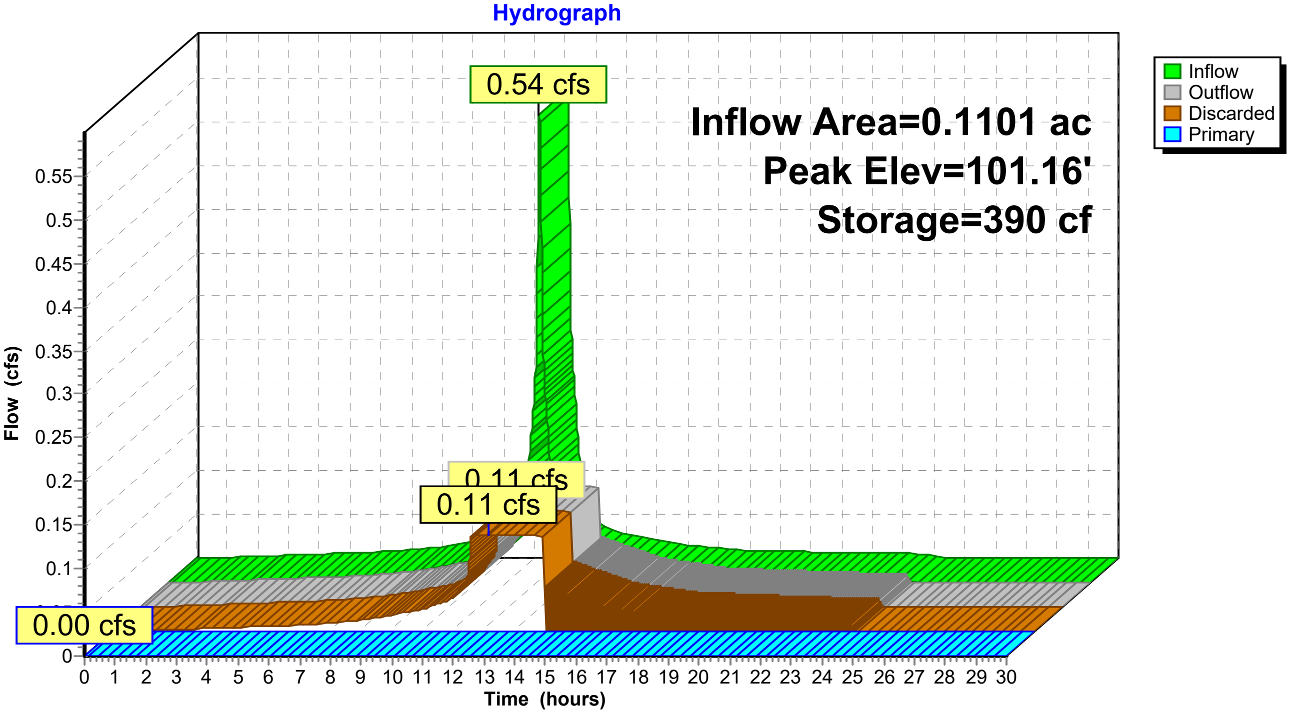
Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	546 cf	**11.00'W x 26.00'L x 3.30'H Prismatoid** x 2 1,888 cf Overall - 522 cf Embedded = 1,365 cf x 40.0% Voids
#2	100.50'	522 cf	**Cultec R-280HD** x 12 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 2 rows
#3	101.00'	0 cf	**0.33'D x 2.00'H Vertical Cone/Cylinder** x 2
		1,069 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	176.00'	**4.0" Vert. Orifice/Grate X 12.00** C= 0.600

Discarded OutFlow Max=0.11 cfs @ 12.21 hrs HW=101.01' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=100.00' TW=0.00' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond DW6/7: LOTS 6 & 7



Summary for Subcatchment PR1:

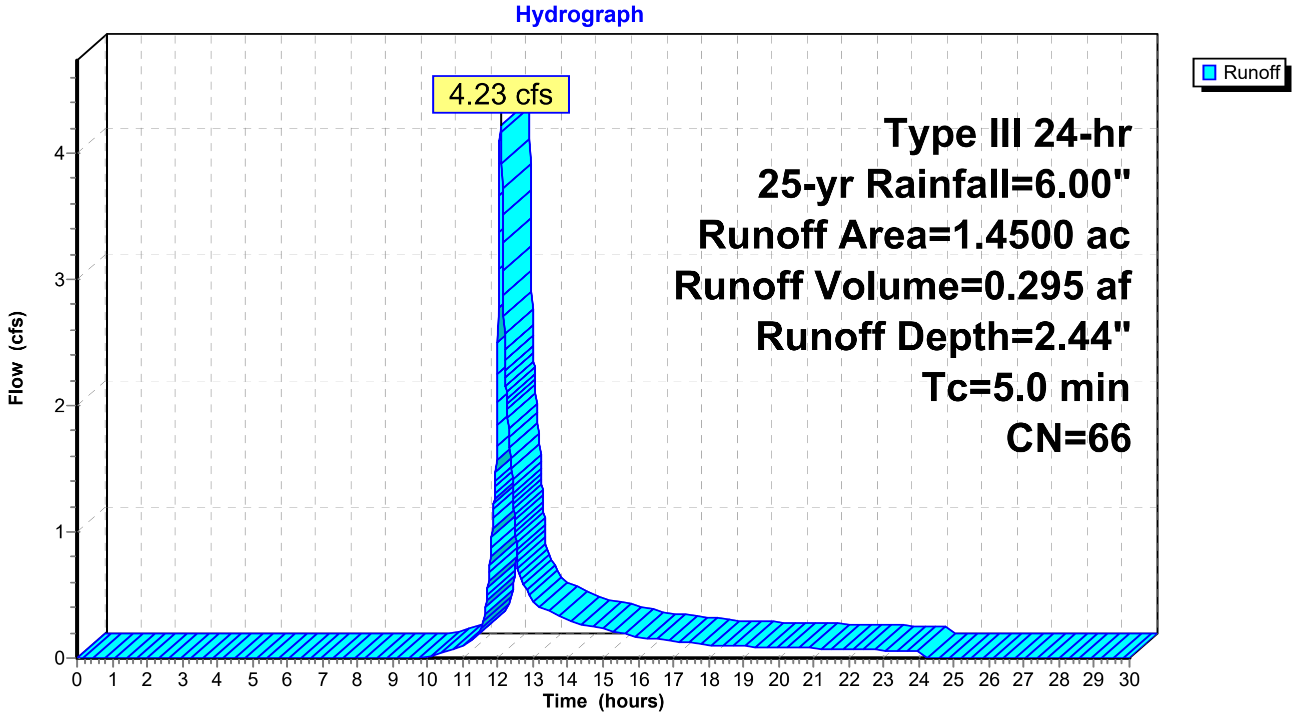
Runoff = 4.23 cfs @ 12.08 hrs, Volume= 0.295 af, Depth= 2.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

	Area (ac)	CN	Description
	1.0800	61	>75% Grass cover, Good, HSG B
*	0.2300	98	Pavement
	0.1400	55	Woods, Good, HSG B
	1.4500	66	Weighted Average
	1.2200		84.14% Pervious Area
	0.2300		15.86% Impervious Area

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

Subcatchment PR1:



Summary for Subcatchment PR2:

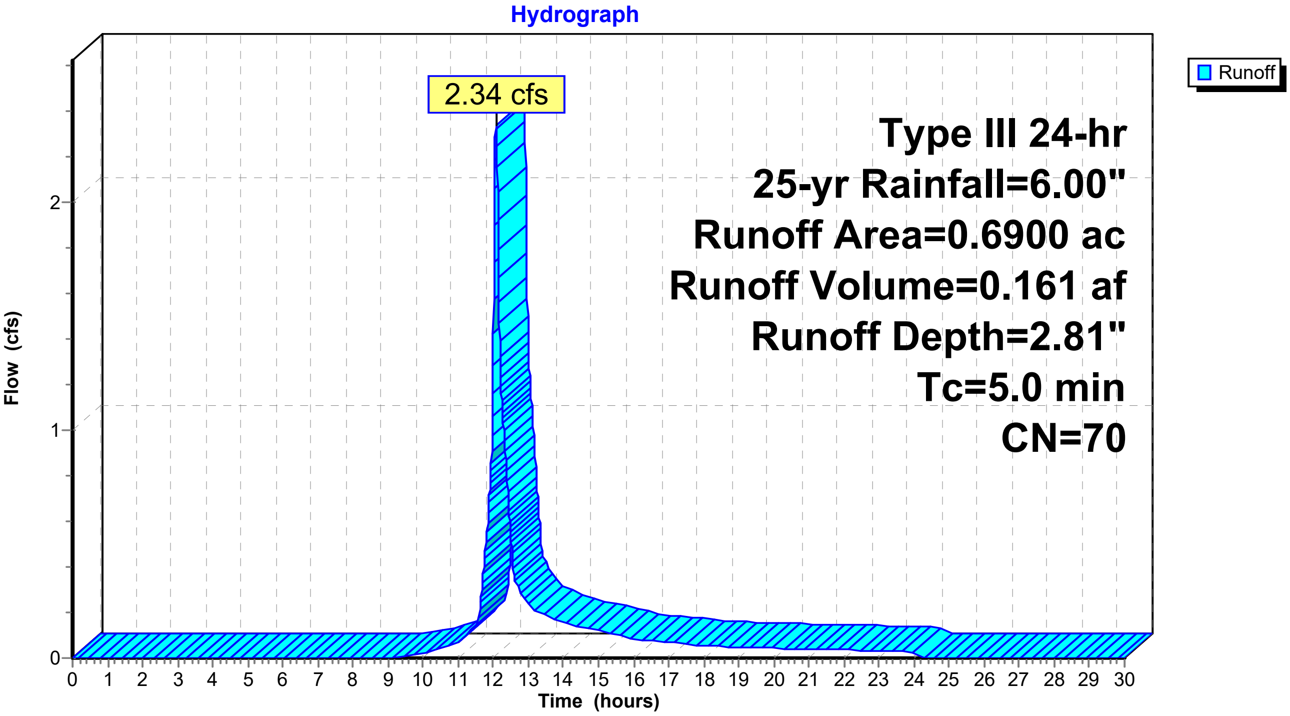
Runoff = 2.34 cfs @ 12.08 hrs, Volume= 0.161 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

	Area (ac)	CN	Description
	0.4100	61	>75% Grass cover, Good, HSG B
*	0.1900	98	Pavement
	0.0900	55	Woods, Good, HSG B
	0.6900	70	Weighted Average
	0.5000		72.46% Pervious Area
	0.1900		27.54% Impervious Area

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

Subcatchment PR2:



Summary for Subcatchment PR3:

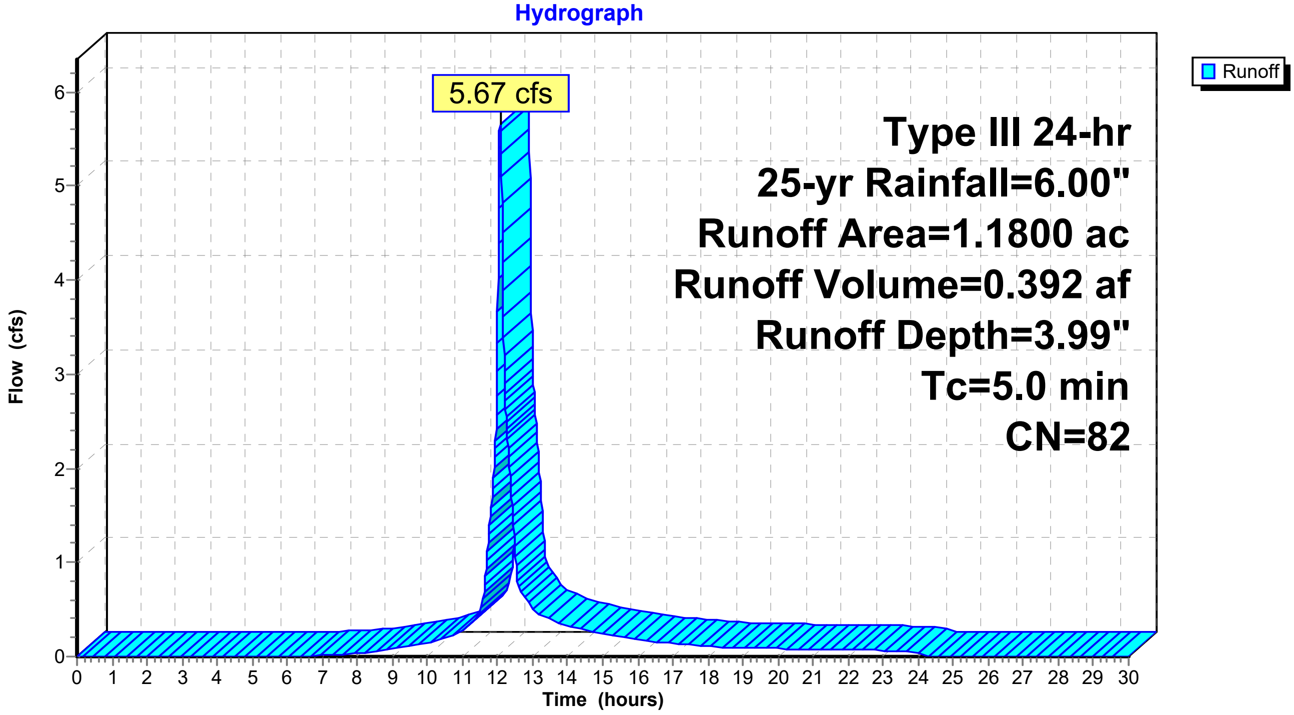
Runoff = 5.67 cfs @ 12.07 hrs, Volume= 0.392 af, Depth= 3.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

	Area (ac)	CN	Description
	0.5000	61	>75% Grass cover, Good, HSG B
*	0.6800	98	Pavement
	1.1800	82	Weighted Average
	0.5000		42.37% Pervious Area
	0.6800		57.63% Impervious Area

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

Subcatchment PR3:



Summary for Subcatchment PR4:

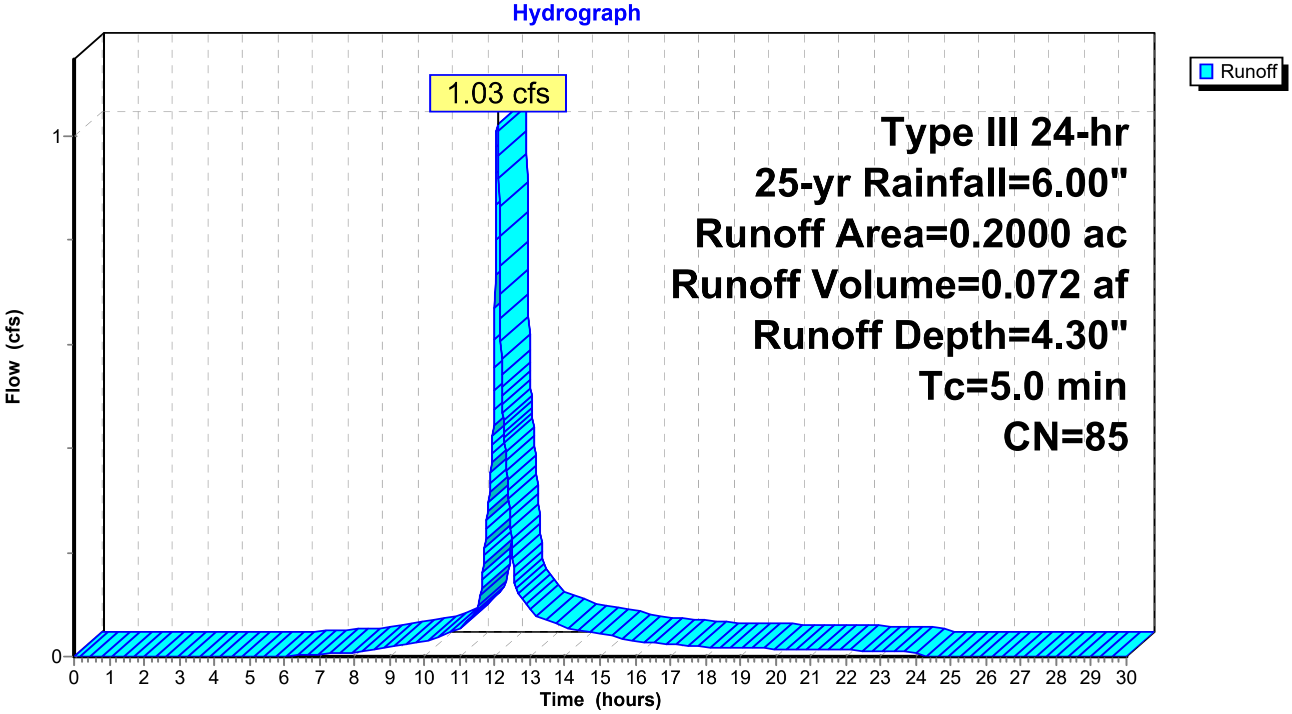
Runoff = 1.03 cfs @ 12.07 hrs, Volume= 0.072 af, Depth= 4.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

	Area (ac)	CN	Description
	0.0700	61	>75% Grass cover, Good, HSG B
*	0.1300	98	Pavement
	0.2000	85	Weighted Average
	0.0700		35.00% Pervious Area
	0.1300		65.00% Impervious Area

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

Subcatchment PR4:



Summary for Subcatchment PR5:

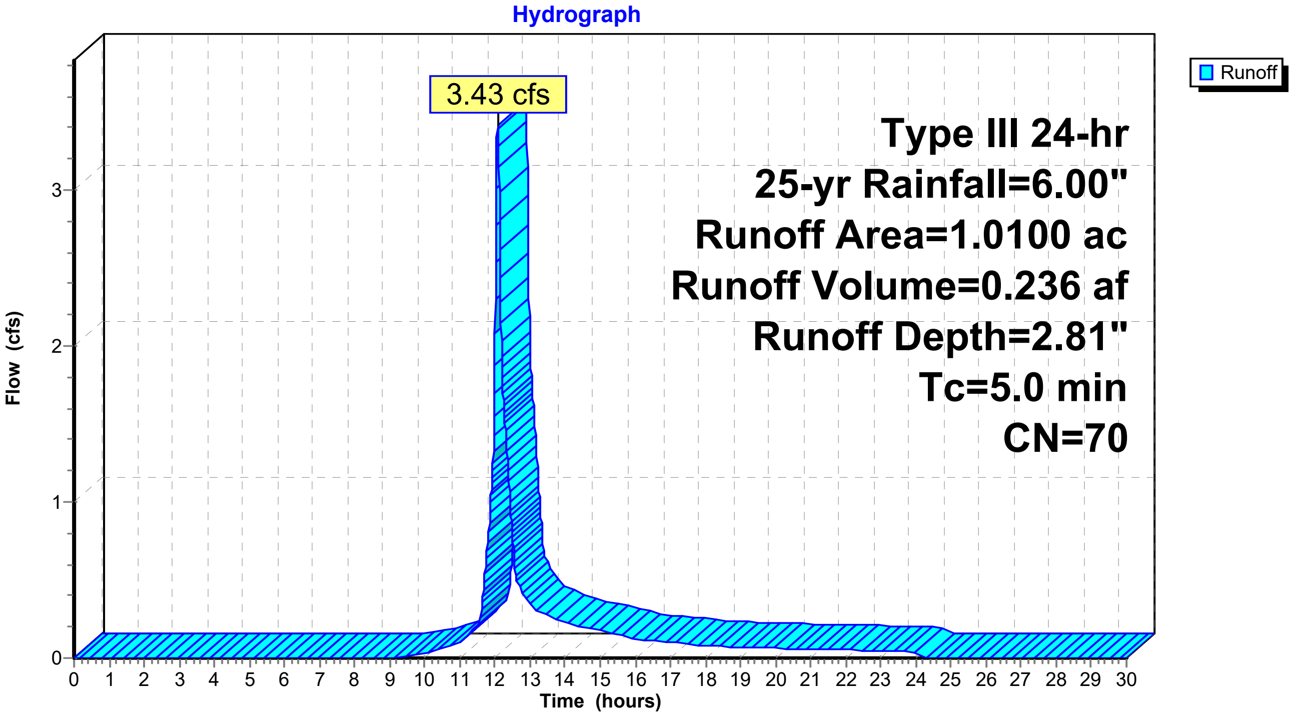
Runoff = 3.43 cfs @ 12.08 hrs, Volume= 0.236 af, Depth= 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

	Area (ac)	CN	Description
	0.6200	61	>75% Grass cover, Good, HSG B
*	0.2700	98	Pavement
	0.1200	55	Woods, Good, HSG B
	1.0100	70	Weighted Average
	0.7400		73.27% Pervious Area
	0.2700		26.73% Impervious Area

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

Subcatchment PR5:



Summary for Subcatchment PR6:

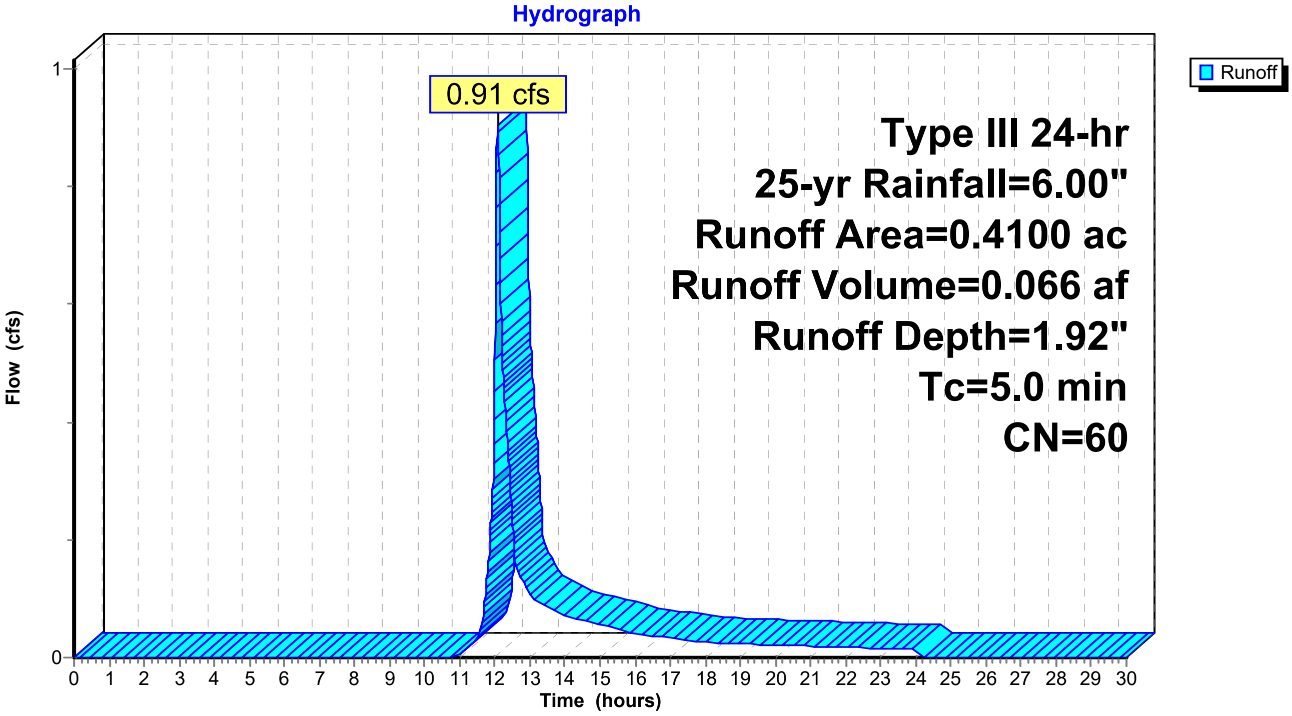
Runoff = 0.91 cfs @ 12.08 hrs, Volume= 0.066 af, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

Area (ac)	CN	Description
0.3100	61	>75% Grass cover, Good, HSG B
0.1000	55	Woods, Good, HSG B
0.4100	60	Weighted Average
0.4100		100.00% Pervious Area

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

Subcatchment PR6:



Summary for Subcatchment PR7:

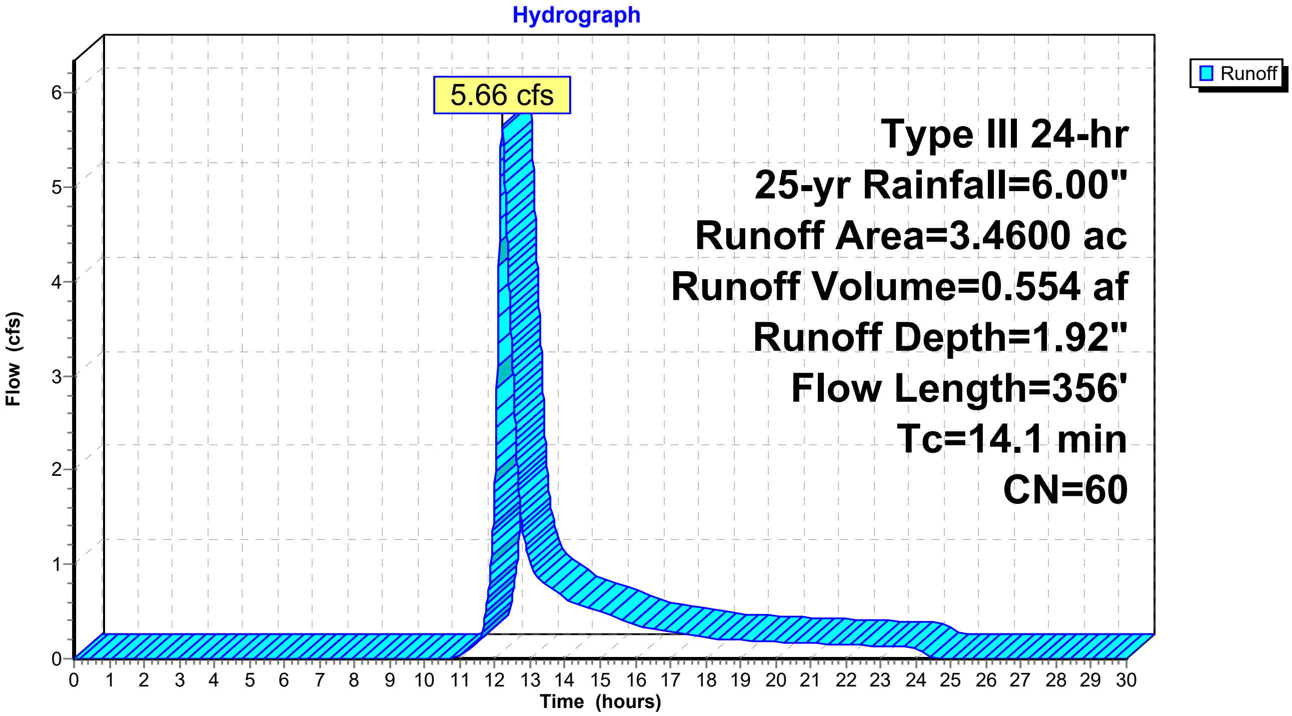
Runoff = 5.66 cfs @ 12.21 hrs, Volume= 0.554 af, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

Area (ac)	CN	Description
3.0500	61	>75% Grass cover, Good, HSG B
0.4100	55	Woods, Good, HSG B
3.4600	60	Weighted Average
3.4600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.08		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.20"
0.2	16	0.0100	1.50		**Shallow Concentrated Flow, SCF** Grassed Waterway Kv= 15.0 fps
1.4	117	0.0090	1.42		**Shallow Concentrated Flow, SCF** Grassed Waterway Kv= 15.0 fps
1.7	173	0.0130	1.71		**Shallow Concentrated Flow, SCF** Grassed Waterway Kv= 15.0 fps
14.1	356	Total			

Subcatchment PR7:



Summary for Subcatchment PR8: OFF SITE

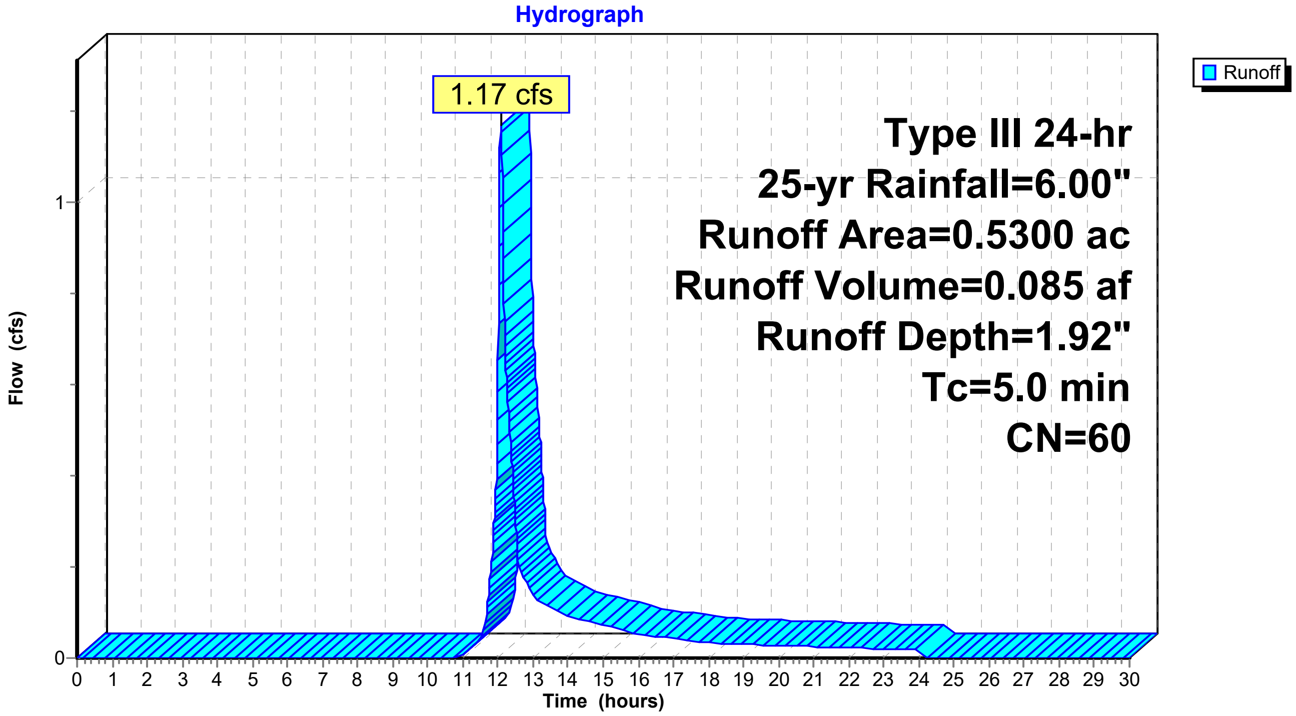
Runoff = 1.17 cfs @ 12.08 hrs, Volume= 0.085 af, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

	Area (ac)	CN	Description
	0.3200	55	Woods, Good, HSG B
*	0.0400	98	Impervious
	0.1700	61	>75% Grass cover, Good, HSG B
	0.5300	60	Weighted Average
	0.4900		92.45% Pervious Area
	0.0400		7.55% Impervious Area

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

Subcatchment PR8: OFF SITE



Summary for Subcatchment PR9:

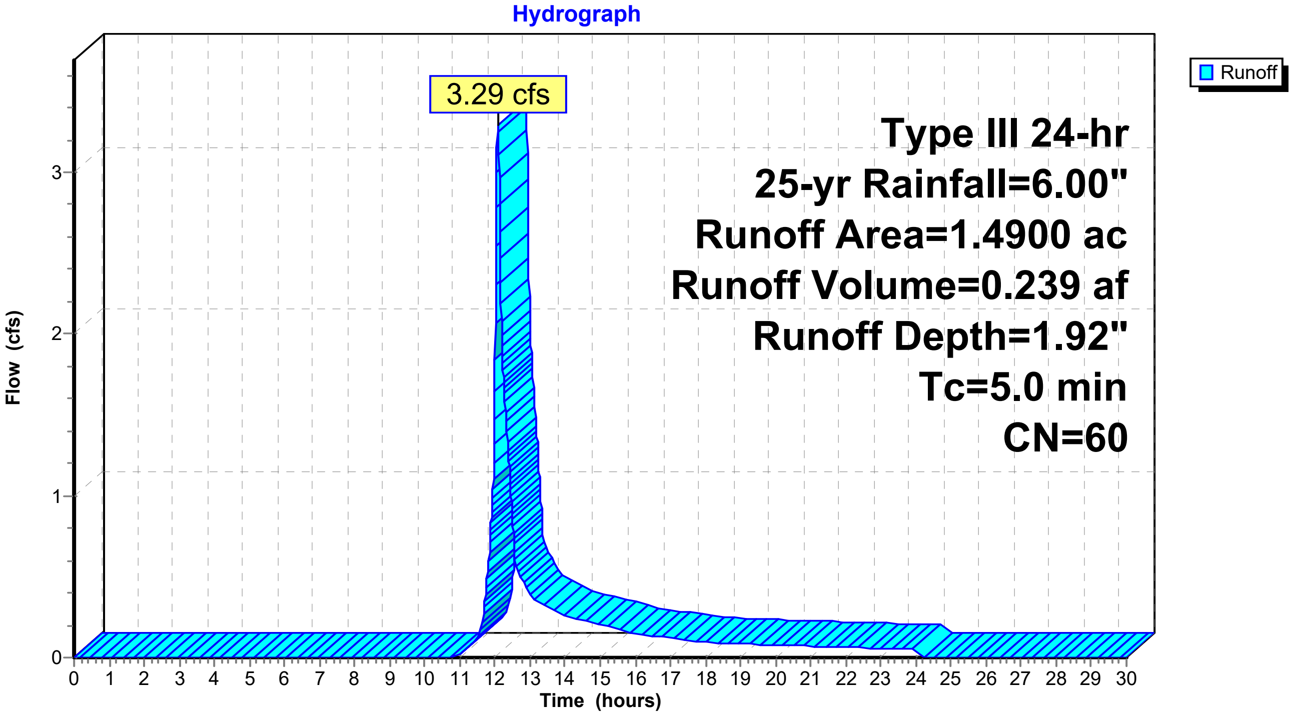
Runoff = 3.29 cfs @ 12.08 hrs, Volume= 0.239 af, Depth= 1.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

Area (ac)	CN	Description
1.3600	61	>75% Grass cover, Good, HSG B
0.1300	55	Woods, Good, HSG B
1.4900	60	Weighted Average
1.4900		100.00% Pervious Area

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

Subcatchment PR9:



Summary for Subcatchment R1: LOT 1 ROOF

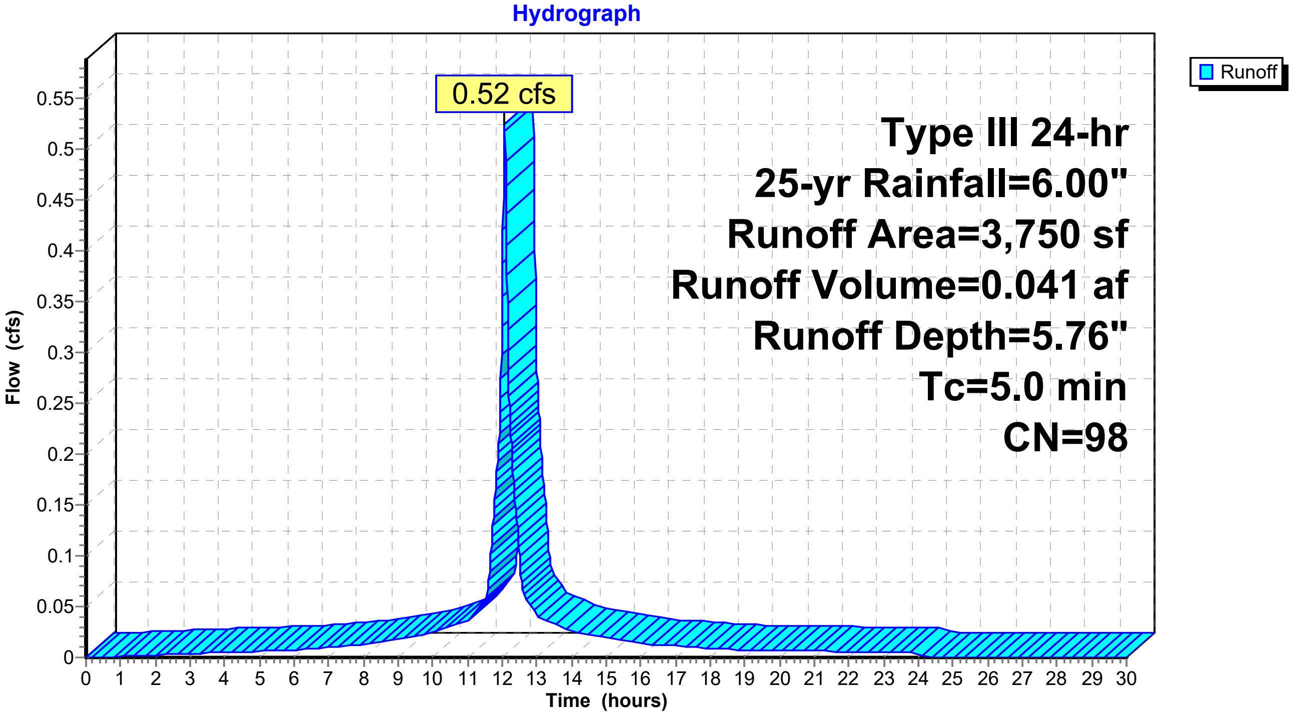
Runoff = 0.52 cfs @ 12.07 hrs, Volume= 0.041 af, Depth= 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

	Area (sf)	CN	Description
*	3,750	98	ROOF AREA
	3,750		100.00% Impervious Area

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

Subcatchment R1: LOT 1 ROOF



Summary for Subcatchment R2: LOT 2 ROOF

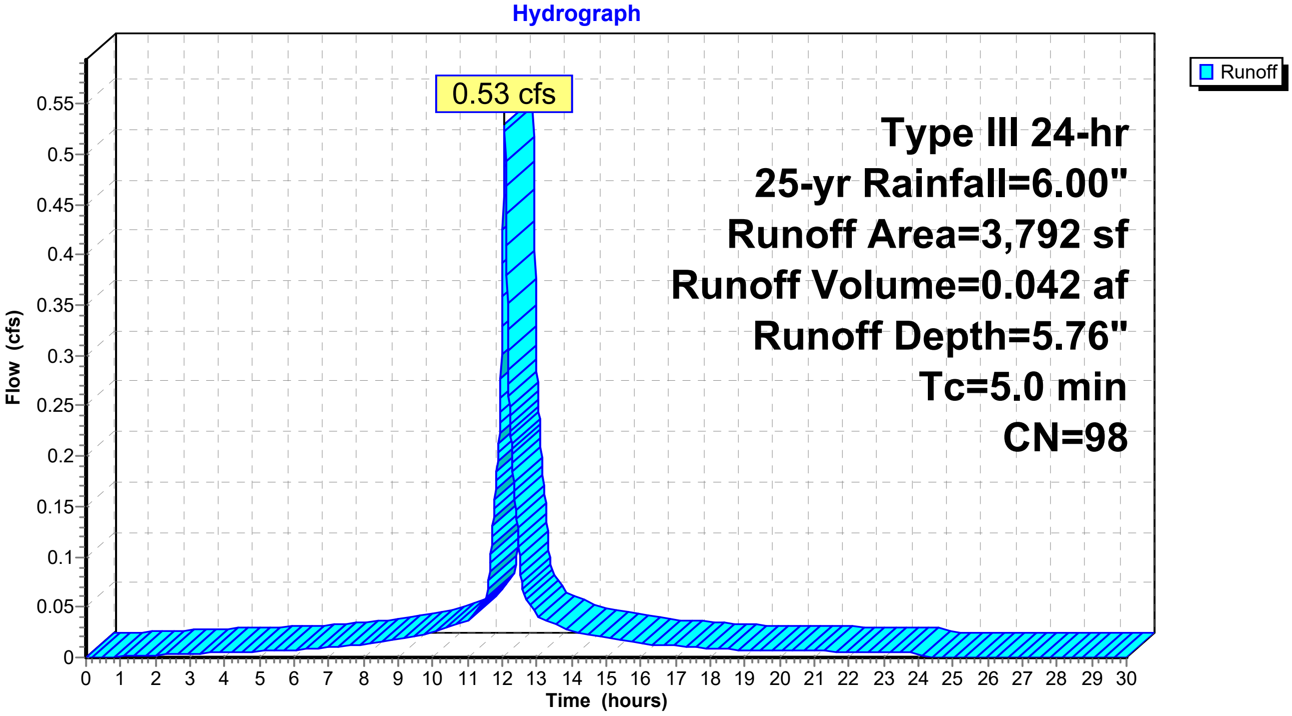
Runoff = 0.53 cfs @ 12.07 hrs, Volume= 0.042 af, Depth= 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

	Area (sf)	CN	Description
*	3,792	98	ROOF AREA
	3,792		100.00% Impervious Area

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

Subcatchment R2: LOT 2 ROOF



Summary for Subcatchment R3: LOT 3 ROOF

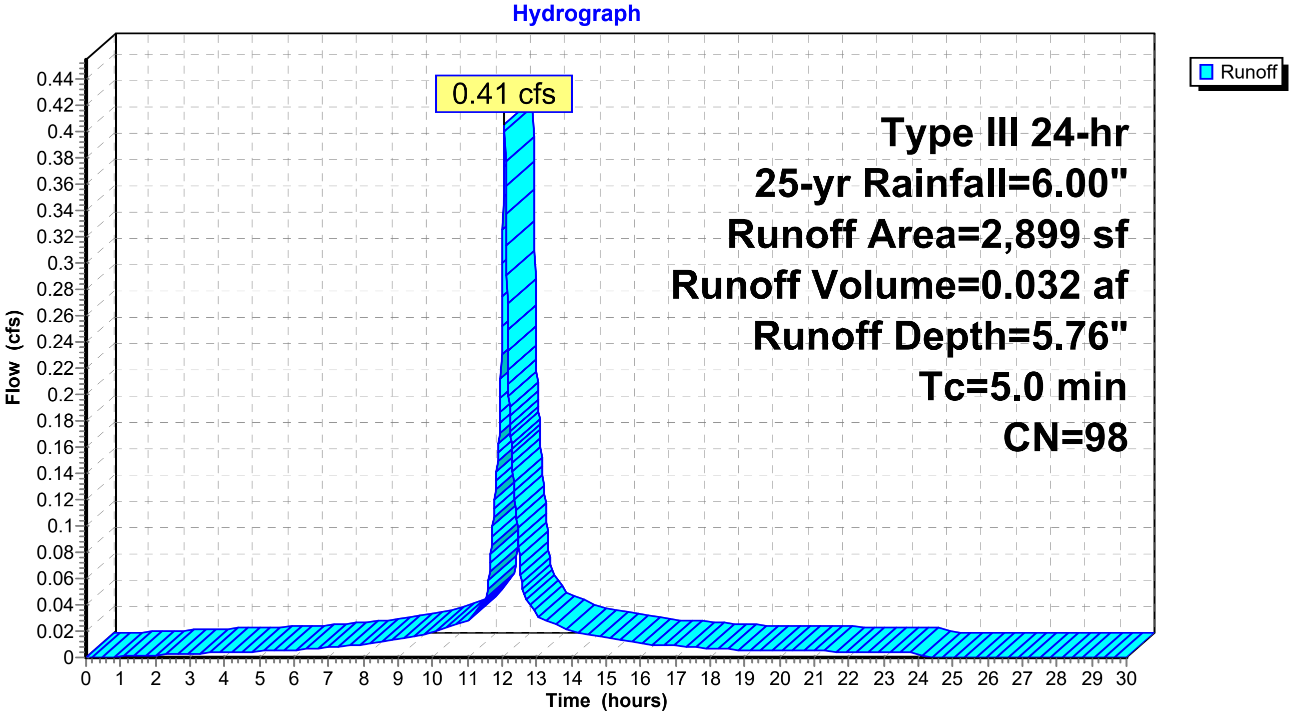
Runoff = 0.41 cfs @ 12.07 hrs, Volume= 0.032 af, Depth= 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

	Area (sf)	CN	Description
*	2,899	98	ROOF AREA
	2,899		100.00% Impervious Area

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

Subcatchment R3: LOT 3 ROOF



Summary for Subcatchment R4: LOT 4 ROOF

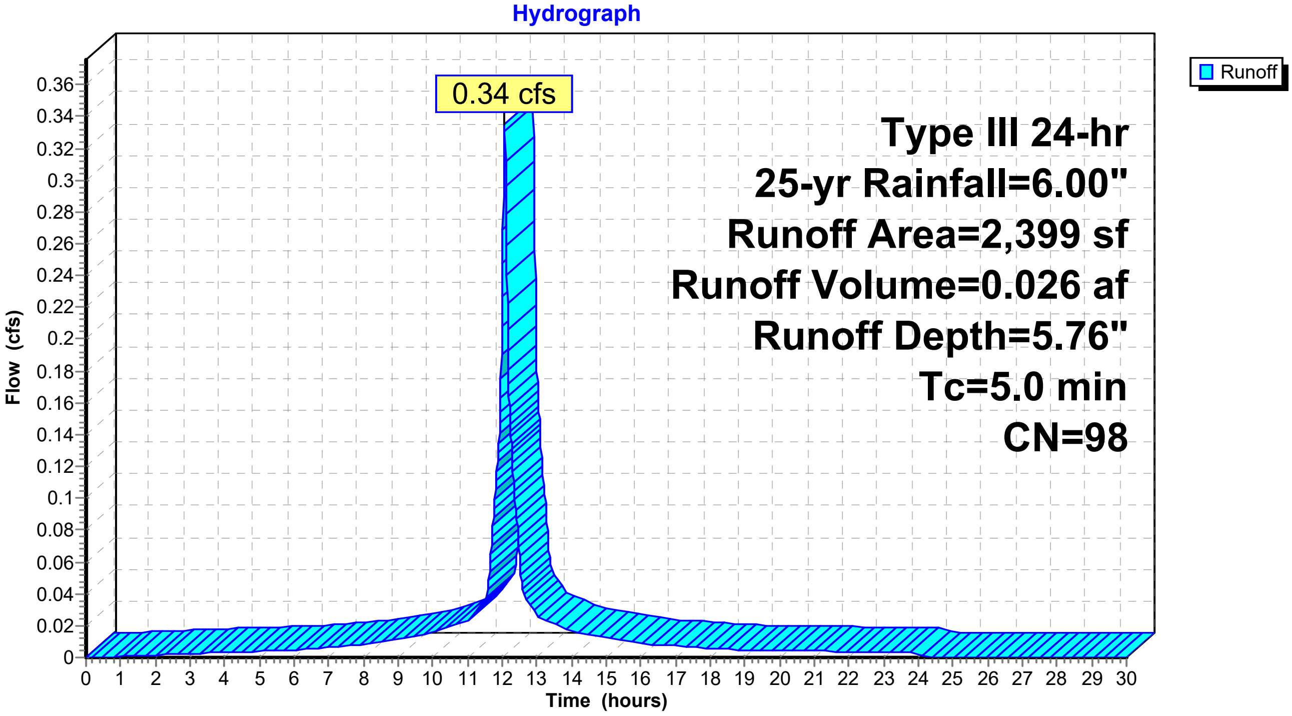
Runoff = 0.34 cfs @ 12.07 hrs, Volume= 0.026 af, Depth= 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

	Area (sf)	CN	Description
*	2,399	98	ROOF AREA
	2,399		100.00% Impervious Area

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

Subcatchment R4: LOT 4 ROOF



Summary for Subcatchment R6/7: LOTS 6 & 7 (ROOFS)

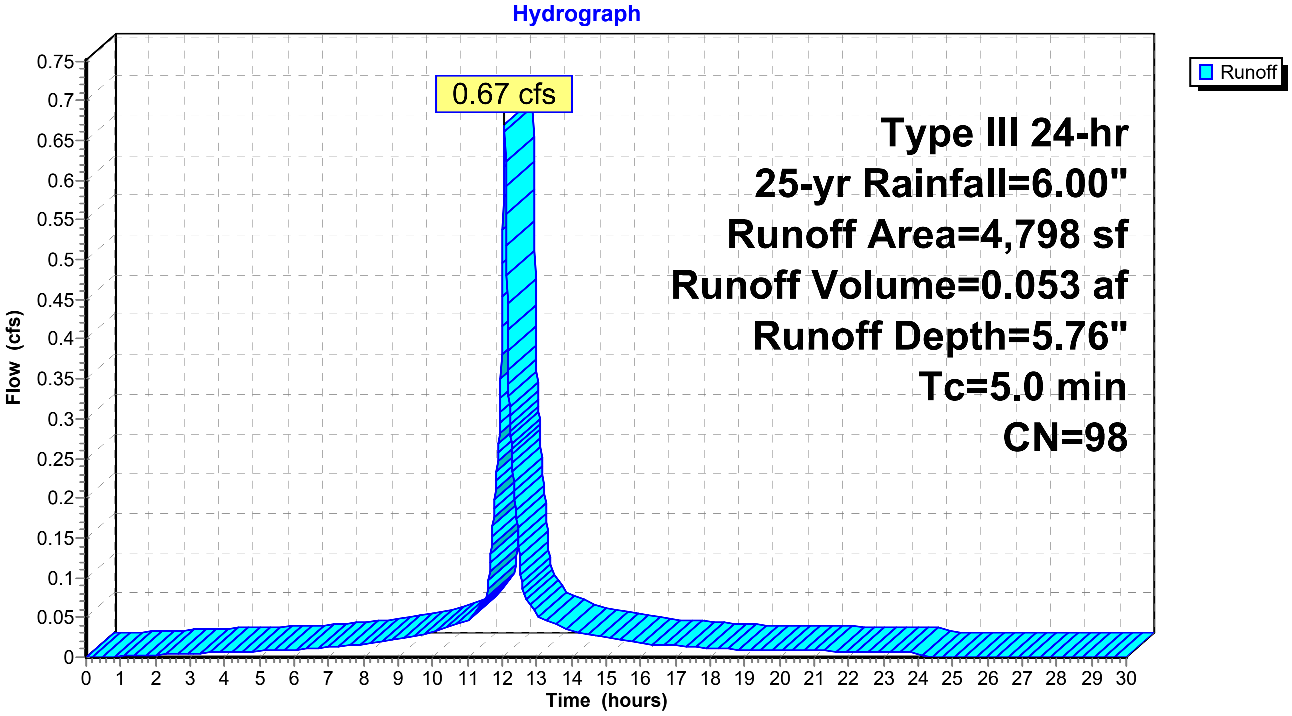
Runoff = 0.67 cfs @ 12.07 hrs, Volume= 0.053 af, Depth= 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

	Area (sf)	CN	Description
*	4,798	98	ROOF AREA
	4,798		100.00% Impervious Area

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

Subcatchment R6/7: LOTS 6 & 7 (ROOFS)



Summary for Subcatchment R8: LOT 8 ROOF

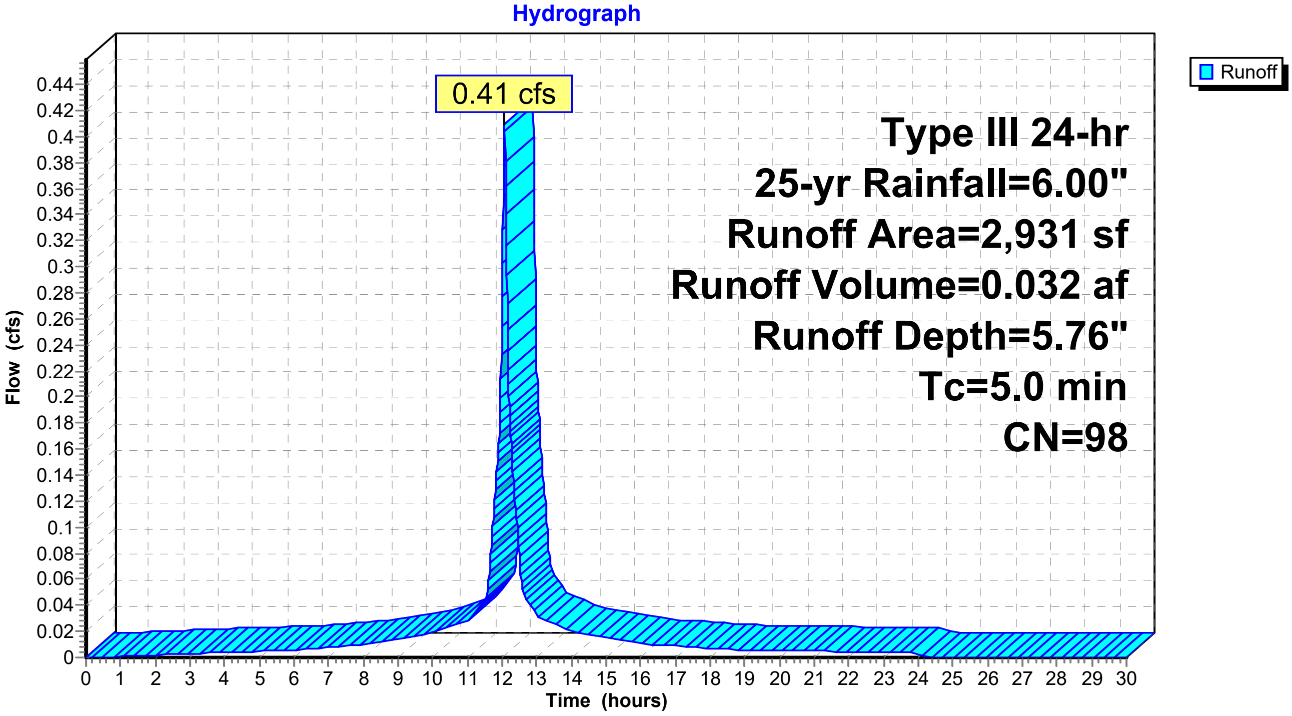
Runoff = 0.41 cfs @ 12.07 hrs, Volume= 0.032 af, Depth= 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

	Area (sf)	CN	Description
*	2,931	98	ROOF AREA
	2,931		100.00% Impervious Area

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

Subcatchment R8: LOT 8 ROOF



Summary for Subcatchment R9: LOT 9 ROOF

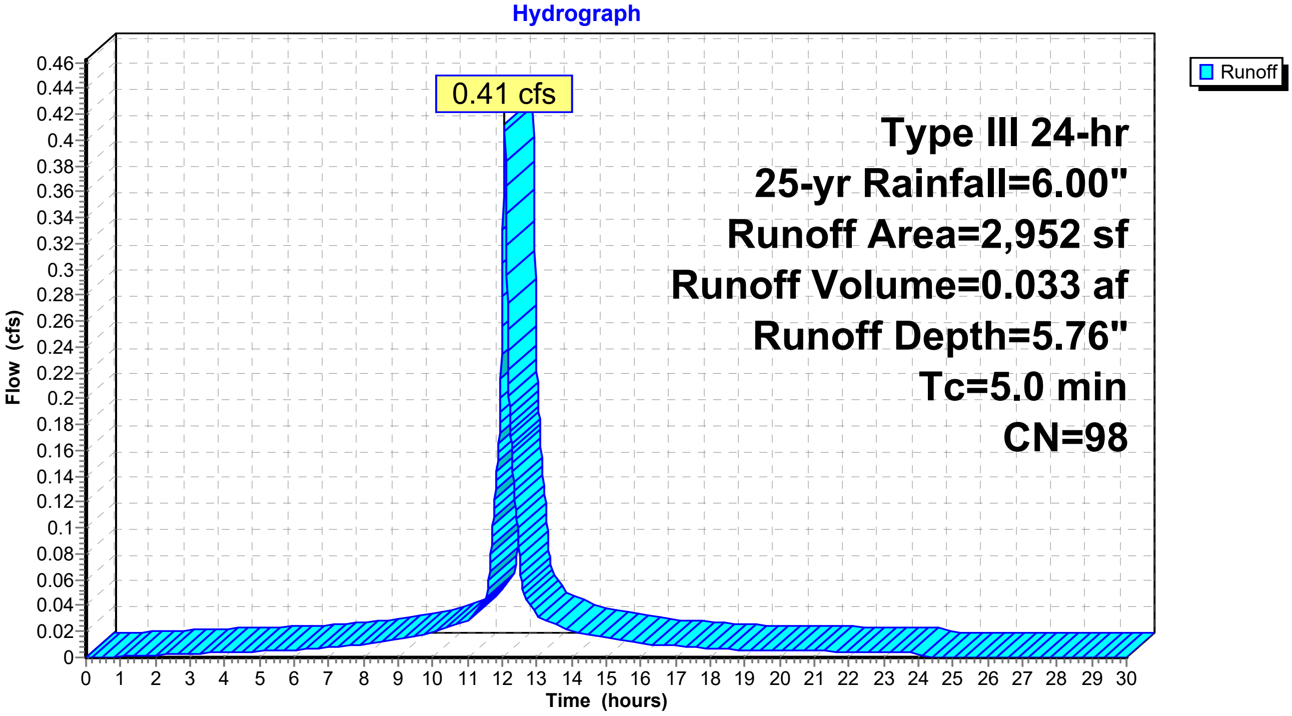
Runoff = 0.41 cfs @ 12.07 hrs, Volume= 0.033 af, Depth= 5.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 25-yr Rainfall=6.00"

	Area (sf)	CN	Description
*	2,952	98	ROOF AREA
	2,952		100.00% Impervious Area

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

Subcatchment R9: LOT 9 ROOF

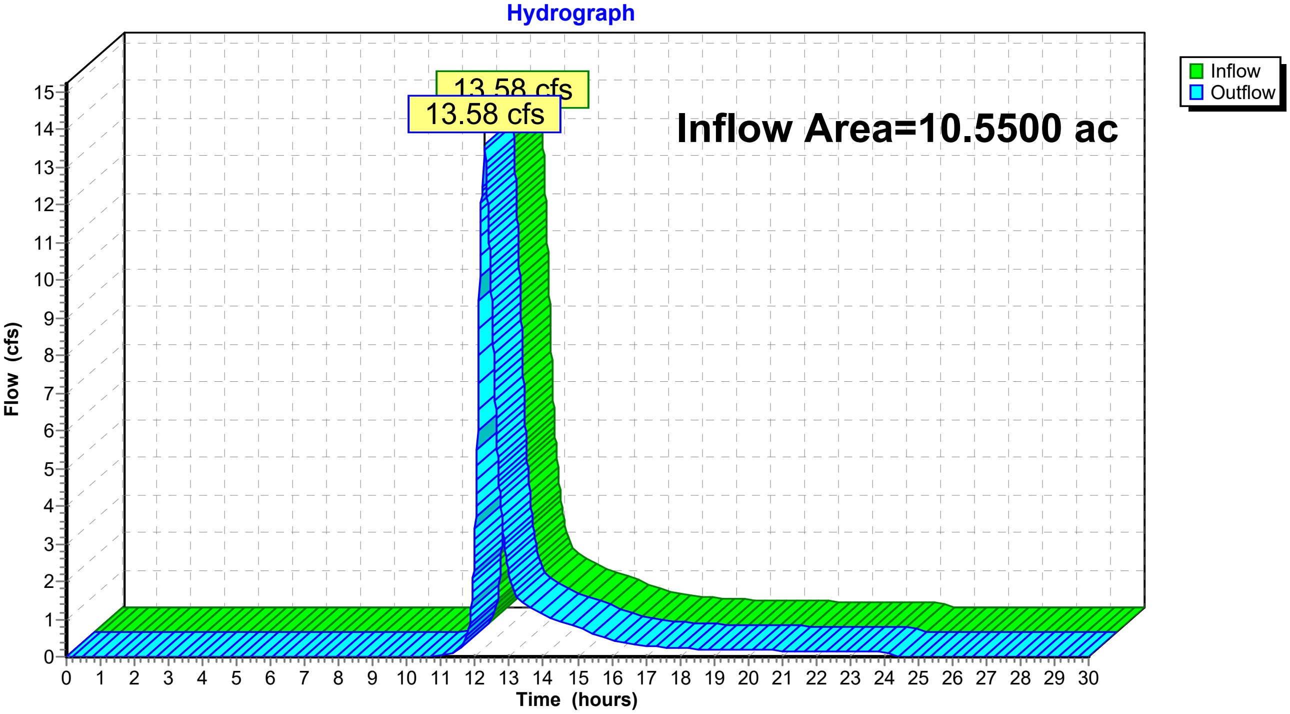


Summary for Reach BVW: WETLANDS

Inflow Area = 10.5500 ac, 19.72% Impervious, Inflow Depth = 1.17" for 25-yr event
Inflow = 13.58 cfs @ 12.27 hrs, Volume= 1.032 af
Outflow = 13.58 cfs @ 12.27 hrs, Volume= 1.032 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Reach BVW: WETLANDS

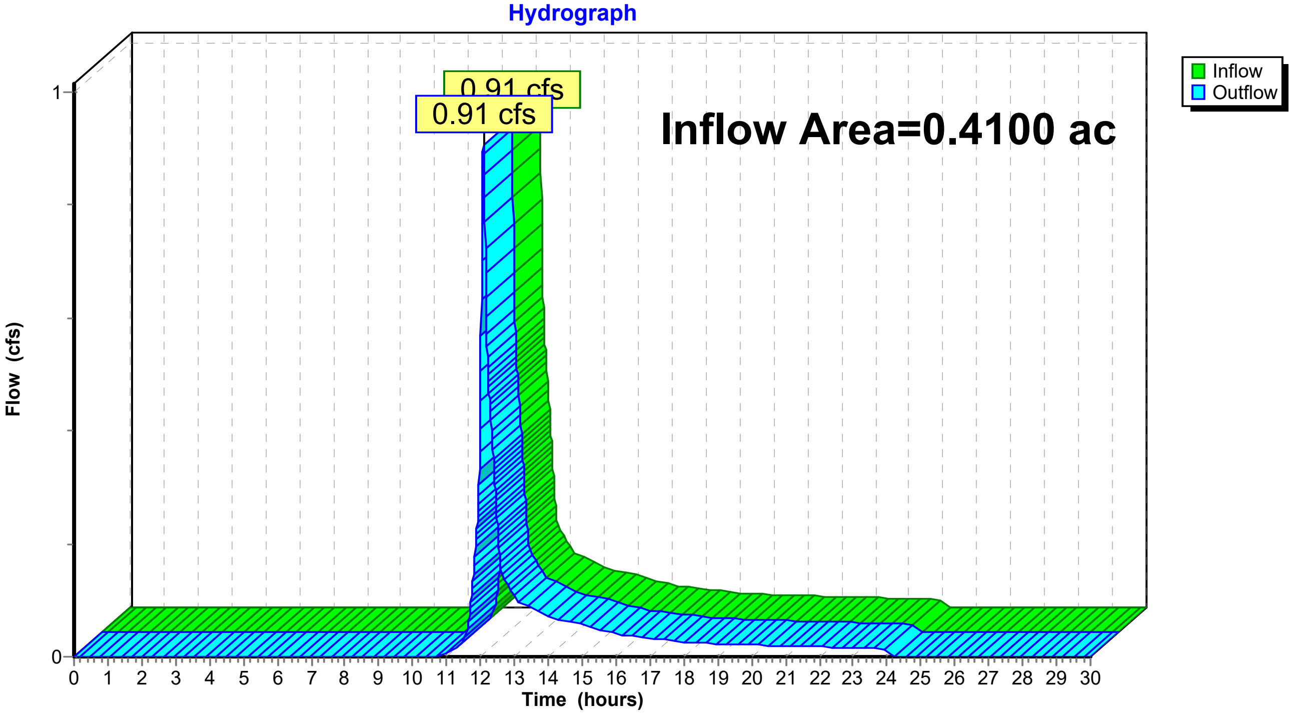


Summary for Reach RD: MAYNARD RD

Inflow Area =	0.4100 ac,	0.00% Impervious, Inflow Depth = 1.92"	for 25-yr event	
Inflow =	0.91 cfs @	12.08 hrs, Volume=	0.066 af	
Outflow =	0.91 cfs @	12.08 hrs, Volume=	0.066 af,	Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Reach RD: MAYNARD RD

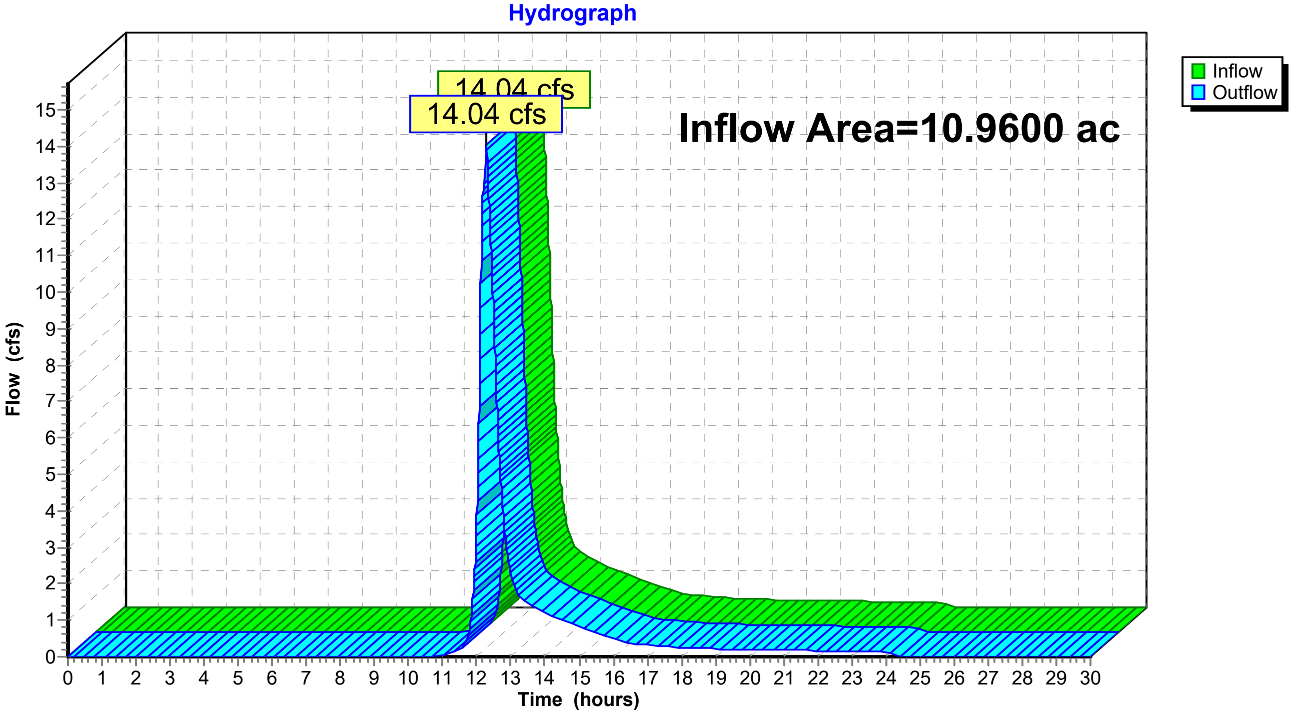


Summary for Reach T: TOTAL

Inflow Area = 10.9600 ac, 18.98% Impervious, Inflow Depth = 1.20" for 25-yr event
Inflow = 14.04 cfs @ 12.27 hrs, Volume= 1.098 af
Outflow = 14.04 cfs @ 12.27 hrs, Volume= 1.098 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Reach T: TOTAL



Summary for Pond CS1: CHAMBER SYSTEM #1

```
Inflow Area =      2.0478 ac,  16.49% Impervious,  Inflow Depth =   1.44"    for  25-yr event
Inflow     =      3.93 cfs @  12.12 hrs,  Volume=          0.246 af
Outflow    =      2.41 cfs @  12.41 hrs,  Volume=          0.246 af,  Atten= 39%,  Lag= 17.2 min
Discarded  =      0.85 cfs @  12.04 hrs,  Volume=          0.168 af
Primary    =      1.55 cfs @  12.41 hrs,  Volume=          0.078 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 177.89' @ 12.41 hrs   Surf.Area= 4,456 sf   Storage= 2,469 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 11.5 min ( 802.0 - 790.5 )

Volume      Invert   Avail.Storage   Storage Description
  #1       176.20'          578 cf   Custom Stage Data (Prismatic)Listed below (Recalc)
                                     1,444 cf Overall  x 40.0% Voids
  #2       176.70'        4,777 cf   retain_it retain_it  3.0' x 28
                                     Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf
                                     Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
  #3       179.70'           44 cf   2.00'D x 2.80'H Vertical Cone/Cylinder x 5 -Impervious
                          5,399 cf   Total Available Storage

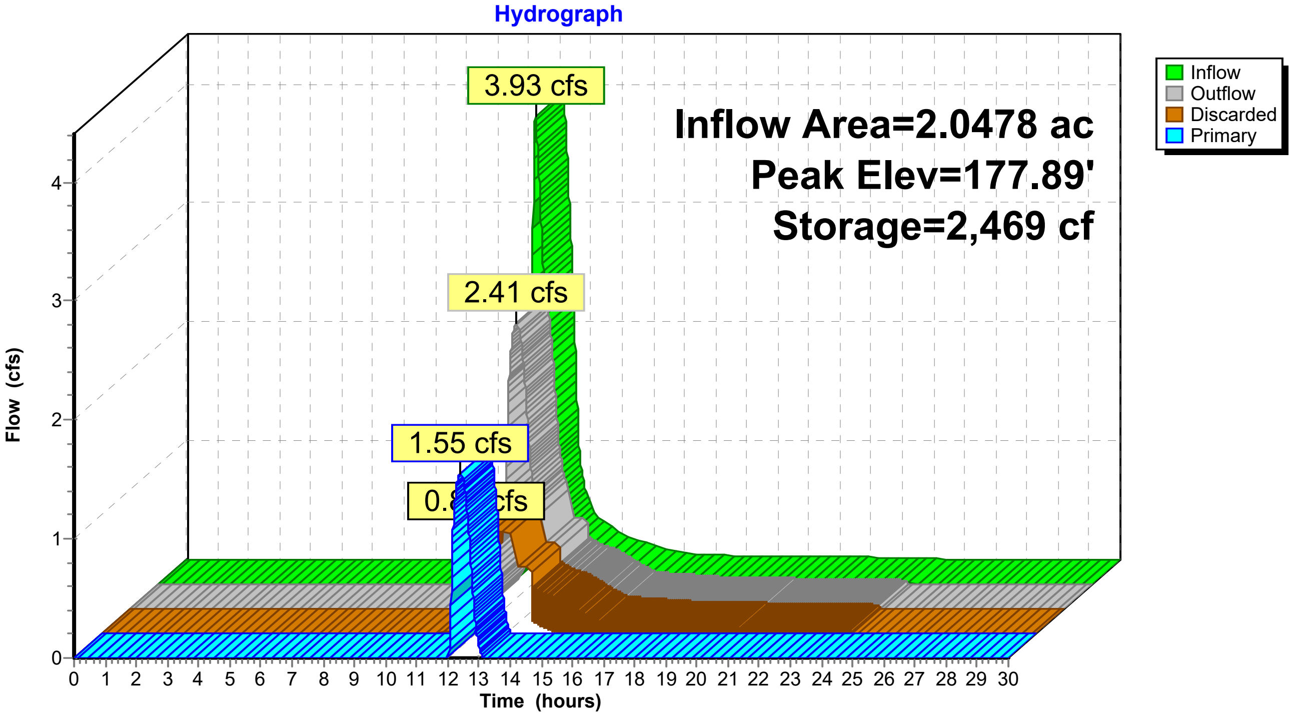
 Elevation        Surf.Area        Inc.Store       Cum.Store
    (feet)          (sq-ft)    (cubic-feet)    (cubic-feet)
    176.20            2,888               0               0
    176.70            2,888           1,444           1,444

Device   Routing         Invert   Outlet Devices
  #1     Discarded      176.20'   8.270 in/hr Exfiltration over Surface area
  #2     Primary        176.70'   8.0" Vert. Orifice/Grate   C= 0.600
  #3     Primary        179.30'   4.2' long Sharp-Crested Rectangular Weir  2 End Contraction(s)
                                  3.5' Crest Height

Discarded OutFlow Max=0.85 cfs @ 12.04 hrs  HW=176.75'   (Free Discharge)
└─1=Exfiltration  (Exfiltration Controls 0.85 cfs)

Primary OutFlow Max=1.55 cfs @ 12.41 hrs  HW=177.89'  TW=0.00'   (Dynamic Tailwater)
├─2=Orifice/Grate  (Orifice Controls 1.55 cfs @ 4.45 fps)
└─3=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)
```

Pond CS1: CHAMBER SYSTEM #1



Summary for Pond CS2: CHAMBER SYSTEM #2

Inflow Area = 1.5178 ac, 19.62% Impervious, Inflow Depth = 2.59" for 25-yr event
Inflow = 4.64 cfs @ 12.08 hrs, Volume= 0.327 af
Outflow = 3.18 cfs @ 12.16 hrs, Volume= 0.327 af, Atten= 31%, Lag= 4.8 min
Discarded = 0.21 cfs @ 11.54 hrs, Volume= 0.167 af
Primary = 2.97 cfs @ 12.16 hrs, Volume= 0.161 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 179.20' @ 12.16 hrs Surf.Area= 1,100 sf Storage= 1,571 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 9.3 min (845.9 - 836.6)

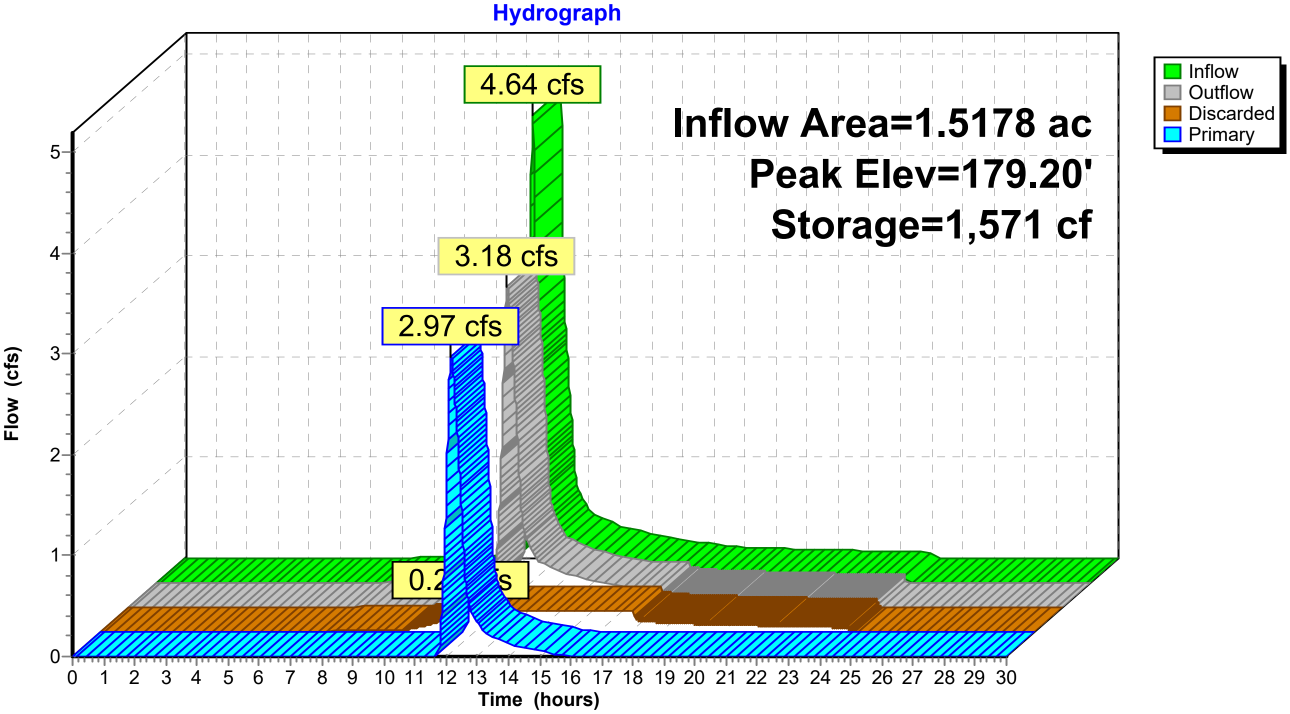
Volume	Invert	Avail.Storage	Storage Description
#1	177.00'	854 cf	**22.00'W x 50.00'L x 5.20'H Prismatoid** 5,720 cf Overall - 3,584 cf Embedded = 2,136 cf x 40.0% Voids
#2	177.50'	2,650 cf	**retain_it retain_it 4.0'** x 12 Inside #1 Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf 2 Rows adjusted for 120.8 cf perimeter wall
		3,505 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	177.50'	**10.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	177.00'	**8.270 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.21 cfs @ 11.54 hrs HW=177.06' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=2.97 cfs @ 12.16 hrs HW=179.20' TW=177.39' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 2.97 cfs @ 5.45 fps)

Pond CS2: CHAMBER SYSTEM #2



Summary for Pond CS3: CHAMBER SYSTEM #3

```
Inflow Area =       1.1800 ac,  57.63% Impervious,  Inflow Depth =   3.99"    for  25-yr event
Inflow      =      5.67 cfs @   12.07 hrs,  Volume=          0.392 af
Outflow     =      2.72 cfs @   12.22 hrs,  Volume=          0.392 af,  Atten= 52%,  Lag= 8.8 min
Discarded   =      0.23 cfs @   11.72 hrs,  Volume=          0.227 af
Primary     =      2.49 cfs @   12.22 hrs,  Volume=          0.165 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 174.28' @ 12.22 hrs   Surf.Area= 4,096 sf   Storage= 4,978 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 74.0 min ( 882.0 - 808.0 )

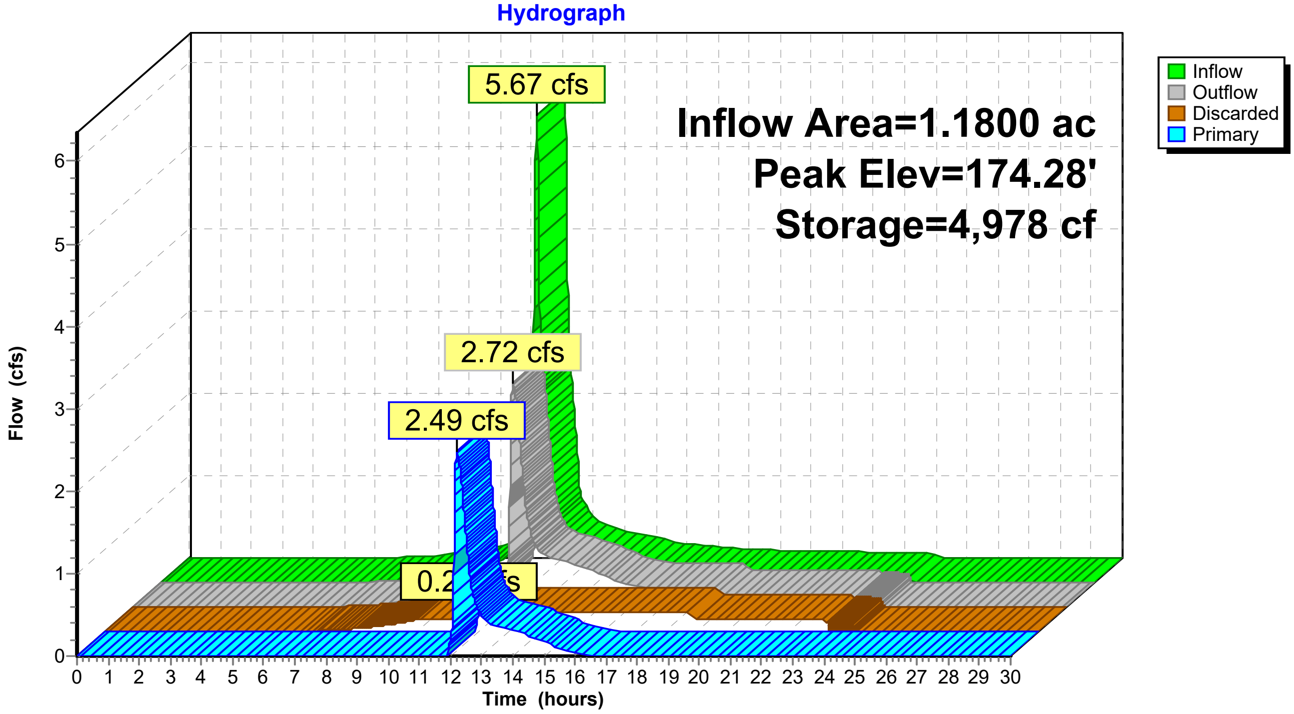
Volume      Invert    Avail.Storage   Storage Description
  #1        171.00'        1,034 cf   34.00'W x 76.00'L x 1.00'H Prismatoid
                                      2,584 cf Overall  x 40.0% Voids
  #2        172.00'          339 cf   2.00'W x 212.00'L x 2.00'H Prismatoid-Impervious
                                      848 cf Overall  x 40.0% Voids
  #3        172.00'        5,274 cf   retain_it retain_it  3.5' x 27
                                      Inside= 84.0"W x 42.0"H => 25.10 sf x 8.00'L = 200.8 cf
                                      Outside= 96.0"W x 50.0"H => 33.33 sf x 8.00'L = 266.7 cf
                                      3 Rows adjusted for 147.4 cf perimeter wall
  #4        172.00'          177 cf   15.0"  Round Pipe Storage-Impervious
                                      L= 144.0'  S= 0.0050 '/'
                           6,823 cf   Total Available Storage

Device   Routing          Invert   Outlet Devices
  #1     Primary         172.50'   4.0" Vert. Orifice/Grate   C= 0.600
  #2     Primary         173.50'   12.0" Vert. Orifice/Grate   C= 0.600
  #3     Discarded       171.00'   2.410 in/hr Exfiltration over Horizontal area

Discarded OutFlow  Max=0.23 cfs @ 11.72 hrs  HW=172.02'   (Free Discharge)
└─3=Exfiltration  (Exfiltration Controls 0.23 cfs)

Primary OutFlow  Max=2.49 cfs @ 12.22 hrs  HW=174.28'  TW=0.00'   (Dynamic Tailwater)
├─1=Orifice/Grate  (Orifice Controls 0.53 cfs @ 6.11 fps)
└─2=Orifice/Grate  (Orifice Controls 1.96 cfs @ 3.00 fps)
```

Pond CS3: CHAMBER SYSTEM #3



Summary for Pond CS4: CHAMBER SYSTEM #4

Inflow Area = 0.2000 ac, 65.00% Impervious, Inflow Depth = 4.30" for 25-yr event
Inflow = 1.03 cfs @ 12.07 hrs, Volume= 0.072 af
Outflow = 0.05 cfs @ 11.34 hrs, Volume= 0.072 af, Atten= 95%, Lag= 0.0 min
Discarded = 0.05 cfs @ 11.34 hrs, Volume= 0.072 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 175.95' @ 14.32 hrs Surf.Area= 924 sf Storage= 1,473 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 261.0 min (1,060.7 - 799.7)

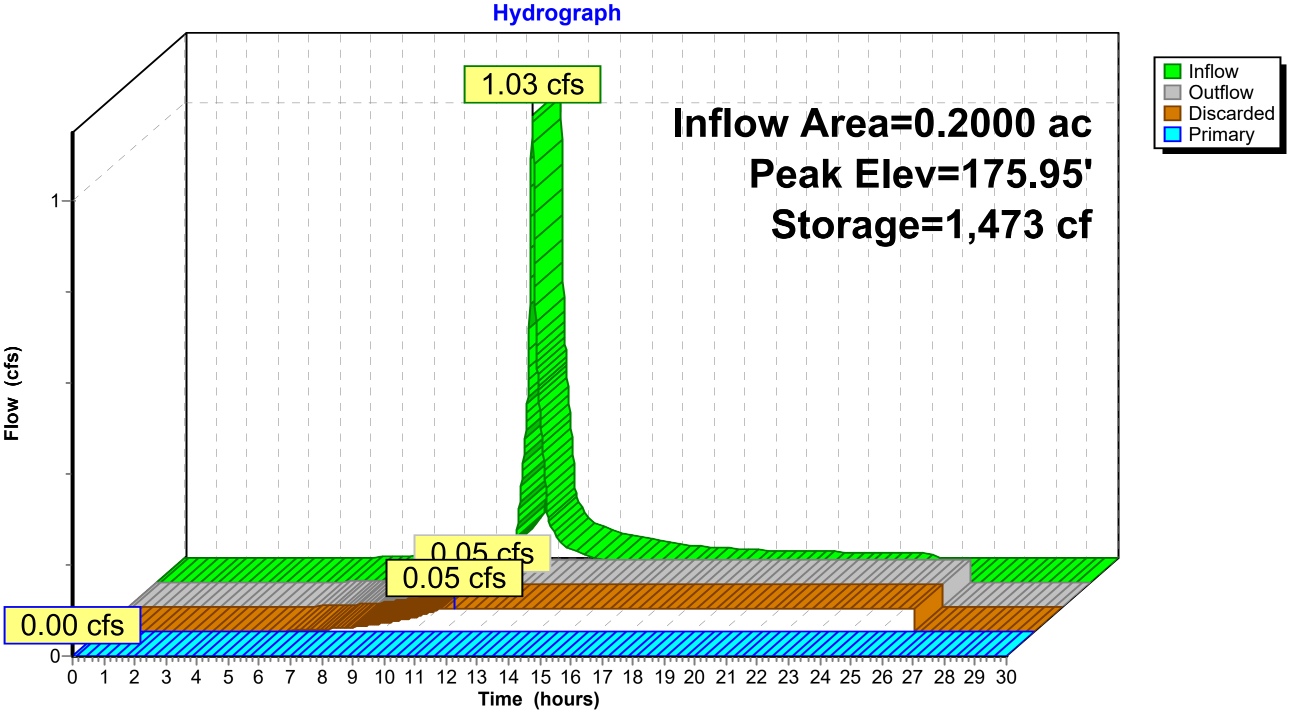
Volume	Invert	Avail.Storage	Storage Description
#1	173.50'	614 cf	**22.00'W x 42.00'L x 4.20'H Prismatoid** 3,881 cf Overall - 2,347 cf Embedded = 1,534 cf x 40.0% Voids
#2	174.00'	1,640 cf	**retain_it retain_it 3.0'** x 10 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 2 Rows adjusted for 66.1 cf perimeter wall
		2,254 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	176.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	173.50'	**2.410 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.05 cfs @ 11.34 hrs HW=173.54' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=173.50' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Pond CS4: CHAMBER SYSTEM #4



Summary for Pond CS5: CHAMBER SYSTEM #5

Inflow Area = 1.8731 ac, 33.80% Impervious, Inflow Depth = 2.81" for 25-yr event
Inflow = 6.29 cfs @ 12.08 hrs, Volume= 0.439 af
Outflow = 3.62 cfs @ 12.19 hrs, Volume= 0.439 af, Atten= 43%, Lag= 6.5 min
Discarded = 0.61 cfs @ 11.77 hrs, Volume= 0.288 af
Primary = 3.01 cfs @ 12.19 hrs, Volume= 0.150 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 180.73' @ 12.19 hrs Surf.Area= 3,164 sf Storage= 2,690 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 9.1 min (837.6 - 828.5)

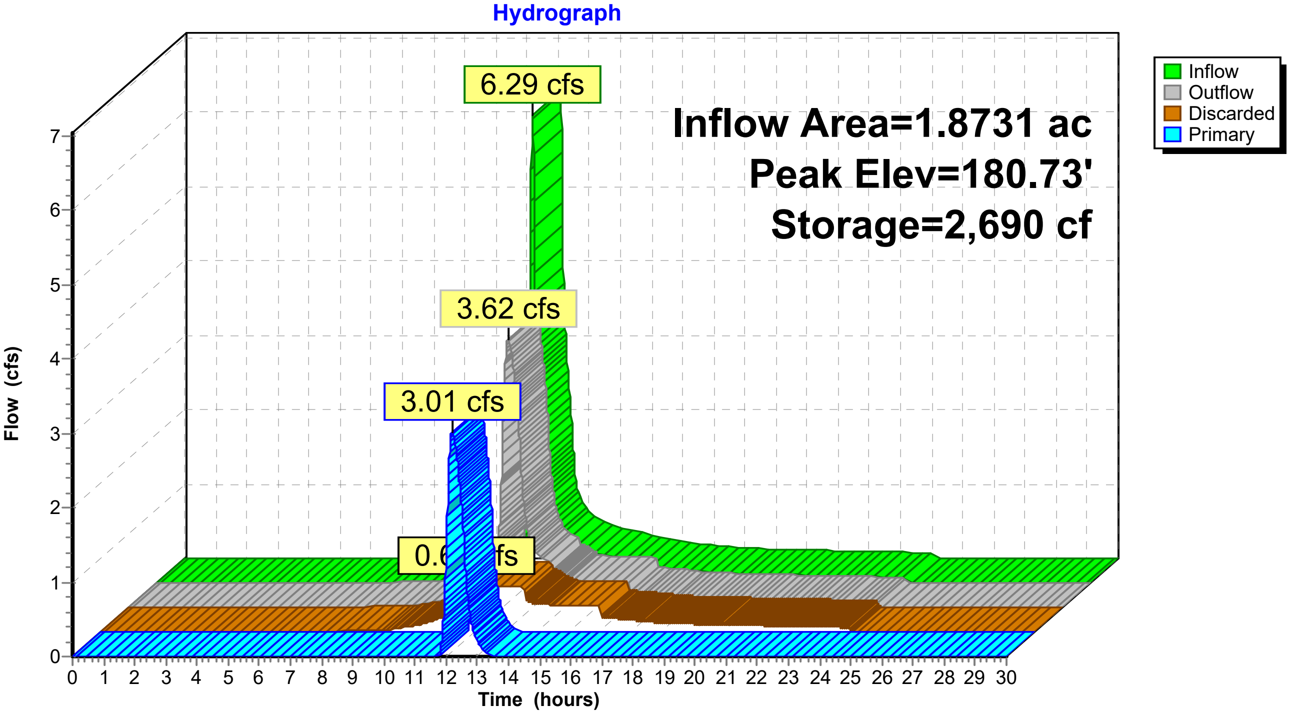
Volume	Invert	Avail.Storage	Storage Description
#1	178.50'	364 cf	**26.00'W x 70.00'L x 0.50'H Prismatoid** 910 cf Overall x 40.0% Voids
#2	179.00'	5,376 cf	**retain_it retain_it 4.0'** x 24 Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf 3 Rows adjusted for 166.1 cf perimeter wall
		5,740 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	179.00'	**10.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	178.50'	**8.270 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.61 cfs @ 11.77 hrs HW=179.02' (Free Discharge)
⮤**2=Exfiltration** (Exfiltration Controls 0.61 cfs)

Primary OutFlow Max=3.01 cfs @ 12.19 hrs HW=180.73' TW=0.00' (Dynamic Tailwater)
⮤**1=Orifice/Grate** (Orifice Controls 3.01 cfs @ 5.52 fps)

Pond CS5: CHAMBER SYSTEM #5



Summary for Pond CS6: CHAMBER SYSTEM #6

Inflow Area = 1.5573 ac, 4.32% Impervious, Inflow Depth = 2.09" for 25-yr event
Inflow = 3.70 cfs @ 12.08 hrs, Volume= 0.271 af
Outflow = 1.75 cfs @ 12.28 hrs, Volume= 0.270 af, Atten= 53%, Lag= 12.2 min
Discarded = 0.12 cfs @ 11.76 hrs, Volume= 0.185 af
Primary = 1.63 cfs @ 12.28 hrs, Volume= 0.085 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 171.32' @ 12.28 hrs Surf.Area= 2,100 sf Storage= 3,455 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 226.0 min (1,073.9 - 847.9)

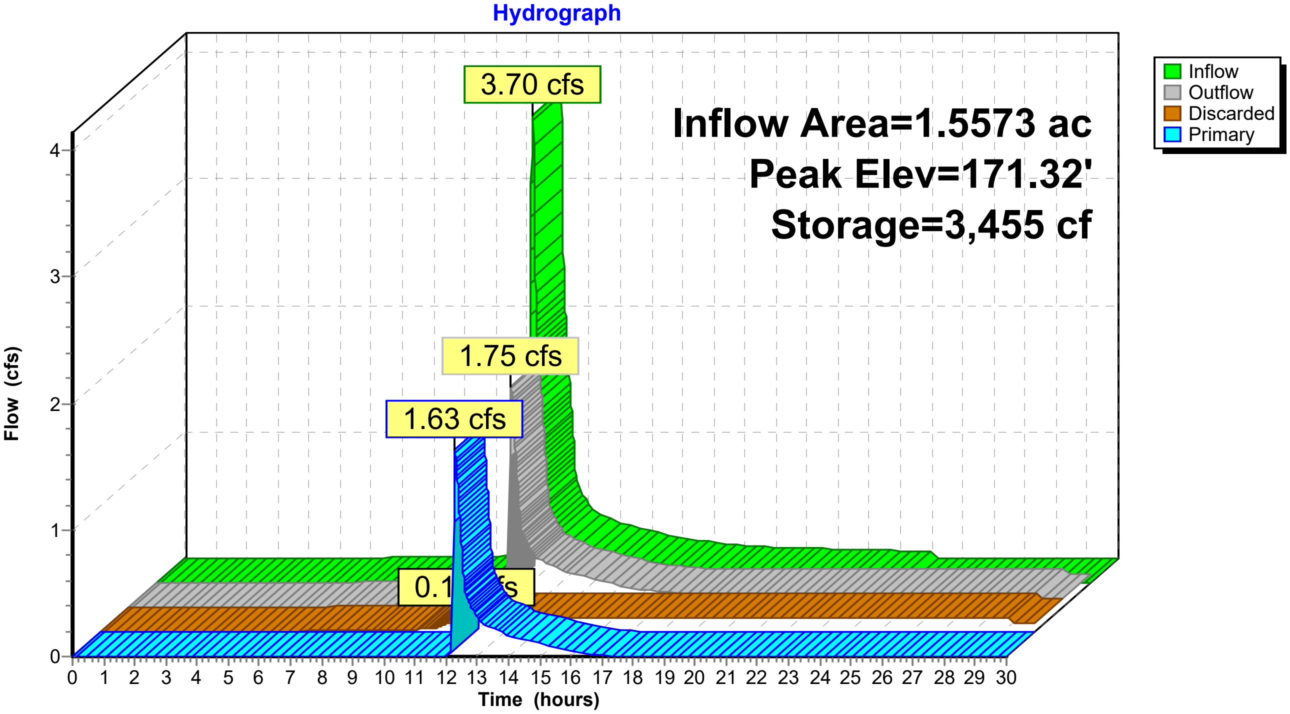
Volume	Invert	Avail.Storage	Storage Description
#1	167.00'	252 cf	**30.00'W x 42.00'L x 0.50'H Prismatoid** 630 cf Overall x 40.0% Voids
#2	167.50'	3,773 cf	**retain_it retain_it 4.5'** x 15 Inside= 84.0"W x 54.0"H => 32.64 sf x 8.00'L = 261.1 cf Outside= 96.0"W x 62.0"H => 41.33 sf x 8.00'L = 330.7 cf 3 Rows adjusted for 143.5 cf perimeter wall
		4,025 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	171.20'	**2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns** X 12 rows C= 0.600 in 48.0" x 24.0" Grate (25% open area) Limited to weir flow at low heads
#2	Discarded	167.00'	**2.410 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.12 cfs @ 11.76 hrs HW=167.52' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=1.63 cfs @ 12.28 hrs HW=171.32' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Weir Controls 1.63 cfs @ 1.13 fps)

Pond CS6: CHAMBER SYSTEM #6



Summary for Pond DW2: LOT 2 DW

Inflow Area = 0.0871 ac,100.00% Impervious, Inflow Depth = 5.76" for 25-yr event
Inflow = 0.53 cfs @ 12.07 hrs, Volume= 0.042 af
Outflow = 0.04 cfs @ 11.69 hrs, Volume= 0.042 af, Atten= 92%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.69 hrs, Volume= 0.042 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 184.28' @ 12.96 hrs Surf.Area= 792 sf Storage= 627 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 96.5 min (840.8 - 744.2)

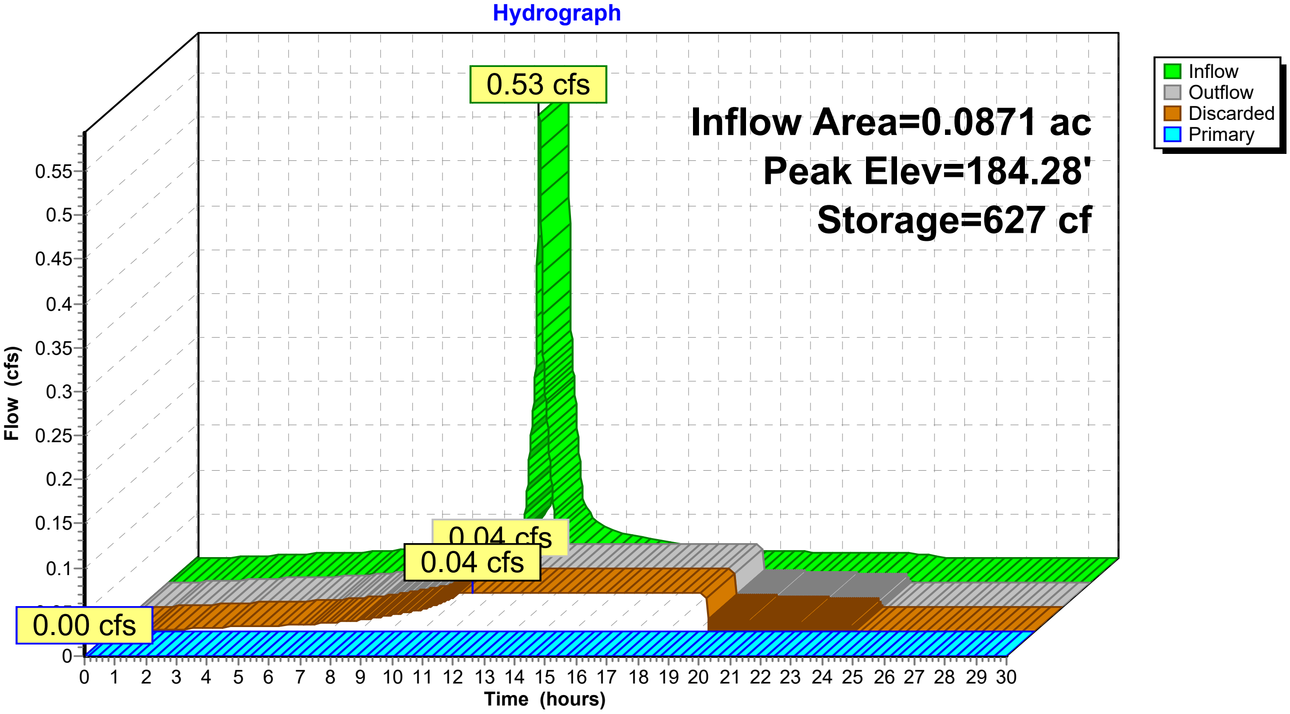
Volume	Invert	Avail.Storage	Storage Description
#1	183.00'	602 cf	**18.00'W x 44.00'L x 2.60'H Prismatoid** 2,059 cf Overall - 553 cf Embedded = 1,506 cf x 40.0% Voids
#2	183.50'	553 cf	**Cultec R-150XLHD** x 20 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 5 rows
#3	184.70'	1 cf	**0.33'D x 6.30'H Vertical Cone/Cylinder** x 2
		1,157 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	183.00'	**2.410 in/hr Exfiltration over Horizontal area**
#2	Primary	192.00'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600

Discarded OutFlow Max=0.04 cfs @ 11.69 hrs HW=183.10' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=183.00' TW=178.50' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond DW2: LOT 2 DW



Summary for Pond DW3: LOT 3 DW

```
Inflow Area =        0.0666 ac,100.00% Impervious,  Inflow Depth =   5.76"    for  25-yr event
Inflow      =       0.41 cfs @  12.07 hrs,  Volume=           0.032 af
Outflow     =       0.06 cfs @  11.75 hrs,  Volume=           0.032 af,  Atten= 84%,  Lag= 0.0 min
Discarded   =       0.06 cfs @  11.75 hrs,  Volume=           0.032 af
Primary     =       0.00 cfs @   0.00 hrs,  Volume=           0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 174.75' @ 12.53 hrs   Surf.Area= 338 sf   Storage= 351 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 28.1 min ( 772.3 - 744.2 )

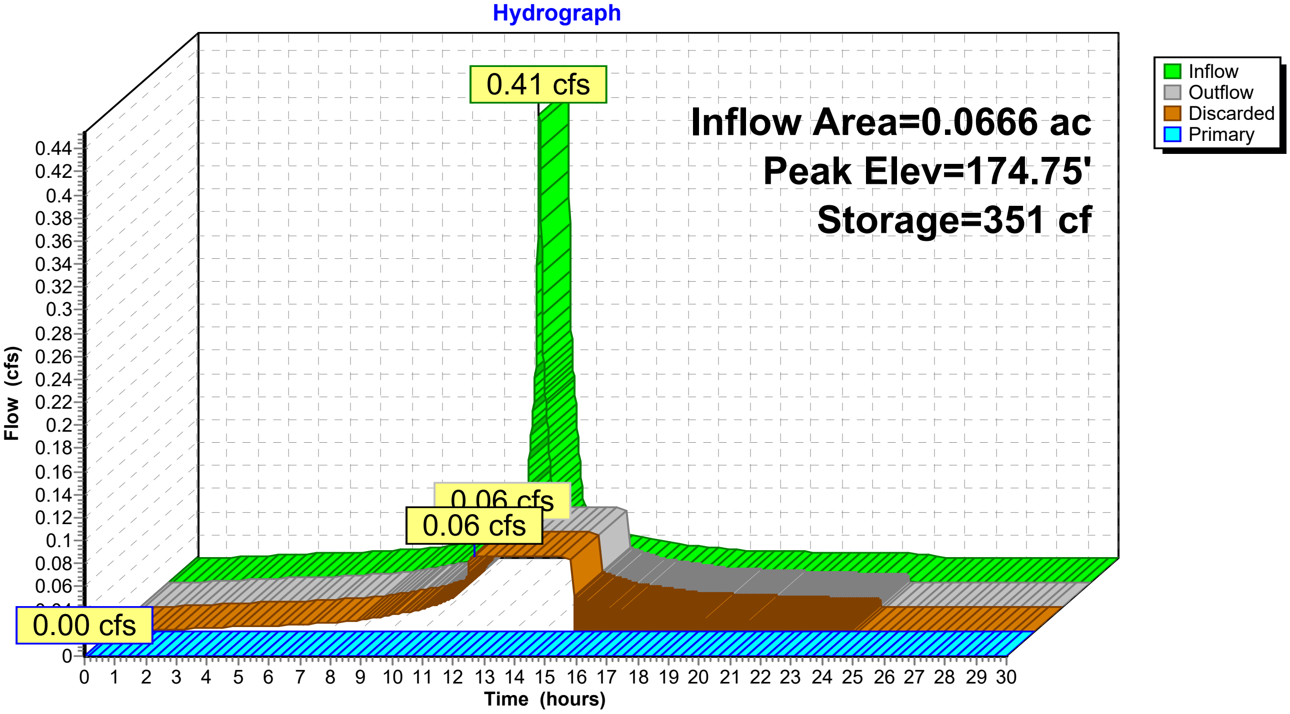
Volume      Invert   Avail.Storage   Storage Description
   #1      173.00'          339 cf   13.00'W x 26.00'L x 3.30'H Prismatoid
                                     1,115 cf Overall - 267 cf Embedded = 848 cf  x 40.0% Voids
   #2      173.50'          267 cf   Cultec R-280HD x 6  Inside #1
                                     Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf
                                     Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap
                                     Row Length Adjustment= +1.00' x 6.07 sf x 2 rows
   #3      175.60'            1 cf   0.33'D x 4.30'H Vertical Cone/Cylinder x 2
                            607 cf   Total Available Storage

Device  Routing        Invert   Outlet Devices
   #1   Discarded     173.00'   8.270 in/hr Exfiltration over Horizontal area
   #2   Primary       179.00'   4.0" Vert. Orifice/Grate X 2.00   C= 0.600

Discarded OutFlow  Max=0.06 cfs @ 11.75 hrs  HW=173.07'   (Free Discharge)
└─1=Exfiltration  (Exfiltration Controls 0.06 cfs)

Primary OutFlow  Max=0.00 cfs @ 0.00 hrs  HW=173.00'  TW=0.00'   (Dynamic Tailwater)
└─2=Orifice/Grate  ( Controls 0.00 cfs)
```

Pond DW3: LOT 3 DW



Summary for Pond DW4: LOT 4 DW

```
Inflow Area =        0.0551 ac,100.00% Impervious,  Inflow Depth =   5.76"    for  25-yr event
Inflow      =        0.34 cfs @   12.07 hrs,  Volume=          0.026 af
Outflow     =        0.05 cfs @   11.76 hrs,  Volume=          0.026 af,  Atten= 84%,  Lag= 0.0 min
Discarded   =        0.05 cfs @   11.76 hrs,  Volume=          0.026 af
Primary     =        0.00 cfs @    0.00 hrs,  Volume=          0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 168.11' @ 12.53 hrs   Surf.Area= 286 sf   Storage= 287 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 26.8 min ( 771.0 - 744.2 )

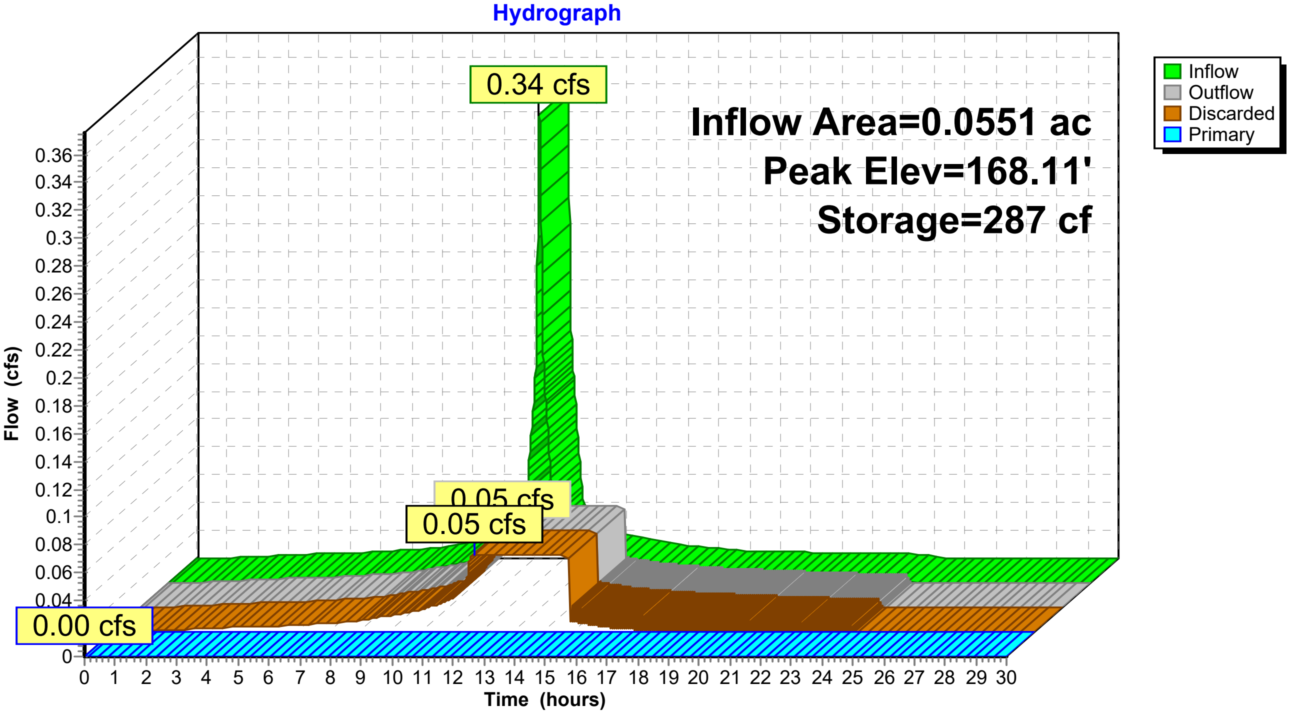
Volume      Invert    Avail.Storage   Storage Description
   #1      166.50'           271 cf   11.00'W x 26.00'L x 3.30'H Prismatoid
                                      944 cf Overall - 267 cf Embedded = 677 cf  x 40.0% Voids
   #2      167.00'           267 cf   Cultec R-280HD x 6  Inside #1
                                      Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf
                                      Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap
                                      Row Length Adjustment= +1.00' x 6.07 sf x 2 rows
   #3      169.20'             0 cf   0.33'D x 2.50'H Vertical Cone/Cylinder x 2
                             538 cf   Total Available Storage

Device   Routing       Invert   Outlet Devices
   #1    Discarded    166.50'   8.270 in/hr Exfiltration over Horizontal area
   #2    Primary      173.00'   4.0" Vert. Orifice/Grate X 12.00   C= 0.600

Discarded OutFlow  Max=0.05 cfs @ 11.76 hrs  HW=166.58'   (Free Discharge)
└─1=Exfiltration  (Exfiltration Controls 0.05 cfs)

Primary OutFlow  Max=0.00 cfs @ 0.00 hrs  HW=166.50'  TW=0.00'   (Dynamic Tailwater)
└─2=Orifice/Grate  ( Controls 0.00 cfs)
```

Pond DW4: LOT 4 DW



Summary for Pond DW6/7: LOTS 6 & 7

Inflow Area = 0.1101 ac,100.00% Impervious, Inflow Depth = 5.76" for 25-yr event
Inflow = 0.67 cfs @ 12.07 hrs, Volume= 0.053 af
Outflow = 0.11 cfs @ 12.10 hrs, Volume= 0.053 af, Atten= 84%, Lag= 1.8 min
Discarded = 0.11 cfs @ 12.10 hrs, Volume= 0.053 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 101.62' @ 12.53 hrs Surf.Area= 572 sf Storage= 573 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 26.8 min (771.0 - 744.2)

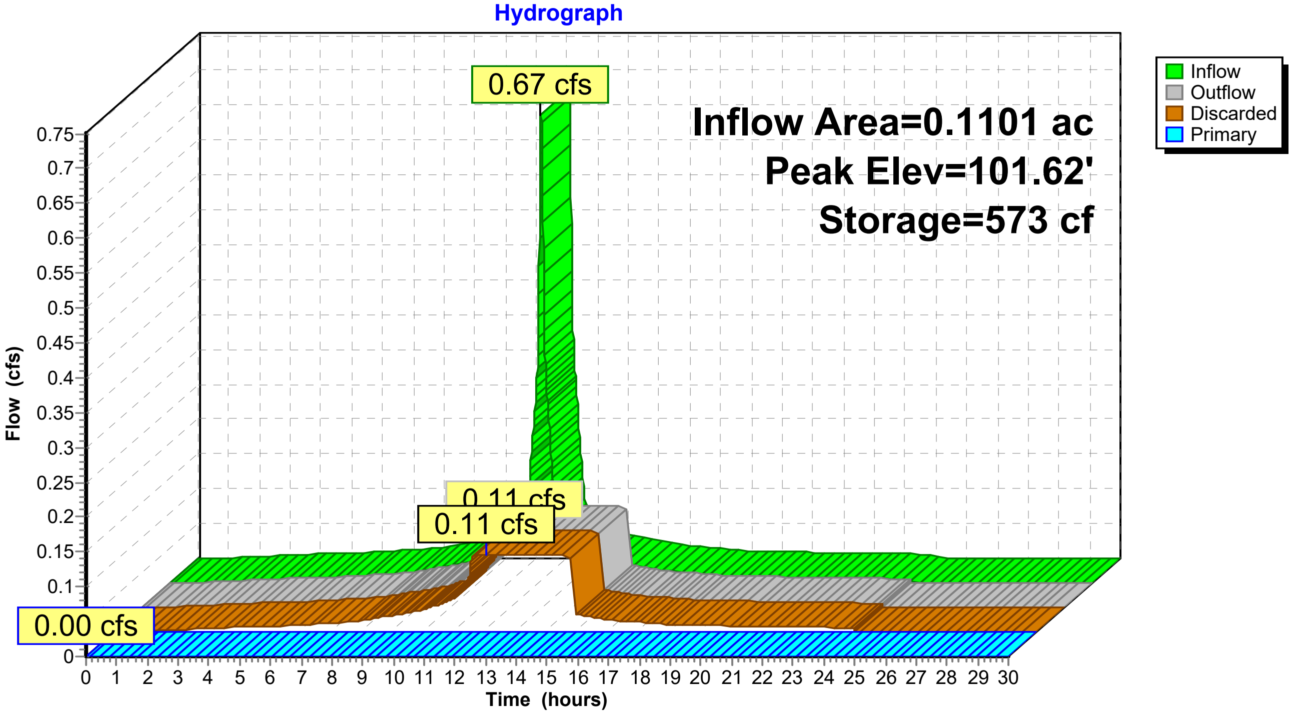
Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	546 cf	**11.00'W x 26.00'L x 3.30'H Prismatoid** x 2 1,888 cf Overall - 522 cf Embedded = 1,365 cf x 40.0% Voids
#2	100.50'	522 cf	**Cultec R-280HD** x 12 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 2 rows
#3	101.00'	0 cf	**0.33'D x 2.00'H Vertical Cone/Cylinder** x 2
		1,069 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	176.00'	**4.0" Vert. Orifice/Grate X 12.00** C= 0.600

Discarded OutFlow Max=0.11 cfs @ 12.10 hrs HW=101.02' (Free Discharge)
└—**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=100.00' TW=0.00' (Dynamic Tailwater)
└—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond DW6/7: LOTS 6 & 7



Summary for Subcatchment PR1:

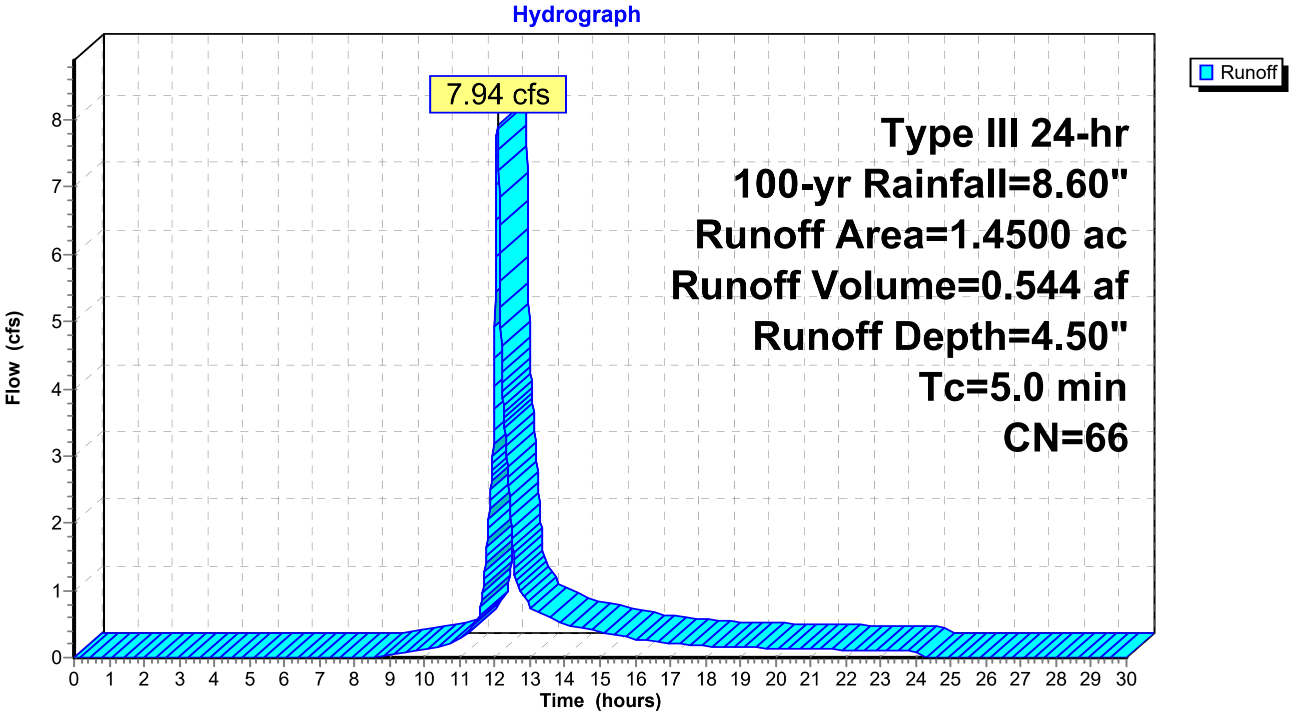
Runoff = 7.94 cfs @ 12.08 hrs, Volume= 0.544 af, Depth= 4.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.60"

	Area (ac)	CN	Description
	1.0800	61	>75% Grass cover, Good, HSG B
*	0.2300	98	Pavement
	0.1400	55	Woods, Good, HSG B
	1.4500	66	Weighted Average
	1.2200		84.14% Pervious Area
	0.2300		15.86% Impervious Area

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

Subcatchment PR1:



Summary for Subcatchment PR2:

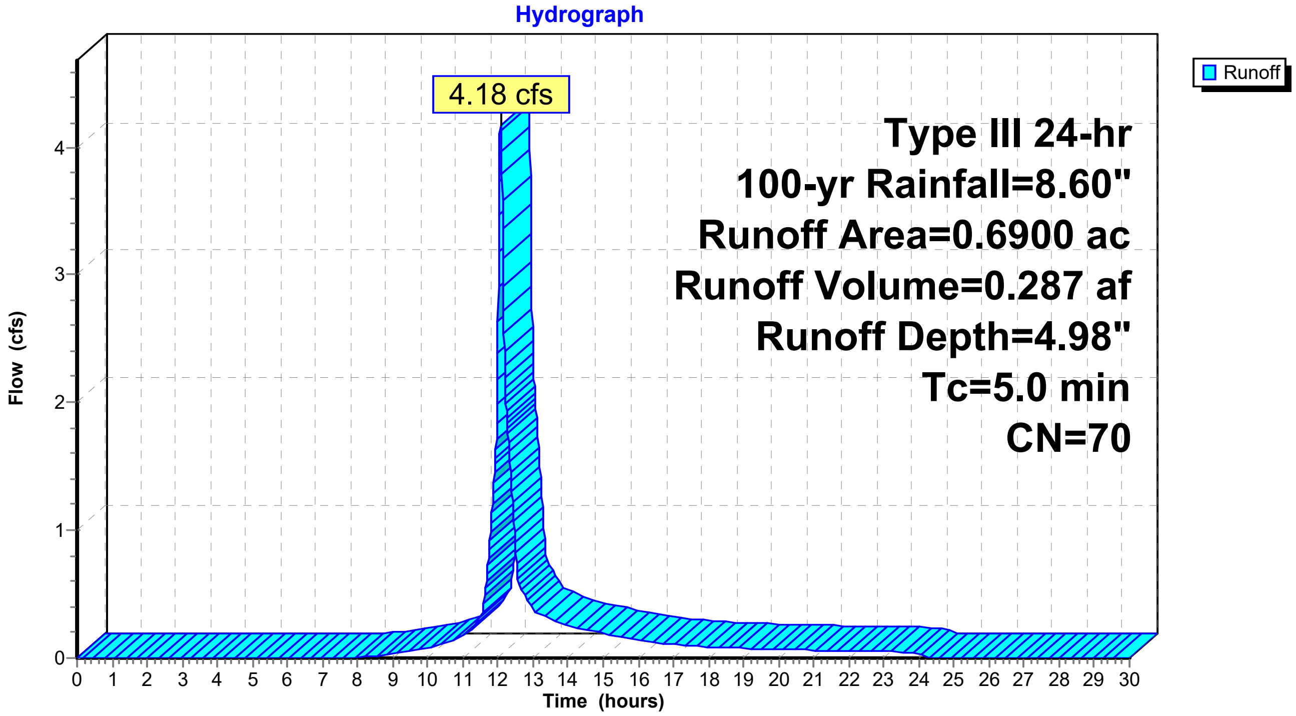
Runoff = 4.18 cfs @ 12.07 hrs, Volume= 0.287 af, Depth= 4.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.60"

	Area (ac)	CN	Description
	0.4100	61	>75% Grass cover, Good, HSG B
*	0.1900	98	Pavement
	0.0900	55	Woods, Good, HSG B
	0.6900	70	Weighted Average
	0.5000		72.46% Pervious Area
	0.1900		27.54% Impervious Area

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

Subcatchment PR2:



Summary for Subcatchment PR3:

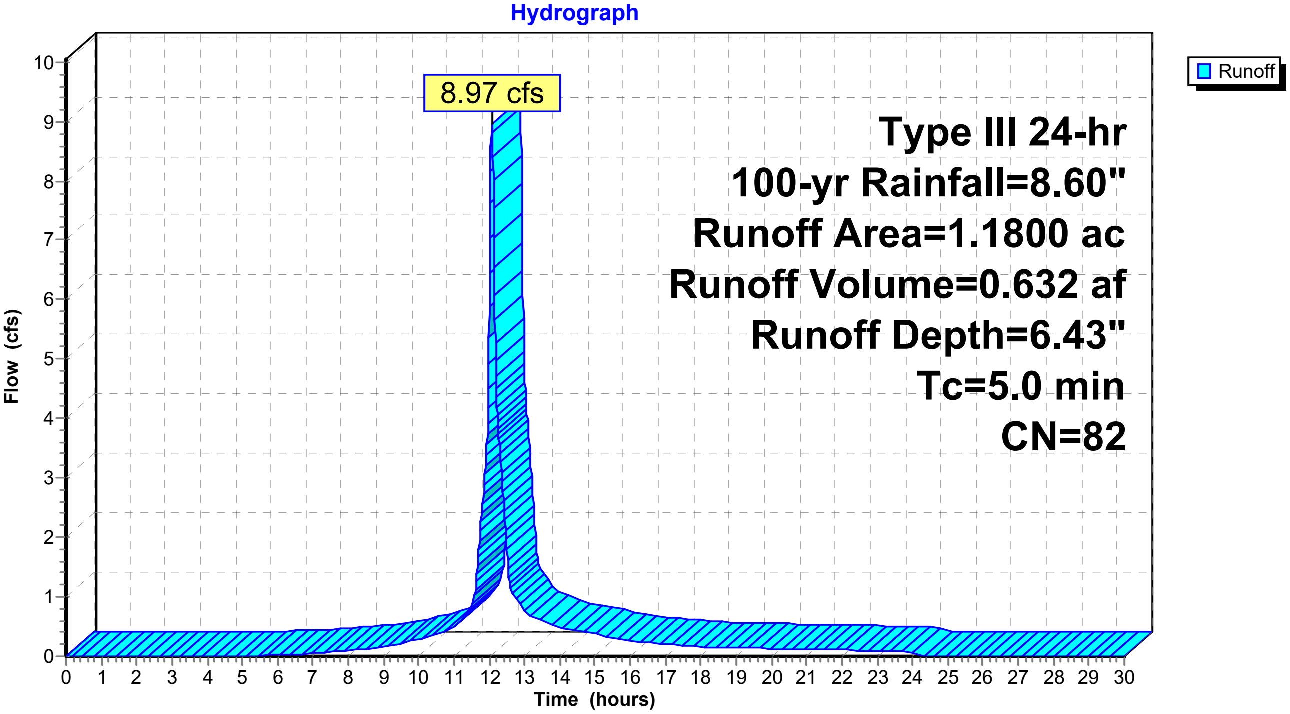
Runoff = 8.97 cfs @ 12.07 hrs, Volume= 0.632 af, Depth= 6.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.60"

	Area (ac)	CN	Description
	0.5000	61	>75% Grass cover, Good, HSG B
*	0.6800	98	Pavement
	1.1800	82	Weighted Average
	0.5000		42.37% Pervious Area
	0.6800		57.63% Impervious Area

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

Subcatchment PR3:



Summary for Subcatchment PR4:

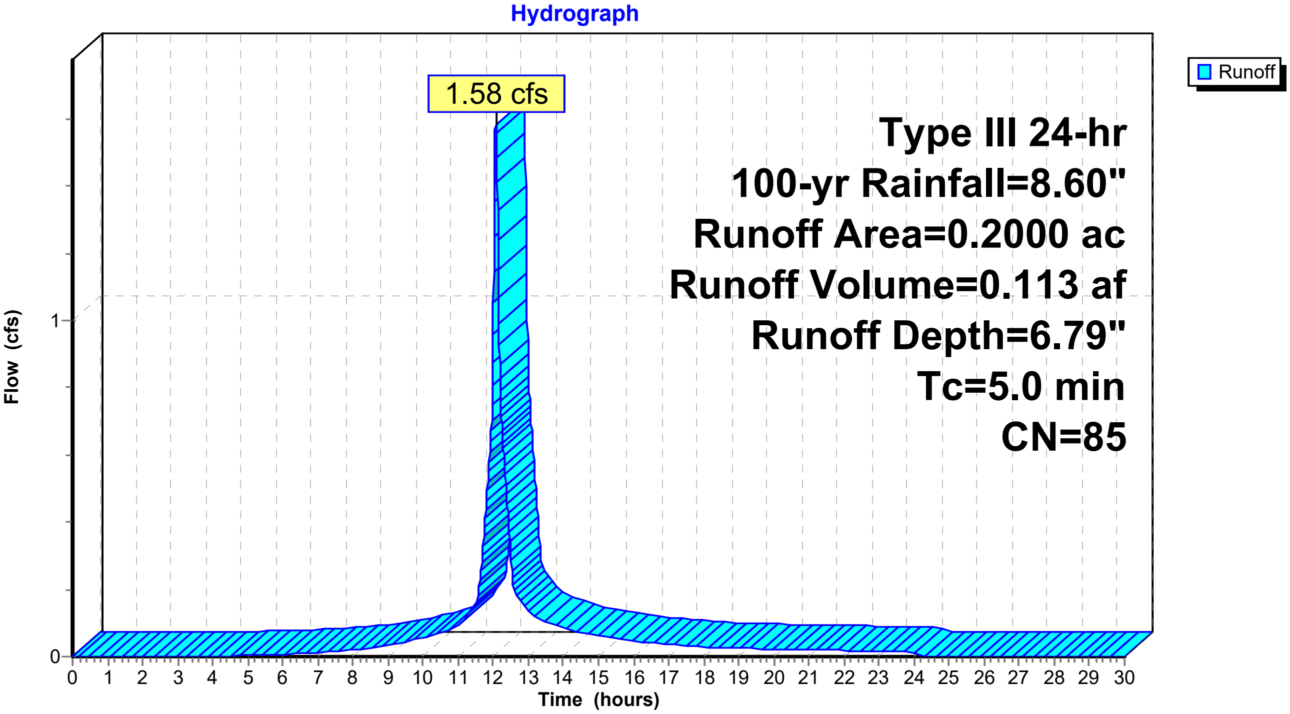
Runoff = 1.58 cfs @ 12.07 hrs, Volume= 0.113 af, Depth= 6.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.60"

	Area (ac)	CN	Description
	0.0700	61	>75% Grass cover, Good, HSG B
*	0.1300	98	Pavement
	0.2000	85	Weighted Average
	0.0700		35.00% Pervious Area
	0.1300		65.00% Impervious Area

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

Subcatchment PR4:



Summary for Subcatchment PR5:

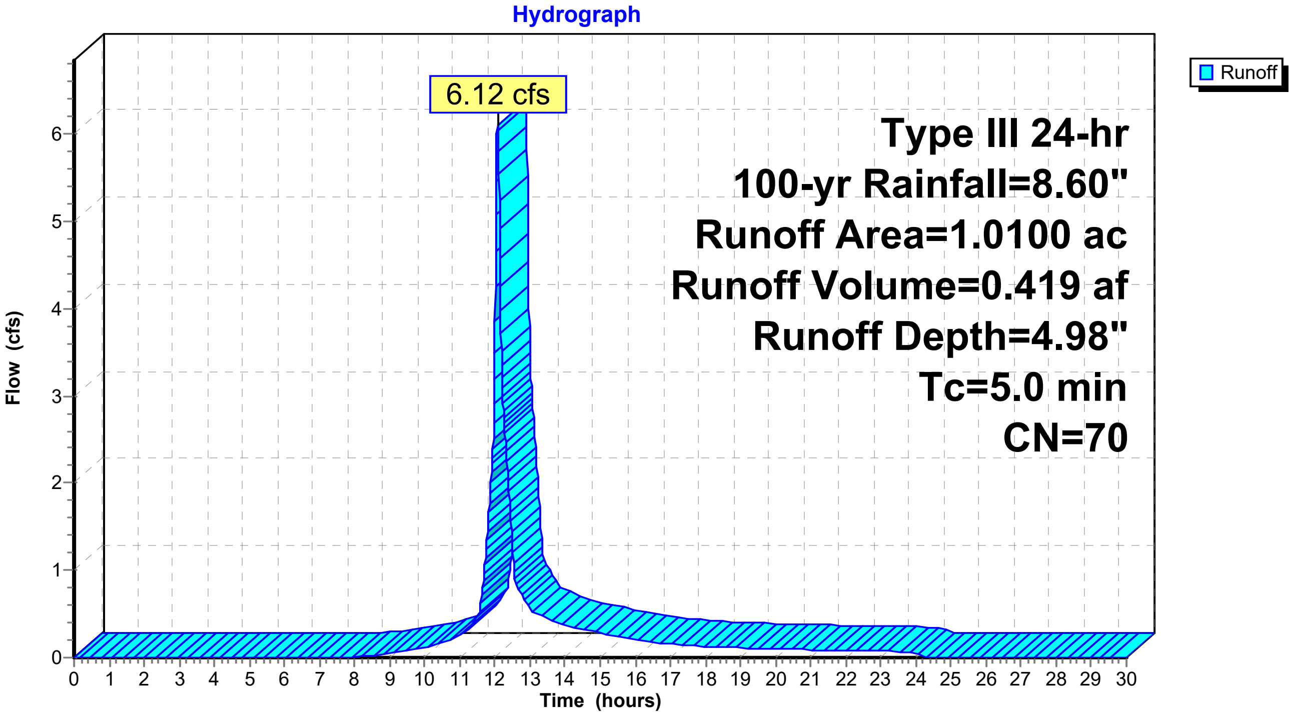
Runoff = 6.12 cfs @ 12.07 hrs, Volume= 0.419 af, Depth= 4.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.60"

	Area (ac)	CN	Description
	0.6200	61	>75% Grass cover, Good, HSG B
*	0.2700	98	Pavement
	0.1200	55	Woods, Good, HSG B
	1.0100	70	Weighted Average
	0.7400		73.27% Pervious Area
	0.2700		26.73% Impervious Area

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

Subcatchment PR5:



Summary for Subcatchment PR6:

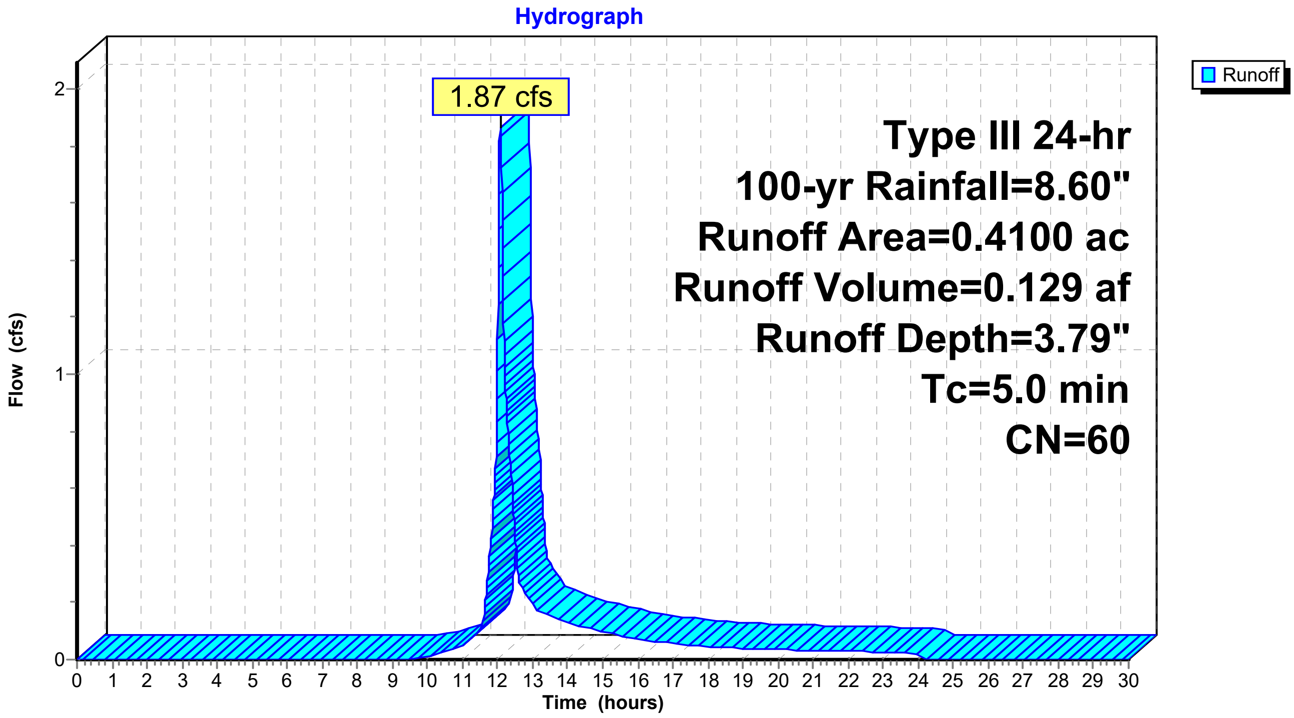
Runoff = 1.87 cfs @ 12.08 hrs, Volume= 0.129 af, Depth= 3.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.60"

Area (ac)	CN	Description
0.3100	61	>75% Grass cover, Good, HSG B
0.1000	55	Woods, Good, HSG B
0.4100	60	Weighted Average
0.4100		100.00% Pervious Area

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

Subcatchment PR6:



Summary for Subcatchment PR7:

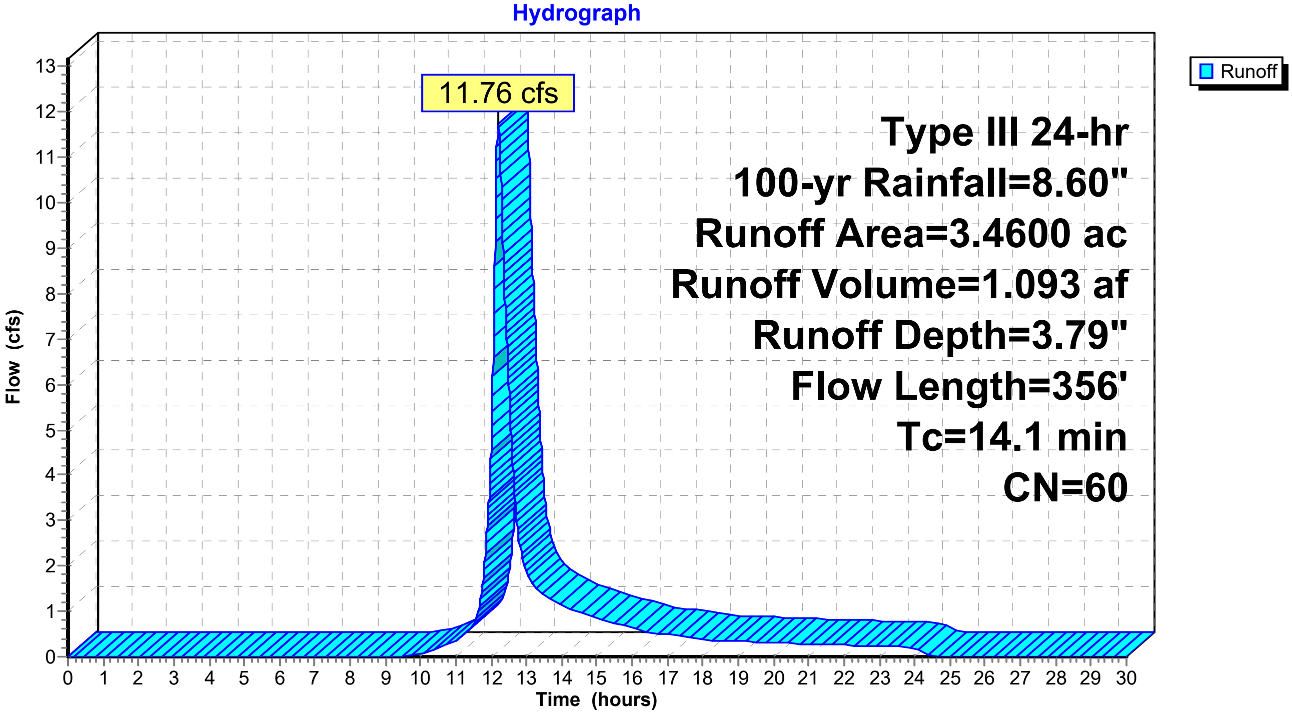
Runoff = 11.76 cfs @ 12.20 hrs, Volume= 1.093 af, Depth= 3.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.60"

Area (ac)	CN	Description
3.0500	61	>75% Grass cover, Good, HSG B
0.4100	55	Woods, Good, HSG B
3.4600	60	Weighted Average
3.4600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.8	50	0.0100	0.08		**Sheet Flow, Sheet** Grass: Dense n= 0.240 P2= 3.20"
0.2	16	0.0100	1.50		**Shallow Concentrated Flow, SCF** Grassed Waterway Kv= 15.0 fps
1.4	117	0.0090	1.42		**Shallow Concentrated Flow, SCF** Grassed Waterway Kv= 15.0 fps
1.7	173	0.0130	1.71		**Shallow Concentrated Flow, SCF** Grassed Waterway Kv= 15.0 fps
14.1	356	Total			

Subcatchment PR7:



Summary for Subcatchment PR8: OFF SITE

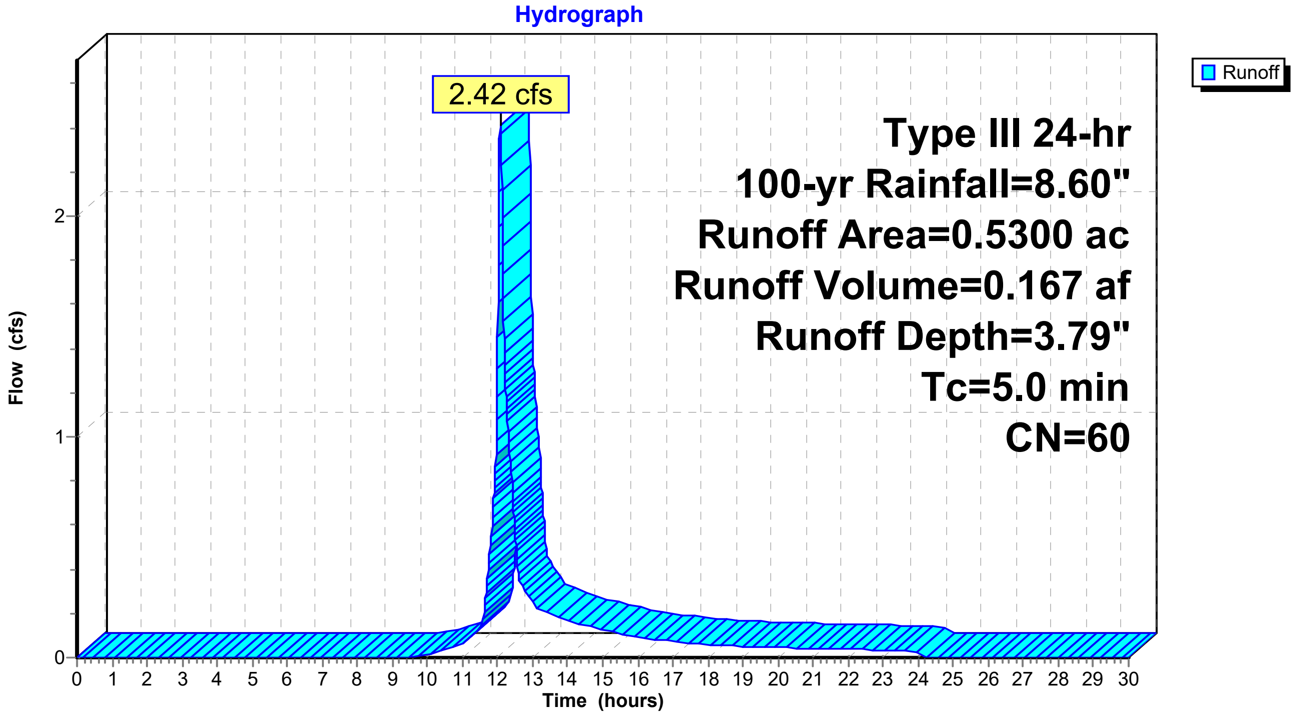
Runoff = 2.42 cfs @ 12.08 hrs, Volume= 0.167 af, Depth= 3.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.60"

	Area (ac)	CN	Description
	0.3200	55	Woods, Good, HSG B
*	0.0400	98	Impervious
	0.1700	61	>75% Grass cover, Good, HSG B
	0.5300	60	Weighted Average
	0.4900		92.45% Pervious Area
	0.0400		7.55% Impervious Area

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

Subcatchment PR8: OFF SITE



Summary for Subcatchment PR9:

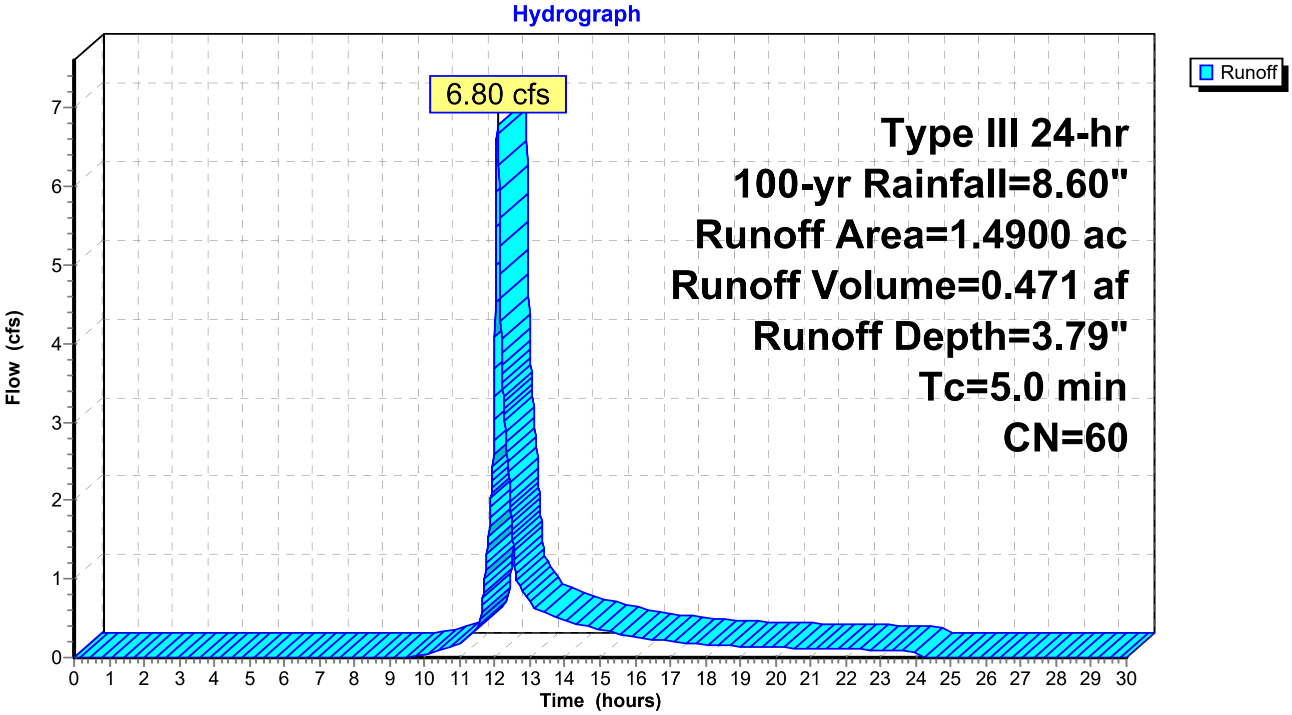
Runoff = 6.80 cfs @ 12.08 hrs, Volume= 0.471 af, Depth= 3.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.60"

Area (ac)	CN	Description
1.3600	61	>75% Grass cover, Good, HSG B
0.1300	55	Woods, Good, HSG B
1.4900	60	Weighted Average
1.4900		100.00% Pervious Area

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

Subcatchment PR9:



Summary for Subcatchment R1: LOT 1 ROOF

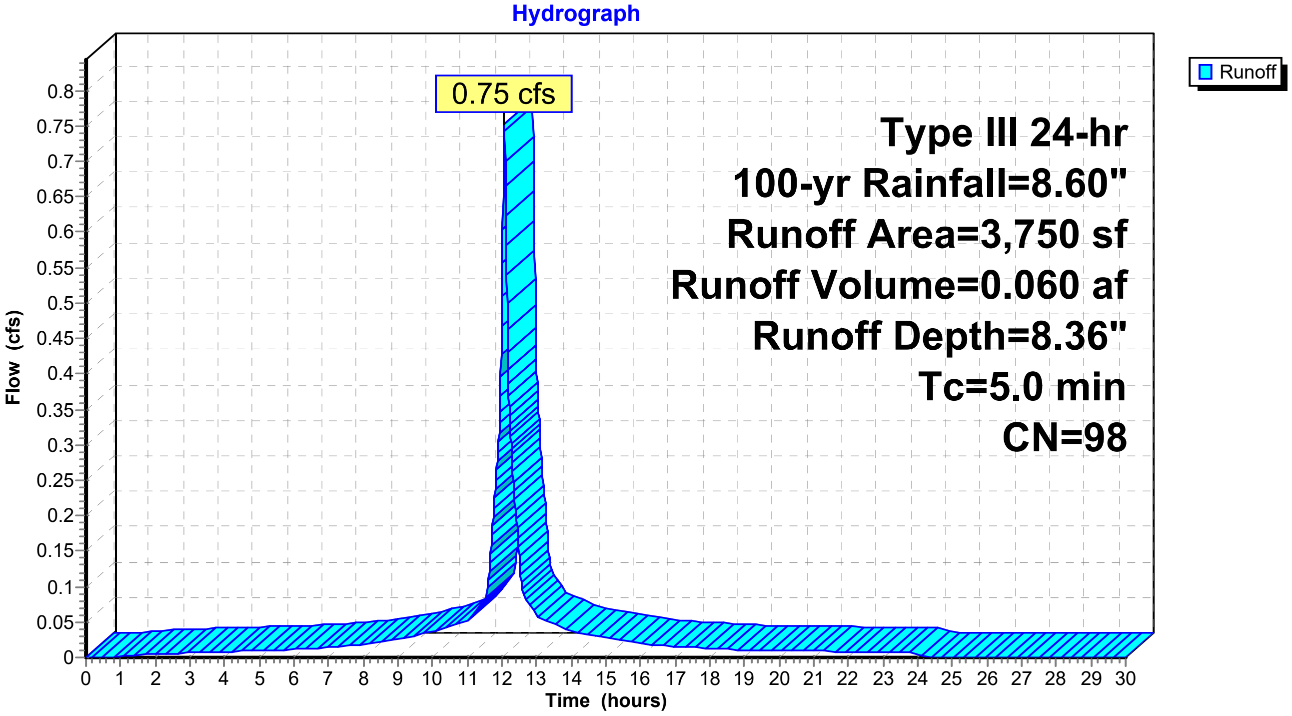
Runoff = 0.75 cfs @ 12.07 hrs, Volume= 0.060 af, Depth= 8.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.60"

	Area (sf)	CN	Description
*	3,750	98	ROOF AREA
	3,750		100.00% Impervious Area

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

Subcatchment R1: LOT 1 ROOF



Summary for Subcatchment R2: LOT 2 ROOF

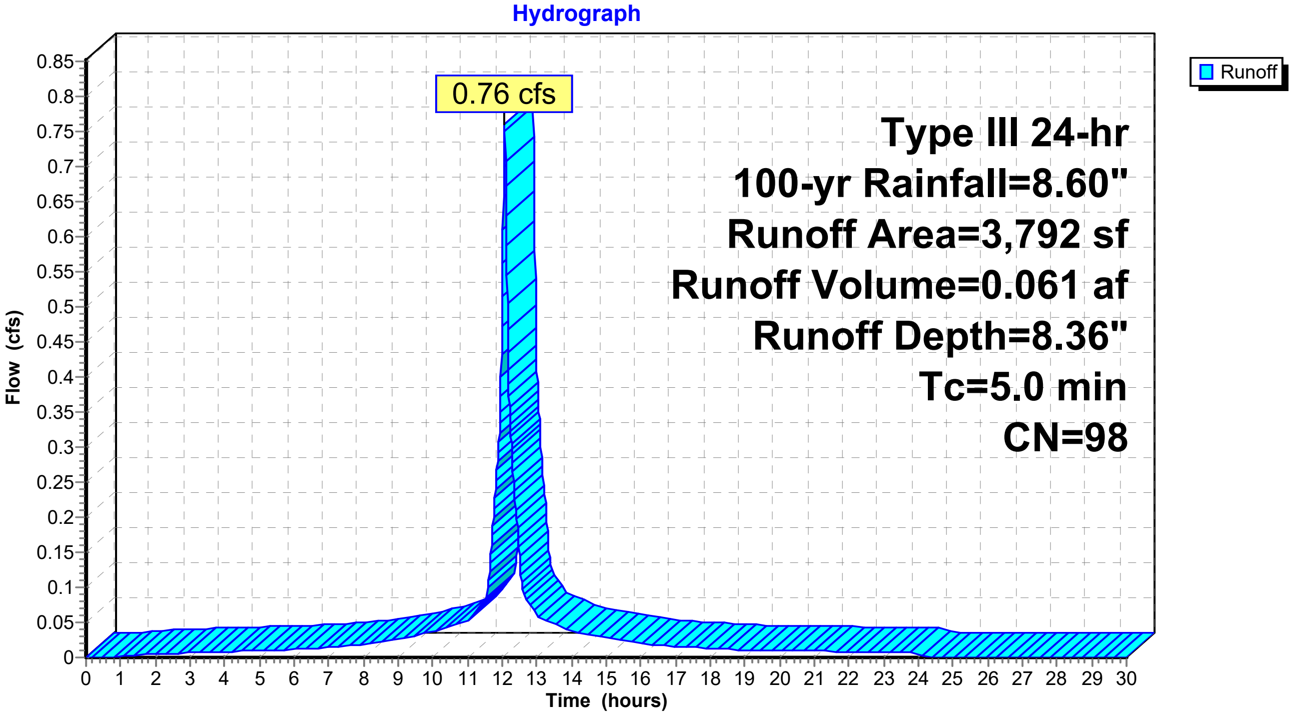
Runoff = 0.76 cfs @ 12.07 hrs, Volume= 0.061 af, Depth= 8.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.60"

	Area (sf)	CN	Description
*	3,792	98	ROOF AREA
	3,792		100.00% Impervious Area

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

Subcatchment R2: LOT 2 ROOF



Summary for Subcatchment R3: LOT 3 ROOF

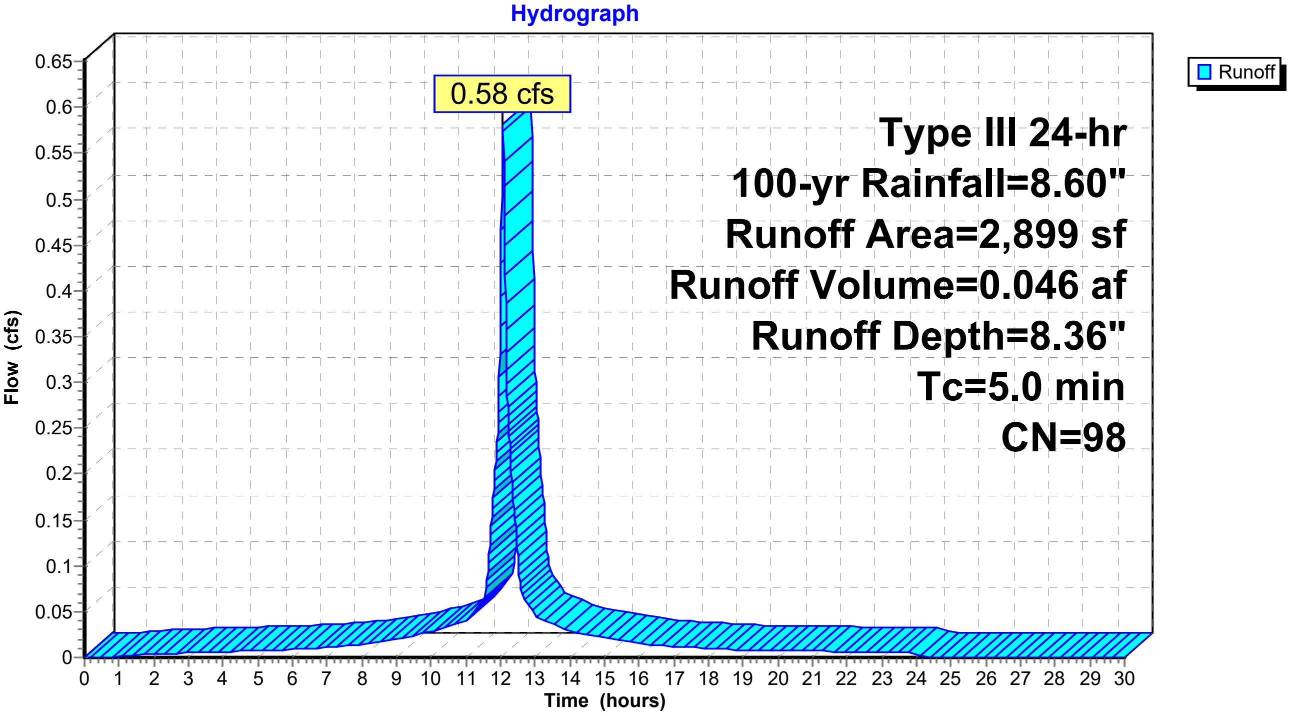
Runoff = 0.58 cfs @ 12.07 hrs, Volume= 0.046 af, Depth= 8.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.60"

	Area (sf)	CN	Description
*	2,899	98	ROOF AREA
	2,899		100.00% Impervious Area

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

Subcatchment R3: LOT 3 ROOF



Summary for Subcatchment R4: LOT 4 ROOF

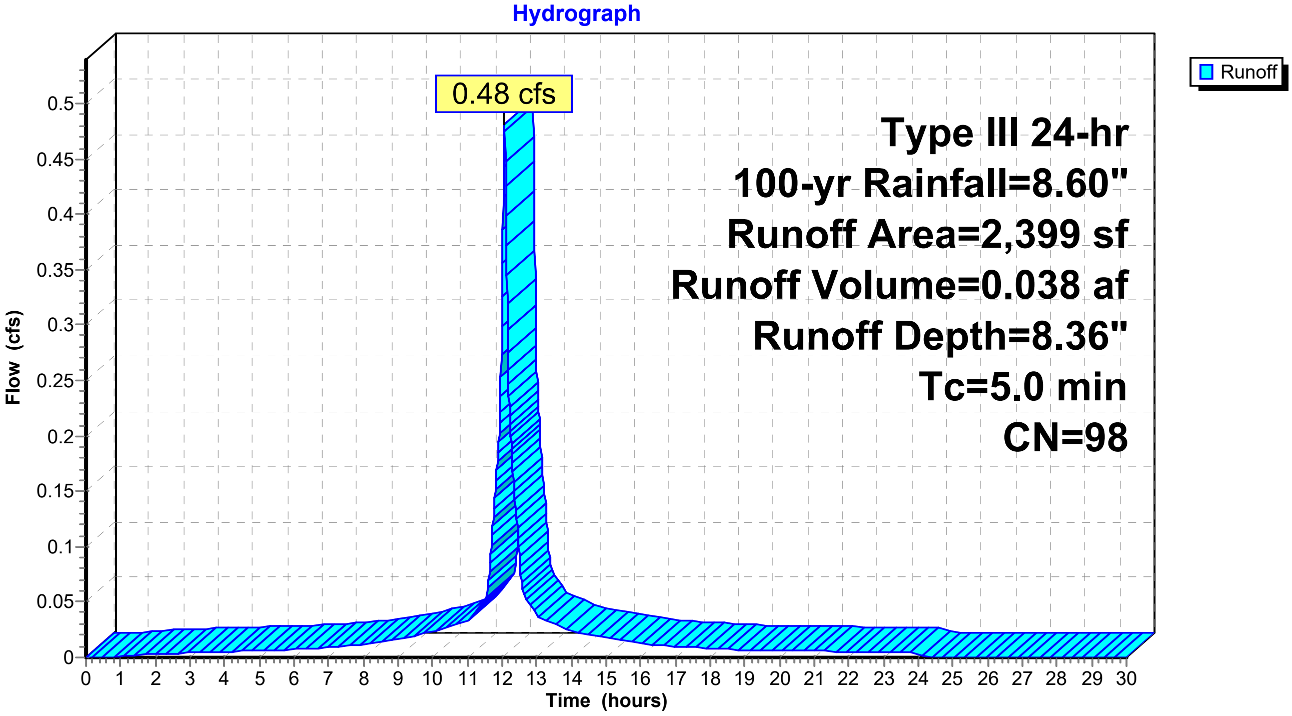
Runoff = 0.48 cfs @ 12.07 hrs, Volume= 0.038 af, Depth= 8.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.60"

	Area (sf)	CN	Description
*	2,399	98	ROOF AREA
	2,399		100.00% Impervious Area

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

Subcatchment R4: LOT 4 ROOF



Summary for Subcatchment R6/7: LOTS 6 & 7 (ROOFS)

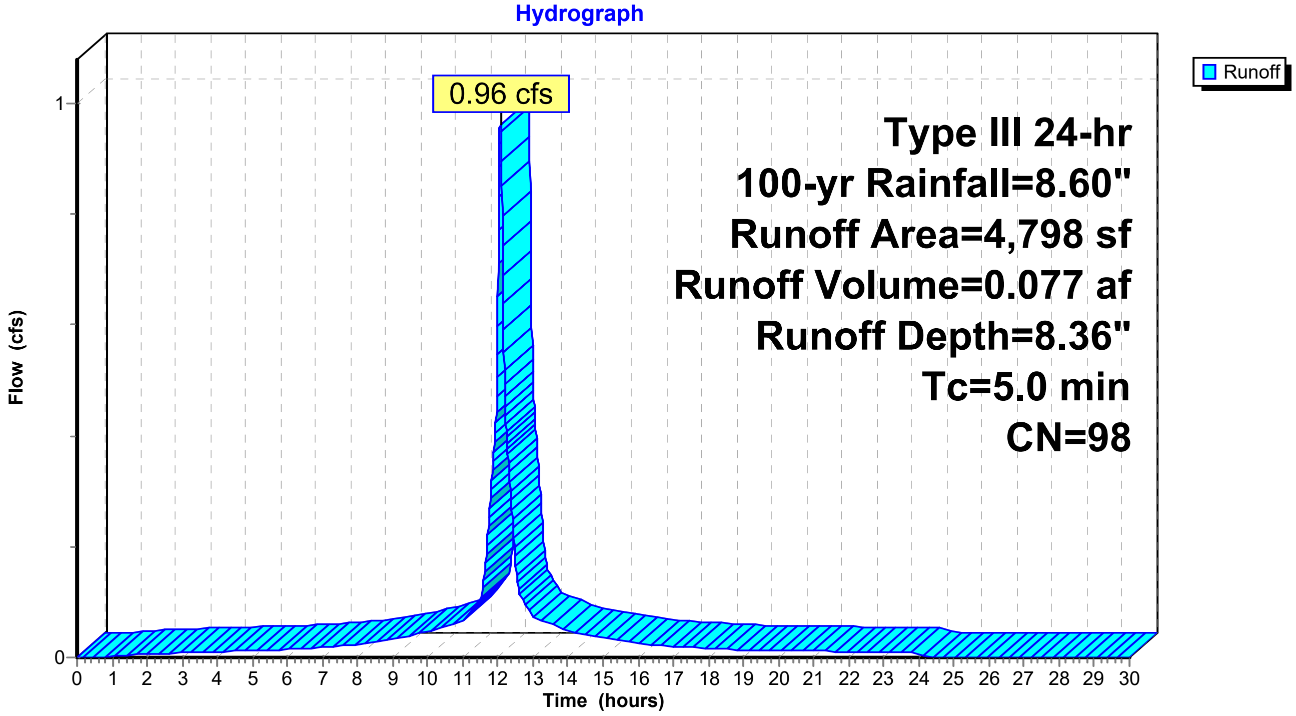
Runoff = 0.96 cfs @ 12.07 hrs, Volume= 0.077 af, Depth= 8.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.60"

	Area (sf)	CN	Description
*	4,798	98	ROOF AREA
	4,798		100.00% Impervious Area

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

Subcatchment R6/7: LOTS 6 & 7 (ROOFS)



Summary for Subcatchment R8: LOT 8 ROOF

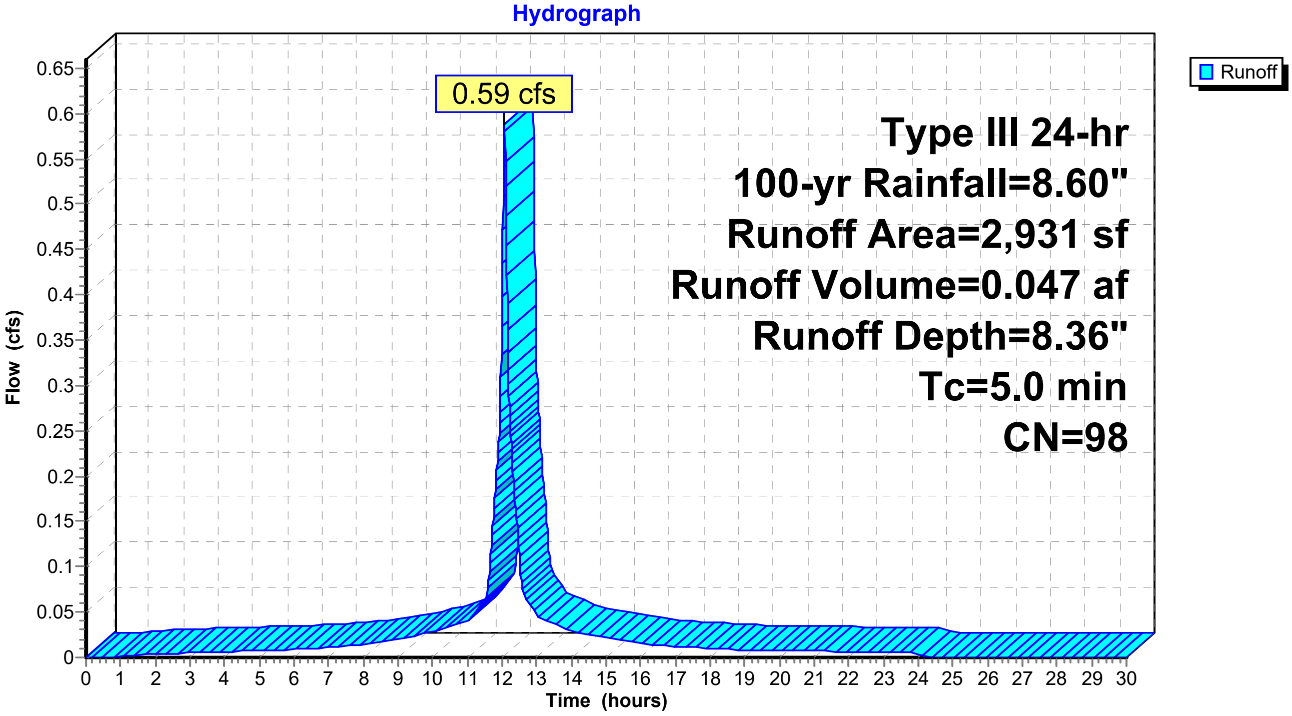
Runoff = 0.59 cfs @ 12.07 hrs, Volume= 0.047 af, Depth= 8.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.60"

	Area (sf)	CN	Description
*	2,931	98	ROOF AREA
	2,931		100.00% Impervious Area

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

Subcatchment R8: LOT 8 ROOF



Summary for Subcatchment R9: LOT 9 ROOF

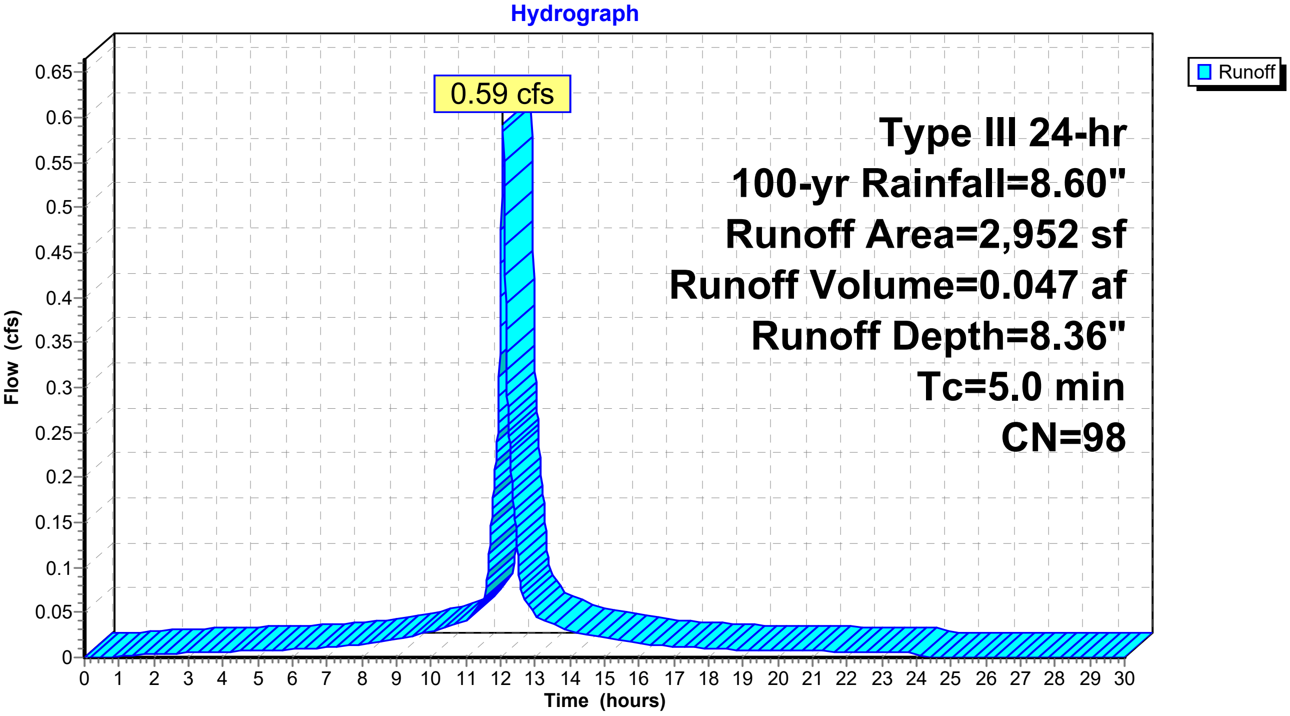
Runoff = 0.59 cfs @ 12.07 hrs, Volume= 0.047 af, Depth= 8.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type III 24-hr 100-yr Rainfall=8.60"

	Area (sf)	CN	Description
*	2,952	98	ROOF AREA
	2,952		100.00% Impervious Area

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

Subcatchment R9: LOT 9 ROOF

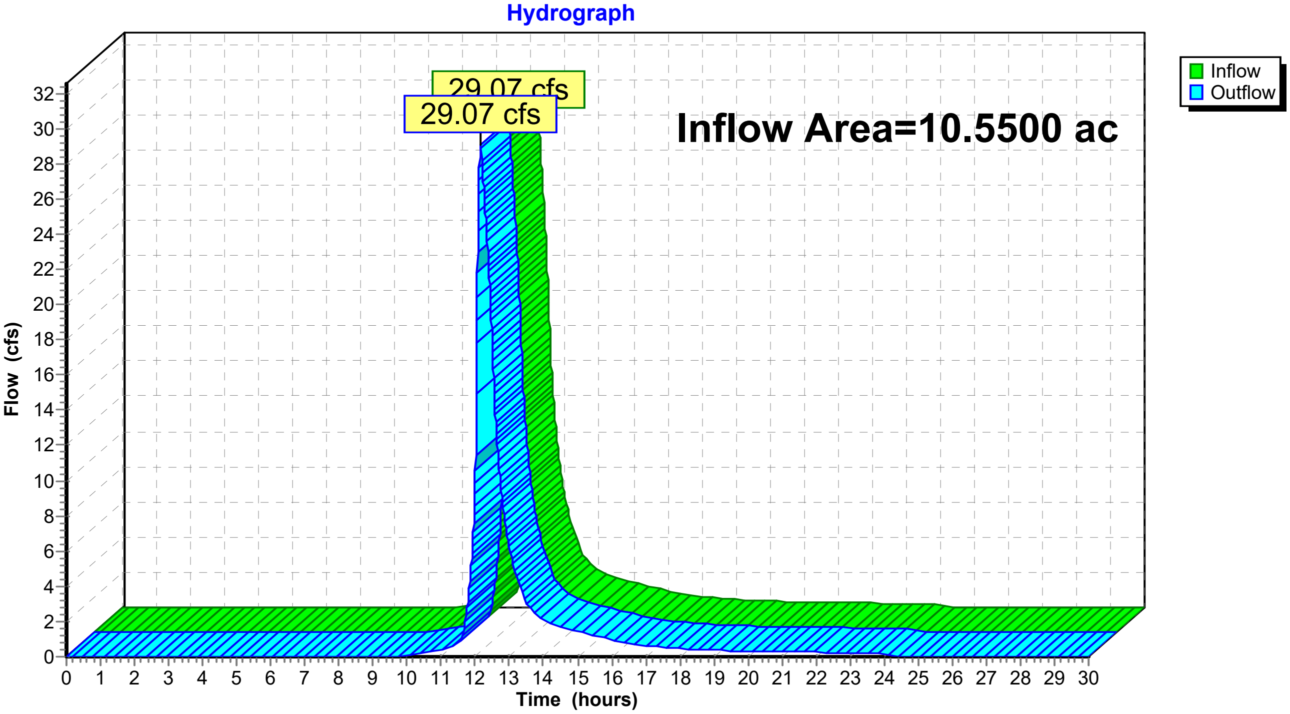


Summary for Reach BVW: WETLANDS

Inflow Area = 10.5500 ac, 19.72% Impervious, Inflow Depth = 2.69" for 100-yr event
Inflow = 29.07 cfs @ 12.16 hrs, Volume= 2.367 af
Outflow = 29.07 cfs @ 12.16 hrs, Volume= 2.367 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Reach BVW: WETLANDS

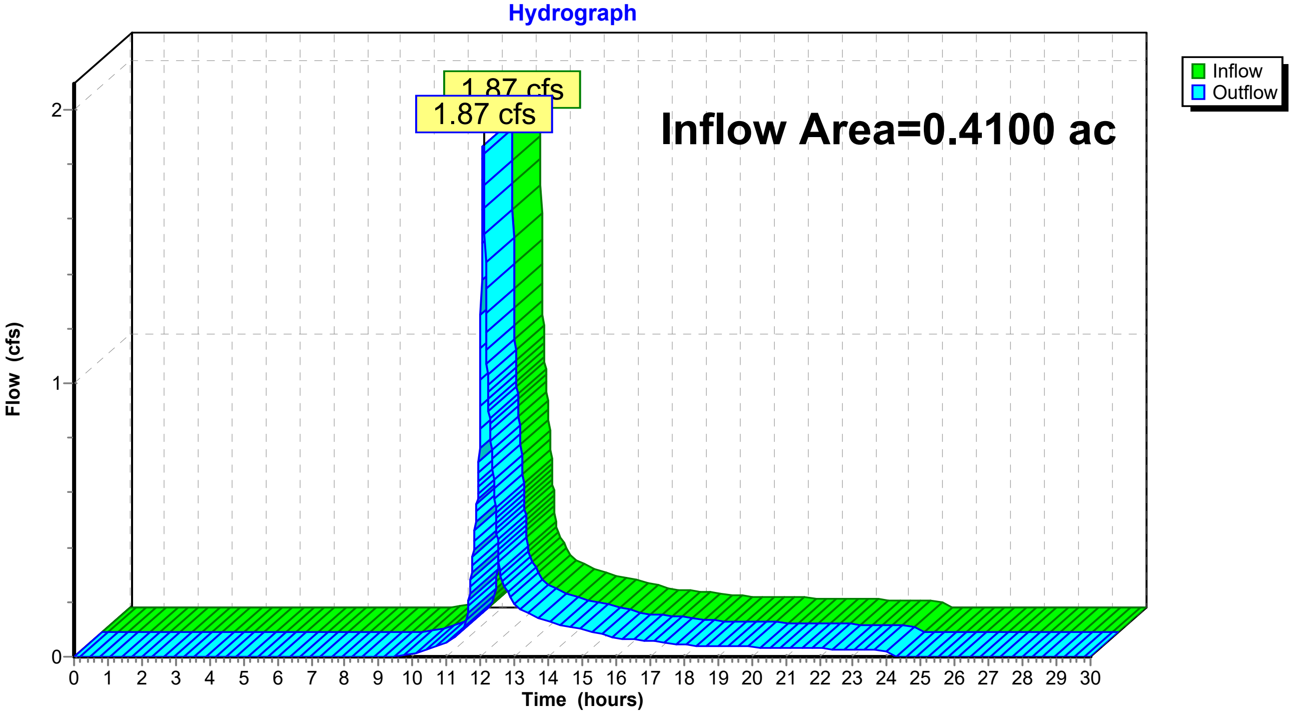


Summary for Reach RD: MAYNARD RD

Inflow Area = 0.4100 ac, 0.00% Impervious, Inflow Depth = 3.79" for 100-yr event
Inflow = 1.87 cfs @ 12.08 hrs, Volume= 0.129 af
Outflow = 1.87 cfs @ 12.08 hrs, Volume= 0.129 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Reach RD: MAYNARD RD

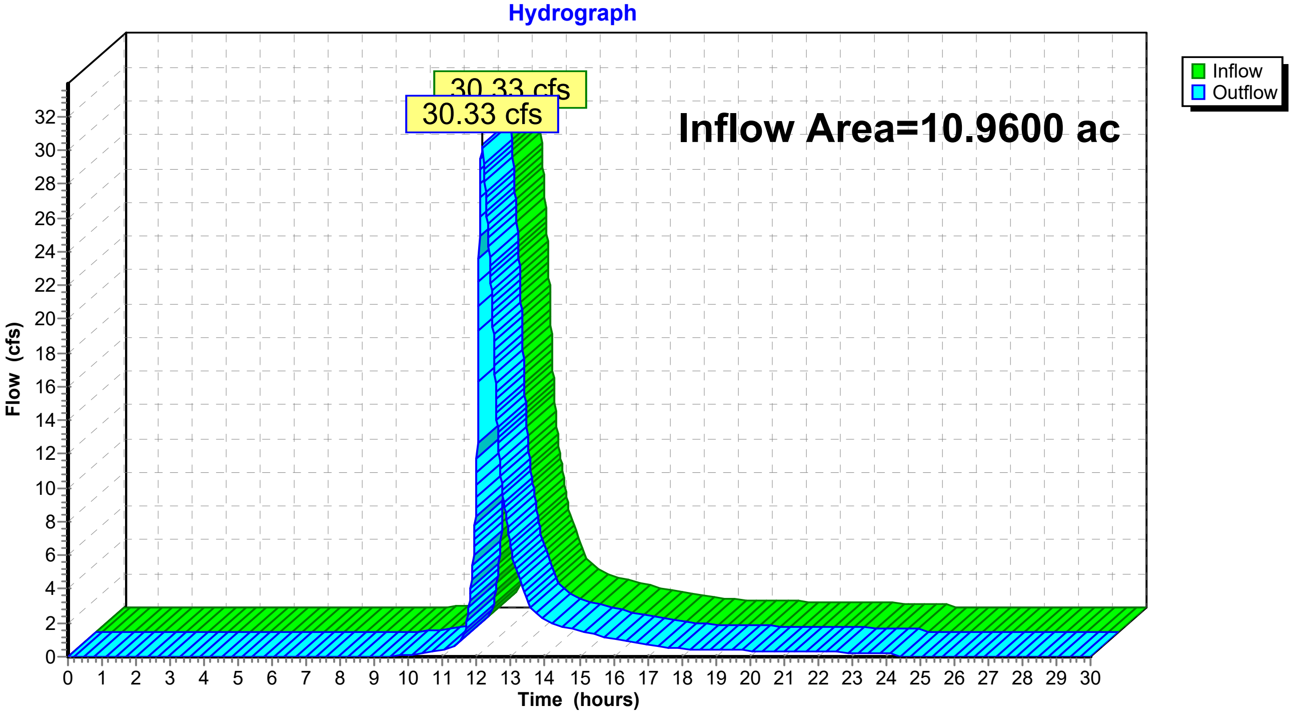


Summary for Reach T: TOTAL

Inflow Area = 10.9600 ac, 18.98% Impervious, Inflow Depth = 2.73" for 100-yr event
Inflow = 30.33 cfs @ 12.16 hrs, Volume= 2.497 af
Outflow = 30.33 cfs @ 12.16 hrs, Volume= 2.497 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2

Reach T: TOTAL



Summary for Pond CS1: CHAMBER SYSTEM #1

Inflow Area = 2.0478 ac, 16.49% Impervious, Inflow Depth = 3.13" for 100-yr event
Inflow = 6.54 cfs @ 12.10 hrs, Volume= 0.535 af
Outflow = 4.09 cfs @ 12.40 hrs, Volume= 0.535 af, Atten= 37%, Lag= 18.5 min
Discarded = 0.85 cfs @ 11.83 hrs, Volume= 0.284 af
Primary = 3.24 cfs @ 12.40 hrs, Volume= 0.251 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 179.43' @ 12.40 hrs Surf.Area= 4,456 sf Storage= 4,923 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 15.5 min (804.4 - 788.9)

Volume	Invert	Avail.Storage	Storage Description
#1	176.20'	578 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 1,444 cf Overall x 40.0% Voids
#2	176.70'	4,777 cf	**retain_it retain_it 3.0'** x 28 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf
#3	179.70'	44 cf	**2.00'D x 2.80'H Vertical Cone/Cylinder** x 5 -Impervious
		5,399 cf	Total Available Storage

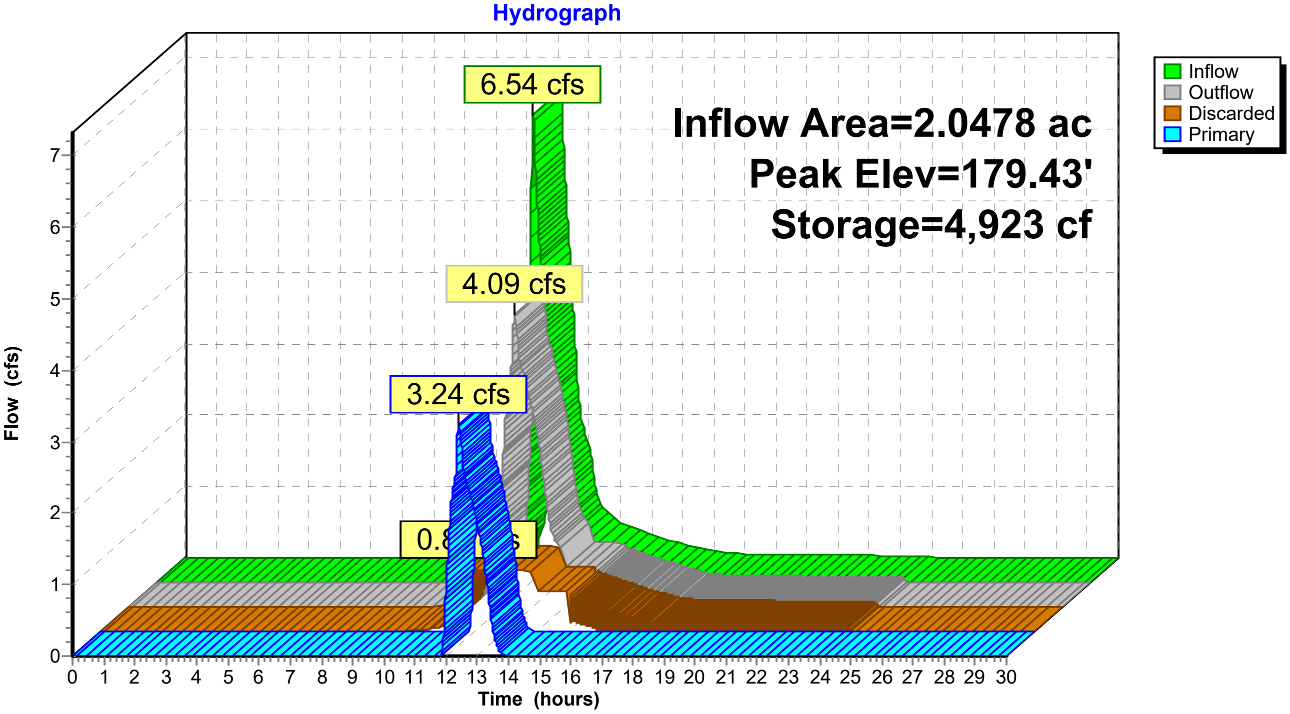
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
176.20	2,888	0	0
176.70	2,888	1,444	1,444

Device	Routing	Invert	Outlet Devices
#1	Discarded	176.20'	**8.270 in/hr Exfiltration over Surface area**
#2	Primary	176.70'	**8.0" Vert. Orifice/Grate** C= 0.600
#3	Primary	179.30'	**4.2' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 3.5' Crest Height

Discarded OutFlow Max=0.85 cfs @ 11.83 hrs HW=176.70' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.85 cfs)

Primary OutFlow Max=3.23 cfs @ 12.40 hrs HW=179.43' TW=0.00' (Dynamic Tailwater)
├─**2=Orifice/Grate** (Orifice Controls 2.60 cfs @ 7.45 fps)
└─**3=Sharp-Crested Rectangular Weir** (Weir Controls 0.63 cfs @ 1.18 fps)

Pond CS1: CHAMBER SYSTEM #1



Summary for Pond CS2: CHAMBER SYSTEM #2

Inflow Area = 1.5178 ac, 19.62% Impervious, Inflow Depth = 4.68" for 100-yr event
Inflow = 8.53 cfs @ 12.08 hrs, Volume= 0.591 af
Outflow = 4.57 cfs @ 12.15 hrs, Volume= 0.591 af, Atten= 46%, Lag= 4.2 min
Discarded = 0.21 cfs @ 10.71 hrs, Volume= 0.224 af
Primary = 4.36 cfs @ 12.15 hrs, Volume= 0.368 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 181.44' @ 12.21 hrs Surf.Area= 1,100 sf Storage= 3,357 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 11.5 min (833.3 - 821.8)

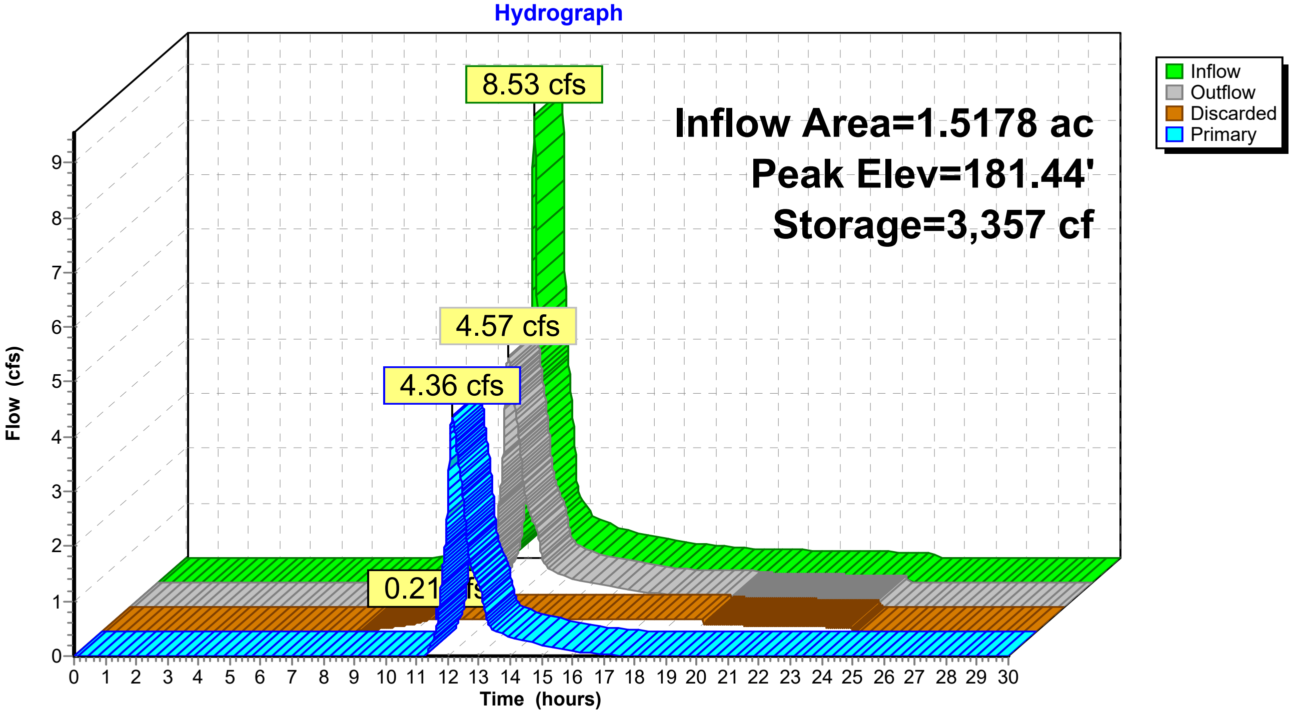
Volume	Invert	Avail.Storage	Storage Description
#1	177.00'	854 cf	**22.00'W x 50.00'L x 5.20'H Prismatoid** 5,720 cf Overall - 3,584 cf Embedded = 2,136 cf x 40.0% Voids
#2	177.50'	2,650 cf	**retain_it retain_it 4.0'** x 12 Inside #1 Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf 2 Rows adjusted for 120.8 cf perimeter wall
		3,505 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	177.50'	**10.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	177.00'	**8.270 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.21 cfs @ 10.71 hrs HW=177.05' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=4.36 cfs @ 12.15 hrs HW=181.26' TW=178.51' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Orifice Controls 4.36 cfs @ 7.99 fps)

Pond CS2: CHAMBER SYSTEM #2



Summary for Pond CS3: CHAMBER SYSTEM #3

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Inflow Area =      1.1800 ac,  57.63% Impervious,  Inflow Depth =   6.43"    for  100-yr event
Inflow      =     8.97 cfs @   12.07 hrs,  Volume=          0.632 af
Outflow     =     5.50 cfs @   12.16 hrs,  Volume=          0.632 af,  Atten= 39%,  Lag= 5.5 min
Discarded   =     0.23 cfs @   10.91 hrs,  Volume=          0.280 af
Primary     =     5.28 cfs @   12.16 hrs,  Volume=          0.352 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 175.46' @ 12.16 hrs   Surf.Area= 4,096 sf   Storage= 6,766 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 65.4 min ( 860.0 - 794.6 )

Volume        Invert    Avail.Storage   Storage Description
   #1        171.00'         1,034 cf   34.00'W x 76.00'L x 1.00'H Prismatoid
                                        2,584 cf Overall  x 40.0% Voids
   #2        172.00'           339 cf   2.00'W x 212.00'L x 2.00'H Prismatoid-Impervious
                                        848 cf Overall  x 40.0% Voids
   #3        172.00'         5,274 cf   retain_it retain_it  3.5' x 27
                                        Inside= 84.0"W x 42.0"H => 25.10 sf x 8.00'L = 200.8 cf
                                        Outside= 96.0"W x 50.0"H => 33.33 sf x 8.00'L = 266.7 cf
                                        3 Rows adjusted for 147.4 cf perimeter wall
   #4        172.00'           177 cf   15.0"  Round Pipe Storage-Impervious
                                        L= 144.0'  S= 0.0050 '/'
                             6,823 cf   Total Available Storage

Device   Routing          Invert   Outlet Devices
   #1    Primary         172.50'   4.0" Vert. Orifice/Grate   C= 0.600
   #2    Primary         173.50'   12.0" Vert. Orifice/Grate   C= 0.600
   #3    Discarded       171.00'   2.410 in/hr Exfiltration over Horizontal area

Discarded OutFlow  Max=0.23 cfs @ 10.91 hrs  HW=172.01'   (Free Discharge)
└─3=Exfiltration  (Exfiltration Controls 0.23 cfs)

Primary OutFlow  Max=5.27 cfs @ 12.16 hrs  HW=175.46'  TW=0.00'   (Dynamic Tailwater)
├─1=Orifice/Grate  (Orifice Controls 0.70 cfs @ 8.05 fps)
└─2=Orifice/Grate  (Orifice Controls 4.57 cfs @ 5.82 fps)
```
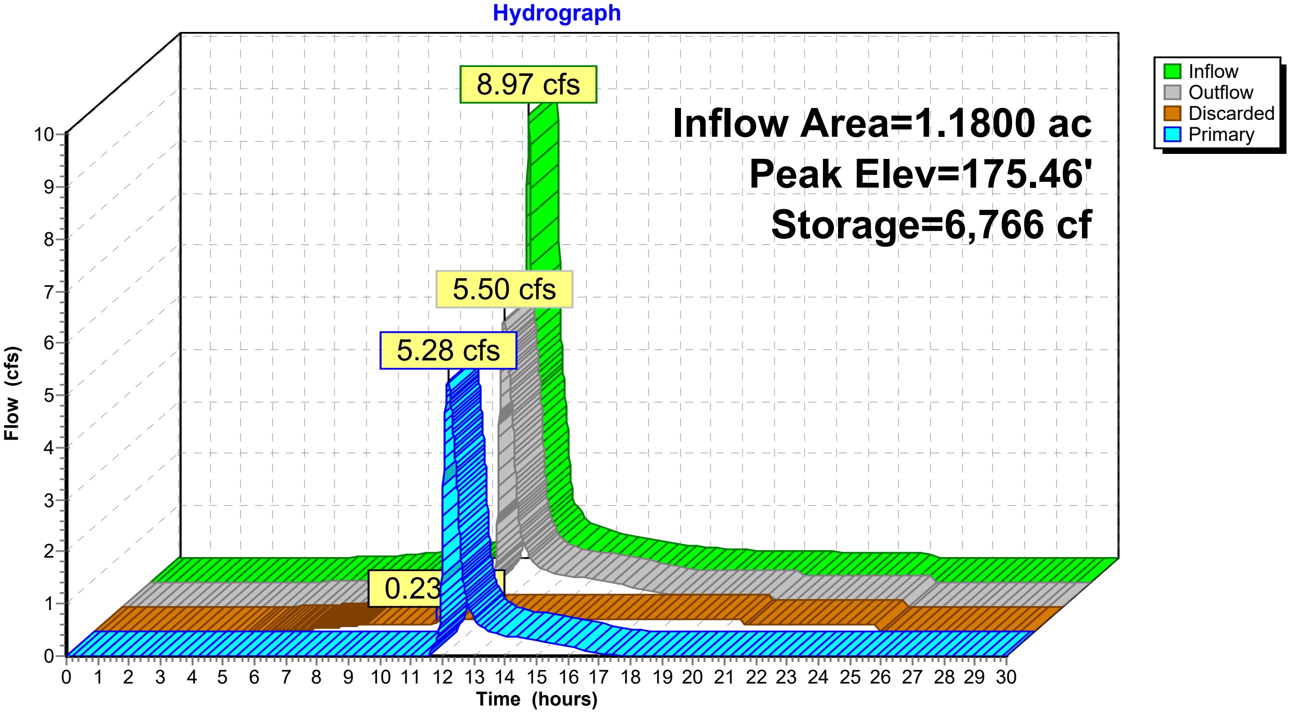

Pond CS3: CHAMBER SYSTEM #3



Summary for Pond CS4: CHAMBER SYSTEM #4

Inflow Area = 0.2000 ac, 65.00% Impervious, Inflow Depth = 6.79" for 100-yr event
Inflow = 1.58 cfs @ 12.07 hrs, Volume= 0.113 af
Outflow = 0.35 cfs @ 12.47 hrs, Volume= 0.113 af, Atten= 78%, Lag= 24.0 min
Discarded = 0.05 cfs @ 10.42 hrs, Volume= 0.093 af
Primary = 0.29 cfs @ 12.47 hrs, Volume= 0.020 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 176.85' @ 12.47 hrs Surf.Area= 924 sf Storage= 2,066 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 281.6 min (1,068.7 - 787.1)

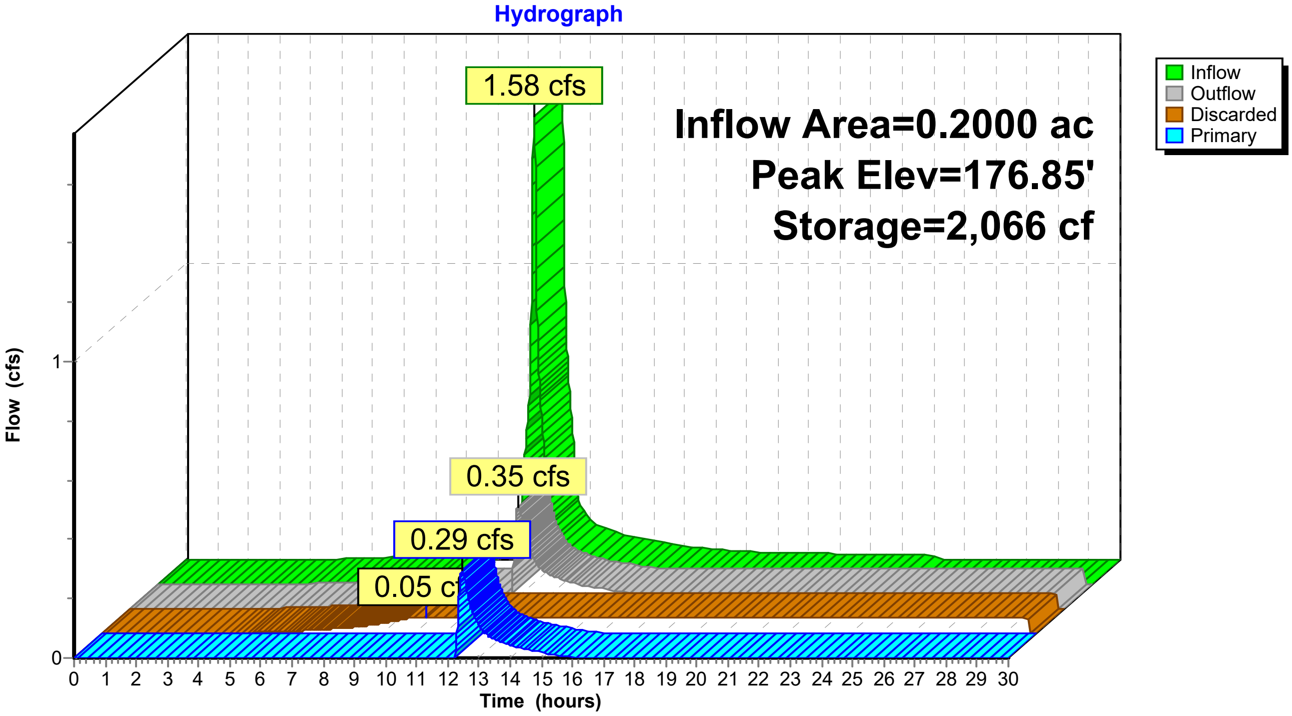
Volume	Invert	Avail.Storage	Storage Description
#1	173.50'	614 cf	**22.00'W x 42.00'L x 4.20'H Prismatoid** 3,881 cf Overall - 2,347 cf Embedded = 1,534 cf x 40.0% Voids
#2	174.00'	1,640 cf	**retain_it retain_it 3.0'** x 10 Inside #1 Inside= 84.0"W x 36.0"H => 21.33 sf x 8.00'L = 170.6 cf Outside= 96.0"W x 44.0"H => 29.33 sf x 8.00'L = 234.7 cf 2 Rows adjusted for 66.1 cf perimeter wall
		2,254 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	176.50'	**6.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	173.50'	**2.410 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.05 cfs @ 10.42 hrs HW=173.54' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.29 cfs @ 12.47 hrs HW=176.85' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 0.29 cfs @ 2.01 fps)

Pond CS4: CHAMBER SYSTEM #4



Summary for Pond CS5: CHAMBER SYSTEM #5

Inflow Area = 1.8731 ac, 33.80% Impervious, Inflow Depth = 4.91" for 100-yr event
Inflow = 11.05 cfs @ 12.07 hrs, Volume= 0.766 af
Outflow = 5.39 cfs @ 12.22 hrs, Volume= 0.766 af, Atten= 51%, Lag= 8.8 min
Discarded = 0.61 cfs @ 11.34 hrs, Volume= 0.417 af
Primary = 4.78 cfs @ 12.22 hrs, Volume= 0.349 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 182.73' @ 12.22 hrs Surf.Area= 3,164 sf Storage= 5,379 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 11.1 min (825.5 - 814.4)

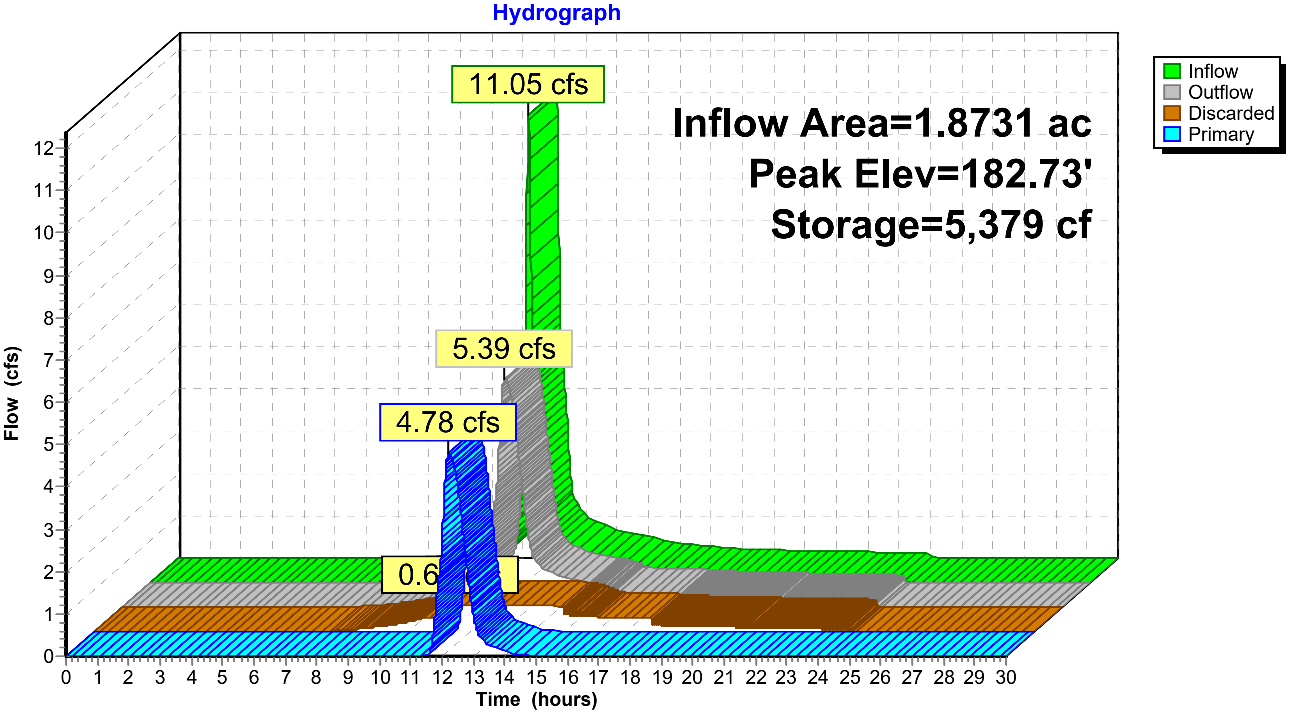
Volume	Invert	Avail.Storage	Storage Description
#1	178.50'	364 cf	**26.00'W x 70.00'L x 0.50'H Prismatoid** 910 cf Overall x 40.0% Voids
#2	179.00'	5,376 cf	**retain_it retain_it 4.0'** x 24 Inside= 84.0"W x 48.0"H => 28.87 sf x 8.00'L = 230.9 cf Outside= 96.0"W x 56.0"H => 37.33 sf x 8.00'L = 298.7 cf 3 Rows adjusted for 166.1 cf perimeter wall
		5,740 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	179.00'	**10.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	178.50'	**8.270 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.61 cfs @ 11.34 hrs HW=179.01' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.61 cfs)

Primary OutFlow Max=4.78 cfs @ 12.22 hrs HW=182.73' TW=0.00' (Dynamic Tailwater)
└─**1=Orifice/Grate** (Orifice Controls 4.78 cfs @ 8.77 fps)

Pond CS5: CHAMBER SYSTEM #5



Summary for Pond CS6: CHAMBER SYSTEM #6

```
Inflow Area =          1.5573 ac,   4.32% Impervious,  Inflow Depth =   3.99"    for  100-yr event
Inflow      =         7.38 cfs @   12.08 hrs,  Volume=            0.517 af
Outflow     =         6.95 cfs @   12.10 hrs,  Volume=            0.501 af,  Atten= 6%,  Lag= 1.7 min
Discarded  =          0.12 cfs @   11.01 hrs,  Volume=            0.199 af
Primary     =         6.83 cfs @   12.10 hrs,  Volume=            0.302 af
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 171.70' @ 12.10 hrs Surf.Area= 2,100 sf Storage= 3,777 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 114.5 min (946.7 - 832.2)

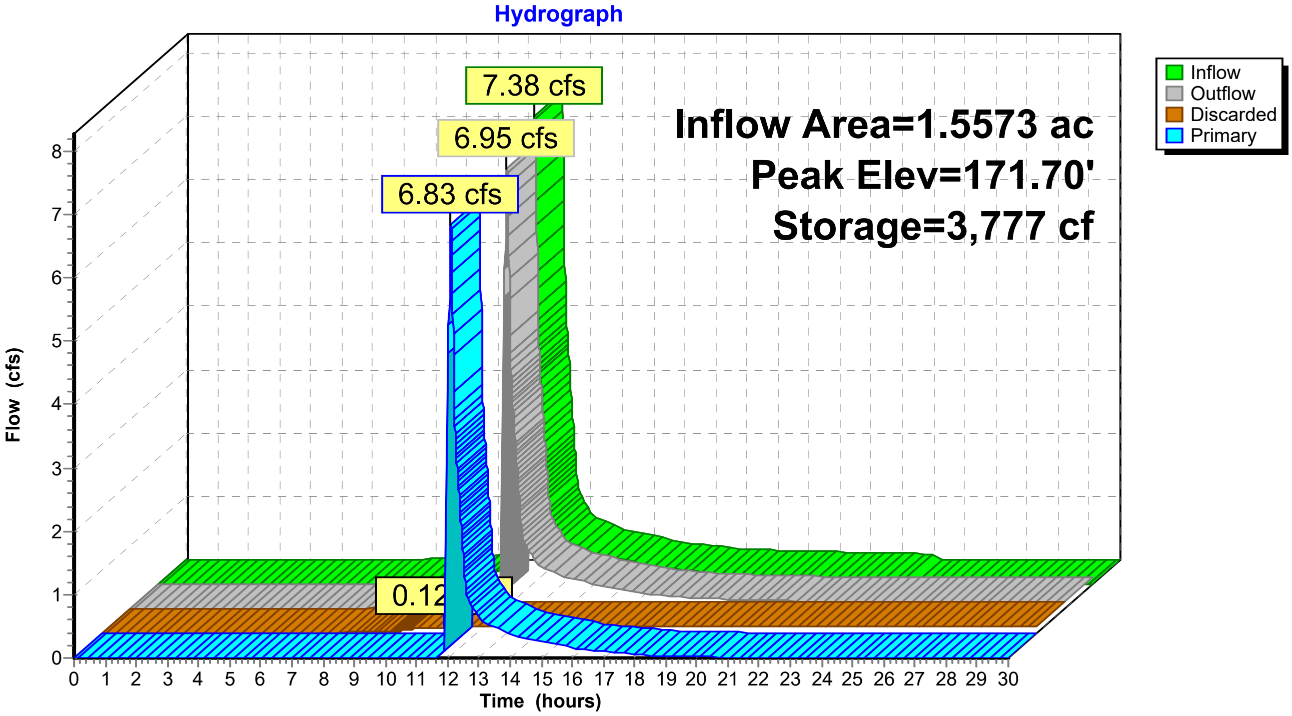
Volume	Invert	Avail.Storage	Storage Description
#1	167.00'	252 cf	**30.00'W x 42.00'L x 0.50'H Prismatoid** 630 cf Overall x 40.0% Voids
#2	167.50'	3,773 cf	**retain_it retain_it 4.5'** x 15 Inside= 84.0"W x 54.0"H => 32.64 sf x 8.00'L = 261.1 cf Outside= 96.0"W x 62.0"H => 41.33 sf x 8.00'L = 330.7 cf 3 Rows adjusted for 143.5 cf perimeter wall
		4,025 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	171.20'	**2.0" x 2.0" Horiz. Orifice/Grate X 6.00 columns** X 12 rows C= 0.600 in 48.0" x 24.0" Grate (25% open area) Limited to weir flow at low heads
#2	Discarded	167.00'	**2.410 in/hr Exfiltration over Horizontal area**

Discarded OutFlow Max=0.12 cfs @ 11.01 hrs HW=167.50' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=6.82 cfs @ 12.10 hrs HW=171.70' TW=0.00' (Dynamic Tailwater)
↑—**1=Orifice/Grate** (Orifice Controls 6.82 cfs @ 3.41 fps)

Pond CS6: CHAMBER SYSTEM #6



Summary for Pond DW2: LOT 2 DW

```
Inflow Area =      0.0871 ac,100.00% Impervious,  Inflow Depth =   8.36"    for  100-yr event
Inflow      =      0.76 cfs @  12.07 hrs,  Volume=          0.061 af
Outflow     =      0.04 cfs @  12.29 hrs,  Volume=          0.061 af,  Atten= 94%,  Lag= 13.2 min
Discarded   =      0.04 cfs @  12.29 hrs,  Volume=          0.061 af
Primary     =      0.00 cfs @   0.00 hrs,  Volume=          0.000 af
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 185.30' @ 13.68 hrs Surf.Area= 792 sf Storage= 1,060 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 182.2 min (921.6 - 739.4)

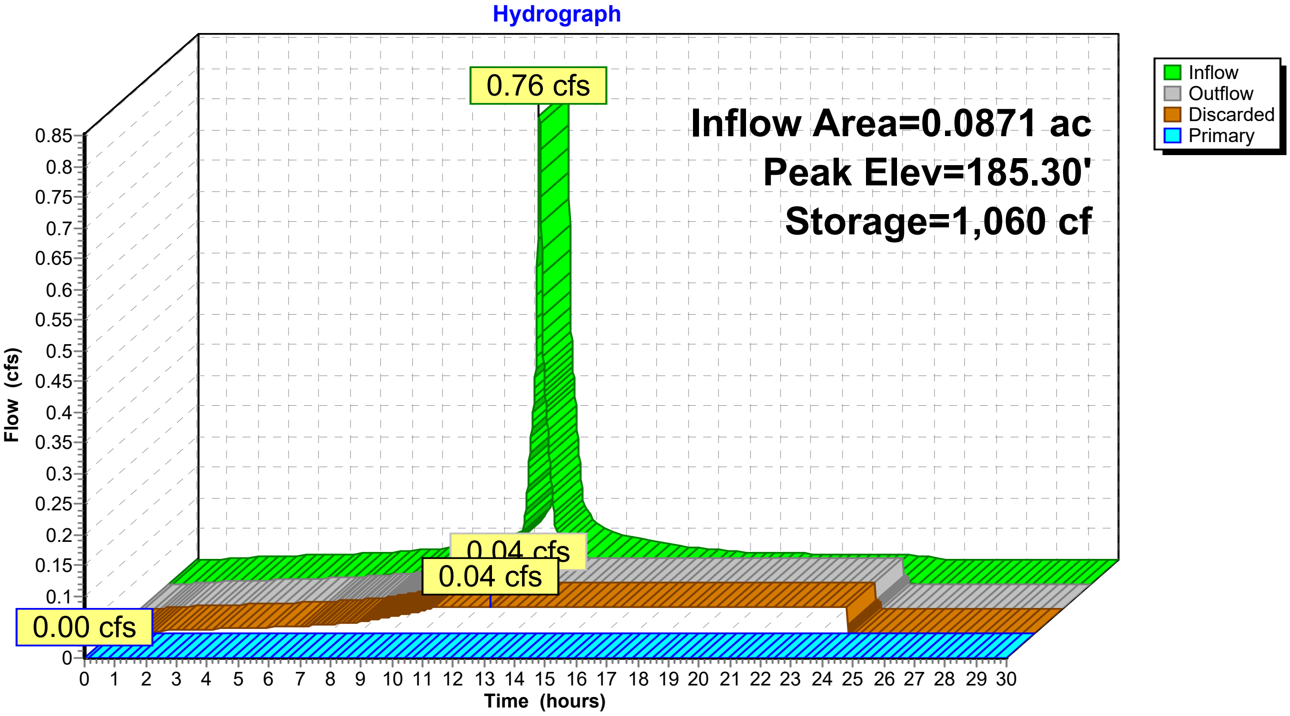
Volume	Invert	Avail.Storage	Storage Description
#1	183.00'	602 cf	**18.00'W x 44.00'L x 2.60'H Prismatoid** 2,059 cf Overall - 553 cf Embedded = 1,506 cf x 40.0% Voids
#2	183.50'	553 cf	**Cultec R-150XLHD** x 20 Inside #1 Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap Row Length Adjustment= +0.75' x 2.65 sf x 5 rows
#3	184.70'	1 cf	**0.33'D x 6.30'H Vertical Cone/Cylinder** x 2
		1,157 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	183.00'	**2.410 in/hr Exfiltration over Horizontal area**
#2	Primary	192.00'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600

Discarded OutFlow Max=0.04 cfs @ 12.29 hrs HW=184.71' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=183.00' TW=178.50' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond DW2: LOT 2 DW



Summary for Pond DW3: LOT 3 DW

Inflow Area = 0.0666 ac,100.00% Impervious, Inflow Depth = 8.36" for 100-yr event
Inflow = 0.58 cfs @ 12.07 hrs, Volume= 0.046 af
Outflow = 0.06 cfs @ 12.27 hrs, Volume= 0.046 af, Atten= 89%, Lag= 12.0 min
Discarded = 0.06 cfs @ 12.27 hrs, Volume= 0.046 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 176.29' @ 12.66 hrs Surf.Area= 338 sf Storage= 605 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 56.3 min (795.7 - 739.4)

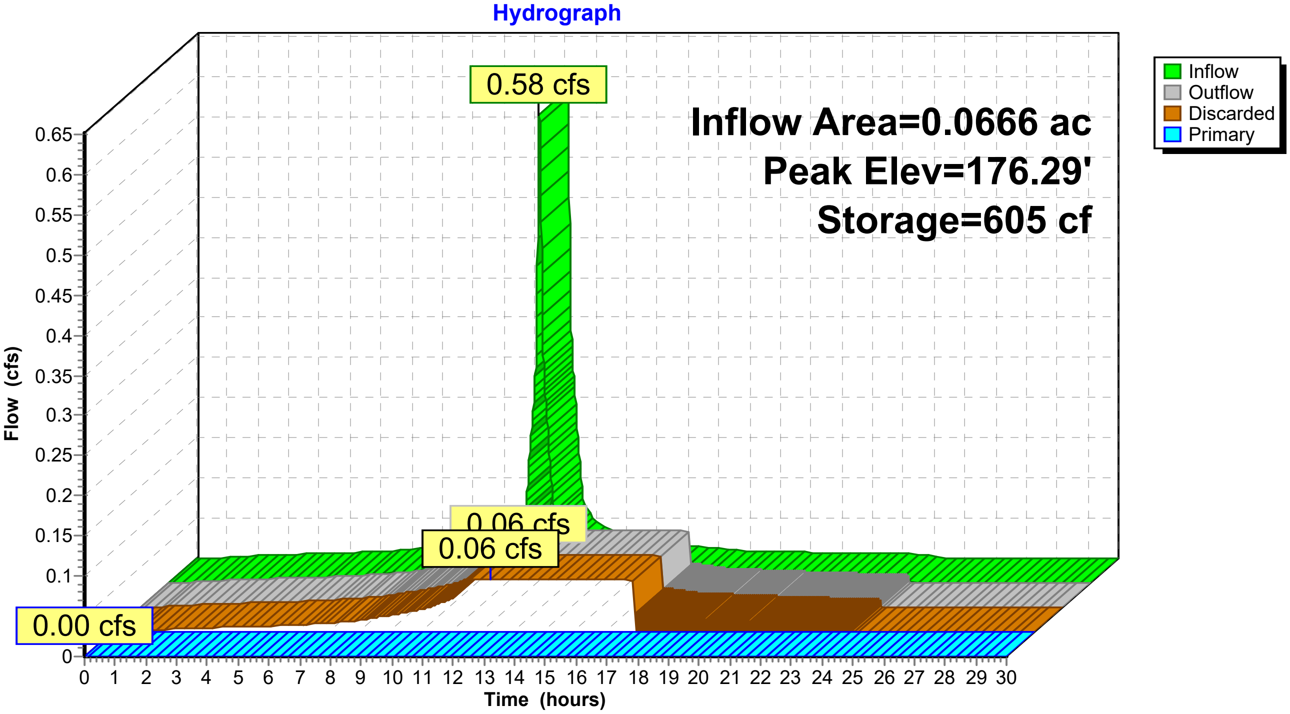
Volume	Invert	Avail.Storage	Storage Description
#1	173.00'	339 cf	**13.00'W x 26.00'L x 3.30'H Prismatoid** 1,115 cf Overall - 267 cf Embedded = 848 cf x 40.0% Voids
#2	173.50'	267 cf	**Cultec R-280HD** x 6 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 2 rows
#3	175.60'	1 cf	**0.33'D x 4.30'H Vertical Cone/Cylinder** x 2
		607 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	173.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	179.00'	**4.0" Vert. Orifice/Grate X 2.00** C= 0.600

Discarded OutFlow Max=0.06 cfs @ 12.27 hrs HW=175.61' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=173.00' TW=0.00' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond DW3: LOT 3 DW



Summary for Pond DW4: LOT 4 DW

Inflow Area = 0.0551 ac,100.00% Impervious, Inflow Depth = 8.36" for 100-yr event
Inflow = 0.48 cfs @ 12.07 hrs, Volume= 0.038 af
Outflow = 0.05 cfs @ 12.40 hrs, Volume= 0.038 af, Atten= 89%, Lag= 19.8 min
Discarded = 0.05 cfs @ 12.40 hrs, Volume= 0.038 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 169.43' @ 12.64 hrs Surf.Area= 286 sf Storage= 496 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 54.0 min (793.4 - 739.4)

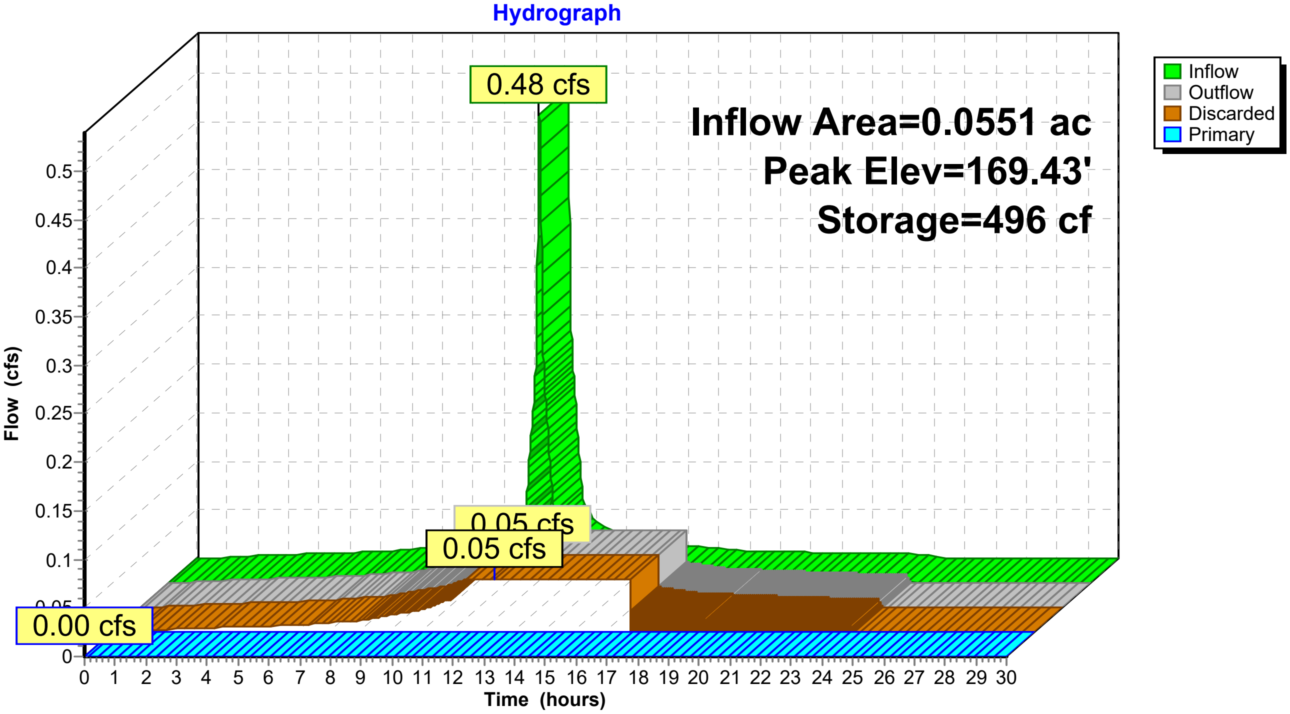
Volume	Invert	Avail.Storage	Storage Description
#1	166.50'	271 cf	**11.00'W x 26.00'L x 3.30'H Prismatoid** 944 cf Overall - 267 cf Embedded = 677 cf x 40.0% Voids
#2	167.00'	267 cf	**Cultec R-280HD** x 6 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 2 rows
#3	169.20'	0 cf	**0.33'D x 2.50'H Vertical Cone/Cylinder** x 2
		538 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	166.50'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	173.00'	**4.0" Vert. Orifice/Grate X 12.00** C= 0.600

Discarded OutFlow Max=0.05 cfs @ 12.40 hrs HW=169.21' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=166.50' TW=0.00' (Dynamic Tailwater)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond DW4: LOT 4 DW



Summary for Pond DW6/7: LOTS 6 & 7

Inflow Area = 0.1101 ac,100.00% Impervious, Inflow Depth = 8.36" for 100-yr event
Inflow = 0.96 cfs @ 12.07 hrs, Volume= 0.077 af
Outflow = 0.11 cfs @ 12.02 hrs, Volume= 0.077 af, Atten= 89%, Lag= 0.0 min
Discarded = 0.11 cfs @ 12.02 hrs, Volume= 0.077 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 102.96' @ 12.64 hrs Surf.Area= 572 sf Storage= 992 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 54.0 min (793.4 - 739.4)

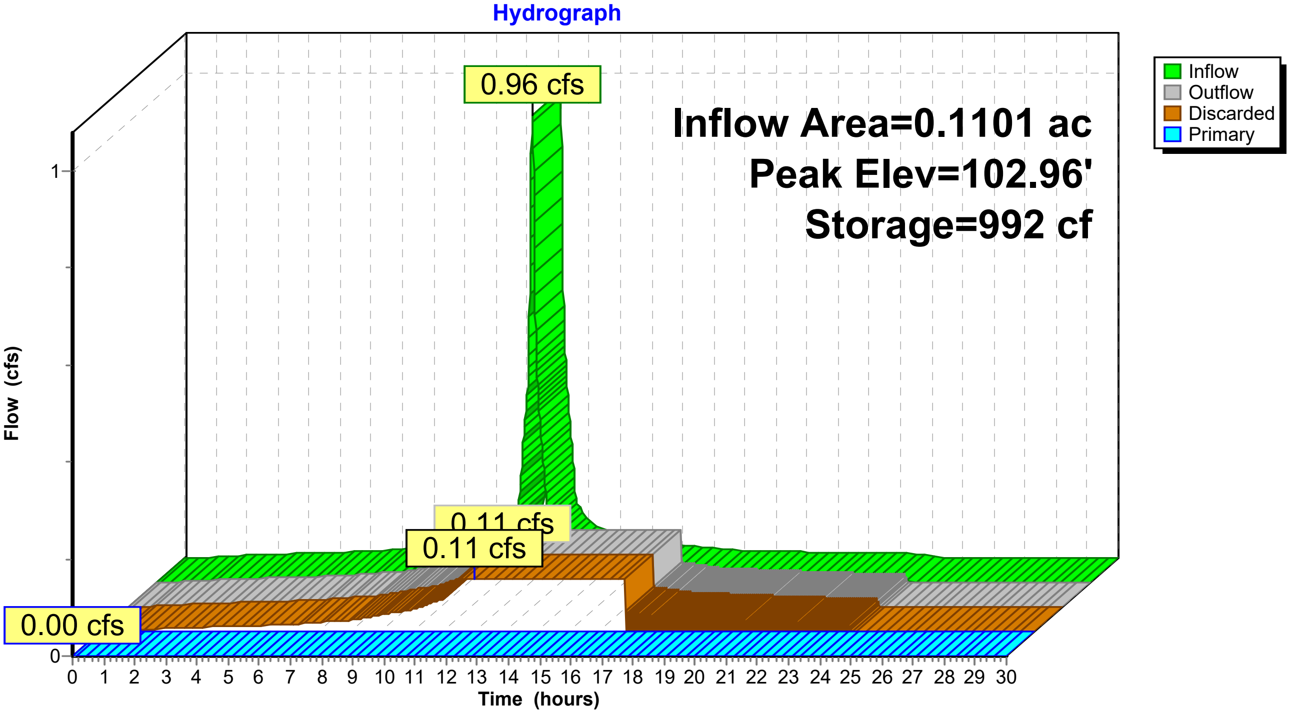
Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	546 cf	**11.00'W x 26.00'L x 3.30'H Prismatoid** x 2 1,888 cf Overall - 522 cf Embedded = 1,365 cf x 40.0% Voids
#2	100.50'	522 cf	**Cultec R-280HD** x 12 Inside #1 Effective Size= 46.9"W x 26.0"H => 6.07 sf x 7.00'L = 42.5 cf Overall Size= 47.0"W x 26.5"H x 8.00'L with 1.00' Overlap Row Length Adjustment= +1.00' x 6.07 sf x 2 rows
#3	101.00'	0 cf	**0.33'D x 2.00'H Vertical Cone/Cylinder** x 2
		1,069 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	**8.270 in/hr Exfiltration over Horizontal area**
#2	Primary	176.00'	**4.0" Vert. Orifice/Grate X 12.00** C= 0.600

Discarded OutFlow Max=0.11 cfs @ 12.02 hrs HW=101.03' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.11 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=100.00' TW=0.00' (Dynamic Tailwater)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond DW6/7: LOTS 6 & 7

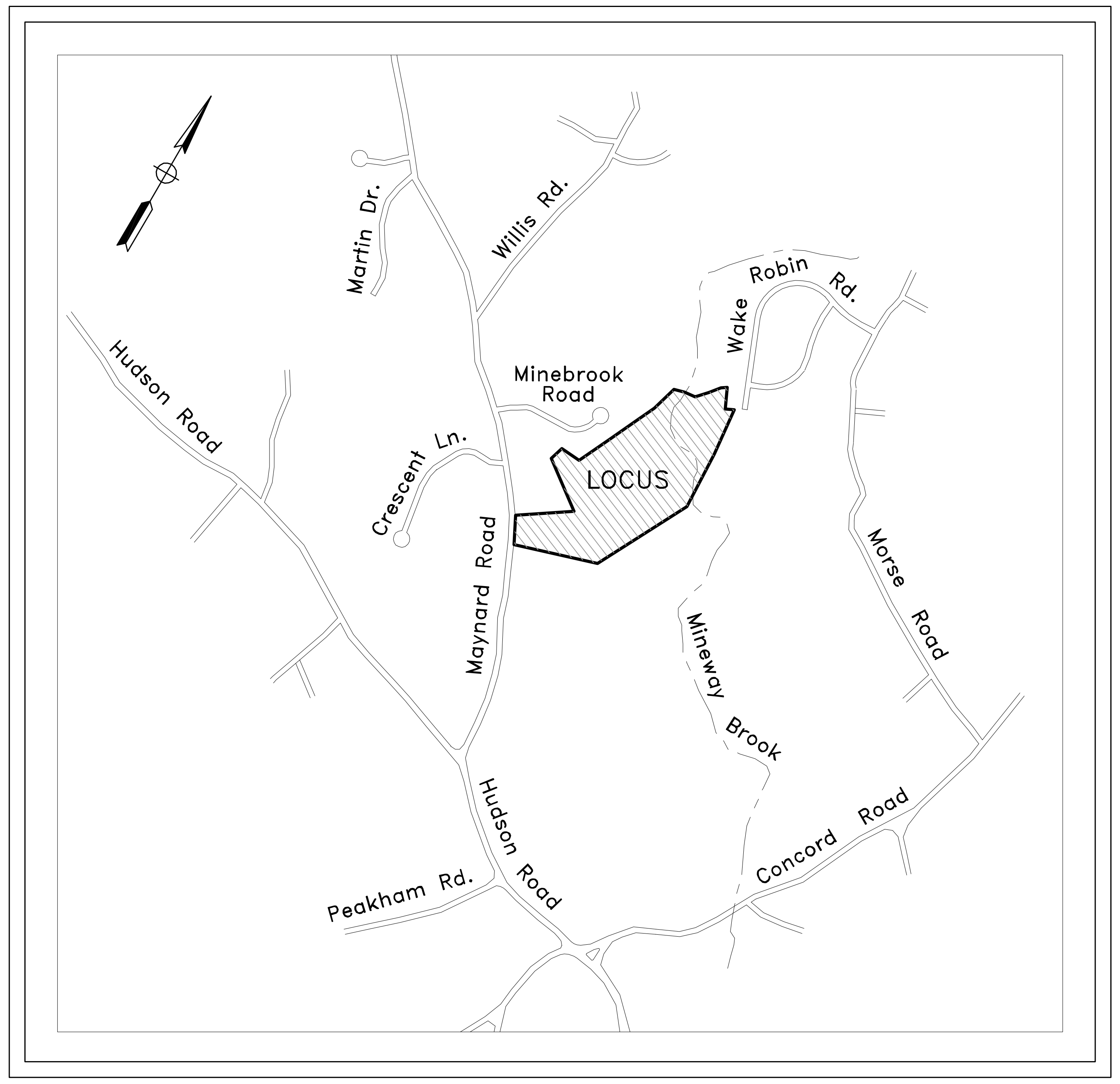


BONNIE BROOK ESTATES
DEFINITIVE SUBDIVISION PLAN
MAYNARD ROAD, SUDBURY MA

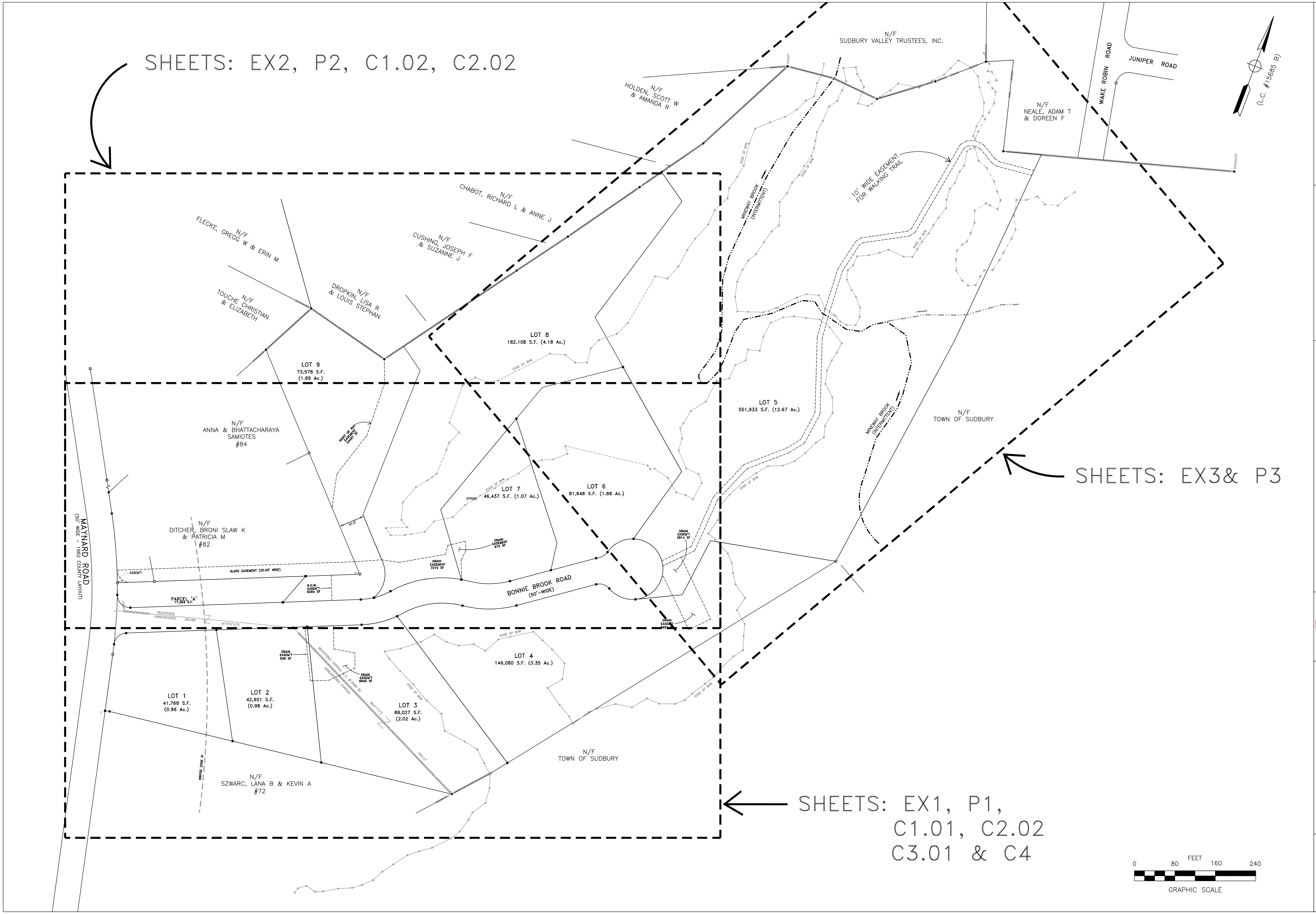
APPLICANT: JOHN DERDERIAN
60 WINDSOR ROAD
WELLESLEY, MA 02481

PROPERTY OWNER: BONNIE BROOK REALTY CORP.
60 WINDSOR ROAD
WELLESLEY, MA 02481

PREPARED BY: BRUCE SALUK & ASSOCIATES., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752
TEL: (508) 485-1662
FAX: (508) 481-9929



LOCUS PLAN
ASSESSORS PARCELS 0500 & 0025 ON MAP G08
IN ZONING DISTRICT RESIDENCE A-1



NO.	DATE	DESCRIPTION	BY
P1	3/18/21	NOI SUBMITTAL	BMS

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752

INDEX PLAN
-BONNIE BROOK ESTATES-
DEFINITIVE PLAN OF LAND

MAYNARD ROAD
SUDBURY, MA

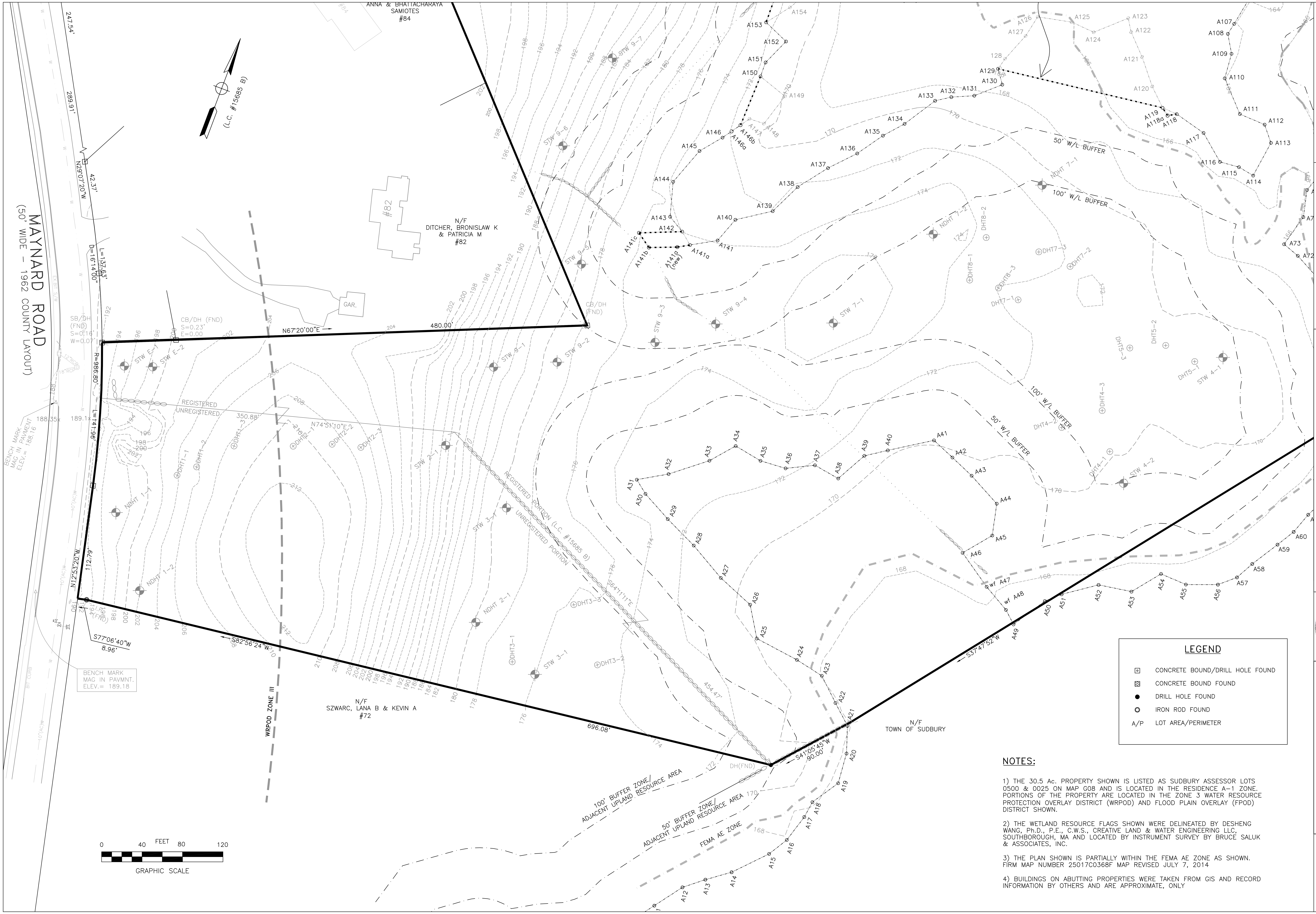
BRUCE M. SALUK
No. 32375

PREPARED FOR:
JOHN DERDERIAN
60 WINDSOR ROAD
WELLESLEY, MA 02481

DATE: OCTOBER 1, 2020

IND

FILE PATH: 2671c1.dwg



LEGEND

⊡	CONCRETE BOUND/DRILL HOLE FOUND
▨	CONCRETE BOUND FOUND
●	DRILL HOLE FOUND
○	IRON ROD FOUND
A/P	LOT AREA/PERIMETER

NOTES:

1) THE 30.5 Ac. PROPERTY SHOWN IS LISTED AS SUDBURY ASSESSOR LOTS 0500 & 0025 ON MAP G08 AND IS LOCATED IN THE RESIDENCE A–1 ZONE. PORTIONS OF THE PROPERTY ARE LOCATED IN THE ZONE 3 WATER RESOURCE PROTECTION OVERLAY DISTRICT (WRPOD) AND FLOOD PLAIN OVERLAY (FPOD) DISTRICT SHOWN.

2) THE WETLAND RESOURCE FLAGS SHOWN WERE DELINEATED BY DESHENG WANG, Ph.D., P.E., C.W.S., CREATIVE LAND & WATER ENGINEERING LLC, SOUTHBOROUGH, MA AND LOCATED BY INSTRUMENT SURVEY BY BRUCE SALUK & ASSOCIATES, INC.

3) THE PLAN SHOWN IS PARTIALLY WITHIN THE FEMA AE ZONE AS SHOWN. FIRM MAP NUMBER 25017C0368F MAP REVISED JULY 7, 2014

4) BUILDINGS ON ABUTTING PROPERTIES WERE TAKEN FROM GIS AND RECORD INFORMATION BY OTHERS AND ARE APPROXIMATE, ONLY

NO.	DATE	DESCRIPTION	BY
P1	3/18/21	NOI SUBMITTAL	BMS

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752

EXISTING CONDITIONS
–BONNIE BROOK ESTATES–
DEFINITIVE PLAN OF LAND
MAYNARD ROAD
SUDBURY, MA

COMMONWEALTH OF MASSACHUSETTS
BRUCE M. SALUK
No. 35415
PROFESSIONAL LAND SURVEYOR

PREPARED FOR:
JOHN DERDERIAN
60 WINDSOR ROAD
WELLESLEY, MA 02481

DATE: OCTOBER 1, 2020

EX1

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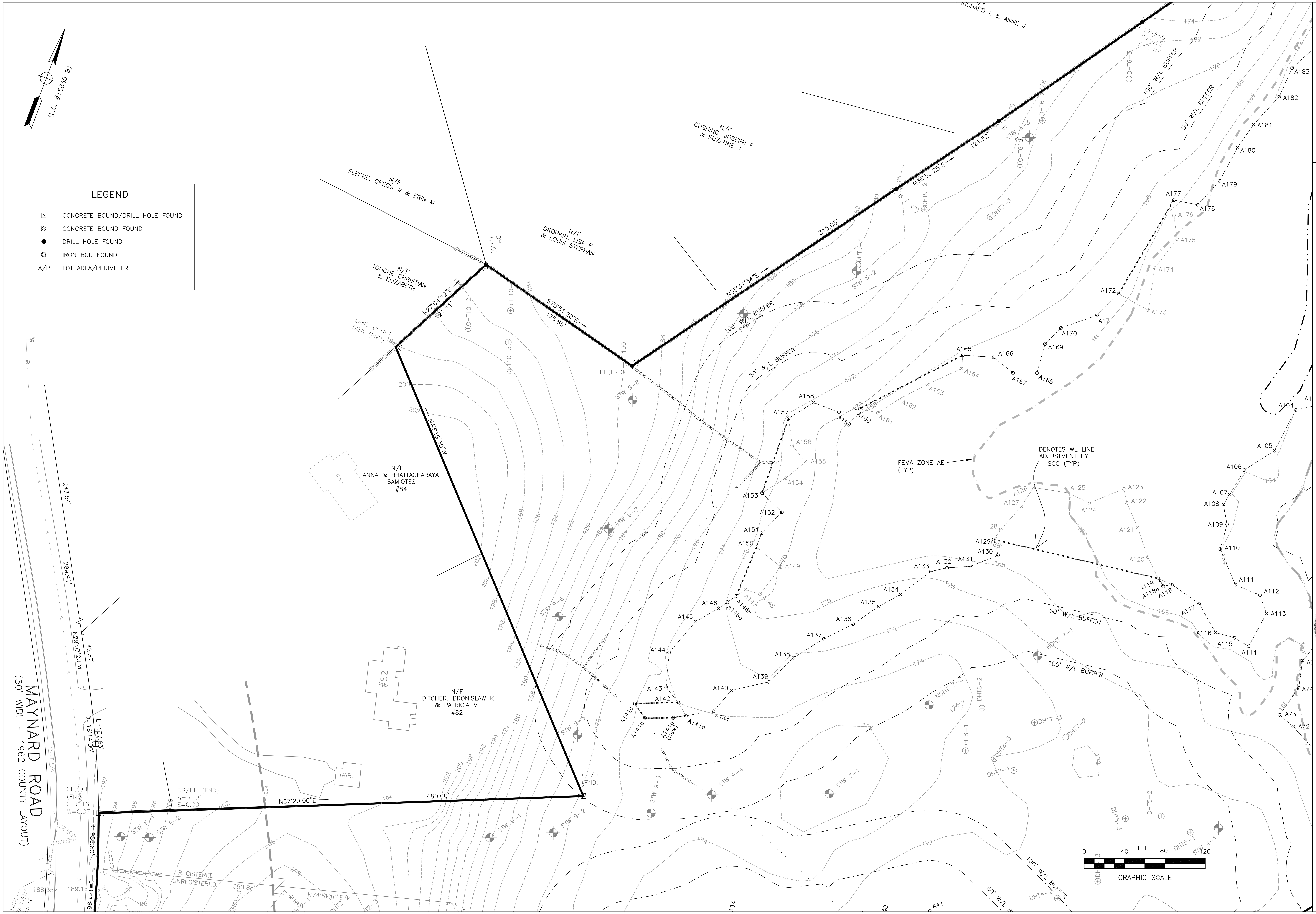

LEGEND

⊡	CONCRETE BOUND/DRILL HOLE FOUND
▨	CONCRETE BOUND FOUND
●	DRILL HOLE FOUND
○	IRON ROD FOUND
A/P	LOT AREA/PERIMETER

NO.	DATE	DESCRIPTION	BY
P1	3/18/21	NOI SUBMITTAL	BMS

PREPARED BY:
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CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752

EXISTING CONDITIONS
-BONNIE BROOK ESTATES-
DEFINITIVE PLAN OF LAND

MAYNARD ROAD
SUDBURY, MA

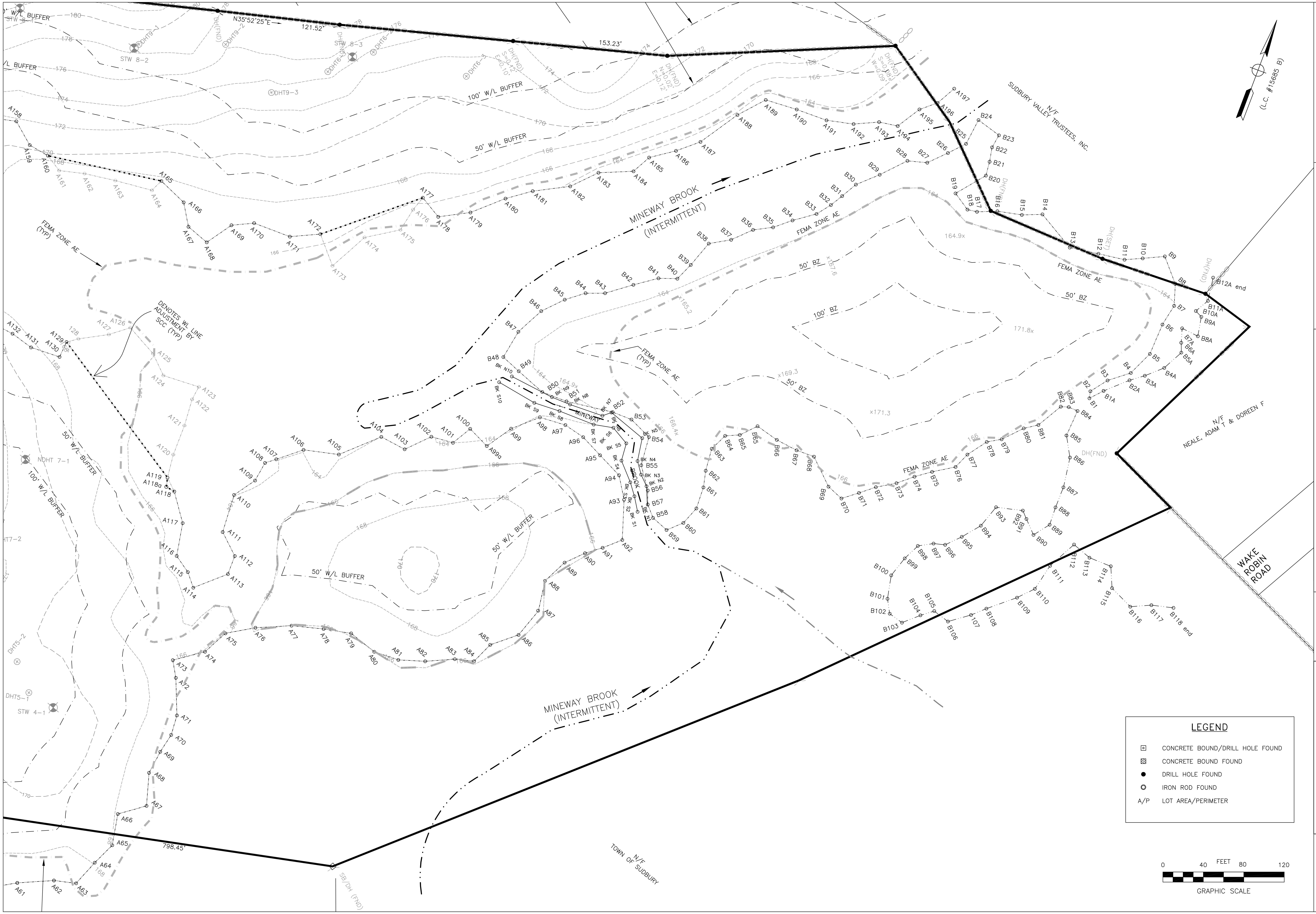
BRUCE M. SALUK No. 35415

PREPARED FOR:
JOHN DERDERIAN
60 WINDSOR ROAD
WELLESLEY, MA 02481

DATE: OCTOBER 1, 2020

EX2

FILE: 2671c1.dwg



LEGEND

⊡	CONCRETE BOUND/DRILL HOLE FOUND
▨	CONCRETE BOUND FOUND
●	DRILL HOLE FOUND
○	IRON ROD FOUND
A/P	LOT AREA/PERIMETER

NO.	DATE	DESCRIPTION	BY
P1	3/18/21	NOI SUBMITTAL	BMS

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752

EXISTING CONDITIONS
–BONNIE BROOK ESTATES–
DEFINITIVE PLAN OF LAND

MAYNARD ROAD
SUDBURY, MA

BRUCE M. SALUK
No. 35415

PREPARED FOR:
JOHN DERDERIAN
60 WINDSOR ROAD
WELLESLEY, MA 02481

DATE: OCTOBER 1, 2020

EX3

FILE: 2671c1.dwg

FOR REGISTRY USE

PROPERTY LOCATION AND ZONE:

THE LAND SHOWN IS LISTED AS SUDBURY ASSESSOR LOTS 0500 & 0025 ON MAP G08 AND IS LOCATED IN THE RESIDENCE A-1 ZONE, AND PORTIONS OF THE PROPERTY ARE LOCATED IN THE ZONE 3 WATER RESOURCE PROTECTION OVERLAY DISTRICT (WRPOD) AND FLOOD PLAIN OVERLAY (FPOD) DISTRICT SHOWN.

DEED REFERENCE

OWNER FOR 2 PARCELS SHOWN:

BONNIE BROOK REALTY CORP.
BK: 26711 PG: 331
ASSESSOR'S MAP G08-PARCEL 0025
(UNREGISTERED PORTION)

BONNIE BROOK REALTY CORP.
206397 (LAND COURT)
ASSESSOR'S MAP G08-PARCEL 0500
(REGISTERED PORTION)

PLAN REFERENCE

L.C. PLAN 15686 A & B
PLAN #432 of 1999
PLAN #1265 of 1997
PLAN #277 of 1976
PLAN #1002 of 1973
PLAN #1241 of 1972
PLAN #1070 of 1964
PLAN #529 of 1948
PLAN #1218 of 1946
1962 COUNTY L.O.
"MAYNARD ROAD"

"SUBDIVISION APPROVED SUBJECT TO CONDITIONS CONTAINED IN THE COVENANT AND THE DECISION DOCUMENT, BOTH RECORDED HEREWITH."

SUDBURY PLANNING BOARD:

DATE APPROVED: ______________

DATE SIGNED: ______________

I HEREBY CERTIFY THAT NO NOTICE OF APPEAL WAS RECEIVED DURING THE TWENTY DAYS NEXT AFTER RECEIPT AND RECORDING OF NOTICE FROM THE PLANNING BOARD OF THE APPROVAL OF THE PLAN WITHIN.

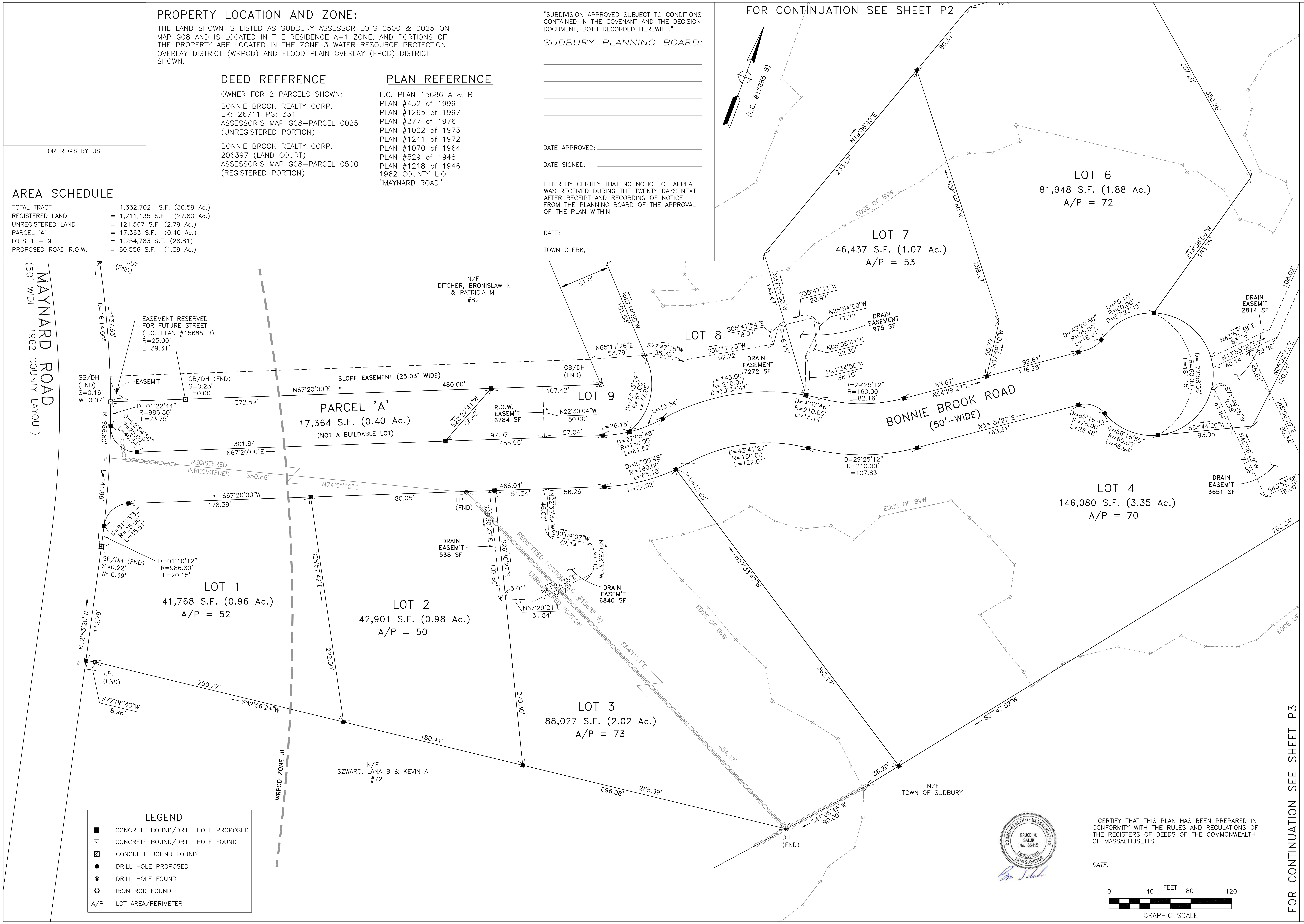
DATE: ______________

TOWN CLERK, ______________

AREA SCHEDULE

TOTAL TRACT	= 1,332,702 S.F. (30.59 Ac.)
REGISTERED LAND	= 1,211,135 S.F. (27.80 Ac.)
UNREGISTERED LAND	= 121,567 S.F. (2.79 Ac.)
PARCEL 'A'	= 17,363 S.F. (0.40 Ac.)
LOTS 1 – 9	= 1,254,783 S.F. (28.81)
PROPOSED ROAD R.O.W.	= 60,556 S.F. (1.39 Ac.)

FOR CONTINUATION SEE SHEET P2



LEGEND

■	CONCRETE BOUND/DRILL HOLE PROPOSED
⊡	CONCRETE BOUND/DRILL HOLE FOUND
▨	CONCRETE BOUND FOUND
●	DRILL HOLE PROPOSED
◉	DRILL HOLE FOUND
○	IRON ROD FOUND
A/P	LOT AREA/PERIMETER

BRUCE N. SALUK No. 35415 PROFESSIONAL LAND SURVEYOR

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

DATE: ______________

FOR CONTINUATION SEE SHEET P3

NO.	DATE	REVISION	BY
P1	3/18/21	NOI SUBMITTAL	BMS

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752
TEL: 508-485-1662
FAX: 508-481-9929

PROPERTY PLAN
-BONNIE BROOK ESTATES-
DEFINITIVE PLAN OF LAND
MAYNARD ROAD
SUDBURY, MA

PREPARED FOR:
JOHN DERDERIAN
60 WINDSOR ROAD
WELLESLEY, MA 02481

DATE: OCTOBER 1, 2020

P1

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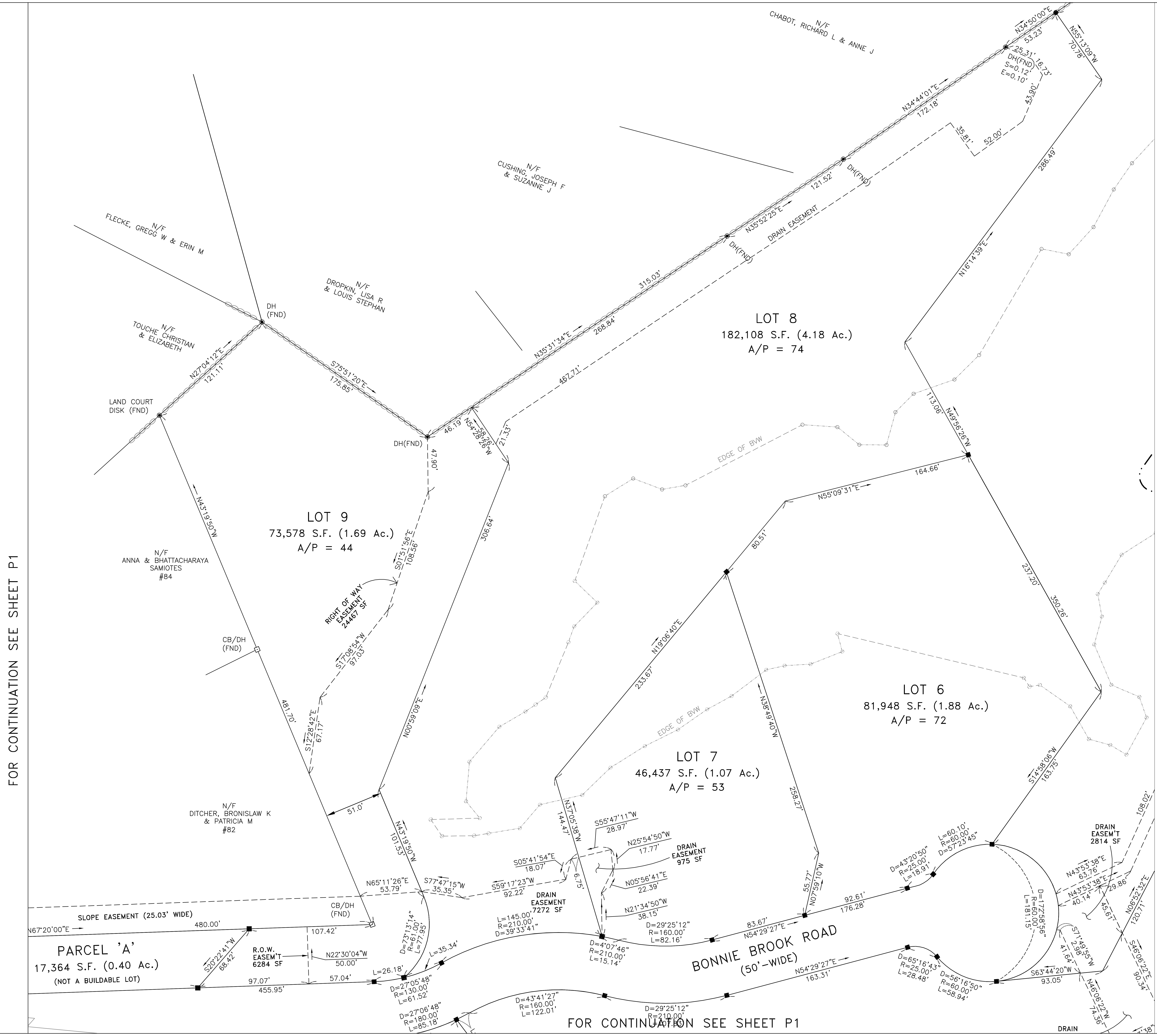


FOR REGISTRY USE

I HEREBY CERTIFY THAT NO NOTICE OF APPEAL WAS RECEIVED DURING THE TWENTY DAYS NEXT AFTER RECEIPT AND RECORDING OF NOTICE FROM THE PLANNING BOARD OF THE APPROVAL OF THE PLAN WITHIN.

DATE: ______________________

TOWN CLERK, ______________________

"SUBDIVISION APPROVED SUBJECT TO CONDITIONS CONTAINED IN THE COVENANT AND THE DECISION DOCUMENT, BOTH RECORDED HEREWITH."

SUDBURY PLANNING BOARD:

____

____

____

____

____

DATE APPROVED: ______________________

DATE SIGNED: ______________________

LEGEND

■	CONCRETE BOUND/DRILL HOLE PROPOSED
⊡	CONCRETE BOUND/DRILL HOLE FOUND
▨	CONCRETE BOUND FOUND
●	DRILL HOLE PROPOSED
◉	DRILL HOLE FOUND
○	IRON ROD FOUND
A/P	LOT AREA/PERIMETER

BRUCE N. SALUK No. 35415 PROFESSIONAL LAND SURVEYOR

Bn Saluk

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

DATE: ______________________

FEET
0 40 80 120
GRAPHIC SCALE

NO.	DATE	REVISION	BY
P1	3/18/21	NOI SUBMITTAL	BMS

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752
TEL: 508-485-1662
FAX: 508-481-9929

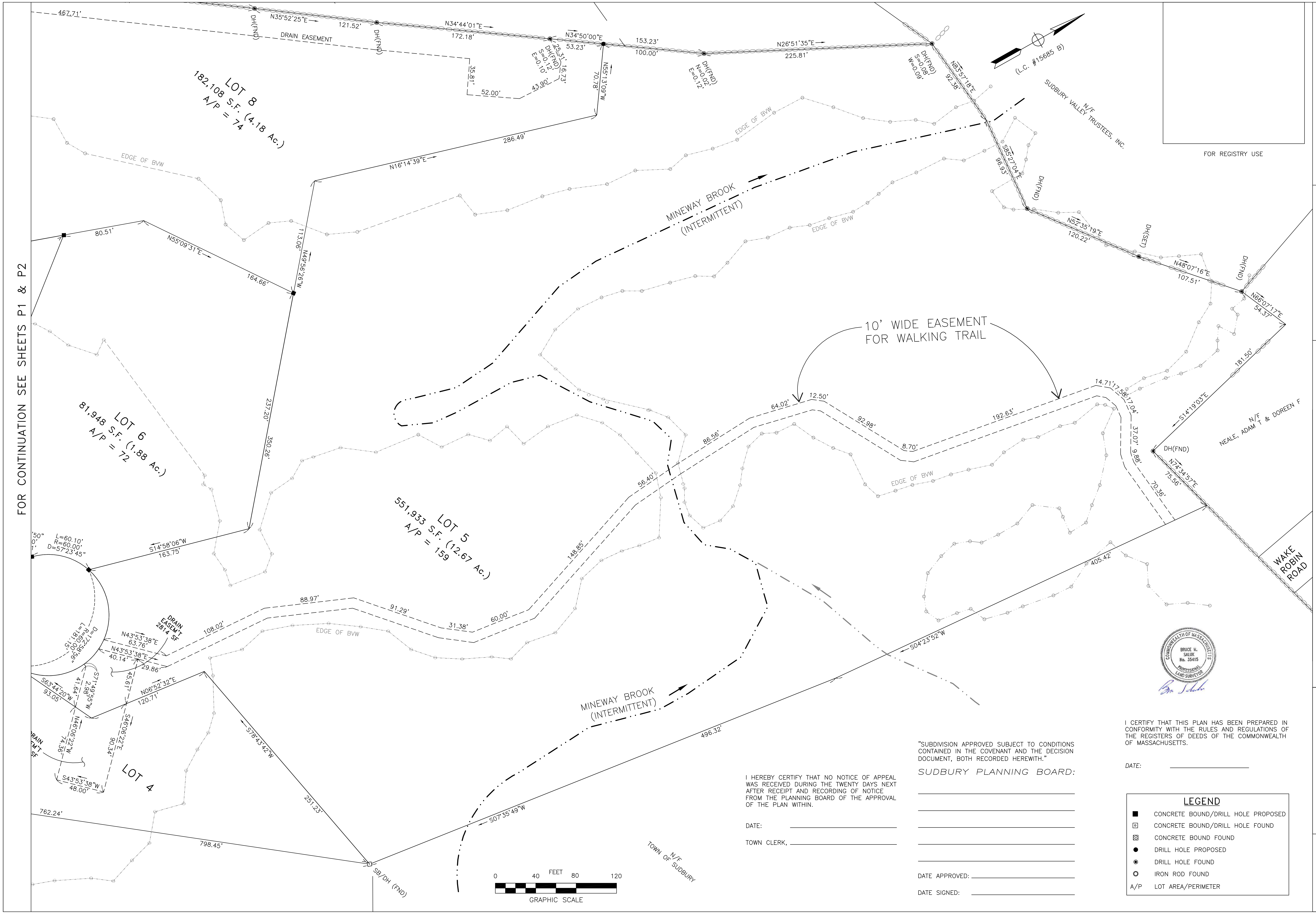
PROPERTY PLAN
—BONNIE BROOK ESTATES—
DEFINITIVE PLAN OF LAND
MAYNARD ROAD
SUDBURY, MA

PREPARED FOR:
JOHN DERDERIAN
60 WINDSOR ROAD
WELLESLEY, MA 02481

DATE: OCTOBER 1, 2020

P2

FILE #2671C1.dwg



NO.	DATE	REVISION	BY
P1	3/18/21	NOI SUBMITTAL	BMS

FOR REGISTRY USE

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
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576 BOSTON POST ROAD EAST
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TEL: 508-485-1662
FAX: 508-481-9929

PROPERTY PLAN
-BONNIE BROOK ESTATES-
DEFINITIVE PLAN OF LAND
MAYNARD ROAD
SUDBURY, MA

PREPARED FOR:
JOHN DERDERIAN
60 WINDSOR ROAD
WELLESLEY, MA 02481

DATE: OCTOBER 1, 2020

P3

BRUCE M. SALUK
No. 35415

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

DATE: ____________

"SUBDIVISION APPROVED SUBJECT TO CONDITIONS CONTAINED IN THE COVENANT AND THE DECISION DOCUMENT, BOTH RECORDED HEREWITH."

SUDBURY PLANNING BOARD:

____

____

____

____

____

DATE APPROVED: ____________

DATE SIGNED: ____________

I HEREBY CERTIFY THAT NO NOTICE OF APPEAL WAS RECEIVED DURING THE TWENTY DAYS NEXT AFTER RECEIPT AND RECORDING OF NOTICE FROM THE PLANNING BOARD OF THE APPROVAL OF THE PLAN WITHIN.

DATE: ____________

TOWN CLERK, ____________

LEGEND

■	CONCRETE BOUND/DRILL HOLE PROPOSED
⊡	CONCRETE BOUND/DRILL HOLE FOUND
▨	CONCRETE BOUND FOUND
●	DRILL HOLE PROPOSED
◉	DRILL HOLE FOUND
○	IRON ROD FOUND
A/P	LOT AREA/PERIMETER

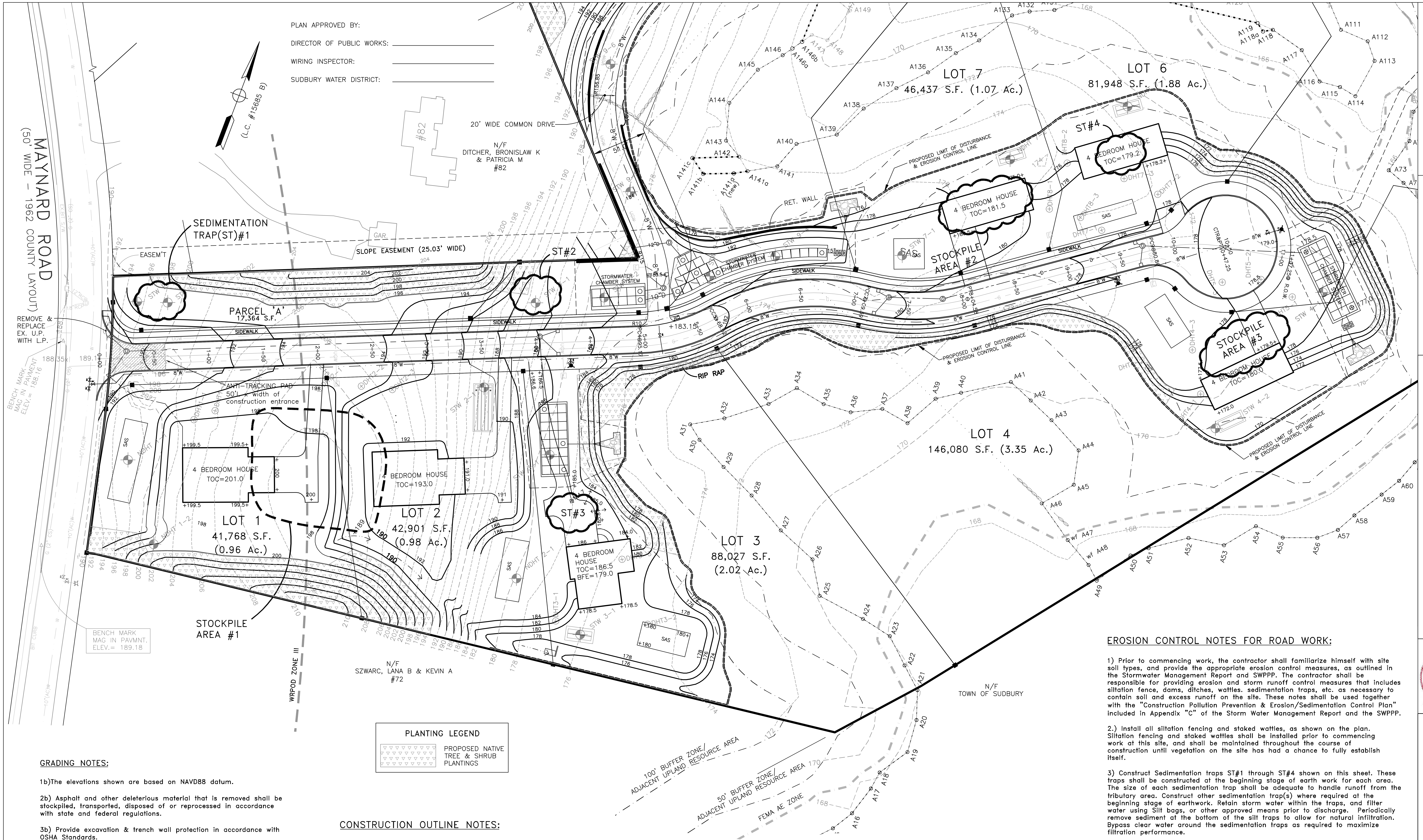
FILE #2671C1.dwg

PLAN APPROVED BY:

DIRECTOR OF PUBLIC WORKS: ____________________

WIRING INSPECTOR: ____________________

SUDBURY WATER DISTRICT: ____________________



GRADING NOTES:

1b)The elevations shown are based on NAVD88 datum.

2b) Asphalt and other deleterious material that is removed shall be stockpiled, transported, disposed of or reprocessed in accordance with state and federal regulations.

3b) Provide excavation & trench wall protection in accordance with OSHA Standards.

4b) Provide safety fencing around all stockpiles greater than 10 Ft. in height, or otherwise restrict site access.

5b) Retaining walls shall be architectural modular concrete block. All walls exceeding 4' in height shall be designed by a structural engineer. Safety fence is required along the top of all retaining walls that exceed 4 FT height. Said fence shall 42" high black vinyl clad chain link fence.

6b) Existing topsoil, subsoil stumps and organic matter below proposed pavement footprint fill areas shall be removed. All unsuitable soil shall be removed. Pavement subgrade shall be natural sandy soils, or equal. Compaction of subgrade in 12" lifts at 90% at maximum dry density by ASTM D698. Maintain the correct mositure content for proper compaction.

CONSTRUCTION OUTLINE NOTES:

1a. Locations of all existing utilities shown on these drawings are approximate, only, and and it shall be the responsibility of the contractor to contact all utility companies for field locations of existing underground pipes, conduits, tanks and structures. contact dig safe at 811 or 888-dig-safe.

2a. The developer shall obtain all required permits including: National Pollution Elimination Discharge System (NPDES) Construction General Permit and Conservation Commission Order of Conditions, etc..

3a. All proposed retaining walls shall include a 42"H black vinyl clad fence located a the top of wall where the wall height exceeds 4 FT.

EROSION CONTROL NOTES FOR ROAD WORK:

1) Prior to commencing work, the contractor shall familiarize himself with site soil types, and provide the appropriate erosion control measures, as outlined in the Stormwater Management Report and SWPPP. The contractor shall be responsible for providing erosion and storm runoff control measures that includes siltation fence, dams, ditches, wattles. sedimentation traps, etc. as necessary to contain soil and excess runoff on the site. These notes shall be used together with the "Construction Pollution Prevention & Erosion/Sedimentation Control Plan" included in Appendix "C" of the Storm Water Management Report and the SWPPP.

2.) Install all siltation fencing and staked wattles, as shown on the plan. Siltation fencing and staked wattles shall be installed prior to commencing work at this site, and shall be maintained throughout the course of construction until vegetation on the site has had a chance to fully establish itself.

3) Construct Sedimentation traps ST#1 through ST#4 shown on this sheet. These traps shall be constructed at the beginning stage of earth work for each area. The size of each sedimentation trap shall be adequate to handle runoff from the tributary area. Construct other sedimentation trap(s) where required at the beginning stage of earthwork. Retain storm water within the traps, and filter water using Silt bags, or other approved means prior to discharge. Periodically remove sediment at the bottom of the silt traps to allow for natural infiltration. Bypass clear water around the sedimentation traps as required to maximize filtration performance.

4) Construct an Anti-Tracking Pad at the site entrance consisting of 1"- 3" crushed stone 12"depth by 50' long times the width of the traveled construction access road. The stone shall project above grade to form a berm barrier that prevents sediment from washing into abutting properties.

5) Soil stripping and removal at any one time shall be done in stages in order to minimize the amount of exposed soil for the project. Soil stabilization measures shall be implemented immediately after finish grading. Loam and seed shall be applied as soon as reasonably possible.

6) Siltation fence shall be located where shown. Acceptable products for siltation fence is Mirafi, Inc, Charlotte, NC, Model 100x, or equal.

7) Siltsacks are required at all CB's (See Detail).

9) An NPDES Construction General Permit is required.

NO.	DATE	DESCRIPTION	BY
P1	3/18/21	NOI SUBMITTAL	BMS

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752

GRADING & EROSION CONTROL –BONNIE BROOK ESTATES– DEFINITIVE PLAN OF LAND

MAYNARD ROAD
SUDBURY, MA

BRUCE M. SALUK
CIVIL
No. 32375

PREPARED FOR:
JOHN DERDERIAN
60 WINDSOR ROAD
WELLESLEY, MA 02481

DATE: OCTOBER 1, 2020

C1.01

FILE: 2671c1.dwg

PLAN APPROVED BY:

DIRECTOR OF PUBLIC WORKS: ____________________

WIRING INSPECTOR: ____________________

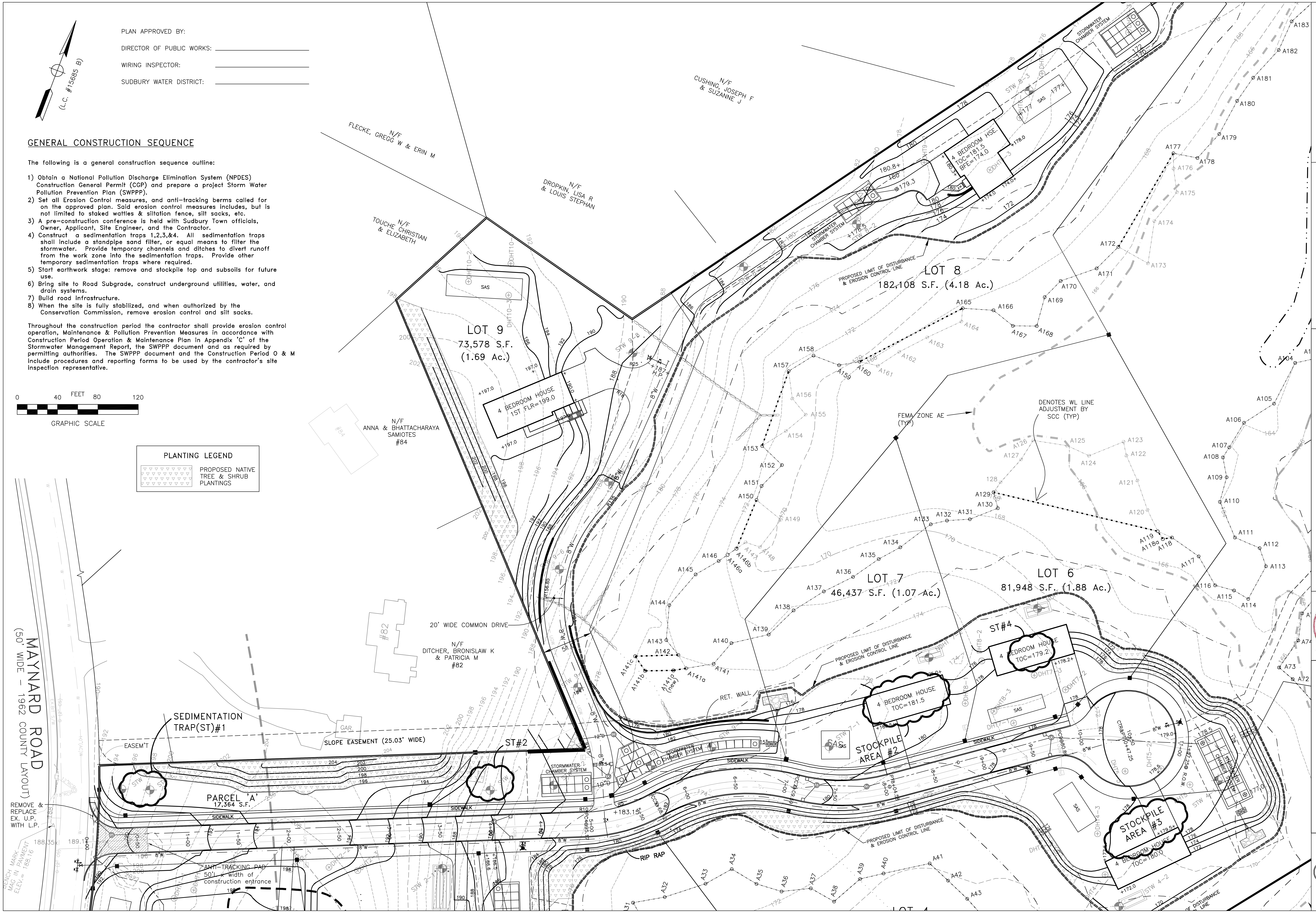
SUDBURY WATER DISTRICT: ____________________

GENERAL CONSTRUCTION SEQUENCE

The following is a general construction sequence outline:

1) Obtain a National Pollution Discharge Elimination System (NPDES) Construction General Permit (CGP) and prepare a project Storm Water Pollution Prevention Plan (SWPPP).
2) Set all Erosion Control measures, and anti-tracking berms called for on the approved plan. Said erosion control measures includes, but is not limited to staked wattles & siltation fence, silt sacks, etc.
3) A pre-construction conference is held with Sudbury Town officials, Owner, Applicant, Site Engineer, and the Contractor.
4) Construct a sedimentation traps 1,2,3,&4. All sedimentation traps shall include a standpipe sand filter, or equal means to filter the stormwater. Provide temporary channels and ditches to divert runoff from the work zone into the sedimentation traps. Provide other temporary sedimentation traps where required.
5) Start earthwork stage: remove and stockpile top and subsoils for future use.
6) Bring site to Road Subgrade, construct underground utilities, water, and drain systems.
7) Build road infrastructure.
8) When the site is fully stabilized, and when authorized by the Conservation Commission, remove erosion control and silt sacks.

Throughout the construction period the contractor shall provide erosion control operation, Maintenance & Pollution Prevention Measures in accordance with Construction Period Operation & Maintenance Plan in Appendix 'C' of the Stormwater Management Report, the SWPPP document and as required by permitting authorities. The SWPPP document and the Construction Period O & M include procedures and reporting forms to be used by the contractor's site inspection representative.



GRADING & EROSION CONTROL
-BONNIE BROOK ESTATES-
DEFINITIVE PLAN OF LAND
MAYNARD ROAD
SUDBURY, MA

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752

NO.	DATE	DESCRIPTION	BY
P1	3/18/21	NOI SUBMITTAL	BMS

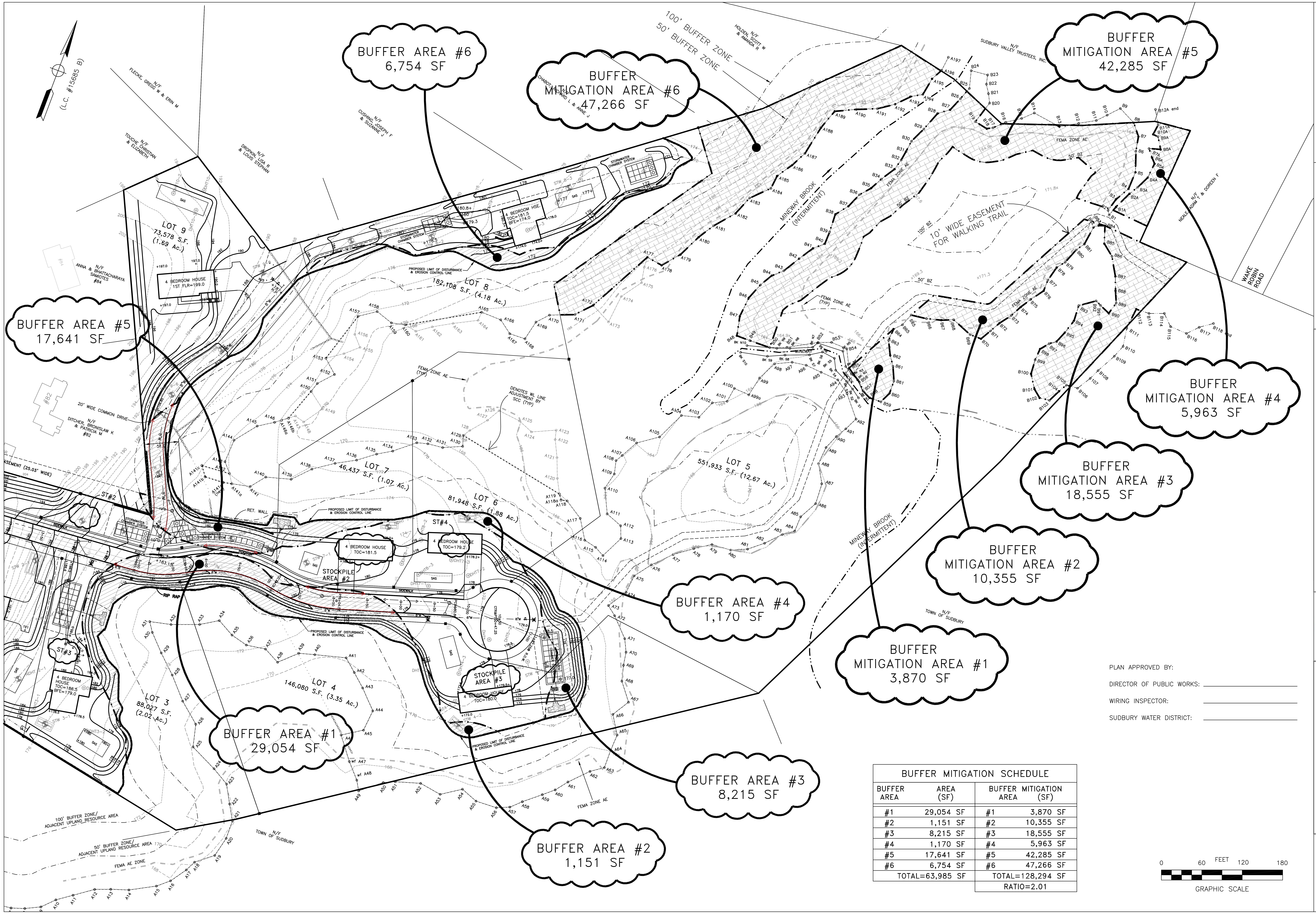
BRUCE M. SALUK
CIVIL
No. 32375

PREPARED FOR:
JOHN DERDERIAN
60 WINDSOR ROAD
WELLESLEY, MA 02481

DATE: OCTOBER 1, 2020

C1.02

FILE: 2671c1.dwg



BUFFER MITIGATION SCHEDULE

BUFFER AREA	AREA (SF)	BUFFER MITIGATION AREA	(SF)
#1	29,054 SF	#1	3,870 SF
#2	1,151 SF	#2	10,355 SF
#3	8,215 SF	#3	18,555 SF
#4	1,170 SF	#4	5,963 SF
#5	17,641 SF	#5	42,285 SF
#6	6,754 SF	#6	47,266 SF
	TOTAL=63,985 SF		TOTAL=128,294 SF
			RATIO=2.01

PLAN APPROVED BY:

DIRECTOR OF PUBLIC WORKS: ____________________

WIRING INSPECTOR: ____________________

SUDBURY WATER DISTRICT: ____________________

NO.	DATE	DESCRIPTION	BY
P1	3/18/21	NOI SUBMITTAL	BMS

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752

BUFFER MITIGATION PLAN
-BONNIE BROOK ESTATES-
DEFINITIVE PLAN OF LAND
MAYNARD ROAD
SUDBURY, MA

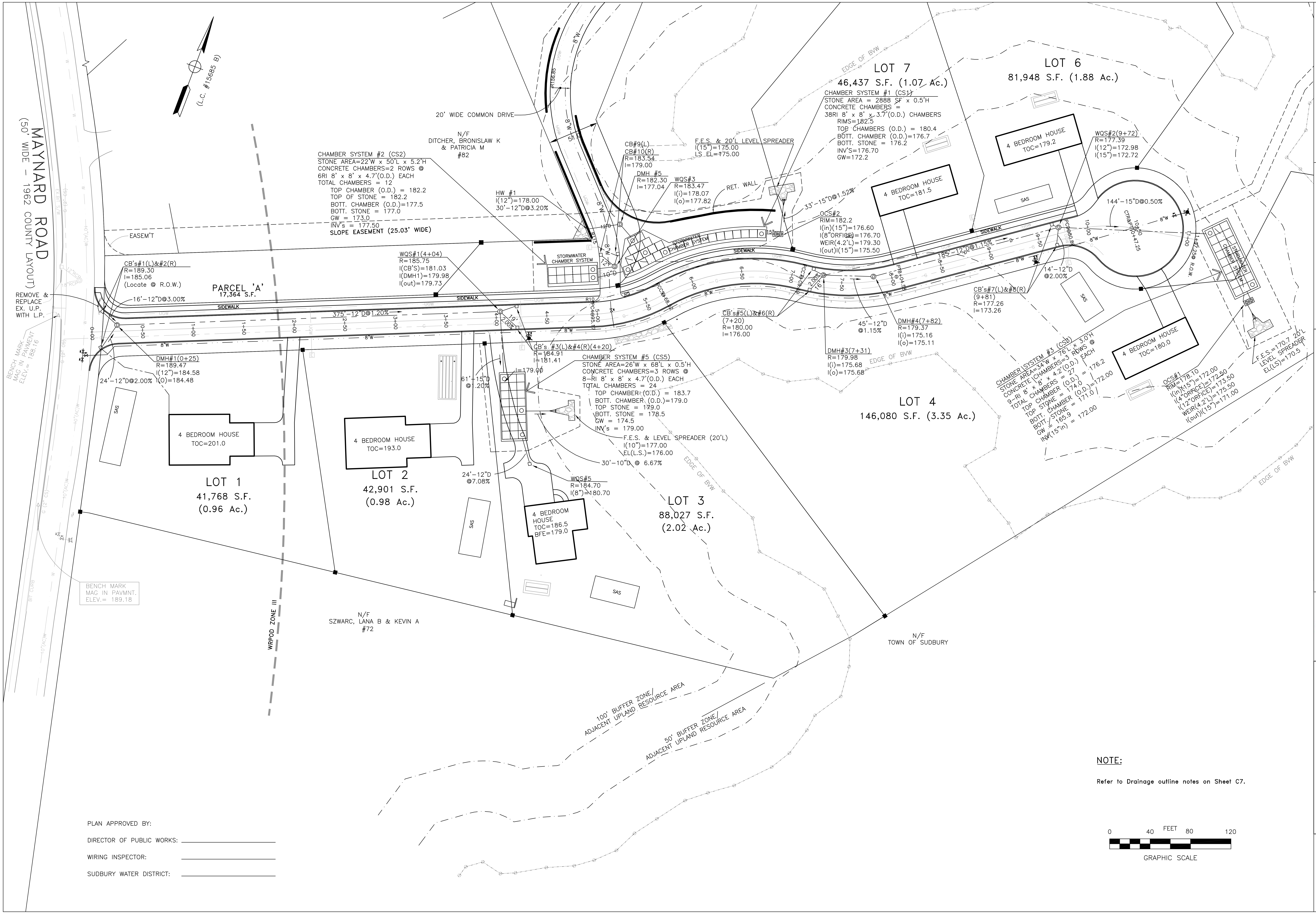
BRUCE M. SALUK
CIVIL
No. 32375

PREPARED FOR:
JOHN DERDERIAN
60 WINDSOR ROAD
WELLESLEY, MA 02481

DATE: OCTOBER 1, 2020

C1.03

FILE: 2671c1.dwg



NOTE:

Refer to Drainage outline notes on Sheet C7.

PLAN APPROVED BY:

DIRECTOR OF PUBLIC WORKS: __________________

WIRING INSPECTOR: __________________

SUDBURY WATER DISTRICT: __________________

NO.	DATE	DESCRIPTION	BY
P1	3/18/21	NOI SUBMITTAL	BMS

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752

DRAINAGE PLAN
-BONNIE BROOK ESTATES-
DEFINITIVE PLAN OF LAND

MAYNARD ROAD
SUDBURY, MA

BRUCE N. SALUK
CIVIL
No. 32375

PREPARED FOR:
JOHN DERDERIAN
60 WINDSOR ROAD
WELLESLEY, MA 02481

DATE: OCTOBER 1, 2020

C2.01

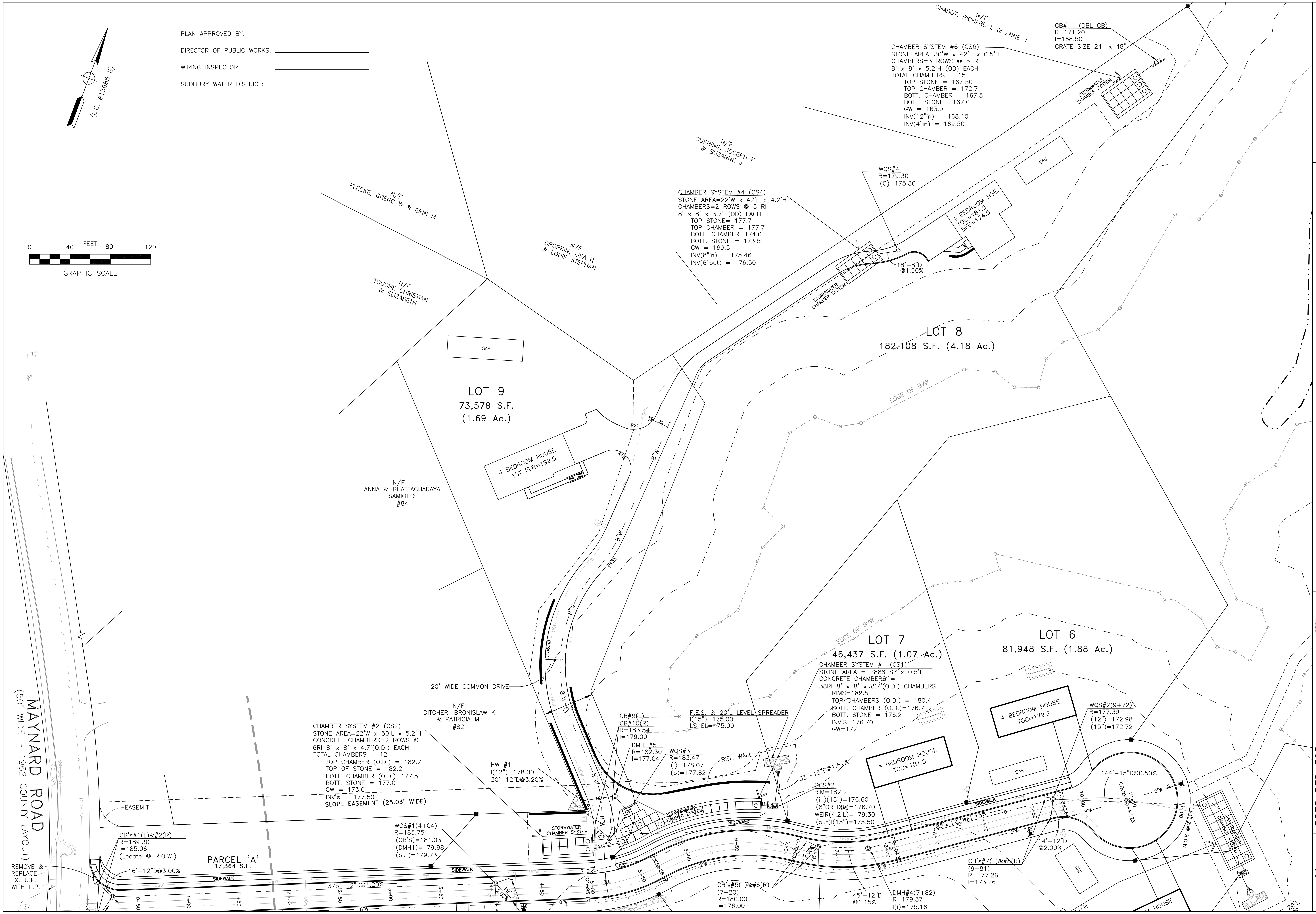
FILE: 2671c1.dwg

PLAN APPROVED BY:

DIRECTOR OF PUBLIC WORKS: ____________________

WIRING INSPECTOR: ____________________

SUDBURY WATER DISTRICT: ____________________



P1	3/18/21	NOI SUBMITTAL	BMS
NO.	DATE	DESCRIPTION	BY

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752

DRAINAGE PLAN
–BONNIE BROOK ESTATES–
DEFINITIVE PLAN OF LAND
MAYNARD ROAD
SUDBURY, MA

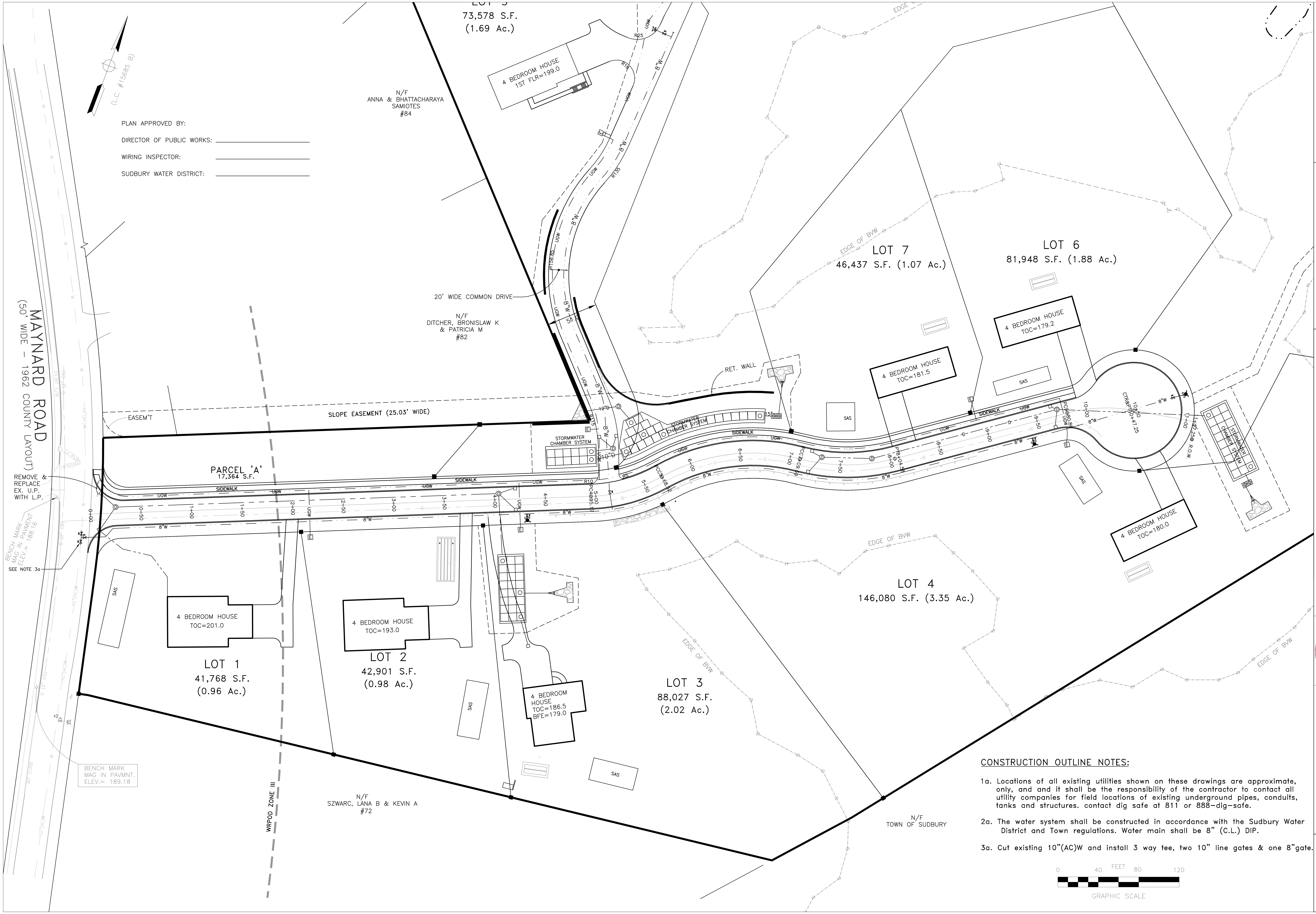
BRUCE M. SALUK
CIVIL
No. 32375

PREPARED FOR:
JOHN DERDERIAN
WALTHAM LUMBER
P.O. BOX 560
WALTHAM MA 02454-0560

DATE: OCTOBER 1, 2020

C2.02

FILE: 2671c1.dwg



PLAN APPROVED BY:

DIRECTOR OF PUBLIC WORKS: ____________________

WIRING INSPECTOR: ____________________

SUDBURY WATER DISTRICT: ____________________

CONSTRUCTION OUTLINE NOTES:

1a. Locations of all existing utilities shown on these drawings are approximate, only, and and it shall be the responsibility of the contractor to contact all utility companies for field locations of existing underground pipes, conduits, tanks and structures. contact dig safe at 811 or 888-dig-safe.

2a. The water system shall be constructed in accordance with the Sudbury Water District and Town regulations. Water main shall be 8" (C.L.) DIP.

3a. Cut existing 10"(AC)W and install 3 way tee, two 10" line gates & one 8"gate.

NO.	DATE	DESCRIPTION	BY
P1	3/18/21	NOI SUBMITTAL	BMS

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752

WATER & UTILITY PLAN
—BONNIE BROOK ESTATES—
DEFINITIVE PLAN OF LAND
MAYNARD ROAD
SUDBURY, MA

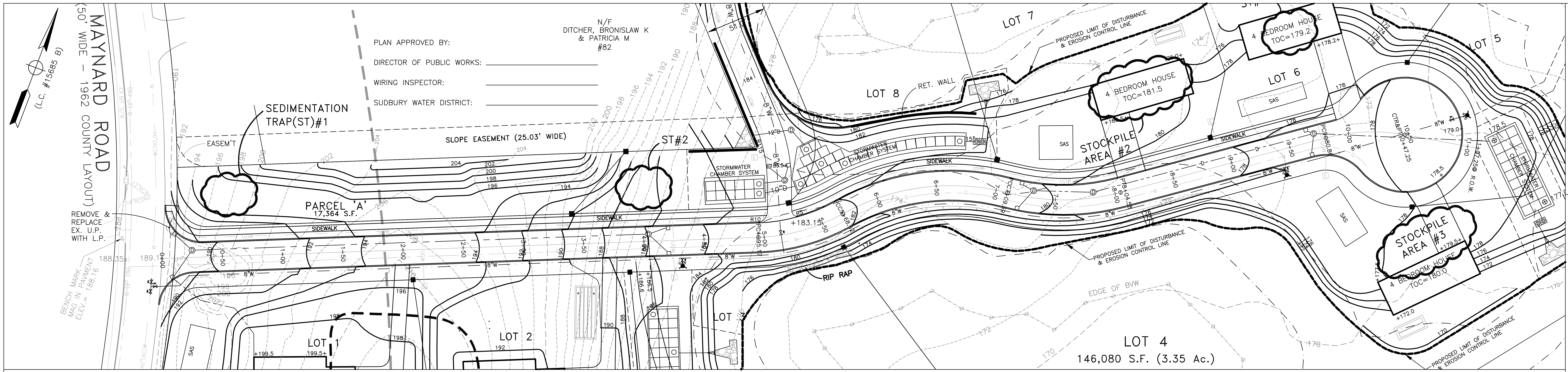
BRUCE M. SALUK
No. 32375

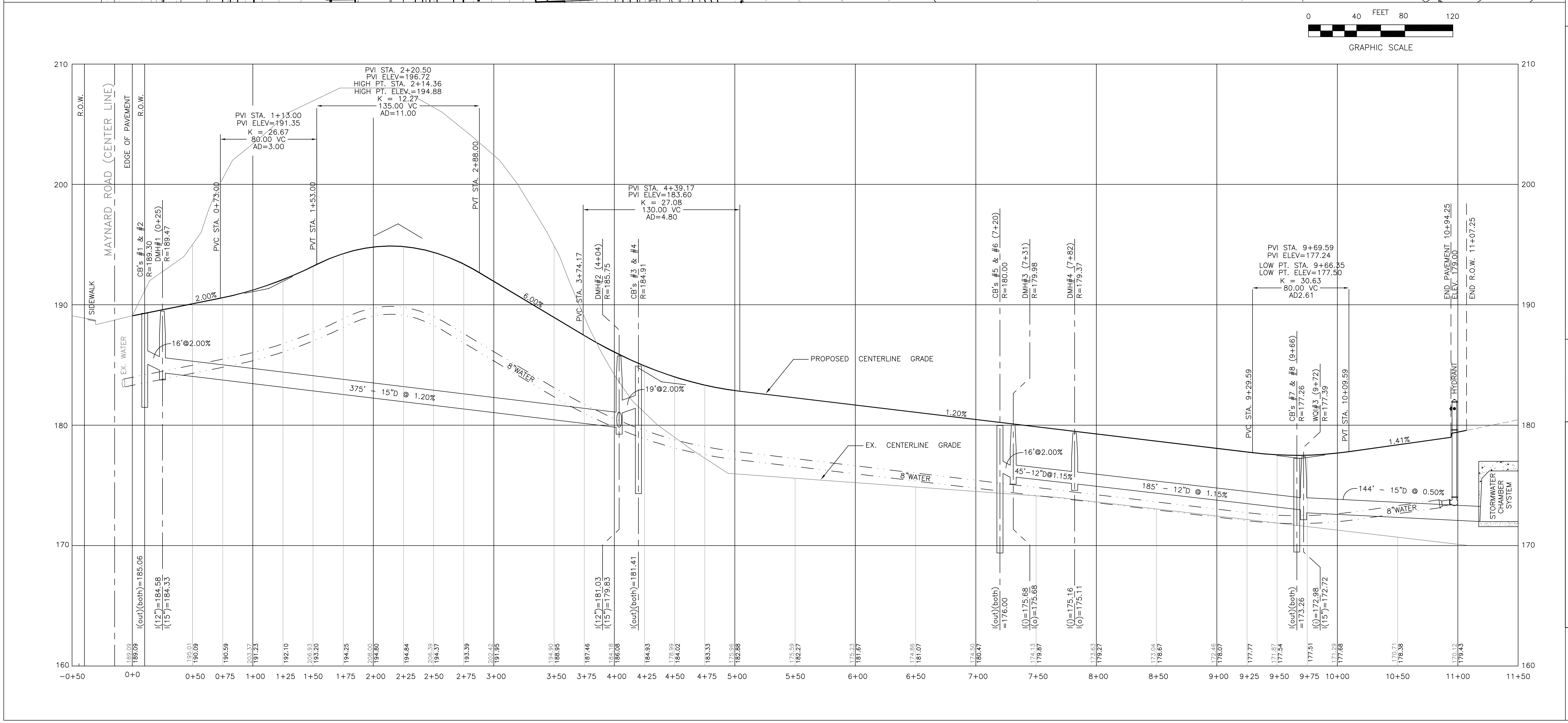
PREPARED FOR:
JOHN DERDERIAN
60 WINDSOR ROAD
WELLESLEY, MA 02481

DATE: OCTOBER 1, 2020

C3.01

FILE: 2671c1.dwg





NO.	DATE	DESCRIPTION	BY
P1	3/18/21	NOI SUBMITTAL	BMS

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752

PLAN & PROFILE
-BONNIE BROOK ESTATES-
DEFINITIVE PLAN OF LAND

MAYNARD ROAD
SUDBURY, MA

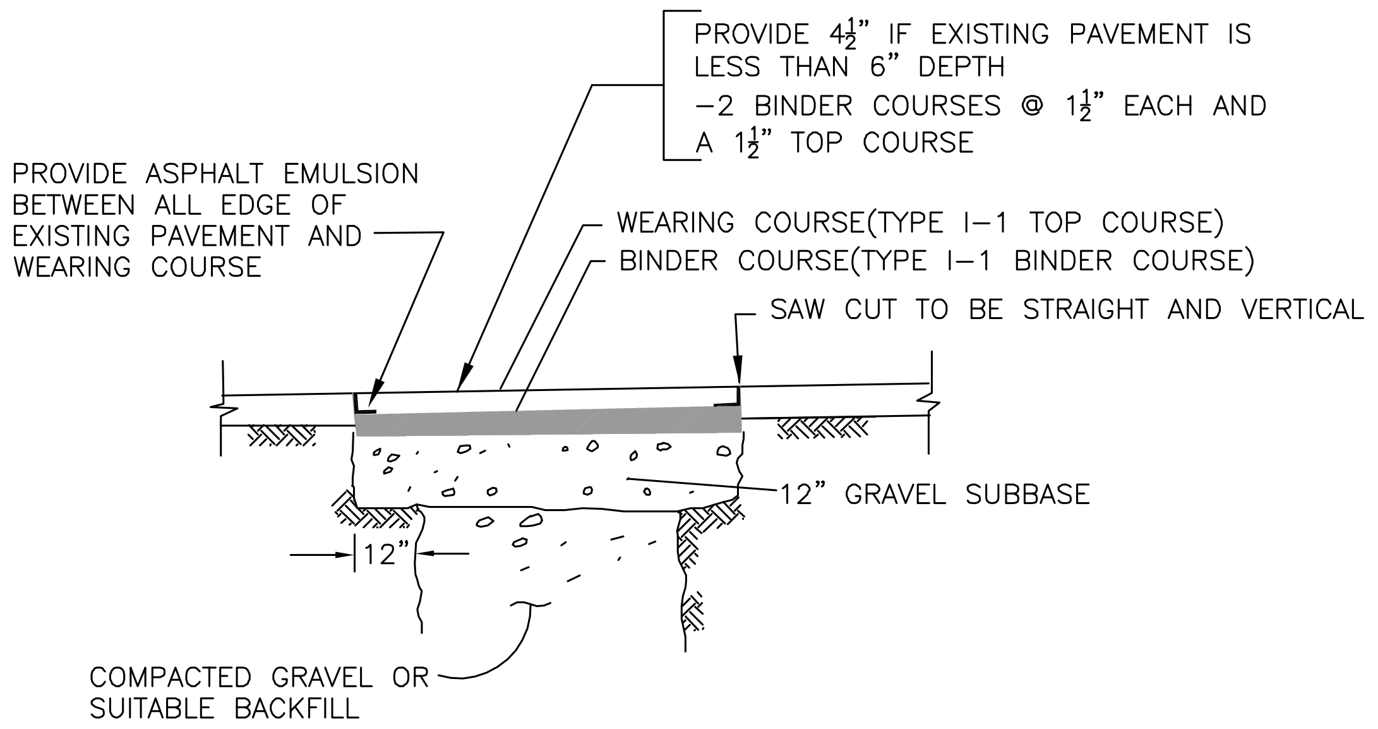
BRUCE M. SALUK
No. 32375

PREPARED FOR:
JOHN DERDERIAN
60 WINDSOR ROAD
WELLESLEY, MA 02481

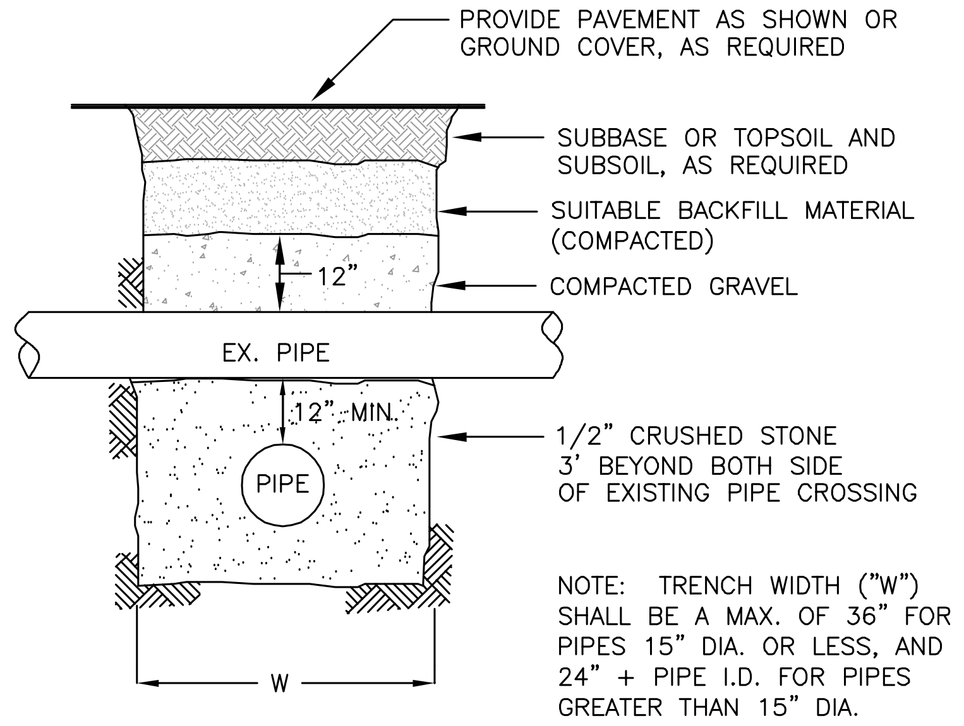
DATE: OCTOBER 1, 2020

C4

FILE: 2671c1.dwg

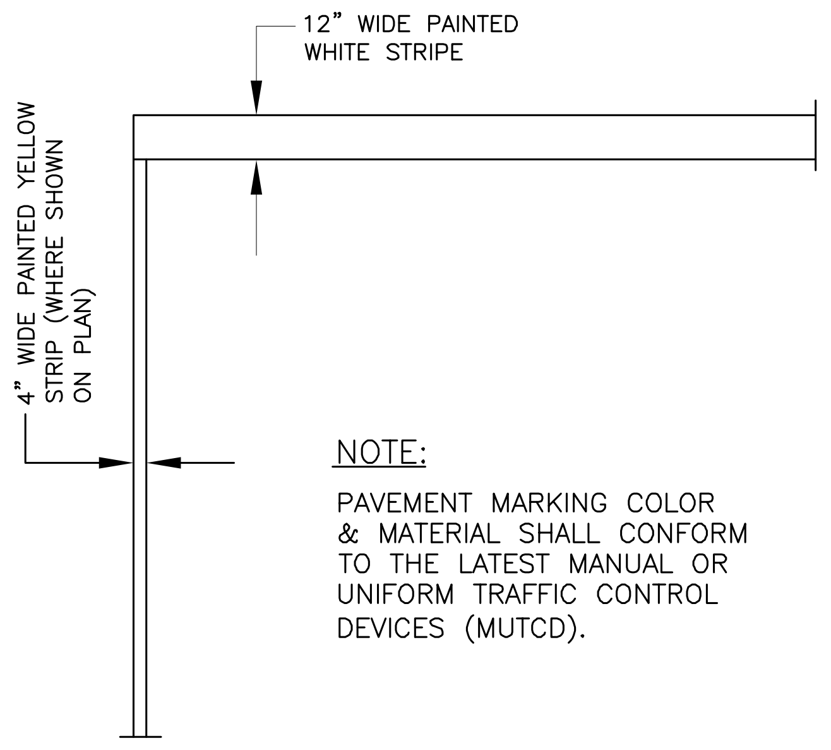


TRENCH FINAL PAVEMENT SECTION
(FOR EXISTING ROAD)
N. T. S.



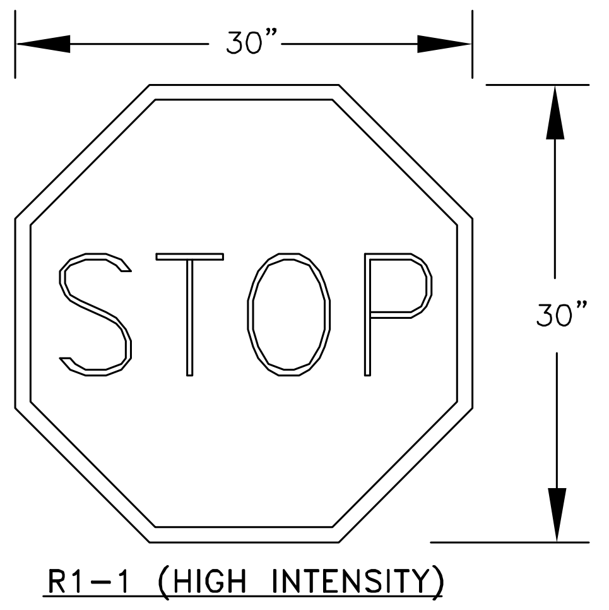
NOTE: TRENCH WIDTH ("W") SHALL BE A MAX. OF 36" FOR PIPES 15" DIA. OR LESS, AND 24" + PIPE I.D. FOR PIPES GREATER THAN 15" DIA.

PIPE CROSSING DETAIL
N. T. S.



NOTE:
PAVEMENT MARKING COLOR & MATERIAL SHALL CONFORM TO THE LATEST MANUAL OR UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).

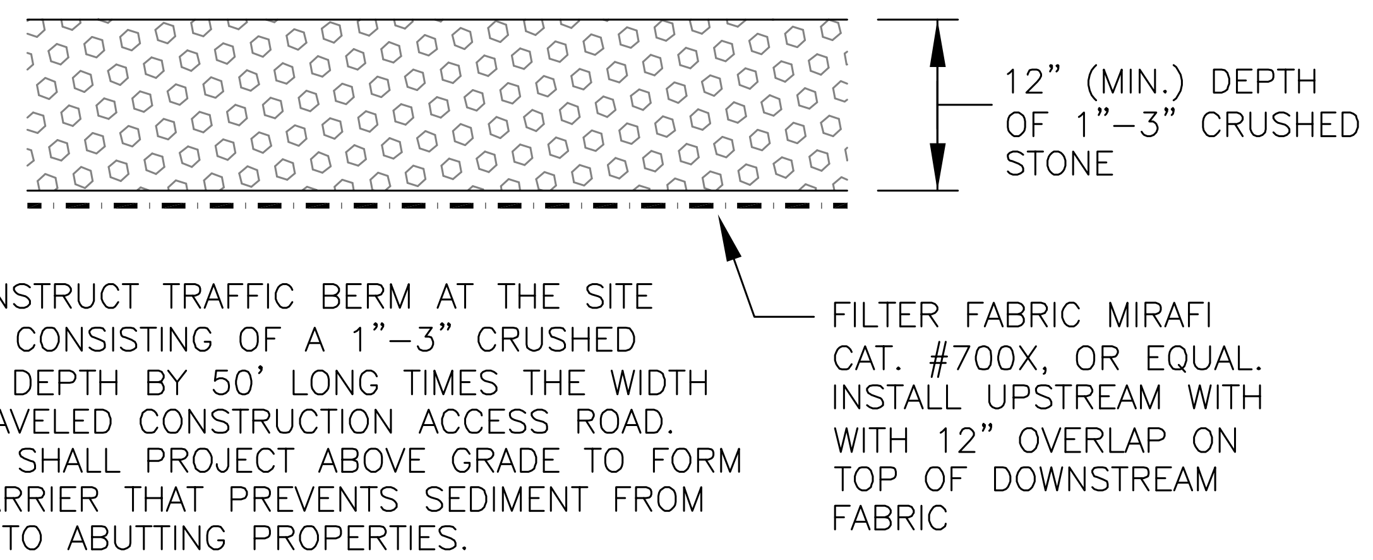
STOP LINE DETAIL
N. T. S.



R1–1 (HIGH INTENSITY)

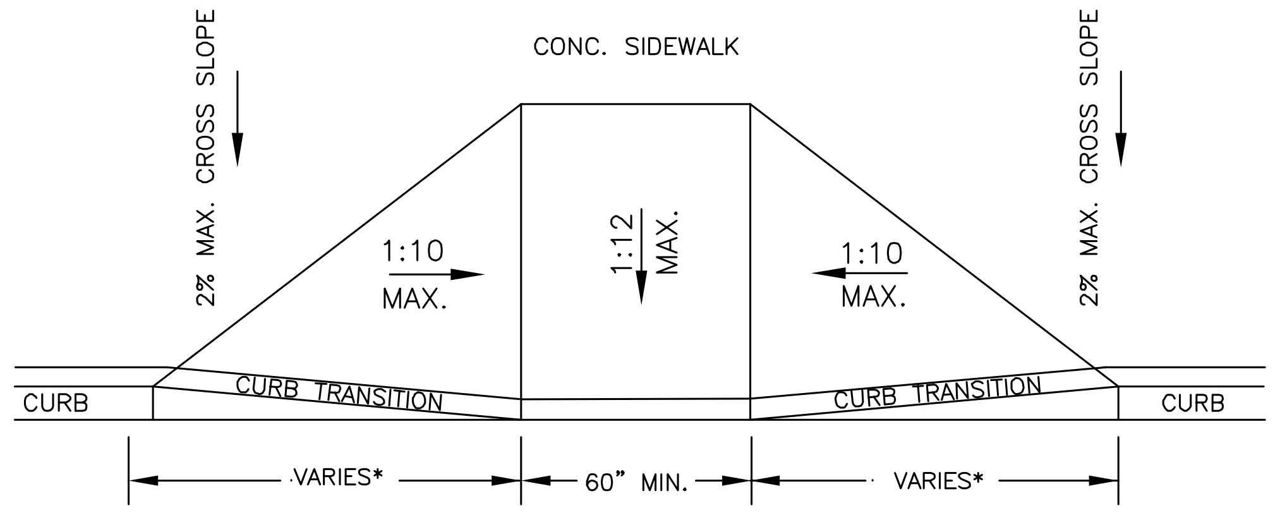
NOTE:
TEXT SHALL COMPLY WITH THE LATEST MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) FOR STREETS AND HIGHWAYS.

TYPICAL STOP SIGN DETAIL
N. T. S.



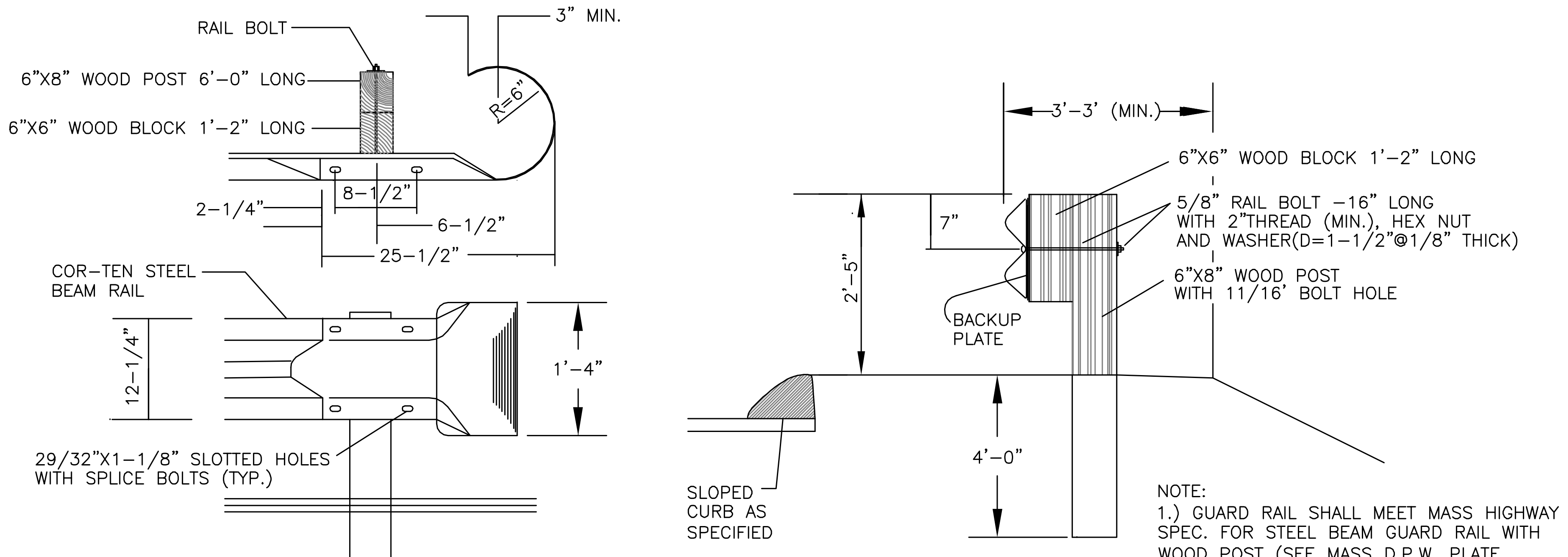
NOTE: CONSTRUCT TRAFFIC BERM AT THE SITE ENTRANCES CONSISTING OF A 1"–3" CRUSHED STONE 12" DEPTH BY 50' LONG TIMES THE WIDTH OF THE TRAVELED CONSTRUCTION ACCESS ROAD. THE STONE SHALL PROJECT ABOVE GRADE TO FORM A BERM BARRIER THAT PREVENTS SEDIMENT FROM WASHING INTO ABUTTING PROPERTIES.

ANTI–TRACKING BERM
N. T. S.



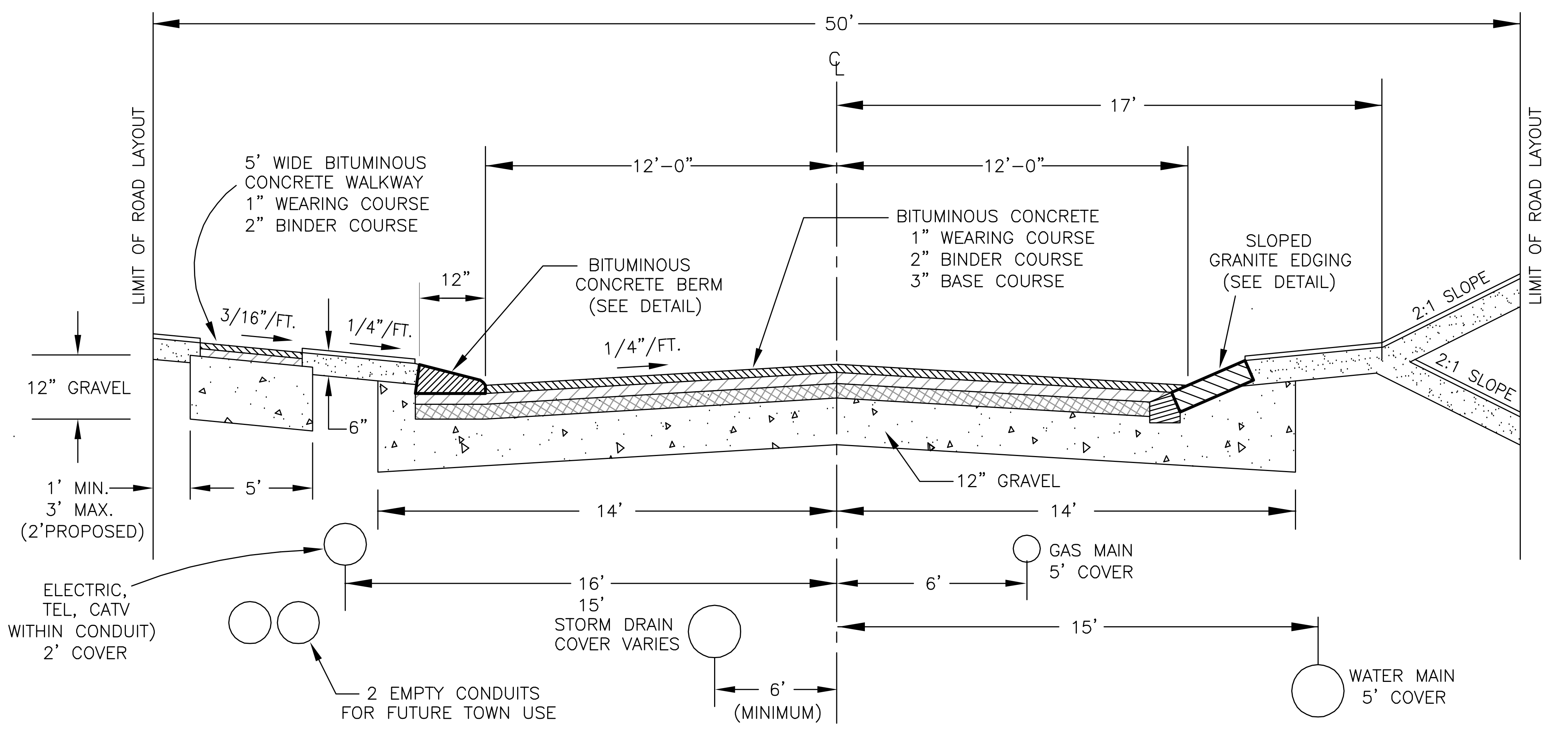
NOTES:
1. CURB TREATMENT VARIES, SEE PLANS FOR CURB TYPE.
2. ELIMINATE ALL CURBING (OTHER THAN VERTICAL CURBING TO BE SET FLUSH) WHERE IT MEETS TRAFFIC PAVEMENT.
3. SIDEWALK HANDICAP RAMP SHALL MEET ADA REQUIREMENTS

SIDEWALK HANDICAP RAMP
N. T. S.

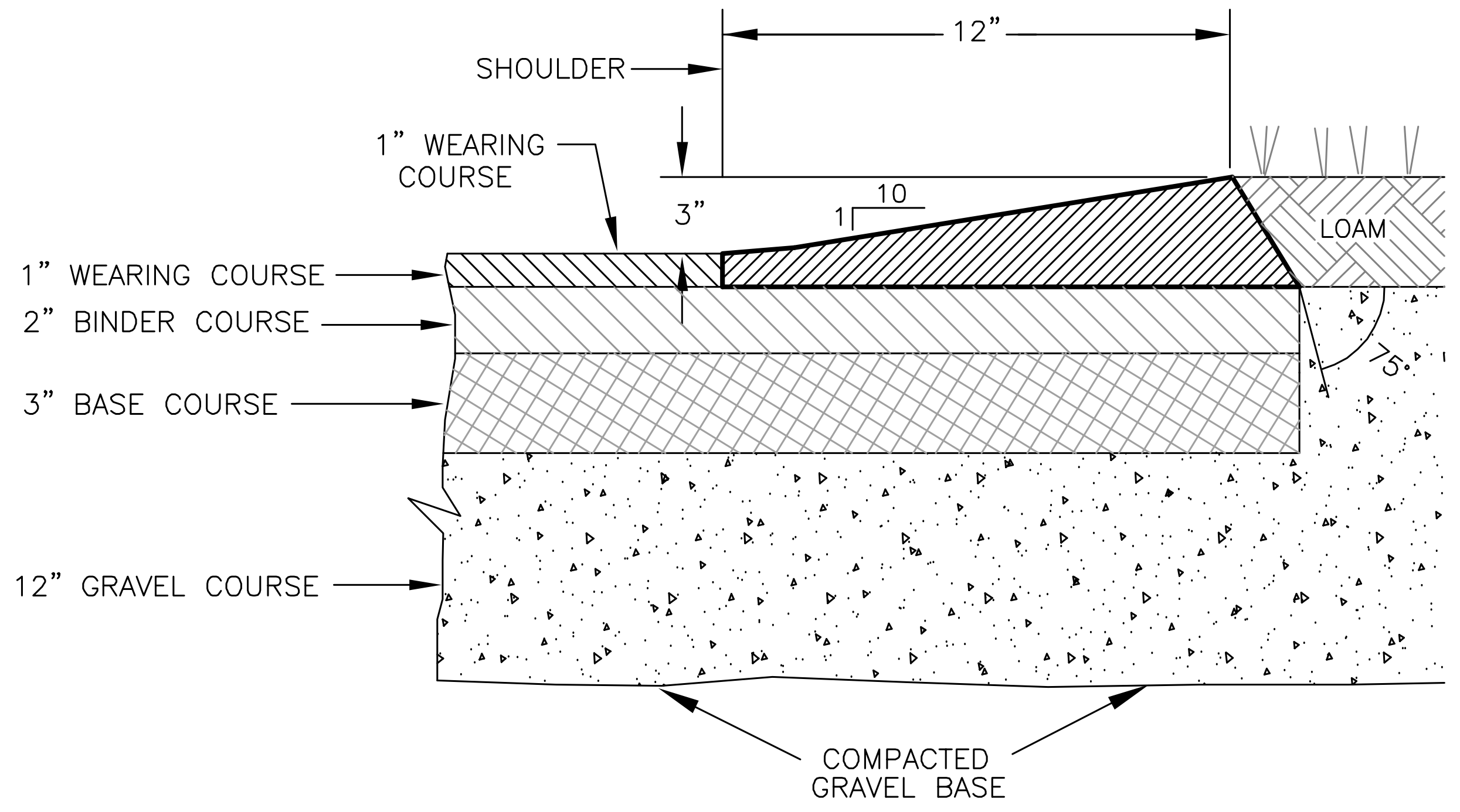


NOTE:
1.) GUARD RAIL SHALL MEET MASS HIGHWAY SPEC. FOR STEEL BEAM GUARD RAIL WITH WOOD POST (SEE MASS D.P.W. PLATE 401.10.0).
2.) STEEL SHALL BE COR–TEN (WEATHERED), OR APPROVED EQUAL.

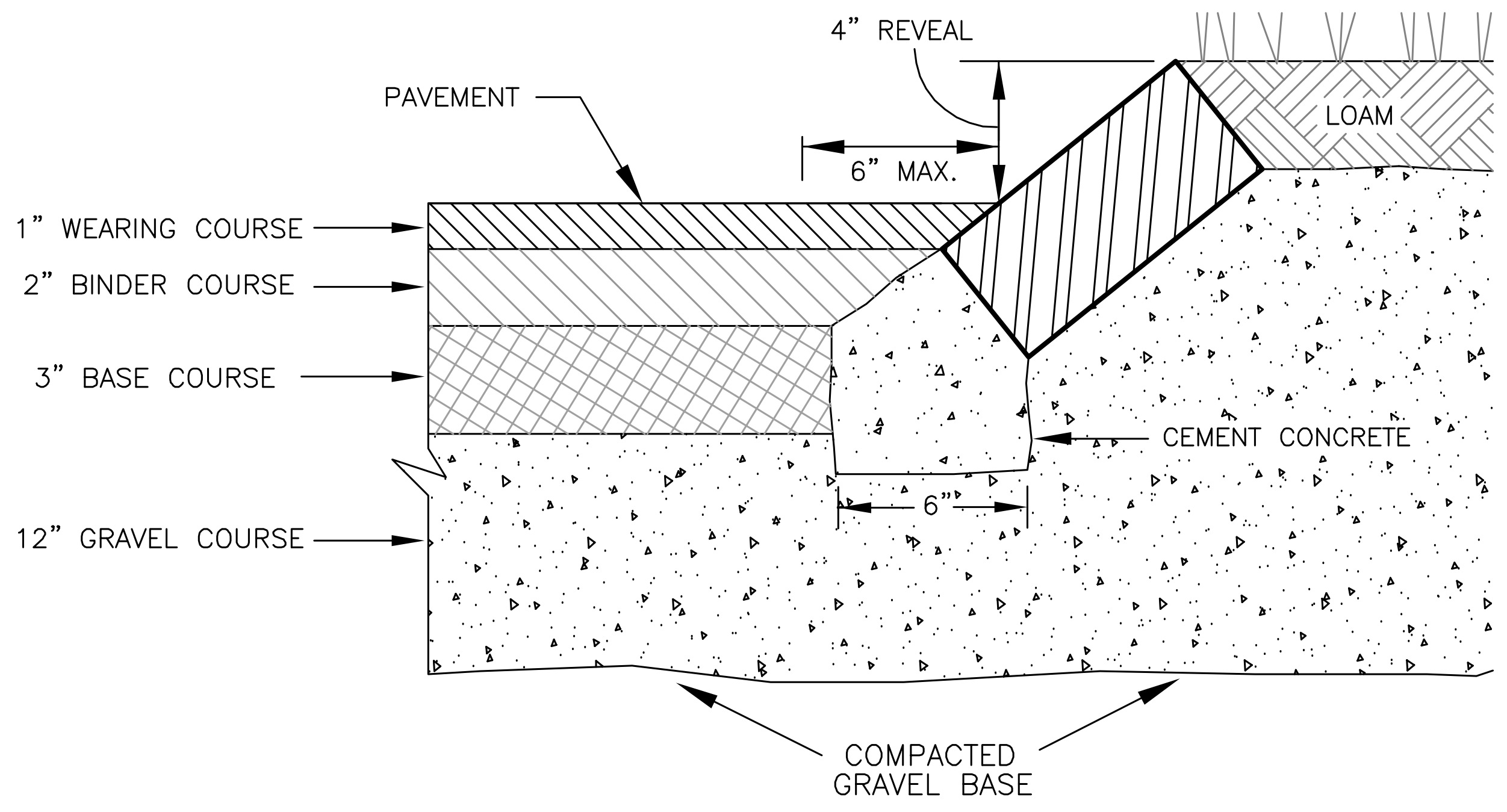
COR–TEN STEEL BEAM GUARDRAIL W/ WOOD POST
N. T. S.
Steel Guard Rail.dwg



TYPICAL ROAD CROSS SECTION
(NOT TO SCALE)



TYPE "A" CAPE COD BERM DETAIL
N. T. S.



GRANITE CURBING DETAIL
N. T. S.
Slopedcurbgran.dwg

NO.	DATE	DESCRIPTION	BY
P1	3/18/21	NOI SUBMITTAL	BMS

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752

DETAIL SHEET
-BONNIE BROOK ESTATES-
DEFINITIVE PLAN OF LAND
MAYNARD ROAD
SUDBURY, MA

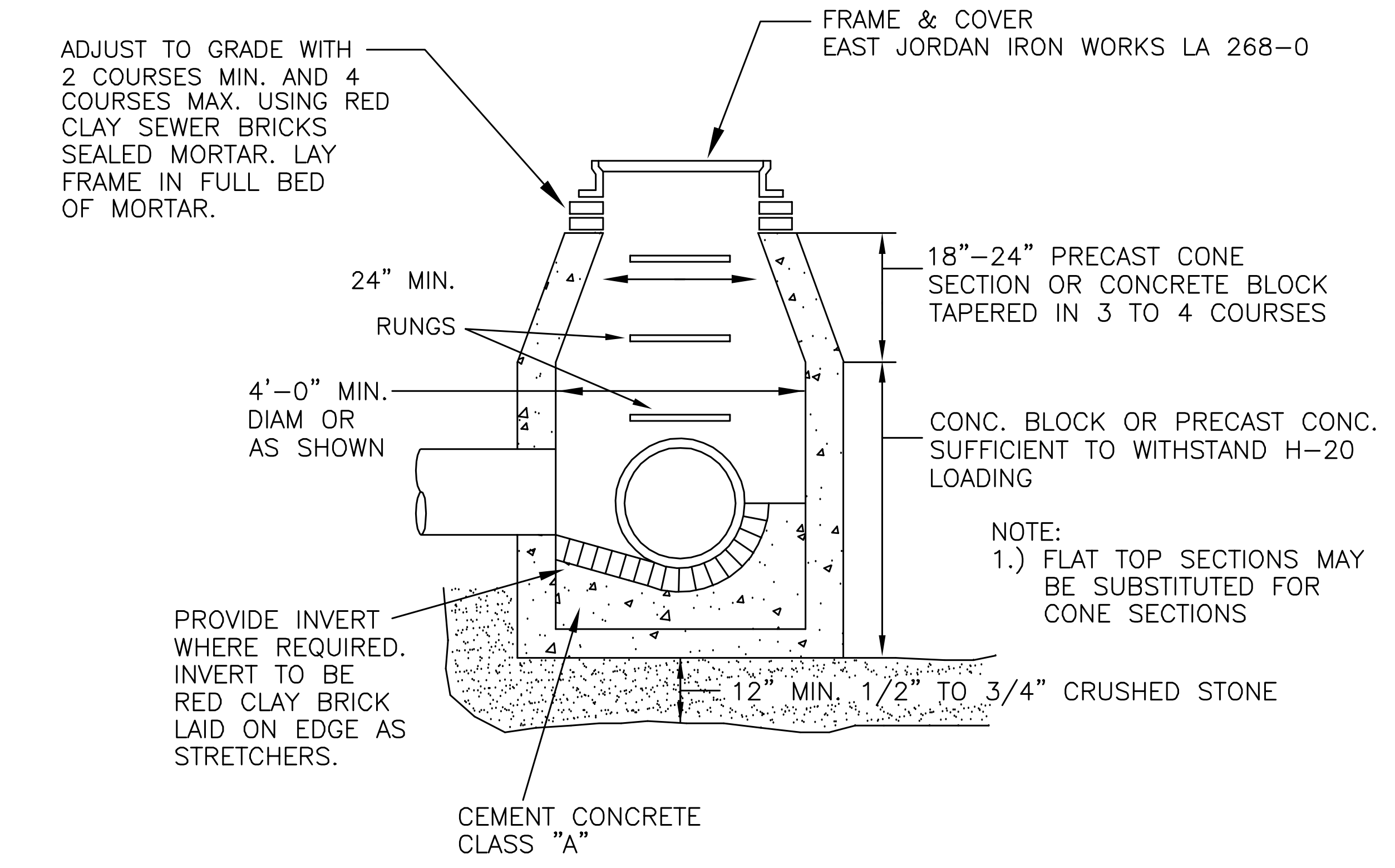
BRUCE N. SALUK
No. 32575

PREPARED FOR:
JOHN DERDERIAN
60 WINDSOR ROAD
WELLESLEY, MA 02481

DATE: OCTOBER 1, 2020

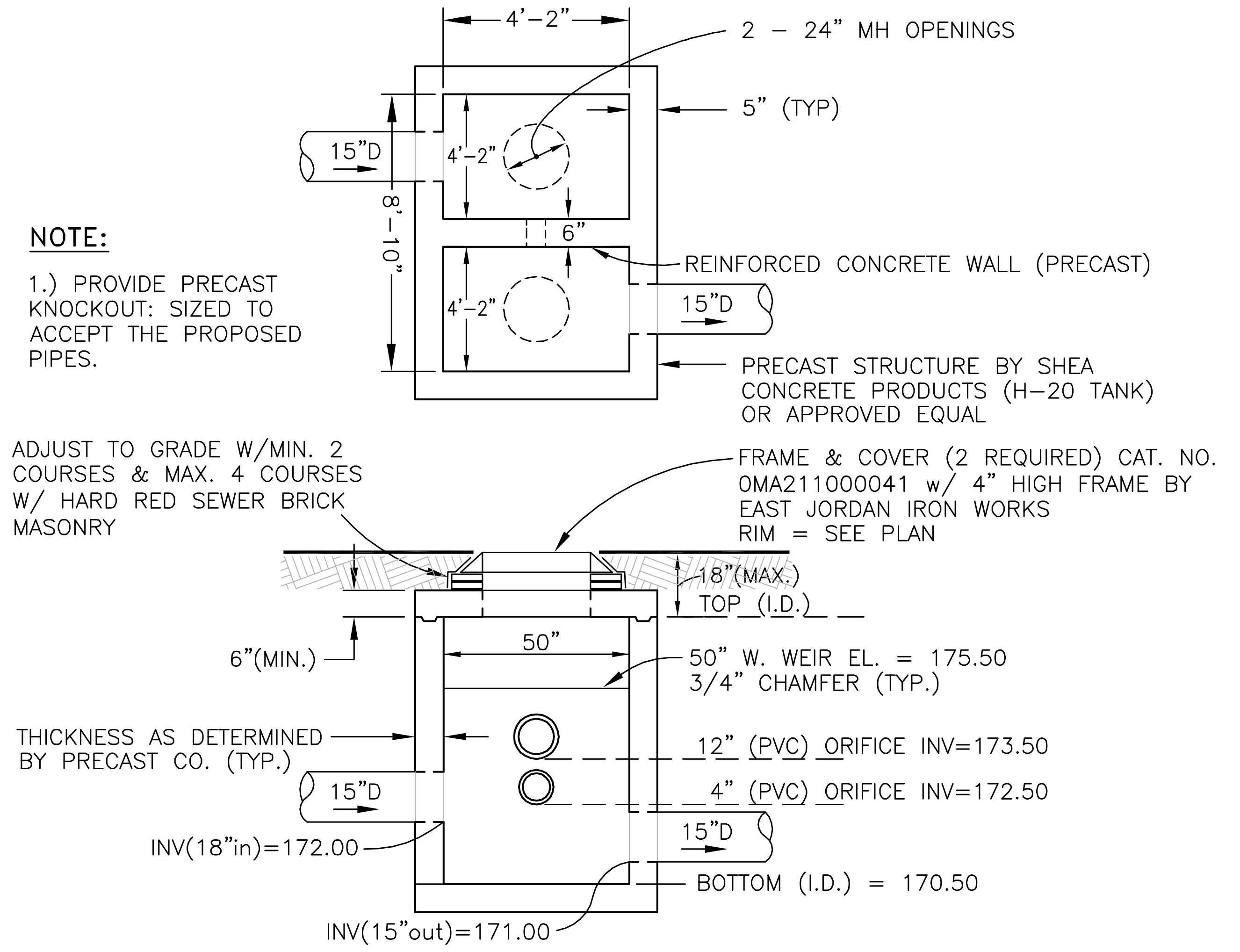
C5

FILE: 2671c1.dwg



STORM DRAIN MANHOLE W/ STEP

N. T. S. DMH4Marlboro.dwg

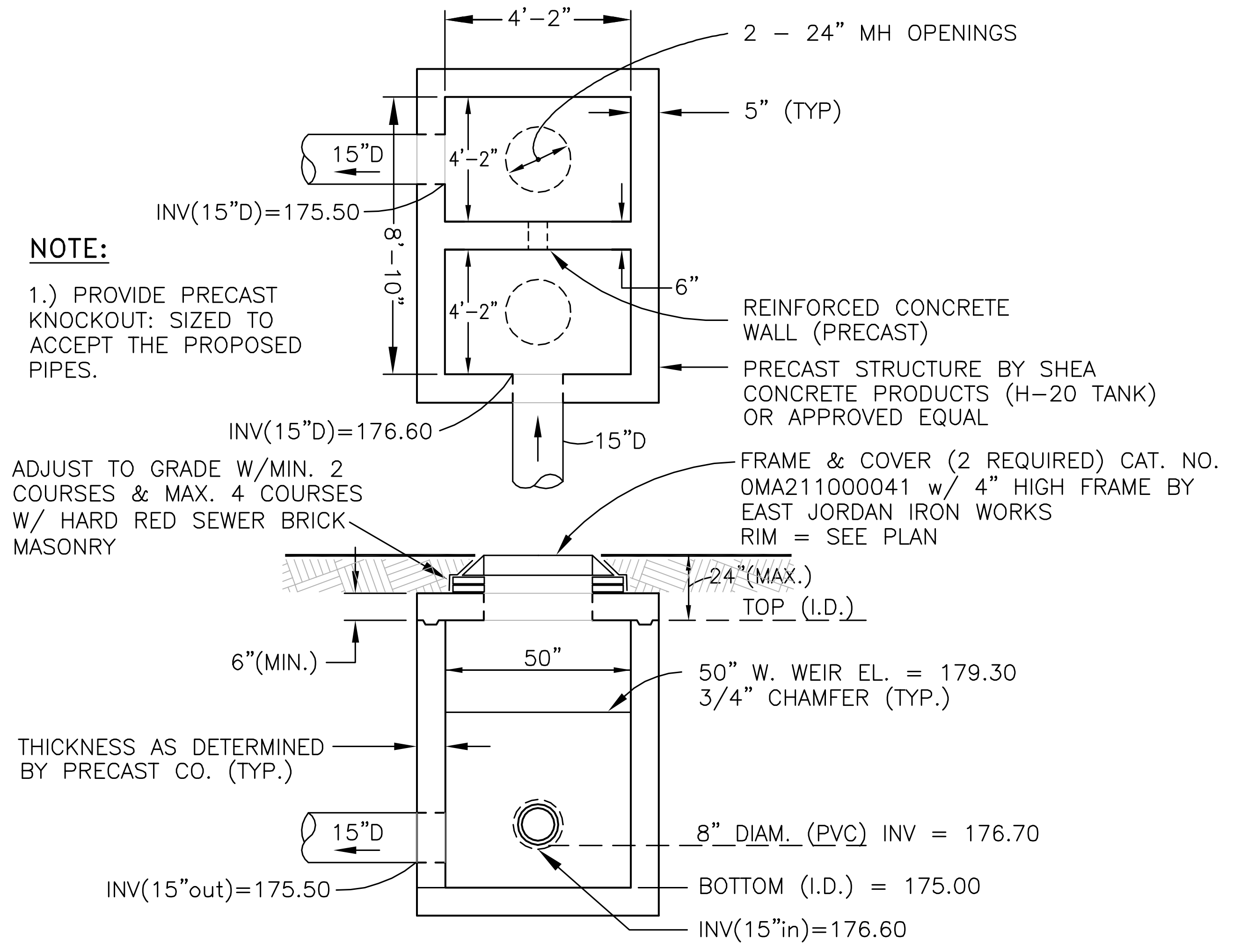


NOTE:

1.) PROVIDE PRECAST KNOCKOUT: SIZED TO ACCEPT THE PROPOSED PIPES.

OUTLET CONTROL STRUCTURE #1 (OCS#1)

N. T. S. Outletcntrl.dwg

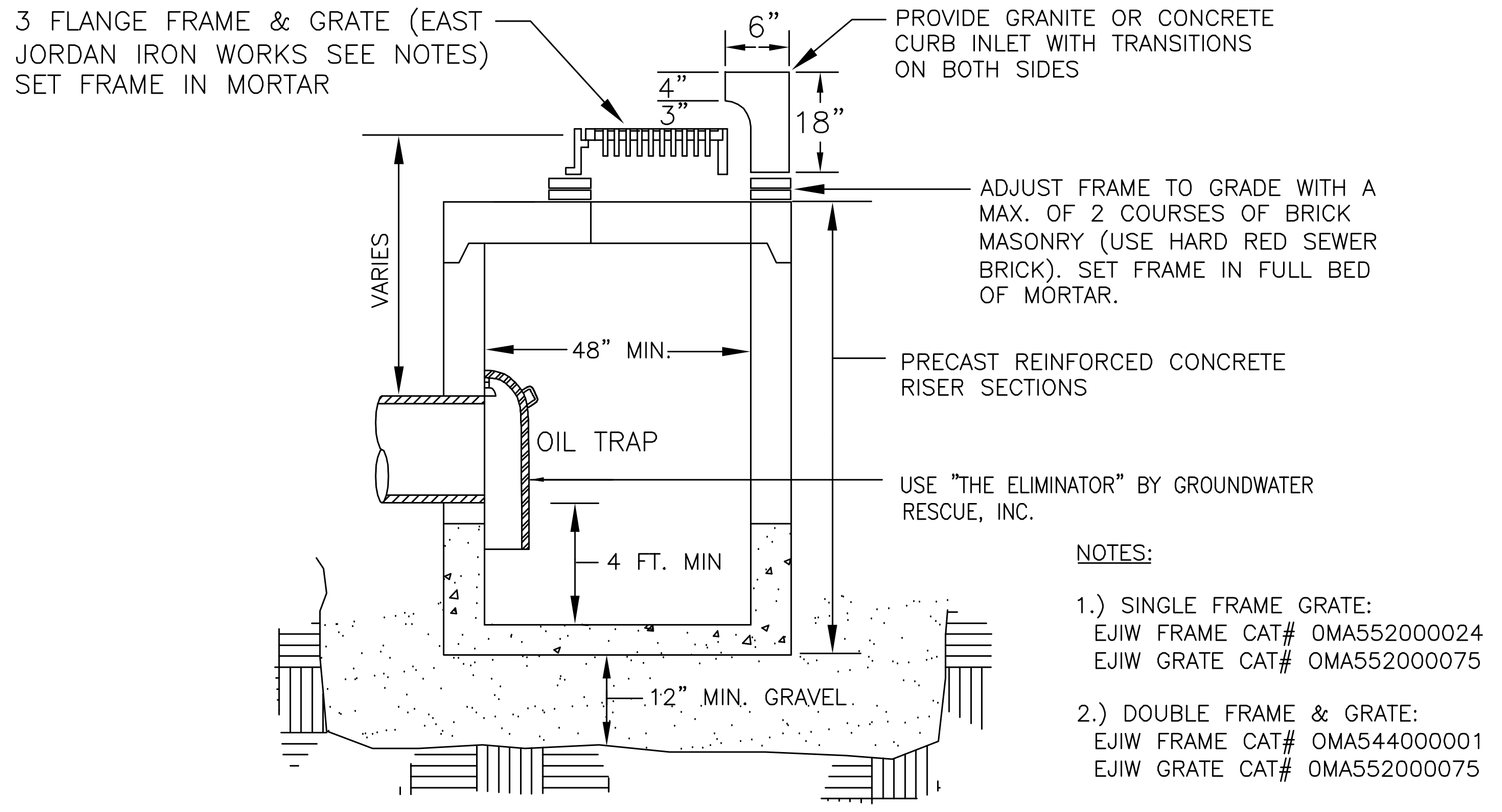


NOTE:

1.) PROVIDE PRECAST KNOCKOUT: SIZED TO ACCEPT THE PROPOSED PIPES.

OUTLET CONTROL STRUCTURE #2 (OCS#2)

N. T. S. Outletcntrl.dwg



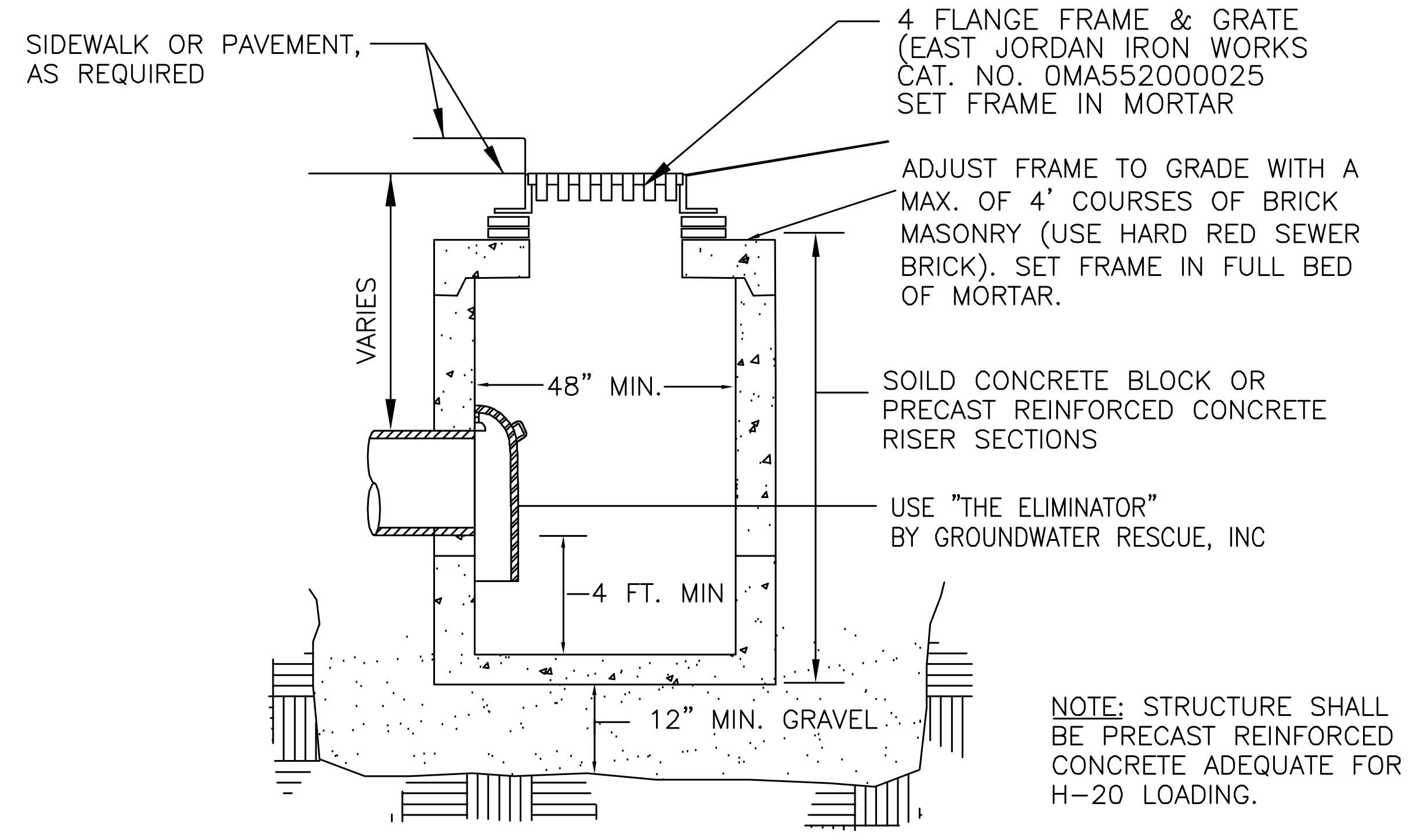
NOTES:

1.) SINGLE FRAME GRATE:
EJIW FRAME CAT# 0MA552000024
EJIW GRATE CAT# 0MA552000075

2.) DOUBLE FRAME & GRATE:
EJIW FRAME CAT# 0MA544000001
EJIW GRATE CAT# 0MA552000075

SINGLE & DOUBLE CATCH BASIN WITH CURB INLET

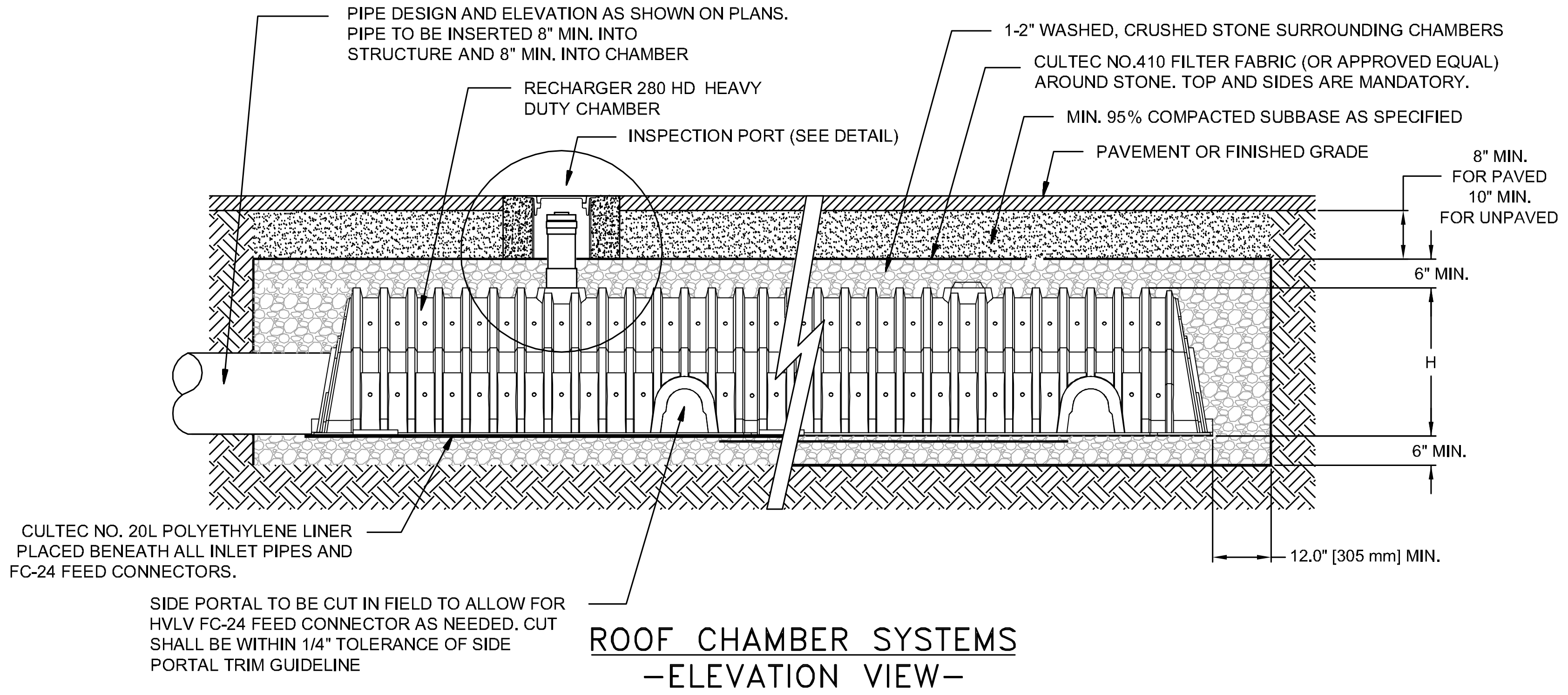
N. T. S. CB1–Marlborough.Dwg



NOTE: STRUCTURE SHALL BE PRECAST REINFORCED CONCRETE ADEQUATE FOR H-20 LOADING.

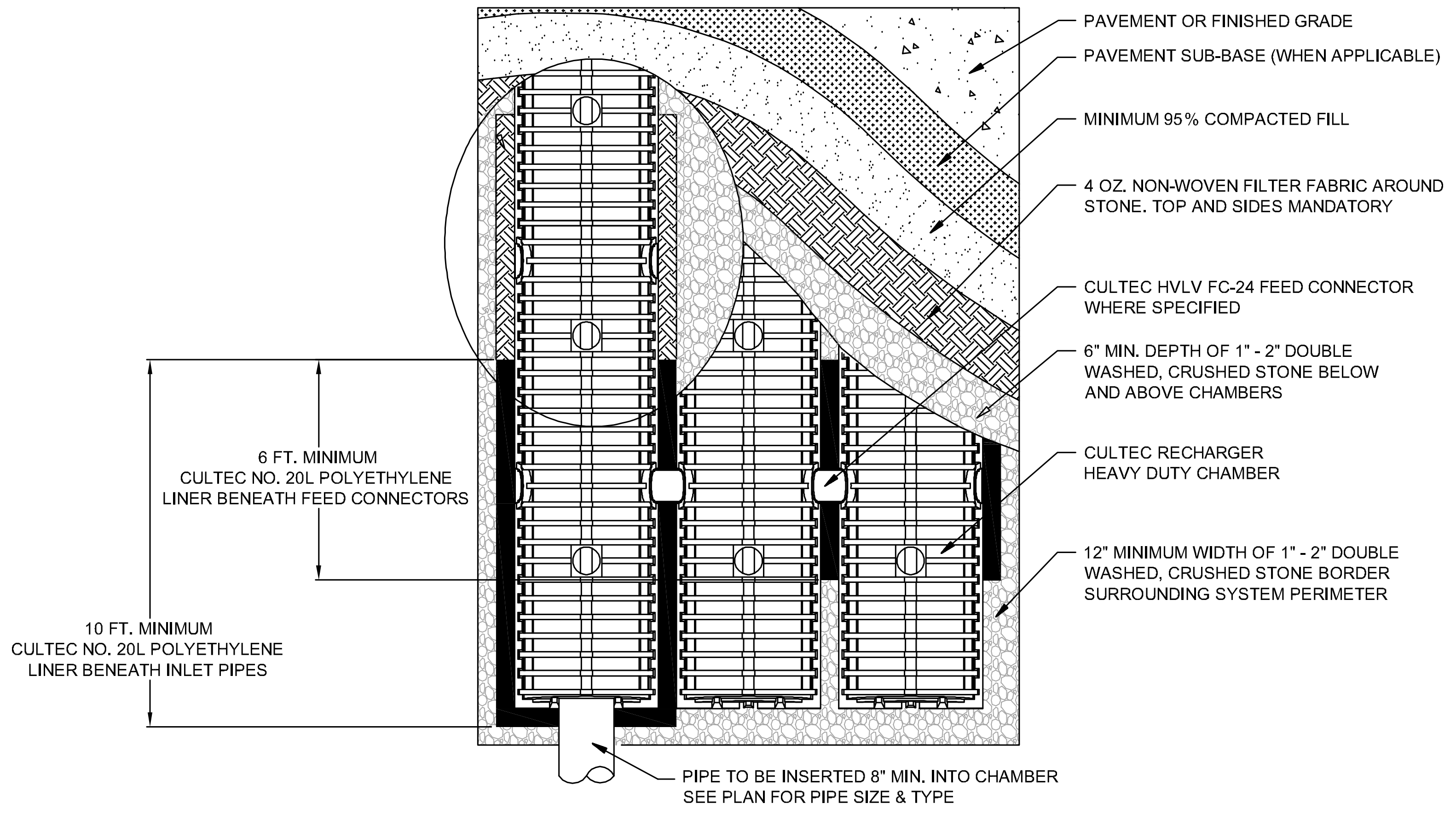
CATCH BASIN (ROAD ENTRANCE ONLY)

N. T. S. CB6.dwg



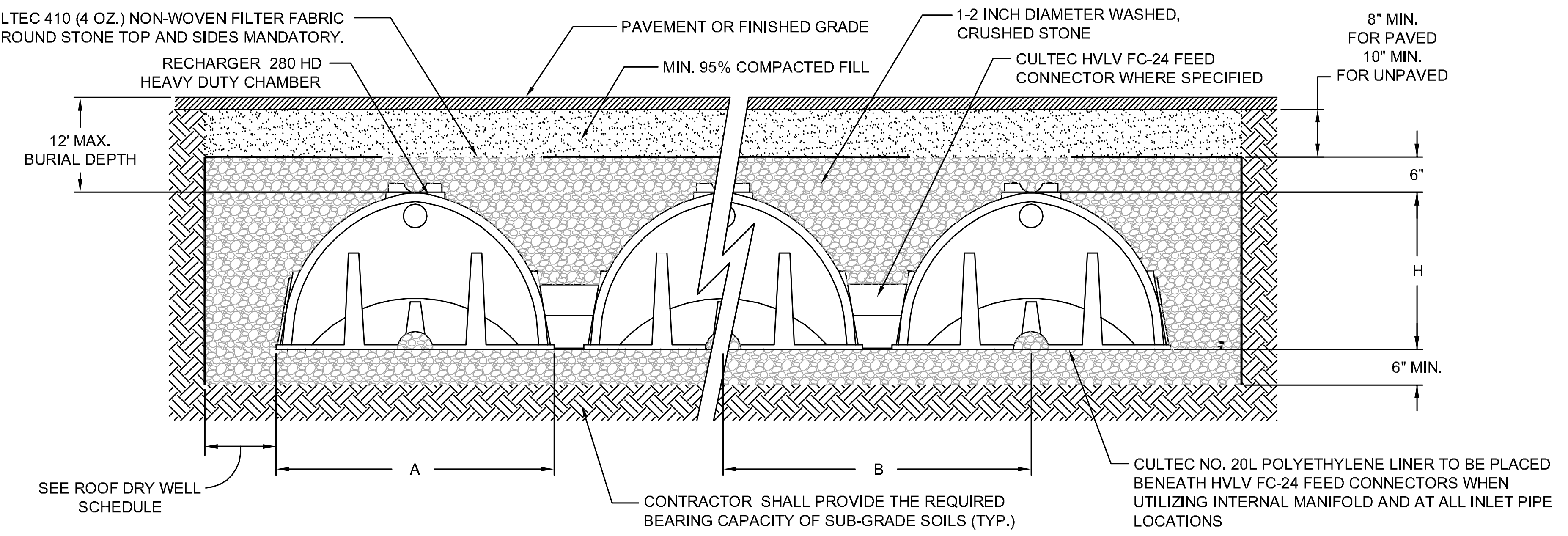
ROOF CHAMBER SYSTEMS
-ELEVATION VIEW-

N. T. S.



ROOF CHAMBER SYSTEMS
– PLAN VIEW –

N. T. S.



ROOF CHAMBER SYSTEMS
-SECTION VIEW-

N. T. S.

ROOF DRYWELL SCHEDULE

ROOF DRYWELL	FOR LOTS**	STONE DIMENSIONS	CULTEC CHAMBER SCHEDULE	GWT. ELEV.	BOTTOM STONE ELEV.	BOTTOM CHAMBER ELEV.	TOP CHAMBER ELEV.	TOP STONE ELEV.
R2	LOT 2	18'W x 44'L x 2.6'H	5 ROWS @ 4 (R–150 XLHD)/ROW)	183.0	185.0	185.5	187.0	187.6
R3	LOT 3	13'W x 26'L x 3.3'H	2 ROWS @ 3 (R–280HD)/ROW)	170.0	173.0	173.50	175.7	176.3
R4	LOT 4	11'W x 26'L x 3.3'H	2 ROWS @ 3 (R–280HD)/ROW)	163.9	166.50	167.0	169.2	169.8
R6	LOT 6	11'W x 26'L x 3.3'H	2 ROWS @ 3 (R–280HD)/ROW)	164.2	166.5	167.0	169.2	169.8
R7	LOT 7	11'W x 26'L x 3.3'H	2 ROWS @ 3 (R–280HD)/ROW)	167.5	170.2	170.7	172.9	173.5

* – GW TAKEN FROM TEST HOLES
** – ROOF TRIBUTARY AREA FOR ROOF CHAMBER SYSTEMS SHALL BE FOR ENTIRE ROOF AREA

GENERAL NOTES

1)RECHARGER CHAMBERS BY CULTEC, INC. OF BROOKFIELD, CT.
2)REFER TO CULTEC, INC.'S CURRENT RECOMMENDED INSTALLATION GUIDELINES.
3)MAXIMUM ALLOWED COVER OVER TOP OF UNIT SHALL BE 12' THE CHAMBER WILL BE DESIGNED TO WITHSTAND TRAFFIC LOADS WHEN INSTALLED ACCORDING TO CULTEC'S RECOMMENDED INSTALLATION INSTRUCTIONS.
4)ALL RECHARGER HEAVY DUTY UNITS ARE MARKED WITH A COLOR STRIPE FORMED INTO THE PART ALONG THE LENGTH OF THE CHAMBER. ALL RECHARGER CHAMBERS MUST BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.
4) OVERFLLOW TEES ARE REQUIRED WHERE ROOF DRAINS ARE PIPED TO THE CHAMBERS.
5) SEE PLAN FOR STONE, CHAMBER, PIPE AND FINISHED GRADE ELEVATIONS.

CHAMBER SCHEDULE

CHAMBER	H	A	B
R–150 XLHD	18.5"	33"	39'
R–280 HD	26.5"	47"	52"

NO.	DATE	DESCRIPTION	BY
P1	3/18/21	NOI SUBMITTAL	BMS

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752

DETAIL SHEET
-BONNIE BROOK ESTATES-
DEFINITIVE PLAN OF LAND

MAYNARD ROAD
SUDBURY, MA

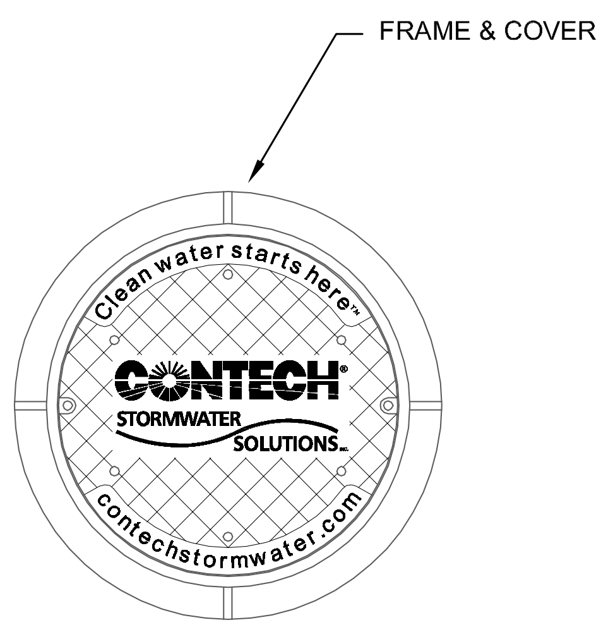
BRUCE M. SALUK CIVIL No. 32375

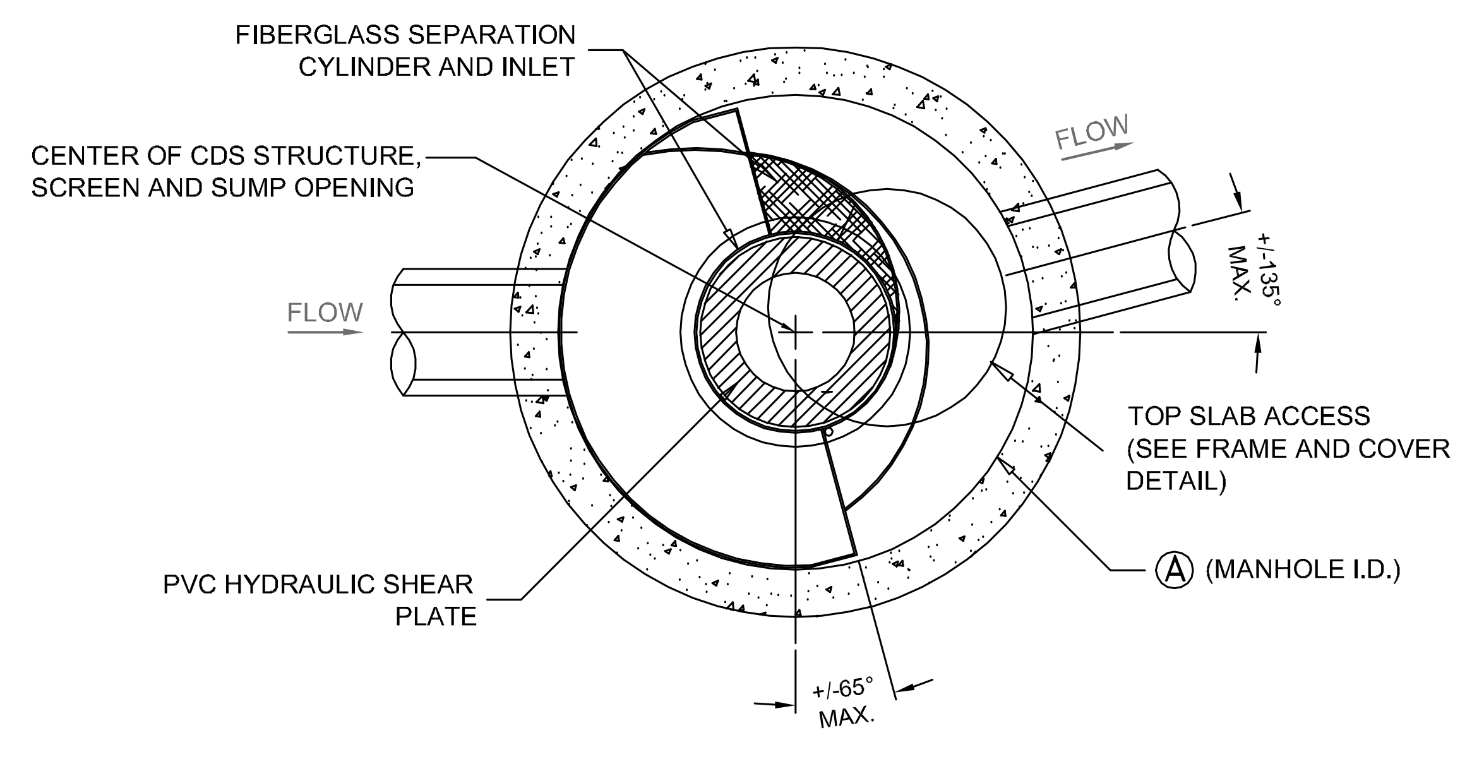
PREPARED FOR:
JOHN DERDERIAN
60 WINDSOR ROAD
WELLESLEY, MA 02481

DATE: OCTOBER 1, 2020

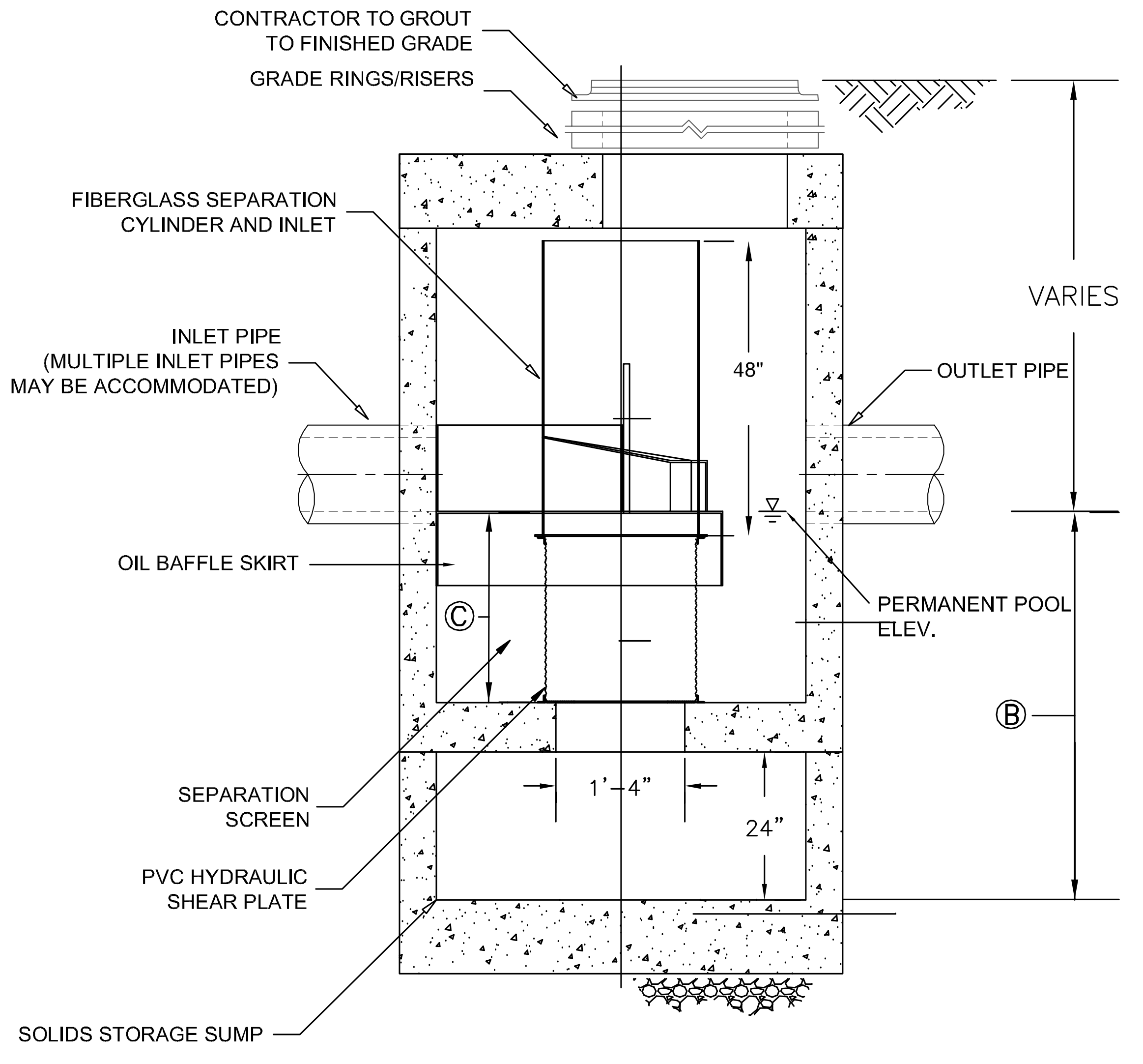
C6

FILE: 2671c1.dwg





PLAN VIEW B-B
N.T.S.



ELEVATION A-A
N.T.S.

WQI SCHEDULE

WQI	CCD MODEL #	DIMENSIONS Ⓐ	Ⓑ	Ⓒ
WQI#1–3	2015–4–C	36"	4'–2"	20"

WATER QUALITY INLETS(WQI) SHALL BE BY CONTECH ENGINEERED SOLUTIONS, AS NOTED IN THE WQI SCHEDULE.

WATER QUALITY UNITS (WQU) 1–3

N. T. S. cds.dwg

DRAINAGE OUTLINE NOTES:

1. Materials and construction of the storm drain system and associated work shall conform to the Town of Sudbury Construction Standards, as amended, the Planning Board rules and regulations and the Mass. DPW Standard Specifications in the document entitled Standard Specifications for Highways and Bridges, 1988 as amended.

2. Storm Drain Manholes shall be reinforced precast concrete conforming to ASTM Specification Section C478. Grade adjustment and pipe connections shall be as stipulated for the Standard cast Catch Basins detailed on this sheet.

3. Storm sewer covers shall the word DRAIN cast in 3–inch high letters on the covers. Refer to the detail sheets for specifications and model types.

4. Provide pipe joint a maximum of 3' from manhole walls.

5. Reinforcing for all precast units shall conform to ASTM Specification Section A 185 and shall include reinforcing in bell in spigot of riser sections. Reinforcing shall be placed in accordance with AASHTO Designation N199.

6. In the event that rock is encountered, the contractor shall maintain a 12–inch minimum separation between the pipe and the rock.

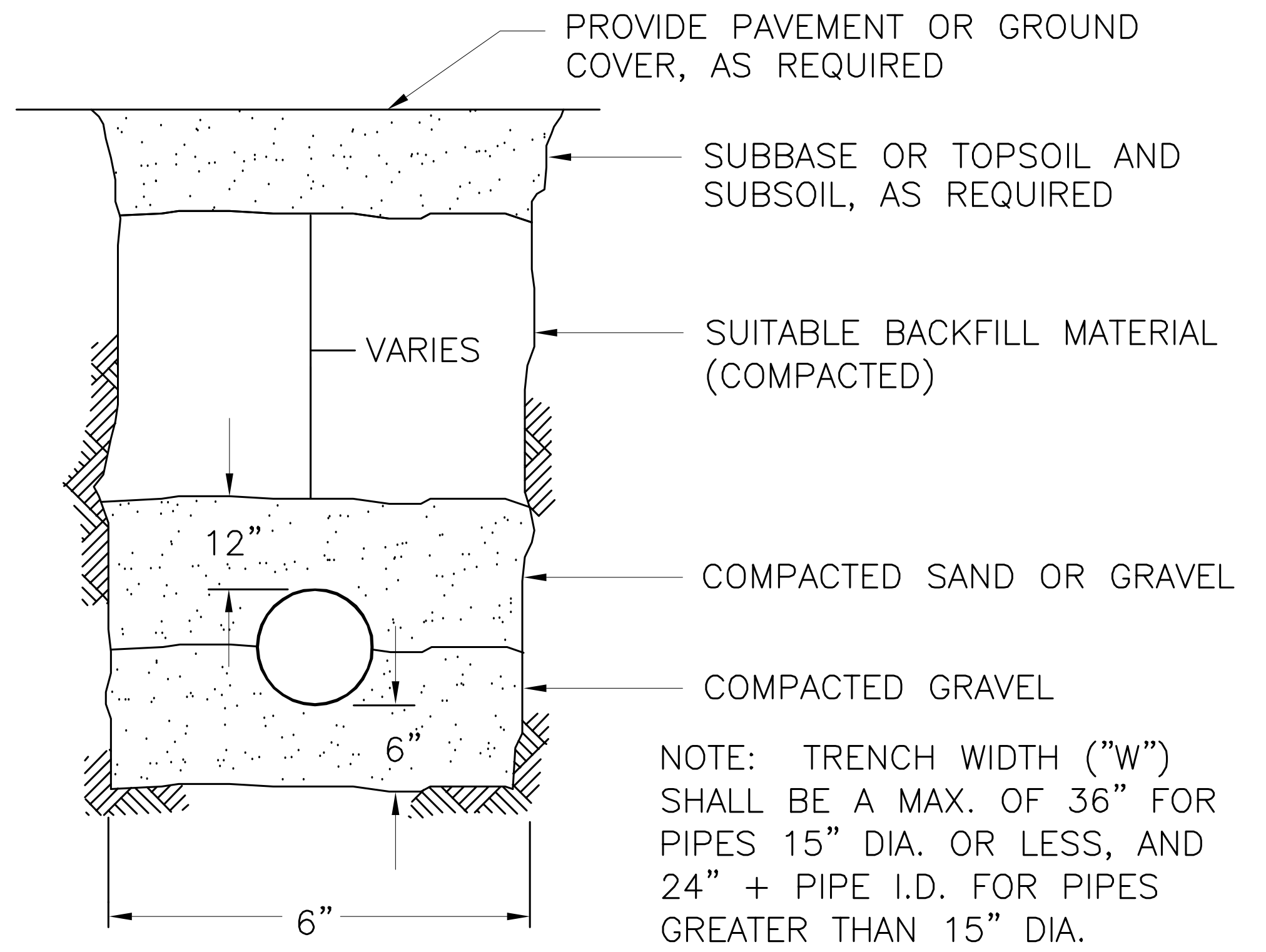
7. Suitable backfill material shall be select excavated material from which frozen material, humus, peat, roots, vegetation, trash, rocks, and stones larger than 6–inches have been removed.

8. Compaction of backfill material between centerline of pipe and trench pavement shall be done in 12–inch layers, or less, as required to prevent trench settlement. The con– tractor will be responsible for excessive trench settlement following final paving.

9. Utilities shown on this plan are partly from available municipal and utility Co. records information and are approximate, only. There may be existing lines other than those shown hereon. The contractor shall be required to contact the proper utility companies & dig– safe prior to beginning any construction on the site. Our firm does not warrant or guarantee the location of any utilities hereon.

10. The elevation datum is NAVD 88.

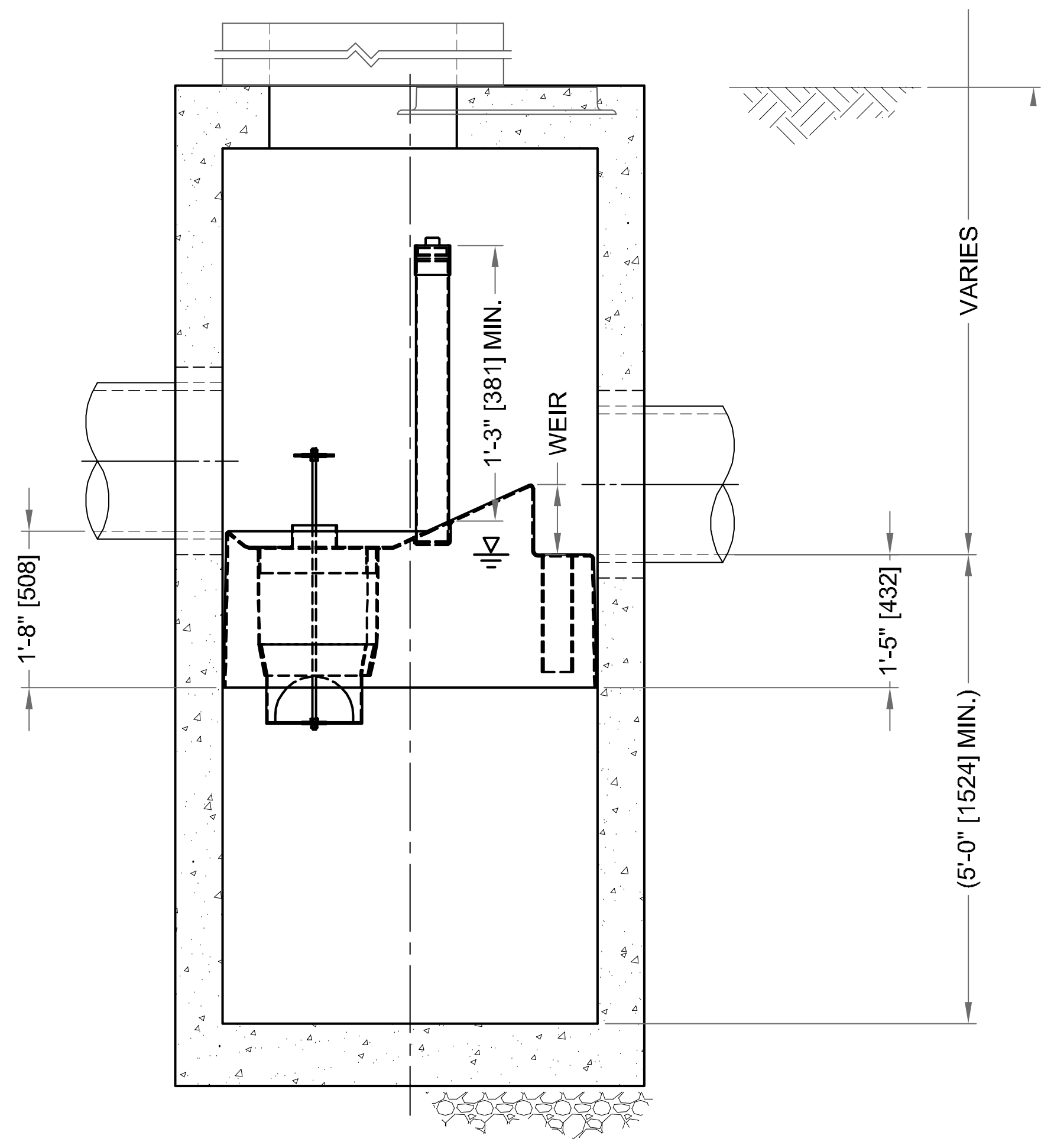
11. Unless otherwise noted on the drawings, pipe and Flared end sections (FES) shall conform to AASHTO M170 Standards, or ASTM C–76 for drain pipe. All 12–inches through 48–inches in diameter shall be reinforced concrete conforming to ASTM C–76 Class 3, Wall B circular reinforcement. Where specified, 12–inch through 48–inch diameter Class 4 drain lines shall be Wall B.



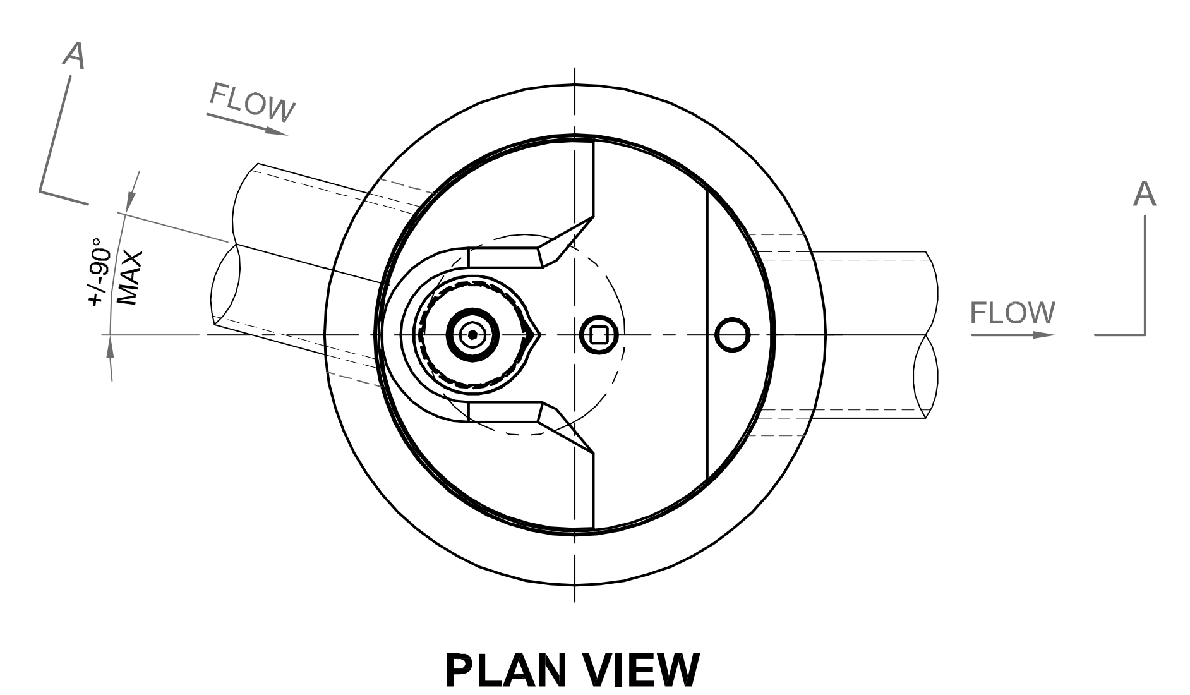
NOTE: TRENCH WIDTH ("W") SHALL BE A MAX. OF 36" FOR PIPES 15" DIA. OR LESS, AND 24" + PIPE I.D. FOR PIPES GREATER THAN 15" DIA.

TRENCH SECTION FOR STORM DRAIN

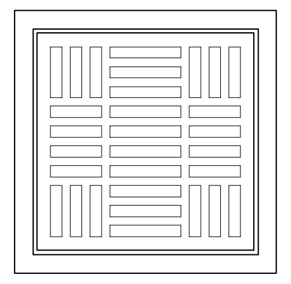
N. T. S. TRENCH2.DWG



SECTION A-A



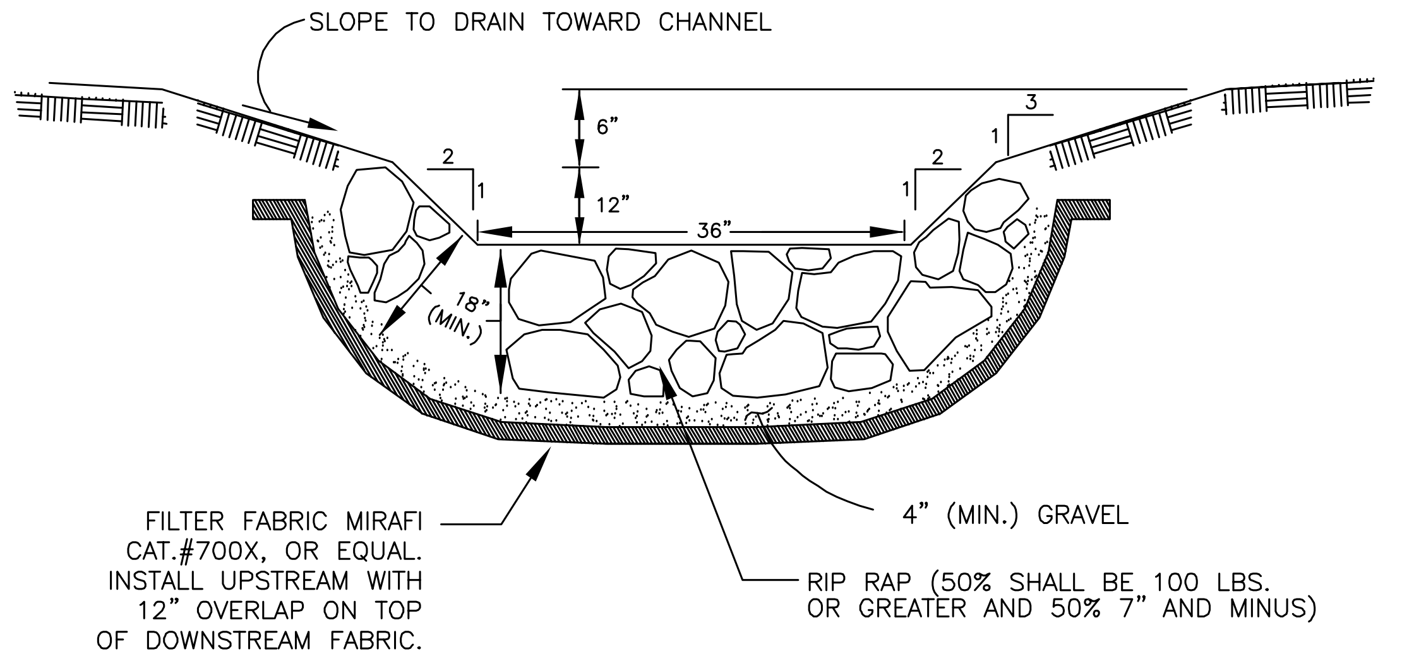
PLAN VIEW
TOP SLAB NOT SHOWN



FRAME AND GRATE
(MAY VARY)
NOT TO SCALE

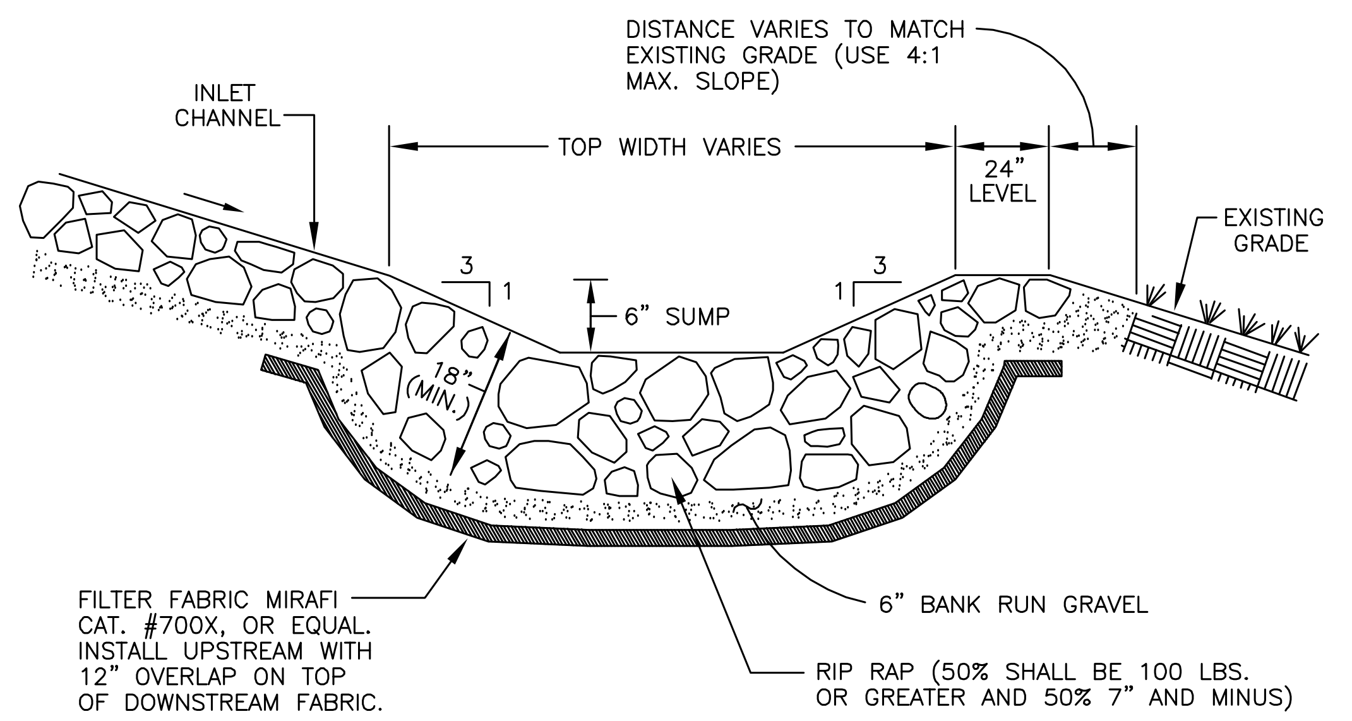
WATER QUALITY UNITS (WQU) 4 & 5

N. T. S. cds–wqi.dwg



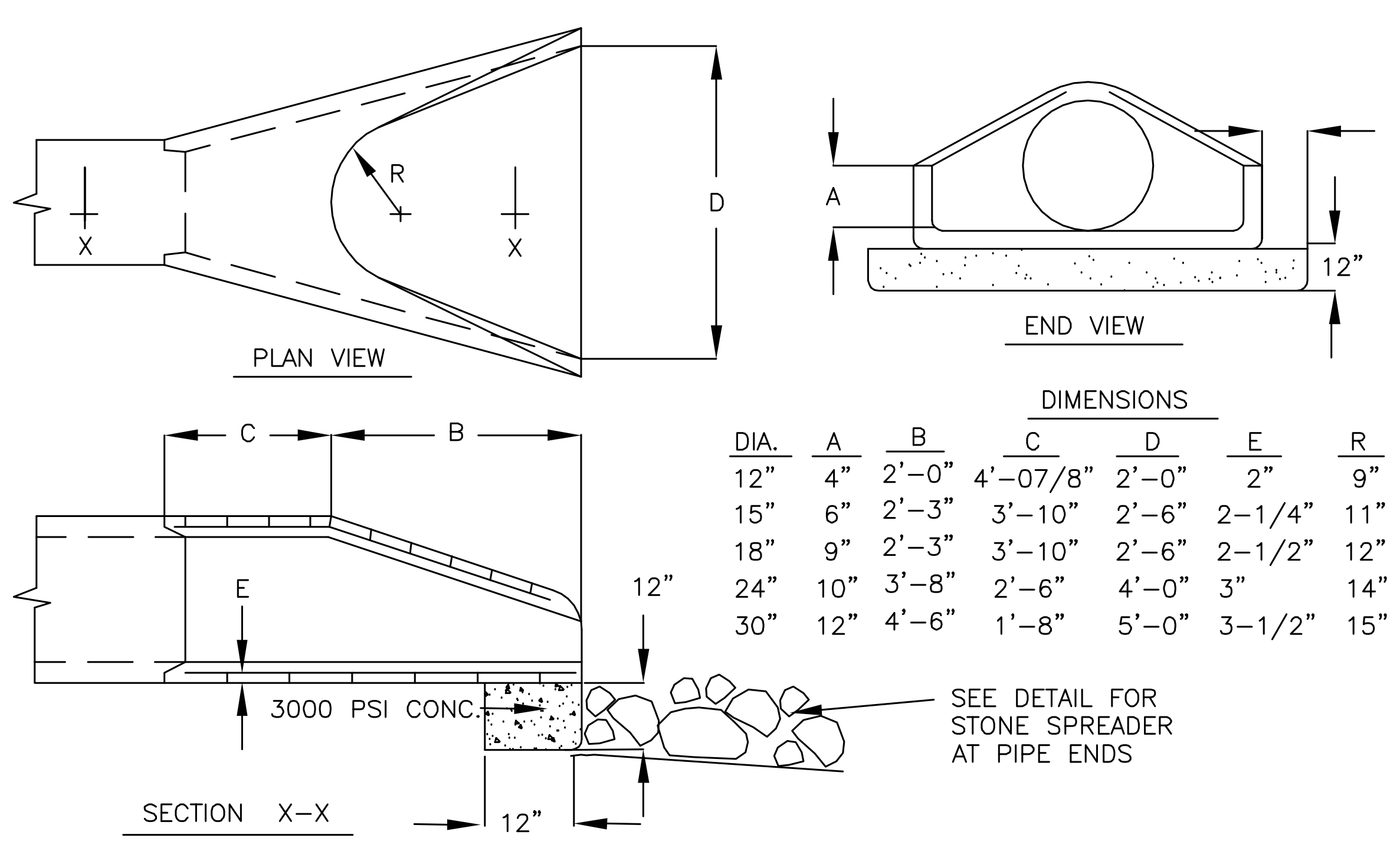
SMALL STONE CHANNEL

N. T. S. SWALESTONE.dwg



LEVEL SPREADER SECTION

N. T. S. levelsprdr.dwg

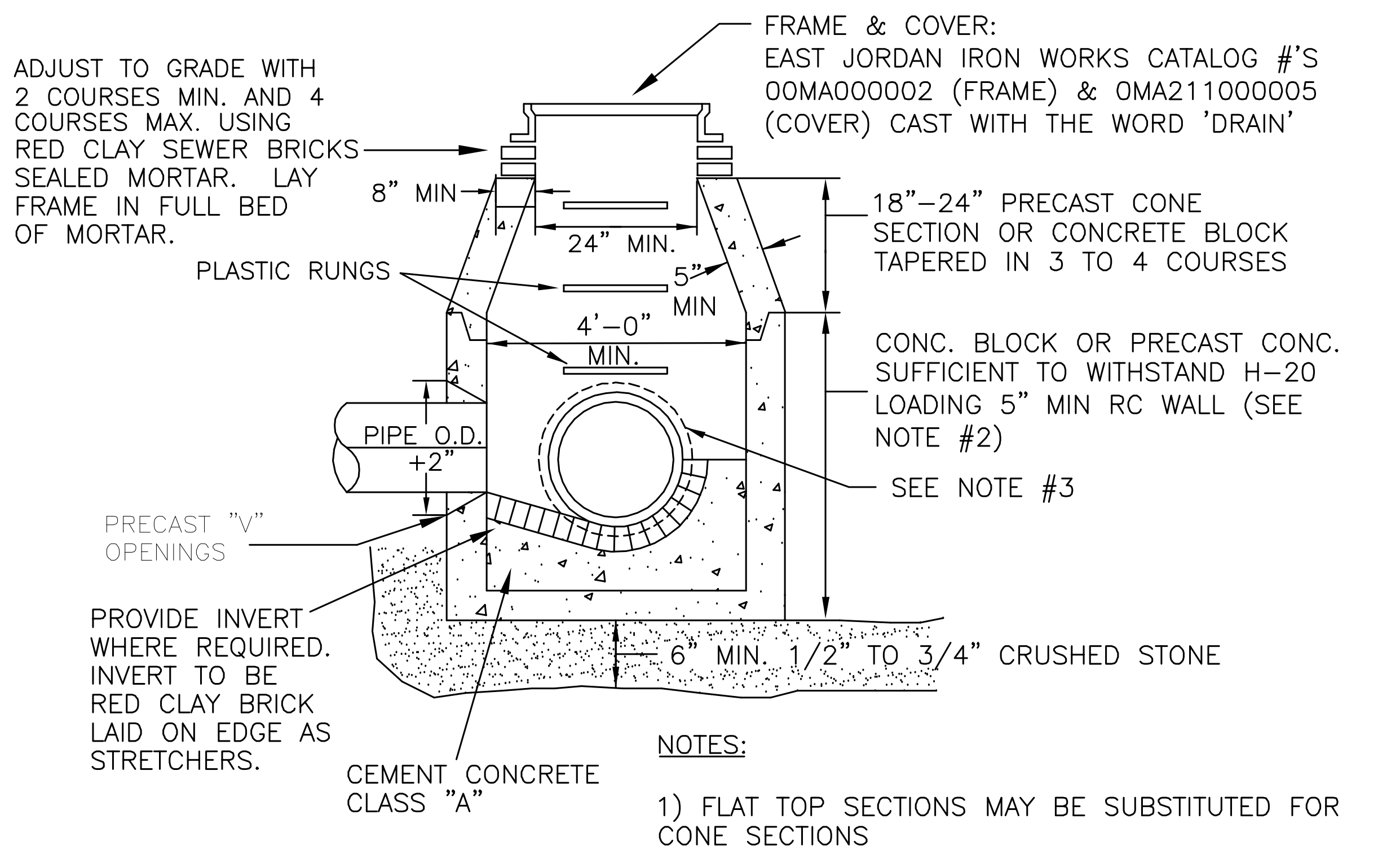


DIMENSIONS

DIA.	A	B	C	D	E	R
12"	4"	2'–0"	4'–07/8"	2'–0"	2"	9"
15"	6"	2'–3"	3'–10"	2'–6"	2–1/4"	11"
18"	9"	2'–3"	3'–10"	2'–6"	2–1/2"	12"
24"	10"	3'–8"	2'–6"	4'–0"	3"	14"
30"	12"	4'–6"	1'–8"	5'–0"	3–1/2"	15"

FLARED END SECTION (REINFORCED CONCRETE)

N. T. S. FES1.dwg



NOTES:

1) FLAT TOP SECTIONS MAY BE SUBSTITUTED FOR CONE SECTIONS

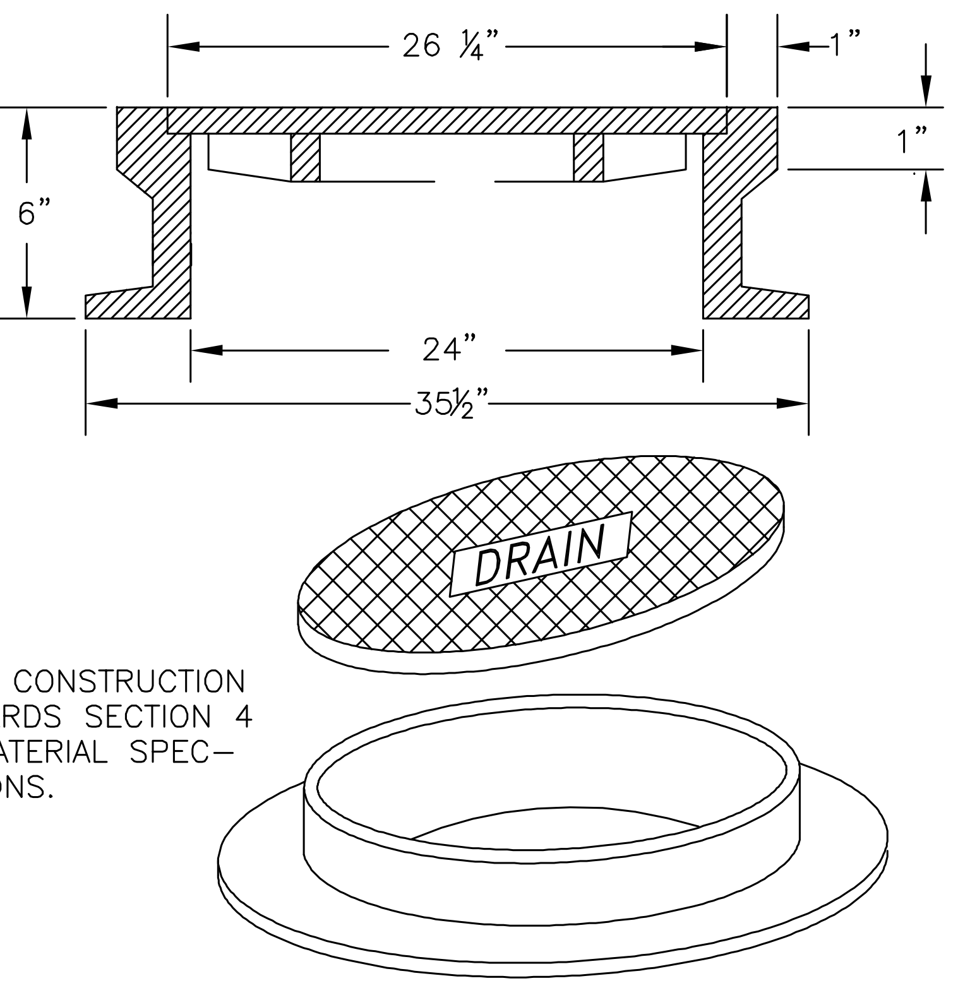
2) MIN 0.12 SQ. IN. STEEL PER VERTICAL FOOT, PLACED ACCORDING TO ARSHTO DESIGNATION M–189

3) FOR PIPES 18" DIAMETER AND GREATER PROVIDE SINGLE ANNULAR #3 BAR FOR MANHOLE OPENING W/2" CLEAR

STORM DRAIN MANHOLE W/ STEP

N. T. S.

FRAME & COVER EJUSA OMA000002(FRAME)
EJUSA OMA211000005(COVER) OR APPROVED EQUAL



NOTE:

1. SEE CONSTRUCTION STANDARDS SECTION 4 FOR MATERIAL SPECIFICATIONS.

DRAIN FRAME & COVER

N. T. S. Frame&CoverDrain NATICK.dwg

NO.	DATE	DESCRIPTION	BY
P1	3/16/21	NOI SUBMITTAL	BMS

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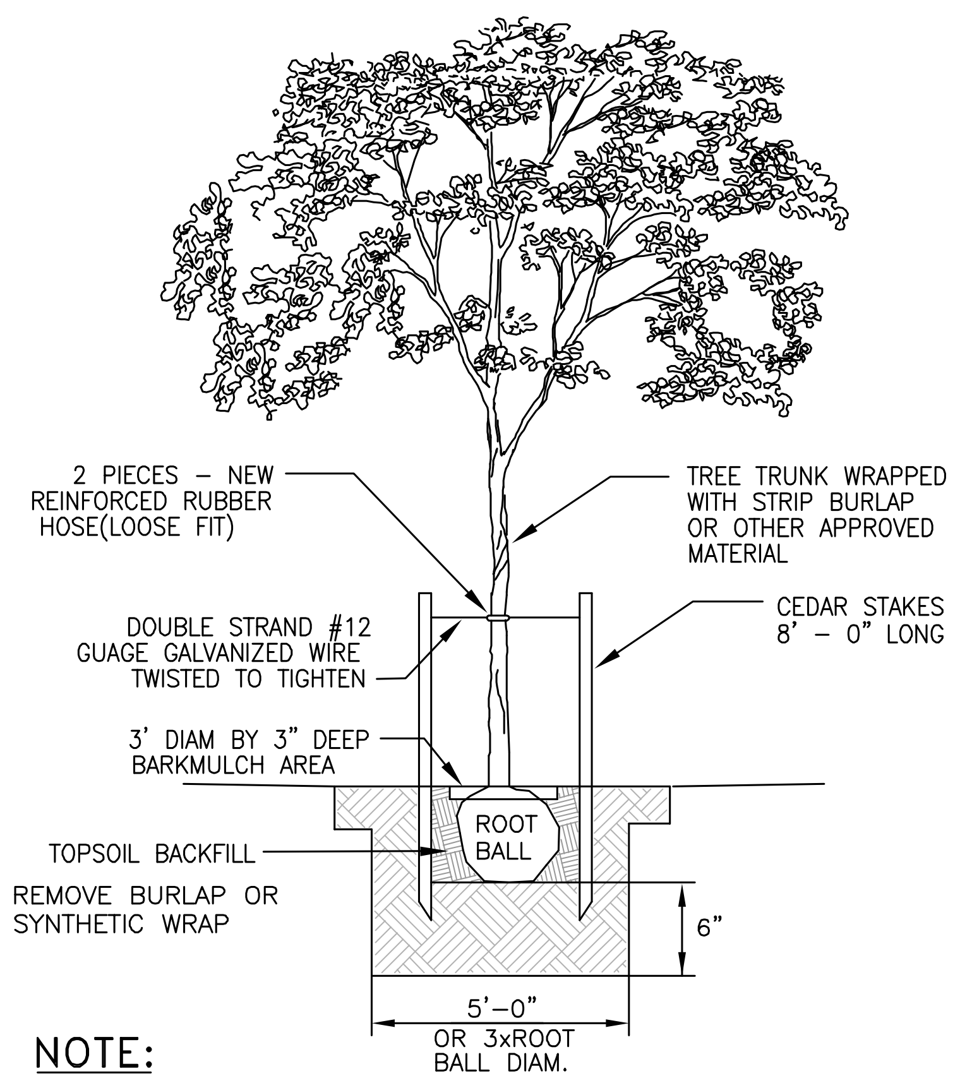
WELLESLEY, MA 02481

DATE: OCTOBER 1, 2020

C7

FILE: 2671c1.dwg

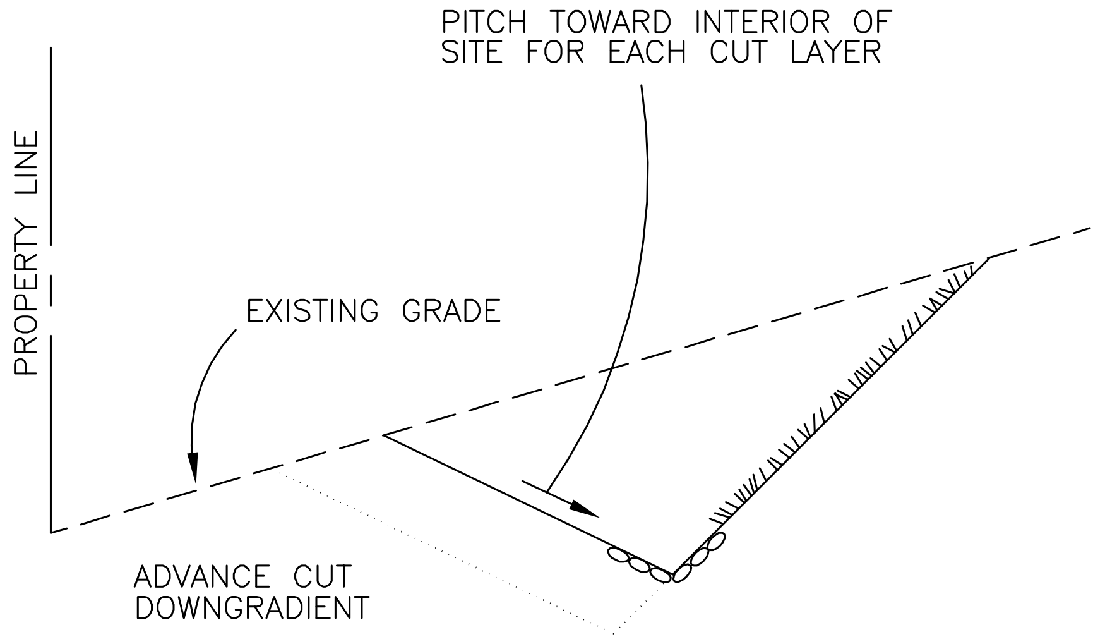


NOTE:

STRUCTURAL SOIL SHALL BE USED BENEATH TREE DRIP ZONE WITHIN PROPOSED PAVED AREAS. SEE NOTE #8 ON SHEET C4.

TREE STAKING DETAIL

N. T. S. treestaking.dwg

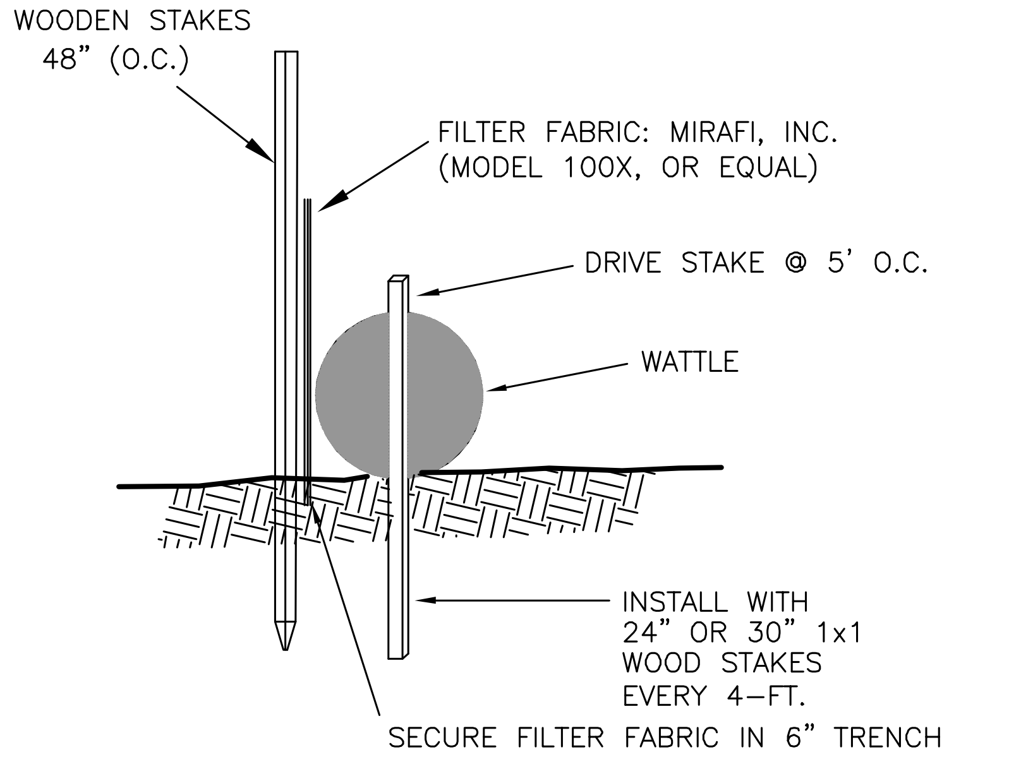


SWALE TOWARD SEDIMENTATION TRAP. PROVIDE RIPRAP SWALE WHERE EXPOSED CUT EXCEEDS 1/2 AC.

NOTE: START CUTS FROM SITE INTERIOR AND ADVANCE DOWNGRADIENT TO THE SITE BOUNDARY.

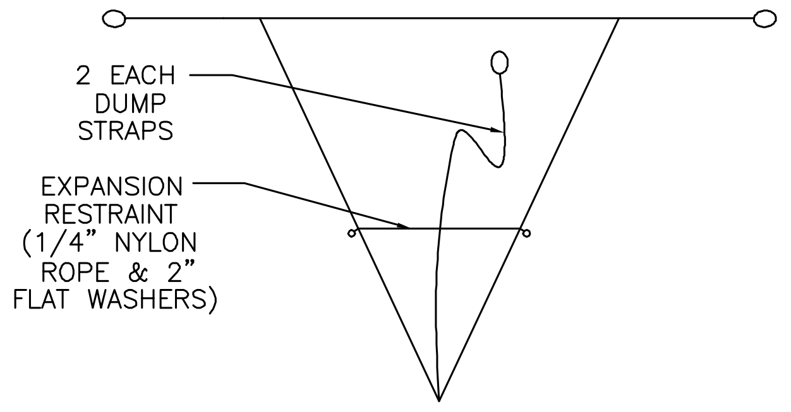
EROSION CONTROL FOR CUT AREAS

N. T. S. Cutareas.dwg



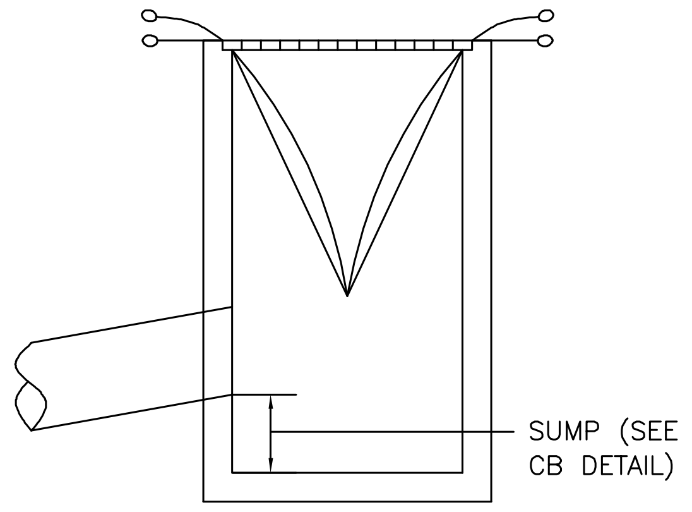
STAKED WATTLE DETAIL

N. T. S. Wattles AND Silt Fence.dwg



BAG DETAIL

N. T. S. siltsac



INSTALLATION DETAIL

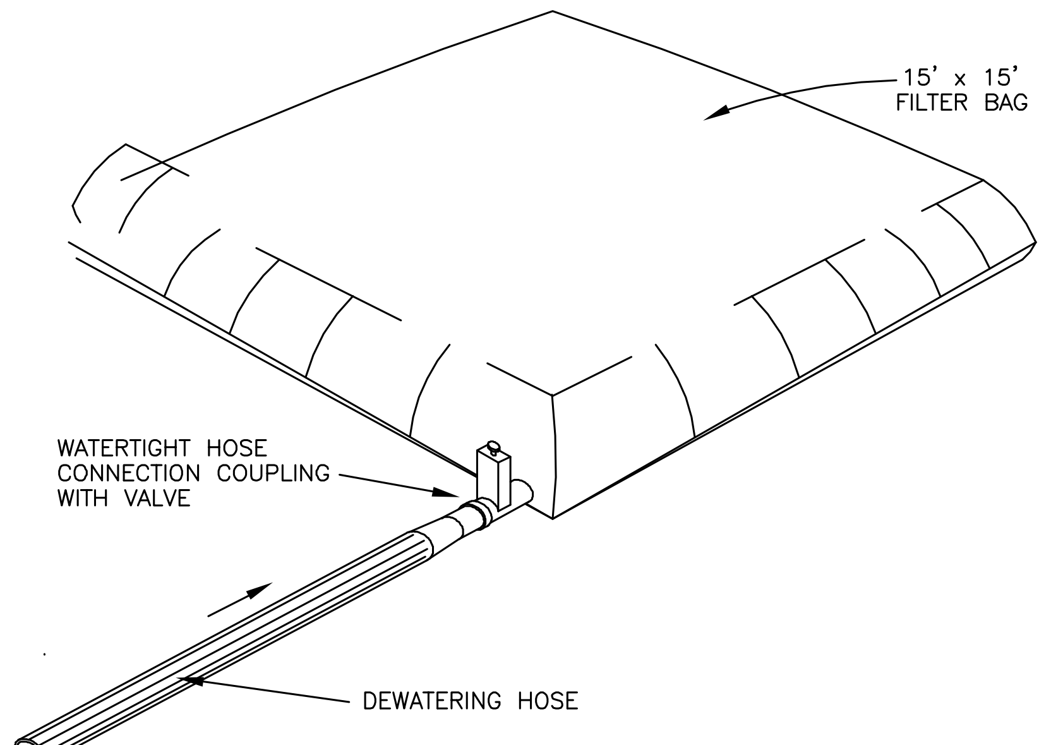
N. T. S. siltsac

NOTES:

FILTER BAGS SHALL BE 15' x 15' POLYPROPYLENE GEOTEXTILE DESIGNED TO ENACT OR EXCEED THE PROPERTIES BELOW:

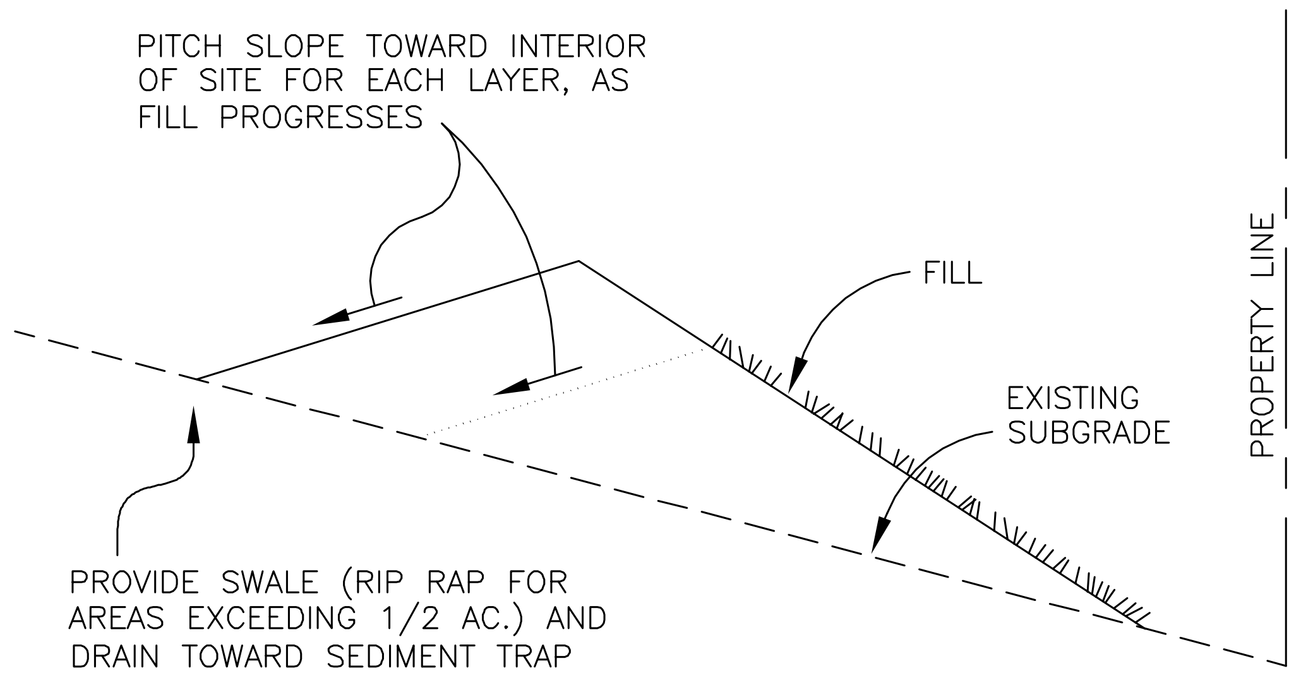
–TENSILE STRENGTH, 205 lbs (ASTM D–4632)
–ELONGATION @ BREAK, 50 % (ASTM D–4632)
–MULLEN BURST, 400 psi (ASTM D–3786)
–PUNCTURE STRENGTH, 130 lbs (ASTM D–4833)
–TRAPEZOIDAL TEAR, 85 lbs (ASTM D–4533)
–APPARENT OPENING SIZE, 80 US Sieve (ASTM D–4751)
–PERMITTIBITY, 1.40 Sec–1 (ASTM D–4491)
–UV RESISTANCE, % RETAINED, 70 % (ASTM D–4355)
–FLOW RATE, 90 gal/min/sf (ASTM D–4491)

BAGS SHALL BE US FILTER BAG BY US FABRICS, CINCINNATI, OHIO, OR APPROVED EQUAL.



DEWATERING FILTER BAG DETAIL

N. T. S. FilterBag.dwg



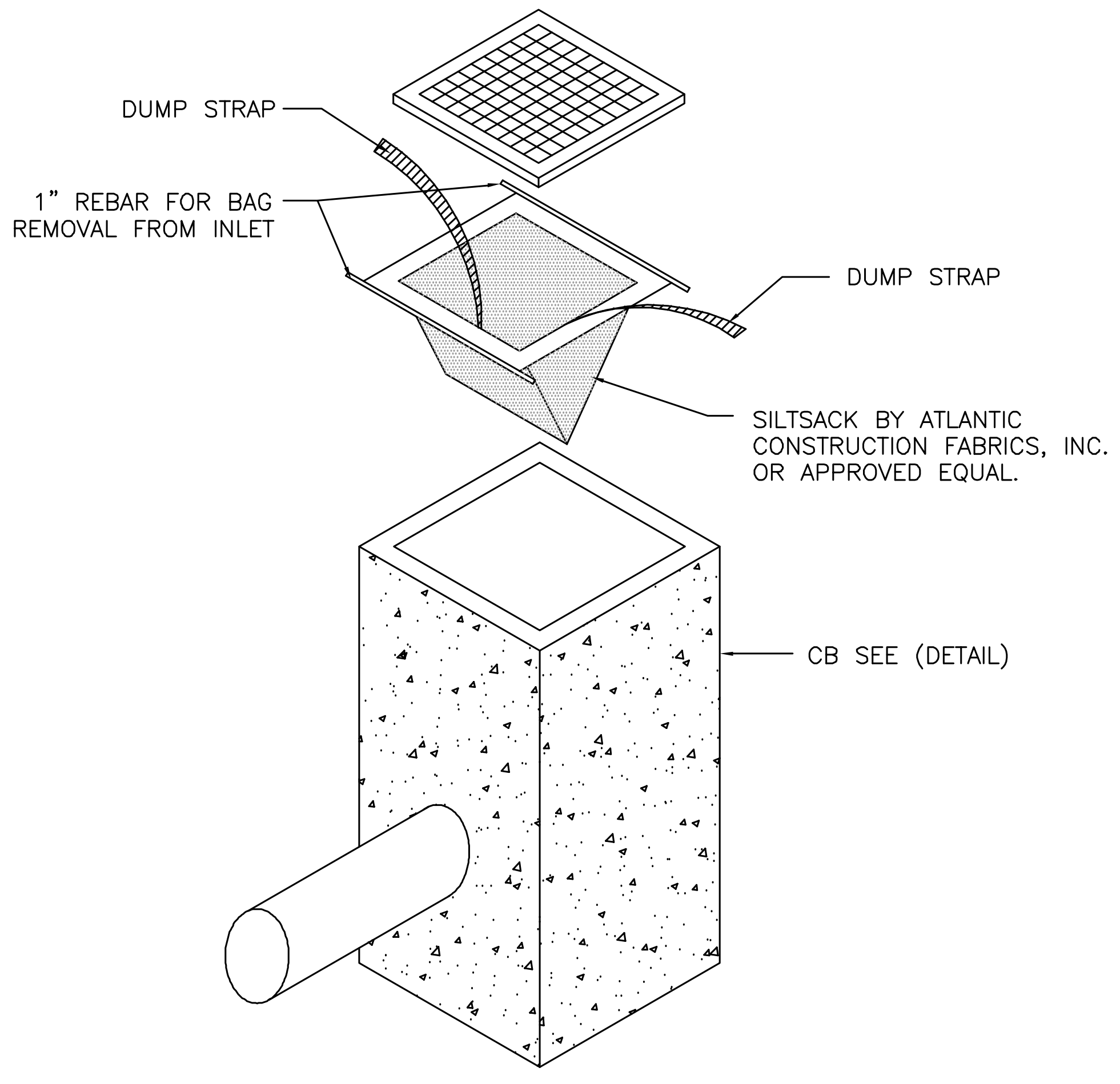
NOTES:

1.) STABILIZE WITH LOAM, SEED & SLOPE PROTECTION WHEN EXPOSED SLOPE EXCEEDS 30 FT. DURING INITIAL STABILIZATION FOLLOWED BY SHRUB & TREE SEEDING AND PLANTING.

2.) ALL SLOPE SUBGRADE, MATERIAL, COMPACTION & SLOPE PROTECTION SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER (OTHERS).

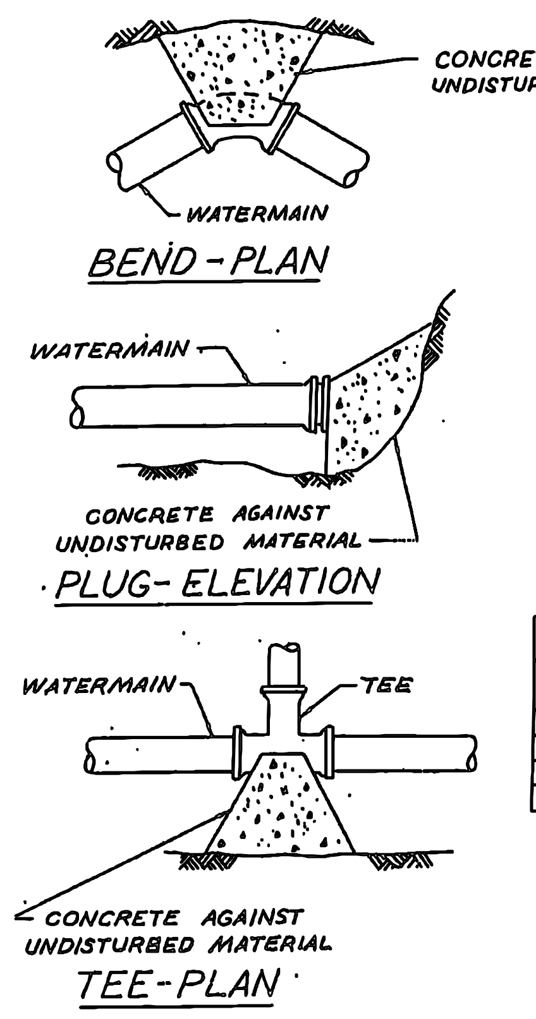
EROSION CONTROL FOR FILLED AREAS

N. T. S.



SILTSACK DETAIL

N. T. S.



BEND-PLAN

PLUG-ELEVATION

TEE-PLAN

NOTE:

1. CONCRETE FOR THRUST BLOCKS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 1500 PSI AT 28 DAYS.

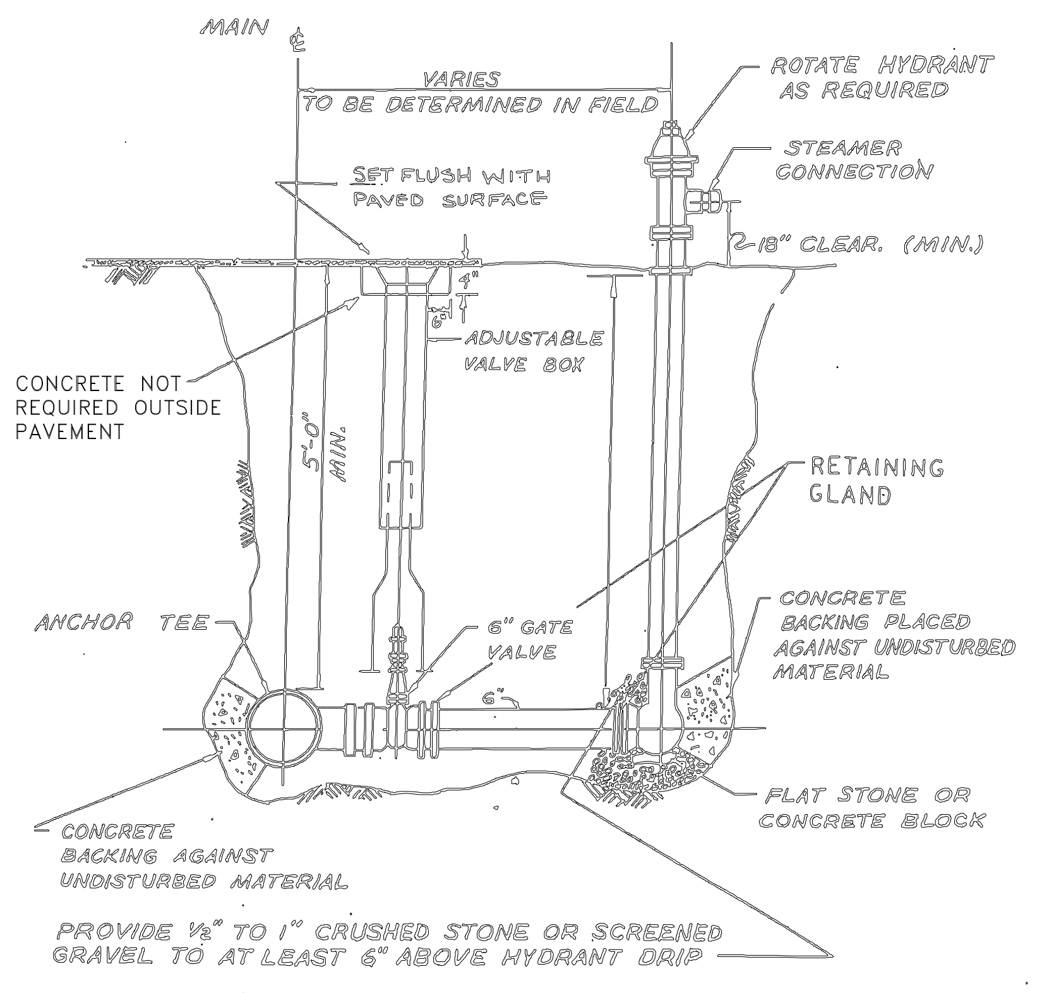
2. THRUST BLOCK BEARING AREAS TO BE IN ACCORDANCE WITH TABLE BELOW, UNLESS DETERMINED OTHERWISE BY THE ENGINEER BECAUSE OF SOIL CONDITIONS.

TABLE OF BEARING AREAS S.F.

SIZE OF MAIN (IN.)	90° BEND	TEES AND PLUGS	45° BEND
8	6	4	3
6	4	3	2

THRUST BLOCK DETAILS

NO SCALE

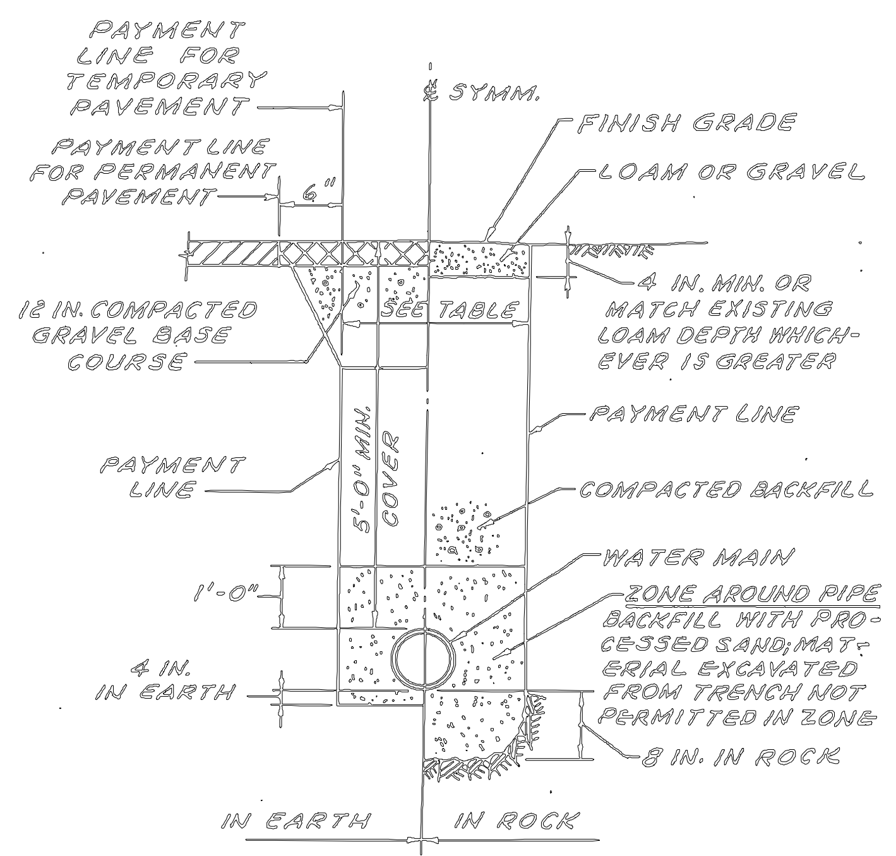


PROVIDE ½" TO 1" CRUSHED STONE OR SCREENED GRAVEL TO AT LEAST 6" ABOVE HYDRANT DRIP

NOTE: RETAINING GLANDS SHALL BE PROVIDED AS SHOWN

HYDRANT ASSEMBLY AND VALVE DETAIL

NO SCALE



TRENCH WIDTH TABLE

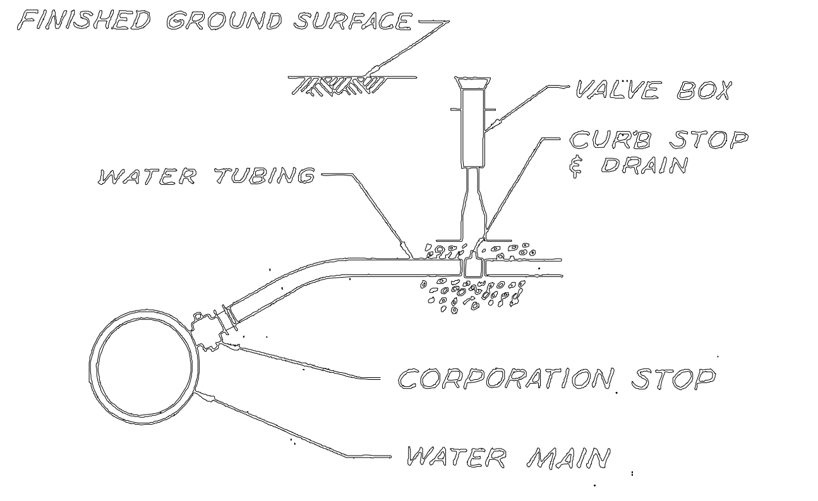
PIPE DIA. IN.	≤12	16	
TRENCH WIDTH IN.	48	52	

NOTE:

PAYMENT FOR PAVEMENT INSTALLED BEYOND PAYMENT LINE WILL BE MADE ONLY WHEN SUCH INSTALLATION IS SPECIFICALLY AUTHORIZED BY THE ENGINEER.

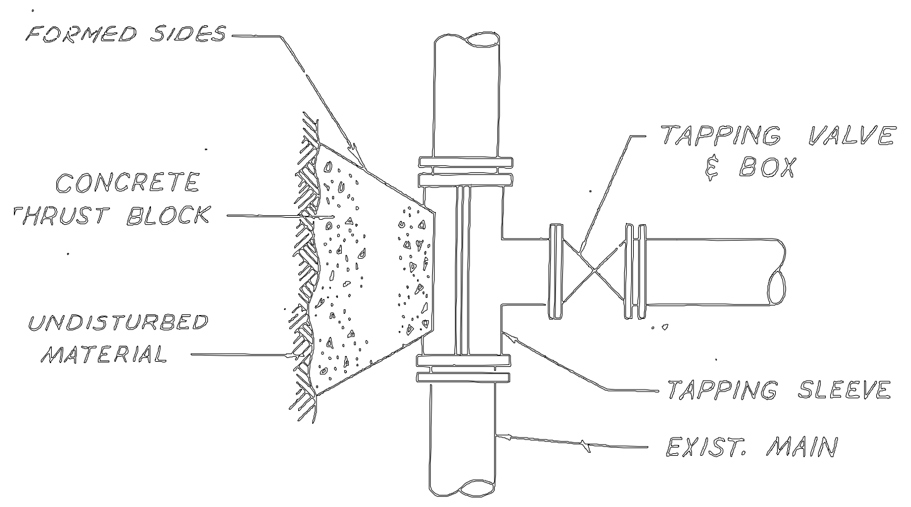
TRENCH DETAIL

NO SCALE



SERVICE CONNECTION DETAIL

NO SCALE



TAPPING SLEEVE & VALVE DETAIL

NO SCALE

NO.	DATE	DESCRIPTION	BY
P1	3/18/21	NOI SUBMITTAL	BMS

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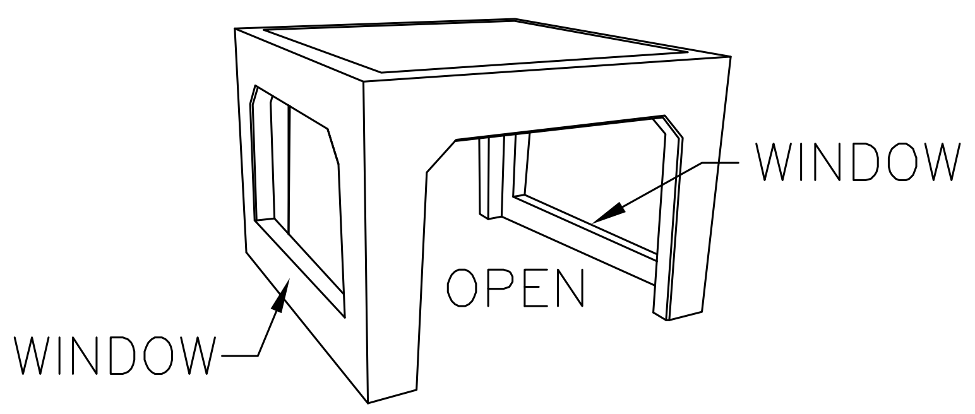
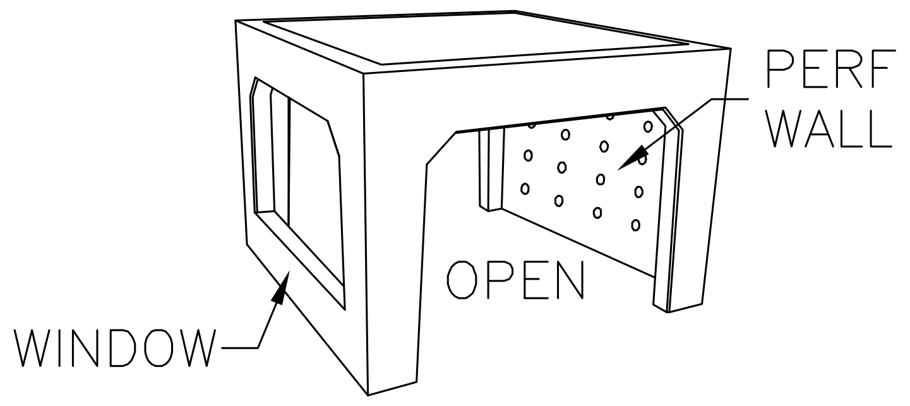
C8

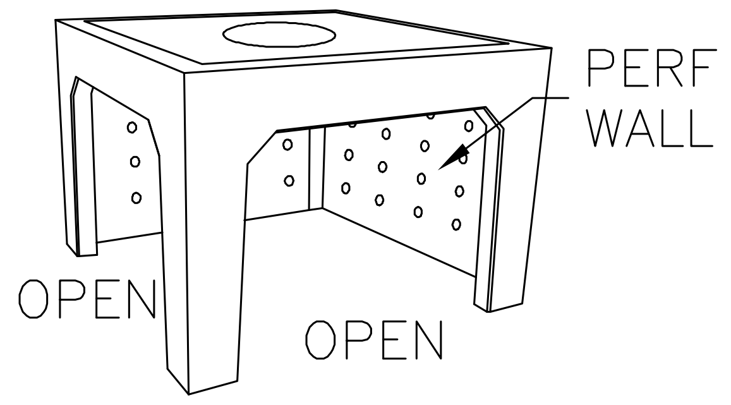
FILE: 2671c1.dwg



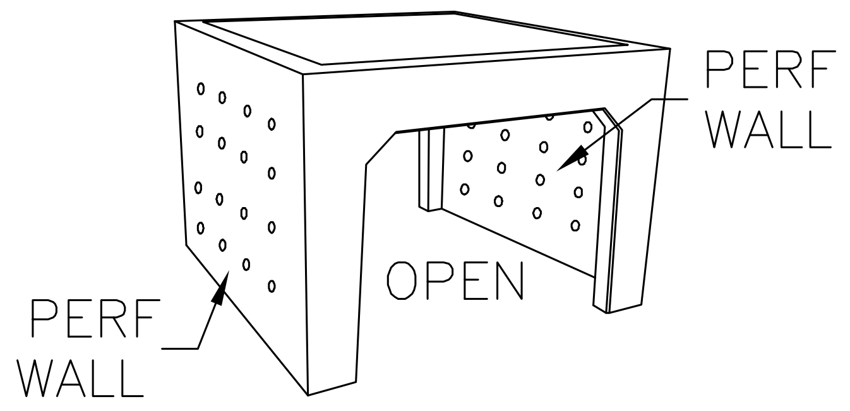
MULTI ROW CENTER



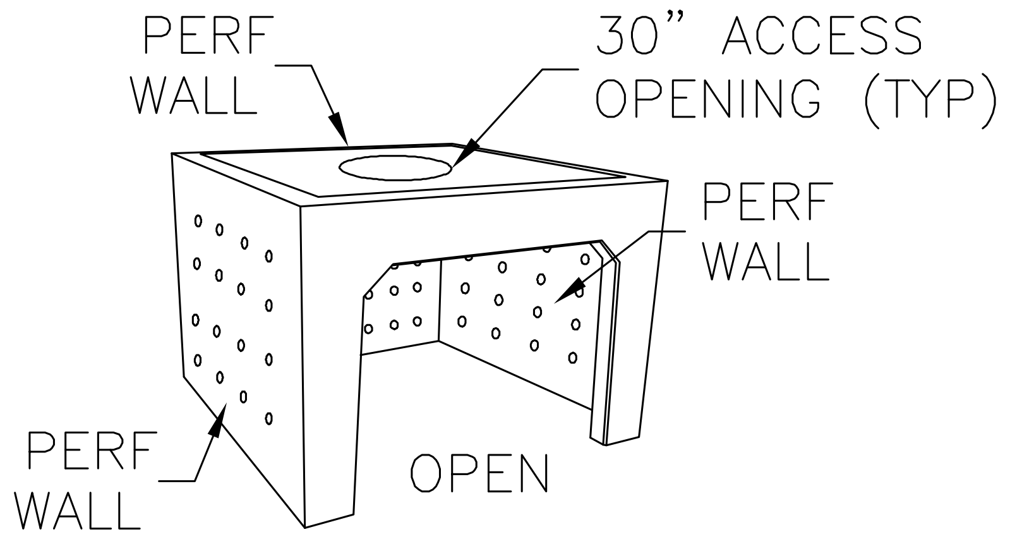
MULTI ROW PERIMETER



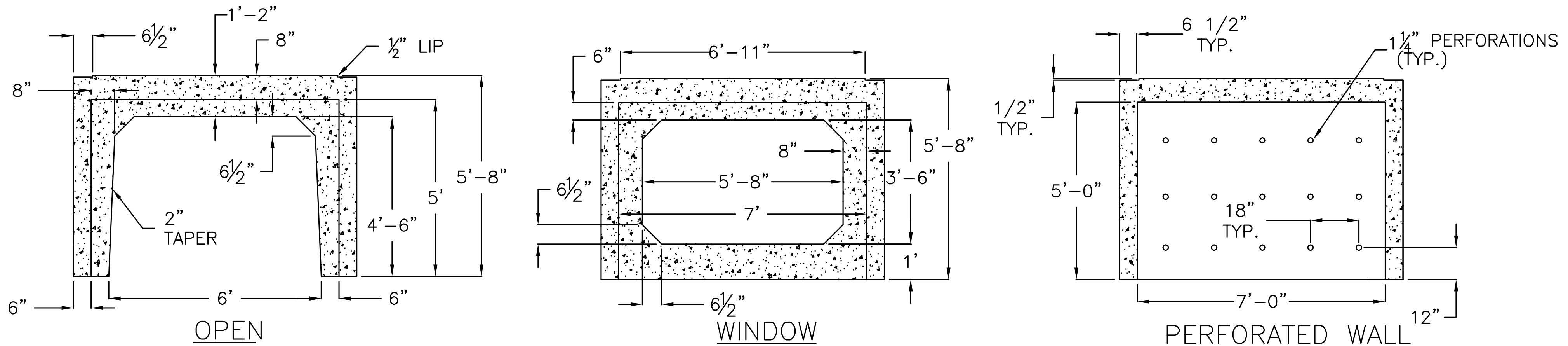
MULTI ROW CORNER



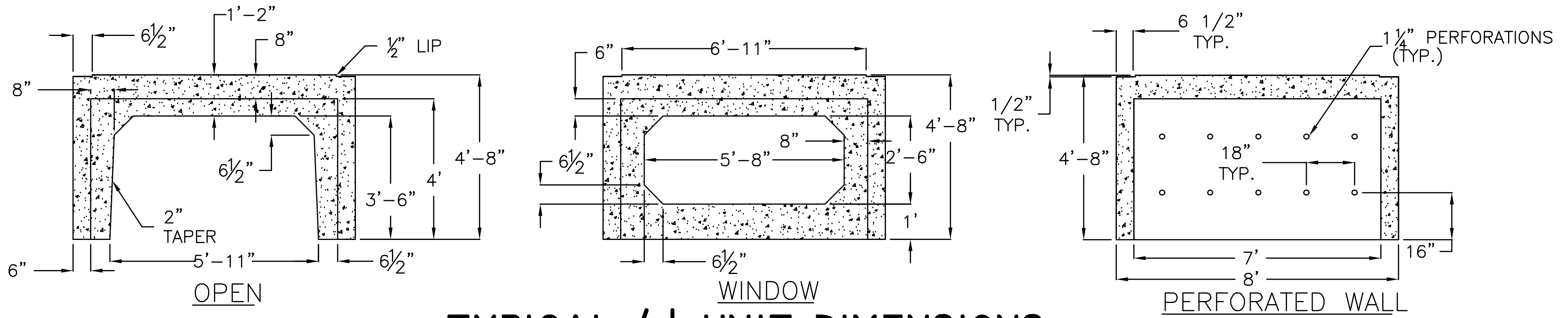
SINGLE ROW CENTER



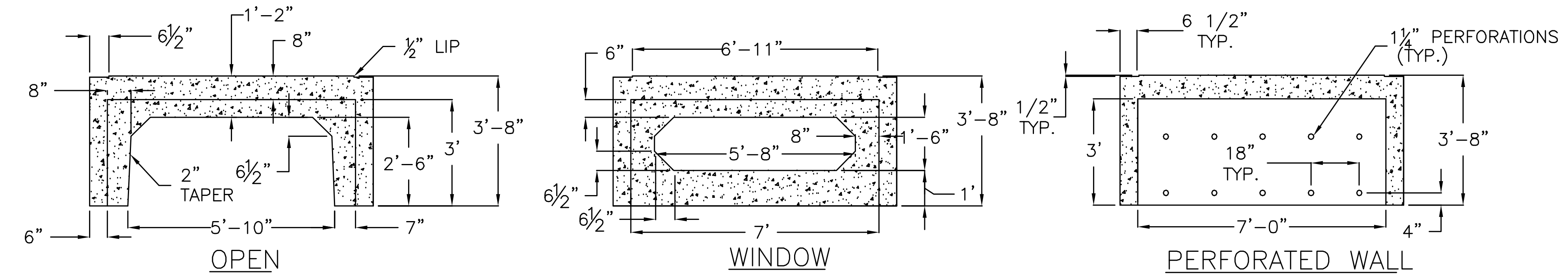
SINGLE ROW END



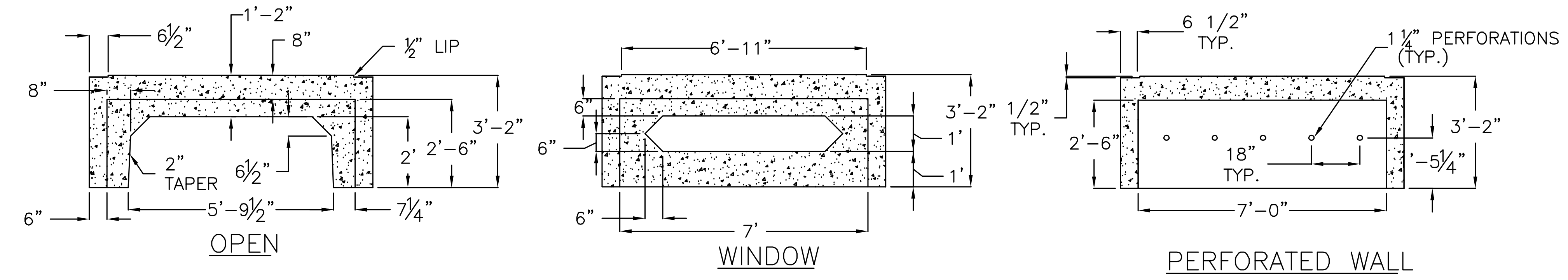
TYPICAL 5' UNIT DIMENSIONS



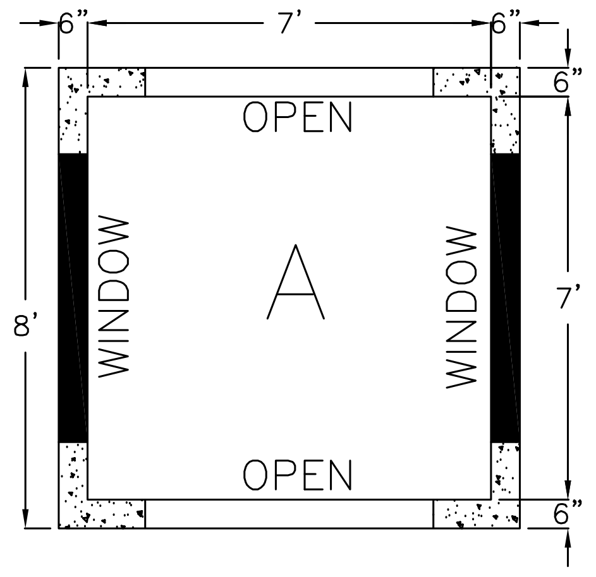
TYPICAL 4' UNIT DIMENSIONS



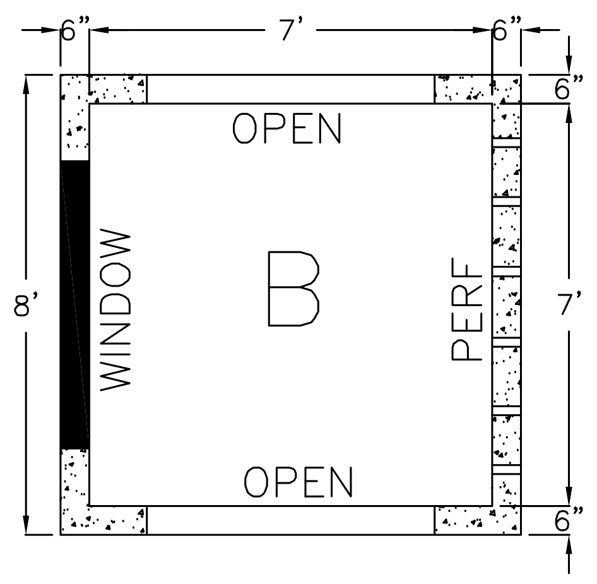
TYPICAL 3' UNIT DIMENSIONS



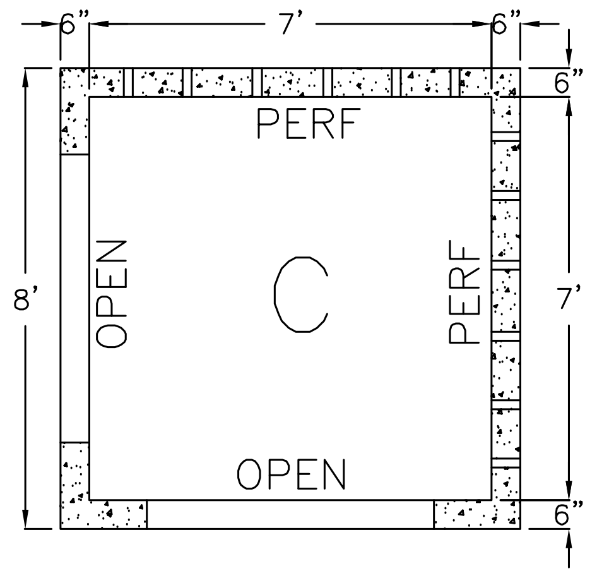
TYPICAL 2.5' UNIT DIMENSIONS



MULTI ROW CENTER



MULTI ROW PERIMETER



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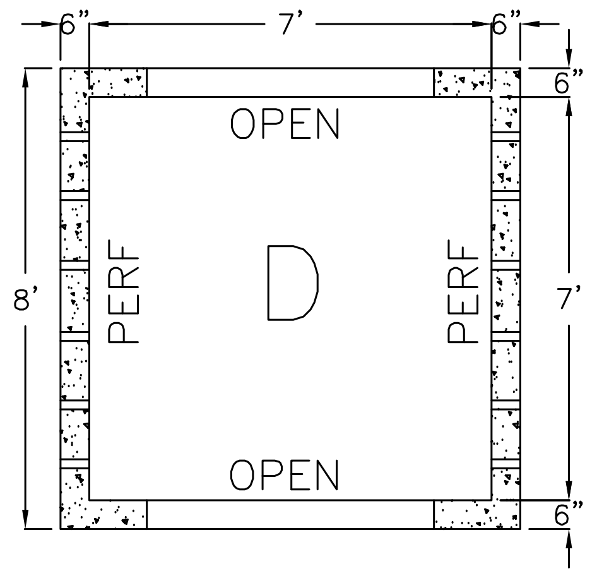

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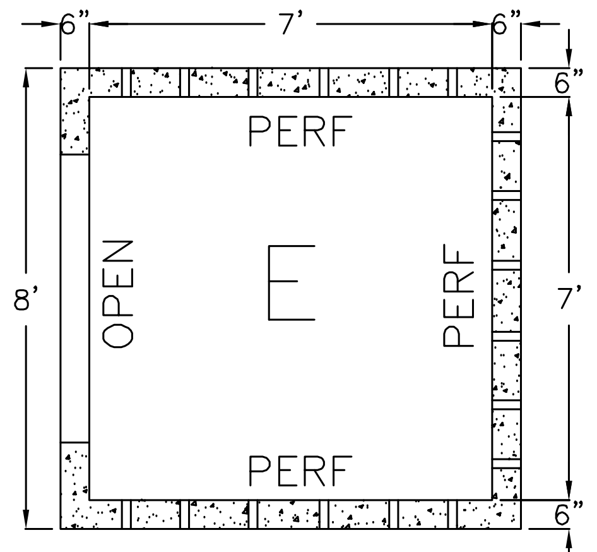
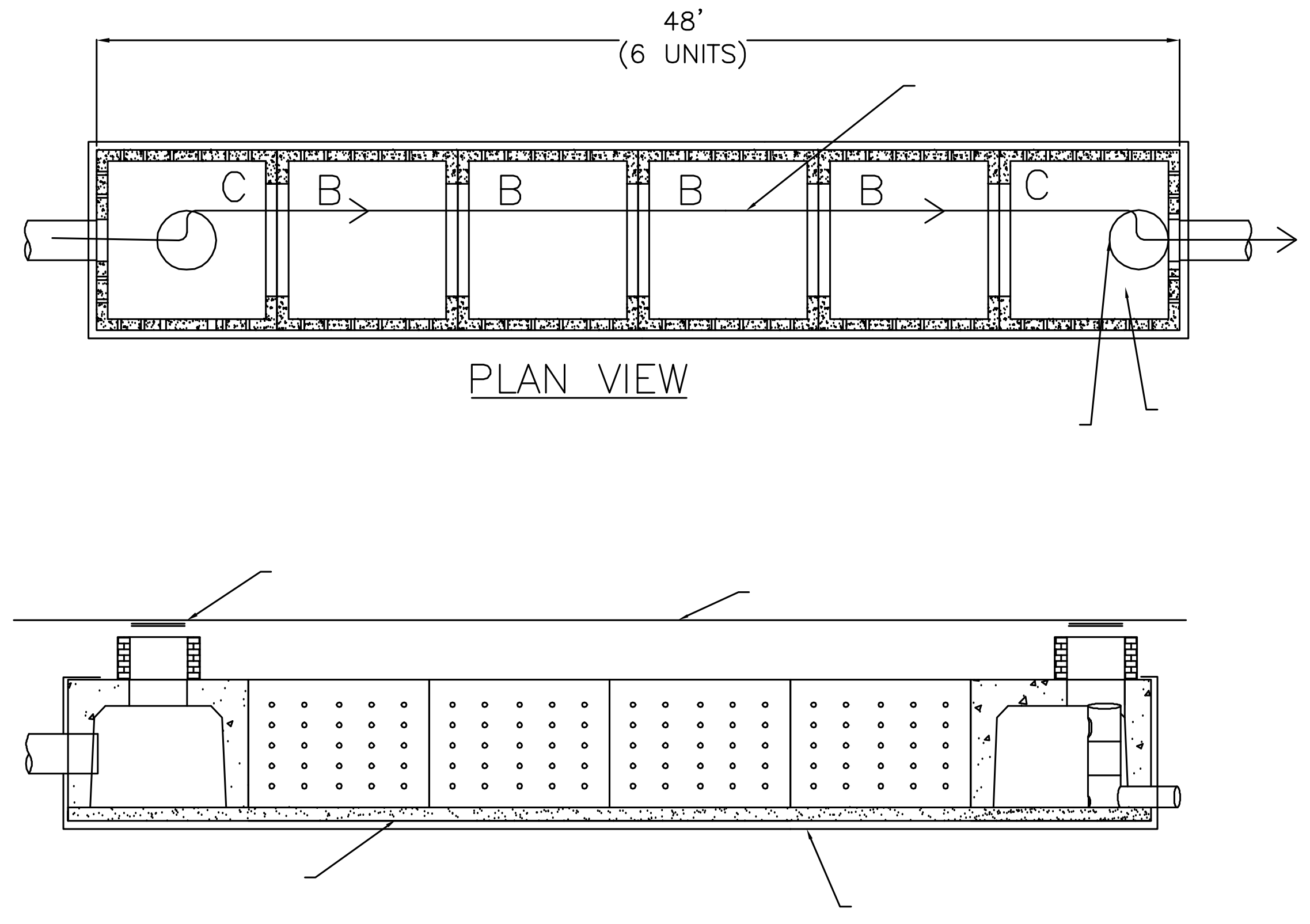
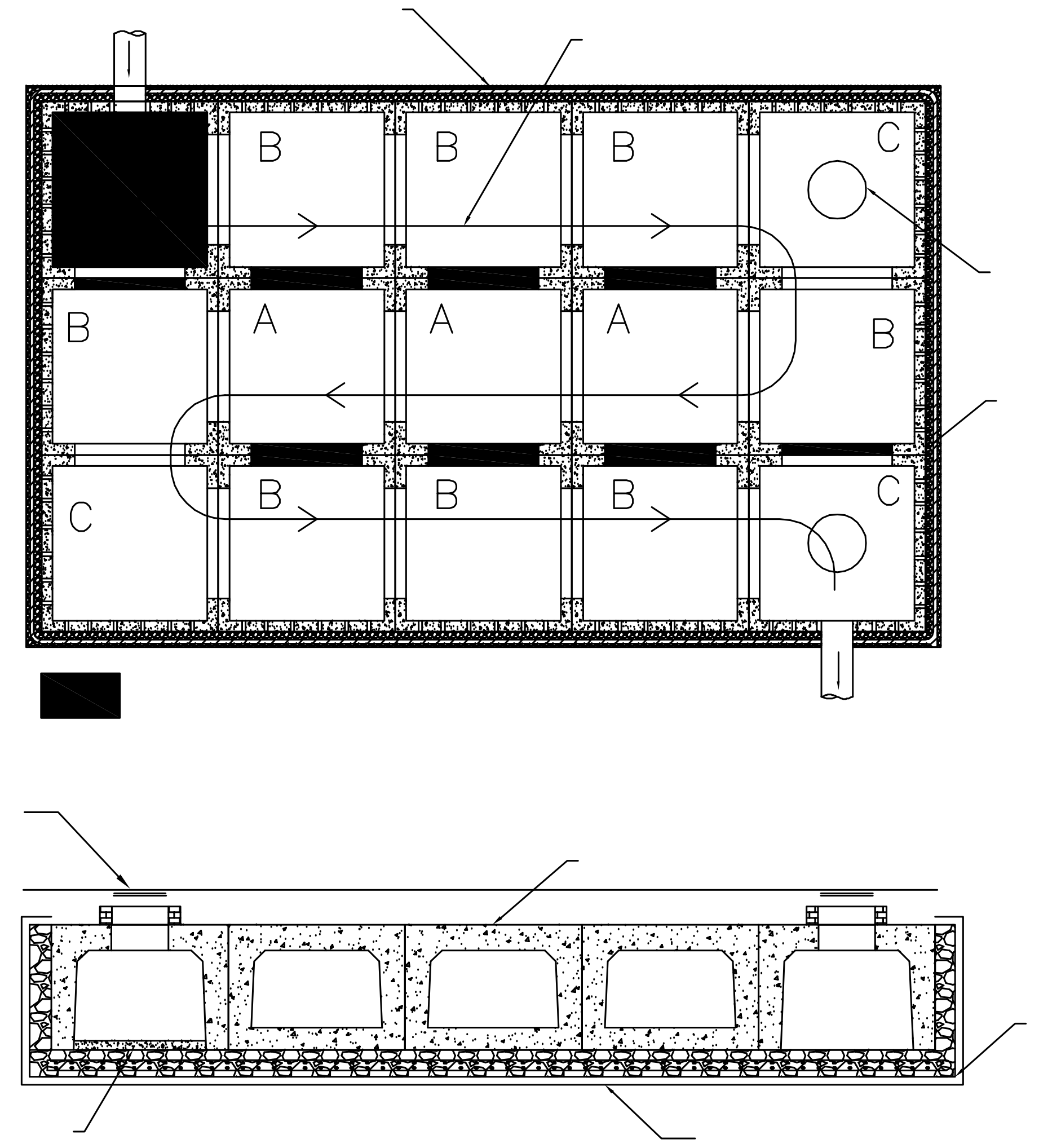


SINGLE ROW END



TYPICAL DETENTION /RETENTION



TYPICAL INFILTRATION

NOTES:

NO.	DATE	DESCRIPTION	BY
P1	3/18/21	NOI SUBMITTAL	BMS

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752

DETAIL SHEET
-BONNIE BROOK ESTATES-
DEFINITIVE PLAN OF LAND
MAYNARD ROAD
SUDBURY, MA

BRUCE M.
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DATE: OCTOBER 1, 2020

C9

FILE: 2671c1.dwg