May 6, 2024

Notice of Intent

Submittal For:

Gerard Rankin, 30 Arnold Road, LLC

0 Arnold Road, Hingham MA 02043

Table of Contents

Notice of Intent

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

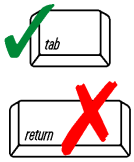
Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Hingham
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.



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):

0 Arnold Road (a. Street Address) | Hingham (b. City/Town) | 02043 (c. Zip Code)

Latitude and Longitude: 42.22571 (d. Latitude) | -70.88355 (e. Longitude)

Map 100 Block 0 (f. Assessors Map/Plat Number) | Lot 65 (g. Parcel /Lot Number)

2. Applicant:

Gerard (a. First Name) | Rankin (b. Last Name)

30 Arnold Road, LLC (c. Organization)

338 Clapp Road (d. Street Address)

Scituate (e. City/Town) | MA (f. State) | 02060 (g. Zip Code)

617-799-0588 (h. Phone Number) | (i. Fax Number) | gerry@rankinresidential.com (j. Email Address)

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

(a. First Name) | (b. Last Name)

(c. Organization)

(d. Street Address)

(e. City/Town) | (f. State) | (g. Zip Code)

(h. Phone Number) | (i. Fax Number) | (j. Email address)

4. Representative (if any):

Deborah (a. First Name) | Keller (b. Last Name)

Merrill Engineers and Land Surveyors (c. Company)

427 Columbia Road (d. Street Address)

Hanover (e. City/Town) | MA (f. State) | 02339 (g. Zip Code)

781-826-9200 (h. Phone Number) | (i. Fax Number) | dkeller@merrillinc.com (j. Email address)

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

$500 (a. Total Fee Paid) | $237.50 (b. State Fee Paid) | $262.50 (c. City/Town Fee Paid)

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A. General Information (continued)

6. General Project Description:

Proponent wishes to expand existing driveway, construct a single family residence, and install stormwater management measures to treat roof and driveway runoff. Driveway work and associated site work will take place within 100' buffer zone to BVW.

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

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

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:

a. County	b. Certificate # (if registered land)
Plymouth	
c. Book	**d. Page Number**
57925	110

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.

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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	2. square feet
	3. cubic feet of flood storage lost	4. cubic feet replaced
e. ☐ Isolated Land Subject to Flooding	1. square feet	
	2. cubic feet of flood storage lost	3. cubic feet replaced
f. ☐ Riverfront Area	1. Name of Waterway (if 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.

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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

Resource Area	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

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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

   MassMapper
   4/2024

   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

   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

* 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.

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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 - Bourne to Rhode Island border, and the Cape & Islands:

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

North Shore - Plymouth to New Hampshire border:

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).

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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.

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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.

Site Plan - 0 Arnold Road
a. Plan Title

Merrill Engineers and Land Surveyors
b. Prepared By

Dana Altobello, P.E.
c. Signed and Stamped by

March 15, 2024
d. Final Revision Date

1" = 20'
e. Scale

Stormwater Management Report
f. Additional Plan or Document Title

February 16, 2024
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:

9996
2. Municipal Check Number

May 6, 2024
3. Check date

9994
4. State Check Number

May 6, 2024
5. Check date

Merrill Engineers and Land Surveyors
6. Payor name on check: First Name

7. Payor name on check: Last Name

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F. Signatures and Submittal Requirements

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

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

1. Signature of Applicant

2. Date 4/27/24

3. Signature of Property Owner (if different)

4. Date 4/27/24

5. Signature of Representative (if any)

6. Date 5/3/24

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.

TOWN OF HINGHAM
CONSERVATION COMMISSION

APPLICATION CHECKLIST
NOTICE OF INTENT (NOI)

The following instructions and submittal requirements should be used when submitting a Notice of Intent to the Conservation Commission under the MA Wetlands Protection Act and Hingham Wetlands Protection By-Law. Please also refer to the DEP Instructions for Completing WPA Form 3. Submit two (2) copies of the following, unless otherwise specified, to the Conservation Office, and one electronic copy of the complete application to conservation@hingham-ma.gov

☒ WPA Form 3- Notice of Intent: WPA Form 3: Wetlands Notice of Intent | Mass.gov The application must be signed by the property owner. Submit the original and one copy to the Commission by hand delivery or certified mail.

☒ WPA Appendix B- *NOI Wetland Fee Transmittal Form* and two (2) separate checks for the following: Town of Hingham Wetlands Protection Bylaw fee and State Wetlands Protection Act local filing fee

- *Payable to Town of Hingham*
- *Please redact bank account information from photocopies*
- *Note, a public legal notice is prepared and submitted by staff and the newspaper will invoice the applicant*

☒ A copy of the Certified Abutter List and the 'Notification to Abutters Form'

- *Contact Conservation Office for abutters list which will be certified by the Assessor's Office*
- *Abutters must be notified by hand delivery, certified mail-return receipt, OR certificate of mailing at least 7 days prior to the hearing date*
- *Certified mail receipts or certificate of mailing receipts shall be submitted to the Conservation Office with the application or presented to the Commission at the beginning of the public hearing*

To be filled out

☒ 'Affidavit of Service' Form attesting abutters were notified in accordance with 310 CMR 10.05(4) and the Hingham Wetland Regulations, §7.5

- *Abutters within 100 feet of a property line where work is proposed for inland projects*
- *Abutters within 300 feet of a property line where work is proposed for coastal projects*

☒ Narrative describing the property location, existing conditions, methodology used for wetland delineation including DEP data forms or other delineation method, site photos, proposed work, and performance standards analysis, as applicable, for impacts to resource areas under the Wetlands Protection Act Regulations and/or Hingham Wetland Regulations. The narrative should also include: a report on the on-site wetland resource areas (per the Resource Area Delineation Policy), existing/proposed impervious and pervious surface calculations and proposed mitigation (per the Buffer Zone Mitigation Policy), tree removal/replacement requests (per the Tree Removal and Replacement Policy), and stormwater management.

☒ Project plan(s): two (2) copies of full size plan set and one (1) copy of reduced 11" x 17" plan(s), signed and stamped by a MA Registered Professional Engineer (PE) or other registered professional including the following information:

- *All wetland resource area boundaries including the 50 and 100 foot Buffer Zone (showing sequentially numbered flags as applicable)*

- *FEMA Floodplain boundaries, as applicable*
- *A note indicating the date the wetland delineation was completed and who performed the delineation. If the wetland boundaries were previously approved by the Commission a note should be included indicating the date of approval and DEP File Number, if applicable.*
- *All plans shall be colored coded or highlighted with transparent marker pen as follows: freshwater or coastal wetland boundary in blue; 50 foot buffer zone in green; 100 foot buffer zone in yellow; 200 Foot Riverfront Area in pink; and Bordering Land Subject to Flooding (100 year flood plain where NFIP data available) or Land Subject to Coastal Storm Flowage in orange.*
- *Location of existing and proposed site amenities above and below the ground*
- *Topography in 2 foot contour intervals*
- *Limit of work/erosion and sediment control line*
- *Stockpile locations and other Stormwater BMPs as applicable*
- *Edge of lawn/tree line, and trees of 6 inches or greater DBH in the buffer zone*
- *The drainage basin in which the site is located*

Guidelines: sheet sizes not more than 24"x 36"; scale not more than 1"=40'; title block located at the lower right hand corner, preferably.

☒ For projects subject to the DEP Stormwater Regulations, 310 CMR 10.05(6)(k)-(q), one copy of the Stormwater Report, Stormwater Report Checklist and the Registered Professional Engineer's Certification that the project conforms to the Stormwater Management Regulations and meets acceptable engineering standards

☐ Proof of mailing the complete NOI to the MA Department of Environmental Protection (DEP), Southeast Regional Office at 20 Riverside Drive, Lakeville MA, 02347 (certified mail receipt from the post office) or proof of electronic filing (eDEP Transaction Number)

☐ Proof of mailing the complete NOI to the MA Natural Heritage & Endangered Species Program (NHESP) and the MA Division of Marine Fisheries (Gloucester), if applicable (certified mail receipt from the post office)

☒ The Conservation Commission's Policy on Receipt of Information

☐ Optional - Voluntary 21 Day Waiver

Project Narrative

Project Narrative

Notice of Intent
0 Arnold Road
Hingham, MA 02043

Project Description

The project proponent, Gerard Rankin, 30 Arnold Rd LLC, proposes to construct a single-family dwelling at 0 Arnold Road along with a common driveway with 30 Arnold Road, with associated site work. Stormwater management and erosion control measures are proposed to minimize impact to the wetland resource area downgradient from the project. Mitigation will restore wetland buffer zone areas with native plantings.

Existing Conditions

The parcel is shown as Map 100 Block 0 Lot 65 of the Hingham Assessor's Maps and is comprised of 6.0± acres, where 3.8± acres are wetlands. The Parcel is intended to be divided into two lots. Lot 1 located on the Site Plan is a buildable lot where the proposed house and driveway will be located. Parcel A will not be a buildable lot. The parcel has frontage on Arnold Road and abuts residential lots to the west and south. This lot has been previously developed by a gravel driveway with a turnaround for 30 Arnold Road. The site has a forested wetland, further categorized as a bordering vegetated wetland (BVW), and was delineated by Independent Environmental Consultants, Inc. See the Environmental Assessment Report attached, completed by Independent Environmental Consultants, Inc., which details the date of wetland delineation, existing site conditions, location of the wetland, and reasons for delineating this resource as a BVW.

Proposed Conditions and Mitigation

The work under this Notice of Intent includes the expansion and construction of an existing gravel driveway, which will be used commonly between 30 Arnold Road and 0 Arnold Road, along with a gravel diaphragm following the proposed driveway on the easterly side. Utility installation for 0 Arnold Road and site grading will also be necessary within the wetland buffer zone. Construction of a single-family dwelling, septic system, and stormwater drainage are proposed outside of the 100' wetland buffer zone.

Construction of the proposed gravel driveway and diaphragm will alter approximately 890± SF within the 0'-50' buffer zone to BVW, and 2,060 ±SF within the 50'-100' buffer zone to BVW. Since proposed work in the buffer zone will render no new impervious surfaces, only a 1:1 mitigation ratio is required for the alteration of land within the 0'-50' buffer zone, based on Hingham's *Buffer Zone Mitigation Policy*. Therefore, 890 SF of mitigation is proposed along the portion of the driveway closer to the wetland resource area. A total of 1 - 16" caliper deciduous tree will be removed within the 0'-50' buffer zone, and 0 trees will be removed within the 50'-100' buffer zone. As part of the Hingham *Final Tree Removal and Replacement Policy,* a 2:1 tree replacement is

required for trees removed within the 0'-50' buffer zone. Therefore, 2 tree plantings are required within the mitigation area and must have a minimum caliper of 1.5"-2".

The current location of the proposed gravel driveway is considered the favorable location to meet the criteria of other Boards, while also considering the protection of the site resource areas to the greatest extent. There will be no added impervious area within the wetland buffer zone, and the proposed gravel driveway will be constructed as an expansion of the existing gravel driveway (proposed 20' wide), with an extension to meet the proposed dwelling at 0 Arnold Road. The necessity of expanding the driveway results from design requirements for the common driveway under the Hingham Planning Board regulations. Access to the site will remain the same, off Arnold Road.

Stormwater Management

Stormwater systems on-site were designed to comply with the standards outlined in the Massachusetts Stormwater Management Regulations. A proposed 2' wide gravel diaphragm will capture runoff from the proposed gravel driveway to encourage recharge before overflow to the wetland resource area downgradient. There are 2 proposed subsurface Stormtech SC-740 chamber systems, located near the southeast and northwest corners of the proposed dwelling. These subsurface systems will provide stormwater storage and recharge, prior to any overflow discharge towards the wetland resource area. For more information regarding stormwater management, please see the Stormwater Management report attached.

Erosion Control Measures

Erosion control measures are proposed along the edge of the gravel diaphragm and mitigation area to protect the bordering vegetated wetland (BVW) downgradient. The proposed erosion control is a silt sock which will be installed prior to the start of work and will remain in place until the site is stabilized, and non-paved areas have been loam and seeded.

The contractor is to inspect the erosion control periodically as well as after each rain event. Any silt or other debris that builds up on the silt sock should be removed at the time of these inspections. Additional silt sock is to be kept on site to repair the erosion control line as needed.

HINGHAM WETLAND BYLAW INTEREST

Hingham Wetland Regulation interest	Project Activity/Impact	Notes
Protection of Public or Private Water Supply	***No significant impact.***	The site will is not located within or near any public or private water supplies***.***
Protection of Surface Water or Groundwater	***No significant impact.***	The site is not located within any known surface or ground water protection overlays. No untreated stormwater discharges will be included in this project.
Flood Control	**Not Applicable**	The project site is not located within any FEMA flood zone areas.
Erosion and Sedimentation Control	***No significant impact.***	Any anticipated erosion or sedimentation which will occur during construction will be controlled via the proposed silt sock, which is also the limit of work line. Therefore, the wetland resource area will be protected. The site will be stabilized after construction.
Storm Damage Prevention	***No significant impact.***	The proposed single-family dwelling and driveway will be constructed to withstand heavy storm occurrences.
Water Pollution Prevention	***No Significant Impact.***	No untreated Stormwater discharges or illicit discharges will be included in this project.
Protection of Fisheries	***Not applicable.***	The project is not located near any fisheries.
Protection of Shellfish	***Not applicable.***	The project is not located near any shellfish growing areas.
Protection of Wildlife and Wildlife Habitat	***No Significant Impact.***	Minor site work will occur within the 100’ buffer zone to the BVW on site.
Protection of Rare Species Habitat	***Not Applicable.***	The site is not located within or near to any NHESP Rare or Endangered Habitat overlays, according to the NHESP inventory map, dated August 1, 2021.

Protection of Recreation and Open Space	***No Significant Impact.***	No work is proposed to alter any recreational use of the wetland located on site.
Protection of Aesthetics	***No Significant Impact.***	Minor alteration will occur within the 100’ buffer zone to BVW to allow for adequate site access. Proposed mitigation plantings will match the existing landscape, which will add to site aesthetics.

INDEPENDENT ENVIRONMENTAL CONSULTANTS, INC.
162 West Long Pond Road, Plymouth, MA 02360
508-274-0310

May 31, 2023

Gerry Rankin
Triphammer Road
Hingham, MA 02043

Re: 30 Arnold Road, Hingham, MA

Mr. Rankin,
This letter is an environmental assessment report concerning the above mentioned residential property located at 30 Arnold Road, Hingham. Independent Environmental Consultants, Inc. (IEC) conducted a site inspection and evaluation of the subject property on 5-31-23 to delineate the boundary of wetland resource areas located within the property. This site inspection occurred during the spring season, during the growing season, and during leaf-out conditions.

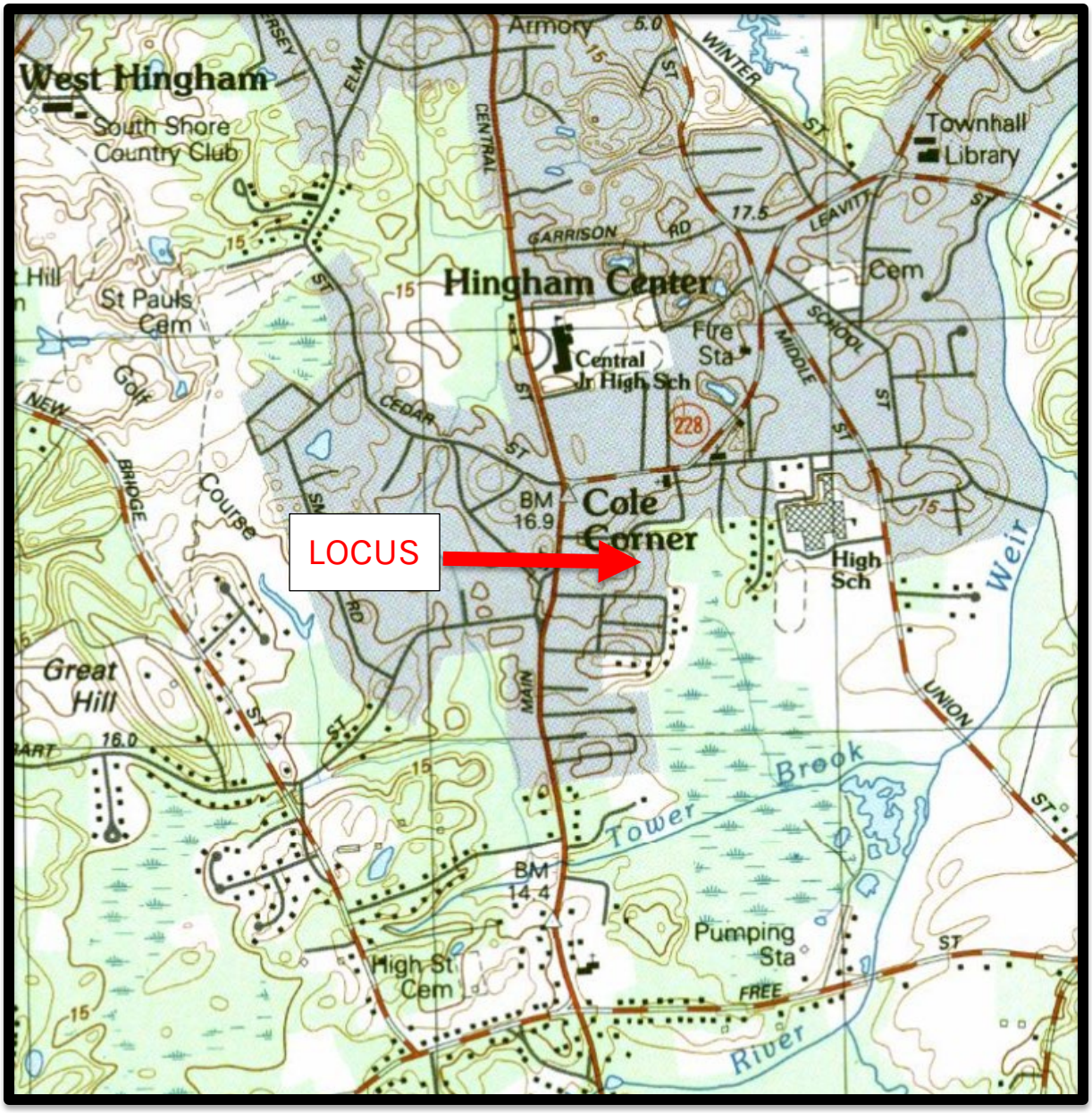
The property contains an existing residential house, garage, driveway, and lawn areas. The property contains areas of forested land. There is bordering vegetated wetland (BVW), a deciduous wooded swamp located within areas of reduced topography within the property. The BVW wetland (forested wetland) contains greater than 50% wetland vegetation, hydric soils, and high groundwater conditions. Sections of the BVW wetland contain dense vegetation. IEC has delineated the edge of wetlands with the flags A1 – A23, and B1 – B15. Flag A1 is adjacent to flag B1, near the edge of Arnold Road. The BVW wetland is located downgradient of the existing house & garage structure onsite. The subject wetlands continue off property. There is a 50’ buffer zone and a 100’ buffer zone associated with the delineated edge of wetlands, flags A1 – A23 and B1 – B15.

The subject wetland resource area, and the wetland buffer zones are under the jurisdiction of the Hingham Conservation Commission, and DEP Wetlands SERO.

Paul J. Shea, PWS
President

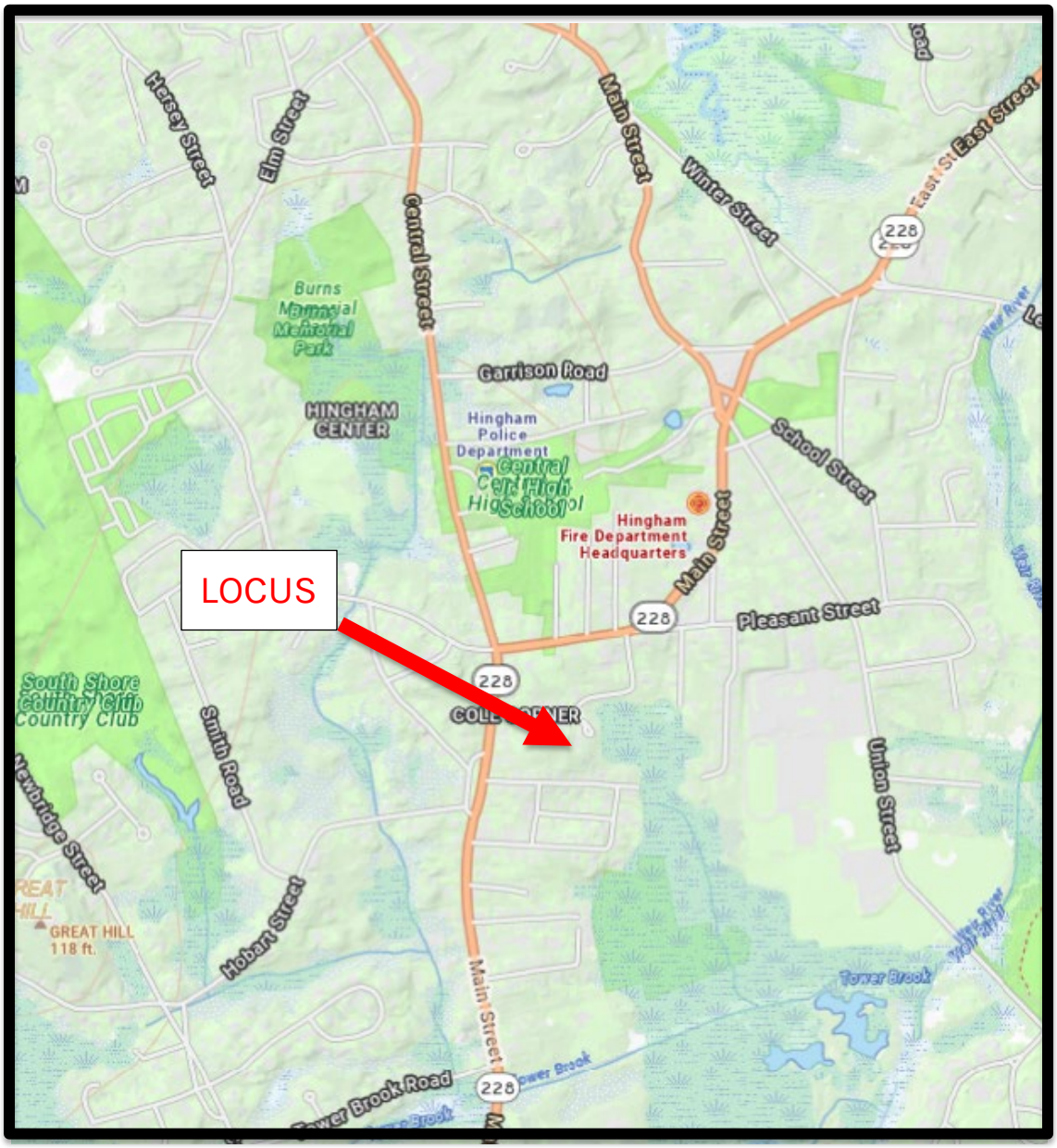
Figures

USGS Locus Map



FEMA Flood Rate Insurance Map

NHESP Inventory Map



Aerial Photograph

Site Photos

Site Photos

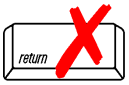
NOI Wetland Filing Fees

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

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



A. Applicant Information

1. Location of Project:

0 Arnold Road	Hingham
a. Street Address	b. City/Town
9994	$237.50
c. Check number	d. Fee amount

2. Applicant Mailing Address:

Gerard		Rankin
a. First Name		b. Last Name
30 Arnold Road, LLC		
c. Organization		
338 Clapp Road		
d. Mailing Address		
Scituate	MA	02060
e. City/Town	f. State	g. Zip Code
617-799-0588		gerry@rankinresidential.com
h. Phone Number	i. Fax Number	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.

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

B. Fees (continued)

Step 1/Type of Activity	Step 2/Number of Activities	Step 3/Individual Activity Fee	Step 4/Subtotal Activity Fee
Category 2(a)	1	$500	$500

Step 5/Total Project Fee:

Step 6/Fee Payments:

Total Project Fee:	$500.00 (a. Total Fee from Step 5)
State share of filing Fee:	$237.50 (b. 1/2 Total Fee **less $**12.50)
City/Town share of filling Fee:	$262.50 (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.)

TOWN OF HINGHAM
WETLANDS PROTECTION BY-LAW FEE SCHEDULE
Effective February 10, 2017

ADMINISTRATIVE REVIEWS		**$ 30.00**	
REQUESTS FOR DETERMINATION OF APPLICABILITY*		**$ 50.00**	**For ancillary work on an existing single family house and all other requests for the first acre of land.**
		$ 40.00	**For each additional acre of land.**
NOTICES OF INTENT*	**Category 1**	**$ 100.00**	
	Category 2	**$ 250.00**	
	Category 3	**$ 525.00**	**Commercial**
		$ 1,000.00	**Subdivision (+ $25.00 per house lot)**
	Category 4	**$ 725.00**	
	Category 5	**$3.00/foot**	**Not less than $100.00.**
EXTENSIONS		**$ 100.00**	**Residential**
		$ 300.00	**Commercial/Subdivision**
CERTIFICATES OF COMPLIANCE		**$ 50.00**	**Residential**
		$ 100.00	**Commercial/Subdivision**
BOUNDARY DELINEATIONS		**$ 3.00/foot**	**Not less than $100.00 and not more than $200.00 for activities associated with a single family house or $2,000.00 for all other activities.**
REQUESTS FOR AMENDMENTS TO ORDERS OF CONDITIONS		**$ 25.00**	**Residential**
		$ 200.00	**Commercial/Subdivision**

NOTE: These Bylaw fees are in addition to the fees pursuant to the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40). The Bylaw fee and the Town's share of the WPA fee should submitted on ***separate checks***, payable to the **Town of Hingham**.

***Fees for filings received after a project has commenced are double the fee listed.**

TOWN OF HINGHAM
CALCULATED FEE STATEMENT
NOTICE OF INTENT FILINGS

Activity definition: anywhere the footprint is changing or site work occurs constitutes a new activity.

Category	Activity Letter(s)	Quantity	Fee/Activity	Fee
1	a, b	1 each	$100.00	
2			$250.00	$250
3		Commercial	$525.00	
		Subdivision	$1,000.00	
4			$725.00	
5			$3.00/foot	
Circle activities below.				TOTAL $250

WETLAND FEE CATEGORY SUMMARY

CATEGORY 1: $100.00
- a) Work on Single Family Lot: addition, pool, etc.
- b) Site work without house
- c) Control vegetation (SFH): removal, herbicide, etc.
- d) Resource improvement.
- e) Work on septic system separate from house.
- f) Monitoring well activities minus roadway.

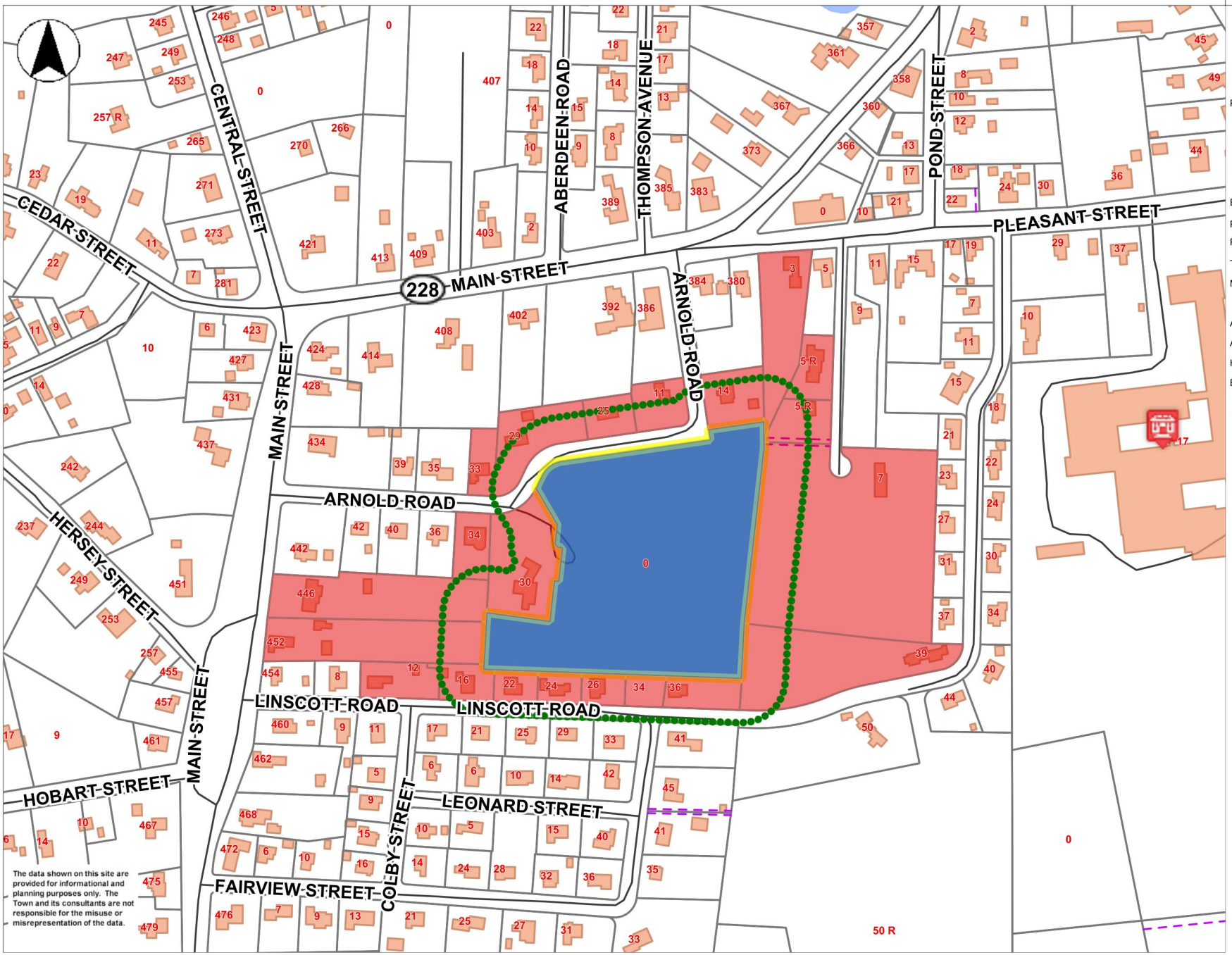
CATEGORY 2: $250.00
- a) Construction of Single Family House (SFH).
- b) Parking lot.
- c) Beach nourishment.
- d) Electric Generating Facility activities.
- e) Inland Limited Projects minus road crossings.
- f) New agricultural or aquacultural projects.
- g) Each crossing for driveway to SFH.
- h) Any point source discharge.

CATEGORY 3: $525.00/$1,000.00
- a) Site preparation (for development beyond NOI scope).
- b) Each building (for development) including site.
- c) Road construction not crossing or driveway.
- d) Hazardous clean up.

CATEGORY 4: $725.00
- a) Each crossing for development or commercial road.
- b) Dam, sluiceway, tidegate work.
- c) Landfill.
- d) Sand and gravel operation.
- e) Railroad line construction.
- f) Control vegetation in development (SFH).
- g) Bridge (SFH).
- h) Water level variation.
- i) Hazardous waste alterations to resource area.
- j) Dredging.
- k) Package treatment plant & discharge

CATEGORY 5: $3.00 per linear foot ($100.00 minimum)
- a) Docks, piers, revetments dikes, etc. (coastal or inland)

Abutters Notifications



0 400 800 ft

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Hingham MapsOnline

TOWN OF HINGHAM
CONSERVATION COMMISSION
210 CENTRAL STREET
HINGHAM, MA 02043
(781) 741-1445

Per MA DEP regulations, Abutters must be notified via
Certified Mail-Return Receipt OR Certificate of Mailing.

REQUEST FOR A CERTIFIED LIST OF ABUTTERS

REQUIRED BY DEPARTMENT:

CONSERVATION COMMISSION

REQUESTED BY: NICK COURTNEY

EMAIL: NCOURTNEY@MERRILLINC.COM

TELEPHONE: 781-887-3214

PROPERTY LOCATION: MAP(S): 100 **BLOCK(S):** 0 **LOT(S):** 65

PROPERTY ADDRESS: 0 ARNOLD ROAD, HINGHAM MA

OWNER OF RECORD: 30 ARNOLD ROAD, LLC

PURPOSE OF LIST: NOTICE OF INTENT
(Example: Notice of Intent, Anrad, etc.)

REQUIREMENT: 100-FT. RADIUS X 300-FT. RADIUS (COASTAL PROJECTS)

Submit with this request, a list of abutters created from the GIS map program: Hingham GIS mapsonline

- Select the blue tab on the left labeled "FIND",
- Enter the street name and enter the street #. (clicking on the autopopulated choice as it appears)
- The parcel is then selected & highlighted
- At the far bottom, on the left, click on the gray tab 'Find Abutters"
- The parcel will be automatically entered in 'Find abutters to a single parcel section'; select the distance required.
- Press 'Go'.
- Select the 'envelope' icon for printing mailing labels. Print or save the list generated and submit with this Request form.

For contiguous parcel selection, or other questions, contact the Conservation office for assistance.

TOWN OF HINGHAM
BOARD OF ASSESSORS

CERTIFICATION SHEET

Property Address: 0 Arnold Road
Parcel ID: 100-0-65
Requestor: Nick Courtney, Merrill Inc
Pursuant to the provisions of Chapter 131 Section 40 of the MA General Laws and Article 22 of the Town of Hingham General Bylaws (Wetlands Protection By-law), we hereby certify that the list attached hereto is a true list of names and addresses of abutters concerning a matter to be heard by the Hingham Conservation Commission involving the above-referenced property.

As used herein the term "abutter" means:

Owners of adjoining land within 100 feet of the property line where the activity proposed;
Owners of adjoining land within 300 feet of the property line where the activity proposed for coastal projects; or
Owners of land directly opposite on any public or private street or way; or across a body of water.

All as they appear on the most recent applicable tax list.

BOARD OF ASSESSORS

CERTIFICATION DATE APRIL 26th. 2024

Parcel ID: 100-0-65
30 ARNOLD ROAD LLC
41 BREWSTER ROAD
HINGHAM, MA 02043

Parcel ID: 100-0-10
THANE MICHAEL W TT
MICHAEL W THANE 2022
36 LINSCOTT ROAD
HINGHAM, MA 02043

Parcel ID: 100-0-2
MCDONALD RYAN P &
34 ARNOLD ROAD
HINGHAM, MA 02043

Parcel ID: 100-0-3
30 ARNOLD ROAD LLC
41 BREWSTER ROAD
HINGHAM, MA 02043

Parcel ID: 100-0-5
CROZIER JENNIFER &
PAUL MITCHELL
16 LINSCOTT ROAD
HINGHAM, MA 02043

Parcel ID: 100-0-52
MOSS THOMAS W & CAROL B
39 DOWNING STREET
HINGHAM, MA 02043

Parcel ID: 100-0-6
BARDSLEY ROBERT A (LE)
& THE NELSON IRREVOCABLE
22 LINSCOTT ROAD
HINGHAM, MA 02043

Parcel ID: 100-0-7
LINDE DMITRI & LAUREN
24 LINSCOTT ROAD
HINGHAM, MA 02043

Parcel ID: 100-0-8
AMYOUNY ELIZABETH &
26 LINSCOTT ROAD
HINGHAM, MA 02043

Parcel ID: 100-0-9
AMYOUNY ELIZABETH &
26 LINSCOTT ROAD
HINGHAM, MA 02043

Parcel ID: 90-0-77
WALSH JULIE TT
RYAN FAMILY TRUST
11 ARNOLD ROAD
HINGHAM, MA 02043

Parcel ID: 90-0-78
ODELL EDITH FOLGE TT
25 ARNOLD ROAD REALTY
25 ARNOLD ROAD
HINGHAM, MA 02043

Parcel ID: 90-0-80
TONUCCI CYNTHIA J TT
CYNTHIA J TONUCCI 2009
29 ARNOLD ROAD
HINGHAM, MA 02043

Parcel ID: 90-0-81
KENNEDY THOMAS S III &
33 ARNOLD ROAD
HINGHAM, MA 02043

Parcel ID: 90-0-84
DUNN ADAM F & KYLIE
14 ARNOLD ROAD
HINGHAM, MA 02043

Parcel ID: 90-0-88
NEVILL MARTHA TT
3 PLEASANT STREET REALTY
3 PLEASANT STREET
HINGHAM, MA 02043

Parcel ID: 90-0-90
SPALL STEVEN M & AMY D
5R PLEASANT STREET
HINGHAM, MA 02043

Parcel ID: 90-0-91
RANDO WANDA V
5 R PLEASANT STREET
HINGHAM, MA 02043

Parcel ID: 90-0-92
SANTORO MAUREEN F &
SANTORO FAMILY 2011 TRUST
7 PLEASANT STREET
HINGHAM, MA 02043

Parcel ID: 99-0-49
THOMPSON KARL & KAREN
446 MAIN ST
HINGHAM, MA 02043

Parcel ID: 99-0-50
BERKIN DAVID M & LISA N
452 MAIN STREET
HINGHAM, MA 02043

Parcel ID: 99-0-53
ROBINSON WILLIAM S &
ROBINSON REVOCABLE TRUST
12 LINSCOTT ROAD
HINGHAM, MA 02043

NOTIFICATION TO ABUTTERS

Under the MA Wetlands Protection Act and
Hingham Wetlands Protection By-Law

In accordance with the second paragraph of the Massachusetts General Laws Chapter 131 §40, and Section 7.5 of the Hingham Wetland Regulations, you are hereby notified of the following:

Gerard Rankin , 30 Arnold Rd LLC has filed a Notice of Intent
Applicant Name *Application Type*

with the Town of Hingham Conservation Commission seeking permission to remove, fill, dredge, or alter an Area Subject to Protection under the Wetlands Protection Act, M.G.L. 131 §40, and/or the Town of Hingham Wetlands Protection By-Law [Article 22].

The address of the property where work is proposed: 0 Arnold Road
The proposed work includes: Expanding existing gravel driveway, construct a residential single family dwelling, and associated drainage and site work.

Copies of the application may be examined at the Conservation Office located at Hingham Town Hall, 210 Central Street, Hingham, MA during the following business hours:

Monday, Wednesday, Thursday 8:30AM- 4:30PM
Tuesday 8:30AM - 7:00PM
Friday 8:30AM - 1:00PM

For more information, to request copies of the application, or obtain information about the public hearing please contact the Conservation Office at (781)741-1445 or by emailing Conservation@hingham-ma.gov

You may also request copies of the application from the ☐ applicant or ☒ applicant's representative by contacting Merrill Engineers and Land Surveyors at (781) -826-9200 between the hours of 8AM___ and 4PM___ on the following days: Monday- Friday.

An Administrative fee may be applied for providing copies of the application or plans.

Notice of the public hearing, including the date, time, and place will be published at least five (5) business days in advance of the hearing in the Patriot Ledger. Notice will also be posted on the town website at least forty-eight (48) hours in advance of the public hearing. To view the agenda, go to Agenda Center • Hingham, MA • CivicEngage (hingham-ma.gov)

The Department of Environmental Protection (DEP) Southeast Regional Office can also provide information about this application or the MA Wetlands Protection Act. DEP is located at 20 Riverside Drive, Lakeville, MA 02347 and can be reached by telephone at (508) 946-2700.

AFFADAVIT OF SERVICE

Under the MA Wetlands Protection Act and
Hingham Wetlands Protection By-Law

(To be submitted to the Hingham Conservation Commission and the MA Department of Environmental Protection when filing an application requiring abutter notification)

I, _____, hereby certify under the pains and penalties of perjury
Name of person making Affidavit

that on _____ I gave notification to abutters in compliance with the second paragraph of
Date

the Massachusetts General Laws Chapter 131, Section 40, and the Hingham Wetlands Protection By-Law and

Wetland Regulations, by _____in connection with the following matter:
Type of Service

A Notice of Intent was filed under the MA Wetlands Protection Act and Hingham Wetlands Protection By-Law with the Hingham Conservation Commission on:

_____ for property located at _____.
Date *Property Address*

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

_____
Signature

_____
Date

HINGHAM WETLAND REGULATIONS

APPENDIX C

Policy on Receipt of Information

(Revised March 4, 2024)

1. New applications/filings must be submitted to the Conservation office (by certified mail or hand delivery) two weeks prior to the meeting date, on Monday by noon, to facilitate the placement of the legal ad and to allow timely review by the Conservation Officer (if the office is closed on Monday due to a holiday, then the information is due on the preceding Friday by noon). Conservation staff will review the application for administrative completeness. Upon receipt of a complete application, a hearing or meeting will be scheduled in accordance with the 310 CMR 10.05(5) and the Wetland Regulations, Section 7.6.

2. If deemed necessary, based on the Commission's meeting schedule, Conservation staff may request the applicant *voluntarily* waive the 21 day statutory deadline for holding a public hearing or issuing a Determination of Applicability.

3. Requests for additional information may be made by the Commission members or their agent to clarify the scope of the project or determine compliance with the 310 CMR 10.00 and/or the Hingham Wetland Regulations. Such requests, if not made at the public hearing, will be communicated to the applicant or their representative as promptly as possible.

4. Additional information requested by the Commission or their agent in accordance with No.3, must be submitted to the Conservation office a minimum of 7 days prior to the meeting date, on Monday by noon. If the office is closed on Monday due to a holiday, the information is due on the preceding Friday by noon. *Revisions submitted after the established deadline may not receive a review, thereby resulting in a continuance to the next available meeting.*

5. The Commission may engage the peer review services of an outside consultant as provided by M.G.L. Ch. 44, § 53G, to be paid for by the applicant, for specific expert review deemed necessary to come to a final decision on a submitted application. Specific consultant services may include but are not limited to, review of a Notice of Intent, Wetland Resource Area Delineation, Stormwater/Drainage Reports, etc. The consultant shall be chosen by the Conservation Commission by vote at the public hearing, and report only to the Commission or its agent. *Requested additional information/revisions by the peer reviewer is required a minimum of two weeks prior to the hearing date.*

5. All supplemental documentation and revised plans must include a revision date and must be date stamped by the Conservation office upon receipt. If this information is not present, the documents may be considered incomplete and may not receive a timely review, thereby resulting in a continuance to the next available meeting.

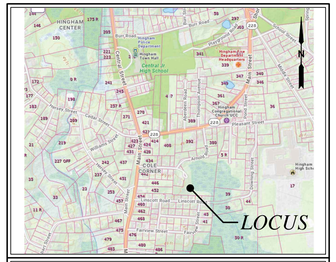
6. Please note that all supplemental documentation and revised plans submitted to the Commission for a pending application, subject to the MA Wetlands Protection Act, must also be sent to the DEP Southeast Regional Office, 20 Riverside Dr., Lakeville, MA 02347

The Hingham Conservation Commission is committed to a thorough and timely review of each application and an efficient hearing process. Cooperation with this policy is appreciated to facilitate these efforts. Exceptions to this policy may be made by the Conservation staff if deemed warranted. Please sign and include with your filing. Thank you.

Nick Courtney — 4/29/24

Applicant or Applicant's Representative Signature — Date

Site Plan



LOCATION MAP SCALE: 1" = 1000'±

RECORD OWNER:

ASSESSORS MAP 100 BLOCK 0 LOT 65
0 ARNOLD ROAD

30 ARNOLD RD LLC
41 BREWSTER RD
HINGHAM, MA 02043
DEED BOOK 57925 PAGE 110

NOTES:

1. PLAN REFERENCES:
   1.1. PLAN NO. 871 OF 2003
   1.2. PLAN RECORDED IN PLAN BOOK 5 , PAGE 165.
2. TOPOGRAPHIC AND DETAIL INFORMATION SHOWN HEREON IS BASED UPON AN ON THE GROUND SURVEY PERFORMED BY CAVANARO CONSULTING DURING JUNE OF 2019.
3. WETLAND RESOURCE AREAS SHOWN ON THIS PLAN WERE DELINEATED BY INDEPENDENT ENVIRONMENTAL CONSULTANTS, INC. PLYMOUTH MA DURING MAY OF 2023 AND FIELD LOCATED BY MERRILL ENGINEERS AND LAND SURVEYORS.
4. SUBJECT SITE IS IN THE "RESIDENCE A" DISTRICT AS DEPICTED ON THE TOWN OF HINGHAM ZONING MAP.
5. EXISTING UTILITIES, WHERE SHOWN, HAVE BEEN COMPILED BASED ON OBSERVED ABOVE GROUND EVIDENCE AND AVAILABLE RECORD PLANS AND ARE TO BE CONSIDERED APPROXIMATE. MERRILL ENGINEERS AND LAND SURVEYORS DOES NOT GUARANTEE THE LOCATION OF THE UNDERGROUND UTILITIES SHOWN OR THAT ALL EXISTING UTILITIES AND/OR SUBSURFACE STRUCTURES ARE SHOWN.
6. EXISTING SEPTIC SYSTEM COMPONENTS SHOWN HEREON TAKEN FROM RECORD AS-BUILT PLAN ON FILE WITH THE TOWN OF HINGHAM BOARD OF HEALTH AND ARE SHOWN AS APPROXIMATE ONLY.

DATUM NOTE:

ELEVATIONS SHOWN ON THE PLAN ARE ON AN ASSUMED DATUM. TO CONVERT THE EXISTING ELEVATIONS TO NAVD88, SUBTRACT 64.06 FROM ASSUMED ELEVATION.

FLOOD NOTE:

BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS LOCATED IN ZONE X OF THE FLOOD INSURANCE RATE MAP, AS SHOWN ON COMMUNITY MAP No. 25023C0082J, WHICH BEARS AN EFFECTIVE DATE OF JULY 17, 2012, AND IS NOT IN A SPECIAL FLOOD HAZARD AREA.

ZONING REQUIREMENTS
RESIDENCE DISTRICT "A"

	REQUIRED	EXISTING	PROPOSED LOT 1
AREA	20,000 SF	261,360 SF	138,661 SF
FRONTAGE	125 FEET	456.39 FEET	126.00 FEET
BUILDING HEIGHT	35 FEET	0 FEET	33.9± FEET
MINIMUM YARDS:			
FRONT	25 FEET*	0 FEET	272.8 FEET
SIDE	15 FEET	0 FEET	36.0 FEET
REAR	15 FEET	0 FEET	17.5 FEET
PARKING SPACES	2/UNIT	0 SPACES	3 SPACES

* IN ALL RESIDENCE DISTRICTS, THE FRONT SETBACK MAY BE AS NEAR THE STREET AS THE AVERAGE OF THE BUILDINGS OR STRUCTURES IN THE ADJOINING LOTS.
BUILDING INSPECTOR TO CONFIRM ALL SETBACKS.

LEGEND

DMH	DRAIN MANHOLE
AC	HVAC UNIT
LAMP	LAMP POST (PRIVATE)
MH	MANHOLE (UNKNOWN)
RHT	ROOF HEIGHT
ROCK	LARGE ROCK (BOULDER)
SIGN	SIGN
SLAB	SLAB ELEVATION
SMH	SEWER MANHOLE
TH	THRESHOLD
TOF	TOP OF FOUNDATION
	DECIDUOUS TREE
	CONIFEROUS TREE
UP	UTILITY POLE
WELL	WATER WELL
	POST AND RAIL FENCE
	CHAIN LINK FENCE
100	CONTOUR LINE
LS	LANDSCAPE AREA
	BUILDING OVERHANG
	EDGE OF POND
	GUARD RAIL
OHW	OVERHEAD WIRES
GTD	GRADE TO DRAIN
TW	TOP OF WALL
BW	BOTTOM OF WALL

ARNOLD ROAD (PUBLIC - 40' WIDE)

PARCEL A
121,443 ± SF
2.79 ACRES
UPLAND: 16,688± SF
WETLAND 104,755± SF
(NOT A BUILDABLE LOT)

LOT 1
138,661± SF
3.18 ACRES
UPLAND: 78,996± SF
WETLAND: 59,665± SF

PARCEL ID 100-0-65
0 ARNOLD RD
30 ARNOLD RD LLC
6.0± ACRES
261,360± SF
(RECORD)
UPLAND: 95,608± SF
WETLAND: 165,752± SF

LIMIT OF WETLANDS FLAGGED MAY 2023

RECORD LOCATION OF ORIGINAL GRAVEL DRIVE (PRESENTLY OVERGROWN)

B14 NO B15 FOUND

REBAR FD

N/F RYAN P. & DANIELLE M. MCDONALD
N/F KARL & KAREN THOMPSON
N/F DAVID M. & LISA N. BERKIN
N/F PAUL F. & JANE V. MITCHELL
N/F AMY E. CONANT & LAURIE S. SCHUT
N/F TOMMY DANG
N/F MONICA L. LATOS & MICHAEL F. HOGAN
N/F MICHAEL W. THANE & CAROL A. SULIS
N/F THOMAS M. & CAROL B. MOSS
N/F SANTORO FAMILY 2011 TRUST
N/F JOHN J. RANDO, JR & DEBORAH V. BARONAS

30 0 30 60 90
SCALE IN FEET

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REVISIONS:

MITIGATION	3/15/24
BLDG. LAYOUT	3/15/24
REVIEW COMMENTS	2/16/23
SP & SITE PLAN REVIEW	12/8/23
BOH REVIEW COMMENTS	8/31/23
SAS CHAMBER LAYOUT	8/3/23

DRAWN BY: PAL
DESIGNED BY: DK/PAL/DA
CHECKED BY: DK/DA
SCALE: AS NOTED
STAMP:

COMMONWEALTH OF MASSACHUSETTS
DANA MATTHEW ALTOBELLO
No. 46237
CIVIL
REGISTERED PROFESSIONAL ENGINEER

Merrill
Engineers and Land Surveyors
427 Columbia Road
Hanover, MA 02339
781-826-9200
40 Court Street, Ste 2A
Plymouth, MA 02360
508-746-6060
Marine Division:
26 Union Street
Plymouth, MA 02360
508-746-6060
448 N. Falmouth Hwy, Unit A
North Falmouth, MA 02556
508-563-2183

PROJECT #: 22-083.1

PROJECT:
SITE PLAN
0 ARNOLD ROAD
ASSESSOR'S
MAP 100 BLOCK 0 LOT 65
HINGHAM MASSACHUSETTS

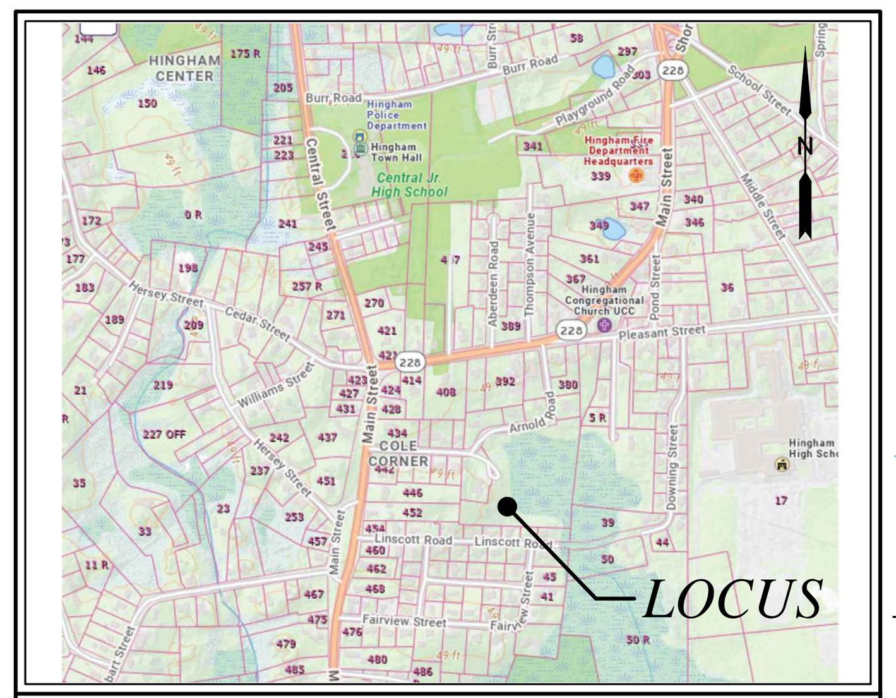
CLIENT:
GERRY RANKIN
30 ARNOLD ROAD, LLC
41 BREWSTER ROAD
HINGHAM, MA 02043
(617)-799-0588

DRAWING PATH: H:\22-083.1\DESIGN\22-083.1 SP.DWG

DATE: JULY 31, 2023

EXISTING CONDITIONS PLAN

SHEET 1 of 6



LOCATION MAP SCALE: 1" = 1000'±

RECORD OWNER:

ASSESSORS MAP 100 BLOCK 0 LOT 65
0 ARNOLD ROAD

30 ARNOLD RD LLC
41 BREWSTER RD
HINGHAM, MA 02043
DEED BOOK 57925 PAGE 110

NOTES:

1. PLAN REFERENCES:
   1.1. PLAN NO. 871 OF 2003
   1.2. PLAN RECORDED IN PLAN BOOK 5 , PAGE 165.
2. TOPOGRAPHIC AND DETAIL INFORMATION SHOWN HEREON IS BASED UPON AN ON THE GROUND SURVEY PERFORMED BY CAVANARO CONSULTING DURING JUNE OF 2019.
3. WETLAND RESOURCE AREAS SHOWN ON THIS PLAN WERE DELINEATED BY INDEPENDENT ENVIRONMENTAL CONSULTANTS, INC. PLYMOUTH MA DURING MAY OF 2023 AND FIELD LOCATED BY MERRILL ENGINEERS AND LAND SURVEYORS.
4. SUBJECT SITE IS IN THE "RESIDENCE A" DISTRICT AS DEPICTED ON THE TOWN OF HINGHAM ZONING MAP.
5. EXISTING UTILITIES, WHERE SHOWN, HAVE BEEN COMPILED BASED ON OBSERVED ABOVE GROUND EVIDENCE AND AVAILABLE RECORD PLANS AND ARE TO BE CONSIDERED APPROXIMATE. MERRILL ENGINEERS AND LAND SURVEYORS DOES NOT GUARANTEE THE LOCATION OF THE UNDERGROUND UTILITIES SHOWN OR THAT ALL EXISTING UTILITIES AND/OR SUBSURFACE STRUCTURES ARE SHOWN.
6. EXISTING SEPTIC SYSTEM COMPONENTS SHOWN HEREON TAKEN FROM RECORD AS-BUILT PLAN ON FILE WITH THE TOWN OF HINGHAM BOARD OF HEALTH AND ARE SHOWN AS APPROXIMATE ONLY.

DATUM NOTE:

ELEVATIONS SHOWN ON THE PLAN ARE ON AN ASSUMED DATUM. TO CONVERT THE EXISTING ELEVATIONS TO NAVD88, SUBTRACT 64.06 FROM ASSUMED ELEVATION.

FLOOD NOTE:

BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS LOCATED IN ZONE X OF THE FLOOD INSURANCE RATE MAP, AS SHOWN ON COMMUNITY MAP No. 25023C0082J, WHICH BEARS AN EFFECTIVE DATE OF JULY 17, 2012, AND IS NOT IN A SPECIAL FLOOD HAZARD AREA.

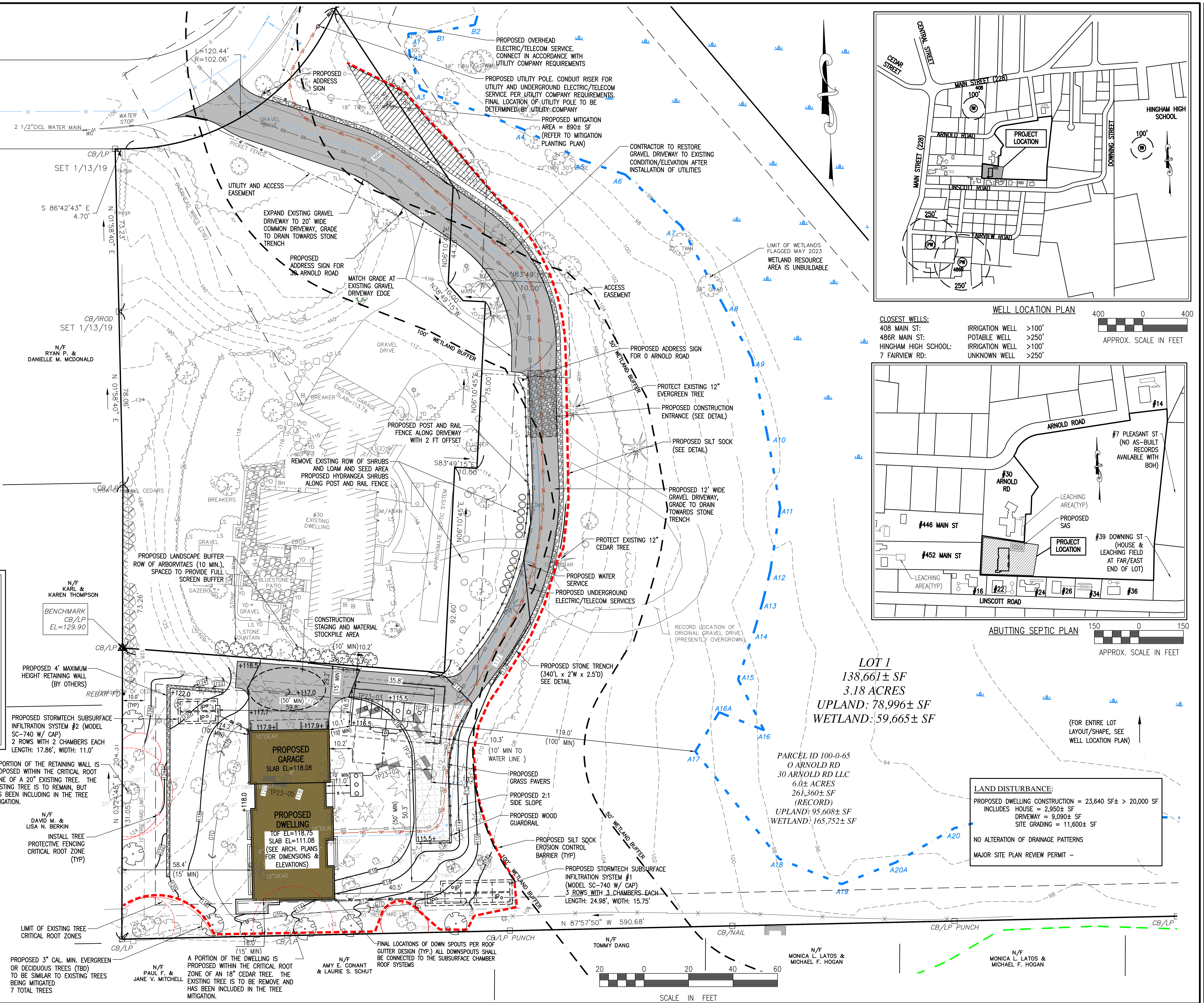
ZONING REQUIREMENTS
RESIDENCE DISTRICT "A"

	REQUIRED	EXISTING	PROPOSED LOT 1
AREA	20,000 SF	261,360 SF	138,661 SF
FRONTAGE	125 FEET	456.39 FEET	126.00 FEET
BUILDING HEIGHT	35 FEET	0 FEET	33.9± FEET
MINIMUM YARDS:			
FRONT	25 FEET*	0 FEET	272.8 FEET
SIDE	15 FEET	0 FEET	29.2 FEET
REAR	15 FEET	0 FEET	16.0 FEET
PARKING SPACES	2/UNIT	0 SPACES	3 SPACES

* IN ALL RESIDENCE DISTRICTS, THE FRONT SETBACK MAY BE AS NEAR THE STREET AS THE AVERAGE OF THE BUILDINGS OR STRUCTURES IN THE ADJOINING LOTS. BUILDING INSPECTOR TO CONFIRM ALL SETBACKS.

LEGEND

DMH	DRAIN MANHOLE
AC	HVAC UNIT
LAMP	LAMP POST (PRIVATE)
MH	MANHOLE (UNKNOWN)
RHT	ROOF HEIGHT
ROCK	LARGE ROCK (BOULDER)
SIGN	SIGN
SLAB	SLAB ELEVATION
SMH	SEWER MANHOLE
TH	THRESHOLD
TOF	TOP OF FOUNDATION
	DECIDUOUS TREE
	CONIFEROUS TREE
UP	UTILITY POLE
WELL	WATER WELL
	POST AND RAIL FENCE
	CHAIN LINK FENCE
100	CONTOUR LINE
LS	LANDSCAPE AREA
	BUILDING OVERHANG
	EDGE OF POND
	GUARD RAIL
OHW	OVERHEAD WIRES
GTD	GRADE TO DRAIN
TW	TOP OF WALL
BW	BOTTOM OF WALL



LAND DISTURBANCE:

PROPOSED DWELLING CONSTRUCTION = 23,640 SF± > 20,000 SF
INCLUDES HOUSE = 2,950± SF
DRIVEWAY = 9,090± SF
SITE GRADING = 11,600± SF

NO ALTERATION OF DRAINAGE PATTERNS

MAJOR SITE PLAN REVIEW PERMIT –

merrillinc.com

REVISIONS:

MITIGATION	3/15/24
BLDG. LAYOUT	3/15/24
REVIEW COMMENTS	2/16/23
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SAS CHAMBER LAYOUT	8/3/23

DRAWN BY: PAL

DESIGNED BY: DK/PAL/DA

CHECKED BY: DK/DA

SCALE: AS NOTED

STAMP: COMMONWEALTH OF MASSACHUSETTS DANA MATTHEW ALTOBELLO CIVIL No. 46237 PROFESSIONAL ENGINEER

Merrill
Engineers and Land Surveyors
427 Columbia Road
Hanover, MA 02339
781-826-9200
40 Court Street, Ste 2A
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North Falmouth, MA 02556
508-563-2183

PROJECT #: 22-083.1

PROJECT:

SITE PLAN

0 ARNOLD ROAD
ASSESSOR'S
MAP 100 BLOCK 0 LOT 65
HINGHAM MASSACHUSETTS

CLIENT:
GERRY RANKIN
30 ARNOLD ROAD, LLC
41 BREWSTER ROAD
HINGHAM, MA 02043
(617)-799-0588

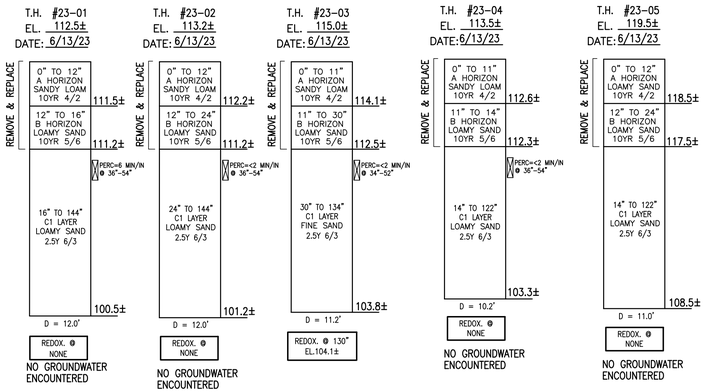
DRAWING PATH: H:\22-083.1\DESIGN\22-083.1 SP.DWG

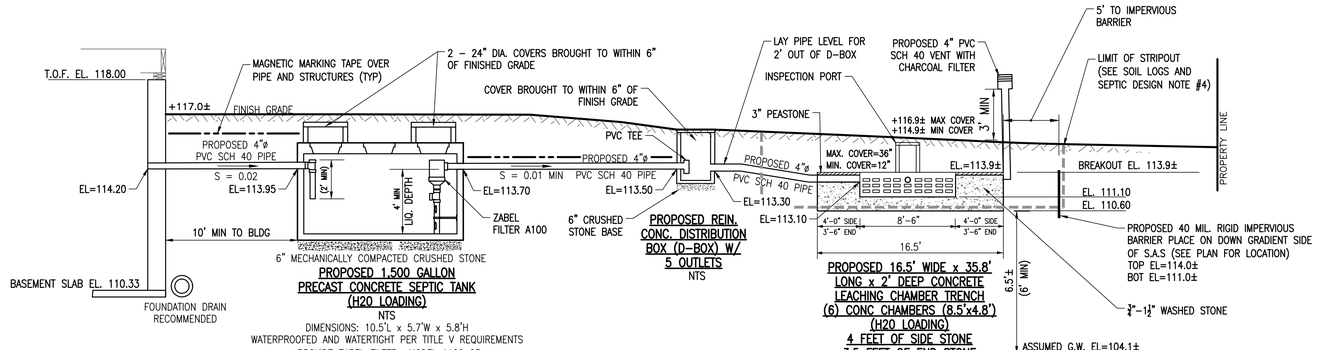
DATE: JULY 31, 2023

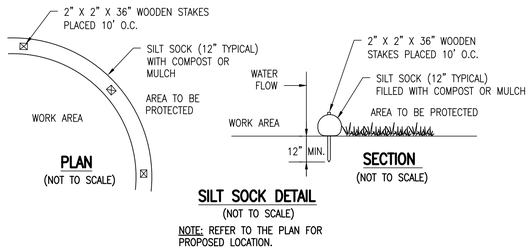
SITE/SEPTIC DESIGN PLAN

SOIL LOGS

PERFORMED BY: PAUL LOUDERBACK SE#14618 (MERRILL ENGINEERS)
WITNESSED BY: PAT BRENNON (HINGHAM B.O.H. CONSULTANT)
DATE: JUNE 13, 2023



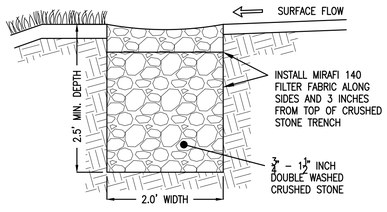




SILT SOCK DETAIL

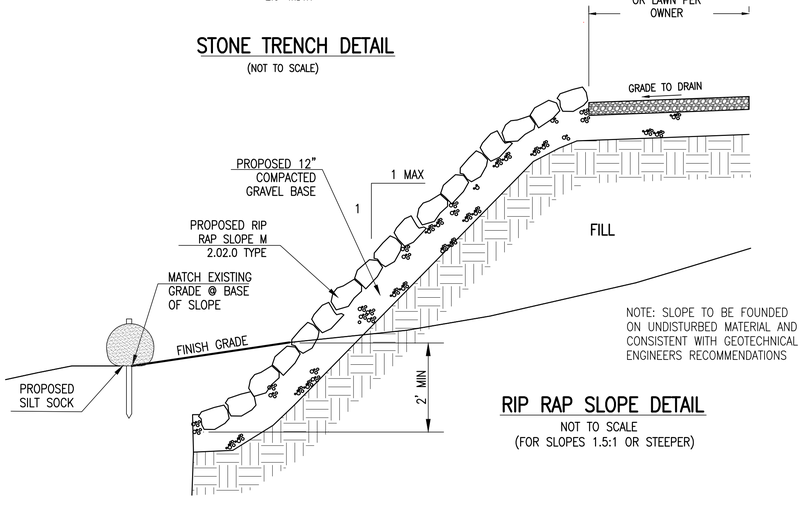
(NOT TO SCALE)

NOTE: REFER TO THE PLAN FOR PROPOSED LOCATION.



STONE TRENCH DETAIL

(NOT TO SCALE)



RIP RAP SLOPE DETAIL

NOT TO SCALE
(FOR SLOPES 1.5:1 OR STEEPER)

TREE MITIGATION CALCULATIONS

(REQUIRED MITIGATION PER HINGHAM ZONING BY-LAW SECTION I–I.6.d.(ii))

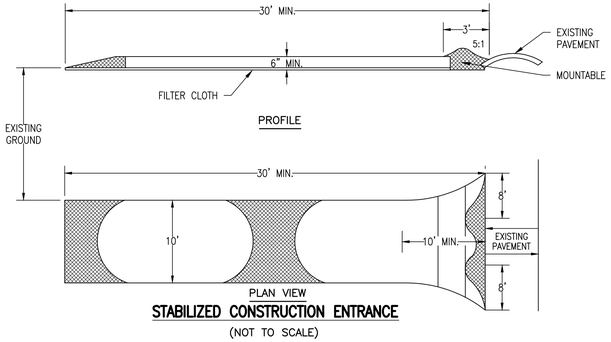
1. A TOTAL OF 2 TREES WITHIN PROPERTIES TREE YARD WILL BE AFFECTED BY PROPOSED WORK. THE TREES HAVE RESEPCTIVE DIAMETER BREAST HEIGHT (DBH) CALIPER MEASUREMENTS OF: 18" AND 20". (18"+20"=38")
2. REQUIRED MITIGATION: FOR EVERY ONE (1) INCH OF PROTECTED TREE CALIPER DISRUPTED, 0.5 INCH OF NEW TREE PLANTING MITIGATION MUST BE DONE. (38"/2=19" DBH CALIPER MITIGATION)
3. PROPOSED TREES MUST HAVE A 3" MINIMUM CALIPER. (19"/(3"/TREE)=7 TOTAL TREES

SEPTIC DESIGN (NOT DESIGNED FOR GARBAGE GRINDER)

1. **DESIGN DAILY FLOW: 310 CMR 15.203 (1): SYSTEM SEWAGE FLOW DESIGN CRITERIA**

USE	PARAMETER	DAILY FLOW FOR PARAMETER	DESIGN DAILY FLOW
SINGLE FAMILY	5 BEDROOMS	@ 110 G.P.D. PER BED	550 G.P.D.

2. **DESIGN SEPTIC TANK (310 CMR 15.223 TO 15.228)**
   SEPTIC TANK: 550 GPD x 2 = 1100 GAL. USE: 1,500 GAL (MIN)
3. **DESIGN SOIL ABSORPTION SYSTEM**
   LEACHING CHAMBERS: P.R. = 6 MIN/IN, CLASS I, E.L.R. =0.70 GPD/SF
   TITLE V : (NOT DESIGNED FOR GARBAGE GRINDER)
   CHAMBER TRENCH: (1) 35.8' LONG x 16.5' WIDE x 2' DEEP CHAMBER TRENCH
   REQUIRED AREA: 550 GPD/0.70 GPD/SF = 785 SF (MIN.)
   USE: SIX (6) 500-GALLON LEACHING CHAMBERS WITH 4' OF SIDE STONE/3.5' OF END STONE AROUND (16.5'W x 35.8'L x 2.0'D)
   BOTTOM AREA: 16.5 LF x 35.8 LF = 590 SF
   SIDEWALL AREA: 2(35.8LF x 2FT) + 2(16.5LF x 2FT) = 209 SF
   TOTAL AREA: 590 SF + 209 SF = 799 SF
   CAPACITY: 799 SF x 0.70 GPD/SF = 559 GPD > 550 GPD
4. **EXCAVATION NOTE**
   EXCAVATE ALL MATERIAL 5' AROUND SYSTEM TO C LAYER (SEE SOIL LOGS). REPLACE WITH CLEAN COARSE MATERIAL IN ACCORDANCE WITH 310 CMR 15.255 TO TOP OF S.A.S. (SEE PROFILE). EXCAVATION MUST BE INSPECTED BY THE TOWN AND MERRILL CORPORATION BEFORE SOIL PLACEMENT.



STABILIZED CONSTRUCTION ENTRANCE

(NOT TO SCALE)

STABILIZED CONSTRUCTION ENTRANCE SPECIFICATIONS

1. STONE SIZE – USE 2" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH – AS REQUIRED, BUT NOT LESS THAN 30 FT.
3. THICKNESS – NOT LESS THAN SIX (6) INCHES.
4. 4. WIDTH – TEN (10) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
5. FILTER CLOTH – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE. FILTER WILL NOT BE REQUIRED ON A SINGLE FAMILY RESIDENCE LOT.
6. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS–OF–WAYS MUST BE REMOVED IMMEDIATELY.
8. WASHING – WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS OF WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

SEPTIC CONSTRUCTION NOTES

1. CALL DIG SAFE 1–888–344–7233 AT LEAST 3 DAYS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
2. CONTRACTOR TO VERIFY EXISTING CONDITIONS PRIOR TO COMMENCEMENT OF WORK. THE BOARD OF HEALTH & MERRILL TO BE NOTIFIED OF ANY INCONSISTENCIES NOTED IN THE FIELD.
3. THE INSTALLATION OF THE SEPTIC SYSTEM MUST BE PERFORMED BY A LICENSED CONTRACTOR THAT HAS A WORKING KNOWLEDGE OF THE STATE ENVIRONMENTAL CODE TITLE V AND THE LOCAL BOARD OF HEALTH REGULATIONS. THE CONTRACTOR IS REFERRED TO TITLE V AND THE LOCAL REGULATIONS FOR ANY REQUIREMENTS THAT IS NOT SPECIFICALLY MENTIONED ON THE PLANS.
4. NO CHANGES ARE TO BE MADE IN THE FIELD WITHOUT THE APPROVAL OF THE BOARD OF HEALTH AND MERRILL.
5. CONTRACTOR TO CONFIRM GROUNDWATER ELEVATION AT FOUNDATION PRIOR TO CONSTRUCTION.
6. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SECURE ALL NECESSARY STATE, MUNICIPAL AND UTILITY PERMITS AND VERIFY THE PROPOSED LOCATION OF UTILITIES WITH UTILITY COMPANIES.
7. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH ALL APPLICABLE STATE AND LOCAL REGULATIONS.
8. ALL FILL USED ON THIS SITE WILL BE CLEAN GRANULAR FILL.
9. ALL TREE STUMPS & DEBRIS SHALL BE DISPOSED OF OFF SITE AT AN APPROVED FACILITY. ALL TREES WITHIN 5' OVERDIG AREA AND SIDE SLOPES SHALL BE REMOVED.
10. MERRILL RECOMMENDS PROPERLY DESIGNED FOUNDATION DRAINS, BY OTHERS, FOR EVERY STRUCTURE WITH A BASEMENT.
11. THE TOP OF ALL SYSTEM COMPONENTS, INCLUDING THE SEPTIC TANK, DISTRIBUTION BOX OR DOSING CHAMBER AND SOIL ABSORPTION SYSTEM, SHALL BE INSTALLED NO MORE THAN 36" BELOW FINISH GRADE. THE ENTIRE STRUCTURE MAY REQUIRE A RISER OVER THE INVERTS TO REDUCE THE DEPTH OF COVER OVER THE TOP OF THE CHAMBER.
12. ALL SYSTEM COMPONENTS SHALL BE MARKED WITH MAGNETIC TAPE OR A COMPARABLE MEANS IN ORDER TO LOCATE THEM ONCE BURIED.
13. ALL AREAS DISTURBED BY CONSTRUCTION AND NOT TO BE PAVED OR OTHERWISE TREATED AS NOTED ON PLAN, SHALL BE GRADED WITH 4" OF SCREENED LOAM AND SEEDED.
14. SET SANITARY COVERS SO FINISHED ADJACENT GRADE ARE LOWER TO ENSURE SURFACE RUNOFF IS NOT SHEDDING OVER COVERS, SLOPE GROUND TO 2% MIN.
15. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT THE GRADING AROUND THE FOUNDATION MEETS THE REQUIREMENTS OF THE MASS. STATE BUILDING CODE AND THE INTERNATIONAL RESIDENTIAL CODE (IRC 2009) SECTION R401.3. THE GRADE SHALL DROP A MINIMUM OF 6" WITHIN 10 FEET OF THE FOUNDATION AS REQUIRED TO ENSURE WATER DRAINS AWAY FROM THE FOUNDATION. ADDITIONALLY, THE MINIMUM DISTANCE FROM FINISH GRADE TO ANY WOOD FRAMING/CONSTRUCTION SHALL MEET THE MINIMUM REQUIREMENTS OF THE MASS. STATE BUILDING CODE AND THE IRC 2009.
16. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT AN ACCURATE BENCHMARK IS SET ON THE SITE PRIOR TO CONSTRUCTION.
17. A FINAL GRADING INSPECTION IS NEEDED BY THE ENGINEER AND SHALL BE SHOWN ON THE AS–BUILT PLAN.
18. THERE ARE NO KNOWN WELLS WITHIN 250 FEET OF THE SAS.
19. THERE ARE NO KNOW PUBLIC WATER SUPPLY WELLS WITHIN 400 FEET OF THE SAS.
20. THERE ARE NO EXISTING FOUNDATIONS WITHIN 25 FEET OF THE SAS UNLESS OTHERWISE NOTED.
21. THERE ARE NO KNOWN PERENNIAL STREAMS OR SURFACE WATER SUPPLY WITHIN 200 FEET OF THE SAS.
22. THERE ARE NO KNOWN PROTECTED WATER BODIES WITHIN 150 FEET OF THE SAS.
23. THERE ARE NO KNOWN WETLANDS WITHIN 100 FEET OF THE SAS.
24. THERE ARE NO KNOWN SURFACE OR SUBSURFACE DRAINS WITHIN 50 FEET OF THE SAS.
25. THERE ARE NO KNOWN SURFACE OR SUBSURFACE DRAINS WITH ELEVATION HIGHER THAN THE SAS WITHIN 25 FEET OF THE SAS.
26. THERE ARE NO KNOW SURFACE OR SUBSURFACE DRAINS WHICH DISCHARGE INTO A SURFACE WATER SUPPLY WITH 175 FEET OF THE SAS.
27. THERE ARE NO KNOW SURFACE OR SUBSURFACE DRAINS WHICH DISCHARGE INTO A PROTECTED WATER BODY WITH 125 FEET OF THE SAS.
28. THE SITE DOES NOT FALL WITHIN AN APPROVED ZONE II.
29. THE PROPOSED DESIGN DOES NOT REQUIRE A VARIANCE OR LOCAL UPGRADE APPROVAL FROM TITLE 5 OR LOCAL REGULATIONS.

SEPTIC SYSTEM INSPECTIONS

1. THE CONTRACTOR WILL PROVIDE A 48 HOUR ADVANCED NOTICE TO THE BOARD OF HEALTH AND MERRILL ENGINEERS AND LAND SURVEYORS PRIOR TO NEEDING INSPECTIONS.
2. AN EXCAVATION INSPECTION FOR BOTH FIELD AND SEPTIC TANKS IS REQUIRED BY THE BOARD OF HEALTH AND ENGINEER PRIOR TO PROCEEDING WITH THE INSTALLATION.
3. NOTIFY BOARD OF HEALTH AND MERRILL CORPORATION PRIOR TO BACKFILLING OF SYSTEM. THE CONTRACTOR SHALL NOT BACKFILL ANY COMPONENT OF THE SYSTEM UNTIL MERRILL CORPORATION HAS VERIFIED THE SYSTEM LOCATION & ELEVATION.
4. NOTIFY THE BOARD OF HEALTH AND MERRILL CORPORATION AFTER THE SEPTIC SYSTEM HAS BEEN BACKFILLED FOR FINAL GRADING INSPECTION.

SEPTIC MAINTENANCE NOTES

1. EVERY SEPTIC TANK OR TIGHT TANK SHALL BE PUMPED WHENEVER NECESSARY TO ENSURE PROPER FUNCTIONING OF THE SYSTEM. PUMPING IS REQUIRED WHENEVER THE TOP OF THE SLUDGE OR SOLIDS LAYER IS WITHIN 12 INCHES OR LESS OF THE BOTTOM OF THE OUTLET TEE OR THE TOP OF THE SCUM LAYER IS WITHIN TWO INCHES OF THE BOTTOM OF THE OUTLET TEE. PUMPING FREQUENCY IS A FUNCTION OF USE AND IS RECOMMENDED ON AN ANNUAL BASIS.

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REVISIONS:

MITIGATION	3/15/24
BLDG. LAYOUT	3/15/24
REVIEW COMMENTS	2/16/23
SP & SITE PLAN REVIEW	12/8/23
BOH REVIEW COMMENTS	8/31/23
SAS CHAMBER LAYOUT	8/3/23

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SCALE: AS NOTED
STAMP:

COMMONWEALTH OF MASSACHUSETTS
DANA MATTHEW ALTOBELLO
No. 46237
CIVIL
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PROJECT #: 22–083.1

PROJECT:
SITE PLAN
0 ARNOLD ROAD
ASSESSOR'S MAP 100 BLOCK 0 LOT 65
HINGHAM MASSACHUSETTS

CLIENT:
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HINGHAM, MA 02043
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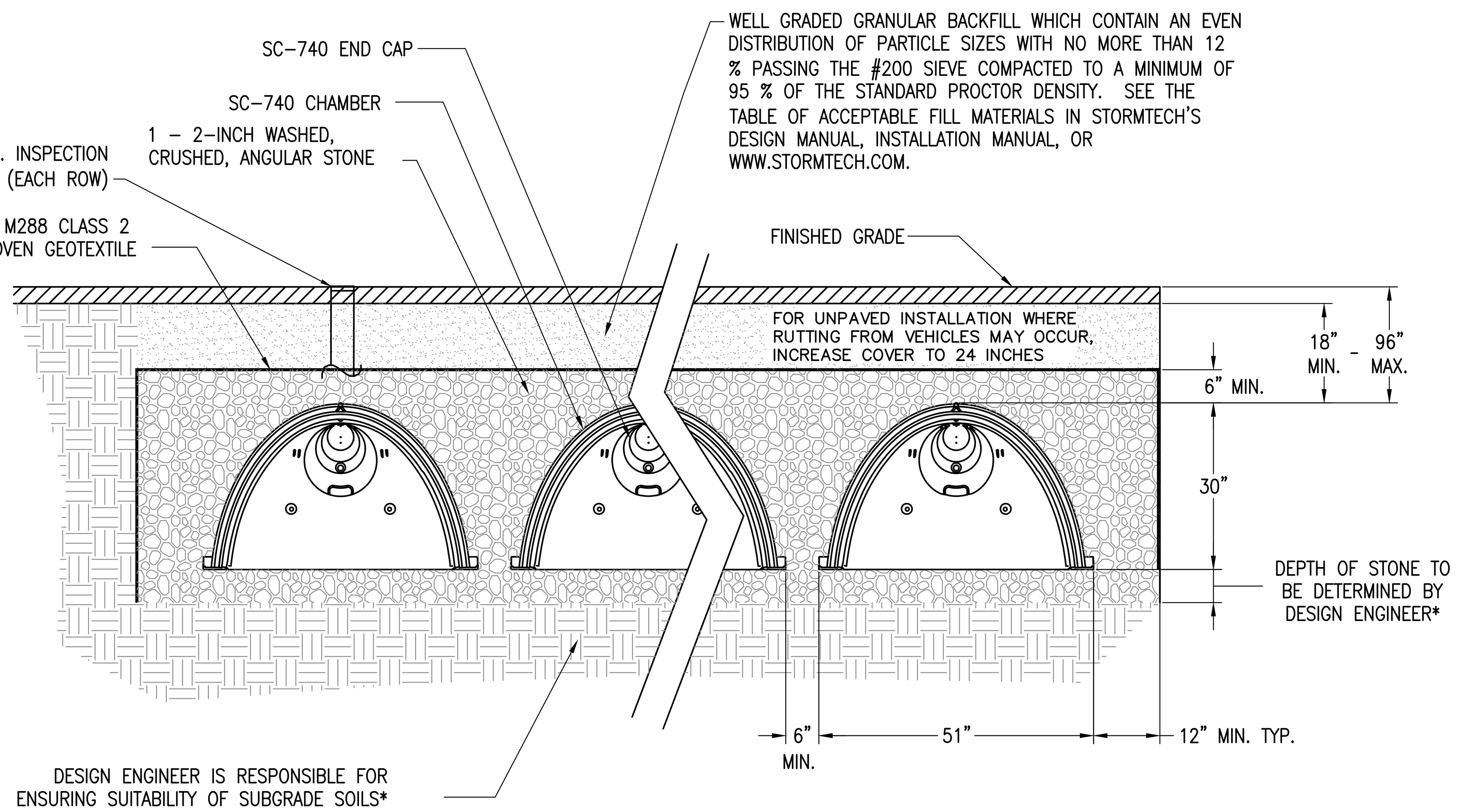
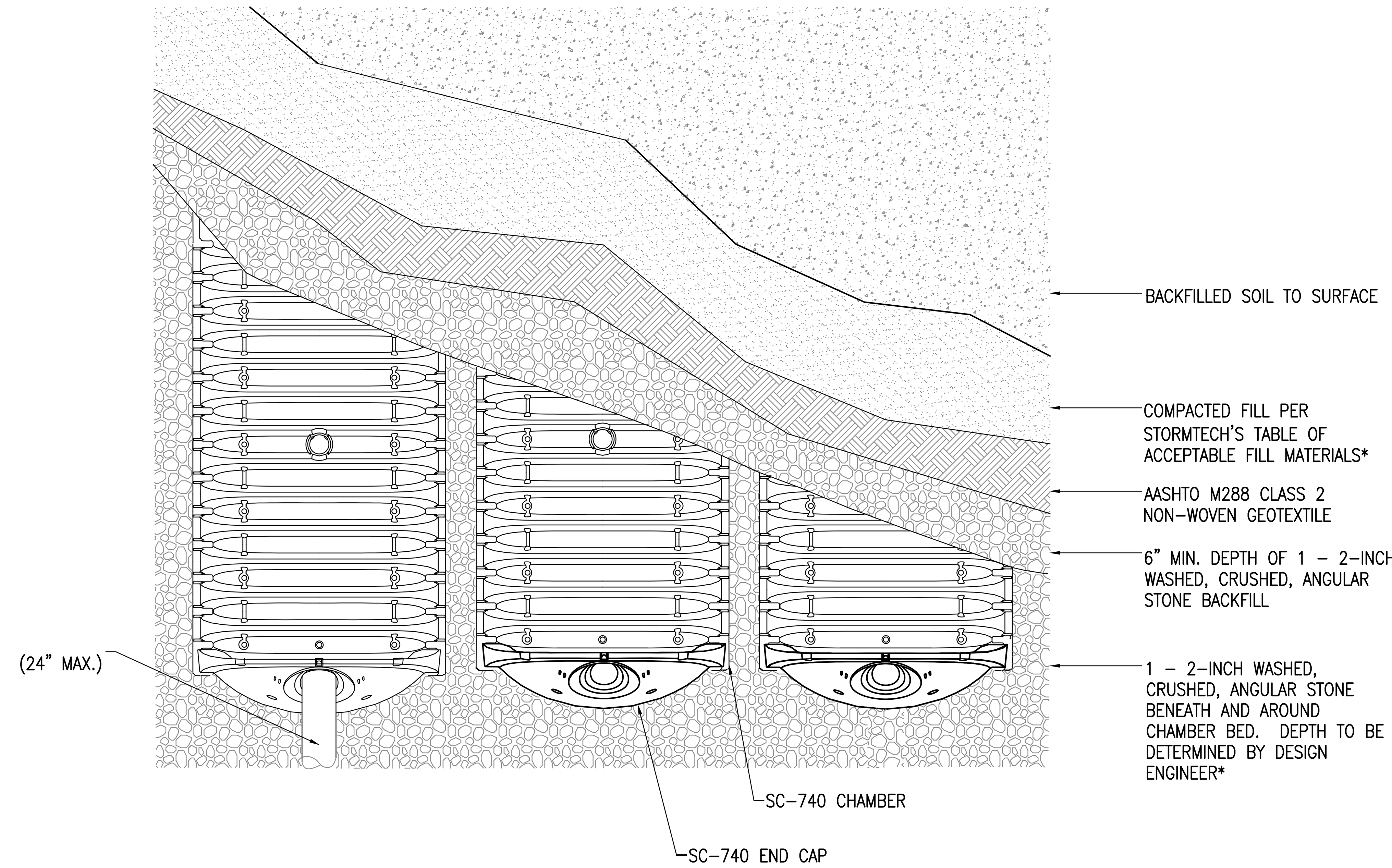
DRAWING PATH: H:\22–083.1\DESIGN\22–083.1 SP.DWG
DATE: JULY 31, 2023

SITE/SEPTIC DESIGN PLAN



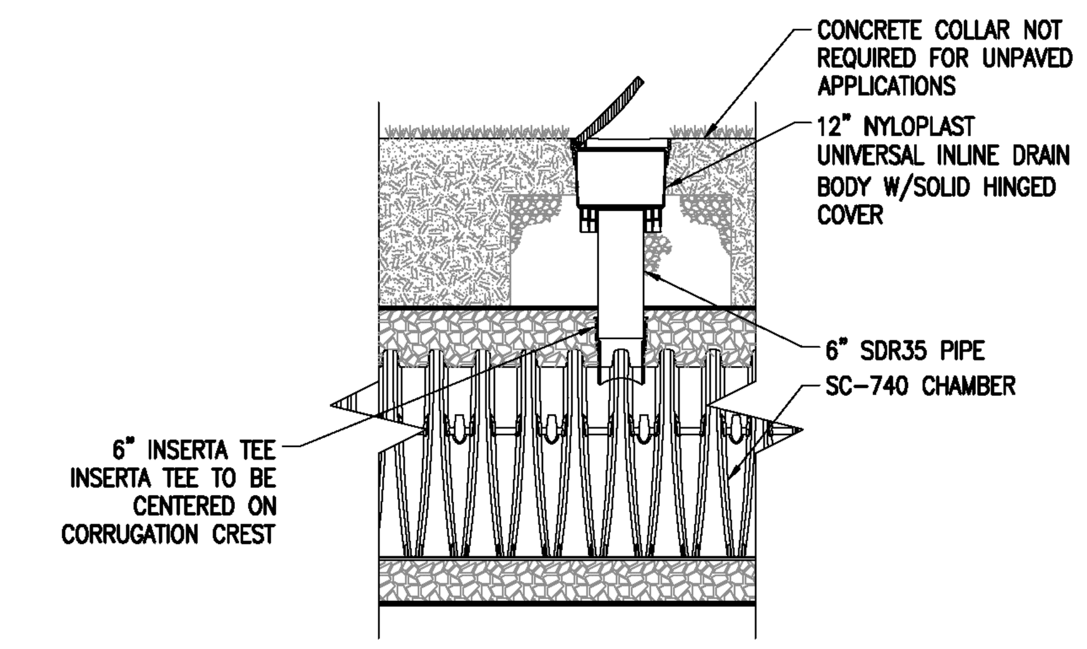
STORMTECH SC-740 CHAMBER SYSTEM
TYPICAL CROSS SECTION DETAIL

NOT TO SCALE



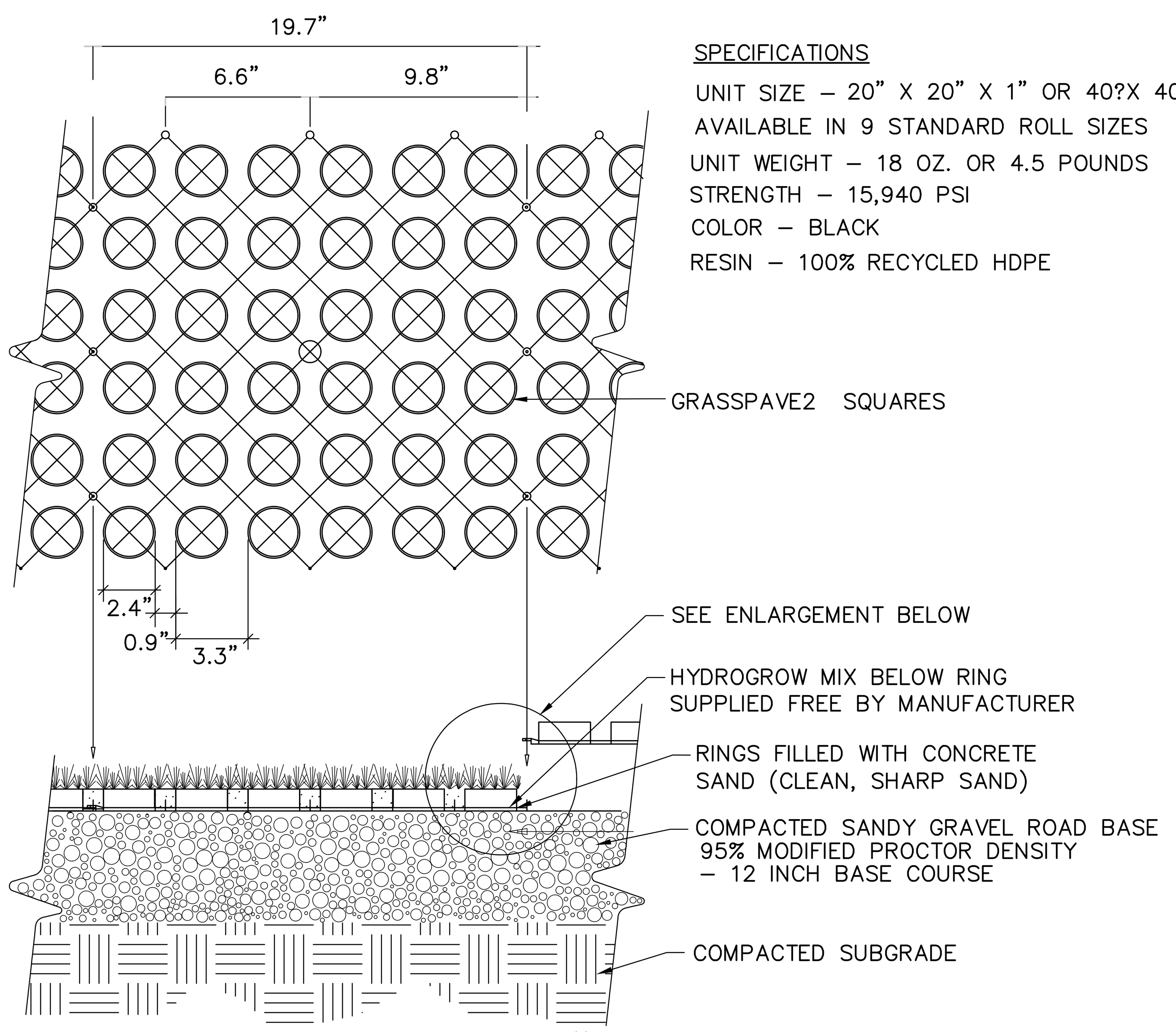
STORMTECH SC-740 CHAMBER SYSTEM
PLAN VIEW DETAIL

NOT TO SCALE



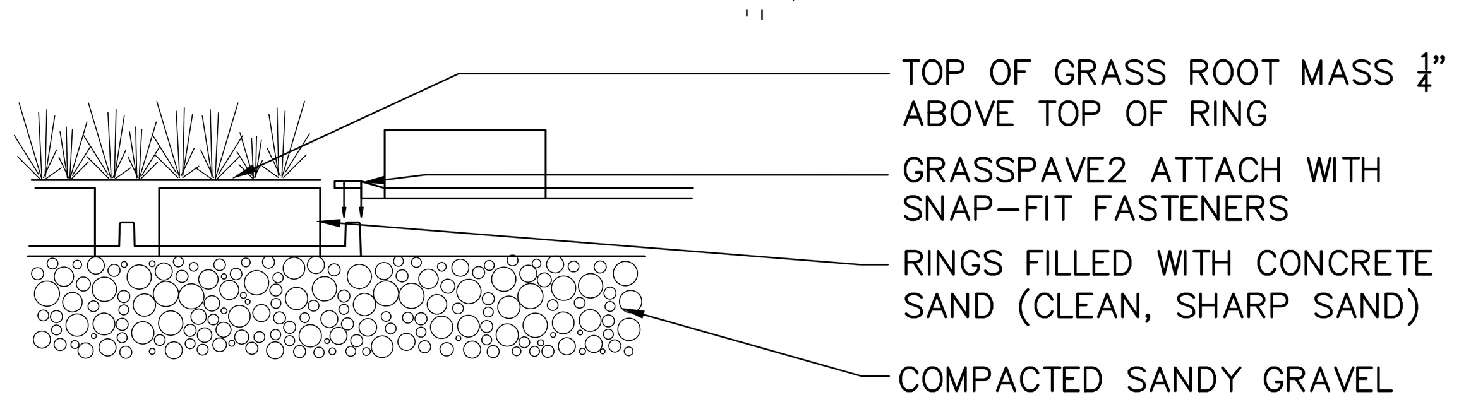
SC-740 6" INSPECTION PORT DETAIL

NOT TO SCALE



SPECIFICATIONS

UNIT SIZE – 20" X 20" X 1" OR 40?X 40?X 1?
AVAILABLE IN 9 STANDARD ROLL SIZES
UNIT WEIGHT – 18 OZ. OR 4.5 POUNDS
STRENGTH – 15,940 PSI
COLOR – BLACK
RESIN – 100% RECYCLED HDPE

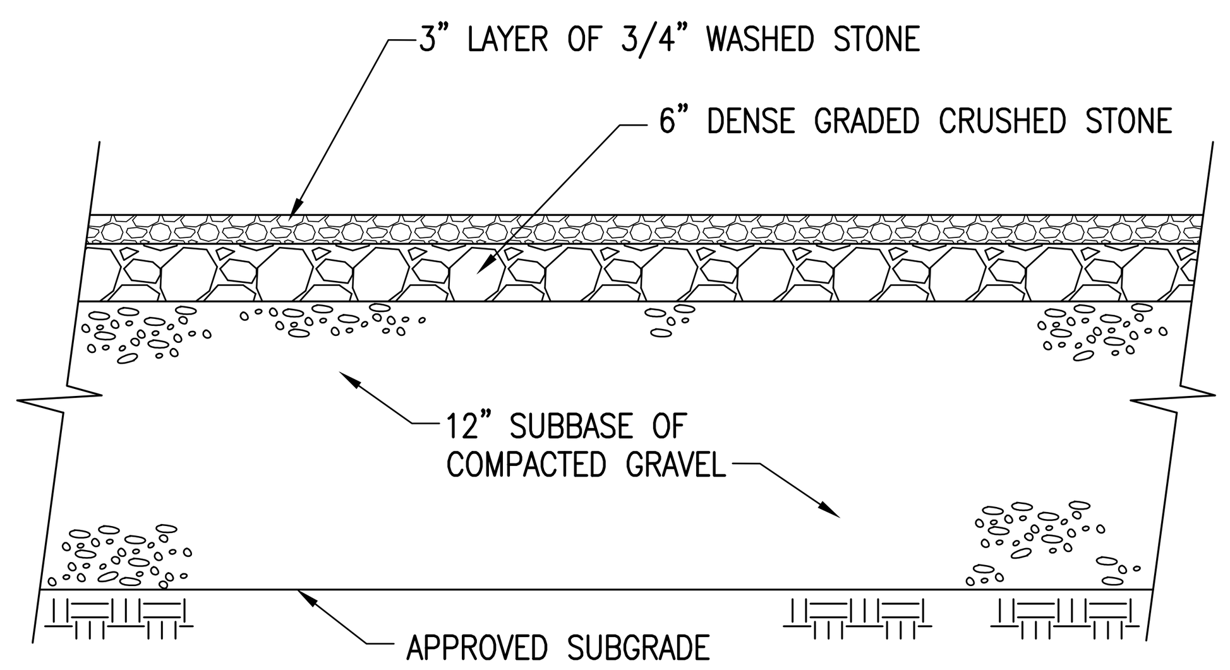


ENLARGEMENT

GRASSPAVE2 BY Invisible Structures, Inc. OR EQUIVALENT

TYPICAL GRASSPAVE2 DETAIL

(NOT TO SCALE)

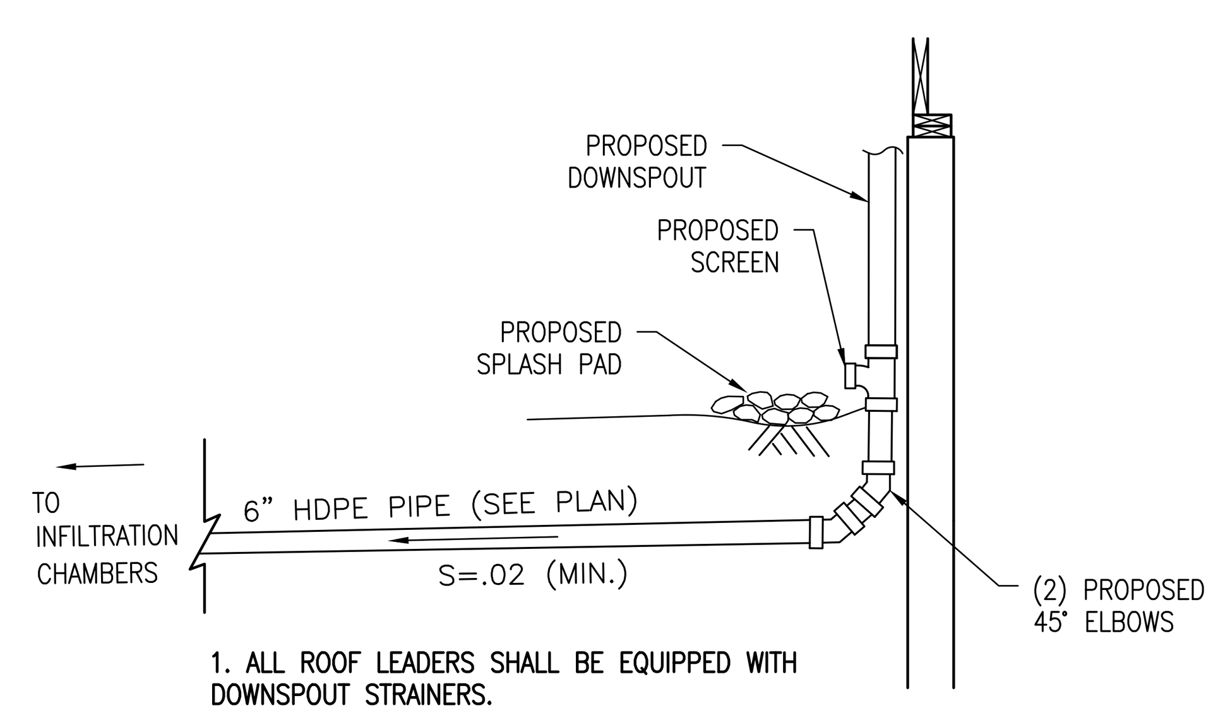


NOTE:

1. ALL UNSUITABLE MATERIAL SHALL BE REMOVED AND REPLACED WITH CLEAN GRAVEL BASE (95% COMPACTION)

GRAVEL DRIVEWAY SECTION DETAIL

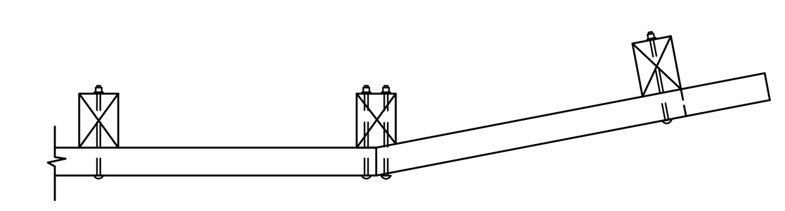
(NOT TO SCALE)



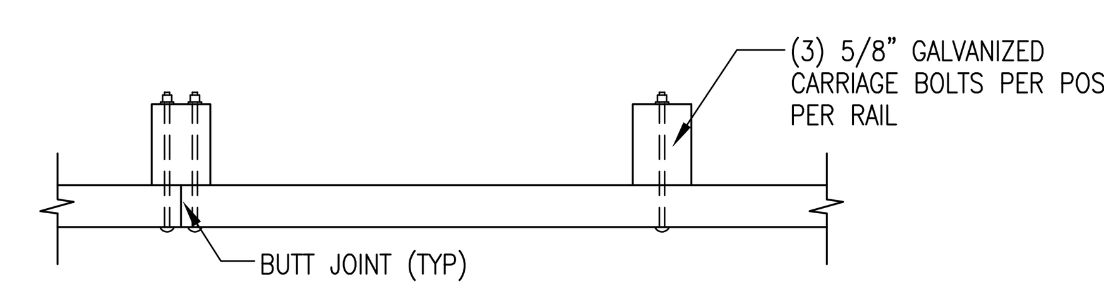
1. ALL ROOF LEADERS SHALL BE EQUIPPED WITH DOWNSPOUT STRAINERS.

TYPICAL DOWNSPOUT DETAIL

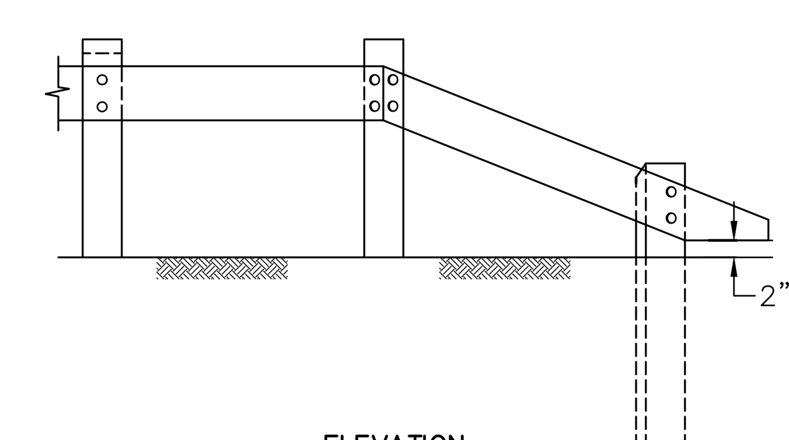
(NOT TO SCALE)



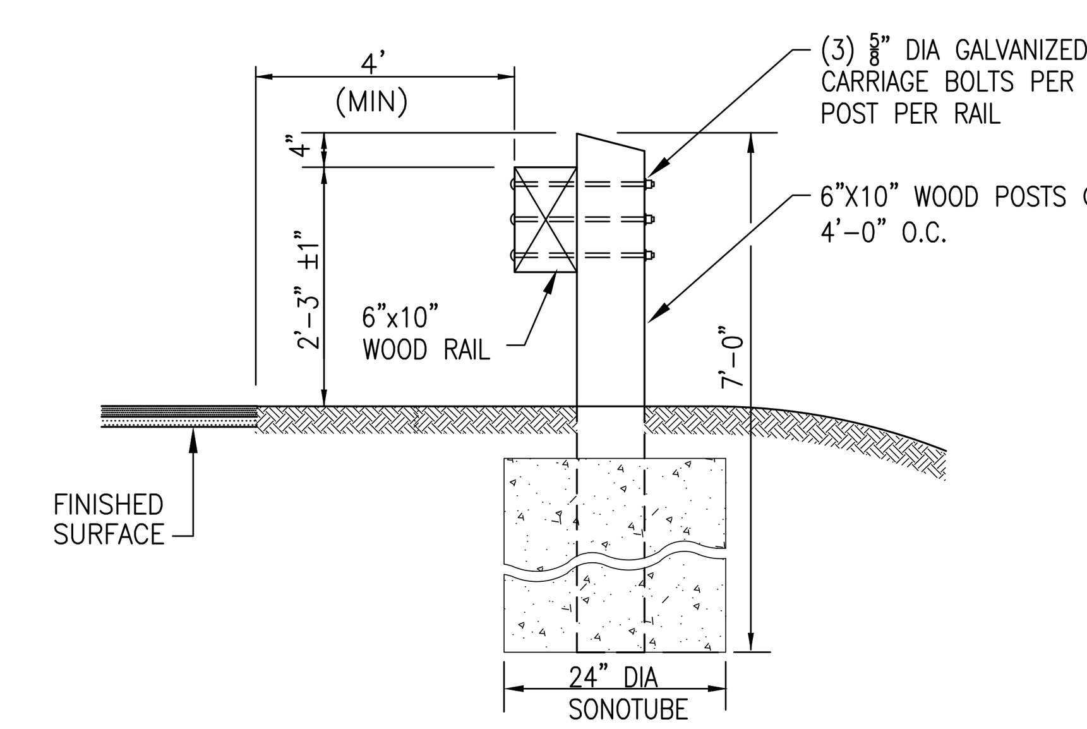
PLAN OF TRANSITION END



PLAN



ELEVATION



SECTION AT GRADE

NOTES:

1. ALL RAIL AND POST SECTIONS TO BE PRESSURE TREATED #1 SOUTHERN YELLOW PINE OR EQUAL.
2. BOLT CONNECTIONS TO BE DESIGNED BY A REGISTERED PROFESSIONAL STRUCTURAL ENGINEER PRIOR TO CONSTRUCTION.

WOOD GUARDRAIL DETAIL

(NOT TO SCALE)

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REVISIONS:

MITIGATION	3/15/24
BLDG. LAYOUT	3/15/24
REVIEW COMMENTS	2/16/23
SP & SITE PLAN REVIEW	12/8/23
BOH REVIEW COMMENTS	8/31/23
SAS CHAMBER LAYOUT	8/3/23

DRAWN BY: PAL

DESIGNED BY: DK/PAL/DA

CHECKED BY: DK/DA

SCALE: AS NOTED

STAMP:

Merrill
Engineers and Land Surveyors

427 Columbia Road
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40 Court Street, Ste 2A
Plymouth, MA 02360
508-746-6060

Marine Division:
26 Union Street
Plymouth, MA 02360
508-746-6060

448 N. Falmouth Hwy, Unit A
North Falmouth, MA 02556
508-563-2183

PROJECT #: 22-083.1

PROJECT:

SITE PLAN

0 ARNOLD ROAD
ASSESSOR'S
MAP 100 BLOCK 0 LOT 65
HINGHAM MASSACHUSETTS

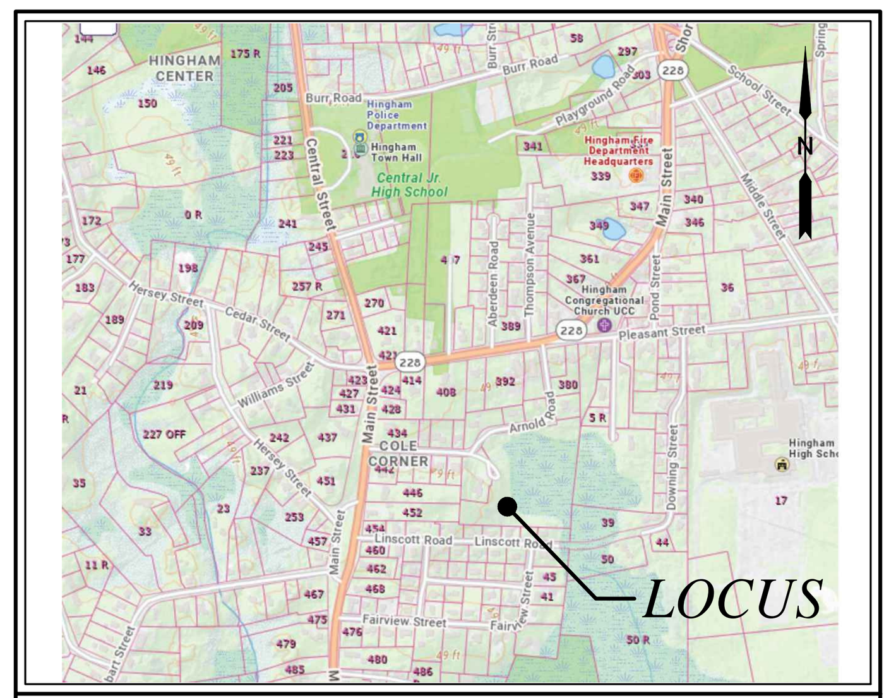
CLIENT:
GERRY RANKIN
30 ARNOLD ROAD, LLC
41 BREWSTER ROAD
HINGHAM, MA 02043
(617)-799-0588

DRAWING PATH: H:\22-083.1\DESIGN\22-083.1 SP.DWG

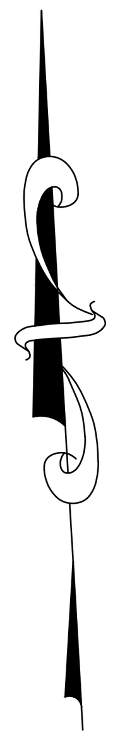
DATE: JULY 31, 2023

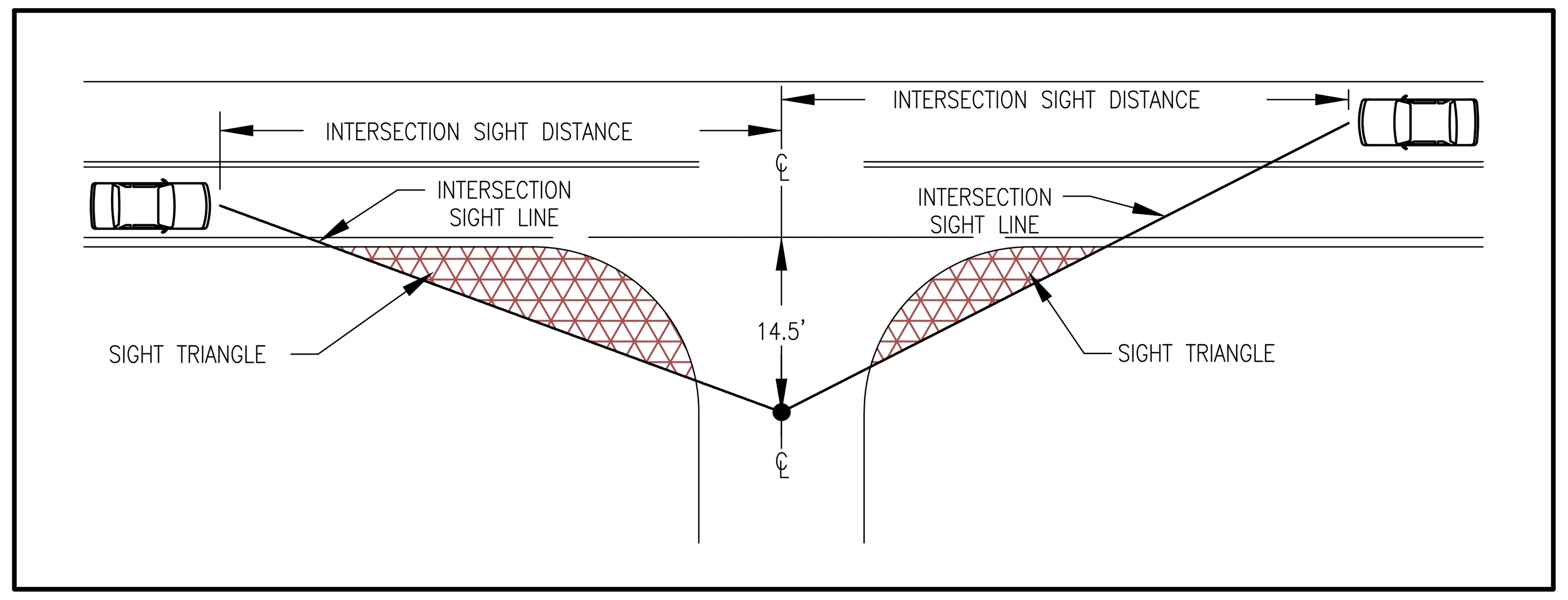
SITE/SEPTIC DESIGN PLAN

SHEET 4 of 6



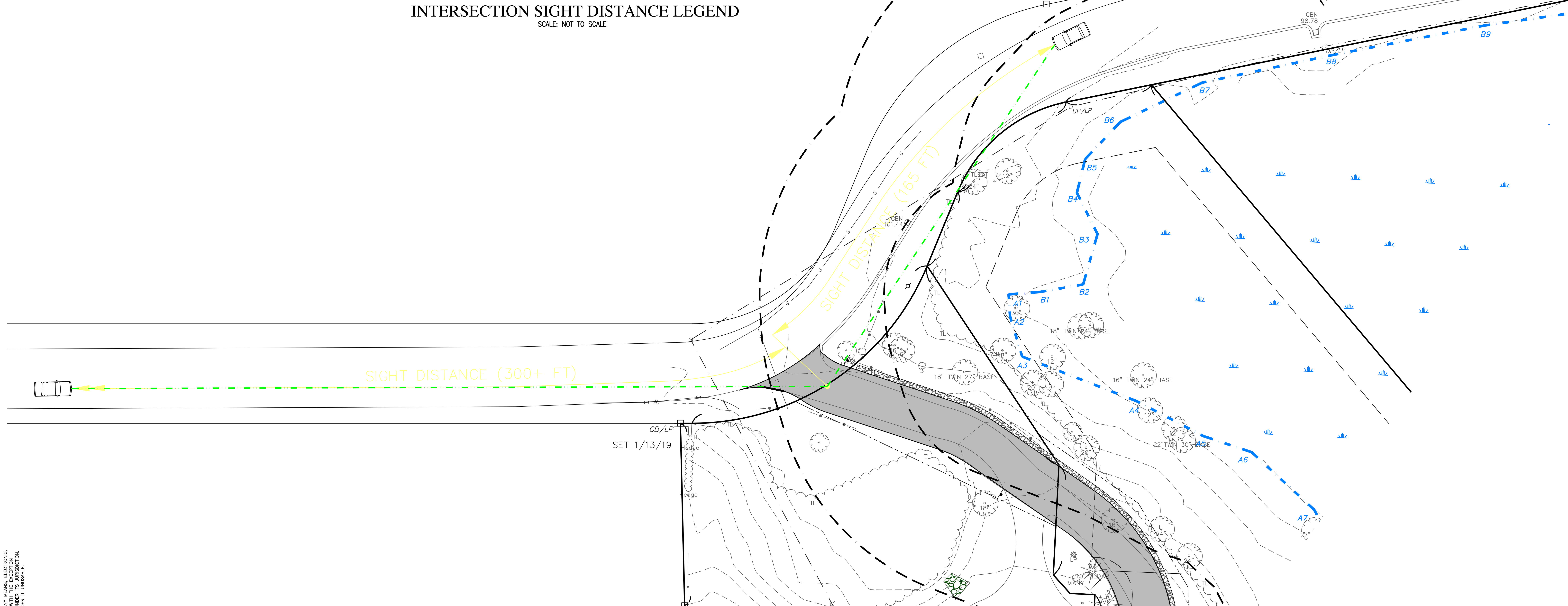
LOCATION MAP SCALE: 1" = 1000'±





INTERSECTION SIGHT DISTANCE LEGEND

SCALE: NOT TO SCALE



INTERSECTION SIGHT DISTANCE - SITE DRIVEWAY

30 0 30 60 90

SCALE IN FEET

INTERSECTION SIGHT DISTANCE SUMMARY

LOCATION/DIRECTION SITE DRIVEWAY		INTERSECTION SIGHT DISTANCE (FEET) REQUIRED MINIMUM STOPPING SIGHT DISTANCE (SSD)	DESIRABLE INTERSECTION SIGHT DISTANCE ISD(b)	MEASURED SIGHT DISTANCE
STOPPING SIGHT DISTANCE:	25 MPH			
ARNOLD ROAD APPROACHING FROM THE EAST:		155 FT.		165 FT.
ARNOLD ROAD APPROACHING FROM THE WEST:		155 FT.		>300 FT.
DRIVEWAY SIGHT DISTANCE:	25 MPH			
LOOKING TO THE WEST (LEFT):			280 FT.	165 FT. (b)
LOOKING TO THE EAST (RIGHT):			280 FT.	>300 FT.

(a) RECOMMENDED MINIMUM VALUES OBTAINED FROM A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS, 7TH EDITION; AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO), 2018.

(b) VALUES SHOWN ARE THE INTERSECTION SIGHT DISTANCE FOR A VEHICLE TURNING RIGHT OR LEFT EXITING A ROADWAY UNDER STOP CONTROL SUCH THAT MOTORISTS APPROACHING THE INTERSECTION ON THE MAJOR STREET SHOULD NOT NEED TO ADJUST THEIR TRAVEL SPEED TO LESS THAN 70 PERCENT OF THEIR INITIAL APPROACH SPEED.
BASED ON AASHTO STANDARDS IF THE MEASURED ISD VALUE (165') IS HIGHER THAN THE REQUIRED SSD VALUE (155'), THE INTERSECTION CAN OPERATE IN A SAFE MANNER, THEREFORE THIS DRIVEWAY WILL FUNCTION IN A SAFE MANNER.

(c) TRAVEL SPEED BASED ON SPEED OF 25 MPH.

LEGEND

DMH	DRAIN MANHOLE
AC	HVAC UNIT
LAMP	LAMP POST (PRIVATE)
MH	MANHOLE (UNKNOWN)
RHT	ROOF HEIGHT
ROCK	LARGE ROCK (BOULDER)
SIGN	SIGN
SLAB	SLAB ELEVATION
SMH	SEWER MANHOLE
TH	THRESHOLD
TOF	TOP OF FOUNDATION
	DECIDUOUS TREE
	CONIFEROUS TREE
UP	UTILITY POLE
WELL	WATER WELL
	POST AND RAIL FENCE
	CHAIN LINK FENCE
100	CONTOUR LINE
LS	LANDSCAPE AREA
	BUILDING OVERHANG
	EDGE OF POND
	GUARD RAIL
OHW	OVERHEAD WIRES
GTD	GRADE TO DRAIN
TW	TOP OF WALL
BW	BOTTOM OF WALL

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BOH REVIEW COMMENTS	8/31/23
SAS CHAMBER LAYOUT	8/3/23

DRAWN BY: PAL

DESIGNED BY: DK/PAL/DA

CHECKED BY: DK/DA

SCALE: AS NOTED

STAMP: DANA MATTHEW ALTOBELLO No. 46237 CIVIL

Merrill
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427 Columbia Road
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508-746-6060

Marine Division:
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448 N. Falmouth Hwy, Unit A
North Falmouth, MA 02556
508-563-2183

PROJECT #: 22-083.1

PROJECT:

SITE PLAN

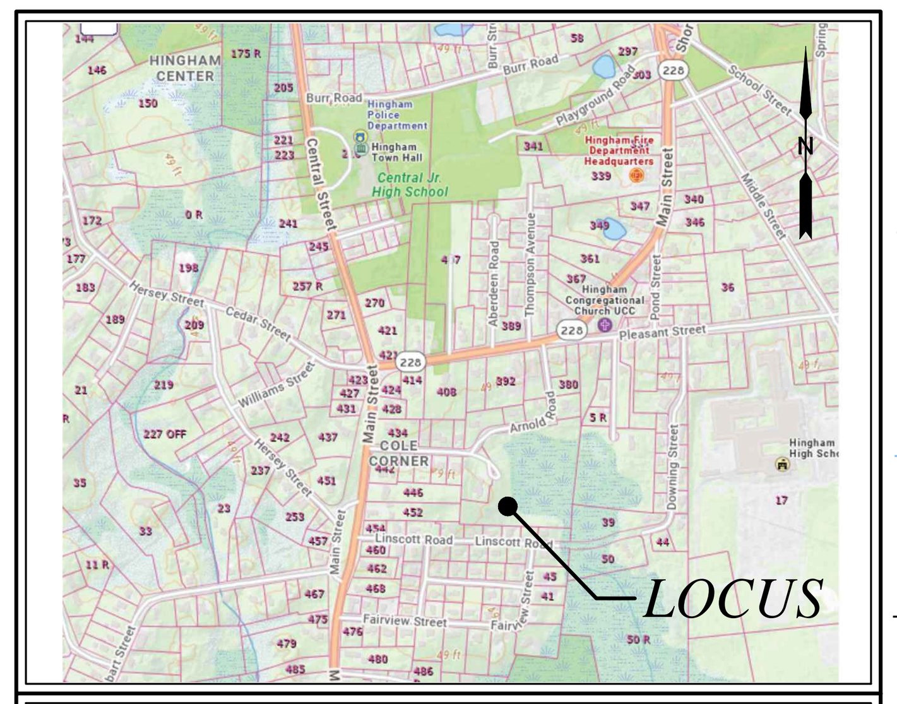
0 ARNOLD ROAD
ASSESSOR'S
MAP 100 BLOCK 0 LOT 65
HINGHAM MASSACHUSETTS

CLIENT:
GERRY RANKIN
30 ARNOLD ROAD, LLC
41 BREWSTER ROAD
HINGHAM, MA 02043
(617)-799-0588

DRAWING PATH: H:\22-083.1\DESIGN\22-083.1 SP.DWG

DATE: JULY 31, 2023

SIGHT DISTANCE PLAN



LOCATION MAP SCALE: 1" = 1000'±

RECORD OWNER:

ASSESSORS MAP 100 BLOCK 0 LOT 65
0 ARNOLD ROAD

30 ARNOLD RD LLC
41 BREWSTER RD
HINGHAM, MA 02043
DEED BOOK 57925 PAGE 110

ALTERATION AND MITIGATION CALCULATIONS:

BVW BUFFER ZONE ALTERATION CALCULATIONS:
0'–50' (PERVIOUS) = 890± SF (W/ 1 TREE REMOVAL)
50'–100' (PERVIOUS) = 2,060± SF (NO TREE REMOVAL)

HINGHAM BUFFER ZONE MITIGATION NOTES:
FOR WORK WITHIN 50'–100' BUFFER ZONE:
1. 1:1 MITIGATION REQUIRED FOR PROPOSED IMPERVIOUS SURFACES
2. NO MITIGATION REQUIRED FOR PROPOSED PERVIOUS SURFACES

FOR WORK WITHIN 0'–50' BUFFER ZONE:
1. 2:1 MITIGATION REQUIRED FOR PROPOSED IMPERVIOUS SURFACES
2. 1:1 MITIGATION REQUIRED FOR PROPOSED PERVIOUS SURFACES

PROPOSED MITIGATION:
TOTAL AREA = 890 SF (W/ 2 PROPOSED TREES)

PLANT SCHEDULE			
SHRUBS:			
BOTANICAL NAME	COMMON NAME	SIZE	QUANTITY
Azalea viscosum	Swamp Azalea	3 OR 5 GAL	TBD
Clethra Alnifolia	Summersweet	3 OR 5 GAL	TBD
Comptonia peregrina	Sweetfern	3 OR 5 GAL	TBD
Ilex glabra	Inkberry	3 OR 5 GAL	TBD
Viburnum dentatum	Arrowwood	3 OR 5 GAL	TBD
TREES:			
BOTANICAL NAME	COMMON NAME		
TBD	TBD	2" CAL. MIN.	2

LEGEND

DMH	DRAIN MANHOLE
AC	HVAC UNIT
LAMP	LAMP POST (PRIVATE)
MH	MANHOLE (UNKNOWN)
RHT	ROOF HEIGHT
ROCK	LARGE ROCK (BOULDER)
SIGN	SIGN
SLAB	SLAB ELEVATION
SMH	SEWER MANHOLE
TH	THRESHOLD
TOF	TOP OF FOUNDATION
	DECIDUOUS TREE
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	CHAIN LINK FENCE
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LS	LANDSCAPE AREA
	BUILDING OVERHANG
	EDGE OF POND
	GUARD RAIL
OHW	OVERHEAD WIRES
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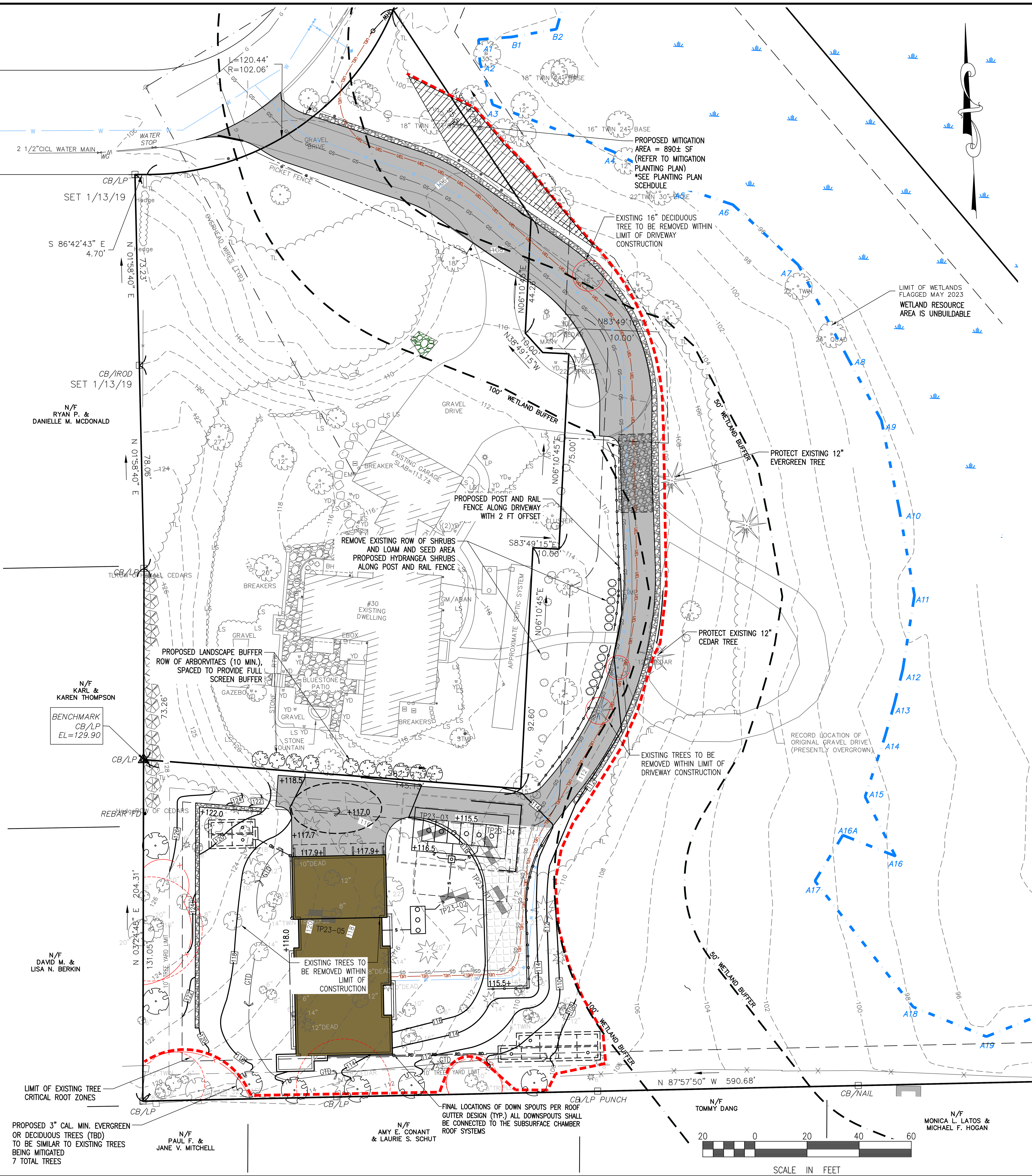
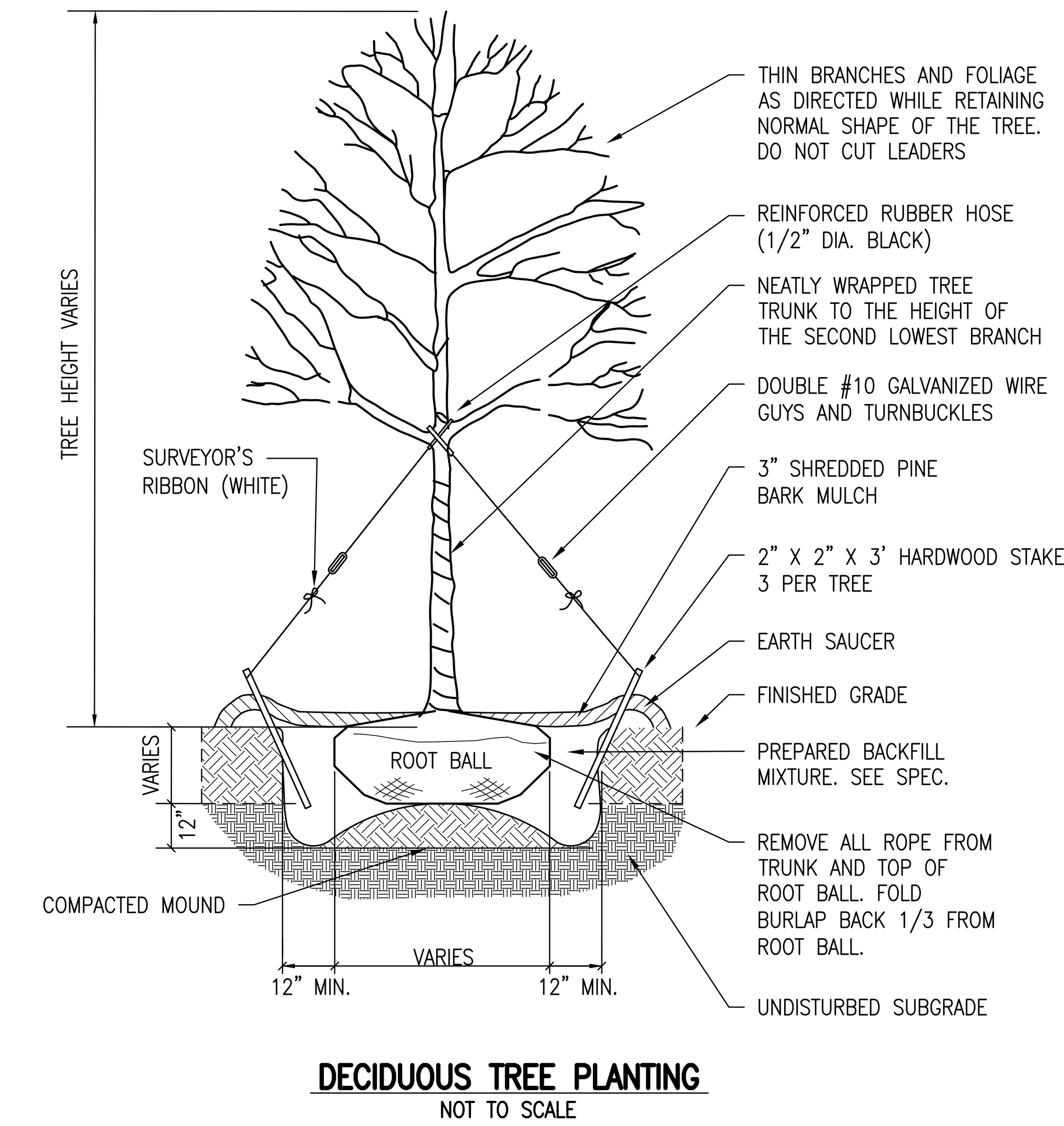
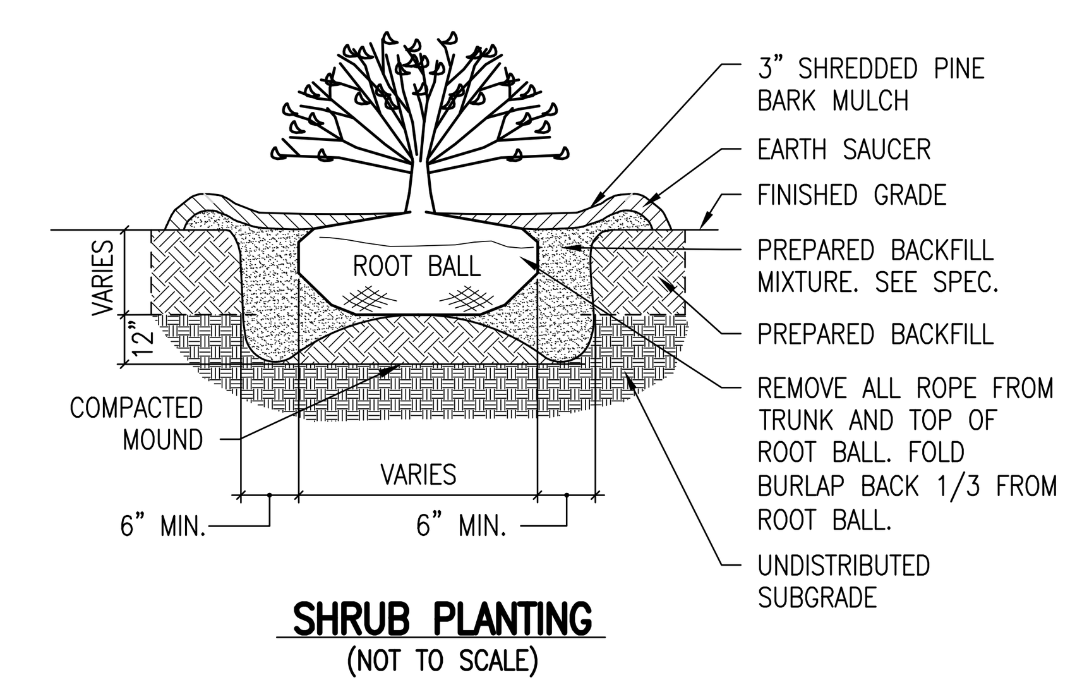




DECIDUOUS TREE PLANTING
NOT TO SCALE

NOTES:
1. NO SOIL OR MULCH SHALL BE PLACED AGAINST ROOT COLLAR OF PLANT.
2. PLANTING DEPTH SHALL BE THE SAME OR HIGHER AS GROWN IN NURSERY.



SHRUB PLANTING
(NOT TO SCALE)

NOTES:
1. NO SOIL OR MULCH SHALL BE PLACED AGAINST ROOT COLLAR OF PLANT.
2. PLANTING DEPTH SHALL BE THE SAME OR HIGHER AS GROWN IN NURSERY.

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DRAWN BY: PAL
DESIGNED BY: DK/PAL/DA
CHECKED BY: DK/DA
SCALE: AS NOTED
STAMP: COMMONWEALTH OF MASSACHUSETTS DANA MATTHEW ALTOBELLO No. 46237 CIVIL REGISTERED PROFESSIONAL ENGINEER

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(617)-799-0588

DRAWING PATH: H:\22-083.1\DESIGN\22-083.1 SP.DWG

DATE: JULY 31, 2023

MITIGATION PLANTING PLAN

SHEET 6 of 6

Stormwater Report

STORMWATER MANAGEMENT REPORT AND HYDROLOGIC-HYDRAULIC ANALYSIS

Proposed Residential Development
0 Arnold Road
Hingham, MA 02043

APPLICANT/OWNER:
Gerard Rankin
30 Arnold Road, LLC
41 Brewster Road
Hingham, MA 02043

SUBMITTED TO:
Town of Hingham
Conservation Commission
210 Central Street
Hingham, MA 02043

PREPARED BY:
Merrill Engineers and Land Surveyors
427 Columbia Road
Hanover, MA 02339

December 8, 2023
Revised February 16, 2024

Merrill
Engineers and Land Surveyors

Table of Contents

Merrill
Engineers and Land Surveyors

SECTION I

Merrill
Engineers and Land Surveyors

STORMWATER REPORT

PROPOSED RESIDENTIAL REDEVELOPMENT

Site Plan - Project Summary

The subject property is located on the southern side of Arnold Road, abutting 30 Arnold Road. The site is located within the Residential A District as depicted on the Town of Hingham Zoning Map. The Lot consists of 165,752± SF of Wetlands, and 95,608± SF of Upland, totaling 261,360± SF. The proposed residential development will consist of a 3,810± SF building footprint including a porch, with a 3-car garage. This development will have an on-site septic system, stormwater management facilities, a common gravel driveway, landscaping features, utility connections and a retaining wall to accommodate the site development. A Major Site Plan Review will be triggered for this project because over 20,000 SF of site land disturbance will likely occur, and a Special Permit A3 is required for the construction and use of a common driveway.

Wetland resource areas on site were identified as Bordering Vegetated Wetlands (BVW) based on a delineation completed by Independent Environmental Consultants, Inc. during May of 2023 and later field located by Merrill Engineers and Land Surveyors. Work for this project will take place within the 50' and 100' buffer zone to the BVW.

The project site is currently undeveloped, located within a woodsy area, and has wetlands. The existing slopes for this site contain mostly moderate to high slopes ranging between 10-20%, with some areas on the westerly side of the lot having a slope of around 30-35%. The site's high point is around EL. 128', with a low point of no more than EL. 92'. NRCS Soil Survey identifies the soils on site as Quonset sandy loam. 2023 test pit data indicated loamy sand to fine sand below. Therefore, A Soils were used for modeling purposes.

The applicant proposes to develop the lot with a single-family residential dwelling, a gravel driveway, landscaping, on-site septic system and associated utility connections. The site improvements will include approximately 4,361 sf of impervious area.

The proposed site and adjacent off-site area were included in the 3.179 acre watershed analyzed in the stormwater study. This was modelled in HydroCAD using the topographic survey data. Watershed plans are included in this report.

Existing Conditions

Based on the existing site survey data and site visits, the project area is moderately steep. The existing slopes for this site generally range between 10-20%, with some areas on the westerly side of the lot having a slope of around 30-35%. The site's high point is near a concrete bound located on the northern side of the west side lot line. Stormwater runoff flows down towards the BVW

from nearly all areas of the site. No stormwater management practices or facilities are currently in-place for this site.

Much of the existing cover for the site could be classified as either woods in good condition or wetlands. According to onsite soil test pit logs, the soil conditions are indicated as either loamy sand (HSG A) or fine sand (HSG A). Based on this, Rawls Rates for infiltration will be taken as 2.41 inches. Groundwater was not located for Test Pits 23-01, 23-02, 23-04, and 23-05 from recorded soil logs (found on the attached site plan), suggesting that groundwater is not relatively high within this part of the site. Natural Resources Conservation Service (NRCS) Web Soil Survey data indicates loamy sand material (map unit symbol 262C) around completed test pit locations. Refer to section VI for more NRCS information and soil test pit data is shown on the site plans.

Proposed Conditions/Stormwater Management

Under proposed conditions, stormwater runoff from the roof area will be treated with 2 subsurface infiltration chambers, each with an overflow outlet. Runoff from the proposed gravel driveway will flow into an adjacent stone diaphragm. The proposed subsurface infiltration systems and stone diaphragm will provide volume storage for runoff to be captured and provide TSS removal for runoff. A rip rap slope will be installed on the side of the driveway by the wetland area to allow for a stepper land slope than 3:1. Land will be cut down from the area between the proposed retaining wall to the driveway area on the north side of the proposed dwelling, and to the rear around of the garage on the south side. Additional grade changes will need to take place to stabilize the proposed driveway and rip rap slope.

Compliance with Stormwater Management Standards

Standard 1 – No New Untreated Discharges

No new stormwater conveyances will discharge untreated impervious runoff into, or cause erosion to downgradient areas. All runoff from proposed impervious areas will be directed to subsurface infiltration systems or a stone diaphragm for pretreatment proposed to the extent practicable. The existing lot has no impervious area. The proposed work will result in 4,361± SF of additional impervious area to the lot.

Standard 2 – Peak Rate Attenuation

Peak rates of runoff were calculated using the TR-20 methology developed by NRCS. This method was computed by using HydroCAD® software based on design storms for 2-year, 10-year, 25-year, and 100-year storm occurrences. Rainfall data for the design storms was collected and utilized from the National Oceanic and Atmospheric Administration (NOAA), for Hingham, MA.

Due to an increase in impervious area resulting from this project, there will be an increase in flow rate to the wetland area design point (DP-2). The design point listed as off site (DP-1) discharge will not receive an increase in flow rate. Refer to watershed plans in Section II and III to view subcatchments and design points for this project. Although there is a slight increase in the peak

flow rate for the 100-yr storm event for DP-2 wetland area, the peak volume meets the existing condition. This would indicate that there will be no impact to downstream flooding within the wetland area.

The following is a summary of peak runoff flow rates for proposed and existing conditions:

RETURN PERIOD	EXISTING CONDITIONS (CFS)		PROPOSED CONDITIONS (CFS)	
	DP-1 (OFFSITE)	DP-2 (WETLANDS)	DP-1 (OFFSITE)	DP-2 (WETLANDS)
2-YEAR	0.00	0.00	0.00	0.00
10-YEAR	0.00	0.11	0.00	0.11
25-YEAR	0.00	0.61	0.00	0.57
100-YEAR	0.01	2.14	0.01	2.71

The following is a summary of peak volumes for proposed and existing conditions:

RETURN PERIOD	EXISTING CONDITIONS (AF)		PROPOSED CONDITIONS (AF)	
	DP-1 (OFFSITE)	DP-2 (WETLANDS)	DP-1 (OFFSITE)	DP-2 (WETLANDS)
2-YEAR	0.00	0.00	0.00	0.00
10-YEAR	0.00	0.054	0.00	0.051
25-YEAR	0.001	0.128	0.001	0.122
100-YEAR	0.003	0.287	0.002	0.287

Standard 3 – Groundwater Recharge

There are 2 proposed subsurface infiltration systems and a stone diaphragm, which would provide groundwater recharge. The hydraulic conductivity was based on soil conditions found on the site via soil testing and DEP SMR Table 2.3.3 1982 Rawls Rates - values developed from Rawls, Brakensiek and Saxton, 1982.

The total proposed impervious area on the site is 4,361 s.f. under the proposed conditions. The required recharge volume has been provided in accordance with the Massachusetts Stormwater Handbook. According to the Handbook, HSG A soils require a Target Depth Factor of 0.60-inch which is multiplied by the increase in impervious area to get the minimum recharge volume required:

(0.60x12”/ft)(4,361s.f. = 218± c.f. of recharge volume (min)

The proposed subsurface infiltration systems have a combined volume (below the outlets) of 1,163± cf. of volume which is well above the required recharge volume. The stone diaphragm will provide an additional 680 cf of volume of storage.

Standard 4 – Water Quality

The water quality volume (WQV) was calculated using the 1-inch rule as the site soil conditions for infiltration units includes infiltration rates of 2.4 inches/hr or greater. The water quality calculations are shown below:

Existing impervious area= 0± s.f
Proposed impervious area= 4,361± s.f
Increased impervious area= 4,361± s.f

WQV is calculated by multiplying the **1.0-inch** of runoff by the net increase in paved area on the site as follow:

WQV = (4,361 ft^2)(1.0 in/12 in/1 ft) = 363.42± ft^3

Proposed drainage conditions including the subsurface infiltration chambers and stone diaphragm total 1,843± ft^3, exceeding the required 363.42± ft^3.

Additionally, a Long-Term Pollution prevention Plan has been included in this report along with a TSS Calculation showing that the system exceeds the minimum TSS removal requirement of 80%

Standard 5 – Land Use with Higher Potential Pollutants Loads (LUHPPL)

The proposed project is not considered a LUHPPL. Not Applicable.

Standard 6 – Critical Areas

The proposed project does not discharge to any critical areas. Not Applicable.

Standard 7 – Redevelopment and Other Projects Subject to the Standards only to the maximum extent practicable

The project site is not a redevelopment project. Not Applicable.

Standard 8 – Construction Period Pollutions Prevention and Erosion and Sedimentation Control

Silt sock erosion controls will be placed at the limit of work as erosion control barriers to protect wetland resource areas prior to commencement of any construction activity. A stabilized construction entrance will also be installed at the project driveway entrance to prevent sediment from being tracked offsite. A Construction Operation and Maintenance Plan and Construction Pollution Prevention Plan have been included with this report.

Standard 9 – Operation and Maintenance Plan

The Long-Term Source Control/Pollution Prevention Plan and Operation and Maintenance Plan is also provided included with this report.

Standard 10 – Prohibition of Illicit Discharges

An Illicit Discharge Compliance Statement is included in this submittal.

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Engineers and Land Surveyors

SECTION II

EXISTING CONDITIONS MODEL

2 (3.41”), 10 (5.22”), 25 (6.36”)
and 100 (8.11”) year return storms

EXISTING WATERSHED DETAILS
TOTAL WATERSHED AREA=138,496± SF
TOTAL IMPERVIOUS AREA= 5,436± SF

DISCHARGE TO OFFSITE ABUTTERS (DP-1)

SUBCATCHMENT 1
TOTAL AREA=3,330± SF
TOTAL IMPERVIOUS AREA=0 SF

WOODS, GOOD, HSG B=3,330± SF

DISCHARGE TO WETLAND AREA (DP-2)

SUBCATCHMENT 2
TOTAL AREA=135,166± SF
TOTAL IMPERVIOUS=5,436± SF

WOODS, GOOD, HSG B=83,377± SF
GRAVEL DRIVEWAY=6,975± SF
WALKWAY/PATIO=2,020± SF
ROOF=3,416± SF
WOODS/GRASS COMBO, GOOD, HSG B=39,378± SF

40 0 40 80 120
SCALE IN FEET

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REVISIONS:

DRAWN BY:

DESIGNED BY:

CHECKED BY:

SCALE:
1" = 40'

STAMP:

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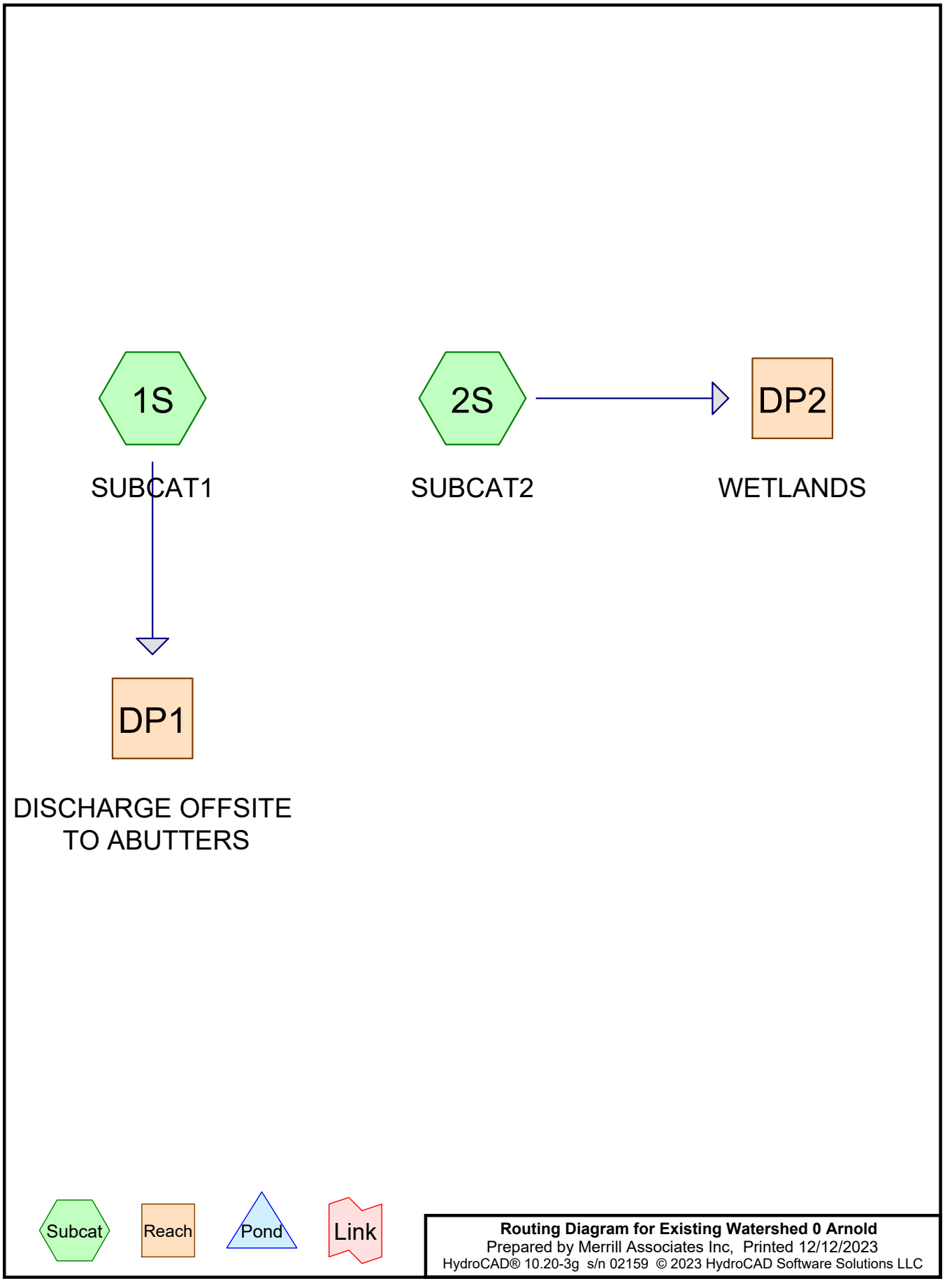
H:\22-083.1\DESIGN\22-083.1 EX & PROP WATERSHED.DWG

DATE:
NOVEMBER 28, 2023

EXISTING
WATERSHED PLAN

SHEET 1 of 1



Routing Diagram for Existing Watershed 0 Arnold
Prepared by Merrill Associates Inc, Printed 12/12/2023

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.904	39	>75% Grass cover, Good, HSG A (2S)
0.160	76	Gravel roads, HSG A (2S)
0.078	98	Roofs, HSG A (2S)
0.046	98	Walkway/Patio, HSG A (2S)
1.991	30	Woods, Good, HSG A (1S, 2S)
3.179	**38**	**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SUBCAT1 Runoff Area=3,330 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=96' Tc=6.7 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment 2S: SUBCAT2 Runoff Area=135,166 sf 4.02% Impervious Runoff Depth=0.00"
Flow Length=316' Tc=9.9 min CN=38 Runoff=0.00 cfs 0.000 af

Reach DP1: DISCHARGE OFFSITE TO ABUTTERS Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach DP2: WETLANDS Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 3.179 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
96.07% Pervious = 3.055 ac 3.93% Impervious = 0.125 ac

Summary for Subcatchment 1S: SUBCAT1

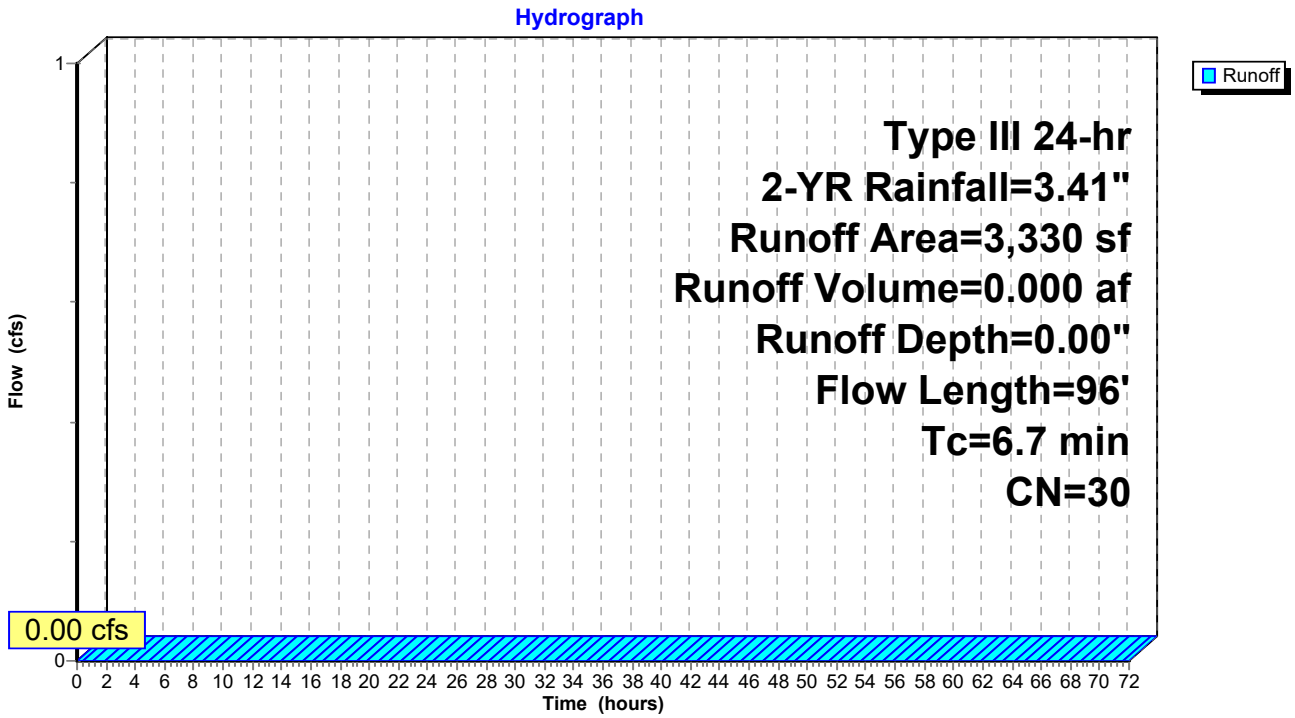
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Reach DP1 : DISCHARGE OFFSITE TO ABUTTERS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.41"

Area (sf)	CN	Description
3,330	30	Woods, Good, HSG A
3,330		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 3.41"
0.4	46	0.1500	1.94		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
6.7	96	Total			

Subcatchment 1S: SUBCAT1



Summary for Subcatchment 2S: SUBCAT2

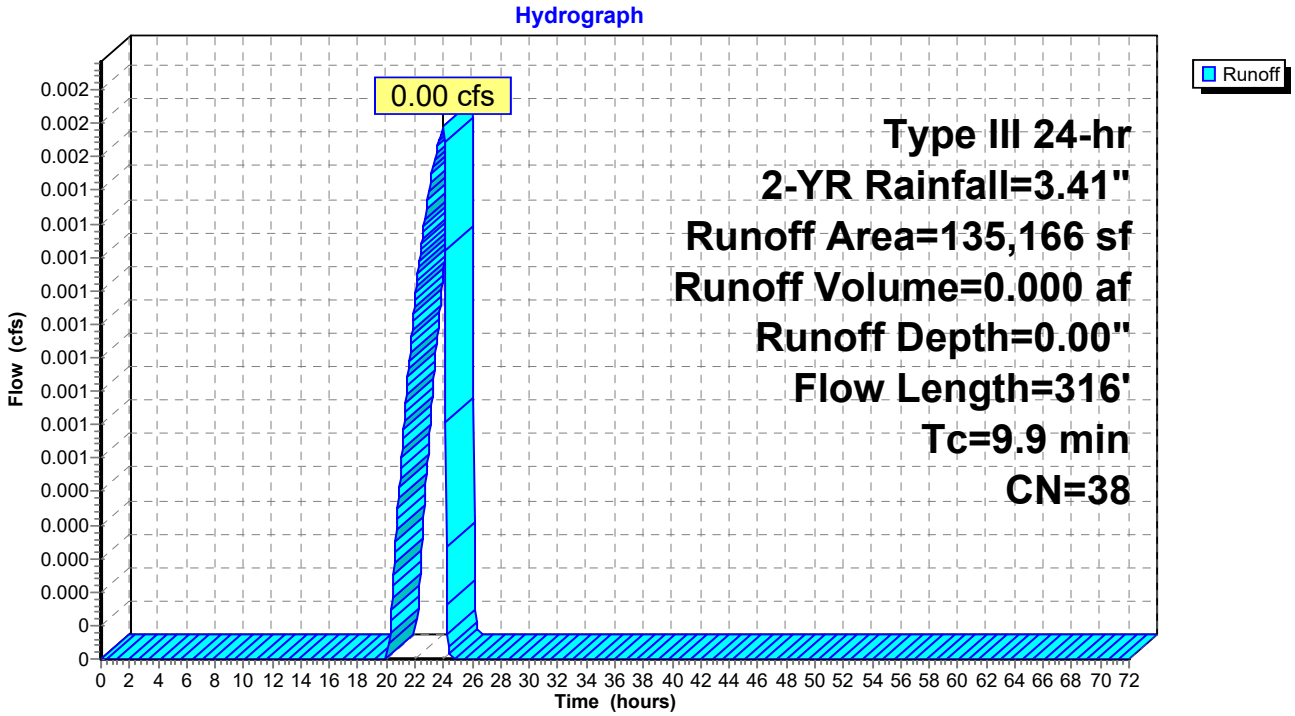
Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Reach DP2 : WETLANDS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.41"

	Area (sf)	CN	Description
	83,377	30	Woods, Good, HSG A
	6,975	76	Gravel roads, HSG A
*	2,020	98	Walkway/Patio, HSG A
*	3,416	98	Roofs, HSG A
	39,378	39	>75% Grass cover, Good, HSG A
	135,166	38	Weighted Average
	129,730		95.98% Pervious Area
	5,436		4.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0800	0.12		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 3.41"
3.0	266	0.0900	1.50		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
9.9	316	Total			

Subcatchment 2S: SUBCAT2

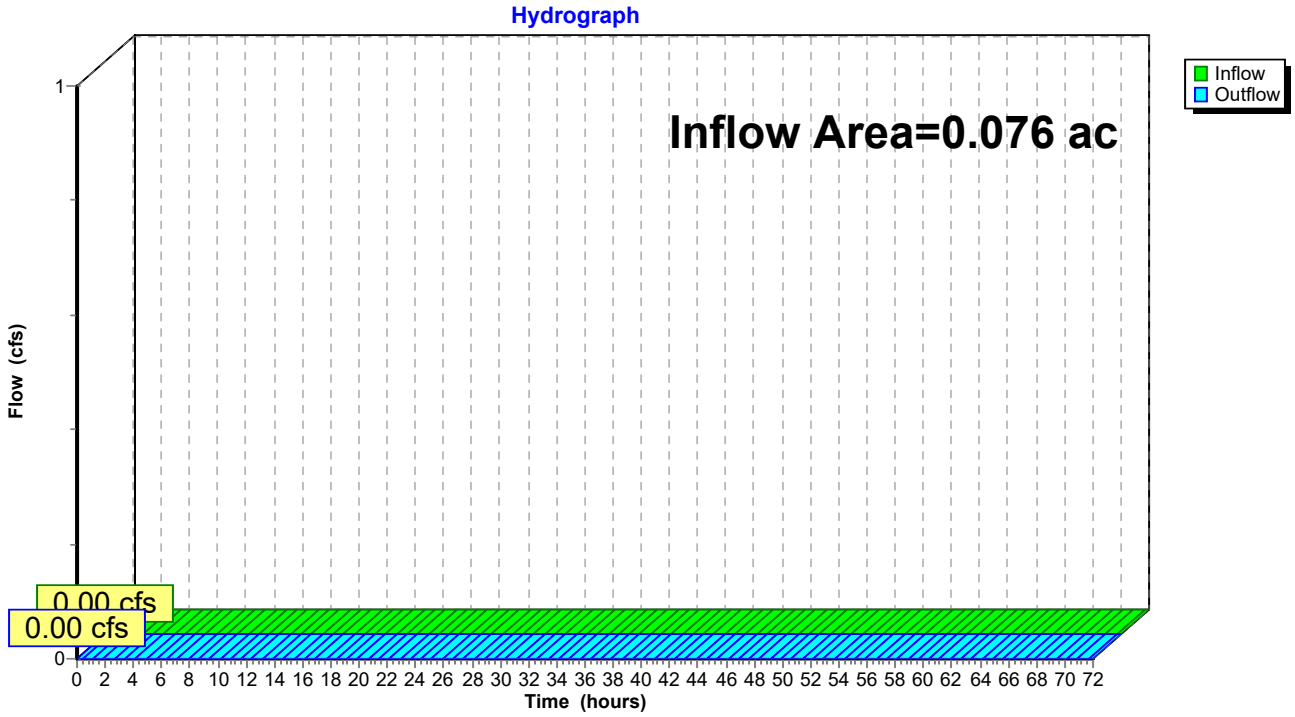


Summary for Reach DP1: DISCHARGE OFFSITE TO ABUTTERS

Inflow Area = 0.076 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-YR 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= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP1: DISCHARGE OFFSITE TO ABUTTERS

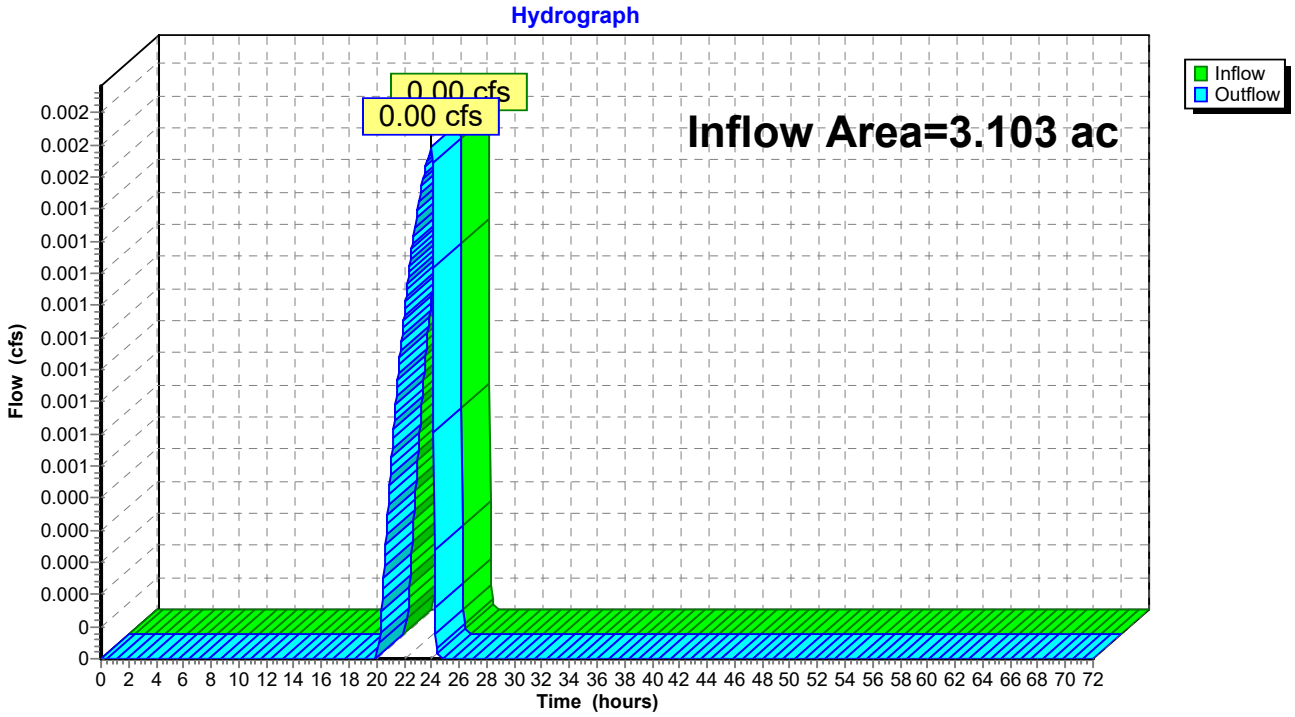


Summary for Reach DP2: WETLANDS

Inflow Area = 3.103 ac, 4.02% Impervious, Inflow Depth = 0.00" for 2-YR event
Inflow = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP2: WETLANDS



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SUBCAT1 Runoff Area=3,330 sf 0.00% Impervious Runoff Depth=0.01"
Flow Length=96' Tc=6.7 min CN=30 Runoff=0.00 cfs 0.000 af

Subcatchment 2S: SUBCAT2 Runoff Area=135,166 sf 4.02% Impervious Runoff Depth=0.21"
Flow Length=316' Tc=9.9 min CN=38 Runoff=0.11 cfs 0.054 af

Reach DP1: DISCHARGE OFFSITE TO ABUTTERS Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach DP2: WETLANDS Inflow=0.11 cfs 0.054 af
Outflow=0.11 cfs 0.054 af

Total Runoff Area = 3.179 ac Runoff Volume = 0.054 af Average Runoff Depth = 0.20"
96.07% Pervious = 3.055 ac 3.93% Impervious = 0.125 ac

Summary for Subcatchment 1S: SUBCAT1

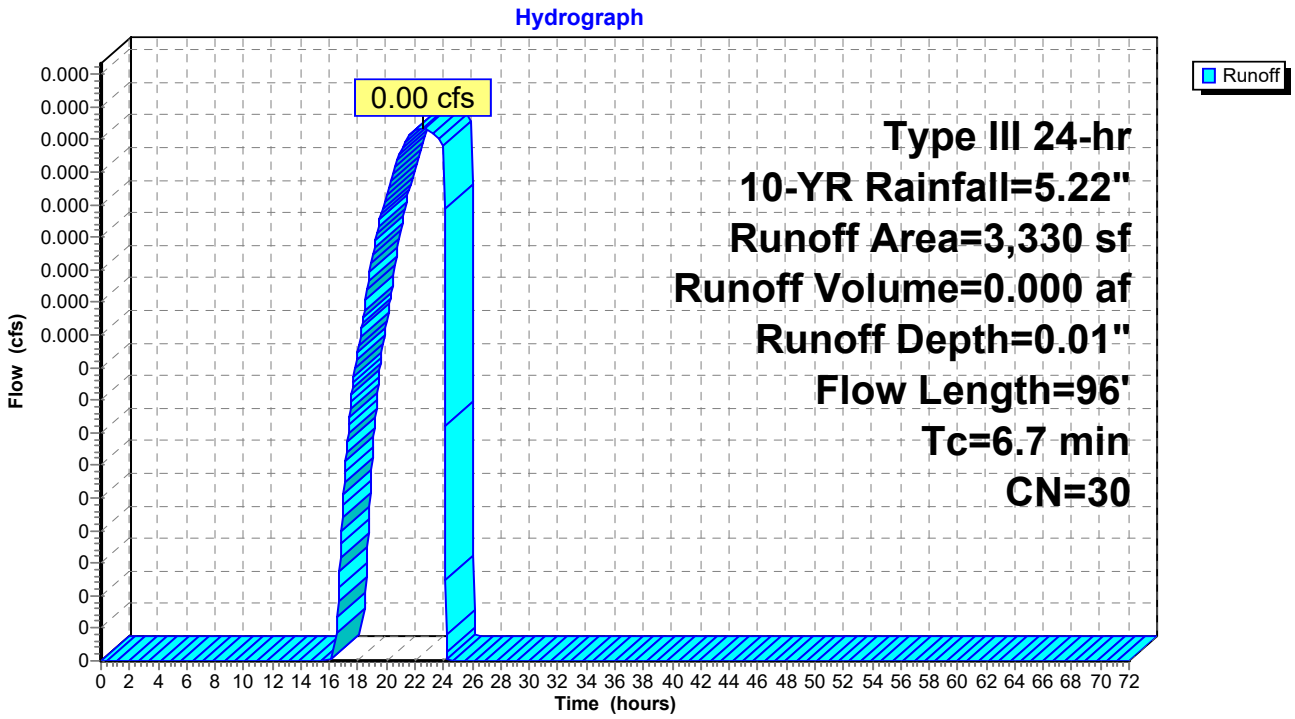
Runoff = 0.00 cfs @ 22.50 hrs, Volume= 0.000 af, Depth= 0.01"
Routed to Reach DP1 : DISCHARGE OFFSITE TO ABUTTERS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.22"

Area (sf)	CN	Description
3,330	30	Woods, Good, HSG A
3,330		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 3.41"
0.4	46	0.1500	1.94		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
6.7	96	Total			

Subcatchment 1S: SUBCAT1



Summary for Subcatchment 2S: SUBCAT2

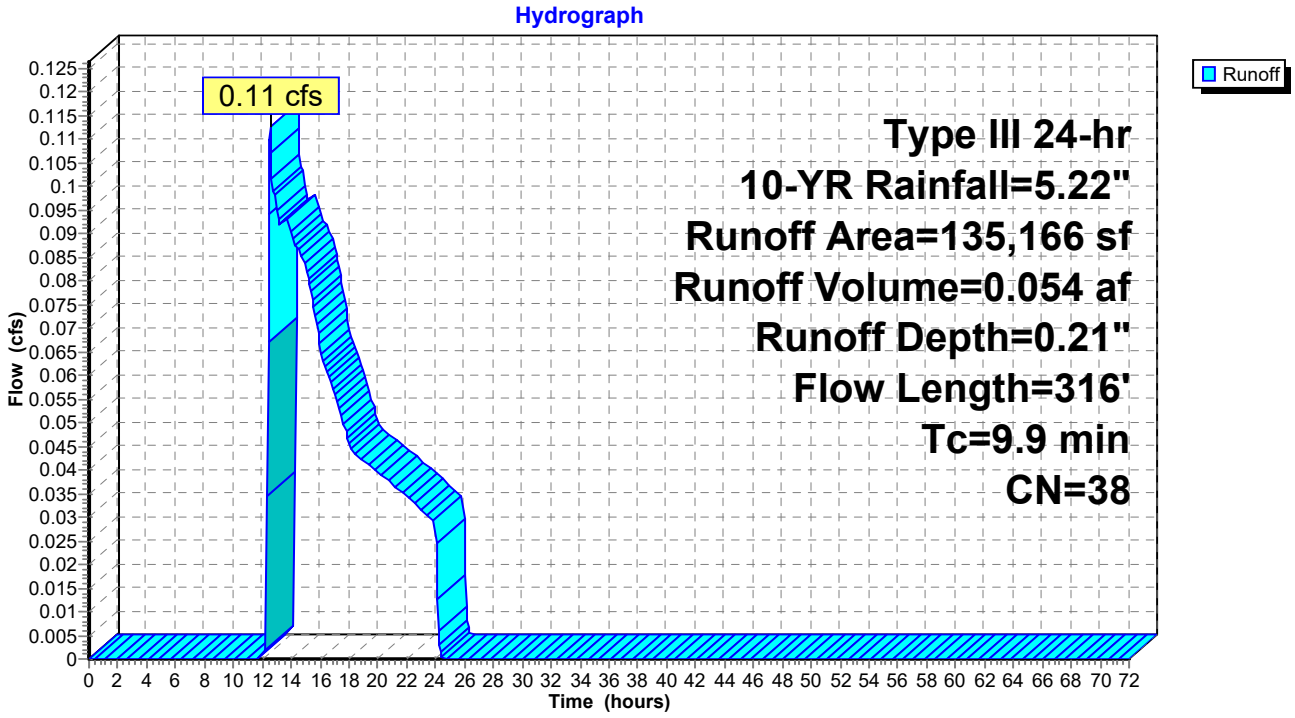
Runoff = 0.11 cfs @ 12.54 hrs, Volume= 0.054 af, Depth= 0.21"
Routed to Reach DP2 : WETLANDS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.22"

	Area (sf)	CN	Description
	83,377	30	Woods, Good, HSG A
	6,975	76	Gravel roads, HSG A
*	2,020	98	Walkway/Patio, HSG A
*	3,416	98	Roofs, HSG A
	39,378	39	>75% Grass cover, Good, HSG A
	135,166	38	Weighted Average
	129,730		95.98% Pervious Area
	5,436		4.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0800	0.12		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 3.41"
3.0	266	0.0900	1.50		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
9.9	316	Total			

Subcatchment 2S: SUBCAT2

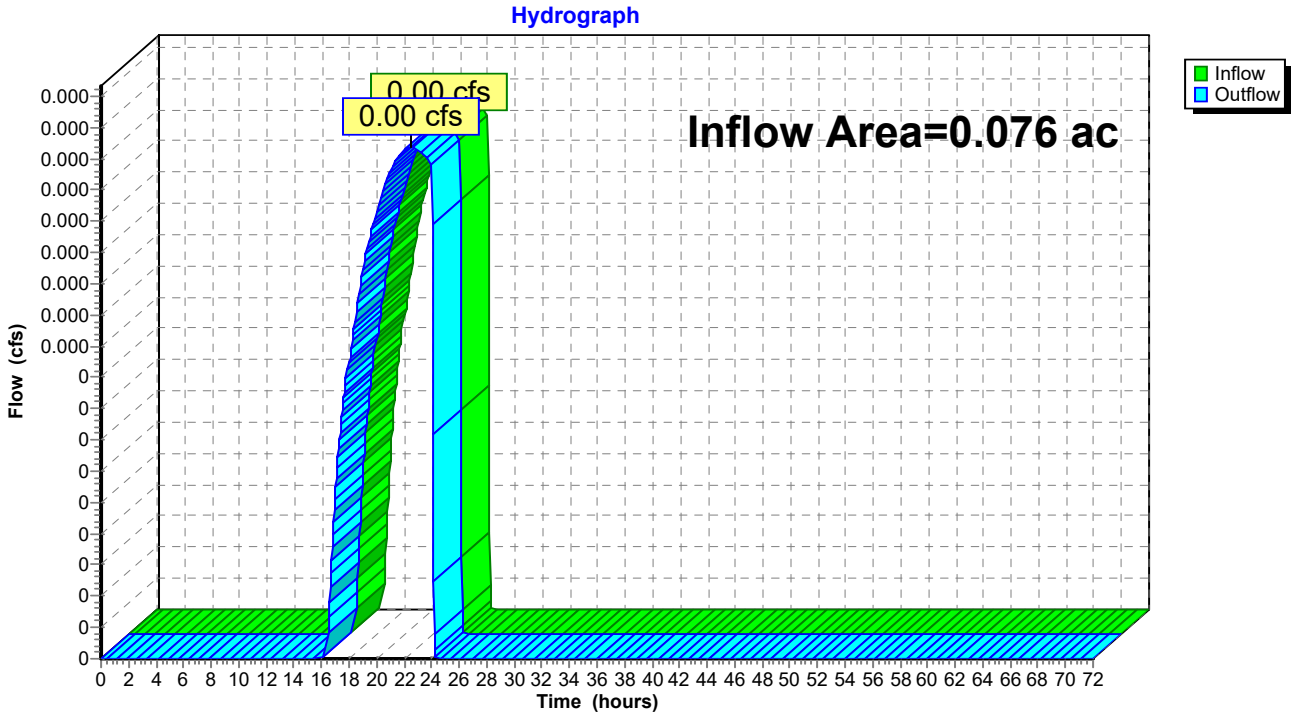


Summary for Reach DP1: DISCHARGE OFFSITE TO ABUTTERS

Inflow Area = 0.076 ac, 0.00% Impervious, Inflow Depth = 0.01" for 10-YR event
Inflow = 0.00 cfs @ 22.50 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 22.50 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP1: DISCHARGE OFFSITE TO ABUTTERS

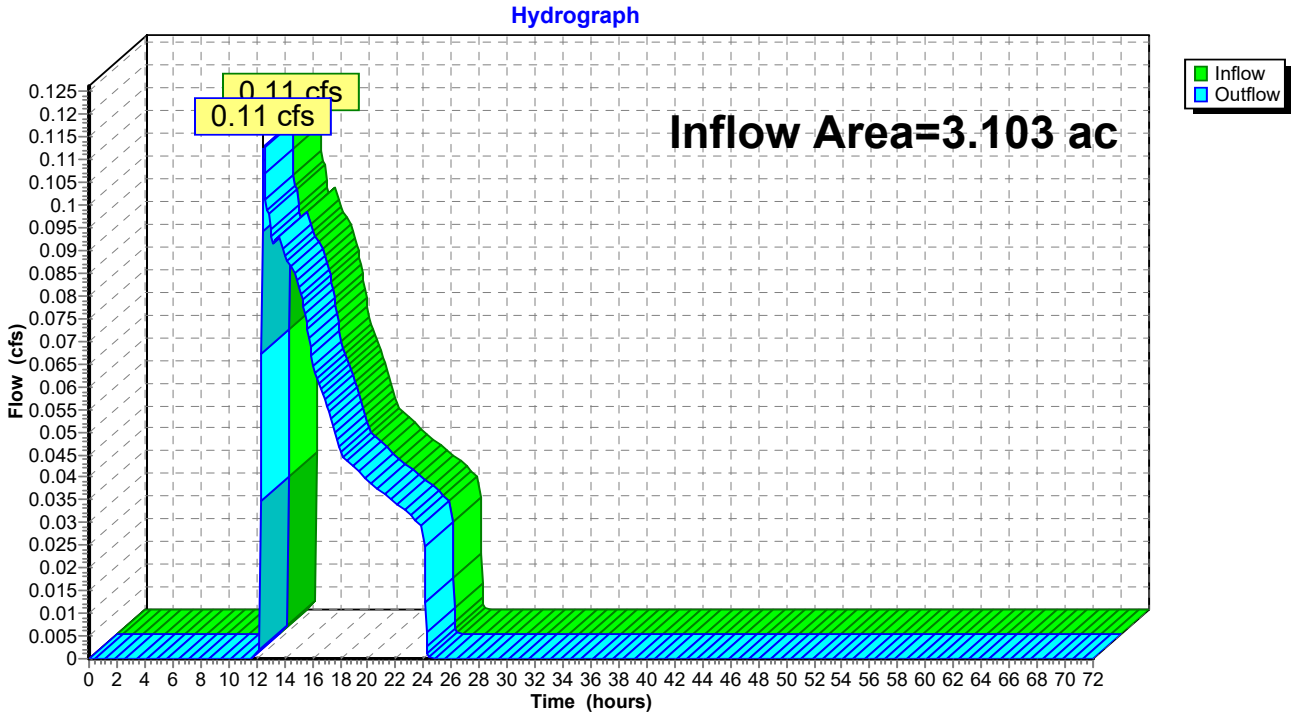


Summary for Reach DP2: WETLANDS

Inflow Area = 3.103 ac, 4.02% Impervious, Inflow Depth = 0.21" for 10-YR event
Inflow = 0.11 cfs @ 12.54 hrs, Volume= 0.054 af
Outflow = 0.11 cfs @ 12.54 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP2: WETLANDS



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SUBCAT1 Runoff Area=3,330 sf 0.00% Impervious Runoff Depth=0.11"
Flow Length=96' Tc=6.7 min CN=30 Runoff=0.00 cfs 0.001 af

Subcatchment 2S: SUBCAT2 Runoff Area=135,166 sf 4.02% Impervious Runoff Depth=0.49"
Flow Length=316' Tc=9.9 min CN=38 Runoff=0.61 cfs 0.128 af

Reach DP1: DISCHARGE OFFSITE TO ABUTTERS Inflow=0.00 cfs 0.001 af
Outflow=0.00 cfs 0.001 af

Reach DP2: WETLANDS Inflow=0.61 cfs 0.128 af
Outflow=0.61 cfs 0.128 af

Total Runoff Area = 3.179 ac Runoff Volume = 0.128 af Average Runoff Depth = 0.48"
96.07% Pervious = 3.055 ac 3.93% Impervious = 0.125 ac

Summary for Subcatchment 1S: SUBCAT1

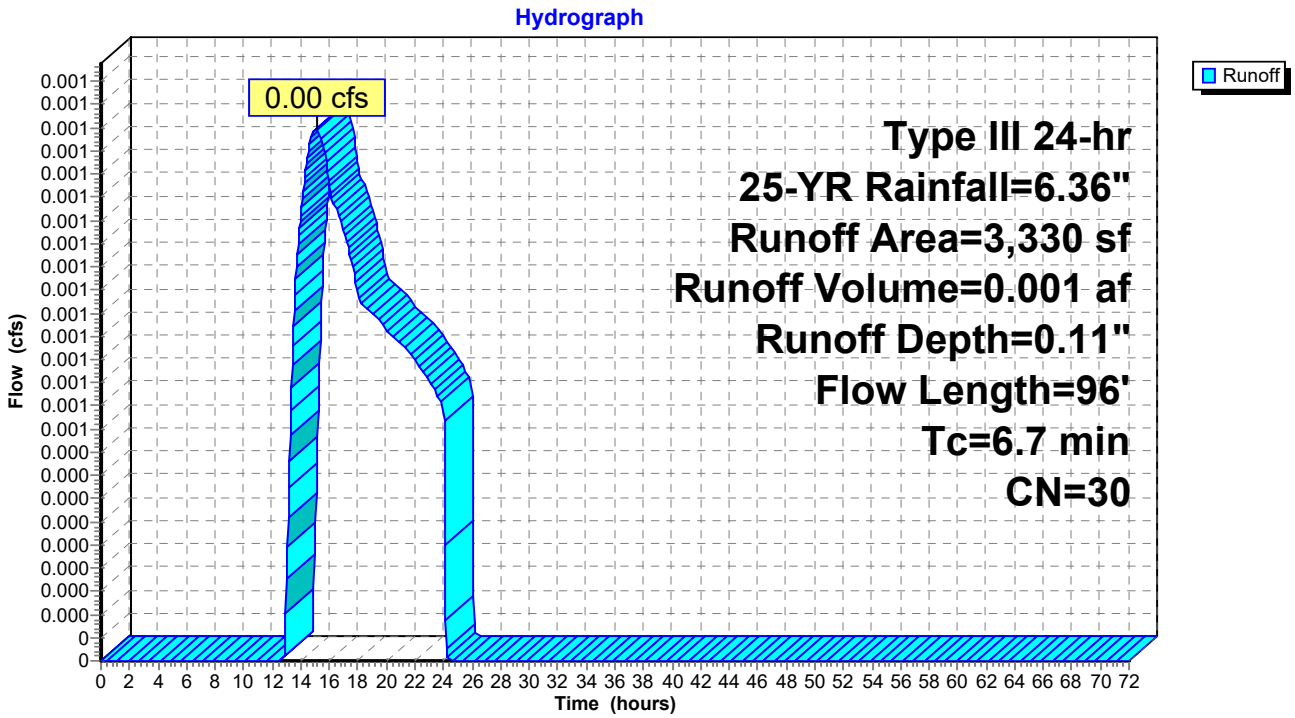
Runoff = 0.00 cfs @ 15.07 hrs, Volume= 0.001 af, Depth= 0.11"
Routed to Reach DP1 : DISCHARGE OFFSITE TO ABUTTERS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.36"

Area (sf)	CN	Description
3,330	30	Woods, Good, HSG A
3,330		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 3.41"
0.4	46	0.1500	1.94		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
6.7	96	Total			

Subcatchment 1S: SUBCAT1



Summary for Subcatchment 2S: SUBCAT2

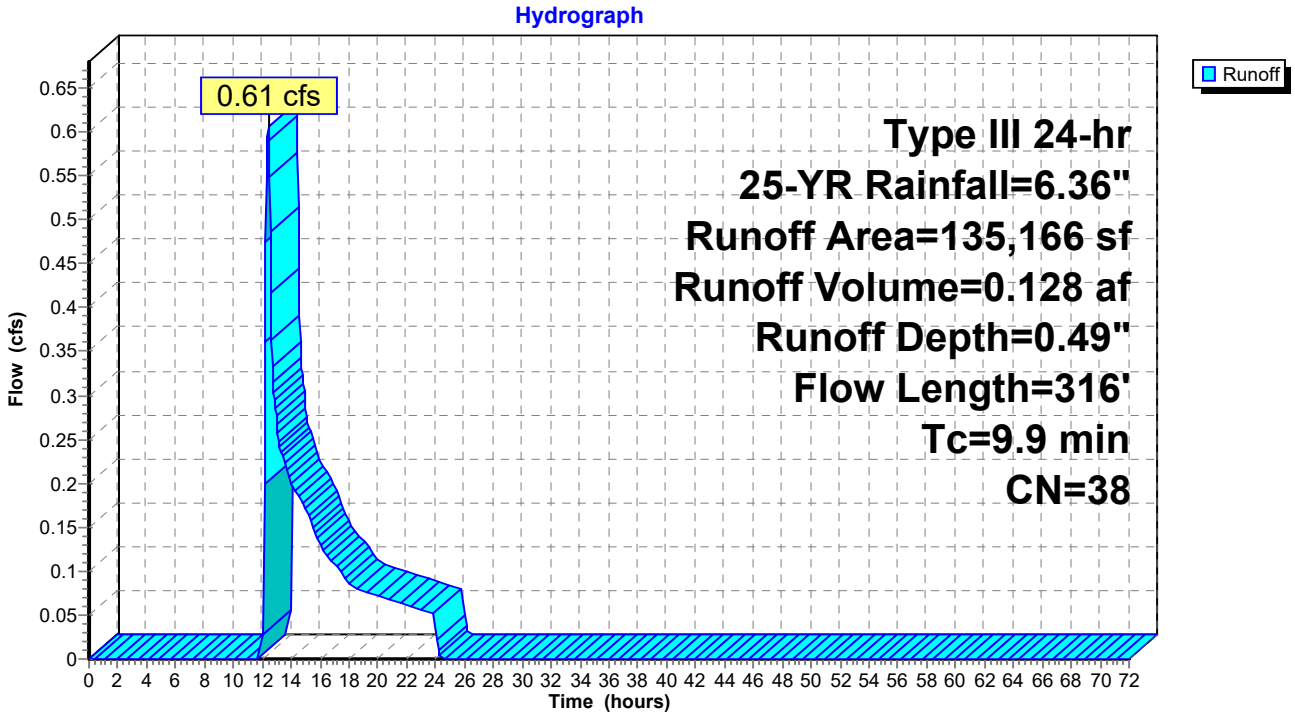
Runoff = 0.61 cfs @ 12.40 hrs, Volume= 0.128 af, Depth= 0.49"
Routed to Reach DP2 : WETLANDS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.36"

	Area (sf)	CN	Description
	83,377	30	Woods, Good, HSG A
	6,975	76	Gravel roads, HSG A
*	2,020	98	Walkway/Patio, HSG A
*	3,416	98	Roofs, HSG A
	39,378	39	>75% Grass cover, Good, HSG A
	135,166	38	Weighted Average
	129,730		95.98% Pervious Area
	5,436		4.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0800	0.12		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 3.41"
3.0	266	0.0900	1.50		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
9.9	316	Total			

Subcatchment 2S: SUBCAT2

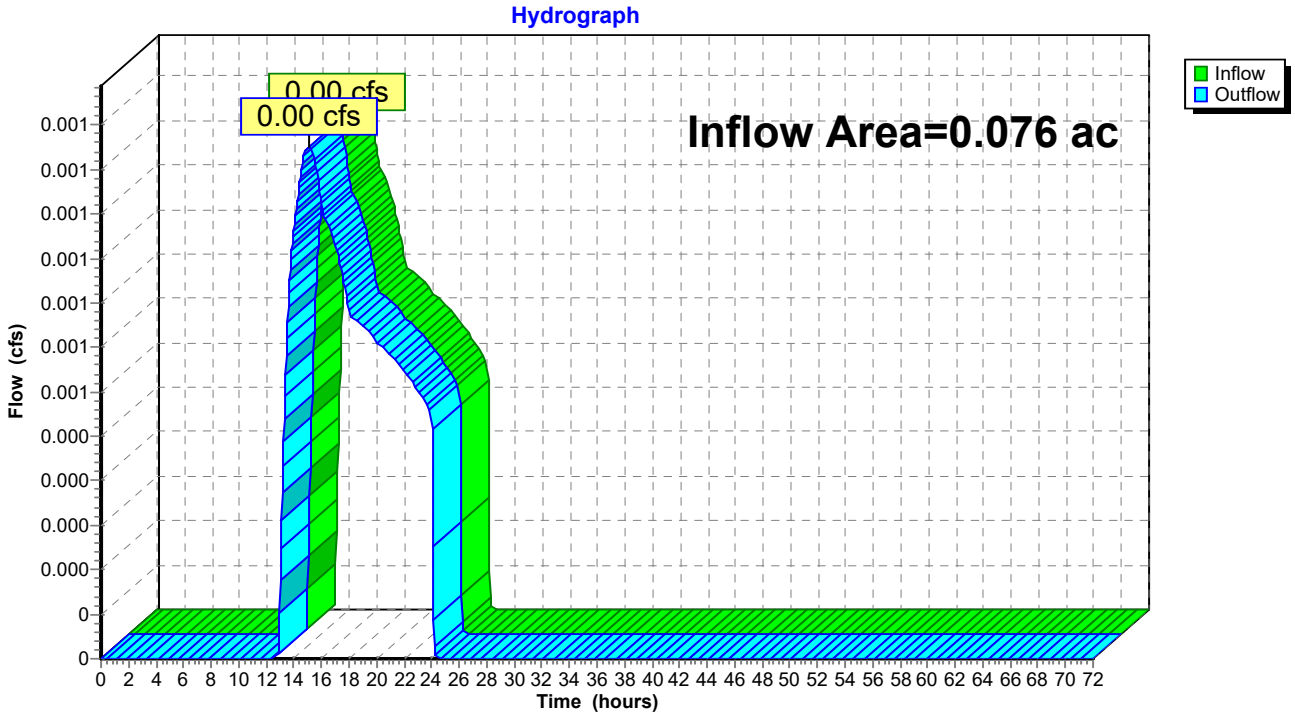


Summary for Reach DP1: DISCHARGE OFFSITE TO ABUTTERS

Inflow Area = 0.076 ac, 0.00% Impervious, Inflow Depth = 0.11" for 25-YR event
Inflow = 0.00 cfs @ 15.07 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 15.07 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP1: DISCHARGE OFFSITE TO ABUTTERS

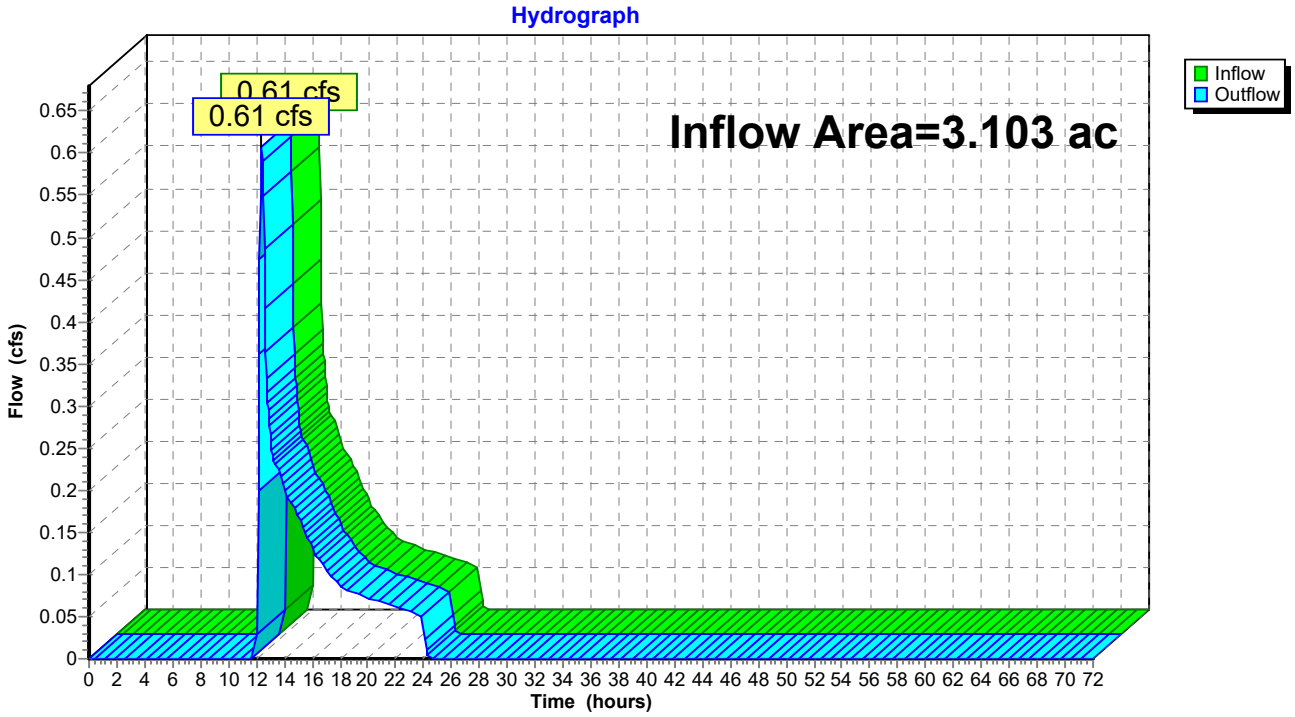


Summary for Reach DP2: WETLANDS

Inflow Area = 3.103 ac, 4.02% Impervious, Inflow Depth = 0.49" for 25-YR event
Inflow = 0.61 cfs @ 12.40 hrs, Volume= 0.128 af
Outflow = 0.61 cfs @ 12.40 hrs, Volume= 0.128 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP2: WETLANDS



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SUBCAT1 Runoff Area=3,330 sf 0.00% Impervious Runoff Depth=0.44"
Flow Length=96' Tc=6.7 min CN=30 Runoff=0.01 cfs 0.003 af

Subcatchment 2S: SUBCAT2 Runoff Area=135,166 sf 4.02% Impervious Runoff Depth=1.11"
Flow Length=316' Tc=9.9 min CN=38 Runoff=2.14 cfs 0.287 af

Reach DP1: DISCHARGE OFFSITE TO ABUTTERS Inflow=0.01 cfs 0.003 af
Outflow=0.01 cfs 0.003 af

Reach DP2: WETLANDS Inflow=2.14 cfs 0.287 af
Outflow=2.14 cfs 0.287 af

Total Runoff Area = 3.179 ac Runoff Volume = 0.290 af Average Runoff Depth = 1.09"
96.07% Pervious = 3.055 ac 3.93% Impervious = 0.125 ac

Summary for Subcatchment 1S: SUBCAT1

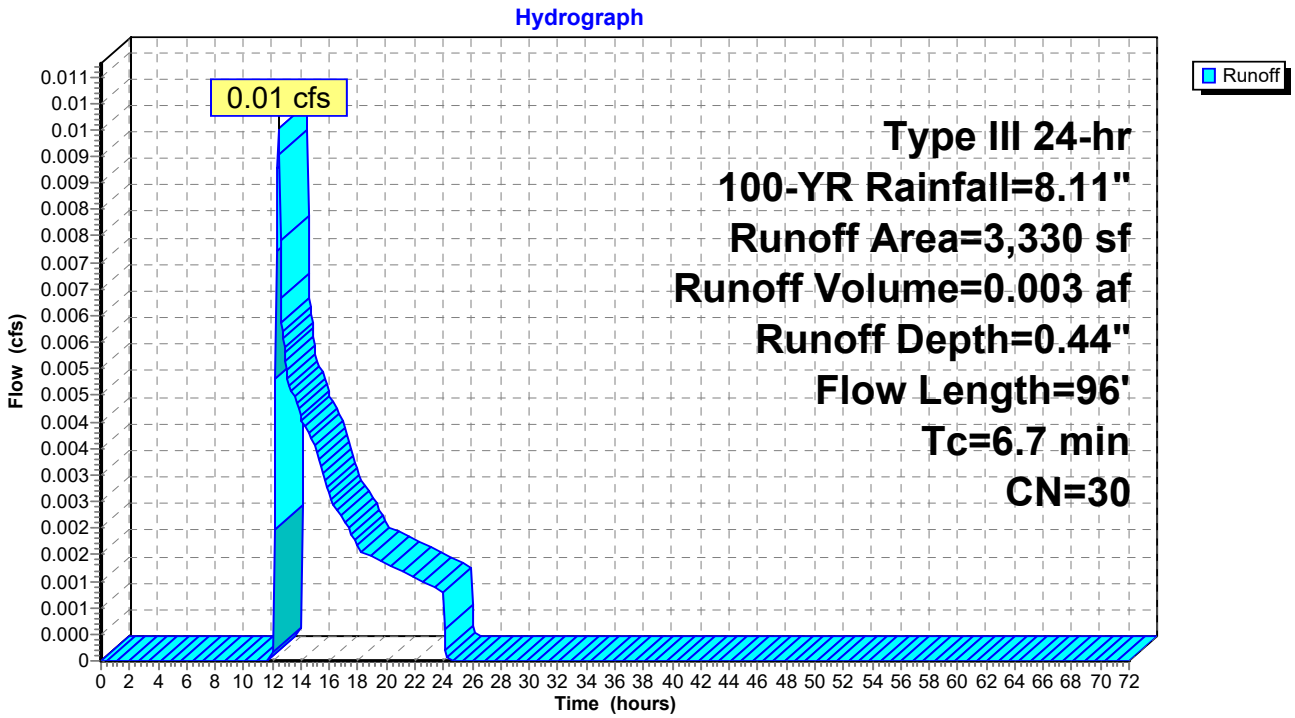
Runoff = 0.01 cfs @ 12.42 hrs, Volume= 0.003 af, Depth= 0.44"
Routed to Reach DP1 : DISCHARGE OFFSITE TO ABUTTERS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=8.11"

Area (sf)	CN	Description
3,330	30	Woods, Good, HSG A
3,330		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 3.41"
0.4	46	0.1500	1.94		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
6.7	96	Total			

Subcatchment 1S: SUBCAT1



Summary for Subcatchment 2S: SUBCAT2

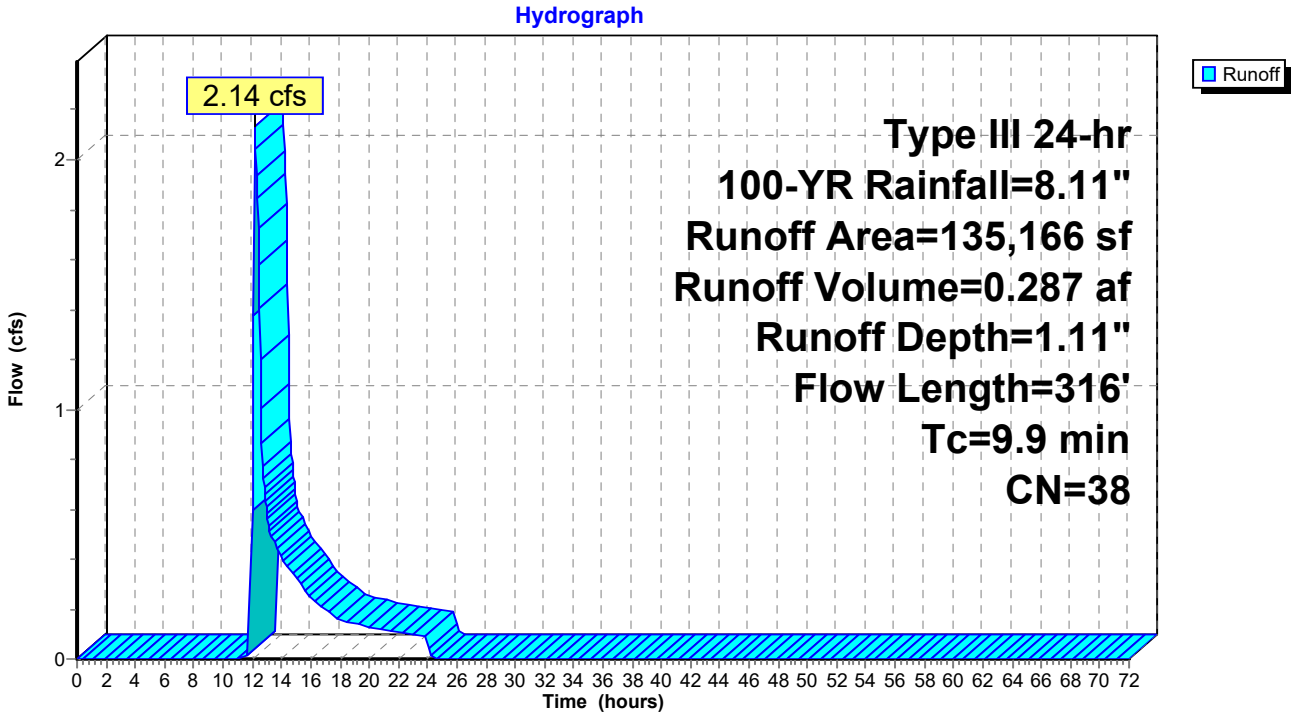
Runoff = 2.14 cfs @ 12.20 hrs, Volume= 0.287 af, Depth= 1.11"
Routed to Reach DP2 : WETLANDS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=8.11"

	Area (sf)	CN	Description
	83,377	30	Woods, Good, HSG A
	6,975	76	Gravel roads, HSG A
*	2,020	98	Walkway/Patio, HSG A
*	3,416	98	Roofs, HSG A
	39,378	39	>75% Grass cover, Good, HSG A
	135,166	38	Weighted Average
	129,730		95.98% Pervious Area
	5,436		4.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0800	0.12		**Sheet Flow, WOODS** Woods: Light underbrush n= 0.400 P2= 3.41"
3.0	266	0.0900	1.50		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
9.9	316	Total			

Subcatchment 2S: SUBCAT2

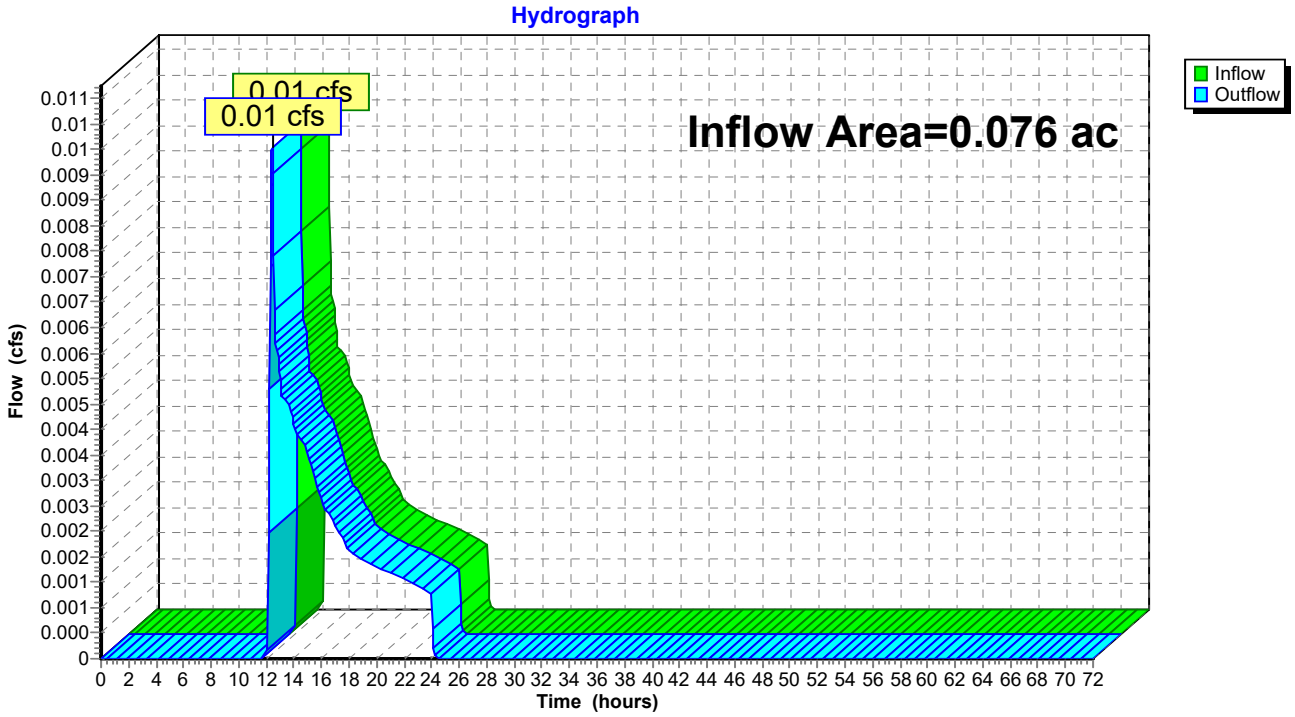


Summary for Reach DP1: DISCHARGE OFFSITE TO ABUTTERS

Inflow Area = 0.076 ac, 0.00% Impervious, Inflow Depth = 0.44" for 100-YR event
Inflow = 0.01 cfs @ 12.42 hrs, Volume= 0.003 af
Outflow = 0.01 cfs @ 12.42 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP1: DISCHARGE OFFSITE TO ABUTTERS

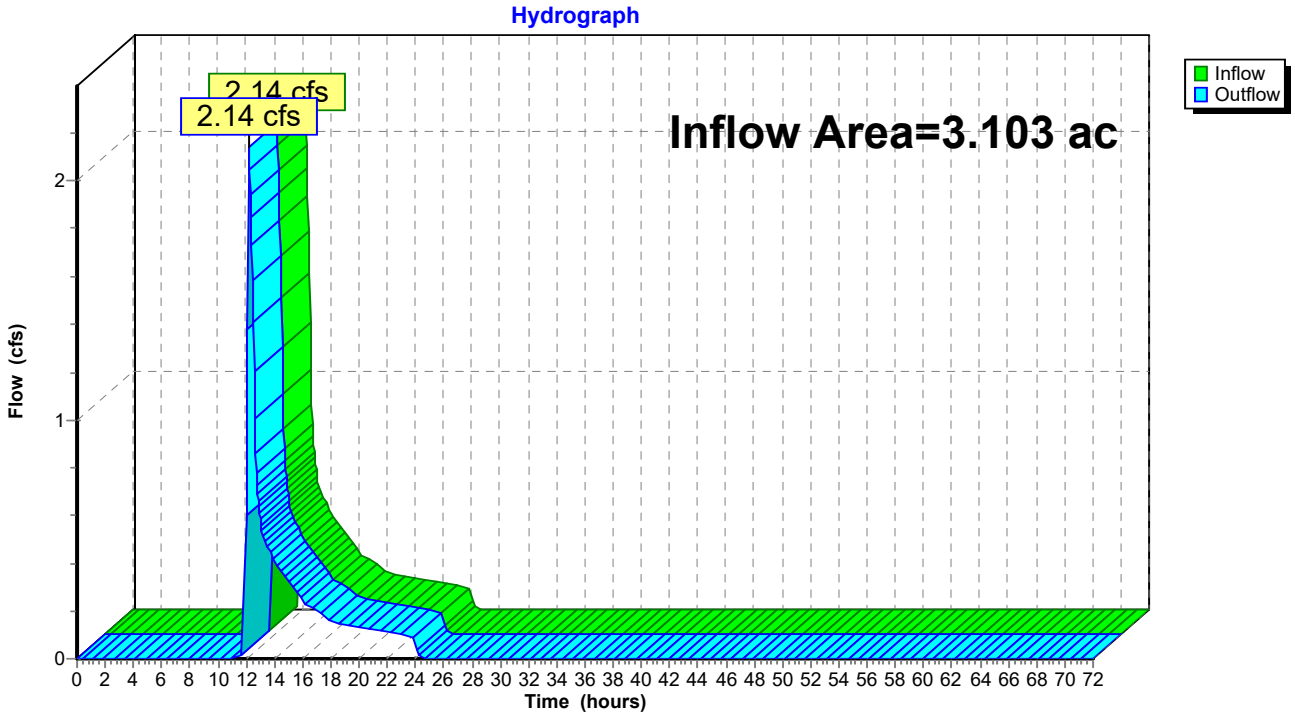


Summary for Reach DP2: WETLANDS

Inflow Area = 3.103 ac, 4.02% Impervious, Inflow Depth = 1.11" for 100-YR event
Inflow = 2.14 cfs @ 12.20 hrs, Volume= 0.287 af
Outflow = 2.14 cfs @ 12.20 hrs, Volume= 0.287 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP2: WETLANDS



Merrill
Engineers and Land Surveyors

SECTION III

PROPOSED CONDITIONS MODEL

2 (3.41”), 10 (5.22”), 25 (6.36”)

and 100 (8.11”) year return storms

PROPOSED WATERSHED DETAILS
TOTAL WATERSHED AREA=138,496± SF
TOTAL IMPERVIOUS AREA= 9,807± SF

DISCHARGE TO OFFSITE ABUTTERS (DP–1)

SUBCATCHMENT 1
TOTAL AREA= 2,268± SF
TOTAL IMPERVIOUS AREA= 0 SF

WOODS, GOOD, HSG B=1,988± SF
LAWN, GOOD, HSG B= 280± SF

DISCHARGE TO WETLAND AREA (DP–2)

SUBCATCHMENT 2S
TOTAL AREA= 5,642± SF
TOTAL IMPERVIOUS AREA= 0± SF

GRAVEL DRIVEWAY=5,642± SF

SUBCATCHMENT 2SR
TOTAL AREA=2,956± SF
TOTAL IMPERVIOUS= 2,956± SF

ROOF=2,956± SF

SUBCATCHMENT 2SRG
TOTAL AREA= 864± SF
TOTAL IMPERVIOUS= 864± SF

ROOF= 864± SF

SUBCATCHMENT 4S
TOTAL AREA=126,766± SF
TOTAL IMPERVIOUS= 5,987± SF

WOODS, GOOD, HSG B=70,840± SF
WALKWAY/PATIO/DECK= 2,571± SF
GRAVEL DRIVEWAY=5,562± SF
ROOF=3,416± SF
LAWN, GOOD, HSG B=44,377± SF

merrillinc.com

REVISIONS:

REVIEW COMMENTS 2/16/23

DRAWN BY:

DESIGNED BY:

CHECKED BY:

SCALE:
1" = 40'

STAMP:

Merrill
Engineers and Land Surveyors

427 Columbia Road
Hanover, MA 02339
781–826–9200

40 Court Street, Suite 2A
Plymouth, MA 02360
508–746–6060

448 N. Falmouth Highway
North Falmouth, MA 02556
508–563–2183

Marine Division:
26 Union Street
Plymouth, MA 02360
508–746–6060

PROJECT #:
22–083.1

PROJECT:

SITE PLAN
0 ARNOLD ROAD
ASSESSOR'S
MAP 100 BLOCK 0 LOT 65
HINGHAM MASSACHUSETTS

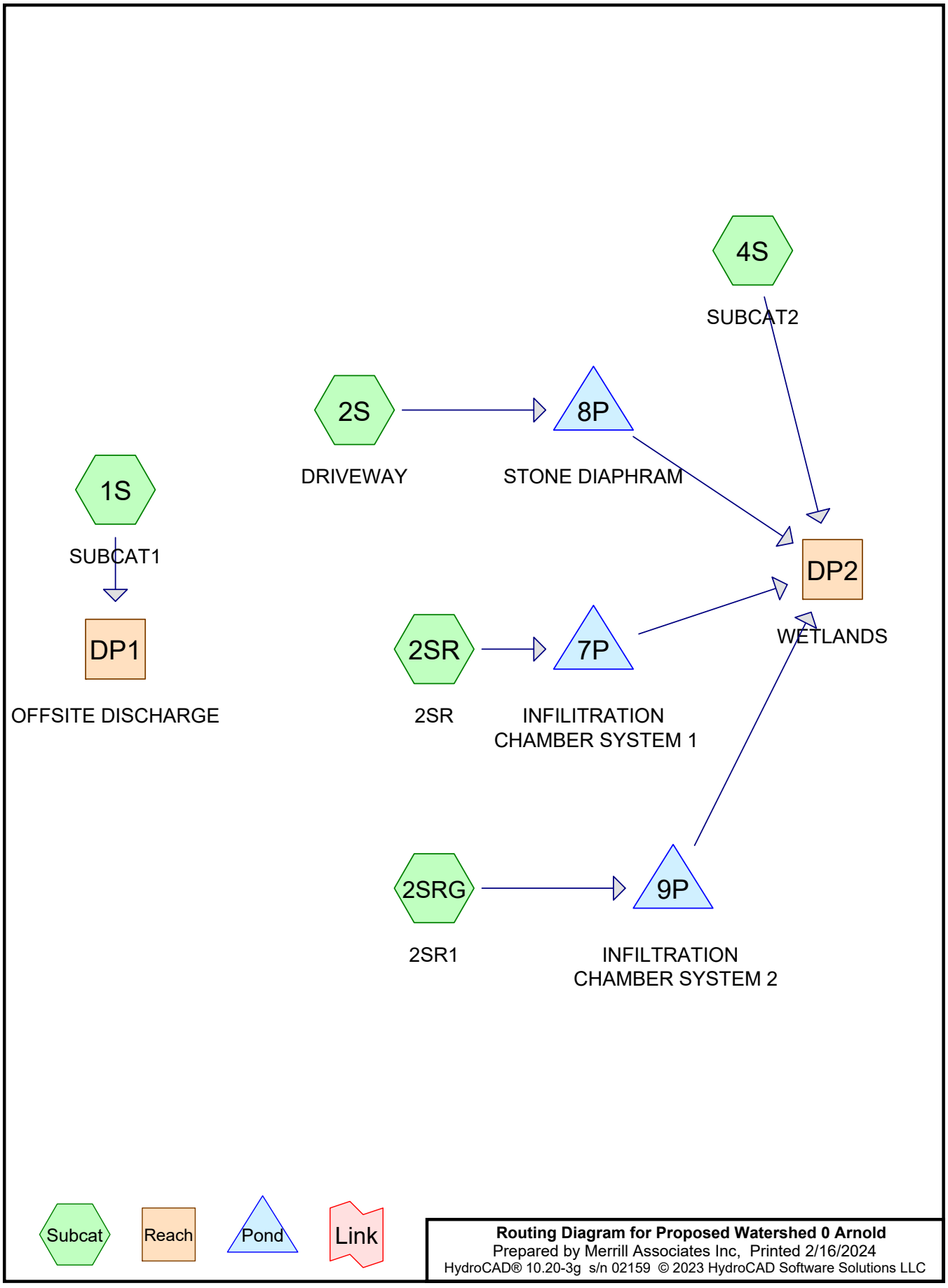
CLIENT:
GERRY RANKIN
30 ARNOLD ROAD, LLC
41 BREWSTER ROAD
HINGHAM, MA 02043
(617)–799–0588

DRAWING PATH:
H:\22–083.1\DESIGN\22–083.1 EX & PROP.WATERSHED.DWG

DATE:
NOVEMBER 28, 2023

PROPOSED
WATERSHED PLAN

SHEET 1 of 1



Routing Diagram for Proposed Watershed 0 Arnold
Prepared by Merrill Associates Inc, Printed 2/16/2024

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.025	39	>75% Grass cover, Good, HSG A (1S, 4S)
0.257	76	Gravel roads, HSG A (2S, 4S)
0.166	98	Roofs, HSG A (2SR, 2SRG, 4S)
0.046	98	Walkway/Patio, HSG A (4S)
0.013	98	Walkway/Patio/Deck, HSG A (4S)
1.672	30	Woods, Good, HSG A (1S, 4S)
3.179	**41**	**TOTAL AREA**

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SUBCAT1 Runoff Area=2,268 sf 0.00% Impervious Runoff Depth=0.00"
Flow Length=96' Tc=6.7 min CN=31 Runoff=0.00 cfs 0.000 af

Subcatchment 2S: DRIVEWAY Runoff Area=5,642 sf 0.00% Impervious Runoff Depth=1.30"
Tc=6.0 min CN=76 Runoff=0.19 cfs 0.014 af

Subcatchment 2SR: 2SR Runoff Area=2,956 sf 100.00% Impervious Runoff Depth=3.18"
Tc=6.0 min CN=98 Runoff=0.22 cfs 0.018 af

Subcatchment 2SRG: 2SR1 Runoff Area=864 sf 100.00% Impervious Runoff Depth=3.18"
Tc=6.0 min CN=98 Runoff=0.06 cfs 0.005 af

Subcatchment 4S: SUBCAT2 Runoff Area=126,766 sf 4.72% Impervious Runoff Depth=0.00"
Flow Length=300' Tc=9.8 min CN=38 Runoff=0.00 cfs 0.000 af

Reach DP1: OFFSITE DISCHARGE Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach DP2: WETLANDS Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 7P: INFILITRATION CHAMBER SYSTEM Peak Elev=113.13' Storage=266 cf Inflow=0.22 cfs 0.018 af
Discarded=0.02 cfs 0.018 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.018 af

Pond 8P: STONE DIAPHRAM Peak Elev=110.08' Storage=157 cf Inflow=0.19 cfs 0.014 af
Discarded=0.04 cfs 0.014 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.014 af

Pond 9P: INFILTRATION CHAMBER SYSTEM 2 Peak Elev=104.15' Storage=61 cf Inflow=0.06 cfs 0.005 af
Discarded=0.01 cfs 0.005 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.005 af

Total Runoff Area = 3.179 ac Runoff Volume = 0.038 af Average Runoff Depth = 0.14"
92.92% Pervious = 2.954 ac 7.08% Impervious = 0.225 ac

Summary for Subcatchment 1S: SUBCAT1

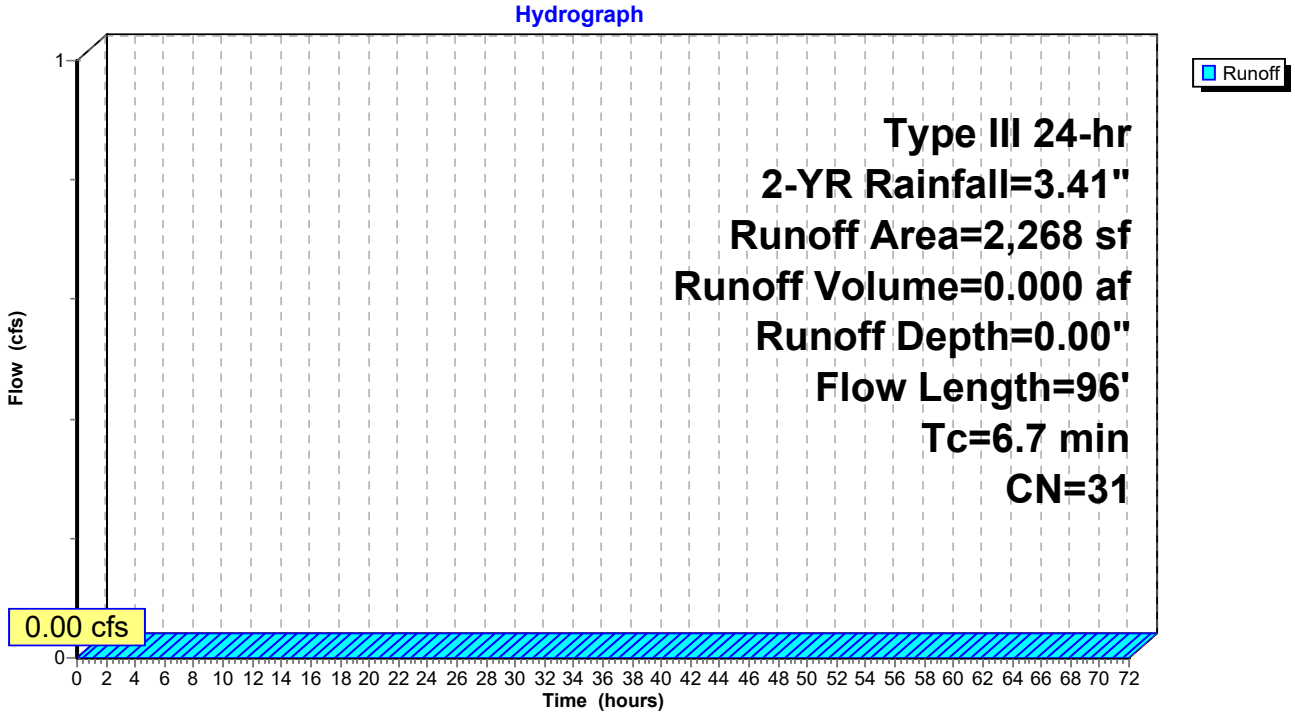
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Reach DP1 : OFFSITE DISCHARGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.41"

Area (sf)	CN	Description
1,988	30	Woods, Good, HSG A
280	39	>75% Grass cover, Good, HSG A
2,268	31	Weighted Average
2,268		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.41"
0.4	46	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.7	96	Total			

Subcatchment 1S: SUBCAT1



Summary for Subcatchment 2S: DRIVEWAY

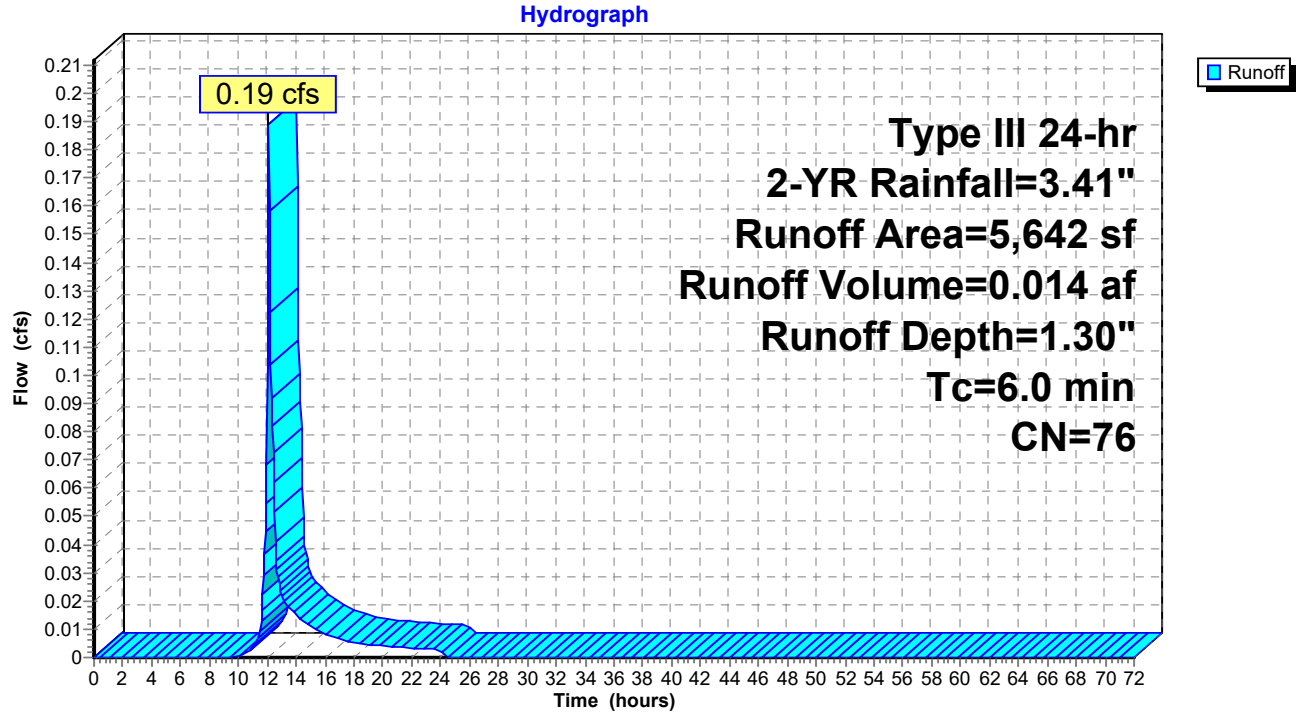
Runoff = 0.19 cfs @ 12.10 hrs, Volume= 0.014 af, Depth= 1.30"
Routed to Pond 8P : STONE DIAPHRAM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.41"

Area (sf)	CN	Description
5,642	76	Gravel roads, HSG A
5,642		100.00% Pervious Area

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

Subcatchment 2S: DRIVEWAY



Summary for Subcatchment 2SR: 2SR

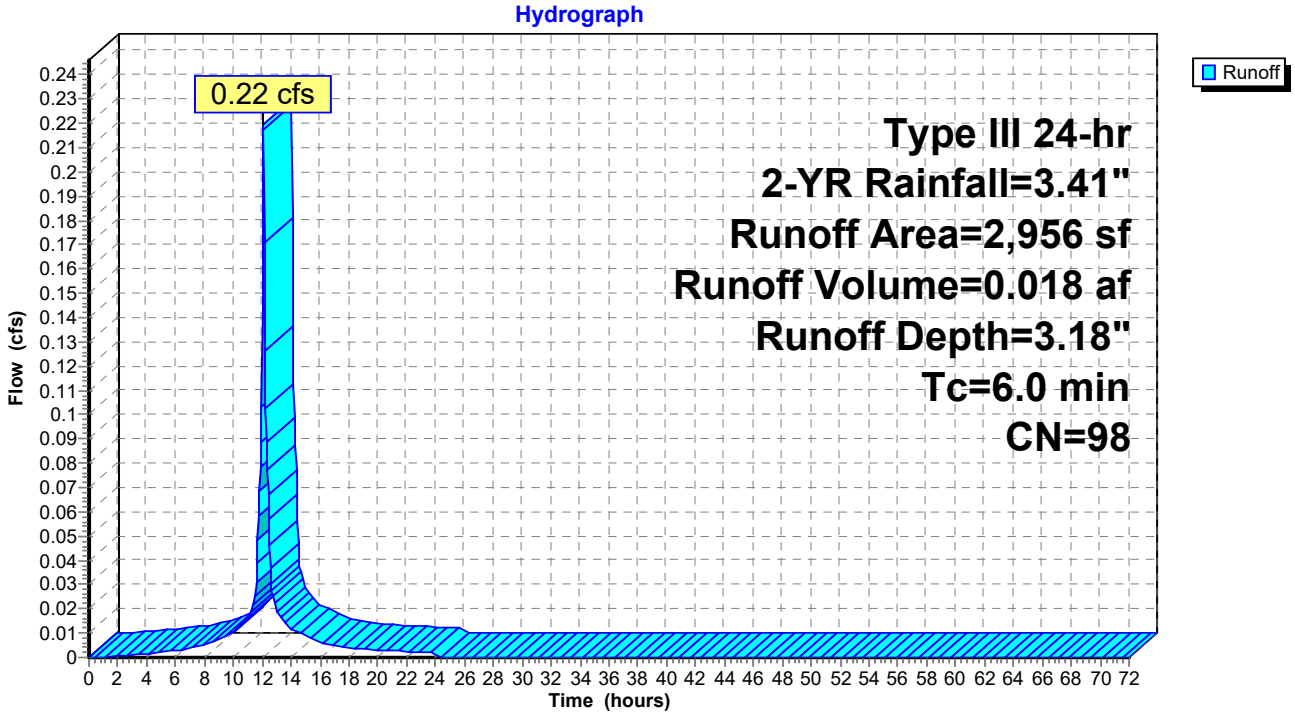
Runoff = 0.22 cfs @ 12.09 hrs, Volume= 0.018 af, Depth= 3.18"
Routed to Pond 7P : INFILITRATION CHAMBER SYSTEM 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.41"

	Area (sf)	CN	Description
*	2,956	98	Roofs, HSG A
	2,956		100.00% Impervious Area

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

Subcatchment 2SR: 2SR



Summary for Subcatchment 2SRG: 2SR1

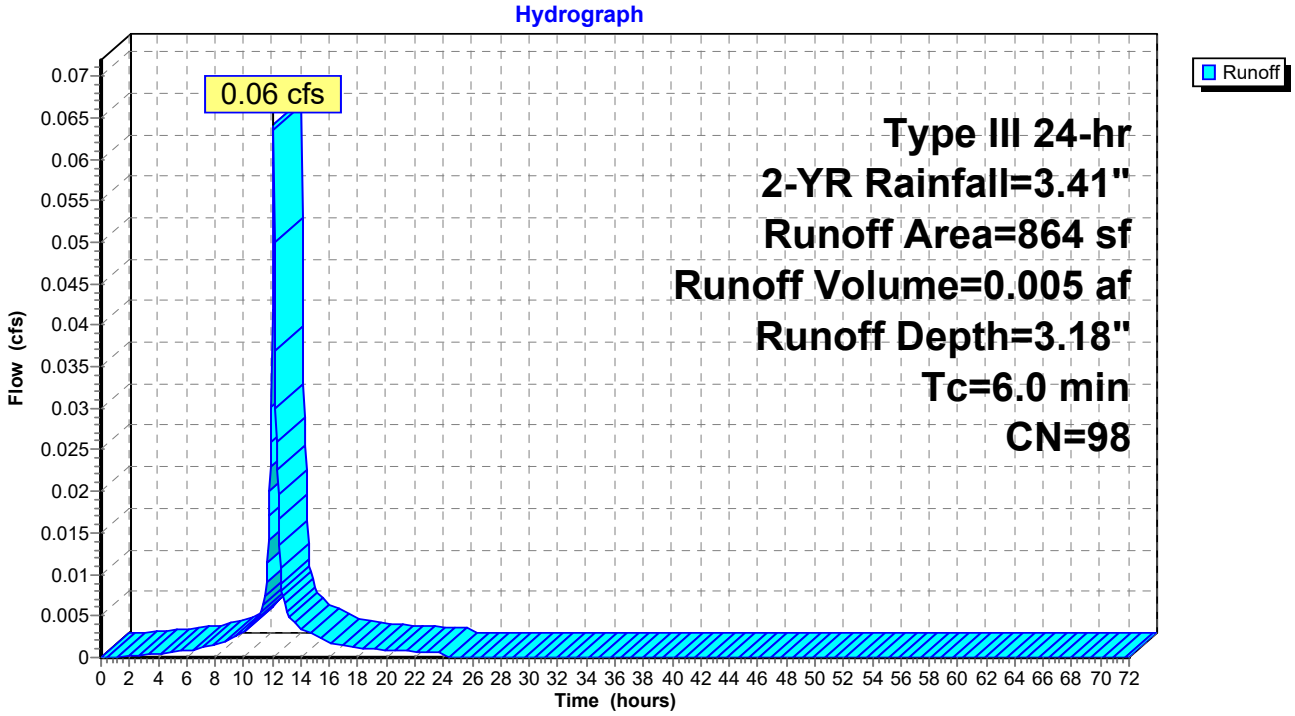
Runoff = 0.06 cfs @ 12.09 hrs, Volume= 0.005 af, Depth= 3.18"
Routed to Pond 9P : INFILTRATION CHAMBER SYSTEM 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.41"

Area (sf)	CN	Description
864	98	Roofs, HSG A
864		100.00% Impervious Area

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

Subcatchment 2SRG: 2SR1



Summary for Subcatchment 4S: SUBCAT2

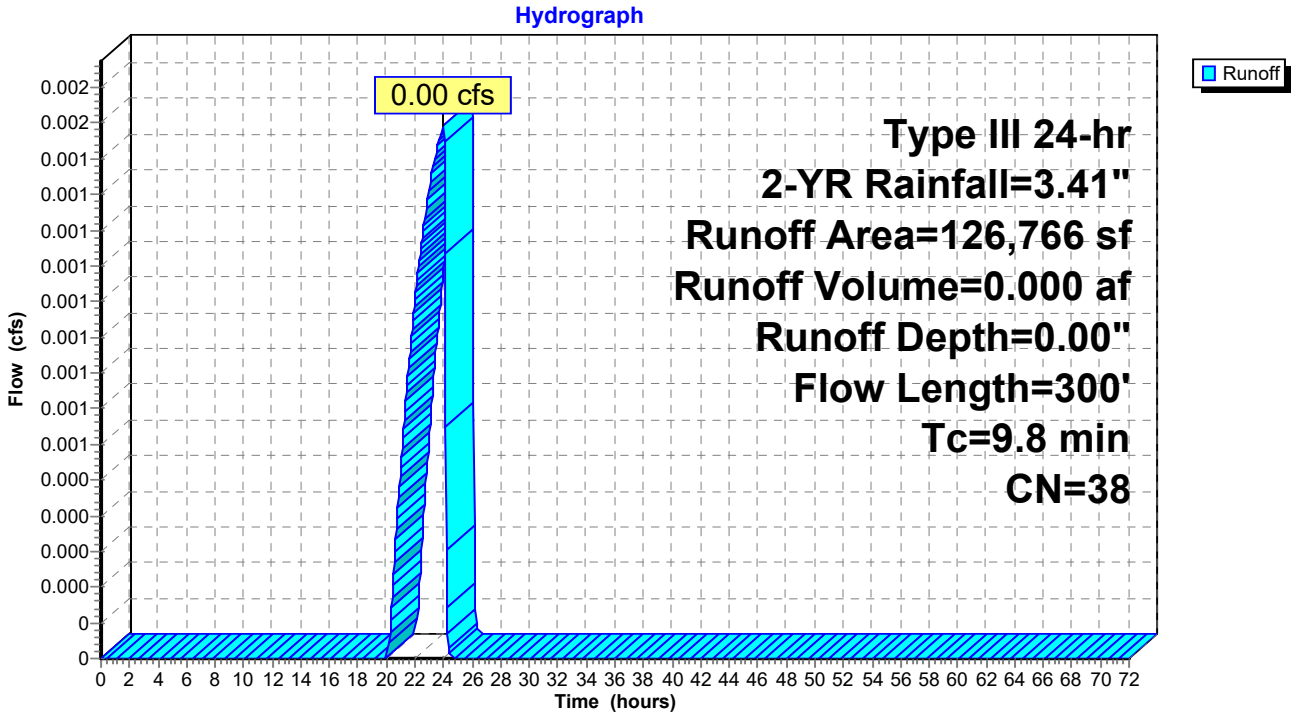
Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Reach DP2 : WETLANDS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.41"

	Area (sf)	CN	Description
	70,840	30	Woods, Good, HSG A
*	2,020	98	Walkway/Patio, HSG A
	37,158	39	>75% Grass cover, Good, HSG A
	5,562	76	Gravel roads, HSG A
	3,416	98	Roofs, HSG A
*	551	98	Walkway/Patio/Deck, HSG A
	7,219	39	>75% Grass cover, Good, HSG A
	126,766	38	Weighted Average
	120,779		95.28% Pervious Area
	5,987		4.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0100	0.12		**Sheet Flow, GRASS** Grass: Short n= 0.150 P2= 3.41"
1.0	120	0.0750	1.92		**Shallow Concentrated Flow, GRASS** Short Grass Pasture Kv= 7.0 fps
1.6	130	0.0750	1.37		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
9.8	300	Total			

Subcatchment 4S: SUBCAT2

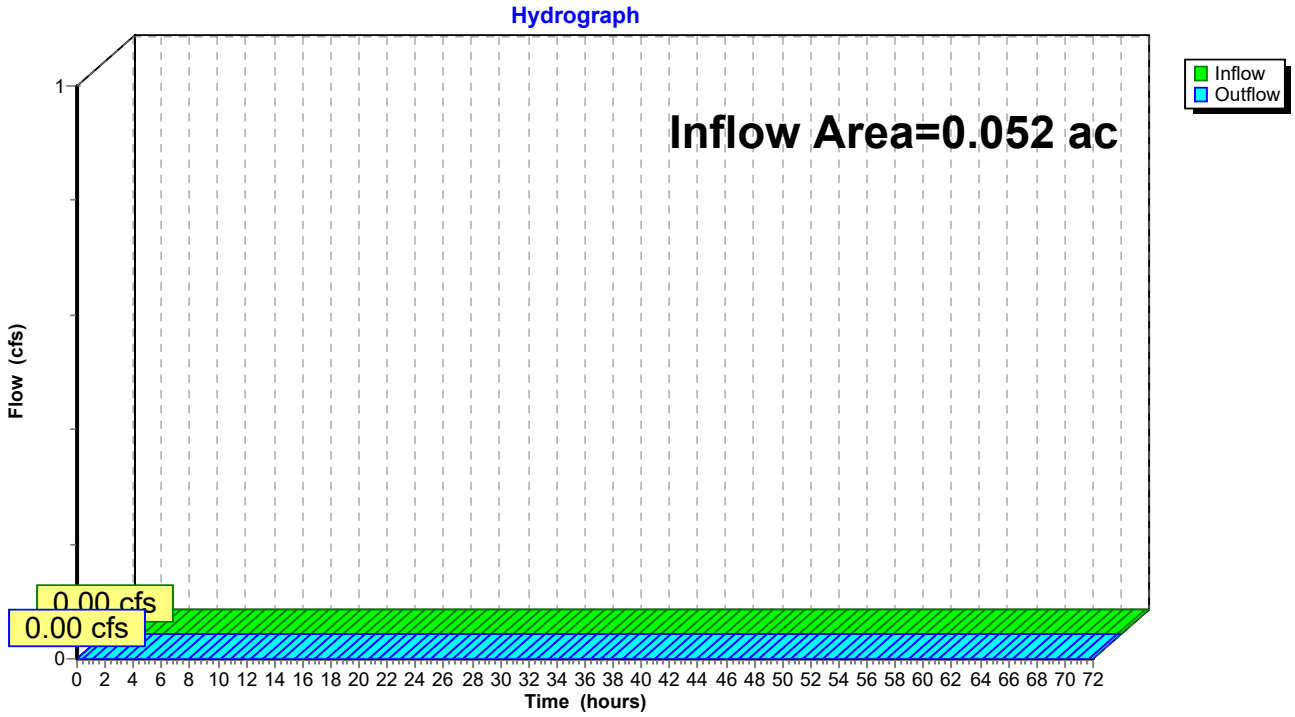


Summary for Reach DP1: OFFSITE DISCHARGE

Inflow Area = 0.052 ac, 0.00% Impervious, Inflow Depth = 0.00" for 2-YR 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= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP1: OFFSITE DISCHARGE

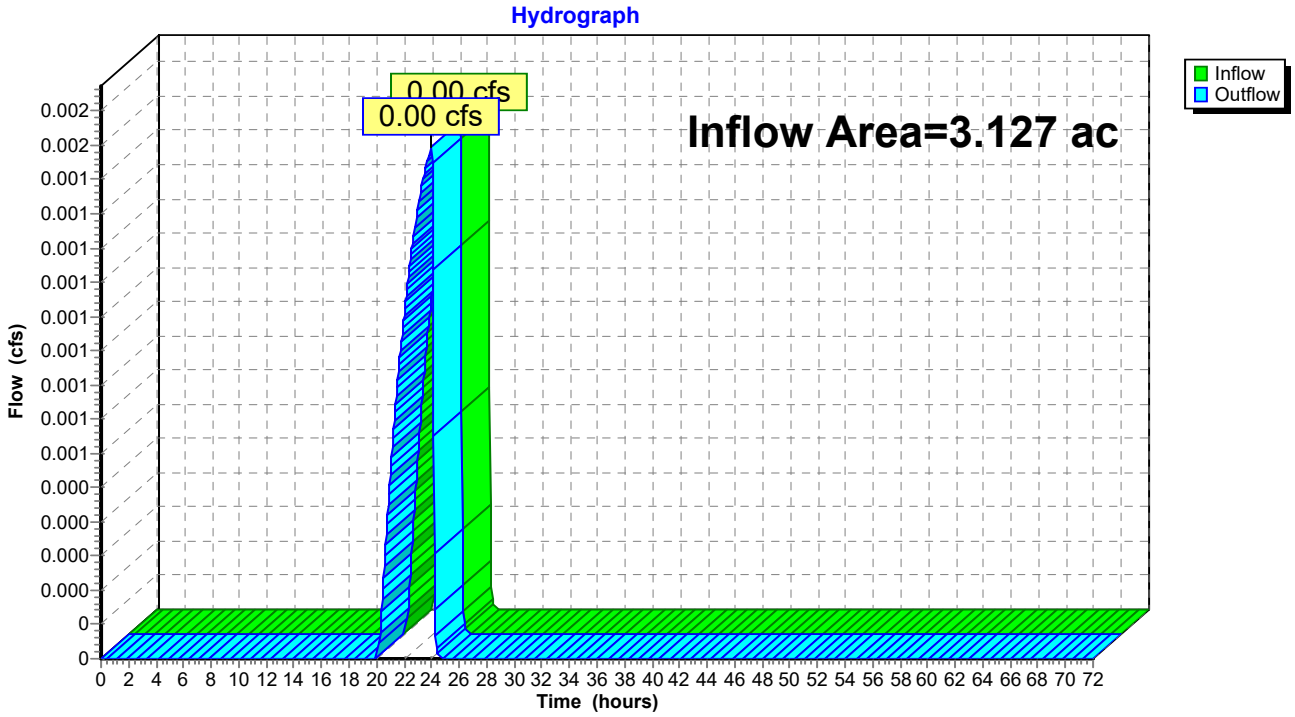


Summary for Reach DP2: WETLANDS

Inflow Area = 3.127 ac, 7.20% Impervious, Inflow Depth = 0.00" for 2-YR event
Inflow = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP2: WETLANDS



Summary for Pond 7P: INFILITRATION CHAMBER SYSTEM 1

Inflow Area = 0.068 ac,100.00% Impervious, Inflow Depth = 3.18" for 2-YR event
Inflow = 0.22 cfs @ 12.09 hrs, Volume= 0.018 af
Outflow = 0.02 cfs @ 11.45 hrs, Volume= 0.018 af, Atten= 90%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.45 hrs, Volume= 0.018 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP2 : WETLANDS

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 113.13' @ 12.86 hrs Surf.Area= 393 sf Storage= 266 cf

Plug-Flow detention time= 82.9 min calculated for 0.018 af (100% of inflow)
Center-of-Mass det. time= 82.9 min (838.0 - 755.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	112.00'	385 cf	**15.75'W x 24.98'L x 3.50'H Field A** 1,377 cf Overall - 413 cf Embedded = 963 cf x 40.0% Voids
#2A	112.50'	413 cf	**ADS_StormTech SC-740 +Cap** x 9 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 9 Chambers in 3 Rows
		799 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	112.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	115.00'	**4.0" Horiz. Orifice/Grate** X 3 rows C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 11.45 hrs HW=112.04' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=112.00' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 7P: INFILITRATION CHAMBER SYSTEM 1 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

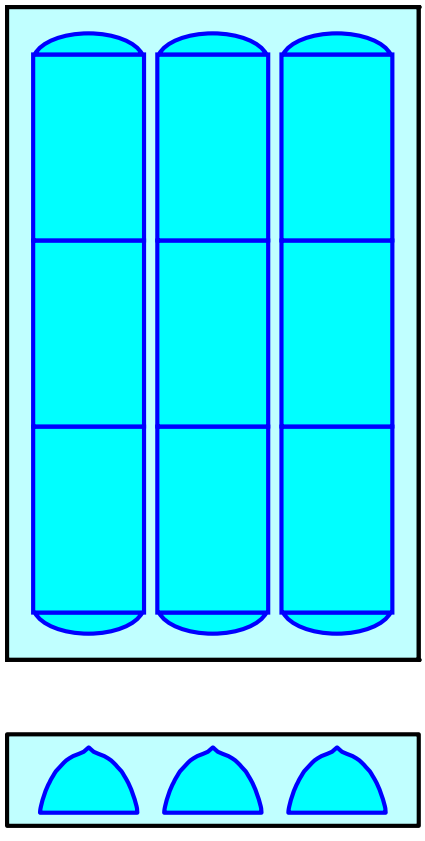
3 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 22.98' Row Length +12.0" End Stone x 2 = 24.98' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

9 Chambers x 45.9 cf = 413.5 cf Chamber Storage

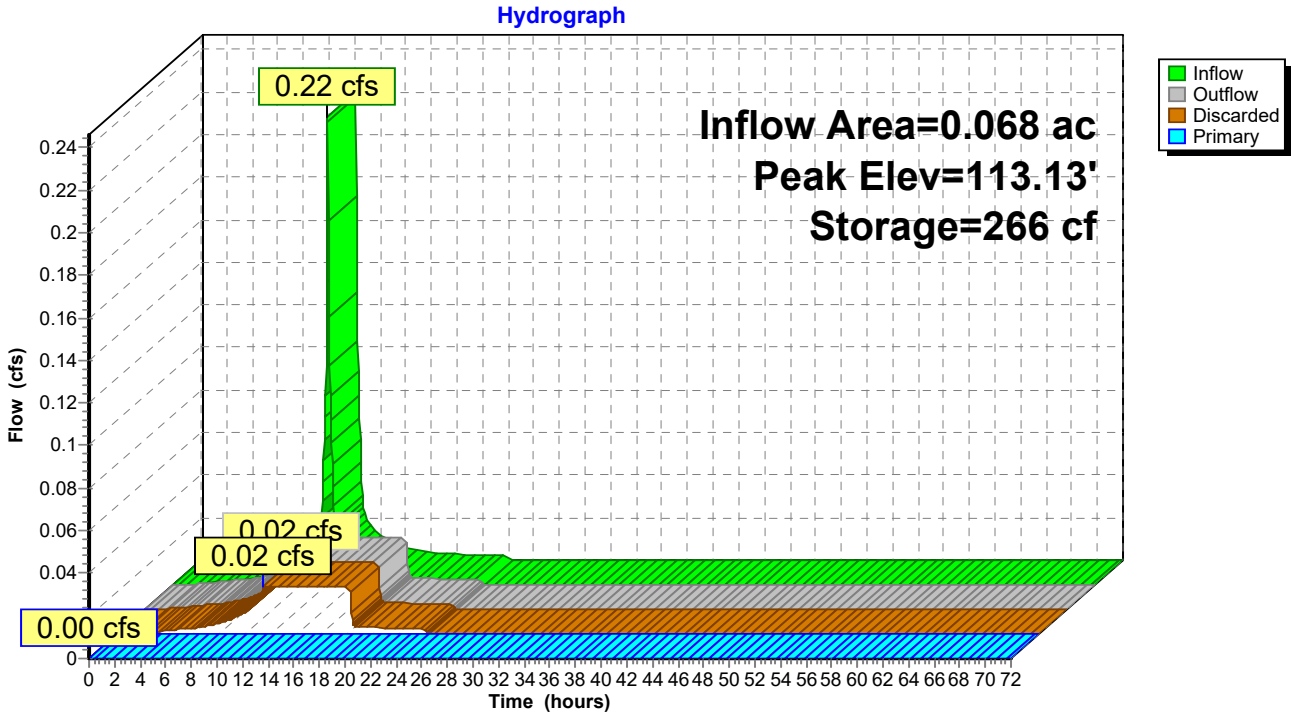
1,376.8 cf Field - 413.5 cf Chambers = 963.4 cf Stone x 40.0% Voids = 385.4 cf Stone Storage

Chamber Storage + Stone Storage = 798.8 cf = 0.018 af
Overall Storage Efficiency = 58.0%
Overall System Size = 24.98' x 15.75' x 3.50'

9 Chambers
51.0 cy Field
35.7 cy Stone



Pond 7P: INFILITRATION CHAMBER SYSTEM 1



Summary for Pond 8P: STONE DIAPHRAM

Inflow Area = 0.130 ac, 0.00% Impervious, Inflow Depth = 1.30" for 2-YR event
Inflow = 0.19 cfs @ 12.10 hrs, Volume= 0.014 af
Outflow = 0.04 cfs @ 11.90 hrs, Volume= 0.014 af, Atten= 80%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.90 hrs, Volume= 0.014 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP2 : WETLANDS

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 110.08' @ 12.57 hrs Surf.Area= 680 sf Storage= 157 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 27.1 min (879.0 - 851.9)

Volume	Invert	Avail.Storage	Storage Description
#1	109.50'	680 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 1,700 cf Overall x 40.0% Voids

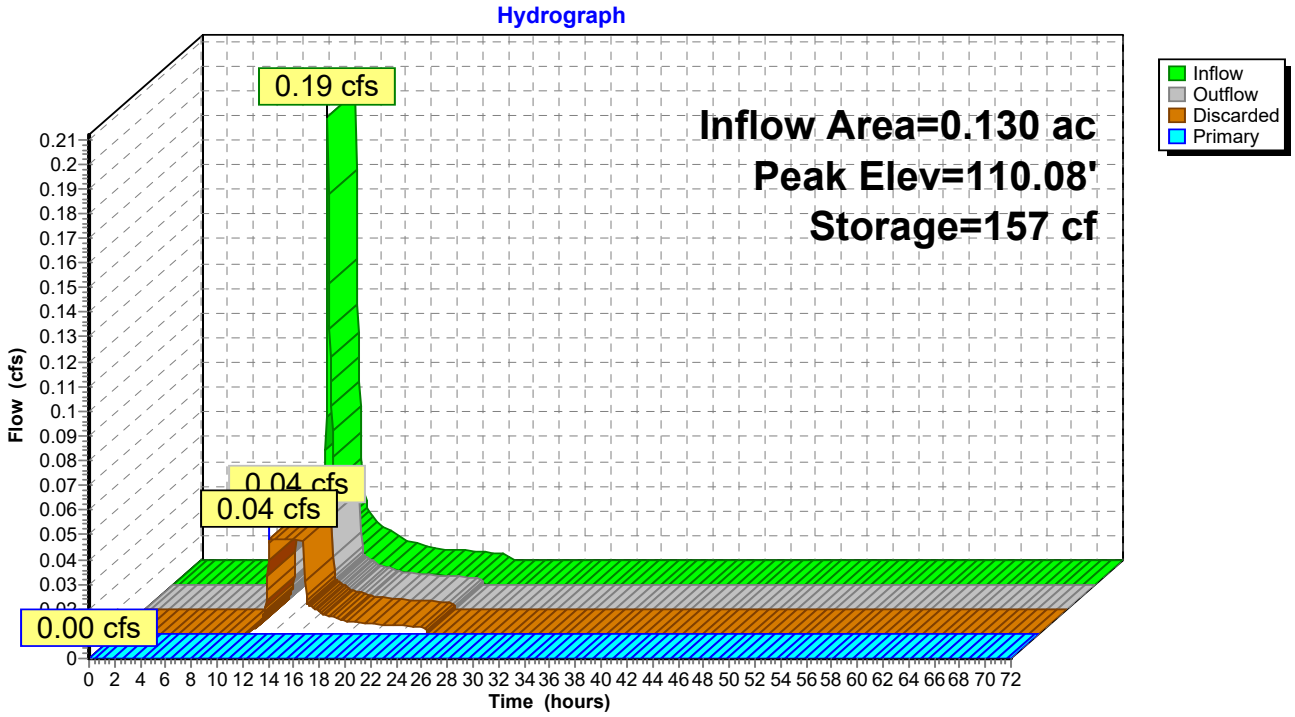
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
109.50	680	0	0
110.00	680	340	340
111.00	680	680	1,020
112.00	680	680	1,700

Device	Routing	Invert	Outlet Devices
#1	Primary	111.90'	**200.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	109.50'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.90 hrs HW=109.53' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=109.50' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 8P: STONE DIAPHRAM



Summary for Pond 9P: INFILTRATION CHAMBER SYSTEM 2

Inflow Area = 0.020 ac,100.00% Impervious, Inflow Depth = 3.18" for 2-YR event
Inflow = 0.06 cfs @ 12.09 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 11.70 hrs, Volume= 0.005 af, Atten= 83%, Lag= 0.0 min
Discarded = 0.01 cfs @ 11.70 hrs, Volume= 0.005 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP2 : WETLANDS

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 104.15' @ 12.55 hrs Surf.Area= 196 sf Storage= 61 cf

Plug-Flow detention time= 32.0 min calculated for 0.005 af (100% of inflow)
Center-of-Mass det. time= 32.0 min (787.1 - 755.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	103.50'	201 cf	**11.00'W x 17.86'L x 3.50'H Field A** 687 cf Overall - 184 cf Embedded = 504 cf x 40.0% Voids
#2A	104.00'	184 cf	**ADS_StormTech SC-740 +Cap** x 4 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 4 Chambers in 2 Rows
		385 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	106.00'	**4.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	103.50'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 11.70 hrs HW=103.54' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=103.50' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Pond 9P: INFILTRATION CHAMBER SYSTEM 2 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

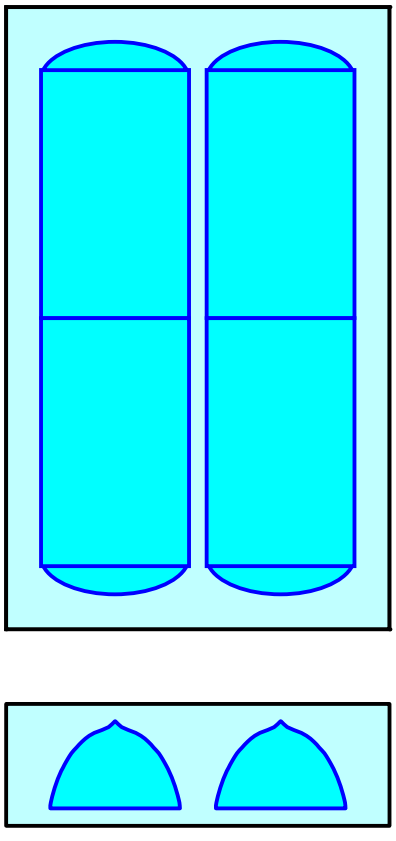
2 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 15.86' Row Length +12.0" End Stone x 2 = 17.86' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

4 Chambers x 45.9 cf = 183.8 cf Chamber Storage

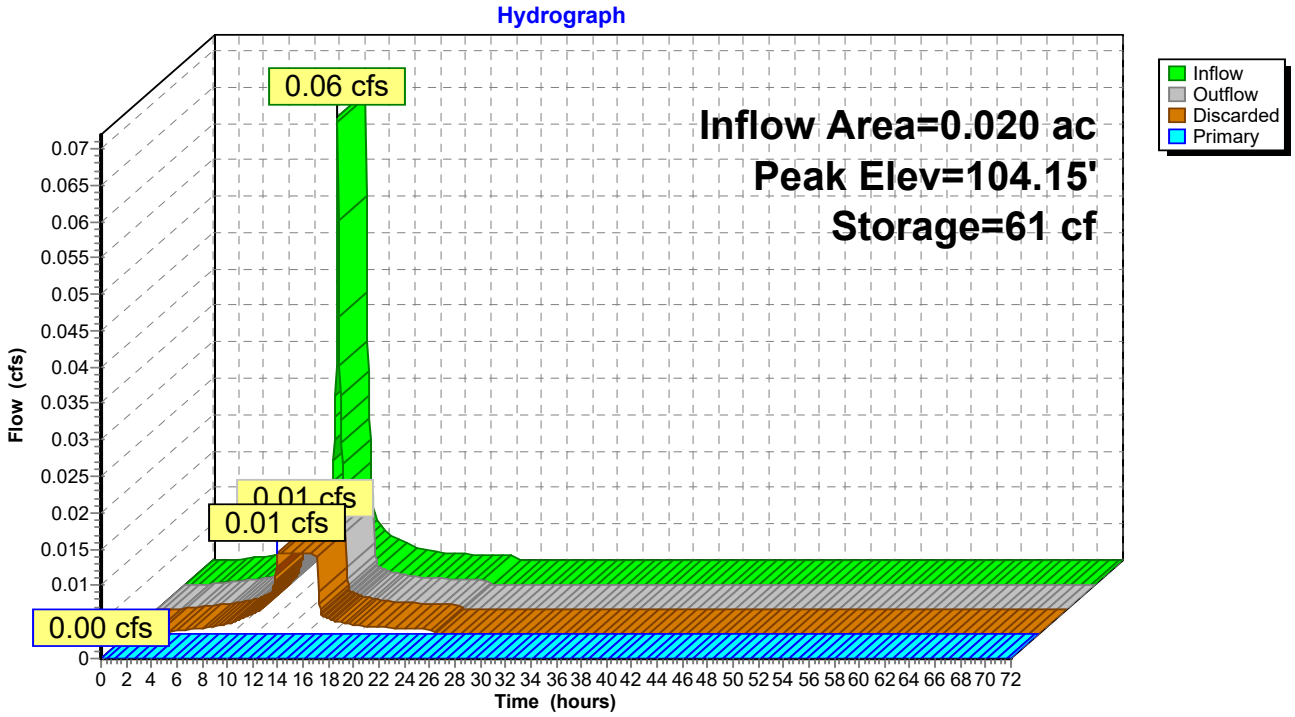
687.5 cf Field - 183.8 cf Chambers = 503.7 cf Stone x 40.0% Voids = 201.5 cf Stone Storage

Chamber Storage + Stone Storage = 385.2 cf = 0.009 af
Overall Storage Efficiency = 56.0%
Overall System Size = 17.86' x 11.00' x 3.50'

4 Chambers
25.5 cy Field
18.7 cy Stone



Pond 9P: INFILTRATION CHAMBER SYSTEM 2



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SUBCAT1 Runoff Area=2,268 sf 0.00% Impervious Runoff Depth=0.03"
Flow Length=96' Tc=6.7 min CN=31 Runoff=0.00 cfs 0.000 af

Subcatchment 2S: DRIVEWAY Runoff Area=5,642 sf 0.00% Impervious Runoff Depth=2.72"
Tc=6.0 min CN=76 Runoff=0.40 cfs 0.029 af

Subcatchment 2SR: 2SR Runoff Area=2,956 sf 100.00% Impervious Runoff Depth=4.98"
Tc=6.0 min CN=98 Runoff=0.34 cfs 0.028 af

Subcatchment 2SRG: 2SR1 Runoff Area=864 sf 100.00% Impervious Runoff Depth=4.98"
Tc=6.0 min CN=98 Runoff=0.10 cfs 0.008 af

Subcatchment 4S: SUBCAT2 Runoff Area=126,766 sf 4.72% Impervious Runoff Depth=0.21"
Flow Length=300' Tc=9.8 min CN=38 Runoff=0.11 cfs 0.051 af

Reach DP1: OFFSITE DISCHARGE Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Reach DP2: WETLANDS Inflow=0.11 cfs 0.051 af
Outflow=0.11 cfs 0.051 af

Pond 7P: INFILITRATION CHAMBER SYSTEM Peak Elev=113.95' Storage=492 cf Inflow=0.34 cfs 0.028 af
Discarded=0.02 cfs 0.028 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.028 af

Pond 8P: STONE DIAPHRAM Peak Elev=111.30' Storage=489 cf Inflow=0.40 cfs 0.029 af
Discarded=0.04 cfs 0.029 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.029 af

Pond 9P: INFILTRATION CHAMBER SYSTEM Peak Elev=104.54' Storage=115 cf Inflow=0.10 cfs 0.008 af
Discarded=0.01 cfs 0.008 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.008 af

Total Runoff Area = 3.179 ac Runoff Volume = 0.117 af Average Runoff Depth = 0.44"
92.92% Pervious = 2.954 ac 7.08% Impervious = 0.225 ac

Summary for Subcatchment 1S: SUBCAT1

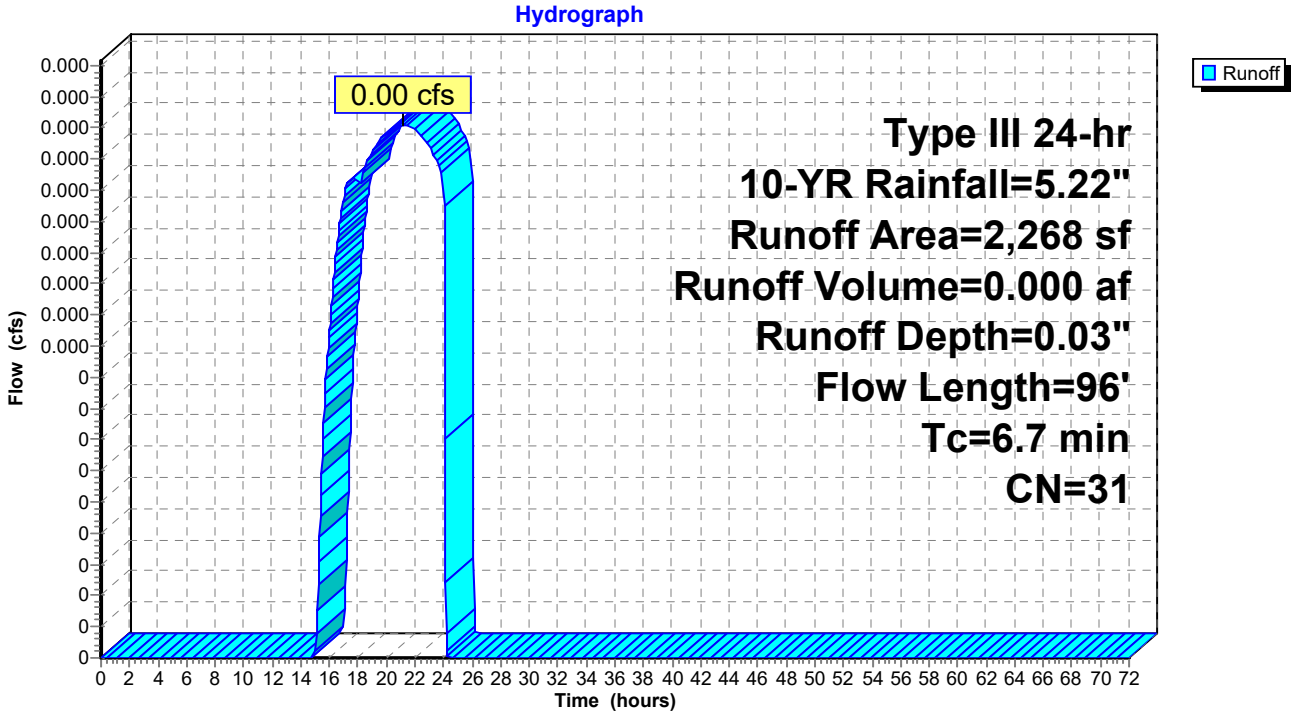
Runoff = 0.00 cfs @ 21.21 hrs, Volume= 0.000 af, Depth= 0.03"
Routed to Reach DP1 : OFFSITE DISCHARGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.22"

Area (sf)	CN	Description
1,988	30	Woods, Good, HSG A
280	39	>75% Grass cover, Good, HSG A
2,268	31	Weighted Average
2,268		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.41"
0.4	46	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.7	96	Total			

Subcatchment 1S: SUBCAT1



Summary for Subcatchment 2S: DRIVEWAY

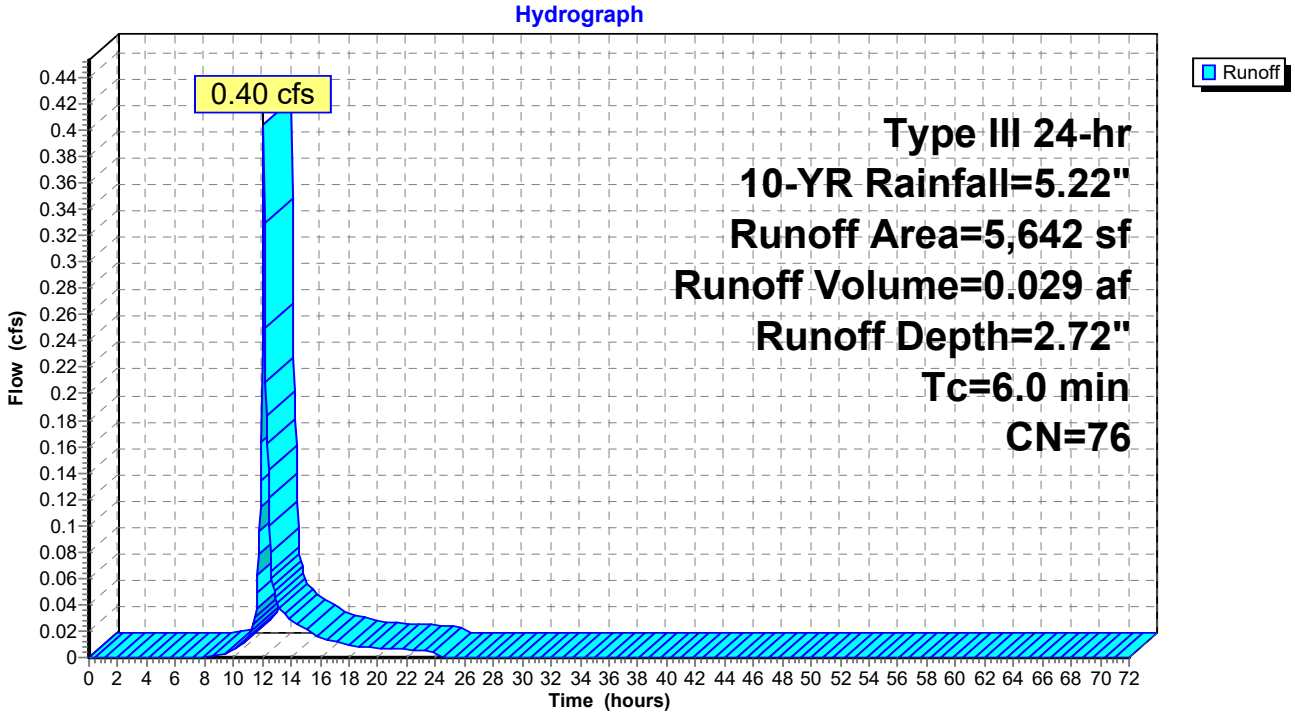
Runoff = 0.40 cfs @ 12.09 hrs, Volume= 0.029 af, Depth= 2.72"
Routed to Pond 8P : STONE DIAPHRAM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.22"

Area (sf)	CN	Description
5,642	76	Gravel roads, HSG A
5,642		100.00% Pervious Area

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

Subcatchment 2S: DRIVEWAY



Summary for Subcatchment 2SR: 2SR

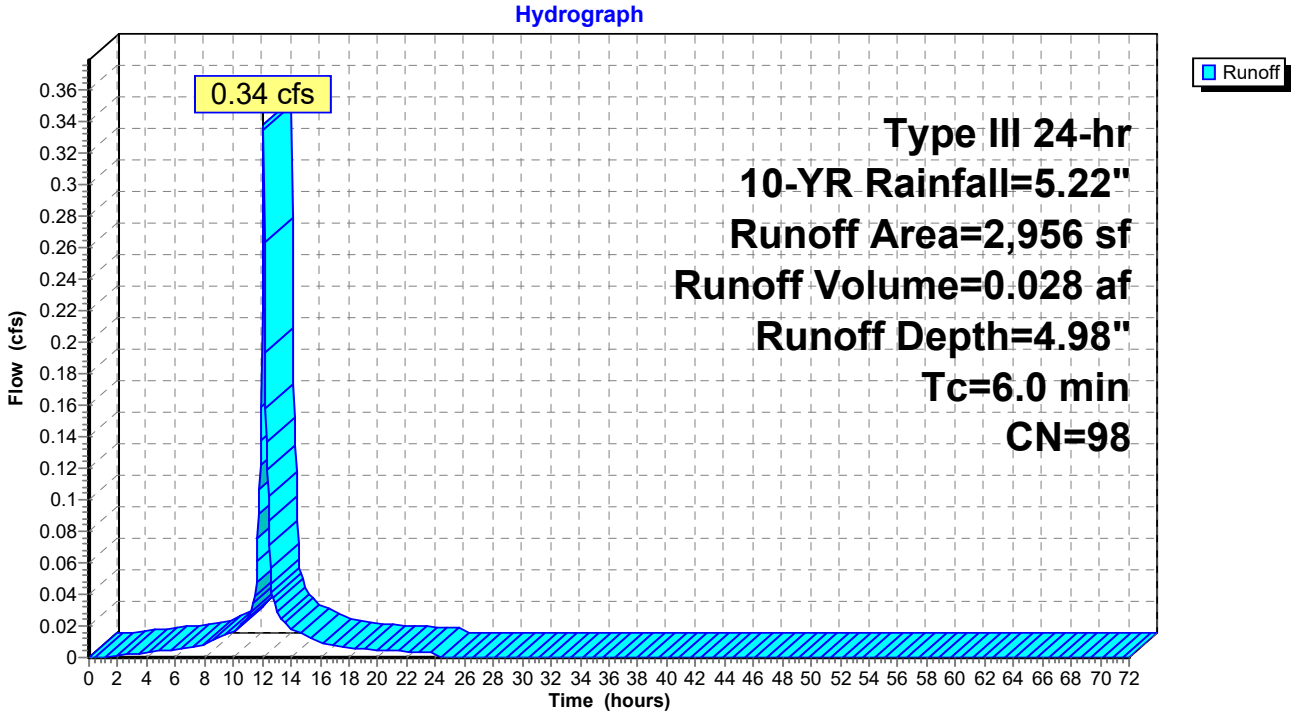
Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.028 af, Depth= 4.98"
Routed to Pond 7P : INFILITRATION CHAMBER SYSTEM 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.22"

	Area (sf)	CN	Description
*	2,956	98	Roofs, HSG A
	2,956		100.00% Impervious Area

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

Subcatchment 2SR: 2SR



Summary for Subcatchment 2SRG: 2SR1

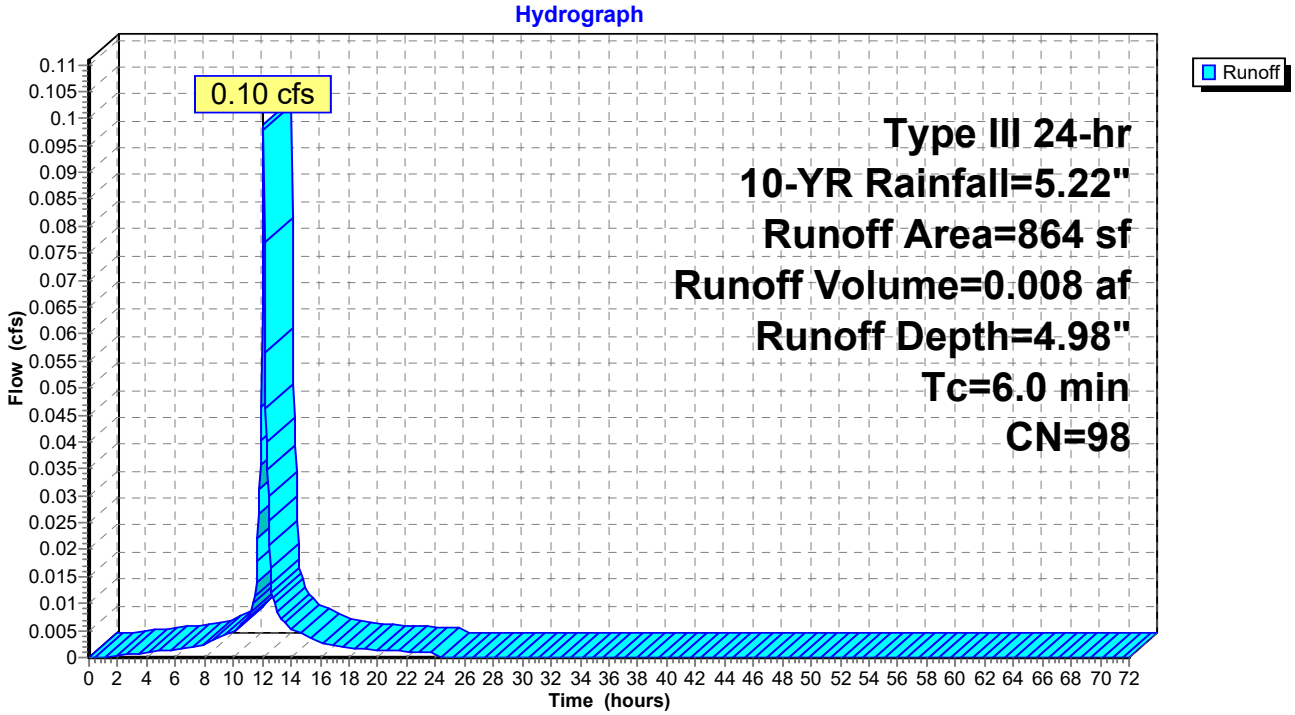
Runoff = 0.10 cfs @ 12.09 hrs, Volume= 0.008 af, Depth= 4.98"
Routed to Pond 9P : INFILTRATION CHAMBER SYSTEM 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.22"

Area (sf)	CN	Description
864	98	Roofs, HSG A
864		100.00% Impervious Area

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

Subcatchment 2SRG: 2SR1



Summary for Subcatchment 4S: SUBCAT2

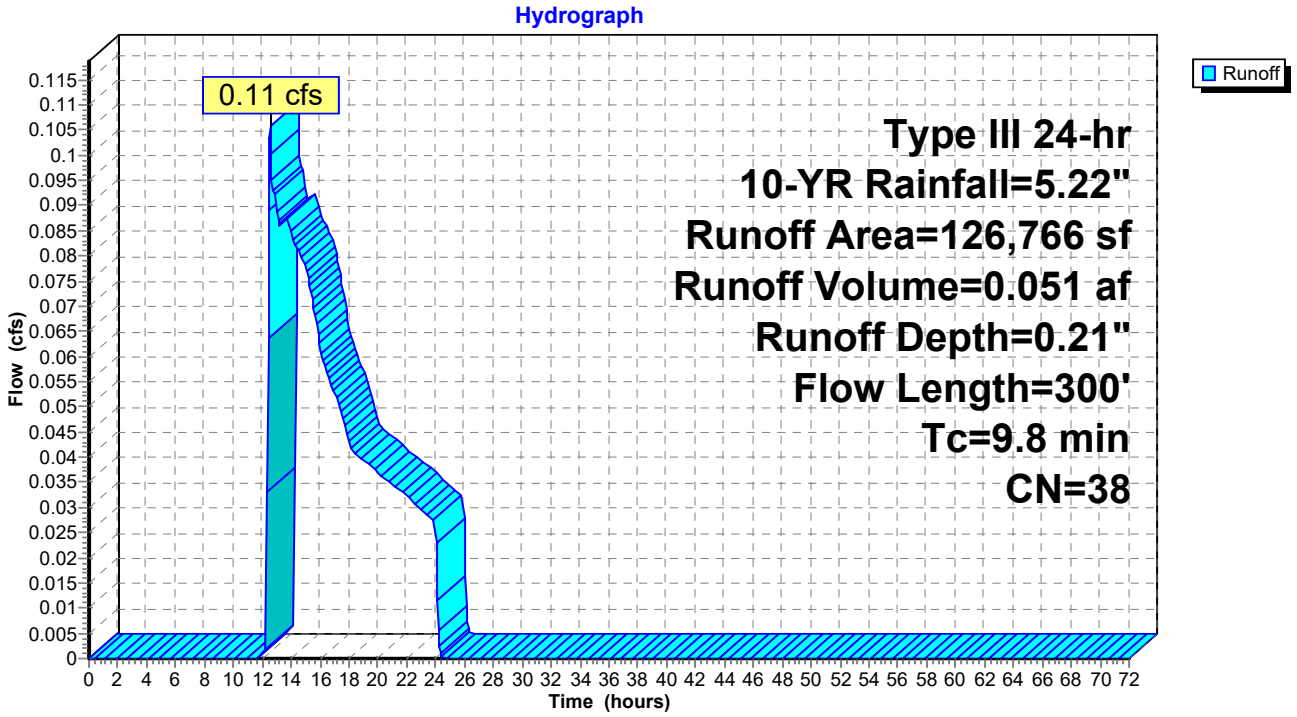
Runoff = 0.11 cfs @ 12.54 hrs, Volume= 0.051 af, Depth= 0.21"
Routed to Reach DP2 : WETLANDS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=5.22"

	Area (sf)	CN	Description
	70,840	30	Woods, Good, HSG A
*	2,020	98	Walkway/Patio, HSG A
	37,158	39	>75% Grass cover, Good, HSG A
	5,562	76	Gravel roads, HSG A
	3,416	98	Roofs, HSG A
*	551	98	Walkway/Patio/Deck, HSG A
	7,219	39	>75% Grass cover, Good, HSG A
	126,766	38	Weighted Average
	120,779		95.28% Pervious Area
	5,987		4.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0100	0.12		**Sheet Flow, GRASS** Grass: Short n= 0.150 P2= 3.41"
1.0	120	0.0750	1.92		**Shallow Concentrated Flow, GRASS** Short Grass Pasture Kv= 7.0 fps
1.6	130	0.0750	1.37		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
9.8	300	Total			

Subcatchment 4S: SUBCAT2

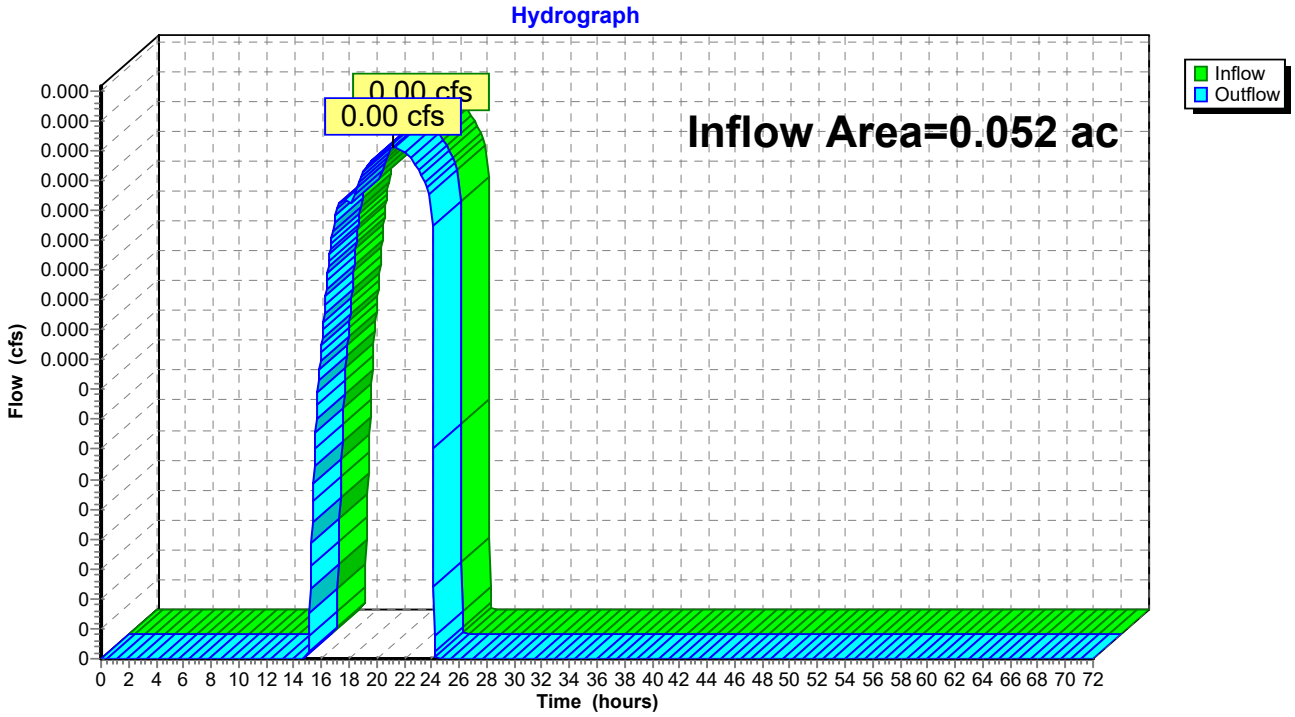


Summary for Reach DP1: OFFSITE DISCHARGE

Inflow Area = 0.052 ac, 0.00% Impervious, Inflow Depth = 0.03" for 10-YR event
Inflow = 0.00 cfs @ 21.21 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 21.21 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP1: OFFSITE DISCHARGE

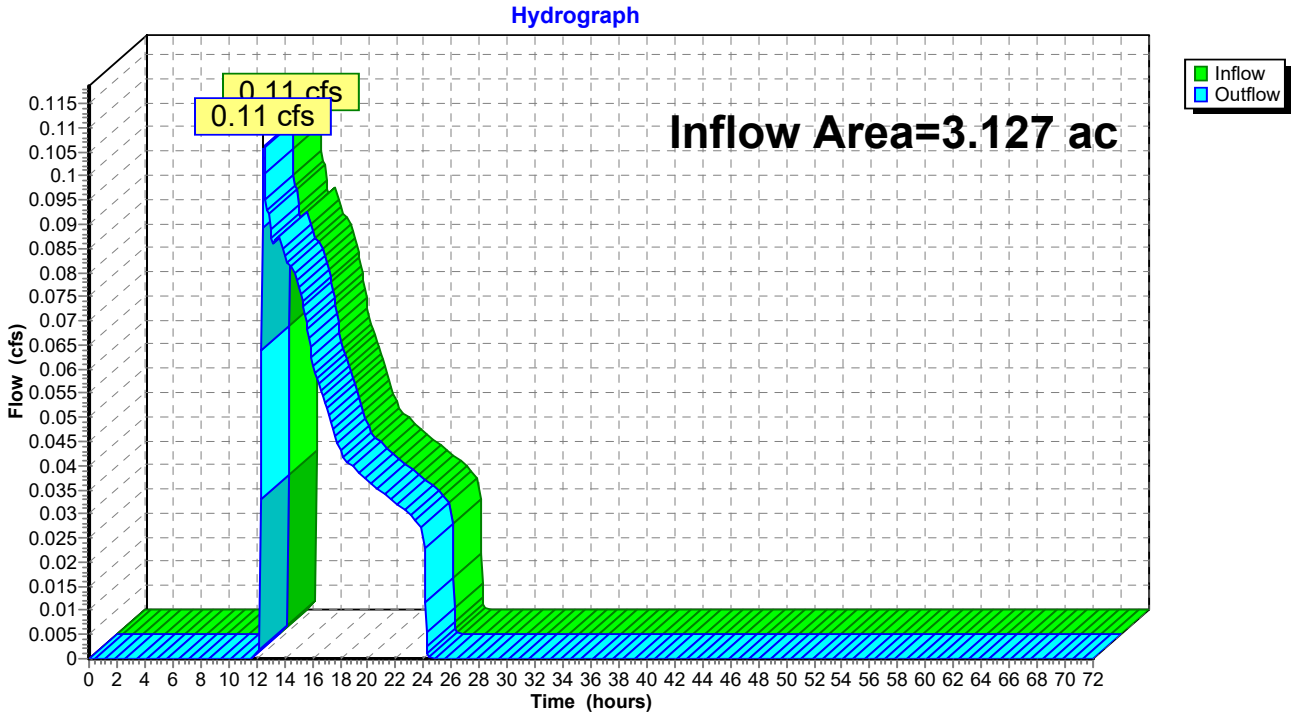


Summary for Reach DP2: WETLANDS

Inflow Area = 3.127 ac, 7.20% Impervious, Inflow Depth = 0.20" for 10-YR event
Inflow = 0.11 cfs @ 12.54 hrs, Volume= 0.051 af
Outflow = 0.11 cfs @ 12.54 hrs, Volume= 0.051 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP2: WETLANDS



Summary for Pond 7P: INFILITRATION CHAMBER SYSTEM 1

Inflow Area = 0.068 ac,100.00% Impervious, Inflow Depth = 4.98" for 10-YR event
Inflow = 0.34 cfs @ 12.09 hrs, Volume= 0.028 af
Outflow = 0.02 cfs @ 10.75 hrs, Volume= 0.028 af, Atten= 94%, Lag= 0.0 min
Discarded = 0.02 cfs @ 10.75 hrs, Volume= 0.028 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP2 : WETLANDS

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 113.95' @ 13.57 hrs Surf.Area= 393 sf Storage= 492 cf

Plug-Flow detention time= 172.3 min calculated for 0.028 af (100% of inflow)
Center-of-Mass det. time= 172.2 min (919.5 - 747.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	112.00'	385 cf	**15.75'W x 24.98'L x 3.50'H Field A** 1,377 cf Overall - 413 cf Embedded = 963 cf x 40.0% Voids
#2A	112.50'	413 cf	**ADS_StormTech SC-740 +Cap** x 9 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 9 Chambers in 3 Rows
		799 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	112.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	115.00'	**4.0" Horiz. Orifice/Grate** X 3 rows C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 10.75 hrs HW=112.04' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=112.00' (Free Discharge)
↑**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 7P: INFILITRATION CHAMBER SYSTEM 1 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

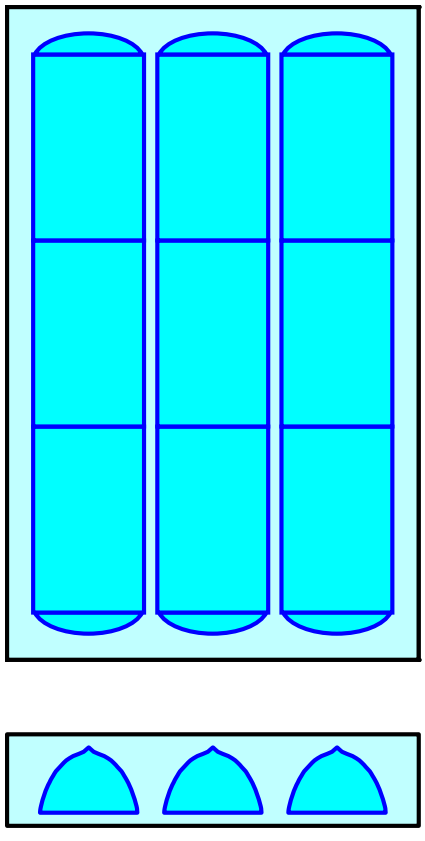
3 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 22.98' Row Length +12.0" End Stone x 2 = 24.98' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

9 Chambers x 45.9 cf = 413.5 cf Chamber Storage

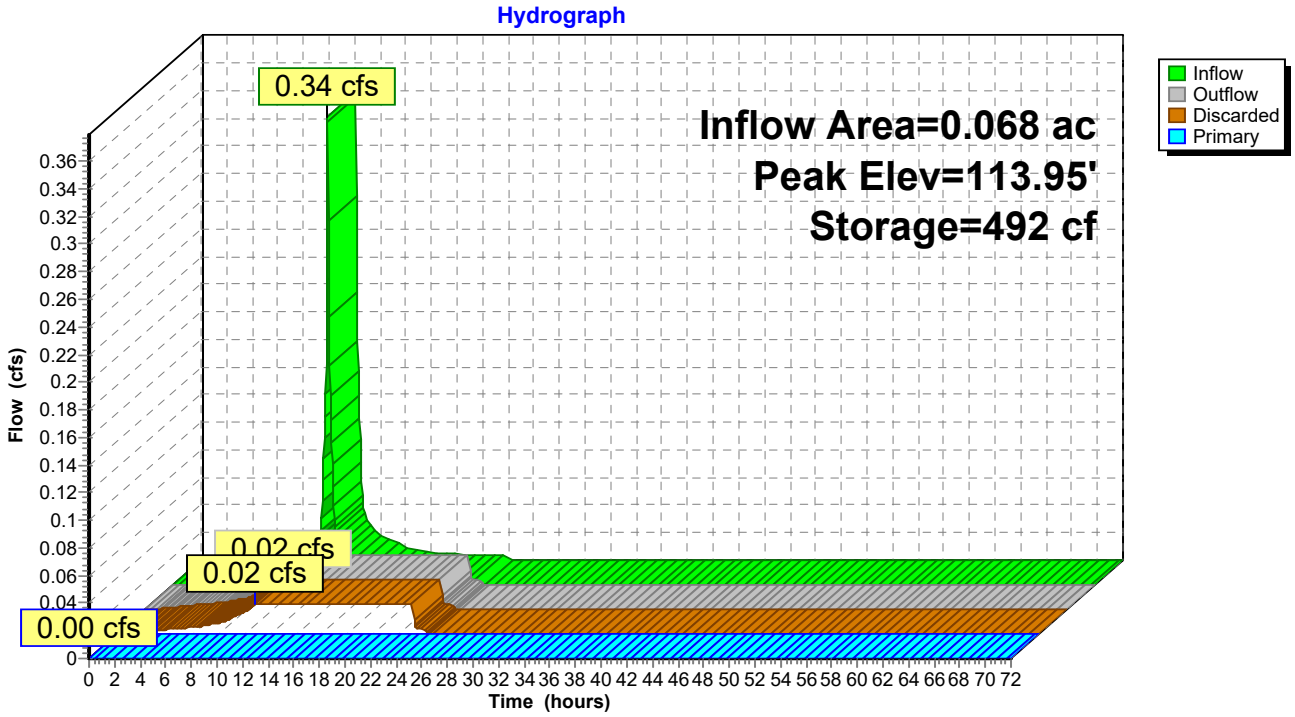
1,376.8 cf Field - 413.5 cf Chambers = 963.4 cf Stone x 40.0% Voids = 385.4 cf Stone Storage

Chamber Storage + Stone Storage = 798.8 cf = 0.018 af
Overall Storage Efficiency = 58.0%
Overall System Size = 24.98' x 15.75' x 3.50'

9 Chambers
51.0 cy Field
35.7 cy Stone



Pond 7P: INFILITRATION CHAMBER SYSTEM 1



Summary for Pond 8P: STONE DIAPHRAM

Inflow Area = 0.130 ac, 0.00% Impervious, Inflow Depth = 2.72" for 10-YR event
Inflow = 0.40 cfs @ 12.09 hrs, Volume= 0.029 af
Outflow = 0.04 cfs @ 11.65 hrs, Volume= 0.029 af, Atten= 91%, Lag= 0.0 min
Discarded = 0.04 cfs @ 11.65 hrs, Volume= 0.029 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP2 : WETLANDS

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 111.30' @ 13.12 hrs Surf.Area= 680 sf Storage= 489 cf

Plug-Flow detention time= 111.9 min calculated for 0.029 af (100% of inflow)
Center-of-Mass det. time= 111.9 min (942.2 - 830.3)

Volume	Invert	Avail.Storage	Storage Description
#1	109.50'	680 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 1,700 cf Overall x 40.0% Voids

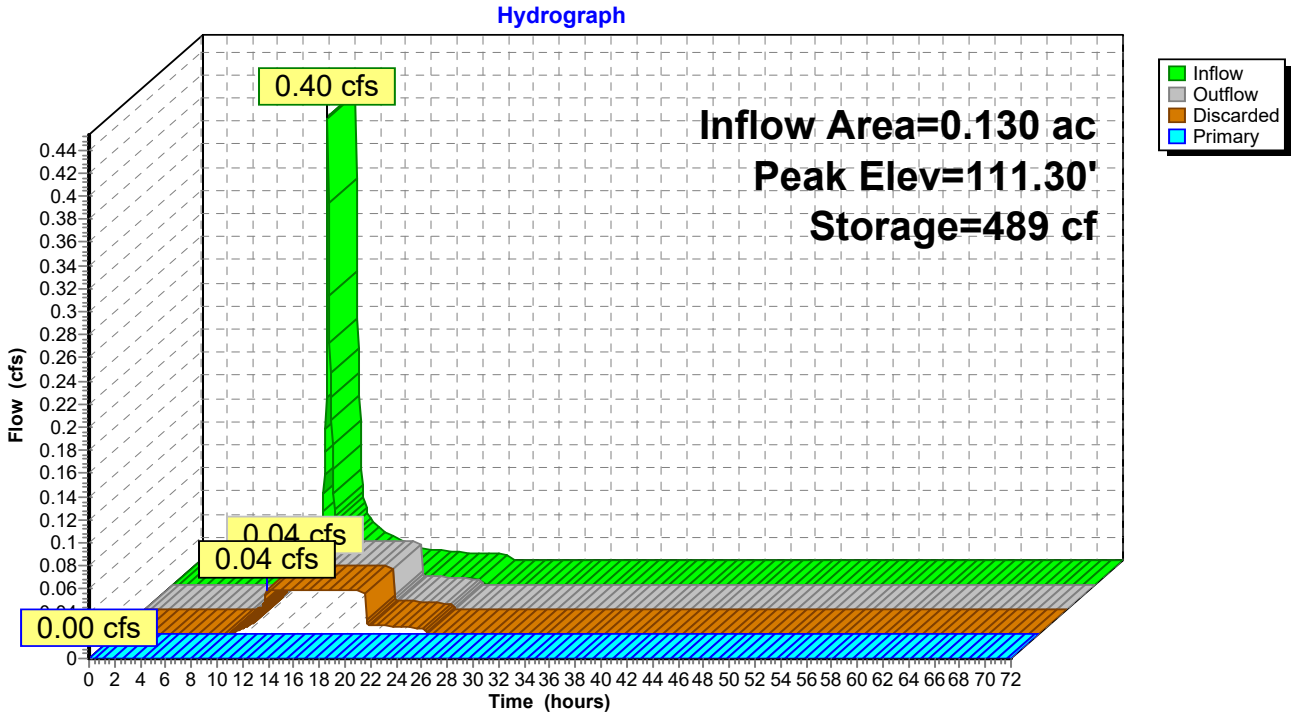
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
109.50	680	0	0
110.00	680	340	340
111.00	680	680	1,020
112.00	680	680	1,700

Device	Routing	Invert	Outlet Devices
#1	Primary	111.90'	**200.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	109.50'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.65 hrs HW=109.53' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=109.50' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 8P: STONE DIAPHRAM



Summary for Pond 9P: INFILTRATION CHAMBER SYSTEM 2

Inflow Area = 0.020 ac,100.00% Impervious, Inflow Depth = 4.98" for 10-YR event
Inflow = 0.10 cfs @ 12.09 hrs, Volume= 0.008 af
Outflow = 0.01 cfs @ 11.55 hrs, Volume= 0.008 af, Atten= 89%, Lag= 0.0 min
Discarded = 0.01 cfs @ 11.55 hrs, Volume= 0.008 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP2 : WETLANDS

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 104.54' @ 12.75 hrs Surf.Area= 196 sf Storage= 115 cf

Plug-Flow detention time= 68.2 min calculated for 0.008 af (100% of inflow)
Center-of-Mass det. time= 68.1 min (815.4 - 747.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	103.50'	201 cf	**11.00'W x 17.86'L x 3.50'H Field A** 687 cf Overall - 184 cf Embedded = 504 cf x 40.0% Voids
#2A	104.00'	184 cf	**ADS_StormTech SC-740 +Cap** x 4 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 4 Chambers in 2 Rows
		385 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	106.00'	**4.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	103.50'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 11.55 hrs HW=103.54' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=103.50' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Pond 9P: INFILTRATION CHAMBER SYSTEM 2 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

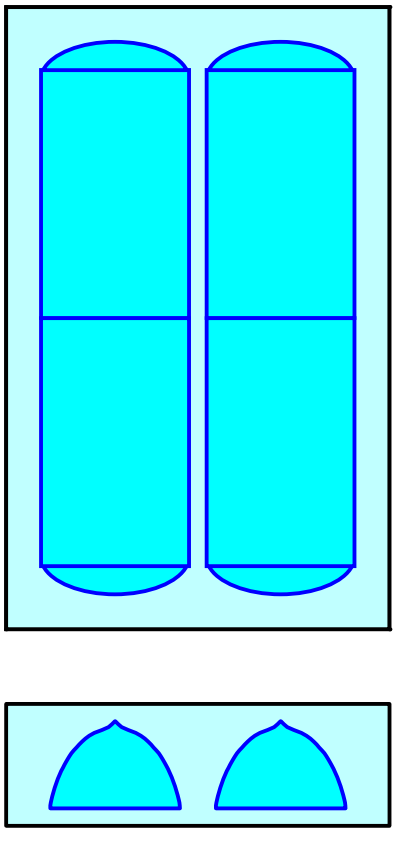
2 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 15.86' Row Length +12.0" End Stone x 2 = 17.86' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

4 Chambers x 45.9 cf = 183.8 cf Chamber Storage

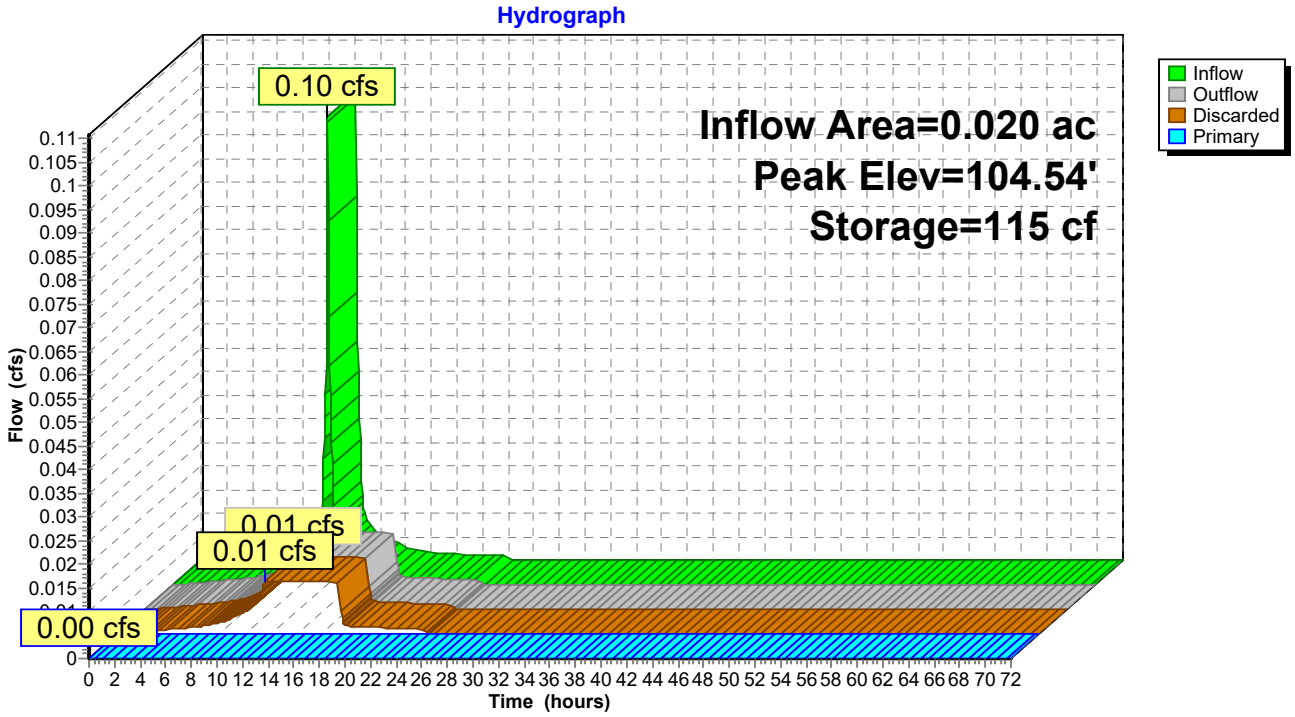
687.5 cf Field - 183.8 cf Chambers = 503.7 cf Stone x 40.0% Voids = 201.5 cf Stone Storage

Chamber Storage + Stone Storage = 385.2 cf = 0.009 af
Overall Storage Efficiency = 56.0%
Overall System Size = 17.86' x 11.00' x 3.50'

4 Chambers
25.5 cy Field
18.7 cy Stone



Pond 9P: INFILTRATION CHAMBER SYSTEM 2



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SUBCAT1 Runoff Area=2,268 sf 0.00% Impervious Runoff Depth=0.15"
Flow Length=96' Tc=6.7 min CN=31 Runoff=0.00 cfs 0.001 af

Subcatchment 2S: DRIVEWAY Runoff Area=5,642 sf 0.00% Impervious Runoff Depth=3.69"
Tc=6.0 min CN=76 Runoff=0.55 cfs 0.040 af

Subcatchment 2SR: 2SR Runoff Area=2,956 sf 100.00% Impervious Runoff Depth=6.12"
Tc=6.0 min CN=98 Runoff=0.41 cfs 0.035 af

Subcatchment 2SRG: 2SR1 Runoff Area=864 sf 100.00% Impervious Runoff Depth=6.12"
Tc=6.0 min CN=98 Runoff=0.12 cfs 0.010 af

Subcatchment 4S: SUBCAT2 Runoff Area=126,766 sf 4.72% Impervious Runoff Depth=0.49"
Flow Length=300' Tc=9.8 min CN=38 Runoff=0.57 cfs 0.120 af

Reach DP1: OFFSITE DISCHARGE Inflow=0.00 cfs 0.001 af
Outflow=0.00 cfs 0.001 af

Reach DP2: WETLANDS Inflow=0.57 cfs 0.122 af
Outflow=0.57 cfs 0.122 af

Pond 7P: INFILITRATION CHAMBER SYSTEM Peak Elev=114.65' Storage=659 cf Inflow=0.41 cfs 0.035 af
Discarded=0.02 cfs 0.035 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.035 af

Pond 8P: STONE DIAPHRAM Peak Elev=111.90' Storage=653 cf Inflow=0.55 cfs 0.040 af
Discarded=0.04 cfs 0.038 af Primary=0.09 cfs 0.002 af Outflow=0.13 cfs 0.040 af

Pond 9P: INFILTRATION CHAMBER SYSTEM Peak Elev=104.81' Storage=152 cf Inflow=0.12 cfs 0.010 af
Discarded=0.01 cfs 0.010 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.010 af

Total Runoff Area = 3.179 ac Runoff Volume = 0.205 af Average Runoff Depth = 0.77"
92.92% Pervious = 2.954 ac 7.08% Impervious = 0.225 ac

Summary for Subcatchment 1S: SUBCAT1

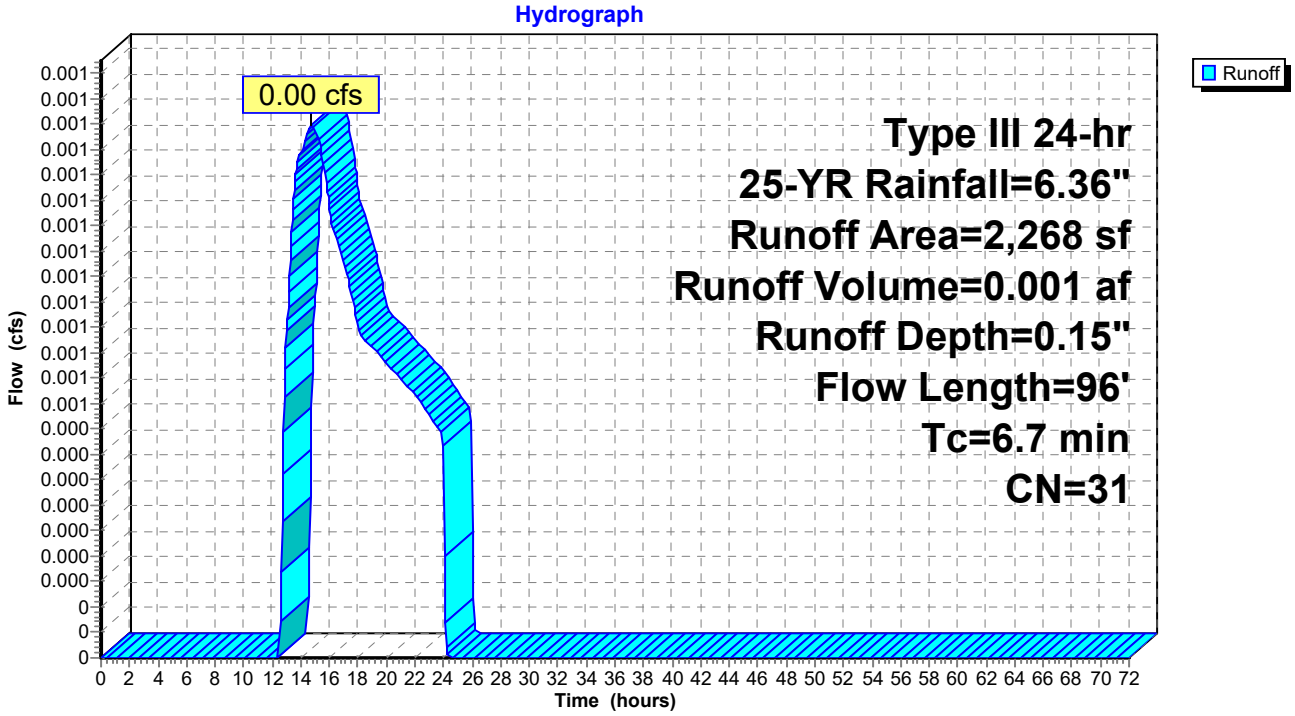
Runoff = 0.00 cfs @ 14.77 hrs, Volume= 0.001 af, Depth= 0.15"
Routed to Reach DP1 : OFFSITE DISCHARGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.36"

Area (sf)	CN	Description
1,988	30	Woods, Good, HSG A
280	39	>75% Grass cover, Good, HSG A
2,268	31	Weighted Average
2,268		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.41"
0.4	46	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.7	96	Total			

Subcatchment 1S: SUBCAT1



Summary for Subcatchment 2S: DRIVEWAY

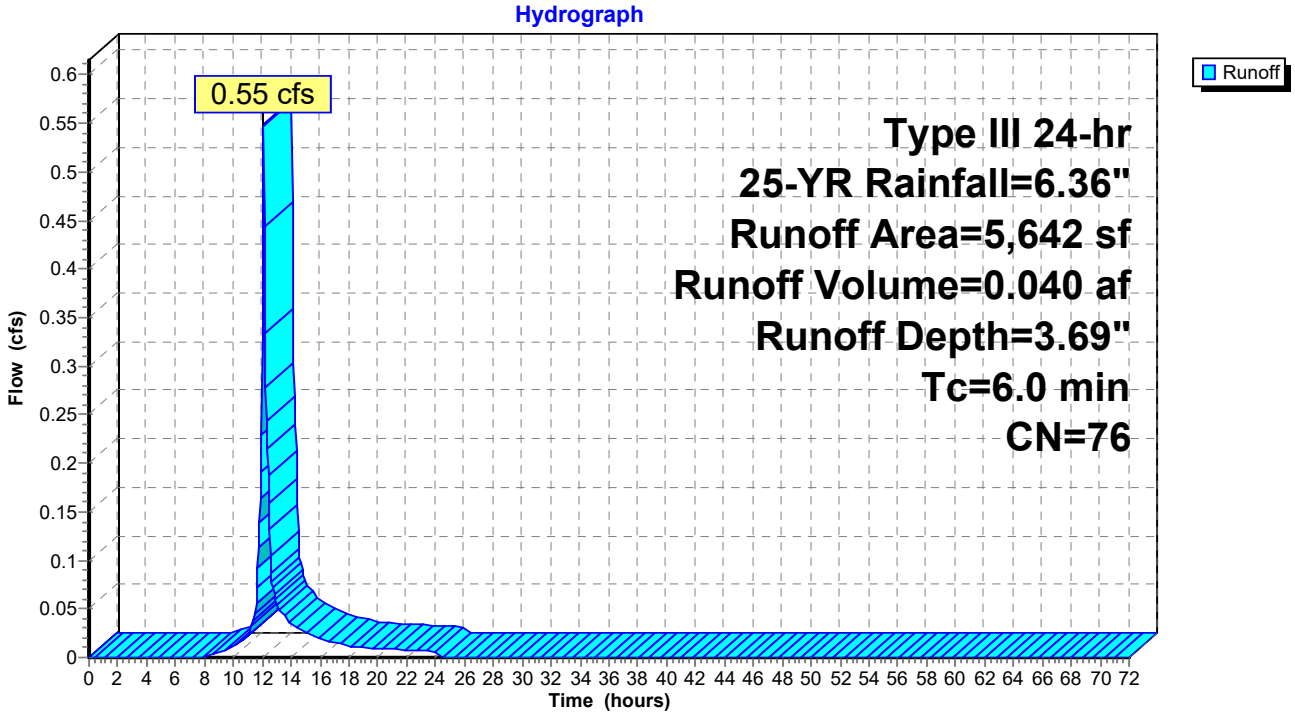
Runoff = 0.55 cfs @ 12.09 hrs, Volume= 0.040 af, Depth= 3.69"
Routed to Pond 8P : STONE DIAPHRAM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.36"

Area (sf)	CN	Description
5,642	76	Gravel roads, HSG A
5,642		100.00% Pervious Area

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

Subcatchment 2S: DRIVEWAY



Summary for Subcatchment 2SR: 2SR

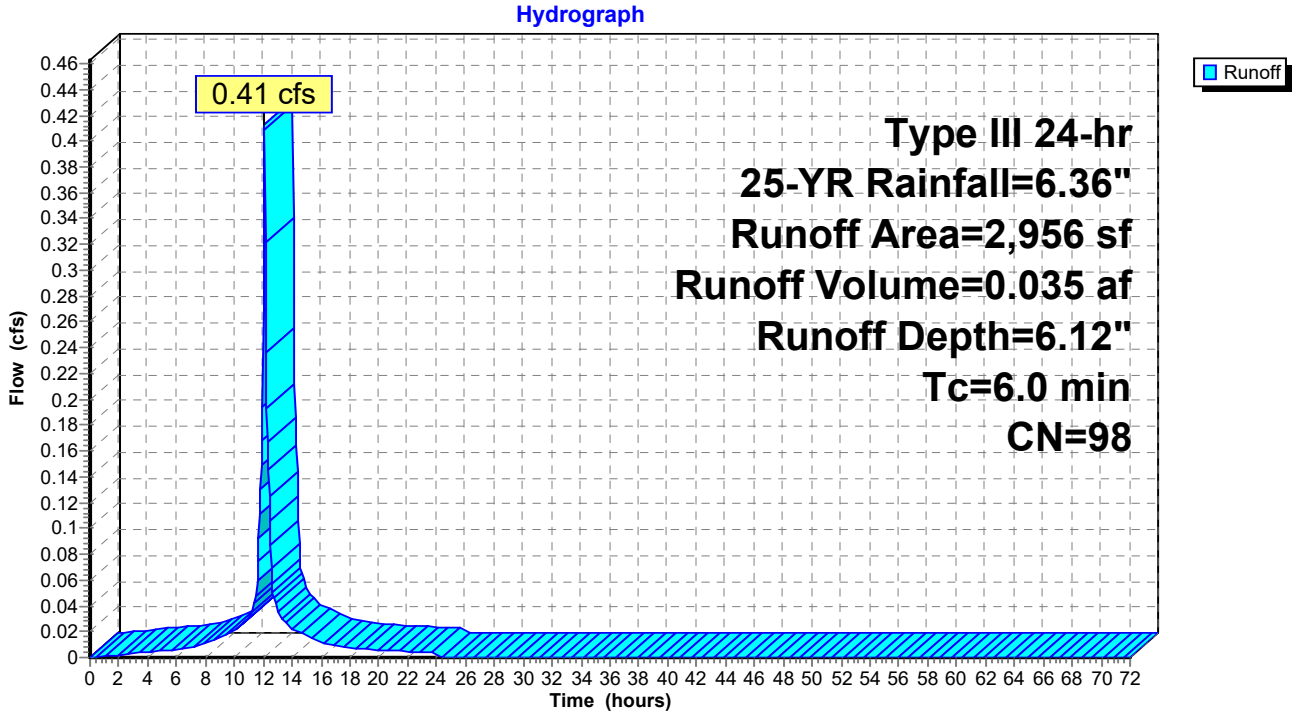
Runoff = 0.41 cfs @ 12.09 hrs, Volume= 0.035 af, Depth= 6.12"
Routed to Pond 7P : INFILITRATION CHAMBER SYSTEM 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.36"

	Area (sf)	CN	Description
*	2,956	98	Roofs, HSG A
	2,956		100.00% Impervious Area

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

Subcatchment 2SR: 2SR



Summary for Subcatchment 2SRG: 2SR1

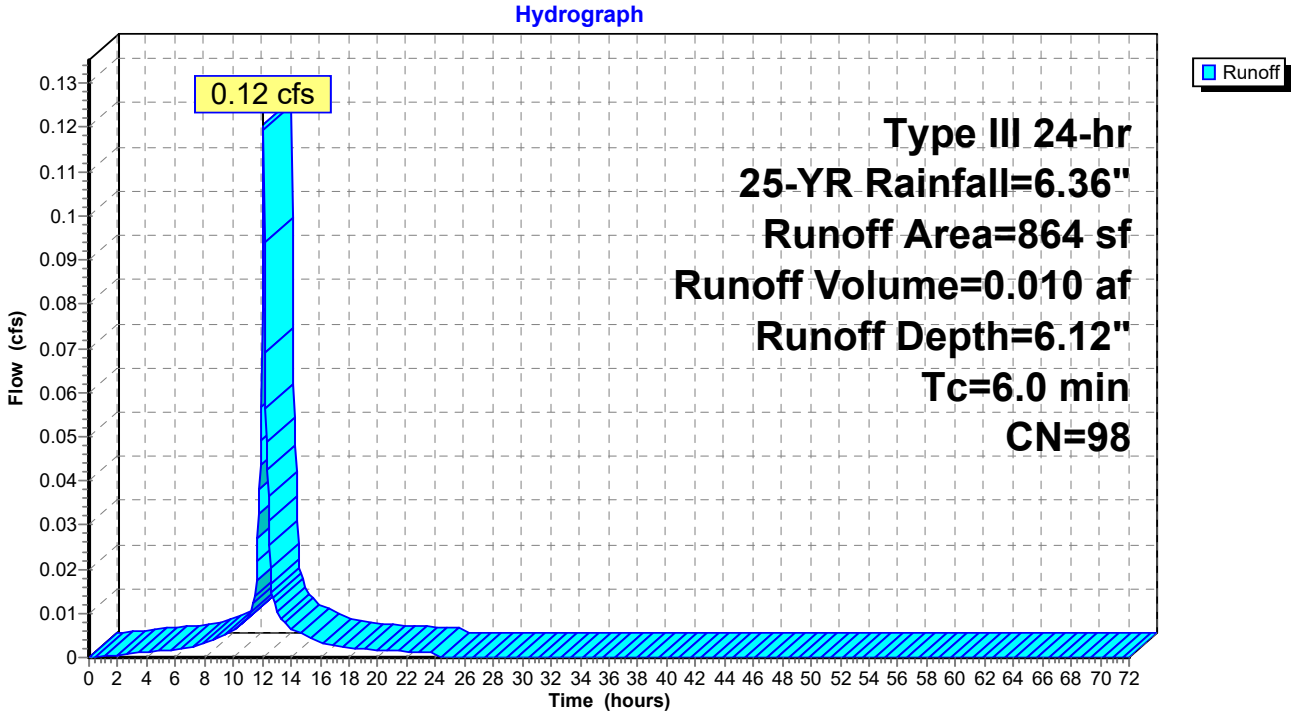
Runoff = 0.12 cfs @ 12.09 hrs, Volume= 0.010 af, Depth= 6.12"
Routed to Pond 9P : INFILTRATION CHAMBER SYSTEM 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.36"

Area (sf)	CN	Description
864	98	Roofs, HSG A
864		100.00% Impervious Area

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

Subcatchment 2SRG: 2SR1



Summary for Subcatchment 4S: SUBCAT2

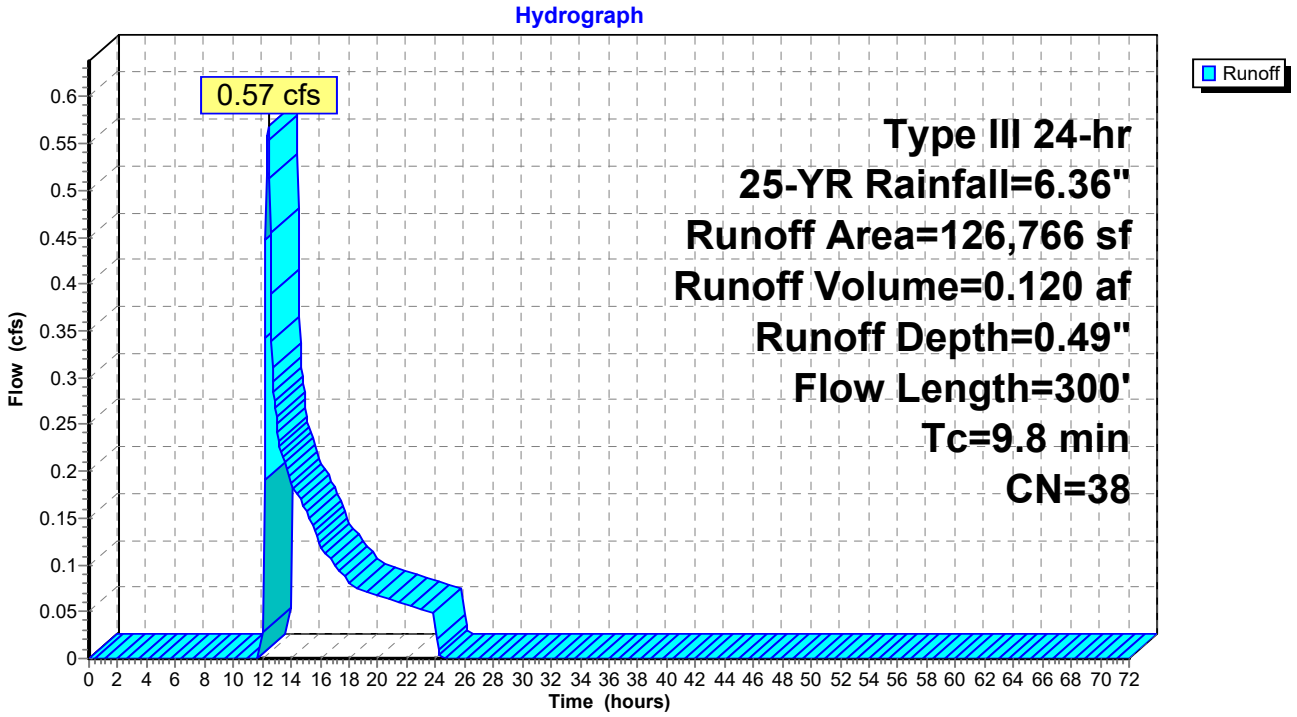
Runoff = 0.57 cfs @ 12.40 hrs, Volume= 0.120 af, Depth= 0.49"
Routed to Reach DP2 : WETLANDS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 25-YR Rainfall=6.36"

	Area (sf)	CN	Description
	70,840	30	Woods, Good, HSG A
*	2,020	98	Walkway/Patio, HSG A
	37,158	39	>75% Grass cover, Good, HSG A
	5,562	76	Gravel roads, HSG A
	3,416	98	Roofs, HSG A
*	551	98	Walkway/Patio/Deck, HSG A
	7,219	39	>75% Grass cover, Good, HSG A
	126,766	38	Weighted Average
	120,779		95.28% Pervious Area
	5,987		4.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0100	0.12		**Sheet Flow, GRASS** Grass: Short n= 0.150 P2= 3.41"
1.0	120	0.0750	1.92		**Shallow Concentrated Flow, GRASS** Short Grass Pasture Kv= 7.0 fps
1.6	130	0.0750	1.37		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
9.8	300	Total			

Subcatchment 4S: SUBCAT2

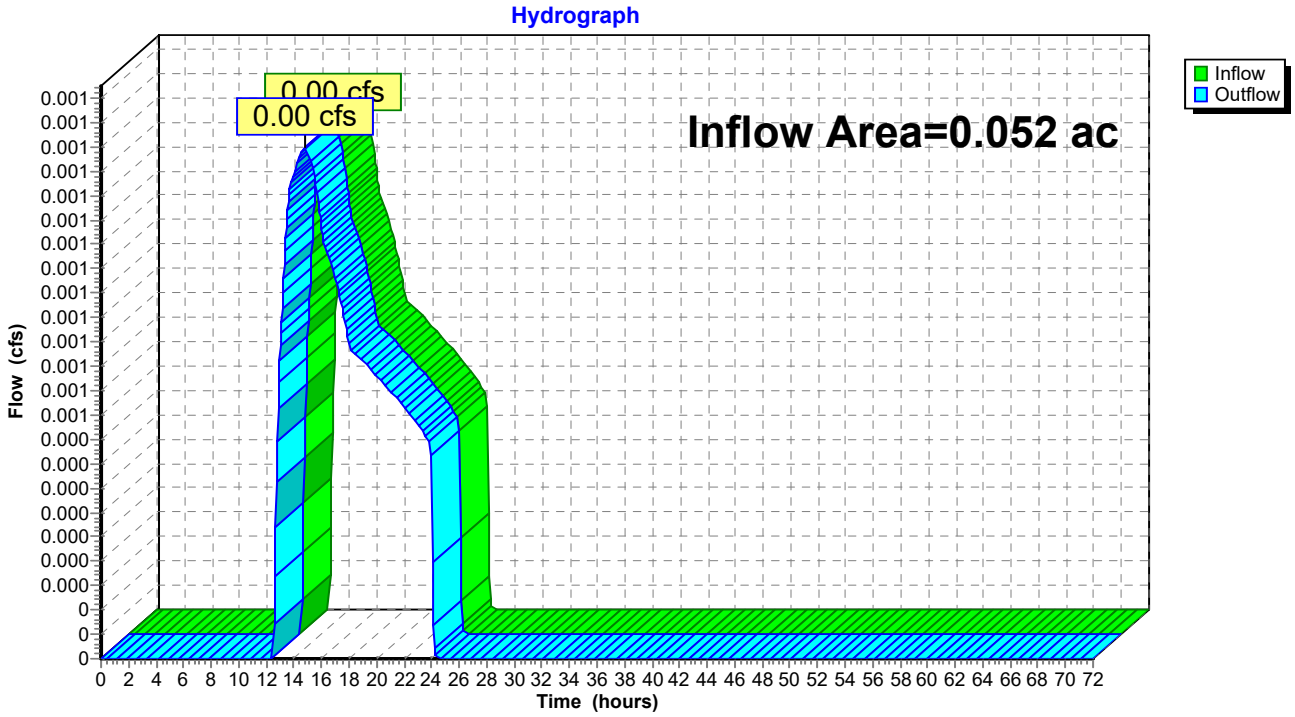


Summary for Reach DP1: OFFSITE DISCHARGE

Inflow Area = 0.052 ac, 0.00% Impervious, Inflow Depth = 0.15" for 25-YR event
Inflow = 0.00 cfs @ 14.77 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 14.77 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP1: OFFSITE DISCHARGE

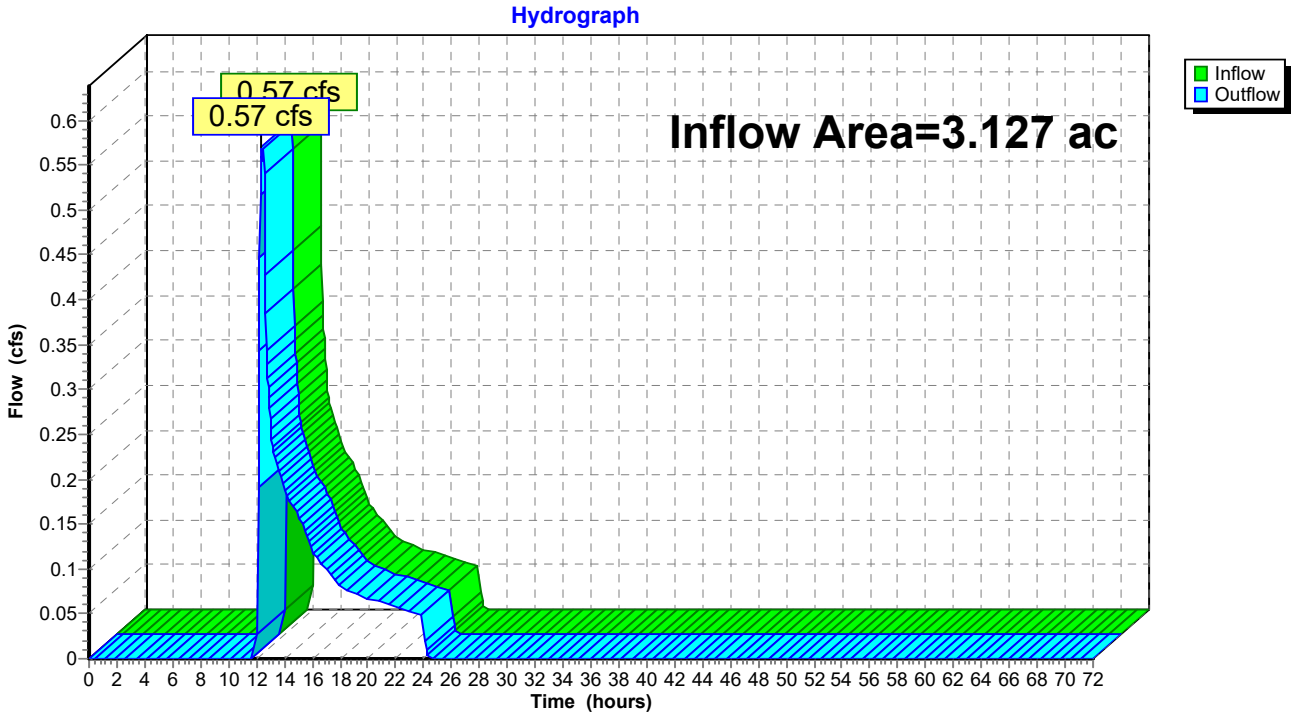


Summary for Reach DP2: WETLANDS

Inflow Area = 3.127 ac, 7.20% Impervious, Inflow Depth = 0.47" for 25-YR event
Inflow = 0.57 cfs @ 12.40 hrs, Volume= 0.122 af
Outflow = 0.57 cfs @ 12.40 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP2: WETLANDS



Summary for Pond 7P: INFILITRATION CHAMBER SYSTEM 1

Inflow Area = 0.068 ac,100.00% Impervious, Inflow Depth = 6.12" for 25-YR event
Inflow = 0.41 cfs @ 12.09 hrs, Volume= 0.035 af
Outflow = 0.02 cfs @ 10.30 hrs, Volume= 0.035 af, Atten= 95%, Lag= 0.0 min
Discarded = 0.02 cfs @ 10.30 hrs, Volume= 0.035 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP2 : WETLANDS

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 114.65' @ 14.03 hrs Surf.Area= 393 sf Storage= 659 cf

Plug-Flow detention time= 240.9 min calculated for 0.035 af (100% of inflow)
Center-of-Mass det. time= 240.8 min (985.1 - 744.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	112.00'	385 cf	**15.75'W x 24.98'L x 3.50'H Field A** 1,377 cf Overall - 413 cf Embedded = 963 cf x 40.0% Voids
#2A	112.50'	413 cf	**ADS_StormTech SC-740 +Cap** x 9 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 9 Chambers in 3 Rows
		799 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	112.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	115.00'	**4.0" Horiz. Orifice/Grate** X 3 rows C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 10.30 hrs HW=112.04' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=112.00' (Free Discharge)
↑**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 7P: INFILITRATION CHAMBER SYSTEM 1 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

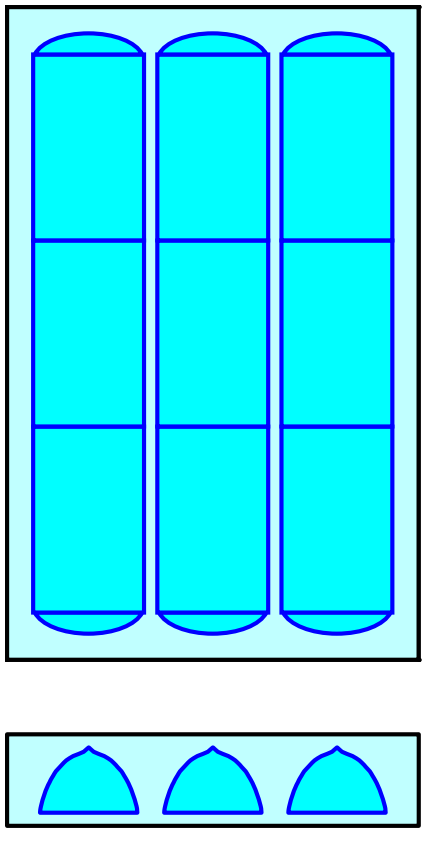
3 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 22.98' Row Length +12.0" End Stone x 2 = 24.98' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

9 Chambers x 45.9 cf = 413.5 cf Chamber Storage

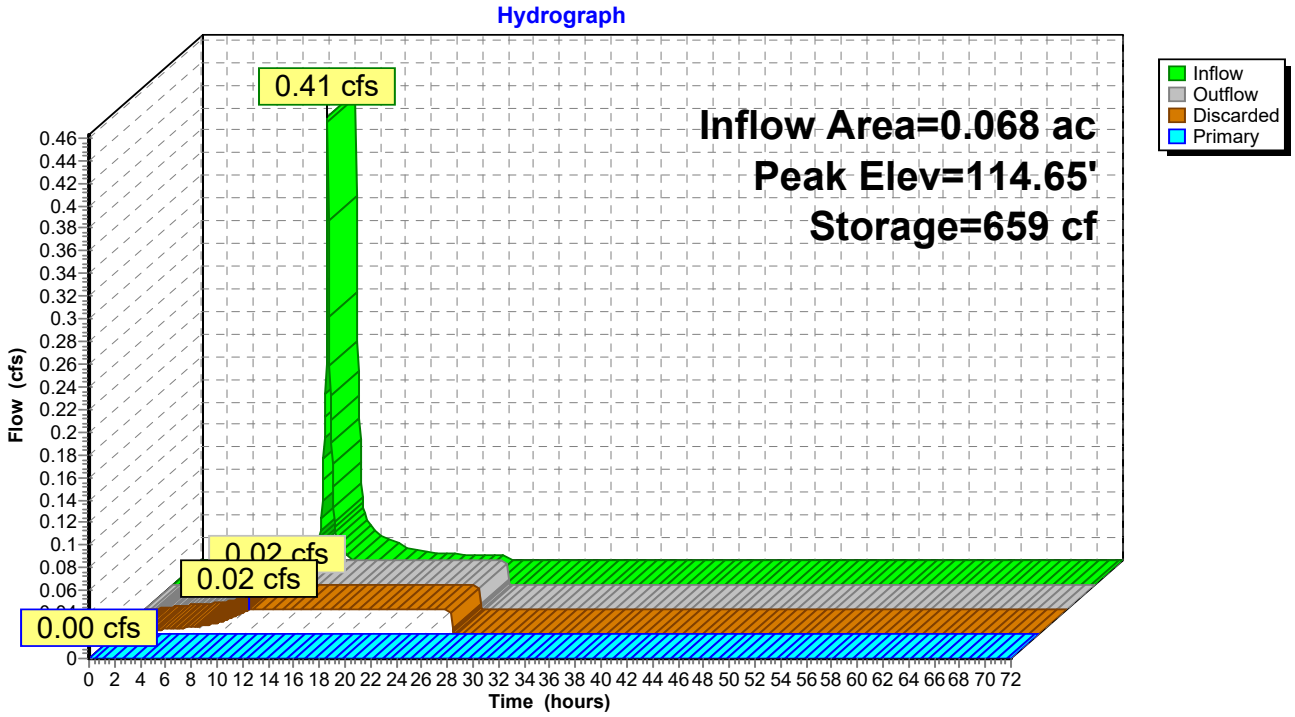
1,376.8 cf Field - 413.5 cf Chambers = 963.4 cf Stone x 40.0% Voids = 385.4 cf Stone Storage

Chamber Storage + Stone Storage = 798.8 cf = 0.018 af
Overall Storage Efficiency = 58.0%
Overall System Size = 24.98' x 15.75' x 3.50'

9 Chambers
51.0 cy Field
35.7 cy Stone



Pond 7P: INFILITRATION CHAMBER SYSTEM 1



Summary for Pond 8P: STONE DIAPHRAM

Inflow Area = 0.130 ac, 0.00% Impervious, Inflow Depth = 3.69" for 25-YR event
Inflow = 0.55 cfs @ 12.09 hrs, Volume= 0.040 af
Outflow = 0.13 cfs @ 12.55 hrs, Volume= 0.040 af, Atten= 77%, Lag= 27.2 min
Discarded = 0.04 cfs @ 11.45 hrs, Volume= 0.038 af
Primary = 0.09 cfs @ 12.55 hrs, Volume= 0.002 af
Routed to Reach DP2 : WETLANDS

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 111.90' @ 12.55 hrs Surf.Area= 680 sf Storage= 653 cf

Plug-Flow detention time= 154.4 min calculated for 0.040 af (99% of inflow)
Center-of-Mass det. time= 150.9 min (972.4 - 821.5)

Volume	Invert	Avail.Storage	Storage Description
#1	109.50'	680 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 1,700 cf Overall x 40.0% Voids

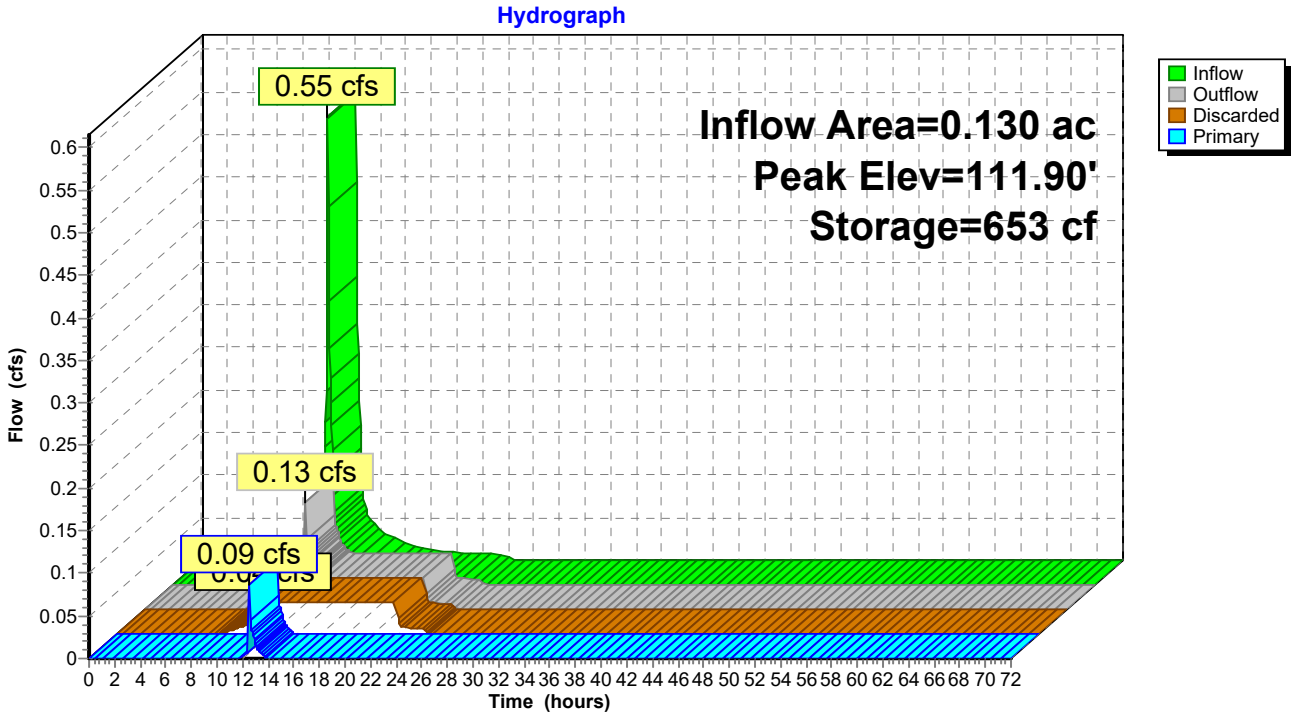
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
109.50	680	0	0
110.00	680	340	340
111.00	680	680	1,020
112.00	680	680	1,700

Device	Routing	Invert	Outlet Devices
#1	Primary	111.90'	**200.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	109.50'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.45 hrs HW=109.53' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.02 cfs @ 12.55 hrs HW=111.90' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 0.02 cfs @ 0.08 fps)

Pond 8P: STONE DIAPHRAM



Summary for Pond 9P: INFILTRATION CHAMBER SYSTEM 2

Inflow Area = 0.020 ac,100.00% Impervious, Inflow Depth = 6.12" for 25-YR event
Inflow = 0.12 cfs @ 12.09 hrs, Volume= 0.010 af
Outflow = 0.01 cfs @ 11.35 hrs, Volume= 0.010 af, Atten= 91%, Lag= 0.0 min
Discarded = 0.01 cfs @ 11.35 hrs, Volume= 0.010 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP2 : WETLANDS

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 104.81' @ 12.95 hrs Surf.Area= 196 sf Storage= 152 cf

Plug-Flow detention time= 96.0 min calculated for 0.010 af (100% of inflow)
Center-of-Mass det. time= 95.9 min (840.2 - 744.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	103.50'	201 cf	**11.00'W x 17.86'L x 3.50'H Field A** 687 cf Overall - 184 cf Embedded = 504 cf x 40.0% Voids
#2A	104.00'	184 cf	**ADS_StormTech SC-740 +Cap** x 4 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 4 Chambers in 2 Rows
		385 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	106.00'	**4.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	103.50'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 11.35 hrs HW=103.54' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=103.50' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Pond 9P: INFILTRATION CHAMBER SYSTEM 2 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

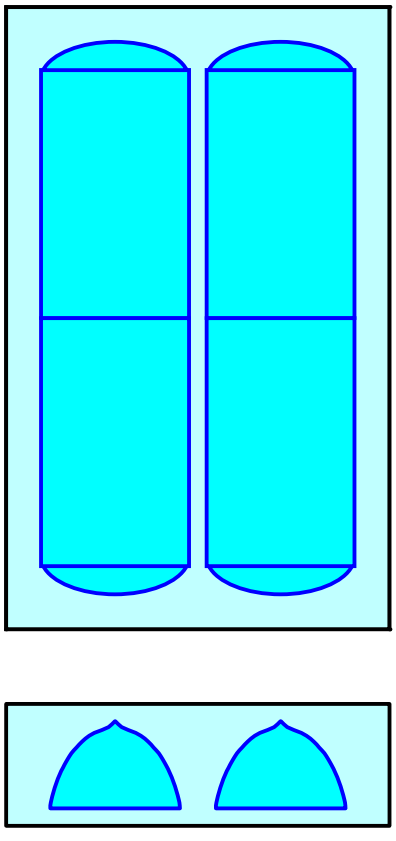
2 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 15.86' Row Length +12.0" End Stone x 2 = 17.86' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

4 Chambers x 45.9 cf = 183.8 cf Chamber Storage

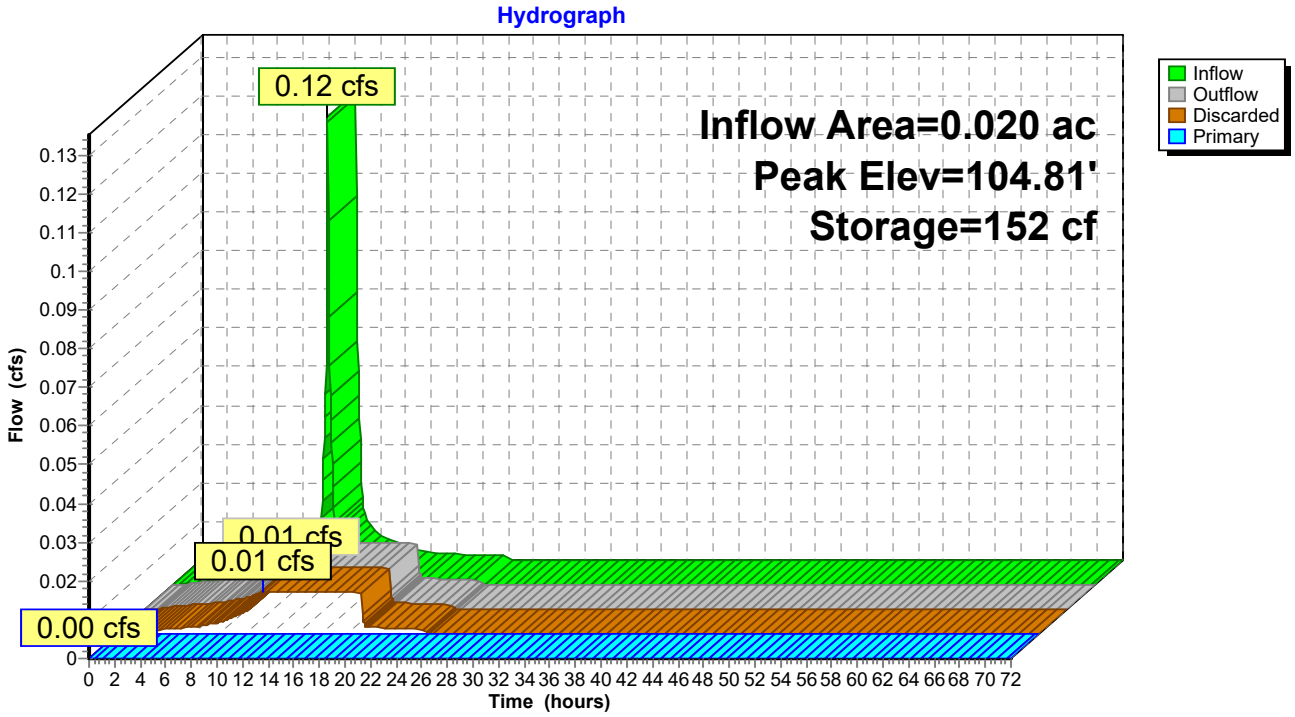
687.5 cf Field - 183.8 cf Chambers = 503.7 cf Stone x 40.0% Voids = 201.5 cf Stone Storage

Chamber Storage + Stone Storage = 385.2 cf = 0.009 af
Overall Storage Efficiency = 56.0%
Overall System Size = 17.86' x 11.00' x 3.50'

4 Chambers
25.5 cy Field
18.7 cy Stone



Pond 9P: INFILTRATION CHAMBER SYSTEM 2



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SUBCAT1 Runoff Area=2,268 sf 0.00% Impervious Runoff Depth=0.52"
Flow Length=96' Tc=6.7 min CN=31 Runoff=0.01 cfs 0.002 af

Subcatchment 2S: DRIVEWAY Runoff Area=5,642 sf 0.00% Impervious Runoff Depth=5.26"
Tc=6.0 min CN=76 Runoff=0.78 cfs 0.057 af

Subcatchment 2SR: 2SR Runoff Area=2,956 sf 100.00% Impervious Runoff Depth=7.87"
Tc=6.0 min CN=98 Runoff=0.53 cfs 0.045 af

Subcatchment 2SRG: 2SR1 Runoff Area=864 sf 100.00% Impervious Runoff Depth=7.87"
Tc=6.0 min CN=98 Runoff=0.15 cfs 0.013 af

Subcatchment 4S: SUBCAT2 Runoff Area=126,766 sf 4.72% Impervious Runoff Depth=1.11"
Flow Length=300' Tc=9.8 min CN=38 Runoff=2.01 cfs 0.269 af

Reach DP1: OFFSITE DISCHARGE Inflow=0.01 cfs 0.002 af
Outflow=0.01 cfs 0.002 af

Reach DP2: WETLANDS Inflow=2.71 cfs 0.287 af
Outflow=2.71 cfs 0.287 af

Pond 7P: INFILITRATION CHAMBER SYSTEM Peak Elev=115.06' Storage=730 cf Inflow=0.53 cfs 0.045 af
Discarded=0.02 cfs 0.039 af Primary=0.15 cfs 0.005 af Outflow=0.18 cfs 0.045 af

Pond 8P: STONE DIAPHRAM Peak Elev=111.91' Storage=655 cf Inflow=0.78 cfs 0.057 af
Discarded=0.04 cfs 0.043 af Primary=0.70 cfs 0.013 af Outflow=0.73 cfs 0.056 af

Pond 9P: INFILTRATION CHAMBER SYSTEM Peak Elev=105.29' Storage=215 cf Inflow=0.15 cfs 0.013 af
Discarded=0.01 cfs 0.013 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.013 af

Total Runoff Area = 3.179 ac Runoff Volume = 0.386 af Average Runoff Depth = 1.46"
92.92% Pervious = 2.954 ac 7.08% Impervious = 0.225 ac

Summary for Subcatchment 1S: SUBCAT1

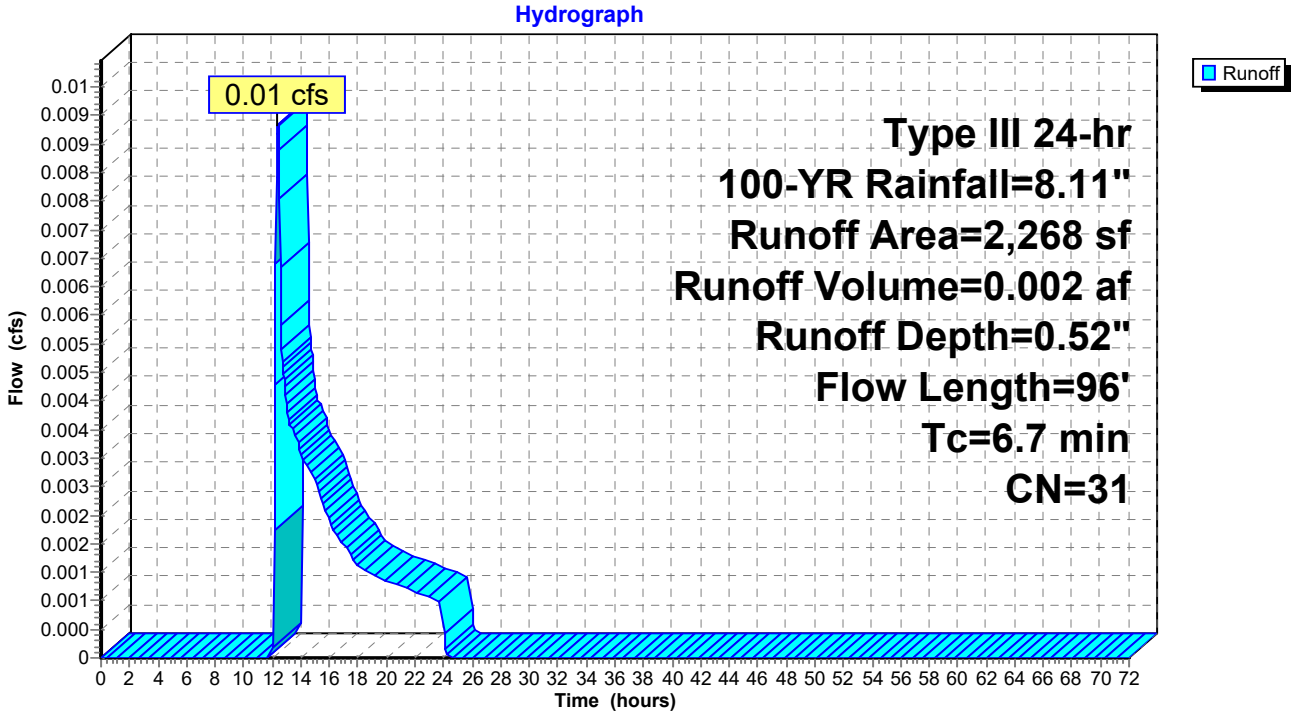
Runoff = 0.01 cfs @ 12.39 hrs, Volume= 0.002 af, Depth= 0.52"
Routed to Reach DP1 : OFFSITE DISCHARGE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=8.11"

Area (sf)	CN	Description
1,988	30	Woods, Good, HSG A
280	39	>75% Grass cover, Good, HSG A
2,268	31	Weighted Average
2,268		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.41"
0.4	46	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.7	96	Total			

Subcatchment 1S: SUBCAT1



Summary for Subcatchment 2S: DRIVEWAY

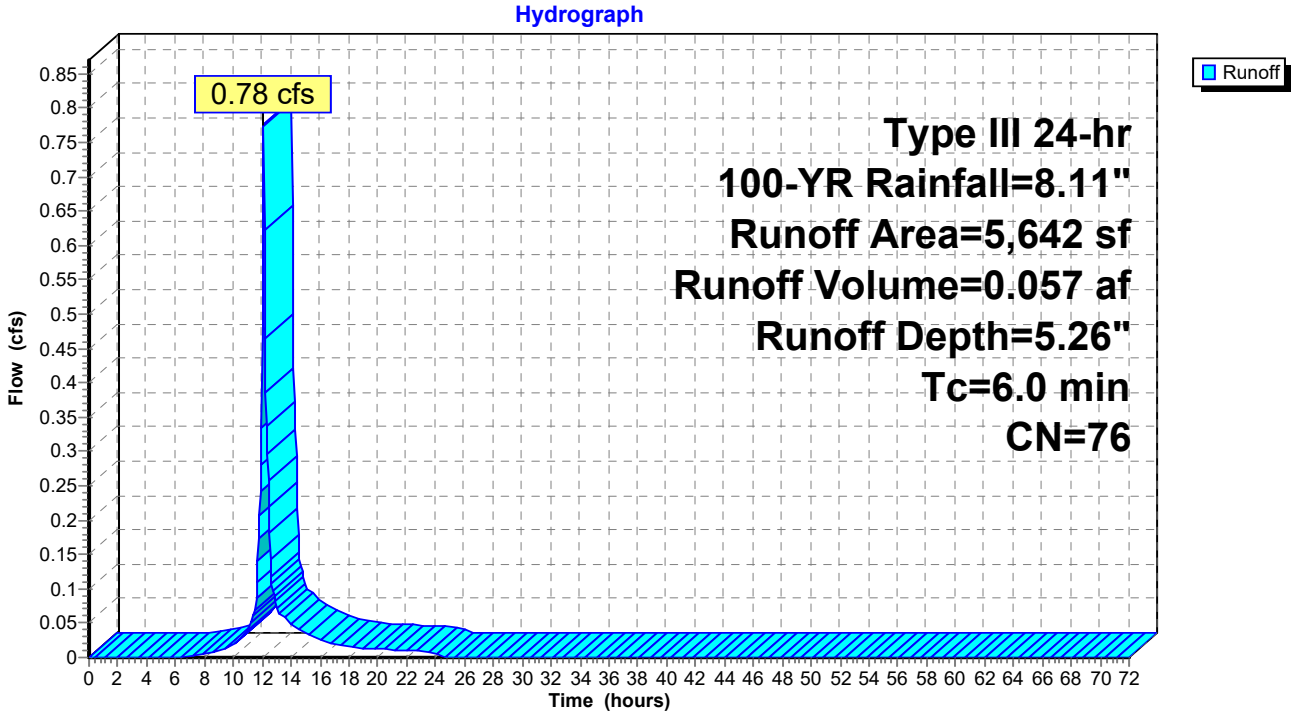
Runoff = 0.78 cfs @ 12.09 hrs, Volume= 0.057 af, Depth= 5.26"
Routed to Pond 8P : STONE DIAPHRAM

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=8.11"

Area (sf)	CN	Description
5,642	76	Gravel roads, HSG A
5,642		100.00% Pervious Area

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

Subcatchment 2S: DRIVEWAY



Summary for Subcatchment 2SR: 2SR

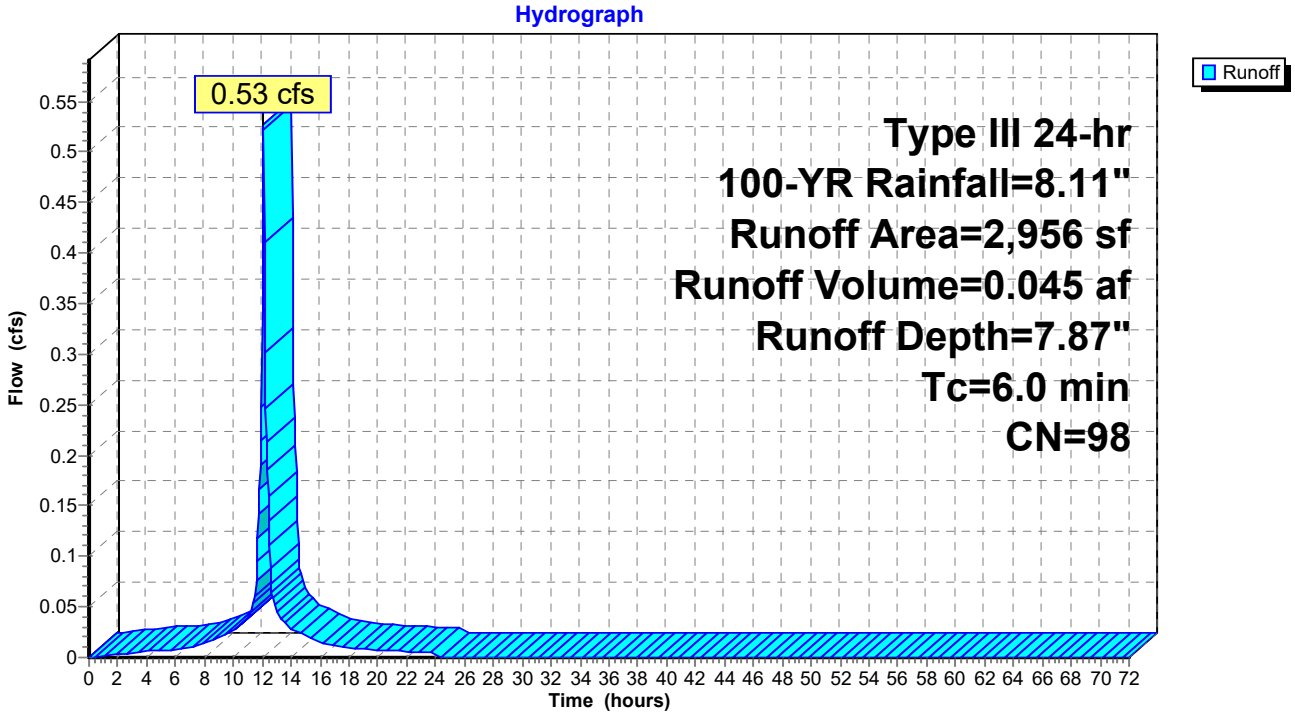
Runoff = 0.53 cfs @ 12.09 hrs, Volume= 0.045 af, Depth= 7.87"
Routed to Pond 7P : INFILITRATION CHAMBER SYSTEM 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=8.11"

	Area (sf)	CN	Description
*	2,956	98	Roofs, HSG A
	2,956		100.00% Impervious Area

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

Subcatchment 2SR: 2SR



Summary for Subcatchment 2SRG: 2SR1

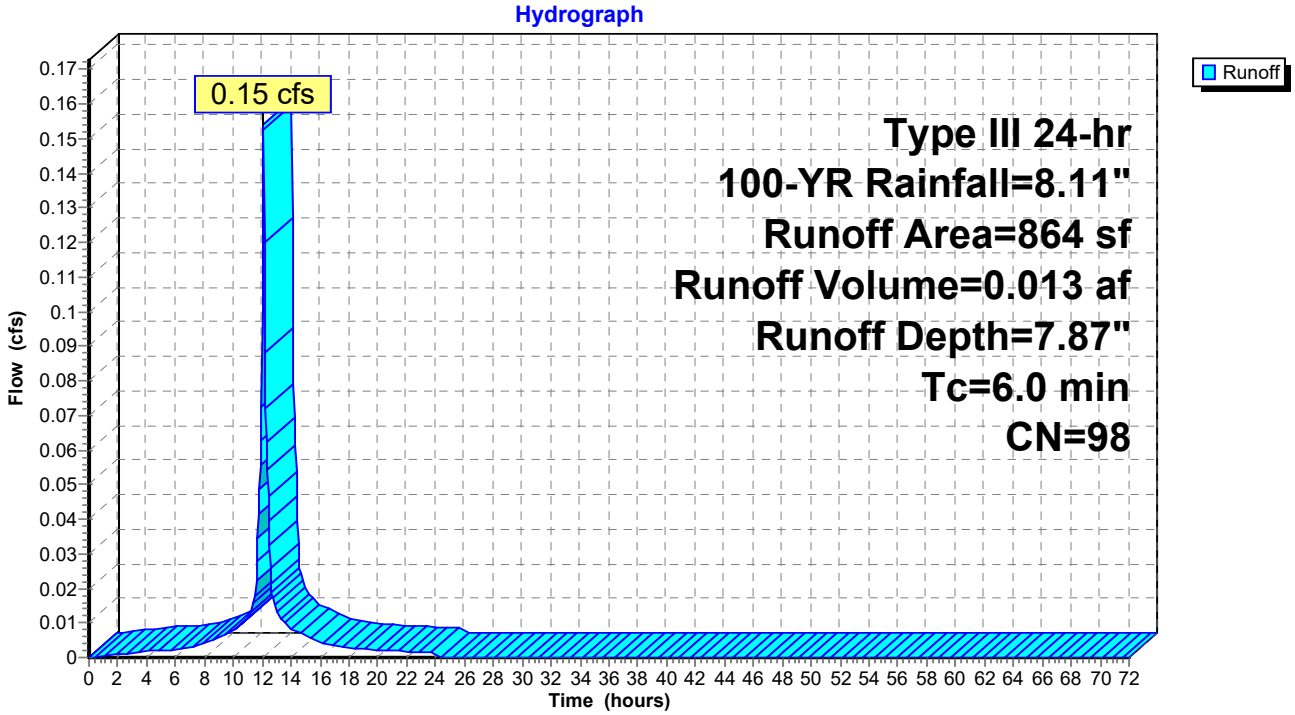
Runoff = 0.15 cfs @ 12.09 hrs, Volume= 0.013 af, Depth= 7.87"
Routed to Pond 9P : INFILTRATION CHAMBER SYSTEM 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=8.11"

Area (sf)	CN	Description
864	98	Roofs, HSG A
864		100.00% Impervious Area

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

Subcatchment 2SRG: 2SR1



Summary for Subcatchment 4S: SUBCAT2

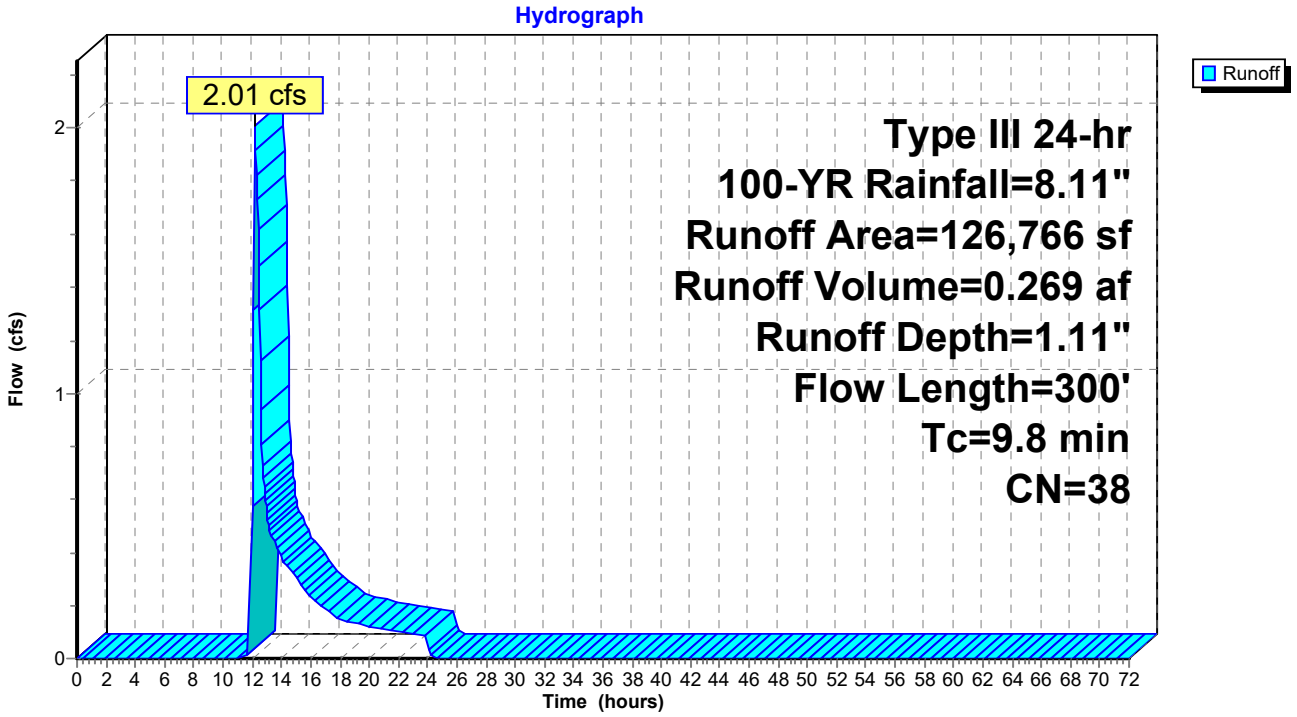
Runoff = 2.01 cfs @ 12.20 hrs, Volume= 0.269 af, Depth= 1.11"
Routed to Reach DP2 : WETLANDS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=8.11"

	Area (sf)	CN	Description
	70,840	30	Woods, Good, HSG A
*	2,020	98	Walkway/Patio, HSG A
	37,158	39	>75% Grass cover, Good, HSG A
	5,562	76	Gravel roads, HSG A
	3,416	98	Roofs, HSG A
*	551	98	Walkway/Patio/Deck, HSG A
	7,219	39	>75% Grass cover, Good, HSG A
	126,766	38	Weighted Average
	120,779		95.28% Pervious Area
	5,987		4.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	50	0.0100	0.12		**Sheet Flow, GRASS** Grass: Short n= 0.150 P2= 3.41"
1.0	120	0.0750	1.92		**Shallow Concentrated Flow, GRASS** Short Grass Pasture Kv= 7.0 fps
1.6	130	0.0750	1.37		**Shallow Concentrated Flow, WOODS** Woodland Kv= 5.0 fps
9.8	300	Total			

Subcatchment 4S: SUBCAT2

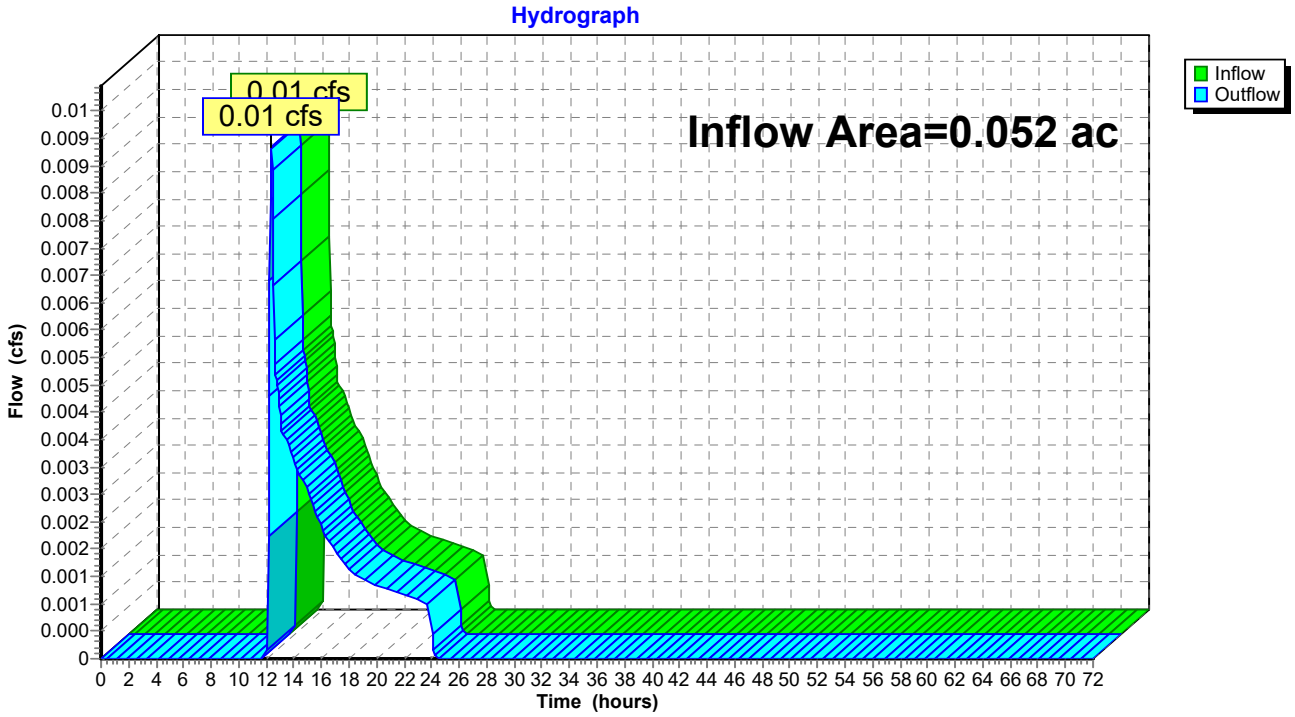


Summary for Reach DP1: OFFSITE DISCHARGE

Inflow Area = 0.052 ac, 0.00% Impervious, Inflow Depth = 0.52" for 100-YR event
Inflow = 0.01 cfs @ 12.39 hrs, Volume= 0.002 af
Outflow = 0.01 cfs @ 12.39 hrs, Volume= 0.002 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP1: OFFSITE DISCHARGE

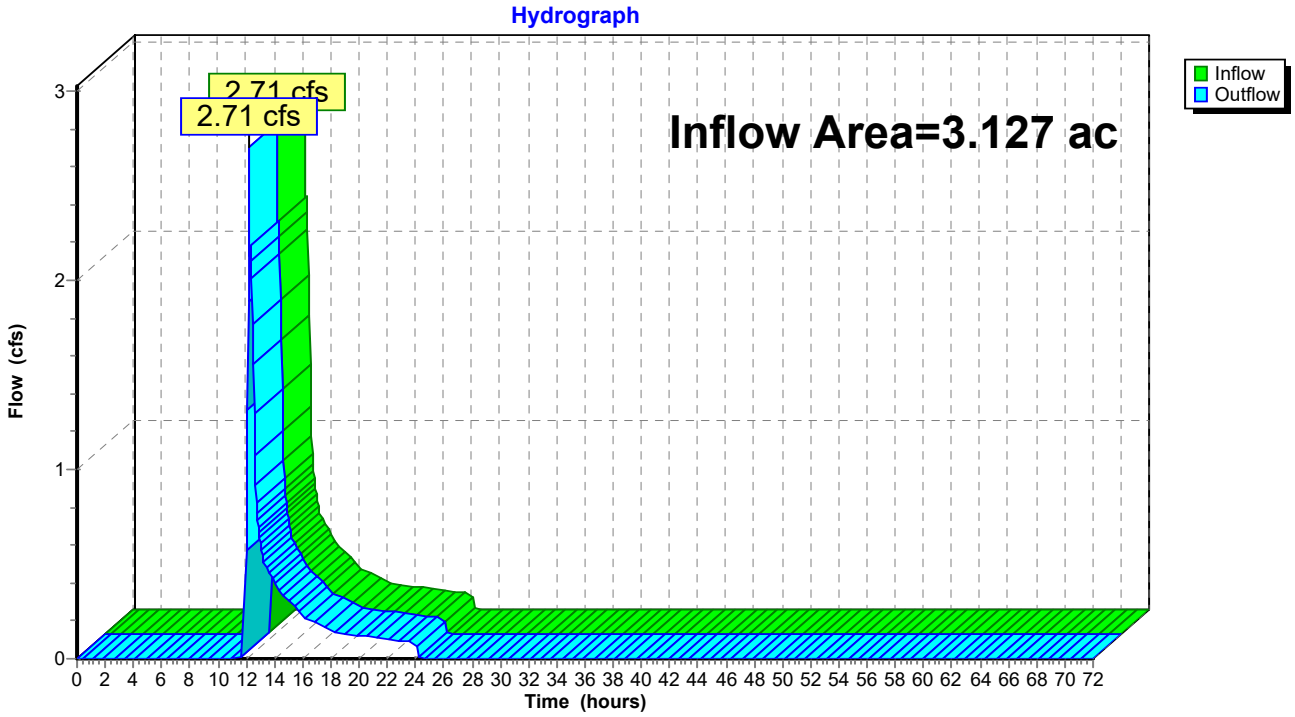


Summary for Reach DP2: WETLANDS

Inflow Area = 3.127 ac, 7.20% Impervious, Inflow Depth = 1.10" for 100-YR event
Inflow = 2.71 cfs @ 12.20 hrs, Volume= 0.287 af
Outflow = 2.71 cfs @ 12.20 hrs, Volume= 0.287 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Reach DP2: WETLANDS



Summary for Pond 7P: INFILITRATION CHAMBER SYSTEM 1

Inflow Area = 0.068 ac,100.00% Impervious, Inflow Depth = 7.87" for 100-YR event
Inflow = 0.53 cfs @ 12.09 hrs, Volume= 0.045 af
Outflow = 0.18 cfs @ 12.38 hrs, Volume= 0.045 af, Atten= 66%, Lag= 17.7 min
Discarded = 0.02 cfs @ 9.45 hrs, Volume= 0.039 af
Primary = 0.15 cfs @ 12.38 hrs, Volume= 0.005 af
Routed to Reach DP2 : WETLANDS

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 115.06' @ 12.38 hrs Surf.Area= 393 sf Storage= 730 cf

Plug-Flow detention time= 241.6 min calculated for 0.044 af (100% of inflow)
Center-of-Mass det. time= 241.6 min (982.6 - 741.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	112.00'	385 cf	**15.75'W x 24.98'L x 3.50'H Field A** 1,377 cf Overall - 413 cf Embedded = 963 cf x 40.0% Voids
#2A	112.50'	413 cf	**ADS_StormTech SC-740 +Cap** x 9 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 9 Chambers in 3 Rows
		799 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	112.00'	**2.410 in/hr Exfiltration over Surface area**
#2	Primary	115.00'	**4.0" Horiz. Orifice/Grate** X 3 rows C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.02 cfs @ 9.45 hrs HW=112.04' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.15 cfs @ 12.38 hrs HW=115.06' (Free Discharge)
↑—**2=Orifice/Grate** (Weir Controls 0.15 cfs @ 0.79 fps)

Pond 7P: INFILITRATION CHAMBER SYSTEM 1 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

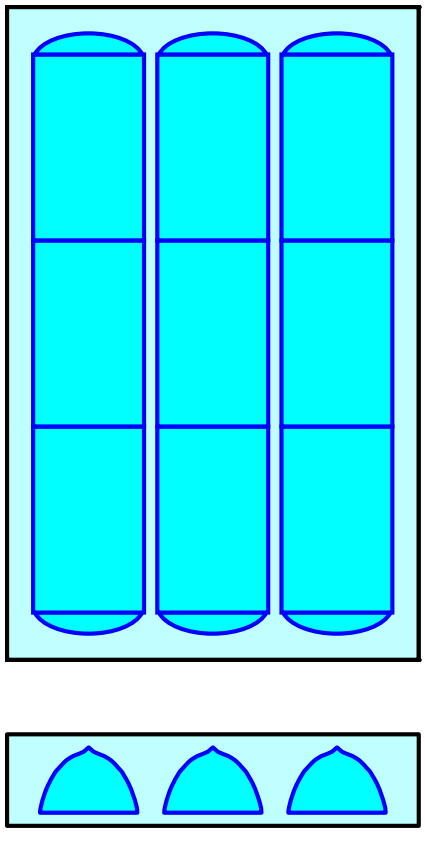
3 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 22.98' Row Length +12.0" End Stone x 2 = 24.98' Base Length
3 Rows x 51.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 15.75' Base Width
6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

9 Chambers x 45.9 cf = 413.5 cf Chamber Storage

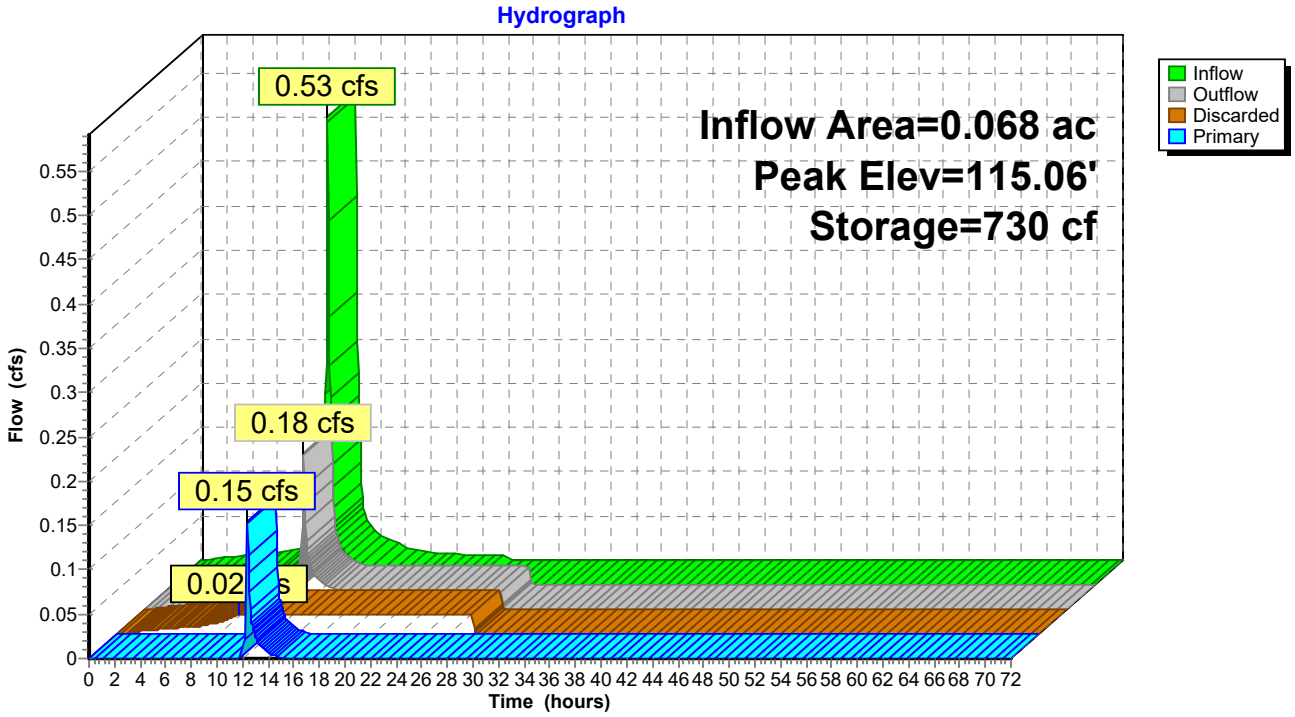
1,376.8 cf Field - 413.5 cf Chambers = 963.4 cf Stone x 40.0% Voids = 385.4 cf Stone Storage

Chamber Storage + Stone Storage = 798.8 cf = 0.018 af
Overall Storage Efficiency = 58.0%
Overall System Size = 24.98' x 15.75' x 3.50'

9 Chambers
51.0 cy Field
35.7 cy Stone



Pond 7P: INFILITRATION CHAMBER SYSTEM 1



Summary for Pond 8P: STONE DIAPHRAM

Inflow Area = 0.130 ac, 0.00% Impervious, Inflow Depth = 5.26" for 100-YR event
Inflow = 0.78 cfs @ 12.09 hrs, Volume= 0.057 af
Outflow = 0.73 cfs @ 12.20 hrs, Volume= 0.056 af, Atten= 6%, Lag= 6.8 min
Discarded = 0.04 cfs @ 11.05 hrs, Volume= 0.043 af
Primary = 0.70 cfs @ 12.20 hrs, Volume= 0.013 af
Routed to Reach DP2 : WETLANDS

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 111.91' @ 12.20 hrs Surf.Area= 680 sf Storage= 655 cf

Plug-Flow detention time= 131.9 min calculated for 0.056 af (99% of inflow)
Center-of-Mass det. time= 127.5 min (938.9 - 811.4)

Volume	Invert	Avail.Storage	Storage Description
#1	109.50'	680 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc) 1,700 cf Overall x 40.0% Voids

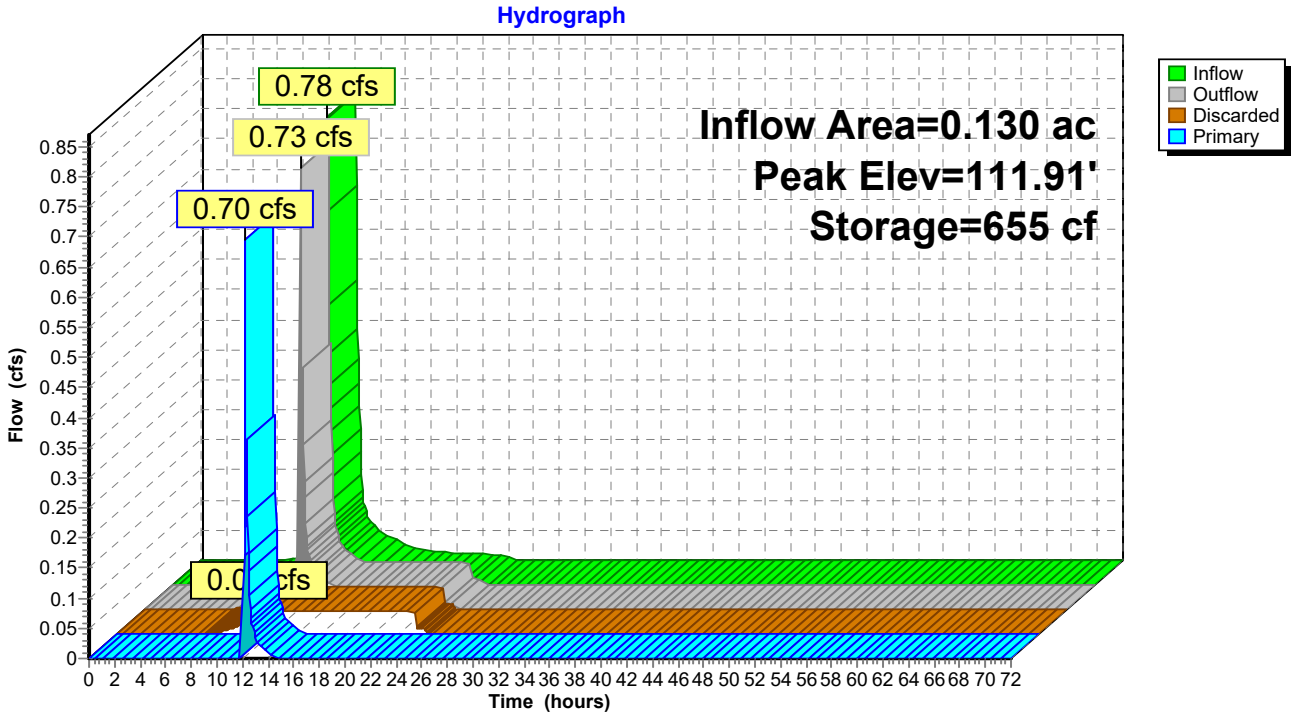
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
109.50	680	0	0
110.00	680	340	340
111.00	680	680	1,020
112.00	680	680	1,700

Device	Routing	Invert	Outlet Devices
#1	Primary	111.90'	**200.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
#2	Discarded	109.50'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.04 cfs @ 11.05 hrs HW=109.53' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.37 cfs @ 12.20 hrs HW=111.91' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 0.37 cfs @ 0.23 fps)

Pond 8P: STONE DIAPHRAM



Summary for Pond 9P: INFILTRATION CHAMBER SYSTEM 2

Inflow Area = 0.020 ac,100.00% Impervious, Inflow Depth = 7.87" for 100-YR event
Inflow = 0.15 cfs @ 12.09 hrs, Volume= 0.013 af
Outflow = 0.01 cfs @ 11.00 hrs, Volume= 0.013 af, Atten= 93%, Lag= 0.0 min
Discarded = 0.01 cfs @ 11.00 hrs, Volume= 0.013 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP2 : WETLANDS

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 105.29' @ 13.32 hrs Surf.Area= 196 sf Storage= 215 cf

Plug-Flow detention time= 145.3 min calculated for 0.013 af (100% of inflow)
Center-of-Mass det. time= 145.2 min (886.3 - 741.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	103.50'	201 cf	**11.00'W x 17.86'L x 3.50'H Field A** 687 cf Overall - 184 cf Embedded = 504 cf x 40.0% Voids
#2A	104.00'	184 cf	**ADS_StormTech SC-740 +Cap** x 4 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 4 Chambers in 2 Rows
		385 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	106.00'	**4.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	103.50'	**2.410 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 11.00 hrs HW=103.54' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=103.50' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Pond 9P: INFILTRATION CHAMBER SYSTEM 2 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

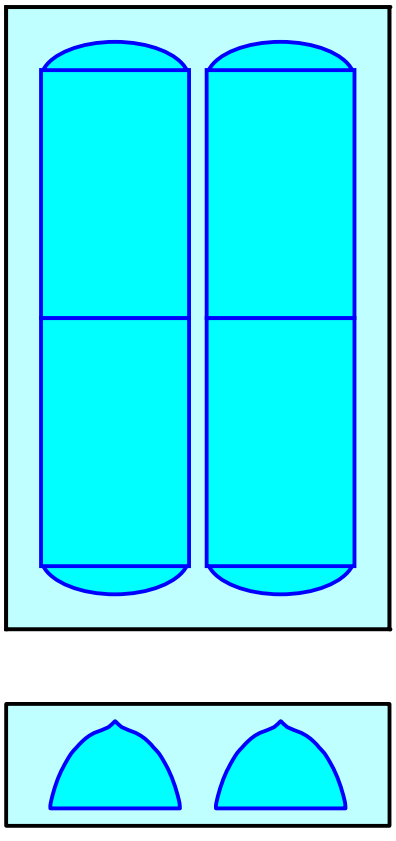
2 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 15.86' Row Length +12.0" End Stone x 2 = 17.86' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

4 Chambers x 45.9 cf = 183.8 cf Chamber Storage

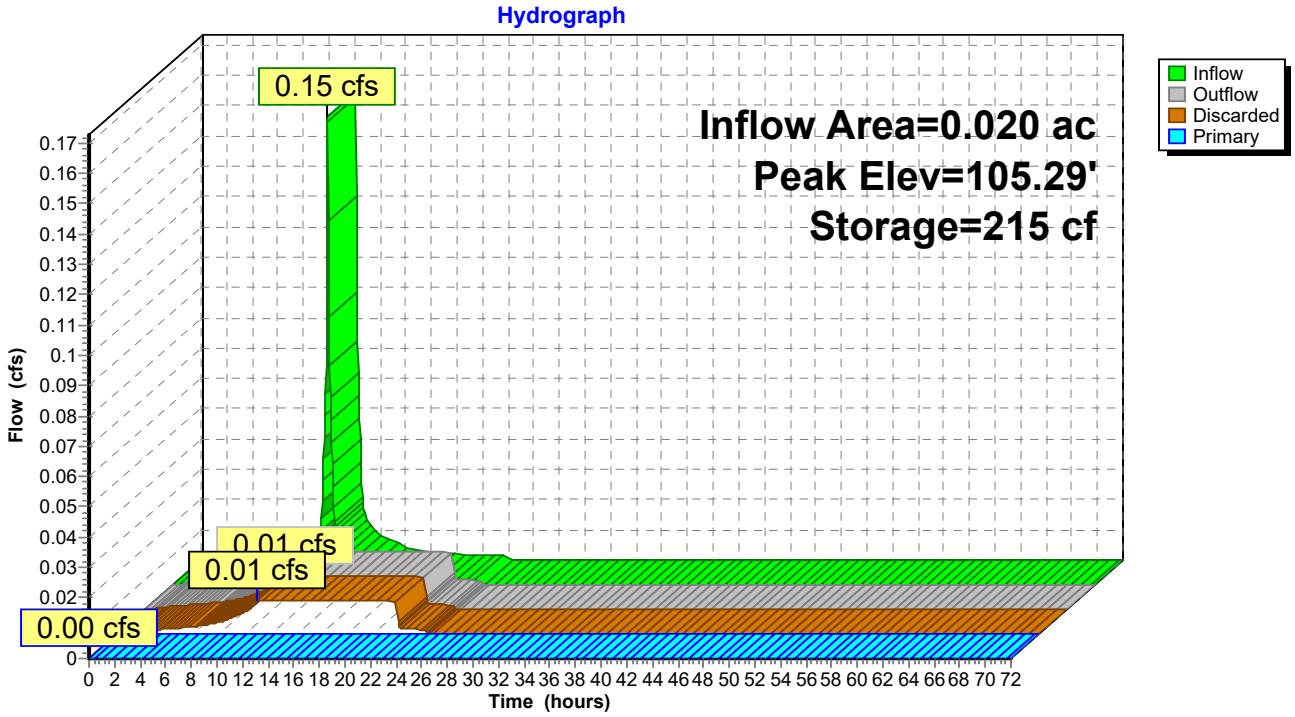
687.5 cf Field - 183.8 cf Chambers = 503.7 cf Stone x 40.0% Voids = 201.5 cf Stone Storage

Chamber Storage + Stone Storage = 385.2 cf = 0.009 af
Overall Storage Efficiency = 56.0%
Overall System Size = 17.86' x 11.00' x 3.50'

4 Chambers
25.5 cy Field
18.7 cy Stone



Pond 9P: INFILTRATION CHAMBER SYSTEM 2



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SECTION IV

Construction Period Operations and Maintenance Plan

CONSTRUCTION OPERATION AND MAINTENANCE PLAN/CONSTRUCTION POLLUTION PREVENTION PLAN
Dated: December 8, 2023

Residential Redevelopment
0 Arnold Road
Hingham, MA

Owner:

30 Arnold Road, LLC
41 Brewster Road
Hingham, MA 02043

Party Responsible for Operation and Maintenance:

30 Arnold Road, LLC
41 Brewster Road
Hingham, MA 02043

As part of any infrastructure improvement, the system must be maintained to work properly. The following Construction Sequencing guideline and Operation and Maintenance plans are provided to upkeep the existing non-structural and structural best performance practices as outlined in the Massachusetts Department of Environmental Protection's Stormwater Management Policy.

Emergency Contact Information:

Gerry Rankin
30 Arnold Road, LLC
41 Brewster Road
Hingham, MA 02043
Emergency telephone: 617-799-0588
Email: gerryre@icloud.com

Construction Sequencing:

The following section provides construction details and highlights the construction sequence and timing of earth moving activities.

1. ***Installation of Erosion Controls***
   Erosion and sedimentation controls (i.e., silt sock, construction entrance) will be installed as shown on the Site Plan and inspected at the limits of the work area prior to the commencement of earth moving activities.

2. ***Utility Identification & Clearing***
   All utilities (including stubs) must be identified and marked in the field prior to disturbance. No large boulders or building materials will be buried on the site. All cleared trees and vegetation, apart from any vegetation that may be deemed appropriate to be replanted, will be removed from the project site or mulched and stockpiled for future use on the site.

3. ***Rough Grading***
   During this phase of construction, rough grades will be established for the project site. If suitable topsoil is found, it will be removed and stockpiled in an upland area. The stockpiled topsoil will be stored until ready for re-use on site.

4. ***Foundation excavation and Utility Layout***
   The foundations for the additions will be carefully excavated and placed. Utility lines to the new structures will be located at this time.

5. ***Installation of Dwelling***
   During this phase of construction, the proposed additions and other work to the dwelling will be constructed.

6. ***Installation of Infiltration System, Roof Drywells and Buried Drainage Pipes***
   The septic system components, subsurface infiltration systems, outlet pipe, and roof leader drainage pipes from the dwelling shall be installed once the structures are constructed. If the contractor prefers to install the septic system components, subsurface infiltration system and drainage pipe system before the structure is completed, then the area above the buried infiltration system, drainage pipes and septic system components should be roped off to avoid heavy equipment load on top of these components to avoid damage.

7. ***Utility Connection & Installation***
   In this phase of construction, any utilities will be installed.

8. ***Gravel Driveway, Stone Diaphragm and Hardscape Installation***
   The proposed driveway will be constructed of gravel material and will be installed before or after the subsurface septic and drainage system components. If the gravel driveway is constructed after the installation of subsurface septic or drainage system components, the area above the systems and inlet/ outlet pipes should be roped off to avoid heavy equipment load on top of these structures. Buried utility locations should also be marked.

9. ***Site Stabilization and Landscaping***
   The final phase of the project is the restoration and stabilization of all exposed surfaces. Disturbed areas will be landscaped or seeded as necessary only after all other construction is final. In the event that weather conditions prevent final restoration, temporary erosion and sedimentation measures will be employed until the weather is suitable for final cleanup. Should the final ground stabilization be postponed due to winter conditions, the exposed ground shall be covered with an erosion control blanket to prevent erosion. A final inspection will ensure that the project site is cleared of all project debris and that erosion and sedimentation controls are functioning properly. Erosion and sedimentation controls will not be removed until the site is stabilized, and the final inspection is completed.

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Stormwater Operation and Maintenance During Construction:

Sediment and Erosion Control

- Silt socks shall be inspected at least once a week and after each rainfall event. Make any required repairs immediately. Repair damaged areas of the sock at this time to prevent future problems.
- Should the fabric of the silt sock tear, decompose or otherwise become ineffective, replace it within 24 hours of discovery.
- Remove silt deposits once they reach 20 to 30 percent of the height of the silt sock to provide adequate storage volume for the next rain event and to reduce pressure on the fence. Care should be taken to avoid undermining the fence during cleanout process.
- Silt socks are to be removed upon stabilization of the contributing drainage area. Accumulated sediment may be spread to form a surface for turf or other vegetation establishment or disposed of elsewhere. The area should be reshaped to permit natural drainage.
- Any sediment tracked from the construction site onto the street during construction shall be removed immediately.

Infiltration Systems

Per MA DEP Stormwater Guidelines, the following work shall be done to stabilize the site prior to installing the subsurface structures:

- Do not allow runoff from any disturbed areas on the site to flow to the exposed subsurface structures.
- Accomplish any required excavation with equipment placed just outside the area. If the size of the area intended for exfiltration is too large to accommodate this approach, use trucks with low-pressure tires to minimize compaction. Do not allow any other vehicles within the area to be excavated.
- Keep the area above and immediately surrounding the subsurface systems roped off to all construction vehicles until the final top surface is installed.
- At no time shall the area for the infiltration systems be used as a temporary sediment basin. Stockpiles shall be placed away from the subsurface infiltration system and silt socks shall be placed around the perimeter of the infiltration area to prevent the accumulation of sediment within the native soils.

Septic System

The septic system should be installed per Hingham Board of Health requirements.

Dust Control

Sprinkle water as necessary to control dust during construction.

Material Stockpiling

Stockpiles of material must be placed within the area confined by the silt sock. If left overnight, material stockpiling must be protected from the weather.

Good Housekeeping

The following good housekeeping BMP's will be implemented in order to prevent pollution during construction:

- Petroleum products will be stored in tightly sealed containers which are clearly labeled.
- Any asphalt substances on site will be applied according to the manufacturer's specifications.
- If portable sanitary units are used, sanitary waste will be removed as necessary to avoid overfilling.
- All paint and other hazardous waste materials will be tightly sealed and stored when not in use. Excess material will not be discharged into the public stormwater system but will be properly disposed of according to the manufacturer's specifications.
- If spray guns are used, they will be cleaned on a removable tarp.

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SECTION V

Long-Term Source Control/Pollution Prevention Plan and Operation and Maintenance Plan

LONG TERM SOURCE CONTROL/POLLUTION PREVENTION PLAN
AND OPERTATION AND MAINTENANCE PLAN
Dated: December 8, 2023

Residential Redevelopment
0 Arnold Road
Hingham MA

Owner:

30 Arnold Road, LLC
41 Brewster RD
Hingham, MA 02043

Party Responsible for Operation and Maintenance:

30 Arnold Road, LLC
41 Brewster Road
Hingham, MA 02043

Long-Term Operation and Maintenance Plan (After Construction)

Roof Drain Cleaning:
All roof drains shall be cleaned and inspected in late Fall, after the trees have lost their leaves, late Winter or early Spring after the snow melts, and any time that the roof drains system does not appear to be functioning properly. Inspections should include the gutters, down spouts and all accessible piping.

Subsurface Infiltration System:
All inspection ports and overflow pipes in the two infiltration systems shall be inspected at least twice a year, in Spring and Fall. Remove any debris or sediment that may be clogging the system. The ground above and around the infiltration should be visually inspected at this time for depressions, standing water, and other indications of potential failure. Any concerns should be addressed in a timely manner.

Gravel Trench:
Remove any debris or sediment that may be clogging the system as it is observed. The ground above and around the gravel trench should be visually inspected seasonally for depressions, standing water, and other indications of potential clogging. Any concerns should be addressed in a timely manner.

Driveway Maintenance:
The driveway should be cleaned of debris and any pot holes repaired in Spring after snow melts, mid-Summer and in the Fall as leaves accumulate, and any other occasion where debris accumulates.

Snow Management:
Any snow and ice buildup on the proposed roof drains will be removed in a timely fashion.

Estimated Operation and Maintenance Budget:
Maintenance cost will be approximately $800.00 per year.

Illicit Discharge Compliance Statement:

At no time will the owner or any other individual utilize the stormwater management system for any purpose other than its intended use. The stormwater management system as shown on the attached site plan at no time shall receive discharges other than stormwater, this includes “wastewater discharges and discharges of stormwater contaminated by contact with process wastes, raw materials, raw materials, toxic pollutants, hazardous substances, oil or grease.”

_____ _____

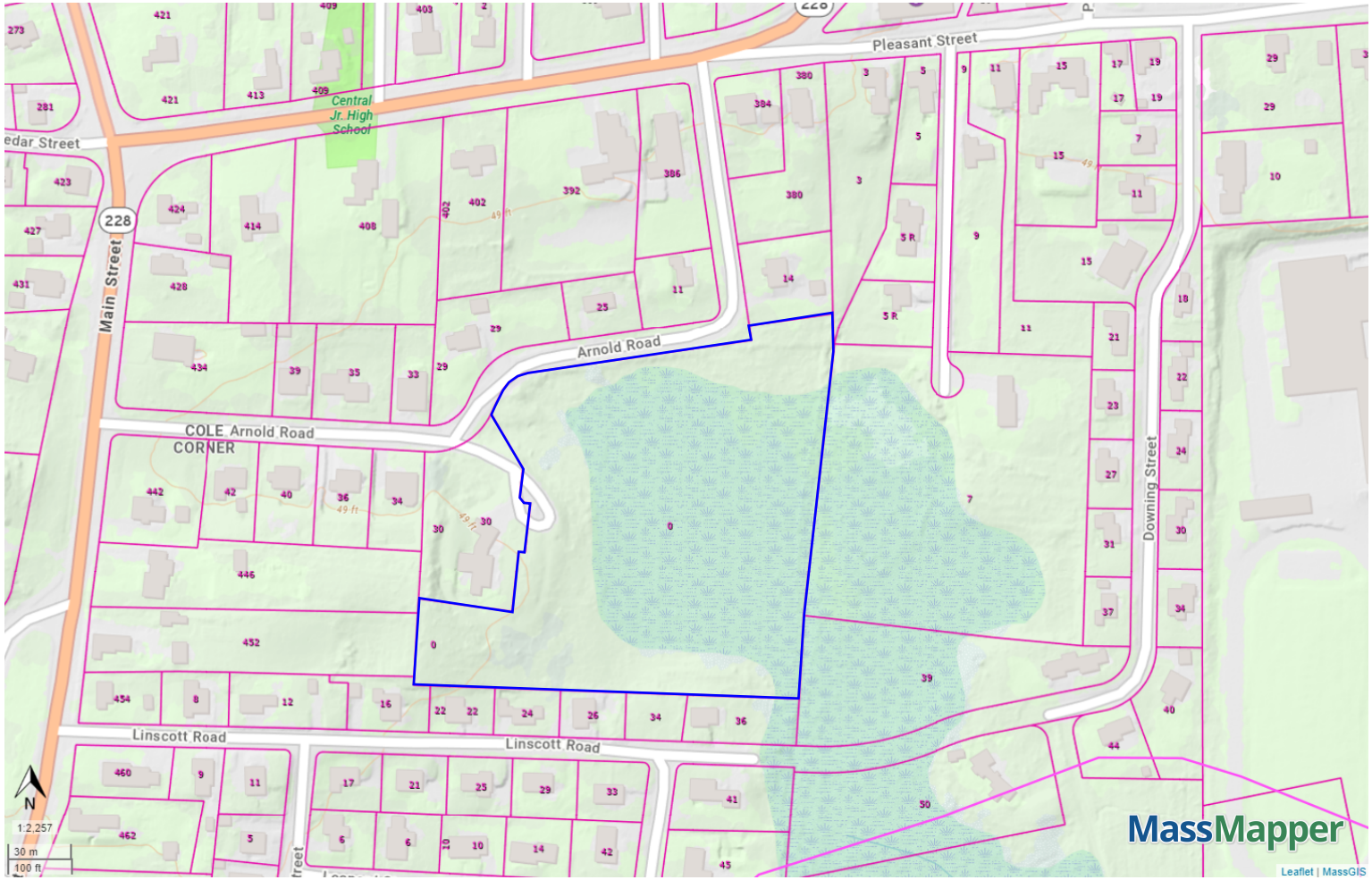
Property Owner (Signature) Property Owner (Print)

SECTION VI

Figures:

1. **MassMapper GIS Map**
2. **FEMA Flood Map**

0 Arnold Road



NHESP Ecoregions

Areas of Critical Environmental Concern ACECs

Areas of Critical Environmental Concern ACECs Boundaries

- ROAD/RAIL BASED
- RIVER BASED
- WETLAND BASED
- FLOODPLAIN BASED
- TIDAL BASED
- CONTOUR BASED
- POLITICAL BOUNDARY
- PROPERTY LINE BASED
- OTHER
- NOT DEFINED

NHESP Priority Habitats of Rare Species

NHESP Estimated Habitats of Rare Wildlife

Zone IIs

NHESP Certified Vernal Pools

Potential Vernal Pools

Property Tax Parcels

National Flood Hazard Layer FIRMette

FEMA

70°53'14"W 42°13'52"N

70°52'37"W 42°13'25"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/6/2023 at 1:49 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

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SECTION VII

Additional Information:

1. **TSS Removal Calculations (Standard #4)**
2. **Soil Suitability Assessment**

INSTRUCTIONS:

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

Version 1, Automated: Mar. 4, 2008

Location: 0 Arnold Road, Hingham MA. Roof runoff treatement

TSS Removal Calculation Worksheet

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

Total TSS Removal = **80%**

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

Project: 22-083.1

Prepared By: **Nick Courtney**

Date: **12/6/2023**

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

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

1. From MassDEP Stormwater Handbook Vol. 1

Map Scale: 1:1,330 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

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 1:12,000.

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: Plymouth County, Massachusetts
Survey Area Data: Version 15, Sep 9, 2022

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

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
52A	Freetown muck, 0 to 1 percent slopes	1.7	27.9%
262A	Quonset sandy loam, 0 to 3 percent slopes	0.1	1.6%
262B	Quonset sandy loam, 3 to 8 percent slopes	0.7	11.0%
262C	Quonset sandy loam, 8 to 15 percent slopes	3.7	59.4%
Totals for Area of Interest		**6.2**	**100.0%**

Plymouth County, Massachusetts

262C—Quonset sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: bqtl
Elevation: 0 to 400 feet
Mean annual precipitation: 41 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Quonset

Setting

Landform: Terraces, outwash plains, kames, eskers, deltas
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Sandy and gravelly glaciofluvial deposits

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oa - 1 to 2 inches: highly decomposed plant material
A - 2 to 4 inches: sandy loam
Bw1 - 4 to 7 inches: channery sandy loam
Bw2 - 7 to 14 inches: channery loamy sand
BC - 14 to 22 inches: very channery loamy sand
C - 22 to 65 inches: extremely channery sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Warwick
Percent of map unit: 8 percent
Landform: Terraces, outwash plains, deltas
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Deerfield
Percent of map unit: 5 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Shoulder, footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Hinckley
Percent of map unit: 4 percent
Landform: Outwash deltas, terraces, kames, eskers
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Canton
Percent of map unit: 3 percent
Landform: Till plains, ridges, hills
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Data Source Information

Soil Survey Area: Plymouth County, Massachusetts
Survey Area Data: Version 15, Sep 9, 2022

Merrill Engineers- Land Surveyors
427 Columbia Rd., Hanover, MA. 02339
781-826-9200
26 Union St., Plymouth, MA. 02360
508-746-6060

Project No. 22-083.1

Date: 6/13/2023
Revision:

Commonwealth of Massachusetts
Hingham , Massachusetts

Soil Suitability Assessment for On-site Sewage Disposal

Performed By:	Paul Louderback SE#14618	Test Dates:	6/13/2023
Performed By:		Test Dates:	
Witnessed By:	Pat Brennon, Hingham BOH	Testhole #:	23-01 to 23-05
Witnessed By:		Testhole #:	

FACILITY INFORMATION

Site Location:		Owner/ Applicant Information:	
Builder's lot #:		Name:	Gerry Rankin
Street Address:	0/30 Arnold Road	Address:	Main Street
Town, State, Zip:	Hingham, MA 02043	Town, State, Zip:	Hingham, MA 02043
Assessor's Map:	100-0-65	Telephone no.:	617-799-0588

SITE INFORMATION

Construction Type:

New Construction: [X] Repair: [ ] Upgrade: [ ] Drainage: [ ]

Published Soil Survey Available: No: [ ] Yes: [X]

Year Published: 2023 Publication Scale: 1:12,000 a. Soil Map Unit: **262C** Drainage Class: **HSG A**
b. Soil Map Unit: Drainage Class:

Soil Name: a. **Quonset Sandy Loam** Soil Limitations: **None**

Surficial Geologic Report Available: No: [ ] Yes: [X]

Year Published: 2018 Publication Scale: 1:250,000

Geological Material/map unit: Course Deposits - Gravel deposits, sand and gravel deposits & Sand deposits

Landform: Terraces, outwash plains

Flood Insurance Rate Map:

Above 500 year flood boundary? No: [ ] Yes: [X] Within a velocity zone? No: [X] Yes: [ ]

Within 500 year flood boundary? No: [X] Yes: [ ] Within 100 year flood boundary? No: [ ] Yes: [x]

Wetland Area:

National Wetland Inventory Map: (map unit) n/a Name:

Wetlands Conservancy Program Map: (map unit) n/a Name:

Current Water Resource Conditions (USGS): (Month/year) June/2023 - MA-D4W 79R Duxbury MA Well

Range: Above Normal: [ ] Normal: [X] Below Normal: [ ]

Other References Reviewed:
Comments:

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Project No.: 22-083.1

Date: 6/13/23
Revised:

***Deep Hole #** 22-01

Builder's lot #:
Street Address: 0/30 Arnold Road
Town: Hingham, MA 02043
Assessor's Map: 100-0-65

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Method Used:

- ☐ Depth observed standing in observation hole: A: _____ inches B: _____ inches
- ☐ Depth weeping from side of observation hole: A: _____ inches B: _____ inches
- ☒ Depth to soil mottles: 130 inches
- ☐ Ground water adjustment: _____ feet

Index Well Number: _____ Reading Date: _____ Index well level: _____

Adjustment factor: None Adjustment groundwater level:

DEPTH OF PERVIOUS MATERIAL

Depth of Naturally Occurring Pervious Material

Does at least four feet of naturally occurring pervious material exist in all areas observed throughout the area proposed for the soil absorption system? Yes: ☒ No: ☐

If yes, at what depth was it observed? Upper Boundary (inches): see logs
Lower Boundary (inches): see logs

CERTIFICATION

I certify that I have passed the soil evaluator examination approved by the Department of Environtmental Protection and that the above analysis was performed by me conistent with the required training, expertise and experience described in 310 CMR 15.017.

Signature of Soil Evaluator: _____ Date: June 13, 2023
Typed or Printed Name of Soil Evaluator: Paul Louderback SE#14618
Date of Soil Evaluator Exam:

Name of Board of Health Witness: Pat Brennon, Hingham BOH
Board of Health:

*If applicable, only deep hole with shallowest ESHGW listed.

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FORMS 11 AND 12
SOIL EVALUATOR FORM

ON-SITE REVIEW

DEEP HOLE #: 23-01 DATE: 6/13/2023 TIME: 10:00 WEATHER: Overcast 60°
SITE ADDRESS or MAP/LOT #: 0 & 30 Arnold Road, Hingham 100-0-3 / 100-0-65
OWNER: Arnold Road LLC - Gerry Rankin JOB NO.: 22-083.1
LOCATION (Identify on Plan): See Attached Plan GROUND ELEVATION AT SURFACE OF HOLE: 113.5±

LAND USE: Residential SURFACE STONES: Yes: [ ] No: [X] SLOPE (%): 6% ±

VEGETATION: Woods, 12"-24" pines, maples, oaks LANDFORM: Outwash Plains

DISTANCES FROM:
OPEN WATER BODY: >100 ft PROPERTY LINE: 80± ft POSSIBLE WET AREA: >100 ft DRAINAGEWAY: >100 ft
DRINKING WATER WELL: >250 ft OTHER:

DEEP OBSERVATION HOLE LOG

Depth (inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redoximorphic Features	Other (Structure, Consistency,% Gravels, Stones, Boulders
0-12	A	Sandy Loam	10YR 4/2	-	Friable
12-16	B	Loamy Sand	10YR 5/6	-	Friable
16-144	C1	Loamy Sand	2.5Y 6/3	-	Very Friable, NO gravel Fine to very fine sand w/some silt

PARENT MATERIAL: Sandy & Gravelly Glaciofluvial Deposits Unsuitable Material Present? Yes: [ ] No: [X] If Yes:
Disturbed Soil: [ ] Fill Mat'l: [ ] Impervious Layer(s): [ ] Weathered/Fractured Rock: [ ] Bedrock: [ ]

GROUNDWATER OBSERVED: Yes: [ ] No: [X] If Yes: What is the depth of Groundwater:
Standing in Hole: - Weeping from Face: - Saturating the Face: - Mottling: None Observed
Estimated Depth to Seasonal High Ground Water : None Observed

PERCOLATION TEST

Percolation Hole #:	23-01		Percolation Hole #:		
Test Date:	6/13/2023		Test Date:		
Depth of Perc:	36-54"		Depth of Perc:		
Start of Presoak:	10:11 AM		Start of Presoak:		
End of Presoak:	10:27 AM		End of Presoak:		
Time @ 12":	10:27 AM		Time @ 12":		
Time @ 9":	10:36 AM		Time @ 9":		
Time Elapse:(12"-9")	9 min		Time Elapse:(12"-9")		
Time AT 6":	10:52 AM		Time AT 6":		
Time Elapse: (9"-6"):	16 min		Time Elapse: (9"-6"):		
Rate: (min/in.):	6 min/in		Rate: (min/in.):		
Test Passed/ Failed/ Discon/ Add. Test Req'd:			Test Passed/ Failed/ Discon/ Add. Testing Req'd:		

Performed By: PAL Witnessed By: Pat Brennon Mach./Oper.: Al Emmanello
Comments: Hole holding up by some silt in sand.

An indication that the "site passed" indicates only that the basic criteria for a soil evaluation and percolation test under Title 5 have been met in the area tested. Further soil evaluations and design work are necessary to determine whether a septic system for a particular use, meeting the requirements of Title5 and applicable local bylaws, will in fact be feasible on this site.

An indication that the "site failed" indicates only that the area tested did not meet the minimum criteria (at the time of testing) for a successful soil evaluation and/or percolation test in the area tested. Additional testing at another depth or other areas may result in passing results.

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FORMS 11 AND 12
SOIL EVALUATOR FORM

ON-SITE REVIEW

DEEP HOLE #: 23-02 DATE: 6/13/2023 TIME: 11:00 WEATHER: Overcast 60°- 65°
SITE ADDRESS or MAP/LOT #: 0&30 Arnold Road, Hingham 100-0-3 / 100-0-65
OWNER: Arnold Road LLC - Gerry Rankin JOB NO.: 22-083.1
LOCATION (Identify on Plan): See Attached Plan GROUND ELEVATION AT SURFACE OF HOLE: 115.0±

LAND USE: Residential SURFACE STONES: Yes: [ ] No: [X] SLOPE (%): 15% ±

VEGETATION: Woods, 12"-24" pines, maples, oaks LANDFORM: Outwash Plains

DISTANCES FROM:
OPEN WATER BODY: >100 ft PROPERTY LINE: 80± ft POSSIBLE WET AREA: >100 ft DRAINAGEWAY: >100 ft
DRINKING WATER WELL: >250 ft OTHER:

DEEP OBSERVATION HOLE LOG

Depth (inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redoximorphic Features	Other (Structure, Consistency,% Gravels, Stones, Boulders
0-12	A	Sandy Loam	10YR 4/2	-	Friable
12-24	B	Loamy Sand	10YR 5/6	-	Friable
24-144	C1	Loamy Sand	2.5Y 6/3	-	Very Friable, NO gravel Fine to very fine sand w/ trace silt

PARENT MATERIAL: Unsuitable Material Present? Yes: [ ] No: [X] If Yes:
Disturbed Soil: [ ] Fill Mat'l: [ ] Impervious Layer(s): [ ] Weathered/Fractured Rock: [ ] Bedrock: [ ]

GROUNDWATER OBSERVED: Yes: [ ] No: [X] If Yes: What is the depth of Groundwater:
Standing in Hole: - Weeping from Face: - Saturating the Face: - Mottling: None Observed
Estimated Depth to Seasonal High Ground Water : None Observed

PERCOLATION TEST

Percolation Hole #:	23-02		Percolation Hole #:		
Test Date:	6/13/2023		Test Date:		
Depth of Perc:	36-54"		Depth of Perc:		
Start of Presoak:	10:20 AM		Start of Presoak:		
End of Presoak:	10:35 AM		End of Presoak:		
Time @ 12":	10:35 AM		Time @ 12":		
Time @ 9":	10:37 AM		Time @ 9":		
Time Elapse:(12"-9")	2 min		Time Elapse:(12"-9")		
Time AT 6":	10:40 AM		Time AT 6":		
Time Elapse: (9"-6"):	3 min		Time Elapse: (9"-6"):		
Rate: (min/in.):	< 2 min/in		Rate: (min/in.):		
Test Passed/ Failed/ Discon/ Add. Test Req'd:			Test Passed/ Failed/ Discon/ Add. Testing Req'd:		

Performed By: PAL Witnessed By: Pat Brennon Mach./Oper.: Al Emmanello
Comments:

An indication that the "site passed" indicates only that the basic criteria for a soil evaluation and percolation test under Title 5 have been met in the area tested. Further soil evaluations and design work are necessary to determine whether a septic system for a particular use, meeting the requirements of Title5 and applicable local bylaws, will in fact be feasible on this site.

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FORMS 11 AND 12
SOIL EVALUATOR FORM

ON-SITE REVIEW

DEEP HOLE #: 23-03 DATE: 6/13/2023 TIME: 11:00 WEATHER: Overcast 65°
SITE ADDRESS or MAP/LOT #: 0&30 Arnold Road, Hingham 100-0-3 / 100-0-65
OWNER: Arnold Road LLC - Gerry Rankin JOB NO.: 22-083.1
LOCATION (Identify on Plan): See Attached Plan GROUND ELEVATION AT SURFACE OF HOLE: 115.0±

LAND USE: Residential SURFACE STONES: Yes: [ ] No: [X] SLOPE (%): 15% ±

VEGETATION: Woods, 12"-24" pines, maples, oaks LANDFORM: Outwash Plains

DISTANCES FROM:
OPEN WATER BODY: >100 ft PROPERTY LINE: 80± ft POSSIBLE WET AREA: >100 ft DRAINAGEWAY: >100 ft
DRINKING WATER WELL: >250 ft OTHER:

DEEP OBSERVATION HOLE LOG

Depth (inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redoximorphic Features	Other (Structure, Consistency,% Gravels, Stones, Boulders
0-11	A	Sandy Loam	10YR 4/2	-	Friable
11-30	B	Loamy Sand	10YR 5/6	-	Friable
30-134	C1	Fine Sand	2.5Y 6/3	130" (Faint)	Single grain, Loose, No Gravel caving, NO silt
				7.5 YR 5/8	

PARENT MATERIAL: Unsuitable Material Present? Yes: [ ] No: [X] If Yes:
Disturbed Soil: [ ] Fill Mat'l: [ ] Impervious Layer(s): [ ] Weathered/Fractured Rock: [ ] Bedrock: [ ]

GROUNDWATER OBSERVED: Yes: [ ] No: [ ] If Yes: What is the depth of Groundwater:
Standing in Hole: - Weeping from Face: - Saturating the Face: - Mottling: 130" (faint)
Estimated Depth to Seasonal High Ground Water : 130" From faint mottling

PERCOLATION TEST

			Percolation Hole #:		
Percolation Hole #:	23-03		Test Date:		
Test Date:	6/13/2023		Depth of Perc:		
Depth of Perc:	34-52"		Start of Presoak:		
Start of Presoak:	10:53 AM		End of Presoak:		
End of Presoak:	11:01 AM		Time @ 12":		
Time @ 12":	-		Time @ 9":		
Time @ 9":	-		Time Elapse:(12"-9")		
Time Elapse:(12"-9")	-		Time AT 6":		
Time AT 6":	-		Time Elapse: (9"-6"):		
Time Elapse: (9"-6"):	-		Rate: (min/in.):		
Rate: (min/in.):	< 2 min/in		Test Passed/ Failed/ Discon/ Add. Testing Req'd:		
Test Passed/ Failed/ Discon/ Add. Test Req'd:					

Performed By: PAL Witnessed By: Pat Brennon Mach./Oper.: Al Emmanello
Comments: Hole caving from sand.

An indication that the "site passed" indicates only that the basic criteria for a soil evaluation and percolation test under Title 5 have been met in the area tested. Further soil evaluations and design work are necessary to determine whether a septic system for a particular use, meeting the requirements of Title5 and applicable local bylaws, will in fact be feasible on this site.

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FORMS 11 AND 12
SOIL EVALUATOR FORM

ON-SITE REVIEW

DEEP HOLE #: 23-04 DATE: 6/13/2023 TIME: 11:30 WEATHER: Overcast 65°
SITE ADDRESS or MAP/LOT #: 0&30 Arnold Road, Hingham 100-0-3 / 100-0-65
OWNER: Arnold Road LLC - Gerry Rankin JOB NO.: 22-083.1
LOCATION (Identify on Plan): See Attached Plan GROUND ELEVATION AT SURFACE OF HOLE: 114.2±

LAND USE: Residential SURFACE STONES: Yes: [ ] No: [X] SLOPE (%): 15% ±

VEGETATION: Woods, 12"-24" pines, maples, oaks LANDFORM: Outwash Plains

DISTANCES FROM:
OPEN WATER BODY: >100 ft PROPERTY LINE: 80± ft POSSIBLE WET AREA: >100 ft DRAINAGEWAY: >100 ft
DRINKING WATER WELL: >250 ft OTHER:

DEEP OBSERVATION HOLE LOG

Depth (inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redoximorphic Features	Other (Structure, Consistency,% Gravels, Stones, Boulders
0-11	A	Sandy Loam	10YR 4/2	-	Friable
11-14	B	Loamy Sand	10YR 5/6	-	Friable
14-122	C1	Loamy Sand, Fine to very fine sand trace silt	2.5Y 6/3	-	Very Friable, NO gravel Fine to very fine sand w/ trace silt

PARENT MATERIAL: Sandy & Gravelly Glaciofluvial Deposits Unsuitable Material Present? Yes: [ ] No: [X] If Yes:
Disturbed Soil: [ ] Fill Mat'l: [ ] Impervious Layer(s): [ ] Weathered/Fractured Rock: [ ] Bedrock: [ ]

GROUNDWATER OBSERVED: Yes: [ ] No: [X] If Yes: What is the depth of Groundwater:
Standing in Hole: - Weeping from Face: - Saturating the Face: - Mottling: None Observed
Estimated Depth to Seasonal High Ground Water : None Observed

PERCOLATION TEST

Percolation Hole #:	23-04		Percolation Hole #:		
Test Date:	6/13/2023		Test Date:		
Depth of Perc:	36-54"		Depth of Perc:		
Start of Presoak:	11:06 AM		Start of Presoak:		
End of Presoak:	11:21 AM		End of Presoak:		
Time @ 12":	11:21 AM		Time @ 12":		
Time @ 9":	11:22 AM		Time @ 9":		
Time Elapse:(12"-9")	11 min		Time Elapse:(12"-9")		
Time AT 6":	11:23 AM		Time AT 6":		
Time Elapse: (9"-6"):	1 min		Time Elapse: (9"-6"):		
Rate: (min/in.):	< 2 min/in		Rate: (min/in.):		
Test Passed/ Failed/ Discon/ Add. Test Req'd:			Test Passed/ Failed/ Discon/ Add. Testing Req'd:		

Performed By: PAL Witnessed By: Pat Brennon Mach./Oper.: Al Emmanello
Comments:

An indication that the "site passed" indicates only that the basic criteria for a soil evaluation and percolation test under Title 5 have been met in the area tested. Further soil evaluations and design work are necessary to determine whether a septic system for a particular use, meeting the requirements of Title5 and applicable local bylaws, will in fact be feasible on this site.

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FORMS 11 AND 12
SOIL EVALUATOR FORM

ON-SITE REVIEW

DEEP HOLE #: 23-05 DATE: 6/13/2023 TIME: 9:00 WEATHER: Overcast 65°
SITE ADDRESS or MAP/LOT #: 0&30 Arnold Road, Hingham 100-0-3 / 100-0-65
OWNER: Arnold Road LLC - Gerry Rankin JOB NO.: 22-083.1
LOCATION (Identify on Plan): See Attached Plan GROUND ELEVATION AT SURFACE OF HOLE: 121.0±

LAND USE: Residential SURFACE STONES: Yes: ☐ No: ☒ SLOPE (%): 13% ±

VEGETATION: Woods, 12"-24" pines, maples, oaks LANDFORM: Outwash Plains

DISTANCES FROM:
OPEN WATER BODY: >100 ft PROPERTY LINE: 80± ft POSSIBLE WET AREA: >100 ft DRAINAGEWAY: >100 ft
DRINKING WATER WELL: >250 ft OTHER:

DEEP OBSERVATION HOLE LOG

Depth (inches)	Soil Hor./ Layer	Soil Texture (USDA)	Soil Color (Munsell)	Redoximorphic Features	Other (Structure, Consistency,% Gravels, Stones, Boulders
0-12	A	Sandy Loam	10YR 4/2	-	Massive Friable
12-24	B	Loamy Sand	10YR 5/6	-	Massive Friable
24-132	C1	Loamy Sand	2.5Y 6/3	-	Very Friable, 0% Gravel - Fine to Very Fine Sand w/some silt.

PARENT MATERIAL: Sandy & Gravelly Glaciofluvial Deposits Unsuitable Material Present? Yes: ☐ No: ☐ If Yes:
Disturbed Soil: ☐ Fill Mat'l: ☐ Impervious Layer(s): ☐ Weathered/Fractured Rock: ☐ Bedrock: ☐

GROUNDWATER OBSERVED: Yes: ☐ No: ☐ If Yes: What is the depth of Groundwater:
Standing in Hole: - Weeping from Face: - Saturating the Face: - Mottling: None Observed
Estimated Depth to Seasonal High Ground Water : None Observed

PERCOLATION TEST

Percolation Hole #:	N/A		Percolation Hole #:		
Test Date:			Test Date:		
Depth of Perc:	For Foundation		Depth of Perc:		
Start of Presoak:			Start of Presoak:		
End of Presoak:			End of Presoak:		
Time @ 12":			Time @ 12":		
Time @ 9":			Time @ 9":		
Time Elapse:(12"-9")			Time Elapse:(12"-9")		
Time AT 6":			Time AT 6":		
Time Elapse: (9"-6"):			Time Elapse: (9"-6"):		
Rate: (min/in.):			Rate: (min/in.):		
Test Passed/ Failed/ Discon/ Add. Test Req'd:			Test Passed/ Failed/ Discon/ Add. Testing Req'd:		

Performed By: PAL Witnessed By: Pat Brennon Mach./Oper.: Al Emmanello
Comments: Test hole for foundation.

An indication that the "site passed" indicates only that the basic criteria for a soil evaluation and percolation test under Title 5 have been met in the area tested. Further soil evaluations and design work are necessary to determine whether a septic system for a particular use, meeting the requirements of Title5 and applicable local bylaws, will in fact be feasible on this site.

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