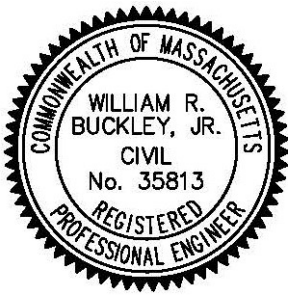
Bay Colony Group, Inc.
Professional Civil Engineers & Land Surveyors

4 School Street, PO Box 9136
Foxborough, Massachusetts 02035
Telephone (508) 543-3939 • Fax (508) 543-8866
E-mail: mailbox@baycolonygroup.com

Storm Water Impact Report
Pine Air Estates
204 East Street
Foxborough, MA

January, 2024



Prepared for:

Pine Air, LLC
364 Hickory Road
North Attleboro, MA 02760

Table of Contents:

1.0 Introduction

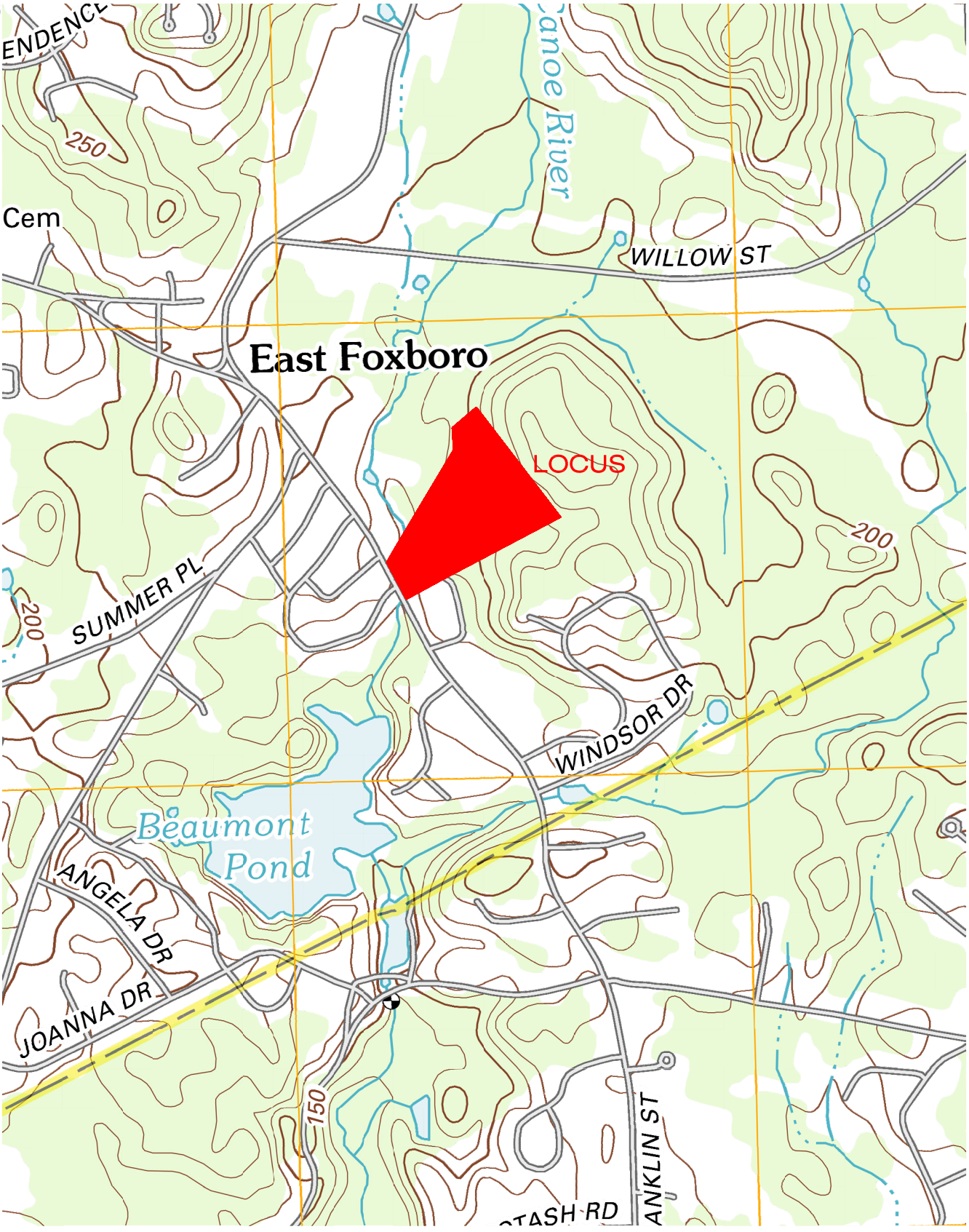
The project involves the construction of a 12-lot single-family home subdivision on 17.3 acres of land located on the east side of East Street where it crosses over the Canoe River. The property is bordered by residences to the west and east and by Foxborough Conservation Commission land to the north. **Figure 1** is an extract from the USGS Mansfield quadrangle and shows the site locus.

Bay Colony Group, Inc. conducted a study of flood control and storm water management to ensure that the proposed project meets the ten MA DEP Stormwater Management Standards, the storm water standards outlined in the Town of Foxborough Zoning Bylaws, and standard engineering practice. The scope of this study includes:

- Determining existing flood conditions and storm water quality calculations and analysis;
- Developing proposed flood conditions and storm water quality calculations and analysis;
- Designing a storm water management system.

2.0 Existing Conditions

The project area lies within the river valley of the Canoe River as well as the hillside to the east of that water body. The Canoe River bisects the westerly portion of the site on a generally north south line that runs from Summer Street to East Street. The NRCS has logged the soils in the upland portion of the site as A and B soils **(APPENDIX F).** The vegetation on the upland portion of the site consists of a mature woodland with a mixture of coniferous and deciduous trees as well as an existing single-family home with accessory structures. Coneco, Inc. conducted soil evaluations throughout the site in 1999, 2014 and 2015 for the purpose of determining suitability for on-site sewage disposal and testing in the areas of the proposed storm water basin. Soil evaluations were conducted in accordance with Standard 3 of the DEP Stormwater Standards. Based on the results of the soil investigations, we confirmed that the upland portion of the site is dominated by NRCS hydrologic Class A and B soils. Test Pit D-8 by Coneco found that the soils under the infiltration basin are SAND and the infiltration rate was greater than 30 inches per hour. Because the soil evaluation did not extend below the bottom of the proposed basin, BCG conducted an additional soil evaluation on January 30, 2024. The test pit was advanced to a depth of 168" (el. 175.5') and no ground water nor mottling was encountered. Elevations of standing water in the wetland closest to the proposed test pit were at elevation 170.8', which is our estimate of the high groundwater **(APPENDIX F)**. A falling head permeability test was conducted at the test pit and the rate was found to be 75.4 in/hour **(APPENDIX B)**. The RAWLS table found in the DEP Stormwater Management Standards, Volume 3, Chapter 1 yields an infiltration rate of 8.27 inches per hour for Sand which is substantially slower than the in-situ permeability test found. To be conservative, the RAWLS rate will be used in the basin design. Copies of the soil logs are included in **APPENDIX F** and the locations of the test pits are shown on the topographic plans **(Sheets 3.1-3.2)**.



23-0182

Pine Air Estates
FOXBOROUGH, MA

February 1, 2024

BAY COLONY GROUP, INC.

3.0 Flood Condition Analyses and Flood Control

The storm water management system will consist of roof drainage, driveway and roadway drainage (runoff collection, pretreatment, and conveyance) and flood control and treatment. This report will concentrate on the storm water basin designs, the ten DEP stormwater management standards and the Town of Foxborough performance standards.

There were no existing storm water management facilities observed during our site inspections of the site and the vast majority of runoff from the site runs overland toward the west and south to the aforementioned bordering vegetated wetlands that drain to the Canoe River. The proposed design will achieve flood control through the use of one infiltration basin. All runoff from pavement will be pretreated by deep sump catch basins with oil traps before being discharged into Stormceptors and then the majority will be directed to the storm water basin, which contain a forebay which has been designed in accordance with the DEP standards (**Sheet 5.1**). All of the runoff entering the basins will meet the 44% TSS removal requirement necessary since it is located in an area of rapid infiltration and/or in critical areas.

The basin will be an infiltration basin that will capture the runoff from the roadway as well as most of the runoff from any developed portion of the site. The infiltration basin on Lot 2 was designed to be as close as possible to the wetland and as low as possible in order to capture as much roadway runoff as possible. It will infiltrate all runoff, up to and including the 100-year storm event. The infiltration basin will contain a traprock overflow weir that will be located above the projected 100-year storm elevation. The first 181' of roadway is too low to capture and route into the infiltration basin. In order to provide appropriate water quality for that portion of the site before discharge a Stormceptor, or equivalent will be placed in DMH#3.

The closed roadway drainage system was designed using the Rational Method with the capability of handling a 25-year storm event in accordance with the Foxborough rules and regulations. The spreadsheet summary of the system is attached to this report in **APPENDIX D**.

The current land uses are a single-family home and a mature woodland. Proposed land uses include single-family homes, driveways, roadways, lawn, landscape, and woods. The land uses for existing and proposed conditions are summarized in **Tables 1a** and **1b**. There are three study lines on the project. The northeast property line, the northwest property line, and the Canoe River. The northwest property line study area eventually drains to the Canoe River, but has been made a separate subarea to ensure that the runoff to the abutter is no greater than the current condition. See the plan in **Appendix A – Existing Subareas and Soils.**

For proposed conditions the watershed is divided into four separate subareas. Subarea DA sheet flow to the northwest property line. Subarea DB flows into the infiltration basin through a combination of sheet flow and hard piping. Subarea DC sheet flows to the northeast property line and Subarea DD sheet flows to the Canoe River. **Appendix A Developed Subareas and Soils.**

Table 1a – Summary of Existing Land Uses

Subarea	Total Area (acres)	Land use	Area (acres)
EA	6.21	Woods, good, HSG A	0.7
		Woods, good, HSG B	5.51
EB	9.94	Woods, good, HSG A	2.79
		50-75% Grass cover, fair, HSG A	0.88
		Roofs, HSG A	0.10
		Gravel surface, HSG A	0.04
		Paved parking, HSG A	0.07
		Woods, good, HSG B	6.06
EC	0.56	Woods, good, HSG B	0.56
Total:	16.71	Total:	16.71

The detailed runoff and flood routing calculations are attached in **APPENDIX A**. The infiltration rates used were those outlined in the RAWLs Table in the DEP Stormwater Management Standards and were discussed in **Section 2.0 Existing Conditions**.

The on-site runoff collection and conveyance system (catch basins, manholes, and pipes) are designed based on the Rational Method and the 25-year design storm. Details of the rims, inverts and hydraulic grade lines can be found on the site plans and **APPENDIX D**.

Table 1b – Summary of Proposed Land Uses

Subarea	Total Area (acres)	Land use	Area (acres)
DA	4.84	Woods, good, HSG A	0.77
		Woods, good, HSG B	4.07
DB	9.76	Woods, good, HSG A	0.93
		>75% Grass cover, good, HSG A	0.69
		Roofs, HSG A	0.18
		Paved parking, HSG A	0.15
		Paved roads w/curbs & sewers, HSG A	0.31
		Woods, good, HSG B	3.63
		>75% Grass cover, good, HSG B	2.45
		Roofs, HSG B	0.54
		Paved parking, HSG B	0.45
		Paved roads w/curbs & sewers, HSG B	0.43
DC	0.56	Woods, good, HSG B	0.56
DD	1.55	>75% Grass Cover, good, HSG A	0.08
		Woods, good, HSG A	1.34
		Paved roads w/curbs & sewers, HSG A	0.13
Total:	16.71	Total:	16.71

Table 2: Summary of Peak Runoff (cfs) at Study Points

Condition	Study Point	2-year (cfs)	10-year (cfs)	100-year (cfs)
Existing Conditions	NW Property Line	0.3	2.4	8.0
	NE Property Line	0.1	0.3	1.0
	Canoe River	0.1	1.9	7.9
Developed Conditions	NW Property Line	0.2	1.7	6.0
	NE Property Line	0.1	0.3	1.0
	Canoe River	0.0	0.0	0.3

4.0 Stormwater Management

The site is not located in a groundwater recharge zone (Zone II), there are no private drinking water wells around the project site. There are no other critical areas downgradient of the project site based on 314 CMR 4.00 (Massachusetts Surface Water Quality Standards). There are no certified vernal pools on the site. The DEP Stormwater Standards apply to this proposed project and the project design is based on the latest edition of these documents.

DEP STORMWATER MANAGEMENT STANDARDS

Standard #1: NO UNTREATED DISCHARGE OR EROSION TO WETLANDS

No untreated stormwater from the proposed project area will be discharged to a resource area. Runoff from all pavement will be discharged to deep sump catch basins equipped with "Snout" water quality elbows, then to proprietary water quality inlets (Stormceptors) and the majority will go through an infiltration basin. The first 181' of the roadway will not discharge to a storm water basin but will be routed through deep sump catch basins and a Stormceptor prior to discharge to the Canoe River. This treatment train will achieve a TSS removal rate of 85%, which exceeds the DEP standard of 80%. All of the outfalls have been designed to accept the maximum flow from the basin without causing erosion in the wetlands or soils.

Standard #2: PEAK RATE ATTENUATION

Storm water controls have been designed for 2, 10, and 100-year storms according to both state and local regulations. The post-development peak discharge rates with flood control do not exceed pre-development rates on the site at the downgradient discharge point. See **Table 2** for details.

Standard #3: STORMWATER RECHARGE

1) The proposed project is located on a plot with hydrologic class A and B upland soils and D wetland soils based on the NRCS soil map. The target depth factor for an A soil is 0.60 inches and for a B soil is 0.35 inches. Soil textural analyses have been conducted in the areas where recharge is proposed under the infiltration basin, and it was found to be SAND. The RAWLS rate for a Sand is 8.27 inches per hour and this rate will be used for the recharge calculations. The calculations for the separate subareas recharge volumes are located in **Appendix B**.

2) The infiltration BMPs that will be used will be the above-ground infiltration basin as well as roof recharge systems for each house which will be designed to capture the first 2" of runoff. The roof drain systems have not been included in the Inflow-Outflow analysis in order for the basin design to be conservative. The calculations for the separate subareas recharge volumes are located in **Appendix B**.

3) Since we are assuming that all of the basins are in sensitive areas, and in areas of rapid infiltration, the TSS removal must be at least 44% before the water reaches the basins. Largely due to the use of the Stormceptors in the treatment train, the actual TSS removal is approximately 93% and so the standard is met. **Table 3 & APPENDIX B**

4) Using the RAWLS rate for the basin shows that the drawdown of the Required Recharge Volume will take 1.5 hours, which meets the required 72 hours dewatering standard **APPENDIX B**.

5) Capture area adjustment is necessary since not all of the infiltration will take place within the drainage basin. The portion of the roadway that will not be infiltrated is about 0.13 acres, which is about 6% of the impervious area on the site, which means that 94% of the site will be directed to an infiltration structure, which meets the 65% requirement.

6) A mounding analysis is not necessary under the storm water basins since the vertical separation from the bottom of the basins and the estimated high ground water elevation is greater than 4'.

Standard # 4: WATER QUALITY

1) The required water quality volume is based on 2.19 acres of impervious area and 1.0 inch water quality depth, which yields a water quality volume of 7,950 cubic feet or 0.18 acre-feet.
2) The BMPs used for the proposed project to enhance water quality include: deep sump catch basins, forebays, Stormceptors, roof drain systems, and an infiltration basin. Almost all of the runoff, minus the first 181' of driveway will go through deep sump catch basins with "Snout" water quality elbows to the above-ground infiltration basins. The first 181' of roadway will not go through the infiltration basin, but will go through deep sump catch basins and a Stormceptor prior to discharge. Runoff from the roofs will

be infiltrated through direct discharge to individual on-site infiltration systems. The estimated overall TSS removal will be greater than 85% **- see Table 3.**

3) Because the infiltration basin is being used to fulfill the requirements of Standards 3 and 4 it must handle the larger of the water quality volumes. The basin has a Water Quality Volume of 0.0717 ac-ft and a storage volume of 0.65 ac-ft. Therefore, the standard is met. **APPENDIX B**

Table 3: Summary of TSS Removal

DMH#2 (first 181' of roadway)

Impervious Area =	0.13	acres
Runoff depth to be treated =	1.00	inches
Runoff volume to be treated =	0.0108	ac-ft

BMP	*TSS Removal Rate*	*Starting TSS Load*	*Amount Removed*	*Remaining Load*
Deep Sump Catch Basin w/hood	0.25	1.00	0.25	0.75
Stormcepter	0.8	0.75	0.60	0.15
TOTAL TSS REMOVED =				**85 %**

Infiltration Basin

Impervious Area =	2.06	acres
Runoff depth to be treated =	1.00	inches
Runoff volume to be treated =	0.1717	ac-ft

BMP	*TSS Removal Rate*	*Starting TSS Load*	*Amount Removed*	*Remaining Load*
Deep Sump Catch Basin w/hood	0.25	1.00	0.25	0.75
Stormcepter	0.5	0.75	0.38	0.38
Infiltration Basin	0.8	0.38	0.30	0.08
TOTAL TSS REMOVED =				**93 %**

Standard # 5: LAND USES WITH HIGHER POTENTIAL POLLUTION LOADS

The site will consist of a typical residential use which is not considered to have a high potential pollutant load. The site will be compatible with the surrounding environment, which is a residential area.

Standard #6: CRITICAL AREAS

According to MassGIS the southerly portion of the project site lies within the Canoe River Area of Critical Environmental Concern but the river is not an Outstanding Resource Water and so is not considered a critical area. However, to be conservative, for purposes of storm water management we will treat all storm water structures as lying within a critical area.

Therefore, the storm water system must meet enhanced requirements outlined in the DEP Stormwater Management Standards. These include a Required Water Quality Volume of 1” of

the impervious area. This standard is being used in the design as discussed in Standard 4. At least 44% TSS removal must take place prior to discharge to a recharge BMP as shown in Table 4. This standard is being met as discussed in Standard 4 and **Table 3.** Proprietary BMPs must be verified by TARP or STEP and the Stormceptor has been verified by STEP **APPENDIX B.** The pretreatment BMPs being proposed include: deep sump catch basins, proprietary separators, and sediment forebays. These BMPs are allowed under the DEP standards, Volume 1, Table CA 2, Standard 6. The proposed infiltration BMPs are infiltration trenches and infiltration basins, which are both "highly recommended" in the aforementioned standard. Finally, no activity will take place within 25' of the BVW except for the construction of the roadway.

Standard #7: REDEVELOPMENT

The proposed activity is not a redevelopment project.

Standard #8: CONSTRUCTION PERIOD CONTROLS

Silt sock barriers will be installed at the downgradient limit of work if within 100' of any wetland resource area before any excavation starts. A stone pad shall be spread at the entrance from the existing roadway to the project site to prevent mud from escaping the site during construction.

A Draft Stormwater Pollution Prevention Plan has been developed in accordance with the EPA General Permit for Construction Activities. A final SWPPP will be prepared once the construction schedule is finalized and the contractors are chosen. A copy of the Draft SWPPP is included in **Appendix E**

Standard #9: OPERATION AND MAINTENANCE PLAN

See **Appendix C** for details.

Standard # 10: ILLICIT DISCHARGES TO DRAINAGE SYSTEM

I certify to the best of my professional knowledge, information and belief that there are no illicit discharges to the stormwater management system, including wastewater discharges and discharges of stormwater contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease. The proposed systems as shown on the referenced plans do not allow entry of any illicit discharges into the system and there are no connections between the stormwater and wastewater management systems.

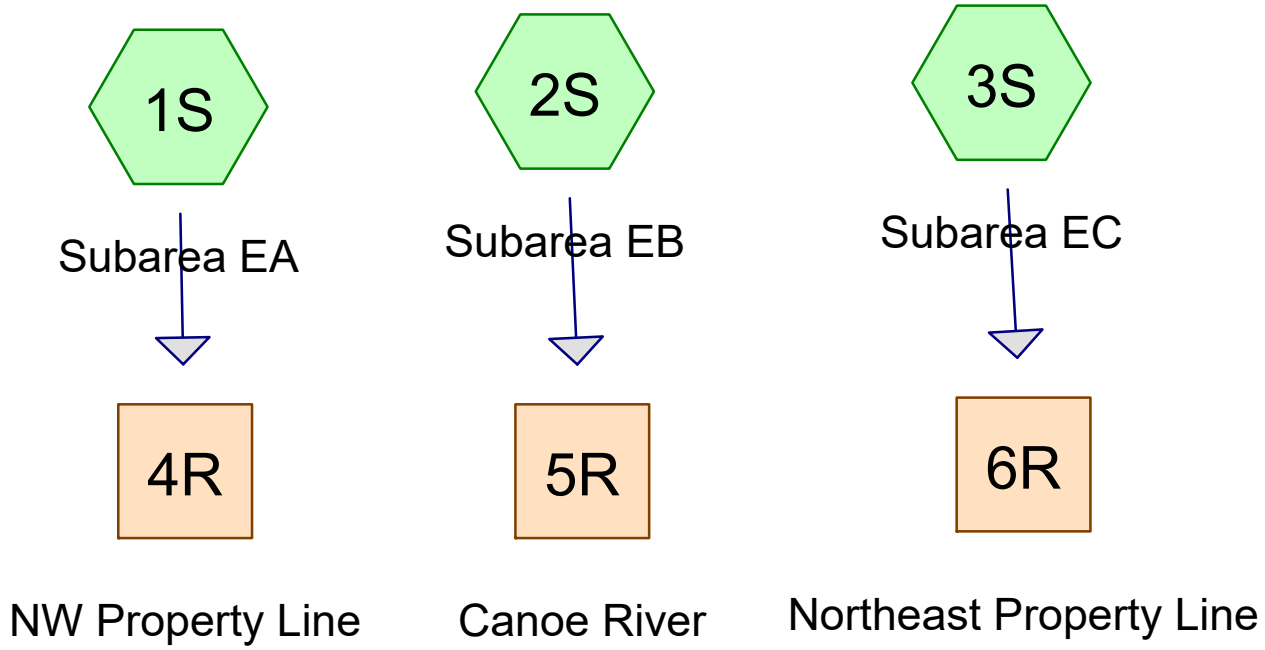
To be signed prior to construction _____ _____
Owner Date

APPENDIX A – Pre- and Post-DEVELOPMENT ANALYSIS AND STORM WATER POND DESIGNS

TABLE OF CONTENTS

Developed Conditions
Prepared by Bay Colony Group Inc

TABLE OF CONTENTS



Subcat Reach Pond Link

Routing Diagram for Existing Conditions
Prepared by Bay Colony Group Inc, Printed 1/16/2024

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	3.20	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.70	2
3	100-Year	Type III 24-hr		Default	24.00	1	6.70	2

Area Listing (all nodes)

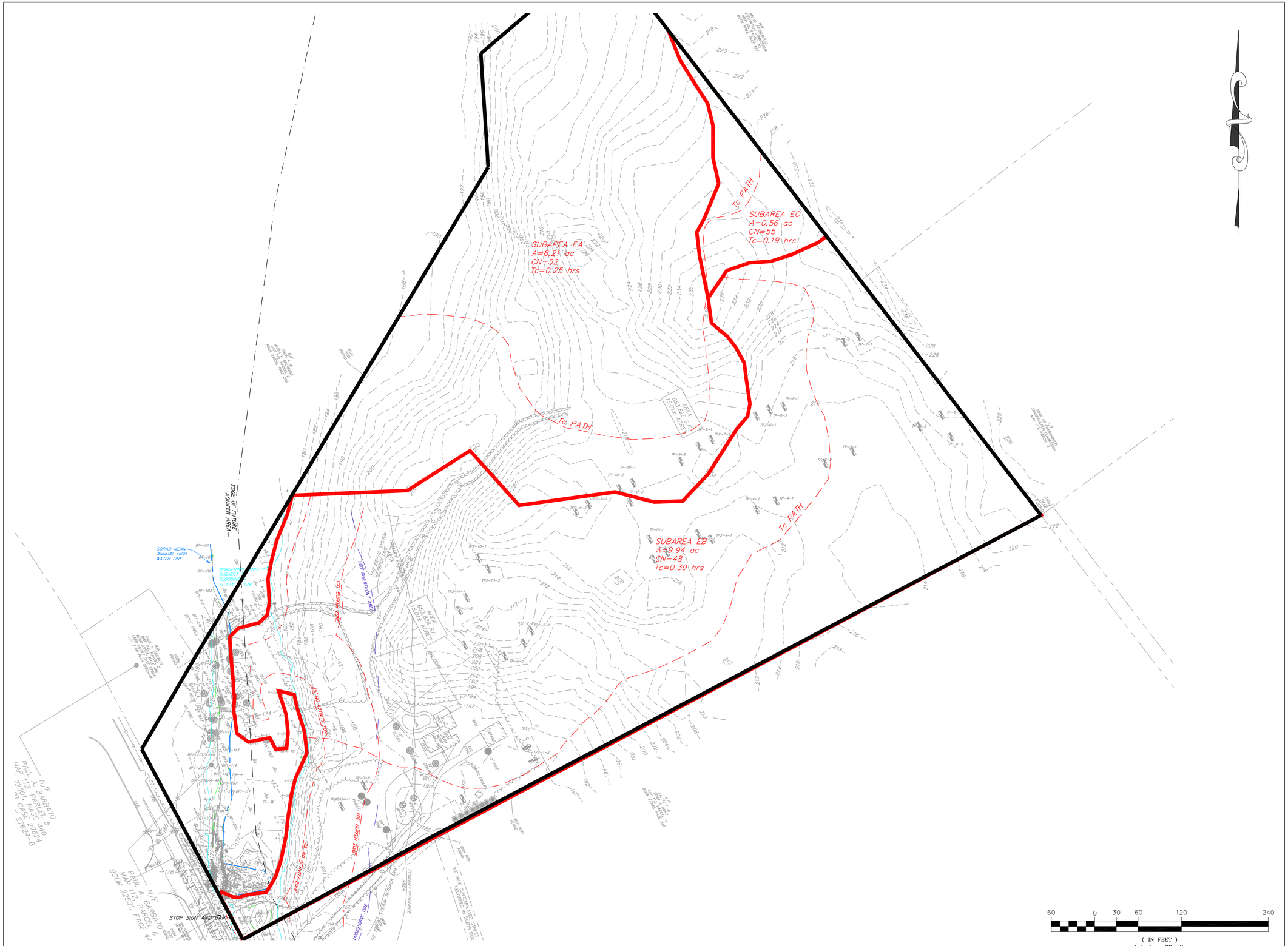
Area (acres)	CN	Description (subcatchment-numbers)
0.88	49	50-75% Grass cover, Fair, HSG A (2S)
0.04	96	Gravel surface, HSG A (2S)
0.07	98	Paved parking, HSG A (2S)
0.10	98	Roofs, HSG A (2S)
3.49	30	Woods, Good, HSG A (1S, 2S)
12.13	55	Woods, Good, HSG B (1S, 2S, 3S)
16.71	**50**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
4.58	HSG A	1S, 2S
12.13	HSG B	1S, 2S, 3S
0.00	HSG C	
0.00	HSG D	
0.00	Other	
16.71		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.88	0.00	0.00	0.00	0.00	0.88	50-75% Grass cover, Fair	2S
0.04	0.00	0.00	0.00	0.00	0.04	Gravel surface	2S
0.07	0.00	0.00	0.00	0.00	0.07	Paved parking	2S
0.10	0.00	0.00	0.00	0.00	0.10	Roofs	2S
3.49	12.13	0.00	0.00	0.00	15.62	Woods, Good	1S, 2S, 3S
4.58	**12.13**	**0.00**	**0.00**	**0.00**	**16.71**	**TOTAL AREA**	



PROJECT:

Pine Estates
Foxborough
Massachusetts

OWNERS:

Scott M. & Elaine D. Barbato
204 East Street
Foxborough, MA 02035

Paul A. Barbato
192 East Street
Foxborough, MA 02035

APPLICANT:

Pine Air, LLC
364 Hickory Road
North Attleboro, MA 02760

Bay Colony Group, Inc.
Professional Civil Engineers & Professional Land Surveyors

FOUR SCHOOL STREET
P.O. BOX 9136
FOXBOROUGH, MA 02035
508-543-3939

NOTICE TO CONTRACTOR:

1. *ALL CONTRACTORS SHALL CONTACT THE PLANNING BOARD 508.543.1250 PRIOR TO THE INITIATION OF ANY CONSTRUCTION.*
2. *A STREET OPENING PERMIT MUST BE OBTAINED FROM THE FOXBOROUGH HIGHWAY DEPARTMENT PRIOR TO ANY WORK OCCURRING IN OR ON ANY STREET (AFTER ACCEPTED OR NOT) AFTER THE TOP COURSE OF PAVEMENT IS INSTALLED.*

STAMP

DRAWING TITLE

Existing Subarea

SCALE: 1" = 60'

FEBRUARY 1, 2024	SHEET NUMBER
23-0182B	**Ex**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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: Subarea EA Runoff Area=6.21 ac 0.00% Impervious Runoff Depth>0.17"
Flow Length=680' Tc=14.9 min CN=52 Runoff=0.3 cfs 0.089 af

Subcatchment 2S: Subarea EB Runoff Area=9.94 ac 1.71% Impervious Runoff Depth>0.09"
Flow Length=1,320' Tc=23.4 min CN=48 Runoff=0.1 cfs 0.073 af

Subcatchment 3S: Subarea EC Runoff Area=0.56 ac 0.00% Impervious Runoff Depth>0.25"
Flow Length=244' Tc=11.1 min CN=55 Runoff=0.1 cfs 0.012 af

Reach 4R: NW Property Line Inflow=0.3 cfs 0.089 af
Outflow=0.3 cfs 0.089 af

Reach 5R: Canoe River Inflow=0.1 cfs 0.073 af
Outflow=0.1 cfs 0.073 af

Reach 6R: Northeast Property Line Inflow=0.1 cfs 0.012 af
Outflow=0.1 cfs 0.012 af

Total Runoff Area = 16.71 ac Runoff Volume = 0.174 af Average Runoff Depth = 0.12"
98.98% Pervious = 16.54 ac 1.02% Impervious = 0.17 ac

Summary for Subcatchment 1S: Subarea EA

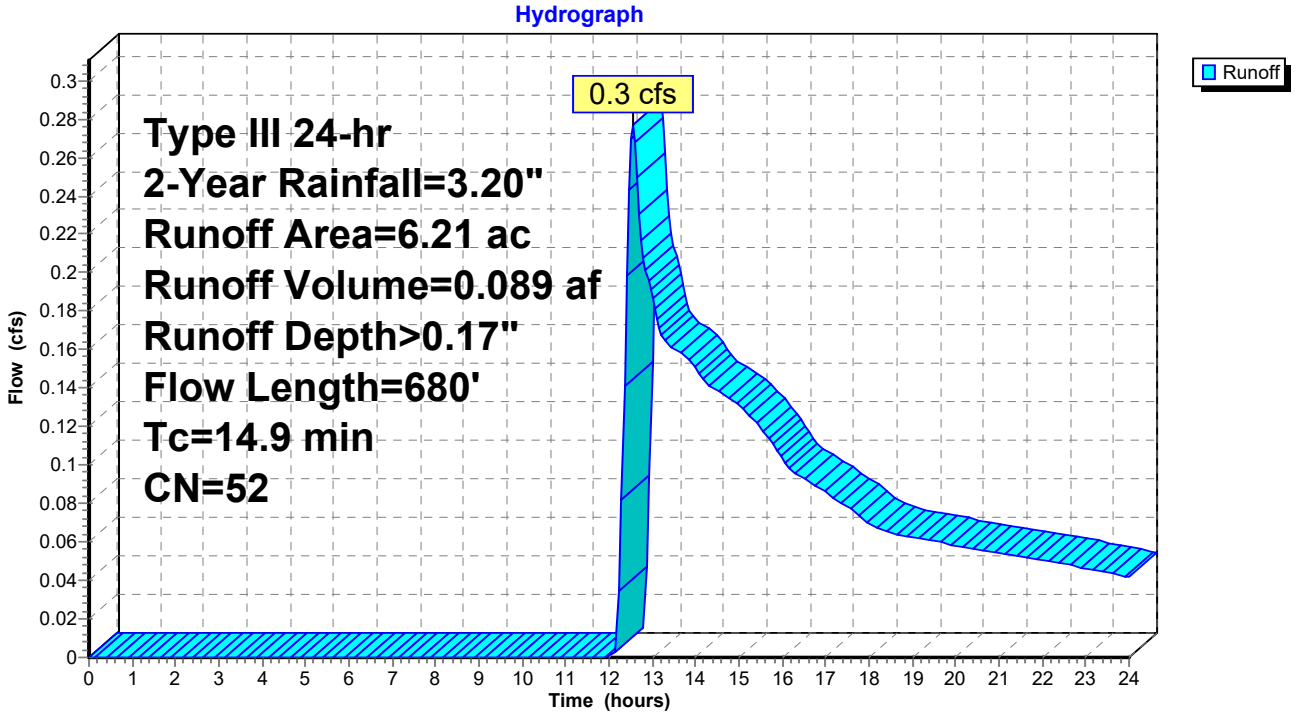
Runoff = 0.3 cfs @ 12.55 hrs, Volume= 0.089 af, Depth> 0.17"
Routed to Reach 4R : NW Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description
0.70	30	Woods, Good, HSG A
5.51	55	Woods, Good, HSG B
6.21	52	Weighted Average
6.21		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
7.8	630	0.0730	1.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
14.9	680	Total			

Subcatchment 1S: Subarea EA



Summary for Subcatchment 2S: Subarea EB

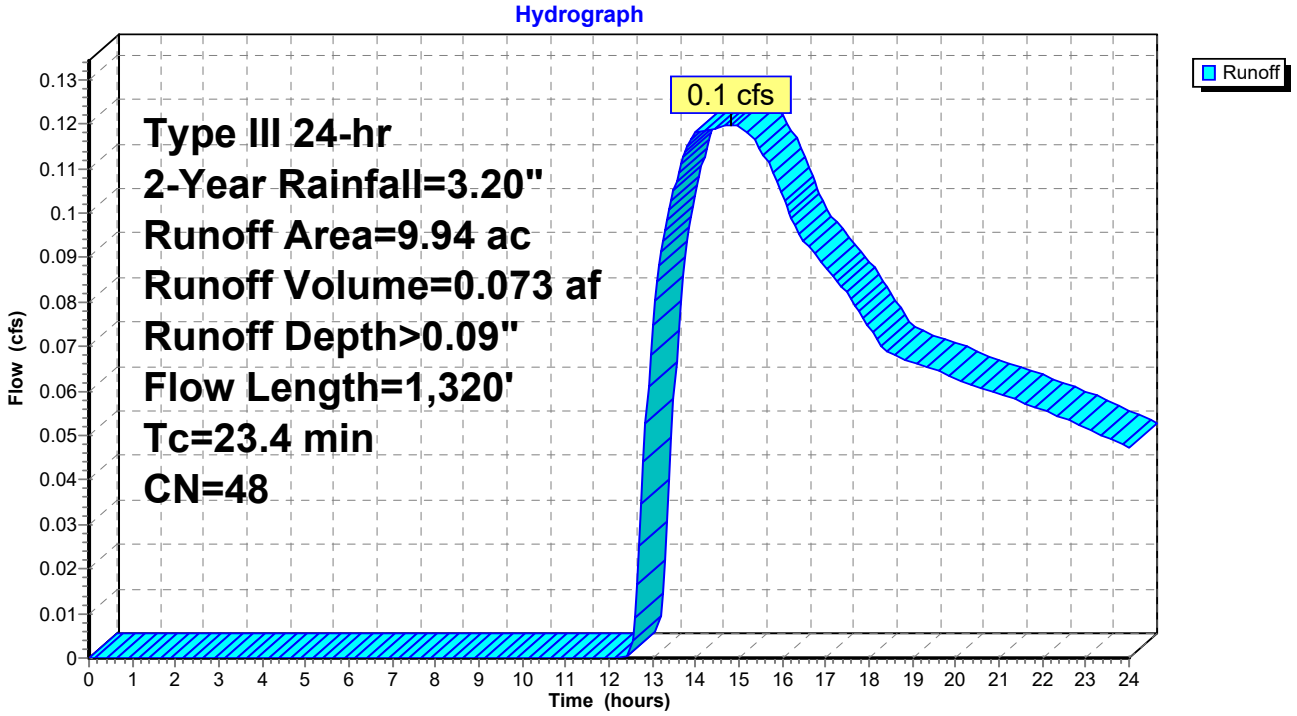
Runoff = 0.1 cfs @ 14.80 hrs, Volume= 0.073 af, Depth> 0.09"
Routed to Reach 5R : Canoe River

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description
2.79	30	Woods, Good, HSG A
0.88	49	50-75% Grass cover, Fair, HSG A
0.10	98	Roofs, HSG A
0.04	96	Gravel surface, HSG A
0.07	98	Paved parking, HSG A
6.06	55	Woods, Good, HSG B
9.94	48	Weighted Average
9.77		98.29% Pervious Area
0.17		1.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
13.9	933	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.0	337	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
23.4	1,320	Total			

Subcatchment 2S: Subarea EB



Summary for Subcatchment 3S: Subarea EC

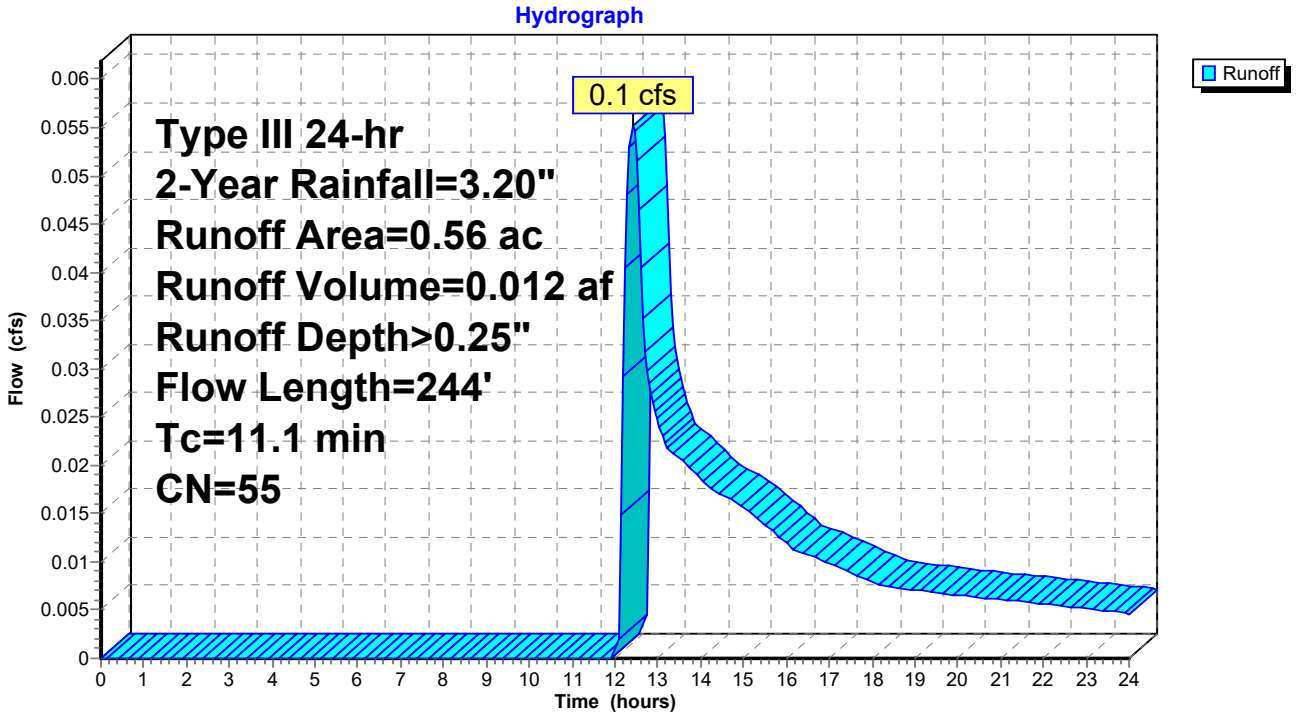
Runoff = 0.1 cfs @ 12.41 hrs, Volume= 0.012 af, Depth> 0.25"
Routed to Reach 6R : Northeast Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description
0.56	55	Woods, Good, HSG B
0.56		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.2	194	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.1	244	Total			

Subcatchment 3S: Subarea EC

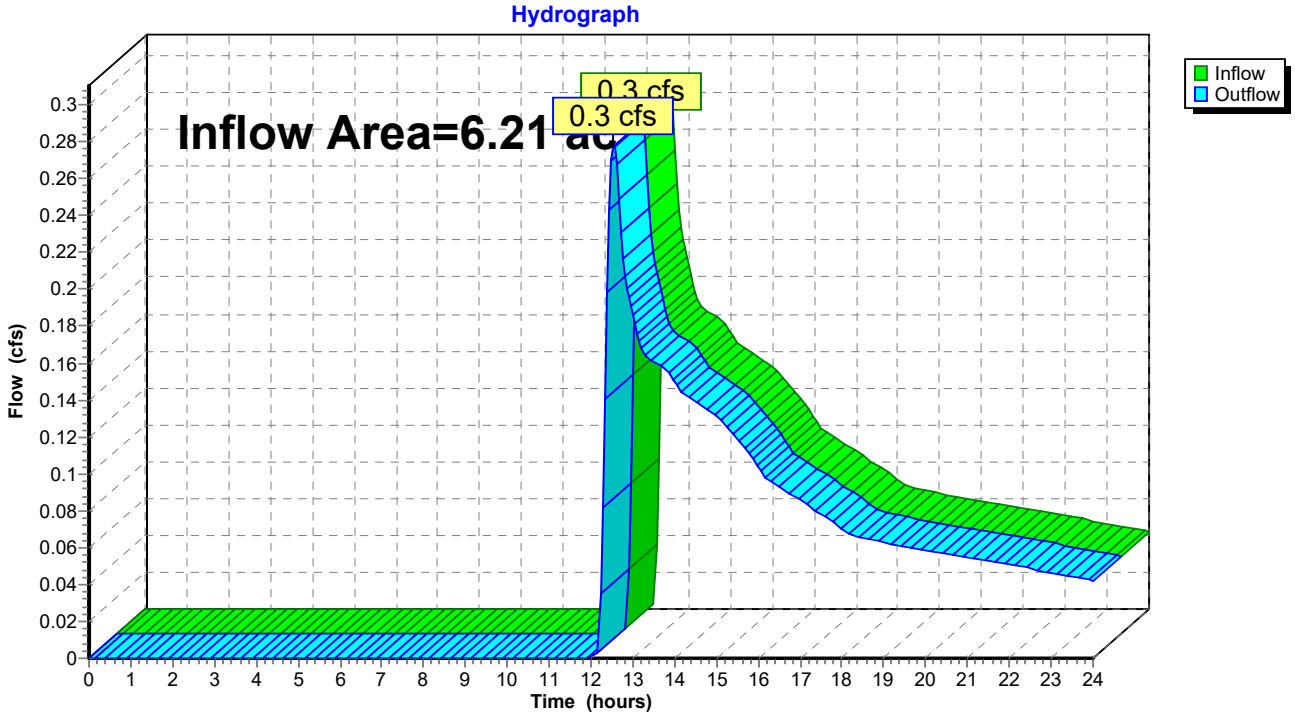


Summary for Reach 4R: NW Property Line

Inflow Area = 6.21 ac, 0.00% Impervious, Inflow Depth > 0.17" for 2-Year event
Inflow = 0.3 cfs @ 12.55 hrs, Volume= 0.089 af
Outflow = 0.3 cfs @ 12.55 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 4R: NW Property Line

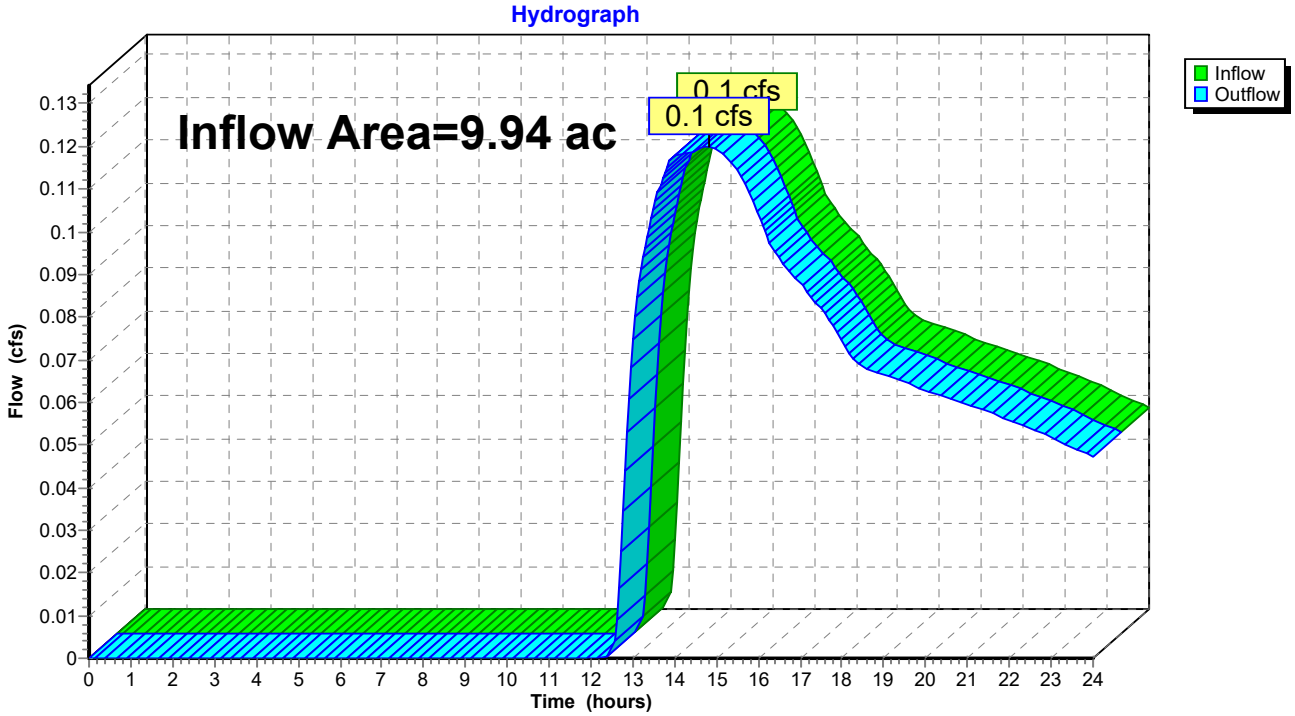


Summary for Reach 5R: Canoe River

Inflow Area = 9.94 ac, 1.71% Impervious, Inflow Depth > 0.09" for 2-Year event
Inflow = 0.1 cfs @ 14.80 hrs, Volume= 0.073 af
Outflow = 0.1 cfs @ 14.80 hrs, Volume= 0.073 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 5R: Canoe River

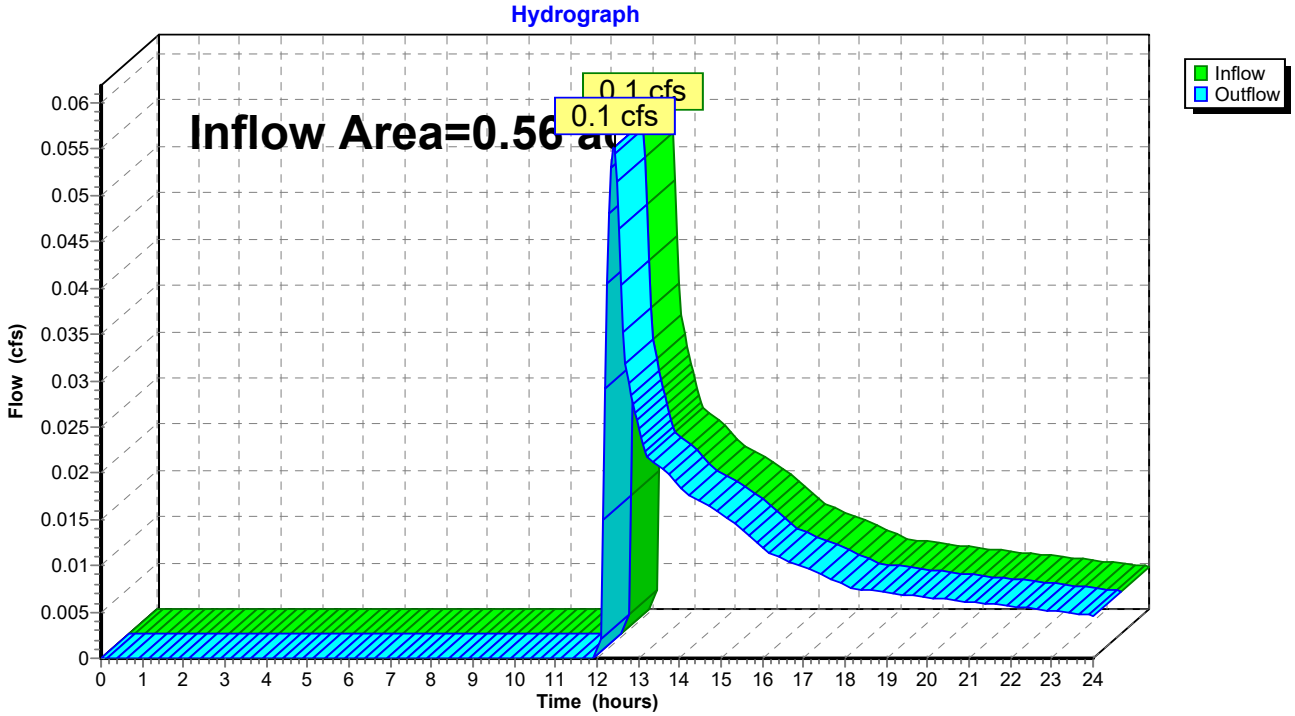


Summary for Reach 6R: Northeast Property Line

Inflow Area = 0.56 ac, 0.00% Impervious, Inflow Depth > 0.25" for 2-Year event
Inflow = 0.1 cfs @ 12.41 hrs, Volume= 0.012 af
Outflow = 0.1 cfs @ 12.41 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 6R: Northeast Property Line



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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: Subarea EA Runoff Area=6.21 ac 0.00% Impervious Runoff Depth>0.67"
Flow Length=680' Tc=14.9 min CN=52 Runoff=2.4 cfs 0.347 af

Subcatchment 2S: Subarea EB Runoff Area=9.94 ac 1.71% Impervious Runoff Depth>0.48"
Flow Length=1,320' Tc=23.4 min CN=48 Runoff=1.9 cfs 0.394 af

Subcatchment 3S: Subarea EC Runoff Area=0.56 ac 0.00% Impervious Runoff Depth>0.83"
Flow Length=244' Tc=11.1 min CN=55 Runoff=0.3 cfs 0.039 af

Reach 4R: NW Property Line Inflow=2.4 cfs 0.347 af
Outflow=2.4 cfs 0.347 af

Reach 5R: Canoe River Inflow=1.9 cfs 0.394 af
Outflow=1.9 cfs 0.394 af

Reach 6R: Northeast Property Line Inflow=0.3 cfs 0.039 af
Outflow=0.3 cfs 0.039 af

Total Runoff Area = 16.71 ac Runoff Volume = 0.780 af Average Runoff Depth = 0.56"
98.98% Pervious = 16.54 ac 1.02% Impervious = 0.17 ac

Summary for Subcatchment 1S: Subarea EA

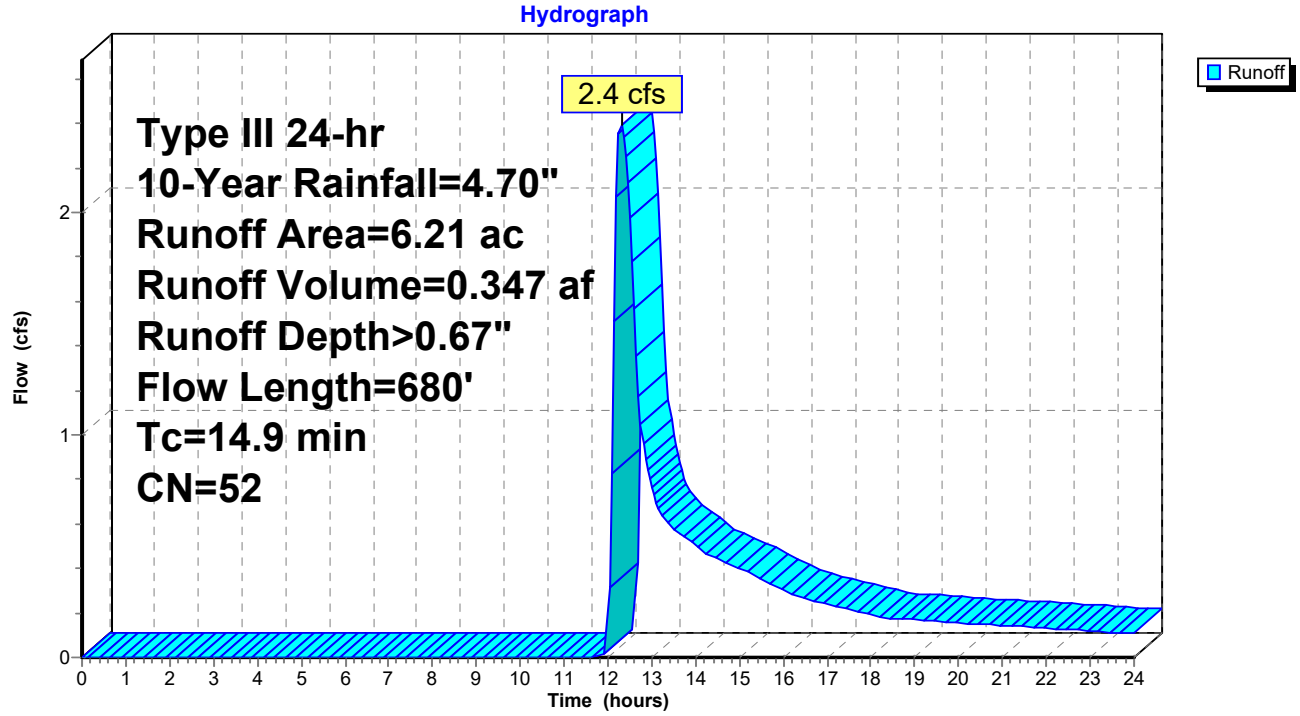
Runoff = 2.4 cfs @ 12.30 hrs, Volume= 0.347 af, Depth> 0.67"
Routed to Reach 4R : NW Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (ac)	CN	Description
0.70	30	Woods, Good, HSG A
5.51	55	Woods, Good, HSG B
6.21	52	Weighted Average
6.21		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
7.8	630	0.0730	1.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
14.9	680	Total			

Subcatchment 1S: Subarea EA



Summary for Subcatchment 2S: Subarea EB

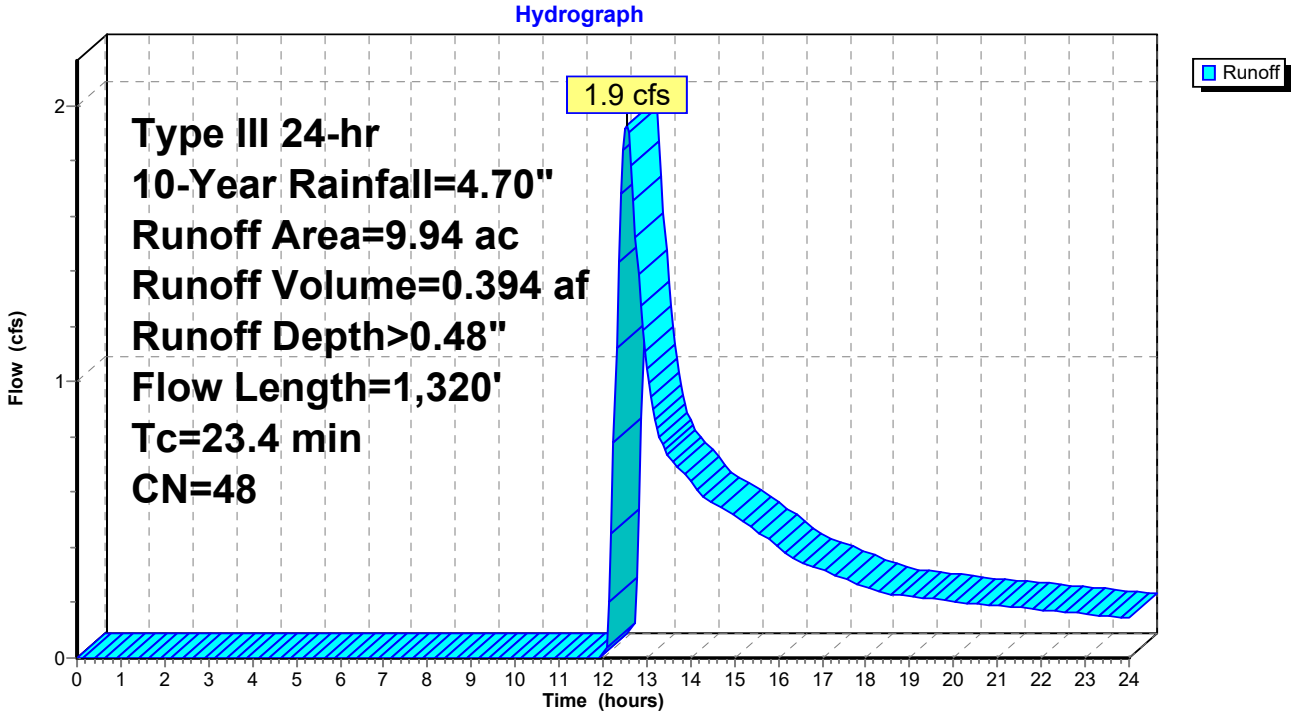
Runoff = 1.9 cfs @ 12.53 hrs, Volume= 0.394 af, Depth> 0.48"
Routed to Reach 5R : Canoe River

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (ac)	CN	Description
2.79	30	Woods, Good, HSG A
0.88	49	50-75% Grass cover, Fair, HSG A
0.10	98	Roofs, HSG A
0.04	96	Gravel surface, HSG A
0.07	98	Paved parking, HSG A
6.06	55	Woods, Good, HSG B
9.94	48	Weighted Average
9.77		98.29% Pervious Area
0.17		1.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
13.9	933	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.0	337	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
23.4	1,320	Total			

Subcatchment 2S: Subarea EB



Summary for Subcatchment 3S: Subarea EC

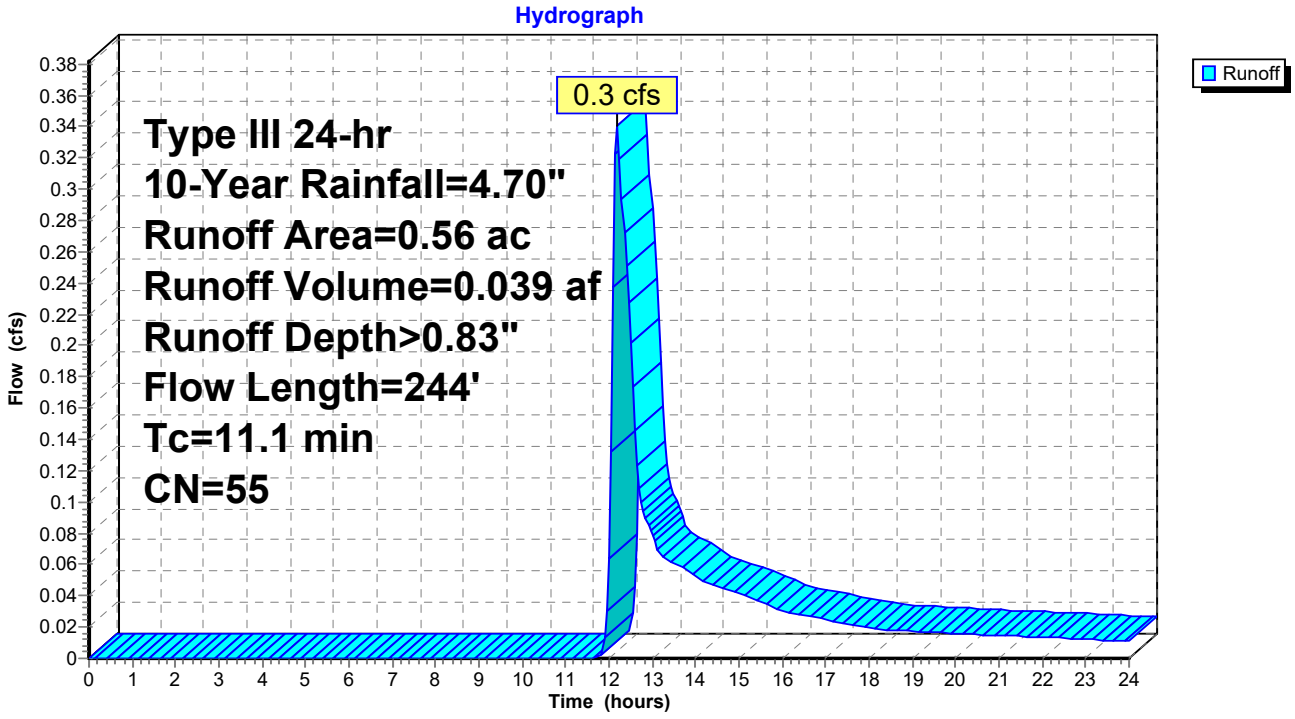
Runoff = 0.3 cfs @ 12.20 hrs, Volume= 0.039 af, Depth> 0.83"
Routed to Reach 6R : Northeast Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (ac)	CN	Description
0.56	55	Woods, Good, HSG B
0.56		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.2	194	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.1	244	Total			

Subcatchment 3S: Subarea EC

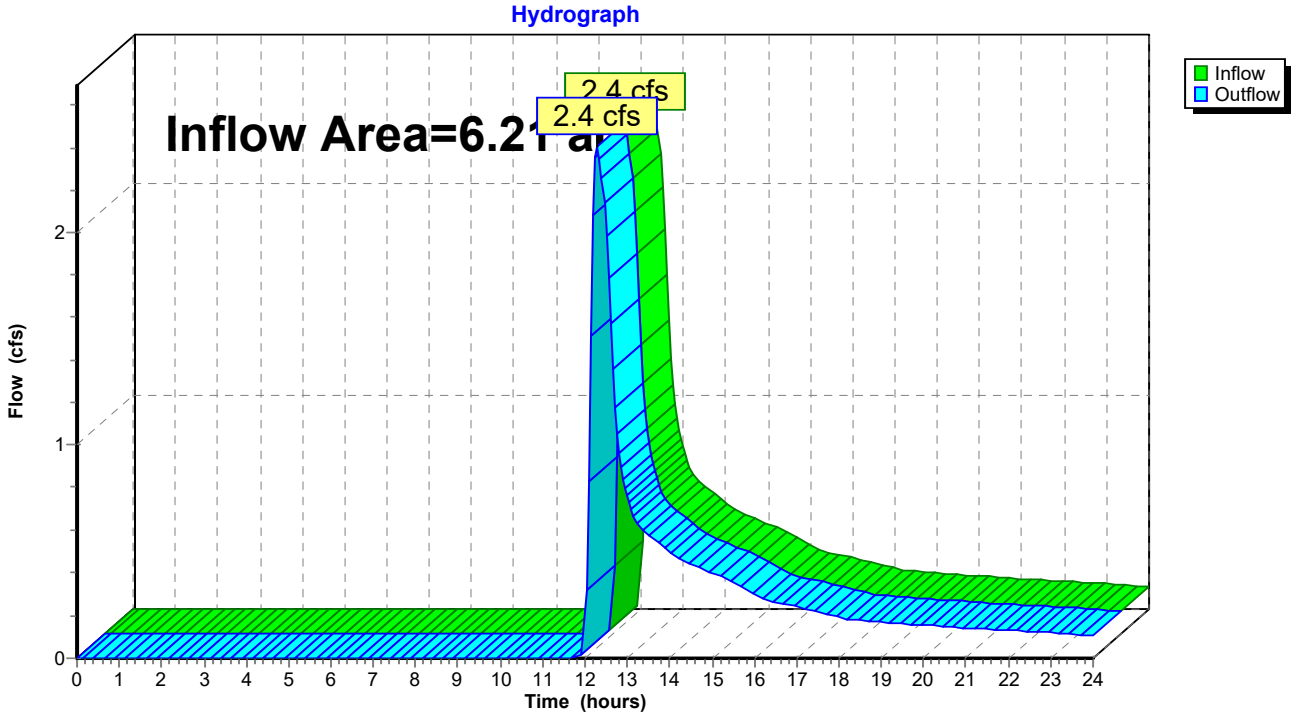


Summary for Reach 4R: NW Property Line

Inflow Area = 6.21 ac, 0.00% Impervious, Inflow Depth > 0.67" for 10-Year event
Inflow = 2.4 cfs @ 12.30 hrs, Volume= 0.347 af
Outflow = 2.4 cfs @ 12.30 hrs, Volume= 0.347 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 4R: NW Property Line

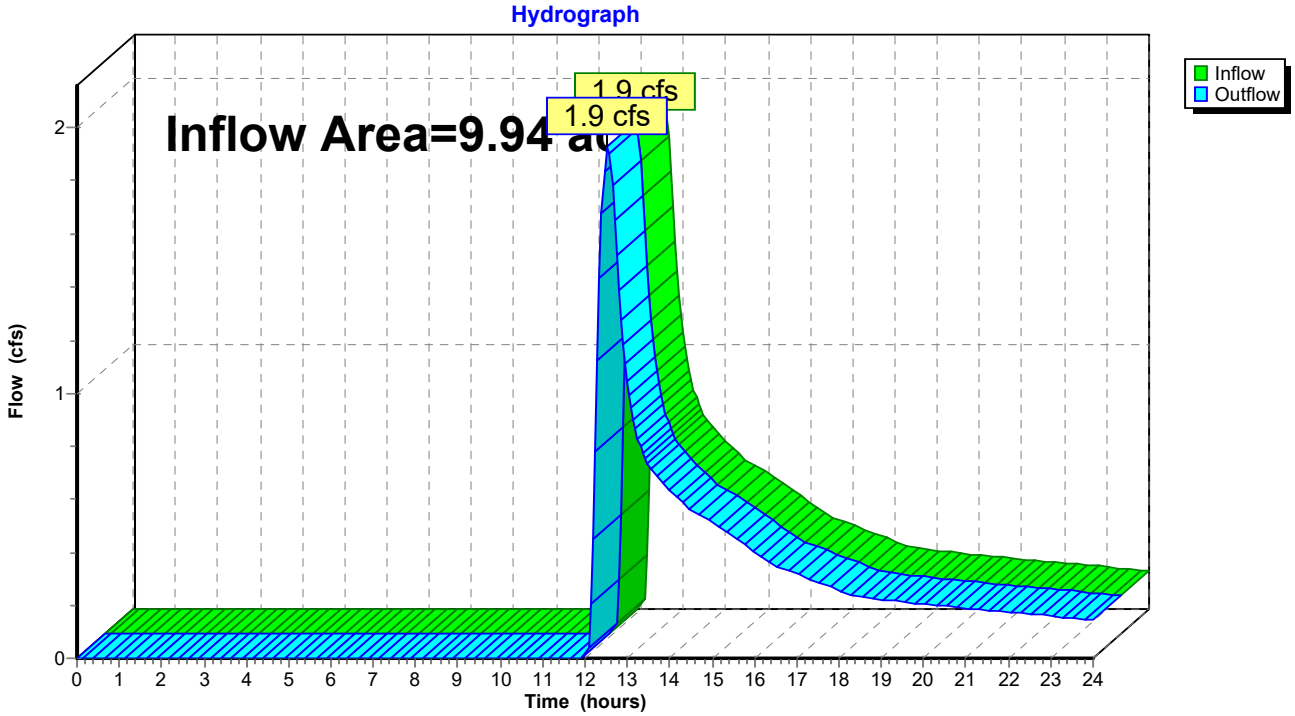


Summary for Reach 5R: Canoe River

Inflow Area = 9.94 ac, 1.71% Impervious, Inflow Depth > 0.48" for 10-Year event
Inflow = 1.9 cfs @ 12.53 hrs, Volume= 0.394 af
Outflow = 1.9 cfs @ 12.53 hrs, Volume= 0.394 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 5R: Canoe River

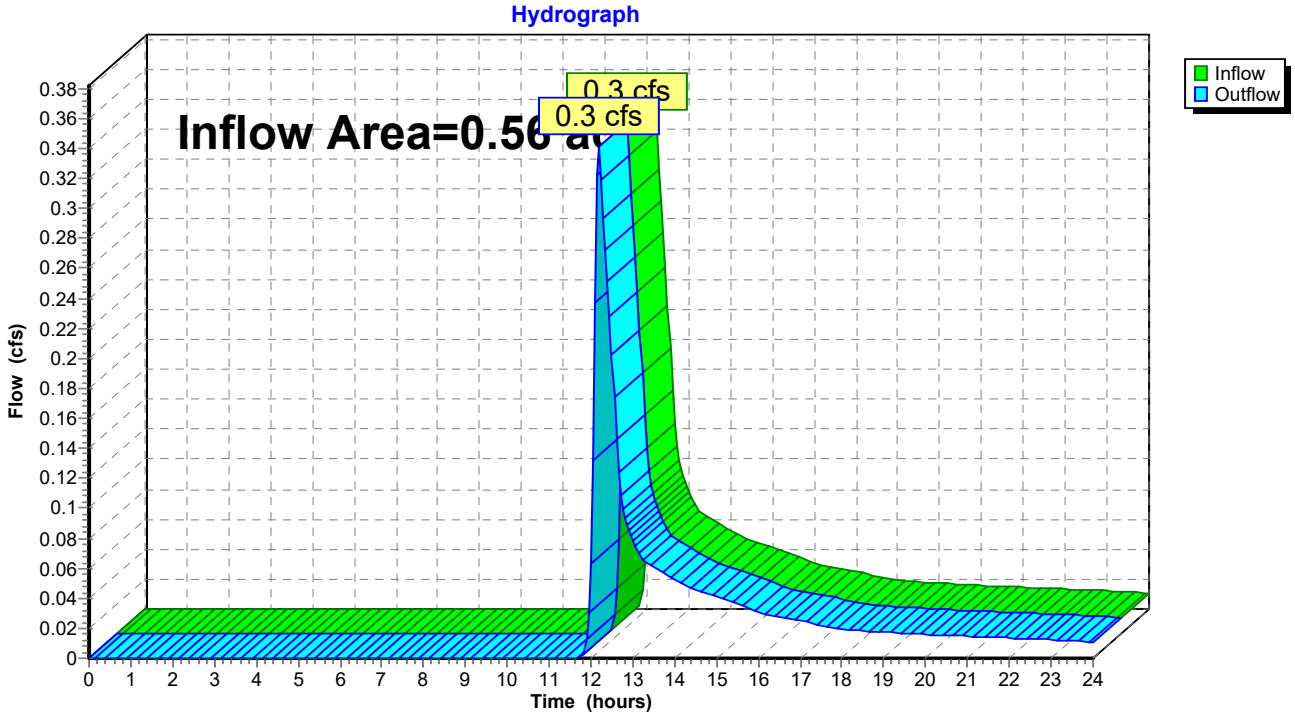


Summary for Reach 6R: Northeast Property Line

Inflow Area = 0.56 ac, 0.00% Impervious, Inflow Depth > 0.83" for 10-Year event
Inflow = 0.3 cfs @ 12.20 hrs, Volume= 0.039 af
Outflow = 0.3 cfs @ 12.20 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 6R: Northeast Property Line



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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: Subarea EA Runoff Area=6.21 ac 0.00% Impervious Runoff Depth>1.67"
Flow Length=680' Tc=14.9 min CN=52 Runoff=8.0 cfs 0.862 af

Subcatchment 2S: Subarea EB Runoff Area=9.94 ac 1.71% Impervious Runoff Depth>1.33"
Flow Length=1,320' Tc=23.4 min CN=48 Runoff=7.9 cfs 1.100 af

Subcatchment 3S: Subarea EC Runoff Area=0.56 ac 0.00% Impervious Runoff Depth>1.93"
Flow Length=244' Tc=11.1 min CN=55 Runoff=1.0 cfs 0.090 af

Reach 4R: NW Property Line Inflow=8.0 cfs 0.862 af
Outflow=8.0 cfs 0.862 af

Reach 5R: Canoe River Inflow=7.9 cfs 1.100 af
Outflow=7.9 cfs 1.100 af

Reach 6R: Northeast Property Line Inflow=1.0 cfs 0.090 af
Outflow=1.0 cfs 0.090 af

Total Runoff Area = 16.71 ac Runoff Volume = 2.052 af Average Runoff Depth = 1.47"
98.98% Pervious = 16.54 ac 1.02% Impervious = 0.17 ac

Summary for Subcatchment 1S: Subarea EA

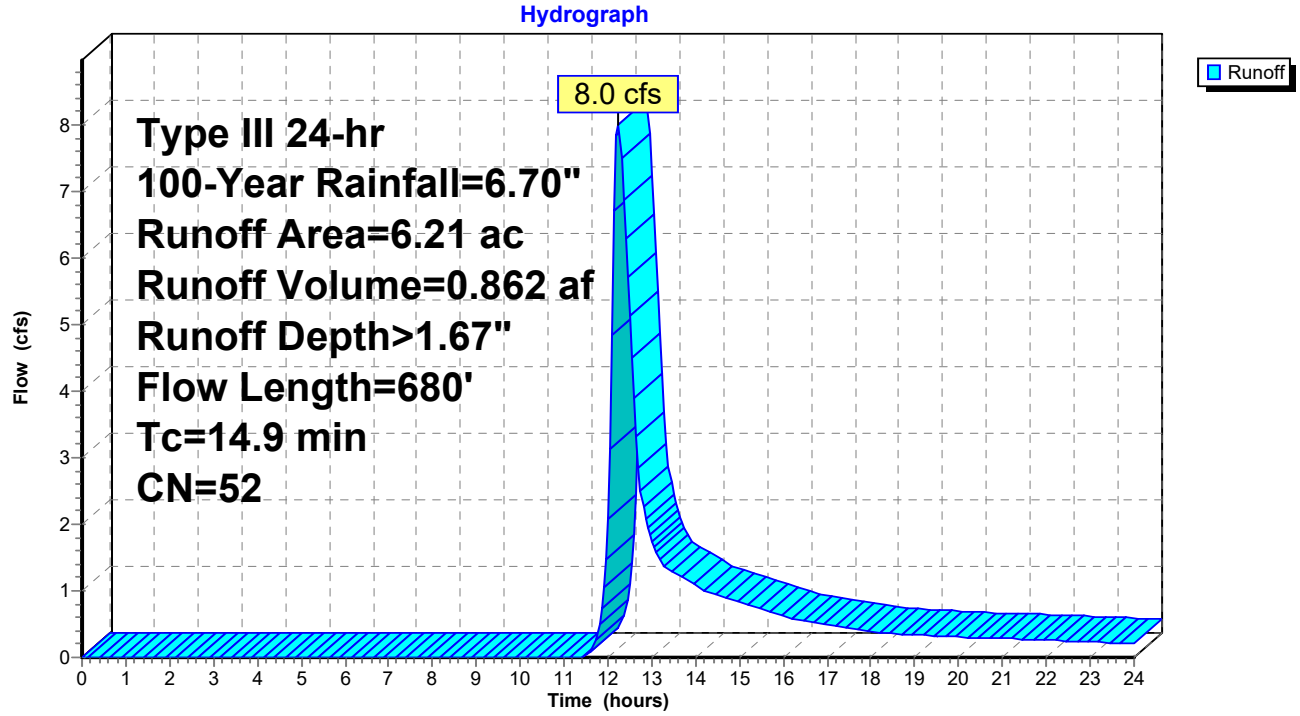
Runoff = 8.0 cfs @ 12.24 hrs, Volume= 0.862 af, Depth> 1.67"
Routed to Reach 4R : NW Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.70"

Area (ac)	CN	Description
0.70	30	Woods, Good, HSG A
5.51	55	Woods, Good, HSG B
6.21	52	Weighted Average
6.21		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
7.8	630	0.0730	1.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
14.9	680	Total			

Subcatchment 1S: Subarea EA



Summary for Subcatchment 2S: Subarea EB

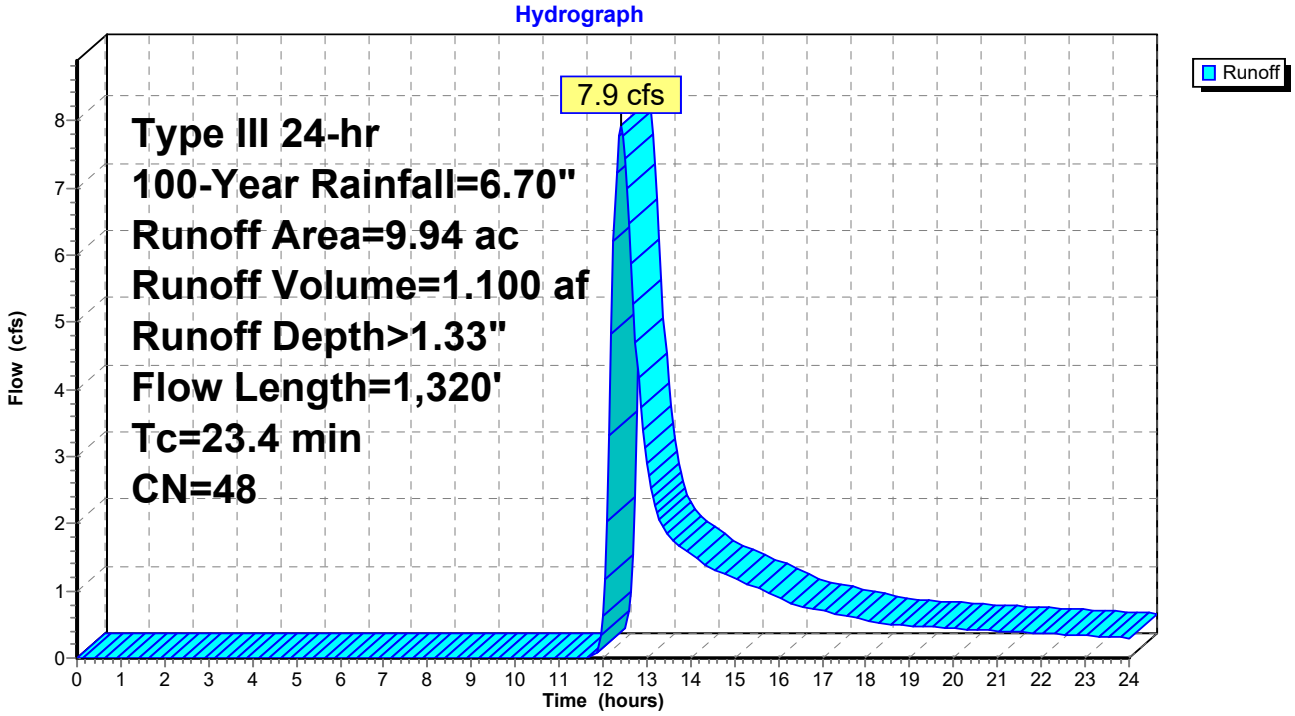
Runoff = 7.9 cfs @ 12.40 hrs, Volume= 1.100 af, Depth> 1.33"
Routed to Reach 5R : Canoe River

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.70"

Area (ac)	CN	Description
2.79	30	Woods, Good, HSG A
0.88	49	50-75% Grass cover, Fair, HSG A
0.10	98	Roofs, HSG A
0.04	96	Gravel surface, HSG A
0.07	98	Paved parking, HSG A
6.06	55	Woods, Good, HSG B
9.94	48	Weighted Average
9.77		98.29% Pervious Area
0.17		1.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.5	50	0.1000	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
13.9	933	0.0500	1.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.0	337	0.0700	1.85		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
23.4	1,320	Total			

Subcatchment 2S: Subarea EB



Summary for Subcatchment 3S: Subarea EC

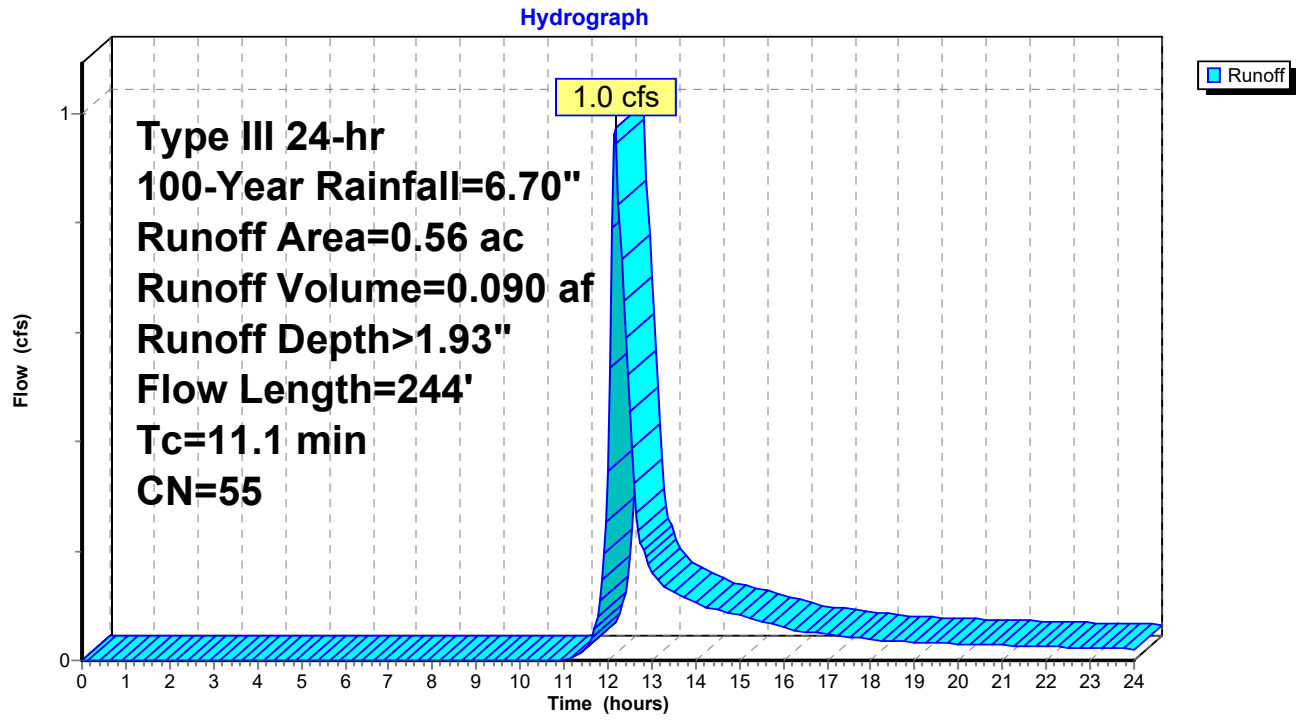
Runoff = 1.0 cfs @ 12.17 hrs, Volume= 0.090 af, Depth> 1.93"
Routed to Reach 6R : Northeast Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.70"

Area (ac)	CN	Description
0.56	55	Woods, Good, HSG B
0.56		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.2	194	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.1	244	Total			

Subcatchment 3S: Subarea EC

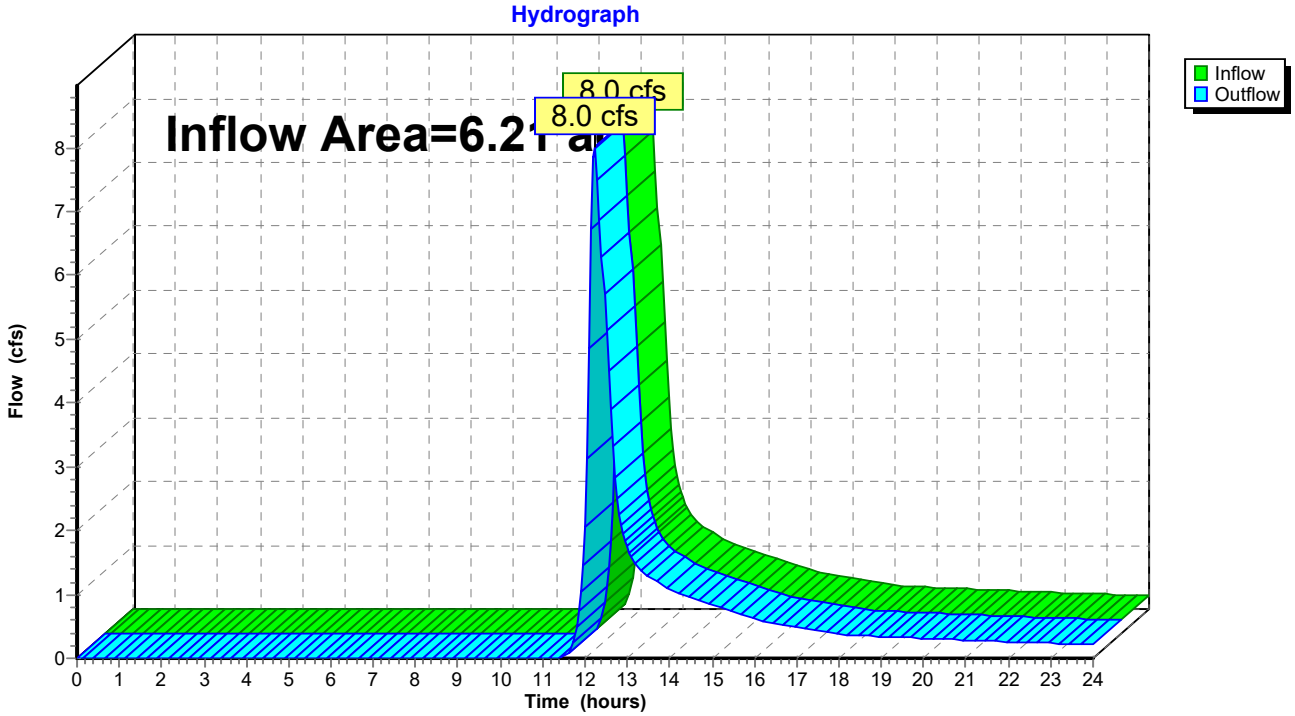


Summary for Reach 4R: NW Property Line

Inflow Area = 6.21 ac, 0.00% Impervious, Inflow Depth > 1.67" for 100-Year event
Inflow = 8.0 cfs @ 12.24 hrs, Volume= 0.862 af
Outflow = 8.0 cfs @ 12.24 hrs, Volume= 0.862 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 4R: NW Property Line

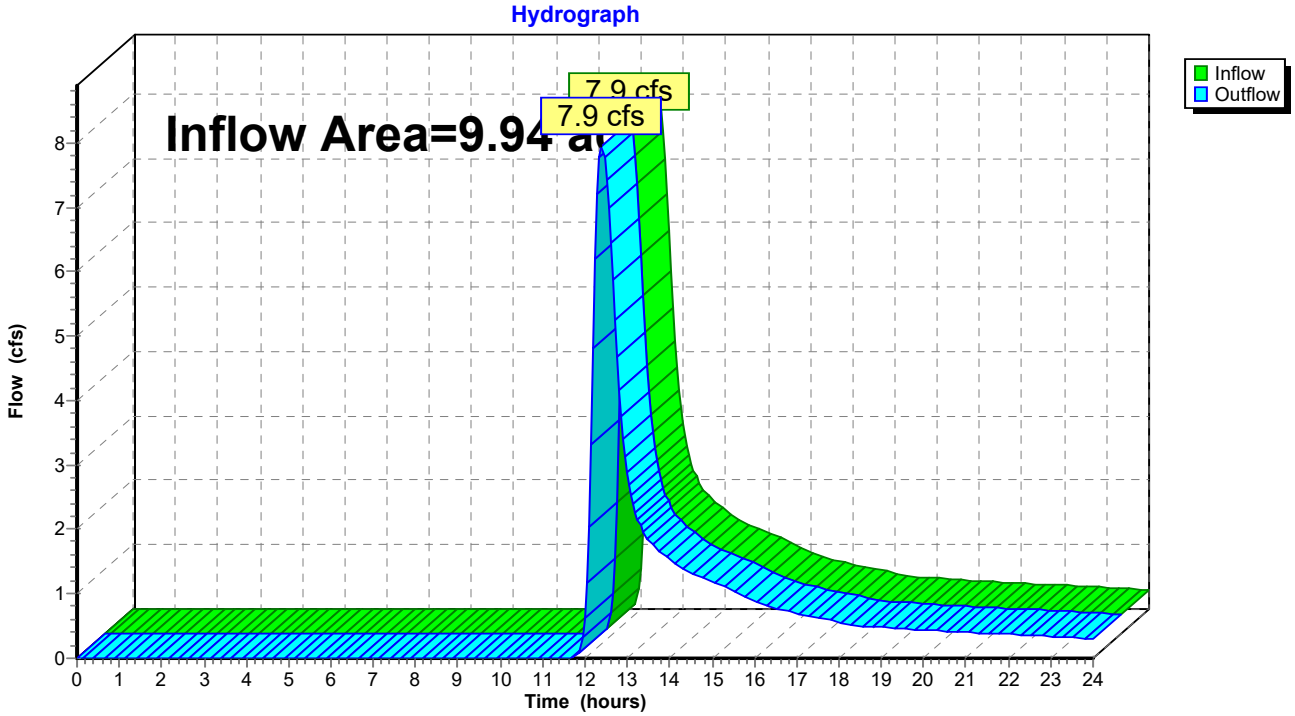


Summary for Reach 5R: Canoe River

Inflow Area = 9.94 ac, 1.71% Impervious, Inflow Depth > 1.33" for 100-Year event
Inflow = 7.9 cfs @ 12.40 hrs, Volume= 1.100 af
Outflow = 7.9 cfs @ 12.40 hrs, Volume= 1.100 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 5R: Canoe River

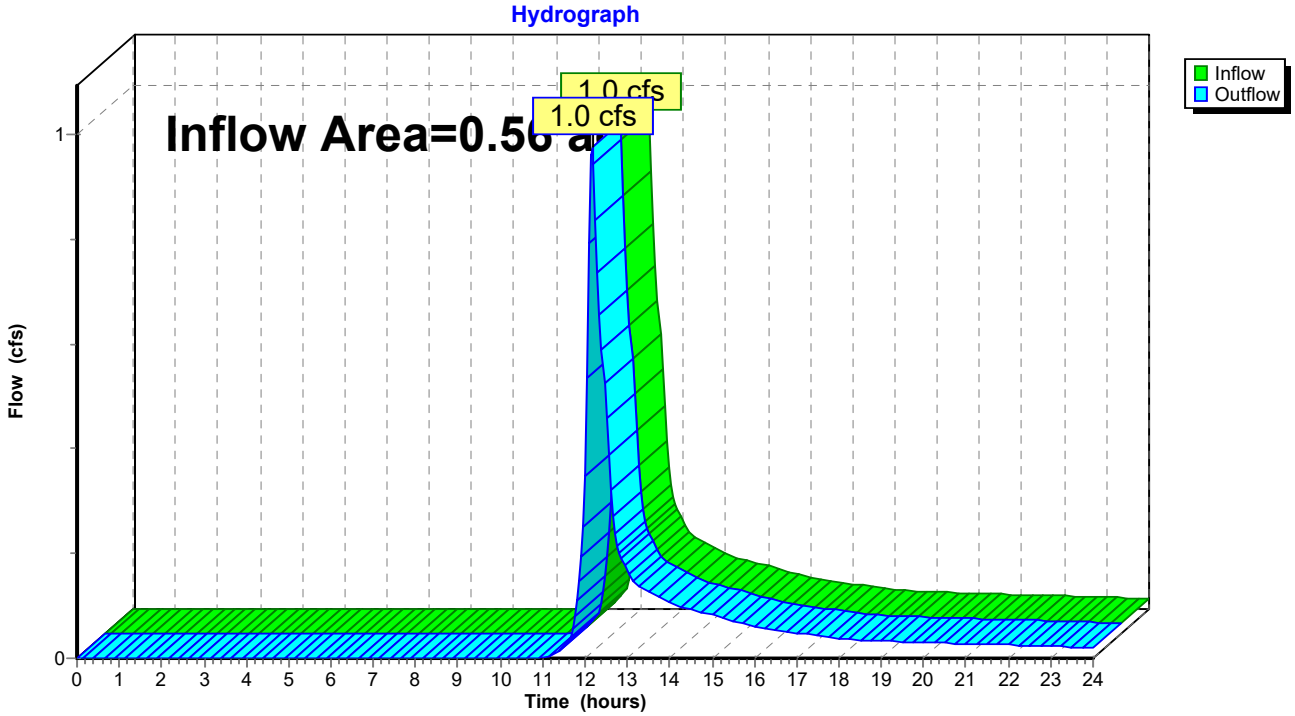


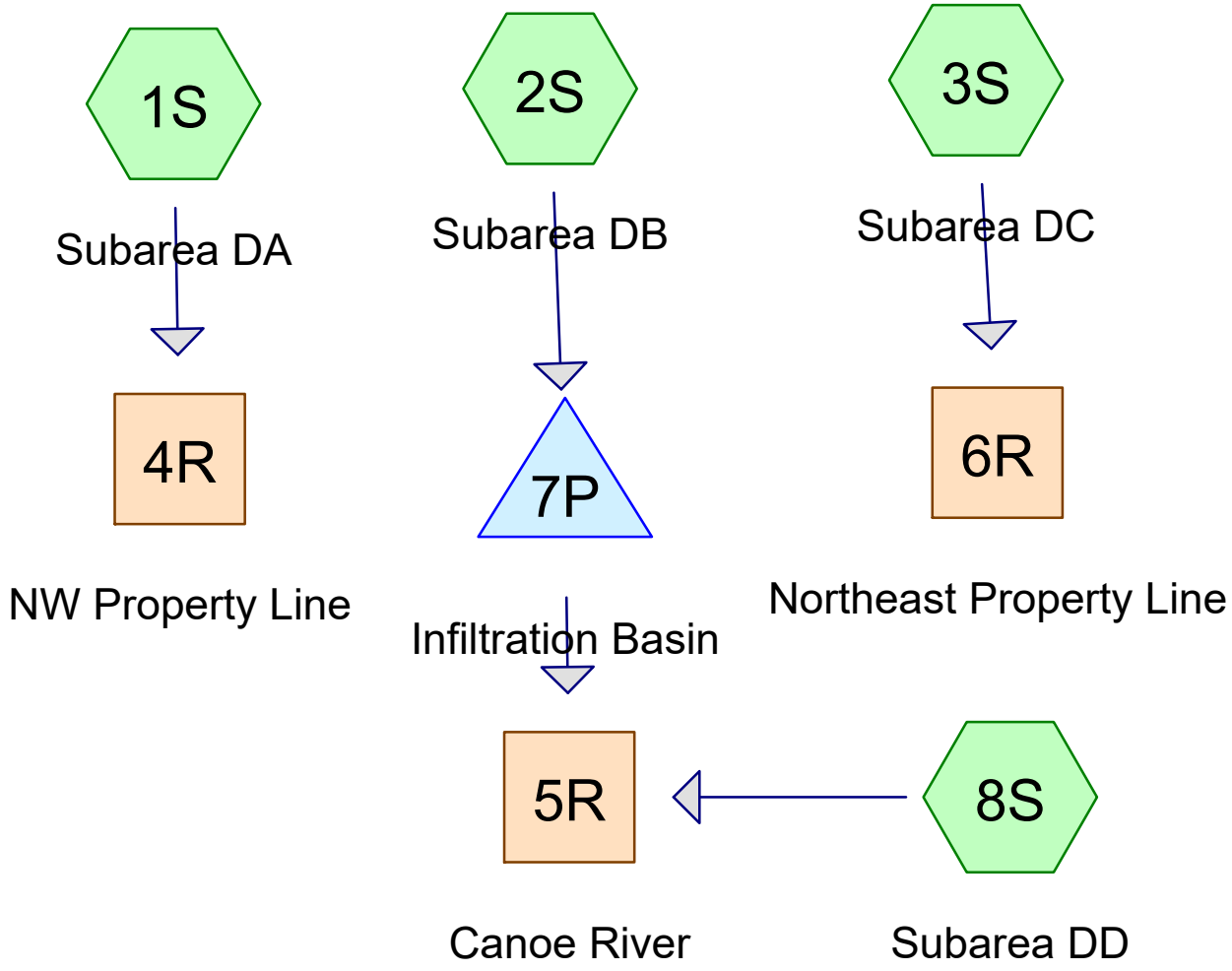
Summary for Reach 6R: Northeast Property Line

Inflow Area = 0.56 ac, 0.00% Impervious, Inflow Depth > 1.93" for 100-Year event
Inflow = 1.0 cfs @ 12.17 hrs, Volume= 0.090 af
Outflow = 1.0 cfs @ 12.17 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 6R: Northeast Property Line





Subcat Reach Pond Link

Routing Diagram for Developed Conditions
Prepared by Bay Colony Group Inc, Printed 1/18/2024

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	3.20	2
2	10-Year	Type III 24-hr		Default	24.00	1	4.70	2
3	100-Year	Type III 24-hr		Default	24.00	1	6.70	2

Area Listing (all nodes)

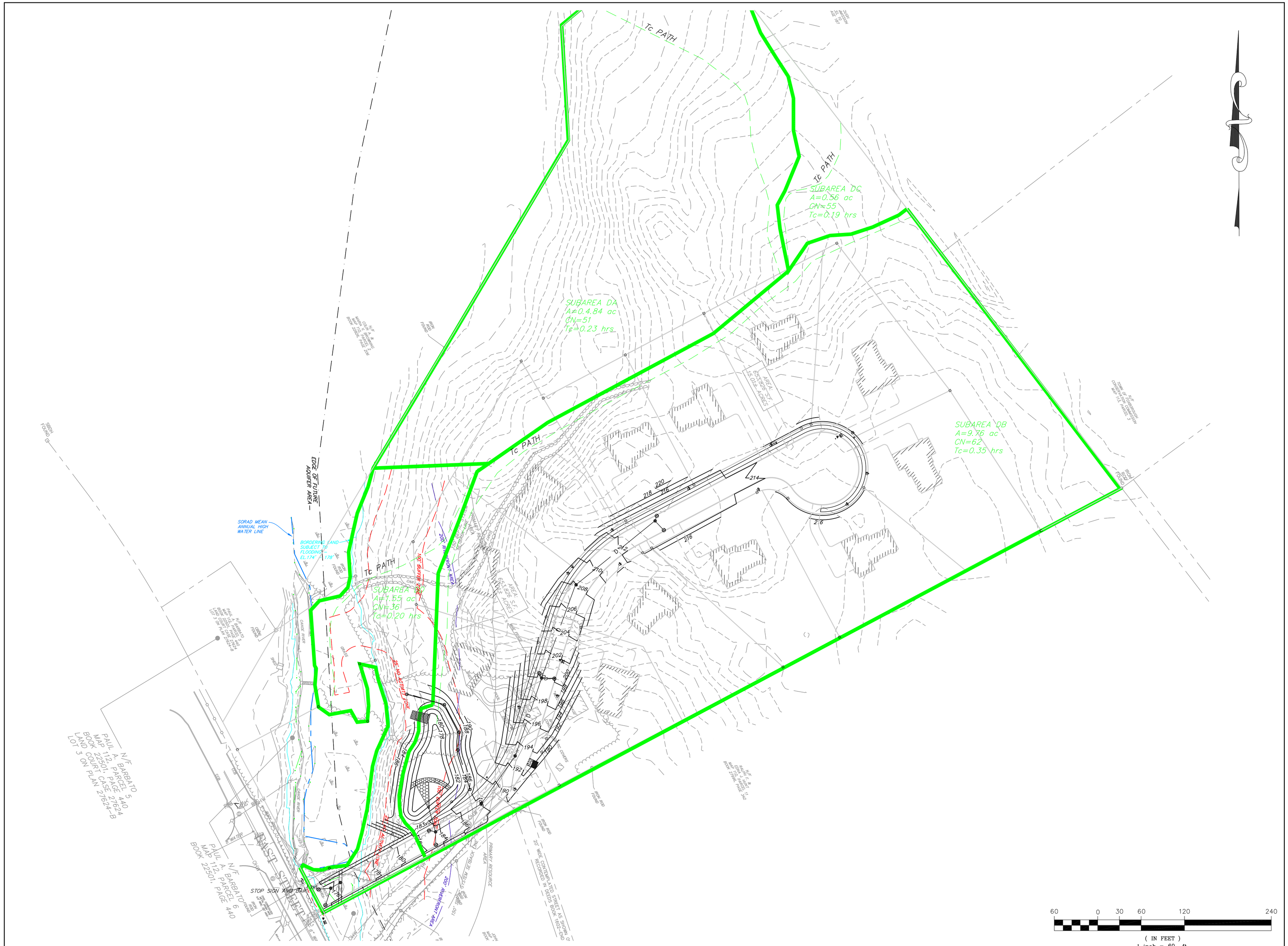
Area (acres)	CN	Description (subcatchment-numbers)
0.77	39	>75% Grass cover, Good, HSG A (2S, 8S)
2.45	61	>75% Grass cover, Good, HSG B (2S)
0.15	98	Paved parking, HSG A (2S)
0.45	98	Paved parking, HSG B (2S)
0.44	98	Paved roads w/curbs & sewers, HSG A (2S, 8S)
0.43	98	Paved roads w/curbs & sewers, HSG B (2S)
0.18	98	Roofs, HSG A (2S)
0.54	98	Roofs, HSG B (2S)
3.04	30	Woods, Good, HSG A (1S, 2S, 8S)
8.26	55	Woods, Good, HSG B (1S, 2S, 3S)
16.71	**56**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
4.58	HSG A	1S, 2S, 8S
12.13	HSG B	1S, 2S, 3S
0.00	HSG C	
0.00	HSG D	
0.00	Other	
16.71		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.77	2.45	0.00	0.00	0.00	3.22	>75% Grass cover, Good	2S, 8S
0.15	0.45	0.00	0.00	0.00	0.60	Paved parking	2S
0.44	0.43	0.00	0.00	0.00	0.87	Paved roads w/curbs & sewers	2S, 8S
0.18	0.54	0.00	0.00	0.00	0.72	Roofs	2S
3.04	8.26	0.00	0.00	0.00	11.30	Woods, Good	1S, 2S, 3S, 8S
4.58	**12.13**	**0.00**	**0.00**	**0.00**	**16.71**	**TOTAL AREA**	



PROJECT:

Pine Estates
Foxborough
Massachusetts

OWNERS:

Scott M. & Elaine D. Barbato
204 East Street
Foxborough, MA 02035

Paul A. Barbato
192 East Street
Foxborough, MA 02035

APPLICANT:

Pine Air, LLC
364 Hickory Road
North Attleboro, MA 02760

Bay Colony Group, Inc.
Professional Civil Engineers & Professional Land Surveyors

FOUR SCHOOL STREET
P.O. BOX 91136
FOXBOROUGH, MA 02035
508-543-3939

NOTICE TO CONTRACTOR:

1. *ALL CONTRACTORS SHALL CONTACT THE PLANNING BOARD 508.543.1250 PRIOR TO THE INITIATION OF ANY CONSTRUCTION.*
2. *A STREET OPENING PERMIT MUST BE OBTAINED FROM THE FOXBOROUGH HIGHWAY DEPARTMENT PRIOR TO ANY WORK OCCURRING IN OR ON ANY STREET (AFTER ACCEPTED OR NOT) AFTER THE TOP COURSE OF PAVEMENT IS INSTALLED.*

ASSUMPTIONS:

- *0.06 AC BUILDING FOOTPRINT PER LOT*
- *0.05 AC DRIVEWAY PER LOT*
- *0.23 AC LAWN PER LOT*

STAMP

DRAWING TITLE

Developed Subareas

SCALE: 1" = 60'

FEBRUARY 1, 2024	SHEET NUMBER
23-0182B	**Dev**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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: Subarea DA Runoff Area=4.84 ac 0.00% Impervious Runoff Depth>0.15"
Flow Length=500' Tc=13.8 min CN=51 Runoff=0.2 cfs 0.060 af

Subcatchment 2S: Subarea DB Runoff Area=9.76 ac 21.11% Impervious Runoff Depth>0.48"
Flow Length=1,045' Tc=20.7 min CN=62 Runoff=2.5 cfs 0.388 af

Subcatchment 3S: Subarea DC Runoff Area=0.56 ac 0.00% Impervious Runoff Depth>0.25"
Flow Length=244' Tc=11.1 min CN=55 Runoff=0.1 cfs 0.012 af

Subcatchment 8S: Subarea DD Runoff Area=1.55 ac 8.39% Impervious Runoff Depth=0.00"
Flow Length=430' Tc=11.8 min CN=36 Runoff=0.0 cfs 0.000 af

Reach 4R: NW Property Line Inflow=0.2 cfs 0.060 af
Outflow=0.2 cfs 0.060 af

Reach 5R: Canoe River Inflow=0.0 cfs 0.000 af
Outflow=0.0 cfs 0.000 af

Reach 6R: Northeast Property Line Inflow=0.1 cfs 0.012 af
Outflow=0.1 cfs 0.012 af

Pond 7P: Infiltration Basin Peak Elev=178.88' Storage=3,072 cf Inflow=2.5 cfs 0.388 af
Discarded=1.0 cfs 0.388 af Primary=0.0 cfs 0.000 af Outflow=1.0 cfs 0.388 af

Total Runoff Area = 16.71 ac Runoff Volume = 0.460 af Average Runoff Depth = 0.33"
86.89% Pervious = 14.52 ac 13.11% Impervious = 2.19 ac

Summary for Subcatchment 1S: Subarea DA

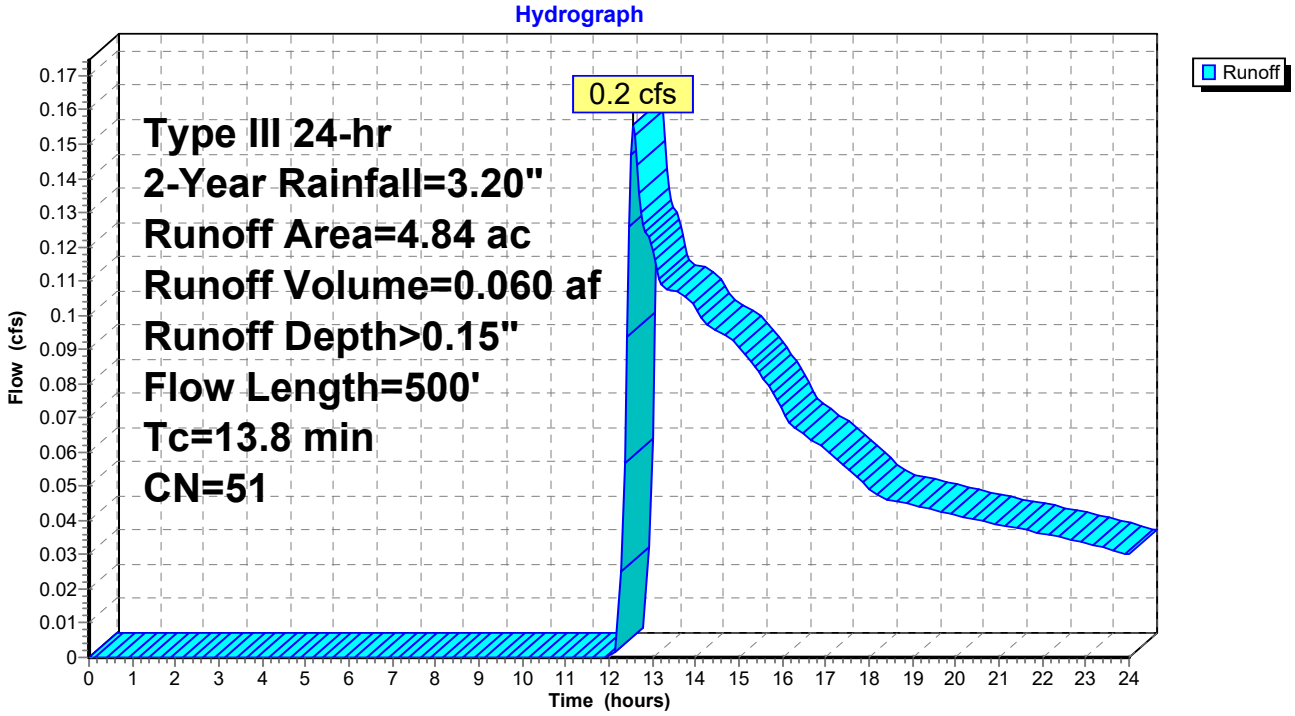
Runoff = 0.2 cfs @ 12.56 hrs, Volume= 0.060 af, Depth> 0.15"
Routed to Reach 4R : NW Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description
0.77	30	Woods, Good, HSG A
4.07	55	Woods, Good, HSG B
4.84	51	Weighted Average
4.84		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
5.3	450	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.8	500	Total			

Subcatchment 1S: Subarea DA



Summary for Subcatchment 2S: Subarea DB

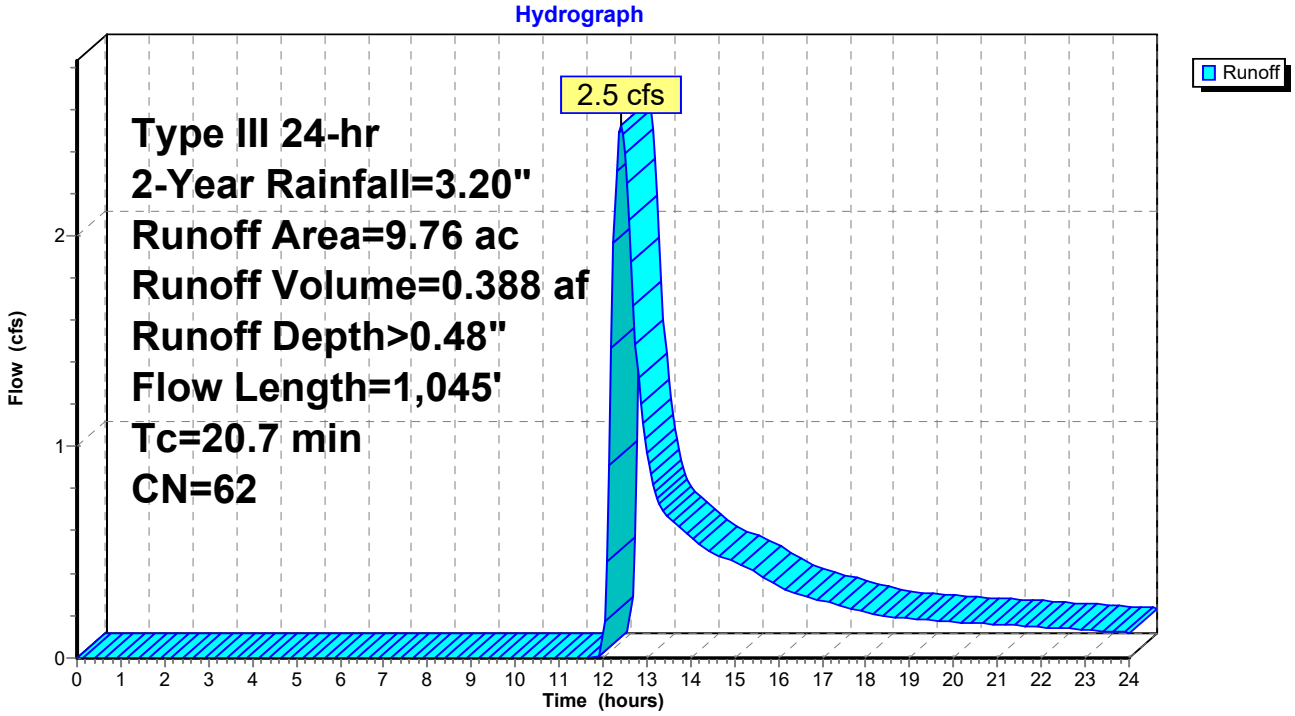
Runoff = 2.5 cfs @ 12.40 hrs, Volume= 0.388 af, Depth> 0.48"
Routed to Pond 7P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description
0.93	30	Woods, Good, HSG A
0.69	39	>75% Grass cover, Good, HSG A
0.18	98	Roofs, HSG A
0.15	98	Paved parking, HSG A
0.31	98	Paved roads w/curbs & sewers, HSG A
3.63	55	Woods, Good, HSG B
2.45	61	>75% Grass cover, Good, HSG B
0.54	98	Roofs, HSG B
0.45	98	Paved parking, HSG B
0.43	98	Paved roads w/curbs & sewers, HSG B
9.76	62	Weighted Average
7.70		78.89% Pervious Area
2.06		21.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.2	65	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.0	930	0.0490	1.55		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.7	1,045	Total			

Subcatchment 2S: Subarea DB



Summary for Subcatchment 3S: Subarea DC

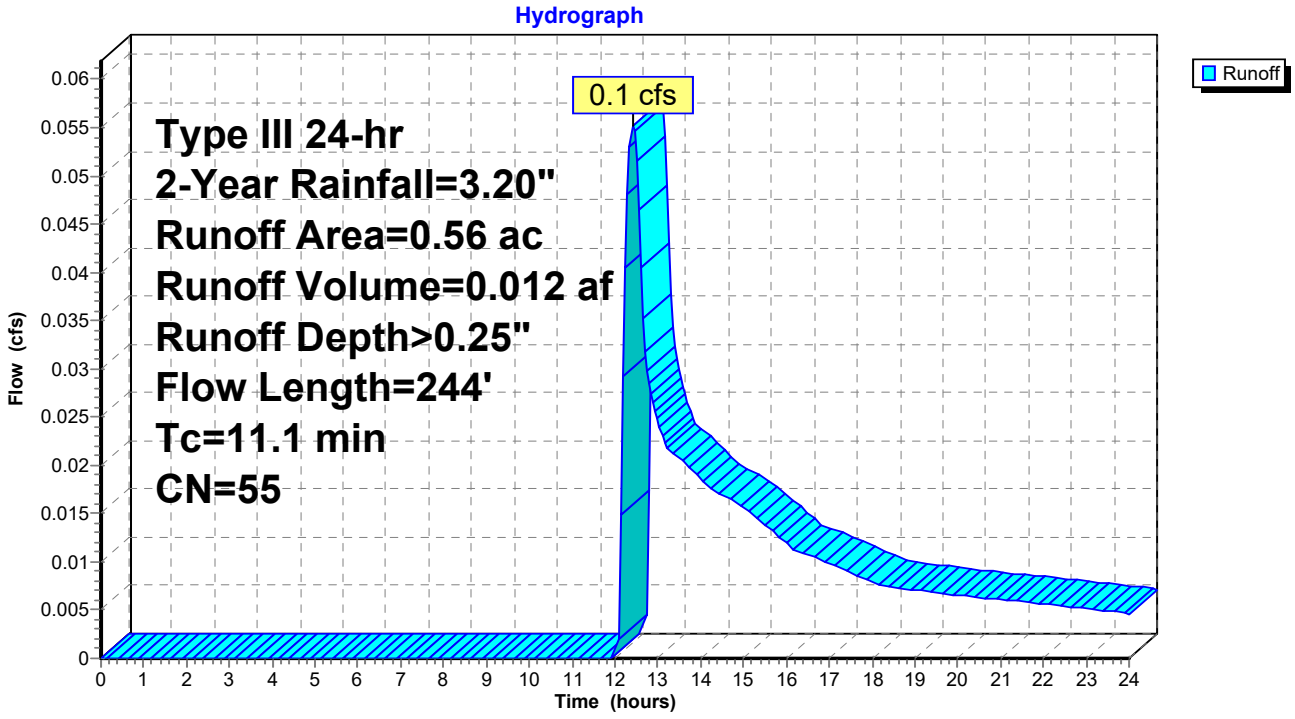
Runoff = 0.1 cfs @ 12.41 hrs, Volume= 0.012 af, Depth> 0.25"
Routed to Reach 6R : Northeast Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description
0.56	55	Woods, Good, HSG B
0.56		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.2	194	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.1	244	Total			

Subcatchment 3S: Subarea DC



Summary for Subcatchment 8S: Subarea DD

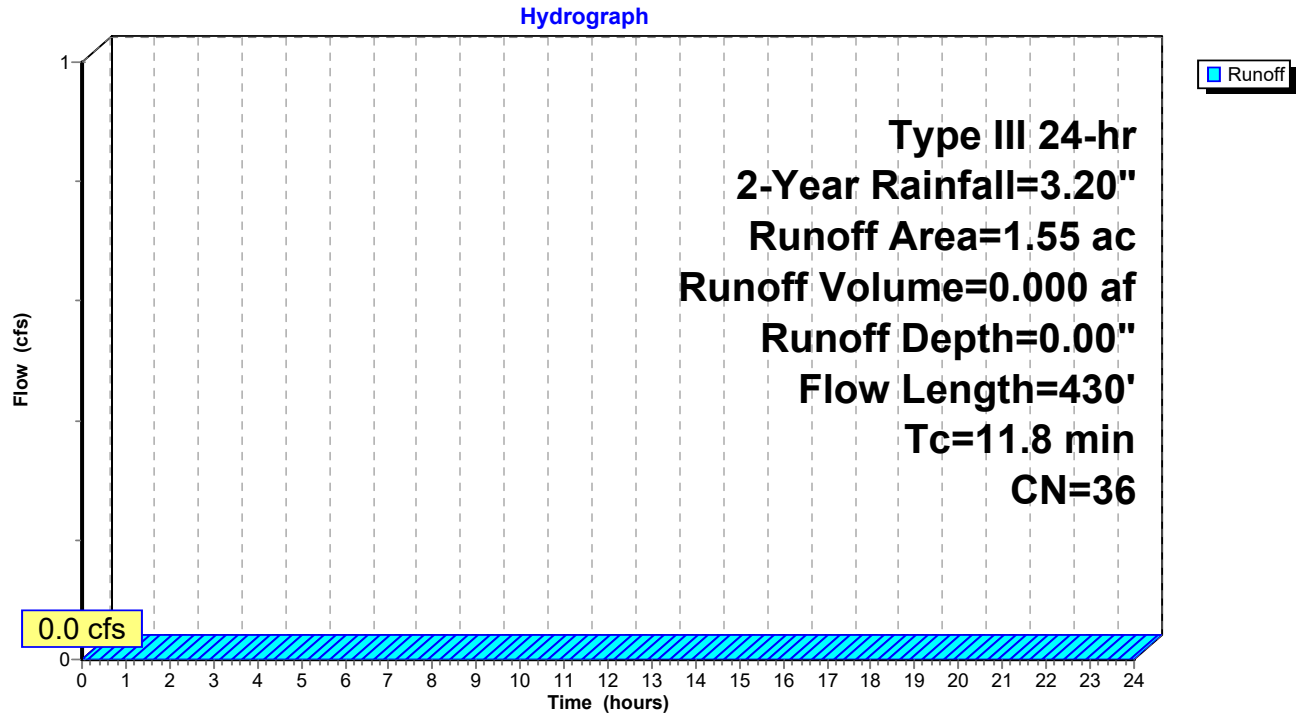
Runoff = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Reach 5R : Canoe River

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.20"

Area (ac)	CN	Description
1.34	30	Woods, Good, HSG A
0.08	39	>75% Grass cover, Good, HSG A
0.13	98	Paved roads w/curbs & sewers, HSG A
1.55	36	Weighted Average
1.42		91.61% Pervious Area
0.13		8.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
4.7	380	0.0740	1.36		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.8	430	Total			

Subcatchment 8S: Subarea DD

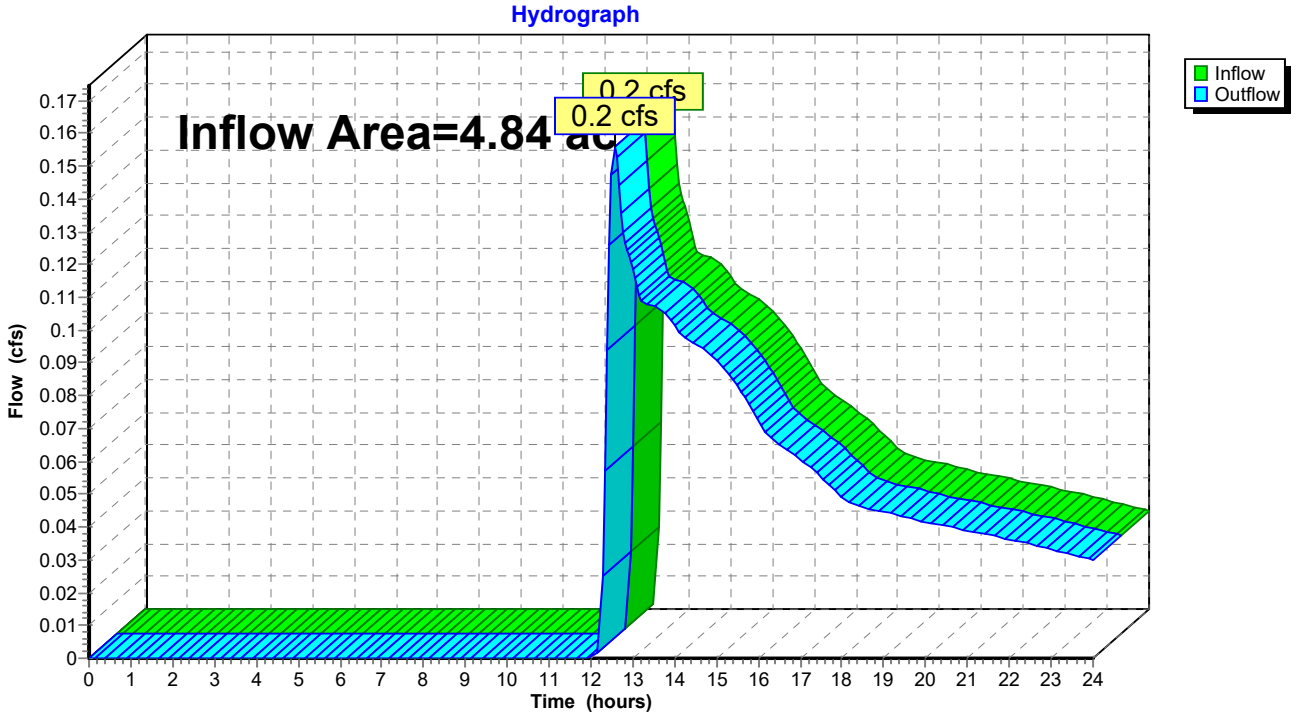


Summary for Reach 4R: NW Property Line

Inflow Area = 4.84 ac, 0.00% Impervious, Inflow Depth > 0.15" for 2-Year event
Inflow = 0.2 cfs @ 12.56 hrs, Volume= 0.060 af
Outflow = 0.2 cfs @ 12.56 hrs, Volume= 0.060 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 4R: NW Property Line

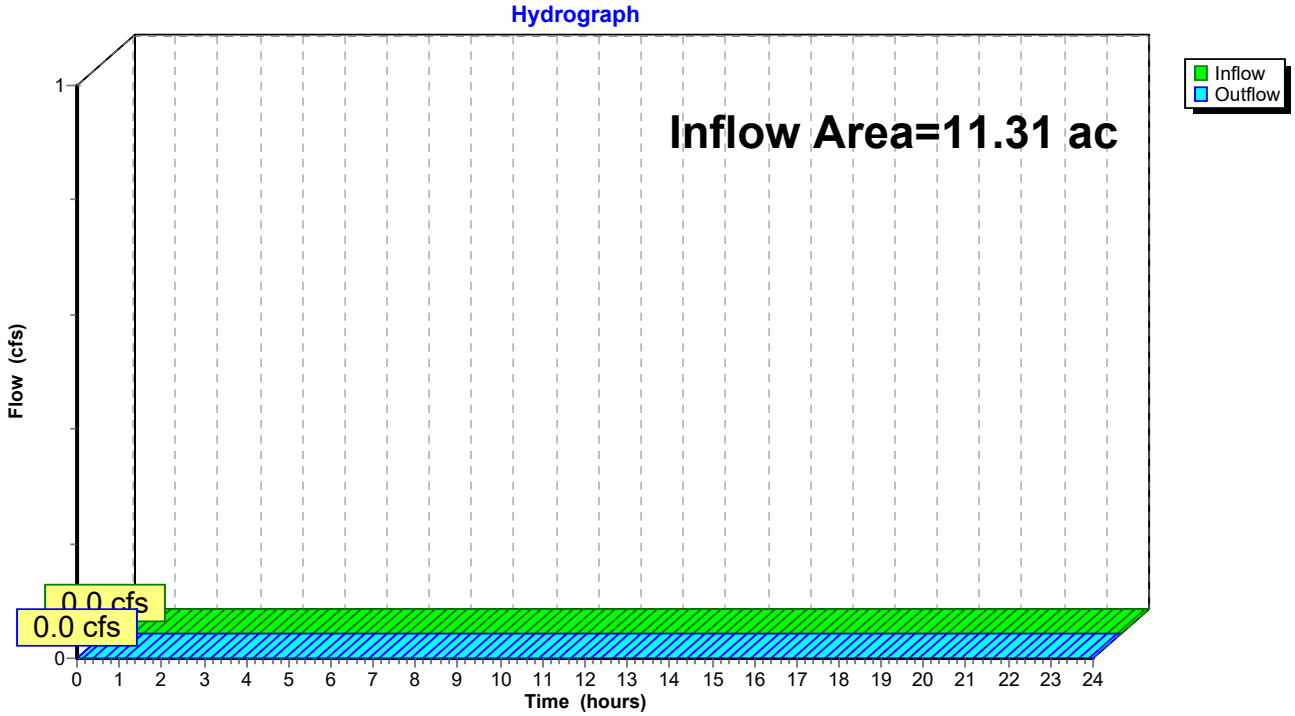


Summary for Reach 5R: Canoe River

Inflow Area = 11.31 ac, 19.36% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Outflow = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 5R: Canoe River

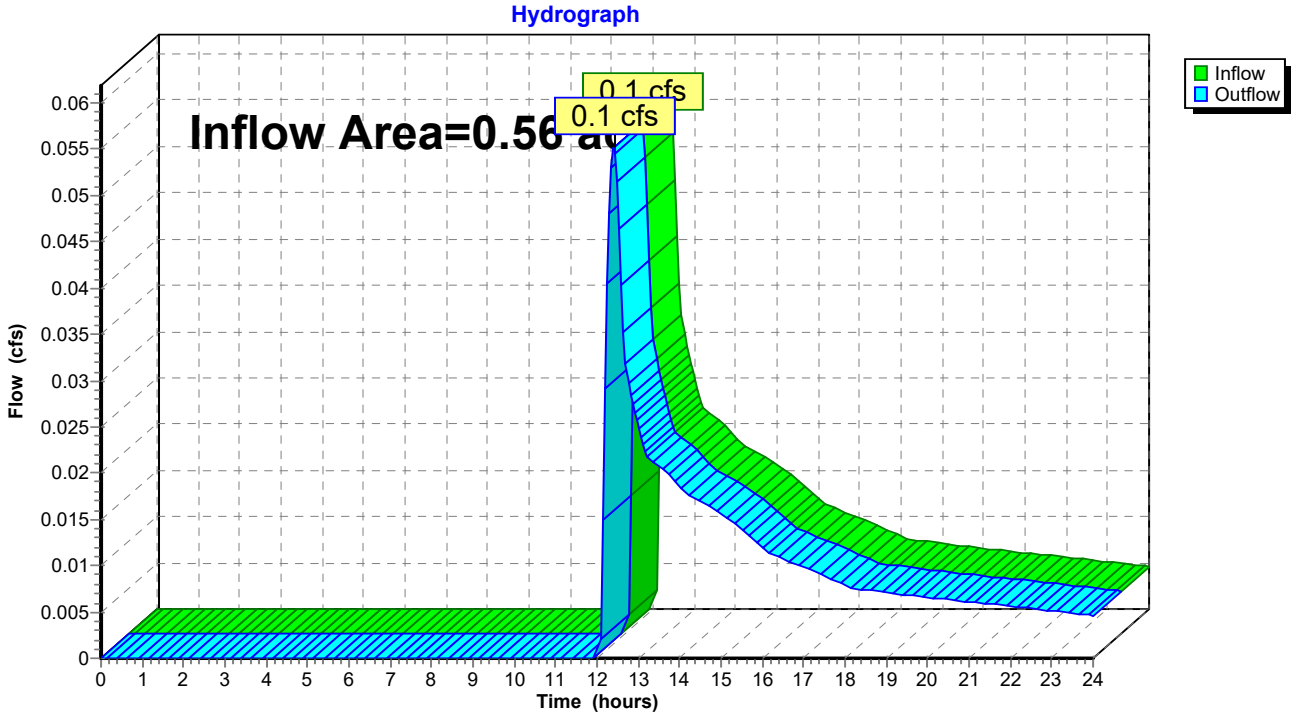


Summary for Reach 6R: Northeast Property Line

Inflow Area = 0.56 ac, 0.00% Impervious, Inflow Depth > 0.25" for 2-Year event
Inflow = 0.1 cfs @ 12.41 hrs, Volume= 0.012 af
Outflow = 0.1 cfs @ 12.41 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 6R: Northeast Property Line



Summary for Pond 7P: Infiltration Basin

Inflow Area = 9.76 ac, 21.11% Impervious, Inflow Depth > 0.48" for 2-Year event
Inflow = 2.5 cfs @ 12.40 hrs, Volume= 0.388 af
Outflow = 1.0 cfs @ 13.01 hrs, Volume= 0.388 af, Atten= 62%, Lag= 36.4 min
Discarded = 1.0 cfs @ 13.01 hrs, Volume= 0.388 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 5R : Canoe River

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 178.88' @ 13.01 hrs Surf.Area= 3,904 sf Storage= 3,072 cf

Plug-Flow detention time= 25.5 min calculated for 0.387 af (100% of inflow)
Center-of-Mass det. time= 24.5 min (943.8 - 919.2)

Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	28,351 cf	**Infiltration Basin (Irregular)**Listed below (Recalc)

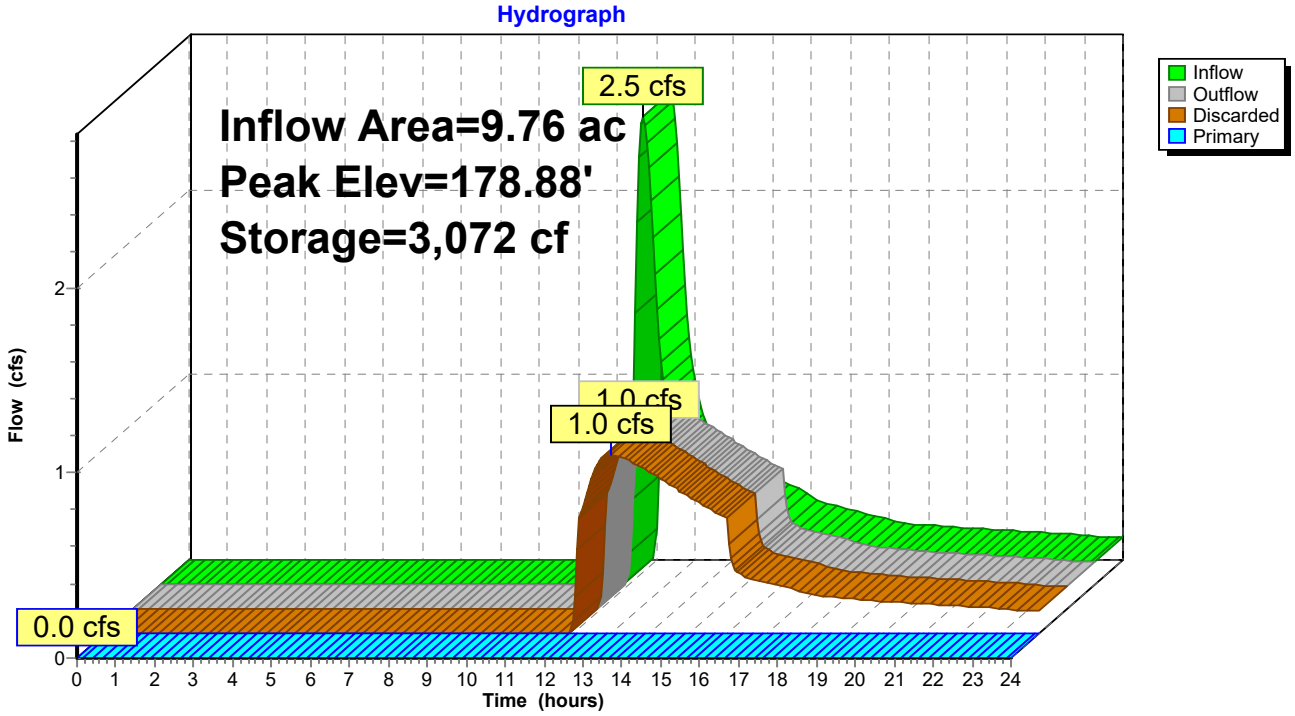
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	3,122	278.0	0	0	3,122
180.00	5,035	333.0	8,081	8,081	5,865
182.00	7,145	371.0	12,119	20,200	8,107
183.00	9,200	394.0	8,151	28,351	9,559

Device	Routing	Invert	Outlet Devices
#1	Discarded	178.00'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 174.00'
#2	Primary	182.50'	**45.0 deg x 10.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=1.0 cfs @ 13.01 hrs HW=178.88' (Free Discharge)
↑—**1=Exfiltration** (Controls 1.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=178.00' (Free Discharge)
↑—**2=Sharp-Crested Vee/Trap Weir** (Controls 0.0 cfs)

Pond 7P: Infiltration Basin



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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: Subarea DA Runoff Area=4.84 ac 0.00% Impervious Runoff Depth>0.62"
Flow Length=500' Tc=13.8 min CN=51 Runoff=1.7 cfs 0.250 af

Subcatchment 2S: Subarea DB Runoff Area=9.76 ac 21.11% Impervious Runoff Depth>1.25"
Flow Length=1,045' Tc=20.7 min CN=62 Runoff=8.6 cfs 1.016 af

Subcatchment 3S: Subarea DC Runoff Area=0.56 ac 0.00% Impervious Runoff Depth>0.83"
Flow Length=244' Tc=11.1 min CN=55 Runoff=0.3 cfs 0.039 af

Subcatchment 8S: Subarea DD Runoff Area=1.55 ac 8.39% Impervious Runoff Depth>0.07"
Flow Length=430' Tc=11.8 min CN=36 Runoff=0.0 cfs 0.009 af

Reach 4R: NW Property Line Inflow=1.7 cfs 0.250 af
Outflow=1.7 cfs 0.250 af

Reach 5R: Canoe River Inflow=0.0 cfs 0.009 af
Outflow=0.0 cfs 0.009 af

Reach 6R: Northeast Property Line Inflow=0.3 cfs 0.039 af
Outflow=0.3 cfs 0.039 af

Pond 7P: Infiltration Basin Peak Elev=181.06' Storage=13,966 cf Inflow=8.6 cfs 1.016 af
Discarded=2.0 cfs 1.015 af Primary=0.0 cfs 0.000 af Outflow=2.0 cfs 1.015 af

Total Runoff Area = 16.71 ac Runoff Volume = 1.314 af Average Runoff Depth = 0.94"
86.89% Pervious = 14.52 ac 13.11% Impervious = 2.19 ac

Summary for Subcatchment 1S: Subarea DA

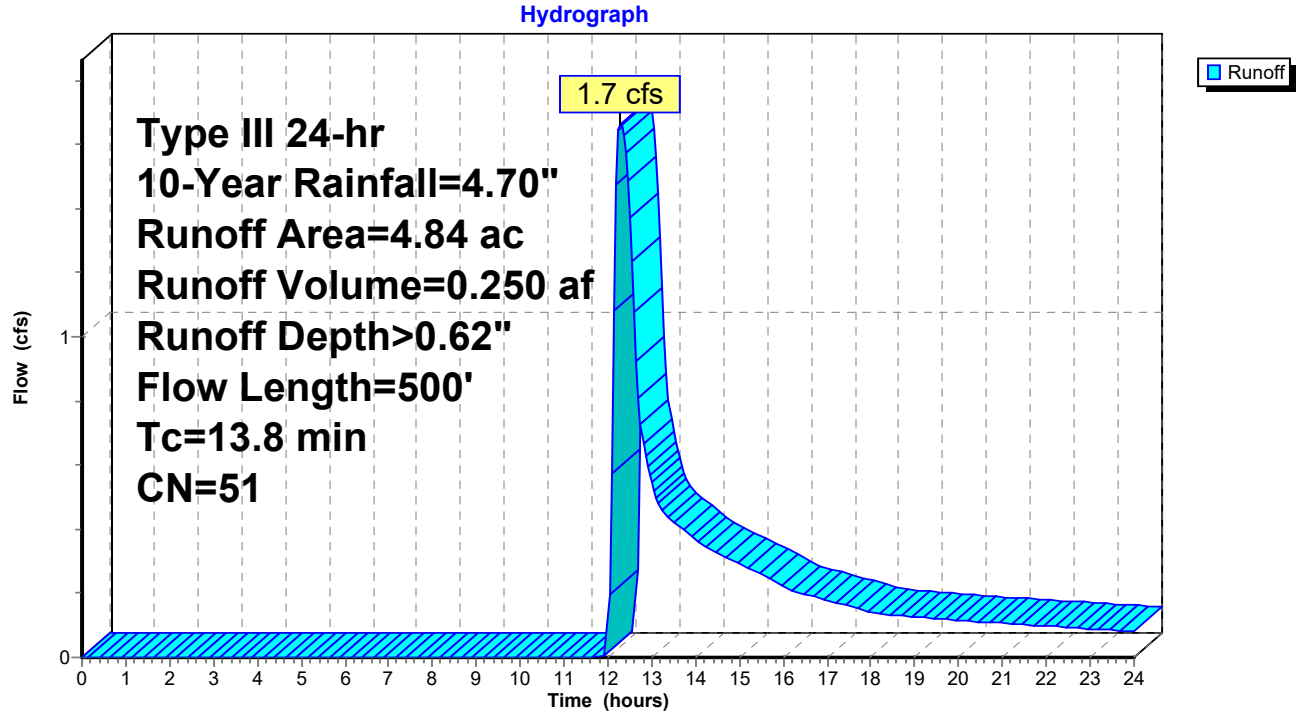
Runoff = 1.7 cfs @ 12.29 hrs, Volume= 0.250 af, Depth> 0.62"
Routed to Reach 4R : NW Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (ac)	CN	Description
0.77	30	Woods, Good, HSG A
4.07	55	Woods, Good, HSG B
4.84	51	Weighted Average
4.84		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
5.3	450	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.8	500	Total			

Subcatchment 1S: Subarea DA



Summary for Subcatchment 2S: Subarea DB

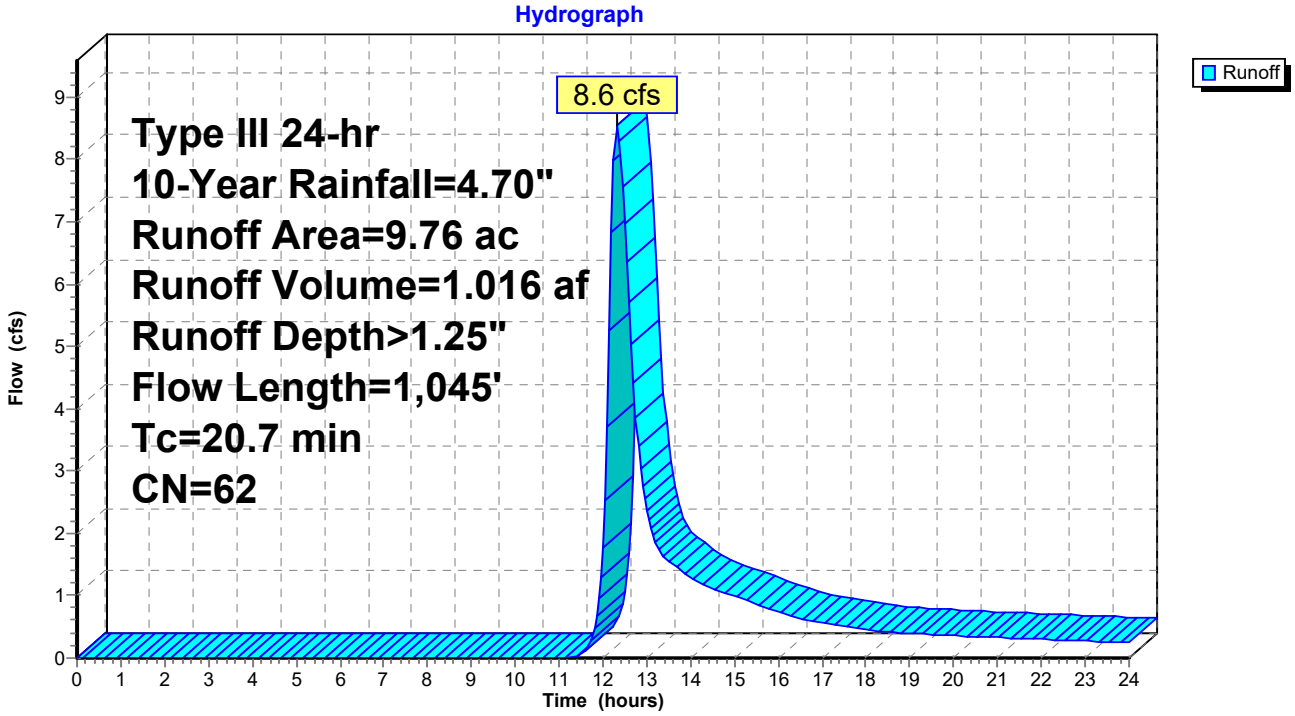
Runoff = 8.6 cfs @ 12.32 hrs, Volume= 1.016 af, Depth> 1.25"
Routed to Pond 7P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (ac)	CN	Description
0.93	30	Woods, Good, HSG A
0.69	39	>75% Grass cover, Good, HSG A
0.18	98	Roofs, HSG A
0.15	98	Paved parking, HSG A
0.31	98	Paved roads w/curbs & sewers, HSG A
3.63	55	Woods, Good, HSG B
2.45	61	>75% Grass cover, Good, HSG B
0.54	98	Roofs, HSG B
0.45	98	Paved parking, HSG B
0.43	98	Paved roads w/curbs & sewers, HSG B
9.76	62	Weighted Average
7.70		78.89% Pervious Area
2.06		21.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.2	65	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.0	930	0.0490	1.55		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.7	1,045	Total			

Subcatchment 2S: Subarea DB



Summary for Subcatchment 3S: Subarea DC

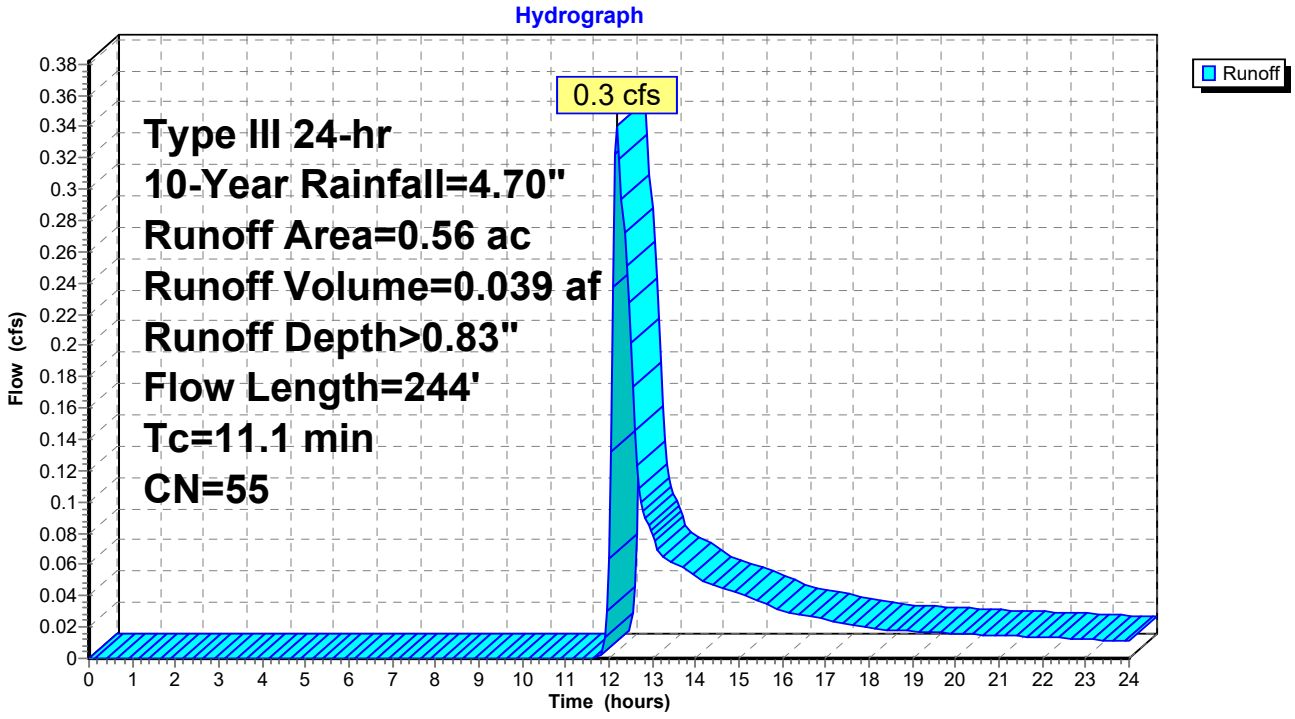
Runoff = 0.3 cfs @ 12.20 hrs, Volume= 0.039 af, Depth> 0.83"
Routed to Reach 6R : Northeast Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (ac)	CN	Description
0.56	55	Woods, Good, HSG B
0.56		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.2	194	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.1	244	Total			

Subcatchment 3S: Subarea DC



Summary for Subcatchment 8S: Subarea DD

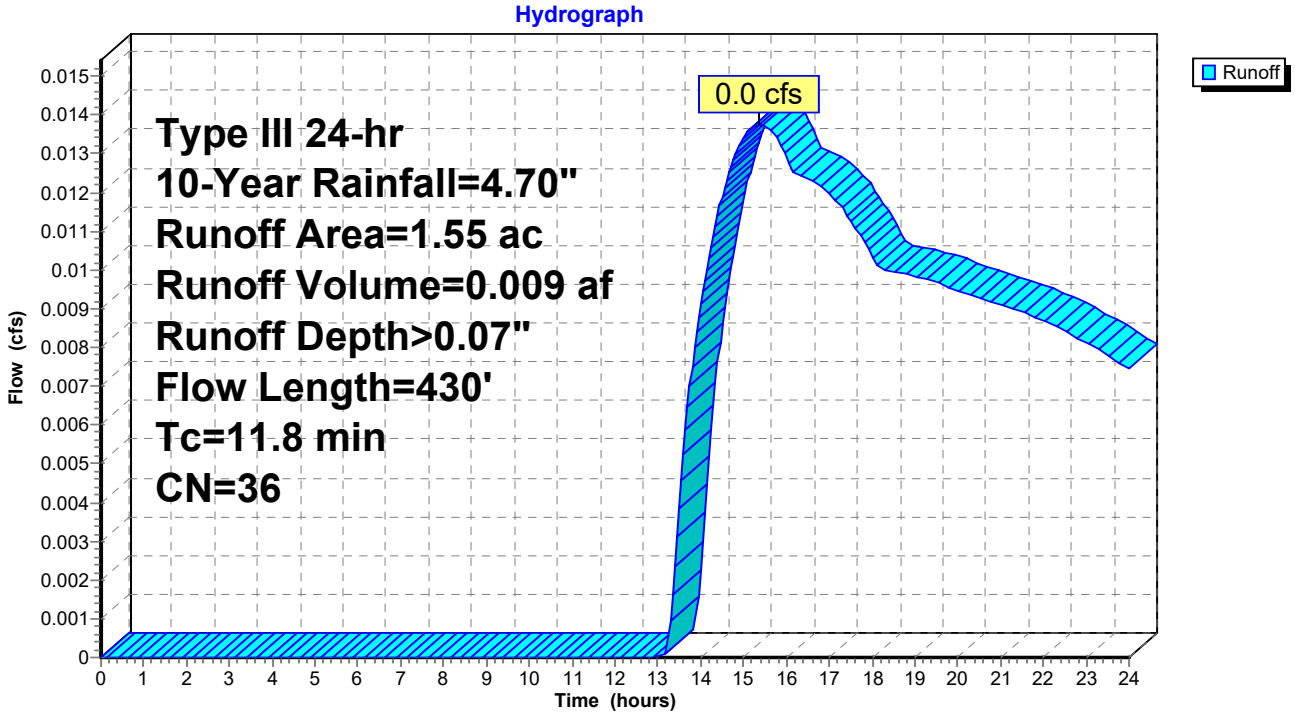
Runoff = 0.0 cfs @ 15.37 hrs, Volume= 0.009 af, Depth> 0.07"
Routed to Reach 5R : Canoe River

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.70"

Area (ac)	CN	Description
1.34	30	Woods, Good, HSG A
0.08	39	>75% Grass cover, Good, HSG A
0.13	98	Paved roads w/curbs & sewers, HSG A
1.55	36	Weighted Average
1.42		91.61% Pervious Area
0.13		8.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
4.7	380	0.0740	1.36		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.8	430	Total			

Subcatchment 8S: Subarea DD

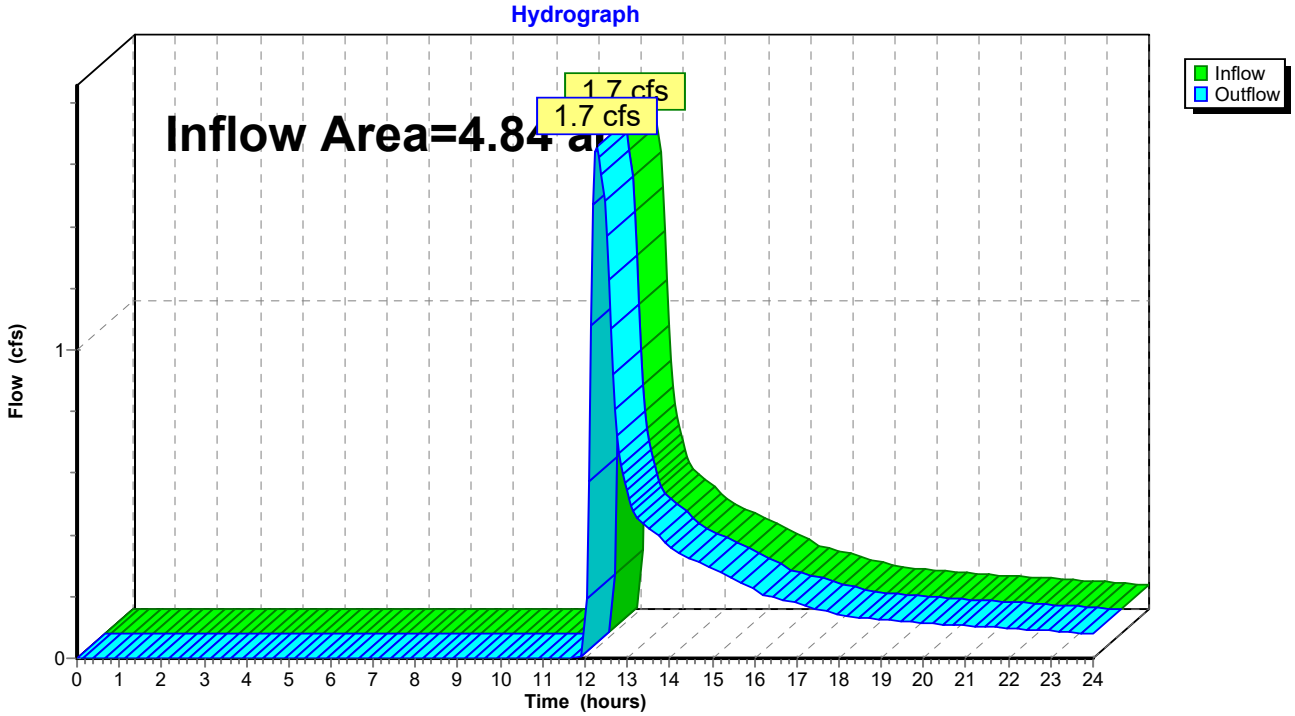


Summary for Reach 4R: NW Property Line

Inflow Area = 4.84 ac, 0.00% Impervious, Inflow Depth > 0.62" for 10-Year event
Inflow = 1.7 cfs @ 12.29 hrs, Volume= 0.250 af
Outflow = 1.7 cfs @ 12.29 hrs, Volume= 0.250 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 4R: NW Property Line

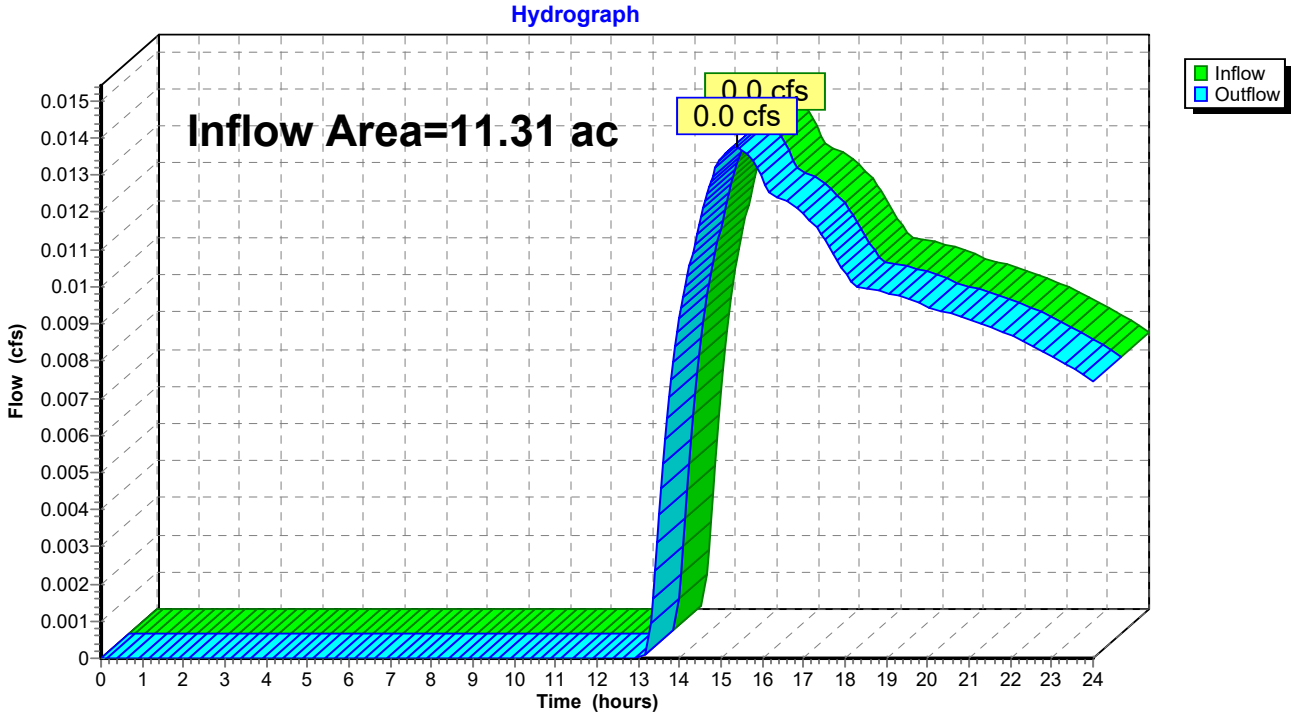


Summary for Reach 5R: Canoe River

Inflow Area = 11.31 ac, 19.36% Impervious, Inflow Depth > 0.01" for 10-Year event
Inflow = 0.0 cfs @ 15.37 hrs, Volume= 0.009 af
Outflow = 0.0 cfs @ 15.37 hrs, Volume= 0.009 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 5R: Canoe River

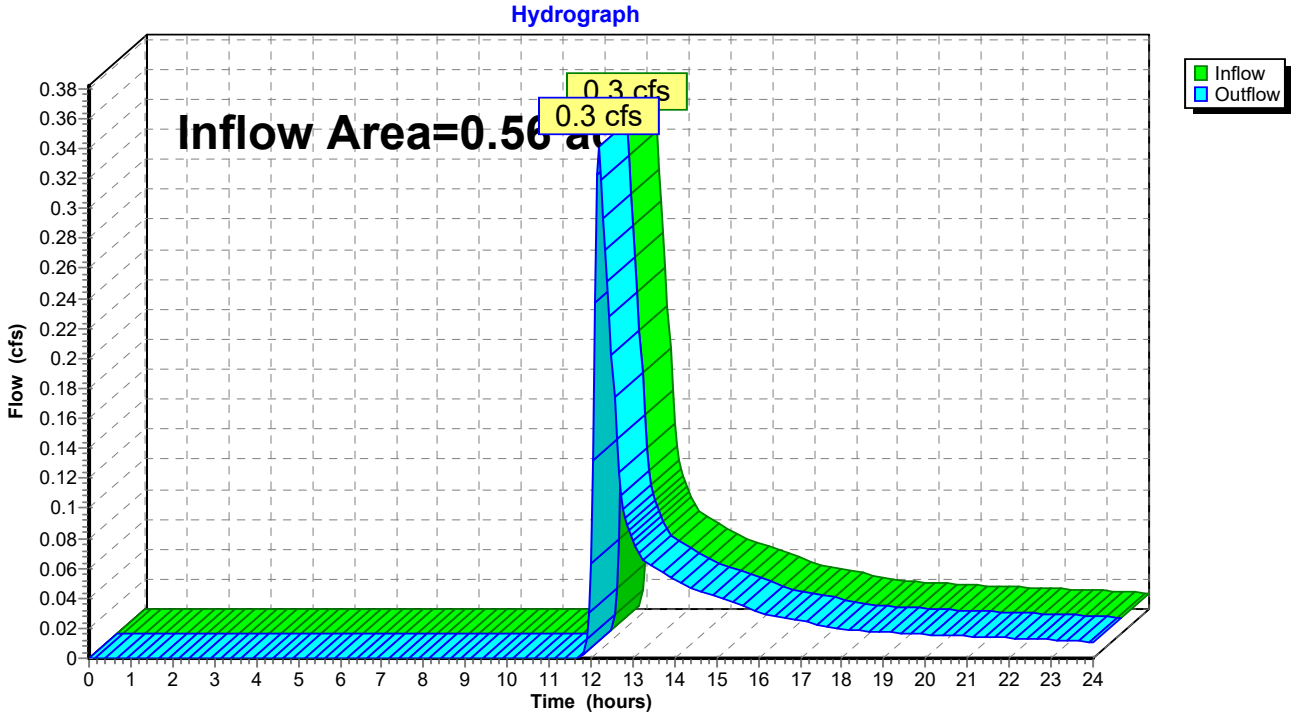


Summary for Reach 6R: Northeast Property Line

Inflow Area = 0.56 ac, 0.00% Impervious, Inflow Depth > 0.83" for 10-Year event
Inflow = 0.3 cfs @ 12.20 hrs, Volume= 0.039 af
Outflow = 0.3 cfs @ 12.20 hrs, Volume= 0.039 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 6R: Northeast Property Line



Summary for Pond 7P: Infiltration Basin

Inflow Area = 9.76 ac, 21.11% Impervious, Inflow Depth > 1.25" for 10-Year event
Inflow = 8.6 cfs @ 12.32 hrs, Volume= 1.016 af
Outflow = 2.0 cfs @ 13.12 hrs, Volume= 1.015 af, Atten= 76%, Lag= 47.9 min
Discarded = 2.0 cfs @ 13.12 hrs, Volume= 1.015 af
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 5R : Canoe River

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 181.06' @ 13.12 hrs Surf.Area= 6,105 sf Storage= 13,966 cf

Plug-Flow detention time= 75.7 min calculated for 1.013 af (100% of inflow)
Center-of-Mass det. time= 74.8 min (958.9 - 884.2)

Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	28,351 cf	**Infiltration Basin (Irregular)**Listed below (Recalc)

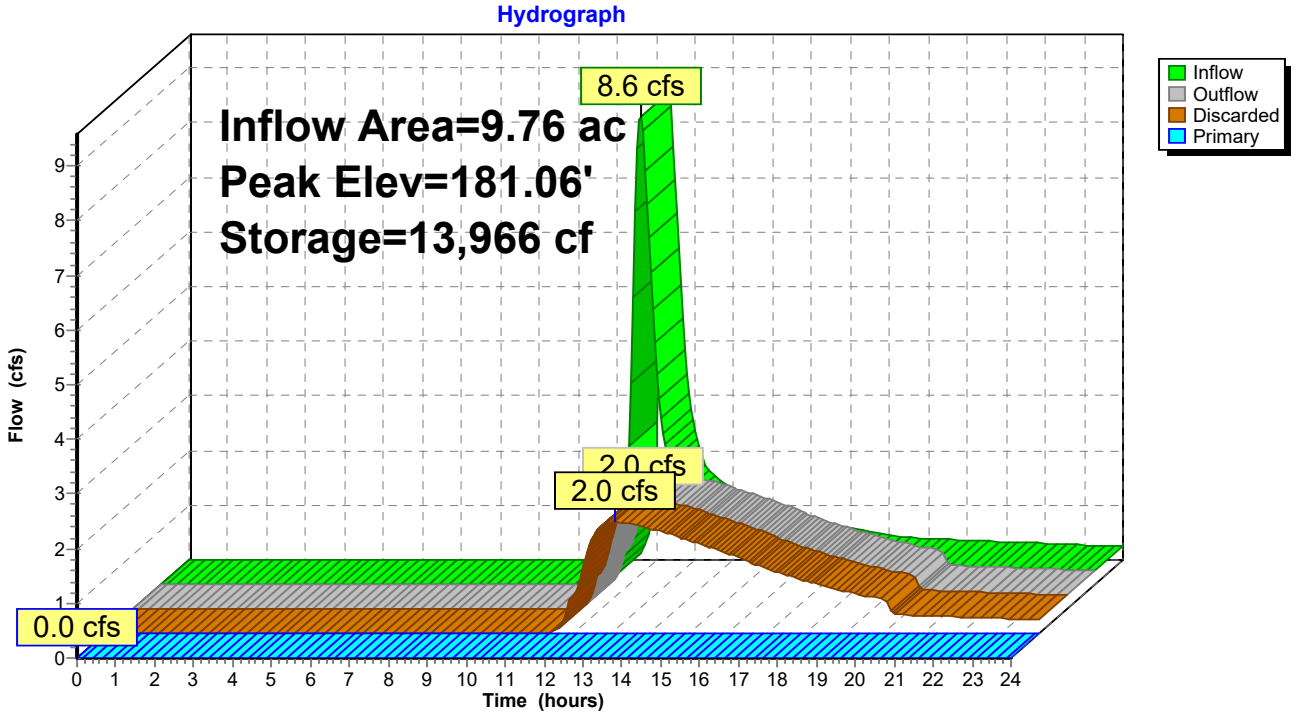
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	3,122	278.0	0	0	3,122
180.00	5,035	333.0	8,081	8,081	5,865
182.00	7,145	371.0	12,119	20,200	8,107
183.00	9,200	394.0	8,151	28,351	9,559

Device	Routing	Invert	Outlet Devices
#1	Discarded	178.00'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 174.00'
#2	Primary	182.50'	**45.0 deg x 10.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=2.0 cfs @ 13.12 hrs HW=181.06' (Free Discharge)
↑**1=Exfiltration** (Controls 2.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=178.00' (Free Discharge)
↑**2=Sharp-Crested Vee/Trap Weir** (Controls 0.0 cfs)

Pond 7P: Infiltration Basin



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 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: Subarea DA Runoff Area=4.84 ac 0.00% Impervious Runoff Depth>1.58"
Flow Length=500' Tc=13.8 min CN=51 Runoff=6.0 cfs 0.638 af

Subcatchment 2S: Subarea DB Runoff Area=9.76 ac 21.11% Impervious Runoff Depth>2.57"
Flow Length=1,045' Tc=20.7 min CN=62 Runoff=19.0 cfs 2.090 af

Subcatchment 3S: Subarea DC Runoff Area=0.56 ac 0.00% Impervious Runoff Depth>1.93"
Flow Length=244' Tc=11.1 min CN=55 Runoff=1.0 cfs 0.090 af

Subcatchment 8S: Subarea DD Runoff Area=1.55 ac 8.39% Impervious Runoff Depth>0.47"
Flow Length=430' Tc=11.8 min CN=36 Runoff=0.3 cfs 0.061 af

Reach 4R: NW Property Line Inflow=6.0 cfs 0.638 af
Outflow=6.0 cfs 0.638 af

Reach 5R: Canoe River Inflow=7.8 cfs 0.344 af
Outflow=7.8 cfs 0.344 af

Reach 6R: Northeast Property Line Inflow=1.0 cfs 0.090 af
Outflow=1.0 cfs 0.090 af

Pond 7P: Infiltration Basin Peak Elev=182.88' Storage=27,276 cf Inflow=19.0 cfs 2.090 af
Discarded=3.1 cfs 1.804 af Primary=7.6 cfs 0.283 af Outflow=10.7 cfs 2.087 af

Total Runoff Area = 16.71 ac Runoff Volume = 2.879 af Average Runoff Depth = 2.07"
86.89% Pervious = 14.52 ac 13.11% Impervious = 2.19 ac

Summary for Subcatchment 1S: Subarea DA

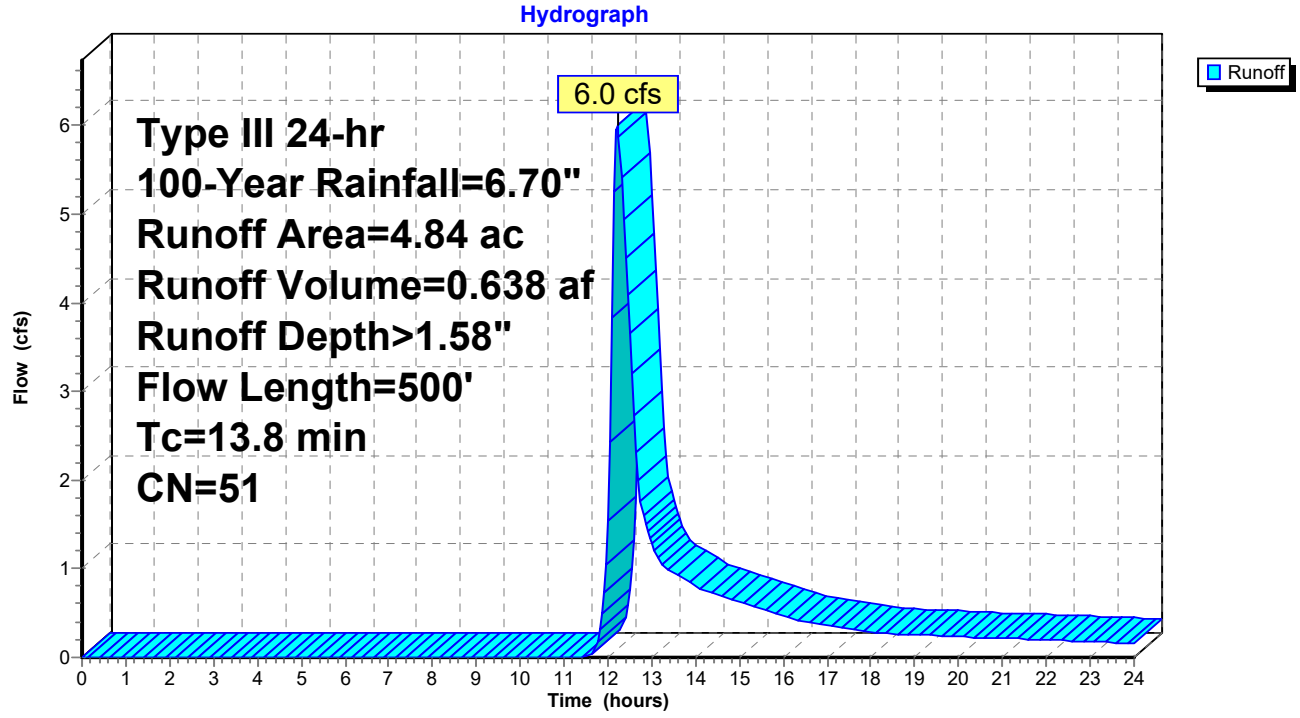
Runoff = 6.0 cfs @ 12.22 hrs, Volume= 0.638 af, Depth> 1.58"
Routed to Reach 4R : NW Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.70"

Area (ac)	CN	Description
0.77	30	Woods, Good, HSG A
4.07	55	Woods, Good, HSG B
4.84	51	Weighted Average
4.84		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
5.3	450	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.8	500	Total			

Subcatchment 1S: Subarea DA



Summary for Subcatchment 2S: Subarea DB

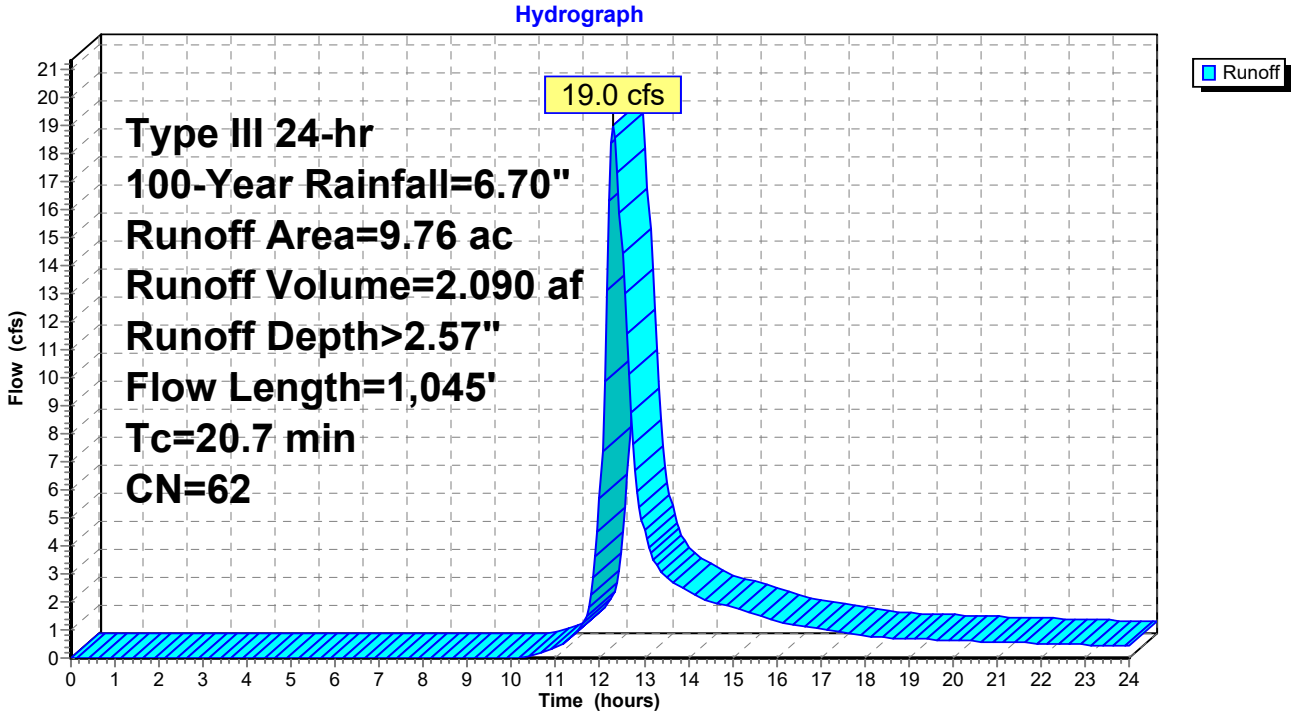
Runoff = 19.0 cfs @ 12.30 hrs, Volume= 2.090 af, Depth> 2.57"
Routed to Pond 7P : Infiltration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.70"

Area (ac)	CN	Description
0.93	30	Woods, Good, HSG A
0.69	39	>75% Grass cover, Good, HSG A
0.18	98	Roofs, HSG A
0.15	98	Paved parking, HSG A
0.31	98	Paved roads w/curbs & sewers, HSG A
3.63	55	Woods, Good, HSG B
2.45	61	>75% Grass cover, Good, HSG B
0.54	98	Roofs, HSG B
0.45	98	Paved parking, HSG B
0.43	98	Paved roads w/curbs & sewers, HSG B
9.76	62	Weighted Average
7.70		78.89% Pervious Area
2.06		21.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	50	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
2.2	65	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.0	930	0.0490	1.55		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.7	1,045	Total			

Subcatchment 2S: Subarea DB



Summary for Subcatchment 3S: Subarea DC

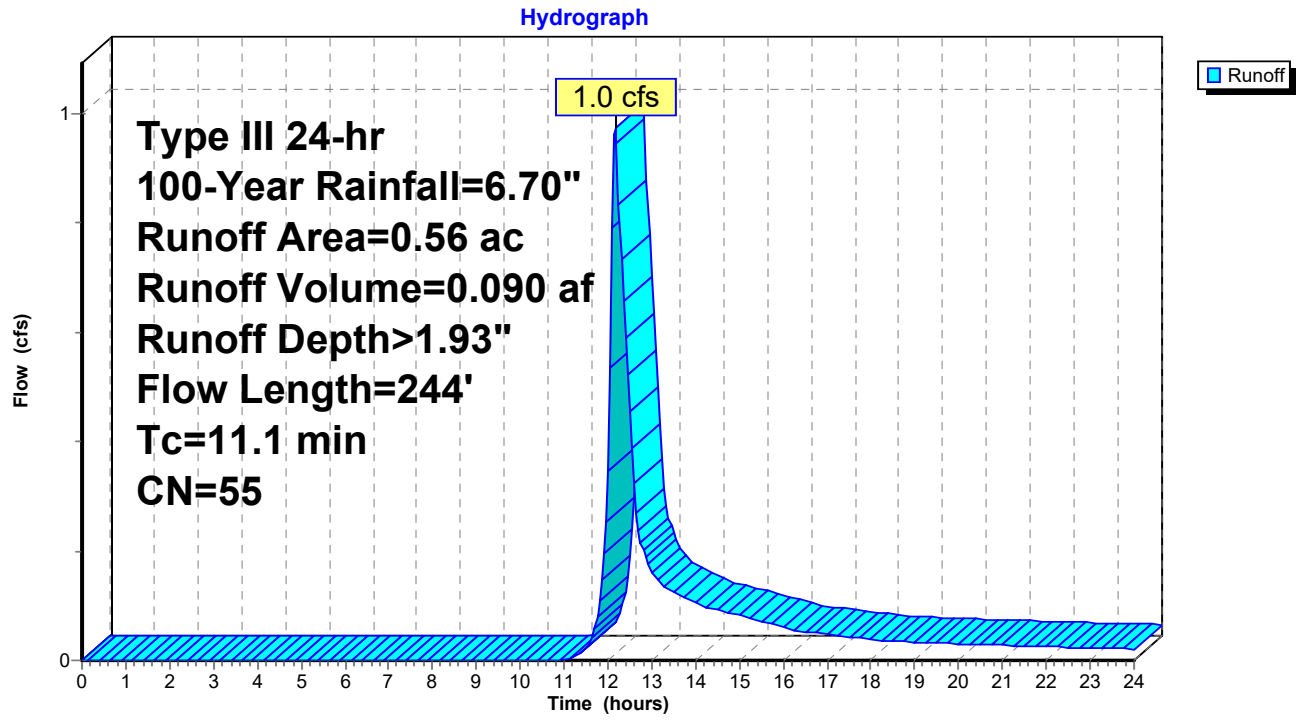
Runoff = 1.0 cfs @ 12.17 hrs, Volume= 0.090 af, Depth> 1.93"
Routed to Reach 6R : Northeast Property Line

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.70"

Area (ac)	CN	Description
0.56	55	Woods, Good, HSG B
0.56		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.9	50	0.0600	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
3.2	194	0.0400	1.00		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.1	244	Total			

Subcatchment 3S: Subarea DC



Summary for Subcatchment 8S: Subarea DD

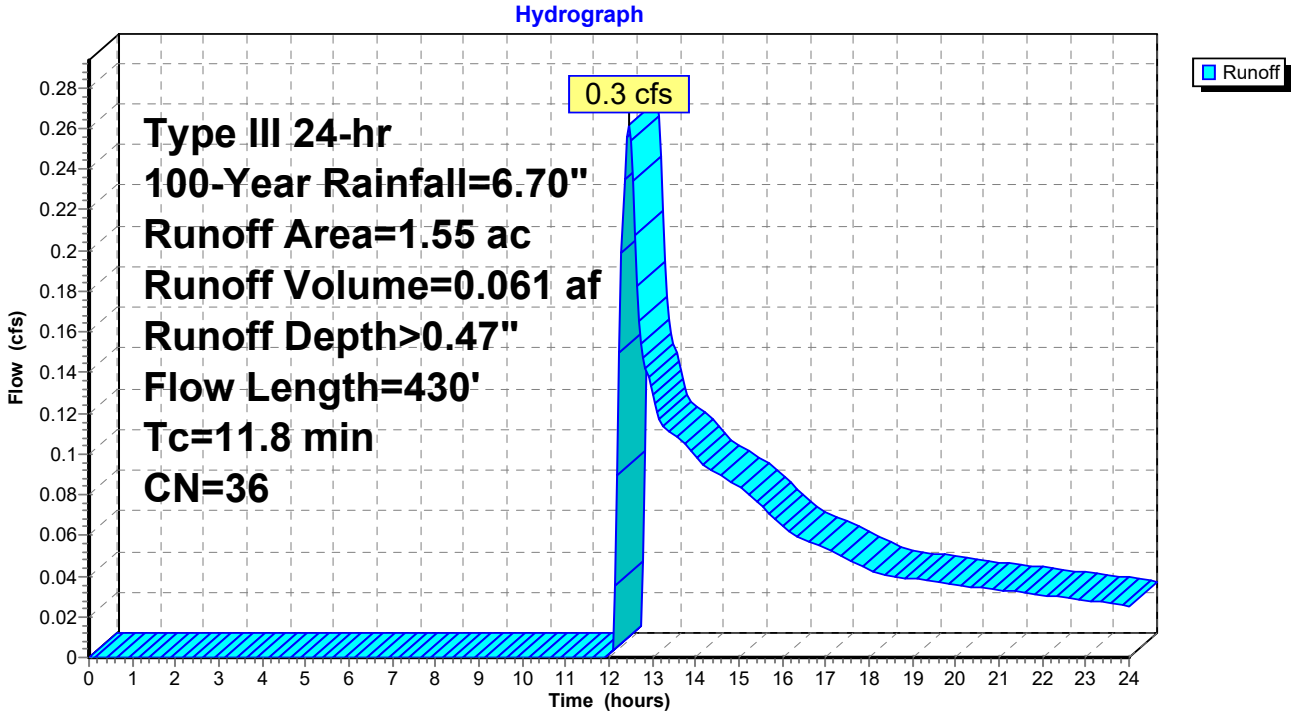
Runoff = 0.3 cfs @ 12.45 hrs, Volume= 0.061 af, Depth> 0.47"
Routed to Reach 5R : Canoe River

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.70"

Area (ac)	CN	Description
1.34	30	Woods, Good, HSG A
0.08	39	>75% Grass cover, Good, HSG A
0.13	98	Paved roads w/curbs & sewers, HSG A
1.55	36	Weighted Average
1.42		91.61% Pervious Area
0.13		8.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.20"
4.7	380	0.0740	1.36		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.8	430	Total			

Subcatchment 8S: Subarea DD

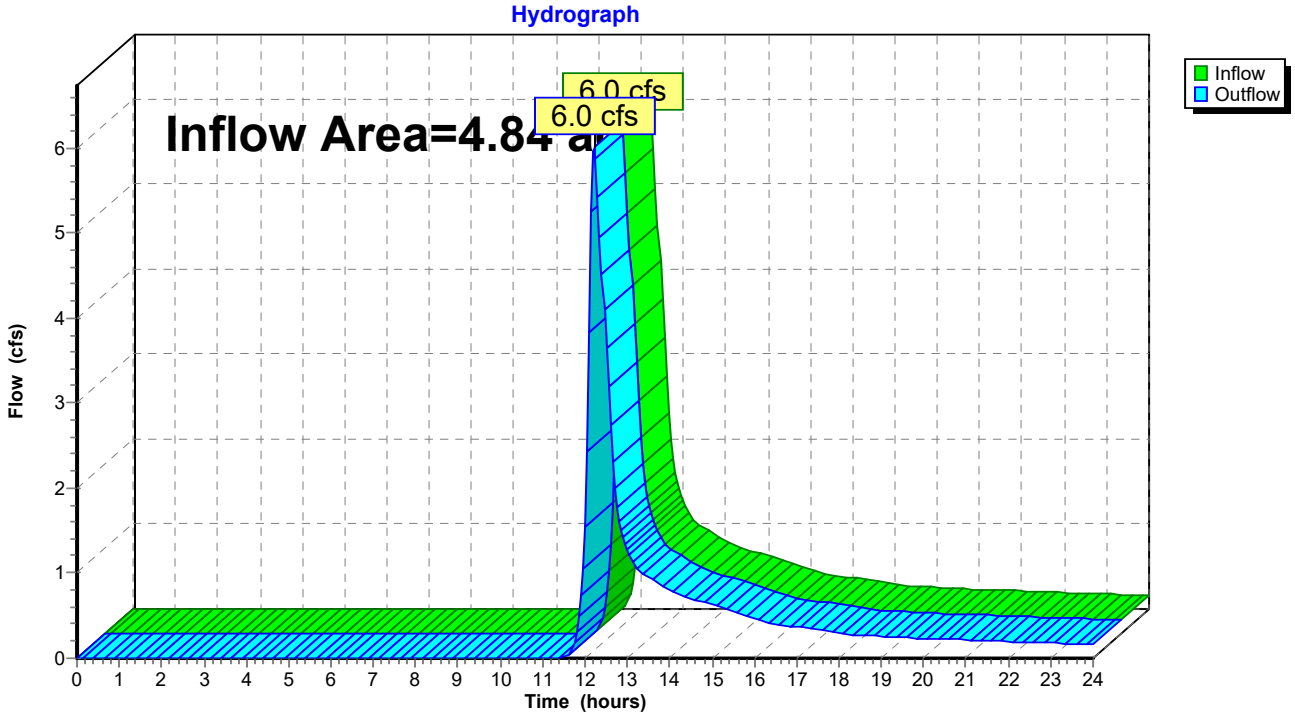


Summary for Reach 4R: NW Property Line

Inflow Area = 4.84 ac, 0.00% Impervious, Inflow Depth > 1.58" for 100-Year event
Inflow = 6.0 cfs @ 12.22 hrs, Volume= 0.638 af
Outflow = 6.0 cfs @ 12.22 hrs, Volume= 0.638 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 4R: NW Property Line

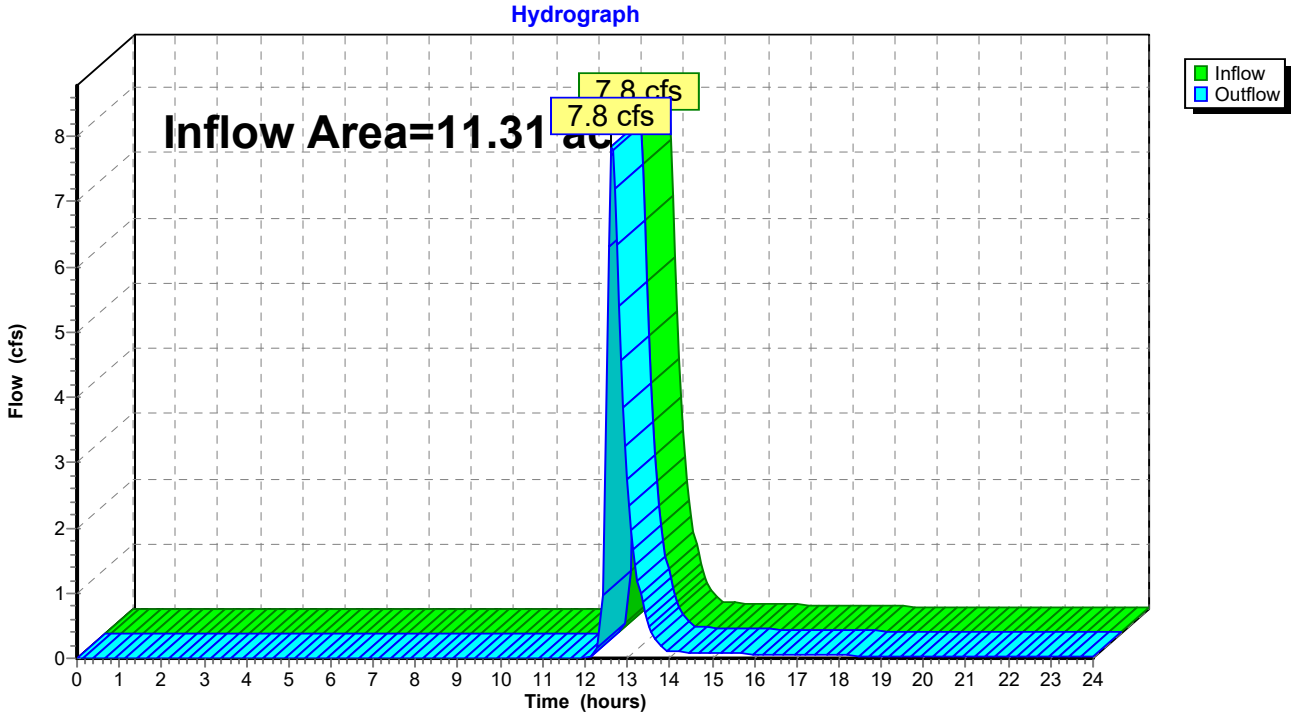


Summary for Reach 5R: Canoe River

Inflow Area = 11.31 ac, 19.36% Impervious, Inflow Depth > 0.36" for 100-Year event
Inflow = 7.8 cfs @ 12.63 hrs, Volume= 0.344 af
Outflow = 7.8 cfs @ 12.63 hrs, Volume= 0.344 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 5R: Canoe River

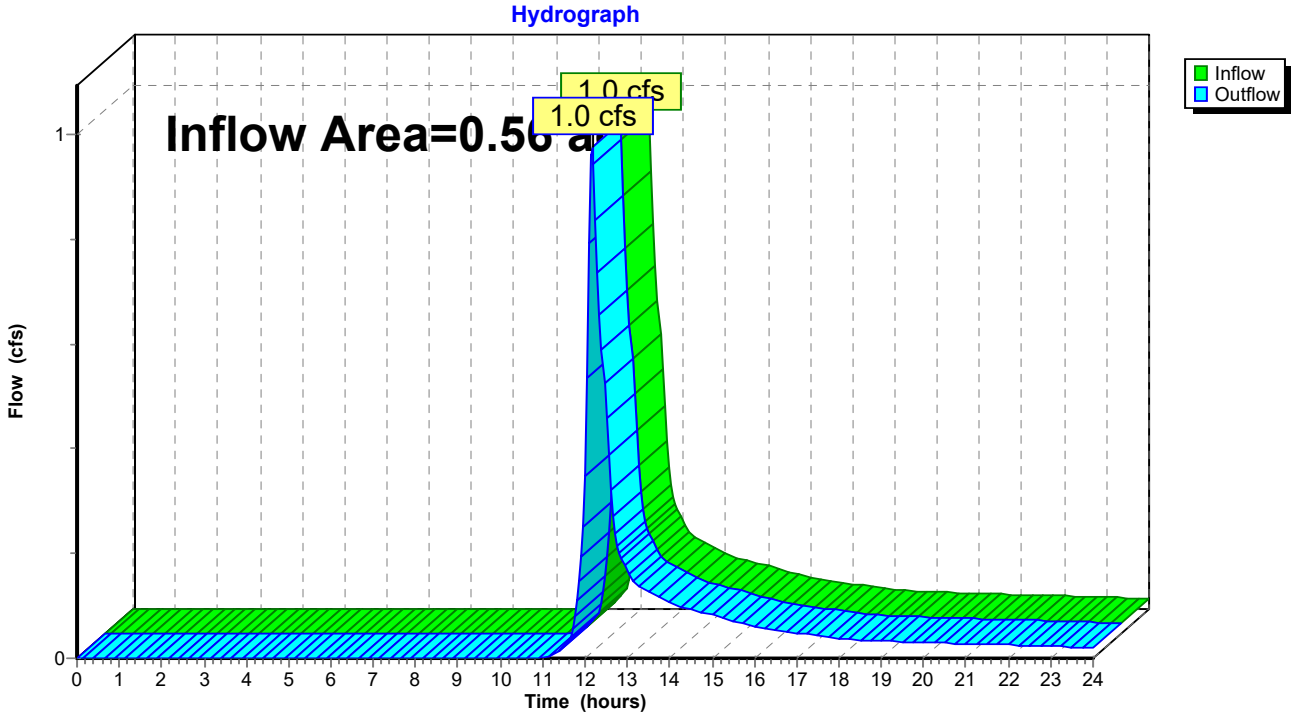


Summary for Reach 6R: Northeast Property Line

Inflow Area = 0.56 ac, 0.00% Impervious, Inflow Depth > 1.93" for 100-Year event
Inflow = 1.0 cfs @ 12.17 hrs, Volume= 0.090 af
Outflow = 1.0 cfs @ 12.17 hrs, Volume= 0.090 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Reach 6R: Northeast Property Line



Summary for Pond 7P: Infiltration Basin

Inflow Area = 9.76 ac, 21.11% Impervious, Inflow Depth > 2.57" for 100-Year event
Inflow = 19.0 cfs @ 12.30 hrs, Volume= 2.090 af
Outflow = 10.7 cfs @ 12.63 hrs, Volume= 2.087 af, Atten= 44%, Lag= 19.8 min
Discarded = 3.1 cfs @ 12.63 hrs, Volume= 1.804 af
Primary = 7.6 cfs @ 12.63 hrs, Volume= 0.283 af
Routed to Reach 5R : Canoe River

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 182.88' @ 12.63 hrs Surf.Area= 8,943 sf Storage= 27,276 cf

Plug-Flow detention time= 92.7 min calculated for 2.082 af (100% of inflow)
Center-of-Mass det. time= 91.4 min (953.4 - 862.0)

Volume	Invert	Avail.Storage	Storage Description
#1	178.00'	28,351 cf	**Infiltration Basin (Irregular)**Listed below (Recalc)

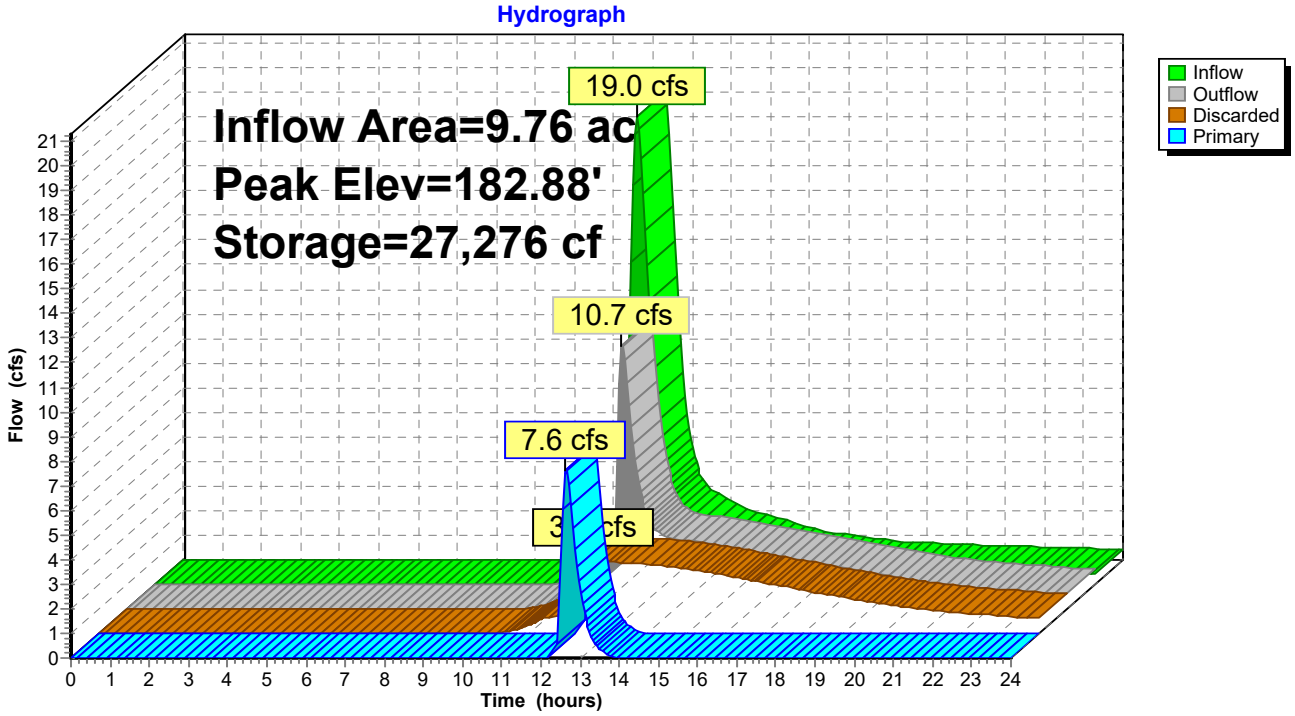
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
178.00	3,122	278.0	0	0	3,122
180.00	5,035	333.0	8,081	8,081	5,865
182.00	7,145	371.0	12,119	20,200	8,107
183.00	9,200	394.0	8,151	28,351	9,559

Device	Routing	Invert	Outlet Devices
#1	Discarded	178.00'	**8.270 in/hr Exfiltration over Wetted area** Conductivity to Groundwater Elevation = 174.00'
#2	Primary	182.50'	**45.0 deg x 10.0' long Sharp-Crested Vee/Trap Weir** Cv= 2.56 (C= 3.20)

Discarded OutFlow Max=3.1 cfs @ 12.63 hrs HW=182.88' (Free Discharge)
↑—**1=Exfiltration** (Controls 3.1 cfs)

Primary OutFlow Max=7.6 cfs @ 12.63 hrs HW=182.88' (Free Discharge)
↑—**2=Sharp-Crested Vee/Trap Weir** (Weir Controls 7.6 cfs @ 1.96 fps)

Pond 7P: Infiltration Basin



APPENDIX B – STORM WATER WORKSHEETS

Required Recharge Volume and Drawdown Worksheet
Falling Head Permeability Test Worksheet
Stormceptor Sizing Worksheets & MASTEP Technology Review
DEP Stormwater Checklist

Required Recharge Volume Worksheet

PROJECT LOCATION: **Pine Estates**
DATE: January, 2024
PROJECT NUMBER: 23-0182

Subarea DB (Infiltration Basin)

SCS Soil Type Hydrologic Group	*Target Depth Factor (in)*	*Total Impervious Area (acre)*	*Required Volume to Recharge (ac-ft)*
HSG A - Pavement & Roofs	0.60	0.64	0.0320
HSG B - Pavement & Roofs	0.35	1.42	0.0414
		TOTAL:	**0.0734**

Recharge Methods		*(ac-ft)*
Infiltration Basin - Simple Method		***0.6509***
Roof Recharge - Simple Method	2,025 sf x 2"/12 x 2 = 675 ft3	**0.0160**

Subarea DD (181' of roadway)

SCS Soil Type Hydrologic Group	*Target Depth Factor (in)*	*Total Impervious Area (acre)*	*Required Volume to Recharge (ac-ft)*
HSG A - Pavement & Roofs	0.60	0.13	0.0065
		TOTAL:	**0.0065**

Recharge Methods	*(ac-ft)*
None	**0.0000**

Capture Area Adjustment

Total Impervious Area: 2.19 ac

Impervious Area Not Directed to Treatment Structure: 0.13 ac (6%) Meets the no more than 35% standard

Infiltration Basin

Required Recharge Volume	
Subarea DB	0.0734 ac-ft

Drawdown Within 72 hours	
Soil Type:	Sand
RAWLS Rate (in/hr):	8.27
Infiltration Area (sf):	3,122
Drawdown Time (hours):	1.5

Hydraulic Conductivity Worksheet - Falling Head Test

Project Name: Pine Estates Foxborough, MA
Project Address: 204 East Street Foxborough, MA
Test Pit No: 2024-1
Field Work By: CG & WBJr
Date: 1/30/2024

Trial 1

Time (sec)	Depth from Top of Pipe (ft)	Depth from Top (%)	Piezometric Head (%)
0	0.00	0.0%	100.0%
5	0.27	16.5%	83.5%
10	0.50	30.5%	69.5%
15	0.69	42.1%	57.9%
20	0.81	49.4%	50.6%
25	0.95	57.9%	42.1%
30	1.07	65.2%	34.8%
35	1.20	73.2%	26.8%
40	1.34	81.7%	18.3%
45	1.45	88.4%	11.6%
50	1.50	91.5%	8.5%
55	1.61	98.2%	1.8%

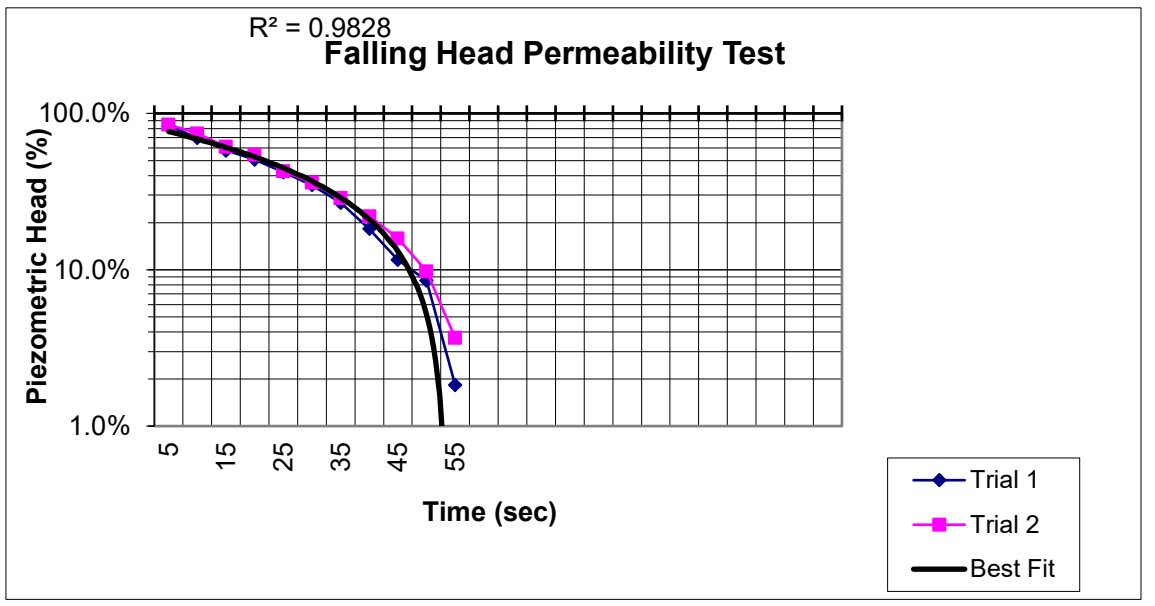
Trial 2

Time (sec)	Depth from Top of Pipe (ft)	Depth from Top (%)	Piezometric Head (%)
0	0.00	0.0%	100.0%
5	0.25	15.2%	84.8%
10	0.42	25.6%	74.4%
15	0.64	39.0%	61.0%
20	0.75	45.7%	54.3%
25	0.94	57.3%	42.7%
30	1.05	64.0%	36.0%
35	1.17	71.3%	28.7%
40	1.28	78.0%	22.0%
45	1.38	84.1%	15.9%
50	1.48	90.2%	9.8%
55	1.58	96.3%	3.7%
60	1.64	100.0%	0.0%

Pipe Length (ft): 1.64
Pipe Diameter (ft): 0.33
Time @ 37% PH (sec): 54

Permeability (K) = $\frac{PI\,(D)}{11(T)}$

K= 0.0017453 ft/sec
K= 75.4 in/hour



Reference:
Extract from Foundation Engineering Handbook by Winterkorn & Fang (Figure 1.17) as supplied by Town of Mansfield Engineering Department

UNIVERSITY OF MASSACHUSETTS
AT AMHERST
Water Resources Research Center
Blaisdell House, UMass
310 Hicks Way
Amherst, MA 01003

Massachusetts Stormwater Evaluation Project

(413) 545-5532
(413) 545-2304 FAX
www.mastep.net

MASTEP Technology Review

Technology Name: Stormceptor

Studies Reviewed: Final NJCAT Technology Verification Stormceptor STC900 September 2004; Coventry University Study, 1996; Technology Assessment, University of Massachusetts, 1997; SeaTac Stormceptor Performance report 2001; SWAMP report Ontario 2004; Phoenix Group Edmonton report 1995; Stormceptor 1200 Field Evaluation report 2004; Applied Hydrology Associates Denver report 2003; Rinker Materials Como Park St. Paul MN report 2002; VA DOT / UVA "Testing of Ultra-Urban Stormwater Best Management Practices" report 2001.
Hydrodynamic Separator Sediment Retention Testing, Mohseni, 2010.

Date: September 17, 2013

Reviewer: Jerry Schoen

Rating: 2

Brief rationale for rating: This rating is primarily based on the 2005 NJCAT Technology Verification study. In general, this was a well-conducted test, which in large part followed NJDEP test guidelines for laboratory studies, which MASTEP considers as the laboratory equivalent of TARP field protocols. Issues of concern: the study measured suspended sediment concentration (SSC) rather than total suspended solids (TSS). Although SSC is considered by many scientists to be the preferred method, it is at odds with Massachusetts stormwater regulations, which are based on TSS treatment. Comparing SSC and TSS results is considered an inexact science. The test was conducted with higher influent sediment concentrations than is preferred, but results were fairly consistent across all ranges studied. The particle size distribution also appears to be slightly higher than the target test range. There are additional field studies that in general support the results obtained in this laboratory studies. These studies do not satisfy TARP protocols, but they do not contradict results obtained in the NJCAT study.

TARP Requirements Not Met*:

- Measurements in TSS.
- Influent sediment concentration is 100 – 300 mg/l: actual was 153-460.
- No documentation of a Quality Assurance Project Plan
- Third party studies are preferred. This was conducted by Stormceptor personnel, with sample analyses conducted by an external laboratory.

Other Comments:
* The 2010 Mohseni study evaluates the susceptibility of the Stormceptor to scouring, or washout of collected sediments. Report concluded that the unit does not scour at high flows as long as sediment depth does not exceed maintenance level.

* Criteria also based on NJDEP laboratory testing guidelines.

Convert Required WQV to Discharge Rate for
Proprietary Stormwater Treatment Structures

PROJECT LOCATION:	Pine Estates
DATE:	01/29/24
PROJECT NUMBER:	23-0182

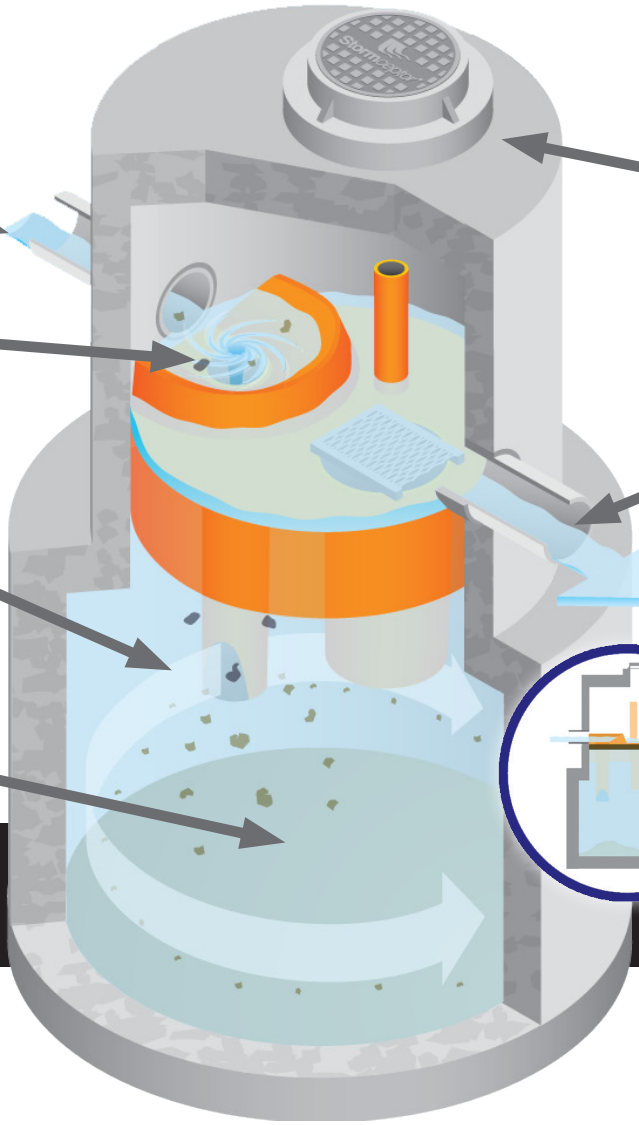
Structure Location:	DMH #1 - CBs# 1A & 1B		
Within or Near a Critical Area:	Yes		
WQV:	1.0	inch	
Impervious Area =	0.000281	square miles	
Runoff Curve Number - CN =	98		
Time of Concentration - Tc =	10.0	min	
Unit Peak Discharge - qu =	774	csm/inch	see Table in Figure 2
Computed Flow Rate (1.0" of Runoff) $Q_{1.0}$ =	0.22	cfs	**STC 450i**

Structure Location:	DMH #3 - Subarea DB		
Within or Near a Critical Area:	Yes		
WQV:	1.0	inch	
Impervious Area =	0.003219	square miles	
Runoff Curve Number - CN =	62		
Time of Concentration - Tc =	21.0	min	
Unit Peak Discharge - qu =	563	csm/inch	see Table in Figure 2
Computed Flow Rate (1.0" of Runoff) $Q_{1.0}$ =	1.81	cfs	**STC 4800**

Stormceptor®

Stormwater Treatment Made Simple!

TSS & Oil Removal ■ *Scour Prevention* ■ *Small Footprint*



Design Flexibility

Proven Performance

Environmentally Engineered Stormwater Solutions...
that exceed your client's needs!

www.rinkerstormceptor.com
Phone: (413) 562-3647

Rinker MATERIALS™

Stormceptor® STC

Stormceptor® is an underground stormwater quality treatment device that is unparalleled in its effectiveness for pollutant capture and retention. With thousands of systems operating worldwide, Stormceptor delivers protection every day in every storm.

With patented technology, optimal treatment occurs by allowing free oil to rise and sediment to settle. The Stormceptor design prohibits scour and release of previously captured pollutants, ensuring superior treatment and protection during even the most extreme storm events.

Stormceptor is very easy to design and provides flexibility under varying site constraints such as tight right-of-ways, zero lot lines and retrofit projects. Design flexibility allows for a cost-effective approach to stormwater treatment. Stormceptor has proven performance backed by the longest record of lab and field verification in the industry.

Tested Performance

- Fine particle capture
- Prevents scour or release
- 95%+ Oil removal

Massachusetts – Water Quality (Q) Flow Rate

Stormceptor STC Model	Inside Diameter	Typical Depth Below Inlet Pipe Invert [1]	Water Quality Flow Rate Q [2]	Peak Conveyance Flow Rate [3]	Hydrocarbon Capacity [4]	Maximum Sediment Capacity [4]
	(ft)	(in)	(cfs)	(cfs)	(Gallons)	(ft^3)
STC 450i	4	68	0.40	5.5	86	46
STC 900	6	63	0.89	22	251	89
STC 2400	8	104	1.58	22	840	205
STC 4800	10	140	2.47	22	909	543
STC 7200	12	148	3.56	22	1,059	839
STC 11000	2 x 10	142	4.94	48	2,792	1,086
STC 16000	2 x 12	148	7.12	48	3,055	1,677

[1] Depth Below Pipe Inlet Invert to the Bottom of Base Slab, and Maximum Sediment Capacity can vary to accommodate specific site designs and pollutant loads. Depths can vary to accommodate special designs or site conditions. Contact your local representative for assistance.
[2] Water Quality Flow Rate (Q) is based on 80% annual average TSS removal of the OK110 particle size distribution.
[3] Peak Conveyance Flow Rate is based upon ideal velocity of 3 feet per second and outlet pipe diameters of 18-inch, 36-inch, and 54-inch diameters.
[4] Hydrocarbon & Sediment capacities can be modified to accommodate specific site design requirements, contact your local representative for assistance.

Stormceptor®
www.stormceptor.com

Rinker MATERIALS™
www.rinkerstormceptor.com
Manufacturing Plant: Westfield, MA
Phone: (413) 562-3647
11-22-13-R13-802 MDEP

Stormwater Report

A Stormwater Report must be submitted with the permit application to document compliance with the Stormwater Management Standards. The Stormwater Report must be organized into sections that correspond to the categories listed in the Checklist (e.g., Project Type, LID Practices, Standard 1 etc.). As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

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

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

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

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has

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

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

not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

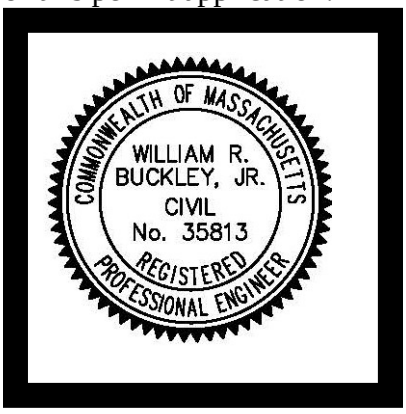
Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary to comprise a comprehensive Stormwater Report that addresses the ten Stormwater Standards. *Note:* Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

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

Registered Professional Engineer's Certification

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



Registered Professional Engineer Block and Signature _____

Signature, Date

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

- ☑ New Development
- ☐ Redevelopment
- ☐ Mix of New Development and Redevelopment

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

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

Standard 1: No New Untreated Discharges

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

Standard 2: Peak Rate Attenuation

- ☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.
- ☑ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm
- ☑ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☑ Soil Analysis provided.
☑ Required Recharge Volume calculation provided
☐ Required Recharge volume reduced through use of the LID site Design Credits.
☑ Sizing the infiltration, BMPs is based on the following method: Circle the method used.
☐Static ☑Simple Dynamic ☐Dynamic Field[3]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.
☑ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.
☑ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.
☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:
- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☐ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☑ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.
☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.
☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.
☑ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

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

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;

[3] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

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

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

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

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

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

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

- ☑ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

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

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

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

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

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

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

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

☐ All exposure has been eliminated

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.
☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☑ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.
☑ Critical areas and BMPs are identified in the Stormwater Report.

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

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

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.
☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

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

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

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

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

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

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

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

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

Standard 9: Operation and Maintenance Plan

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

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

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

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

Standard 10: Prohibition of Illicit Discharges

☑ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;
☐ An Illicit Discharge Compliance Statement is attached;
☑ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

APPENDIX C - OPERATION AND MAINTENANCE PLAN FOR STORM WATER BMPS

Appendix C: OPERATION AND MAINTENANCE PLAN FOR STORMWATER BMPs

	During Construction	Post-construction
BMP Owner:	**Owner**	**Town of Foxborough**
Party of Plan Responsibility:	**Owner**	**Town of Foxborough**

References:

- Special Permit and Definitive Plan of Land Pine Estates Foxborough, MA by Bay Colony Group, Inc.
- Stormwater Pollution Prevention Plan for Construction Activities – Pine Estates Foxborough, MA

Operation and Maintenance

Item 1: During construction, **weekly** inspection of the crushed stone construction entrance pad and erosion control silt socks shall be conducted by a qualified staff member of the responsible party or an independent sediment and erosion control expert hired by the responsible party. Any displaced barriers shall be restored or repaired immediately. All barriers shall be installed, except at the crossing location, a minimum **25 ft** from the edge of the bordering vegetated wetlands and **5 ft** from the exterior property line.

Item 2: The catch basins shall be set to base course grade so that they are functional throughout the project. They shall be inspected **before** and **after** rain storms, if the basins are filled with sediment to half of its depth, they shall be cleaned out with an orange peel bucket or some other means. Silt socks shall be installed around to direct runoff into the catch basins and silt sacks shall be installed within the catch basins to ensure that siltation does not exit the site nor enter the infiltration basin or wetland. **After the construction is completed**, the storm water basin and catch basins should be inspected three times a year: once after leaf fall, once before the arrival of hurricane season, the third in the early or mid-spring after the snow melt and road sweeping. Any debris in basins should be cleaned out as during the construction phase. The parking lots will be swept twice a year: once before hurricane season, the other in the spring after snow melt.

Item 3: Install "Snout" water quality elbows in all deep sump catch basins. Stormceptors, or Engineer approved equivalent, shall be installed where indicated prior to discharge to the basins or wetlands. Installation and maintenance shall be in accordance with the manufacturer's recommendations.

Item 4: Once the infiltration basin is in use, inspect it after every major storm (2 inches in 24 hours) for the first few months to ensure it is stabilized and functioning properly and if necessary take corrective action. Note how long water remains standing in the basin after a storm; standing water within the basin 48 to 72 hours after a storm indicates that there is an issue. If the ponding is due to clogging, immediately address the reasons for the clogging (such as upland sediment erosion, excessive compaction of soils, or low spots). Thereafter, inspect the infiltration basin at least twice per year. Inspect for the following:

- Signs of differential settlement
- Cracking
- Erosion
- Leakage in the embankments
- Tree growth on the embankments
- Condition of riprap
- Sediment accumulation and the health of the turf.

At least twice a year, mow the buffer area, side slopes, and basin bottom. Remove grass clippings and accumulated organic matter to prevent an impervious organic mat from forming. Remove trash and debris at the same time. Use deep tilling to break up clogged surfaces, and revegetate immediately. Remove sediment from the basin as necessary, but wait until the floor of the basin is thoroughly dry. Use light equipment (no wheeled vehicles) to remove the top layer so as to not compact the underlying soil. Deeply till the remaining soil, and revegetate as soon as possible.

Item 5: During construction, the stone pad at the entrance to the project shall be inspected **weekly** and replenished if siltation is impeding the cleaning of truck tires. Any materials tracked into the roadway shall be swept up within a day.

Estimated Operations and Maintenance Budget

The following is an estimate of the O&M Budget, post construction.

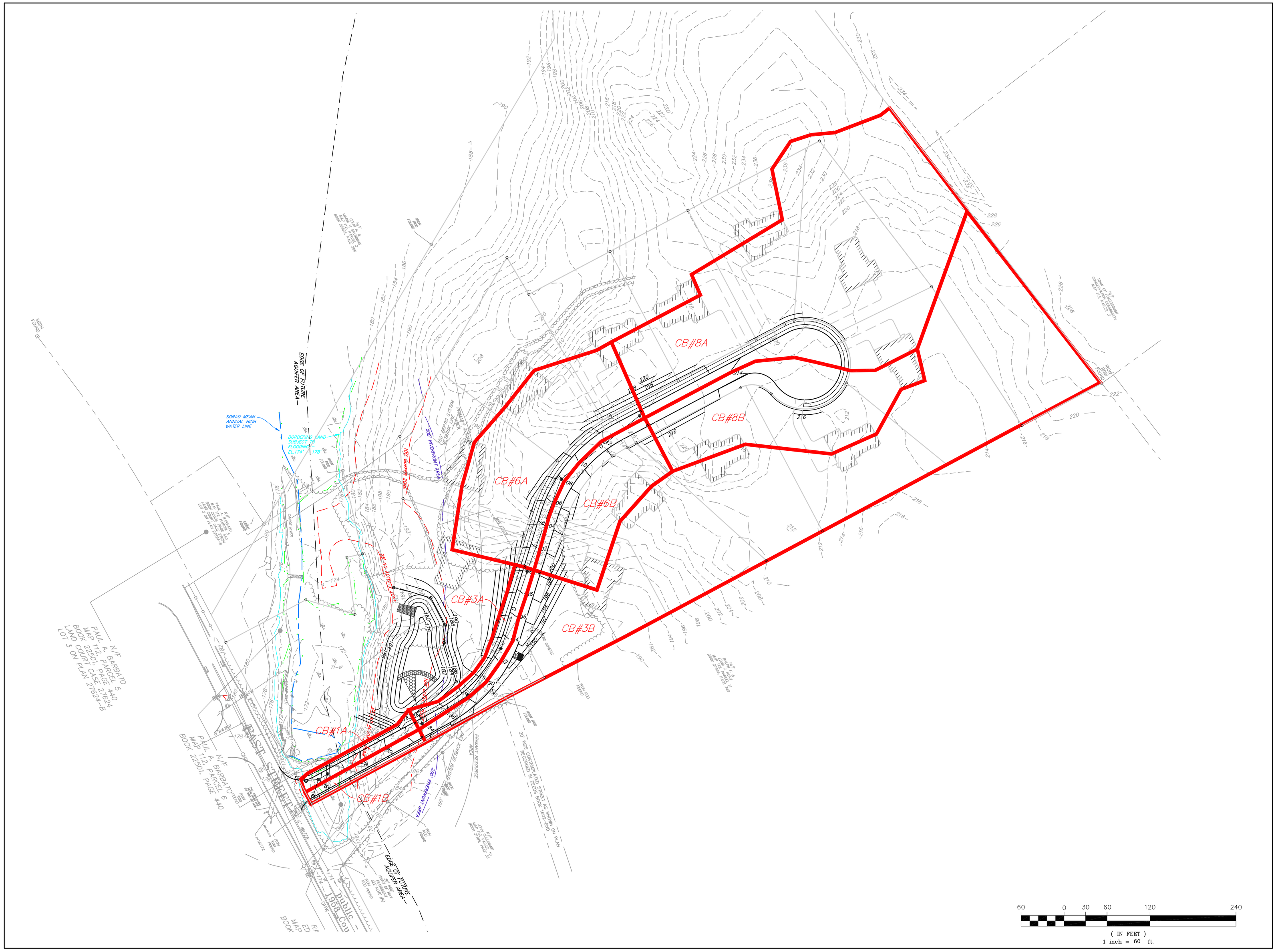
Inspections (3 times per year): $420
Cleaning catch basins/Stormceptors (yearly): $1,500
Mowing (2 times per year): $320

APPENDIX D - Closed Drainage System Design

Closed Drainage System Summary
Pine Estates Foxborough, MA

Upstream Node	Downstream Node	Length (ft)	Section Size	Constructed Slope (ft/ft)	Full Capacity (cfs)	Total Flow (cfs)	Average Velocity (ft/sec)	Upstream Ground Elevation (ft)	Upstream Invert Elevation (ft)	Upstream Structure Hydraulic Grade (ft)	Downstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Downstream Structure Hydraulic Grade (ft)
DMH#1	DMH#2	11	12 inch	0.032	6.4	2.6	7.7	175.9	171.35	172.04	176.3	171.00	171.00
CB#1A	DMH#1	5	12 inch	0.050	8.0	0.8	6.6	175.6	171.60	172.13	175.9	171.35	172.17
CB#1B	DMH#1	13	12 inch	0.019	4.9	1.7	5.7	175.6	171.60	172.16	175.9	171.35	172.17
DMH#3	FES#1	31	15 inch	0.024	10.1	7.1	5.8	183.5	178.75	182.57	179.0	178.00	182.20
CB#3A	DMH#3	5	12 inch	0.050	8.0	1.4	1.8	183.0	179.00	182.68	183.5	178.75	182.67
CB#3B	DMH#3	13	12 inch	0.019	4.9	2.1	2.7	183.0	179.00	183.00	183.5	178.75	182.67
DMH#4	DMH#3	70	15 inch	0.030	11.2	6.5	5.3	188.0	181.60	184.08	183.5	179.50	182.67
DMH#5	DMH#4	77	12 inch	0.030	6.2	6.5	8.8	193.0	186.30	187.27	188.0	184.00	184.34
DMH#6	DMH#5	110	12 inch	0.030	6.2	6.6	8.8	200.0	192.30	193.27	193.0	189.00	187.65
CB#6B	DMH#6	13	12 inch	0.019	4.9	1.0	5.0	200.0	196.00	196.43	200.0	195.75	193.74
CB#6A	DMH#6	5	12 inch	0.050	8.0	2.2	8.7	200.0	196.00	196.63	200.0	195.75	193.74
DMH#7	DMH#6	133	12 inch	0.030	6.2	3.5	8.1	208.0	200.00	200.80	200.0	196.00	193.74
DMH#8	DMH#7	136	12 inch	0.032	6.4	3.5	8.3	212.6	208.35	209.15	208.0	204.00	201.00
CB#8A	DMH#8	5	12 inch	0.050	8.0	2.4	8.9	212.6	208.60	209.26	212.6	208.35	209.33
CB#8B	DMH#8	13	12 inch	0.019	4.9	1.1	5.1	212.6	208.60	209.34	212.6	208.35	209.33

Design storm: 25-yr event TP40 Boston
Tailwater in basin from HydroCAD 25-yr event = 182.2'



PROJECT:

Pine Estates
Foxborough
Massachusetts

OWNERS:

Scott M. & Elaine D. Barbato
204 East Street
Foxborough, MA 02035

Paul A. Barbato
192 East Street
Foxborough, MA 02035

APPLICANT:

Pine Air, LLC
364 Hickory Road
North Attleboro, MA 02760

Bay Colony Group, Inc.
Professional Civil Engineers & Professional Land Surveyors

FOUR SCHOOL STREET
P.O. BOX 9136
FOXBOROUGH, MA 02035
508-543-3939

NOTICE TO CONTRACTOR:

1. ALL CONTRACTORS SHALL CONTACT THE PLANNING BOARD 508.543.1250 PRIOR TO THE INITIATION OF ANY CONSTRUCTION.
2. A STREET OPENING PERMIT MUST BE OBTAINED FROM THE FOXBOROUGH HIGHWAY DEPARTMENT PRIOR TO ANY WORK OCCURRING IN OR ON ANY STREET (AFTER ACCEPTED OR NOT) AFTER THE TOP COURSE OF PAVEMENT IS INSTALLED.

ASSUMPTIONS:

- 4,700 SF BUILDING FOOTPRINT & DRIVEWAY AREA PER LOT
- 15,000 SF LAWN PER LOT

STAMP

DRAWING TITLE

Closed Drain Subareas

SCALE: 1" = 60'

FEBRUARY 1, 2024	SHEET NUMBER
23-0182B	Dr

APPENDIX E - DRAFT STORMWATER POLLUTION PREVENTION PLAN

Stormwater Pollution Prevention Plan (SWPPP)

For Construction Activities At:

Pine Air Estates
204 East Street
Foxborough, MA 02035
Telephone: TBD

SWPPP Prepared For:

Pine Air, LLC
364 Hickory Road
North Attleboro, MA 02760
508.989.9012

SWPPP Prepared By:

Bay Colony Group, Inc.
4 School Street
Foxborough, MA 02035
508.543.3939
508.543.8866 fax

SWPPP Preparation Date:

January, 2024

Estimated Project Dates:

Project Start Date: June 1, 2024
Project Completion Date: October 1, 2026

Contents

SECTION 1: CONTACT INFORMATION/RESPONSIBLE PARTIES

1.1 Operator(s) / Subcontractor(s)

Operator(s):

Name
Address
Phone Number

General Contractor:
Insert Company or Organization Name:
Insert Name:
Insert Address:
Insert City, State, Zip Code:
Insert Telephone Number:
Insert Fax/Email:
Insert area of control (if more than one operator at site):

Subcontractor(s):

Insert Company or Organization Name:
Insert Name:
Insert Address:
Insert City, State, Zip Code:
Insert Telephone Number:
Insert Fax/Email:
Insert area of control (if more than one operator at site):

Emergency 24-Hour Contact:

A. xxxxx
xxxxx
xxxxx

1.2 Stormwater Team

Insert Role or Responsibility: **Project Manager**
Insert Position: **Project Manager**
Insert Name: **xxxx**

Insert Telephone Number: **xxxxx**
Insert Email: **xxxxx**

Insert Role or Responsibility:
Insert Position:
Insert Name:
Insert Telephone Number:
Insert Email:

Insert Role or Responsibility:
Insert Position:
Insert Name:
Insert Telephone Number:
Insert Email:

SECTION 2: SITE EVALUATION, ASSESSMENT, AND PLANNING

2.1 Project/Site Information

Project Name and Address

Project/Site Name: **Pine Estates**
Project Street/Location: **204 East Street**
City: **Foxborough**
State: **MA**
ZIP Code: **02035**
County or Similar Subdivision: **Norfolk**

Project Latitude/Longitude

(Use **one** of three possible formats, and specify method)

Latitude:	Longitude:
1. **42 ° 03 ' 28.6" N** (degrees, minutes, seconds)	1. **-71 ° 11 ' 39.7" W** (degrees, minutes, seconds)
2. _ _ ° _ _ . _ _ ' N (degrees, minutes, decimal)	2. _ _ ° _ _ . _ _ ' W (degrees, minutes, decimal)
3. _ _ . _ _ _ _ ° N (decimal)	3. _ _ . _ _ _ _ ° W (decimal)

Method for determining latitude/longitude:
☐ USGS topographic map (specify scale: _____) ☐ EPA Web site ☒ GPS
☐ Other (please specify): _____

Horizontal Reference Datum:
☐ NAD 27 ☒ NAD 83 or WGS 84 ☐ Unknown

If you used a U.S.G.S topographic map, what was the scale? _____

Additional Project Information

Is the project/site located on Indian country lands, or located on a property of religious or cultural significance to an Indian tribe? ☐ Yes ☒ No

If yes, provide the name of the Indian tribe associated with the area of Indian country (including the name of Indian reservation if applicable), or if not in Indian country, provide the name of the Indian tribe associated with the property: **N/A**

If you are conducting earth-disturbing activities in response to a public emergency, document the cause of the public emergency *(e.g., natural disaster, extreme flooding conditions)*, information substantiating its occurrence *(e.g., state disaster declaration)*, and a description of the construction necessary to reestablish effective public services: N/A

Are you applying for permit coverage as a "federal operator" as defined in Appendix A of the 2012 CGP? ☐ Yes ☒ No

2.2 Discharge Information

Does your project/site discharge stormwater into a Municipal Separate Storm Sewer System (MS4)? ☐ Yes ☒ No

Are there any surface waters that are located within 50 feet of your construction disturbances?
☒ Yes ☐ No

Table 1 – Names of Receiving Waters

Name(s) of the first surface water that receives stormwater directly from your site and/or from the MS4 (note: multiple rows provided where your site has more than one point of discharge that flows to different surface waters)
1. Canoe River
2.
3.
4.
5.
6.

Table 2 – Impaired Waters / TMDLs (Answer the following for each surface water listed in Table 1 above)

	Is this surface water listed as "impaired"?	If you answered yes, then answer the following:			
		What pollutant(s) are causing the impairment?	Has a TMDL been completed?	Title of the TMDL document	Pollutant(s) for which there is a TMDL
1.	☐ YES ☒ NO		☐ YES ☐ NO		
2.	☐ YES ☐ NO		☐ YES ☐ NO		
3.	☐ YES ☐ NO		☐ YES ☐ NO		
4.	☐ YES ☐ NO		☐ YES ☐ NO		
5.	☐ YES ☐ NO		☐ YES ☐ NO		
6.	☐ YES ☐ NO		☐ YES ☐ NO		

[Include additional rows as necessary.]

Describe the method(s) you used to determine whether or not your project/site discharges to an impaired water: Review of the 2022 MassDEP list of impaired water.

Table 3 – Tier 2, 2.5, or 3 Waters (Answer the following for each surface water listed in Table 1 above)

	Is this surface water designated as a Tier 2, Tier 2.5, or Tier 3 water? (see Appendix F)	If you answered yes, specify which Tier (2, 2.5, or 3) the surface water is designated as?
1.	☐ YES ☒ NO	INSERT "Tier 2", "Tier 2.5", or "Tier 3"
2.	☐ YES ☐ NO	INSERT "Tier 2", "Tier 2.5", or "Tier 3"
3.	☐ YES ☐ NO	INSERT "Tier 2", "Tier 2.5", or "Tier 3"
4.	☐ YES ☐ NO	INSERT "Tier 2", "Tier 2.5", or "Tier 3"
5.	☐ YES ☐ NO	INSERT "Tier 2", "Tier 2.5", or "Tier 3"

2.3 Nature of the Construction Activity

General Description of Project

Provide a general description of the construction project:

Construction of 1,025+/- feet of roadway and twelve new single family homes with associated utilities, septic systems and storm water systems.

Size of Construction Project

What is the size of the property (in acres), the total area expected to be disturbed by the construction activities (in acres), and the maximum area expected to be disturbed at any one time?

INSERT SIZE OF PROPERTY – 17.3+/- acres
INSERT TOTAL AREA OF CONSTRUCTION DISTURBANCES – 7.0+/- acres
INSERT MAXIMUM AREA TO BE DISTURBED AT ANY ONE TIME – 3.5+/- acres

Construction Support Activities (only provide if applicable)

Describe any construction support activities for the project (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas)

INSERT DESCRIPTION OF CONSTRUCTION SUPPORT ACTIVITY
INSERT CONTACT INFORMATION FOR CONSTRUCTION SUPPORT ACTIVITY (Name, Telephone No., Email Address)
INSERT LOCATION INFORMATION FOR CONSTRUCTION SUPPORT ACTIVITY (Address and/or Latitude/Longitude)

2.4 Sequence and Estimated Dates of Construction Activities

Phase I

Clearing of roadways, demolition of existing buildings on the site, screening and moving of existing material piles, clearing of storm water basin area, installation of erosion controls, and grubbing of roadway and storm water basin areas.

- INSERT ESTIMATED START AND END DATES OF CONSTRUCTION DISTURBANCES ASSOCIATED WITH THIS PHASE
- FOR EACH STORMWATER CONTROL, INSERT ESTIMATED DATE(s) OF INSTALLATION OF EACH STORMWATER CONTROL
- FOR AREAS OF THE SITE REQUIRED TO BE STABILIZED, INSERT ESTIMATED DATE(s) OF APPLICATION OF STABILIZATION MEASURES
- INSERT ESTIMATED DATE(s) WHEN STORMWATER CONTROLS WILL BE REMOVED

Phase II

Import and placement of material to bring roadways to subbase elevation. Construction of storm water basin. Installation of drainage and water mains within project area.

- INSERT ESTIMATED START AND END DATES OF CONSTRUCTION DISTURBANCES ASSOCIATED WITH THIS PHASE
- FOR EACH STORMWATER CONTROL, INSERT ESTIMATED DATE(s) OF INSTALLATION OF EACH STORMWATER CONTROL
- FOR AREAS OF THE SITE REQUIRED TO BE STABILIZED, INSERT ESTIMATED DATE(s) OF APPLICATION OF STABILIZATION MEASURES
- INSERT ESTIMATED DATE(s) WHEN STORMWATER CONTROLS WILL BE REMOVED

Phase III

Installation of base course of pavement. Start construction of new homes.

- INSERT ESTIMATED START AND END DATES OF CONSTRUCTION DISTURBANCES ASSOCIATED WITH THIS PHASE
- FOR EACH STORMWATER CONTROL, INSERT ESTIMATED DATE(s) OF INSTALLATION OF EACH STORMWATER CONTROL
- FOR AREAS OF THE SITE REQUIRED TO BE STABILIZED, INSERT ESTIMATED DATE(s) OF APPLICATION OF STABILIZATION MEASURES
- INSERT ESTIMATED DATE(s) WHEN STORMWATER CONTROLS WILL BE REMOVED

Phase IV

Construct finished course of pavement. Complete landscaping of disturbed areas. Remove storm water erosion controls.

- INSERT ESTIMATED START AND END DATES OF CONSTRUCTION DISTURBANCES ASSOCIATED WITH THIS PHASE
- FOR EACH STORMWATER CONTROL, INSERT ESTIMATED DATE(s) OF INSTALLATION OF EACH STORMWATER CONTROL
- FOR AREAS OF THE SITE REQUIRED TO BE STABILIZED, INSERT ESTIMATED DATE(s) OF APPLICATION OF STABILIZATION MEASURES
- INSERT ESTIMATED DATE(s) WHEN STORMWATER CONTROLS WILL BE REMOVED
-

2.5 Allowable Non-Stormwater Discharges

List of Allowable Non-Stormwater Discharges Present at the Site

Type of Allowable Non-Stormwater Discharge	**Likely to be Present at Your Site?**
Discharges from emergency fire-fighting activities	☐ YES ☒ NO
Fire hydrant flushings	☒ YES ☐ NO
Landscape irrigation	☒ YES ☐ NO
Waters used to wash vehicles and equipment	☐ YES ☒ NO
Water used to control dust	☒ YES ☐ NO
Potable water including uncontaminated water line flushings	☒ YES ☐ NO
Routine external building wash down	☐ YES ☒ NO
Pavement wash waters	☐ YES ☒ NO
Uncontaminated air conditioning or compressor condensate	☒ YES ☐ NO

Uncontaminated, non-turbid discharges of ground water or spring water	☐ YES ☒ NO
Foundation or footing drains	☐ YES ☒ NO
Construction dewatering water	☒ YES ☐ NO

(Note: You are reminded of the requirement to identify the likely locations of these allowable non-stormwater discharges on your site map. See Section 2.6, below, of the SWPPP Template.)

2.6 Site Maps

Instructions (see CGP Part 7.2.6):

- Attach site maps in Appendix A of the Template. For most projects, a series of site maps is necessary and recommended. The first should show the undeveloped site and its current features. An additional map or maps should be created to show the developed site or, for more complicated sites, show the major phases of development.

These maps must include the following features:

- Boundaries of the property and of the locations where construction will occur, including:
  - ✓ Locations where earth-disturbing activities will occur, noting any phasing of construction activities;
  - ✓ Approximate slopes before and after major grading activities. Note areas of steep slopes, as defined in Appendix A;
  - ✓ Locations where sediment, soil, or other construction materials will be stockpiled;
  - ✓ Locations of any crossings of surface waters;
  - ✓ Designated points on the site where vehicles will exit onto paved roads;
  - ✓ Locations of structures and other impervious surfaces upon completion of construction; and
  - ✓ Locations of construction support activity areas covered by this permit.
- Locations of all surface waters, including wetlands, that exists on or near your site. Indicate which waterbodies are listed as impaired, and which are identified by your state, tribe, or EPA as Tier 2, Tier 2.5, or Tier 3 waters.
- The boundary lines of any natural buffer areas. See CGP Part 2.1.2.1.a.
- Areas of federally-listed critical habitat for endangered or threatened species.
- Topography of the site, existing vegetative cover (e.g., forest, pasture, pavement, structures), and drainage pattern(s) of stormwater and allowable non-stormwater flow onto, over, and from the site property before and after major grading activities.
- Stormwater and allowable non-stormwater discharge locations, including:
  - ✓ Locations of any storm drain inlets on the site and in the immediate vicinity of the site; and
  - ✓ Locations where stormwater or allowable non-stormwater will be discharged to surface waters (including wetlands).
- Locations of all potential pollutant-generating activities.
- Locations of stormwater control measures.
- Locations where polymers, flocculants, or other treatment chemicals will be used and stored.

SECTION 3: DOCUMENTATION OF COMPLIANCE WITH OTHER FEDERAL REQUIREMENTS

3.1 Endangered Species Protection

Eligibility Criterion

Under which criterion listed in Appendix D are you eligible for coverage under this permit?

☒ **A** ☐ **B** ☐ **C** ☐ **D** ☐ **E**

For reference purposes, the eligibility criteria listed in Appendix D are as follows:

Criterion A. No federally-listed threatened or endangered species or their designated critical habitat(s) are likely to occur in your site's "action area" as defined in Appendix A of this permit.

Criterion B. The construction site's discharges and discharge-related activities were already addressed in another operator's valid certification of eligibility for your action area under eligibility Criterion A, C, D, E, or F and there is no reason to believe that federally-listed species or federally-designated critical habitat not considered in the prior certification may be present or located in the "action area". To certify your eligibility under this Criterion, there must be no lapse of NPDES permit coverage in the other operator's certification. By certifying eligibility under this Criterion, you agree to comply with any effluent limitations or conditions upon which the other operator's certification was based. You must include in your NOI the tracking number from the other operator's notification of authorization under this permit. If your certification is based on another operator's certification under Criterion C, you must provide EPA with the relevant supporting information required of existing dischargers in Criterion C in your NOI form.

Criterion C. Federally-listed threatened or endangered species or their designated critical habitat(s) are likely to occur in or near your site's "action area," and your site's discharges and discharge-related activities are not likely to adversely affect listed threatened or endangered species or critical habitat. This determination may include consideration of any stormwater controls and/or management practices you will adopt to ensure that your discharges and discharge-related activities are not likely to adversely affect listed species and critical habitat. To make this certification, you must include the following in your NOI: 1) any federally listed species and/or designated habitat located in your "action area"; and 2) the distance between your site and the listed species or designated critical habitat (in miles). You must also include a copy of your site map with your NOI.

Criterion D. Coordination between you and the Services has been concluded. The coordination must have addressed the effects of your site's discharges and discharge-related activities on federally-listed threatened or endangered species and federally-designated critical habitat, and must have resulted in a written concurrence from the relevant Service(s) that your site's discharges and discharge-related activities are not likely to adversely affect listed species or critical habitat. You must include copies of the correspondence between yourself and the Services in your SWPPP and your NOI.

Criterion E. Consultation between a Federal Agency and the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service under section 7 of the ESA has been concluded. The consultation must have addressed the effects of the construction site's discharges and discharge-related activities on federally-listed threatened or endangered species and federally-designated critical habitat. The result of this consultation must be either:

i. a biological opinion that concludes that the action in question (taking into account the effects of your site's discharges and discharge-related activities) is not likely to jeopardize the continued existence of listed species, nor the destruction or adverse modification of critical habitat; or

ii. written concurrence from the applicable Service(s) with a finding that the site's discharges and discharge-related activities are not likely to adversely affect federally-listed species or federally-designated habitat.

You must include copies of the correspondence between yourself and the Services in your SWPPP and your NOI.

Criterion F. Your construction activities are authorized through the issuance of a permit under section 10 of the ESA, and this authorization addresses the effects of the site's discharges and discharge-related activities on federally-listed species and federally-designated critical habitat. You must include copies of the correspondence between yourself and the Services in your SWPPP and your NOI.

Supporting Documentation

Provide documentation for the applicable eligibility criterion you select in Appendix D, as follows:

For criterion A, indicate the basis for your determination that no federally-listed threatened or endangered species or their designated critical habitat(s) are likely to occur in your site's action area (as defined in Appendix A of the permit). Check the applicable source of information you relied upon:

- ☐ Specific communication with staff of the U.S. Fish & Wildlife Service or National Marine Fisheries Service. INSERT DATE OF COMMUNICATION AND WHO YOU SPOKE WITH
- ☒ Publicly available species list. MASS GIS Website – NHESP Tabs
- ☐ Other source: INSERT SPECIFIC SOURCE

For criterion B, provide the Tracking Number from the other operator's notification of permit authorization: INSERT AUTHORIZATION TRACKING NUMBER FROM OTHER OPERATOR'S NOTIFICATION LETTER/EMAIL

Provide a brief summary of the basis used by the other operator for selecting criterion A, B, C, D, E, or F: INSERT TEXT HERE

For criterion C, provide the following information:

- INSERT LIST OF FEDERALLY-LISTED SPECIES OR FEDERALLY-DESIGNATED CRITICAL HABITAT LOCATED IN YOUR ACTION AREA
- INSERT DISTANCE BETWEEN YOUR SITE AND THE LISTED SPECIES OR CRITICAL HABITAT (in miles)

Also, provide a brief summary of the basis used for determining that your site's discharges and discharge-related activities are not likely to adversely affect listed species or critical habitat: INSERT TEXT HERE

For criterion D, E, or F, attach copies of any letters or other communication between you and the U.S. Fish & Wildlife Service or National Marine Fisheries Service concluding consultation or

coordination activities. INSERT COPIES OF LETTERS OR OTHER COMMUNICATIONS HERE

3.2 Historic Preservation

Appendix E, Step 1
Do you plan on installing any of the following stormwater controls at your site? Check all that apply below, and proceed to Appendix E, Step 2.

- ☐ Dike
- ☐ Berm
- ☒ Catch Basin
- ☒ Pond
- ☐ Stormwater Conveyance Channel (e.g., ditch, trench, perimeter drain, swale, etc.)
- ☒ Culvert
- ☐ Other type of ground-disturbing stormwater control: INSERT SPECIFIC TYPE OF STORMWATER CONTROL

(Note: If you will not be installing any ground-disturbing stormwater controls, no further documentation is required for Section 3.2 of the Template.)

Appendix E, Step 2
If you answered yes in Step 1, have prior surveys or evaluations conducted on the site already determined that historic properties do not exist, or that prior disturbances at the site have precluded the existence of historic properties? ☐ YES ☒ NO

- If yes, no further documentation is required for Section 3.2 of the Template.
- If no, proceed to Appendix E, Step 3.

Appendix E, Step 3
If you answered no in Step 2, have you determined that your installation of subsurface earth-disturbing stormwater controls will have no effect on historic properties? ☒ YES ☐ NO

If yes, provide documentation of the basis for your determination. **Reference to the Massachusetts Cultural Resources Information System shows no historical areas, buildings, burial grounds, objects or structures on or near the site. Demolition of the buildings will require a sign-off from Foxborough Historical Commission.**

If no, proceed to Appendix E, Step 4.

Appendix E, Step 4
If you answered no in Step 3, did the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Office (THPO), or other tribal representative (whichever applies) respond to you within 15 calendar days to indicate whether the subsurface earth disturbances caused by the installation of stormwater controls affect historic properties? ☐ YES ☐ NO

If no, no further documentation is required for Section 3.2 of the Template.

If yes, describe the nature of their response:

- ☐ Written indication that adverse effects to historic properties from the installation of stormwater controls can be mitigated by agreed upon actions. INSERT COPIES OF LETTERS, EMAILS, OR OTHER COMMUNICATION BETWEEN YOU AND THE APPLICABLE SHPO, THPO, OR OTHER TRIBAL REPRESENTATIVE

- ☐ No agreement has been reached regarding measures to mitigate effects to historic properties from the installation of stormwater controls. INSERT COPIES OF LETTERS, EMAILS, OR OTHER COMMUNICATION BETWEEN YOU AND THE APPLICABLE SHPO, THPO, OR OTHER TRIBAL REPRESENTATIVE

- ☐ Other: INSERT COPIES OF LETTERS, EMAILS, OR OTHER COMMUNICATION BETWEEN YOU AND THE APPLICABLE SHPO, THPO, OR OTHER TRIBAL REPRESENTATIVE

3.3 Safe Drinking Water Act Underground Injection Control Requirements

Do you plan to install any of the following controls? Check all that apply below.

- ☐ Infiltration trenches (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system)

- ☐ Commercially manufactured pre-cast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate stormwater flow

- ☐ Drywells, seepage pits, or improved sinkholes (if stormwater is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system)

If yes, INSERT COPIES OF LETTERS, EMAILS, OR OTHER COMMUNICATION BETWEEN YOU AND THE STATE AGENCY OR EPA REGIONAL OFFICE - **no correspondence undertaken. Project is permitted under the MassDEP Stormwater Regulations which are enforced by the local Conservation Commissions. A Notice of Intent will be filed and an Order of Conditions issued before the project can proceed.**

SECTION 4: EROSION AND SEDIMENT CONTROLS

4.1 Natural Buffers or Equivalent Sediment Controls

Buffer Compliance Alternatives

Are there any surface waters within 50 feet of your project's earth disturbances? ☒ YES ☐ NO

(Note: If no, no further documentation is required for the SWPPP Template.)

Check the compliance alternative that you have chosen:

☐ I will provide and maintain a 50-foot undisturbed natural buffer.

(Note (1): You must show the 50-foot boundary line of the natural buffer on your site map.)

(Note (2): You must show on your site map how all discharges from your construction disturbances through the natural buffer area will first be treated by the site's erosion and sediment controls. Also, show on the site map any velocity dissipation devices used to prevent erosion within the natural buffer area.)

☐ I will provide and maintain an undisturbed natural buffer that is less than 50 feet and is supplemented by additional erosion and sediment controls, which in combination achieves the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.

(Note (1): You must show the boundary line of the natural buffer on your site map.)

(Note (2): You must show on your site map how all discharges from your construction disturbances through the natural buffer area will first be treated by the site's erosion and sediment controls. Also, show on the site map any velocity dissipation devices used to prevent erosion within the natural buffer area.)

- INSERT WIDTH OF NATURAL BUFFER TO BE RETAINED
- INSERT EITHER ONE OF THE FOLLOWING:

  (1) THE ESTIMATED SEDIMENT REMOVAL FROM A 50-FOOT BUFFER USING APPLICABLE TABLES IN APP. G, ATTACHMENT 1. INCLUDE INFORMATION ABOUT THE BUFFER VEGETATION AND SOIL TYPE THAT PREDOMINATE AT YOUR SITE

  OR

  (2) IF YOU CONDUCTED A SITE-SPECIFIC CALCULATION FOR THE ESTIMATED SEDIMENT REMOVAL OF A 50-FOOT BUFFER, PROVIDE THE SPECIFIC REMOVAL EFFICIENCY, AND INFORMATION YOU RELIED UPON TO MAKE YOUR SITE-SPECIFIC CALCULATION.
- INSERT DESCRIPTION OF ADDITIONAL EROSION AND SEDIMENT CONTROLS TO BE USED IN COMBINATION WITH NATURAL BUFFER AREA
- INSERT THE FOLLOWING INFORMATION:
  - (1) SPECIFY THE MODEL OR OTHER TOOL USED TO ESTIMATE SEDIMENT LOAD REDUCTIONS FROM THE COMBINATION OF THE BUFFER AREA AND ADDITIONAL EROSION AND SEDIMENT CONTROLS INSTALLED AT YOUR SITE, AND
  - (2) INCLUDE THE RESULTS OF CALCULATIONS SHOWING THAT THE COMBINATION OF YOUR BUFFER AREA AND THE ADDITIONAL EROSION AND SEDIMENT CONTROLS INSTALLED AT YOUR SITE WILL MEET OR EXCEED THE SEDIMENT REMOVAL EFFICIENCY OF A 50-FOOT BUFFER

☐ It is infeasible to provide and maintain an undisturbed natural buffer of any size, therefore I will implement erosion and sediment controls that achieve the sediment load reduction equivalent to a 50-foot undisturbed natural buffer.

- DESCRIPTION OF WHY IT IS NOT FEASIBLE
- INSERT EITHER ONE OF THE FOLLOWING:

  (1) THE ESTIMATED SEDIMENT REMOVAL FROM A 50-FOOT BUFFER USING APPLICABLE TABLES IN APP. G, ATTACHMENT 1. INCLUDE INFORMATION ABOUT THE BUFFER VEGETATION AND SOIL TYPE THAT PREDOMINATE AT YOUR SITE

  OR

  (2) IF YOU CONDUCTED A SITE-SPECIFIC CALCULATION FOR THE ESTIMATED SEDIMENT REMOVAL OF A 50-FOOT BUFFER, PROVIDE THE SPECIFIC REMOVAL EFFICIENCY, AND INFORMATION YOU RELIED UPON TO MAKE YOUR SITE-SPECIFIC CALCULATION.
- INSERT DESCRIPTION OF ADDITIONAL EROSION AND SEDIMENT CONTROLS TO BE USED IN COMBINATION WITH NATURAL BUFFER AREA
- INSERT THE FOLLOWING INFORMATION:
  - (1) SPECIFY THE MODEL OR OTHER TOOL USED TO ESTIMATE SEDIMENT LOAD REDUCTIONS FROM THE EROSION AND SEDIMENT CONTROLS INSTALLED AT YOUR SITE, AND
  - (2) INCLUDE THE RESULTS OF CALCULATIONS SHOWING THAT THE ADDITIONAL EROSION AND SEDIMENT CONTROLS INSTALLED AT YOUR SITE WILL MEET OR EXCEED THE SEDIMENT REMOVAL EFFICIENCY OF A 50-FOOT BUFFER

☒ I qualify for one of the exceptions in Part 2.1.2.1.e. (If you have checked this box, provide information on the applicable buffer exception that applies, below.)

Buffer Exceptions

Which of the following exceptions to the buffer requirements applies to your site?

☐ There is no discharge of stormwater to the surface water that is located 50 feet from my construction disturbances.

(Note: If this exception applies, no further documentation is required for Section 4.1 of the Template.)

☐ No natural buffer exists due to preexisting development disturbances that occurred prior to the initiation of planning for this project.

(Note (1): If this exception applies, no further documentation is required for Section 4.1 of the Template.)

(Note (2): Where some natural buffer exists but portions of the area within 50 feet of the surface water are occupied by preexisting development disturbances, you must still comply with the one of the CGP Part 2.1.2.1.a compliance alternatives.)

☒ For a "linear project" (defined in Appendix A), site constraints (e.g., limited right-of-way) make it infeasible for me to meet any of the CGP Part 2.1.2.1.a compliance alternatives. INCLUDE DOCUMENTATION HERE OF THE FOLLOWING: (1) WHY IT IS INFEASIBLE FOR YOU TO MEET ONE OF THE BUFFER COMPLIANCE ALTERNATIVES, AND (2) BUFFER WIDTH RETAINED AND/OR SUPPLEMENTAL

EROSION AND SEDIMENT CONTROLS TO TREAT DISCHARGES TO THE SURFACE WATER **The project is a limited project in that there is no access to a portion of the site without a wetland crossing. The site chosen has the minimum impact on the wetlands and the construction method chosen (minimal roadway cross section crossing over an open bottom culvert) will further minimize the impact. No buffer width will be retained at the crossing and sediment barriers will be used to minimize the impact during the construction of the crossing.**

☐ The project qualifies as "small residential lot" construction (defined in Part 2.1.2.1.e.iv and in Appendix A).

For Alternative 1 (see Appendix G, Part G.2.3.2.a):

- INSERT WIDTH OF NATURAL BUFFER TO BE RETAINED
- INSERT APPLICABLE REQUIREMENTS BASED ON TABLE G-1
- INSERT DESCRIPTION OF HOW YOU WILL COMPLY WITH THESE REQUIREMENTS

For Alternative 2 (see Appendix G, Part G.2.3.2.b):

- INSERT (1) THE ASSIGNED RISK LEVEL BASED ON APPLICABLE TABLE IN APP. G, PART G.2.3.2.b, AND (2) THE PREDOMINANT SOIL TYPE AND AVERAGE SLOPE AT YOUR SITE
- INSERT APPLICABLE REQUIREMENTS BASED ON APP. G, TABLE G-7
- INSERT DESCRIPTION OF HOW YOU WILL COMPLY WITH THESE REQUIREMENTS

☐ Buffer disturbances are authorized under a CWA Section 404 permit. INSERT DESCRIPTION OF ANY EARTH DISTURBANCES THAT WILL OCCUR WITHIN THE BUFFER AREA

(Note (1): If this exception applies, no further documentation is required for Section 4.1 of the Template.)

(Note (2): This exception only applies to the limits of disturbance authorized under the Section 404 permit, and does not apply to any upland portion of the construction project.)

☐ Buffer disturbances will occur for the construction of a water-dependent structure or water access area (e.g., pier, boat ramp, and trail). INSERT DESCRIPTION OF ANY EARTH DISTURBANCES THAT WILL OCCUR WITHIN THE BUFFER AREA

(Note (1): If this exception applies, no further documentation is required for Section 4.1 of the Template.)

4.2 Perimeter Controls

General

- **The downgradient perimeter of the site where the proposed work is located within 100' of the wetlands will contain a silt sock barrier that will capture siltation.**

Specific Perimeter Controls

Perimeter Control # 1

Perimeter Control Description

- **Silt sock barrier**
- **See SWPP Plan –Sheet 6.1 of the Definitive Plan**

Installation

- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements

- **Weekly inspection and removal of sediment once it reaches at least ½ way up the barrier.**

[Repeat as needed for individual perimeter controls.]

4.3 Sediment Track-Out

General

- **Rip rap stabilized construction entrance.**

Specific Track-Out Controls

Track-Out Control # 1

Track-Out Control Description

- **Rip rap stabilized construction entrance at point where it meets existing Springdale Avenue pavement**
- **See SWPP Plan –Sheet 6.1 of the Definitive Plan**

Installation

- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements

- **Where sediment has been tracked-out from the site onto the surface of off-site streets, other paved areas, and sidewalks, you must remove the deposited sediment by the end of the same work day in which the track-out occurs or by the end of the next work day if track-out occurs on a non-work day. You must remove the track-out by sweeping, shoveling, or vacuuming these surfaces, or by using other similarly effective means of sediment removal. Hosing or sweeping tracked-out sediment into any stormwater conveyance (unless it is connected to a sediment basin, sediment trap, or similarly effective control), storm drain inlet, or surface water.") is prohibited.**

[Repeat as needed for individual track-out controls.]

4.4 Stockpiled Sediment or Soil

General

- **Stockpiled Material will be at least 100' from any wetlands and will be encircled with a silt sock or hay bale barrier.**

Specific Stockpile Controls

Stockpile Control # 1

Stockpiled Sediment/Soil Control Description

- **Silt sock or hay bales will be placed around the perimeter of the stockpiled material.**
- **See SWPP Plan –Sheet 6.1 of the Definitive Plan**

Installation

- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements

- **Inspect barriers weekly or after a rain storm and remove sediment if it has reached ½ way up the barrier.**

[Repeat as needed for individual stockpile controls.]

4.5 Minimize Dust

General

- **A water truck will be used for dust control.**

Specific Dust Controls

Dust Control # 1
Dust Control Description

- **A water truck will be used for dust control.**

Installation

- **n/a**

Maintenance Requirements

- **n/a**

[Repeat as needed for individual dust controls.]

4.6 Minimize the Disturbance of Steep Slopes

General

- **There are steep slopes on the southern half of the property. Silt socks will be used as necessary for the construction of the roadway and the single family homes.**

Specific Steep Slope Controls

Steep Slope Control # 1
Steep Slope Control Description

- INSERT DESCRIPTION OF STEEP SLOPE CONTROL TO BE INSTALLED
- INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE

Installation

- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements

- INSERT MAINTENANCE REQUIREMENTS FOR THE STEEP SLOPE CONTROL

[Repeat as needed for individual steep slope controls.]

4.7 Topsoil

General

- **The existing topsoil will stripped and stockpiled on the site and reused in areas of the site where it is appropriate: lawns, road side slopes, storm water basin slopes, etc. The remainder will be removed from the site to locations TBD.**

Specific Topsoil Controls

Topsoil Control # 1
Topsoil Control Description

- **Topsoil will be stripped and stockpiled on the site and handled in accordance with the specifications of other stockpiles**
- **See Section 4.4**
- **See SWPP Plan – Appendix A**

Installation

- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements

- **Same as Section 4.4**

[Repeat as needed for individual topsoil controls.]

4.8 Soil Compaction

General

- **Areas of landscaping will be handled in accordance with local landscaping practice. Storm water basin construction will be handled in accordance with the guidance in the MA DEP Stormwater standards.**

Specific Soil Compaction Controls

Soil Compaction Control # 1
Soil Compaction Control Description

- **Storm water basin construction will be in accordance with MA DEP Stormwater standards.**
- **See Sheets 5,6,9 and 12 of the definitive plans**

Installation

- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements

- **Storm water basin will be cleaned on an annual basis, or more if necessary.**
-

[Repeat as needed for individual soil compaction controls.]

4.9 Storm Drain Inlets

General

- **Storm drain inlets will be protected through the use of silt socks within drainage swales. Catch basins will protected by silt socks around the grates or with silt bags inserted in the structure.**

Specific Storm Drain Inlet Controls

Storm Drain Inlet Control # 1
Storm Drain Inlet Control Description

- **Silt socks in drainage swales**
- **See SWPP Plan – Appendix A**

Installation

- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements

- **Clean, or remove and replace, the protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, you must remove the deposited sediment by the end of the same work day in which it is found or by the end of the following work day if removal by the same work day is not feasible.**

Storm Drain Inlet Control # 2
Storm Drain Inlet Control Description

- **Silt socks around grates or silt sacks in catch basins**
- **See SWPP Plan – Appendix A**

Installation

- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements

- **Clean, or remove and replace, the protection measures as sediment accumulates, the filter becomes clogged, and/or performance is compromised. Where there is evidence of sediment accumulation adjacent to the inlet protection measure, you must remove the deposited sediment by the end of the same work day in which it is found or by the end of the following work day if removal by the same work day is not feasible.**

[Repeat as needed for individual storm drain inlet controls.]

4.10 Constructed Stormwater Conveyance Channels

General

- **Rip rap devices will be used at all outlets.**

Specific Conveyance Channel Controls

Stormwater Conveyance Channel Control # 1
Stormwater Conveyance Channel Control Description

- **Rip rap outlet to drain outlet pipes**
- **See Definitive Plan Sheet 5.1 – Appendix A**

Installation
- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements
- **Rip rap shall be inspected weekly and after every rainstorm. If erosion is taking place the stone shall be replenished.**

[Repeat as needed for individual stormwater conveyance channel controls.]

4.11 Sediment Basins

General
- **Sediment basins will be constructed throughout the site as necessary during construction until the base course has been placed.**

Specific Sediment Basin Controls

Sediment Basin Control # 1
Sediment Basin Control Description
- **Storm water basin will be constructed in accordance with the site development plan. The outlet is above the permanent pool elevation and so the basins will act as an effective sediment basin.**

Installation
- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements
- **Sediment basins will be inspected weekly and after every rain event greater than 0.5". Once the sediment in the forebay reaches 18" of depth the sediment will be removed.**
- **Once construction has stopped and the site is fully stabilized the basin will be revegetated as necessary to bring it into compliance with the definitive plans.**

  (Note: At a minimum, you must comply with following requirement in CGP Part 2.1.3.2.b: "Keep in effective operating condition and remove accumulated sediment to maintain at least ½ of the design capacity of the sediment basin at all times.")

[Repeat as needed for individual sediment basin controls.]

4.12 Chemical Treatment

Soil Types
List all the soil types (including soil types expected to be found in fill material) that are expected to be exposed during construction and that will be discharged to locations where chemicals will be applied:
None anticipated

Treatment Chemicals

List all treatment chemicals that will be used at the site and explain why these chemicals are suited to the soil characteristics: INSERT TEXT HERE

Describe the dosage of all treatment chemicals you will use at the site or the methodology you will use to determine dosage: INSERT TEXT HERE

Provide information from any applicable Material Safety Data Sheets (MSDS): INSERT TEXT HERE

Describe how each of the chemicals will stored: INSERT TEXT HERE

Include references to applicable state or local requirements affecting the use of treatment chemicals, and copies of applicable manufacturer's specifications regarding the use of your specific treatment chemicals and/or chemical treatment systems: INSERT TEXT HERE

Special Controls for Cationic Treatment Chemicals (if applicable)
If you have been authorized by your applicable Regional Office to use cationic treatment chemicals, include the official EPA authorization letter or other communication, and identify the specific controls and implementation procedures you are required to implement to ensure that your use of cationic treatment chemicals will not lead to a violation of water quality standards: INSERT (1) ANY LETTERS OR OTHER DOCUMENTS SENT FROM THE EPA REGIONAL OFFICE CONCERNING YOUR USE OF CATIONIC TREATMENT CHEMICALS, AND (2) DESCRIPTION OF ANY SPECIFIC CONTROLS YOU ARE REQUIRED TO IMPLEMENT

Schematic Drawings of Stormwater Controls/Chemical Treatment Systems
Provide schematic drawings of any chemically-enhanced stormwater controls or chemical treatment systems to be used for application of treatment chemicals: INSERT TEXT HERE

Training
Describe the training that personnel who handle and apply chemicals have received prior to permit coverage, or will receive prior to the use of treatment chemicals: INSERT TEXT HERE

4.13 Dewatering Practices

General

- **Dewatering is not expected to be necessary for the construction except in the area of the wetland crossing.**

Specific Dewatering Practices

Dewatering Practice # 1
Dewatering Practice Description

- **Installation of a sump pipe with trash pump in the area of the footing excavation**
- **Discharge will take place in the area designated on the SWPP Plan, which will allow the water to infiltrate into the ground away from the wetlands.**

Installation

- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements

- **Water removed by dewatering will be discharged to an upland area at least 100' away from the wetlands. Create a stone sump if necessary to ameliorate velocity and to encourage infiltration. If necessary, use silt socks or hay bales to contain.**

[Repeat as needed for individual dewatering practices.]

4.14 Other Stormwater Controls

General

- INSERT GENERAL DESCRIPTION OF THE PROBLEM THIS CONTROL IS DESIGNED TO ADDRESS

Specific Stormwater Control Practices

Stormwater Control Practice # 1
Description

- INSERT DESCRIPTION OF PRACTICE TO BE INSTALLED
- IF APPLICABLE INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE

Installation

- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements

- INSERT MAINTENANCE REQUIREMENTS FOR THE STORMWATER CONTROL PRACTICE

[Repeat as needed.]

4.15 Site Stabilization

Site Stabilization Practice (only use this if you are not located in an arid, semi-arid, or drought-stricken area)
☒ *Vegetative* ☐ *Non-Vegetative*
☒ *Temporary* ☐ *Permanent*

Description of Practice

- **Temporary stabilization of disturbed areas.**
- **No later than 14 days after initiation of soil stabilization measures the portion of the site in question will be planted with temporary cover using either standard seeding or hydroseeding.**
- **Seed mixture shall be based on the Massachusetts Conservation Guide Vol. II – Vegetated Practices in Site Development Table 1 – Seedings for Temporary Cover and is dependent on the time of year and the weather conditions.**

Installation

- INSERT APPROXIMATE DATE OF INSTALLATION
- INSERT APPROXIMATE COMPLETION DATE CONSISTENT WITH CGP PART 2.2.1.2

Maintenance Requirements
Seeded areas should be refertilized with ½ of the establishment amount in the second growing season and subsequently as needed.

[Repeat as needed for additional stabilization practices.]

Site Stabilization Practice (only use this if you are located in an arid, semi-arid, or drought-stricken area)
☒ *Vegetative* ☐ *Non-Vegetative*
☐ *Temporary* ☒ *Permanent*

Description of Practice
- **Permanent stabilization of disturbed areas.**
- **Final stabilization in areas to be vegetated will be done in accordance Section 2.2.2 of the general permit.**
- **Seed mixture shall be based on the Massachusetts Conservation Guide Vol. II – Vegetated Practices in Site Development Table 2 – Seed Mixtures for Permanenty Cover and is dependent on the time of year and the weather conditions.**
-

Installation
- FOR VEGETATIVE STABILIZATION IN ARID OR SEMI-ARID AREAS, INDICATE THE BEGINNING AND ENDING DATES OF THE SEASONALLY DRY PERIOD AND DESCRIBE YOUR SITE CONDITIONS
- INSERT APPROXIMATE DATE OF INSTALLATION
- INSERT APPROXIMATE COMPLETION DATE CONSISTENT WITH CGP PART 2.2.1.3

Maintenance Requirements
Seeded areas should be refertilized with ½ of the establishment amount in the second growing season and subsequently as needed.

[Repeat as needed for additional stabilization practices.]

Site Stabilization Practice (only use this if uncontrollable circumstances have delayed the initiation or completion of stabilization)
(Note: You will not be able to include this information in your initial SWPPP. If you are affected by circumstances such as those described in CGP Part 2.2.1.3.b, you will need to modify your SWPPP to include this information.)

☐ *Vegetative* ☐ *Non-Vegetative*
☐ *Temporary* ☐ *Permanent*

Justification
- INSERT DESCRIPTION OF CIRCUMSTANCES THAT PREVENT YOU FROM MEETING THE DEADLINES REQUIRED IN CGP PARTS 2.2.1.1 AND/OR 2.2.1.2 AND THE SCHEDULE YOU WILL FOLLOW FOR INITIATING AND COMPLETING STABILIZATION

Description of Practice
- INSERT DESCRIPTION OF STABILIZATION PRACTICE TO BE INSTALLED
- NOTE HOW DESIGN WILL MEET REQUIREMENTS OF PART 2.2.2.1 OR 2.2.2.2, WHICHEVER APPLIES
- INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE

Installation
- INSERT DATES OF INITIATION AND COMPLETION OF NON-VEGETATIVE STABILIZATION CONTROLS (must be completed within 14 days of the cessation of construction)

Maintenance Requirements
INSERT MAINTENANCE REQUIREMENTS FOR THE STABILIZATION PRACTICE

[Repeat as needed for additional stabilization practices.]

SECTION 5: POLLUTION PREVENTION STANDARDS

5.1 Potential Sources of Pollution

Construction Site Pollutants

Pollutant-Generating Activity	**Pollutants or Pollutant Constituents** (that could be discharged if exposed to stormwater)	**Location on Site** (or reference SWPPP site map where this is shown)
Fueling of vehicles	Gasoline or diesel	Only on paved surfaces, to include existing Springdale Avenue

[Include additional rows as necessary.]

5.2 Spill Prevention and Response

Any spills of petroleum products will be cleaned using available sorbent material, to include sand, gravel, earth, or other dry clean up measures. If the spill is so large that it enters a catch basin then ensure that the basin is properly emptied so that the materials do not exit the structure. If necessary, contact the Attleboro Fire Department at 911 and direct them to the project site.

5.3 Fueling and Maintenance of Equipment or Vehicles

General

- **Fueling will only take place on pavement where spills can be readily cleaned-up. Ensure that adequate absorbent, spill clean-up materials are available on the site. If necessary, drip pans will be used under vehicles that leak. Those vehicles shall be removed from the site and repaired before being allowed to return. No storage of fuels or lubricants will take place on site. No maintenance will take place on site.**

Specific Pollution Prevention Practices

Pollution Prevention Practice # 1
Description

- **Fueling will only take place on pavement and adequate absorbent, spill clean-up materials will be available on site.**

Installation

- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements

- **Ensure that adequate materials are maintained on site.**

[Repeat as needed.]

5.4 Washing of Equipment and Vehicles

General

- **No washing of equipment or vehicles will be done on site.**

Specific Pollution Prevention Practices

Pollution Prevention Practice # 1
Description

- INSERT DESCRIPTION OF PRACTICE TO BE INSTALLED
- IF APPLICABLE INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE

Installation

- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements

- INSERT MAINTENANCE REQUIREMENTS FOR THE POLLUTION PREVENTION PRACTICE

[Repeat as needed.]

5.5 Storage, Handling, and Disposal of Construction Products, Materials, and Wastes

5.5.1 Building Products

(Note: Examples include asphalt sealants, copper flashing, roofing materials, adhesives, concrete admixtures.)

General

- **Building products not designed to come in contact with rain will be stored under cover.**

Specific Pollution Prevention Practices

Pollution Prevention Practice # 1

Description

- **Building products not designed to come in contact with rain will be stored under cover.**

Installation

- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements

- INSERT MAINTENANCE REQUIREMENTS FOR THE POLLUTION PREVENTION PRACTICE

[Repeat as needed.]

5.5.2 Pesticides, Herbicides, Insecticides, Fertilizers, and Landscape Materials

General

- **Shall not be stored on site. Application shall be done at a rate and in amounts consistent with the manufacturer's specifications.**

Specific Pollution Prevention Practices

Pollution Prevention Practice # 1

Description

- **Application shall be done at a rate and in amounts consistent with the manufacturer's specifications.**
- **See manufacturer's specifications**

Installation

- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements

- INSERT MAINTENANCE REQUIREMENTS FOR THE POLLUTION PREVENTION PRACTICE

[Repeat as needed.]

5.5.3 Diesel Fuel, Oil, Hydraulic Fluids, Other Petroleum Products, and Other Chemicals

General

- **No fuels or petroleum products will be stored on site.**

Specific Pollution Prevention Practices

Pollution Prevention Practice # 1
Description
- INSERT DESCRIPTION OF PRACTICE TO BE INSTALLED
- IF APPLICABLE INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE

Installation
- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements
- INSERT MAINTENANCE REQUIREMENTS FOR THE POLLUTION PREVENTION PRACTICE

[Repeat as needed.]

5.5.4 Hazardous or Toxic Waste

(Note: Examples include paints, solvents, petroleum-based products, wood preservatives, additives, curing compounds, acids.)

General
- INSERT GENERAL DESCRIPTION OF HOW YOU WILL COMPLY WITH CGP PART 2.3.3.3.d

Specific Pollution Prevention Practices

Pollution Prevention Practice # 1
Description
- INSERT DESCRIPTION OF PRACTICE TO BE INSTALLED
- IF APPLICABLE INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE

Installation
- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements
- INSERT MAINTENANCE REQUIREMENTS FOR THE POLLUTION PREVENTION PRACTICE

[Repeat as needed.]

5.5.5 Construction and Domestic Waste

(Note: Examples include packaging materials, scrap construction materials, masonry products, timber, pipe and electrical cuttings, plastics, styrofoam, concrete, and other trash or building materials.)

General
- **Dumpsters will be used for individual home construction.**

Specific Pollution Prevention Practices

Pollution Prevention Practice # 1
Description

- **Dumpsters will be used for materials waste for home construction. The location of the dumpsters will be determined on a case by case basis as the homes are built.**
-

Installation
- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements
- **Remove from site when full.**

[Repeat as needed.]

5.5.6 Sanitary Waste

General
- **Porta-johns will be used on the site for human waste.**

Specific Pollution Prevention Practices

Pollution Prevention Practice # 1
Description
- **Porta-johns will be used on the site as necessary. The number of porta-johns will be based on the worker population. Typically, one will be sufficient.**

Installation
- **They will be used on the site from the start to the end of construction.**

Maintenance Requirements
- **Typical maintenance will involve pumping and cleaning once per week depending on the population size.**

[Repeat as needed.]

5.6 Washing of Applicators and Containers used for Paint, Concrete or Other Materials

General
- **Direct all washwater into leak proof containers designed so that no overflows can occur. Do not dump liquid wastes in storm sewers. Remove and dispose of hardened concrete in accordance with other solid wastes generated on site.**

Specific Pollution Prevention Practices

Pollution Prevention Practice # 1
Description
- INSERT DESCRIPTION OF PRACTICE TO BE INSTALLED
- IF APPLICABLE INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE

Installation
- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements

- INSERT MAINTENANCE REQUIREMENTS FOR THE POLLUTION PREVENTION PRACTICE

[Repeat as needed.]

5.7 Fertilizers

General

- **Shall not be stored on site. Application shall be done at a rate and in amounts consistent with the manufacturer's specifications.**

Specific Pollution Prevention Practices

Pollution Prevention Practice # 1
Description

- **Application shall be done at a rate and in amounts consistent with the manufacturer's specifications.**

Installation

- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements

- INSERT MAINTENANCE REQUIREMENTS FOR THE POLLUTION PREVENTION PRACTICE

[Repeat as needed for individual fertilizer practices.]

5.8 Other Pollution Prevention Practices

General

- INSERT GENERAL DESCRIPTION OF THE PROBLEM THIS CONTROL IS DESIGNED TO ADDRESS

Specific Pollution Prevention Practices

Pollution Prevention Practice # 1
Description

- INSERT DESCRIPTION OF PRACTICE TO BE INSTALLED
- IF APPLICABLE INCLUDE COPIES OF DESIGN SPECIFICATIONS HERE

Installation

- INSERT APPROXIMATE DATE OF INSTALLATION

Maintenance Requirements

- INSERT MAINTENANCE REQUIREMENTS FOR THE POLLUTION PREVENTION PRACTICE

[Repeat as needed.]

SECTION 6: INSPECTION AND CORRECTIVE ACTION

6.1 Inspection Personnel and Procedures

Personnel Responsible for Inspections

INSERT NAMES OF PERSONNEL OR TYPES OF PERSONNEL WHO WILL BE CONDUCTING SITE INSPECTIONS HERE

Note: All personnel conducting inspections must be considered a "qualified person." CGP Part 4.1.1 clarifies that a "qualified person" is a person knowledgeable in the principles and practices of erosion and sediment controls and pollution prevention, who possesses the skills to assess conditions at the construction site that could impact stormwater quality, and the skills to assess the effectiveness of any stormwater controls selected and installed to meet the requirements of this permit.

Inspection Schedule

Specific Inspection Frequency

Inspections will take place once every 7 days or more often if a rain event greater then 0.25" has occurred.

Rain Gauge Location (if applicable)

SPECIFY LOCATION(S) OF RAIN GAUGE TO BE USED FOR DETERMINING WHETHER A RAIN EVENT OF 0.25 INCHES OR GREATER HAS OCCURRED (only applies to inspections conducted for Part 4.1.2.2, 4.1.3, or 4.1.4.2)

Reductions in Inspection Frequency (if applicable)

- For the reduction in inspections resulting from stabilization: SPECIFY (1) LOCATIONS WHERE STABILIZATION STEPS HAVE BEEN COMPLETED AND (2) DATE THAT THEY WERE COMPLETED
  (Note: It is likely that you will not be able to include this in your initial SWPPP. If you qualify for this reduction (see CGP Part 4.1.4.1), you will need to modify your SWPPP to include this information.)

- For the reduction in inspections in arid, semi-arid, or drought-stricken areas: INSERT BEGINNING AND ENDING DATES OF THE SEASONALLY-DEFINED ARID PERIOD FOR YOUR AREA OR THE VALID PERIOD OF DROUGHT

- For reduction in inspections due to frozen conditions: INSERT BEGINNING AND ENDING DATES OF FROZEN CONDITIONS ON YOUR SITE

Inspection Report Forms

See Appendix D

6.2 Corrective Action

Personnel Responsible for Corrective Actions

INSERT NAMES OF PERSONNEL OR TYPES OF PERSONNEL RESPONSIBLE FOR CORRECTIVE ACTIONS

Corrective Action Forms

See Appendix E

6.3 Delegation of Authority

Duly Authorized Representative(s) or Position(s):

Insert Company or Organization Name:
Insert Name:
Insert Position:
Insert Address:
Insert City, State, Zip Code:
Insert Telephone Number:
Insert Fax/Email:

SECTION 7: TRAINING

Table 7-1: Documentation for Completion of Training

Name	Date Training Completed
INSERT NAME OF PERSONNEL HERE	INSERT COMPLETION DATE HERE
INSERT NAME OF PERSONNEL HERE	INSERT COMPLETION DATE HERE
INSERT NAME OF PERSONNEL HERE	INSERT COMPLETION DATE HERE
INSERT NAME OF PERSONNEL HERE	INSERT COMPLETION DATE HERE
INSERT NAME OF PERSONNEL HERE	INSERT COMPLETION DATE HERE
INSERT NAME OF PERSONNEL HERE	INSERT COMPLETION DATE HERE
INSERT NAME OF PERSONNEL HERE	INSERT COMPLETION DATE HERE
INSERT NAME OF PERSONNEL HERE	INSERT COMPLETION DATE HERE
INSERT NAME OF PERSONNEL HERE	INSERT COMPLETION DATE HERE
INSERT NAME OF PERSONNEL HERE	INSERT COMPLETION DATE HERE
INSERT NAME OF PERSONNEL HERE	INSERT COMPLETION DATE HERE
INSERT NAME OF PERSONNEL HERE	INSERT COMPLETION DATE HERE
INSERT NAME OF PERSONNEL HERE	INSERT COMPLETION DATE HERE
INSERT NAME OF PERSONNEL HERE	INSERT COMPLETION DATE HERE

SECTION 8: CERTIFICATION AND NOTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____ Title: _____

Signature: _____ Date: _____

[Repeat as needed for multiple construction operators at the site.]

SWPPP APPENDICES

Attach the following documentation to the SWPPP:

Appendix A – Site Maps

Appendix B – Copy of 2021CGP

Appendix C – NOI and EPA Authorization Email

Appendix D – Inspection Form

(Note: EPA is in the process of developing a sample inspection form for use by CGP permittees. The form will be made available at http://cfpub.epa.gov/npdes/stormwater/cgp.cfm.)

Appendix E – Corrective Action Form

(Note: EPA is in the process of developing a sample corrective action form for use by CGP permittees. The form will be made available at http://cfpub.epa.gov/npdes/stormwater/cgp.cfm.)

Appendix F – SWPPP Amendment Log

Appendix G – Subcontractor Certifications/Agreements

Appendix H – Grading and Stabilization Activities Log

Appendix I – Training Log

Appendix J – Delegation of Authority

Appendix K – Endangered Species Documentation

Appendix L – Historic Preservation Documentation

Appendix A – Site Maps

INSERT SITE MAPS CONSISTENT WITH TEMPLATE SECTION 2.6

Appendix B – Copy of 2021 CGP

Insert copy of 2021 CGP

Appendix C – Copy of NOI and EPA Authorization email

INSERT COPY OF NOI AND EPA'S AUTHORIZATION EMAIL PROVIDING COVERAGE UNDER THE CGP

Appendix D – Copy of Inspection Form

INSERT COPY OF ANY INSPECTION FORMS YOU WILL USE TO PREPARE INSPECTION REPORTS

CHECKLIST FOR INSPECTION OF INFILTRATION BASIN			
Location:			
Inspector:			
Date/Time:			
Weather:			
Date of Last Rainfall:			
Amount of Last Rainfall:			
Inspection Items:	**Satisfactory (S) or Unsatisfactory (U)**		**Comments/ Corrective Actions**
Signs of differential settlement	S	U	
Cracking	S	U	
Erosion	S	U	
Leakage in the embankments	S	U	
Tree growth on the embankments	S	U	
Condition of inlet rip rap	S	U	
Sediment in forebay	S	U	
Damage to forebay outlet	S	U	
Damage to emergency spillway	S	U	
Emergence of invasive species	S	U	
Evidence of standing water 72 hrs after rainfall	S	U	
Corrective Action Needed			**Due Date**
1			
2			
3			
4			
5			

CHECKLIST FOR INSPECTION OF CATCH BASIN			
Location:			
Inspector:			
Date/Time:			
Weather:			
Date of Last Rainfall:			
Amount of Last Rainfall:			
Inspection Items:	**Satisfactory (S) or Unsatisfactory (U)**		**Comments/ Corrective Actions**
Damage to frame/cover	S	U	
Settlement of frame/cover	S	U	
Depth of sediment in basin	S	U	
Condition of water quality hood	S	U	
Condition of inlet from Tree Box Filter	S	U	
Corrective Action Needed			**Due Date**
1			
2			
3			
4			
5			

CHECKLIST FOR INSPECTION OF STORMCEPTOR			
Location:			
Inspector:			
Date/Time:			
Weather:			
Date of Last Rainfall:			
Amount of Last Rainfall:			
Inspection Items:	**Satisfactory (S) or Unsatisfactory (U)**		**Comments/ Corrective Actions**
Damage to frame or cover	S	U	
Settlement of frame/cover	S	U	
Check for presence of oil	S	U	
Depth of sediment in sump	S	U	
Corrective Action Needed			**Due Date**
1			
2			
3			
4			
5			

Note: Inspection and maintenance shall be in accordance with the most recent Stormceptor Inspection and Maintenance information which can be found at https://www.conteches.com/Portals/0/Documents/Maintenance Guides/Stormceptor-STC-Maintenance-Guide.pdf?ver=2020-05-21-114420-030. Inspector shall use that document during the inspection and follow the recomendations therein.

Appendix E – Copy of Corrective Action Form

INSERT COPY OF CORRECTIVE ACTION FORMS YOU WILL USE

Stormwater Construction Site Inspection Report

General Information			
Project Name			
NPDES Tracking No.		**Location**	
Date of Inspection		**Start/End Time**	
Inspector's Name(s)			
Inspector's Title(s)			
Inspector's Contact Information			
Inspector's Qualifications	Insert qualifications or add reference to the SWPPP. (See Section 5 of the SWPPP Template)		
Describe present phase of construction			

Type of Inspection:
❑ Regular ❑ Pre-storm event ❑ During storm event ❑ Post-storm event

Weather Information
Has there been a storm event since the last inspection? ❑Yes ❑No **If yes, provide:** Storm Start Date & Time: Storm Duration (hrs): Approximate Amount of Precipitation (in):
Weather at time of this inspection? ❑ Clear ❑Cloudy ❑ Rain ❑ Sleet ❑ Fog ❑ Snowing ❑ High Winds ❑ Other: Temperature:
Have any discharges occurred since the last inspection? ❑Yes ❑No **If yes, describe:**
Are there any discharges at the time of inspection? ❑Yes ❑No **If yes, describe:**

Site-specific BMPs

- *Number the structural and non-structural BMPs identified in your SWPPP on your site map and list them below (add as many BMPs as necessary). Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.*
- *Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.*

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
1		❑Yes ❑No	❑Yes ❑No	
2		❑Yes ❑No	❑Yes ❑No	
3		❑Yes ❑No	❑Yes ❑No	
4		❑Yes ❑No	❑Yes ❑No	
5		❑Yes ❑No	❑Yes ❑No	
6		❑Yes ❑No	❑Yes ❑No	
7		❑Yes ❑No	❑Yes ❑No	
8		❑Yes ❑No	❑Yes ❑No	
9		❑Yes ❑No	❑Yes ❑No	
10		❑Yes ❑No	❑Yes ❑No	
11		❑Yes ❑No	❑Yes ❑No	

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
12		❑Yes ❑No	❑Yes ❑No	
13		❑Yes ❑No	❑Yes ❑No	
14		❑Yes ❑No	❑Yes ❑No	
15		❑Yes ❑No	❑Yes ❑No	
16		❑Yes ❑No	❑Yes ❑No	
17		❑Yes ❑No	❑Yes ❑No	
18		❑Yes ❑No	❑Yes ❑No	
19		❑Yes ❑No	❑Yes ❑No	
20		❑Yes ❑No	❑Yes ❑No	

Overall Site Issues

Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	❑Yes ❑No	❑Yes ❑No	
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	❑Yes ❑No	❑Yes ❑No	
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	❑Yes ❑No	❑Yes ❑No	
4	Are discharge points and receiving waters free of any sediment deposits?	❑Yes ❑No	❑Yes ❑No	
5	Are storm drain inlets properly protected?	❑Yes ❑No	❑Yes ❑No	
6	Is the construction exit preventing sediment from being tracked into the street?	❑Yes ❑No	❑Yes ❑No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	❑Yes ❑No	❑Yes ❑No	
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	❑Yes ❑No	❑Yes ❑No	

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	❑Yes ❑No	❑Yes ❑No	
10	Are materials that are potential stormwater contaminants stored inside or under cover?	❑Yes ❑No	❑Yes ❑No	
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	❑Yes ❑No	❑Yes ❑No	
12	(Other)	❑Yes ❑No	❑Yes ❑No	

Non-Compliance

Describe any incidents of non-compliance not described above:

CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print name and title: _____

Signature:_____ **Date:**_____

Appendix F –SWPPP Amendment Log

Instructions (see CGP Part 7.4):

- Create a log here of changes and updates to the SWPPP. You may use the table below to track these modifications.
- SWPPP modifications are required pursuant to CGP Part 7.4.1 in the following circumstances:
  - ✓ Whenever new operators become active in construction activities on your site, or you make changes to your construction plans, stormwater control measures, pollution prevention measures, or other activities at your site that are no longer accurately reflected in your SWPPP;
  - ✓ To reflect areas on your site map where operational control has been transferred (and the date of transfer) since initiating permit coverage;
  - ✓ If inspections or investigations determine that SWPPP modifications are necessary for compliance with this permit;
  - ✓ Where EPA determines it is necessary to impose additional requirements on your discharge; and
  - ✓ To reflect any revisions to applicable federal, state, tribal, or local requirements that affect the stormwater control measures implemented at the site.
- If applicable, if a change in chemical treatment systems or chemically-enhanced stormwater control is made, including use of a different treatment chemical, different dosage rate, or different area of application.

No.	Description of the Amendment	Date of Amendment	Amendment Prepared by [Name(s) and Title]

Appendix G – *Sample* Subcontractor Certifications/Agreements

SUBCONTRACTOR CERTIFICATION
STORMWATER POLLUTION PREVENTION PLAN

Project Number: _____

Project Title: _____

Operator(s): _____

As a subcontractor, you are required to comply with the Stormwater Pollution Prevention Plan (SWPPP) for any work that you perform on-site. Any person or group who violates any condition of the SWPPP may be subject to substantial penalties or loss of contract. You are encouraged to advise each of your employees working on this project of the requirements of the SWPPP. A copy of the SWPPP is available for your review at the office trailer.

Each subcontractor engaged in activities at the construction site that could impact stormwater must be identified and sign the following certification statement:

I certify under the penalty of law that I have read and understand the terms and conditions of the SWPPP for the above designated project and agree to follow the practices described in the SWPPP.

This certification is hereby signed in reference to the above named project:

Company: _____

Address: _____

Telephone Number: _____

Type of construction service to be provided: _____

_____

_____

Signature: _____

Title: _____

Date: _____

Appendix H –Grading and Stabilization Activities Log

Date Grading Activity Initiated	**Description of Grading Activity**	**Description of Stabilization Measure and Location**	**Date Grading Activity Ceased** (Indicate Temporary or Permanent)	**Date When Stabilization Measures Initiated**

Appendix I –SWPPP Training Log

Stormwater Pollution Prevention Training Log

Project Name:

Project Location:

Instructor's Name(s):

Instructor's Title(s):

Course Location: _____ Date: _____

Course Length (hours): _____

Stormwater Training Topic: *(check as appropriate)*

- ❑ **Sediment and Erosion Controls**
- ❑ **Emergency Procedures**
- ❑ **Stabilization Controls**
- ❑ **Inspections/Corrective Actions**
- ❑ **Pollution Prevention Measures**

Specific Training Objective:_____

_____

Attendee Roster: *(attach additional pages as necessary)*

No.	Name of Attendee	Company
1		
2		
3		
4		
5		
6		
7		
8		

Appendix J –Delegation of Authority Form

Delegation of Authority

I, _____ (name), hereby designate the person or specifically described position below to be a duly authorized representative for the purpose of overseeing compliance with environmental requirements, including the Construction General Permit, at the _____ construction site. The designee is authorized to sign any reports, stormwater pollution prevention plans and all other documents required by the permit.

_____ (name of person or position)
_____ (company)
_____ (address)
_____ (city, state, zip)
_____ (phone)

By signing this authorization, I confirm that I meet the requirements to make such a designation as set forth in Appendix I of EPA's Construction General Permit (CGP), and that the designee above meets the definition of a "duly authorized representative" as set forth in Appendix I.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name: _____

Company: _____

Title: _____

Signature: _____

Date: _____

Appendix K – Endangered Species Documentation

INSERT DOCUMENTATION CONSISTENT WITH SWPPP TEMPLATE SECTION 3.1

Appendix L – Historic Properties Documentation

INSERT DOCUMENTATION CONSISTENT WITH SWPPP TEMPLATE SECTION 3.2

APPENDIX F: SOILS DATA

Soil Evaluation Forms
NRCS Custom Soil Resource Report

Job No.: 8001.0 | Soil Evaluator: Tracy L. Duarte

Client: Deer Hill Development, LLC | Witness: N/A

Site Location: 204 East Street, Foxborough MA | Excavator: G.B. Sons - Kieth

Land Use: Woodland/Developed Lot | Date: January 16, 2015

Parent Material: Glacial Outwash | Weather: Sunny 26º F

Check One: New: X Repair: ____ Upgrade: ____

Water Resource Conditions: Normal: X Above: ____ Below: ____

TP # D-5 Surface: Wooded

Depth (in.)	Horizon	Texture	Color	Comments	Infiltration Test		Groundwater	
0-2	O			Orgnaics/ Leaf Litter	Depth	60"	Mottling	44"
2-8	A	Sandy Loam	10 YR 3/4	Roots	0-15 Min.	1 3/4"		
8-26	B	Loamy Sand	10 YR 4/6	Roots	15-30 Min.	1 1/4"	Weeping	N/A
26-68	C1	Fine-Medium Loamy Sand	2.5 Y 5/4	10% Gravel, 10% Cobbles, 10% Stones - Very Firm in Place	30-45 Min.	1"		
					45-60 Min.	1"	Standing	N/A
68-102	C2	Coarse Loamy Sand	2.5 Y 5/4	10% Gravel, 10% Cobbles, 10% Stones - Very Firm in Place	60-75 Min.	1"		
					Rate	5"/hour		

TP # D-7 Surface: Lawn Note: Pocket of Fill in Corner

Depth (in.)	Horizon	Texture	Color	Comments	Infiltration Test		Groundwater	
0-8	A	Sandy Loam	10 YR 3/2		Depth	30"	Mottling	N/A
8-24	B	Loamy Sand	10 YR 4/6	30-40% Gravel & Cobbles, Rounded Stones	0-15 Min.	N/A		
					15-30 Min.	N/A	Weeping	N/A
24-76	C1	Sand	2.5 Y 5/3	30-40% Gravel & Cobbles, Rounded Stones	30-45 Min.	N/A		
					45-60 Min.	N/A	Standing	N/A
76-108	C2	Coarse Sand	2.5 Y 5/3	30-40% Gravel & Cobbles, Rounded Stones	Rate	>30"/hour		

TP # D-8 Surface: Lawn

Depth (in.)	Horizon	Texture	Color	Comments	Infiltration Test		Groundwater	
0-12	A	Sandy Loam	10 YR 3/2		Depth	30"	Mottling	N/A
12-27	B	Loamy Sand	10 YR 5/6	30-40% Gravel & Cobbles, Rounded Stones	0-15 Min.	N/A		
					15-30 Min.	N/A	Weeping	N/A
27-70	C1	Sand	2.5 Y 5/4	30-40% Gravel & Cobbles, Rounded Stones	30-45 Min.	N/A		
					45-60 Min.	N/A	Standing	N/A
70-95	C2	Coarse Sand	2.5 Y 5/4	30-40% Gravel & Cobbles, Rounded Stones	Rate	>30"/hour		

No. 23-0182 Date: 1/30/2024

Commonwealth of Massachusetts

Foxborough , Massachusetts

Soil Suitability Assessment for On-Site Sewage Disposal

Performed By: Cameron Gray Date: 1/30/2024

Witnessed By: William Buckley, Jr.

Location Address or Lot #:	Owner's Name, Address, and , Telephone #:
204 East Street Foxborough New Construction: ☑ Repair ☐	Scott & Elaine Barbato 204 East Street Foxborough, MA 02035

Office Review

Published Soil Survey Available: No ☐ Yes ☑

Year Published 1989 Publication Scale 1:25,000 Soil Map Unit Hinckley

Drainage Class A Soil Limitations

Surficial Geology Report Available: No ☑ Yes ☐

Year Published 2015 Publication Scale 1:24,000

Geologic Material (Map Unit) Coarse stratified deposit

Landform Terrace

Flood Insurance Rate Map:

Above 500 year flood boundary No ☐ Yes ☑

Within 500 year flood boundary No ☑ Yes ☐

Within 100 year flood boundary No ☑ Yes ☐

Wetland Area:

National Wetland Inventory Map (map unit)

Wetlands Conservancy Program Map (map unit)

Current Water Resource Conditions (USGS): Month January, 2024

Range: Above Normal ☑ Normal ☐ Below Normal ☐

Other References Reviewed:

Location Address or Lot No. 204 East Street Foxborough

On-site Review

Deep Hole Number: 2024-1 Date: 30 January 2024 Time: 0700 Weather: 25° snow

Location (identify on site plan) within infiltration basin

Land Use vacant Slope (%) 1% Surface Stones none

Vegetation grass

Landform terrace

Position on landscape (sketch on back) _____

Distances from:

Open Water Body	>100'	Drainageway	100'+/-
Possible Wet Area	100'+/-	Property Line	100'+/-
Drinking Water Well	n/a	Other	

DEEP OBSERVATION HOLE LOG*

Depth from Surface (inches)	Soil Horizon	Soil Texture (USDA)	Soil Color (Munsell)	Soil Mottling	Other (Structure, Stones, Boulders, Consistency, % Gravel)
8"	A	SL	10YR3/2		
24"	B	LS	10YR5/6		
168"	C	SAND	2.5Y5/4		gravelly, cobbly, coarse

*MINIMUM OF TWO HOLES REQUIRED AT EVERY DISPOSAL AREA

Parent Material (geologic) Outwash plain Depth to Bedrock: none

Depth to Groundwater Standing Water in Hole: none Weeping from Pit Face: none

Estimated Seasonal High Groundwater: >168"

United States Department of Agriculture

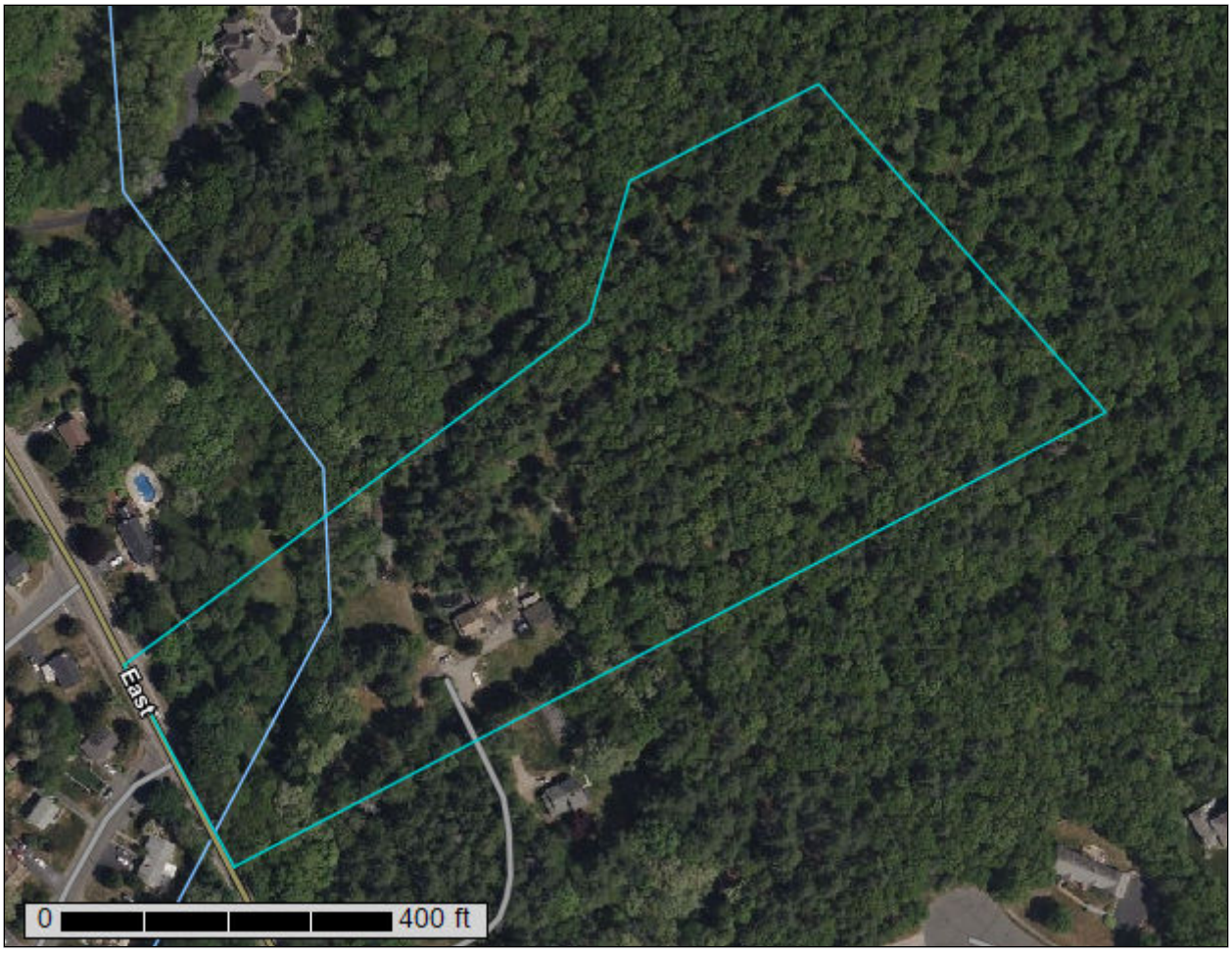
NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for Norfolk and Suffolk Counties, Massachusetts

Pine Estates



January 29, 2024

Preface

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

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

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

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

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

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

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

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

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

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

Soil Map

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

Custom Soil Resource Report
Soil Map

Map Scale: 1:2,430 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

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

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 19, Sep 10, 2023

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
10	Scarboro and Birdsall soils, 0 to 3 percent slopes	1.3	13.2%
245C	Hinckley loamy sand, 8 to 15 percent slopes	0.9	9.0%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	1.7	16.9%
424C	Canton fine sandy loam, 8 to 15 percent slopes, extremely bouldery	6.2	60.9%
Totals for Area of Interest		**10.2**	**100.0%**

Map Unit Descriptions

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

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

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

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

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

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

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

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

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

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

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

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

Norfolk and Suffolk Counties, Massachusetts

10—Scarboro and Birdsall soils, 0 to 3 percent slopes

Map Unit Setting

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

Map Unit Composition

Scarboro and similar soils: 65 percent
Birdsall and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scarboro

Setting

Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loose sandy glaciofluvial deposits

Typical profile

H1 - 0 to 9 inches: mucky fine sandy loam
H2 - 9 to 60 inches: stratified loamy fine sand to gravelly coarse sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

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

Description of Birdsall

Setting

Landform: Terraces
Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Soft coarse-silty glaciolacustrine deposits

Typical profile

H1 - 0 to 8 inches: very fine sandy loam
H2 - 8 to 16 inches: very fine sandy loam
H3 - 16 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Very high (about 12.8 inches)

Interpretive groups

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

Minor Components

Swansea

Percent of map unit: 5 percent
Landform: Bogs
Hydric soil rating: Yes

Raynham

Percent of map unit: 3 percent
Landform: Depressions
Hydric soil rating: Yes

Walpole

Percent of map unit: 2 percent
Landform: Terraces
Hydric soil rating: Yes

245C—Hinckley loamy sand, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2svm9
Elevation: 0 to 1,480 feet

Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Hinckley

Setting

Landform: Outwash deltas, outwash terraces, moraines, eskers, kames, outwash plains, kame terraces
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Crest, head slope, nose slope, side slope, riser
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 8 inches: loamy sand
Bw1 - 8 to 11 inches: gravelly loamy sand
Bw2 - 11 to 16 inches: gravelly loamy sand
BC - 16 to 19 inches: very gravelly loamy sand
C - 19 to 65 inches: very gravelly 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): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.1 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

Windsor

Percent of map unit: 5 percent
Landform: Moraines, eskers, kames, outwash deltas, outwash terraces, outwash plains, kame terraces

Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Crest, head slope, nose slope, side slope, riser
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Sudbury

Percent of map unit: 5 percent
Landform: Outwash deltas, moraines, outwash plains, kame terraces, outwash terraces
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent
Landform: Kames, outwash plains, outwash terraces, moraines, eskers
Landform position (two-dimensional): Shoulder, backslope, footslope, toeslope
Landform position (three-dimensional): Crest, head slope, nose slope, side slope, riser
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

254B—Merrimac fine sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2tyqs
Elevation: 0 to 1,290 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

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

Description of Merrimac

Setting

Landform: Kames, outwash plains, outwash terraces, moraines, eskers
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Crest, side slope, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex

Parent material: Loamy glaciofluvial deposits derived from granite, schist, and gneiss over sandy and gravelly glaciofluvial deposits derived from granite, schist, and gneiss

Typical profile

Ap - 0 to 10 inches: fine sandy loam
Bw1 - 10 to 22 inches: fine sandy loam
Bw2 - 22 to 26 inches: stratified gravel to gravelly loamy sand
2C - 26 to 65 inches: stratified gravel to very gravelly sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Maximum salinity: Nonsaline (0.0 to 1.4 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F145XY008MA - Dry Outwash
Hydric soil rating: No

Minor Components

Sudbury

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

Hinckley

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Crest, side slope, head slope, nose slope, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

Windsor

Percent of map unit: 3 percent
Landform: Outwash terraces, dunes, deltas, outwash plains
Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Agawam

Percent of map unit: 2 percent
Landform: Outwash plains, outwash terraces, moraines, stream terraces, eskers, kames
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

424C—Canton fine sandy loam, 8 to 15 percent slopes, extremely bouldery

Map Unit Setting

National map unit symbol: vkq7
Elevation: 0 to 1,000 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Canton

Setting

Landform: Ice-contact slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over loose sandy and gravelly ablation till

Typical profile

H1 - 0 to 3 inches: fine sandy loam
H2 - 3 to 18 inches: fine sandy loam
H3 - 18 to 60 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent
Surface area covered with cobbles, stones or boulders: 9.0 percent
Depth to restrictive feature: 18 to 36 inches to strongly contrasting textural stratification

Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 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 2.7 inches)

Interpretive groups

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

Minor Components

Montauk

Percent of map unit: 4 percent
Hydric soil rating: No

Charlton

Percent of map unit: 2 percent
Hydric soil rating: No

Chatfield

Percent of map unit: 2 percent
Hydric soil rating: No

Scituate

Percent of map unit: 2 percent
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf